1 Installation and initial setup

1.1 Prerequisite

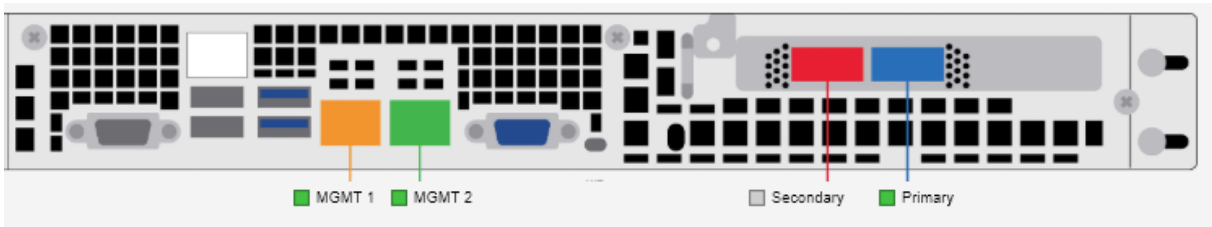
To connect the appliance you need the following:

- Two power cables for the redundant PSU
- 1 or 2 RJ45 1 Gbps Ethernet ports for management
- QSFP28 connectors for the data ports, or a QSFP cage + supported SFP madule

Supported QSFP28 protocols:

- 100GBASE-CR4
- 100GBASE-KR4
- 100GBASE-SR4
- 56GBASE-R4
- 50G Ethernet Consortium
- 40GBASE-CR4
- 40GBASE-SR4
- 40GBASEL-R4
- 40GBASE-ER4
- 25GBASE-CR/CR-S
- 25GBASE-SR
- 25GBASE-LR
- 25G Ethernet Consortium
- 10GBASE-SR
- 10GBASE-LR
- 10GBASE-ER
- 10GBASE-CX4
- SGMII
- 1000BASE-X

1.2 Quick Installation Guide



Connect one or both of the management cables. Please note that with the default configuration MGMT 1 (Orange) is configured with a static IP, and MGMT 2 (Green) is configured using DHCP. If you choose to use the static port, the pre-configured address will be 10.0.20.101/16.

The server also has an IPMI port that can be connected if wanted. It is configured to use DHCP and the username and password is ADMIN / ADMIN.

Insert the QSFPs into the Primary (Blue) and Secondary (Red) ports, choosing a supported QSFP-type from the list above.

You can then connect the two power cables and power the server on.

1.3 Accessing the User Interface

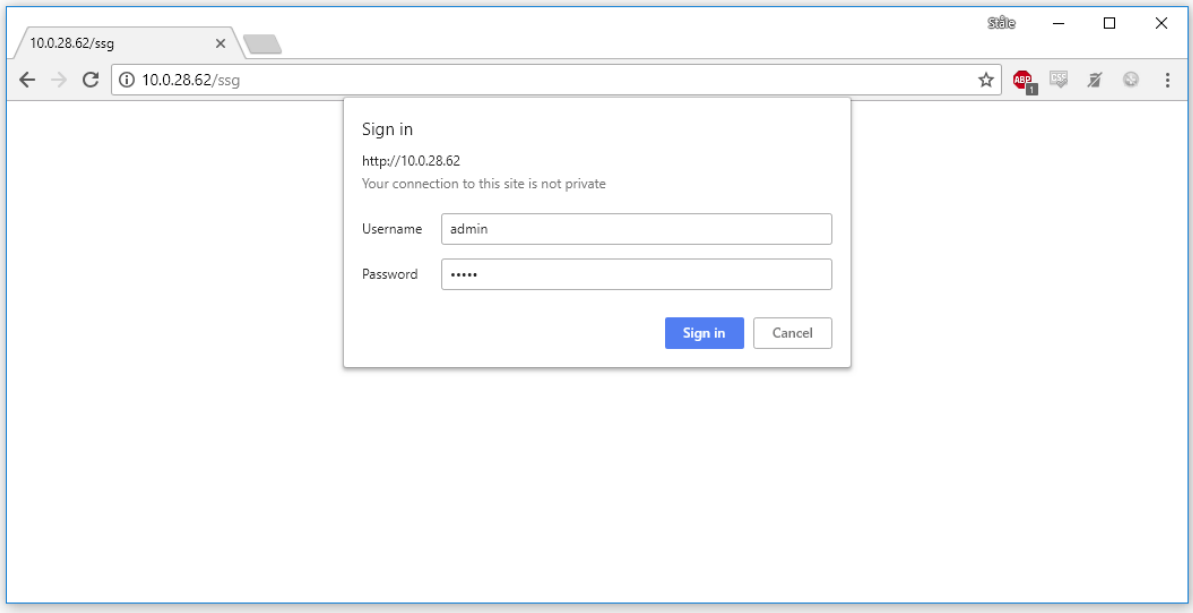
Once the server has been connected to the network, you can use a browser to connect to the user interface.

Please note that, for optimum results, Chrome is recommended to manage the VB440.

To connect to the VB440, you will either have to have mDNS and IPv6 working (typically only on Mac OS) or know the IP. If you have connected to the static management port, the default address should be 10.0.20.101. Your machine will have to be on the same network in order to reach it through that address. If you have connected it to the DHCP management port, you will either have to get the IP from your DHCP server, or from the printout in the console.

