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Milestone Systems

XProtect® VMS

Failover clustering guide



Changes to this document

Version history

Document version	Release	Comments
Version 2	2022 R1	Microsoft® Windows Server 2019 requirement: Minimum server requirements on page 8 API gateway added: Install and configure a management server on Node 1 on page 16 and Install and configure a management server on Node 2 on page 17
Version 1	2017 R1	This document applies to XProtect VMS versions 2017 R1

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Introduction

About Windows Server Failover Clustering (WSFC)

If your VMS environment requires continuous access that cannot tolerate hardware and software failures without any system interruption, then a viable system solution is Windows Server Failover Clustering (WSFC).

In some cases, for example a small retail shop, the operation of the VMS is not critical enough to warrant the cost of additional hardware. Instead, the shop accepts that failures can be addressed within a day or two by fixing or replacing the server. But, if your VMS environment requires high-availability, then WSFC can be a cost-effective way of achieving that.

WSFC is a group of independent servers that work together to increase the availability of applications and services. If a cluster node or service fails, the services that are hosted on that node can be automatically or manually transferred to another available node.

The management server can be installed on multiple servers within a cluster of servers. This ensures that the system has very little downtime. If a server in the cluster fails, another server in the cluster automatically takes over the failed server's job running the management server.

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.



By default, the Management Server service limits the number of times a failover occurs to twice within a six-hour period. If this is exceeded, the Management Server services are not automatically started by the clustering service. This limit can be changed to better fit your needs.

This document provides an outline on creating a high availability environment with Microsoft Failover Clustering on two server nodes by:

- Preparing the operating system for failover clustering (see "[Prerequisites for clustering on page 12](#)")
- Installing SQL Server for failover clustering (see "[Install a SQL Server failover cluster instance on page 13](#)")
- Configuring redundant XProtect management servers (see "[Configure redundant XProtect management servers on page 16](#)")
- Setting up service redundancies (see "[Set service dependencies](#)")
- Verifying that the failover clustering works (see "[Verify that failover clustering is working on page 25](#)")

This document provides a general outline of WSFC. Refer to the Microsoft documentation (<https://msdn.microsoft.com/en-us/library/hh270278>) for more detailed information.



There are many ways to set up failover clustering. This document shows a simple example of one way: a Failover Cluster Instance (FCI) with shared storage.



We recommend you refer to the Microsoft documentation (<https://msdn.microsoft.com/en-us/library/hh270278>) for more information about failover clustering.

This document is primarily intended for:

- Surveillance system architects, designers and integrators
- Large-scale surveillance project consultants
- Installers

System planning and requirements

System setup

In XProtect Corporate and XProtect Expert, you can achieve high availability for the management server and SQL Server by using Windows Server Failover Clustering (WSFC).

Hardware failures on a standalone server running the management server and SQL Server do not affect recordings or the recording server. However, hardware failures can result in downtime for operators that are not already logged into the clients. A WSFC environment will mitigate this downtime. There are a number of reasons why you would want to use a cluster:

- **Server failure** – If a server starts to have problems, you can run the management server and SQL Server from another node while you resolve the issue.
- **System updates and security patches** – Applying security patches on a standalone server can be time consuming, resulting in extended periods of downtime. By using failover clustering, you can apply system updates and security patches with minimal downtime.
- **Seamless connection** – Because clients and applications connect to a failover cluster by using the cluster IP address and cluster name, the connection to the management server and SQL Server is transparent and failover is seamless.

Requirements for clustering

- Two machines with Microsoft Windows Server 2016 or newer. Make sure that:
 - All servers that you want to add as cluster nodes are running the same version of Windows Server
 - All servers that you want to add as cluster nodes are joined to the same domain
 - You have log-in access to the Windows account as the local administrator

About clusters in Microsoft Windows Servers, see Failover clusters <https://docs.microsoft.com/en-us/windows-server/failover-clustering/create-failover-cluster>.

- A Microsoft SQL Server installation

Either external SQL Server and a database installed **outside** the server cluster **or** an **internal** SQL Server service (clustered) within the server cluster (creating an internal SQL Server service requires the use of a Microsoft® SQL Server® Standard or Microsoft® SQL Server® Enterprise edition, which can work as clustered SQL Server).



When connecting the management server to the database, depending on your system configuration password settings, you may be asked to provide the current system configuration password.



