Milestone Federated Architecture™

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Introduction

Milestone Federated Architecture is a technology that allows individual standard XProtect Corporate and XProtect Expert sites to be tied together in a hierarchy of federated sites.

When individual XProtect Corporate or XProtect Expert sites are tied together in a federated hierarchy, the individual sites will appear as one large system to administrators and users accessing it from the hierarchy’s top-node, while still being as manageable as individual sites.

Through Milestone Federated Architecture, users will have access to video, audio, metadata and other resources across the individual sites in the hierarchy based on their user rights per individual site. In addition, administrators can centrally manage sites in the hierarchy through the Management Client based on administration rights on the individual sites in the hierarchy.

Milestone Federated Architecture is the perfect solution for large-scale installations covering multiple buildings, campuses or sites. It provides unrestricted scaling, flexibility and accessibility for more efficient, cost-effective video surveillance across multiple sites.

Purpose and target audience

The purpose of this white paper is to give a general overview of Milestone Federated Architecture, the technology behind it, its implementation, its benefits, and the problems it solves.

This white paper should enable the reader to understand the architecture and technology behind Milestone Federated Architecture, as well as how to design and implement a large-scale multisite surveillance system by utilizing Milestone Federated Architecture.

It is assumed that the reader has a general understanding of Milestone XProtect Corporate and XProtect Expert, the XProtect Management Client and the XProtect Smart Client, as well as a general understanding of network infrastructure and Microsoft Active Directory.

The primary audience of this white paper might include (but is not limited to) the following audiences:

- Surveillance system architects/designers
- Large-scale surveillance project consultants
- Companies, organizations, universities, and governments with large-scale surveillance projects/installations
Designing a multisite video surveillance system

There are several ways to design a multisite surveillance system. This whitepaper focuses on using Milestone Federated Architecture to tie the sites together, thus it will not cover the other ways.

Please review the System Architecture Guide for IT Professionals whitepaper, in order to get an overview of the different ways multisite video surveillance can be designed and implemented.

Milestone Federated Architecture Overview

A Milestone Federated Architecture hierarchy consists of at least two stand-alone XProtect Corporate and XProtect Expert systems that are linked together to create Milestone Federated Architecture hierarchy.

Once a Milestone Federated Architecture hierarchy is created and sites added to it, it will form a hierarchy of parent and child sites as seen in the chart below.

Note: XProtect Expert can only function as a child-site under an XProtect Corporate site, therefore, it cannot have underlying child-sites attached to it.
Each site in the hierarchy provides users and administrators a login point to the hierarchy. Based on the specific permissions configured per site, the users and administrators logging in will have access to the site they logged in to and sites below it in the hierarchy that they have permissions for.

Milestone Federated Architecture example
As already mentioned, Milestone Federated Architecture can be used to allow for scalability, centralized management, and seamless video sharing between geographically distributed sites within one large corporation or between installations belonging to different operational entities.

Corporation with regional and branch offices
A typical example for implementing Milestone Federated Architecture is a corporation with regional and branch offices as shown below.

In corporations with multiple offices, it is generally desirable for each installation to be tied into the overall corporate surveillance installation for central administration and
monitoring, yet at the same time allow each office to have operational control over their own surveillance installation.

Milestone Federated Architecture makes it possible to monitor and manage distributed surveillance systems centrally from headquarters or regional offices, but also enables local management and monitoring – a key advantage whenever a site is temporarily offline from the corporate network. Milestone Federated Architecture also allows a corporation to house surveillance operations in separate premises for monitoring during off hours or to perform more advanced system administration from headquarters.

Milestone Federated Architecture gives surveillance system administrators the ability to configure the system so different entities or users can access different cameras depending on a defined schedule. For example, an administrator might want to give surveillance guards access to outdoor cameras on sub-sites during working hours, but allow them to access all cameras during off hours. Another example is giving users on a local site access to cameras only during working hours.

