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# Spectrum Licenses

## DW Spectrum Professional License

<table>
<thead>
<tr>
<th>License Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DW-SPECTRUMLSC001</td>
<td>Single DW Spectrum IPVMS License / No Annual Renewal, No Upgrade Required</td>
</tr>
<tr>
<td>DW-SPECTRUMLSC004</td>
<td>4 DW Spectrum IPVMS License / No Annual Renewal, No Upgrade Required</td>
</tr>
<tr>
<td>DW-SPECTRUMLSC010</td>
<td>10 DW Spectrum IPVMS License / No Annual Renewal, No Upgrade Required</td>
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<td>50 DW Spectrum IPVMS License / No Annual Renewal, No Upgrade Required</td>
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<tr>
<td>DW-SPECTRUMLSC100</td>
<td>100 DW Spectrum IPVMS License / No Annual Renewal, No Upgrade Required</td>
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</tbody>
</table>

## DW Spectrum Encoder License

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<th>Description</th>
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</thead>
<tbody>
<tr>
<td>DW-SPCP04LSC004</td>
<td>4 Channel Encoder License - allows up to 4-channels of recording when used with DW-CPUHD16, DW-CP04 and DW-CP16 / No Annual Renewal, No Upgrade Required</td>
</tr>
<tr>
<td>DW-SPCP16LSC016</td>
<td>16 Channel Encoder License - allows up to 16-channels of recording when used with DW-CPUHD16 and DW-CP16 / No Annual Renewal, No Upgrade Required</td>
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</tbody>
</table>

## DW Spectrum I/O Module License

<table>
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<tr>
<th>License Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DW-SPIOLSC001</td>
<td>IP I/O Module License - Like all supported devices IP I/O Modules are automatically discovered and can be used to trigger system events, actions, and alerts. Compatible with the Axis P8221, which also allows for audio recording by schedule, and the Advantech ADAM-6052</td>
</tr>
</tbody>
</table>

## DW Spectrum Video Wall License

<table>
<thead>
<tr>
<th>License Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DW-SPVWALL1X2</td>
<td>Single DW Spectrum IPVMS Video Wall License - 1 operator / 2 monitors / No Annual Renewal, No Upgrade Required</td>
</tr>
</tbody>
</table>
Spectrum 3.0 Cloud and Webpage Limitations

Spectrum 3.0 – Cloud

1. Usage and Benefits
   a. Manage multiple servers
      - Check server status online
      - Share and assign permission with other users without providing server information
   b. No need to assign static IP address to the server
   c. No need to setup DDNS for non-static public IP address
   d. No need to create port forwarding rule in the router (some limitations may apply)

2. Limitations
   a. No data will be stored online
   b. Only works in single router configuration (both server and client)
   c. Does not work in Symmetric NAT environment
   d. Does not work in more than one dynamic NAT environment (multiple routers)
      - If the server is behind multiple routers, only one router should have dynamic NAT configuration
      - Applies to both server and client
   e. Does not work in VLAN environment.
   f. OS or Network with outbound(egress) firewall rules.
      - TCP Ports 80, 443 and 3345 must be unblocked on the outbound(egress) rule

3. Disabling Cloud
   a. Tech support can run script to disable the Cloud connection on the server
      - Reenableing script is also available from Tech Support.

4. Reference
   https://en.wikipedia.org/wiki/UDP_hole_punching
   https://en.wikipedia.org/wiki/Network_address_translation#Types_of_NAT

Spectrum 3.0 – Webpage

1. Limitations
   a. Does not work with website with pop-ups
   b. Does not work with website that require ActiveX, Chrome extensions, or Plug ins.
   c. Does not work with Video and Audio streaming website
   d. Not able to download files from website
   e. Does not save cookies
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Working with DW Spectrum

Opening and Closing DW Spectrum Client

A few different ways are available to launch the application:

Windows

- From desktop: DW Spectrum shortcut icon.
- From Start Menu: Start -> Programs -> Digital Watchdog -> DW Spectrum.
- Directly from the installed folder:
  - For x86 default is C: \Program Files (x86) \Digital Watchdog \DW Spectrum\Client\<VERSION>\DW Spectrum Launcher.exe
  - For x64 default is C: \Program Files \Digital Watchdog \DW Spectrum\Client\<VERSION>\DW Spectrum Launcher.exe

Linux

- Using DW Spectrum shortcut icon.
- Directly from the installed folder:
  /opt/\%NAMESPACE.MINOR%/\%NAMESPACE.ADDITIONAL%/Client/<VERSION>/DW Spectrum

MAC

- Using DW Spectrum shortcut icon located in Applications or Launchpad.
- Directly from the installed folder: /Applications/DW Spectrum/Contents/MacOS/DW Spectrum

To close DW Spectrum Client:

- Click on the "X" button located in the top right corner
- Go to Main Menu -> Exit (or press ALT+F4).

It is possible to set up DW Spectrum Client to launch at startup (Windows/Linux only). To proceed:

1. Open Main Menu and go to Local Settings.
2. Select Run Application when PC boots up (see Misc section).
3. Click OK when done or Cancel to discard changes.

⚠️ IMPORTANT. In order to display video and graphics properly, it is important to have most current video drivers installed. If video drivers are not installed, the warning will be displayed.

Finally, DW Spectrum Client can detect PC configuration automatically. If CPU and/or graphic adapter are insufficient to render all graphics, the configuration mode will be activated.

This mode restricts the following functionality:

- Only one video can be viewed at the same time
- No notifications in Client (see Notifications)
- All animations are turned off.
Connecting to DW Spectrum via Web-Client

Web Client allows users to do the following:

- view Live streams from Cameras
- search through archive
- change resolution to save bandwidth

To open Web Client:

1. Open Server’s Web Interface and log in using user name and password (or cloud credentials).
2. Go to the Web Client tab.

See also "Connecting to DW Spectrum via Mobile Client".

Connecting to DW Spectrum via Mobile Client

Mobile Client allows users to do the following:

- view Live streams from Cameras
- search through archive
- change resolution to save bandwidth.

Mobile client is available for Android and iOS platforms.

There are 2 different mobile clients available:

- New Mobile clients. Provide much better user experience and enhanced interface. Allows connecting to versions 2.5 and higher. Requires iOS 8.1+ and Android 4.1+.
- Old Mobile clients. Allow connecting to any version of DW Spectrum. Remains available for better compatibility.

Connecting to System and Working Offline

In order to gain access to Cameras, User must be connected to System. System may consist of one or more Servers.

When DW Spectrum Client is launched for the first time, it displays the list of available Systems on the welcome page:
DW Spectrum automatically detects and displays the Systems in local networks. Also it displays Systems that have been recently accessed. Those Systems are called Local and can be accessed by username and password.

DW Spectrum Client can connect to Systems that have different version. If System is incompatible with Client, then its version is displayed in yellow. See "Launching DW Spectrum in Compatibility Mode" for details.

Finally, if User is logged into DW Cloud Account (see "Connecting as Cloud User"), it displays Cloud Systems as well. No login credentials are needed in this case.

Systems that are unavailable at the moment, are marked grey and can be deleted.

To search the specific System, use the search bar. To scroll Systems, use navigation arrows.

If System is not displayed in the welcome screen, it is possible to connect to a specific Server using its IP address. See "Connecting to Specific Server".

⚠️ 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 Server, but it is not allowed to perform any configurations.

If User is not connected to System, he can use Client as Media Player (see "Playing Back Local Files in DW Spectrum") and Screen Recorder (see "Screen Recording (Windows Only)").

**Connecting as Cloud User**

To connect to DW Cloud, click the cloud icon at the top. Cloud connection dialog will open up.

It allows to:

- Create DW Cloud account. This will open up Cloud Portal and redirect user to the registration form
- Connect to DW Cloud using cloud username (Email address) and password
- Restore password.

Once connected, User will be able to see and access the System connected to the Cloud that are either owned or shared to this Cloud Account (see "Connecting System to Cloud Account").

* Not all the System/Server can be connected to due to the restriction and limitation of network configurations.

Also the cloud icon at the top will open up Cloud Menu that can redirect user to Cloud Portal.

To disable login using the cloud account, click the cloud icon at the top and choose Log out from DW Cloud.

Note that each Cloud System is still accessible in a standard way (username and password).

**Connecting to Specific Server**

To connect to specific Server, open Main Menu and choose Connect to (Another) Server...

The connection dialog is displayed as follows:
DW Spectrum provides a powerful mechanism that can auto-discover Servers in local network. The easiest way to is to use one of the auto-discovered Servers.

To use predefined connections, click on the drop-down list. By default, "*Last Used Connection*" is recommended:

📚 Note: the computer Server is installed on may have several network interfaces. In this case, a random one is displayed on the Auto-Discovered Servers list.

Note that Servers with different versions are discovered automatically as well. However, they will be displayed in red. It is possible to connect to them in a compatibility mode (see "Launching DW Spectrum in Compatibility Mode").

System name is displayed in before the Server’s IP address. In case of multi-server environment several servers with the same System Name can be discovered. In this case it is possible to connect to any Server. See "Understanding Multi-Server Architecture and Basics" for details.

Connection details can also be entered manually. The following values are required:

- **Host** – IP Address or name 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** and **Password** to connect to Server. If connecting for the first time, "admin" should be used as a login name. Use the same password that was set up during the initial installation.

To check connectivity to Server, press **Test**. 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 (different versions). In this case the compatibility mode will be suggested (see "Launching DW Spectrum in Compatibility Mode").
- Server and Client are incompatible with each other (different customizations).

To save login details, select the **Auto-Login** option on the bottom. When Client is launched again, it will connect to the Server automatically through the pre-established login and password combination.

To save and restore connection details:

- If current connection details are used, press **Save** and create a connection name to store, which will appear in the drop-down list next time a user logs in.
- To delete details of a stored connection, select it from the drop-down list and press **Delete**.
- If the last connection was not properly saved, the software will use its connection data from the next launch (*Last Used Connection*).

**Note:** passwords are not stored in saved connection details unless the **Auto-Login** option is enabled.

To log out, go to **Main Menu** and choose **Disconnect from Server**.

If **Client** is not connected to **Server**, a user can only access **Local Files** (see “Playing Back Local Files in DW Spectrum”).

To connect to a different **Server** under a different user, open the login window and enter new **Server** coordinates or login credentials. If canceled, the current user will still be connected to **Server**.

### Launching DW Spectrum in Compatibility Mode

It is necessary sometimes to connect to **Server** with different versions. A good example would be when DW Spectrum is installed at multiple sites (home, work, etc.) and only one installation is upgraded. In this particular case, Systems will have different versions and one **Client** should connect to another **System** (Client at home connects to System at work). Systems of different versions are highlighted in red in login dialog and in yellow in the main page.

In this case, the following message will appear:

*You are about to connect to Server which has a different version. Would you like to restart client in compatibility mode?*

By clicking **OK**, the application will restart in compatibility mode.

In some instances, it may be necessary to download additional files for compatibility pack. In this particular instance, the following message will be displayed:
You are about to connect to Server which has a different version. 
Client version X is required to connect to this Server
Download version 2.2?

Once download is completed, restart is suggested.

**IMPORTANT.** If some of the components of the Multi-Server System such as Server or Client have different versions installed, it may cause potential issues. When Client is connected to Server, all component versions are checked. The warning will appear if the component versions differ from one another.

It is recommended to have the same version installed on all system components. See Upgrading DW Spectrum.

## Introducing User Roles

There are several predefined types of user roles in DW Spectrum:

- **Owner** (user with "admin" login). Unlimited control. This user cannot be deleted.
- **Administrator.** Full control, except:
  - Change **Owner (admin)** settings
  - Delete or change own role
- **Viewers (Live Viewer, Viewer, Advanced Viewer).** Limited control. A viewer cannot:
  - Manage users (except for changing their own password).
  - See servers and all connected devices. Only the devices assigned by the administrator are visible.
  - Change predefined layouts (layouts can be changed, but cannot be saved); however, it is possible to configure and save own layouts based on available resources (assigned devices and local files).

Additional permissions can be assigned to users to be able to operate with available devices (assigned by Administrator):

<table>
<thead>
<tr>
<th>PERMANENT</th>
<th>VIDEO WALL</th>
<th>CAM SETTINGS</th>
<th>ACTIONS (PTZ, 2WAY)</th>
<th>ARCHIVE</th>
<th>EXPORT</th>
<th>LIVE</th>
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<tbody>
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<tr>
<td>Live Viewer</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
</tr>
</tbody>
</table>

- View archive, perform search and forensic analysis
- Perform export from archives
- Set up devices
- Perform various actions on Cameras and devices (Control PTZ, trigger outputs, use 2-way audio)
- Create, modify and delete Video Walls.

If none of these permissions are assigned, a user can only view live videos on available cameras.

Additionally it is possible to create Custom Roles and then assign it to Users. Custom Roles can include permissions for Cameras and Layouts. See "Roles Management" for details.
**IMPORTANT.** If any action or graphical element described in this document is not available to a specific user level, the following will apply *(Admin only).* If the action described in this document is unavailable to certain roles, it will be indicated in the corresponding topic.

Usually **Administrators** create and configure layouts for **Viewers. Viewers** log into DW Spectrum and can only work with assigned layouts and devices.

**DW Spectrum User Interface Overview**

DW Spectrum **User Interface (UI)** includes the following main controls:

- **Scene** (main view). Displays video items from cameras or local files.
- **Tab Navigator** (top **Panel**). It contains **Main Menu, Tabs** and the following buttons:
  - **Cloud Connect Button.** This button indicates the current cloud connection status and allows to connect/disconnect to Cloud and open Cloud Portal.
  - **Help Button.** Invokes this help.
  - **Window Buttons** (go/exit fullscreen, minimize, close window)
- **Playback Panel** (located on the bottom **Panel**). Used for playing back local videos and live streams.
- **Resource Tree** (left **Panel**). Contains all servers, devices, local files, users and layouts available to the current user.
- **Search Tab.** Function to search Video Files, Image Files, Live Cameras or from All types.
- **Notifications** (right **Panel**). Contains notifications about system events.

**Scene** represents space for video **Items** can be placed on. DW Spectrum allows viewing streams from **Cameras** as well as **Local Video Files.**

Items are placed on **Scene** and can be saved as **Layouts.**

If several **Tabs** are opened, then each **Tab** contains its own **Layout** with **Items.**

**Main Menu**

**Main Menu** allows users to gain access to various DW Spectrum features quickly and intuitively. **Main Menu** can be opened by clicking on the at the upper left corner and contains the following items:

- **Connect to (Another) Server** – allows connecting/disconnecting to/from Server (see "Connecting to System and Working Offline")
- **Disconnect from Server** – drop connection to a current Server and go offline
- **New:**
  - **Tab** – creates an empty tab in Tab Navigator (see "Tabs")
  - **Window** – opens a new window of DW Spectrum (see "Working with Multiple DW Spectrum Windows")
  - **User** – creates a new user (see "User and Roles Management")
  - **Video Wall** – create new Video Wall (see "Video Wall Management")
- **Web Page** – open a new web page on Scene (see "Using DW Spectrum as Web Browser").

- **Open** – opens and plays back **Local Files** (see "Playing Back Local Files in DW Spectrum"):  
  - **File** – opens Local Video File  
  - **Folder** – opens all **Local Video Files** in the selected folder and plays them back simultaneously (max 24 files for x86 and max 64 files for x64).  
  - **Web Client** – opens Web Client and connects to the current Server. See "Connecting to DW Spectrum via Web-Client".

- **Start/Stop Screen recording** (see "Screen Recording (Windows Only)").

- **System Administration** – opens up system-related settings (see "System-Wide Configurations").

- **User and Roles Management** – allows managing Users and its roles from a single dialog (see "User and Roles Management Form").

- **Local Settings** – opens up client-related settings (see "Customizing Look and Feel of DW Spectrum").

- **Audit Trail** – invokes the form that provides information about storage statistics (see "Analyzing and Anticipating Storage Usage").

- **Bookmark Search** – opens the list of Bookmarks (see "Search using Bookmarks").

- **Merge Systems** – allows merging multi-server system (see "").

- **About** – opens information about the system (see "Collecting Additional Information").

- **Exit**.

---

### Showing and Hiding Side Panels

**Side Panels** are extremely useful, though may be hidden by a user if needed. The ">" buttons show/hide **Panels** as well as **Hide Panel** Context Menu item.

If an item is expanded to full-screen (see "Expanding Items to Fullscreen"), all **Panels** slide off the screen and disappear.

To bring **Panel** back, click on ">".

Additionally, both left and right sliding menu panels can be pinned:

- If **Pinned**: side **Panels** are always visible. If a panel is hidden manually, it will not reappear automatically.

- If **Unpinned**: **Panel** is only visible when the cursor is on. As soon as a user clicks off the **Panel**, the panel will disappear. **Panel** can reappear if a user points or clicks on ">".

**F11** hides all **Panels**. To undo, press **F11** again or use **Esc**.

### Tabs and Layouts

**Tabs** are used to make layout navigation easier. Each **Tab** hosts a separate **Layout**. Tabs function very similar to any Internet browser.

The following actions can be performed with **Tabs**:
• Open a new tab:
  • Tab Navigator's Context Menu → New Tab (Ctrl+T)
  • Main Menu → New → Tab
  • "+" icon on the right of layout tabs
• Close a specific Tab: Tab's Context Menu → Close (Ctrl+W)
• Keep one Tab open – Tab's Context Menu → Close All but This
• Change the tab order – switch position by dragging and dropping a tab in the desired order.

⚠️ IMPORTANT: A warning message will appear every time Tab is modified, suggesting to the user to save changes. See “Saving Layouts”.

If too many Tabs are opened at the same time, scrolling arrows will appear:

These arrows can be used to scroll Tabs left and right.

To navigate to a specific Tab or open a saved layout, use the following button located at the end of the Tab bar

Initially, no Layouts are configured in the system. An empty default Tab is shown (“New Layout”). If User tries to configure Layout in this Tab, asterisk will automatically be added to the caption (indicating a Layout change). The Layout will remain local.

⚠️ IMPORTANT. Sometimes Alarm Layout may pop up if configured. See “Showing Cameras on Alarm Layout” for details.

The layout information is automatically passed to Server once Layout is saved (See “Saving Layouts”). If Layout is saved successfully, it will be displayed in Resource Tree under the current User.

When closing all Layouts, the default blank Tab will still appear. If the current Layout is saved as “New Layout”, the blank Tab located next to it will be renamed “New Layout 1” automatically.

Any saved Layouts that were previously opened, will appear automatically once User logs in.

🔍 Note: If Alarm Monitoring is configured, Alarm Layout will show up when the corresponding event occurs. See "Showing Cameras on Alarm Layout" for details.

See "Layout Management" and specifically "Setting up Layout" sections for more details.

Context Menu

Context Menu displays all available actions as they relate to the selected element. Context Menu will appear by right-clicking on the desired element (or on empty space).
**Items on Layouts and Scene**

**Video Item** represents video recorded by a camera that can be played back within DW Spectrum.

**Items** displayed on **Scene** offer total video manipulation, a variety of features, streaming data and other related information.

Local videos are displayed as follows:

![Local Video Item](image)

The file name is displayed in the upper left corner of **Local Video Item**.

The following buttons are displayed in the upper right corner of **Local Video Item**:

- ![Image Enhancement](image)
- ![create Zoom Window](image)
- ![take screenshot](image)
- ![Rotation](image)
- ![Information](image)
- ![Close](image)

Streams from cameras are displayed as follows:
The following information is displayed in the upper left corner of the camera item:

- **Device Name**
- **Current Recording Mode** *(Device may be recording differently depending on its schedule):*
  - ![green circle](checkmark.png) **– Recording Always**
  - ![red circle](checkmark.png) **– Motion Recording**
  - ![red circle and green circle](checkmark.png) **– Low Resolution** - always, **High Resolution** - only while in motion (red circle crossed green)
  - ![grey circle](checkmark.png) **– Not Recording**

For more information on recording settings, see "Setting up Recording Schedule".

The following buttons are displayed in the upper right corner of **Device** in addition to those displayed for local video:

- ![de-warping icon](checkmark.png) **– applies de-warping** *(is displayed if this is a fish-eye lens camera) – see "De-warping Fish-Eye Cameras"
- ![PTZ icon](checkmark.png) **– PTZ**, motorized zoom, auto focus*(if camera supports) – see "Setting up PTZ on PTZ and Fish-Eye Cameras"
- ![Smart Search icon](checkmark.png) **– Smart Search** – see "Performing Smart Motion Search".

The following information can be useful during camera setup to help adjust to the desired FPS and bitrate. It may also be useful for monitoring local files.

To view item information, click on ![icon](checkmark.png) located in the top right corner of the item. To view information on multiple items at a time, select **Items** *(see "Selecting Items"), open **Context Menu** and choose **Show Info (Alt+i)**.

The following data will appear on the bottom:

- **Current Resolution** of the stream
• Current FPS of the stream
• Current Bitrate
• Current stream Codec (H264 or MJPEG)
• Current Resolution (if Dual-Streaming is enabled for the camera): Hi-Res or Lo-Res
• Current Time of video playback or LIVE if viewing live from a camera

Additionally, the following messages may appear for camera items:

• **NO SIGNAL** – no connectivity with camera. It is possible to diagnose camera or network in this case (see "Diagnosing Offline Devices").
• **NO DATA** – no recorded data. No data available.
• **Loading...** – awaiting data from Server
• **Unauthorized** – incorrect or missing credential for the camera

On the right-hand side the following information and controls are displayed:

• Current playback mode:
  • **LIVE** – if watching a camera in live mode
  • **Date/Time** – if watching archive or local file.
• **Audio** – 2-way audio button. Displayed if watching an Axis device with firmware 5.x or higher. See "Using 2-Way Audio"

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**Working with Resource Tree and Renaming Resources**

**Resource Tree** is a convenient tool to display, search and manage available resources within the application. The format of **Resource Tree** depends on the current user's permission level.

It is displayed on the left **Panel**. It can be resized by dragging the right edge to the left or right.

Depending on a user level (see "Introducing User Roles") it may contain different elements. For **Administrators**, **Resource Tree** is displayed as follows:

• **Servers** (admin only) – a list of servers registered in the system. Server IP addresses are also displayed (if the corresponding setting is enabled).

  **Note:** Server can have several network interfaces, so different IP addresses may be displayed.

Servers can have additional **statuses**:

• **Server** – indicates Server the client is connected to.
• **Server** – Server is offline for various reasons.
• **Server** – Server is incompatible. This means the system is not fully updated and update is recommended. See "Upgrading DW Spectrum".
• **Server** – unauthorized Server. This means the password for user "admin" does not coincide with other servers so this server is not able connect to this system.
• 📷 and 🔄 – **Cameras** and I/O Modules (Devices). Displayed under **Servers** (admin only) and **Layouts**. If Device appears on more than one saved layout, the device will be listed multiple times in **Resource Tree**.

Devices can have additional **statuses**:

• 🔄 or 🔄 – Device is offline for various reasons (see "Diagnosing Offline Devices").
• 🔄 or 🔄 – unauthorized Device (see "Configuring Device’s Authentication").

The following indicators are displayed on the left:

- – Device is in recording mode
- – recording is set up for Device, but not recording at the moment.

Additionally **Devices’** IP addresses are displayed (if the setting is enabled, see below).

If **Device** is experiencing network issues over the past minute, "!" is displayed on the right. See "**Device Disconnection/Malfunction**" for details.

When hovering over **Camera** with a mouse cursor, a thumbnail of a frame taken from the **Camera** will appear.

• 📷 – **Recorders** (admin only). Displayed under **Servers** and contain several channels (represented as **Cameras**).
• 📷 – **Video Walls** (admin only). See "**Video Wall Management**" for details.
• 📷 – **Layouts**. Contains resources (devices and local files). Owned by users and displayed under each user. Locked layouts are displayed like this: 🕔 (see "**Locking Layouts**").
• 📷 – **Web Pages**. See "**Locking Layouts**".
• 📷 – **Users** (Administrator can view several users in **Resource Tree**).
• 📷 – **Other Systems** – Servers in local network that belong to different systems. See "**Configuring Multi-Server Environment (Admin Only)**".

• 📷 – **Local Files**. Contains the following:
  - Local Video files
  - Exported Video Files (see “Exporting”)
  - Exported Multi-Video Files and their contents: **Cameras**, or **Local Files** (see “Exporting the Layout in Multi-Video Format”)
  - Screen Recordings (see “Screen Recording”)
  - Images
  - Screenshots (see “Taking a Screenshot”).

**Items** that are currently placed on **Scene** are highlighted in bold in **Resource Tree**. A selected (focused) Item it has the“>” mark in both **Server** and **Layout** sections.

To enable/disable displaying IP addresses in **Resource Tree**:

1. Open **Main Menu** and go to **Local Settings**
2. Select/clear the flag in **Show IP in Tree** option (Look and Feel section).

Viewer’s **Resource Tree** contains only **Layouts**, **Devices** and **Local Files**.

If **Client** is not connected to **Server**, only **Local Files** and **Other Systems** are visible.

The following actions can be performed in **Resource Tree**:
• **Expanding/collapsing** a tree node (+/- on keypad)
• **Scrolling** (if the tree contains multiple elements)
• **Multi-Selection. Shift** to select multiple items and hold **Ctrl** to select/deselect items individually.
• **Drag and drop.** An efficient way to organize and configure resources in the tree. The following chapters will further explain the drag and drop capabilities.

• **Search.**

Almost any resource (except **Local Files**) can be renamed by **Administrator** in **Resource Tree**. To rename a resource, simply select it and:

• **Left-Click** on it again (like Windows Explorer).
• **Right-Click** for **Context Menu** and choose **Rename** (or press **F2**).

**Search**

DW Spectrum provides fast, powerful and flexible search engine that enables users to quickly locate the desired items on demand. To perform search, click on the **Search** tab in **Resource Tree** next to **Resources**.

⚠️ **IMPORTANT:** Search results will appear on Scene immediately. If the search comes back with a high number of found items, only the first 24 will be displayed for x86 architecture and 64 results - for x64 architecture. Search results are automatically added to the current scene.

Type any three consecutive characters from a resource **name**, **MAC** or **IP** into the box to activate search. Search results are displayed as follows:

To refine search, use the following tips:

• Specify the resource type: **Any Type**, **Video Files**, **Image Files** or **Live Cameras**.
• Use special symbols to combine several search criteria:
  • “+” – to add a new criteria to the search. Example, “out” + “100” will pull in all files containing “out” or “100” in file description.
  • “\” – to avoid files containing certain characters. Example, “out \hdtv” will pull in all files containing “out”, but no “hdtv”.

For instance, search string "**254** + 00−" shows the following results:

• Cameras, recorders and local files that contain "00−" or "254",
• Cameras and recorders that contain "00-" in their MAC Addresses,
• Cameras and recorders that contain "254" in their IP Addresses.

All results will disappear from the scene once all characters are removed from the search box.

ℹ️ **Note:** It is not possible to rename resources in the Search tab.
**Playback Panel**

DW Spectrum provides powerful and intuitive playback system. It includes seamless transition from live to archived footage, smooth archive playback, extensive search capabilities, local files playback, etc. All playback operations can be performed within the **Playback Panel**:

The following elements are displayed:

- **Playback Buttons** – used for playing back selected Item(s)
- **Speed Slider** – controls the playback speed of selected Item(s)
- **Pan-Temporal Time Line** – represents the archived data for selected Item(s)
- **Volume Control** – used to adjust volume for the selected Item
- **Additional Buttons**:
  - **LIVE** – switches selected camera(s) to a live playback mode or indicates that they are playing live. See "Navigating through Archive and Live"
  - **SYNC** – performs time synchronization of all cameras displayed on Scene. See "Navigating through Several Cameras Synchronously"
  - **Calendar** – opens calendar to help navigate through archive (see "Using Calendar")
  - **Bookmarks**. See "Using Bookmarks".

**Time Line** can be expanded by dragging upper edge and will show small previews called ** Thumbnails** if expanded. See "Using Thumbnails for Better Navigation".

**Full Screen and Window Mode**

DW Spectrum is recommended to be operated in full screen. To toggle full screen or bring the application to a window mode:

- Fullscreen button on top
- Double-click on Tab Navigator
- **Alt + Enter**
- **F11** (all side panels will be hidden).

Moreover it is possible to expand a single item on fullscreen. See "Expanding Items to Fullscreen".
**Getting Context Help**

DW Spectrum provides intuitive context help system on each interface element.

To invoke help:
1. Press “?” button on Tab Navigator.
2. **Left-Click** on the desired interface elements.

**Context Help** contains links to other topics that can be useful as well.

**Customizing Look and Feel of DW Spectrum**

DW Spectrum provides a number of ways to customize user interface. To start, open **Main Menu**, choose **Local Settings**, then switch to **Look and Feel**...

The following settings can be changed:

- **Language** – interface localization
- **Time mode** – display time when viewing recorded footage (**Server Time** or **Local Time**). It affects Timeline and timestamps in Event Logs, Audit Trail and Bookmarks
- **Show additional info in tree** – display IP device and recorder addresses in **Resource Tree**
- **Tour cycle** – time between cycling items in Tour Mode (see "Tours")
- **Background Image**. Click **Browse...** to select a graphic file and set **Mode** (**Stretch**, **Fit** or **Crop**) and **Intensity** (transparency).

Click **OK** when done or **Cancel** to discard changes. If the changes require restart, the corresponding warning will be displayed.

**Run DW Spectrum when computer boots up**

It is possible to automatically launch DW Spectrum if a computer boots up. To do so, open **Main Menu**, choose **Local Settings** (**General** tab), and set the "Run Application when PC Boots".

