AN-355

Avigilon Unity Integration with Protege GX

Application Note

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Contents

Introduction

The Protege GX Avigilon Unity Video Service provides a seamless integration between Protege GX and an Avigilon Unity system (previously known as Avigilon Control Center). Integrating with a Video Management System (VMS) enables you to control cameras and view live and historical video footage from a single, easy-to-use interface.

Cameras can be linked to doors, inputs, outputs and areas, allowing you to easily retrieve footage based on any change of status, such as when a PIR is triggered or a door is opened. An automatic popup can display a live video stream on any door event, allowing you to see when someone is at the door or when a door has been forced open.

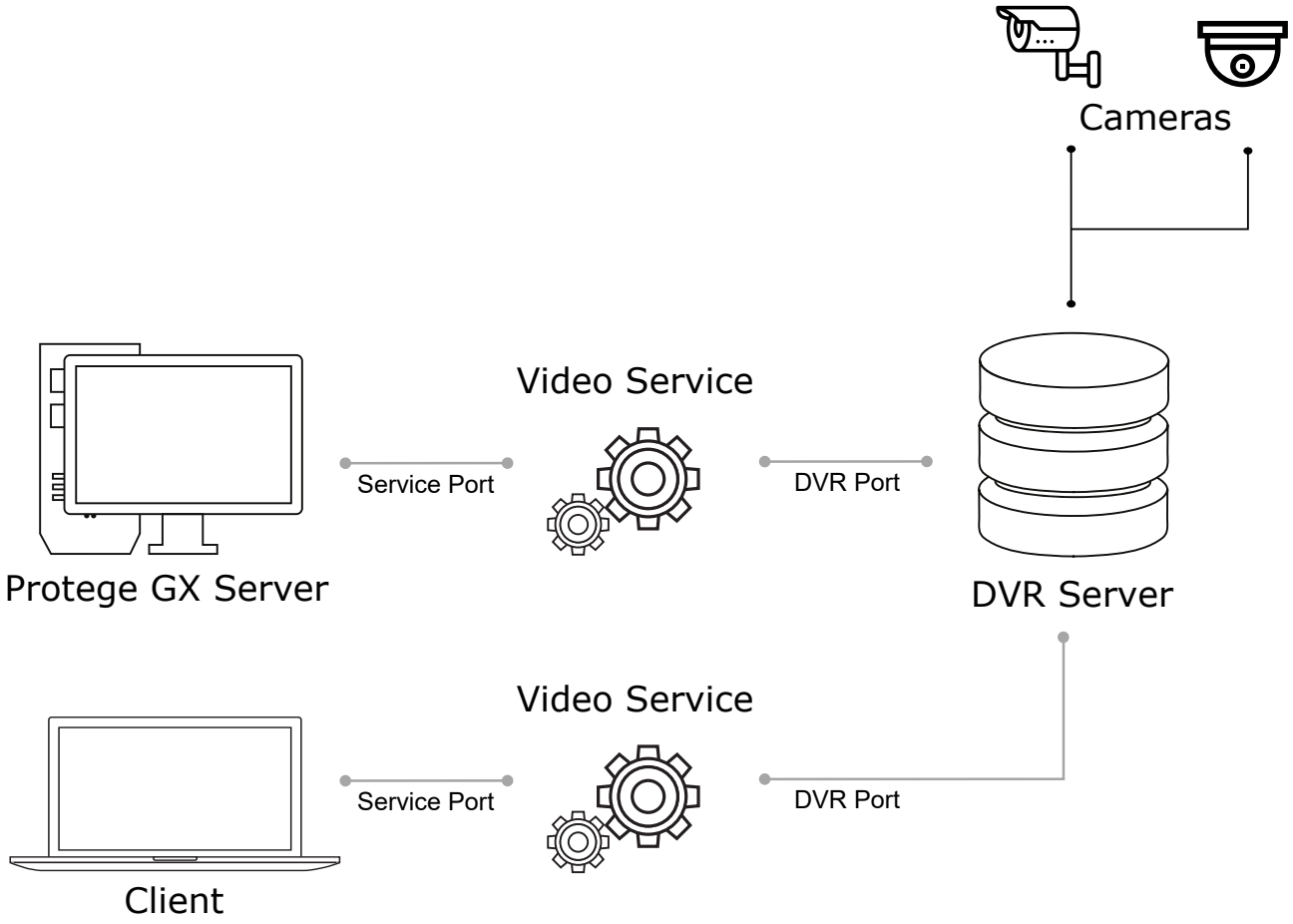
The included high level interface (HLI) enables the communication of PTZ triggers and alarm interfaces back to the VMS, providing bi-directional exchange of information. If desired, VMS events such as 'Motion Detected' can be monitored directly in Protege GX.