Configuring Milestone Federated Architecture

Prerequisites

Before creating a Milestone Federated Architecture hierarchy it should be ensured that all sites run XProtect Corporate or XProtect Expert version 2014 or newer. The federated sites do not need to be running the same version, but all management servers older than the 2016 version needs to be patched to be compatible with the newer versions. See the “how to patch an older version” section for information on how to patch the management server.

To simplify the creation of the hierarchy, all sites should belong to the same domain, and the management service should run under the same domain account across all systems.

In cases where the sites are on different domains or the management server service does not run under the same account, please review the manual for further information on how to set up the Milestone Federated Architecture or alternatively, use Milestone Interconnect.
Adding site to a hierarchy

Once the system sites are installed according to the prerequisites, creating a Milestone Federated Architecture hierarchy or adding a site to an existing hierarchy is done simply by adding a sub-site to the current XProtect Corporate system.

This is done using the XProtect Management Client:

1. Right-click the current server in the **Federated Site Hierarchy** pane on the left side of the window.
2. Select **Add Site to Hierarchy...** in the context menu
3. Enter the address of the new site and click the **OK** button
4. The Management Client will now connect to the site and add it to the hierarchy
5. Once added, the site will be shown in the tree view in the **Federated Site Hierarchy** pane indented under the parent server. The site is now ready to be used.

To administrate the different sites, the user need to be an administrator on both the system logged into and the child sites which the user want to administrate. To administrate a child site simply right-click the desired site in the hierarchy’s tree view and select **Log into Site** in the context menu to connect to the selected site.

Once connected, the configuration of the child site will be displayed in a new Management Client window and can be managed as usual.

**Note:**
The functionality and features available on the sites in the Milestone Federated
Architecture hierarchy depends on the product and version used on the individual sites.

**How to patch an older version**

Patching old systems is done by replacing two files on the old management servers.

The files that should be replaced on the management server can be obtained by installing the newest version of the Management Client on the management server or on another computer.

Once the new version of the XProtect Management Client has been installed, open the file explorer on that computer and navigate to the folder the XProtect Management Client is installed in – typically “C:\Program Files\Milestone\XProtect Management Client”.

In that folder find the subfolder that matches the management server version you want to patch (e.g. MC701 for the 2014 7.0a version)

In the folder matching the version to patch, navigate to the “ServerPatch” sub-folder and copy the two files in the folder.

These two files must then be pasted in to the folder the management server is installed in and replace the existing files, on the relevant management servers. The management server is by default installed in this path – “C:\Program Files\Milestone\XProtect Management Server”.

When copying the patch files to the management servers, it is not necessary to shut down the management server. The files can be replaced while the server is running.

When sites running old unpatched management server versions, sites already added to the hierarchy can still be managed by the new Management Client, but it will not be
possible to view the online/offline status of the sites, and to add these sites to the Milestone Federated Architecture hierarchy.

**Notes:**
It is not necessary to upgrade the Top Node in a Milestone Federated Architecture hierarchy to the latest version. It is possible to use newer version further down in the hierarchy without updating the sites above it in the hierarchy – the other servers in the hierarchy just need to be updated as described above.

Update patches are available for management server 2014 (version 7.0a) and up.

**Network traffic between sites**
A Milestone Federated Architecture hierarchy will have a scheduled synchronization task running between the sites every 10 minutes, and each time a site is added to or removed from the hierarchy. The synchronization communicates site identity information only and uses less than 1 MB each time.

In addition to the data sent during scheduled synchronization, video or configuration data will be sent each time a user or an administrator views live or recorded video, logs in to a site, or configures a site. In these cases, the amount of data transmitted depends on what is being accessed.

**User Experience**

**Management Client**
Milestone Federated Architecture provides administrators with the experience of a unified large-scale system with easy access to all sites, servers and devices in the hierarchy. It also frees the administrators from the challenges of designing, implementing and managing everything in one extremely large and complex system.