If you work in a failover cluster environment, it is recommended that you pause the cluster before you start tasks in the Server Configurator. This is because the Server Configurator may need to stop services while applying changes and the failover cluster environment may interfere with this operation.

Minimum server requirements

The servers in a clustered environment must be identical in terms of hardware, operating system and software.

This document is based on an environment comprising the following components. Each component have their own set of minimum requirements.

Component	Requirement
Operating system	<p>This document is based on clustering in a Microsoft® Windows Server 2019 environment.</p> <p>Clustering is only available in the Standard and Datacenter editions of Windows Server.</p> <p>Earlier versions of Windows Server (from 2003) also support Windows Server Failover Clustering (WSFC).</p>
Storage	<p>External storage for database files and video archives is required. Serial attached SCSI, Fiber Channel or iSCSI are recommended.</p>
SQL Server	<p>While Microsoft® SQL Express is bundled with XProtect Corporate and XProtect Expert, it is not supported for clustering.</p>
XProtect Corporate or XProtect Expert	<p>This document is based on XProtect Corporate or XProtect Expert.</p>

Planning checklist

Before you create a failover cluster environment, you should have the following information for your environment.

The following tables provide examples of the information you require.

Servers

Host name	Windows version / Edition	Physical / Virtual	CPU	RAM	Domain	Role
Cluster1	Windows Server 2016 Datacenter Edition x64	Virtual	2 CPU 2.54 GHz	8 GB	TESTDOMAIN.local	Cluster node 1
Cluster2	Windows Server 2016 Datacenter Edition x64	Virtual	2 CPU 2.54 GHz	8 GB	TESTDOMAIN.local	Cluster node 2
Shared storage	N/A	N/A	N/A	N/A	N/A	Shared storage for SQL Serverdata

Network

Host name	Network	IP	Subnet	Gateway	Primary DNS	Secondary DNS
Cluster1	Public	177.16.0.213	255.255.0.0	177.16.0.1	177.16.0.200	193.168.0.200
	Heartbeat	199.160.0.213	255.255.255.0			
	iSCSI	10.0.0.213	255.0.0.0			
Cluster2	Public	177.16.0.214	255.255.0.0	177.16.0.1	177.16.0.200	193.168.0.200
	Heartbeat	199.160.0.214	255.255.255.0			
	iSCSI	10.0.0.213	255.0.0.0			
Shared storage	Public	177.16.0.211	255.255.0.0			
SQL 2016 Cluster	Public	177.16.0.217	255.255.0.0			

Shared storage

Storage name	Purpose	Volume	Path	Size
Quorum	Cluster Witness Disk	Quorum	B:\	1 GB
Data	SQL Server Disk	SQL	F:\	20 GB

Cluster services

Application	Software	Virtual Server Name	Virtual IP Address
SQL Server	SQL Server 2016 Enterprise Edition x64	SQL2016Cluster	177.16.0.217

Service accounts

Domain account	Password	Purpose
TESTDOMAIN\sqlservice	*****	SQL Server service account
TESTDOMAIN\sqlagent	*****	SQL Server Agent service account

Failover Cluster Instances

SQL Server Always On Failover Cluster Instances (FCI)