**DW Spectrum Quick Start**

This section provides recommendations on system settings for DW Spectrum to be configured properly.

Once the system is installed, it is necessary to perform a few steps to get it ready to work.

First, new System will be displayed as follows:
It is possible to connect to it without login credentials. Then the setup wizard will open up:

- **Setup New System** – specify System Name, owner password. The following advanced settings are available:
  - device setting optimization (see "Preventing DW Spectrum from Changing Camera Streaming Settings (Admin Only)")
  - device auto discovery (see "Automatic Device Discovery")
  - sending usage statistics and crash reports.
- **Add to Existing System** – if System contains multiple Servers (see "Configuring Multi-Server Environment"). Specify:
  - system URL (it can be auto-discovered). If not, URL looks like Error! Hyperlink reference not valid., where <host> is the name or IP address of Server and <port> is the Server port (usually 7001)
  - Login and Password for this system.

If it is a new System, a sufficient number of Licenses should be obtained and activated (see “Obtaining and Activating DW Spectrum Licenses (Admin Only)”).

No matter is it a new System or Server is connected to an existing-one, the following additional settings will be required:

- Storage on each Server should be configured (see “Configuring Server Storage/NAS”).
- All Devices should be properly set up (see “Cameras, Encoders and I/O Modules Management”). Same with Recording Settings (see “Setting up Recording Schedule (Admin Only)”).

Once completed, it becomes possible to create multiple Users, configure Layouts for them and more.

**Connecting System to Cloud Account**

DW Cloud allows users to have access to all their Systems from a single place. Once connected to DW Cloud, user gains access to all Systems that are connected to Cloud Account. Learn more in "Connecting to System and Working Offline".

The following operations are possible:

- Connect to any System without entering login credentials
- Invite Users to Cloud Account
- Share Systems with Users and granting custom privileges.
To connect System to Cloud Account, open System-Wide Configurations and go to the Users tab.

- **Create Account** – opens up Cloud Portal and redirects to registration form
- **Connect System to Cloud Account...** – opens up the authentication form. Enter Cloud Account login and password to bind System to Cloud account.

Once connected, System will be displayed in Cloud Portal and will be accessible without credentials. Sharing can be done within the cloud portal.

Note that each Cloud System is still accessible in a standard way (username and password).

To disconnect System from Cloud Account, open System-Wide Configurations and go to the Users tab, then click Disconnect System from Cloud Account. Note that all users, System is shared with, will lose their access.

### Obtaining and Activating DW Spectrum Licenses

DW Spectrum's license policy is quite simple. Each Device requires License. The application has no device count restrictions.

The License allows viewing and recording of a single Device. Cameras can be viewed live without Licenses allowing for an unlimited number of Cameras to be connected and viewed live at no charge. I/O Module requires the specific License.

*Note: If recording is enabled for Device License is considered used even if recording is not performed ( icon in Tree). Recording is required to capture Motion Detection and Input Detection events on Device.*

For instance, the following screenshot illustrates the situation that Cameras are offline and not recording. However recording is enabled on four Cameras (marked by ):

![Screenshot](image)

In this case 4 Licenses are being used.

See also "Setting up Recording Schedule".

Additionally there are Video Wall Licenses. Each one allows controlling video wall from a single computer (one session) or extend Video Wall on 2 displays. For instance 4 licenses allow user to display Video Wall on 8 monitors and control it from 4 clients concurrently.
DW Spectrum comes with four Trial Licenses automatically (do not allow Video Wall feature). Trial Licenses are active 30 days only.

⚠️ IMPORTANT: In Multi Server System Licenses are activated on a certain Server (the one Client is currently connected to - icon). If this server is offline, those licenses will be invalidated until the server is back online. If licenses are activated on different servers, they will be combined if those servers are merged into a single system.

To activate Trial Licenses:

1. Open Main Menu → System Administration (CTRL+ALT+A).
2. Go to Licenses tab.
3. Click Activate Trial License.

If Trial License is about to expire, the corresponding warning will appear.

To get additional Licenses, contact Digital Watchdog at Sales Department.

To activate License Key over the Internet:

1. Note Server the client is connected to (License Key will be bound to it). See the icon in Resource Tree. If it is necessary to activate License Key on a different Server, disconnect and connect to a desired one.
2. Select the Licenses tab in System Administration.
3. Automatic activation via Internet must be selected.
4. Enter License Key and click Activate License.

If DW Spectrum is not connected to the Internet, then licenses can be activated offline.

To activate License (trial or commercial) offline:

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

3. Copy Hardware ID and email to license@dwcc.tv
   - License Key: enter License key received from reseller.
   - Hardware ID: click Copy to Clipboard next to the Hardware ID and paste.

   An activation Key File will be provided.

4. As soon as the activation key is received, save it as a text file (i.e. key.txt), move to the target computer, browse the file and click OK.
5. Click **Activate License**

It is also possible to delete an expired or invalid **License Key**. To do so:

1. Go to **Licenses** tab in **System Administration**.
2. Select the desired licenses (should be marked in red) and click **Remove** (or press **DEL**).

Finally, it is possible to export the list of licenses in a file. It may be necessary, for instance, if re-activation is needed. To do so, click on **Export** and select the target file. Currently, **CSV** and **HTML** formats are supported.

⚠️ **Note**: database backup contains information about licenses, so they may be backed up and restored as well. See "**Backing up and Restoring DW Spectrum Database**" for details.

### System-Wide Configurations

All system related settings are combined in the single dialog. That makes system administration much more simple. This dialog can be opened by clicking on **Main Menu** → **System Administration** (**CTRL+ALT+A**).

The dialog contains the following sections (tabs):

- **General**:
  - **Alarm/Event Rules** – invokes the dialog when Event/Actions can be configured
  - **Event Log** – opens up the list of events that occurred (Viewing Events Log)
  - **Device List** – opens up the list of devices in the system
  - **Audit Trail** – opens up the list of users' actions. Can be enabled and disabled
  - **Health Monitoring** – opens Layout and shows health information for all servers.
  - **Bookmarks** – invokes Bookmark Search (the list of all Bookmarks)
  - Other system settings – ability to Disable Automatic Discovery and Preventing DW Spectrum from Changing Camera Streaming Settings etc.
  - **Backing up and Restoring DW Spectrum Database**
  - **Licenses** – see "**Obtaining and Activating DW Spectrum Licenses**"
  - **E-Mail** – ability to Configure Mail Server for E-Mail Notifications
  - **Updates** – see "**Upgrading DW Spectrum**"
  - **User and Roles Management Form**
  - **Routing Management**
  - **Time Synchronization**
  - **DW Cloud**.

### Obtaining and Configuring Server’s Additional Settings (Admin Only)

In addition to the basic **Server** settings that are setup initial configuration, Administrators can also do the following:

- Server Status Check (**Ping**). If Server is not responding for some reason this can help to check availability of the computer Server is hosted on
• Rename
• Failover Setup (see "Configuring Failover")
• Storage Configuration

To configure Server parameters, open the desired Server in Resource Tree, then open Context Menu and choose Server Settings.

The following Server parameters can be checked and configured:

• Name – can be changed here or in Resource Tree
• IP Address – cannot be changed. Displayed in Resource Tree as well if the corresponding setting is enabled (see "Working with Resource Tree and Renaming Resources")
• Port – can be changed from web-client
• Ping – check availability of the computer Server is hosted on
• Failover (see "Configuring Failover")
• Storage Management – see "Configuring Server Storage/NAS"
• Backup (Redundancy) – see "Configuring Redundant Storage (Storage Backup)"
• Rebuild Archive Index – restore recorded footage if moved. See "Restoring Broken Archive"
• Storage Analytics – see "Analyzing and Anticipating Storage Usage".

Configuring Server Storage/NAS

DW Spectrum provides an easy and flexible storage management policy. 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 the space consumption. The more free space the storage has, the higher the usage intensity will be.

Storage is considered to be a separate hard disk partition. If a partition has more than 100 Gb of free space, DW Spectrum uses it automatically.

Additionally it is possible to add network storage locations (NAS).

To configure Server Storage:

1. Open the Server Settings.
2. Go to Storage Management tab:
As displayed above, the computer has 3 partitions and only disks D and E are used for storage because disk C has less than 100 Gb of free space. Disk D is configured as **Backup Storage** (see "Configuring Redundant Storage (Storage Backup)").

3. To select Storage to be used click the switch

4. To add **NAS/External Storage**, click **Add** and enter the storage path (**URL**), **Login** and **Password**, for instance:

![Protocol](Network Shared Resource)  ![URL](\\192.168.20.100\Volume1)  ![Login](NAS1\admin)  ![Password](admin1234)

**IMPORTANT.** Make sure NAS is available and accessible through network from the computer **Server** is installed on.

5. Click **OK**. At this point, all **Storage** will be checked for validity and confirm ability to write to that storage location. If the drive has insufficient space, a warning will appear.

Due to different bitrate streams from Cameras may occupy different amount of space in Storage. DW Spectrum uses special algorithm to keep the same amount of time stored for different Cameras. However a user can set minimum or maximum amount of data that can be stored for specific camera(s). See "Configuring Maximum and Minimum Recording Time for Camera".

To configure redundant storage see "Configuring Redundant Storage (Storage Backup)".

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

The **Storage** structure on the partition is as follows:

<drive>/DW Spectrum Media/[Resolution]/[MAC or UUID]/[YYYY]/[MM]/[DD]/[HH]:
• Resolution:
  • hi_quality – full resolution streams
  • lo_quality – low resolution streams
• MAC or UUID – MAC address of the recorded device
• YYYY – Recorded Year
• MM – Recorded Month
• DD – Day
• HH – Hour

⚠️ IMPORTANT. 10-30 GB of free space is always preserved on Storage. For NAS storages this amount vary between 50 and 100 Gb (depending on the storage size). If only one system partition (where OS is installed) is present, then DW Spectrum will use this partition for recording. If any other disk is added and an extended partition is created, then the system partition will be disabled for recording and DW Spectrum will record data to the extended partition(s).

## Configuring Redundant Storage (Storage Backup)

DW Spectrum provides the ability to make the storage redundant. That means, even if the server the recording is performed on, goes offline, the archive will still be available. This is especially useful in multi-server environments.

The following scenarios are most commonly used:

• Servers record and back up the archive to a NAS device.
• Servers back up to each other.

The following options are available:

• Backing up footage from specific Cameras
• Backing up specific streams (Hi-res or Low-res) if necessary
• Different backup modes.

To set up storage as a backup one click Use as backup storage. If at least one storage is set for backup, the additional settings will be available. To return storage in a regular mode click Use as main storage.

⚠️ IMPORTANT. It is necessary to have at least one active main storage.

### Servers record and back up the archive to a NAS device.

To setup such scenario:

1. Make sure NAS is available and accessible through network from the computer Server is installed on.
2. Add NAS to Server (see "Configuring Server Storage/NAS").
3. Click Use as backup storage.
4. Setup backup parameters (described below).
5. Repeat the above steps on remaining servers.

### Servers back up to each other.

To setup such scenario:

1. Make sure each server is available and accessible through network.
2. Create a shared folder on each Server and make sure \server\share is accessible through the network.
3. Go to Server Settings and add all shared folders as NAS devices (see "Configuring Server Storage/NAS").
4. Click Use as backup storage on each one added.
5. Setup backup parameters (described below).
6. Repeat the above steps on all servers.

Therefore, each server will be backing up the footage to all other servers in the system. This will reduce the overall amount of stored footage but increase redundancy.

The backup options are active if at least one storage is used as backup:

- **Backup Archive From** – select Cameras to backup footage from. By default all devices are being backed up.
- **Backup Quality** – select specific streams (Hi-res or Low-res) if bandwidth saving is necessary

Server Backup Settings provides several different backup modes:

- **Real-Time** – backup will be performed immediately: the footage will be written to the main and backup immediately and simultaneously. If there is insufficient bandwidth to write to a network location, user will see the corresponding warning. **Previous data is not backed up in this case.**
- **By Schedule** – backup will be performed on specific days of week and specific hours. **Only previous data is backed up in this case.** Note that the footage will be backed up since the last time backup finished (or since the very beginning if this is the first time backup occurs). If the network bandwidth is insufficient, the backup may not be fully completed within the time frame given. For instance, if backup is performed once a week for 1 hour and tries to back up footage from 100 cameras, it will be able to backup only several hours. The date and time of the footage that is backed up will be clearly indicated on the bottom part (Archive backup complete until...).
- **On Demand** – backup occurs only if User presses Start Backup Now and continues until completion (that means all previous data is backed up) or until it's canceled. **Only previous data is backed up in this case.**

When archive Backup is finished, the corresponding Event is triggered. See "Archive Backup Finished".
Analyzing and Anticipating Storage Usage

DW Spectrum provides a way to estimate and predict storage usage. This feature allows users to plan their systems and store recorded data more accurately.

This data is displayed per Server and broken down by individual camera.

Some common ways this information can be used:

- Identify camera(s) that stream at extremely high bitrates
- Estimate amount of time that Server can store recording (Days and Hours)
- Understand the storage space that each camera consumes
- Predict the amount of time that Server can store recording if add X terabytes.

To access Storage Statistics for a Server:

1. Open the Server Settings.
2. Click on Storage Analytics:

![Storage Analytics]

- **Camera** – Camera Name
- **Space** – the amount of storage consumed by recordings from this Camera
- **Calendar Days** – the amount of recorded data that is available for this Camera. DW Spectrum uses special algorithm to keep the same amount of time stored for different Cameras. However a user can set minimum or maximum storage duration in days for individual cameras. See "Configuring Maximum and Minimum Recording Time for Camera".
- **Bitrate for the Last Recorded** – the average bitrate of the camera. It is possible to specify the amount of time the average bitrate is calculated for, by specifying it in the upper-right dropdown list (i.e last 5 minutes or last day).
To anticipate the storage capacity it is necessary to check the Forecast for full storage(s) usage box and select the amount of storage to be added (in the screenshot above 37.9 Gb is considered to be added). The software will display the amount of time Camera(s) will be recorded with the added capacity (notice Calendar Days and Space).

The data might have been changed since the form is opened. To update it click Refresh.

**Deleting Server**

In some instances, it may be necessary to delete Server from the system.

*Note: Server can only be deleted when offline.*

To delete Server, locate it in Resource Tree, Right-Click for Context Menu and select Delete.

**IMPORTANT.** All devices that are hosted on this specific server will be deleted as well. Recorded data will be kept in server’s Storage.

Server will automatically discover all Devices and start operating once it is back online. The deleted camera's archive will remain available. It will be required to perform all storage settings and configure all discovered Devices again.

**Monitoring Servers**

DW Spectrum enables users to perform health monitoring of Servers in the real-time mode. To proceed, perform one of the following:

- Drag Server from Resource Tree to Scene
- Open Server's Context Menu and choose Monitor (Monitor in a New Tab or Window).

The information is displayed as follows:

- Uptime (the time since the server is started)
- CPU Load
- Memory Usage (RAM)
• Hard disk partitions usage (C: and D: in this case)
• Network Interfaces Usage

To enable/disable graphs check/uncheck them. If hover with a mouse cursor on a check, the corresponding graph will be clearly visible, the rest-ones will be faded.

**User** can perform standard manipulations with **Monitoring Item**: move, resize, swap, duplicate etc (see "[Items on Layouts](#)").

To stop monitoring, remove the corresponding item from **Scene**.

Multiple **Server**s can be monitored simultaneously.

Additionally it is possible to monitor all **Servers** on a single **Layout**. To do so open **Main Menu**, choose **System Administration** *(CTRL+ALT+A)*, then click **Health Monitoring**.

### Using Server's Web Interface

DW Spectrum provides simple and convenient way to control Servers remotely through **Server's Web Interface**.

To access it from a browser enter the following address: Error! Hyperlink reference not valid., then login and password.

- `<ip>` – IP address of Server (the current computer should be able to connect to this Server)
- `<port>` – network port of Server (default 7001).

To access it from DW Spectrum Client:

1. Connect to a desired **Server** via **Client**.
2. Right-click on **System**, invoke **Context Menu** and choose **Open Web Client**.

🔍 **Note**: If System contains multiple Servers, Web Interface will control Server Client is connected to (note the icon in **Resource Tree**).

**Web Interface provides the following features:**

- Obtaining list of Servers in System and ability to connect to them (click corresponding links at the bottom of the **Settings** page) – Adimin only
- Merging/Splitting Systems (see "[Configuring Multi-Server Environment](#)") – Adimin only
- Connecting/disconnecting System to/from Cloud (see **Connecting System to Cloud Account**) – Adimin only
- Changing Server’s **Port** – Adimin only
- Restarting Server (**Restart** button on **Settings**) – Adimin only
- Ability to control the compatible hardware: reboot and restore factory defaults – Adimin only
- Gathering Server Information (**Information** tab): version, Storage, health monitoring, server logs
  - **Web client**
  - Developer Resources (Server API and Device Integration SDK)
- A variety of useful links (Support, Mobile Apps). See the **Help** tab.
Configuring Multi-Server Environment (Admin Only)

DW Spectrum is a very scalable solution and it allows many Servers to work together in a single System.

This section describes how to manage multi-server environment to maintain maximum system reliability and performance:

- Understanding Multi-Server Architecture and Basics
- Joining and Splitting Servers
- Configuring Failover
- Configuring Routing within Multi-Server Environment
- Configuring Time Synchronization within Multi-Server Environment

Understanding Multi-Server Architecture and Basics

DW Spectrum implements the unique hive architecture that enables high redundancy and performance and provides almost unlimited scalability. Servers can be located in a local network, behind NAT or even in different locations – they will act as a single cluster allowing users to view cameras and control the whole system from a single workstation.

If several Servers are working together, they should somehow connect to each other. To do so servers have the unique identifier – System Name, that allows server to group together. If Server discovers another Server with the identical System Name in a local network, they merges automatically. If System names are different, Server will display other one in Resource Tree under Other Systems.

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

When Servers are merged, they are constantly synchronizing all data between each other so it doesn't matter what server Client is connected to. If a video is requested from a remote Server, the one Client is connected to will be proxying the video traffic. Licenses are combined as well: if 4 licenses were activated on server 1 and 10 – on Server 2, System will have 14 Licenses total after the servers are merged.

Thus, the only thing Administrator should do to merge systems, is to assign the same system names to all Servers. Opposite, to split Systems Administrator needs to assign different system names.

Joining and Splitting Servers

There is several ways to join and split servers:

- Join Server from Different System to Current-One
- Split Server to Different System
- Merge all Servers to Another System

Join Server from Different System to Current-One

This action can be useful if there is a single Server in a different System in local network. To join such server to the current system it is possible to use DW Spectrum Client or Server's Web Interface.
Client:

1. Expand Other Systems under Resource Tree and locate the desired System.
2. Expand the desired System and locate Server to connect to the current System.
3. Open Context Menu and choose Merge to Currently Connected System...
4. Enter the admin password of the other System.

Web Interface:

1. Log in to web-interface of Server that should be connected to the current System.
2. Change System Name to the desired value and click Save.

After some time the desired Server will be joined.

If it is necessary to connect several Servers in a different System to the current one, this method may not be an option. Also, this method won't work if the server that should be joined, is outside local network. Merge all Servers to Another System should be used for these purposes.

⚠️ IMPORTANT. Backup the database prior to merging the systems. Unmerging(splitting) from the system requires the server to be reset to factory default.

### Split Server to Different System

This action can be useful if it is necessary to isolate Server from current System. This is pretty rare operation.

>Note: If Licenses have been previously activated on this server, they will be gone from the current System.

To split Server to another System use Server’s Web Interface:

1. Log in to web-interface of Server that should be split off the current System.
2. Click Restore factory defaults.

### Reset server

This action will revert this server to defaults (clear the database and reset configuration). The server will be detached from the current system. Video archive will remain intact.

[Restore factory defaults]

### Merge all Servers to Another System

This operation can be useful if there is System A that contains several Servers and all of them should be joined to another System B. Also this method should be used to join remote server(s) to a current System.

⚠️ IMPORTANT. It is not possible to merge Cloud and non-Cloud systems.

To merge Systems:

1. Launch DW Spectrum Client and connect to any Server in system A.
2. Right-click on System, invoke Context Menu and choose Merge Systems.
3. Enter Server URL (any server of System B or remote Server). To find Systems in local network use drop-down menu. For Remote Server type \texttt{Error! Hyperlink reference not valid.}:
   \begin{itemize}
   \item \texttt{<ip>} – IP address of Server (the current computer should be able to connect to this Server)
   \item \texttt{<port>} – network port of Server (default 7001).
   \end{itemize}
4. Enter \texttt{Password} to System B (or to remote Server) and click \texttt{Find System}.
5. Select the new System Name (System A or System B).
   \begin{itemize}
   \item System A – System B will be merged to System A
   \item System B – System A will be merged to System B
   \end{itemize}
6. Click \texttt{Merge with <System Name>}.\\

\textbf{Configuring Failover}

DW Spectrum can automatically manage failover in multi-server environment. If Server goes down, all devices are transferred to other Servers and Client is being reconnected to other Servers as well. The archive playback will remain seamless, however this may be a 30 seconds gap in recording during the transfer.

Failover should be configured on backup servers. For instance if System contains Server A and Server B it should configure Server A to take over Devices from Server B and vice versa.

\textbf{IMPORTANT}. To be able to do failover, both server should be able to access devices.

To configure Failover:

1. Find \texttt{Server B} in \texttt{Resource Tree}, open \texttt{Context Menu} and choose \texttt{Server Settings}.
2. Click \texttt{Enable Failover}.
3. Enter the number of \texttt{Devices} the server can handle.
4. Click OK. Now If \texttt{Server A} goes down, all devices will be transferred to Server B.
5. To make \texttt{Server A} handle the devices from Server B, make the same on \texttt{Server A}.

\textbf{IMPORTANT}. To be able to do failover, Server should be able to handle double amount of devices.

It is possible to set up \texttt{Failover Priorities}. This means if some cameras are more important, it can be failed over first. There are the following priorities:

\begin{itemize}
   \item High – these cameras will be failed over at first.
   \item Medium and Low – these cameras will be failed over only if there is a server to host them.
   \item Never – these cameras won't be failed over.
\end{itemize}

1. To configure Failover Priorities find any Server in \texttt{Resource Tree}, open \texttt{Context Menu} and choose \texttt{Server Settings}.
2. Click \texttt{Failover Priority}. The list of Servers and Cameras will be displayed.
3. Select Cameras and click a button on the bottom to set the desired Priority.
4. Repeat this for all cameras that should be prioritized.
5. Click OK to apply changes.
Configuring Routing within Multi-Server Environment

DW Spectrum provides built-in automatic routing mechanism that enables users to seamlessly work with the large sites as a single cluster. However there may be custom network configurations that may require custom routing settings. For instance, Servers may have several IP addresses (Public and Private) and it may be necessary to allow or restrict traffic flow for some of them.

Initially DW Spectrum tries to discover all available IP addresses of servers (including Public ones). However it is not possible in some network environments.

To setup routing open **Main Menu** -> **System Administration (CTRL+ALT+A)** and go to **Routing Management** tab.

On the left all Servers are displayed. If click on Server all available interfaces are displayed in the right hand side.

- To add an address manually click "+" and add **URL** like Error! Hyperlink reference not valid.:<ip> – the desired IP address of Server (i.e. Public IP)
  - <port> – network port Server is listening on (default 7001).
- To allow/deny traffic to go through the specific network interface click **In Use** to set/release checkbox.

For instance, Server can have Public IP address and is connected to the Internet via 100 Mbit network and 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 Public IP.

Configuring Time Synchronization within Multi-Server Environment

DW Spectrum provides built-in time synchronization mechanism. However this mechanism synchronizes the time with the Internet and if no Internet connection available, it may be necessary to configure time settings manually. Even in this case DW Spectrum tries to synchronize time across servers. Manual settings are needed if it is necessary to specify **Master Time Server**: the one all other Servers will synchronize to.

To do so open **Main Menu** -> **System Administration (CTRL+ALT+A)** and go to **Time Synchronization** tab.

Initially DW Spectrum tries to discover all available IP addresses of servers (including Public ones). However it is not possible in some network environments.

To go to routing setup open **Main Menu** -> **System Administration (CTRL+ALT+A)** and go to **Routing Management** tab.

The table shows all Servers that are currently online, current time and offset from Internet time or master server time.

To specify **Master Time Server** tick it in the table and click **OK**.

Cameras, Encoders and I/O Modules Management

The following types of **Devices** are supported in DW Spectrum:

- Cameras
- Encoders/DVRs
- I/O Modules
The following **Device Settings** are crucial for the application to function properly:

- **Recording schedule** (see "Setting up Recording Schedule")
- **Authentication** (the default password has been changed for devices). See "Configuring Device Authentication".

**IMPORTANT.** Most device parameters can only be configured by **Advanced Viewer** (permission level is required). A basic viewer can access configuration, but cannot make any changes. See the "User and Roles Management" section for more.

The section describes the following functions related to devices:

- **Viewing Full Device List**
- **Adding Devices (Cameras, Encoders and I/O Modules)**
- **Setting Up Devices**
- **Setting Same Parameters for Multiple Devices**
- **Swapping Devices between Servers (Admin Only)**
- **Deleting Devices (Admin Only)**

### Viewing Full Device List

All **Devices** registered in DW Spectrum are displayed in Resource Tree. It may be problematic to find a particular device when too many **Devices** appear in Tree. It is possible to use Search to locate **Cameras** on Scene.

To use a more organized list, open **System Administration** dialog and select Device List (Cameras List)... (or press **CTRL + M**).

The information is broken down by the following columns:

<table>
<thead>
<tr>
<th>Recording Type</th>
<th>Name</th>
<th>Vendor</th>
<th>Model</th>
<th>Firmware</th>
<th>IP/Name</th>
<th>MAC address</th>
<th>Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motion + Lo-Res</td>
<td>DWI-MBT213MT1W</td>
<td>Digital Watchdog</td>
<td>DWI-MBT213MT1W</td>
<td>2.1.5.4</td>
<td>192.168.100.209</td>
<td>00-1C-6f-22-53-F3</td>
<td>Server (100.32.247.136)</td>
</tr>
<tr>
<td>Motion + Lo-Res</td>
<td>DWI-MVD54WV</td>
<td>Onewif</td>
<td>DWI-MVD54WV</td>
<td>V5.3.0 build 150729</td>
<td>192.168.100.208</td>
<td>28-5F-0E-04-70-4E</td>
<td>Server (100.32.247.136)</td>
</tr>
<tr>
<td>Motion + Lo-Res</td>
<td>DWI-MVD54WV</td>
<td>Onewif</td>
<td>DWI-MVD54WV</td>
<td>V5.3.0 build 150729</td>
<td>192.168.100.207</td>
<td>28-5F-0E-04-70-80</td>
<td>Server (100.32.247.136)</td>
</tr>
<tr>
<td>Continuous</td>
<td>DWI-MBT213MX</td>
<td>Digital Watchdog</td>
<td>DWI-MBT213MX</td>
<td>2.1.5.4</td>
<td>192.168.100.202</td>
<td>00-1C-6f-22-32-26</td>
<td>Server (100.32.247.136)</td>
</tr>
<tr>
<td>Motion + Lo-Res</td>
<td>DWI-PB2MTR</td>
<td>IPAC</td>
<td>DWI-PB2MTR</td>
<td>1.0.0.1</td>
<td>192.168.100.201</td>
<td>00-0D-F1-20-47-9A</td>
<td>Server (100.32.247.136)</td>
</tr>
<tr>
<td>Motion + Lo-Res</td>
<td>DWI-PQ2MFT</td>
<td>IPAC</td>
<td>DWI-PQ2MFT</td>
<td>1.0.0.1</td>
<td>192.168.100.204</td>
<td>00-0D-F1-20-54-F3</td>
<td>Server (100.32.247.136)</td>
</tr>
<tr>
<td>Motion + Lo-Res</td>
<td>AUDIO BRTZ TR</td>
<td>Digital Watchdog</td>
<td>NSF3-ALAHE</td>
<td>A1.1.1</td>
<td>192.168.100.209</td>
<td>00-0D-F1-C7-12-07</td>
<td>Server (100.32.247.136)</td>
</tr>
<tr>
<td>Motion + Lo-Res</td>
<td>DWI-MBD214V (Encrypted by NVR)</td>
<td>Digital Watchdog</td>
<td>DWI-MBD214V</td>
<td>1.2</td>
<td>192.168.100.206</td>
<td>00-0D-F1-20-62-07</td>
<td>Server (100.32.247.136)</td>
</tr>
</tbody>
</table>

- **Recording** – recording type of **Device** (Not recording, Continuous, Motion only, Motion + Lo-Res). See "Setting up Recording Schedule".

  📈 **Note:** this is not an indication on how **Device** is being recorded.

- **Name** – **Device** name.
- **Vendor** – **Device's** manufacturer/maker. When interacting with a 3rd party Devices via Onvif protocol, **OnvifDevice** is displayed.
- **Model of Device.**
- **Firmware** – the current firmware version.
- **IP/Name** – **Device's** IP address.
- **MAC Address** – Device's MAC address. It is not possible at times to determine the MAC address. In this instance, a unique identifier is shown (i.e. `urn:uuid:207f19b2-d5a6-407f-8fec-6265a311058b`)
- **Server** – the Server where Device is hosted on.

