Eagle Eye Application Note - AN063

Eagle Eye Cloud Video Replication Installation and Configuration

2024-09-11 Revision 1.0

Target Audience

This Application Note is intended for installers who want to add camera streams to the Eagle Eye Cloud VMS while maintaining a pre-existing third-party VMS system, and without the need to affect the current installation. Installers should be familiar with IP camera RTSP URLs and general networking techniques and tools. This document may be beneficial for installers working to add cameras for Eagle Eye 911 Camera Sharing at locations that already have a functioning third-party VMS.

Introduction

Eagle Eye Networks Cloud Video Replication provides the ability to utilize the Eagle Eye Cloud VMS as a supplementary video management system alongside traditional Network Video Recorders, or other On-Premise recording systems. This allows the End User of our Cloud VMS to utilize all of the unique features and capabilities of our product, without the need for replacing existing systems, or operating two completely different Video Management Systems in the same location, which creates a best of both worlds opportunity for the site.

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Background

Eagle Eye Networks Cloud Video Replication via RTSP will allow you to pull either a single H.264 stream from a camera, and in many cases, also the MJPEG stream, and add it to an Eagle Eye Networks Bridge or CMVR. The intended user for this app note should have an admin account on Eagle Eye Cloud VMS.

Typically when adding cameras to the Eagle Eye Bridge or CMVR, when there are no other systems that need access to the cameras, they will be added via ONVIF (see een.com/cameras), which allows for the simplest integration. Most of Eagle Eye Networks' existing support and installation documentation covers the ONVIF method of adding cameras to an Eagle Eye VMS account. In this app note, it is assumed that the existing video surveillance system was already established via an ONVIF device integration, and therefore, attempting to add the devices again utilizing ONVIF with the Eagle Eye Bridge will result in both recording devices fighting for ONVIF control of the camera.

Eagle Eye Bridges and CMVRs conventionally utilize two camera streams. Modern IP cameras typically have many video stream options, including different compression formats, including Motion JPEG (MJPEG), H.264, H.265, etc, which differ in their resolution, or bitrate, and other attributes. Our bridges and CMVRs utilize both MJPEG, and H.264, and their resolution and bit rate are typically controlled via ONVIF, in accordance with customers' Eagle Eye Cloud VMS subscription. For example, a camera added to the Cloud VMS with a subscription of “HD1” (720p) will receive by default, a 720p Full Video recording, at 12 frames per second for the H.264 stream, and “cif” (320x240) recording at 1fps for the MJPEG stream. The MJPEG stream is utilized as what we call the “Preview” stream, which can be streamed with low bandwidth to the Cloud VMS when accessed over the internet, providing fast access to live streams through an internet browser.

There are two methods for adding cameras via RTSP to an Eagle Eye Bridge or CMVR: Dual Stream, and Single Stream. When utilizing RTSP for camera integration for Cloud Replication, it is important to be aware of the tradeoff between ease of installation and resource utilization on the bridge or CMVR. The camera must be capable of simultaneously providing its default streams for both the third-party VMS and the Eagle Eye Bridge or CMVR.

Dual-Stream Cloud Video Replication is the preferred method, as this will ensure that no video processing needs to take place in the Bridge (see single-stream method below), which increases the overall utilization of the device. In this method, both the MJPEG (Preview), and H.264 RTSP URLs will be added from the camera to the Bridge.

