

Milestone Systems

XProtect® VMS 2017 R3

Administrator Manual

XProtect Corporate

XProtect Expert

XProtect Professional+

XProtect Express+

XProtect Essential+

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All names of people and organizations used in the examples in this text are fictitious. Any resemblance to any actual organization or person, living or dead, is purely coincidental and unintended.

This product may make use of third-party software for which specific terms and conditions may apply. When that is the case, you can find more information in the file

3rd_party_software_terms_and_conditions.txt located in your Milestone system installation folder.

Before you start

Introduction to this manual

This manual covers the following products:

- XProtect Corporate
- XProtect Expert
- XProtect Professional+
- XProtect Express+
- XProtect Essential+

The documentation describes all settings and functionality available to you when you use the most feature-rich product, XProtect Corporate.

If you are using one of the other products, you have less functionality available to you. Topics may mention functionality or settings that are only available in a more advanced product. In such cases, notes in the top of the relevant section indicate that you may not have this functionality available to you.

For more information about available functionality in your system, see the product comparison chart (on page 24).

Structure of the help

The help is divided into sections that each serves a targeted purpose. The sections are structured in a logical flow:

Section	Description
System overview (on page 16)	Provides an introduction to your video surveillance system, system components, and concepts. This is useful if you are new to the system. The system overview also provides a comparison chart that lists the most significant differences between the products.
Installation (on page 29)	Provides installation preconditions and step by step procedures that help you install and upgrade your system.
First time use (on page 59)	Provides an overview of the Management Client and information about best practices to follow to have your system running smoothly. This overview is useful if you are new to the system.
Management Client elements (on page 67)	Provides a thorough walk through of each of the nodes in the Site Navigation pane of the Management Client. This section contains conceptual and procedural information about the basic elements of your system.
Feature configuration (on page 262)	Provides self-contained, detailed information about the additional features and add-on products that your system supports.

Section	Description
System maintenance (on page 403)	Provides an overview of the ports used in the system and step-by-step procedures for, for example, backing up your system and monitoring system performance. This section is useful after installation and configuration to maintain, expand and optimize your system.

Navigate the built-in help system

Press F1 to access a related help topic or select **Help > Contents** from the Management Client toolbar to launch the complete help.

You can navigate between the help window's three tabs: **Contents**, **Index**, and **Search** or use the links inside the help topics.

Tab	Description
Contents	Navigate the help system based on a tree structure.
Index	Select the first letter of the term you are interested in and scroll until you find it. Click a help topic title in the search results list to open the required topic.
Search	Search for help topics that contain particular terms of interest. For example, search for the term zoom and receive a list in the search result of all help topics that contains the term zoom . Click a help topic title in the search results list to open the required topic.

To print a help topic, navigate to the required topic and click the browser's **Print** button.

System overview

Product overview

The XProtect VMS products are video management software designed for installations of all shapes and sizes. Whether you want to protect your store from vandalism or you want to manage a multi-site, high security installation, XProtect makes it possible. The solutions offer centralized management of all devices, servers, and users, and provide an extremely flexible rule system driven by schedules and events.

Your system consists of the following main elements:

- The **management server** - the center of your installation, consists of multiple servers.
- One or more **recording servers**.
- One or more **XProtect Management Clients**.
- **XProtect Download Manager**.
- One or more **XProtect® Smart Clients**.
- One or more **XProtect Web Clients** and/or **Milestone Mobile clients** if needed.

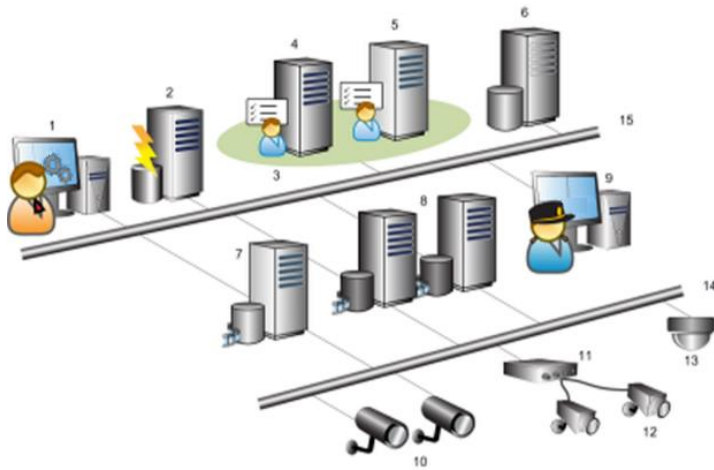
Your system also includes fully integrated Matrix functionality for distributed viewing of video from any camera on your surveillance system to any computer with XProtect Smart Client installed.

You can install your system on virtualized servers or on multiple physical servers in a distributed setup.

The system also offers the possibility of including the standalone XProtect® Smart Client – Player when you export video evidence from the XProtect Smart Client. XProtect Smart Client – Player allows recipients of video evidence (such as police officers, internal or external investigators and more) to browse and play back the exported recordings without having to install any software on their computers.

With the most feature-rich products installed (see "Product comparison chart" on page 24), your system can handle an unrestricted number of cameras, servers, and users and across multiple sites if required. Your system can handle IPv4 as well as IPv6.

A distributed system setup



Example of a system setup. The number of cameras, recording servers, and connected clients, can be as high as you require.

Legend:

1. Management Client(s)
2. Event server
3. Microsoft cluster
4. Management server
5. Failover management server
6. SQL server
7. Failover recording server
8. Recording server(s)
9. XProtect Smart Client(s)
10. IP video cameras
11. Video server
12. Analog cameras
13. PTZ IP camera
14. Camera network
15. Server network

System components

Management server

The management server is the central component of the VMS system. It stores the configuration of the surveillance system in a relational database, either on the management server computer itself or on a separate SQL server on the network. It also handles user authentication, user rights, the rule system and more. To improve system performance, you can run several management servers as a Milestone Federated Architecture™. The management server runs as a service, and is typically installed on a dedicated server.

Users connect to the management server for initial authentication, then transparently to the recording servers for access to for video recordings, etc.

Failover management server

Failover support on the management server is achieved by installing the management server in a Microsoft Windows Cluster. The cluster will then ensure that another server take over the management server function should the first server fail.

Recording server

The recording server is responsible for communicating with the network cameras and video encoders, recording the retrieved audio and video as well as providing client access to both live and recorded audio and video. The recording server is also responsible for communicating with other Milestone products connected via the Milestone Interconnect technology.

Device Drivers

- Communication with the network cameras and video encoders are done through a device driver developed specifically for individual devices or a series of similar devices from the same manufacture.
- The device drivers are by default installed when the recording server is installed, but can later be updated by downloading and installing a newer version of the device pack.

Media Database

- The retrieved audio and video data is stored in the tailor-made high performance media database optimized for recording and storing audio and video data.
- The media database supports various unique features like; multistage archiving, video grooming, encryption, and adding a digital signature to the recordings.

Failover recording server

The failover recording server is responsible for taking over the recording task if a recording server fails.

The failover recording server can operate in two modes:

- Cold standby – for monitoring multiple recording servers
- Hot standby – for monitoring a single recording server

The difference between the cold and hot standby modes is that in the cold standby mode, the failover recording server does not know which server to take over from, so it cannot start until a recording server fails. In the hot standby mode, the failover time is significantly shorter, as the failover recording server already knows which recording server it should take over from and can preload the configuration and start up completely - except for the last step of connecting to the cameras.

Mobile server

The Mobile server is responsible for giving Milestone Mobile client and XProtect Web Client users access to the system.

In addition to acting as a system gateway for the two clients, the Mobile server can transcode video, since the original camera video stream in many cases are too large to fit the bandwidth available for the client users.

If you are performing a **Distributed** or **Custom** installation, Milestone recommends that you install the Mobile server on a dedicated server.

Event server

The event server handles various tasks related to events, alarms, maps and 3rd party integrations via the MIP Software Development Kit (SDK).

Events:

- All system events are consolidated in the event server so there are one place and interface for partners to make integrations that utilize system events.
- Furthermore, the event server offers 3rd party access to sending events to the system via the Generic events or Analytics events interface.

Alarms:

- The event server hosts the alarm feature, alarm logic, alarm state as well as handling the alarm database. The alarm database is stored in the same SQL server the management server uses.

Maps:

- The event server also hosts the maps that are configured and used in XProtect Smart Client.

MIP SDK:

- Finally, third-party-developed plug-ins can be installed on the event server and utilize access to system events.

Log server

The log server is responsible for storing all log messages for the entire system. The log server uses the same SQL server as the management server and is typically installed on the same server as the management server, but can be installed on a separate server if needed to increase performance of the management and log servers.

SQL server

The management server, event server and log server uses a SQL server to store, for example, the configuration, alarms, events and log messages.

The system installer includes Microsoft SQL Server Express that can be used freely for systems up to 300 cameras.

For larger systems over 300 cameras it is recommended to use the SQL Server 2008 R2 Standard or Enterprise edition on a dedicated server as these editions can handle larger databases and offer backup functionality.

Active Directory

Active Directory is a distributed directory service implemented by Microsoft for Windows domain networks. It is included in most Windows Server operating systems. It identifies resources on a network in order for users or applications to access them.

With the Active Directory installed, you can add Windows users from Active Directory, but you also have the option of adding basic users without Active Directory. Note that there are certain system limitations related to basic users.

Virtual servers

You can run all system components on virtualized Windows® servers, such as VMware® and Microsoft® Hyper-V®.

Virtualization is often preferred to better utilize hardware resources. Normally, virtual servers running on the hardware host server do not load the virtual server to a great extent, and often not at the same time. However, recording servers record all cameras and video streams. This puts high load on CPU, memory, network, and storage system. So, when run on a virtual server, the normal gain of virtualization disappears to a large extent, since - in many cases - it uses all available resources.

If run in a virtual environment, it is important that the hardware host has the same amount of physical memory as allocated for the virtual servers and that the virtual server running the recording server is allocated enough CPU and memory - which it is not by default. Typically, the recording server needs 2-4 GB depending on configuration. Another bottleneck is network adapter allocation and hard disk performance. Consider allocating a physical network adapter on the host server of the virtual server running the recording server. This makes it easier to ensure that the network adapter is not overloaded with traffic to other virtual servers. If the network adapter is used for several virtual servers, the network traffic might result in the recording server not retrieving and recording the configured number of images.

Clients

Management Client (explained)

Feature-rich administration client for configuration and day-to-day management of the system. Available in several languages.

Typically installed on the surveillance system administrator's workstation or similar.

For a detailed overview of the Management Client, see Management Client overview (on page 61).

XProtect Smart Client (explained)

Designed for Milestone XProtect® IP video management software, the XProtect Smart Client is an easy-to-use client application that provides intuitive control over security installations. Manage security installations with XProtect Smart Client which gives users access to live and recorded video, instant control of cameras and connected security devices, and an overview of recordings. Available in multiple local languages, XProtect Smart Client has an adaptable user interface that can be optimized for individual operators' tasks and adjusted according to specific skills and authority levels.



The interface allows you to tailor your viewing experience to specific working environments by selecting a light or dark theme, depending on room lighting or brightness of the video. It also features work-optimized tabs and an integrated video timeline for easy surveillance operation. Using the MIP SDK, users can integrate various types of security and business systems and video analytics applications, which you manage through XProtect Smart Client.

XProtect Smart Client must be installed on users' computers. Surveillance system administrators manage clients' access to the surveillance system through the Management Client. Recordings viewed by clients are provided by your XProtect system's Image Server service. The service runs in the background on the surveillance system server. Separate hardware is not required.

To download XProtect Smart Client, you must connect to the surveillance system server which presents you with a welcome page that lists available clients and language versions. System administrators can use XProtect Download Manager to control what clients and language versions should be available to users on the welcome page of the XProtect Download Manager.

Milestone Mobile client (explained)

Milestone Mobile client is a mobile surveillance solution closely integrated with the rest of your XProtect system. It runs on your Android tablet or smartphone, your Apple® tablet, smartphone or portable music player or your Windows Phone 8 tablet or smartphone and gives you access to cameras, views and other functionality set up in the management clients.

Use the Milestone Mobile client to view and play back live and recorded video from one or multiple cameras, control pan-tilt-zoom (PTZ) cameras, trigger output and events and use the Video push functionality to send video from your device to your XProtect system.

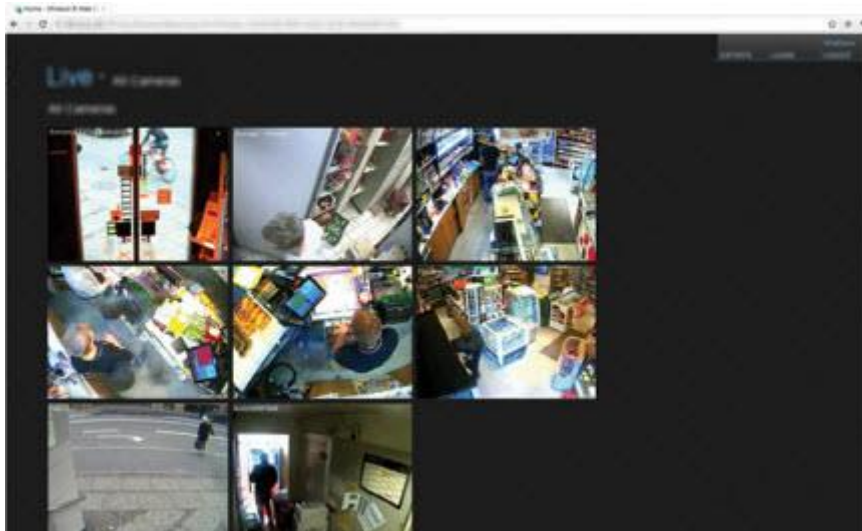


If you want to use Milestone Mobile client with your system, you must have a Mobile server to establish the connection between the Milestone Mobile client and your system. Once the Mobile server is set up, download the Milestone Mobile client for free from Google Play, App Store or Windows Phone Store to start using Milestone Mobile.

You need one hardware device license per device that should be able to push video to your XProtect system.

XProtect Web Client (explained)

XProtect Web Client is a web-based client application for viewing, playing back and sharing video. It provides instant access to the most commonly used surveillance functions, such as viewing live video, play back recorded video, print and export evidence. Access to features depends on individual user rights which are set up in the management client.



To enable access to the XProtect Web Client, you must have a Mobile server to establish the connection between the XProtect Web Client and your system. The XProtect Web Client itself does not require any installation itself and works with most Internet browsers. Once you have set up the Mobile server, you can monitor your XProtect system anywhere from any computer or tablet with Internet access (provided you know the right external/Internet address, user name and password).

Licenses (explained)

If you have installed your XProtect Essential+ system, you can run the system and eight hardware device licenses for free. Automatic license activation is enabled and hardware will be activated as you add it to the system.

Only when you upgrade (see "Change Software License Code" on page 48) to a more advanced XProtect product, the rest of this topic and the other licensing related topics in this documentation is relevant.

When you purchase your software and licenses, you receive:

- An order confirmation.
- A software license file named after your SLC (Software License Code) and with the .lic extension.

Your SLC is also printed on your order confirmation and consists of several numbers and letters grouped by hyphens like:

- Product version 2014 or earlier: xxx-xxxx-xxxx
- Product version 2016 or later: xxx-xxx-xxx-xx-xxxxxx

The software license file contains all information about your purchased VMS products and licenses. Milestone recommends that you store the information about your SLC and a copy of your software license file in a safe place from which you can find them again. In the navigation tree, you can also see your SLC if you select **Basics > License Information**. You may need the software license file or your SLC when you, for example create a My Milestone user account, contact your reseller for support and if you need to make changes to your system.

To get started, you download the software from our website (<http://www.milestonesys.com/downloads>). While you are installing (see "Installation" on page 29) the software, you are asked to provide the software license file.

Once the installation is complete and you have activated your licenses, you can see an overview of your licenses (see "License information" on page 67) for all installations on the same SLC on the **Basics > License Information** page.

You have purchased at least two types of licenses:

Base licenses: As a minimum, you have a base license for one of the XProtect products. You may also have one or more base licenses for XProtect add-on products.

Hardware device licenses: Every hardware device that you add to your XProtect system requires a hardware device license. You do not need additional hardware device licenses for speakers, microphones or input and output devices attached to your cameras. You need only one hardware device license per video encoder IP address even if you connect several cameras to the video encoder. A video encoder can have one or more IP addresses.

For more information, see the list of supported hardware on the Milestone website (<https://www.milestonesys.com/supported-hardware>). If you want to use the video push feature in Milestone Mobile, you also need one hardware device license per mobile device or tablet that should be able to push video to your system. If you are short of hardware device licenses, you can disable (see "Disable/enable hardware" on page 102) less important hardware devices to allow new hardware devices to run instead.

If your surveillance system is the central site of a larger system hierarchy using Milestone Interconnect, you need Milestone Interconnect camera licenses to be able to view video from hardware devices on remote sites. Note that only XProtect Corporate can act as a central site.

Most XProtect add-on products require additional license types. The software license file also includes information about your licenses for add-on products. Some add-on products have their own separate software license files. You can find more information about add-on product licenses here:

- XProtect Access (see "XProtect Access licenses" on page 298)
- XProtect LPR (see "XProtect LPR licenses" on page 306)
- XProtect Transact (see "Getting started" on page 341)
- XProtect Smart Wall (see "XProtect Smart Wall licenses" on page 291) (included in XProtect Corporate)
- For add-on product licenses for XProtect Retail and XProtect Screen Recorder, see the documentation for these products.

Product comparison chart

XProtect VMS includes the following products:

- XProtect Corporate
- XProtect Expert
- XProtect Professional+
- XProtect Express+
- XProtect Essential+

The complete feature list is available on the product overview page on the Milestone website (<https://www.milestonesys.com/solutions/platform/product-index/>).

Below is a list of the main differences between the products:

Name	XProtect Essential+	XProtect Express+	XProtect Professional+	XProtect Expert	XProtect Corporate
Sites per SLC	1	1	Multi-site	Multi-site	Multi-site
Recording servers per SLC	1	1	Unrestricted	Unrestricted	Unrestricted
Hardware devices per recording server	8	48	Unrestricted	Unrestricted	Unrestricted
Milestone Interconnect™	-	Remote site	Remote site	Remote site	Central/remote site
Milestone Federated Architecture™	-	-	-	Remote site	Central/remote site
Recording server failover	-	-	-	Cold and hot standby	Cold and hot standby

Name	XProtect Essential+	XProtect Express+	XProtect Professional+	XProtect Expert	XProtect Corporate
Remote connect services	-	-	-	-	✓
Edge storage support	-	-	✓	✓	✓
Migrating e-code servers	✓	✓	✓	✓	✓
Multi-stage video storage	Live databases + 1 archive	Live databases + 1 archive	Live databases + 1 archive	Live databases + unrestricted archives	Live databases + unrestricted archives
SNMP notification	-	-	-	✓	✓
Time controlled user access rights	-	-	-	-	✓
Reduce frame rate (grooming)	-	-	-	✓	✓
Video data encryption (recording server)	-	-	-	✓	✓
Database signing (recording server)	-	-	-	✓	✓
PTZ priority levels	1	1	3	32000	32000
Extended PTZ (Reserve PTZ session and patrolling from XProtect Smart Client)	-	-	-	✓	✓
Evidence lock	-	-	-	-	✓
Bookmark function	-	-	Manual only	Manual and rule-based	Manual and rule-based
Live multi-streaming/multicasting	-	-	-	✓	✓
Overall security	Client user rights	Client user rights	Client user rights	Client user rights	Client user rights/ administrator user rights
XProtect Management Client profiles	-	-	-	-	✓
XProtect Smart Client profiles	-	-	3	3	Unrestricted
XProtect Smart Wall	-	-	-	optional	✓

Name	XProtect Essential+	XProtect Express+	XProtect Professional+	XProtect Expert	XProtect Corporate
System Monitor	-	-	-	✓	✓
Smart Map	-	-	-	✓	✓
Two-step verification	-	-	-	-	✓
DLNA support	-	✓	✓	✓	✓

IPv6 and IPv4 (explained)

Your system supports IPv6 as well as IPv4. So does XProtect Smart Client.

IPv6 is the latest version of the Internet Protocol (IP). The Internet protocol determines the format and use of IP addresses. IPv6 coexists with the still much more widely used IP version IPv4. IPv6 was developed in order to solve the address exhaustion of IPv4. IPv6 addresses are 128-bit long, whereas IPv4 addresses are only 32-bit long.

It meant that the Internet's address book grew from 4.3 billion unique addresses to 340 undecillion (340 trillion trillion trillion) addresses. A growth factor of 79 octillion (billion billion billion).

More and more organizations are implementing IPv6 on their networks. For example, all US federal agency infrastructures are required to be IPv6 compliant. Examples and illustrations in this manual reflect use of IPv4 because this is still the most widely used IP version. IPv6 works equally well with the system.

Using the system with IPv6 (explained)

The following conditions apply when using the system with IPv6:

Servers

Servers can often use IPv4 as well as IPv6. However, if just one server in your system (for example, a management server or recording server) requires a particular IP version, all other servers in your system must communicate using the same IP version.

Example: All of the servers in your system except one can use IPv4 as well as IPv6. The exception is a server which is only capable of using IPv6. This means that all servers must communicate with each other using IPv6.

Devices

You can use devices (cameras, inputs, outputs, microphones, speakers) with a different IP version than that being used for server communication provided your network equipment and the recording servers also support the devices' IP version. See also the illustration below.

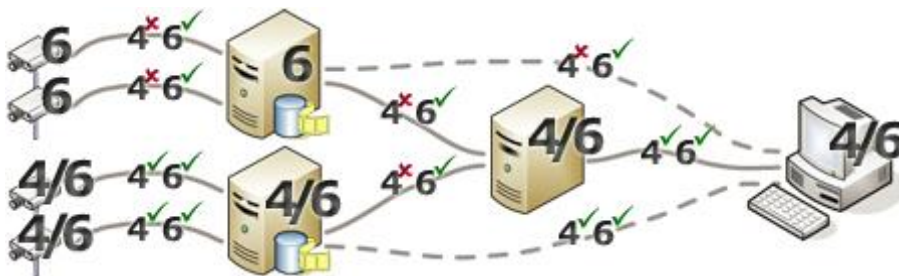
Clients

If your system uses IPv6, users should connect with the XProtect Smart Client. The XProtect Smart Client supports IPv6 as well as IPv4.

If one or more servers in your system can **only** use IPv6, XProtect Smart Client users **must** use IPv6 for their communication with those servers. In this context, it is important to remember that XProtect Smart Clients technically connect to a management server for initial authentication, and then to the required recording servers for access to recordings.

However, the XProtect Smart Client users do not have to be on an IPv6 network themselves, provided your network equipment supports communication between different IP versions, and they have installed the IPv6 protocol on their computers. See also illustration. To install IPv6 on a client computer, open a command prompt, type *Ipv6 install*, and press **ENTER**.

Example illustration



Example: Since one server in the system can only use IPv6, all communication with that server must use IPv6. However, that server also determines the IP version for communication between all other servers in the system.

No Matrix Monitor compatibility

If using IPv6, you cannot use the Matrix Monitor application with your system. Matrix functionality in XProtect Smart Client is not affected.

Writing IPv6 addresses (explained)

An IPv6 address is usually written as eight blocks of four hexadecimal digits, with each block separated by a colon.

Example: *2001:0B80:0000:0000:0000:0F80:3FA8:18AB*

You may shorten addresses by eliminating leading zeros in a block. Also, note that some of the four-digit blocks may consist of zeros only. If any number of such 0000 blocks are consecutive, you may shorten addresses by replacing the 0000 blocks with two colons as long as there is only one such double colon in the address.

Example:

2001:0B80:0000:0000:0000:0F80:3FA8:18AB can be shortened to

2001:B80:0000:0000:0000:F80:3FA8:18AB if removing the leading zeros, or to

2001:0B80::0F80:3FA8:18AB if removing the 0000 blocks, or even to

2001:B80::F80:3FA8:18AB if removing the leading zeros as well as the 0000 blocks.

Using IPv6 Addresses in URLs

IPv6 addresses contain colons. Colons, however, are also used in other types of network addressing syntax. For example, IPv4 uses a colon to separate IP address and port number when both are used in a URL. IPv6 has inherited this principle. Therefore, to avoid confusion, square brackets are put around IPv6 addresses when they are used in URLs.

Example of a URL with an IPv6 address:

`http://[2001:0B80:0000:0000:0000:0F80:3FA8:18AB]`, which may of course be shortened to, for example, `http://[2001:B80::F80:3FA8:18AB]`

Example of a URL with an IPv6 address and a port number:

`http://[2001:0B80:0000:0000:0000:0F80:3FA8:18AB]:1234`, which may of course be shortened to, for example, `http://[2001:B80::F80:3FA8:18AB]:1234`

For more information about IPv6, see, for example, the IANA website (<http://www.iana.org/numbers/>). IANA, the Internet Assigned Numbers Authority, is the organization responsible for the global coordination of IP addressing.

System requirements

Important: Your system no longer supports Microsoft® Windows® 2008, but you can still run or access clients from computers with Windows 2008.

Important: Your system no longer supports Microsoft® Windows® 32-bit OS, but you can still run or access XProtect Web Client and XProtect Smart Client from computers with Windows 32-bit OS.

For information about the **minimum** system requirements to the various components of your system, go to the Milestone website (<http://www.milestonesys.com/SystemRequirements>).

Installation

If you upgrade from a previous XProtect version, see Upgrade (explained) (on page 56).

Before you start installation

Milestone recommends that you go through the requirements described in the next sections, before you start the actual installation.

Prepare your servers and network

Operating system

Make sure that all servers have a clean installation of a Microsoft Windows operating system, and that it is updated with all the latest Windows updates.

For information about the **minimum** system requirements to the various components of your system, go to the Milestone website (<http://www.milestonesys.com/SystemRequirements>).

Microsoft® .NET framework

Check that all servers have Microsoft .NET 4.5.1 framework or higher installed.

Check that the server targeted for the management server installation has Microsoft .NET 3.5 SP1 framework installed. This is a requirement for the SQL server.

Network

Assign static IP addresses or make DHCP reservations to all system components and cameras. To make sure that sufficient bandwidth is available on your network, you must understand how and when the system consumes bandwidth. The main load on your network consists of three elements:

- Camera video streams
- Clients displaying video
- Archiving of recorded video

The recording server retrieves video streams from the cameras, which results in a constant load on the network. Clients that display video consume network bandwidth. If there are no changes in the content of the client views, the load is constant. Changes in view content, video search, or playback, make the load dynamic.

Archiving of recorded video is an optional feature that lets the system move recordings to a network storage if there is not enough space in the internal storage system of the computer. This is a scheduled job that you have to define. Typically, you archive to a network drive which makes it a scheduled dynamic load on the network.

Your network must have bandwidth headroom to cope with these peaks in the traffic. This enhances the system responsiveness and general user experience.

Prepare Active Directory

If you want to add users to your system through the Active Directory service, you must have a server with Active Directory installed and acting as domain controller available on your network.

For easy user and group management, Milestone recommends that you have Microsoft Active Directory® installed and configured before you install your XProtect system. If you add the management server to the Active Directory after installing your system, you must reinstall the management server, and replace users with new Windows users defined in the Active Directory.

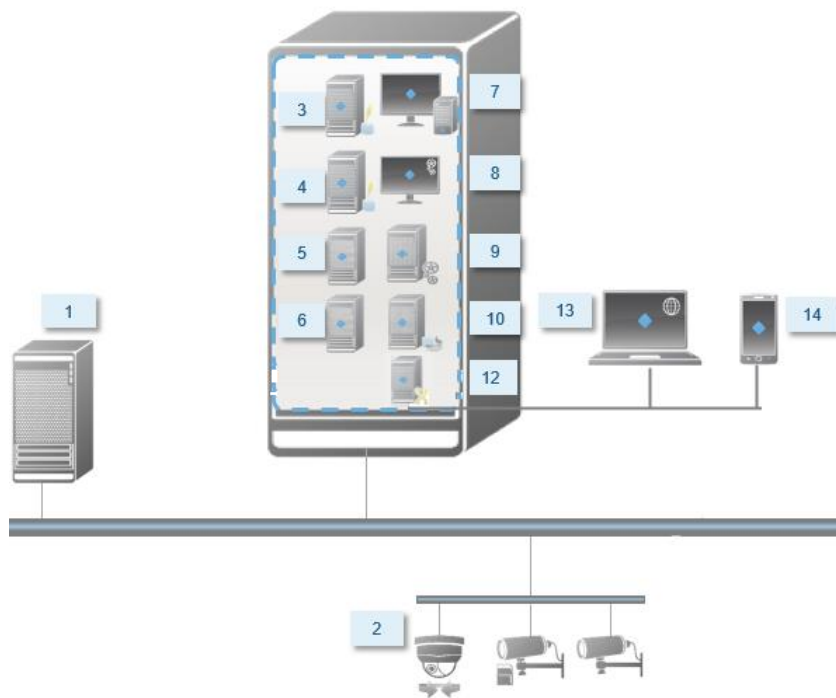
Basic users are not supported in Milestone Federated Architecture systems, so if you plan to use Milestone Federated Architecture, you must add users as Windows users through the Active Directory service. If you do not install Active Directory, follow the steps in Installation for workgroups (on page 45) when you install.

Installation method

As part of the installation wizard, you must decide which installation method to use. You should base your selection on your organization's needs, but it is very likely that you already decided on the method when you purchased the system.

Options	Description
Single Computer	<p>Installs all management server components, recording server, Milestone Mobile server, and XProtect Smart Client, as well as the SQL server on the current computer.</p> <p>The single computer installation installs and configures your system. The recording server is authorized, so you are ready to use the system directly after installation.</p> <p>Depending on your hardware and configuration, the recording server scans your network for hardware, adding up to 64 pieces of hardware automatically, which are then added to your system. Cameras are preconfigured in views, and a default Operator role is created. After installation, open XProtect Smart Client and you are ready to use the system.</p>
Distributed	<p>Installs only the management server components on the current computer. This means that the recording server and XProtect Smart Client are not visible in the component list. You cannot edit anything in the component list.</p> <p>You must install the recording server, Milestone Mobile server, and XProtect Smart Client on other computers afterwards.</p>
Custom	<p>The management server is always selected in the system component list and is always installed, but you can select freely what to install on the current computer, such as the other management server components, the recording server and XProtect Smart Client.</p> <p>By default, the recording server is cleared in the component list, but you can change this. Depending on your selections, you must install the cleared components on other computers afterwards.</p>

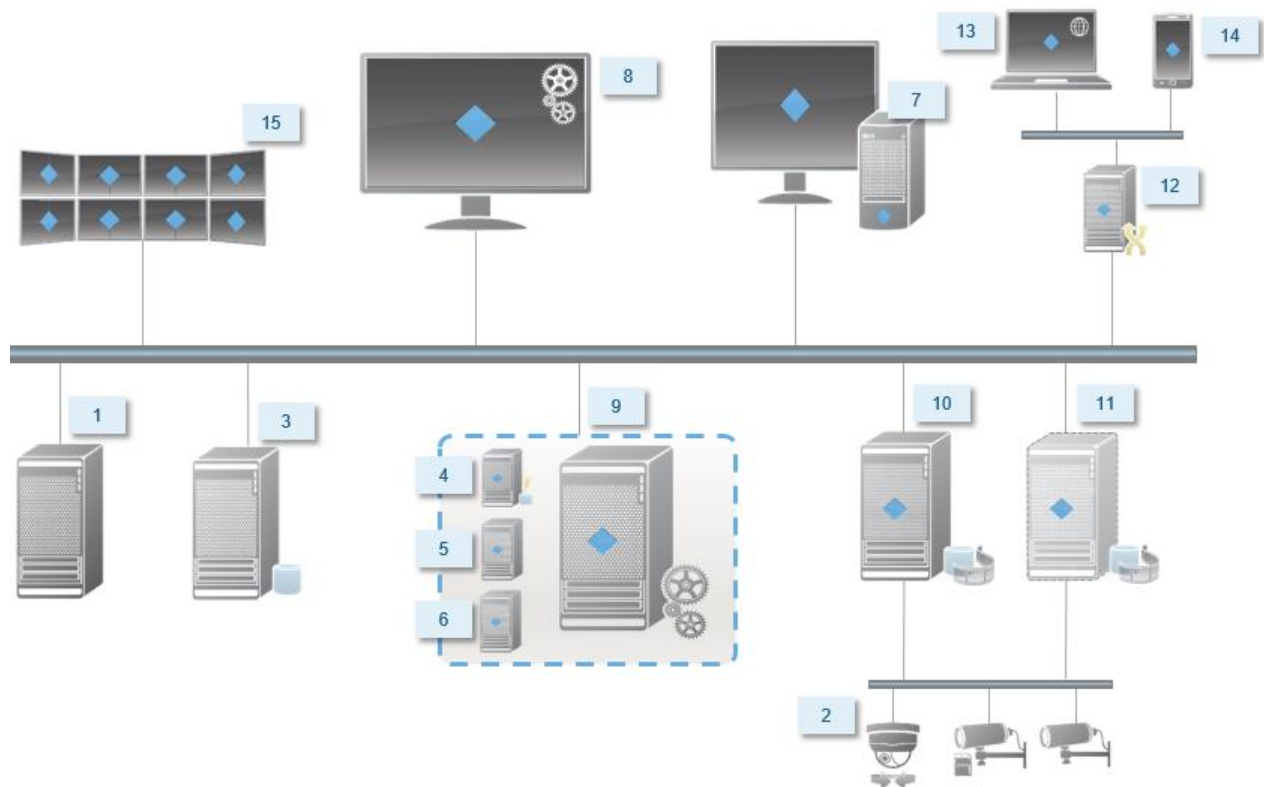
Single Computer installation



Typical system components in a system:

1. **Active Directory**
2. **Devices**
3. **SQL server**
4. **Event server**
5. **Log server**
6. **Service channel**
7. **XProtect Smart Client**
8. **Management Client**
9. **Management server**
10. **Recording server**
11. **Failover recording server**
12. **Milestone Mobile server**
13. **XProtect Web Client**
14. **Milestone Mobile client**
15. **XProtect Smart Client with XProtect Smart Wall**

Distributed installation



Determine SQL server type

The Microsoft SQL Server Express Edition is a "lightweight" version of a full SQL server. It is easy to install and prepare for use, and is often a good choice for systems with less than 300 cameras. This version of the SQL Server is included in the **Single Computer** installation.

For large installations with more than 300 cameras, Milestone recommends that you use a dedicated existing SQL server on a dedicated computer on the network. You must have administrator rights on the SQL server.

Milestone recommends that you install the database on a dedicated hard disk drive that is not used for other purposes. Installing the database on its own drive improves the entire system performance.

When you select **Distributed** or **Custom** as part of the installation wizard, you must decide what to do regarding the SQL server.

If you do not have a SQL server installed, the options are:

- **Install SQL Server Express on this computer.**
- **Use an existing SQL Server on the network:** If your system uses a dedicated computer for the SQL database, the list of SQL servers that your account can access appears.

If you have a SQL server installed, the options are:

- **Use the installed Microsoft SQL Server Express database on this computer.**
- **Use an existing SQL Server on the network:** When you use a dedicated computer for the SQL database on the network, the list of SQL servers that your account can access appears.

You are also asked whether you want to create a new database, use an existing database, or overwrite an existing database.

- **Create new database:** For a new installation.
- **Use existing database:** If you are installing the database as part of an upgrade of the system, and you want to use your existing database.

Select service account

As part of the installation, you are asked to specify an account to run the Milestone services on this computer. The services always run on this account no matter which user is logged in. Make sure that the account has all necessary user rights, for example, the proper rights to perform tasks, proper network and file access, and access to network shared folders.

You can select either a predefined account, or a user account. Base your decision on the environment that you want to install your system in:

Domain environment

In a domain environment:

- Milestone recommends that you use the built-in Network Service account. It is easier to use even if you need to expand the system to multiple computers.
- You can also use domain user accounts, but they are potentially more difficult to configure.

Workgroup environment

In a workgroup environment, Milestone recommends that you use a local user account that has all necessary rights. This is often the administrator account.

Important: If you have installed your system components on multiple computers, the selected user account must be configured on all computers in your installations with identical user name, password, and access rights.

Kerberos authentication (explained)

Kerberos is a ticket-based network authentication protocol. It is designed to provide strong authentication for client/server or server/server applications.

Use Kerberos authentication as an alternative to the older Microsoft NT LAN (NTLM) authentication protocol.

Kerberos authentication requires mutual authentication, where the client authenticates to the service and the service authenticates to the client. This way you can authenticate more securely from XProtect clients to XProtect servers without exposing your password.

To make mutual authentication possible in your XProtect VMS you must register Service Principal Names (SPN) in the active directory. An SPN is an alias that uniquely identifies an entity such as a XProtect server service. Every service that uses mutual authentication must have an SPN registered so that clients can identify the service on the network. Without correctly registered SPNs, mutual authentication is not possible.

The table below lists the different Milestone services with corresponding port numbers you need to register:

Service	Port number
Management server - IIS	80 - Configurable
Management server - Internal	8080
Recording server - Data Collector	7609
Failover Server	8990
Event Server	22331
LPR Server	22334

The number of services you need to register in the active directory depends on your current installation. Data Collector is installed automatically when installing Management Server, Recording Server, Event Server, LPR Server or Failover Server.

You must register two SPNs for the user running the service: one with the hostname and one with the fully qualified domain name.

If you are running the service under a network user service account, you must register the two SPNs for each computer running this service.

This is the Milestone SPN naming scheme:

VideoOS/[DNS Host Name]:[Port]

VideoOS/[Fully qualified domain name]:[Port]

The following is an example of SPNs for the recording server service running on a computer with the following details:

Hostname: Record-Server1

Domain: Surveillance.com

SPNs to register:

VideoOS/Record-Server1:7609

VideoOS/Record-Server1.Surveillance.com:7609

Virus scanning (explained)

As is the case with any other database software, if an antivirus program is installed on a computer running XProtect software, it is important that you exclude specific file types and folders, as well as certain network traffic. Without implementing these exceptions, virus scanning uses a considerable amount of system resources. On top of that, the scanning process can temporarily lock files, which could result in a disruption in the recording process or even corruption of databases.

When you need to perform virus scanning, do not scan Recording Server folders that contain recording databases (by default C:\mediadatabase\, as well as all subfolders). Also, avoid performing virus scanning on archive storage directories.

Create the following additional exclusions:

- File types: .blk, .idx, .pic
- Folders and subfolders:
 - C:\Program Files\Milestone or C:\Program Files (x86)\Milestone
 - C:\ProgramData\Milestone\MIPSDK

- C:\ProgramData\Milestone\Milestone Mobile Server\Logs
- C:\ProgramData\Milestone\XProtect Data Collector Server\Logs
- C:\ProgramData\Milestone\XProtect Event Server\logs
- C:\ProgramData\Milestone\XProtect Log Server
- C:\ProgramData\Milestone\XProtect Management Server\Logs
- C:\ProgramData\Milestone\XProtect Recording Server\Logs
- C:\ProgramData\Milestone\XProtect Report Web Server\Logs
- C:\ProgramData\Milestone\XProtect Service Channel\Logs
- Exclude network scanning on the following TCP ports:

Product	TCP ports
XProtect VMS	80, 8080, 7563, 25, 21, 9993
Milestone Mobile	8081

or

- Exclude network scanning of the following processes:

Product	Processes
XProtect VMS	VideoOS.Recording.Service.exe, VideoOS.Server.Service.exe, VideoOS.Administration.exe
Milestone Mobile	VideoOS.MobileServer.Service.exe

Your organization may have strict guidelines regarding virus scanning, but it is important that you exclude the above folders and files from virus scanning.

Register Software License Code

Before you install, you must have the name and location of the software license file that you received from Milestone.

You can install a free version of XProtect Essential+. This version provides you with a limited functionality and limited number of cameras compared to a purchased XProtect VMS system. In this case, the license is provided with the installer.

The Software License Code (SLC) is printed on your order confirmation and the software license file is named after your SLC. Milestone recommends that you register your SLC on our website (<http://online.milestonesys.com>) before installation. Your reseller may have done that for you.

Requirements for offline installation

If you install the system on a server that is offline, you need the following:

- The Milestone XProtect VMS Products 2017 R3 System Installer.exe file.
- The software license file (SLC) for your XProtect system.
- OS installation media including the required .NET version (<http://www.milestonesys.com/SystemRequirements>).

Install the system

Select one of the installation options:

- Install your system - XProtect Essential+ (on page 36)
- Install your system - Single Computer option (on page 37)
- Install your system - Distributed option (on page 39)
- Install your system - Custom option (on page 40)

Install your system - XProtect Essential+

You can install a free version of XProtect Essential+. This version provides you with limited capabilities of the XProtect VMS for a limited number of cameras. You must have Internet connection to install XProtect Essential+.

This version is installed on a single computer, using the **Single Computer** installation option. The **Single Computer** option installs all server and client components on the current computer. The recording server is authorized, so you are ready to use the system directly after installation.

Depending on your hardware and configuration, the recording server scans your network for hardware, and adds them to your system. Cameras are preconfigured in views, and a default Operator role is created. After installation, XProtect Smart Client opens and you are ready to use the system.

Microsoft® IIS is automatically installed during the process. Afterwards, you may be prompted to restart your computer. Do so and after restart, depending on your security settings, one or more Windows security warnings may appear. Accept these and the installation completes.

Note: If you upgrade from a previous version of the product, the system does not scan for cameras, or create new views and operator roles.

1. Download the software from the Internet (<http://www.milestonesys.com/downloads>) and run the Milestone XProtect VMS Products 2017 R3 System Installer.exe file from the location where you saved it.
2. The installation files unpack. Depending on your security settings, one or more Windows® security warnings appear. Accept these and the unpacking continues.
3. When done, the **Milestone XProtect VMS** dialog box appears,
 - a) Select the **Language** to use during the installation (this is **not** the language your system uses once installed, this is selected later). Click **Continue**.
 - b) Read the *Milestone End-user License Agreement*. Select the **I accept the terms in the license agreement** check box and click **Continue**.

- c) Click **Download free XProtect Essential+ license**.

The free license is downloaded and appears in the license file field. Click **Continue**.

4. Select **Single Computer**.

A list of components to install appears (you cannot edit this list). Click **Continue**.

5. In the **Specify recording server settings** window, do the following:

- a) In the **Recording server name** field, enter the name of the recording server. The default is the name of the computer.
- b) The **Management server address** field shows the address and port number of the management server: localhost:80.
- c) In the **Media database** field, select the location where you want to save your video recording. It is recommended that you save your video recordings in a separate location from where you install the program. The default location is c:\MediaDatabase.
- d) In **Retention time for video recordings**, define how long you want to save the video recordings. You can select 7 days, 14 days, or 30 days, where 7 days is the default retention time.
- e) Click **Continue**.

6. If you have changed the camera user names and passwords from the manufacturer defaults, enter them in the list. The installation program will scan for these cameras as well as cameras with manufacturer default credentials.

Click **Continue**.

7. Select **Files location** for the program file. In **Product language**, select the language in which your XProtect product should be installed. Click **Install**.

The software now installs.

When the installation is done:

- A default Operator role is created for users of XProtect. Add users to this role in the Management Client.
- In the Management Client, you see a list of successfully installed components.

Cameras in your system are configured in views in XProtect Smart Client, XProtect Web Client, and the Milestone Mobile client.

Install your system - Single Computer option

The **Single Computer** option installs all server and client components on the current computer. The recording server is authorized, so you are ready to use the system directly after installation.

Depending on your hardware and configuration, the recording server scans your network for hardware, adding up to 64 pieces of hardware automatically, which are then added to your system. Cameras are preconfigured in views, and a default Operator role is created. After installation, XProtect Smart Client opens and you are ready to use the system.

Microsoft® IIS is automatically installed during the process. Afterwards, you may be prompted to restart your computer. Do so and after restart, depending on your security settings, one or more Windows security warnings may appear. Accept these and the installation completes.

Note: If you upgrade from a previous version of the product, the system does not scan for cameras, or create new views and operator roles.

1. Download the software from the Internet (<http://www.milestonesys.com/downloads>) and run the *Milestone XProtect VMS Products 2017 R3 System Installer.exe* file from the location where you saved it.
2. The installation files unpack. Depending on your security settings, one or more Windows® security warnings appear. Accept these and the unpacking continues.
3. When done, the **Milestone XProtect VMS** dialog box appears,
 - a) Select the **Language** to use during the installation (this is **not** the language your system uses once installed, this is selected later). Click **Continue**.
 - b) Read the *Milestone End-user License Agreement*. Select the **I accept the terms in the license agreement** check box and click **Continue**.
 - c) In **Type the location of the license file**, enter your license file from your XProtect provider. Alternatively, use the browse function to locate it. The system verifies your license file before you can continue. Click **Continue**.
4. Select **Single Computer**.

A list of components to install appears (you cannot edit this list). Click **Continue**.
5. In the **Specify recording server settings** window, do the following:
 - a) In the **Recording server name** field, enter the name of the recording server. The default is the name of the computer.
 - b) The **Management server address** field shows the address and port number of the management server: localhost:80.
 - c) In the **Media database** field, select the location where you want to save your video recording. It is recommended that you save your video recordings in a separate location from where you install the program. The default location is c:\MediaDatabase.
 - d) In **Retention time for video recordings**, define how long you want to save the video recordings. You can select 7 days, 14 days, or 30 days, where 7 days is the default retention time.
 - e) Click **Continue**.
6. If you have changed the camera user names and passwords from the manufacturer defaults, enter them in the list. The installation program will scan for these cameras as well as cameras with manufacturer default credentials.

Click **Continue**.
7. Select **Files location** for the program file. In **Product language**, select the language in which your XProtect product should be installed. Click **Install**.

The software now installs.

When the installation is done:

- A default Operator role is created for users of XProtect. Add users to this role in the Management Client.
- In the Management Client, you see a list of successfully installed components.

Cameras in your system are configured in views in XProtect Smart Client, XProtect Web Client, and the Milestone Mobile client.

Install your system - Distributed option

The **Distributed** option installs only the management server components on the current computer. This means that the recording server and XProtect Smart Client are not visible in the un-editable component list. You must install the recording server, XProtect Smart Client, and SQL server on other computers.

1. Download the software from the Internet (<http://www.milestonesys.com/downloads>) and run the *Milestone XProtect VMS Products 2017 R3 System Installer.exe* file from the location where you saved it.
2. The installation files unpack. Depending on your security settings, one or more Windows® security warnings appear. Accept these and the unpacking continues.
3. When done, the **Milestone XProtect VMS** dialog box appears,
 - a) Select the **Language** to use during the installation (this is **not** the language your system uses once installed, this is selected later). Click **Continue**.
 - b) Read the *Milestone End-user License Agreement*. Select the **I accept the terms in the license agreement** check box and click **Continue**.
 - c) In **Type the location of the license file**, enter your license file from your XProtect provider. Alternatively, use the browse function to locate it. The system verifies your license file before you can continue. Click **Continue**.
4. Select **Distributed**. A non-editable list of components to be installed appears. Click **Continue**.
5. Select the type of SQL server database you want. Also, specify the name of the SQL server. Click **Continue**.
6. Select either **Create new database** or **Use existing database** and name the database. If you choose the latter, select to **Keep** or **Overwrite** existing data. Click **Continue**.
7. Select **File location** for the program file. In **Product language**, select the language in which your XProtect product should be installed. Click **Install**.
8. The software now installs. When done, you see a list of successfully installed components. Click **Close**.

Microsoft® IIS is automatically installed during the process. Afterwards, you may be prompted to restart your computer. Do so and after restart, depending on your security settings, one or more Windows security warnings may appear. Accept these and the installation completes.

9. Install at least one recording server and XProtect Smart Client on another computer.

See also

Install the recording server (on page 41)

Install clients (on page 49)

Install your system - Custom option

The **Custom** option installs the management server always, but you can select freely among the other management server components, recording server, and XProtect Smart Client to install on the current computer. By default, the recording server is unselected in the component list, but you can edit this. Depending on your selections you must install the unselected components afterwards on other computers plus the SQL server.

1. Download the software from the Internet (<http://www.milestonesys.com/downloads>) and run the Milestone XProtect VMS Products 2017 R3 System Installer.exe file from the location where you saved it.
2. The installation files unpack. Depending on your security settings, one or more Windows® security warnings appear. Accept these and the unpacking continues.
3. When done, the **Milestone XProtect VMS** dialog box appears,
 - a) Select the **Language** to use during the installation (this is **not** the language your system uses once installed, this is selected later). Click **Continue**.
 - b) Read the *Milestone End-user License Agreement*. Select the **I accept the terms in the license agreement** check box and click **Continue**.
 - c) In **Type the location of the license file**, enter your license file from your XProtect provider. Alternatively, use the browse function to locate it. The system verifies your license file before you can continue. Click **Continue**.
4. Select **Custom**. A list of components to be installed appears. Apart from the management server, all elements in the list are optional. The recording server is by default deselected, but you can change this if needed. Click **Continue**.
5. Select the type of SQL server database you want. If relevant, also specify the name of the SQL server. Click **Continue**.
6. Select either **Create new database** or **Use existing database** and name the database. If you choose the latter, select to **Keep** or **Overwrite** existing data. Click **Continue**.
7. Select either **This predefined account** or **This account** to select the service account. If needed, enter a password and confirm this. Click **Continue**.
8. If you have more than one available IIS website, you can select any of these. However, if any of your websites have HTTPS binding, select one of these. Click **Continue**.
9. Select **File location** for the program file. In **Product language**, select the language in which your XProtect product should be installed. Click **Install**.
10. The software now installs. When done, you see a list of successfully installed components. Click **Close**.

Microsoft® IIS is automatically installed during the process. Afterwards, you may be prompted to restart your computer. Do so and after restart, depending on your security settings, one or more Windows security warnings may appear. Accept these and the installation completes.

11. Depending on your selections, install the remaining servers on other computers:
 - a) Go to the Management server's download web page from Windows' **Start** menu.
 - b) Select **Programs > Milestone > Administrative Installation Page** and copy the Internet address.

- c) Log into each of the computers to install:
 - Log server.
 - Event server.
 - Management Client.
 - d) Open an Internet browser, paste the address of the Management server's download web page into the address field and download the relevant installer.
 - e) Run the installer.
12. Install the recording server on a separate computer, see Install the recording server (on page 41).

Install the recording server

Once you have installed the management server, download the separate recording server installer from the management server's download manager.

The recording server is automatically authorized to work with the management server after running the Recording Server installer.

Note: The recording server is already installed when you make a **Single Computer** installation.

See Install a failover recording server (on page 97) if you want to install a failover server.

To access the installation webpage:

1. Log into the computer where you want to install the recording server and open an Internet browser.
2. Enter the following URL in your browser: `http://[management server address]/installation/admin`

[management server address] is the IP address or host name of the management server.
3. Select **All Languages** below the **Recording Server installer**. Save the installer somewhere appropriately and run it from here or run it directly from the web page.
4. Select the **Language** you want to use during the installation. Click **Continue**.
5. Select:

Typical: to install a recording server with default values, or
Custom: to install a recording server with custom values.
6. Specify the recording server settings:
 - **Name**
 - **Management server address**
 - **Path** for saving recordings, and click **Continue**.
7. If you selected **Custom**:
 - a) Specify the number of recording servers you want to install on this computer. Click **Continue**.

- b) Specify the service account. If needed, enter a password and confirm this. Click **Continue**.
8. Select **Files location** for the program file. In **Product language**, select the language in which to install your system. Click **Install**.
9. The software is now installed. Once it is completed, you see a list of successfully installed components. Click **Close**.

When you have installed the recording server, you can check its state from the **Recording Server service** icon.

10. When done, your installation completes and you can continue with configuration, see Configuration process (see "Configure the system in the Management Client" on page 47).

Install a recording server silently

The advantage of a silent install is that you can do it remotely. Follow the steps below:

1. Locate the recording server installation file:
MilestoneXProtectRecordingServerInstaller_x64.exe.
 1. Log into the management server.
 2. Open an internet browser and type the address: <http://localhost/Installation/Admin/>
 3. Save the recording server installation file on the server where you want to install the new recording server.

Or you can browse to the file. The path is typically:

C:\Program Files\Milestone\XProtect Management Server\IIS\httpdocs\Admin\Recording Server Installer\[version number] [bit-version]\All Languages\en-US

2. Run a silent installation using these options:

- Run with default parameter settings:

To run a silent installation using the default values for all parameters, start a command prompt (cmd.exe) in the directory where the installation program is located and perform following command:

>MilestoneXProtectRecordingServerInstaller_x64.exe --quiet

- To do customized installation you need to specify the list of parameters that you want to overwrite:

For example, to change the path to Management Server of the installation, run:

><MilestoneXProtectRecordingServerInstaller_x64.exe --quiet --parameters=SERVERHOSTNAME:DKWS-OKR-02

These are the parameters that you may use through command line parameters:

- To change name of the recording server:

RECORDERNAME – name of the recorder that will appear in Management Client.

--quiet --parameters=RECORDERNAME:NewRecorderName

- To install recording server as failover:

ISFAILOVER – set this flag to True

--quiet --parameters=ISFAILOVER:True

- To change Management Server:

SERVERHOSTNAME – hostname of the Management Server where Recording Server will connect to

SERVERPORT – port of the Management Server (80 by default)

--quiet --parameters=SERVERHOSTNAME:DKWS-OKR-02

- To install Recording Server as different user than NT AUTHORITY\NETWORK SERVICE:

RECUSERACCOUNT – flag that determines if user account is used or one of the predefined accounts

RECSERVICEACCOUNT – name of the used user or predefined service account

- In order to change the location of the installation from default you must first perform:

><MilestoneXProtectRecordingServerInstaller_x64.exe --generateargsfile=C:\temp

In the specified location you will find .xml file with the parameters. So you would need to change parameters in this file and run your installation with the newly modified file.

- To change location of the installation:

INSTALLDIR - path where Recording Server should be installed to

TARGETDIR – should be the same as INSTALLDIR

INSTALLLOCATION – should be the same as INSTALLDIR

- To change location of recordings:

MEDIADBPATH – path to the Media database with all recordings

E.g. modifications in my Argements_.xml were. My new location of the installation will be %ProgramFiles(x86)%\Milestone\ and new location for recordings is C:\MD

```
<KeyValueParametersOfStringString>
```

```
<Value>%ProgramFiles(x86)%\Milestone\bla</Value>
```

```
<Key>INSTALLDIR</Key>
```

```
</KeyValueParametersOfStringString>
```

```
<KeyValueParametersOfStringString>
```

```
<Value>%ProgramFiles(x86)%\Milestone\bla</Value>
```

```
<Key>TARGETDIR</Key>
```

```
</KeyValueParametersOfStringString>
<KeyValueParametersOfStringString>
  <Value>%ProgramFiles(x86)%\Milestone\bla</Value>
  <Key>INSTALLLOCATION</Key>
</KeyValueParametersOfStringString>
<KeyValueParametersOfStringString>
  <Value>C:\MD</Value>
  <Key>MEDIADBPATH</Key>
</KeyValueParametersOfStringString>
```

Run the:

```
><MilestoneXProtectRecordingServerInstaller_x64.exe --quiet --
arguments=C:\temp\Arguments_.xml
```

Troubleshooting

Where can I find the log files of the installation?

The log files of the installation are located under **C:\ProgramData\Milestone\Installer**

How do I see a list of default parameters that will be used during a Single Computer installation?

To see a list of parameters with all default values you can run

MilestoneXProtectRecordingServerInstaller_x64.exe --generateargsfile=C:\temp

It will generate a file called Arguments.xml in the specified folder.

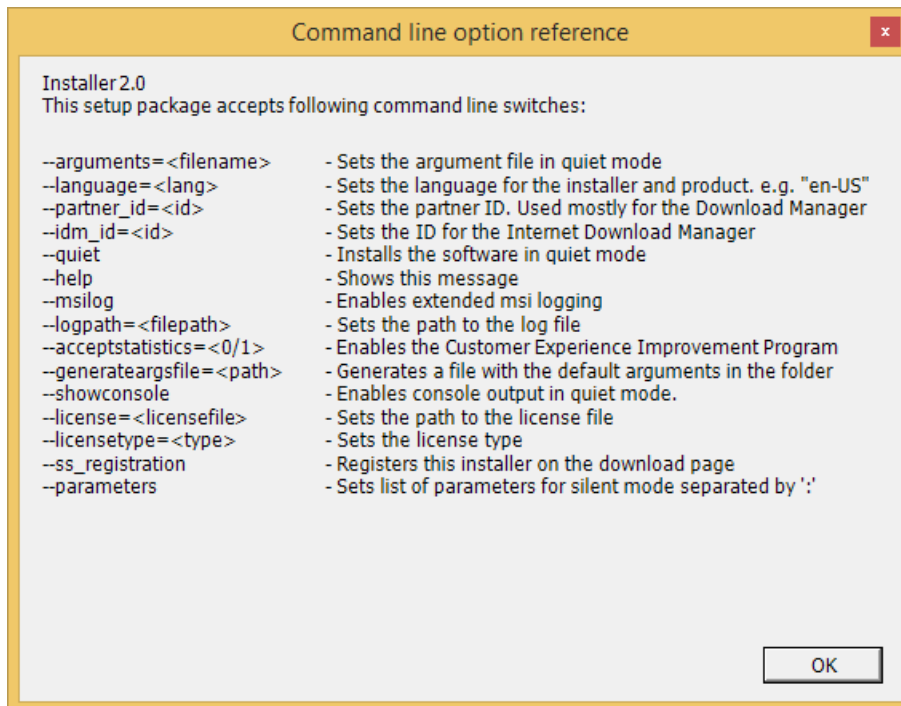
How do I see the parameters that were used during my customized installation?

The full list of parameters used to run the installation are in

C:\ProgramData\Milestone\Installer\Milestone XProtect Recording Server (64_bit)I.log
+ search for 'Command line'

How do I see a full list of possible parameters?

Run **MilestoneXProtectRecordingServerInstaller_x64.exe --help**



Set up Kerberos authentication

Use Kerberos authentication as an alternative to the older Microsoft NT LAN (NTLM) authentication protocol.

See Kerberos authentication (explained) (on page 33) for more information.

Installation for workgroups

If you do not use a domain setup with an Active Directory server, but a workgroup setup, do the following when you install:

1. Log in to Windows using a common administrator account.
Make sure to use the same account on all computers in the system.
2. Depending on your needs, start the management or recording server installation and click **Custom**.
3. Depending on what you selected in step 2, select to install the Management or Recording Server service using a common administrator account.
4. Finish the installation.
5. Repeat steps 1-4 to install any other systems you want to connect. They must all be installed using a common administrator account.

You cannot use this approach when you **upgrade** workgroup installations. See instead Alternative upgrade for workgroup (on page 57).

Installation troubleshooting

The following issues may occur during or upon installation of the management server or recording servers. For each issue, one or more solutions are available.

Issue: Recording server startup fails due to port conflict

This issue can only appear if the Simple Mail Transfer Protocol (SMTP) service is running as it uses port 25. If port 25 is already in use for, it may not be possible to start the Recording Server service. It is important that port number 25 is available for the recording server's SMTP service.

SMTP Service: Verification and solutions

To verify whether SMTP Service is installed:

1. From Windows' **Start** menu, select **Control Panel**.
2. In the **Control Panel**, double-click **Add or Remove Programs**.
3. In the left side of the **Add or Remove Programs** window, click **Add/Remove Windows Components**.
4. In the **Windows Components** wizard, select **Internet Information Services (IIS)**, and click **Details**.
5. In the **Internet Information Services (IIS)** window, verify whether the **SMTP Service** check box is selected. If so, SMTP Service is installed.

If SMTP Service is installed, select one of the following solutions:

Solution 1: Disable SMTP Service, or set it to manual startup

This solution lets you start the recording server without having to stop the SMTP Service every time:

1. From Windows' **Start** menu, select **Control Panel**.
2. In the **Control Panel**, double-click **Administrative Tools**.
3. In the **Administrative Tools** window, double-click **Services**.
4. In the **Services** window, double-click **Simple Mail Transfer Protocol (SMTP)**.
5. In the **SMTP Properties** window, click **Stop**, then set **Startup type** to either **Manual** or **Disabled**.

When set to **Manual**, the SMTP Service can be started manually from the **Services** window, or from a command prompt using the command *net start SMTPSVC*.

6. Click **OK**.

Solution 2: Remove SMTP service

Removing the SMTP Service may affect other applications using the SMTP Service.

1. From Windows' **Start** menu, select **Control Panel**.
2. In the **Control Panel** window, double-click **Add or Remove Programs**.
3. In the left side of the **Add or Remove Programs** window, click **Add/Remove Windows Components**.

4. In the **Windows Components** wizard, select the **Internet Information Services (IIS)** item, and click **Details**.
5. In the **Internet Information Services (IIS)** window, clear the **SMTP Service** check box.
6. Click **OK**, **Next**, and **Finish**.

Issue: Changes to SQL server location prevents database access

This is an issue if the location of the SQL Server is changed, for example by changing the host name of the computer running the SQL Server. The result of this issue is that the access to the database is lost.

Solution: Use the update SQL address tool found at the tray icon.

Configure the system in the Management Client

In the following, you see a list of the typical tasks for configuring your system.

Even if the tasks are listed as a checklist, a completed checklist does not in itself guarantee that the system matches the exact requirements of your organization. To make the system match the needs of your organization, Milestone recommends that you monitor and adjust the system continuously.

For example, it is a good idea to test and adjust the motion detection sensitivity settings of individual cameras under different physical conditions, including day/night and windy calm weather, once the system is running.

The setup of rules, which determine most of the actions your system performs, including when to record video, is another example of configuration that you can change according to your organization's needs.

<input checked="" type="checkbox"/>	You have finished the initial installation of your system. See <i>Install the system</i> (on page 36).
<input checked="" type="checkbox"/>	Change the trial SLC to a permanent SLC (if required). See <i>Change Software License Code</i> (on page 48).
<input checked="" type="checkbox"/>	Log in to the Management Client.
<input type="checkbox"/>	Verify that each recording server's storage settings meet your needs. See <i>Storage and archiving (explained)</i> (on page 78).
<input type="checkbox"/>	Verify that each recording server's archiving settings meet your needs. See <i>Archive settings properties</i> (on page 86).
<input type="checkbox"/>	Detect the hardware, cameras or video encoders to add to each recording server. See <i>Add hardware</i> (on page 101).
<input type="checkbox"/>	Configure each recording server's individual cameras. See <i>Camera devices (explained)</i> (on page 114).

<input type="checkbox"/>	<p>Enable storage and archiving for individual cameras or for a group of cameras. This is done from the individual cameras or from the device group.</p> <p>See Attach a device or group of devices to a storage (on page 81).</p>
<input type="checkbox"/>	<p>Enable and configure devices.</p> <p>See Working with devices (on page 114).</p>
<input type="checkbox"/>	<p>Rules determine the system's behavior to a large extent. You create rules to define when cameras should record, when pan-tilt-zoom (PTZ) cameras should patrol, and when notifications should be sent, for example.</p> <p>Create rules.</p> <p>See Rules and events (explained) (on page 166).</p>
<input type="checkbox"/>	<p>Add roles to the system.</p> <p>See Roles (explained) (on page 203).</p>
<input type="checkbox"/>	<p>Add users and/or groups of users to each of the roles.</p> <p>See Assign/remove users and groups to/from roles (on page 206).</p>
<input type="checkbox"/>	<p>Activate licenses.</p> <p>See Activate licenses online (on page 72) or Activate licenses offline (on page 72).</p>

Change Software License Code

If you run your installation on a trial Software License Code (SLC) during the first period, you can change it into a permanent SLC without any un- or reinstallation actions when you have received your new software license file.

Important: This must be done locally on the management server. You **cannot** do this from the Management Client.

1. On the management server, go to the notification area of the taskbar.



2. Right-click the **Management Server** icon and select **Change License**.
3. Click **Import License**.
4. Next, select the software license file saved for this purpose. When done, the selected software license file location is added just below the **Import License** button.
5. Click **OK** and you are now ready to register SLC. See Register Software License Code (on page 35).

Local IP address ranges (explained)

When a client, such as XProtect Smart Client, connects to a surveillance system, an amount of initial data communication, including the exchange of contact addresses goes on in the background. This happens automatically, and is transparent to users.

Clients may connect from the local network as well as from the Internet, and in each case the surveillance system should be able to provide suitable addresses so the clients can get access to live and recorded video from the recording servers:

- When clients connect locally, the surveillance system should reply with local addresses and port numbers.
- When clients connect from the Internet, the surveillance system should reply with the recording servers' public addresses, that is the address of the firewall or NAT (Network Address Translation) router, and often also a different port number (which is then forwarded to recording servers).

The surveillance system must therefore be able to determine whether a client belongs on a local IP range or on the Internet. For this purpose, you can define a list of IP ranges which the surveillance system should recognize as coming from a local network.

Install clients

Install XProtect Smart Client silently

You can deploy XProtect Smart Client or your surveillance software to users' computers using tools such as Microsoft Systems Management Server (SMS). Such tools let you build up databases of hardware and software on local networks. The databases can then, among other things, be used for distributing and installing software applications, such as XProtect Smart Client, over local networks.

1. Locate the Smart Client installation program (.exe) file - *XProtect Smart Client 2017 R3 Installer.exe* or *XProtect Smart Client 2017 R3 Installer x64.exe* for 32-bit and 64-bit versions respectively. You find the file in a subfolder under the folder **httpdocs**. The **httpdocs** folder is located under the folder in which your Milestone surveillance software is installed.

The path is typically:

C:\Program Files\Milestone\XProtect Management Server\IIS\httpdocs\XProtect Smart Client Installer\[version number] [bit-version]\All Languages\en-US

For example:

C:\Program Files\Milestone\XProtect Management Server\IIS\httpdocs\XProtect Smart Client Installer\2016 (32-bit)\All Languages\en-US

2. Run a silent installation using one of the following two options:
 - a Run with default parameter settings:

To run a silent installation using the default values for all parameters, start a command prompt (cmd.exe) in the directory where the installation program is located and perform following command:

>XProtect Smart Client 2017 R3 Installer.exe --quiet

This performs a quiet installation of the XProtect Smart Client using default values for parameters such as target directory and so on. To change the default settings, see below.

b Customize default parameters using an xml argument file as input:

To customize the default installation settings, provide an xml file with modified values as input. To generate the xml file with default values, open a command prompt in the directory where the installation program is located and perform the following command:

```
>XProtect Smart Client 2017 R3 Installer.exe --generateargsfile=[path]
```

Open the generated Arguments.xml file, using for example Windows Notepad, and perform any changes needed. Then, to run silent installation using these modified values, perform the following command in the same directory.

```
>XProtect Smart Client 2017 R3 Installer.exe --arguments=args.xml --quiet
```

Install Milestone Mobile server

Once you have installed the Milestone Mobile server, you can use Milestone Mobile client and XProtect Web Client with your system. To reduce the overall use of system resources on the computer running the management server, install the Milestone Mobile server on a separate computer.

The management server has a built-in public installation webpage. From this webpage, administrators and end-users can download and install the required XProtect system components from the management server or any other computer in the system.

To access the installation webpage:

1. Enter the following URL in your browser: `http://[management server address]/installation/admin`
[management server address] is the IP address or host name of the management server.
2. Click **All Languages** for the Milestone Mobile server installer.
3. Run the downloaded file. Click **Yes** to all warnings. Unpacking starts.
4. Select language for the installer. Click **Continue**.
5. Read and accept the license agreement. Click **Continue**.
6. Select the installation type.
 - Click **Typical** to install the Milestone Mobile server and plug-in.
 - **Custom** - Install only the server or only the plug-in. For example, installing only the plug-in is useful if you want to use Management Client to manage Milestone Mobile servers, but don't need the Milestone Mobile server on that computer.

The Milestone Mobile plug-in is required on the computer running Management Client to manage Milestone Mobile servers in Management Client.

The Milestone Mobile plug-in is a common part of the Management Client installation, but the plug-in installation is needed when you want to upgrade the plug-in.

7. Enter the following information about the primary surveillance system server:
 - Management server URL
 - Log in

- User name and password. Click **Continue**.
8. Select the file location and product language, and then click **Install**.
 9. When the installation is complete, a list of successfully installed components appears. Click **Close**.

You are ready for configuration of Milestone Mobile (see "Milestone Mobile configuration" on page 354).

Download Manager/download web page

The management server has a built-in web page. This web page enables administrators and end users to download and install required XProtect system components from any location, locally or remotely.

Milestone XProtect Advanced VMS contains a set of administrative applications which are downloaded and installed from this page. User applications can be found on the default download page. If you want to view this page in another language, use the language menu in the top right corner.

Recording Server Installer
The XProtect Recording Server has features for recording of video and audio feeds, and for communication with cameras and other devices in the surveillance system.
Recording Server Installer 10.1a (64 bit)
[All Languages](#)

Management Client Installer
The XProtect Management Client is the system's administration application, used for setting up hardware, recording servers, security, etc.
Management Client Installer 10.1a (64 bit)
[All Languages](#)

Event Server Installer
The Event Server manages all event and map related communication. It stores events, image files and map configurations, and makes status information about the surveillance system available.
Event Server Installer 2016 (64 bit)
[All Languages](#)

Log Server Installer
The Log Server manages all system logging.
Log Server Installer 10.1a (64 bit)
[All Languages](#)

Service Channel Installer
The Service Channel communicates configuration changes and updates, system messages, etc. between the server and clients.
Service Channel Installer 10.1a (64 bit)
[All Languages](#)

Milestone Mobile Server Installer
As part of the surveillance system, the Milestone Mobile component contains features for managing server- and administrator-based settings of the Milestone Mobile client application.
Milestone Mobile Server Installer 10.1a (64 bit)
[All Languages](#)

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The web page can display two sets of content, both in a language version that by default matches the language of the system installation:

- One web page is targeted at **administrators**, enabling them to download and install key system components. Most often the web page is automatically loaded at the end of the management server installation and the default content is displayed. On the management server, you can access the web page from Windows' **Start** menu, select **Programs** > **Milestone** > **Administrative Installation Page**. Otherwise you can enter the URL:

`http://[management server address]:[port]/installation/admin/`

[management server address] is the IP address or host name of the management server, and [port] is the port number which you have configured IIS to use on the management server. If not accessing the web page on the management server itself, log in with an account which has administrator rights on the management server.

- One web page is targeted at end **users**, providing them access to client applications with default configuration. On the management server, you can access the web page from Windows' **Start** menu, select **Programs > Milestone > Public Installation Page**. Otherwise you can enter the URL:

`http://[management server address]:[port]/installation/`

[management server address] is the IP address or host name of the management server, and [port] is the port number which you have configured IIS to use on the management server.

The two web pages have some default content so you can use them straight away after installation. As administrator, however, by using the Download Manager, you can customize what should be displayed on the web pages. You can also move components between the two versions of the web page. To move a component, right-click it, and select the web page version you want to move the component to.

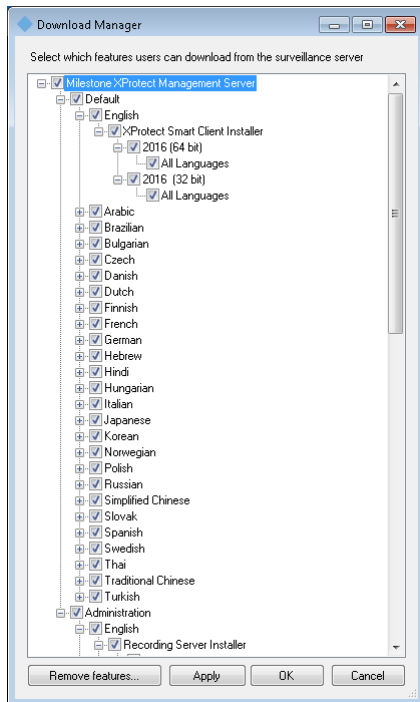
Even though you can control which components users can download and install in Download Manager, you cannot use it as a users' rights management tool. Such rights are determined by roles defined in the Management Client.

On the management server, you can access the XProtect Download Manager from Windows' **Start** menu, select **Programs > Milestone > XProtect Download Manager**.

Download Manager's default configuration

The Download Manager has a default configuration. This ensures that your organization's users can access standard components from the start.

The default configuration provides you a default setup with access to downloading extra or optional components. Usually you access the web page from the management server computer, but you can also access the web page from other computers.



- The first level: Refers to your XProtect product.
- The second level: Refers to the two targeted versions of the web page. **Default** refers to the web page version viewed by end users. **Administration** refers to the web page version viewed by system administrators.
- The third level: Refers to the languages in which the web page is available.
- The fourth level: Refers to the components which are - or can be made - available to users.
- The fifth level: Refers to particular versions of each component, which are - or can be made - available to users.
- The sixth level: Refers to the language versions of the components which are - or can be made - available to users.

The fact that only standard components are initially available - and only in the same language version as the system itself - helps reduce installation time and save space on the server. There is no need to have a component or language version available on the server if nobody uses it.

You can make more components or languages available as required and you can hide or remove unwanted components or languages.

Download Manager's standard installers (user)

By default, the following components are available for separate installation from the management server's download web page targeted at users (controlled by the Download Manager):

- Recording servers, including failover recording servers. Failover recording servers are initially downloaded and installed as recording servers, during the installation process you specify that you want a failover recording server.
- Management Client
- XProtect Smart Client

- Event server, used in connection with map functionality
- Log server, used for providing the necessary functionality for logging system information
- Service channel, enables automatic and transparent configuration communication between servers and clients
- Milestone Mobile server - **only available here**
- More options may be available in your organization.

For installation of **device packs**, see Device pack installer - must be downloaded (on page 55).

Add/publish Download Manager installer components

You must complete two procedures to make non-standard components and new versions available on the management server's download page.

First you **add new and/or non-standard components to the Download Manager**. Then you use it to **fine-tune which components should be available** in the various language versions of the web page.

If the Download Manager is open, close it before installing new components.

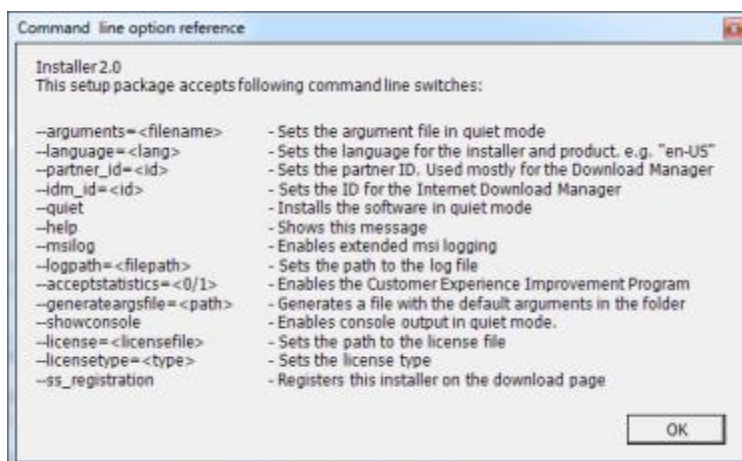
Adding new/non-standard files to the Download Manager:

1. On the computer where you downloaded the component(s), go to Window's **Start**, enter a *Command Prompt*
2. In the *Command Prompt*, execute the name of the file (.exe) with: [space]--ss_registration

Example: *RecordingServer_setup_x64.exe --ss_registration*

The file is now added to the Download Manager, but **not** installed on the current computer.

To get an overview of installer commands, in the *Command Prompt*, type [space]--help and the following window appears:



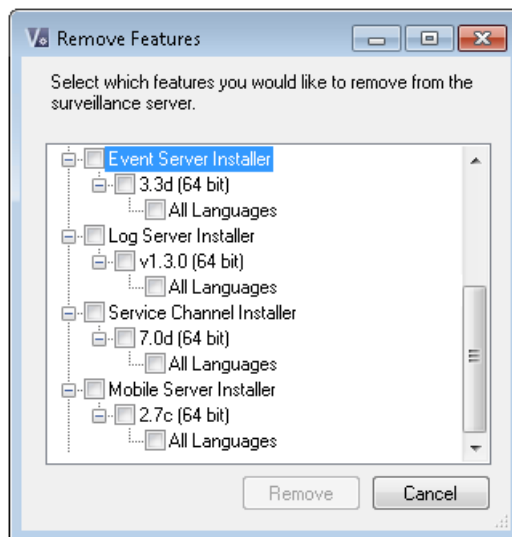
When you have installed new components, they are by default selected in the Download Manager and are immediately available to users via the web page. You can always show or hide features on the web page by selecting or clearing check boxes in the Download Manager's tree structure.

You can change the sequence in which components are displayed on the web page. In the Download Manager's tree structure, drag component items and drop them at the required position.

Hide/remove Download Manager installer components

You have three options:

- **Hide components** from the web page by clearing check boxes in the Download Manager's tree structure. The components are still installed on the management server, and by selecting check boxes in the Download Manager's tree structure you can quickly make the components available again.
 - **Remove the installation of components** on the management server. The components disappear from the Download Manager, but installation files for the components are kept at *C:\Program Files (x86)\Milestone\XProtect Download Manager*, so you can re-install them later if required.
1. In the Download Manager, click **Remove features**.
 2. In the **Remove Features** window, select the feature(s) you want to remove.



3. Click **OK** and **Yes**.

- **Remove installation files for non-required features** from the management server. This can help save disk space on the server if you know that your organization is not going to use certain features.

Device pack installer - must be downloaded

The device pack (containing device drivers) included in your original installation is not included on the download website. So, if you need to reinstall the device pack or make the device pack installer available, you must first add or publish the latest device pack installer to the Download Manager:

1. Get the newest device pack from the download page on the Milestone website (<http://www.milestonesys.com/downloads>).
2. Add/publish it to the Download Manager by calling it with the `--ss_registration` command.

If you do not have a network connection, you can reinstall the entire recording server from the Download Manager. The installation files for the recording server is placed locally on your computer and in this way, you automatically get a reinstall of the device pack.

Upgrade

Upgrade (explained)

This information is only relevant if you are upgrading a previous XProtect installation.

Important: Your XProtect system no longer supports Microsoft Windows XP.

When you upgrade, all components, except the management server database, are automatically removed and replaced. This includes the drivers of your device pack.

The management server database contains the entire system configuration (recording server configurations, camera configurations, rules, and so on). As long as you do not remove the management server database, no reconfiguration of your system configuration is needed, even if you may want to configure some of the new features in the new version.

Backward compatibility with recording servers from XProtect versions older than this current version is limited. You can still access recordings on such older recording servers, but to be able to change their configuration, they must be of the same version as this current one. Milestone recommends that you upgrade all recording servers in your system.

When you do an upgrade including your recording servers, you are asked whether you want to **update** or **keep** your video device drivers. If you choose to update, it might take a few minutes for your hardware devices to make contact with the new video device drivers after restarting your system. This is due to several internal checks being performed on the newly installed drivers.

Upgrade requirements

- Have your **software license file (see "Licenses (explained)" on page 23)** (.lic) ready.
 - **Service pack upgrade:** During the installation of the management server, the wizard may ask you to specify the location of the software license file. You can use both the software license file you got after your purchase of your system (or latest upgrade) and the activated software license file you got after your last license activation.
 - **Version upgrade:** After you purchased the new version, you receive a new software license file. During the installation of the management server, the wizard asks you to specify the location of the new software license file.

The system verifies the software license file before you can continue. Already added hardware devices and other devices, which require licenses go into a grace period. If you have not enabled automatic license activation (see "Automatic license activation (explained)" on page 71), remember to activate your licenses manually before the grace period expires. If you do not have your software license file, contact your XProtect reseller.

- Have your **new product version** software ready. You can download it from the download page on the Milestone website (<http://www.milestonesys.com/downloads>).
- Make sure that you have backed up your system configuration (see "Backing up and restoring your system configuration (explained)" on page 410).

The management server stores your system's configuration in a database. The system configuration database can be stored in two different ways:

1. In a SQL Server Express Edition database on the management server itself.
2. In a database on an existing SQL Server on your network.

If using 2), you must have **Administrator rights on the SQL Server** whenever you want to create, move or upgrade the management server's system configuration database on the SQL Server. Once you are done creating, moving or updating, it is sufficient to be the database owner of the management server's system configuration database on the SQL Server.

When you are ready to start the upgrade, follow the procedures in Upgrade best practices (on page 57).

Upgrade best practices

Read about upgrade requirements (on page 56) including SQL database backup before you start the actual upgrade.

If your system is a **Single Computer** system, you can simply install the new software on top of the existing installation.

In a Milestone Interconnect or Milestone Federated Architecture system, you must start upgrading the central site and afterwards the remote sites.

Perform the upgrade in this order:

1. Upgrade the management server with the **Distributed** option in the installer.
 1. On the wizard page where you choose components, all management servers components are preselected.
 2. Specify your SQL server, and choose to keep the database.When you start the installation, you lose failover server functionality.
2. Upgrade failover servers. From your management server's download web page (controlled by the Download Manager), install the Recording Server.

At this point the failover server functionality works again.
3. Upgrade the recording servers. You can install recording servers using the installation wizard (see "Install the recording server" on page 41) or silently (see "Install a recording server silently" on page 42). The advantage of a silent install is that you can do it remotely.
4. Upgrade the event server. From your management server's download web page, install the Event Server.

Continue these steps for the other sites in your system.

Alternative upgrade for workgroup

If you do not use a domain setup, but a workgroup setup, you must do the following when you upgrade:

1. On the recording server, create a local Windows user.
2. From the Windows **Control Panel**, find the **Milestone XProtect Data Collector service**. Right-click it, select **Properties**, and select the **Log on** tab. Set the Data Collector service to run as the local windows user you just created on the recording server.
3. On the management server, create the same local Windows user (with the same user name and password).
4. In the Management Client, add this local Windows user to the **Administrator's** group.

For installing with workgroups, see Installation for workgroups (on page 45).

First time use

Best practices

Protect recording databases from corruption

You can select which action to take if a camera database becomes corrupted. The actions include several database repair options. While it is good to have such options, Milestone recommends that you take steps to ensure that your camera databases do not become corrupted.

Hard disk failure: protect your drives

Hard disk drives are mechanical devices and are vulnerable to external factors. The following are examples of external factors which may damage hard disk drives and lead to corrupt camera databases:

- Vibration (make sure the surveillance system server and its surroundings are stable)
- Strong heat (make sure the server has adequate ventilation)
- Strong magnetic fields (avoid)
- Power outages (make sure you use an Uninterruptible Power Supply (UPS))
- Static electricity (make sure you ground yourself if you are going to handle a hard disk drive).
- Fire, water, etc. (avoid)

Windows Task Manager: be careful when you end processes

When you work in Windows Task Manager, be careful not to end any processes which affect the surveillance system. If you end an application or system service by clicking **End Process** in the Windows Task Manager, the process is not given the chance to save its state or data before it is terminated. This may lead to corrupt camera databases.

Windows Task Manager typically displays a warning if you attempt to end a process. Unless you are absolutely sure that ending the process is not going to affect the surveillance system, click **No** when the warning message asks you if you really want to terminate the process.

Power outages: use a UPS

The single-most common reason for corrupt databases is the recording server being shut down abruptly, without files being saved and without the operating system being closed down properly. This may happen due to power outages, due to somebody accidentally pulling out the server's power cable, or similar.

The best way of protecting your recording servers from being shut down abruptly is to equip each of your recording servers with a UPS (Uninterruptible Power Supply).

The UPS works as a battery-driven secondary power source, providing the necessary power for saving open files and safely powering down your system in the event of power irregularities. UPSs

vary in sophistication, but many UPSs include software for automatically saving open files, for alerting system administrators, etc.

Selecting the right type of UPS for your organization's environment is an individual process. When you assess your needs, however, bear in mind the amount of runtime you require the UPS to be able to provide if the power fails. Saving open files and shutting down an operating system properly may take several minutes.

Daylight saving time (explained)

Daylight saving time (DST) is the practice of advancing clocks for evenings to have more daylight and mornings to have less. The use of DST varies between countries/regions.

When you work with a surveillance system, which is inherently time-sensitive, it is important that you know how the system handles DST.

Important: Do not change the DST setting when you are in the DST period or if you have recordings from a DST period.

Spring: Switch from Standard Time to DST

The change from standard time to DST is not much of an issue since you jump one hour forward.

Example:

The clock jumps forward from 02:00 standard time to 03:00 DST, and the day has 23 hours. In that case, there is no data between 02:00 and 03:00 in the morning since that hour, for that day, did not exist.

Fall: Switch from DST to Standard Time

When you switch from DST to standard time in the fall, you jump one hour back.

Example:

The clock jumps backward from 02:00 DST to 01:00 standard time, repeating that hour, and the day has 25 hours. You reach 01:59:59, then immediately revert to 01:00:00. If the system did not react, it would essentially re-record that hour, so the first instance of 01:30 would be overwritten by the second instance of 01:30.

To solve such an issue from happening, your system archives the current video in the event the system time changes by more than five minutes. You cannot view the first instance of the 01:00 hour directly in any clients, but the data is recorded and safe. You can browse this video in XProtect Smart Client by opening the archived database directly.

Time servers (explained)

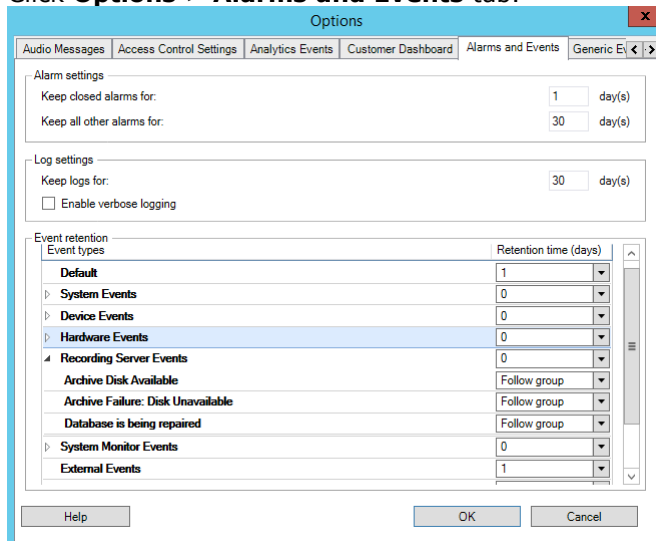
Once your system receives images, they are instantly time-stamped. Since cameras are separate units which may have separate timing devices, camera time and your system time may not correspond fully. This may occasionally lead to confusion. If your cameras support timestamps, Milestone recommends that you auto-synchronize camera and system time through a time server for consistent synchronization.

For information about how to configure a time server, search the Microsoft website (<http://www.microsoft.com/>) for '**time server**', '**time service**', or similar terms.

Limit size of database

To avoid that the database (see "SQL server" on page 19) grows to a size that affects the performance of the system, you can specify for how many days the different types of events and alarms are stored in the database.

1. Open the **Tools** menu.
2. Click **Options > Alarms and Events** tab.



The screenshot shows the 'Options' dialog box with the 'Alarms and Events' tab selected. The 'Alarm settings' section has 'Keep closed alarms for' set to 1 day(s) and 'Keep all other alarms for' set to 30 day(s). The 'Log settings' section has 'Keep logs for' set to 30 day(s) and 'Enable verbose logging' unchecked. The 'Event retention' section is expanded, showing a list of event types and their retention times in days.

Event types	Retention time (days)
Default	1
System Events	0
Device Events	0
Hardware Events	0
Recording Server Events	0
Archive Disk Available	Follow group
Archive Failure: Disk Unavailable	Follow group
Database is being repaired	Follow group
System Monitor Events	0
External Events	1

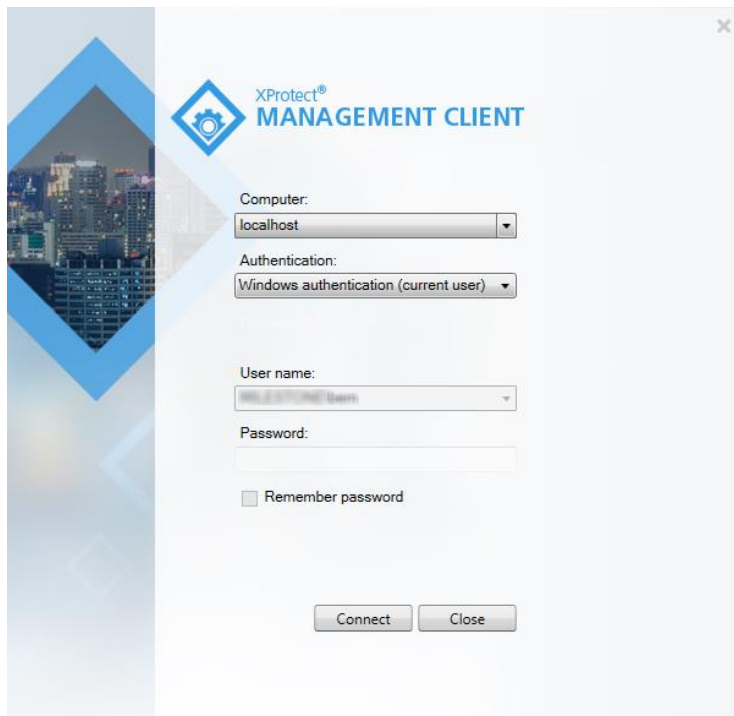
3. Make the required settings. For more information, see Alarms and Events tab (see "Alarms and Events tab (options)" on page 259).

Management Client overview

Login overview

When you launch the Management Client, you must first enter your login information to connect to a system.

With XProtect Corporate 2016 or XProtect Expert 2016 or newer installed, you can log into systems that run older versions of the product after installing a patch. The supported versions are XProtect Corporate 2013 and XProtect Expert 2013 or newer.



Login authorization (explained)

The system allows administrators to set up users so they can only log into a system if a second user with sufficient rights authorizes their login. In this case, XProtect Smart Client or the Management Client asks for the second authorization during login.

A user associated with the built-in **Administrators** role has always permission to authorize and is not asked for a second login, unless the user is associated with another role that requires a second login.

To associate login authorization with a role:

- Set **Login authorization required** for the selected role on the **Info** tab (see "Info tab (roles)" on page 207) under **Roles**, so that the user is asked for additional authorization during login.
- Set **Authorize users** for the selected role on the **Overall Security** tab (see "Overall Security tab (roles)" on page 208) under **Roles**, so that the user can authorize other users' logins.

You can choose both options for the same user. This means that the user is asked for additional authorization during login, but can also authorize other users' logins, except for his/her own.

Management Client window overview

The Management Client window is divided into panes. The number of panes and layout depend on your:

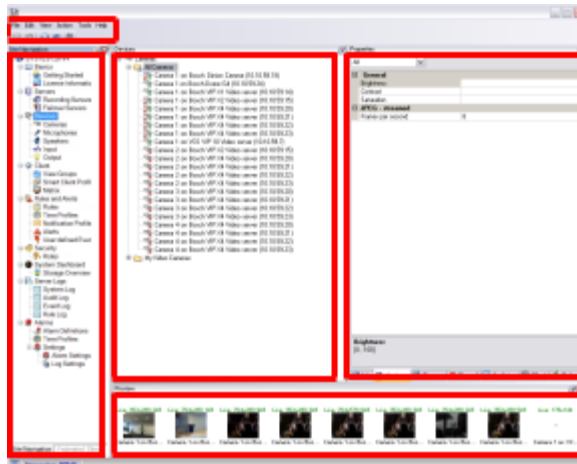
- system configuration

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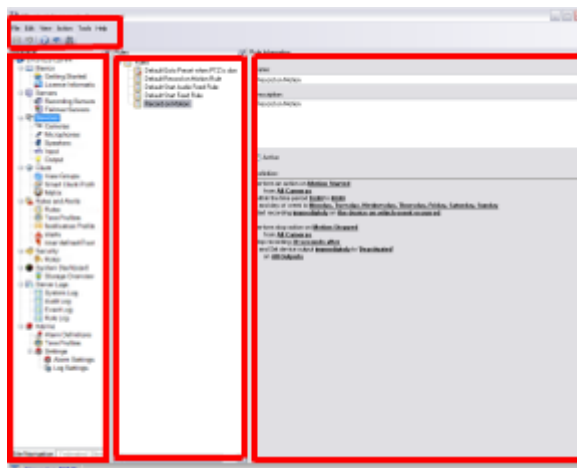
- task
- available functions.

Below are some examples of typical layouts:

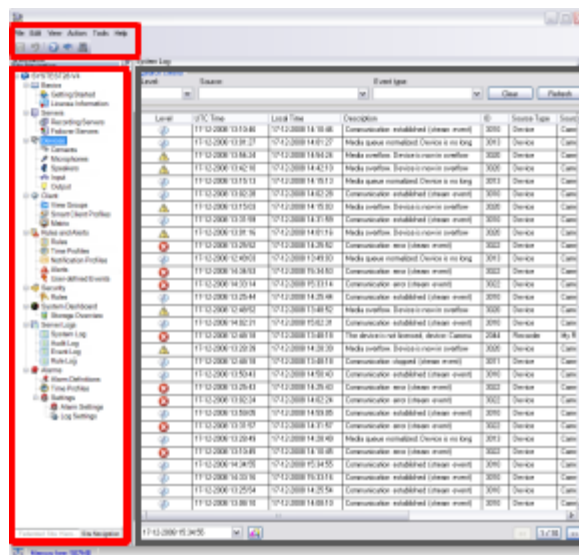
- When you work with recording servers and devices:



- When you work with rules, time and notification profiles, users, roles:

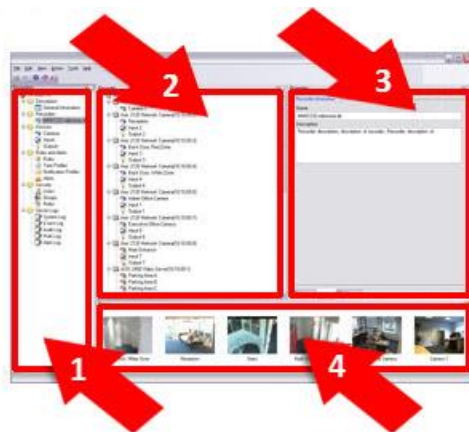


- When you view logs:



Panes overview

The illustration outlines a typical window layout. You can customize the layout so it may look different on your computer.



