

Streambox StreamOn Server

Manual and FAQ

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Manual date: 2024-08-01

Introduction

Streambox StreamOn Server is a lightweight software application which will allow the user to stream from one Encoder to multiple Decoders and Media Players without the use of the Streambox Cloud Service. At the user's request, Streambox StreamOn Server will create simple codes to be entered into the Encoder, and sent to clients/reviewers to put into their Decoders and Media Players. The Streambox StreamOn Server works with an online asset called Broker to negotiate the connections from the Streambox StreamOn Server to the Client/Reviewer's Media Players and Decoders.

Set Up Streambox StreamOn Server

Requirements

Platform

The Streambox StreamOn Server is compatible with Ubuntu Linux version 20.04 “Focal Fossa”. While newer releases of Ubuntu may also be compatible, their compatibility has not been thoroughly tested and so 20.04 remains the recommended version. It can run on x86/x64 platforms, but not ARM such as Apple Silicon. At this stage, only AWS deployments are supported, but in the future, other Cloud-based platforms will be supported.

There is an AMI available for AWS; see the Installation section below.

PHP v8.3 or higher is required to run the installer.

Version 20.04 Focal Fossa: <https://cdimage.ubuntu.com/ubuntu-legacy-server/releases/20.04/release/>

Hardware

Hardware requirements can vary depending on the number of encoders sending streams at once.

Number of encoder connections	CPU Cores	RAM (GB)	Clock Speed (GHz)	Disk	AWS EC2 Recommended Minimum
1	2	2	2.0	60GB	t2.small
2	2	4	2.0	60GB	t2.medium
5	4	8	2.5	80GB	t2.large
> 5	4 - 16	8 - 32	2.8 - 3	100GB	t2.large - t2.xlarge

Encoder/Decoder/Player Versions:

Streambox Chroma Encoders with the 2023.x Update will have the ability to directly create Sessions Streambox StreamOn Server using the new webUI.

Streambox Media Player for MacOS and iOS 3.0.12 and later will support Streambox StreamOn Server connections. Streambox Media Player for AppleTV 2.2.9 offers beta support.

Network Requirements:

Ports

Encoders and Decoders will be accessing the StreamOn Server via a series of UDP ports. The default port is 1770/udp but we recommend opening a small range of 5 to 10 ports if multiple sessions are likely to be occurring simultaneously.

If encoders or decoders are expected to be across the public Internet from the StreamOn Server, it will *require* access to the internet bidirectionally via that range of UDP ports.

- If the StreamOn Server is inside a private network, the firewall of that network must set two things:
 - Allow the UDP port range bidirectionally through the firewall, and
 - Set Port Forwarding/Port Filtering, or else NAT/PAT, to ensure that connections from outside the firewall will be able to reach the StreamOn Server.
 - **NOTE: Opening the ports alone will not be adequate.**
- If using AWS or similar cloud computing platform, be sure to set your security profile to allow bidirectional access through those ports.

Broker.streambox.com connectivity

Whether in the cloud or a local network, the StreamOn Server (as well as all encoders and decoders/media players to be used) must have internet access to the domain broker.streambox.com, currently at the IP 107.23.6.109. This is a Streambox asset which allows the creation of the Session codes as well as helping negotiate the connections. It does not access or transmit any content of the streams; it only deals with the metadata around the stream to help connect the Server to Decoders/Media Players.

Bandwidth

Bandwidth between Encoder and Server is the sum of incoming and outgoing streams. For a given encoder, one can determine this by the Target Bitrate setting in the Encoder, multiplied by the number of streams, one incoming and however many outgoing. Repeat that process for each active encoder.. Though in some circumstances, such as severe network congestion on the LAN, the Encoder may exceed that bitrate, usually the rate will be at or below the target rate.

If the Streambox StreamOn Server is positioned inside the local network, the bandwidth required for streams coming out of the Server will be the Target Bitrate multiplied by the number of connected clients. This bandwidth requirement may potentially influence the decision as to whether the Server should be run locally or in the Cloud.

