DVG Series
Quick Start Guide
RTMP Server/Client

R1.2

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1 Scope

This quick start guide provides fundamental information on how to configure an RTMP stream between one Transmitter to a receiver for the purpose of sending a multicast transport stream over IP network like the Internet. This quick start guide is applicable for DVG software version 1.0 and above.

2 General

VideoFlow's solution is comprised at minimum with two elements Protector/Transmitter and Sentinel/Receiver. The sample system as illustrated below comprises from a Digital Video Gateway (DVG) Protector/Transmitter connected to the source (e.g., encoder) and acts as a transmitter of protected data stream. On the Receiving side another DVG Sentinel/Receiver is Tuned to receive the stream and output to the receiver (e.g., Integrated receiver decoder – IRD). The quick start guide provides an easy and systematic guide for setting up the Protector and the Sentinel using RTMP delivery protocol. Both Protector and Sentinel require the following step setup:

1. Interfaces setup
2. Create a new Codec Preset
3. Stream setup

A step by step procedure to connect a DVG Transmitter to a DVG Receiver is provided. The procedure includes the following sections:

1. Receiver setup
    a. Interfaces
    b. Setup Codec Preset
    c. Stream setup as an RTMP client
    d. Setup verification
2. Transmitter setup
    a. Interfaces
    b. Setup Codec Preset
    c. Stream setup as an RTMP Server
    d. Setup verification

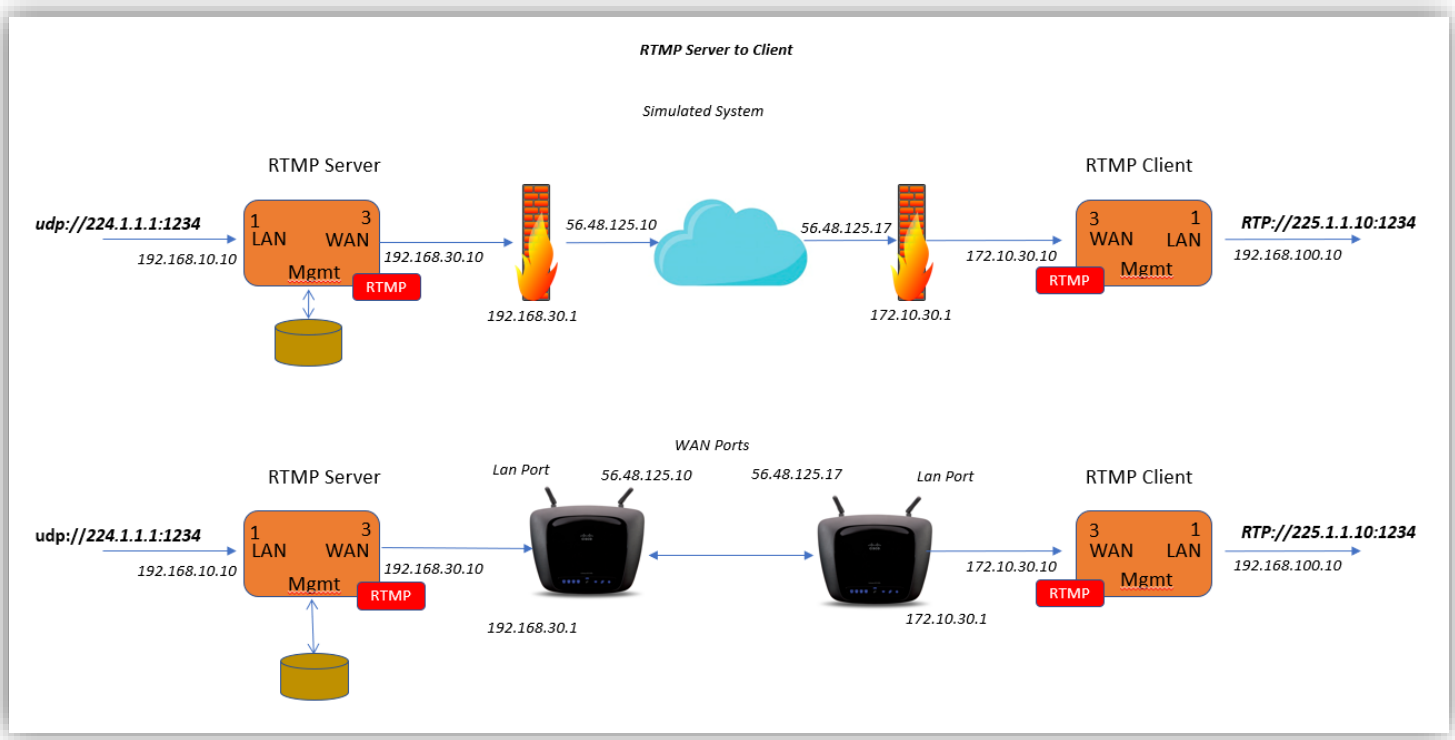
NOTE

Both the DVG device may be capable of any function; transmitter, Receiver, Relay. The Functionality is user selectable on a stream by stream basis. The example given in this quick start guide is for setting up a contribution network. Therefore, the Receiver is configured as RTMP Server and the Transmitter as RTMP Client

At the end of the process, the two devices will communicate and will deliver the input stream from side to side.