1. Site Navigation pane and Federated Site Hierarchy pane
2. Overview pane
3. Properties pane
4. Preview pane

Site Navigation pane: This is your main navigation element in the Management Client. It reflects the name, settings and configurations of the site that you have logged into. The site name is visible at the top of the pane. The features are grouped into categories that reflect the functionality of the software.

Federated Site Hierarchy pane: This is your navigation element that displays all Milestone Federated Architecture sites in a parent/child site hierarchy.

You can select any site, log into it and the Management Client for that site launches. The site that you are logged into, is always at the top of the hierarchy.

Overview pane: Provides an overview of the element you have selected in the **Site Navigation** pane, for example as a detailed list. When you select an element in the **Overview** pane, it typically displays the properties in the **Properties** pane. When you right-click elements in the **Overview** pane you get access to the management features.

Properties pane: Displays the properties of the element selected in the **Overview** pane. The properties appear on several dedicated tabs:



Example of properties displayed on tabs

Preview pane: The **Preview** pane appears when you work with recording servers and devices. It shows preview images from the selected cameras or displays information about the state of the device. The example shows a camera preview image with information about the resolution and data rate of the camera's live stream:

Live: 640x480 88kB

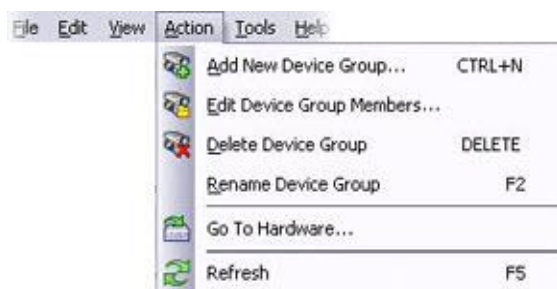


Camera 5

By default, the information shown with the camera preview images concerns live streams. This is displayed in green text above the preview. If you want recording stream information instead (red text), select **View > Show Recording Streams** in the menu.

Performance can be affected if the **Preview** pane displays preview images from many cameras at a high frame rate. To control the number of preview images, and their frame rate, select **Options > General** in the menu.

Menu overview



Example only - some menus change depending on context.

File menu

You can save changes to the configuration and exit the application. You can also back up your configuration, see Backing up and restoring your system configuration (explained) (on page 410).

Edit menu

You can undo changes.

View menu

Name	Description
Reset Application Layout	Reset the layout of the different panes in the Management Client to their default settings.
Preview Window	Toggle the Preview pane on and off when working with recording servers and devices.
Show Recording Streams	By default, the information shown with preview images in the Preview pane concerns live streams of the cameras. If you want information about recording streams instead, select Show Recording Streams .
Federated Site Hierarchy	By default, the Federated Site Hierarchy pane is enabled.
Site Navigation	By default, the Site Navigation pane is enabled.

Action menu

The content of the **Action** menu differs depending on the element you have selected in the **Site Navigation** pane. The actions you can choose from are the same as when you right-click the element. The elements are described in Management Client elements (on page 67).

Name	Description
Refresh	Is always available and reloads the requested information from the management server.

Tools menu

Name	Description
Registered Services	Manage registered services. See Service channel (explained) (on page 430).
Professional VMS Servers	Add XProtect Professional VMS servers to your system and manage the integration of the added servers. See XProtect Professional VMS servers (explained) (on page 401). You can also use the feature to migrate from an XProtect Professional VMS system to XProtect VMS. This is described in a separate document. Only supported if your system: - uses IPv4 - works with XProtect Professional VMS servers running XProtect Professional VMS version 7.0 and up
Effective Roles	View all roles of a selected user or group.
Options	Opens the Options dialog box, which lets you define and edit global system settings.

Help menu

You can access the help system and information about the version of the Management Client.

Management Client elements

Basics

License information

You can keep track of all licenses that share the same software license file both on this site and on all other sites, your Milestone Care subscriptions and decide how you want to activate your licenses. For basic information about the different XProtect licenses, see Licenses (explained) (on page 23).

Licensed to

Lists the contact details of the license owner that you entered during the software registration. Click **Edit details** to edit the license owner information. Here you can also find a link to the end user license agreement, which you accepted prior to the installation.

Milestone Care

Here you can see information about your current Milestone Care™ level. When you bought your system, you also entered a two-year Milestone Care Plus subscription. Your installation is always covered by Milestone Care Basic which gives you access to different types of self-help material like knowledge base articles, guides and tutorials on our Support website (<http://www.milestonesys.com/support>). A Milestone Care Plus subscription gives you access to upgrades. You also get access to the Customer Dashboard service, the Smart Connect feature, and the full Push Notification functionality. The expiration date of your Milestone Care Plus subscription is visible in the **Installed Products** table. If you have a Milestone Care Premium subscription, you can also contact Milestone support for help. Please remember to include information about your Milestone Care ID when contacting Milestone support. Again, the expiry date for your Milestone Care Premium subscription is visible. To learn more about Milestone Care, follow the links. If you decide to buy or renew a Milestone Care subscription after you have installed your system, you must activate your licenses before the correct Milestone Care information is shown.

Installed Products

Lists the following information about all your installed base licenses for XProtect VMS and add-on products that share the same software license file:

- Products and versions
- The products' software license code (SLC).
- The expiration date of your SLC. Typically, unlimited.
- The expiration date of your Milestone Care Plus subscription.
- The expiration date of your Milestone Care Premium subscription.

Note: Some licenses, such as XProtect Essential+, do not include the option for Milestone Care Plus or Milestone Care Premium, and these columns will not appear in the window.

Installed Products

Product Version	Software License Code	Expiration Date	Milestone Care Plus	Milestone Care Premium
XProtect Corporate 2016	M01-C01-100-01- HC42B8	Unlimited	01-10-2016	01-10-2016
Milestone XProtect Smart Wall	M01-P03-023-01- HC42B4	Unlimited	Unlimited	
Milestone XProtect Access 2016 v10.0a	M01-P01-011-01- HC42EF	Unlimited	Unlimited	
Milestone XProtect Transact 2016	M01-P08-100-01- HC42E1	Unlimited	Unlimited	

License Overview - All sites

Lists the number of activated hardware device licenses or other licenses in your software license file and the total number of available licenses on your system. Here you can easily see if you can still grow your system without purchasing additional licenses.

For a detailed overview of the status of your licenses activated on other sites, click the **License Details - All sites** link. See the **License Details - Current site** section below for the available information.

License Overview - All sites

[License Details - All Sites...](#)

License Type	Activated
Hardware Device	51 out of 100
Milestone Interconnect Camera	0 out of 100
Access control door	9 out of 2002
Transaction source	1 out of 101

If you have licenses for add-on products, you can see additional details about these under the add-on product specific nodes in the **Site Navigation Pane**.

License Details - Current Site

The **Activated** column lists the number of activated hardware device licenses or other licenses on this site.

You can also see the number of used device changes without activation (see "Device changes without activation (explained)" on page 69) and how many you have available per year in the **Changes without activation** column.

If you have licenses that you have not yet activated and that therefore run in a grace period, these are listed in the **In Grace Period** column. The expiration date of the first license which expires, appears in red below the table.

If you forget to activate licenses before the grace period expires, they will stop sending video to the system. These licenses are shown in the **Grace Period Expired** column. See also Activate licenses after grace period (on page 72).

If you have used more licenses than you have available, these are listed in the **Without License** column and cannot be used in your system. See also Get additional licenses (on page 73).

If you have licenses in a grace period, with an expired grace period or without license, a message will pop up to remind you every time you log into your Management Client.

License Details - Current Site: SYS-TEST3-W1

License Type	Activated	Changes without activation	In Grace Period	Grace Period Expired	Without License
Hardware Device	32	0 out of 10	0	0	0
Milestone Interconnect Camera	11	N/A	0	0	0
Access control door	9	N/A	0	0	0
Transaction source	1	N/A	0	0	0

Hardware devices without licenses are identified by an exclamation mark in the Management Client. Note that the exclamation mark is also used for other purposes. Place your mouse over the exclamation mark to see the purpose.

Features for activating licenses

Below the three tables are

- A check box for enabling automatic license activation and a link to edit the user credentials for automatic activation. For more information, see Automatic license activation (explained) (on page 71) and Enable automatic license activation (on page 71). If the automatic activation has failed, a failed message will appear in red. For more information, click the **Details** link.
- A drop-down list for manually activating licenses online or offline. For more information, see Activate licenses online (on page 72) and Activate licenses offline (on page 72).
- In the lower right corner of the page, you can see when your licenses were activated last (automatically or manually) and when the information on the page were refreshed. The time stamps are from the server and not from the local computer.

Note: Some licenses, such as XProtect Essential+, are installed with the automatic license activation enabled, and it is not possible to disable this setting.



Device changes without activation (explained)

On the **Basics > License Information** page, the column **Changes without activation** shows the number of hardware devices you can replace or add without having to activate your hardware device licenses and how many changes you have already made since the last activation. Hardware devices added within your device changes without activation run as fully activated hardware device licenses. One year after your last license activation, your number of used **device changes without activation** is automatically reset to zero. Once the reset happens, you can continue to add and replace hardware devices without activating the licenses.

The number of device changes without activation differs from installation to installation and is calculated based on several variables. For a detailed description, see How the number of device changes without activation is calculated (on page 70).

If your surveillance system is offline for longer periods of time, for example in cases with a surveillance system on a ship on a long cruise or a surveillance system in a very remote place without any Internet access, you can contact your Milestone reseller and request a higher number of device changes without activation.

You must explain why you think you qualify for a higher number of device changes without activation. Milestone decides each request on an individual basis. Should you be granted a higher number of device changes without activation, you must activate your licenses to register the higher number on your XProtect system.

How the number of device changes without activation is calculated

The device changes without activation are calculated based on three variables. If you have several installations of the Milestone software, the variables apply to each of them separately. The variables are:

- **C%** that is a fixed percentage of the total amount of activated licenses.
- **Cmin** that is a fixed minimum value of the number of device changes without activation.
- **Cmax** that is a fixed maximum value of the number of devices changes without activation.

The number of device changes without activation can never be lower than the **Cmin** value or higher than the **Cmax** value. The calculated value based on the **C%** variable changes according to how many activated devices you have on each installation in your system. Devices added with device changes without activation are not counted as activated by the **C%** variable.

Milestone defines the values of all three variables and the values are subject to change without notification. The values of the variables differ depending on the product.

For more information about the current default values for your product, go to My Milestone (<http://www.milestonesys.com/device-change-calculation>).

Examples based on C% = 15%, Cmin = 10 and Cmax = 100

A customer buys 100 hardware device licenses. He adds 100 cameras to his system. Unless he has enabled automatic license activation, his device changes without activation is still zero. He activates his licenses and he now has 15 device changes without activation.

A customer buys 100 hardware device licenses. He adds 100 cameras to his system and activates his licenses. His device changes without activation is now 15. The customer decides to delete a hardware device from his system. He has now 99 activated devices and his number of device changes without activation drops to 14.

A customer buys 1000 hardware device licenses. He adds 1000 cameras and activates his licenses. His device changes without activation is now 100. According to the **C%** variable, he should now have had 150 devices changes without activation, but the **Cmax** variable only allows him to have 100 devices changes without activation.

A customer buys 10 hardware device licenses. He adds 10 cameras to his system and activates his licenses. His number of device changes without activation is now 10 because of the **Cmin** variable. If the number was only calculated based on the **C%** variable, he would only have had 1 (15% of 10 = 1.5 rounded off to 1).

A customer buys 115 hardware device licenses. He adds 100 cameras to his system and activates his licenses. His device changes without activation is now 15. He adds another 15 cameras without activating them, using 15 out of 15 of his device changes without activation. He removes 50 of the cameras from the system and his device changes without activation goes down to 7. This means that 8 of the cameras previously added within the 15 device changes without activation go into a grace period. The customer now adds 50 new cameras. Because the customer activated 100 cameras on his system last time he activated his licenses, the device changes without activation goes back to 15 and the 8 cameras, which were moved into a grace period, moves back as device changes without activation. The 50 new cameras go into a grace period.

View license overview

You can access a license overview that lists licenses that are activated, in a grace period, expired and missing for all sites licensed via the same software license file.

- Click **License Overview**.

If the site is not a federated site or the connection is down, you can only view the number of activated licenses. N/A appears for licenses in a grace period, expired licenses, and missing licenses.

Automatic license activation (explained)

For easy maintenance and flexibility, Milestone recommends that you enable automatic license activation (on page 71) because it means less maintenance for you. Automatic activation of licenses requires that your management server is online.

When the requirements above are met, the system activates your hardware devices or other licenses a few minutes after you have added, removed or replaced hardware devices or made other changes, which affect the use of your licenses. Therefore, you never have to manually start a license activation, the number of used device changes without activation is always zero and no hardware devices are within a grace period and are in the risk of expiring. If one of your base licenses expire within a period of 14 days, your XProtect system will also - as an extra precaution - automatically try to activate your licenses every night.

The only time you have to manually activate your licenses, is when you have purchased additional licenses (see "Get additional licenses" on page 73), want to upgrade (see "Upgrade requirements" on page 56), if you have bought or renewed a Milestone Care subscription (see "License information" on page 67), or if Milestone has granted you a higher number of device changes without activation (see "Device changes without activation (explained)" on page 69).

Enable automatic license activation

1. On the **License Information** page, select **Enable automatic license activation**.
2. Enter the user name and password that you want to use with automatic license activation. The credentials are saved in a file on the management server.
 - If you are an existing user, enter your user name and password to log into the software registration system.
 - If you are a new user, click the **Create new user** link to set up a new user account and then follow the registration procedure. If you have not yet registered your Software License Code (SLC), you must do so.
3. Click **OK**.

If you later want to change your user name and/or the password for automatic activation, click the **Edit activation credentials** link.

Disable automatic license activation

Disable automatic license activation but keep the password for later use

- On the **License Information** page, deselect **Enable automatic license activation**. The password and user name are still saved on the management server.

Disable automatic license activation and delete password

- On the **License Information** page, click **Edit activation credentials**.
- Click **Delete password**.
- Confirm that you want to delete the password and user name from the management server.

Activate licenses online

Activate your licenses online if the computer that runs the management server has Internet access.

1. On the **License Information** node, select **Activate License Manually** and then **Online**.
2. The **Activate Online** dialog box opens.
 - If you are an existing user, enter your user name and password.
 - If you are a new user, click the **Create new user** link to set up a new user account. If you have not yet registered your Software License Code (SLC), you must do so.
3. Click **OK**.

If you receive an error message during online activation, follow the instructions on the screen to solve the issue. If you have followed the instructions and still cannot access online activation (<https://www.milestonesys.com/OnlineActivation/LicenseManagementService.aspx>), contact Milestone Support.

Activate licenses offline

If the computer that runs the management server does not have Internet access, you can activate licenses offline.

1. On the **License Information** node, select **Activate License Manually -> Offline -> Export License for Activation** to export a license request file (.lrq) with information about your added hardware devices.
2. The license request file (.lrq) is automatically given the same name as your SLC. If you have several sites, remember to make the name unique so you easily can identify which file belong to which site.
3. Copy the license request file to a computer with Internet access and log into our website (<http://online.milestonesys.com>) to obtain the activated software license file (.lic).
4. Copy the .lic file that has the same name as your license request file to your computer with Management Client.
5. In Management Client on the **License Information** page, select **Activate License Offline > Import Activated License**, and select the activated software license file to import it and thereby activate your licenses.
6. Click **Finish** to end the activation process.

Activate licenses after grace period

If you do not activate a license (hardware device, Milestone Interconnect Camera, or access control door licenses) within the grace period, the device becomes unavailable and cannot send data to the surveillance system.

- The device itself, its configuration and other settings are not removed from the system configuration.
- To be able to receive data from the expired device again, simply activate the license. For more information, see *Activate licenses offline* (on page 72) or *Activate licenses online* (on page 72).

Get additional licenses

If you want to add or if you have already added more hardware devices, Milestone Interconnect systems, or doors than you currently have licenses for, you must buy additional licenses to enable the devices to send data to your system.

- To get additional licenses for your system, contact your XProtect product reseller.

New licenses to your existing surveillance system version:

- Simply activate your licenses manually to get access to the new licenses. For more information, see [Activate licenses offline](#) (on page 72) or [Activate licenses online](#) (on page 72).

New licenses and an upgraded surveillance system version:

- You receive an updated software license file (**.lic**) (see ["Licenses \(explained\)"](#) on page 23) with the new licenses and the new version. You must use the new software license file during the installation of the new version. For more information, see [Upgrade requirements](#) (on page 56).

Licenses and hardware device replacement

You can replace a hardware device, such as a camera, licensed in your system with a new hardware device, and have the new hardware device activated and licensed instead.

If you remove a hardware device from a recording server, you free a hardware device license.

If you replace a camera with a similar camera (manufacturer, brand, and model), and give the new camera the same IP address, you maintain full access to all the camera's databases. In this case, you move the network cable from the old camera to the new one without changing any settings in the Management Client.

If you replace a hardware device with a different model, you must use the **Replace Hardware** wizard (see [Replace hardware](#) (on page 419)) to map all relevant databases of cameras, microphones, inputs, outputs, and settings.

If you have enabled automatic license activation (see ["Enable automatic license activation"](#) on page 71), the new hardware device is automatically activated. If you have used all your devices changes without activation (see ["Device changes without activation \(explained\)"](#) on page 69), you must manually activate your licenses. For more information, see [Activate licenses offline](#) (on page 72) or [Activate licenses online](#) (on page 72).

Site information

You can add additional information to a site for an easier identification of each site, for example, in a large Milestone Federated Architecture setup. Apart from the site name, you can describe:

- Address/location
- Administrator(s)
- Additional information

Update site information

To update site information:

1. Select **Edit**.

2. Select a tag.
3. Enter information in the **Value** field.
4. Click **OK**.

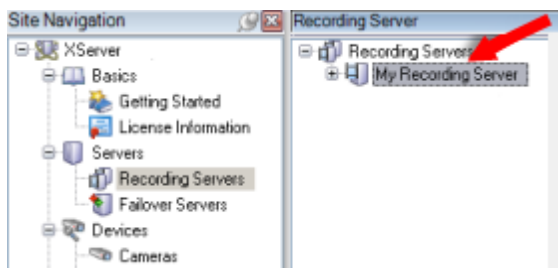
Servers and hardware

Recording servers

Recording servers (explained)

You use recording servers for recording of video feeds, and for communicating with cameras and other devices. A surveillance system typically consists of several recording servers.

Recording servers are computers where you have installed the recording server software, and configured it to communicate with a management server. You can see your recording servers in the **Overview** pane when you expand the **Servers** folder and then select **Recording Servers**.



Recording server listed in Overview pane

Backward compatibility with recording server versions older than this version of the management server is limited. You can still access recordings on recording servers with older versions, but if you want to change their configuration, make sure they match this version of the management server. Milestone recommends that you upgrade all recording servers in your system to the same version as your management server.

You have several options related to management of your recording servers:

- Authorize a recording server (on page 75)
- Add hardware (on page 101)
- Move hardware (on page 104)
- Delete all hardware (see "Delete all hardware on a recording server" on page 93)
- Remove a recording server (on page 93)

Important: When the Recording Server service is running, it is very important that Windows Explorer or other programs do not access Media Database files or folders associated with your system setup. If they do, it is likely that the recording server cannot rename or move relevant media files. This might bring the recording server to a halt. To restart a stopped recording server, stop the Recording Server service, close the program accessing the relevant media file(s) or folder(s), and restart the Recording Server service.

Authorize a recording server

If the connection between your management server and your recording server is broken, you must authorize the recording server to reestablish the connection.

Note: When you install a recording server, it is authorized automatically. You must authorize a recording server only if the recording server has been removed from the management server and then re-added.

When you authorize a recording server, you configure it to connect to your management server.

1. Right-click the required recording server in the **Overview** pane.
2. Select **Authorize Recording Server**:



3. After a moment, the recording server is authorized and ready for further configuration via the tabs. You can also Add hardware (on page 101).

Change/verify the basic configuration of a recording server

If your Management Client does not list all the recording servers you have installed, the most likely reason is that you have configured the setup parameters (for example, the IP address or host name of the management server) incorrectly during installation.

You do not need to re-install recording servers to specify the parameters of the management servers, but you can change/verify its basic configuration:

1. On the computer that runs the recording server, right-click the **Recording Server** icon in the notification area.
2. Select **Stop Recording Server service**.
3. Right-click the **Recording Server** icon again and select **Change Settings**.

The **Recording Server Settings** window appears.






4. Verify/change the following settings:
 - **Management server hostname/IP address:** Specify the IP address or host name of the management server to which the recording server should be connected.
 - **Management server port:** Specify the port number to be used when communicating with the management server. Default is port 9993. You can change this if required, but the port number must always match the port number set up on the management server.

5. Click **OK**.
6. To start the Recording Server service again, right-click the **Recording Server** icon, and select **Start Recording Server service**.

Important: Stopping the Recording Server service means that you cannot record and view live video while you verify/change the recording server's basic configuration.

Recording server status icons

The Management Client uses the following icons to indicate the state of individual recording servers:

Icon	Description
	Recording server is running
	Recording server is communicating
	<p>Recording server requires attention: This icon typically appears because the Recording Server service is stopped.</p> <ol style="list-style-type: none"> 1) Right-click the recording server icon in the notification area. 2) Start/stop the Recording Server service and view recording server status messages.
	<p>Recording server must be authorized: Appears when you load the recording server for the first time. When you first use a recording server, you must authorize it:</p> <ol style="list-style-type: none"> 1) Right-click the required recording server icon. 2) Select Authorize Recording Server. After a moment, the recording server is authorized and ready for further configuration.
	<p>Ongoing database repair: Appears when databases are corrupted, for example due to a power failure, and the recording server is repairing them. The repair process may take some time if the databases are large.</p> <p>See Protect recording databases from corruption (on page 59) for information about how to avoid corrupt databases.</p> <p>Important: During a database repair at startup, you cannot record video from cameras connected to the recording server. Only live viewing is available.</p> <p>A database repair at normal operation does not affect any recordings.</p>

Info tab (recording server)

You can verify or edit the name and description of a selected recording server on the **Info** tab.



Info tab, displaying information about a recording server.

Info tab properties

Name	Description
Name	Used when the recording server is listed in the system and clients. The name does not have to be unique. When you rename a recording server, the name is changed globally in the Management Client.
Description	The description appears in a number of listings within the system. A description is not mandatory.
Host name	Displays the recording server's host name.
Web server URL	Displays the URL of the recording server's web server. You use the web server, for example, for handling PTZ camera control commands, and for handling browse and live requests from XProtect Smart Client. The URL includes the port number used for web server communication (typically port 7563).
Time zone	Displays the time zone in which the recording server is located.

Storage tab (recording server)

On the **Storage** tab, you can set up, manage and view storages for a selected recording server.

For each level, the horizontal bar shows the current amount of free space.

If you are using **Evidence lock**, there will be a vertical red line showing the space used for evidence locked footage.



Storage and archiving (explained)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

When a camera records video or audio, all specified recordings are by default stored in the storage defined for the device. Each storage saves recordings in the recording database **Recording**. A storage has no default archive(s), but you can create these.

To avoid that the recording database runs full, you can create additional storages (see "Add a new recording storage" on page 80). You can also create archives (see "Create an archive within a storage" on page 80) within each storage and start an archiving process to store data.

Archiving is the automatic transfer of recordings from, for example, a camera's recording database to another location. In this way, the amount of recordings that you can store is not limited to the size of the recording database. With archiving you can also back up your recordings to another media.

You configure storage and archiving on a per-recording server basis.

As long as you store archived recordings locally or on accessible network drives, you can use XProtect Smart Client to view them. This is also how you view recordings stored in a cameras' regular databases.

The following mostly mentions cameras and video, but speakers, microphones, audio and sound also apply.

Important: Milestone recommends that you use a dedicated hard disk drive for the recording server database to prevent low disk performance. When you format the hard disk, it is important to change its **Allocation unit size** setting from 4 to 64 kilobytes. This is to significantly improve recording performance of the hard disk. You can read more about allocating unit sizes and find help on the Microsoft website (<http://support.microsoft.com/kb/140365/en-us>).

Important: The oldest data in a database is always auto-archived (or deleted if no next archive is defined) when less than 5GB of space is free. If less than 1GB space is free, data is deleted. A database always requires 250MB of free space. If you reach this limit because data is not deleted

fast enough, no more data is written to the database until you free up enough space. The actual maximum size of your database becomes the amount of gigabytes that you specify, minus 5GB.

Attaching devices to a storage

Once you have configured the storage and archiving settings for a recording server, you can enable storage and archiving for individual cameras or a group of cameras. This is done from the individual devices or from the device group. See [Attach a device or group of devices to a storage](#) (on page 81).

Effective archiving

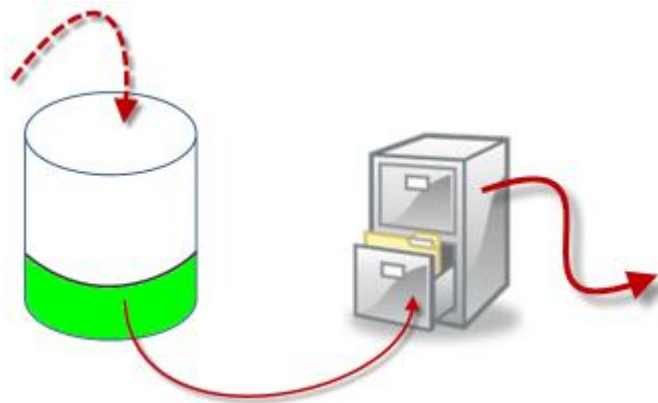
When you enable archiving for a camera or a group of cameras, the content of the camera database is automatically moved to an archive at intervals that you define.

Depending on your requirements, you can configure one or more archives for each of your databases. Archives can be located either on the recording server computer itself, or at another location which can be reached by the system, for example on a network drive.

By setting up your archiving in an effective way, you can prune your database storage usage if needed. Often, you want to make archived recordings take up as little space as possible especially on a long-term basis, where it is perhaps even possible to slacken image quality a bit. You can handle effective pruning from the **Storage** tab of a recording server by adjusting several interdependent settings:

- Recording database retention
- Recording database size
- Archive retention
- Archive size
- Archive schedule
- Encryption
- Frames Per Second (FPS).

The size fields define the size of the camera's database, exemplified by the cylinder, and its archive(s) respectively:



Recordings' way from recording database to archive to deletion

By means of retention time and size setting for the recording database, exemplified by the white area in the cylinder, you define how old recordings must be before they are archived. In our illustrated example, you archive the recordings when they are old enough to be archived.

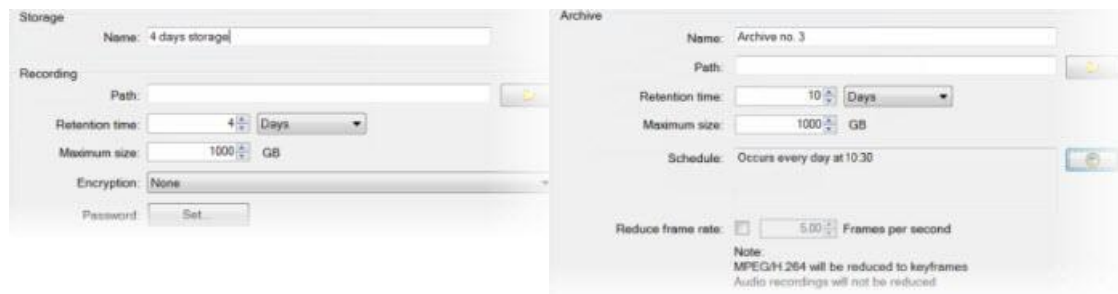
The retention time and size setting for archives define how long the recordings remain in the archive. Recordings remain in the archive for the time specified, or until the archive has reached the specified size limit. When these settings are met, the system begins to overwrite old recordings in the archive.

The archiving schedule defines how often and at what times archiving takes place.

FPS determines the size of the data in the databases.

To archive your recordings, you must set all these parameters up in accordance with each other. This means that the retention period of a next coming archive must always be longer than the retention period of a current archive or recording database. This is because the number of retention days stated for an archive includes all retention stated earlier in the process. Archiving must also always take place more frequently than the retention period, otherwise you risk losing data. If you have a retention time of 24 hours, any data older than 24 hours is deleted. Therefore, to get your data safely moved to the next archive, it is important to run archiving more often than every 24 hours.


Example: These storages (image to the left) have a retention time of 4 days and the following archive (image to the right) a retention time of 10 days. Archiving is set to occur every day at 10:30, ensuring a much more frequent archiving than retention time.



You can also control archiving by use of rules and events.

Add a new recording storage


You always create one storage with a predefined recording database named **Recording**. You cannot rename it. Apart from a recording database, a storage can contain a number of archives.

1. To add an extra storage to a selected recording server, click the  button located below the **Storage configuration** list. This opens the **Storage and Recording Settings** dialog box.
2. Specify the relevant settings (see "Storage and Recording Settings properties" on page 85).
3. Click **OK**.

If needed, you are now ready to create archive(s) within your new storage. See Create an archive within a storage (on page 80).

Create an archive within a storage

A storage has no default archive when it is created.

1. To create an archive, select the relevant storage in the **Recording and archiving configuration** list.
2. Click the  button below the **Recording and archiving configuration** list.

3. In the **Archive Settings** dialog box, specify the required settings (see Archive settings properties (on page 86)).
4. Click **OK**.


Attach a device or group of devices to a storage

Once a storage area is configured for a recording server, you can enable it for individual devices such as cameras, microphones or speakers or a group of devices. You can also select which of a recording server's storage areas you want to use for the individual device or the group.

1. Expand **Devices** and select either **Cameras**, **Microphones** or **Speakers** as required.
2. Select the device or a device group.
3. Select the **Record** tab.
4. In the **Storage** area, select **Select**.
5. In the dialog box that appears, select the database that should store the recordings of the device and then click **OK**.
6. In the toolbar, click **Save**.

When you click the device usage number for the storage area on the Storage tab of the recording server, the device is visible in the message report that appears.

Edit settings for a selected storage or archive

1. To edit a storage, select its recording database in the **Recording and archiving configuration** list. To edit an archive, select the archive database.
2. Click the **Edit Recording Storage** button  located below the **Recording and archiving configuration** list.
3. Either edit a recording database or edit an archive.

If you change the maximum size of a database, the system auto-archives recordings that exceed the new limit. It auto-archives the recordings to the next archive or deletes them depending on archiving settings.

Enable digital signing for export

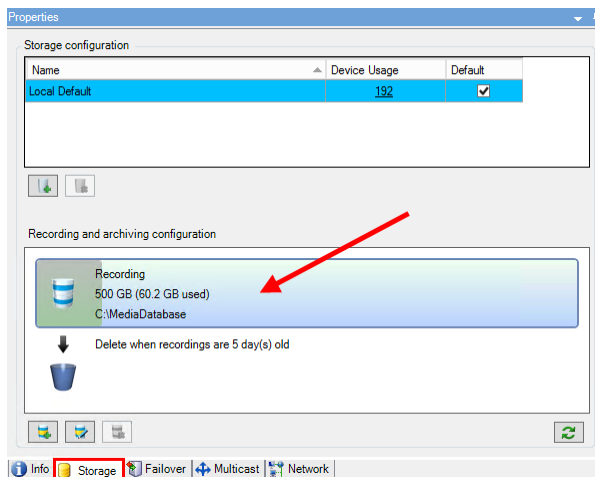
Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

You can enable digital signing for recorded video, so that client users can verify that the recorded video has not been tampered with since it was recorded. Verifying the authenticity of the video is something that the user does in XProtect Smart Client – Player after the video has been exported.

Signing must also be activated in XProtect Smart Client in the **Export** dialog. Otherwise, the **Verify Signatures** button in XProtect Smart Client – Player is not displayed.

1. In the **Site Navigation** pane, expand the **Servers** node.
2. Click **Recording Servers**.
3. In the overview pane, click the recording server you want to enable signing for.

- At the bottom of the **Properties** pane, click the **Storage** tab.



- In the **Recording and archiving configuration** section, double-click the horizontal bar that represents the recording database. The **Storage and Recording Settings** window appears.
- Select the **Signing** check box.
- Click **OK**.

Back up archived recordings

Many organizations want to back up their recordings by using tape drives or similar. Exactly how you do this is highly individual and depends on the backup media used in your organization. However, the following is worth bearing in mind:

Back up archives rather than camera databases

Always create backups based on the content of archives, not based on individual camera databases. If you create backups based on the content of individual camera databases, you may cause sharing violations or other malfunctions.

When scheduling a backup, make sure the backup job does not overlap with your specified archiving times. To view each recording server's archiving schedule in each of a recording server's storage areas, see the Storage tab.

Know your archive structure so that you can target backups

When you archive recordings, you store them in a certain sub-directory structure within the archive.

During all regular use of your system, the sub-directory structure is completely transparent to the system's users when they browse all recordings with the XProtect Smart Client. This is true both with archived and non-archived recordings. It is relevant to know the sub-directory structure if you want to back up your archived recordings. See Archive structure (explained) (on page 82) and Backing up and restoring configuration (see "Backing up and restoring system configuration" on page 410).

Archive structure (explained)

When you archive recordings, they are stored in a certain sub-directory structure within the archive.

During all regular use of your system, the sub-directory structure is completely transparent to the system's users, as they browse all recordings with the XProtect Smart Client regardless of whether the recordings are archived or not. Knowing the sub-directory structure is primarily interesting if you want to back up your archived recordings.

In each of the recording server's archive directories, the system automatically creates separate sub-directories. These sub-directories are named after the name of the device and the archive database.

Because you can store recordings from different cameras in the same archive, and since archiving for each camera is likely to be performed at regular intervals, further sub-directories are also automatically added.

These sub-directories each represent approximately an hour's worth of recordings. The one-hour split makes it possible to remove only relatively small parts of an archive's data if you reach the maximum allowed size of the archive.

The sub-directories are named after the device, followed by an indication of where the recordings came from (edge camera or via SMTP), **plus** the date and time of the most recent database record contained in the sub-directory.

Naming structure:

```
...[Storage Path]\[Storage name]\[device-name] - plus date and time of most recent recording\
```

If from edge camera:

```
...[Storage Path]\[Storage name]\[device-name] (Edge) - plus date and time of most recent recording\
```

If from SMTP:

```
...[Storage Path]\[Storage name]\[device-name] (SMTP) - plus date and time of most recent recording\
```

Real life example:

```
...F:\OurArchive\Archive1\Camera 1 on Axis Q7404 Video Server(10.100.50.137) - 2011-10-05T11:23:47+02:00\
```

Sub-directories:

Even further sub-directories are automatically added. The amount and nature of these sub-directories depend on the nature of the actual recordings. For example, several different sub-directories are added if the recordings are technically divided into sequences. This is often the case if you have used motion detection to trigger recordings.

- **Media:** This folder contains the actual media that is either video or audio (not both).
- **MotionLevel:** This folder contains motion level grids generated from the video data using our motion detection algorithm. This data allows the Smart Search feature in XProtect Smart Client to do very fast searches.
- **Motion:** In this folder, the system stores motion sequences. A motion sequence is a time slice for which motion has been detected in the video data. This information is, for example, used in the time line in XProtect Smart Client.
- **Recording:** In this folder, the system stores recording sequences. A recording sequence is a time slice for which there are coherent recordings of media data. This information is, for example, used to draw the time line in XProtect Smart Client.
- **Signature:** This folder holds the signatures generated for the media data (in the Media folder). With this information, you can verify that the media data has not been tampered with since it was recorded.

If you want to back up your archives, you can target your backups if you know the basics of the sub-directory structure.

Examples of backup:

To back up the content of an entire archive, back up the required archive directory and all of its content. For example, everything under:

```
...F:\OurArchive\
```

To back up the recordings from a particular camera from a particular period of time, back up the contents of the relevant sub-directories only. For example, everything under:

```
...F:\OurArchive\Archive1\Camera 1 on Axis Q7404 Video Server(10.100.50.137)
- 2011-10-05T11:23:47+02:00\
```

Delete an archive from a storage

1. Select the archive from the **Recording and archiving configuration** list.

It is only possible to delete the last archive in the list. The archive does not have to be empty.

2. Click the  button located below the **Recording and archiving configuration** list.
3. Click **Yes**.

Delete a storage

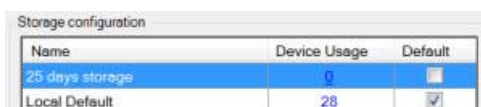
You cannot delete the default storage or storages that devices use as the recording storage for live recordings.

This means that you may need to move devices (see "Move hardware" on page 104) and any not yet archived recordings to another storage before you delete the storage.


1. To see the list of devices that use this storage, click the device usage number.

If the storage has data from devices that have been moved to another recording server, a warning appears. Click the link to see the list of devices.

2. Follow the steps in Move non-archived recordings from one storage to another (on page 84).
3. Continue until you have moved all devices.
4. Select the storage that you want to delete.



Name	Device Usage	Default
25 days storage	0	<input type="checkbox"/>
Local Default	28	<input checked="" type="checkbox"/>

5. Click the  button located below the **Storage configuration** list.
6. Click **Yes**.

Move non-archived recordings from one storage to another

You move recordings from one live recording database to another from the **Record** tab of the device.

1. Select the device type. In the **Overview** pane, select the device.

2. Click the **Record** tab. In the upper part of the **Storage** area, click **Select**.
3. In the **Select Storage** dialog box, select the database.
4. Click **OK**.
5. In the **Recordings Action** dialog box, select if you want to remove already existing - but **non-archived** - recordings to the new storage or if you want to delete them.
6. Click **OK**.

Storage and Recording Settings properties

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

In the **Storage and Recording Settings** dialog box, specify the following:

Name	Description
Name	Rename the storage if needed. Names must be unique.
Path	Specify the path to the directory to which you save recordings in this storage. The storage does not necessarily have to be located on the recording server computer. If the directory does not exist, you can create it. Network drives must be specified by using UNC (Universal Naming Convention) format, example: \\server\volume\directory\.
Retention time	Specify for how long recordings should stay in the archive before they are deleted or moved to the next archive (depending on archive settings). The retention time must always be longer than the retention time of the previous archive or the default recording database. This is because the number of retention days specified for an archive includes all the retention periods stated earlier in the process.
Maximum size	Select the maximum number of gigabytes of recording data to save in the recording database. Recording data in excess of the specified number of gigabytes is auto-moved to the first archive in the list - if any is specified - or deleted. Important: When less than 5GB of space is free, the system always auto-archives (or deletes if no next archive is defined) the oldest data in a database. If less than 1GB space is free, data is deleted. A database always requires 250MB of free space. If you reach this limit (if data is not deleted fast enough), no more data is written to the database until you have freed enough space. The actual maximum size of your database is the amount of gigabytes you specify, minus 5GB.
Signing	Enables a digital signature to the recordings. This means, for example, that the system confirms that exported video has not been modified or tampered with when played back. The system uses the SHA-2 algorithm for digital signing.

Name	Description
Encryption	<p>Select the encryption level of the recordings:</p> <ul style="list-style-type: none"> • None • Light (Less CPU usage) • Strong (More CPU usage) <p>The system uses the AES-256 algorithm for encryption.</p> <p>If you select Light, a part of the recording is encrypted. If you select Strong, the whole recording is encrypted. Both options are equally secure.</p> <p>If you choose to enable encryption, you must also specify a password below.</p>
Password	<p>Enter a password for the users allowed to view encrypted data.</p> <p>Milestone recommends that you use strong passwords. Strong passwords do not contain words that can be found in a dictionary or are part of the user's name. They include eight or more alphanumeric characters, upper and lower cases, and special characters.</p>

Archive Settings properties

In the **Archive Settings** dialog box, specify the following:

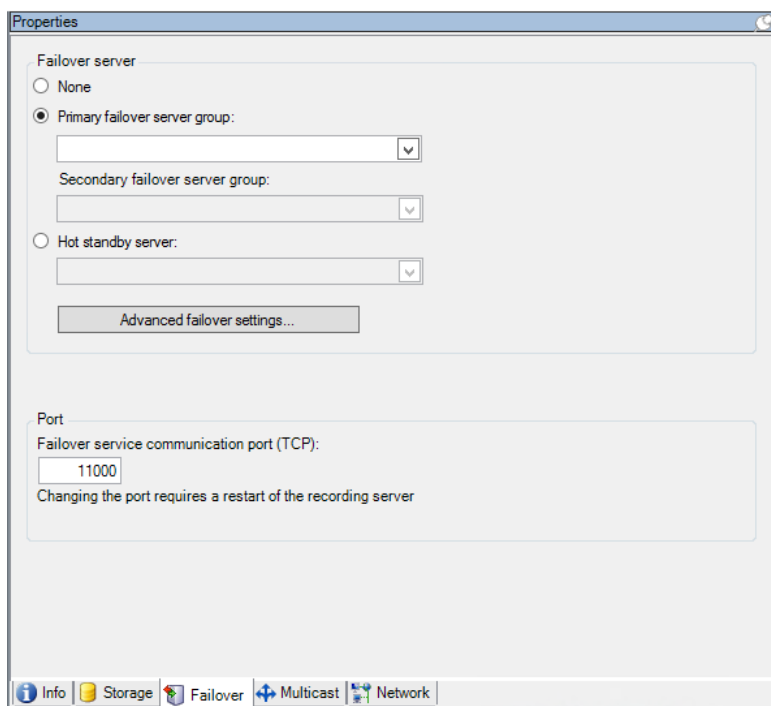
Name	Description
Name	Rename the storage if needed. Names must be unique.
Path	<p>Specify the path to the directory to which you save recordings in this storage. The storage does not necessarily have to be located on the recording server computer.</p> <p>If the directory does not exist, you can create it. Network drives must be specified by using UNC (Universal Naming Convention) format, example: \\server\volume\directory\.</p>
Retention time	<p>Specify for how long recordings should stay in the archive before they are deleted or moved to the next archive (depending on archive settings).</p> <p>The retention time must always be longer than the retention time of the previous archive or the default recording database. This is because the number of retention days specified for an archive includes all the retention periods stated earlier in the process.</p>

Name	Description
Maximum size	<p>Select the maximum number of gigabytes of recording data to save in the recording database.</p> <p>Recording data in excess of the specified number of gigabytes is auto-moved to the first archive in the list - if any is specified - or deleted.</p> <p>Important: When less than 5GB of space is free, the system always auto-archives (or deletes if no next archive is defined) the oldest data in a database. If less than 1GB space is free, data is deleted. A database always requires 250MB of free space. If you reach this limit (if data is not deleted fast enough), no more data is written to the database until you have freed enough space. The actual maximum size of your database is the amount of gigabytes you specify, minus 5GB.</p>
Schedule	<p>Specify an archiving schedule that outlines the intervals with which the archiving process should start. You can archive very frequently (in principle every hour all year round), or very infrequently (for example, every first Monday of every 36 months).</p>
Reduce frame rate	<p>To reduce FPS when archiving, select the Reduce frame rate check box and set a frame per second (FPS).</p> <p>Reduction of frame rates by a selected number of FPS makes your recordings take up less space in the archive, but it also reduces the quality of your archive.</p> <p>MPEG-4/H.264/H.265 reduces automatically to key-frames as a minimum.</p> <p>0.1 = 1 frame per 10 seconds.</p>

Failover tab (recording server)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

If your organization uses failover recording servers, use the **Failover** tab to assign failover servers to recording servers, see Failover tab properties (on page 89).



For details on failover recording servers, installation and settings, failover groups and their settings, see Failover recording servers (explained) (on page 93).

Assign failover recording servers

On the **Failover** tab of a recording server, you can choose between three types of failover setups:

- No failover setup
- A primary/secondary failover setup (cold standby)
- A hot standby setup.

If you select **b** and **c**, you must select the specific server/groups. With **b**, you can also select a secondary failover group. If the recording server becomes unavailable, a failover recording server from the primary failover group takes over. If you have also selected a secondary failover group, a failover recording server from the secondary group takes over in case all failover recording servers in the primary failover group are busy. In this way, you only risk not having a failover solution in the rare case when all failover recording servers in the primary, as well as in the secondary, failover group are busy.

1. In the **Site Navigation** pane, select **Servers > Recording Servers**. This opens a list of recording servers.
2. In the **Overview** pane, select the wanted recording server, go to the **Failover** tab.
3. To choose failover setup type, select between:
 - **None**
 - **Primary failover server group/Secondary failover sever group**

- **Hot standby server.**

You cannot select the same failover group as both primary and secondary failover group nor select regular failover servers already part of a failover group as hot standby servers.

4. Next, click **Advanced failover settings**. This opens the **Advanced Failover Settings** window, listing all devices attached to the selected recording server. If you selected **None**, Advanced failover settings are available. Any selections are kept for later failover setups.
5. To specify the level of failover support, select **Full Support**, **Live Only** or **Disabled** for each device in the list. Click **OK**.
6. In the **Failover service communication port (TCP)** field, edit the port number if needed.

Failover tab properties

Name	Description
None	Select a setup without failover recording servers.
Primary failover server group / Secondary failover sever group	Select a regular failover setup with one primary and possibly one secondary failover server group.
Hot standby server	Select a hot standby setup with one dedicated recording server as hot standby server.
Advanced failover settings	<p>Opens the Advanced Failover Settings window.</p> <ul style="list-style-type: none"> • Full Support: Enables full failover support for the device. • Live Only: Enables only failover support for live streams on the device. • Disabled: Disables failover support for the device.
Failover service communication port (TCP)	By default, the port number is 11000. You use this port for communication between recording servers and failover recording servers. If you change the port, the recording server must be running and must be connected to the management server.

Multicast tab (recording server)

Your system supports multicasting of live streams from recording servers. If multiple XProtect Smart Client users want to view live video from the same camera, multicasting helps saving considerable system resources. Multicasting is particularly useful if you use the Matrix functionality, where multiple clients require live video from the same camera.

Multicasting is only possible for live streams, not for recorded video/audio.

If a recording server has more than one network interface card, it is only possible to use multicast on one of them. Through the Management Client you can specify which one to use.

If you are using failover servers, remember to also specify the IP address of the network interface card on the failover servers (see "Multicast tab (failover server)" on page 100).

The successful implementation of multicasting also requires that you have set up your network equipment to relay multicast data packets to the required group of recipients only. If not, multicasting may not be different from broadcasting, which can significantly slow down network communication.

Multicasting (explained)

In regular network communication, each data packet is sent from a single sender to a single recipient - a process known as unicasting. But with multicasting you can send a single data packet (from a server) to multiple recipients (clients) within a group. Multicasting can help save bandwidth.

- When you use **unicasting**, the source must transmit one data stream for each recipient.
- When you use **multicasting**, only a single data stream is required on each network segment.

Multicasting as described here is **not** streaming of video from camera to servers, but from servers to clients.

With multicasting, you work with a defined group of recipients, based on options such as IP address ranges, the ability to enable/disable multicast for individual cameras, the ability to define largest acceptable data packet size (MTU), the maximum number of routers a data packet must be forwarded between (TTL), and so on.

Multicasting should not be confused with **broadcasting**, which sends data to everyone connected to the network, even if the data is perhaps not relevant for everyone:

Name	Description
Unicasting	Sends data from a single source to a single recipient.
Multicasting	Sends data from a single source to multiple recipients within a clearly defined group.

Name	Description
Broadcasting	Sends data from a single source to everyone on a network. Broadcasting can therefore significantly slow down network communication.

Enable multicasting

To use multicasting, your network infrastructure must support the IP multicasting standard IGMP (Internet Group Management Protocol).

- On the **Multicast** tab, select the **Multicast** check box.

If the entire IP address range for multicast is already in use on one or more recording servers, you first release some multicast IP addresses before you can enable multicasting on additional recording servers.

Assign IP address range

Specify the range you want to assign as addresses for multicast streams from the selected recording server. The clients connect to these addresses when the users view multicast video from the recording server.

For each multicast camera feed, the IP address and port combination must be unique (IPv4 example: 232.0.1.0:6000). You can either use one IP address and many ports, or many IP addresses and fewer ports. By default, the system suggests a single IP address and a range of 1000 ports, but you can change this as required.

IP addresses for multicasting must be within the range defined for dynamic host allocation by IANA. IANA is the authority overseeing global IP address allocation.

Name	Description
IP address	In the Start field, specify the first IP address in the required range. Then specify the last IP address in the range in the End field.
Port	In the Start field, specify the first port number in the required range. Then specify the last port number in the range in the End field.
Source IP address for all multicast streams	<p>You can only multicast on one network interface card, so this field is relevant if your recording server has more than one network interface card or if it has a network interface card with more than one IP address.</p> <p>To use the recording server's default interface, leave the value 0.0.0.0 (IPv4) or :: (IPv6) in the field. If you want to use another network interface card, or a different IP address on the same network interface card, specify the IP address of the required interface.</p> <ul style="list-style-type: none"> • IPv4: 224.0.0.0 to 239.255.255.255. • IPv6, the range is described on the IANA website (http://www.iana.org).

Specify datagram options

Specify the settings for data packets (datagrams) transmitted through multicasting.

Name	Description
MTU	Maximum Transmission Unit, the largest allowed physical data packet size (measured in bytes). Messages larger than the specified MTU are split into smaller packets before they are sent. The default value is 1500, which is also the default on most Windows computers and Ethernet networks.
TTL	Time To Live, the largest allowed number of hops a data packet should be able to travel before it is discarded or returned. A hop is a point between two network devices, typically a router. Default value is 128.

Enable multicasting for individual cameras

Multicasting only works when you enable it for the required cameras:

1. Select the recording server and select the required camera in the **Overview** pane.
2. On the **Client** tab, select the **Live multicast** check box. Repeat for all required cameras.

Network tab (recording server)

You define a recording server's public IP address on the **Network** tab.

Why use a public address?

When an access client, such as XProtect Smart Client, connects to a surveillance system, an amount of initial data communication, including the exchange of contact addresses, is shared in the background. This happens automatically, and is completely transparent to the users.

Clients may connect from the local network as well as from the Internet, and in both cases the surveillance system must provide suitable addresses so the clients can get access to live and recorded video from the recording servers:

- When clients connect locally, the surveillance system should reply with local addresses and port numbers.
- When clients connect from the Internet, the surveillance system should reply with the recording server's public address. This is the address of the firewall or NAT (Network Address Translation) router, and often also a different port number. The address and the port can then be forwarded to the server's local address and port.

To provide access to the surveillance system from outside a NAT (Network Address Translation) firewall, you can use public addresses and port forwarding. This allows clients from outside the firewall to connect to recording servers without using VPN (Virtual Private Network). Each recording server can be mapped to a specific port and the port can be forwarded through the firewall to the server's internal address.

Define public address and port

1. To enable public access, select the **Enable public access** check box.

2. Define the recording server's public address. Enter the address of the firewall or NAT router so clients that access the surveillance system from the Internet can connect to the recording servers.
3. Specify a public port number. It is always a good idea that port numbers used on the firewall or NAT router are different from the ones used locally.

If you use public access, configure the firewall or NAT router so requests sent to the public address and port are forwarded to the local address and port of relevant recording servers.

Assign local IP ranges

You define a list of local IP ranges which the surveillance system should recognize as coming from a local network.

- On the **Network** tab, click **Configure**.

Remove a recording server

Important: If you remove a recording server, all configuration specified in the Management Client is removed for the recording server, including **all** of the recording server's associated hardware (cameras, input devices, and so on).

1. Right-click the recording server you want to remove in the **Overview** pane.
2. Select **Remove Recording Server**.
3. If you are sure, click **Yes**.
4. The recording server and all of its associated hardware are removed.

Delete all hardware on a recording server

Important: When you delete hardware, all recorded data related to the hardware is deleted permanently.

1. Right-click the recording server on which you want to delete all hardware.
2. Select **Delete All Hardware**.
3. Confirm the deletion.

Failover servers

Failover recording servers (explained)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

A failover recording server is an extra recording server which takes over from the standard recording server if this becomes unavailable. You can configure a failover recording server in two modes, as a **cold standby server** or as a **hot standby server**.

You install failover recording servers like standard recording servers (see "Install a failover recording server" on page 97). Once you have installed failover recording servers, they are visible in the Management Client. Milestone recommends that you install all failover recording servers on

separate computers. Make sure that you configure failover recording servers with the correct IP address/hostname of the management server and that you verify that the user account under which the Failover Server service runs has access to your system with administrator rights.

You can specify what type of failover support you want on device-level. For each device on a recording server, select full, live only or no failover support. This helps you prioritize your failover resources and, for example, only set up failover for video and not for audio, or only have failover on essential cameras, not on less important ones.

Important: While your system is in failover mode, you are unable to multicast, replace or move hardware, update the recording server, or change device configurations such as storage settings or video stream settings.

Cold standby failover recording servers

In a cold standby failover recording server setup, you group multiple failover recording servers in a failover group. The entire failover group is dedicated to take over from any of several preselected recording servers, if one of these becomes unavailable. You can create as many groups as you want (see "Group failover recording servers for cold standby" on page 98).

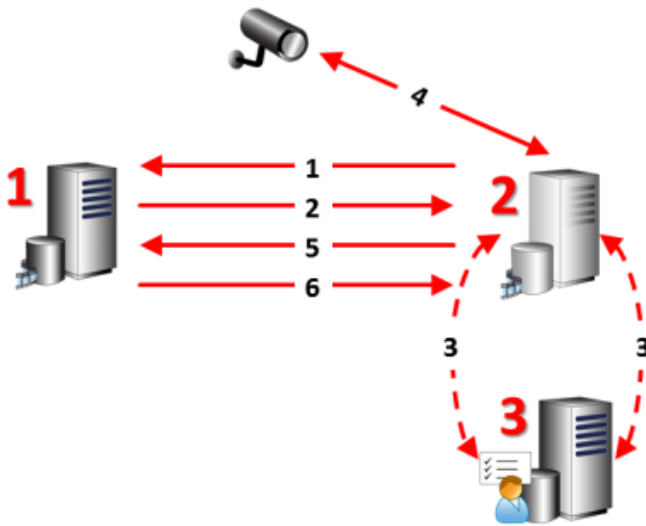
Grouping has a clear benefit: when you later specify which failover recording servers should take over from a recording server, you select a group of failover recording servers. If the selected group contains more than one failover recording server, this offers you the security of having more than one failover recording server ready to take over if a recording server becomes unavailable. You can specify a secondary failover server group that takes over from the primary group if all the recording servers in the primary group are busy. A failover recording server can only be a member of one group at a time.

Failover recording servers in a failover group are ordered in a sequence. The sequence determines the order in which the failover recording servers will take over from a recording server. By default, the sequence reflects the order in which you have incorporated the failover recording servers in the failover group: first in is first in the sequence. You can change this if you need to.

Hot standby failover recording servers

In a hot standby failover recording server setup, you dedicate a failover recording server to take over from **one** recording server only. Because of this, the system can keep this failover recording server in a "standby" mode which means that it is synchronized with the correct/current configuration of the recording server it is dedicated to and can take over much faster than a cold standby failover recording server. As mentioned, you assign hot standby servers to one recording server only and cannot group it. You cannot assign failover servers that are already part of a failover group as hot standby recording servers.

Failover steps (explained)



Involved **servers** (numbers in red):

1. Recording server
2. Failover recording server
3. Management server.

Failover steps for **Cold standby** setups:

1. To check whether it is running or not, a failover recording server has a non-stop TCP connection to a recording server.
2. This connection is interrupted.
3. The failover recording server requests the current configuration of the recording server from the management server. The management server sends the requested configuration, the failover recording server receives the configuration, starts up, and starts recording on behalf of the recording server.
4. The failover recording server and the relevant camera(s) exchange video data.
5. The failover recording server continually tries to re-establish connection to the recording server.
6. When the connection to the recording server is re-established, the failover recording server shuts down and the recording server fetches video data (if any) recorded during its down-time and the video data is merged back in to the recording server database.

Failover steps for **Hot standby** setups:

1. To check whether it is running or not, a hot standby server has a non-stop TCP connection to its assigned recording server.
2. This connection is interrupted.
3. From the management server, the hot standby server already knows the current configuration of its assigned recording server and starts recording on its behalf.
4. The hot standby server and the relevant camera(s) exchange video data.
5. The hot standby server continually tries to re-establish connection to the recording server.
6. When the connection to the recording server is re-established and the hot standby server goes back to hot standby mode, the recording server fetches video data (if any) recorded during its down-time and the video data is merged back in to the recording server database.

Failover recording server functionality (explained)

- A failover recording server checks the state of relevant recording servers every 0.5 seconds. If a recording server does not reply within 2 seconds, the recording server is considered unavailable and the failover recording server takes over.
- A cold standby failover recording server takes over for the recording server that has become unavailable after five seconds plus the time it takes for the failover recording server's Recording Server service to start and the time it takes to connect to the cameras. In contrast, a hot standby failover recording server takes over faster because the Recording Server service is already running with the correct configuration and only has to start its cameras to deliver feeds. During the startup period, you can neither store recordings nor view live video from affected cameras.
- When a recording server becomes available again, it automatically takes over from the failover recording server. Recordings stored by the failover recording server are automatically merged into the standard recording server's databases. The time it takes to merge, depends on the amount of recordings, network capacity and more. During the merging process, you cannot browse recordings from the period during which the failover recording server took over.
- If a failover recording server must take over from another recording server during the merging process in a cold standby failover recording server setup, it postpones the merging process with recording server A, and takes over from recording server B. When recording server B becomes available again, the failover recording server takes up the merging process with recording server A, after which it begins merging with recording server B. In a hot standby setup, a hot standby server cannot take over for another recording server because it can only be hot standby for a single recording server. But if that recording server fails again, the hot standby takes over again and keeps the recordings from the previous period. The recording server keeps recordings until they are merged back to the primary recorder or until the failover recording server runs out of disk space.
- A failover solution does not provide complete redundancy. It can only serve as a reliable way of minimizing the downtime. If a recording server becomes available again, the Failover Server service makes sure that the recording server is ready to store recordings again. Only then is the responsibility for storing recordings handed back to the standard recording server. So, a loss of recordings at this stage of the process is very unlikely.
- Client users hardly notice that a failover recording server is taking over. A short break occurs, usually only for a few seconds, when the failover recording server takes over. During this break, users cannot access video from the affected recording server. Client users can resume viewing live video as soon as the failover recording server has taken over. Because recent recordings are stored on the failover recording server, they can play back recordings from after the failover recording server took over. Clients cannot play back older recordings stored only on the affected recording server until that recording server is functioning again and has taken over from the failover recording server. You cannot access archived recordings. When the recording server is functioning again, a merging process takes place during which failover recordings are merged back into the recording server's database. During this process, you cannot play back recordings from the period during which the failover recording server took over.
- In a cold standby setup, setting up one failover recording server as backup for another failover recording server is not necessary. This is because you do not allocate particular failover recording servers to take over from a standard recording server. Instead, you allocate failover groups. A failover group must contain at least one failover recording server, but you can add as many failover recording servers as needed. Provided a failover group contains more than one failover recording server, more than one failover recording server can take over. In a hot standby setup, you cannot set up a failover recording servers or hot standby servers for a hot standby server.

Install a failover recording server

Important: During the installation process, you are asked to specify a user account under which the **Failover Server service** should run. This user account must have administrator rights in the system. Note also that if you run workgroups, you should ignore the normal installation guidelines for installing recording servers and use the alternative installation method for workgroups (see "Installation for workgroups" on page 45).

Once you have installed the management server using the common installer, download the separate recording server installer from the management server's web page. As part of this installer, specify if you want to install a standard recording server or a failover recording server.

1. Go to the Management server's download web page and select the Recording Server installer. Save the installer somewhere appropriate and run it from here or run it directly from the web page.
2. Select the **Language** you want to use during the installation. Click **Continue**.
3. From the selection list, select **Failover** to install a recording server as a failover recording server.
4. Specify failover recording server properties. Click **Continue**.
5. When installing a failover recording server you must use the particular user account labeled **This account**. If needed, enter a password and confirm this. Click **Continue**.
6. Select **Files location** for the program file. In **Product language**, select the language in which to install your system. Click **Install**.
7. The software now installs. When done, you see a list of successfully installed components. Click **Close**.

When you have installed the failover recording server, you can check its state from the **Failover Server service** icon.

Set up and enable failover recording servers

Important: If you have disabled the failover recording server, you must enable it before it can take over from the standard recording servers.

Do the following to enable a failover recording server and edit its basic properties:

1. In the **Site Navigation** pane, select **Servers > Failover Servers**. This opens a list of installed failover recording servers and failover groups.
2. In the **Overview** pane, select the required failover recording server.
3. Right-click and select **Enabled**. The failover recording server is now enabled.
4. To edit failover recording server properties, go to the **Info** tab.
5. When done, go to the **Network** tab. Here you can define the failover recording server's public IP address and more. This is relevant if you use NAT (Network Address Translation) and port forwarding. See the standard recording server's **Network** tab for more information.

To see the status of a failover recording server, hold your mouse over the icon in the system tray. A tooltip appears containing the text entered in the Description field of the failover recording server. This may help you determine which recording server the failover recording server is configured to take over from.




Important: The failover recording server pings the management server on a regular basis to verify that it is online and able to request and receive the configuration of the standard recording servers when needed. If you block the pinging, the failover recording server is not able to take over from the standard recording servers.

Group failover recording servers for cold standby

1. Select **Servers > Failover Servers**. This opens a list of installed failover recording servers and failover groups.
2. In the **Overview** pane, right-click the top-node **Failover Groups** and select **Add Group**.
3. Specify a name (in this example *Failover Group 1*) for and a description (optional) of your new group. Click **OK**.
4. Right-click the group (*Failover Group 1*) you just created. Select **Edit Group Members**. This opens the **Select Group Members** window.
5. Drag and drop or use the buttons to move the selected failover recording server(s) from the left side to the right side. Click **OK**. The selected failover recording server(s) now belongs to the group (*Failover Group 1*) you just created.
6. Go to the **Sequence** tab. Click **Up** and **Down** to set the internal sequence of the regular failover recordings servers in the group.

Read failover recording server status icons

The following icons represent the status of failover recording servers (icons are visible in the **Overview** pane):

Icon	Description
	The failover recording server is either waiting or "watching". When waiting, the failover recording server is not configured to take over from any recording server yet. When "watching", the failover recording server is configured to watch one or more recording servers.
	The failover recording server has taken over from the designated recording server. If you place your cursor over the server icon, you see a tooltip. Use the tooltip to see which recording server the failover recording server has taken over from.
	Connection to the failover recording server is broken.

Failover recording server properties

Specify the following failover recording server properties:

Name	Description
Name	The name of the failover recording server as it appears in the Management Client, logs and more.

Name	Description
Description	An optional field that you can use to describe the failover recording server, for example which recording server it takes over from.
Host name	Displays the network address of the failover recording server. You cannot change this.
UDP port	The port number used for communication between failover recording servers. Default port is 8844.
Database location	Specify the path to the database used by the failover recording server for storing recordings. You cannot change the database path while the failover recording server is taking over from a recording server. The system applies the changes when the failover recording server is no longer taking over from a recording server.
Enable this failover server	Clear to disable the failover recording server (selected by default). Note that you must disable failover recording servers before they can take over from recording servers.

Failover group properties

The **Info** tab:

Field	Description
Name	The name of the failover group as it appears in the Management Client, logs and more.
Description	An optional description, for example the server's physical location.

The **Sequence** tab:

Field	Description
Specify the failover sequence	Use Up and Down to set the wanted sequence of regular failover recording servers within the group.

Failover recording server services (explained)

A failover recording server has two services installed:

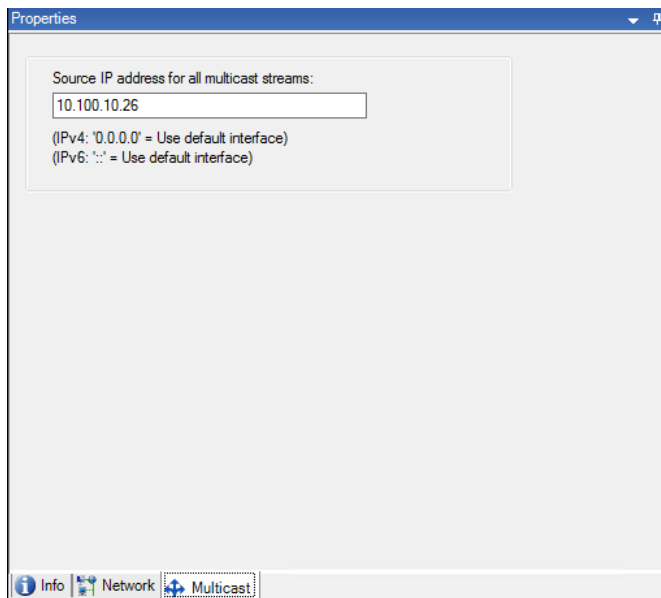
- A Failover Server service, which handles the processes of taking over from the recording server. This service is always running, and constantly checks the state of relevant recording servers.
- A Failover Recording Server service, which enables the failover recording server to act as a recording server.

In a cold standby setup, this service is only started when required, that is when the cold standby failover recording server takes over from the recording server. Starting this service typically takes a couple of seconds, but may take longer depending on local security settings and more.

In a hot standby setup, this service is always running, allowing the hot standby server to take over faster than the cold standby failover recording server.

Multicast tab (failover server)

If you are using failover servers, and you have enabled multicasting of live streaming, you must specify the IP address of the network interface card you are using, on both the recording servers and the failover servers.



For more information about multicasting, see [Multicasting \(explained\)](#) (on page 90) or [Multicast tab \(recording server\)](#) (on page 89).

View status messages

1. On the failover recording server, right-click the **Milestone Failover Server service** icon.
2. Select **Show Status Messages**. The **Failover Server Status Messages** window appears, listing time-stamped status messages.

Change the management server address

The failover recording server must be able to communicate with your system's management server. You specify the IP address/hostname of the management server during the installation of the failover recording server. If you want to change the address of the management server, do as follows:

1. On the failover recording server, stop the Failover Recording Server service.
2. Right-click the notification area's Failover Recording Server service icon again.

3. Select **Change Settings**. The **Failover Recording Server Settings** window appears, so you can specify the IP address or host name of the management server with which the failover recording server should communicate.

View version information

Knowing the exact version of your **Failover Recording Server service** is an advantage if you need to contact product support.

1. On the failover recording server, right-click the **Milestone Failover Recording Server service** icon.
2. Select **About**.
3. A small dialog box opens that shows the exact version of your **Failover Recording Server service**.

Hardware and remote servers

Hardware (explained)

Hardware represents either:

- The physical unit that connects directly to the recording server of the surveillance system via IP, for example a camera, a video encoder, an I/O module or,
- a recording server on a remote site in a Milestone Interconnect setup.

See Add hardware (on page 101) to read about how to add hardware to your system.

Add hardware

You have several options for adding hardware for each recording server you have authorized on your system.

Important: If your hardware is located behind a NAT-enabled router or a firewall, you may need to specify a different port number and configure the router/firewall so it maps the port and IP addresses that the hardware uses.

The **Add Hardware** wizard helps you detect hardware like cameras and video encoders on your network and add them to the recording servers on your system. The wizard also helps you add remote recording servers for Milestone Interconnect setups. Only add hardware to **one recording server** at a time.

1. To access **Add Hardware**, right-click the required recording server and select **Add Hardware**.
2. Select one of the wizard options (see below) and follow the instruction on the screen.
3. After installation, you can see the hardware and its devices in the **Overview** pane.

Name	Description
Express (Recommended)	<p>The system scans automatically for new hardware on the recording server's local network.</p> <p>Select the Show hardware running on other recording servers check box to see if detected hardware is running on other recording servers.</p> <p>You can select this option every time you add new hardware to your network and want to use it in your system.</p> <p>You cannot use this option to add remote systems in Milestone Interconnect setups.</p>
Address range scanning	<p>The system scans your network for relevant hardware and Milestone Interconnect remote systems based on your specifications of:</p> <ul style="list-style-type: none"> • hardware user names and passwords. Not needed if your hardware uses the factory default user names and passwords. • drivers • IP ranges (IPv4 only) • port number (default = 80) <p>You can select this option when you only want to scan a part of your network, for example, when you expand your system.</p>
Manual	<p>Specify details about each hardware and Milestone Interconnect remote systems separately. This can be a good choice if you want to add only a few pieces of hardware, and you know their IP addresses, relevant user names and passwords or if a camera does not support the automatic discovery function.</p>
Remote connect hardware	<p>The system scans for hardware connected via a remotely connected server.</p> <p>You can use this option if you have installed servers for, for example, the Axis One-click Camera Connection.</p> <p>You cannot use this option to add remote systems in Milestone Interconnect setups.</p>

Disable/enable hardware

Added hardware is by default **enabled**.

You can see if hardware is enabled or disabled in this way:



Enabled



Disabled

To disable added hardware, for example, for licensing or performance purposes:

1. Expand the recording server, right-click the hardware you want to disable.
2. Select **Enabled** to clear or select it.

Edit hardware

You can edit basic settings, such as IP address/host name, for added hardware:

1. Expand the recording server, right-click the hardware you want to edit.
2. Select **Edit Hardware**. This opens the **Edit Hardware** window, where you can edit relevant properties.
3. Click **OK**.

Enable/disable individual devices

Cameras are by default **enabled**.

Microphones, speakers, metadata, inputs and outputs are by default **disabled**.

This means that microphones, speakers, metadata, inputs and outputs must be individually enabled before you can use them in the system. The reason for this is that surveillance systems rely on cameras, whereas the use of microphones and so on is highly individual depending on the needs of each organization.

You can see if devices are enabled or disabled (the examples show an output):



Disabled



Enabled

The same method for enabling/disabling is used for cameras, microphones, speakers, metadata, inputs, and outputs.

1. Expand the recording server and the device. Right-click the device you want to enable.
2. Select **Enabled** to clear or select it.



Set up a secure connection to the hardware

You can set up a secure HTTPS connection using SSL (Secure Sockets Layer) between the hardware and the recording server.

Consult your camera vendor to get a certificate for your hardware and upload it to the hardware, before you continue with the steps below:

1. In the **Overview** pane, right-click the recording server and select the hardware.



Selecting hardware under a recording server

2. On the **Settings** tab, enable HTTPS. This is not enabled by default.
3. Enter the port on the recording server to which the HTTPS connection is connected. The port number must correspond with the port set up on the device's homepage.
4. Make changes as needed and save.

Move hardware

Moving hardware (explained)

You can move hardware between recording servers that belong to the same site. After a move, the hardware and its devices run on the new recording server and new recordings are stored on this server. The move is transparent to the client users.

The recordings on the old recording server remain there until:

- The system deletes them when the retention time expires. Recordings that someone has protected with Evidence Lock (see "Evidence lock (explained)" on page 238) is not deleted until the evidence lock's retention time expires. You define the retention time for evidence locks when you create them. Potentially the retention time never expires.
- You delete them from each device's new recording server on the **Record** tab.

If you try to remove a recording server that still contains recordings, you receive a warning.

If you move hardware to a recording server that currently has no hardware added to it, the client users must log out and log in to receive data from the devices.

You can use the move hardware feature to:

- **Load balance:** If, for example, the disk on a recording server is overloaded, you can add a new recording server and move some of your hardware.
- **Upgrade:** If you, for example, have to replace the server that hosts the recording server with a newer model, you can install a new recording server and move the hardware from the old server to the new server.
- **Replace a defective recording server:** If, for example, the server is offline and will never come online again, you can move the hardware to other recording servers and thereby keep the system running. You cannot access the old recordings. See also Replace a recording server (on page 421).

Remote recordings

When you move hardware to another recording server, the system cancels ongoing or scheduled retrievals from interconnected sites or edge storages on cameras. The recordings are not deleted, but the data is not retrieved and saved in the databases as expected. You receive a warning if this

is the case. For the XProtect Smart Client user, who has started a retrieval when you initiate moving the hardware, the retrieval fails. The XProtect Smart Client user is notified and can try again later.

If someone has moved hardware on a remote site, you must manually synchronize the central site with the **Update hardware** option to reflect the new configuration of the remote site. If you do not synchronize, the moved cameras remain disconnected on the central site.

See also

Move hardware (wizard) (on page 105)

Move hardware (wizard)

To move hardware from one recording server to another, run the **Move hardware** wizard. The wizard takes you through the necessary steps to complete a move for one or more hardware devices.

Requirements

Before you start the wizard:

- Make sure that the new recording server can access the physical camera via the network.
- Install the recording server (on page 41) that you want to move hardware to.
- Authorize it (see "Authorize a recording server" on page 75) and verified that it is online.
- Install the same device pack versions (see "Video device drivers (explained)" on page 422) on the new recording server that you run on the existing server.

To run the wizard:

1. In the **Site Navigation** pane, select **Recording Servers**.
2. In the **Overview** pane, right-click the recording server you want to move hardware from or right-click a specific hardware device.
3. Select **Move Hardware**.

If the recording server that you move hardware from is disconnected, an error message appears. You should only choose to move hardware from a disconnected recording server if you are sure that it will never come online again. If you move hardware anyway and the server comes back online, you risk an unexpected behavior from the system due to having the same hardware running on two recording servers for a period. Possible issues are, for example, license errors or events that are not sent to the correct recording server.

4. If you started the wizard from the recording server level, the **Select the hardware you want to move** page appears. Select the hardware devices you want to move.
5. On the **Select the recording server you want to move the hardware to** page, select from the list of recording servers installed on this site.
6. On the **Select the storage you want to use for future recordings** page, the storage usage bar indicates the free space in the recording database for live recordings only, not the archives. The total retention time is the retention period for both the recording database and the archives.
7. The system processes your request.

8. If the move was successful, click **Close**. If you select the new recording server in the Management Client, you can see the moved hardware and now recordings are stored on this server.

If the move failed, you can troubleshoot the issue below.

In an interconnected system, you must manually synchronize the central site after moving hardware on a remote site to reflect the changes you, or another system administrator, made at the remote site.

Move hardware troubleshooting

If a move did not succeed, one of the following reasons can be the cause:


Error type	Troubleshooting
The recording server is not connected or in failover mode.	Make sure that the recording server is online. You may need to authorize it. If the server is in failover mode, wait and try again.
The recording server is not the latest version.	Update the recording server so it runs the same version as the management server.
The recording server could not be found in the configuration.	Make sure that you have authorized the recording server or that it has not been removed.
Updating the configuration or communication with the configuration database failed.	Make sure that your SQL server is connected and running.
Stopping the hardware on the current recording server failed	Maybe another process has locked the recording server or the recording server is in error mode. Make sure that the recording server is running and try again.
The hardware does not exist.	Make sure that the hardware you try to move has not simultaneously been removed from the system by another user. The scenario is quite unlikely.
The recording server that hardware was moved from is back online, but you chose to ignore it when it was offline.	Most likely, you have accepted that the old recording server will never get online again when you started the Move Hardware wizard, but during the move, the server came online. Start the wizard again, and select No when you are asked to confirm if the server comes online again.

Manage hardware

Info tab (hardware)

For information about the **Info** tab for remote servers, see Info tab (remote server) (on page 109).

Info tab (hardware)

Name	Description
Name	<p>Enter a name. The system uses the name whenever the hardware is listed in the system and in the clients. The name does not have to be unique.</p> <p>When you rename hardware, the name is changed globally in the Management Client.</p>
Description	<p>Enter a description of the hardware (optional). The description appears in a number of listings within the system. For example, when pausing the mouse pointer over the hardware name in the Overview pane:</p>  <p>Example from a camera.</p>
Model	Identifies the hardware model.
Version	Displays the firmware version of the system as specified by the manufacturer.
Serial number	Hardware serial number as specified by the manufacturer. The serial number is often, but not always, identical to the MAC address.
Driver	Identifies the driver that handles the connection to the hardware.
IE	Opens the default home page of the hardware vendor. You can use this page for administration of the hardware.
Address	The host name or IP address of the hardware.
MAC address	Specifies the Media Access Control (MAC) address of the system hardware. A MAC address is a 12-character hexadecimal number uniquely identifying each piece of hardware on a network.

Settings tab (hardware)

On the **Settings** tab, you can verify or edit settings for the hardware.

The content of the **Settings** tab is determined by the selected hardware, and varies depending on the type of hardware. For some types of hardware, the **Settings** tab displays no content at all or read-only content.

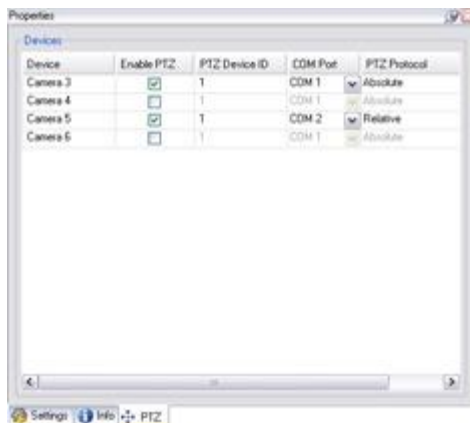
For information about the **Settings** tab for remote servers, see Settings tab (remote server) (on page 110).

PTZ tab (video encoders)

On the **PTZ** tab, you can enable PTZ (pan-tilt-zoom) for video encoders. The tab is available if the selected device is a video encoder or if the driver supports both non-PTZ and PTZ cameras.

You must enable the use of PTZ separately for each of the video encoder's channels on the **PTZ** tab before you can use the PTZ features of the PTZ cameras attached to the video encoder.

Not all video encoders support the use of PTZ cameras. Even video encoders that support the use of PTZ cameras may require configuration before the PTZ cameras can be used. It is typically the installation of additional drivers through a browser-based configuration interface on the device's IP address.



PTZ tab, with PTZ enabled for two channels on a video encoder

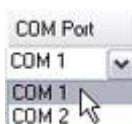
Enable PTZ on a video encoder

To enable the use of PTZ cameras on a video encoder, do the following on the **PTZ** tab:

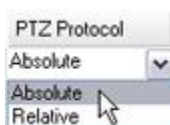
1. In the list of devices connected to the video encoder, select the **Enable PTZ** box for the relevant cameras:



2. In the **PTZ Device ID** column, verify the ID of each camera.
3. In the **COM Port** column, select which video encoder's COM (serial communications) ports to use for control of the PTZ functionality:



4. In the **PTZ Protocol** column, select which positioning scheme you want to use:



- **Absolute:** When operators use PTZ controls for the camera, the camera is adjusted relative to a fixed position, often referred to as the camera's home position

- **Relative:** When operators use PTZ controls for the camera, the camera is adjusted relative to its current position

The content of the **PTZ protocol** column varies a lot depending on the hardware. Some have 5 to 8 different protocols. See also the camera documentation.

5. In the toolbar, click **Save**.

You are ready to configure preset positions and patrolling for each PTZ camera:

- Add a preset position (type 1) (on page 137)
- Add a patrolling profile (on page 144)

Manage remote servers

Info tab (remote server)

Name	Description
Name	The system uses the name whenever the remote server is listed in the system and clients. The name does not have to be unique. When you rename a server, the name is changed globally in the Management Client.
Description	Enter a description of the remote server (optional). The description appears in a number of listings within the system. For example, when pausing the mouse pointer over the hardware name in the Overview pane.
Model	Displays the XProtect product installed at the remote site.
Version	Displays the version of the remote system.
Software license code	The software license code of the remote system.
Driver	Identifies the driver that handles the connection to the remote server.
Address	The host name or IP address of the hardware.
IE	(Applies only to Milestone Arcus™-enabled hardware) Opens the default home page of the hardware vendor. You can use this page for administration of the hardware or system.
Remote system ID	The unique system ID of the remote site used by XProtect to, for example, manage licenses.
Windows user name	Enter the Windows user name for access through the remote desktop. Does not apply to Milestone Arcus-enabled hardware.
Windows password	Enter the Windows password for access through the remote desktop. Does not apply to Milestone Arcus-enabled hardware.

Name	Description
Connect	<p>Opens a remote connection to the remote site (if Windows credentials are approved).</p> <p>Does not apply to Milestone Arcus-enabled hardware.</p>

Settings tab (remote server)

On the **Settings** tab, you can view the name of the remote system.

Events tab (remote server)

You can add events from the remote system to your central site in order to create rules and thereby respond immediately to events from the remote system. The number of events depend on the events configured in the remote system. You cannot delete default events.

If the list appears to be incomplete:

1. Right-click the relevant remote server in the **Overview** pane and select **Update Hardware**.
2. The dialog box lists all changes (devices removed, updated and added) in the remote system since you established or last refreshed the Milestone Interconnect setup. Click **Confirm** to update your central site with these changes.

Remote Retrieval tab

On the **Remote Retrieval** tab, you can handle remote recording retrieval settings for the remote site in a Milestone Interconnect setup:

Specify the following properties:

Name	Description
Retrieve recordings at max	Determines the maximum bandwidth in Kbits/s to be used for retrieving recordings from a remote site. Select the check box to enable limiting retrievals.
Retrieve recordings between	<p>Determines that retrieval of recordings from a remote site are limited to a specific time interval.</p> <p>Unfinished jobs at the end time continue until completion, so if the end time is critical, you need to set it earlier to allow for unfinished jobs to complete.</p> <p>If the system receives an automatic retrieval or request for retrieval from the XProtect Smart Client outside the time interval, it is accepted, but not started until the selected time interval is reached.</p> <p>You can view pending remote recording retrieval jobs initiated by the users from System Dashboard -> Current Tasks.</p>

Name	Description
Retrieve on devices in parallel	Determines the maximum number of devices from which recordings are retrieved simultaneously. Change the default value if you need more or less capacity depending on your system's capabilities.

When you change the settings, it may take several minutes until the changes are reflected in the system.

None of the above applies to direct playback of remote recordings.
All cameras set to be played back directly is available for direct playback and use bandwidth as needed.

Devices

The devices appear in the Management Client when you add hardware with the **Add Hardware** wizard.

You can manage devices via the device groups if they have the same properties, see Device groups (explained) (on page 111).

You can also manage the devices individually:

- Cameras
- Microphones
- Speakers
- Metadata
- Inputs
- Outputs

See Devices (explained) (on page 114).

Working with device groups

Device groups (explained)

Grouping of devices into device groups is part of the **Add Hardware** wizard, but you can always modify the groups and add more groups if needed.

You can benefit from grouping different types of devices (cameras, microphones, speakers, metadata, inputs, and outputs) on your system:

- Device groups help you maintain an intuitive overview of devices on your system.
- Devices can exist in several groups.
- You can create subgroups and subgroups in subgroups.
- You can specify common properties for all devices within a device group in one go.

- Device properties set via the group are not stored for the group but on the individual devices.
- When dealing with roles, you can specify common security settings for all devices within a device group in one go.
- When dealing with rules, you can apply a rule for all devices within a device group in one go.

You can add as many device groups as required, but you cannot mix different types of devices (for example cameras and speakers) in a device group.



Example: cameras grouped into device groups

Create device groups with **less** than 400 devices so you can view and edit all properties.

If you delete a device group, you only delete the device group itself. If you want to delete a device, for example a camera, from your system, do it on the recording server level.

The following examples are based on grouping cameras into device groups, but the principles apply for all devices:

Add a device group (on page 112)

Specify which devices to include in a device group (on page 113)

Specify common properties for all devices in a device group (on page 113)

Add a device group

1. In the **Overview** pane, right-click the device type under which you want to create a device group.
2. Select **Add Device Group**.
3. In the **Add Device Group** dialog box, specify a name and description of the new device group:



The description appears when you pause the mouse pointer over the device group in the device group list.

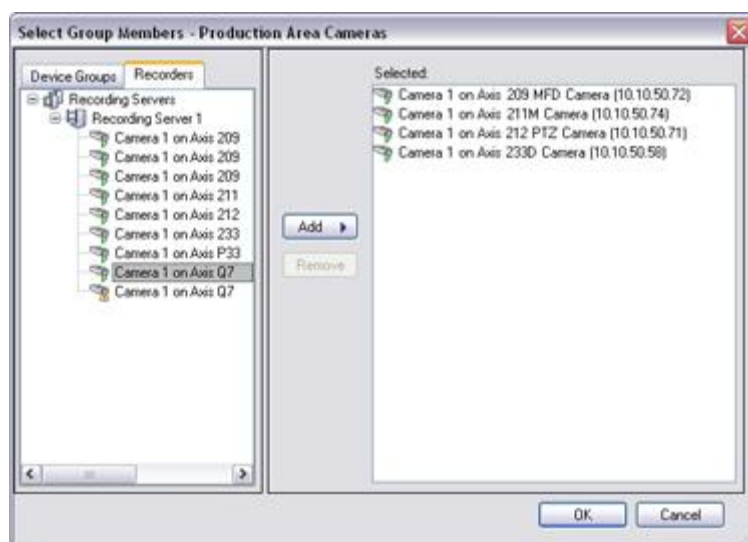
4. Click **OK**. A folder representing the new device group appears in the list.
5. Continue with Specify which devices to include in a device group (on page 113).

Specify which devices to include in a device group

1. In the **Overview** pane, right-click the relevant device group folder.
2. Select **Edit Device Group Members**.
3. In the **Select Group Members** window, select one of the tabs to locate the device.

A device can be a member of more than one device group.

4. Select the devices you want to include, and click **Add** or double-click the device:



5. Click **OK**.
6. If you exceed the limit of 400 devices in one group, you can add device groups as subgroups under other device groups:



Specify common properties for all devices in a device group

With device groups, you can specify common properties for all devices within a given device group:

1. In the **Overview** pane, click the device group.
In the **Properties** pane, all properties **which are available on all of the device group's devices** are listed and grouped on tabs.

2. Specify the relevant common properties.

On the **Settings** tab, you can switch between settings for **all** devices and settings for individual devices.

3. In the toolbar, click **Save**. The settings are saved on the individual devices, not in the device group.

Working with devices

Devices (explained)

Hardware has a number of devices that you can manage individually, for example:

- A physical camera has devices that represent the camera part (lenses) as well as microphones, speakers, metadata, input and output either attached or built-in.
- A video encoder has multiple analog cameras connected that appear in one list of devices that represent the camera part (lenses) as well as microphones, speakers, metadata, input and output either attached or built-in.
- An I/O module has devices that represent the input and output channels for, for example, lights.
- A dedicated audio module has devices that represent microphones and speaker inputs and outputs.
- In a Milestone Interconnect setup, the remote system appears as hardware with all devices from the remote system listed in one list.

The system automatically adds the hardware's devices when you add hardware.

For information about supported hardware, see the supported hardware page on the Milestone website (<https://www.milestonesys.com/supported-hardware>).

The following sections describe each of the device types with links to the tabs you can use to manage them.

Camera devices (explained)

Camera devices are added automatically when you add hardware to the system and are by default enabled.

Camera devices deliver video streams to the system that the client users can use to view live video or that the system can record for later playback by the client users. Roles determine the users' right to view video.

For information about supported hardware, see the supported hardware page on the Milestone website (<https://www.milestonesys.com/supported-hardware>).

The system comes with a default start feed rule which ensures that video feeds from all connected cameras are automatically fed to the system. Like other rules, the default rule can be deactivated and/or modified as required.

Enabling/disabling and renaming of individual devices take place on the recording server hardware. See Enable/disable devices via device groups (on page 119).

For all other configuration and management of cameras, expand **Devices** in the Site Navigation pane, then select **Cameras**. In the Overview pane, you group your cameras for an easy overview of your cameras. Initial grouping is done as part of the **Add hardware** wizard.

Follow this configuration order to complete the most typical tasks related to configuration of a camera device:

1. Configure camera settings (see Settings tab (see "Settings tab (devices)" on page 122)).

2. Configure streams (see Streams tab (see "Streams tab (devices)" on page 123)).
3. Configure motion (see Motion tab (see "Motion tab (devices)" on page 131)).
4. Configure recording (see Record tab (see "Record tab (devices)" on page 125)).
5. Configure the remaining settings as needed.

Microphone devices (explained)

On many devices, you can attach external microphones. Some devices have built-in microphones.

Microphone devices are added automatically when you add hardware to the system. They are by default disabled, so you must enable them before use, either as part of the **Add Hardware** wizard or afterwards. Microphones do not require separate licenses. You can use as many microphones as required on your system.

You can use microphones completely independently of cameras.

Microphone devices deliver audio streams to the system that the client users can listen to live or the system can record for later playback by the client users. You can set up the system to receive microphone specific events that trigger relevant actions.

For information about supported hardware, see the supported hardware page on the Milestone website (<https://www.milestonesys.com/supported-hardware>).

Roles determine the users' right to listen to microphones. You cannot listen to microphones from the Management Client.

The system comes with a default start audio feed rule which ensures that audio feeds from all connected microphones are automatically fed to the system. Like other rules, the default rule can be deactivated and/or modified as required.

Enabling/disabling and renaming of individual devices take place on the recording server hardware. See Enable/disable devices via device groups (on page 119).

For all other configuration and management of cameras, expand **Devices** in the Site Navigation pane, then select **Microphones**. In the Overview pane, you group your microphones for an easy overview. Initial grouping is done as part of the **Add hardware** wizard.

You can configure microphone devices on these tabs:

- Info tab (see "Info tab (devices)" on page 120)
- Settings tab (see "Settings tab (devices)" on page 122)
- Record tab (see "Record tab (devices)" on page 125)
- Events tab (see "Events tab (devices)" on page 149)

Speaker devices (explained)

On many devices you can attach external speakers. Some devices have built-in speakers.

Speaker devices are added automatically when you add hardware to the system. They are by default disabled, so you must enable them before use, either as part of the **Add Hardware** wizard or afterwards. Speakers do not require separate licenses. You can use as many speakers as required on your system.

You can use speakers completely independently of cameras.

For information about supported hardware, see the supported hardware page on the Milestone website (<https://www.milestonesys.com/supported-hardware>).

The system sends an audio stream to the speakers when a user presses the talk button in XProtect Smart Client. Speaker audio is only recorded when talked to by a user. Roles determine users' right to talk through speakers. You cannot talk through speakers from the Management Client.

If two users want to speak at the same time, the roles determine users' right to talk through speakers. As part of the roles definition, you can specify a speaker priority from very high to very low. If two users want to speak at the same time, the user whose role has the highest priority wins the ability to speak. If two users with the same role want to speak at the same time, the first-come first-served principle applies.

The system comes with a default start audio feed rule that starts the device so the device is ready to send user activated audio to the speakers. Like other rules, the default rule can be deactivated and/or modified as required.

Enabling/disabling and renaming of individual devices take place on the recording server hardware. See [Enable/disable devices via device groups](#) (on page 119).

For all other configuration and management of cameras, expand **Devices** in the Site Navigation pane, then select **Speakers**. In the Overview pane, you group your speakers for an easy overview. Initial grouping is done as part of the **Add hardware** wizard.

You can configure speaker devices on these tabs:

- Info tab (see "Info tab (devices)" on page 120)
- Settings tab (see "Settings tab (devices)" on page 122)
- Record tab (see "Record tab (devices)" on page 125)

Metadata devices (explained)

Metadata devices deliver data streams to the system that the client users can use to view data about data, for example, data that describes the video image, the content or objects in the image, or the location of where the image was recorded. Metadata can be attached to cameras, microphones, or speakers.

Metadata can be generated by:

- The device itself delivering the data, for example the camera delivering video.
- A third-party system or integration via a generic metadata driver.

The device-generated metadata is automatically linked to one or more devices on the same hardware.

For information about supported hardware, see the supported hardware page on the Milestone website (<https://www.milestonesys.com/supported-hardware>).

Roles determine the users' right to view metadata.

The system comes with a default start feed rule which ensures that metadata feeds from all connected hardware that supports metadata, are automatically fed to the system. Like other rules, the default rule can be deactivated and/or modified as required.

Enabling/disabling and renaming of individual devices take place on the recording server hardware. See [Enable/disable devices via device groups](#) (on page 119).

For all other configuration and management of metadata devices, expand **Devices** in the Site Navigation pane, then select **Metadata**. In the Overview pane, you group your metadata devices for an easy overview. Initial grouping is done as part of the **Add hardware** wizard.

You can configure metadata devices on these tabs:

- Info tab (see "Info tab (devices)" on page 120)

- Settings tab (see "Settings tab (devices)" on page 122)
- Record tab (see "Record tab (devices)" on page 125)

Input devices (explained)

On many devices, you can attach external units to input ports on the device. Input units are typically external sensors. You can use such external sensors, for example, for detecting if doors, windows, or gates are opened. Input from such external input units is treated as events by the system.

You can use such events in rules. For example, you could create a rule specifying that a camera should begin recording when an input is activated, and stop recording 30 seconds after the input is deactivated.

You can use input devices completely independently of cameras.

Before you specify use of external input units on a device, verify that the device itself recognizes the sensor operation. Most devices can show this in their configuration interfaces, or via Common Gateway Interface (CGI) script commands.

Input devices are added automatically when you add hardware to the system. They are by default disabled, so you must enable them before use, either as part of the **Add Hardware** wizard or afterwards. Input devices do not require separate licenses. You can use as many input devices as required on your system.

For information about supported hardware, see the supported hardware page on the Milestone website (<https://www.milestonesys.com/supported-hardware>).