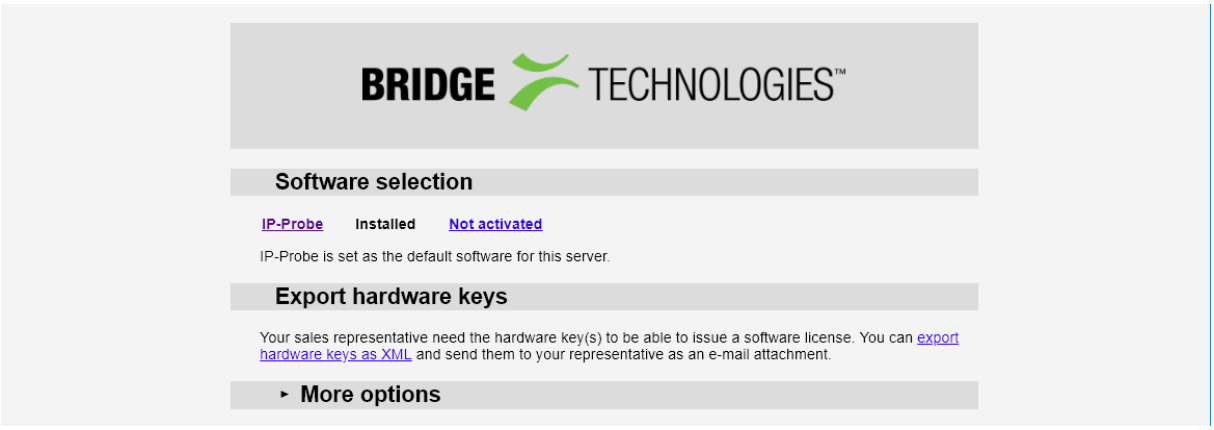
```
VB440 Probe - CentOS Linux 7 (Core)
Kernel 3.10.0-862.2.3.el7.x86_64 on an x86_64

    MGMT1: 10.0.20.101 fe80::3bd6:d3ca:3f5e:217f
    MGMT2: 10.0.28.62 fe80::8d3e:452d:3d57:32ae
  Primary: 10.100.1.91 fe80::d8a5:547e:cbc3:50f
Secondary:

probe login:
```

Depending on if the product is enabled and is properly licensed you either get the enable / license UI or the main UI up.



If you get a login page as seen above, the product has not yet been activated. If you do not get a login page, go straight to section 1.4

Log in using the username **admin** and the password **elvis**.

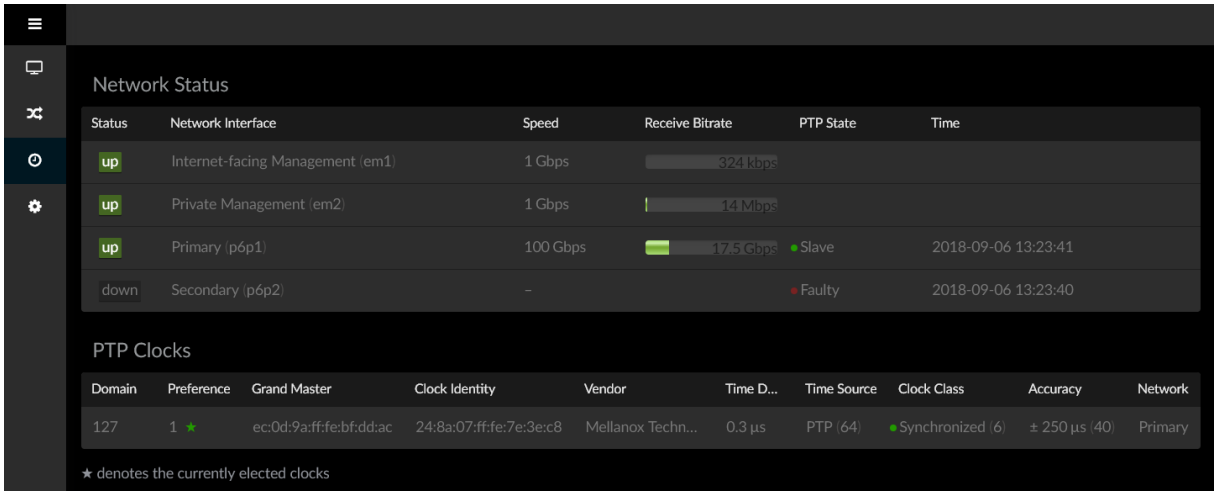


On the **Software selection** screen, choose **Not activated** and input both the software license, and the software maintenance license, pressing **Add license** after each license. Then select **Activate software** near the bottom of the screen, and go back to the previous page.

Back at the **Software selection** screen, click on **IP-Probe** to go straight to the management view.

1.4 Management View

The default management view should look similar to the following picture.



1.5 Configuring Ethernet settings

The VB440 comes with built in support for editing the network interface settings. To access it, go through the main configuration interface, accessible through the cog symbol on the left hand side. Go to the **Setup** tab, and then select the **Ethernet** sub-tab.

The default username and password is admin / elvis.

1.5.1 Network Interfaces

To view the interfaces that are currently active on your system, click on the Network Interfaces icon on the Ethernet page. This will take you to the page shown in , which lists interfaces on your system in two categories. At the top under Interfaces Active Now are those that are currently enabled and have an

IP address assigned. At the bottom under Interfaces Activated at Boot Time are those which have been configured to be activated at boot.

To change the settings of an interface do the following:

- Select the **Activated at Boot** tab.
- Click on the interface you want to edit. This will take you to a form for editing its settings.
- To assign a different address, enter it into the IP Address field. Or select the From DHCP option if you want the address to be dynamically assigned by a DHCP server on your network.
- If necessary, change the Netmask field. If it or IP address is changed, you will also need to set the Broadcast address field based on the new netmask and IP.
- Make sure the **Activate at boot** field is set to Yes so that the interface is brought up when the system starts. If editing an active interface, make sure the Status field is set to Up so that it can be used immediately.
- When done editing a boot-time interface, click the **Save and Apply** button to save your changes for use at bootup time, and to make them immediately active. If you are editing an active interface, just click Save to activate your changes.

1.5.2 Hostname and DNS

Every Unix system has a hostname. Normally the hostname is the same as or part of the DNS name for the system's IP address. The hostname should be the hosts fully qualified DNS name (like server1.foo.com), or just the first part (like server1). Anything else is likely to cause confusion and possibly network problems.

