NetworkOptix VIDEO. POWERED.

Nx Witness User Manual

Nx Witness VIDEO MANAGEMENT SYSTEM

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Working with Nx Witness

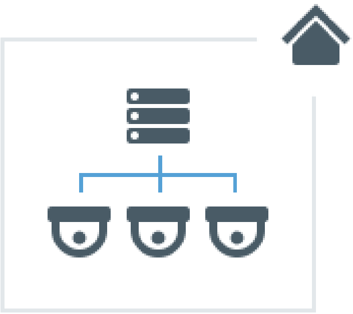
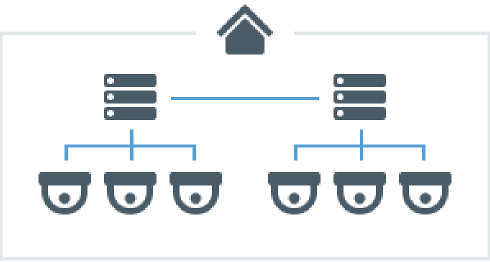
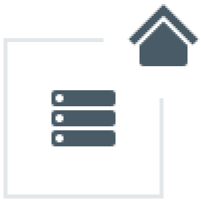
The below diagrams illustrate how the Nx Witness components work together in a System. The following icons are used:

- 🏠 System
- 👤 User(s)
- ☰ Server(s)
- Camera(s)
- 🖥 Client
- ☁ Nx Cloud

System

Nx Witness has a unique Client-Server hive architecture where the servers discover devices and manage system users and data together.

A System is made up of one or more servers, their connected streaming devices (IP Cameras, I/O devices), streams (RTSP, HTTP, UDP), storage (HDDs, NAS, DAS, etc), and connected Desktop, Mobile, orWeb Admin applications. Multiple Servers can be tied together as a System – for example when there are several locations with Cameras, or if the total number of Cameras is too large to process with just one computer, or in order to improve System stability. The maximum recommended number of Servers per System is 100 and the maximum recommended number of resources (Cameras, NVR channels, I/O modules, etc.) per System is 10,000 (if a configuration reaches 100 Servers in a System, the maximum recommended number of Cameras per Server is reduced to 100).

A System can have just one server	A System can have several servers	A Server by itself is a System
		

If there is only one server, there is little difference between the Server and the System, and they can be considered equivalent. However, with more servers in a System the differences will become significant.

All Servers in a System are equal and each of them has all the information about all Cameras, Users, and settings in the System. Video archive, however, is not shared. Recorded video is stored only on the Server to which a Camera is connected.

Therefore, if you replace one Server in the System with a new one (e.g., for an update or repair), all System settings will be retained – but the video archive recorded on the old Server is not.

User(s)

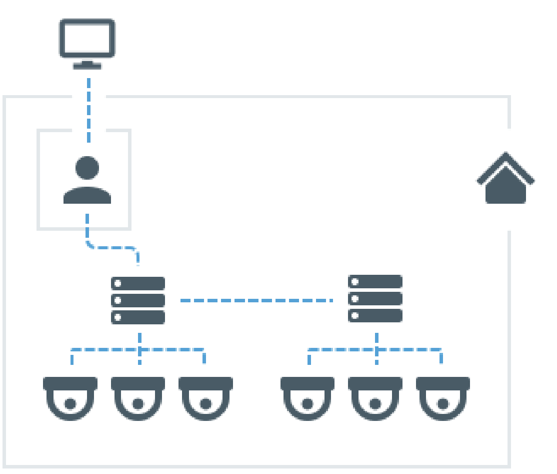
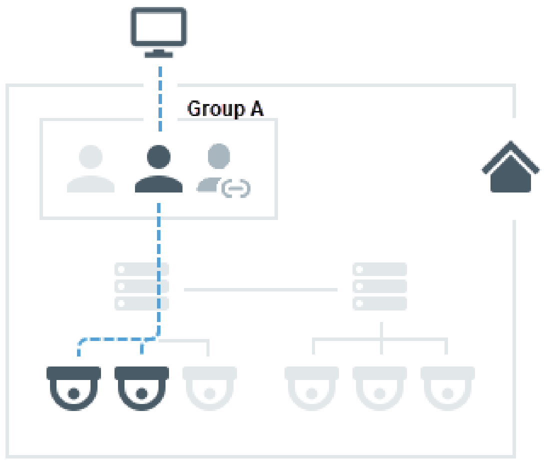
Every System contains a User database that associates identity information (Name, Email, User Type) with specific Permissions. Each User is created in or added to the System with a particular User Type (Cloud, Local, LDAP, or Temporary) that cannot be changed once set; a User must be deleted and recreated to change the User Type.

User Management can be done at the User level or by placing Users into Groups with configurable Permissions and Notification settings. Similar to the User Type, the Group Type (Built-In, Custom, LDAP) defines how the Group can be configured and the User Types that can be members of the Group. Groups can be nested to inherit Permissions.

A System Administrator is defined during System setup. This Admin User has full control over the System and all other Users. There can be only two Administrator accounts on any System; one is a **Local User** and the other is an optional **Cloud User** available for Cloud Connected Systems. Administrators add or create Power Users to perform limited System and User Management tasks. All other Users are Viewers with a configurable set of Permissions to View Cameras, Manage Bookmarks, Export from the Archive, Interact with System s and Monitor System Health indicators. Users can change Camera settings if granted the "Edit Settings" permission (see Permissions Management).

Cloud Users are unique as their core attributes (Email and password) are stored in the Nx Cloud. Cloud Users are granted access to or removed from Systems where the other User Types are added to or deleted from a System.

Removing a Cloud User from a System does not delete the Cloud User – deleting a non-Cloud User from a System completely removes the User and their Audit Trail of User Actions.

Administrator has full access to all Servers and all Devices	Users in a group have a common permission to servers and devices.
	

The term "User" can mean the same thing as the term account, or it can refer to a physical person. A physical person can have multiple accounts and many physical people can share an account. For example, a person has different accounts to access different Systems or multiple people can share a single Admin User account.

See "Users and Groups" for details.

Note: The maximum recommended number of users per system is 1,000.

Server(s)

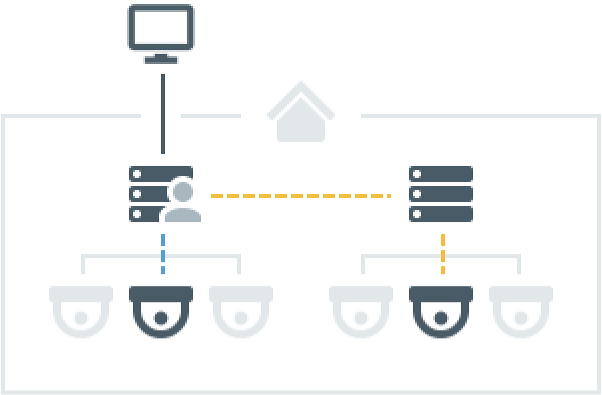
"Server” in this manual can refer to either the Server application (called the Media Server) or the computer on which the Media Server application is installed. The maximum recommended number of cameras per Server is 256.

Servers can:

1. Receive video streams from Cameras.
2. Manage camera settings.
3. Record video from cameras to internal or external storage.
4. Process and analyze video – for example, detect motion.
5. Manage User database and access levels.
6. Track certain events and react to them.
7. Work with different hardware devices – for example, NVRs, I/O modules, or door locks.

Client

Client applications can connect to servers, and can show live or recorded video from cameras in the System. Clients are also used to manage the System, Server, and Cameras settings. A client can be connected to different Servers, but only to one at a time. However, any number of Clients can be connected to one Server at any time. If the Client is connected to a single Server in the System, it has access to the entire System through this Server – to all other Servers and Cameras, System settings, and Camera settings.



The following Client applications allow operators to access and manage their System(s) with an intuitive GUI:

- *Nx Witness Desktop* – The most powerful Client application. Available on Windows, MacOS and Ubuntu Linux.
  - Connect to any server.
  - View live streams.
  - Playback recorded video and local video files.
  - Playback up to 64 videos simultaneously.
  - Advanced camera controls – PTZ, 2-way-audio, I/O ports, etc...
  - Built-in web browser.
  - Manage users, cameras, System, and Server settings.
  - View event logs and User behavior logs.
- *Nx Witness* – Available on Android and iOS.
  - Connect to any server.
  - View live streams.
  - Playback recorded videos.
  - Camera controls – PTZ, 2-way-audio.
  - Smart Search.
  - Push Notifications.
- *Nx Witness Server Web Admin* – Also called "Web Admin". Can be opened in any modern web browser.
  - Server specific.
  - View live streams.
  - Playback recorded videos.
  - Access Health Monitoring.

  - ○ Manage Users, Cameras, System, and Server settings (see Opening Nx WitnessWeb Admin for details).
- *Nx Witness Cloud Admin*

Nx Cloud

An important part of Nx Witness is Nx Cloud. It is a cloud service hosted on the Internet and extends functionality of Nx Witness Systems.

In addition to the default functionality, Nx Cloud also gives the ability to:

1. Log in to multiple Systems with a single account.
2. Connect to servers through the internet even though they don't have an external IP address.
3. Add users to your Systems via an Email invite.

To access Cloud features, a System must be connected to the cloud – which makes it a *Cloud System* (as opposed to a L*ocal System*).

Create a Cloud account to interact with Nx Cloud. You can do the following with a Cloud account:

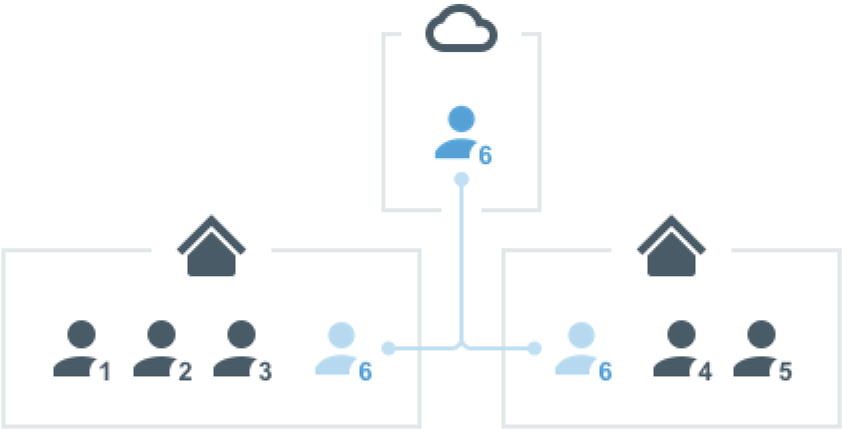
1. Log in to Cloud systems in the same way as with a regular User account.
2. Log in to Cloud systems from desktop and mobile clients.
3. Logging in to Nx Cloud.
4. Connect your Systems to Nx Cloud.
5. Restore a password using your Email address.

Users with Cloud accounts are also referred to as Cloud Users. Users with regular accounts or local accounts are referred to as Local Users.

Local accounts belong to the System, and cannot be moved elsewhere or used in the different services.

Cloud accounts do not belong to any System, so System Administrators are not able to create a new account – they can just add an account to their System, and place the user in a permission group.

In the diagram below, users 1–5 are Local User accounts – they exist only in the System databases and are managed by System Administrators. User 6 is a Cloud User – the account is the same for both Systems, and is managed on the Cloud Portal by the Cloud account Owner. The System database has information about this account but cannot manage it.



To connect a System to Nx Cloud, you must log in to the System using the administrator account. In the Nx Cloud tab of the System Administration dialog, specify the Cloud account that the System will be associated with. This account will also receive administrator access permissions and be displayed in the interface as the System administrator.

After a System is connected to Nx Cloud, it has access to all Cloud features, and can be disconnected from Nx Cloud at any time. After being disconnected, a System becomes a local System again. The Cloud Owner and all other Cloud users will be deleted, but other settings and video archive will not be affected.

Benefits to using the Cloud Portal:

1. Cloud accounts can be created on the Cloud Portal – a web service which is independent of any System and available to everybody.
2. On the Cloud Portal you can see all your Cloud Systems, view video, and edit some of the settings.
3. You can log in to all Systems associated with your Cloud account from the client Welcome Screens.

Opening and Closing Nx Witness Clients

To open the latest version of Nx Witness Desktop or Mobile Client by using a shortcut

Click on the Nx Witness shortcut icon on your PC or mobile device interface to launch the Welcome Screen. See Mobile Client.

To open the latest version of Nx Witness Desktop Client by other methods

If for some reason you need to use an executable file, locate the **applauncher** executable which launches the newest installed version of the Desktop Client.

- *Windows*
  - ○ Open the **Windows Desktop** and double-click the **Nx Witness shortcut icon**.
  - ○ Open the **Windows Start Menu** > **Programs** > **Network Optix** > **Nx Witness**

- ○ Open the **Nx Witness installation folder** (the default location is `C:\Program Files\Network Optix\Nx Witness\Client\<VERSION>\HD Witness Launcher.exe`) and open the **Nx Witness executable file**.
- ○ Automatically launch Nx Witness when a computer starts up:
  - **a.** Open **Main Menu** > **Local Settings** > **General.**
  - **b.** Check the **Run Application when PC boots up** checkbox.
  - **c.** Click **Apply** to accept changes, **OK** to save changes and close the dialog, or **Cancel** to discard changes.

  Note: This option is only available on Windows.

- *Linux*
  - ○ Click on Nx Witness shortcut icon
  - ○ From the installation folder: `/opt/`networkoptix`/client/<VERSION>/bin/applauncher`
- *macOS*
  - ○ Use the Nx Witness shortcut icon located in Applications or Launchpad
  - ○ From the installation folder: /Applications/Nx Witness.app/Contents/MacOS/applauncher

IMPORTANT: In order to display video and graphics properly, it is important to have the video drivers installed. If compatible video drivers are not installed, a warning will display prompting you to update your installation.

Launching in Configuration Mode

The Nx Witness Client detects PC system configuration automatically. If the CPU and/or GPU are insufficient to render all graphics, the Client will launch in *configuration mode*. This mode restricts functionality as follows to limit CPU load and graphics usage:

- Only one video can be viewed at a time
- Notifications are disabled in the client
- Movement of interface elements is disabled

To Close Nx Witness Desktop Client

- Click on the "**X**" button in the top corner of the application window.
- Go to **Main Menu** > **Exit.**

Automatic Session Timeouts

You can set the Desktop and Web Admins to automatically close a User session after a specified amount of time. All System User sessions will close automatically after the specified amount of time regardless of activity level or interaction status within the application. Re-authentication will be required at log in.

Desktop Client

1. Open **Main Menu** > **System Administration** > **Security**.

2. Check the **Limit session duration** checkbox.
3. Enter a timeout length of up to 99, and select **days, minutes** or **hours**.
4. Apply changes.

Web Admin / *Cloud Portal*

1. Open **Settings** > **System Administration** > **Security**.
2. Check the **Limit session duration** checkbox
3. Enter a timeout length of up to 99, and select the unit of **days**, **minutes** or **hours**.
4. Apply changes.

Launching from command line interface

The Desktop Client can be launched with a command line parameter to define an initial layout. Please contact Support to learn more about launching the Desktop Client from the command line interface.

Retained Settings

Retained settings are restored automatically. To turn off this feature, disable **Main Menu > Local Settings > Automatically restore saved windows configuration**.

The following values are saved locally and restored when the Desktop Client is relaunched:

- Layouts and tabs opened in the main window
- Stream resolution of items on a layout
- Visibility and pin state of the Timeline and Navigation Panel
- Current tab in the Notification Panel

By default, automatically retained settings are only applicable to a single active Desktop Client window at a time. To manually retain and restore settings for multiple Desktop Client windows at a time, do one of the following:

- To create save state – Open **Main Menu > Save Windows Configuration**
- To update save state – Open **Main Menu > Windows Configuration > Save Current State**
- To restore save state – Open **Main Menu > Windows Configuration > Restore Saved State**
- To delete save state – Open **Main Menu > Windows Configuration > Delete Saved State**

Connecting to a System

In order to gain access to Cameras and other Devices, a User must be connected to a Nx Witness System.

Connection can be made via the following Nx Witness components:

- The Desktop Client (on the Welcome Screen or Specific Server forms).
- Nx Cloud Portal.

- Server's Web Admin.
- Mobile Client.

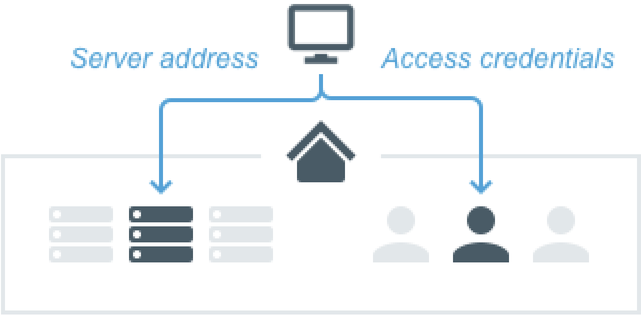
Connecting to a known Server

Sometimes the term "log in to a System" is used interchangeably with "connect to a server". In fact, to establish connection with a Nx Witness Server you must do both – connect to the Server using its IP address and a specific port, then log in to the System using your individual access credentials.

To connect to a Server you must specify the Server (i.e. host) IP address and port, then provide your Nx Witness account login and password.

In Desktop and Mobile Clients, the Server address is entered into a designated field.

In the Web Admin, you enter the Server IP address and connection port in the address line of an Internet browser to access theWeb Adminconnection dialog.



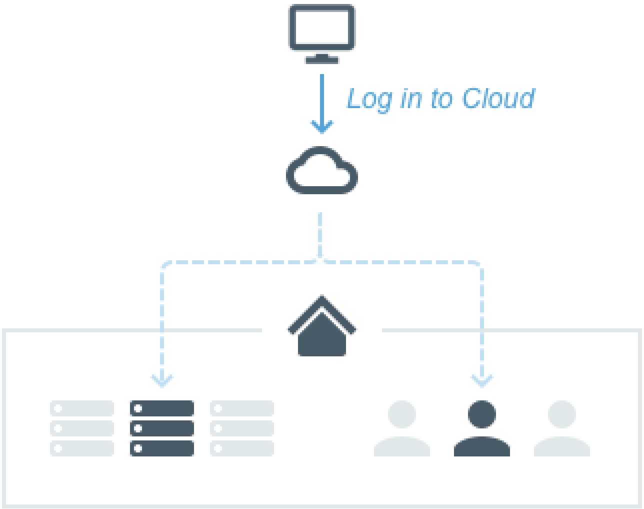
Both Cloud and Local accounts can be used to connect to a Server in this way. In rare cases, Cloud accounts may not work if the System you are connecting to doesn’t have connection to the internet and you never used the the account of the System.

Local accounts will always work.

Connecting after you have logged into Nx Cloud.

Another way to connect to a Server, if it belongs to a System which is connected to Nx Cloud, is to log in to Nx Cloud in the client. After that, if you are not currently connected to a Server, you will see a list of all your Cloud systems, and be able to log in to any of them by simply clicking on the associated icon.

Your Cloud account will be used as your login, and because you are already logged in to the Client with that account, you will not have to enter your login access credentials again.



The Server to which you will be connected will be determined automatically based on which Server has the best connection. If your System is connected to the Cloud, you still can connect to a known Server by entering its address and the appropriate credentials.

Reconnecting after session has expired

An informative dialog box will be presented after Cloud sessions are automatically disconnected in accordance with the Automatic Session Timeouts settings.

Connecting to System from the Welcome Screen

When Nx Witness Client is first launched, the *Welcome Screen* (shown below) automatically detects and displays the Systems in your local networks and Systems that have been recently accessed. Local Systems can be accessed with a username and password. If a User is logged into Nx Cloud, Cloud Systems are also displayed.

Click on the "**Log in to Nx Cloud**" tile on the welcome screen, or the Cloud icon in the application header, to open Nx Cloud portal. See "Logging in to Nx Cloud" for details.

Note: When accessing a Cloud connected multi-server System, the Desktop Client attempts to connect to the Server with the best uplink. Alternatively, a specific Server can be chosen in the System for the Desktop Client to connect to, if unreachable, it attempts to connect to another Server.

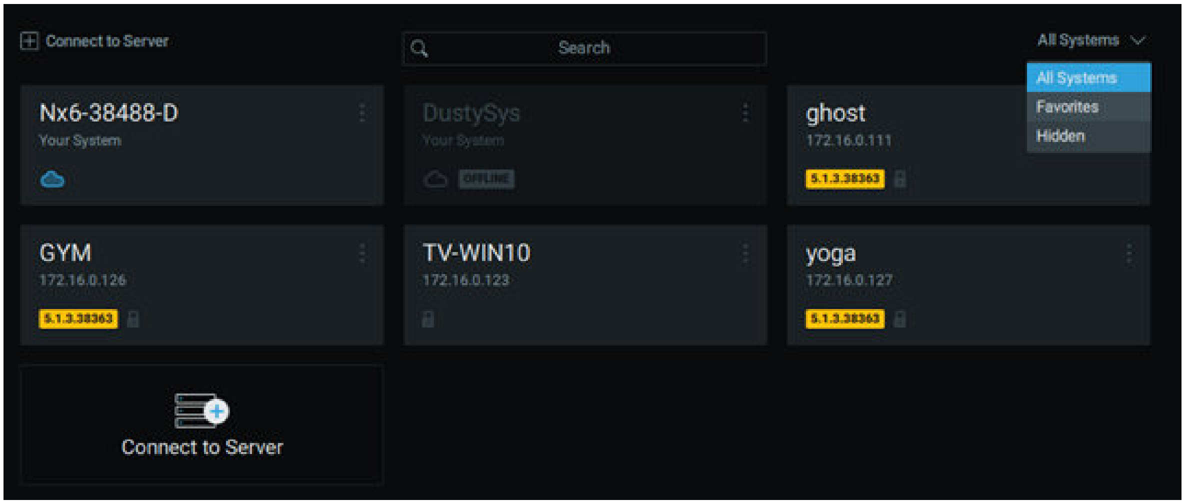
The number of System tiles displayed on the Welcome Screen is determined by your screen and window size.

Use the search bar above the tiles to search for a specific System by certain attributes:

- System name.
- Server name.
- IP address.
- System Owner (cloud only).

- User's Email (cloud only).

Systems that are unavailable at the moment are grayed out and may be deleted from the display. If a system is hidden, it will not be shown in the list of tiles unless the *Hidden* display mode is selected.



The Client can connect to Systems running different version of Nx Witness. The product version is displayed in a yellow block within the System tile if it is not the same version as the Client. If a System is incompatible with the Client, the block will be red.

See "Launching Nx Witness in Compatibility Mode" for information on resolving Desktop Client/System version discrepancies.

IMPORTANT: Compatible hardware supports Safe Mode booting. The hardware boots up in Safe Mode if something has happened during a previous boot. In this case it is possible to connect to a server, but it is not possible to perform any configuration.

To Connect to a System

Click on the tile for the desired System. If it is compatible with the client a connection dialog will open.

1. Enter a login and password.

   Note: Optionally, check **Remember me** so in the future clicking on the tile will connect directly to the System using the saved credentials.

2. Click **Connect**.

If there are 10 or more unsuccessful attempts to log in from a given IP address within 5 minutes, all log in attempts from that IP address will be denied for 1 minute.

Display Modes

The Welcome Screen has three display mode options which can be accessed in the upper-right corner.

- *All Systems* – displays all Systems on the network that have not yet been hidden or removed (default display mode).
- *Favorites* – displays all Systems added to the list of Favorites.
- *Hidden* – displays all Systems marked to be hidden from other display modes.

To Edit, Hide, or Favorite a System Connection

For local Systems that are online, you can click on the tile to expand the connection details.

Also, context menu lets you edit the System tile by clicking on the three dots in the upper-right corner.

- *Hide* – moves the System tile from the default All Systems display mode to the Hidden display mode.
- *Add to Favorites* – moves the System tile up in the list when in *All Systems* mode and adds the System tile to the *Favorites* display mode for easy access.
- *Delete* – removes the System completely (option only appears for offline and incompatible Systems). The tile won't appear on the Welcome Screen again unless the System is online.

Working Offline

Even when you are not connected to a System, the Welcome Screen main menu provides the following:

- *Connect to Server* – lets you connect to a specific Server using its IP address (see "Connecting to a Specific Server").
- *Browse Local Files* – use the Welcome Screen as a media player (see "Playing Local Video Files in Nx Witness").
- *New* – launches a Welcome Screen in a new window.
- *Start Screen Recording* – toggles the recording of the entire screen (see "Screen Recording (Windows Only)").
- *Local Settings* – opens the Local Settings dialog where you can choose language, display time and other global setting (see "Customizing Look and Feel of Nx Witness").
- *About* – displays important System and network configuration information (see "Collecting Additional Information").
- *User Manual* – open the User Manual.
- *Exit* – closes the window (Alt+F4).

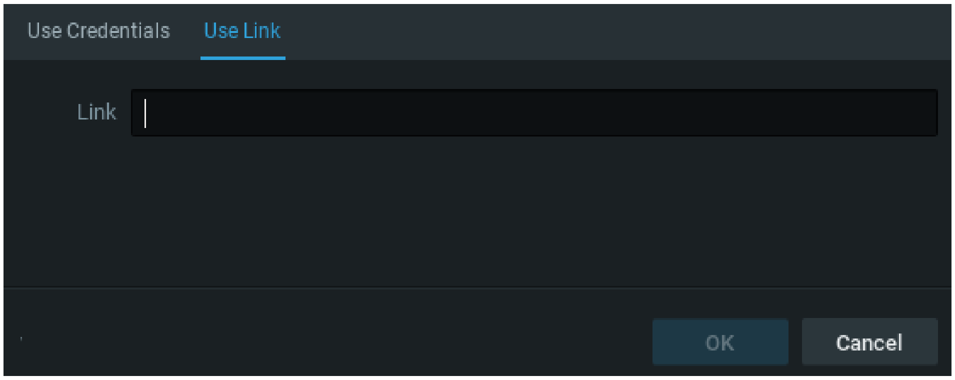
Connecting as a Temporary User

Temporary users are granted limited-duration access to either Local or Cloud-Connected systems. Anyone with the Temporary User link can access the associated system.

See "Managing Users" for Temporary Users limitations and "Adding Users" to create a Temporary User.

Connect to a System or Server using the Desktop Client

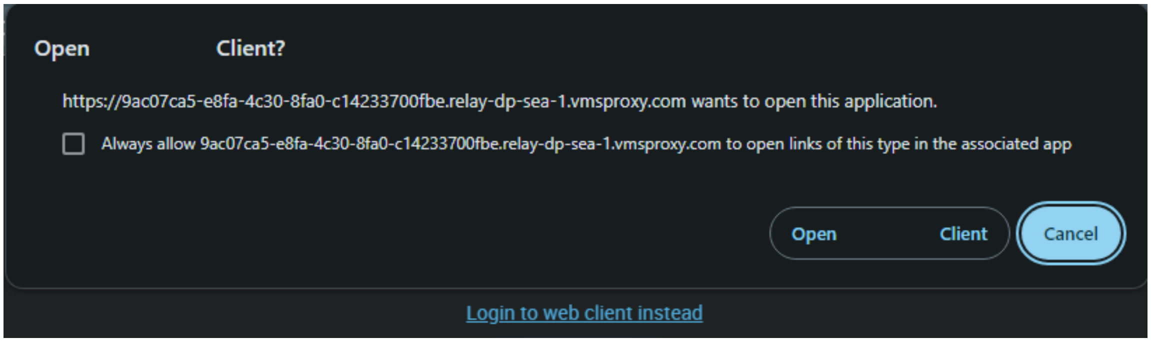
1. Have the Temporary User link provided by the System Administration team.
2. Open the Desktop Client, Select **Connect to Server**, Select the Use Link tab.
3. Enter the link into the dialog box and press **OK**.
4. The Desktop Client will open to the target System with no further action needed.



Connect to a System or a Server using an Internet Browser and the Web Admin

1. Enter the provided Temporary User link into a browser.
2. Depending on local system configuration there may be prompts to launch the Desktop Client or use the Web Admin.
3. Select Web Admin to open the System.

Depending on permission granted to Temporary User, the Web Admin may offer less functionality than the Desktop Client.


Open Client?

https://9ac07ca5-e8fa-4c30-8fa0-c14233700fbe.relay-dp-sea-1.vmsproxy.com wants to open this application.

☐ Always allow 9ac07ca5-e8fa-4c30-8fa0-c14233700fbe.relay-dp-sea-1.vmsproxy.com to open links of this type in the associated app

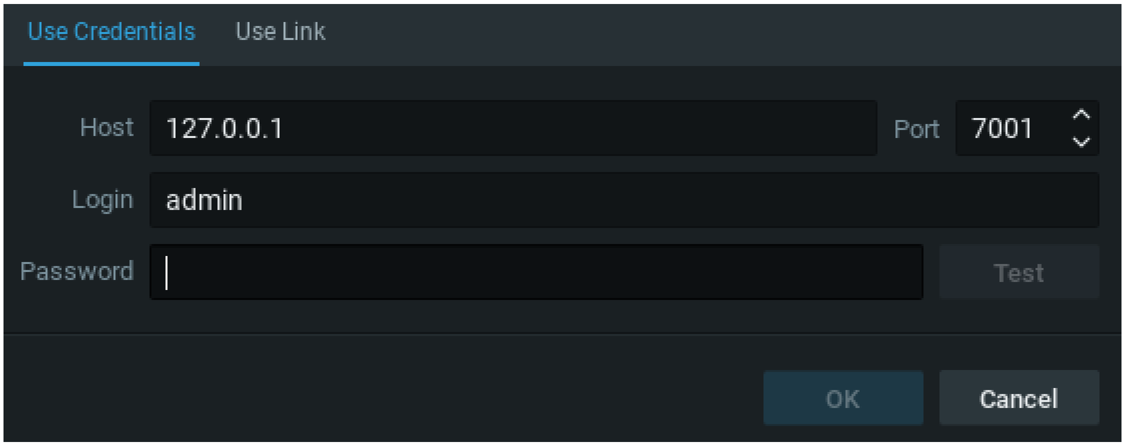
Connecting to a Specific Server

If the System is not connected to Nx Cloud (see "Connect your Systems to Nx Cloud"), you will have to connect to a specific Server via its IP Address, Hostname, or a provided Temporary User Link.

To Connect to Specific Server via IP or Hostname:

On the *Welcome Screen* or in the *Main Menu*, click *Connect to Server* to open the connection dialog shown below. The *Connect to Server* dialog enables connecting via an IP Address and the use of different User credentials.

If the operation is canceled, the current User will still be connected to the Server.



Host 127.0.0.1 Port 7001

Login admin

Password

The following connection details are required:

- *Host* – IP Address or address of the computer Server is installed on (`localhost` or `127.0.0.1` for All-in-One installation).
- *Port* – IP Port for access to Server (`7001` by default).
- *Login* – Account username used to connect to a server. If connecting for the first time, use "`admin`" as the login name.
- *Password* – Account password used to connect to a server. Use the same password that was set up during the initial installation.
- *Test* – Press this button to check connectivity to a server. The following may cause connection errors:
  - Server is not available
  - Specified IP Address is incorrect or inaccessible
  - Specified port is incorrect
  - Server is stopped
  - Login and/or password are incorrect
  - Server and client are incompatible with each other because they are running different Nx Witness versions. In this case compatibility mode will be suggested.

If the Desktop Client is not connected to a Server, a User can only access *Local Files* (see "Playing Local Video Files in Nx Witness").

To Log Out

Open the **Main Menu** and choose **Disconnect from Server**.

Logging in to Nx Cloud

Nx Cloud is a cloud service hosted on the Internet that extends the access to Nx Witness Systems. See "Working with Nx Witness" for more information about Nx Cloud.

The cloud icon ☁ in the Navigation Panel opens a dialog where you can log in or log out of Nx Cloud, or create a Nx Cloud account.

To obtain all benefits of Cloud connectivity, the system should be linked to Nx Cloud. See "Connect your Systems to Nx Cloud" for more details.

To Log In to Nx Cloud from the Desktop Client

1. Click the ☁ icon in the Navigation Panel.
2. Enter your Email and Nx Cloud password, then click on the **Log In** button.

Once connected, your Email address will be displayed next to the cloud icon, and you can click on it to open the Nx Cloud portal, log out from Nx Cloud, or change your Cloud account settings.

Note: It is possible to connect to a Server using the Nx Cloud login even if the internet connection is temporarily unavailable. After several unsuccessful attempts to log in, connect to, or disconnect from a Cloud account, all log in attempts will be denied for 1 minute.

To log in to the Nx Cloud Portal Interface

1. Open the Nx Cloud portal homepage and click **Log In**.
2. Enter your Nx Cloud account credentials and click **Log In**.
3. Click on a tile to access the following web pages for the selected system:
   - *View* – Use the Resource Panel to view live and archive footage.
   - *Settings* – Manage users, system and security settings, activate Licenses or Services, enable recording, create a motion mask, etc.
   - *Information* – Use the Health Monitoring tool to check to see if the system is in good shape and displays information such as the performance of the system and if any errors have occurred.

The Nx Cloud portal homepage displays tiles, and each tile represents a cloud-connected system to which the User has access.

To Create a Nx Cloud Account

When a System administrator or power user adds a Cloud User who does not have an established Cloud account, the User will receive instructions to create their Cloud account.

1. Do one of the following:
   - Open the Cloud Account Creation dialog from the Desktop Client using the ☁ icon in the Navigation Panel
   - Open the Nx Cloud Website and find the **Create Account** button in the upper, right-hand corner of the page

- Open the link provided in the invitation Emailed to Cloud Users who do not have am established Cloud Account

2. Enter your registration information and click **Create Account**.
3. An activation Email will be sent to the Email address specified.

Opening the Nx Witness Web Admin

The Nx Witness Web Admin (Web Admin) provides the following features:

- Administrator-level Server and System controls.
- Live stream viewing.
- Playback of archived video.
- Camera management (view camera information and configure motion settings).
- Server Health Monitoring and Log viewing.
- Storage management (view storage information and add external storage).
- User management (add cloud users, remove local/cloud users and change access level).
- View and activate Licenses.
- Access to developer tools and API documentation.

To Open the Web Admin:

1. Enter //{server IP address:7001} in a web browser.

   If the default 7001 port does not work, you can open the Web Admin interface through the Desktop Client (right-click on the Server in the Resource Panel and choose **Server Web Page**).

   You can open Web Admin from the Tray Assistant. Click the Nx Witness tray icon and choose **Server Web Page**.
2. In the log in dialog that opens, enter your standard login and password credentials. (You will be able to check or edit the port setting on this page).

The Web Admin can be opened on mobile devices as well. See Using a Server's Web Interface for more information about the Web Admin.

Note: If a System contains multiple Servers, the web interface will control the Server to which the client is connected (as indicated by the icon in the Resource Panel).

Connecting to Nx Witness via Mobile Client

Nx Witness *Mobile Client* provides the following features:

- View live streams from cameras
- Search through recorded archive
- PTZ camera control

- Fish-eye camera dewarping
- Two-way audio
- Soft triggers
- Push notifications

The mobile client is available for Android and iOS platforms.

The comprehensive User Guide for the Mobile Client is available as an additional PDF document which is installed locally along with the Desktop Client.

Server Certificate Validation

Nx Witness Server certificate validation occurs on the communication between Nx Witness Server, Nx Witness Clients (Desktop Client and Mobile Client), and Nx Cloud to enhance the security of Nx Witness by ensuring you are connecting to a trusted location.

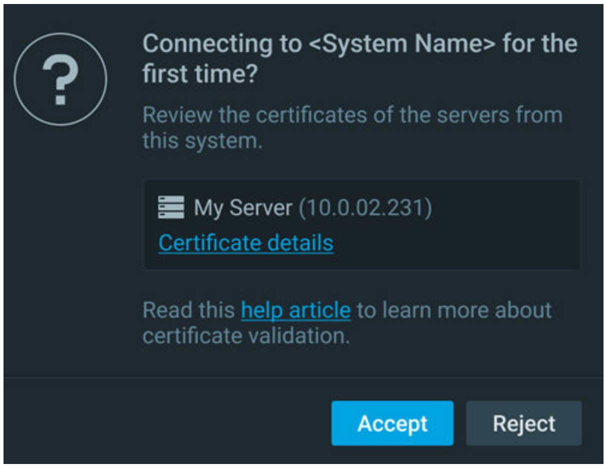
While the Client connects to the System, the System will provide the public keys from every Server to the Client for validation. No matter which level is configured, there will be no warning message displayed at all when you connect to a System having a valid (public) certificate with a matching hostname.

> **Note**: A valid certificate must be issued by a public Certification Authority (CA) that contains the completed information of the certificate chain. A public certificate without a certificate chain will be considered invalid in Nx Witness. See "Obtaining and Installing an Authorized Certificate" for details. Trusted Man In The Middle certificates are trusted on the Desktop Client side.

For other types of certificates, the behavior will depend on the Client’s validation level:

- **Disabled** – The Client will skip the validation process and connect to the System directly. The User will not see a warning message. However, it is still NOT recommended to turn the validation off since certificate validation is recommended as a part of the security hardening process of any System.
- **Recommended** (default) – It allows the User to connect to the System with any certificate, but it may require the user’s confirmation. You may still see the warning message in the following situations:
    - *Connected to an UNKNOWN System* – When a Client attempts to connect to a new System for the first time, that means the Client has no information about the servers’ certificates before. When the System provides the certificate(s) that is custom/self-signed, or public certificate without chain information, a “Connecting to Server for the first time?” prompt may appear stating that the SSL certificate could not be verified automatically. Once the Client approves this connection, the certificate will be stored at the Client’s end. It is expected that no warning message will pop up again for any further connections until the

certificate expires/changes.



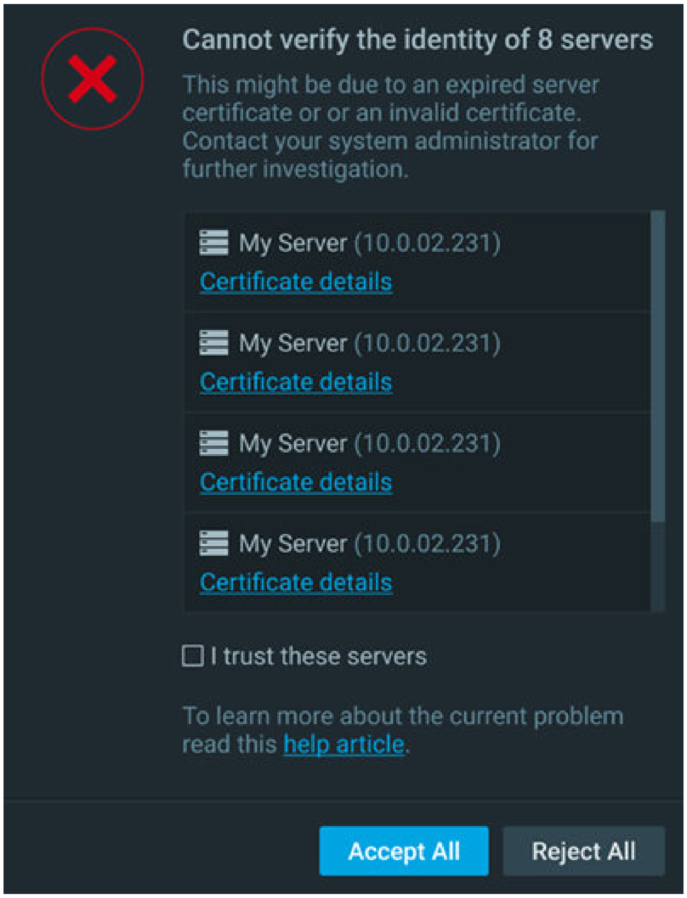
Connecting to <System Name> for the first time?

Review the certificates of the servers from this system.

My Server (10.0.02.231)
Certificate details

Read this help article to learn more about certificate validation.

- *Connected to a KNOWN System* – When a User attempts to use the Client to connect a known System but whose certificate(s) cannot be verified successfully (for example, mismatched with the Client's pinned certificate, expired certificate, etc.), the Client will display the warning message: “Cannot verify the identity of # Server ”.
  The User is prompted to take further action and check the certificate's problems. The User can check the *I trust this/these Servers* checkbox and then click *Connect Anyway* to connect to the Servers. This message will be seen every time the User attempts to connect to the System until the issue with the certificate has been fixed.



Cannot verify the identity of 8 servers

This might be due to an expired server certificate or or an invalid certificate. Contact your system administrator for further investigation.

My Server (10.0.02.231)
Certificate details

My Server (10.0.02.231)
Certificate details

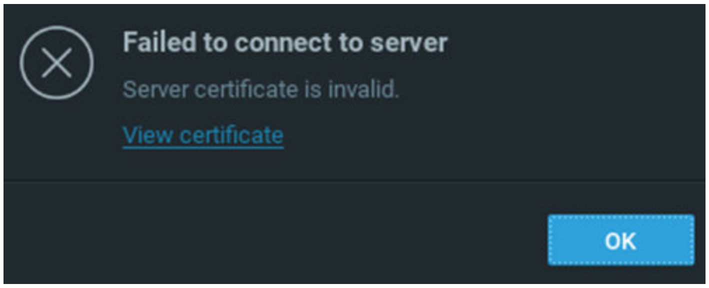
My Server (10.0.02.231)
Certificate details

My Server (10.0.02.231)
Certificate details

□ I trust these servers

To learn more about the current problem read this help article.

- **Strict** – With this mode, the servers that use the default self-signed certificates will also be rejected by the Client. It forces the User to connect to Servers with only a valid (public) certificate and correct hostname. The User will see the warning message below when they attempt to connect to the System with an invalid certificate or a mismatched hostname.



Failed to connect to server

Server certificate is invalid.

View certificate

How to Change the Certificate's Validation Level

To change the validation level in the Desktop Client:

1. Open **Main Menu** > **Local Settings** > **Advanced** tab.
2. Open the **Server certificate validation** drop-down and select a validation level: *Disabled*, *Recommended*, or *Strict*.
3. Apply changes.

Note: The Server certificate validation level can also be modified in the Mobile Client.

How to Check the Certificate's Details

To check the Server's SSL certificate validity and information:

Desktop Client

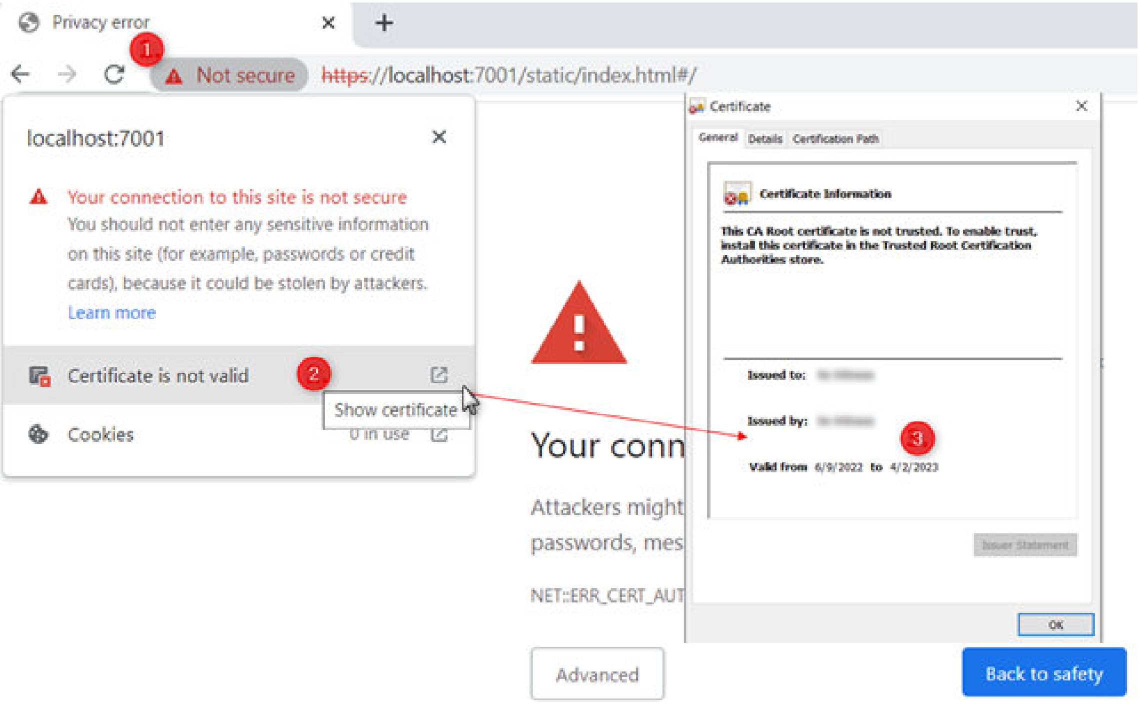
1. Open **Server Settings** > **General**.

Note: Any available pinned/custom certificate will be listed here.

2. Click the certificate to view its details.

Web Admin

1. Visit the Web and click the **Not secure** indicator in the address bar.
2. Click on the certificate's status to open its details
3. Review the certificate's information, such as issuer and expiration date.



Your connection to this site is not secure

You should not enter any sensitive information on this site (for example, passwords or credit cards), because it could be stolen by attackers.

Learn more

Your conn

Attackers might

passwords, mes

NET::ERR_CERT_AUT

This CA Root certificate is not trusted. To enable trust, install this certificate in the Trusted Root Certification Authorities store.

Issued to: [redacted]

Issued by: [redacted]

Valid from 6/9/2022 to 4/2/2023

How to Renew the Expired Certificate

- Self-signed Certificates from Nx Witness

  Restart the Server to renew its certificate and try again.

- Public Certificates / Other Self-signed Certificates

  Contact your administrator to renew the Server certificate.

Initial System Configuration

When Nx Witness is installed, some initial configuration is required. A newly installed Server will be displayed as *New System* on the Welcome Screen.

To Setup a New System or Add Server to an Existing System

1. Click on the tile for the new System to launch the setup wizard.
2. Choose one of the two options:
   - **Setup New System** – specify a System name and *Administrator* password. Sometimes, the **New Server** tile may not be displayed if the Desktop Client did not detect the Server. When this happens, use the "Connect to Server" Main Menu item (see "Connecting to a Specific Server"), and provide the Server IP, Port and use **`admin/admin`** as the login/password combination for the new System.
   - Use the Advanced System Settings to configure these additional parameters:
     - Enabling and Disabling auto-discovery (see "Automatic Device Discovery").
     - Enabling and Disabling device setting optimization (see "Preventing Nx Witness from Changing Device Settings").
     - Enabling and Disabling anonymous usage statistics (see "Sending Anonymous Usage and Crash Statistics").
     - Configuring Secure Connections.
   - **Add to Existing System** – if a System contains multiple Servers (see "Configuring Multi-Server Environment"), specify:
     - System URL – this value can be auto-discovered. If it is not, the URL format is *http://<host>:<port>*, where <host> is the name or IP address of the Server and <port> is the Server port (usually 7001).
     - Login and Password for the existing System.

Configuring Storage, Devices, and Recording

Whether it is a new System or the Server is connecting to an existing one, the following settings will be required:

- Configuring Server and NAS Storage”
- Device Management (Cameras, Encoders and I/O Modules).
- Enable Recording" - A sufficient number of Licenses or Services must be available (see "Services and Licenses").

Creating User Groups and Layouts

Once storage, device, and recording configuration is complete it is possible to configure the following:

- Users and Groups.
- Layout Management.
- Permissions Management.

System ID

- All Servers in a given System have the same ID value. This parameter cannot be viewed or edited, it is required for internal processing when servers are merged.

- If you select "Setup New System," the system ID is assigned during initial configuration.
- If you select "Add to Existing System," the system ID is taken from the existing System.

To enable Cloud connectivity feature it is necessary to Connect the System to Nx Cloud.

If your reseller provides Service Subscription (SaaS) Model, you may need to Connecting the System from an Organization.

Finally, to use full functionality of, you need to obtain Services or activate Licenses. See "Services and Licenses" for details.

Launching Nx Witness in Compatibility Mode

Compatibility mode lets you launch a compatible version of the client application in order to connect to a Server running a different version of Nx Witness. The Client downloads another version of itself to match the Server version using the same method as an auto-update.

This would be necessary, for instance, when Nx Witness is installed at multiple sites (factory, store, warehouse, etc.) and only one installation has been updated to the current version. In that particular case, the System will have different versions and one Desktop Client should connect to another System (i.e. Client at a store connects to the System in a factory). Systems of different versions are highlighted in red in the log in dialog and in yellow on the Welcome Screen.

When a Desktop Client is connected to a Server, all component versions are checked and a warning is displayed prompting to restart in compatibility mode if the component versions differ from one another. Click **Restart** to connect to the Server in Compabilitiy Mode.

In some instances, it may be necessary to download additional files for the compatibility pack. Once the download is complete, the client should be restarted.

> ❗ **IMPORTANT:** The best practice is to have the same product version installed on all System components. If some of the components (Server or Client) in a multi-Server System have different versions installed there may be operational issues.

See Updating Nx Witness for more information.

Updating Nx Witness

Nx Witness provides users with one-click updating for an entire System considers servers on different platforms in different locations and with devices, without the need for an individual log in to multiple devices.

Updates can be performed over the internet using the latest build available, a specific build number, or locally from a downloaded file or a file on a USB drive. For internet updates at least one System component must have an internet connection, whether it is the Client or another server.

By default, the client and each Server downloads the update independently from each other. But, if the Server doesn't have internet access, the update can be downloaded via another Server that has an active connection. In the event that all available servers are without internet access, the client will provide each Server with the desired update file.

The Desktop Client can be updated without needing to update the Server. This allows for Network Optix to deliver quicker updates for Desktop Client specific issues.

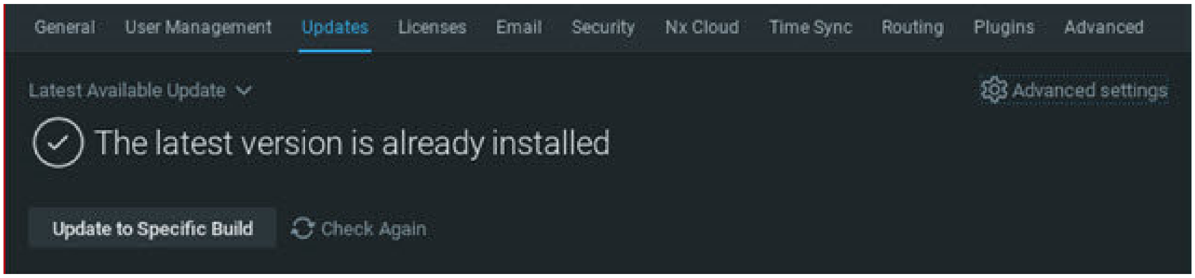
When the download is distributed, servers are tracked with a "ready", "skipped", or "failed" status. The administrator or power user who initiated the update receives specific notifications such as "*Failed to push upgrade package to all servers. Not all servers will be upgraded. Continue?*" This way updating of the System as a whole does not fail because one or more individual servers is offline or unavailable. Download progress is reported graphically on the *Updates* tab for each server.

It is also possible to initiate a manual update for a specific server. If a new product version does not support the current operating system for a blocked Server the update process will not start and upgrades for unsupported operating systems can be blocked.

Update files are stored for both the current and target version. This allows clients to update themselves when an installation is started but not finished, or when an old Client tries to connect to a system. Servers will delete files for the current version when a new update is started. Similarly, files for the target version are deleted when the target version changes, for example because the update is canceled or another target version is set. Desktop Clients do not delete update files and are not used to update other clients.

<u>To Configure Updates Settings</u>

Open **Main Menu** > **System Administration** to the **Updates** tab for update controls. The tab shows indicates that the latest version is installed or shows which version number is currently installed.



The latest version is already installed

<u>Advanced Settings</u>

Click on **Advanced settings** in the upper-right corner to configure update settings:

- *Notify about available updates* – If enabled, performs automatic update checks so that when a new version of Nx Witness is released, a notification will open in the Desktop Client.

- *Automatic Client Updates* – Enabled by default. Connecting clients will be automatically updated to the new version when it's available.
- *Check for updates* provides on-demand update checking. This function is unavailable when the *Automatic client updates* toggle is disabled.

Update to a Specific Version

In the upper-left corner is a drop-down for choosing which version to install:

- *Latest Available Updates* – Selects the latest product version available.
- *Specific Build* – Opens a dialog where you can enter a specific *Version* and *Password* (available from your support team).
- *Browse for Update File* – Lets you search for a local update package that has been downloaded (see Offline updates below).

Update Status Indicators

- A yellow exclamation mark on the Server icon in the Resource Panel indicates that the Server version is incompatible with versions of other servers in the system. (These incompatible servers must be updated separately).
- If the version number is shown in green, the current version is the latest one installed on the System.
- If the version number is shown in yellow, it does not have the latest build but can be updated.
- If the version number is shown in red, it does not have the latest build and cannot be updated. (Usually because the update for the particular Server is not found. It is possible the Server OS is no longer supported or the package for such a platform was not published).

Online Update

1. Open **Main Menu** > **System Administration** > **Updates** tab.
2. Click on **Download.**
3. Wait for the update to download and then click on **Install Update**.

Offline Update to the Latest Available Version

1. Open **Main Menu** > **System Administration** > **Updates** tab.
2. Click on **Get Update File** and choose **Copy Link to Clipboard**.
3. Save the link to an external drive so it can be transferred to a computer with Internet access.
4. Paste the copied link into a browser on a computer with Internet access and use it to download the update file.
5. Save the update file to an external drive, then copy it onto the Client PC that is in a private network.
6. On the offline Client PC, open **Main Menu** > **System Administration** > **Updates** tab.
7. Click the arrow on the *Latest Available Update* menu and choose **Browse for Update File**.

8. In the file browser that opens, navigate to the external drive where the update file is saved and open it to start the update process.

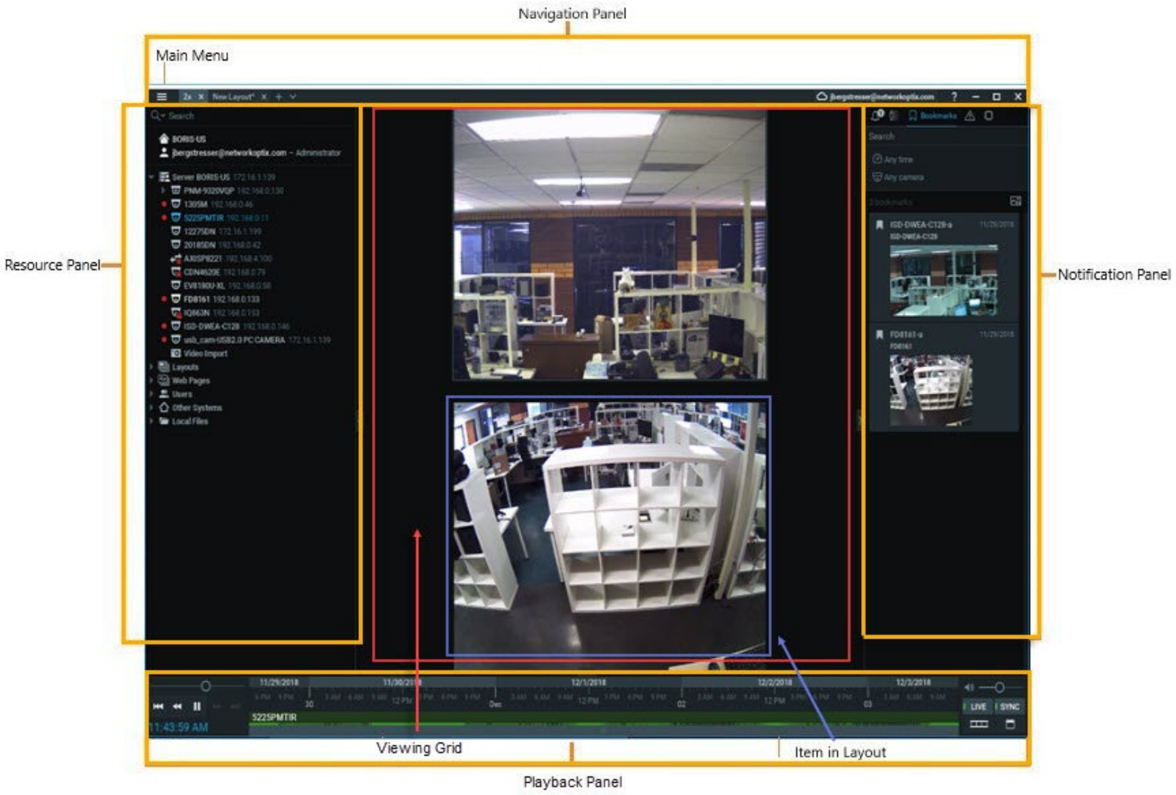
Offline Update to a Specific Build

It may be necessary to accept a newer version of the end User License agreement (EULA) to proceed with installation. During the downloading phase it is always possible to cancel an update. During the installing phase the update cannot be canceled. After all online servers receive "Install" status, a confirmation dialog displays and you will be prompted to restart the Client to the updated version.

1. Open **Main Menu** > **System Administration** > **Updates** tab.
2. Click on the **Latest Available Update** menu and choose **Specific Build**.
3. In the dialog that opens, enter the build number and a password (provided by support team), then click **Select Build**.
4. In **Main Menu** > **System Administration** > **Updates** tab, click on **Get Update File** and choose **Copy Link to Clipboard**.
5. Follow steps 3 through 8 from the above instructions.

Nx Witness Desktop User Interface

The Nx Witness Desktop Client User Interface includes the following main regions:



Viewing Grid for Layouts

The central Viewing Grid can display up to 64 individual *Items* – live Camera streams, recorded video files, Web Pages, etc.

An arrangement of items in the Viewing Grid is called a *Layout*. Layouts can be named and saved. Multiple layouts can be open at once, each displayed in a separate tab.

Panels

Sliding panels on each side of the Viewing Grid provide management and display tools. These panels can be resized by dragging the inner edge towards or away from the Viewing Grid, and hidden or opened using the directional arrows.

- *Navigation Panel (top)* – provides access to the Main Menu ☰, tabs for each layout, the Nx Cloud connection form, the help system, and standard window sizing controls.
- *Playback Panel (bottom)* – controls playback of local videos and live streams.
- *Resource Panel (left)* – displays all servers, devices (cameras, analog encoders, DVRs/NVRs, IO Modules), Layouts, Showreels, Web Pages, other Systems, and Local files (video and image files) available to the current User (see "Searching and Filtering in Nx Witness" for details about searching and filtering in the Resource Panel.
- *Notification Panel (right)* – contains tabs that display tiles for notifications, motion detection, bookmarks, events, and analytics objects. See "Searching and Filtering in Nx Witness" for details about searching and filtering in the Notification Panel.

Each interface element has a *Context Menu* that provides shortcuts to key actions related to that element. Throughout this help System you will find instructions to use these context menus to access necessary tools. Right-click on an interface element to open its context menu.

Tooltips and Context-sensitive Help

Throughout the Desktop Client application, you can click on the contextual help icon ❓ to toggle the mouse pointer into a question mark, then click on a element interest to view related help information. Tooltips and mouse-hover text is also provided though the application.

Keyboard Shortcuts

A set of Keyboard Shortcuts are available to speed up common tasks.

Main Menu

The *Main Menu* provides access to fundamental Nx Witness settings for server connections, display characteristics, users permissions, device controls, and layout configurations.

Click on the **Main Menu** button ☰ in the upper left corner of the Navigation Panel to access the following:

- *Connect to (Another) Server* (Ctrl+Shift+C) – see "Connecting to System from the Welcome Screen".
- *Disconnect from Server* (Ctrl+Shift+D)

- *New*
  - *Layout* – creates a new empty tab in the Tab Navigator (see "Layout Tabs").
  - *Window* – opens a new window of Nx Witness (see "Working with Multiple Nx Witness Windows").
  - *Welcome Screen* – opens the Welcome Screen in a new window of Nx Witness (see "Working with Multiple Nx Witness Windows").
- *Open*
  - *File(s)* and *Folder* commands open and play back selected local video files or all video files in a folder, respectively (see "Playing Local Video Files in Nx Witness").
  - *Web Admin* – opens a web browser to an Nx Witness Web Admin login dialog (see "Opening Nx Witness Web Admin").
- *Start Screen Recording* (Alt+R) – toggles screen recording of an entire window (see "Screen Recording (Windows Only)").
- *System Administration* (Ctrl+Alt+A) – opens a tabbed dialog for System-related settings (see "System-Wide Configurations").
- *User Management* – opens a dialog for managing Users and User Groups (see "Users and Groups").
- *Local Settings* – opens a dialog for local client settings (see "Customizing Look and Feel of Nx Witness").
- *Audit Trail* – opens a log that displays all User sessions, actions, and device activity (see "Audit Trail of User Actions").
- *Bookmark Log* (Ctrl+B)– opens a log where you can view, search and manage Bookmarks (see "Searching Bookmarks").
- *Add*
  - Device – opens the dialog where you can specify or search for a connected device, by Server (see "Adding Devices Manually").
  - *User* – creates a new User
  - *Video Wall* – creates new Video Wall (see "Video Wall Management").
  - *Integration* – creates a Web Page frame that can interact with the Desktop Client,
  - *Web Page* – creates a new layout item for a web page,

    see "Managing Web Pages and Integrations".
  - *Showreel* – creates a new tab containing a Showreel layout (see "Showreel (Tour Cycle)").
  - *Virtual Camera* – creates a new Virtual Camera device (see "Setting Up a Virtual Camera").
- *Merge Systems* – allows for merging of multi-server Systems (see "Configuring Multi-Server Environment").

- *About* (F1) – displays product version, hardware, and driver information (see "Collecting Additional Information").
- User manual – Opens the User Manual.
- *Save Window Configuration* – allows for retaining and restoring settings for multiple Desktop Client windows at a time (see "Retained Settings" for more information).
- *Exit* (Alt+F4) – closes Nx Witness client session.

Customizing Look and Feel

The Nx Witness Desktop Client can be customized in a specific way. These settings are local and apply to the current Client instance only.

To Customize the Look and Feel

Open **Main Menu** > **Local Settings** > **Look and Feel** to set the following global display characteristics:

- *Language* – select your preferred display language from the pull-down menu. You must restart Nx Witness for this change to take effect.
- *Time Mode* – when the Client and Server are in different time zones, use this to select whether *Server Time* or *Client Time* will apply in Client displays (e.g. Timeline, timestamps in Event Logs and Trail, etc). See "Time Synchronization in a Multi-Server Environment".
- *Show additional info in tree* – check this box to include the IP address of devices and servers.
- *Show aim overlay for PTZ cameras* – check this box to enable the alternative UI for PTZ controls, this mode is off by default (see "Alternative PTZ Controls").
- *Tour cycle* – sets the time, in seconds, that each item in a Tour will be displayed.
- *Background Image* – toggle this switch to add an image (typically a logo or map of camera placement) that will display on the Viewing Grid beneath all layouts. Once an image is selected, you can use this switch to toggle the background image on and off.
  1. Click **Browse** to select an image file
  2. Open the **Mode** drop-down and select the desired display mode: *Stretch*, *Fit*, or *Crop*.
  3. Set the **Intensity** level (0%/completely transparent to 100%/completely opaque)

Click *OK* to save changes and exit the dialog or Click *Apply* to save change and remain in the setting dialog, or Click *Cancel* to discard changes and exit the dialog. If your changes require a restart, you will be prompted to *Restart Now*, *Restart Later*, or *Cancel*.

Note: The Viewing Grid background applies to all Layouts – A background image can be applied to a single Layout (see " Layout Backgrounds (E-Mapping) (E-Mapping)").

Showing and Hiding Panels

Panels in the User interface can be shown or hidden individually, or all at once.

Use the "**>**" and "**<**" arrow buttons at the perimeter of the Viewing Grid to show or hide individual panels.

Press **F11** to simultaneously hide all Panels, and zoom Nx Witness to fill the screen. Press **F11** again to show all Panels – The product window remains maximized.

You can also use Fullscreen Mode to simultaneously hide all four sliding panels and expand the display of a single Item to fill the entire layout.

Searching and Filtering

Nx Witness enable users to search and filter data in various forms (Audit Trail of User Actions, Event Log, Device List, Users etc). The common UI element is a search box. Type any characters there to activate a search. Search results appear in the form immediately as characters are entered. This is because Camera ID strings are so long and contain so many characters they could flood search results without this limitation.

The search functionality in the Resource Panel is a little different than everywhere else in Nx Witness. The Resource Panel display can be filtered in two ways, by type and by text, and these two filters can be applied separately or together. By using this function, the following items can be searched for: Servers, Devices (I/O modules, cameras, etc.), Layouts, Showreels, Video Walls, Web Pages, Users, Local Files, and Groups.

Note: The display of server and device IP addresses will change according to the setting of the *Show additional info in tree* option, see the Customizing the Look and Feel section for more information.

Filtering by Resource Type

Only one resource type can be selected at a time. The type filter can be applied by clicking on the magnifying glass (🔍) in the Search field to open a drop-down menu. When a type filter is applied, the tree structure changes – all elements become grouped by type, and are displayed without nested elements of a different type (for example, cameras under layouts under users).

You can select a group from the search results **(Shift + Click)** or select multiple items sequentially **(Ctrl + Click)**. You can add items from the search results to the existing layout **(Enter)** or open all selected items into a new layout **(Right-click > Open in New Tab)**. Note that the cursor must be in the search field for these add-to-layout functions to be available.

Filtering by Text

Any text entered in the Search field filters the existing resource display. Multiple keywords are treated as a Boolean "AND". For example entering **abc def** returns only resources which have **abc** and **def**. If the filter returns a large number of results, only the first 64 results will be displayed. Camera ID fields are only searched if a query is 4 symbols or longer.

Search Syntax

Search syntax in Nx Witness search fields is generally the same across all Nx Witness resources, but additional search features are available in a few places.

The standard search syntax includes the following:

- Single word search (not case-sensitive)
- Two word search (not case-sensitive and the search terms' order does not matter)

Search Fields That Use the Standard Search Syntax

- Server Web Admin
- Desktop Client
  - Resource Panel
  - Event Rules (Indexed field: Source)

    Note: Events with more than one camera set will show up in your search results if one of the cameras match the search term, but the exact camera name will not be visible until you click on the list of cameras for that event.
  - Event Log (Indexed field: Description)
  - Cameras list (Indexed fields: Name, Vendor, Model, Firmware, IP, and MAC address)
  - Audit Trail (Indexed fields: Camera name, User, IP, Activity, Description, Session ends)
- Cloud Portal

Search Fields That Do Not Use the Standard Search Syntax

The following places in the Desktop Client have an exception or additional search features.

- User Manual
  - Two word search terms will provide results for both search terms together and separately.
  - An asterisk (*) can be used in any position to any number of symbols.
  - A question mark (?) can be used to substitute a single character.
  - A hyphen (-) can be used in front of the second search term to search for lines that contain the first term but not the second term.
- User Management
  - Unlike two-word searches across our other resources, only results matching the exact order of search terms will show up.
  - A question mark can be used to substitute a single character.
  - An asterisk can be used in any position to any number of symbols.
- Bookmark Log – (Indexed fields: Name, Description, and Tags)
  - Quotations can be used to find results with the search terms in the order specified.
- Notification Panel, Bookmarks tab (Indexed fields: Name, Description, and Tags) and Objects tab (Indexed fields: Object type and Object text attributes)

○ Quotations can be used to find results with the search terms in the order specified.

Navigation Panel

The **Navigation Panel** provides access to the most important System tools and features, as well as the layout tabs. Like all panels, it can be shown and hidden. The Navigation Panel contains the following controls:

- *Main Menu* ☰ – use to configure fundamental behavior such as System Administration, Users and Groups, Local Settings, etc.
- *Layout Tabs* – all open tabs are displayed and can be navigated through.
- *Cloud Connect Button* ☁ – connects to Nx Cloud. This button indicates the current Nx Cloud connection status and allows you to connect/disconnect to Nx Cloud and open the Nx Cloud Portal.
- *Help Button* ? – Toggles the cursor into a (?) that will open a related help topic when clicked on a User Interface element.
- Standard window sizing buttons – Minimize, Maximize, Exit.

Resource Panel

The *Resource Panel* displays all servers, cameras and devices, layouts, Showreels, Video Walls, web pages, local files and other Systems available to the current user. What is shown in the Resource Panel depends on the user's permission level.

Note: To access the Resource Panel from the Web Admin, open the **View** tab.

Resource Panel Display

Levels can be expanded to show additional information. For example, Servers at the top-level expands to show each Server in the System, and expanding a Server shows all of the devices connected to it. Use **Ctrl (Cmd) + F** to search through the Resource Panel. The **+** and **-** keys expand/collapse Resource Panel sections and the arrow keys can navigate through and select resources.

Resources that are placed in the active layout are bolded in the Resource Panel list. The currently selected resource is shown in blue in the Resource Panel. Display of Server and device IP addresses can be toggled on or off in the Look and Feel dialog.

Each resource and resource type has a related context menu. You can highlight the name and click **F2** as a shortcut to rename a resource.

– *Servers:* Lists the servers registered in the System. A Server may have several network interfaces, so it is possible for different IP addresses to be displayed for the same server. Server icons indicate the following statuses:

Client is connected to this server

Server is offline

Server version is incompatible with other Servers in the System (see "Updating Nx Witness")

Server is unauthorized. In this very rare situation, the password for the User Admin does not coincide with other servers so this Server is not able connect to the System. To fix this issue, open the *Server Web Page* in the Server context menu, open the Server Settings, select the corresponding Server and click on **Reset to Defaults**, and then reconnect to the System (see "Using a Server's Web Interface").

Devices (various icons)**:** Each Server shows a list of the attached devices. When a mouse cursor hovers over a device icon in the Resource Panel, a thumbnail of a frame taken by that device will open (thumbnails update every 2-3 seconds). Devices attached to a Server can include:

Cameras

Virtual Cameras

I/O Modules

Multi-Channel Cameras

Recorders

Groups: Two or more of the above devices organized into a group. To create a group, select two or more resources, right-click the selection, and click **Create Group**.

Device icons indicate the following statuses:

or – Device is offline (see "Diagnosing Offline Devices").

or – Device is unauthorized (see "Configuring Device's Authentication").

Icons to the left of a device name indicate the following:

● – Device is currently in recording mode.

○ – Device is configured for recording but is not recording at the moment.

○ – Indicates camera is not recording but there a recorded archive is available.

! – Device is experiencing network issues (see "Device Disconnection/Malfunction" or "Working Around Device Issues (Expert Settings)").

Note: “Preview is outdated” message is displayed over the video preview thumbnail of a device if the thumbnail has not been updated in over 15 minutes.

– *Layouts:* Contains resources (devices and local files). Owned by the user.

Cloud Layouts – Layouts that are available to the user from within the Cloud Portal.

Shared Layouts – Layouts created by an administrator or power user and made available to a User or Groups of Users.

Locked Layouts – Layouts that cannot be changed (see "Locking Layouts").

– *Showreels:* Cycle display through a sequence of layouts (see "Showreel (Tour Cycle)").

– *Integrations:* Show the viewing cells containing an Integration (see "Adding a Web Page as an Integration").

– *Web Pages:* Show the viewing cells containing a web page (see "Adding a Web Page as an Item").

– *Video Walls:* Control multiple displays remotely (see "Video Wall Management").

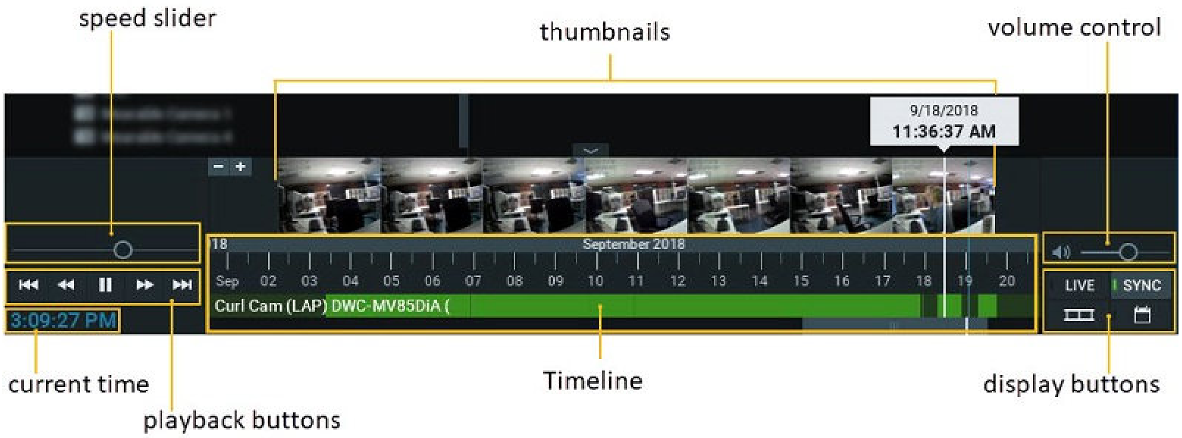
– *Other Systems:* Shows servers in local network that belong to different Systems, and the available Cloud Systems (see "Configuring Multi-Server Environment").

– *Local Files:* Displays the following file types:

- Local Video files (see"Playing Local Video Files in Nx Witness").
- Exported Video Files (see "Exporting Video").
- Exported Multi-Video Files (see "Multi-Video Export").
- Screen Recordings (see "Screen Recording").
- Images.
- Screenshots (see "Taking Screenshots").

Playback Panel

The *Playback Panel* provides archive and local file playback controls, extensive search capabilities, and seamless transition from live to archived footage.



- *Current time* – displays the current time from your computer.
- *Playback buttons* – use to start, stop, and control playback speed.
- *Speed Slider* – alternate control for playback speed.
- *Timeline* – controls navigation through archive footage. See "Using the Timeline".

- *Thumbnails* – drag the upper edge of the Timeline upward to display preview thumbnails. See "Using Thumbnails".
- Display buttons:
  - *LIVE* – switches selected camera(s) to live playback mode. See "Parts of the Timeline".
  - *SYNC* – performs time synchronization of all cameras displayed on the current layout. See "Synchronizing Playback".
  - ▭ – use to show/hide thumbnails above the Timeline.
  - 📅 – use to show/hide calendar for navigating through archives. See "Using the Calendar".
- *Volume control* – adjusts audio volume of the client application. See "Adjusting Volume".

Notification Panel

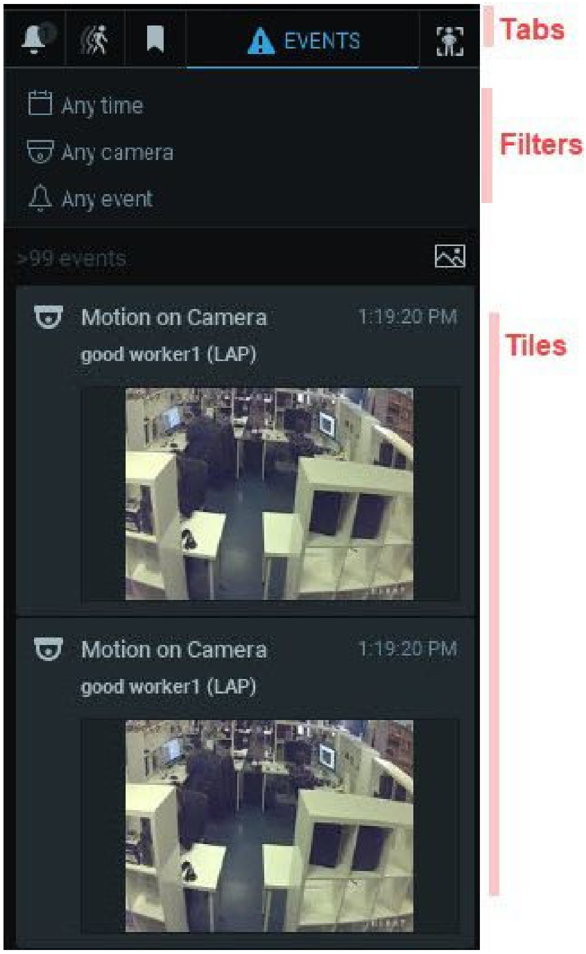
The Notification Panel provides centralized access to System information, with separate tabs for:

- *Notifications*
- *Motion*
- *Bookmarks*
- *Events*
- *Objects* (analytics).

Having these information elements together lets you search, filter and control responses to detected events without leaving playback mode and without having to open another window that might interfere with the layout display.

The Notification Panel has three main sections:

- Tabs
- Filters
- Tiles.



Panel Behavior

The Notification Panel can be minimized/maximized by clicking on the arrow on the outer edge.

Right-clicking on the background in any tab opens a generic context menu:

- *Event Log* – see "Viewing and Exporting the Event Log"
- *Event Rules* – see "Event Rules"
- *Filter* – see "Global Notifications"

Tab Behavior

Only one tab can be active at a time. Each tab can be searched and filtered independently by time period, camera, or other parameters as applicable to the given tab. Tab visibility depends on the state of the system and User permissions. For example, the Motion tab is only available if the User has permission to view archive; the Objects tab is only visible if there is an analytics plugin on the system which can detect objects, or if there is a database of detected objects from a previously attached plugin.

Filters

The filter section has a set of controls which will differ by tab. The state of filter controls is independent and persistent for each tab when configured in the Notification Panel. The filter options to choose from are – time, camera, area for motion detection, event type for events, object type, and area selector for objects. See "Searching and Filtering in Nx Witness" for more details.

Click on a filter control to open a menu of options. When a filter is applied it will be highlighted. Some filters can also be added by selecting an item outside of the Notification Panel, such as clicking on a camera tile or selecting an area on a camera tile to filter motion detection. Click on the **X** to clear a filter.

- *Time selector* – The following options are available:
  - *Any time* (default)
  - *Last day*
  - *Last 7 days*
  - *Last 30 days*

  Note: If a segment is selected on the Timeline, that segment becomes the time filter and it is applied to all tabs.
- *Camera selector* – The following options are available:
  - *Any camera* (default)
  - *Current camera*
  - *Cameras on layout*
  - *Choose cameras*
- *Area selector* – Available to the Objects and Motion tabs only, with the prompt to "*Select area on the video to filter results*" if an area is not selected, or in filtered state "*In selected area*". In the Motion and Objects tab, selecting an area simultaneously selects the related camera.
- *Event selector* – Available for the Events tab only and has a two-level menu where the second level menu options are dependent on the top-level selection. Available events are:
  - Any event
  - Motion on Camera
  - Input Signal on Camera
  - Soft trigger
  - Plugin Diagnostic Event
  - Generic Event
  - Analytics Event
  - Camera Issues
  - Server events

- *Plugin selector* – Only available while in the Objects tab. Its options depend entirely on the third-party products integrated with your Nx Witness System.
- *Object selector* – Only available while in the Objects tab. Its options depend entirely on the third-party products integrated with your Nx Witness System.

Event Counter

The event counter shows the number of events displayed in the tiles section. Click the image button (🖼) to toggle thumbnails on and off, and in the Objects tab, you also have the option to click the information button (☰) to toggle thumbnail information on and off.

Tile Behavior

Tiles display is always ordered with the most recent tile on top. If the source camera is not in the current layout, double-click to add it or open it in a new layout tab (Right-click). If the source camera is open in the active layout and SYNC mode is turned on, the archive playback for all items in the layout will be synchronized to that camera's Timeline. Clicking on a tile opens the related archive and moves the Timeline marker to the start of the Bookmark.

All tiles have one of four priority types, as indicated with color:

- *Default*
- *Success*
- *Alert*
- *Critical*

The Notifications and Event tabs handle tiles a little differently depending on the event type. A notification tile may open because of an event and then close, or may open and only close when the triggering event ends or the triggering System state changes. However, notifications with the "Force Acknowledgment" setting cannot be closed until the required action is complete.

Search Field

When there is a search field, text input filters all results so only the tiles that meet the search criteria are displayed.

Responding to a Notification

While in the Notifications tab, hovering the cursor over a notification displays additional information according to the notification type.

Clicking or double-clicking on a notification displays additional information and triggers a corresponding action. For example, clicking on a "network issue on device notification" displays the last frame received from that device and opens the *Device Settings* dialog.

Notifications Tab

Communications displayed in this tab are of two types:

- *Informers* are pinned to the top of the tile section display and include a System state, for example "Device IP Conflict" or "Storage Issue". Clicking on a tile will launch the appropriate dialog where related settings can be modified, for example, the Server settings dialog for a storage issue notification. Informers may also show an updated status bar or a prompt for how to resolve the issue ("Enter your Email address to receive System Notifications").
- *Notifications* are displayed at the moment the triggering event occurs, usually as a result of an Event. Examples are "Motion on Camera" or "Connection to streams on 5 cameras has been lost" that provides a list of the Camera names.

Cross System Notifications

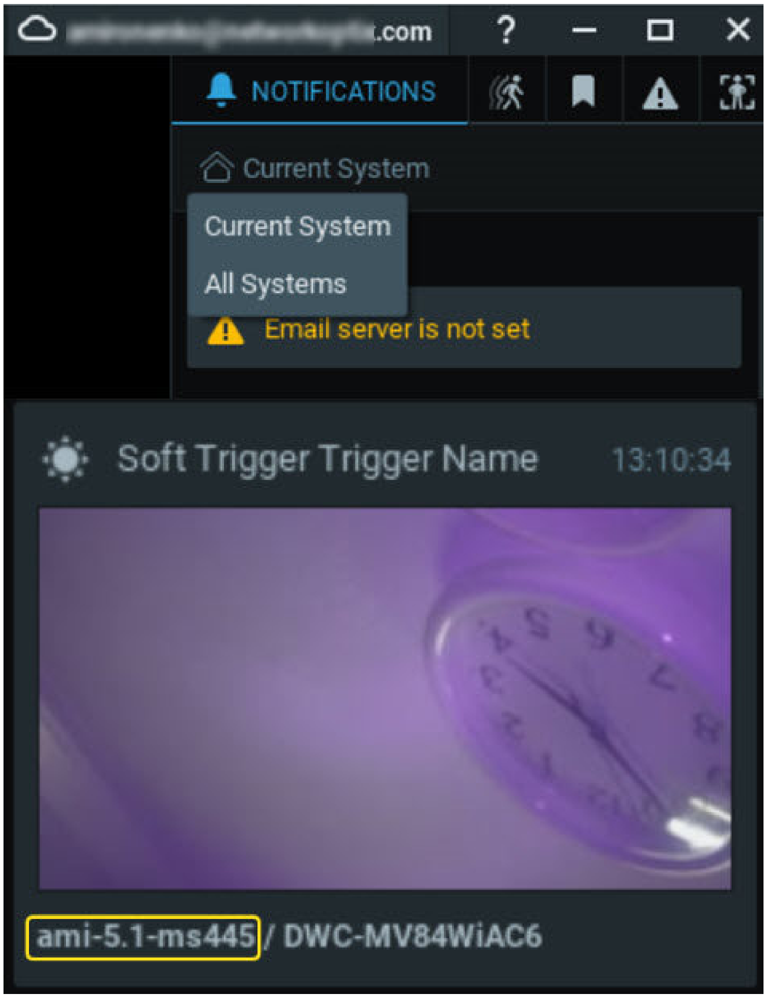
Systems that are connected within a common Organization will display notifications and informers from all systems in the Organization when Cross System Notifications are enabled.

Key features of the Cross System Notification service:

- Users must be logged into the Cloud to receive Cross System Notifications.
- The Desktop Client will only display communications from Systems that the current user has access to.
- The Cross System Notification selector is only displayed while logged into the Cloud and when compatible Systems are available.
- Cross System Notifications must be enabled each time the Desktop Client is restarted – this setting is not saved.
- Notification footers are prefixed with the System ID instead of the Camera IP Address provided with local Notifications.
- Cross System Notifications are initiated by the Event Action Show Desktop Notification and adhere to other Event Rules (distribution, timing).

To enable or disable Cross System Notifications

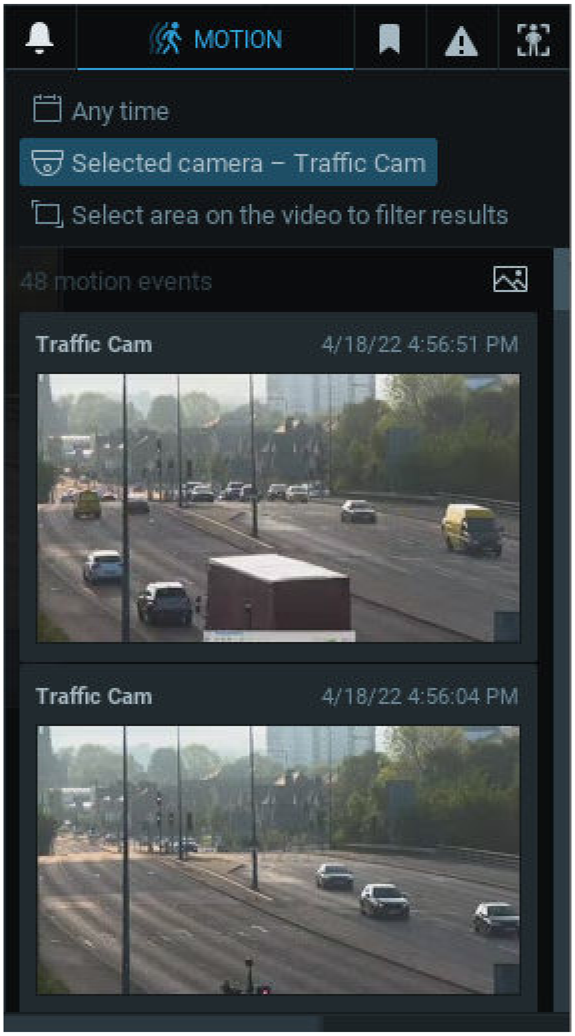
1. Select the Notifications tab in the right panel.
2. Under the tab title (Notifications) select All Systems to enable or Current System to disable Cross System Notifications.



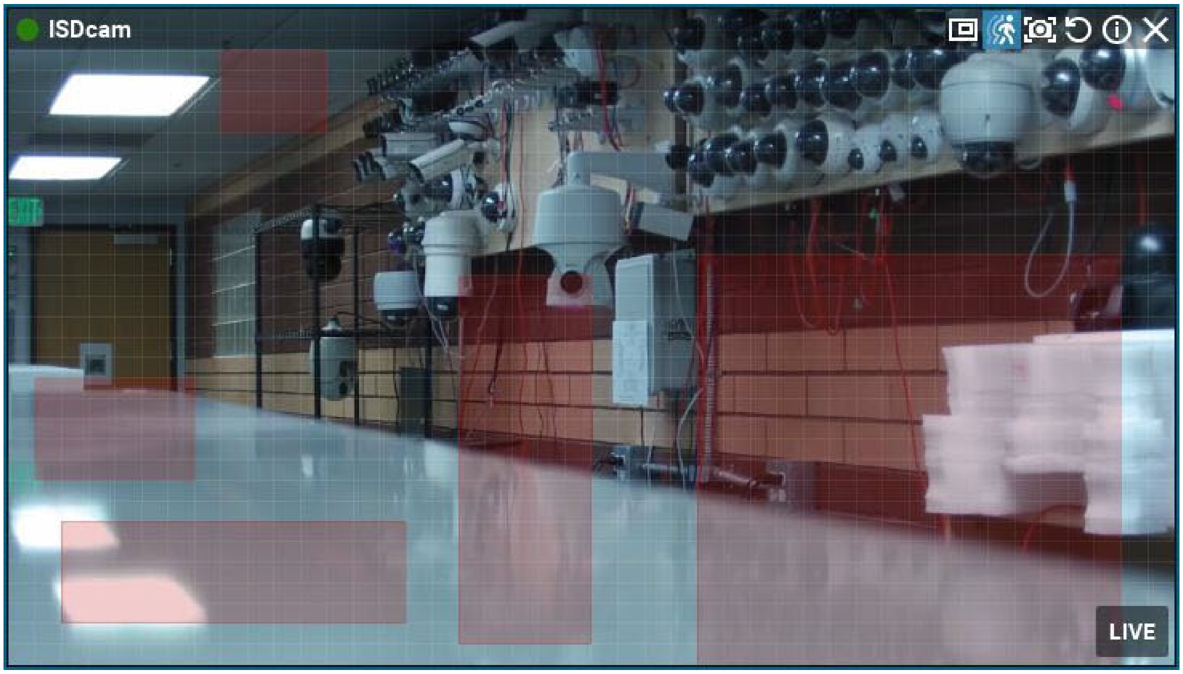
Email server is not set

Motion Tab

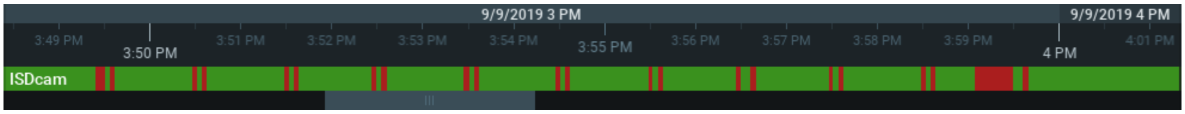
When the *Motion* tab is active, the Client enters *Motion Search* mode. Conversely, any other method of entering Motion Search mode will launch the Motion Tab. In this mode, items in the active layout are overlayed with a semi-transparent Motion Smart Search grid. The default filter display is any time and the currently selected camera.