The following instructions outline how to install the Avigilon Video Service and configure the DVRs, cameras and doors within Protege GX.

This integration service can be used with Avigilon Unity 8 and Avigilon Control Center 7. For earlier versions, contact ICT.

Integration Architecture

In this integration Protege GX communicates with the DVR server via the integration's video service. This service monitors the two systems and sends any camera commands from Protege GX to the DVR server, and continuously transfers any events triggered in the DVR system to Protege GX.



Ports

As shown in the diagram above, the video service communicates with Protege GX via the **Service Port**, and with the Avigilon DVR server via the **DVR Port**. These ports are configured in the Protege GX DVR programming.

The DVR port is determined by the Avigilon Unity VMS and is set to 8443. The service port must be set to 11000.

Feature Support

This integration enables you to:

- View live video footage from programmed cameras.
- View historic and archived video footage.
- Embed cameras into a status page.
- Link a camera to a door, input, output or area.
- View live or archived video footage directly from an event associated with a camera.
- Automatically launch a camera view window when specific types of events occur.
- Send PTZ preset commands to the VMS in response to a Protege GX event filter.
- View the following HLI events directly within Protege GX:
  - Motion Start
  - Motion Stop
  - Low Disk Space
  - Communication to Camera Lost
  - Communication to Camera Restored
  - Connection Lost
  - Connection Restored
  - Camera Property Changed
  - Input Activation

Prerequisites

Software Requirements

Software	Version	Notes
Protege GX Software	4.3.298 or higher	
Protege GX Avigilon Video Service	2.1.0.10 or higher	This service must be installed on the Protege GX server and every client machine that will use this integration. This document includes instructions for installing this service below (see page 8).
Avigilon Unity 8	8.7.2.6 or higher	This video service supports both Unity V8 and Control Center V7. These are the only tested and supported versions for this integration.
Avigilon Control Center 7	7.14.18.8	
Microsoft .NET Framework	4.6.2 or higher	

Supported cameras are determined by the Avigilon system.

It is the responsibility of the installation professional to verify the version of the proposed third-party system and supported components with the version listed in this document. ICT will not accept responsibility for the failure to verify integrated system versions and requirements.

Protege GX Licensing Requirements

License	Order Code	Notes
Protege GX Camera License	PRT-GX-CAM-10	1 license required per camera programmed in Protege GX. A single camera is included with the Protege GX standard license. The base Protege GX license includes an unlimited number of DVRs and DVR HLIs. HLIs allow bi-directional communication between Protege GX and the VMS. Note that this is separate to the live and archived video display that is covered by a camera license.
	PRT-GX-CAM-50	

Time Settings

VMS integrations rely on the time being accurately configured for both the hardware and the operating systems used in a site.

To ensure the system is keeping precise time, all devices should be set to synchronize with the same NTP time server. NTP servers work by sending accurate time information periodically to the system. Many corporate organizations have an NTP server running on the internal network, allowing you to simply enter the relevant IP address. Alternatively, you could use any public NTP server. Finding an NTP server relevant to your region is usually as simple as a quick web search.

The same time server must be used for all workstations, servers and controllers within the site. You can configure the time server for each computer in the Windows **Date and Time** settings, and set a time server for the controller in the **Sites | Controllers | Time update** settings in Protege GX.