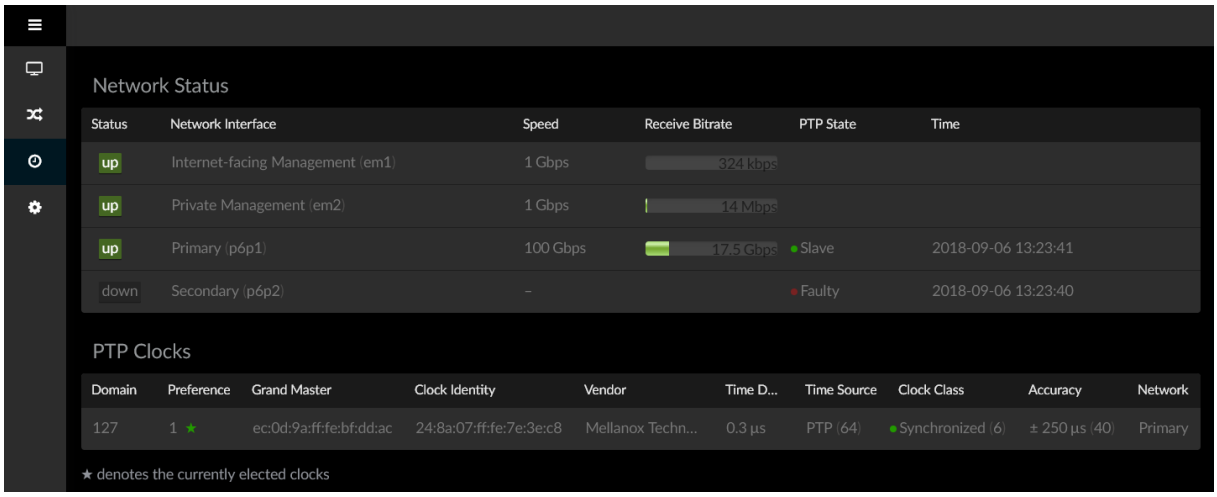
To change the hostname do the following:

- On the main page of the **Ethernet** tab, click the DNS Client icon. This will take you to the form for editing the hostname and DNS options.
- Enter the new hostname (composed of letters, numbers, underscores and dots) into the Hostname field.
- Click the Save button to have it immediately changed.
- If you are running a DNS server, don't forget to update the entry for your system there as well.

To change the DNS server do the following:

- On the main page of the **Ethernet** tab, click the DNS Client icon. This will take you to the form for editing the hostname and DNS options.
- Enter the addresses of up to three servers into the DNS servers field. If the first is not available, your system will try the second or finally the third. Most networks will have at least a primary and secondary DNS server to increase reliability in case one fails.
- The Resolution order field can be used to control where your system will look when resolving hostnames and IP addresses. Generally the defaults are reasonable, with Hosts (the /etc/hosts file) listed first and DNS later.
- In the Search domains field, enter any domain names that you want your system to automatically append to resolved hostnames. For example, if foo.com was listed and you ran the command telnet server1 then the IP address for server1.foo.com would be looked up.
- When done, click the Save button. Any changes will take effect immediately in all programs running on your system.

2 The VB440 graphical user interface



The VB440 web interface is reached by pointing a web browser to the IP address of the VB440 Studio Probe as shown in the screenshot above. The following web browsers are recommended:

- Google Chrome
- Apple Safari

Note that different web browsers behave differently with respect to memory leaking, and if the VB440 GUI should be available at all times the browser should be selected carefully. A browser memory leak manifests itself as the browser responding more and more slowly, and this is corrected by closing down the application and restarting.

The interface is easy and intuitive to use. The interface is divided into analysis and monitoring/configuration. The analysis interface is what greets you first when you connect. To configure streams, go to the configuration interface by pressing the cog on the left hand side menu. If you are unable to see the left hand menu, expand it by pressing the button marked with three horizontal lines in the top left corner.

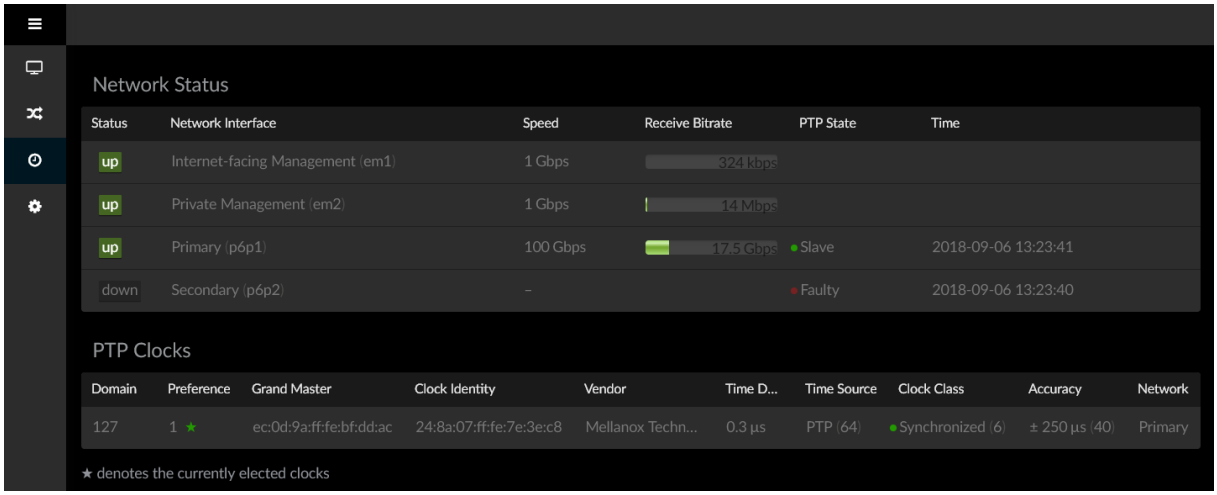
The web interface has been designed to be resizable in both vertical and horizontal directions with a minimum screen resolution of 1280×800 pixels.

Tool-tips are available for most buttons and labels. To access tool-tip information simply navigate the mouse pointer towards a button or a label and leave it hovering for a second or two.

In this manual the term stream is generally used instead of the terms multicast and/or unicast. A stream may thus contain a single service or multiple services.

2.1 Instrument View

2.1.1 Analysis – Summary



When you first open the probe in a browser, you are greeted with the status page, as seen in the screenshot above. You can find more detailed instructions in **Status view**.