The following tools are available to manage **Device List**:

- **Sort data** by column. **Left Click** on column's header.
- **Filter data**. Type the filter sub-string into the *Search String* field (on the top). The results will be refresh as typing. To disable filtering, clear the sub-string.
- **Select several rows** from the table. Drag the mouse, use **CTRL + Click**, or **Shift + Click**. Use **CTRL + A** to select all Devices.
- **Open one or several Devices**. Select the desired **Devices**, open **Context Menu** and choose *Open, Open in New Tab, Open in New Window*.
- **Rename Devices**. Select **Device**, open **Context Menu** and choose *Rename*.
- **Viewing Device's event history**. Select **Device**, open **Context Menu** and choose *Check Device Issues... Event History* form will open and filtering against the selected **Device** will apply.
- **Delete** one or multiple Devices. Select the desired **Devices**, open **Context Menu** and choose *Delete*.
- **Go to Device Settings**. Select the desired **Devices**, open **Context Menu** and choose *Device Settings*...
- **Export** data from one or multiple **Devices** to an external file. Select the desired **Devices**, open **Context Menu** and choose *Export Selected to File...* Select file name and format. The following formats are supported:
  - **HTML File**
  - **CSV file** (text file with delimiters). This file type can easily be imported into Microsoft Excel.
- **Copy one or several rows to clipboard**. Select the desired rows, open **Context Menu** and choose *Copy Selection to Clipboard*. The data can be pasted into any text editor or Microsoft Excel.

**Adding Devices (Cameras, Encoders and I/O Modules)**

This section provides information on how to add various devices (Cameras, encoders, I/O Modules) to the DW Spectrum resource list.

Choose one of the following methods:

- **Automatic Device Discovery**
- **Disabling Automatic Discovery (Admin Only)**
- **Adding Devices Manually (Admin Only)**
- **Adding RTSP or HTTP Streams as Cameras (Admin Only)**

**Automatic Device Discovery**

DW Spectrum provides a powerful and easy-to-use mechanism for automatic device discovery. It is required that a device should be accessible via **Broadcast**.

As soon as **Server** is started and connected to **Server**, it automatically performs device discovery in its network. Once a device is discovered, its parameters will be displayed in **Resource Tree** automatically.
If a device does not transmit media data, it is marked as **Offline**.

If **Server** is offline, all **Devices** the server is hosting are switched to the offline status **automatically**.

Once **Device** is discovered, DW Spectrum tries to configure the following settings on **Camera**: the best possible image settings for the main video stream (best possible resolution and FPS) and optimal ones for the secondary stream (240p to 320p, 2 to 7 FPS). To disable this feature, see "Preventing DW Spectrum from Changing Camera Streaming Settings".

If **Device** was deleted (see "Deleting Devices (Admin Only)") and connected again, it will be re-discovered. Disable this feature to avoid auto device discovery. See "Disabling Automatic Discovery (Admin Only)".

**Disabling Automatic Discovery (Admin Only)**

Once **Device** is discovered, the only way to delete it is to unplug it from the network (see "Deleting Devices (Admin Only)"). However, if **Device** is plugged back again, it will be re-discovered. To avoid this it is possible to disable this feature:

1. Open **Main Menu** → **System Administration** (**CTRL+ALT+A**) → **General** tab.
2. Uncheck **Enable devices and servers auto discovery** in the **Device Management** section.
3. When finished, press **OK** to apply or **Cancel** to discard settings.

**IMPORTANT.** Once the feature is disabled, new devices will no longer be auto-discovered, only added manually.

**Adding Devices Manually (Admin Only)**

If **Device** is not accessible via broadcast (usually if it is located in a different network), it will not be discovered automatically. In this case DW Spectrum provides an ability to add **Device** manually. For instance, it can be useful if **Device** is located in a different network or can even be accessed via Internet only. It is also possible to add several **Devices** simultaneously by scanning a range of IP addresses.

To add one or more **Devices**:

1. **Right-Click** on server in **Resource Tree** and open **Context Menu**.
2. Choose **Add Device(s)**. The following view will appear:

![Server 192.168.40.11](image)

3. Choose one of the following:
   - To add a single **Device**, enter device's **Address** (**IP** or **Host Name** the **Device** can be resolved on)
IMPORTANT. DW Spectrum allows adding Devices by IP Address, Host Name or Generic RTSP/HTTP Link (advanced). See "Adding RTSP or HTTP Streams as Cameras (Admin Only)".

- To add several Devices at once, select Subnet Scan:

```
Start IP  192.168.1.0
End IP   192.168.1.255

Subnet Scan
```

4. Enter the desired IP range to start scanning. By default, addresses 0–255 of the same subnet are suggested. As a result, the entire specified network will get scanned for Devices. (Only scan C-Class subnet)


7. Specify Discovery Port if needed. Most Devices are discovered on port 80, so it is better to leave on Auto setting.

8. Press Scan to initiate search. This can take a lengthy period of time (especially if IP Range is being scanned).

9. If Devices are located, they will be displayed in order.

```
Discovered Devices:

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Address</th>
</tr>
</thead>
</table>

Add selected  New Scan...  Close
```

If Device is already registered (manually or automatically), the selection checkbox is disabled and cannot be selected for addition:

```
Discovered Devices:

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Address</th>
</tr>
</thead>
</table>

Add selected  New Scan...  Close
```

10. Select desired devices and click Add selected.

Devices should be added to Resource Tree.

Adding RTSP or HTTP Streams as Cameras (Admin Only)

Some camera models are not fully compatible with Onvif Profile S; therefore, will not work properly in DW Spectrum. However, if such Cameras can provide streams by RTSP or HTTP, they can still be viewed and recorded.

-note: to add, it is important to check if a particular camera model supports this option plus know the exact RTSP/HTTP URL of the stream. This information can be found in camera's guide or by contacting the manufacturer.

To add the stream use the standard manual addition procedure (see "Adding Devices Manually (Admin Only)").
First, Make sure Subnet Scan is unchecked, then enter RTSP or HTTP URL (i.e. rtsp://<camera IP>:554/hi_stream) instead of Camera IP.

Once added, Camera will be displayed in Resource Tree as follows:

It can now be configured as any regular IP Camera (see "Setting Up Devices").

Note: only one stream can be added per Camera, so Dual-Streaming benefits will not be available (see "Dual Stream Recording Specifics (RADASS)"). Lastly, if resolution is greater than 720*576, software motion detection will not be available.

Setting Up Devices

It is possible to configure Devices for Administrators and Viewers that have the appropriate access Permission. Administrators can configure all cameras and Viewers can only use the ones that are assigned to them by Administrators.

A user can locate Device Settings from Device's Context Menu that can be invoked from Resource Tree or From Scene.

The following actions can be performed when configuring Device Parameters:

- Setting Up I/O Modules
- Renaming Devices
- Obtaining Device’s IP, MAC, Firmware and Model
- Configuring Audio on Device
- Configuring Device’s Authentication
- Forcing Aspect Ratio for Cameras
- Setting up Camera Orientation
- Setting up PTZ on PTZ and Fish-Eye Cameras
- Setting Up Fish-Eye Cameras
- Setting up Recording Schedule
- Setting up Motion Mask and Motion Sensitivity
• Configuring Proprietary Device Parameters
• Working Around Device Issues (Expert Settings).

Additionally, there is some specifics while working with Analog Encoders and Cameras. See "Setting up Analog Cameras" for details.

### Setting up Analog Cameras

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 Recorder is plugged into the network, it can either be discovered automatically or added manually (see "Adding Devices (Cameras, Encoders and I/O Modules)").

The following types of Analog Cameras are supported:

- **Analog Cameras** plugged into Encoder. Those cameras act like regular Cameras: it is possible to configure Recording Schedule for them as well as Motion Detection.
- **Analog Cameras** plugged into Recorder. Those cameras are recorded somewhere else so DW Spectrum only pulls the desired stream from the recorder. It is not possible to configure Recording Schedule and Motion Detection for those Cameras.

### Setting Up I/O Modules

DW Spectrum considers I/O devices as regular ones (Cameras), but provides some specific functionality. First of all, DW Spectrum discovers I/O Modules exactly as all other devices: automatically or with the user’s help. Afterward I/O Modules are displayed in Resource Tree.

To start working with I/O Module it is necessary to obtain and configure I/O Module License, otherwise the "Module is disabled" message will be displayed. See "Obtaining and Activating DW Spectrum Licenses" for details.

It is possible to configure I/O Devices for Administrators and Viewers that have the appropriate access Permission. Administrators can configure all cameras and Viewers can only use the ones that are assigned to them by Administrators. See "Introducing User Roles" for details.

After the license is activated the module will be displayed in the following way:
To get I/O Module working it is necessary to perform additional setup:

1. Open **Device Settings** and go to **IO Ports**.
2. Set Up the following I/O Connectors' configuration and apply the changes:

<table>
<thead>
<tr>
<th>#</th>
<th>Type</th>
<th>Default state</th>
<th>Name</th>
<th>Pulse time(ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Input</td>
<td>Open Circuit</td>
<td>Main Door Sensor</td>
<td>0</td>
</tr>
<tr>
<td>A2</td>
<td>Input</td>
<td>Grounded circuit</td>
<td>Window Sensor</td>
<td>0</td>
</tr>
<tr>
<td>A3</td>
<td>Input</td>
<td>Open Circuit</td>
<td>Light Sensor</td>
<td>0</td>
</tr>
<tr>
<td>A4</td>
<td>Input</td>
<td>Open Circuit</td>
<td>Back Door Sensor</td>
<td>0</td>
</tr>
<tr>
<td>B1</td>
<td>Output</td>
<td>Grounded circuit</td>
<td>Flamethrower</td>
<td>5000</td>
</tr>
<tr>
<td>B2</td>
<td>Output</td>
<td>Open Circuit</td>
<td>Machine Gun</td>
<td>1000</td>
</tr>
<tr>
<td>B3</td>
<td>Output</td>
<td>Grounded circuit</td>
<td>Stroboscope</td>
<td>10000</td>
</tr>
<tr>
<td>B4</td>
<td>Output</td>
<td>Open Circuit</td>
<td>Discball</td>
<td>60000</td>
</tr>
</tbody>
</table>

   - **Type** – *Input* or *Output*
   - **Default State** – *Open* or *Grounded* (depending on I/O Module)
   - **Name** of the port
   - **Pulse time** (output only) – the amount of time the signal will be generated for (in milliseconds)

After the I/O module is configured, it will be displayed as following:
The following actions can be performed:

- **Record Audio from I/O Module** (if a microphone is connected). See Setting up Recording Schedule for details.
- **Playback Audio Archive Recorded from I/O Module** (if a microphone is connected). This is similar to viewing archive from Cameras (see "Navigating through Archive and Live")
- **View Inputs State**. When the circuit is grounded, the appropriate sensor turns green
- **Trigger Output**. For this purpose click the corresponding button (B1-B4 on the picture above). The output signal is being sent for the amount of time specified in Pulse Time setting.
- **Create Rules** (see "Configuring Events and Actions (Admin Only)") using the device’s Input/Output ports:
  - Input Signal on Device
  - Trigger Output on Device.

**Renaming Devices (Admin Only)**

If a device is discovered automatically (see "Automatic Device Discovery"), it is displayed in Resource Tree as a predefined sequence ("model" or "manufacturer + model"). For instance, 10005 for Arecont Vision cameras or DWC-MD421D for Digital Watchdog.

⚠️ **Note**: It is possible to configure Devices for Administrators and Viewers with an appropriate permission level.

It is recommended to rename same device models for easier identification. Devices can be renamed directly from Resource Tree using Context Menu (or F2), or in device settings (General -> Name).

IP-addresses are added to a device name automatically and are non-editable. It is possible to deactivate displaying IP addresses in Resource Tree.

**Obtaining Device’s IP, MAC, Firmware and Model**

To obtain Device’s IP and MAC, open Camera settings and go to General. They will be displayed and are non-editable.
Note: this information is available for Administrators and Viewers with an appropriate permission level.

It may be useful to go to Device’s web page by clicking on the appropriate hyperlink to check or set up Device's parameters. See "Configuring Proprietary Device Parameters" for details.

It is possible to check if a device is accessible by pressing the Ping button.

**Configuring Audio on Device**

DW Spectrum allows to record audio from Devices (if device has this feature and the microphone is connected to it).

To set up audio recording for the device open device settings and go to General, then enable or disable the corresponding flag. The settings are applied right after Apply or OK are clicked.

It may be useful to go to Device's web page by clicking on the hyperlink. See "Configuring Proprietary Device Parameters" for details.

Note: it is possible to configure audio for multiple devices at a time. See “Setting Same Parameters for Multiple Devices”.

**Configuring Device Authentication**

All Devices come with a predefined login and password combination. During the discovery process, DW Spectrum attempts to use manufacturer’s default credentials to access a device.

However, default login and passwords may vary between models/lines or can be changed deliberately, which prevents DW Spectrum from accessing Devices and acquiring media streams. As a result, Device is shown as Unauthorized ( ) in Resource Tree. The following message will appear if a user attempts to view a live stream:

**UNAUTHORIZED**

Please check authentication information in device settings.

Note: It is possible to configure Devices for Administrators and Viewers that have the appropriate permission level.

To get Device working it is necessary to setup Authorization Parameters:

1. Open Device Settings -> General.
2. Enter Login and Password in the Authentication section and click Apply or OK. To discard changes, click Cancel.

Note: it is possible to configure same authentication credentials for several devices simultaneously. See “Setting Same Parameters for Multiple Devices”.

**Forcing Aspect Ratio for Cameras**

Occasionally, Cameras report an incorrect Aspect Ratio. In such instance, DW Spectrum automatically corrects Aspect Ratio for Cameras.

Note: this correction will require transcoding if exporting videos from Camera. See "Exporting Recorded Region from Single Camera".
To specify **Aspect Ratio**:

1. Open [Camera Settings](#) and go to **General**.
2. Enable *Force aspect ratio* flag and select the desired ratio. The following AR are available: 1:1, 4:3, 16:9.
3. Disable the flag to restore the original **Aspect Ratio**.
4. The settings are applied once **Apply** or **OK** are clicked.

**Setting up Camera Orientation**

Sometimes Cameras can be mounted rotated by 90 degrees or upside down. In such instance, DW Spectrum can display proper orientation.

⚠️ **Note**: this correction **will require transcoding** if exporting videos from **Camera**. See "[Exporting Recorded Region from Single Camera](#)".

To specify **Orientation**:

1. Open [Camera Settings](#) and go to **General**.
2. Enable *Default Rotation* flag and select the desired orientation.
3. Disable the flag to restore the original orientation.
Setting Up Fish-Eye Cameras

DW Spectrum provides advanced capabilities to operate with fish-eye cameras. Such cameras use a specific type of lens that can cover a much larger viewing area. This particular type of lens warps a picture and a de-warping algorithm must be enabled to display the picture correctly:

![Fish-Eye Camera Example]

Note: It is possible to configure Cameras for Administrators and Viewers with an appropriate permission level.

In order for DW Spectrum to distinguish cameras with fish-eye lens, the following configuration must be performed:

1. Open Camera Settings and go to General.
2. Check This is a fish-eye lens camera to activate the Fisheye tab:
3. Go to the Fisheye tab to select the following parameters:

- **Camera**’s orientation - type of de-warping algorithms based on orientation.

- **Calibration** - to avoid de-warping artifacts, it is important to position the calibration circle within the Camera's view as accurately as possible. First, try *Auto Calibration*, then manually adjust the viewing range (if needed):
  - Use scrollers to move the circle horizontally or vertically (or drag it with a mouse)
  - Use the bottom scroller to specify the shape of the lens (panamorph lens support)
  - Use a mouse wheel to resize the circle

- **Camera**’s view angle.

  📨 **Note**: It is recommended to keep Camera on Scene to monitor any image changes while adjusting settings.

4. Click *Apply* or *OK* when finished. To discard changes, click *Cancel*.

Once Camera is established as a fish-eye camera, de-warping can be performed. See "De-warping Fish-Eye Cameras" for details.

### Setting up and Controlling PTZ on PTZ and Fish-Eye Cameras

DW Spectrum provides a smart and intuitive way for setting up PTZ on Cameras, in addition to easy controls for PTZ on Fish-Eye Cameras and Screenshots (see "De-warping Fish-Eye Cameras").

PTZ on PTZ Cameras can be set by either Administrator or Viewer (a corresponding permission level is required – see "User and Roles Management"). PTZ on Fish-Eye Cameras/Screenshots is accessible to all users.
This feature is available for PTZ Cameras if:

- It is supported by the Camera model (Onvif Cameras only)
- Camera is in Live mode

If the requirements are met, clicking 🔄 will display PTZ control on the corresponding camera.

These restrictions do not apply to Fish-Eye Cameras and Screenshots.

The following PTZ modes are available:

- **Simple (Zoom only)**. Refer to the following image:

  ![Simple Zoom only](image)

  Use + and - buttons to zoom in/out.

- **Regular (Zoom and Point)**. Refer to the following image:

  ![Regular Zoom and Point](image)

  Use + and - buttons to zoom in/out. **Left-Click** on the center circle, **Hold Left Mouse Button** and move the cursor to move Camera to the desired position.

  Additionally, if Camera supports **Absolute Move**, the following features will be available:

  - **Save and restore PTZ positions**
  - **Setting Up PTZ Tours**
• Setting Up Home Positions or Tours (see "Home Positions and Tours for PTZ and Fish-Eye Cameras")

• Extended (Zoom, Point and additional features). Requires the support for Absolute Move from Camera and custom integration:

  In this case Camera allows moving and zooming as in previous case, plus:
  • Move to a certain position – Left Click to the desired position

  • Zoom to a certain range – Hold Left Mouse Button and draw the rectangle to zoom into (see the above picture)

  • Full Zoom Out – Double Click.

• Fish-Eye Cameras/Screenshots support full PTZ functionality.

After all settings are configured press to once again to hide PTZ controls.

**Saving and Restoring PTZ Positions**

In addition to standard PTZ controls, DW Spectrum allows for managing of predefined PTZ positions. It is basically possible to set up several points, tilt and zoom presets and restore them with only two clicks or one hot key.

Then PTZ presets can be used for composing PTZ Tours (see "Setting Up PTZ Tours") or serve as a Home Position (see "Home Positions and Tours for PTZ and Fish-Eye Cameras"). Finally, a specific position can be restored if an event occurs. See "Execute PTZ Preset".

**Note:** It is possible to configure PTZ on Cameras for Administrators and Viewers with the appropriate permission level.

The following is possible:

**Saving PTZ positions (simple):**
1. Set up a desired PTZ Position on Camera using PTZ Controls (see "Setting up and Controlling PTZ on PTZ and Fish-Eye Cameras")

2. Open Context Menu by right-click on the PTZ icon and select PTZ... -> Save Current Position...

3. Type a desired preset name.

4. If needed, select a hot key for preset (0-9).

**Saving and Editing PTZ positions (advanced):**

1. Open Context Menu right-click on the PTZ icon and select PTZ... -> Manage. The following form will appear:

   ![PTZ position form](image)

2. Move the form aside, so that the item and its PTZ controls are fully accessible.

3. Set up a desired PTZ Position on Camera using PTZ Controls (see "Setting up and Controlling PTZ on PTZ and Fish-Eye Cameras").


5. To edit positions set Hotkey and Name if necessary.

6. Set Home Position if necessary (see "Home Positions and Tours for PTZ and Fish-Eye Cameras").

7. Click Apply or OK when finished. To discard changes, click Cancel.

**Restoring PTZ positions:**

Open Context Menu and choose PTZ... -> Go to Position... -> Desired position> or press the predefined hot key (0-9).

It is also possible to restore PTZ Positions in Manage PTZ window (Go to Position):

**Deleting PTZ positions:**

1. Open Context Menu and select PTZ... -> Manage ...

2. Select a desired preset and Click Delete.

   **IMPORTANT.** If Position is included in Tour, the deletion may make this Tour invalid.

3. Click Apply or OK when finished. To discard changes, click Cancel.
Setting Up PTZ Tours

DW Spectrum allows to create **PTZ Tours**. **PTZ Tour** is a sequence of **PTZ Positions**. It may be useful to move from one position to another automatically in a cycle to observe large locations by a single **Camera**.

The following parameters can be configured for **PTZ Tours**:

- **Positions. Tour** can contain an unlimited number of **PTZ Positions**.
- **Stay Time** - the duration of time for **Camera** to stay on **PTZ Positions**.
- **Speed** - the speed of **Camera** moving between **PTZ Positions**.

To configure **PTZ Tours**:

1. Open **Context Menu** and select **PTZ... -> Manage**. The following window will appear:

![PTZ Tour Configuration Window]

2. Move the form aside, so that the item and its PTZ controls are fully accessible.
3. Make sure the list of positions contains a minimum of two positions.
4. Click **Create Tour**. A new item will appear in the bottom section:
5. Select **PTZ Positions** to include in **Tour**:

- To add **Position** click on "+" button
- To change, click on the desired **Position** and select another one:

- To change the order of **Positions**, select desired **Position** and use arrows on the right to move it up and down the list.
- To delete **Position** select the desired **Position** and click on "-" button.

**Note:** the following restrictions are applied to **Tours**:

- **Tour** should contain at least two **Positions**.
- It is not recommended to use the same **Positions** in a row or select the same ones for the first and last **Position**.
- Warning appears if **Tour** has two or more identical positions.
- Warning appears if **Tour** has only one positions.
6. Set *Stay Time* and *Speed* for each *Position*.

7. Test *Tour* by clicking *Start Tour* in the upper table.

8. Rename *Tour* if necessary (in the upper table) or set it as *Home Tour* (see "Home Positions and Tours for PTZ and Fish-Eye Cameras").

9. Click *Apply* or *OK* when finished. To discard changes, click *Cancel*.

### Home Positions and Tours for PTZ and Fish-Eye Cameras

DW Spectrum allows setting *Home Position* or *Tour* for any PTZ or Fisheye Camera. *Home Position* or *Tour* will be activated on *Camera* automatically in the following cases:

- If there is no active PTZ *Tour*
- If PTZ *Position* is not changed for *Camera* for 2 minutes.

To set up *Home Position* or *Tour* for *Camera*:

1. Configure the desired *Position* (see "Saving and Restoring PTZ Positions") or *Tour* (see "Setting Up PTZ Tours").
2. Open PTZ Positions and Tours management dialog:
3. Choose the desired *Position* or *Tour* on top and check *Home*.

   ☑️ **Note:** only one *Home Position* or *Tour* can be active.
4. Click *Apply* or *OK* when finished. To discard changes, click *Cancel*.

### Setting up Recording Schedule

To record *Camera*, *Recording Schedule* must be set up first.

🔍 **Note:** It is possible to configure *Cameras* for *Administrators* and *Viewers* with an appropriate *permission* level.

🔍 **Note:** To record one camera, *License* is required. See “Obtaining and Activating DW Spectrum Licenses (Admin Only)”. Even if recording is not performed immediately, the *License* will still be considered as *used*.

The recording schedule specifies the following recording parameters:

- **Recording Type:**
  - **Record Always**
  - **Motion Only** – records only when motion occurs. Motion recording may require for the camera to support motion detection.
  - **Motion + Lo-Res Always** – by default, a camera is set to record at low resolution unless motion occurs, at which point it switches recording to high resolution automatically. High resolution recording requires dual streaming (if supported by camera). See "Dual Stream Recording Specifics (RADASS)"

Motion Mask and Motion Sensitivity may need to be configured as well (see "Setting up Motion Mask and Motion Sensitivity").
• FPS
• Quality

**Note:** FPS and Quality recording settings will affect live stream viewing as well. For example, if 1 FPS and Low Quality are set in the recording schedule, DW Spectrum will stream live as per selected settings even if the camera is capable of more. If recording is not set, DW Spectrum will stream live at Maximum FPS and Quality.

Those settings are applied to Recording Schedule. See "Modifying Recording Schedule" for details.

It is possible to record I/O Modules as well (see "Setting Up I/O Modules"). In this case audio will be recorded, if a microphone is connected to the module. To enable recording it is necessary to setup Recording Schedule for I/O Module. It is similar to Camera Recording Schedule except Quality/FPS settings.

See also "Analyzing and Anticipating Storage Usage".

## Dual Stream Recording Specifics (RADASS)

Some Recording Parameters may need Motion to be supported by the Camera. Motion + Low Quality Always recording requires Dual-Streaming to be supported by Camera.

If Dual-Streaming is supported, the second stream settings are set automatically based on the main recording settings:

- 2 to 7 FPS
- 320p to 480p

Not only is the second stream used for recording, it is also used for Software Motion Detection and bandwidth and CPU saving during playback. See "Setting up Motion Mask and Motion Sensitivity" and "CPU and Bandwidth Saving during Playback (RADASS)".

If primary stream is 480p or less, it can be used for Software Motion Detection as well.

## Modifying Recording Schedule

DW Spectrum provides a powerful and flexible schedule for configuring recording parameters.

A specific date and time can be set in the recording schedule as well.

Examples:

- Workdays 8AM-8PM – record Always, 24 FPS, high quality
- Weekends and Workdays 8PM-8AM – record motion only, 10 fps, low quality

The cameras recorded by Server s are marked with a small red circle in Resource Tree:

- • – camera in recording mode
- o – camera recording is setup, though not recording at the moment (a license is still being used)

**Note:** It is possible to configure Cameras for Administrators and Viewers that have appropriate permissions. To set up Recording Schedule:
1. Select the desired Camera(s) in Resource Tree (use SHIFT or CTRL to select several) or on Scene, open Camera Settings and go to Recording:

**IMPORTANT.** If Server and Client are in different time zones the schedule displays Server Time.

2. Click `Recording` to enable. ( : enabled).

Check the number of licenses used. If the number is insufficient, click Get More Licenses and proceed with activation.

Click on **Display FPS on Grid** and **Display Quality on Grid** to show/or hide FPS and quality in grid cells. Select **Recording Mode**:

- **Record Always**
- **Motion Only** – recording will start if motion occurs. To specify a range for motion recording, use Record before motion and Record after motion selectors. Motion detection must be supported by the camera (Software or Hardware) and requires secondary(sub) stream.
- **Motion + Low Quality Always** – low quality stream is recorded always and is switched to high quality streaming once in case of any motion. To use this recording setting, make sure the camera supports dual-streaming.

If not, the following will be displayed:

_Dual-Streaming and Motion Detection is not available for this camera._

- **Do not Record**

3. Select **Recording Quality**

4. Select **FPS**

**IMPORTANT.** If making any changes to image parameters for Camera is prohibited for DW Spectrum, then FPS and Recording Quality changes will not take effect. See "Preventing DW Spectrum from Changing Camera Streaming Settings (Admin Only)" for details.

6. As soon as all the parameters are selected, click on **Schedule Grid**:

- **Click and Drag** to select multiple cells
- Click on **hour** to select an entire column
- Click on **weekday** to select an entire row
- Click **Schedule Grid's** top left corner to select all cells

**Note:** to select same values, hold **Alt** and click on the cell to choose a recording mode, FPS and values.

7. Repeat to set another recording for different cells
8. If **Motion Recording** is set, it is possible to adjust **Pre-recording** and **Post-Recording** intervals (the time range between the start and end of motion recording).

9. Click **Apply** or **OK** when finished. To discard changes, click **Cancel**.

   In case of insufficient licenses, the following warning will appear:
   
   License limit exceeded (X of Y used). Your schedule will be saved, but will not take effect
   
   **Enable Recording** flag will be disabled; however, all schedule settings will be saved.

**Example:**

- Workdays 8AM-8PM – Record Always, 24 FPS, High
- Workdays 8PM-8AM – Motion + Low Quality Always, 24 FPS, Medium
- Weekends – record motion only, 10 fps, Low

![Recording Schedule](image)

**IMPORTANT.** Make sure to apply all recording selections to the schedule once selected (recording type, FPS and quality).

**Copying Recording Schedule between Cameras**

If **Recording Schedule** is already set up on **Camera** it may be needed to copy the settings to a different one. For instance, if a new camera is plugged in it is much more convenient than set up a schedule separately.

To copy Recording Schedule:

1. Open **Camera** the schedule should be copied from, go to **Camera Settings** -> **Recording**:

2. Click on the **Copy Schedule** button. The following form will be opened:
3. Check desired **Cameras** the schedule should be copied to. To select all **Cameras** on specific **Server** check it. To filter search use the **Filter** box. Filter criteria is the same as search (see "**Search**"). If hover with a mouse cursor on **Camera**, the actual picture from this **Camera** will be displayed on the right.

   
   📚 **Note**: additional **Licenses** may be needed. See "**Obtaining and Activating DW Spectrum Licenses**" for details.

4. Click **Apply** or **OK** when finished. To discard changes, click **Cancel**.

### Configuring Maximum and Minimum Recording Days for Camera

Some governmental regulations require the footage to be stored for a specific length of days. DW Spectrum supports the ability to set up maximum and minimum recording days.

⚠️ **IMPORTANT.** Be careful with **minimum days**. These settings do not guarantee this to be kept, they just set the **priority**. So, in case of insufficient space DW Spectrum will delete the records on cameras that do not have minimum amount of footage. However if there is no space to store such amount of data, no other cameras will be recorded.

To specify minimum and maximum amounts:

1. Select the desired Camera(s) in **Resource Tree** (use **SHIFT** or **CTRL** to select several) or on Scene, open **Camera Settings** and go to **Recording**.

2. Set **Min. Days** and **Max. Days**.

### Setting up Motion Mask and Motion Sensitivity

In order to detect motion more properly and accurately, DW Spectrum provides a powerful and flexible **Motion Detection** configuration. For example, if a camera is pointed at a parking lot, motion mask can be set on all the surrounding areas that are not targeted for recording. In this case, any motion appearing in the areas surrounding the main target area, will not trigger motion detection and recording.
IMPORTANT. This particular feature in DW Spectrum works only if the selected camera supports Motion Detection.

