



Multi-Streaming in Ocularis

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Multi-Streaming in Ocularis 5

The introduction of multi-streaming capabilities in Ocularis 5.3 offers users greatly increased flexibility in system design, new bandwidth optimization capabilities – particularly with regards to viewing video using web and mobile clients - and expanded recording flexibility. This document will address the concept of multi-streaming, how to configure and examples of how this capability can be utilized.

Multi-Streaming Explained

Multi-streaming is the ability to use multiple streams produced by the IP camera or encoder for different tasks within Ocularis. The number and type of streams are dependent on the specific camera or encoder model. OnSSI's [Supported Devices List](#) details the capabilities for each tested model and should be consulted during camera selection to ensure compatibility and required multi-streaming capabilities. The device manufacturer's specifications should also be consulted to verify compatibility and capabilities.

Almost all modern IP cameras and encoders are able to simultaneously produce multiple video streams with different attributes for each stream. Depending on the device's capabilities, the following attributes may be configurable for each stream:

- Video codec
- Transmission mode
- Compression method – MJPEG, MPEG4, H.264, H.265
- Incoming audio
- Frame rate (fps)
- I-Frame distance (in seconds)
- Quality
- Resolution
- Bandwidth control
- RTSP port
- MPEG profile (for H.264 compression)

Please note that not all devices support configuration of all attributes on each stream. Please consult the [Supported Devices List](#) or the camera manufacturers' specifications to verify this information.

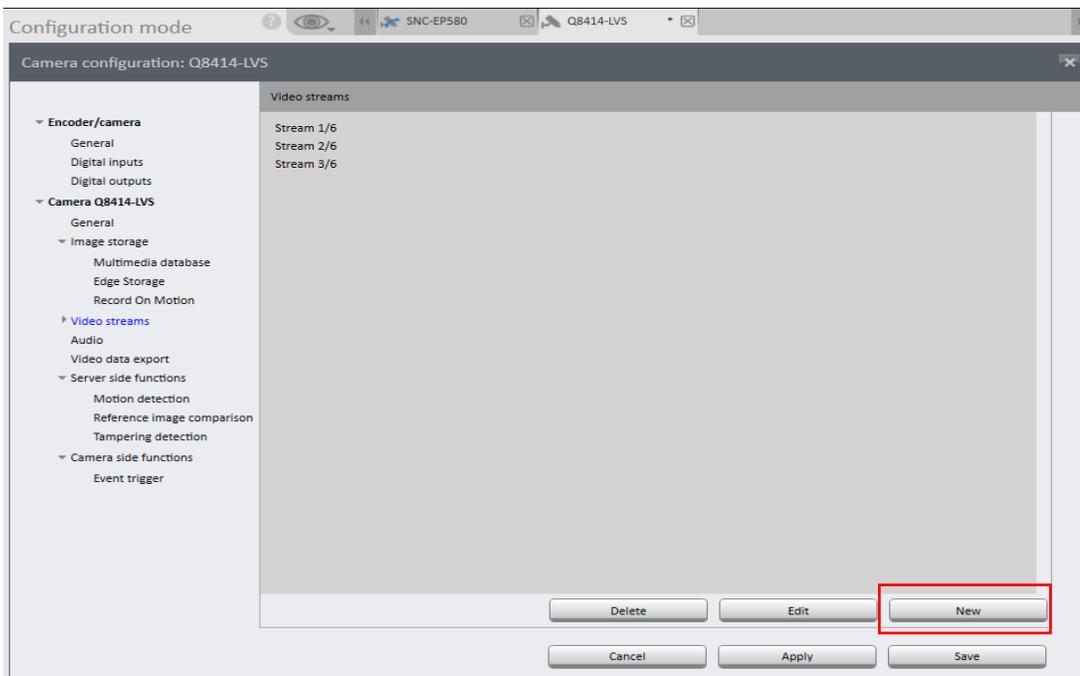
Role of the Ocularis Event Proxy

In the Ocularis 5.3 release, the Event Proxy's role was enhanced to facilitate proper use of multiple streams. Therefore, the Event Proxy must be installed and configured for multi-streaming capabilities to function – even if events are not being used on the system.