2.1.2 Top level menu

On the left is a navigation menu that can be shown or hidden by clicking the menu button in the top left corner. The menu button is marked with three horizontal lines. This menu is persistent and you will be able to reach it from any other page.

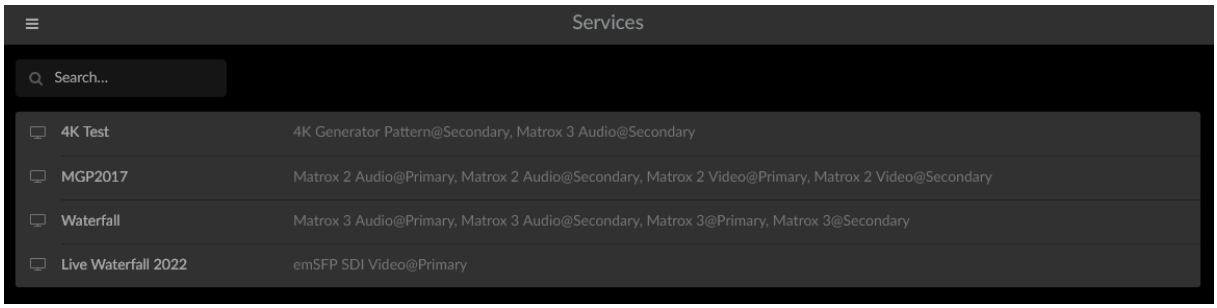
On the top, underneath the show/hide menu button is a small icon with a computer screen. This button takes you to the **Services** view, where you look at your different service bundles.

The next button looks like two horizontal arrows that cross. It takes you to the flows list, where you can see all of your configured flows.

The following button in the menu looks like a clock face. It takes you back to the status page.

At the bottom you have a button that looks like a cog. That button will take you to the configuration / monitoring page.

2.1.3 Service view

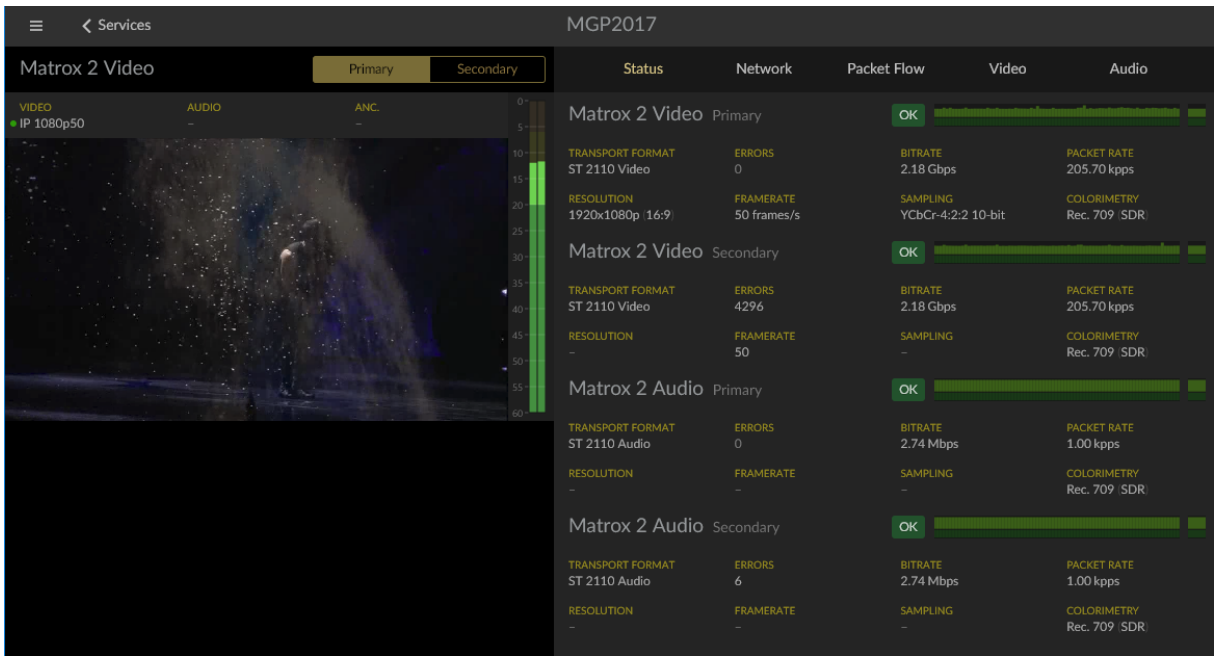


In this view you can see how the services are configured and what flows they contain. If you are having trouble finding a service, just use the search box, located near the top of the screen. Notice that while in

this view, you can select a different service bundle directly at the bottom of the screen, even if you are looking at another stream.

When you click on one service, either from the list or at the bottom, you are taken to the detailed service view.