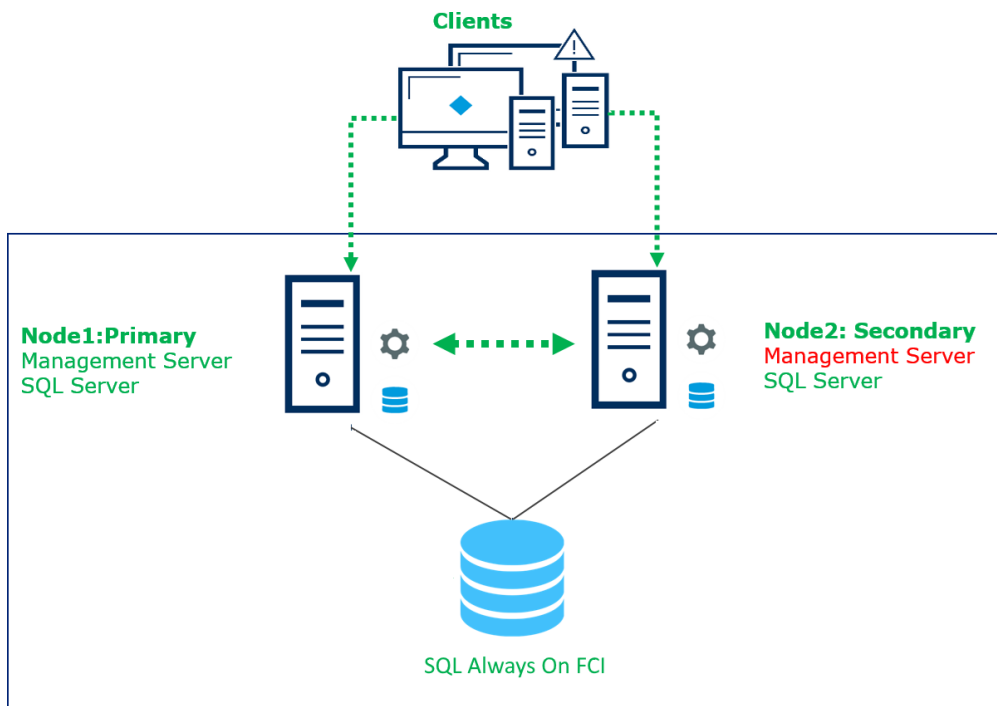
A Failover Cluster Instance (FCI) is a single instance of SQL Server that is installed across Windows Server Failover Clustering (WSFC) nodes. On the network, an FCI appears to be an instance of SQL Server running on a single computer, but the FCI provides failover from one WSFC node to another, if the current node becomes unavailable.

Windows Failover Cluster relies on shared storage. FCI supports storage solutions such as WSFC cluster disks (iSCSI, Fiber Channel, and so on) and server message block (SMB) file shares. When a SQL Server instance is installed on the cluster, Milestone and system databases are required to be on the shared storage. Note that this means that your storage is a single point of failure, so the databases should be backed up elsewhere.

Shared storage allows the cluster to move the SQL Server instance to any node in the cluster. This can be done either manually, or automatically if one of the nodes is having a problem. There is only one copy of the data, but the network name and SQL Server service for the instance can be made active from any cluster node.

A failover cluster gives you the ability to have all the data for a SQL Server instance installed in a shared storage that can be accessed from different servers. It will always have the same instance name, IP address and port and logins, therefore XProtect Corporate and XProtect Expert will always know where to access the data.

This document provides a general outline of FCI. Refer to the Microsoft documentation (<https://msdn.microsoft.com/en-us/library/ms189134>) for more detailed information.



Prerequisites for clustering

Windows Failover Cluster relies on shared storage. Make sure you have shared storage with at least two disks: a designated disk for quorum and another designated disk for SQL Server data.

Failover clustering also requires that you use an Active Directory domain.

Before setting up your failover cluster environment, make sure you have the component information as described in "[Planning checklist on page 8](#)".

Refer to the Microsoft documentation (<https://msdn.microsoft.com/en-us/library/ms189910.aspx>) for more detailed information on installation requirements for failover clustering.

Enable failover clustering on each node

On each node, do the following:

1. Log in to the Windows Server as Administrator.
2. Open the **Server Manager**.
3. Click **Add roles and features**.

The **Add Roles and Features Wizard** appears.

1. In the **Before You Begin** window, click **Next**.
2. In the **Installation Type** window, select **Role-based or feature-based installation** and click **Next**.
3. In the **Server Selection** window, select **Select a server from the server pool** and select the current server and then click **Next**.
4. In the **Server Roles** window, click **Next**.
5. In the **Features** window, select **Failover Clustering**.

The **Add features that are required for Failover Clustering** window appears.

Select **Include management tools (if applicable)** and click **Add Features**.

Click **Next**.

6. In the **Confirmation** window, click **Install**.
7. When the installation is complete, click **Close**.

After you have prepared the operating system on all of the nodes, "[Create the cluster on page 12](#)" on Node 1.

Create the cluster

On Node 1, run a validation test to ensure the server configuration can support clustering.

1. In the **Server Manager**, select **Tools > Failover Cluster Manager**.

The **Failover Cluster Manager** appears.

2. In the **Actions** pane, click **Validate Configuration**.

The **Validate a Configuration Wizard** appears.

3. In the **Before You Begin** window, click **Next**.

4. In the **Select Servers or a Cluster** window, click **Browse** and add the names of the nodes in the cluster. Click **Next**.

5. In the **Testing Options** window, select **Run all tests (recommended)** and click **Next**.

6. In the **Confirmation** window, click **Next**.

The wizard validates the configuration. When it is done, the **Summary** window appears.