Installation

Install on AWS EC2 using AMI

This AWS machine image loads the Ubuntu OS image appropriate for Streambox StreamOn Server Installation.

<https://aws.amazon.com/marketplace/pp/prodview-iftkyuwv2sjxi>

Install on your own server

This will be offered in the future, but at this time, only AWS is supported.

Manual Installation

To install manually, access the command-line prompt on the server and run the following commands consecutively. You may need to preface the command with **sudo** to get them to run.

```
sudo apt --fix-broken install
sudo apt install software-properties-common
sudo add-apt-repository ppa:ondrej/php
sudo apt update
```

```
sudo apt-get --assume-yes install php8.3-fpm php8.3 php8.3-mbstring php8.3-sqlite3 php8.3-xml
lsb-release nginx sqlite wget
sudo apt-get remove apache2
```

```
wget https://streambox-lightserver.s3.us-west-2.amazonaws.com/linux/latest/lightserver.tgz
tar xzf lightserver.tgz
```

```
sudo dpkg --install *.deb
rm -f *.deb *.tgz
```

Connect to the Server

Using a web browser, connect to your Streambox StreamOn Server by its IP address or a domain name that you've assigned to it using this URL:

[https://\[server.ip.or.domain\]/light/light_status.php](https://[server.ip.or.domain]/light/light_status.php)

Log in to the server; the default credentials are **admin** / **demo**

Web Interface and Settings

There are two different views for the Streambox StreamOn Server users to see. A more friendly simplified interface for the typical user such as the Colorist or Producer, and a more detailed view for administrator users and IT support, which discloses more information about current activity within all current sessions. The Advanced UI for administrators also has access to additional settings.

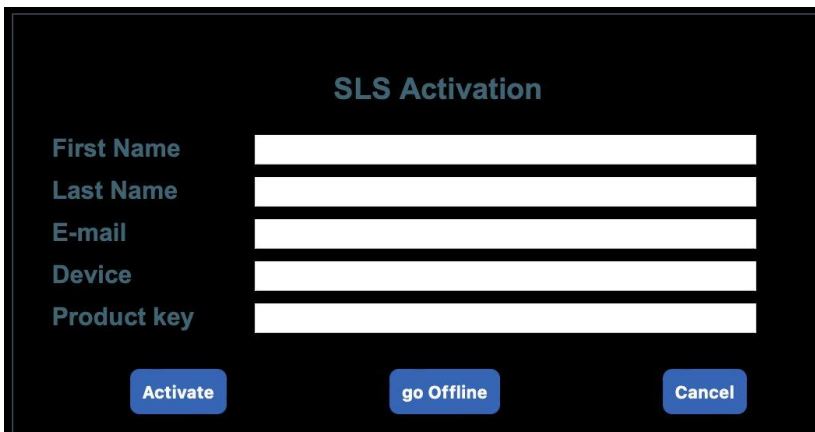
Activation

With your purchase or renewal of Streambox StreamOn Server software, you should receive a 7 digit product key which will serve as your activation code.

Go to the Advanced Settings. The Activation status is found in the Support section at the bottom of the page. The “Config” line will either indicate “Activation required” or will indicate the tier activated, such as “Light” or “Full.”

If Activation is required, click the linktext “activation” and this “SLS Activation” page will appear. Fill in the fields of the form, with the final field containing the 7-digit product key. The Device field is optional. This information is not shared outside of Streambox, but is used to help distinguish activations by multiple people within the same company or volume license.

If activating online fails click the “Go Offline” button and send the displayed Hardware ID to Streambox Support, along with your 7-digit product key. The support tech will generate an activation code that will work offline.