Enabling/disabling and renaming of individual devices take place on the recording server hardware. See Enable/disable devices via device groups (on page 119).

For all other configuration and management of cameras, expand **Devices** in the Site Navigation pane, then select **Input**. In the Overview pane, you group your input devices for an easy overview. Initial grouping is done as part of the **Add hardware** wizard.

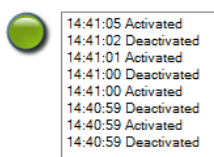
You can configure input devices on these tabs:

- Info tab (see "Info tab (devices)" on page 120)
- Settings tab (see "Settings tab (devices)" on page 122)
- Events tab (see "Events tab (devices)" on page 149)

Activate input manually for test

With the rules feature, you define rules that automatically activate or deactivate input or you can activate them manually and check the result in the Management Client:

1. In the **Overview** pane, select the relevant input device.
2. Activate the input on the physical device.
3. In the **Preview** pane, see if the indicator lights up green. Then the input device works.



Output devices (explained)

On many devices, you can attach external units to output ports on the device. This allows you to activate/deactivate lights, sirens, etc. through the system.

You can use output when creating rules. You can create rules that automatically activate or deactivate outputs, and rules that trigger actions when the state of an output is changed.

Output can be triggered manually from the Management Client and XProtect Smart Client.

Before you specify use of external output units on a device, verify that the device itself can control the device attached to the output. Most devices can show this in their configuration interfaces, or via Common Gateway Interface (CGI) script commands.

Output devices are added automatically when you add hardware to the system. They are by default disabled, so you must enable them before use, either as part of the **Add Hardware** wizard or afterwards. Output devices do not require separate licenses. You can use as many output devices as required on your system.

For information about supported hardware, see the supported hardware page on the Milestone website (<https://www.milestonesys.com/supported-hardware>).

Enabling/disabling and renaming of individual devices take place on the recording server hardware. See Enable/disable devices via device groups (on page 119).

For all other configuration and management of cameras, expand **Devices** in the Site Navigation pane, then select **Output**. In the Overview pane, you group your input devices for an easy overview. Initial grouping is done as part of the **Add hardware** wizard.

You can configure output devices on these tabs:

- Info tab (see "Info tab (devices)" on page 120)
- Settings tab (see "Settings tab (devices)" on page 122)


Activate output manually for test

With the rules feature, you define rules that automatically activate or deactivate output or you can activate them manually from a client.


You can activate an output manually from the Management Client to test the functionality:

1. In the **Overview pane**, select the relevant output device.
2. Typically, the following elements are shown for each output in the **Preview pane**:



3. Select/clear the check box ☒  to activate/deactivate the selected output. When an output is activated, the indicator lights up green:



4. Alternatively, click the rectangular button  to activate the output for the duration defined in the **Output Trigger Time** setting on the **Settings** tab (this feature/setting may not be available for all outputs). After the defined duration, the output is automatically deactivated.

Enable/disable devices via device groups

















You can enable/disable devices only via the configured hardware. Unless manually enabled/disabled in the add hardware wizard, camera devices are by default enabled and all other devices are by default disabled.

To locate a device via the device groups to enable or disable:

1. In the **Site Navigation** pane, select the device.
2. In the **Overview** pane expand the relevant group and find the device.
3. Right-click the device, and select **Go To Hardware**.
4. Click the plus node to see all devices on the hardware.
5. Right-click the device you want to enable/disable, and select **Enabled**.

Status icons of devices

When you select a device, information about the current status appears in the **Preview** pane. The following icons indicate the status of the devices:

Cam- era	Micro- phon e	Spea- ker	Met a- data	In- put	Out- put	Description
						Device enabled and retrieving data: The device is enabled and you retrieve a live stream.
						Device recording: The device is recording data on the system.
						Device temporarily stopped or has no feed: When stopped, no information is transferred to the system. If it is a camera, you cannot view live video. A stopped device can still communicate with the recording server for retrieving events, setting settings etc., as opposed to when a device is disabled.

Camera	Micro- phone	Speaker	Meta- data	Input	Output	Description
						Devices disabled: Cannot be started automatically through a rule and cannot communicate with the recording server. If a camera is disabled, you cannot view live or recorded video.
						Device database being repaired.
						Device requires attention: The device does not function correctly. Pause the mouse pointer over the device icon to get a description of the problem in the tooltip.
						Status unknown: Status of the device is unknown, for example, if the recording server is offline.
						Note that some icons can be combined, as in this example where Device enabled and retrieving data is combined with Device recording .

Info tab (devices)

Info tab (explained)

On the **Info** tab, you can view and edit basic information about a device in a number of fields. All devices have an **Info** tab.

Properties

Device information

Name:
Axis 211W Camera (10.100.50.65) - Camera 1

Description:

Hardware name:
Axis 211W Camera (10.100.50.65) →

Port number:
1

Example of **Info** tab from a camera.

Info tab properties

Name	Description
Name	<p>The name is used whenever the device is listed in the system and clients.</p> <p>When you rename a device, the name is changed globally in the Management Client.</p>
Description	<p>Enter a description of the device (optional).</p> <p>The description appears in a number of listings within the system. For example, when you pause the mouse pointer over the name in the Overview pane.</p>
Hardware name	<p>Displays the name of the hardware, with which the device is connected. The field is non-editable from here, but you can change it by clicking Go To next to it. This takes you to hardware information where you can change the name.</p>
Port number	<p>Displays the port on which the device is attached on the hardware.</p> <p>For single-device hardware, the port number is typically 1. For multi-device hardware, such as video servers with several channels, the port number typically indicates the channel on which the device is attached, for example 3.</p>
Short name	<p>To apply a short name for the camera, enter it here. The maximum length of characters is 128.</p> <p>If you are using smart map, automatically the short name is displayed with the camera on the smart map. Otherwise the full name is displayed.</p>
GPS coordinates	<p>Enter the geographic location of the camera in the format latitude, longitude. The value you enter determines the position of the camera icon on the smart map in XProtect Smart Client.</p> <p>The field is mainly for smart map and third party integrations.</p>
Direction	<p>Enter the viewing direction of the camera measured against a due north point on a vertical axis. The value you enter determines the direction of the camera icon on the smart map in XProtect Smart Client.</p> <p>The default value is 0.0.</p> <p>The field is mainly for smart map and third party integrations.</p>
Field of view	<p>Enter the field of view in degrees. The value you enter determines the field of view of the camera icon on the smart map in XProtect Smart Client.</p> <p>The default value is 0.0.</p> <p>The field is mainly for smart map and third party integrations.</p>
Depth	<p>Enter the depth of the camera in meters or feet. The value you enter determines the depth of the camera icon on the smart map in XProtect Smart Client.</p> <p>The default value is 0.0.</p> <p>The field is mainly for smart map and third party integrations.</p>

Name	Description
Preview position in browser	To verify that you have entered the correct GPS coordinates, click the button. Google Maps will open in your standard Internet browser on the position you specify.
	The field is mainly for smart map and third party integrations.

Settings tab (devices)

Settings tab (explained)

On the **Settings** tab, you can view and edit settings for a device in a number of fields. All devices have a **Settings** tab.

The values appear in a table as changeable or read-only. When you change a setting to a non-default value, the value appears **in bold**.

The content of the table depends on the device driver.

Allowed ranges appear in the information box below the settings table:

Properties

Axis 211W Camera

General	
Brightness	50
Include Date	No
Include Time	No
Rotation	0
Saturation	50
Sharpness	0
JPEG - streamed	
Compression	30
Frames per second	8
Resolution	640x480
JPEG 2 - streamed	
Compression	30
Frames per second	8
Resolution	640x480
JPEG 3 - streamed	
Compression	30
Frames per second	8
Resolution	640x480
MPEG-4 - streamed	
Bit rate control priority	Framerate
Frames per second	30
Maximum bit rate	3000
Maximum compression	100
Minimum compression	0
Resolution	640x480
Target bit rate	9900

Saturation
A numeric value between 0 and 100.

Settings tab, example from camera.

Camera settings (explained)

You can view or edit settings, such as:

- default frame rate
- resolution
- compression
- the maximum number of frames between keyframes
- on-screen date/time/text display for a selected camera, or for all cameras within a device group.

The drivers for the cameras determine the content of the **Settings** tab. The drivers vary depending on the type of camera.

For cameras that support more than one type of stream, for example MJPEG and MPEG-4/H.264/H.265, you can use multi-streaming, see Multi-streaming (explained) (on page 124).

When you change a setting, you can quickly verify the effect of your change if you have the **Preview** pane enabled. You cannot use the **Preview** pane to judge the effect of frame rate changes because the **Preview** pane's thumbnail images use another frame rate defined in the **Options** dialog box.

If you change the settings for **Max. frames between keyframes** and **Max. frames between keyframes mode**, it may lower the performance of some functionalities in XProtect Smart Client. For example, XProtect Smart Client requires a keyframe to start up showing video, so a longer period between keyframes, prolongs the XProtect Smart Client start up.

Streams tab (devices)

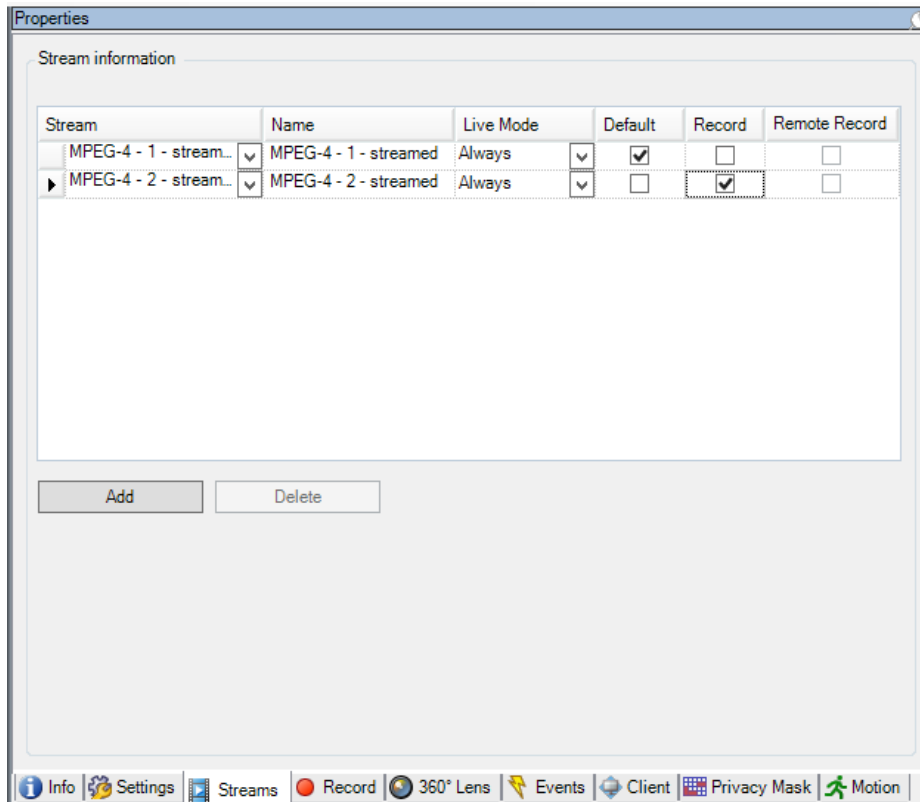
Streams tab (explained)

The following devices have a **Streams** tab:

- Cameras

The **Streams** tab lists by default a single stream. It is the selected camera's default stream, used for live and recorded video.

For live streaming, you can set up and use as many live streams as the camera supports, but you can only select one stream for recording at a time. To change which stream to use for recording, select the **Record** box for the stream to be recorded.



Multi-streaming (explained)

Playback of recorded video and viewing live video do not necessarily require the same video quality and frame rate to achieve the best result. You can have **either** one stream for live viewing and another stream for playback purposes **or** multiple separate live streams with different resolution, encoding, and frame rate.

Example 1, live and recorded video:

- For viewing **live** video, your organization may prefer H.264 at a high frame rate.
- For playing back **recorded** video, your organization may prefer MJPEG at a lower frame rate because this preserves disk space.

Example 2, multiple live videos:

- For viewing **live video from a local operating point**, your organization may prefer H.264 at a high frame rate to have the highest quality of video available.
- For viewing **live video from a remotely connected operating point**, your organization may prefer MJPEG at a lower frame rate and quality in order to preserve network bandwidth.

If you enable **Live multicast** on the camera's **Client** tab, it only works on the default video stream.

Even when cameras support multi-streaming, individual multi-streaming capabilities may vary between different cameras. See the camera's documentation for more information.

To see if a camera offers different types of streams, see the **Settings** tab.

Add a stream

1. On the **Streams** tab, click **Add**. This adds a second stream to the list.
2. In the **Name** column, edit the name of the stream. The name appears in XProtect Smart Client.
3. In the **Live Mode** column, select when live streaming is needed.
 - **Always**: the stream runs even if no XProtect Smart Client users request the stream.
 - **Never**: the stream is off. Only use this for recording streams, for example, if you want recordings in high quality and need the bandwidth.
 - **When needed**: the stream starts when a user of XProtect Smart Client requests for it.
4. In the **Default** column, select which stream is default.
5. In the **Record** column, select the check box if you want to record this stream or leave it cleared if you only want to use it for live video.
6. Click **Save**.

Important: If you set a stream to **Default** or **Record**, the stream is always running independent of the **Live Mode** setting. Selecting **When needed** and **Always** have the same effect in the system and if you select **Never**, the stream is running, but cannot be viewed live.

If you do not want the streams to run at all unless someone is viewing live video, you can modify the **Default Start Feed Rule** to start on request with the predefined **Live Client Feed Requested** event.

Record tab (devices)

Record tab (explained)

The following devices have a **Record** tab:

- Cameras
- Microphones
- Speakers
- Metadata

Recordings from a device are only saved in the database when you have enabled recording and the recording-related rule criteria are met.

Parameters that cannot be configured for a device are grayed out.

Properties

Recording settings

☒ Recording

☒ Record on related devices

☒ Stop manual recording after: 5 minutes

☒ Pre-buffer

Location: Memory

Time: 3 seconds

Recording frame rate

JPEG: 5 FPS

MPEG-4/H.264/H.265: ☐ Record keyframes only

Storage

Local Default Select...

Status: Active

Status	Database	Location	Used space
OK	Local Default	C:\MediaDatabase	17.7 MB

Total used space: 17.7 MB Delete All Recordings

Remote recordings

☐ Automatically retrieve remote recordings when connection is restored

Info Settings Streams Record 360° Lens Events Client Privacy Mask Motion

Record tab, example from camera

Enable/disable recording

Recording is by default enabled. To enable/disable recording:

1. In the **Site Navigation** pane, select **Recording Servers**.
2. Select the relevant device in the **Overview** pane.
3. On the **Record** tab, select or clear the **Recording** check box.

You must enable recording for the device before you can record data from the camera. A rule that specifies the circumstances for a device to record does not work if you have disabled recording for the device.

Enable recording on related devices

For camera devices, you can enable recording for related devices, for example, microphones that are connected to the same recording server. It means that the related devices record when the camera records.

Recording on related devices are enabled by default for new camera devices, but you can disable and enable as you want. For existing camera devices in the system, the check box is cleared by default.

1. In the **Site Navigation** pane, select **Recording Servers**.
2. Select the relevant camera device in the **Overview** pane.
3. On the **Record** tab, select or clear the **Record on related devices** box.
4. On the **Client** tab, specify the devices that relate to this camera.

If you want to enable recording on related devices that are connected to another recording server, you must create a rule.

Pre-buffering (explained)

Pre-buffering is the ability to record audio and video before the actual triggering event occurs. This is useful when you want to record the audio or video that leads up to an event that triggers recording, for example, opening a door.

Pre-buffering is possible because the system continuously receives audio and video streams from the connected devices and temporarily stores them for the defined pre-buffer period.

- If a recording rule is triggered, the temporary recordings are made permanent for the rule's configured pre-recording time.
- If no recording rule is triggered, the temporary recordings in the pre-buffer are automatically deleted after the defined pre-buffer time.

To use the pre-buffer function, the devices must be enabled and sending a stream to the system.

Storage of the temporary pre-buffer recordings

You can choose the storage location of the temporary pre-buffer recordings:

- In the memory; the pre-buffer period is limited to 15 seconds.
- On the disk (in the media database); you can choose all values.

Storage to the memory instead of to disk improves system performance, but is only possible for shorter pre-buffer periods.

When recordings are stored in the memory, and you make some of the temporary recordings permanent, the remaining temporary recordings are deleted and cannot be restored. If you need to be able to keep the remaining recordings, store the recordings on the disk.

Devices that support pre-buffering

Cameras, microphones and speakers support pre-buffering. For speakers, the streams are only sent when the XProtect Smart Client user uses the **Talk to speaker** function. This means that depending on how your speaker streams are triggered to be recorded there is little or no pre-buffering available.

In most cases, you set up speakers to record when the XProtect Smart Client user uses the **Talk to speaker** function. In such cases, no speaker pre-buffer is available.

Manage pre-buffering

Enable and disable pre-buffering:

Pre-buffering is enabled by default with a pre-buffer size of three seconds and storage to the memory.

1. To enable/disable pre-buffering, select/clear the **Pre-buffer** check box.

Specify storage location and pre-buffer period:

Temporary pre-buffer recordings are stored either in the memory or on the disk:

1. For **Location**, select **Memory** or **Disk** and specify the number of seconds.

The number of seconds you specify must be sufficiently large to accommodate your requirements in the various recording rules you define.

If you require a pre-buffer period of more than 15 seconds, select **Disk**.

2. If you change the location to **Memory**, the system reduced the period to 15 seconds automatically.

Use pre-buffer in rules:

When you create rules that trigger recording, you can select that recordings should start some time before the actual event (pre-buffer).

Example: The below rule specifies that recording should start on the camera 5 seconds before motion is detected on the camera.



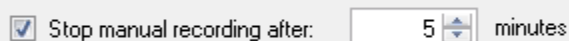
Perform an action on **Motion Started**
from **Red Sector Entrance Cam**
start recording **5 seconds before** on the device on which event occurred

Detail from a rule relying on pre-buffering

To use the pre-buffer recording function in the rule, you must enable pre-buffering on the device being recorded and you must set the pre-buffer length to at least the same length as specified in the rule.

Manage manual recording

Stop manual recording after is enabled by default with a recording time of five minutes. This is to ensure that the system automatically stops all recordings started by the XProtect Smart Client users.



☒ Stop manual recording after: minutes

1. To enable and disable manual recording to be stopped automatically by the system, select/clear the **Stop manual recording after** check box.
2. When you enable it, specify a recording time. The number of minutes you specify must be sufficiently large to accommodate the requirements of the various manual recordings without overloading the system.

Add to roles:

You must grant the right to start and stop manual recording to the client users on each camera in **Roles** on the **Device** tab.

Use in rules:

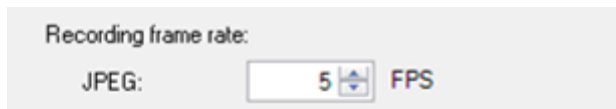
The events you can use when you create rules related to manual recording are:

- **Manual Recording Started**
- **Manual Recording Stopped**

Specify recording frame rate

You can specify the recording frame rate for JPEG.

- Select or type the recording frame rate (in FPS, frames per second) in the **Recording frame rate: (JPEG)** box.



Recording frame rate:
JPEG: FPS

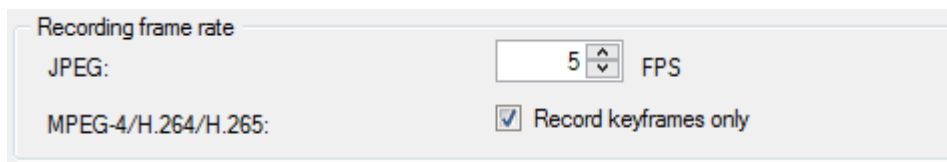
Specifying a specific recording frame rate

Enable keyframe recording

You can enable keyframe recording for MPEG-4/H.264/H.265 streams. It means that the system switches between recording keyframes only and recording all frames depending on your rule settings.

You can, for example, let the system record keyframes when there is no motion in the view and switch to all frames only in case of motion detection to save storage.

1. Select the **Record keyframes only** box.



Recording frame rate:
JPEG: FPS
MPEG-4/H.264/H.265: ☒ Record keyframes only

Enabling keyframe recording

2. Set up a rule that activates the function, see Actions and stop actions (explained) (on page 167).

Storage (explained)

Under **Storage**, you can monitor and manage the databases for a device or a group of devices added to the same recording server.

Above the table, you can see the selected database and its status. In this example, the selected database is the default **Local Default** and the status is **Recordings also located on other recording servers**. The other server is the recording server in building A.

Status	Database	Location	Used space
OK	Local Default	C:\MediaDB	288 MB
OK	Local Default	Recording server - Building A	42.2 MB

Total used space: 330 MB

Delete All Recordings

Possible statuses for selected database:

Name	Description
Recordings also located on other recording servers	The database is active and running and has recordings located in storages on other recording servers as well.
Archives also located in old storage	The database is active and running and has archives located in other storages as well.
Active	The database is active and running.
Data for some of the devices chosen is currently moving to another location	The database is active and running and the system is moving data for one or more selected devices in a group from one location to another.
Data for the device is currently moving to another location	The database is active and running and the system is moving data for the selected device from one location to another.
Information unavailable in failover mode	The system cannot collect status information about the database when the database is in failover mode.

Further down in the window, you can see the status of each database (**OK**, **Offline** or **Old Storage**), the location of each database and how much space each database uses.

If all servers are online, you can see the total spaced used for the entire storage in the **Total used space** field.

With the **Delete All Recordings** button, you can delete all recordings for the device or device group if you have added all devices in the group to the same server. Protected data is not deleted.

For information about configuration of storage, see storage and archiving (explained) (on page 78).

Remote recording (explained)

The remote recording option is only available if the selected camera supports edge storage or is a camera in a Milestone Interconnect setup.

To ensure that all recordings are saved in case of network issues, select **Automatically retrieve remote recordings when connection is restored**. This enables automatic retrieval of recordings once connection is re-established.

The type of hardware selected determines where recordings are retrieved from:

- For a camera with local recording storage, recordings are retrieved from the camera's local recording storage.
- For a Milestone Interconnect remote system, recordings are retrieved from the remote systems' recording servers.

You can use the following functionality independently of the automatic retrieval:

- Manual recording.
- The **Retrieve and store remote recordings from <devices>** rule.
- The **Retrieve and store remote recordings between <start and end time> from <devices>** rule.

Motion tab (devices)

Motion tab (explained)

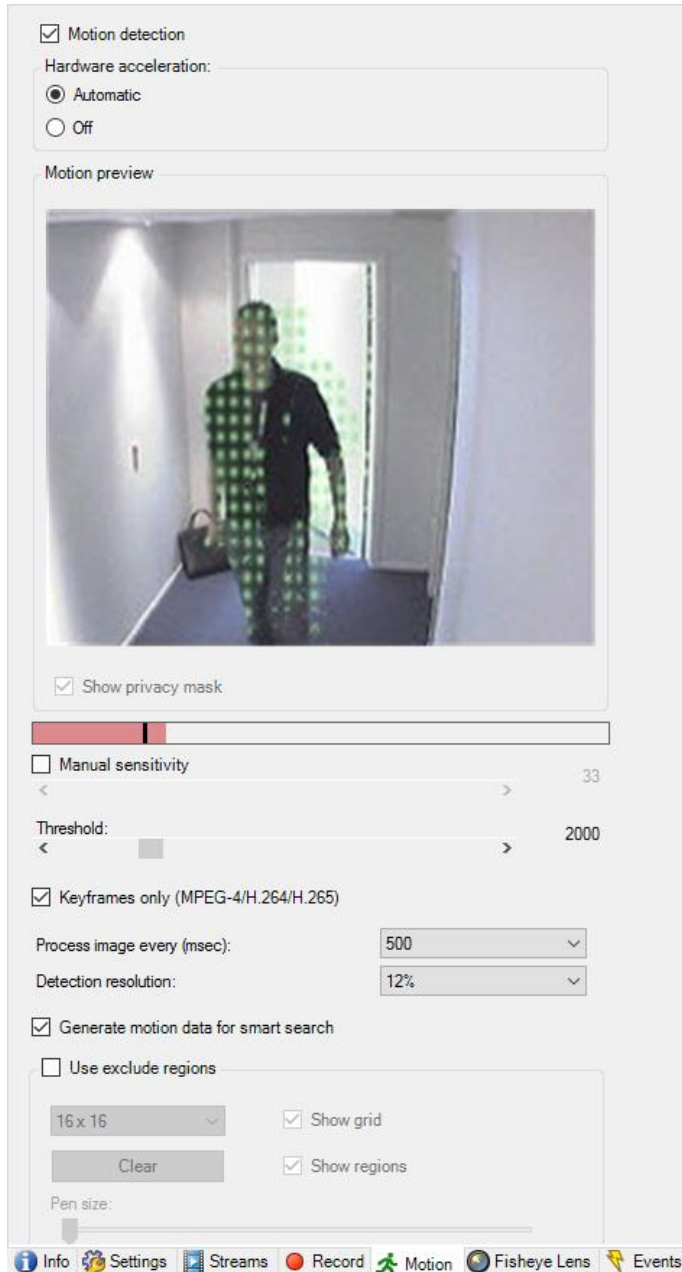
The following devices have a **Motion** tab:

- Cameras

On the **Motion** tab, you can enable and configure motion detection for the selected camera. Motion detection configuration is a key element in your system: Your motion detection configuration determines when the system generates motion events and typically also when video is recorded.

Time spent on finding the best possible motion detection configuration for each camera helps you later avoid, for example, unnecessary recordings. Depending on the physical location of the camera, it may be a good idea to test motion detection settings under different physical conditions such as day/night and windy/calm weather.

Before you configure motion detection for a camera, Milestone recommends that you have configured the camera's image quality settings, for example resolution, video codec and stream settings on the **Settings** tab. If you later change image quality settings, you should always test any motion detection configuration afterwards.



Camera properties: **Motion** tab with red deflection on the motion indication bar

You can configure all the settings for a group of cameras, but you would typically set the exclude regions per camera.

- Enable and disable motion detection (on page 133)
- Specify motion detection settings (on page 133)

Enable and disable motion detection

You specify the default setting of motion detection for cameras on the **Tools > Options > General** tab.

To enable or disable motion detection afterwards for a camera:

- Select or clear the **Motion** tab's **Motion detection** check box.

Important: When you disable motion detection for a camera, motion detection-related rules for the camera do not work.

Specify motion detection settings

You can specify settings related to the amount of changes required in a camera's view in order for the change to be regarded as motion. You can for example specify intervals between motion detection analysis and areas of a view in which motion should be ignored. You can also adjust the accuracy of the motion detection and thereby the load on system resources.

Hardware acceleration (explained)

Select **Automatic** to enable hardware acceleration. The system is now using GPU resources if they are available. This will reduce the CPU load on the recording server during video motion analysis and improve the general performance of the recording server.

Hardware accelerated video motion detection uses an Intel library connected to the GPU on Intel CPUs that support Intel Quick Sync.

You can measure the GPU load with a third-party tool, for example, GPU-z. Note that it only measures the load on the first GPU core and GPU load is based on current frequency, not accounting for GPU clocking up and down.

To see if video motion detection is hardware accelerated for a specific camera, enable logging on the recording server log file. Set level to **Debug** and diagnostics is logged to the DeviceHandling.log. The log follows the pattern:
[time] [274] DEBUG – [guid] [name] Configured decoding: Automatic: Actual decoding: hardware

The OS version of the recording server and CPU generation may impact performance of hardware accelerated video motion detection. GPU memory allocation is often the bottleneck with older versions (typical limit is between 0.5 GB and 1.7 GB).

Systems based on Windows 10 / Server 2016 and 6th generation CPU (Skylake) or newer can allocate 50% of system memory to GPU and thereby removing or reducing this bottleneck.

6th generation Intel CPUs does provide hardware accelerated decoding of H.265, so the performance is comparable with H.264 for these versions of CPU.

Dynamic sensitivity (explained)

Motion detection is by default set up for dynamic sensitivity. To adjust the sensitivity level manually, see Enable manual sensitivity (on page 134).

Milestone recommends that you do not enable manual sensitivity because:

- With dynamic sensitivity, the system calculates and optimizes the sensitivity level automatically and suppresses the motion detections that come from noise in the images.
- Dynamic sensitivity improves motion detection at nighttime, where the noise in the images often triggers false motion.
- The system is not overloaded from too much recording.
- The users are not missing results from too little recording.

Enable manual sensitivity

The sensitivity setting determines **how much each pixel** in the image must change before it is regarded as motion.

1. Select the **Motion** tab's **Manual Sensitivity** check box.
2. Drag the slider to the left for a higher sensitivity level, and to the right for a lower sensitivity level.

The **higher** the sensitivity level, the less change is allowed in each pixel before it is regarded as motion.

The **lower** the sensitivity level, the more change in each pixel is allowed before it is regarded as motion.

Pixels in which motion is detected are highlighted in green in the preview image.

3. Select a slider position in which only detections you consider motion are highlighted.



Highlighted motion in the preview image

You can compare and set the exact sensitivity setting between cameras by the number in the right side of the slider.

Specify threshold

The motion detection threshold determines **how many pixels** in the image must change before it is regarded as motion.

1. Drag the slider to the left for a higher motion level, and to the right for a lower motion level.
2. Select a slider position in which only detections that you consider motion are detected.

The black vertical line in the motion indication bar shows the motion detection threshold: When detected motion is above the selected detection threshold level, the bar changes color from green to red, indicating a positive detection.



Motion indication bar: changes color from green to red when above the threshold, indicating a positive motion detection

Select keyframes settings

Determines if motion detection is done on keyframes only instead of on the entire video stream. Only applies to MPEG-4/H.264/H.265.

Motion detection on keyframes reduces the amount of processing power used to carry out the analysis.

Select **Keyframes only (MPEG-4/H.264/H.265)** box to do motion detection on keyframes only.

Select image processing interval

You can select how often the system performs the motion detection analysis.

From the **Process image every (msec)** list:

- Select the interval. For example, every 1000 milliseconds are once every second. Default value is every 500 milliseconds.

The interval is applied if the actual frame rate is higher than the interval you set here.

Specify detection resolution

Lets you optimize motion detection performance by analyzing only a selected percentage of the image, for example 25%. By analyzing 25%, only every fourth pixel in the image is analyzed instead of all pixels.

Using optimized detection reduces the amount of processing power used to carry out the analysis, but also means a less accurate motion detection.

- In the **Detection resolution** list, select the wanted detection resolution.

Generating motion data for smart search

With **Generate motion data for smart search** enabled, the system generates motion data for the images used for motion detection. For example, if you select motion detection on keyframes only, the motion data is also produced for keyframes only.

The extra motion data enables the client user, via the smart search function, to quickly search for relevant recordings based on motion in the selected area of the image. The motion data is not generated for areas with privacy masks.

Motion detection threshold and exclude regions do not influence the generated motion data.

You specify the default setting of generating smart search data for cameras on the **Tools > Options > General** tab.

Specify exclude regions

You can disable motion detection in specific areas of a camera view.

Disabling motion detection in specific areas helps you avoid detection of irrelevant motion, for example if the camera covers an area where a tree is swaying in the wind or where cars regularly pass by in the background.

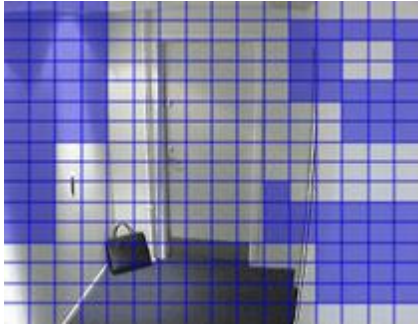
When you use exclude regions with PTZ cameras and you pan-tilt-zoom the camera, the excluded area does **not** move accordingly because the area is locked to the camera image, and not the object.

1. To use exclude regions, select the **Use exclude regions** check box.

A grid divides the preview image into selectable sections.

2. To define exclude regions, drag the mouse pointer over the required areas in the preview image while you press the left mouse button. Right mouse button clears a grid section.

You can define as many exclude regions as needed. Excluded regions appear in blue.



Three exclude regions defined in the preview window. In this case, the grid is visible.

The blue exclude areas only appear in the preview image on the **Motion** tab, not in any other preview images in the Management Client or access clients.

Presets tab (devices)


Presets tab (explained)

The following devices have a **Presets** tab:

- PTZ cameras that support preset positions

On the **Presets** tab, you can create or import preset positions, for example:

- In rules for making a PTZ (pan-tilt-zoom) camera move to a specific preset position when an event occurs.
- In patrolling, for the automatic movement of a PTZ camera between a number of preset positions.
- For manual activation by the XProtect Smart Client users.

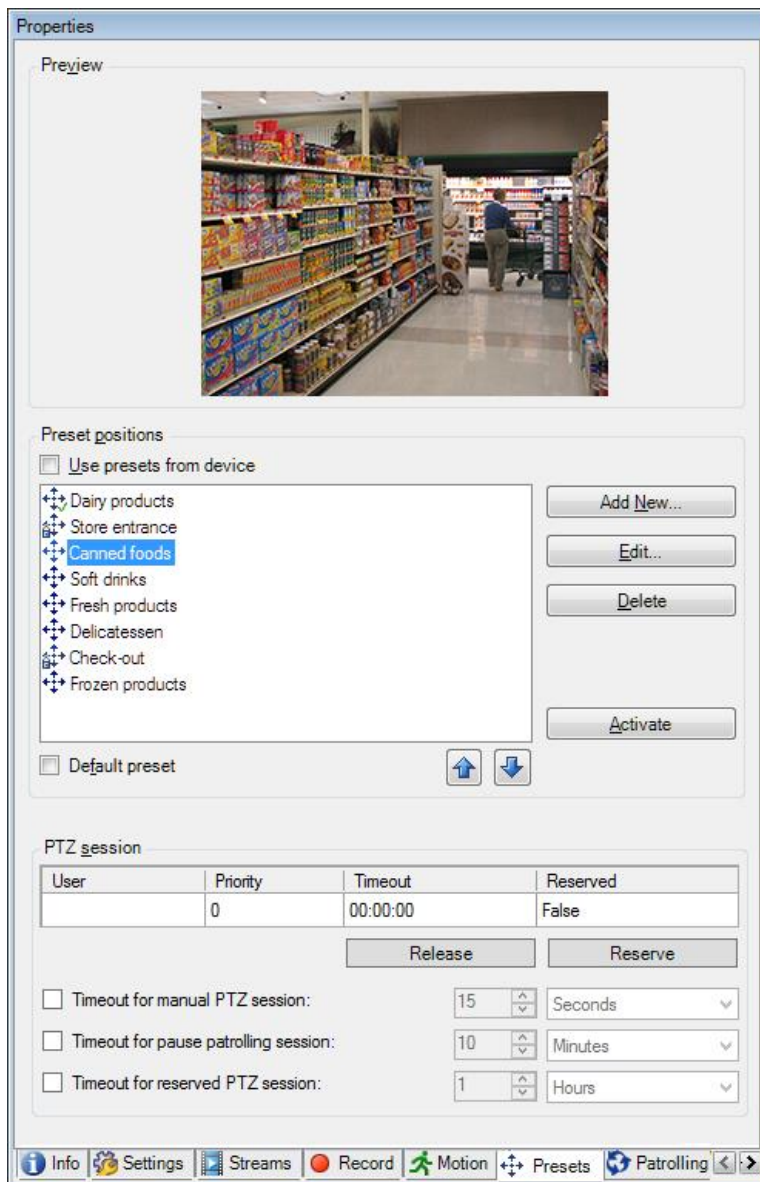
You can lock a preset position if you want to prevent users in XProtect Smart Client or users with limited security rights from updating this preset. Locked presets are indicated with this icon .

Administrators with security rights to run a reserved PTZ session (see "Reserved PTZ sessions (explained)" on page 141) can run the PTZ camera in this mode. This prevents other users from taking control over the camera. With sufficient rights, you can release other users' reserved PTZ sessions (see "Release PTZ session" on page 142).

You assign PTZ permission to roles on the Overall Security tab (see "Overall Security tab (roles)" on page 208) or the PTZ tab (see "PTZ tab (roles)" on page 228).

You can monitor if the system is currently patrolling or a user has taken control, in the **PTZ session** area. (see "PTZ session properties" on page 142)

You also change the PTZ session timeouts for the camera.

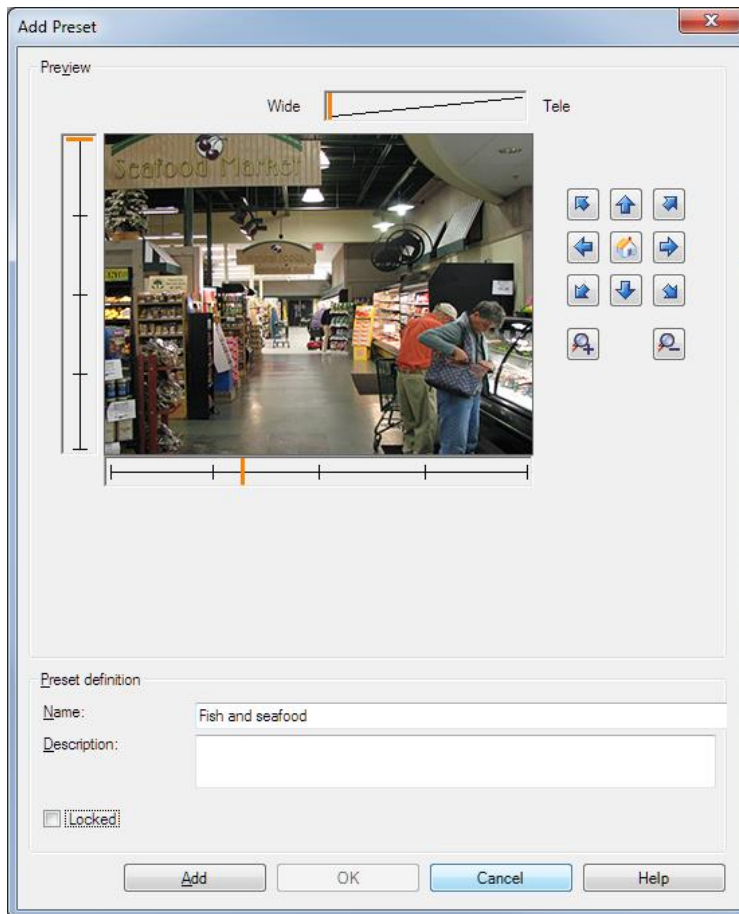


Presets tab, with preset positions defined

Add a preset position (type 1)

To add a preset position for the camera:

1. Click **Add New**. The **Add Preset** window appears:



2. The **Add Preset** window displays a live preview image from the camera. Use the navigation buttons and/or sliders to move the camera to the required position.
3. Specify a name for the preset position in the **Name** field.
4. Optionally, type a description of the preset position in the **Description** field.
5. Select **Locked** if you want to lock the preset position. Only users with sufficient rights can unlock the position afterwards.
6. Click **Add** to specify presets. Keep adding until you have the presets you want.
7. Click **OK**. The **Add Preset** window closes, and adds the position to the **Presets** tab's list of available preset positions for the camera.

Use preset positions from the camera (type 2)

As an alternative to specifying preset positions in the system, you can specify preset positions for some PTZ cameras on the camera itself. You can typically do this by accessing a product-specific configuration web page.

1. Import the presets into the system by selecting **Use presets from device**.

Any presets you have previously defined for the camera are deleted and affect any defined rules and patrolling schedules as well as remove the presets available for the XProtect Smart Client users.

2. Click **Delete** to delete presets that your users do not need.
3. Click **Edit** if you want to change the display name of the preset (see "Edit a preset position name (type 2 only)" on page 140).
4. If you later want to edit such device-defined presets, edit on the camera and then re-import.

Assign a default preset position

If required, you can assign one of a PTZ camera's preset positions as the camera's default preset position.

It can be useful to have a default preset position because it allows you to define rules that specify that the PTZ camera should go to the default preset position under particular circumstances, for example after you have operated the PTZ camera manually.

1. To assign a preset position as the default, select the preset in your list of defined preset positions.
2. Select the **Default preset** check box below the list.

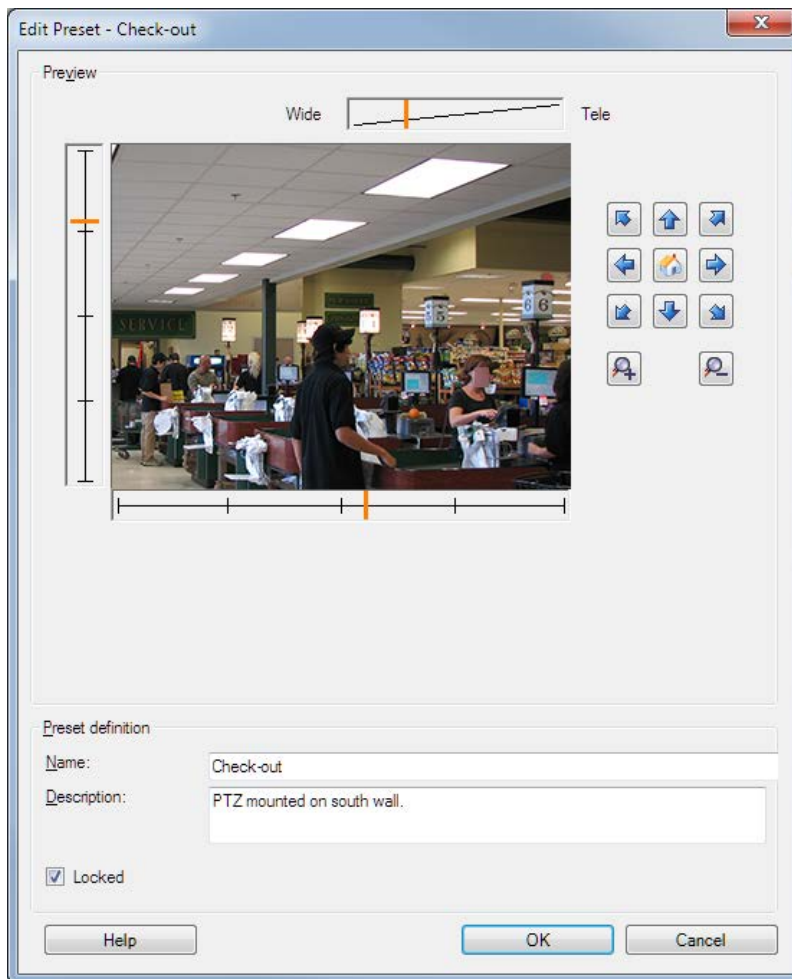
You can only define one preset position as the default preset position.

Edit a preset position (type 1 only)

To edit an existing preset position defined in the system:

1. Select the preset position in the **Presets** tab's list of available preset positions for the camera.

2. Click **Edit**. This opens the **Edit Preset** window:



Example only. Features are camera-dependent

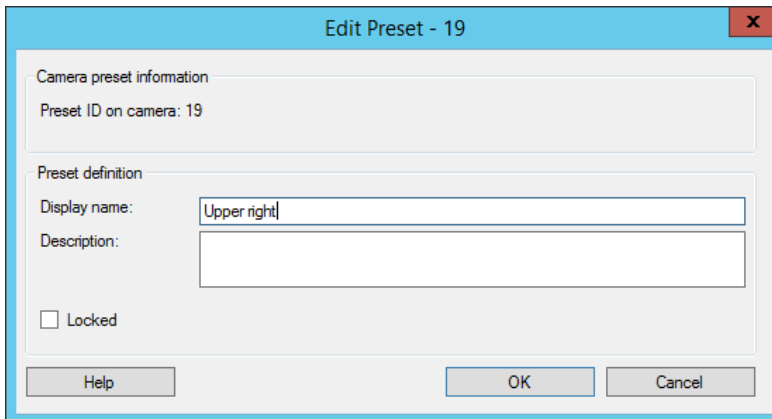
3. The **Edit Preset** window displays live video from the preset position. Use the navigation buttons and/or sliders to change the preset position as required.
4. Change the name/number and description of the preset position if needed.
5. Select **Locked** if you want to lock the preset position. Only users with sufficient rights can unlock the position afterwards.
6. Click **OK**.

Edit a preset position name (type 2 only)


To edit the name of a preset position defined in the camera:

1. Select the preset position in the **Presets** tab's list of available presets for the camera.


2. Click **Edit**. This opens the **Edit Preset** window:



Example of a preset defined in the camera

3. Change the name and add a description of the preset position if needed.
4. Select **Locked** if you want to lock the preset name. You can lock a preset name if you want to prevent users in XProtect Smart Client or users with limited security rights from updating the preset name or deleting the preset. Locked presets are indicated with this icon . Only users with sufficient rights can unlock the preset name afterwards.
5. Click **OK**.

Lock a preset position

You can lock a preset position if you want to prevent users in XProtect Smart Client or users with limited security rights from updating or deleting a preset. Locked presets are indicated with this icon .

You lock presets as part of adding (see "Add a preset position (type 1)" on page 137) and editing (see "Edit a preset position (type 1 only)" on page 139).

Test a preset position (type 1 only)

1. Select the preset position in the **Presets** tab's list of available preset positions for the camera.
2. Click **Activate**.
3. The camera moves to the selected preset position.

Reserved PTZ sessions (explained)

Depending on your surveillance system, you can reserve PTZ sessions.

Administrators with security rights to run a reserved PTZ session can run the PTZ camera in this mode. This prevents other users from taking control over the camera. In a reserved PTZ session, the standard PTZ priority system is disregarded to avoid that users with a higher PTZ priority interrupt the session.

You can operate the camera in a reserved PTZ session both from XProtect Smart Client and the Management Client.

To reserve a PTZ session can be useful, if you need to make urgent updates or maintenance to a PTZ camera or its presets without being interrupted by other users.

You cannot start a reserved PTZ session, if a user with a higher priority than yours controls the camera or if another user has already reserved the camera.

Release PTZ session

The **Release** button allows you to release your current PTZ session so another user can control the camera. When you click **Release**, the PTZ session ends immediately and will be available for the first user to operate the camera.

Administrators assigned with the security permission **Release PTZ session** has the rights to release other users' reserved PTZ session at any time. This can, for example, be useful in occasions where you need to maintain the PTZ camera or its presets, or if other users have accidentally blocked the camera in urgent situations.

Specify PTZ session timeouts

Management Client and XProtect Smart Client users with the necessary user rights can manually interrupt the patrolling of PTZ cameras.

You can specify how much time should pass before regular patrolling is resumed for all PTZ cameras on your system:

1. Select **Tools > Options**.
2. On the **Options** window's **General** tab, select the amount of time in the:
 - **Timeout for manual PTZ sessions** list (default is 15 seconds).
 - **Timeout for pause patrolling sessions** list (default is 10 minutes).
 - **Timeout for reserved PTZ sessions** list (default is 1 hour).

The settings apply for all PTZ cameras on your system.

You can change the timeouts individually for each camera.

1. In the **Site Navigation** pane, click **Camera**.
2. In the Overview pane, select the camera.
3. On the **Preset** tab, select the amount of time in the:
 - **Timeout for manual PTZ session** list (default is 15 seconds).
 - **Timeout for pause patrolling session** list (default is 10 minutes).
 - **Timeout for reserved PTZ session** list (default is 1 hour).

The settings apply for this camera only.

PTZ session properties

The **PTZ session** table shows the current status of the PTZ camera.

Name	Description
User	Displays the user that has pressed the Reserved button and currently controls the PTZ camera. If a patrolling session is activated by the system, it displays Patrolling .
Priority	Displays the user's PTZ priority. You can only take over PTZ sessions from users with a lower priority than you.
Timeout	Displays the remaining time of the current PTZ session.
Reserved	Indicates if the current session is a reserved PTZ session or not. <ul style="list-style-type: none"> • True: Reserved. • False: Not reserved.

You can change the following timeouts for each PTZ camera.

Name	Description
Timeout for manual PTZ session	Specify the timeout period for manual PTZ sessions on this camera if you want the timeout to be different from the default period. You specify the default period in the Tools menu under Options .
Timeout for pause patrolling PTZ session	Specify the timeout period for pause patrolling PTZ sessions on this camera if you want the timeout to be different from the default period. You specify the default period in the Tools menu under Options .
Timeout for reserved PTZ session	Specify the timeout period for reserved PTZ sessions on this camera if you want the timeout to be different from the default period. You specify the default period in the Tools menu under Options .

Patrolling tab (devices)

Patrolling tab (explained)

The following devices have a **Patrolling** tab:

- PTZ cameras

On the **Patrolling** tab, you can create patrolling profiles - the automatic movement of a PTZ (pan-tilt-zoom) camera between a number of preset positions.

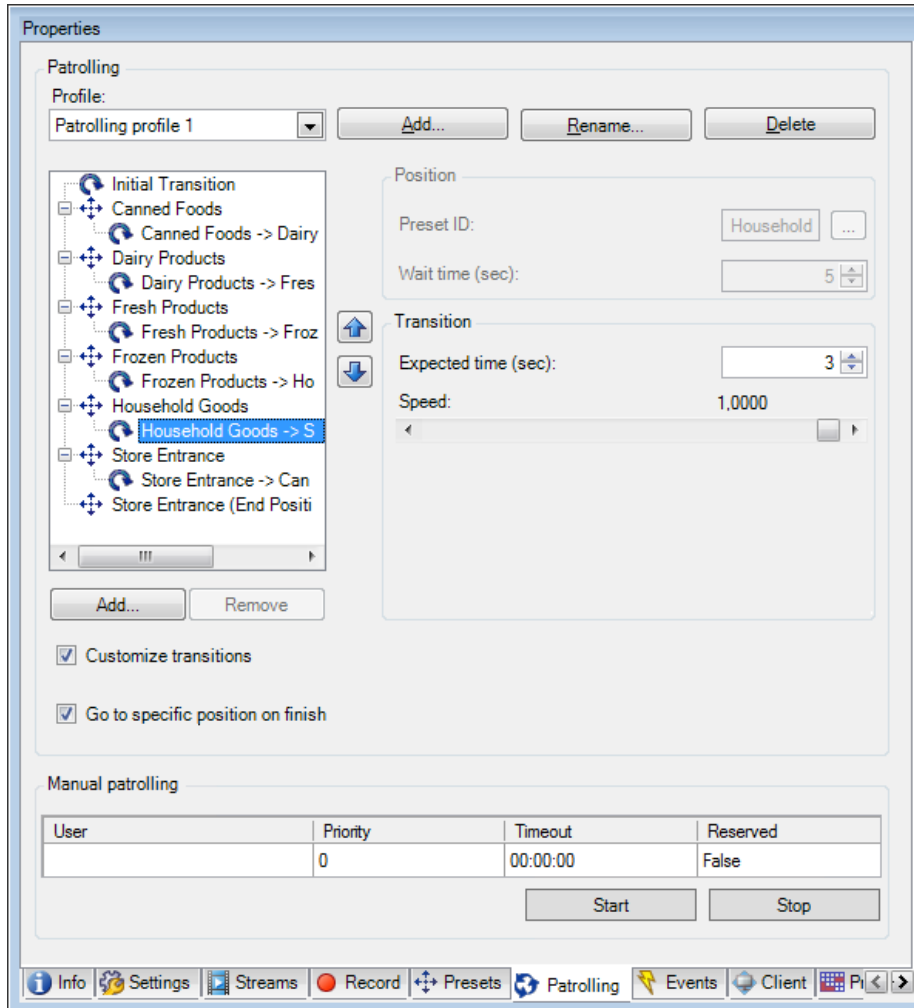
Before you can work with patrolling, you must specify at least two preset positions for the camera in the **Presets** tab.

Patrolling profiles are the definitions of how patrolling should take place. This includes the order in which the camera should move between preset positions and how long it should remain at each

position. You can create an unrestricted number of patrolling profiles and use them in your rules. For example, you may create a rule specifying that one patrolling profile should be used during daytime opening hours and another during nights.

Before you apply a patrolling profile in a rule, for example, you can test the patrolling profile with manual patrolling. You can also use manual patrolling to take over patrolling from another user or from a rule-activated patrolling, provided that you have a higher PTZ priority.

You can monitor if the system is currently patrolling or a user has taken control, in the **Manual patrolling** area.



Patrolling tab, displaying a patrolling profile with customized transitions

Add a patrolling profile

Add a profile that you want to use in a rule:

1. Click **Add**. The **Add Profile** dialog box appears.
2. In the **Add Profile** dialog box, specify a name for the patrolling profile.
3. Click **OK**. The button is disabled if the name is not unique.

The new patrolling profile is added to the **Profile** list. You can now specify the preset positions and other settings for the patrolling profile.

Specify preset positions in a patrolling profile

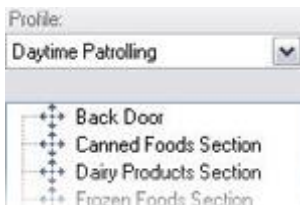
1. Select the patrolling profile in the **Profile** list:



2. Click **Add**.
3. In the **Select Preset** dialog box, select the preset positions for your patrolling profile:



4. Click **OK**. The selected preset positions are added to the list of preset positions for the patrolling profile:



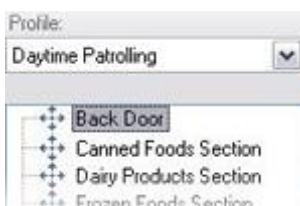
5. The camera uses the preset position at the top of the list as the first stop when it patrols according to the patrolling profile. The preset position in the second position from the top is the second stop, and so forth.

Specify the time at each preset position

When patrolling, the PTZ camera by default remains for 5 seconds at each preset position specified in the patrolling profile.

To change the number of seconds:

1. Select the patrolling profile in the **Profile** list.
2. Select the preset position for which you want to change the time:



3. Specify the time in the **Time on position (sec)** field:
4. If required, repeat for other preset positions.

Customize transitions

By default, the time required for moving the camera from one preset position to another, known as **transition**, is estimated to be three seconds. During this time, motion detection is by default disabled on the camera, because irrelevant motion is otherwise likely to be detected while the camera moves between the preset positions.

You can only customize speed for transitions if your camera supports PTZ scanning and is of the type where preset positions are configured and stored on your system's server (type 1 PTZ camera). Otherwise the **Speed** slider is grayed out.

You can customize the following:

- The estimated transition time.
- The speed with which the camera moves during a transition.

To customize transitions between the different preset positions:

1. Select the patrolling profile in the **Profile** list.
2. Select the **Customize transitions** check box:



Transition indications are added to the list of preset positions.

3. In the list, select the transition:



4. Specify the estimated transition time (in number of seconds) in the **Expected time (sec)** field:



5. Use the **Speed** slider to specify the transition speed. When the slider is in its rightmost position, the camera moves with its default speed. The more you move the slider to the left, the slower the camera moves during the selected transition.
6. Repeat as required for other transitions.

Specify an end position

You can specify that the camera should move to a specific preset position when patrolling according to the selected patrolling profile ends.

1. Select the patrolling profile in the **Profile** list.

2. Select the **Go to specific position on finish** check box. This opens the **Select preset** dialog box.
3. Select the end position, and click **OK**.

You can select any of the camera's preset positions as the end position, you are not limited to the preset positions used in the patrolling profile.

4. The selected end position is added to the profile list.

When patrolling according to the selected patrolling profile ends, the camera moves to the specified end position.

Manual patrolling (explained)

When you have designed a patrolling profile, you can test it with manual patrolling before you apply it in the system. Use the **Start** and **Stop** buttons to initiate and stop manual patrolling.

If the camera is already patrolling or controlled by another user, you can only start manual patrolling if you have a higher priority.

If you start a manual patrolling while the camera runs a rule-activated system patrolling, the system resumes to this patrolling when you stop your manual patrolling. If another user runs a manual patrolling, but you have a higher priority and start your manual patrolling, the other user's manual patrolling is not resumed.

If you do not stop your manual patrolling yourself, it will continue until a rule-based patrolling or a user with a higher priority takes over. When the rule-based system patrolling stops, the system resumes your manual patrolling. If another user starts a manual patrolling, your manual patrolling stops, and will not be resumed.

When you stop your manual patrolling and you have defined an end position for your patrolling profile with **Go to specific position on finish**, the camera returns to this position.

Manual patrolling properties

The **Manual patrolling** table shows the current status of the PTZ camera.

Name	Description
User	Displays the user who has either reserved the PTZ session or started a manual patrolling and currently controls the camera. If a patrolling session is activated by the system, it displays Patrolling .
Priority	Displays the user's PTZ priority. You can only take over PTZ sessions from users or patrolling profiles with a lower priority than yours.
Timeout	Displays the remaining time of the current reserved or manual PTZ sessions.
Reserved	Indicates if the current session is a reserved PTZ session or not. <ul style="list-style-type: none">• True: Reserved.• False: Not reserved.

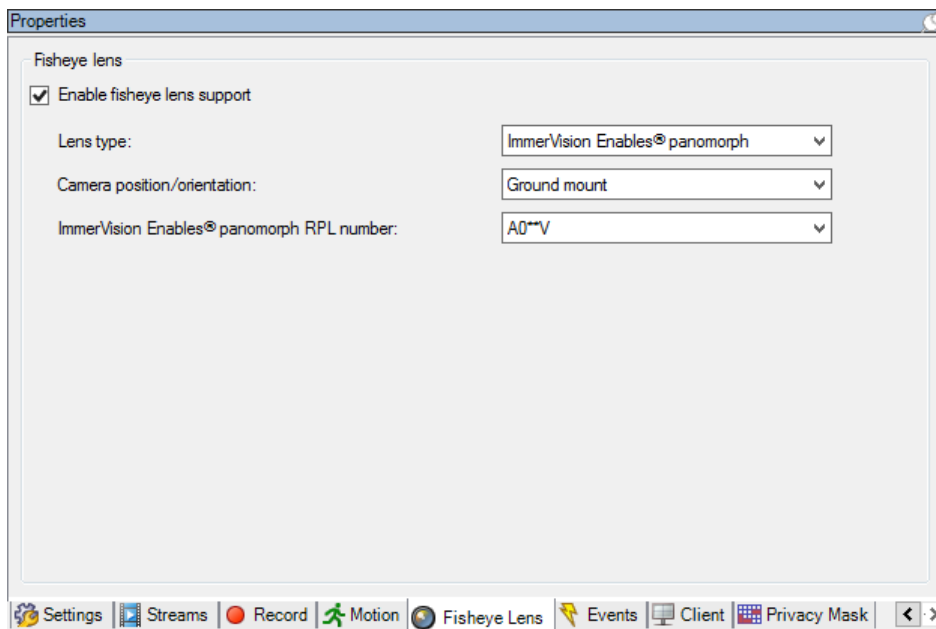
Fisheye lens tab (devices)

Fisheye Lens tab (explained)

The following devices have a **Fisheye Lens** tab:

- Fixed cameras with a fisheye lens

On the **Fisheye Lens** tab, you can enable and configure fisheye lens support for the selected camera.



Enable and disable fisheye lens support

The fisheye lens support is disabled by default.

To enable or disable it, select or clear the **Fisheye Lens** tab's **Enable fisheye lens support** check box.

Specify fisheye lens settings

When you enable the fisheye lens support:

1. Select the lens type.
2. Specify the physical position/orientation of the camera from the **Camera position/orientation** list.
3. Select a Registered Panomorph Lens (RPL) number from the **ImmerVision Enables® panomorph RPL number** list.

This ensures the identification and correct configuration of the lens used with the camera. You usually find the RPL number on the lens itself or on the box it came in. For details of ImmerVision, panomorph lenses, and RPLs, see the Immervision website (<https://www.immervisionenables.com/>).

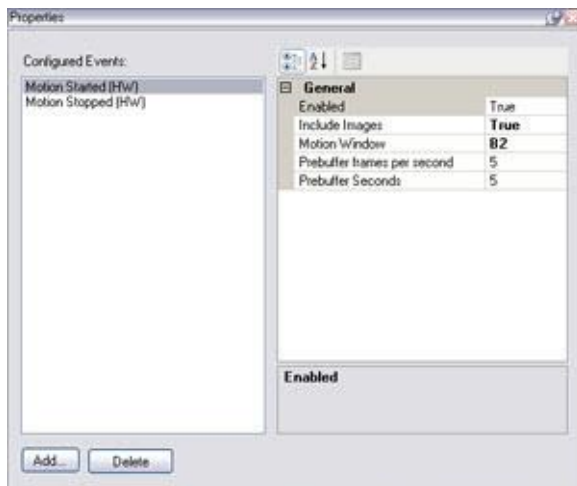
Events tab (devices)

Events tab (explained)

The following devices have an **Events** tab:

- Cameras
- Microphones
- Inputs

In addition to the system's event, some devices can be configured to trigger events. You can use these events when creating event-based rules in the system. Technically, they occur on the actual hardware/device rather than on the surveillance system.



Event tab, example from camera

When you delete an event, it affects all rules that use the event.

- Add an event (on page 149)
- Specify event properties (on page 150)
- Use several instances of an event (on page 150)

Add an event

1. In the **Overview** pane, select a device.
2. Select the **Events** tab and click **Add**. This opens the **Select Driver Event** window.
3. Select an event. You can only select one event at a time.
4. Click **OK**.
5. In the toolbar, click **Save**.

Specify event properties

You can specify properties for each event you have added. The number of properties depends on the device and the event. In order for the event to work as intended, you must specify some or all of the properties identically on the device as well as on this tab.

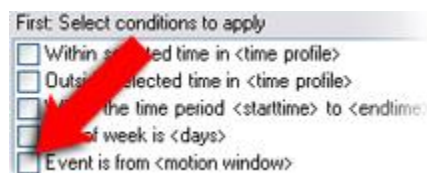
Use several instances of an event

To be able to specify different properties for different instances of an event, you can add an event more than once.

The following example is specific to **cameras**.

Example: You have configured the camera with two motion windows, called A1, and A2. You have added two instances of the **Motion Started (HW)** event. In the properties of one instance, you have specified the use of motion window A1. In the properties of the other instance, you have specified the use of motion window A2.

When you use the event in a rule, you can specify that the event should be based on motion detected in a specific motion window for the rule to be triggered:



Example: Specifying specific motion window
as part of a rule's conditions

Event tab (properties)

Name	Description
Configured events	Which events you may select and add in the Configured events list is determined entirely by the device and its configuration. For some types of devices, the list is empty.
General	The list of properties depends on the device and the event. In order for the event to work as intended, you must specify some or all of the properties identically on the device as well as on this tab.

Client tab (devices)

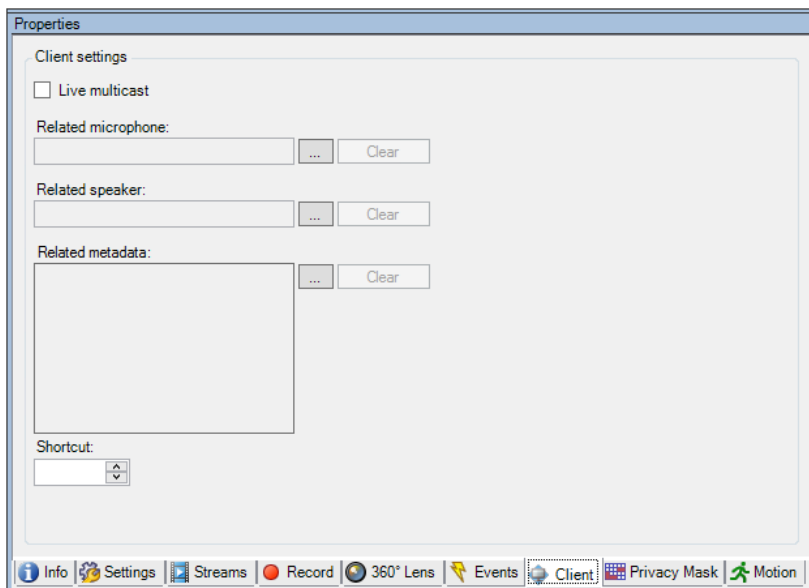
Client tab (explained)

The following devices have a **Client** tab:

- Cameras

On the **Client** tab you can specify which other devices are viewed and heard when you use the camera in XProtect Smart Client.

The related devices also record when the camera records, see Enable recording on related devices (on page 127).



Client tab properties

Name	Description
Live multicast	<p>The system supports multicast of live streams from the recording server to XProtect Smart Client. To enable multicast of live streams from the selected camera, select the check box.</p> <p>Note that live multicasting only works on the stream you have specified as the camera's default stream on the Streams tab.</p> <p>You must also configure multicasting for the recording server. See Multicasting (explained) (on page 90).</p> <p>If multicast streams do not work, for example due to restrictions on the network or on individual clients, the system reverts to unicast.</p>
Related microphone	<p>Specify from which microphone on the camera, that XProtect Smart Client users by default receive audio. The XProtect Smart Client user can manually select to listen to another microphone if needed.</p> <p>The related microphones record when the camera records.</p>
Related speaker	<p>Specify through which speakers on the camera, that XProtect Smart Client users speak by default. The XProtect Smart Client user can manually select another speaker if needed.</p> <p>The related speakers record when the camera records.</p>
Related metadata	<p>Specify one or more metadata devices on the camera, that XProtect Smart Client users receive data from.</p> <p>The related metadata devices record when the camera records.</p>

Name	Description
Shortcut	<p>To ease the selection of cameras for the XProtect Smart Client users, define keyboard shortcuts to the cameras.</p> <ul style="list-style-type: none"> • Create each shortcut so it uniquely identifies the cameras. • A camera shortcut number cannot be longer than four digits.

Privacy mask tab (devices)

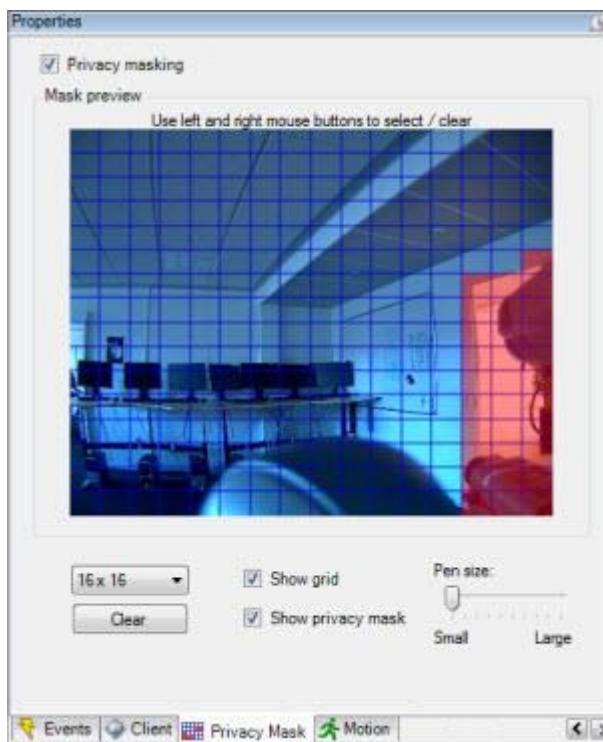
Privacy Mask tab (explained)

The following devices have a **Privacy Mask** tab:

- Cameras

On the **Privacy Mask** tab, you can enable and configure privacy masking for the selected camera. You can define which areas of the image to mask before distribution. For example, if a surveillance camera covers a street, in order to protect residents' privacy, you can mask certain areas of a building (could be windows and doors) with privacy masking.

When viewed via XProtect Smart Client or any other media, privacy masked areas appear as black areas which no one can remove.



Red areas indicate the areas masked for privacy.

When you use privacy masks with PTZ cameras and you pan-tilt-zoom the camera, the selected area masked for privacy does **not** move accordingly because the masked area is locked to the

camera image. As an alternative, some PTZ cameras support enabling of a position based privacy mask in the camera itself.

In a Milestone Interconnect setup, the central site disregards privacy masking defined in a remote site. If you want to apply the same privacy masking, you must redefine it on the central site.

Enable/disable privacy masking

The privacy masking feature is disabled by default.

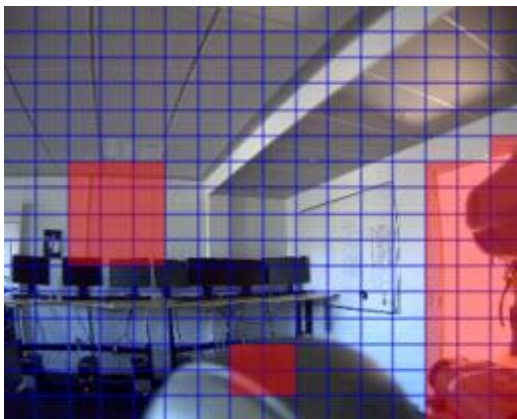
To enable/disable the privacy masking feature for a camera:

- Select/clear the **Privacy Mask** tab's **Privacy masking** check box.

Specify privacy mask settings

When you enable privacy masking, the preview image is divided into selectable sections by a grid.

1. To define privacy mask regions, drag the mouse pointer over the required areas in the preview image. Press down the left mouse button to select a grid section. Right mouse button clears a grid section.
2. You can define as many privacy mask regions as needed. Privacy mask regions are shown in red.



Three privacy mask regions defined in the preview window. In this case, the grid is visible.

The red privacy mask indications also appear in the preview image on the **Motion** tab.

Privacy mask tab (properties)

Name	Description
Grid Size	The value you selected in the Grid size list determines the density of the grid, regardless whether the grid is shown or not. Select between the values 8×8, 16×16, 32×32 or 64×64.
Show Grid	Select the Show grid check box to make the grid visible.

Name	Description
Show Privacy Mask	<p>When you select the Show privacy mask check box (default), selected regions are highlighted in red in the preview image.</p> <p>Hiding regions may provide a less obscured view of the preview image.</p> <p>Milestone recommends that you keep the Show privacy mask box selected to avoid regions exist without you or your colleagues being aware of it.</p>
Pen size	<p>Use the Pen size slider to indicate the size of the selections you wish to make when you click and drag the grid to select regions. Default is set to small, which is equivalent to one square in the grid.</p>

Client

Clients (explained)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

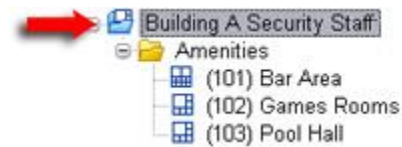
The Client section of the Management Client consists of:

Name	Description
XProtect Smart Wall	<p>XProtect Smart Wall is an add-on that allows you to send view content from XProtect Smart Client to dedicated video wall.</p> <p>For more detailed information about XProtect Smart Wall, see XProtect Smart Wall (explained (see "XProtect Smart Wall (explained)" on page 291)).</p>
View groups	<p>The way in which video from cameras is presented is called a view. To control who can see what in XProtect Smart Client, you can create view groups to group views in logical entities. You can assign access to these view groups through roles and limit who can access individual view groups to specific roles. Select View Groups to design and work with view groups to fit your surveillance needs.</p>
Smart Client profiles	<p>To differentiate XProtect Smart Client users, you can create Smart Client profiles, prioritize these and customize their profiles as needed for the different tasks at hand.</p>
Management Client profiles	<p>To differentiate Management Client administrator users, you can create Management Client profiles, prioritize these and customize their profiles as needed for the different tasks at hand.</p>
Matrix	<p>Matrix is a feature for distributing video remotely. If you use Matrix, you can push video from any camera on your system's network to any running XProtect Smart Client.</p>

View groups

View groups (explained)

The way in which the system presents video from one or more cameras in clients is called a view. A view group is a container for one or more logical groups of such views. In clients, a view group is presented as an expandable folder from which users can select the group and the view they want to see:



Example from XProtect Smart Client: Arrow indicates a view group, which contains a logical group (called Amenities), which in turn contains 3 views.

View groups and roles (explained)

By default, each role you define in the Management Client is also created as a view group. When you add a role in the Management Client, the role by default appears as a view group for use in clients.

- You can assign a view group based on a role to users/groups assigned to the relevant role. You may change these view group rights by setting this up in the role afterwards.
- A view group based on a role carries the role's name.

Example: If you create a role with the name **Building A Security Staff**, it appears in XProtect Smart Client as a view group called **Building A Security Staff**.

In addition to the view groups you get when adding roles, you may create as many other view groups as you like. You can also delete view groups, including those automatically created when adding roles.

- Even if a view group is created each time you add a role, view groups do not have to correspond to roles. You can add, rename or remove any of your view groups if required.

Note that if you rename a View group, client users already connected must log out and log in again before the name change is visible.

Add a view group

1. Right-click **View Groups**, and select **Add View Group**. This opens the **Add View Group** dialog box.
2. Type the name and an optional description of the new view group and click **OK**.

Note: No roles have the right to use the newly added view group until you have specified such rights. If you have specified which roles that can use the newly added view group, already connected client users with the relevant roles must log out and log in again before they can see the view group.

Smart Client profiles

Smart Client profiles (explained)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

Smart Client profiles allows system administrators to control how XProtect Smart Client should look and behave and what features and panes XProtect Smart Client users have access to. You can set up user rights for: panes and options, minimize/maximize options, inactivity time-control, remember password or not, view shown after log in, layout of print reports, export path, and more.

To manage Smart Client profiles in the system, expand **Client** and select **Smart Client Profiles**. You can also learn about the relationship between Smart Client profiles, roles and time profiles and how to use these together (see "Create and set up Smart Client profiles, roles and time profiles" on page 156).

Add and configure a Smart Client profile

You must create a Smart Client profile before you can configure it.

1. Right-click **Smart Client Profiles**.
2. Select **Add Smart Client Profile**.
3. In the **Add Smart Client Profile** dialog box, type a name and description of the new profile and click **OK**.
4. In the **Overview** pane, click the profile you created to configure it.
5. Adjust settings on one, more or all of the available tabs and click **OK**.

Copy a Smart Client profile

If you have a Smart Client profile with complicated settings or rights and need a similar profile, it might be easier to copy an already existing profile and make minor adjustments to the copy than to creating a new profile from scratch.

1. Click **Smart Client Profiles**, right-click the profile in the **Overview** pane, select **Copy Smart Client Profile**.
2. In the dialog box that appears, give the copied profile a new unique name and description. Click **OK**.
3. In the **Overview** pane, click the profile you just created to configure it. This is done by adjusting settings on one, more or all of the available tabs. Click **OK**.

Create and set up Smart Client profiles, roles and time profiles

When you work with Smart Client profiles, it is important to understand the interaction between Smart Client profiles, roles and time profiles.

- Smart Client profiles deal with user right settings in XProtect Smart Client
- Roles deal with security settings in clients, MIP SDK and more

- Time profiles deal with time aspects of the two profiles-types

Together these three features provide unique control and customizing possibilities with regards to XProtect Smart Client user rights.

Example: You need a user in your XProtect Smart Client setup who should only be allowed to view live video (no playback) from selected cameras, and only during normal working hours (8.00 to 16.00). One way of setting this up could be as follows:

1. Create a Smart Client profile, and name it, for example, **Live only**.
2. Specify the needed live/playback settings on **Live only**.
3. Create a time profile, and name it, for example, **Daytime only**.
4. Specify the needed time period on **Daytime only**.
5. Create a new role and name it, for example, **Guard (Selected cameras)**.
6. Specify which cameras **Guard (Selected cameras)** can use.
7. Assign the **Live only** Smart Client profile and the **Daytime only** time profile to the **Guard (Selected cameras)** role to connect the three elements.

You now have a mix of the three features creating the wanted result and allowing you room for easy fine-tuning and adjustments. Note also that you can do the setup in a different order, for example, creating the role first and then the Smart Client profile and the time profile, or any other order you prefer.

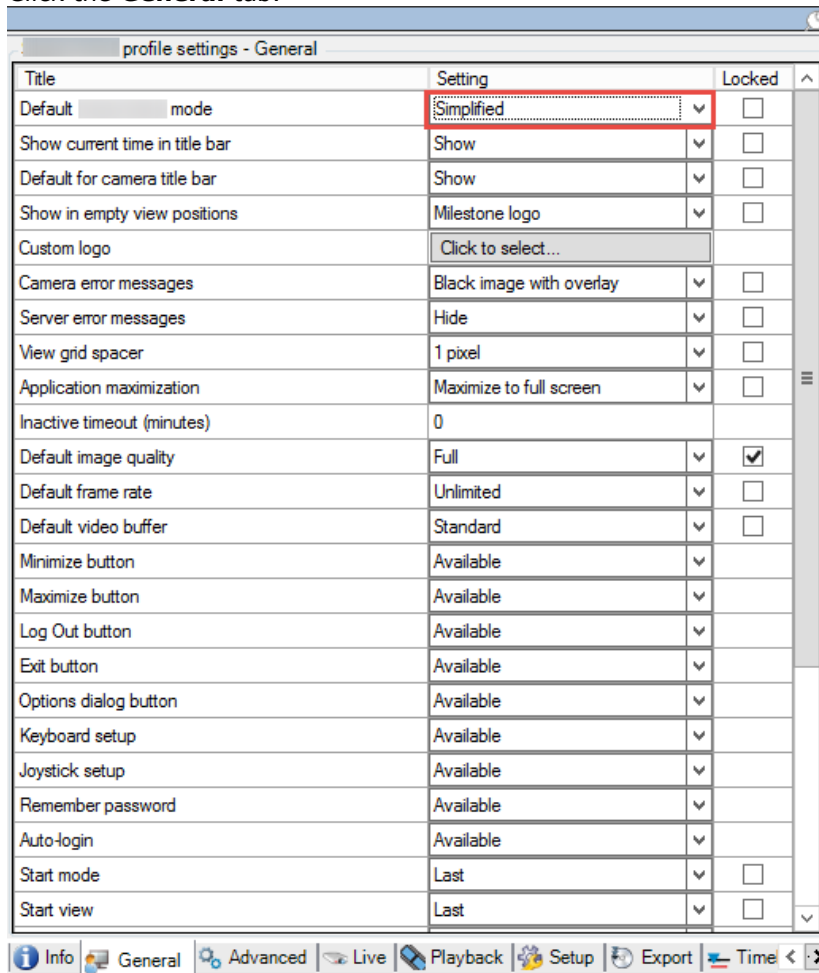
Set simplified mode as the default mode

Through the Smart Client profiles, you can configure your system to automatically open XProtect Smart Client in simplified mode with a limited set of features and tabs. By default, XProtect Smart Client opens in advanced mode with the complete set of features and tabs.

If the XProtect Smart Client operator at some point decides to switch to a different mode than the default mode, XProtect Smart Client remembers this setting the next time the operator opens the program.

1. In Management Client, expand the **Client** node.

2. Select the relevant Smart Client profile.
3. Click the **General** tab.



4. In the **Default Smart Client mode** list, select **Simplified**. XProtect Smart Client now opens in simplified mode for those users associated with the current Smart Client profile.

See also

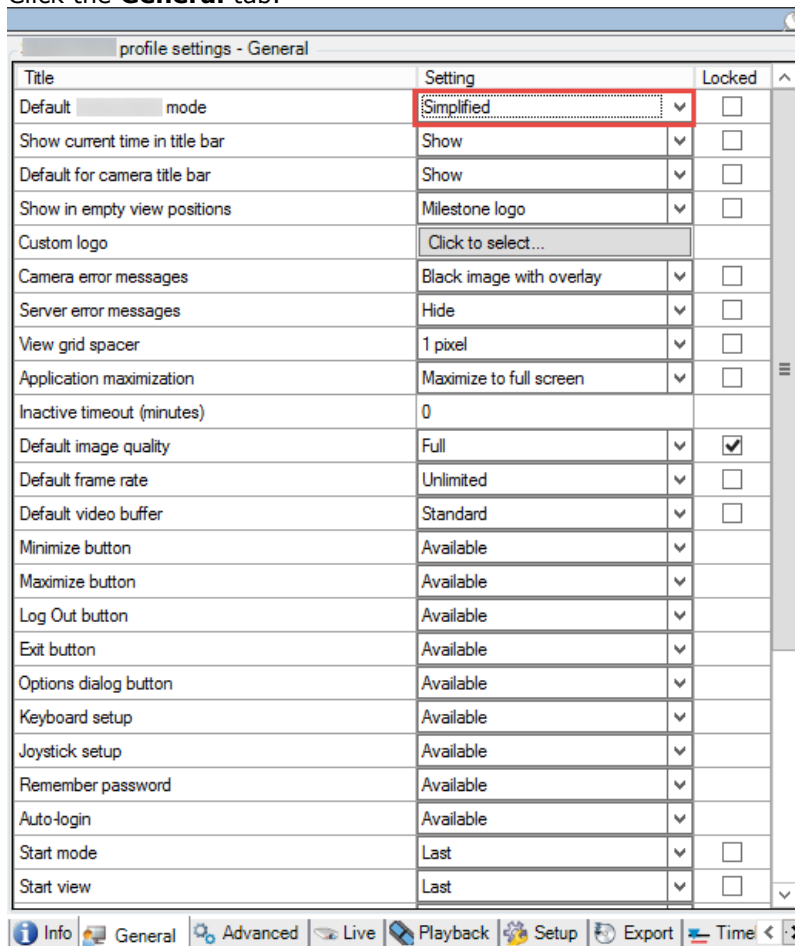
Prevent operators from switching between simple and advanced mode (on page 158)

Prevent operators from switching between simple and advanced mode

In XProtect Smart Client, operators can switch between simple and advanced mode. However, you can prevent the XProtect Smart Client operators from switching between modes. Technically, you must lock the setting that determines whether XProtect Smart Client opens in simple mode or advanced mode.

1. In Management Client, expand the **Client** node.

2. Select the relevant Smart Client profile.
3. Click the **General** tab.



4. Verify that the **Default Smart Client mode** list has the proper value. If **Enabled**, XProtect Smart Client opens in simple mode.
5. Select the **Locked** check box. The mode toggling button in XProtect Smart Client is hidden.

See also

Set simple mode as the default mode (see "Set simplified mode as the default mode" on page 157)

Smart Client profile properties

The following tabs allow you to specify the properties of each Smart Client profile. You can lock the settings in the Management Client if required, so the users of XProtect Smart Client cannot change them:

Tab	Description
Info	<p>Name and description, priority of existing profiles and an overview of which roles use the profile.</p> <p>If a user is a member of more than one role, each with their individual Smart Client profile, the user gets the Smart Client profile with the highest priority.</p>
General	Settings such as show/hide and mini- and maximize menu settings, login/-out, startup, timeout, info and messaging options, and Sequence Explorer settings.
Advanced	<p>Advanced settings such as maximum decoding threads, deinterlacing and time zone settings.</p> <p>Maximum decoding threads controls how many decoding threads are used to decode video streams. It can help improve performance on multi-core computers in live as well as playback mode. The exact performance improvement depends on the video stream. It is mainly relevant if using heavily coded high-resolution video streams like H.264/H.265, for which the performance improvement potential can be significant, and less relevant if using, for example, JPEG or MPEG-4.</p> <p>With deinterlacing, you convert video into a non-interlaced format. Interlacing determines how an image is refreshed on a screen. The image is refreshed by first scanning the odd lines in the image, then scanning the even lines. This allows a faster refresh rate because less information is processed during each scan. However, interlacing may cause flickering, or the changes in half of the image's lines may be noticeable.</p>
Live	Availability of live tabs/panes, camera playback and overlay buttons, bounding boxes, and live-related MIP plug-ins.
Playback	Availability of playback tabs/panes, layout of print reports, independent playback, bookmarks, bounding boxes, and playback-related MIP plug-ins.
Setup	Availability of general setup/panes/buttons, setup-related MIP plug-in and rights to edit a map and to edit live video buffering.
Exports	Paths, privacy masks, video and still image formats and what to include when exporting these, export formats for XProtect Smart Client – Player and much more.
Timeline	<p>Whether to include audio or not, visibility of indication of time and motion, and finally how to handle playback gaps.</p> <p>You can also select whether to show additional data or additional markers from other sources.</p>
Access Control	Select if access request notifications should pop up on the XProtect Smart Client screen when triggered by events.

Tab	Description
Smart Map	<p>Specify settings for the Smart Map feature.</p> <p>You can specify whether OpenStreetMaps is available for use as a geographic background, and whether XProtect Smart Client will automatically create locations when a user adds a custom overlay to the Smart Map.</p> <p>You can also specify how often you want the system to delete data related to Smart Maps from your computer. To help XProtect Smart Client display Smart Map faster, the client saves map data in the cache on your computer. Over time this might slow down your computer.</p> <p>If you want to use Bing Maps or Google Maps as geographic backgrounds, enter a key for a Bing Maps API, or a private key and client ID for the Google Static Maps API.</p>

Management Client profiles

Management Client profiles (explained)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

Management Client profiles allow system administrators to modify the Management Client user interface for other users. Associate Management Client profiles with roles to limit the user interface to represent the functionality available for each administrator role.

To associate a role with a Management Client profile, see the Role Settings' Info tab (see "Info tab (roles)" on page 207). Note that Management Client profiles only handle the visual representation of system functionality, not the actual access to it. To limit the overall access to system functionality for a role, see the Role Settings' Overall Security tab (see "Overall Security tab (roles)" on page 208).

You can change settings for the visibility of all Management Client elements. By default, the Management Client profile can see all functionality in the Management Client.

- To limit visibility of functionality, clear the check boxes for the relevant functionality in order to remove the functionality visually from the Management Client for any Management Client user with a role associated with this Management Client profile.

Apart from the built-in administrator role, only users associated with a role that has been granted **Manage security** permissions for the management server on the **Overall Security** tab, can add, edit, and delete Management Client profiles.

Add and configure a Management Client profile

If you do not want to use the default profile, you can create a Management Client profile before you can configure it.

1. Right-click **Management Client Profiles**.
2. Select **Add Management Client Profile**.

3. In the **Add Management Client Profile** dialog box, type a name and description of the new profile and click **OK**.
4. In the **Overview** pane, click the profile you created to configure it.
5. On the **Profile** tab, select or clear functionality from the Management Client profile.

Copy a Management Client profile

If you have a Management Client profile with settings that you would like to reuse, you can copy an already existing profile and make minor adjustments to the copy instead of creating a new profile from scratch.

1. Click **Management Client Profile**, right-click the profile in the **Overview** pane, select **Copy Management Client Profile**.
2. In the dialog box that appears, give the copied profile a new unique name and description. Click **OK**.
3. In the **Overview** pane, click the profile and go to the **Info** tab or **Profile** tab to configure the profile.

Management Client profile properties

Info tab (Management Client Profiles)

On the **Info** tab, you can set the following for Management Client profiles:

Component	Requirement
Name	Enter a name for the Management Client profile.
Priority	Use the up and down arrows to set a priority for the Management Client profile.
Description	Enter a description for the profile. This is optional.
Roles using the Management Client profile	This field shows the roles that you have associated with the Management Client profile. You cannot edit this.

Profile tab (Management Client Profiles)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

On the **Profile** tab, you can enable or disable the visibility of the following elements from the Management Client's user interface:

Navigation

In this section, decide if an administrator user associated with the Management Client profile is allowed to see the various features and functionality located in the **Navigation** pane.

Navigation element	Description
Basics	Allows the administrator user associated with the Management Client profile to see License Information and Site Information .
Remote Connect Services	Allows the administrator user associated with the Management Client profile to see Axis One-click Camera Connection .
Servers	Allows the administrator user associated with the Management Client profile to see Recording Servers and Failover Servers .
Devices	Allows the administrator user associated with the Management Client profile to see Cameras, Microphones, Speakers, Metadata, Input and Output .
Client	Allows the administrator user associated with the Management Client profile to see Smart Wall, View Groups, Smart Client Profiles, Management Client Profiles and Matrix .
Rules and Events	Allows the administrator user associated with the Management Client profile to see Rules, Time Profiles, Notification Profiles, User-defined Events, Analytics Events and Generic Events .
Security	Allows the administrator user associated with the Management Client profile to see Roles and Basic Users .
System Dashboard	Allows the administrator user associated with the Management Client profile to see System Monitor, System Monitor Thresholds, Evidence Lock, Current Tasks and Configuration Reports .
Server Logs	Allows the administrator user associated with the Management Client profile to see System Log, Audit Log and Rule Log .
Access Control	Allows the administrator user associated with the Management Client profile to see Access Control features, if you have added any access control system integrations or plug-ins to your system.

Details

In this section, decide if an administrator user associated with the Management Client profile is allowed to see the various tabs for a specific device channel, for example the **Settings** tab or **Record** tab for cameras.

Device channel	Description
Cameras	Allows the administrator user associated with the Management Client profile to see some or all camera-related settings and tabs.
Microphones	Allows the administrator user associated with the Management Client profile to see some or all microphone-related settings and tabs.

Device channel	Description
Speakers	Allows the administrator user associated with the Management Client profile to see some or all speaker-related settings and tabs.
Metadata	Allows the administrator user associated with the Management Client profile to see some or all metadata-related settings and tabs.
Input	Allows the administrator user associated with the Management Client profile to see some or all input-related settings and tabs.
Output	Allows the administrator user associated with the Management Client profile to see some or all output-related settings and tabs.

Tools Menu

In this section, decide if an administrator user associated with the Management Client profile is allowed to see the elements that are part of the **Tools** menu.

Tool Menu option	Description
Registered Services	Allows the administrator user associated with the Management Client profile to see Registered Services .
Effective Roles	Allows the administrator user associated with the Management Client profile to see Effective Roles .
Options	Allows the administrator user associated with the Management Client profile to see Options .
Enterprise Servers	Allows the administrator user associated with the Management Client profile to see Enterprise Servers .

Federated Sites

In this section, decide if an administrator user associated with the Management Client profile is allowed to see the **Federated Site Hierarchy** pane.

Matrix

Matrix (explained)

With Matrix, you can send video from any camera on a network operating your system to Matrix-recipients. A Matrix recipient is a computer that can display Matrix-triggered video. There are two kinds of Matrix recipients:

- computers running a dedicated Matrix application and
- computers running XProtect Smart Client.

To see a list of Matrix recipients configured in the Management Client, expand **Client** in the **Site Navigation** pane, then select **Matrix**. A list of Matrix configurations is displayed in the **Properties** pane.

Each Matrix recipient, regardless whether it is a computer with the Matrix Monitor or the XProtect Smart Client, must be configured to receive Matrix-triggered video. See the Matrix Monitor and XProtect Smart Client documentation for more information.

Add Matrix recipients

To add an existing Matrix recipient, for example an existing Matrix Monitor or XProtect Smart Client installation, through the Management Client:

1. Expand **Clients**, then select **Matrix**.
2. Right-click **Matrix Configurations** and select **Add Matrix**.
3. Fill out the fields in the **Add Matrix** dialog box.
4. In the **Address** field enter the IP address or the host name of the required Matrix recipient.
5. In the **Port** field enter the port number used by the Matrix recipient installation. You can find the port number and password in this way: For a Matrix Monitor application, go to the Matrix Monitor **Configuration** dialog box. For XProtect Smart Client, see the XProtect Smart Client documentation.
6. Click **OK**.

You can now use the Matrix recipient in rules.

Note: Your system does not verify that the specified port number or password is correct or that the specified port number, password, or type corresponds with the actual Matrix recipient. Make sure that you enter the correct information.

Define rules sending video to Matrix-recipients

To send video to Matrix-recipients you must include the Matrix recipient in a rule that triggers the video transmission to the related Matrix-recipient. To do so:

1. In the **Site Navigation** pane, Expand **Rules and Events** > **Rules**. Right-click **Rules** to open the **Manage Rule** wizard. In the first step, select a rule type and in the second step, a condition.
2. In **Manage Rule**'s step 3 (**Step 3: Actions**) select the **Set Matrix to view <devices>** action.
3. Click the Matrix link in the initial rule description.
4. In the **Select Matrix Configuration** dialog box, select the relevant Matrix-recipient, and click **OK**.
5. Click the **devices** link in the initial rule description, and select from which cameras you would like to send video to the Matrix-recipient, then click **OK** to confirm your selection.
6. Click **Finish** if the rule is complete or define if required additional actions and/or a stop action.

If you delete a Matrix-recipient, any rule that includes the Matrix-recipient stops working.

Send the same video to several XProtect Smart Client views

If the Matrix-recipient is XProtect Smart Client, you can send the same video to Matrix positions in several of XProtect Smart Client's views, provided the views' Matrix positions share the same port number and password:

1. In XProtect Smart Client, create the relevant views and Matrix positions that share the same port number and password.
2. In the Management Client, add the relevant XProtect Smart Client as a Matrix-recipient.
3. You may include the Matrix-recipient in a rule.

Rules and events

Rules and events (explained)

Rules are a central element in your system. Rules determine highly important settings, such as when cameras should record, when PTZ cameras should patrol, when notifications should be sent, etc.



Perform an action on [Motion Start](#)
from [Camera 2](#)
start recording [3 seconds before](#) on [the device on which event occurred](#)

Perform stop action on [Motion End](#)
from [Camera 2](#)
stop recording [immediately](#)

Example: A rule specifying that a particular camera should begin recording when it detects motion.

Events are central elements when using the **Manage Rule** wizard. In the wizard, events are primarily used for triggering actions. For example, you can create a rule which specifies that in the **event** of detected motion, the surveillance system should take the **action** of starting recording of video from a particular camera.

Two types of conditions can trigger rules:

Name	Description
Events	When events occur on the surveillance system, for example when motion is detected or the system receives input from external sensors.
Time	When you enter specific periods of time, for example: Thursday 16th August 2007 from 07.00 to 07.59 or every Saturday and Sunday.

You can work with the following under **Rules and Events**:

- **Rules:** Rules are a central element in the system. The behavior of your surveillance system is to a very large extent determined by rules. When creating a rule, you can work with all types of events.