2.1.3.1 Detailed service view

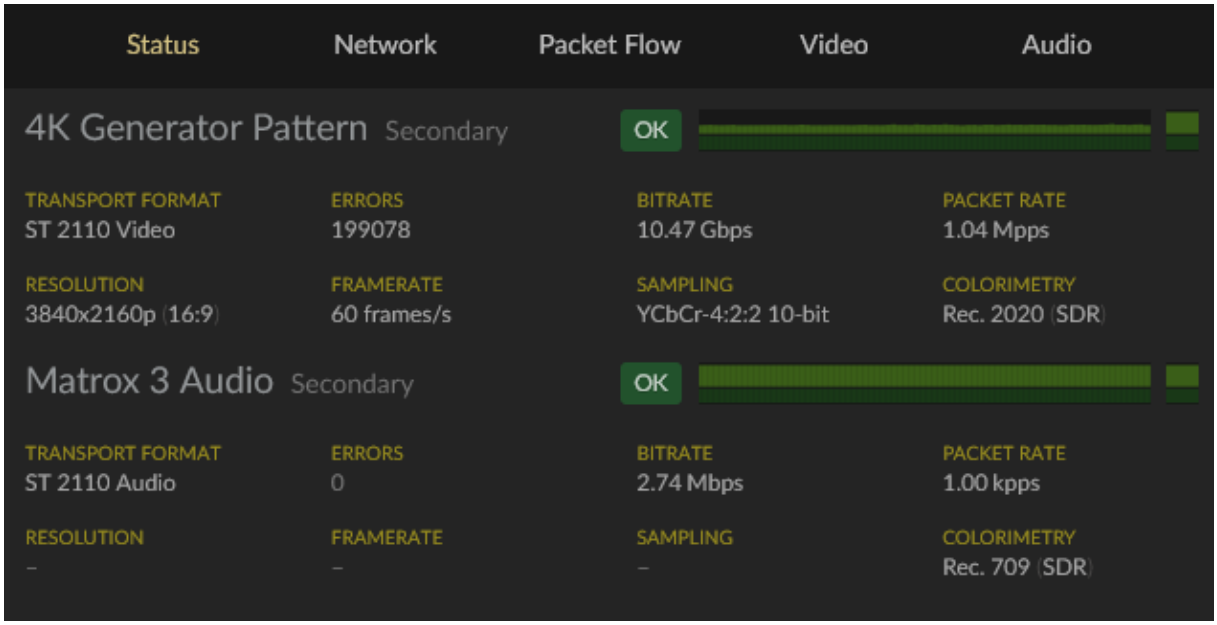


In the top of this view you have a button at the top, next to the service name, to select between your different classes of flows. A typical use for the classes is to mark **Primary** and **Secondary** flows. Please note that those buttons are only available if you have configured and joined more than one class of flows for this service.

On the left, under the class-buttons you have a list of each video flow, with a live view of what is transmitted, with audio bars if available.

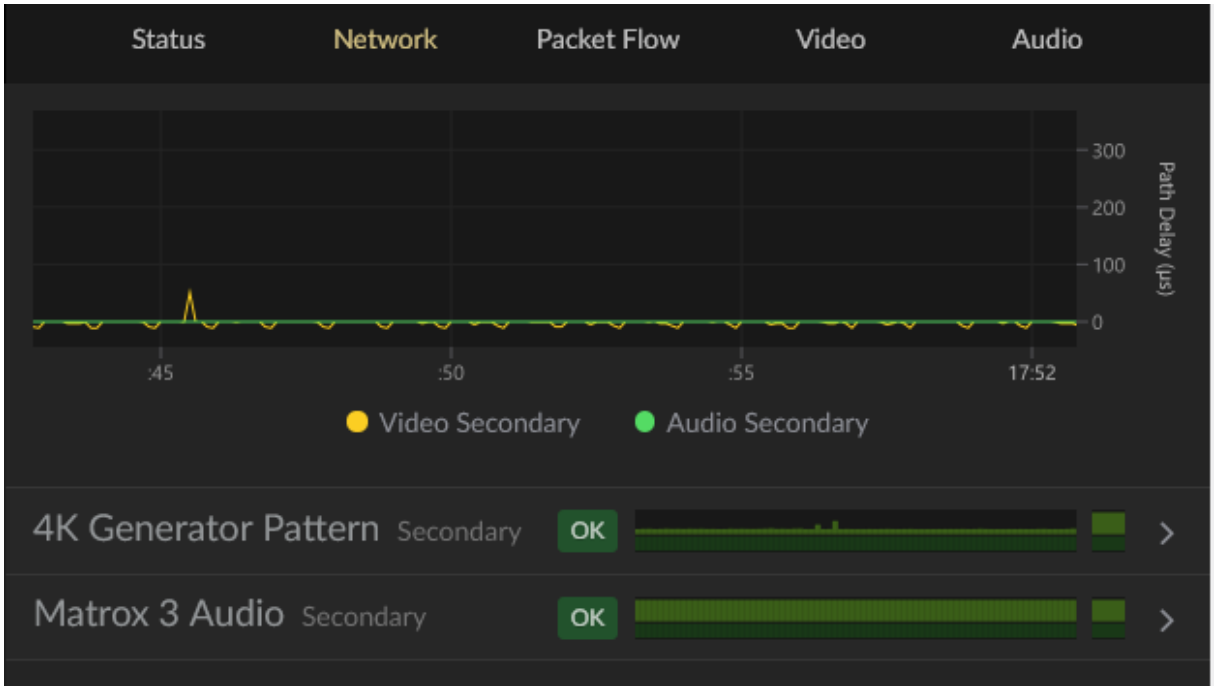
On the top right, you have buttons selecting which information card to show. The available choices are **Status** (the default), **Network**, **Packet Flow**, **Video** and **Audio**.

2.1.3.2 Detailed service view – Status



On the status page, you will get a quick overview of each flow associated with the service. To the right of the flow-name you have a bulb that either shows "OK" or "Error" depending on the status of the stream the last couple of minutes. Further right you have a media window for that flow, showing a combined IAT / packet loss graph.

2.1.3.3 Detailed service view – Network



At the top of the Network page, you can see the **Path Delay** of your flows. The **Path Delay** is calculated based on the time difference between the timestamp of the media and when the media was first received. Typically it should be between 0 and 1 ms if the probe is located near the transmitter, the transmitter is

PTP synchronized to the same time-domain as the probe, and the transmitter is using the 2110 timing model.

Please note that some 2022-6 transmitters adheres to 2022-8, which means they follow the 2110 timing model.