Setting Up Avigilon Unity

Some initial setup steps are required to connect the integration to the Unity system.

Unity Web Certificate

The Avigilon Unity system uses a **Web Certificate** to secure the communication between Unity and third-party services. By default, this is a self-signed certificate, which is not inherently trusted by other computers. For the video service to function correctly, you must install a Web Certificate that is trusted by both computers.

You can acquire a trusted certificate from an internal public key infrastructure (PKI) if available, or a third-party certificate authority. You will need two files: the private key (.key) and the public certificate (.crt). You must have the passphrase used to secure the private key.

For instructions, see How to Implement an SSL Certificate for ACC Web Endpoint Running on Windows OS in the Avigilon knowledge base.

Setting the Camera Logical IDs

Each camera in Unity must have a unique **Logical ID** to allow Protege GX to identify it. To set the Logical IDs:

1. Open Avigilon Unity or Control Center.
2. In the **New Task** menu, click **Site Setup**.
3. Select a camera and click the cog icon.
4. Set the **Logical ID** to a unique number.
5. Click **OK**.
6. Repeat for each camera that will be integrated with Protege GX.

Installing the Video Service

The Protege GX Avigilon Video Service must be installed on the server and each client machine that uses the integration. You must have administrator rights on each computer to complete the installation.

1. If you have version 1 of the Avigilon Video Service installed (for integration with Avigilon Control Center V6), uninstall this existing service before installing the new one.
2. Run the Protege GX Avigilon Video Service.exe file to open the Installation Wizard. Click **Next**.
3. Select **Complete** for the installation type, then click **Next**.
4. Click **Install**.
5. Ensure the **Service Port Number** to be used for the integration is set to 11000. Click **Next**.

   The Service Port Number defines the connection to Protege GX and must be set to 11000. This is **not** the DVR Port, which is set to 8443.

6. Set the **Connection Type** to HTTP (unencrypted) or HTTPS (encrypted) and click **Next**.

   HTTPS is **strongly recommended** for live sites. This requires enabling HTTPS on your Unity server (see previous page).

7. Click **Finish**.
8. If the Windows Defender Firewall is on, you will see a Windows Security Alert popup indicating that some features of the integration service have been blocked.

   To allow the service to function, check the boxes to allow the service to communicate on **Domain networks** and **Private networks** (or as appropriate for your installation). Then click **Allow Access**.

Check the Services are Running

The services used by the integration must be running so that Protege GX can communicate with the Avigilon system.

1. Open **Services** as an administrator:
   - Press the **Windows + R** keys.
   - Type **services.msc** into the search bar.
   - Press **Control + Shift + Enter**.
2. Scroll down to locate **Protege GX Avigilon Video Service**.
3. Ensure the service has started automatically (check the **Status** column to confirm that it's 'Running'). If not, right-click the service and select **Start**.
4. Ensure **Protege GX DVR Service B** is running.

Enabling HTTP Connections

HTTP connections are insecure and are not recommended for live sites, but may be appropriate for testing environments. You must enable insecure connections in the configuration for the Avigilon server.

1. On the Avigilon server machine, open the File Explorer and navigate to C:\ProgramData\Avigilon
2. Open WebEndpoint.config.yaml in a text editor.

   Files in this directory require administrator permissions to edit. You may need to open the file as an administrator using an application like Notepad++, or make a copy in a different directory to edit and replace the original.

3. Add the following config parameter to the file:

```
publicRestInterface
    secure:  false
```

> Two spaces are required after the colon.

4. Save the file.
5. Restart the Avigilon Web Endpoint Service.
6. If you need to set the Avigilon server back to HTTPS, repeat this process and set:

```
publicRestInterface
    secure:  true
```

PTZ Configuration

Pan and tilt speed can be customized through the video service config file.

> This configuration applies to all connected Avigilon cameras.

1. First **stop** the Protege GX Avigilon Video Service.
2. Navigate to the installation directory.
   - The default path is C:\Program Files (x86)\Integrated Control Technology\GXVideoService_Avigilon
3. Open the GXVideoService_Avigilon.exe.config file.