Administrators using the XProtect Management Client to log in to a site attached to a Milestone Federated Architecture hierarchy will notice a new tab in the bottom of the **Navigation pane**, called **Federated Site Hierarchy**.

This tab will display the site hierarchy as seen from the site the administrator is logged in to and down in the hierarchy.

Administration of the different sites in the hierarchy is done by selecting the site in the hierarchy’s tree view, right-clicking it and selecting **Log into Site** in the menu.
A new XProtect Management Client login window will be presented with the site address prefilled. Once the user name and password have been entered the site can be viewed and managed. If dual-authentication is used on the site you will be presented for a second dual authentication dialog.

**Smart Client**

Smart Client users logging in to a site attached to a Milestone Federated Architecture hierarchy will experience the same Smart Client layout, functions and way to use the Smart Client as they are used to when accessing a stand-alone site.

The only difference is that in some dialogs and panes (like the **Cameras** pane to the right) an extra layer will be added to the tree structure, allowing the user to access resources across the different sites in the hierarchy.

**Views in a Milestone Federated Architecture hierarchy**

When creating views, it is possible to mix cameras and other view items from different sites in the hierarchy in the same view, as if they were all from a stand-alone site. The views will be stored on the site where the user is logged in. Only views available on the site from which the user is currently logged in can be accessed. Views created on other sites in the hierarchy will not be accessible.

Once views have been configured, users will not experience any changes compared to accessing views and cameras on a stand-alone site. The hierarchy will appear as one large system.

**Evidence lock**

With the evidence lock feature, recordings can be protected by overruling the local systems retention policy. This prevents evidence recordings from being deleted due to local retention policies.

When creating evidence locks that include cameras running on multiple sites, evidence locks for each site running the selected cameras will be created seamlessly. This means that evidence locks can be viewed and managed across all sites in the hierarchy, or individually per site if logging on to a site further down in the hierarchy.

**Milestone interconnected cameras**

If one or more sites using Milestone Interconnect is added to the Milestone Federated Architecture hierarchy, interconnected cameras will be listed as any other camera on the federated site and can be operated as such.
**Smart Maps**  
Integration of the Smart Client’s Smart map feature is fully supported in Milestone Federated Architecture.

Cameras from all sites can be placed freely on the global Smart Map. If the cameras have their GPS location and orientation parameters set on the child sites in the hierarchy, they will be placed on the correct location in the Smart Map automatically.

**Maps**  
Integration of the Smart Client’s map feature is fully supported in Milestone Federated Architecture.

If the map feature in the Smart Client is used in a federated hierarchy, each site in the hierarchy must have its own event server installed and maps defined. It is then possible to link the maps from the different sites together by using ‘hot zones’.

Instead of linking to a sub-map stored on the parent site, the map will link to a map on a child site. In other words, selecting such a hot zone in the Smart Client will redirect the client to connect to the child site’s event server and show the map.

One limitation to this is that a map level can only contain devices from the local site. It is not possible to mix cameras from separate sites in the same map layer.

**Bookmarks**  
The bookmark feature is fully supported in Milestone Federated Architecture.

Each bookmark is stored per camera on the individual sites in the hierarchy. Adding and viewing bookmarks works in the same way as it does on a stand-alone system. Similarly, access to adding, deleting, editing and viewing the bookmarks depends on user rights per camera in the different sites.

**Alarm Manager**  
The Alarm Manager is fully supported in the Smart Client running in a Milestone Federated Architecture hierarchy.

The Smart Client has a dedicated **Alarm Manager** tab listing alarms from all sites in the entire Milestone Federated Architecture hierarchy. It is also possible to view alarms from a specific site only simply by selecting the site in the Alarm Manager’s site tree view.