Enabling Multi-Streaming in Ocularis 5

Enabling multiple streams for a device is a simple and straightforward process using the Ocularis Recorder Manager application. After opening the configuration window for a camera or encoder, click the left-side menu "Video streams." Click the New button for each additional stream required.

Please note that Ocularis already indicates how many streams may be enabled in the menu itself – the first stream available will be labeled with "Stream (1/x)" with the x value showing the number of possible streams. For example, a camera showing "Stream (1/6)" will be capable of a total of six different streams. This is also carried through after clicking the "Video streams" menu item:

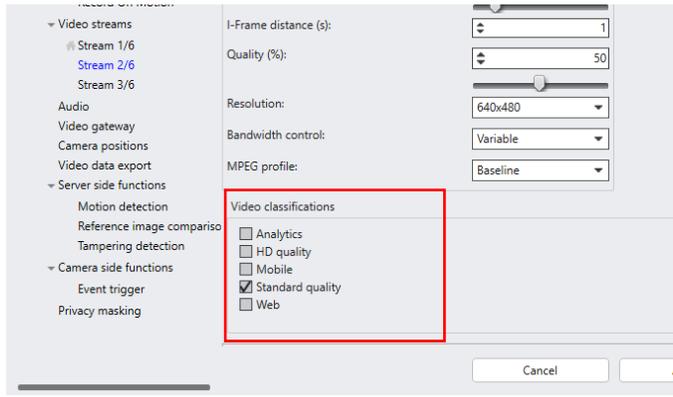


Each individual stream may then be configured for its attributes by selecting it in the left panel of the application.

Also note that stream number 1 is used for the default live view in Ocularis Client and also for Standard Recording. Alarm Recording uses stream 1 by default but may be configured to use any available stream.

Video Classifications

Video Classifications are labels used to identify streams. It is critically important to assign each stream a Video Classification. Classifications appear in the stream configuration window after a second stream has been added. Each stream must have its own unique classification – this helps users to identify the proper stream to use.

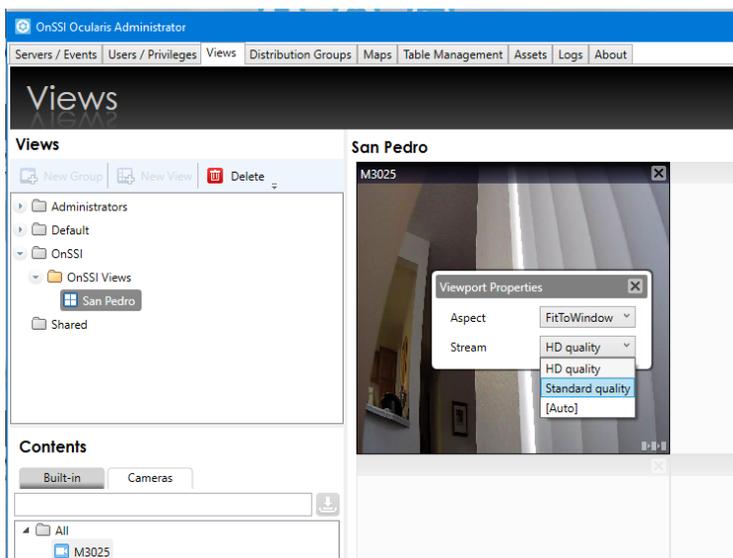


If desired, Video Classifications may be customized under the System menu in the Ocularis Recorder Manager.

Using Multiple Streams to Configure Views

Multi-streaming can be beneficial in many applications by reducing network utilization to the Client workstations and reducing the workstation workload. **Please note that this affects live viewing only – playback is shown in the resolution that the video was recorded in regardless of view configuration.**

In Ocularis Administrator, you have options for stream selection when building a view. After dragging a camera into a pane, click the pane once to display the Viewport Properties. All streams that have been configured for the camera will be available in the drop-down menu with an additional selection for [Auto].



Specifying a Default Stream

By default, if no default stream is selected, Ocularis Client will use stream 1 for the live view. By selecting a different stream during view configuration, Ocularis Client will always use that stream when initially drawing the live view. The stream will be maintained if the operator maximizes the pane or performs a digital zoom.