When you click-and-drag on an item display, a red rectangular area is created in which motion will be detected for that camera. Multiple search areas can be created by holding down the Ctrl button while drawing. Selecting a detection area also sets the filters to the states *Selected Camera* and *Selected Area*.



Archive segments on the Timeline that have motion in the selected area are highlighted in red. It is possible to have a motion detection area in as many layout items as you like. When you shift focus to a different camera, the motion search display switches accordingly.



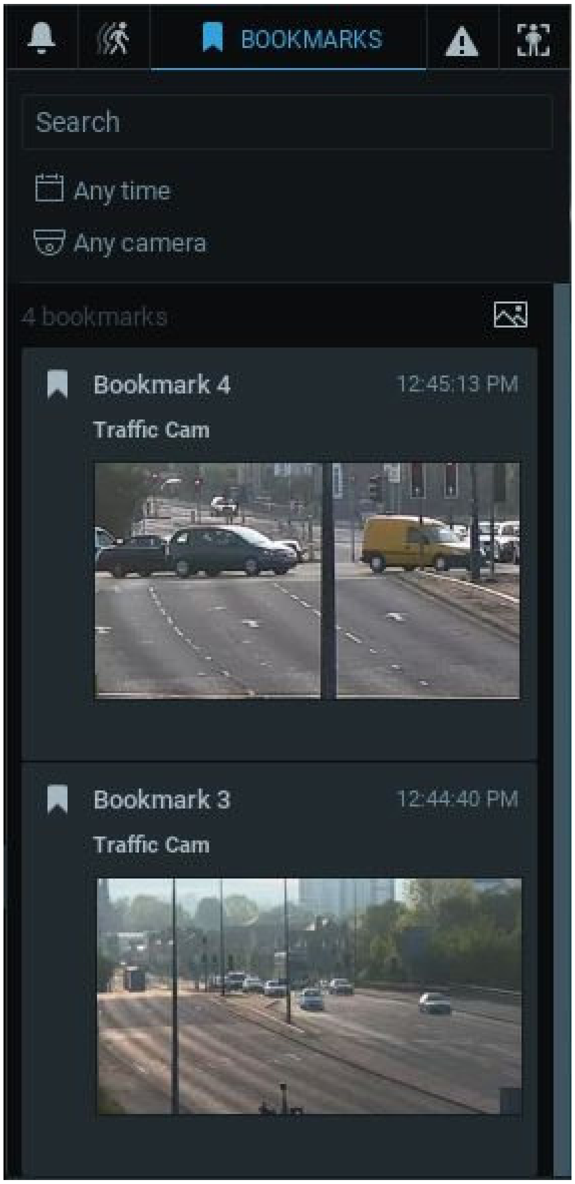
To enter Motion Search mode from layout

- Right-click on the item and choose **Show Motion/Smart Search** option from the context menu.
- Click the **Smart Motion Search** button (🏃) in the top right of the item tile.
- Press the Motion tab shortcut on your keyboard (the *m* key*)*.

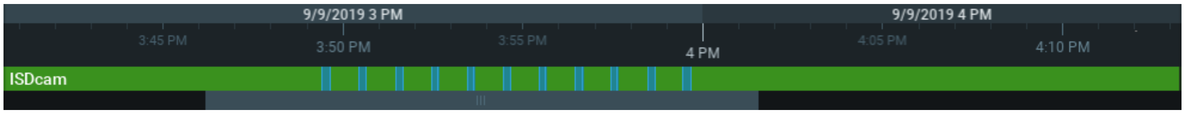
Bookmarks Tab

The *Bookmarks* tab in the Notification Panel provides a visual interface for searching and viewing Bookmarks. All information from the Bookmark dialog is displayed with a thumbnail image for approximately the middle of the Bookmark video.

When a camera tile is selected, Bookmarks in the archive will be shown in descending order by archive timestamp. Clicking on a Bookmark will move the Timeline marker to the start of the Bookmark. Default filter display is any time for any camera on the layout. The Search field can search through the Bookmark Name, Description, and Tags (see "Searching and Filtering in Nx Witness" for more details).

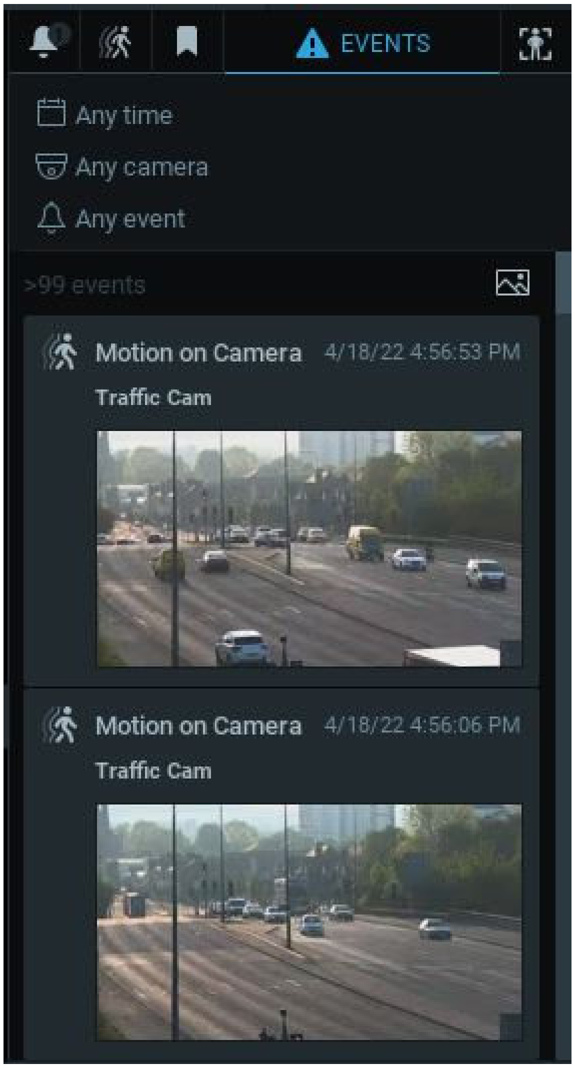


When the Bookmarks Tab is active, blue bookmark segments will display in the Timeline (see "Using Bookmarks" for more details.)



Events Tab

The *Event* tab is only available to users who have permission to view the Event Log. It provides a visual display of the Events Log content (see "Viewing and Exporting the Event Log"). Default filter display is any time, any camera, and any type of event.



EVENTS

Any time

Any camera

Any event

>99 events

Motion on Camera 4/18/22 4:56:53 PM

Traffic Cam

Motion on Camera 4/18/22 4:56:06 PM

Traffic Cam

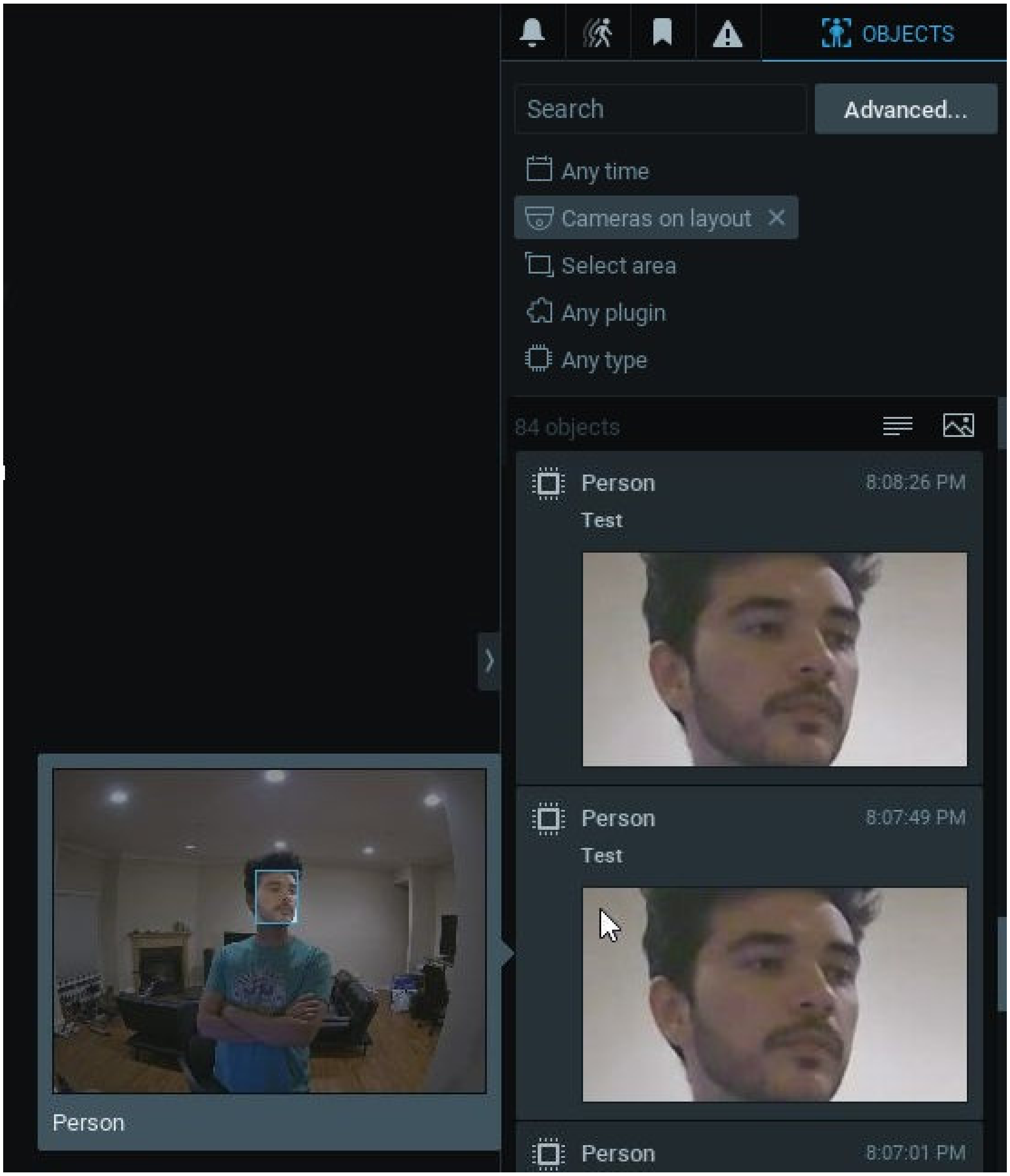
Objects Tab

Visibility of the *Objects* tab depends on the existence and type of analytics in the System and the user's permission level. When an analytics plugin is enabled, newly detected objects will appear as tiles if a Camera is open and being viewed (recording doesn't need to be enabled) or a Camera is recording. Previously detected objects stored in the archive will also appear as tiles. Detections not recorded to the archive will be lost after closing the Desktop Client.

Detected objects are outlined by bounding boxes that can be seen in the thumbnail that appears when hovering over the tile. The color used for bounding boxes can vary between object types and analytics plugins. Some analytics plugins allow the bounding box color for object types to be customized.

The object filter can be used to filter for a specific object type, but by default it is on "Any type". Depending on the analytics plugin being used, different selectable object types (e.g., car, human, bicycle, etc.) may be available to you.

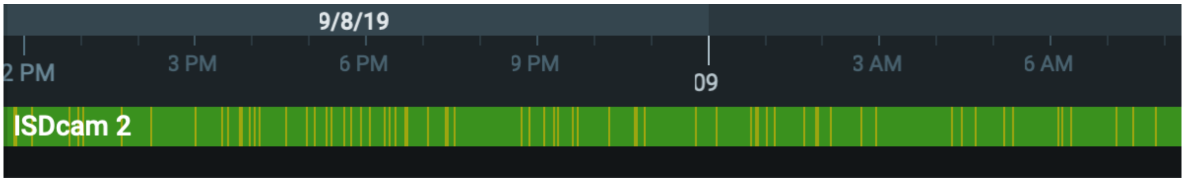
The Search field can search through object types and object text attributes (e.g., color, make, travel speed, etc.). See "Searching and Filtering in Nx Witness" and "Analytics: Region of Interest (ROI)" for more details.



Note: Fields from an *Analytics Event* can be used to automatically fill in certain parameters when creating an HTTP Request is made (see "Do HTTP(s) Request" for more information.)

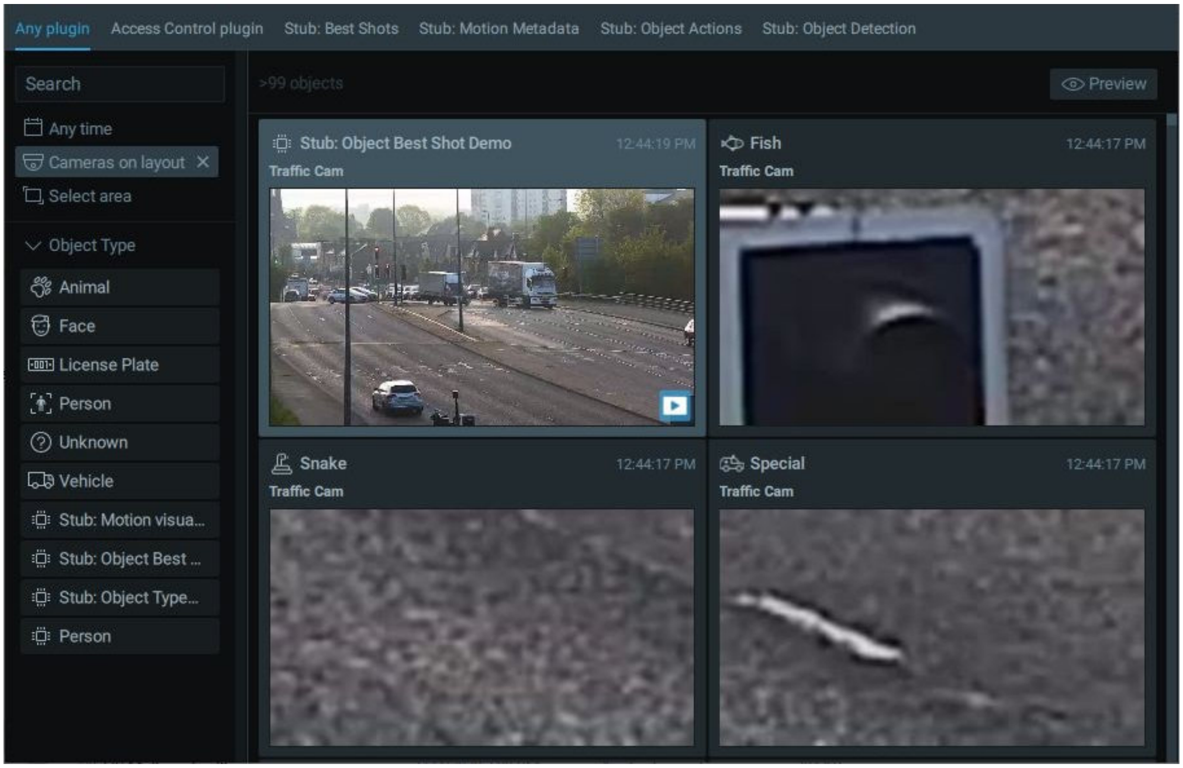
Default filter display is any time and the Cameras on Layout. The area selector filter is always available and has the default state "Select area" when filtering is not applied. Click and drag over any device to create an area and enter filtering state "In selected area" for the selected camera.

Detected objects are indicated with yellow segments in the Timeline.

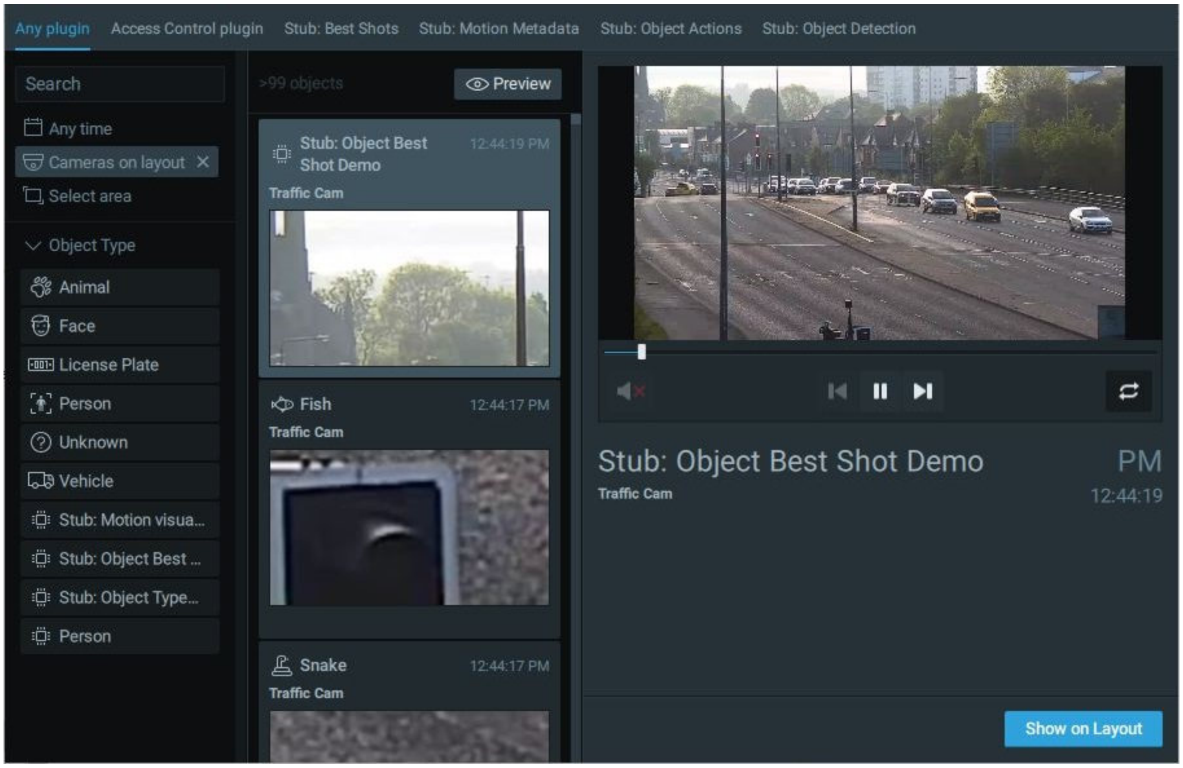


Advanced Object Search

For more granular control over the filtered object type, click **Advanced** to open up the Advanced Object Search dialog. This dialog displays objects from the Objects Tab in two or more columns (depending on window size) and will allow you to more easily switch between enabled plugins via the tabs at the top and configure other selected options such as object type in the menu on the left. To see the selected search result in the main window, click the play icon, and it will take you to that position in the archive.



When a result is selected and *Preview* is clicked, a sidebar will open within the dialog, allowing you to preview that portion of the archive. Click *Show on Layout* to go back to the main window and view that position in the archive.



Working with Multiple Windows

It is possible to open multiple Nx Witness windows in a multi-monitor environment.

To open a new window, click on **Main Menu** > **New** > **Window**. You can select Items from the Resource Panel or Viewing Grid and drag them to the new window (only *Administrators* can add Items to a predefined Layout).

You can also select an item and open it directly in a new window:

1. Select desired Items in the Resource Panel or on the Viewing Grid.
2. Select **Open in New Window** from the context menu.

The Video Wall feature provides further control of multiple displays and broadcast capability (see "Video Wall Management").

Keyboard Shortcuts

These Keyboard Shortcuts are for Windows and Ubuntu Linux, but most will also work for Mac OS by replacing "Ctrl" with "Command" key. Keyboard shortcuts only affect the active item.

Action	Windows Shortcut	Mac OS X Shortcut
About	F1	F1
Alarm/Event Rules	Ctrl + E	Cmd + E
Archive selection end	]	]

Action	Windows Shortcut	Mac OS X Shortcut
Archive selection start	[	[
Bookmark Log	Ctrl + B	Cmd + B
Exit item's fullscreen mode	Esc	Esc
Check File Watermark	Alt + C	Option + C
Close layout	Ctrl + W	Cmd + W
Connect to another Server	Ctrl + Shift + C	Cmd + Shift + C
Create new Layout	Ctrl + T	Cmd + T
Device List	Ctrl + M	Cmd + M
Disconnect from Server	Ctrl + Shift + D	Cmd + Shift + D
Duplicate item on layout	Ctrl + drag-and-drop	Cmd + drag-and-drop
Enable Smart Search	Shift + Left click + drag area	Shift + Left click
Enable/disable Image Enhancement	Alt + J	Option + J
Event Log	Ctrl + L	Cmd + L
Exit Desktop client	Alt + F4	Option + F4
Fisheye dewarping (toggle)	D	D
Hide all panels and switch to Fullscreen Mode	F11	F11
Hotspot toggle	H	H
Information on Item (toggle)	I	I
Maximize/minimize item	Enter	Enter
Move entire scene	Alt + arrows	Option + arrows
Move PTZ/fisheye camera angle	←, ↑,→, ↓	←, ↑,→, ↓
Mute	U	U
Next layout in tour	→, ↓, PgDn, Space, or Enter	
Next recorded chunk	X	X
Open Bookmarks tab (from Notification Panel)	B	B
Open Events tab	E	E
Open local file	Ctrl + O	Cmd + O

Action	Windows Shortcut	Mac OS X Shortcut
Open Motion tab (from Notification Panel) Smart Search Toggle	M | Alt + M to toggle	M | Option + M to toggle
Open new window	Ctrl + N	Cmd + N
Open Notifications tab (from Notification Panel)	N	N
Open Objects tab (from Notification Panel)	O	O
Play/Pause video	Space	Space
Playback slow down (on play) / previous frame (on pause)	Ctrl + ←	Cmd + ←
Playback speed up (on play) / next frame (on pause)	Ctrl + →	Cmd + →
Playback – forward 10 seconds	→	→
Playback – rewind 10 seconds	←	←
Previous layout in tour	←, ↑, PgUp, Backspace	
Previous recorded chunk	Z	Z
PTZ (toggle)	P	P
Remove item from layout	Delete	Delete
Rename Resource	F2	F2
Rotate item	Alt + Click-and-drag	Option + Click-and-drag
Rotate with 15-degree step	Ctrl + Alt + Click-and-drag	Cmd + Option + Click-and-drag
Save layout	Ctrl + S	Cmd + S
Save layout as	Ctrl + Shift + S	Cmd + Shift + S
Screen Recording (toggle)	Alt + R	Option + R
Screenshot from selected item	Alt + S	Option + S
Search Resource Panel	Ctrl + F	Cmd + F
Select camera on layout	Shift + ←, ↑,→, ↓	Shift + ←, ↑,→, ↓
Shift selection in Resource Panel	↑, ↓	↑, ↓
Start tour on layout	Alt + T	Option + T

Action	Windows Shortcut	Mac OS X Shortcut
Switch Layout	Ctrl + Tab	Cmd + Tab
Switch to LIVE	L	L
SYNC on/off	S	S
System Administration	Ctrl + Alt + A	Cmd + Option + A
Volume down	Ctrl + ↓	Cmd + ↓
Volume up	Ctrl + ↑	Cmd + ↑
Windowed mode/Fullscreen	Alt + Enter	Option + Enter
Zoom in/out on PTZ/fisheye camera	[+]/[-]/Mouse Scroll Wheel	[+]/[-]/Mouse Scroll Wheel
Zoom window (create)	W	W

Getting Context Help

Nx Witness includes a context-sensitive help system.

To launch the help system, click on the **Help** button "**?**" in the Navigation Panel, then click on the desired interface element. This manual will open in a web browser to the topic most relevant to the element you clicked on.

You can also use the **F1** button to open the *About Nx Witness* dialog, which displays important System and network configuration information (see "Collecting Additional Information").

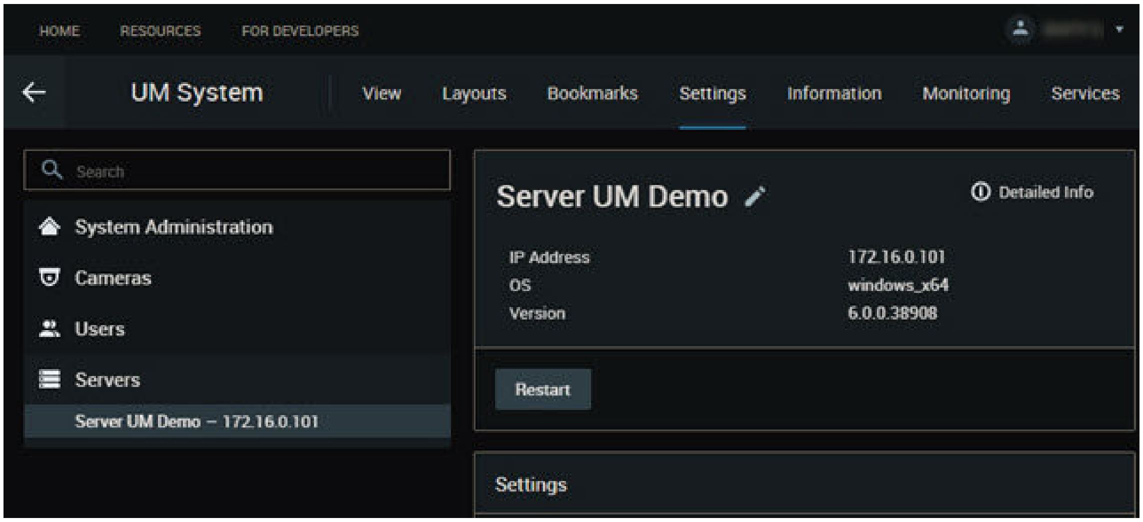
Nx Cloud Portal Interface

Nx Cloud is an important part of Nx Witness that extends functionality of Nx Witness Systems.

Once a System is linked to Nx Cloud, it becomes possible to access the System from virtually any Internet browser. Depending on your System configuration, the Nx Cloud can display Bookmarks and Cloud Layouts that contains devices from different Systems. See "Connecting System to Nx Cloud" and "Logging in to Nx Cloud".

The Cloud Portal menus and options are contextually aware and will change based on selections made, System configuration, and User permissions.

- A menu positioned along the header area includes tabs for enabled functions (View, Layout, Bookmarks, Settings, Information, Monitoring, Services).
- The left panel provides for second-level menus choices, filters, or resource selection controls.
- Information refined by the menu selections made is displayed in the Center display panel.



IP Address 172.16.0.101
OS windows_x64
Version 6.0.0.38908

Setting Up 2 Factor Authentication

Improve the security of your Nx Cloud account and prevent unauthorized access by enabling Two-Factor Authentication (2FA). Logging into an account with 2FA turned on requires a verification code generated by a mobile authentication app (e.g. Google Authenticator, Microsoft Authenticator, or Duo Mobile) in addition to your *Nx Cloud* password to be entered.

Note: When 2FA is enabled, a TOTP verification code will be required for a Cloud user to change their password.

To Turn On Two-Factor Authentication

1. Install Google Authenticator, Microsoft Authenticator, or Duo Mobile on your mobile device.
2. Open Nx Cloud Portal and log in to your account.
3. Open the Account Settings drop-down menu and click **Security**.
4. Enable **Two-factor Authentication**.
5. Enter your Nx Cloud account password.
6. Open the mobile authentication app and scan the QR code.
7. Enter the TOTP verification code generated by the mobile authentication app.
8. Click **Verify** to complete the setup process.

Note: For additional security, enable *Ask for verification code on every log in with Nx Cloud account,* or generate single-use backup codes to keep somewhere safe that can be used to log in if you lose access to the mobile authentication app.

To Require Cloud Users to Have 2FA Enabled

1. Open Nx Cloud and log in as a System Administrator.
2. Navigate to the **System Administration > Security page**.
3. Select the option "*Mandatory two-factor authentication for cloud users*".

Cloud users without two-factor authentication will not be able to log into the system. This setting does not affect local and LDAP users.

To Turn Off Two-Factor Authentication for a Cloud User

1. Open Nx Cloud Portal and log in to your account.
2. Open the Account Settings drop-down menu and click **Security**.
3. Click the **Disable** box.
4. Enter the TOTP verification code generated by the mobile authentication app.
5. Click the **Disable** box to complete the action or select **Cancel**.

To Generate Backup Codes

Backup codes can be used when mobile cannot be used.

1. Open Nx Cloud Portal and log in to your account.
2. Open the Account Settings drop-down menu and click **Security**.
3. Click the **Generate Backup Codes** button.

   Note: Any previously generated backup codes will be invalidated.

   a. Click the **Copy All** button to copy the backup codes to the clipboard.

   b. Paste the backup codes into a recovery file and save it to a secure location.

To Authenticate using Backup Code

1. Open Nx Cloud Portal and log in to your account.
2. When prompted for the verification code, click the link at the bottom of the dialog box labeled **No access to authentication app?**
3. Enter one of the previously generated and saved backup codes
4. Click the **Log In** button.

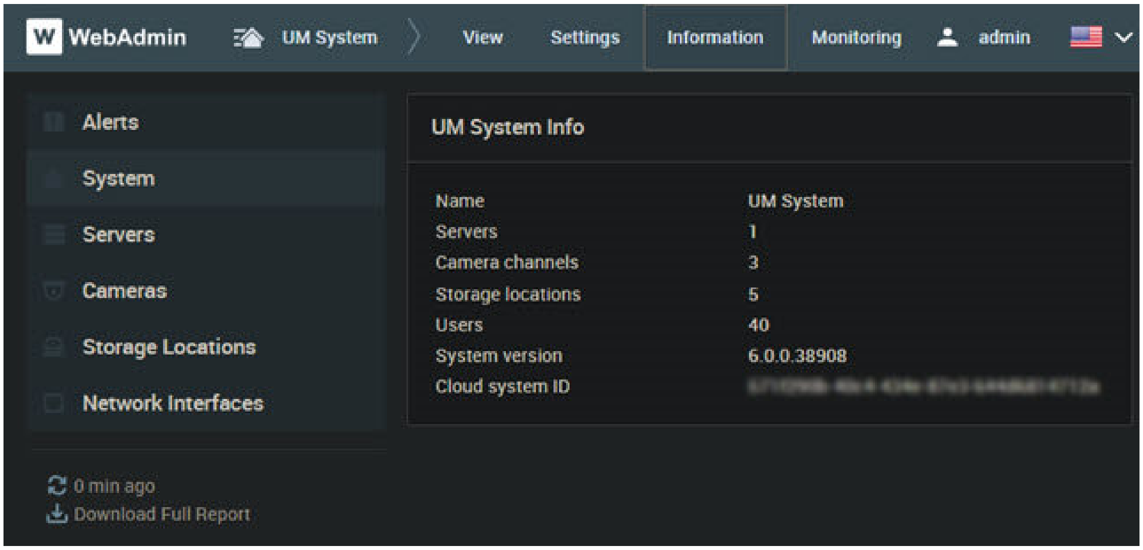
   IMPORTANT: Each Backup code can only be used one time. Remember to regenerate new codes if they are frequently used to access Systems.

Nx Witness Web Admin Interface

The Nx Witness Web Admin provides a method to access local systems using a simple and lightweight browser interface.

The Cloud Portal menus and options are contextually aware and will change based on selections made, System configuration, and User permissions.

- A menu positioned along the header area includes tabs for enabled functions (View, Layout, Bookmarks, Settings, Information, Monitoring, Services).
- The left panel provides for second-level menus choices, filters, or resource selection controls.
- Information refined by the menu selections made is displayed in the Center display panel.



UM System Info

Name	UM System
Servers	1
Camera channels	3
Storage locations	5
Users	40
System version	6.0.0.38908
Cloud system ID	[redacted]

System-Wide Configurations

The System Administration dialog (Ctrl+Alt+A) is used to manage Users, configure Devices, maintain Licenses status or allocate Services, a setup up outgoing Email services, and create the events Nx Witness will track,.

The dialog contains the following tabs and sections:

- *General*
  - ○ *Event Rules* – opens the dialog when to configured events and corresponding actions can be configured.
  - ○ *Event Log* – opens the list of events that occurred.
  - ○ *Device Camera List* – opens the list of devices in the System.
  - ○ *Audit Trail* – opens the list of users' actions. Can be enabled and disabled.
  - ○ *Bookmarks* – opens the Bookmark log.
  - ○ *System Settings* – selectable options displayed on the General Tab:
    - Enable Automatic Device Discovery.
    - Send anonymous usage and crash statistics.
    - Preventing Nx Witness from Changing Device Settings.
    - Custom language for Cloud notifications.
- *User Management* – access the configuration dialogs for Users and Groups.
- *Updates* – tools to manage versions and updates.
- *Licenses* – view, activate and manage System Licenses.
- *Email* – enable the Cloud Email service or configure an outgoing Email server.
- *Security:*
  - ○ Use only HTTPS to connect to cameras.

  - Force servers to accept only encrypted connections.
  - Encrypt video traffic.
  - Archive encryption.
  - Adding a User Watermarks.
  - Enable audit trail.
  - Limit session length.
- *Nx Cloud* – use this tab to create or connect to a Cloud account.
- *Time Synchronization* – lets you choose or synchronize Server time.
- *Routing* – shows System Servers and their IP addresses.
- *Plugins* – this tab lists the analytics plugins on the System, in alphabetical order by device manufacturer.
- *Advanced*:
  - Logs Management – enables users to specify log levels and download log files.
  - Backup and Restore – creates or restores a backup database of the System configuration (server and camera settings, users, event rules, etc.).

Connecting or Disconnecting System to Nx Cloud

Connecting a System to a Cloud Account will enable Nx Cloud features and additional connection methods. Systems can be connected using the Desktop Client or the Nx Witness WebAdmin Interface.

When User log into Nx Cloud are able to access all the Systems that are connected to their Nx Cloud account (see "Connecting to System from the Welcome Screen").

The following operations are possible with the Cloud:

- Log in to any Cloud System without reentering credentials.
- Share access to Nx Cloud with other Cloud Users.
- Share Systems with Users and add Users to Groups. This action is logged in the Audit Trail of User Actions.

To Connect a System to Nx Cloud

It is necessary to have a Nx Cloud account first (see "Creating a Nx Cloud".)

Desktop Client

1. Open **Main Menu** > **System Administration** and go to the **Nx Cloud** tab.
2. Click **Connect System to Nx Cloud** and log in the Nx Cloud where the System will be connected.

Web Admin

1. Open the Web Admin and log in.
2. Go to **Settings** > **System Administration** > **General**.
3. Click **Connect to Nx Cloud** and log in to Nx Cloud where the System will be connected.

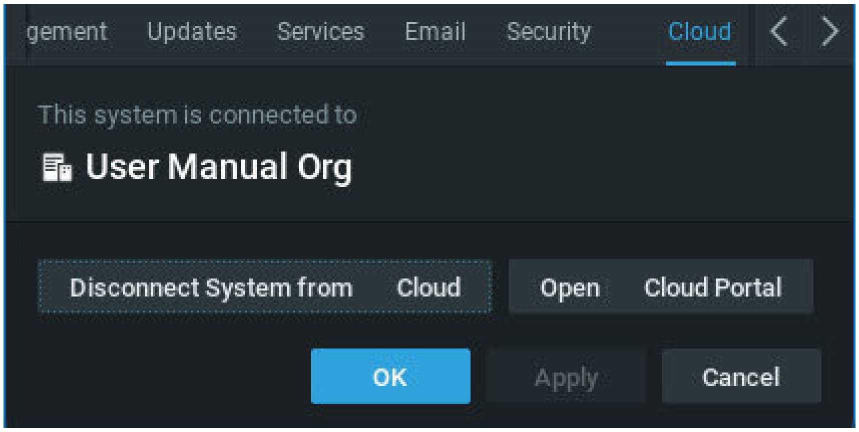
Once connected, the System will be displayed in the Nx Cloud Portal and will be accessible when logged into the Cloud.

To Disconnect a System from Nx Cloud

❗ **IMPORTANT:** Disconnecting a System will remove access for all Cloud Users that this System is shared with.

Desktop Client

1. Log in as a System Administrator.
2. Open **Main Menu** > **System Administration** and go to the **Nx Cloud** tab.
3. Click **Disconnect System from Nx Cloud** and authenticate if prompted.
4. Confirm Disconnection and the removal of all Cloud Users from the System.



This system is connected to

User Manual Org

Web Admin / Cloud Portal

1. Open the Web Admin and login as a System Administrator.
2. Go to **Settings** tab in the header menu.
3. Select **System Administration** > **General** on the left panel.
4. Click **Disconnect System from Nx Cloud** and authenticate if prompted.
5. Confirm Disconnection and the removal of all Cloud Users from the System.

Connecting or Disconnecting a System to an Organization

Connecting a System to an Organization will upgrade HD Witness to support Subscription Services.

Key considerations before connecting a System to an Organization:

1. Each recording license key will be converted into a 24-month credit for a Local Recording Service.

2. It is not possible to recover license keys once they are converted into Subscription Service credits.
3. Systems that are disconnected from an Organization will require new recording license keys.

Contact your local Nx Witness reseller or Network Optix customer service team for more information on the benefits of using Organizations.

There are two ways to connect a System to an Organization:

- Transfer ownership of a Cloud Connected system from a Cloud Account to an Organization.
- Connect a local System to an Organization.

Both methods require a System Administrator and an Organization Administrator to complete the transfer.

Transferring Cloud Connected Systems to an Organization

Prerequisites:

- An Organization must be available.
- The System to transfer must be accessible via the Cloud Portal.

Transfer Process:

1. Open the Cloud Portal and connect to the System to be transferred.
2. Switch to the **Settings** tab in the Cloud Portal.
3. Click the (change) owner text under the System Name.
4. Select the **To Organization** in the **Transfer Ownership** dialog.
5. Select the Organization the System will be transferred to.
6. Confirm the Transfer action.
7. A System Administrator and the Organization Administrator are required to authenticate.

To Connect a Local System to an Organization

Desktop Client

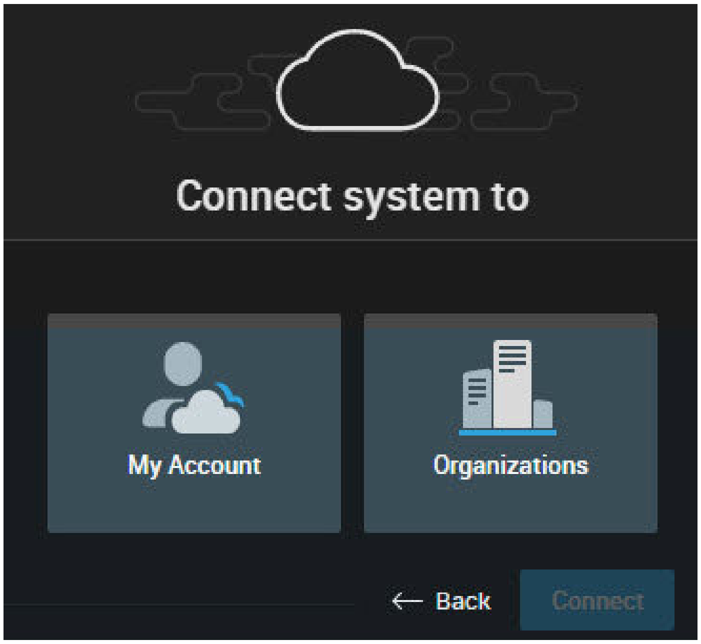
1. Log in to the System as an Administrator.
2. Open **Main Menu** > **System Administration** and go to the **Nx Cloud** tab.
3. Click **Connect System to Nx Cloud** and log in to Nx Cloud.
4. Click the **Connect System to Cloud** button.
5. Select the Organization the System will be connected to.
6. A System Administrator and the Organization Administrator are required to authenticate.

Web Admin

1. Login to the System as an Administrator
2. Open the Web Admin and login.

3. Go to **Settings** > **System Administration** > **General**.
4. Click **Connect to Nx Cloud** and login as an Organization Administrator
5. Select the **Organizations** tile.
6. Select the Organization the System will be connected to.
7. A System Administrator and the Organization Administrator are required to authenticate.

Once connected, the System will be displayed in the Nx Cloud Portal and will be accessible by Cloud users granted access to the System.



To Disconnect a System from the Organization

❗ **IMPORTANT:** Disconnecting a System will remove access for all Cloud Users that this System is shared with and termination of all used Services.

The process of disconnection is the same as Disconnecting a System from Nx Cloud.

Services and Licenses

Nx Witness allows users to create layouts displaying live video feeds and perform System configuration tasks immediately after installation. Some advanced features related to recording, archiving and analyzing video require either a license or an active Service.

The highlights listed below outline the primary differences between the Licensing and Services model to assist with planning and preparation for System migration. Please contact your customer service team for more information.

Subscription Service Model

- Services are pooled within an Organization and easily moved between devices within the same Organization.

- Recording Services are considered in use when attached to Camera; there is no billing for Services not attached to a Camera.
- Each Recording License is converted into 24 months of Local Recording Service when a System connects to an Organization.
- Organization wide reports show overall Services usage and Services changes over time.
- The total number of available Services can quickly adjusted to match the needs of a changing System configuration.

License Model

- Each installation comes with four free, 30-day license keys to record video.
- License keys are activated and linked to Servers using unique hardware identifiers.
- Keys must be activated over the internet or by using an off-line, email based activation service.
- It is possible for License Keys to become invalid when the linked hardware is offline; these can be recovered.
- License keys are considered in use when assigned to a Server, even if the function enabled by the license is not active.

Nx Witness Services

Live video from any Source can be viewed in Nx Witness without any Services being available. However, a Recording Service is required for each channel that will have recording enabled.

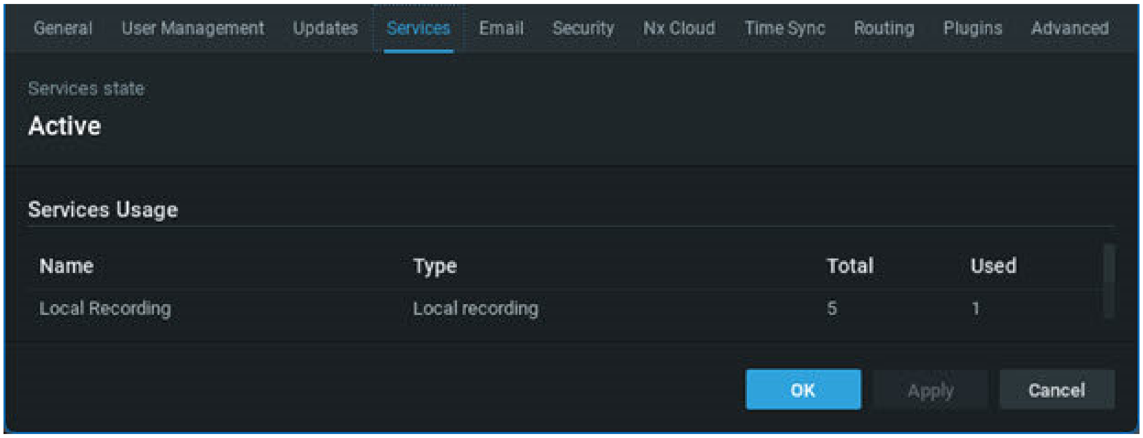
The following conditions must be set before a System can use available Services:

1. The System must support the Services model. For this purpose, it must be a part of an Organization. See "Connecting a System to an Organization".
2. There must be Services available to the System.

One Recording Services is marked as in-use for each camera where recording is enabled. See "Recording".

Systems that are connected to an Organization have a tab labeled *Services* within the **System Administration** dialog. This tab displays the state of the Services, the names of available Services, and a count of total and used Services for each Service type.

Note:Remove Services from System devices before an Organization Administrator changes the amount of total available Services to prevent the System from auto-selecting the devices where Services are removed.



Services state

Active

Services Usage

Name	Type	Total	Used
Local Recording	Local recording	5	1

Services provided to an Organization can be set to the following states:

State	Functional Description
Active	This is the fully operational State for Systems in an Organization. All users can access their Systems via the Cloud Portal, the Desktop Client, and the Web Admin (when on the same local network as the System). Recording Services are running as configured within the Camera Settings.
Suspended	Limits access to Systems while keeping all Services running. User access via the Cloud Portal is not permitted. Only the Desktop Client or Web Admin interface can be used to access Systems over the local network.
Shutdown	Stops all Services and disables all Cloud Portal access. System can only be access by using the Desktop Client or Web Admin (when on the same local network as the System).

Nx Witness Licenses

Live video from any Source can be viewed in Nx Witness without a License. However, a License is required to record video from a device. One License is required to record video from a device – One License enables one video stream from an IP camera, an RTSP stream, or an HTTP link to be recorded, therefore one Recording License is needed per Camera.

License Types

- A Free License is a no cost, time based license which expires after a certain length of time.
- A Professional License will not expire.
- I/O Modules require a specific type of license. See "Setting Up I/O Modules".
- A specific type of license is also required for Video Walls. Each license allows a Video Wall to be extended to 2 monitors. For instance, 4 licenses allow a Video Wall to be displayed on 8 monitors. See "Video Wall Management".

A specific *Bridge* license may be required to view video streams from Hanwha NVRs. See "Working with NVRs".

Licenses and Hardware ID

Every Nx Witness license, when activated, is locked to the hardware ID of the computing device upon which it is installed. The hardware ID is a unique 34-digit identifier generated when the Server is installed on a Windows, Ubuntu Linux, or ARM device. The hardware ID is based on the following:

- Motherboard
- MAC Address

After installing Nx Witness on a server, any modification in the components above will result in a change to the hardware ID and invalidation of licenses attached to that device (see "Expired and Invalid License Keys").

To Determine Hardware ID

1. In the Nx Witness Desktop client, open **Main Menu** > **System Administration**.
2. Go to the **License** tab.
3. Select a license attached to the Server for which you want to see the hardware ID.
4. Click the **Details** button.
5. The *License Details* dialog that opens will display the *License Type*, *License Key*, *Hardware ID,* and the number of archived streams allowed on that device.
6. To copy the license information press the **Copy to Clipboard** button.

Note: Mobile and Server Web Admins do not have the ability to locate licensing information.

The following sections describe how to obtain, activate, and deactivate licenses:

- Obtaining and Activating Licenses
- Expired and Invalid License Keys

1.9.3.2.1 Obtaining and Activating Licenses

Nx Witness comes with four trial licenses. A trial license is active for 30 days.

IMPORTANT: Licenses for Servers in a multiple Server System are activated on the Server to which the client is currently connected. If this Server is offline, those licenses will be invalid until the Server is back online.

> **Note**: Licenses that are activated on different servers will be combined if the servers are merged into a single System.

To Activate a Free License

To get additional licenses, contact your local Nx Witness reseller or Network Optix customer service.

Desktop Client

1. Open **Main Menu** > **System Administration** and go to the **Licenses** tab.
2. Click **Activate Free License**.

Web Admin / *Cloud Portal*

1. Open **Settings** > **Licenses.**
2. Click **Activate Free License.**

Note: You will be warned when a Free License is about to expire.

To Activate a License over the Internet

The server the client is connected to (as indicated by the current server icon in the Resource Panel) will have the license key bound to it. If it is necessary to activate the license key on a different server, disconnect and connect to a desired one. If Nx Witness is not connected to the Internet, then licenses can be activated offline.

Desktop Client

1. Select the **Licenses** tab in **System Administration**.
2. Go to the **Internet Activation** tab.
3. Enter or paste in the License Key value and click **Activate License**.

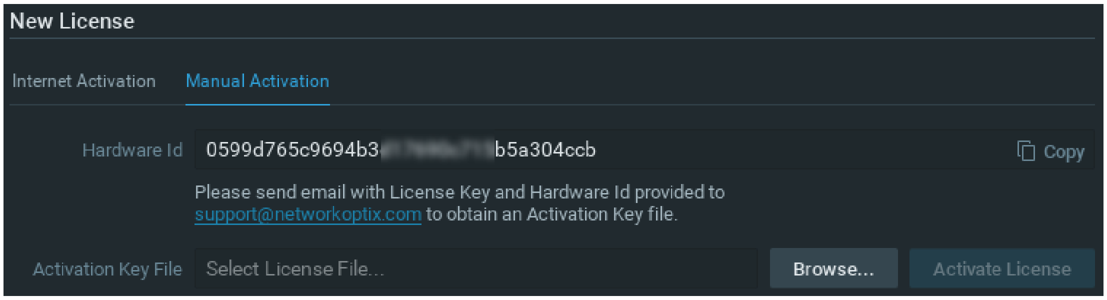
Web Admin / *Cloud Portal*

1. Open **Settings** > **Licenses**.
2. Enter or paste in the *License Key* value and click **License.**

To Activate a License (Trial or Commercial) Offline

In situations where an Nx Witness System is installed on a device that does not have Internet access, users will be required to perform an Offline (or Manual) license activation. Launch the Nx Witness Client and connect to the Server on which you wish to do an Offline (manual) Activation. The Nx Witness Desktop Client is required – mobile or Web Admins do not have the ability to locate licensing information.

1. Go to **Licenses** tab in **System Administration**.
2. Go to **Manual Activation** tab.



Hardware Id 0599d765c9694b3[redacted]b5a304ccb

Please send email with License Key and Hardware Id provided to support@networkoptix.com to obtain an Activation Key file.

Activation Key File Select License File...

3. Press the **Copy** button to copy the hardware ID.
4. Email Network Optix customer service to request an activation key, include the Hardware ID and License Key you received in the Email.

5. As soon as you receive the activation key, click **Browse** to import it to the target computer.

To Export a List of License Keys

It is possible to export a list of license keys to a CSV or HTML format file. It may be necessary, for instance, if re-activation is needed. To do so, click on *Export* (near the upper right corner) and select the target file.

Nx Witness allows for license deactivation as well. See "Expired and Invalid License Keys".

Note: When recording is enabled for a device, the license is considered in use even if the device is not currently recording (as indicated by the empty circle ○ icon to the left of device in the Resource Panel).

Insufficient Licenses Available

An error message or information banner will be presented when there are insufficient licenses to support the selected configuration.

1.9.3.2.2 Expired and Invalid License Keys

Under some circumstances, a license may become invalid. For instance, when a Server is removed from the System or goes offline, the licenses tied to the hardware ID of that Server will become invalid. When the Server is back online or reconnected to the System, the licenses will be active again without configuration.

However, if a server change results in a hardware ID update, all licenses tied to the previous hardware ID will become invalid and can only be activated on the new hardware ID by contacting support. If a hardware change is planned, the best approach is to contact support prior to the update so licenses can be intentionally deactivated before the hardware change, while they are still active and valid, and reactivated once the new hardware ID is established.

Note: A trial license cannot be deactivated nor reactivated once it expires.

Under certain conditions, such as when a recording license is invalidated, or when a Server fails in a failover-enabled system (see Configuring Failover), a 30-day grace period is granted to prevent gaps in recording and allow you enough time to resolve the Server or license issue. Once the original Server comes back online, or the license issue has been resolved, the recording will continue normally with the original license(s).

Similar functionality exists for Video Wall licenses, where a seven day grace period is granted to prevent any interruptions in the Video Wall and allow you enough time to resolve the license issue (see Video Wall Mode).

To Deactivate a License

Users can deactivate and move a license a maximum of 3 times. The operation must be performed from the Desktop Client and requires an active Internet connection in order to execute. Trial licenses cannot be deactivated.

1. Go to **Licenses** tab in **System Administration**.
2. Select a license, click **Deactivate** and confirm the action in the dialog that opens.
3. Enter your name, Email address, and select the reason for deactivation from drop-down list to confirm and explain the action.

It will now be possible to activate this license key on another computer.

To Remove a License

If you are absolutely certain a license is no longer needed, it is possible to remove it. Only invalid (red) licenses can be removed.

1. Go to **Licenses** tab in **System Administration**.
2. Select the license you want to remove and click the **Remove** button.

Configuring Secure Connections

Nx Witness includes many protections for system communications over both secure (e.g. LAN/WAN/VPN) and unsecure (e.g. Internet) networks:

- Authorized Certificate on Server.
- Secure Connections to Cameras over HTTPS.
- Secure Connections between Client and Server.
- Video Traffic Encryption.
- Archive Encryption.

The basic security configuration can be done at the Initial System Configuration stage. Click **Advanced System settings** and choose **Security Level**:

Standard

- “Encrypt video traffic to desktop and mobile client” is disabled.
- Camera credentials are shown in the Camera settings dialog.
- Server IP is shown in API responses.

High

- “Encrypt video traffic to desktop and mobile client” is enabled.
- Camera credentials are not shown in Camera settings.
- Server IP is not shown in API responses.

❗ **IMPORTANT:** The Security Level cannot be changed after the initial configuration is set.

Obtaining and Installing an Authorized Certificate

By default, the Nx Witness server is installed with a generated self-signed certificate which has the lowest security level. If you use this certificate and use a web browser to connect to the Server through HTTPS, a warning message will appear stating that the connection to the site is not secure (see "Server Certificate Validation"). This means that using the self-signed certificate is not recommended, even though a secure connection is used. It is therefore recommended to obtain a certificate from an authorized certificate provider and install it on the Server that is used for public access (from outside of the local network).

To Obtain and Install an Authorized Certificate

1. Obtain a certificate from any certificate provider (for instance, see the list of top ones here: https://www.techradar.com/news/best-ssl-certificate-provider).
2. Create a file **cert.pem** with the Private Key and Entire Trust Chain (see the instructions on the certificate provider's web site).
3. Place the **cert.pem** file in the following folder:
   - Windows: **`C:\Windows\System32\config\systemprofile\AppData\Local\Network Optix\Network Optix Media Server\ssl`**
   - Linux: /opt/networkoptix/mediaserver/var/ssl
4. Restart the server.

For Servers within the local network it is recommended to install the Self-Signed SSL certificate into the Trusted Root Certificate Authorities Store (https://specopssoft.com/support-docs/specops-password-reset/reference-material/installing-the-self-signed-ssl-certificate-into-the-trusted-root-certificate-authorities-store/).

To View A Server's Security Certificate

1. Right-click on a Server and select **Server Settings**.
2. Find the *Certificate* field and click on the **Nx Witness** hyperlink.
3. A dialog displaying the following information about the SSL certificate will appear:
   - Certificate signer (e.g. Self or Trusted CA)
   - Fingerprints
   - Certificate data
   - Expiration date

To Set Server Certificate Validation

This option prevents the Desktop Client from connecting to untrusted servers (the ones not having a valid certificate). This is set individually for each instance of the Desktop Client.

1. Open **Main Menu** > **Local Settings** > **Advanced** tab.
2. Click on the **Server certificate validation** drop-down menu and choose one of the following options:

- *Disabled* – Any certificate is allowed. No warnings are displayed.

  ❗ **IMPORTANT:** This may lead to privacy issues.
- *Recommended* – Your confirmation will be requested to pin self-signed certificates.
- *Strict* – Only trusted certificates are allowed (i.e. no self-signed certificates).

3. Apply changes.

To Get Notifed about Certificate Validation Issues

If a certificate is invalid, the "Server Certificate Error" event is triggered.

Connecting to Cameras over HTTPS Only

This setting will ensure the Server only connects to cameras using HTTPS, preventing management traffic between the camera and Server from being intercepted and analyzed.

To Connect to Cameras over Only HTTPS

1. Open **Main Menu > System Administration > Security** tab.
2. Check the **Use only HTTPS to connect to cameras** checkbox.
3. Apply changes.

❗ **IMPORTANT:** Any cameras on the System that do not support HTTPS will be dropped and appear offline.

Forcing Secure Connections

Forcing Secure Connections ensures Clients only connect to Servers in the System using HTTPS to prevent management traffic (Users accounts, Device access credentials, Web Admin.) from being intercepted.

This setting is enabled by default.

To Force Secure Connections

Desktop Client

1. Open **Main Menu** > **System Administration** > **Security** tab.
2. Check the **Force servers to accept only encrypted connections** checkbox.
3. Apply changes.

Web Admin / *Cloud Portal*

1. Open **Settings** > **System Administration** > **General**.
2. Check the **Allow only secure connections** checkbox.
3. Apply changes.

❗ **IMPORTANT:** This setting is turned on by default and will affect the following:

- Generic Events should be reconfigured in the external system. All integrations configured to work with HTTP need to be updated and tested.

- API calls – all external systems that use API for integrations should be re-configured to use HTTPS and then tested.

Once HTTPS is enabled, the first time you attempt to log onto a server's web page, the browser may first display warnings that indicate a bad certificate and insecure connection ("Your connection is not private. Attackers might be trying to steal your information..."). This is not the case. The warning is a safety feature due to the self-signed certificate on the Server. The connection will in fact be more secure.

Note: Most browsers will generate a prompt or confirmation dialog to proceed using an HTTPS connection. While the specific text will vary by browser version, a common sequence it to click on the word **Advanced**, then click the **Proceed** to [xxx.x.x.x] (unsafe) link to log in. Local machine and application define when this authorization must be repeated.

Enabling Encrypted Video Traffic

This setting prevents video streams (live and playback) from being intercepted and viewed by third parties. This option is only available on Systems that are configured to use Secure Connections.

To Enable Encrypted Video Traffic (Only Available If System Is Configured to Use Secure Connections)

Desktop Client

1. Open **Main Menu** > **System Administration** > **Security** tab.
2. Check the **Encrypt video traffic to desktop and mobile clients** checkbox.
3. Apply changes.

Web Admin / *Cloud Portal*

1. Open **Settings** > **System Administration** > **General**.
2. Check the **Encrypt video traffic to desktop and mobile clients** checkbox.
3. Apply changes.

IMPORTANT: Encrypting video traffic will significantly increase CPU usage on the Server and should not be used if a System has Servers installed on low power computers.

Enabling Archive Encryption

Nx Witness stores the recorded footage in a file system and it can be accessed and viewed by someone who has physical/network access to a Storage. This setting encrypts archive data to prevent it from being viewed outside of the Nx Witness System (the Desktop Client, Mobile Client, Web Admin, or Cloud Portal).

To Enable Archive Encryption

1. Open **Main Menu** > **System Administration** > **Security** tab.
2. Toggle the **Archive encryption** switch.

3. Set a password to encrypt the archive. The encryption password will be required to restore the archive on another system but will not be required to enter the encryption password to view the video archive within the system.

❗ **IMPORTANT:** This password cannot be reset. If you lose it, the archive will be unrecoverable.

Configuring the Email Server

An Email service must be configured for the System to be able to send Emails (see "Mail Notifications").

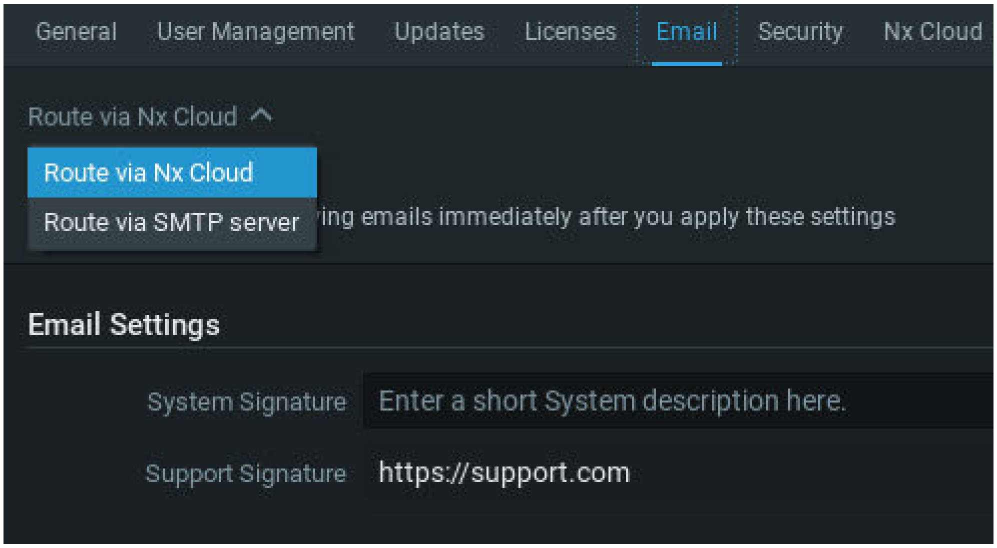
Nx Witness provides a Cloud based solution to directly push Email notifications to Users or a private SMPT service can be configured to provide delivery of Email notifications using an authorized Email account and corresponding password.

Note: Review the terms and conditions published by SMTP Email service provider to ensure the account is not rate limited or employing a rolling password that could delay or prevent Email notifications from being sent.

To Enable the Cloud Email Service

1. Open **Main Menu** > **System Administration** > **Email** tab.
2. Select **Route via Cloud** in the pull-down menu.
3. Enter a signature and support URL for the notification messages.
4. Click **Apply** to commit changes and keep dialog open, or Click **OK** to save and close the dialog.

Message delivery will immediately be enabled.



System Signature: Enter a short System description here.

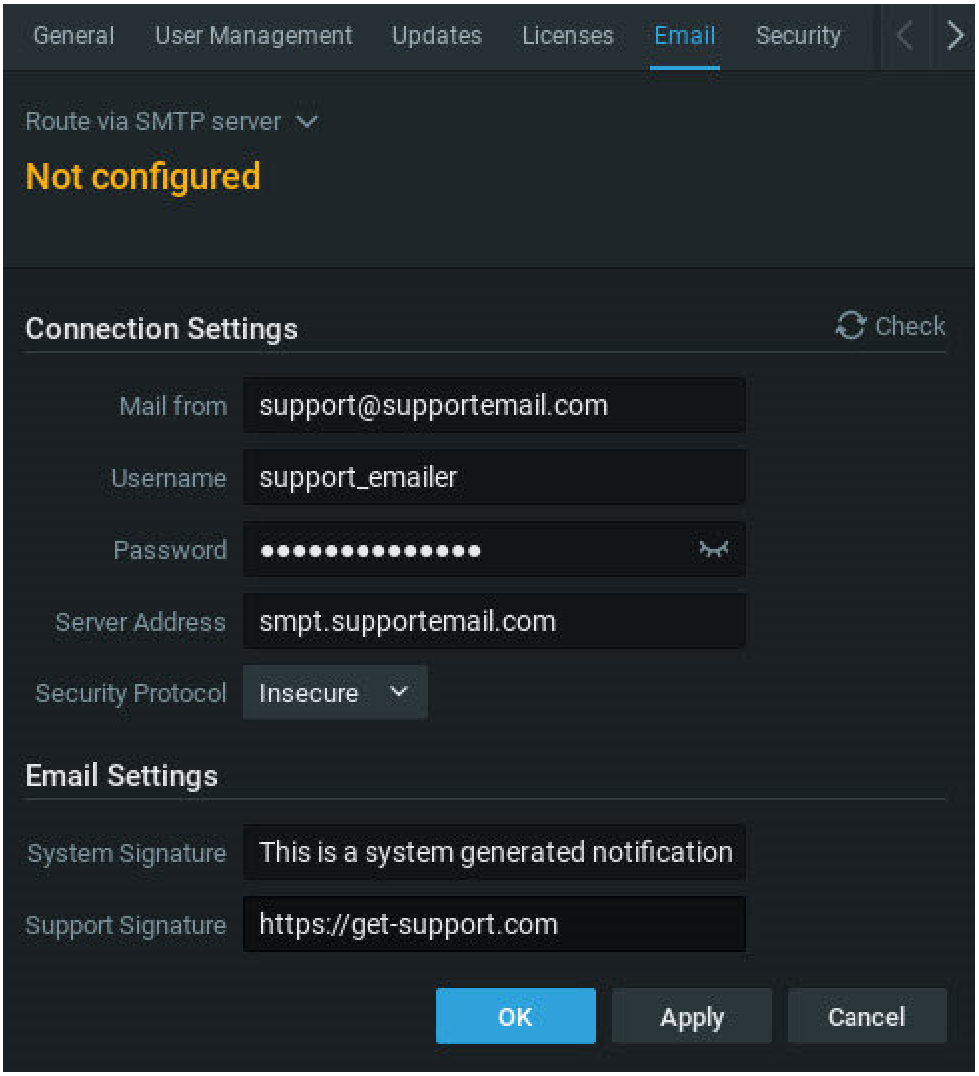
Support Signature: https://support.com

To Configure a SMTP Connection Settings

1. Open **Main Menu** > **System Administration** > **Email** tab.
2. Enter the following:
   - *Mail from*– Email address to use for outgoing mail.

- *Username* – Email or login of the outgoing account on the Email server.
- *Password* – Password for the outgoing Email account.
- *Server Address* – Email Server address or Gateway.
- *Security Protocol* – Choose Secure connection using TLS, Secure connection using SSL, or an insecure connection.
- *System Signature* – User defined System description that will identify the System in outbound Emails.
- *Support Signature* – Support website for the Nx Witness installation.

3. Click the **Check** button to test the Email Server connection.
4. Click the **Apply** button to save changes to the Email Server configuration.



Not configured

Connection Settings

Mail from: support@supportemail.com

Username: support_emailer

Password: ••••••••••••••

Server Address: smpt.supportemail.com

Security Protocol: Insecure

Email Settings

System Signature: This is a system generated notification

Support Signature: https://get-support.com

Configuring Server Settings

In addition to the settings that are entered during initial configuration, Administrators can also view and edit these other server parameters.

See the following topics for advanced information concerning Nx Witness storage behavior:

- Background: Archive Distribution and Retention
- Background: Archive Indexing
- Background: Archive Backup

To configure server parameters, select the desired server in the Resource Panel, open its context menu, and choose **Server Settings**.

General tab

- *Name* – Server can be renamed here or in the Resource Panel
- *IP Address* – cannot be changed (IP address display in the Resource Panel can be turned on or off using the Show additional info in tree flag).
- *Ping* – initiates a server status check. If Server is not responding, this can help check availability of the computer on which the Server is hosted.
- *Port* – this value is display only but can be changed from the Web Admin.
- *Certificate* – Server utilizes this SSL certificate to authenticate its identity.
- *Autodetect USB and web cameras* – if enabled, Nx Witness automatically discovers built-in and USB webcams.
- *Failover* – setup and turn failover on or off (see "Configuring Failover"). At least 2 servers are required.
- *Server Web Page* – provides a convenient link to the Server web page.

Storage Management tab

- *Storage Locations* – add and configure main, external and backup storage locations (see "Configuring Server and NAS Storage, Configuring Backup and Redundant Storage and Configuring Analytics Storage").
- *Reindex Archive* or *Reindex Backup* – restores recorded footage if it is moved (see "Reindexing and Fast-Scanning Archives").

Note: Displayed statistics will refresh periodically – a manual Refresh button is also provided along the right side of the header menu.

Storage Analytics tab

- To view detailed storage statistics (see "Analyzing and Predicting Storage Usage").

Backup tab

- Storage backup duplicates the footage in archive and saves it to other available locations (see "Configuring Backup and Redundant Storage").

Background: Archive Distribution and Retention

Video from a camera is always written to the Server to which the camera is connected. Cameras can be moved between servers but the recorded video stays where it was and never moves with the camera. New video is written on the new server. Recorded video is called *archive***.**

If a server has multiple drives, video archive is divided between them in order to improve reliability and balance the load on each drive. Nevertheless, even when different parts of the archive are stored on different drives or on different servers, video playback is seamless.

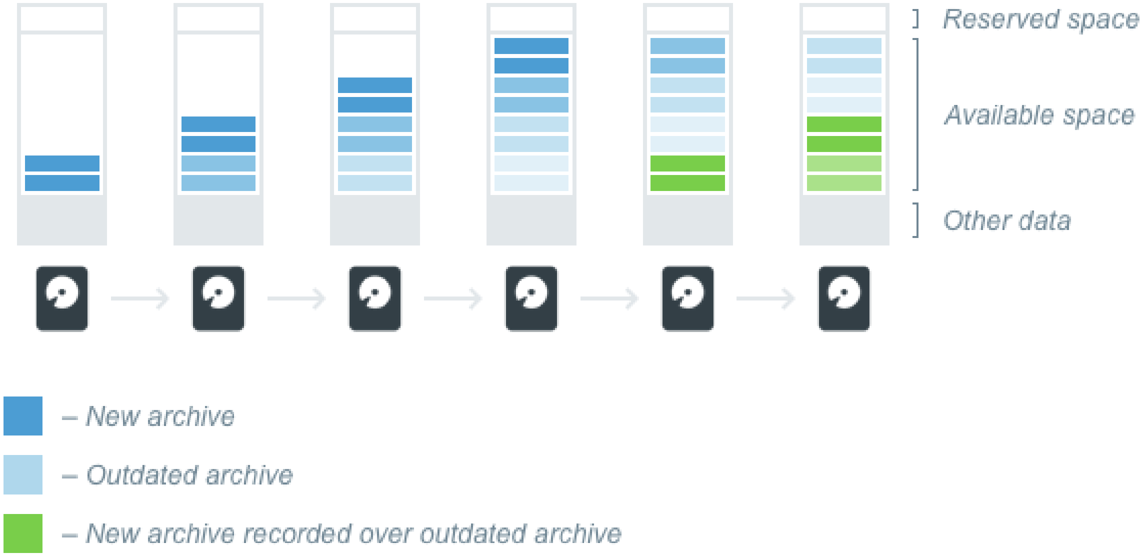
Other data is storage space occupied by data that isn't from the VMS, this storage space is never recorded on. In addition, a certain amount of the total capacity is *reserved space* that will not be used for recording. Numbers vary depending on the software version, Server configuration; typically 10-30 GB is reserved for local storage and 50-100 GB is reserved for external storage.

<u>Available Space</u>

The remaining disk storage is considered *available space* – whether it is currently recorded on or is currently free space. Archive is recorded according to available space.

If there is no free space on a given storage device, the system will automatically delete outdated recordings in order to free space for new archive. By default the oldest archive is deleted first. However, there are two special properties a given camera can be granted that affect archive retention. One prevents archive from being deleted before a certain number of days has elapsed. The other requires that archive be deleted after a certain number of days has elapsed. These are the only cases in which the system will actively determine storage deletion.

Schematically, storage life cycle can be illustrated like this:

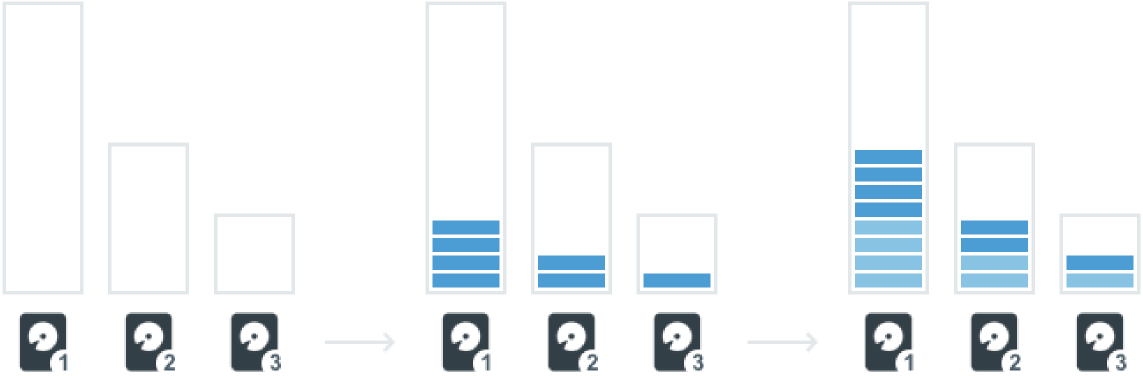


<u>Storing Archive on Multiple Drives</u>

Servers can have any number of storage devices. Recording to some can be disabled manually, or automatically when they are too small or are the main OS partition. USB drives are disabled by default, but can be enabled manually (though for ARM devices they can be enabled by default).

Enabled drives can be one of two types – *main* or *backup* type. Main storage is used to record archive, backup is used to store extra copies of some recordings. At any given moment, a drive can be assigned only one type, but because it is possible to change a drive's type, it is therefore possible to have different types of recording (main and backup) on one drive.

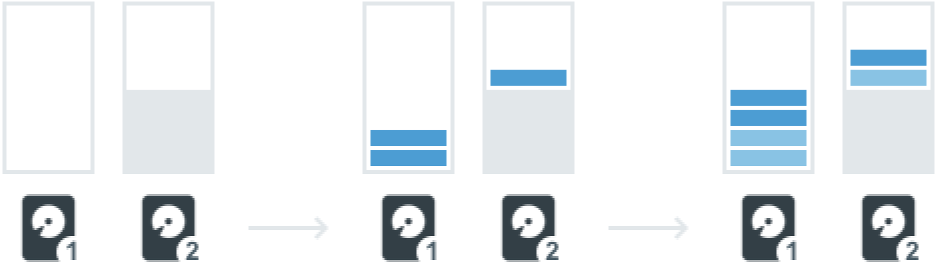
If there are multiple storage locations of the same type (main or backup) on a server, recorded archive will be split between them in proportion to their available space, as shown below:



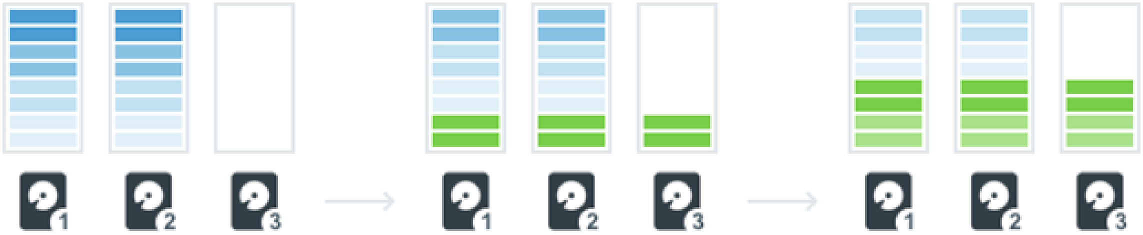
Note: When there are multiple storage locations of the same type on a Server, recorded Archive is distributed separately by type in proportion to the available space for each type.

Write **bitrate** (the amount of data that is processed per unit of time) will correlate with the amount of the available space – in the illustration above disk 1 will have a higher bitrate than the others.

Remember that the distribution of recorded data is dependent on the amount of the available space, not free space. If you have two similar drives, but part of drive #2 is occupied by some other data, recording speed will be higher for the drive #1 because the amount of available space for this drive is higher. Also, because archive recorded by the System does not reduce the amount of available space, recording speed doesn't depend on how much available space is currently used.



For example, you have two similar drives, and both are already full. You add a third drive with the same amount of available space as the first two but completely empty. Distribution of recorded data is dependent on the amount of available space, so new recordings will be distributed evenly between all three drives. Even though there is plenty of free space on the third drive, outdated footage on the first two drives will be deleted to free up space for new recordings – archive must to be split evenly between all three drives because they have the same amount of the available space.



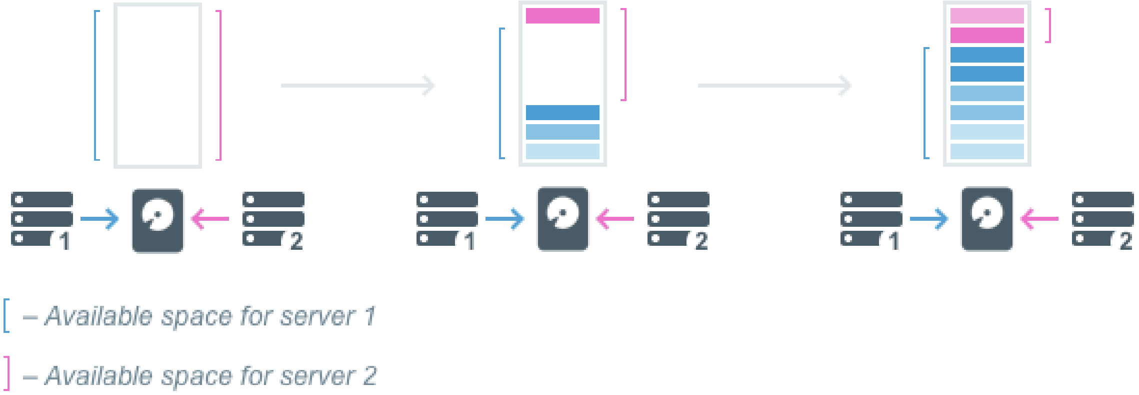
This is done to balance drive usage and to avoid a situation where all cameras are being written to one drive, which might not have enough speed to record such an amount of data.

Servers Sharing the Same Drive

It is possible to set up recording from multiple servers to the same drive. However, it is very important to split the drive into different partitions and attach separate partitions to each Server so that archive written by one Server cannot be deleted by another.

If you add one partition to multiple servers, they both will treat free space on that drive as available and will use it for recording. Data recorded by one Server will be considered “other data” by the other server, and will reduce the amount of available space but will not be overwritten. However, if multiple servers use the same folder and the archive for any one of them is reindexed (see "Reindexing Archive") archive footage from the other servers can be deleted.

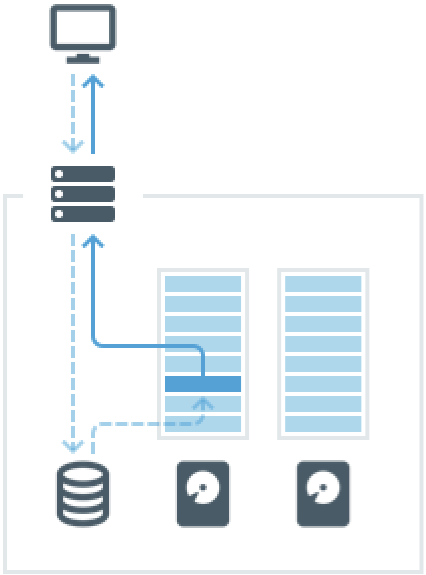
If different servers have different recording speeds, it will lead to a situation where storage is divided unequally. After storage is filled with archive, each Server will manage only the space that is occupied by its own data, as shown in the diagram below.


1
2
1
2
1
2
[– Available space for server 1
] – Available space for server 2

Background: Archive Indexing

The *archive index* is a special database that stores mapping information for video archive. This database includes which cameras are archived, for which times, and in which chunks exactly the archive is stored. *Chunks* are the building blocks of video storage, see "To find archive on a storage device".

The client application pulls storage chunks to the Timeline based on the information in the archive index database. When you click on the Timeline to play a given recorded segment, the client sends the Server a request for that video. The Server checks the archive index to determine where video for that particular moment is stored – on which drive and in which exact chunks. The Server reads that particular video and sends it to the client to display.



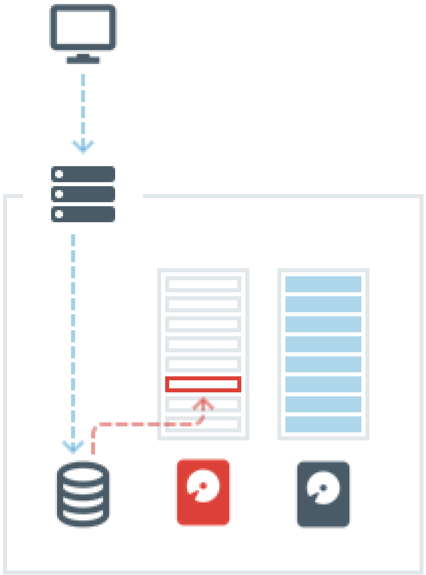
🖥 – Client

🗄 – Server

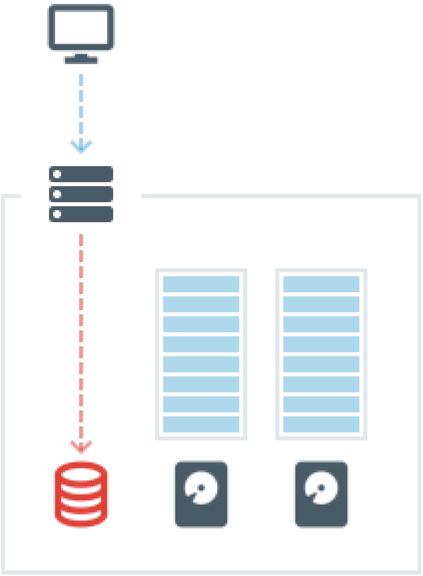
🛢 – Archive Index database

💽 – Storage disk

There can be situations when information in the archive index doesn’t reflect the actual video archive. For example, if archive has been deleted or manually relocated, the information about that archive will still be in the index database, but the Server will not be able to read such archive because it is no longer where the archive index last found it.



Similarly, sometimes there is no information in the archive index about archive that does exist in storage. This can happen if the index database file is corrupted or deleted, or when archive video is added to a storage location manually.



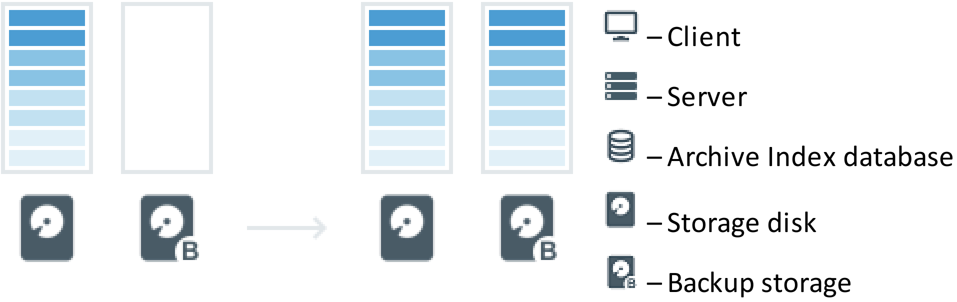
These problem can be fixed by *archive reindexing*. During this process, the Server will scan all recordings on all drives and update the archive index database with the current information. Archive reindexing is initiated from the Storage Management dialog for each server, and can be performed for main or backup storage locations (see "Reindexing and Fast-Scanning Archives").

Background: Archive Backup

Some disks on a Server can be designated as *backup storage*. They will store a copy of the archives recorded to the main storage on the same server.

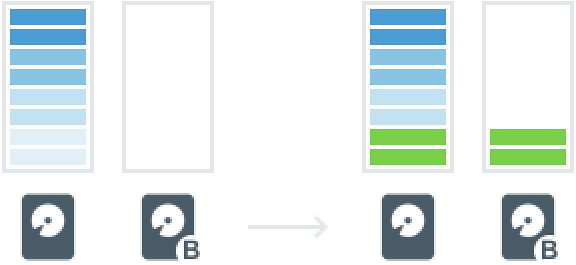
Note: Only archives from main storage of a given Server will be backed up. If there is archive on some other Server you want to backup, you should configure backup storage for that Server as well.

With Backups enabled, the bandwidth restrictions can be configured in three ways: *No Limit*, *Schedule*, or *Fixed* (see "Configuring Backup and Redundant Storage" for details).

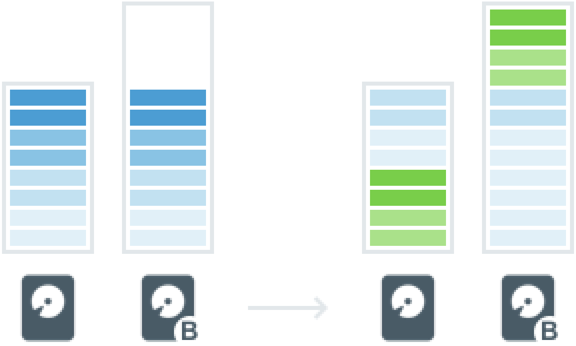


Because large amounts of data are being copied during backup, it is possible to set bandwidth limitations or to schedule regular backups at specific times (i.e. *schedule*), to minimize the negative impact of loading the network.

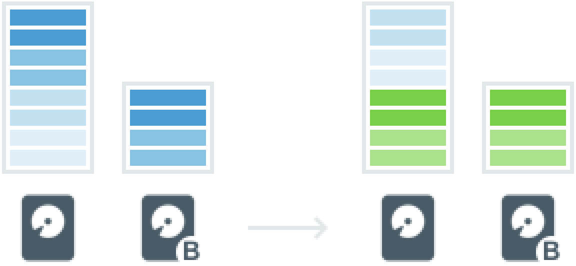
With the *No Limit* bandwidth option enabled, existing archive will be backed up. Afterward, live streams will be continuously recorded in backup storage.



Outdated archive is deleted from backup drives in the same way as from main ones, but independently of the main storage. In other words, if the backup storage has higher capacity, the maximum archive age on it will also be greater.



The opposite is also true – if backup storage is smaller, archive age will be less.



In order to save storage space, a System can be configured to backup only archive from certain cameras or only certain streams (see Configuring Backup and Redundant Storage for details). Camera recording is backed up only if the camera is selected in backup settings and backup storage is configured on the Server that camera is currently connected to.

Configuring Server and NAS Storage

Each server can use an unlimited number of local and network storage paths. If more than one storage location is used, the Media Server will automatically balance space consumption across drives (see "Background: Archive Distribution and Retention"). Each local hard disk partition is considered a storage location. If enabled, Network attached storage (**NAS**) and USB storage are also supported. Usage intensity is directly related to storage availability. Displayed statistics will refresh periodically – a manual Refresh button is also provided along the right side of the header menu.

The Storage that can be used are broken down the following types:

- Local Storage – hard drive in the Server PC. Detected automatically once detected in OS, can be used for the archive and analytics data
- USB Storage – hard or portable drive connected via USB. Detected automatically once detected in OS, can be used for the Archive, but not analytics data
- External Storage (**Network**) – any storage connected over the network (Samba, CIFS, NFS). Should be added manually (see below). Can be used for the archive, but not for the analytics data.

See "Configuring Analytics Storage" for more information.

The storage may contain the following data:

- Video Archive.
- Index Data (Motion, Bookmarks, other proprietary information facilitating the archive search) – resides at the same drive as the corresponding archive.
- Analytics Data. By default, the biggest local non-system storage is used for analytics data (see "Configuring Analytics Storage").

IMPORTANT:

- 10-30 GB of free space is always preserved on each storage location. For NAS storage, this amount may vary between 50 and 100 GB depending on storage capacity (recommended value is 1-3%).
- If only one system partition (where OS is installed) is present, then Nx Witness will use this partition for recording.
- When another disk is added and an extended partition is created with 5 times the storage capacity than the system storage, or if the total sum of available (non-system) storage capacity is **5 times** that of the system storage, the system partition will be disabled for recording and Nx Witness will record data to the extended partition(s).
- It is recommended to NOT use a System for any archive, index or analytics data storage – Use an independent partition on a separate physical drive.
- If a system partition is used, the "Local storage is used for analytic and motion data (system)" event will be triggered.