3 VideoFlow's RTMP Solution

This section provides an introduction to VideoFlow's RTMP handling implementation. The Open Real Time Messaging Protocol is an open source protocol that is used by many companies to connect over unmanaged networks. The protocol does not provide any ARQ and error recovery like the DVP/RIST/SRT/Zixi protocols. To Achieve link security the user is advised to use one of the DVG secure VPN/Tunnels (like UDPVPN, RIST or EasyLink). The Protocol is using a Server/Client architecture regardless of the transmission direction. Each session can carry only one stream in unicast or multicast. The DVG stream can have RTMP input or output. The VideoFlow RTMP functionality is achieved by using open source tools such as FFMPEG and NGINX (as Media server). The RTMP server allows many users to pull the available content by many users. Open source tools like VLC, OBS and FFMPEG come with built in RTMP support.



The DVG RTMP Server functionality is achieved with by collaboration with the on board Media server (NGINX) for the purpose of pushing or pulling streams

RTMP push – send Data to a Server

RTMP Pull – read Data from a server

In this example setup we will take an input Multicast on the Transmitter and store it temporarily in the Media serve with a unique name. A remote client on the Receiver will pull the stream and output it back as a multicast.

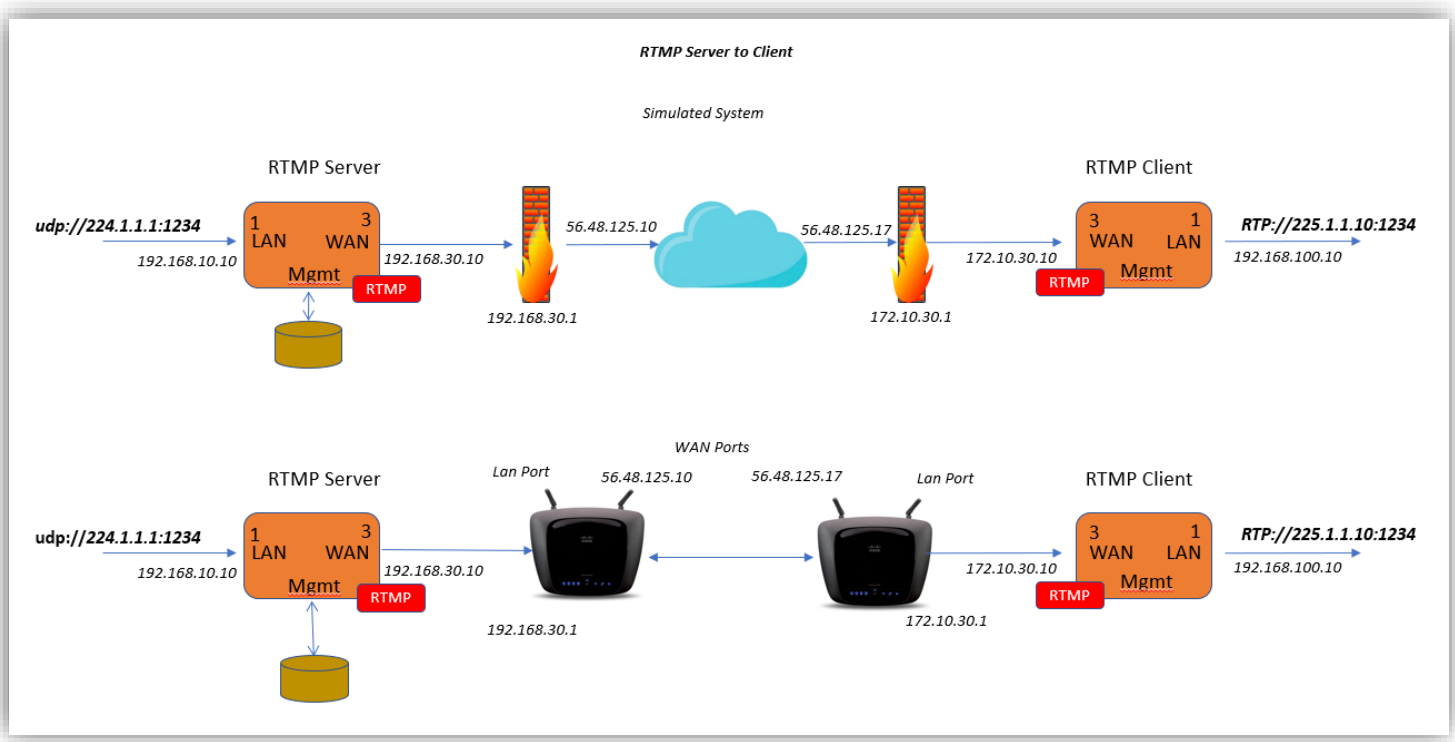
NOTE

The RTMP Server should be set in a location where it can be reachable. Its IP address shall be static. The RTM client can be set anywhere.