By selecting a lower resolution and low frame rate stream, you can ensure that bandwidth usage to the client workstation is optimized. This can be particularly useful for Client users who are viewing via limited bandwidth connections, or for remote sites that have limited bandwidth such as wells, pumping stations and construction sites. In either configuration, recorded video is presented at the resolution and frame rate it was originally recorded.

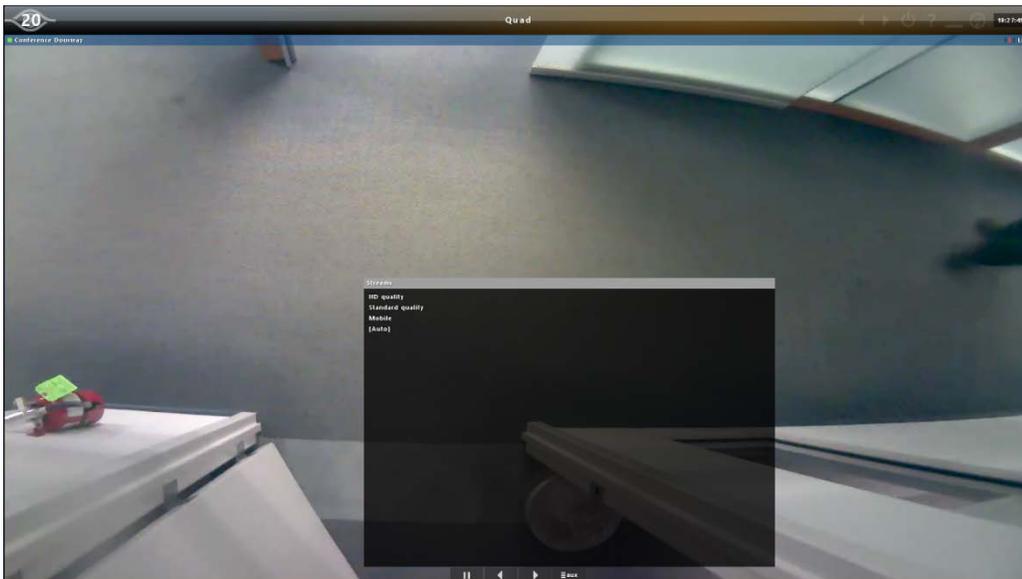
Using [Auto] Function

By selecting the [Auto] function, Ocularis Client will choose the stream that best fits that pane when viewing the camera live. This is dependent on the resolution of the display. For example, if you are displaying a 2x2 view on a 4K monitor and have 720p or 1080p streams available, Ocularis Client will use those streams since there are enough pixels available to display the full resolution of each stream. If displaying the same view on a 1080p monitor, Ocularis Client will choose lower resolution streams that best fit the available pixels.

The [Auto] function will automatically choose the highest resolution stream (regardless of monitor resolution) when the operator either maximizes the camera pane (by clicking the image bar) or by performing a digital zoom. The [Auto] function can be very useful in reducing workstation load and bandwidth when using views with a large number of cameras in Ocularis Client.

Selecting Different Streams in Ocularis Client

When multiple streams are available, Ocularis Client users may select each stream from the AUX button at the bottom of the camera pane.



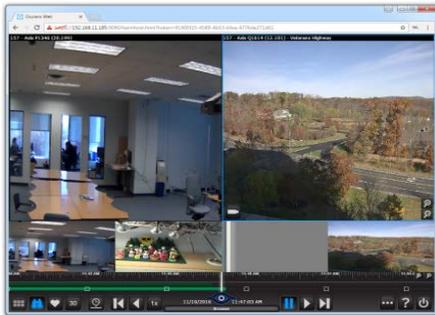
Stream selection is a privilege that can be managed by User Group and by individual users. See page 9 for additional information.

Multi-streaming for Mobile and Web Users

Ocularis Media Server (5.3 or later) uses multiple streams as the means to reduce bandwidth to web and mobile clients. Ocularis Web and Mobile clients always use the [Auto] stream selection and will choose the stream that best fits the available display area. Mobile clients have the ability to select a different stream for live viewing.