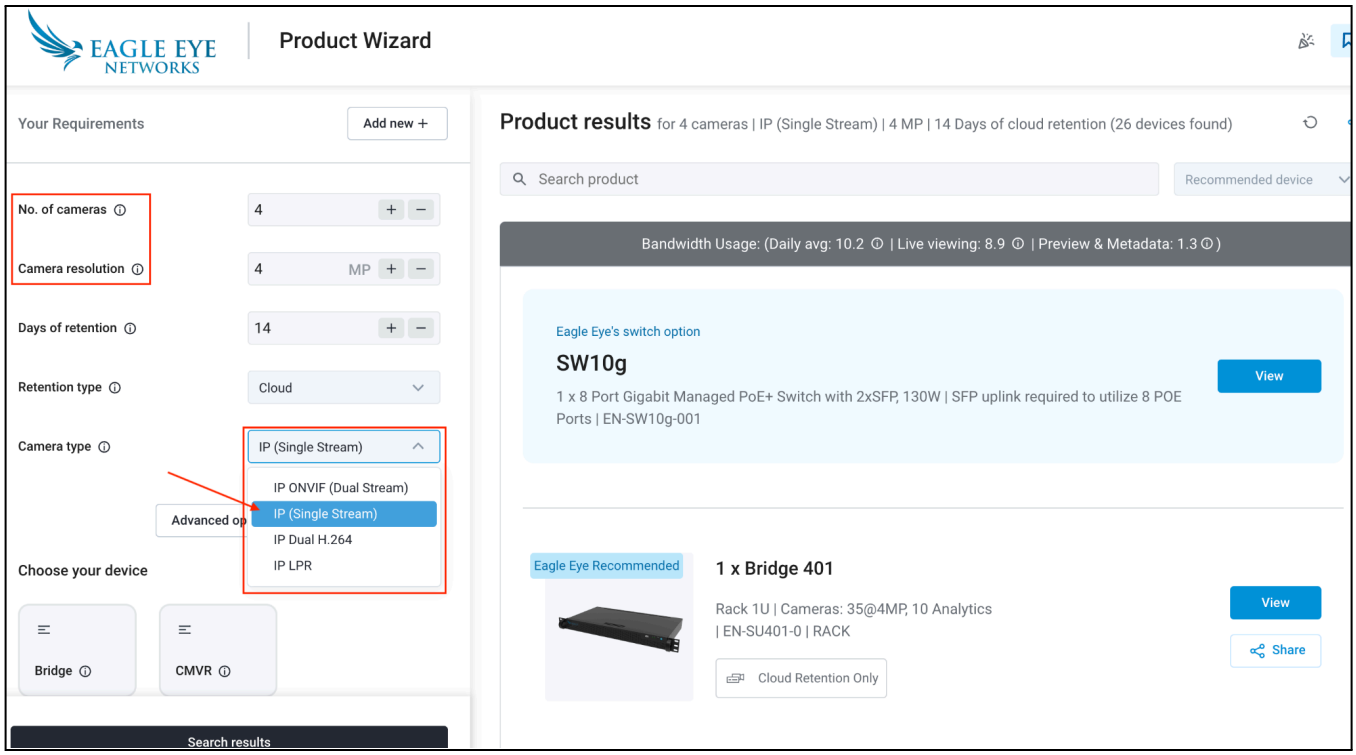
Single-Stream Cloud Video Replication is a Bridge and CMVR function where the device ingests one H.264 stream and breaks out a stream with lower resolution and frame rate to be utilized as the preview stream. This method requires only one H.264 RTSP URL per camera, but will require more processing, which affects the total number of cameras that can be added.

Assessing the Correct Bridge or CMVR for the Install

Before adding the cameras to the account, it's important to know whether you need to add the cameras as Single Stream, or Dual Stream. There are varied reasons why you may need to add a camera as a Single Stream, but most commonly it would be because the camera does not already have a MJPEG option, or that you need to stream RTSP from an embedded NVR or Video Server that has limited streaming capabilities. (Hanwha and Hikvision NVRs, for instance, allow for RTSP to stream from the NVR IP for each channel of camera added). In the case of streaming directly from an NVR, requesting only the H.264 option for the cameras would be easier to deploy, create less network bandwidth, and be less likely to strain the existing NVR.

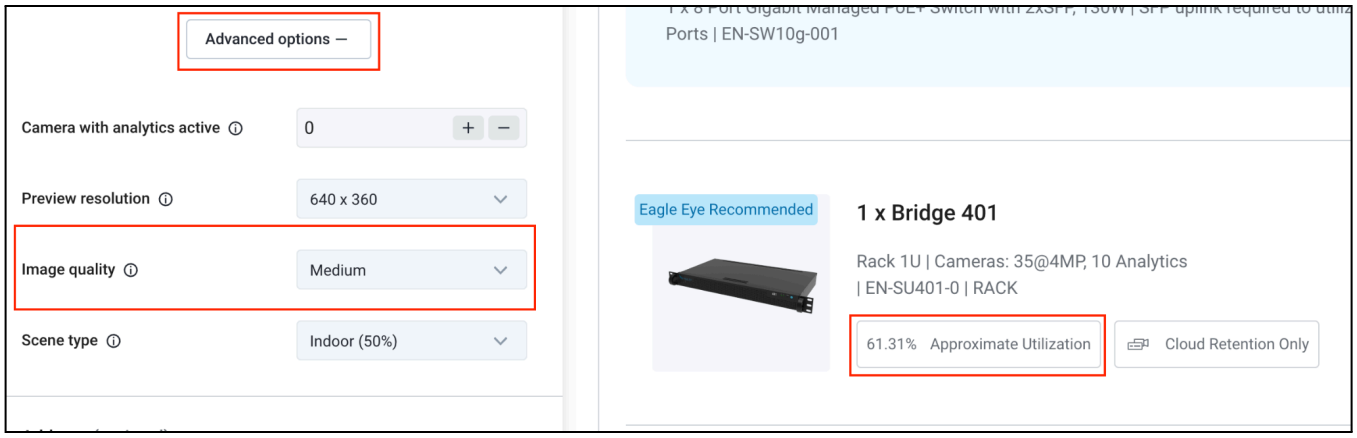
Single-Stream RTSP increases the processing workload for our Bridges and CMVRs. There are many factors to consider, and we cannot detail each scenario separately, but the important factors to consider are the current stream settings for resolution, frames per second, and bit rate. We have the ability with the Eagle Eye Networks Product Wizard to determine the correct device to implement for the customer. With this tool you can make sure that the correct Bridge device is selected to accomplish the job. Dual-Stream RTSP will utilize the same amount of resources on the Bridge or CMVR that a camera utilizing ONVIF will, as long as the stream settings are within the parameters of a typical ONVIF camera installation.