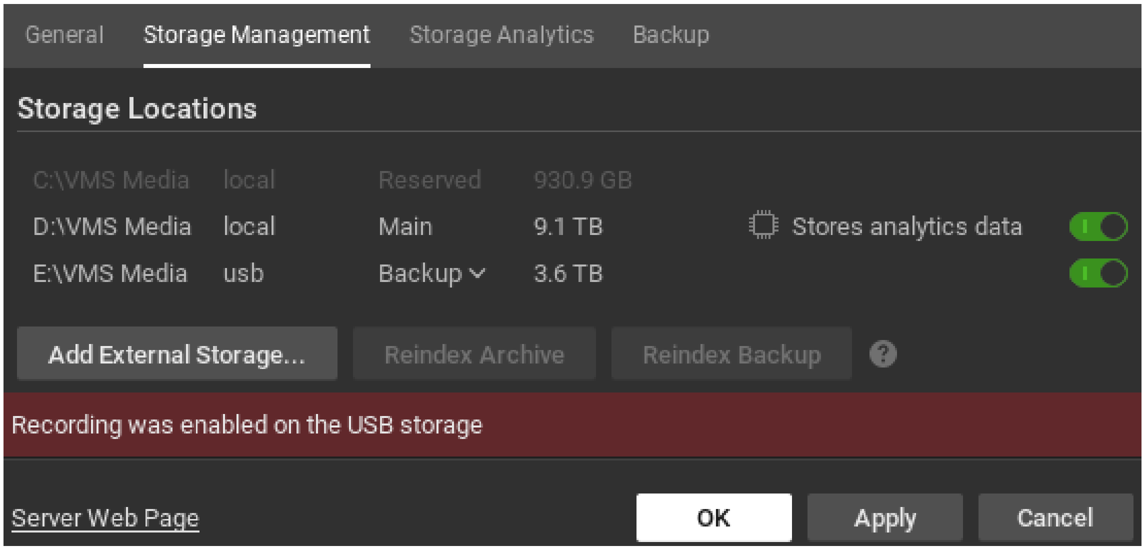
To Configure Server Storage

Note: USB storage is not enabled by default. Nx Witness will show a warning when a User is attempting to record to a removable drive (USB).

1. Do one of the following:
   - *Desktop Client*: Open the Server context menu and go to **Server Settings** > **Storage Management** tab.
   - *Web Admin* / *Cloud Portal*: Open **Settings** > **Servers** and select a server.

Nx Witness discovers and displays local storage resources.

2. In the example shown below, the computer has 3 partitions. Disk D is the main storage partition and USB disk E is configured as backup. Disk C is not used because it is a system partition (a partition where the operating system is installed) and there are two other storage locations in the list. The system disk drive will be used if it is the only storage location on a Server or the total sum of available storage space (excluding the system partition) is less than 5 times the system partition size.



Storage Locations

C:\VMS Media	local	Reserved	930.9 GB		
D:\VMS Media	local	Main	9.1 TB	Stores analytics data	on
E:\VMS Media	usb	Backup	3.6 TB		on

Recording was enabled on the USB storage

Note: Recycling bins (i.e. Trashboxes/trash bins) **must be disabled** as a part of the configuration step. Nx Witness Server will start overwriting data when the "Reserved Space" limit is reached. To do that, it sends standard SMB-delete requests to the NAS drive. NAS will put files in the bin if the recycle bin is enabled. The Nx Witness Server will not get the necessary space, sending new delete commands instead. Eventually, it will end up with a full drive and the inability to record data until the recycle bin is emptied.

3. Click on a storage location and use the button at the end of the row to toggle it on or off. There must always be at least one **Main** storage location. Once a main storage location is configured, any other storage location you may have can be set as **Main** or **Backup**.

   Note: At least one drive must be defined as Backup for archive backup to be possible.

4. Nx Witness will check all storage locations for validity and confirm the ability to write to each. If a drive is not available or has insufficient space, a warning will display.
5. To enable storage backup, see "Configuring Backup and Redundant Storage".

   Note: Because some cameras record directly to their own internal storage, Nx Witness must periodically download archive from the camera's internal storage to Nx Witness System servers. See "Remote Archive Synchronization".

To Add a Network Storage

External storage must use one of the supported storage protocols: CIFS, SMB, NFS, or iSCSI.

IMPORTANT: Make sure NAS is available and accessible through the network on which the computer server is installed.

1. Do one of the following:
   - *Desktop Client:* Open the server's context menu and go to **Server Settings** > **Storage Management** tab.
   - *Web Admin* / *Cloud Portal:* Open **Settings** > **Servers** and select a server.
2. Click **Add External Storage**.
3. Choose the desired option from the **Protocol** menu, and enter the storage path (**URL**), **Login***,* and **Password** for the external storage device.
4. Click OK to accept the entries and add the new device to the list of storage locations.
5. Use the button at the end of the row to toggle it on or off.

To Find Archive on a Storage Device

The storage structure on a partition is as follows:

- *<drive>/HD Witness Media/$Resolution/$ID/$YYYY/$MM/$DD/$HH*

where:

- *$Resolution* – can be *hi_quality* (high resolution streams) or *low_quality* (low resolution streams)
- *$ID* – if reported, the MAC address of the recorded device, otherwise the Camera ID
- *$YYYY* – year recorded
- *$MM* – month recorded
- *$DD* – day recorded
- *$HH* – hour recorded

Configuring Backup and Redundant Storage

Storage backup duplicates the footage in archive and saves it to other available locations, which can be local HDDs, SSDs, NAS, IPSAN, DAS, or even off-site cloud-based locations such as FTP sites. Each Server only backs up recordings from its own storage archives. In a System with multiple Servers, a Backup storage location should be specified for every Server in the System in order to back up footage from all cameras. For more information please refer to "Background: Archive Backup".

- Backups can be executed in real-time or as scheduled.
- Backups can be configured to copy captured low-resolution streams, or all streams.
- Backups can be configured for specific cameras.

Once a backup has been executed, backup archives can still be directly played and accessed via the Client. For example, you might have local storage for 7 days of footage and backup storage for 30 days. If you backup your local storage once per week, you can still play back video from all backed up video.

IMPORTANT: To configure either backup or redundant storage it is necessary to define at least one main and one backup storage location as described in "Configuring Server and NAS Storage".

Note: Analytics Database cannot be located in a Backup storage location.

To Configure Storage Backup

Make sure you have added your storage location to the server. Backup settings cannot be changed if a backup storage location is not defined or is not currently attached. A small alert displays under the *Backup Archive* section of **Server Settings** > **Storage Management** if there is no backup storage drive or if no cameras have been selected.

1. Right-click on a Server in the Resource Panel and choose **Server Settings**.
2. Select the **Backup tab** within the **Server Settings** dialog
3. Select the cameras to backup by toggling the switch on the right side. Toggle the **New added devices** option to automatically begin backing up a device once it has been added to the System.
4. Use the **What to backup** menu to select what aspect of the camera's archive should be backed up:
    - *All archive*
    - *Motion*
    - *Objects*
    - *Bookmarks*
    - *Motion and Objects*
    - *Motion and Bookmarks*

- *Objects and Bookmarks*
- *Motion, Bookmarks, and Objects*

5. Use the **Quality** menu to select which streams to backup:
    - *All streams*
    - *Low-res*
6. Use **Bandwidth Limit** to set the bandwidth limit for your backups:
    - *No Limit* (redundant) – Footage is written to main and backup location(s) immediately and simultaneously with no bandwidth restriction.
    - *Schedule* – Backup is performed only during the selected days and hours. Fill in the cells of the schedule using the following options: **Unlimited, No backup**, and **Limited to** (limit to a certain Mbit/s, but remember that too tight a bandwidth constraint can cause the entire backup to fail). The footage will be backed up since the last time backup was completed. If network bandwidth is insufficient, the backup may not be fully completed within the specified time frame. In this case the date and time of the footage that was backed up will be clearly indicated (*Archive backup complete until...*).
    - *Fixed* – The bandwidth remains a specified Mbit/s across all days and times.

    Note: If *Skip Current Queue* is clicked, the backup process will ignore existing footage and only backup recordings after that point.

After the backup is finished, an internal archive integrity check occurs so that if an archive file is changed or removed, users who are actively viewing that archive will be notified. See "Archive Integrity Check Failure".

To Configure Redundant Storage

With this structure, each Server will back up footage to all other servers in the System. This will reduce the overall amount of stored footage but provides healthy redundancy. Note that each Server backs up the archive for selected cameras, but if a camera is moved to a different server, backup will include only the portion archived before the camera was moved.

1. Make sure each Server is available and accessible through the network.
2. On each server, create a shared folder (**\\server\shared**) on a separate HDD to prevent System malfunction.
3. Make **\\server\shared** accessible through the network with the WRITE permission.
4. Go to **Server Settings** and add all shared folders as NAS devices.
5. Set to **Backup** for each one added.
6. Repeat the above steps on all servers.
7. Configure backup parameters as described above. It is best that servers perform their backup at different times, otherwise recording speed may be too low. When many servers use the same drive for recording it can lead to I/O errors or insufficient write speed.

Configuring Analytics Storage

By default, Nx Witness utilizes the largest available local storage (**non-system**) for storing analytical data. However, there may be instances where you would prefer to use a different drive for this purpose.

Note: Network (CIFS/Samba/NFS) cannot be used for storing analytic data.

Particularly in systems with a high volume of events, it proves advantageous to employ a faster and dedicated drive specifically for this purpose. For example, **SSD** or **NVMe** drives offer significantly faster read/write speeds compared to common HDDs, enabling them to effectively handle the incoming analytic events.

Nx Witness enables you to predict the storage usage based on the current data recorded. See "Analyzing and Predicting Storage Usage" for details.

To change the Analytics storage location:

1. Navigate to the Server Settings menu, tab Storage management.
2. Hover with your mouse over the available drives and select Store analytics data.
3. If any data has been recorded to the previous drive, decide to **Delete** or **Keep the current analytics data**.

To Fix the Analytics Storage Database Error

The error “Storage Issue: Analytics storage DB error. Insufficient permissions on the mount point” typically occurs on **Ubuntu** servers when trying to store analytics data on a drive that the Nx Witness Server application is not able to properly access due to having inadequate permissions. Your Server is likely missing the following permissions to the storage drive:

- Read (the capability to read the contents of the file)
- Execute (the capability to execute a file or view the contents of a directory)

Fix the storage issue by enabling the option *forceAnalyticsDbStoragePermissons* in the Nx Witness Web Admin interface. This option grants the Nx Witness Server application the necessary read and execute permissions for that storage drive.

By default, the option is enabled, but it may not be enabled if you have upgraded from a previous version. To enable it manually:

1. Open the Nx Witness Web Admin advanced page (i.e., http://<server ip>:<server port>/#/settings/advanced).
2. Login to as an administrator or power user.
3. Check the box for **forceAnalyticsDbStoragePermissons**.
4. Click the **Save** button at the bottom of the page.

Note: If the Server still does not have the appropriate permissions after enabling *forceAnalyticsDbStoragePermissions*, the error “Storage Issue: Analytics storage DB error. Insufficient permissions on the mount point” will still appear in the Notification Panel.

Reindexing and Fast-Scanning Archives

Nx Witness Server creates a database that stores an index that maps the relationship between archive filenames and the physical location of the archive files on the storage drive.

When an archive is damaged, administrators will receive a notification when attempting to view that archive. The notification indicates the storage path where the problem was detected.

Note: Archives can be saved to one or more backup storage locations to protect against the possibility of complete loss or removal.

The Reindex procedure restores the relationship between the database and archive files. This process can take up to several hours, depending on the size of the archive. The System can still be used during this process and will continue recording while the archive is being reindexed as long as the storage drive has enough capacity to do both simultaneously (performance may be affected).

Reindexing should be performed when the index is broken, which can occur when:

- a camera is deleted
- a storage device is moved, renamed, or deleted
- an archive file is removed, renamed, has an incorrect timestamp, or is otherwise corrupted.

To Reindex an Archive

1. Do one of the following:
   - *Desktop Client:* Right-click on a Server in the Resource Panel, choose **Server Settings** and go to the **Storage Management** tab.
   - *Web Admin* / *Cloud Portal:* Open **Settings** > **Servers** and select a server.
2. Click on **Reindex Archive** to restore the index for all Main storage locations. Click **Reindex Backup** to restore the index for all Backup storage locations.
3. A message will open with the warning "**Hard disk load will increase significantly**". Depending on the size of the archive, reindexing can take up to several hours. The System will continue recording while the archive is being reindexed but performance may be affected.
4. Click *OK* to continue. When the window closes, reindexing will to run in background. A progress bar will indicate status, and you will see a message when reindexing is either complete or has been canceled.

   Note: Reindexing can be canceled at any point, which will trigger the "Reindexing Archive Canceled" event. However, an incompletely indexed archive may be partially or entirely inaccessible. **It is strongly recommended that the archive reindex process be completed**.
5. When reindexing is complete, a "Reindexing Archive Complete" event is triggered.

To protect against the possibility of complete loss or removal, archives can be saved to one or more backup storage locations. See "Configuring Backup and Redundant Storage".

Fast Archive Scan

A fast archive scan checks to see that the database is intact and matches the archive. This process usually only takes a few seconds and occurs automatically when the Server is initially started or restarted at any point afterward, an archive file closed improperly, or the index files cannot be read. During a fast archive scan, recording will be put on hold and resume after the process is complete.

There are a few situations where a fast archive scan may take much longer than anticipated, such as when there is an extremely large archive, the Server database was moved while the Server was offline, or an archive from another Server was transferred over to this Server prior to its initial launch.

Analyzing and Predicting Storage Usage

Due to differing stream bitrates, different cameras may require different amounts of storage space to save data for the same time interval. Nx Witness uses special algorithms to balance storage needs so that cameras with high storage needs do not prevent archive from other cameras from being recorded. Nx Witness storage analytics are available in the Desktop Client to help users estimate and predict storage usage.

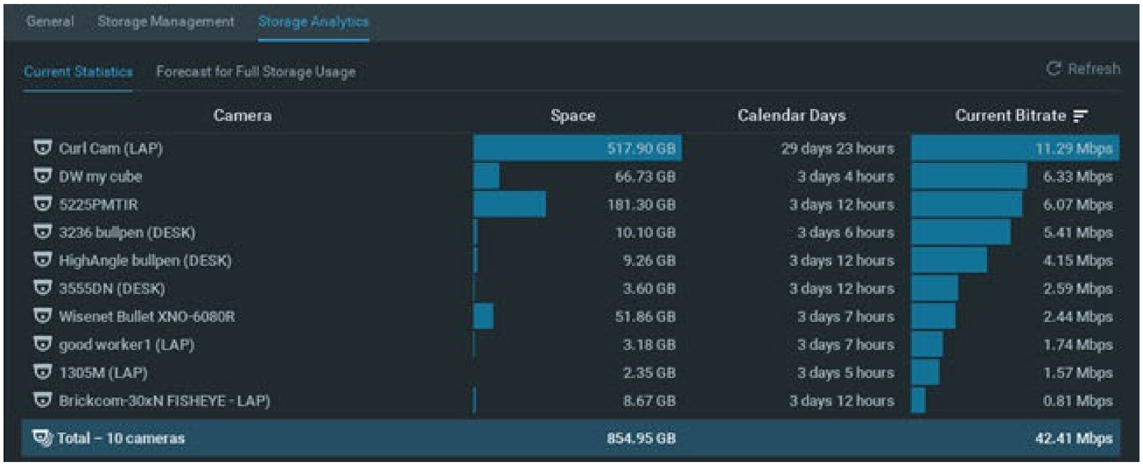
Note: For any given camera, Administrators have the option of setting a minimum or maximum number of days that data is archived (see "Configuring Minimum and Maximum Archive Storage").

Some common ways storage analysis can be used:

- Identify camera(s) that stream at extremely high bitrates.
- Estimate the amount of time a Server can store data from a given device in days and hours.
- Assess the storage space that each camera consumes.
- Predict the amount of time a Server can store recordings if additional storage is added.

To View Storage Statistics for a Server

Open **Server Settings** from the Server context menu and go to the **Storage Analytics** tab. The *Current Statistics* tab shows the total number of cameras, total space used for archive and total streaming rate at the bottom of the list, and there is a link to open the Server web page on the lower left corner of the page.



Camera	Space	Calendar Days	Current Bitrate
Curl Cam (LAP)	517.90 GB	29 days 23 hours	11.29 Mbps
DW my cube	66.73 GB	3 days 4 hours	6.33 Mbps
5225PMTIR	181.30 GB	3 days 12 hours	6.07 Mbps
3236 bullpen (DESK)	10.10 GB	3 days 6 hours	5.41 Mbps
HighAngle bullpen (DESK)	9.26 GB	3 days 12 hours	4.15 Mbps
3555DN (DESK)	3.60 GB	3 days 12 hours	2.59 Mbps
Wisenet Bullet XNO-6080R	51.86 GB	3 days 7 hours	2.44 Mbps
good worker1 (LAP)	3.18 GB	3 days 7 hours	1.74 Mbps
1305M (LAP)	2.35 GB	3 days 5 hours	1.57 Mbps
Brickcom-30xN FISHEYE - LAP)	8.67 GB	3 days 12 hours	0.81 Mbps
Total – 10 cameras	854.95 GB		42.41 Mbps

Each of the columns can be sorted in ascending or descending order:

- *Camera* – Camera name.
- *Space* – the amount of storage currently consumed by recordings from a given camera.
- *Calendar Days* – the amount of time recorded data is available for this camera.
- *Current Bitrate* – the current bitrate at which the camera is streaming.

<u>To Predict Storage Needed for a Server</u>

Forecast data is only available for Cameras with recording enabled.

1. Click on the **Forecast for Full Storage Usage** tab in **Server Settings** > **Storage Analytics**. The total number of cameras and total space required for archive is shown at the bottom of the list.
   Each of the columns can be sorted in ascending or descending order:
   - *Camera* – Camera name.
   - *Space* – the amount of storage that will be required.
   - *Calendar Days* – the duration of time that there is for the archive.
2. In the **Base forecast on data recorded during** field, set the window of past history that will be used to calculate future storage needs from the options:
   - *Last 5 minutes.*
   - *Last 60 minutes.*
   - *Last 24 hours.*
   - *Longest period available.*
3. Use the **Additional Storage** field or slider to select an amount of storage that would be added, in Terabytes (TB).

The amount of space and archive duration will update as values in the two settings change.

Note: Displayed statistics will periodically refresh – a manual Refresh button is provided along the right side of the header menu.

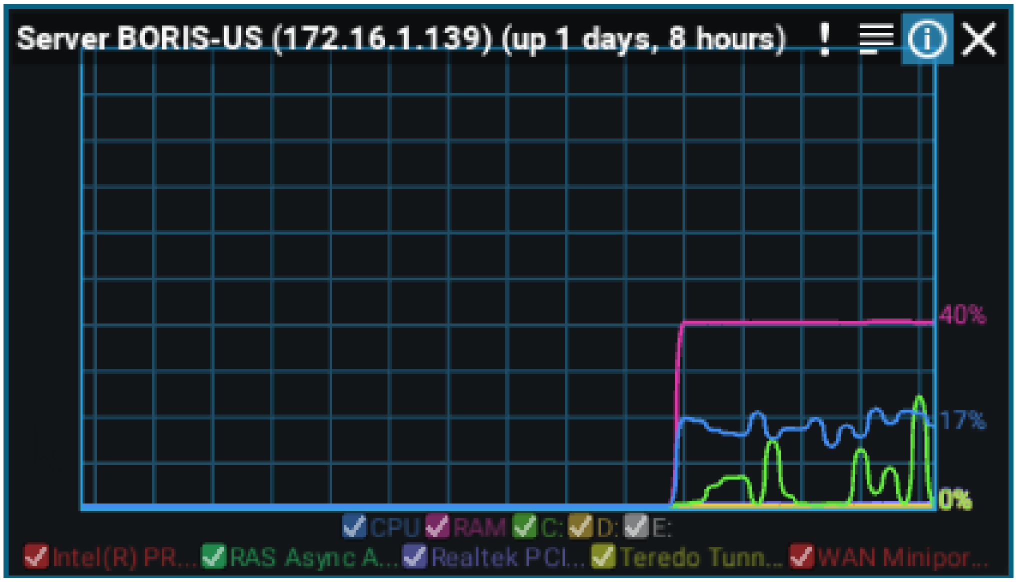
Monitoring Servers

Nx Witness provides a real time Server Health Monitor display that can be added to layouts, opened in separate tabs or a new window.

Access to System Health Monitors is granted to all Built-In Groups. The Built-In Group *System Health Monitor* is configured to only allow viewing of System Health Monitors and notifications. Custom Groups can be granted access to System Health Monitors by using the Permission Resource control or adding the *System Health Monitor* Group as a member of the Custom Group.

To Monitor Server Health in the Desktop Client

- Click-and-drag the Server from the Resource Panel into a new or existing layout.
- Open the Server context menu and choose **Monitor, Monitor in New Tab***,* or **Monitor in New Window** to open the monitor.
  - Multiple Servers can be selected at once by using CTRL+Click to select before opening as previously described.


Server BORIS-US (172.16.1.139) (up 1 days, 8 hours)
40%
17%
0%
☑CPU ☑RAM ☑C: ☑D: ☑E:
☑Intel(R) PR... ☑RAS Async A... ☑Realtek PCI... ☑Teredo Tunn... ☑WAN Minipor...

The following traces are displayed by default and can be toggled off and on by clicking the checkbox in the legend at the bottom of the display:

- CPU load.
- RAM memory usage.
- Hard disk partition usage (for example, C: and D:).
- Network interfaces usage.

The following details can be toggled to always be displayed by clicking the **(i)** icon in the upper right corner of the graph or by opening the graph context menu and selecting **Show on Item > Info**:

- Server name and current up-time since Server was last re/started.

- Percentage of capability being used displayed on the right side.
- Legends and chart color key.

To Monitor Server Health in Web Admin or Cloud Portal

1. Connect to the Server
2. Select **Monitoring** from the header menu
3. Choose to view the *Graph* or *Log*

Note: Review the "Health Monitoring" topic for additional options to monitor the performance of System components.

Using a Server's Web Interface

Nx Witness provides a simple and convenient way to control servers remotely through the server's web interface.

To access a server's web interface from a browser, see "Opening Nx Witness Web Admin".

Note: In merged Systems, a Server web page may be inaccessible if it is located on a different network. See Adding a Web Page as an Item for information on accessing such web pages via proxy.

To Access a Server's Web Interface from the Nx Witness Client

1. Right-click on a Server and choose **Server Settings** from the context menu.
2. Click on the **Server Web Page** link on the bottom left of the dialog.

You can also choose **Server Web Page** directly from the server's context menu.

The Web Interface Provides the Following Options and Information

View

- See all connected servers and devices.
- View live and recorded video.

Note: See "Searching and Filtering in Nx Witness" for information about searching and filtering connected servers and devices.

Settings – System Administration (General).

- Rename System.
- Merge Systems.
- Connect to Nx Cloud.
- Allow only secure connections.
- Encrypt video traffic.
- Limit session duration.
- Disable audit trail.
- Disable automatic device discovery.

- Preventing Nx Witness from Changing Device Settings.

Settings – System Administration (Licenses).

- Activate licenses.
- View license information.

Settings – Cameras.

- Select image aspect ratio.
- Select image rotation.
- Enable audio.
- Edit authentication credentials.
- Configure motion detection.

Settings – Users.

- Delete or Remove Users.
- Modify User information (name and Email).
- Change User password.

Settings – Servers.

- Change port.
- Restart Server.
- Restore factory defaults.
- Detach from the System.
- Choose Main or Backup storage.
- Add external storage.
- Reindex main storage.
- Reindex backup storage.

Information.

- View Health Monitoring information and download a report.

Settings – Footer Links.

- Download Nx Witness.
- API documentation.
- Download SDK.
- Support link.

Session and Digest Authentication

Nx Witness offers different authentication methods for the different aspects of Nx Witness. HTTP Bearer Session authentication is the default option due to its improved security over HTTP Digest authentication. Digest authentication is deprecated in Nx Witness but still usable if enabled on a user-by-user basis.

To Enable HTTP Digest Authentication for a User

1. Open Main Menu > **User Management**.
   a. Click **New User**.
   b. Click **Edit** on an existing user.
2. Click the three vertical dots on the bottom left of the dialog and select **Allow digest authentication for this user**.
3. A red banner will appear alerting you of the change. To revert the change, click **Force Secure Authentication** in the red banner.
4. Apply changes.

Note: A warning text will appear in the Security tab (Main Menu > System Administration) stating that Digest authentication is not secure and the number of users with access to it.

Configuring Multi-Server Environment

Nx Witness allows many servers to work together, in one or more Systems, for complete scalability.

Servers are identified and merged according to a **localSystemId** value that is assigned to a Server during initial configuration in the Setup Wizard. If "Setup New System" is selected in the Setup Wizard, a new localSystemId is generated. If "Add to Existing System" is selected, the localSystemId is taken from the remote System.

If servers are in different subnets, it is necessary to specify the other server's IP to allow them to merge in separate networks (behind NAT or over the Internet).

When servers are merged, they constantly synchronize all settings so it doesn't matter which Server the client is connected to. If video from a remote Server is requested, the client tries to connect directly to it and if it fails, the current Server will act as a proxy between the client and the Server with the video data.

Licenses are combined as well: if 4 licenses were activated on Server A and 10 licenses were activated on Server B, the System will have 14 licenses total after the servers are merged.

The maximum recommended scale of a single System, based on lab testing results, is approximately 100 servers and 1,000 users, but can vary significantly based on System design choices and operating environment.

Is recommended to contact your Support Team for assistance with large scale deployments and performance optimizations.

The following topics his section describes how to manage multi-Server environments to maintain maximum System reliability and performance:

- Moving One Server to a Different System.
- Merging Systems.
- Detaching a Server.
- Configuring Failover.
- Configuring Routing in a Multi-Server Environment.
- Configuring Time Synchronization in a Multi-Server Environment.

Moving One Server to a Different System

Use this action to move a single Server to a different System in the same local network.

Note: If it is necessary to join several servers in a different System to the current one, this method is not an option. Also, this method won't work if the Server that should be connected is outside the local network. For these cases use "Merging Systems".

Using the Client to Join a Server

1. Expand *Other Systems* in the Resource Panel and locate the destination System where the Server will be moved to.
2. Expand the desired System and locate the Server that will be moved to the connected System.
3. Open the context menu of the Server you want to move and choose **Merge to Currently Connected System**.
4. Enter the admin password of the destination System.

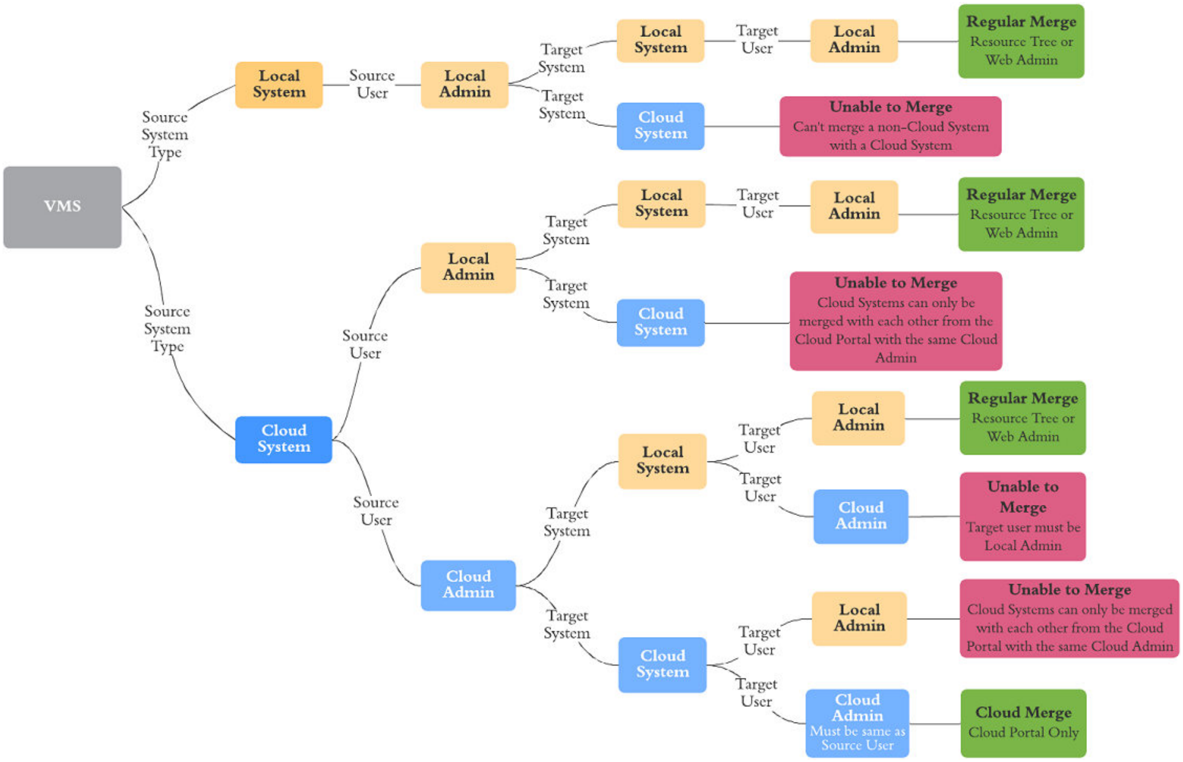
Merging Systems

It is possible to merge two Systems of the same type or to merge a Local System to a Cloud System. This is useful if System A contains several Servers and you want to join all of them to System B, or when you want to join remote Server(s) to a current System. Systems that have one or more Servers with the same Server ID in common cannot be merged. This happens when Nx Witness System files are copied over to another Server without removing the unique identifiers from the original System.

IMPORTANT: You can merge Servers from a local System to a Cloud System, but not vice versa.

Cloud connected Systems can be merged together as long as the same User has the Administrator permissions on both Systems. Cloud System merge can only be initiated from the Cloud Portal while logged into the Cloud Owner account.

See the diagram below for a visual representation of your options when trying to merge two Systems.



To Merge Local Systems

Desktop Client

1. Launch Nx Witness Client and connect to any Server in System A.
2. Right-click on the System name in the Resource Panel and choose **Merge Systems** from the context menu.
3. In the *Merge Systems* dialog, enter the URL of the Server you want to merge (any Server in System B or a remote server) in the **Server URL** field. You can use the drop-down menu to find Systems in the local network. For a remote server, type `http://<ip>:<port>`, where:
    - `<ip>` – IP address of Server (the current computer should be able to connect to this server)
    - `<port>` – network port of Server (default `7001`).
4. Enter the **Password** to System B (or the remote server) and click **Check**.
5. Select the system that the others will merge into:

- System A – System B will be merged to System A.
- System B – System A will be merged to System B.

6. Click **Merge with <System Name>**.

Web Admin

1. Open a web browser and enter the following address: http://<ip>:<port>
   - <ip> – IP address of Server.
   - <port> – network port of Server (default 7001).
2. Login with a Local Admin username and password.
3. Go to the **System** tab and click **Merge Systems**.
4. Choose a System from the drop-down list (or enter the target System's information and click **Find System)** then click **Next**.
   - Other System URL (<server_ip>:<server_port>).
   - Other System administrator Login/Password.
5. Fill in the Current Password (for this System) field.
6. Select which System's name and administrator password will be kept.
7. Click **Merge Systems**.

❗ **IMPORTANT:** Nx Witness creates a System database backup automatically before merging Systems. See "Backing up and Restoring the System Database".

To Merge Cloud Systems

Cloud Portal

1. Open Nx Cloud.
2. Click on the System you want to start the merge with. You will be taken to that System's page.
3. Click on **Merge with Another System**.
4. Choose the System you want to merge with from the drop-down menu.
5. Select which System's name and settings will be kept and click **Next**.
6. Enter the Cloud account password and click **Merge Systems**.

Desktop Client and Web Admin

See "To merge Local Systems" at the top of this page.

Backing up and Restoring the System Database

You can create a backup of the database of System settings, User rights and settings, and device configurations, which can be restored in case of failure. If a User creates the backup in the Client, the file is saved as a ***.db** file. Nx Witness creates a database backup automatically every 7 days, whenever the product version is updated, and when Systems are merged (see "Merging Systems"). If the backup is created automatically, the file is saved as a ***.backup** file. More details about backups can be found on the Support Portal.

The System database does not include archives, Server data, or local settings.

The default database backup location:

- *Windows*

  ```
  C:\Windows\System32\config\systemprofile\AppData\Local\Network Optix\Network Optix Media Server
  ```

- *Linux*

  ```
  /opt/networkoptix/mediaserver/var
  ```

! **IMPORTANT:** It is best to backup and restore the database on the same computer.

To Back up Nx Witness Database

1. Go to **Main Menu** > **System Administration** > **Advanced.**
2. In the **Backup and Restore** section, click **Create Backup**.
3. In the dialog that opens, choose a location on the local file system, enter a file name for the backup, then click **Save**.

To Restore Nx Witness Settings from Backup

1. Go to **Main Menu** > **System Administration** > **General.**
2. In the *Backup and Restore* section, click **Restore from Backup**.
3. In the dialog that opens, find the desired database backup file (*.db), then click **Open**.
4. Click **OK** in the confirmation dialog to restore the database.

Servers will restart automatically when the System is restored from backup.

! **IMPORTANT:** It may be necessary to restart Nx Witness clients after restoring a database.

Deleting a Server

In some instances, it may be necessary to delete a server from the System.

A Server can only be deleted when it is offline. To delete a server, locate it in the Resource Panel, **right-click** to open the context menu and select **Delete**.

! **IMPORTANT:** All devices that are hosted on a deleted Server will be deleted as well. Recorded data will remain in the server's storage.

A Server will automatically discover all devices and start operating once it is back online, and archives from previously attached cameras will remain available. However, storage settings and device configurations are not saved and will have to be re-entered.

Detaching a Server

This action can be useful if it is necessary to isolate a Server from the current System. This operation is rarely performed.

> **Note**: If licenses have previously been activated on the Server being detached, it will be disabled with the error "Server not found."

To Detach Server from the System Using a Server's Web Interface

1. Login to the Web Admin interface of the Server that should be detached from the current System.
2. Open the **Settings** tab and click **Detach from the system**.
3. Enter the Server password and confirm the action.

> **IMPORTANT:** All Nx Cloud users including the Cloud System Owner will be deleted when a Server is unlinked from the Cloud System. **Only the local administrator and local users will remain.**

To Detach Server from the System by Restoring a Server's Factory Defaults

1. Log in to the Web Admin interface of the Server to be detached.
2. Go to the **Settings** tab and click **Reset to Defaults.**
3. A confirmation dialog box will displayed and a Server password may be required.

Configuring Failover

Automatic failover allows a Server to automatically discover and attach cameras from a failed Server. The failed and the functional Server(s) must be within the same System. When a Server power, networking failure, or failure to the last remaining storage drives occurs, devices are transferred to the first available failover-enabled Server, and the Client is automatically reconnected.

> **Note**: A 30-day grace period is granted to the failover-enabled Server to allow the Cameras to continue recording seamlessly (see Expired and Invalid License Keys).

Failover requires that at least two Servers be enabled. However, to adequately protect a System, all Servers should be failover-enabled. This is to protect any given Server and because failover success depends on the device capacity of the individual servers.

> For example, in a System with three servers, Server A has maximum capacity of 256 cameras and is actively recording 160 cameras, Server B has a maximum capacity of 256 cameras and is actively recording 128 cameras, and Server C has a maximum capacity of 256 Cameras and is

actively recording 176 cameras. Therefore Server A has a failover capacity of 96 devices (256 - 160), Server B has a failover capacity of 128 devices (256-128), and Server C has a failover capacity of 80 devices (256-176).

If any one of these Servers were to fail, both the other Servers would be required to capture all of the disconnected devices. For example, a failure of Server A would require space for 160 devices. Server B has failover capacity for 128 devices and Server C has failover capacity for 80 devices, so neither alone would be sufficient (128 + 80 ≥ 160). Similarly, A (96) plus C (80) are needed for the 128 cameras on B if it were to fail, and A + B are needed for the 176 devices on C (96 + 128 ≥ 176).

Failover takes approximately 1 minute to complete in the instance of a network or power failure. Archive playback from the failed Server will not function until the Server holding the archive becomes available.

To Configure Failover on a Server

The failover priority setting is a system-wide option and is synced across all servers in the System.

1. Right-click on the desired Server in the Resource Panel and choose *Server Settings*.
2. In the *General* tab of the *Server Settings* dialog, enable **Failover**.
3. Enter the maximum number of cameras that can be attached to the Server (256 maximum on Intel/AMD CPUs, 12 maximum on ARM CPUs).
4. Set the **Server Location ID**. By default, this value is 0 for all servers with failover enabled. Servers that share the same Location ID can failover to one another but not to servers with different Location IDs. This ensures that failover occurs between appropriate servers (for example, you may want to set servers near one another to the same Location ID and severs that are further away to a different Location ID).
5. Click *Apply* or *OK*.
6. Repeat steps 1 – 5 to enable additional failover servers.

To Configure Failover Priority for a Specific Camera

Failover Priority can specify the most important streams that will be transferred first, lower priority devices after that, and inessential devices can be set to not transfer at all.

By default all cameras in a System are set to "Medium" failover priority. To turn off the failover feature for a given cameras, set it to "Never".

1. In the *General* tab of the *Server Settings* dialog, click **Failover Priority** checkbox.
2. Expand each Server to list the attached cameras and reveal the Failover Priority checkbox. The default setting is medium.
3. Check the desired camera and click one of the buttons – **Never**, **Low**, **Medium**, or **High** – at the bottom to set the desired priority.
4. Repeat steps 2 – 3 for all cameras that should be given a failover priority.
5. Click *OK* to apply changes in the Failover Priority dialog.

6. Click *OK* or *Apply* in the Server Setting dialog.

Configuring Routing in a Multi-Server Environment

Nx Witness provides a built-in automatic routing mechanism that enables users to seamlessly work with large sites as a single cluster.

Initially Nx Witness tries to discover all available IP addresses of servers, including public ones. However discovery is not always possible in some network environments. There may be custom network configurations that require custom routing settings. Sometimes servers have several IP addresses (public and private) and it may be necessary to allow or restrict traffic flow for some of them. For instance, a Server can have a public IP address connected to the Internet via 100 Mbit network and a local NIC with local IP address (1Gbit). If it is not necessary to provide public access to this server, it may be useful to restrict traffic flow through the public IP.

To add, enable, and disable routing, open **Main Menu** > **System Administration** and go to the **Routing Management** tab.

The left panel displays a list of all connected servers. Click on a Server in this list to show all available interfaces on the right side of the dialog.

- To add an address manually, click the **Add** button and enter a URL using the format http://<ip>:<port>:
  - ***<ip>*** – the desired IP address or DNS name of server.
  - ***<port>*** – network port Server is listening on (default **7001**).
- To allow/deny traffic via a specific network interface, click the toggle button for that connection.

Time Synchronization in a Multi-Server Environment

In large systems, different components may reside on different locations or even in different time zones. There are a few system components that the time settings are important for:

- Servers.
- Desktop Clients.
- Cameras.

To Control Time Synchronization between Servers

Some archive potion may become unavailable if the time difference between servers is greater than 10 seconds. Nx Witness can be set to take the current time either from the Internet or from a given server to which all other servers will synchronize.

1. Open **Main Menu** > **System Administration**.

2. Go to the **Time Synchronization** tab. The current System time is displayed at the top.
   - To synchronize System time with the Internet, enable the **Sync time with the Internet** selector. Time cannot be synchronized if there is no Internet connection or if the time Server is offline.
   - To synchronize with local time on a given server, disable the **Sync time with the Internet** toggle and click on the name of the desired server.
   - To allow each Server to use its own local time, choose the **Do not sync time among servers** option (not recommended).
3. Confirm changes.

To Control Time Displayed on Desktop Clients

It is important to configure time in the Desktop Client, if Client and Servers are in different time zones (especially if there are multiple Servers in different time zones).

Desktop Client can display its local time or Server time when browsing the archive, Event Logs, Audit Trail of User Actions, etc.

To specify:

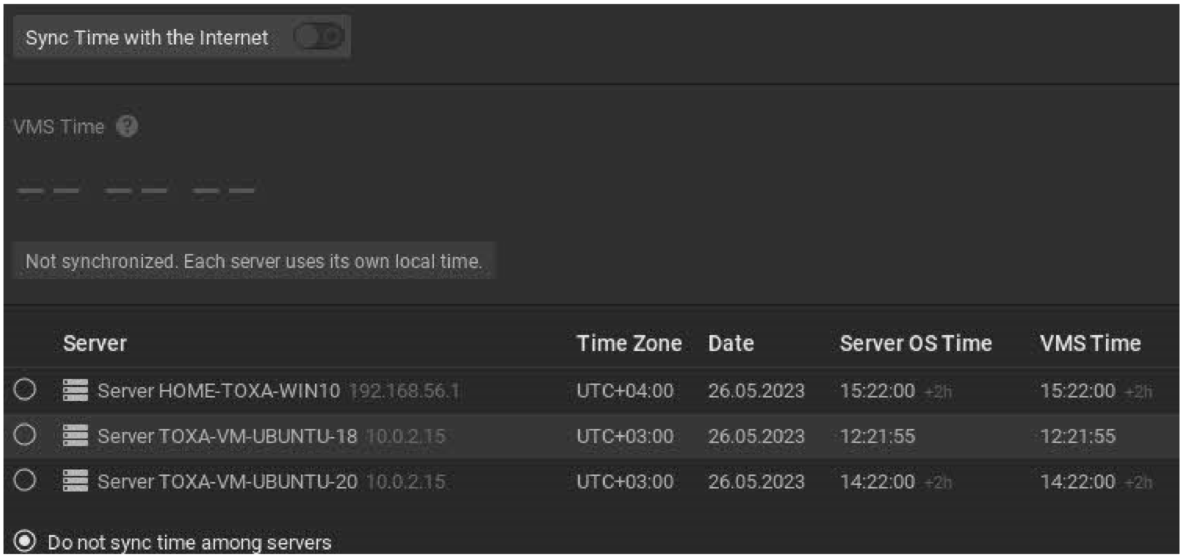
1. Open **Main Menu** > **Local Settings** > **Look and Feel**.
2. In **Time Mode**, choose: *Server Time* or *Client Time.*
3. Confirm changes.

This operation should be done on each Desktop Client independently.

For Systems where time is not synchronized, offsets are displayed for both Server time and VMS (Global System) time.

The time offset is relative to the Server the cursor is hovered over.

For Systems where time is synchronized with a local server, offsets are shown for Server OS time only, relative to the Server OS time on the selected server.



Not synchronized. Each server uses its own local time.

	Server	Time Zone	Date	Server OS Time	VMS Time
○	Server HOME-TOXA-WIN10 192.168.56.1	UTC+04:00	26.05.2023	15:22:00 +2h	15:22:00 +2h
○	Server TOXA-VM-UBUNTU-18 10.0.2.15	UTC+03:00	26.05.2023	12:21:55	12:21:55
○	Server TOXA-VM-UBUNTU-20 10.0.2.15	UTC+03:00	26.05.2023	14:22:00 +2h	14:22:00 +2h

● Do not sync time among servers

Additionally, it is possible to synchronize time with cameras. However, in some cases it may be necessary. See "Time Synchronization between Servers and Cameras".

Device Management

The following types of Devices are supported in Nx Witness:

- Cameras.
- Encoders.
- DVRs.
- I/O modules.
- NVRs.
- Virtual Cameras.

The devices are listed in the Resource Panel and can be accessed, configured and grouped there.

The following settings are required for a device to be able to record:

- Setting a Recording Schedule.
- Recording Mode.
- Authentication.

Note: Authentication credentials only need to be updated if the default password has been changed for the device.

This section describes the following functions related to devices:

- Viewing Full Device List.
- Adding Devices.
- Diagnosing Offline Devices.
- Working with NVRs.
- Working With Intercoms.
- Using Joysticks.
- Moving a Device to a New Server.
- Deleting a Device.
- Setting Up Cameras and Devices.

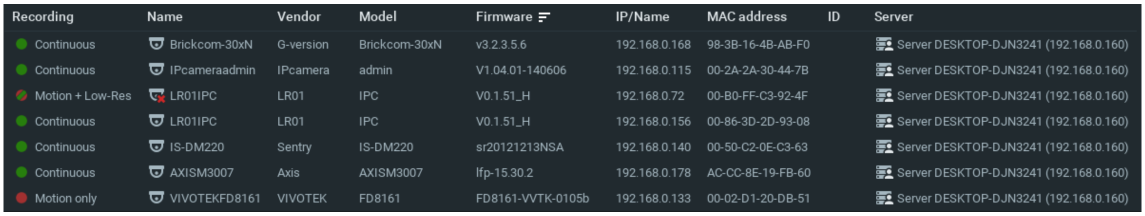
IMPORTANT: Most device parameters can only be configured by a Users with the Power User or higher permission level (see "Users and Groups").

Viewing Full Device List

The *Cameras List* (i.e., *Devices List*) lets you view and manage all devices registered in the Nx Witness System.

To Open the Device List

Open the **System Administration** dialog and select **Camera List** (**Ctrl**+**M**).



Recording	Name	Vendor	Model	Firmware	IP/Name	MAC address	ID	Server
● Continuous	Brickcom-30xN	G-version	Brickcom-30xN	v3.2.3.5.6	192.168.0.168	98-3B-16-4B-AB-F0		Server DESKTOP-DJN3241 (192.168.0.160)
● Continuous	IPcameraadmin	IPcamera	admin	V1.04.01-140606	192.168.0.115	00-2A-2A-30-44-7B		Server DESKTOP-DJN3241 (192.168.0.160)
● Motion + Low-Res	LR01IPC	LR01	IPC	V0.1.51_H	192.168.0.72	00-B0-FF-C3-92-4F		Server DESKTOP-DJN3241 (192.168.0.160)
● Continuous	LR01IPC	LR01	IPC	V0.1.51_H	192.168.0.156	00-86-3D-2D-93-08		Server DESKTOP-DJN3241 (192.168.0.160)
● Continuous	IS-DM220	Sentry	IS-DM220	sr20121213NSA	192.168.0.140	00-50-C2-0E-C3-63		Server DESKTOP-DJN3241 (192.168.0.160)
● Continuous	AXISM3007	Axis	AXISM3007	lfp-15.30.2	192.168.0.178	AC-CC-8E-19-FB-60		Server DESKTOP-DJN3241 (192.168.0.160)
● Motion only	VIVOTEKFD8161	VIVOTEK	FD8161	FD8161-VVTK-0105b	192.168.0.133	00-02-D1-20-DB-51		Server DESKTOP-DJN3241 (192.168.0.160)

- *Recording* – current recording state of the device (Not recording, Continuous, Motion only, Motion + Lo-Res). See "Recording Mode".
- *Name* – Device name
- *Vendor* – Device manufacturer/maker. When interacting with a 3rd party device via ONVIF protocol, *Onvif Device* is displayed.
- *Model* – *Model* of the device
- *Firmware* – The current firmware version
- *IP/Name* – Device IP address
- *MAC Address* – Device MAC address. If it is not possible to determine the MAC address, a unique identifier is shown (i.e. `urn_uuid_207f19b2-d5a6-407f-8fec-6265a311058b)`
- *ID* – 1 to 999999 digits for Logical ID (see "Expert Device Settings").
- *Server* – Server hosting the device

The following controls are available:

- Sort data – Data in each of the columns can be sorted in ascending or descending order by clicking on the header.
- Filter data – Text entered in the *Search* field applies to all data in the list. Results refresh as characters are entered. To disable filtering, clear the field.
- Select data – To select multiple rows use **Ctrl+Click** or **Shift+Click**. Use **Ctrl+A** to select all devices.

The following tools are available from the **Camera List** context menu:

- *Open* – Choose *Open*, *Open in New Tab*, or *Open in New Window*.
- *Delete* – Disconnects the selected device(s) for the Server host.
- *Check Camera Issues* – Opens the "Event Log" for the selected device.
- *Camera Rules* – Opens the "Event Rules List" for the selected device
- *Camera Settings* – Opens the Camera Settings dialog for the chosen device. If multiple cameras are selected before clicking this setting, the dialog that opens will be feature restricted.
- *Select All* – Selects all the cameras in the list

- *Export Selection to File* – Opens the *Export* dialog. Enter a file name and select a format (HTML or CSV text file).
- *Copy Selection to Clipboard* – Copies the column data for each selected camera to clipboard, from which it can be pasted into a text editor or spreadsheet application.

Note: A camera can be renamed by opening the Camera Settings dialog for a single device and editing the title.

Adding Devices

This section provides information on how to add various devices (cameras, encoders, I/O Modules) to the Nx Witness resource list.

Choose one of the following methods:

- Automatic Device Discovery
- Adding Devices Manually
- Adding Multicast, RTSP or HTTP Streams or Webcams as cameras
- Replacing a Camera

See also:

- Setting Up a Virtual Camera
- Setting Up an I/O Module
- Setting Up an Analog Camera
- Device Groups

Automatic Device Discovery

As soon as a server is started and connected to a System, it automatically performs device discovery in its network for devices that are accessible via broadcast. Once a device is discovered, it is displayed in the Resource Panel.

By default, this feature is turned on. It can be disabled during the Initial System Configuration or later (see below).

If a device does not transmit media data, it is marked as offline. If a server is offline, all devices the Server is hosting are automatically switched to the offline status.

Some devices require that a password be created or entered upon the first attempted access. They will be displayed in the Resource Panel but an error message will be displayed when an attempt is made to view streams from such devices.

Note: For Axis cameras only — if the "People Counter" function is enabled, automatic discovery will not work!

If a device was deleted and connected again, it will be re-discovered. See "Deleting a Device" for details.

Note: Once a device is discovered, Nx Witness adjusts the manufacturer's preset image quality settings and streaming configuration for optimal performance in the Nx Witness System. See "Preventing Nx Witness from Changing Manufacturer Settings" to disable these changes.

If the auto-discovery is turned on, once a device is discovered it cannot be deleted unless physically disconnected from the network. If deleted, it will be discovered and added back automatically.

To avoid that and add only desired devices, you can turn the auto-discovery off.

To Disable Automatic Device Discovery

Desktop Client

1. Open **Main Menu** > **System Administration** > **General** tab.
2. Uncheck **Enable devices and servers auto discovery** in the *System Settings* section.
3. When finished, press *OK* to apply or *Cancel* to discard changes.

Web Admin / *Cloud Portal*

1. Open **Settings** > **System Administration** > **General**.
2. Unheck the **Enable auto discovery of cameras and servers** checkbox.
3. Apply changes.

IMPORTANT: Once auto-discovery is disabled, new devices and servers will no longer be auto-discovered, they will have to be added manually.

Adding Devices Manually

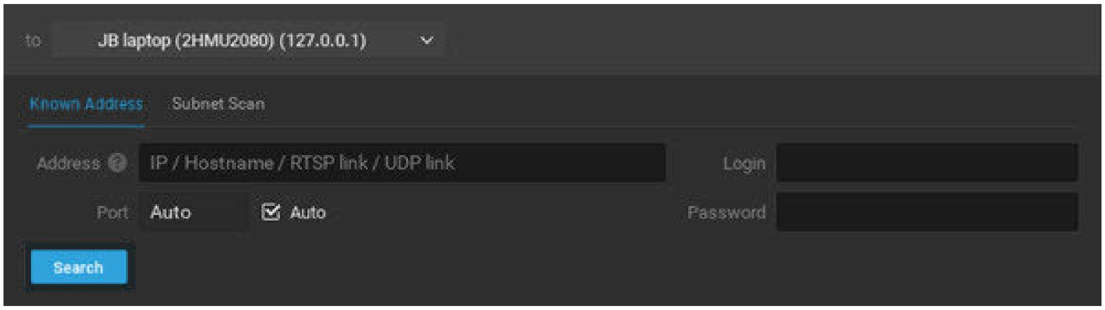
If a device is not accessible via broadcast, for instance if is located in a different network or can only be accessed via internet, it will not be discovered automatically. In this case Nx Witness provides an ability to add a device manually. It is also possible to add several devices simultaneously by scanning a range of IP addresses. You can also specify a device by IP Address, Host Name, or generic RTSP/HTTP/UDP link (see "Adding Multicast, RTSP or HTTP Streams as Cameras").

Note: For Axis cameras only — if the "People Counter" function is enabled, neither automatic or manual discovery will work in Nx Witness software.

To Add One or More Devices

1. Open the **Add Device** dialog by doing one of the following:
   - Open **Main Menu** and select **Add > Device**.
   - **Right-click** on the desired Server in Resource Panel to open its context menu.
2. Select the desired Server in the **To** field.

3. If the device requires, specify authentication parameters in the **Login** and **Password** fields. Once a device is added you can use the **Edit Credentials** button in **Camera Settings > General** to change this password.
    - Some devices may be discovered without specifying credentials, but often it is necessary to specify at least the default login and password.
    - Other devices may not require credentials for discovery but will require credentials when they are accessed for the first time. In this case, they will be displayed in the Resource Panel, but you will be prompted to enter credentials in order to view streams from these devices.
4. If needed, specify a discovery **Port**. The default **Auto** setting is recommended. Most devices are discovered on port `80`.
5. Choose one of the following:
    - Select the **Known Address** tab (to add a single device):
        1. Enter either the IP address, Host Name the device can be resolved on, or an RTSP, HTTP, or UDP link for the device in the **Address** field.
        2. Mouse hover over the ? icon near the Address field to see some syntax examples.



to JB laptop (2HMU2080) (127.0.0.1)

Address ? IP / Hostname / RTSP link / UDP link

Port Auto ☑ Auto

    - Select the **Subnet Scan** tab (to add several devices at once):
        1. Enter the desired **Start IP** and **End IP** values. (By default, addresses 0-255 of the same subnet are suggested so that the entire network will be scanned.)
        2. Press **Scan** to initiate the search. This can take some time, especially when an IP range is being scanned.
        3. If devices are located they will be displayed showing the brand, model and IP address. If a device is already registered it will display in the list as *Added*. Previously added devices, that were later removed, may be re-added.
6. Select the desired devices and click on **Add all devices**.The total number of devices being added will display in a banner at the top of the window.

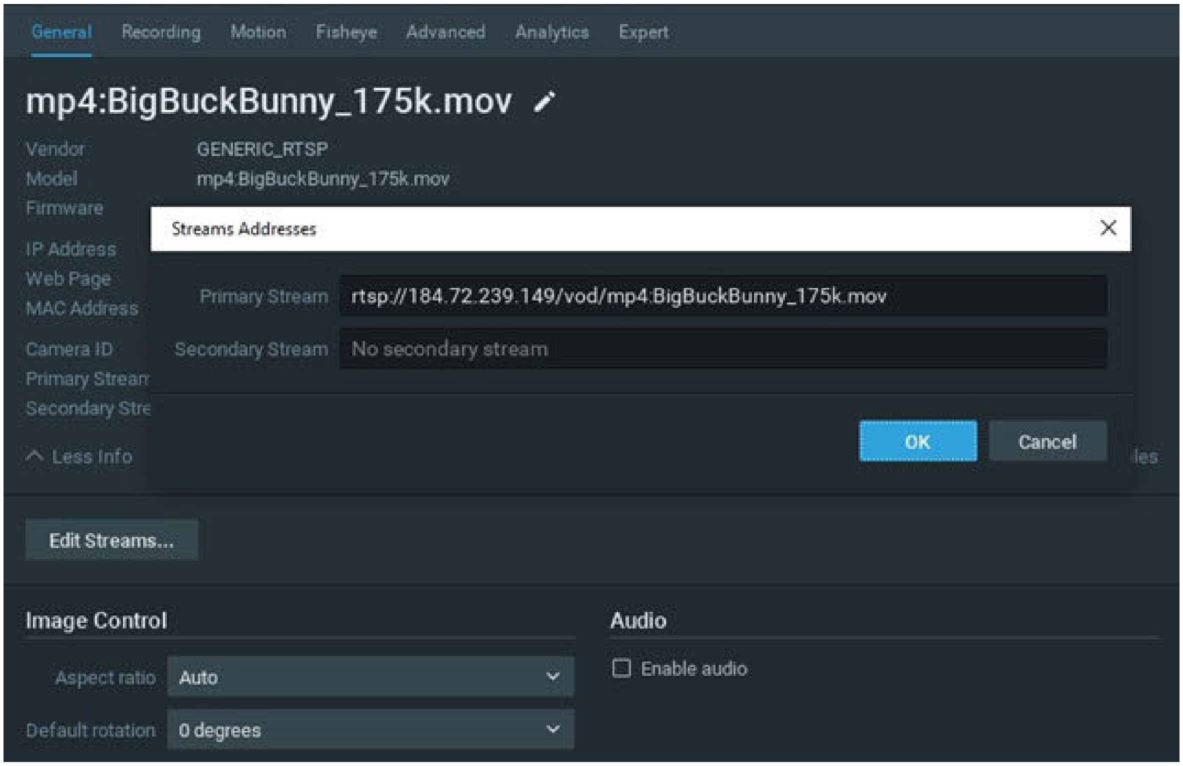
Adding RTSP, HTTP, or Multicast Streams as Cameras

Occasionally a camera cannot be automatically discovered, or will not work properly in Nx Witness because it is not fully compatible with ONVIF. These devices can instead be added using their RTSP, HTTP, or UDP multicast URL stream address. Once added, such a camera can be successfully viewed and recorded in Nx Witness, including audio output over RTSP for devices that record audio.

It is possible to add two streams when creating an RTSP/HTTP camera, which enables dual streaming and adaptive scaling (see "Dual Stream Processing"). Dual-stream cameras from RTSP, HTTP, or UDP streams allow for the integration of third party legacy IP Cameras, DVRs, and NVRs with full Nx Witness adaptive scaling capabilities for reduced CPU and network usage.

IMPORTANT: You must know the exact RTSP/HTTP/UDP URL of the stream. This information can be found in the camera manual, on the camera web page, or by contacting the manufacturer.

Follow the steps described in "Adding Devices Manually" for a single device to add the desired stream value in the **Address** field. Once added, the camera will be displayed in the Resource Panel as a "GENERIC_*stream type_stream name*". You can then use **Edit Streams** in **Camera Settings** > **General** to add or edit either stream value. Not all RTSP devices are compatible with the quality and FPS selection capability in the Client.



mp4:BigBuckBunny_175k.mov

Vendor GENERIC_RTSP
Model mp4:BigBuckBunny_175k.mov
Firmware
IP Address
Web Page
MAC Address
Camera ID
Primary Stream
Secondary Stre

Streams Addresses

Primary Stream rtsp://184.72.239.149/vod/mp4:BigBuckBunny_175k.mov
Secondary Stream No secondary stream

Image Control

Aspect ratio Auto
Default rotation 0 degrees

Audio

☐ Enable audio

Note: If the lowest resolution is greater than 1024x768p, software motion detection will not be available.

Adding a Webcam or Raspberry Pi Camera

Non-IP cameras such as built-in Raspberry Pi cameras or USB webcams are supported on Windows, Ubuntu Linux, and Raspbian operating systems with dual-streaming and audio support when the *Autodetect USB and web cameras* option is enabled (see "Configuring Server Settings").

These cameras will be automatically detected and added as a Nx Witness resource available for live and recorded viewing.

When the Nx Witness System is installed on a Raspberry Pi machine with a Raspberry Pi camera module, the System will function as a Server with a smart IP camera, capable of operating as a stand-alone System for demonstrations or as part of a larger system.

Note: Audio is not supported for the Raspberry Pi camera.

Replacing a Camera

The Camera Replacement feature is used to replace an existing camera with another one while allowing the new camera to continue using the original archive. This can be useful for situations where the old camera is broken, an upgrade is needed, or you want to switch camera models from different parts of the building. Camera Replacement is only supported for single-channel cameras and can only be replaced by another single-channel cameras on the same Server. This action can only be initiated by users with administrator or power user permissions.

The feature does not support the following device types:

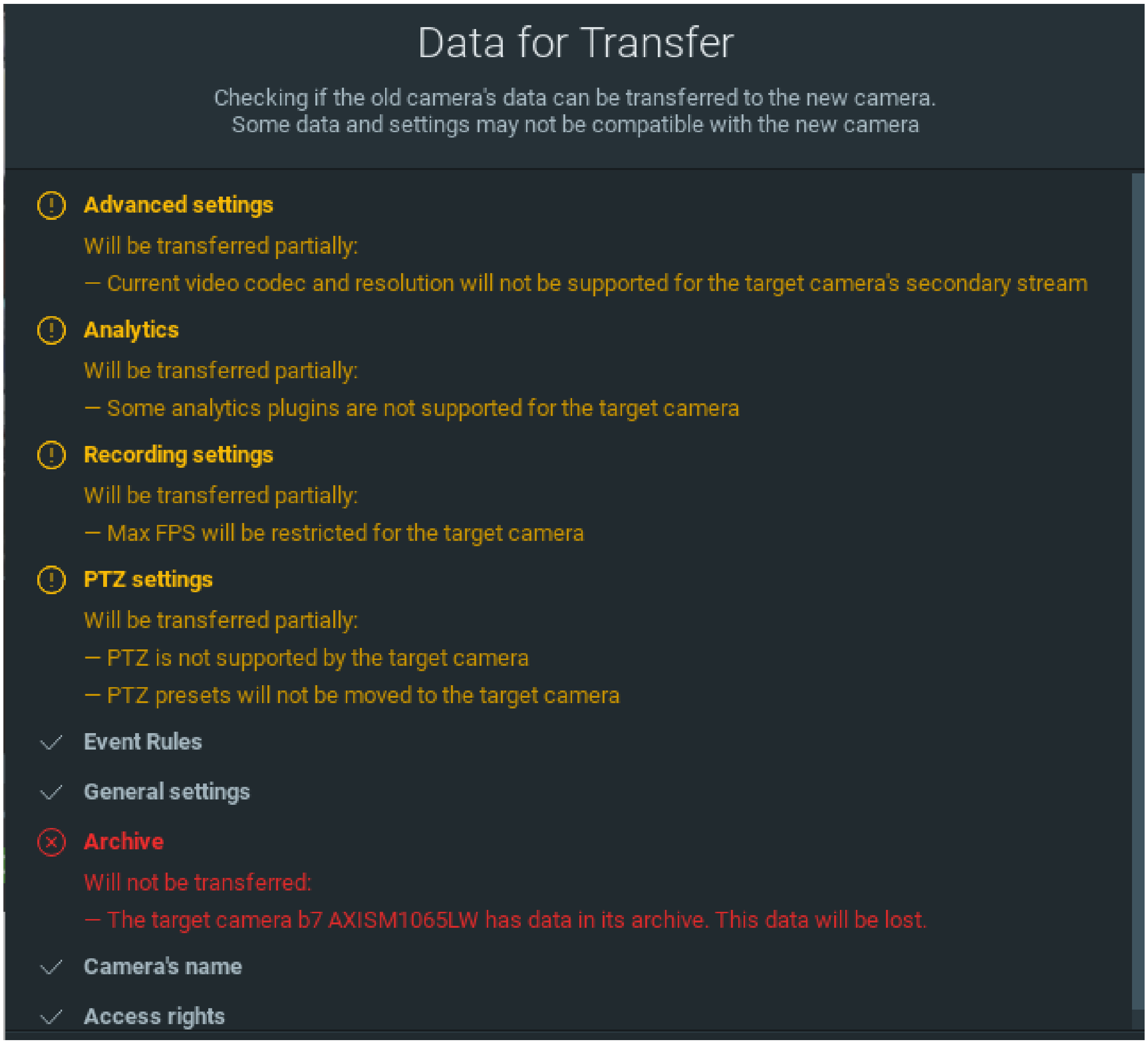
- Multi-sensor cameras.
- Virtual cameras.
- Speakers.
- NVRs.
- Unauthorized Cameras.
- IO modules.
- Offline cameras that appeared after reindexing the archive.

How to Replace a Camera

1. Make sure the camera to be replaced is disconnected and appears as offline in the system.
2. Right-click the desired offline camera in the Resource Panel.
3. Select the **Replace Camera** option.
4. Select a camera to replace the current one.
5. Apply changes.

Transferable Data Between Cameras

Before the transfer starts, the following dialog will be displayed:



Data for Transfer

Checking if the old camera's data can be transferred to the new camera.
Some data and settings may not be compatible with the new camera

Advanced settings
Will be transferred partially:
— Current video codec and resolution will not be supported for the target camera's secondary stream

Analytics
Will be transferred partially:
— Some analytics plugins are not supported for the target camera

Recording settings
Will be transferred partially:
— Max FPS will be restricted for the target camera

PTZ settings
Will be transferred partially:
— PTZ is not supported by the target camera
— PTZ presets will not be moved to the target camera

✓ **Event Rules**

✓ **General settings**

Archive
Will not be transferred:
— The target camera b7 AXISM1065LW has data in its archive. This data will be lost.

✓ **Camera's name**

✓ **Access rights**

Not all data and settings can be transferred to the new camera as the new camera may have technical limitations. Motion Detection settings and 2-way Audio will not be transferred.

The following data and settings can be transferred:

- Archive.
- Camera’s name.
- Access rights.
- Analytics.
- Event rules.
- PTZ settings.
- General settings.
- Recording settings.
- Advanced settings.

Note: If the original Camera is reconnected, you will have the option to undo the replacement procedure.

Device Groups

Devices can be placed in Groups to organize how they are displayed in the Resource Panel, this is very useful for Systems with many devices.

Device Groups:

- Are only used for the visual display and organization of resources within the Desktop Client.
- Cannot be used for device settings or permission management.
- Can be nested 8-levels deep with the same Group name used at each level.
- Cannot have a blank name; the Group name must be at least one character and leading spaces will be removed.
- Do not support a single device being within multiple device groups.

To Create a Device Group:

1. **Right Click** on a device or group in the Resource Panel to open the context menu, or use the hotkey (**CTRL+G**) while a device or Group is selected.
2. Rename the Group or press **Enter** to accept the system generated name.

To Add or Move Devices Between Groups:

Use drag-and-drop to move the device to the desired group.

To Remove a Device from a Group:

Use drag-and-drop to move the device underneath the Server.

To Delete a Device Group:

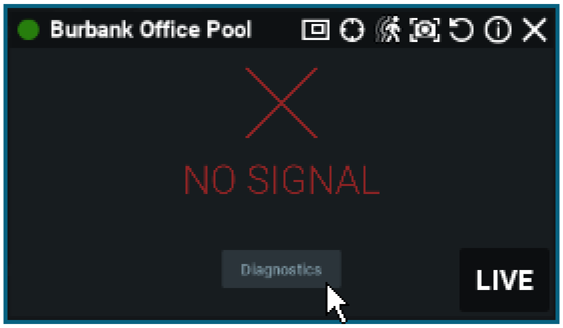
Right Click on a group to open the context menu and select **Delete** or use the **DEL** hotkey.

Note: Devices are moved up one group level when their current group is deleted.

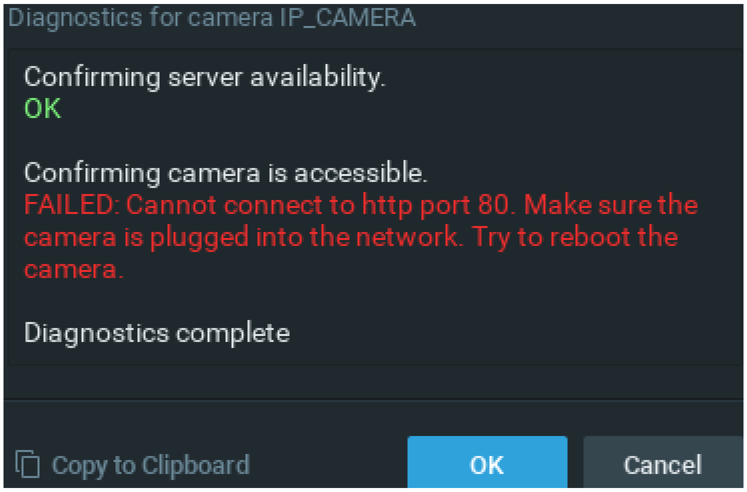
Diagnosing Offline Devices

Nx Witness can perform basic diagnostics to determine why a camera is offline. If you cannot fix the problem yourself, it is important to run a diagnostic test prior to contacting support, and provide them with the results.

A camera that is offline will be have an offline icon () in the Resource Panel and will display **NO SIGNAL** in layout. Diagnostics can be invoked by pressing the **Diagnostics** button on the item:



Once diagnosis is complete, the analysis and recommended actions will be displayed:


Diagnostics for camera IP_CAMERA

Confirming server availability.
OK

Confirming camera is accessible.
FAILED: Cannot connect to http port 80. Make sure the camera is plugged into the network. Try to reboot the camera.

Diagnostics complete

Follow the instructions to resolve the issue. If unsuccessful, contact support (see "Contacting Support").

❗ **IMPORTANT:** Make sure to click *Copy to Clipboard* and paste the data into your message prior to sending it to support.

Working with NVRs

Nx Witness can work with a wide number of network video recorders (**NVRs**), however there are some special requirements:

- Hanwha NVRs require a specific Bridge License to work (however a professional license will work as well). Each Bridge License allows viewing one channel from the NVR.
- Cameras should be connected to NVRs and properly configured to display in Nx Witness.

After an NVR is configured and added, its channels become visible and it is possible to navigate through its live and archive streams. Some restrictions apply:

- NVRs do not support asynchronous playback, so the SYNC button on the Timeline has no effect.
- Only three simultaneous connections per channel are supported for archive playback. This means only three Nx Witness Client applications may request video from a certain channel. If an additional client tries to view archive from this channel, it will not be accessible.

Working With Intercoms

An intercom is a visitor-side two-way communication device containing a camera and a microphone. Connected intercoms constantly send audio and video to its Nx Witness system. Nx Witness does not send audio to intercoms unless the User is in an ongoing call with a visitor using an intercom. The only supported intercom in Nx Witness is the Hanwha Techwin TID-600R.

Intercom Soft Triggers

The TID-600R intercom has three preconfigured soft triggers:

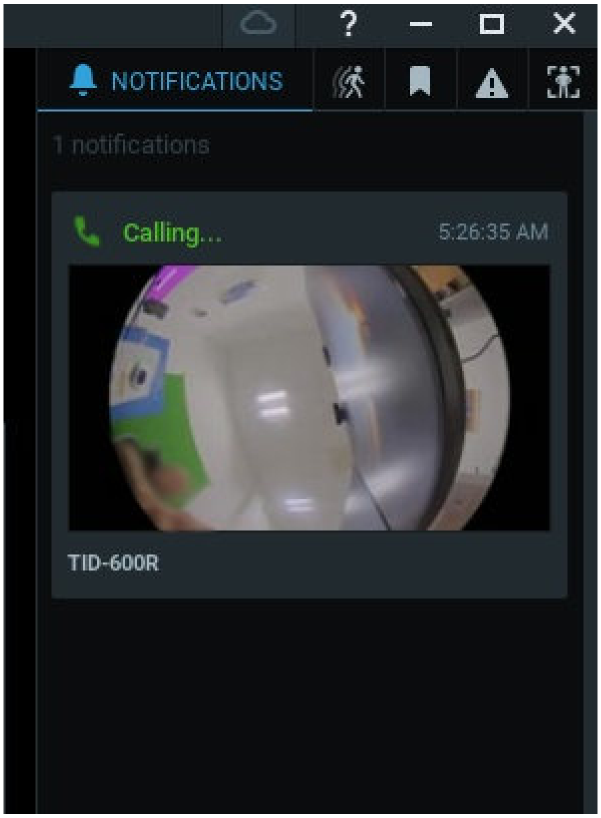
- Mute/Unmute – mute the microphone to stop sending audio to the intercom or unmute it to begin sending audio (see Using 2-Way Audio for help with configuring 2-way audio.)
- Door – opens the relay for the door associated with the intercom.
- Heater – turns on the heater function.

Intercom Layouts

When saving a layout containing an intercom or receiving a call, an intercom layout will appear in the Resource Panel called *TID-600R Layout* with the following icon . An intercom layout cannot be deleted unless the intercom is removed from the Nx Witness system first.

Receiving and Ending Calls

When the visitor initiates a call by clicking a button on the intercom, you will see a notification labeled *Calling...* in the Notification Panel. Click anywhere on the notification to be taken to the intercom layout (it will be automatically created if it does not already exist), where you can click the **Unmute** soft trigger to start sending audio to the intercom. Click the **Mute** soft trigger or close the layout when done speaking to the visitor.



Using Joysticks

A joystick is a peripheral device that provides programmable hotkeys and accurate analog control over the pan, tilt, and zoom functions of compatible PTZ cameras in Nx Witness.

This functionality is officially supported on **Microsoft Windows only**. Other OS may work but issues might occur.

The following joysticks are officially supported:

- Axis T8311
- Hanwha Techwin SPC-2000

Other USB joysticks are also supported, but may provide limited functionality.

Initial Setup to start using a joystick in the Desktop Client

1. Close the Desktop Client.
2. Plug in the joystick to the computer that you will be using. Windows will automatically detect the device and install the necessary drivers.
3. Open the Desktop Client.
4. Open a PTZ camera and click on the PTZ icon with your mouse.
5. Use the joystick to pan, tilt, and zoom the camera.

Common Joystick Usage

Stick movement – controls PTZ

Stick rotation – controls zoom in/out.

Note: When controlling a PTZ IP camera via analog joystick controls, expect latency from physical movement of the joystick to the resulting PTZ action of the camera. PTZ actions are only applied to items that are selected on the scene in the Desktop Client.

Advanced Configuration

Supported joysticks can access additional configuration settings in the Desktop Client (**Main Menu > Joystick Settings**). Joystick Settings contains two tabs: Basic Actions and With Modifier.

Basic Actions

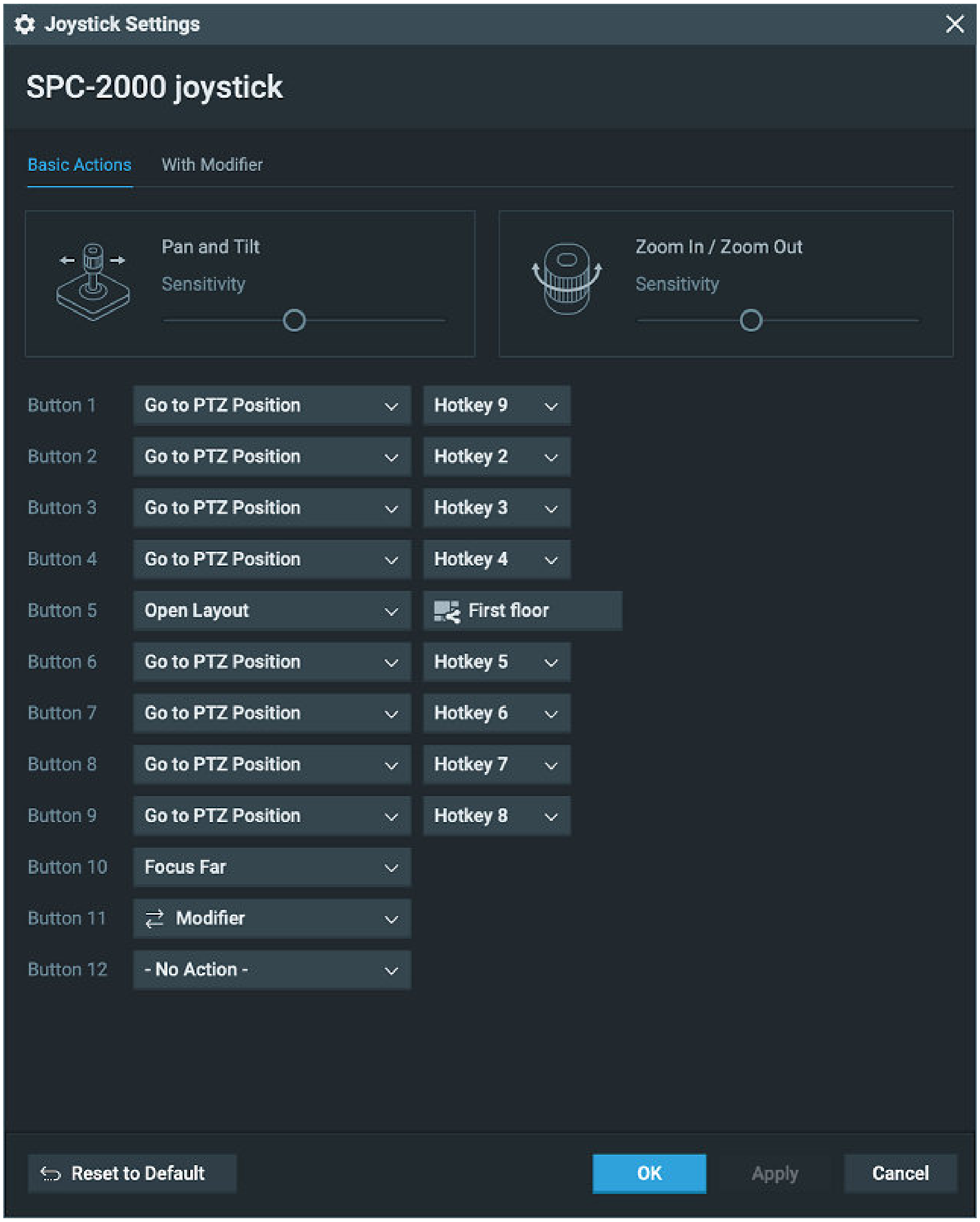
Adjust PTZ sensitivity and configure joystick buttons in this tab. To adjust the sensitivity of PTZ controls, move the slider to the left to reduce sensitivity and move the slider to the right to increase sensitivity.

Note: If joystick has only two axises, Zoom sensitivity control is not shown.

Each joystick button has a drop-down menu associated with it where you can assign one of the following actions to the button:

- Focus Near
- Focus Far
- Autofocus
- Go to PTZ position (requires you to select the hotkey/PTZ position)
- Open Layout (requires you to select a specific layout)
- Set to Fullscreen
- Next Camera on Layout
- Previous Camera on Layout
- Modifier (requires additional configuration in the With Modifier tab)

Note: All changes must be saved by clicking Apply or OK before exiting the settings dialog.



Button 1	Go to PTZ Position	Hotkey 9
Button 2	Go to PTZ Position	Hotkey 2
Button 3	Go to PTZ Position	Hotkey 3
Button 4	Go to PTZ Position	Hotkey 4
Button 5	Open Layout	First floor
Button 6	Go to PTZ Position	Hotkey 5
Button 7	Go to PTZ Position	Hotkey 6
Button 8	Go to PTZ Position	Hotkey 7
Button 9	Go to PTZ Position	Hotkey 8
Button 10	Focus Far	
Button 11	⇄ Modifier	
Button 12	- No Action -	

With Modifier

The With Modifier tab is disabled unless at least one of the joystick buttons is set as a modifier in the Basic Actions tab. Select a secondary action for each joystick button in this tab. The secondary action will activate while the modifier button is held down.

For example: If you set button 11 as a modifier and open the With Modifier tab, you can configure button 1 to open a layout any time button 11 is held down. Button 1 will still retain its standard action of going to a PTZ position when button 11 is not held down.

Note: All changes must be saved by clicking Apply or OK before exiting the settings dialog.

Moving a Device to a Different Server

You can use the Resource Panel to move a device from one Server to another. When a device is moved from one Server to another, all predefined parameters are retained and archive will be combined seamlessly.

However, the device must be on the same local network as both Servers to remain online, in which case recording will restart automatically and you will be able to view the live stream. If the servers are not attached to the same network, moving a device will take it offline. In this case you will be given the option to **Move** it anyway, **Skip** (the specific camera, if more than one is selected), or **Cancel** the operation.

Note:An offline camera (icon ○) still uses a license, even though the device is not recoding at the moment.

Moving a device is helpful when too many devices are used on the network and you need to add an additional Server for load balancing and redundancy purposes, as it allows for load-balancing to be performed manually.

To Move Device(s) to Different Server

1. Select the desired device(s) in the Resource Panel.
2. **Drag-and-drop** the selected devices over the name of the desired server.

   Note: Devices can also be automatically moved in the event of a Server failure (see "Configuring Failover" for details).

Deleting a Device

To delete a Device

1. Expand the server hosting the desired device in *Resource Panel*.
2. Find and select the device.
3. **Right-click** for the context menu and choose **Delete** (or the ***Del*** button on a keyboard).
4. Click **Delete** to confirm.

If a camera is disconnected or deleted, its archived footage becomes unavailable. However, it can be restored (see "Viewing Archive from Deleted Cameras").

Note: If a device is online it will be auto-discovered again unless it was added manually. To avoid auto discovery, either unplug the device or Disable automatic device discovery.

If the device is back online, it will start working immediately and its recorded archive will be available. However, a User will need to reconfigure the **Device** as its settings have been erased.

Setting Up Cameras and Devices

Cameras and Devices contain internal settings specified by the manufacture and System settings that HD Witness applies outside of the Device. An example is Camera Resolution being set and defined within the Camera while Camera Hotspots are defined and contained within the Desktop Client. The devices settings and options available through the System will vary depending on device model, firmware installed, and compliance with industry standards.

Users must be a member of a group having **Edit Device** permissions or have been granted permission to **Edit a Device** to perform the tasks outlined in this topics (see "Users and Groups").

Note: It is possible to configure image controls, audio, recording schedule, authentication credentials, etc. – for several devices simultaneously. See "Applying Parameters to Multiple Devices".

Device Set Up

Obtaining Basic Device Information.

Device Authentication.

Renaming a Device.

Setting Camera Orientation.

Setting Camera Aspect Ratio.

Hot Spot and Camera Linking.

Events Log.

Event Rules List.

Image Control

Image Enhancement.

Pan, Tilt, and Zoom Controls.

Dewarping Controls.

Saving and Restoring PTZ Positions.

Setting Up PTZ Tours.

Configuration Settings

Configuring Audio on a Device.

Setting Up a Virtual Camera.

Setting Up an I/O Module.

Setting Up an Analog Camera.

Setting Up Motion Detection.

Setting a Recording Schedule.

Recording Modes.

Configuring Minimum and Maximum Archive Storage.

Obtaining Basic Device Information

For all cameras, the **Camera Settings** > **General** tab displays the unique camera ID, RTSP URLs for primary and secondary streams. For ONVIF-compliant cameras; editable fields for streams, image quality, and related parameters as also available.

- *Camera name* – this field is editable.
- *Vendor.*
- *Model.*
- *Firmware.*
- *IP address* – press the **Ping** button to test device accessibility.
- *Web Page* – this link launches the device web page in a browser to view and edit all device parameters. Depending on the device make and model, the device web page can also be launched and edited from within the Nx Witness client (see "Configuring Device Advanced Settings Using Nx Witness").
- *MAC address.*
- *Camera ID* – a UUID that the system assigns to each camera, usually in the format similar to f93369eb-e530-27b7-78ba-16978cbd3061. It is also used for devices such as virtual cameras.
- *Primary stream URL.*
- *Secondary stream URL.*

Device Authentication

All devices come with a predefined login and password combination. During the discovery process, Nx Witness attempts to use the manufacturer's default credentials to access a device and acquire media streams. However, default login and passwords can vary between models or product lines, or may have already been changed.

If Nx Witness cannot access a device using the default authentication, the device is shown as **Unauthorized** ( ) in the Resource Panel and the following message will appear when a User attempts to view a live stream: "UNAUTHORIZED Please check authentication information."

Some devices require that a non-default password be created if they are discovered using default credentials. In this case, the device is displayed within the Resource Panel but an "unauthorized" message will be displayed when attempts are made to view streams from such devices.

To Enter Authorization Parameters

1. Open **Camera Settings** > **General**.
2. Click on the **Edit Credentials** button.
3. Enter **Login** and **Password** in the *Authentication* section and click *Apply* or *OK*. To discard changes, click *Cancel*.

Renaming a Device

When a device is discovered automatically, it is displayed in the Resource Panel as either "model" or "manufacturer + model". As a result, all cameras with the same make and model will have the same name – only the IP address will differ. Display of the IP address is optional (see "Show additional info in tree").

A device can be renamed for easier identification or any other reason.

In the Resource Panel right-click on the device and use the context menu option **Rename** (**F2**), or from **Camera Settings** > **General** click on the pencil icon in the camera name field to make it editable.

Camera Rotation

Nx Witness can compensate for devices that aremounted upside down or rotated by either 90, 180, or 270 degrees. Rotation correction requires the transcoding of video exported from a Camera.

Note: Users must have the Resource Permission to Edit Device Setting grant directly or by Group membership (see "Users and Groups").

To Specify Device Orientation

Desktop Client

1. Open **Camera Settings** and go to the **General** tab.
2. In the **Image Control** section, select the desired rotation adjustment from the **Default rotation** options: *0 degrees*, *90 degrees*, *180 degrees*, *270 degrees*.
3. Apply changes.

Web Admin / *Cloud Portal*

1. Open **Settings** > **Cameras** and select a camera.
2. Open the *Rotation* drop-down menu.
3. Select the desired rotation adjustment from the default options: **0 degrees**, **90 degrees**, **180 degrees**, **270 degrees**.
4. Apply changes.

Setting Camera Aspect Ratio

Occasionally, cameras will report an incorrect aspect ratio. If Nx Witness cannot make an automatic correction you can do so manually.

Note: This correction will require transcoding of videos that are exported from the camera.

To Specify an Aspect Ratio

Desktop Client

1. Open **Camera Settings** and go to the **General** tab.
2. In the **Image Control** section, click on the **Aspect Ratio** drop-down menu.
3. Select the desired aspect ratio from the available options: **16:9**, **1:1**, or **4:3**. Select **Auto** for Nx Witness to determine the aspect ratio.
4. Apply changes.

Web Admin / *Cloud Portal*

1. Open **Settings** > **Cameras** and select a camera.
2. Click on the *Aspect Ratio* drop-down menu.
3. Select the desired aspect ratio from the available options: **16:9**, **1:1**, or **4:3**. Select **Auto** for Nx Witness to determine the aspect ratio.
4. Apply changes.

Note: If the aspect ratio is set to **Auto** in the Camera Settings dialog, the aspect ratio of the secondary stream will be modified to match the aspect ratio of the primary stream.

Applying Parameters to Multiple Devices

To simplify the configuration process, you can apply the same parameters to multiple devices at once. Not all settings and devices

1. Select the desired devices from the Resource Panel or layout.
2. Open the device context menu and go to **Device Settings**. The following settings can be configured when multiple devices are selected:
   - Authentication credentials.
   - Aspect Ratio.
   - Default rotation.
   - Audio (enabled or not).
   - License Activation (Recording on or off).
   - Recording Schedule.
   - All **Expert** tab settings except **Logical ID** (see "Expert Device Settings").
3. Enter the desired parameters.
4. Apply changes.

Hotspots

Hotspots are icons layered over the display of a Camera. Each Hotspot icon is linked to another Camera that provides an alternate view of the same area, or is the next Camera to cover the path an object of interest may follow. Viewers can hover their mouse over a Hotspot to see a preview of the linked Camera, or click on the Hotspot to open the linked Camera on the current Viewing Grid or in a new tab/window. This provides an efficient method to follow objects of interest while they travel through doorways, down hallways, or in and out of the view of Cameras.