- **Time profiles:** Time profiles are periods of time defined in the Management Client. You use them when you create rules in the Management Client, for example to create a rule which specifies that a certain action should take place within a certain time profile.
- **Notification profiles:** You can use notification profiles to set up ready-made email notifications, which can automatically be triggered by a rule, for example when a particular event occurs.
- **User-defined events:** User-defined events are custom-made events that makes it possible for users to manually trigger events in the system or react to inputs from the system.
- **Analytics events:** Analytics events are data received from an external third-party video content analysis (VCA) providers. You can use analytics events as basis for alarms.
- **Generic events:** Generic events allow you to trigger actions in the XProtect event server by sending simple strings via the IP network to your system.

See Events overview (on page 175) for a list of events.

Actions and stop actions (explained)

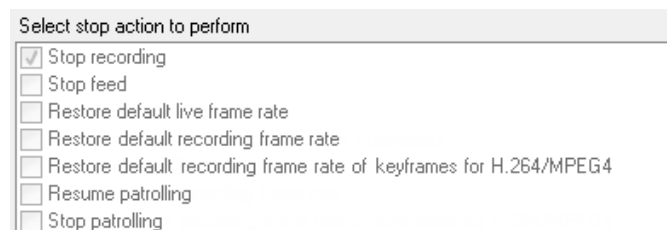
When you add rules (see "Add a rule" on page 184) in the **Manage Rule** wizard, you can select between different actions:



Example: Selecting actions

Some of the actions require a stop action. **Example:** If you select the action **Start recording**, recording starts and potentially continues indefinitely. As a result, the action **Start recording** has a mandatory stop action called **Stop recording**.

The **Manage Rule** wizard makes sure you specify stop actions when necessary:



Selecting stop actions. In the example, note the mandatory stop action (selected, dimmed), the non-relevant stop actions (dimmed) and the optional stop actions (selectable).

Each type of action from your XProtect system is described. You may have more actions available if your system installation uses add-on products or vendor-specific plug-ins. For each type of action, stop action information is listed if relevant:

Action	Description
Start recording on <devices>	<p>Start recording and saving data in the database from the selected devices.</p> <p>When you select this type of action, the Manage Rule wizard prompts you to specify:</p> <p>When recording should start. This happens either immediately or a number of seconds before the triggering event/beginning of the triggering time interval and on which devices the action should take place.</p>

Action	Description
	<p>This type of action requires that you have enabled recording on the devices to which the action is linked. You can only save data from before an event or time interval if you have enabled pre-buffering for the relevant devices. You enable recording and specify pre-buffering settings for a device on the Record tab.</p> <p>Stop action required: This type of action requires one or more stop actions. In one of the following steps, the wizard automatically prompts you to specify the stop action: Stop recording.</p> <p>Without this stop action, recording would potentially continue indefinitely. You also have the option of specifying further stop actions.</p>
Start feed on <devices>	<p>Begin data feed from devices to the system. When the feed from a device is started, data is transferred from the device to the system, in which case you may view and record, depending on the data type.</p> <p>When you select this type of action, the Manage Rule wizard prompts you to specify on which devices to start the feeds. Your system includes a default rule which ensures that feeds are always started on all cameras.</p> <p>Stop action required: This type of action requires one or more stop actions. In one of the following steps, the wizard automatically prompts you to specify the stop action: Stop feed.</p> <p>You can also specify further stop actions.</p> <p>Note that using the mandatory stop action Stop feed to stop the feed from a device means that data is no longer transferred from the device to the system, in which case live viewing and recording of video, for example, is no longer possible. However, a device on which you have stopped the feed can still communicate with the recording server, and you can start the feed again automatically through a rule, as opposed to when you manually have disabled the device.</p> <p>Important: While this type of action enables access to selected devices' data feeds, it does not guarantee that data is recorded, as you must specify recording settings separately.</p>
Set <Smart Wall> to <preset>	<p>Sets the XProtect Smart Wall to a selected preset. Specify the preset on the Smart Wall Presets tab.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Set <Smart Wall> <monitor> to show <cameras>	<p>Sets a specific XProtect Smart Wall monitor to display live video from the selected cameras on this site or any child site configured in Milestone Federated Architecture.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Set <Smart Wall> <monitor> to show text <messages>	<p>Sets a specific XProtect Smart Wall monitor to display a user-defined text message of up to 200 characters.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>

Action	Description
Remove <cameras> from <Smart Wall> monitor <monitor>	<p>Stop displaying video from a specific camera.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Set live frame rate on <devices>	<p>Sets a particular frame rate to use when the system displays live video from the selected cameras that substitutes the cameras' default frame rate. Specify this on the Settings tab.</p> <p>When you select this type of action, the Manage Rule wizard prompts you to specify which frame rate to set, and on which devices. Always verify that the frame rate you specify is available on the relevant cameras.</p> <p>Stop action required: This type of action requires one or more stop actions. In one of the following steps, the wizard automatically prompts you to specify the stop action: Restore default live frame rate.</p> <p>Without this stop action, the default frame rate would potentially never be restored. You also have the option of specifying further stop actions.</p>
Set recording frame rate on <devices>	<p>Sets a particular frame rate to use when the system saves recorded video from the selected cameras in the database, instead of the cameras' default recording frame rate.</p> <p>When you select this type of action, the Manage Rule wizard prompts you to specify which recording frame rate to set, and on which cameras.</p> <p>You can only specify a recording frame rate for JPEG, a video codec with which each frame is separately compressed into a JPEG image. This type of action also requires that you have enabled recording on the cameras to which the action is linked. You enable recording for a camera on the Record tab. The maximum frame rate you can specify depends on the relevant camera types, and on their selected image resolution.</p> <p>Stop action required: This type of action requires one or more stop actions. In one of the following steps, the wizard automatically prompts you to specify the stop action: Restore default recording frame rate.</p> <p>Without this stop action, the default recording frame rate would potentially never be restored. You also have the option of specifying further stop actions.</p>
Set recording frame rate to all frames for MPEG-4/H.264/H.265 on <devices>	<p>Sets the frame rate to record all frames when the system saves recorded video from the selected cameras in the database, instead of keyframes only. Enable the recording keyframes only function on the Record tab.</p> <p>When you select this type of action, the Manage Rule wizard prompts you to select which devices the action should apply for.</p> <p>You can only enable keyframe recording for MPEG-4/H.264/H.265. This type of action also requires that you have enabled recording on the cameras to which the action is linked. You enable recording for a camera on the Record tab.</p> <p>Stop action required: This type of action requires one or more stop actions. In one of the following steps, the wizard automatically prompts you to specify the stop action:</p> <p>Restore default recording frame rate of keyframes for MPEG-4/H.264/H.265</p> <p>Without this stop action, the default setting would potentially never be</p>

Action	Description
	restored. You also have the option of specifying further stop actions.
Start patrolling on <device> using <profile> with PTZ priority <priority>	<p>Begins PTZ patrolling according to a particular patrolling profile for a particular PTZ camera with a particular priority. This is an exact definition of how patrolling should be carried out, including the sequence of preset positions, timing settings, and more.</p> <p>If you have upgraded your system from an older version of the system, the old values (Very Low, Low, Medium, High and Very High) have been translated as follows:</p> <ul style="list-style-type: none"> • Very Low = 1000 • Low = 2000 • Medium = 3000 • High = 4000 • Very High = 5000 <p>When you select this type of action, the Manage Rule wizard prompts you to select a patrolling profile. You can only select one patrolling profile on one device and you cannot select several patrolling profiles.</p> <p>This type of action requires that the devices to which the action is linked are PTZ devices.</p> <p>You must define at least one patrolling profile for the device(s). You define patrolling profiles for a PTZ camera on the Patrolling tab.</p> <p>Stop action required: This type of action requires one or more stop actions. In one of the following steps, the wizard automatically prompts you to specify the stop action:</p> <p>Stop patrolling</p> <p>Without this stop action, patrolling would potentially never stop. You can also specify further stop actions.</p>
Pause patrolling on <devices>	<p>Pauses PTZ patrolling. When you select this type of action, the Manage Rule wizard prompts you to specify the devices on which to pause patrolling.</p> <p>This type of action requires that the devices to which the action is linked are PTZ devices.</p> <p>You must define at least one patrolling profile for the device(s). You define patrolling profiles for a PTZ camera on the Patrolling tab.</p> <p>Stop action required: This type of action requires one or more stop actions. In one of the following steps, the wizard automatically prompts you to specify the stop action: Resume patrolling</p> <p>Without this stop action, patrolling would potentially pause indefinitely. You</p>

Action	Description
	have also the option of specifying further stop actions.
Move <device> to <preset> position with PTZ priority <priority>	<p>Moves a particular camera to a particular preset position - however always according to priority. When selecting this type of action, the Manage Rule wizard prompts you to select a preset position. Only one preset position on one camera can be selected. It is not possible to select several preset positions.</p> <p>This type of action requires that the devices to which the action is linked are PTZ devices.</p> <p>This action requires that you have defined at least one preset position for those devices. You define preset positions for a PTZ camera on the Presets tab.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Move to default preset on <devices> with PTZ priority <priority>	<p>Moves one or more particular cameras to their respective default preset positions - however always according to priority. When you select this type of action, the Manage Rule wizard prompts you to select which devices the action should apply for.</p> <p>This type of action requires that the devices to which the action is linked are PTZ devices.</p> <p>This action requires that you have defined at least one preset position for those devices. You define preset positions for a PTZ camera on the Presets tab.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Set device output to <state>	<p>Sets an output on a device to a particular state (activated or deactivated). When you select this type of action, the Manage Rule wizard prompts you to specify which state to set, and on which devices.</p> <p>This type of action requires that the devices to which the action is linked each have at least one external output unit connected to an output port.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Create bookmark on <device>	<p>Creates a bookmark on live streaming or recordings from a selected device. A bookmark makes it easy to retrace a certain event or period in time. Bookmark settings are controlled from the Options dialog box. When you select this type of action, the Manage Rule wizard prompts you to specify bookmark details and select devices.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>

Action	Description
Play audio <message> on <devices> with <priority>	<p>Plays back an audio message on selected devices triggered by an event. Devices are mostly speakers or cameras.</p> <p>This type of action requires that you have uploaded the message to the system on Tools > Options > Audio messages tab.</p> <p>You can create more rules to the same event and send different messages to each device, but always according to priority. The priorities that control the sequence are those set on the rule and on the device for a role on the Speech tab:</p> <ul style="list-style-type: none"> • If a message is played back and another message with the same priority is sent to the same speaker, the first message will complete and then the second one starts. • If a message is played back and another message with a higher priority is sent to the same speaker, the first message is interrupted and the second one starts immediately.
Send notification to <profile>	<p>Sends a notification, using a particular notification profile. When you select this type of action, the Manage Rule wizard prompts you to select a notification profile, and which devices to include pre-alarm images from. You can only select one notification profile and you cannot select several notification profiles. Note that a single notification profile may contain several recipients.</p> <p>You can also create more rules to the same event and send different notifications to each of the notification profiles. You can copy and re-use the content of rules by right-clicking a rule in the Rules list.</p> <p>This type of action requires that you have defined at least one notification profile. Pre-alarm images are only included if you have enabled the Include images option for the relevant notification profile.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Make new <log entry>	<p>Generates an entry in the rule log. When selecting this type of action, the Manage Rule wizard prompts you to specify a text for the log entry. When you specify the log text, you can insert variables, such as \$DeviceName\$, \$EventName\$, into the log message.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Start plug-in on <devices>	<p>Starts one or more plug-ins. When you select this type of action, the Manage Rule wizard prompts you to select required plug-ins, and on which devices to start the plug-ins.</p> <p>This type of action requires that you have at least one or more plug-ins installed on your system.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>

Action	Description
Stop plug-in on <devices>	<p>Stops one or more plug-ins. When you select this type of action, the Manage Rule wizard prompts you to select required plug-ins, and on which devices to stop the plug-ins.</p> <p>This type of action requires that you have at least one or more plug-ins installed on your system.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Apply new settings on <devices>	<p>Changes device settings on one or more devices. When you select this type of action, the Manage Rule wizard prompts you to select relevant devices, and you can define the relevant settings on the devices you have specified.</p> <p>If you define settings for more than one device, you can only change settings that are available for all of the specified devices.</p> <p>Example: You specify that the action should be linked to Device 1 and Device 2. Device 1 has the settings A, B and C, and Device 2 has the settings B, C and D. In this case, you can only change the settings that are available for both devices, namely settings B and C.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Set Matrix to view <devices>	<p>Makes video from the selected cameras appear on a computer capable of displaying Matrix-triggered video such as a computer on which you have installed either XProtect Smart Client or the Matrix Monitor application.</p> <p>When you select this type of action, the Manage Rule wizard prompts you to select a Matrix recipient, and one or more devices from which to display video on the selected Matrix recipient.</p> <p>This type of action allows you to select only a single Matrix recipient at a time. If you want to make video from the selected devices appear on more than one Matrix recipient, you should create a rule for each required Matrix recipient or use the XProtect Smart Wall feature. By right-clicking a rule in the Rules list, you can copy and re-use the content of rules. This way, you can avoid having to create near-identical rules from scratch.</p> <p>As part of the configuration on the Matrix recipients themselves, users must specify the port number and password required for the Matrix communication. Make sure that the users have access to this information. The users must typically also define the IP addresses of allowed hosts from which commands regarding display of Matrix-triggered video is accepted. In that case, the users must also know the IP address of the management server, or any router or firewall used.</p>
Send SNMP trap	<p>Generates a small message which logs events on selected devices. The text of SNMP traps is auto-generated and cannot be customized. It can contain the source type and name of the device on which the event occurred.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>

Action	Description
Retrieve and store remote recordings from <devices>	<p>Retrieves and stores remote recordings from selected devices (that support edge recording) in a specified period before and after the triggering event.</p> <p>Note that this rule is independent of the Automatically retrieve remote recordings when connection is restored setting.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Retrieve and store remote recordings between <start and end time> from <devices>	<p>Retrieves and stores remote recordings in a specified period from selected devices (that support edge recording).</p> <p>Note that this rule is independent of the Automatically retrieve remote recordings when connection is restored setting.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Save attached image	<p>Ensures that when an image is received from the Images Received event (sent via SMTP email from a camera), it is saved for future usage. In future, other events can possibly also trigger this action.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Activate archiving on <archives>	<p>Starts archiving on one or more archives. When you select this type of action, the Manage Rule wizard prompts you to select relevant archives.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
On <site> trigger <user-defined event>	<p>Relevant mostly within Milestone Federated Architecture, but you can also use this in a single site setup. Use the rule to trigger a user-defined event on a site, normally a remote site within a federated hierarchy.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>
Send to Customer Dashboard	<p>Sends relevant system information to Milestone Customer Dashboard.</p> <p>You can only send system information to Customer Dashboard if you have enabled the system to access Customer Dashboard on the Customer Dashboard tab (see "Customer Dashboard tab (options)" on page 256).</p>
Show <access request notification>	<p>Lets you access request notifications pop up on the XProtect Smart Client screen when the criteria for the triggering events are met. Milestone recommends that you use access control events as triggering events for this action, because access request notifications typically are configured for operating on related access control commands and cameras.</p> <p>This type of action requires that you have at least one access control plug-in installed on your system.</p> <p>No mandatory stop action: This type of action does not require a stop action. You can specify optional stop actions to be performed on either an event or after a period of time.</p>

Events overview

When you add an event-based rule in the **Manage Rule** wizard, you can select between a number of different event types. In order for you to get a good overview, events you can select are listed in groups according to whether they are:

Hardware:

Some hardware is capable of creating events themselves, for example to detect motion. You can use these as events but you must configure them on the hardware before you can use them in the system. You may only be able to use the events listed on some hardware as not all types of cameras can detect tampering or temperature changes.

Hardware - Configurable events:

Configurable events from hardware are automatically imported from device drivers. This means that they vary from hardware to hardware and are not documented here. Configurable events are not triggered until you have added them to the system and configured them on the **Event** tab for hardware. Some of the configurable events also require that you configure the camera (hardware) itself.

Hardware - Predefined events:

Event	Description
Communication Error (Hardware)	Occurs when a connection to the hardware is lost.
Communication Started (Hardware)	Occurs when communication with the hardware is successfully established.
Communication Stopped (Hardware)	Occurs when communication with the hardware is successfully stopped.

Devices - Configurable events:

Configurable events from devices are automatically imported from device drivers. This means that they vary from device to device and are not documented here. Configurable events are not triggered until you have added them to the system and configured them on the **Event** tab on a device.

Devices - Predefined events:

Event	Description
Bookmark Reference Requested	Occurs when a bookmark is made in live or playback mode in the clients. Also, a requirement for using the Default record on bookmark rule.
Communication Error (Device)	Occurs when a connection to a device is lost, or when an attempt is made to communicate with a device, and the attempt is unsuccessful.
Communication Started (Device)	Occurs when communication with a device is successfully established.

Event	Description
Communication Stopped (Device)	Occurs when communication with a device is successfully stopped.
Evidence Lock Changed	Occurs when an evidence lock is changed for devices by a client user or via the MIP SDK.
Evidence Locked	Occurs when an evidence lock is created for devices by a client user or via the MIP SDK.
Evidence Unlocked	Occurs when an evidence lock is removed for devices by a client user or via the MIP SDK.
Feed Overflow Started	<p>Feed overflow (media overflow) occurs when a recording server cannot process received data as quickly as specified in the configuration and therefore is forced to discard some recordings.</p> <p>If the server is healthy, feed overflow usually happens because of slow disk writes. You can resolve this either by reducing the amount of data written, or by improving the storage system's performance. Reduce the amount of written data by reducing frame rates, resolution or image quality on your cameras, but this may degrade recording quality. If you are not interested in that, instead improve your storage system's performance by installing extra drives to share the load or by installing faster disks or controllers.</p> <p>You can use this event to trigger actions that helps you avoid the problem, for example, to lower the recording frame rate.</p>
Feed Overflow Stopped	Occurs when feed overflow (see description of the Feed Overflow Started event) ends.
Live Client Feed Requested	<p>Occurs when client users request a live stream from a device.</p> <p>The event occurs upon the request even if the client user's request later turns out to be unsuccessful, for example because the client user does not have the rights required for viewing the requested live feed or because the feed is for some reason stopped.</p>
Live Client Feed Terminated	Occurs when client users no longer request a live stream from a device.
Manual Recording Started	<p>Occurs when a client user starts a recording session for a camera.</p> <p>The event is triggered even if the device already is being recorded via rule actions.</p>
Manual Recording Stopped	<p>Occurs when a client user stops a recording session for a camera.</p> <p>If the rule system also has started a recording session it continues recording even after the manual recording is stopped.</p>
Marked Data Reference Requested	<p>Occurs when an evidence lock is made in playback mode in the clients or via the MIP SDK.</p> <p>An event is created that you can use in your rules.</p>

Event	Description
Motion Started	<p>Occurs when the system detects motion in video received from cameras.</p> <p>This type of event requires that the system's motion detection is enabled for the cameras to which the event is linked.</p> <p>In addition to the system's motion detection, some cameras can detect motion themselves and trigger the Motion Started (HW) event, but it depends on the configuration of the camera hardware and in the system. See Hardware - Configurable events above.</p>
Motion Stopped	<p>Occurs when motion is no longer detected in received video. See also the description of the Motion Started event.</p> <p>This type of event requires that the system's motion detection is enabled for the cameras to which the event is linked.</p> <p>In addition to the system's motion detection, some cameras can detect motion themselves and trigger the Motion Stopped (HW) event, but it depends on the configuration of the camera hardware and in the system. See Hardware - Configurable events above.</p>
Output Activated	<p>Occurs when an external output port on a device is activated.</p> <p>This type of event requires that at least one device on your system supports output ports.</p>
Output Changed	<p>Occurs when the state of an external output port on a device is changed.</p> <p>This type of event requires that at least one device on your system supports output ports.</p>
Output Deactivated	<p>Occurs when an external output port on a device is deactivated.</p> <p>This type of event requires that at least one device on your system supports output ports.</p>
PTZ Manual Session Started	<p>Occurs when a manually operated PTZ session (as opposed to a PTZ session based on scheduled patrolling or automatically triggered by an event) is started on a camera.</p> <p>This type of event requires that the cameras to which the event is linked are PTZ cameras.</p>
PTZ Manual Session Stopped	<p>Occurs when a manually operated PTZ session (as opposed to a PTZ session based on scheduled patrolling or automatically triggered by an event) is stopped on a camera.</p> <p>This type of event requires that the cameras to which the event is linked are PTZ cameras.</p>
Recording Started	<p>Occurs whenever recording is started. There is a separate event for manual recording started.</p>

Event	Description
Recording Stopped	Occurs whenever recording is stopped. There is a separate event for manual recording stopped.
Settings Changed	Occurs when settings on a device are successfully changed.
Settings Changed Error	Occurs when an attempt is made to change settings on a device, and the attempt is unsuccessful.

External events - Predefined events:

Event	Description
Request Start Recording	Activated when start recordings are requested via the MIP Software Development Kit (SDK). Through the MIP SDK a third-party vendor can develop custom plug-ins (for example, integration to external access control systems or similar) for your system.
Request Stop Recording	Activated when stop recordings are requested via the MIP SDK. Through the MIP SDK a third party vendor can develop custom plug-ins (for example, integration to external access control systems or similar) for your system.

External events - Generic events:

Generic events allow you to trigger actions in the system by sending simple strings via the IP network to the system. The purpose of generic events is to allow as many external sources as possible to interact with the system.

External events - User-defined events:

A number of events custom made to suit your system may also be selectable. You can use such user-defined events for:

- Making it possible for client users to manually trigger events while viewing live video in the clients.
- Countless other purposes. For example, you may create user-defined events which occur if a particular type of data is received from a device.

See User-defined events (explained) (on page 193) for more information.

Recording servers:

Event	Description
Archive Available	Occurs when an archive for a recording server becomes available after having been unavailable (see Archive Unavailable).

Event	Description
Archive Unavailable	Occurs when an archive for a recording server becomes unavailable, for example if the connection to an archive located on a network drive is lost. In such cases, you cannot archive recordings. You can use the event to, for example, trigger an alarm or a notification profile so that an email notification is automatically sent to relevant people in your organization.
Archive Not Finished	Occurs when an archive for a recording server is not finished with the last archiving round when the next is scheduled to start.
Database Disk Full	Occurs when a database disk is full. A database disk is considered to be full when there is less than 5GB of space is left on the disk: The oldest data in a database is always auto-archived (or deleted if no next archive is defined) when less than 5GB of space is free. If less than 1GB space is free, data is deleted even if a next archive is defined. A database always requires 250MB of free space. If this limit is reached (if data is not deleted fast enough), no more data is written to the database until enough space has been freed. The actual maximum size of your database is the amount of gigabytes you specify, minus 5GB.
Database Full - Auto Archive	Occurs when an archive for a recording server is full and needs to auto-archive to an archive in the storage.
Database Repair	Occurs if a database becomes corrupted, in which case the system automatically attempts two different database repair methods: a fast repair and a thorough repair.
Database Storage Available	Occurs when a storage for a recording server becomes available after having been unavailable (see Database Storage Unavailable). You can, for example, use the event to start recording if it has been stopped by a Database Storage Unavailable event.
Database Storage Unavailable	Occurs when a storage for a recording server becomes unavailable, for example if the connection to a storage located on a network drive is lost. In such cases, you cannot archive recordings. You can use the event to, for example, stop recording, trigger an alarm or a notification profile so an e-mail notification is automatically sent to relevant people in your organization.
Failover Started	Occurs when a failover recording server takes over from a recording server. See Failover recording servers (explained) (on page 93).
Failover Stopped	Occurs when a recording server becomes available again, and can take over from a failover recording server.

Events from add-on products and integrations:

Events from add-on products and integrations can be used in the rule system, for example:

- Analytics events can also be used in the rule system.

Rules

Rules (explained)

Rules specify actions to carry out under particular conditions. Example: When motion is detected (condition), a camera should begin recording (action).

The following are **examples** of what you can do with rules:

- Start and stop recording
- Set non-default live frame rate
- Set non-default recording frame rate
- Start and stop PTZ patrolling
- Pause and resume PTZ patrolling
- Move PTZ cameras to specific positions
- Set output to activated/deactivated state
- Send notifications via e-mail
- Generate log entries
- Generate events
- Apply new device settings, for example a different resolution on a camera
- Make video appear in Matrix recipients
- Start and stop plug-ins
- Start and stop feeds from devices

Stopping a device means that video is no longer transferred from the device to the system, in which case you cannot view live video nor record video. In contrast, a device on which you have stopped the feed can still communicate with the recording server, and you can start the feed from the device automatically through a rule, as opposed to when the device is manually disabled in the Management Client.

Important: Some rule content may require that certain features are enabled for the relevant devices. For example, a rule specifying that a camera should record does not work as intended if recording is not enabled for the relevant camera. Before creating a rule, Milestone recommends that you verify that the devices involved can perform as intended.

Default rules (explained)

Your system includes a number of default rules that you can use for basic features without setting anything up. You can deactivate or modify the default rules as you need. If you modify or deactivate the default rules, your system may not work as desired nor guarantee that video feeds or audio feeds are automatically fed to the system.

Default rule	Description
Go to Preset when PTZ is done	<p>Ensures that PTZ cameras go to their respective default preset positions after you have operated them manually. This rule is not enabled by default.</p> <p>Even when you have enabled the rule, you must have defined default preset positions for the relevant PTZ cameras in order for the rule to work. You do this on the Presets tab.</p>
Play Audio on Request	<p>Ensures that video is recorded automatically when an external request occurs.</p> <p>The request is always triggered by a system integrating externally with your system, and the rule is primarily used by integrators of external systems or plug-ins.</p>
Record on Bookmark	<p>Ensures that video is recorded automatically when an operator sets a bookmark in XProtect Smart Client. This is provided you have enabled recording for the relevant cameras. Recording is enabled by default.</p> <p>The default recording time for this rule is three seconds before the bookmark is set and 30 seconds after the bookmark is set. You can edit the default recording times in the rule. Note that the pre-buffer which you set on the Record Tab must match or be longer than the pre-recording time.</p>
Record on Motion	<p>Ensures that as long as motion is detected in video from cameras, the video is recorded, provided recording is enabled for the relevant cameras. Recording is by default enabled.</p> <p>While the default rule specifies recording based on detected motion, it does not guarantee that the system records video, as you may have disabled individual cameras' recording for one or more cameras. Even when you have enabled recording, remember that the quality of recordings may be affected by individual camera's recording settings.</p>
Record on Request	<p>Ensures that video is recorded automatically when an external request occurs, provided recording is enabled for the relevant cameras. Recording is enabled by default.</p> <p>The request is always triggered by a system integrating externally with your system, and the rule is primarily used by integrators of external systems or plug-ins.</p>
Start Audio Feed	<p>Ensures that audio feeds from all connected microphones and speakers are automatically fed to the system.</p> <p>While the default rule enables access to connected microphones' and speakers' audio feeds immediately upon installing the system, it does not guarantee that audio is recorded, as you must specify recording settings separately.</p>
Start Feed	<p>Ensures that video feeds from all connected cameras are automatically fed to the system.</p> <p>While the default rule enables access to connected cameras' video feeds immediately upon installing the system, it does not guarantee that video is recorded, as cameras' recording settings must be specified separately.</p>

Default rule	Description
Start Metadata Feed	Ensures that data feeds from all connected cameras are automatically fed to the system. While the default rule enables access to connected cameras' data feeds immediately upon installing the system, it does not guarantee that data is recorded, as cameras' recording settings must be specified separately.
Show Access Request Notification	Ensures that all access control events categorized as 'Access Request', will cause an access request notification to pop up in XProtect Smart Client, unless the notification function is disabled in the Smart Client profile.

Recreate default rules

If you accidentally delete any of the default rules, you can recreate them by typing the following content:

Default rule	Text to type
Goto preset when PTZ is done	Perform an action on PTZ Manual Session Stopped from All Cameras Move immediately to default preset on the device on which event occurred
Play Audio on Request	Perform an action on Request Play Audio Message from External Play audio message message from metadata on the devices from metadata with priority 1
Record on Bookmark	Perform an action on Bookmark Reference Requested from All Cameras, All Microphones, All Speakers start recording three seconds before on the device on which event occurred Perform action 30 seconds after stop recording immediately
Record on Motion	Perform an action on Motion Started from All Cameras start recording three seconds before on the device on which event occurred Perform stop action on Motion Stopped from All Cameras stop recording three seconds after
Record on Request	Perform an action on Request Start Recording from External start recording immediately on the devices from metadata Perform stop action on Request Stop Recording from External stop recording immediately
Start Audio Feed	Perform an action in a time interval always start feed on All Microphones, All Speakers Perform an action when time interval ends stop feed immediately
Start Feed	Perform an action in a time interval always start feed on All Cameras Perform an action when time interval ends stop feed immediately

Default rule	Text to type
Start Metadata Feed	Perform an action in a time interval always start feed on All Metadata Perform an action when time interval ends stop feed immediately
Show Access Request Notification	Perform an action on Access request (Access Control Categories) from Systems [+ units] Show built-in access request notification

Rule complexity (explained)

Your exact number of options depends on the type of rule you want to create, and on the number of devices available on your system. Rules provide a high degree of flexibility: you can combine event and time conditions, specify several actions in a single rule, and very often create rules covering several or all of the devices on your system.

You can make your rules as simple or complex as required. For example, you can create very simple time-based rules:

Example	Explanation
Very Simple Time-Based Rule	On Mondays between 08.30 and 11.30 (time condition), Camera 1 and Camera 2 should start recording (action) when the time period begins and stop recording (stop action) when the time period ends.
Very Simple Event-Based Rule	When motion is detected (event condition) on Camera 1, Camera 1 should start recording (action) immediately, then stop recording (stop action) after 10 seconds. Even if an event-based rule is activated by an event on one device, you can specify that actions should take place on one or more other devices.
Rule Involving Several Devices	When motion is detected (event condition) on Camera 1, Camera 2 should start recording (action) immediately, and the siren connected to Output 3 should sound (action) immediately. Then, after 60 seconds, Camera 2 should stop recording (stop action), and the siren connected to Output 3 should stop sounding (stop action).
Rule Combining Time, Events, and Devices	When motion is detected (event condition) on Camera 1, and the day of the week is Saturday or Sunday (time condition), Camera 1 and Camera 2 should start recording (action) immediately, and a notification should be sent to the security manager (action). Then, 5 seconds after motion is no longer detected on Camera 1 or Camera 2, the 2 cameras should stop recording (stop action).

Depending on your organization's needs, it is often a good idea to create many simple rules rather than a few complex rules. Even if it means you have more rules in your system, it provides an easy way to maintain an overview of what your rules do. Keeping your rules simple also means that you have much more flexibility when it comes to deactivating/activating individual rule elements. With simple rules, you can deactivate/activate entire rules when required.

Validating rules (explained)

You can validate the content of an individual rule or all rules in one go. When you create a rule, the **Manage Rule** wizard ensures that all of the rule's elements make sense. When a rule has existed for some time, one or more of the rule's elements may have been affected by other configuration, and the rule may no longer work. For example, if a rule is triggered by a particular time profile, the rule does not work if you have deleted that time profile or if you no longer have permissions to it. Such unintended effects of configuration may be hard to keep an overview of.

Rule validation helps you keep track of which rules have been affected. Validation takes place on a per-rule basis and each rule is validated by themselves. You cannot validate rules against each other, for example in order to see whether one rule conflicts with another rule, not even if you use the **Validate All Rules** feature.

Note that you cannot validate whether configuration of requirements outside the rule itself may prevent the rule from working. For example, a rule specifying that recording should take place when motion is detected by a particular camera validates OK if the elements in the rule itself are correct, even if motion detection, which is enabled on a camera level, not through rules, has not been enabled for the relevant camera.

You validate an individual rule or all rules in one go by right-clicking the rule you want to validate and select **Validate Rule** or **Validate All Rules**. A dialog box informs you whether the rule(s) validated successfully or not. If you chose to validate more than one rule and one or more rules did not succeed, the dialog box lists the names of the affected rules.



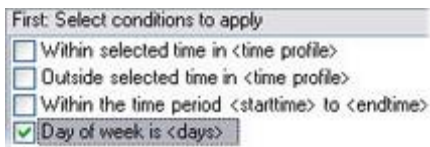
Add a rule

When you create rules, you are guided by the wizard **Manage Rule** which only lists relevant options.

It ensures that a rule does not contain missing elements. Based on your rule's content, it automatically suggests suitable stop actions, that is what should take place when the rule no longer applies, ensuring that you do not unintentionally create a never-ending rule.

1. Right-click the **Rules** item > **Add Rule**. This opens the **Manage Rule** wizard. The wizard guides you through specifying the content of your rule.
2. Specifying a name and a description of the new rule in the **Name** and **Description** fields respectively.
3. Select the relevant type of condition for the rule: either a rule which performs one or more actions when a particular event occurs, or a rule which performs one or more actions when you enter a specific period of time.
4. Click **Next** to go to the wizard's second step. On the wizard's second step, define further conditions for the rule.

5. Select one or more conditions, for example **Day of week is <day>**:



Example only. Your selections may be different

Depending on your selections, edit the rule description in the lower part of the wizard window:



Example only. Your selections may be different

Click the underlined items in **bold italics** to specify their exact content. For example, clicking the **days** link in our example lets you select one or more days of the week on which the rule should apply.

6. Having specified your exact conditions, click **Next** to move to the next step of the wizard and select which actions the rule should cover. Depending on the content and complexity of your rule, you may need to define more steps, such as stop events and stop actions. For example, if a rule specifies that a device should perform a particular action during a time interval (for example, Thursday between 08.00 and 10.30), the wizard may ask you to specify what should happen when that time interval ends.
7. Your rule is by default active once you have created it if the rule's conditions are met. If you do not want the rule to be active straight away, clear the **Active** check box.
8. Click **Finish**.

Edit, copy and rename a rule

1. In the **Overview** pane, right-click the relevant rule.
2. Select either:
Edit Rule or **Copy Rule** or **Rename Rule**. The wizard **Manage Rule** opens.
3. In the wizard, rename and/or change the rule. If you selected **Copy Rule**, the wizard opens, displaying a copy of the selected rule.
4. Click **Finish**.

Deactivate and activate a rule

Your system applies a rule as soon as the rule's conditions apply which means it is active. If you do not want a rule to be active, you can deactivate the rule. When you deactivate the rule, the system does not apply the rule even if the rule's conditions apply. You can easily activate a deactivated rule later.

Deactivating a rule

1. In the **Overview** pane, select the rule.

2. Clear the **Active** check box in the **Properties** pane.
3. Click **Save** in the toolbar.
4. An icon with a red x indicates that the rule is deactivated in the **Rules** list:



Example: The added x on the icon indicates that the third rule is deactivated

Activating a rule

When you want to activate the rule again, select the rule, select the **Activate** check box, and save the setting.

Time profiles

Time profiles (explained)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

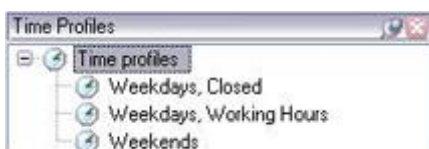
Time profiles are periods of time defined by the administrator. You can use time profiles when creating rules, for example, a rule specifying that a certain action should take place within a certain time period.

Time profiles are also assigned to roles, along with Smart Client profiles. By default, all roles are assigned the default time profile **Always**. This means that members of roles with this default time profile attached has no time-based limits to their user rights in the system. You can also assign an alternative time profile to a role.

Time profiles are highly flexible: you can base them on one or more single periods of time, on one or more recurring periods of time, or a combination of single and recurring times. Many users may be familiar with the concepts of single and recurring time periods from calendar applications, such as the one in Microsoft® Outlook.

Time profiles always apply in local time. This means that if your system has recording servers placed in different time zones, any actions, for example recording on cameras, associated with time profiles are carried out in each recording server's local time. Example: If you have a time profile covering the period from 08.30 to 09.30, any associated actions on a recording server placed in New York is carried out when the local time is 08.30 to 09.30 in New York, while the same actions on a recording server placed in Los Angeles is carried out some hours later, when the local time is 08.30 to 09.30 in Los Angeles.

You create and manage time profiles by expanding **Rules and Events > Time Profiles**. A **Time Profiles** list opens:



Example only

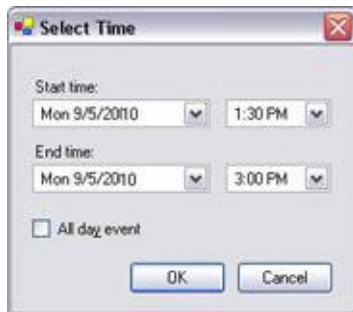
For an alternative to time profiles, see Day length time profiles (see "Day length time profiles (explained)" on page 189).

Specify a time profile

1. In the **Time Profiles** list, right-click **Time Profiles** > **Add Time Profile**. This opens the **Time Profile** window.
2. In the **Time Profile** window, type a name for the new time profile in the **Name** field. Optionally, type a description of the new time profile in the **Description** field.
3. In the **Time Profile** window's calendar, select either **Day View**, **Week View** or **Month View**, then right-click inside the calendar and select either **Add Single Time** or **Add Recurring Time**.
4. When you have specified the time periods for your time profile, click **OK** in the **Time Profile** window. Your system adds your new time profile to the **Time Profiles** list. If at a later stage you wish to edit or delete the time profile, you do that from the **Time Profiles** list as well.

Add a single time

When you select **Add Single Time**, the **Select Time** window appears:



Time and date format may be different on your system

1. In the **Select Time** window, specify **Start time** and **End time**. If the time is to cover whole days, select the **All day event** box.
2. Click **OK**.

Specify a recurring time

When you select **Add Recurring Time**, the **Select Recurring Time** window appears:

Time and date format may be different on your system

1. In the **Select Time** window, specify time range, recurrence pattern and range of recurrence.
2. Click **OK**.

A time profile can contain several periods of time. If you want your time profile to contain further periods of time, add more single times or recurring times.

Edit a time profile

1. In the **Overview** pane's **Time Profiles** list, right-click the relevant time profile, and select **Edit Time Profile**. This opens the **Time Profile** window.
2. Edit the time profile as needed. If you have made changes to the time profile, click **OK** in the **Time Profile** window. You return to the **Time Profiles** list.



Note: In the **Time Profile Information** window, you can edit the time profile as needed. Remember that a time profile may contain more than one time period, and that time periods may be recurring. The small month overview in the top right corner can help you get a quick overview of the time periods covered by the time profile, as dates containing specified times are highlighted in bold.

In this example, the bold dates indicate that you have specified time periods on several days, and that you have specified a recurring time on Mondays.

Day length time profiles (explained)

When you place cameras outside, you must often lower the camera resolution, enable black/white or change other settings when it gets dark or when it gets light. The further north or south from the equator the cameras are placed, the more the sunrise and sunset time varies during the year. This makes it impossible to use normal fixed time profiles to adjust camera settings according to light conditions.

In such situations, you can create day length time profiles instead to define the sunrise and sunset in a specified geographical area. Via GPS coordinates, the system calculates the sunrise and sunset time, even incorporating daylight saving time on a daily basis. As a result, the time profile automatically follows the yearly changes in sunrise/sunset in the selected area, ensuring the profile to be active only when needed. All times and dates are based on the management servers time and date settings. You can also set a positive or negative offset (in minutes) for the start (sunrise) and end time (sunset). The offset for the start and the end time can be identical or different.

You can use day length profiles both when you create rules and roles.

Create a day length time profile

1. Expand the **Rules and Events** folder > **Time Profiles**.
2. In the **Time Profiles** list, right-click **Time Profiles**, and select **Add Day Length Time Profile**.
3. In the **Day Length Time Profile** window, fill in the needed information. To deal with transition periods between lightness and darkness, you can offset activation and deactivation of the profile. The time and the name of months are shown in the language used your computer's language/regional settings.
4. To see the location of the entered GPS coordinates in a map, click **Show Position in Browser**. This opens a browser where you can see the location.
5. Click **OK**.

Day length time profile properties

Set the following properties for day length time profile:

Name	Description
Name	The name of the profile.
Description	A description of the profile (optional).
GPS coordinates	GPS coordinates indicating the physical location of the camera(s) assigned to the profile.
Sunrise offset	Number of minutes (+/-) by which activation of the profile is offset by sunrise.
Sunset offset	Number of minutes (+/-) by which deactivation of the profile is offset by sunset.
Time zone	Time zone indicating the physical location of the camera(s).

Notification profiles

Notification profiles (explained)

Notification profiles allow you to set up ready-made email notifications, which can automatically be triggered by a rule, for example when a particular event occurs. You can include still images and AVI video clips in the email notifications.

The system does not support TLS (Transport Layer Security) and its predecessor SSL (Secure Socket Layer). If the sender belongs on a server that requires TLS or SSL, email notifications do not work properly. Also, you may need to disable any email scanners that could prevent the application from sending the email notifications.

Requirements for creating notification profiles

Before you can create notification profiles, you must specify settings for the outgoing SMTP mail server for the email notifications.

If you want the email notifications to be able to include AVI movie clips, you must also specify the compression settings to use:

1. Go to **Tools > Options**. This opens the **Options** window.
2. Specify the **Outgoing SMTP Mail Server** on the **Mail Server** tab and the compression settings on the **AVI Generation** tab.

Add notification profiles

1. Expand **Rules and Events**, right-click **Notification Profiles > Add Notification Profile**. This opens the **Add Notification Profile** wizard.
2. Specify name and description. Click **Next**.

- Specify recipient, subject, message text and time between emails:

- To send a test email notification to the specified recipients, click **Test E-mail**.
- To include pre-alarm still images, select **Include images**, and specify number of images, time between images and whether to embed images in emails or not.
- To include AVI video clips, select **Include AVI**, and specify the time before and after event and frame rate.

Notifications containing H.265 encoded video require a computer that supports hardware acceleration.

- Click **Finish**.

Use rules to trigger email notifications

You use the **Manage Rule** for creating rules. The wizard takes you through all relevant steps. You specify the use of a notification profile during the step on which you specify the rule's actions.

When you select the action **Send notification to <profile>**, you can select the relevant notification profile and which cameras any recordings to include in the notification profile's email notifications should come from:



Example only. In **Manage Rule**, you click the links to make your selections

Remember that you cannot include recordings in the notification profile's email notifications unless something is actually being recorded. If you want still images or AVI video clips in the email notifications, verify that the rule specifies that recording should take place. The following example is from a rule which includes both a **Start recording** action and a **Send notification to** action:



Notification profile (properties)

Specify the following properties for notification profiles:

Component	Requirement
Name	Type a descriptive name for the notification profile. The name appears later whenever you select the notification profile during the process of creating a rule.
Description (optional)	Type a description of the notification profile. The description appears when you pause your mouse pointer over the notification profile in the Overview pane's Notification Profiles list.
Recipients	Type the e-mail addresses to which the notification profile's e-mail notifications should be sent. To type more than one e-mail address, separate addresses with a semicolon. Example: aa@aaaa.aa;bb@bbbb.bb;cc@cccc.cc
Subject	Type the text you want to appear as the subject of the e-mail notification. You can insert system variables, such as Device name , in the subject and message text field. To insert variables, click the required variable links in the box below the field.
Message text	Type the text you want to appear in the body of the e-mail notifications. In addition to the message text, the body of each e-mail notification automatically contains this information: <ul style="list-style-type: none"> What triggered the e-mail notification. The source of any attached still images or AVI video clips

Component	Requirement
Time between e-mails	<p>Specify required minimum time (in seconds) to pass between the sending of each e-mail notification. Examples:</p> <ul style="list-style-type: none"> • If specifying a value of 120, a minimum of 2 minutes pass between the sending of each e-mail notification, even if the notification profile is triggered again by a rule before the 2 minutes have passed. • If specifying a value of 0, e-mail notifications is sent each time the notification profile is triggered by a rule. This can potentially result in a very large number of e-mail notifications being sent. If using the value 0, you should therefore carefully consider whether you want to use the notification profile in rules which are likely to be triggered frequently.
Number of images	Specify the maximum number of still images you want to include in each of the notification profile's e-mail notifications. Default is five images.
Time between images (ms)	Specify the number of milliseconds you want between the recordings presented on the included images. Example: With the default value of 500 milliseconds, the included images show recordings with half a second between them.
Time before event (sec.)	This setting is used to specify the start of the AVI file. By default, the AVI file contains recordings from 2 seconds before the notification profile is triggered. You can change this to the number of seconds you require.
Time after event (sec.)	This setting is used to specify the end of the AVI file. By default, the AVI file ends 4 seconds after the notification profile is triggered. You can change this to the number of seconds you require.
Frame rate	Specify the number of frames per second you want the AVI file to contain. Default is five frames per second. The higher the frame rate, the higher the image quality and AVI file size.
Embed images in e-mail	If selected (default), images are inserted in the body of e-mail notifications. If not, images are included in e-mail notifications as attached files.

User-defined events

User-defined events (explained)

If the event you require is not on the **Events Overview** list, you can create your own user-defined events. Use such user-defined events to integrate other systems with your surveillance system.

With user-defined events, you can use data received from a third-party access control system as events in the system. The events can later trigger actions. This way, you can, for example, begin recording video from relevant cameras when somebody enters a building.

You can also use user-defined events for manually triggering events while viewing live video in XProtect Smart Client or automatically if you use them in rules. For example, when user-defined event 37 occurs, PTZ camera 224 should stop patrolling and go to preset position 18.

Through roles, you define which of your users are able to trigger the user-defined events. You can use user-defined events in two ways and at the same time if required:

Events	Description
For providing the ability to manually trigger events in XProtect Smart Client	In this case, user-defined events make it possible for end users to manually trigger events while viewing live video in XProtect Smart Client. When a user-defined event occurs because a user of XProtect Smart Client triggers it manually, a rule can trigger that one or more actions should take place on the system.
For providing the ability to trigger events through API	<p>In this case, you can trigger user-defined events outside the surveillance system. Using user-defined events this way requires that a separate API (Application Program Interface. A set of building blocks for creating or customizing software applications) is used when triggering the user-defined event. Authentication through Active Directory is required for using user-defined events this way. This ensures that even if the user-defined events can be triggered from outside the surveillance system, only authorized users are to do it.</p> <p>Also, user-defined events can via API be associated with meta-data, defining certain devices or device groups. This is highly usable when using user-defined events to trigger rules: you avoid having a rule for each device, basically doing the same thing. Example: A company uses access control, having 35 entrances, each with an access control device. When an access control device is activated, a user-defined event is triggered in the system. This user-defined event is used in a rule to start recording on a camera associated with the activated access control device. It is defined in the meta-data which camera is associated with what rule. This way the company does not need to have 35 user-defined events and 35 rules triggered by the user-defined events. A single user-defined event and a single rule are enough.</p> <p>When you use user-defined events this way, you may not always want them to be available for manual triggering in XProtect Smart Client. You can use roles to define which user-defined events should be visible in XProtect Smart Client.</p>

No matter how you want to use user-defined events, you must add each user-defined event through the Management Client.

If you rename a user-defined event, already connected XProtect Smart Client users must log out and log in again before the name change is visible.

Also note that if you delete a user-defined event, this affects any rules in which the user-defined event is in use. Also, a deleted user-defined event only disappears from XProtect Smart Client when the XProtect Smart Client users log out.

Add a user-defined event

1. Expand **Rules and Events > User-defined Events**.

2. In the **Overview** pane, right-click **Events** > **Add User-defined Event**.
3. Type a name for the new user-defined event, and click **OK**. The newly added user-defined event now appears in the list in the **Overview** pane.
4. The user can now trigger the user-defined event manually in XProtect Smart Client if the user has rights to do so.

Rename a user-defined event

1. Expand **Rules and Events** > **User-defined Events**.
2. In the **Overview** pane, select the user-defined event.
3. In the **Properties** pane, overwrite the existing name.
4. In the toolbar, click **Save**.

Analytics events

Analytics events (explained)

Analytics events are typically data received from an external third-party video content analysis (VCA) providers.

Using analytics events as basis for alarms is basically a three step process:

- Part one, enabling the analytics events feature and setting up its security. Use a list of allowed addresses to control who can send event data to the system and which port the server listens on.
- Part two, creating the analytics event, possibly with a description of the event, and testing it.
- Part three, using the analytics event as the source of an alarm definition.

You set up analytics events on the **Rules and Events** list in the **Site Navigation** pane.

To use VCA-based events, a third-party VCA tool is required for supplying data to the system. Which VCA tool to use is entirely up to you, as long as the data supplied by the tool adheres to the format. This format is set out in the Milestone Analytics Events: Developer's Manual. Contact your system provider for more details. Third-party VCA tools are developed by independent partners delivering solutions based on a Milestone open platform. These solutions can impact performance on the system.

Add and edit an analytics event

Add an analytics event

1. Expand **Rules and Events**, right-click **Analytics Events** and select **Add New**.
2. In the **Properties** window, type a name for the event in the **Name** field.
3. Type a description text in the **Description** field if needed.

4. In the toolbar, click **Save**. You can test the validity of the event by clicking **Test Event**. You can continually correct errors indicated in the test and run the test as many times as you want and from anywhere in the process.

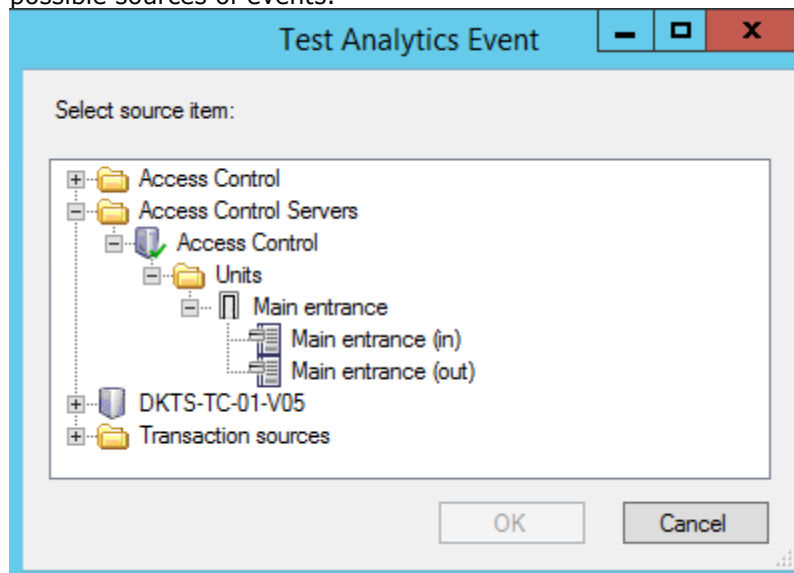
Edit an analytics event

1. Click an existing analytics event to view the **Properties** window, where you can edit relevant fields.
2. You can test the validity of the event by clicking **Test Event**. You can continually correct errors indicated in the test and run the test as many times as you want and from anywhere in the process.

Test an analytics event

After you create an analytics event, you can test the requirements (see "Test Analytics Event (properties)" on page 197), for example that the analytics events feature has been enabled in Management Client.

1. Select an existing analytics event.
2. In the properties, click the **Test Event** button. A window appears that shows all the possible sources of events.



3. Select the source of your test event, for example a camera. The window is closed and a new window appears that goes through four conditions that must be fulfilled for the analytics event to work.

As an additional test, in XProtect Smart Client you can verify that the analytics event was sent to the event server. To do this, open XProtect Smart Client and view the event in the **Alarm Manager** tab.

See also

Analytics events (explained) (on page 195)

Test Analytics Event (properties)

When you test the requirements of an analytics event, a window appears that checks four conditions and provides possible error descriptions and solutions.

Condition	Description	Error messages and solutions
Changes saved	If the event is new, is it saved? Or if there are changes to the event name, are these changes saved?	Save changes before testing analytics event. Solution/Explanation: Save changes.
Analytics Events enabled	Is the Analytics Event feature enabled?	Analytics events have not been enabled. Solution/Explanation: Enable the Analytics Events feature. To do this, click Tools > Options > Analytics Events and select the Enabled check box.
Address allowed	Is the IP address/host name of the machine sending the event(s) allowed (listed on the analytics events address list)?	The local host name must be added as allowed address for the Analytics Event service. Solution/Explanation: Add your machine to the analytics events address list of allowed IP addresses or host names. Error resolving the local host name. Solution/Explanation: The IP address or host name of the machine cannot be found or is invalid.
Send analytics event	Did sending a test event to the Event Server succeed?	See table below.

Each step is marked by either failed:  or successful: .

Error messages and solutions for the condition **Send analytics event**:

Event server not found	Unable to find the event server on the list of registered services.
Error connecting to event server	Unable to connect to the event server on the stated port. The error occurs most likely because of network problems, or the event server service has stopped.
Error sending analytics event	The connection to the event server is established, but the event cannot be sent. The error most likely occurs because of network problems, for example a time out.
Error receiving response from event server	The event has been sent to the event server, but no reply received. The error most likely occurs because of network problems or a port that is busy. See the event server log, typically located at <i>ProgramData\Milestone\XProtect Event Server\logs\</i> .
Analytics event unknown by event server	The event server service does not know the event. The error most likely occurs because the event or changes to the event have not been saved.
Invalid analytics event received by event server	The event format is incorrect.

Sender unauthorized by event server	Most likely your machine is not on the list of allowed IP addresses or hostnames.
Internal error in event server.	Event server error. See the event server log, typically located at <i>ProgramData\Milestone\XProtect Event Server\logs\</i> .
Invalid response received from Event server	The response is invalid. Possibly the port is busy or there are network problems. See the event server log, typically located at <i>ProgramData\Milestone\XProtect Event Server\logs\</i> .
Unknown response from event server	The response is valid, but not understood. The error occurs possibly because of network problems, or the port is busy. See the event server log, typically located at <i>ProgramData\Milestone\XProtect Event Server\logs\</i> .
Unexpected error	Please contact Milestone support for help.

Edit analytics events settings

In the toolbar, go to the **Tools > Options > Analytics Events** tab to edit relevant settings.

Generic events

Generic events (explained)

Important: This feature does not work if you do not have the XProtect event server installed.

Generic events allow you to trigger actions in the XProtect event server by sending simple strings via the IP network to your system.

You can use any hard- or software, which can send strings via TCP or UDP, to trigger generic events. Your system can analyze received TCP or UDP data packages, and automatically trigger generic events when specific criteria are met. This way, you may integrate your system with external sources, for example access control systems and alarm systems. The aim is to allow as many external sources as possible to interact with the system.

With the concept of data sources, you avoid having to adapt third-party tools to meet the standards of your system. With data sources, you can communicate with a particular piece of hard- or software on a specific IP port and fine-tune how bytes arriving on that port are interpreted. Each generic event type pairs up with a data source and makes up a language used for communication with a specific piece of hard- or software.

Working with data sources requires general knowledge of IP networking and specific knowledge of the individual hard- or software you want to interface from. There are many parameters you can use and no ready-made solution on how to do this. Basically, your system provides the tools, but not the solution. Unlike user-defined events, generic events have no authentication. This makes them easier to trigger but, to avoid jeopardizing security, only events from local host are accepted. You can allow other client IP addresses from the **Generic Events** tab of the **Options** menu.

Add a generic event

You can define generic events to help the VMS recognize specific strings in TCP or UDP packets from an external system. Based on a generic event, you can configure Management Client to trigger actions, for example to start recording, or alarms.

Requirements

You have enabled generic events and specified the source destinations allowed. For more information, see Generic Events tab (see "Generic Events tab (options)" on page 260).

To add a generic event:

1. Expand **Rules and Events**.
2. Right-click **Generic Events** and select **Add New**.
3. Fill in the needed information and properties. For more information, see Generic event properties (see "Generic event (properties)" on page 199).
4. (optional) To validate that the search expression is valid, enter a search string in the **Check if expression matches event string** field that corresponds to the expected packages:
 - **Match** - the string can be validated against the search expression.
 - **No match** - the search expression is invalid. Change it and try again.

In XProtect Smart Client, you can verify whether your generic events have been received by the event server. You do this in the **Alarm List** on the **Alarm Manager** tab by selecting **Events**.

Generic event (properties)

Component	Requirement
Name	Unique name for the generic event. Name must be unique among all types of events, such as user defined events, analytics events, and so on.
Enabled	Generic events are by default enabled. Clear the check box to disable the event.

<p>Expression</p>	<p>Expression that the system should look out for when analyzing data packages. You can use the following operators:</p> <ul style="list-style-type: none"> • (): Used to ensure that related terms are processed together as a logical unit. They can be used to force a certain processing order in the analysis. <p>Example: The search criteria "(User001 OR Door053) AND Sunday" first processes the two terms inside the parenthesis, then combines the result with the last part of the string. So, the system first looks for any packages containing either of the terms User001 or Door053, then takes the results and run through them in order to see which packages also contain the term Sunday.</p> <ul style="list-style-type: none"> • AND: With an AND operator, you specify that the terms on both sides of the AND operator must be present. <p>Example: The search criteria "User001 AND Door053 AND Sunday" returns a result only if the terms User001, Door053 and Sunday are all included in your expression. It is not enough for only one or two of the terms to be present. The more terms you combine with AND, the fewer results you retrieve.</p> <ul style="list-style-type: none"> • OR: With an OR operator, you specify that either one or another term must be present. <p>Example: The search criteria "User001 OR Door053 OR Sunday" returns any results containing either User001, Door053 or Sunday. The more terms you combine with OR, the more results you retrieve.</p>
<p>Expression type</p>	<p>Indicates how particular the system should be when analyzing received data packages. The options are the following:</p> <ul style="list-style-type: none"> • Search: In order for the event to occur, the received data package must contain the text specified in the Expression: field, but may also have more content. <p>Example: If you have specified that the received package should contain the terms User001 and Door053, the event is triggered if the received package contains the terms User001 and Door053 and Sunday since your two required terms are contained in the received package.</p> <ul style="list-style-type: none"> • Match: In order for the event to occur, the received data package must contain exactly the text specified in the Expression: field, and nothing else. • Regular expression: In order for the event to occur, the text specified in the Expression: field must identify specific patterns in the received data packages. <p>If you switch from Search or Match to Regular expression, the text in the Expression field is automatically translated to a regular expression.</p>

Priority	<p>The priority must be specified as a number between 0 (lowest priority) and 999999 (highest priority).</p> <p>The same data package may be analyzed for different events. The ability to assign a priority to each event lets you manage which event should be triggered if a received package matches the criteria for several events.</p> <p>When the system receives a TCP and/or UDP package, analysis of the packet starts with analysis for the event with the highest priority. This way, when a package matches the criteria for several events, only the event with the highest priority is triggered. If a package matches the criteria for several events with an identical priority, for example two events with a priority of 999, all events with this priority is triggered.</p>
Check if expression matches event string	An event string to be tested against the expression entered in the Expression: field.

Generic event data source (properties)

Component	Requirement
Data source	<p>You can choose between two default data sources and define a custom data source. What to choose depends on your third party program and/or the hard- or software you want to interface from:</p> <p>Compatible: Factory default settings are enabled, echoes all bytes, TCP and UDP, Ipv4 only, port 1234, no separator, local host only, current code page encoding (ANSI).</p> <p>International: Factory default settings are enabled, echoes statistics only, TCP only, Ipv4+6, port 1235, <CR><LF> as separator, local host only, UTF-8 encoding. (<CR><LF> = 13,10).</p> <p>[Data source A] [Data source B] and so on.</p>
New	Click to create a new data source.
Name	Name of the data source.
Enabled	Data sources are by default enabled. Clear the check box to disable the data source.
Reset	Click to reset all settings for the selected data source. The entered name in the Name field remains.
Port	The port number of the data source.

Component	Requirement
Protocol type selector	<p>Protocols which the system should listen for, and analyze, in order to detect generic events:</p> <p>Any: TCP as well as UDP.</p> <p>TCP: TCP only.</p> <p>UDP: UDP only.</p> <p>TCP and UDP packages used for generic events may contain special characters, such as @, #, +, ~, and more.</p>
IP type selector	Selectable IP address types: IPv4, IPv6 or both.
Separator bytes	Select the separator bytes used to separate individual generic event records. Default for data source type International (see Data sources earlier) is 13,10 . (13,10 = <CR><IF>).
Echo type selector	<p>Available echo return formats:</p> <ul style="list-style-type: none"> Echo statistics: Echoes the following format: [X],[Y],[Z],[Name of generic event] [X] = request number. [Y] = number of characters. [Z] = number of matches with a generic event. [Name of generic event] = name entered in the Name: field. Echo all bytes: Echoes all bytes. No echo: Suppresses all echoing.
Encoding type selector	By default, the list only shows the most relevant options. Select the Show all check box to display all available encodings.
Show all	See previous bullet.
Allowed external IPv4 addresses	Specify the IP addresses, that the management server must be able to communicate with in order to manage external events. You can also use this to exclude IP addresses that you do not want data from.
Allowed external IPv6 addresses	Specify the IP addresses, that the management server must be able to communicate with in order to manage external events. You can also use this to exclude IP addresses that you do not want data from.

Tip: Ranges can be specified in each of the four positions, like **100,105,110-120**. As an example, all addresses on the 10.10 network can be allowed by **10.10.[0-254].[0-254]** or by **10.10.255.255**.

Security

Roles

Roles (explained)

Roles determine which devices users can access. Roles also determine rights and handle security within the video management system. First, you add roles, then you add users and groups and finally a Smart Client and a Management Client profile as well as other default profiles that belong to each role. Roles you can create in the system have their own view groups in XProtect Smart Client in which their views are created and stored.

The system comes with one predefined role which you cannot delete: the **Administrators** role. Users and groups with the **Administrators** role have complete and unrestricted access to the entire system. For this reason, you cannot specify role settings for the **Administrators** role. The **Administrators** role has the default Smart Client profile and the default evidence lock profiles and does not have a time profile.

Users with local machine administrator rights on the computer running the management server automatically have administrator rights on the management server. Only users whom you trust as administrators of your system should have local machine administrator rights on the computer running the management server. You cannot turn this off. You add users and groups to the **Administrators** role just as with any other role. See Assign and remove users and groups to/from roles (see "Assign/remove users and groups to/from roles" on page 206).

In addition to the **Administrators** role, you can add as many roles as required to suit your needs. You may, for example, have different roles for users of XProtect Smart Client depending on which cameras you want them to access or similar restrictions. To set up roles in your system, expand the **Security > Roles**.

Rights of a role (explained)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

When you create a role in your system, you can give the role a number of rights to the system components or features that the relevant role can access and use. You may, for example, want to create roles that only have rights to functionality in XProtect Smart Client or other Milestone viewing clients, with the rights to view only certain cameras. If you create such roles, these roles should not have rights to access and use the Management Client, but only have access to some or all functionality found in XProtect Smart Client or other clients. To address this, you may want to set up a role that has some or most typical administrator rights, for example, the rights to add and remove cameras, servers and similar functionality.

You can create roles that have some or most rights of a system administrator. This may, for example, be relevant if your organization wants to separate between people who can administrate a subset of the system and people who can administrate the entire system. The feature allows you to provide differentiated administrator permissions to access, edit or change a large variety of system functions, for example, the right to edit the settings for servers or cameras in your system. You specify these permissions on the Overall Security tab (see "Overall Security tab (roles)" on page 208). As a minimum, to enable that the differentiated system administrator can launch the Management Client, you must grant read permissions on the management server for the role.

You can also reflect the same limitations in the user interface of the Management Client for each role by associating the role with a Management Client profile that has the removed the

corresponding system functions from the user interface. See Management Client profiles (explained) (on page 161) for information.

To give a role such differentiated administrator rights, the person with the default full administrator role must set up the role under **Security > Roles > Info tab > Add new**. When you set up the new role, you can then associate the role with your own profiles must similarly to when you set up any other role in the system or use the system's default profiles. For more information, see Add and manage a role (on page 205).

Once you have specified what profiles you want to associate the role with, go to the **Overall Security** tab to specify the rights of the role.

The rights you can set for a role are different between your products. You can only give all available rights to a role in XProtect Corporate.

Users (explained)

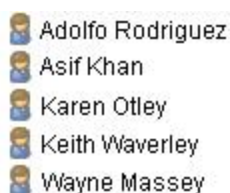
The term **users** primarily refers to users who connect to the surveillance system through the clients. You can configure such users in two ways:

- As **basic users**, authenticated by a user name/password combination.
- As **Windows users**, authenticated based on their Windows login.

Windows Users

You add Windows Users through the use of Active Directory. Active Directory (AD) is a directory service implemented by Microsoft for Windows domain networks. It is included in most Windows Server operating systems. It identifies resources on a network in order for users or applications to access them. Active Directory uses the concepts of users and groups.

Users are Active Directory objects representing individuals with a user account. Example:



Groups are Active Directory objects with several users. In this example, the Management Group has three users:



Groups can contain any number of users. By adding a group to the system, you add all of its members in one go. Once you have added the group to the system, any changes made to the group in Active Directory, such as new members you add or old members you remove at a later stage, are immediately reflected in the system. Note that a user can be a member of more than one group at a time.

You can use Active Directory to add existing user and group information to the system with some benefits:

- Users and groups are specified centrally in Active Directory so you do not have to create user accounts from scratch.
- You do not have to configure any authentication of users on the system as Active Directory handles authentication.

Before you can add users and groups through the Active Directory service, you must have a server with Active Directory installed on your network.

Basic users

If your system does not have access to Active Directory, create a basic user (see "Basic users (explained)" on page 233). For information about how to set up basic users, see Create basic user (see "Create basic users" on page 233).

Add and manage a role

1. Expand **Security** and right-click **Roles**.
2. Select **Add Role**. This opens the **Add Role** dialog box.
3. Type a name and description of the new role and click **OK**.
4. The new role is added to the **Roles** list. By default, a new role does not have any users/groups associated with it, but it does have a number of default profiles associated.
5. To choose different Smart Client and Management Client profiles, evidence lock profiles or time profiles, click the drop-down lists.
6. You can now assign users/groups to the role, and specify which of the system's features they can access.

See also Assign/remove users and groups to/from roles (on page 206) and Role settings (see "Roles settings" on page 207).

Copy, rename or delete a role

Copy a role

If you have a role with complicated settings and/or rights and need a similar or almost similar role, it might be easier to copy the already existing role and make minor adjustments to the copy than to creating a new role from scratch.

1. Expand **Security**, click **Roles**, right-click the relevant role and select **Copy Role**.
2. In the dialog box that opens, give the copied role a new unique name and description.
3. Click **OK**.

Rename a role

If you rename a role, this does not change the name of the view group based upon the role.

1. Expand **Security**, and right-click **Roles**.
2. Right-click required role and select **Rename Role**.
3. In the dialog box that opens, change the name of the role.

4. Click **OK**.

Delete a role

1. Expand **Security**, and click **Roles**.
2. Right-click the unwanted role and select **Delete Role**.
3. Click **Yes**.

Important: If you delete a role, this does not delete the view group based upon the role.

Assign/remove users and groups to/from roles

To assign or remove Windows users or groups or basic users to/from a role:

1. Expand **Security** and select **Roles**. Then select the required role in the **Overview** pane:
2. In the **Properties** pane, select the **Users and Groups** tab at the bottom.
3. Click **Add**, select between **Windows user** or **Basic user**.

Assign Windows users and groups to a role

1. Select **Windows user**. This opens the **Select Users, Computers and Groups** dialog box:
2. Verify that the required object type is specified. If, for example, you need to add a computer, click **Object Types** and mark **Computer**. Also verify that the required domain is specified in the **From this location** field. If not, click **Locations** to browse for the required domain.
3. In the **Enter the object names to select** box, type the relevant user names, initials, or other types of identifier which Active Directory can recognize. Use the **Check Names** feature to verify that Active Directory recognizes the names or initials you have typed. Alternatively, use the **"Advanced..."** function to search for users or groups.
4. Click **OK**. The selected users/groups are now added to the **Users and Groups** tab's list of users who you have assigned the selected role. You can add more users and groups by entering multiple names separated by a semicolon (;).

Assign basic users to a role

1. Select **Basic User**. This opens the **Select Basic Users to add to Role** dialog box:
2. Select the basic user(s) that you want to assign to this role.
3. Optional: Click **New** to create a new basic user.
4. Click **OK**. The selected basic user(s) are now added to the **Users and Groups** tab's list of basic users who you have assigned the selected role.

Remove users and groups from a role

1. On the **Users and Groups** tab, select the user or group you want to remove and click **Remove** in the lower part of the tab. You can select more than one user or group, or a combination of groups and individual users, if you need to.

2. Confirm that you want to remove the selected user(s) or and group(s). Click **Yes**.

A user may also have roles through group memberships. When that is the case, you cannot remove the individual user from the role. Group members may also hold roles as individuals. To find out which roles users, groups, or individual group members have, use the **View Effective Roles** function.

View effective roles

With the Effective Roles feature, you can view all roles of a selected user or group. This is practical if you are using groups and it is the only way of viewing which roles a specific user is a member of.

1. Open the **Effective Roles** window by expanding **Security**, then right-clicking **Roles** and select **Effective Roles**.
2. If you want information about a basic user, type the name in the **User name** field. Click **Refresh** to display the roles of the user.
3. If you use Windows users or groups in Active Directory, click the **"..."** browse button. Select object type, enter the name, and click **OK**. The user's roles appear automatically.

Roles settings

Info tab (roles)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

On the **Info** tab of a role, you can set the following:

Name	Description
Name	Type a name for the role.
Description	Type a description for the role.
Management Client profile	Select a Management Client profile to associate with the role. You cannot apply this to the default Administrators role. Requires permissions to manage security on the management server.
Smart Client profile	Select a Smart Client profile to associate with the role. Requires permissions to manage security on the management server.
Default time profile	Select a default time profile to associate with the role. You cannot apply this to the default Administrators role.
Evidence lock profile	Select an evidence lock profile to associate with the role.
Smart Client login within time profile	Select a time profile for which the XProtect Smart Client user associated with this role is allowed to log in. If the XProtect Smart Client user is logged in when the period expires, he or she is logged off automatically. You cannot apply this to the default Administrators role.

Name	Description
Allow Smart Client login	Select the check box to allow users associated with this role to log in to XProtect Smart Client. Access to Smart Client is allowed by default. Clear the check box to deny access to XProtect Smart Client.
Allow Milestone Mobile client login	Select the check box to allow users associated with this role to log in to Milestone Mobile Client. Access to Milestone Mobile Client is allowed by default. Clear the check box to deny access to Milestone Mobile Client.
Allow XProtect Web Client login	Select the check box to allow users associated with this role to log in to XProtect Web Client. Access to XProtect Web Client is allowed by default. Clear the check box to deny access to XProtect Web Client.
Login authorization required	Select the check box to associate login authorization with the role. It means that XProtect Smart Client or the Management Client asks for a second authorization, typically by a superuser or manager, when the user logs in. To enable administrators to authorize users, configure the management server's Authorize Users right on the Overall Security tab. You cannot apply this to the default Administrators role.
Make users anonymous during PTZ sessions	Select the check box to hide the names of users associated with this role when they control PTZ sessions.

User and Groups tab (roles)

On the **User and Groups** tab, you assign users and groups to roles (see "Assign/remove users and groups to/from roles" on page 206). You can assign Windows users and groups or basic users (see "Users (explained)" on page 204).

Name	Description
Name	Displays the name of the user or group assigned to this role.
Description	Displays the description that you entered when the basic user was created.

Overall Security tab (roles)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

On the **Overall Security** tab, you set up overall rights for roles. For every component available in your system, decide whether to **Allow** or **Deny** users with the role the rights to access and use different areas on the relevant component.

The overall security settings only apply to the current site.

You can associate a user with more than one role. If you select **Deny** on a security setting for one role and **Allow** for another, the **Deny** right permission overrules the **Allow** right permission.

The **Overall Security** tab is available in both XProtect Corporate and XProtect Expert, but the tab gives you the possibility to change more functionality in XProtect Corporate than in XProtect Expert. This is because you can set up differentiated administrator rights in XProtect Corporate, while such rights are not available in XProtect Expert. However, you can set overall rights for a role that uses XProtect Smart Client in both XProtect products.

In the following, the descriptions show what happens on each individual right for the different system components if you select **Allow** for the relevant role. If you use XProtect Expert, you can see which settings are not available to you under each system component.

For every system component or functionality, the full system administrator can use the **Allow** or **Deny** check boxes to set up security permissions for the role. Any security permissions you set up here is set up for the whole system component or functionality. So if, for example, you select the **Deny** check box on **Cameras**, all cameras added to the system are unavailable for the role. In contrast, if you select the **Allow** check box instead, the role can see all added cameras to the system. The result of selecting **Allow** or **Deny** on your cameras is that the camera settings on the **Device** tab then inherit your selections on the **Overall Security** tab so that either all cameras are available or unavailable to the particular role.

If you want to set security permissions for **individual** cameras or similar, you can only set these individual permissions on the tab of the relevant system component or functionality if you have **not set any overall permissions** for the system component or functionality on the **Overall Security** tab.

The descriptions below also apply to the rights that you can configure through the MIP SDKs.

If you switch your base license from XProtect Corporate to XProtect Expert, you can only do this if you have not set any security rights for the role for functionality that is not available in XProtect Expert. Therefore, to complete such a switch, make sure that you remove all security rights that are available to XProtect Corporate only.

Management Server

Security right	Description	XProtect Expert
Full control	Enables the right to manage all security entries on this part of the system.	

Security right	Description	XProtect Expert
Read	<p>Enables the right to access a wide range of functionality, including:</p> <ul style="list-style-type: none"> • Logging in with the Management Client • List of current tasks • Server Logs. <p>It also enables access to the following features:</p> <ul style="list-style-type: none"> • Remote Connect Services • Smart Client Profiles • Management Client Profiles • Matrix • Time Profiles • Registered Servers and Service Registration API • Enterprise Servers. 	Not available
Edit	<p>Enables the right to modify data in a wide range of functionality, including:</p> <ul style="list-style-type: none"> • Options • License Management. <p>It also enables users to create, delete and edit the following features:</p> <ul style="list-style-type: none"> • Remote Connect Services • Device groups • Matrix • Time Profiles • Notification Profiles • Registered Servers • Enterprise Servers. <p>Enables the right to configure local IP ranges when configuring the network on the recording server.</p>	Not available
System Monitor	Enables the right to view the data of the System Monitor.	
Status API	Enables the right to perform queries on the Status API located on the recording server. This means that the role with this right enabled, has access to read the status of the items located on the recording server.	

Security right	Description	XProtect Expert
Manage Federated site hierarchy	<p>Enables the right to add and detach the current site to other sites in a federated site hierarchy.</p> <p>If you set this permission to allowed on the child site only, the user can still detach the site from the parent site.</p>	Not available
Backup Configuration	Enables the right to create backups of the system configuration using the system's backup/restore functionality.	Not available
Authorize users	Enables the right to authorize users when they are asked for a second login in XProtect Smart Client or Management Client. You define if a role requires login authorization on the Info tab.	
Manage security	<p>Enables the right to manage permissions for the Management Server.</p> <p>It also enables users to create, delete and edit the following features:</p> <ul style="list-style-type: none"> • Roles • Basic users • Smart Client Profiles • Management Client Profiles. 	Not available

Recording Servers

The following settings are only available in XProtect Corporate.

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Edit	Enables the right to edit properties on the recording servers, except for network configuration settings that require Edit right on the management server.
Delete	<p>Enables the right to delete recording servers. To do this, you must also give the user delete permissions on:</p> <ul style="list-style-type: none"> • Hardware security group if you have added hardware to the recording server. <p>If any of the devices on the recording server contains evidence locks, you can only delete the recording server if it is offline.</p>
Manage hardware	Enables the right to add hardware on recording servers.
Manage storage	Enables the right to administrate storage containers on recording server, that is to create, delete, move and empty storage containers.
Authorize recording server	Enables the right to authorize new recording servers.

Manage security	Enables the right to manage security permissions for recording servers.
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Failover Servers

The following settings are only available in XProtect Corporate.

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Read	Enables the right to see and access failover servers in the Management Client.
Edit	Enables the right to create, update, delete, move, and enable/disable failover servers in the Management Client.
Manage security	Enables the right to manage security permissions for the failover servers.

Mobile Servers

The following settings are only available in XProtect Corporate.

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Read	Enables the right to see and access mobile servers in the Management Client.
Edit	Enables the right to edit and delete mobile servers in the Management Client.
Manage security	Enables the right to manage security permissions for the mobile servers.
Create	Enables the right to add mobile servers to the system.

Hardware

The following settings are only available in XProtect Corporate.

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Edit	Enables the right to edit properties on hardware.
Delete	Enables the right to delete hardware. If any of the hardware devices contains evidence locks, you can only delete the hardware if the recording server is offline.
Manage security	Enables the right to manage security permissions for the hardware.

Security right	Description
Driver commands	<p>Enables the right to send special commands to the drivers and thereby control features and configuration on the device itself.</p> <p>The Driver commands right is for special developed MIP plug-ins in the clients only. It does not control standard configuration tasks.</p>

Cameras

Security right	Description	XProtect Expert
Full control	Enables the right to manage all security entries on this part of the system.	
Read	Enables the right to view camera devices in the clients and the Management Client.	
Edit	Enables the right to edit properties for cameras in the Management Client. It also enables users to enable or disable a camera.	Not available
View Live	Enables the right to view live video from cameras in the clients and the Management Client.	
Playback	Enables the right to play back recorded video from cameras in all clients.	
Retrieve remote recordings	Enables the right to retrieve recordings in the clients from cameras on remotes sites or from edge storages on cameras.	
Read sequences	Enables the right to read the sequence information related to, for example, the Sequence explorer in the clients.	
Smart search	Enables the right to use the Smart search function in the clients.	
Export	Enables the right to export recordings from the clients.	
Create bookmarks	Enables the right to create bookmarks in recorded and live video in the clients.	
Read bookmarks	Enables the right to search for and read bookmark details in the clients.	
Edit bookmarks	Enables the right to edit bookmarks in the clients.	
Delete bookmarks	Enables the right to delete bookmarks in the clients.	
Create and extend evidence locks	Enables the right to create and extend evidence locks in the clients.	Not available
Read evidence locks	Enables the right to search and read evidence locks in the clients.	Not available
Delete and reduce evidence locks	Enables the right to delete or reduce evidence locks in the clients.	Not available

Security right	Description	XProtect Expert
Start manual recording	Enables the right to start manual recording of video in the clients.	
Stop manual recording	Enables the right to stop manual recording of video in the clients.	
AUX commands	Enables the right to use auxiliary (AUX) commands on the camera from the clients. AUX commands offer users the control of for example, wipers on a camera connected via a video server. Camera-associated devices connected via auxiliary connections are controlled from the client.	
Manual PTZ	Enables the right to use PTZ functions on PTZ cameras in the clients and the Management Client.	
Activate PTZ presets or patrolling profile	Enables the right to move PTZ cameras to preset positions, start and stop patrolling profiles, and pause a patrolling in the clients and the Management Client. To allow this role to use other PTZ functions on the camera, enable the Manual PTZ right.	
Manage PTZ presets or patrolling profiles	Enables the right to add, edit and delete PTZ presets and patrolling profiles on PTZ cameras in the clients and the Management Client. To allow this role to use other PTZ functions on the camera, enable the Manual PTZ right.	
Lock/unlock PTZ presets	Enables the right to lock and unlock PTZ presets in the Management Client. This prevents or allows other users to change preset positions in the clients and in the Management Client.	Not available
Reserve PTZ sessions	Enables the right to set PTZ cameras in reserved PTZ session mode in the clients and the Management Client. In a reserved PTZ session other users with higher PTZ priority are not able to take over the control. To allow this role to use other PTZ functions on the camera, enable the Manual PTZ right.	Not available
Release PTZ sessions	Enables the right to release other users' PTZ sessions from the Management Client. You can always release your own PTZ sessions - without this permission.	Not available
Delete recordings	Enables the right to delete stored video recordings from the system via the Management Client.	Not available
Manage security	Enables the right to manage security permissions in the Management Client for the camera.	Not available

Microphones

Security right	Description	XProtect Expert
Full control	Enables the right to manage all security entries on this part of the system.	
Read	Enables the right to view microphone devices in the clients and the Management Client.	
Edit	Enables the right to edit microphone properties in the Management Client. It also allows users to enable or disable microphones.	Not available
Listen	Enables the right to listen to live audio from microphones in the clients and the Management Client.	
Playback	Enables the right to play back recorded audio from microphones in the clients.	
Retrieve remote recordings	Enables the right to retrieve recordings in the clients from microphones on remotes sites or from edge storages on cameras.	
Read sequences	Enables the right to read the sequence information related to, for example, the Sequence explorer in the clients.	
Export	Enables the right to export recordings from the clients.	
Create bookmarks	Enables the right to create bookmarks in the clients.	
Read bookmarks	Enables the right to search for and read bookmark details in the clients.	
Edit bookmarks	Enables the right to edit bookmarks in the clients.	
Delete bookmarks	Enables the right to delete bookmarks in the clients.	
Create and extend evidence locks	Enables the right to create or extend evidence locks in the clients.	Not available
Read evidence locks	Enables the right to search and read evidence lock details in the clients.	Not available
Delete and reduce evidence locks	Enables the right to delete or reduce evidence locks in the clients.	Not available
Start manual recording	Enables the right to start manual recording of audio in the clients.	
Stop manual recording	Enables the right to stop manual recording of audio in the clients.	
Delete recordings	Enables the right to delete stored recordings from the system.	Not available
Manage security	Enables the right to manage security permissions in the Management Client for microphones.	Not available

Speakers

Security right	Description	XProtect Expert
Full control	Enables the right to manage all security entries on this part of the system.	
Read	Enables the right to view speaker devices in the clients and the Management Client.	
Edit	Enables the right to edit properties for speakers in the Management Client. It also allows users to enable or disable speakers.	Not available
Listen	Enables the right to listen to live audio from speakers in the clients and the Management Client.	
Speak	Enables the right to speak through the speakers in the clients.	
Playback	Enables the right to play back recorded audio from speakers in the clients.	
Retrieve remote recordings	Enables the right to retrieve recordings in the clients from speakers on remotes sites or from edge storages on cameras.	
Read sequences	Enables the right to use the Sequences feature while browsing recorded audio from speakers in the clients.	
Export	Enables the right to export recorded audio from speakers in the clients.	
Create bookmarks	Enables the right to create bookmarks in the clients.	
Read bookmarks	Enables the right to search for and read bookmark details in the clients.	
Edit bookmarks	Enables the right to edit bookmarks in the clients.	
Delete bookmarks	Enables the right to delete bookmarks in the clients.	
Create and extend evidence locks	Enables the right to create or extend evidence locks on recorded audio in the clients.	Not available
Read evidence locks	Enables the right to view evidence locks on recorded audio in the clients.	Not available
Delete and reduce evidence locks	Enables the right to delete or reduce evidence locks on recorded audio in the clients.	Not available
Start manual recording	Enables the right to start manual recording of audio in the clients.	
Stop manual recording	Enables the right to stop manual recording of audio in the clients.	
Delete recordings	Enables the right to delete stored recordings from the system.	Not available
Manage security	Enables the right to manage security permissions in the Management Client for speakers.	Not available

Metadata

Security right	Description	XProtect Expert
Full control	Enables the right to manage all security entries on this part of the system.	
Read	Enables the right to receive metadata in the clients.	
Edit	Enables the right to edit metadata properties in the Management Client. It also allows users to enable or disable metadata devices.	Not available
Live	Enables the right to receive live metadata from cameras in the clients.	
Playback	Enables the right to play back recorded data from metadata devices in the clients.	
Retrieve remote recordings	Enables the right to retrieve recordings in the clients from metadata devices on remotes sites or from edge storages on cameras.	
Read sequences	Enables the right to read the sequence information related to, for example, the Sequence explorer in the clients.	
Export	Enables the right to export recordings in the clients.	
Create and extend evidence locks	Enables the right to create evidence locks in the clients.	Not available
Read evidence locks	Enables the right to view evidence locks in the clients.	Not available
Delete and reduce evidence locks	Enables the right to delete or reduce evidence locks in the clients.	Not available
Start manual recording	Enables the right to start manual recording of metadata in the clients.	
Stop manual recording	Enables the right to stop manual recording of metadata in the clients.	
Delete recordings	Enables the right to delete stored recordings from the system.	Not available
Manage security	Enables the right to manage security permissions in the Management Client for metadata.	Not available

Input

Security right	Description	XProtect Expert
Full control	Enables the right to manage all security entries on this part of the system.	Not available
Read	Enables the right to view input devices in the clients and the Management Client.	

Security right	Description	XProtect Expert
Edit	Enables the right to edit properties for input devices in the Management Client. It also enables users to enable or disable an input device.	Not available
Manage security	Enables the right to manage security permissions in the Management Client for input devices.	Not available

Output

Security right	Description	XProtect Expert
Full control	Enables the right to manage all security entries on this part of the system.	
Read	Enables the right to view output devices in the clients.	
Edit	Enables the right to edit properties for output devices in the Management Client. It also enables users to enable or disable an output device.	Not available
Activate	Enables the right to activate outputs in the clients.	
Manage security	Enables the right to manage security permissions in the Management Client for output devices.	Not available

Smart Wall

Security right	Description	XProtect Expert
Full control	Enables the right to manage all security entries on this part of the system.	
Read	Enables the right to view Smart Walls in the clients.	
Edit	Enables the right to edit properties for the Smart Wall in the Management Client.	Not available
Delete	Enables the right to delete existing Smart Walls in the Management Client.	Not available
Operate	Enables the right to activate and modify Smart Walls, for example to change and activate presets or apply cameras on views in the clients and in the Management Client.	
Create Smart Wall	Enables the right to create new Smart Walls in the Management Client.	Not available
Manage security	Enables the right to manage security permissions in the Management Client for the Smart Wall.	Not available
Playback	Enables the right to play back recorded data from within Smart Walls in the clients.	

View Groups

Security right	Description	XProtect Expert
Full control	Enables the right to manage all security entries on this part of the system.	
Read	Enables the right to view View Groups in the clients and in the Management Client. View groups are created in the Management Client.	
Edit	Enables the right to edit properties on the View Groups in the Management Client.	Not available
Delete	Enables the right to delete View Groups in the Management Client.	
Operate	Enables the right to use View Groups in XProtect Smart Client, that is to create and delete subgroups and views.	
Create view group	Enables the right to create View Groups in the Management Client.	Not available
Manage security	Enables the right to manage security permissions in the Management Client for View Groups.	Not available

User-defined Events

Security right	Description	XProtect Expert
Full control	Enables the right to manage all security entries on this part of the system.	
Read	Enables the right to view user-defined events in the clients.	
Edit	Enables the right to edit properties on user-defined events in the Management Client.	Not available
Delete	Enables the right to delete user-defined events in the Management Client.	Not available
Trigger	Enables the right to trigger user-defined events in the clients.	
Manage security	Enables the right to manage security permissions in the Management Client for user-defined events.	Not available
Create user-defined event	Enables the right to create new user-defined events in the Management Client.	Not available

Generic Events

The following settings are only available in XProtect Corporate.

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Read	Enables the right to view generic events in the clients and the Management Client.
Edit	Enables the right to edit properties on generic events in the Management Client.
Delete	Enables the right to delete generic events in the Management Client.
Manage security	Enables the right to manage security permissions in the Management Client for generic events.
Create	Enables the right to create new generic events in the Management Client.

Analytics Events

The following settings are only available in XProtect Corporate.

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Read	Enables the right to view analytics events in the Management Client.
Edit	Enables the right to edit properties on analytics events in the Management Client.
Delete	Enables the right to delete analytics events in the Management Client.
Create	Enables the right to create new analytics events in the Management Client.
Manage security	Enables the right to manage security permissions in the Management Client for analytics events.

Matrix

Security right	Description	XProtect Expert
Full control	Enables the right to manage all security entries on this part of the system.	Not available
Read	Enables the right to select and send video to the Matrix recipient from the clients.	
Edit	Enables the right to edit properties for the Matrix's in the Management Client.	Not available
Delete	Enables the right to delete Matrix's in the Management Client.	Not available

Security right	Description	XProtect Expert
Create Matrix	Enables the right to create new Matrix's in the Management Client.	Not available
Manage security	Enables the right to manage security permissions in the Management Client for all Matrix's.	Not available

Rules

The following settings are only available in XProtect Corporate.

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Read	Enables the right to view existing rules in the Management Client.
Edit	Enables the right to edit properties for rules and to define rule behavior in the Management Client. It also requires that the user has read permissions on all the devices that are impacted by the rule.
Delete	Enables the right to delete rules from the Management Client. It also requires that the user has read permissions on all devices that are impacted by the rule.
Create rule	Enables the right to create new rules in the Management Client. It also requires that the user has read permissions on all devices that are impacted by the rule.
Manage security	Enables the right to manage security permissions in the Management Client for all rules.

Sites

The following settings are only available in XProtect Corporate.

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Read	Enables the right to view other sites in the Management Client. Connected sites are connected via Milestone Federated Architecture. To edit properties, you need Edit permissions on the Management Server on each site.
Manage security	Enables the right to manage security permissions all sites.

Alarms

The following settings are only available in XProtect Corporate.

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Read	Enables the right to view alarm definitions, alarm sounds, and alarm data settings in the Management Client. Only when you set this to allowed, the Alarms and Events tab in the Options dialog appears.
Edit	Enables the right to edit properties for alarm definitions, alarm sounds, and alarm data settings in the Management Client.
Delete	Enables the right to delete alarm definitions in the Management Client.
Manage security	Enables the right to manage security permissions for alarms.
Create	Enables the right to create new alarm definitions in the Management Client.

Access Control

The following settings are only available in XProtect Corporate.

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Read	Enables the right to view properties for the Access Control systems in the Management Client.
Edit	Enables the right to edit properties for the Access Control systems in the Management Client.
Delete	Enables the right to delete Access Control systems in the Management Client.
Create	Enables the right to create new Access Control systems in the Management Client.
Manage security	Enables the right to manage security permissions for all Access Control systems.

System Monitors

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Read	Enables the right to view System Monitors in XProtect Smart Client.

Security right	Description
Edit	Enables the right to edit properties for System Monitors in the Management Client.
Manage security	Enables the right to manage security permissions in the Management Client for all System Monitors.

Transaction sources

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Read	Enables the right to view properties for the Transaction sources in the Management Client.
Edit	Enables the right to edit properties for the Transaction sources in the Management Client.
Delete	Enables the right to delete Transaction sources in the Management Client.
Create	Enables the right to create new Transaction sources in the Management Client.
Manage security	Enables the right to manage security permissions in the Management Client for all Transaction sources.

Transaction definitions

Security right	Description
Full control	Enables the right to manage all security entries on this part of the system.
Read	Enables the right to view properties for the Transaction definitions in the Management Client.
Edit	Enables the right to edit properties for the Transaction definitions in the Management Client.
Delete	Enables the right to delete Transaction definitions in the Management Client.
Create	Enables the right to create new Transaction definitions in the Management Client.
Manage security	Enables the right to manage security permissions in the Management Client for all Transaction definitions.

Device tab (roles)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

The **Device** tab lets you specify which features users/groups with the selected role can use for each device (for example, a camera) or device group in XProtect Smart Client.

Remember to repeat for each device. You can also select a device group, and specify role rights for all the devices in the group in one go.

You can still select or clear such square-filled check boxes, but note that your choice in that case applies for **all** devices within the device group. Alternatively, select the individual devices in the device group to verify exactly which devices the relevant right applies for.

Camera-related rights

Specify the following rights for camera devices:

Name	Description
Read	The selected camera(s) will be visible in the clients.
View live	Allows live viewing of video from the selected camera(s) in the clients. For XProtect Smart Client, it requires that the role has been granted the right to view the clients' Live tab. This right is granted as part of the application rights. Specify the time profile or leave the default value.
Playback > Within time profile	Allows playback of recorded video from the selected camera(s) in the clients. Specify the time profile or leave the default value.
Playback > Limit playback to	Allows playback of recorded video from the selected camera(s) in the clients. Specify a playback limit or apply no restrictions.
Read sequences	Allows reading the sequence information related to, for example, the Sequence explorer in the clients.
Smart search	Allows the user to use the Smart search function in the clients.
Export	Allows the user to export recordings from the clients.
Start manual recording	Allows starting manual recording of video from the selected camera(s) in the clients.
Stop manual recording	Allows stopping manual recording of video from the selected camera(s) in the clients.
Read bookmarks	Allows search for and read bookmark details in the clients.
Edit bookmarks	Allows editing bookmarks in the clients.
Create bookmarks	Allows adding bookmarks in the clients.
Delete bookmarks	Allows deleting bookmarks in the clients.
AUX commands	Allows the use of auxiliary commands from the clients.
Create and extend evidence locks	<p>Allows the client user to:</p> <ul style="list-style-type: none"> • Add the camera to new or existing evidence locks. • Extend the expiry time for existing evidence locks. • Extend the protected interval for existing evidence locks. <p>Requires user rights to all devices included in the evidence lock.</p>

Name	Description
Delete and reduce evidence locks	<p>Allows the client user to:</p> <ul style="list-style-type: none"> • Remove the camera from existing evidence locks. • Delete existing evidence locks. • Shorten the expiry time for existing evidence locks. • Shorten the protected interval for existing evidence locks. <p>Requires user rights to all devices included in the evidence lock.</p>
Read evidence locks	Allows the client user to search for and read evidence lock details.