From the Product Wizard, set the quantity of cameras, and resolution, and select "IP (Single Stream)" as the Camera type:



Then select Advanced options, and apply the correct Image Quality that most closely matches the camera stream settings (you can also adjust the Preview resolution).

The Product Wizard has many information tabs to assist you in finding the correct product, but make sure depending on the results given that the “Approximate Utilization” of the device is less than 90% to maximize the long term goal of the product being trouble free.

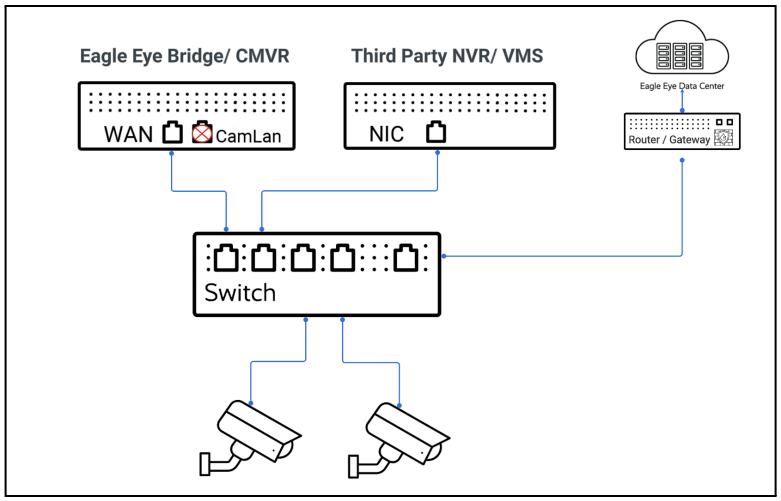


Example of Device Limitations:
Our 304+ compact Bridge (Data Sheet) can handle up to 20 4MP Dual-Stream cameras operating at 12 frames per second. However, the same 304+ Bridge can accommodate a total of only three Single-Stream cameras at the same settings. To accomplish adding 20 Single-Stream IP cameras at 4MP at 12 frames per second, you would need to either utilize two of our 504+ compact Bridges, or a single 701 rack-mount Bridge. As you can see, this can significantly increase the cost to deploy a Cloud VMS system utilizing Single-Stream RTSP.

Camera Networking

There are ways around accessing the existing system to onboard cameras into the Eagle Eye Cloud VMS, but there is no way to complete any of the following steps if either of the camera's user name, and passwords are unknown. If you do not have the existing camera credentials, there is no way to complete the integration to the Eagle Eye VMS. Please retrieve the camera credentials before continuing - they are a mandatory requirement.

Camera network: Below is the recommended network topology for a simple Eagle Eye Networks Cloud Video Replication. In these cases, the CamLAN is not our preferred camera installation port, as in its default state, it is a DHCP server, and it is assumed that the camera network is already configured. The Bridge and third-party NVR/VMS, as well as the cameras, should all be on the same network. If the network is already implemented for static IPs, the Bridge WAN port IP will need to be configured for that network. For instructions on setting up a static IP for the Bridge WAN port, please refer to AN064 Eagle Eye Mobile Bridge Configurator Guide.



When utilizing a camera's RTSP URL for integration, part of the URL includes the camera's network address (IP address). Once this camera URL is added to a client device as a video source, that client device will always look for the camera at that address; therefore if the address of the camera changes, the URL will no longer be valid.

It is recommended that the camera network is configured for static addresses rather than for DHCP (dynamic host configuration protocol), so that it is less likely for a device IP to change. Static addresses, though recommended, are not required,, and may not be possible (especially if you are not the network manager). However, depending on the resources and complexity of the network, it is possible for a camera to lose its IP address due to the settings of the network DHCP server, and in those cases the connection to the Bridge or CMVR will fail. If you are unsure about the design of the camera network, it may be important to consult with the network administrator before proceeding.

With the appropriate administrative permissions, you may also be able to apply the DHCP reservation method for preserving device configurations.