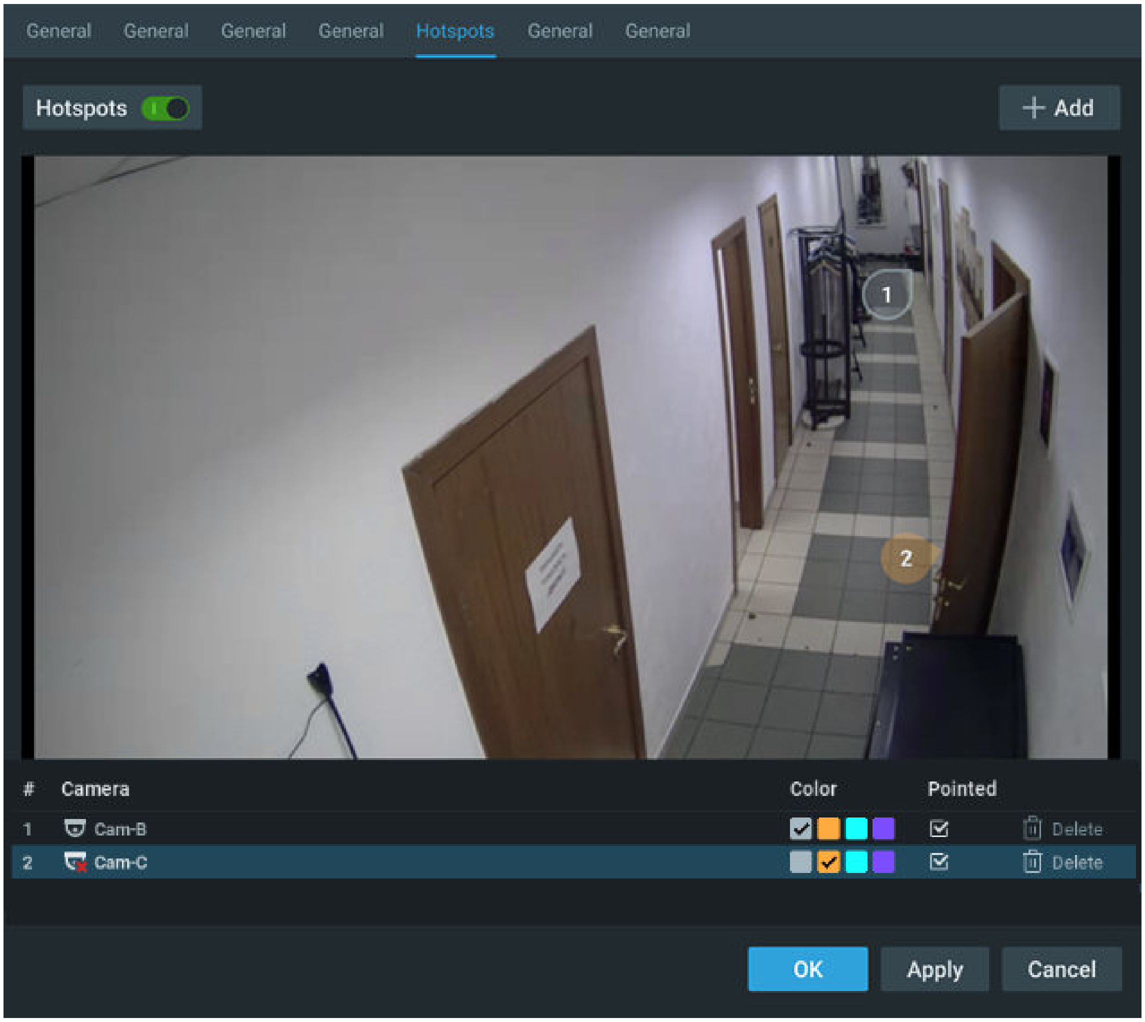
- Hotspots can be freely positioned over the Camera display and remain in a fixed positions that is not affected by Image Controls or Pan, Tilt, and Zoom Controls.
- Managing Hotspots is limited to Administrators and Power Users, all Users who can View the Camera can toggle the Hotspot overlay on and off (see "Users and Groups").
- Hotspots are disabled by default. They must be enabled for each Camera and after a new Camera has been added to the System (see "Setting Up Cameras and Devices").
- A Camera can have one Hotspot configured for every other Camera in the System. Hotspots can be color coded and set with a directional indicator.
- The Hotspot layer can be toggled per Camera display while the position and visibility of a Hotspot remains unchanged on all other Camera displays.
- Hotspots are functional in the Desktop Client and will not be visible in the Web Admin or Cloud Portal.

❗ **IMPORTANT:** Using PTZ controls to change the position of a Camera can affect the accuracy of the Hotspot as Hotspots do not track Camera movements.

To Add or Edit a Hotspot using the Desktop Client

1. Open **Camera Settings** by doing one of the follow:
   - **Main Menu > System Administration > Camera List** and double click a Camera.
   - Open **Camera Settings...** using the context menu on the Viewing Grid or a Camera name in the Resources Panel.
2. Switch to the **Hotspots** tab in the *Camera Settings* dialog.
3. Ensure Hotspots are enabled for the Camera by checking the toggle.
4. Click the **Add** button and the next sequential Hotspot number is added to the center of the Camera display.
5. Drag the Hotspot to any location on the Camera display; select a Hotspot color and rotate the optional pointer.
6. In the list of Hotspots, click any Hotspot labeled *Select Camera...* to link a Camera to the Hotspot using the search and selection dialog.
7. **Apply** changes to remain in the Hotspot dialog or click **OK** to apply settings and exit the *Camera Settings* dialog.

Note: All created Hotspots that are not linked to a Camera will be removed when the *Hotspot* dialog is closed.



#	Camera	Color	Pointed	
1	Cam-B	✓ 🟧 🟦 🟪	☑	Delete
2	Cam-C	⬜ ✓ 🟦 🟪	☑	Delete

Using Hotspots

1. If not displayed, toggle the Hotspot layer using Keyboard Shortcut (**"H"**) or by Clicking the Hotspot icon in the display title bar.
2. Mouse-hover over a Hotspot to see a preview of the linked Camera.
3. Click on the Hotspot to open the linked Camera on the Viewing Grid.
4. Right-click the Hotspot to open the Hotspot context menu.
   - Open Camera (on Viewing Grid).
   - Open Camera in a New Tab.
   - Open Camera in place (of the Camera displaying the Hotspot).

To Delete a Hotspot using the Desktop Client

1. Open Camera Settings by doing one of the follow:
   - **Main Menu > System Administration > Camera List** and double click a Camera.

- Open **Camera Settings...** using the context menu on the Viewing Grid or a Camera name in Resources Panel.

2. Change to the Hotspots tab in the *Camera Settings* dialog.
3. Remove Hotspots using the **Delete** icon in the list of Hotspots.

❗ **IMPORTANT:** Deleted Hotspots cannot be restored.

Image Controls

Item windows display basic device information and provide icons for powerful built-in functions. Information and icons shown depends on whether the item is showing live or recorded video.

Upper Left

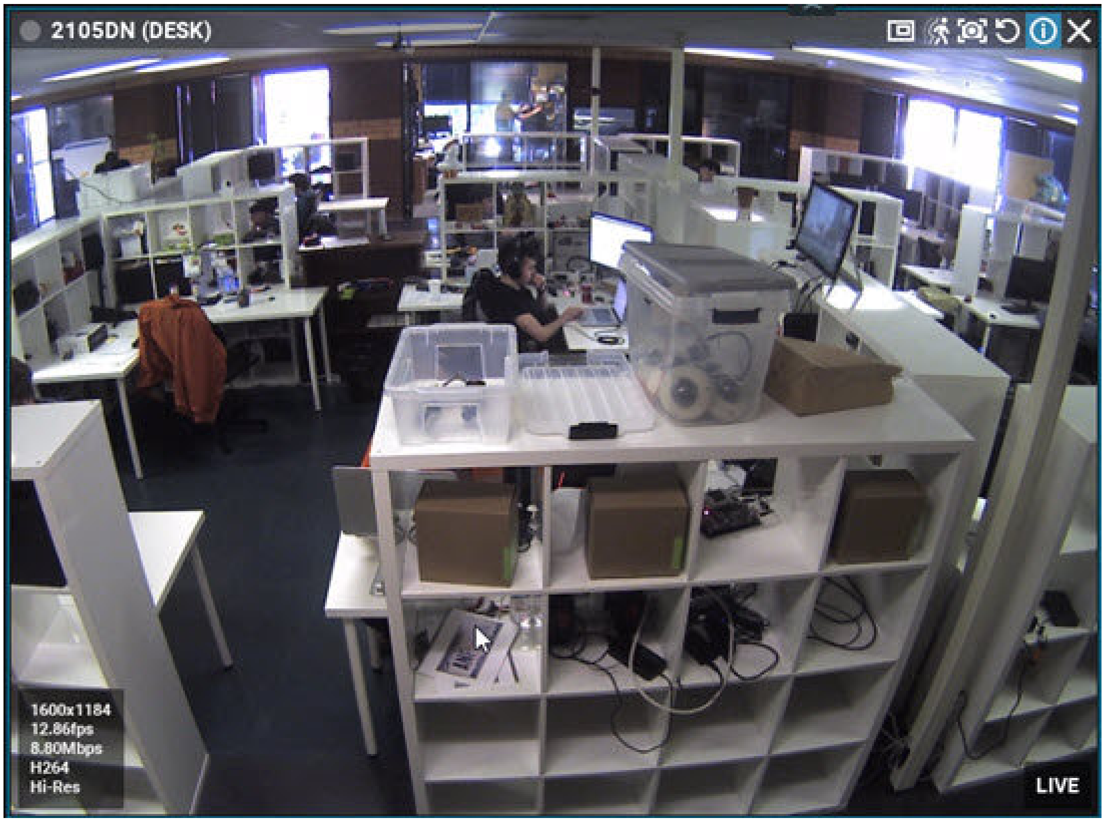
The upper left corner displays the camera name for live streams, or the file name for recorded video, and an icon for the current Recording Mode.

🟢 – Constant Recording (green circle)

🔴 – Motion Recording (red circle)

◐ – Low Resolution always and High Resolution for motion (red circle with green diagonal stripe)

○ – Not Recording (grey circle)



Upper Right

The upper right corner contains the following buttons:

– Motion Smart Search.

– Screenshot.

– Creating a Zoom Window.

– Dewarping Controls.

– Object Search.

– Pan, Tilt, and Zoom Controls – for live streams, if supported by the device

– Hotspot

– Rotate

ⓘ – Information – displays additional information about the device settings

✕ – Close – removes the item from the current Viewing Grid.

Bottom Right

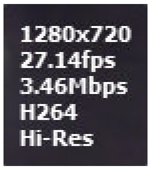
The bottom right corner indicates **LIVE** for live streams, or displays the date and running time for archive. If supported by the device you may also see:

– Using 2-Way Audio button

Custom Soft Triggers

Bottom Left

Click on the Information icon ⓘ or right-click on any selected item to open the context menu, and choose **Show On Item > Info** (**Alt+I**) to display the following item information:



1280x720
27.14fps
3.46Mbps
H264
Hi-Res

- Resolution of the stream in pixels
- Frames per second (FPS) of the stream
- Bitrate of the stream. The letter after the bitrate value is the video traffic delivery method indicator – Direct Connect, NAT traversal (N) and Proxy (P).
- Codec (e.g., H.265, H.264, or MJPEG). If "Hardware Decoding" (Intel Quick Sync) is enabled, the stream will display the (HW) indicator to the right of the stream codec.
- Stream in use – Hi-Res or Lo-Res.

Messages in place of Camera feed

- *OFFLINE* (see "Diagnosing Offline Devices").

- *NO DATA* – No recording was performed, no data is available.
- *Loading* – Awaiting data from server.
- *Unauthorized* – Incorrect/missing login or password.

1.14.10.8.1 Image Enhancement

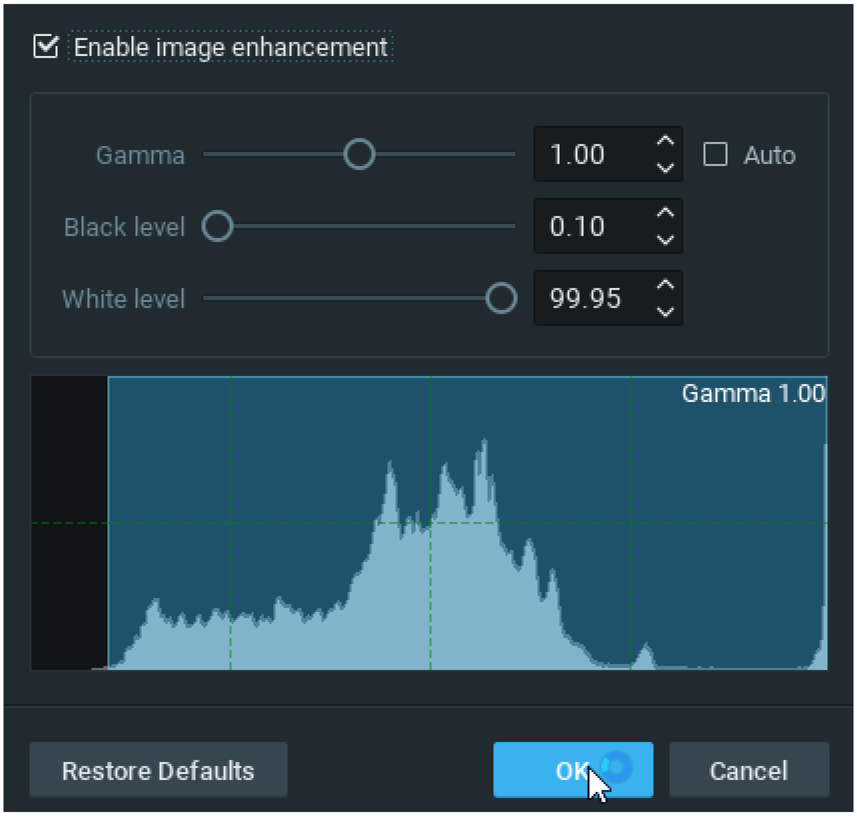
Image enhancement applies a set of adjustments to improve overall image quality. Select an image and open the Image Enhancement dialog using the context menu or hotkey (**ALT+J**).

Automatic Image Enhancement:

Use the default adjustment parameters that Nx Witness calculates (using a standard gamma correction algorithm) or set the parameters manually. In most cases, the default settings are adequate.

To Set Image Enhancement Parameters Manually

1. Right-click on the desired image and select **Image Enhancement** (**Alt+J**) in the context menu.



☑ Enable image enhancement

Gamma 1.00 □ Auto

Black level 0.10

White level 99.95

2. In the *Image Enhancement* dialog that opens, click the **Enable image enhancement** checkbox to turn image enhancement on. This will allow you to see the effect of your changes as they are made.

Note: This setting is persistent and will the applied to all images where manual adjustment in enabled.

3. Set the following parameters:
   - *Gamma* – use the slider to adjust this value, where the lower the value the lighter the image will be. Check **Auto** to allow the gamma value to change to an optimal level as the other settings change.
   - *Black level* and *White level* – use the sliders to adjust these values, noting the impact on the histogram section. It is best to cover as much of the histogram area possible. If too much of the histogram is clipped on the left or right sides, important graphic information will be lost.
3. You can click **Restore Defaults** at any point to restore the default enhancement settings.
4. Click **OK** to save your changes or **Cancel** to discard them.

   Note: The current state of image enhancement is always applied to screenshots, and optionally to exported video (it can be turned off in the export settings).

1.14.10.8.2 Dewarping Controls

Some specialty lens known as Fish-eye lens capture a very large viewing area but also create a highly distorted image. Nx Witness provides a powerful dewarping algorithm that can be applied to flatten make a fish-eye image making it much easier to view.

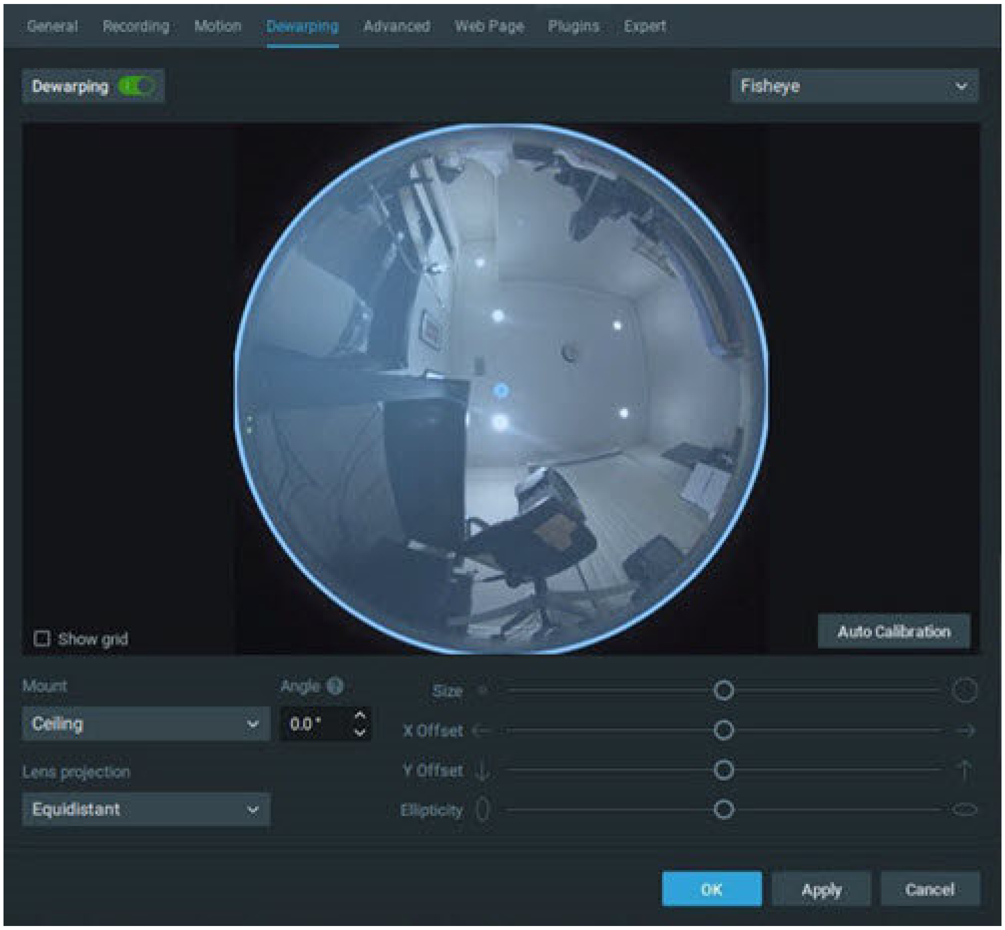
Dewarping requires some initial configuration. Once configured a viewer can click on the dewarping icon when the Camera is in a layout to toggle dewarp mode.

Configuring Camera Dewarping

- Configuring Camera dewarp can only performed by User with Permission to Edit Device Settings (see mode "Permissions Management")
- Keep the Camera open in Layout to view how its image changes as the dewarp settings are adjusted.
- Select the desired camera and open the **Camera Settings** dialog from the context menu.
- In the **Dewarping** tab, click on the **Dewarping** toggle to enable the distortion correction parameters; toggle turns Green with an (1)ON indicator when Enabled.
  - *Dewarping* – select dewarping type: Fisheye or 360° Equirectangular. If 360° Equirectangular, the only fields you can modify are α and β for Horizon correction.
  - *Mount* – indicate the mounting position of the camera to apply the proper dewarping algorithm for the camera's orientation: **Ceiling**, **Wall**, or **Floor/Table.** A wall mount setting allows for only a 180 degree panoramic view while Ceiling and Wall allow for a 360 degree panoramic view.
  - *Angle* – if the camera is not mounted in an exact vertical or horizontal position, you can adjust the mounting angle by -30.0 to +30.0 degrees to fix the distortion.
  - *Lens Projection* – improve fisheye dewarping precision by selecting the most suitable lens projection type:
    - *Equidistant*

○ *Stereographic*

○ *Equisolid*



Dewarping: on

Fisheye

Mount: Ceiling

Angle: 0.0 °

Lens projection: Equidistant

Note: The equidistant dewarping setting can also be used to dewarp compatible 360° panoramic images and videos.

3. If necessary, position the blue calibration circle over the camera's field of view as accurately as possible. Click-and-drag to move the circle and use the mouse wheel to resize it.
4. Click **Auto Calibration** to apply the dewarping algorithm.
5. If needed, you can manually adjust the distortion settings:
   - *Size* – use the slider to change the size of the blue circle. You can also use the mouse scroll wheel to resize it.
   - *X Offset* – use the slider to change the position of the circle horizontally.
   - *Y Offset* – use the slider to change the position of the circle vertically.
   - *Ellipticity* – use the slider to adjust the shape of the lens (panamorph lens support).
8. Click **Apply** or **OK** when finished. To discard changes, click *Cancel*.

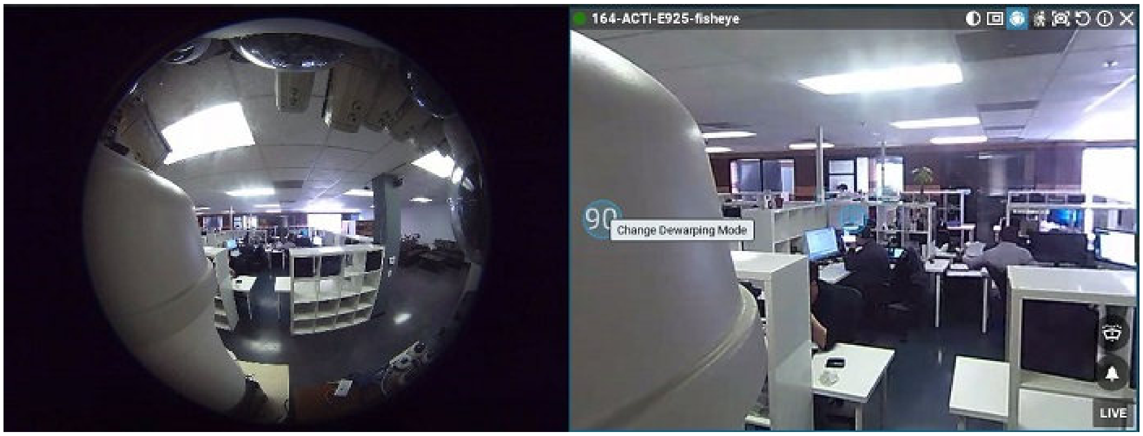
   Note: Using PTZ controls on a de-warped image does not cause the Camera to move or change PTZ position, only the calculated view is changed.

Viewing a dewarped Camera

Once dewarp is configured and enabled, the dewarping icon will be displayed on the camera image and PTZ-style controls can be used to move around the dewarped image without changing the Camera position (see "Keyboard Shortcuts"). Dewarping mode is disabled while motion search is active, the dewarping state remembered and reinstated when motion search is no longer active.

- Zoom windows created from a dewarped image are dewarped automatically.
- The current dewarping state is applied to screenshots, and it is possible to apply dewarping to a screenshot after it is captured: open the **File Settings** dialog from the context menu and select Dewarping.
- The option to apply dewarping to exported video can be turned on or off in the Export Video dialog using **Apply Filters**.
- Dewarping a camera will set its resolution to **High**.

1. Click the dewarping icon to toggle dewarping mode on and off:



2. Click the **Change Dewarping Mode** button in layout to show the image as a **90**, **180**, or **360** degree panoramic view, as indicated by the button.
3. Use PTZ-style controls can be used to move about the dewarped image without changing the Camera position (see "Pan, Tilt, and Zoom Controls").

   Note: Using PTZ controls on a de-warped image does not cause the Camera to move or change PTZ position, only the calculated view is changed.

To Dewarp Fish-eye or 360° Panorama Content

1. Right-click on the image or video file to open the context menu and select **Camera Settings**.
2. Click on the **Dewarping** toggle to Enable (slider turns green) the distortion correction parameters.
3. Configure dewarping as described above.

   Note: 360 degree panoramic mode is not available to cameras that are configured as wall mounted, 360° panorama content must use equidistant projection.

1.14.10.8.3 Pan, Tilt, and Zoom Controls

Nx Witness will present a PTZ Guide the first time PTZ controls are activated on a System, unless the Alternate UI for PTZ has been enabled. Once viewed, the PTZ Guide will only be shown after navigating to **Main Menu > Local Settings > Advanced** and clicking on the "**Reset All Warnings**" button.

To the extent supported by a particular ONVIF camera, PTZ controls (Pan, Tilt, and Zoom) are available when the Camera is in Live mode. PTZ controls are also available on archived footage for fish-eye cameras that have dewarping enabled (see "Dewarping Controls").

Cameras that support **ONVIF Absolute Move** have the following features:

- Saving and Restoring PTZ Positions
- Setting Up PTZ Tours
- Relative PTZ

When PTZ requirements are met and enabled, the PTZ icon will display on the corresponding camera item. See Adjusting PTZ Speed and Selecting PTZ Presets for more configuration options.

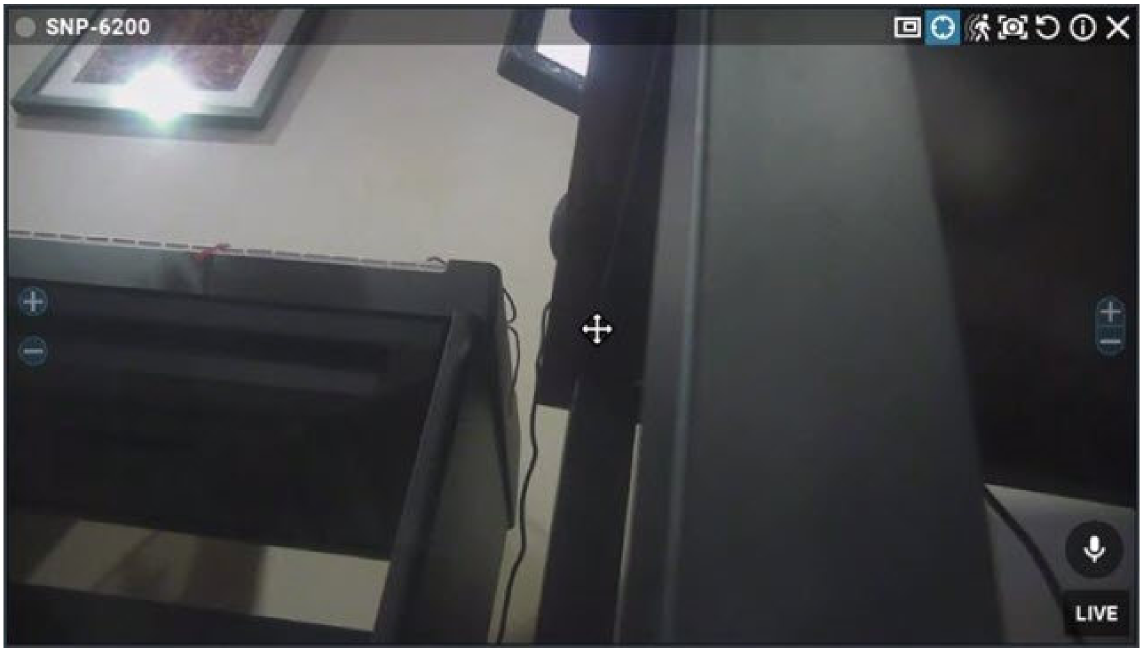
Manufacturer "Native" PTZ Settings

Native PTZ camera presets – those provided in-camera – for a specific camera can maintained by checking **Use camera native presets** in **Camera Settings** > **Expert**. To ignore manufacturer settings in favor of Nx Witness settings, check **Use system presets** instead.

Default UI for PTZ controls

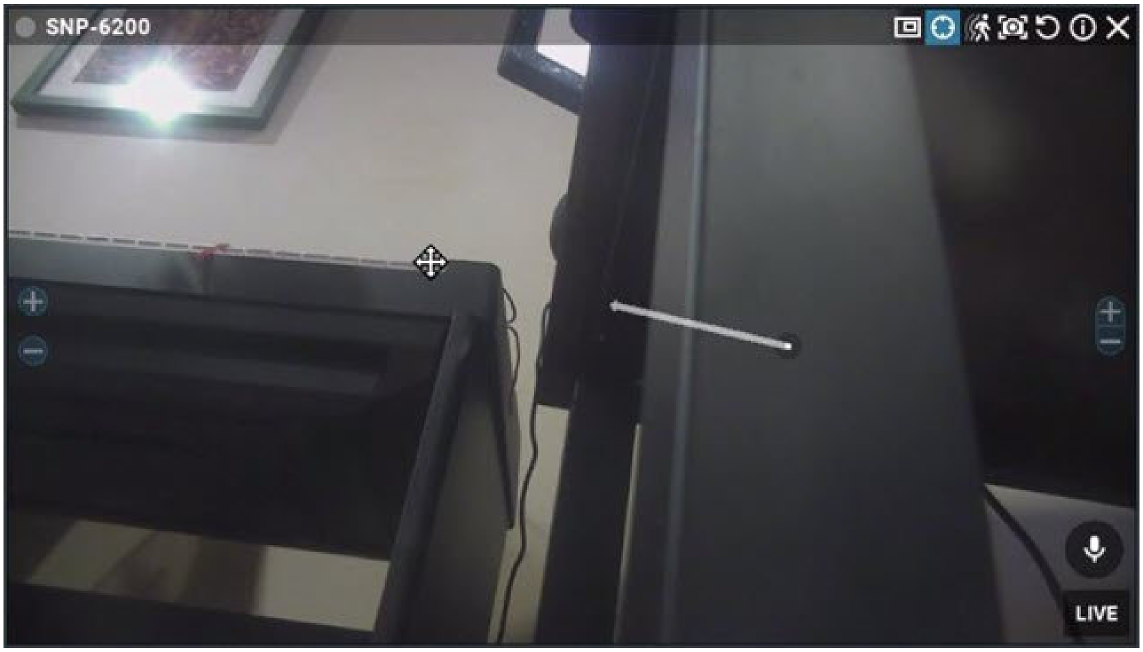
Depending on the camera model, one of the following modes is available when you click on the PTZ icon .

Simple (**Zoom** only) – Use the mouse wheel or +/- keys to zoom.



Regular (**Zoom** and **Point**) – In addition to the zoom functionality from *Simple* mode, press the arrow keys or drag over any part of the video to point (pan/tilt) the camera.

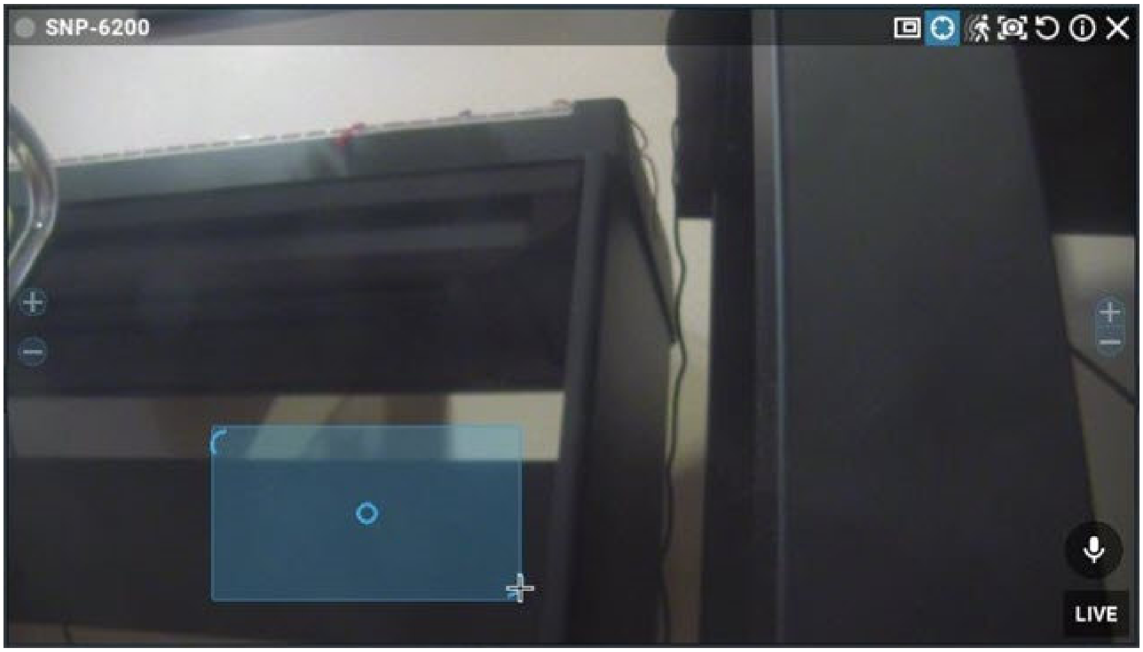
.



Advanced PTZ (**Zoom**, **Point** and **additional features**) – In addition to the zoom and point functionality from *Regular* mode, *Extended* mode requires a custom product integration and ONVIF Absolute Move support from the camera. Extended mode allows the following additional controls:

- **Shift + Click** anywhere in the field of view to re-center at that position.

- ○ **Shift + Click-and-drag** and draw a zoom rectangle that can be positioned until the mouse button is released.
- ○ **Shift + Double-click** to zoom out all the way.



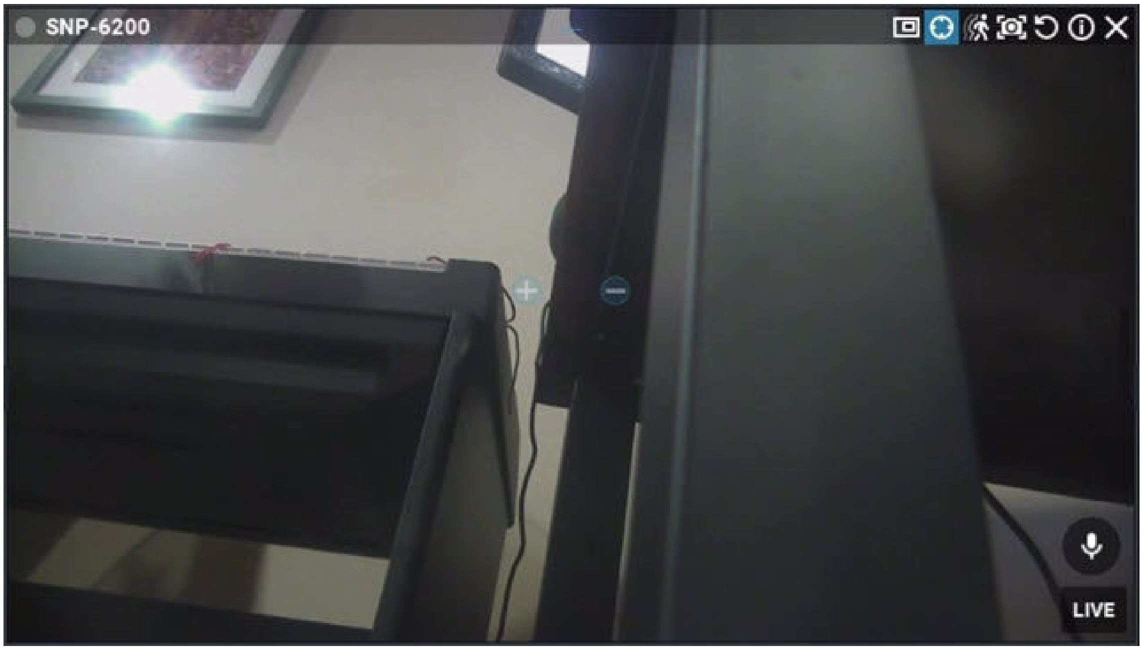
Alternate PTZ Controls

Enable the alternative UI for PTZ controls by selecting the checkbox next to "Show aim overlay for PTZ cameras".

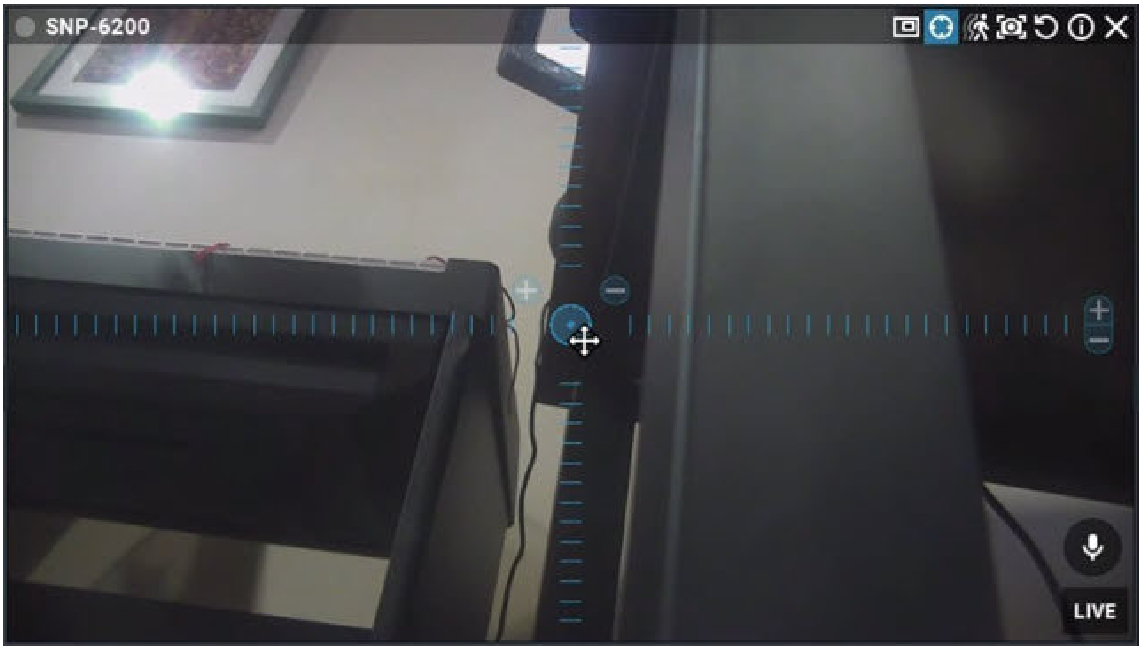
Note: The PTZ Guide will not be shown if the Alternate UI for PTZ is enabled.

Depending on the camera model, one of the following modes is available when you click on the PTZ icon ⊙.

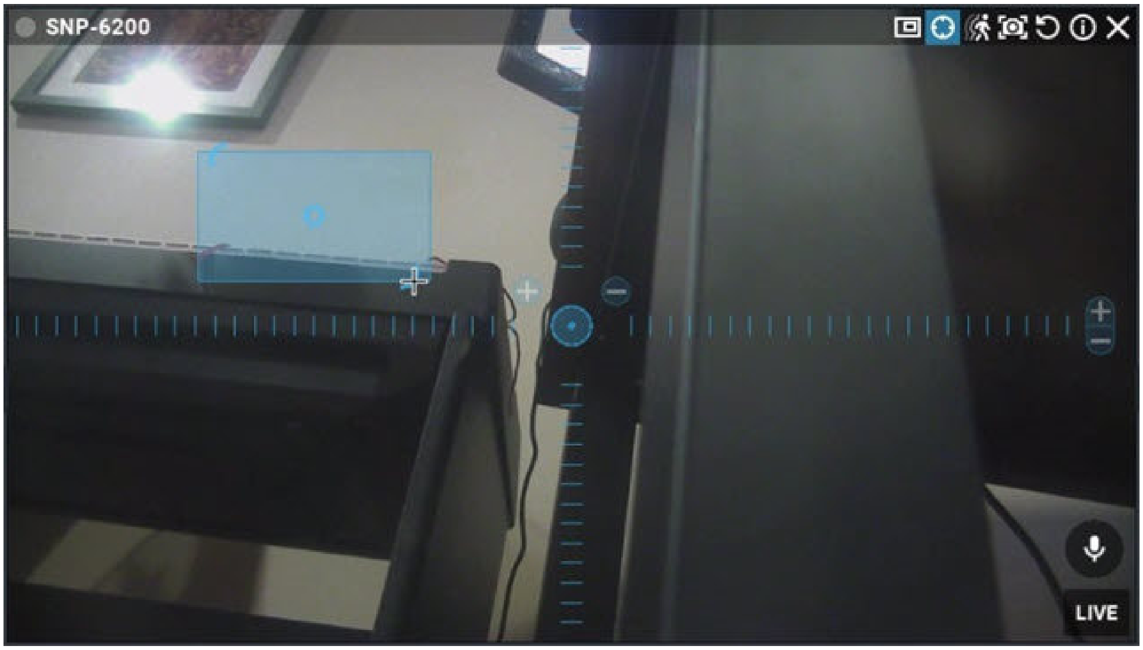
Simple (**Zoom** only) – As shown in the image below, only the **+** and **-** buttons are available to zoom in and out.



Regular (**Zoom** and **Point**) – Use the **+** and **-** buttons to zoom in and out. When there is a center circle as shown below, you can use it to click-and-drag the center of the image to the desired position.



Extended (**Zoom**, **Point** and **additional features**) – Requires a custom product integration and ONVIF Absolute Move support from the camera. Allows zooming, repositioning, and the following additional controls:



- **Click** anywhere in the field of view to re-center at that position.
- **Click-and-drag** and draw a zoom rectangle that can be positioned until the mouse button is released.
- **Double-click** to zoom out all the way.

Once a PTZ position is set, press ⊕ again to hide PTZ controls.

1.14.10.8.4 Saving and Restoring PTZ Positions

It is possible to establish predefined PTZ positions that can be restored in just a few clicks or with a Keyboard Shortcut.

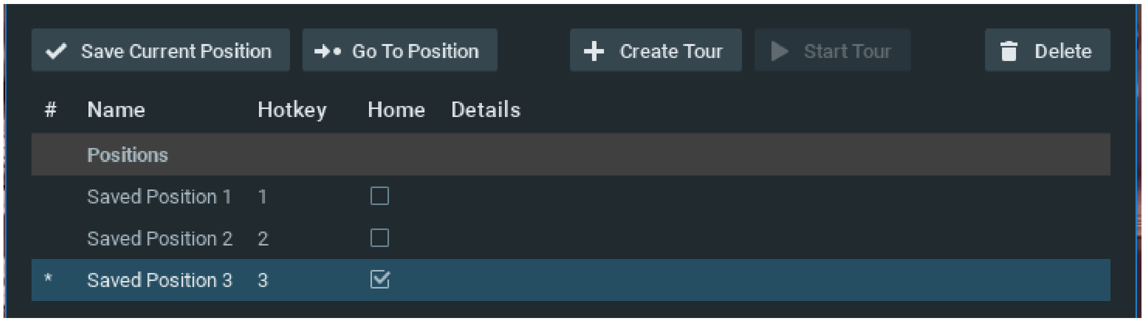
Once defined, a preset PTZ position can serve as the home position for a device, or several presets can be sequenced to create a PTZ tour (see "Setting Up PTZ Tours"). There is also an "Execute PTZ Preset" action for event rules.

To Save a PTZ Position

1. Click on the PTZ icon ⊕ in layout and go to the desired position.
2. From the camera item in layout, open the context menu and select **PTZ** > **Save Current Position**.
3. Enter a name or accept the default name.
4. Optionally, select a hotkey for the position (**0-9**).

To Edit a Saved PTZ Position

1. From the camera item in layout, open the context menu and select **PTZ** > **Manage**. It is a good idea to move the *Manage PTZ* dialog so the camera item is clearly visible in layout.
2. The **Name** and **Hotkey** fields in the *Manage PTZ* list are editable fields.



#	Name	Hotkey	Home	Details
	Positions			
	Saved Position 1	1	☐	
	Saved Position 2	2	☐	
*	Saved Position 3	3	☑	

3. If desired, click the **Home** checkbox to select the position the camera will return when the PTZ position is not changed for 2 minutes. (You can use the **Go To Position** button to preview a preset position.)
4. It is possible to add a new preset by clicking on the PTZ icon in layout and clicking **Save Current Position in** the *Manage PTZ* dialog.
5. Click *Apply* or *OK* when finished. To discard changes, click *Cancel*.

To Restore a PTZ Position

Open the camera context menu and choose **PTZ** > **<position name>** or press the related hot key (**0-9**). The active position will be indicated in the PTZ context menu.

To Delete a PTZ Position

1. Open the camera context menu and select **PTZ** > **Manage**.
2. Select a desired preset and click **Delete**.

   Note: If a preset position is included in a PTZ tour, deleting it will make the tour invalid. The tour will remain in the list in the *Manage PTZ* dialog but will not be available from the PTZ context menu.
3. Click *Apply* or *OK* when finished. To discard changes, click *Cancel*.

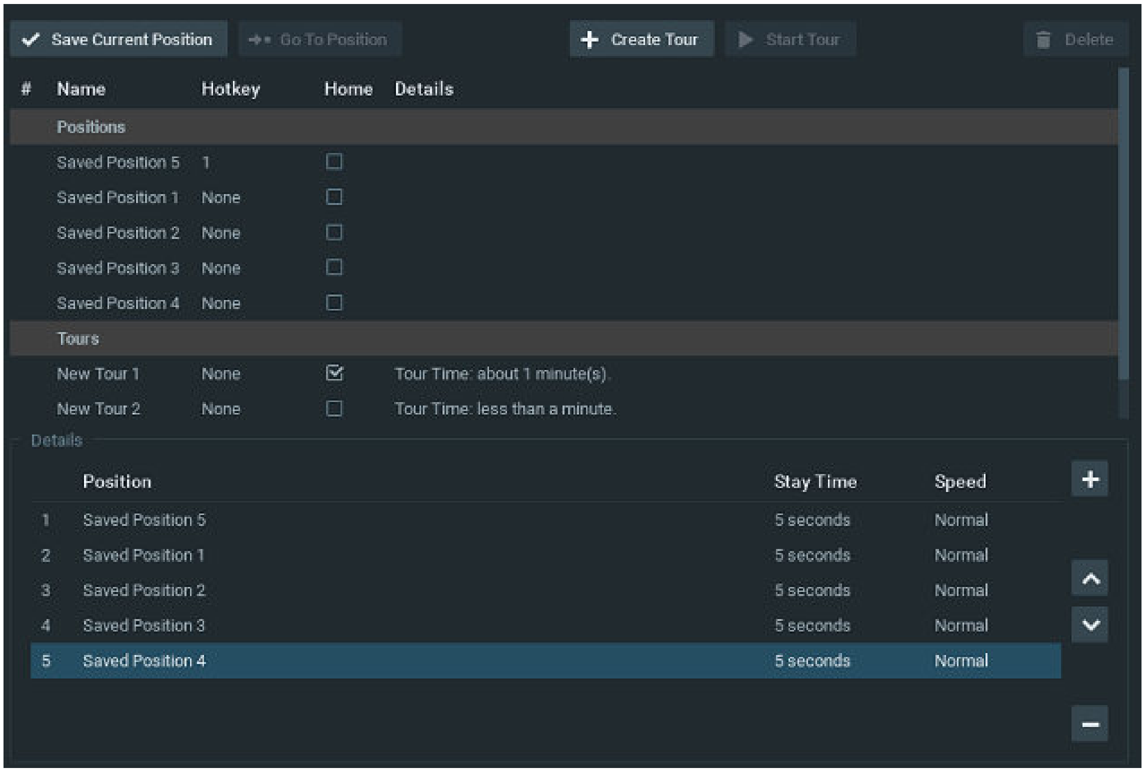
1.14.10.8.5 Setting Up PTZ Tours

A **PTZ tour** is a sequence of saved PTZ positions. PTZ tours are useful for observing a broad field of coverage with a single camera. The following requirements apply:

- Can only be applied to a PTZ or fish-eye camera
- Must contain at least two positions
- The same position should not be used consecutively or as both the first and last position. A warning will appear if a tour contains multiple instances of the same position. Instead, define and use slightly different or overlapping PTZ presets.

To Create a PTZ Tour

1. Right-click on the camera item in the layout and select **PTZ** > **Manage** from the context menu.



#	Name	Hotkey	Home	Details
	Positions			
	Saved Position 5	1	□	
	Saved Position 1	None	□	
	Saved Position 2	None	□	
	Saved Position 3	None	□	
	Saved Position 4	None	□	
	Tours			
	New Tour 1	None	☑	Tour Time: about 1 minute(s).
	New Tour 2	None	□	Tour Time: less than a minute.

Details

	Position	Stay Time	Speed
1	Saved Position 5	5 seconds	Normal
2	Saved Position 1	5 seconds	Normal
3	Saved Position 2	5 seconds	Normal
4	Saved Position 3	5 seconds	Normal
5	Saved Position 4	5 seconds	Normal

2. Make sure at least two positions are saved.
3. Click the **Create Tour button**. A *Tours* section will open at the end of the position list, with a default name *New Tour <#>*.
4. In the *Details* form, click the **+** button to add the first position to the tour. Continue to click **+** until you have added all desired positions.
5. Each tour position can be edited as follows:
   - Click on the **Stay Time** field to select the display duration for a position.
   - Click on the **Speed** field to set the speed of the move from one position to the next.
   - Click on the **Position** field to select a different position.
   - Use the **up and down arrows** at the right to change the order of a position in the tour.
   - Click the **+** button to add a position.
   - Click the - button to delete a position.
4. Click *Apply* to save the tour then click the **Start Tour** button to test it.
5. Optionally, rename the tour using the list **Name** field or assign it a **Hotkey**.
6. Optionally, check the **Home** box. The home tour will be activated on a camera automatically if there is no active PTZ tour.
7. Click *Apply* or *OK* when finished. To discard changes, click *Cancel*.

To Start a PTZ Tour

1. From the camera item in layout, open the context menu and select **PTZ**.

2. Select the desired tour from the list of saved tours (which is below the list of saved positions).
3. Alternately, open the context menu, select **PTZ** > **Manage**, highlight the desired tour in the list and click on **Start Tour**.

To Stop a PTZ Tour

A PTZ tour cannot be toggled on and off, it must be replaced with a static PTZ position. Either enable PTZ controls on the camera item and choose a PTZ position manually or choose a saved PTZ position (select one from the context menu or use a hotkey).

Configuring Audio on a Device

Nx Witness allows for audio recording from devices that are audio-enabled and have a microphone connected (see "Audio in Nx Witness").

To Configure Audio

Desktop Client

1. Right-click the camera **> Camera Settings > General** tab.
2. Check the *Enable audio* checkbox and choose between the two options:
   - **Use audio stream from this camera** – use the audio input from the current camera.
   - **Use audio stream from another camera** – select a camera or device with audio input to use instead of the current camera's audio input.
3. Apply changes.

Web Admin / *Cloud Portal*

1. Open **Settings** > **Cameras** and select a camera.
2. Check the *Enable audio* checkbox and choose between the two options:
   - **Use audio stream from this camera** – use the audio input from the current camera.
   - **Use audio stream from another camera** – select a camera or device with audio input to use instead of the current camera's audio input.
3. Apply changes.

Note: Only devices connected to the same Server can provide their audio stream to another camera.

Setting Up a Virtual Camera

It is possible to import offline video files (from wearable Cameras, action Cameras, drones, etc.) into Nx Witness archive and associate that footage with a *Virtual Camera* which can be viewed and processed like any other Camera in the System. Frames pe Second (FPS) and bitrate recording options are inactive with Virtual Cameras.

Note: To be processed as a virtual camera, a imported media must have been produced with timestamp data.

As with any other camera, virtual cameras can be opened, deleted, and renamed. Virtual camera images can be rotated 0, 90, 180, or 270 degrees, can be dewarped, analyzed, and searched to detect motion. Like camera streams recorded by Nx Witness, videos uploaded using the virtual camera feature remain in the archive after the camera is removed from a Server.

IMPORTANT: Motion detection for Virtual Camera footage must be enabled during upload or it will not be available subsequently.

Once storage blocks for a given time period are filled with virtual camera content, they cannot be overwritten. For example, if file "A" was recorded from 11:32 to 11:37, and file "B" was recorded from 11:35 to 11:38 on the same day, if one of the two has already been uploaded, the other file will not be, as they occupy some of the same storage blocks in archive. If the selected file covers a period for which video is already uploaded, you can upload it to a different virtual camera instead.

To Add a Virtual Camera

1. Do one of the following:
   - Open the **Main Menu** and select **Add > Virtual Camera**.
   - Open a Server context menu and select **Add > Virtual Camera**
2. In the dialog that opens, select a Server from the pull-down menu.

   IMPORTANT: Make sure the Server you select has enough storage space for the files being uploaded (see "Analyzing and Predicting Storage Usage"). If there is not enough available storage, the oldest existing archive may be deleted. Or, if the virtual camera footage is older than anything in archive, it will be uploaded and then deleted by the <storage management> sub-system.
3. Enter a name for the virtual camera in the *Name* field.

Note: If you do not enter a name, the default name "Virtual Camera" will automatically be appended with an integer that increments by 1.

4. Click *OK* to save or *Cancel* to exit without saving.
5. In the *Camera Settings* dialog that opens, you can proceed to upload files immediately or at a later point.

To Upload Files to a Virtual Camera

Once added, the virtual camera will be displayed in the Server Resource Panel, and files can be uploaded.

IMPORTANT: Once uploaded, virtual camera files cannot be overwritten.

1. From the camera's context menu choose **Camera Settings**.

   IMPORTANT: In the Camera Settings dialog, make sure to enable all upload setting first. Upload begins as soon as a file or folder is selected and you will not be able to enter settings such as motion detection or fixed archive length at that point.

2. If desired, use the **Default rotation** option to rotate the virtual camera footage by *90, 180* or *270 degrees*.
3. If desired, use the **Ignore timezone in uploaded files** option to make the uploaded file use the Desktop Client's local time instead of the time information found in the file.
4. Check **Enable audio** to include any audio tracks in the original footage.
5. Use the **Fixed Archive Length** fields to assign high or low priority to the virtual camera (see "Configuring Minimum and Maximum Archive Storage").
   - If there is not enough room in Server storage, setting a **Min Days** value will cause archived content with lower priority to be deleted in order to successfully upload files from the higher priority virtual camera. This setting can be crucial for a virtual camera, since oldest footage is deleted first and the virtual camera footage may be much older than material already in archive.
   - **Max. Days** sets an archive duration after which records will *not be saved* for the virtual camera.
6. If desired, check **Detect motion in uploaded video**, which will parse motion detection during file upload.

Note: This option adds significant processing time.

   - If motion detection is checked, you have the option to also adjust the **Sensitivity** setting (see "Setting up Motion Detection").

7. Select **Upload File** to select a single file or **Upload Folder** to select all video files in a given directory.
   - If there is limited storage space on the server, you will get a warning message with a prompt to continue or cancel. There is also an option to cancel upload from *Camera Settings* once upload is launched. If upload is canceled, any files that have already been uploaded will remain in storage.
   - Upload will begin as soon as the file or folder is selected, and runs in background so you can perform other tasks simultaneously. An upload progress bar displays at the top of the *Camera Settings* dialog, and progress percentage is also shown in the Resource Panel.
8. Once upload is complete, the video will launch and play automatically.
   - If only virtual cameras are open in the layout, the Timeline will scale to show only the time interval spanning archive from those cameras. This is especially helpful when virtual camera footage is old and would be difficult to locate with the Timeline fully expanded to the present.
   - If an audio track exists but is not audible, ensure **Enable Audio** in **Camera Settings** > **General** is checked.

Setting Up an I/O Module

Nx Witness handles I/O devices as it does cameras, with some specific functionality adaptations. Like all other devices, I/O modules are discovered automatically or with the user's help and then displayed in the Resource Panel.

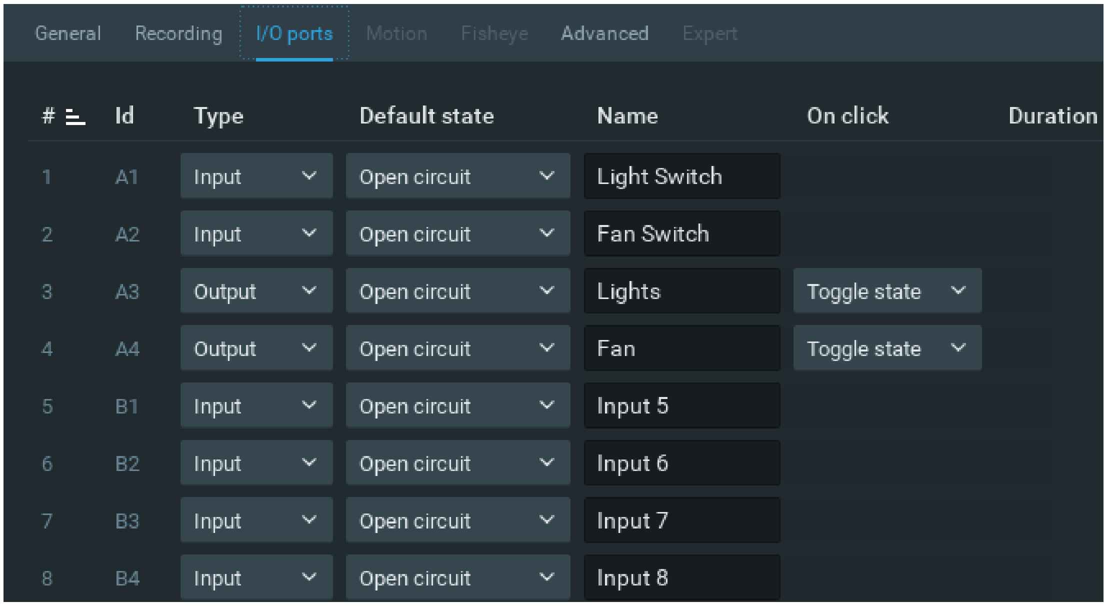
However, to start working with an I/O Module it is necessary to obtain and configure an *I/O Module License* (otherwise the "Device Disabled" message will be displayed). After the license is activated, the module will be displayed with the available inputs and outputs.

I/O Module permissions vary depending on the user's role (see "Permissions Management").

- Any User in the System that has access to the I/O Module can view its inputs and outputs.
- Administrators, Power Users, and Custom Groups or Users with the "Edit camera settings" permission can configure I/O Modules.
- Administrators, Power Users, Advanced Viewers, and Custom Groups or Users with the "User Input" permission can trigger IO Module outputs.

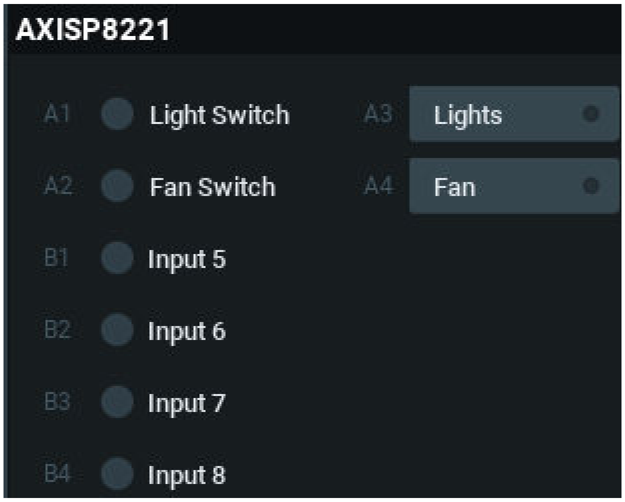
I/O Modules Require the Following Setup Steps

1. Right-click on the device in the Resource Panel and click on **I/O Module Settings**.
2. Go to the **I/O ports** tab and enter the following parameters:
    - *Type* – Input or Output.
    - *Default State* – Default state of the circuit depending on the I/O Module: *Open circuit* or *Grounded*.
    - *Name* – Name of the port.
    - *On click (output only)* – Select the desired action to occur on button click.
        - *Impulse* (requires Duration) – The length of time the signal will be generated (with 100ms steps). Clicking the button changes the port state to Duration time.
        - *Toggle state* – Clicking the button changes the port state until clicking the button again.
    - *Duration* – Time in milliseconds.



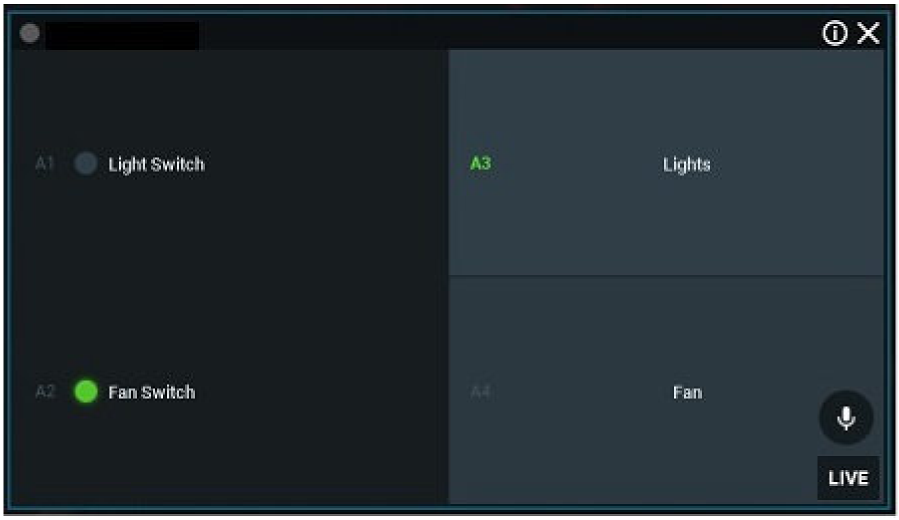
#	Id	Type	Default state	Name	On click	Duration
1	A1	Input	Open circuit	Light Switch		
2	A2	Input	Open circuit	Fan Switch		
3	A3	Output	Open circuit	Lights	Toggle state	
4	A4	Output	Open circuit	Fan	Toggle state	
5	B1	Input	Open circuit	Input 5		
6	B2	Input	Open circuit	Input 6		
7	B3	Input	Open circuit	Input 7		
8	B4	Input	Open circuit	Input 8		

After the I/O module is configured, you will see Input ports on the left and Output ports on the right. The state of each port can be seen. The I/O module will be displayed as shown below:


AXISP8221

A1	Light Switch	A3	Lights
A2	Fan Switch	A4	Fan
B1	Input 5		
B2	Input 6		
B3	Input 7		
B4	Input 8		

If you are using multiple Inputs and Outputs from the device we recommend using the "Enable tile interface" option in the lower left hand corner of the dialog. This option will generate a responsive tiled interface for the I/O in the Viewing Grid, offering a different visual experience for triggering ports and seeing their state.



The following actions can be performed with an I/O Module:

- *Record Audio from I/O Module* – Only if a microphone is connected. See "Recording Modes" and "Audio in Nx Witness" for details.
- *Playback Audio Archive Recorded from I/O Module* – Only if a microphone was connected during recording. This is similar to viewing archive from cameras (see "Parts of the Timeline").
- *View Inputs State* – Information regarding the inputs state of the device depending on the settings you configured. For example, when the circuit is grounded, the appropriate sensor turns green. Alternatively, you can also set the sensor to turn green when the circuit is open.
- *Trigger Output* – For this purpose click the corresponding button (A3 and A4 in the image above). The output signal is sent for the amount of time specified in the *Pulse Time* setting unless the output is manually turned on/off.
- *Create Rules* – Using the device's input and output ports as described in Input Signal on Device and Device Output.

Setting Up an Analog Camera

Typically, analog Cameras are connected via analog recorders. Each recorder has a number of channels that indicates the number of analog Cameras it can handle. If a recorder is plugged into the network, it can either be discovered automatically or added manually.

The following types of analog Cameras are supported:

- Analog cameras plugged into an encoder – These cameras behave like any other camera in the System. It is possible to have a Recording Schedule and Motion Detection configured for Encoder analog cameras.

- Analog cameras plugged into a recorder (DVR) – These cameras are recorded somewhere else so Nx Witness only pulls the desired stream from the recorder. It is not possible to configure a recording schedule or motion detection for recorder analog cameras.

Setting Up Motion Detection

The Nx Witness server is able to perform software motion detection. Motion detection on the software side allows for adaptive scaling, which is dynamic resolution switching that yields bandwidth savings and optimizes the processor load.

By default, the secondary stream will only be used for motion detection if its resolution is less than 1024x728. If the secondary stream resolution is higher than this, the primary stream will be used if its resolution is less than 1024x728.

If both the primary and secondary stream's resolution is higher than 1024x768, then no motion detection will be enabled.

IMPORTANT: If the secondary stream is high-resolution, motion decoding may consume most or all of the Server CPU. See "Forcing Motion Detection to a Specific Stream" to adjust for this issue.

Software-side detection also makes it possible to define regions in which motion detection is performed, with a range of sensitivity levels that include complete **motion masking**, where motion detection is blocked. For cameras that perform in-device motion detection, Nx Witness does not implement software motion detection. With such **hardware motion detection**, a motion mask can be applied, but no other sensitivity levels are available. In some cases it may be possible to use the **Camera Settings** > **General** tab to instead configure device parameters (see "Configuring Device Advanced Settings Using Nx Witness").

Note: Arecont Vision devices are set to hardware detection mode automatically.

Motion Detection Indicators

Nx Witness provides motion detection indicators in the form of a temporary red outline on grid cells when motion is detected. This feature is especially useful for highlighting motion that is easily detected by cameras but often filtered out by humans – for example, trees moving in the wind, the motion of shadows, sudden changes in light level, etc.

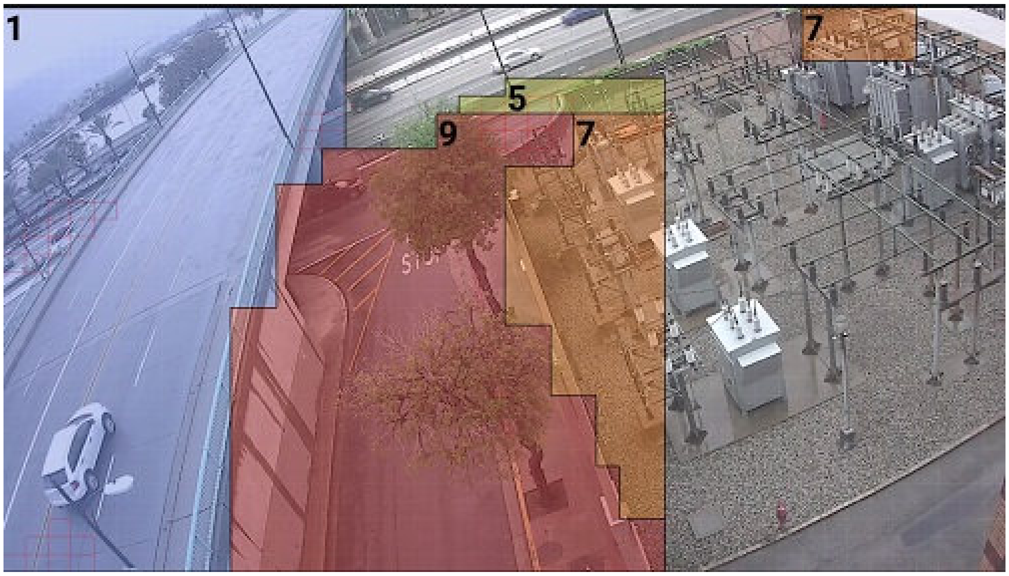
To Configure Motion Detection

1. Do one of the following:
   - *Desktop Client*: Open **Camera Settings** and go to the **Motion** tab, then click the **Motion Detection** button to enable detection (green) for the device.
   - *Web Admin* / *Cloud Portal*: Open **Settings** > **Cameras** and select a camera and Click the **Enable motion detection** button.

IMPORTANT: Cells in the motion detection grid are briefly highlighted in red when motion is detected. The greater the intensity of brighter these red indicators, the higher the level of motion detection that is set.

2. Click on a number in the *Sensitivity* section, where **0** is no sensitivity to motion (motion mask), **1** is minimal sensitivity, and **9** is maximum sensitivity.
3. The motion detection grid is 42 x 32 cells. Use the following actions to apply the selected sensitivity to cells:
   - Click and Drag to select a rectangular area.
   - Click on a cell (the entire area that the cell is associated with will be filled, not just the individual cell).
4. The sensitivity level remains active until a new one is selected. Continue to select and apply sensitivity levels as desired. If necessary, you can use **RESET** to return the entire field to the default level of 5.
5. Apply changes.

For Example



The above image contains the following motion detection regions:

- Grey (un-numbered) is motion mask
- Blue (**1**) has very low sensitivity to motion
- Yellow (**5**) will capture motion with moderate sensitivity (5 is the default setting)
- Orange (**7**) will be highly sensitive to motion, red (**9**) offers the maximum sensitivity

You can also see some of the red motion indicators on the left side of the image.

Recording

Video archiving begins once you enable recording, set image quality parameters, and specify a recording schedule.

IMPORTANT: FPS and quality settings in the recording schedule dictate live stream settings.

Audio can be recorded as well as image if the device has, or is connected to a microphone, and the **Enable Audio** checkbox in **Device Settings** > **General** > **Audio** is checked (see "Configuring Audio on a Device"). It is possible set a recording schedule for an I/O module as well (see "Setting Up I/O Modules").

When recording is enabled, Nx Witness automatically seeks an available License or Service. If one is available, the stream from device will be recorded. If not, you will be warned that the License or Service limit is exceeded and only schedule copy will be available.

See Setting a Recording Schedule for details on the scheduling interface.

Recording Indicators in the Resource Panel

When recording is enabled, the device is marked with a small red circle to the left of its name in the Resource Panel:

● – Indicates camera is recording.

○ – Indicates a recording schedule is established but the camera is not recording at the moment; a License or Recording Service is still being used even though the device is not currently recording.

○ – Indicates camera is not recording but there a recorded archive is available.

Setting a Motion Detection Region

You can control the image regions that will trigger motion detection, and how sensitive to motion those regions will be (see "Setting up Motion Detection").

1.14.10.14.1 Setting a Recording Schedule

The *recording schedule* is where you define when and at what quality a device will be recorded, using a weekly calendar divided into 1 hour blocks.

The recording schedule is always based on VMS time. When *Motion Detection* is enabled, you can set regions of the image that will register motion, and how sensitive to motion those regions will be (see "Setting up Motion Detection").

Note: If recording is *not* enabled, motion detection will only be active when the camera is being viewed in a layout.

Remember that image quality settings in the recording schedule dictate image quality in live playback as well.

IMPORTANT: If no license is available, the "License is required" error will appear above the recording schedule and prevent recording from being enabled. The recording schedule and settings will be inaccessible until a valid license is added.

To Set a Recording Schedule

Desktop Client

1. Select the desired camera(s) in the Resource Panel or in layout.

Note: The Recording Schedule comes with the following settings by default: Motion Only, High Quality, and Max FPS.

2. Choose **Camera Settings** in the context menu and go to the **Recording** tab.
3. Click the **Recording** button at the upper-left to enable recording.

Note: The total number of licenses available and the number of licenses in use is displayed below this button. If the number of available licenses is insufficient, you can click the **Activate License** button and proceed with activation.

4. If desired, set the frames-per-second (**FPS**) rate and **Quality** (*Low*, *Medium*, *High*, or *Best)* that will apply to the device(s). When available for the selected device, you can also adjust the **Bitrate** by clicking on *More Settings*.

   IMPORTANT: If changes to streamed settings are prohibited at the system level (see "Preventing Nx Witness from Changing Device Settings"), image quality settings in the recording schedule are ignored (the **FPS** and **Quality** fields will be disabled).

5. If desired, check the eye icon to toggling viewing of the **Show Quality** and **Show FPS** to display the respective values in the recording schedule Calendar.
6. If desired, adjust the length of time that will be added to the recording before (**Pre-Recording**) and after (**Post-Recording**) motion or an object is detected. Pre-Recording can be set up to 90 seconds, and Post-Recording can be set up to 300 seconds.
7. If desired, use the *For...* fields to assign high or low priority to the camera's archive.

   IMPORTANT: It is best to leave **Minimum** and **Maximum** set to **Auto** unless you have specific related requirements (see "Configuring Minimum and Maximum Archive Storage").

8. Select the desired Recording Type – *Motion*, *Objects*, or *Motion & Objects*. This selection will change the type of Recording Modes to choose from.
9. Select the desired Recording Mode:
   - *Record Always.*
   - *Motion Only / Objects Only / Motion & Objects Only.*
   - *Motion + Lo-Res / Objects + Lo-Res / Motion & Objects + Lo-Res.*
   - *Do Not Record.*

   A blue outline around the button indicates the active recording mode (see "Recording Modes").

10. Once the above parameters are set, click hour blocks in the calendar to apply a recording mode:
    - Click-and-drag to select multiple time blocks.
    - Click on an hour number to select that block of time for an entire week.

- Click on a day name to select an entire day.
- Click **All** to select the entire week.

Note:You can use **Alt + Click** to copy the recording mode in a given block so it can be applied to a different block.

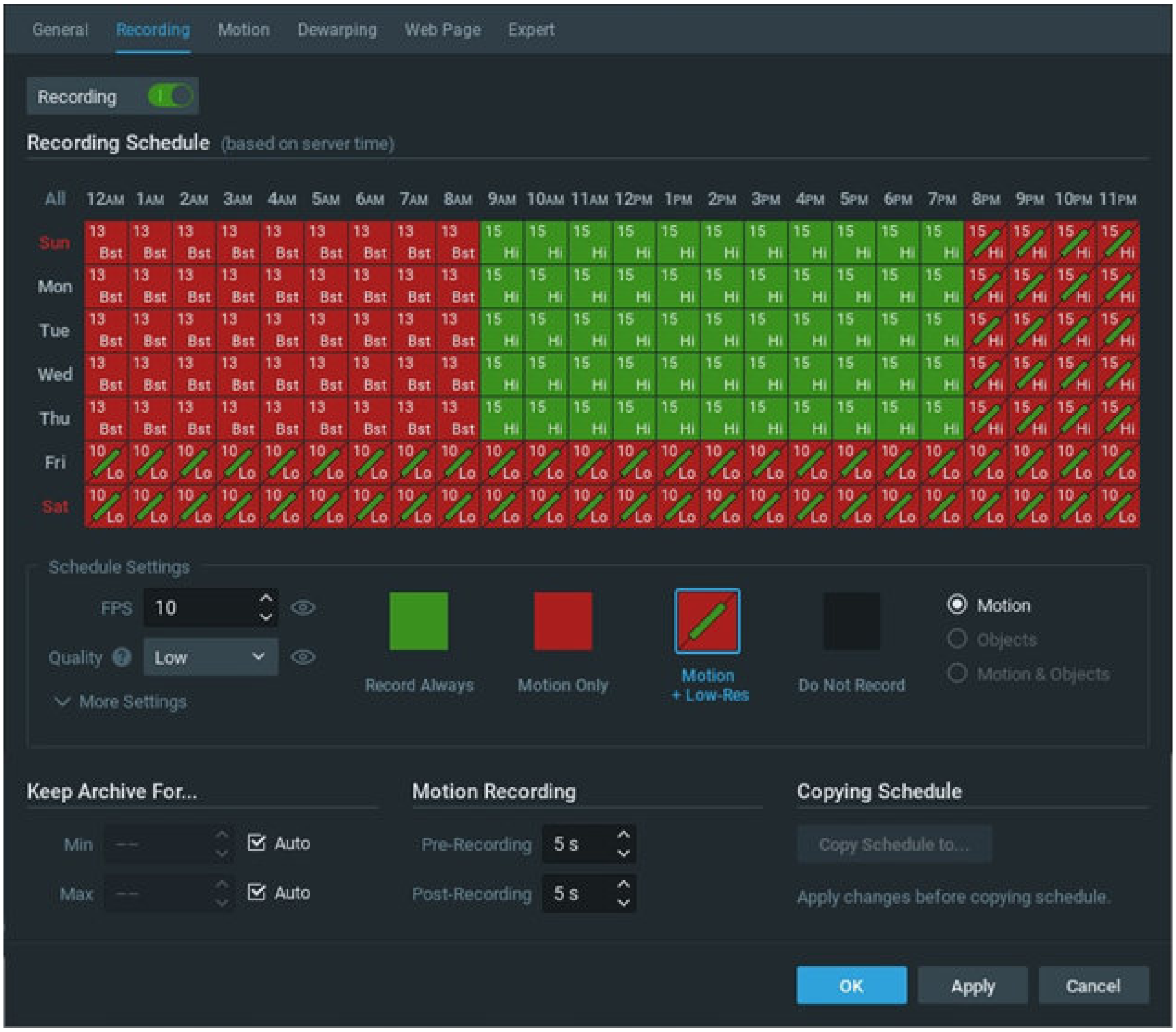
IMPORTANT: First choose FPS, Quality and bitrate values and then apply them to the calendar. Stream setting values are not in effect until time block(s) are selected.

10. Repeat the above steps as desired to schedule other recording modes.

Note: The quality settings are independent of the recording mode. (This is illustrated in the example below, where some Motion + Lo-Res blocks are at 15 FPS/High quality and others are at 10 FPS/Low quality.)

11. Apply changes.

Example



Recording ●

Recording Schedule (based on server time)

All	12AM	1AM	2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	10AM	11AM	12PM	1PM	2PM	3PM	4PM	5PM	6PM	7PM	8PM	9PM	10PM	11PM
Sun	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 ⁄ Hi	15 ⁄ Hi	15 ⁄ Hi	15 ⁄ Hi
Mon	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 ⁄ Hi	15 ⁄ Hi	15 ⁄ Hi	15 ⁄ Hi
Tue	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 ⁄ Hi	15 ⁄ Hi	15 ⁄ Hi	15 ⁄ Hi
Wed	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 ⁄ Hi	15 ⁄ Hi	15 ⁄ Hi	15 ⁄ Hi
Thu	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	13 Bst	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 Hi	15 ⁄ Hi	15 ⁄ Hi	15 ⁄ Hi	15 ⁄ Hi
Fri	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo
Sat	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo	10 ⁄ Lo

Schedule Settings

FPS 10

Quality Low

More Settings

🟩 Record Always

🟥 Motion Only

[✓ Motion + Low-Res]

Do Not Record

● Motion
○ Objects
○ Motion & Objects

Keep Archive For...

Min --- ☑ Auto

Max --- ☑ Auto

Motion Recording

Pre-Recording 5 s

Post-Recording 5 s

Copying Schedule

Copy Schedule to...

Apply changes before copying schedule.

This example uses the following settings:

- Mon – Fri, 9:00 AM-7:59 PM – Record Always, 15 FPS, High quality.

- Mon – Fri, 8:00 PM-11:59 PM – Motion + Lo-Res, 15 FPS, High quality.
- Fri & Sun, 24 hours – Motion + Lo-Res, 10 FPS, Low quality.
- Mon – Fri, 12:00 AM-8:59 AM – Motion Only, 13 FPS, Best quality.

1.14.10.14.1.1 Recording Modes

The recording schedule provides the following modes, which can be applied in 1 hour blocks:

🟢 *Record Always* – Always records.

🔴 *Motion Only* – Recording will start if motion occurs. Requires that the camera support hardware or software motion detection.

◍ *Motion + Lo-Res* – Records at low resolution unless motion occurs, at which point it automatically switches to recording at high resolution. The camera must support dual-streaming to be able to use this Motion + Lo-Res mode. If it does not, the following warning will be displayed: *Dual-Streaming and Motion Detection is not available for this camera* (see "Dual Stream Processing" for details).

○ *Do Not Record* – Never records, unless configured as part of an event.

Remember, image quality settings in the recording schedule dictate image quality during live playback.

For example, if the recording quality in the schedule is set to 4 frames per second and Low Quality, Nx Witness will stream the live image at those settings – even if the camera is capable of higher quality playback. However, when recording is turned off in the schedule, Nx Witness will stream live at the maximum possible quality and frames per second settings for the device.

1.14.10.14.1.2 Configuring Minimum and Maximum Archive Storage

Nx Witness provides the ability to set a maximum and minimum storage duration for the archive of any given camera, from the current time going backwards.

Before you use a *Keep Archive For* setting, it is important to understand the impact it will have. The default *Auto* setting means that archived footage for a given camera is treated according to the standard algorithm – the oldest data is deleted first. No controls are placed on when or which archived footage is deleted.

The *Min* and *Max* fields assign priority to a given camera – high priority for Min, low priority for Max. If more than one camera is assigned high or low priority, storage results may not be predictable. Typically the *Min* setting is used for environments with limited storage capacity and a few high-importance cameras, or when a regulation requires that certain footage be stored for a minimum amount of time. *Max* is typically used for environments where storage is limited and there is no need to store records beyond a certain age from certain cameras.

It is not possible to enter a Max value less than the Min value, and vice versa.

Minimum (Days. Hours, Minutes)

Min sets a minimum archive length, in number of days, hours or minutes from the current date, for which Nx Witness gives highest priority to retention of records from a given camera over retention of records from any camera that has the default (*Auto*) archive setting.

For example, a *Min. Days* value of 120 for a given camera means Nx Witness will attempt to preserve the past 120 days of records from that camera.

IMPORTANT: *Be careful when setting a minimum days value.* If more than one camera is assigned a *Min. Days* value, those cameras will have the same priority level – in which case storage results cannot be entirely guaranteed for any of them. If there is insufficient storage space, in order to retain footage as specified with *Min*, Nx Witness will first delete records from cameras that do not have a minimum archive length set, and then the system may stop recording incoming signals from low and average priority Cameras. If storage space is at capacity, no other camera streams will be recorded.

Maximum (Days. Hours, Minutes)

Max sets an archive duration after which records will not be saved for a given camera.

To Configure Minimum and Maximum Storage Duration

1. Go to the camera's context menu from the Resource Panel or layout and open **Camera Settings** > **Recording** tab (or the **General** tab for Virtual Cameras).
2. In the *Fixed Archive Length* section, uncheck the **Auto** checkbox.
3. In **Min**, enter the amount of time for which archive should be retained.
4. In **Max**, enter the amount of time after which archive will be automatically deleted from storage.
5. Click *Apply* to accept, *OK* to save and close the dialog, or *Cancel* to discard changes.

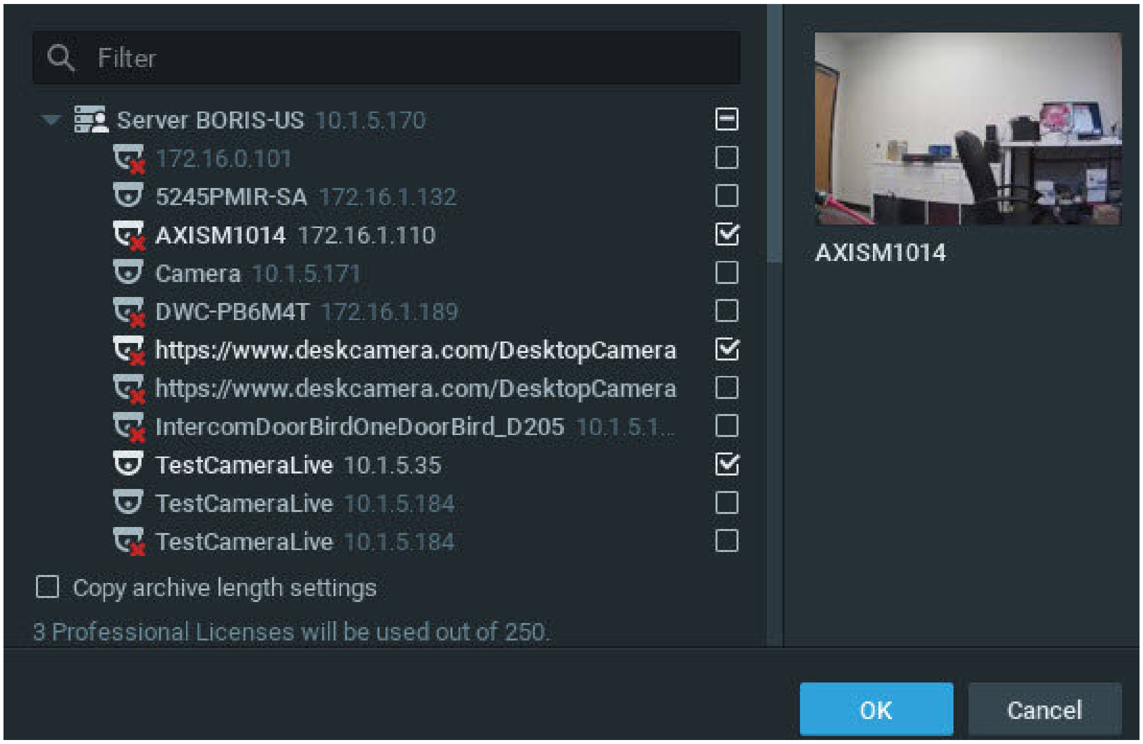
1.14.10.14.2 Copying a Recording Schedule

Once a recording schedule is configured for one device the settings can be copied to other devices.

Note: A license is required for each device to which the recording schedule is copied. As you select devices, a dynamic message will indicate how many licenses are in use and how many are available.

To Copy a Recording Schedule

1. Open the context menu for the camera where the desired schedule is defined and select **Camera Settings**.
2. In the **Recording** tab, click the **Copy Schedule to** button.



Filter

Server BORIS-US 10.1.5.170 ⊟
172.16.0.101 □
5245PMIR-SA 172.16.1.132 □
AXISM1014 172.16.1.110 ☑
Camera 10.1.5.171 □
DWC-PB6M4T 172.16.1.189 □
https://www.deskcamera.com/DesktopCamera ☑
https://www.deskcamera.com/DesktopCamera □
IntercomDoorBirdOneDoorBird_D205 10.1.5.1... □
TestCameraLive 10.1.5.35 ☑
TestCameraLive 10.1.5.184 □
TestCameraLive 10.1.5.184 □

□ Copy archive length settings

3 Professional Licenses will be used out of 250.

3. In the *Select Cameras* dialog that opens, check the camera(s) to copy the schedule to, or check a Server to copy the schedule to all cameras on that server.

   Use the *Filter* box to filter the device search (see "Searching and Filtering in Nx Witness"). Hover the mouse cursor over a camera name to see a thumbnail of the camera's image.
4. If desired, check **Copy archive length settings** (see "Configuring Minimum and Maximum Archive Storage").
5. Apply changes.

Advanced Device Settings

Nx Witness provides advanced controls so you can view and configure manufacturer parameters such as video stream configuration, image or audio settings, or network configurations either from within the Desktop Client or by opening the manufacturer's device web page.

This section describes the following features:

- Configuring Device Advanced Settings Using Nx Witness
- Configuring Device Using Web Page
- Resetting or Rebooting a Camera

More device settings are explained in the "Expert Device Settings" section.

1.14.10.15.1 Configuring Device Advanced Settings Using Nx Witness Client

To Edit Basic Proprietary Settings

1. Open **Camera Settings** and go to the **Advanced** tab.
2. Available controls are determined by the specific camera model. Settings are grouped by category:
   - *Video Streams Configuration* – Use to control **Codec** and **Resolution** for the primary and secondary streams in addition to **Bitrate** and **FPS** for the secondary stream. These values can be separately **Reset to Defaults** for each stream.
   - *Imaging* – Use to adjust **Exposure** and **Extra Settings** (such as line frequency), if available for the camera.
   - *Audio* – Typically includes audio-in sensitivity and audio-out volume.
   - *Maintenance* – Use to perform various levels of camera reboot. See "Resetting Camera" for details.

   Note: If no device settings are displayed, the camera is not ONVIF-compliant and cannot support custom configuration.