3.1 Quick start desktop demo setup

For a simple benchtop demo, we propose to use a low cost Wifi Routers as a network simulation.

The following diagram ilustrates the Simulated System and its implementation oin the lab using off the self Wifi routers



3.1.1 Server side Router setup

Local LAN: 192.168.30.1/24 Gateway: 192.168.30.1

WAN Address: 56.48.125.10/24 Gateway: 56.48.125.1

In the Router Web management add forward rule of port 1935 to 192.168.30.10

Another option is to put 192.168.30.10 in the DMZ.

3.1.2 client-side Router setup

Local LAN: 172.10.30.10/24 Gateway: 172.10.30.1

WAN Address: 56.48.125.17/24 Gateway: 56.48.125.1

In the Router Web management add forward rule of port 12000 to 172.10.30.10

Another option is to put 172.10.30.10 in the DMZ.

NOTE1

In the example and the next step by step guide, the Receiver will implement the reception as a Transmitter, this will illustrate the transmitter ability to receive RTMP but also avoid the Receiver stream inherent local buffering.

4 Setting Up the Receiver at the Center

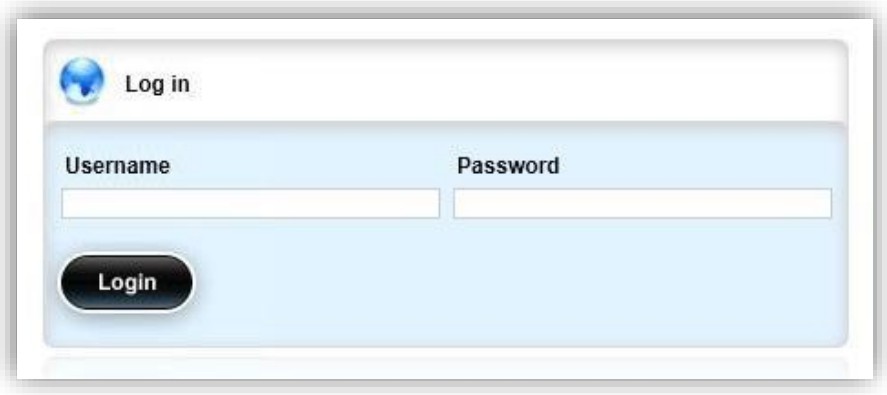
This section will describe the procedure required for configuring the Receiver at the center. The Receiver will act as the RTMP Client to the peer that will act as a RTMP server.

4.1 Sentinel Port Setup

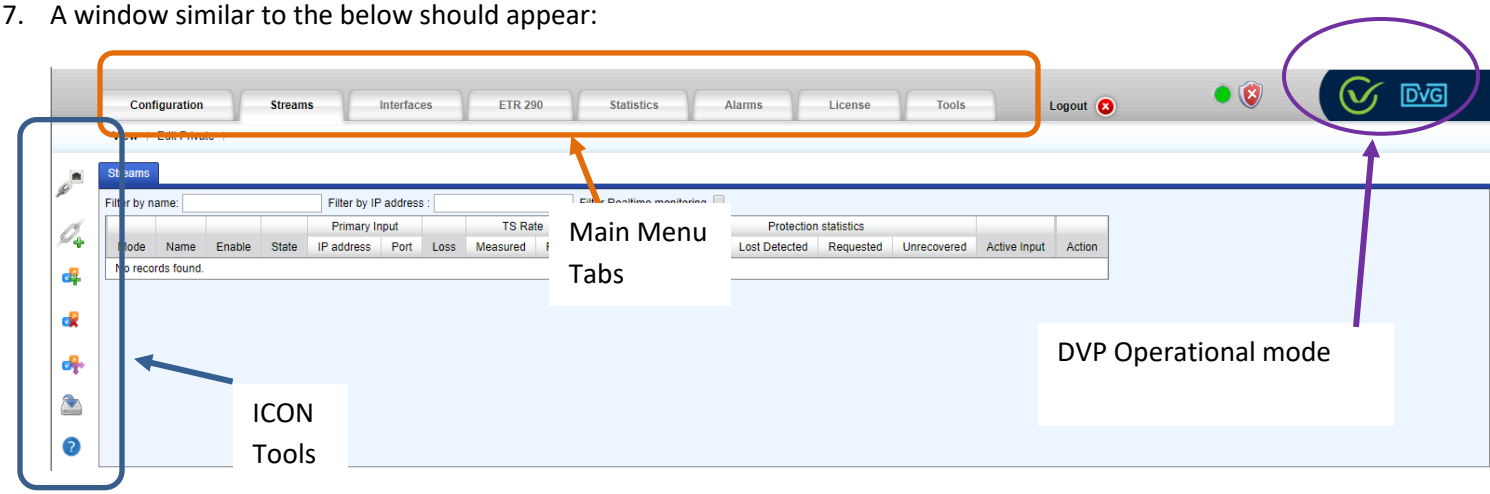
The default DVP factory management IP address is: 10.0.0.200.