   > Files in this directory require administrator permissions to edit. You may need to open the file as an administrator using an application like Notepad++, or make a copy in a different directory to edit and replace the original.

4. Locate the section below and edit the **Velocity** setting as required to define the pan and tilt speed. Increase the value for faster pan/tilt. Valid values are in the range of 0.0 to 1.0. The default setting is 0.1.

```
<appSettings>
    ...
    <add key="Velocity" value="0.1"/>
    ...
</appSettings>
```

5. Save the config file then **start** the Protege GX Avigilon Video Service.

Programming Cameras in Protege GX

Port Settings

To configure the DVR in Protege GX you will need to enter the DVR Port and Service Port settings, as described in the Integration Architecture section. The port numbers specified below **must be used**.

- **DVR Port**: 8443
- **Service Port**: 11000

Adding the DVR

From the main menu, navigate to **Monitoring | Setup | DVRs**. Add a DVR record and configure the following options:

1. Enter the **IP address** and **DVR port** of the DVR server.

   The DVR port is determined by the third-party VMS and will depend on the configuration of the DVR itself.

2. Set the **DVR type** to Custom.
3. Set the **Service port** that was configured during the video service installation. This option is only visible once the **DVR type** is set to Custom.

   The service port must be defined for the integration to work correctly. If necessary, it can be changed in the config file for the service.

4. Enable the **Monitor events from this DVR/NVR** option to start logging HLI events from the DVR in Protege GX. The operator can right click any HLI event to view the footage archived at the time the event was logged.

   For camera motion events, the **Monitor events** option must be enabled in the camera settings in Protege GX. Note that motion detection must also be enabled for that camera in the VMS.

5. If required, enable the **Connect to this DVR/NVR on start up** option. When this option is enabled, Protege GX will send a login request to the DVR when the client starts up. Otherwise, Protege GX will not connect to the DVR until it needs to request a camera list or footage.
6. If logging in to the VMS requires authentication, enable **Login required** and enter the **Username** and **Password** required to access the VMS.

   The pipe character | is not supported in these fields.

Adding the Camera(s)

Once the DVR has been configured, you can add a record for each of the installed cameras, enabling you to view live and historical (archived) video feeds directly from a status page or floor plan.

1. From the main menu, navigate to **Monitoring | Setup | Cameras**. Add a new camera with a descriptive name.
2. Set the **Type** to DVR and select the **DVR** you created earlier.
3. On the **DVR camera name** row, select the **[...]** button to open the **Select camera** window.

   The pipe character | is not permitted in the **DVR camera name**. You may need to change the camera's name in the third-party system.

4. The window will display a list of cameras connected to the selected DVR. Highlight the camera you want to use and click **Select**.
5. Set the required display options:

- **Show sidebar controls in status page**: When this option is enabled, PTZ controls are displayed by default when the camera feed is viewed on a status page. When this option is disabled the control sidebar can be opened but will not be displayed by default.
- **Stretch image**: When this option is enabled the camera image will be stretched to fill the tile where it is displayed. This may not preserve the aspect ratio.
- **Floor plan**: The floor plan the camera belongs to. This allows you to right click on a camera event in the event log and open the floor plan associated with the camera.

6. Enable the **Monitor events** option if you wish to log HLI events from the DVR system.

   This setting must be used in conjunction with the **Monitor events from this DVR** option of the DVR record. It enables certain camera events, such as motion detected, to be logged from the DVR/NVR. The operator can then right click the event and select the camera to view the footage archived from the time the event was logged.

Linking a Camera to a Record

Linking a camera to a record enables you to view a live or archived feed by right clicking a record or any associated event. Cameras can be linked to doors, inputs, outputs or areas, allowing you to track any status changes, such as when a PIR is triggered or an area is disarmed.

If an event has a camera associated with it, a small yellow camera icon appears to the left of the event. Right-clicking the event allows you to view the archived footage from the camera at the time the event was logged.