It is much easier to proceed if you already have the camera IP Addresses available. If you do not have the camera IP addresses, but wish to continue with completing a Cloud Replication installation, one simple way to find camera IPs is to attach a laptop or desktop computer to the existing camera network switch and run the Address Resolution Protocol command (typically in a terminal window via command prompt; type ‘arp -a’ and press enter). This will return the IP addresses associated with each Camera MAC address from the current network map. If you are unsure of the MAC addresses for the cameras, typically they can be searched in Google;note that the first 6 characters of a MAC address are unique to the manufacturer.

Integrating an existing NVR with an embedded PoE switch typically requires that the NVR has an option to stream RTSP to the network. In these cases, often the IP address for the camera stream will be based on the IP address for the NVR, and the stream resources will be referenced with a “channel” or other indicator that differentiates each stream resource. Once you have all the camera IP addresses needed you can proceed.

Finding and Testing Camera RTSP URLs

RTSP URLs are unique to the manufacturer of the camera, but all follow the basic structure needed to request a camera stream from an IP camera. This format looks like “rtsp://<IP Address>:<RTSP port 554>/<server_URL>”. For example, the RTSP URLs for many Axis IP cameras at an IP address of 10.10.1.113 would be:
Preview URL “rtsp://10.10.1.113:554/onvif-media/media.amp?profile=profile_1_jpeg”
Video URL “rtsp://10.10.1.113:554/onvif-media/media.amp?profile=profile_1_h264”

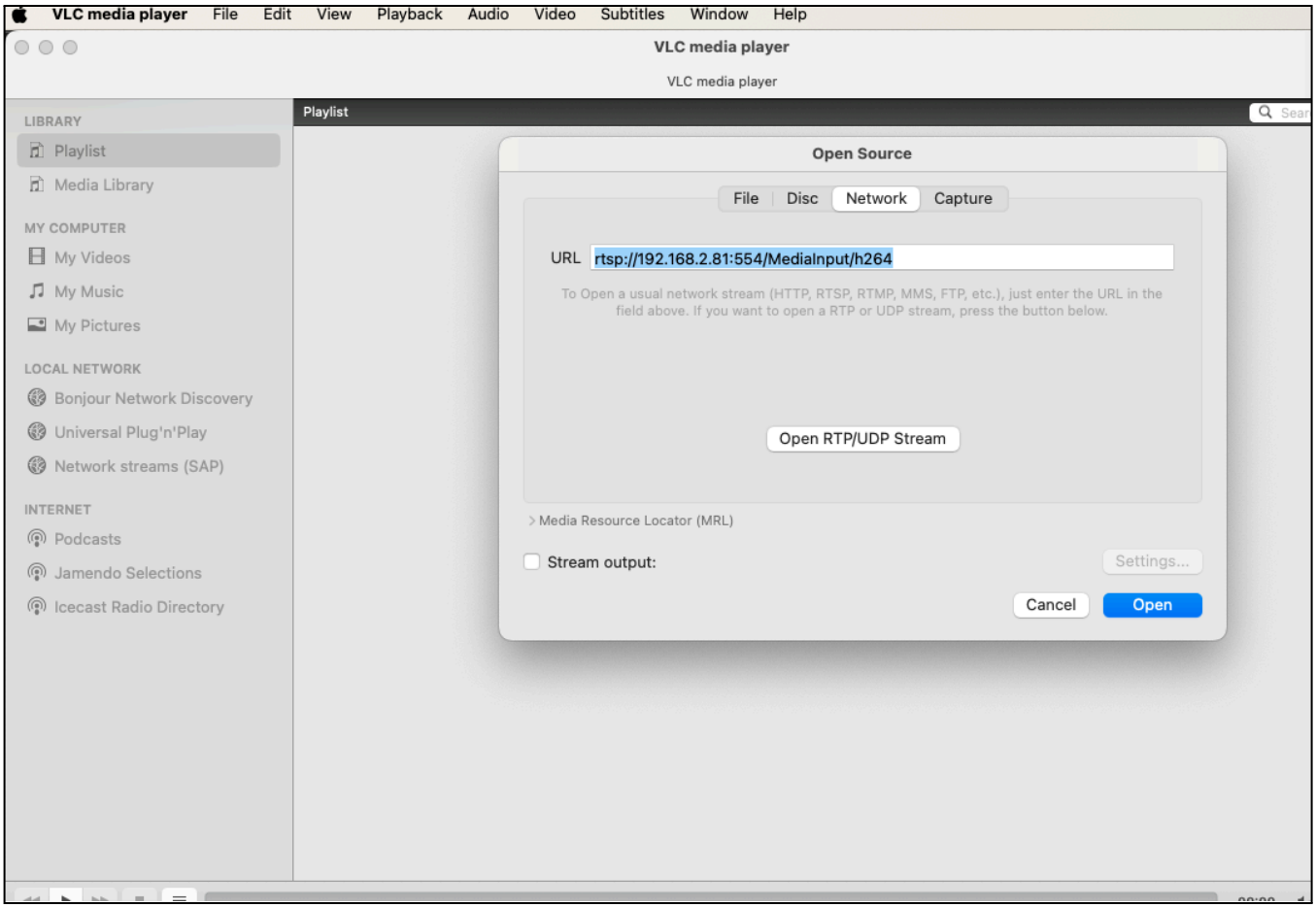
Note: port 554 is the default RTSP port, and our Bridges and CMVRs require this port for connection. If your camera manufacturer uses any other port, and does not allow the port to be changed, the camera may not be compatible with our system.