7. In the **Summary** window, verify that both nodes are validated. Select **Create the cluster now using the validated nodes** and click **Finish**.

The **Create Cluster Wizard** appears.

8. In the **Create Cluster Wizard**, do the following:

1. In the **Before You Begin** window, click **Next**.

2. In the **Access Point for Administering the Cluster** window, enter the cluster name and click **Next**.

3. In the **Confirmation** window, ensure that **Add all eligible storage to the cluster** is selected, and click **Next**.

A new cluster is created.

4. In the **Summary** window, verify that the cluster is created and then click **Finish**.

Install a SQL Server failover cluster instance

To create a new SQL Server installation for the failover cluster, sign in to Node 1 using the domain Administrator credentials, and start the SQL Server Installer executable. This starts the **SQL Server Installation Center**.

The following steps provide an outline of this installation. Refer to the Microsoft documentation (<https://msdn.microsoft.com/en-us/library/ms179530.aspx>) for more detailed information.

1. On the **Installation** page, click **New SQL Server failover cluster installation**.

The **Install a SQL Server Failover Cluster** window appears.

2. On the **Product Key** page, indicate whether you are installing a free edition of SQL Server, or whether you have a PID key for a production version of the product. Click **Next**.

3. On the **License Terms** page, read the license agreement, and then select the check box to accept the license terms and conditions. Click **Next**.

4. The **Global Rules** checker runs a discovery operation on your computer.

The **Global Rules** checker verifies the system state of your computer before setup continues.

If the checker identifies any missing product updates, on the **Product Updates** page, select the **Include SQL Server product updates** check box and click **Next** to continue.

5. The setup checker identifies potential problems that might occur while running setup. You must correct failures before setup. Click **Next** to continue.

6. On the **Feature Selection** page, select **Database Engine Services**.

Sub-features are automatically selected.

Click **Next**.

The setup runs another set of rules that are based on the features you selected to validate your configuration.

7. On the **Instance Configuration** page, do the following:

1. Specify a network name for the new SQL Server failover cluster. This is the name that is used to identify your failover cluster on the network.
2. Specify a named instance, name it for example SQLCLUSTER.
3. Click **Next**.

8. On the **Cluster Resource Group** page, you can specify the cluster resource group name where SQL Server virtual server resources will be located. Leave as default and click **Next**.

9. On the **Cluster Disk Selection** page, select the shared cluster disk resource for your SQL Server failover cluster.

The cluster disk is where the SQL Server data will be put. You can select more than one disk.

Click **Next**.

10. On the **Cluster Network Configuration** page, specify the network resources for your failover cluster instance.

Specify a static IP type and IP address for your failover cluster. This is recorded under Network in "[Planning checklist on page 8](#)".

Click **Next** to continue.

11. On the **Server Configuration** page under the **Service Accounts** tab, specify login accounts for SQL Server services. These are recorded under Service Accounts in "[Planning checklist on page 8](#)". Click **Next** to continue.

12. On the **Database Engine Configuration** page, define the following:
 1. Under the **Server Configuration** tab, define the SQL Server administrator account and the server authentication mode.
 2. Under the **Data Directories** tab, define the paths for the following. The path to where SQL Server data will be stored is recorded under Shared Storage in "[Planning checklist on page 8](#)".
 - Data Root Directory
 - User Database Directory
 - User Database Log Directory

Backup Directory Distribution can be, for example:

Disk	Volume	Usage	Path
1		Cluster Quorum Drive	N/A
2	1	Data Root Directory User Database Directory Backup Directory	F:\ F:\MSSQL13.SQLCLUSTER\MSSQL\Data F:\MSSQL13.SQLCLUSTER\MSSQL\Backup
3	2	User Database Log Directory TempDB data directory TempDB log directory	E:\MSSQL13.SQLCLUSTER\MSSQL\Data

Click **Next**.

The System Configuration Checker runs another set of rules that are based on the settings you selected to validate your configuration.

13. On the **Ready to Install** page, click **Install**.
14. After installation, the **Complete** page provides a link to the summary log file for the installation. Click **Close** to complete the SQL Server installation.

Management server redundancy

Configure redundant XProtect management servers

Now that you have created a failover cluster using both Node 1 and Node 2 servers as cluster nodes, you must install the XProtect Management Server on both Node 1 and Node 2 and configure both XProtect Management Servers so that their services run in the cluster instead of on each individual server.