If the door auto camera popup settings are enabled, Protege GX will automatically display a window with the live camera feed whenever a door event is triggered, or if a door is forced open.

1. Select the door, input, output or area you wish to link the camera to (from the appropriate **Programming** menu).
2. In the **General** tab, scroll down to **Graphics**. Set the **Camera** which is monitoring that physical space.

   For doors, you can set a **Camera (entry)** and **Camera (exit)**. Depending on where the camera is located, you may wish to use the same camera for both entry and exit, or select a different camera for each.
3. For doors, you can set the following **Auto popup options**:
   - **Auto camera popup on any door event**: When enabled, displays a popup window showing a live camera feed when any door event is triggered.
   - **Auto camera popup on door forced event**: When enabled, displays a popup window showing a live camera feed when a forced door event is triggered.
   - Select the **Camera** to be displayed in the popup window.
4. Save your changes.
5. To view the camera feed, right click on the record in the programming window or status list and click the **Camera** button. Right click any events associated with that record to view either live footage or archived footage from the time of the event.

Including a Camera in a Status Page

A camera can also be included in a status page for live viewing of video footage while monitoring a site.

1. Open the **Status page editor** (**Monitoring | Setup | Status page editor**). Select an existing status page to update, or create a new status page by clicking **Add** and choosing a layout.
2. Select the panel where you wish to display the camera and set the **Type** to Camera.
3. For the **Record**, select the camera that you wish to display.
4. Save your changes.

5. Navigate to **Monitoring | Status page view** to view the camera feed on your status page. Click the arrow button on the upper right of the panel to display PTZ arrows, which can be used to pan, tilt and zoom a PTZ camera.

You can also include camera HLI events on a status page. You can do this by including a panel that displays All Events. Alternatively, you can create an event report that displays only camera HLI events, and display that on the status page:

1. Navigate to **Events | Event filters** and create a new event filter which will filter for camera HLI events.
2. In the **Event types** tab, disable **Include all event types**.
3. Click **Add** and expand the **All PC events** section. Scroll down to the Camera events, select the desired HLI events and drag and drop them onto the main window. **Save** the event filter.
4. Navigate to **Reports | Setup | Event** and create a new event report to display the HLI events.
5. **Add** the event filter created above.
6. Finally, to display the event report on a status page, navigate to **Monitoring | Setup | Status page editor**. Select an existing status page to update or create a new status page.
7. Select a panel and set the **Type** to Event windows. Set the **Record** to the event report created above.
8. Save your changes and navigate to **Monitoring | Status page view** to view the events on your status page. You can right click the events to open the camera window to the time of the event.

Note: Some HLI events require the corresponding camera feature to be enabled in the VMS (such as motion detection).

Programming Camera Actions

Actions in Protege GX are triggered in response to particular events, as defined by an event filter. There are two actions related to cameras: sending PTZ commands and popping up a camera feed window.

Send PTZ Command on Event

Through the HLI, Protege GX can send PTZ commands to connected cameras in response to particular events. This allows the system to physically move PTZ cameras to preset positions to get the best view of the situation.

In Unity, enable PTZ controls for each camera and create the required presets. See the following pages in the Unity documentation:

- Configuring PTZ
- Activating PTZ Presets, Patterns, and Tours

Note down the **ID number** for each preset (e.g. 1, 2)—this will be the **Command string** for the preset in Protege GX.

To send a PTZ command in response to an event, program the following in Protege GX:

1. Navigate to **Monitoring | Setup | PTZ commands** and create a new PTZ command.
2. Under **Configuration**, select the **Camera** that the command will be sent to.
3. Enter the **Command string** that represents the PTZ preset.
4. Navigate to **Events | Actions** and create a new action.
5. Set the **Event filter** to define the events that will trigger the action. If required, click the ellipsis **[...]** button to break out the event filter programming window and create a relevant event filter.
6. Select the **PTZ command** created above.
7. Click **Save**.

Pop Up Camera Window on Event

Actions can be used to automatically trigger a live popup window when specific events occur, such as when a door is left open or when an area alarm is triggered.