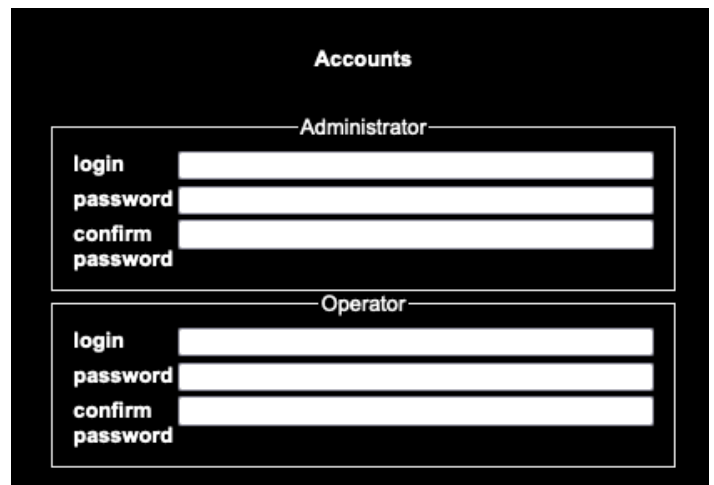
The screenshot shows a form titled "SLS Activation" with a dark background. It contains five input fields labeled "First Name", "Last Name", "E-mail", "Device", and "Product key". Below the fields are three buttons: "Activate", "go Offline", and "Cancel".

Setup

Access the Setup from the Advanced Settings screen:
Advanced Settings -> Setup

Accounts

The Accounts area of the Setup page allows you to set up the server’s single Administrator account and a single Operator account. The Administrator has access to all settings, while the Operator has no access to setup, and a more limited view on the Advanced Settings page.



The screenshot shows a form titled "Accounts" with a dark background. It is divided into two sections: "Administrator" and "Operator". Each section has three input fields labeled "login", "password", and "confirm password".

Creating a new Administrator or Operator account will replace the prior account of the same type. Enter a login and enter and confirm password, followed by clicking Apply, to set the user into the system.

The Operator account is intended for a user such as an editor or colorist, or other user who is creating and managing sessions.

Note: If your web browser uses Autofill for login pages, it may add existing credentials to the fields.

Misc / DNS

This section may expand in the future, but currently contains only DNS setting info. This information may be required for the server to function properly. Enter the DNS Name of the server and the local/private IP address of the server, and click Save.

Create Session

Session List

The top of the page lists existing sessions and their specifications:

Available Encoder/Decoder Session IDs:

#	NAME	Encoder	Decoder	Live Ports	Created	Expires	Params	Actions
1	Color test B	\$SAR64P	\$RWNX9U	1771	2023.09.07 23:00:25	23:57:36	ldmp	Edit Delete
2	Acme Campaign Final	\$SWN83T	\$R77EHX	1772	2023.09.07 23:01:01	05:58:12	color	Edit Delete
3	4K Reel	\$SLHBOF	\$RHQN7Q	1773	2023.09.07 23:01:41	3d 23:58:52	net	Edit Delete
* Request public Session from Streambox Broker								

- # and Name are the number and name of currently available sessions.
- Enc and Dec are the Session codes to be added to the two different ends of the stream: “enc” goes into the Encoder Metadata and “dec” is entered into the Decoder/Media Player as a Session ID.
- Live will indicate a number as soon as Server begins to receive a stream pointed at that Session. The number that appears will be the number of connected clients. Also when the stream starts, this number and the session codes will turn red:

5 BetaTest1 \$SCSPN8 \$R6E1NP 1

- Ports will show either “any” or a single port or range of ports. These are the UDP ports at which the Streambox StreamOn Server will allow clients/viewers to connect using their Decoders/Media Players.
- Created will show the creation time of the Session if the Session has a time limit. If the Session has unlimited lifetime, this field shows “auto”
- Time left shows the time remaining in the session
- Params will indicate with abbreviations if any network or color parameters have been changed using the Edit button (see below).