4.1.1 First Time Connection

1. Connect an Ethernet cable between a computer running a browser program to a port labeled Mgmt in the DVP's front panel.
2. Change the local LAN settings in your PC to manual IP address
3. Select IP address from the same subnet (e.g., 10.0.0.120, Subnet Mask: 255.255.255.0)
4. Browse the Sentinel's management IP address. A login window similar to the below will appear:



5. Type the default Username: oper
6. Type the default Password: oper
7. A window similar to the below should appear:

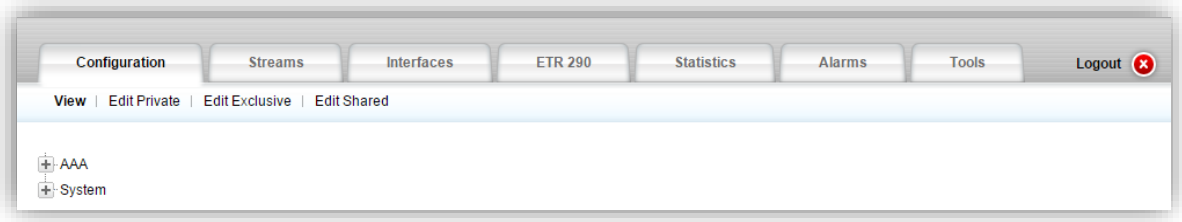


NOTE

If you prefer not to leave the Mgmt IP unchanged, Go to Section 4.1.3