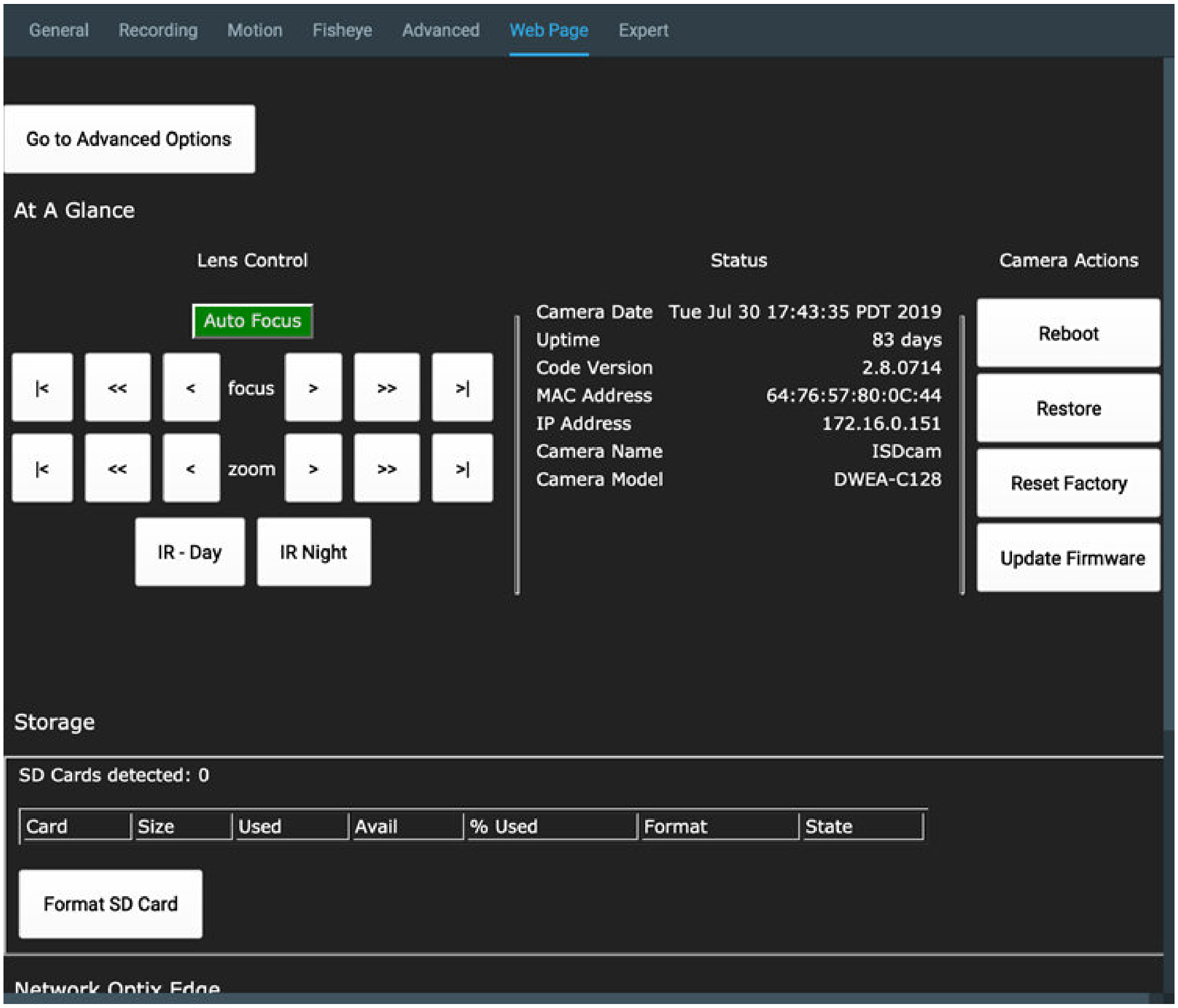
In addition, for the most commonly-used cameras, Nx Witness also provides a **Web Page** tab in the **Camera Settings** dialog. This tab launches the device's web page, where you can configure additional proprietary device parameters such as in-camera events, security controls, and network settings – see "Configuring Device Using Web Page".

1.14.10.15.2 Configuring Device Using Web Page

For all camera vendors, Nx Witness provides direct access to a camera's web page where users can configure the camera's settings without leaving the Desktop Client. If the device cannot be accessible from the computer Desktop Client is running on, Nx Witness Server acts like a proxy Server to retrieve the device web page content and display it within the Desktop Client.

Note: Only camera web pages that work in Chrome are supported.

In some cases, if a custom integration with a camera has been implemented, Nx Witness pulls proprietary device parameters such as authorization, network settings, and displays controls into the Desktop Client where they can be configured directly. See the below image for one example of such a web page (can vary depending on the manufacturer).



At A Glance

Status

Camera Date	Tue Jul 30 17:43:35 PDT 2019
Uptime	83 days
Code Version	2.8.0714
MAC Address	64:76:57:80:0C:44
IP Address	172.16.0.151
Camera Name	ISDcam
Camera Model	DWEA-C128

Storage

SD Cards detected: 0

Card	Size	Used	Avail	% Used	Format	State

Network Optix Edge

By default, the web page is available on the standard port (80). In case of using a non-standard port, it should be configured in on a device's "Expert" tab (see "Device Expert Tab").

From the General tab

1. Select a camera and open the **Camera Settings** > **General** tab.
2. If the device requires authentication, enter camera credentials in the **Authentication** section (see "Configuring Device Authentication"). You must have the "Edit camera settings" permission to perform this function.
3. Click on the **Web Page** link. The browser will open the device’s web page. From here you can control settings such as display size, JPEG refresh rate, PTZ and focus speed, etc.

   Note: To check device accessibility, press the **Ping** button prior to opening the web page.

From the Web Page tab

1. Select a camera and open the **Camera Settings** > **Web Page** tab
2. The device's web page will open within that tab.
3. Enter authentication parameters if required.

1.14.10.15.3 Resetting or Rebooting a Camera

ONVIF-compliant cameras can be reset to manufacturer defaults.

❗ **IMPORTANT:** Reboot is performed instantly once selected.

1. Open **Camera Settings** and select **Advanced**.
2. Click on **Maintenance** under **Category.** (If the Category list is empty, the camera is not ONVIF-compliant.)
3. Click on one of the following:
   - *System Reboot* – reboots the camera but saves current settings.
   - *Soft Factory Reset* – reboots the camera and restores all settings related to the image but not the IP address.
   - *Hard Factory Reset* – reboots the camera and restores all settings (Network, Authorization, IP address, etc).

It is also possible to reboot a camera from its web page. See "Configuring Device Using Web Page".

Expert Device Settings

Nx Witness provides expert settings that can resolve some issues on the device side.

- Configuring Expert Streaming Settings
- Time Synchronization between Servers and Cameras
- Assigning Logical ID
- Adjusting PTZ Speed
- Selecting PTZ Presets

❗ **IMPORTANT:** Improper configuration may lead to serious System malfunction! Do not change these settings unless you are absolutely sure of their potential impact on your System performance.

1.14.10.16.1 Configuring Expert Streaming Settings

Nx Witness Server automatically configures the optimal streaming parameters to configure how devices will stream data.

However, in some cases the automatic settings may work improperly and require manual tuning.

This section describes how to set various streaming parameters manually.

❗ **IMPORTANT:** By default, Nx Witness captures 2 streams from cameras (see "Background: Dual Stream Processing"). Before changing the settings manually, please make sure you understand how the dual-streaming works.

- Preventing Nx Witness from Changing Device Settings.
- Configuring ONVIF Profiles.
- Tuning up Camera Streaming.
- Adjusting Average Bitrate.
- Forcing Motion Detection to a Specific Stream.
- Disabling Recording of a Specific Stream.
- Disabling a Secondary Stream.

1.14.10.16.1.1 Background: Dual Stream Processing

Most IP cameras can provide multiple data streams, each at a different resolution and frame rate. Nx Witness requests two data streams, one high resolution and one low resolution, and switches between them for the best image quality with the least impact on processing and network efficiency.

This *adaptive scaling* is one of the most valued features of the Nx Witness:

- *Primary (High-Resolution)* – Streams provide better image quality, but require significant CPU capacity and network bandwidth to view.
- *Secondary (Low-Resolution)* – Streams require far less computing power than typical high-resolution streams, but provide much lower image resolution at a slower frame rate.

When a camera supports dual-streaming, the System tries to configure the low-resolution stream at or near 640x360 resolution at 7fps (though some cameras may set secondary stream resolution at up to 720p). The secondary stream is used for constant recording, for motion detection (as long as the resolution is less than 1024x768), and to save bandwidth and CPU during playback.

However, if the secondary stream resolution is more than 1024x768, the media Server will check the primary stream resolution. If the primary stream is less than or equal to 1024x768, it will be used for motion. If it's higher than 1024x768, motion detection will be disabled unless **Force motion detection for the stream** is enabled in **Camera Settings** > **Expert** tab.

Default Nx Witness dual stream settings work well with most cameras. If not, a set of individual controls can be used to manually control stream processing. It is important to understand how these settings behave individually and together, as adjusting them can seriously affect Server and display performance.

> ❗ **IMPORTANT:** Do not change image or stream quality settings unless you are absolutely sure of the likely impact on System performance.

Dual Streaming on the Server

The Server uses the low-resolution stream whenever possible for software motion detection and records both streams to archive unless a different behavior is specified. However, some cameras may not or cannot comply with default System behavior, usually for one of these reasons:

- Requested settings are not available from the camera.
- The lowest resolution stream is higher than 1024x768p.
- A secondary or low-resolution stream is not provided at all.
- A low-resolution stream is provided as Primary and a high-resolution stream as Secondary.

Note: If data is not received from the secondary stream for more than 10 seconds, the Sever will re-initialize the camera.

Dual Streaming on the Client

On the Client, stream resolution for viewing live or archive video is selected automatically.

- High Resolution is displayed under the following conditions:
  - Network bandwidth and CPU load are within normal range.
  - An item is pulled into Fullscreen display.
- Low Resolution is displayed under the following conditions:
  - If network bandwidth between client and Server is insufficient.
  - When image quality is of limited importance: items smaller than 172 pixels, during fast forward or fast rewind playback.
  - When high resolution processing compromises display quality or raises CPU usage to a high level (frames are delayed or dropped during decoding if there are too many streams are open in a given layout).

Settings That Affect Motion Detection

Motion detection is performed on the lowest resolution stream detected, to a threshold of ≤ 1024x768p. Above that, motion detection will not be performed.

- *Motion Detection* – Toggles motion detection on and off for a given camera (see "Setting a Recording Schedule").
- *Disable secondary stream* – If enabled, motion detection will not be performed for the camera, and the secondary stream will not be archived (see "Disabling a Secondary Stream").
- *Force motion detection for stream* – Occasionally, a camera will report its configuration incorrectly and swap the primary and secondary streams. If the secondary stream is high-resolution, motion detection processing will create a very high CPU load. To correct this you can force motion detection to a specific stream (see "Forcing Motion Detection to a Specific Stream").

Settings That Affect Recording and Playback

When certain settings are applied, the Server may or may not archive high-resolution or low-resolution streams.

- *Motion + Lo-Res* – Archives the high-resolution stream when motion is detected and the low-resolution stream when there is no motion, so high-resolution will not always be available for playback (see "Setting a Recording Schedule").
- *Disable secondary stream* – If checked, motion detection won't be performed for the camera, and the secondary stream won't be archived (see "Disabling a Secondary Stream").
- *Do not record primary stream / Do not archive secondary stream* – Use to completely disable archiving of one or both streams (see "Disabling Recording of a Specific Stream").
- *Video Streams Configuration* – Depending on the camera, camera stream settings may be configured in the either of these tabs (Camera Settings > Advanced or Camera Settings > Web Page tab). If you choose to control stream settings from one of these tabs you must do *one of the following*:
  - Open **Camera Settings > Expert** and enable **Keep camera stream and profile settings** to prevent the internal optimization performed by Nx Witness, and causes FPS and image quality settings in the Recording Schedule to be ignored. See "Preventing Nx Witness from Changing Device Settings".
  - Open **System Administration > General** and disable **Allow System to optimize device settings**.

Refer to "Configuring Device Advanced Settings Using Nx Witness" and "Configuring Device Using Web Page" for how to use **Restore Defaults** (Expert Tab) to discard manual adjustments and return to native presets.

If performance has dropped significantly after a given layout was opened and some cameras on layout have a fixed high resolution setting, the message "*Set layout resolution to "Auto" to increase performance*" will display across that layout so you can improve streaming quality yourself.

1.14.10.16.1.2 Preventing Nx Witness from Changing Device Settings

When Nx Witness discovers a camera, it captures the manufacturer's preset image quality settings and streaming configuration, then adjusts these settings to optimize the device for the Nx Witness System. Manufacturer settings can also be adjusted manually, for example FPS, quality, and bitrate when a recording schedule is defined, or stream settings for a variety of reasons (see "Dual Stream Processing").

However, in some cases, it may be preferable to keep the native settings. For instance, you may want to maintain pre-existing FPS, bitrate, and resolution settings when connecting Nx Witness to another VMS system. Or, on occasion the ONVIF implementation for a given camera diverges from standard ONVIF enough to make it preferable, or even necessary, to keep the manufacturer settings.

It is possible to prevent the automatic optimization that Nx Witness performs and use native stream and profile settings instead.

To disable automatic optimization for a single camera

1. Open **Camera Settings** and go to the **Expert** tab.
2. Check **Keep camera stream and profile settings**.
3. Apply changes.

IMPORTANT: Enabling this flag means FPS and image quality settings in the recording schedule will be ignored.

Note: This setting is not available for RTSP/HTTP streams.

To disable automatic optimization for all cameras

It is possible to do this during the Initial System Configuration.

Later, it can be done as follows:

Desktop Client

1. Open **Main Menu** and go to **System Administration** > **General** tab.
2. Uncheck the **Allow System to optimize device settings** checkbox.
3. Apply changes.

Note: For each camera in your System, use the web page to set desired image settings.

Web Admin / *Cloud Portal*

1. Open **Settings** > **System Administration** > **General** tab.
2. Unheck the **Allow System to optimize device settings** checkbox.
3. Apply changes.

1.14.10.16.1.3 Configuring ONVIF Profiles

Nx Witness automatically discovers devices and configures the optimal streaming parameters to fetch data from devices. For this purpose, the ONVIF protocol is used.

The communication is configured according to the **ONVIF Network Interface specification**.

Nx Witness supports different ONVIF Network Interface specifications:

- **Media** – the older one (is supported by all ONVIF devices)
- **Media2** – the newer one.

If the device reports that Media2 is supported, Nx Witness will try to use it.

The audio and video communication is configured through **stream profiles.**

A profile describes the set of parameters related to audio/video transport from a device to the Nx Witness Server:

- A/V Codec
- Bitrate

- Resolution
- Additional parameters.

Usually, cameras provide 2 independent stream profiles:

- Primary stream (Hi-Res)
- Secondary Stream (Lo-res) – used for motion detection, browsing archive etc (see "Dual Stream Processing" for details).

Cameras may provide additional stream profiles (more than 2) but Nx Witness uses only Primary and Secondary ones.

In some cases, the profiles can be fetched and identified incorrectly. In this case it may be necessary to configure stream profiles manually.

To access those settings, use the camera's context menu to open **Camera Settings** > **Expert > Media Streaming**:

- **Primary** and **Secondary Stream Profiles** – specify the stream profiles for Primary and Secondary streams.

  The available profiles may vary depending on the vendor or model of the device used.

  By default, Nx Witness configures the optimal parameters for the stream profiles but it can be turned off and the settings setup on Camera can be used unchanged (see "Preventing Nx Witness from Changing Device Settings").
- **Use Media2 to fetch profiles** – in some case Media2 can work incorrectly. In this case it is possible to select the following options:
  - **Never** – always use Media to configure stream profiles
  - **Use if supported** – use Media2 if the device indicates its support
  - **Auto** – use the built-in method to discover if the device supports Media2.

See also:

- Disabling Recording of a Specific Stream
- Disabling a Secondary Stream

1.14.10.16.1.4 Tuning up Camera Streaming

By default, Nx Witness automatically determines the optimal settings that it will use to pull video streams from the camera. However, some cameras use their own proprietary settings that cannot be properly determined. In this case streaming may be unstable.

In this case it is possible to set them manually. To access those settings, use the camera's context menu to open **Camera Settings** > **Expert > Media Streaming**.

IMPORTANT: Do not change these settings unless you are absolutely sure of their potential impact on your system performance.

The following streaming settings can be manually specified:

- **RTP Transport**. By default, Nx Witness automatically determines the optimal protocol (*Auto*).
- **Media Port**. This is the port used for RTSP communication. By default, **554**.
- **Trust camera timestamp.** By default (disabled), Server puts its own timestamps in the archive, overriding the data coming from cameras. However, if the stream is intermittent, Server may incorrectly put timestamps and this may affect the archive browsing. This option will make the Server trust timestamps coming from the camera, as long as the time difference between the Server and camera is less than 10 seconds. In this mode, network delay doesn't affect the timestamp.

Also, Server may push time settings to cameras to make sure the timestamps are synchronized. This is especially important for Edge cameras. See "Time Synchronization between Servers and Cameras".

1.14.10.16.1.5 Adjusting Average Bitrate

Some camera models do not yield the best setting when Nx Witness tries to configure a target bitrate, resulting in poor image quality. If this is the case you can adjust the bitrate calculation for the device manually.

IMPORTANT: This setting will significantly increase bitrate. Use only if the picture quality is noticeably poor.

To Adjust Bitrate

1. Open the **Camera Settings** > **Expert** tab.
2. Check **Calculate bitrate per GOP instead of bitrate per second**.
3. Apply changes.

Note: This setting is ignored when "**Keep camera streams and profiles settings**" is checked. See "Preventing Nx Witness from Changing Manufacturer Settings".

1.14.10.16.1.6 Forcing Motion Detection to a Specific Stream

Nx Witness performs motion detection on the server side by analyzing and decoding the secondary stream from a camera, which is usually a low resolution stream. Occasionally, a camera will report its configuration incorrectly and swap the primary and secondary streams. If this occurs and the secondary stream is high-resolution, motion detection processing will create a very high CPU load.

To correct this, you can force motion detection onto a specific stream.

1. Open the **Camera Settings** > **Expert** tab.
2. Check **Force motion detection for stream** and select **Primary** or **Secondary**.

3. Apply changes.

❗ **IMPORTANT:** Adjusting these settings can seriously affect Server performance. See "Dual Stream Processing" for details.

1.14.10.16.1.7 Disabling Recording of a Specific Stream

In some circumstances you may want to disable recording of the primary or secondary stream.

For instance, it may make sense to disable recording of the primary stream to save storage space and instead set the recording type to "Motion Only" and "Low" quality. Or, if the secondary stream bitrate is too high, it may make sense to disable recording so that the Nx Witness Server still performs motion detection but it does not record it.

To disable recording of a specific stream

1. Open the **Camera Settings** > **Expert** tab.
2. Check **Do not archive primary stream** or **Do not record secondary stream**.
3. Apply changes.

1.14.10.16.1.8 Disabling a Secondary Stream

It is possible to disable the secondary stream entirely. This may be necessary, for example, for very old cameras where the secondary stream has motion detection but does not support H.264 or H.265 Codec. In this case it is helpful to reduce the demand on storage space by disabling the secondary stream so it is not recorded.

📝 **Note**: If the resolution of the primary stream is more than 1024x768, software motion detection will be disabled. If the primary stream resolution is less than or equal to 1024 x 768, motion detection can be performed there.

To completely disable a secondary stream

1. Open the **Camera Settings** > **Expert** tab.
2. Check **Disable secondary stream**.
3. Apply changes.

❗ **IMPORTANT:** This setting is unavailable if "Allow system to optimize camera settings is disabled. See ("Dual Stream Processing").

1.14.10.16.2 Time Synchronization between Servers and Cameras

By default, all Servers in System have the time synchronized (see "Time Synchronization in a Multi-Server Environment"). This ensures the smooth archive recording, indexing and fetching.

By default, Server ignores the time on cameras. However, in some cases it may be necessary, especially for Edge cameras that record archive to the internal storage. In this case it is critical to have the camera time synchronized with Server.

To push time from Server to a camera:

1. Open the **Camera Settings** > **Expert** tab.
2. Unheck **Time Settings** > **Keep Camera Time Settings**.
3. Apply changes.

Additionally, it is possible to force the Server to use timestamps from cameras (may be also useful for Edge cameras). See "Tuning up Camera Streaming" for details.

1.14.10.16.3 Assigning Logical ID

The Nx Witness Server provides a mapping that lets you assign a six digit *Logical ID* that can be used instead of the much longer Camera ID**.** The Logical ID simplifies device identification when integrating with third-party systems, and is necessary in environments with input devices that are not capable of entering the full Camera ID. The Logical ID can be used in API calls (including getting RTSP streams etc) to address Cameras. If one is assigned, the Logical ID is displayed on the *General* tab of *Camera Settings*.

To assign a Logical ID

1. Open the context menu for a camera and go to **Camera Settings** > **Expert**.
2. Enter a number in the **Logical ID** field.

If you are integrating with a system that is already using 1 to 3 digit identifiers, use the **Generate** button to discover and display the smallest number that is not already in use.

Note: It is also possible to assign a Logical ID to a layout, see "Configuring Layouts".

To remove a Logical ID

Press the **Reset** button. This sets the Logical ID to zero, which the Server equates to having no Logical ID.

1.14.10.16.4 Adjusting PTZ Speed

The PTZ speed setting changes how fast the pan or tilt action is completed. The minimum value is 0.1 and the maximum value is 1.0.

In **Camera Settings > Expert** tab, enable **Use different values for pan and tilt** if different speeds for pan and tilt are needed.

1.14.10.16.5 Selecting PTZ Presets

The PTZ presets setting decides which presets the Server will use. Some cameras aren't able to save or activate PTZ presets through Nx Witness (*system presets*) and must process such requests directly on the camera to function correctly (*native presets*).

Choose between two options in **Camera Settings > Expert** tab:

- *Use system presets* – The preset profile and coordinates are saved in the Server's database. When you call the PTZ preset, Nx Witness sends the move request with the absolute coordinates.
- *Use camera native presets* – The preset profile and coordinates are saved in the camera itself. When the PTZ preset is activated, Nx Witness sends the move request with the preset ID. The camera will check the preset configuration by itself and move to the position.

Plugins and Analytics

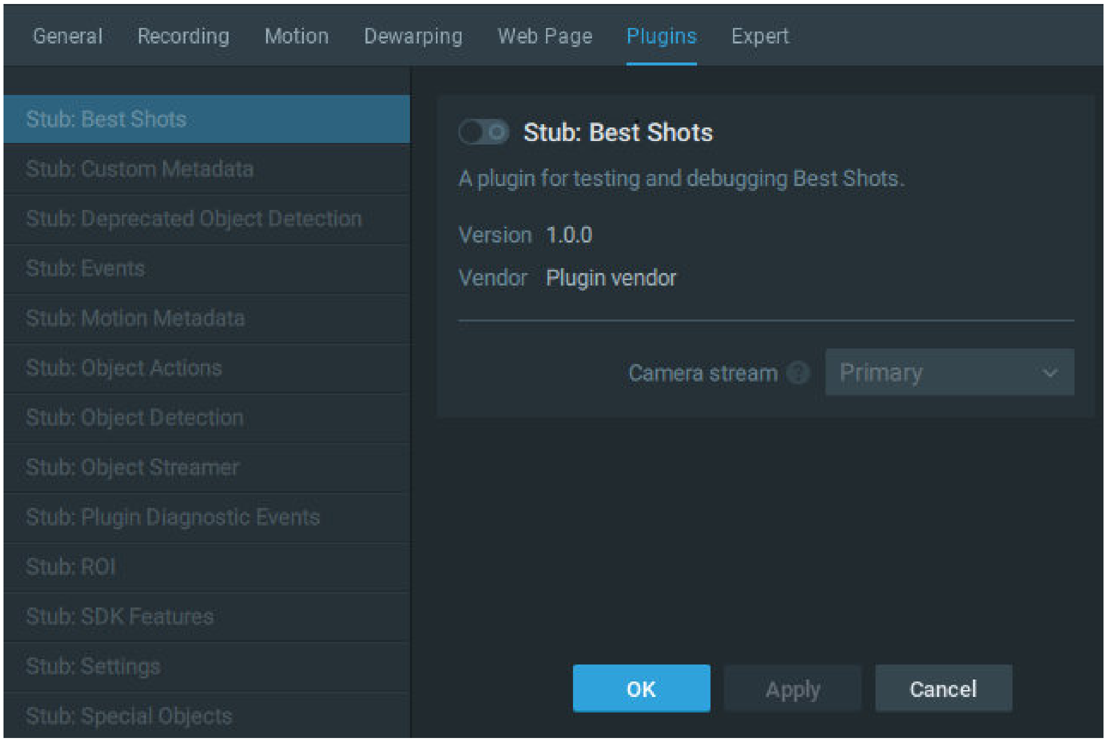
Nx Witness comes with plugins pre-installed for the most popular manufacturers devices. Plugins allow for built-in video analytics and Nx Witness to properly communicate with one another. Usually, the initially set-up and configuration for built-in camera analytics must be done in the camera's dedicated web page or the 3rd party software's settings, but can be done in the Desktop Client for compatible cameras (see "Analytics: Region of Interest (ROI)" for details).

Installing a Plugin

The *Stub Analytics Plugin* will be used in the installation example below, but applies to any camera plugin. The Stub Analytics Plugin is a sample plugin that attempts to utilize and demonstrate some of the features present in Nx Witness and is included in by default in the *plugins_optional/stub_analytics_plugin* directory.

To activate Stub Analytics Plugin perform the following steps:

1. Copy or move the plugin from where you have it saved to the *plugins/* directory. For the Stub plugin, you can find it in the default plugins_optional/ directory. The file name is *sample_analytics_plugin.dll* on Windows and *plugins_optional/stub_analytics_plugin/libsample_analytics_plugin.so* on Linux.
2. Restart Nx Witness Server.
3. In Nx Witness desktop client, open a camera on the layout. Make sure the video starts playing.
4. Right-click the camera and select **Camera Settings**.
5. Go to the **Plugins** tab**.**
6. Toggle the on/off switch the feature that you would like to test.



7. Apply changes.
8. Once a Plugin is enabled for a camera, the Server will feed video frames into the integrated video analytic engine for analysis.

For example, enabling *Stub: Best Shot* on a camera will generate a simulated object with a bounding box around it. This simulated object is detected by the analytics engine as it moves across the camera's stream and each detection shows up as a thumbnail in the Objects tab if the camera is open in a Layout. See Analytics Event for information on configuring events.

If an object is detected, the "Analytics Object Detected" event may be triggered.

Note: Users can find and modify the plugin’s System-wide settings in the Analytics tab on the System Administration dialog.

Additional plugins that are available:.

- Axis Analytics.
- Bosch Analytics.
- Dahua Analytics.
- Hikvision Analytics.
- VIVOTEK Analytics.

Finally, Nx Witness supports the Region of Interest (ROI) feature which allows configuring analytics from the Desktop Client ather than 3rd party software settings or cameras' web pages.

Note: At the moment, only **Stub Analytics** can be configured in the Desktop Client.

1.14.10.17.1 Analytics: Region of Interest (ROI)

Region of Interest (ROI) is a feature found in cameras with built-in video analytics or 3rd party software products. You can use the Desktop Client rather than various 3rd party software settings or cameras' web pages to configure special regions on cameras like line crossing, perimeter intrusion, bounding boxes, the minimum and maximum size of detected objects.

This can optimize resources for processing and analyzing video and make analytics setup more intuitive.

Note: At the moment, only **Stub Analytics** can be configured in the Desktop Client.

ROI in the Desktop Client

ROI configuration can only be accessed if you have an analytics plugin supporting this feature installed (see Plugins and Analytics for details). To access the ROI configuration settings in the Desktop Client, open the context menu on a camera > **Camera Settings** > **Plugins** > select the analytics plugin. A preview of the selected camera will be available to draw any necessary lines, polygons, or boxes to represent the ROI. See Analytics Event after configuring ROI for more information about Analytics Event Rules.

Note: Select which camera stream will be used for analytics (primary or secondary stream) in the *Camera stream* drop-down.

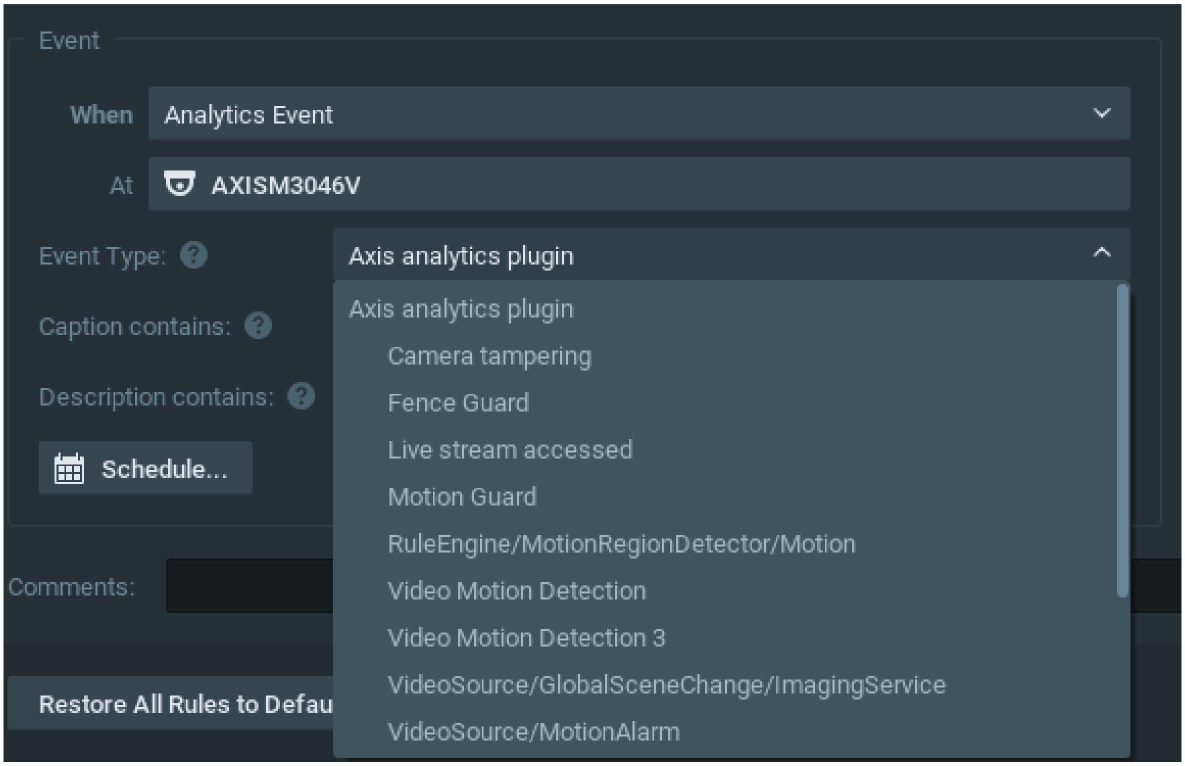
1.14.10.17.2 Axis Analytics

The Axis analytics plugin is integrated in to Nx Witness using Axis ACAP (AXIS Camera Application Platform) API version 3 or later. Different settings may be available to you depending on the type of analytics provided by the camera.

Supported Events

- Camera Tampering
- Global Scene Change
- Day Night Vision
- Live Stream Accessed
- Motion Detection
- Motion Guard
- Fence Guard
- Line Cross Detection (timer/line touched)

Example Event Rule Configuration



Event

When: Analytics Event

At: AXISM3046V

Event Type: Axis analytics plugin

Caption contains:

Description contains:

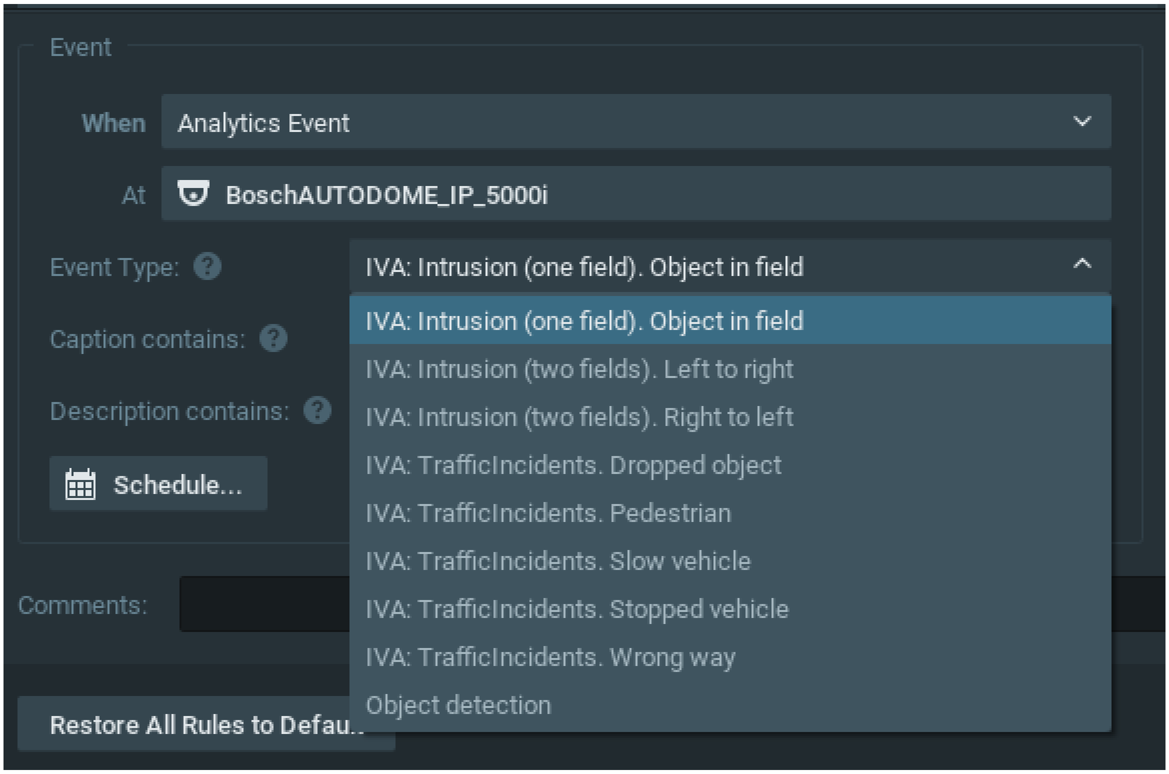
1.14.10.17.3 Bosch Analytics

The Bosch analytics plugin is integrated in to Nx Witness using ONVIF. Different settings may be available to you depending on the type of analytics provided by the camera.

Supported Events

- Excessive brightness
- IVA: Intrusion – one field (object in field)
- IVA: Intrusion – two fields (left to right / right to left)
- IVA: TrafficIncidents (dropped object, pedestrian, slow vehicle, stopped vehicle, wrong way)
- Insufficient brightness
- Motion detection
- Object detection
- Scene change
- Blurry signal
- Flame detection
- Scene change
- Signal loss
- Smoke detection

Example Event Rule Configuration


Event

When: Analytics Event

At: BoschAUTODOME_IP_5000i

Event Type: IVA: Intrusion (one field). Object in field

Caption contains:
Description contains:
Schedule...
Comments:
Restore All Rules to Defau...
IVA: Intrusion (one field). Object in field
IVA: Intrusion (two fields). Left to right
IVA: Intrusion (two fields). Right to left
IVA: TrafficIncidents. Dropped object
IVA: TrafficIncidents. Pedestrian
IVA: TrafficIncidents. Slow vehicle
IVA: TrafficIncidents. Stopped vehicle
IVA: TrafficIncidents. Wrong way
Object detection

1.14.10.17.4 Dahua Analytics

The Dahua analytics plugin is integrated in to Nx Witness using Dahua API of HTTP Protocol Specification V2.71 of 2019-06-03 or later. Different settings may be available to you depending on the type of analytics provided by the camera.

Supported Audio Events

- Audio anomaly detection (Audio input abnormal detection)
- Audio intensity change detection (Audio mutation detection)

Supported Basic Events

- Motion detection
- Scene change detection (Video abnormal detection)
- Video blind detection

Complex analytics events

- Automatic Number Plate Recognition (ANPR)
- Parking detection
- Rioter detection (People gathering detection)
- Queue size detection
- Queue stay detection
- Stay detection

- People flow counting
- In-area people counting
- Wander detection (Loitering detection)
- Traffic detection
- Fire detection
- Smoking detection
- Temperature alarm

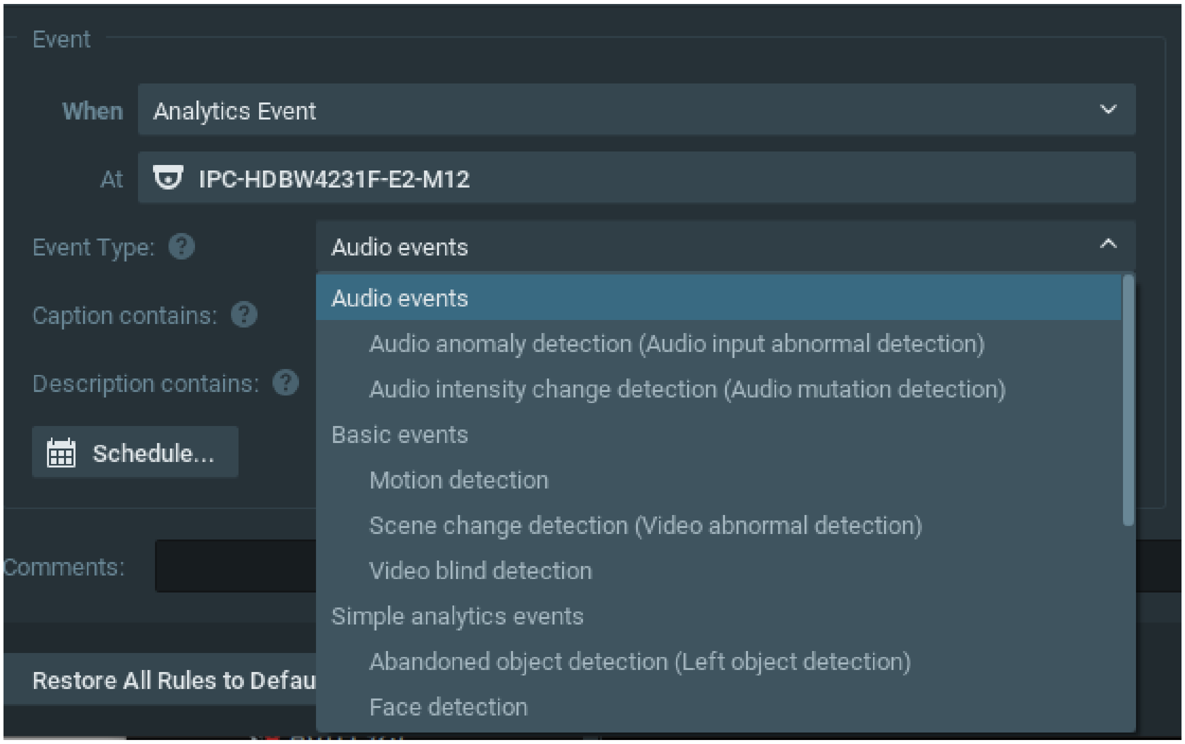
Supported Simple Events

- Abandoned object detection (Left object detection)
- Face detection
- Fast moving detection
- Intrusion detection (Cross-region detection)
- Missing object detection (Taken away detection)
- Tripwire detection (Cross line detection)

Supported System Events

- Login error detection
- Storage absence detection
- Storage failure detection
- Storage low space detection

Example Event Rule Configuration



Event

When Analytics Event

At IPC-HDBW4231F-E2-M12

Event Type: Audio events

Caption contains:
Description contains:
Schedule...
Comments:
Restore All Rules to Defau
Audio events
Audio anomaly detection (Audio input abnormal detection)
Audio intensity change detection (Audio mutation detection)
Basic events
Motion detection
Scene change detection (Video abnormal detection)
Video blind detection
Simple analytics events
Abandoned object detection (Left object detection)
Face detection

1.14.10.17.5 Hikvision Analytics

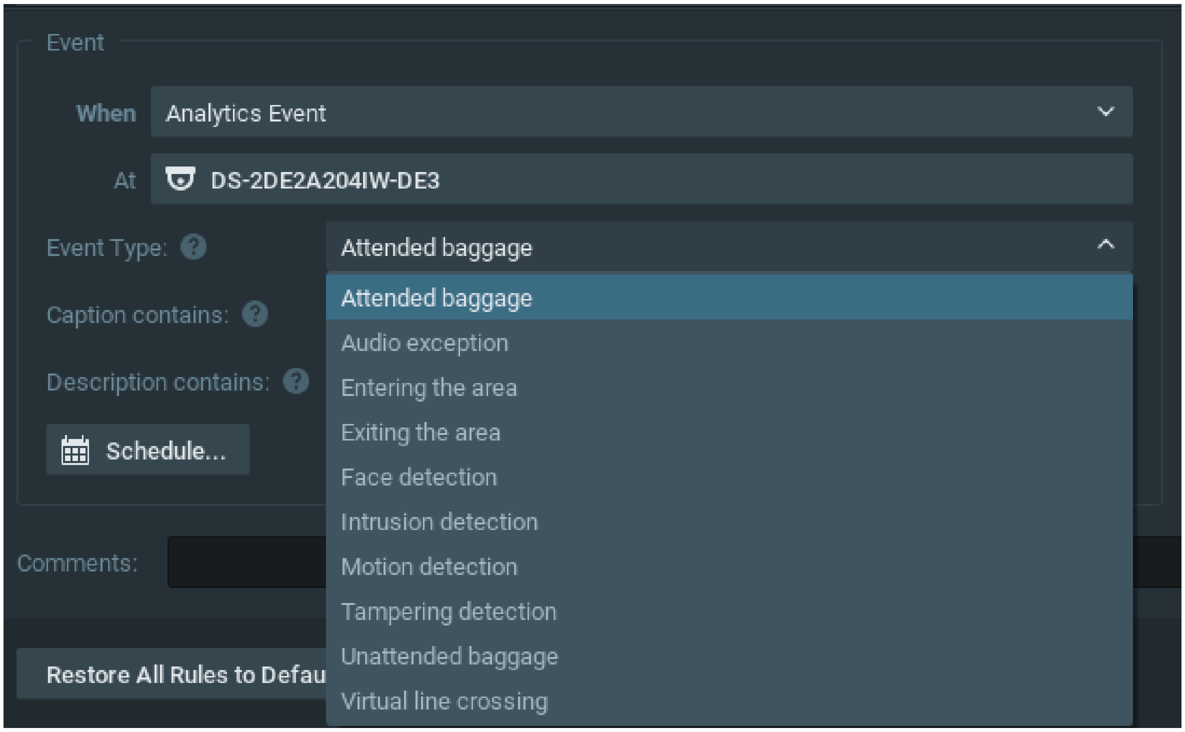
The Hikvision analytics plugin is integrated in to Nx Witness using Hikvision ISAPI. Different settings may be available to you depending on the type of analytics provided by the camera.

<u>Supported Events</u>

- Loitering detection
- Intrusion detection
- Group detection
- Video loss detection
- Rapid move detection
- Parking detection
- Face detection
- Virtual line crossing
- Entering the area
- Exiting the area
- Audio exception
- Tampering detection
- Defocusing detection
- Motion detection
- Unattended baggage

- Object removal/attended baggage
- Scene changed

Example Event Rule Configuration



Event

When: Analytics Event

At: DS-2DE2A204IW-DE3

Event Type: Attended baggage

1.14.10.17.6 Milesight Analytcs

The Milesight analytics plugin is integrated into Nx Witness using HTTP API. Different settings may be available to you depending on the type of analytics provided by the camera.

Supported events

- Motion Detection
- Audio Alarm
- Direct Input
- Direct Output
- Region Entrance
- Region Exiting
- Advanced Motion Detection
- Tampering Detection
- Line Crossing
- Loitering Detection
- Human Detection
- People Counting Threshold Reached

- Object Left
- Object Removed
- People Counting
- Regional People Counting
- Face [exclusive]

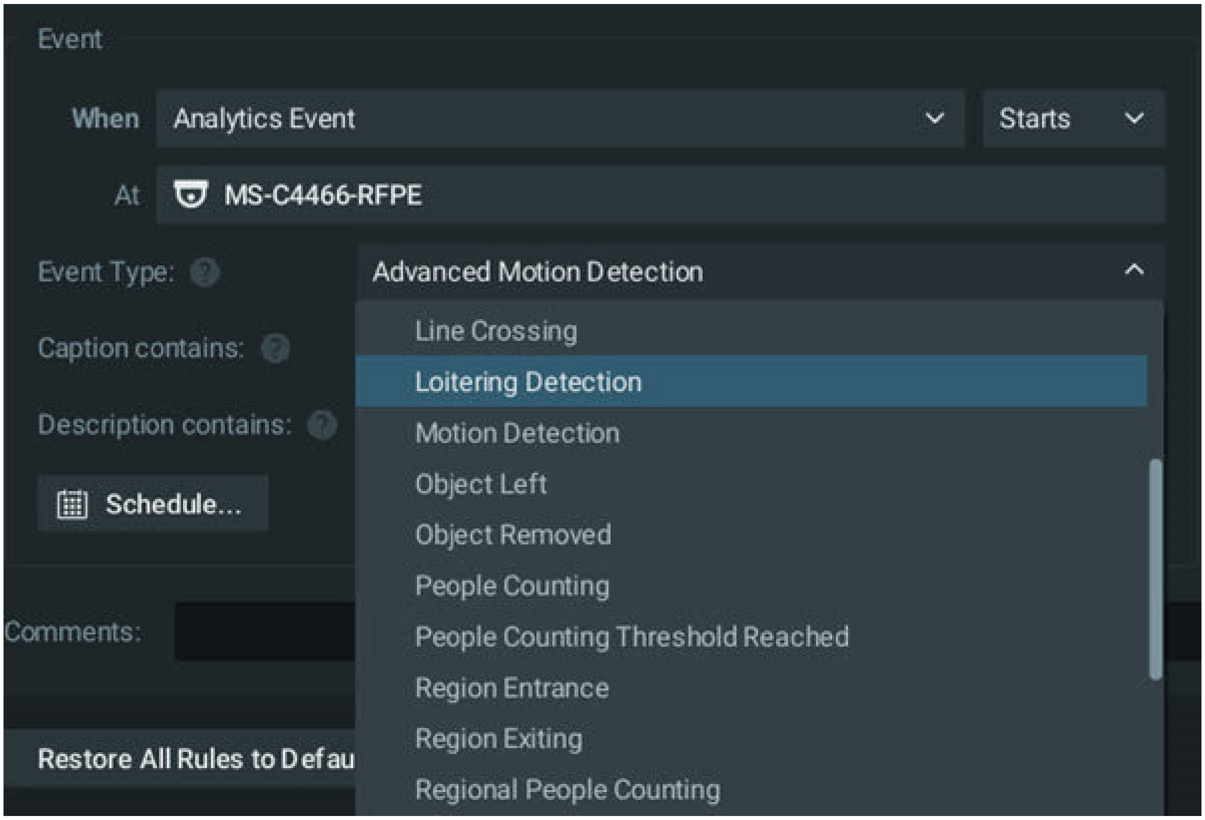
Supported object types

- License Plate
- Vehicle
- Car
- Truck
- Bus
- Bike
- Person

Plugin supports OEM branding, current compatible vendors:

- Milesight (default)
- Brickcom
- Only
- Rhodium
- Vista

Example Event Rule Configuration



1.14.10.17.7 Uniview Analytcs

The Uniview analytics plugin is integrated into Nx Witness using HTTP API. Different settings may be available to you depending on the type of analytics provided by the camera.

Supported Events

- Motion
- Tampering
- Audio Detection
- Line Crossed
- Intrusion Detection
- Object Recognized
- Global Scene Change
- Image Is Blurry
- Input
- Area Entered
- Area Left
- Fence Crossed
- Object Removed

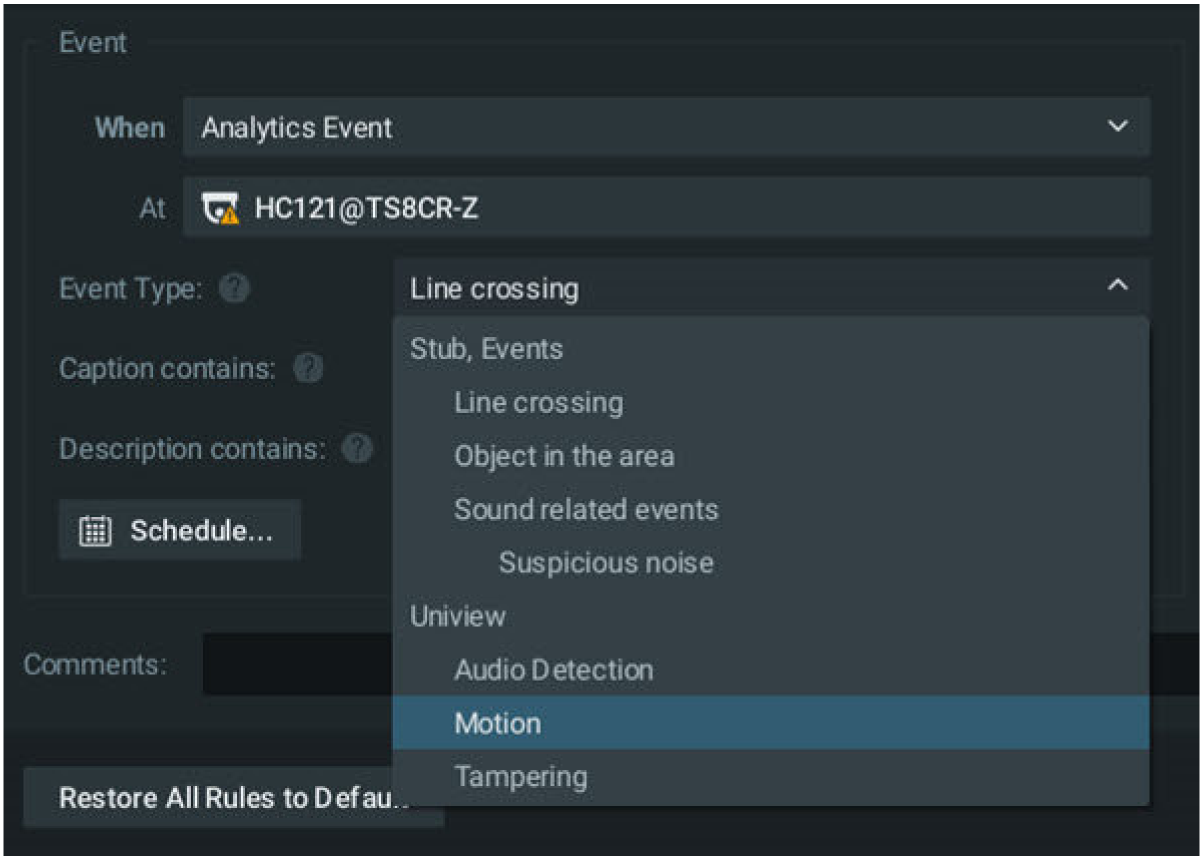
- Object Left Behind
- People Gathering
- Fast Moving
- Parking
- Heat Map
- Crowd Density: Minor
- Crowd Density: Major
- Crowd Density: Critical
- Object Tracked

Supported object types

- Face
- Person
- Vehicle
- Bike
- License Plate

Note: LPR is currently not supported.

Example Event Rule Configuration



Event

When: Analytics Event

At: HC121@TS8CR-Z

Event Type: Line crossing

1.14.10.17.8 Vivotek Analytics

The Vivotek analytics plugin is integrated into Nx Witness using Smart VCA API version 1.4 of 2020-05-13. Different settings may be available to you depending on the type of analytics provided by the camera.

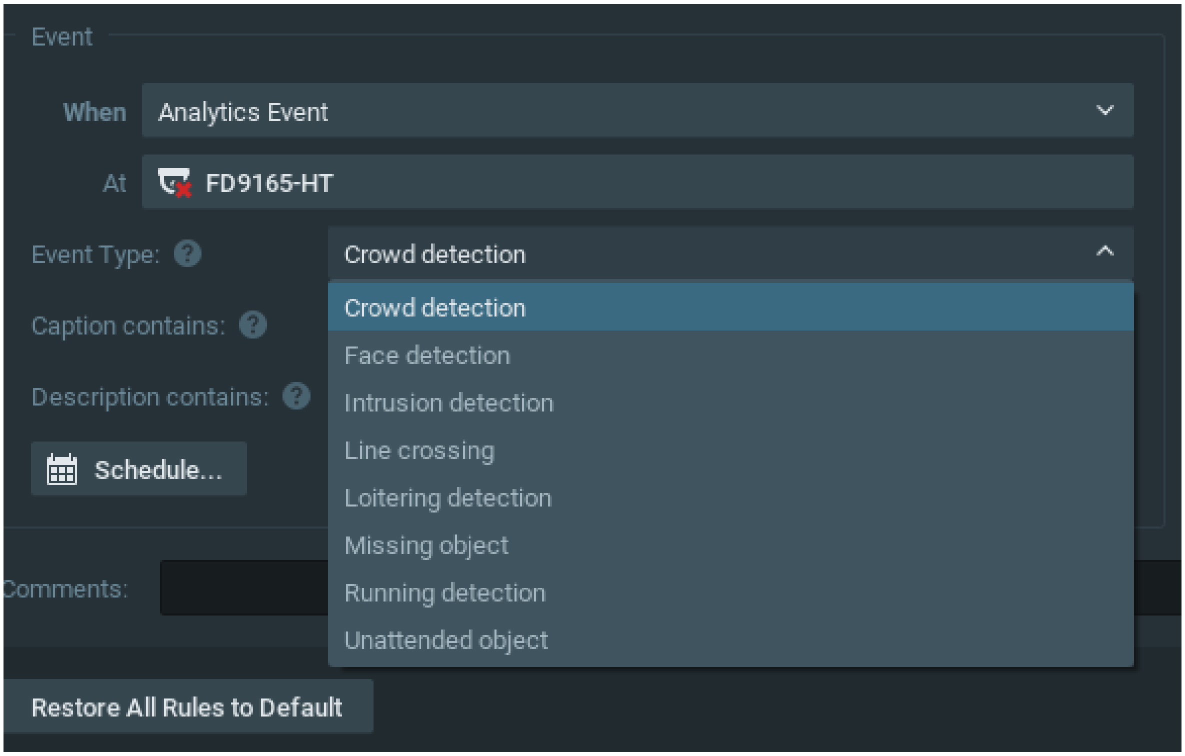
<u>Supported Events</u>

- Crowd detection.
- Face detection (for some cameras, the example is FD9165-HT).
- Intrusion detection.
- Line crossing.
- Loitering detection.
- Missing object.
- Running detection.
- Unattended object.
- Smart Tracking:
  - Supports zoom variables in Region of Interest Settings.
  - Parking Detection feature.

- ○ Exclusion Mask supported in the Desktop Client

Note: Deep Learning VCA is limited to 5 rules of any type.

Example Event Rule Configuration



Event

When: Analytics Event

At: FD9165-HT

Event Type: Crowd detection

Health Monitoring Metrics

In addition to the Nx Witness Server Monitoring display, Users with certain Permission (*System Health Monitor*) can view detailed metrics using the Web Admin or Cloud Portal.

System Health Metrics are parameters of different components of the System that provides valuable information about the state of each component. Metrics are aimed at helping investigate problems and tune performance. Below are some examples of the parameters available for each component type:

- Alerts – System, Server, Camera, and Storage related alerts. Event notifications are not shown here.
- System metrics – The number of Servers, camera channels, storage locations and users, etc.
- Server metrics – CPU/RAM usage, camera channels, Server threads and network connections, etc.
- Camera metrics – Vendor, model, firmware and video quality settings, etc.
- Storage Locations – Capacity, read/write speed and issues, etc.
- Network Interfaces metrics – IP addresses and i/o rates, etc.

To view the Health Monitor:

1. Connect to a System using the *Web Admin* or *Cloud Portal*.
2. Select the **Information** tab in the heading menu.
3. Select the component to monitor in the left panel.
4. Optionally download the full report for offline review, record keeping, or sharing with technical support.

   Note: All metrics are erased after the Server has been restarted.

Alerts

Alerts are representations of metrics that are presented to the User once metrics pass a threshold where they enter into values that should not be reached for that parameter in a healthy system.

Alerts can show what's wrong with the system without having to go too far deep in the details. Below are some examples of the alerts you will receive for each component type:

- *System alerts* – Maximum number of Servers or channels per System reached.
- Server alerts – Offline event, high CPU/RAM usage, logging level status, encoding threads greater than 2, etc.
- Camera alerts – Camera offline event, IP conflict, frame drop, etc.
- Storage alerts – Storage inaccessible or offline, storage issue in the last 24 hours, etc.

Note: All alerts (including aggregated alerts), are erased after the Server has been restarted.

System Metrics

The **System** tab contains *System-level* metrics.

The following information is displayed:

- *Servers* – The number of servers in the System.
- Camera channels – The number of camera channels in the System.
- Storage locations – The number of storage locations in the System.
- Users – The number of users in the System.
- System *Version* – The Nx Witness Server version.

Server Metrics

The **Servers** tab contains *Server-level* metrics.

The following information is displayed:

<u>Server Availability</u>

- *Status* – Current status of the sever (online/offline).

- *Events count: Server Offline (24h)* – Number of times the Server went offline in the last 24 hours.
- *Uptime* – Length of time the sever has been active.

Load

- *Total CPU Usage (%)* – CPU usage of the entire machine.
- *CPU used by VMS Server (%)* – CPU usage of the Nx Witness Server application.
- *Total RAM Usage* – RAM usage of the entire machine in GB.
- *Total RAM Usage (%)* – RAM usage of the entire machine as a percentage.
- *RAM used by VMS Server* – RAM usage of the Nx Witness Server application in GB.
- *RAM used by VMS Server (%)* – RAM usage of the Nx Witness Server application as a percentage.
- *Server threads* – Number of threads inside Server processes.
- *Camera channels* – Number of device channels in the System.
- *Decoding threads* – The number of running decoding threads.
- *Decoding speed* – Total decoding speed in megapixels per second, including thumbnails encoding.
- *Encoding threads* -The number of running encoding threads.
- *Encoding speed* – Total encoding speed in megapixels per second, including thumbnails encoding.
- *Outgoing Primary streams* – The number of primary media streams that are being taken from the Server (including audio-only streams, such as from an I/O module).
- *Outgoing Secondary streams* – The number of secondary media streams that are being taken from the server.
- *Incoming connections* – Number of open incoming sockets, including UDT (TCP over UDP).
- *Outgoing connections* – Number of open outgoing sockets, including UDT (TCP over UDP).
- *Logging level* – The type of logging enabled on the server.

Info

- *Public IP* – Public IP of the server.
- *OS* – Operating System installed on the server.
- *OS Time* – Time as reported by the Operating System.
- *VMS Time* – Time as reported by the Nx Witness Server application.
- *CPU Name* – Manufactuerer and model of CPU.
- *Cores* – Number of cores the CPU has.
- *RAM* – Amount of RAM (GB) installed on the server.

- *Events count: Time Changed (24h)* – Number of times the server's time had to be synchronized.

Activity

- *Transactions per second* – Represents activity with resources settings and information being changed in the internal database (from a moving average over the last 60 seconds).
- *Event Rules activations per second* – Number of times Event Rules have been triggered (from a moving average over the last 60 seconds).
- *REST API calls per second* – Number of HTTP REST API per second (from a moving average over the last 60 seconds). This number does not include API calls for media streaming and data proxying between servers.
- *Thumbnails per second* – Number of thumbnails decoded per second (from a moving average over the last 60 seconds).
- *Active plugins list* – Numbered list of plugins that are currently working on the server.

Camera Metrics

The **Cameras** tab contains Camera-level metrics.

The following information is displayed:

- *Name* – Name of the device.

Info

- *Server* – Name of the Server the camera is connected to.
- *Type* – The type of device: Camera, Multi-Sensor Camera, Encoder, NVR, I/O module, or Horn Speaker.
- *IP* – IP address of the device.
- *Recording* – The recording status of the device: On, Scheduled, or Off.

Availability

- *Status* – The connectivity status of the device: Offline, Online, Unauthorized, or Server Offline.
- *Events* – Camera Offline (1h) – Number of times the camera went offline over the past hour.
- *Events – Stream Issues (1h)* – Number of times the stream had issues over the past hour.

Primary Stream

- *Resolution* – The resolution of the primary stream.
- *Actual FPS* – Frames Per Second (FPS) of the stream.
- *Avg FPS drop (10 min)* – Difference between the FPS being targeted and the actual FPS (average over the last 10 minutes).

Secondary Stream

- *Resolution* – The resolution of the secondary stream.
- *Actual FPS* – Frames Per Second (FPS) of the stream.
- *Avg FPS drop (10 min)* – Difference between the FPS being targeted (set in the Advanced tab) and the actual FPS (average over the last 10 minutes).

Storage Analytics

- *Archive* – Length of all archived footage associated with this camera.
- *Recording Bitrate (5min)* – Bitrate for the Camera archive (based on the last 5 minutes of recorded archive).

Storage Metrics

The **Storage** tab contains *Storage-level* metrics.

The following information is displayed:

- *Name* – Storage location path.

Info

- *Server* – Name of the Server the storage is installed on.
- *Type* – Types of storage being used (local, smb, etc).

State

- *Status* – Current status of the storage drive.
  - Online – Displays when the storage drive is online and not disabled by the user.
  - Disabled – Displays when the storage drive is online but disabled by the user.
  - Inaccessible – Displays when the storage is offline.
  - Server Offline – Displays when the Server that the storage drive belongs to is offline.
- *Issues (24h)* – Number of storage issue events within the last 24 hours.

Activity

- *Read Rate* – Storage drive read rate per second (from a moving average over the last 60 seconds).
- *Write Rate* – Storage drive write rate per second (from a moving average over the last 60 seconds).

Space

- *Total* – Size of the storage in Gigabyles (GB).
- *VMS Media (%)* – Amount of the storage space occupied by data (as a percentage).

Network Metrics

The **Network Interfaces** tab contains *Network-level* metrics.

The following information is displayed:

- *Name* – Name of the network interface.

Info

- *Server* – Name of the Server the network interface is installed on.
- *State* – Status of the network interface: Up (active), or Down (Disconnected or disabled in the OS).
- *IP* – IPv4-address of the network interface.

I/O Rates

- *IN Rate* – The amount of data received per second on the network interface (in kilobytes).
- *OUT Rate* – The amount of data sent per second on the network interface (in kilobytes).

Event Rules

An Event Rule is an Event-Action pair – when an Event is detected, the related Action is triggered.

An event rule is a one-to-one definition: a given event can have just one action. However, you can create as many event rules as you need. For example, you can define an event that detects motion on a camera with the action "send an Email", and a second event that detects motion on a camera with the action "create a bookmark".

There are three types of Event Rules:

- *User events* – Custom defined for a wide variety of conditions, using the available events and actions.
- *System-generated events* – Exist for notification of critical storage and connection issues; a User cannot configure them or delete them.
- *Default Events* – Preconfigured events that run in background whenever Nx Witness is open. Default events are triggered by System-level circumstances such as Storage issue, License issues, Device disconnection, etc.

Default Events

Default events are effective as soon as Nx Witness is installed, and are automatically written to the Event log. With the exceptions noted below, all default events trigger both global notifications and an Email:

- Show Notifications to all users, every 30 seconds until issue is resolved.
- Send Email to System Administrator.

(The exceptions are Archive Backup Finished and Generic Event, which send notifications only, and Server Started, which sends Email only.)

Event Indicators in Layout

Due to their importance, or simply to make an event noticeable in a dense layout, certain events provide built-in visual indication when triggered. For critical events – storage issue or storage not configured, Server failure or conflict, device disconnected, etc. – the indicator is a set of red outlines that radiate from the perimeter of the related item in layout. For other less critical events – motion on camera, input signal on device – a set of green outlines will radiate from the perimeter of the related item. The Server monitor also provides a similar visual indicator when a Server issue is detected.

Event Logging

Events are automatically recorded in the System Event Log (see "Viewing Events Log"). The "Write to Log" action can be used for an event to be written to the log without needing to perform an external action such as playing a sound, sending an Email, setting a bookmark, etc.

Turning Rules On or Off

- *Using the Event Rule List* – Once a rule is defined, it can be turned on or off using a checkbox in the Event Rules list. Turning a rule off means the event will not be detected and the corresponding action will not be performed.
- *Using the Schedule* – For any rule, detection of the event can be turned on or off in increments of one hour using a weekly calendar (see "Event Scheduling".)
- *Using Global Notification* – Notification of a rule occurrence can be turned on or off System-wide (see "Global Notification Settings"). The rule is still on, but notifications are not sent when it triggers.

Resetting All Rules to Default

Rule configurations can be returned to their default settings:

1. From **Main Menu** > **System Administration** > **Event Rules**.
2. Click on **Restore all Rules to Default**.
3. Click **Reset** to accept changes.

❗ **IMPORTANT:** All user-defined rules are discarded when you restore rules to default.

To Create a Rule

See "Using the Event Rules List" and "Using the Event Rules Form".

To Delete a Rule

- **Right-click** on a single rule in the list and choose **Delete** from the context menu
- Use the **Delete** button at the top of the dialog.

❗ **IMPORTANT:** There is no confirmation prompt before a rule is deleted.

Supported Events and Actions

The following events and actions are supported:

Events	Actions:
User Events • Analytics Event • Generic Event • Input Signal on Device • Motion on Cameras • Plugin Diagnostic Event • Soft Trigger **Default Events** • Archive Backup Finished • Devices Disconnected • Devices IP Conflict • License Issue • Network Issue • Server Conflict • Server Failure • Server Started • Storage Issue **System-Generated Events** • Archive Integrity Check Failure • Email Address Not Set • Email Not Set for Users • Email Server Not Configured • Error while Sending Email • LDAP Sync Issue • Licenses not Configured • Reindexing Archive Canceled • Reindexing Archive Complete • Remote Archive Synchronization • Storage not Configured	• Bookmark • Device Output • Device Recording • Do HTTP(s) Request • Execute PTZ Preset • Exit Fullscreen • Open Layout • Panic Recording • Play Sound • Repeat Sound • Send Email • Send Mobile Notification • Set to Fullscreen • Show Desktop Notification • Show on Alarm Layout • Show Text Overlay • Speak • Write to Log

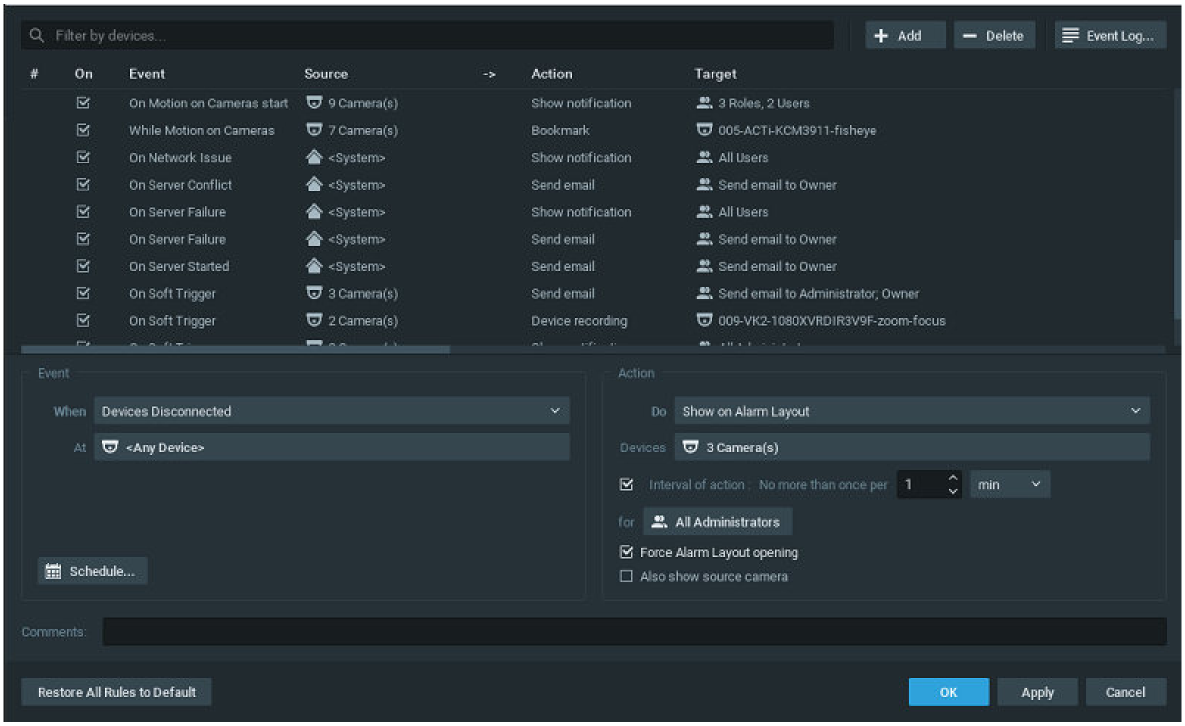
Events	Actions:
- System in Safe Mode - Time Synchronization Issue	

Using the Event Rules List

There are several ways to open the *Event Rules* dialog:

- Open the context menu from the Notifications panel and choose **Event rules.**
- Open **System Administration** > **General** tab and click the **Event Rules** button.
- Use the device context menu and select **Camera Rules** (i.e., *Device Rules*) to list just the rules that apply to that specific device.
- Click on the **Camera Rules** button in the **Camera Settings** (i.e., *Device Settings*) dialog.

Each row in the *Event Rules* list is a rule. A small dot in the left-most **#** column indicates that an event has unsaved changes.



#	On	Event	Source	->	Action	Target
	☑	On Motion on Cameras start	9 Camera(s)		Show notification	3 Roles, 2 Users
	☑	While Motion on Cameras	7 Camera(s)		Bookmark	005-ACTi-KCM3911-fisheye
	☑	On Network Issue	<System>		Show notification	All Users
	☑	On Server Conflict	<System>		Send email	Send email to Owner
	☑	On Server Failure	<System>		Show notification	All Users
	☑	On Server Failure	<System>		Send email	Send email to Owner
	☑	On Server Started	<System>		Send email	Send email to Owner
	☑	On Soft Trigger	3 Camera(s)		Send email	Send email to Administrator; Owner
	☑	On Soft Trigger	2 Camera(s)		Device recording	009-VK2-1080XVRDIR3V9F-zoom-focus

Event

When: Devices Disconnected

At: <Any Device>

Schedule...

Action

Do: Show on Alarm Layout

Devices: 3 Camera(s)

☑ Interval of action : No more than once per 1 min

for: All Administrators

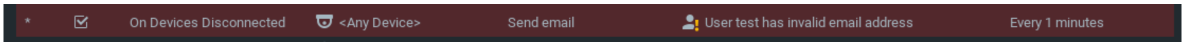
☑ Force Alarm Layout opening

☐ Also show source camera

Comments:

Invalid Rules

If a rule is not configured correctly, it will be have a red background indicating it is invalid:



*	☑	On Devices Disconnected	<Any Device>	Send email	User test has invalid email address	Every 1 minutes

Filtering and Sorting the Event Rule List

You can click on each of the column headers to sort rules in ascending or descending order by the values in that column. The **Filter** field applies to devices (**Source** column) only. Filter results refresh as characters are entered, and will include rules that apply to multiple devices if any one of the devices matches the criteria. Rules that apply to <*Any Device*> will never be filtered out. To disable filtering, clear the field.

Editing Rules from the List

The Event Rules list provides basic editing functions. A click on any parameter in the list opens a pull-down menu where you can edit the parameter value for the selected rule. A right-click on any parameter opens a context menu where you can add a **New** rule, **Delete** the selected rule, or set a **Schedule** for the selected rule.

Editing Rules from the Advanced Settings Form

You can also configure rule parameters using the **advanced settings form** on the lower half of the dialog (see "Using the Event Rules Form").

Using the Event Rules Form

The form opens in the lower half of the *Event Rules* dialog when you select a rule in the list or when you click the *Add* button. Often it includes parameters that are not available in the *Event Rules* list.

Adding an Event Rule from the Form

1. Click the **Add** button (or **right-click** on an existing rule in the list and click **New** in the context menu). The form will open and a new line for the rule is added to the list.
2. Select the **Event** to be monitored and the **Action** to execute when that event occurs. Each requires one or more of these parameters:
   - For Events:
     - *When* – Click on this field in the form (or the **Event** field in the list) to select from the menu of events.
     - *Starts* or *Stops* – See below.
     - *Device(s)* – Click on the **At** field in the form (or double-click on the **Source** field in the list) to select one or more devices.
   - For Actions:
     - *Do* – Click on this field in the form (or the **Action** field in the list) to select from a menu of actions.
     - *Device(s)* – Click on the **At** field in the form (or the **Target** field in the list) to select one or more devices that will execute the action. At least one device must be selected for a rule to be valid.
     - *User(s)* – Click on the **To** field in the form (or the **Target** field in the list) to select one or more User Groups as recipient of the action. At least one User must be selected for a rule to be valid.
     - *Schedule* – Click on this button to open a calendar for "Setting up Schedule for Tracking Events".

- ○ *Comments* – Enter any desired remarks.
- ○ *Interval of action* and *Fixed duration* – See "Instant, Interval or Fixed Duration Actions" in the below section.

3. Apply changes.

   Note: If one or more rules are not correctly defined, you will get the error message "Some rules are not valid and may not work, OK?". Click **Yes** to disable the invalid rules (invalid rules remain in the list but their *On* checkbox will not be checked). Click **No** to allow invalid rules to be active (their *On* checkbox will be checked and the rule will be highlighted in red).

4. In the Event Rule list, set or clear the **On** checkbox to enable or disable the rule.

   IMPORTANT: Make sure notification for the event type is turned on in Global Notifications.

Using Selection Lists in Event Rules

Event rules use selection lists to choose devices and users. Selection and filtering behavior, described in the next topic, is consistent in both.

Continuous or Instant Events

Some events may be continuous, some can only be instant, and some may be either (generic or analytics events).

- *Continuous* – Events that can occur continuously, such as an motion on a camera, require a state definition of either **Starts** or **Stops.**
- *Instant* – Events that occur instantly, without duration, such as a device being disconnected or a Server starting. For generic and analytics events, instant events are labeled **Occurs**.

Instant, Interval or Fixed Duration Actions

The following parameters are available for most actions, depending on their intended behavior.

- *Interval of Action* – Check this box to limit the frequency with which an action will occur in response to an event. Enter an integer value (1 – 999) in the **No more than once per** field, and select a corresponding time increment (*sec, min, hrs, days*). This feature is useful, for instance, with an action like show notification where the triggering event may be continuous but it is only necessary to be notified periodically.
- *Instant* – Uncheck this option so the action will execute every time the event occurs.
- *Fixed Duration* – Check this option to specify how long an action will last, typically in response to a continuous event. Enter the duration, in seconds. Zero is not a valid entry, and depending on the action there may be an upper limit to the duration.

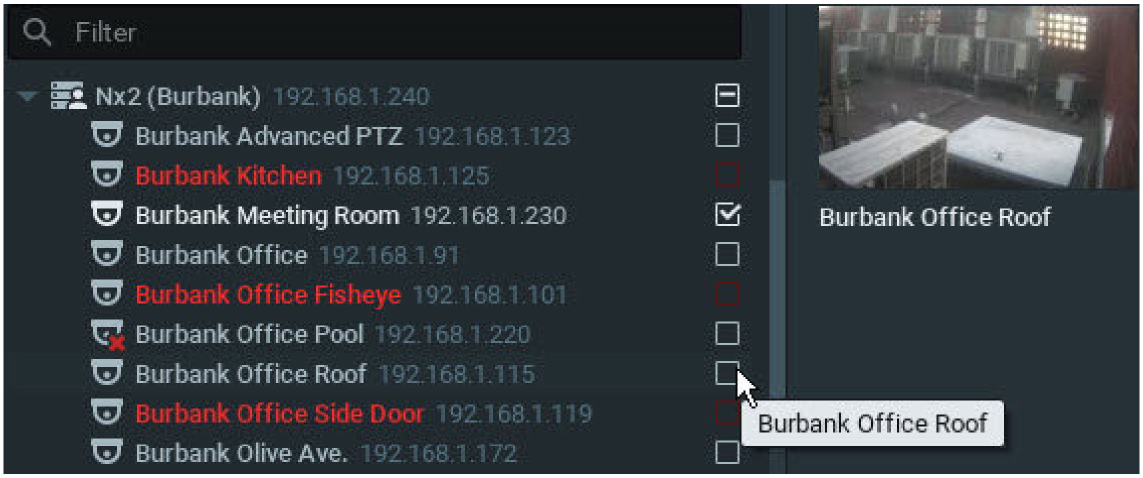
Selection Lists in Event Rules

<u>To Select Devices</u>

For Events, choose the device(s) that will trigger the rule. If no devices are selected (shown as <*Any Device*>), the rule will apply to all devices.

For Actions, choose the device(s) that will respond to the event. At least one device must be selected for a rule to be valid.

- Drag-and-drop devices from the Resource Panel into the **At** field.
- Alternately, use the *Select Devices* dialog which lists all servers in the System, and all devices attached to them:



Filter

Nx2 (Burbank) 192.168.1.240 ⊟
Burbank Advanced PTZ 192.168.1.123 □
Burbank Kitchen 192.168.1.125 □
Burbank Meeting Room 192.168.1.230 ☑
Burbank Office 192.168.1.91 □
Burbank Office Fisheye 192.168.1.101 □
Burbank Office Pool 192.168.1.220 □
Burbank Office Roof 192.168.1.115 □
Burbank Office Side Door 192.168.1.119 □
Burbank Olive Ave. 192.168.1.172 □

Burbank Office Roof

Burbank Office Roof

1. Click on the **At** field in the advanced settings form to open the *Select Devices* dialog.
2. Check the desired individual devices, or click a server's check box to select all devices on that server.
3. Optionally, use the **Filter** field to search for specific devices. All device parameter values (name, firmware, vendor, etc.) are searched. The results update immediately as characters are entered in the field.
4. Click **Apply** changes.

<u>To Select Users</u>

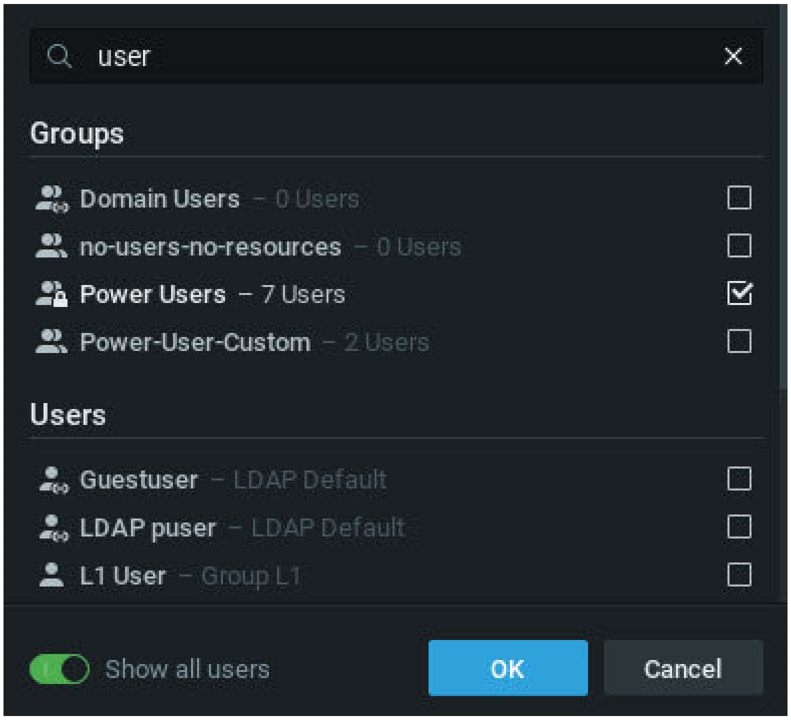
For Events, choose the user(s) the event will be available to. At least one User must be selected for a rule to be valid.

For Actions, choose the user(s) who will be recipients of the action. At least one User must be selected for a rule to be valid.

Use the *Select Users* dialog to select one or more users:

1. Click on the **To** field (alternately labeled *For, Available to, Play to users, or Speak to users*) in the advanced settings form to open the *Select Users* dialog.
2. Check one or more Users, User Groups, or check **All users** to select all users in the System.

3. To see individual User names, enable **Show all users** (green) and check the desired individuals.
4. Use the Search field to locate user names or Groups that contain the characters entered. Filter results refresh as characters are entered.



user ✕

Groups

- Domain Users – 0 Users □
- no-users-no-resources – 0 Users □
- Power Users – 7 Users ☑
- Power-User-Custom – 2 Users □

Users

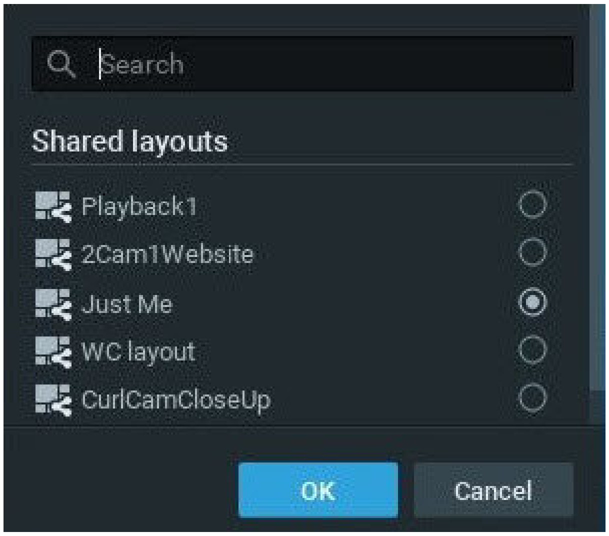
- Guestuser – LDAP Default □
- LDAP puser – LDAP Default □
- L1 User – Group L1 □

Show all users

OK Cancel

To Select Layouts

For Actions, choose the layout that will open in response to the event. The "Open layout" action allows only one layout to be selected. The "Set to fullscreen" and "Exit fullscreen" actions allow more than one layout to be selected, but the action will only take effect in the layout that is open at the time of the event being triggered.



Search

Shared layouts

- Playback1 ○
- 2Cam1Website ○
- Just Me ●
- WC layout ○
- CurlCamCloseUp ○

OK Cancel

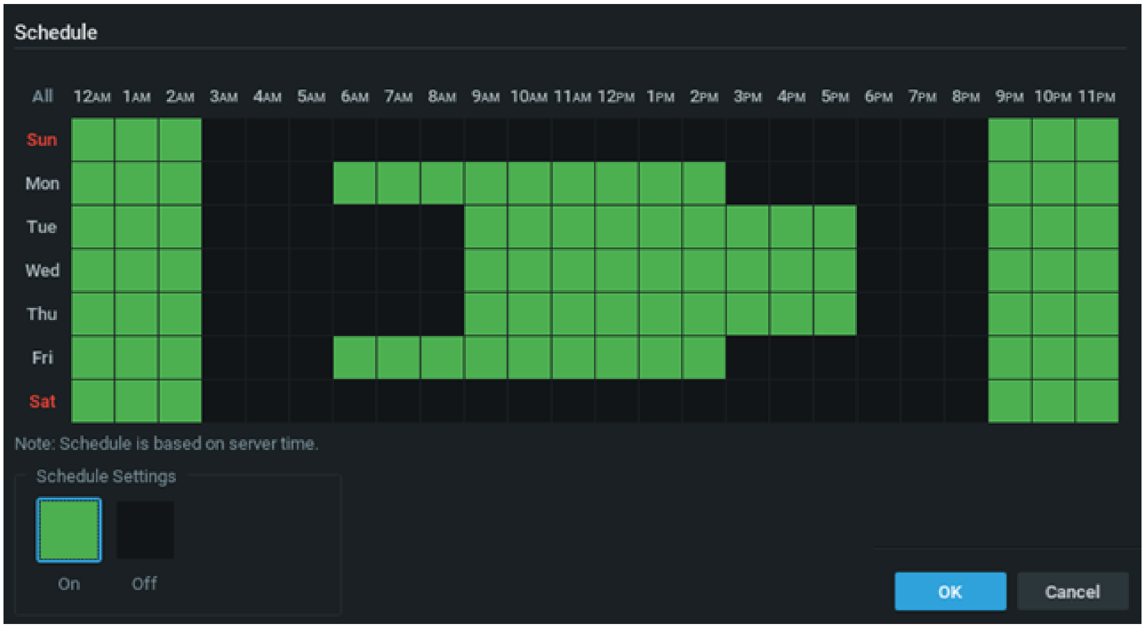
Event Scheduling

By default, event monitoring is active 24 hours a day, 7 days a week. If you only want to monitor for an event at certain times, you can assign it a schedule. System-generated events cannot be placed on a schedule since they are always on.

Note: It is possible to disable a rule entirely by unchecking the **On** box in the Event Rules list.

<u>To set a schedule for an event</u>

1. When a event is editable (because it is new or it is selected in the Event Rules list), click on the **Schedule** button to open the dialog shown below.



Schedule

All	12AM	1AM	2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	10AM	11AM	12PM	1PM	2PM	3PM	4PM	5PM	6PM	7PM	8PM	9PM	10PM	11PM
Sun	🟩	🟩	🟩	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	🟩	🟩	🟩
Mon	🟩	🟩	🟩	⬛	⬛	⬛	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	⬛	⬛	⬛	⬛	⬛	⬛	🟩	🟩	🟩
Tue	🟩	🟩	🟩	⬛	⬛	⬛	⬛	⬛	⬛	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	⬛	⬛	⬛	🟩	🟩	🟩
Wed	🟩	🟩	🟩	⬛	⬛	⬛	⬛	⬛	⬛	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	⬛	⬛	⬛	🟩	🟩	🟩
Thu	🟩	🟩	🟩	⬛	⬛	⬛	⬛	⬛	⬛	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	⬛	⬛	⬛	🟩	🟩	🟩
Fri	🟩	🟩	🟩	⬛	⬛	⬛	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	⬛	⬛	⬛	⬛	⬛	⬛	🟩	🟩	🟩
Sat	🟩	🟩	🟩	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	🟩	🟩	🟩

Note: Schedule is based on server time.

2. Click the **On** or **Off** button to determine monitoring behavior in specific 1-hour cells from 12AM to 11PM.
3. Click in a cell to apply the selected schedule setting to cells, or use these shortcuts to apply to multiple cells:
   - **Click**-and-**drag** to select multiple cells.
   - Click the hour heading to select an entire column.
   - Click the day of the week to select an entire row.
   - Click **All** to select all cells.
4. Click **OK** to accept or **Cancel** to discard changes.

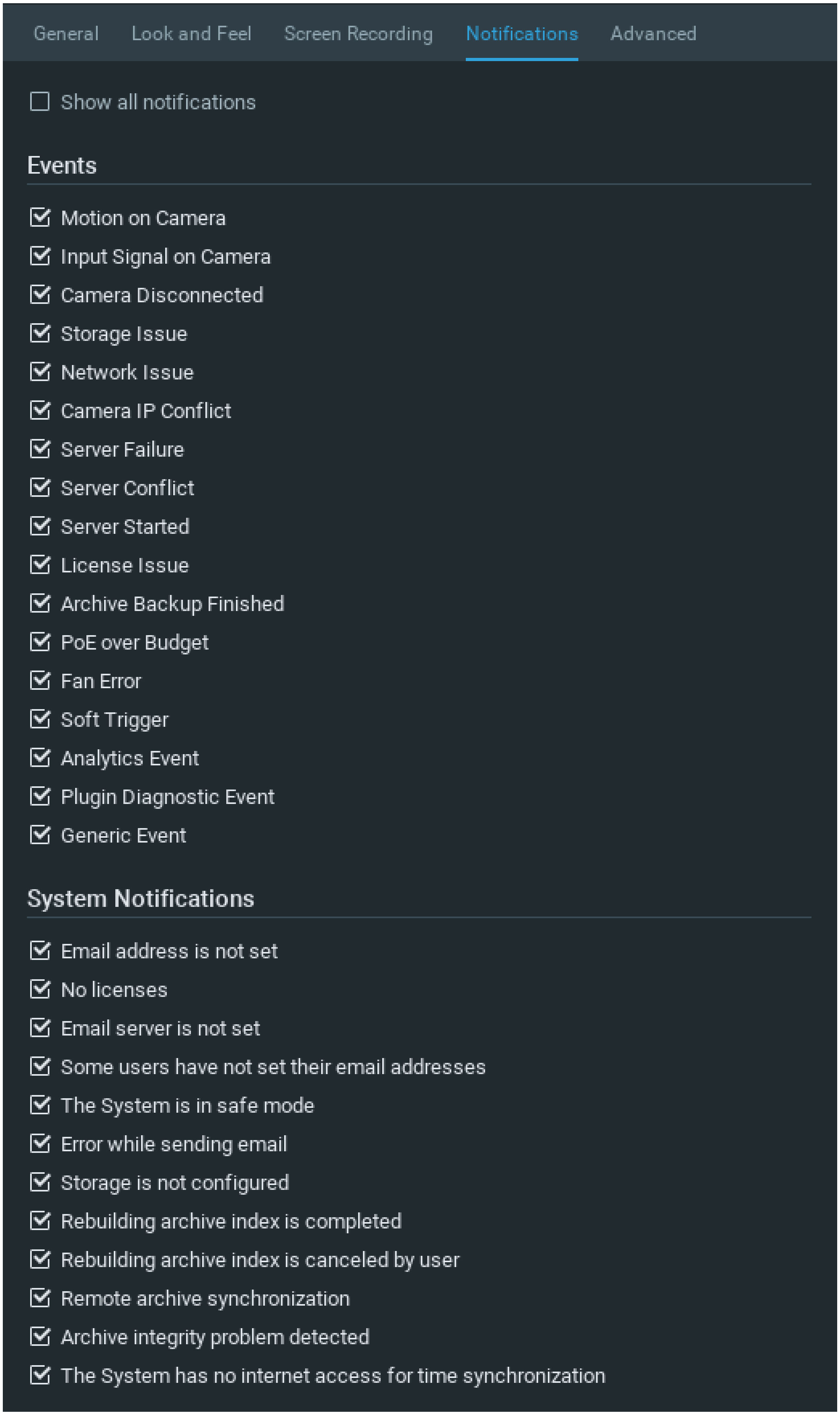
Global Notifications

Notification of a particular event type or System alert can be turned on or off globally. The notification setting does not affect event detection or action execution, only whether or not notifications are sent to the Notification Panel.