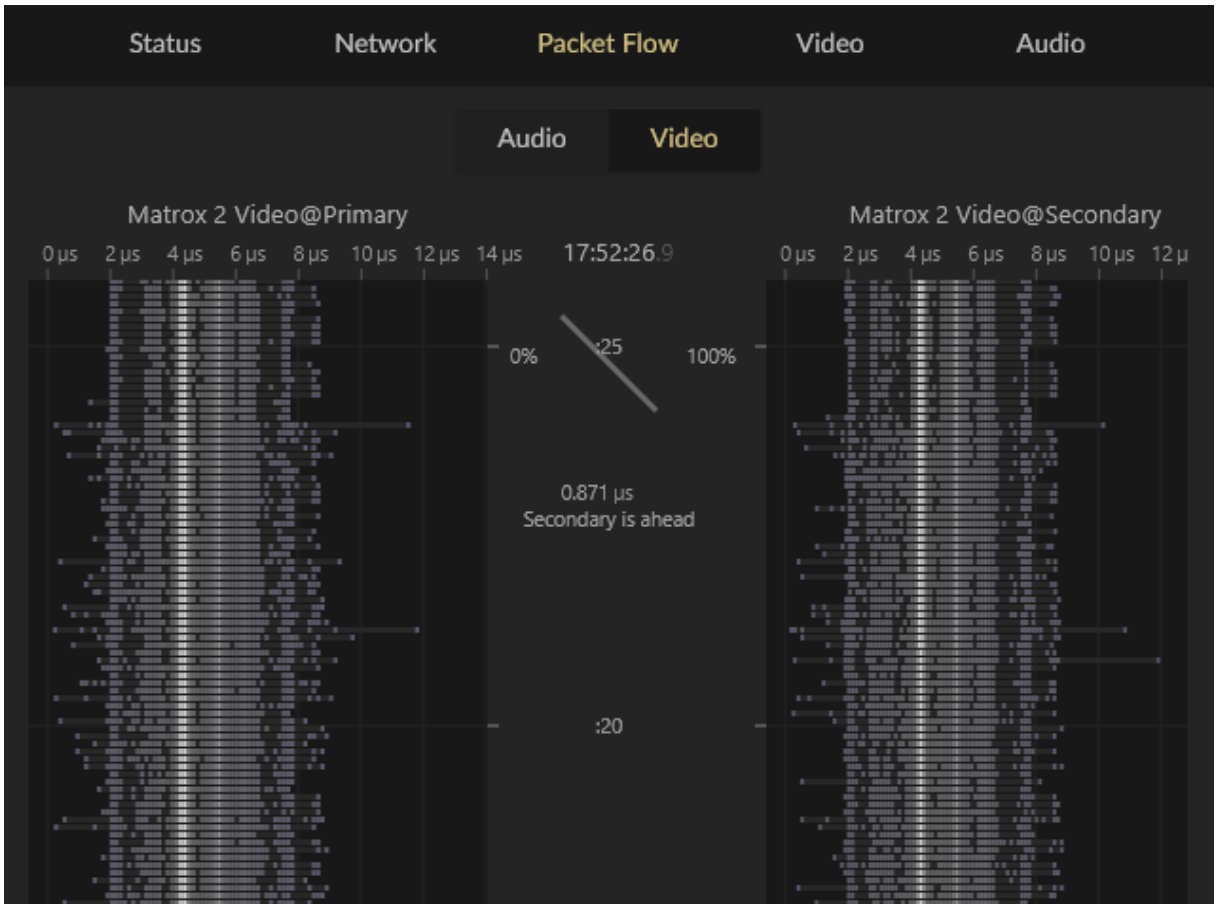
If the signal has been processed by other equipment, or has travelled far through a network bigger delays can be seen.

Subsequently you will find all of the flows for this service, in a collapsable stack, with the same media window as in the status page. To expand one flow, press the line it is on.

When expanded, a bigger media window, and the network IAT graph will be shown together with a lot of network metrics.

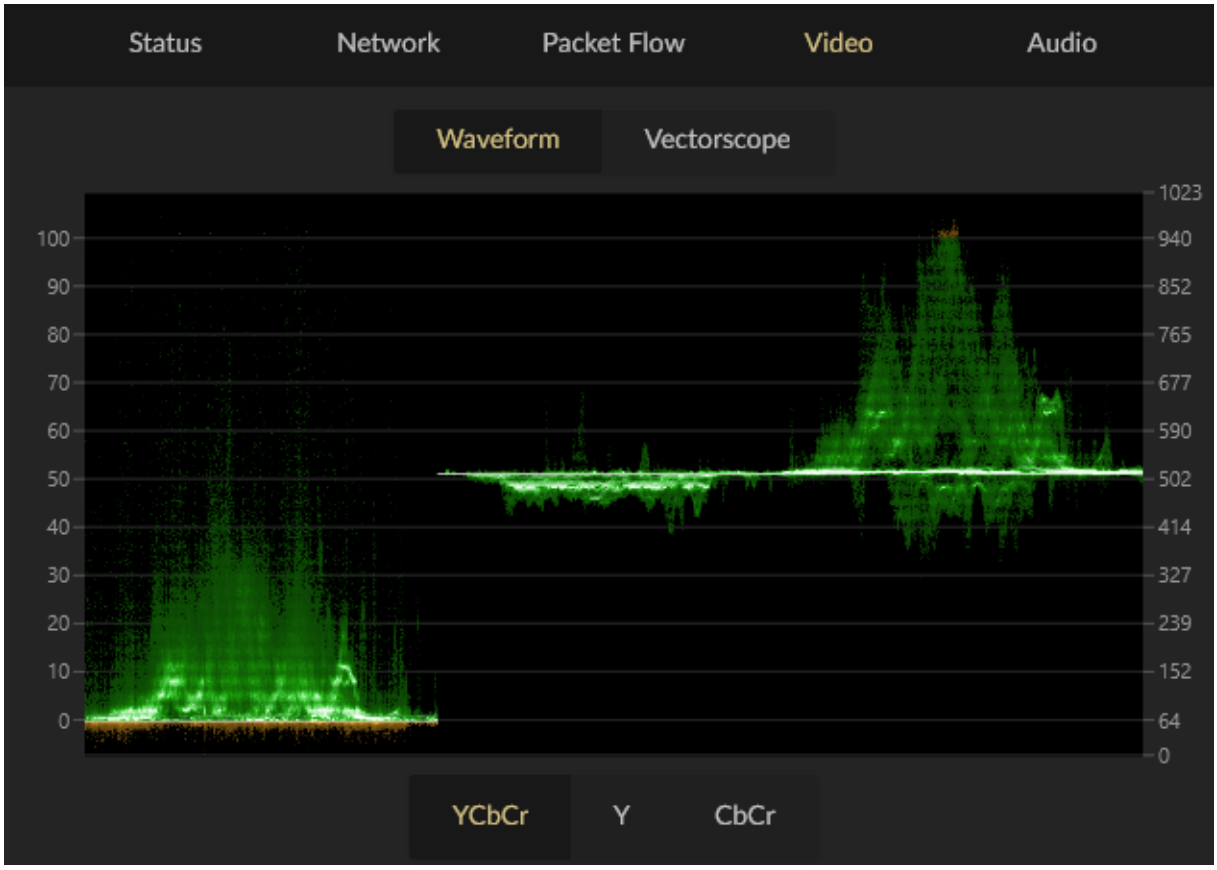
A button to create a pcap capture of the flow is also there.