**XProtect Smart Wall**  
Integration and user control of the Milestone XProtect Smart Wall is fully supported in Milestone Federated Architecture
Using the XProtect Smart Wall together with Milestone Federated Architecture hierarchy requires the following:

- The Smart Wall to view and control must be defined on the same site the users controlling it are logged into.
- The user account used for the Smart Client powering the Smart Wall monitors must have sufficient permissions on all sub-sites in the hierarchy to display the cameras

License Overview
Milestone Federated Architecture is included in the XProtect Corporate and XProtect Expert base licenses and does not require any additional licenses purchase.

If using the same XProtect Corporate SLC (Software License Code) on multiple sites, it is possible to see an overview of the license usage per site – no matter if the sites are connected to a Milestone Federated Hierarchy or not.

On the License Information page in the XProtect Management Client, click the License Details – All sites... link
A dialog will be opened, showing a complete overview of the license usage per site (for the sites using the same SLC as the site logged in to).

Summary and benefits
Milestone Federated Architecture offers surveillance system architects, designers and administrators the possibility to implement a large-scale surveillance systems that span multiple physical locations.

Key features of Milestone Federated Architecture are:
- Versatile architecture with unrestricted scalability and operational flexibility
- Easy deployment and management with very few steps to add sites to the hierarchy
- Easy management of all sites in the Milestone Federated Architecture even though all sites are not running on the same XProtect product or version
- The ability to bring geographically dispersed installations into one centrally managed system
- A unified and seamless management and operator interface throughout the hierarchy
- Flexible and comprehensive user and administrator rights with both global and local access
- Graphical overview of the entire surveillance installation via the map function
- Integrated support for standard product functionality like: Alarm management, XProtect Smart Wall, Smart Maps, Bookmarks, Evidence lock etc.
Benefits of using Milestone Federated Architecture

Milestone Federated Architecture offers benefits in several areas:

1. Scalability
   - Milestone Federated Architecture allows surveillance system architects, designers and integrators to design, implement and grow a large-scale surveillance system in manageable parts.
   - Milestone Federated Architecture provides the flexibility to create, add and delete sites depending on:
     - Organizational structure
     - Network infrastructure
     - Usage
     - Security
     - Political or legal requirements

2. Manageability and user privileges
   - Users and administrators can be granted access to any combination of sites - from a single to all systems in the federated hierarchy.
   - Milestone Federated Architecture does not limit the accessibility and management features of the local XProtect Corporate and XProtect Expert sites.

3. Network and Performance
   - When designing the individual sites, the designer does not have to consider the network and performance of the entire system but focus only on optimizing the design and network layout for the site in question.
   - Connecting the site to the hierarchy then requires just a network connection from the local site to the other sites.
   - Milestone Federated Architecture does not require any special features in the used network equipment. All traffic is by default standard TCP/IP unicast traffic.

4. Server simplicity
   - Milestone Federated Architecture does not require extra servers on the individual sites to be part of a federated hierarchy, everything is included in the standard XProtect product servers.

5. Redundancy and fault tolerance
   - Milestone Federated Architecture adds extra fault tolerance to XProtect Expert and XProtect Corporate by dividing the system into logical/physical sites that can operate independently in case of failures.
   - Local administrators and users can log in, view video, and manage the site even when the network connection to the federated hierarchy is broken.
   - If the connection to a site in the hierarchy is lost, it does not compromise
access for global users to cameras on sites that are still online. Only cameras from the disconnected site will be unavailable.

- Standard methods for implementing network redundancy can be used to minimize the risk of losing network connection.
About Milestone Systems

Founded in 1998, Milestone Systems is the global industry leader in open platform IP video management software. The XProtect platform delivers powerful surveillance that is easy to manage, reliable and proven in thousands of customer installations around the world. With support for the widest choice in network hardware and integration with other systems, XProtect provides best-in-class solutions to video enable organizations – managing risks, protecting people and assets, optimizing processes and reducing costs. Milestone software is sold through authorized and certified partners. For more information, visit www.milestonesys.com

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