The following Motion Detection types are supported:

- **Hardware Motion Detection** – implemented on Cameras directly. In this case only motion mask can be configured. To configure additional parameters it may be necessary to go to Camera Settings web page (see "Configuring Proprietary Device Parameters").

- **Software Motion Detection** is performed on Server. It consumes more resources, though it provides better and more flexible motion detection. In this case, it is possible to set up unlimited number of motion regions and adjust its sensitivity. Software Motion Detection requires Dual-Streaming supported by Camera. If supported, Software Motion Detection is set automatically (excluding Arecont Vision cameras). If primary stream is 480p or less, it can be used for Software Motion Detection as well.

IMPORTANT. Software motion detection is performed on Server side. Server analyzes secondary stream from Camera and detects motion. For this purpose it needs to perform decoding. Thus, if the secondary stream is high-resolution one, it may consume all the Server CPU. To fine tune this, see "Forcing Software Motion Detection on Specific Stream".

To set up Motion Detection:

1. Open Camera Settings and go to Motion:
   - If red zones appear on the grid during motion, Motion Detection is supported. Red cells indicate the level of motion (the higher the motion level, the brighter the cells).
2. Select the type of motion detection (Hardware or Software). If none are active, the camera does not support Motion Detection at all.
3. Select Sensitivity on the slider. 0 is motion mask (minimal sensitivity, motion will not be detected on the selected region); 9 is the highest sensitivity.
4. Select the desired regions the sensitivity will be applied to:
   - Click and Drag to select a single region
   - Ctrl + Click and Drag to add another region
   - Click on a region to fill it with desired sensitivity
   - To set Motion Mask just Click and Drag. There is no need to adjust Motion Sensitivity.
5. Repeat for each desired sensitivity. Use Reset Motion Regions to start over.
The above picture illustrates the following:

- the area marked in grey will not capture motion (Motion Mask)
- the green area will capture motion with very low sensitivity
- top right and bottom left corners will capture motion with standard sensitivity
- for other regions, the sensitivity will be high.

6. Click Apply or OK when finished. To discard any changes, click Cancel.

It is possible to set up motion directly from camera’s web page. For this purpose, use Camera Web Page link on the Motion tab.

### Configuring Proprietary Device Parameters

DW Spectrum allows configuring basic image settings inside the software. These settings are available for Onvif-compliant devices only.

Additionally, DW Spectrum allows displaying native device web page inside the software (approved models only).

🔍 **Note:** It is possible to configure Devices for Administrators and for Viewers that have the appropriate permissions.

To go to proprietary device settings:

1. Open Device settings and select Advanced.
2. Configure desired Device Parameters:
If DW Spectrum supports the specific Device, it displays Device Web Page inside this tab.
Other proprietary device parameters such as Authorization, Network Settings etc. can be configured directly from device’s web page.

1. Open Camera settings and select General tab.
2. Enter Authentication Parameters if the device requires authentication (Admin only).
3. Click on Web Page. The browser will open device’s web page.

Web page may be inaccessible because it can be located on a different network. To check device accessibility, press the Ping button prior to opening the web page.

Additionally, the following can also be performed:

- Resetting Camera
- Upgrading Camera’s Firmware

### Resetting Camera

DW Spectrum allows for cameras to be reset to factory defaults. These settings are available for Onvif-compliant cameras only.

Note: It is possible to configure Cameras for Administrators and Viewers with an appropriate permission level.

To go to proprietary camera settings:

1. Open Camera settings and select Advanced.
2. Go to Maintenance.
   
   Note: If the list is empty, Camera does not support configuring (not Onvif-Compliant).
3. Choose one of the following:
   
   - System Reboot – reboot Camera and save settings
   - Soft System Factory Default – reboot Camera and restore all settings related to the image
   - Hard System Factory Default – reboot Camera and restore all settings (Network, Authorization, etc).

The reboot is performed instantly once selected.

It is also possible to reboot Camera from its Web Page. See "Configuring Proprietary Device Parameters".

### Upgrading Camera’s Firmware

DW Spectrum allows for Cameras Firmware upgrade from within the application. These settings are available for supported Digital Watchdog cameras only.

Note: It is possible to configure Cameras for Administrators and Viewers with an appropriate permission level.

IMPORTANT. To enable this feature, Camera must have Internet Access.

To go to proprietary camera settings:

1. Open Camera settings and select Advanced
2. Go to Maintenance → Firmware Upgrade

Note: If the list is empty, Camera does not support configuring (not Onvif-Compliant).

3. Click on Check Upgrade. The coordinates of Digital Watchdog FTP Server (Address, Port, Login and Password) are predefined.

4. If a camera has Internet access, the application will check for any available upgrades automatically.

5. If a newer version of firmware is found, click OK to run upgrades. The application will automatically reboot once upgrades are completed.

It is possible to upgrade Camera Firmware from its Web Page. See "Configuring Proprietary Device Parameters" for details.

Working Around Device Issues (Expert Settings)

DW Spectrum provides expert settings that can work around some issues on device side.

十分重要。These are expert settings. Improper configuration may lead to serious System malfunction!

- Preventing DW Spectrum from Changing Camera Streaming Settings (Admin Only)
- Setting Up Camera Transport Protocol
- Forcing Software Motion Detection on Specific Stream
- Adjusting Average Bitrate on Device
- Disabling Recording of Primary/Secondary Stream
- Adjusting Secondary Stream Quality.

Preventing DW Spectrum from Changing Camera Streaming Settings (Admin Only)

Once Camera is discovered, DW Spectrum attempts to configure the following settings on Camera: the best possible image quality for the main video stream (best possible resolution and FPS) and optimal quality for the secondary stream.

In some cases it may be necessary to set up custom stream settings on Cameras. DW Spectrum allows this as well.

十分重要。In this case DW Spectrum can record Camera with specified settings only. It will not be possible to set up FPS and Quality when configuring Recording Schedule (see "Modifying Recording Schedule").

To disable automatic adjustment for one or multiple Cameras:

1. Stop recording of the desired Cameras and close them.
2. Select one or multiple Cameras, then open Camera Settings and go to Expert.
3. Check I have read the manual and understand the risks.
4. Check Keep camera streams' and profiles' settings.
5. Click Apply or OK when finished. To discard changes, click Cancel.

Afterward it is necessary to open Web Page and set all desired image settings (FPS, quality and resolution) for High quality and low quality streams. Those settings won't be adjusted by DW Spectrum. Those steps are necessary for each Camera that needs to be configured manually.
To disable automatic adjustment for all **Cameras**:

1. Disable recording for all cameras and close them (if opened for viewing).
2. For each **Camera** go to its **Web Page** and set desired image settings.
3. Open **Main Menu** and go to **System Administration** → **General** tab.
4. Remove **Allow system to optimize cameras settings** flag.
5. Click **OK** when done or **Cancel** to discard changes.

This setting influences on the following ones:

- Adjusting Average Bitrate on Device
- Adjusting Secondary Stream Quality

**Setting Up Camera Transport Protocol**

Some cameras stream data in a different way. Usually 2 protocols are used for streaming: **UDP** (faster, but less reliable) and **TCP** (more reliable, but slower). DW Spectrum tries to determine the best protocol for the camera. However, sometimes camera may have issues when streaming via the chosen protocol. In this case setting the protocol manually may help.

To do so:

1. Open **Camera Settings** and go to **Expert**.
2. Check **I have read the manual and understand the risks**.
3. Choose **RTP Transport** and click **OK** or **Apply**.
4. Restart the camera.
5. If the changes do not help, choose a different protocol and restart once more.

**Forcing Software Motion Detection on Specific Stream**

DW Spectrum provides the **Software Motion Detection** feature. It is performed on the **Server** side. Server analyzes secondary stream from Camera and detects motion. For this purpose it needs to perform decoding. Thus, if the secondary stream is high-resolution one, it may consume all the Server CPU.

Sometimes specific cameras report their configuration incorrectly and swap primary and secondary streams. **Server** considers Hi-Res stream as a secondary-one and tries to decode it, resulting in high CPU load. To avoid this, it is possible to force Software Motion Detection on Specific Stream.

To do so:

1. Open **Camera Settings** and go to **Expert**.
2. Check **I have read the manual and understand the risks**.
3. Choose **Force motion detection for stream (Primary or Secondary)**.
4. Restart the camera.

**IMPORTANT.** Adjusting these settings may seriously affect the Server performance!
**Adjusting Average Bitrate on Device**

When the software tries to configure target bitrate on some camera models it can be set up incorrectly. This may result in poor image quality.

To workaround this issue it is possible to adjust Average Bitrate on Device:

1. Open [Camera Settings](#) and go to *Expert*.
2. Check *I have read the manual and understand the risks*.
3. Choose *Calculate Bitrate per GOP instead of bitrate per second*.
4. Restart the camera.

⚠️ **IMPORTANT.** If this option is set by mistake, this will significantly increase bitrate! Use it only if the picture quality is noticeably poor.

This setting is ignored if DW Spectrum is configured to not [change Camera Streaming Settings](#).

**Disabling Recording of Primary/Secondary Stream**

For some reasons it may be necessary to disable recording of primary or secondary streams. For instance:

- **Primary** – to save space. Instead it is recommended to set *"Motion + LQ" recording type*
- **Secondary** – if secondary stream’s bitrate is too high. In this case DW Spectrum server will still do software motion detection (by decoding a secondary stream for this purpose), but won't record it.

To disable recording of primary or secondary streams

1. Open [Camera Settings](#) and go to *Expert*.
2. Check *I have read the manual and understand the risks*.
3. Tick *Do not archive primary stream or Do not archive primary stream*.

**Adjusting Secondary Stream Quality**

DW Spectrum’s architecture provides significant CPU and network bandwidth savings by acquiring multiple streams from a single camera: **High Resolution** (regular) and **Low Resolution** (approximately x10 less bandwidth). The second stream is always decoded by Server and is used for the following:

- Software Motion Detection
- **CPU and Bandwidth Saving during Playback (RADASS)**

The quality of the second stream is set automatically, however, it is possible for [User](#) to adjust the quality of the stream.

⚠️ **IMPORTANT.** Higher quality of the second stream provides for a much better look and feel (especially on larger monitors), but can significantly increase CPU load on Server. It is not recommended to change these settings.

To adjust the quality of the second stream:

1. Open [Camera Settings](#) and go to *Expert*.
2. Check *I have read the manual and understand the risks*. 
3. Click **Override secondary stream quality**.
4. Use slider to adjust quality.
4. Click **Apply** or **OK** when finished. To discard changes, click **Cancel**.

![Note:](image)

If **Camera** does not support dual-streaming, the above settings are unavailable.

This setting is ignored if DW Spectrum is configured to not **change Camera Streaming Settings**.

### Setting Same Parameters for Multiple Devices

In order to simplify the configuration process, DW Spectrum enables users to apply same parameters to more than one device at a time.

The following can be performed as a batch:

- **Authentication** setup
- **Schedule** configuration

To set the same parameters for multiple **Devices**:

1. Use **Multi-Selection** to select desired devices:
   - In **Resource Tree**, hold **Ctrl** or **Shift** and Click
   - On **Scene** – use **Ctrl** and Click
2. Open **Context Menu** and go to **Device Settings**.
   - If the selected devices share the same **Authentication Credentials**, they will be displayed.
   - If the selected devices share the same **Recording Settings**, they will be displayed.
   - If the selected devices have different **Enable recording** field values, the field will be displayed as follows:

```
Recording [ ]
```

3. Set the desired parameters and click **Apply**.
   - If needed, a user can add a device to the selection by holding the **Ctrl** button and clicking on the desired device in **Resource Tree**.
   - To set up another device, select the desired device in **Resource Tree**. It is not necessary to close the settings dialog.
   - If the changes are not applied, the warning message will appear.
4. When finished, press **OK** to apply or **Cancel** to discard settings.

### Swapping Devices between Servers (Admin Only)

If too many devices are used on the network, it may be helpful to set up an additional server for load balancing and redundancy purposes. If several servers are set up on the same network, it is possible to perform **manual load-balancing**.

**IMPORTANT.** When moving **Device** from one Server to another, recording will be restarted automatically (with predefined parameters). Also, **Archive** is seamlessly **combined** from all servers.
To move device(s) from one server to another:

1. Hold **Ctrl** or **Shift** to select the desired devices in **Resource Tree**
2. **Drag and drop** the selected devices to the desired server

⚠️ IMPORTANT. In order to be able to see video from **Device** on a new Server, the devices must be accessible and discovered by this server. Otherwise it will be displayed offline.

Also devices may be swapped automatically during failover. If Server failure occurs, all Cameras can be moved to other Servers automatically. See "Configuring Failover".

**Deleting Devices (Admin Only)**

To delete **Device**(s):

1. Expand the **Server** hosting the desired server in **Resource Tree**.
2. Find and select **Device**.
3. **Right-Click** for **Context Menu** and choose **Delete** (or the **Del** button on a keyboard).
4. Click Yes to confirm.

🔍 **Note**: If **Device** is online it will be auto-discovered again in some time (this doesn't apply to devices that have been added manually). To avoid this either unplug the device or disable **automatic device discovery**.

If **Device** is back online, it will start working immediately. Recorded archive will be available as well; however, a user will need to reconfigure **Device** as its settings have been erased. To prevent this from happening, **User** must disable automatic discovery. See "Disabling Automatic Discovery (Admin Only)" for details.

If Camera is disconnected, then the archived footage on this Camera becomes unavailable. However it can be restored. See "Viewing Archive from Deleted Cameras".

**Configuring Events and Actions (Admin Only)**

DW Spectrum provides powerful and flexible event bus than can be used for simple and intuitive programming of any algorithm.

Algorithms are a set of **Rules**. Each **Rule** is a combination of **Event-Action**. As soon as **Event** is fired up, DW Spectrum triggers the appropriate **Action**.

The following events and actions are supported:

**Events:**
- Setting up Schedule for Tracking Events
- Motion on Camera
- Device Disconnected
- Storage Failure
- Network Issue
- Camera IP Conflict
- Server Failure

**Actions:**
- Notifications
- Visual Event Indication
- Mail Notifications
- Start Recording on Camera
- Start Panic Recording
- Trigger Output on Device
Every Event that has occurred is automatically saved in system's Event Log. If no Rules are active, only system issues will be saved. See "Viewing Events Log" for details.

**IMPORTANT.** Some default Rules are already configured. See "Default Rules" for details. It is possible to reset all Rules configurations to default settings. To reset, click on Restore all Rules to Default and Apply or OK. All previously configured Rules will be discarded.

To configure Rules:

1. Do one of the following:
   - To configure Global Rules: open System Administration and press Alarm/Event Rules button on the General tab (or press CTRL + E). It is possible to configure Rules for specific Device(s). To proceed, type the desired Device name, IP or MAC address into the Filter box. Only Rules that are applied to a corresponding Device will be displayed.
   - To configure Rules for a single Device: open Device's Context Menu and select Device Rules or open Device Settings, then click Device Rules...

The following dialog will open:
2. To add a new Rule, click Add. To delete an existing one, click Delete.

3. Once added, Rule should be configured.
   - Select Event on the left-hand side that needs to be monitored. See "Tracked Events" for more information
   - Select Action on the right-hand side that needs to be performed once Event occurs. Refer to "Actions" for details
   - Specify basic parameters for Event and Action. Click on Source or Target column in the Rule row and choose the desired value.
     **IMPORTANT.** If some fields are missing or incorrect, Rule is considered invalid. In this case, it will turn red:

   - Set Aggregation period. Once set, all Actions will be executed once per the specified period. If not, Actions will be executed every time Events occur. Applies to Notifications, Mail Notifications, Play Sound, Speak.
   - If any additional configuration is needed, click Advanced... The advanced settings will be displayed on the bottom. Those settings differ from each other depending on Events/Actions that are being configured. See this chapter for more information on a specific Event/Action.
   - Add Comments for Rule if needed.

4. Set or clear the flag (on the left-hand side of each Rule) to enable or disable it.

5. As soon as all configurations are done, click Apply to accept changes or Cancel to discard. Click OK to apply changes and close the form.

**IMPORTANT.** If any Rule is considered invalid, the warning displayed below will appear. If apply the changes, incorrect Rules will be disabled.
Tracked Events

DW Spectrum can react as soon as a particular Event occurs.

There are 2 types of Events:

- **Continuous** – occur continuously (for instance, Motion)
- **Instant** – occur once (for instance, Server Failure or Network Issue).

 Depending of Event Types there are different algorithms to handle them. Certain Actions can be bound to a certain types of Events. Every tracked event may have its own parameters. Refer to the particular Event description for more information:

- **Continuous**
  - Motion on Camera
  - Generic Event
  - Input Signal on Device

- **Instant**
  - Device Disconnection/Malfunction
  - Storage Failure
  - Network Issue
  - Camera IP Conflict
  - Input Signal on Device
  - Server Failure
  - Server s Conflict
  - Server Connection Lost
  - Licenses are not Configured
  - E-mail is not Set for Users
  - E-Mail Server is not Configured
  - Storage is not Configured
  - Server Started
  - Archive Backup Finished.

As soon as Event occurs, the **Action** can be performed. See "Actions".

Additionally, **Events** can be tracked based on the schedule. For instance, **Motion** can be tracked only on weekends and **Input Signal** – at 8PM-8AM. See "Setting up Schedule for Tracking Events" for details.

Finally, all **Events** are recorded in **Log**. See "Viewing Events Log" and "Write to Log".
Setting up Schedule for Tracking Events

Events can be tracked based on the schedule. For instance, Motion can be tracked only on weekends and Input Signal – at 8PM-8AM.

The schedule can be configured as advanced parameters for the desired Event:

1. Open Event Advanced Parameters by clicking on Advanced on the Alarm/Event Rules form. The advanced settings will be displayed on the bottom.
2. Click on Schedule... The following form will be displayed:

![Schedule Form]

3. Select On or Off to enable/disable monitoring in particular cells.
4. Click on Schedule Grid:
   - Click and Drag to select multiple cells
   - Click on hour to select an entire column
   - Click on weekday to select an entire row
   - Click Schedule Grid's top left corner to select all cells

The above example shows that the event is tracked on workdays (Sun-Fri) since 8AM till 8PM.

By default, events are always tracked.

Motion on Camera

Occurs if motion is detected on Camera(s).

Basic Parameters

Camera(s) motion is detected on. To specify:
1. Click on Any Camera at the desired row on the Alarm/Event Rules form (see "Configuring Events and Actions (Admin Only)"). The following form will appear:

![Select Cameras... - DW Spectrum Client](image)

2. Check the cameras to detect motion, then click OK (Cancel will discard changes).

To select all Cameras on a specific Server, set the flag on it. To filter search, use the Filter box. Filter criterias are the same as search (see "Search"). It is possible to Drag'n'Drop the selected Cameras from Resource Tree onto the Event's advanced settings form.

⚠️ IMPORTANT. To detect motion, recording must be enabled on Camera. Refer to "Modifying Recording Schedule" for information on how to enable recording. If the selected Camera is not being recorded, then the corresponding message will be displayed (see above).

If cameras are not specified, motion will be detected on all the cameras that support it.

Advanced Parameters

Schedule (see "Setting up Schedule for Tracking Events").

Starts/Stops. Available only for instant actions (Send Mail, Show Notification, Camera Output). If no motion occurs for 3 seconds, the current motion Event is considered stopped. When motion occurs again, a new motion Event is generated.

May result in

- Camera Recording.
- Panic Recording.

These actions are performed while motion is taking place on at least one camera out of the selected.
Send Mail.
Show Notification.
Camera Output.

These actions will be performed if motion is detected on at least one camera out of the selected.

Why Event may work incorrectly

Recording is disabled for Camera(s) that are being monitored. Refer to "Modifying Recording Schedule" for information on how to enable recording for Camera.
Motion Mask is not set properly. See "Setting up Motion Mask and Motion Sensitivity".
Too many Cameras are monitored and too many Events occur.
Cameras that are monitored are offline.
Action is not configured properly. See the Action's description for details.
Notifications for this type of Event is hidden in system settings. See "Notifications" for more details.

Device Disconnection/Malfunction

Occurs if Device(s) is/are disconnected for whatever reason (network, Device malfunction etc.). Device is considered disconnected if no data is received for 10 seconds. Once data is received from Device, the status is automatically changed back to Online.

If Device is experiencing network issues over a minute, then ı appears within Resource Tree.

Additional Events may occur as well and may help to investigate the issue:

- **Network Issue.** This means that network is unable to transfer data between Device and Server, which may be the reason why a device goes offline.
- **Server Failure.** If Server is down, all hosted Devices drop offline.
- **Camera IP Conflict.** If another Camera with the same IP enters the network, one of these two Cameras will go offline.
- **Server s Conflict.** If a new Server is connected to another Server on the same network and pulls data from the same Cameras, then some Cameras may drop offline because they may not provide several streams simultaneously.

Basic Parameters

Device(s). To specify:

1. Click on Any Device at the desired row on the Alarm/Event Rules form (see "Configuring Events and Actions (Admin Only)"). The following form will appear:
2. Check the devices to track, then click OK (Cancel will discard changes).

To select all Devices on a specific Server, set the flag on it. To filter search, use the Filter box. Filter criteria are the same as search (see "Search"). It is possible to Drag'n'Drop the selected Devices from Resource Tree onto the Event's advanced settings form.

If Devices are not specified, all Devices will be monitored.

**Advanced Parameters**

Schedule (see "Setting up Schedule for Tracking Events").

**May result in**

- Send Mail.
- Show Notification.
- Device Output.

**Why Event may work incorrectly**

Too many Devices are monitored and too many Events occur.

- Devices being monitored are offline.
- Action is not configured properly. See the Action's description for details.
- Notifications for this type of Event is hidden in system settings. See "Notifications" for more details.
**Storage Failure**

Occurs if **Server** is unable to write data on one or more **Storage**. This may be caused by 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 recorded and hard disk cannot record on such speed. It may be useful to add another hard disk drive.
- **Disk is full**. By default, **Server** writes data to disk in a circular pattern: as soon as free disk space falls below 5 Gb, oldest data will erase automatically. However, if the disk is full by any foreign data and free space is less than 5 Gb, **Server** writes data on disk and erases it immediately. In this particular case, the following **Event** occurs.

If no **Storage** are selected to write to, **Storage is not Configured** is fired up.

**Basic Parameters**

None

**Advanced Parameters**

Schedule (see "Setting up Schedule for Tracking Events").

**Why Event may work incorrectly**

Notifications for this type of **Event** is hidden in system settings. See "Notifications" for more details.

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**Network Issue**

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. **Camera Disconnected** event is then generated in this particular case.

**Basic Parameters**

None

**Advanced Parameters**

Schedule (see "Setting up Schedule for Tracking Events").

**Why Event may work incorrectly**

Notifications for this type of **Event** is hidden in system settings. See "Notifications" for more details.

---

**Device IP Conflict**

Occurs if another **Device** with the same IP has entered the network, resulting in one of these two **Devices** to go offline. **Camera Disconnected** event is then generated in this particular case.

**Basic Parameters**
Advanced Parameters

Schedule (see "Setting up Schedule for Tracking Events").

Why Event may work incorrectly

Notifications for this type of Event is hidden in system settings. See "Notifications" for more details.

Input Signal on Device

Occurs if input signal is detected on Device(s). DW Spectrum may detect input signals on the following Devices:

- ONVIF-compliant (input support via ONVIF may vary from Device to Device)
- Axis.

Basic Parameters

Device(s) the input signal is detected on. To specify:

1. Click on Any Device at the desired row on the Alarm/Event Rules form (see "Configuring Events and Actions (Admin Only)").:

Note: Devices that do not support input, are highlighted in red.

2. Check the Devices to detect input, then click OK (Cancel will discard changes).
To select all Devices on a specific Server, click on the check box. To filter search, use the Filter box. Filter criteria are the same as search (see "Search"). It is possible to Drag’n'Drop the selected Devices from Resource Tree onto the Event’s advanced settings form.

⚠️ IMPORTANT. To detect input signals, input must be supported on Device. If the selected Device does not support input, then the corresponding message will be displayed (see above).

If the particular Devices are not specified, then input signal will be detected on all the Devices that support input.

**Advanced Parameters**

Schedule (see "Setting up Schedule for Tracking Events").

Starts/Stops. Available only for instant actions (Send Mail, Show Notification, Device Output etc).

Input ID – I/O Module port to take signal from (see Setting Up I/O Moduless).

**May result in**

- Camera Recording.
- Panic Recording.

These actions will be performed while input signal is taking place on at least one Device out of the selected.

- Send Mail.
- Show Notification.
- Device Output.

These actions will be performed once input signal is detected on at least one Device out of the selected.

**Why Event may work incorrectly**

Too many Devices are monitored and too many Events occur.

Devices that are being monitored are offline.

Action is not configured properly. See the Action's description for details.

Notifications for this type of Event is hidden in system settings. See "Notifications" for more details.

**Server Failure**

Occurs if Server is down (either hardware/software issue or manual shutdown). In this case, all Devices hosted on Server are dropped offline.

**Basic Parameters**

None

**Advanced Parameters**

Schedule (see "Setting up Schedule for Tracking Events").

**Why Event may work incorrectly**

Notifications for this type of Event is hidden in system settings. See "Notifications" for more details.
Servers Conflict

Occurs if a new Server is connected to another Server on the same network and pulls data from same Devices. In this case, some Devices may drop offline because they may not provide several streams simultaneously. This results in Device Disconnection/Malfunction Event. Message contains the specific list of devices that are used by both servers.

Basic Parameters
None

Advanced Parameters
Schedule (see "Setting up Schedule for Tracking Events").

Why Event may work incorrectly
Notifications for this type of Event is hidden in system settings. See "Notifications" for more details.

Server Connection Lost

Occurs if connection to Server is lost for whatever reason (network issue or Server is down). In this case Client tries to connect to another Server (if in multi-server environment) or reconnect to the current Server.

If User clicks on the notification, then login dialog will automatically open. See "Connecting to System and Working Offline".

This notification will hide automatically as soon as the connection is restored.

Why Event may work incorrectly
Notifications for this type of Event is hidden in system settings. See "Notifications" for more details.

Licenses are not Configured

Occurs if no Licenses are activated. In this case, Notification is displayed.

In this case, it is not possible to record Cameras and view Analog Cameras.

If User clicks on the notification, then license dialog will automatically open. See "Obtaining and Activating DW Spectrum Licenses".

This notification will hide automatically as soon as one License is activated.

Why Event may work incorrectly
Notifications for this type of Event is hidden in system settings. See "Notifications" for more details.

License Issue

Occurs if Server Licenses are activated on, went offline. In this case, Notification is displayed every 30 seconds.

In this case, it is not possible to record Cameras and view Analog Cameras.
If User clicks on the notification, then license dialog will automatically open. See "Obtaining and Activating DW Spectrum Licenses".

This notification will hide automatically as soon as one License is activated.

**Why Event may work incorrectly**

Notifications for this type of Event is hidden in system settings. See "Notifications" for more details.

**E-mail is not Set for Users**

Occurs if E-Mail address is not set up:

- **Viewer** is notified if an email address is not configured.
- **Administrator** is notified if a User does not have an email address specified.

In this case, Notification will be displayed.

If click on the notification, User's mail settings dialog will open. See "Changing User Settings".

If User does not have an e-mail address, that user is unable to receive mail notifications.

This notification will hide automatically as soon as all email addresses are configured (for Admin) or individual email address is set (Viewer).

**Mail Notifications** may not work if E-Mail Server is not configured. In this case, Error while Sending E-Mail notification will appear.

**Why Event may work incorrectly**

Notifications for this type of Event is hidden in system settings. See "Notifications" for more details.

**E-Mail Server is not Configured**

Occurs if E-Mail Server is not configured. In this case, Notification is displayed.

If E-Mail Server is not configured, mail notifications cannot not be sent.

If click on the notification, Mail Server settings dialog will open. See "Mail Notifications" for details.

This notification will hide automatically as soon as all E-Mail Server parameters are configured.

**Mail Notifications** may not work if E-mail is not Set for Users. In this case, Error while Sending E-Mail notification will appear.

**Why Event may work incorrectly**

Notifications for this type of Event is hidden in system settings. See "Notifications" for more details.

**Error while Sending E-Mail**

Occurs when E-Mail Notification fails. In this case, Notification is displayed.
If click on the notification, Mail Server settings dialog will open. See "Mail Notifications" for details.

Storage is not Configured

Occurs if no **Storage** are selected (recording flag might have been removed accidentally).

In this case, **Notification** is displayed.

If **Storage** are not configured, it is not possible to record **Cameras**.

If click on the notification, storage configuration dialog will open. See "Configuring Server Storage/NAS".

This notification will hide automatically once **Storage** has a recording flag set up.

**Why Event may work incorrectly**

Notifications for this type of **Event** is hidden in system settings. See "Notifications" for more details.

Server Started

Occurs when any Server registered in the system has started.

**Basic Parameters**

None

**Advanced Parameters**

Schedule (see "Setting up Schedule for Tracking Events").

**Why Event may work incorrectly**

Notifications for this type of **Event** are hidden in system settings. See "Notifications" for more details.

Archive Backup Finished

Occurs when Archive Backup is done. Does not occur if Archive Backup is set up to perform in Real-Time. See "Configuring Redundant Storage (Storage Backup)" for details.

**Basic Parameters**

None

**Advanced Parameters**

Schedule (see "Setting up Schedule for Tracking Events").

**Why Event may work incorrectly**

Notifications for this type of **Event** are hidden in system settings. See "Notifications" for more details Backup is set up to Real-Time mode.
**Generic Event**

Occurs when Server receives a special **HTTP Request** from an external system. For instance, it may be access control system or alarm/monitoring system. Each request contains the following fields:

- Source
- Caption
- Description.