There are many ways to find RTSP URLs. Most manufacturers have a default URL for camera lines, and often the URL for a particular camera's default streams can be found with a simple online search. If an online search does not yield the result you need, there are various online tools to help. One that we have tested is ONVIF Device Manager (ODM for short). With ODM installed, and your device on the same network as the cameras, ODM will scan for available cameras with ONVIF enabled, and when you use the camera credentials to access the device, and select any available camera live stream, the URL will be listed below the live view image. (This also serves as an alternate method of testing the URL.)

Testing the URL:
Now that you have documented the camera credentials, IP address, and video URLs for the cameras, the next step to ensure a properly integrated Cloud Replication installation is to verify that the URL is accessible and works, which will be a good indication that the Bridge will be able to properly associate the camera.

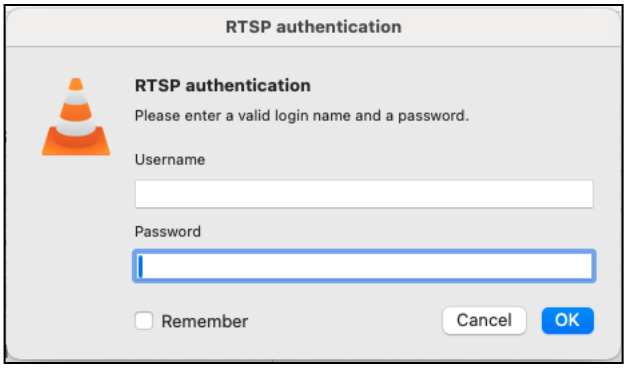
The easiest tool for verifying RTSP URLs that we have tested is VLC (videolan.org). This media player should be installed on the device that is performing the installation, and the device should be on the same network as the camera. There are other tools available if you have a media player of choice that can access RTSP.

Example of VLC on a MacBook, requesting the H.264 URL for a Panasonic IP camera:
Open the VLC media player, and then open a new Network Source (cmd+n for macOS). A popup will let you add the RTSP URL.



Select Open, and you should get a popup for the Camera credentials:

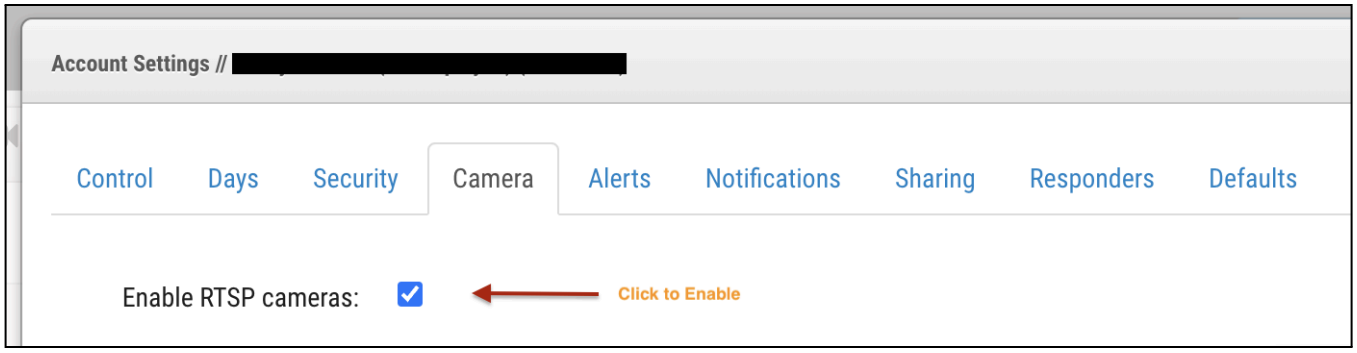
Enter the camera's Username and Password, then select OK. If everything is correct, the camera live view will appear in another window.