If the camera cannot produce lower bandwidth streams or if the streams have not been configured, then the web and mobile clients will simply use the default stream. However, the impact of this must be considered.

For web clients, only five streams with resolutions higher than 600 pixels vertically may be displayed simultaneously – regardless of the number of cameras in the view. Additionally, due to the limitations of web browsers' ability to display multiple streams simultaneously, performance and the viewing experience may suffer if only high resolution streams are available. For mobile clients, data usage and the cost of service may be unnecessarily impacted if lower bandwidth streams are not available.



Ocularis Web



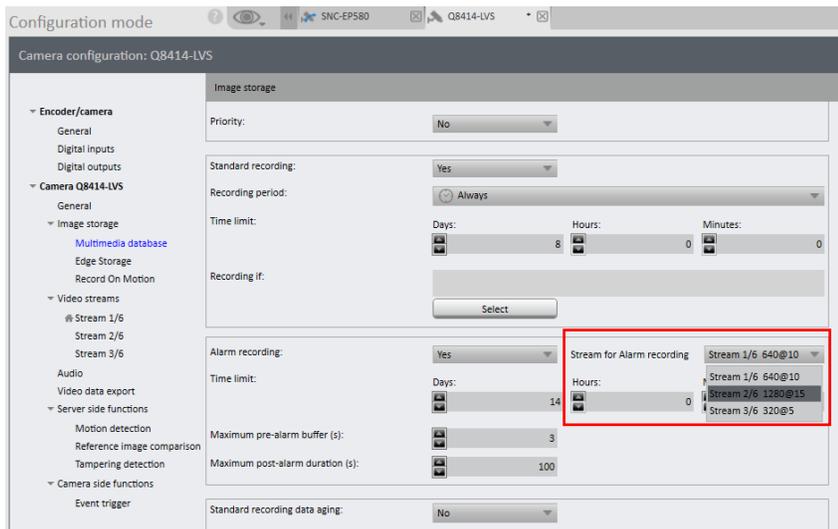
Ocularis Mobile

For playback in Ocularis Web and Mobile, the recorded video is transcoded to minimize the impact on Web and Mobile clients and also on the server where Ocularis Media Server is installed. Mobile users are restricted to playing back one camera at a time. Web users may play back a maximum of two cameras concurrently.

Using Multi-streaming with Standard and Alarm Recording

Multi-streaming enables system administrators to customize their recordings using Ocularis 5's unique Standard and Alarm Recording modes. (See the [Understanding Ocularis 5 Recording Modes](#) white paper for additional information.)

This unique Ocularis 5 feature can be used to reduce storage requirements when using both recording modes and multi-streaming. To enable this, configure stream 1 with lower resolution, lower frame rate, and lower bandwidth settings and configure stream 2 (or any other stream) with higher resolution, higher frame rate and higher bandwidth settings. Then select stream 2 as the Stream for Alarm recording in the Multimedia Database/Image Storage menu in Ocularis Recorder Manager. (Note: Stream 1 is always used for Standard Recording.)



During playback, the resolution shift will be noticeable, but there is no gap or missing frames in the video. Note that any pre or post alarm buffers that have been configured for the camera in the Record on Motion menu will capture the designated Alarm Recording stream.

Speedup for Alarm Recording

Multi-streaming can also be used to effectively configure a 'speedup' during alarm. Many users wish to simply use a higher frame rate during an alarm event. In the past, when MJPEG was the primary encoding available, this was easily done since the camera doesn't change the frame rate – instead the recorder simply discards any unwanted frames and captures all frames during the alarm.

However, when using MPEG-4/H.264/H.265 encoding this is not possible due to the manner in which video is encoded. Instead of the Recorder discarding frames, with MPEG-4/H.264/H.265 the camera itself must reconfigure the stream to the higher frame rate. This can result in missing video for several seconds during the most critical moments.

With multi-streaming, simply enable a second stream with the same resolution as the first stream but with a higher frame rate. Then select this as the stream for Alarm Recording in the Multimedia Database/Image Storage menu as outlined in the example above.