Also HTTP Request may contain the "State" field. If specified, the event is considered as **continuous**. For instance, it is possible to set up the following **Rule**: while Generic Event occurs, Camera 1 is recording. In this case, if Server receives Generic Event that contains State=Start, Camera 1 will start recording and will be recorded until Server receives Generic Event that contains State=Stop.

If there is no "State" field in HTTP request, Generic Event is considered as **instant**. If any of continuous actions (Camera Recording, Camera Output, Panic Recording or Repeat Sound) is bound to this Event, the Rule will not work.

See "**Tracked Events**" for more information about continuous and instant Events.

The format of HTTP requests is documented in API that available on the Server's web page (see **Using Server's Web Interface**).

DW Spectrum can also send the HTTP request if an event occurs. See "**Perform HTTP Request**".

**Basic Parameters**

- Source
- Caption
- Description.

The fields in HTTP request should match the corresponding fields in Event settings (case matters). If a string is empty, the field always matches. For instance, Event may be configured in the following way:

- Source – "foo"
- Caption – "bar"
- Description – "" (empty).

In this case HTTP Request with the following data will trigger Generic Event:

- Source – "foo12345" (contains "foo")
- Caption – "bartender" (contains bar)
- Description – "Lorem ipsum dolor sit amet" (empty string makes all values match).

HTTP Request with the following data will NOT trigger Generic Event:

- Source – "Foo12345" (contains "Foo" instead of "foo")
- Caption – "batender" (does not contain "bar")
- Description – "Lorem ipsum dolor sit amet" (empty string makes all values match).

**Advanced Parameters**
Schedule (see "Setting up Schedule for Tracking Events").

Why Event may work incorrectly

HTTP request is malformed. Check Server API
Request is filtered out. Try to clear all fields (Source, Caption, Description) and trigger HTTP request once more
HTTP Request does not contains the "State" field and a continuous type of Action is bound to it (Camera Recording, Camera Output, Panic Recording or Repeat Sound)
Notifications for this type of Event are hidden in system settings. See "Notifications" for more details.

Actions that DW Spectrum Can Do

DW Spectrum reacts differently to each Event. The result is called Action. Each Action that is fired up by the software may have its own parameters. Refer to the particular Action description for more information:

- Actions that DW Spectrum Can Do
- Notifications
- Visual Event Indication
- Showing Cameras on Alarm Layout
- Mail Notifications
- Start Recording on Camera
- Start Panic Recording
- Create Bookmark
- Trigger Output on Device
- Play Sound
- Repeat Sound
- Speak
- Execute PTZ Preset
- Display text on Cameras
- Perform HTTP Request
- Write to Log.

See "Tracked Events" for detailed information on Events.
Notifications

DW Spectrum provides a powerful notification mechanism for notifying Users of Events that occur. When Event occurs, right Panel starts blinking (the color varies depending on the importance of the notification). Notification Types:

- **System Messages** (red) – something is not properly configured. Can be fixed.
- **Warnings** (orange) – critical event (Device disconnected, Server failure, etc).
- **Notifications** (green) – non-critical events (motion, input signal, etc).

If a user opens the panel, the following will be displayed (on the right):

It is possible to perform the following:

- **Obtain additional information** by hovering over the notification with a mouse cursor. The information will appear on the left:
  
    - **Motion Detection** and **Input Signals** – the frame from Camera the Event occurred at and additional information. Click on the notification or additional information to open Camera to view its archive for event specifics.
  
    - **Network Issue on Device** – the last frame received from Device and additional information. Click on the notification or additional information to open Device Settings.
  
    - Issues related to System Messages – additional information. Click on the notification to go to the appropriate dialog.

When clicking on notification or detailed information, the corresponding action will be performed:

- **Motion or Input on Camera** – Camera will be opened in a new Tab.
- **Device IP Conflict** – Device’s Web Page will be opened in a browser
- **Device Network Issue** – Device’s Settings form will be opened
- **Server Failure or Storage Issue** – Server Settings form will be opened
- **E-Mail Issue** – E-Mail Server Settings form will be opened
- **License Issue** – License Form will be opened
- **Connection is Lost** – connection dialog will be opened
- **Server Conflict** – no action
- **Generic Event** – no action

**Close the notification.** Either Right Click or hover over with a mouse cursor to obtain additional information and click on the cross sign in the top right corner. Green and yellow notifications will eventually disappear.

- **View** [Event Log](#). Click on  
- **Go to** [Event Settings](#). Click on  

**Show/Hide notifications of this particular type.** Click on  or [Open Main Menu](#) and go to **Local Settings** → **Notifications**:

Select notifications types that should be displayed. Click **Apply** or **OK** when finished. To discard changes, click **Cancel**.

**Basic Parameters**
Type of **Users** notifications are displayed to:

- All users
- Administrators only.

**Advanced Parameters**

Aggregation (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**

- Some notifications are disabled.
- **Event** is not configured properly. See **Event** description for details
- Too long interval of action is set. Try "instant".

**Visual Event Indication**

If too many Devices are opened at the same time, it becomes very difficult to locate a specific Device when Event occurs. DW Spectrum provides a powerful and intuitive way to highlight a specific object on Scene if **Event** occurs:

The following **Events** are indicated:

- **Motion on Camera**, **Network Issue**, and **Input Signal on Device** – visualization on **Camera**
- Server Issue – visualization on **Server Monitoring Widget** if Server is being monitored (see "Monitoring Servers (Admin Only)").

The action is always enabled and does not require configuration.

See also "Showing Cameras on Alarm Layouts".
Showing Cameras on Alarm Layout

DW Spectrum provides the ability to dynamically create Alarm Layouts. They allow bringing specific Cameras to User's attention when a specific Event occurs. In this case a dynamic layout is created and the corresponding cameras are placed on it. This layout is displayed in the following way:

For instance, Rule can be configured as follows: if motion occurs on cameras 1 or 2, cameras 2, 3 and 4 will be placed on Alarm Layout.

Basic Parameters

Camera(s) to show on Alarm Layout. To specify:

1. Click on Select at least one camera in the desired row on the Alarm/Event Rules form (see "Configuring Events and Actions (Admin Only)"). The following form will appear:

2. Check the cameras to display, then click OK (Cancel will discard changes).

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 (see "Search"). It is possible to Drag'n'Drop the selected Cameras from Resource Tree onto the Action's advanced settings form.

Advanced Parameters
Aggregation (Interval of action): no more than once per certain amount of time (to reduce the amount of events), or instant.

Users to show alarm to – it is possible to show Alarm Layout to certain Users. If several Events are configured to show different Cameras on 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 alarm layout for different Users, each User will see the separate Alarm Layout.

Force Alarm Layout opening – if checked, when Event occurs Alarm Layout will show up immediately. If not, the Alarm Layout will be created, but the user will still be watching the current layout and will be able to switch to Alarm Layout.

Also show source camera – available only if Event is bound to Cameras. If checked, when Event occurs Alarm Layout will contain camera that created Event. For instance, if Rule is set up to show Cameras 2 and 3 and if motion occurs on Camera 1, Alarm Layout will contain Cameras 1, 2 and 3. If unchecked, it will contain only Cameras 2 and 3.

May be caused by

All Events.

Why Action may work incorrectly

Alarm Layout is not showing to a certain User

Event is not configured properly. See the Event description for details

Too long interval of action is set. Try "instant".

Mail Notifications

DW Spectrum can send E-mails to Users or to additional addresses when Events occur.

⚠️ IMPORTANT. E-mails cannot be sent if E-Mail Server is not configured. In this case, E-Mail Server is not Configured notification is shown up. See "Configuring Mail Server for E-Mail Notifications" for more details.

Basic Parameters

Users the E-Mails should be sent to:

To filter search, use the Filter box. Filter criteria is the same as search (see "Search"). It is possible to Drag'n'Drop selected Users from Resource Tree onto Action's advanced settings form.

⚠️ IMPORTANT. E-Mails will be sent to Users' E-Mail addresses. If E-Mail address is not configured for User, then the user cannot receive E-Mails (see above). E-mail is not Set for User notification is generated in this case. See "Changing User Settings" for information on how to set up E-Mail for User.

⚠️ Note: To send E-Mails to additional addresses, see advanced parameters.

Advanced Parameters
**Additional Recipients** – additional E-Mail addresses to send notifications to. Several recipients must be separated by the ";" symbol.

**Aggregation** (Interval of action): no more than once per certain amount of time (to reduce the amount of events), or instant.

**Note**: Click on *Global Email Settings* to configure E-Mail Server parameters.

As soon as event occurs, a mail notification is sent as follows:

```
PRACK-S3
DW ADMIN
dwadmin@yahoo.com
```

**Motion on Camera DW-PZV2M72T**

93 times, first: 7/3/17 2:36 AM

- [Play archive from the local network](#)
- [Play archive from the web](#)

**May be caused by**

- All Events.

**Why Action may work incorrectly**

- Event is not configured properly. See Event description for details.
- Too long interval of action is set. Try "instant".
Configuring Mail Server for E-Mail Notifications

In order to send Mail Notifications on Events, E-Mail Server should be configured. To configure E-Mail Server:

1. Open Main Menu → System Administration (CTRL+ALT+A) and switch to the Email tab.
2. Choose quick or advanced E-Mail Server setup (see below for reference).
3. When finished, press OK to apply or Cancel to discard settings.

Quick E-Mail Server Setup

* E-Mail/Password – address and password of the mail account, which will be used for outgoing mail. DW Spectrum will handle the rest.

**Note**: click Test to ensure that the settings are correct. If test fails:

* If the result is "Cannot test such parameters", the domain name is not supported. It is necessary to switch to Advanced mode and set up the server manually.

* If the result is different, the error message will be displayed:

Advanced E-Mail Server Setup
The parameters are the same as in **Simple Setup** plus:

- **SMTP Server**: E-Mail server address
- **Port**: SMTP Port
- **Connection type**: (Secure (TLS), Secure (SSL), Unsecure).

⚠️ **Note**: click *Test* to ensure that the settings are correct. If test fails:
- Try a different SMTP Port
- Try a different connection type.

### Start Recording on Camera

Starts recording on **Camera(s)** when **Event** occurs. For instance, if Motion is detected on Cameras 1, 2 or 4, recording on Cameras 4, 5 and 6 will start.

#### Basic Parameters

**Camera(s)** to record. To specify:

1. Click on *Select at least one camera* in the desired row on the Alarm/Event Rules form (see "[Configuring Events, and Actions (Admin Only)](#)"). The following form will appear:
2. Check the cameras to record, then click OK (Cancel will discard changes).

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 (see "Search"). It is possible to Drag'n'Drop the selected Cameras from Resource Tree onto the Action's advanced settings form.

⚠️ IMPORTANT. To record Camera on Event, recording must be enabled on Camera. Refer to "Modifying Recording Schedule" for information on how to enable recording. If the "Recording" flag is not set on the selected Camera, the following message will be displayed (see above).

**Advanced Parameters**

- **Action**
  - **Do**: Camera recording
  - **at**: Select at least one camera
  - **Interval of action**: No more than once per 1 min

- **Quality**: Best
- **fps**: 0 FPS
- **Post-Recording**: 0s

*Quality and fps* – target recording parameters for Camera(s). If Camera's maximum FPS is lower than specified, maximum FPS will be acquired.

*Post-recording* – the time it takes for the recording to be performed after the event is complete.

**May be caused by**
- Motion on Camera
- Input Signal on Device
- Generic Event
Why Action may work incorrectly

Recording is not enabled on Camera. Refer to "Modifying Recording Schedule" for information on how to enable recording.

Event is not configured properly. See the Event description for details.

Start Panic Recording

Starts Panic Recording when Event occurs.

Panic Recording mode switches Recording Settings for all Cameras to maximum FPS and Quality.

Note: if Recording is not enabled for Camera, Panic Recording will not be activated.

Current Panic Recording status can be viewed:

- in Recording Schedule (see "Modifying Recording Schedule")
- in server's settings (see "Obtaining and Configuring Server’s Additional Settings (Admin Only)").

Basic Parameters

None.

Advanced Parameters

None.

May be caused by

Motion on Camera
Input Signal on Device
Generic Event

Why Action may work incorrectly

Event is not configured properly. See Event description for details.

Create Bookmark

Creates Bookmark in the archive of one or several Cameras when Event occurs. See "Using Bookmarks". Bookmark is the footage in archive that is specially marked.

Note: To be able to set Bookmarks, recording should be enabled on Camera.

Bookmark will be named automatically in the following way: <Event> on <Device>.

Basic Parameters

Camera(s) to set Bookmarks on. To specify:

1. Click on Select at least one camera in the desired row on the Alarm/Event Rules form (see "Configuring Events and Actions (Admin Only)"). The following form will appear:
2. Check the cameras to record, then click OK (Cancel will discard changes).

**Advanced Parameters**

*Fixed Duration* – the duration of the bookmark. If checked, *Pre-Recording* can be set as well. It specifies the amount of time to bookmark before the event. Can be unchecked for the following continuous events: Motion on Camera, Input Signal on Device, Generic Event. If unchecked, Bookmark will continue until the event stops. Additionally *Pre-Recording* and *Post-Recording* can be set. They specify the amount of time to bookmark before and after the event.

*Tags* that will be added to *Bookmark*.

**May be caused by**

All *Events*.

**Why Action may work incorrectly**

Recording is not enabled on *Camera* that is used for bookmarking. Refer to "*Modifying Recording Schedule*" for information on how to enable recording

*Event* is not configured properly. See *Event* description for details.

**Trigger Output on Device**

It is possible to generate output via two different methods:

- **Output** – generates output on *Device(s)* while *Event* occurs and stops when Event ends.
- **Device output for 30 seconds** – generates output on *Device(s)* when *Event* occurs and stops output in 30 seconds.

**Basic Parameters**

*Device(s)* output is triggered on. To specify:
1. Click on **Select at least one Device** in the desired row on the Alarm/Event Rules form (see "Configuring Events and Actions (Admin Only)"). The following form will appear:

![Select at least one Device form]

2. Check the Devices to trigger output, then click **OK** (**Cancel** will discard changes).

   To select all Devices on a specific Server, check the corresponding box. To filter search, use the **Filter** box. Filter criteria is the same as search (see "Search"). It is possible to **Drag'n'Drop** the selected Devices from **Resource Tree** onto the **Action**'s advanced settings form.

   **IMPORTANT.** To trigger output signals, output must be supported on Device. If the selected Device does not support output, then the corresponding message will be displayed (see above).

### Advanced Parameters

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Do</strong></td>
</tr>
<tr>
<td><strong>at</strong></td>
</tr>
<tr>
<td><strong>Output ID</strong></td>
</tr>
</tbody>
</table>

**Output ID** – I/O Module port to route signal (see Setting Up I/O Modules).

**Auto-reset in (sec)** – if checked, the output will be reset automatically after the specified period of time.

### May be caused by

- Any events – Device output for 30 seconds.
- **Motion on Camera, Generic Event** and **Input Signal on Device** – synchronous output. Output stops when motion or input are stopped.

### Why Action may work incorrectly

- Output is not supported on some Devices.
- **Output** and **Device output for 30 seconds** are slightly different.
**Event** is not configured properly. See **Event** description for details.

### Play Sound

Plays the specific sound when **Event** occurs.

**Basic Parameters**

Sound to be played. It is possible to select any sound from the available options:

- **Camera** to play the sound on. Camera should support 2-way audio. Right now 2-way audio is supported on Axis devices with firmware 5.x or higher. See "Using 2-Way Audio".
- **Play to user**. If checked, the sound will be played in client application.

⚠️ IMPORTANT. Either **Play to user** should be checked or **Camera** for 2-way audio should be selected. Otherwise the rule will be considered invalid.

**Advanced Parameters**

**Volume**

Aggregation (Interval of action): no more than once per certain amount of time (to reduce the amount of events), or instant.

Sound library customization: adding, editing or removing sounds.

To view the sound library, go to **Advanced Parameters** and click **Manage**...

The following dialog will appear:
- To add sound:
  1. Click Add... and select the desired audio file.
  2. Choose the duration and set it to Clip sound up to. The audio file will be cut to the specified duration.
  3. Choose Custom Title for the selected sound. If not specified, the file name will be used as the title by default.
  4. Click Open to add the sound or Cancel to discard changes.

- To rename the selected sound, click Rename... and enter a new title
- To test the chosen sample, click Play...
- To delete the selected sample, click Delete...
- Click Open to add the sound or Cancel to discard changes.

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 on Scene 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.

**Repeat Sound**

Plays a specific sound while Event occurs.

**Basic Parameters**

Sound to be played. It is possible to select any sound from the available options:

Camera to play the sound on. Camera should support 2-way audio. Right now 2-way audio is supported on Axis devices with firmware 5.x or higher. See "Using 2-Way Audio".

Play to user. If checked, the sound will be played in client application.

⚠️ IMPORTANT. Either Play to user should be checked or Camera for 2-way audio should be selected. Otherwise the rule will be considered invalid.

**Advanced Parameters**

Volume

Sound library customization: adding, editing or removing sounds.

To go to sound library go to Advanced Parameters and click Manage...

The following dialog is displayed
To add a sound:

1. Click Add... and select the desired audio file.

2. Choose the duration and set it to Clip sound up to. The audio file will be cut to the specified duration.

3. Choose Custom Title for the selected sound. If not specified, the file name will be used as the title by default.

4. Click Open to add the sound or Cancel to discard changes.

To rename the selected sound, click Rename... and enter a new title.

To test the chosen sample, click Play...

To delete the selected sample, click Delete...

Click Open to add the selected sound or Cancel to discard changes.

May be caused by

- Motion on Camera
- Input Signal on Device
- Generic Event

Why Action may work incorrectly
**Event** is not configured properly. See **Event** description for details.

Sound is muted. Open any item on Scene and check if the sound is muted. Volume settings are applied globally. See "**Adjusting Volume**".

Either **Play to user** should be checked or **Camera** for 2-way audio should be selected.

**Speak**

Pronounces specific text when **Event** occurs.

**Basic Parameters**

Text to pronounce:

- **Do**: Speak
- **at**: AUDIO BUILT IN
- **Interval of action**: No more than once per **4 min**
- **Speak to user**: checked
- **Speak the following**: Door Opened
- **Volume**:

**Camera** to pronounce the text on. Camera should support 2-way audio. Right now 2-way audio is supported on Axis devices with firmware 5.x or higher. See "**Using 2-Way Audio**".

**Play to user**. If checked, the sound will be played in client application.

⚠️ **IMPORTANT**. Either **Play to user** should be checked or **Camera** for 2-way audio should be selected. Otherwise the rule will be considered invalid.

**Advanced Parameters**

Aggregation (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 on Scene 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.
**Execute PTZ Preset**

Activates PTZ Preset on a specific Camera. See "Saving and Restoring PTZ Positions" for more information on how to setup PTZ presets. PTZ Tours cannot be activated by Event.

**Basic Parameters**

Camera to activate preset on.

**Advanced Parameters**

PTZ Preset on this Camera. If no presets are configured, it is necessary to set them up first.

Aggregation (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.

Too long interval of action is set. Try "instant".

**Display text on Cameras**

Displays text overlay on specific Cameras when Event occurs.

The text looks like the following:

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 "Configuring Events and Actions [Admin Only]"). The following form will appear:

![Select Cameras Form](image)

2. Check the cameras to display, then click OK (Cancel will discard changes).

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 (see "Search"). It is possible to **Drag'n'Drop** the selected **Cameras** from **Resource Tree** onto the **Action**’s advanced settings form.

**Advanced Parameters**

![Action Settings](image)

- **Also show on source camera** – available only if **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 motion occurs on Camera 1, Alarm Layout will contain Cameras 1, 2 and 3. If unchecked, it will contain only 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**. 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.

Perform HTTP Request

Sends a special HTTP Request to an external system when the specific event occurs. For instance, external system may be access control system or alarm/monitoring system.

DW Spectrum can also receive the HTTP request as events. See "Generic Event".

Basic Parameters

- **HTTP URL** – the HTTP link to the external system that listens to the request
- **Login** and **Password** – authentication details for the external system (required if the system requires authentication)
- **HTTP Content** – the content of HTTP request.

Why Event may work incorrectly

HTTP request is malformed. Check the syntax

External system requires authorization and no or incorrect credentials were specified

Event is not configured properly. See the Event description for details.

Write to Log

Writes the record to Log when Event occurs.

By default, all Events mentioned in Rules are written to Log. However, in some cases it may be necessary to disable all notifications but certain types of Events in Log. In this instance, create Rule with this particular type of Action.

Basic Parameters

None

Advanced Parameters

Aggregation (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

Too long interval of action is set. Try "instant".
Default Rules

As soon as DW Spectrum is installed, default Rules are set up.

The following Events

- Device Disconnection/Malfunction
- Storage Failure (including "Disk Is Full")
- Network Issue
- Device IP Conflict
- Server Failure
- Servers Conflict
- Server Started

will result in

- Notifications to all Users (no more than once per 30 seconds).
- Mail Notifications for admin. To receive mail notifications, E-Mail Server must be configured (see "Configuring Mail Server for E-Mail Notifications") with e-mail address specified for admin (see "Changing User Settings").
- Write to Log.

Viewing Events Log

Each event that occurs in DW Spectrum is stored in Event Log. Event Log makes it easy to navigate through past activity or diagnose Device or Server. To view the log, proceed with one of the following:

- Open Main Menu and go to Event Log (Ctrl + L)
- Open Notification Panel on the right and click .
- To view Events that occurred on a particular Device: open Device's Context Menu and choose Check Device Issues...

The data is broken down by the following columns:
• **Date/Time** – date and time the event occurred

• **Event** – the name of the event

• **Source** – the resource that initiates the event: Device (Motion Detection, Input Signal, etc) or Server (Storage Failure, Server Failure, etc).

• **The Action** that is performed when **Event** occurs.

• **Target** – the recipient of the action: Users or Devices.

• **Description** – any additional information. If Motion is detected, then hyperlink is provided. When clicking on hyperlink, the Device will open in a new Layout and start playing back from the moment Motion occurred.

The following tools are available to manage **Device List**:

• **Sort** data by column. **Left Click** on column's header.

• **Filter** data. Select filter conditions on the top:

• **Start** and **End Date** – only the events that occurred during a particular period of time are displayed (the current day by default)
• **Event type** – displays a specific type of events only
• **Source** – displays events on a particular device only (applies to Motion, Input and Device Issues)
• **Action type** – specific events caused by certain types of actions are displayed

To remove all filter conditions, click *Clear Filter* or open *Context Menu* and select *Clear Filter*.

To show events that are related to a particular source, locate the actual event, open *Context Menu* and select *Filter Similar Rows*.

• **Select multiple rows** from a table. Drag the mouse, use *CTRL + Click/Up/Down* arrows, or *Shift + Click/Up/Down* arrows. Use *CTRL + A* to select all records.

• All **Device** options (open, rename, diagnose, etc.). To access the devices, Select **Device** and open *Context Menu*.

• All **Server** options (monitor, configure, diagnose, etc.). To access Server s, Select **Server** and open *Context Menu*.

• **Export** data from one or multiple rows/cells to an external file. Select the desired rows, open *Context Menu* and select *Export Selected to File...* Choose a file name and format. The following formats are supported:

![Image of event log]

Enter a file name and choose file type (HTML or CSV).

![Image of file selection]

• **Copy one or several rows** to clipboard. Select the desired rows, open *Context Menu* and select *Copy Selection to Clipboard*. The data can be pasted into any text editor or Microsoft Excel.

It is possible to view the event log on a specific **Device** or **Server**.

• Device: open Device's *Context Menu* (on Scene, in *Resource Tree*, etc.) and select *Check Device Issues...*

• Server Diagnostics: open Server's *Context Menu* (on Scene, in *Resource Tree*, etc.) and select *Server Diagnostics...*

**Event Log** will open and a filter will apply (Source - desired **Device** or **Server**).

**User and Roles Management**

DW Spectrum provides a simple way to manage **Users**: There are several roles predefined in a System: **Super Administrators**, **Administrators**, **Viewers**, and Advanced Viewers (can be configured as **Live Viewer**, **Viewer**, **Advanced Viewer**). See “*Introducing User Roles*” for details. It is possible to create custom users with specific permission sets as well. See "*Roles Management*".

Below are a few guides to creating, modifying, disabling, and deleting users:

• **Creating New User (Admin Only)**
• Changing User Settings
• Disabling/Enabling Users (Admin Only)
• Deleting User (Admin Only).

All user operations may be performed from the single User Management Form.

To simplify User and Roles Management in large corporate systems it is possible to import users from the corporate network directory (LDAP). After import users will be able to login to DW Spectrum using their domain username and password. See "Adding Users from LDAP Server (Admin Only)" for details.

Finally, it is possible to track the actions that users perform in the system. See "Viewing Users' Actions Log (Audit Trail)" for details.

User Management Form

DW Spectrum provides a centralized dialog for User and Roles Management. To access the Users Dialog open System-Wide Configurations and go to the Users tab. The following information is available:

- Login
- User Name
- User Role
- LDAP – indicates if user has been imported from LDAP (see "Importing Users from LDAP Server")
- Enabled – indicates if user is enabled.

The following operations available:
- **Filtering Users.** Type any symbols in the *Filter* box and the form will only display users that contain such symbols in name, permissions, E-Mail addresses etc. For instance if type "PTZ", the only users that will be displayed is those who have PTZ permissions.

- **Creating New User (Admin Only)**
- **Changing User Settings**
- **Deleting User (Admin Only)**
- **Disabling/Enabling Users (Admin Only)**
- **Setting Up LDAP Integration**
- **Importing Users from LDAP Server.**

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**Roles Management**

DW Spectrum provides several predefine Roles (see "Introducing User Roles") as well as enables Administrators to create custom roles and then assign such roles to users. Role may include:

- Permissions (see "Introducing User Roles")
- Cameras
- Layouts. In this case all cameras on these Layouts will be available too.

To create and configure a new Role do one of the following:

- Right click on *Users* on *Resource Tree* to invoke *Context Menu* and choose *Roles*.
- Go to *User Management Form* and click *Edit Roles*...
- Create user or change User Settings and in the form click *Edit Roles*...

To set up Role:

1. Choose Role *Name*.
2. Set up role *Permissions*.
3. Either pick *Cameras* that will be available for Users with this Role, or choose *Layouts*. 
Devices that have this icon, are available for these Roles because layouts that contain such devices are included in this Role.

4. Click Apply or OK. Now Role may be assigned to Users as any predefined-one. All Users that have this role will be displayed in the Role Info tab.

Creating New User (Admin Only)

To create User:

1. Do one of the following:
   - Open Main Menu and go to New -> User
   - Right-Click on Users in Resources Tree and choose New.
   - Open User and Roles Management Form and click New User.

2. Enter user settings:
   - Login and Password – user credentials. IMPORTANT: login and password are case sensitive.
   - Enabled – sets if the user is active.
   - Email – this address will be used for E-Mail notifications. If it is not set the user will not be able to receive such notifications. See "Mail Notifications".

   - Access Rights – select a predefined role (see "Introducing User Roles") or specify custom permissions (click Advanced and tick desired-ones).

3. Click OK to create a user.

Once User is established, Layouts can be created and assigned to this User. See “Creating New Layout”.

Changing User Settings

The following User Settings can be modified:
• **Login** (Admin only) – can be changed for all users except **Super Administrator** (admin). Also, a user cannot change own login name. The login name can be set in **Resource Tree**.

• **Password** – can be changed for all users, except **Super Administrator** (admin). **Viewer** can only change own password. **Super Administrator** can change his password as well.

• **Enabled** – can be changed for all users, except **Super Administrator** (admin). Also, a user cannot disable himself. See "**Disabling/Enabling Users (Admin Only)**".

• **E-Mail**.

• **Access Rights** (Admin only) – can be changed for all users, except **Super Administrator** (admin). Also, **User** cannot change own role.

To change **User Details**:

1. Do one of the following:
   • Select any **User** in **Resource Tree**, **Right-Click** on **Context Menu** and choose **User Settings**.
   • Open **User and Roles Management Form** and double-click on the desired user record (or click 📺).
2. Change the desired fields and click **OK** (or **Cancel** to close the form).

**Disabling/Enabling Users (Admin Only)**

To restrict access to DW Spectrum it is possible to make **User** inactive. Contrary to deleting User this method allows keeping all User action records (see "**Viewing Users' Actions Log (Audit Trail)**").

To disable **User(s)**, do one of the following:

• Open **User and Roles Management Form**, select user(s) to disable and click **Disable Selected**. This method is useful when it's necessary to delete several **Users** simultaneously.

• Go to user settings (see "**Changing User Settings**") and clear the **Enabled** flag, then click **OK**.

To enable **User(s)** back, do the opposite.

**Deleting User (Admin Only)**

It is possible to delete any **User**, except **Super Administrator**. A **User** cannot delete own profile. To delete, do one of the following:

• Open **User and Roles Management Form**, select user(s) to delete and click **Delete Selected**. This method is useful when it's necessary to delete several **Users** simultaneously.

• Locate the desired **User** in **Resource Tree**, **Right-Click** for **Context Menu** and choose **Delete** (or press **DEL**).

Also it is recommended to disable User instead of deleting him (see "**Disabling/Enabling Users (Admin Only)**"). This method helps to keep the user's action history (refer to "**Viewing Users' Actions Log (Audit Trail)**").

⚠ **IMPORTANT**. All associated **Layouts** will automatically be deleted along with the **User**. If **Layout** is assigned to another **User**, it will remain in System.
Adding Users from LDAP Server (Admin Only)

To simplify User and Roles Management in large corporate systems it is possible to import users from the corporate network directory (LDAP). The following LDAP Servers are available:

- Microsoft Active Directory
- Open LDAP Server.