2.1.3.4 Detailed service view – Packet Flow

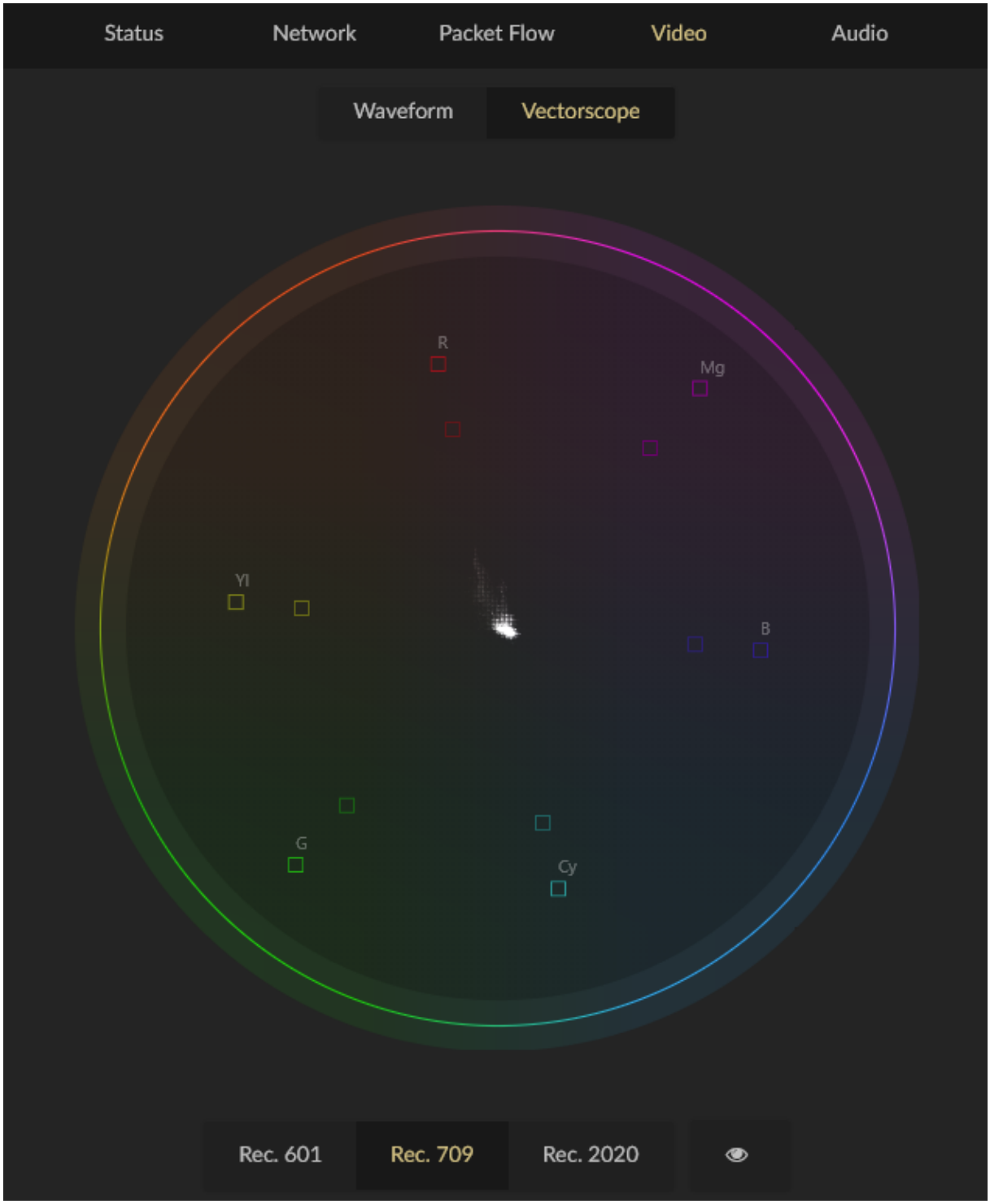


On this page you will see the IAT and Timing for the primary and secondary flows (if configured). The seesaw in the middle is an illustration for which stream is ahead. Its angle is based on the percentage of packets received first on each link.

2.1.3.5 Detailed service view – Video



In this view you can see the Waveform scope. Buttons to only see **Y**, **CbCr** or all the data is also provided.