Misc

dns

local ip

Save

Cancel

Overwrite session options:

☒ Network protocol

☒ Chat password

☒ Color

☒ Network options

- **Edit:** Open additional settings by checking the box next to the items. (You can also click anywhere in the “Name” column.) Leave the box checked and click Save to enable the parameter. Disabling the parameter will clear any changes made to its settings.
 - **Network Protocol:** Select UDP (monodirectional) mode or LDMP (bidirectional) communication between Streambox StreamOn Server and each client/viewer. LDMP has improved error correction but may require tuning some parameters. Selecting LDMP will reveal the parameters.
 - **Chat Password:** Set a password (use only letters and numbers) for the Session’s chat.
 - **Color:** Set the color space of the stream to be set in the Streambox Media Players used by clients. The media players must have their own color space setting set to Auto for this Server setting to work. This setting on the server **can be overridden** by the Encoder’s color space setting.
 - The color space will automatically be implemented if sending to Streambox hardware decoders.)
 - **Network Options:** Enable these options if Clients fail to connect to the stream, particularly when the client is using Wi-fi.
 - **Enable per-decoder sending sockets (LAN only)**
 - **Enable non-blocking send**
 - **Set wifi-friendly TOS byte**
 - **Enable separate per-decoder threads**
- **Delete:** Delete the session permanently, without confirmation.

Network protocol

proto ☐ UDP ☒ LDMP

ack_to

snd_to

cwnd

cwnd_max

cwnd_min

codecPacketSize

Chat password

Color

Network options

Network options

☐ Enable per-decoder sending sockets (LAN only)

☐ Enable non-blocking send

☐ Set wifi-friendly TOS byte

☐ Enable separate per-decoder threads

Request a new Session

The first step is to request a new Session. Click the **Request public session from broker** link to create a new session. Broker is a Streambox-maintained online asset which negotiates the stream connection between server and client once a stream is established. Here’s the blank form for requesting a session, followed by an example.

Request public session from broker

Name

Port range ☒ auto

Lifetime, hr

Give the Session a name related to the project or clients/viewers. As a general rule, one should create a different Session each time one has a different set of clients/viewers.

Request public session from broker

Name

Port range ☐ auto

Lifetime, hr

Name: Enter a name, for your reference only, for the Session.

Port Range: If Auto is checked, the session will be assigned a single port that's available.

To enter a single port, enter that port number both boxes.

To enter a range of ports, enter the lowest port number in the first box and the highest port number in the range in the second box.

Lifetime: The lifespan of the Session in hours. If left blank, Lifetime will be set to "unlimited."

The Name and Port Range fields are required to successfully generate a Session.

After clicking the Request button to request the Session, a pair of codes appear:

Session pair has been generated

(dec) \$R6E1NP : \$SCSPN8 (enc)

Click the OK button to return to the main screen. Now the Session is displayed in the list:

5	BetaTest1	\$SCSPN8	\$R6E1NP	1775-1776	2023.08.29 20:50:58	00:58:43	edit delete
---	-----------	----------	----------	-----------	---------------------	----------	---

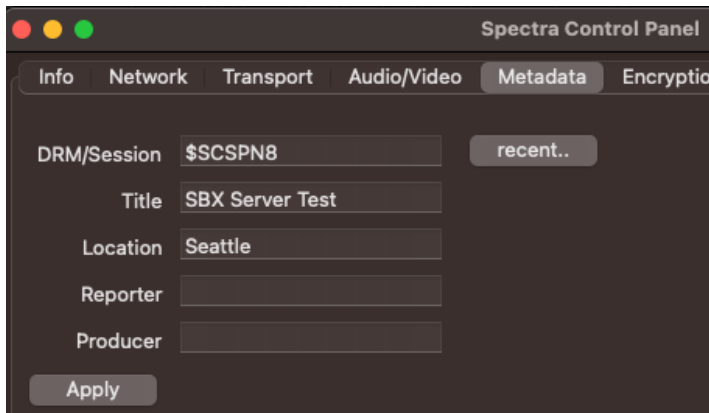
After editing a few parameters using the Edit button and also stating a stream, it looks like this:

5	BetaTest1	\$SCSPN8	\$R6E1NP	1	1775-1776	2023.08.29 20:50:58	00:11:50	color, net	edit delete
---	-----------	-----------------	-----------------	----------	-----------	---------------------	----------	------------	---

Configure the Encoder

Metadata

Take the Encoder code (enc) and enter it into the DRM/Session field of the Metadata tab in Streambox Spectra. If using Streambox Chroma or Spectra SDI, use the DRM/Group field found in the System Tab.