Microphone-related rights

Specify the following rights for microphone devices:

Name	Description
Read	The selected microphone(s) will be visible in the clients.
Live > Listen	<p>Allows listening to live audio from the selected microphones(s) in the clients.</p> <p>For XProtect Smart Client, it requires that the role has been granted the right to view the clients' Live tab. This right is granted as part of the application rights. Specify the time profile or leave the default value.</p>
Playback > Within time profile	Allows playback of recorded audio from the selected microphone(s) in the clients. Specify the time profile or leave the default value.
Playback > Limit playback to	Allows playback of recorded audio from the selected microphone(s) in the clients. Specify a playback limit or apply no restrictions.
Read sequences	Allows reading the sequence information related to, for example, the Sequence explorer in the clients.
Export	Allows the user to export recordings from the clients.
Start manual recording	Allows starting manual recording of audio from the selected microphone(s) in the clients.
Stop manual recording	Allows stopping manual recording of audio from the selected microphone(s) in the clients.
Read bookmarks	Allows search for and read bookmark details in the clients.
Edit bookmarks	Allows editing bookmarks in the clients.
Create bookmarks	Allows adding bookmarks in the clients.
Delete bookmarks	Allows deleting bookmarks in the clients.

Name	Description
Create and extend evidence locks	<p>Allows the client user to:</p> <ul style="list-style-type: none"> • Add the microphone to new or existing evidence locks. • Extend the expiry time for existing evidence locks. • Extend the protected interval for existing evidence locks. <p>Requires user rights to all devices included in the evidence lock.</p>
Delete and reduce evidence locks	<p>Allows the client user to:</p> <ul style="list-style-type: none"> • Remove the microphone from existing evidence locks. • Delete existing evidence locks. • Shorten the expiry time for existing evidence locks. • Shorten the protected interval for existing evidence locks. <p>Requires user rights to all devices included in the evidence lock.</p>
Read evidence locks	Allows the client user to search for and read evidence lock details.

Speaker-related rights

Specify the following rights for speaker devices:

Name	Description
Read	The selected speaker(s) is visible in the clients.
Live > Listen	<p>Allows listening to live audio from the selected speaker(s) in the clients.</p> <p>For XProtect Smart Client, it requires that the role has been granted the right to view the clients' Live tab. This right is granted as part of the application rights. Specify the time profile or leave the default value.</p>
Playback > Within time profile	Allows playback of recorded audio from the selected speaker(s) in the clients. Specify the time profile or leave the default value.
Playback > Limit playback to	Allows playback of recorded audio from the selected speaker(s) in the clients. Specify a playback limit or apply no restrictions.
Read sequences	Allows reading the sequence information related to, for example, the Sequence explorer in the clients.
Export	Allows the user to export recordings from the clients.
Start manual recording	Allows starting manual recording of audio from the selected speaker(s) in the clients.
Stop manual recording	Allows stopping manual recording of audio from the selected speaker(s) in the clients.
Read bookmarks	Allows search for and read bookmark details in the clients.

Name	Description
Edit bookmarks	Allows editing bookmarks in the clients.
Create bookmarks	Allows adding bookmarks in the clients.
Delete bookmarks	Allows deleting bookmarks in the clients.
Create and extend evidence locks	<p>Allows the client user to:</p> <ul style="list-style-type: none"> • Add the speaker to new or existing evidence locks. • Extend the expiry time for existing evidence locks. • Extend the protected interval for existing evidence locks. <p>Requires user rights to all devices included in the evidence lock.</p>
Delete and reduce evidence locks	<p>Allows the client user to:</p> <ul style="list-style-type: none"> • Remove the speaker from existing evidence locks. • Delete existing evidence locks. • Shorten the expiry time for existing evidence locks. • Shorten the protected interval for existing evidence locks. <p>Requires user rights to all devices included in the evidence lock.</p>
Read evidence locks	Allows the client user to search for and read evidence lock details.

Metadata-related rights

Specify the following rights for metadata devices:

Name	Description
Read	Enables the right to see metadata devices and retrieve data from them in the clients.
Edit	Enables the right to edit metadata properties. It also allows users to enable or disable metadata devices in the Management Client and via the MIP SDK.
View Live	Enables the right to view metadata from cameras in the clients. For XProtect Smart Client, it requires that the role has been granted the right to view the clients' Live tab. This right is granted as part of the application rights.
Playback	Enables the right to play back recorded data from metadata devices in the clients.
Read sequences	Enables the right to use the Sequences feature while browsing recorded data from metadata devices in the clients.
Export	Enables the right to export recorded audio from metadata devices in the clients.

Name	Description
Create and extend evidence locks	Enables the right to create and extend the evidence locks on metadata in the clients.
Read evidence locks	Enables the right to view evidence locks on metadata in the clients.
Delete and reduce evidence locks	Enables the right to delete or reduce evidence locks on metadata in the clients.
Start manual recording	Enables the right to start manual recording of metadata in the clients.
Stop manual recording	Enables the right to stop manual recording of metadata in the clients.

Input-related rights

Specify the following rights for input devices:

Name	Description
Read	The selected input(s) will be visible in the clients.

Output-related rights

Specify the following rights for output devices:

Name	Description
Read	The selected output(s) will be visible in the clients. If visible, the output will be selectable on a list in the clients.
Activate	The selected output(s) can be activated from the Management Client and the clients. Specify the time profile or leave the default value.

PTZ tab (roles)

You set up rights for pan-tilt-zoom (PTZ) cameras on the **PTZ** tab. You can specify the features users/groups can use in the clients. You can select individual PTZ cameras or device groups containing PTZ cameras.

Specify the following rights for PTZ:

Name	Description
Manual PTZ	<p>Determines if the selected role can use PTZ functions and pause a patrolling on the selected camera.</p> <p>Specify a time profile, select Always, or leave the default value that follows the default time profile defined on the Info tab for that role.</p>
Activate PTZ presets or patrolling profiles	<p>Determines if the selected role can move the selected camera to preset positions, start and stop patrolling profiles, and pause a patrolling.</p> <p>Specify a time profile, select Always, or leave the default value that follows the default time profile defined on the Info tab for that role.</p> <p>To allow this role to use other PTZ functions on the camera, enable the Manual PTZ right.</p>
PTZ Priority	<p>Determines the priority of PTZ cameras. When several users on a surveillance system want to control the same PTZ camera at the same time, conflicts may occur.</p> <p>You can avoid such a situation by specifying a priority for use of the selected PTZ camera(s) by users/groups with the selected role. Specify a priority from 1 to 32,000, where 1 is the lowest priority. The default priority is 3,000. The role with the highest priority number is the one who can control the PTZ camera(s).</p>
Manage PTZ presets or patrolling profiles	<p>Determines the right to add, edit and delete PTZ presets and patrolling profiles on the selected camera in both the Management Client and XProtect Smart Client.</p> <p>To allow this role to use other PTZ functions on the camera, enable the Manual PTZ right.</p>
Lock/unlock PTZ presets	<p>Determines if the role can lock and unlock preset positions for the selected camera.</p>
Reserve PTZ sessions	<p>Determines the right to set the selected camera in reserved PTZ session mode.</p> <p>In a reserved PTZ session other users or patrolling sessions with higher PTZ priority are not able to take over the control.</p> <p>To allow this role to use other PTZ functions on the camera, enable the Manual PTZ right.</p>
Release PTZ sessions	<p>Determines if the selected role can release other users' PTZ sessions from the Management Client.</p> <p>You can always release your own PTZ sessions - without this permission.</p>

Speech tab (roles)

Relevant only if you use speakers on your system. Specify the following rights for speakers:

Name	Description
Speak	Determine if users should be allowed to talk through the selected speaker(s). Specify the time profile or leave the default value.
Speak priority	<p>When several client users want to talk through the same speaker at the same time, conflicts may occur.</p> <p>Solve the problem by specifying a priority for use of the selected speaker(s) by users/groups with the selected role. Specify a priority from Very low to Very high. The role with the highest priority is allowed use the speaker before other roles.</p> <p>Should two users with the same role want to speak at the same time, the first come, first served-principle applies.</p>

Remote Recordings tab (roles)

Specify the following rights for remote recordings:

Name	Description
Retrieve remote recordings	Enables the right to retrieve recordings in the clients from cameras, microphones, speakers, and metadata devices on remotes sites or from edge storages on cameras.

Smart Wall tab (roles)

Through roles, you can grant your client users Smart Wall-related user rights for the Smart Wall feature:

Name	Description
Read	Allows users to view the selected Smart Wall in the clients.
Edit	Allows users to edit the selected Smart Wall in the Management Client.
Delete	Allows users to delete the selected Smart Wall in the Management Client.
Operate	Allows users to apply layouts on the selected Smart Wall in the client and to activate the selected preset.
Playback	Allows users to play back recorded data from the selected Smart Wall in the clients.

External Event tab (roles)

Specify the following external event rights:

Name	Description
Read	Allows users to search for and view the selected external system event in the clients and the Management Client.
Edit	Allows users to edit the selected external system event in the Management Client.
Delete	Allows users to delete the selected external system event in the Management Client.
Trigger	Allows users to trigger the selected external system event in the clients.

View Group tab (roles)

On the **View Group** tab, you specify which view groups the users and user groups with the selected role can use in the clients.

Specify the following rights for view groups:

Name	Description
Read	Enables the right to view the View Groups in the clients and in the Management Client. View groups are created in the Management Client.
Edit	Enables the right to edit properties on View Groups in the Management Client.
Delete	Enables the right to delete View Groups in the Management Client.
Operate	Enables the right to use View Groups in XProtect Smart Client, that is to create and delete subgroups and views.

Servers tab (roles)

Specifying role rights on the **Servers** tab is only relevant if you have integrated XProtect Professional VMS servers into your system or your system works in a Milestone Federated Architecture setup.

Name	Description
Enterprise Servers	User account that provides access to the selected XProtect Professional VMS server. The user must be set up on the XProtect Professional VMS server.
Sites	<p>Enables the right to view the selected site in the Management Client. Connected sites are connected via Milestone Federated Architecture.</p> <p>To edit properties, you need Edit permissions on the Management Server on each site.</p>

See XProtect Professional VMS servers (explained) (on page 401) or Milestone Federated Architecture (explained) (on page 267) for more information.

Matrix tab (roles)

If you have configured Matrix recipients on your system, you may configure Matrix role rights. From a client, you can send video to selected Matrix recipients. Select the users who can receive this on the Matrix tab.

The following rights are available:

Name	Description
Read	Determine if users and groups with the selected role can select and send video to the Matrix recipient from the clients.

Alarms tab (roles)

If you use alarms in your system setup to provide central overview and control of your installation (including any other XProtect servers), you can use the **Alarms** tab to specify the alarm rights users/groups with the selected role should have, for example, how to handle alarms in the clients.

Specify the following rights for alarms:

Name	Description
Manage	Enables the right to manage alarms, for example changing priorities of alarms and re-delegate alarms to other users, acknowledge alarms and change the state, for example from New to Assigned , of several alarms at the same time.
View	Enables the right to view alarms and print alarm reports.
Disable alarms	Enables the right to disable alarms.
Receive notifications	Enables the right to receive notifications about alarms in the clients.

Access Control tab (roles)

When you add or edit basic users, Windows users or groups, specify access control settings:

Name	Description
Use access control	Allows the user to use any access control-related features in the clients.
View cardholders list	Allows the user to view the cardholders list on the Access Control tab in the clients.
Receive notifications	Allows the user to receive notifications about access requests in the clients.

LPR tab (roles)

If your system runs with XProtect LPR, specify the following rights for the users:

Name	Description
Use LPR	Enables the right to use any LPR-related features in the clients.
Manage license plate match lists	Enables the right to add, import, modify, export, and delete license plate match lists in the Management Client.
Read license plate match lists	Enables the right to view license plate match lists.

MIP tab (roles)

Through the MIP Software Development Kit (SDK), a third-party vendor can develop custom plug-ins for your system, for example, integration to external access control systems or similar functionality.



Which settings you change for your plug-in depend on the relevant plug-in. Find the custom settings for the plug-ins on the **MIP** tab.

Basic users

Basic users (explained)

When you add a basic user to your system, you create a dedicated surveillance system user account with basic user name and password authentication for the individual user. This is in contrast to the Windows user, added through Active Directory.

When working with basic users, it is important to understand the difference between basic user and Windows user.

-  Basic users are authenticated by a user name/password combination and are specific to a system. Even if basic users have the same name and password, a basic user created at one federated site does not have access to another federated site.
-  Windows users are authenticated based on their Windows login and are specific to a machine.

Create basic users

To create a basic user on your system:

1. Expand **Security** > **Basic Users**.
2. In the **Basic Users** pane, right-click and select **Create Basic User**.
3. Specify a user name and a password, and repeat it to be sure you have specified it correctly.
4. Click **OK** to create the basic user.

System dashboard

System dashboard (explained)

System dashboard provides you with the functionality to monitor your system and its components.

Access the following functionality:

Name	Description
System Monitor	Monitor the status of your servers and cameras by parameters you define.
System Monitor Thresholds	Set threshold values for monitored parameters on server and monitor tiles used in System Monitor.
Evidence Lock	Get an overview of all protected data in the system.
Current Task	Get an overview of ongoing tasks on a selected recording server.
Configuration Reports	Decide what to include in your system configuration reports before printing.

System monitor (explained)

System monitor provides you with a quick, visual overview of the current state of your system's servers and cameras through colored tiles that represent the system hardware. By default, the system displays tiles that represent all **Recording servers**, **All servers** and **All cameras**.

The color of the tiles:

Tile color	Description
Green	Normal state. Everything is running normally.
Yellow	Warning state. One or more monitoring parameters is above the threshold value (see "System monitor thresholds (explained)" on page 237) for the Normal state.
Red	Critical state. One or more monitoring parameters is above the threshold value for the Normal and Warning state.

You can customize the server and camera tiles if you want to display more or less tiles on the dashboard. For example, you can set up tiles to represent a single server, a single camera, a group of cameras, or a server group. You can also delete a tile if you do not want to use it or edit its monitoring parameters. Monitoring parameters are, for example, CPU usage or memory available for a server. If you remove these parameters from the server tile, the tile does not monitor these parameters on the relevant tile. Click **Customize** in the upper right corner of the tab to open the Customize dashboard window. See Customize dashboard (on page 235) for more information.

Tiles change their state and thereby color based on threshold values set in System monitor thresholds. While the system does set some default threshold values for you, you can decide for yourself what the threshold value should be for each of the three states. To set up or change threshold values, you can use **System monitor thresholds**. See System monitor thresholds (explained) (on page 237).

If a tile changes color and you want to know which server/parameter that makes the tile change color, click the tile. This opens an overview in the bottom of the screen which shows the colors red, yellow or green for each monitoring parameter you have enabled for your tile. Click the **Details** button to get more detailed information about why the state has changed.

If you see a warning sign on a tile, a data collector for one of your monitored servers or cameras may not be running. If you place your mouse above the tile, the system shows you when it last collected data for the relevant tile.

Customize dashboard

Add a new camera or server tile

1. In the System monitor window, click **Customize**.
2. In the **Customize dashboard** window that opens, click **New** under **Server tiles** or **Camera tiles**.
3. In the **New server tile/New camera tile** window, select the cameras or servers to monitor.
4. Under **Monitoring parameters**, select or clear check boxes for any parameters to add or remove from the relevant tile.
5. Click **OK**. The new server or camera tile is now added to the tiles displayed on your dashboard.

Edit monitoring parameters

1. In the System monitor dashboard window, click **Customize**.
2. In the **Customize dashboard** window that opens, click **Edit** under **Server tiles** or **Camera tiles**.
3. In the **Edit server tile** or **Edit camera tile** window, select the server component or cameras you want to edit.
4. In the **Monitoring parameters** box, select or clear the check boxes for the monitoring parameters you want to add or remove from the relevant tile.
5. Click **OK**. The changed monitoring parameters are now a part of or removed from the relevant tile.

You can enable and disable historical data on the system if you want to. If you disable this data, you cannot see graphs of previous system behavior. If you want to reduce the load on the SQL server database or on your bandwidth, you can reduce the sampling interval of historical data. If you reduce the sampling interval of historical data, less details are available in graphs.

System monitor details (explained)

If you click a server or camera tile, you can see the status of each selected monitoring parameter below the dashboard.

State	Name	Live FPS	Recording FPS	Used space	
	Panasonic SPxxx/SFxxx/SWxxx no I/O Camera Series	<div></div>	<div></div>	<div></div>	Details

Example: A camera's LIVE FPS monitoring parameters has reached the Warning state.

The **State** field shows the camera's state. For example, a red warning is shown if the connection to the device is broken. The icon includes a tool tip with a short description of the issue that is causing the warning.

The **Used space** field shows data from other recording servers where this device has recordings if, for example, the device has been located on other recording servers previously.

If you click the **Details** button for the relevant camera/server, you can view system information and create reports regarding:

Component	Description
Management server	Shows data from the selected management server
Recording server(s)	Shows data from the selected recording server. You can view these per: <ul style="list-style-type: none"> Disk Storage Network Camera
Failover recording servers	Shows data from the selected failover recording server.
Additional servers	Shows data on log server, event servers and more.
Cameras	Shows data from any camera in any camera group in your setup.

Each of these elements is an area you can click and expand. When you click this area, it provides relevant dynamic data on this server or camera.

The **Cameras** bar contains a list of camera groups to select from. Once you select a group, select a specific camera and see dynamic data for it. All servers display CPU usage and available memory information. Recording servers also display connection status information. Within each view, find a **History** link. Click it to view historic data and reports (to view reports on a camera, click the name of the camera). For each historic report, you can view data for the last 24 hours, 7 days or 30 days. To save and/or print reports, click the **Send to PDF** icon. Use the < and home icons to navigate System Monitor.

You can only create historical reports with data from the recording server where the device is currently located.

Important: If you access the system monitor's details from a server operating system, you may experience a message regarding **Internet Explorer Enhanced Security Configuration**. Follow the instructions in the message to add the **System Monitor** page to the **Trusted sites zone** before proceeding.

System monitor thresholds (explained)

System monitor thresholds allow you to set up and adjust the global thresholds for when tiles on System monitor should visually indicate that your system hardware changes state, for example when the CPU usage of a server changes from a normal state (green) state to a warning state (yellow).

The system is set up with default threshold values so that you can start monitoring your system hardware from the moment your system is set up. You can change these values if you want to (see "Set system monitor thresholds" on page 238).

As a default, the system is set up to show threshold values for all units of a particular hardware, for example all cameras or servers. You can also set up threshold values for individual servers or cameras or a subset of these. Setting threshold values for individual servers or cameras may be a good idea if, for example, some cameras should be allowed to use a higher **Live FPS** or **Recording FPS** than other cameras.

You can set the threshold values for servers, cameras, disks and storage. If you want to change threshold values, you can use the threshold control slider. The threshold control slider allows you to increase or decrease threshold values by dragging the handles separating states either up or down. The threshold control slider is divided into colors similar to those shown in your server or camera tiles present in System monitor (see "System monitor (explained)" on page 234).

To ensure that you do not see a **Critical** or **Warning** state in cases where the usage of or the load on your system hardware reaches a high threshold value only for a second or similar, use the **Calculation interval**. The **Calculation interval** averages out the effect of brief or frequent changes to a system hardware state. In practice, this means that the **Calculation interval** evens out the effect of hardware changes over time so that you do not get alerts every time a threshold is exceeded.

For example, you can set the **Calculation interval** to one (1) minute which ensures that you only get alerts if the average value for the whole minute exceeds the threshold. The benefit of this is that you avoid alerts about frequent and maybe possibly irrelevant changes in hardware states and only receive alerts that reflect sustained issues with, for example, CPU usage or memory consumption.

Server thresholds

Threshold	Description	Unit
Memory	Thresholds for RAM memory in use on the servers you monitor.	MB
CPU Usage	Thresholds for the CPU usage on the servers you monitor.	%

Camera thresholds

Threshold	Description	Unit
Used space	Thresholds for the space used by cameras you monitor.	GB
Recording FPS	Thresholds for cameras' FPS in use when the system is recording video on cameras you monitor.	%
Live FPS	Thresholds for cameras' FPS in use when live video is shown on cameras you monitor.	%

Disk thresholds

Threshold	Description	Unit
Free space	Thresholds for available space on disks you monitor.	GB

Storage thresholds

Threshold	Description	Unit
Retention time	Threshold showing a prediction for when you run out of space on your storage. The state shown is based on your system setup and is updated twice a day.	Days

You can also set up rules (see "Rules (explained)" on page 180) to perform specific actions or activate alarms (see "Alarms (explained)" on page 245) when a threshold changes from one state to another.

Set system monitor thresholds

1. Select the **Enable** check box for the relevant system hardware if you have not already enabled it
2. Drag the threshold control slider up or down to increase or decrease the threshold value. There are two sliders available for each piece of system hardware shown in the threshold control, separating the **Normal**, **Warning** and **Critical** levels.
3. Once you have set the relevant thresholds levels, select **File** > **Save** from the menu.



An example of how a threshold control slider could be set. Drag the sliders up and down to increase or decrease any of the three threshold levels. Red indicates you have reached a Critical state, Yellow is a Warning state indicating that you are close to reaching the Critical state and Green indicates that things are at a normal state and within your selected threshold values.

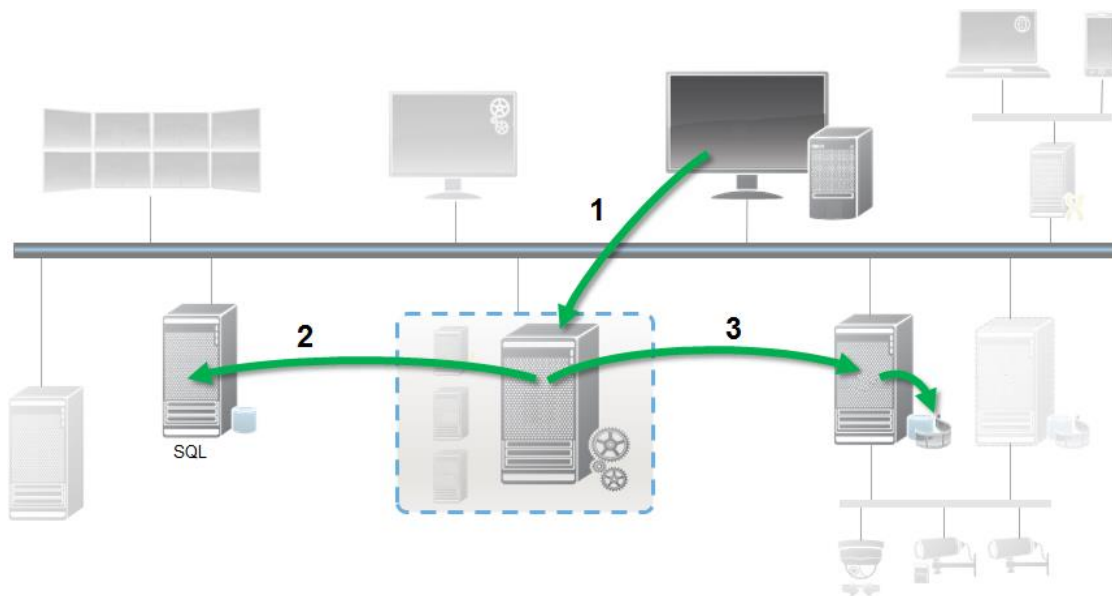
Evidence lock (explained)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

With the evidence lock functionality, client operators can protect video sequences, including audio and other data, from deletion if required, for example, while an investigation or trial is ongoing. For information about how to lock evidence, see the XProtect Smart Client documentation.

When protected, the data cannot be deleted, neither automatically by the system after the system's default retention time or in other situations nor manually by the client users. The system or a user cannot delete the data until a user with sufficient user rights unlocks the evidence.

Flow diagram for Evidence Lock:



1. User creates an evidence lock in XProtect Smart Client. Information sent to Management Server.
2. Management Server stores information about the evidence lock in the SQL server.
3. Management Server informs Recording Server to store and protect the protected recordings in the database.

When the operator creates an evidence lock, the protected data remains in the recording storage that it was recorded to, and is moved to archiving disks together with non-protected data, but the protected data:

- Follows the retention time configured for the evidence lock. Potentially infinitely.
- Keeps the original quality of the recordings, even if grooming has been configured for non-protected data.

When an operator creates locks, the minimum size of a sequence is the period that the database divides recorded files into, this is by default one-hour sequences. You can change this, but it requires that you customize the RecorderConfig.xml file on the recording server. If a small sequence spans two one-hour periods, the system locks the recordings in both periods.

In the audit log in the Management Client, you can see when a user creates, edits or deletes evidence locks.

When a disk runs out of disk space, it does not impact the protected data. Instead the oldest non-protected data will be deleted. If there are no more non-protected data to delete, the system stops recording. You can create rules and alarms triggered by disk full events, so you are automatically notified.

Except for more data being stored for a longer period and potentially affecting disk storage, the evidence lock feature as such does not influence system performance.

If you move hardware (see "Moving hardware (explained)" on page 104) to another recording server:

- Recordings protected with evidence locks, remains on the old recording server following the retention time set for the evidence lock, when it was created.

- The XProtect Smart Client user can still protect data with evidence locks on the recordings that were made on a camera before it was moved to another recording server. Even if you move the camera multiple times and the recordings are stored on multiple recording servers.

By default, all operators have the default evidence lock profile assigned to them but no user access rights to the feature. To specify the evidence lock access rights of a role, see the Device tab (see "Device tab (roles)" on page 223) for role settings. To specify the evidence lock profile of a role, see the Info tab (see "Info tab (roles)" on page 207) for role settings.

In the Management Client, you can edit the properties of the default evidence lock profile and create additional evidence lock profiles and assign these to the roles instead.

Evidence Lock under **System Dashboard** shows an overview of all protected data on the current surveillance system:

- start and end date for the protected data
- the user who locked the evidence
- when the evidence is no longer locked
- where the data is stored
- the size of each evidence lock

All information shown in **Evidence Lock** are snapshots. Press F5 to refresh.

Current tasks (explained)

The **Current Tasks** node shows an overview of tasks under a selected recording server, their begin time, estimated end time and progress. All information shown in **Current Tasks** are snapshots. You can refresh these by clicking on the **Refresh** button in the lower right corner of the **Properties** pane.

Configuration reports (explained)

When you create PDF configuration reports, you can include any possible elements of your system in the report. You can, for example, include licenses, device configuration, alarm configuration, and much more. You can also customize your font and page setup and include a customized front page.

Add a configuration report

1. Expand **System Dashboard** and click **Configuration Reports**. This brings up the report configuration page.
2. Select the elements that you want to include in your report.
3. **Optional:** Click **Front Page** to customize your front page. In the window that appears, fill in the needed info. Select **Front page** as an element to include in your report, otherwise the front page you customize is not included in your report.
4. Click **Formatting** to customize your font, page size and margins. In the window that appears, select the wanted settings.
5. When you are ready to export, click **Export** and select a name and save location for your report.

Configure report details

The following is available when setting up reports:

Name	Description
Select All	Selects all elements in the list.
Clear All	Clears all elements in the list.
Front Page	Customize the front page of the report.
Formatting	Format the report.
Export	Select a save location for the report and create a PDF.

Server logs

Logs (explained)

You can view and export contents from different logs related to the system. The purpose of the logs is to document activity, events, actions and errors in the system, for later analysis or documentation.

The logs have different purposes:

Name	Description
System log	Logs system-related information.
Audit log	Logs user activity.
Rule log	Logs rules in which users have specified the Make new log entry action.

Your system has a number of default settings related to the different logs. To change the settings, see Server Logs tab (see "Server Logs tab (options)" on page 254) under Options.

You can view logs in a number of different languages (see "Change log language" on page 242) and export logs (on page 242) as tab delimited text (.txt) files.

If a log contains more than one page of information, you can navigate between the log pages by clicking the buttons in the bottom right corner of the log pane:



In the lower left corner, jump to a specific date and time in the log:



Search logs

To search a log, use **Search criteria** in the top part of the log pane:


1. Specify your search criteria from the lists.
2. Click **Refresh** to make the log page reflect your search criteria. To clear your search criteria, and return to viewing all of the log's content, click **Clear**.

You can double-click any row to have all details presented in a **Log Details** window. In this way you can also read the log entries that contain more text than can be displayed in a single line.

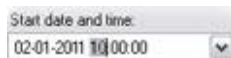
Export logs

You can export logs as tab delimited text (.txt) files. You can customize the log content by specifying which log, log elements, and time range to include in the export. For example, you can specify to include only the System Log error-related log entries from between January 2nd 2016 08:00:00 and January 6th 2014 07:59:59 in your export.

To export a log:

1. In the **Export Log** window's **File name** field, specify a name for the exported log file.
By default, exported log files are saved in your **My Documents** folder. However, you can specify a different location by clicking the browse button  next to the field.
2. Any criteria you have selected to target the content of the exported log is listed in the **Filters** field. You cannot edit this field. If you need to change your criteria, close the window, and repeat steps 1-2.
3. Specify the time period you want the export to cover. Specify the **Start date and time** and **End date and time** fields respectively. You can select the date by clicking the arrow:

To specify an exact time, overwrite the required time elements (hours:minutes:seconds) with the needed values. In this example, the hours element is being overwritten:



4. Click **Export** to export the log content.

Change log language




1. At the bottom part of the log pane, in the **Show log in** list, select the wanted language.



2. The log is displayed in the selected language. Next time you open the log, it is reset to the default language.




System log (properties)

Each row in a log represents a log entry. A log entry contains a number of information fields:

Name	Description
Level	Displays an icon that indicates the level of the log entry:  - indicates info  - indicates warning  - indicates error 'blank' - indicates an undefined entry.
UTC Time	Timestamped in coordinated universal time (UTC).
Local Time	Timestamped in the local time of your system's server.
ID	The identification number for the logged incident.
Source Type	The type of equipment on which the logged incident occurred, for example, server or device.
Source Name	Management server, the name of the recording server or device on which the logged incident occurred.
Event Type	The type of event represented by the logged incident.
Description	Shows a description of the logged incident.

Audit log (properties)




Each row in a log represents a log entry. A log entry contains a number of information fields:

Name	Description
Level	Displays an icon that indicates the level of the log entry:  - indicates info  - indicates warning  - indicates error 'blank' - indicates an undefined entry.
UTC Time	Timestamped in coordinated universal time (UTC).
Local Time	Timestamped in the local time of your system's server.
ID	The identification number for the logged incident.
User	The user name of the remote user causing the logged incident.
User Location	The IP address or host name of the computer from which the remote user caused the logged incident.
Permission	The information about whether the remote user action was allowed (granted) or not.
Category	The type of logged incident.
Resource Type	The type of equipment on which the logged incident occurred, for example, server or device.
Resource Name	Management server, or the name of the recording server or device on which the logged incident occurred.

Name	Description
Resource Host	The name of the recording server that hosts a device or a storage on which the logged incident occurred. The name of the management server that hosts the recording server or the management server on which the logged incident occurred.
Description	Shows a description of the logged incident.

Rule log (properties)

Each row in a log represents a log entry. A log entry contains a number of information fields:

Name	Description
Level	Displays an icon that indicates the level of the log entry:  - indicates info  - indicates warning  - indicates error 'blank' - indicates an undefined entry.
UTC Time	Timestamped in coordinated universal time (UTC).
Local Time	Timestamped in the local time of your system's server.
ID	The identification number for the logged incident.
Service Name	The name of the service on which the logged incident occurred.
Rule Name	The name of the rule triggering the log entry.
Source Type	The type of equipment on which the logged incident occurred, for example, server or device.
Source Name	Management server, the name of the recording server or device on which the logged incident occurred.
Event Type	The type of event represented by the logged incident.
Generator Type	The type of equipment on which the logged incident was triggered. Log entries are administrator-defined and relate to incidents in your system.
Generator Name	The name of the equipment on which the logged incident was generated.
Description	Shows a description of the logged incident.

Alarms

Alarms (explained)

Important: This feature only works if you have XProtect Event Server installed.

Based on functionality handled in the event server, the alarms feature provides central overview, control and scalability of alarms in any number of installations (including any other XProtect systems) throughout your organization. You can configure it to generate alarms based on either:

- **Internal system related events**

For example, motion, server responding/not responding, archiving problems, lack of disk space and more.

- **External integrated events**

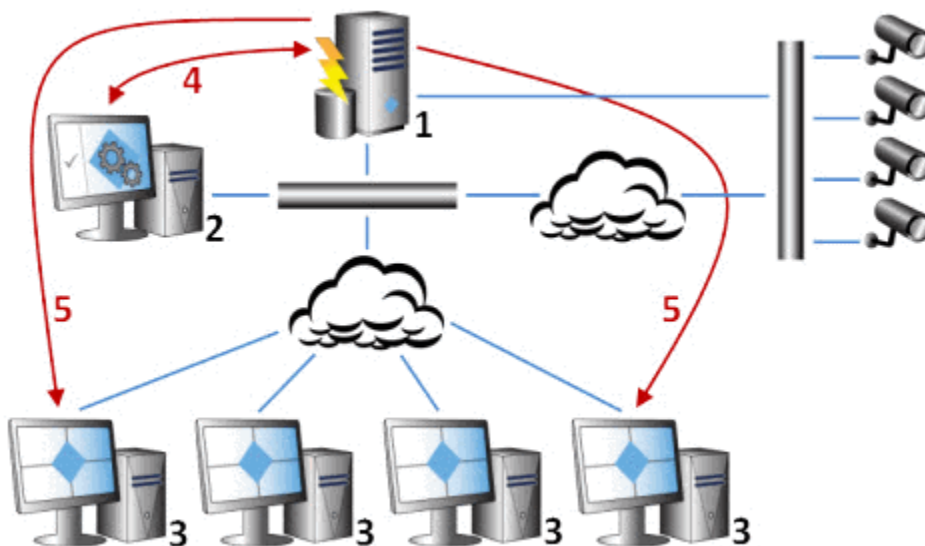
This group can consist of several types of external events:

- **Analytics events**

Typically data received from an external third-party video content analysis (VCA) providers.

- **MIP plug-in events**

Through the MIP Software Development Kit (SDK) a third-party vendor can develop custom plug-ins (for example, integration to external access control systems or similar) to your system.



Legend:

1. Surveillance system
2. Management Client
3. XProtect Smart Client
4. Alarm configuration
5. Alarm data flow

You handle and delegate alarms in the alarm list in XProtect Smart Client. You can also integrate alarms with the XProtect Smart Client's map functionality.

Alarm configuration (explained)

Alarm configuration includes:

- Dynamic role-based setup of alarm handling
- Central technical overview of all components: servers, cameras, and external units
- Setup of central logging of all incoming alarms and system information
- Handling of plug-ins, allowing customized integration of other systems, for example external access control or VCA-based systems.

In general, alarms are controlled by the visibility of the object causing the alarm. This means that four possible aspects can play a role with regards to alarms and who can control/manage them and to what degree:

Name	Description
Source/device visibility	If the device causing the alarm is not set to be visible to the user's role, the user cannot see the alarm in the alarm list in XProtect Smart Client.
The right to trigger user-defined events	This right determines if the user's role can trigger selected user-defined events in XProtect Smart Client.
External plug-ins	If any external plug-ins are set up in your system, these might control users' rights to handle alarms.
General role rights	Determine whether the user is allowed to only view or also to manage alarms. What a user of Alarms can do with alarms depends on the user's role and on settings configured for that particular role.

On the **Alarms and Events** tab in **Options**, you can specify settings for alarms, events and logs.

Alarm Definitions

When your system registers an event on your system, you can configure the system to generate an alarm in XProtect Smart Client. You must define alarms before you can use them, and alarms are defined based on events registered in your system servers. You can also use user-defined events for triggering alarms and use the same event to trigger several different alarms.

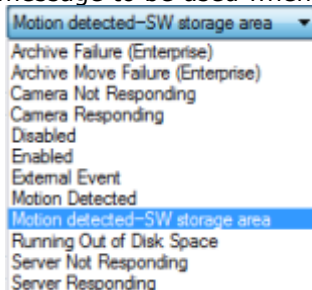
Add an alarm

To define an alarm, you need to create an alarm definition, where you specify, for example, what triggers the alarm, instructions on what the operator needs to do, and what or when the alarm stops. For detailed information about the settings, see Alarm Definitions (properties) (on page 247).

1. In the **Site Navigation** pane, expand **Alarms**, and right-click **Alarm Definitions**.
2. Select **Add New**.

3. Fill in these properties:

- **Name:** Type a name for the alarm definition. The name of the alarm definition appears whenever the alarm definition is listed.
- **Instructions:** You can write instructions for the operator who receives the alarm.
- **Triggering event:** Use the drop-down menus to select an event type and an event message to be used when the alarm is triggered.



A list of selectable triggering events. The one highlighted is created and customized using analytics events.

- **Sources:** Select the cameras or other devices that the event should originate from to trigger the alarm. Your options depend on the type of event you have selected.
 - **Time profile:** If you want the alarm to be activated during a specific time interval, select the radio button and then a time profile in the drop-down menu.
 - **Event based:** If you want the alarm to be activated by an event, select the radio button and specify which event will start the alarm. You also need to specify the event that will stop the alarm.
4. In the **Time limit** drop-down menu, specify a time limit for when action is required by the operator.
 5. In the **Events triggered** drop-down menu, specify which event to trigger when the time limit has passed.
 6. Specify additional settings, for example related cameras and initial alarm owner.

Alarm Definitions (properties)

The table describes the settings you can make when you create an alarm definition.

Alarm definition settings:

Name	Description
Enable	By default, the alarm definition is enabled. To disable it, clear the check box.
Name	Alarm names do not have to be unique, but using unique and descriptive alarm names are advantageous in many situations.

Name	Description
Instructions	Type a descriptive text about the alarm and how to resolve the issue that caused the alarm. The text appears in XProtect Smart Client when the user handles the alarm.
Triggering event	Select the event message to use when the alarm is triggered. Choose from two drop-downs: <ul style="list-style-type: none"> The first drop-down: Select the type of event, for example analytics event and system events. The second drop-down: Select the specific event message to use. The messages available are determined by the event type you selected in the first drop-down menu.
Sources	Specify the sources that the events originate from. Aside from cameras or other devices, sources may also be plug-in defined sources, for example VCA and MIP. The options depend on the type of event you have selected.

Alarm trigger:

Name	Description
Time profile	Select the Time profile radio button to specify the time interval during which the alarm definition is active. Only the time profile you have defined under the Rules and Events node are displayed in the list. If none are defined, only the Always option is available.
Event based	If you want the alarm to be based on an event, select this radio button. Once selected, specify the start and stop event. You can select hardware events defined on cameras, video servers and input (see "Events overview" on page 175). Also global/manual event definitions can be used (see "User-defined events (explained)" on page 193).

Operator action required:

Name	Description
Time limit	Select a time limit for when operator action is required. The default value is 1 minute. The time limit is not active before you have attached an event in the Events triggered drop-down menu.
Events triggered	Select which event to trigger when the time limit has passed.

Additional settings:

Name	Description
Related cameras	Select up to 15 cameras to include in the alarm definition, even if these cameras themselves do not trigger the alarm. This can be relevant, for example, if you have selected an external event message (such as a door being opened) as the source of your alarm. By defining one or more cameras near the door, you can attach the cameras' recordings of the incident to the alarm.
Related map	Assign a map to the alarm when it is listed in the XProtect Smart Client's Alarm Manager .
Initial alarm owner	Select a default user responsible for the alarm.
Initial alarm priority	Select a priority (High , Medium , Low or none) for the alarm. Use these priorities in XProtect Smart Client to determine the importance of an alarm.
Initial alarm category	Select an alarm category for the alarm, for example False alarm or Need investigation .
Events triggered by alarm	Define an event that the alarm can trigger in XProtect Smart Client.
Auto-close alarm	If you want a particular event to automatically stop the alarm, select this check box. Not all events can trigger alarms. Clear the check box to disable the new alarm from the beginning.

See also

Add an alarm (on page 246)

Alarm Data Settings

When you configure alarm data settings, specify the following:

Alarm Data Levels tab**Priorities**

Name	Description
Level	Add new priorities with level numbers of your choosing or use/edit the default priority levels (numbers 1, 2 or 3). These priority levels are used to configure the Initial alarm priority setting.
Name	Type a name for the entity. You can create as many as you like.
Sound	Select the sound to be associated with the alarm. Use one if the default sounds or add more in Sound Settings .

States

Name	Description
Level	In addition to the default state levels (numbers 1 , 4 , 9 and 11 , which cannot be edited or reused), add new states with level numbers of your choosing. These state levels are only visible in the XProtect Smart Client's <i>Alarm List</i> .

Categories

Name	Description
Level	Add new categories with level numbers of your choosing. These category levels are used to configure the Initial alarm category setting.
Name	Type a name for the entity. You can create as many as you like.

Alarm List Configuration tab

Name	Description
Available columns	Use > to select which columns should be available in the XProtect Smart Client's <i>Alarm List</i> . Use < to clear selection. When done, Selected columns should contain the items to be included.

Reasons for Closing tab

Name	Description
Enable	Select to enable that all alarms must be assigned a reason for closing before they can be closed.
Reason	Add reasons for closing that the user can choose between when closing alarms. Examples could be <i>Solved-Trespasser</i> or <i>False Alarm</i> . You can create as many as you like.

Sound Settings

When you configure sound settings, specify the following:

Name	Description
Sounds	<p>Select the sound to associate with the alarm. The list of sounds contains a number of default Windows sounds. You cannot edit these. However, you can add new sounds of the file type .wav, but only if these are encoded in Pulse Code Modulation (PCM).</p> <p>Even if the default sounds are standard Windows sound-files, local Windows settings might cause these to sound different on different machines. Some users might also have deleted one or more of these sound-files and can therefore not play them. To ensure an identical sound all over, you should import and use your own .wav files encoded in PCM.</p>

Name	Description
Add	Add sounds. Browse to the sound to upload one or several .wav files.
Remove	Remove a selected sound from the list of manually added sounds. Default sounds cannot be removed.
Test	Test the sound. In the list, select the sound. The sound plays once.

Options dialog box

In the **Options** dialog box, you can specify a number of settings related to the general appearance and functionality of the system.

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

To access the dialog box, select **Tools > Options**.

The **Options** dialog box features the following tabs:

- General tab (see "General tab (options)" on page 252)
- Server Logs tab (see "Server Logs tab (options)" on page 254)
- Mail Server tab (see "Mail Server tab (options)" on page 255)

- AVI Generation tab (see "AVI Generation tab (options)" on page 255)
- Network tab (see "Network tab (options)" on page 256)
- Bookmark tab (see "Bookmark tab (options)" on page 256)
- User Settings tab (see "User Settings tab (options)" on page 256)
- Evidence Lock tab (see "Evidence Lock tab (options)" on page 257)
- Audio messages tab (see "Audio messages tab (options)" on page 257)
- Access Control Settings tab (see "Access Control Settings tab (options)" on page 258)
- Analytics Events tab (see "Analytics Events tab (options)" on page 258)
- Alarms and Events tab (see "Alarms and Events tab (options)" on page 259)
- Generic Events tab (see "Generic Events tab (options)" on page 260)

General tab (options)

On the General tab, you can specify general settings for the Management Client and the recording server.

Management Client

Name	Description
Number of log rows per page	Select how many rows a single log page can contain. The default value is 50 rows. If a log contains more rows, it displays the next rows on the following pages.
Default preview frame rate	<p>Select frame rate for the thumbnail camera images displayed in the Preview pane. Default is 1 frame per second.</p> <p>Select Action > Refresh from the menu for the change to take effect.</p> <p>Note that a high frame rate in combination with a large number of thumbnail images in the Preview pane slows down the computer that runs the Management Client. You can limit the number of thumbnail images with the Max number of previews setting.</p>
Max number of previews	<p>Select the maximum number of thumbnail images displayed in the Preview pane. Default is 64 thumbnail images.</p> <p>Select Action > Refresh from the menu for the change to take effect.</p> <p>Note that a large number of thumbnail images in combination with a high frame rate may slow the system down. You can limit the frame rate used for the thumbnail images with the Default preview frame rate setting.</p>

Name	Description
When adding new camera devices automatically enable: Motion detection	<p>Select the check box to enable motion detection on new cameras, when you add them to the system with the Add Hardware wizard.</p> <p>This setting does not affect motion detection settings on existing cameras.</p> <p>You enable and disable motion detection for a camera on the Motion tab for the camera device.</p>
When adding new camera devices automatically enable: Generate motion data for smart search	<p>Generation of motion data for smart search requires that motion detection is enabled for the camera.</p> <p>Select the check box to enable generation of smart search motion data on new cameras, when you add them to the system with the Add Hardware wizard.</p> <p>This setting does not affect motion detection settings on existing cameras.</p> <p>You enable and disable the generation of smart search motion data for a camera on the Motion tab for the camera device.</p>
When adding new camera devices automatically enable: Multicast	<p>Select the check box to enable multicast on new cameras when you add them with the Add Hardware wizard.</p> <p>This setting does not affect multicast settings on existing cameras.</p> <p>You enable and disable live multicasting for a camera on the Client tab for the camera device.</p>
Language	<p>Select the language of the Management Client.</p> <p>Restart the Management Client to use the new language.</p>

Recording server

Name	Description
Timeout for manual PTZ sessions	<p>Client users with the necessary user rights can manually interrupt the patrolling of PTZ cameras. Select how much time should pass before regular patrolling is resumed after a manual interruption. The setting applies for all PTZ cameras on your system. Default setting is 15 seconds.</p> <p>If you want individual timeouts on the cameras, you specify this on the Presets tab for the camera.</p>
Timeout for pause patrolling sessions	<p>Client users with a sufficient PTZ priority can pause patrolling on PTZ cameras. Select how much time should pass before regular patrolling is resumed after a pause. The setting applies for all PTZ cameras on your system. Default setting is 10 minutes.</p> <p>If you want individual timeouts on the cameras, you specify this on the Presets tab for the camera.</p>

Name	Description
Timeout for reserved PTZ sessions	<p>Set the default timeout period for reserved PTZ sessions. When a user runs a reserved PTZ session, the PTZ camera cannot be used by others before it is released either manually or when the period has timed out. Default setting is 1 hour.</p> <p>If you want individual timeouts on the cameras, you specify this on the Presets tab for the camera.</p>
Ignore device communication errors if communication reestablished before	<p>Select for how long a communication error may exist before the system logs it as an error and triggers the Communication Error event.</p>

Server Logs tab (options)

On the **Server Logs** tab, you can specify settings for the system's management server logs.

See also Logs (explained) (on page 241) for more information.

Name	Description
Logs	<p>Select the log that you want to configure:</p> <ul style="list-style-type: none"> • System Log • Audit Log • Rule Log
Settings	<p>Disable/enable the logs and specify the retention period and the maximum number of rows for each log.</p> <p>For System logs, specify the level of messages you want to log:</p> <ul style="list-style-type: none"> • All - includes undefined messages • Information, warnings and errors • Warnings and errors • Errors (default setting) <p>For Audit logs, enable user access logging if you want the system to log all user actions in XProtect Smart Client. These are, for example, exports, activating outputs, viewing cameras live or in playback.</p> <p>Specify:</p> <ul style="list-style-type: none"> • the length of a playback sequence. This means that as long as the user plays back within this period, the system only generates one log entry. When playing back outside the period, the system creates a new log entry. • the number of records (frames) a user has seen before the system creates a log entry.

Mail Server tab (options)

On the **Mail Server** tab, you can specify the settings for your system's outgoing SMTP mail server. See also Notification profiles (explained) (on page 190).

Name	Description
Sender e-mail address	Type the e-mail address you want to appear as the sender of e-mail notifications for all notification profiles. Example: sender@organization.org.
Outgoing mail (SMTP) server name	Type the name of the SMTP mail server that sends e-mail notifications. Example: mailserver.organization.org.
Server requires login	Specify a user name and password for the users to log into the mail server.

AVI Generation tab (options)

On the **AVI Generation** tab, you can specify compression settings for the generation of AVI video clip files. The settings are required if you want to include AVI files in e-mail notifications sent by rule-triggered notification profiles.

See also Use rules to trigger email notifications (on page 191).

Name	Description
Compressor	Select the codec (compression/decompression technology) that you want to apply. To have more codecs available in the list, install them on the management server. Not all cameras support all codecs.
Compression quality	(Not available for all codecs). Use the slider to select the degree of compression (0-100) to be performed by the codec. 0 means no compression, generally resulting in high image quality and large file size. 100 means maximum compression, generally resulting in low image quality and small file size. If the slider is not available, the compression quality is determined entirely by the selected codec.
Keyframe every	(Not available for all codecs). If you want to use keyframes, select the check box and specify the required number of frames between keyframes. A keyframe is a single frame stored at specified intervals. The keyframe contains the entire view of the camera, whereas the following frames contain only the pixels that change. This helps greatly reduce the size of files. If the check box is not available, or not selected, every frame contains the entire view of the camera.

Name	Description
Data rate	<p>(Not available for all codecs). If you want to use a particular data rate, select the check box and specify the number of kilobytes per second.</p> <p>The data rate specifies the size of the attached AVI file.</p> <p>If the check box is not available, or not selected, the data rate is determined by the selected codec.</p>

Network tab (options)

On the **Network** tab, you can specify the IP addresses of the local clients, if the clients are to connect to the recording server via the Internet. The surveillance system then recognizes them as coming from the local network.

You can also specify the IP version of the system: IPv4 or IPv6. Default value is IPv4.

Bookmark tab (options)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

On the **Bookmarks** tab, you can specify settings for bookmarks, their IDs and function in XProtect Smart Client.

Name	Description
Bookmark ID prefix	Specify a prefix for all the bookmarks that is made by the users of XProtect Smart Client.
Default bookmark time	<p>Specify the default start and end time of a bookmark is set in XProtect Smart Client.</p> <p>This setting needs to be aligned with:</p> <ul style="list-style-type: none"> • The default bookmark rule, see Default record on bookmark rule. • The pre-buffer period for each camera, see Manage pre-buffering (on page 128).

To specify the bookmark rights of a role, see Device rights (see "Device tab (roles)" on page 223).

User Settings tab (options)

On the **User Settings** tab, you can specify user preference settings, for example, if a message should be shown when remote recording is enabled.

Customer Dashboard tab (options)

On the **Customer Dashboard** tab, you can enable or disable Milestone Customer Dashboard.

Customer Dashboard is an online monitoring service that provides a graphical overview of the current status of your system, including possible technical issues such as camera failures, to

system administrators or other people that have been given access to information about your system installation.

You can select or clear the check box to change your Customer Dashboard settings at any time.

Evidence Lock tab (options)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

On the **Evidence Lock** tab, you define and edit evidence lock profiles and the duration your client users can select to keep the data protected.

Name	Description
Evidence lock profiles	A list with defined evidence lock profiles. You can add and remove existing evidence lock profiles. You cannot remove the default evidence lock profile but you can change its time options and its name.
Lock time options	The duration the client users can select to lock evidence. Available time options are hour(s), day(s), week(s), month(s), year(s), indefinite or user-defined.

To specify the evidence lock access rights of a role, see the Device tab (see "Device tab (roles)" on page 223) for role settings.

Audio messages tab (options)

On the **Audio messages** tab, you can upload files with audio messages that are used for broadcasting messages, triggered by rules.

The maximum number of uploaded files is 50 and the maximum size allowed for each file is 1 MB.

Name	Description
Name	Provides the name of a message. You enter the name when you add a message. To upload a message to the system, click Add .
Description	Provides a description of the message. You enter the description when you add a message. You can use the description field to describe the purpose or the actual message.
Add	Lets you upload audio messages to the system. Supported formats are standard Windows audio file formats (.wav, .wma, and .flac)
Edit	Lets you modify the name and description, or you can replace the actual file.
Remove	Delete the audio message from the list.
Play	Click this button to listen to the audio message from the computer that runs the Management Client.

To create a rule that triggers playback of audio messages, see [Add a rule](#) (on page 184).

To learn more about actions in general that you can use in rules, see [Actions and stop actions \(explained\)](#) (on page 167).

Access Control Settings tab (options)

The use of XProtect Access requires that you have purchased a base license that allows you to access this feature.

Name	Description
Show development property panel	<p>If selected, additional developer information appears for Access Control > General Settings.</p> <p>This setting is only meant to be used by developers of access control system integrations.</p>

Analytics Events tab (options)

On the **Analytics Events** tab, you can enable and specify the analytics events feature.

Name	Description
Enable	Specify if you want to use analytics events. As default, the feature is disabled.
Port	<p>Specify the port used by this feature. The default port is 9090.</p> <p>Make sure that relevant VCA tool providers also use this port number. If you change the port number, remember to change the port number of the providers.</p>
All network addresses or Specified network addresses	Specify if events from all IP addresses/hostnames are allowed, or only events from IP addresses/hostnames that are specified in the Address list (see below).
Address list	<p>Specify a list of trusted IP addresses/hostnames. The list filters incoming data so that only events from certain IP addresses/hostnames are allowed. You can use both Domain Name System (DNS), IPv4 and IPv6 address formats.</p> <p>You can add addresses to your list by manually entering each IP address or hostname, or by importing an external list of addresses.</p> <ul style="list-style-type: none"> • Manual entering: Type the IP address/hostname in the address list. Repeat for each required address. • Import: Click Import to browse for the external list of addresses. The external list must be a .txt file and each IP address or hostname must be on a separate line.

Alarms and Events tab (options)

On the **Alarms and Events** tab, you can specify settings for alarms, events and logs (see "Limit size of database" on page 61).

Name	Description
Keep closed alarms for	<p>Specify the number of days for storing alarms with the state Closed in the database. If you set the value to 0, the alarm is deleted after it has been closed.</p> <p>Alarms always have timestamps. If the alarm is triggered by a camera, the timestamp has an image from the time of the alarm. The alarm information itself is stored on the event server, while the video recordings corresponding to the attached image are stored on the relevant surveillance system server.</p> <p>To be able to see the images of your alarms, keep video recordings for at least as long as you intend to keep alarms on the event server.</p>
Keep all other alarms for	<p>Specify the number of days for storing alarms with the state New, In progress, or On hold. If you set the value to 0, the alarm appears in the system, but will not be stored.</p> <p>Alarms always have timestamps. If the alarm is triggered by a camera, the timestamp has an image from the time of the alarm. The alarm information itself is stored on the event server, while the video recordings corresponding to the attached image are stored on the relevant surveillance system server.</p> <p>To be able to see the images of your alarms, keep video recordings for at least as long as you intend to keep alarms on the event server.</p>
Keep logs for	<p>Specify the number of days for keeping the event server logs. If you keep the logs for longer periods of time, ensure that the machine where the event server is installed has enough disk space.</p>
Enable verbose logging	<p>To keep a more detailed log for event server communication, select the check box. It will be stored for the number of days specified in the Keep logs for field.</p>
Event types	<p>Specify the number of days for storing events in the database. There are two ways of doing this:</p> <ul style="list-style-type: none"> You can specify the retention time for an entire event group. Event types with the value Follow group will inherit the value of the event group. Even if you set a value for an event group, you can specify the retention time for individual event types. <p>If the value is 0, the events will not be stored in the database.</p> <p>The external events (user-defined events, generic events, and input events) are set to 0 by default, and you cannot change that value. The reason is that these types of events occur so frequently that storing them in the database may cause performance issues.</p>

Generic Events tab (options)

On the **Generic Events** tab, you can specify generic events and data source related settings.

For more information about how to configure actual generic events, see Generic events (explained) (on page 198).

Name	Description
Data source	<p>You can choose between two default data sources and define a custom data source. What to choose depends on your third party program and/or the hard- or software you want to interface from:</p> <p>Compatible: Factory default settings are enabled, echoes all bytes, TCP and UDP, Ipv4 only, port 1234, no separator, local host only, current code page encoding (ANSI).</p> <p>International: Factory default settings are enabled, echoes statistics only, TCP only, Ipv4+6, port 1235, <CR><LF> as separator, local host only, UTF-8 encoding. (<CR><LF> = 13,10).</p> <p>[Data source A] [Data source B] and so on.</p>
New	Click to define a new data source.
Name	Name of the data source.
Enabled	Data sources are by default enabled. Clear the check box to disable the data source.
Reset	Click to reset all settings for the selected data source. The entered name in the Name field remains.
Port	The port number of the data source.
Protocol type selector	<p>Protocols which the system should listen for, and analyze, in order to detect generic events:</p> <p>Any: TCP as well as UDP.</p> <p>TCP: TCP only.</p> <p>UDP: UDP only.</p> <p>TCP and UDP packages used for generic events may contain special characters, such as @, #, +, ~, and more.</p>
IP type selector	Selectable IP address types: IPv4, IPv6 or both.
Separator bytes	Select the separator bytes used to separate individual generic event records. Default for data source type International (see Data sources earlier) is 13,10 . (13,10 = <CR><LF>).

Name	Description
Echo type selector	<p>Available echo return formats:</p> <ul style="list-style-type: none"> • Echo statistics: Echoes the following format: [X],[Y],[Z],[Name of generic event] [X] = request number. [Y] = number of characters. [Z] = number of matches with a generic event. [Name of generic event] = name entered in the Name: field. • Echo all bytes: Echoes all bytes. • No echo: Suppresses all echoing.
Encoding type selector	By default, the list only shows the most relevant options. Select the Show all check box to display all available encodings.
Allowed external IPv4 addresses	Specify the IP addresses, that the management server must be able to communicate with in order to manage external events. You can also use this to exclude IP addresses that you do not want data from.
Allowed external IPv6 addresses	Specify the IP addresses, that the management server must be able to communicate with in order to manage external events. You can also use this to exclude IP addresses that you do not want data from.

Feature configuration

Failover management servers

Multiple management servers (clustering) (explained)

The management server can be installed on multiple servers within a cluster of servers. This ensures that the system has very little down-time. If a server in the cluster fails, another server in the cluster automatically takes over the failed server's job running the management server. The automatic process of switching over the server service to run on another server in the cluster only takes a very short time (up to 30 seconds).

It is only possible to have one active management server per surveillance setup, but other management servers may be set up to take over in case of failure.

The allowed number of failovers is limited to two within a six-hour period. If exceeded, Management Server services are not automatically started by the clustering service. The number of allowed failovers can be changed to better fit your needs.

Requirements for clustering

- Two or more servers installed in a cluster:
 - Regarding clusters in Microsoft Windows 2012®, see Failover clusters [https://technet.microsoft.com/en-us/library/dn505754\(v=ws.11\).aspx](https://technet.microsoft.com/en-us/library/dn505754(v=ws.11).aspx).
- **Either** an external SQL database installed **outside** the server cluster **or** an **internal** SQL (clustered) service within the server cluster (creating an internal SQL service requires the use of SQL Server Standard or a greater version which is capable of working as a clustered SQL Server).
- A Microsoft® Windows® Server (Enterprise or Data Center edition).

Install in a cluster

Descriptions and illustrations might differ from what you see on your screen.

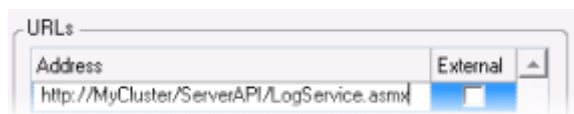
Installation and change of URL address:

1. Install the management server and all its subcomponents on the first server in the cluster.

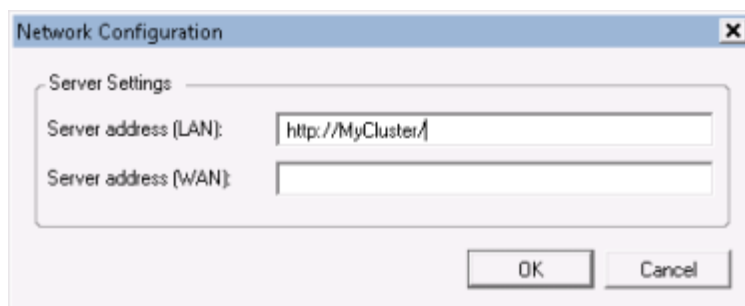
The management server must be installed with a specific user and not as a **network service**. This requires that you use the **Custom** install option. Also, the specific user must have access to the shared network drive and preferably a non-expiry password.

2. After you have installed the management server and the Management Client on the first server in the cluster, open the Management Client, and from the **Tools** menu, select **Registered Services**.
 - a) In the **Add/Remove Registered Services** window, select **Log Service** in the list, click **Edit**.

- b) In the **Edit Registered Service** window, change the URL address of the log service to the URL address of the cluster.



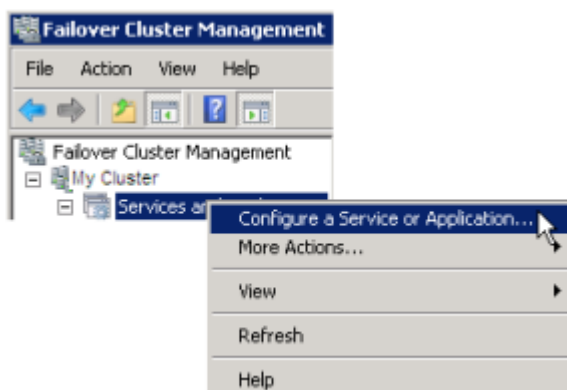
- c) Repeat steps a and b for all services listed in the **Add/Remove Registered Services** window. Click **Network**.
- d) In the **Network Configuration** window, change the URL address of the server to the URL address of the cluster. (This step only applies to the first server in the cluster.) Click **OK**.



3. In the **Add/Remove Registered Services** window, click **Close**. Exit the Management Client.
4. Stop the management server service and the IIS. Read about how to stop the IIS at Microsoft's® homepage ([http://technet.microsoft.com/en-us/library/cc732317\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc732317(WS.10).aspx)).
5. Repeat steps 1-4 for all subsequent servers in the cluster, this time pointing to the existing SQL database. However, for the **last** server in the cluster on which you install the management server, do not stop the Management Server service.

Next, in order to take effect, the Management Server service must be configured as a generic service in the failover cluster:

1. On the last server on which you have installed the management server, go to **Start > Administrative Tools**, open Windows' **Failover Cluster Management**. In the **Failover Cluster Management** window, expand your cluster, right-click **Services and Applications**, and select **Configure a Service or Application...**



2. In the **High Availability** dialog box click **Next**, select **Generic Service** and click **Next**. Do not specify anything on the third page of the dialog box, click **Next**.
3. Select the **Milestone XProtect Management Server** service, click **Next**. Specify the name (host name of the cluster) that clients use when accessing the service, click **Next**.
4. No storage is required for the service, click **Next**. No registry settings should be replicated, click **Next**. Verify that the cluster service is configured according to your needs, click **Next**. The management server is now configured as a generic service in the failover cluster. Click **Finish**.
5. In the cluster setup, the event server and the Data Collector should be set as a dependent service of the management server, so the event server stops when the management server is stopped.
6. To add the **Milestone XProtect Event Server** service as a resource to the **Milestone XProtect Management Server Cluster** service, right-click the cluster service and click **Add a resource > 4 - Generic Service** and select **Milestone XProtect Event Server**.

Upgrade in a cluster

Make sure to have a backup of the database before updating the cluster.

1. Stop the Management Server services on all management servers in the cluster.
2. Uninstall the management server on all servers in the cluster.
3. Use the procedure for installing multiple management servers in a cluster as described for install in a cluster, see Install in a cluster (on page 262).

Important: When installing, make sure to reuse the existing SQL configuration database (which is automatically upgraded from the old existing database version to the new one).

Remote connect services

Remote connect services (explained)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

The remote connect services feature contains the Axis One-click Camera Connection technology developed by Axis Communications. It enables the system to retrieve video (and audio) from external cameras where firewalls and/or router network configuration normally prevents initiating connections to such cameras. The actual communication takes place via secure tunnel servers (ST servers). ST servers use VPN. Only devices that hold a valid key work within a VPN. This offers a secure tunnel where public networks can exchange data in a safe way.

Remote connect services allows you to:

- Edit credentials within the Axis Dispatch Service
- Add, edit, and remove ST servers
- Register/unregister and edit Axis One-click cameras
- Go to the hardware related to the Axis One-Click camera.

Before you can use Axis One-click Camera Connection, you must first install a suitable ST server environment. To work with secure tunnel server (ST server) environments and Axis One-click cameras, you must first contact your system provider to obtain the needed user name and password for Axis Dispatch Services.

Install STS environment for One-click camera connection

Requirements

- Contact your system provider to obtain the needed user name and password for Axis Dispatch Services.
 - Make sure your camera(s) support Axis Video Hosting System. Go to the Axis website to see supported devices (<http://axis-avhs.com/supported-devices/>).
 - If needed, update your Axis cameras with the newest firmware. Go to the Axis website to download firmware (<http://www.axis.com/techsup/firmware.php>).
1. On each camera's homepage, go to **Basic Setup, TCP/IP**, and select **Enable AVHS and Always**.
 2. From your management server's download web page (controlled by the Download Manager), install the **Axis One-Click Connection Component** to setup a suitable Axis secure tunnel framework.

Add/edit STSs

1. Do one of the following:
 - a) To add an ST server, right-click the **Axis Secure Tunnel Servers** top node, select **Add Axis Secure Tunnel Server**.
 - b) To edit an ST server, right-click it, select **Edit Axis Secure Tunnel Server**.
2. In the window that opens, fill in the relevant information.
3. If you chose to use credentials when you installed the **Axis One-Click Connection Component**, select the **Use credentials** check box and fill in the same user name and password as used for the **Axis One-Click Connection Component**.
4. Click **OK**.

Register new Axis One-click camera

1. To register a camera under an ST server, right-click it and select **Register Axis One-click Camera**.
2. In the window that opens, fill in the relevant information.
3. Click **OK**.
4. The camera now appears under the relevant ST server.

The camera can have the following color coding:

Color	Description
Red	Initial state. Registered, but not connected to the ST server.
Yellow	Registered. Connected to the ST server, but not added as hardware.
Green	Added as hardware. May or may not be connected to the ST server.

When you add a new camera, its status is always green. The connection status is reflected by **Devices on Recording Servers** in the **Overview** pane. In the **Overview** pane, you may group your cameras for an easier overview. If you choose **not** to register your camera at the Axis dispatch service at this point, you can do so later from the right-click menu (select **Edit Axis One-click Camera**).

Axis One-Click Camera connection properties

Name	Description
Camera password	Enter/edit. Provided with your camera at purchase. For further details, see your camera's manual or go to the Axis website (http://www.axis.com).
Camera user	See details for Camera password .
Description	Enter/edit a description for the camera.
External address	Enter/edit the http address of the ST server to which the camera(s) connect.
Internal address	Enter/edit the http address of the ST server to which the recording server connects.
Name	If needed, edit the name of the item.
Owner authentication key	See Camera password .
Passwords (for Dispatch Server)	Enter password. Must be identical to the one received from your system provider.
Passwords (for ST server)	Enter password. Must be identical to the one entered when the Axis One-Click Connection Component was installed.
Register/Unregister at the Axis Dispatch Service	Indicate whether you wish to register your Axis camera with the Axis dispatch service. Can be done at time of setup or later.
Serial number	Hardware serial number as specified by the manufacturer. The serial number is often, but not always, identical to the MAC address.
Use credentials	Select the check box if you decided to use credentials during the installation of the ST server.
User name (for Dispatch Server)	Enter a user name. The user name must be identical to the one received from your system provider.
User name (for ST server)	Enter user name. Must be identical to the one entered when the Axis One-Click Connection Component was installed.

Milestone Federated Architecture

Selecting Milestone Interconnect or Milestone Federated Architecture (explained)

In a physically distributed system where users on the central site need to access the video on the remote site, you can choose between Milestone Interconnect™ or Milestone Federated Architecture™.

Milestone recommends Milestone Federated Architecture when:

- The network connection between the central and federated sites is stable.
- The network uses the same domain.
- There are fewer larger sites.
- The bandwidth is sufficient for the required use.

Milestone recommends Milestone Interconnect when:

- The network connection between the central and remote sites is unstable.
- You or your organization want to use another XProtect product on the remote sites.
- The network uses different domains or workgroups.
- There are many smaller sites.

Milestone Federated Architecture (explained)

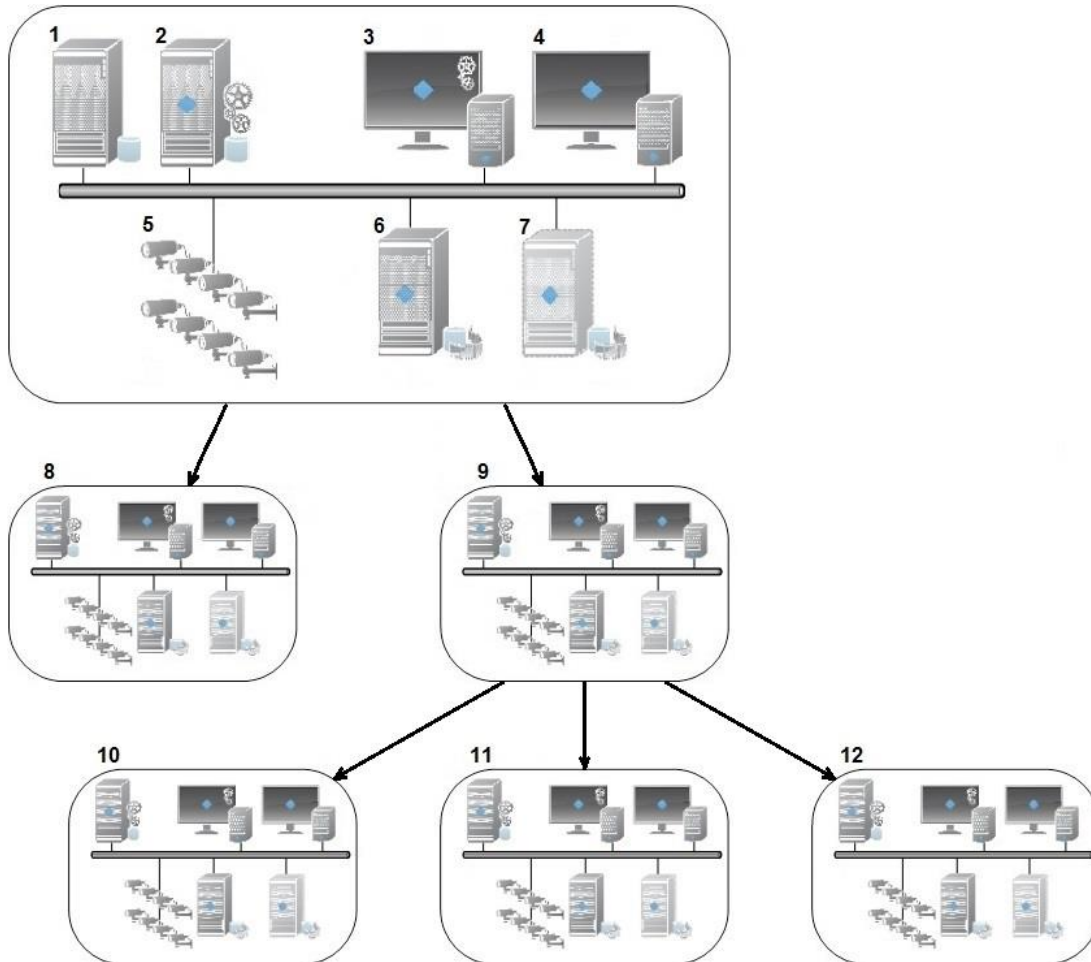
Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

Milestone Federated Architecture links multiple individual standard systems into a federated site hierarchy of parent/child sites. Client users with sufficient rights have seamless access to video, audio and other resources across individual sites. Administrators can centrally manage all sites within the federated hierarchy, based on administrator rights for the individual sites.

Basic users are not supported in Milestone Federated Architecture systems, so you must add users as Windows users through the Active Directory service.

Important: From the Management Client, you can centrally manage federated sites that run older versions of the product after patching the servers (see "Patch servers on older versions" on page 272). The supported versions are XProtect Corporate 2014 and XProtect Expert 2014 or newer.

Milestone Federated Architecture is set up with one central site (top site) and an unrestricted number of federated sites (see "Set up your system to run federated sites" on page 270). When you are logged into a site, you can access information about all of its child sites and the child sites' child sites. The link between two sites is established, when you request the link from the parent site (see "Add site to hierarchy" on page 273). A child site can only be linked to one parent site. If you are not the administrator of the child site when you add it to the federated site hierarchy, the request must be accepted by the child site administrator.



The components of a Milestone Federated Architecture setup:

1. SQL server
2. Management server
3. Management Client
4. XProtect Smart Client
5. Cameras
6. Recording server
7. Failover recording server
8. to 12. Federated sites

Hierarchy synchronization

A parent site contains an updated list of all its currently attached child sites, child sites' child sites and so on. The federated site hierarchy has a scheduled synchronization between sites, as well as management-triggered synchronization every time a site is added or removed. When the system synchronizes the hierarchy, it takes place level by level, each level forwarding and returning communication, until it reaches the server that requests the information. The system sends less than 1MB each time. Depending on the number of levels, changes to a hierarchy can take some time to become visible in the Management Client. You cannot schedule your own synchronizations.

Data traffic

The system sends communication or configuration data when a user or administrator views live or recorded video or configures a site. The amount of data depends on what and how much is being viewed or configured.

Milestone Federated Architecture with other products

- If the central site uses XProtect Smart Wall, you can also use the Smart Wall features in the federated site hierarchy. See Configure Smart Walls (on page 291) on how set up a Smart Wall.
- If the central site uses XProtect Access and an XProtect Smart Client user logs into a site in a federated site hierarchy, access request notifications from the federated sites also appear in XProtect Smart Client.
- You can add XProtect Expert 2013 systems or newer to the federated site hierarchy as child sites, not as parent sites.
- Milestone Federated Architecture does not require additional licenses.
- For more information about use cases and benefits, see the white paper about the Milestone Federated Architecture technology on the Milestone website.
- For integrating XProtect Professional VMS 7.0 and up into your system, see XProtect Professional VMS servers (explained) (on page 401).

Establishing a federated site hierarchy

Before you start building up the hierarchy in the Management Client, Milestone recommends that you map how you want your sites to link together.

You install and configure each site in a federated hierarchy as a normal standalone system with standard system components, settings, rules, schedules, administrators, users, and user rights. If you already have the sites installed and configured and only need to combine them in a federated site hierarchy, your systems are ready to be set up.

Once the individual sites are installed, you must set them up to run as federated sites (see "Set up your system to run federated sites" on page 270).

To start the hierarchy, you can log into the site that you want to work as the central site and add (see "Add site to hierarchy" on page 273) the first federated site. When the link is established, the two sites automatically create a federated site hierarchy in the **Federated Site Hierarchy** pane in the Management Client to which you can add more sites to grow the federated hierarchy.

When you have created a federated site hierarchy, users and administrators can log into a site to access that site and any federated sites it may have. Access to federated sites depend on the user rights.

There is no limit to the number of sites you can add to the federated hierarchy. Also, you can have a site on an older product version linked to a newer version and vice versa. The version numbers appear automatically and cannot be deleted. The site that you are logged into is always at the top of the **Federated Site Hierarchy** pane and is called home site.



Example of federated sites in the Management Client.

To the left: Logged into the top site.

To the right: Logged into one of the child sites. In this example, the Paris Server, which is then the home site.

Status icons in Milestone Federated Architecture

The icons represent the possible states of a site:

Description	Icon
The top site in the entire hierarchy is operational.	
The top site in the entire hierarchy is still operational, but one or more issues need attention. Shown on top of the top site icon.	
The site is operational.	
The site is awaiting to be accepted in the hierarchy.	
The site is attaching, but is not yet operational.	

Set up your system to run federated sites

To prepare your system for Milestone Federated Architecture, you must make certain choices when you install the management server. Depending on how your IT infrastructure is set up, choose between three different alternatives.

Alternative 1: Connect sites from the same domain (with a common domain user)

Before you install the management server, you must create a common domain user and configure this user as the administrator on all servers involved in the federated site hierarchy.

Custom installation

1. Start the installation of the product on the server to be used as the management server and select **Custom**.
2. Select to install the Management Server service using a user account. The selected user account must be the administrator account used on all management servers. You must use

the same user account when you install the other management servers in the federated site hierarchy.

3. Finish the installation. Repeat steps 1-3 to install any other systems you want to add to the federated site hierarchy.
4. If your federated site hierarchy contains sites with different product versions, continue with Patch federated sites on older versions (see "Patch servers on older versions" on page 272). If all sites run on the same version, continue with Add site to hierarchy (on page 273).

Single Computer or Distributed Installation - set up network service on all servers

1. Start the installation of the product on the first server to be used as the management server and select **Single Computer** or **Distributed**. This installs the management server using a network service account. Repeat this step for all the sites in your federated site hierarchy.
2. Log into the site that you want as your central site in the federated site hierarchy.
3. In the Management Client, expand **Security > Roles > Administrators**.
4. On the **Users and Groups** tab, click **Add** and select **Windows User**.
5. In the dialog box, select **Computers** as object type, type the server name of the federated site and click **OK** to add the server to the **Administrator** role of the central site. Repeat this step until you have added all the federated sites in this way and exit the application.
6. Log into each federated site, and add the following servers to the **Administrator** role, in the same way as above:
 - The parent site server.
 - The child site servers that you want to connect directly to this federated site.
7. If your federated site hierarchy contains sites with different product versions, continue with Patch federated sites on older versions (see "Patch servers on older versions" on page 272). If all sites run on the same version, continue with Add site to hierarchy (on page 273).

Alternative 2: Connecting sites from different domains

To connect to sites across domains, make sure that the domains trust each other. You set up domains to trust each other in the Microsoft Windows Domain configuration. When you have established trust between the different domains on each site in the federated site hierarchy, follow the same description as described in Alternative 1. For more information about how to set up trusted domains, see the Microsoft website (<http://technet.microsoft.com/en-us/library/cc961481.aspx>).

Milestone recommends Milestone Interconnect for creating connected multi-site systems with multiple domains.

Alternative 3: Connect sites in workgroup(s)

When you connect sites inside workgroups, the same administrator account must be present on all servers you want connected in the federated site hierarchy. You must define the administrator account before you install the system.

1. Log into **Windows** using a common administrator account.
2. Start the installation of the product and click **Custom**.
3. Select to install the Management Server service using the common administrator account.

4. Finish the installation. Repeat steps 1-4 to install any other systems you want to connect. You must install all of these systems using the common administrator account.
5. If your federated site hierarchy consists of sites on different product versions, continue with Patch federated sites on older versions (see "Patch servers on older versions" on page 272). If all sites run on the same version, continue with Add site to hierarchy (on page 273).

Milestone recommends Milestone Interconnect for creating connected multi-site systems when the sites are not part of a domain.

You cannot mix domain(s) and workgroup(s). This means that you cannot connect sites from a domain to sites from a workgroup and vice versa.

Patch servers on older versions

To add and manage sites that run older versions of the product, you must replace some files in the management server folder on the servers that run older versions. The patch files are included in the XProtect Corporate 2017 R3 installation. The default path to the patch files is:

```
...\Program Files\Milestone\XProtect Management Client\[older version folder]\ServerPatch
```

The table links the supported product versions with the relevant folders. You may have newer versions in your system:

Product	Software Version	Older version folder
XProtect Corporate 2014	7.0a	MC701
XProtect Corporate 2014 SP1	7.0b	MC702
XProtect Corporate 2014 SP2	7.0c	MC703
XProtect Corporate 2014 SP3	7.0d	MC704

Requirement: Before you start patching, you must know the software versions of the sites.

Follow these steps to patch older versions:

1. Connect to the computer with the Management Client 2017 R3 installed.
2. Open a file explorer and copy the files in the folder:
...\Program Files\Milestone\XProtect Management Client\[older version folder]\ServerPatch
to a location that you can access from the servers that run older versions.

The path to the server patch may be different in your system.

3. Connect to the management server of the older version of XProtect Corporate.
4. Open a file explorer and browse to the folder:\Program Files\Milestone\XProtect Management Server\IIS\ManagementServer\bin.
5. Replace the files in the folder with the patch files.
6. Repeat from step 2 for the remaining sites on older versions.


You are ready to configure the federated site hierarchy in the Management Client, see [Add site to hierarchy](#) (on page 273).


Help files in the Management Client are the files originally installed with the product, as they are not patched.

Add site to hierarchy


As you expand your system, you can add sites to your top site and to its child sites as long as the system is set up correctly.

1. Select the **Federated Site Hierarchy** pane.
2. Select the site to which you want to add a child site, right-click, and click **Add Site to Hierarchy**.
3. Enter the URL of the requested site in the **Add Site to Hierarchy** window and click **OK**.
4. The parent site sends a link request to the child site and after a while, a link between the two sites is added to the **Federated Site Hierarchy** pane.
5. If you can establish the link to the child site without requesting acceptance from the child site administrator, go to step 7.

If **not**, the child site has the awaiting acceptance  icon until the administrator of the child site has authorize the request.

6. Make sure that the administrator of the child site authorizes the link request from the parent site (see "Accept inclusion in the hierarchy" on page 273).
7. The new parent/child link is established and the **Federated Site Hierarchy** pane is updated with the  icon for the new child site.


Accept inclusion in the hierarchy

When a child site has received a link request from a potential parent site where the administrator did not have administrator rights to the child site, it has the awaiting acceptance  icon.

To accept a link request:

1. Log into the site.
2. In the **Federated Site Hierarchy** pane, right-click the site and click **Accept Inclusion in Hierarchy**.

If the site runs the XProtect Expert version, you right-click the site in the **Site Navigation** pane.

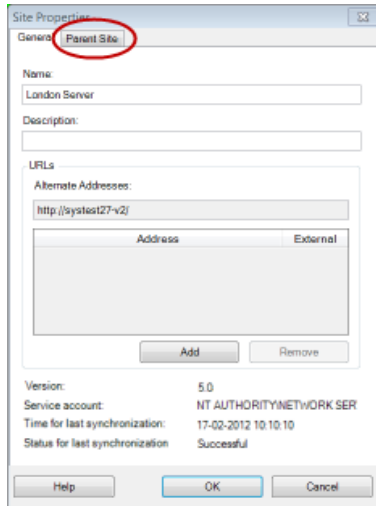
3. Click **Yes**.
4. The new parent/child link is established and the **Federated Site Hierarchy** pane is updated with the normal site  icon for the selected site.

Changes that you make to child sites located far from the parent site can take some time to be reflected in the **Federated Site Hierarchy** pane.

Set site properties

You can view and, possibly, edit properties on your home site and its child sites.

1. In the Management Client, in the **Federated Site Hierarchy** pane, select the relevant site, right-click, and select **Properties**.



2. If needed, change the following:

General tab (on page 275)

Parent Site tab (on page 276) (**available on child sites only**)

Due to synchronization issues, any changes made to remote children might take some time to be reflected in the **Site Navigation** pane.

Update site information

This section is only relevant if you use XProtect Corporate or XProtect Expert 2014 or newer.

You can read the information about the site, when you pause your mouse over the site name in the **Federated Site Hierarchy** pane. To update information about the site:

1. Log into the site.
2. Click **Site Navigation** pane and select **Site Information**.
3. Click **Edit** and add the relevant information in each category.

Refresh site hierarchy

Regularly the system automatically synchronizes the hierarchy through all levels of your parent/child setup. You can refresh it manually, if you want to see changes reflected instantly in the hierarchy, and do not want to wait for the next automatic synchronization.

You need to be logged into a site to perform a manual refresh. Only changes saved by this site since the last synchronization are reflected by a refresh. This means that changes made further down in the hierarchy might not be reflected by the manual update, if the changes have not reached the site yet.

1. Log into the relevant site.
2. Right-click the top site in the **Federated Site Hierarchy** pane and click **Refresh Site Hierarchy**.

This will take a few seconds.

Log into other sites in the hierarchy

You can log into other sites and administrate these. The site you are logged into is your home site.

1. In the **Federated Site Hierarchy** pane, right-click the site that you want to log into.
2. Click **Log into Site**.



The Management Client for that site opens.

3. Enter login information and click **OK**.
4. After login is complete, you are ready to do your administrative tasks for that site.

Detach a site from the hierarchy

When you detach a site from its parent site, the link between the sites are broken. You can detach sites from the central site, from the site itself or its' parent site.

1. In the **Federated Site Hierarchy** pane, right-click the site, and click **Detach Site from Hierarchy**.
2. Click **Yes** to update the **Federated Site Hierarchy** pane.

If the detached site has child sites, it becomes the new top site for this branch of the hierarchy, and the normal site icon  changes to a top site  icon.

3. Click **OK**.

The changes to the hierarchy are reflected after a manual refresh or an automatic synchronization.

Federated site properties

General tab

You can change some of the information related to the site that you are currently logged in to.

Name	Description
Name	Enter the name of the site.
Description	Enter a site description.
URLs	Use the list to add and remove URL(s) for this site and indicate if they are external and not. External addresses can be reached from outside the local network.
Version	The version number of the site's management server.

Name	Description
Service account	The service account under which the management server is running.
Time for last synchronization	Time and date of the last synchronization of the hierarchy.
Status for last synchronization	The status of the last synchronization of the hierarchy. It can be either Successful or Failed .

Parent Site tab

This tab shows information about the parent site of the site that you are currently logged in to. The tab is not visible if your site has no parent site.

Name	Description
Name	Shows the name of the parent site.
Description	Shows a description of the parent site (optional).
URLs	Lists URL(s) for the parent site and indicates if they are external or not. External addresses can be reached from outside the local network.
Version	The version number of the site's management server.
Service account	The service account under which the management server is running.
Time for last synchronization	Time and date of the last synchronization of the hierarchy.
Status for last synchronization	The status of the last synchronization of the hierarchy. It can be either Successful or Failed .

Milestone Interconnect

Selecting Milestone Interconnect or Milestone Federated Architecture (explained)

In a physically distributed system where users on the central site need to access the video on the remote site, you can choose between Milestone Interconnect™ or Milestone Federated Architecture™.

Milestone recommends Milestone Federated Architecture when:

- The network connection between the central and federated sites is stable.
- The network uses the same domain.
- There are fewer larger sites.
- The bandwidth is sufficient for the required use.

Milestone recommends Milestone Interconnect when:

- The network connection between the central and remote sites is unstable.
- You or your organization want to use another XProtect product on the remote sites.
- The network uses different domains or workgroups.
- There are many smaller sites.

Milestone Interconnect and licensing

To run Milestone Interconnect, you need Milestone Interconnect camera licenses on your central site to view video from hardware devices on remote sites. Note that only XProtect Corporate can act as a central site.

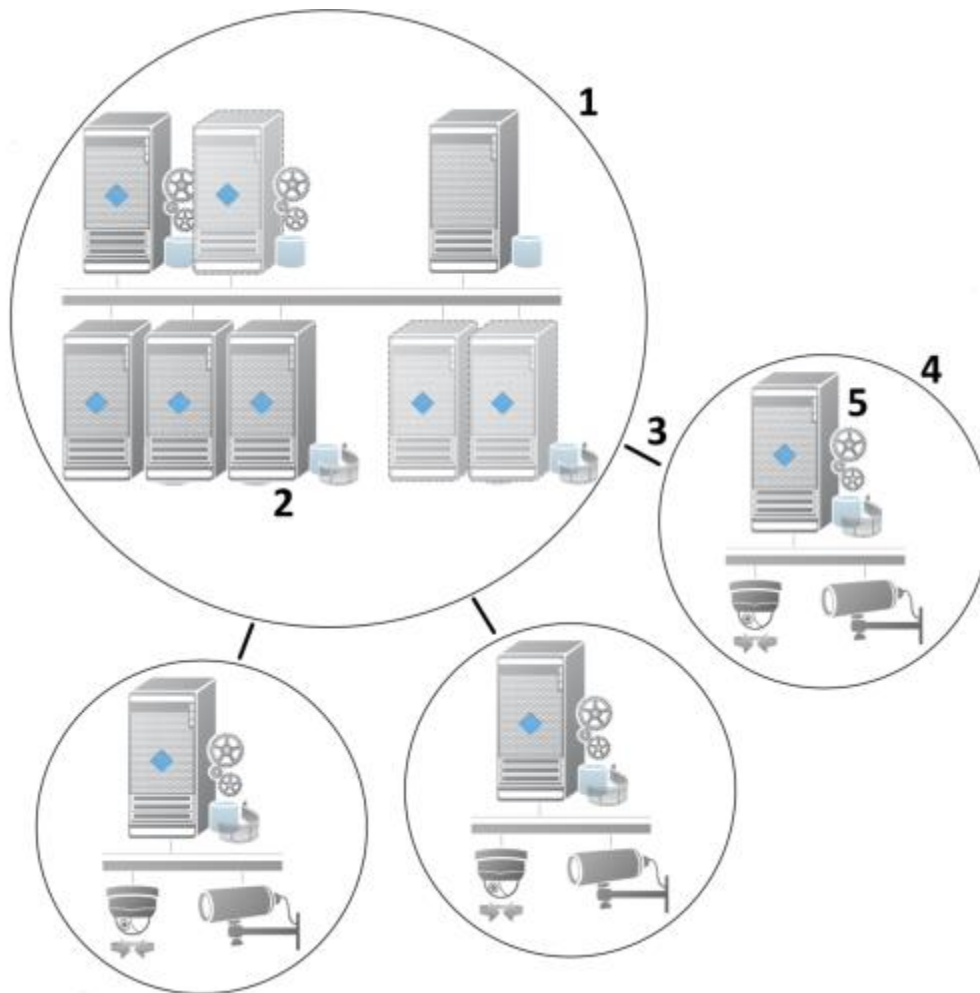
The status of your Milestone Interconnect camera licenses are listed on the **License Information** page of the central site.

Milestone Interconnect (explained)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

Milestone Interconnect™ allows you to integrate a number of smaller, physically fragmented, and remote XProtect or Milestone Husky™ NVR installations with one XProtect Corporate central site. You can install these smaller sites, called remote sites, on mobile units, for example, boats, busses or trains. This means that such sites do not need to be permanently connected to a network.

The following illustration shows how you could set up Milestone Interconnect on your system:



1. Milestone Interconnect central XProtect Corporate site
2. Milestone Interconnect drivers (handles the connection between the central sites' recording servers and the remote site, must be selected in the list of drivers when adding remote systems via the **Add Hardware** wizard)
3. Milestone Interconnect connection
4. Milestone Interconnect remote site (the complete remote site with system installation, users, cameras and so on)
5. Milestone Interconnect remote system (the actual technical installation at the remote site)

You add remote sites to your central site with the **Add Hardware** wizard from the central site (see "Add a remote site to your central Milestone Interconnect site" on page 280).

Each remote site runs independently and can perform any normal surveillance tasks. Depending on the network connections and appropriate user rights (see "Assign user rights" on page 281), Milestone Interconnect offers you direct live viewing of remote site cameras and play back of remote site recordings on the central site.

The central site can only see and access devices that the specified user account (when adding the remote site) has access to. This allows local system administrators to control which devices should be made available to the central site and its users.

On the central site, you can view the system's own status for the interconnected cameras, but not directly the state of the remote site. Instead, to monitor the remote site, you can use the remote

site events to trigger alarms or other notifications on the central site (see "Configure your central site to respond to events from remote sites" on page 283).

It also offers you the possibility to transfer remote site recordings to the central site based on either events, rules/schedules, or manual requests by XProtect Smart Client users.

Only XProtect Corporate systems can work as central sites. All other products can act as remote sites including XProtect Corporate. It differs from setup to setup which versions, how many cameras, and how devices and events originating from the remote site are handled - if at all - by the central site. For further details on how specific XProtect products interact in a Milestone Interconnect setup, go to the Milestone Interconnect website (<http://www.milestonesys.com/our-products/milestone-interconnect/>).

Milestone Interconnect setups (explained)

There are three ways to run Milestone Interconnect. How to run your setup depends on your network connection, how to play back recordings, and whether you retrieve remote recordings and to what degree.

In the following, the three most likely setups are described:

Direct playback from remote sites (good network connections)

The most straightforward setup. The central site is continuously online with its remote sites and the central site users play back remote recordings directly from the remote sites. This requires use of the **Play back recordings from remote system** option (see "Enable playback directly from remote site camera" on page 282).

Rule- or XProtect Smart Client-based retrieval of selected remote recording sequences from remote sites (periodically limited network connections)

Used when selected recording sequences (originating from remote sites) should be stored centrally to ensure independence from remote sites. Independence is crucial in case of network failure or network restrictions. You configure remote recordings retrieval settings on the **Remote Retrieval** tab (on page 110).

Remote recordings retrieval can be started from the XProtect Smart Client when needed or a rule can be set up. In some scenarios, remote sites are online and in others, offline most of the time. This is often industry specific. For some industries it is common for the central site to be permanently online with its remote sites (for example a retail HQ (central site) and a number of shops (remote sites)). For other industries, like transportation, the remote sites are mobile (for example, busses, trains, ships, and so on) and can only establish network connection randomly. Should the network connection fail during a commenced remote recording retrieval, the job continues at next given opportunity.

If the system detects an automatic retrieval, or request for retrieval from the XProtect Smart Client, outside the time interval that you specified on the **Remote Retrieval** tab, it is accepted, but not started until the selected time interval is reached. New remote recording retrieval jobs will queue and start when the allowed time interval is reached. You can view pending remote recording retrieval jobs from **System Dashboard -> Current Tasks**.

After connection failure, missing remote recordings are by default retrieved from remote sites

Uses remote sites like a recording server uses the edge storage on a camera. Typically, remote sites are online with their central site, feeding it a live stream that the central site records. Should the network fail for some reason, the central site misses out on recording sequences. However,

once the network is reestablished, the central site automatically retrieves remote recordings covering the down-period. This requires use of the **Automatically retrieve remote recordings when connection is restored** option (see "Retrieve remote recordings from remote site camera" on page 282) on the **Record** tab for the camera.

You can mix any of the above solutions to fit your organizations special needs.

Add a remote site to your central Milestone Interconnect site

You add remote sites to the central site with the **Add Hardware** wizard.