❗ **IMPORTANT**: Make sure to expand this window so that the entire contents are visible.

To show or hide notifications of a particular type

1. Open **Main Menu** > **Local Settings** > **Notifications** or *right-click* any open space in the Notifications panel and select **Filter.**
2. Check **Show all notifications** so that all events will display in the Notification panel, or uncheck it to select individual notification types to display
3. Apply changes.



☐ Show all notifications

Events

☑ Motion on Camera
☑ Input Signal on Camera
☑ Camera Disconnected
☑ Storage Issue
☑ Network Issue
☑ Camera IP Conflict
☑ Server Failure
☑ Server Conflict
☑ Server Started
☑ License Issue
☑ Archive Backup Finished
☑ PoE over Budget
☑ Fan Error
☑ Soft Trigger
☑ Analytics Event
☑ Plugin Diagnostic Event
☑ Generic Event

System Notifications

☑ Email address is not set
☑ No licenses
☑ Email server is not set
☑ Some users have not set their email addresses
☑ The System is in safe mode
☑ Error while sending email
☑ Storage is not configured
☑ Rebuilding archive index is completed
☑ Rebuilding archive index is canceled by user
☑ Remote archive synchronization
☑ Archive integrity problem detected
☑ The System has no internet access for time synchronization

Viewing and Exporting the Event Log

Each event that occurs in Nx Witness is stored in the **Event Log** and displayed in the "Events Tab". The Event Log make it easy to navigate through past activity and diagnose Device or Server issues.

To View the Event Log

- Open **Main Menu** > **System Administration** > **General** tab and click on the **Event Log** button.
- Open the context menu by right-clicking anywhere on the Notification Panel, then choose **Event Log.**
- Use the **Ctrl+L** shortcut.

To search the Event Log

The search box found at the top right of the Event Log will allow you to search the descriptions of all logged events for your desired keyword(s).

To sort the Event Log

Events are displayed in the following columns. You can click on any column header to sort the log in ascending or descending order:

- *Date/Time* – Date and time the event occurred.
- *Event* – The type of event.
- *Source* – The resource that initiates the event: device (motion detection, input signal, etc) or Server (storage issue, Server failure, etc).
- *Action* – The action that is performed when the event occurs.
- *Target* – The Users or Devices that are recipient of the action.
- *Description* – Any additional information. For motion detection events, the description includes a hyperlink that will open the device in a new layout and start playback of the event.

To Filter the Event Log using the Header Menus

- *Start date* and *End date* – Select a day in each of these calendar fields to show only events that occurred during a particular time period. Default display is the current day. Dates are shown in dd/mm/yyyy format.
- *Event type* – From the pull-down menu, select an event category (*Any Event*, *Any Device Issue, Any Server Issue, Analytics Event, Generic Event*), or specific type of event within those categories.
- *Device type* – Display events occurring on a particular device only (applies to Motion, Input and Device Issues).
- *Action* – Display only the events caused by a particular action.

Click the **Clear Filter** button to remove all filter conditions. Click the **Refresh** button to apply additional filter criteria to list that is already filtered.

To Filter the Event Log using Event Fields

You can also use the context menu of an existing record to filter the Event Log according to that record. For example, if you **right-click** on a specific record and choose **Filter Similar Rows**, only the events occurring on the same source and event will be displayed. To clear all existing filters, click **Clear Filter** at the top right or open the context menu on an existing record and choose **Clear Filter**.

To View the Event Log for a Specific Device or Server

- *Device* – Open the device context menu and select **Check {*device type*} Issues**.
- *Server* – Open the Server context menu and select **Server Diagnostics**.

Other Event Log Functionality

Context menus in the Event Log provide different options, depending on the field (event, source, action, etc.) from which they are opened. The following options are available from the context menu for all fields:

- *Select All (Ctrl+A)* – Selects all entries in the log.
- *Export Selection to File* – Saves the selected data to an HTML or CSV text file.
- *Copy Selection to Clipboard* – Copies the selected data to your clipboard.

Context menus in the *Source* field provide several additional functions, depending on the device.

You can drag the mouse or use **Ctrl**+**Click** or **Shift**+**Click** to select multiple and apply the desired option to multiple events.

To Export Event Logs

This may be requested once contacting technical support. See "Contacting Support".

1. Open **Main Menu** > **System Administration** > **General** > **Event Log**.
2. If desired, filter by event or camera.
3. Select the events to be exported, or use the context menu to select all.
4. Open the context menu and choose **Export Selection to File**.
5. Choose the save location, enter a file name, and select the file type:
   - *.html*
   - *.csv*
6. Save the file.

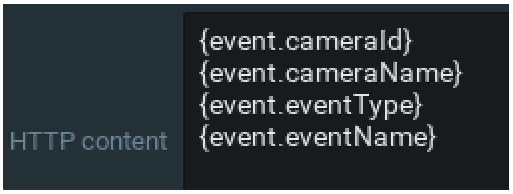
Event Field Placeholders

When applicable events are paired with the Do HTTP(s) Request action, they are capable of containing parameters in the HTTP Content section, which can be used to be replaced by the appropriate fields automatically.

Analytics Events

Analytics Events have four placeholders that can be used in the Do HTTP action:

- {event.cameraId} – Replaced by the selected camera's Camera ID.
- {event.cameraName} – Replaced by the selected camera's name (using the drop-down list next to "At").
- {event.eventType} – Replaced by the selected event type (using the drop-down list next to "Event Type").
- {event.eventName} – Replaced by the object or line name.

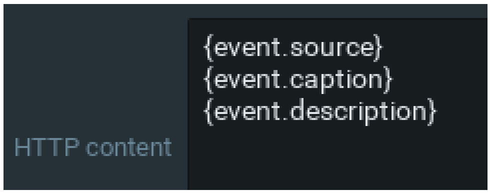


{event.cameraId}
{event.cameraName}
{event.eventType}
{event.eventName}

Generic Events

Generic Events have three placeholders that can be used in the Do HTTP action:

- {event.source} – Replaced by the content in the "Source contains" field.
- {event.caption} – Replaced by the content in the "Caption contains" field.
- {event.description} – Replaced by the content in the "Description contains" field.



{event.source}
{event.caption}
{event.description}

Example

You have a Generic Event with the following data:

- Source – 3fa85f64-5717-4562-b3fc-2c963f66afa6.
- Caption – Homepage.
- Description – https://www.google.com/

The action for the above Generic Event is Do HTTP(s) Request with the following data:

- HTTP URL – https://localhost:7001/rest/v1/webPages
- HTTP Content – {"parentId": "{event.source}", "{event.caption}": "string","url": "{event.description}";"name": "{event.caption}"}
- Content type – MIME.

When the Generic Event is triggered, the HTTP Content for the Do HTTP(s) Request action will automatically change to the following:

{"parentId": "3fa85f64-5717-4562-b3fc-2c963f66afa6", "Homepage": "string","url": "https://www.google.com/"}

Tracked Events

The trigger for an action is an *Event*. Each event has its own parameters. Most events can be defined with "Event Scheduling" to control the days and times event detection is enabled.

Refer to the particular event description for more information:

- Analytics Event.
- Analytics Object Detected.
- Archive Backup Finished (default).
- Archive Integrity Check Failure (system).
- Server Certificate Error.
- Devices Disconnected (default).
- Devices IP Conflict (default).
- Email Address Not Set (system).
- Email Not Set for Users (system).
- Email Server Not Configured (system).
- Error While Sending Email (system).
- Generic Event (default).
- Input Signal on Device.
- LDAP Sync Issue.
- Licenses Not Configured (system).
- License Issue (default).
- Local storage is used for analytic and motion data (system).
- Motion on Camera.
- Network Issue (default).
- Plugin Diagnostic Event.
- Reindexing Archive Canceled (system).
- Reindexing Archive Complete (system).
- Remote Archive Synchronization (system).
- Server Conflict (default).
- Server Failure (default).
- Server Started (default).
- Soft Trigger.

- Storage Issue (default).
- Storage Not Configured (system).
- System in Safe Mode (system).
- Time Synchronization Issue (system).

Analytics Event

Occurs when Nx Witness Server receives a special HTTP request from a device with built-in video analytics. If a camera has analytics enabled, Nx Witness can render visual displays in layout for the various types of analytics data received. Event metadata is also captured, and can be searched, filtered, and further analyzed.

IMPORTANT: Analytics must be configured in the camera first in order to be detected by Nx Witness.

For example, video analytics can detect when a vehicle has entered a certain area, zoom in on the license plate, and then perform license plate recognition. The corresponding event in Nx Witness could render a bounding box of one color around the car, a bounding box of another color around the license plate, and trigger an Email alert to security personnel. See "Analytics Object Detected" for more details about Analytics Events that specifically involve object detection (i.e. temperature detection is an Analytics Event with no object detection, but face recognition is an Analytics Event involving object detection).

Any number of video analytics devices can be connected the System, and for each device any number of video analytic types can be enabled. Visualizations are captured and displayed as a bounding box in a user-specified color for each event or as a point for objects with a coordinate but no size. Once defined, an analytics event can be searched and filtered by entity type (notifications, Bookmarks, events, motion, detected objects), by area as with motion search, by class or by attribute using unified text search of the Caption and Description fields, or by date interval. A counter shows the number of results that match the search criteria.

To configure an Analytics Event

1. Use the camera web page to confirm that analytics detection is properly configured and enabled in the device(s) you plan to use.

   Note: Some cameras can have their analytics detection configured in the Nx Witness desktop client. See Plugins and Analytics for more information.
2. Open **Event Rules** and click the **Add** button to create a new rule.
3. Select **Analytics Event** from the **When** field.
4. Click on the **At** field to select the device(s) that will be generating the third party analytics for the rule. In the *Select Devices* list, cameras that do not support analytics are highlighted in red.

Note: Analytics integration works with certain camera models only, and event types differ from camera to camera. A warning notification will open if one or more of the selected cameras does not support analytics.

5. Choose the **Event Type** that will trigger the rule.

   Note: Each device will have a different set of available triggers depending on the analytic capabilities provided by the manufacturer. Only those available for the selected devices will be listed.

6. Optionally, use the *Caption* and *Description* fields to enter or filter attributes or metadata provided by the analytics device. Entries in these fields should match the corresponding fields in the HTTP request and are case sensitive. If the field is empty, it will always be considered a match.

   - *Caption* – Optional class value used to identify object type.
   - *Description* – Optional attribute value used to distinguish objects within a class.

Advanced Parameters

- Event Scheduling

Why Event may work incorrectly

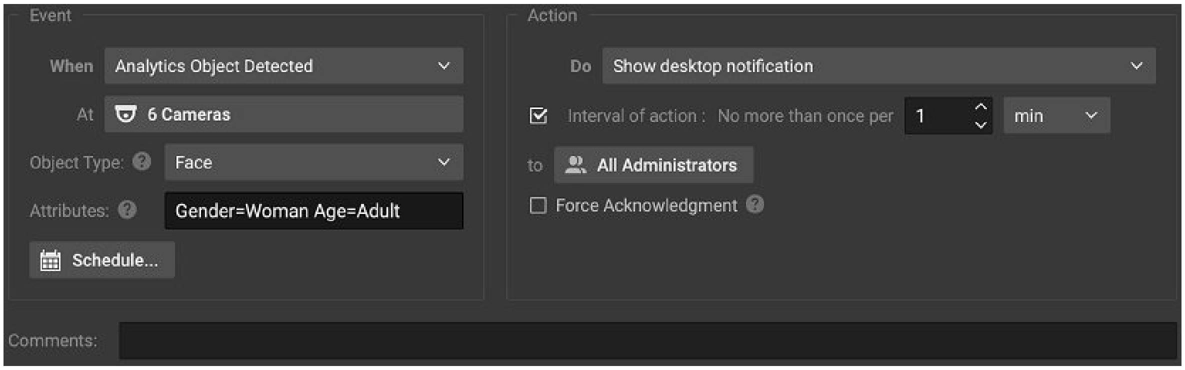
- Request is filtered out. Edit or clear the *Caption* and *Description* fields and trigger the event again.
- Global notification for this event is disabled.

Analytics Object Detected

Occurs if an analytics object is detected on one or more cameras. This is a more narrow type of Analytics Event meant to be used specifically with video analytics providing object detection metadata. This event will allow such events to be appropriately categorized based on the object type selected, improving how it gets stored in the archive for later retrieval when using the search function. See "Plugins and Analytics" for details.

Basic Parameters

- *At* – Click in this field to select devices to monitor; all devices can be selected.
- *Object Type* – Depending on the analytics plugin being used, different selectable object types (e.g., car, human, bicycle, etc.) may be available to you.
- *Attributes* – Event will only trigger if names entered in this field match the attributes of detected objects in the Objects tab.


Event

When: Analytics Object Detected

At: 6 Cameras

Object Type: Face

Attributes: Gender=Woman Age=Adult

Schedule...

Action

Do: Show desktop notification

☑ Interval of action : No more than once per 1 min

to: All Administrators

□ Force Acknowledgment

Comments:

In the example above, the analytics plugin should support face detection with the **Gender** and **Age** parameters to ensure the event is working.

Advanced Parameters

- Event Scheduling

Why Event may work incorrectly

- Event Attributes are set incorrectly or
- Global notification for this event is disabled.

Archive Integrity Check Failure (system)

Occurs when archive files are removed, renamed, or otherwise manually changed, when a file has an incorrect timestamp, or if archive backup does not complete successfully. If you hover over the notification, the storage path where the problem was detected displays. This is a System-generated event.

An archive Integrity check failure notification is triggered automatically when archive backup does not complete successfully.

Users with administrator or power user privileges will also receive a notification when attempting to view an altered archive for the specific camera affected. If you hover over the notification, the storage path where the problem was detected will be displayed. You can obtain more information (ex. the exact file name) from the Server log files (see "Collecting Logs").

Why Event may work incorrectly

- Global notification for this event is disabled.

1.16.9.3.1 Archive Backup Finished (deprecated)

This event is deprecated and is only available as a past event in the Event Log. It occurred when an archive backup was complete. See "Configuring Backup and Redundant Storage" for details. This is a default event.

Advanced Parameters

- Event Scheduling

Why Event may work incorrectly

- Backup is set to "real time".
- There has been an Archive Integrity Check Failure
- Global notification for this event is disabled.

Devices Disconnected (default)

Occurs if a device is disconnected for whatever reason (network issue, device malfunction, etc.). This is a default event.

Devices are considered disconnected if no data is received for 10 seconds. If a device is experiencing network issues for over a minute, then ❗ appears next to it in the Resource Panel. Once data is received from the device, the status is automatically changed back to Online.

Additional related events may occur that can help to investigate the issue:

- *Network Issue* – Indicates the network is unable to transfer data between the device and server, potentially the reason a device goes offline.
- *Server Failure* – If a server is down, all hosted devices will appear offline.
- *Camera IP Conflict* – If another camera with the same IP address enters the network, one of these two cameras will go offline.
- *Server Conflict* – If different servers on the same network access and pull data from the same cameras. Some cameras may drop offline because they are not able to provide several streams simultaneously.

Basic Parameters

- *At* – Click in this field to select devices to monitor, or use *<Any Device>* to monitor all devices.

Advanced Parameters

- Event Scheduling

Why Event may work incorrectly

- Too many devices are monitored, triggering too many events.
- Devices being monitored are offline.
- Action is not configured properly.
- Global notification for this event is disabled.

Devices IP Conflict (default)

Occurs if another Device with the same IP address has entered the network, resulting in one of the two Devices going offline and generating a Devices Disconnected event. This is a default event.

Advanced Parameters

- Event Scheduling

Why Event may work incorrectly

- Global notification for this event is disabled.

Email Address Not Set (system)

Occurs when a logged-in User does not have an Email address configured in the System and is therefore unable to receive Email notifications.

This System-generated event is disabled by default.

- *Viewer* is notified that their Email address is not configured.
- *Administrator* is notified that a User does not have an Email address specified.

If you click on the notification, the user's Email settings dialog will open (see "Changing User Settings"). This notification will close automatically once the Email address is set.

Email notifications cannot work if an Email Server is not configured. In this case, an Error while Sending Email notification will display.

Why Event may work incorrectly

- Global notification for this event is not enabled.

Email Not Set for Users (system)

Occurs to notify the Administrator when one or more users do not have an Email address specified and are therefore unable to receive mail notifications.

This System-generated event is disabled by default.

When an Administrator receives notification that a particular User does not have an Email address specified, they can click on the notification to open the User Settings dialog for that user. Once Email for the User is set by an Administrator, the related notification will stop.

Why Event may work incorrectly

- Global notification for this event is not enabled.

Email Server Not Configured (system)

Occurs if an Email Server is not configured. Displays a notification. This is a System-generated event.

If you click on the notification, the *System Administration* dialog opens to the *Email* tab where you can configure *Outgoing Email Settings*. See "Configuring the Email Server".

This notification will hide automatically once the Email Server is configured.

Why Event may work incorrectly

- Global notification for this event is disabled.

Error While Sending Email (system)

Occurs when Email notification fails. This is a System-generated event.

If you click on the notification, the *Mail Server* settings dialog will open (see "Send Email" for details).

This notification will hide automatically once Email is configured.

Why Event may work incorrectly

- Global notification for this event is disabled.

Generic Event (default)

Occurs when the Server receives an HTTP request from an external system such as an alarm system, access control device, or monitoring system. This is a default event.

Nx Witness allows third-party systems and devices to send an HTTP string known as a "createEvent" API call. The CreateEvent request must follow the proper format in order to be read by the server, and the event fields in the rule must match the corresponding fields in the HTTP request to be acted upon.

Together with the "Do HTTP(s) Request" action, which can send an HTTP request, you can create bidirectional API communication between Nx Witness and other software systems. A Generic Event can automatically replace the appropriate action parameter placeholders used in a "Do HTTP(s) Request" with the corresponding parameter's value. See "Using a Server's Web Interface" for more information.

Note: Values in the event field are case-sensitive, and an empty string functions as a wildcard, where any value is considered a match.

Basic Parameters

Each request contains the following fields:

- *Source.*
- *Caption.*
- *Description.*
- *Metadata* – Used to pass a device identifier that will specify devices the event is limited to (cameras, I/O modules, etc). To obtain the device identifier:

  Open the device context menu and click **Device Settings**. In the **General** tab, the device identifier will be displayed as **Camera/Device ID**. The device identifier should be passed in the following format: `{"cameraRefs":["<id>"]}`. In HTML encoding it will look like this: `{%22cameraRefs%22:[%22<id>%22]}`.

  ❗ **IMPORTANT:** It is necessary to specify a device if the generic event is linked to a notification, and the "Force Acknowledgment" option is required. In this case once the notification is acknowledged, a Bookmark will be created and linked to the specified device. See "Show Notifications" for details.
- *Occurs/Starts/Stops* – This is an optional field for the "State". If there is no "State" field in the HTTP request, the event is considered **instant**. If specified, the event is considered **continuous** and the rule requires a State=**Active** (Start) or State=**Inactive** (Stop) attribute. If a Generic Event containing State=Active is received, the resulting action will continue until the Server receives a Generic Event with the same parameters that contains State=Inactive.

Note: If a continuous action such as "device recording" or "repeat sound" is bound to an instant Generic Event (one without a State field), the rule will not work. (See "Configuring Event Rules" for more information about continuous and instant events.)

Example

http://127.0.0.1:7001/api/createEvent?source=%22**Door**%22&caption=%22**Knock**%20**Knock**%22&description=%22**Visitor!**%22&metadata={%22cameraRefs%22:[**%22066fbf9c-2e11-a501-6e15-dfb0fb97c7cb**%22]} This HTTP request:

- Sends data to a Server at IP Address 127.0.0.1 and Port 7001,
- *Source* –"Door".
- *Caption* – "Knock Knock".
- *Description* – "Visitor!".
- *State* – Not used, so it is instant.
- *Device Identifier* – 066fbf9c-2e11-a501-6e15-dfb0fb97c7cb.

Remember, fields in the Generic Event must match the corresponding HTTP request and are case-sensitive. For instance, for an event configured as Source "*foo*", Caption "*bar*", and Description "" (empty):

An HTTP request with the following data WILL trigger a Generic Event:	An HTTP request with the following data will NOT trigger Generic Event:
Source – "foo12345" (contains "foo")	Source – "Foo12345" (contains "Foo" instead of "foo")
Caption – "bartender" (contains "bar")	Caption – "batender" (does not contain "bar")
Description – (empty string means all values match)	Description – "Lorem ipsum dolor sit amet" (empty string means all values match).

Advanced Parameters

- *Omit Logging* – When checked, the generic event will not be added to the Event log. This option allows an action that is trigger in rapid succession or with a very high frequency to be performed without a database call or database storage that would cause undesirable "spamming" of the Event Log. Even if the "Omit logging" checkbox is enabled, a Generic event with a "Write to log" Action will still appear in the Event Log.
- see "Event Scheduling".

Why Event may work incorrectly

- HTTP request is not correctly written. Refer to the Server API.
- Request is filtered out. Try clearing all fields (Source, Caption, Description) and trigger the HTTP request again.
- HTTP request is bound to a continuous type of action but does not contain the "State" field.
- A device is not specified yet the event is linked to a notification and the "Force Acknowledgment" option is set.
- Global notification for this event is disabled.

Input Signal on Device

Occurs if input signal is detected on one or more device(s). Nx Witness can detect input signals on the following devices:

- ONVIF-compliant (input support via ONVIF may vary from device to device)
- Axis cameras

IMPORTANT: To detect input signals, input must be supported on the device.

Basic Parameters

- *When* – A signal can be continuous, so the event must be defined as occurring when input "**Starts**" or "**Stops**".
- *At* – Device(s) the input signal is detected on. To specify devices see Selection Lists in Event Rules. Choose *<Any Device>* to detect input signals on all devices supporting that input.

Note: A warning notification will open if one or more of the selected cameras does not support this event. These cameras will be highlighted in red.

Advanced Parameters

- *Input ID* – the I/O Module port to take signal from (see Setting Up I/O Modules).
- Event Scheduling

Why Event may work incorrectly

- Too many devices are being monitored, causing too many events to occur.
- Devices that are being monitored are offline.
- Action is not configured properly.
- Global notification for this event is disabled.

LDAP Sync Issue (system)

Occurs when the LDAP Server fails to synchronize with the System. Event is inclusive of any issue that prevents successful LDAP synchronization (improperly configured proxy, connectivity issues, LDAP Server offline).

IMPORTANT: LDAP users will not be able to connect to a system (see "LDAP Users and Groups").

Basic Parameters

- *When* – A system defined trigger linked to the result of the LDAP synchronization routine (LDAP Su
- *Do* – Only Panic Recording and Repeat Sound are not permitted actions for LDAP Sync Issue Events.

Why Synchronization may fail

- Failed to connect to LDAP server.
- Failed to complete the synchronization within the timeout setting.
- No User accounts on LDAP Server match the synchronization settings.
- Some LDAP users or groups were not found in the LDAP database.
- Changes being made on LDAP Server during Synchronization.
- Incorrect LDAP configuration or misaligned attribute mapping.

Why Event may work incorrectly

- Action is not configured properly.

Licenses Not Configured (system)

Occurs if no licenses are activated. Displays a notification. This is a System-generated event.

If licenses are not configured it is not possible to record cameras, it is always possible to view analog cameras connected to an NVR or I/O module.

Click on the notification to open the license dialog. See "Nx Witness Licenses".

The notification will hide automatically once at least one license is activated.

Why Event may work incorrectly

- Global notification for this event is disabled.

License Issue (default)

Occurs when a trial license expires, or when the Server on which licenses are activated goes offline. This is a default event.

When there is a license issue, it is not possible to record camera streams. Some analog Cameras connected to encoders or I/O modules may remain viewable. Once recording has stopped a License Issue event generates a notification. The notification will list the cameras that are not being recorded. If you click on the notification, the license dialog will automatically open (see "Nx Witness Licenses").

When a Server goes offline, there is a 30-day failover period for the licenses that were in use, during which recording can continue. The Server must be restored or a new license must be activated during this grace period, or recording will stop on as many cameras as there are missing licenses.

Why Event may work incorrectly

- Global notification for this event is disabled.

Local storage is used for analytic and motion data (system)

Occurs if a system (OS) drive is used for analytic and motion data. This is a System-generated event.

This event triggers a corresponding notification for administrators only when the Desktop Client connects to the system. When you click on the notification, the storage configuration dialog will open. See "Configuring Server and NAS Storage" for details.

Advanced Parameters

- Event Scheduling

Why Event may not work correctly

- Global notification for this event is disabled.

Motion on Camera

Occurs if motion is detected on camera(s).

IMPORTANT: Recording must be enabled on the selected cameras for this rule to be functional. See "Setting a Recording Schedule" for instructions on enabling and configuring recording.

Basic Parameters

When – motion can be continuous so the event must be defined as occurring when motion "**Starts**" or "**Stops**". If no motion occurs for 3 seconds, the current motion event is considered stopped. When motion occurs again, a new motion event is generated.

At – device(s) on which motion detection will be enabled. To specify devices see Selection Lists in Event Rules. Choose *<Any Device>* to detect motion on all devices.

Note: A warning notification will open if one or more of the selected cameras does not support motion detection. These cameras will be highlighted in red.

Advanced Parameters

- Event Scheduling

Why Event may not work correctly

- Recording is disabled for camera(s) that are being monitored.
- Motion Mask is not set properly. See "Setting up Motion Detection".
- Too many cameras are monitored, triggering too many events to process.
- Cameras that are monitored are offline.
- Action is not configured properly.
- Global notification for this event is disabled.

Network Issue (default)

Occurs if network is unable to transfer data between device and server and packet loss is detected. That may cause for frame rate to drop on device(s). If no frames are received from device for 10 seconds, device is considered offline. The Devices Disconnected event is then generated in this particular case. This is a default event.

Advanced Parameters

- Event Scheduling

Why Event may work incorrectly

- Global notification for this event is disabled.

Plugin Diagnostic Event

Occurs when Nx Witness Server receives a event from a plugin device attached to the System. Event metadata is captured, and can be searched, filtered, and further analyzed.

Basic Parameters

- *Source* – Select the triggering device or the At field.
- *Caption contains* – Optional class value used to identify object type.
- *Description contains* – Optional attribute value used to distinguish objects within a class.
- *Level* – Select one or more from the options *ERROR*, *WARNING*, or *INFO*.

Advanced Parameters

- Event Scheduling

Reindexing Archive Canceled (system)

Occurs if the archive reindexing operation is canceled before it completes. This is a System-generated event.

When a storage device or archive file is moved, renamed, or deleted, it is possible to restore access to the archive by rebuilding the index that maps physical storage locations for the System (see "Reindexing and Fast-Scanning Archives").

If such reindexing is cancelled, the System automatically generates the warning notification "*Rebuilding archive index is canceled by user*". It is highly recommended that archive reindexing be restarted and allowed to complete, otherwise you may not be able to access some or all of your archived files.

Why Event may work incorrectly

- Global notification for this event is disabled.

Reindexing Archive Complete (system)

Occurs when the archive reindexing operation completes successfully. This is a System-generated event.

When a storage device or archive file is moved, renamed, or deleted, it is possible to restore access to the archive by rebuilding the index that maps physical storage locations for the System (see "Reindexing and Fast-Scanning Archives").

When reindexing is complete, the System generates the notification "*Rebuilding archive index is complete*".

Why Event may work incorrectly

- Global notification for this event is disabled.

Remote Archive Synchronization (system)

Occurs when remote archive synchronization from an internal Camera storage begins and when it is complete. Used for certain cameras that record directly to their own internal storage, in which case the camera's internal storage must be periodically downloaded to the Nx Witness System servers. This is a System-generated event.

Why Event may work incorrectly

- Global notification for this event is disabled.

Server Certificate Error (system)

Occurs if the Server's SSL certificate is unable to be verified. See "Obtaining and Installing an Authorized Certificate" and "Server Certificate Validation" for details.

Advanced Parameters

- Event Scheduling

Why Event may work incorrectly

- Global notification for this event is disabled.

Server Conflict (default)

Occurs if different servers on the same network access and pull data from the same devices. In this case, some devices may drop offline because they do not provide several streams simultaneously. This results in a Device Disconnection/Malfunction event. The notification message contains a list of the specific devices that are used by both servers. This is a default event.

Advanced Parameters

- Event Scheduling

Why Event may work incorrectly

- Global notification for this event is disabled.

Server Failure (default)

Occurs if a Server is down. Can be triggered by a hardware or software issue, or by manual or emergency shutdown. When a Server fails, all devices hosted that Server will go offline. This is a default event.

Advanced Parameters

- Event Scheduling

Why Event may work incorrectly

- Global notification for this event is disabled.

Server Started (default)

Occurs when any Server registered in the System has started. This is a default event.

Advanced Parameters

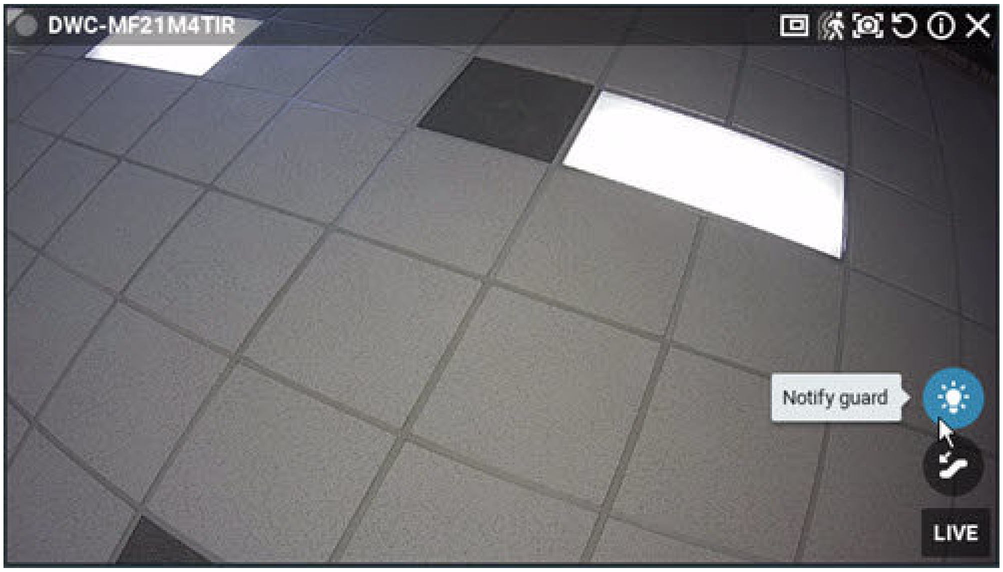
- Event Scheduling

Why Event may work incorrectly

- Global notification for this event is disabled.

Soft Trigger

This event type adds a button to one or more devices in layout. When a User clicks on a soft trigger button, the associated action is triggered. The event can be instant (triggers when the button is clicked), or continuous (triggers as long as the button is held). Soft trigger buttons appear as a circular overlay in the lower-right region of an item, and will display the contents of the **Name** field when the mouse cursor is hovered over it.



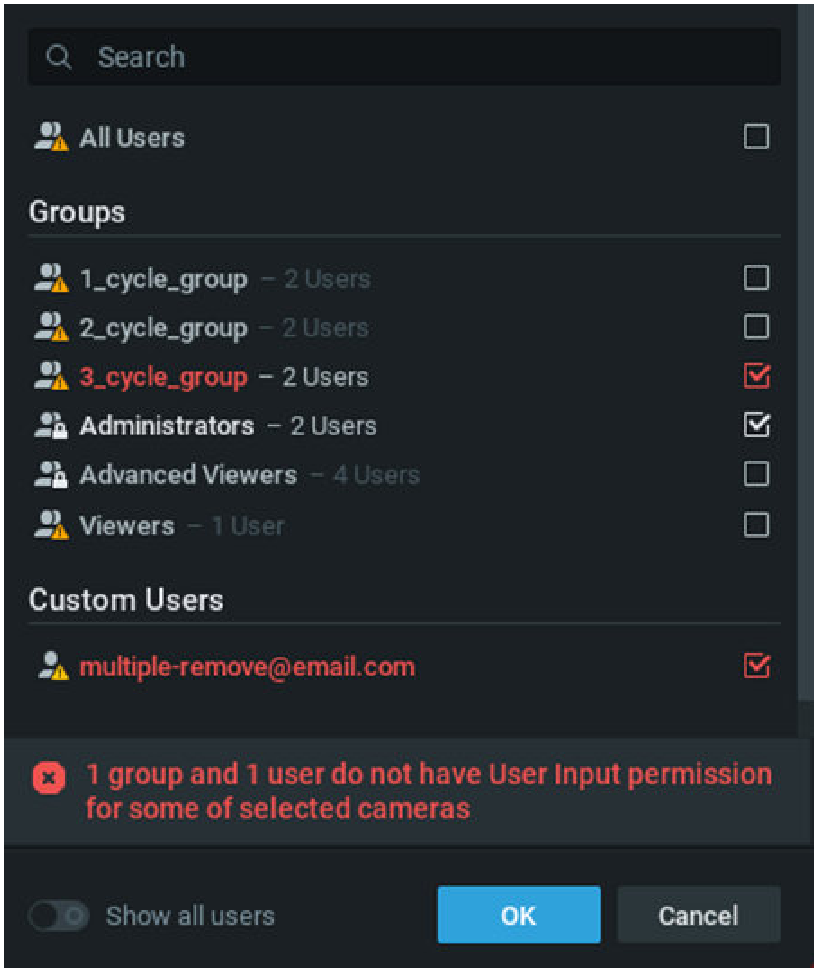
For example, you can create soft trigger button to start and stop a Bookmark recording when an operator sees suspicious activity. Or, it could be a panic button that starts a siren when an emergency situation is detected.

In addition to making it possible for a User to initiate an action from layout, a soft trigger that has a "Perform HTTP Request" action makes it possible to integrate third-party systems and devices, and to bundle multiple actions within an event. For example, you can create a soft trigger with an HTTP request to a 3rd party device that initiates one or more of the actions the device is capable of, such as "if temperature that exceeds 110°F is detected, close door."

Basic Parameters

- *At* – Click in this field to select the device(s) that will have the soft trigger button. If <*Any Device*> is selected then the button will be placed on offline devices as well.
- *Available to* – Click in this field to select the Users or User Groups that are allowed to use the trigger.

  ❗ **IMPORTANT:** To be able to trigger an event on a device, the User or User role must have input permission on the device. If they do not, the following warning appears:



All Users ☐

Groups

- 1_cycle_group – 2 Users ☐
- 2_cycle_group – 2 Users ☐
- 3_cycle_group – 2 Users ☑
- Administrators – 2 Users ☑
- Advanced Viewers – 4 Users ☐
- Viewers – 1 User ☐

Custom Users

- multiple-remove@email.com ☑

1 group and 1 user do not have User Input permission for some of selected cameras

.

- *Name* – Enter a brief description of the event that will triggered. Contents of this field are displayed on layout when the mouse cursor hovers over the button.
- *Icon* – Select from the menu of available icons.

Advanced Parameters

- Event Scheduling

Why Event may work incorrectly

- Action is not configured properly.
- Global notification for this event is disabled.

Storage Issue (default)

Occurs if the Server is unable to write data onto one or more storage device. This is a default event.

Storage issue may be caused by any of the following:

- *Hard disk malfunction.*

- *Insufficient rights* – The permission to write on disk or recorded folder may be restricted by the computer Administrator.
- *Hard disk is too slow* – Too many cameras are attempting to record simultaneously and the hard disk cannot respond quickly enough. It may be useful to add another hard disk drive.
- *Disk is full* – There is a required reserved space of approximately 10-30GB for local storage or 50-100GB for NAS devices. When available disk space reaches that threshold, the oldest data will be overwritten by new data. If available storage drops below this threshold, the Server will write data to the disk but instantly erase it.
- *System Drive is Full* – Occurs when the partition on which the operating system is installed has less than the required amount of free space (5GB for PCs or 1GB for ARM devices). It is highly recommended that space be made available as soon as possible to avoid loss of data and system instability.

Advanced Parameters

- Event Scheduling

Why Event may work incorrectly

- Global notification for this event is disabled.

Storage Not Configured (system)

Occurs if storage is not configured, or no storage device is selected (the recording flag may have been removed accidentally), so it is not possible to record. This is a System-generated event.

This event triggers a "Storage is not configured" notification. When you click on the notification, the storage configuration dialog will open. See "Configuring Server and NAS Storage" for details.

Advanced Parameters

- Event Scheduling

Why Event may not work correctly

- Global notification for this event is disabled.

System in Safe Mode (system)

Occurs when a System is in Safe Mode, in which case changes cannot be saved. The only available option is to activate a license. This is a System-generated event.

Why Event may work incorrectly

- Global notification for this event is disabled.

Time Synchronization Issue (system)

Occurs when the Server loses Internet access. A notification with the message "No Server has internet access for time synchronization." is displayed. This is a System-generated event.

If you click on the notification, the Time Synchronization tab in System Administration will open (see Time Synchronization in a Multi-Server Environment). This notification will close automatically once Internet access has been restored.

Why Event may work incorrectly

- Global notification for this event is disabled.

Available Actions

The reaction to an event is an *Action*. Each action has its own parameters.

The common parameters *interval of action/instant* and *fixed duration* are described in "Interval of Action".

Refer to the particular action description for more information:

- Bookmark
- Device Output
- Device Recording
- Do HTTP(s) Request
- Execute PTZ Preset
- Exit Full screen
- Open Layout
- Panic Recording
- Play Sound
- Repeat Sound
- Send Email
- Send Mobile Notification
- Set to Full screen
- Show Desktop Notification
- Show on Alarm Layout
- Show Text Overlay
- Speak
- Write to Log

Bookmark

Creates a Bookmark in the archive of one or more cameras when an event occurs. See Using Bookmarks for details about Bookmarks.

Note: Recording must be enabled on the selected cameras for Bookmarks to be saved.

A Bookmark is automatically named with the syntax *<Event> on <Device>*.

Basic Parameters

- *At* – Camera(s) for which Bookmarks will be recorded. To specify cameras see "Selection Lists in Event Rules". At least one device must be selected.
- *Also set on source camera* – Check to set the Bookmark on the camera selected in the event.

Advanced Parameters

- *Fixed Duration* – The duration of the Bookmark. It applies to continuous events only, such as those with the Starts or Stops attribute set (e.g., motion on camera, input signal on device, etc.). If unchecked, the Bookmark will continue until the event ends.
- *Pre-Recording* – If checked, use to specify an amount of time to include in the Bookmark before the event occurs.
- *Post-Recording* – If checked, use to specify an amount of time to include in the Bookmark after the event occurs.
- *Tags* – Optional descriptors that can be added to help identify and search for Bookmarks.

May be caused by

- All Events
- Notifications with *Force Acknowledgment* enabled will create the Bookmark once acknowledgment is complete.

Why Action may work incorrectly

- Recording is not enabled on a selected camera (see "Setting a Recording Schedule").
- Event is not configured properly.

Device Output

Generates output on a device when an event occurs, starts, or stops.

IMPORTANT: Output must be supported on the selected devices.

Basic Parameters

- *At* – Device(s) on which output will be triggered. To specify devices see Selection Lists in Event Rules. At least one device must be selected.
- *Also trigger on source camera* – Check to to send the output signal to the camera selected in the event.

Note: A warning notification will open if one or more of the selected devices does not have an output relay. These devices will be highlighted in red.

Advanced Parameters

- *Output ID* – The I/O Module port ID to route signal to (see "Setting Up I/O Modules").

May be caused by

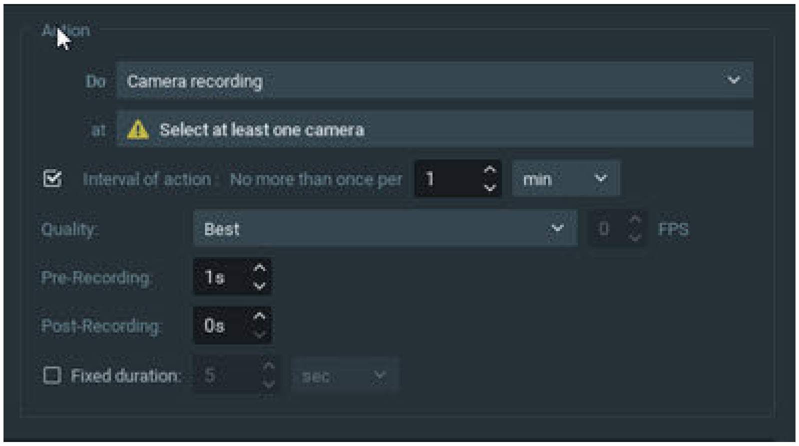
- Any Event
- Motion on Camera, Generic Event, Analytics Event, Soft Trigger, and Input Signal on Device – synchronous output. Output stops when motion or input stops.

Why Action may work incorrectly

- Output is not supported on some devices.
- Event is not configured properly.

Device Recording

Starts recording on selected cameras when event occurs.



Action

Do: Camera recording

at: Select at least one camera

☑ Interval of action : No more than once per 1 min

Quality: Best 0 FPS

Pre-Recording: 1s

Post-Recording: 0s

□ Fixed duration: 5 sec

Basic Parameters

- *At* – Devices to record. At least one device must be selected. To specify cameras see Selection Lists in Event Rules.
    1. Click on the **at** field to open the *Select Devices* dialog.
    2. Optionally, use the filter field to locate cameras (see "Searching and Filtering in Nx Witness".)
    3. Check specific cameras to record or select all cameras on a server by checking the corresponding box. (It is also possible to drag-and-drop the selected cameras from the Resource Panel into this field.)
    4. Click *OK* to accept or *Cancel* to discard changes.
- *Also record source camera* – Check to record the camera selected in the event.

IMPORTANT: At least one camera must be selected, and recording must be enabled on the selected cameras for this rule to be functional (see "Setting a Recording Schedule").

- *Interval of action* – Check to repeat no more than once per a given amount of time (to reduce the number of events), or uncheck for the action to be instant.

Advanced Parameters

- *Quality* – Select the desired recording parameter for these options: *Lowest*, *Low*, *Medium*, *High*, *Best*.
- *FPS* – Enter a frames per second value of up to 30. The camera's maximum FPS will be used if the FPS value entered exceeds the camera's capability.
- Select one of the following:
  - *Pre-Recording* – For continuous events (those with *Starts* and *Stops* attributes), you can enter the number of seconds (up to 600 seconds) that archive will begin prior to the triggering event. The higher the pre-recording time, the higher the server's RAM utilization will be.
  - *Post-Recording* – For continuous events (those with *Starts* and *Stops* attributes), you can enter the number of seconds (up to 600 seconds) that recording will continue after the triggering event.

    OR
  - *Fixed duration* – Records for a specified amount of time in seconds when the event occurs.

Note: Fixed duration must be unchecked to use Pre-Recording and Post-Recording. They will only work when used with a Generic Event and an HTTP-request with the appropriate parameters enabled. Please visit our Support Portal to learn more about recording using Nx Witness Generic Event.

May be caused by

- Analytics Event
- Generic Event
- Input Signal on Device
- Motion on Camera
- Soft Trigger

Why Action may work incorrectly

- Recording is not enabled on camera.
- Event is not configured properly.

Do HTTP(s) Request

Sends an HTTP/HTTPS request to a targeted external device or system (floodlight switch, access control trigger, alarm system) which can then be used in those devices or systems to trigger additional actions. The request must follow the proper format in order to be read by the receiving device. HTTPS URLs are supported.

This action generates an HTTP GET, POST, PUT, or DELETE request in response to any event triggered in Nx Witness. Together with the "Generic Event", which can receive an HTTP request as an event, you can create bidirectional API communication between Nx Witness and other software systems.

For example, a manufacturer has a restricted area with an ACS card reader at the entry point and cameras that monitor the area surrounding the entry point. Nx Witness has a standard rule to send a notification when abnormal duration motion is detected in the entry area. If someone tampers with the card reader in an unauthorized attempt to enter the restricted area, Nx Witness triggers one action to notify the surveillance center that motion is detected in the area, and a second HTTP request action to the manufacturer's call center server, which in turn runs a security procedure to activate an alarm and generate a phone call to factory floor security personnel.

Example

http://123.12.8.1:7001/api.clickandcall.com/http/**sendmsg**?**user**=VMSuser&password=123456&**api_id**=3612726$MO=1&**from**-13234567890&**to**=18184493546$**text**=Visitor+is+outside+front+door.

This example sends an API request to the clickandcall system to send an SMS message to the phone number you specify. It could be coupled, for example, with a generic event that can trigger a 3rd party device to unlock the front door.

- *sendmsg* – Sends data to a Server at IP Address 123.12.8.1 port 7001
- *user and password* – credentials required by the receiver to allow the request access to their system.
- *api_id* – required account number with receiving entity.
- *from* – phone number from which the message will be sent.
- *to* – phone number to which the message is sent.
- *text* – the message text, in this case "Visitor is outside front door".

Basic Parameters

- *Interval of action* – Check this box to aggregate the number of times the action will be triggered. Enter an integer and select a time interval from the menu (**seconds**, **minutes**, **hours**, or **days**). Uncheck to trigger the action every time the event occurs.
- *HTTP URL* – The HTTP link to the external system that will receive the request. Can also contain the request itself.

- *HTTP Content* – The body of the HTTP request, if needed. See "Event Field Placeholders" for details about the parameters that the appropriate Event data can automatically replace.
- *Login and Password* – If required by the external system, enter credentials for authentication.
- *Content type* – Enter the body type of the request. Select one of the following content format types according to the requirements of the receiving system:
  - *Auto*
  - *text/plain*
  - *text/html*
  - *application/html*
  - *application/json*
  - *application/xml*

  Note: Auto selects the best format based on your entry.
- *Authentication type* – Level of authentication required (*Auto* or *Basic*).
- *Request type* – Type of request. Select one of the following request types:
  - *Auto*
  - *GET*
  - *POST*
  - *PUT*
  - *PATCH*
  - *DELETE*

Why Action may work incorrectly

- Event is not configured properly.
- HTTP request syntax is incorrect or does not meet receiver requirements.
- External system requires authorization and no or incorrect credentials were specified.

Execute PTZ Preset

Activates a *PTZ Preset* on a specific camera (see "Saving and Restoring PTZ Positions"). PTZ Tours cannot be activated by an event.

IMPORTANT: At least one PTZ position must be defined on the selected camera for this action to be valid.

Basic Parameters

- *At* – Select one camera on which to activate preset.

Advanced Parameters

- *Interval of action* – Check to limit the number of occurrences in a given amount of time, or uncheck for a single, instant action.
- *PTZ Preset* – Choose from the PTZ presets defined for the selected camera. If no presets are configured, the menu will be empty.

May be caused by

- All events.

Why Action may work incorrectly

- Event is not configured properly.
- Interval of action is too long, try "instant".

Exit Fullscreen

Exits Full screen mode when an event occurs.

Basic Parameters

- *On Layout* – Click to select the layout(s) in which the Full screen mode will exit.

May be caused by

- All events.

Why Action may work incorrectly

- Event is not configured properly.

Open Layout

Opens a given layout when an event occurs. For example, a shared layout can open for a single or group of users, or a local layout can be opened for the User who owns it.

Basic Parameters

- Interval of action – Check to repeat no more than once per a given amount of time (to reduce the number of events), or uncheck for the action to be triggered instantly each time it occurs.

Advanced Parameters

- *Layout* – Click to select the layout that will open when the the action is triggered. Only one layout can be selected. A local layout can only be shown to the User who owns it.
  - Cross-System Layouts cannot be used
  - If no User is selected, only shared layouts will be displayed in the *Select Layout* dialog
  - If exactly one User is selected, their local and all shared layouts will be displayed in the *Select Layout* dialog

    - If a local layout is selected that doesn't belong to the selected user(s), a message will indicate that
    - If a local layout is selected when more than one User is selected, a message will indicate that
- *Show To* – Select at least one User or User Role for whom the layout will open (see "Select Users dialog")
    - If some selected users don't have access to the selected layout, a message will indicate that
    - If no selected users have access to the selected layout, a message will indicate that

May be caused by

- All events.

Why Action may work incorrectly

- Event is not configured properly.

Panic Recording

Triggers *Panic Recording mode* when event occurs. Panic Recording switches recording settings for all cameras to maximum FPS and highest possible quality.

Note: If recording is not enabled for a camera, Panic Recording cannot be activated. See "Setting a Recording Schedule" for instructions on enabling and configuring recording.

Basic Parameters

- *Interval of action* – Check to repeat no more than once per a given amount of time (to reduce the number of events), or uncheck for the action to be instant.

Advanced Parameters

- None

Why Action may work incorrectly

- Event is not configured properly. See event description for details.

Play Sound

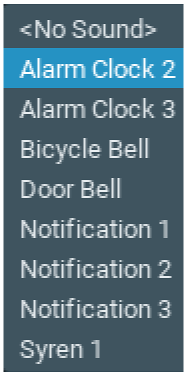
Plays a sound when event occurs.

Basic Parameters

- *At* – Device to play the sound on. (The device should support 2-way audio, see "Using 2-Way Audio".)
- *Also play on source camera* – Check to play sound on the camera selected in the event.

- *Interval of action* – Check to repeat no more than once per a given amount of time (to reduce the number of events), or uncheck for the action to be instant.
- *Play to users* – If checked, the sound will be played in the client application of the selected users.

  IMPORTANT: Either *Play to User or* a camera for 2-way audio ("*at*") must be enabled for this rule to be valid.
- Select a sound from the drop-down menu:



Advanced Parameters

- *Volume* – Drag the slider to increase or decrease volume of selected sound.
- *Test* – Preview the selected sound and volume level.
- *Manage* – Click to open the *Notification Sounds* dialog where you can customize the library of available sounds by adding, renaming or deleting sounds.
- Click **Add** to add a sound:
  1. Select the desired audio file. WAV, MP3, OGG, and WMA formats are supported. Maximum duration allowed is **30 seconds**.
  2. Set the duration in seconds the audio file will be played by changing the value in the *Clip sound up to* field.
  3. Choose Custom Title to name the selected sound. If not specified, the file name will be used by default.
  4. Apply changes.
- Click **Rename** and enter a new title to rename the selected sound.
- Click **Play** to test the chosen sample.
- Click **Delete** to delete the selected sample.

May be caused by

- All events.

Why Action may work incorrectly

- Event is not configured properly.

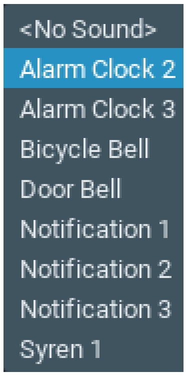
- Sound is muted. Open any item in layout and check if the sound is muted. Volume settings are applied globally. See "Adjusting Volume"
- Too long interval of action is set. Try "instant".
- Neither *Play to User* or camera for 2-way audio is checked.

Repeat Sound

Plays a sound repeatedly when event occurs.

Basic Parameters

- *At* – Device to play the sound on. (The device should support 2-way audio, see "Using 2-Way Audio".)
- *Also play on source camera* – Check to play sound on the camera selected in the event.
- *Interval of action* – Check to repeat no more than once per a given amount of time (to reduce the number of events), or uncheck for the action to be instant.
- *Play to users* – If checked, the sound will be played in the client application of the selected users. Those users are sent a special notification in the Notification Panel. **Note** that if the User closes the notification, the sound will stop playing even if event continues.
- *Drop down menu* – select a sound from the available options:



IMPORTANT: Either *Play to User or* a camera for 2-way audio ("*at*") must be enabled for this rule to be valid.

Advanced Parameters

Volume – Drag the slider to increase or decrease the volume of the selected sound.

Test – Preview the selected sound and volume level.

Manage – Click to open the *Notification Sounds* dialog where you can customize the library of available sounds by adding, renaming or deleting sounds.

- Click **Add** to add a sound:
  1. Select the desired audio file. WAV, MP3, OGG, and WMA formats are supported. Maximum duration allowed is **30 seconds**.

2. Use Clip sound up to to set the duration in seconds the audio file will be played.
3. Choose Custom Title to name the selected sound. If not specified, the file name will be used by default.
4. Apply changes.

- Click **Rename** and enter a new title to rename the selected sound.
- Click **Play** to test the chosen sample.
- Click **Delete** to delete the selected sample.

May be caused by

- Analytics Event
- Generic Event
- Input Signal on Device
- Motion on Camera
- Soft Trigger

Why Action may work incorrectly

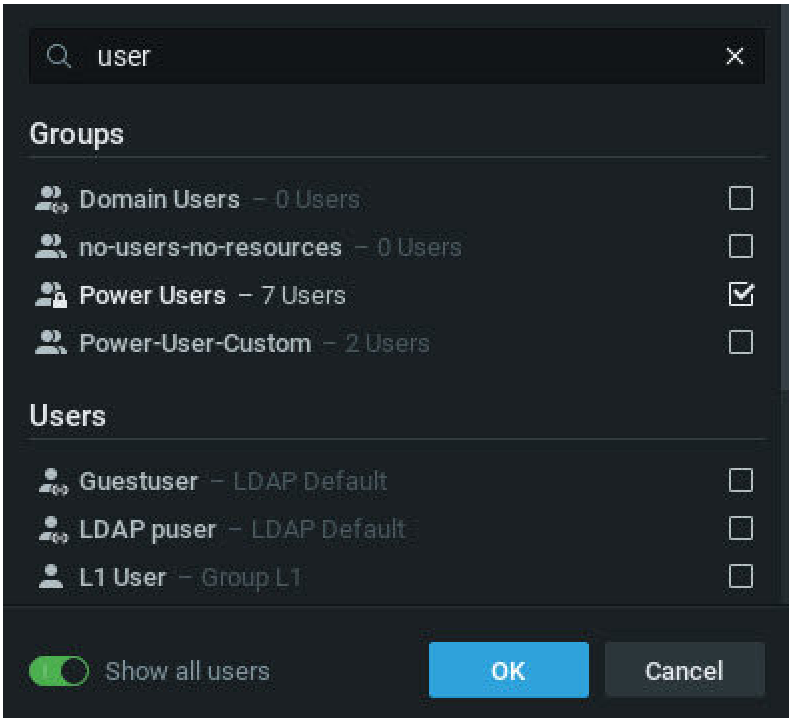
- Event is not configured properly.
- Sound is muted. Open any item in a layout and check if the sound is muted. Volume settings are applied globally. See "Adjusting Volume"
- Too long interval of action is set. Try "instant".
- Neither *Play to User* or camera for 2-way audio is checked.

Send Email

Sends an Email to one or more users, or to additional addresses, when an event occurs. An *Email server* must be configured for Nx Witness to send Emails (see "Configuring the Email Server") and the users must have a valid Email address in the Nx Witness System (see "Changing User Settings").

Basic Parameters

- Users the Email should be sent to. Use the **Search** field to filter names.



user

Groups

- Domain Users – 0 Users □
- no-users-no-resources – 0 Users □
- Power Users – 7 Users ☑
- Power-User-Custom – 2 Users □

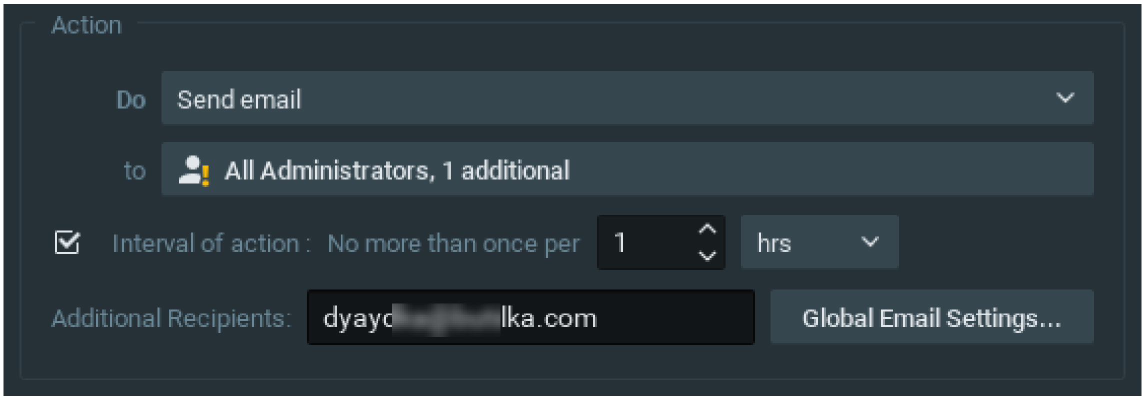
Users

- Guestuser – LDAP Default □
- LDAP puser – LDAP Default □
- L1 User – Group L1 □

Show all users (on)

Advanced Parameters

- *Additional Recipients* – Additional Email addresses to send notifications to. Separate multiple addresses with a semicolon (**;**) no spaces.



Action

Do: Send email

to: All Administrators, 1 additional

☑ Interval of action : No more than once per 1 hrs

Additional Recipients: dyayd[redacted]lka.com

- *Interval of action* – No more than once per a given amount of time, or instant.
- *Global Email Settings* – Click to configure Email Server parameters.

May be caused by

- All events.

Why Action may work incorrectly

- Email Server is not Configured – A notification is generated in this case (see "Configuring the Email Server").
- Email is not Set for Users – A notification is generated in this case.

- Event is not configured properly.
- Too long an interval of action is set.

Send Mobile Notification

Sends a push notification to a mobile device.

In order to receive push notifications, users must be logged in to the Cloud through their mobile applications (requires mobile client v20.1 or later). Users can receive push notifications from multiple systems and turn on/off notifications for specific systems.

Basic Parameters

- Users the push notification should be sent to. Use the **Search** field to filter names.

Advanced Parameters

- *Interval of action* – No more than once per a given amount of time, or instant.
- *Custom notification content* – Enter your own notification **Header** and **Body** text to replace the default one generated by the push notification.
  - *Add source device name in body* – Checked by default. Uncheck to prevent the source device name from being put in the notification body.

May be caused by

- All events.

Why Action may work incorrectly

- Event is not configured properly.
- Interval of action is too long, try "instant" instead.

Set to Fullscreen

Opens the selected camera to Full screen mode in the selected layout when an event occurs.

> ❗ **IMPORTANT**: This action works only if the layout selected in the rule is already open when the event occurs, and when the selected camera is on the selected layout.

Basic Parameters

- *Source camera* – Check to choose the camera selected in the event to open to Full screen mode.
- *Camera* – Select the camera that will open to Full screen mode.
- *On Layout* – Click to select the layout in which the Full screen mode will launch.

May be caused by

- All events.

Why Action may work incorrectly

- Event is not configured properly.

Show Desktop Notification

Sends a notification to the selected user(s). See "Notification Panel".

Basic Parameters

- *To* – Select users who will see the notification

Advanced Parameters

- *Interval of action* – Check this box to aggregate notifications to a given per a certain amount of time, to reduce the number of events. Uncheck so the action is instant and will occur whenever the event is triggered.
- *Force Acknowledgment* – Prompts the recipient to acknowledge the notification. When "Force Acknowledgment" is checked, a notification will remain in the Notification Panel until the recipient responds by clicking the **Acknowledge** button. Hovering over the Acknowledge button opens a thumbnail that showing the device name and timestamp of the event. Clicking the Acknowledge button opens a Bookmark form.
  - The **Name** field is pre-populated with an event description but may be edited. A **Description** is required, **Tags** are optional.
  - Click **OK** to close the notification and create the Bookmark.

May be caused by

- All events

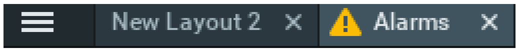
Why Action may work incorrectly

- Some notifications are disabled.
- Event is not configured properly.
- Interval of action is too long. Reduce length or try instant.
- Global notification for this event is disabled.

Note: Show Desktop Notification must be selected for any Notifications intended to work with the Cross System Notification feature.

Show on Alarm Layout

Launches the specified cameras in a special **Alarm Layout** tab with an "Alarm" title and icon, when a specific event occurs. For example, a rule can be configured so that if motion occurs on camera 1, cameras 1, 2 and 3 will launch in an Alarm Layout. If several events are configured to show different cameras on an alarm layout for the same user, the corresponding cameras will be added upon the Event occurrence. If several Events are configured to show different cameras on the Alarm Layout for different users, each User will see a separate Alarm Layout.



Basic Parameters

- Cameras to show on Alarm Layout.
  1. Right-click on the camera (in the Resource Panel or Viewing Grid) and select Camera Rules to open the Event Rules Dialog.
  2. Under the Event section (on the left side of the rule dialog) next to **When,** choose your target System Event (e.g. Motion, Soft Trigger, etc).
  3. Next to **At** is the *Cameras* field, select at least one camera, then click *OK* (or *Cancel* to discard changes).
  4. In the Action section of the rule (on the right side of the rule dialog) in the Do field select Show on Alarm Layout.
- To select all cameras on a specific server, check the box corresponding the Server in the Cameras field dialog. If desired, use the *Filter* box as described in the "Searching and Filtering in Nx Witness". It is also possible to drag-and-drop cameras from the Resource Panel into *Cameras* field of this action.

Advanced Parameters

- *Interval of action* – Check to trigger the action no more than once in a given amount of time.
- *For* – Click to show the Alarm Layout to only certain users or User Groups.
- *Force Alarm Layout opening* – Check this box to open the Alarm Layout as the active layout tab, regardless of what the users are currently viewing. If unchecked, the Alarm Layout will open as a new tab with the alarm title and icon, but it will not be the active tab.
- *Also show source camera* – If the event is triggered by a camera, check this option to always include that camera in the Alarm Layout.

May be caused by

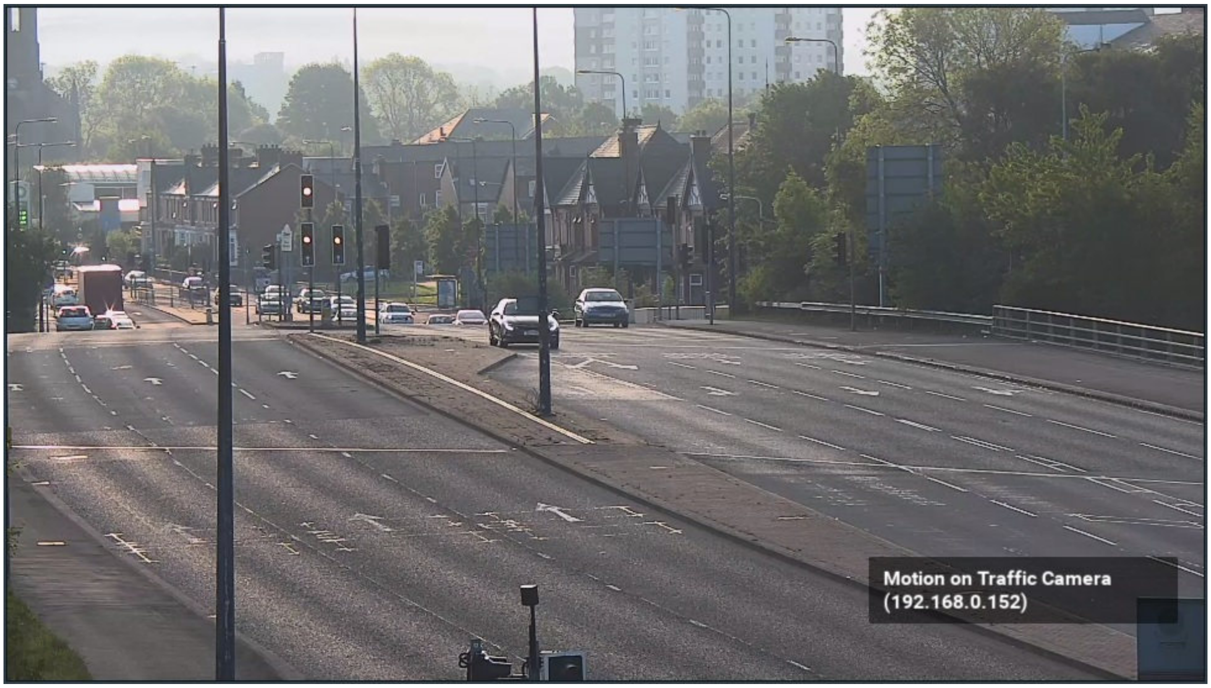
- All events.

Why Action may work incorrectly

- Alarm Layout is not available to certain Users or User Groups.

Show Text Overlay

Displays text overlay on specific cameras when an event occurs, as shown below:



Basic Parameters

- *at* – Camera(s) to display text overlay on. To specify:
    1. Click on *Select at least one camera* in the desired row on the Alarm/Event Rules form (see "Event Rules").
    2. Check the cameras to display, then click *OK* (*Cancel* will discard changes).
    - *Use Source camera* – Check to show text overlay on the camera selected in the event.

  To select all cameras on a specific Server, check the corresponding box. To filter search, use the *Filter* box. Filter criteria is the same as search criteria. It is possible to drag-and-drop the selected cameras from Resource Panel onto the action's advanced settings form.

Advanced Parameters

- *Also show on source camera* – available only if the event is bound to cameras. If checked, when event occurs text will be displayed on the source camera too. For instance, if Rule is set up to show Cameras 2 and 3 and event occurs on Camera 1, text will display on all 3 cameras. If unchecked, it will display only on cameras 2 and 3.
- *Display text for... Seconds* – If checked, the text will be visible for the specified amount of time. Can be unchecked for the following continuous events: Motion on Camera, Input Signal on Device, Generic Event, Analytic Event, Soft Trigger. If unchecked, text will be displayed until the event stops. For instance, text will be displayed while the motion is going on on a specific camera.

- *Use custom text* – If not specified, the event description will be used as a text.

May be caused by

- All Events.

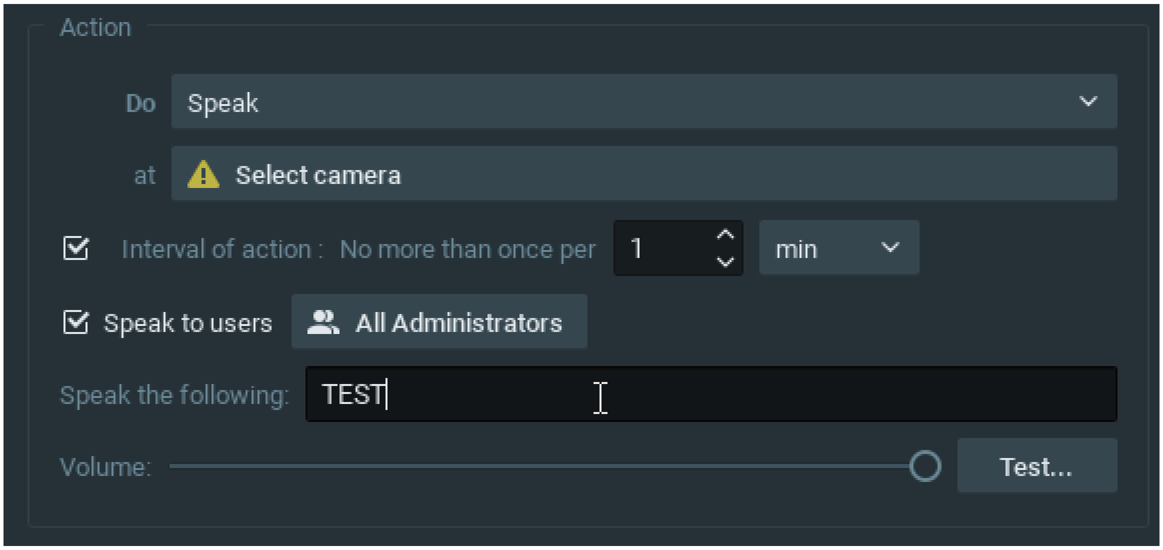
Why Action may work incorrectly

- Event is not configured properly. See the Event description for details.

Speak

Pronounces specific text when an event occurs.

Basic Parameters



Action

Do: Speak

at: Select camera

☑ Interval of action : No more than once per 1 min

☑ Speak to users: All Administrators

Speak the following: TEST

Volume:

- *Speak the following* – Text to pronounce.
- *at* – Camera to pronounce the text on. Camera should support 2-Way Audio.
- *Also play on source camera* – Check to play sound on the camera selected in the event.
- *Speak to users* – If checked, the text will be pronounced to the selected users in the Client application.

❗ **IMPORTANT:** Either *Speak to users* should be checked or at least one camera should be selected for 2-way audio, otherwise the rule will be invalid.

Advanced Parameters

- *Interval of action*: no more than once per certain amount of time (to reduce the amount of events), or instant.

May be caused by

All Events.

Why Action may work incorrectly

- Event is not configured properly. See event description for details.
- Sound is muted. Open any item in a layout and check if the sound is muted. Volume settings are applied globally. See "Adjusting Volume"
- Too long interval of action is set. Try "instant".
- Either *Play to User* should be checked or camera for 2-way audio should be selected.

Write to Log

Writes a record to the event log when an event occurs.

By default, all events mentioned in rules are written to the log.

Basic Parameters

- None

Advanced Parameters

- *Interval of action* – no more than once per certain amount of time (to reduce the number of events), or instant.

May be caused by

- All events.

Why Action may work incorrectly

- Event is not configured properly.
- Interval of action is too long, try "instant" instead.

Users and Groups

Users connect to Systems to order to view Cameras, search Archives, interact with Devices, and perform administrative tasks on a System. Users are created with a User Type that defines how they can interface with a System. Permissions granted either directly to a User, or through Group membership, define the actions a User can perform.

Groups are designed to provide bulk management of User Permissions. There are two types of Groups, Built-In Groups and Custom Groups. Built-In Groups have preset Permissions and attributes that cannot be changed while Custom Groups can be created and configured by Administrators and Power Users. Changes made to a Group will be applied to all Users in the Group, and all members of a Group inherit permissions from every Group their Group is a member of.

Users imported from a Lightweight Directory Access Protocol (LDAP) Server will use their existing credentials to connect to a Nx Witness System. LDAP Users can be configured as individual Users with Group Memberships or LDAP Groups can be imported and managed as a Custom Group (see "LDAP Users and Groups").

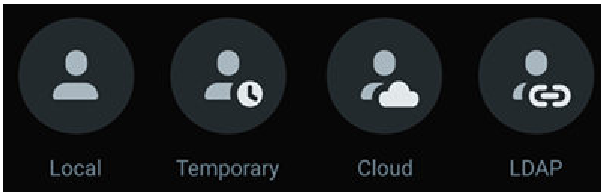
The list of Users and Groups can be accessed from the **Main Menu > User Management** dialog which has the following tabs:

- *Users* – see "Managing Users"
- *Groups* – see "Managing Groups"
- *LDAP* tab – allows to configure the integration with an LDAP Server (see "LDAP Users and Groups").

Note: The dialog to configure User Permissions and Group Permissions is the same (see "Permissions Management").

Managing Users

The following types of Users can be present in the System and are identified in lists with specific icons; grayed out icons are disabled Users.



- *Local Users*
  - ○ Reside in the System where they were added.
  - ○ Connect to the Local System using the *Desktop Client or Web Admin* interface.
  - ○ Cannot use the *Cloud Portal* to access a Local System or a Cloud Connected System.
- *Temporary Users*
  - ○ Are Local Users with limited permissions, a preset expiration date, and an optional session length limit.
  - ○ Cannot be a member of any group with Power User permissions.
  - ○ Can use the *Desktop Client* and *Web Admin* to connect to a System.
  - ○ Cannot connect the the *Cloud Portal*.
  - ○ Receive a URL to connect to a specific System; no password is required and the link can be used by anyone.
- *Cloud Users*
  - ○ Reside in the Cloud and can exist without having access to a System.
  - ○ Use the Desktop Client, Web Admin, and Cloud Portal to access Cloud Connected Systems.
  - ○ Can only access Systems that are connected to the Cloud.

- *Organization Users*
  - ○ Are managed at the Organization level by the Organization Administrator.
  - ○ Can be granted access to all Systems within the Organization, or only a subset of Systems in the Organization.
  - ○ Are displayed in User Management dialogs – but their attributes cannot be changed.
  - ○ Cannot be a member of any Custom Permissions Groups.
- *LDAP Users*
  - ○ Retain their username, password, and LDAP Group memberships when imported into Nx Witness.
  - ○ Connect to systems using their imported credentials and the Desktop Client or Web Admin.
  - ○ Cannot log into a System when the LDAP Server fails to respond.
  - ○ Can be directly granted Permissions to Resources and added to both Built-In and Custom Groups to inherit Permissions.
  - ○ Cannot be permanently deleted from Nx Witness – they will be re-imported during each LDAP sync until removed from the LDAP Server.
  - ○ Can be permanently Disabled to maintain User related entries on the Audit Trail of User Actions (see "Enabling and Disabling Users").
  - ○ Will be disabled in the System when a LDAP username is the same as existing System username. Existing System Users have conflict priority to prevent login issues.

See LDAP Users and Groups for configuration settings, warning banners, and related details.

Configuring Users

The primary method to access the User Management controls is by opening the **Main Menu > User Management** dialog and switching to the **Users** tab.

There are also many User Management controls that can also be accessed from screens displaying related User and Group information.

Restrictions:

- Only Administrators and Power Users can manage others Users.
- Power Users cannot create or modify other Power Users (see "Built-In Groups and Permissions" and "Managing Groups").

There are different elements of User Management:

- **Attributes** – Login, Name, Email, Status (Enabled or Disabled).
- **Permissions** – control access to System Settings and Resources (Cameras, Devices, Bookmarks, Layouts, and Archives).

The following topics are structured around how to perform common User Management tasks:

- Adding Users.
- Configuring Users.

- Managing Temporary User Access.
- Disabling and Enabling Users.
- Deleting Users.

IMPORTANT: Users can inherit Permissions (from Groups and Layouts) and have special Permissions on top of that. Always confirm Users Permission are set as intended.

Adding Users

Know the User Type to be added before starting the process as User Type cannot be changed once set. A User must be deleted and added again to change User Type.

- Only Administrators and Power Users can add users.
- Regular Users and Temporary Users can be added at the Desktop Client only.
- Cloud Users can be added at the Web Admin, Cloud Portal or Desktop Client.
- User permissions can be assigned at the Desktop Client only.
- Permission Groups can be assigned using the Desktop Client, Web Admin, and Cloud Portal.

IMPORTANT: Users will be Added to a System without access to System Resources if they are not a member of a Permission Group, or assigned Permissions using the Desktop Client (see "Configure Users").

Adding a User using the Desktop Client

1. Open the *Add User* dialog by accessing the **Main Menu > Add > User** navigation path.
2. Confirm the *New User* dialog box is open to the *General* tab.
   - Information on the *General* tab is required to create a user.
3. Select to add a User as Enabled or Disabled (see "Enabling and Disabling Users").
4. Choose the User Type.
   - *Cloud*: Enter the Email address of the User to add. Cloud Users cannot be Temporary Users.
   - *Local*: Enter the following information.
     - Login.
     - Full Name.
     - Email address.
     - Access type – Select **Regular** or **Temporary**.
       - ○ Set time limitations when Adding Temporary Users (see "Managing Temporary User Access").
       - ○ Provide and confirm a Password when Adding Regular Users.
5. Optional – Select the Permission Groups the Added User will be a member of.
6. Click the **Add User** button to complete the process. Authentication may be required.

Note: Copy and provide the Temporary link to the intended User.

Adding a User using the *Web Admin* / *Cloud Portal*

1. Select **Settings** in the header menu.
2. Expand **Users** in the left panel navigation.
3. Click the **Add User** button.
4. Enter the Email address of the User to add.
5. Optional – Select the Permission Groups the Added User will be a member of.
6. Click **Add User** to complete the process. Authentication may be required.

Note: Established Cloud Users will see the System on their Welcome screen and new Cloud Users will receive further instructions by Email.

Configuring Users

Configuring Users includes updating identity information, settings User Permissions, and toggling the User status between Enabled and Disabled. The User Type of any User cannot be changed.

- Power Users cannot configure Administrators or other Power Users.
- The Desktop Client must be used to change Temporary Users and User Permissions.
- Unless stated otherwise below:
  - All clients can modify the Groups where the User is a member – not all Users can be members of every group.
  - All Users can be Enabled, Disabled, Deleted (Local User) or Removed (Cloud User) in the Web Admin and Cloud Portal.
- LDAP Users:
  - Retain their username, password, and LDAP Group memberships when imported into Nx Witness.
  - Use their domain credentials to connect to a System – these can only be changed on the LDAP Server.
  - Can be added to Built-In and Custom Groups to inherit Resource Permissions – LDAP Groups memberships must be changed on the LDAP Server.
  - Cannot be permanently deleted from Nx Witness – they will be re-imported during each LDAP sync until removed from the LDAP Server.
  - Can be permanently Disabled to maintain User related entries on the Audit Trail of User Actions (see "Enabling and Disabling Users").

  IMPORTANT: LDAP Users are still imported when there is already the same username in the system – this may create access issues for all users sharing this username.
- Organization Users:
  - Can only be managed and changed by Organization Administrators using Cloud Portal interface.

- ○ Are shown in the Desktop Client, Web Admin, and Cloud Portal as locked users belonging to a Built-In Permission Group.
- ○ Cannot be members of Custom Permission Groups created in the Desktop Client.

To Configure a User in the Desktop Client

1. Open the *User Management* dialog by selecting **Main Menu > User Management** dialog and switching to the **Users** tab.
   - Optionally refine the list of users by using the search box, filters, and column sorting options.
2. Click on a **User** to open the configuration dialog.
   - User configuration changes are limited to Enabling and Disabling Users when multiple Users are selected.
3. Make changes in the *User Settings* tabs as outlined below.
   - The *General* tab configures User identity attributes (Name, Email) of non-LDAP Users.
   - The *Groups* tab selects which Groups the User is a member of – cannot change LDAP Group memberships.
   - The *Resources* tab is used to view and Manage Permissions.
   - The *Global Resources* tab defines:
     - ○ If the User is permitted to view the Event Log.
     - ○ If the User is permitted to generate Events.
4. Click **Apply** to save edits and keep the dialog open, or Click **OK** to Apply changes and close the dialog. Authentication may be required.

To Modify a User using the *Web Admin* / *Cloud Portal*

1. Select **Settings** in the page header menu.
2. Expand the list of **Users** in the left panel.
3. Click on a User to open the configuration dialog.
   - Regular Users can be Enabled, Disabled, or Deleted – Group Memberships, Name, Password, and Email can be updated.
   - Cloud Users can be Enabled, Disabled, Removed from the System, or have their Group Memberships changed.
   - Temporary Users can be Enabled, Disabled, or Deleted.
   - LDAP Users can be Enabled, Disabled, and have their non-LDAP Group memberships changed.
4. Configure available User attributes and Click **Save**. Authentication may be required.

Managing Temporary User Access

Temporary Users receive a unique URL link that provides access to a System through either the Desktop Client or the Web Admin. The Temporary User URL does not require a password and can be used by anyone (see Connecting as a Temporary User").

- Only Administrators and Power Users can create or modify Temporary Users.
- Temporary User must be configured with a future expiration date.
- Temporary Users can be added and configured at the Desktop Client only (except Status).
- Temporary Users can be members of any Groups that do not include Administrative or Power User permissions.
- The Audit Trail of User Actions captures the activity of Temporary Users.
- Temporary Users can be Enabled, Disable, or Deleted in the Desktop Client, Web Admin, and Cloud Portal.
  - Disabling a Temporary User disables the Temporary link, it does not change the configuration of the Temporary User.

Generating a Temporary Link

❗ **IMPORTANT**: Generating a Link for a Temporary User with an existing Link will invalidate the existing link and close any open sessions.

1. Open the *User Management* dialog by selecting **Main Menu > User Management** dialog and switching to the **Users** tab.
   - Optionally refine the list of users by using the search box, filters, and column sorting options.
2. Open the User by doing one the following.
   - Clicking on the User name in the list.
   - Selecting the checkbox for the User and clicking the **Edit** icon.
     - Selecting multiple Users will limit the edit dialog to batch Enabling and Disabling of Users.
3. Click the **New Link**... button to open the *New Link* configuration dialog.
4. Select the date the Link is *Valid Until.* Server date is used for this required value.
5. Check the *Revoke access after login* box to define an expiration timer that will start when the link is used (optional).
   - If *Revoke access after login* is selected, than a value between 1 and 999, in minutes, hours, or days must be provided.
6. Click the **Create** button. Authentication may be required.
7. Copy the link and provide it to the intended User (see "Connecting as a Temporary User").

Terminating a Temporary User Link

❗ **IMPORTANT**: This will quickly log the Temporary User out of an active session.

1. Open the *User Management* dialog by selecting **Main Menu > User Management** dialog and switching to the **Users** tab.
   - Optionally refine the list of users by using the search box, filters, and column sorting options.
2. Open the User to modify by doing one the following.
   - Clicking on the User name in the list.
   - Select the checkbox for the User and click the **Edit** icon.
     - Selecting multiple Users will limit the Edit dialog to batch Enabling and Disabling of Users.
3. Click the **Terminate** button to disconnect the User and terminate the previously provided link.
4. Confirm and authenticate if prompted.

Enabling and Disabling Users

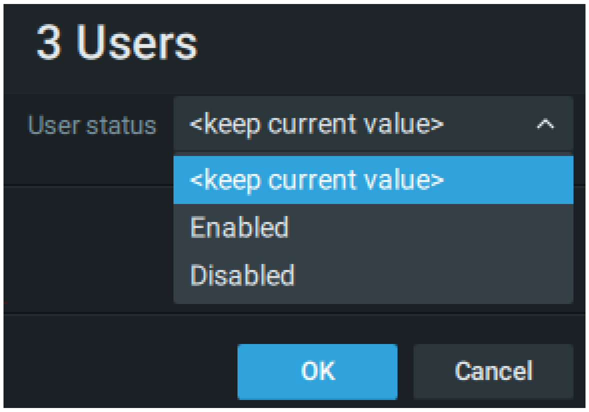
Enabled Users can access the System according to their Permissions while a Disabled User is prevented from accessing the System by any method. Unlike Deleting a User, Disabling a User preserves existing User information in the database and the User can again be Enabled with previous Permissions and settings unchanged.

- Administrators and Power Users can Enable or Disable User in the Desktop Client, Web Admin, and Cloud Portal.
- Power Users cannot Enable or Disable Administrators or other Power Users.
- The Audit Trail of User Actions retains all entries for Disabled Users.
- Disabled Users will be disconnected from the System and Email notifications will stop.
- Layouts created or shared by Disabled Users will remain available to other users.

Enabling and Disabling Users in the Desktop Client

1. Open the *User Management* dialog by selecting **Main Menu > User Management** dialog and switching to the **Users** tab.
   - Optionally refine the list of users by using the search box, filters, and column sorting options.
2. To disable or enable a single User:
   - Click on the User name in the list, or a select a single checkbox and Click **Edit** to open *User Properties*.
   - Change the toggle to Enabled (Green) or Disabled (Gray).
3. To Enable or Disable enable multiple Users at once:
   - Select the checkbox next to each User to Enable or Disable.
   - Click the Edit button to open the multiple User Enable or Disable dialog.

- Choose if all selected Users are to be Enabled or Disabled.



3 Users

User status <keep current value>

4. Click **OK** to Apply changes. Authentication may be required. Disabled Users will be disconnected from the System.

Disabling and Enabling Users using the *Web Admin* / *Cloud Portal*

1. Select **Settings** in the page header menu.
2. Expand **Users** in the left panel menu.
3. Select a User to display User Properties.
4. Change the toggle to Enabled (Green) or Disabled (Red).
5. Click **Save** to Apply changes. Authentication may be required.

❗ **IMPORTANT:** Disabled User will be disconnected from the System.

Deleting and Removing Users

Local Users can be deleted from the System they reside in while Cloud Users can only be removed from a System. Removing a Cloud User from a System does not delete the Cloud User Account.

Deleting a User from a Local System is instantaneous, permanent, and complete. Deleting a User cannot be undone (try "Disabling Users" if you want to keep the User data and history).

- Administrators cannot be deleted or removed from a System.
- Only Administrators and Power Users can delete or remove Users.
- Power Users cannot delete or remove other Power Users, or their own account.
- Users can be deleted or removed in the Desktop Client, Web Admin, and Cloud Portal.
- LDAP Users cannot be deleted until the LDAP Server is disconnected
- The Desktop Client can delete multiple users in one action.
- Deleting or removing a User will close all active sessions and prevent further access to the System.
- Audit Trail of User Actions for deleted Users will be permanently removed.
- Layouts available only to the deleted User will be removed from the System.

IMPORTANT: If "*Do not show this message again*" has been previously checked, you will not be prompted to confirm a User deletion and the action will be instant and permanent. To re-enable confirmations open **Local Settings** > **Advanced** and click the **Reset All Warnings** button.

Delete a User in the Desktop Client

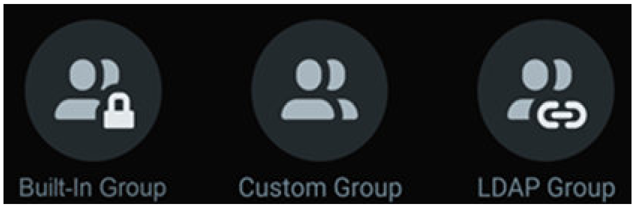
1. Open the *User Management* dialog by selecting **Main Menu > User Management** dialog and switching to the **Users** tab.
   - Optionally refine the list of users by using the search box, filters, and column sorting options.
2. Do one of the following
   - Click on the User to open the User settings and then select the **Delete** button on the right side of the dialog box.
   - Click the checkbox next to each User to be deleted, then select the **Delete** Icon in the banner.
3. Confirm if prompted. Authentication may be required.

Delete or Remove a User in the *Web Admin* / *Cloud Portal*

1. Select **Settings** in the page header menu.
2. Expand **Users** in the left panel navigation.
3. If needed, use the *Search* box to narrow the list of users.
4. Select the User to delete or remove, this will open the User Settings dialog:
   - Click **Delete User** to delete Temporary or Regular Users.
   - Click **Remove User** to remove Cloud Users from the System.
5. Confirm if prompted. Authentication may be required.

Managing Groups

Groups are a powerful method to organize Users and simplify Permissions Management. There are three types of groups:



Built-In Groups

- ○ Provide predefined access to Settings and Resources.
- ○ Cannot be modified or changed (see "Built-In Groups and Permissions").
- ○ *Administrators* and *Power Users* are the only Groups that can edit System settings.

- ○ Are a hierarchy where an upper group will inherit the Permissions of a lower group, in this order:
    - ○ Administrator
    - ○ Power Users
    - ○ Advanced Viewers
    - ○ Viewers
    - ○ Live Viewers
    - ○ System Health Viewers
- ○ Can contain Custom Groups as member who Inherits Permissions from the Built-In Group.

- *Custom Groups*
    - ○ Allow to configure custom Permissions.
    - ○ Can be created and managed by members of the Built-in *Administrators* and *Power Users* Groups.
    - ○ Can be members of the Built-In *Power User* In Group to access some System settings (see "Configuring Groups").
    - ○ Members of a Custom Group inherit permissions when their Group is a member of another Group.
    - ○ Temporary Users cannot be added to any Custom Group that inherits Power User permissions.
- *LDAP Groups*
    - ○ Can be imported with existing LDAP User members.
    - ○ Can be managed similar to a Custom Group but their membership and group name can be changed on the LDAP Server only.
    - ○ May have a duplicated Group name if a similar Group exists in the the System.