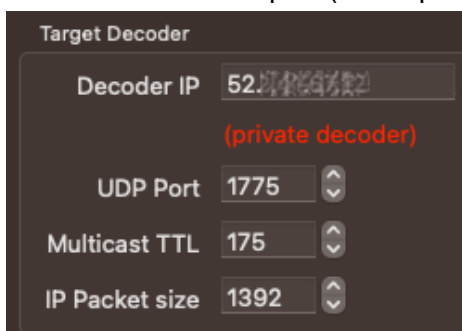
Screenshot is from Streambox Spectra for MacOS

Share the Decoder (dec) Code with the people whom you want to view the stream, and instruct them to enter it into their Media Player or Chroma as they would a Session ID. **The \$ is required.**

Network

In your Encoder, the following Network settings are required:

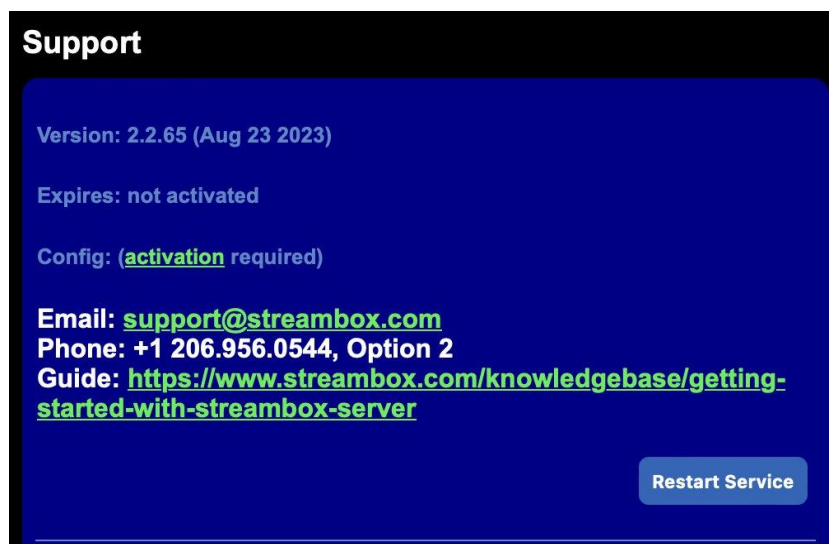
- Set the Decoder IP (sometimes called Target IP or Destination IP) as the IP Address of your Streambox StreamOn Server.
- Set the UDP port (to the port set in your Session). In this document's example, 1775 is the port.



Screenshot is from Streambox Spectra for MacOS

Transport Protocol

If the Streambox StreamOn Server is a machine on the local network (genuinely local, not remote but accessible over VLAN), we recommend using the UDP protocol in the Transport settings on the Encoder.

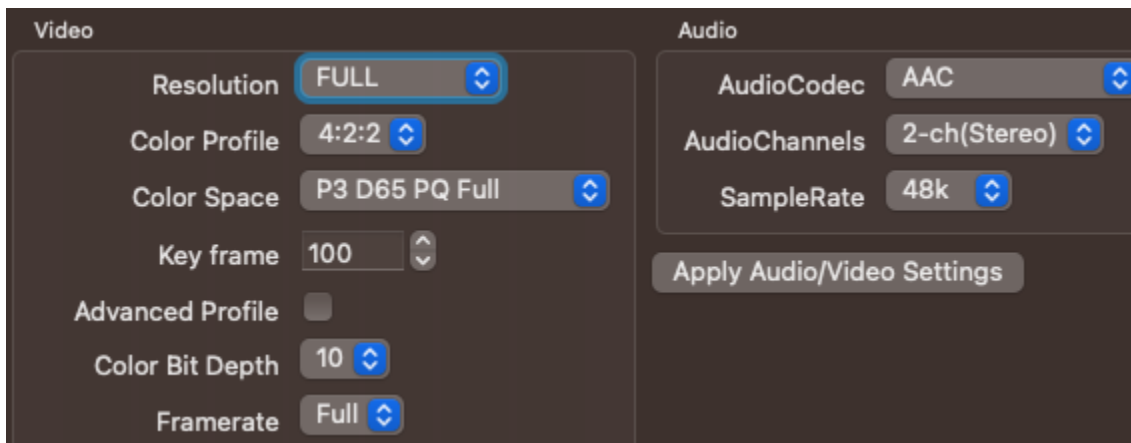


Otherwise, use LDMP. This setting is either found in the Transport tab (Spectra) or the Network tab (Chroma).