Requirements

- Sufficient number of Milestone Interconnect camera licenses (see "Milestone Interconnect and licensing" on page 277).
- Another configured and working XProtect, Milestone Husky NVR, or Milestone Arcus-enabled system including a user account (basic users, local Windows user or Windows Active Directory user) with rights for the devices that the central XProtect Corporate system should be able to access.
- Network connection between the central XProtect Corporate site and the remote sites with access or port forwarding to the ports used on the remote sites.

To add a remote site:

1. On the central site, expand **Servers** and select **Recording Servers**.
2. In the Overview pane, expand the relevant recording server and right-click.
3. Select **Add Hardware** to start the wizard.
4. On the first page select **Address range scanning** or **Manual** and click **Next**.
5. Specify user names and passwords. The user account must be predefined on the remote system. You can add user names and passwords as needed by clicking **Add**. When ready, click **Next**.
6. Select the drivers to use when you scan. In this case choose between the Milestone drivers. Click **Next**.
7. Specify the IP addresses and port numbers you want to scan. Default is port 80. Click **Next**.

Wait while your system detects the remote sites. A status indicator shows the detection process. In case of a successful detection, a **Success** message appears in the **Status** column. If you fail to add, you can click the **Failed** error message to see why.

8. Choose to enable or disable successfully detected systems. Click **Next**.
9. Wait while your system detects hardware and collects device specific information. Click **Next**.
10. Choose to enable or disable successfully detected hardware and devices. Click **Next**.
11. Select a default group. Click **Finish**.
12. After installation, you can see the system and its devices in the **Overview** pane.

Depending on the user rights for the selected user on the remote site, the central site gets access to all cameras and functions or a sub-set of them.

Assign user rights

You configure user rights for an interconnected camera as you do with other cameras, by creating a role and assigning access to functions.

1. On the central site, in the **Site Navigation** pane, expand **Security** and select **Roles**.
2. In the Overview pane, right-click the built-in administrator role and select **Add Role** (see "**Add and manage a role**" on page 205).
3. Name the role and configure the settings on the **Device** tab (see "Device tab (roles)" on page 223) and the **Remote Recordings** tab (see "Remote Recordings tab (roles)" on page 230).

Update remote site hardware

If the configuration has been changed on a remote site, for example, added or removed cameras and events, you must update the configuration on the central site to reflect the new configuration on the remote site.

1. On the central site, expand **Servers** and select **Recording Servers**.
2. In the Overview pane, expand the required recording server, select the relevant remote system. Right-click it.
3. Select **Update Hardware**. This opens the **Update hardware** dialog box.
4. The dialog box lists all changes (devices removed, updated and added) in the remote system since your Milestone Interconnect setup was established or refreshed last. Click **Confirm** to update your central site with these changes.

Establish remote desktop connection to remote system

You can connect remotely to systems in your Milestone Interconnect setup.

Requirements

The remote desktop connections to the computer you want to remote to must be up and running.

This feature is not supported by Milestone Arcus-enabled hardware.

1. On the central site, expand **Servers** and select **Recording Servers**.
2. In the Overview pane, expand the required recording server, select the relevant remote system.
3. In the Properties pane, select the **Info** tab.
4. In the **Remote administration** area, type the appropriate Windows user name and password.
5. Once user name and password are saved, click **Connect** to establish remote desktop connection.
6. In the toolbar, click **Save**.

Enable playback directly from remote site camera

If your central site is continuously connected with its remote sites, you can configure your system so that the users playback the recordings directly from the remote sites. See also possible Milestone Interconnect setups (see "Milestone Interconnect setups (explained)" on page 279).

1. On the central site, expand **Servers** and select **Recording Servers**.
2. In the Overview pane, expand the required recording server, select the relevant remote system. Select the relevant interconnected camera.
3. In the Properties pane, select the **Record** tab, and select the **Play back recordings from remote system** option.
4. In the toolbar, click **Save**.

In a Milestone Interconnect setup, the central site disregards privacy masking defined in a remote site. If you want to apply the same privacy masking, you must redefine it on the central site.

Retrieve remote recordings from remote site camera

If your central site is **not** continuously connected with its remote sites, you can configure your system to store remote recordings centrally and you can configure retrieval of remote recordings when the network connection is optimal. See also possible Milestone Interconnect setups (see "Milestone Interconnect setups (explained)" on page 279).

To allow users to actually retrieve recordings, you must enable this permission for the relevant role (see "Remote Recordings tab (roles)" on page 230).

To configure your system:

1. On the central site, expand **Servers** and select **Recording Servers**.
2. In the Overview pane, expand the required recording server, select the relevant remote system. Select the relevant remote server.
3. In the Properties pane, select the **Remote Retrieval** tab and update the settings (see "Remote Retrieval tab" on page 110).

If the network fails for some reason, the central site misses out on recording sequences. You can configure your system to let the central site automatically retrieve remote recordings to cover the down-period, once the network is reestablished.

1. On the central site, expand **Servers** and select **Recording Servers**.
2. In the Overview pane, expand the required recording server, select the relevant remote system. Select the relevant camera.
3. In the Properties pane, select the **Record** tab, and select the **Automatically retrieve remote recordings when connection is restored** option (see "Remote recording (explained)" on page 131).
4. In the toolbar, click **Save**.

As an alternative, you can use rules or start remote recording retrievals from XProtect Smart Client when needed.

In a Milestone Interconnect setup, the central site disregards privacy masking defined in a remote site. If you want to apply the same privacy masking, you must redefine it on the central site.

Configure your central site to respond to events from remote sites

You can use events defined on the remote sites to trigger rules and alarms on your central site and thereby respond immediately to events from the remote sites. This requires that the remote sites are connected and online. The number and type of events depend on the events configured and predefined in the remote sites.

The list of supported events is available on the Milestone website (<http://www.milestonesys.com/our-products/milestone-interconnect/milestone-interconnect-compatibility>).

You cannot delete predefined events.

Requirements:

- If you want to use user-defined/manual events from the remote sites as triggering events, you must first create these on the remote sites.
- Make sure that you have an updated list of events from the remote sites (see "Update remote site hardware" on page 281).

Add a user-defined/manual event from a remote site

1. On the central site, expand **Servers** and select **Recording Servers**.
2. In the Overview pane, select the relevant remote server and the **Events tab**.
3. The list contains the predefined events. Click **Add** to include user-defined or manual events from the remote site in the list.

Use an event on a remote site to trigger an alarm on the central site:

1. On the central site, expand **Alarms** and select **Alarm Definitions**.
2. In the Overview pane, right-click **Alarm Definitions** and click **Add New**.
3. Enter values as needed.
4. In the **Triggering Event** field, you can select between the supported predefined and user-defined events.
5. In the **Sources** field, select the remote server representing the remote site that you want alarms from.
6. Save the configuration when done.

Use an event on a remote site to trigger a rule-based action on the central site:

1. On the central site, expand **Rules and Events** and select **Rules**.
2. In the Overview pane, right-click **Rules** and click **Add Rule**.
3. In the wizard that appears, select **Perform an action on <event>**.
4. In the **Edit the rule description** area, click **event** and select between the supported predefined and user-defined events. Click **OK**.

5. Click **devices/recording server/management server** and select the remote server representing the remote site that you want the central site to start an action for. Click **OK**.
6. Click **Next** to get to the next wizard page.
7. Select the conditions that you want to apply for this rule. If you do not select any conditions, the rule always applies. Click **Next**.
8. Select an action and specify the details in the **Edit the rule description** area. Click **Next**.
9. Select a stop criterion if required. Click **Next**.
10. Select a stop action if required. Click **Finish**.

Smart map

Cached smart map files (explained)

The files that you use for your geographic background are retrieved from a tile server. The time that the files are stored in the cache folder depends on the value selected in the **Removed cached smart map files** list in the **Options** dialog in XProtect Smart Client. The files are stored either:

- Indefinitely (**Never**)
- For 30 days if the file is not used (**When not used for 30 days**)
- When the operator exits XProtect Smart Client (**On exit**).

When you change the tile server address, automatically a new cache folder is created. The previous map files are retained in the associated cache folder on your local computer.

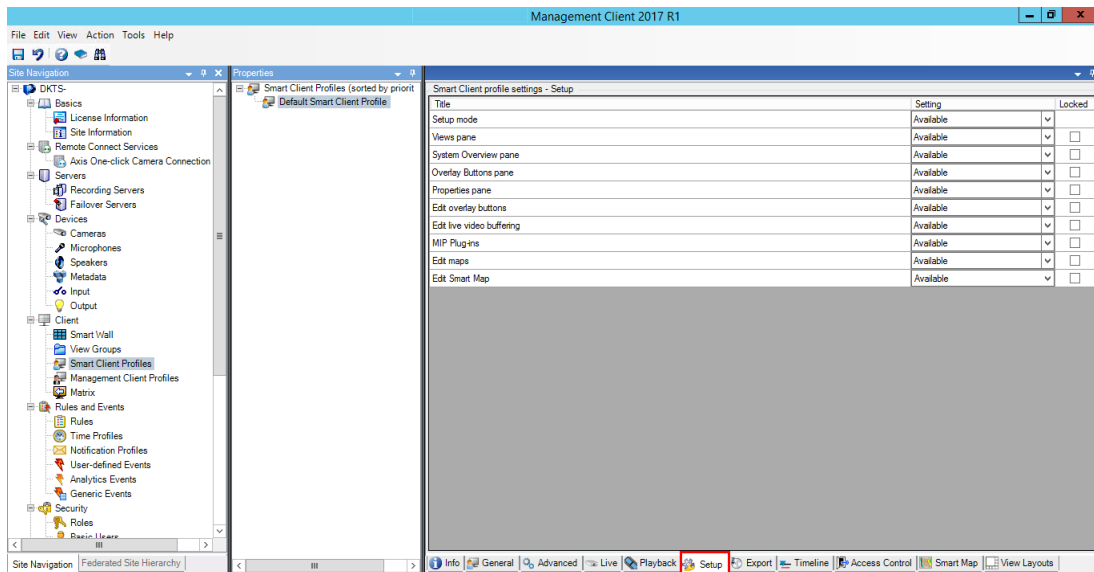
Enable smart map editing

Operators can edit smart maps in XProtect Smart Client in setup mode only if editing is enabled in Management Client. If not already enabled, you need to enable editing for each relevant Smart Client profile.

Steps:

1. In the **Site Navigation** pane, expand the **Client** node.

2. Click **Smart Client Profiles**.



3. In the overview pane, select the relevant Smart Client profile.
4. In the **Properties** pane, click the **Setup** tab.
5. In the **Edit smart map** list, select **Available**.
6. Repeat these steps for each relevant Smart Client profile.
7. Save your changes. Next time users assigned to the Smart Client profile you selected log into XProtect Smart Client, they will be able to edit smart maps.

To disable editing, in **Edit smart map** list, select **Unavailable**.

Enable editing of cameras on smart map

To allow operators to position a camera on the smart map, adjust the field of view, and direction, you must enable editing of cameras per role.

Requirements

Before you start, make sure that Smart map editing has been enabled (see "Enable smart map editing" on page 284). You do this on the Smart Client profile that the role of the operator is associated with.

Steps:

1. Expand the **Security** node > **Roles**.
2. In the **Roles** pane, select the role that your operator is associated with.
3. To give the role editing rights:
 - Click the **Overall Security** tab, and select **Cameras** in the **Role Settings** pane.
 - In the **Allow** column, select the **Full control** or **Edit** check box.
4. Save the changes.

The steps above gives the role the right to edit all cameras. To enable editing for individual cameras, go to the **Device** tab and select the relevant camera.

Setting up geographic backgrounds

The Basic world map is the default geographic background, and does not require any setup. You can also use OpenStreetMaps out-of-the-box without additional steps if your system can access the Internet. For information about the other types of backgrounds, see Types of geographic backgrounds (see "Types of geographic backgrounds (explained)" on page 286).

Requirements for using Bing Maps and Google Maps:

1. Your system administrator must enter your Bing Maps key, or your Google Maps private cryptographic key and client ID in Management Client for a Smart Client profile. Bing Maps and Google Maps geographic backgrounds are available in XProtect Smart Client only after your administrator does this.
2. Use your Google Maps or Bing Maps account to create or purchase a key for Bing Maps, or a client ID and private key for the Google Maps API. For more information, see Select plan for Google Maps and Bing Maps APIs (see "Select plan for Google Maps or Bing Maps APIs" on page 287).

If you want to prevent users from using OpenStreetMaps as a geographic background, click  **Settings**, and select **Unavailable** for the **OpenStreetMap geographic background** option. Then XProtect Smart Client does not display it as an option for a smart map.

Types of geographic backgrounds (explained)

After you add a smart map to a view, you can choose one of the following geographic backgrounds:

- **Basic world map** - use the standard geographic background provided in XProtect Smart Client. This map is intended for use as a general reference, and does not contain features such as country boundaries, cities, or other details. However, like the other geographic backgrounds, it does contain geo-reference data.
- **Bing Maps** - connect to Bing Maps.
- **Google Maps** - connect to Google Maps.

Note: The Bing Maps and Google Maps options require access to the Internet, and you must purchase a key from Microsoft or Google.

- **OpenStreetMap** - connect to the OpenStreetMap (<http://www.openstreetmap.org>) (OSM) open source mapping project. This option requires access to the Internet. The map data for OSM is provided under the organization's Open Database License (www.openstreetmap.org/copyright).
- **None** - this hides the geographic background. However, the geo-reference data is still there. For more information, see Working with layers on smart map.

By default, Bing Maps and Google Maps display satellite imagery (Satellite). You can change the imagery, for example to aerial or terrain, to see different details. For more information, see Change the geographic background on smart map.

Select plan for Google Maps or Bing Maps APIs

Bing Maps and Google Maps offer different usage plans for their APIs. When you select a plan it is important to consider how much you will use the map service.

Bing Maps offers Basic Keys and Enterprise Keys, and Google Maps offers Standard and Premium plans. Basic keys for Bing Maps are free, but allow a limited number of transactions before the transactions become billable or access to the map service is denied. Premium and Enterprise keys are not free, but allow unlimited transactions.

If you are going to use Bing Maps or Google Maps in XProtect Smart Client, Milestone recommends the following:

- For Bing Maps, purchase an Enterprise Key. You can also use a Basic Key, but remember that they allow limited use.
- To use Google Maps, you must purchase a Premium Plan for the Google Static Maps API.

For more information, visit the following websites:

- Bing Maps (<https://www.microsoft.com/maps/Licensing/licensing.aspx>)
- Google Maps Developer Console (<https://developers.google.com/maps/pricing-and-plans/>)

Next, Enter Bing Maps key or Google Maps key or client ID in Management Client (on page 287).

Enter Bing Maps key or Google Maps key or client ID in Management Client

You can make a key available to multiple users by entering it for a Smart Client profile in Management Client. All users who are assigned to the profile will use this key.

If you want to use a different key, you can enter it in the **Options** dialog box in Smart Client. This requires that your system administrator has not locked the key in Management Client, and that the **Follow server** check box is not selected in Smart Client. The key in Smart Client is associated with your user account, and only you will use it.


Steps:

1. In Management Client, on the **Site Navigation** pane, click **Smart Client Profiles**.
2. In the **Properties** pane, select the Smart Client profile, and then click the **Smart Map** tab.
 - For Bing Maps, enter your key in the **Bing Maps key** field.
 - For Google Maps, enter the information you received for your Premium Plan in the **Client ID for Google Maps** and **Private key for Google Maps** fields.
3. Next, enter Bing Maps key or Google Maps private key and client ID in XProtect Smart Client (on page 287).

Enter Bing Maps key or Google Maps private key and client ID in XProtect Smart Client

If you want to use a different key, and not use the key from the Smart Client profile that you are assigned to, you can enter the key in XProtect Smart Client. If you enter a key in XProtect Smart Client, it is associated with your user account and only you will use it.

Steps:

1. In the upper-right corner of the workspace, click  **Settings**.
2. In the **Settings** window, in the navigation pane, click **Smart map**.
3. Depending on the map service you want to use, do one of the following:
 - For Bing Maps, enter your key in the **Bing Maps key** field.
 - For Google Maps, enter the information you received for your Premium Plan in the **Client ID for Google Maps** and **Private key for Google Maps** fields.

Changing OpenStreetMap tile server

If you use OpenStreetMap as the geographic background for your smart map, you can change the location where the tiled images are retrieved. The tiled images make up the map. You do this by changing the tile server address. This allows you to use a local tile server, for example if your organization has its own maps for areas such as airports or harbors. Using a local server means that XProtect Smart Client can retrieve the map images without Internet access.

You can also use a commercial tile server. Milestone does not provide a tile server solution for OpenStreetMap.

The tile server address can be specified in two ways:

- In Management Client - you set the tile server address on the Smart Client profiles (see "Set an alternative OpenStreetMap tile server" on page 288). The server address applies to all Smart Client users assigned to the individual Smart Client profiles.
- In XProtect Smart Client - you set the tile server address in the **Settings** dialog. The server address applies only to that Smart Client installation.

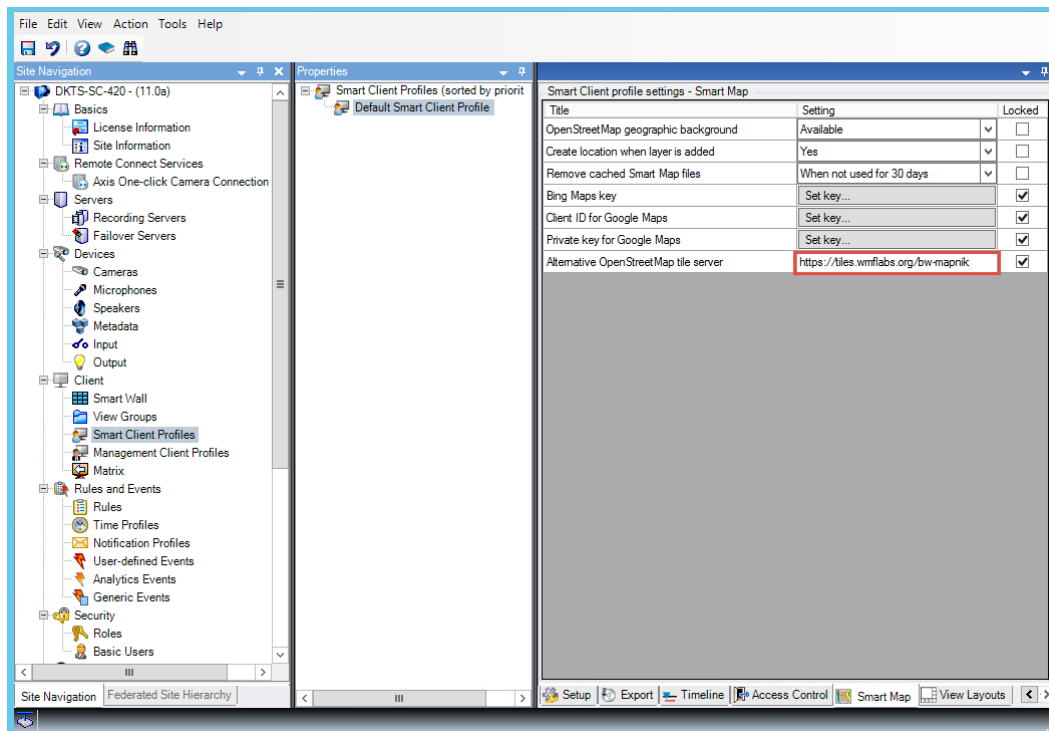
Set an alternative OpenStreetMap tile server

For the smart map feature, you can specify an alternative OpenStreetMap tile server, where the VMS retrieves the map files for the geographic background. The server you specify is associated with a Smart Client profile, so that users assigned to the Smart Client profile view the same OpenStreetMap in XProtect Smart Client.

Steps:

1. In the **Site Navigation** pane, expand the **Client** node and click **Smart Client Profiles**.

2. In the overview pane, select the relevant Smart Client profile.



3. In the Properties pane, click the **Smart map** tab.
4. In the **Alternative OpenStreetMap tile server** field, enter the address of the tile server.
5. If you want to prevent XProtect Smart Client users from changing the setting, select the **Locked** check box.
6. Save the changes.

Set camera position, direction, field of view, and depth (smart map)

To ensure that a camera is positioned correctly on the smart map, you can set the GPS coordinates, the direction of the camera, the field of view, and the viewing depth. In doing so, automatically the camera is added to the smart map next time an operator loads it in XProtect Smart Client.

Steps:

1. In Management Client, expand the **Devices** node and select **Cameras**.

2. In the **Devices** pane, select the relevant camera group and camera.
3. On the **Info** tab, scroll down to **Positioning information**.

The screenshot shows the 'Properties' dialog box with the 'Info' tab selected. The 'Positioning information' section is expanded, showing fields for GPS coordinates, Direction (a), Field of view (b), and Depth (c). An illustration shows a camera icon with a field of view cone and points a, b, and c. The bottom of the dialog has a toolbar with icons for Info, Settings, Streams, Record, Motion, Fisheye Lens, Client, and Privacy Mask.

Device information

Name: 10.100.x.xxx_camera1

Short name:

Back entry:

Description:

Hardware name:

Back entry:

Port number: 2

Positioning information

GPS coordinates: 55.6553634527205, 12.43028007233498
(Example: -33.856900, 151.215100)

Direction (a): 87.75 Degrees

Field of view (b): 150 Degrees

Depth (c): 112.36 Meter

Preview position in browser...

4. Specify the latitude and the longitude in the **GPS coordinates** field, in that order. Use a period as decimal separator and a comma to separate the values.
5. In the **Direction** field, enter a value in the range of 0 and 360 degrees.
6. In the **Field of view** field, enter a value in the range of 0 and 360 degrees.
7. In the **Depth** field, enter the viewing depth, either in meters or feet.
8. Save the changes.

You can also set the properties on the recording servers.

Troubleshooting (smart map)

Error when adding camera to smart map

Error

If an operator tries to add cameras to a smart map manually, because the cameras were not added automatically when loading the smart map, the following error may be displayed: *Cannot save the map. Cannot perform the operation.*

What may cause the error is that the operator is running version 2017 R1 of XProtect Smart Client against an XProtect Corporate 2017 R2 installation. XProtect Smart Client looks for the GPS position of the camera on the event server, but in version 2017 R2 or newer of XProtect Corporate, the GPS position is stored on the management server.

Solution

Upgrade XProtect Smart Client to version 2017 R2 or newer.

XProtect Smart Wall

XProtect Smart Wall (explained)

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

XProtect Smart Wall is an advanced video wall product that provides supreme situation awareness in larger surveillance centers and helps the surveillance operators to focus on what is important ensuring higher efficiency and shorter response times.



XProtect Smart Wall enables swift change of live video displayed on the video wall to meet specific security scenarios and needs. One way to change what is displayed on the video wall is with Smart Wall presets. The surveillance administrator defines the Smart Wall presets in the Management Client for optimizing the surveillance coverage for different recurring surveillance scenarios. Smart Wall presets work for the entire video wall or parts of the video wall and determine which cameras are displayed and the layout of the content on the monitors in the video wall.

With Smart Wall presets, the display changes can be triggered automatically by rules. The display changes can also be triggered manually by the surveillance operators using XProtect Smart Client by dragging and dropping views and cameras onto the logical representation of the video wall in XProtect Smart Client or by selecting the different Smart Wall presets defined by the surveillance administrator.

See the XProtect Smart Client documentation for more information about how to use the XProtect Smart Wall features in XProtect Smart Client.

XProtect Smart Wall licenses

XProtect Smart Wall requires the following video wall-related licenses:

- A **base license** for XProtect Smart Wall that covers an unrestricted number of monitors displaying video on a video wall.

A base license for XProtect Smart Wall is included in the base license for XProtect Corporate. If you have XProtect Expert, you can purchase a base license for XProtect Smart Wall separately.

Configure Smart Walls

A Smart Wall configuration consists of defining the Smart Wall, adding monitors and defining the monitor layout, and optionally specifying Smart Wall presets and the layout and content of the different monitors.

You need not define Smart Wall presets, if you only want to display cameras and XProtect Smart Client views that your XProtect Smart Client users manually can push onto the video wall.

If you want to use rules to change automatically what is displayed on the video wall, or if you have typical surveillance scenarios where you want to display the same content on the video wall each time the scenario happens, you should define Smart Wall presets.

The configuration of the Smart Wall is very flexible. You can include all monitors on the video wall in one Smart Wall or group the monitors and configure a Smart Wall for each group. Smart Wall presets can change the layout and content of all monitors in a Smart Wall or only some of the monitors. Monitors can be part of several Smart Walls and Smart Wall presets. Create as many Smart Walls and Smart Wall presets you need to optimize the coverage of your typical surveillance scenarios.

a. Define the Smart Wall

1. Expand **Client**, and select **Smart Wall**.
2. In the **Overview** pane, right-click **Smart Walls** and select **Add Smart Wall**.
3. Specify the settings for the Smart Wall.
4. In the **General View Item Properties** settings, define if you want system status information and title bars to appear above the cameras' layout items.
5. Click **OK**.

b. Add monitors and define the monitor layout


1. Right-click the Smart Wall and select **Add Monitor**.
2. Configure the dimensions of the monitor so it resembles one of the physical monitors on the video wall.
3. Use the preset behavior settings **Empty preset** and **Empty preset item** to define what is displayed on a monitor with an empty preset layout or in a preset's empty preset items when a new Smart Wall preset is automatically triggered or manually selected in XProtect Smart Client. You can use empty presets and empty preset items for content not controlled by the Smart Wall preset.
4. Use the preset behavior setting **Element insertion** to define what should happen when a user of XProtect Smart Client drags a camera onto a layout item in the Smart Wall preset. Select **Independent** to replace the camera already in the preset item with the new camera or **Linked** to push the content of the layout items from left to right from where you inserted the new camera.
5. Add as many monitors as you have on the physical video wall.
6. Select the Smart Wall and on the **Layout** tab, click **Edit** to position the different monitors so their positions resemble the mounting of the physical monitors on the video wall.
7. Click **OK**. The same layout is used in XProtect Smart Client.

c. Add Smart Wall presets (optionally)

1. Select the Smart Wall and from the **Presets** tab, click **Add New**.
2. Enter a name and a description and click **OK**.
3. Click **Activate** to display the Smart Wall preset on the video wall.

4. Create as many Smart Wall presets as you need.

d. Add layout and cameras to the monitors (requires a Smart Wall preset)

1. Select one of the monitors you created and from the **Presets** tab, select a preset from the list to configure what you want the selected monitor to show when used with the selected Smart Wall preset.
2. Click **Edit**.
3. Click the layout button to select which layout to use with your monitor, and click **OK**.

4. Drag cameras from the **Device Groups**, **Recording Servers** or **Federated Site Hierarchy** tab onto the different layout items. The cameras on the **Federated Site Hierarchy** tab are accessible in a Milestone Federated Architecture setup. You can leave layout items blank, so they are available for other content not controlled by the Smart Wall preset.
5. If the monitor already has a layout for the selected preset, you can click **Clear** to define a new layout or to exclude the monitor from the Smart Wall preset, so the monitor is available for other content not controlled by the Smart Wall preset.
6. Click **OK**.
7. Repeat the steps, until you have added a layout and cameras on the monitors you want to include in the Smart Wall preset.

Set up user rights for XProtect Smart Wall

You can control the tasks that XProtect Smart Client users can perform in XProtect Smart Wall by specifying user rights for roles. The user rights apply to all users who are assigned to the role. For more information, see Roles with Smart Wall rights properties (see "Smart Wall tab (roles)" on page 230).

Selections for the **Read**, **Edit**, and **Delete** user rights are always applied. For the **Operate** and **Playback** user rights, you can also grant the user rights for a specific period of time by selecting a time profile. For example, this is useful if you want to allow a user to change the content that is displayed on a Smart Wall, but only during their normal working hours.

To specify user rights for a role, follow these steps:

1. In the Site Navigation pane, expand **Security**, and select **Roles**.
2. In the **Roles** pane, select the role, or create a new role by right-clicking in the pane and selecting **Add Role**.
3. In the upper part of the **Role settings** pane, select the Smart Wall.
4. In the lower part of the Role Settings pane, click the **Smart Wall** tab, and then select the user rights to assign.
 - **Read** - View Smart Walls in client applications
 - **Edit** - Modify Smart Walls in client applications
 - **Delete** - Delete Smart Walls in client applications

- **Operate** - Apply layouts on the selected monitor in client applications, and activate presets
- **Playback** - Review and manage live and recorded video

Note: If you do not select the **Playback** permission, users can view but not change the content that is displayed on the video wall. If a user makes a change, the system automatically disconnects from the shared state and the content on the video wall is not affected. To return to the shared view, click **Reconnect Smart Wall monitor**.

- Optional: To grant the **Operate** or **Playback** user rights for a specific period of time, select the check box, and then select the time profile.

Using rules with Smart Wall presets (explained)

By combining rules and Smart Wall presets, you can control what is displayed on your video wall in similar way as the system uses rules to control the behavior of cameras and more. For example, a rule can trigger your video wall to display a certain Smart Wall preset during a certain day. You can even use rules to control what individual monitors in a video wall display. See Add a rule (on page 184) for information about how to create rules.

```
Perform an action in a time interval
day of week is Thursday
Set smart wall London to preset Factory
and Set smart wall London monitor UK Monitor 9 using current layout
to show Camera 1 starting in position 6
```

Example of a rule triggering a Smart Wall preset.

Smart Wall properties

Info tab (Smart Wall properties)

On the **Info** tab for a Smart Wall, you can add and edit Smart Walls.

Name	Description
Name	The name of the Smart Wall. Displayed in XProtect Smart Client as the Smart Wall view group name.
Description	A description of the Smart Wall. The description is only used internally in the Management Client.
Status text	If selected, camera and system status information is displayed across cameras' layout items on the video wall.
No title bar	If selected, all Smart Wall layout items have no title bars on the video wall.
Title bar	If selected, all Smart Wall layout items have title bars on the video wall.
Title bar with live indicator	When selected, all Smart Wall layout items' title bars display live and motion indicators on the video wall.

Presets tab (Smart Wall properties)

On the **Presets** tab for a Smart Wall, you can add and edit Smart Wall presets.

Name	Description
Add New	Click to add a preset to your XProtect Smart Wall installation. Define a name and description for the new Smart Wall preset.
Edit	Edit the name and/or description of a Smart Wall preset.
Delete	Delete a Smart Wall preset.
Activate	Click to display the Smart Wall preset on the video wall. You must create rules with the Smart Wall preset before the system can automatically trigger the display of the Smart Wall preset. See also Using rules with Smart Wall presets (explained) (on page 294).

Layout tab (Smart Wall properties)

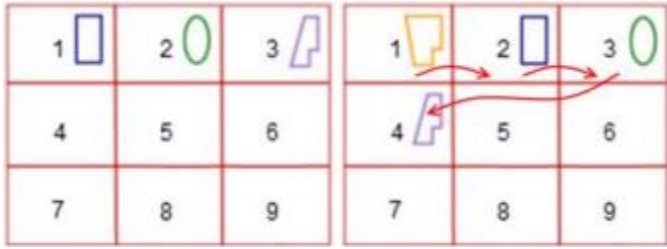
On the **Layout** tab for a Smart Wall, you position the monitors in your Smart Wall so their positions resemble the mounting of the physical monitors on the video wall. The layout is also used in the XProtect Smart Client.

Name	Description
Edit	Click to adjust the positioning of the monitors.
Movement	To move a monitor to a new position, select the relevant monitor and drag it to the desired position, or click one of the arrow buttons to move the monitor in the selected direction.
Zoom buttons	Click buttons to zoom in/out of the Smart Wall layout preview to ensure you position the monitors correctly.
Name	The name of the monitor. The name is displayed in XProtect Smart Client.
Size	The size of the physical monitor on the video wall.
Aspect ratio	The height/width relationship of the physical monitor on the video wall.

Monitor properties


Info tab (monitor properties)

On the **Info** tab for a monitor in a Smart Wall preset, you can add monitors and edit the monitors' settings.

Name	Description
Name	The name of the monitor. The name is displayed in XProtect Smart Client.
Description	A description of the monitor. The description is only used internally in the Management Client.
Size	The size of the physical monitor on the video wall.
Aspect ratio	The height/width relationship of the physical monitor on the video wall.
Empty preset	<p>Defines what should be displayed on a monitor with an empty preset layout when a new Smart Wall preset is triggered or selected in XProtect Smart Client.</p> <p>Select Preserve to keep the current content on the monitor.</p> <p>Select Clear to clear all content so nothing is displayed on the monitor.</p>
Empty preset item	<p>Defines what should be displayed in an empty preset layout item when a new Smart Wall preset is triggered or selected in XProtect Smart Client.</p> <p>Select Preserve to keep the current content in the layout item.</p> <p>Select Clear to clear the content so nothing is displayed in the layout item.</p>
Element insertion	<p>Defines how cameras are inserted in the monitor's layout when viewed in the XProtect Smart Client. When selecting Independent, only the content of the affected layout item changes, the rest of the content in the layout remain the same. When selecting Linked, the contents of the layout items are pushed from left to right. If, for instance, a camera is inserted in position 1, the previous camera of position 1 is pushed to position 2, the previous camera of position 2 is pushed to position 3, and so on as illustrated in this example.</p>  <p>Before a new camera is inserted and after.</p>

Presets tab (monitor properties)

On the **Presets** tab for a monitor in a Smart Wall preset, you can edit the layout and content of the monitor in the selected Smart Wall preset.

Name	Description
Preset	A list of Smart Wall presets for the select Smart Wall.
Edit	<p>Click Edit to edit the layout and the content of the selected monitor.</p> <p>Double-click a camera to remove a single camera.</p> <p>Click Clear to define a new layout or to exclude the monitor in the Smart Wall preset so the monitor is available for other content not controlled by the Smart Wall preset.</p> <p>Click  to select the layout you want to use with your monitor in the selected preset, and click OK.</p> <p>Drag cameras from the Device Groups, Recording Servers or Federated Sites tab onto the different layout items. You can leave layout items empty, so they are available for other content not controlled by the Smart Wall preset.</p>

XProtect Access

Access control integration (explained)

The use of XProtect Access requires that you have purchased a base license that allows you to access this feature within your XProtect system. You also need an access control door license for each door you want to control.

You can use XProtect Access with access control systems from vendors where a vendor-specific plug-in for XProtect Access exists.

The access control integration feature introduces new functionality that makes it simple to integrate customers' access control systems with XProtect. You get:

- A common operator user interface for multiple access control systems in XProtect Smart Client.
- Faster and more powerful integration of access control systems.
- More functionality for the operator (see below).

In XProtect Smart Client, the operator gets:

- Live monitoring of events at access points.
- Operator aided passage for access requests.
- Map integration.
- Alarm definitions for access control events.
- Investigation of events at access points.
- Centralized overview and control of door states.

- Cardholder information and management.

The **Audit log** logs the commands that each user performs in the access control system from XProtect Smart Client.

Apart from a XProtect Access base license, you need a vendor-specific integration plug-in installed on the event server before you can start an integration (see "Configure an integrated access control system" on page 298).

XProtect Access licenses

XProtect Access requires the following access control-related licenses:

- A **base license** for XProtect Access that covers an unrestricted number of access servers.
- An **access control door license** per door you want to integrate and control in XProtect Access. **Two** access control door licenses are included with the XProtect Access base license. All door licenses are automatically installed when you install your XProtect Access product. However, the installed door licenses are by default disabled which means that you must enable the doors that you want to use. You can only enable as many doors as you have door licenses for.

Example: You have five access control door licenses and you have added 10 doors. Once you have added five doors, you cannot select any more. You must remove some of your doors before you can add another door.

To find information about the current status of your access control door licenses, expand the **Access Control** node.

To buy additional XProtect Access base licenses or door licenses, contact your vendor.

Configure an integrated access control system

This section provides the steps for a successful creation and configuration of an integrated access control system.

Requirements

- You have purchased the required XProtect Access licenses.
 - You have installed the integration plug-in specific for your access control system on the event server.
1. Add the integrated access control system to your XProtect system. See Wizard for access control system integration (on page 299). The wizard takes you through the most basic steps.
 2. Specify additional properties for the access control system integration, especially the access control events may require that you map events from the access control system with event categories that XProtect recognizes. See Access control properties (on page 300).
 3. You need to create a role with permission to use access control features in XProtect Smart Client. See Access Control tab (see "Access Control tab (roles)" on page 232).
 4. You also need to associate this role with a Smart Client profile. See Smart Client profile properties (on page 159).

5. The system provides a default rule that lets you access request notifications appear on the XProtect Smart Client screen in case of access denied. You can add and modify access request notifications, see Access Request Notification (properties) (see "Access Request Notification tab (Access Control)" on page 302).
6. You can create additional rules based on actions and events from the access control system. See Actions and stop actions (explained) (on page 167) and Events overview (on page 175).
7. If required, change the overall access control settings in **Options > Access Control Settings**. See Access Control Settings tab (see "Access Control Settings tab (options)" on page 258).

Wizard for access control system integration

The **Access control system integration** wizard is for step-by-step configuration of the initial integration with an access control system. Use the wizard to get through the most basic configuration tasks. You can do more detailed configuration afterwards.

Before you start the access control integration wizard make sure you have the integration plug-in installed on the event server.

Some of the fields to fill out and their default values are inherited from the integration plug-in. Therefore, the appearance of the wizard may differ depending on the access control system you integrate with.

To start the wizard, select **Access Control** in the node tree, right-click, and click **Create new**.

Create access control system integration

Enter the name and specify the connection details for the access control system you want to add. The parameters that you must specify depend on the type of system, but are typically the network address of the access control system server and an access control administrator user name and password.

The video management system uses the specified user name and password to log into the access control system for retrieving the full configuration.

The integration plug-in may also define secondary parameters which are not listed in the wizard, but you can change these in **General Settings** after setting up the integration. The default values for the parameters are supplied by the plug-in or the XProtect system.

Connecting to the access control system

When the plug-in has been successfully integrated, a summary of the retrieved access control system configuration appears. Review the list to ensure that all items have been integrated before you continue to the next step of the wizard.

Associated cameras

Map access points in the access control system with the cameras in the XProtect system, to show related video for events from the doors.

You can map several cameras to one access point. The XProtect Smart Client user is then able to view video from all the cameras when investigating events, for example.

The XProtect Smart Client user is also able to add one of the cameras when configuring **Access Monitor** view items.

Licensed doors are by default enabled. Clear the check box to disable a door and thereby free an access control door license.

Final summary

Your access control system integration has been successfully created in XProtect with default settings inherited from the integration plug-in. Client users must log into XProtect Smart Client to see and use the new access control system.

You can refine the configuration if needed.

Access control properties

General Settings tab (Access Control)

Name	Description
Enable	Systems are by default enabled, meaning that they are visible in XProtect Smart Client for users with sufficient rights and that the XProtect system receives access control events. You can disable a system, for example during maintenance, to avoid creating unnecessary alarms.
Name	The name of the access control integration as it appears in the management application and in the clients. You can overwrite the existing name with a new one.
Description	Provide a description of the access control integration. This is optional.
Integration plug-in	Shows the type of access control system selected during the initial integration.
Last configuration refresh	Shows the date and time of the last time the configuration was imported from the access control system.
Refresh configuration	Click the button when you need to reflect configuration changes made in the access control system in XProtect, for example if you have added or deleted a door. A summary of the configuration changes from the access control system appears. Review the list to ensure that your access control system is reflected correctly before you apply the new configuration.
Operator login required	Enable an additional login for the client users, if the access control system supports differentiated user rights. This option is only visible if the integration plug-in supports differentiated user rights.

The naming and content of the following fields are imported from the integration plug-in. Below are examples of some typical fields:

Name	Description
Address	Type the address of the server that hosts the integrated access control system.

Name	Description
Port	Specify the port number on the server to which the access control system is connected.
User name	Type the name of the user, as defined in the access control system, who should be administrator of the integrated system in XProtect.
Password	Specify the password for the user.

Doors and Associated Cameras tab (Access Control)

This tab provides mappings between door access points and cameras, microphones or speakers. You associate cameras as part of the integration wizard, but you can change the setup at any time. Mappings to microphones and speakers are implicit through the related microphone or speaker on the camera.

Name	Description
Doors	<p>Lists the available door access points defined in the access control system, grouped by door.</p> <p>For an easier navigation to the relevant doors, you can filter on the doors in your access control system with the dropdown list box at the top.</p> <p>Enabled: Licensed doors are by default enabled. You can disable a door to free a license.</p> <p>License: Shows if a door is licensed or if the license has expired. The field is blank when the door is disabled.</p> <p>Remove: Click Remove to remove a camera from an access point. If you remove all cameras, the check box for associated cameras is automatically cleared.</p>
Cameras	<p>Lists the cameras configured in the XProtect system.</p> <p>Select a camera from the list, and drag and drop it at the relevant access point to associate the access point with the camera.</p>

Access Control Events tab (Access Control)

Event categories allow you to group events. The configuration of event categories affects the behavior of access control in the XProtect system and allows you to, for example, define an alarm to trigger a single alarm on multiple event types.

Name	Description
Access Control Event	<p>Lists the access control events imported from the access control system. The integration plug-in controls default enabling and disabling of events. You can disable or enable events any time after the integration.</p> <p>When an event is enabled, it is stored in the XProtect event database and is, for example, available for filtering in the XProtect Smart Client.</p>
Source Type	Shows the access control unit that can trigger the access control event.
Event Category	<p>Assign none, one or more event categories to the access control events. The system automatically maps relevant event categories to the events during integration. This enables a default setup in the XProtect system. You can change the mapping at any time.</p> <p>Built-in event categories are:</p> <ul style="list-style-type: none"> • Access denied • Access granted • Access request • Alarm • Error • Warning <p>Events and event categories defined by the integration plug-in also appear, but you can also define your own event categories, see User-defined Categories.</p> <p>Important: If you change the event categories in a Corporate system, ensure that the existing access control rules still work.</p>
User-defined Categories	<p>Allows you to create, modify or delete user-defined event categories.</p> <p>You can create event categories when the built-in categories do not meet your requirements, for example, in connection with defining triggering events for access control actions.</p> <p>The categories are global for all integration systems added to the XProtect system. They allow setting up cross-system handling, for example on alarm definitions.</p> <p>If you delete a user-defined event category, you receive a warning if it is used by any integration. If you delete it anyway, all configurations made with this category, for example access control actions, do not work anymore.</p>

Access Request Notification tab (Access Control)

You can specify access request notifications that appear on the XProtect Smart Client screen when a given event occurs.

Name	Description
Name	Enter a name for the access request notification.
Add Access Request Notification	<p>Click to add and define access request notifications.</p> <p>To delete a notification, click X on the right side.</p> <p>If a user of XProtect Smart Client logs into a parent site in a Milestone Federated Architecture hierarchy, access request notifications from the child sites also appear in XProtect Smart Client.</p>
Access request notification details	Specify which cameras, microphones or speakers that appear in the access request notifications when a given event occurs. Also specify the sound to alert the user when the notification pops up.
Add command	<p>Select which commands that should be available as buttons in the access request notification dialogs in the XProtect Smart Client.</p> <p>Related access request commands:</p> <ul style="list-style-type: none"> Enables all commands related to access request operations available on the source unit. For example Open door. <p>All related commands:</p> <ul style="list-style-type: none"> Enables all commands on the source unit. <p>Access control command:</p> <ul style="list-style-type: none"> Enables a selected access control command. <p>System command:</p> <ul style="list-style-type: none"> Enables a command predefined in the XProtect system. <p>To delete a command, click X on the right side.</p>

Cardholders tab (Access Control)

Use the **Cardholders** tab to review information about cardholders in the access control system.

Name	Description
Search cardholder	Type the characters of a cardholder name and it appears in the list, if it exists.
Name	Lists the names of the cardholders retrieved from the access control system.
Type	<p>Lists the type of cardholder, for example:</p> <ul style="list-style-type: none"> Employee Guard Guest

If your access control system supports adding/deleting pictures in the XProtect system, you can add pictures to the cardholders. This is useful if your access control system does not include pictures of the cardholders.

Name	Description
Select picture	<p>Specify the path to a file with a picture of the cardholder. This button is not visible if the access control system manages the pictures.</p> <p>Allowed file-formats are .bmp, .png, and .jpg.</p> <p>Pictures are resized to maximize the view.</p> <p>Milestone recommends that you use a quadratic picture.</p>
Delete picture	<p>Click to delete the picture. If the access control system had a picture, then this picture is shown after deletion.</p>

XProtect LPR

XProtect LPR system overview

XProtect LPR (explained)

Available functionality depends on the system you are using. See the Product comparison chart for more information.

XProtect LPR offers video-based content analysis (VCA) and recognition of vehicle license plates that interacts with your surveillance system and your XProtect Smart Client.

To read the characters on a plate, XProtect LPR uses optical character recognition on images aided by specialized camera settings.

You can combine LPR (license plate recognition) with other surveillance features such as recording and event-based activation of outputs.

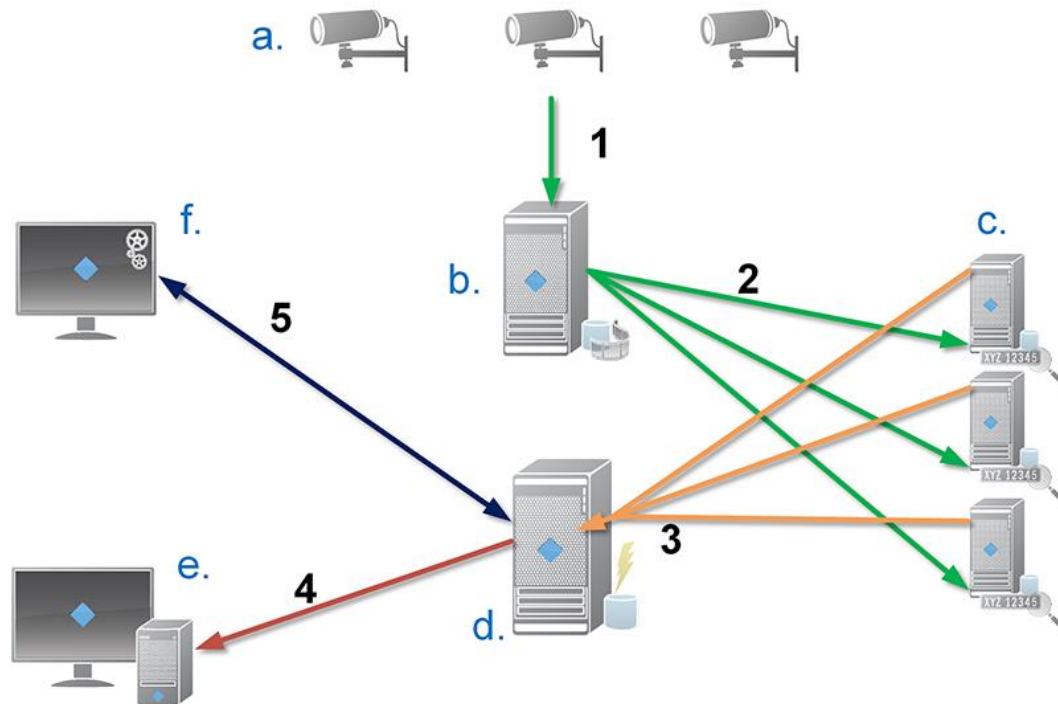
Examples of events in XProtect LPR:

- Trigger surveillance system recordings in a particular quality.
- Activate alarms.
- Match against positive/negative license plate match lists.
- Open gates.
- Switch on lights.
- Push video of incidents to computer screens of particular security staff members.
- Send mobile phone text messages.

With an event, you can activate alarms in XProtect Smart Client.

XProtect LPR system architecture

Basic data flow:



1. LPR cameras (a) send video to the recording server (b).
2. The recording server sends video to the LPR servers (c) to recognize license plates by comparing them with the license plate characteristics in the installed country modules.
3. LPR servers send recognitions to the event server (d) to match with the license plate match lists.
4. The event server sends events and alarms to XProtect Smart Client (e) when there is a match.
5. The system administrator manages the entire LPR configuration, for example, setting up events, alarms, and lists from the Management Client (f).

LPR server: The LPR server handles LPR video recorded by your surveillance system. It analyzes the video and sends information to the event server that uses it for triggering the defined events and alarms. Milestone recommends that you install the LPR server on a computer especially allocated for this purpose.

LPR camera: The LPR camera captures video as any other camera, but some cameras are dedicated for LPR use. The better suited camera you use, the more successful recognitions you will get.

Country module: A country module is a set of rules that defines license plates of a certain type and form as belonging to a certain country or region. It dictates plate and character specifics such as color, height, spacing, and similar, which is used during the recognition process.

License plate match list: A license plate match list is a user-defined list that you create. License plate match lists are collections of license plates that you want your system to treat in a special way. Once you have specified a list, you can set up events to recognize license plates on these lists and in this way trigger events and alarms.

Compatibility

XProtect LPR is compatible with version 2014 SP3 or newer of:

- XProtect Corporate
- XProtect Expert

XProtect LPR is compatible with version 2017 R2 or newer of:

- XProtect Professional+
- XProtect Express+

XProtect LPR is compatible with Milestone Husky M30 and Milestone Husky M50, but these products do not currently support the full functionality of XProtect LPR.

Minimum system requirements

For information about the minimum system requirements for the various components of your system, go to the Milestone website (<http://www.milestonesys.com/SystemRequirements>).

Milestone recommends that you install the LPR server on a computer especially allocated for this purpose.

XProtect LPR licenses

XProtect LPR requires the following LPR-related licenses:

- A **base license** for XProtect LPR that covers an unrestricted number of LPR servers.
- One **LPR camera license** per LPR camera you want to use in XProtect LPR.
- A **LPR country module license** for each country, state or region you need in your XProtect LPR solution. **Five** LPR country module licenses are included with the XProtect LPR base license. All country modules are automatically installed when you install your XProtect LPR product. However, the installed modules are by default disabled and you must enable the modules (see "Country modules tab" on page 329) that you want to use. You can only enable as many country modules as you have LPR country module licenses for.

Example: You have five LPR country module licenses and you have installed 10 country modules. Once you have selected five country modules, you cannot select any more. You must clear some of your selections before you can select other modules.

To find information about the current status of your licenses, see View LPR server information (on page 319).

To buy additional LPR-related licenses or country modules, contact your vendor.

Preparing cameras for LPR (explained)

LPR differs from other kinds of video surveillance. Normally, you choose cameras based on their ability to provide the best possible images for viewing by the human eye. When you choose cameras for LPR, only the area where you expect to detect license plates is important. The clearer and consistent you capture an image in that small area, the higher recognition rate you will get.

This section helps you prepare cameras for license plate recognition, but it also introduces you to important theories about cameras and lenses that are crucial to understand in order to get optimal images.

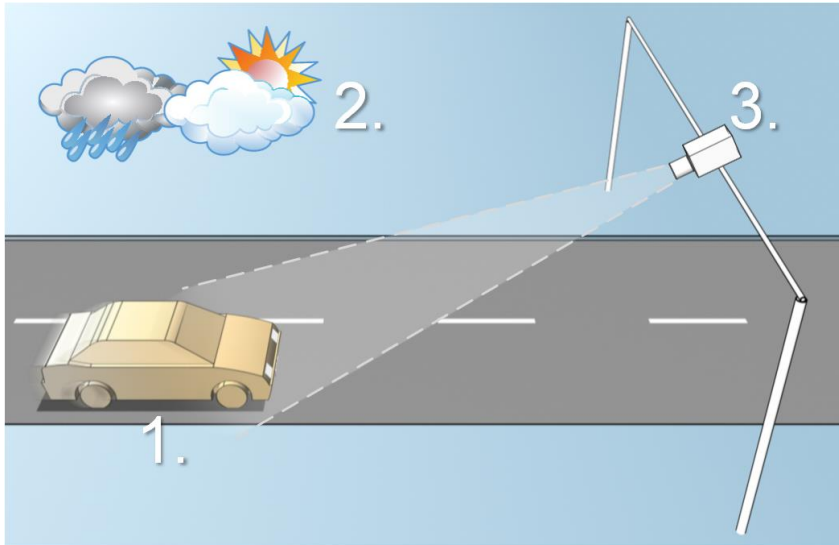


Illustration of an LPR solution

Factors that influence your configuration of LPR:

1. Vehicle

- Speed
- Plate size and position

2. Physical surroundings

- Lighting conditions
- Weather

3. Camera

- Exposure
- Field of view
- Shutter speed
- Resolution
- Positioning

It is important to take these factors into consideration as they have a critical influence on successful license plate recognition. You must mount cameras and configure XProtect LPR in a way that matches each specific environment. You cannot expect the product to run successfully without configuration. A camera used for LPR has a CPU consumption that is about five times higher than a normal camera. If a camera has not been set up correctly, it will greatly affect the level of successful recognitions and the CPU performance.

Read the following sections to learn about the factors that influence your LPR solution:

Positioning the camera (on page 308)

Camera angles (on page 309)

Plate width recommendations (on page 310)

Image resolution (on page 311)

Understanding camera exposure (on page 312)

Physical surroundings (on page 314)

Lens and shutter speed (on page 315)

Contrast (on page 316)

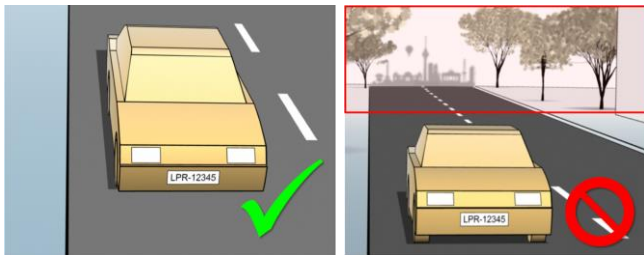
Unwanted camera features (on page 317)

Positioning the camera

When you mount cameras for LPR use, it is important to get a good, clear view of the area of interest so the plate can be detected consistently. This ensures the best possible performance and low risk of false detection:

- The area should cover **only** the part of the image where the license plate is visible as the vehicle moves in and out of the image.
- Avoid to have objects that block the view path of the camera, such as pillars, barriers, fences, gates.
- Avoid irrelevant moving objects such as people, trees, or traffic in

If too many irrelevant items are included, they will interfere with the detection, and the LPR server will use CPU resources on analyzing irrelevant items instead of license plates.

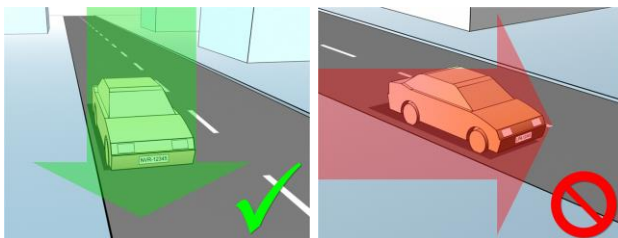


Left image shows a correct mounting without interference in the field of view. Right image shows an incorrect mounting. The camera is mounted too low and with too much background 'noise' in the view.

To help you obtain a clear and undisturbed view, you can:

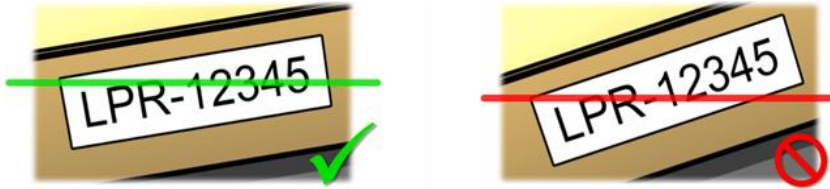
- Mount the camera as close as possible to the area of interest.
- Angle your camera.
- Zoom. If you zoom, always use the camera's optical zoom.

Mount the camera so the license plate appears from the top of the image (or bottom if traffic is driving away from the camera) instead of from the right or left side. In this way you make sure that the recognition process of a license plate only starts when the whole plate is in the view:

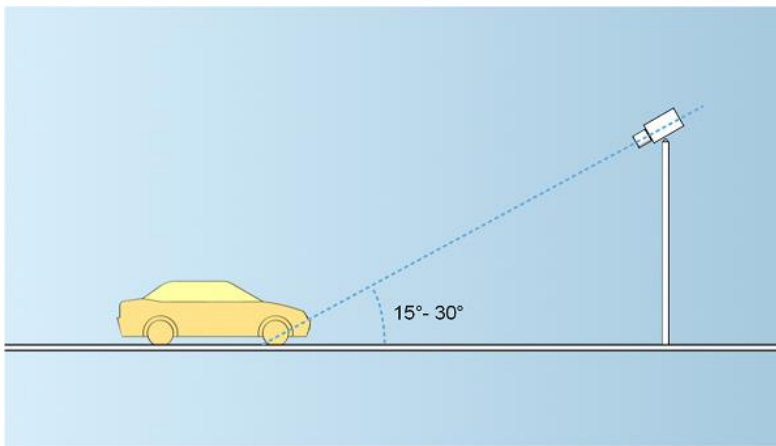


Camera angles

- **Single-line rule:** Mount the camera so that you can draw a horizontal line that crosses both the left and right edge of the license plate in the captured images. See the illustrations below for correct and incorrect angles for recognition.



- **Vertical angle:** The recommended vertical view angle of a camera used for LPR is between 15°-30°.



- **Horizontal angle:** The recommended maximum horizontal view angle of a camera used for LPR is between 15°-25°.

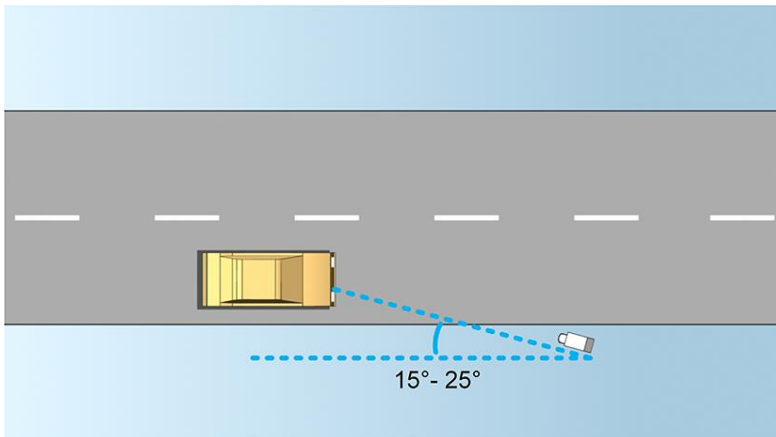
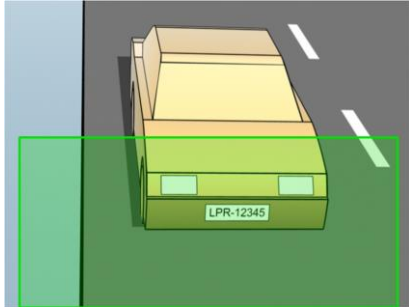


Plate width recommendations

Mount the camera so that the ideal snapshot of the license plate is captured when the license plate is in the center or lower half of the image:



Take a snapshot and make sure that the requirements to stroke width and plate width as described below are fulfilled. Use a standard graphics editor to measure the amount of pixels. When you start the process of reaching the minimum plate width, begin with a low resolution on the camera, and then work your way up in a higher resolution until you have the required plate width.

Stroke width

The term *pixels per stroke* is used to define a minimum requirement for fonts that should be recognized. The following illustration outlines what is meant by *stroke*:



Because the thickness of strokes depends on country and plate style, measurements like pixels/cm or pixels/inch are not used.

The resolution for best LPR performance should be at least 2.7 pixels/stroke.

Plate width

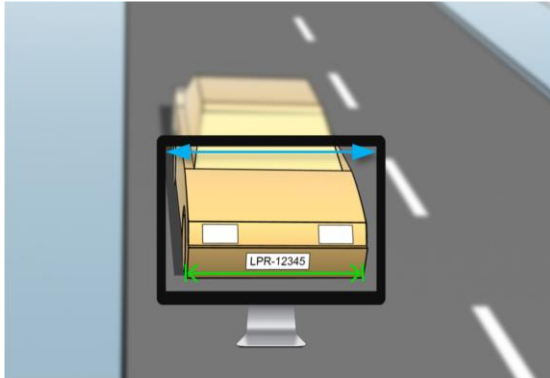
Plate type	Plate width	Setup	Minimum plate width (pixels)
Single line US plates	<ul style="list-style-type: none"> plate width 12 inches stroke width around ¼ inches 	vehicles stopped; no interlacing	130
		vehicles are moving; interlaced	215
Single line European plates	<ul style="list-style-type: none"> plate width 52 cm stroke width around 1 cm 	vehicles stopped; no interlacing	170
		vehicles are moving; interlaced	280

If vehicles are moving when recorded, and an interlaced camera is used, only a half of the image can be used (only the even lines) for recognition compared with a camera configured for stopped vehicles and no interlacing. This means that the resolution requirements are almost double as high.

Image resolution

Image quality and resolution is important for a successful license plate recognition. On the other hand, if the video resolution is too high, the CPU might be overloaded with the risk of skipped or faulty detections. The lower you can set the acceptable resolution, the better CPU-performance and the higher detection rate you get.

In this example we explain how to do a simple image quality calculation and find a suitable resolution for LPR. The calculation is based on the width of a car.



Example of a capture where we want to calculate a suitable resolution.

We estimate that the horizontal width is 200 cm/78 inches, as we assume the width of a standard car is 177 cm/70 inches, and besides that we add ~10% for the extra space. You can also do a physical measuring of the area of interest if you need to know the exact width.

The recommended resolution of the stroke thickness is 2.7 pixels/stroke, and the physical stroke thickness is 1 cm for a European plate and 0.27 inches for a US plate. This gives the following calculation:

Calculation for European plates in cm:

$$200 \times 2.7 \div 1 = 540 \text{ pixels}$$

Recommended resolution = VGA (640×480)

Calculation for US plates in inches:

$$78 \times 2.7 \div 0.27 = 780 \text{ pixels}$$

Recommended resolution = SVGA (800×600)

Because US plates use a font with a narrow stroke, a higher resolution is needed than for European plates.

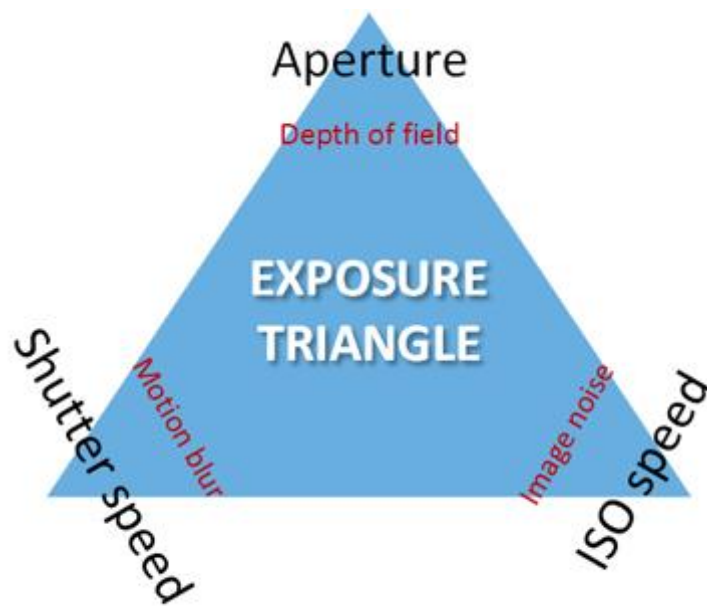
Common video resolutions

Name	Pixels (W×H)
QCIF	176×120
CIF	352×240
2CIF	704×240
VGA	640×480

Name	Pixels (W×H)
4CIF	704×480
D1	720×576
SVGA	800×600
XGA	1024×768
720p	1280×1024

Understanding camera exposure

Camera exposure determines how light/dark and sharp/blurry an image appears when it has been captured. This is determined by three camera settings: aperture, shutter speed, and ISO speed. Understanding their use and interdependency can help you to set up the camera correctly for LPR.



Exposure triangle

You can use different combinations of the three settings to achieve the same exposure. The key is to know which trade-offs to make, since each setting also influences the other image settings:

Camera settings	Controls...	Affects...
Aperture	The adjustable opening that limits the amount of light to enter the camera	Depth of field
Shutter speed	The duration of the exposure	Motion blur
ISO speed	The sensitivity of the camera's sensor to a given amount of light	Image noise

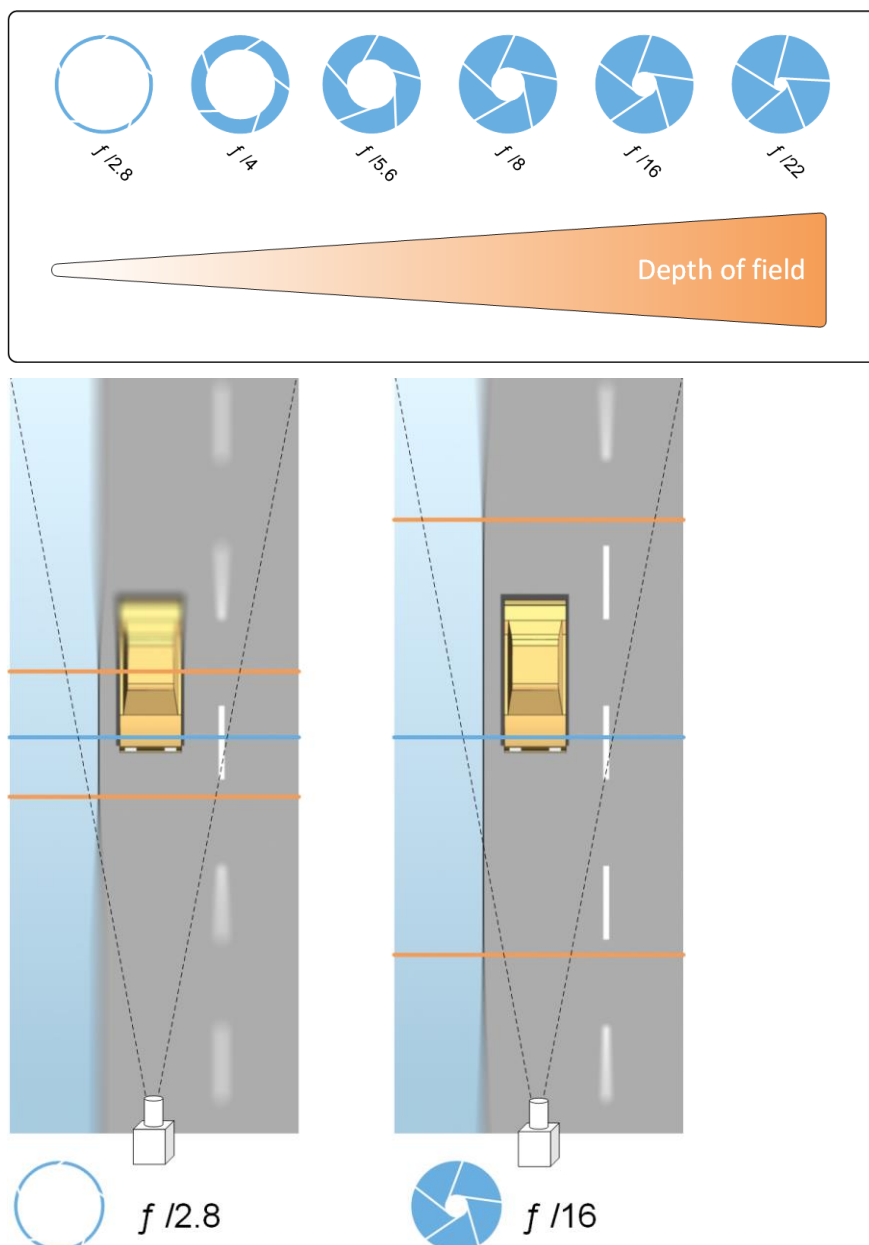
The next sections describe how each setting is specified, what it looks like, and how a given camera exposure mode affects this combination:

Aperture settings

The aperture setting controls the amount of light that enters your camera from the lens. It is specified in terms of an f-stop value, which can at times be counterintuitive, because the area of the opening increases as the f-stop decreases.

Low f-stop value/wide aperture = shallow depth of field

High f-stop value/narrow aperture = large depth of field



The example illustrates how the depth of field is affected by the f-stop value. The blue line indicates the focus point.

A high f-stop value makes it possible to have a longer distance where the license plate is in focus. Good light conditions are important for sufficient exposure. If lighting conditions are insufficient, the exposure time needs to be longer, which again increases the risk of getting blurry images.

A low f-stop value reduces the focus area and thereby the area used for recognition, but is suitable for conditions with low light. If it is possible to ensure that vehicles are passing the focus area at a low speed, a low f-stop value is suitable for a consistent recognition.

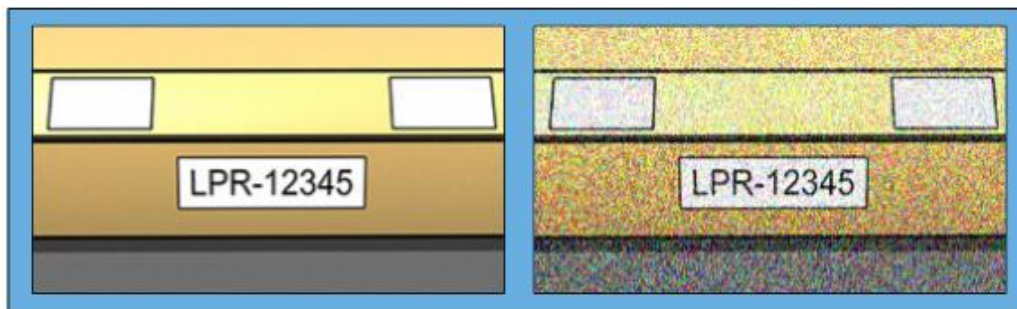
Shutter speed

A camera's shutter determines when the camera sensor is open or closed for incoming light from the camera lens. The shutter speed refers to the duration when the shutter is open and light can enter the camera. Shutter speed and exposure time refer to the same concept, and a faster shutter speed means a shorter exposure time.

Motion blur is undesired for license plate recognition and surveillance. In many occasions vehicles are in motion while license plates are detected which makes a correct shutter speed an important factor. The rule of thumb is to keep the shutter speed high enough to avoid motion blur, but not too high as this may cause under-exposed images depending on light and aperture.

ISO speed

The ISO speed determines how sensitive the camera is to incoming light. Similar to shutter speed, it also correlates 1:1 with how much the exposure increases or decreases. However, unlike aperture and shutter speed, a lower ISO speed is in general desirable, since higher ISO speeds dramatically increase image noise. As a result, ISO speed is usually only increased from its minimum value if the desired image quality is not obtainable by modifying the aperture and shutter speed settings solely.



Example of low and high ISO speed images. High ISO speed on the right image affects the level of image noise negatively.

Common ISO speeds include 100, 200, 400 and 800, although many cameras also permit lower or higher values. With digital single-lens reflex (DSLR) cameras, a range of 50-800 (or higher) is often acceptable.

Physical surroundings

When you mount and use cameras for LPR, note the following factors related to the surroundings:

- **Much light:** Too much light in the surroundings can lead to overexposure or smear.
- **Overexposure** is when images are exposed to too much light, resulting in a burnt-out and overly white appearance. To avoid overexposure, Milestone recommends that you use a camera with a high dynamic range and/or use an auto-iris lens. **Iris** is the adjustable aperture. For that reason, iris has a significant effect on the exposure of images.

- **Smear** is an effect from overexposure that leads to unwanted light vertical lines in images. It is often caused by slight imperfections in the cameras' charge-coupled device (CCD) imagers. The CCS imagers are the sensors used to digitally create the images.



- **Little light:** Too little light in the surroundings or too little external lighting can lead to underexposure.
- **Underexposure** is when images are exposed to too little light, resulting in a dark image with hardly any contrast (on page 316). When auto-gain (see "Unwanted camera features" on page 317) cannot be disabled or when you are not able to configure a maximum allowed shutter time (see "Lens and shutter speed" on page 315) for capturing moving vehicles, too little light will initially lead to gain noise and motion blur in the images, and ultimately to underexposure. To avoid underexposure, use sufficient external lighting and/or use a camera that has sufficient sensitivity in low-light surroundings without using gain.
- **Infrared:** Another way to overcome difficult lighting conditions is to use artificial infrared lighting combined with an infrared-sensitive camera with an infrared pass filter. Retro-reflective license plates are particularly suitable for use with infrared lighting.
- **Retro-reflectivity** is achieved by covering surfaces with a special reflective material which sends a large portion of the light from a light source straight back along the path it came from. Retro-reflective objects appear to shine much more brightly than other objects. This means that at night they can be seen clearly from considerable distances. Retro-reflectivity is frequently used for road signs, and is also used for different types of license plates.
- **Weather:** Snow or very bright sunlight may for example require special configuration of cameras.
- **Plate condition:** Vehicles may have damaged or dirty license plates. Sometimes this is done deliberately in an attempt to avoid recognition.

Lens and shutter speed

When configuring cameras' lenses and shutter speeds for LPR, note the following:

- **Focus:** Always make sure the license plate is in focus.
- **Auto-iris:** If using an auto-iris lens, always set the focus with the aperture as open as possible. In order to make the aperture open, you can use neutral density (ND) filters or—if the camera supports manual configuration of the shutter time—the shutter time can be set to a very short time.

- **Neutral Density (ND)** filters or gray filters basically reduce the amount of light coming into a camera. They work as "sunglasses" for the camera. ND filters affect the exposure of images (see "Understanding camera exposure" on page 312).
- **Infrared:** If using an infrared light source, focus may change when switching between visible light and infrared light. You can avoid the change in focus by using an infrared compensated lens, or by using an infrared pass filter. Note that if you use an infrared pass filter, an infrared light source is required—also during daytime.
- **Vehicle speed:** When vehicles are moving, cameras' shutter time should be short enough to avoid motion blur. A formula for calculating the longest suitable shutter time is:
 - **Vehicle speed in km/h:** Shutter time in seconds = 1 second / (11 × max vehicle speed in kilometers per hour)
 - **Vehicle speed in mph:** Shutter time in seconds = 1 second / (18 × max vehicle speed in miles per hour)

where / denotes "divided by" and × denotes "multiplied by."

The following table provides guidelines for recommended camera shutter speeds for different vehicle speeds:

Shutter time in seconds	Max. vehicle speed in kilometers per hour	Max. vehicle speed in miles per hour
1/50	4	2
1/100	9	5
1/200	18	11
1/250	22	13
1/500	45	27
1/750	68	41
1/1000	90	55
1/1500	136	83
1/2000	181	111
1/3000	272	166
1/4000	363	222

Contrast

When you determine the right contrast for your LPR camera, consider the difference in gray value (when images are converted to 8-bit grayscale) between the license plate's characters and the license plate's background color:



Good contrast



Acceptable contrast; recognition is still possible

Pixels in an 8-bit grayscale image can have color values ranging from 0 to 255, where grayscale value 0 is absolute black and 255 is absolute white. When you convert your input image to an 8-bit grayscale image, the minimum pixel value difference between a pixel in the text and a pixel in the background should be at least 15.

Note that noise in the image (see "Unwanted camera features" on page 317), the use of compression (see "Unwanted camera features" on page 317), the light conditions, and similar can make it difficult to determine the colors of a license plate's characters and background.

Unwanted camera features

When you configure cameras for LPR, note the following:

- **Automatic gain adjustment:** One of the most common types of image interference caused by cameras is gain noise.
- **Gain** is basically the way that a camera captures a picture of a scene and distributes light into it. If light is not distributed optimally in the image, the result is gain noise.

Controlling gain requires that complex algorithms are applied, and many cameras have features for automatically adjusting gain. Unfortunately, such features are rarely helpful in connection with LPR. Milestone recommends that you configure your cameras' auto-gain functionality to be as low as possible. Alternatively, disable the cameras' auto-gain functionality.



License plate image with gain noise

In dark surroundings, you can avoid gain noise by installing sufficient external lighting.

- **Automatic enhancement:** Some cameras use contour, edge or contrast enhancement algorithms to make images look better to the human eye. Such algorithms can interfere with the algorithms used in the LPR process. Milestone recommends that you disable the cameras' contour, edge and contrast enhancement algorithms whenever possible.
- **Automatic compression:** High compression rates can have a negative influence on the quality of license plate images. When a high compression rate is used, more resolution (see "Plate width recommendations" on page 310) is required in order to achieve optimal LPR performance. If a low JPEG compression is used, the negative impact on LPR is very low, as

long as the images are saved with a JPEG quality level of 80% or above, and images have normal resolution, contrast and focus as well as a low noise level.



Left: License plate image saved with a JPEG quality level of 80% (i.e. low compression); acceptable

Right: License plate image saved with a JPEG quality level of 50% (i.e. high compression); unacceptable

XProtect LPR installation

Install XProtect LPR

To run XProtect LPR, you must install:

- At least one LPR server.
- The XProtect LPR plug-in on all computers that run the Management Client and the event server.
- Make sure that the user selected for running the LPR Server service can access the management server.

Milestone recommends that you do not install the LPR server on the same computer as your management server or recording servers.

Start installation:

1. Go to the download page on the Milestone website (<http://www.milestonesys.com/downloads>).
2. Download the two installers:
 - *Milestone XProtect LPR Plug-in* installer to all computers that run the Management Client and the event server.
 - *Milestone XProtect LPR Server* installer to all computers allocated for this purpose. You can also create virtual servers for LPR on one computer.
3. First, run all the *Milestone XProtect LPR Plug-in* installers.
4. Then, run the *Milestone XProtect LPR Server* installer(s).

During installation, specify the IP address or hostname of the management server or image server including the domain user name and password of a user account that has administrator rights to the surveillance system.

5. Launch the Management Client.

In the **Site Navigation pane**, your Management Client automatically lists the installed LPR servers in the **LPR Servers** list.

6. Make sure that you have the necessary licenses (see "XProtect LPR licenses" on page 306).
7. All country modules are automatically installed when you install your XProtect LPR product. However, the installed modules are by default disabled and you must enable the modules (see "Country modules tab" on page 329) that you want to use. You can only enable as many country modules as you have LPR country module licenses for.

You cannot add LPR servers from the Management Client.

If you need to install more LPR servers after the initial installation, run the *Milestone XProtect LPR Server* installer on these servers.

If an antivirus program is installed on a computer running XProtect software, it is important that you exclude the C:\ProgramData\Milestone\XProtect LPR folder. Without implementing this exception, virus scanning uses a considerable amount of system resources and the scanning process can temporarily lock files.

Upgrade XProtect LPR

To upgrade XProtect LPR, you follow the same steps as for installation (see "Install XProtect LPR" on page 318).

If you upgrade from XProtect LPR 1.0 to XProtect LPR 2016, some recognition settings are not compatible with those from the previous configuration. To apply the new settings, you must save your configuration. The settings that previously allowed you to flip, rotate and invert the colors of the video have been removed. If you still need these functions, you must change the settings on the cameras themselves.

XProtect LPR configuration

View LPR server information

To check the state of your LPR servers:

1. In the **Site Navigation pane**, expand **Servers** and select **LPR servers**. Go to the Overview pane.

The **LPR server information** window opens with a summary of the server status:

- Name
- Host name
- Status

2. Select the relevant LPR server and review all details for this server (see "LPR server information properties" on page 319).

LPR server information properties

Field	Description
Name	Here you can change the name of the LPR server.

Field	Description
Host name	Shows the LPR server host name. The first part of the name of the LPR server consists of the name of the host computer for your LPR server installation. Example: <i>MYHOST.domainname.country</i> .
Status	Shows the status of the LPR server. If the server has just been added, the status is: <ul style="list-style-type: none"> • <i>No LPR cameras configured.</i> If the system is running without problems, the status is: <ul style="list-style-type: none"> • <i>All LPR cameras are running.</i> Alternatively, the system returns: <ul style="list-style-type: none"> • <i>Service not responding.</i> • <i>Not connected to surveillance system.</i> • <i>Service not running.</i> • <i>Event Server not connected.</i> • <i>Unknown error.</i> • <i>X of Y LPR cameras running.</i>
Service up time	Shows the up time since the LPR server was last down and the LPR server service started.
Computer CPU usage	Shows the current CPU usage on the entire computer with the LPR server(s) installed.
Memory available	Shows how much memory is available on the LPR server.
Recognized license plates	Shows the number of license plates that the LPR server has recognized in this session.
LPR cameras	Shows a list of enabled LPR cameras that run on the LPR server and their status.
LPR cameras available	Based on your license, this number shows how many additional LPR cameras you are allowed to add and use on all your LPR servers in total.
Country modules available	Based on your license, this number shows how many additional country modules you are allowed to use on all your LPR servers in total. It also lists the number of country modules already in use.

Configuring cameras for LPR

Requirements for LPR in the Management Client

Once cameras have been mounted and added in the Management Client, adjust each camera's settings so that they match the requirements for LPR. You adjust camera settings on the properties tabs for each camera device.

For the relevant cameras, Milestone recommends to:

- Set the video codec to JPEG.

Note that if you use H.264 or H.265 codec, only key frames are supported. This is usually only one frame per second which is not enough for LPR. For higher frame rates, always use a JPEG codec.

- Specify a frame rate of four frames per second.
- Avoid compression, so set a fine quality.
- If possible, specify a resolution below one megapixel.
- If possible, keep automatic sharpness at a low level.

To learn about LPR fundamentals, make yourself familiar with the information in Preparing cameras for LPR (explained) (on page 306).

Snapshots (explained)

The system uses snapshots to optimize the configuration automatically and to visualize the effect of the recognition settings as they are applied.

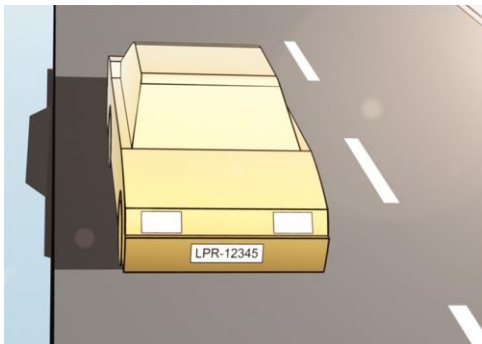
You need to provide at least one valid snapshot in order to complete the initial configuration of a camera.

As a guideline, capture snapshots of vehicles in the real physical surroundings and conditions, in which you want to be able to recognize license plates.

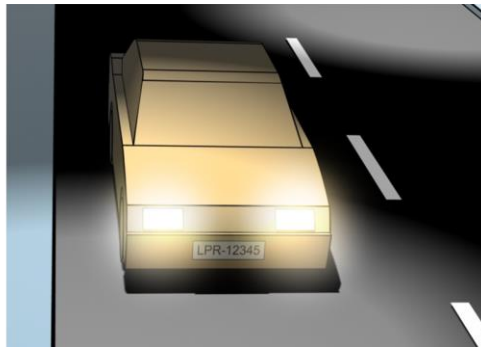
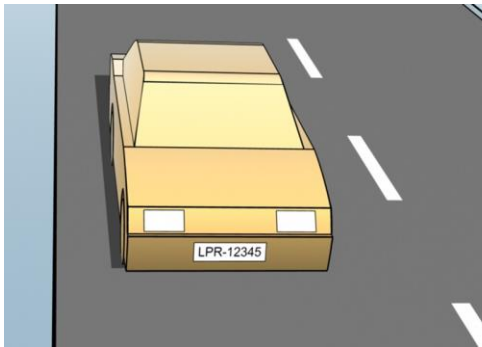
The list below illustrates examples of the situations that you should consider when you capture and select snapshots. Not all may be applicable to your surroundings.

Milestone recommends that you select minimum 5-10 snapshots that represent typical conditions of:

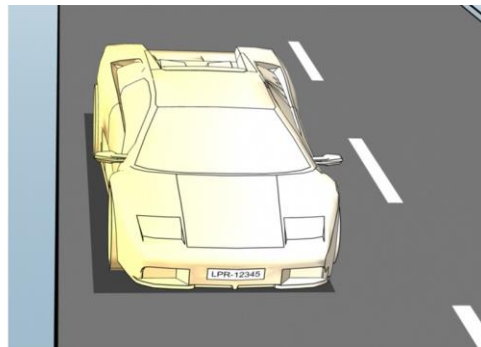
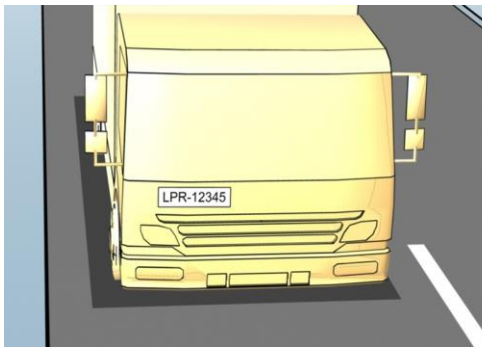
- **The weather; for example, sunlight and rain**



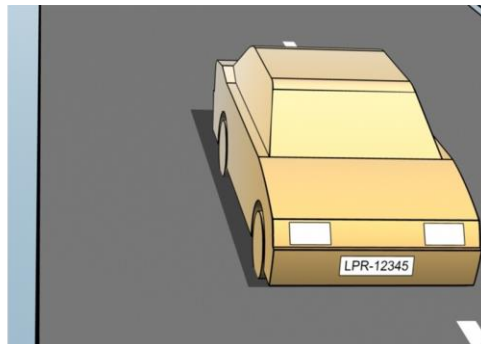
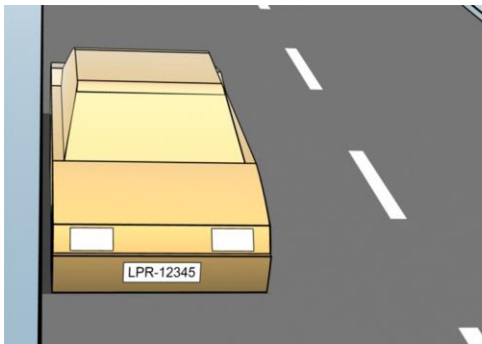
- **The light;** for example, daylight and nighttime



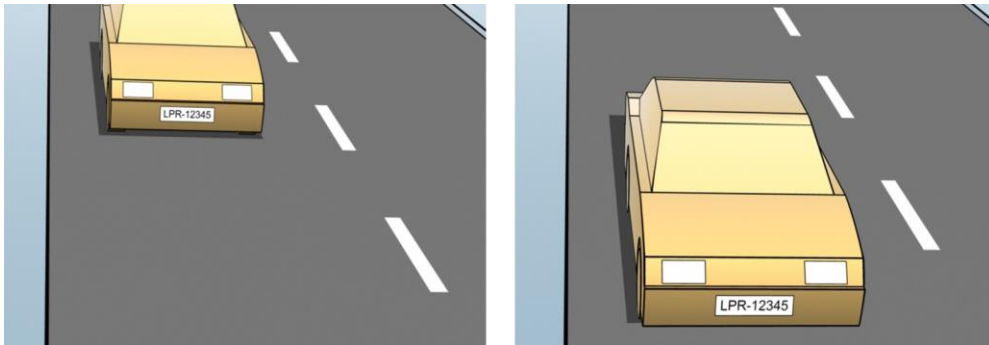
- **Vehicle types;** to define the top and bottom of the recognition area



- **Position in the lane;** to define the left and right of the recognition area



- **Distance to the car; to define the area where LPR analyzes license plates**



Add LPR camera

To configure cameras for LPR, you initially run the **Add LPR camera** wizard. The wizard takes you through the main configuration steps and automatically optimizes the configuration.

To run the wizard:

1. In the **Site Navigation pane**, expand **Servers**, expand **LPR servers**, and select **LPR camera**.
2. Go to the Overview pane. Right-click **LPR camera**.
3. From the menu that appears, select **Add LPR camera** and follow the instructions in the wizard:
 - Select the camera you want to configure for LPR.
 - Select which country modules you want to use with your LPR camera (see "Country modules tab" on page 329).
 - Select snapshots to use for validating the configuration (see "Snapshots (explained)" on page 321).
 - Validate the result of the snapshot analysis (see "Validate configuration" on page 331).
 - Select which license plate match lists to use (see "License plate match lists (explained)" on page 332). Choose the default selection, if you have not yet created any lists.

4. On the last page, click **Close**.

The LPR camera appears in the Management Client and based on your selections, the system has optimized the recognition settings for the camera (see "Recognition settings tab" on page 324).

5. Select the camera you have added and review its settings. You only need to change the configuration if the system does not recognize license plates as well as expected.
6. In the **Recognition settings** tab, click Validate configuration (on page 331).

Adjust settings for your LPR camera

The system automatically optimized the configuration of your LPR camera, when you added the LPR camera with the **Add LPR camera** wizard. If you want to make changes to the initial configuration, you can:

- Change the name of the server or change server (see "Info tab" on page 324)
- Adjust and validate the recognition settings (see "Recognition settings tab" on page 324)
- Add more license plate match lists (see "Match lists tab" on page 328)
- Enable additional country modules (see "Country modules tab" on page 329)

Info tab

This tab provides information about the selected camera:

Name	Description
Enable	LPR cameras are by default enabled after the initial configuration. Disable any camera that is not used in connection with LPR. Disabling an LPR camera does not stop it from performing normal recording in the surveillance system.
Camera	Shows the name of the selected camera as it appears in the XProtect Management Client and the clients.
Description	Use this field to enter a description (optional).
Change Server	Click to change LPR server. Changing the LPR server can be a good idea if you need to load balance. For example, if the CPU load is too high on an LPR server, Milestone recommends that you move one or more LPR cameras to another LPR server.

Recognition settings tab

Change recognition settings manually. Based on the snapshots you provided, the system auto-configured the recognition settings. Changing these settings can greatly affect the recognition success rate.

Action buttons

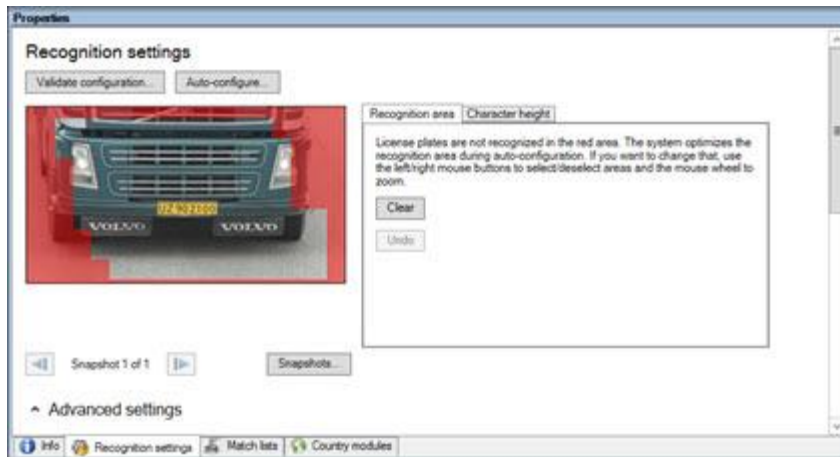
Change, update, and validate auto-configured settings.

Name	Description
Validate configuration	Test that license plates are recognized as expected (see "Validate configuration" on page 331).
Auto-configure	Discard manual changes and auto-configure settings (see "Auto-configure" on page 331).
Snapshots	Add or delete snapshots (see "Select snapshots" on page 330).

Recognition area

To ensure best performance and avoid false recognitions, Milestone recommends that you select a clearly defined and "well-trimmed" recognition area. The area should cover only the part of the image where the license plate is visible and remains visible as the vehicle moves in and out of the image. Avoid irrelevant moving objects (people, trees, traffic) in the recognition area (see "Positioning the camera" on page 308).

License plates are not recognized in the red area.



When specifying a recognition area, you can click:

- **Clear** to remove all selections and select new areas for LPR.
- **Undo** to revert to your last saved recognition area.

After changing the settings for your LPR camera, validate your configuration (see "Validate configuration" on page 331) to check if the system recognizes license plates as well as expected.

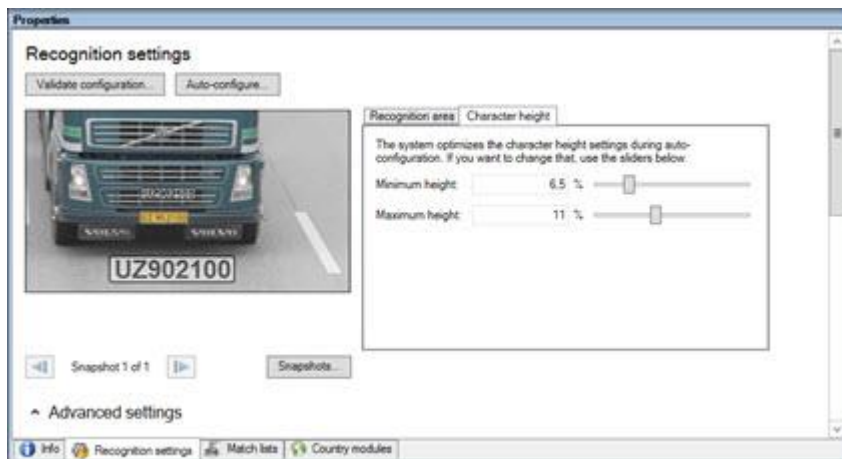
Character height

Define the minimum and maximum height of the license plate characters (in percent). Select character heights as close as possible to the height of the characters in the real license plate.

These character settings affect the recognition time and process. The smaller the difference between the minimum and the maximum character height:

- The smoother the LPR process.
- The lower the CPU load.

- The sooner you get the results.



The overlay in the snapshot displays the currently defined character height setting. The overlay grows and shrinks proportionally to the character height settings to the right. For easy comparison, drag the overlay on top of the real license plate in the snapshot. Zoom with your mouse wheel for a closer look.

Name	Description
Minimum height	Set the minimum character height for including license plates in the recognition process. If the real license plate characters are smaller than the value you specify, the system will not start the recognition process.
Maximum height	Set the maximum character height for including license plates in the recognition process. If the real license plate characters are bigger than the value you specify, the system will not start the recognition process.