This process consists of the following steps:

- Setting Up LDAP Integration
- Importing Users from LDAP Server.

Setting Up LDAP Integration

To be able to import Users and allow them to connect to DW Spectrum, it is necessary to setup connection between DW Spectrum and LDAP Server. This part should be done by or in cooperation with Network (Domain) Administrator.

To integrate with a corporate LDAP Server:

1. Open User and Roles Management Form and click LDAP Settings...
   
   📝 Note: If this button is not available, make sure no Users are selected.

2. Enter the following details (consult with your Network (Domain) Administrator if needed):

   - **Server URL**: `ldap://fileservewr.dwca.local`
   - **Admin DN**: `cn=administrator,cn=users,dc=dwca,dc=local`
   - **Password**: `******`
   - **Search Base**: `cn=users,dc=dwca,dc=local`
   - **Search Filter**: `cn=ch*`

   Test completed successfully: 5 users found.

   ⚠️ **IMPORTANT.** Server URL should be **Fully Qualified Domain Name** of the supported LDAP server that can authenticate the login.

   If the server URL of the server that can’t authenticate login but have the LDAP data, the test will pass and will show the LDAP users and add to the Spectrum but can’t login using the LDAP account.

   See [https://en.wikipedia.org/wiki/FullyQualifiedDomainName](https://en.wikipedia.org/wiki/FullyQualifiedDomainName) for details.

   **Search Filter** is optional and used to filter Users on the server side (special LDAP syntax is used). The above example illustrates the most simple filter.
3. Click Test. If test is successful, the server will return the number of LDAP users found (Search Filter will be pre-applied).

Now it is possible to **Import Users from LDAP Server**.

⚠️ **IMPORTANT**. If LDAP Server is not available, LDAP users won’t be able to log in.

## Importing Users from LDAP Server

After [Setting Up LDAP Integration](#) it is possible to import LDAP Users to DW Spectrum. Imported users will be able to log in to DW Spectrum using their domain usernames and passwords.

To import LDAP User(s):

1. Open [User and Roles Management Form](#) and click **Fetch Users from LDAP...** The list of LDAP Users found on the server will be displayed.

<table>
<thead>
<tr>
<th>Login</th>
<th>Name</th>
<th>Email</th>
<th>DN</th>
</tr>
</thead>
<tbody>
<tr>
<td>charlie</td>
<td>Charlie Strange</td>
<td></td>
<td>CN=Charlie Stran...</td>
</tr>
<tr>
<td>christal</td>
<td>Christal Lane</td>
<td></td>
<td>CN=Christal Lan...</td>
</tr>
<tr>
<td>catesca</td>
<td>Christian Telesca</td>
<td></td>
<td>CN=Christian Tel...</td>
</tr>
</tbody>
</table>

2. Select User(s) to be imported (it is possible to use Search Filter on the top) and then select the role then click **Import Users**.

3. The imported user(s) will be automatically enabled with the role assigned.
After LDAP users are added, the users are able to log in to DW Spectrum using his domain usernames and passwords.

⚠️ IMPORTANT. If LDAP Server is not available, LDAP users won’t be able to log in.

**Viewing Users’ Actions Log (Audit Trail)**

DW Spectrum tracks all User actions and records them to log.

🔍 Note: This feature is available for Administrators only (see “Introducing User Roles”).

To enable/disable this feature (enabled by default):

1. Open System-Wide Configurations and go to the General tab.
2. Use Enable audit trail checkbox, to enable or disable the feature, then apply changes.

To view the log, open Main Menu and choose Audit Trail. The following information is available:

The following information is available:

- **Sessions**: Session is considered as amount of time between user’s log in and log out. The information displayed for each session is:
  - Session time (login/logout time) and Duration
  - User logged in
  - Activity graph (the number of actions performed can be viewed if hover with a mouse on the corresponding graph)

- **Devices**: Watching Live/Archive, Exporting Video or Device Modifications

The detailed information about Selected Session(s) or Device Operation(s) (on the right). To select a session click on it or use checkbox on the left. To select several sessions:

- hold **CTRL** and/or **SHIFT**
- use **CTRL+A** or Select All Context Menu item to select all records
• use checkboxes on the left.
If no sessions are selected, all details will be displayed.

The following detailed information is provided:
• Date and Time of action
• User that performed the operation
• IP address the user was logged from
• Activity – the action performed
• Description – the details of action performed
• View it – ability to view the action performed. Can be done for Camera Operations:
  • Watching Live/Archive, Exporting Video: the exact camera will be opened and played back on the exact position
  • Device Modification: Device Settings will be shown)

The following operations are possible:
• Filter. Type a filter criteria in the Search textbox on the top. Select the desired period in From and till fields. Finally it is possible to show/hide specific action types.
• Update data. The data might have been changed since the form is opened. To update it click Refresh.
• Export. To do it:
  1. Select the desired records from the left or right table (see above for multi-selection tips)
  2. Open Context Menu and choose one of the following:
  • Copy Selection to Clipboard – to be able to paste it to any desirable program (like Microsoft Excel or Google Docs)
  • Export Selection to File... – to export data to html or csv file. It will be necessary to set file location and name in the dialog and click Save.

Layout Management

Layouts are a powerful and flexible way to represent video data in DW Spectrum. Layout can contain an unlimited number of videos: Cameras, Local videos or Images, which are not restricted in terms of location, size or orientation.

Initially, Layout is created and configured by Administrator. It can then be assigned to Viewers. Viewers can create its own Layouts based on the available Resources (Devices and Local files).

The following Layout Management actions are described in this section:
• Creating New Layout
• Setting up Layouts
• Assigning Layouts to Users (Admin Only)
• Deleting Layouts (Admin Only)
• Opening and Closing Saved Layouts.

See also "Showing Cameras on Alarm Layout".
Creating New Layout

The simplest way to create new Layout is to open a new Tab (see "Tabs and Layouts"). However in this case Layout will be created locally and will not be saved on Server and will not be restored after next login. Layouts should be saved for future use.

⚠️ IMPORTANT. Sometimes Alarm Layout may pop up if configured. See "Showing Cameras on Alarm Layout" for details.

To create new Layout for specific User:

1. Find User in Resource Tree, Right-Click on Context Menu and choose New Layout:
2. Enter Layout’s Name and click OK (Cancel will discard all changes):
3. New Layout will be created and displayed in Resource Tree. A new Tab will automatically appear.

There are several ways to set up Layouts:

Set Up Own Layouts:

1. Open a new Tab, configure Layout and save.
2. Locate own User in Resource Tree, create new Layout using Context Menu and save.

Setting up Layouts for other Users:

1. Find the desired User in Resource Tree, create new Layout using Context Menu and save.
2. Open a new Tab, configure and save Layout, then associate with the desired User (See “Assigning Layouts to Users (Admin Only)”).

Setting up Layouts

This section provides detailed instructions on how to configure layouts:

- Adding Items to Layouts
- Removing Item(s) from Layouts
- Using Backgrounds (Maps or Plans) on Layout (E-Mapping)
- Adjusting Layout’s Appearance
- Zoom Windows
- Locking Layouts
- Working with Multiple DW Spectrum Windows
- Saving Layouts.

⚠️ IMPORTANT. Viewers cannot change Layouts. Also it is not possible to change Locked Layouts.

Adding Items to Layouts

More than one Item can be added to Layout at a time regardless of their source (live cameras, local video, images, etc.). DW Spectrum allows 24 Items to be displayed on the x86 architecture and 64 Items – on x64.
IMPORTANT. Viewers cannot add Items to predefined Layouts. They can only open and add Items to new Tabs. Also it is not possible to add cameras to Locked Layouts.

To add Item(s) to Layout, choose from one of the following:

- **Double-Click** on the Item in Resource Tree
- Invoke **Context Menu** in Resource Tree and select *Open*. Multiple items can be selected and added (**Ctrl + Shift** and select the desired Items).
- **Drag and drop** from Resource Tree
- **Ctrl + Drag and Drop** items onto Scene – duplicates Item(s). To avoid duplication, release Ctrl and hit Esc, while holding the left mouse button.

IMPORTANT. Hold **Ctrl** or use the mouse to draw a selection of multiple Items on Scene. To select all Items on Scene, use **Ctrl + A**. Refer to “Selecting Items” for more information.

- Open **Local file(s)** or **Folder** – they will be added to the current layout (see “Opening Local Files Outside of Media Folders”)
- **Ctrl + Drag and Drop** from Resource Tree Scene – dropped Items will automatically be added to Layout (use Multi-Selection to selection more than one item). To prevent duplication, release **Ctrl** and hit **Esc** while holding the left mouse button.

New Items will automatically occupy any available space. Grid cell aspect ratio will be adjusted automatically as per the existing item aspect ratio to occupy space on Scene. See "Changing Cell Aspect Ratio".

To open items directly from new Tab:

- Select desired Item(s) from Resource Tree and select *Open in New Tab* from Context Menu
- Drag selected Item(s) from Resource Tree and drop them onto Tab Navigator
- **Ctrl + Drag and Drop** items from **Scene** to **Tab Navigator** (Multi-Selection can be applied). To prevent duplication, release **Ctrl** and hit **Esc** while holding the left mouse button.

  **IMPORTANT.** It may be difficult to locate and add each item manually. Search may be very useful in configuring a new layout (see "Search").

How to configure a layout using **Search**:

1. **Create a new Layout**.
2. Enter keywords into the Search box. The search results will appear on **Scene** automatically.
3. By adding or deleting keywords from the search box, the items on **Scene** will vary.
4. Do not forget to save configured **Layout**.

**Removing Item(s) from Layouts**

**IMPORTANT.** **Viewers** cannot change **Layouts** that are assigned by **Administrators**. They can only open new **Tabs** and add/remove **Items**, but cannot save. Also it is not possible to add cameras to **Locked Layouts**.

To remove Item(s) from Layout on **Scene**:

1. Select desired item(s) on **Scene**.
2. Proceed with one of the following:
   - **Click** to remove single Item
   - Open **Context Menu** and select **Remove from Layout** (or hit **Del**) to remove all selected Items

To remove Item(s) from Layout in **Resource Tree**:

1. Expand **Users** and locate the desired **Layout** in **Resource Tree**.
2. Select desired **Item(s)** under specified **Layout**. **Multi-Selection** can be applied (see “**Working with a Resource Tree**”).
3. Open **Context Menu** and select **Remove from Layout** (or hit **Del**).
4. Confirm deletion by clicking **Yes**.

**Note:** grid cell aspect ratio will be adjusted automatically as per the existing item aspect ratio to occupy space on **Scene**. See "**Changing Cell Aspect Ratio**".

**Using Backgrounds (Maps or Plans) on Layout (E-Mapping)**

DW Spectrum offers an ability to change background for **Layouts**. A schematic map or a building plan can be chosen as the background behind cameras for easy camera location and information accessibility to **Users**.
IMPORTANT. Viewers cannot change Layouts. It is also not possible to change Locked Layouts.
To set background for **Layout** (simple):

1. Open the desired picture on Scene.
2. Right-Click on the image to open **Context Menu** and select **Set as Layout Background**:

To set background for **Layout** (advanced):

3. Expand **Users** to locate the desired **Layout** in **Resource Tree**.
4. Open **Context Menu** (by clicking on any empty space within **Layout** and select **Layout Settings**...
5. Click *Browse...* and select a desired image file to set as background.

6. Configure additional parameters:
   - *Crop to monitor aspect ratio* – if selected, then aspect ratio of the image will be adjusted according to the monitor. For instance, if monitor resolution is 1920x1080 (16:9) and image resolution is 1920x1200 (16:10), then the image will be cropped from both top and bottom.
   - *Width* and *Height* – image dimensions within cells. For instance, it is possible to place twenty items on a 5x4 layout. The greater the dimensions the lesser the cells are.
   - *Opacity* of the image (in percents).

5. Click *OK* when finished. To discard changes, click *Cancel*.

6. Add, Remove, resize or move cameras across background (see "Adjusting Layout’s Appearance").


8. Do not forget to *Save Layout*.

**Adjusting Layout’s Appearance**

Any video manipulation can be performed in the application to customize *Layout*:

- *Selecting Items*
- *Zooming while Working with Layouts*
- *Moving and Swapping Items within Scene*
- *Resizing Items within Scene*
• Using Fit-In-View
• Changing Distance between Items
• Changing Cell Aspect Ratio

It’s recommended to first make an item selection and configure the look on Scene.

⚠️ IMPORTANT. Viewer is allowed to perform any operations, except changing Locked Layouts.

Selecting Items

Click on Item(s) to select. The selected Items will expand on the screen. To bring it back to normal, click again. Arrow keys may be used to scroll through Items.

To select more than one Item:

• Click and Drag over Items with a mouse to draw a selection.
• Hold Ctrl and Click on several Items. Click again to remove selection. Click without Ctrl to discard the current selection.
• Use Ctrl + A to select all Items on Scene.

The selected items are outlined or filled with a color:

See also how to select Item(s) in "Resource Tree".

Zooming while Working with Layouts

There are several ways to Zoom while working with DW Spectrum.

• Zoom whole Layout / single Item is Fullscreen - use Mouse Wheel (see "Zoom")
• PTZ/Fisheye Zoom - use "+" and "-" buttons on Item (see "Setting up and Controlling PTZ on PTZ and Fish-Eye Cameras").

Moving and Swapping Items within Scene

Scene consists of cells. Each cell may contain one Item. The initial aspect ratio of a cell is 16:9 but it can be changed to 4:3 (see "Changing Cell Aspect Ratio").

⚠ IMPORTANT. It is not possible to change Locked Layouts.

In order to move Item, Click on it and Drag it to a new position (grid cell borders are visible while in motion). Multiple items can also be moved.

If the desired position is already occupied, Items will be swapped (if possible).

If swapping is not possible, the target cell will be marked red:
If bigger Item is being replaced by a smaller one, they will swap sizes as well as positions.

**Resizing Items within Scene**

⚠️ **IMPORTANT.** It is not possible to change Locked Layouts.

Resizing items is an easy operation in DW Spectrum. To resize, select the edge on Item, **Click and Drag** the mouse to resize.

Item is resized according to its proportions, so it can occupy 1, 4, 9 cells etc.

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:
1. Move the entire Scene using a Right-Click Drag.
2. Resize an Item to occupy the available space.

OR

3. Move the desired Item away from the rest of Items
4. Resize the Item to occupy the available space.

**Using Fit In View**

This feature allows users to revert the view to maximum in order to view all Items conveniently. This can also be used when zooming or moving the entire Scene.

**Fit In View** can be performed by Double-Clicking on any empty space on Scene (or by Right-Clicking on Context Menu and selecting Fit in View).

Also **Fit In View** is performed automatically if:

- Change in view mode: Window or Fullscreen (see "Full Screen and Window Mode")
- Change in DW Spectrum window size.

**Changing Distance between Items**

This feature is used when multiple Items need to be stitched together or positioned closer to each other. A good example is a panoramic view derived from four individual single-sensor cameras to compose a 180 degree view.

To adjust the distance between Items, use **Change Cells Spacing** Context Menu item or **Ctrl + Mouse Wheel** on Scene:

![Fit in View Context Menu]

**IMPORTANT.** If aspect ratio of an item is not 4:3 or 16:9 the extra space will remain.
Changing Cell Aspect Ratio

Cameras provide video in 4:3, 16:9 or custom format. Grid cells aspect ratio is changed dynamically per item's aspect ratio to occupy Scene space.

This feature is used to occupy Scene space efficiently: cell aspect ratio should be equal (or similar) to Camera aspect ratio.

Additionally, the aspect ratio of cells can be changed manually. To proceed, use Change Cell Aspect Ratio Context Menu item (invoke Context Menu on any empty space on Scene).

Zoom Windows

DW Spectrum provides a great feature that allows users to create an unlimited number of digital Zoom Windows for a single Camera. These windows can be placed on Layouts and saved for future use.

⚠️ IMPORTANT. It is not possible to use Zoom Windows on Locked Layouts.

To configure Zoom Window for Camera:

1. Open Camera.
2. Click on to drag a rectangle on an item. A new item will appear on Scene.
3. Move Zoom Window or resize it by dragging its edges. Zoom Window can be moved between Cameras on Scene.
4. To close Zoom Window, close the corresponding item.

>Note: it may be very convenient to use Zoom Windows of fish-eye Cameras. See "De-warping Fish-Eye Cameras" for more information.
Locking Layouts

To prevent accidental changes to Layouts, DW Spectrum offers a locking capability. Once locked, the following cannot be performed:

- Adding or Removing items
- Change Background
- Moving and Swapping Items within Scene
- Resizing Items within Scene
- Deleting Layouts.

To lock Layout:

1. Open Context Menu (click on any empty space within Layout) and select Layout Settings...
2. Check Layout is locked.
3. Click Apply or OK when finished. To discard changes, click Cancel.

Working with Several DW Spectrum Windows

It is possible to set up Layouts on multiple DW Spectrum windows in a multi-monitor environment.

⚠️ IMPORTANT. This feature is not supported on Mac OS.

To open a new window, click on Main Menu → New → Window (or press Ctrl + N).

Also selected Items may be opened in a new window:

1. Select desired Items in Resource Tree or on Scene (Multi-Selection can be applied, see "Selecting Items").
2. Invoke Context Menu and select Open in New Window.

Finally, it is possible to drag Items from one window to another (only Administrators can drag Items to predefined Layouts):

1. Select desired Items in Resource Tree or on Scene (Multi-Selection can be applied, see "Selecting Items").
2. Drag selected Items to a new window.

Video Wall introduces much more functionality when working with several monitors. See "Video Wall Management" for details.

Saving Layouts

To retain any changes made to Layout, User must save it.

⚠️ Note: current playback position and selection is saved for Layout as well. After DW Spectrum is closed, all saved layouts that were opened in Tabs prior to closing, will be restored.

Layout should always be saved in case of any changes. If any changes are made, an asterisk will appear in the corresponding Tab and in Resource Tree:
To save **Layout**:

- Open **Context Menu** on **Scene** (on empty space) and select **Save Current Layout** (or press **Ctrl + S**). **Layout** will be saved to the previously assigned file name (the Tab's caption).
- Open **Context Menu** on **Scene** (on empty space) and select **Save Current Layout As** (or press **Ctrl + Alt + S**). **Layout** will be saved as specified by **User**.
- Find the desired **Layout** in **Resource Tree**, invoke for **Context Menu** and select **Save Layout**.

⚠️ **IMPORTANT.** Saved **Layout** is activated immediately (if running on multi-machines, all saved changes to **Layout** will reflect on all machines identically). Refer to “**Opening and Closing Saved Layouts**” for more information.

### Assigning Layouts to Users (Admin Only)

To duplicate **Layout** for another **User(s)**, **Drag and Drop Layouts** within **Resources Tree**:

**Administrator** can then modify **Layouts** as needed.

Also it is possible to assign Layouts to **Role** and then assign **Role** to several **Users**. See **Roles Management** for details.

### Deleting Layouts (Admin Only)

To delete **Layout** from **Resource Tree**:

1. Find and select desired **Layout(s)** in **Resource Tree**.
2. Invoke on **Context Menu** and choose **Delete Layout** (or press **Del**).
3. Accept deletion by clicking on **Yes** or press **Cancel** to discard all changes.

If the layout that is opened on another computer is deleted, all items will disappear.

📈 **Note:** **Locked Layouts** cannot be deleted!
Opening and Closing Saved Layouts

As User logs into DW Spectrum, all existing Layouts are listed in Resource Tree. To open an existing Layout, find the desired layout in Resource Tree and perform one of the following:

- Drag and Drop Layout from Resource Tree to Scene:
- Open Context Menu and choose Open Layout (or press Enter).

To open multiple Layouts, select the desired layouts in Resource Tree (using Multi-Selection) and do one of the following:

- Drag selection to Scene.
- Open Context Menu and choose Open Layouts.

Layouts will be opened in separate Tabs. If Tab already contains this Layout, it will not be opened again. Sometimes Alarm Layout may pop up if configured. See "Showing Cameras on Alarm Layout" for details.

Note: after DW Spectrum is closed, all saved Layouts opened in Tabs will be restored when User logs back in.

Backing up and Restoring DW Spectrum Database

DW Spectrum provides simple mechanism to perform backup and restore of system settings. It is done by backing up the DW Spectrum database as a single file. Database contains all system configuration.

⚠️ IMPORTANT. It is recommended to perform restore operation on the same computer backup has been saved.

To back up DW Spectrum database:

1. Open Main Menu and go to System Administration. Locate Backup and Restore section.
2. Click Create Backup... The window will open. Choose the desired location on the local file system to save the backup then click Save.

To restore DW Spectrum settings from backup:

1. Open Main Menu and go to System Administration -> General.
   Locate Backup and Restore section.
2. Click Restore from Backup... The window will open. Choose the backup file then click Open.
3. If click OK, database will be restored.

⚠️ IMPORTANT. It may be necessary to restart Servers and DW Spectrum Clients after restore.
**Video Wall Management (Windows Only)**

DW Spectrum provides the unique feature to control multiple displays from a single workplace called **Video Wall**.

To enable **Video Wall** feature it is necessary to obtain and activate **Video Wall Licenses** (see "Obtaining and Activating DW Spectrum Licenses"). Each one allows controlling video wall from a single computer (one session) or extend Video Wall on 2 displays. For instance 4 Licenses allow user to display **Video Wall** on 8 monitors and control it from 4 Clients concurrently.

It is necessary to obtain a certain permission to be able to configure and control **Video Walls**. See [Introducing User Roles](#) for details.

This section provides full information about **Video Wall** installation, configuration and control:

- **Video Wall Architecture**
- Configuring Video Walls
- Controlling Video Wall.

**Video Wall Architecture**

**Video Wall** architecture is displayed on the picture below:
**Video Wall Server** is the computer that hosts the main database of Video Wall Cluster. So far it is recommended that only one server is installed in Video Wall Cluster. Video Wall Displays can be connected to this computer and it can act as **Video Wall Processor** as well.

**Video Wall Processor** is the computer Video Wall Displays are connected to. Depending on its configuration it can handle one or several displays. DW Spectrum can contain almost unlimited number of Video Wall Processors that can be combined in Video Wall Cluster.

**Video Wall Controller** is any computer that can connect to Video Wall and control it. No special requirements are applied to it, it can even be a laptop. The only requirement is: video adapter should support OpenGL > 2.0. Almost every modern video adapter does support it, however video drivers should be updated.

Additionally, all computers that are parts of Video Wall Cluster (clients and controllers) should be **located in the same network**.

In order to operate Video Wall properly, DW Spectrum should be installed on every computer of Video Wall Cluster:

- Video Wall Server: **Full installation**.
- Video Wall Processor(s): **Client only installation**.
- Video Wall Controller(s): **Client only installation**.
If all components are installed on one computer, choose **Full installation**.

### Configuring Video Walls

Initial Video Wall configuration is performed in several steps:

- Configuring Video Wall
- Configuring Layout of Video Wall Displays
- Configuring Video Wall on Several Computers
- Switching to Video Wall Mode
- Deleting Video Wall and its Elements.

Since a single computer has a limited number of available video outputs, it can handle limited number of displays. To extend Video Wall it is necessary to add additional computers and combine them to Video Wall Cluster. See "Configuring Video Wall on Several Computers".

To change configuration refer to the following sections.

### Creating new Video Wall

To enable **Video Wall** feature it is necessary to obtain and activate **Video Wall Licenses** (see "Obtaining and Activating DW Spectrum Licenses"). Each one allows controlling video wall from a single computer (one session) or extend Video Wall on 2 displays. For instance 4 Licenses allow user to display **Video Wall** on 8 monitors and control it from 4 Clients concurrently.

To create Video Wall:

1. Open **Main Menu** and choose **New -> Video Wall**.
2. Enter the name of Video Wall and click **OK** or press **Enter**.

### Configuring Layout of Video Wall Displays

DW Spectrum can display video on unlimited number of displays. To make a computer displays part of Video Wall (Video Wall Processor) it is necessary to perform the following settings on that computer:

1. Right Click on **Video Wall** in **Resource Tree** and choose **Attach to Video Wall**.
2. Configure **Video Wall Screens**. DW Spectrum automatiacally detects the number of displays connected to the computer.
   - To add screen click on "+" in the dialog:
• To remove screen click on "X":

• To resize Screen drag the edges:

• To move Screen click at center and drag:
The following scenarios are available:

- Most common – one virtual Screen represents one physical Display. Just click on every single Screen.
- one virtual Screen is stretched on several physical Displays:

- one physical Display contains several virtual Screens in various combinations:

3. After the screens are configured, Video Wall Layout will be opened:
Note: It is not possible to open videos in this Layout.

4. Rename Displays in Tree.

5. Calibrate Video Wall. This means the position and size of virtual Displays should coincide with the physical-ones:

- To move/swap Displays click on their header and drag
- To resize Displays drag their edges.
To simplify the calibration process it is possible to display identification information on a particular physical Display. To do so right click on the desired Virtual Display and select Identify (it is necessary to attach to video wall first - see above). This initiates displaying identification information on the corresponding physical Display.

5. Fill up Screens. It is possible to place a single Item or whole Layout on each virtual Screen:

![Image of Video Wall Layout]

To remove Layout from Screen locate it in Resource Tree, or on Video Wall Layout, Right-click and choose Detach Layout.

6. To save changes right click on Video Wall in Resource Tree and choose Save Current Matrix... and enter the desired name.

To restore Video Wall View expand Video Wall in Resource Tree right click on saved Matrix and choose Load Matrix...

The configuration is almost done. To finalize it is necessary to Switch Video Wall Processor to Video Wall Mode. After Video Wall has been started on Video Wall Processor, the current configuration can be changed on Video Wall Controller.

To open Video Wall on Video Wall Controller do one of the following:
- Drag Video Wall on Scene
- Right Click on desired Video Wall in Resource Tree and choose Open Video Wall(s).

Video Wall Layout will be opened.

**Switching to and Exiting from Video Wall Mode**

To be able to control Video Wall it is necessary to switch Video Wall Processor to Video Wall Mode. This should be done on Video Wall Processor.

Usually Video Walls are controlled from Video Wall Controllers and the computers the displays are connected to are one easily accessible. So it is recommended to set up automatic switching to Video Wall Mode. To do so:
1. Right Click on Video Wall in Resource Tree and choose Video Wall Settings.
2. Click on Launch video wall when Windows starts and click OK.

To switch to Video Wall Mode right Click on Video Wall in Resource Tree and choose Switch to Video Wall Mode and click Yes on the dialog window.

Several instances of Client will be launched. The client will be switched to Video Wall mode and will become inoperable. Then it is possible to change settings and control Video Wall from Video Wall Controller.

To switch back from Video Wall to standard mode it is necessary to close all Client instances (ALT+F4) and launch Client once again. 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 Resource Tree as offline.

### Configuring Video Wall on Several Computers

Usually one PC can handle limited number of Displays. In this case if it is necessary to increase the number of Video Wall Displays it is necessary to add Video Wall Processors. Thus, DW Spectrum is has great scalability and flexibility in terms of Video Wall Configuration.

To add Video Wall Processor

1. Run Client of the PC then should be added to the current Video Wall (physical Displays should be connected to it).
2. Right Click on desired Video Wall in Resource Tree and choose Attach to Video Wall. Repeat all steps that are described in the "Configuring Layout of Video Wall Displays" section.
3. Switch to Video Wall Mode (see "Switching to and Exiting from Video Wall Mode").
4. Repeat the steps above on each Video Wall Processor.

After that Video Wall will be extended and will include Displays connected to newly attached Video Wall Processors.

### Deleting Video Wall and its Elements

The following Video Wall Elements can be deleted:

- Screen. This results in stopping video wall in the corresponding physical Display.
- Saved configuration (Matrix).

To delete, locate the desired element it in Resource Tree Right Click and choose Delete, then confirm.

The whole video Wall can be deleted as well. To delete it locate it in Resource Tree Right Click and choose Delete, then confirm. This action will delete all Screens and configurations related to this Video Wall and will stop Video Wall on every single Video Wall Processor.

### Controlling Video Wall

DW Spectrum allows users to control Video Wall by changing the layouts that are placed on Video Wall. The process is simple: as soon as Video Wall Display is opened on Video Wall Controller, the user operates with is as with usual
Layout. It is possible to change layout, seek into archive, perform search etc. In the meantime all changes made on Video Wall Controller will be immediately displayed on Video Wall itself. See "Controlling Video Wall Displays".

Also it is possible to push the desktop view from Video Wall Controller to Video Wall. See "Pushing Operator's Screen on Video Wall".

### Controlling Video Wall Displays

To control Video Wall:

1. Open Video Wall on Video Wall Controller (do one of the following):
   - Drag Video Wall on Scene
   - Right Click on desired Video Wall in Resource Tree and choose Open Video Wall(s).
   
   Video Wall Layout will be opened

   ☑️ **Note:** It is not possible to open videos in this Layout.

2. Double-click on the desired Video Wall Screen to switch to control mode. The layout of this screen will be opened.

3. Do any necessary operation as it were a regular Layout:
   - Adding Items to Layouts
   - Removing Item(s) from Layouts
   - Adjusting Layout's Appearance
   - Selecting Items
   - Moving and Swapping Items within Scene
   - Resizing Items within Scene
   - Changing Distance between Items
   - Changing Cell Aspect Ratio
   - Zoom Windows
   - Working with Several DW Spectrum Windows
   - Navigating through Archive and Live
   - Forensic Analysis
   - Pushing Operator’s Screen on Video Wall.
   
   All changes will be reflected immediately on the corresponding Display.