Video/Audio quality settings

Set the Video/Audio settings of the stream to your preferences. For Color Space, the color space of the stream can be configured here, or in the Session (within the Streambox StreamOn Server) or in the media players/software decoders used by each client. We recommend setting the Color space in the Encoder or in the Streambox StreamOn Server to set uniform output.

The color space setting does not affect hardware Decoders because they do not have a display; they output a full-fidelity datastream through their SDI outputs.



The image shows a user interface for configuring video and audio settings. It is divided into two main sections: 'Video' on the left and 'Audio' on the right. The 'Video' section includes settings for Resolution (FULL), Color Profile (4:2:2), Color Space (P3 D65 PQ Full), Key frame (100), Advanced Profile (unchecked), Color Bit Depth (10), and Framerate (Full). The 'Audio' section includes settings for AudioCodec (AAC), AudioChannels (2-ch(Stereo)), and SampleRate (48k). An 'Apply Audio/Video Settings' button is located at the bottom of the 'Audio' section.

Section	Setting	Value
Video	Resolution	FULL
	Color Profile	4:2:2
	Color Space	P3 D65 PQ Full
	Key frame	100
	Advanced Profile	☐
	Color Bit Depth	10
	Framerate	Full
Audio	AudioCodec	AAC
	AudioChannels	2-ch(Stereo)
	SampleRate	48k
	Apply Audio/Video Settings	

Start the Stream

On the Info tab of your Encoder, start the stream.

Monitor client connection status

On Streambox StreamOn Server, the Session list now indicates that a stream is being received

5 BetaTest1 **\$SCSPN8** **\$R6E1NP** 1 1775-1776 2023.08.29 20:50:58 00:11:50 color, net [edit](#) [delete](#)

Additionally the Streams info section indicates an incoming stream, and describes its parameters: Session DRM, Title (from the encoder metadata), bitrate and video quality settings, encoder version with origin IP address, and duration.

Streams info:

1. \$SCSPN8
BetaTest1
4061kbps 1920 x 1080 x 30.00, AAC 48KHz 2 ch
MAC, v5.104, [REDACTED]:7771
1300s

When a client's Decoder or Media Player connects, it will be listed on the Server interface near the bottom:

Streaming to 1 decoders:

#	ip:port	sid	server port	bitrate	last active, s	max timeout, s	Packets/Resent/%	RTT/Avg/Peak	Ack timeout
1	[REDACTED]:1770	\$R6E1NP	1775	1425	5	9	315996/93/0	25/24/68	300

 **Streambox®** StreamOn Server

Available Encoder/Decoder Session IDs:

#	NAME	Encoder	Decoder	Live	Ports	Created
1	vlad-test	\$SARU8P	\$ROOZWU	Live	1779	2024.03.14 16:07:43
2	vlad-test-2	\$S0KH0W	\$RDVM1N		1781	2024.03.14 16:12:11
3		\$AAAAAA	\$9LOCAL		any	auto
4		\$AAAAAA	\$90MI0I		any	auto

* [Request public Session from Streambox Broker](#)



Frequently Asked Questions

GENERAL FAQ

Q: Is Streambox StreamOn Server different from a Cloud server?

A: Yes; Streambox StreamOn Server is a software product to be run on hardware that is owned or at least operated and maintained by the customer company and is not a shared service with other Streambox customers. In other words, it's a dedicated server software instead of a service.

Q: Where does the Server run?

A: The Server application can be run locally on some PC or Mac hardware, or the Cloud using e.g. an AWS EC2 virtual machine.

Q: If a session runs out of time will it stop?

A: No; the stream will continue as normal for clients connected to the stream, but it won't allow clients to start a new connection to the stream.