As a prerequisite, each Management Server in the cluster must be installed under the domain Administrator service account.

You must do the following:

- [Install and configure a management server on Node 1 on page 16](#)
- [Install and configure a management server on Node 2 on page 17](#)

Install and configure a management server on Node 1

1. On Node 1, run the Milestone XProtect VMS Products System Installer file.

The installation files unpack. Depending on your security settings, one or more Windows® security warnings appear. Accept these and the unpacking continues.

2. After specifying the location of the license file and accepting the license terms, select **Custom**.

A list of components to be installed appears. Apart from the management server, all elements in the list are optional.

3. Select all components EXCEPT XProtect Recording Server and XProtect Smart Client. Click **Continue**.

4. In the **Select Microsoft SQL Server** window, select **Use an existing SQL Server on the network** and select the location of the Central SQL Server that you installed in Install new SQL Server failover cluster installation (see "[Install a SQL Server failover cluster instance on page 13](#)"). Click **Continue**.

5. Select **Create new database** and click **Continue**.

6. In the **Select Service Account** window, select **This account** and enter the domain Administrator credentials. Click **Continue** and then click **Install**.



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.

7. After the installation is complete, open the XProtect Management Client using the domain Administrator credentials.
8. From the **Tools** menu, select **Registered Services**.
9. In the **Add/Remove Registered Services** window, select each service in the list and click **Edit**.

In the **Edit Registered Service** window, modify the URL address to use the Cluster Name.

Update all of the services listed in the **Add/Remove Registered Services** window including the Service Channel http and https fields. The new URLs should look something like this:

- Event Server: http://ClusterName.host:22331/
- Log Server: http://ClusterName.host:80/LogServer/soapext.dll?logserver
- Report Server: http://ClusterName.host/Reporting/
- Service Channel: http://ClusterName.host:80/ and https://ClusterName.host:443/
- Api Gateway: http://ClusterName.host:80/API/

10. In the **Add/Remove Registered Services** window, click **Network** and in the **Service address (LAN)** field, modify the URL address to use the cluster service address and then click **OK**.
11. In the **Add/Remove Registered Services** window, click **Close** and exit the XProtect Management Client.
12. On Node 1, stop the management server service and the IIS service.

To stop IIS, launch the **Internet Information Services (IIS) Manager** and navigate to the **Web server** node in the tree.

In the **Actions** pane, click **Stop**.

Install and configure a management server on Node 2

1. On Node 2, run the Milestone XProtect VMS Products System Installer file.
The installation files unpack. Depending on your security settings, one or more Windows® security warnings appear. Accept these and the unpacking continues.
2. After specifying the location of the license file and accepting the license terms, select **Custom**.
A list of components to be installed appears. Apart from the management server, all elements in the list are optional.
3. Select all components EXCEPT the XProtect Recording Server and XProtect Smart Client. Click **Continue**.
4. In the **Select Microsoft SQL Server** window, select **Use an existing SQL Server on the network** and select the location of the Central SQL Server that you installed in Install new SQL Server failover cluster installation (see "[Install a SQL Server failover cluster instance on page 13](#)"). Click **Continue**.
5. Select **Create new database** and click **Continue**.

6. In the **Select Service Account** window, select **This account** and enter the domain Administrator credentials. Click **Continue** and then click **Install**.
7. After the installation is complete, open the XProtect Management Client using the domain Administrator credentials.
8. From the **Tools** menu, select **Registered Services**.
9. In the **Add/Remove Registered Services** window, select each service in the list and click **Edit**.

In the **Edit Registered Service** window, modify the URL address to use the Cluster Name.

Update all of the services listed in the **Add/Remove Registered Services** window including the Service Channel http and https fields. The new URLs should look something like this:

- Event Server: http://ClusterName.host:22331/
 - Log Server: http://ClusterName.host:80/LogServer/soapext.dll?logserver
 - Report Server: http://ClusterName.host/Reporting/
 - Service Channel: http://ClusterName.host:80/and https://ClusterName.host:443/
 - Api Gateway: http://ClusterName.host:80/API/
10. In the **Add/Remove Registered Services** window, click **Network** and in the **Service address (LAN)** field, modify the URL address to use the cluster service address and then click **OK**.
 11. In the **Add/Remove Registered Services** window, click **Close** and exit the XProtect Management Client.

Postrequisite

In general, all XProtect services must be registered to the Management Server address using the Server Configurator. In the cluster setup, this address should point to the cluster role.