4. To switch to another Screen repeat the steps above.

### Pushing Operator's Screen on Video Wall

DW Spectrum provides the ability to push Operator’s screen to Video Wall. This is done from Video Wall Controller:

1. Open Video Wall on Video Wall Controller:
   - Drag Video Wall on Scene
   - Right Click on desired Video Wall in Resource Tree and choose Open Video Wall(s).
2. Right-click on the desired Screen and choose Push my Screen. Everything that displayed on the operator's desktop will be send to Video Wall Screen (including sound).

3. To stop broadcast locate the desired Screen in Resource Tree, or on Video Wall Layout, Right-click and choose Detach Layout.

**Playback in DW Spectrum**

DW Spectrum offers a smooth playback feature. See "Playback Panel" for more information on Playback interface.

The following can be played back:

- **Cameras** (see "Watching Cameras in DW Spectrum"). It is possible to view archive and live in Time Line among other features helping User to perform search archived footage.

- **I/O Modules**. Only sound can be recorded from I/O Module (if microphone is connected). It is possible to view archive and live in Time Line.

- **Local files: Video Files, Images** (see "Playing Back Local Files in DW Spectrum").

The following operations can be performed in addition to playback:

- **Forensic Analysis**
- **Exporting**
- **Adjusting Volume**
- **Tours**

Additionally users with appropriate permissions can perform the following operations:

- **Setting up and Controlling PTZ on PTZ and Fish-Eye Cameras**
- **Using 2-Way Audio**.

All operations described in this section do not require administrative privileges. However, some operations may require certain permissions. See "Introducing User Roles" for details.

**Watching Cameras in DW Spectrum**

DW Spectrum provides a powerful and easy camera playback engine that enables users to quickly find a video fragment, perform forensic analysis, capture screenshots and export video in just a few clicks.

This section provides a detailed description on camera playback. The following operations can be performed:

- **Navigating through Archive and Live**
- **Searching through Archive**

Note: It is recommended to read the following section prior to moving on to the next step: "CPU and Bandwidth Saving during Playback (RADASS)".

Lastly, videos can be displayed in a slide-show mode. See "Tours" for more details.
CPU and Bandwidth Saving during Playback (RADASS)

DW Spectrum's architectures provides significant CPU and network bandwidth savings by acquiring multiple streams from a single camera: High Resolution (regular) and Low Resolution (approximately 10 times less bandwidth). If there is not enough bandwidth between Client and Server to display the High Resolution stream while viewing a camera, then the camera is automatically switched to Low Resolution mode.

In case of insufficient CPU, a user may experience difficulties with displaying too many videos simultaneously (examples: running over 20 full high resolution videos at the same time, fast forwarding multiple full high definition videos at the x16 speed, etc.). In this instance, cameras are switched to a Low Resolution stream. As a result, CPU will yield a much smoother playback.

Additionally, it is possible to choose resolution manually. To do so, Right-Click on Scene's empty space and choose Change Resolution... The changes are applied once to the entire Layout and will be reverted back to Auto whenever a user re-opens Layout.

Note: this feature requires support of camera dual-streaming.

Lastly, DW Spectrum offers significant bandwidth savings by auto-pausing video. If viewing video from Camera in fullscreen, the video will be paused 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.

Navigating through Archive and Live

It is very easy to navigate through Live and Archive in DW Spectrum. Here are some tips and shortcuts.

IMPORTANT. It is only possible to navigate through recorded fragments (chunks). Position Slider to the dark area will jump to the next available recorded fragment (displayed in green on Time Line).

By default, all Cameras are set to display Live if opened for the first time.

Note: all Users are allowed to view cameras Live. However, to view Archive, Viewers must have the appropriate permissions.

Search Archive:

- Click on any desired position on Time Line or Time Scale.
- Drag Time Slider to the desired position. The picture will refresh while dragging.

Time Scale navigation:

- Zoom Time Scale using Mouse Wheel for finer selection
- Move Time Scale Scrollbar
- Double Click on Time Scale Scrollbar to zoom out

Go to Live:

- Press LIVE or L
- Move Position Slider all the way to the right
Note: Sometimes Live playback may stutter or there is too much time between actual action and action shown on Live view. In this case it is necessary to adjust Live buffer size.

Play/Pause: Press ▶ or Space

Fast Forward or Rewind:
- Press ▶ or Ctrl + Right Arrow to increase speed
- Press ▶ or Ctrl + Left Arrow to decrease speed
- Available speeds on play: -16x, -8x, -4x, -2x, 1x, 2x, 4x, 8x, 16x
- Available speeds on pause: -2x, -1x, -0.5x, -0.25x, 0x, 0.25x, 0.5x, 1x, 2x
- Use Speed Slider: very left position is -16x (-2x on pause), very right one – 16x(2x on Pause)
- Click on Speed Slider to change speed temporarily and then revert to 1x (0x on Pause)
- Drag Speed Slider to change speed permanently (or use Mouse Wheel on Speed Slider)
- If Rewinding while in Live mode, the position will be switched to Archive
- If Fast Forwarding while viewing archive, camera(s) will be switched to Live if the very right position is reached.

Previous/Next Frame (Pause only):
- Press ▶ or Ctrl + Right Arrow to skip to the next frame
- Press ▶ or Ctrl + Left Arrow to skip to the previous frame
- Use Mouse Wheel on Speed Slider when on Pause

Previous/Next Recorded Fragment:
- Press ▶ or Ctrl + Right Arrow to skip to the next frame
- Press ▶ or Ctrl + Left Arrow to skip to the previous frame

Useful sections:
- Pan-Temporal Time Line
- Navigating through Several Cameras Synchronously.

Pan-Temporal Time Line

Pan-Temporal Time Line is a convenient way to navigate through Live and Archive footage (below).

The current time is indicated by Position Slider. The very right position indicates that Live video is currently played back. If slider is moved to the left, the playback automatically is switched to the Archive.

IMPORTANT. It is not possible to navigate through the last minute of archive (this increment is represented in stripes).
**Time Scale** is displayed on the bottom of the **Time Line**. It contains marks indicating the time. **Time Scale** can be zoomed in and out by mouse wheel or buttons at the left. This is extremely useful when trying to find a particular event navigating through a long period of time. **Double Click** on **Time Line Scroller** (the very bottom) to fully zoom out.

To zoom to the particular region select the desired region by the following ways:

Select the region to export on **Time Scale**:

- Use **Right Click Drag**
- Open **Context Menu** on **Time Scale** and click **Mark Selection Start** (or press “[“), then **Mark Selection End** (or press “]”)
- To clear selection, use the corresponding **Context Menu** item
- Adjust the region to export by dragging edges.

Then open **Context Menu** on the Time Line and choose **Zoom to Selection**.

**Time Line** can display **Local** or **Server** time (specified in Local Settings). To change the setting:

1. Open **Main Menu** and choose **Local Settings**
2. Use the **Timeline Mode** setting in **Look and Feel**: select **Client Time** or **Server Time**.
3. Click **OK** when done or **Cancel** to discard changes.

خدام: **Export** and **Preview Search** features will depend on this settings as well. This setting does not affect **Recording Schedule** (always based on **Server Time**).

**Time Line**’s color indicators:

- **Black** – empty space (no recording took place in this period of time)
- **Green** – represent recorded fragments
- **Blue** – Bookmarks. See "Using Bookmarks"
- **Red** – motion regions. Displayed only if **Smart Search** is active. See “Performing Smart Search”.

It is possible to navigate through recorded fragments only. When moving **Position Slider** to the black area (no recording), it will jump to the next available recorded fragment. If several live **Cameras** are currently displayed, all recorded fragments are combined on **Time Line** (in the lower **All Cameras** line).

**Navigating through Several Cameras Synchronously**

DW Spectrum provides a powerful engine that enables users to navigate through multiple cameras: if several **Cameras** are displaying at the same time, they can be **synchronized**.
If User performs search, fast forward, rewind or search by frame – each camera will be synchronized. However, recording may be set up differently. If no recording took place over a certain period of time, NO DATA will appear on the camera view.

Recorded fragments are displayed on the Time Line in two rows:

- The upper row displays fragments for Camera selected on Scene
- The lower row – for all Cameras displayed on Scene

It is possible to disable Synchronization (press SYNC button). If no Item is selected, the selection will move to the previously selected item, which will become the only item affected by playback controls (seek, speed etc).

Thus, if Synchronization is disabled, it is possible to seek each Camera in a different position. In this case Time Line displays positions for all Cameras played back (see blue markers on the picture):

If User selects Camera on Scene and enables Synchronization again, all other cameras will get synchronized with the selected Camera (Position and Speed will be synchronized).

**Configuring Live Buffer Size**

On some cameras Live playback may stutter or there may be significant delays between actual action and action shown on Live view.

In this case it is necessary to adjust live buffer size. To do so, open Main Menu, choose Advanced, then adjust Maximum Live Buffer Length:

- bigger buffer makes playback smoother but increases the delay between real situation and live view,
- bigger buffer can cause stutters on playback but decreases the delay.

Adjust the value to smallest possible one without issues on live view on all cameras for better viewing experience.
Searching through Archive

DW Spectrum provides many features that make archive search faster, more convenient and intuitive. Since archive may contain significant video data (taken over several months), it is crucial to minimize the time spent by a user on searching a particular event.

The following search methods are introduced:

- **Calendar** – pan temporal time line can zoom in on selected date to make search easier (see "Using Calendar").
- **Smart Motion Search** – select a region on video and allow for the application to automatically refine the archive and highlight the fragments that involved motion. See "Performing Smart Motion Search".
- **Thumbnail Navigation** – small previews are displayed on top of the Time Line to help locate a particular scene. See "Using Thumbnails for Better Navigation".
- **Preview Search** – select a region and allow for the application to provide videos that represent a time period based on time stamps. See "Preview Search".
- **Bookmarks** – It is possible to select a part from a single Camera footage and give it a name, description and assign tags. This makes the search much easier. See "Using Bookmarks".

Finally

Using Calendar

This type of search helps the user to locate an event that took place on a particular date and time.

To perform a calendar search:

1. Open Camera that contains the archived event.
2. Press **CLND**. Calendar will appear above **Time Line**. The dates that are displayed on **Time Line** are highlighted in green:

   ![Calendar Grid]

   It is possible to pin Calendar if needed

3. Select a desired date in Calendar. To select multiple dates, use **CTRL**. Time Line zoom will automatically change to reflect the selected date(s) only. If the archive contains data outside the visible range, it will appear in shaded green:
4. Select a desired hour in the upper part Calendar. To select multiple hours, use CTRL. Time Line zoom will automatically adjust to display the selected hour(s) only.

Performing Smart Motion Search

Smart Motion Search enables User to perform fast and intuitive archived motion search.

To perform Smart Motion Search, select the desired region and DW Spectrum will display all fragments that contain motion throughout the archive (scanning through a yearly archive only takes a few seconds).

⚠️ IMPORTANT. Smart Motion Search in DW Spectrum assumes the selected Camera supports Motion Detection. It is important to perform motion setup as well. See "Setting up Motion Mask and Motion Sensitivity".

To perform Smart Motion Search:

1. Open Motion Grid on the camera:
   - use Camera’s Quick Button ()
   - open Camera’s Context Menu and choose Motion Grid (or select it and press Alt + G)

Motion Grid will appear:
Note: if red fragments appears in motion zones, Motion Detection is supported by Camera.

2. Select the region the motion should be searched on:

- Hold **Shift**, **Left Click and Drag**:  
- **Ctrl + Click and Drag** to add another region  
- Click and Hold Left Mouse Button or use Context Menu (Clear Motion Selection) to clear all regions.

**IMPORTANT.** Motion will not be visible and detected on a region marked as **Motion Mask**. 

As soon as the region is selected, **Time Line** will be populated with red bars. Each bar indicates recording period that contains motion.
IMPORTANT. Navigation in Time Line is possible by red fragments only until Smart Motion Search is off.

To disable Smart Motion Search, clear all regions in Motion Grid or disable pressing the \[\text{Context Menu Hide Motion Grid or Alt + G}\].

Using Thumbnails for Better Navigation

The Thumbnail feature is a fast and convenient way to navigate through archive. Thumbnails are single snapshots taken from archived video footage that are displayed on the Time Line. This feature serves as another useful forensic tool for analyzing video.

To open Thumbnails:

1. Click on the desired Camera.
2. Drag upper edge of Time Line. The small previews called Thumbnails will show up:

If no Thumbnails are displayed, then there is no archive available for this particular Camera.

Thumbnails panel can be re-sized. To re-size, point a mouse cursor over Time Line, click and pull it up or down.
The white dots under the pictures point on the exact archive place where the shot has been taken. When clicking on Thumbnail, the current playback position will jump to the corresponding spot in the archive.

To close Thumbnails, pull Thumbnails Panel down.

See also "Preview Search".

**Preview Search**

This feature helps to search data through large archives. It breaks the selected range of time into smaller time increments and displays these increments as separate **Items**. For instance, it breaks a month period into ten 3-days periods displaying them as separate **Items**, which makes it possible to locate a specific event in one of these periods (then breaking this period into nine 8-hour periods and so on). Finally location of a specific event in archive may take 3-5 such iterations for initial period of several months.

To perform **Preview Search**:

1. Select the desired camera on Scene.
2. Select the region to export on Time Scale:
   - Use **Right-Click Drag**
   - Open **Context Menu** on **Time Scale** and click **Mark Selection Start** (or press "["), then **Mark Selection End** (or press "]")
   - To clear selection, use the corresponding **Context Menu** item
   - Adjust the region by dragging edges to export
   - To make zooming easier, zoom on **Time Line** using a **Mouse Wheel**
3. Invoke **Context Menu** and choose **Preview Search**.
   
   New **Tab** will be opened. The **Tab** contains several **Items** representing the selected **Camera** in different periods.
If click on Items, the selection on Time Line will display the particular period in archive related to the selected Item.

If the selection does not contain archive data this feature is not available.

4. Locate the period of time the desired event took place and select appropriate Tab.

5. Repeat steps 1-3 on the desired Item on Preview Search Tab to refine search.

It is also possible to perform the following actions in Preview Search Tab:

- Navigate through archive
- Thumbnail Navigation
- Smart Motion Search
- Calendar Search
- Tours
- Screenshot
- Export.
Using Bookmarks

DW Spectrum provides Bookmarks – a way to mark specific parts of the archive to simplify further search. Bookmark belongs to a specific Camera and has the following parameters:

- Start time in the archive
- End time in the archive
- Name
- Description
- Tags.

Bookmarks can be created manually or automatically. The following sections describe how to create Bookmarks manually:

- Creating and Setting Up Bookmarks
- Search using Bookmarks
- Deleting Bookmarks.

Also Bookmarks can be created automatically when various Events occur. See "Create Bookmark" for details.

Creating and Setting Up Bookmarks

Bookmarks can be created manually or automatically when various Events occur. See "Create Bookmark" action for details.

To create Bookmark manually:

1. Open a desired Camera that has recorded footage.
2. Select the region to bookmark on Time Scale:
   - Use Right Click Drag
   - Open Context Menu on Time Scale and click Mark Selection Start (or press “[“), then Mark Selection End (or press “]“)
   - To clear selection, use the corresponding Context Menu item
   - Adjust the selected region by dragging edges
   - To make zooming easier, zoom Time Line using Mouse Wheel (or use Context Menu and click Zoom to Selection)
3. Invoke Context Menu and choose Create Bookmark...
4. Enter Name, Description and assign Tags. It is possible to use pre-defined tags or create new ones (most commonly used tags will be suggested) and click OK. It will be possible to perform search by all these fields. See "Search using Bookmarks".

After Bookmark is created it is visible on Time Scale and colored in Blue. If point mouse cursor over it, additional dialog will pop up:
Bookmarks will be visible if BOOK button is enabled on Time Line. Bookmarks are displayed for a specific Camera. If there are several Cameras opened on Scene, Bookmarks will be visible for selected Camera.

Finally DW Spectrum provides convenient way to search for a specific footage in the archive using Bookmarks. See "Search using Bookmarks".

**IMPORTANT.** Since the storage space is limited, archive is stored for a limited amount of time. When the storage runs out of space, DW Spectrum erases the oldest footage and records a new data. When the footage is deleted, all associated Bookmarks are deleted as well. See also "Configuring Maximum and Minimum Recording Time for Camera".

### Search using Bookmarks

Bookmarks will be visible if BOOK button is enabled on Time Line. They are colored in Blue. If point mouse cursor over it, additional dialog will pop up:

Bookmarks are displayed for a specific Camera. If there are several Cameras opened on Scene, Bookmarks will be visible for selected Camera.

However, if needed to find a specific marked footage in archive, it is possible to use Bookmark Search. Open Main Menu and choose Bookmark Search... or press Ctrl+B. The following dialog will open up:
The following operations are available:

- **Filter.** It is possible to specify **Dates** and **Cameras** to and display bookmarks on.
- **Edit Bookmark:** change Name, Description and Tags.
- **Search.** Type in the string. If **Bookmark** contain such string in **Name**, **Description** or **Tags**, it will be displayed.
- **IMPORTANT.** There is a limit of 1000 bookmarks that can be displayed on this form.
- **Play Bookmark.** If double-click a single record in table or invoke **Context Menu** and choose **Open in new Tab**, the corresponding **Bookmark** will be opened on a new layout.
- **Delete Bookmarks** (**Remove Bookmarks...** item in **Context Menu**).
- **Export a single Bookmark** (**Export Bookmark...** item in **Context Menu**). See "Exporting Bookmarks" as well.

### Deleting Bookmarks

**Bookmarks** can be deleted directly from **Time Scale** (one by one) or from the **Bookmark Search** dialog (multiple).

Only user-created **Bookmarks** can be deleted.

To delete **Bookmark** from **Time Scale**:

1. Find **Bookmark** on **Time Scale**. To make zooming easier, zoom **Time Line** using a **Mouse Wheel** (or use **Context Menu** and click **Zoom to Selection**)

2. Point mouse cursor over **Bookmark** and click or invoke **Context Menu** and choose **Remove Bookmark**...

To delete **Bookmark** from **Bookmark Search** dialog:
1. Open **Main Menu** and choose *Bookmark Search*... or press **Ctrl+B**

2. Using **Filter** and **Search** select desired **Bookmarks** (it is possible to use mouse drag, **Ctrl** and **Shift** to select multiple rows), open **Context Menu** and choose **Remove Bookmarks**...

⚠️ **IMPORTANT.** Since the storage space is limited, archive is stored for a limited amount of time. When the storage runs out of space, DW Spectrum erases the oldest footage and records a new data. When the footage is deleted, all associated **Bookmarks** are deleted as well. See also "**Configuring Maximum and Minimum Recording Time for Camera**".

### Viewing Archive from Deleted Cameras

If Camera have been deleted, Users lose access to its footage. However index rebuild will make such footage available again.

See "**Restoring Broken Archive**".

After the archive is restored, the deleted Camera will be displayed in **Resource Tree** (but will be marked offline). It will be possible to navigate through archive on this Camera.

### Playing Back Local Files in DW Spectrum

In addition to powerful camera playback engine DW Spectrum can also act as **Media Center**: it can play back almost any file. Most major codecs and most major containers are supported. This section contains detailed description of **Local Files** playback:

- **Local files structure in Resource Tree**
- **Configuring Media Folders**
- **Opening Local Files Outside of Media Folders**
- **Navigating Through Local Files**.

Additionally it is possible to export fragments from video files (see "**Exporting**") and to take screenshots (see "**Taking Screenshot**").

Finally, all features described in the "**Forensic Analysis**" section can be applied to local files.

If User is connected to System, all Local files operations, described in this sections, are available. If not, it is necessary to switch to Local Files Playback Mode: open **Main Menu** and choose **Browse Local Files**.

To switch back to System connection page open **Main Menu** and choose **Show Welcome Screen**.

⚠️ **IMPORTANT.** Some video files may contain 5.1 sound stream. In order to play back those files on stereo speakers:

1. Open **Main Menu** and choose **Local Settings (General tab)**.
2. Check **Downmix Audio from 5.1 to 2.1 Channels**.
3. Restart **Client**.
Local files structure in Resource Tree

All local files are displayed in Resource Tree under the Local node, which include:

- Files that are located in **DW Spectrum Media Folders** (see “Configuring Media Folders”)
- Recently opened local files (see “Opening Local Files Outside of Media Folders”)
- Exported files (see “Exporting”)
- Screen Recordings (see “Screen Recording”)
- Screenshots (see "Taking Screenshot").

⚠️ **IMPORTANT.** All files except the ones in media folders, are displayed in Resource Tree until DW Spectrum is restarted. When saving or restoring Layout that contains Items located outside the media folders, they will get restored in Resource Tree as well.

Configuring Media Folders

When DW Spectrum starts, it automatically indexes local media folders in order to find and display local files in Resource Tree. By default, the current user's video folder (C:\Users\$User\Videos) is configured as media folder.

To configure unlimited number of media folders:

1. Open Main Menu and choose Local Settings.
2. Go to General.
3. If needed to change Main Media Folder, click Browse and choose the desired path.
4. Configure Extra Media Folders:
   - To add extra media folder click Add... and choose the desired path.
   - It is possible to perform standard files and folders operations in this form (similar to Windows Explorer).
   - To delete an extra media folder, select the folder from the list and click Remove.
5. Click OK when finished (or Cancel to discard changes).

As soon as media folders are configured, DW Spectrum should be restarted. Then files from the specified media folders will be visible in Resources Tree (under the Local node). It is possible to place such resources in Layouts. Search is also available for Local Files.

See also "Opening Local Files Outside of Media Folders".

Opening Local Files Outside of Media Folders

It is possible to open Local Files outside Media Folders and thus are not visible in Resource Tree.

Use one of the following:

- **Drag-n-Drop one or several video files** from Windows Explorer to DW Spectrum window
- **Drag-n-drop a folder containing video files** from Windows Explorer to DW Spectrum window
- Open Main Menu and choose Open -> File(s)... (or use Ctrl + O) then choose the file(s) to be opened
- Open Main Menu and choose Open -> Folder... then choose a folder to be opened
• Invoke **Context Menu** on **Scene** (on empty space) and choose **Open → Folder...**, then choose a folder to be opened. Any opened files will be shown in **Resource Tree** until DW Spectrum is restarted. If restore **Layout** that contains **Items** located outside of **Media Folders** they will be restored in **Resource Tree** as well.

**Navigating Through Local Files**

Navigation through **Local Files** very similar to the navigation through **Camera** archive, except:

- All items are **not synchronized** (**Sync** is always disabled)
- **No Live** for **Local Files**
- **Time Line** is not colored (no recorded or motion regions).
- **and** buttons move position to the beginning or to the end of the file.

All other operations (seek, play, pause, ff/rew, etc.) are described in details in "[Navigating through Archive and Live](#)".

⚠️ **IMPORTANT.** If **Scene** contains both **Cameras** and **Local Files**, **Cameras** are played back synchronously and **Local Files** – independently.

**Forensic Analysis**

DW Spectrum provides a wide number of features for forensic analysis of recorded streams. This section explains how to perform forensic analysis in the application:

- **Expanding Items to Fullscreen**
- **Zoom**
- **Rotate**
- **De-warping Fish-Eye Cameras**
- **Image Enhancement**.

**Expanding Items to Fullscreen**

In order to perform forensic analysis, it is recommended to switch the desired **Item** to **Fullscreen**.

To toggle **Fullscreen**, proceed with one of the following:

- **Double Click** on the desired **Item** on **Scene**
- Open **Context Menu** and select **Maximize Item/Restore Item** (or press **Enter**)

When in **Fullscreen** mode, all **Side Panels** are hidden. Use ">" buttons at the edges of panels to appear.

If several **Cameras** are displayed simultaneously, then the recorded fragments are combined on **Time Line**. If **User** switches **Item** to **Fullscreen**, only recorded fragments related to the selected **Item** are visible.

🔍 **Note:** it is possible to expand **Items** to **Fullscreen** sequentially (like slide-show). See "[Tours](#)" for more information.
Zoom

Zoom is extremely useful when it comes to working with high resolution Cameras. It is possible to Zoom in on single Item in Fullscreen or whole Layout if needed.

To Zoom in/out:

- use a Mouse Wheel which will only Zoom on the area that has a cursor over it
- use “+”/”-” keys (zoom relatively to the center of the Scene).

To move the zoomed Item, use either Left or Right Mouse Button. If Layout is zoomed, Left Mouse Button is reserved for Item drag. In this case, use Right Mouse Button.

To restore the initial size of an item, use Double Click.

To zoom on the entire Layout, use Mouse Wheel.

Rotate

Rotation can be performed using Item’s Quick Button (⾵). Just Click and Hold Item and Drag the Mouse to rotate Item on Scene:

![Link Image]

It is possible to use Item’s Context Menu (Rotate to...):
Finally it is possible to rotate Item while holding Alt (Left Click and Drag mouse). Release when finished.

To perform incremental rotation (using 30 degrees step), hold Ctrl while rotating (with Alt or  ). Release when finished.

**De-warping Fish-Eye Cameras**

DW Spectrum provides a dewarping feature to be able to view fish-eye cameras. To activate this feature on Cameras, dewarping must be configured for Camera. See "Setting Up Fish-Eye Cameras".

After all configurations are completed, the button will appear on the Camera Item:

Once clicked, the button will activate dewarping and enable the following controls:
• **Left-Click** on the item, **Hold Left Mouse Button** and **move the cursor** to move **Camera** on the desired position.

• Use + and - buttons to zoom in/out

• Move to a certain position – **Left Click** on the desired position.

DW Spectrum does not perform any dewarping when taking screenshots from Fish-Eye Lens Cameras. However, the image can be dewarped later. See "De-warping Screenshots Taken from Fish-Eye Cameras".

It is possible to select **Dewarping Panoramic Mode** (the circle on the right). Once clicked, it will show the image as a 90, 180, or 360 degree panoramic view:

Press □ again to disable dewarping and hide controls.
Note: Export and Taking Screenshots features will depend on this setting as well: if dewarping is enabled, the screenshot will be dewarped automatically and the Export dialog will suggest this feature (can be disabled).

It is important to place Zoom Windows on the originally warped camera:

As displayed above, all zoom windows are dewarped automatically. Configure the zoom windows and Save Layout.

Note: this feature can be applied to images as well.

De-warping Screenshots Taken from Fish-Eye Cameras

DW Spectrum does not automatically dewarp while taking screenshots from a fish-eye camera. However, the image can be dewarped later.

To dewarp an image:

1. Right-Click on the image to open Context Menu and select Camera Settings...
2. Move to Fisheye tab and click *Fisheye Dewarping* to enable:
3. Set the following parameters:

- **Camera**'s orientation - type of de-warping algorithms based on orientation.
- **Calibration** - to avoid de-warping artifacts, it is important to position the calibration circle within the Camera's view as accurately as possible. First, try *Auto Calibration*, then manually adjust the viewing range (if needed):
  - Use scrollers to move the circle horizontally or vertically (or drag it with a mouse)
  - Use a mouse wheel to resize the circle
- **Camera**'s view angle.
  
  📝 **Note:** It is recommended to keep image on Scene to monitor any image changes while adjusting settings.

4. Click Apply or OK when finished. To discard changes, click Cancel.

Once a screenshot is determined to be as a fish-eye screenshot, dewarping can be performed as usual (button on the image). See "Dewarping Fish-Eye Cameras" for details.

**Image Enhancement**

To enhance the image on darker scenes, DW Spectrum offers **Image Enhancement**. Not only can this feature be applied to Cameras, it can also enhance local files and pictures as well (except Screenshots, taken within DW Spectrum).

To activate **Image Enhancement**, click on the button located on the item:

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Note: Export and Taking Screenshots features will depend on this setting as well: if dewarping is enabled, the screenshot will be dewarped automatically and the Export dialog will suggest this feature (can be disabled).

To adjust additional settings:

1. Invoke Context Menu and select Image Enhancement… (or use Alt + J). The following dialog will open:

   - **Enable image enhancement**
   - **Gamma** – the lesser the value, the lighter the image will be. Set Auto for recommended values.
   - **Black** and **White Levels** (information is located in the Histogram section). Refrain from cutting too much of left or right areas on the histogram – this will result in losing important graphical information.
   - Click Restore Defaults to reset settings.

2. Click Enable enhancement and configure desired parameters:
   - **Gamma** – the lesser the value, the lighter the image will be. Set Auto for recommended values.
   - **Black** and **White Levels** (information is located in the Histogram section). Refrain from cutting too much of left or right areas on the histogram – this will result in losing important graphical information.
   - Click Restore Defaults to reset settings.

3. Click Apply or OK when finished. To discard changes, click Cancel.

   Note: in most cases, it is not necessary to perform any additional adjustments.
Using 2-Way Audio

DW Spectrum allows playing sound directly on devices (Cameras or I/O Modules). It can be initiated manually or automatically.

Currently this feature is supported on Axis devices with firmware 5.x or higher.

If the device supports 2-way audio, the following button appears:

To manually say something on camera press the button and hold while speaking. It is necessary to have a microphone connected and set up. Use spectrum analyzer check the level while the button is pressed and hold:

When the button is released, the transmission is over.

It is possible to play sound or say a text on a device when an event occurs. See "Play Sound, Repeat Sound, Speak" topics for more details.

Exporting

DW Spectrum provides powerful and flexible Export capabilities. It is possible to perform Export in different formats, Export several videos simultaneously and perform synchronous playback of such videos, add metadata to exported videos etc.

Existing Export options:
• **Single Camera Export.** Allows exporting to AVI and MKV formats. Adds time stamps to exported video (start and end time).