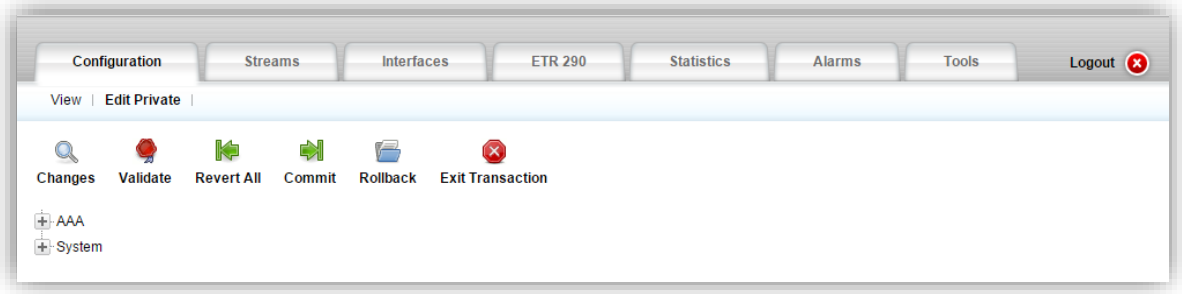
8. Click on the Configuration tab

9. A new page will appear:

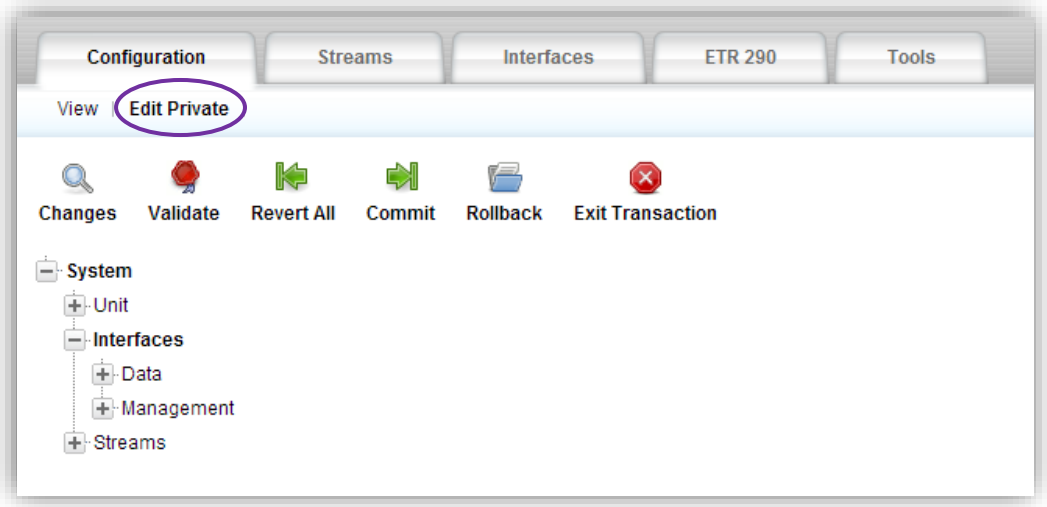


4.1.2 New Management IP Address Setup

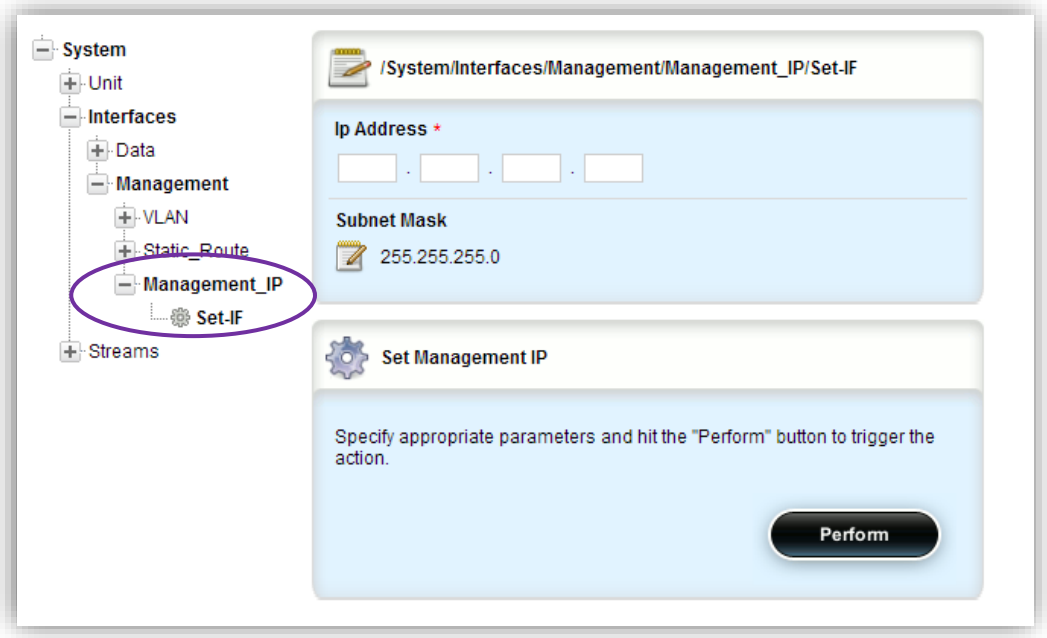
1. Click on the **Edit Private** mode



2. Clicking on the '+' expand a menu tree item. Click on System→Interfaces→Management



3. Click on Management_IP→Set-IF to setup the management interface's IP address



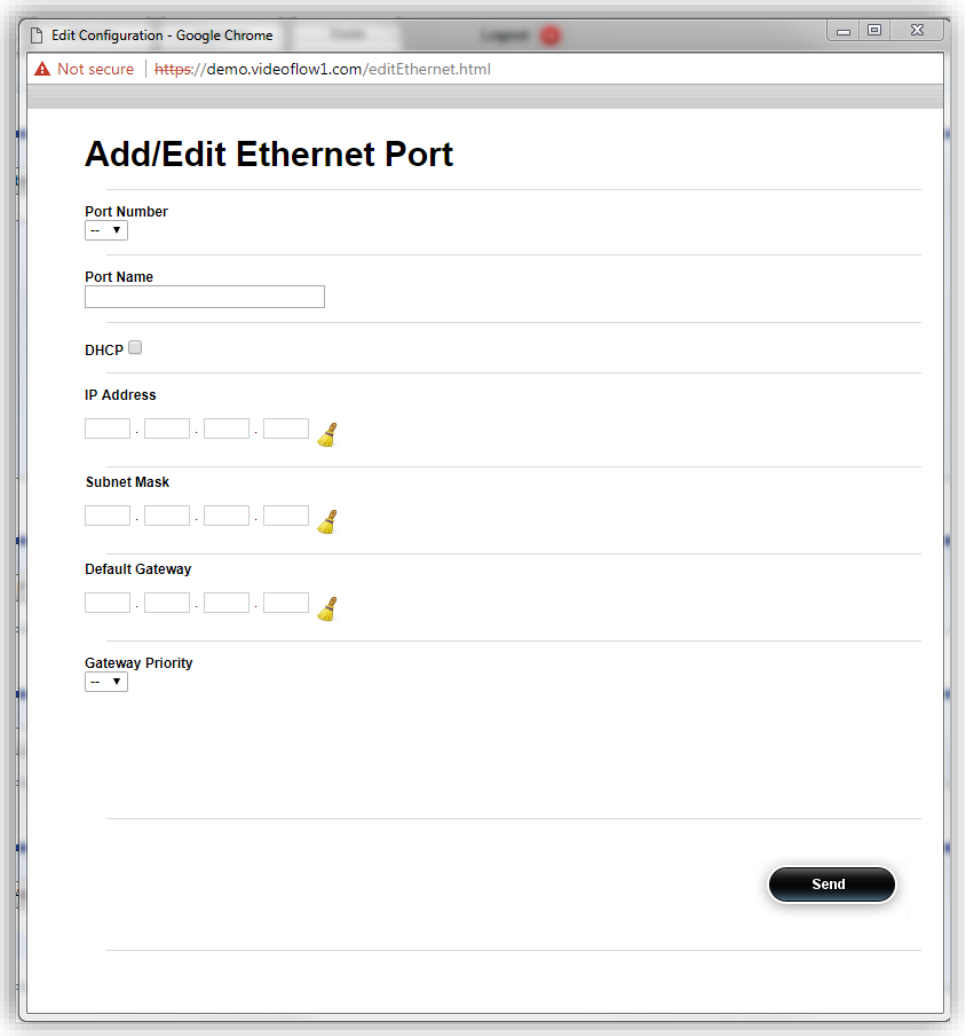
4. Type a new management IP address if required
5. Modify the management Subnet Mask if required
6. Click on the Perform button to apply the changes