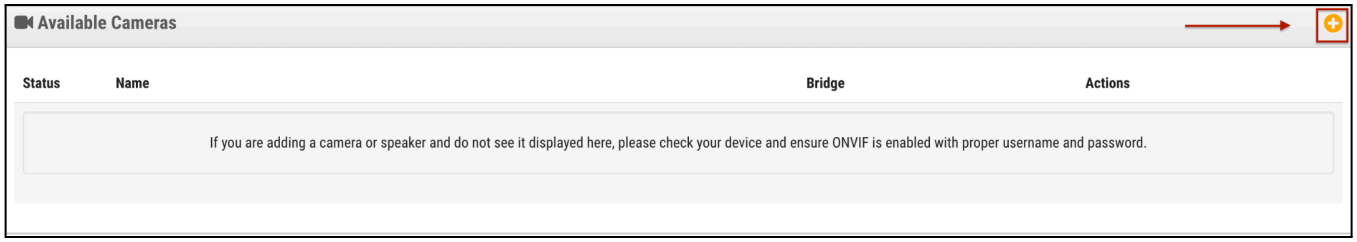
If the recording settings for a particular camera (such as its resolution, framerate, or camera bit rate) on the third-party VMS are unknown, VLC or ODM can be used to display these settings.

How to Activate RTSP Cameras

The ability to add cameras to a Bridge as RTSP is not enabled by default, and must first be set for the account. From the customer account, click your name at the top right and select Account Settings. Under the camera tab, select the Enable RTSP cameras checkbox.

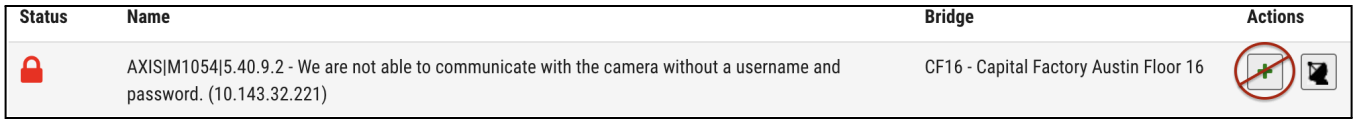


Once that is done, in the dashboard, you will see a new yellow plus button to the right of the Available Cameras field.

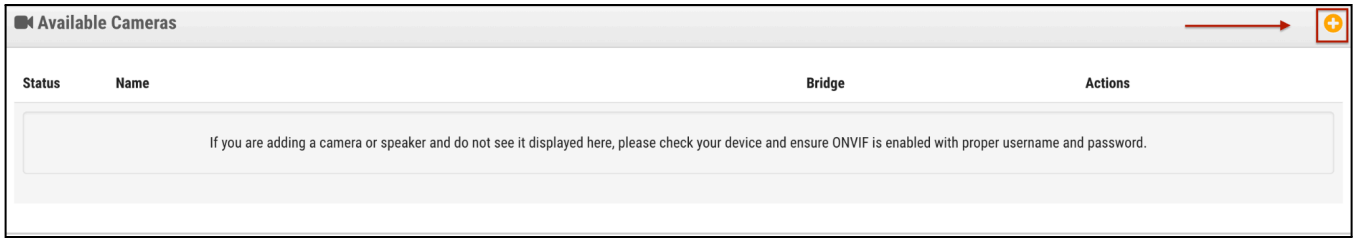


Adding Cameras to the Bridge

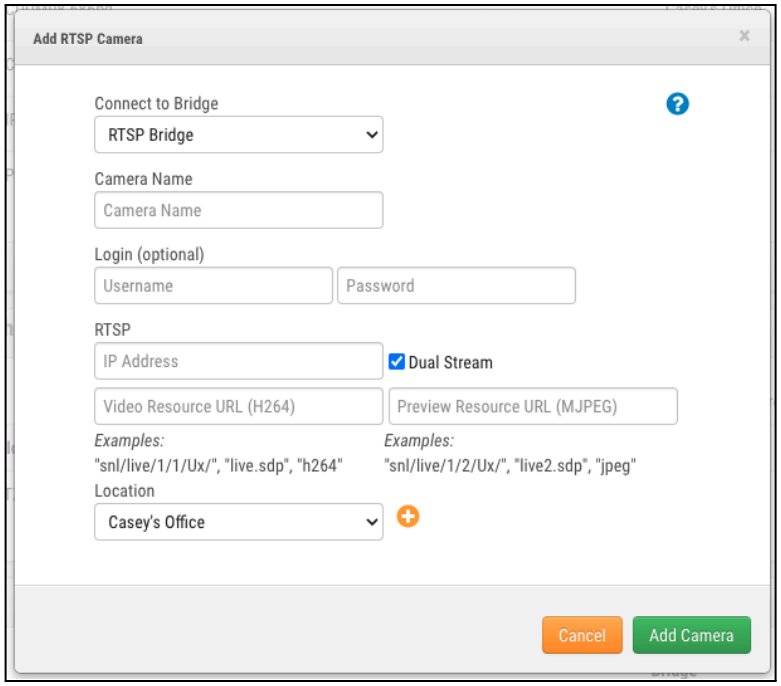
From the account Dashboard, navigate to the Available Cameras section. Even if the cameras have been added viaONVIF to another recording device, the “Green Plus” icon can appear next to the available camera. However, do not select this option if the camera has already been added to the third-party using ONVIF; in some cases, the cameras will not appear as available in this manner if ONVIF is already being utilized. Selecting this option can cause the Eagle Eye Bridge or CMVR and the third-party device to compete for camera settings control, which will affect the recording for the primary VMS, and both systems have the potential to become unstable.