After changing the settings for your LPR camera, validate your configuration (see "Validate configuration" on page 331) to check if the system recognizes license plates as well as expected.

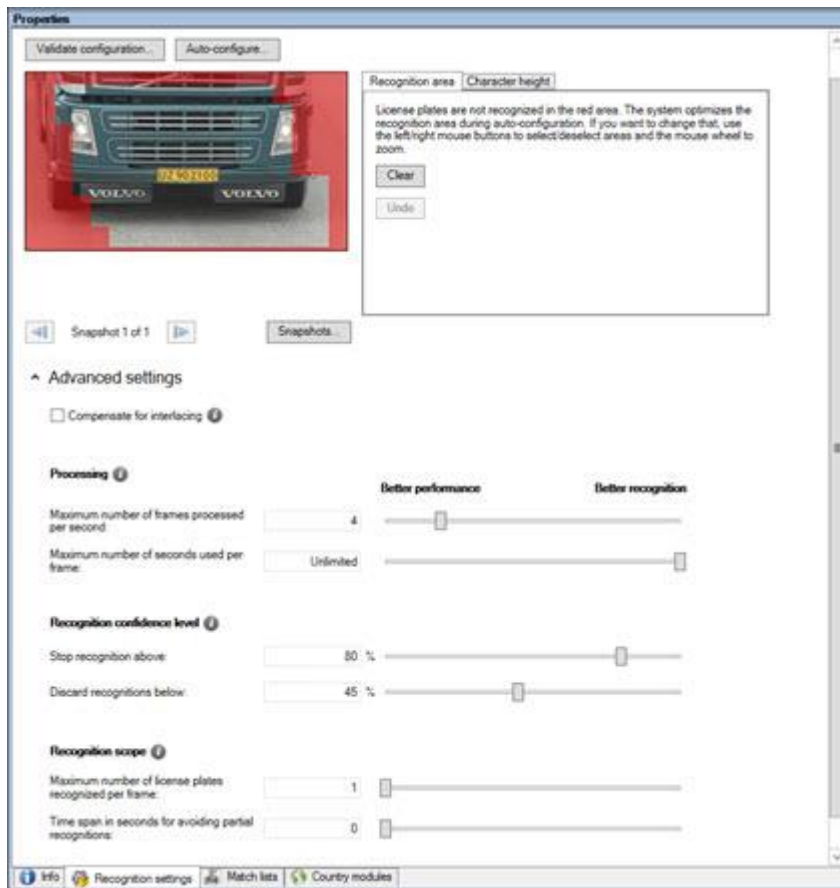
Advanced settings

The recognition process has two steps: 1) finding the plate(s) and 2) recognizing the characters in the plates. Click **Advanced settings** to define a trade-off between processing speed and recognition quality.

High recognition quality:

- needs higher computational effort.
- increases CPU load.

- takes more time to return results.



The recognition process stops when the optimal results are met and returns the license plate it recognized at that point.

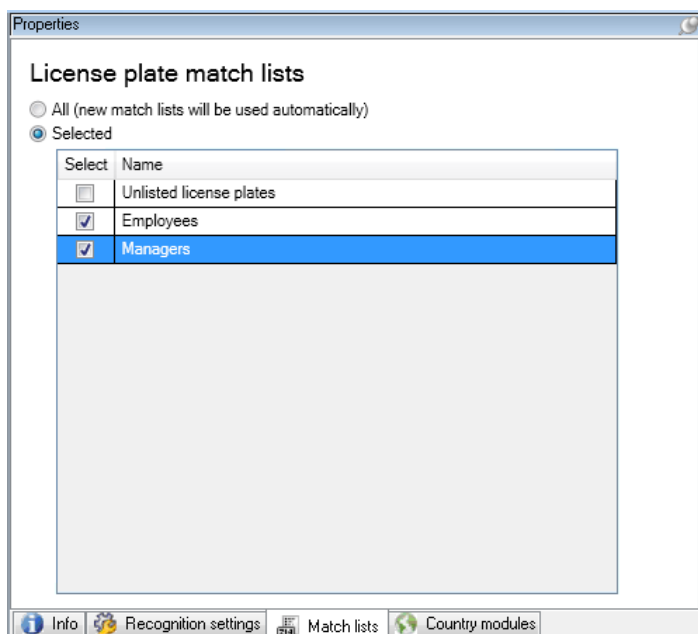
Name	Description
Compensate for interlacing	If your LPR camera records interlaced video, and you see a combing effect in the de-interlaced image in LPR, select this check box. This may improve image quality and recognition results.
Maximum number of frames processed per second	Limit the number of frames your system processes every second. If you keep this setting low, you can increase the frame rate on your camera without adding unnecessary load to your LPR server. Unlimited: Remove the top limit. You will risk increasing the processing time and the CPU load.
Maximum number of seconds used per frame	Limit the number of seconds your LPR can spend on recognizing one frame. If adjusted, the recommended value is 0.2 seconds per frame. Unlimited: Remove the top limit. You will risk increasing the processing time and the CPU load.
Stop recognition above	Stop recognition when a license plate is recognized with a confidence level equal to or above the value you specify.

Name	Description
Discard recognitions below	<p>Discard recognitions with a confidence level below the value you specify. Increase this value to get fewer but possibly more accurate recognitions. Decrease this value to get more but potentially less accurate recognitions.</p> <p>The smaller the difference between Stop recognition above and Discard recognitions below values, the lower the processing time and the CPU load.</p>
Maximum number of license plates recognized per frame	<p>Recognize several license plates simultaneously. For example, relevant for cameras recording multi-lane roads, where many license plates must be recognized at the same time.</p> <p>Unlimited: Remove the top limit. You will risk increasing the processing time and the CPU load.</p>
Time span in seconds for avoiding partial recognitions	<p>Delay all recognitions for the time period you specify. This is to avoid that the same license plate is recognized several times as different license plates. The system will wait for a better recognition and only accept the most complete recognition.</p> <p>Note: Before changing this setting, ensure no irrelevant moving objects (see "Camera angles" on page 309) block the view of your LPR camera.</p>

After changing the settings for your LPR camera, validate your configuration (see "Validate configuration" on page 331) to check if the system recognizes license plates as well as expected.

Match lists tab

On this tab you select which license plate match list(s) you want a specific LPR camera to match license plates against. You can create as many lists as you need (see "Add new license plate match lists" on page 332).



Name	Description
All	License plates are matched against all available and future lists.
Selected	License plates are matched against the selected lists only. Select one or more from the available lists.

After changing the settings for your LPR camera, validate your configuration (see "Validate configuration" on page 331) to check if the system recognizes license plates as well as expected.

Country modules tab

Here you select the country modules that you want to use with a specific LPR camera. The list that you can select from, depends on which modules you have installed and your licenses (see "XProtect LPR licenses" on page 306).

A country module is a set of rules that defines license plates of a certain type and form belonging to a certain country, state or region.

Already licensed modules appear with a check mark in the **Licensed** column. If the country module you are looking for is not on your list, contact your vendor.

Properties

Country modules

Select	Country module	Country code	Licensed
<input type="checkbox"/>	Croatia	HR	<input type="checkbox"/>
<input type="checkbox"/>	Czech Republic	CZ	<input type="checkbox"/>
<input type="checkbox"/>	Democratic Republic of Congo	RCB	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Denmark	DK	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Ecuador	EC	<input type="checkbox"/>
<input type="checkbox"/>	Egypt	ET	<input type="checkbox"/>
<input type="checkbox"/>	Estonia	EST	<input type="checkbox"/>
<input checked="" type="checkbox"/>	EU	X_EU	<input type="checkbox"/>
<input type="checkbox"/>	Faroe Islands	FO	<input type="checkbox"/>
<input type="checkbox"/>	Finland	FIN	<input type="checkbox"/>
<input type="checkbox"/>	France	F	<input type="checkbox"/>
<input type="checkbox"/>	Generic	X_XX	<input type="checkbox"/>
<input type="checkbox"/>	Germany	D	<input type="checkbox"/>
<input type="checkbox"/>	Ghana	GH	<input type="checkbox"/>
<input type="checkbox"/>	Great Britain	GB	<input type="checkbox"/>
<input type="checkbox"/>	Greece	GR	<input type="checkbox"/>
<input type="checkbox"/>	Guyana	GUY	<input type="checkbox"/>
<input type="checkbox"/>	Honduras	HON	<input type="checkbox"/>
<input type="checkbox"/>	Hong Kong	HK	<input type="checkbox"/>
<input type="checkbox"/>	Hungary	H	<input type="checkbox"/>
<input type="checkbox"/>	Iceland	IS	<input type="checkbox"/>

7 free country module license(s) available.

Selected country modules:
Denmark (DK)
EU (X_EU)

Info Recognition settings Match lists Country modules

Name	Description
Select	Click to select or deselect a country module. The list of selected country modules on the right side updates automatically.
Country Module	Lists the installed country modules.
Country Code	Letters that identify a country module.
Licensed	Shows if a country module is already licensed. You can select a licensed country module for as many cameras as you like.

After changing the settings for your LPR camera, validate your configuration (see "Validate configuration" on page 331) to check if the system recognizes license plates as well as expected.

Extend time span for avoiding partial recognitions

If parts of the same license plate are recognized as separate and incomplete plate numbers, ensure no irrelevant moving objects (see "Camera angles" on page 309) block the view of your LPR camera. If the problem persists, give the system more time to avoid partial recognitions. Your recognitions will be more accurate, but they will all show up delayed.

1. In the **Site Navigation pane** pane, expand **Servers**.
2. Expand **LPR servers** and click **LPR cameras**.
3. In the **LPR cameras** pane, find and click the camera to modify.
4. On the **Recognition settings** tab, click **Advanced settings**.
5. In the **Time span for avoiding partial recognitions** field, drag the slider to the right to give the system a maximum of five extra seconds to recognize the most complete license plate numbers and discard the rest.

Select snapshots

When you configured the LPR initially with the **Add LPR camera** wizard, you also added snapshots (see "Snapshots (explained)" on page 321). You can always add additional representative snapshots to improve the optimization of the configuration.

1. Select the relevant camera.
2. In the **Recognition settings** tab, click **Snapshots**.
3. Capture snapshots from live video or import them from an external location. Click **Next**.
The system analyzes the snapshots you have selected for the camera.
4. On the next page, approve or reject each of the snapshots. If the system could not recognize any license plates, click **Previous** to add new snapshots in a better quality. If the system still cannot provide correct recognitions, you probably need to change your configuration. Check that the camera is mounted and configured correctly (see "Preparing cameras for LPR (explained)" on page 306).
5. When you have approved all snapshots, click **Next** and close the wizard.
6. On the **Recognition settings** tab, click **Validate configuration** (on page 331).

Validate configuration

You can validate your current configuration to see if you need to change any settings or provide more snapshots. The validation function informs you about how many license plates your system recognizes, and if they are recognized correctly.

It can help you decide if your confidence level is set correctly and if your system configuration is optimal.

1. Select the relevant camera.
2. From the **Recognition settings** tab, click **Validate configuration**.

Based on the current settings, the system analyzes the snapshots you have selected for the camera and provides a result summary:

- **License plates detected:** The number of recognized license plates, for example, 3 of 3.
- **Average confidence:** The average percent of confidence with which the license plates have been recognized.
- **Average processing time:** The average time it took to analyze a snapshot and return a reading measured in ms.

License plates detected:	2 of 2
Average confidence:	91 %
Average processing time:	112 ms

3. If the current configuration meets your requirements, click **Close**.
4. If you want to investigate the results further, click **Next**, and you can review the results for each snapshot. This helps you to identify the situations that cause problems.

You can validate the configuration as many times as you like and on any LPR camera and with different settings.

Auto-configure

Auto-configuration of the LPR camera overwrites any manual changes you have made to the settings. You can select this option if, for example, you have made manual changes that have not given you good recognition results.

1. From the **Recognition settings** tab, click **Auto-configure**.

A new dialog box appears.

2. Confirm that you want to return to auto-configured settings by clicking **Next**.

The system optimizes the settings.

3. Click **Close**.
4. If prompted, confirm to save the configuration.
5. Review and validate (see "Validate configuration" on page 331) the new settings.

Working with license plate match lists

License plate match lists (explained)

License plate lists are collections of license plates that you want your LPR solution to treat in a special way. License plate recognitions are compared with these lists and if there is a match, the system triggers an LPR event. The events are stored on the event server and can be searched for and viewed on the **LPR** tab in XProtect Smart Client.

By default, events are stored for 24 hours. To change this, open the **Options** dialog box in the Management Client and on the **Event Server Settings** tab, in the **Keep events for** field, enter a new time frame.

After specifying a license plate match list, you can set up additional events and alarms to be triggered on a match.

Examples:

- A company headquarter uses a list of executive management's company car license plates to grant executives access to a separate parking area. When executives' license plates are recognized, the LPR solution triggers an output signal that opens the gate to the parking area.
- A chain of gas stations creates a list of license plates from vehicles that have previously left gas stations without paying for their gas. When such license plates are recognized, LPR triggers output signals that activate an alarm and temporarily block the gas supply to certain gas pumps.

Triggered events can also be used for making cameras record in high quality or similar. You can even use an event to trigger combinations of such actions.

Unlisted license plates list (explained)

Often you would trigger an event when a license plate that is included in a list is recognized, but you can also trigger an event with a license plate which is **not** included in a list.

Example: A private car park uses a list of license plates to grant residents' vehicles access to the car park. If a vehicle with a license plate that is not in the list approaches the car park, the LPR solution triggers an output signal which lights a sign telling the driver to obtain a temporary guest pass from the security office.

To trigger a surveillance system event, when a license plate that is **not** on a list is recognized, use the **Unlisted license plates** list. You select it for a camera like any other list (see "Match lists tab" on page 328) and set it up like any other list (see "Events triggered by LPR" on page 335).

Add new license plate match lists

1. In the **Site Navigation pane**, select **License plate match lists**, right-click and select **Add New**.
2. In the window that appears, give the list a name and click **OK**.

As soon as you have created a license plate list, it becomes visible in the **License plate match list** and on the **Match lists** tab for all your LPR cameras.

3. If you want to add columns to the match list, click **Custom field** and specify the columns in the dialog box that opens (see "Edit custom fields properties" on page 335).
4. To update the match list, use the **Add**, **Edit**, **Delete** buttons (see "Edit license plate match lists" on page 333).

5. Instead of defining the match list directly in the Management Client, you can import a file (see "Import/export license plate match lists" on page 333).
6. If prompted, confirm to save changes.

Edit license plate match lists

1. In the **Site Navigation pane**, select **License plate match lists**.
2. Go to the Overview pane. Click the relevant list.
3. The **License plate match list information** window opens.
4. To include new rows to your list, click **Add** and fill out the fields:
 - Do not include any spaces.
 - Always use capital letters.

Examples: *ABC123* (correct), *ABC 123* (incorrect), *abc123* (incorrect)

 - You can use wildcards in your license plate match lists. Do this by defining plates with a number of ?'s and the letter(s) and/or number(s) which must appear at specific places.

Examples: *?????A*, *A?????*, *???1??*, *22??33*, *A?B?C?* or similar.
5. If prompted, confirm to save changes.

Import/export license plate match lists

You can import a file with a list of license plates that you want to use in a license plate match list. You have the following import options:

- Add license plates to the existing list.
- Replace the existing list.

This is useful if, for example, the lists are managed from a central location. Then all local installations can be updated by distributing a file.

Similarly, you can export the complete list of license plates from a match list to an external location.

Supported file formats are .txt or .csv.

To import:


1. In the **Site Navigation pane**, click **License plate match lists** and select the relevant list.
2. To import a file, click **Import**.
3. In the dialog box, specify the location of the import file and the import type. Click **Next**.
4. Await the confirmation and click **Close**.

To export:

1. To export a file, click **Export**.
2. In the dialog box, specify the location of the export file and click **Next**.

3. Click **Close**.
4. You can open and edit the exported file in, for example, Microsoft Excel.

License plate match list properties

Name	Description
Name	Shows the name of the list. If needed, you can change the name.
Custom fields	Click to specify which license plate entry columns that you or the client user can add additional information to. See Custom fields (properties) (see "Edit custom fields properties" on page 335).
Search	Search the list for specific license plates, numbers, patterns or similar. If needed, you can use ? as a single wildcard
Add	<p>Click to add a license plate.</p> <ul style="list-style-type: none"> Do not include any spaces. Always use capital letters. <p>Examples: ABC123 (correct), ABC 123 (incorrect), abc123 (incorrect)</p> <ul style="list-style-type: none"> You can use wildcards in your license plate lists. Do this by defining plates with a number of ?'s and the letter(s) and/or number(s) which must appear at specific places. <p>Examples: ?????A, A?????, ???1??, 22??33, A?B?C? and similar.</p> <p>Some regional areas might have exceptions to these rules. For example, personalized plates with spaces. Plates with two sets of characters which must be recognized separately by an underscore character (_). Or plates from certain regions with letters on a different background color on parts of the license plate.</p> <p>Example: </p>
Edit	Click to edit a license plate. You can select multiple rows for editing.
Delete	Click to delete the selected license plate(s).
Import	Click to import license plates from any comma-separated file, for example a .txt-file or .csv-file (see "Import/export license plate match lists" on page 333).
Export	Click to export the entire license plate list to a comma-separated file, for example a .txt-file or .csv-file (see "Import/export license plate match lists" on page 333).
Rows per page	Select how many license plates to display in one page (one screen). You can choose between 50 to 1000 rows.
Events triggered by list match	Select which event(s) should be triggered by a list match (see "Events triggered by LPR" on page 335). You can choose between all available types of events defined in your system.

Edit custom fields properties

You can add columns to your license plate match lists for additional information. You define the name and number of columns as well as the field content.

The XProtect Smart Client users can update the information in the columns but not the columns themselves.

Name	Description
Add	Adds a column to the match list. Type a name for the column.
Edit	Click to edit the name of the column.
Delete	Deletes a column.
Up	Changes the order of the columns.
Down	Changes the order of the columns.

Events triggered by LPR

After you have created license plate match lists (see "Add new license plate match lists" on page 332), you can associate them with all types of events defined in your system.

The type of events available depends on the configuration of your system. In connection with LPR, events are used to trigger output signals for, for example, raising of parking barrier or making cameras record in high quality. You can also use an event to trigger combinations of such actions. See License plate match lists (explained) (on page 332) for more examples.

Set up system events triggered by list matches

1. Expand **Servers**, click **License plate match list** and select the list to which you want to associate an event.
2. In the **License plate match list information** window, next to the **Events triggered by list match** selection field, click **Select**.
3. In the **Select triggered events** dialog box, select one or more events.
4. If prompted, confirm to save changes.
5. The event is now associated with recognitions on the selected license plate match list.

To trigger a surveillance system event, when a license plate that is **not** on a list is recognized, configure the **Unlisted license plates** list.

Alarms triggered by LPR

You can associate some types of alarms with events from XProtect LPR. Do the following:

1. Create the license plate match list (see "Add new license plate match lists" on page 332) you want to match license plates against.
2. Add and configure your LPR camera(s) (see "Add LPR camera" on page 323).

3. In the **Site Navigation pane**, expand **Alarms**, right-click **Alarm Definitions** and select to create a new alarm.
4. The **Alarm Definition Information** window appears. Select the relevant properties (see "Alarm Definitions for LPR" on page 336).
5. If prompted when done, confirm to save changes.
6. Configure the alarm data settings for LPR (see "Alarm Data Settings for LPR" on page 336).

Alarm Definitions for LPR

Except for defining **Triggering events**, the settings for **Alarm Definitions** are the same for LPR as for the remaining part of the system.

To define triggering events related to LPR, select the event message to use when the alarm is triggered:

1. In the **Triggering events** field, in the top drop-down list, decide what type of event to use for the alarm. The list offers **License plate match lists** and **LPR server** events (see "Working with license plate match lists" on page 332).
2. In the second drop-down list, select the specific event message to use. If you selected **License plate match lists** in the drop-down above, select a license plate list. If you selected **LPR server**, select the relevant LPR server event message:
 - LPR camera connection lost
 - LPR camera running
 - LPR server not responding
 - LPR server responding

For information about the remaining alarm definition settings, see the **Alarms** section.

Alarm Data Settings for LPR

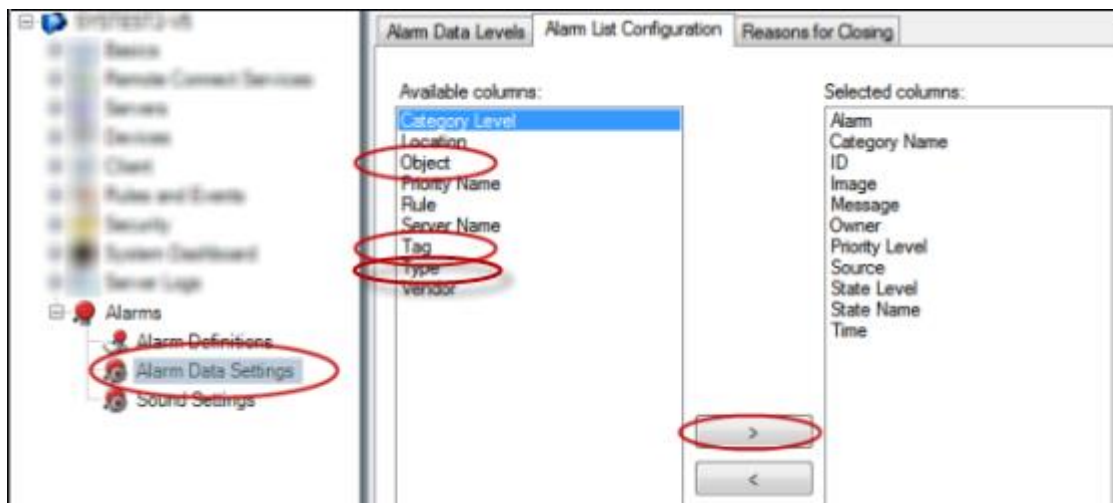
In the Management Client, you must make two specific **Alarm List Configuration** elements available for selection in XProtect Smart Client.

These two elements are used for configuring alarm lists in the **Alarm Manager** tab in XProtect Smart Client. The relevant elements are **Object**, **Tag**, and **Type**, which are essential for recognizing license plate numbers (Object) and country codes (Tag).

Do the following in the Management Client:

1. In the **Site Navigation pane**, expand **Alarms**, select **Alarm Data Settings**.

2. On the **Alarm List Configuration** tab, select **Object**, **Tag**, and **Type** and click **>**.



3. If prompted, confirm to save changes.

LPR maintenance

LPR Server Manager (explained)

After installing an LPR server, you can check the status of its services with the XProtect LPR Server Manager. You can, for example, start and stop the LPR Server Service, view status messages, and read log files.

- Access LPR server state information via the **LPR Server Manager** icon in the notification area of the **computer running the LPR server**.



Example: LPR Server Manager icon in notification area.

In the Management Client, you can get a full overview of the status of your LPR servers (see "View LPR server information" on page 319).

Start and stop LPR Server Service

The LPR Server Service starts automatically after installation. If you have stopped the service manually, you can restart it manually.

1. Right-click the **LPR Server Manager** icon in the notification area.
2. From the menu that appears, select **Start LPR Server Service**.
3. If needed, select **Stop LPR Server Service** to stop the service again.

Show LPR server status

1. On your LPR server, right-click the **LPR Server Manager** icon in the notification area.

2. From the menu that appears, select **Show LPR server status**.

If the system is running without problems, the status is: *All LPR cameras running*.

Other statuses are:

- *Service not responding*
- *Not connected to surveillance system*
- *Service not running*
- *Event Server not connected*
- *Unknown error*
- *X of Y LPR cameras running*

Show LPR server log

Log files are a useful tool for monitoring and troubleshooting the status of the LPR Server Service. All entries are time-stamped, with the most recent entries at the bottom.

1. In the notification area, right-click the **LPR Server Manager** icon.
2. From the menu that appears, select **Show LPR server Log File**.

A log-viewer lists the server activities with time stamps.

Change LPR server settings

The LPR server must be able to communicate with your management server. To enable this, you specify the IP address or hostname of the management server during the installation of the LPR server.

If you need to change the address of the management server, do the following:

1. Stop (see "Start and stop LPR Server Service" on page 337) the LPR Server Service.
2. In the notification area, right-click the **LPR Server Manager** icon.
3. From the menu that appears, select **Change settings**. The **LPR Server Service settings** window appears.
4. Specify the new values and click **OK**.
5. Restart the LPR Server Service.

Uninstall XProtect LPR

If you want to remove XProtect LPR from your system, uninstall the two components separately using the regular Windows removal procedure:

- On the computers where the XProtect LPR plug-in is installed, uninstall *Milestone XProtect LPR [version] Plug-in*.
- On the computers where the XProtect LPR server is installed, uninstall *Milestone XProtect LPR [version] Server*.

XProtect Transact

XProtect Transact introduction

XProtect Transact (explained)

Available functionality depends on the system you are using. See the Product comparison chart for more information.

XProtect Transact is an add-on to Milestone's IP video surveillance solutions.

XProtect Transact is a tool for observing ongoing transactions and investigating transactions in the past. The transactions are linked with the digital surveillance video monitoring the transactions, for example to help you prove fraud or provide evidence against a perpetrator. There is a 1-to-1 relationship between the transaction lines and video images.

The transaction data may originate from different types of transaction sources, typically point of sales (PoS) systems or automated teller machines (ATM).

XProtect Transact system architecture

There are several components in the XProtect Transact communication flow. The input data originates from the video surveillance cameras and the transaction sources providing the transaction data, for example cash registers or ATMs. The transaction data is stored on the event server, whereas the video stream is stored on the recording server. From the servers, the data is passed on to XProtect Smart Client.

Depending on your system, there may be several recording servers.

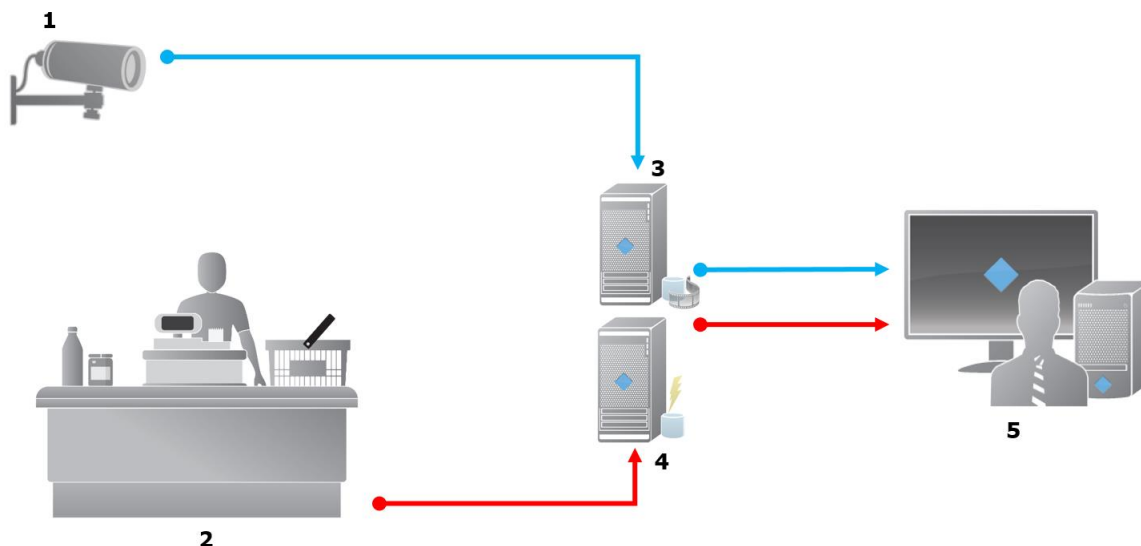


Illustration:

- 1 = Camera.
- 2 = Cash register.
- 3 = Recording server.

- 4 = Event server.
- 5 = Smart Client.
- The blue arrows outline video recordings from the surveillance system.
- The red arrows outline transaction data from the transaction sources.

By standard, XProtect Transact supports two types of transaction sources:

- Serial port clients.
- TCP server clients.

Additional types of transaction sources may be supported through custom connectors developed with the MIP software development kit (SDK), for example a connector that retrieves transaction data from an enterprise resource planning (ERP) system.

Connectors (explained)

A connector facilitates import of raw transaction data from the transaction source, for example the ATM, into the event server associated with the VMS.

The built-in connectors available are described in the table:

Name	Description
TCP client connector	Use when the transaction source delivers the transaction data through a TCP server interface. This connector has two settings that you can specify: host name and port number.
Serial port connector	Use when receiving transaction data as input on a serial port on the event server.

Connectors developed through the MIP software development kit may also be available.

See also

Add transaction source (wizard) (on page 342)

Transaction definitions (explained)

A transaction definition is a group of settings that help you control how raw data from the transaction sources are displayed in XProtect Smart Client together with the video recordings. The output is a reader-friendly format that resembles real-life receipts, for example till receipts and receipts from automated teller machines.

More specifically, transaction definitions let you:

- define when the individual transactions begin and end.
- insert line breaks as required.
- filter out unwanted characters or text strings, for example if the data comes from a printer connection and contains unprintable characters for indicating line breaks, when to cut off a till receipt.
- substitute characters with other characters.

You can use the same transaction definition on multiple transaction sources.

See also

Add transaction definitions (on page 344)

Transaction events (explained)

A transaction event is the occurrence of specific words, numbers, or characters in the stream of transaction data that flows from the transactions sources, for example the cash registers, to the event server. As a system administrator, you need to define what the events are. This allows the operator to track and investigate transaction events in XProtect Smart Client. For each event, a method (match type) must be specified to identify strings in the transaction data: exact match, wildcard, or regular expression.

See also

Define a transaction event (see "Define transaction events" on page 347)

Create a transaction alarm (see "Create alarms based on transaction events" on page 348)

Compatibility

XProtect Transact is compatible with version 2016 R1 or newer of:

- XProtect Corporate
- XProtect Expert

XProtect Transact is compatible with version 2017 R2 or newer of:

- XProtect Professional+
- XProtect Express+

Getting started

The XProtect Transact functionality is standard in Management Client. When you have activated the base license and transaction source licenses, the features are available immediately. Before using the XProtect Transact features in XProtect Smart Client, you should:

1. Verify that your base license for XProtect Transact has been activated. In addition, verify that you have a transaction source license for each transaction source that you need to monitor. License information is available under the **Basics** node.

If you do not have the sufficient number of transaction source licenses, make sure that you acquire additional licenses before the 30-days grace period expires.

2. Add and configure the sources providing the transaction data, for example the cash registers. For more information, see Add transaction source (wizard) (on page 342).
3. (optional) Define the transaction events and potentially configure them to trigger rules or alarms. In XProtect Smart Client, the operator can investigate the transaction events.

Even if you have not purchased any XProtect Transact licenses, you can try out XProtect Transact with a trial license. For more information, see XProtect Transact trial license (on page 342).

See also

Setting up transactions (on page 342)

Setting up events (see "Setting up transaction events and alarms" on page 347)

XProtect Transact trial license

With an XProtect Transact trial license, you can try out the XProtect Transact functionality up to 30 days. All related features are enabled, and you can add one transaction source, for example a cash register. When the 30 days trial period expires, all XProtect Transact features are deactivated, including the **Transact** workspace and transaction view items. By purchasing and activating an XProtect Transact base license and the transaction source licenses you need, you can use XProtect Transact again, and your settings and data are maintained.

If you are using XProtect Professional VMS Products, the trial license is a built-in license. The trial license is activated when the system administrator adds a transaction source in the configuration.

For other products, you need to acquire the trial license from Milestone. The system administrator must activate the trial license in the configuration.

XProtect Transact configuration

Setting up transactions

In this section, you will learn how to add and configure the transaction sources, and how to create the transaction definitions.

Add transaction source (wizard)

To connect data from a transaction source to XProtect Transact, you need to add the sources of the transactions, for example an automated teller machine. In the wizard, you select a connector, and you can connect one or more cameras.

If you do not have a transaction source license for the transaction source you are about to add, the system will work during the 30-days grace period. Make sure that you acquire an additional transaction source license and activate it in due time.

Steps:

1. In the **Site Navigation pane**, expand **Transact**.
2. Go to the Overview pane. Right-click the **Transaction sources** node and select **Add source**. The wizard appears.
3. Follow the steps in the wizard.
4. Depending on the connector you select, different fields appear that you need to fill in. For more information, see Transaction sources (properties) (on page 343). You can change these settings after completing the wizard.
5. If the transaction definition you need is not available, click **Add new** to create a new transaction definition.

See also

Add transaction definitions (on page 344)

Connectors (explained) (on page 340)

Transaction sources (properties)

The settings for transaction sources are described in the table.

Name	Description
Enable	<p>If you want to disable the transaction source, clear this check box. The stream of transaction data stops, but the data already imported remains on the event server. You can still view transactions from a disabled transaction source in XProtect Smart Client during its retention period.</p> <p>Even a disabled transaction source requires a transaction source license.</p>
Name	If you want to change the name, enter a new name here.
Connector	You cannot change the connector you selected when you created the transaction source. To select a different connector, you need to create a new transaction source, and during the wizard, select the connector you want.
Transaction definition	<p>You can select a different transaction definition that defines how to transform the transaction data received into transactions and transaction lines. This includes defining:</p> <ul style="list-style-type: none"> • when a transaction begins and ends. • how transactions are displayed in XProtect Smart Client.
Retention period	<p>Specify, in days, for how long transaction data is maintained on the event server. The default retention period is 30 days. When the retention period expires, automatically the data is deleted. This is to avoid the situation, where the storage capacity of the database is exceeded.</p> <p>The minimum value is 1 day, whereas the maximum value is 1000 days.</p>
TCP client connector	<p>If you selected TCP client connector, specify these settings:</p> <ul style="list-style-type: none"> • Host name: enter the host name of the TCP server associated with the transaction source. • Port: enter the port name on the TCP server associated with the transaction source.

Name	Description
Serial port connector	<p>If you selected Serial port connector, specify these settings and make sure that they match the settings on the transaction source:</p> <ul style="list-style-type: none"> • Serial port: select the COM port. • Baud rate: specify the number of bits transmitted per second. • Parity: specify the method for detecting errors in the transmissions. By default, None is selected. • Data bits: specify the number of bits used to represent one character of data. • Stop bits: specify the number of bits to indicate when a byte has been transmitted. Most devices need 1 bit. • Handshake: specify the handshaking method determining the communication protocol between the transaction source and event server.

See also

Add transaction source (wizard) (on page 342)

Add transaction definitions (on page 344)

Add transaction definitions

As part of defining a transaction source, you specify a definition for the source. A definition transforms the raw data received into presentable data, so that users can view the data in XProtect Smart Client in a format that matches real-life receipts. This is necessary, because typically the raw data consists of a single string of data, and it can be difficult to see where the individual transactions begin and end.

Steps:

1. In the **Site Navigation pane**, expand **Transact**.
2. Select **Transaction definitions**.
3. Go to the Overview pane. Right-click **Transaction definition** and select **Add new**. A number of settings appear in the **Properties** section.
4. Use the **Start pattern** and **Stop pattern** fields to specify what data defines the start and end of a receipt.
5. Click **Start collecting data** to collect raw data from the connected data source. The more data you collect, the smaller the risk of missing characters, for example control characters, you want to replace or omit.
6. In the **Raw data** section, highlight the characters you want to replace or omit. If you want to type the characters manually, skip this step and click **Add filter**.

7. Click **Add filter** to define how the selected characters from the transaction source data are displayed in XProtect Smart Client.
8. For each filter, select an action to determine how the characters are transformed. The **Preview** section gives you a preview of how data is presented with the filters defined.

For detailed information about the fields, see Transaction definitions (properties) (on page 345).

You can also load previously collected data stored locally on your computer. To do this, click **Load from file**.

Transaction definitions (properties)

The settings for transaction definitions are described in the table.

Name	Description
Name	Type a name.
Encoding	Select the character set used by the transaction source, for example the cash register. This helps XProtect Transact convert the transaction data to understandable text that you can work with when configuring the definition. If you select the wrong encoding, the data may appear as non-sense text.
Start collecting data	Collect transaction data from the connected transaction source. You can use the data to configure a transaction definition. Wait for at least one, but preferably more, transactions to complete.
Stop collecting data	When you have collected sufficient data to configure the definition, click this button.
Load from file	If you want to import data from an already existing file, click this button. Typically this is a file that you have created previously in the file format .capture. It can be other file formats. What is important here is that the encoding of the import file matches the encoding selected for the current definition.
Save to file	If you want to save the collected raw data to a file, click this button. You can reuse it later.

Name	Description
Match type	<p>Select the match type to use to search for the start mask and the stop mask in the collected raw data:</p> <ul style="list-style-type: none"> • Use exact match: The search identifies strings that contain exactly what you have entered in the Start mask and Stop mask fields. • Use wildcards: The search identifies strings that contain what you have entered in the Start mask and Stop mask fields in combination with a wild card symbol (*, #, ?). <ul style="list-style-type: none"> * matches any number of characters. For example, if you have entered "Start tra*tion", the search identifies strings that contain "Start transaction". # matches exactly 1 digit. For example, if you have entered "# watermelon", the search identifies strings that contain, for example, "1 watermelon". ? matches exactly 1 character. For example, you may use the search expression "Start trans?ction" to identify strings that contain "Start transaction". • Use regular expression: Use this match type to identify strings that contain specific notation methods or conventions, for example a date format or credit card number. For more information, see the Microsoft website (https://msdn.microsoft.com/en-us/library/az24scfc(v=vs.110).aspx).
Raw data	Transaction data strings from the connected transaction source are displayed in this section.
Start mask	Specify a start mask to indicate where a transaction begins. Horizontal lines are inserted in the Preview field to visualize where the transaction starts and ends, and will help to keep individual transactions separated.
Stop mask	<p>Specify a stop mask to indicate where a transaction ends. A stop mask is not mandatory, but is useful if the received data contains irrelevant information, such as information about opening hours or special offers, between actual transactions.</p> <p>If you do not specify a stop mask, the end of the receipt is defined in terms of where the next receipt starts. The start is determined by what is entered in the Start mask field.</p>
Add filter	<p>Use the Add filters button to point out the characters that you want to be omitted in XProtect Smart Client or replaced by other characters or a line break.</p> <p>Replacing characters is useful when the transaction source string contains control characters for non-printing purposes. Adding lines breaks is necessary to make receipts in XProtect Smart Client resemble the original receipts.</p>

Name	Description
Filter text	<p>Displays the characters currently selected in the Raw data section. If you are aware of characters that you want to be omitted or replaced, but they do not occur in the collected raw data string, you can enter the characters manually in the Character field.</p> <p>If the character is a control character, you need to enter its hexadecimal byte value. Use this format for the byte value: {XX} and {XX,XX,...} if a characters consists of more bytes.</p>
Action	<p>For each filter you add, you should specify how the characters you have selected are handled:</p> <ul style="list-style-type: none"> • Omit: the characters you select are filtered out. • Substitute: the characters you select are replaced with the characters you specify. • Add line break: the characters you select are replaced by a line break.
Substitution	Type the text to replace the characters selected. Only relevant if you have selected the action Substitute .
Preview	Use the Preview section to verify that you have identified and filtered out unwanted characters. The output you see here resembles what the real-life receipt looks like in XProtect Smart Client.

See also

Add transaction definitions (on page 344)

Setting up transaction events and alarms

In this section, you will learn how to define the transaction events and set up alarms.

Define transaction events

To track and investigate transaction events in XProtect Smart Client, first you need to define what the events are, for example the acquisition of a smartphone. You define transaction events on a transaction definition, so that the events defined apply to all transaction sources, for example cash registers, that use the transaction definition.

Steps:

1. In the **Site Navigation pane**, expand **Transact**.

2. Go to the Overview pane. Select the transaction definition, where you want to define an event.
3. Click the **Events** tab.

Event name	Match type	Match pattern
Whiskey	Use exact match	whiskey
Jacket	Use wildcards	jack*
UnauthorizedDiscount	Use exact match	discount
Smartphone	Use exact match	smartphone

4. In the **Properties** pane, click **Add**. A new line is added.
5. Type a name for the event.
6. Select the match type to use to identify a specific string in the transaction data as an event. You can choose between exact match, wildcard symbols, and regular expressions. For more information, see the description of match type in Transaction definitions (properties) (on page 345).
7. In the **Match pattern** column, specify what you want the system to identify as an event, for example "smartphone".
8. For each event, repeat the steps above.

See also

Rules and events (explained) (on page 166)

Transaction definitions (explained) (on page 340)

Create alarms based on transaction events

To notify the XProtect Smart Client operator whenever a specific transaction event occurs, first you need to create a transaction alarm in Management Client. The alarm will appear on the **Alarm Manager** tab in XProtect Smart Client allowing the operator to investigate the event and, if required, take action.

Steps:

1. In the **Site Navigation pane**, expand **Alarms**.

2. Go to the Overview pane. Right-click the **Alarm Definitions** node and select **Add New....** The settings in the **Properties** pane become active.
3. Type a name for the alarm and, in the **Description** field, possibly also instructions for XProtect Smart Client operator on what action to take.
4. In the **Triggering event** drop-down menu, select **Transaction events**.
5. In the drop-down menu below **Transaction events**, select the specific event.
6. In the **Sources** field, click the **Select...** button. A pop-up window appears.
7. Click the **Servers** tab and select the transaction source.
8. Specify additional settings. For more information, see Alarm Definitions (see "Alarm Definitions (properties)" on page 247).

See also

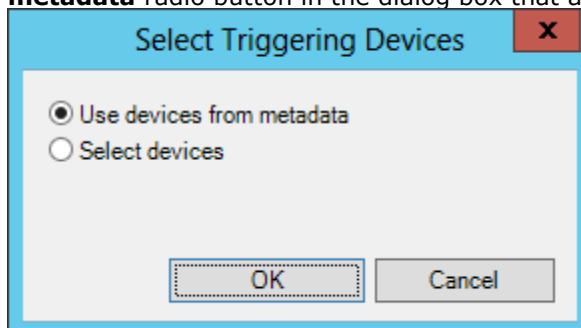
Define transaction events (on page 347)

Set up rules on an event

To trigger an action when a specific transaction event occurs, you need to configure a rule, where you select an event and specifies what needs to happen, for example that a camera starts recording or an e-mail is sent.

Steps:

1. In the **Site Navigation pane**, expand **Rules and Events**.
2. Go to the Overview pane. Right-click **Rules** and select **Add Rule....** A wizard appears.
3. Follow the steps in the wizard.
4. Make sure that the **Perform an action on <event>** radio button is selected.
5. Select the transaction event under **Transact > Transaction events**.
6. If an action involves recording, and you want to use the cameras associated with the transaction sources, for example the cash registers, select the **Use devices from metadata** radio button in the dialog box that appears during the wizard.



See also

Define transaction events (on page 347)

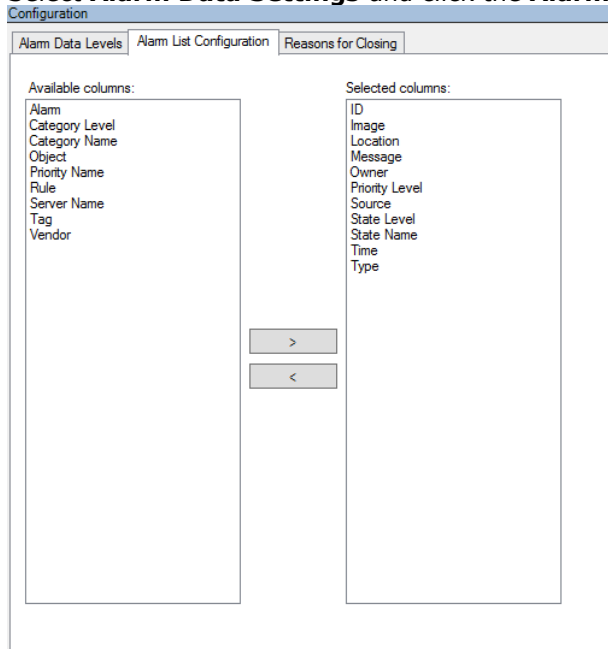
Rules and events (explained) (on page 166)

Enable filtering of transaction events or alarms

If you want the XProtect Smart Client operator to be able to filter events or alarms by transactions, first you need to enable the **Type** field in Management Client. Once enabled, the field is available in the filter section on the **Alarm Manager** tab in XProtect Smart Client.

Steps:

1. In the **Site Navigation pane**, expand **Alarms**
2. Select **Alarm Data Settings** and click the **Alarm List Configuration** tab.



3. In the **Available columns** section, select the **Type** field.
4. Add the field to **Selected columns**.
5. Save the changes. Now, the field is available in XProtect Smart Client.

Maintaining transaction setup

In this section, you will learn how to edit, disable, and delete transaction sources.

Edit transaction source settings

After adding a transaction source, you can change the name or select a different transaction definition. Depending on the connector selected, there may be additional settings you can modify, for example the host name and port number of a connected TCP server. In addition, you can disable a transaction source. This will interrupt the flow of transaction data from the transaction source to the event server.

Once you have selected a connector, you cannot change it.

Steps:

1. In the **Site Navigation pane**, expand **Transact**.

2. Select **Transaction sources**.
3. Go to the Overview pane. Click the transaction source. The properties are displayed.
4. Make the required changes and save them. For more information, see Transaction sources (properties) (on page 343).

See also

Add transaction source (wizard) (on page 342)

Disable transaction sources (on page 351)

Disable transaction sources

You can disable a transaction source, for example if an ATM is temporarily out of order, or a service on a registered cash register is disabled. The flow of transaction data to the event server is disrupted.

Steps:

1. In the **Site Navigation pane**, expand **Transact**.
2. Select **Transaction sources**.
3. Go to the Overview pane. Click the transaction source. The properties are displayed.
4. Clear the **Enable** check box and save the changes. The transaction source is disabled.

See also

Add transaction source (wizard) (on page 342)

Delete transaction source (see "Delete transaction sources" on page 351)

Delete transaction sources

You can delete the transaction sources you have added. The stored transaction data from that source is deleted from the event server.

As an alternative, you can disable the transaction source to avoid that stored transaction data is deleted. A disabled transaction source also requires a transaction source license.

Steps:


1. In the **Site Navigation pane**, expand **Transact**.
2. Select **Transaction sources**.
3. Go to the Overview pane. Click the **Transaction sources** item. Right-click the source you want to delete.
4. Select **Delete**. A dialog box appears.
5. Click **OK** to confirm that you want to delete the transaction source.

See also

Add transaction source (wizard) (on page 342)

Verify XProtect Transact configuration

When you are done configuring XProtect Transact and its components, you can test that Transact works as expected in XProtect Smart Client.

1. Verify that the all required transaction sources have been added correctly in Management Client:
 1. Open XProtect Smart Client and click the **Transact** tab.
 2. Click the **All sources** drop-down menu and verify that all the transaction sources appear.
2. Verify that the transaction definitions have been configured correctly in Management Client. If configured correctly, there is one receipt per transaction, and the lines break correctly:
 1. Open XProtect Smart Client and click the **Transact** tab.
 2. Select a transaction source that you know is active and click . The transaction lines for today appear.
 3. Click a line to view the associated receipt and video recordings.
3. Verify that transaction events are configured correctly:
 1. Define a transaction test event in Management Client, for example an item that is likely to be purchased and registered on a connected transaction source, for example a cash register.
 2. When the event has occurred, open XProtect Smart Client and click the **Alarm Manager** tab.
 3. Open the alarm list and select **Event**. The most recent events are displayed at the top of the list. The test event you created should appear in the list.

Milestone Mobile

Milestone Mobile introduction

Milestone Mobile (explained)

Milestone Mobile consists of three components:

- **Milestone Mobile client**
- **Milestone Mobile server**
- **Milestone Mobile plug-in**

The Milestone Mobile client is a mobile surveillance app that you can install and use on your Android device, Apple device or Windows Phone device. You can use as many installations of Milestone Mobile client as you need.

For more information, download the Milestone Mobile Client User Guide from the Milestone Systems website (<http://www.milestonesys.com/support/manuals-and-guides/>).

The Milestone Mobile server and Milestone Mobile plug-in are covered in this manual.

Requirements for using Milestone Mobile

Before you can start using Milestone Mobile, you must make sure that you have the following:

- A running VMS installed and configured with at least one user.
- Cameras and views set up in XProtect Smart Client.
- A mobile device running Android, iOS or Windows with access to Google Play, App StoreSM or Windows Phone Store from which you can download the Milestone Mobile client application.

Milestone Mobile system requirements

For information about the **minimum** system requirements to the various components, go to the Milestone website (<http://www.milestonesys.com/SystemRequirements>).

- To find requirements for the Milestone Mobile client, click the **Milestone Mobile** entry.
- To find requirements for the Milestone Mobile server, click the XProtect product that you have installed.
- Requirements for the Milestone Mobile plug-in are:
 - A running Management Client.
 - The Milestone plug-in is installed to integrate with your VMS.

Milestone Mobile configuration

Milestone Mobile server (explained)

Milestone Mobile server handles logins to the system from Milestone Mobile client from a mobile device or XProtect Web Client.

A Milestone Mobile server distributes video streams from recording servers to Milestone Mobile clients. This offers a secure setup where recording servers are never connected to the Internet. When a Milestone Mobile server receives video streams from recording servers, it also handles the complex conversion of codecs and formats allowing streaming of video on the mobile device.

You must install Milestone Mobile server on any computer from which you want to access recording servers. When you install Milestone Mobile server, make sure you log in using an account that has administrator rights. Otherwise, installation will not complete successfully.

Milestone Federated Architecture and master/slave servers (explained)

If your system supports Milestone Federated Architecture or servers in a master/slave setup, you can access such servers with your Milestone Mobile client. Use this functionality to gain access to all cameras on all slave servers by logging in to the master server.

If in a Milestone Federated Architecture setup, you gain access to child sites via the central site. Install the Milestone Mobile server only on the central site.

This means that when users of the Milestone Mobile client log in to a server to see cameras from all servers in your system, they must connect to the IP address of the master server. Users must have administrator rights on all servers in the system in order for the cameras to show up in the Milestone Mobile client.

Smart Connect (explained)

Smart Connect enables you to verify that you have configured the mobile server correctly without logging in with a mobile device or a tablet to do the validation. It also simplifies the connection process for the client users.

This feature requires that your Milestone Mobile server uses a public IP address and that your system is licensed with a Milestone Care Plus subscription package.

The system gives you instant feedback in the Management Client if the remote connectivity setup has been set up successfully and confirms that the Mobile Server server is accessible from the Internet.

Smart Connect enables the Milestone Mobile server to switch seamlessly between internal and external IP addresses and connect to the mobile server from any location.


To make it easier to set up customers' mobile clients, you can send an email directly from within the Management Client to the end-user. The email includes a link that adds the server directly to Milestone Mobile. This completes the setup without any need to enter network addresses or ports.

Set up Smart Connect

Enable Universal Plug and Play discoverability on your router

To make it easy to connect mobile devices to Milestone Mobile servers, you can enable Universal Plug and Play (UPnP) on your router. UPnP enables Milestone Mobile server to configure port forwarding automatically. However, you can also manually set up port forwarding on your router by using its web interface. Depending on the router, the process for setting up port mapping can differ. If you are not sure how to set up port forwarding on your router, see the documentation for that device.

Note: Every five minutes, the Milestone Mobile server service verifies that the server is available to users on the Internet. The status displays in the upper left corner of the **Properties** pane:

Server accessible through internet:  .

Requirements

- Your Milestone Mobile server must use a public IP address. The address can be static or dynamic, but typically it's a good idea to use static IP addresses.
- You must have a valid license for Smart Connect.

Configure connection settings

1. In Management Client, in the navigation pane, expand **Servers**, and select **Mobile Server**.
2. Select the server and click the **Connectivity** tab.
3. Use the options in the **General** group to specify the following:
 - To make it easy for users to connect mobile devices to Milestone Mobile servers, select the **Enable Smart Connect** check box.
 - Specify the protocol to use in the **Connection type** field.
 - **Note:** If you turn on secure connections, devices running iOS 9.0 or later, or Windows Phone, can connect only if you have a certificate from a certificate authority (CA) installed on your Milestone Mobile server. CAs issue digital certificates that verify the identities of users and websites that exchange data on the Internet. Examples of CAs are companies like Comodo, Symantec, and GoDaddy.
 - Before you turn on secure connections, make sure that you are familiar with digital certificates. To learn how to add a certificate in Milestone Mobile server, see Edit certificates (see "Edit certificate" on page 373).
 - Specify the number of seconds before the connection times out.
 - To let mobile devices find the Milestone Mobile servers that are within range, select the **Enable UPnP discoverability** check box.
 - To enable routers to forward mobile devices to a specific port, select the **Enable automatic port mapping** check box.

Send an email message to help users connect

You can make it easy for users to get started with Milestone Mobile by sending them an email message that includes connection information. You can send the message directly from Management Client, or you can copy the information to the messaging program you use.

1. In the **Email invitation to** field, enter the email address for the recipient, and then specify a language.
2. Next, do one of the following:
 - To send the message, click **Send**.
 - Copy the information to the messaging program you use.

Enable connections on a complex network

If you have a complex network where you have custom settings, you can provide the information users need to connect.

In the **Internet Access** group, specify the following:

- If you use UPnP port mapping, to direct connections to a specific connection, select the **Configure custom Internet access** check box. Then provide the **IP address or hostname**, and the port to use for the connection. For example, you might do this if your router does not support UPnP, or if you have a chain of routers.
- If your IP addresses often change, select the **Check to retrieve IP address dynamically** check box.

Sending notifications (explained)

You can enable Milestone Mobile to notify users when an event occurs, such as when an alarm triggers or something goes wrong with a device or server. Notifications are always delivered, regardless if the app is running or not. When Milestone Mobile is open on the mobile device, the app delivers the notification. System notifications are also delivered even when the app is not running. Users can specify the types of notifications they want to receive. For example, a user can choose to receive notifications for the following:

- All alarms
- Only alarms assigned to them
- Only alarms related to the system. These might be when a server goes offline or comes back online.

You can also use push notifications to notify users who don't have Milestone Mobile open. These are called push notifications. Push notifications are delivered to the mobile device, and are a great way to keep users informed while they're on the go.

Using push notifications

Note: To use push notifications, your system must have access to the Internet.

Push notifications use cloud services from Apple, Microsoft, and Google:

- Apple Push Notification service (APN)
- Microsoft Azure Notification Hub

- Google Cloud Messaging Push Notification service

There is a limit to the number of notifications that your system is allowed to send during a period of time. If your system exceeds the limit, it can send only one notification every 15 minutes during the next period. The notification contains a summary of the events that occurred during the 15 minutes. After the next period, the limitation is removed.

Set up sending notifications to mobile devices

You can enable Milestone Mobile to notify users when an event occurs, such as when an alarm triggers or something goes wrong with a device or server.

Requirements

- You must associate one or more alarms with one or more events and rules. This is not required for system notifications.
- Make sure that your Milestone Care™ agreement with Milestone Systems is up-to-date.
- Your system must have access to the Internet.

Set up system notifications

To send notifications related to the system, such as when a server goes offline, follow these steps:

1. In Management Client, select the mobile server, and then click the **Notifications** tab.
2. Select the **Notifications** check box.

Set up push notifications on the Milestone Mobile server

To set up push notifications, follow these steps:

1. In Management Client, select the mobile server, and then click the **Notifications** tab.
2. To send notifications to all mobile devices that connect to the server, select the **Notifications** check box.
3. To store information about the users and mobile devices that connect to the server, select the **Maintain device registration** check box.

Note: The server sends notifications only to the mobile devices in this list. If you clear the **Maintain device registration** check box and save the change, the system clears the list. To receive push notifications again, users must reconnect their device.

Stop sending push notifications to specific mobile devices, or all mobile devices

There are several ways to stop sending push notifications to mobile devices.

1. In Management Client, select the mobile server, and then click the **Notifications** tab.
2. Do one of the following:
 - For individual devices, clear the **Enabled** check box for each mobile device. The user can use another device to connect to the Milestone Mobile server.

- For all devices, clear the **Notifications** check box.

To temporarily stop for all devices, clear the **Maintain device registration** check box and then save your change. The system sends notifications again after users reconnect.

Set up investigations

Set up investigations so that people can use Web Client and Milestone Mobile to access recorded video and investigate incidents, and prepare and download video evidence.

To set up investigations, follow these steps:

1. In Management Client, click the mobile server, and then click the **Investigations** tab.
2. Select the **Enabled** check box. By default, the check box is selected.
3. In the **Investigations folder** field, specify where to store video for investigations.
4. In the **Limit size of investigations folder to** field, enter the maximum number of megabytes that the investigation folder can contain.
5. Optional: To allow users to access investigations that other users create, select the **View investigations made by other users** check box. If you do not select this check box, users can see only their own investigations.
6. Optional: To include the date and time that a video was downloaded, select the **Include timestamps for AVI exports** check box.
7. In the **Used codec for AVI exports** field, select the compression format to use when preparing AVI packages for download.

Note: The codecs in the list can differ, depending on your operating system. If you do not see the codec you want to use, you can install it on the computer where Management Client is running and it will display in this list.

Additionally, codecs can use different compression rates, which can affect video quality. Higher compression rates reduce storage requirements but can also reduce quality. Lower compression rates require more storage and network capacity, but can increase quality. It's a good idea to research the codecs before you select one.

8. In the **Keep or delete data when exports fail (MKV and AVI)** field, specify whether to keep the data that was successfully downloaded, although it can be incomplete, or delete it.
9. To enable users to save investigations, you must grant the **Export** permission to the security role assigned to the users.

Clean up investigations

If you have investigations or video exports that you no longer need to keep, you can delete them. For example, this can be useful if you want to make more disk space available on the server.

- To delete an investigation, and all of the video exports that were created for it, select the investigation in the list, and then click **Delete**.
- To delete individual video files that were exported for an investigation, but keeping the investigation, select the investigation in the list. In the **Investigation details** group, click the **Delete** icon to the right of the **Database**, **AVI**, or **MKV** fields for exports.

Using Video Push to stream video (explained)

You can set up Video Push so that users can keep others informed about a situation, or record video to investigate it later, by streaming video from their mobile device's camera to your XProtect surveillance system.

Set up Video Push to stream video

To let users stream video from their mobile devices to the XProtect system, set up Video Push on the Milestone Mobile server.

Requirements

- Each channel requires a hardware device license.

In Management Client, perform these steps in the following order:

1. Set up a channel that the mobile device can use to stream video to the recording server.
2. Add the Video Push Driver as a hardware device on the recording server. The driver simulates a camera device so that you can stream video to the recording server.
3. Assign the Video Push Driver device to the channel.

This topic describes each of these steps.

Set up a channel for streaming video

To add a channel, follow these steps:

1. In the navigation pane, select **Mobile Server**, and select the mobile server.
2. On the **Video Push** tab, select the **Video Push** check box.
3. In the bottom right corner, click **Add** to add a video push channel under **Channels mapping**.
4. Enter the user name of the user account (added under **Roles**) that will use the channel. This user account must be allowed to access the Milestone Mobile server and recording server (on the **Overall Security** tab).

Note: To use Video Push, users must log in to Milestone Mobile on their mobile device using the user name and password for this account.

5. Make a note of the port number. You will need it when you add the Video Push driver as a hardware device on the recording server.
6. Click **OK** to close the Video Push Channel dialog box and then save the channel.

Add the Video Push Driver as a hardware device on the recording server

1. In the navigation pane, click **Recording Servers**.
2. Right-click the server that you want to stream video to, and click **Add Hardware** to open the **Add Hardware** wizard.
3. Select **Manual** as the hardware detection method, and click **Next**.

4. Enter credentials for the camera, as follows:

- For user name, enter the factory defaults or the user name specified on the camera.
- For password: Enter **Milestone**, and then click **Next**.

Note: These are the credentials for the hardware, not for the user. They are not related to the user name for the channel.

5. In the list of drivers, expand **Other**, select the **Video Push Driver** check box, and then click **Next**.

Note: The system generates a MAC address for the Video Push Driver device. We recommend that you use this address. Change it only if you experience problems with the Video Push Driver device. For example, if you need to add a new address and port number.

6. In the **Address** field, enter the IP address of the computer where Milestone Mobile server is installed.
7. In the **Port** field, enter the port number for the channel you created for streaming video. The port number was assigned when you created the channel.
8. In the **Hardware model** column, select **Video Push Driver**, and then click **Next**.
9. When the system detects the new hardware, click **Next**.
10. In the **Hardware name template** field, specify whether to display either the model of the hardware and the IP address, or the model only.
11. Specify whether to enable related devices by selecting the **Enabled** check box. You can add related devices to the list for **Video Push Driver**, even though they are not enabled. You can enable them later.

Note: If you want to use location information when you stream video, you must enable the **Metadata** port.

12. Select the default groups for the related devices on the left, or select a specific group in the **Add to Group** field. Adding devices to a group can make it easier to apply settings to all devices at the same time or replace devices.

Add the Video Push Driver device to the channel for video push

1. In the **Site navigation** pane, click **Mobile Servers**, and then click the **Video Push** tab.
2. Click **Find Cameras**. If successful, the name of the Video Push Driver camera displays in the **Camera Name** field.
3. Save your configuration.

Remove a channel that you don't need

You can remove channels that you no longer use.

- Select the channel to remove, and then click **Remove** in the lower right corner.

Set up users for two-step verification via email

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

To impose an additional login step on users of the Milestone Mobile client or XProtect Web Client, set up two-step verification on the Milestone Mobile server. In addition to the standard user name and password, the user must enter a verification code received by email.

Two-step verification increases the protection level of your surveillance system.

Requirements

- You have installed an SMTP server.
- You have added users and groups to your XProtect system in the Management Client on the **Roles** node in the **Site Navigation** pane. On the relevant role, select the **Users and Groups** tab.
- If you upgraded your system from a previous version of XProtect, you must restart the mobile server to enable the two-step verification feature.

In Management Client, perform these steps:

1. Enter information about your SMTP server.
2. Specify the settings for the verification code that will be sent to the client users.
3. Assign login method to users and domain groups.

This topic describes each of these steps.

Enter information about your SMTP server

The provider uses the information about the SMTP server:

1. In the navigation pane, select **Mobile Servers**, and select the relevant mobile server.
2. On the **Two-step verification** tab, select the **Enable two-step verification** check box.
3. Below **Provider settings**, on the **Email** tab, enter information about your SMTP server and specify the email that the system will send to client users when they log in and are set up for a secondary login. For details about each parameter, see Two-step verification (on page 370).

Specify the verification code that will be sent to the users

To specify the complexity of the verification code:

1. On the **Two-step verification** tab, in the **Verification code settings** section, specify the period within which Mobile client users, do not have to reverify its login in case of, for example, a disconnected network. Default period is 3 minutes.
2. Specify the period within which the user can use the received verification code. After this period, the code is invalid and the user has to request for a new code. Default period is 5 minutes.
3. Specify the maximum number of code entry attempts, before the user will be blocked. Default number is 3.
4. Specify the number of characters for the code. Default length is 6.
5. Specify the complexity of the code that you want the system to compose.

Assign login method to users and Active Directory groups

On the **Two-step verification** tab, in the **User settings** section, the list of users and groups added to your XProtect system appears.

1. In the **Login method** column, select between no login, no two-step verification, or delivery method of codes.
2. In the **Details** field, add the delivery details such as email addresses of individual users. Next time the user logs into XProtect Web Client or the Milestone Mobile app, he or she is asked for a secondary login.
3. If a group is configured in Active Directory, the Mobile server uses details, such as email addresses, from Active Directory.

Windows groups do not support two-step verification.

4. Save your configuration.

You have completed the steps for setting up your users for two-step verification via email.

Actions (explained)

You can manage the availability of the **Actions** tab in the Milestone Mobile client by enabling or disabling this on the **General** tab. Actions are by default enabled, and all available actions for the connected devices are shown here.

Naming an output for use in Milestone Mobile (explained)

In order to get actions shown correctly together with current camera, it is important that the output uses the exact same name as the camera.

Example:

If you have a camera named "AXIS P3301,P3304 - 10.100.50.110 - Camera 1", you must also name the action "AXIS P3301,P3304 - 10.100.50.110 - Camera 1".

You can add a further description to the title afterwards, for example "AXIS P3301,P3304 - 10.100.50.110 - Camera 1 - Light switch".

Important: If you do not follow these naming conventions, actions are not available in the action list for the associated camera's view. Instead, actions appear in the list of other actions on the **Actions** tab.

Mobile server settings

General

The following table describes the settings on this tab.

General

Name	Description
Server name	Enter a name of the Milestone Mobile server.

Name	Description
Description	Enter an optional description of the Milestone Mobile server.
Mobile server	Choose between all Milestone Mobile servers currently installed to the specific system. Only Milestone Mobile servers that are running appear in the list.
Login method	<p>Select the authentication method to use when users log in to the server. You can choose between:</p> <ul style="list-style-type: none"> • Automatic • Windows authentication • Basic authentication

Features

In this section, you control the availability of Milestone Mobile features.

Name	Description
Enable XProtect Web Client	Enable access to XProtect Web Client. This feature is enabled by default.
Enable all cameras view	Include the All Cameras view. This view displays all of the cameras that a user is allowed to view on a recording server. This feature is enabled by default.
Enable actions (outputs and events)	<p>Enable access to actions in Milestone Mobile clients and XProtect Web Client. This feature is enabled by default.</p> <p>If you disable this feature, the client users are not able to see output and events even if they are configured correctly.</p>
Enable keyframes	Stream only keyframes when users stream video on mobile devices and in XProtect Web Client. This uses less bandwidth.
Deny the built-in Administrator role access to the Milestone Mobile server	Enable this to exclude users assigned to the built-in administrator role from accessing video on Milestone Mobile clients and XProtect Web Client.

Log settings

You can specify if you want the Mobile Server server to create log files for state changes and disconnections, for example, and how to store them. The information is mainly intended for debugging purposes.

Name	Description
Enabled	Enable or disable logging of Milestone Mobile client's actions in a separate log file.
Log file location	Specify where the system saves log files.
Keep logs for	Specify the number of days to keep logs for (default is three days).

Configuration backup

If your system has multiple Mobile Server servers, you can use the backup function to export the current settings, and import them on other Mobile Server servers.

Name	Description
Import	Import an XML file with a new Milestone Mobile server configuration.
Export	Export your Milestone Mobile server configuration. Your system stores the configuration in an XML file.

Connectivity

Settings on the **Connectivity** tab are used in the following tasks:

- Configure connection settings.
- Send an email message to help users connect their mobile device to Milestone Mobile servers.
- Enable connections to Milestone Mobile servers on a complex network.

For step-by-step descriptions of these tasks, see Set up Smart Connect (on page 355).

General

Name	Description
Connection type	<p>Choose how clients should connect to the Milestone Mobile server. You can choose between the following options: HTTP only, HTTP and HTTPS or HTTPS Only.</p> <p>Note: If you select HTTPS Only, devices running iOS 9.0 or later, or Windows Phone, can connect only if you have a certificate from a certificate authority (CA) installed on your Milestone Mobile server. CAs issue digital certificates that verify the identities of users and websites that exchange data on the Internet. Examples of CAs are companies like Comodo, Symantec, and GoDaddy. Before you turn on secure connections, make sure that you are familiar with digital certificates. To learn how to add a certificate in Milestone Mobile server, see Edit certificate (on page 373).</p>
Client timeout (HTTP)	<p>Set a time frame for how often the Milestone Mobile client must indicate to the Mobile server that it is up and running. The default value is 30 seconds.</p> <p>Milestone recommends that you do not increase the time frame.</p>
Enable UPnP discoverability	<p>This makes the Mobile Server server discoverable on the network by means of the UPnP protocols.</p> <p>Mobile Server clients have scanning functionality for finding Mobile Server servers based on UPnP.</p>

Name	Description
Enable automatic port mapping	When the Mobile Server server is installed behind the firewall, a port mapping is required in the router, so clients can still access the server from the Internet. The Enable automatic port mapping option enables the Mobile Server server to do this port mapping by itself provided that the router is configured for it.
Enable Smart Connect	Smart Connect enables you to verify that you have configured the Mobile Server server correctly without logging in with a mobile device or a tablet to do the validation. It also simplifies the connection process for the client users.

Internet Access

Name	Description
Configure custom Internet access	If you use UPnP port mapping, to direct connections to a specific connection, select the Configure custom Internet access check box. Then provide the IP address or hostname , and the port to use for the connection. For example, you might do this if your router does not support UPnP, or if you have a chain of routers.
Select to retrieve IP address dynamically	If your IP addresses often change, select the Select to retrieve IP address dynamically check box.
Automatically discovered addresses	Lists the IP addresses of this Mobile Server that the system has discovered by itself.

Smart Connect notification

Name	Description
Email invitation to	Enter the email address for the recipient of the Smart Connect notification.
Email language	Specify the language used in the email.
Smart Connect token	A unique identifier that users of mobile devices can use to connect to the Mobile Server server.
Link to Smart Connect	A link that users of mobile devices can use to connect to the Mobile Server server.

Server Status

See the status details for your Mobile server. The details are read-only:

Name	Description
Server active since	Shows how long the Mobile server has been running since it was last stopped.

Name	Description
CPU usage	Shows current CPU usage on the Mobile server.
External bandwidth	Shows the current bandwidth in use between the mobile devices and the Mobile server.

Active users

See the status details for the mobile devices connected to your Mobile server.

Name	Description
User Name	Shows the user name for each Mobile client user connected to the Mobile server.
State	Shows the current relation between the Mobile server and the Mobile Server client user in question. Possible states are: <ul style="list-style-type: none"> • Connected: A state preliminary to servers exchanging keys and encrypting credentials. • Logged In: The Mobile client user is logged into the XProtect system.
Bandwidth Usage (kB/s)	Shows the level of bandwidth used by the Mobile client user in question.
Transcoded streams	Shows the number of transcoded video streams currently open for each mobile client user.

Performance

On the **Performance** tab, you can set the following limitations on the Milestone Mobile server's performance:

Settings

Name	Description
Enable full-size images	Enable the Milestone Mobile server to send full-size images to the Milestone Mobile clients or XProtect Web Client. Enabling full-size images uses more bandwidth. Additionally, enabling this option disables all rules set up in the Levels of video stream limitations settings described below.
Limit playback streams	Enable and specify the maximum number of playback video streams currently open for the relevant mobile client user.

Levels of video stream limitations

Level 1

Level 1 is the default limitation placed on the Milestone Mobile server. Unless you have enabled sending full-size images above, any limitations you set here are always applied to the Milestone Mobile's video stream.

Name	Description
Level 1	Select the check box to enable the first level of limitations to Milestone Mobile server performance.
Max FPS	Set a limit for the maximum number of frames per second (FPS) to send from the Milestone Mobile server to clients.
Max image resolution	Set a limit for the image resolution to send from the Milestone Mobile server to clients.

Level 2

If you would rather like to enforce a different level of limitations than the default one in **Level 1**, you can select the **Level 2** check box instead. You cannot set any settings higher than what you have set them to in the first level. If you, for example, set the Max FPS to 45 on **Level 1**, you can set the Max FPS on **Level 2** only to 44 or below.

Name	Description
Level 2	Select the check box to enable the second level of limitations to Milestone Mobile server performance.
CPU threshold	Set a threshold for the CPU load on the Milestone Mobile server before the system enforces video stream limitations.
Bandwidth threshold	Set a threshold for bandwidth load on the Milestone Mobile server before the system enforces video stream limitations.
Max FPS	Set a limit for the maximum number of frames per second (FPS) to send from the Milestone Mobile server to clients.
Max image resolution	Set a limit for the image resolution to send from the Milestone Mobile server to clients.

Level 3

You can also select a **Level 3** check box to create a third level for limitations. You cannot set any settings higher than what you have set them to in **Level 1** and **Level 2**. If you, for example, set the **Max FPS** to 45 on **Level 1** and to level 32 on **Level 2**, you can set the **Max FPS** on **Level 3** only to 31 or below.

Name	Description
Level 3	Select the check box to enable the third level of limitations to Milestone Mobile server performance.
CPU threshold	Set a threshold for the CPU load on the Milestone Mobile server before the system enforces video stream limitations.
Bandwidth threshold	Set a threshold for bandwidth load on the Milestone Mobile server before the system enforces video stream limitations.
Max FPS	Set a limit for the frames per second (FPS) to send from the Milestone Mobile server to clients.
Max image resolution	Set a limit for the image resolution to send from the Milestone Mobile server to clients.

The system does not instantly switch from one level to another level. If your CPU or bandwidth threshold goes less than five percent above or below the indicated levels, the current level stays in use.

Note that if you enable **Enable full-size images** on the **General** tab, none of the **Performance** levels are applied.

Investigations

Investigations settings

You can enable investigations so that people can use XProtect Web Client and Milestone Mobile to access recorded video and investigate incidents, and prepare and download video evidence.

Name	Description
Investigations folder	Specify where to store video for investigations.
Limit size of investigations folder to	Enter the maximum number of megabytes that the investigations folder can contain. Default size is 2000 MB.
View investigations made by other users	Select this check box to allow users to access investigations that they did not create.
Include timestamps for AVI exports	Select this check box to include the date and time that the AVI file was downloaded.
Used codec for AVI exports	Select the compression format to use when preparing AVI packages for download. The codecs you can choose from can differ, depending on your operating system. If you do not see the codec you want, you can add it to the list by installing it on the computer where the Milestone Mobile server is running.
Keep or delete data when exports fail (MKV and AVI)	Select whether to keep the data that was not successfully prepared for download in an investigation, or delete it.

Investigations

Name	Description
Investigations	Lists the investigations that have been set up so far in the system. Use the Delete or Delete all buttons if you no longer want to keep an investigation. This can be useful if, for example, you want to make more disk space available on the server.
Investigation details	To delete individual video files that were exported for an investigation, but keeping the investigation, select the investigation in the list. In the Investigation details group, click the delete icon to the right of the Database , AVI , or MKV fields for exports.

Video Push

You can specify the following settings if you enable Video push:

Name	Description
Video push	Enable Video push on the Mobile server.
Number of channels	Shows the number of enabled Video push channels in your XProtect system.
Channel	Shows the channel number for the relevant channel. Non-editable.
Port	Port number for the relevant Video push channel.
MAC Address	MAC address for the relevant Video push channel.
User Name	Enter the user name associated with the relevant video push channel.
Camera Name	Shows the name of the camera if the camera has been identified.

Once you have completed all necessary steps (see "Set up Video Push to stream video" on page 359), click **Find Cameras** to search for the relevant camera.

Notifications

Use the **Notifications** tab to turn on or turn off system notifications and push notifications.

If you turn on notifications, and have configured one or more alarms and events, Milestone Mobile notifies users when an event occurs. When the app is open, notifications are delivered in Milestone Mobile on the mobile device. Push notifications notify users who don't have the Milestone Mobile open. These notifications are delivered to the mobile device.

For more information, see Set up sending notifications to mobile devices (on page 357).

The following table describes the settings on this tab.

Name	Description
Notifications	Select this check box to turn on notifications.
Maintain device registration	Select this check box to store information about the devices and users who connect to this server. The system sends notifications to these devices. If you clear this check box, you also clear the list of devices. For users to start receiving notifications again, you must select the check box, and the users must connect their devices to the server again.

Registered devices

Name	Description
Enabled	Select this check box to start sending notifications to the device.

Name	Description
Device Name	A list of the mobile devices that have connected to this server. You can start or stop sending notifications to specific devices by selecting or clearing the Enabled check box.
User	Name of the user that will receive notifications.

Two-step verification

Available functionality depends on the system you are using. See Product comparison chart (on page 24) for more information.

Use the **Two-step verification** tab to enable and specify an additional login step on users of the Milestone Mobile app on their iOS, Windows Phone, or Android mobile devices or XProtect Web Client.

The first type is password and the second type, the verification code, you can configure to be sent via email to the user.

For more information, see Set up users for two-step verification (see "Set up users for two-step verification via email" on page 360).

The following tables describes the settings on this tab.

Provider settings > Email

Name	Description
SMTP server	Enter the IP address or host name of the simple mail transfer protocol (SMTP) server for two-step verification emails.
SMTP server port	Specify the port of the SMTP server for sending emails. Default port number is 25 without SSL and 465 with SSL.
Use SSL	Select this check box if your SMTP server supports SSL encryption.
User name	Specify the user name for logging into the SMTP server.
Password	Specify the password for logging into the SMTP server.
Use Secure Password Authentication (SPA)	Select this check box if your SMTP server supports SPA.
Sender's email address	Specify the email address for sending verification codes.
Email subject	Specify the subject title for the email. Example: Your two-step verification code.
Email text	Type the message you want to send. Example: Your code is {0}. If you forget to include the {0} variable, the code is added at the end of the text by default.

Verification code settings

Name	Description
Reconnection timeout (0-30 minutes)	Specify the period within which Mobile client users do not have to reverify their login in case of, for example, a disconnected network. Default period is 3 minutes. This setting is not valid for XProtect Web Client.
Code expires after (1-10 minutes)	Specify the period within which the user can use the received verification code. After this period, the code is invalid and the user has to request for a new code. Default period is 5 minutes.
Code entry attempts (1-10 attempts)	Specify the maximum number of code entry attempts, before the user will be blocked. Default number is 3.
Code length (4-6 characters)	Specify the number of characters for the code. Default length is 6.
Code composition	Specify the complexity of the code that you want the system to compose. You can select between: <ul style="list-style-type: none"> • Latin uppercase (A-Z) • Latin lowercase(a-z) • Digits (0-9) • Special characters (!@#...)

User settings

Name	Description
Users and groups	Lists the users and groups added to the XProtect system. If a group is configured in Active Directory, the Mobile server uses details, such as email addresses, from Active Directory. Windows groups do not support two-step verification.
Verification method	Select a verification setting for each user or group. You can select between: <ul style="list-style-type: none"> • No login: the user cannot log in. • No two-step verification: the user must enter user name and password. • Email: the user must enter a verification code in addition to user name and password.
User details	Type the email address to which each user will receive codes.

Mobile Server Manager

Mobile Server Manager (explained)

The Mobile Server Manager is a tray-controlled feature connected to the Mobile server. Right-clicking the Mobile Server Manager icon in the system tray opens a menu from which you can easily access Mobile server functionality.

You can:

- Open XProtect Web Client (see "Access XProtect Web Client" on page 372)
- Start, stop and restart the Mobile service (see "Start, stop and restart Mobile service" on page 375)
- Fill in or change surveillance server credentials (see "Fill in/edit surveillance server credentials" on page 375)
- Show/edit port numbers (on page 375)
- Edit certificate (on page 373)
- Open today's log file (see "Accessing logs and investigations (explained)" on page 373)
- Open log folder (see "Accessing logs and investigations (explained)" on page 373)
- Open investigations folder (see "Accessing logs and investigations (explained)" on page 373)
- Show Mobile server status (see "Show status (explained)" on page 373)

Access XProtect Web Client

If you have a Milestone Mobile server installed on your computer, you can use the XProtect Web Client to access your cameras and views. Because you do not need to install XProtect Web Client, you can access it from the computer where you installed the Milestone Mobile server, or any other computer you want to use for this purpose.

1. Set up the Milestone Mobile server in the Management Client.
2. If you are using the computer where Milestone Mobile server is installed, you can right-click the Milestone Mobile Server icon in the system tray, and select **Open XProtect Web Client**.
3. If you are not using the computer where Milestone Mobile server is installed, you can access it from a browser. Continue with step 4 in this process.
4. Open an Internet browser (Internet Explorer, Mozilla Firefox, Google Chrome or Safari).
5. Type the external IP address, that is, the external address and port of the server on which the Milestone Mobile server is running.

Example: The Milestone Mobile server is installed on a server with the IP address 127.2.3.4 and is configured to accept HTTP connections on port 8081 and HTTPS connections on port 8082 (default settings of the installer).

In the address bar of your browser, type: `http://1.2.3.4:8081` or `https://1.2.3.4:8082`, depending on whether you want to use a standard HTTP connection or a secure HTTPS connection. You can now begin using XProtect Web Client.

6. Add the address as a bookmark in your browser for easy future access to XProtect Web Client. If you use XProtect Web Client on the local computer on which you installed the Milestone Mobile server, you can also use the desktop shortcut which the installer creates. Click the shortcut to launch your default browser and open XProtect Web Client.

You must clear the cache of Internet browsers running the XProtect Web Client before you can use a new version of the XProtect Web Client. System administrators must ask their XProtect Web Client users to clear their browser cache after upgrading, or force this action remotely (you can do this action only in Internet Explorer in a domain).

Show status (explained)

Right-click the Mobile Server Manager icon and select **Show Status** or double-click the Mobile Server Manager icon to open a window that shows the status of the Mobile server. You can see the following information:

Name	Description
Server running since	Time and date of the time when the Mobile server was last started.
Connected users	Number of users currently connected to the Mobile server.
Hardware decoding	Indicates if hardware accelerated decoding is in action on the Mobile server.
CPU usage	How many % of the CPU is currently being used by the Mobile server.
CPU usage history	A graph detailing the history of CPU usage by the Mobile server.

Accessing logs and investigations (explained)

The Mobile Server Manager lets you quickly access the log file of the day, open the folder to which logs files are saved, and open the folder to which investigations are saved.

To open any one of these, right-click the Mobile Server Manager and select **Open today's log file**, **Open Log folder** or **Open Investigation folder** respectively.

Important: If you uninstall Milestone Mobile from your system, its log files are not deleted. Administrators with proper rights can access these log files at a later timer, or decide to delete them if they are not needed any longer. The default location of the log files is in the **ProgramData** folder. If you change the default location of log files, existing logs are not copied to the new location nor are they deleted.

Edit certificate

If you want to use a secure HTTPS protocol to establish connection between a Milestone Mobile server and the mobile devices or XProtect Web Clients, you must apply a valid certificate on the server. The certificate confirms that the certificate holder is authorized to establish secure connections.

- If you run a **Single Computer** installation, Milestone Mobile server installs quietly and the system does not create a certificate. You can create one as explained further down.

- If you run a **Typical** installation, the system generates a self-signed certificate when you install the Milestone Mobile server. You can change to a certificate issued by another trusted site, see further down.
- If you run a **Custom** installation, you can choose between generating a self-signed certificate or loading a file that contains a certificate issued by another trusted site.

CA certificates

Certificates issued by CA (Certificate Authority) have a chain of certificates and on the root of that chain is the CA root certificate. When a device or browser sees this certificate, it compares its root certificate with pre-installed ones on the OS (Android, iOS, Windows, etc.). If the root certificate is listed in the pre-installed certificates list, then the OS ensures the user that the connection to the server is secure enough. These certificates are issued for a domain name and are not free of charge.

Self-signed certificates

Anyone can create self-signed certificates. They do not have a root certificate from CA and OSes consider them less secure. They provide security for simple attacks, but there are some situations where they do not guarantee the security of the connection. The easiness of self-signed certificates is that the Milestone Mobile server can create them and they are free of charge.

Note: If you want to use secure connections (HTTPS), devices running iOS 9.0 or later, or Windows Phone, can connect only if you have a certificate from a certificate authority (CA) installed on your Milestone Mobile server. CAs issue digital certificates that verify the identities of users and websites that exchange data on the Internet. Examples of CAs are companies like Comodo, Symantec, and GoDaddy. Before you turn on secure connections, make sure that you are familiar with digital certificates.

If you want to create or change a certificate, do the following.

1. On a computer with Management Client installed, right-click the **Milestone Mobile Server** icon in the system tray and select **Edit certificate**.
2. Choose one of the following:
 - Generate a self-signed certificate.
 - Load a CA certificate file.

Generate a self-signed certificate

1. Select the **Generate a self-signed certificate** option and click **OK**.
2. Wait for a few seconds while the system installs the certificate.
3. When finished, a window opens and informs you that the certificate was installed successfully.

The Mobile Server service restarts to apply the change.

Locate a CA certificate file

1. Select the **Load a certificate file** option.
2. Fill in the path for the certificate file or click the **...** box to open a window where you can browse for the file.
3. Fill in the password connected to the certificate file.

4. When finished, click **OK**.

The user of the Mobile Client will be prompted to accept once again the certificate, if it is not issued by CA.

Fill in/edit surveillance server credentials

1. On a computer with Management Client installed, right-click the **Milestone Mobile Server** icon and select **Surveillance server credentials**.
2. Fill in the **Server URL**.
3. Select what user you want to log in as:
 - Local system administrator (no credentials needed) or
 - A specified user account (credentials needed).
4. If you have chosen a specified user account, fill in **User Name** and **Password**.
5. When finished, click **OK**.

Show/edit port numbers

1. On a computer with Management Client installed, right-click the **Milestone Mobile Server** icon and select **Show/edit port numbers**.
2. To edit the port numbers, type the relevant port number. You can indicate a standard port number for HTTP connections and/or a secured port number for HTTPS connections.
3. When you are done, click **OK**.

Start, stop and restart Mobile service

If needed, you can start, stop and restart the Mobile service from the Mobile Server Manager.

- To perform any of these tasks, right-click the **Milestone Mobile Server** icon and select **Start Mobile service**, **Stop Mobile service** or **Restart Mobile service** respectively.

Troubleshooting Milestone Mobile

Connections

1. **Why can't I connect from my Milestone Mobile client to my recordings/Milestone Mobile server?**

In order to connect to your recordings, the Milestone Mobile server must be installed on the server that runs your XProtect system or alternatively on a dedicated server. The relevant Milestone Mobile settings are also needed in your XProtect video management setup. These are installed as either plug-ins or as part of a product installation or upgrade. For details on how to get the Milestone Mobile server and how to integrate the Milestone Mobile client-related settings in your XProtect system, see the configuration section (see "Milestone Mobile configuration" on page 354).

2. **I just turned on my firewall, and now I can't connect a mobile device to my server. Why not?**

If your firewall was turned off while you installed Milestone Mobile server, you must manually enable TCP and UDP communications.

3. **How to avoid the security warning when I run XProtect Web Client through an HTTPS connection?**

The warning appears because the server address information in the certificate is incorrect. The connection will still be encrypted.

The self-signed certificate in the Milestone Mobile server needs to be replaced with your own certificate matching the server address used to connect to the Milestone Mobile server. These certificates are obtained through official certificate signing authorities such as Verisign. Consult the chosen signing authority for more details.

Milestone Mobile server does not use Microsoft IIS. This means that instructions provided for generating certificate signing request (CSR) files by the signing authority using the IIS is not applicable for the Milestone Mobile server. You must manually create CSR-file using command line certificate tools or other similar third-party application. Note that this process should be performed by system administrators and advanced users only.

Image quality

1. **Why is the image quality sometimes poor when I view video in the Milestone Mobile client?**

The Milestone Mobile server automatically adjusts image quality according to the available bandwidth between the server and client. If you experience lower image quality than in the XProtect® Smart Client, you might have too little bandwidth to get full resolution images through the Milestone Mobile client. The reason for this can either be too little upstream bandwidth from the server or too little downstream bandwidth on the client. See the **XProtect Smart Client User Manual** which you can download from our website (<http://www.milestonesys.com/support/manuals-and-guides/>).

If you are in an area with mixed wireless bandwidth, you may notice that the image quality improves when you enter an area with better bandwidth.

2. **Why is the image quality poor when I connect to my XProtect video management system at home through Wi-Fi at my office?**

Check your home internet bandwidth. Many private internet connections have different download and upload bandwidths often described as, for example, 20 Mbit/2 Mbit. This is because home users rarely need to upload large amounts of data to the internet, but consume a lot of data instead. The XProtect video management system needs to send video to the Milestone Mobile client and is limited by your connection's upload speed. If low image quality is consistent on multiple locations where the download speed of the Milestone Mobile client's network is good, the problem might be solved by upgrading the upload speed of your home internet connection.

Hardware accelerated decoding

1. **Does my processor support hardware-accelerated decoding?**

Only newer processors from Intel support hardware accelerated decoding. Check Intel website (<http://ark.intel.com/search/advanced?s=t&MarketSegment=DT&QuickSyncVideo=true>) if your processor is supported.

In the menu, make sure **Technologies > Intel Quick Sync Video** is set to **Yes**.

If your processor is supported, hardware-accelerated decoding is enabled by default. You can see the current status in **Show status** in the Mobile Server Manager (see "Show status (explained)" on page 373).

2. Does my operating system support hardware-accelerated decoding?

Only Windows 8 and Windows Server 2012 or newer are supported.

Make sure you install the newest graphic drivers from the Intel website on your system. These drivers are not available from Windows Update.

Hardware-accelerated decoding is not supported, if the mobile server is installed in a virtual environment.

3. How do I disable hardware-accelerated decoding on the mobile server? (Advanced)

If the processor on the mobile server supports hardware accelerated decoding, it is by default enabled. To turn hardware-accelerated decoding off, do the following:

1. Locate the file VideoOS.MobileServer.Service.exe.config. The path is typically:
C:\Program Files\Milestone\Milestone Mobile
Server\VideoOS.MobileServer.Service.exe.config.
2. Open the file in Notepad or a similar text editor. If necessary, associate the file type .config with Notepad.
3. Locate the field <add key="HardwareDecodingMode" value="Auto" />.
4. Replace the value "Auto" with "Off".
5. Save and close the file.

Milestone ONVIF Bridge

Milestone ONVIF Bridge (explained)

ONVIF is an open, global forum that is working to standardize and secure the way that IP video surveillance products communicate. The goal is to make it easy to exchange video data. For example, to enable law enforcement, surveillance centers, or similar organizations to quickly access live and recorded video streams in any IP-based surveillance system.

Milestone Systems wants to support this goal, and has developed the Milestone ONVIF Bridge toward that end. Milestone ONVIF Bridge is a part of the Milestone Open Platform, and offers an interface that supports the parts of the ONVIF standard for retrieving live and recorded video from any Milestone VMS product.

This document provides the following:

- Information about the ONVIF standard and links to reference materials.
- Instructions for installing and configuring the Milestone ONVIF Bridge in your XProtect VMS product.
- Examples of how to enable various types of ONVIF clients to stream live and recorded video from XProtect VMS products.

Milestone ONVIF Bridge and the ONVIF standard

The ONVIF standard facilitates information exchange by defining a common protocol. The protocol contains ONVIF profiles, which are collections of specifications for interoperability between ONVIF compliant devices.

Milestone ONVIF Bridge is compliant with the parts of ONVIF Profile G and Profile S that provide access to live and recorded video, and the ability to control pan-tilt-zoom cameras:

- Profile G - Provides support for video recording, storage, search, and retrieval. For more information, see ONVIF Profile G Specification (https://www.onvif.org/Portals/0/documents/specs/ONVIF_Profile_G_Specification_v1-0.pdf)
- Profile S - Provides support for streaming live video using the H.264 codec, audio streaming, and pan-tilt-zoom (PTZ) controls. For more information, see ONVIF Profile S Specification (http://www.onvif.org/Portals/0/documents/op/ONVIF_Profile_S_Specification_v1-1-1.pdf).

For more information about the ONVIF standard, see the ONVIF® website (<http://www.onvif.org/>).

ONVIF Profiles support “get” functions that retrieve data, and “set” functions that configure settings. Each function is either mandatory, conditional, or optional. For security reasons, Milestone ONVIF Bridge supports only the mandatory, conditional, and optional “get” functions that do the following:

- Request video
- Authenticate users
- Stream video

- Play recorded video

ONVIF clients

ONVIF clients are computer appliances or software programs that use ONVIF Webservices. Examples of ONVIF clients are servers, media players, IP-based surveillance systems, or bridges like the Milestone ONVIF Bridge.

The Real Time Streaming Protocol (RTSP) is used to establish and control media sessions between two or more endpoints. The Milestone ONVIF Bridge uses ONVIF Profile S and RTSP to handle requests for video from an ONVIF client, and to stream video from an XProtect installation to the ONVIF client.

By default, communication between ONVIF clients and the ONVIF Bridge server uses the following ports:

- ONVIF port 580. ONVIF clients use this port to submit requests for video streams
- RTSP port 554. Milestone ONVIF Bridge uses this port to stream video to ONVIF clients

ONVIF clients can access the RTSP port on the Milestone ONVIF Bridge directly. For example, the VLC media player or a VLC plug-in in a browser can retrieve and display video. This is described in this document in [Use a media player to view a video stream](#) (on page 390).

You can use different ports, for example, to avoid a port conflict. If you change the port numbers, you must also update the RTSP stream for the ONVIF client URI.

RTSP supports only the H.264 codec. Cameras must be able to stream video in the H.264 codec.