When doing configuration changes, on the Microsoft Failover Cluster Manager, pause the control and monitoring of the service so the Server Configurator can make the changes and start and/or stop the Management Server service. If you change the failover cluster service startup type to manual, it should not result in any conflicts with the Server Configurator.

On the Management Server computers:

1. Start the Server Configurator on each of the computers that have a management server installed.
2. Go to the **Registration** page.
3. Click the pencil (✎) symbol to make management server address editable.
4. Change the management server address to the cluster role name hosting the Management Server, for

example `http://MyCluster`.

5. Click **Register**.

On computers that have components that use the Management Server (for example, Recording Server, Mobile Server, Event Server, API Gateway):

1. Start the Server Configurator on each of the computers.
2. Go to the **Registration** page.
3. Change the management server address to the cluster role name hosting the Management Server, for example `http://MyCluster`.
4. Click **Register**.

When this is done, modify all of the recording servers and failover servers to connect to the cluster service address for the management server by doing the following:

1. On the server where the Recording Server is installed, right-click the **Recording Server** icon in the tool bar and select **Stop Recording Server Service** from the menu.
2. After the Recording Server is stopped, again right-click the **Recording Server** icon in the tool bar and select **Change Settings**.

The **Recording Server Settings** window appears.

3. Modify the address for the management server to connect to the cluster service, and click **OK**.
4. Right-click the **Recording Server** icon and select **Start Recording Server service** to start the Recording Server service again.

Configure the Management Server service as a generic service in the failover cluster



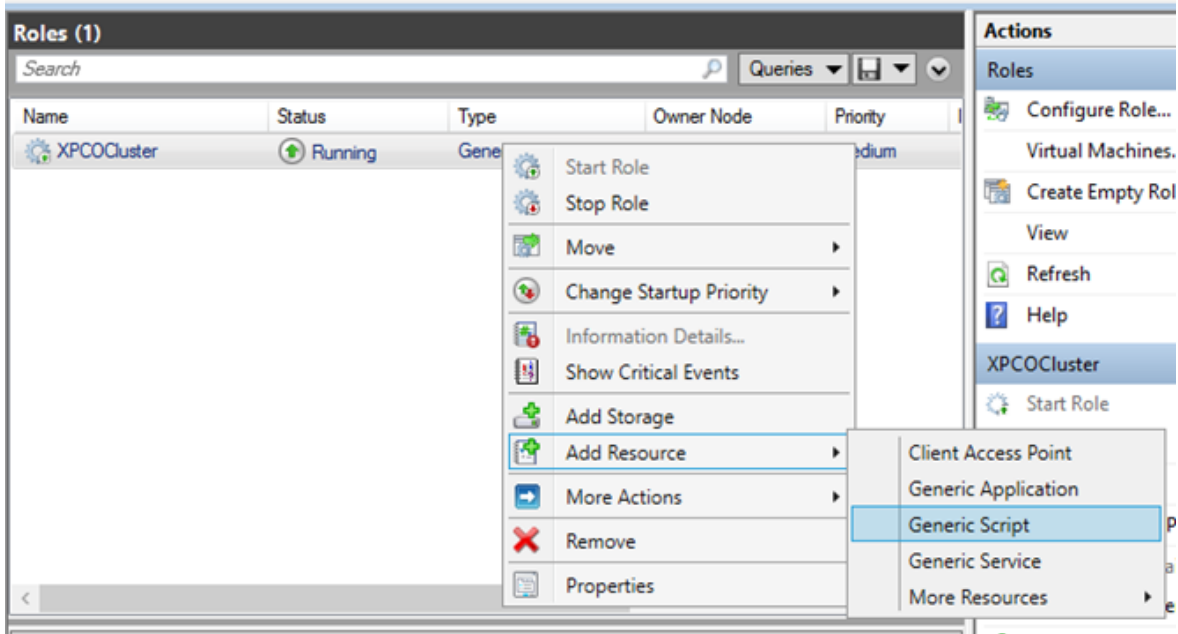
Descriptions and illustrations might differ from what you see on your screen.

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 **Roles**, and select **Configure Role**.