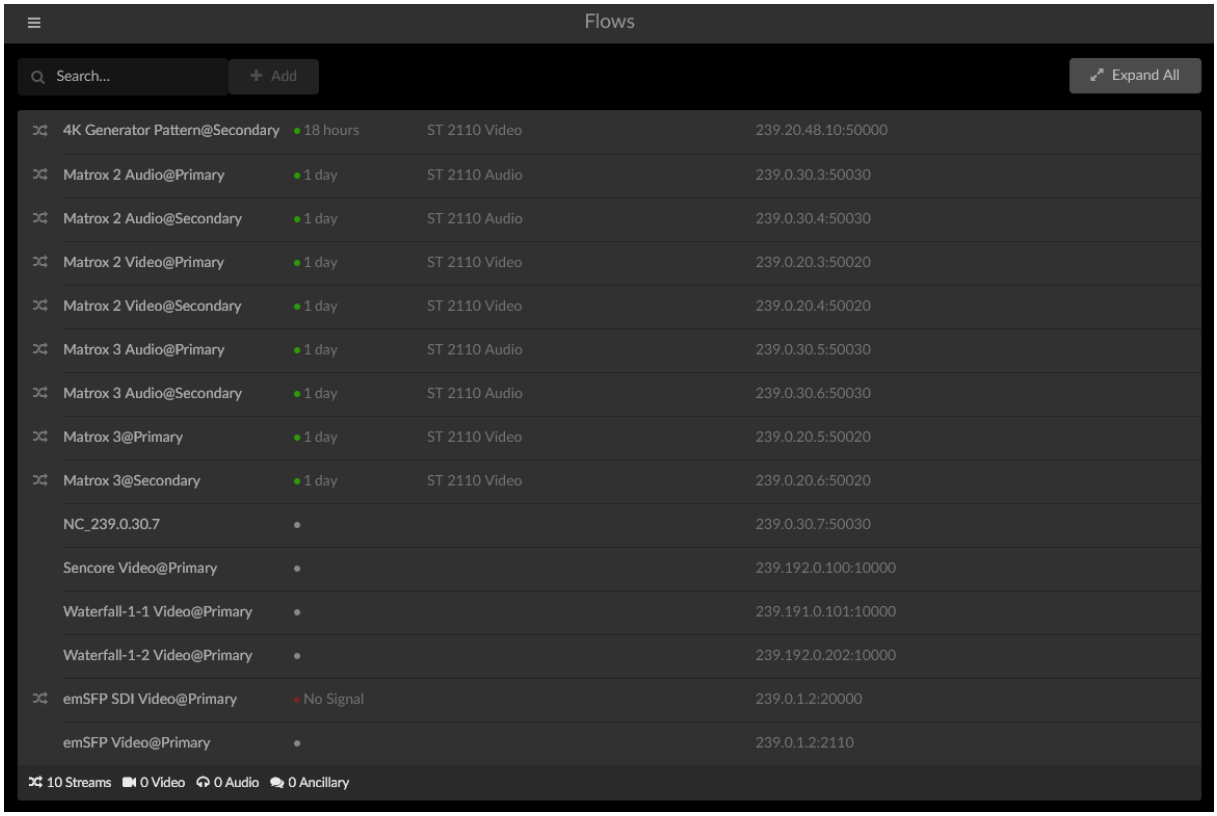
The vectorscope view has buttons to select which color space to use to interpret the data. Changing the color space will move the target boxes at both 75% and 100%, but also change the way the video picture looks in the live video view, for all clients.

The eye button adds contrast to the vector scope, making it easier to see.

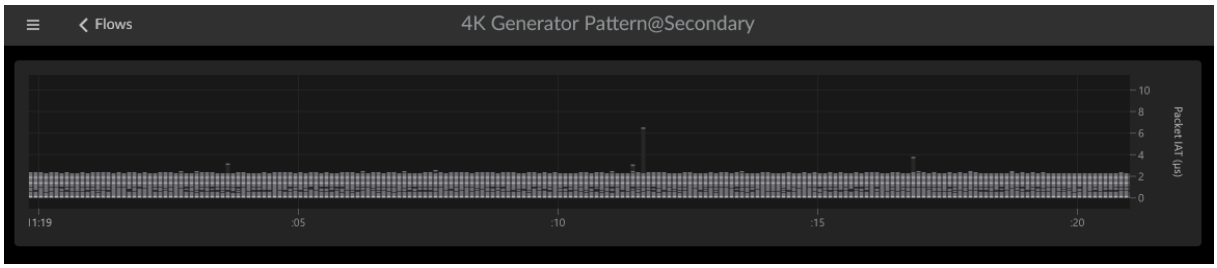
2.1.3.6 Detailed service view – Audio

Here you can see all audio flows that have been configured for this service and also listen to them by unmuting.

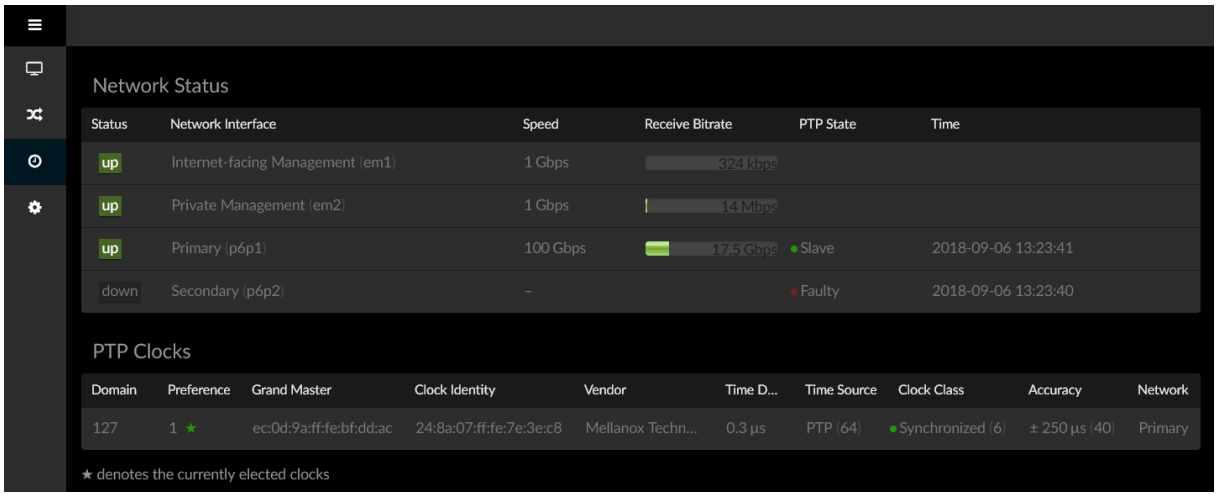
2.1.4 Flows view



In this view you can see all of your configured flows, with status for how long they have had a signal. If you click on a stream, you are taken to a page showing you the **IAT graph** for that flow.



2.1.5 Status view



This view provides a quick overview of the different network interfaces, and PTP grand masters.

For each interface, you will see the link speed (if link is available), the amount of traffic received on the interface, and the PTP state of that interface.