  See LDAP Users and Groups for configuration settings, warning banners, and related details.

The following topics describe the operations that can be performed with Groups:

- Creating a Group
- Configuring a Groups
- Deleting a Group

Built-In Groups and Permissions

The table on this page details the Permissions available to each Built-in Group.

- Built-In groups cannot be renamed or modified.
- Except for the Administrators Group, Custom Groups can be members of Built-In Groups.
- Built in Groups cannot be members of Custom Groups (see "Configuring Groups").

Action	Built In Groups					
	Administrators (Owner in 5.x)	Power Users (Administrator in 5.x)	Advanced Viewers	Viewers	Live Viewers	System Health Viewers
Configure System Settings						
Edit System Name	✔	✔				
Configure General Settings	✔	✔				
Install System Updates	✔	✔				
Activate Licenses	✔	✔				
Deactivate Licenses	✔					
Create, Edit, Delete Regular Users	✔	✔				
Create, Edit, Delete Regular Groups	✔	✔				
Create, Edit, Delete Power Users	✔					
Create, Edit, Delete Administrators						
Configure Email Server Settings	✔	✔				
Configure Security Settings	✔	see "Security Level"				
Configure Time Synchronization Settings	✔	✔				
Configure Routing Settings	✔	✔				
Configure Plugins	✔	✔				
Create System Backup	✔					
Restore from System Backup	✔					
Manage Logs	✔	✔				
Update System	✔	✔				
Merge Systems	✔					
Connect System to Cloud	✔					
Disconnect the System from the Cloud	✔					
Audit Trail	✔	✔				
Configure Server Settings						
Rename Server	✔	✔				

	Auto-detect built-in and USB camera	✓	✓				
	Configure Failover (all settings)	✓	✓				
	Detach Server (from System)	✓					
	Delete Server (Resource Panel, not online Servers)	✓					
	Reset to Defaults	✓					
	Restart Server	✓	✓				
	Add, Edit, Delete Storage Management	✓	✓				
	Manage Analytic DB Storage	✓	✓				
	Reindex (Archive + Backup)	✓	✓				
	Configure Backup Settings	✓	✓				
	Pin Certificate (in case of certificate error)	✓					
Cameras and Devices							
	View Live all Camera and Devices	✓	✓	✓	✓	✓	
	View Live all Web Pages and Integrations	✓	✓	✓	✓	✓	
	View Live all Server Health Monitors	✓	✓	✓	✓	✓	✓
	View Archive	✓	✓	✓	✓		
	Manage Bookmarks	✓	✓	✓			
	User Input (PTZ, 2-Way Audio, Soft Triggers, I/O Buttons)	✓	✓	✓			
	Generate Events	✓	✓	✓			
	Edit Settings all Cameras and Devices	✓	✓				
	Edit Setting all Video Walls	✓	✓				
	View Event Log	✓	✓	✓			
	Edit Event Rules	✓	✓				
	Edit Device Settings	✓	✓				
	View Bookmarks	✓	✓	✓	✓		
	Export Archive	✓	✓	✓	✓		
Other Resources							
	View, Edit, Rename, and Delete Shared Layouts	✓	✓				

	Create new Shared Layouts	✓	✓				
	Configure and access Video Walls	✓	✓				
Web Admin / Cloud Portal							
	View Metrics & Alerts	✓	✓				✓
	View Monitoring & Graphs	✓	✓				✓
	View Monitoring & Logs	✓	✓				

IMPORTANT: Many of the features and functions described in this manual are only available to Users with the appropriate Permissions.

Creating a Group

System Administrators and Power Users can use the Desktop Client to create, manage, and delete Custom Groups. Custom Groups only grant Permission to Resources while some Built-In Groups and Permissions also grant Permission to change Settings. Custom Groups can be nested within other Groups, or contain Built-In Groups as members to inherit Permissions.

How to create a Custom Group in the Desktop Client

1. Open **Main Menu > User Management.**
2. Select the *Groups* tab within the *System Administration* dialog.
3. Click the **Add Group** button to open the *New Group* dialog.
4. Enter the name of the new *Group*.
5. Enter an optional description of the *Group.*
6. Use the Permission Group menu to select if the new group will be a member of any Built-In Groups and Permissions or Custom Groups.
7. Click **Add Group** to create the group. Authentication may be required.

See "Configuring Groups" for information on granting Resources to Groups and managing Group Membership.

Configuring Groups

Groups are a powerful and efficient method to manage User Permissions. Changes made to the Group are applied to all Group members. Groups inherit permissions when they are a member of another Group, which in turn could be a member of another Group.

- Administrators and Power Users can create, configure, or delete Custom Groups.
- Power Users can create, configure, or delete Custom Groups that do not contain Power Users.
- Built-In Groups only allow members to be added or removed.
- Groups can only be created, configured, and deleted using the Desktop Client.
- Changes to LDAP Groups are stored in Nx Witness and not pushed to the LDAP Server.

    - LDAP Group descriptions and Resource Permissions are configurable.
    - Non-LDAP Users and Groups cannot be members of an LDAP Group.
    - Deleting LDAP Groups within Nx Witness is not permanent, a deleted LDAP Group will be re-imported during the next LDAP sync.
    - LDAP Group Name and Membership changes must be made on the LDAP Server.
    - An LDAP Group and non-LDAP Group users can be members of the same System Group.
- The Web Admin and Cloud Portal will display which Groups a User is a member of.
- The Web Admin and Cloud Portal will not display all members of a Group or Group Permissions.
- Changes can be saved on each tab, or on any tab after all changes are completed

To configure Groups:

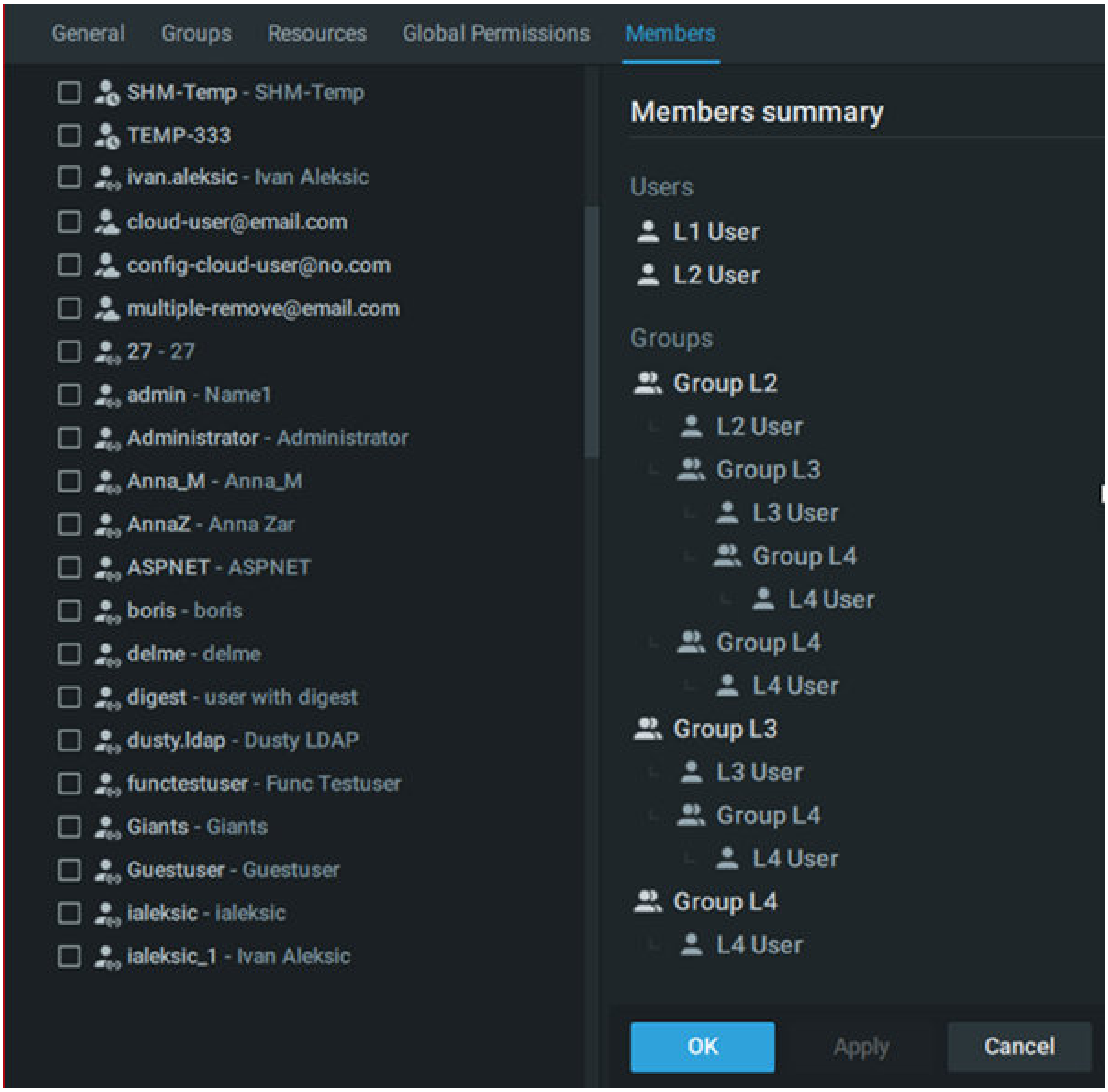
1. Open the *Group Management* dialog by selecting **Main Menu > User Management** dialog and switching to the **Groups** tab.
   - Optionally refine the list of groups by using the search box, filters, and column sorting options.
2. Click on a Group to open the configuration dialog.
3. Use the tabs within the Group configuration dialog in make permitted changes.
   - The *General* tab configures:
     - The name of any Custom Group.
     - The description of any LDAP or Custom Group.
     - All Permissions Groups where Permissions are inherited from.
   - The *Groups* tab provides:
     - A view and search function for all Groups this Group can be a member of.
     - A selection checkbox next each available Group which toggles Group membership.
     - Real-Time display of all Groups the current Group is member of.
     - A read-only view of LDAP Groups the current LDAP Group is a member of.
   - The *Resources* tab provides:
     - A grid-view of Permission types and available System Resources.
     - Visual display indicating if Permissions is granted, inherited, or not authorized.
     - A preview of cascading Permissions that will be included with specific selections.
     - Hover-text that details where permissions are directly inherited from.

     See "Permissions Management" for details.
   - The *Global Permissions* tab defines:
     - If Group members are permitted to view the Viewing the Event log.
     - If Group member are permitted to generate Event Rules.

- The *Members* tab provides:
  - A detailed view of all Group members, including Users from nested Groups.
  - Selectable checkboxes to add or remove members from the Group.

Groups Memberships Inheritance Example

In the following example:



- □ SHM-Temp - SHM-Temp
- □ TEMP-333
- □ ivan.aleksic - Ivan Aleksic
- □ cloud-user@email.com
- □ config-cloud-user@no.com
- □ multiple-remove@email.com
- □ 27 - 27
- □ admin - Name1
- □ Administrator - Administrator
- □ Anna_M - Anna_M
- □ AnnaZ - Anna Zar
- □ ASPNET - ASPNET
- □ boris - boris
- □ delme - delme
- □ digest - user with digest
- □ dusty.ldap - Dusty LDAP
- □ functestuser - Func Testuser
- □ Giants - Giants
- □ Guestuser - Guestuser
- □ ialeksic - ialeksic
- □ ialeksic_1 - Ivan Aleksic

Members summary

Users

- L1 User
- L2 User

Groups

- Group L2
  - L2 User
  - Group L3
    - L3 User
    - Group L4
      - L4 User
  - Group L4
    - L4 User
- Group L3
  - L3 User
  - Group L4
    - L4 User
- Group L4
  - L4 User

- *L1 User* and *L2 User* are directly assigned to **Group L1**.
- *L3 User* is a member of **Group L1** via membership in **Group L2** and **Group L3**.
- *L4 User* is a member of **Group L1** via membership in **Group L3** *and* **Group L4**; both being members of *Group L2*.
- **Group L1** will have the same User Members if **Groups L3** and **Group L4** are removed as member of **Group L1** since *L3 User* and L4 *User* are nested in Group *L2.*

❗**IMPORTANT:** Be careful with nested Groups as improper inheritance can cause unintended Permissions granting and circular dependencies.

Deleting a Group

Built-In Groups and Permissions cannot be deleted. Custom groups can be deleted by Administrators and Power Users using the Desktop Client.

Deleting a group will not delete User accounts that are members of the Group, members of the deleted Group may see a change in the Resources that are available to them if those same Resources are not provided from another Group membership or granted to the User directly.

To delete a Group

1. Open the *Group Management* dialog by selecting **Main Menu > User Management** dialog and switching to the **Groups** tab.
   - Optionally refine the list of users by using the search box, filters, and column sorting options.
1. Select the checkbox next to each Group to be deleted.
2. Click on the **Delete** button to remove the group(s) from the system.
3. Confirm or authenticate if prompted.

❗**IMPORTANT:** A confirmation message will not be displayed if the *Do Not Show Again* option has been selected. **Open Menu Menu > Local Settings > Advanced** and click the **Reset All Warnings** button to again show all confirmation prompts.

Permissions Management

Permissions can be configured for Custom Groups and individual Users.

To configure Permission for a Group

1. Open the *Group Management* dialog by selecting **Main Menu > User Management** dialog and switching to the **Groups** tab.
   - Optionally refine the list of groups by using the search box, filters, and column sorting options.
2. Click on a Group to open the configuration dialog.
3. Choose the *Resources* tab to manage **Resource Permissions** or the *Global Permissions* tab to manage **Global Permissions**.

To configure Permission for a User

1. Open the *User Management* dialog by selecting **Main Menu > User Management** dialog and switching to the **Users** tab.
   - Optionally refine the list of users by using the search box, filters, and column sorting options.

2. Click on the User name in the list, or a select a single checkbox and Click **Edit** to open *User Properties*.
3. Choose the *Resources* tab to manage **Resource Permissions** or the *Global Permissions* tab to manage **Global Permissions**.

Global Permissions

Use the checkboxes to enable or disable the following:

- Permission View the Event log.
- Permission to generate Event Rules.

Resource Permissions

Granting Permissions to Resources is done by selecting the Permission level (view live, archive, manage bookmarks, etc.) a User or Group will have to a Resource. The Resource configuration panel is the same when configuring Users or Groups

- Devices – Cameras, I/O modules, etc.
- Web Pages and Integrations.
- Server Health Monitors.
- Layouts – may include all of the above Resources. Granting permission for a Layout grants access to all Resources placed on the Layout.
- Video Walls – configure Video Walls based on available Resource Permissions.

The following rules are applied when managing Resource Permissions:

- Clicking on the heading row of any device will toggle all devices in the Permission column.
- Permissions can only be granted, inherited, or not granted, there is no mechanism to block access to a specific Resource.
- Users and Groups inherit the Permissions from every Group they are a member of.

Resource Control Icons – provide permissions to selected resources:

- **Live View** – Permission to access a live view only.
- **View Archive** – Permission to access the archive (includes Live View).
- **Export Archive** – Permission to export archives (includes View Archive).
- **View Bookmarks** – Permission to browse Bookmarks (includes View Archive).
- **Manage Bookmarks** – Permission to View, Create, Edit, or Delete Bookmarks (includes View Bookmarks).
- **User Input** – Permission to control PTZ, use Soft Triggers and 2-way audio (includes Live View).
- **Edit Settings** – Permission to change the available settings (includes User Input).

Permission Status Icons:

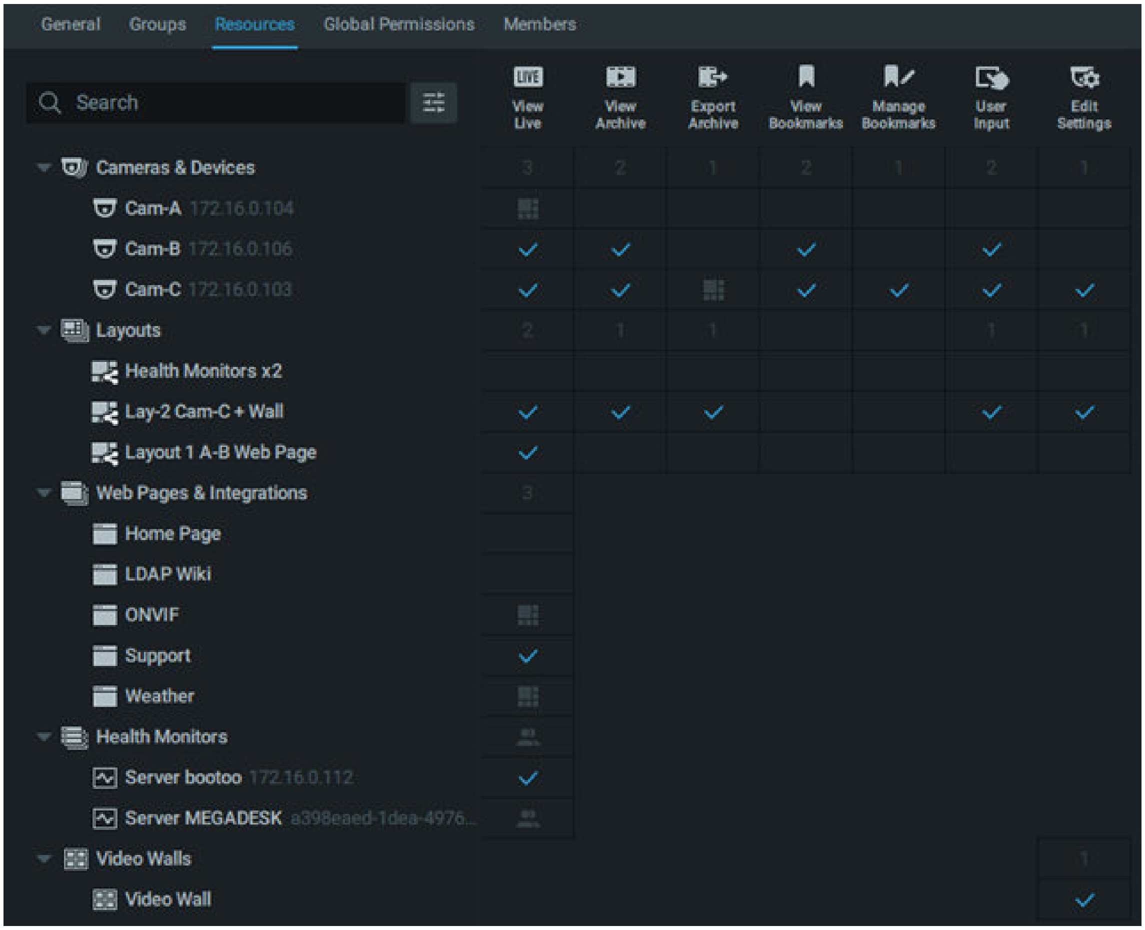
- Empty Space – No Permission granted to this System Resource.

- Checkmark – An explicitly granted (not inherited) Permission to a Resource.
- A Number – The sum of Resources granted per Permission type displayed in row heading.
- Layout – Permission to the Resource is inherited through a Layout granting Permissions.
- Multiple Users – Permissions are inherited from membership in on or more Groups.

Note: Mouse-hover Permission Status Icon in the panel to view inheritance details – Mouse-hover over the Permission grid to see inheritance rules.

<u>Permissions Panel Configuration Example</u>:

The example below illustrates various combinations of Resource Permissions assigned to Users and Groups:



	View Live	View Archive	Export Archive	View Bookmarks	Manage Bookmarks	User Input	Edit Settings
Cameras & Devices	3	2	1	2	1	2	1
Cam-A 172.16.0.104	▦						
Cam-B 172.16.0.106	✓	✓		✓		✓	
Cam-C 172.16.0.103	✓	✓	▦	✓	✓	✓	✓
Layouts	2	1	1			1	1
Health Monitors x2							
Lay-2 Cam-C + Wall	✓	✓	✓			✓	✓
Layout 1 A-B Web Page	✓						
Web Pages & Integrations	3						
Home Page							
LDAP Wiki							
ONVIF	▦						
Support	✓						
Weather	▦						
Health Monitors	👥						
Server bootoo 172.16.0.112	✓						
Server MEGADESK a398eaed-1dea-4976...	👥						
Video Walls							1
Video Wall							✓

- **Cameras & Devices**
  - Cam-A – Live View is inherited from **Layout 1 A-B Web Page**.
  - Cam-B – Live View, View Archive, View Bookmarks, and User Input to Cam-B are explicitly granted.
  - Cam-C – Export Archive permission is inherited from **Layout Lay-2 Cam-C + Wall** and all other permissions are explicitly granted.
- **Layouts**
  - No access to **Health Monitor x2 Layout**.

  - ○ **Lay-2 Cam-C + Wall layout** does not permit any bookmark access.
  - ○ Layout 1 A-B Web Page is limited to Live View.
- **Web Pages & Integrations**
  - ○ Inherited permission to view **ONVIF Web Page** from **Lay-2 Cam-C + Wall**.
  - ○ Explicit permission to view **Support Web Page**.
  - ○ Inherited permission to view **Weather Web Page** from **Layout 1 A-B Web Page**.
- **System Health Monitors**
  - ○ Explicit permission to view for **Server bootoo**.
  - ○ Inherited permission to view for **Server MEGADESK** inherited from **SHM Group**.
- **Video Walls**
  - ○ Explicit permission to edit **Video Wall**.

LDAP Users and Groups

LDAP integration allows a System to import *Users* and *User Groups* from an LDAP Server.

- Users must exist in the LDAP database object tree, match the base selection, and not be disabled in the LDAP Server to be imported.
- LDAP Groups and Users can be assigned Permissions and placed in any existing System Groups, except the Built-In Administrator Group (see "Configuring Users" and "Configuring Groups").
- LDAP Groups have certain specifics in terms of configuration (see "Configuring Groups").
- LDAP Users can access the System using their LDAP username and password.
- LDAP users will not be able to log in while the LDAP Server is not available (see "LDAP Sync Failure").
- The following LDAP Servers types are supported:
  - ○ Microsoft Active Directory,
  - ○ Open LDAP Server,
  - ○ JumpCloud.

IMPORTANT: LDAP Users must have Resource Permissions granted (see "Permissions Management") or to be added to a Built-In Group to do anything more than connect to a System.

<u>Setting Up LDAP Integration</u>

To import LDAP users and allow them to connect to the System, it is necessary to establish a connection between Nx Witness and the LDAP Server. The LDAP server does not have to be a part of the same LAN the Media Server is on, but it must be available for the Media Server either by LAN or WAN.

- LDAP integration should be performed by, or in cooperation with, the Network (Domain) Administrator.
- LDAP over SSL may require certificates on both the LDAP and Nx Witness Servers.

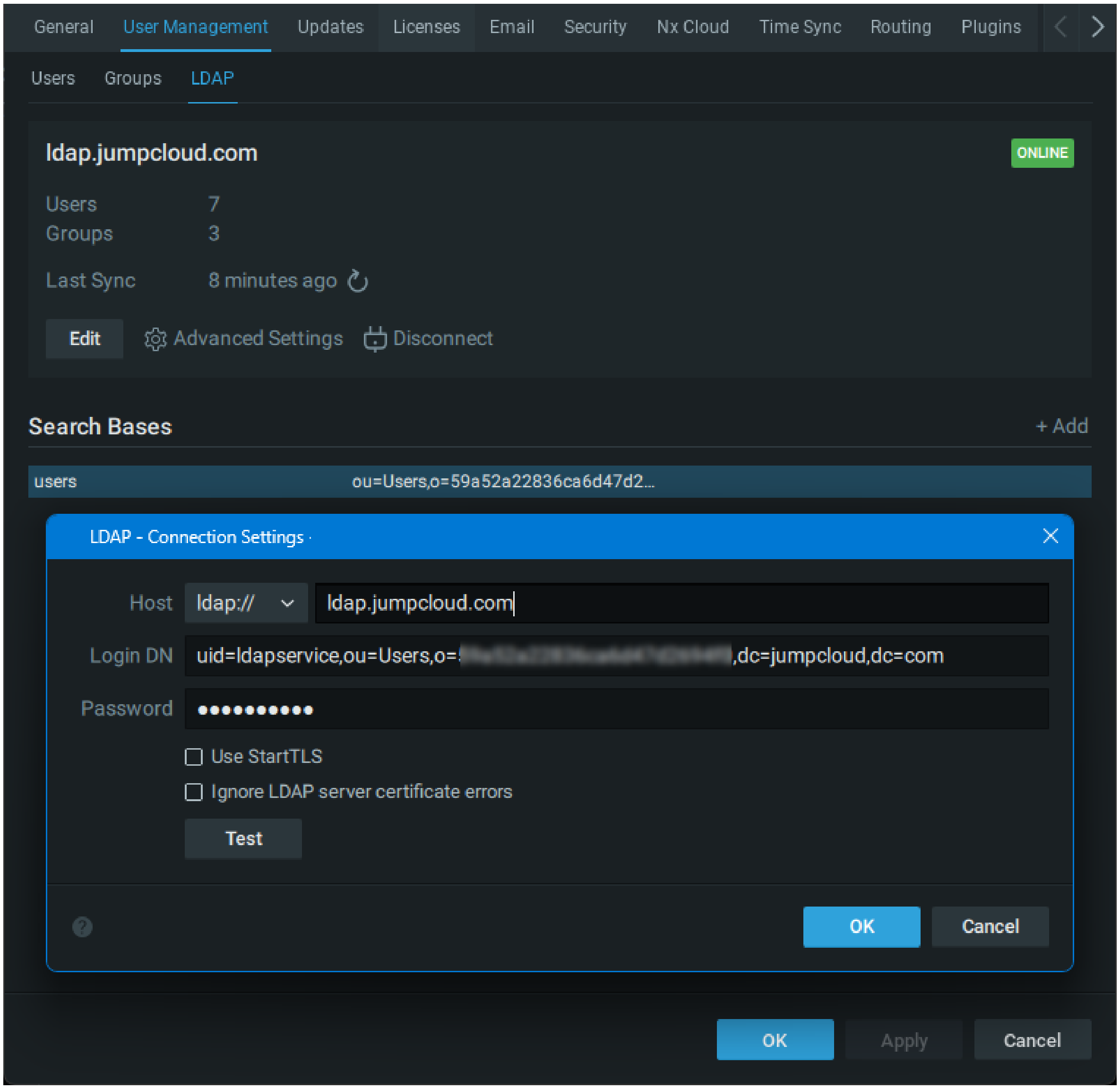
Note: When configuring LDAP integration, do not specify the domain's base distinguished name (DN) as a search base, instead specify the organizational units (OU's) underneath the base DN because it is not possible to filter on OU membership, but you can filter on group membership.

To retrieve all users that are members of a specified group, filter on the **`memberOf`** attribute. For example: memberOf=CN=Security Users,CN=Users,DC=DOMAIN,DC=LOCAL.

1. Select **Main Menu > User Management** and go to the *LDAP* tab.
   A **Configure** button is displayed when no LDAP information exists in the System, otherwise the LDAP dialog displays the following summary information:
   - Server,
   - Server status,
   - the last synchronization timestamp,
   - the numbers of users and groups retrieved.
2. Click the **Edit** button below the summary information to open the *LDAP Connection Settings* dialog.
3. Enter the following information (consult with your Network or Domain Administrator as needed):
   - **Host:** (ldap:// or ldaps://)

     IMPORTANT: If using a Server URL, it should be a fully qualified domain name (FQDN), sometimes also referred to as an absolute domain name. See https://en.wikipedia.org/wiki/Fully_qualified_domain_name for details.
   - **Login DN**
   - **Password**
   - **Options:**
     - ○ Use StarTLS
     - ○ Ignore LDAP Server certificate errors
4. Click the **Test** button to validate the server connection and credentials. One of the following message will be displayed:
   - Connection OK
   - Cannot connect to LDAP Server
5. Upon successful test results click the **Apply** button to save the connection setting and return to the LDAP summary. Clicking **Cancel** will discard all settings entered and exit the *LDAP Connection Settings* dialog.

6. Click the **+Add** button along the Search Bases heading to open the *Add Search Base* dialog; enter the following information:
   - *Name* – often "Users"
   - *Base DN* – the starting point for LDAP searches and synchronization.
   - *Filter* – specific which Users and Groups from the Base DN to are allowed (optional).
7. Click **OK** to close the dialog and return to the *LDAP* tab of the User Management dialog.
8. Click **Apply** to save the Search Base parameters and retrieve User and Group information from the LDAP server. The Users and Groups count will update upon a successful retrieval.



ldap.jumpcloud.com

Users 7
Groups 3
Last Sync 8 minutes ago

users ou=Users,o=59a52a22836ca6d47d2...

Host ldap:// ldap.jumpcloud.com

Login DN uid=ldapservice,ou=Users,o=[redacted],dc=jumpcloud,dc=com

Password ●●●●●●●●●●●

☐ Use StartTLS

☐ Ignore LDAP server certificate errors

9. Optional – Click on Advanced Settings to review and change defaults for:
   - *Synchronize Users* – Always or only at Login.
   - *Sync Interval* – a value from 1 to 9999999 in seconds, minutes, or days.

- *Proxy Server* – select a specific Server to connect to the LDAP server, or Select *Auto.*
    - In Auto mode, each server tries to connect to LDAP directly. If the connection fails, then every Server in the System will try to connect. If a specific Server is selected, but it is unavailable, the System defaults to Auto mode.
- Users – Deselect *Auto* to provide a specific value; use the checkbox to toggle the *allowing insecure (digest) authentication for imported Users*.
- Groups – Deselect *Auto* to provide a specific *objectClass* value.
- Membership – Deselect *Auto* to provide a specific *Group Members Attribute*.

Importing Users from LDAP Server

LDAP Users and Groups are imported immediately after the LDAP integration is completed and validated. Follow these steps to force an LDAP synchronization:

1. Open **Main Menu** > **User Management > LDAP** tab.
2. Below the User and Group count is the *Last Sync* timestamp and a refresh icon.
3. Click the refresh icon to force LDAP synchronization. The refresh icon is not displayed when the sync interval in Advanced Settings is set to 1 minute or less.
4. Once imported, LDAP users can be enabled or disabled (see "Enabling and Disabling Users"), and assigned User Permissions or placed in Permission Groups (see "Configuring Users").

Note: LDAP users must successfully log into the Desktop Client one time before they can use the Web Admin.

Changing or reconfiguring LDAP Servers

Changing or reconfiguring the LDAP Server integration can result in existing LDAP Users becoming invalid and thus disabled in the System. A warning banner and confirmation dialog is presented when LDAP integration changes may disrupt the validity of existing LDAP Users and Group.

Removing or Deleting an LDAP Server from the system

Removing or deleting and LDAP Server connection that has been synchronized at least once will remove all LDAP User and Groups from the System. All System Permissions and Group membership configurations for LDAP User will be removed and all history for the LDAP Users will be removed from the Audit Trail of User Actions. This action cannot be undone.

1. Open **System Administration** > **User Management >** *LDAP* tab.
2. Click on the **Disconnect** button near the **Edit** and **Advanced Settings** buttons.
3. Confirm to *Disconnect LDAP server and remove all LDAP Users and Groups*.

LDAP Warnings

The following warning may be displayed during LDAP configuration, testing, and update Synchronization

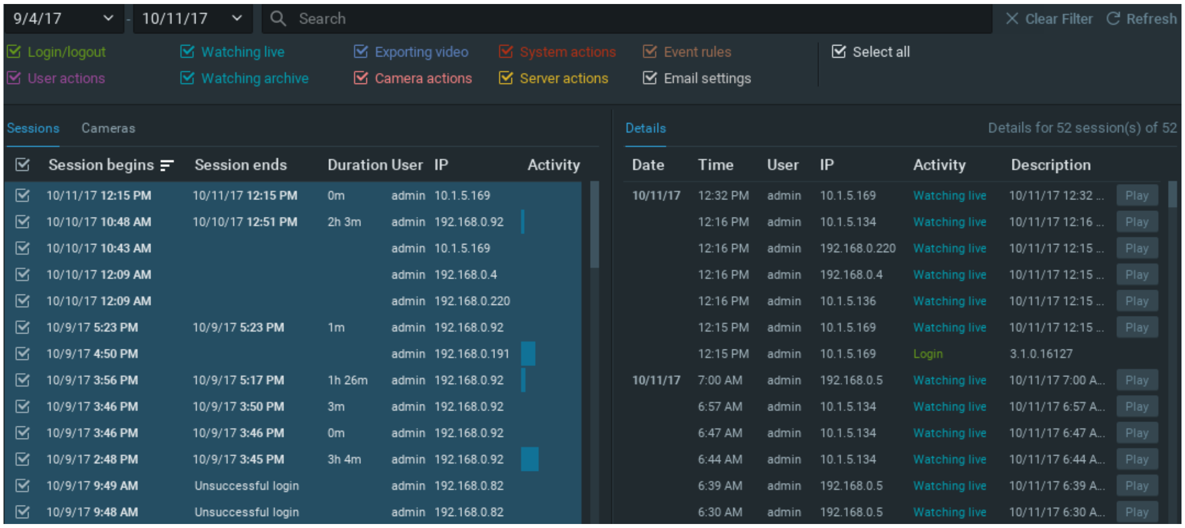
- **Remove existing LDAP Users and Groups**:
  - This warning is displayed for any action that will force the removal of all existing LDAP Users from the system.
- **Disconnect LDAP Server** confirmation:
  - This dialog is displayed before disconnecting and LDAP Server and removing all LDAP Users from the System.
- **LDAP Server is offline:**
  - This banner is displayed in the User Management dialog for LDAP and includes a count of how many Users are currently unable to connect to the System.
- **LDAP User Duplication:**
  - This banner is displayed in the User Management dialog when imported LDAP usernames conflict with existing usernames in the System. System accounts have priority and the duplicated LDAP usernames will are disabled.
- **LDAP Digest Authentication:**
  - An informational dialog is presented when changing the LDAP Digest Authentication settings if some Users will also need their User Configuration Settings changed.

Audit Trail of User Actions

Nx Witness tracks all User actions and records them to a log called the **Audit Trail**. To view this log, open **System Administration** > **General** tab and click the **Audit Trail** button. The top panel provides filters and a search tool. Initial display is with all sessions and cameras selected.

Audit Trail Filtering and Searching

- *Sort* – Data can be sorted in ascending or descending order by clicking on any column header.
- *Filter* – Type a filter criteria in the *Search* field on the top. Select a desired time period using the From and To calendar fields.
- *Show/Hide actions by type* – Use the checkboxes at the top to toggle display of specific action types.
- *Update data* – Data may have changed since the log was opened. Use the **Refresh** to update the display.
- *Export* – To export the log file, select the desired records and open the context menu to choose one of the following:
  - *Copy Selection to Clipboard* – So data can be pasted to another program (ex. Microsoft Excel or Google Docs).
  - *Export Selection to File* – Exports data as an *html* or *csv* file. Click on one or more individual checkboxes to filter the display.



9/4/17 - 10/11/17 Search

☑ Login/logout ☑ Watching live ☑ Exporting video ☑ System actions ☑ Event rules ☑ Select all
☑ User actions ☑ Watching archive ☑ Camera actions ☑ Server actions ☑ Email settings

Sessions Cameras

☑	Session begins	Session ends	Duration	User	IP	Activity
☑	10/11/17 12:15 PM	10/11/17 12:15 PM	0m	admin	10.1.5.169	
☑	10/10/17 10:48 AM	10/10/17 12:51 PM	2h 3m	admin	192.168.0.92	
☑	10/10/17 10:43 AM			admin	10.1.5.169	
☑	10/10/17 12:09 AM			admin	192.168.0.4	
☑	10/10/17 12:09 AM			admin	192.168.0.220	
☑	10/9/17 5:23 PM	10/9/17 5:23 PM	1m	admin	192.168.0.92	
☑	10/9/17 4:50 PM			admin	192.168.0.191	
☑	10/9/17 3:56 PM	10/9/17 5:17 PM	1h 26m	admin	192.168.0.92	
☑	10/9/17 3:46 PM	10/9/17 3:50 PM	3m	admin	192.168.0.92	
☑	10/9/17 3:46 PM	10/9/17 3:46 PM	0m	admin	192.168.0.92	
☑	10/9/17 2:48 PM	10/9/17 3:45 PM	3h 4m	admin	192.168.0.92	
☑	10/9/17 9:49 AM	Unsuccessful login		admin	192.168.0.82	
☑	10/9/17 9:48 AM	Unsuccessful login		admin	192.168.0.82	

Details Details for 52 session(s) of 52

Date	Time	User	IP	Activity	Description	
10/11/17	12:32 PM	admin	10.1.5.169	Watching live	10/11/17 12:32 ...	Play
	12:16 PM	admin	10.1.5.134	Watching live	10/11/17 12:16 ...	Play
	12:16 PM	admin	192.168.0.220	Watching live	10/11/17 12:15 ...	Play
	12:16 PM	admin	192.168.0.4	Watching live	10/11/17 12:15 ...	Play
	12:16 PM	admin	10.1.5.136	Watching live	10/11/17 12:15 ...	Play
	12:15 PM	admin	10.1.5.169	Watching live	10/11/17 12:15 ...	Play
	12:15 PM	admin	10.1.5.169	Login	3.1.0.16127	
10/11/17	7:00 AM	admin	192.168.0.5	Watching live	10/11/17 7:00 A...	Play
	6:57 AM	admin	10.1.5.134	Watching live	10/11/17 6:57 A...	Play
	6:47 AM	admin	10.1.5.134	Watching live	10/11/17 6:47 A...	Play
	6:44 AM	admin	10.1.5.134	Watching live	10/11/17 6:44 A...	Play
	6:39 AM	admin	192.168.0.5	Watching live	10/11/17 6:39 A...	Play
	6:30 AM	admin	192.168.0.5	Watching live	10/11/17 6:30 A...	Play

There are two summary panels, **Sessions** and **Cameras**, with a related **Details** panel to the right. Columns in these tabs can be sorted in ascending or descending order. Use the checkboxes to select certain sessions or cameras, or check the box in the header to select all logged activities.

Sessions Tab

Provides a summary of activities during a User session, where a session is defined as the period between a user's log in and log out:

- Session begins and Session ends date and time
- Duration of session
- User ID
- IP address of Client the User logged in from
- Activity bar graph depicting the number of actions performed during a session. Hover the cursor over this graph to see the precise count of actions.

Cameras Tab

Provides a summary of devices used:

- Camera name
- IP address of the camera
- Activity bar graph depicting the number of actions performed with the camera(s) during the selected time period.

Details Tab

For both sessions and cameras, shows:

- *Date and Time* – When each action occurred.
- *User* – The one who performed the operation.
- *IP* – IP address of Client the User logged in from.

- *Activity* – The action performed. For example, watching archive, watching live, Server updated, camera updated, exporting video, etc.
- *Description* – Details of the action performed (start/end times, number of cameras affected, System version updates, etc.). There may also be a button for direct access to the activity performed. For example, watching activities can be expanded to show the camera(s) that were viewed and a *Play* button that launches the related archive. Similarly, for the "Camera updated" activity, the *Camera settings* button opens the settings dialog of the device modified by the user.

Disabling Audit Trail recording

The Audit Trail is enabled by default.

Desktop Client

1. Open **Main Menu** > **System Administration** > **Security** tab.
2. Uncheck the **Enable audit trail** checkbox.
3. Apply changes.

Web Admin / *Cloud Portal*

1. Open **Settings** > **System Administration** > **General**.
2. Uncheck the **Enable audit trail** checkbox.
3. Apply changes.

Layout Management

Layouts are an integral part of the Nx Witness experience that provides a way to organize Cameras, Devices, and Web Pages for efficient access and viewing. Users can quickly switch between Layouts to follow items of interest or to view an area from another perspective.

- There are three types of Layouts:
  - User Layouts – are only be accessed by the User who created the Layout.
  - Shared Layouts – can be shared with other User of the System.
  - Cloud Layouts – may contain Devices from multiple Cloud Connected systems.
- Layouts are only accessible in the Desktop Client and cannot be viewed in the Web Admin or Cloud Portal.
- A Layout is an arrangement of up to 64 Cameras, Devices, Web Pages, and other elements placed on the Viewing Grid.
- Each Layout is displayed within a separate tab of Desktop Client and Multiple Layouts can be open simultaneously.
- A Layout must be saved after it is created, otherwise it will be lost if the tab is closed or the session has ended.

- *Administrators* and *Power Users* can share Layouts with other Users (see "Creating and Sharing Layouts" and "Permissions Management").
- Changes to Shared Layouts and Cloud Layouts are propagated to all Desktop Client instances and Users who have permissions to the Layout (see "Layout Management").
- An Alarm Layout is configured to open as a responsive action to a specific Event (see "Showing Cameras on Alarm Layout").

Additional Layout Topics

- Viewing Grid
- Layout Tabs
- Creating and Sharing Layouts
- Configuring Layouts
- Layout Backgrounds (E-Mapping)
- Saving and Locking Layouts
- Deleting Layouts

Viewing Grid

The *Viewing Grid* is the empty background of cells into which items are placed to create a layout. Each layout is displayed in a separate tab of the Viewing Grid. Tabs allow you to have multiple layouts open at once.

The cells of the Viewing Grid are only visible when you move or re-size an object in layout. When an item is being moved, a green cell indicates where it can be placed, red cells indicate where it cannot be placed.

The Viewing Grid has a default cell aspect ratio of 16:9, currently the most common aspect ratio of cameras on the market, but will shift to the aspect ratio of the first item placed in a new layout. This is important to consider when designing your layout. Subsequent items added to layout retain their native aspect ratio regardless of the aspect ratio of the Viewing Grid. However, the default aspect ratio for a layout can be changed using **Cell Aspect Ratio** from the Viewing Grid context menu.

It is also possible to control the size of the Viewing Grid cells for specific layouts; see "Configuring Layouts".

The Viewing Grid has a setting for the space between cells (*None*, *Small*, *Medium*, or *Large*) which is useful when you need to make a layout more compact. Access this control from the Viewing Grid context menu by choosing **Change Cell Spacing**.

There is also a setting for the display resolution of the items that are currently displayed (*Auto*, *Low*, *High*), which is controlled from the **Resolution** option in the Viewing Grid context menu (right-click on the camera tile).

Cell Spacing

This feature is used to change the spacing between items in a layout so they can be closer together or further apart.

For example, four individual single-sensor cameras that together form a 180 degree panoramic view would best be displayed without any space between cells.

To adjust the distance between items, open the Viewing Grid context menu and select **Cell Spacing**, or use **Ctrl**+**Mouse Wheel** over the Viewing Grid. Options are *None*, *Small*, *Medium*, or *Large.*

Cell Aspect Ratio

Cameras provide video in a variety of aspect ratio formats. To populate layouts efficiently, Nx Witness attempts to match the default aspect ratio of an Item window to the aspect ratio of its contents.

The Viewing Grid adjusts to the aspect ratio of the first item added. To change the aspect ratio of an entire layout, right-click anywhere on the Viewing Grid, and use **Cell Aspect Ratio** from the context menu to select from the available options (*4:3*, *16:9*, *1:1*, *3:4*, or *9:16*).

Layout Resolution

You can set the resolution for all items in a layout by right-clicking anywhere on the Viewing Grid, and using **Resolution** from the context menu to select from the available options (*Auto*, *High*, or *Low*). Auto allows each device to display at it's own default setting. Once the resolution for an entire layout is set, you can still set the resolution of an individual item as desired, in which case the layout resolution will display *Custom* to indicate that not all items are using the same resolution setting.

Layout Tab Controls

The display on initial System launch is an empty Viewing Grid with tab name “New Layout*”. An asterisk next to a layout name, both on tabs in the Navigation Panel and layout names in the Resource Panel, indicates that the layout has unsaved changes. If you do not enter a custom name, the new tab name automatically increments by 1 (“New Layout 2”) until the User session ends.

A blank tab will always display when all layouts are closed. If too many tabs are open to display at once you can use the "**<**" and "**>**" arrows in the Navigation Panel to scroll left and right through the hidden tabs.

To Open a New Tab

- **Right-click** on any tab in the Navigation Panel and select **New Tab** (**Ctrl**+**T**) from the context menu.
- Go to **Main Menu** > **New** > **Tab**.
- Click on the **+** icon to the right of the last tab in the Navigation Panel.

To Close a Tab

- Click on the **X** icon next to the tab name.
- **Right-click** on a tab to open the context menu and select **Close** (**Ctrl**+**W**).

To Close All but the Active Tab

- To close all tabs but the active one, open the tab's context menu and select **Close All But This.**

To Reposition a Tab

- Click-and-drag a tab name in the Navigation Panel to change its position.

When a User logs into Nx Witness, all saved layouts to which they have access are listed in the Resource Panel.

To Open an Existing Layout

- Drag-and-drop the layout from *Layouts* in the Resource Panel onto the Viewing Grid.
- **Right-click** on the layout in the Resource Panel and choose **Open Layout** (or press **Enter**) from the context menu.
- **Right-click** on an existing layout in the Navigation Panel and select **Open Layout** from the context menu to open a list of all layouts available to the current session.
- Click on the **?** icon to the right of the last tab in the Navigation Panel to open a list of all layouts available to the current session.

If you select a layout that is currently open, focus will shift to that tab. If you select a layout that is not currently open, it will open in a new tab. You can use the first two steps to select and open multiple layouts. Each layout will open in a separate tab. (If a layout is already open it will not be reopened in a second tab.)

Note: After Nx Witness is closed, all saved layouts that are open will be restored when the User logs back in.

Creating and Sharing Layouts

A new System is installed without Layouts configured and will open to a blank Viewing Grid. A new Layout can be configured as a temporary one for the current session, saved to the current User for later recall, shared with others Users of the System, or Saved As a Cloud Layout that can contain Devices from different Cloud Connected Systems.

To Create a New Layout

1. Click on the **+** icon in the Navigation Panel to the right of other open Layout or System tabs.

2. Configure the Layout to meet the viewing needs.

To Save a Local Layout

1. Right-click on the Layout tab or the Layout name in the Resource Tree to open the Layout context menu.
   - Select **Save Layout** to save the Layout using the current type and name (New Layout # if not changed previously).
   - Select **Save Layout As** to save the Layout as the current type under a new name.

Note: A Layout must be saved once before it can be shared locally or converted to a Shared Layout.

To Convert a Local Layout to a Shared Layout

1. Ensure the Layout is has been successfully saved once and is displayed in the Resource Tree.
2. Right-click on the Layout in the Resource Tree to open the Layout context menu.
3. Select *Convert to a Shared Layout* in the context menu. The Layout icon will update to reflect that it is a Shared Layout.
4. The Layout is now visible to Administrator and Power User who can share it with other Users (see "Permissions Management").

To Save a Layout as a Cloud Layout

1. System must be connected to the Cloud.
2. Ensure the Layout is has been successfully saved once and is displayed in the Resource Tree.
3. Right-click on the Layout in the Resource Tree to open the Layout context menu.
4. Select *Save as a Cloud Layout* in the context menu. This will **Save a Copy** of the Layout as a *Cloud Layout* under the name provided.

Granting Permission to a Layout

1. Ensure the Layout is has been successfully saved once and is displayed in the Resource Tree.
2. Administrators and Power Users can grant other Users Permission to the Layout (see "Permissions Management").

Configuring Layouts

Items (Devices, Cameras, Integrations, Virtual Cameras, Web Pages, Local files, etc.) are placed on the Viewing Grid to create a **Layout**. A Layout may contain more than once instance of an Item, up to a total maximum of 64 items.

Permission to Shared Layout are covered in topics about Users and Groups and Permissions Management.

To set Aspect Ratio and Spacing

Right-click on the Viewing Grid of the Layout to open the Layout context menu and select one of the following Layout Configuration choices.

- Resolution expands to offer choices of Auto, High, and Low resolutions.
- Cell *Aspect Ratio* expands to offer quick selection of the most common Aspect Ratios.
    - Cell aspect ratio is adaptive-it depends on the aspect ratio of the first item opened in the Viewing Grid. The default aspect ratio of cell in the Viewing Grid is 16:9 can be changed to other presets.
- *Cell Spacing* expands to offer none, small, medium, and large spacing or padding between layout elements.

Note: Cell Spacing, Cell Aspect Ratio, and Layout Resolution can be set for universally for a Layout or use the Layout Settings dialog to adjust them manually.

To change additional Layout Settings

Do one of the following:

- Right-click on the Viewing Grid where there is item of the Layout and select *Layout Settings...*
- Right-click on a Layout in the Resource Panel and select *Layout Settings...*

Settings on the *General* tab:

- Locked slide toggle – See Locking Layouts.
- Minimum Grid Size – Enable this parameter to control item size and placement more precisely. When an item is added to layout, it is always scaled to fit into one cell of the Viewing Grid. As more items are added to layout, the cell size is adaptively reduced so that all items can fit in the display. Cell size gets smaller with each item added, so item size gets smaller. When Minimum Grid Size is enabled, you can set an absolute Viewing Grid cell size, where the greater the value in the Width and Height fields, the more cells there are in the grid. The larger the number of cells in the grid, the smaller each cell is, and therefore the more flexibility you have in positioning items.
- Logical *ID* – enter a custom ID number or use the up and down arrows to define the Layout ID for quick API and integration identification and access.
    - Generate – Will assign the next available, incremental ID number. 1 if no other Layouts are in the system, or 11 if ten other Layouts exist in the system.
    - Reset – Clears the Logical ID field.

Settings on the *Background* tab are described in Layout Backgrounds.

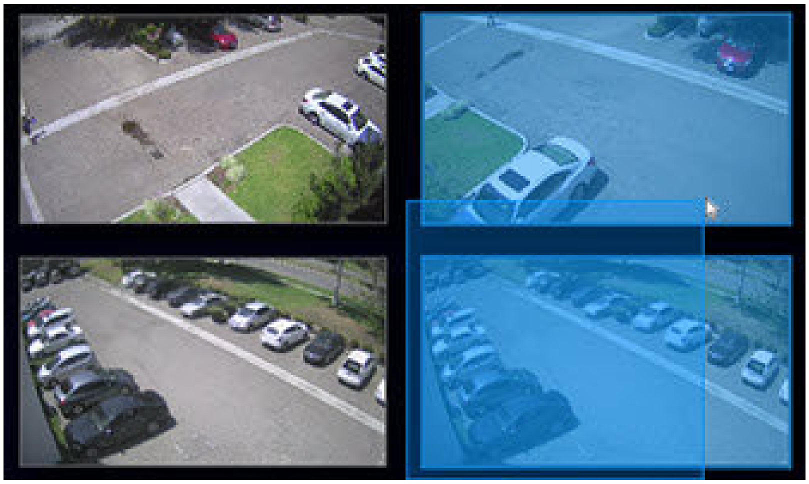
1.18.2.2.1 Selecting Items in Layout

Click on an item to select it. The selected Item will expand in the layout. To bring it back to normal, click again. Once an item is selected you can use Shift+Arrow key to scroll selected through all items in a given layout. Items can also be selected from the Resource Panel.

You can also select multiple items. Multiple selected items do not expand, instead they are outlined and given a colored overlay.

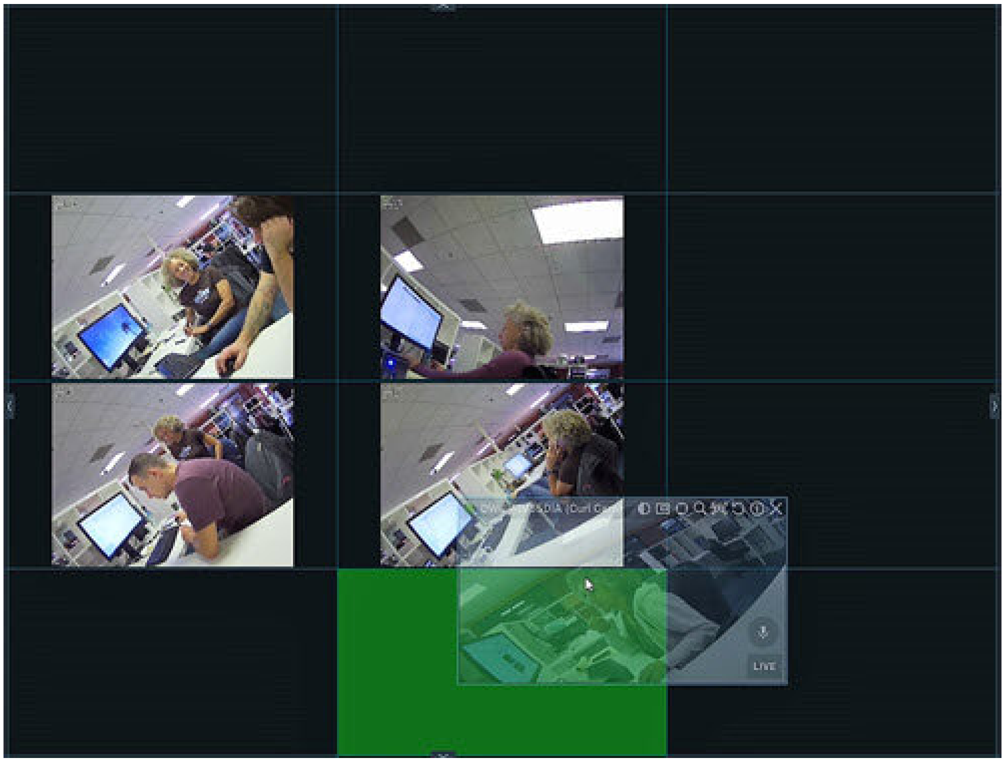
To Select More than One Item

- Click-and-drag over items with a mouse to create a selection box.
- Use Ctrl+Click to toggle selection of successive items. Click on any one of multiple selected items to deselect all.
- Use Ctrl+A to select all items on a layout.

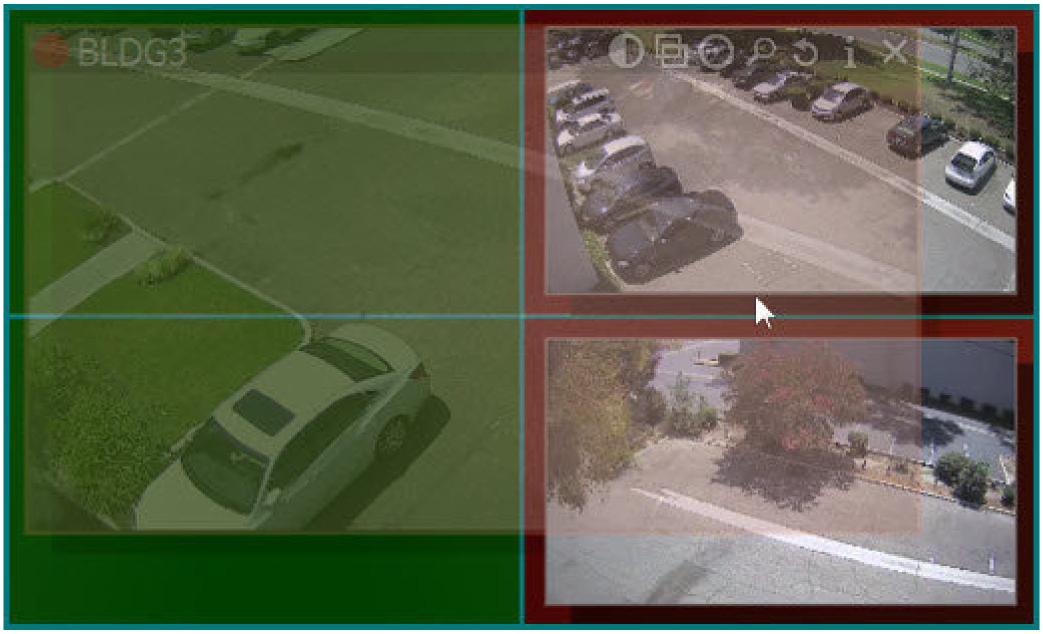


1.18.2.2.2 Rearrange Layout Items

To move an Item, simply click on it and drag it to a new position. The grid cell borders will be visible while the item is in motion. The grid cell aspect ratio is adaptive and depends on aspect ratio of the first item opened.



If the desired cell position is already occupied, the items will be swapped. If swapping is not possible due to too great a difference in item sizes or aspect ratio, the target cell(s) will be marked red:



If a bigger Item is being replaced by a smaller one, they will swap sizes as well as positions.

You can also use a right-click to move all Items in the layout at once, including the background image if there is one.

1.18.2.2.3 Adding Items to Layout

To add item(s) to the current layout, choose from one of the following:

- Double-click on the item in the Resource Panel
- Right-click in the Resource Panel to open the context menu and select **Open**
- Drag-and-drop a device, web page or local file from the Resource Panel into layout

Note: that you can Select and add multiple items from the Resource Panel using the **Ctrl** or **Shift** keys.

- Open *Local file(s)* or *Folder* – will be added to the current layout.

New items will scale to occupy the available space in layout. Nx Witness adjusts the aspect ratio of Viewing Grid cells according to the aspect ratio of the items in layout to maximize use of display space. See "Cell Aspect Ratio".

IMPORTANT: Viewer-level User and Groups with similar limitations on their authority can add items but not save (update) the shared layout, they can also make their own layout from available cameras.

To Open Items Directly into a New Tab

- Right-click on the desired item(s) in the Resource Panel and select **Open in New Tab** in the context menu.
- Drag-and-drop the selected item(s) from the Resource Panel and onto the Navigation Panel header.

  IMPORTANT: It may be difficult to locate and add each device manually. You can use the search pane to help locate items (see "Searching and Filtering in Nx Witness").

To Configure a Layout Using Search

1. Create a new layout (see "Creating and Sharing Layouts").
2. Enter keywords into the Search box. The search results will appear on the Resource Panel automatically.
3. By adding or deleting keywords from the search box, the items on the Resource Panel will vary.
4. Save the configured Layout.

Cross-System Layouts

Additionally, it is possible to add devices from different Systems you have access to. Some limitations apply:

- The Devices must be connected to Systems that share a common Cloud Account or Organization.
- Users need permissions to view Cameras that are placed on the Layout.

To add a device from a different System:

1. Find the desired System in the Resource Panel.
2. Expand the desired System, choose the device(s) you want to add and add them to the current layout as described above.

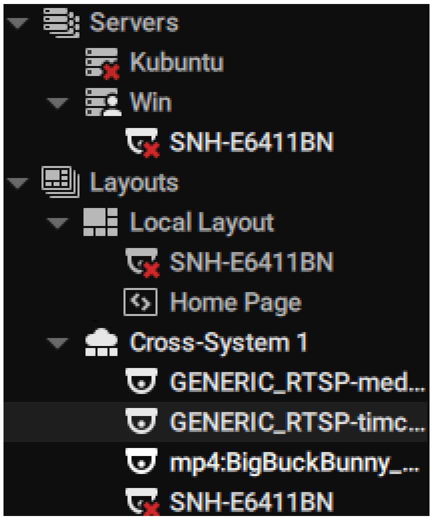
Also items from other Systems may already be in other Cross-System Layouts in the Resource Panel. In this case, once add them to the current Layout, it will automatically turn into a Cross-System one.

Once such layout is saved, a few restrictions will apply:

- It can only be displayed in the Desktop Client (not Mobile/Web Admins).
- Cloud Users can set up and save such layouts but cannot share them to other users.

Cross System layouts cannot be used with VideoWall, Showreels or automated with Event Rules (the "Open Layout" action).

Cross-System Layouts are displayed in the Resource Panel as follows:



- Servers
  - Kubuntu
  - Win
    - SNH-E6411BN
- Layouts
  - Local Layout
    - SNH-E6411BN
    - Home Page
  - Cross-System 1
    - GENERIC_RTSP-med...
    - GENERIC_RTSP-timc...
    - mp4:BigBuckBunny_...
    - SNH-E6411BN

1.18.2.2.4 Removing Items from Layout

To Remove an Item from a Layout

1. Open the desired layout.
2. Select the desired item in the layout.
3. Click the close icon ☒ in the upper right-hand corner to remove a single Item.
4. To remove multiple items at once, use **Ctrl + click** to select the desired items then right-click on any item to open the context menu and select **Remove from Layout** (or use the DEL button on a keyboard).

To Remove an Item from a Layout Using the Resource Panel

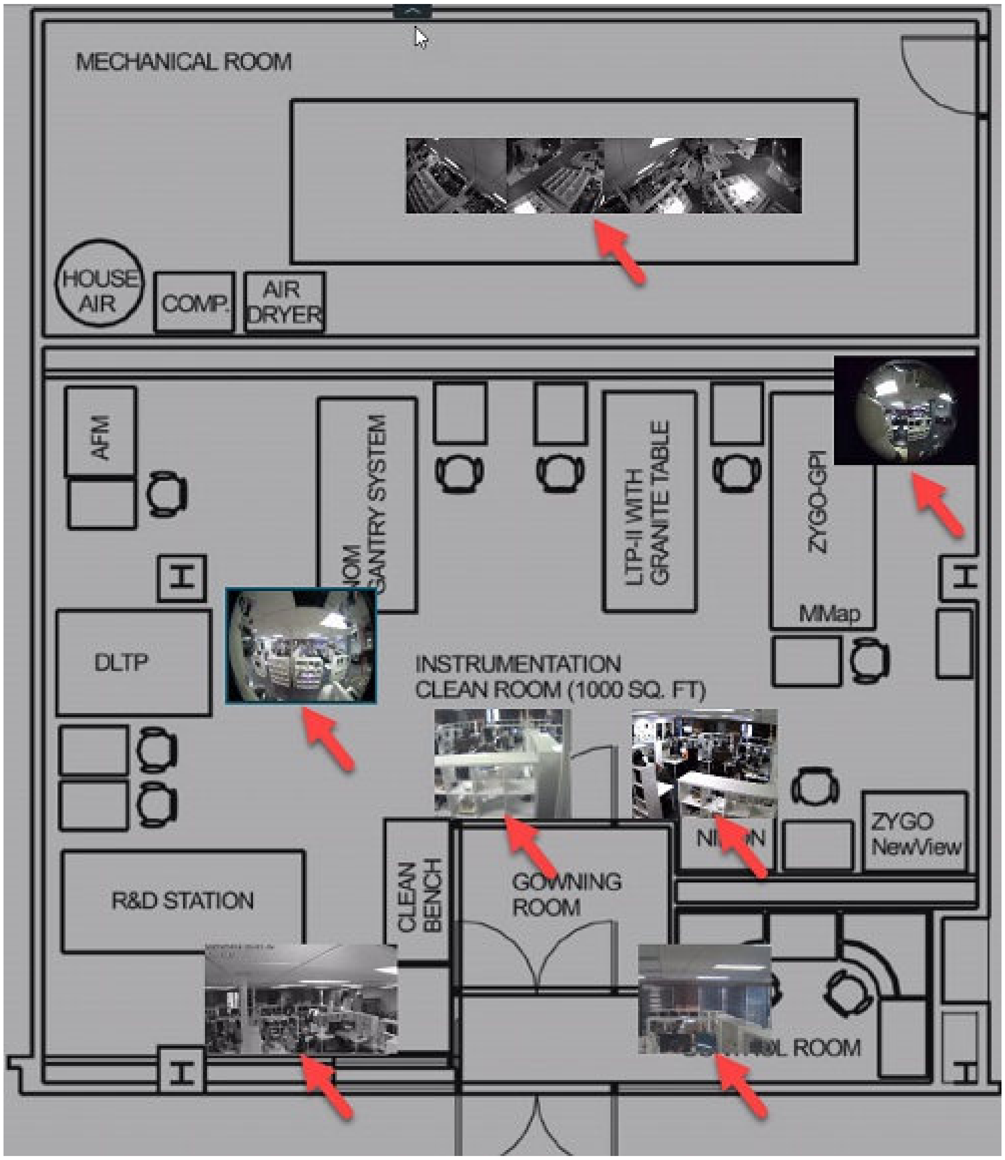
1. In the in Resource Panel, expand **Layouts** or **Users** and locate the desired layout.
2. Select the desired Item(s) under the specified layout.
3. Open the context menu and select **Remove from Layout** (DEL).
4. Confirm deletion by clicking *Yes*.

Note: The size of all items will stay the same or change depending on the position or number of remaining items.

1.18.2.2.5 Layout Backgrounds (E-Mapping)

User and Shared Layouts can be configured with a custom background image to facilitate Layout organization or provide additional information to the viewer such as a map or floor plan on which device thumbnails can be positioned to indicate their physical location. Users must be granted permission to access shared Layouts (see "Users and Groups" and "Permissions Management").

Note: Cloud Layouts do not support background images – they will be removed when a Layout is saved as a Cloud Layout.



To Add a Background Image

You can start with an empty layout or one that already has items. If you start with items in the layout, they will be reduced to thumbnail size they can be positioned as desired.

1. Open the desired picture in layout using **Main Menu** > **Open** > **File(s)** (**Ctrl + O**).
2. Right-click on the image and choose **Set as Layout Background** in the context menu. The image will be added, scaled to fill the entire layout area.
3. Alternately, you can open **Layout Settings** from the Viewing Grid context menu for the layout, open the **Background** tab, then click on *<No picture>* to browse for a background image.

The image types accepted are displayed in the dialog.

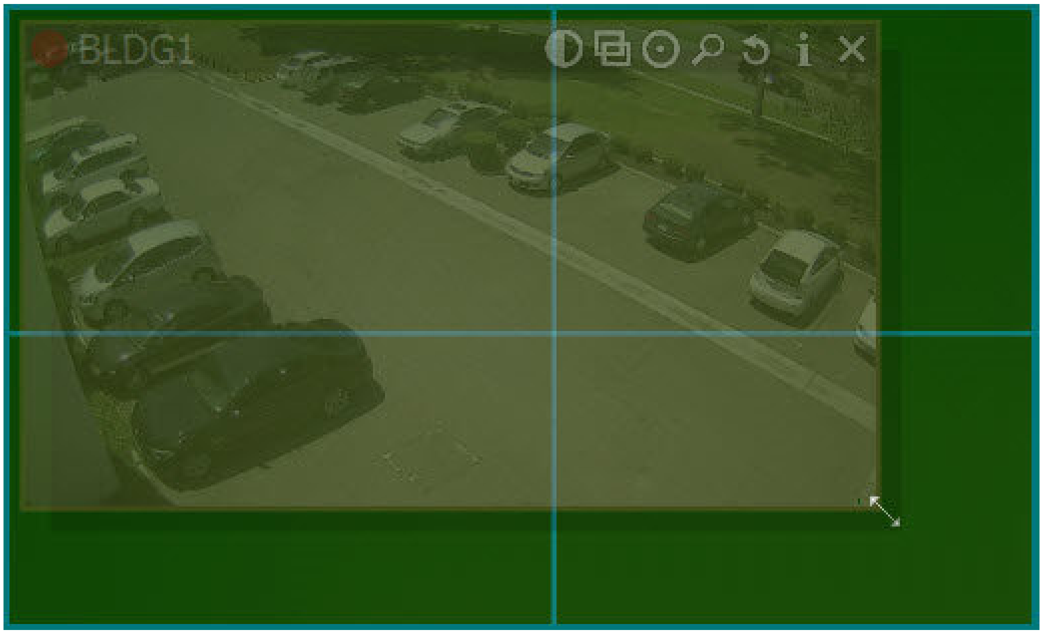
To Edit a Background Image

1. Open the layout with the background you want to change.
2. Right-click anywhere on the background and choose **Layout Settings** in the context menu.
3. Select the *Background* tab.
   - Click **Browse** to select a new image file to set as background.
   - Click **Clear** to remove the background image from the layout.
   - Click **View** to open the background image in an editing application.
   - Check **Crop to monitor aspect ratio** to adjust the aspect ratio of the image according to the monitor aspect ratio. For instance, if monitor resolution is 1920x1080 (16:9) and image resolution is 1920x1200 (16:10), then the image will be cropped on both top and bottom.
   - Use **Width** and **Height** to control the exact number of Viewing Grid cells the background image will span.
   - Use **Keep Aspect Ratio** to maintain the original aspect ratio of the background image while changing the width or height.
   - Use **Opacity** to control the translucence of the image (in percent).

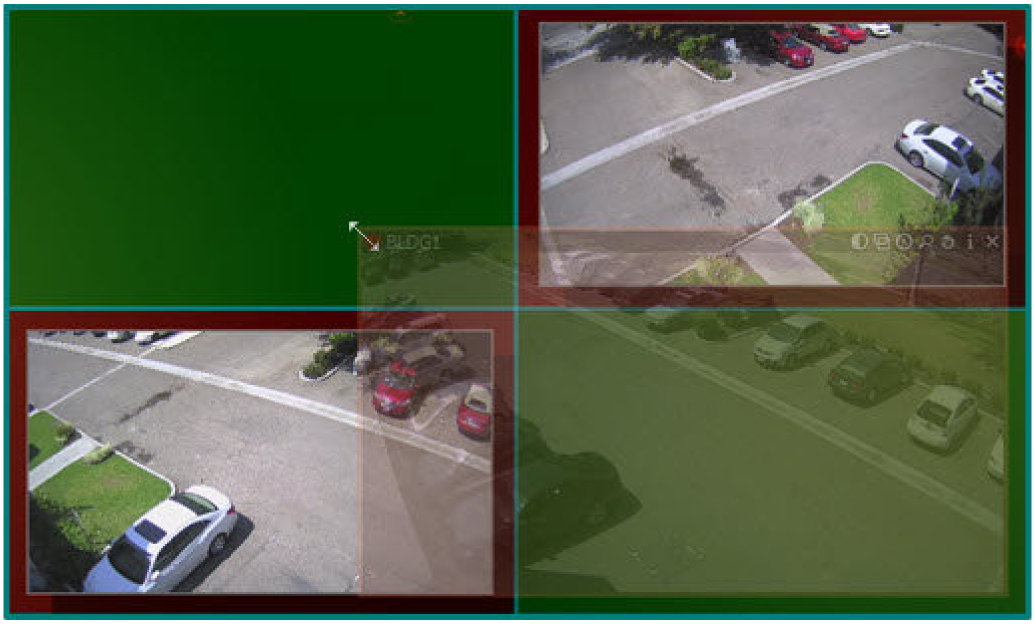
5. Apply changes.
6. Make sure to save the layout when you are done.

1.18.2.2.6 Resizing Items

To resize an item, select an edge in layout and click-and-drag the mouse to resize it. If resizing is possible, the new cells are highlighted in green:



If resizing is not possible, the cells will appear red:



In this case the best practice is to move the entire Viewing Grid using a click-and-drag and then resize the Item to occupy the available space, or move the desired Item away from the other items then resize it to occupy the available space.

1.18.2.2.7 Expanding Items to Fullscreen Mode

Fullscreen mode simultaneously expands display of a single Item to fill the entire layout, and hides all four sliding panels. If you expand an item to Fullscreen mode, only recorded fragments related to the selected Item are visible on the Timeline. Use the **ESC** key to exit Fullscreen mode.

You have the option to pin the timeline while in fullscreen mode to prevent it from automatically hiding. If you exit fullscreen mode with the timeline still pined, all other cameras will have the timeline automatically pinned when entering fullscreen mode.

To Toggle Fullscreen Mode on or off, Use One of the Following:

- Double-click or press **Enter** on an Item in layout.
- Open an item's context menu and select **Maximize Item** to expand or **Restore Item** to return the full layout and panel display.
- Create an event rule using the action "Set to Fullscreen".

Note: You can use a Tour to loop through Fullscreen display of each item in the active layout.

1.18.2.2.8 Zooming an Item or Layout

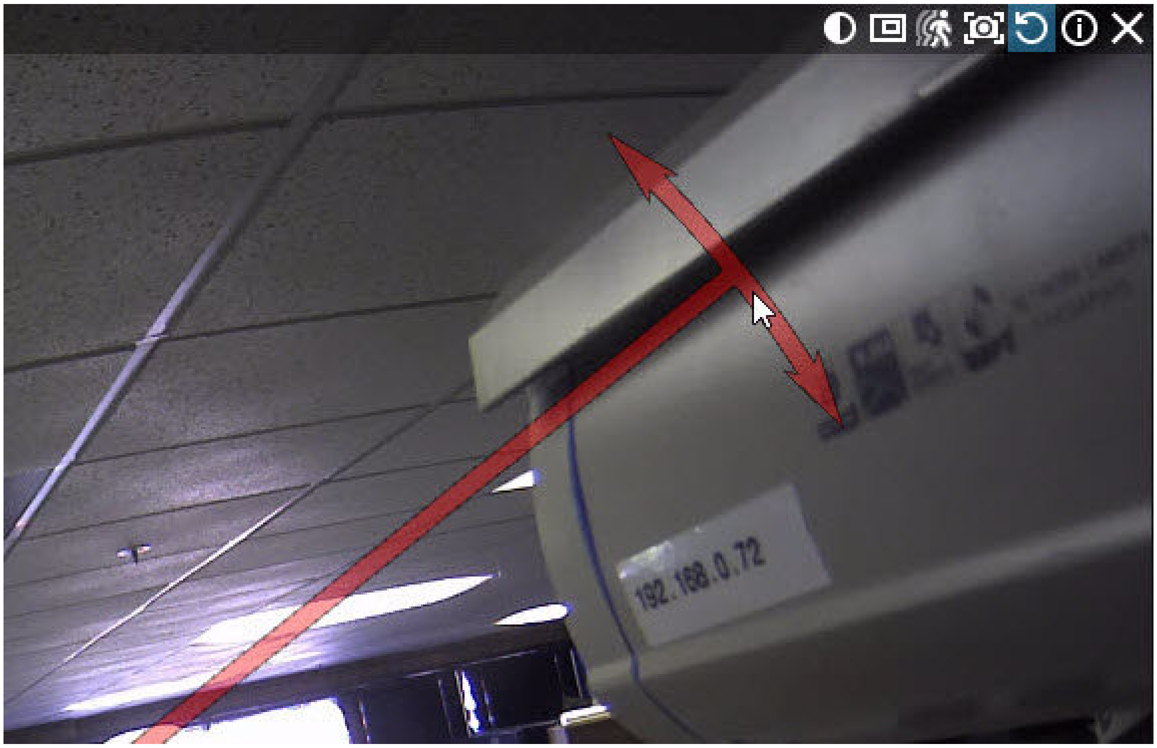
Click anywhere on the layout background and use the "**+**" (in) and "**–**" (out) buttons to zoom the entire layout, or use the mouse wheel to zoom the layout in and out centered on the cursor location.

Fit in View

- *Fit In View* scales the Viewing Grid so that all items in the layout are visible. It is a convenient way to restore a layout you have zoomed or moved.
- Right-click on the layout background to open the context menu and select **Fit in View**.
- Fit In View is performed automatically when you change to *Fullscreen Mode* (see "Expanding Items to Fullscreen Mode").

1.18.2.2.9 Rotating an Item

There are several ways to rotate an item in layout. A red directional arrow will indicate that the item is in rotation mode.



- Press Alt + click-and-drag over an item. Release when the item is at the desired angle. You can use Alt + Ctrl + click-and-drag to limit rotation to increments of 30 degrees.
- Click and hold the **Rotate** button (⟲), then use the mouse to rotate the item. Release when finished. Press **Ctrl** while holding the **Rotate** button to limit rotation to increments of 30 degrees.
- It is also possible to use **Rotate to** in the item's context menu to choose from the options *0, 90, 180* or *270 degrees.*

1.18.2.2.10 Creating a Zoom Window

The *zoom window* feature lets you select a rectangular region in an item's display to instantly open that selected region as a new zoomed-in item on the current layout. You can create as many zoom regions as you like on a given item, and a zoom region can be moved from one camera to another in the same layout. Zoom windows are saved with the layout. Zoom windows can be especially helpful for viewing fish-eye camera output (see "Dewarping Controls").

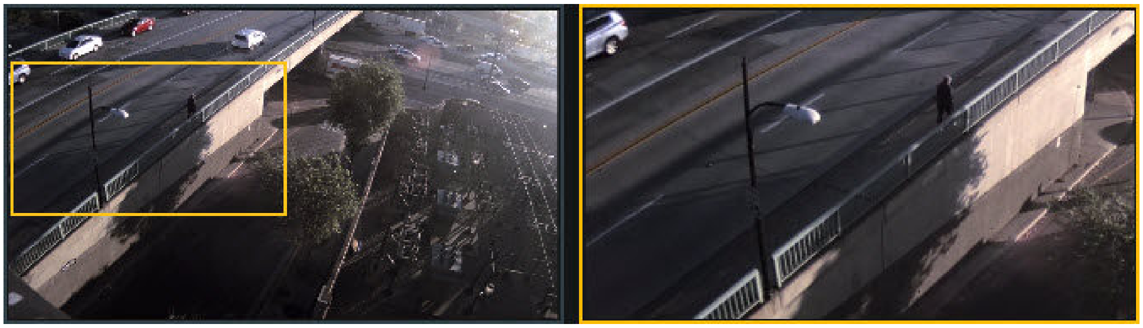
Note: Zoom windows will set the camera's resolution to high.

Zoom regions on the source camera are editable. Click-and-drag inside a zoom region to reposition it, and click-and-drag on the zoom region outline to adjust its size. The related zoom window will adjust dynamically adjust.

Closing a zoom window deletes the zoom region on the source item.

To Configure a Zoom Window

1. Select a camera item.
2. Click on the **Create Zoom Window** icon (▣), then drag a rectangle over the desired area. A new zoom window item will open in the current layout.



Saving and Locking Layouts

A layout remains local and will only be available during the current session unless it is saved. Saving a layout saves the position and rotation of all items. Once a layout is saved, it is added to the Resource Panel under Layouts and also the names of the users who have access to it. Saved layouts that were open when a session closed will automatically reopen the next time a User logs in.

- Use *Save Current Layout* (Ctrl+S) to save the layout name with its current name (as shown in the tab header caption).
- Use *Save Current Layout As* (Ctrl+Alt+S) to enter a name of your choice.

To Save a Layout

- **Right-click** on the tab name in the Navigation Panel and select **Save Current Layout** or **Save Current Layout As** from the context menu.
- **Right-click** on the Viewing Grid of the layout and select **Save Current Layout** or **Save Current Layout As** from the context menu.
- Click on the desired layout in the *Resource Panel* and select **Save Current Layout As** to save it with a new name.

A layout can be locked so that no changes at all are permitted unless and until it is unlocked. This includes item rotation, cell spacing, aspect ratio or window zooming.

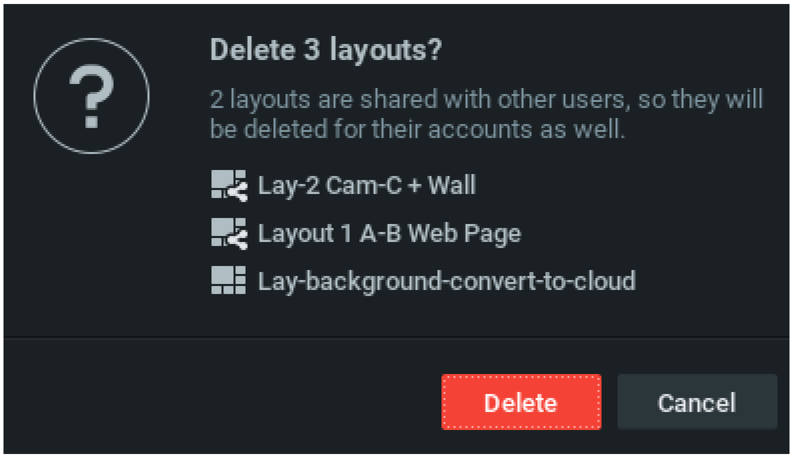
To Lock or Unlock a Layout

1. **Right-click** on the Viewing Grid of the layout you want to lock and select **Layout Settings** in the context menu.
2. In the *General* tab, click the **Locked** toggle.
3. Click *OK* to accept or *Cancel* to discard changes.

Deleting Layouts

To Delete a Layout from the Resource Panel

- Find and select the Layout to delete, or use shift+click to select multiple Layouts in the Resource Panel.
- Invoke the context menu and choose Delete (or use the Del button on a keyboard).
- If the layout is shared, click Delete again in the confirmation dialog.
- The layout will be deleted from all Clients and Users in the System.
- Locked Layouts cannot be deleted.



Delete 3 layouts?

2 layouts are shared with other users, so they will be deleted for their accounts as well.

Lay-2 Cam-C + Wall

Layout 1 A-B Web Page

Lay-background-convert-to-cloud

Video Wall Mode

Video Wall mode lets you use a session of the Nx Witness Desktop Client to remotely control a display on other monitors in your System via a LAN, WAN, or an internet connection.

A special Video Wall License is required (see "Nx Witness Licenses"). Each license allows you to display a Video Wall on up to 2 monitors (for example, 4 licenses allow you to display a Video Wall on 8 monitors). When a Video Wall license is invalidated, the *Video Wall Failover* feature kicks in and provides you with a 7-day grace period to prevent any interruptions in the Video Wall and allows you enough time to resolve the license issue (see Expired and Invalid License Keys). A countdown will be shown until your Video Wall license key has been restored or a new one is activated in its place. If no action is taken, the error message "Not enough licenses" will be shown, and your Video Wall will be disabled. Video Wall Failover is automatically enabled after Video Wall is configured.

Note: To be able to access, configure and control a Video Wall, a User must be assigned the related permissions (see "Permissions Management").

Layout and Camera settings may be changed while editing video wall screen and settings are saved on the Server or on the machine where video wall is running.

The resolution of a Camera when in the Video Wall mode can be changed via the context menu, but to take effect, this must be done in the *Screen* under *Video Walls* in the Resource Panel, and not in the standard layout.

Video Walls do not display any overlays or performance alerts while a camera is in live mode and do not display the Timeline unless that option is enabled. However, the timestamp is always displayed when a Video Wall camera is in archive mode, and it is possible to add backgrounds to Layouts and to assign a logical ID to a Video Wall Layout.

Video Wall Architecture

A *Video Wall Server* is the computer that hosts the main database of a *Video Wall Cluster*. Video Wall displays can be connected to this Server and it can act as the Video Wall Processor as well. All computers that are part of the Video Wall Cluster (clients and controllers) should be Cloud connected or able to connect to the Server.

The *Video Wall Processor* is the computer that Video Wall displays are connected to. Depending on its configuration it can handle one or several displays. There is no limit to the number of Video Wall Processors that can be combined in a Video Wall Cluster.

A *Video Wall Controller* is any computer that can connect to a Video Wall and control it. It can even be a laptop; the only requirement is that the video adapter should support OpenGL > 2.0.

In order to operate Video Wall properly, Nx Witness should be installed on every computer in the Video Wall Cluster:

- Video Wall Server: Full installation.
- Video Wall Processor(s): Client only installation.
- Video Wall Controller(s): Client only installation.

If all Video Wall components are installed on one computer, choose Full installation.

Initial Video Wall configuration is performed in several steps:

- Configuring a Video Wall Display
- Switching to Video Wall Mode
- Controlling Video Wall Displays

You can also Delete a Video Wall or it's Elements, or Push an Operator's Screen to a Video Wall.

The number of displays available to any single computer is limited by the number of video outputs it has. To extend Video Wall it is necessary to add additional computers and combine them with the Video Wall Cluster. See "Configuring Video Wall on Several Computers".

Configuring a Video Wall Display

Use the Desktop Client running on what will be the display computer to complete the following steps.

Create a new Video Wall

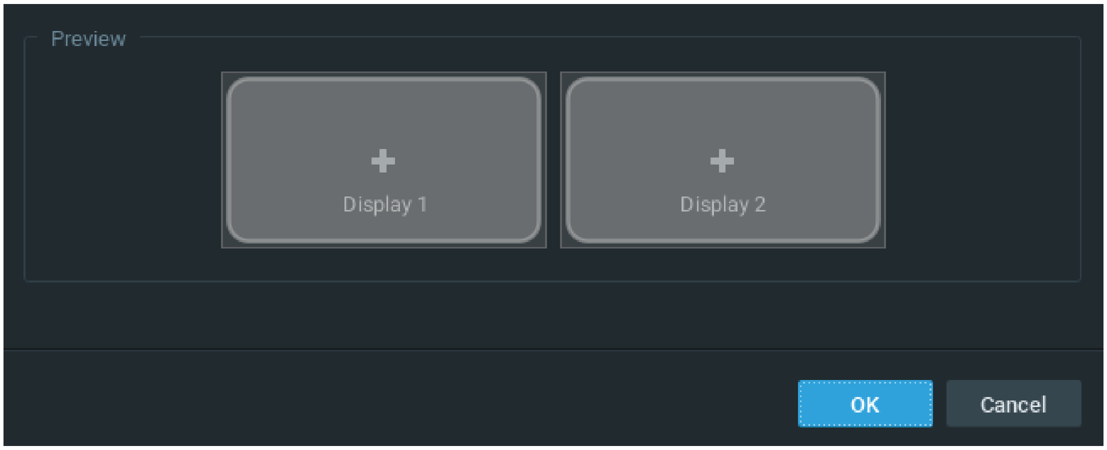
1. Open the **Main Menu** and choose **New** > **Video Wall**.

2. Enter a name for the Video Wall.
3. Apply changes.
4. The newly created and named Video Wall will be added to the Resource Panel.

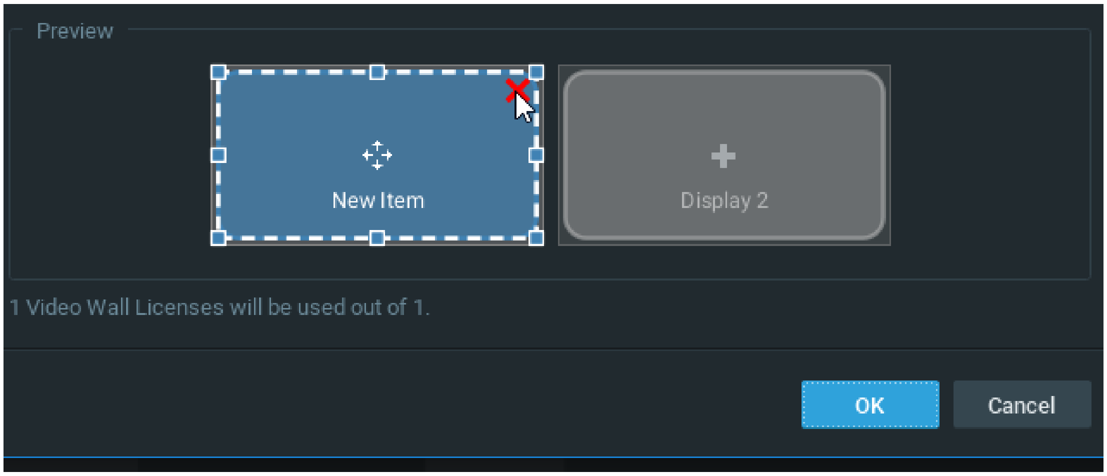
Configure Video Wall Layout

To make a computer display part of Video Wall it is necessary to perform the following settings **on that computer**:

1. Right-click on the Video Wall in the Resource Panel and choose **Attach to Video Wall**.
2. Nx Witness automatically detects, numbers, and previews the displays connected to the computer.

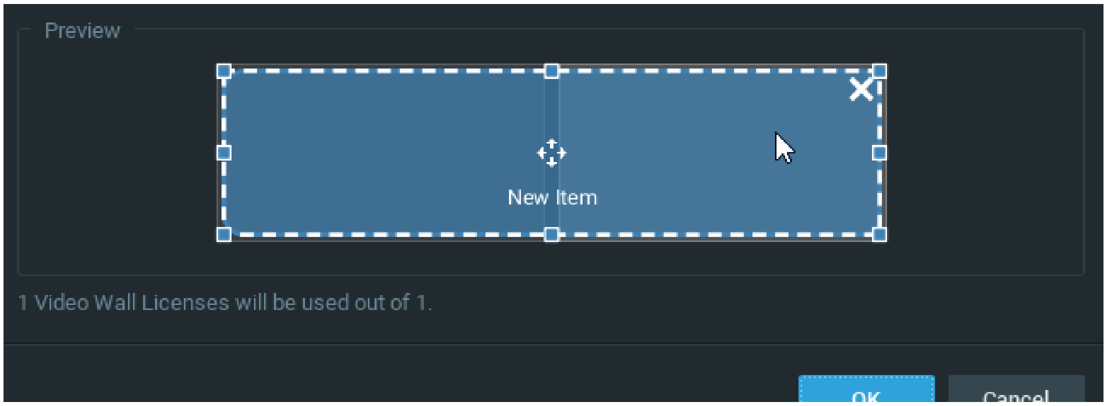


3. Click on an item in the dialog (it will change color and be retitled "New Item"). In this state you can drag the edges to resize the item, click-and-drag in the center to reposition it, or click on the "X" in the upper-right corner to remove the screen.