2. In the **High Availability Wizard**, select **Next**.
3. On the **Select Role** page, select **Generic Service** and click **Next**.
4. On the **Select Service** page, select the **Milestone XProtect Management Server** service and click **Next**.
5. On the **Client Access Point** page, specify the name (host name of the cluster) that clients will use when accessing the service. The host name must be different from the name of the cluster. Click **Next**.
6. On the **Select Storage** page, click **Next** as no storage is required for the service.
7. On the **Replicate Registry Settings** page, click **Next** as no registry settings are to be replicated.
8. On the **Confirmation** page, click **Next** after you have verified that the cluster service is configured according to your requirements.
9. On the **Configure High Availability** page, click **Next**.
10. On the **Summary** page, click **Finish** to complete configuration of the management server as a generic service in the failover cluster.

- Right-click the role you just created and click **Add resource > Generic Script**. Select Milestone XProtect Event Server to add the **Milestone XProtect Event Server** service as a resource to the **Milestone XProtect Management Server Cluster** service.



- Repeat step 11 and add all required services in the cluster, for example the Log Server. The Milestone XProtect Event Server and the Data Collector server should both be added as services to achieve an optimal deployment. Additionally, the Milestone XProtect Event Server should be set as a dependent service of the management server to ensure the event server also will stop when the management server is stopped.
- All added services are displayed in the bottom pane of the window.


Name	Status	Information
Roles		
Milestone XProtect Data Collector Server	Online	
Milestone XProtect Event Server	Online	
Milestone XProtect Log Server	Online	
Milestone XProtect Management Server	Online	

Update the cluster URL



When doing configuration changes, on the Microsoft Failover Cluster Manager, pause the control and monitoring of the service so the Server Configurator can make the changes and start and/or stop the Management Server service. If you change the failover cluster service startup type to manual, it should not result in any conflicts with the Server Configurator.

On the Management Server computers:

1. Start the Server Configurator on each of the computers that have a management server installed.
2. Go to the **Registration** page.
3. Click the pencil () symbol to make management server address editable.
4. Change the management server address to the cluster role name hosting the Management Server, for example `http://MyCluster`.
5. Click **Register**.

On computers that have components that use the Management Server (for example, Recording Server, Mobile Server, Event Server, API Gateway):

1. Start the Server Configurator on each of the computers.
2. Go to the **Registration** page.
3. Change the management server address to the cluster role name hosting the Management Server, for example `http://MyCluster`.
4. Click **Register**.

Use a certificate for an external IDP in a cluster environment

When you install XProtect in a single-server environment, the external IDP configuration data is protected using Data Protection API (DPAPI). If you set up the management server in a cluster, the external IDP configuration data must be protected with a certificate to ensure fluent node failover.

For more information about how to generate a certificate, see [The Milestone guide about certificates](#).

You must import the certificate to the personal certificate store and make the certificate trusted on the computer.

To set up the data protection you must add the thumbprint of the certificate to the Identity Provider configuration.

1. Import the certificate to the personal certificate store and ensure that:
 - the certificate is valid
 - the Identity Provider app pool (IDP) account has permissions to the certificate private key.

For more information about how to verify if the account has permissions to the certificate private key, see [The Milestone guide about certificates](#).

2. Locate the `appsettings.json` file in the installation path of the Identity Provider (`[Install path]\Milestone\XProtectManagement Server\IIS\Identity Provider`).
3. Set the certificate thumbprint in the section:

```
"DataProtectionSettings": {
  "ProtectKeysWithCertificate": {
    "Thumbprint": ""
  }
},
```

4. Repeat step 3 on all management server nodes.
5. Enforce a node failover to ensure that the certificate setup is correct.
6. Log in again using the management client and apply the external provider configuration. If the configuration is already applied, you must re-enter the client secret from the external IDP in the management client.

Troubleshooting errors when an external IDP configuration is protected with a certificate

Invalid certificate/expired certificate

If the configured thumbprint certificate represents a certificate that is not trusted or has expired, the Identity Provider cannot start. The Identity Provider log (`C:\ProgramData\Milestone\Identity Provider\Logs\Idp.log`) will clearly state if the certificate is invalid.

Solution:

Make sure that the certificate is valid and trusted on the computer.