Milestone ONVIF Bridge

The Milestone ONVIF Bridge is comprised of the following components:

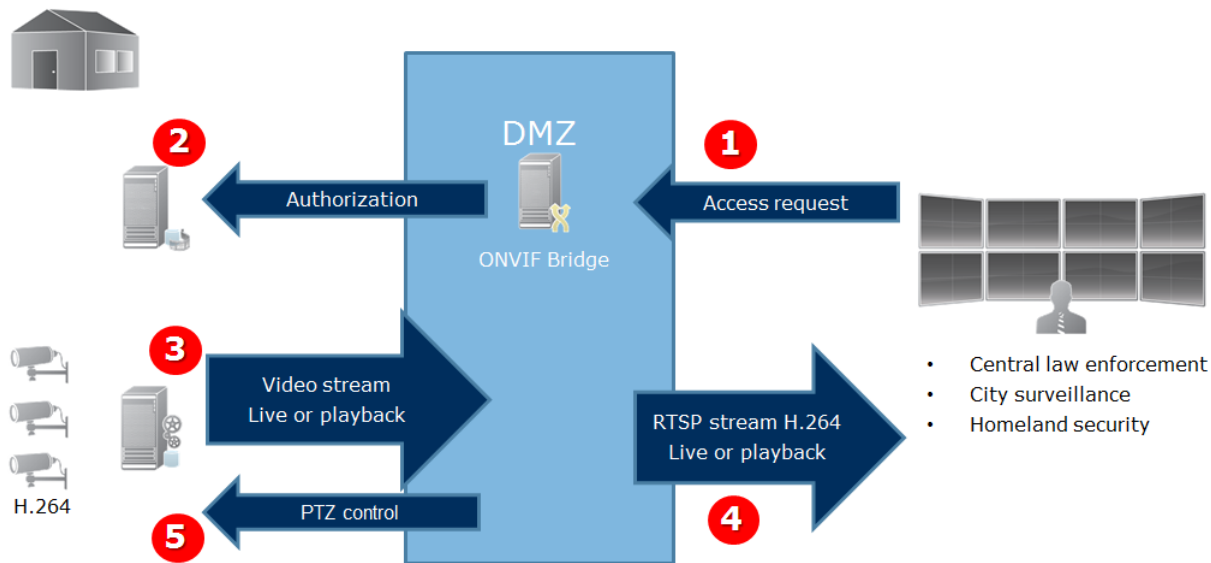
- Milestone ONVIF Bridge server
- Milestone ONVIF Bridge 32-bit plug-in for Management Application
- Milestone ONVIF Bridge 64-bit plug-in for Management Client

The following image shows a high-level view of the interoperability between an ONVIF client, the Milestone ONVIF Bridge, and XProtect VMS.

Note: Milestone recommends that you install the ONVIF Bridge server in a demilitarized zone (DMZ).

XProtect VMS

ONVIF clients



1. An ONVIF client connects to the XProtect VMS via the ONVIF Bridge server through the Internet. To do this, the ONVIF client needs the IP address or domain name (domain/hostname) of the server where the Milestone ONVIF Bridge is installed, and the ONVIF port number.
2. The ONVIF Bridge server connects to the management server to authorize the ONVIF client user.
3. After authorization, the recording server starts sending H.264 video streams from the cameras to the ONVIF Bridge server.

Note: If a camera supports multiple streams, only the default stream is sent.

4. The ONVIF Bridge server sends the video as RTSP streams to the ONVIF client.
5. If available, the ONVIF client user can pan-tilt-zoom PTZ cameras.

Setting up Milestone ONVIF Bridge security controls

Milestone ONVIF Bridge enforces user authorization of ONVIF clients. This controls the ONVIF client's ability to access cameras, and the types of operations the ONVIF clients can perform. For example, whether ONVIF clients can use pan-tilt-zoom (PTZ) controls on cameras.

Milestone recommends that you create and add a dedicated user account for the Milestone ONVIF Bridge, and for each ONVIF client, as follows:

1. Create a basic user in the Management Client, or a Windows user.
2. In the Management Client, assign the user to a role that can access cameras, and specify permissions for the ONVIF Bridges security group on the Overall Security tab for the role.
3. Assign the user to the Milestone ONVIF Bridge during installation, and in the Management Client for each ONVIF client afterward.

Milestone ONVIF Bridge allows ONVIF clients only to request and receive video streams from cameras. ONVIF clients cannot configure settings in the XProtect VMS system or the Milestone ONVIF Bridge.

As a security precaution, Milestone recommends that you install the ONVIF Bridge server in a demilitarized zone (DMZ). If you install the bridge in a DMZ, you must also configure port forwarding for the internal and external IP addresses.

Installing Milestone ONVIF Bridge

When you install Milestone ONVIF Bridge, you install a server and a plug-in for the Management Client. For example, you use these components to manage cameras, set up users, grant permissions, and so on.

You can install and add one or more Milestone ONVIF Bridges to your system. However, this increases the load on the network, and can impact performance. Typically, only one Milestone ONVIF Bridge is added to a system because multiple ONVIF clients can connect via one bridge.

ONVIF licensing

Milestone ONVIF Bridge does not require additional licenses. You can download and install the software for free from the Milestone Systems website (<http://www.milestonesys.com>).

System requirements

The computer where you want to install the Milestone ONVIF Bridge server component must have access to the Internet, and the following software installed:

- Microsoft® .NET Framework 3.5.
- Microsoft® .NET Framework 4.5.1 or higher.
- Visual C++ Redistributable Package for Visual Studio 2013 (x64).

Important: Cameras must support H.264 streaming via the Internet.

What's installed?

During installation, the following components are installed:

- Milestone ONVIF Bridge server, including the Milestone ONVIF Bridge service, the Milestone RTSP Bridge service, and the Milestone ONVIF Bridge Manager.
- Milestone ONVIF Bridge plug-in. The plug-in is available in the Servers node in Management Client. This happens automatically when you use a **Typical** installation method. If you use a **Custom** installation method, you install it at a later stage of the installation.

Installation also does the following:

- Registers and starts the Milestone ONVIF Bridge service and the Milestone RTSP Bridge service
- Starts the Milestone ONVIF Bridge Manager, which is available in the Windows notification area on the server where the ONVIF Bridge Server is installed

Note: The actions in the ONVIF Bridge Manager apply to both the Milestone ONVIF Bridge service and the Milestone RTSP Bridge service. For example, when you start or stop the ONVIF Bridge service, the Milestone RTSP Bridge service also starts or stops.

Before you install

Before you start the installation, get the following information:

- The domain name and password for the dedicated user account that was created for the Milestone ONVIF Bridge. For more information, see Setting up Milestone ONVIF Bridge security controls (on page 380).
- The URL or IP address, and the port number of the management server.

You will need this information during installation.

Install the Milestone ONVIF Bridge

Download the installation file:

1. On the computer where you want to install Milestone ONVIF Bridge, go to the Milestone website (<https://www.milestonesys.com/support/download-software/>) and locate the Milestone ONVIF Bridge product.
2. Click the Milestone ONVIF Bridge installer file.
3. Run the installer and follow the instructions.

Run the installer:

1. Select the language you want to use, and then click **Continue**.
2. Read and accept the license agreement, and then click **Continue**.
3. Select the installation type, as follows:

To install the ONVIF Bridge server and plug-in on one computer, and apply default settings, click Typical.

1. Verify that the server URL, user name and password are correct and click **Continue**.
2. Select the file location and product language, and then click **Install**.

When the installation is complete, a list of successfully installed components displays. Click **Close**.

To install the ONVIF Bridge server and plug-ins on separate computers, click Custom. Use this method if you have a distributed system.

1. To install the server, select the **Milestone ONVIF Bridge Server** checkbox, and then click **Continue**.
2. Establish a connection to management server by specifying the following:
 - The URL or IP address, and the port number, of the management server. The default port is 80. If you omit the port number, the system will use port 80.
 - Keep the **Log in as** field set to **User account**. The domain user name and password of the Windows user or Basic user that the service will use.
 - Click **Continue**.
3. Select the file location and product language, and then click **Install**.

When the installation is complete, a list of successfully installed components displays.

4. Click **Close**, and then install the ONVIF Bridge plug-in on the computer where the Management Client is installed. To install the plug-in, run the installer again on that computer, select **Custom** and select the respective plug-ins.

The following components are now installed:

- Milestone ONVIF Bridge server
- Milestone ONVIF Bridge plug-in that is visible in Management Client in the **Servers** node
- Milestone ONVIF Bridge Manager that is running and accessible from the notification area on the server with the ONVIF Bridge server installed
- Milestone ONVIF Bridge service that is registered as a service

You are ready for initial configuration (see "Configuring the Milestone ONVIF Bridge" on page 383).

Configuring the Milestone ONVIF Bridge

After you install the Milestone ONVIF Bridge, the ONVIF Bridge service is running and the icon in the system tray turns green. The next steps are to:

- Add the ONVIF Bridge plug-in to the Management Client
- Enable ONVIF clients to access your XProtect VMS product

Add a Milestone ONVIF Bridge to the Management Client

1. Open the Management Client.
2. Expand **Servers**, right-click **ONVIF Bridge**, and select **Add New**.
3. Enter a name for the Milestone ONVIF Bridge, and then click **OK**.

Configure user settings for an ONVIF client

Before you can complete these steps, you must have already created a basic user in Management Client, or a Windows user for the ONVIF client. The user must be assigned to a role that has permission to view cameras and access the Milestone ONVIF Bridge. For more information, see [Setting up Milestone ONVIF Bridge security controls](#) (on page 380). For information about how to set up a basic user in Management Client, see the Help for those programs.

To provide an ONVIF client access to your XProtect VMS, follow these steps:

1. Open the Management Client.
2. Expand **Servers**, select **ONVIF Bridge**, and then select the bridge you just added.
3. On the **User settings** tab, enter the domain user name (domain/user) and the password of the dedicated user created for the ONVIF client.
4. Click the **Add user** button.

The name of the ONVIF client user appears in the list of **ONVIF user credentials**.

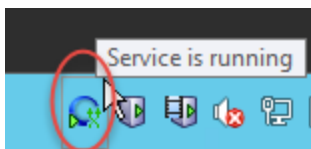
Managing Milestone ONVIF Bridge

After you configure the Milestone ONVIF Bridge, you can monitor the service and change configuration settings in several ways.

Check the status of the ONVIF Bridge service

To view the status of the ONVIF Bridge service, follow these steps.

1. On the computer where the ONVIF Bridge server is installed, look in the notification area. The ONVIF Bridge tray icon indicates the status of the ONVIF Bridge service. If the service is running, the icon is green.

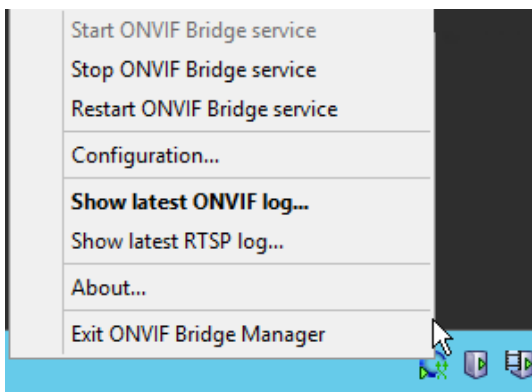


2. If it is not running, the icon is yellow or red. Right-click the icon and select **Start ONVIF Bridge service**.

View logs

The ONVIF Bridge Manager saves the log information about the ONVIF Bridge server and the RTSP streams.

1. In the notification area on the computer where the ONVIF Bridge server is installed, right-click the ONVIF Bridge tray icon.



2. Select **Show latest ONVIF log** or **Show latest RTSP log**.

Change the level of information in your logs

The ONVIF Bridge Manager saves the log information about the ONVIF Bridge server and the RTSP streams.

To change the level of information, follow these steps:

1. Right-click the ONVIF Bridge tray icon, and then stop the ONVIF Bridge service.

2. Right-click the ONVIF Bridge tray icon again, and select **Configuration**.
3. In the **Log level for ONVIF** and **Log level for RTSP** fields, specify the type of information, and how much information you want to save in your ONVIF and RTSP logs. The default value is **Information**.

Note: From top to bottom in the list, the options are ordered from lowest level to highest level. Each level includes the level above it in the list. For example, the **Warning** level includes the **Error** level. Milestone recommends that you use only the **Error**, **Warning**, and **Information** levels. The **Trace** and **Message** levels capture more information and use more disk space, which can decrease performance.

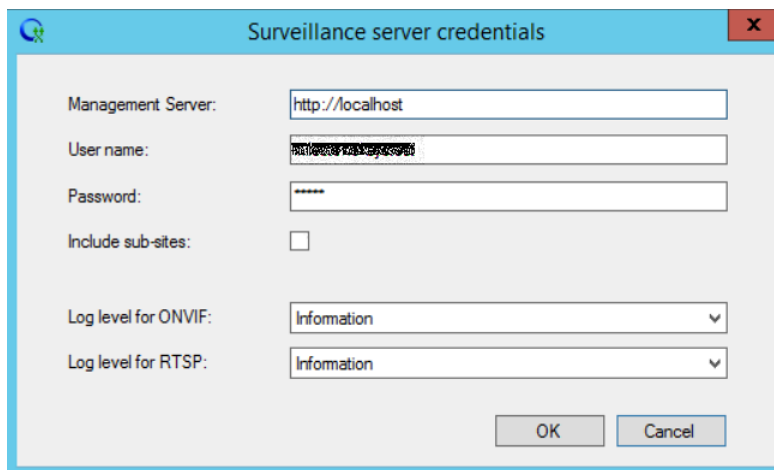
4. Click **OK**.
5. Right-click the ONVIF Bridge tray icon, and then start the ONVIF Bridge service.

Change configuration settings for the Milestone ONVIF Bridge

If you change the IP address or host name of the surveillance server, or if you have changed the user accounts that have access to the surveillance server service, you must update this information for Milestone ONVIF Bridge.

To change the VMS address or login credentials, follow these steps:

1. On the computer where Milestone ONVIF Bridge server is installed, right-click the ONVIF Bridge tray icon, and then stop the ONVIF Bridge service.
2. Right-click the ONVIF Bridge tray icon again, and select **Configuration**.



3. Specify the new information, and then click **OK**.

Note: You must use the fully qualified domain name or the IP address of the server where the management server is installed.

4. Right-click the ONVIF Bridge tray icon, and then start the ONVIF Bridge service.

The ONVIF Bridge service is now running and the tray icon turns green.

Include sub-sites

By default, the Milestone ONVIF Bridge is configured to exclude sub-sites. This means that ONVIF client users cannot access video from cameras that are installed on sub-sites.

You can change this to include sub-sites. However, Milestone recommends that you do so only for systems where sub-sites do not contain large numbers of cameras. The Milestone ONVIF Bridge aggregates and displays all cameras, including those from sub-sites, in one list. For example, if the system and sub-sites have more than 50 cameras, the list will be difficult to use.

Tip: If you must include sub-sites, consider installing the Milestone ONVIF Bridge on each management server. You will have more than one list of cameras, however, the cameras will be easier to identify and navigate.

To include sub-sites:

1. Right-click the ONVIF Bridge tray icon, and then stop the ONVIF Bridge service.
2. Right-click the ONVIF Bridge tray icon again, and click **Configuration**.
3. Select the **Include sub-sites** checkbox, and then click **OK**.
4. Right-click the ONVIF Bridge tray icon, and then start the ONVIF Bridge service.

Tips and tricks

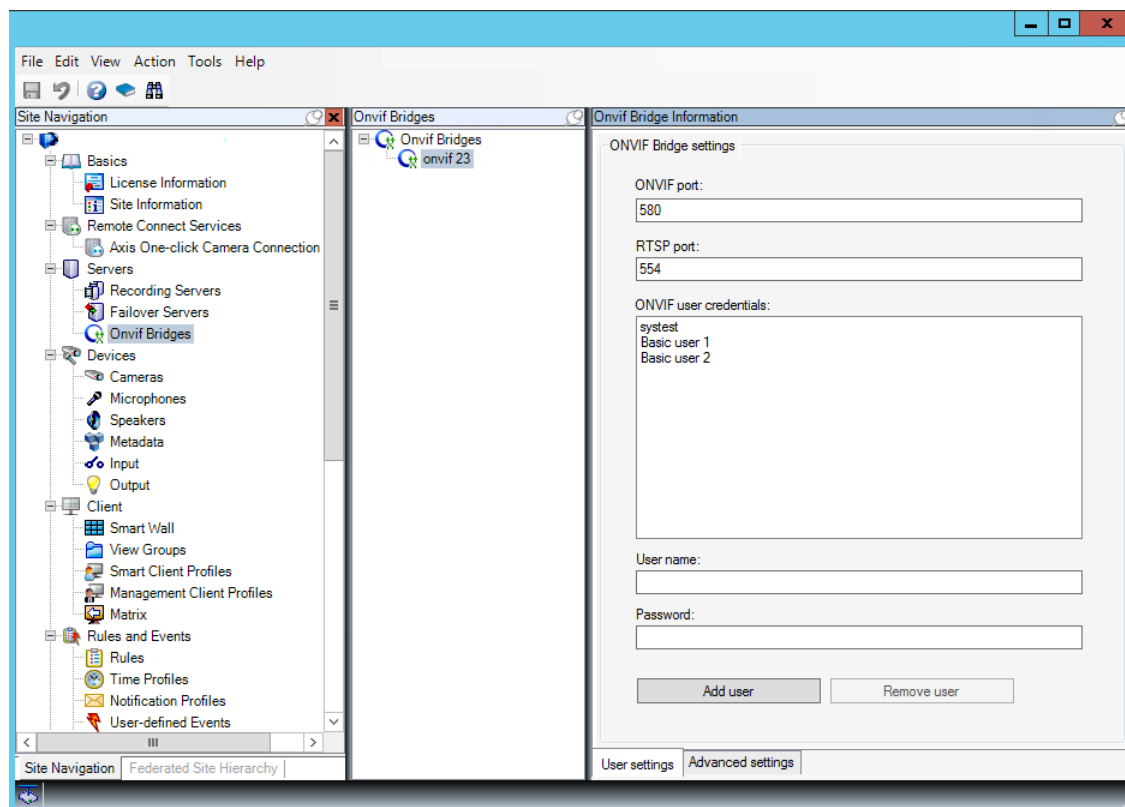
The configuration created by ONVIF Bridge Manager is stored locally in a file at ProgramData\Milestone\Milestone ONVIF Bridge. The name of the file is serverconfiguration.xml. If this file is deleted, you must update the configuration in the ONVIF Bridge Manager.

To update a configuration, follow the steps described in Change configuration settings for a Milestone ONVIF Bridge in this document.

Milestone ONVIF Bridge properties

This section provides information about the settings for managing users and connections, and configuration settings for cameras.

Open the Management Client and select the **ONVIF Bridges** node.



User settings tab (properties)

The following table describes the settings for the ONVIF Bridge server and ONVIF clients.

Name	Description
ONVIF port	The port number of the ONVIF port. ONVIF clients use this port to connect to the ONVIF Bridge server. The default port number is 580.
RTSP port	The port number of the RTSP port. The ONVIF Bridge server sends RTSP video streams through this port to ONVIF clients. The default port number is 554.
ONVIF user credentials	Lists the ONVIF client users that have access to the XProtect VMS system through the ONVIF Bridge server.
User name	The domain user name of the user created for an ONVIF client. Requirement: You must set up the ONVIF client users as users in Management Client with access to cameras and the Milestone ONVIF Bridge.
Password	The password for the ONVIF client user.
Add user	After you enter a domain user name and password, click the Add user button to add the user.

Name	Description
Remove user	Prevent an ONVIF client from accessing the Milestone ONVIF Bridge. Remove a selected user from the ONVIF user credentials list.

Advanced settings tab (properties)

The advanced settings for the ONVIF Bridge list the default settings for all cameras that the ONVIF Bridge provides to the ONVIF clients when the clients connect and request video streams.

The settings do not reflect the actual configuration of the cameras, and do not affect the video stream. The system uses the settings to speed up the exchange of video between the ONVIF Bridge and the ONVIF client. The ONVIF client will use the actual settings from the RTSP stream.

You can change the default settings that ONVIF Bridge provides to the ONVIF client, for example, if you want the values to reflect the actual configuration of the cameras.

Name	Description
Max days of retention	Default value is 30.
Frame per seconds	Default value is 5.
Width	Default value is 1920. This corresponds to full HD quality.
Height	Default value is 1080. This corresponds to full HD quality.
Bitrate Kbps	Default value is 512.
GOP size	Default value is 5.
Codec	Select one of the H.264 codec profiles. The default value is H.264 Baseline Profile.
Use configurations from cameras	<p>Enable this to use the actual configuration of the cameras instead of the default average values defined above.</p> <p>Note: If you enable this setting, the response time between the XProtect system and the ONVIF clients increases.</p>
Return sequences on command	Enable this to return information for sequences on the DESCRIBE command response.
Maximum number to return	Set the maximum number of sequences to be sent to the client. Default value is 10.
Return from start or end of recording	Select from where to start searching the sequences. from the start or from the end of the recording.
Prefer absolute time over normalized	<p>This setting defines the RTSP server playback response, where the client's time interval for playback is not specified.</p> <p>Select this option if you want your RTSP server to use real time as opposed to scaled or normalized playback.</p> <p>However, if your client application is set to use either relative time intervals or real time intervals (in UTC), the RTSP server replies with those intervals defined in the client.</p>

Using ONVIF clients to view video streams

ONVIF clients can be many different things, ranging from advanced custom surveillance systems to basic media players.

This section provides examples of how to connect to the Milestone ONVIF Bridge.

Use a Network Video Client to view a live stream

This example describes how to install the ONVIF Device Manager, and configure it to stream live video from an XProtect installation.

The ONVIF Device Manager is a free, open source Network Video Client from iDeviceDesign that complies with ONVIF standards. The tool is widely used to because it makes it easy to discover and view video from ONVIF compliant cameras on a network. Note, however, that you use ONVIF Device Manager to stream only live video. Additionally, you cannot capture and save the video data in the stream.

Before you start, get the following information from the person who administrates the XProtect installation:

- The login credentials for the user that was created for the Milestone ONVIF Bridge
- The IP address or computer name of the computer where the Milestone ONVIF Bridge is installed

To install the ONVIF Device Manager, follow these steps:

1. Go to the Sourceforge ONVIF Device Manager site (<https://sourceforge.net/projects/onvifdm>) and then download and run the installer. You can install the ONVIF Device Manager on any computer.
2. When the installation completes, an icon is available on your desktop. Double-click the icon to start the ONVIF Device Manager.
3. When you start the ONVIF Device Manager, it automatically discovers ONVIF compliant devices on the network. However, it might not discover the Milestone ONVIF Bridge.
 - If it does, go to step 6.
 - If it does not, add the bridge manually. Continue with step 4.
4. To add a Milestone ONVIF Bridge, click **ADD**.
5. In the **Add device** dialog box, in the **URI** field, provide the name or IP address of the computer where the Milestone ONVIF Bridge is installed, and the ONVIF port number. For example, the string should look like this:
`http://<IP address>:580/onvif/device_service.`
6. After you add the bridge, it is available at the bottom of the **Device** list. Select it.
7. Enter the login credentials for the basic user that was created for the ONVIF client above the list. For the user name, you must enter the domain user name.
8. Restart the ONVIF Bridge service to apply the change.

Use a media player to view a video stream

This example describes how to use the VLC media player to retrieve and view a live video feed or recorded video from a camera in an XProtect installation.

VLC media player is a free, open source multimedia player from VideoLan that supports various streaming protocols, including RTSP. For example, using VLC media player is useful when you want a very fast way to connect to a camera, or just to test the connection to a camera.

When you connect to a camera to view recorded video, the Milestone ONVIF Bridge streams the video sequences, starting with the first sequence.

Before you start, get the following information from the person who administrates the XProtect installation:

- The login credentials for the user account that is assigned to the Milestone ONVIF Bridge.
- The IP address or computer name of the computer where the Milestone ONVIF Bridge is installed.
- The GUID of the device that you want to stream video from.

Tip: The camera GUID is available in Management Client. To find the GUID, select the recording server where the camera has been added, and then select the camera. Click the **Info** tab, press and hold CTRL on your keyboard, and then click the camera's video preview.

This description is based on VLC 2.2.4 for Windows.

To install the VLC media player, and connect it to an XProtect system, follow these steps:

1. Go to <http://www.videolan.org/vlc/index.html>, and then download the installer for the VLC media player.
2. Run the installer, and follow the instructions for each step.
3. On the toolbar, click **Media**, and select **Open Network Stream**.
4. In the **Open media** dialog box, enter the following RSTP string. Replace the variables in the angle brackets "<ONVIF Bridge IP Address>" and "<Camera GUID>" with the correct information:
 - To view a live video stream, enter **rtsp://<ONVIF Bridge IP Address>:554/live/<Camera GUID>**
 - To view recorded video, enter **rtsp://<ONVIF Bridge IP Address>:554/vod/<Camera GUID>**
5. Click **Play**, and then enter the user name and password of the user account that was added to the Milestone ONVIF Bridge.

Manage video playback

Playback controls comply with RTSP standards and the ONVIF Streaming Specification (<http://www.onvif.org/specs/stream/ONVIF-Streaming-Spec-v210.pdf>).

Initiating playback

When viewing video playback, the default speed is 1 (normal playback in the forward direction).

Playback is initiated by means of the RTSP PLAY method. A range can be specified. If no range is specified, the stream is played from the beginning and plays to the end, or, if the stream is

paused, it is resumed at the point it was paused. In this example, "Range: npt=3-20" instructs the RTSP server to start playback from the 3rd second until 20th second.

For example:

```
PLAY rtsp://basic:basic@bgws-pvv-04:554/vod/943ffaad-42be-4584-bc2c-
c8238ed96373 RTSP/1.0

CSeq: 123

Session: 12345678

Require: onvif-replay

Range: npt=3-20

Rate-Control: no
```

Reverse playback

ONVIF devices MAY support reverse playback. Reverse playback is indicated using the Scale header field with a negative value. For example to play in reverse without data loss, a value of -1.0 would be used.

The Milestone ONVIF Bridge supports values [-32 : 32].

```
PLAY rtsp://basic:basic@bgws-pvv-04:554/vod/943ffaad-42be-4584-bc2c-
c8238ed96373 RTSP/1.0

CSeq: 123

Session: 12345678

Require: onvif-replay

Range: clock=20090615T114900.440Z

Rate-Control: no

Scale: -1.0
```

Change speed

Speed is controlled by the RTSP Rate-Control header. If "Rate-Control=yes", then the server is in control of the playback speed. The stream is delivered in real time using standard RTP timing mechanisms. If "Rate-Control=no", then the client is in control of the playback speed. Rate-controlled replay will typically only be used by non-ONVIF specific clients because they will not specify "Rate-Control=no".

To control playback speed in a client, use the provided controllers. For example, with the VLC media player, select **Playback > Speed > Faster** or **Slower**. This increases or decreases the speed by 0.5.

Faster Fine and **Slower Fine** change the speed by 0.25.

Manage VLC media player playback with command line entries

You can manage video playback in the VLC media player by using command lines. Refer to the VLC command line help (https://wiki.videolan.org/VLC_command-line_help/) for details.

Such commands allow you to, for example, reverse playback and change the start time of the playback.

An example of a typical command line:

```
>vlc.exe --rate=-1.0 --start-time=3600 "rtsp://basic:basic@bgws-pvv-
04:554/vod/943ffaad-42be-4584-bc2c-c8238ed96373"
```

Where:

- rate is the scale and speed parameter
- start-time is seconds after the database start

Following are the playback controls for the VLC media player:

input-repeat=	<integer [-2147483648 .. 2147483647]> Input repetitions Number of time the same input will be repeated
start-time=	<float> Start time The stream will start at this position (in seconds)
stop-time=	<float> Stop time The stream will stop at this position (in seconds)
run-time=	<float> Run time The stream will run this duration (in seconds)
input-fast-seek no-input-fast- seek	Fast seek (default disabled) Favor speed over precision while seeking
rate=	<float> Playback speed This defines the playback speed (nominal speed is 1.0)
input-list=	<string> Input list You can give a comma-separated list of inputs that will be concatenated together after the normal one
input-slave=	<string> Input slave (experimental) This allows you to play from several inputs at the same time. This feature is experimental, not all formats are supported. Use a '#' separated list of inputs
bookmarks=	<string> Bookmarks list for a stream You can manually give a list of bookmarks for a stream in the form "{name=bookmark-name,time=optional-time-offset,bytes=optional-byte-off set},{...}"

Milestone DLNA Server

In this section, you can read about the support of DLNA (Digital Living Network Alliance) in XProtect systems. You will find instructions on how to install it and set it up.

Milestone DLNA Server (explained)

DLNA (Digital Living Network Alliance) is a standard for connecting multimedia devices. Electronic manufacturers get their products DLNA certified to ensure interoperability between different vendors and devices and thereby enable them to distribute multimedia content such as audio, video, and photos.

Public displays and TVs are often DLNA certified and connected to a network. They are able to scan the network for media content, connect to the device, and request a media stream to their built-in media player. Milestone DLNA Server can be discovered by certain DLNA certified devices and deliver live video streams from selected cameras to DLNA certified devices with a media player.

Note: The DLNA devices have a live video delay of 1-10 seconds. This is caused by different buffer sizes in the devices.

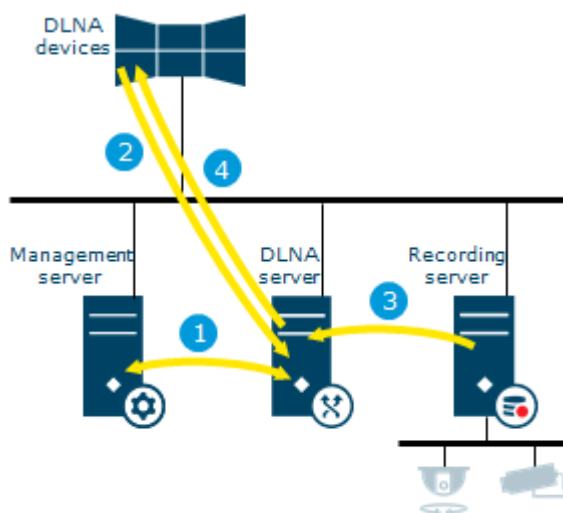
Milestone DLNA Server must be connected to the same network as the XProtect system and the DLNA device must be connected to the same network as Milestone DLNA Server.

Milestone DLNA Server system flow

The Milestone DLNA Server is comprised of the following components:

- Milestone DLNA Server
- Milestone DLNA Server 64-bit admin plug-in for the Management Client

The following illustration shows a high-level view of the interoperability between a DLNA device and Milestone DLNA Server in the XProtect system.



1. During start up of the Milestone DLNA Server service, the Milestone DLNA Server connects to the management server to authorize itself with the provided credentials. After authorization, the Milestone DLNA Server starts and is ready to send H.264 video streams from the cameras to the DLNA devices.

2. A DLNA device connects to the XProtect system via the Milestone DLNA Server and requests a live camera video stream. To do this, the DLNA device needs the IP address or domain name (domain/host name) of the server where Milestone DLNA Server is installed, and the DLNA port number. This is done automatically by UPnP protocol.
3. Milestone DLNA Server retrieves the requested camera video stream from the recording server.
4. Milestone DLNA Server sends the live video stream from the requested camera via HTTP streaming to the DLNA device.

Note: Only H.264 encoded camera streams is supported. If a camera supports multiple streams, only the default stream is sent.

Installing Milestone DLNA Server

When you install Milestone DLNA Server, you install a server and a plug-in for the Management Client. These components enables you to add DLNA channels and provide video to DLNA devices.

You can install and add multiple DLNA servers to your XProtect system. But multiple DLNA devices are able to connect to each DLNA server, so this increases the load on the network, and can impact performance. To reduce the overall use off network resources on the computer running the management server, install Milestone DLNA Server on a separate computer.

DLNA licensing

Milestone DLNA Server does not require additional licenses. You can download and install the software for free from the Milestone Systems website (<http://www.milestonesys.com>).

System requirements

The computer where you want to install the Milestone DLNA Server component must have access to the management server, and the following software installed:

- Microsoft® .NET Framework 4.5.1 or higher.

What's installed?

During installation, the following components are installed:

- Milestone DLNA Server, includes the Milestone DLNA Server service and the Milestone DLNA Server Manager.
- Milestone DLNA Admin Plug-in. The plug-in is available on the **Servers** node in the Management Client. This happens automatically when you use a **Typical** installation method. If you use a **Custom** installation method, you can install it at a later stage of the installation.

Installation also does the following:

- Registers and starts the Milestone DLNA Server service
- Starts the Milestone DLNA Server Manager, which is available in the Windows notification area on the server where the Milestone DLNA Server is installed

Before you install

Before you start the installation, get and verify the following information:

- The URL or IP address, and the port number of the management server.
You will need this information during installation.
- Recommended camera settings.
 - Frames per second: **25** (or more).
 - Maximum frames between keyframes: **25** (same value as frames per second).
 - Resolution: **1920x1080**.
 - Bit rate control mode: **Constant bit rate**.

Install Milestone DLNA Server

Download the installation file:

1. On the computer where you want to install Milestone DLNA Server, go to the Milestone website (<https://www.milestonesys.com/support/download-software/>) and locate the Milestone DLNA Server product.
2. Click the Milestone DLNA Server installer file.
3. Run the installer and follow the instructions.

Run the installer:

1. Select the language you want to use, and then click **Continue**.
2. Read and accept the license agreement, and then click **Continue**.
3. Select the installation type, as follows:

In a single-computer system

1. To install all Milestone DLNA Server components on one computer, and apply default settings, click **Typical**.
 - The URL or IP address, and the port number, of the management server. The default port is 80. If you omit the port number, the system will use port 80.
 - Verify that the login as either NETWORK SERVICE or a specified user account with **User name** and **Password** is correct.
 - Click **Continue**.
2. Select the file location and product language, and then click **Install**.

When the installation is complete, a list of successfully installed components appears. Click **Close**.

In a distributed system

1. To install Milestone DLNA Server components on separate computers, click **Custom**.
2. To install the server, select the **Milestone DLNA Server** checkbox, and then click **Continue**.

3. Specify the ports for communication with the Milestone DLNA Server:
 - The default port numbers are: Video 9200, device 9100 and configuration 9300.
 - Click **Continue**.
4. Establish a connection to management server by specifying the following:
 - The URL or IP address, and the port number, of the management server. The default port is 80. If you omit the port number, the system will use port 80.
 - Verify that the login as either NETWORK SERVICE or a specified user account with **User name** and **Password** is correct.
 - Click **Continue**.
5. Select the file location and product language, and then click **Install**.

When the installation is complete, a list of successfully installed components appears.

Click **Close**, and then install the Milestone DLNA Server plug-in on the computer where the Management Client is installed. To install the plug-in, run the installer again on that computer, select **Custom** and select the plug-in.

The following components are now installed:

- Milestone DLNA Admin Plug-in that is visible in the Management Client in the **Servers** node
- Milestone DLNA Server which includes:
 - Milestone DLNA Server Manager that is running and accessible from the notification area on the server with Milestone DLNA Server installed
 - Milestone DLNA Server service that is registered as a service

Configuring Milestone DLNA Server

After you have installed Milestone DLNA Server, the Milestone DLNA Server service is running and the icon in the system tray turns green. The next steps are to:

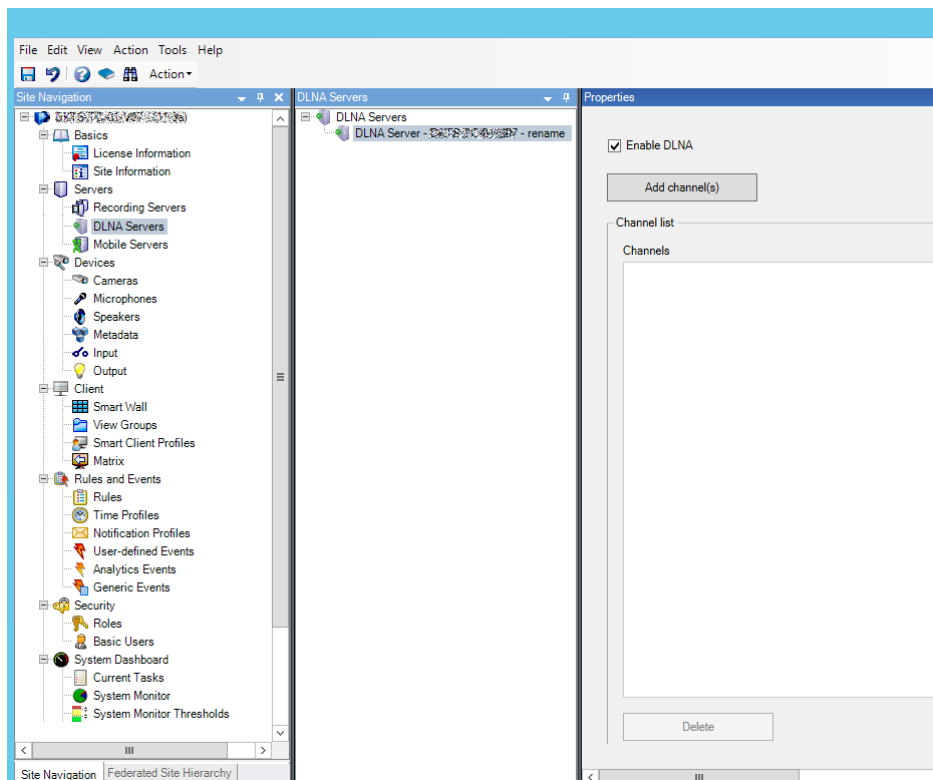
- Enable DLNA devices to access your XProtect system
- Make cameras available for Milestone DLNA Server

Configure settings for a DLNA server

To provide a DLNA device access to your XProtect VMS, follow these steps:

1. Open the Management Client.

2. Expand **Servers**, select **DLNA Servers**, and then select the DLNA server you just added.



3. To rename the server right-click the DLNA Server and select **Rename**. The name you enter is the name that DLNA devices discover during a scan for media available content.
4. On the **Properties** tab, select the **Enable DLNA** check box.

To select the cameras to be available for DLNA devices, follow these steps:

1. Click the **Add channel(s)** button.
2. Click the server and camera groups to expand them and select the cameras you want.

It is possible to bulk select on server; camera group or individual camera level.

The selected cameras appear in the **Channel list**.

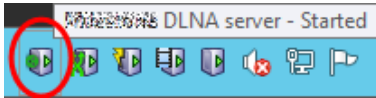
Managing Milestone DLNA Server

After you have configured Milestone DLNA Server, you can monitor the service and change configuration settings in several ways.

Check the status of the Milestone DLNA Server service

To view the status of the Milestone DLNA Server service, follow these steps.

1. On the computer where the Milestone DLNA Server is installed, look in the notification area. The Milestone DLNA Server tray icon indicates the status of the Milestone DLNA Server service. If the service is running, the icon is green.



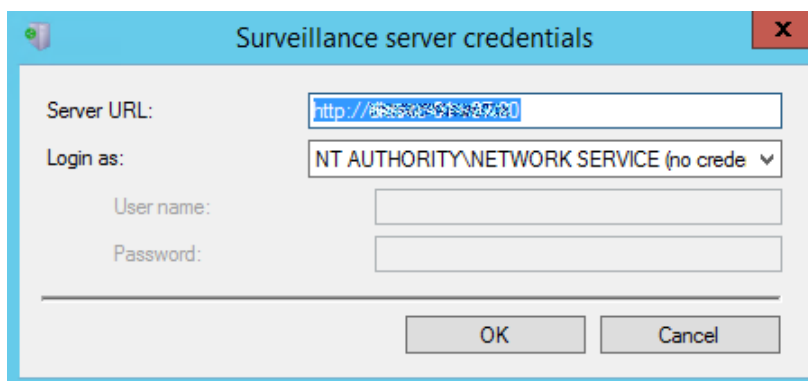
2. If it is not running, the icon is yellow or red. Right-click the icon and select **Start Milestone DLNA Server**.

Change configuration settings for Milestone DLNA Server

If you change the IP address, host name, user account or port numbers of the surveillance server, you must update this information for Milestone DLNA Server. Port numbers for the Milestone DLNA Server can also be changed.

To change the VMS address and login credentials, follow these steps:

1. On the computer where the Milestone DLNA Server service is installed, right-click the Milestone DLNA Server tray icon, and select **Surveillance server credentials**.



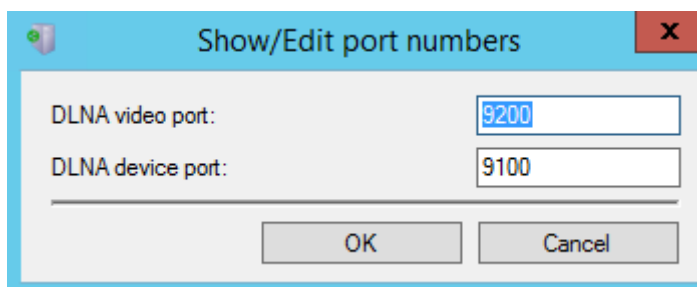
2. Specify the new information, and then click **OK**.

Note: You must use the domain name or the IP address of the server where the management server is installed.

The Milestone DLNA Server service restarts and the tray icon turns green.

To change the Milestone DLNA Server port numbers, follow these steps:

1. On the computer where the Milestone DLNA Server service is installed, right-click the Milestone DLNA Server tray icon, and select **Show/edit port numbers**.



2. Specify the new information, and then click **OK**.

The Milestone DLNA Server service restarts and the tray icon turns green.

Using DLNA certified device to view video streams

To start watching live video from your XProtect system on your public displays or TV, follow these steps:

1. Make sure your device is DLNA certified and connected to the network with Milestone DLNA Server.
2. Scan the network and connect to Milestone DLNA Server when it has been discovered.
3. A list of the different cameras appears. Connect to the camera that you want to show video from.

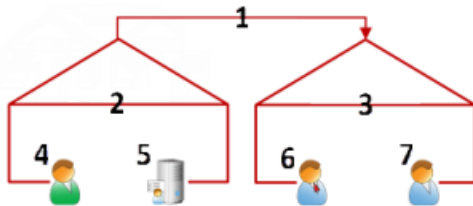
Multi-domain with one-way trust

Setup with one-way trust

If you run your system in a multi-domain environment, you can configure this setup with one-way trust. The system is installed on the **trusting** domain and users log in from **trusting** and **trusted** domains.

1. Create a service account in the **trusted** domain. You can name it whatever you want, for example, **svcMilestone**.
2. Add the new service account to the following local Windows user groups on the server running the system, in the **trusting** domain:
 - Administrators
 - IIS_IUSRS (Windows Server 2008, necessary for Internet Information Services (IIS) Application Pools)
 - IIS_WPG (Windows Server 2003, necessary for IIS Application Pools).
3. Make sure that the service account has system administrator rights on your SQL Database or SQL Server Express, either directly or through the **BUILTIN\Administrators** group.
4. Set the identity of the **ManagementServerAppPool** Application Pool in the IIS to the service account.
5. Reboot the server to make sure that all group membership and permission changes take effect.

Important: To add **trusted** domain users to new or existing XProtect system roles, log in to Windows as a **trusted** domain user. Next, launch the Management Client and log in as user of either the **trusting** domain or the **trusted** domain. If you log in to Windows as a **trusting** domain user, you are asked for credentials for the **trusted** domain in order to browse for users.



Example illustration of multi-domain environments with one-way trust.

Legend:

1. One-way outgoing domain trust
2. MyDomain.local
3. OtherDomain.edu
4. Trusting domain user
5. Management server
6. Milestone service account
7. Trusted domain user

SNMP

SNMP support (explained)

Your system supports Simple Network Management Protocol (SNMP), a standard protocol for monitoring and controlling network devices, for managing their configuration, collecting statistics and more.

The system acts as an SNMP agent, which can generate an SNMP trap as a result of a triggered rule. A third-party SNMP management console can then receive information about the rule-triggering event, and operators of the SNMP management console can configure their system for further action as required.

The implementation uses Microsoft® Windows® SNMP Service for triggering SNMP traps. This means that you must install the SNMP Service on recording servers. When you have configured the SNMP Service through its own user interface, this enables recording servers to send .mib (Management Information Base) files to the SNMP management console.

Install SNMP service

1. On the relevant recording servers, open Windows' **Programs and Features** functionality.
2. In the left side of the **Programs and Features** dialog box, click **Turn Windows functionality on or off**. This opens the **Windows feature** window.
3. In the dialog box, select the check box next to **Simple Network Management Protocol (SNMP)** and click **OK**.

Configure SNMP service

1. On the required recording servers, select **Start > Control Panel > Administrative Tools > Services**.
2. Double-click the SNMP Service.
3. Select the **Traps** tab.
4. Specify a community name, and click **Add to list**.
5. Select the **Destinations** tab.
6. Click **Add**, and specify the IP address or host name of the server running your third-party SNMP management station software.
7. Click **OK**.

XProtect Professional VMS Servers

XProtect Professional VMS servers (explained)

This section is only relevant if:

- your system does not use IPv6, and
- you have installations with XProtect Professional VMS version 7.0 or later.

In all other cases, use Milestone Federated Architecture or Milestone Interconnect.

You can add XProtect Professional VMS servers to your XProtect VMS system. When added, the servers act as recording servers and their video can be viewed by the clients.

In the Management Client, you can see the status of added XProtect Professional VMS servers. You must still define all XProtect Professional VMS server settings (cameras, scheduling, user rights etc.) in XProtect Professional VMS's Management Application. See the XProtect Professional VMS documentation.

To give users access to video from XProtect Professional VMS servers, you must match roles in XProtect VMS with user rights defined on the XProtect Professional VMS servers.

- Add X (see "Add XProtect Professional VMS servers" on page 401)Protect Professional VMS servers (see "Add XProtect Professional VMS servers" on page 401)
- Define roles with access to X (see "Define roles with access to XProtect Professional VMS servers" on page 402)Protect Professional VMS servers (see "Define roles with access to XProtect Professional VMS servers" on page 402)
- Edit X (see "Edit XProtect Professional VMS servers" on page 402)Protect Professional VMS servers (see "Edit XProtect Professional VMS servers" on page 402)

Add XProtect Professional VMS servers

Even if the XProtect Professional VMS system has an internal master/slave setup, you cannot reuse it in your XProtect VMS system. You must add each XProtect Professional VMS server that you need device data from individually.

To add an existing XProtect Professional VMS server to your system:

1. From the Management Client's **Tools** menu, select **Professional VMS Servers**.
2. In the **Add/Remove Professional VMS Servers** dialog box, click **Add**.
3. Enter the IP address or the host name of the XProtect Professional VMS server.
4. Enter the port number used by the XProtect Professional VMS server.

The default port number is 80. If in doubt, you can find the port number in XProtect Professional VMS's Management Application under **Server Access**.
5. Enter the user credentials for the administrator of the XProtect Professional VMS server to give yourself unrestricted rights to the device data from it.
6. If the XProtect VMS system accesses the XProtect Professional VMS server through an Internet connection, click **Network** to specify the WAN address of XProtect VMS's management server. You need only define the WAN address once.

Next step is to give your users access to devices from the XProtect Professional VMS server.

Define roles with access to XProtect Professional VMS servers

To give the users access to devices from the added XProtect Professional VMS servers:

1. On the XProtect Professional VMS server, open the Management Application to find an XProtect Professional VMS user who has user rights you can reuse and match with a role in your XProtect VMS system. If not, create a new XProtect Professional VMS user that matches the role in your XProtect VMS system.
2. Take careful note of the XProtect Professional VMS user's user name, password and authentication type (basic or Windows). The XProtect VMS system does not verify that the information you specify later in these steps corresponds to a defined user in XProtect Professional VMS.
3. In the XProtect VMS Management Client's **Site Navigation** pane, expand **Security**, and select **Roles**.
4. Select the role you want to use or define a new role.
5. At the bottom of the **Role Settings** pane, select the **Servers** tab and then the XProtect Professional VMS server.
6. Select the XProtect Professional VMS user with the user rights you want to match with your role.
7. Click **Save**.

Edit XProtect Professional VMS servers

To edit an XProtect Professional VMS server added to your system:

1. From the **Tools** menu, select **Professional VMS Servers**.
2. Select the XProtect Professional VMS server from the list, and click **Edit**.
3. Edit the relevant settings and click **OK**.

System maintenance

Ports used by the system

All XProtect components and the ports needed by them are listed in individual sections below. To ensure, for example, that the firewall blocks only unwanted traffic, you need to specify the ports that the system uses. You should only enable these ports. The lists also include the ports used for local processes.

They are arranged in two groups:

- **Server components** (services) offer their service on particular ports which is why they need to listen for client requests on these ports. Therefore, these ports need to be opened in the Windows Firewall for inbound connections.
- **Client components** (clients) initiate connections to particular ports on server components. Therefore, these ports need to be opened for outbound connections. Outbound connections are typically open by default in the Windows Firewall.

If nothing else is mentioned, ports for server components must be opened for inbound connections, and ports for client components must be opened for outbound connections.

Do keep in mind that server components can act as clients to other server components as well.

The port numbers are the default numbers, but this can be changed. Contact Milestone Support, if you need to change ports that are not configurable through the Management Client.

Server components (inbound connections)

Each of the following sections list the ports which need to be opened for a particular service. In order to figure out which ports need to be opened on a particular computer, you need to consider all services running on this computer.

Management Server service and related processes

Port number	Protocol	Process	Connections from...	Purpose
80	HTTP	IIS	All XProtect components	Main communication, for example, authentication and configurations.
443	HTTPS	IIS	XProtect Smart Client and the Management Client	Authentication of basic users.
6473	TCP	Management Server service	Management Server tray controller, local connection only.	Showing status and managing the service.

Port number	Protocol	Process	Connections from...	Purpose
7475	TCP	Management Server service	Windows SNMP Service	Communication with the SNMP extension agent. Do not use the port for other purposes even if your system does not apply SNMP. In XProtect 2014 systems or older, the port number was 6475.
8080	TCP	Management server	Local connection only.	Communication between internal processes on the server.
9993	TCP	Management Server service	Recording Server services	Authentication, configuration, token exchange.
12345	TCP	Management Server service	XProtect Smart Client	Communication between the system and Matrix recipients. You can change the port number in the Management Client.

SQL Server service

Port number	Protocol	Process	Connections from...	Purpose
1433	TCP	SQL Server	Management Server service	Storing and retrieving configurations.
1433	TCP	SQL Server	Event Server service	Storing and retrieving events.
1433	TCP	SQL Server	Log Server service	Storing and retrieving log entries.

Data Collector service

Port number	Protocol	Process	Connections from...	Purpose
7609	HTTP	IIS	On the Management Server computer: Data Collector services on all other servers. On other computers: Data Collector service on the Management Server.	System Monitor.

Event Server service

Port number	Protocol	Process	Connections from...	Purpose
1234	TCP/UDP	Event Server Service	Any server sending generic events to your XProtect system.	Listening for generic events from external systems or devices. Only if the relevant data source is enabled.
1235	TCP	Event Server service	Any server sending generic events to your XProtect system.	Listening for generic events from external systems or devices. Only if the relevant data source is enabled.
9090	TCP	Event Server service	Any system or device that sends analytics events to your XProtect system.	Listening for analytics events from external systems or devices. Only relevant if the Analytics Events feature is enabled.
22331	TCP	Event Server service	XProtect Smart Client and the Management Client	Configuration, events, alarms, and map data.
22333	TCP	Event Server service	MIP Plug-ins and applications.	MIP messaging.

Recording Server service

Port number	Protocol	Process	Connections from...	Purpose
25	SMTP	Recording Server Service	Cameras, encoders, and I/O devices.	Listening for event messages from devices. The port is disabled per default.

Port number	Protocol	Process	Connections from...	Purpose
5210	TCP	Recording Server Service	Failover recording servers.	Merging of databases after a failover recording server had been running.
5432	TCP	Recording Server Service	Cameras, encoders, and I/O devices.	Listening for event messages from devices.
7474	TCP	Recording Server Service	Windows SNMP service	Communication with the SNMP extension agent. Do not use the port for other purposes even if your system does not apply SNMP. In XProtect 2014 systems or older, the port number was 6474.
7563	TCP	Recording Server Service	XProtect Smart Client, Management Client	Retrieving video and audio streams, PTZ commands.
8966	TCP	Recording Server Service	Recording Server tray controller, local connection only.	Showing status and managing the service.
11000	TCP	Recording Server Service	Failover recording servers	Polling the state of recording servers.
65101	UDP	Recording Server service	Local connection only	Listening for event notifications from the drivers.

Note that in addition to the inbound connections to the Recording Server service listed above, the Recording Server service establishes outbound connections to the cameras.

Failover Server service and Failover Recording Server service

Port number	Protocol	Process	Connections from...	Purpose
25	SMTP	Recording Server Service	Cameras, encoders, and I/O devices.	Listening for event messages from devices. The port is disabled per default.
5210	TCP	Recording Server Service	Failover recording servers	Merging of databases after a failover recording server had been running.
5432	TCP	Recording Server Service	Cameras, encoders, and I/O devices.	Listening for event messages from devices.

Port number	Protocol	Process	Connections from...	Purpose
7474	TCP	Recording Server Service	Windows SNMP service	Communication with the SNMP extension agent. Do not use the port for other purposes even if your system does not apply SNMP.
7563	TCP	Recording Server Service	XProtect Smart Client	Retrieving video and audio streams, PTZ commands.
8844	UDP	Failover recording servers	Local connection only.	Communication between the servers.
8966	TCP	Failover Recording Server Service	Failover Recording Server tray controller, local connection only.	Showing status and managing the service.
8967	TCP	Failover Server Service	Failover Server tray controller, local connection only.	Showing status and managing the service.
8990	TCP	Failover Server Service	Management Server service	Monitoring the status of the Failover Server service.

Note that in addition to the inbound connections to the Failover Recording Server service listed above, the Recording Server service establishes outbound connections to the cameras.

Mobile Server service

Port number	Protocol	Process	Connections from...	Purpose
8000	TCP	Mobile Server service	Mobil Server management (tray icon), local connection only.	SysTray application.
8081	HTTP	Mobile Server service	Mobile clients, Web clients, and Management Client.	Sending data streams; video and audio.
8082	HTTPS	Mobile Server service	Mobile clients and Web clients.	Sending data streams; video and audio.

LPR Server service

Port number	Protocol	Process	Connections from...	Purpose
22334	TCP	LPR Server Service	Event server	Retrieving recognized license plates and server status. In order to connect, the Event server must have the LPR plug-in installed.
22334	TCP	LPR Server Service	LPR Server management (tray icon), local connection only.	SysTray application

Milestone ONVIF Bridge service

Port number	Protocol	Process	Connections from...	Purpose
580	TCP	ONVIF Bridge Service	ONVIF clients	Authentication and requests for video stream configuration.
554	RTSP	RTSP Service	ONVIF clients	Streaming of requested video to ONVIF clients.

Milestone DLNA Server service

Port number	Protocol	Process	Connections from...	Purpose
9100	HTTP	DLNA Server Service	DLNA device	Device discovery and providing DLNA channels configuration. Requests for video streams.
9200	HTTP	DLNA Server Service	DLNA device	Streaming of requested video to DLNA devices.
9300	HTTP	DLNA Server Service	Milestone DLNA Server Manager	SysTray application.

Screen Recorder service

Port number	Protocol	Process	Connections from...	Purpose
52111	TCP	XProtect Screen Recorder	Recording Server Service	Provides video from a monitor. It appears and acts in the same way as a camera on the recording server. You can change the port number in the Management Client.

Cameras, encoders, and I/O devices**Inbound connections**

Port number	Protocol	Connections from...	Purpose
80	TCP	Recording servers and failover recording servers	Authentication, configuration, and data streams; video and audio.
443	HTTPS	Recording servers and failover recording servers	Authentication, configuration, and data streams; video and audio.
554	RTSP	Recording servers and failover recording servers	Data streams; video and audio.

Outbound connections

Port number	Protocol	Connections to...	Purpose
25	SMTP	Recording servers and failover recording servers	Sending event notifications (deprecated).
5432	TCP	Recording servers and failover recording servers	Sending event notifications.

Note that only a few camera models are able to establish outbound connections.

Client components (outbound connections)

XProtect Smart Client, XProtect Management Client, Milestone Mobile server

Port number	Protocol	Connections to...	Purpose
80	HTTP	Management server service	Authentication
443	HTTPS	Management server service	Authentication of basic users.
7563	TCP	Recording server service	Retrieving video and audio streams, PTZ commands.
22331	TCP	Event Server service	Alarms.

Web Client, Milestone Mobile client

Port number	Protocol	Connections to...	Purpose
8081	HTTP	Milestone Mobile server	Retrieving video and audio streams.
8082	HTTPS	Milestone Mobile server	Retrieving video and audio streams.

Backing up and restoring system configuration

Backing up and restoring your system configuration (explained)

Milestone recommends that you make regular backups of your system configuration as a disaster recovery measure. While it is rare to lose your configuration, it can happen under unfortunate circumstances. Luckily, it takes only a minute to back up your existing configuration.

The system offers a built-in feature that backs up all the system configuration you can define in the Management Client. Note that the log server database and the log files, including audit log files, are not included in this backup.

If your system is large, Milestone recommends that you define scheduled backups. This is done with the third-party tool: Microsoft® SQL Server Management Studio. This backup includes the same data as a manual backup.

During a backup, your system stays online. Depending on your system configuration, your hardware, and on whether you have installed the SQL server, Event Server service and Management Client on a single server or several servers (a distributed setup), backing up the system configuration can take some time.

Each time you make a backup both manual and scheduled, the SQL Server's transaction log file is flushed. For additional information about how to flush this log file, go to the Microsoft website and search for "SQL Server transaction log".

Back up log server database

Handle the **SurveillanceLogServer** database by using the method that you use when handling system configuration as described earlier. The **SurveillanceLogServer** database (the name may be different if you renamed the system configuration database) contains all your system logs, including errors reported by recording servers and cameras.

The database is located where the Log Server's SQL server is installed, typically the same place as your management server's SQL server. Backing up this database is not vital since it does not contain any system configuration, but you may later appreciate having access to system logs from before the management server backup/restore.

Manual backup and restore of system configuration

Manually backing up your system configuration (explained)

When you want to perform a manual backup of your system configuration, make sure that your system stays online. Here are a few things to consider before you start the backup:

- You cannot use a backup to copy configurations to other systems.
- It can take some time to back up your configuration. It depends on your system configuration, your hardware, and on whether your SQL server, management server and Management Client are installed on the same computer.
- Logs, including audit logs, are **not** part of the configuration backup.

Backing up and restoring the event server configuration (explained)

The content of your event server configuration is included when you back up and restore system configuration.

The first time you run the event server, all its configuration files are automatically moved to the SQL server. You can apply the restored configuration to the event server without needing to restart the event server, and the event server can start and stop all external communication while the restoration of the configuration is being loaded.

Backup and restore fail and problem scenarios (explained)

If, after your last system configuration backup, you have moved the event server or other registered services such as the log server, you must select which registered service configuration you want for the new system. You can decide to keep the new configuration after the system is restored to the old version. You decide by looking at the host names of the services.

If your restore of the system configuration fails because the event server is not located at the specified destination (for example, if you have chosen the old registered service setup), do another restore.

Back up system configuration manually

1. From the menu bar, select **File > Backup Configuration**.
2. Read the note in the dialog box and click **Backup**.
3. Enter a file name for the .cnf file.
4. Enter a folder destination and click **Save**.
5. Wait until the backup is finished and click **Close**.

Note: All relevant system configuration files are combined into one single .cnf file that is saved at a specified location. During the backup, all backup files are first exported to a temporary system backup folder on the management server. You can select another temporary folder by right-clicking the notification area's management server service icon and by selecting Select shared backup folder.

Restore system configuration from a manual backup

Important information:

- Both the user who installs and the user who restores must be local administrator of the database on the management server **and** on the SQL server.
- Except for your recording servers, your system is completely shut down for the duration of the restore, which can take some time.
- A backup can only be restored on the system installation where it was created. Make sure that the setup is as similar as possible to when the backup was made. Otherwise, the restore might fail.
- If you do a backup of the database and restore it on a clean SQL server, then the raise errors from the database will not work and you will only receive one generic error message from the SQL server. To avoid that, first reinstall your XProtect system using the clean SQL server and then restore the backup on top of that.
- If restoring fails during the validation phase, you can start the old configuration again because you have made no changes.
If restoring fails elsewhere in the process, you cannot roll back to the old configuration. As long as the backup file is not corrupted, you can do another restore.
- Restoring replaces the current configuration. This means that any changes to the configuration since last backup are lost.
- No logs, including audit logs, are restored.
- Once restoring has started, you cannot cancel it.

Restoring:

1. Right-click the notification area's Management Server service icon and select **Restore Configuration**.
2. Read the important note and click **Restore**.

3. In the file open dialog box, browse to the location of the configuration backup file, select it, and click **Open**.

The backup file is located on the Management Client computer. If the Management Client is installed on a different server, copy the backup file to this server before you select the destination.

4. The **Restore Configuration** window opens. Wait for the restore to finish and click **Close**.

Select shared backup folder

Before backing up and restoring any system configuration, you must set a backup folder for this purpose.

1. Right-click the notification area's management server service icon and select **Select shared backup folder**.
2. In the window that appears, browse to the wanted file location.
3. Click **OK** twice.
4. If asked if you want to delete files in the current backup folder, click **Yes** or **No** depending on your needs

Scheduled backup and restore

Scheduled backup and restore of system configuration (explained)

Milestone recommends that you make regular backups of your system configuration as a disaster recovery measure. While it is rare to lose your configuration, it can happen under unfortunate circumstances. Luckily, it takes only a minute to back up your existing configuration. Regular backups also have the added benefit that they flush your Microsoft® SQL Server's transaction log.

If you have a smaller setup and do not need scheduled backups, you can back up your system configuration manually. For instructions, see Manual backup and restore of system configuration (on page 411).

The management server stores your system's configuration in a database. When you back up/restore management server(s), make sure that this database is included in the backup/restore.

Requirements for using scheduled backup and restore

Microsoft® SQL Server Management Studio, a tool download-able for free from their website (<http://www.microsoft.com/downloads>).

Apart from managing SQL Server databases, the tool includes some easy-to-use backup and restoration features. Download and install the tool on your management server.

SQL server transaction log (explained)

Each time a change in the system's data occurs, the SQL Server log this change in its transaction log, regardless whether it is a SQL Server on your network or a SQL Server Express edition.

The transaction log is essentially a security feature that makes it possible to roll back and undo changes to the SQL Server database. By default, the SQL Server stores its transaction log

indefinitely, and over time the transaction log build up more and more entries. The SQL Server's transaction log is by default located on the system drive, and if the transaction log keeps growing, it may in the end prevent Windows from running properly.

To avoid such a scenario, flushing the SQL Server's transaction log from time to time is a good idea. However, flushing it does not in itself make the transaction log file smaller, but it prevents it from growing out of control. Your system does not, however, automatically flush the SQL Server's transaction log at specific intervals. You can also do several things on the SQL Server itself to keep the size of the transaction log down.

For more information on this topic, go to the Microsoft support page (<http://support.microsoft.com>) and search for SQL Server transaction log.

Back up system configuration with scheduled backup

1. From Windows' Start menu, launch Microsoft® SQL Server Management Studio.
2. When connecting, specify the name of the required SQL Server. Use the account under which you created the database.
1. Find the **Surveillance** database that contains your entire system configuration, including event server, recording servers, cameras, inputs, outputs, users, rules, patrolling profiles, and more.

We assume that the database uses the default name.

2. Make a backup of the **Surveillance** database and make sure to:
 - Verify that the selected database is **Surveillance**.
 - Verify that the backup type is **full**.
 - Set the schedule for the recurrent backup. You can read more about scheduled and automated backups on the Microsoft website (<https://support.microsoft.com/en-us/kb/2019698>).
 - Verify that the suggested path is satisfactory or select alternative path.
 - Select to **verify backup when finished** and to **perform checksum before writing to media**.

3. Follow the instructions in the tool to the end.

Also consider backing up the **SurveillanceLog** database by using the same method.

Backup and restore event server configuration

The content of your event server configuration is included when you backup and restore system configuration. The first time you run the event server, all its configuration files are automatically moved to the SQL server. You can apply the restored configuration to the event server without needing to restart the event server, and the event server is capable of starting and stopping all external communication while the restoration of the configuration is being loaded.

Restore system configuration from a scheduled backup

Requirements

To prevent configuration changes being made while you restore the system configuration database, stop the:

- Management Server service (see "Managing server services" on page 422)
- Event Server Service (can be done from Windows **Services** (search for **services.msc** on your machine. Within **Services**, locate **Milestone XProtect Event Server**))
- World Wide Web Publishing Service, also known as the Internet Information Service (IIS). Learn how to stop the IIS ([http://technet.microsoft.com/en-us/library/cc732317\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc732317(WS.10).aspx)).

Open Microsoft® SQL Server Management Studio from Windows' **Start** menu.

In the tool do the following:

1. When connecting, specify the name of the required SQL Server. Use the account under which the database was created.
2. Find the **Surveillance** database that contains your entire system configuration, including event server, recording servers, cameras, inputs, outputs, users, rules, patrolling profiles, etc.
3. Make a restore of the **Surveillance** database and make sure to:
 - Select to back up **from** device
 - Select backup media type **file**
 - Find and select your backup file **Surveillance.bak**
 - Select to **overwrite the existing database**.
4. Follow the instructions in the tool to the end.

If you also backed up the **SurveillanceLog** database from the old log server, restore it on the new log server by using the same method.

Note that the system does not work while the Management Server service is stopped. It is important to remember to start the services again once you have finished restoring the database.

Moving the management server

Moving the management server (explained)

You may sometimes need to move the management server installation from one physical server to another. The management server stores your system configuration in a database. If you are moving the management server from one physical server to another, it is vital that you make sure that your new management server also gets access to this database. The system configuration database can be stored in two different ways:

- **Network SQL Server:** If you are storing your system configuration in a database on an existing SQL Server on your network, you can point to the database's location on that SQL Server when installing the management server software on your new management server.

In that case, only the following paragraph about management server hostname and IP address applies and you should ignore the rest of this topic:

Management server hostname and IP address: When you move the management server from one physical server to another physical server, it is by far the easiest to give the new server the same hostname and IP address as the old one. This is due to the fact that the recording server connects to the hostname and IP address of the old management server. If you have given the new management server a new hostname and/or IP address, the recording server cannot find the management server. Manually stop each recording server in your system, change their management server URL, and when done, restart them.

- **Local SQL Server:** If you are storing your system configuration in a local SQL Server database on the management server itself, it is important that you back up the existing management server's system configuration database before the move. By backing up the database, and subsequently restoring it on the new server, you avoid having to reconfigure your cameras, rules, time profiles, etc. after the move.

Requirements

- **Your software installation file for installation on the new management server.**
- **Your software license file (.lic),** that you received when you purchased your system and initially installed it. You should not use the activated software license file which you have received after a manual offline license activation. An activated software license file contains information about the specific server on which the system is installed. Therefore, an activated software license file cannot be reused when moving to a new server.

Note that if you are also upgrading your system software in connection with the move, you have received a new software license file. Simply use this.

- **Local SQL Server users only: Microsoft® SQL Server Management Studio.**
- What happens while the management server is unavailable? (see "Unavailable management servers (explained)" on page 416)
- Copy log server database (see "Back up log server database" on page 411)

Unavailable management servers (explained)

- **Recording servers can still record:** Any currently working recording servers received a copy of their configuration from the management server, so they can work and store recordings on their own while the management server is down. Scheduled and motion-triggered recording therefore works, and event-triggered recording works unless based on events related to the management server or any other recording server because these go through the management server.
- **Recording servers temporarily store log data locally:** They automatically send log data to the management server when it becomes available again.
 - **Clients cannot log in:** Client access is authorized through the management server. Without the management server, clients cannot log in.
 - **Clients that are already logged in can remain logged in for up to one hour:** When clients log in, they are authorized by the management server and can communicate with recording servers for up to one hour. If you can get the new management server up and running within an hour, many of your users are not affected.

- **No ability to configure the system:** Without the management server, you cannot change the system configuration.

Milestone recommends that you inform your users about the risk of losing contact with the surveillance system while the management server is down.

Move the system configuration

Moving your system configuration is a three step process:

1. Make a backup of your system configuration. This is identical to making a scheduled backup (see "Back up system configuration with scheduled backup" on page 414).
2. Install the new management server on the new server. See scheduled backup, step 2.
3. Restore your system configuration to the new system. See Restore system configuration from scheduled backup (see "Restore system configuration from a scheduled backup" on page 414).

Managing the SQL server

Updating the SQL server address (explained)

When you install a system as a trial, or if you restructure a large installation, you may need to use a different SQL database. You can do this with the **Update SQL Server Address** tool.

With the tool, you can change the addresses of the SQL servers used by the management server, the event server and the log server. The only limitation is that you cannot change the management server and event server SQL address at the same time as the log server's SQL address. You can do it one after another.

You must do SQL updates locally on the computer where you have installed the management server/event server **or** log server. You cannot do it from the Management Client. If your management server and event server are not located on the same computer, you can still use the tool, but you must run it on both the computer on which the management server is installed and on the computer on which the event server is installed.

You must copy the SQL databases before you proceed.

Update the log server's SQL address

Management server and log server located on the same computer

1. Go to the computer where your management server is installed.
2. Go to the notification area of the taskbar. Right-click the **Management Server** icon, select **Update SQL address**. The **Update SQL Server Address** dialog box appears.
3. Select **Log Server** and click **Next**.
4. Enter or select the new SQL server and click **Next**.
5. Select the new SQL database and click **Select**.
6. Wait while the address change takes place. Click **OK** to confirm.

Management server and log server located on different computers

1. Go to the computer where your management server is installed and copy the directory *%ProgramFiles%\Milestone\XProtect Management Server\Tools\ChangeSqlAddress* (with content) to a temporary directory on the event server.
2. Paste the directory that you copied to a temporary place on the computer where the log server is installed and run the included file: *VideoOS.Server.ChangeSqlAddress.exe*. The **Update SQL Server Address** dialog box appears.
3. Select **Log Server** and click **Next**.
4. Enter or select the new SQL server and click **Next**.
5. Select the new SQL database and click **Select**.
6. Wait while the address change takes place. Click **OK** to confirm.

Update the management server or event server SQL server address

1. If your management server and event server are located:
 - a) together on the same computer and you wish to update both SQL addresses, go to the computer where your management server is installed.
 - b) on different computers and you wish to update the management server SQL address (and later the event server SQL address), go to the computer where your management server is installed.
 - c) on different computers and you wish to update the event server SQL address only (or you have already updated it on the management server), go to the computer where your management server is installed and copy the directory *%ProgramFiles%\Milestone\XProtect Management Server\Tools\ChangeSqlAddress* (with content) to temporary directory on the event server.
2. If:
 - **a** and **b**, go to the notification area of the taskbar. Right-click the **Management Server** icon, select **Update SQL address**.
 - **c**, paste the directory you copied to a temporary place on the computer where the event server is installed and run the included file: *VideoOS.Server.ChangeSqlAddress.exe*.
3. The **Update SQL Server Address** dialog box appears. Select **Management Server and Event Server** and click **Next**.
4. Enter or select the new SQL server and click **Next**.
5. Select the new SQL database and click **Select**.
6. Wait while the address change takes place. When a confirmation message is presented, click **OK**.

If you acted according to step **2 b**, you have by now only updated the **management server** SQL address. You must repeat the process to update the **event server** SQL address. When doing so, make sure to select the scenario in step **2 c**.

Replace hardware

When you replace a hardware device on your network with another hardware device, you must know the IP address, port, user name and password of the new hardware device.

If you have not enabled Automatic license activation (explained) (on page 71) and have used all device changes without activation (see "Device changes without activation (explained)" on page 69), you must manually activate your licenses **after** replacing hardware devices. If the new number of hardware devices exceeds your total number of hardware device licenses, you have to purchase new hardware device licenses.

1. Expand the required recording server, right-click the hardware you want to replace.
2. Select **Replace Hardware**.
3. The **Replace Hardware** wizard appears. Click **Next**.
4. In the wizard, in the **Address** field (marked by red arrow in the image), enter the IP address of the new hardware. If known, select the relevant driver from the **Hardware Driver** drop-down list. Otherwise select **Auto Detect**. If port, user name or password data is different for the new hardware, correct this **before starting the auto detect process (if needed)**.

Address	Port	User Name	Password	Hardware Driver
10.100.10.100		root	****	Axis 216MFD Camera

The wizard is prefilled with data from the existing hardware. If you replace it with a similar hardware device, you can reuse some of this data - for example, port and driver information.

5. Do one of the following:
 - If you selected the required hardware device driver directly from the list, click **Next**.
 - If you selected **Auto Detect** in the list, click **Auto Detect**, wait for this process to be successful (marked by a ✓ to the far left), click **Next**.

This step is designed to help you map devices and their databases, depending on the number of individual cameras, microphones, inputs, outputs and so on attached to the old hardware device and the new respectively.

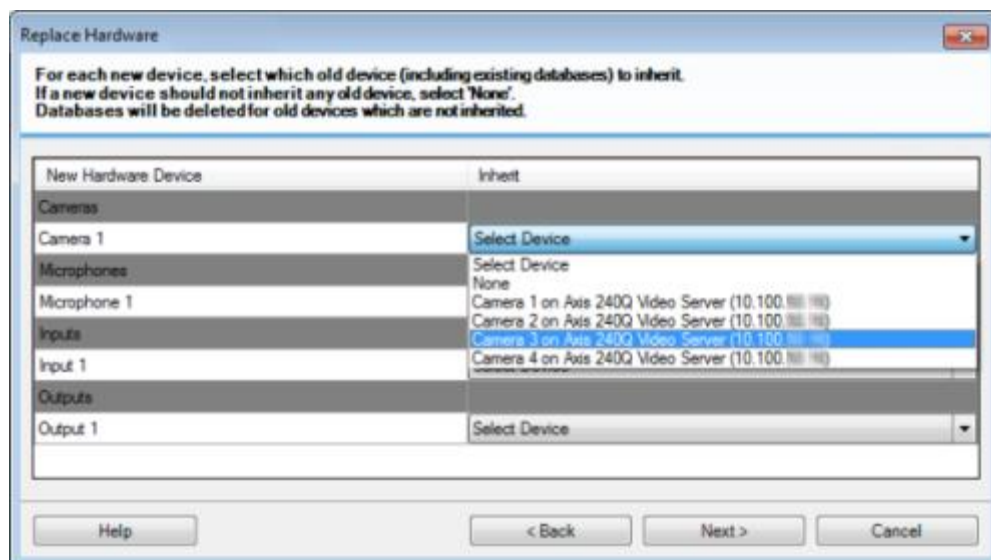
It is important to consider **how** to map databases from the old hardware device to databases of the new hardware device. You do the actual mapping of individual devices by

selecting a corresponding camera, microphone, input, output or **None** in the right-side column.

Important: Make sure to map **all** cameras, microphones, inputs, outputs, etc. Contents mapped to **None**, are **lost**.



Example of the old hardware device having more individual devices than the new one:



Click **Next**.

- You are presented with a list of hardware to be added, replaced or removed. Click **Confirm**.
- Final step is a summary of added, replaced and inherited devices and their settings. Click **Copy to Clipboard** to copy contents to the Windows clipboard or/and **Close** to end the wizard.

Replace a recording server

If a recording server is malfunctioning and you want to replace it with a new server that inherits the settings of the old recording server:

1. Retrieve the recording server ID from the old recording server:
 1. Select **Recording Servers**, then in the **Overview** pane select the old recording server.
 2. Select the **Storage** tab.
 3. Press and hold down the CTRL key on your keyboard while selecting the **Info** tab.
 4. Copy the recording server ID-number in the lower part of the **Info** tab. Do not copy the term *ID*, only the number itself.



2. Replace the recording server ID on the new recording server:
 1. Stop the Recording Server service on the old recording server, then in Windows' **Services** set the service's **Startup type** to **Disabled**.

Important: It is very important that you do not start two recording servers with identical IDs at the same time.

2. On the new recording server, open an explorer and go to *C:\ProgramData\Milestone\XProtect Recording Server* or the path where your recording server is located.
3. Open the file *RecorderConfig.xml*.
4. Delete the ID stated in between the tags *<id>* and *</id>*.

```
- <recorderconfig>
- <recorder>
  <id>ff0b3d62-4b1b-4e06-93ac-40053f637f82</id>
```

5. Paste the copied recording server ID in between the tags *<id>* and *</id>*. Save the *RecorderConfig.xml* file.
6. Go to the registry:
HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\VideoOS\Recorder\Installation.
7. Open **RecorderIDOnMachine** and change the old recording server ID with the new ID.
8. Restart the Recording Server service. When the new Recording Server service starts up, it has inherited all settings from the old recording server.

Video device drivers

Video device drivers (explained)

Your system uses video device drivers to control and communicate with the camera devices connected to a recording server. You must install video device drivers on each recording server on your system.

When you install your system, video device drivers are part of the initial installation process. Milestone releases new versions of video device drivers regularly and makes them available on the download page (<http://www.milestonesys.com/downloads>) on our website. When you update video device drivers, you can install the latest version on top of any version you may have installed. Stop the Recording Server before you install, otherwise you need to restart the computer.

To ensure best performance, always use the latest version of video device drivers.

Removing device drivers (explained)

If you no longer require device drivers on your computer, you can delete the device packs from your system. To do so, follow the standard Windows procedure for removing programs.

If you remove device drivers, the recording server and the camera devices cannot communicate any longer. Do not remove device packs when you upgrade because you can install a new version on top of an old one. Only if you uninstall the entire system, you may remove the device pack.

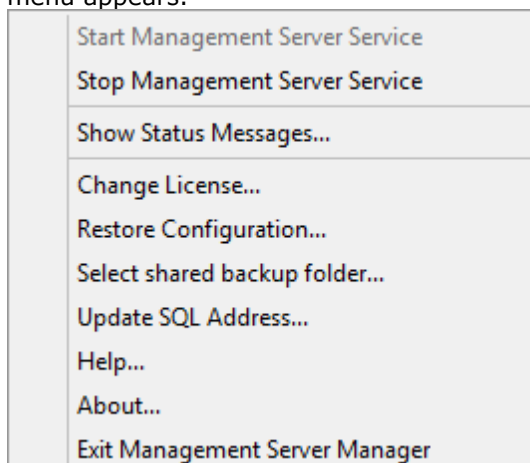
Managing server services

On the computer running the servers, there is a notification area with tray icons. Through the icons, you can get information about the server services and perform certain actions. This includes, for example, checking the state of the services, viewing logs or status messages, and starting and stopping the services.

Start or stop the Management Server service

In the notification area, a tray icon indicates the state of the Management Server service, for example **Running**. Through this icon, you can start or stop the Management Server service. If you stop the Management Server service, you cannot use Management Client.

1. In the notification area, right-click the tray icon for the Management Server. A context-menu appears.



2. If the service has stopped, click **Start Management Server service** to start it. The tray icon changes to reflect the new state.
3. To stop the service, click **Stop Management Server service**.

For more information about the tray icons, see The tray icons (explained) (see "Tray icons (explained)" on page 427).

See also

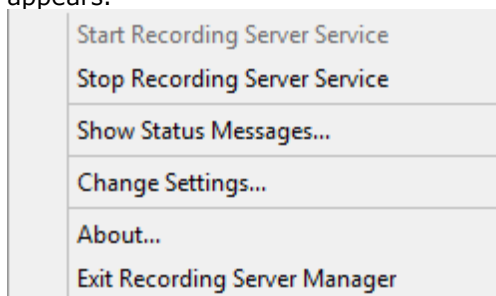
Start, stop, or restart the Event Server service (on page 425)

Start or stop the Recording Server service (on page 423)

Start or stop the Recording Server service

In the notification area, a tray icon indicates the state of the Recording Server service, for example **Running**. Through this icon, you can start or stop the Recording Server service. If you stop the Recording Server service, your system cannot interact with devices connected to the server. This means you cannot view live video or record video.

1. In the notification area, right-click the tray icon for the Recording Server. A context-menu appears.



2. If the service has stopped, click **Start Recording Server service** to start it. The tray icon changes to reflect the new state.
3. To stop the service, click **Stop Recording Server service**.

For more information about the tray icons, see The tray icons (explained) (see "Tray icons (explained)" on page 427).

See also

Start, stop, or restart the Event Server service (on page 425)

Start or stop the Management Server service (on page 423)

View status messages for Management Server or Recording Server

In the notification area on the computer running the servers, tray icons indicate the state of the Management Server and Recording Server. Through these icons, you can view status messages, for example "Service started".

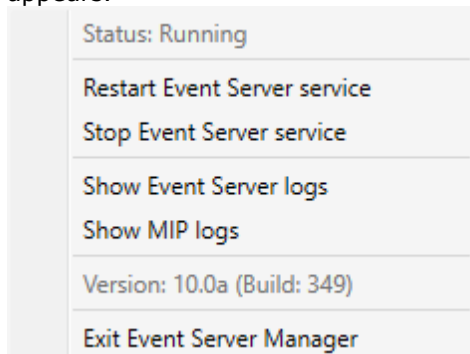
1. In the notification area, right-click the relevant tray icon. A context-menu appears.
2. Select **Show Status Messages**. Depending on the server type, either the **Management Server Status Messages** or **Recording Server Status Messages** window appears, listing time-stamped status messages:



Start, stop, or restart the Event Server service

In the notification area, a tray icon indicates the state of the Event Server service, for example **Running**. Through this icon, you can start, stop, or restart the Event Server service. If you stop the service, parts of the system will not work, including events and alarms. However, you can still view and record video. For more information, see [Stopping the Event Server service](#).

1. In the notification area, right-click the tray icon for the Event Server. A context-menu appears.



2. If the service has stopped, click **Start Event Server service** to start it. The tray icon changes to reflect the new state.
3. To restart or stop the service, click **Restart Event Server service** or **Stop Event Server service**.

For more information about the tray icons, see [The tray icons \(explained\)](#) (see "Tray icons (explained)" on page 427).

See also

[Start or stop the Recording Server service \(on page 423\)](#)

Stopping the Event Server service

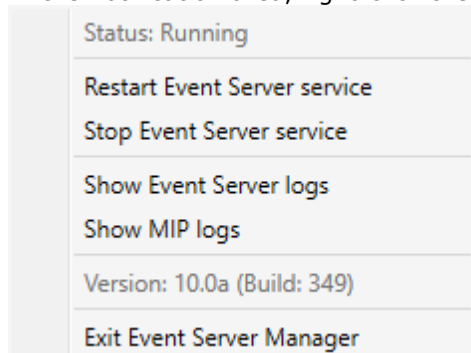
When installing MIP plug-ins in the Event Server, first you must stop the Event Server service and then, afterward, restart it. However, while the service is stopped, many areas of the VMS system will not function:

- No events or alarms are stored in the Event Server. However, system and device events still trigger actions, for example start recording.
- XProtect Access, XProtect LPR, and XProtect Transact do not work in the configuration or in XProtect Smart Client.
- Analytic events do not work.
- Generic events do not work.
- No alarms are triggered.
- In XProtect Smart Client, map view items, alarm list view items, and the Alarm Manager workspace do not work.
- MIP plug-ins in the Event Server cannot run.
- MIP plug-ins in Management Client and XProtect Smart Client do not work correctly.

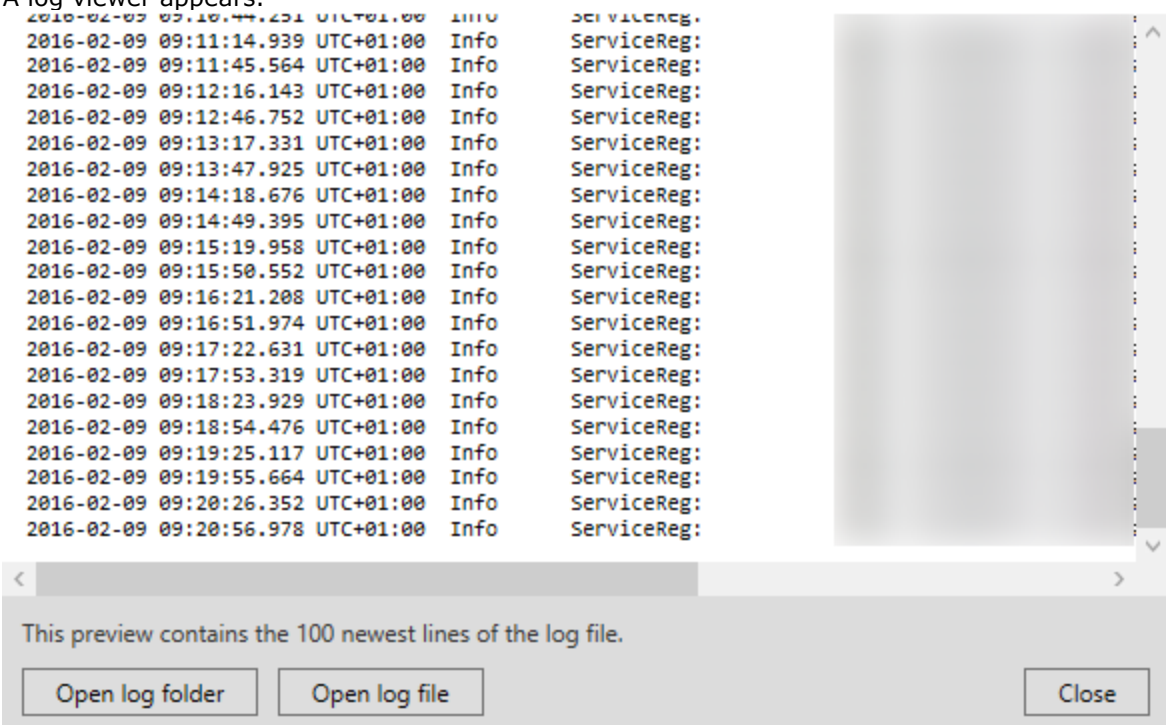
View Event Server or MIP logs

You can view time-stamped information about Event Server activities in the Event Server log. Information about third party integrations is logged in the MIP log in a sub-folder in the **Event Server** folder.

1. In the notification area, right-click the relevant tray icon. A context-menu appears.



2. To view the 100 most recent lines in the Event Server log, click **Show Event Server Logs**. A log viewer appears.






















1. To view the log file, click **Open log file**.
2. To open the log folder, click **Open log folder**.
3. To view the 100 most recent lines in the MIP log, go back to the context-menu and click **Show MIP logs**. A log viewer is displayed.

If someone removes the log files from the log directory, the menu items are grayed out. To open the log viewer, first you need to copy the log files back into one of these folders:

C:\ProgramData\Milestone\XProtect Event Server\logs or C:\ProgramData\Milestone\XProtect Event Server\logs\MIPLogs.

Tray icons (explained)

The tray icons in the table represent the possible states of the services running on Management Server, Recording Server, Failover Recording Server, and Event Server. They are all visible on the computers where the servers are installed, in the notification area:

Management Server service icon	Recording Server service icon	Event Server service icon	Failover Recording Server service icon	Description
				Running Appears when a server service is enabled and started. If the Failover Recording Server service is running, it can take over if the standard recording servers fails.
				Stopped Appears when a server service has stopped. If the Failover Recording Server service stops, it cannot take over if the standard recording server fails.
				Starting Appears when a server service is in the process of starting. Under normal circumstances, the tray icon changes after a short while to Running .
				Stopping Appears when a server service is in the process of stopping. Under normal circumstances, the tray icon changes after a short while to Stopped .
				In indeterminate state Appears when the server service is initially loaded and until the first information is received, upon which the tray icon, under normal circumstances, changes to Starting and afterwards to Running .
				Running offline Typically appears when the Recording Server or Failover recording service is running but the Management Server service is not.

Management Server service icon	Recording Server service icon	Event Server service icon	Failover Recording Server service icon	Description
				<p>Must be authorized by administrator</p> <p>Appears when the Recording Server service is loaded for the first time. Administrators authorize the recording server through the Management Client: Expand the Servers list, select the Recording Server node and in the Overview pane, right-click the relevant recording server and select Authorize Recording Server.</p>

Change settings for the Recording Server service

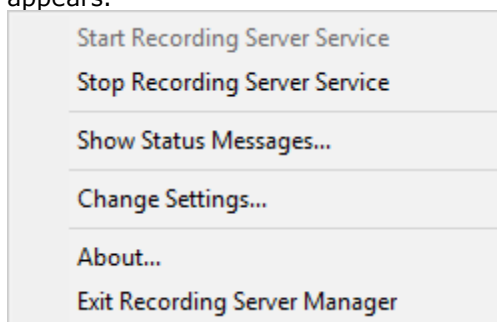
You can change the basic settings for the Recording Server service, such as which port numbers to use.

Requirements

You must stop the Recording Server service. While the Recording Server service is stopped, the system cannot interact with devices connected to the recording server. This means you cannot view live video or record video.

To change settings:

1. In the notification area, right-click the Recording Server tray icon. A context-menu appears.



2. Select **Stop Recording Server service**.
3. Right-click tray icon again.
4. Select **Change Settings**. The **Recording Server Settings** window appears. Change the appropriate settings.

See also

Recording Server Settings (on page 429)

Recording Server Settings

When you configure Recording Server settings, specify the following:

Name	Description
Address	IP address (example: 123.123.123.123) or host name (example: ourserver) of the management server to which the recording server should be connected. This information is necessary so that the recording server can communicate with the management server.
Port	Port number to be used when communicating with the management server. Default is port 9993. You can change this if you need to.
Web server port	Port number to be used for handling web server requests, for example for handling PTZ camera control commands and for browse and live requests from XProtect Smart Client. Default is port 7563. You can change this if you need to.
Alert server port	Port number to be used when the recording server listens for TCP information (some devices use TCP for sending event messages). Default is port 5432. You can change this if you need to.
SMTP server port	Port number to be used when the recording server listens for Simple Mail Transfer Protocol (SMTP) information. SMTP is a standard for sending e-mail messages between servers. Some devices use SMTP for sending event messages or images to the surveillance system server via e-mail. Default is port 25, which you can enable and disable. You can change the port number if you need to.

Restart Data Collector Server service

Your system automatically installs the Data Collector Server service on the same computers as the Management Server, Recording Server, Log Server, Event Server, and Milestone Mobile Server.

Normally, the Data Collector Server service requires no maintenance, but if the service **does** stop, no live feed is sent to the System Monitor. This is indicated in the System Monitor with error messages.

1. On the computer where the Data Collector Server service is installed:
2. In Windows' **Start** menu, select **Control Panel**, and then:
 - If using **Category** view, find the **System and Security** category and click **Administrative Tools**.
 - If using **Small icons** or **Large icons**, click **Administrative Tools**.
3. Double-click **Services**.
4. Locate the **Milestone XProtect Data Collector Server**. Right-click it and select **Start** to restart the service.

Registered services

Occasionally, you have servers and/or services which should be able to communicate with the system even if they are not directly part of the system. Some services, but not all, can register themselves automatically in the system. Services that can automatically be registered are:

- Event Server service
- Log Server service
- Service Channel service

Automatically registered services are displayed in the list of registered services.

You can manually specify servers/services as registered services in the Management Client.

Service channel (explained)

The service channel enables automatic and transparent configuration communication between servers and clients in your system. For example, it is the service channel that makes sure that when a shared view is changed on one client, the change is immediately reflected on other clients using the relevant shared view. The service channel also facilitates configuration-related communication between servers and clients in cases where you use various plug-ins or add-on products with your system.

The service channel is typically installed as part of the management server installation and resides on the management server computer, but if needed, you may just as well install it on another server in your surveillance system.

Once installed, the service channel can register itself automatically with your system (meaning that it automatically becomes listed by the registered services feature in the Management Client). Its location is known by the system, and clients logging into the system can automatically benefit from it.

If you later change the IP address or hostname of the server running the service channel service, you must manually edit the information under **Tool > Registered Services** in the Management Client. Also, if you later need to change the user under which the service channel service was installed, you must remove the Service Channel service and afterwards install it again under the new user.

It is important that any instance of XProtect Smart Client is time-synchronized with the computer running the Service Channel service. If the XProtect Smart Client is not time-synchronized with the management server and the computer running the Service Channel service, the XProtect Smart Client is not updated with information about configuration changes made by other users in XProtect Smart Client. This means that users risk overwriting each other's configuration changes. If your XProtect Smart Clients are not time-synchronized with the computer running the Service Channel service, you see an error informing you of this.

Add and edit registered services

1. In the **Add/Remove Registered Services** window, click **Add** or **Edit**, depending on your needs.
2. In the **Add Registered Service** or **Edit Registered Service** window (depending on your earlier selection), specify or edit settings.
3. Click **OK**.

Manage network configuration

With the network configuration settings, you can specify the management server's server LAN and WAN addresses so the management server and the trusted servers can communicate.

1. In the **Add/Remove Registered Services** window, click **Network**.
2. Specify the LAN and/or WAN IP address of the management server.

If all involved servers (both the management server and the trusted servers) are on your local network, you can simply specify the LAN address. If one or more involved servers access the system through an internet connection, you must also specify the WAN address.



3. Click **OK**.

Registered services properties

In the **Add Registered Service** or **Edit Registered Service** window, specify the following:

Component	Requirement
Type	Prefilled field.
Name	Name of the registered service. The name is only used for display purposes in the Management Client.
URLs	<p>Click Add to add the IP address or hostname of the registered service. If specifying a hostname as part of a URL, the host must exist and be available on the network. URLs must begin with <i>http://</i> or <i>https://</i> and must not contain any of the following characters: < > & ' " * ? [] ".</p> <p>Example of a typical URL format: <i>http://ipaddress:port/directory</i> (where port and directory are optional). Note that you can add more than one URL if required.</p>
Trusted	<p>Select if the registered service should be trusted immediately (this is often the case, but the option gives you the flexibility to add the registered service and then mark it as trusted by editing the registered service later).</p> <p>Note that changing the trusted state also changes the state of other registered services sharing one or more of the URLs defined for the relevant registered service.</p>
Description	Description of the registered service. The description is only used for display purposes in the Management Client.

Component	Requirement
Advanced	When a service is advanced, it has specific URI schemes (for example, http, https, tcp or udp) that need to be set up for each host address you define. A host address therefore has multiple endpoints, each with its own scheme, host address and IP port for that scheme.

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About Milestone Systems

Milestone Systems is a leading provider of open platform video management software; technology that helps the world see how to ensure safety, protect assets and increase business efficiency. Milestone enables an open platform community that drives collaboration and innovation in the development and use of network video technology, with reliable and scalable solutions that are proven in more than 150,000 sites worldwide. Founded in 1998, Milestone is a stand-alone company in the Canon Group. For more information, visit: <http://www.milestonesys.com>.