Q: Can a session be extended or re-started?

A: No, but re-creating the session soon after can often result in the same session codes being used.

Q: What is Broker?

A: Broker is an online asset managed by Streambox which connects to both the Streambox StreamOn Server and Decoders/Media Payers to negotiate the connections between clients and Server. Both Server and all clients must be able to connect to broker.streambox.com (107.23.6.109) in order for the Server's Sessions to work.

NETWORK FAQ

Q: Why use different ports or a range of ports?

A: Encoders sending streams through Streambox StreamOn Server must send on different ports. With respect to clients/viewers connecting, spreading the streams over multiple ports will improve server and stream performance, and so it's best to assign different port ranges to different sessions when possible. We recommend that the users set up their sessions so ports don't overlap. However, if overlap occurs, the server will still function.

Q: How does the Server use the ports?

A: The server sends its own IP and port information to Broker, and Broker assigns the ports used by incoming client connection requests. If you specify for example the range 1770-1775 for a session, Broker will auto assign a port ID for each client connection request, using a port in the 1770-1775 range.

Q: Is it very bad if two sessions share a port?

A: No, but the server has to work harder and it may result in poorer performance, depending on the current load on the server machine.

Q: What if multiple encoders are sending streams to Streambox StreamOn Server?

A: Each encoder should be set to stream to a different port number.

TROUBLESHOOTING FAQ

Q: Error message "Broker Service Not available"

A: One possible reason is that the Ubuntu Certificate was not updated. There is a Chroma update package available to remedy this: **ca-certificates_20210119~16.04.1.sb1_all.deb**. This will be part of 2023.x update. Another possible reason is that the Streambox StreamOn Server cannot connect to the Broker server (broker.streambox.com). Check network connectivity.

Q: The server shows an incoming stream, but no session is indicating the incoming.

A: Most likely the encoder user accidentally failed to click the Apply button when setting the metadata.

Q: On the stream that is coming in, the metadata and session ID shown don't match any sessions.

A: Most likely the encoder user accidentally failed to click the Apply button when setting the metadata.

Appendix

Obtain an SSL certificate from Let's Encrypt

https://streambox-lightserver.s3.us-west-2.amazonaws.com/linux/latest/lightserver_readme.pdf

Using Certbot:

<https://certbot.eff.org/instructions?ws=apache&os=ubuntu>

Create a self-signed SSL certificate

These commands create the self-signed certificate:

```
mkdir /tmp/cert
cd /tmp/cert
openssl req -new > cert.csr
openssl rsa -in privkey.pem -out key.pem
openssl x509 -in cert.csr -out cert.pem -req -signkey key.pem -days 1001
cp cert.pem /etc/ssl/certs/SSLCertificateFile.txt
cp key.pem /etc/ssl/private/SSLCertificateKeyFile.txt
cd ..
rm -rf /tmp/cert
```

Install a self-signed Certificate and enable HTTPS:

To add the certificate to the system, use a text editor, such as **emacs**, **vi**, or **nano** to edit the following file:

/etc/nginx/snippets/lightserver-ssl-params.conf

Add the following lines to that file, or if they already exist, edit them to read as follows:

```
listen 443 ssl;
ssl_certificate /etc/ssl/certs/SSLCertificateFile.txt;
ssl_certificate_key /etc/ssl/private/SSLCertificateKeyFile.txt;
```

Update PHP

PHP version 8.3 is required for the installer to run. The base image for our minimum required OS version, Ubuntu 20.04, comes with PHP 7.4, which is not adequate. You can update PHP by running the following series of commands:

```
apt --fix-broken install
sudo apt install software-properties-common
sudo add-apt-repository ppa:ondrej/php
sudo apt update
sudo apt install php8.3
```

```
sudo apt install php8.3-cli php8.3-fpm php8.3-mysql php8.3-xml php8.3-mbstring php8.3-curl php8.3-gd  
php8.3-zip  
sudo apt-get remove apache2
```

Contact Information

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Privacy Notice

<http://www.streambox.com/streambox-inc-privacy-policy/>