Missing permissions to certificate private keys

The Identity Provider cannot protect data without permissions to the private keys. If the Identity Provider does not have the permission, the following error message is written to the log file of the Identity Provider (`C:\ProgramData\Milestone\Identity Provider\Logs\Idp.log`):

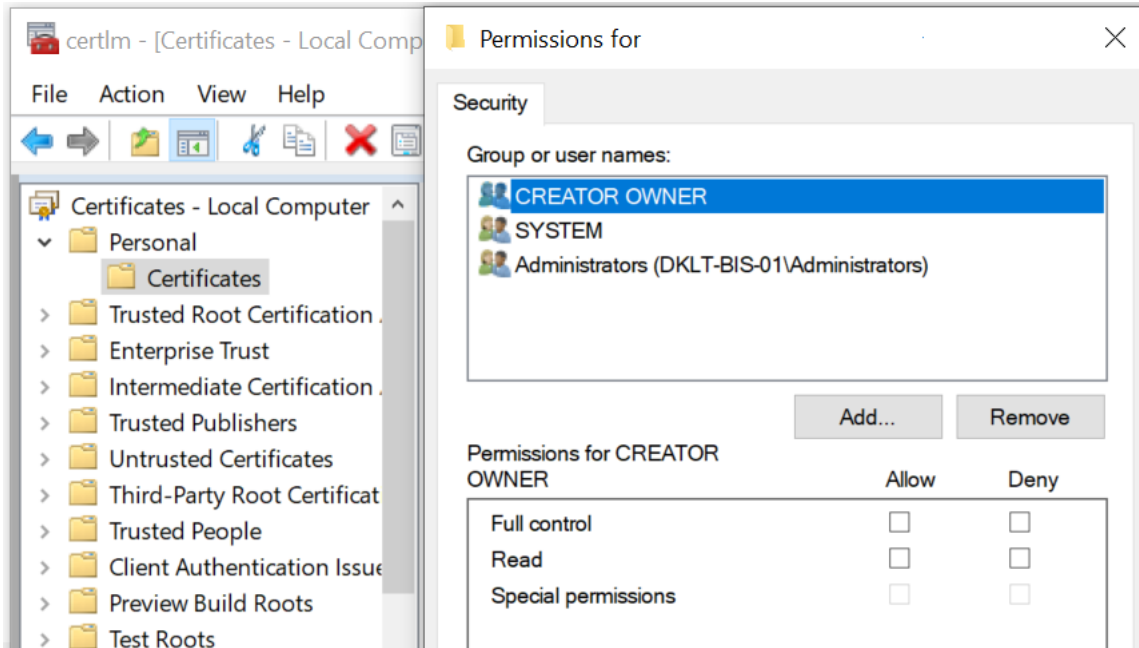
```
ERROR- An exception occurred while processing the key element '<key id="
[installation specific]" version="1" />'.
Internal.Cryptography.CryptoThrowHelper+WindowsCryptographicException: Keyset
does not exist
```

Solution:

Make sure the Identity Provider app pool (IDP) account has permissions to the certificate private keys.

Check permissions to a certificate private key:

1. Select **Start** on the Windows task bar and open the Manage computer certificates tool (certlm.msc).
2. Navigate to the personal certificate store and find the certificate that is used for the encryption.
3. Right-click on the certificate, and select **All Tasks > Manage Private Keys**.
4. Under **Permissions for**, ensure that the Identity Provider app pool (IDP) account has read permissions.



Upgrade in a cluster

Make sure to have a backup of the database before updating the cluster.

1. Stop the Management Server service 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.



When installing, make sure to reuse existing SQL Server and the existing SQL Server database that currently stores the system configuration. The system configuration is automatically upgraded.

Verification

Verify that failover clustering is working

On both Node 1 and Node 2, open the Server Manager.

- If Node 2 is currently running the XProtect Server:
 1. On Node 2, select **Tools > Failover Cluster Manager**.
 2. In the tree, expand the cluster node and select **Nodes**.
 3. In the **Nodes** pane, select the server for Node 2.
 4. At the bottom of the window, open the **Roles** tab.
 5. Note that the Node 2 server is running the XProtect Server.
 6. Restart the Node 2 server.
 7. Note that the Management Server on Node 1 comes online.
- If Node 1 is currently running the XProtect Server:
 1. On Node 1, select **Tools > Failover Cluster Manager**.
 2. In the tree, expand the cluster node and select **Nodes**.
 3. In the **Nodes** pane, select the server for Node 1.
 4. At the bottom of the window, open the **Roles** tab.
 5. Note that the Node 1 server is running the XProtect Server.
 6. Restart the Node 1 server.
 7. Note that the Management Server on Node 2 comes online.



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About Milestone

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 Systems 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 Systems is a stand-alone company in the Canon Group. For more information, visit <https://www.milestonesys.com/>.