7. The PC and the DVG will disconnect in the case of management IP and/or subnet mask change. Follow the below procedure to reconnect:
    a. *Close the browser window*
    b. *Change the IP address in the PC to be in the same subnet as the new management IP address*
    c. *Open the browser and browse the new management IP address*
8. Once the connection with the Sentinel is resumed, continue to the next section

4.1.3 Receiver device Data Ports Setup

This section describes how to Add and assign IP addresses to the DVP interfaces. The ports are used for connecting the DVP to either the local network (LAN) or to the external network (WAN).

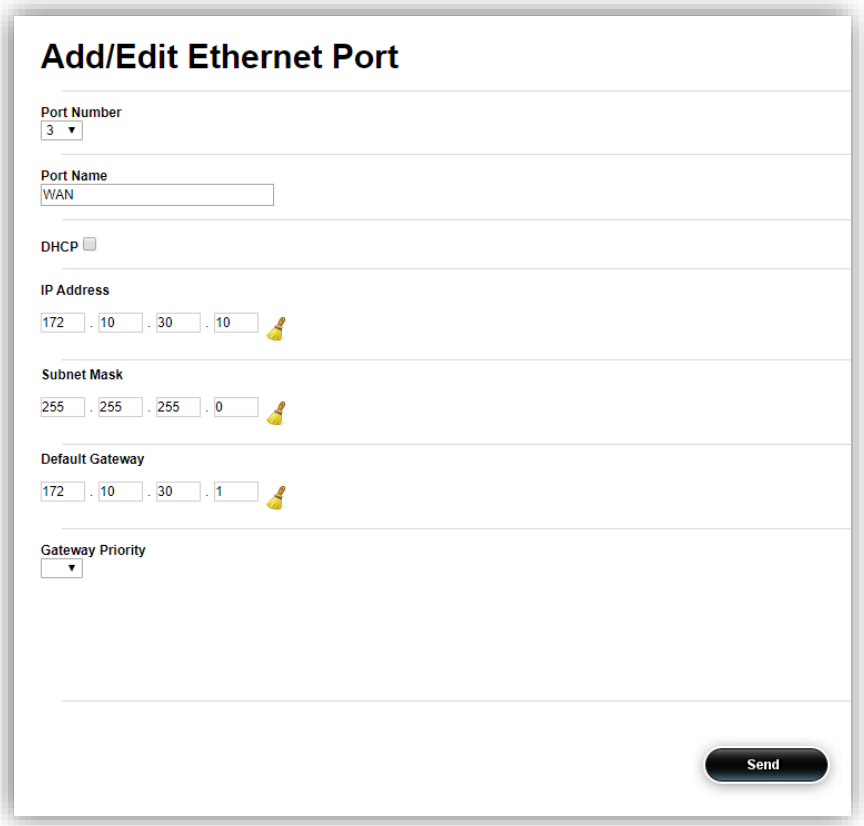
1. Press on the  icon to bring the IP configuration



Select the interface Id number from the pull down list.

In this guide's network example the external network (the public Internet in this example) is connected to Port3 and the local network is connected to Port 1.

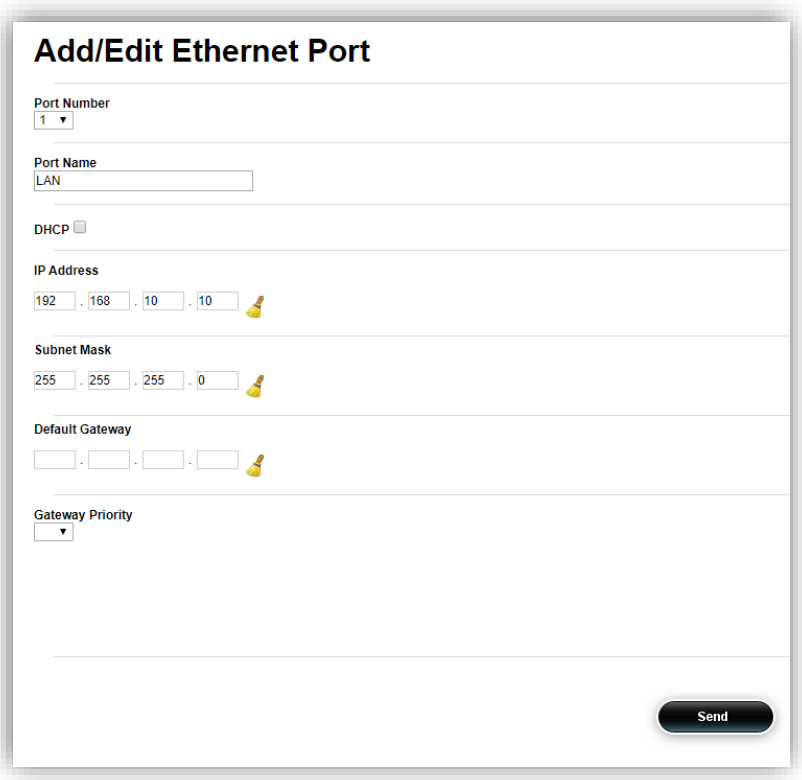
2. Port 3 (to external network) configuration (In this example:):
   Check the 'Enable' check box to enable the Port
   Set the Name field to 'WAN'
   configure IP Address: 172.10.30.10
   configure Subnet Mask: 255.255.255.0
   Configure Default Gateway: 172.10.30.1