1. Navigate to **Events | Actions** and create a new action.
2. Set the **Type** to Popup camera window.
3. Set the **Event filter** to define the events that will trigger the action. If required, click the ellipsis **[...]** button to break out the event filter programming window and create a relevant event filter.
4. Select which camera to use. You can choose from:
   - Default camera associated with event
   - Door entry camera
   - Door exit camera
   - Select camera from list
5. Click **Save** to create the action.

Enabling Camera Popups on Alarm

Operator alarms send a popup window to Protege GX operators (such as security guards) when selected events occur in the system. Along with the event information, you can also include a camera popup window which displays footage from the camera associated with the relevant door, area, input or output.

This approach is similar to using the Popup camera window action but has the additional benefit that the camera popup obeys alarm routing rules, allowing it to be routed to particular workstations and passed on if it is not acknowledged. It may also be more efficient to program if the alarms are already being used in the system.

For more information on programming alarms, see Application Note 332: Setting up Event Notifications in Protege GX.

1. Assign cameras to doors, areas, inputs and outputs as required (see page 11).
2. Navigate to **Events | Alarms** and create a new alarm.
3. Set the **Event filter** to define the events that will trigger the alarm. If required, click the ellipsis **[...]** button to break out the event filter programming window and create a relevant event filter.
4. Enable **Allow camera popup**.
5. Click **Save**.

Now when an alarm popup appears, if any device associated with the alarm has a camera assigned to it that camera window will pop up as well.

The Camera Window

The camera window displays a split view showing archived and live camera footage. It can be opened by right clicking on a record or event associated with a camera.

- The **top left pane** displays a 5 second looping video centered 2 seconds either side of the time of the event.
- The **top right pane** displays a 30 second controllable window centered 15 seconds either side of the time of the event. Drag the slider to adjust the image to any point within the 30 second period.
- The **main lower pane** displays the live camera view.
  - The **Archive view controls** allow you to select any date and time in the past.
  - The **Live view controls** provide PTZ camera control buttons, allowing you to physically control a PTZ enabled camera.

- The options on the **right** provide control over the main view:
  Select the tab on the side to switch between the two views as required.

Troubleshooting

Video Service cannot connect to VMS

Check that Windows Firewall is allowing the connection:

1. Open the Windows firewall settings from **Control Panel > Windows Defender Firewall**.
2. Click the **Allow an app or feature through Windows Defender Firewall** link on the left of the screen.

   Third-party antivirus or firewall software may prevent modification of Windows Firewall rules. If this is the case, refer to the third-party manufacturer for details on allowing programs through the firewall.

3. Find the Protege GX Avigilon Video Service in the list. Ensure that the following networks are enabled:
   - **Domain Networks**
   - **Private Networks**

   Do not enable **Public Networks** unless your installation requires it.

4. Click **OK** to save the changes.

Cameras can be added, but the loop and live video streams are not displayed in Protege GX

To diagnose this issue, open the **Windows Event Viewer** on the computer with the Protege GX Avigilon Video Service installed. Navigate to **Windows Logs**, **Application**. You may see the following message from the Protege GX Avigilon Video Service:

```
ExecuteAsyncCallback : The underlying connection was closed: Could not
establish trust relationship for the SSL/TLS secure channel.
```

This occurs when the Unity system is still using its default self-signed certificate. This certificate is not inherently trusted by other computers, so the video service is rejecting the connection with the Unity server. See Unity Web Certificate for instructions to resolve this issue.

Known Issues

- When the camera popup window is resized the camera views do not resize correctly, which can obscure the time sliders.

Release History

This release history covers changes to the video integration service beginning from version 2.0.0.0. Previous versions of the video service only support Avigilon Control Center V6.

It is assumed that the installation is using the prerequisite version of Protege GX (see page 5). Fixes and features in the integration service may not be available with earlier versions of Protege GX.

Version 2.0.0.0

- Initial release of support for Avigilon Control Center V7. Avigilon Control Center V6 is no longer supported.

Version 2.1.0.10

- Added support for Avigilon Unity V8.

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