Considerations when using Multi-Streaming

Although multi-streaming is an effective method to reduce bandwidth usage to Ocularis Client (desktop), Web and Mobile users, it can have an impact on the network and recording servers. By enabling multiple streams, the bandwidth from each camera to the recording server will increase. Therefore it is important to factor in the higher bandwidth when choosing server hardware and networking components.

OnSSI recommends that cameras are deployed on their own physical or virtual network to minimize overall network traffic and provide better system security. Ocularis never requires or allows a direct connection between the clients and cameras. Using two NICs on the server – one for camera traffic and a second for client traffic – is an effective and recommended method to increase security and minimize bandwidth across the network.

When determining server hardware, OnSSI recommends not exceeding 50% of the capacity of a network connection. In order to calculate the bandwidth properly, you must add in the bandwidth for all additional streams you have enabled from a camera. When using the [OnSSI Hardware & Storage Calculator](#), for each camera type that will have multiple streams, add another entry for each additional stream. For streams that are only being used for viewing and not recording, enter "0" for the retention.





ADD



PDF EXPORT

My Project

Configuration	Number of Cameras	Bandwidth / Throughput	Space
 Camera 1 Alarm Record	25	63.2 MBit/s 7.9 MByte/s	6.51 TB
 Camera 1 Standard Record	25	5.1 MBit/s 652.8 kByte/s	1.05 TB
 Camera 1 Web	25	3.8 MBit/s 486.4 kByte/s	0.00 B
 Camera 1 Mobile	25	716.8 kBit/s 89.6 kByte/s	0.00 B
Total	100	72.8 MBit/s 9.1 MByte/s	7.56 TB

SERVER RECOMMENDATION

Throughput up to 20 MByte/s
At least 4000 Points in the Benchmark
Recommendation: [Xeon E3-1225 v2](#)

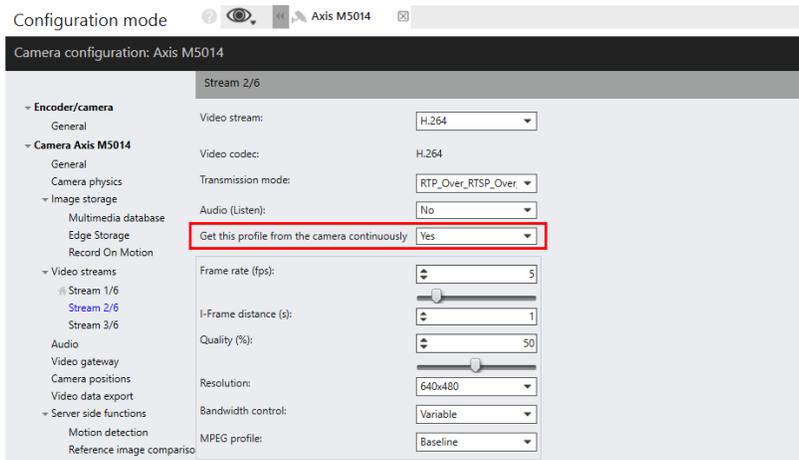
In this example, the calculation for each entry is as follows:

- Camera 1 Alarm Record: 1080p (1920x1080), 15 fps, 8 hours/day
- Camera 1 Standard Record: 4CIF (704x576), 8 fps, 16 hours/day
- Camera 1 Web: VGA (640x480), 8 fps, 24 hours/day viewing only
- Camera 1 Mobile: QCIF (320x240), 5 fps, 24 hours/day viewing only

By performing these detailed calculations, a better estimation of the bandwidth and hardware requirements is available to assist with hardware choices.

Get Profile Continuously Option

Ocularis 5 provides an option for each additional stream to obtain the profile continuously. If set to 'Yes', then the Recorder will always be requesting the stream from the camera. If set to 'No' – the default setting – the Recorder will only request the stream when necessary. This is typically done upon a client requesting the stream. Please note there may be a delay in displaying a live feed if the option for the stream is not set to 'Yes.' If using the secondary stream for Alarm Recording, the Recorder will automatically retrieve the stream.



Stream Select Privileges

Ocularis Client and mobile client operators by default are allowed to select any available stream. (In Ocularis Client, stream selection is via the AUX button in the camera pane.) If desired, this may be unprivileged in Ocularis Client for the User Group or for any individual User in Ocularis Administrator.