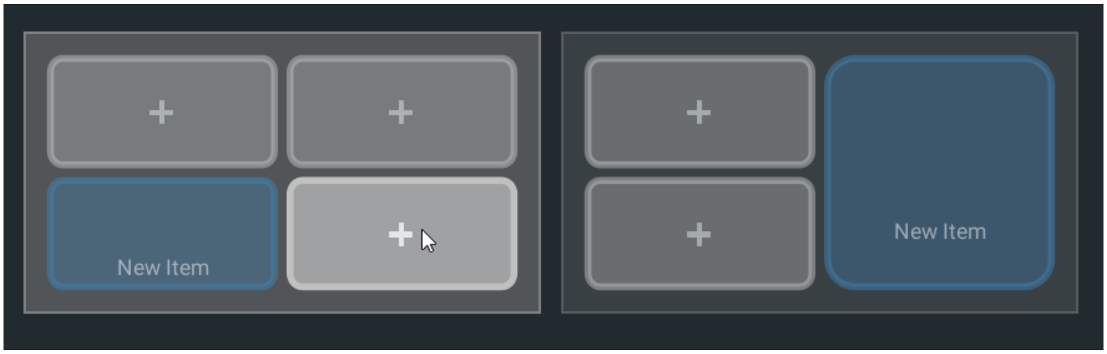
1 Video Wall Licenses will be used out of 1.

4. Typically, one Virtual screen represents one physical display. It is also possible to stretch one Virtual Screen across several physical displays:

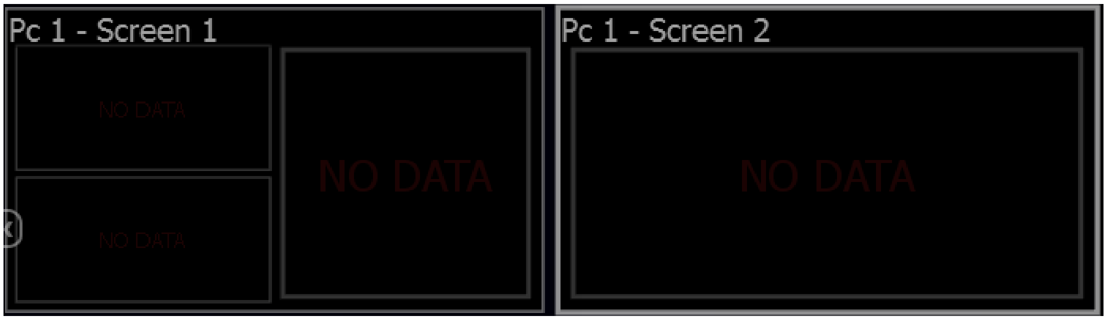


1 Video Wall Licenses will be used out of 1.

Or, you can design one physical display that contains multiple Virtual Screens, in various combinations:

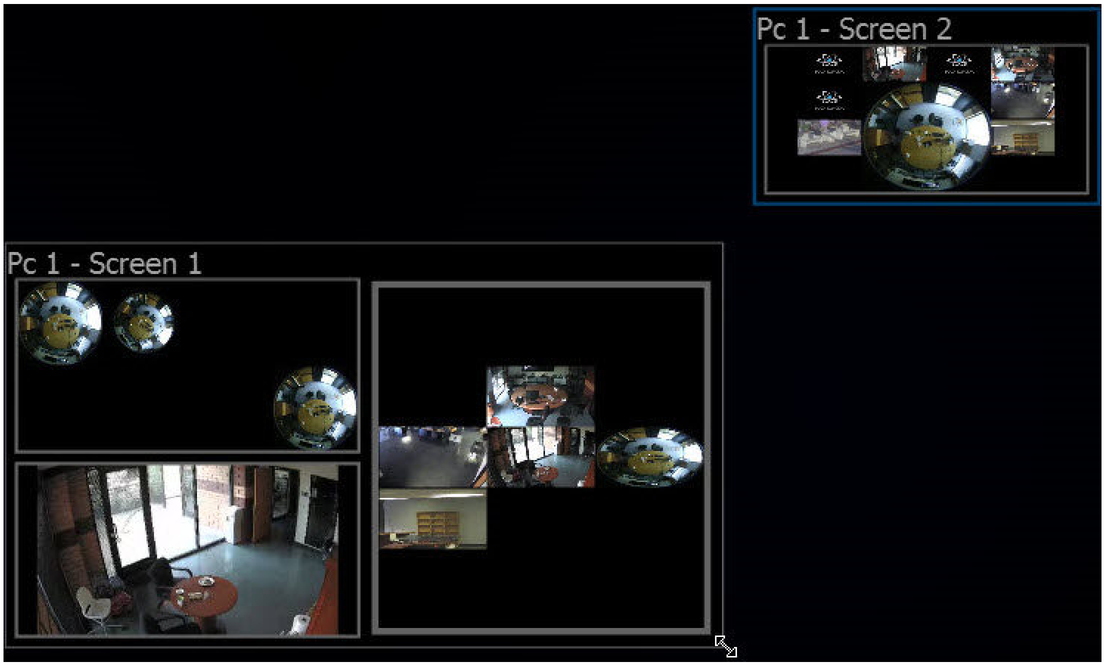


5. Once the screens are arranged as desired, click OK to save the configuration.



6. At this point you can drag-and-drop resources (devices, web pages, local files, etc.) from the Resource Panel into the Video Wall layout. It is possible to place a single device or an entire Layout into each Virtual Screen.

Note: Cross-System Layouts cannot be used.



- To remove a resource from a Virtual Screen, right-click on it in the Video Wall layout and choose *Clear Screen*.
- To simplify the calibration process it is possible to add identification information of a resource the corresponding physical Display. To do so right-click on the desired Virtual Display and select *Identify.*

7. To save changes, right-click on the Video Wall in the Resource Panel and choose *Save Current Matrix*. The Matrix will be added to the Resource Panel under the current Video Wall, where you can right-click to rename it, load or delete it.
8. Right-click on the Video Wall in the Resource Panel and choose *Save Video Wall* (Ctrl+S).

To finalize configuration it is necessary to Switch Video Wall Processor to Video Wall Mode. After a Video Wall has been started on the Video Wall Processor, the current configuration can also be changed on the Video Wall Controller. To restore a Video Wall view, expand the Video Wall in Resource Panel, right-click on a saved Matrix and choose *Load Matrix.*

To open Video Wall on a Video Wall Controller

- Drag Video Wall onto the layout.
- Right-click on the desired Video Wall in Resource Panel and choose *Open Video Wall.*

Switching to Video Wall Mode

To control a Video Wall it is necessary to switch the Video Wall Processor to Video Wall Mode. **This should be done on Video Wall Processor.**

Usually Video Walls are controlled from a Video Wall Controller, and the computers the displays are connected to are easily accessible. So it is recommended to set up automatic switching to Video Wall Mode:

1. Right-click on **Video Wall** in Resource Panel and choose **Video Wall Settings**.
2. Click on **Launch video wall when Windows starts** and click *OK*.

Note: This option is available for Windows PCs only and is enabled by default.

To switch to Video Wall Mode, right-click on **Video Wall** in the Resource Panel and choose *Switch to Video Wall Mode* and click *Close* on the dialog window.

Several instances of the Client will be launched. The Client will be switched to Video Wall mode and will become inoperable. At this point it is possible to change settings and control the Video Wall from the Video Wall Controller.

To switch back from Video Wall to standard mode it is necessary to close all Client instances and relaunch the Client once more. In this case, operator won't be able to control displays connected to this Video Wall Processor and the corresponding screens will be displayed in the Resource Panel as offline.

Configuring Video Wall on Several Computers

To increase the number of Video Wall displays you must to add additional Video Wall processors.

To Add a Video Wall Processor

1. Run the Desktop Client on the PC that should be added to the current Video Wall. Physical displays should be connected to this machine.
2. Right-click on desired Video Wall in the Resource Panel and choose **Attach to Video Wall**.
3. Repeat all steps described in "Configuring a Video Wall Display".
4. Switch to **Video Wall Mode** (see "Switching to Video Wall Mode").
5. Repeat the steps above on each Video Wall Processor.

Video Wall mode will be extended and will include displays connected to the newly attached Video Wall Processors.

Deleting a Video Wall or Elements

To Delete a Video Wall, right-click on it in the Resource Panel and choose *Delete*, then click *Delete* in the confirmation dialog. This action will delete all Screens and configurations related to this Video Wall, and will stop the Video Wall on every single Video Wall Processor.

The Following Video Wall Elements Can Be Deleted

Screen

- Right-click on a screen, within a video wall in the Resource Panel and choose **Delete**, then click **Delete** in the confirmation dialog. This results in stopping the Video Wall in the corresponding physical display.

Matrix

- Right-click on a video wall matrix in the Resource Panel and choose **Delete**, then click **Delete** in the confirmation dialog to delete a saved configuration.

Controlling Video Wall Displays

Users with sufficient rights can change the layouts that are placed on a Video Wall.

As soon as a Video Wall Display is opened on the Video Wall Controller, the User can control it like any other layout – it is possible to change the layout, navigate through archive, perform searches, etc. All changes made on the Video Wall Controller are immediately displayed on the Video Wall itself.

It is also possible to push the Video Wall Controller desktop view to Video Wall. See "Pushing Operator's Screen on Video Wall".

To Control Video Wall

1. Use one of the following to open Video Wall on the Video Wall Controller:
   - Drag Video Wall onto the layout.
   - Right-click on desired Video Wall in Resource Panel and choose *Open Video Wall(s)*.

   Note: It is not possible to open videos in this Layout.
2. Double-click on the desired Video Wall Screen to enter control mode. The layout of this screen will be opened and you will be able to perform any necessary operations:
   - Adding Items to a Layout
   - Removing Items from a Layout
   - Selecting Items in Layout
   - Moving and Swapping Items in Layout
   - Resizing Items
   - Cell Spacing
   - Cell Aspect Ratio
   - Creating a Zoom Window
   - Working with Multiple Nx Witness Windows
   - Navigating through Archive and Live
   - Pushing Operator's Screen on Video Wall.

   All changes will be reflected *immediately* on the corresponding Video Wall Display.

Pushing Operator's Screen on Video Wall

For Windows only, Nx Witness provides the ability to push Operator's screen to Video Wall. This is done from the *Video Wall Controller* on a PC:

1. Open Video Wall on Video Wall Controller by dragging the desired Video Wall from the Resource Panel onto the layout, or by right-clicking on the desired Video Wall in the Resource Panel and choosing *Open Video Wall*.
2. Right-click on the desired Screen and choose *Push my Screen*. Everything displayed on the operator's desktop will be sent to the Video Wall screen, including sound.
3. To stop the broadcast, locate the desired Screen in the Resource Panel or on Video Wall Layout, right-click and choose *Clear Screen*.

Managing Web Pages and Integrations

Nx Witness can be used to display web pages in the layout using the built-in Chromium browser. This can be useful, for instance, for modifying camera parameters on an external web page, or to open an external system such as Access Control or Analytics while also performing surveillance monitoring. Additionally, a web page can be used to view videos and download files.

For convenience, login credentials entered on any website will be saved between browsing sessions unless you manually sign out of your account before the end of a browsing session.

To Add a New Web Page Item

❗ **IMPORTANT:** Create Web Pages as Integration if they need to interact with the System Client API. Additional information on Integrations is at the bottom of this page.

1. Open **Main Menu > Add > Web Page** or right-click on the **Web Pages** icon in the Resource Panel and select **New Web Page**.
2. In the dialog that opens, enter the destination **URL** and a common **Name** for the Web page. The **Name** will be displayed in the Resource Panel and on the header of the Webpage within the Layout.
3. If needed, enable "Proxy this webpage via server" select which Server to use as the proxy for the web page. This setting makes web pages accessible on the Server computer also accessible on the client computer.
4. The *Web Page* will open as a new item in the current *Layout* and be added to the Web Pages section of the *Resource Panel*.

In a web page item, the *Show Info* option toggles display of the URL as a transparent overlay in the bottom left corner of the cell. You can use the **Web Page Settings** option from the item's context menu to change the name or URL.

To Clear Browsing Data Saved Between Sessions

1. Open **Main Menu**, go to **Local Settings > Advanced** and press **Clear Local Cache**.
2. Restart the Nx Witness desktop client.

Advanced Settings

- *Allow opening web page without SSL certificate checking* – If enabled, Nx Witness will not check the web page's security certificate. No warning will be shown if the certificate is not secure.
- *Proxy all requested contents* – If enabled, any service or device on the server's network can be accessed by the users of the web page. This setting is only available if "Proxy this Webpage via server" is enabled.
- Use the Web Page context menu to:
  - ○ Toggle an overlay of the URL and Toolbar controls (refresh, back).
  - ○ Open the Web Page settings dialog.
  - ○ Save the Web Page to a System accessible location.

Creating an Integration – a Web Page that can Interact with the Desktop Client

1. Open **Main Menu> Add > Integration** or open the context menu for an existing Integration and select New Integrations in the Resource Panel,than you can Right-click on the **Integrations** icon and select **Add New Integration...**
2. In the dialog that opens, enter the destination **URL** and a common **Name** for the **Integration**, the **Name** will be displayed within the Integration folder on the Resource Panel and on the header of the Integration when open in a Layout.

   ❗ **IMPORTANT:** An integration may interact with the Desktop Client and request access to the user session. Contact support for additional information (see "Contacting Support").

Integrations can be programmed using JavaScript API. To open up the API documentation, right click on an integration to invoke the Context Menu and choose **JavaScript API**. The documentation will open up in an external browser.

Playback in Nx Witness

Nx Witness provides viewing and playback of the following content:

- *Cameras* – Live and archived footage.
- *I/O Modules* – Sound can be recorded from an I/O module with a microphone connected and played live or from archive.
- *Local files* – Saved video and image files.

In addition to the internal dynamic resolution switching, you can use these manual adjustment features if you are experiencing image stuttering during live streaming, or if there is too much time between actual action and displayed action in Live view:

- Setting Item Resolution
- Setting Layout Resolution

- Configuring Live Buffer Size
- Double Buffering
- Disabling Blur for Intel HD Graphics
- Hardware Video Decoding

There are several tools that make archive search faster and easier:

- Navigating and Searching Video
- Using Bookmarks

This section also describes:

- Playing Local Video Files
- Exporting Video
- Using Audio
- Taking Screenshots
- Tours – Cycles display through items in a single layout.
- Showreels (Tour Cycle) – Cycles display through multiple entire layouts.

Setting Item Resolution

It is possible to override the default image quality for a single item in layout. This is useful, for example, when you need to reduce client CPU usage (in which case you set playback to low-resolution), or to enhance image quality for a given item (in which case you set playback to high-resolution).

Note that this setting is saved for each item individually, so it is possible to have the same device playing back at different resolution levels in different layouts. Alternatively, all the items in a layout can have their resolution set at once (see "Setting Layout Resolution").

Fullscreen mode and dewarp mode will always use the primary stream (see "Fullscreen Mode" and "Dewarping Controls" for details).

> **Note**: All image quality settings are dependent on the camera's primary/secondary stream settings in Nx Witness and any inherent limitations the camera may have (see "Dual Streaming").

To Specify Item Playback Resolution

1. Right-click on the item in layout to open the context menu and choose **Resolution**.
2. The default is **Auto**. Select **High** or **Low**.
3. Click the information icon ⓘ or use the item context menu **Show on Item > Info** (**Alt+I**) to confirm the setting (see "Image Display Controls").

Setting Layout Resolution

Setting Layout Resolution Manually

It is possible to set the resolution for all items in a layout at once. Right-click on the Viewing Grid, choose **Resolution** in the context menu, then select **Low** or **High**. The change is applied at once, but only for the current session. The default setting is **Auto**. The **Custom** setting indicates that one or more items in the layout are playing back at a different resolution than the others. This can occur when the resolution setting for a specific item has been set manually. See "Setting Item Resolution".

Auto Pausing Video Playback

Nx Witness also offers significant bandwidth savings with the option to automatically pause video playback due to inactivity after a certain period of time. To set this option, open **Main Menu**, go to **Local Settings** > **General** and check **Auto Pause Video**, then set the desired time interval (in minutes).

Configuring Live Buffer Size

On some cameras, live playback may stutter, or there may be a time significant delay between actual actions and the action shown on Live view. For a better viewing experience it may be helpful to adjust the live buffer size from the default of 500ms.

To do so, open **Main Menu**, choose **Local Settings** > **Advanced**, then adjust the **Maximum Live Buffer Length** to the smallest possible value that does not cause issues with live view on all cameras.

- Larger buffer makes playback smoother but increases the delay between real time and the live display.
- Smaller buffer decreases the delay but can cause stutters on playback.

See also "Double Buffering" and "Disabling Blur for Intel HD Graphics".

Double Buffering

On some graphic cards, drivers may have problems with OpenGL drawing, resulting in very high or even 100% CPU load. In this case, the issue may be resolved by disabling double buffering, which is enabled by default.

To disable double buffering, open **Main Menu**, choose **Local Settings** then in the **Advanced** tab uncheck the **Double Buffering** checkbox and restart the Nx Witness client to apply the change.

Disabling Blur for Intel HD Graphics

In some situations the client application may work incorrectly on certain computers where an integrated Intel graphic chip (Intel HD Graphics) is installed. This may result in noticeable frames per second drop or incorrect video playback. In this case it may help to disable the blur effect in client settings.

To do so, choose **Local Settings** (**Advanced** tab), then check **Disable blur**, and click *Apply* or *OK.* The Nx Witness client must be restarted for this change to take effect.

> **IMPORTANT:** Do not disable blur unless the graphic adapter is from Intel and you are experiencing graphic issues.

Hardware Video Decoding

The Nx Witness Desktop Client running on the Windows and Ubuntu Operating Systems can support Hardware Acceleration on the following Graphical Processing Units (GPUs):

- NVidia – Windows and Ubuntu Linux.
- Intel – Windows only.

Enabling hardware acceleration will free up CPU resources for other tasks and greatly benefit computers with low power hardware. This opens up the ability to decode very high resolution (e.g. 16MP, 32MP) cameras and streams for a greater number of systems. This option is disabled by default.

Open **Main Menu > Local Settings > Advanced** and toggle the *Use Hardware Acceleration Decoding* checkbox to enable or disable it.

Navigating and Searching Video

Since an archive may contain a significant volume of video data, the following search methods are available to minimize the time spent searching for a particular event or segment.

- *Timeline* – Speeds navigation through live and archived footage. See "Parts of the Timeline" and "Using the Timeline".
- *Calendar* – Zooms the Timeline to a selected date (see "Using the Calendar").
- *Motion Smart Search* – Selects a region on video, refines the archive, and highlight fragments that include motion (see "Performing Motion Smart Search").
- *Thumbnail Navigation* – Small previews are displayed on top of the Timeline to help locate a particular image or event (see "Using Thumbnails").
- *Preview Search* – Select a region on the Timeline and allow for the application to provide videos that represent a time period based on timestamps (see "Preview Search").
- *Bookmarks* – This feature lets you select a segment of footage from a single device, give it a name, description and tags, and instantly export the bookmark (see "Using Bookmarks").

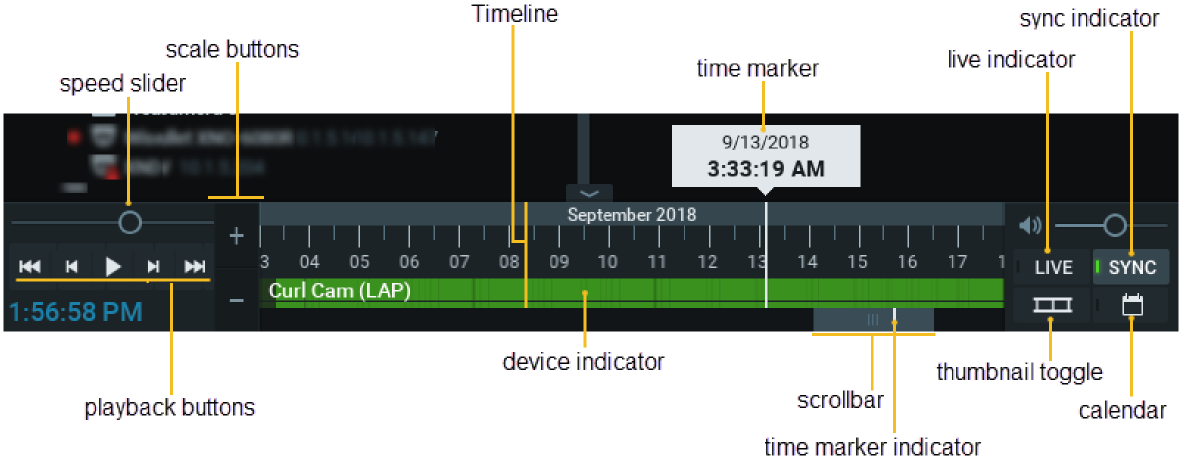
Parts of the Timeline

The Timeline provides a convenient way to navigate through live or archive video and control display speed.

Note: Timeline behavior is slightly different for archive and live footage.

- *LIVE* – Click to switch the selected camera(s) to live playback mode.
- *SYNC* – Click to synchronize all items displayed in the current layout to the same date and time. When SYNC is enabled, the speed slider and LIVE button apply to all items in layout. When SYNC is off, the speed slider and LIVE button apply only to the selected item. See "Synchronizing Playback".
- *Thumbnails* – Use to show/hide thumbnail images of the active device above the Timeline.
- *Calendar* – Opens a calendar option for Timeline navigation. See "Using the Calendar".

Timeline for Archive Display



Timeline Scale and Position Controls

- *Timeline* – Controls navigation through archive footage.
- *Time marker* – Indicates the current date and time of the selected video.
- *Scrollbar* – Use to quickly move backwards and forwards along the Timeline. The scrollbar scales with the Timeline zoom level.
- *Time marker indicator* – Indicates where you are on the Timeline relative to the time marker.
- *Scale buttons* – Use to scale date/time display from increments of 100ms to 1 month.
- *Thumbnails* – Click-and-drag the top of the Timeline to see a thumbnail view of the currently selected item (see "Using Thumbnails").
- *Device indicator* – Displays the name of the currently selected device and also indicates archive status, where bright green indicates a recorded segment, gray indicates no recorded footage, blue indicates a Bookmark, and, if Motion Smart Search is active, red indicates

regions where motion has been detected (see "Performing Motion Smart Search"). When a layout contains multiple devices, combined status for the unselected devices is shown in a very narrow bar beneath the larger bar.

Timeline Speed Controls

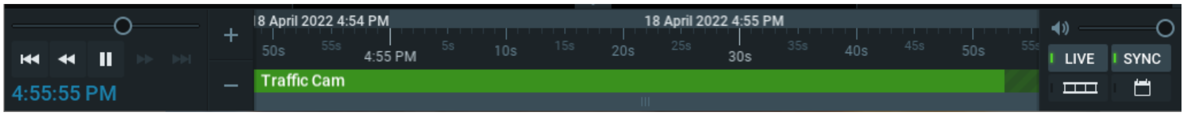
- *Playback buttons* – Use to start, stop, and control playback speed; click forward or reverse to jump 10 seconds.
- *Speed slider* – Provides additional control for playback speed.

Timeline Volume Control

See "Adjusting Volume".

Timeline for Live Display

By default, all devices display a live image when first opened in layout. The last-minute of the archive is generally accessible in Nx Witness. Usually, only the last several seconds will not be available for immediate playback (represented by diagonal stripes on the Timeline).



Using the Timeline

The Timeline itself and the scrollbar respond to a broad set of mouse wheel, mouse click, and button commands.

Click on the desired date and time on the Timeline to select it. If archive exists at that point, the time marker is placed at that point. If not, the time marker jumps to the beginning of the next recorded segment. Playback will begin in real time if playback is active. If playback is paused, the time marker position and content remains static until you click elsewhere on the Timeline.

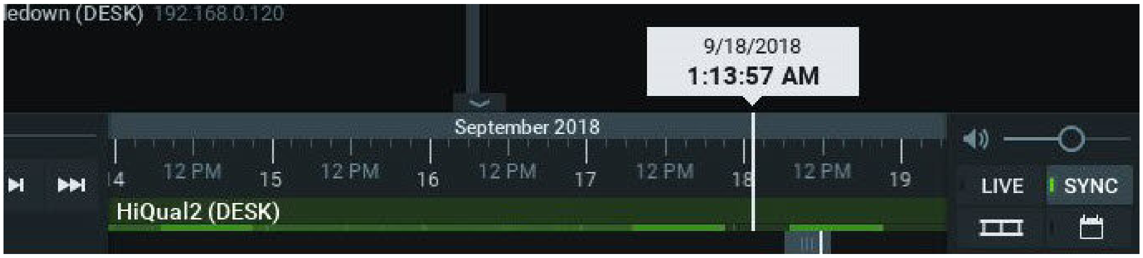
If the desired point in time is not currently visible there are several ways to locate it.

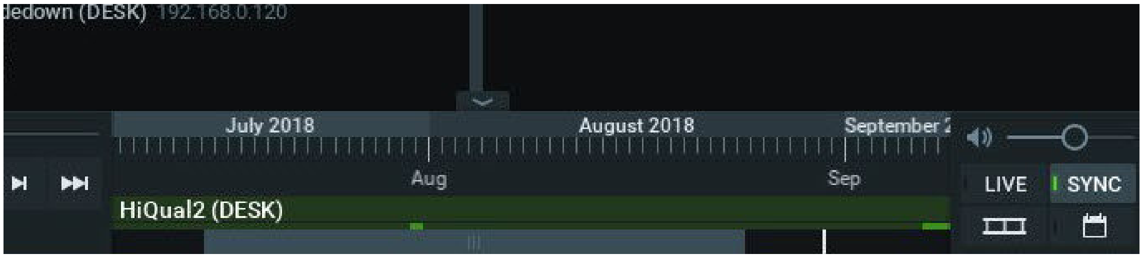
To Scroll the Timeline

- Click-and-drag the scrollbar back or forth to the desired position.
- Use Ctrl+mouse wheel over the Timeline or scrollbar.

To Scale the Timeline

Scaling is centered on the cursor unless the cursor is at the very end of the Timeline, in which case scaling is anchored to that end point. The scrollbar scales with the Timeline to indicate how much of the total Timeline is currently visible on screen. The white time marker indicator shows the location of the time marker in relation to the current Timeline display. For example, in the left illustration below, the scrollbar is small because only a small portion of the total Timeline is visible, and the scrollbar overlaps the time marker indicator because the time marker is currently visible. In the right illustration, the scrollbar is large because a large portion of the total Timeline is visible, and the scrollbar does *not* overlap the time marker indicator, because the time marker (which is still at 9/18/2018) is not currently visible.





- Use the mouse wheel over the Timeline or scrollbar to zoom in (smaller time increments) or out (larger time increments).
- Click on the scale buttons to zoom in (+) or out (−) by 10%. Double-click to zoom by 20%.
- Click and hold the scale buttons for rapid zoom.
- Click in the scrollbar background area to scroll "screen by screen" in increments the size of the current display. Double-click to scroll by two screens.
- Double-click on the scrollbar to zoom out to the maximum available view.

During Playback

Long-Press or Double-Press (in one second) Press or Z to jump backwards to rewind to previous chunk.

- If the rewind button is pressed while in Live mode, the mode will switch to archive playback.
- If the fast forward button is pressed while viewing archive, display will switch to Live mode once the current time is reached.
- Use the **Speed Slider** to temporarily change playback speed by draging-and-holding it to the right for fast forward or to the left for fast rewind.
  - The **Speed Slider** can also be set in 2x, 4x, 8x, and 16x increments. Release to return to 1x speed (during playback) or 0x (when paused).

  Note:When SYNC is enabled, the speed slider and LIVE button apply to all items in layout. When SYNC is off, the speed slider and LIVE button apply only to the selected device.

To Control Playback Speed

- Press **Space** to toggle between play and pause.

- Press ▶ to play at actual speed.
- Press ⏸ to pause.
- Press ⏩ or **Ctrl**+**Right Arrow** to fast forward. Available speeds are 2x, 4x, 8x, and 16x.
- Press ⏪ or **Ctrl**+**Left Arrow** to rewind. Available speeds are -2x, -4x, -8x and -16x.
- Press ⏭ or **X** to jump forward to the next recorded chunk.
- Press ⏮ or **Z** to jump backwards to the previous recorded chunk.

When Paused

- Press ▸| or Ctrl+Right Arrow to jump to the next frame.
- Press |◂ or Ctrl+Left Arrow to jump to the previous frame.
- Press ⏭ or X to jump forward to the next recorded chunk.
- Press ⏮ or Z to jump backwards to the previous recorded chunk.
- The speed slider has increments 0.25x, 0.5x, 1x, 2x, and 4x.

To Select a Time Segment

- Click-and-drag on the Timeline.
- Hover over the Timeline and open the context menu to choose **Mark Selection Start** (shortcut **[**), then move to the end location and choose **Mark Selection End** (shortcut **]**).

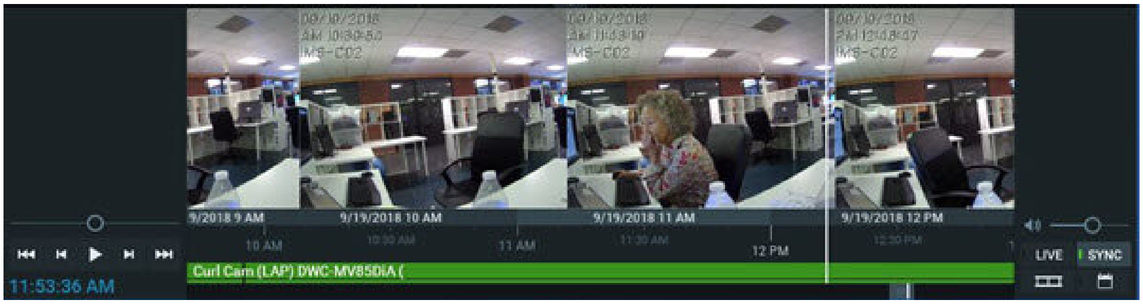
The selection will be highlighted with blue shading. Once a segment is selected, you can click-and-drag the edges to adjust its length. You can also use the context menu to select *Clear Selection or Zoom to Selection*. If you click outside the selected segment the selection will be lost.

Using Thumbnails

Thumbnails are single snapshots taken from archived video footage. They provide a visual preview of footage to speed and simplify archive searches. Hover the mouse cursor over the Timeline to see a thumbnail for that moment in the Timeline.

To Open the Thumbnail Panel

- Select the desired device in layout then click-and-drag the upper edge of the Timeline to open the thumbnail panel.
- Click on the Thumbnail button (▭) to show/hide thumbnails.



The higher you drag upwards, the larger the thumbnails will be.

A tiny dot near the bottom-center of each thumbnail indicates the exact moment the snapshot was taken. You can click on a thumbnail to jump to the moment in archive when it was taken.

If no thumbnails are displayed, there is no archive available for the selected camera during the visible time period.

To close the thumbnails, click-and-drag the upper edge of the thumbnails panel down or or click on the Thumbnail button (▭▭).

Synchronizing Playback

All cameras in a layout can be synchronized to a common playback date and time by enabling the SYNC button (SYNC). When SYNC is on, the speed slider, playback controls (ex. search, fast forward, rewind), and LIVE button apply to all items in layout. If no archive exists for a given camera when devices are synched, that item displays "no data".

When SYNC is off, the speed slider, playback controls, and LIVE button apply only to the selected item. It is possible to view each camera at a different point in time. Thin blue lines on the Timeline will indicate the current position of each camera that has archive. If no archive exists for a given camera, that device will jump to live display.

Using the Calendar

The Calendar is used to navigate the Timeline. The Calendar is displayed is toggled by clicking on the Calendar icon in the lower right corner of the Timeline. The Calendar will overlay the Notification Panel and Viewing Grid or Current Layout when the Desktop Client window is of a small size.

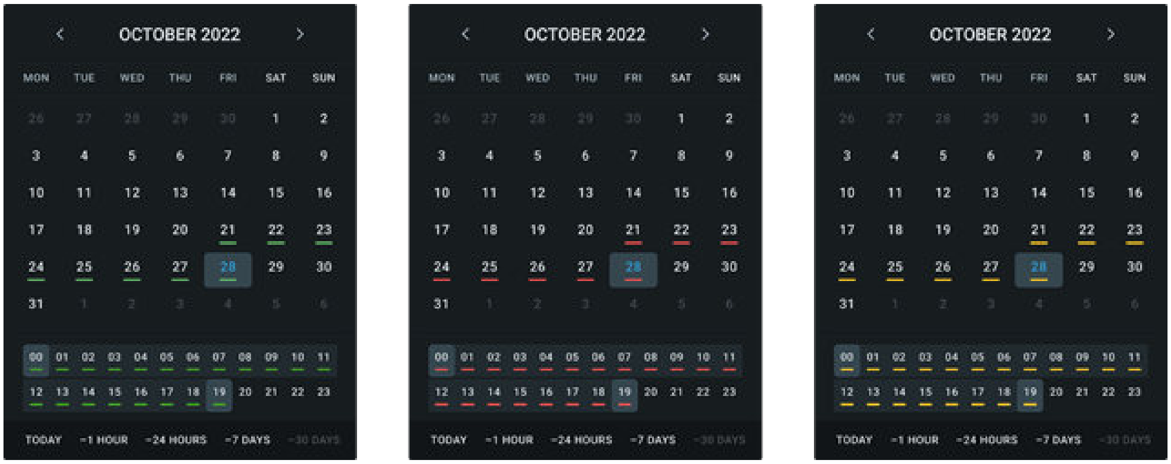
Using visual accents on the Calender

- A blue square outlines the current System date.
- Date and Time display on the Calender:
  - Have a green underline where recordings exists and Bookmarks, Notifications, or Alerts are selected in the Notification Panel.
  - Have a red underline where motion has been detected and Motion is selected in the Notification Panel.

- ○ Have an orange underline where objects have been detected and the Objects are selected in the Notification Panel

<u>Navigating the Calender</u>

- Click on the Month and Year header to open the Month Picker, or use the arrows to move forward or backward by a month.
- Click on a date and the Timeline will center on the selected date.
- Click on a time and the Timeline will center on the selected hour.
- Use Ctrl + Click to select beginning and ending dates or blocks of time to display.
- Quick jump buttons along the bottom of the Calendar will select Today (current System date), the past hour, the past 24 hours, the past 7 days, or the past 30 days.



Performing Motion Smart Search

Smart Motion Search instantly searches archive to discover and highlight the segments that contain motion in a user-selected region of a video image. Simply select the desired region and Nx Witness will display all segments that contain motion throughout the archive (scanning through a yearly archive only takes a few seconds).

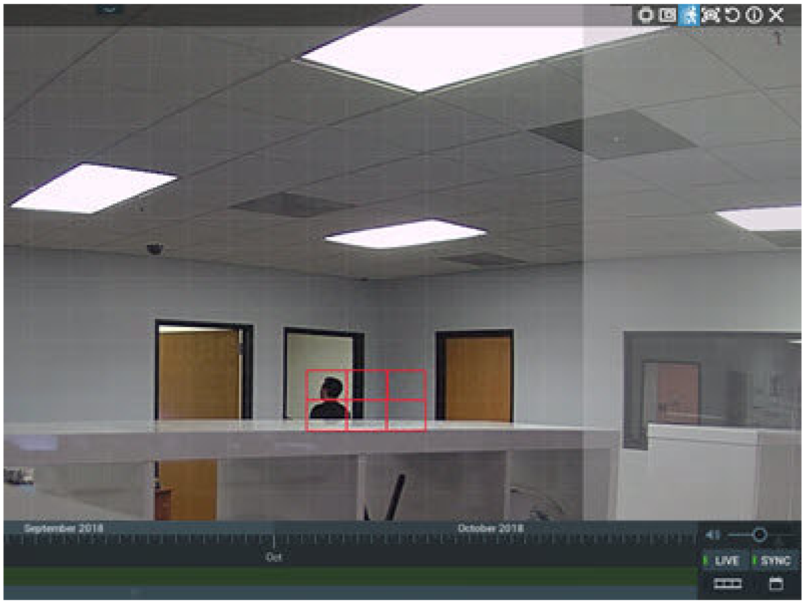
Motion Smart Search requires that the selected camera supports motion detection, and that Nx Witness motion detection be enabled.

Note that motion smart search cannot be applied to Motion Mask regions, where motion detection has been blocked (see "Setting up Motion Detection"). However, if no area is selected, Nx Witness returns results from the entire video region.

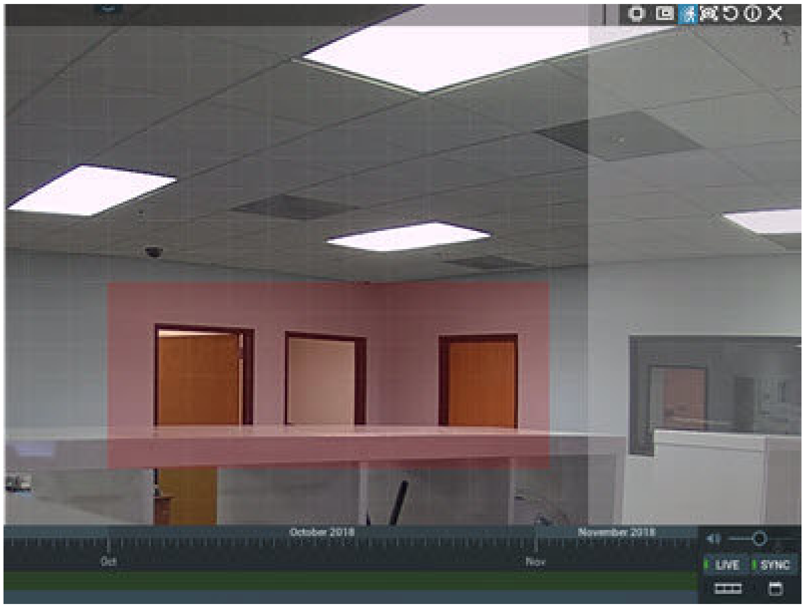
1. Open the camera's motion grid in one of the following ways:
   - Use the icon on the camera tile.
   - Open the camera's context menu and choose *Show Motion/Smart Search*.
   - Select the camera and use the shortcut **M**.

- Use Shift+click-and-drag to simultaneously enable Motion Smart Search and select the desired region.

The motion grid will display as a gray overlay. Red cell outlines indicate that motion is detected:



2. Use Click-and-drag to select the region where motion smart search should be applied or use Ctrl+click-and-drag to select multiple areas.



3. As soon as the region is selected, the Timeline will display red bars, each of which indicates an archive period that contains motion in the selected region.
4. Scroll through the Timeline to the red bars to quickly and easily locate motion in the archive.
5. To disable Smart Motion Search, clear all regions in the motion grid, toggle the button, or use the context menu option **Hide Motion/Smart Search** (**M**).

Preview Search

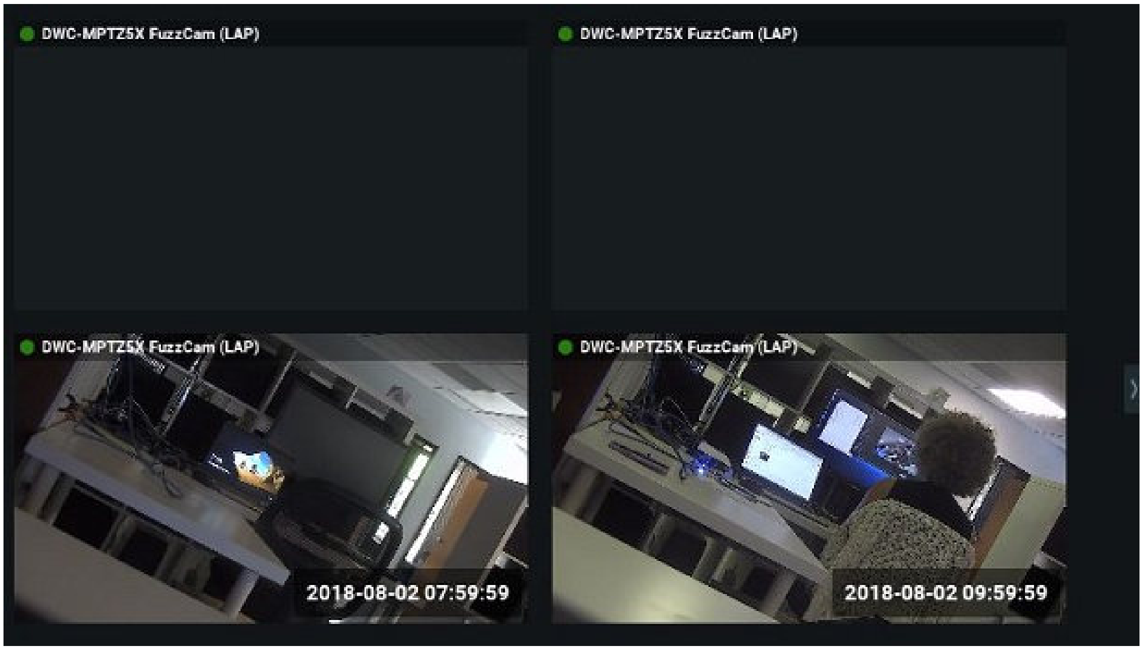
This feature helps to search through data by breaking a selected time range into smaller segments of equal length and displaying these segments as separate items in a new layout tab. Unrecorded time segments are displayed as grey or an empty space on the timeline.

Preview search can be used iteratively until the desired event is located.

For instance, a one month period will be broken down into ten 3-day segments, the 3-day segments will be broken down into nine 8-hour periods, the 8-hour segments into eight 1-hour periods, and so on. It may therefore take three to five iterations to locate a given event within an initial period of several months.

To Perform Preview Search

1. Select the desired camera in layout.
2. Click-and-drag on the Timeline to select a period to search.
3. Right-click on the selection and choose **Preview Search** in the context menu. A new tab will open with multiple items each showing a still of the start of a segment, in time order from upper left to lower right.



4. Click on an item to skip the Timeline to the starting point of the segment shown in the still. The segment will be selected when you click on the item.
5. Click the play button to view the selected segment in that item.
6. If desired, use the Timeline context menu to perform any of the available commands (clear or zoom to the selection, add a bookmark, export video, or perform another preview search).

7. Repeat the above steps as needed.

Viewing Archive from Deleted Cameras

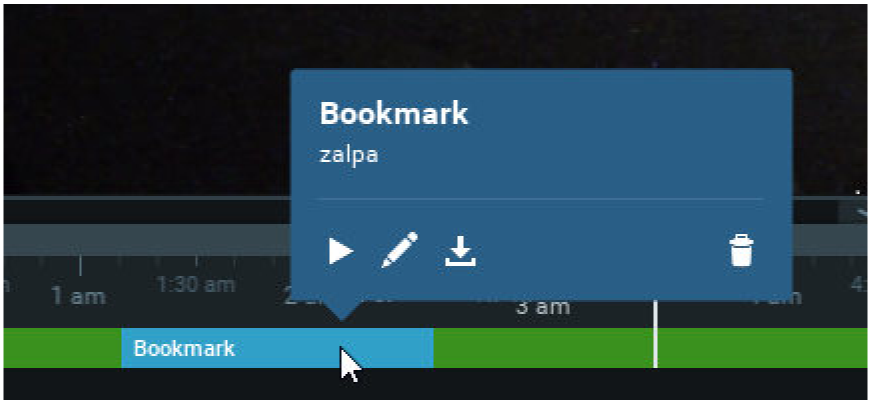
When a camera has been deleted from the System, access to its footage is lost. To make such footage available again the index that maps the relationship between archive filenames and the physical location of the archive files on the storage drive must be restored – see "Reindexing and Fast-Scanning Archives".

After the archive is restored, the deleted camera will again be displayed in the Resource Panel. Though the device will be marked offline and is not available for live video, it is possible to navigate through its archive.

Using Bookmarks

A Bookmark is a footage in the archive that is marked and named to make it easy to find and review. When the "Bookmarks Tab" of the Notifications Panel is active, Bookmarks for the selected Camera appear as blue segments on the Timeline. Only if the Bookmarks Tab is open and only if a camera actually has Bookmarks can they be displayed. When several items are open in a layout, the Timeline only displays Bookmarks for the selected camera.

Hovering the cursor over a Bookmark segment on the Timeline opens controls for that Bookmark.



▶ – Plays the Bookmark from the beginning.

✎ – Opens the *Bookmark* dialog where the name, description and tags can be edited.

⤓ – Opens the *Export Video* dialog.

🗑 – Deletes the Bookmark.

Bookmarks can be created manually on the Timeline (see "Creating Bookmarks Manually"), or they can be created automatically as the action of an event rule (see "Create Bookmark"). The action of completing an acknowledgment in response to a notification also generates a Bookmark of the triggering event.

The name, description and tag properties of Bookmarks are searchable and editable (see "Searching Bookmarks"). Bookmarks are exported with the archive of cameras, and can be exported and saved separately (see "Exporting Bookmarks"). When archived footage is deleted, the associated Bookmarks are deleted as well. You can also manually delete Bookmarks (see "Deleting Bookmarks").

To Play a Bookmark

- Hover over the Bookmark in Timeline and click the play icon (opens in the current layout).
- Double-click a single record in the Bookmark Log (opens in the current layout).
- Invoke the context menu in the Bookmark Log and choose **Open in New Tab** (opens in a new tab).

Creating Bookmarks Manually

To Create a Bookmark Manually

1. Open the desired camera (it must have recorded footage).
2. Select the time span of the Bookmark on the Timeline:
   - Click on the Timeline and drag the time indicator line to mark a segment, which will be highlighted with a blue overlay.
   - Right-Click on the Timeline to open the context menu and select **Mark Selection Start** (shortcut **[**), then Right-Click on the desired end point, and select **Mark Selection End** (shortcut **]**).
3. Once a time segment is defined, you can adjust it by clicking and dragging the edges of the blue block, or it can be removed entirely using **Clear Selection** in the Timeline context menu.
4. Right-click in the blue highlighted area and select **Add Bookmark**.
5. In the *Bookmark* dialog that opens, enter a **Name**, **Description** and if desired, one or more **Tags** separated by commas. (You can use a preexisting tag or create a new one. The most commonly used tags will be suggested.)
6. Click *OK* to accept or *Cancel* to close without saving.

Searching Bookmarks

You can use the *Bookmark Log* to search for and edit Bookmarks (see "Searching and Filtering in Nx Witness"). The "Bookmarks Tab" also provides some search and filter operations.

To Open the Bookmarks log

1. Open the **Main Menu** and select **Bookmark Log** (Ctrl+B).

2. You can sort any of the columns (*Name, Camera, Start time, Length, Created, Creator, Tags, and Description*) in ascending or descending order. You can also filter the Bookmark Log as follows:
   - *Date* – Click on the pull-down arrow to open a calendar popup for the start (left date field) and end (right date field) date filter.
   - *Devices* – Click on **All Camera** to open the standard *Select Cameras* dialog where you can select from the available devices, grouped by server.
   - *Search* – Text entered in this field yields any Bookmarks containing those characters their *Name*, *Description* and *Tags* fields. Returns up to 1000 results. Results can be cleared by clicking **Clear Filter**. See "Searching and Filtering in Nx Witness" for more details.
3. The *Bookmark Log* context menu lets you perform the following operations:
   - *Open in New Tab* – opens a new layout tab and plays the highlighted Bookmark (double-click).
   - *Edit Bookmark* – opens the *Bookmark* dialog where you can edit the *Name*, *Description* and *Tags* for the highlighted Bookmark.
   - *Export Bookmark* – exports a video file containing the Bookmark(s). Available for a single bookmark, or when multiple Bookmarks are selected (see "Exporting Bookmarks").
   - *Copy Bookmark Text* – copy the selected Bookmark's contents in text format.
   - *Delete Bookmark* – deletes the selected Bookmark(s). Available for a single bookmark, or when multiple Bookmarks are selected.

Exporting Bookmarks

Bookmarks are saved to archive and can be exported like any other video. Use one of the following to locate a Bookmark and open the **Export Video** dialog. You can view and manipulate exported bookmarks in the same way as a exported layouts. Note that Bookmarks are included in exported video.

- Open **Main Menu**, choose **Bookmark Log**, right-click on the desired bookmark and select **Export Bookmark**.
- Use the Timeline to find the desired Bookmark (see "Searching Bookmarks"), hover over it and click on the **Export Bookmark** icon in the Bookmark dialog.

Use the Export Video dialog as described in "Single Camera Export".

To Export Multiple Bookmarks

1. Select the desired Bookmarks in the *Bookmark Log* by using Ctrl+Left-click (to select them one by one) or Shift+Left-click (to select all items in-between your clicks as well).
2. Right-click on any of the selected items and choose **Export Bookmarks**.
3. Use the *Multi-Video* tab of the *Export Video* dialog that opens, as described in "Multi-Video Export".

- Optionally you can apply filters as described in "Single Camera Export".

Deleting Bookmarks

Bookmarks can be deleted individually from the Timeline, or in multiples from the *Bookmark Log* dialog.

To Delete a Bookmark Using the Timeline

- Hover the mouse cursor over the Bookmark to open its control dialog and click 🗑.
- Right-click on the Bookmark and choose **Remove Bookmark**.

To Delete a Bookmark Using the Bookmark Log

1. Open Main Menu and choose *Bookmark Log* (Ctrl+B).
2. Select the desired Bookmarks (use mouse drag or Ctrl+Click or Shift+Click to select multiple rows), open the context menu, and choose **Remove bookmarks**.

Playing Local Video Files

Nx Witness can browse to find and playback recorded videos within the Desktop Client or on the Welcome Screen without launching a System

You can play almost any video file on your local drive, with most major codecs and containers supported. You can also use Nx Witness to browse local files from the Welcome Screen without connecting to a System.

Local files include:

- Files found in designated Nx Witness Media Folders.
- Recently opened local files.
- Exported Files.
- Screen Recordings.
- Screenshots.

The Local Files list updates when a source folder is changed or a file in the folder is removed or added.

To Browse and View Local Files from the Nx Witness Welcome Screen

1. Go to **Main Menu** on the Welcome Screen and select **Browse Local Files**.
2. The Nx Witness interface opens to a blank new layout, with all local files found in the specified media folders listed in the Resource Panel.
3. You can add files, arrange items, add new layouts, and use the Timeline from this screen, but will not be able to save layouts.

4. To toggle back to the System connection page, go to **Main Menu** and select **Show Welcome Screen**.

To Rename Local Files from the Resource Panel

1. Right-click on a local file to open the context menu.
2. Choose **Rename** (**F2**) to make the name editable.
3. Type the desired file name.
4. Press **Enter**.

5.1 Sound Stream Playback (for Local Files Only)

Video files that have a 5.1 sound stream require a special setting in order to play back on stereo speakers.

1. Go to **Main Menu > Local Settings > Advanced** tab and check **Downmix Audio from 5.1 to 2.1**.
2. Click *Apply* to save changes, OK to save changes and close the dialog, or *Cancel* to discard changes.
3. You will need to restart the Nx Witness client for this change to take effect.

See Timeline Navigation for Local Files.

Timeline Navigation for Local Files

Navigation through local files is very similar to navigation through recorded archive, with the following exceptions:

- Items are not synchronized, therefore **Sync** is always disabled.
- Files are not live, therefore **Live** is always disabled.
- The Timeline does not display colored markers for recorded or motion regions.
- ⏮ and ⏭ buttons jump to the beginning or end of a file.

All other operations (seek, play, pause, fast forward, rewind, etc.) are available. as described in "Parts of the Timeline".

Note: If a layout contains both live streams and local files, the Cameras are played back synchronously and local files play back independently.

Configuring Local Media Folders

When Nx Witness starts, it automatically indexes the designated local media folders and displays them under *Local Files* in the Resource Panel.

The default media folders (customizable) are:

- *Windows*
  - `C:\Users\<username>\Videos\Nx Witness Media`

- *Linux*
    - `/home/<username>/Videos/Nx Witness Media`
- *macOS*
    - `/Users/<username>/Movies/Nx Witness Media`

To Add or Remove a Media Folder

1. Open **Main Menu** > **Local Settings** > **General** tab.
2. In *Local Media Folders* section, click **Add** and choose the desired path.
3. To delete a media folder, *select* the folder from the list and click **Remove**.
4. Click *OK* when finished or *Cancel* to discard changes.

To Open Local Files That Are Outside the Media Folders

To view local files that are not shown in the Resource Panel, use one of the following:

- Drag-and-drop a video file(s) or a folder from Windows Explorer to copy it into the Nx Witness Viewing Grid.
- Go to **Main Menu** and select **Open** > **Files** (Ctrl+O) then select the file(s) to be opened.
- Go to **Main Menu** and choose **Open** > **Folder** then select a folder to be opened.
- Right-click anywhere on the VieDewing Grid to open the context menu, select **Open** > **Folder** then choose a folder.

Exporting Video

Files from a single device, Bookmarks, and files from multiple devices that are synchronized for simultaneous playback can be can be exported from Nx Witness. Export is performed in background, so it is possible to continue working with Nx Witness until the export is completed. As soon as export is finished, the video will be available under Local Files in the Resource Panel. Exporting motion-only video ignores all gaps between motion events and stitches the separate motion events together to form seamless playback. If they exist for a camera, Bookmarks are included in exported video.

❗ **IMPORTANT: Exported video will only be available as a Local file until the current session ends!** To make it available permanently, the exported video must be saved to the Nx Witness **Media Folder** (see “Configuring Media Folders”). Alternately, you can create and save a layout that contains the exported video(s). See "Viewing Exported Video" for more information.

Exported video can be protected with a password that will be required to be able to log in and view exported.NOV or.EXE files. Videos can also be exported in read-only mode to prevent modifications to Layout and item settings during playback. This protects the chain of custody and authenticity of exported video during investigations.

If a long time segment is selected for export, the following warning message will appear: *You are about to export a long video. It may require over a gigabyte of HDD space and take several minutes to complete.*

The Following File Formats Are Supported

- *MKV* – Matroska (.mkv) is a more advanced format that may not be supported on some devices (ex: home media players). It does not restrict video and audio content. (Single camera only.)
- *AVI* – Audio video interleave (.avi) is more widely used, but the codec remains intact (H264). To view exported videos in other players additional codecs may be required. If a codec is not allowed in the AVI format, a warning message will display. (Single camera only.)
- *MP4* – MPEG-4 Part 14 (.mp4) is another advanced format that may not be played back on some devices (ex: home media players). It does not restrict video and audio content. (Single camera only.)
- *NOV* – A proprietary Nx Witness media file (.NOV). Can be opened by the Nx Witness desktop client only.
- *EXE* – A platform dependent executable bundle where the Nx Witness Client application is exported with the video file. Used to distribute videos to users who do not have any codecs or media players installed. Can be opened without Nx Witness installed on the computer, but video will be viewable only on the Windows architecture with which video was produced. When the executable is opened, the Client launches and plays the exported video. These files can be edited once exported. Motion detection and data processing in the recorded segments is retained in the export.

Note: Export is only available to users with the appropriate permissions. Export archive permission is required for any export operation. See "Built-In Groups and Permissions" for details.

The Following Options Are Available

- Adding a User Watermark – Adds an overlay of the User login to video to identify the recording source.
- Validating Exports – Indicates if any modifications were performed to the footage being exported.
- Read-only – Multi-video files (.exe and.nov formats) can be exported with a read-only option.
- Password Protected Export – Multi-video files (.exe and.nov formats) can be exported with password protection.
- Other options (timestamp, logo, etc.) may be added to single-camera exports.

Single Camera Export

The following option and export overlays are available for *.mkv*, *.avi*, and *.mp4* export formats:

- Export Settings – Check the Apply Filters box to apply image filters (e.g. rotation, dewarping, image enhancement, etc.) from the source recording to the exported video.
- Add Bookmark Info – Toggle this option Check this box to apply your bookmark description to the exported video, you can change area width and font size. (Only available when Exporting Bookmarks.)
- Add Timestamp – Adds a timestamp in Long (day of week, date, month, and year, hour:minute:seconds and UTC differential) or Short (dd/mm/yyyy hh:mm), ISO8601, or RFC2822 format. Font size is also adjustable.
- Add Image – Browse for an image (typically a logo) to add to the exported video.upper left corner. There are sliders for Opacity and Size.
- Add Text – Adds the text of your choice. You can set the Width of the text field and the Font Size.
- Add Info – Check the Camera name box to add the camera's name. Check the Export date box to add the export session's timestamp. You can set the Font Size.
- Rapid Review – Exports video at a higher playback speed than the original recording (see "Rapid Review Export"). Video must be at least 10 seconds long for this option to be available.

IMPORTANT: You may experience playback issues when exporting a video where the primary and secondary streams have different codecs. In such cases, the video should be exported using transcoding or as a multi-video (nov file/executable). See Multi-Video Export for details.

To Export a Video Segment from a Single Camera

1. Select the desired item in the layout.
2. Use the Timeline to select the desired video segment (see instructions for how to select a time segment in "Timeline").
3. Right-click on the selected time segment to open the context menu and choose **Export Video**.
4. Select the *Single Camera* tab in the **Export Video** dialog.
5. Select a **Folder** where the file will be saved and enter a file **Name.**
6. Select a **file format** from the pull-down menu.
7. When available, you can optionally check **Apply Filters** or select from the export overlays described above. Note that overlays are inserted at the upper left corner but can be clicked-and-dragged to any other position.

   Note: Including filters or overlay options requires transcoding, which will increase CPU usage and export time significantly.

8. Click **Export**. A status dialog will display export progress as a percentage. Clicking **Stop Export** will cancel the operation so that no exported data is saved.

   IMPORTANT: An exported video will only be available as a Local File in the Resource Panel until the client restarts. To make it available there for subsequent sessions, save the exported video to the Nx Witness Media Folder (see “Configuring Media Folders”).

Multi-Video Export

With multi-video export it is possible to export video and audio from the archives of several cameras or Bookmarks simultaneously (for instance, the last 10 minutes of recorded video from five different cameras).

> **Note:** It is not possible to playback local videos files in a multi-video export. If a layout includes both cameras and local files, the local files will not be shown in the *Export Video* dialog and will not be exported in the resulting file. When the selection contains empty archive on a given camera**,** it will be exported and "no data" will be shown when viewing the exported clip.

The exported files are saved either in a proprietary format that can be played by Nx Witness (.nov), or as an executable bundle that can be viewed on any Windows computer (.exe). The proprietary format has many benefits in comparison to single camera export. The exported multi-video layout can be navigated, manipulated, and searched like any other layout (see "Synchronizing Playback" and "Smart Motion Search").

IMPORTANT: An exported video will only be available as a Local File in the Resource Panel until the client restarts. To make it available permanently, save the exported video to the **Nx Witness Media Folder** (see “Configuring Media Folders”).

To Export Multiple Items as One File

1. Open the desired layout.
2. Use the Timeline to select the desired time segment.
3. **Right-click** on the selected time segment to open the context menu and choose **Export Video**.
4. Select the **Multi Video** tab.
5. Optionally, you can check **Make read-only** to prevent the exported video from being edited.
6. Optionally, you can check **Protect with password** to require a password to launch and view the exported file (see "Password Protected Exports" below).
7. Select Network Optix Media file (**.nov*) or Executable Network Optix Media File (x64) (**.exe*) format.
8. Select a **Folder** to export to and enter a file **Name**.
9. Click *Export* or *Cancel*.

Password Protected Exports

Exported file types.EXE and.NOV can be protected with a password, which will be required to open the exported layout. To apply a password, use the **Multi-Video** tab of the **Export Video** dialog and check **Protect with password**. Encrypted layouts are indicated in the Local Files list with a locked icon (🔒).

Note: The layout remains unlocked until the User session ends unless you choose the *Forget Password* option in the context menu, which closes the layout so that the password will be required to reopen it.

Rapid Review Export

The *Rapid Review* feature lets you export video at a higher playback speed than the original recording. (Sometimes this is called "timelapse" mode). When you specify either the export playback speed or length of the video, the corresponding value and the *Frames interval* will adjust accordingly. Note that the source video must be at least 10 seconds long for this option to be available.

To Apply Rapid Review Export

1. Select the desired device.
2. Select the time span you want to export and use the Timeline context menu to open the **Export Video** dialog (right-click on the newly selected area highlighted in blue).
3. In the **Single Camera** tab, click on the **Rapid Review** button. (It may be necessary to select a different output format to enable the button.)
4. The Rapid Review panel that opens to the right of the preview will show the **Initial video length** of the selected segment for reference. Set a value for each of the following:
   - *Exported video length* – Enter a desired duration in seconds, where the shorter the exported video, the faster the playback speed will be.
   - *Speed* – Use the slider to set the speed increase from **10x** to the maximum available value. (The maximum speed multiplier depends on the initial video length.)

     Note: The *Exported video length* and *Speed* values are related. The faster the playback speed and the higher the frame interval, the longer the video will be. Smaller video files are created with a slower speed and a lower frame interval.

Viewing Exported Video

As soon as export is finished, the extracted video clip(s) will be available under Local Files on the Resource Panel.

- AVI, MKV and MP4 files are shown as a single record.
- EXE and NOV files are contained in a folder and will display in a new tab.
- Single camera and Bookmark exports are displayed as a single item.

When an exported Multi-Video is opened, it behaves like a standard layout and normal actions (arranging items, smart motion search, exporting video) can be applied.

Adding a User Watermark

To deter unauthorized or unwanted distribution of video recordings, it is possible to add a watermark to video playback. The watermark consists of the User login as a semi-transparent overlay repeated across the entire image. When enabled, only users with administrator or power user permissions can export video without the watermark.

To Enable Watermark on Exported Video

1. Open **System Administration**.
2. In the **Security** tab, enable the **Display watermark with username over video** checkbox.
3. Click on the **Watermark Preview** button to adjust the opacity (0 – 100%) and the number of times the username is overlayed (1x1 array – 6x10 array) on the image.
4. Click *OK* to accept or *Cancel*.

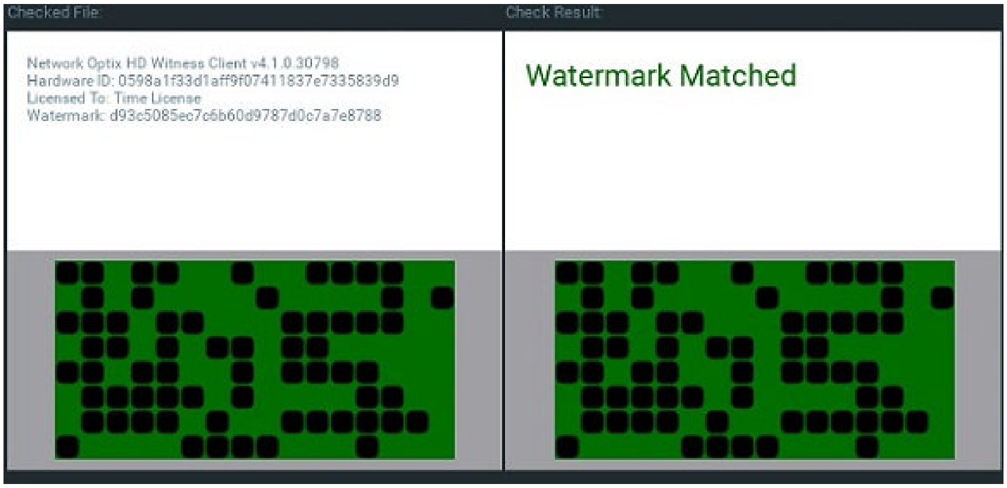
Note: Video still can be exported without a watermark via the Web Admin, for example. However, the Audit Trail of User Actions can be used to trace the recording event and the responsible user.

Validating Exports

Export validation let you determine whether video exported from Nx Witness been modified since being exported. An internal watermark is checked to verify the file is intact. Note that if you try to check the validity of a local file that was not exported, the watermark will be "not found".

To Check the Watermark on an Exported Video

1. Open the desired video in layout.
2. Open the item's context menu and select **Check File Watermark** (**Alt+C**).
3. A progress dialog will display during the validation. If the file is in its original state, the check will succeed (Watermark Matched):



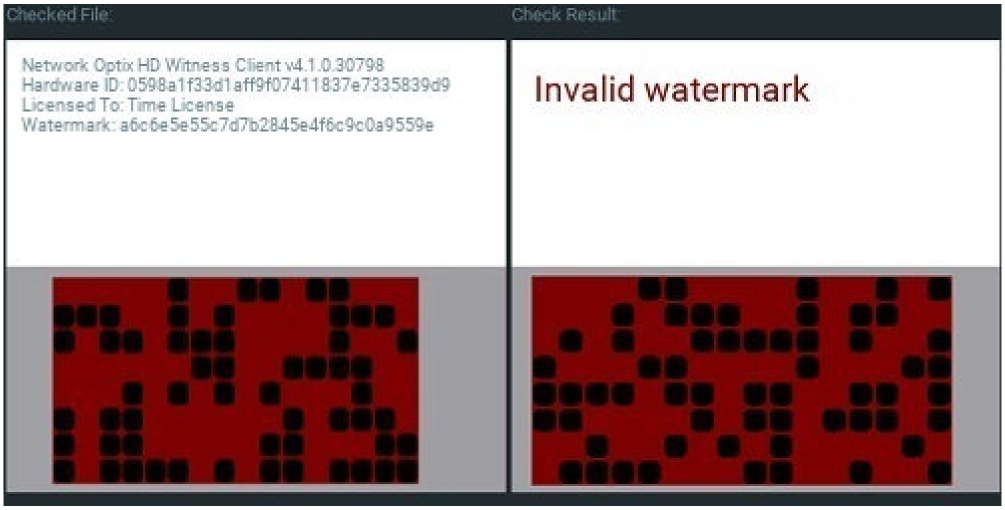
Checked File:

Network Optix HD Witness Client v4.1.0.30798
Hardware ID: 0598a1f33d1aff9f07411837e7335839d9
Licensed To: Time License
Watermark: d93c5085ec7c6b60d9787d0c7a7e8788

Check Result:

Watermark Matched

4. If any modifications took place, the check will fail (Invalid Watermark):



Checked File:

Network Optix HD Witness Client v4.1.0.30798
Hardware ID: 0598a1f33d1aff9f07411837e7335839d9
Licensed To: Time License
Watermark: a6c6e5e55c7d7b2845e4f6c9c0a9559e

Check Result:

Invalid watermark

Audio in Nx Witness

All audio is processed and recorded on the Nx Witness Server and can be played back using one of the Nx Witness Clients. Nx Witness Desktop has the ability to playback audio from all devices open in a layout. To enable this feature, enable *Play audio from all cameras on layout* in Local Settings. See "Adjusting Volume" for information about managing playback volume.

Audio allows users to have a better understanding of what is happening at the scene. In cases where a loudspeaker is present, it enables the option to communicate with people present at the scene (see "Using 2-Way Audio" for more information). Many third-party developers also offer analytics solutions involving sound detection to create events in Nx Witness.

Nx Witness supports audio from the camera's internal microphone or an external microphone through the camera's audio input. Alternatively, you can connect a microphone to an I/O device (e.g. Axis P8221 Audio Module) or use an all-in-one system with built-in microphones (e.g. Axis Network Speakers).

To provide what is considered lip-synced audio, Network Optix enabled the synchronization of audio and video in our source code since each camera has the option to provide the same timestamp for both the video and the audio stream. For the best results, the following prerequisites need to be met: accurate synchronization timing in the RTSP stream of the cameras, appropriate network performance, and sufficient resources in the server-client environment.

The Following Audio Codecs Are Supported

- *AAC* – Advanced Audio Coding is an audio coding standard for lossy digital audio compression.
- *G.711 (u-Law/A-law)* – an ITU-T PCM speech coding standard providing toll-quality voice compression.
- *G.726* – an ITU-T ADPCM speech coding standard with half the bitrate of G.711.
- *MPEG Audio (MP1, MP2, and MP3)* – an audio coding standard for lossy digital audio compression.

Adjusting Volume

The volume level applies to the items with sound played back on Scene and the Speak, Play Sound, and Repeat Sound System actions.

To adjust playback volume, use one of the following:

- Click-and-drag the **Volume Slider** to the right of the Timeline.
- Click on the Volume Slide and then adjust with the **Mouse Wheel**.
- Use **Ctrl**+**Up** or **Ctrl**+**Down** volume Keyboard Shortcuts.

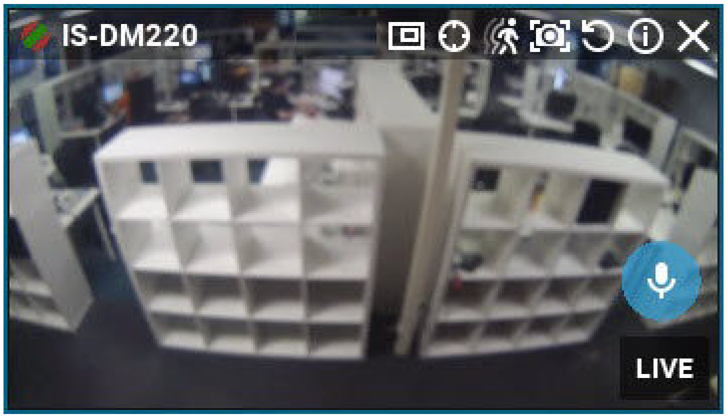
You can also click the speaker icon 🔇 to mute or unmute audio using the Keyboard Shortcut: **U**.

Using 2-Way Audio

Two-way audio (transmitting audio to a camera or I/O device from the Nx Witness client) is possible if you have a microphone connected to your PC. Currently this feature is supported on the following devices:

- ONVIF compliant devices.
- Axis cameras with firmware 5.x or higher.
- Sony SNC-CX600.
- The entire Digital Watchdog camera line.
- The entire Hanwha camera line.

If a device supports 2-way audio, you will see a blue microphone button when the device is open in layout, as shown below.



To Manually Transmit Audio to a Device

- Press and hold the microphone icon while speaking. You can use the spectrum analyzer to check the level while the button is depressed. Release the button to end the transmission.
- You can also configure an event rule or soft trigger to play sound or speak text on a device; see the Play Sound, Repeat Sound, and Speak topics for more details.

  Note: Error will appear when attempting to manually transmit audio with incorrect audio input parameters.

To Configure 2-way Audio

1. Right-click the camera **> Camera Settings > General** tab.
2. Check the *Enable 2-way audio* checkbox and choose between the two options:
   - *Use this camera for audio output* – Use the current camera for audio output.
   - *Transmit audio stream to another camera* – Select a camera or device to use for audio output instead of the current camera.
3. **Apply** changes.

Taking Screenshots

Nx Witness has a built-in *Screenshot* feature that simplifies still image capture of streaming device and local video files to PNG or JPG output formats. If image enhancement and/or Dewarping Controls were applied to the source, they will be retained in the Screenshot. Screenshot settings are retain as the default for the next screenshot.

To Take a Screenshot from a Video

1. Select an item in a **Layout**.
2. Move to the desired position in the **Timeline** (see "Parts of the Timeline").
3. Click the **Screenshot** button .
4. In the **Save As** dialog that opens:
   a. Chose a directory location

b. Enter a **File name** or use the default file name (i.e. the device name appended with a timestamp).

c. Select one of the file types from the drop-down menu: *JPEG* or *PNG*.

d. To include the playback time, select a timestamp location from the drop-down menu or select *No Timestamp*.

e. To include the camera's name, select a camera name location from the drop-down menu or select *No camera name*.

f. Click **Save**.

Tours

If several Items are open in the Viewing Grid, you can create a *Tour* that loops through Fullscreen display of each item like a slide show.

To start a tour, open the Viewing Grid context menu and select **Start Tour** (**Alt**+**T**). To stop a tour, press **Escape** or double-click the mouse.

To Set Item Display Length in a Tour

1. Open **Main Menu** and select **Local Settings**.
2. In the **Look and Feel** tab, use **Tour Cycle** to specify the desired duration (in seconds).

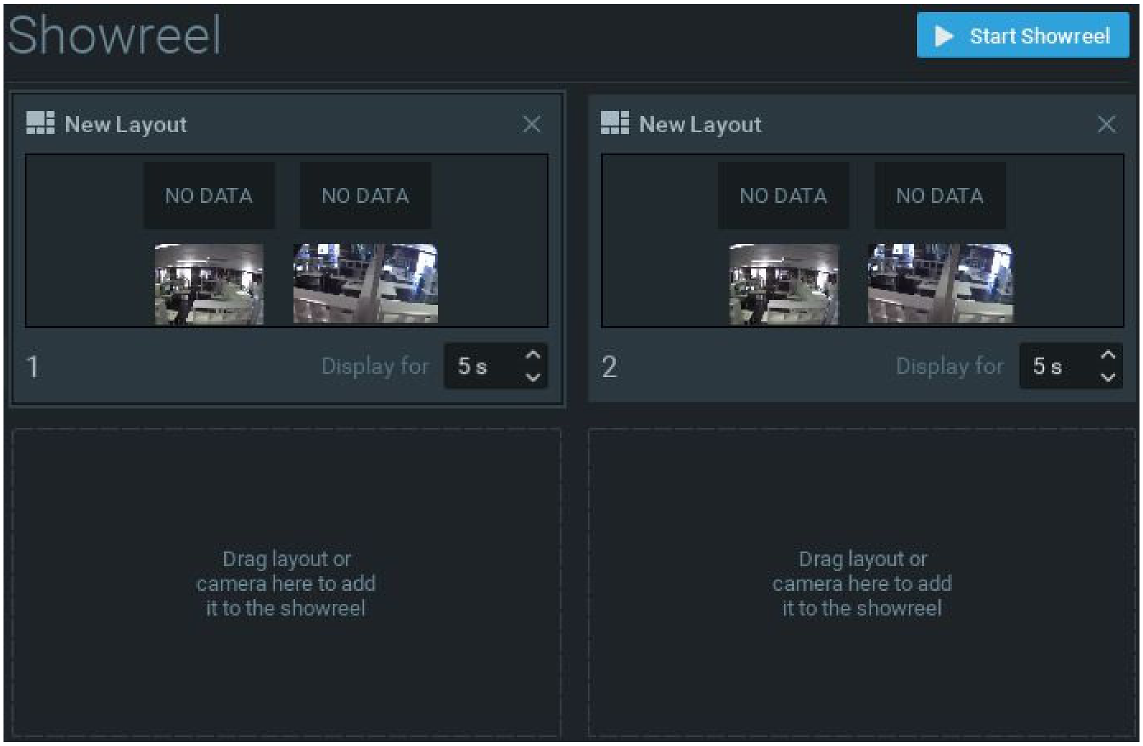
   It is also possible to cycle through layout tabs – see "Showreel (Tour Cycle)".

Showreels (Tour Cycle)

In addition to Tours, which cycle in Fullscreen mode through open items in a single layout, you can create a *Showreel* that cycles in Fullscreen mode through several entire layouts.

To Configure a Showreel

1. Open Main Menu and select **New > Showreel**.


Showreel
Start Showreel
New Layout
NO DATA
NO DATA
1
Display for
5 s
New Layout
NO DATA
NO DATA
2
Display for
5 s
Drag layout or camera here to add it to the showreel
Drag layout or camera here to add it to the showreel

2. Drag any of the following resources into the Showreel cells:
   - Layout(s) from Resource Panel (Cross-System Layouts cannot be used)
   - Individual Resources (Cameras, Local Files, other Devices, Web Pages) from Resource Panel
   - Servers (monitoring item will be displayed) from Resource Panel
   - External video files, or folders containing video files – right-click in an empty cell to open the Showreel context menu and choose **Open** > **Files** or **Open** > **Folder.**
3. Click-and-drag cells to set the display order by repositioning them in the layout. (Showreel order is left to right, top to bottom.) Click the **X** in the upper right corner to remove a cell.
4. Use the scrolling *Display for* field to set the display time, in seconds (1 to 99), for each cell.
5. If you do not want the Showreel to cycle automatically, open the context menu and check **Settings** > **Switch with Hotkeys**. Once the Showreel is started, it can be cycled manually using the right arrow key to go forward and the left arrow key to go backwards. For automatic continuous cycling, check **Settings** > **Switch on timer**.
6. Showreels are displayed in the Resource Panel and can be opened, deleted, renamed or started using their Resource Panel context menu.

To Display a Showreel

1. To start a Showreel, click the **Start Showreel** button in the upper-right corner of the showreel layout, or open the Showreel context menu from the Resource Panel and choose **Start Showreel** (shortcut **Alt+T**). To stop a Showreel, press **ESC**.

2. Once a Showreel is running, whether automatically or manually, you can use the right and left arrow keys to move through the cycle.

Screen Recording

Desktop Clients running on Windows can record the HD Witness screen to a file that may include audio.

Screen recordings can be saved in the following formats:

- *MPEG4 Part 2 (Video)*
- *MP3 LAME Audio Codec (Stereo Audio)*
- *AVI (Container)*

❗ **IMPORTANT:** Screen Recording is a CPU intense task. If you experience issues, try to change the capture resolution and quality.

Setting up Screen Recording

1. Open **Main Menu** and choose **Local Settings**.
2. Go to the *Screen Recording* tab to configure parameters:
   - *Temporary Folder* – The folder that stores temporary files. FIles are stored during recording, then are copied to a specified folder to be saved.

   ❗ **IMPORTANT:** This folder must be accessible and writable.
   - *Screen* – If several monitors are installed, choose the desired one.
   - *Resolution* – Select screen resolution. The lower the resolution, the higher the performance.
   - *Recording Quality* – Select *Performance* for best performance. Select *Best* for best quality. Select *Average* to balance performance and quality.
   - *Disable Aero* – Select this option to tun off Windows Aero while screen recording is in progress. Selecting this option will enhance performance.
   - *Capture Cursor* – Select this checkbox to include the mouse cursor during recording.

4. Click *OK* when done or *Cancel* to discard changes.

<u>To Select an Audio Source</u>

1. Go to the *General* tab in **Local Settings**.
2. Select **First Source** and **Second Source**. Audio will be mixed from both devices. The best practice is to select the sound card as primary and a microphone as secondary source. In this case, both sounds from Nx Witness (i.e. video clips) and microphone will be recorded simultaneously.

<u>To Configure an Audio Source</u>

1. Set up audio input card parameters in Windows and ensure the selected source is the default input device.
2. Test recording using the Windows Recorder or any other sound recording application.

Performing Screen Recording

1. To record the entire client screen, open Main Menu and select Start Screen Recording (Alt+R).
2. Screen recording will begin in 3 seconds.

   Note: See Setting up Screen Recording for instructions on setting up and testing an audio device.
3. To stop recording, open Main Menu and select Stop Screen Recording (Alt+R).
4. Choose the desired file name and location and click *Save* (*Cancel* will close the dialog and data will not be saved). File and folder operations are performed in the same manner as in Windows Explorer. As soon as the file is saved, it will be available in local files.

   IMPORTANT: The screen recording will only be available as a Local File until the client restarts. To make the screen recording available during subsequent sessions, save the recorded video to **Nx Witness Media Folder** or create and save a layout containing the video.

Contacting Support

Some issues can be resolved without support, such as

- A camera that is not working properly can be diagnosed (see "Diagnosing Offline Devices"), and
- An archive that is lost can be restored (see "Reindexing and Fast-Scanning Archives").

Note: This section and the following sub-sections apply only to System Administrators: Collecting Basic Information, Collecting Logs, Providing Remote Access, and Sending Anonymous Usage and Crash Statistics.

When posting an issue to support, describe the problem in as much detail as possible. At a minimum, please provide the version, hardware, and driver of your System from the About screen (see "Collecting Basic Information"). Support may request additional information such as log files, network configuration, etc. (see "Collecting Logs" and "Viewing and Exporting the Event Log"), or ask that you provide Administrator login credentials.

For a more in-depth look at the state your system is in, see "Health Monitoring". Health Monitoring will display system performance and error information. It will be helpful to include some of the information on that page when submitting a support request.

To expedite investigation, it may be useful to provide remote access. If it is not possible to provide remote access for security reasons, or if an issue is difficult to replicate, a supporting video clip can help the support team understand and investigate the issue. Use the screen recording function to create a video clip, and attach the video to your support ticket.

If the issue is related to compatibility of a specific device, the support team might provide a specific build that can solve the particular issue. See "Updating Nx Witness" for more information.

Collecting Basic Information

To display product version, hardware, and driver information, go to **Main Menu** and select **About** (**F1**).

The *About Nx Witness* dialog will display:

- Version and platform information.
- A list of external libraries used.
- Graphical Processing Unit (GPU) information.
- System Servers.
- Nx Witness components and driver versions.
- Customer Support contact information.

This data is required by the support team and should be provided in your support ticket in addition to other pertinent details. (Similar information can be acquired with standard Windows tools such as **ipconfig**, but *About Nx Witness* is more direct and specific to the product).

Collecting Logs

Log files track the internal actions performed by Nx Witness components. They are crucial part in the process to help developers to deeply understand the problem and causes.

The following logs may be requested as part of a support ticket:

- System Logs.
- Client Logs.
- Update Logs.

Note: Desktop Client logs are disabled by default.

To manage log files:

- all: **Main Menu -> System Administration** > **Advanced** > **Logs Management.**
- Client only: **Main Menu -> Local Settings** > **Advanced** > **Logs Management** (does not require to be logged into a System).

Before downloading log files, it is necessary to understand Log Level – the amount of information that the system components record to the log files.

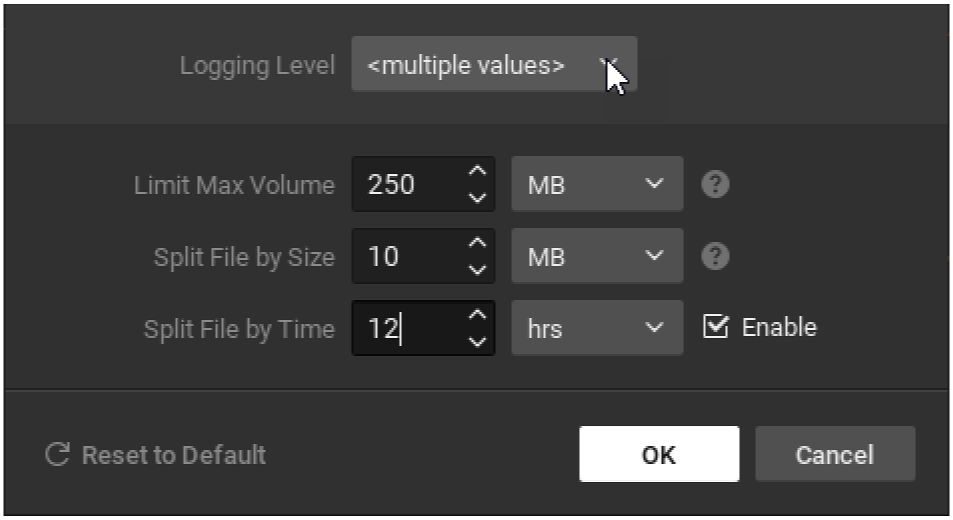
Each component has the following log levels:

- **NONE** – no log files are written (default for Desktop Client).
- **ERROR** – only errors and critical failures are written.
- **WARNING** – warnings (predefined messages from developers), errors, critical failures.
- **INFO** – same as **WARNING** plus informational messages predefined by developers (default log level for Servers).
- **DEBUG** – same as **INFO** plus auto generated messages about the actions performed by the application (recommended when reporting an issue).
- **VERBOSE** – same as **DEBUG but records** full track of everything that the application does (very big amount of data). Slows down the application so definitely not recommended for a long-term run. Might be requested by developers. In this case switch to this log level, collect the log files once the issue is reproduced and switch back immediately after.

Log level and additional parameters can be configured in **Logs Management -> Settings:**

- for Client and Server: select the components that you want to configure (It is not possible to configure logs on offline servers) and click **Settings.**
- for Client only: Click **Settings** in **Local Settings** > **Advanced** > **Logs Management**.

The following settings can be configured:



Logging Level <multiple values>

Limit Max Volume 250 MB

Split File by Size 10 MB

Split File by Time 12 hrs ☑ Enable

- **Logging Level** – explained above
- **Limit Max Volume** – the maximum total size of the log files. Once the size hits the limit, the oldest records will be erased.
- **Split File by Size** – size of the single log file. Once the size hits the limit, the new file will be created until the **Max Volume** limit is reached by all log files.

- **Split File by Time** – if enabled, the new file will be created once in a specified period of time (12 hours at the example above) until the **Max Volume** limit is reached by all log files.
- **Reset to Defaults** – to revert settings to the original ones.

The changes will be applied once you click **OK**.

To view Server Logs view in browser, right-click on the desired Server in Resource Panel and choose **Server Logs** from the context menu. The log will open in a web browser.

To Obtain Server and/or Client Logs

1. Open **Logs Management**.
2. Select the components that you want to download log files for.
3. Click **Download**.
4. Choose the folder which will be used to save log files.

To Obtain Client Logs (alternative way)

1. Open **Logs Management**.
2. Click Download.
3. Choose the folder which will be used to save log files.

Log files are downloaded as zip archives with the following names:

- **`client_<date> - <time>.zip`** – client logs
- **`<server_name> - <server_guid> - <date> - <time>.zip`** – Server logs (for each Server in the System)

Server logs archive contains the following:

- **`system_XXX.log`** – System events (licenses related events Server start/stop, critical issues).
- **`main_XXX.log`** – Server events (everything else).

Providing Remote Access

The best possible way to help the support team investigate an issue is to provide remote access via one of the following applications:

- Team Viewer.
- Citrix GoTo Meeting.
- VNC – RealVNC, TightVNC, or UltraVNC.
- RDP – Windows Remote Desktop (Requires Public IP).

For Linux and Mac it is possible to open SSH access (requires Public IP).

Lastly, a Public IP is necessary for the following investigations:

- Ability to connect remotely to the System and debug issue on the client side (server should be accessible via Internet).
- Camera issues investigations. For this purpose the camera should be accessible via Internet by Public IP.

Sending Anonymous Usage and Crash Statistics

Nx Witness helps developers and support enhance the product by sending the following information anonymously:

- Events rules with details on all settings.
- Cameras with details for the vendor, model, firmware, max FPS, PTZ capabilities, etc.
- Information about saved layouts and the cameras they contain.
- License information – key, license type, camera count, expiration, etc.
- Media Server software information:
    - Version.
    - Failover with max cameras.
    - Status.
    - SystemID.
    - User access rights.
- Features usage:
    - Button clicks for each camera widget button.
    - Button clicks for each timeline button (sync, calendar, play/pause, etc).
    - Count of dialogs opened (per dialog) and opened tabs count.
    - Preview search time and count.
    - Percentage of time when the window is in fullscreen mode.
    - Motion search time and count.
    - Percentage of time when the window is active.
- Total session time.
- Internet network usage.
- Client hardware information:
    - "openGLRenderer" (ex. GeForce GT 730/PCIe/SSE2)
    - "OpenGL vendor" (ex. NVIDIA Corporation)
    - "OpenGL version" (ex. 4.4.0 NVIDIA 331.113)

Statistics reports are sent once a month. This feature is enabled by default.

To Disable Statistics Reports

It is possible to do this during the Initial System Configuration. To do this later:

1. Open System Administration and go to the *General* tab.
2. Clear the *Send anonymous usage and crash statistics to software developer*s checkbox and click **OK**.

Nx Witness
VIDEO MANAGEMENT SYSTEM

Still need help? Visit us at http://support.networkoptix.com