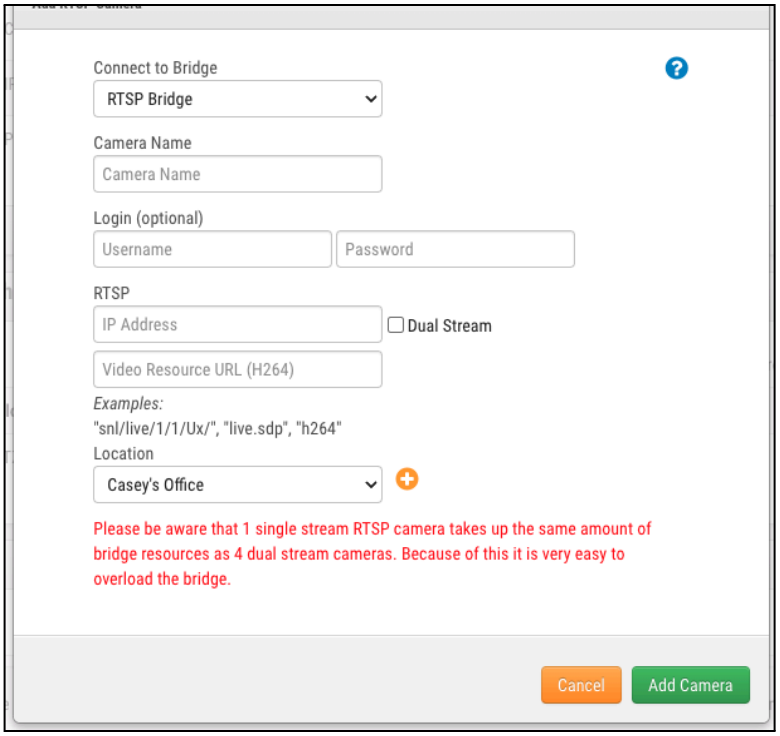
Select the yellow "plus" button in available cameras and you can now add a camera via RTSP.



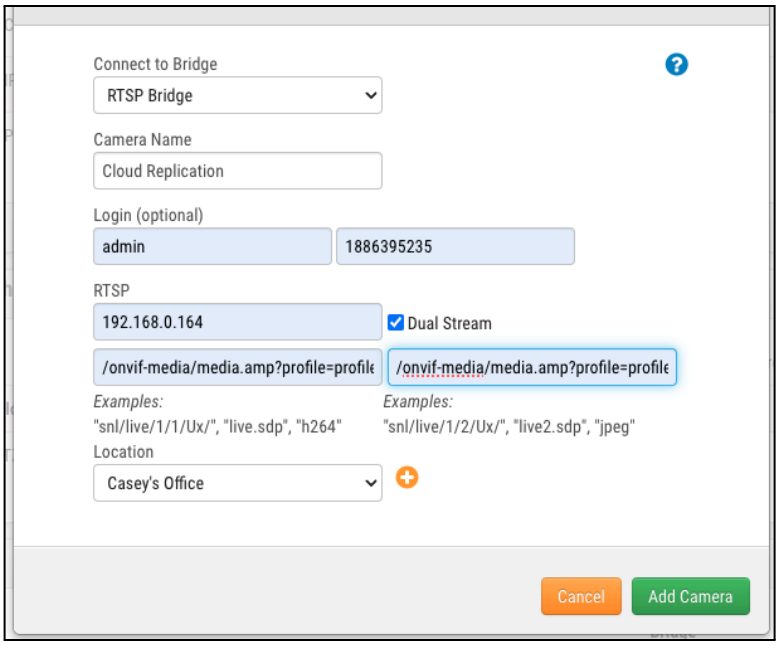
Dual Stream is the default when the Add RTSP Camera popup appears:



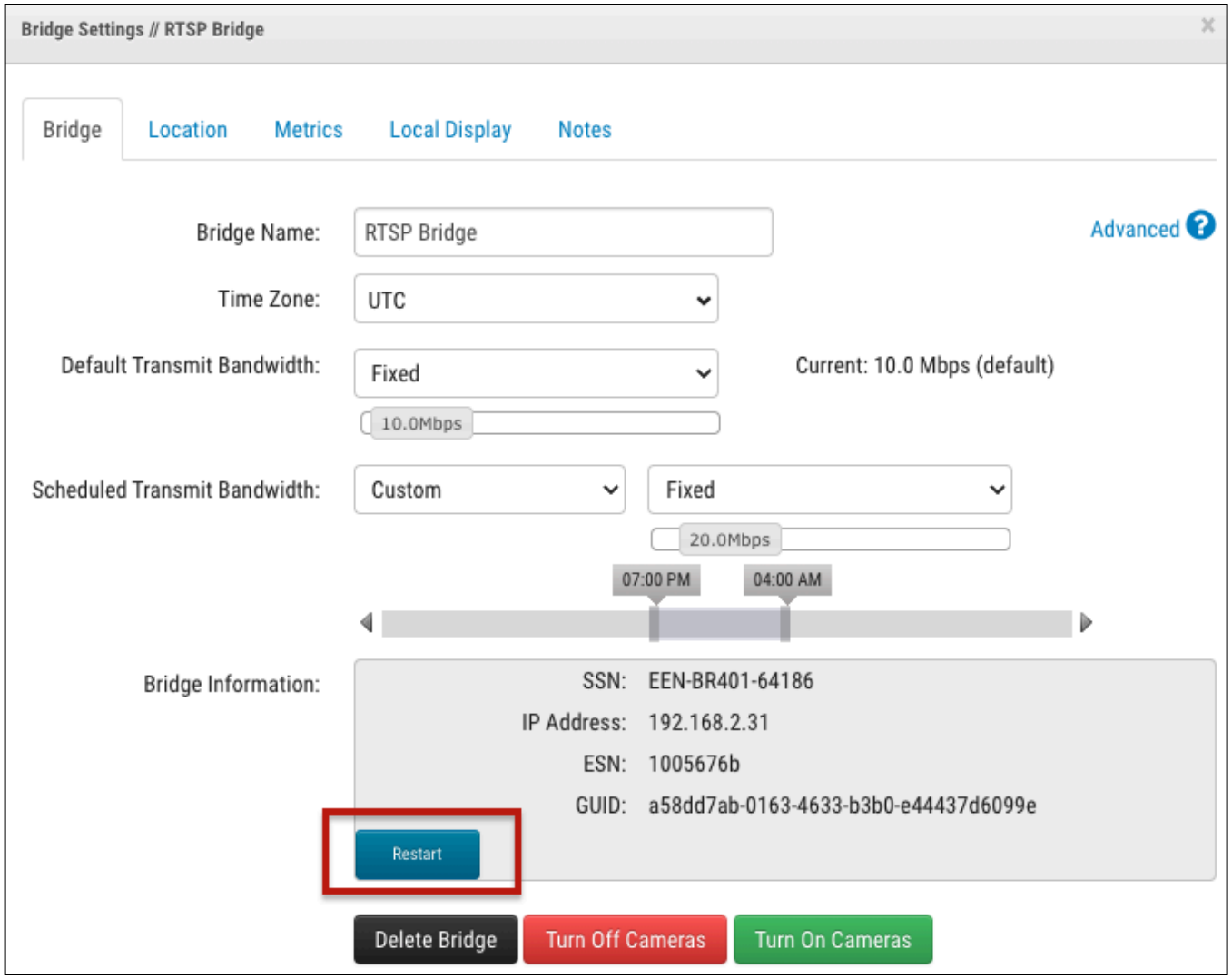
Uncheck the “Dual Stream” checkbox for Single Stream RTSP, you will also notice a warning appears about higher resource usage.



You can now enter the camera credentials, the IP address of the camera (in the case of an NVR, each camera will use the NVR IP) and MJPEG and H.264 video resources URL. (For Single Stream, only H.264 is required. Eagle Eye Cloud VMS will assemble the full URL, and utilize port 554 for the cameras. Inside the URL box, you therefore need to add only the camera resource information (for example “/onvif-media/media.amp?profile=profile0”). You will need to do this for each camera that you want to add.



Note that cameras added via RTSP typically will take longer to appear online than ones added via ONVIF. If the stream does not connect for some time, or if for any reason you need to check or adjust the settings, the best way to force stream reconnection is to restart the Bridge. This option is available in the Bridge Settings, and found at the bottom of the Information section. (If you do not see it, try pressing “r” on your keyboard.)



Activating Eagle Eye 911 Camera Sharing

If you are adding camera streams specifically to utilize Eagle Eye 911 Camera Sharing, the final step will be to activate this feature by selecting the checkbox for 911 Camera Sharing within your camera's settings. For 911 Camera Sharing to work, you must also enter the address under the Location tab and precisely situate the camera on the map. Please see AN066 Increasing Situational Awareness in an Emergency with Eagle Eye 911 Camera Sharing for detailed instructions.