• **Multi-Video Export.** Allows exporting to proprietary format (should be played by DW Spectrum) as well as executable bundle (can be viewed on every Windows computer). Export is performed with additional metadata (time stamps, recorded fragments data, motion etc).

• **Rapid Review Export.**

• **Checking the Validity of Exported Videos**

• **Taking Screenshots.**

![Note: Export are available to Administrators and Viewers that have appropriate permissions.](image)

**Single Camera Export**

This section provides information on how to export video from a single Camera's archive or Local Video File:

• **Exporting Recorded Region from a Single Camera**

• **Viewing Videos Exported from a Single Camera.**

Bookmarks can be exported as well. See "Exporting Bookmarks".

See "**Multi-Video Export**" for information on exporting from several Cameras or Local Files simultaneously.

**Exporting Recorded Region from Single Camera**

DW Spectrum supports Export in two media formats: Matroska (mkv) and avi. These formats are supported by most players (additional codecs may be required for playback).

**Export** can also be done for Local Video Files. To Export:

1. Select the desired **Item** on Scene (Camera or Local Video File).

2. Select the region to export on **Time Scale**:
   - **Use Right Click Drag**
   - Open **Context Menu** on Time Scale and click Mark Selection Start (or press “[“), then Mark Selection End (or press “]”)
   - To clear selection, use the corresponding **Context Menu** item
   - Adjust the region to export by dragging edges
   - To make zooming easier, zoom **Time Line** using **Mouse Wheel** (or use **Context Menu** and click Zoom to Selection)

3. Invoke **Context Menu** and choose Export Selected Range:

If the selection does not contain archive data, this feature is not available. If the selection starts with empty archive, the exported footage will start from the first available frame (empty archive will not be exported). If the selection contains empty archive in the middle, it will still be exported and not show when viewing the exported footage.

![Note: if a long period of time is selected for export, export may be slightly delayed. In this case, the following warning will appear:](image)
You are about to export a long video. It may require over a gigabyte of HDD space and take several minutes to complete.

In this case, it is possible to continue working with DW Spectrum while exporting.

4. Choose the desired **file name**, **format** and **location** and click **Save**:

   ![Note] if **Image Enhancement**, **Forcing Aspect Ratio**, **Camera Orientation** or **De-warping** were applied to the exported source, it will be suggested to the user to keep these settings (may be disabled if needed). Additionally, it is also possible to render date and time on the video (**Timestamps** dropdown list). However, these settings will require **transcoding** on client, so **may take a longer period of time with slightly decreased quality and increased processor load up to 100% during export**. These settings are not applied for the **EXE** format.

File and folder operations are performed in the same manner as in Windows Explorer.

The following formats are supported:

- **AVI** is more widely used, but the codec remains intact (H264). To view exported videos in other players may require additional codecs. Additionally some codecs are not allowed in **AVI** format. A warning message will appear. This is a default format.

- **MKV** is a more advanced format, but may not be played back on some devices (ex: home media players). It does not restrict video and audio content.

- **MP4** is another advanced format as well, but may not be played back on some devices (ex: home media players). It does not restrict video and audio content.

- **EXE** is used for distributing videos to the users who do not have any codecs or media players installed. As soon as this executable is started, new **Client** instance is run and plays back the exported video. In this case, **the data on motion and recorded fragments is also exported**.

   ![Note] Following warning will appear if the file is larger than 4GB.

   ![EXE format not recommended] EXE files over 4 GB cannot be opened by double click due to a Windows limitation. Export to EXE anyway?

   ![Export] Cancel

   ![IMPORTANT] Files produced with the **x64** version of software will only be viewable on Windows **x64**; however, **x86** can be viewed on any architecture.

As soon as export is finished, the video will be available in **Local Files** in **Resource Tree**.

   ![Note] this resource will be available until **Client restarts**. To make it available permanently, save the exported video to DW Spectrum **Media Folder** (see “**Configuring Media Folders**”) or create and save a **Layout** that would contain this video.

Also, see the "**Viewing Videos Exported from a Single Camera**" section for more information.
**Exporting Bookmarks**

DW Spectrum provides **Bookmarks** – a way to mark specific parts of the archive to simplify further search (see "Using Bookmarks"). Since **Bookmark** is a part of archive, it can be exported as well. To export **Bookmark**:

1. Open **Main Menu** and choose **Bookmark Search**... or press **CTRL+B**
2. Using **Filter** and **Search** select desired **Bookmark** (it is possible to use mouse drag, CTRL and SHIFT to select multiple rows). To play **Bookmark**, double-click a single record in the table or invoke **Context Menu** and choose **Open in new Tab**; the corresponding **Bookmark** will be opened on a new layout.
3. Click **Export Bookmark...** item in **Context Menu**.
4. Choose the desired **file name**, **format** and **location** and click **Save**. The process of exporting Bookmarks is similar to exporting footage from single **Camera**. See "Exporting Recorded Region from Single Camera" for details about formats and export specifics.

**Viewing Videos Exported from Single Camera**

As soon as export is finished, the extracted video clip will be available in **Local Files** in **Resource Tree**. Note that **AVI** and **MKV** files are shown as a single record and **EXE** file - as **Folder** containing exported **Camera**.

It is possible to open either an **EXE** file (it will be displayed in new **Tab**) or open a camera - it will be displayed as single **Item**.

When the exported file is opened, **Time Line** will display the exported time range:

![Time Line](image)

If **EXE** bundle is opened, then the recorded fragments and motion will be displayed on the Time Line as well:

![Time Line](image)

⚠️ **Note**: start and end time points **differ from a regular Local File**. It is the start and end time of the **exported fragment**. When viewing information, the time will be displayed in **Item**'s bottom right corner.

**Multi-Video Export**

This section provides detailed information on how to export video from a single **Camera**'s archive or **Local Video File**:

- Exporting the Layout in Multi-Video Format
- Viewing Multi-Videos
- Changing Multi-Videos after Export.

Also, see the "**Single Camera Export**" section for information on exporting video from a single **Camera** or **Local File**.
Exporting Layout in Multi-Video Format

DW Spectrum provides a powerful feature to perform Export in a proprietary format, which has many benefits in comparison to standard Export (see "Exporting Recorded Region from Camera"):

- It is possible to export several videos simultaneously (for instance, it is possible to export the last hour of recording from five cameras). The exported files are saved as regular Layout and can be opened in DW Spectrum. The exported Multi-Video can be navigated through as any other layout (see "Navigating through several cameras synchronously"), perform Smart Motion Search, etc. It is possible even do Multi-Video Export from Multi-Video.

- It is possible to export additional information (recorded chunks and motion).

- It is possible to prepare a bundled version that can be run and viewed on clean Windows systems.

To do Export in proprietary format:

1. Place the desired Items on Scene. A user cannot export Local Video Files into Multi-Videos.

2. Select the export region on Time Scale:
   - Use Right Click Drag
   - Open Context Menu on Time Scale and click Mark Selection Start (or press “I”), then Mark Selection End (or press “J”)
   - To clear selection, use the corresponding Context Menu item
   - Adjust the export region by dragging edges
   - For easier zoom, scroll Mouse Wheel on Time Line.

3. Open Context Menu and choose Export Multi-Video:

   If the selection contains empty archive on Camera, it will be exported and NO DATA will be shown when viewing the exported clip.

   📝 Note: if a long period of time is selected for export, it may cause delays. In this case, 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.

   In this case, it is possible to continue working with DW Spectrum while exporting.

4. Choose the desired file name, format and location and click Save (Cancel will close the dialog and no exported data will be saved):

   File and folder operations are performed in the same manner as in Windows Explorer.

The following formats are supported:

- **NOV** – a proprietary format. Can be opened by DW Spectrum Client only. Can be changed if needed (see "Changing Multi-Video after Export").

- **NOV (Read-Only)** – a proprietary format. Should be opened by DW Spectrum. Cannot be changed.

- **EXE** – an executable bundle (platform dependent – x86 or x64). Can be opened without DW Spectrum installed on the computer. Can be changed in the future if needed (see "Changing Multi-Video after Export").

- **EXE (Read-Only)** – a proprietary format (platform dependent – x86 or x64). An executable bundle. Can be opened without DW Spectrum installed on the computer. Should be opened by DW Spectrum. Cannot be changed.
EXE is used for distributing videos to the users who do not have any codecs or media players installed. As soon as the bundle is started, the Client is run and it plays back the exported video. In this case, the data on motion and recorded fragments is also exported.

**IMPORTANT.** Files produced with the x64 version of software will only be viewable on Windows x64; however, x86 can be viewed on any architecture.

As soon as export is finished, Multi-Video will be available in local files.

The following operations can be performed:

- View videos (see "Viewing Multi-Videos") as Layouts
- View single Items from the videos
- Edit Multi-Videos if not read-only (see "Changing Multi-Video after Export").

### Viewing Multi-Videos

After performing Multi-Video Export, the exported file is displayed in local files as follows:

![Local Files]

The following operations can be performed:

- View a single camera from Multi-Video. Perform actions described in "Adding Items to Layouts".
- Open entire Multi-Video. It will be opened as a regular Layout on a separate Tab. Perform actions described in "Opening and Closing Saved Layouts".
- Delete items from Multi-Video. See "Changing Multi-Video after Export".

When Multi-Video is opened, the following standard features can be performed:

- **Navigation through archive**
- **Thumbnail Navigation**
- **Preview Search**
- **Smart Motion Search**
- **Calendar Search**
- **Tours**
- **Screenshots**
- **Single Camera Export**
- **Export (incl. Multi-Video Export)**
- **Checking the Validity of Exported Videos**
- **Layout Reconfiguration**
• **Forensic Analysis.**

Any capabilities possible with **Cameras** can also be performed with **Multi-Videos** in DW Spectrum.

**Changing Multi-Videos after Export**

DW Spectrum offers many possibilities when working with **Multi-Videos**. A user can do almost everything as with regular **Layout**:

- Add or remove **Items**. For instance, if **Multi-Video** was exported from **10PM** to **11PM** and a new camera was added, it would get synchronized with other cameras and be displaying in the same archive (**10PM – 11PM**). See "**Adding Items to Layouts**" and "**Removing Item(s) from Layouts**".

  🔄 **Note**: Local Files are not allowed in Multi-Videos

- Adjusting **Layout Look and Feel** (move, swap, resize, rotate). See "**Adjusting Layout’s Appearance**".

- Save modified **Multi-Video**. One restriction is applied: it is not possible to mix **Local Videos** and **Cameras** in a single **Multi-Video**. Same as **Layouts** (see "**Saving Layouts**"), but can be performed by **Viewers**.

  🔄 **Note**: **Multi-Video** can be saved with a read-only flag (modifications will not be saved).

**Rapid Review Export**

DW Spectrum introduces a feature that allows users to export video with higher speed that the original one (timelapse mode) - **Rapid Review**.

To do **Rapid Review Export**:

1. Select the desired **Item** on **Scene** (**Camera** or **Local Video File**).
2. Select the region to export on **Time Scale**:
   - Use **Right Click Drag**
   - Open **Context Menu** on **Time Scale** and click **Mark Selection Start** (or press "["), then **Mark Selection End** (or press "]")
   - To clear selection, use the corresponding **Context Menu** item
   - Adjust the region to export by dragging edges
   - To make zooming easier, zoom **Time Line** using **Mouse Wheel** (or use **Context Menu** and click **Zoom to Selection**)
3. Invoke **Context Menu** and choose **Export Rapid Review**:
Specify the desired settings and click OK. It is possible either specify the target speed or target video length. See Initial Video Length and Frames Interval for reference as well.

4. Choose the desired **file name**, **format** and **location** and click **Save**:

   **IMPORTANT.** If Image Enhancement, Forcing Aspect Ratio, Camera Orientation or De-warping were applied to the exported source, it will be suggested to the user to keep these settings (may be disabled if needed). Additionally, it is also possible to render date and time on the video (Timestamps dropdown list). However, these settings will require transcoding on client, so may take a longer period of time with slightly decreased quality and increased processor load up to 100% during export.

   File and folder operations are performed in the same manner as in Windows Explorer.

   The following formats are supported:

   - **AVI** is more widely used, but the codec remains intact (H264). To view exported videos in other players may require additional codecs. Additionally some codecs are not allowed in AVI format. A warning message will appear. This is a default format.
   - **MKV** is a more advanced format, but may not be played back on some devices (ex: home media players). It does not restrict video and audio content.

   As soon as export is finished, the video will be available in **Local Files** in Resource Tree.

   **IMPORTANT.** This resource will be available **until Client restarts**. To make it available permanently, save the exported video to DW Spectrum Media Folder (see “Configuring Media Folders”) or create and save a Layout that would contain this video.

### Checking the Validity of Exported Videos

**Watermark** allows **Users** to check for validity of footage to determine whether or not any modifications were ever performed to the native footage. Any videos exported by DW Spectrum (either single **Cameras** or **Multi-Videos**) can be checked for validity.

To check the validity of exported videos:

1. Bring the desired video onto the scene
2. Open **Context Menu** and select **Check File Watermark** (or press **Alt + C**)

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3. If the file is in its original state, the check will succeed:

![Image of a checked file with Watermark Matched]

4. If any modifications took place, the check will fail:

![Image of a checked file with Invalid watermark]
**Taking Screenshots**

**Screenshot** can be taken from both **Cameras** and **Local Video Files** to **PNG** or **JPG** output formats.

⚠️ **IMPORTANT.** If **Image Enhancement** and/or **De-warping** capabilities were initially applied to the exported source, they will be retained while rendering the screenshot.

To take **Screenshot** from a video:

1. Select the desired **Item** on **Scene**.
2. Seek to the desired position (frame seek will help). See "Navigating through Archive and Live".
3. Click the 📸 button on the item.
4. Choose the desired file name and location and click **Save** (**Cancel** will close the dialog and data will not be saved):

   📝 **Note:** check **Include Timestamp** to insert playback time in the screenshot (enabled by default).

It is possible to place timestamps on screenshots (use **Timestamps** dropdown list).

File and folder operations are performed in the same manner as in Windows Explorer.

Once saved, **Screenshot** will be available in **Local Files** within **Resource Tree**.

⚠️ **IMPORTANT.** This resource will be available until **Client restarts**. To make it available permanently, save the exported video in the DW Spectrum **Media Folder** (see “Configuring Media Folders”) or create and save a **Layout** that would contain this video.

### Adjusting Volume

To adjust **Volume**, use one of the following:
• Use **Volume Slider** (at the right of the **Time Line**)

  ![Volume Slider](image)

• Use a **Mouse Wheel** above the slider

• Use **Ctrl + Up/Down**

• Use ✖️ button or use “M” key to mute/unmute.

⚠️ **IMPORTANT.** The volume level will affect the following system Actions: Speak, Play Sound and Repeat Sound. Note: notifications will not be heard if on mute.

### Tours

If several **Items** are opened on Scene, this feature will provide the ability to automatically switch to the next **Item** in a **Fullscreen** mode (like **slide show**). To start **Tour**:

1. Select several **Items** (see "Adding Items to Layouts")
2. Open **Context Menu** and select **Start Tour** (or press Alt+T)

To stop **Tour**, **Double-Click** or press any key.

To change sequence speed (the frequency in between **Items** during **Tour**):

1. Open **Main Menu** and go to **Local Settings**
2. Specify the desired delay (in seconds) in **Sequence Cycle Time** at the **Look and Feel** tab.

### Using DW Spectrum as Web Browser

Not only can DW Spectrum act as media player and display video from Cameras, it can display web pages on Scene as well.

This may be useful, for instance, for modifying Camera parameters on Camera webpage or open an external System (Access Control, or Analytics) and do surveillance monitoring in the same time.

⚠️ **Note:** The embedded web browser have limited functions and not compatible with public websites, webmail and social media site.

To open a web page:

1. Do one of the following:
   1. Go to **Main Menu** and choose **New -> Web Page**...
   2. Right-click on Web Pages node within **Resource Tree** and select **New Web Page**...
2. Type in the desired URL. The web page will be added to **Resource Tree**.
3. Double-click the new record or drag it to Scene to open up the web page.

Then it is possible to navigate on the web page the same way as in a web browser.

The following additional actions can be performed:
Screen Recording (Windows Only)

This is an extremely useful feature in DW Spectrum for presentations. It is possible to record from several displays with sound, select different quality, etc.

Screen can be recorded in the following formats:

- Video: MPEG4 Part 2
- Audio: Stereo (Lame Audio Codec)
- Container: AVI

⚠️ IMPORTANT. It is necessary to have a powerful processor and video adapter to do screen recording. See recommended configuration in the installation guide.

Setting up Screen Recording

To set up Screen Recording:

1. Open Main Menu and choose Local Settings.
2. Go to the Screen Recording tab.
3. Configure Screen Recording 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 should be accessible and writable.
   - Capture Mode: Fullscreen (if several monitors are installed the desired one should be chosen) or Application Window (only DW Spectrum window will be recorded).
   - Disable Aero – select this option to enhance performance. If chosen, once Screen Recording is in progress, Windows Aero will be turned off.
   - Capture Cursor – select this checkbox if a mouse cursor needs to be visible during recording.
   - Resolution – select screen resolution. The lower the resolution, the higher the performance.
   - Primary and External device – select sound devices to enable audio. Audio will get mixed from both devices. The best practice is to select master from the sound card as primary and microphone as secondary. In this case, both sounds from DW Spectrum (i.e. video clips) and microphone will be recorded simultaneously.
4. Click OK when done or Cancel to discard changes.

⚠️ Note: If you want to record audio over the screen recording, set the Audio Input device from Local Settings -> General tab

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Performing Screen Recording

To run Screen Recording, open Main Menu and select Start Screen Recording (or press Alt + R). Screen recording will start in 3 seconds.

⚠️ IMPORTANT. If audio parameters are setup incorrectly, Screen Recording will not start:

In this case it is necessary to do the following:

1. Set up audio card parameters in Windows, check and select default recording devices. Then try to record sound in Windows Recorder.
2. Set up Screen Recorder Parameters (see "Setting up Screen Recording").

When finished, open Main Menu and select Stop Screen Recording (or press Alt + R).

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. This resource will be available until Client restarts. To make it available permanently, save the exported video to DW Spectrum Media Folder (see “Configuring Media Folders”) or create and save a Layout that would contain this video.

Upgrading DW Spectrum

DW Spectrum provides powerful and convenient way to upgrade the whole system in one click. This feature makes easy to upgrade systems that have systems on different platforms, locations and devices without the need to physically login to computers Servers are installed on.

Upgrade is performed in the following cases:

- If a new version of DW Spectrum is released, the notification pops up. It is possible either upgrade to this version or disable such notification.

⚠️ Note: You can disable the notification by disabling the server check updates. From the System Administration -> Updates tab, uncheck the Check for updates automatically.

☐ Check for updates automatically
If new build that fixes a particular issue is released, the support team recommends to upgrade to a particular version.

To go to upgrade dialog open **Main Menu** \(\rightarrow\) **System Administration** \((CTRL+ALT+A)\) \(\rightarrow\) **Updates** tab.

### Online Upgrade

The latest available version is displayed next to **Available Update**.

- To upgrade to the latest version click **Update**. The update process will start
- To upgrade to the **Specific Build**, click Get a specific build and enter the build number followed by the password (should be provided by support team). The update process will start

**IMPORTANT.** The upgrade to the Specific Build is to address specific matter and not required to update.

### Offline Upgrade

Sometimes the security reasons do not allow DW Spectrum to access the Internet. In this case DW Spectrum can be upgraded offline.

1. Switch from **Update from Internet** to **Update from Local Source...** (link above **Available Update**).
2. Copy the **Archive URL** string to clipboard (use the corresponding button or select the text and press **CTRL+C**).
3. Create new shortcut on Operating system and paste URL.
4. Copy the shortcut to an external drive.
5. Plug the external drive to a computer that has access to the Internet and open the created shortcut. The download will begin.
6. Save the downloaded package to the external drive.
7. Plug the external drive back to the computer in the private network.
8. Click on ellipsis button (...) next to **Update from file**: and choose the downloaded filename from the external drive. The update process will start.
Upgrade process can take some time. Issues may occur during the upgrade process for various reasons (most common one is if one Server goes offline or becomes inaccessible). In this case try to repeat the upgrade.

⚠️ IMPORTANT. Ensure that all servers in the system are upgraded.

**Troubleshooting and Contacting Support**

The following issues can be resolved manually:

- **If Camera** is not working properly, a user should always diagnose it. See "Diagnosing Offline Devices" for more information.
- **If archive is lost**, DW Spectrum will restore it. See "Restoring Broken Archive" for details.

To contact support, use the following link: `<%COMPANY.SUPPORT.ADDRESS%>.

When posting an issue, it is necessary to describe the problem as detailed as possible. It is useful to provide additional information such as log files, network configuration, etc. If possible please provide administrator login credentials as well.

To expedite investigation, it's best to **Provide Remote Access**. If remote access cannot be provided for security reasons, the following steps should be taken in creating a support ticket:

- **Recording Issue**
- **Collecting Logs**
- **Collecting Additional Information**
- **Sending Anonymous Usage and Crash Statistics**.

If the issue is related to a specific Camera compatibility, Support team will likely provide a specific build that should solve this particular problem. Then it will be necessary to upgrade System to this build. See "Upgrading DW Spectrum" for more information.

**Diagnosing Offline Devices**

Sometimes cameras are displayed in Resource Tree, but are marked with a ☐️ sign. When opening such camera, it will display **NO SIGNAL**. DW Spectrum will then prompt the user to perform more thorough diagnostics.

⚠️ IMPORTANT. Run diagnostics prior to contacting support.

Diagnostics can be invoked by pressing on the item:
Once complete, reasons and recommended actions will be displayed:

Diagnostics for camera DWC-MB421TIR (192.168.1.123)

Confirming server availability.
OK

Confirming camera is accessible.
FAILED: Cannot connect to http port 8032. Make sure the camera is plugged into the network. Try to reboot the camera.

Diagnostics complete

Follow instructions to resolve the issue. If unsuccessful, contact support (see "Troubleshooting and Contacting Support"). Click Copy to Clipboard and paste the data into the message prior to sending it to support.

Sometimes cameras are displayed in Resource Tree, but are marked with a sign. When opening such camera, it will display UNAUTHORIZED. This is when the credential entered in the camera setting is invalid.

In this case click on the Camera Settings and reenter the correct credential for the camera
Double Buffering

On some graphic cards drivers may have problems with OpenGL drawing. This may result in 100% CPU load. In this case the issue may be resolved by enabling **Double Buffering**.

To do so, open [Main Menu](#), choose *Local Settings (General tab)*, then toggle *Double Buffering* and restart Client.

Restoring Broken Archive

DW Spectrum uses a specific directory on each network drive. However, sometimes archive is moved for various reasons (ex, a hard drive was replaced, hard drive's letter was changed. etc), possibly resulting in a complete removal of archive from the system.

DW Spectrum can easily restore the lost archive. To perform archive restoration:

1. Open the [Server Settings](#).
2. Click on *Reindex Archive*.
3. The process can take a long time. Click *Yes* to proceed.
   - Restoration can be canceled in any moment.
   - If the window is closed, the restoration will continue running in the background.

The system can continue recording while the archive is being restored.

If Camera have been deleted, Users lose access to its footage. However index rebuild will make such footage available again. See "[Viewing Archive from Deleted Cameras](#)" for details.
Providing Remote Access

The best possible way to help investigate an issue is to provide remote access via one of the following applications:

- **Team Viewer** ([http://www.teamviewer.com](http://www.teamviewer.com))

Finally, **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 Camera should be accessible via Internet by **Public IP**.

Recording Issue

If it is not possible to provide remote access for security reasons, a supporting video clip can help understand and investigate the issue. To create a video clip:

1. Set up **Screen Recording**: select desired screen and microphone settings (see "Setting up Screen Recording").
2. Record a narrated (preferred) video explaining the issue (see "Performing Screen Recording").
3. Attach the video to the support ticket.
Collecting Logs

The following logs must be provided as part of a support ticket:

- System Logs
- Server Logs
- Client Logs.

To obtain System Logs:
1. Open Event Log form (see "Viewing Events Log").
2. Choose <Any Event>, <Any Camera>, <Write To Log> filters.
3. Open Context Menu and choose Select All (or press Ctrl+A).
4. Open Context Menu and choose Export Selection to File.
5. Save the file and attach to the support ticket.

To obtain Server Logs:
1. Right click on the desired Server, open Context Menu and choose Server Logs... The log will open up in browser.
2. Copy all text (CTRL+A) and paste it into a new text file.
3. Repeat this for all Servers (if necessary).
4. Save the file and attach to the support ticket.

To obtain Client Logs:
- Windows: `c:\Users\<Local User>\AppData\Local\Digital Watchdog\Digital Watchdog DW Spectrum\log\log_file.log`.

Collecting Additional Information

Required information:

- Hardware used
- DW Spectrum components and drivers versions
- External Libraries versions.

To obtain this information, open Main Menu and select About (or press F1).

The information on network configuration is also important and should be provided to Support Team in addition to other details.

This information can be acquired by standard Windows tools (i.e.) `ipconfig`, but DW Spectrum provides a much more simple and intuitive way.
Sending Anonymous Usage and Crash Statistics

DW Spectrum helps developers support and enhance the product by sending anonymous statistics. The following information is being sent:

- Crash dumps for servers and clients
- Cameras info
  - Model
  - Firmware
  - Vendor
- Single/dual streaming
- Streams' resolution
- Is audio supported
- Is there audio enabled
- Is there rule with I/O
- Auto-discovered/manual added
- Video codec
- Audio codec
- Max fps
- Is forced AR enabled?
- Default rotation
- Is fish-eye enabled
- Is there PTZ presets
- Primary stream fps
- Secondary stream fps
- Average bitrate
- Target bitrate/quality
- Is password standard
- kbpGOP
- Min/Max Achieve
- Don't record streams
- Rtp transport
- ioSettings
- Servers info
  - Number of cameras
  - Number of recorded cameras
  - Number of licenses
• Type of licenses
• License key
• Country
• OS
• CPU type
• RAM
• Number of network interfaces
• Bandwidth
• Total storage size
• Storage' size
• NAS/DAS
• System info
  • Country
  • Customization
  • Rules
  • Is NAT traversal used?
• Client info
  • OS
  • Video cards
  • Skin
  • CPU
  • Physical memory.

The statistics reports are sent once a months. This feature is enabled by default. To disable it:

1. Open System-Wide Configurations and go to the General tab.
2. Clear the Send anonymous usage and crash statistics to software developers checkbox and click OK.
Glossary

**DW Spectrum Server Components** – DW Spectrum Server and Server.

**Administrator** – a user that configures DW Spectrum.

**Archive** – video and audio data recorded from cameras.

**Aspect Ratio (AR)** – video dimensions. Most commonly used are: 4:3 and 16:9.

**Bitrate** – number of bytes per second. Used to measure video stream.

**Client** – the software used to connect to servers and view video streams.

**Codec** – video or audio compression.

**Dual Streaming** – enables a camera to provide two separate streams simultaneously, yielding bandwidth and processor savings on Client (see RADASS).

**Export** – allows to export a video footage from archive. Exported video can be viewed on any device.

**FPS** – Frames per Second. Used to measure video stream.

**GPU** – Graphic Processing Unit. The processor installed on the video card.

**HTTP** – Hyper Text Transfer Protocol. Some cameras use this protocol to stream video.

**Item** – video or image on Scene.

**Layout** – saved video items and their position, size and orientation. Used to present surveillance information to DW Spectrum user.

**Live** – ability to view cameras live in real-time mode.

**Server Port** – used by Server to process requests for recorded fragments and video data from DW Spectrum Client.

**Motion Detection** – indicates whether or not any motion occurred within camera's viewing zone.

**Motion Mask** – the area in viewing zone that does not trigger **Motion Detection**.

**Multi-Video Export** – an ability to backup several videos in a proprietary format or executable bundle.

**Onvif** – a unified protocol used for communication with cameras. See [http://www.onvif.org/](http://www.onvif.org/).

**OS** – Operating System.

**Preview Search** – breaks down a period of time into smaller video segments. Example: a month broken into ten 3-day periods displaying them as separate video segments. Eases search of large archives.

**Private (cameras) Network** – the network used to transmit data from cameras to Server. It is not accessible from outside.

**Public (Intranet) Network** – the network used to connect to Server from outside. It can be used for either connecting Server to Server or configuring Server Components. It may or may not be connected to the Internet.
**Public IP** – IP Address that can be accessed from the Internet.

**PTZ** – Point, Tilt, Zoom (a camera must support PTZ for the feature to be used)

**Resources** – cameras, Server s, local video files, users and layouts.

**RADASS** – Resolution and Algorithmic Data Adaptive Scaling System. Enables dynamic switching of resolution to yield bandwidth savings and optimize processor load. Requires **Dual-Streaming** to be supported by the Cameras used.

**RTSP** – Real Time Streaming Protocol. Some cameras use this protocol to stream video.

**RTSP Port** – the port used by Server to process requests for media streams from DW Spectrum Client.

**Server** – the computer that DW Spectrum Server is installed on.

**Smart Motion Search** – an ability to search by motion within the selected range. DW Spectrum will provide fragments with motion occurred in the specified region.

**Super Administrator** – an initial user with full access to DW Spectrum (his login is **admin**). This user cannot be deleted.

**Sync** – ability to play back several cameras simultaneously.

**Thumbnails** – small snapshots of recorded footage. Used in searching for specific scenes.

**URL** – Uniform Resource Locator is a specific character string that constitutes a reference to an Internet/Intranet resource. Used to establish connection to Server.

**Viewer** – a user with a limited access to DW Spectrum (not permitted to change configuration).

**Watermark** – used to check validity of exported files. If a file was modified or altered in any way, watermark will fail.