To complete configuration click on the ‘Send’ button to apply the configuration changes

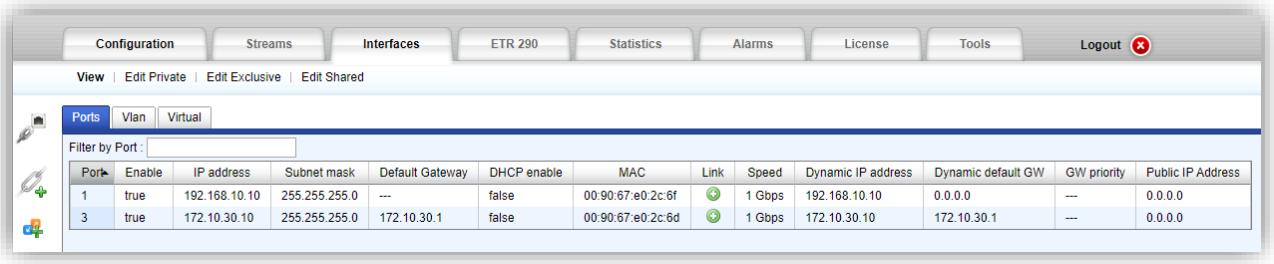
3. Repeat the same steps to configure Por1 (to local network) configuration:

   Set the Name field to ‘LAN’
   configure IP Address: 192.168.10.10
   Subnet Mask: 255.255.255.0
   Note that there is no need to configure default gateway to ports connecting to the local network



4. Check the stream connectivity

   Press the Interfaces TAB to expose:

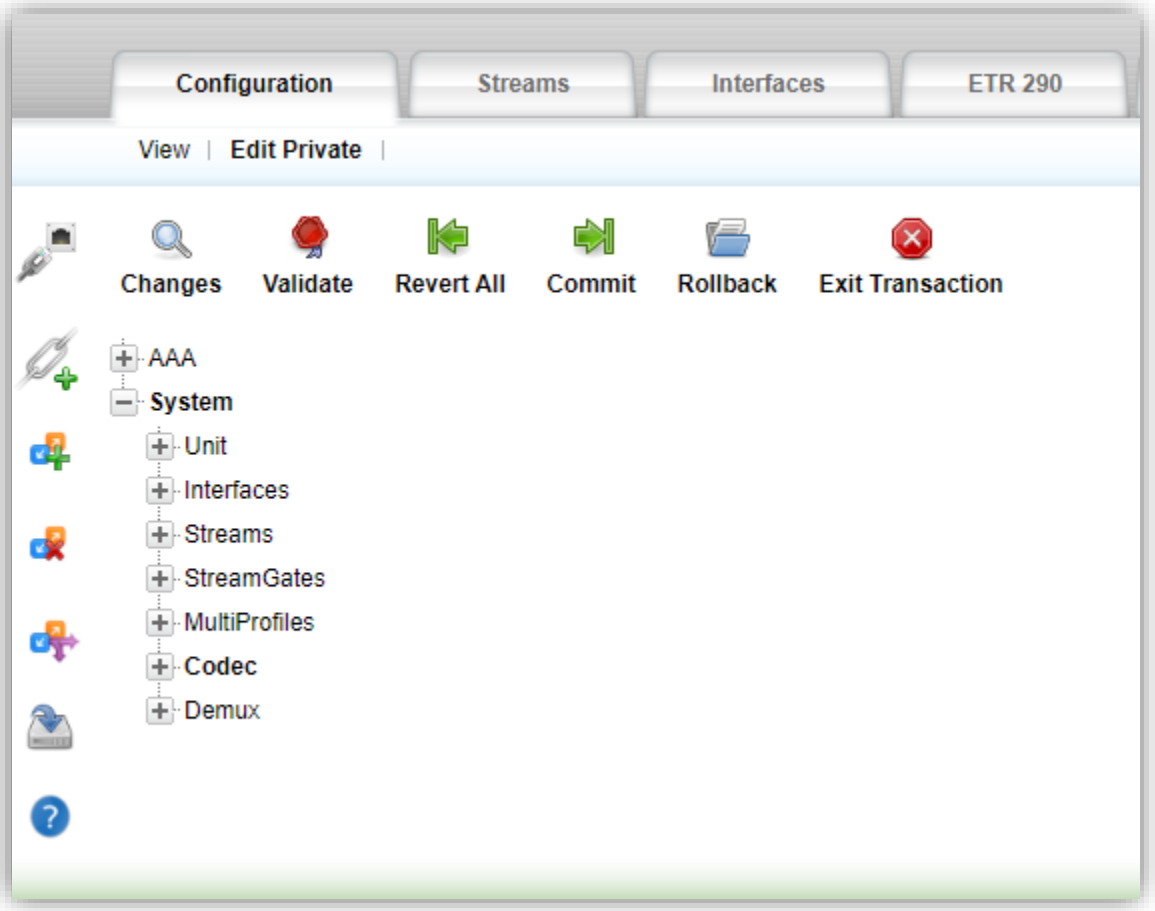


4.2 Create new Passthrough Codec preset

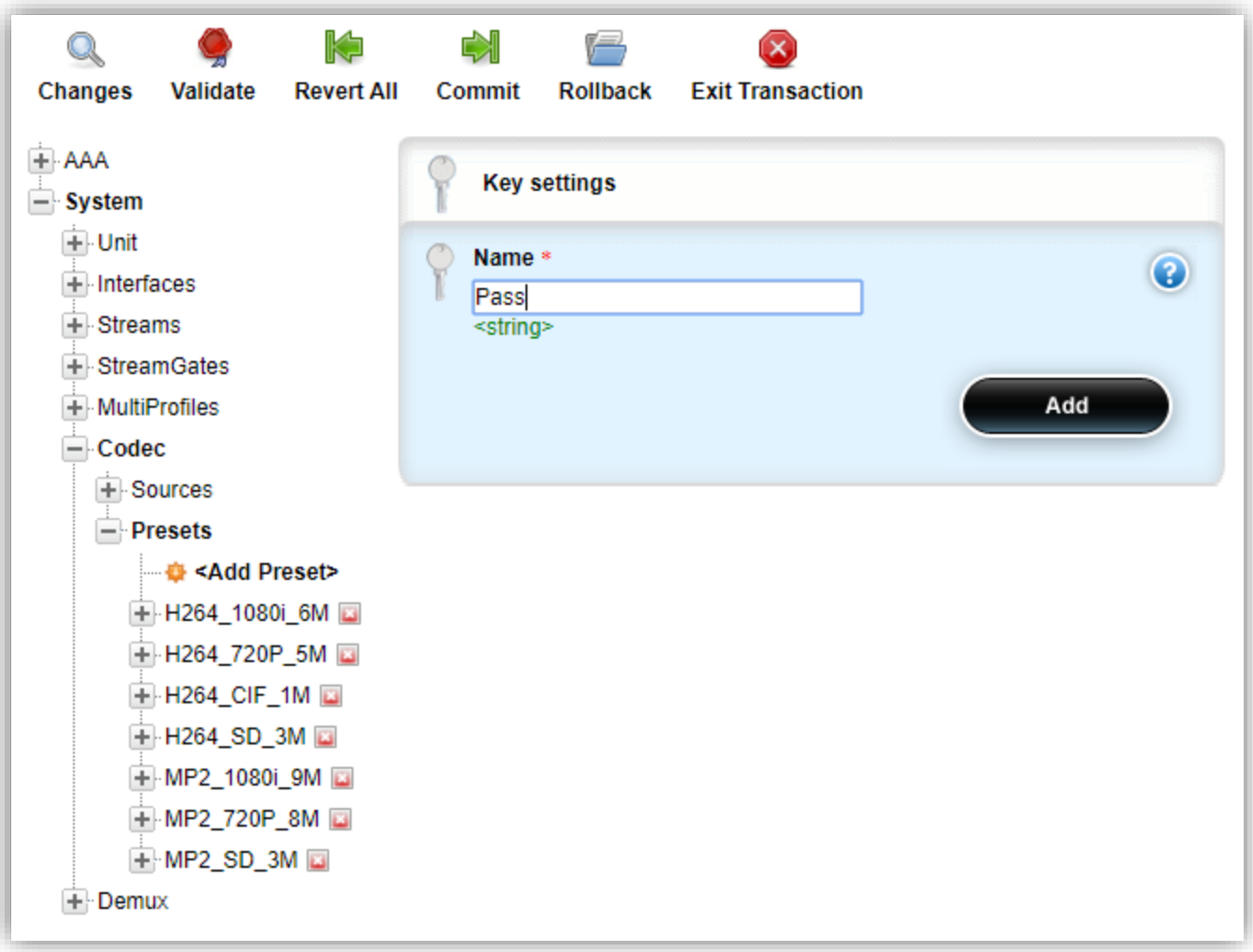
For the purpose of handling the RTMP with FFMPEG, we will need to instruct the FFMPEG not to reencode the incoming RTMP and keep its original Video and Audio codecs.

To create a new preset, follow these steps:

1. Select the Configuration TAB
2. Enter '**Edit Private'** mode
3. The outcome should look like the following:

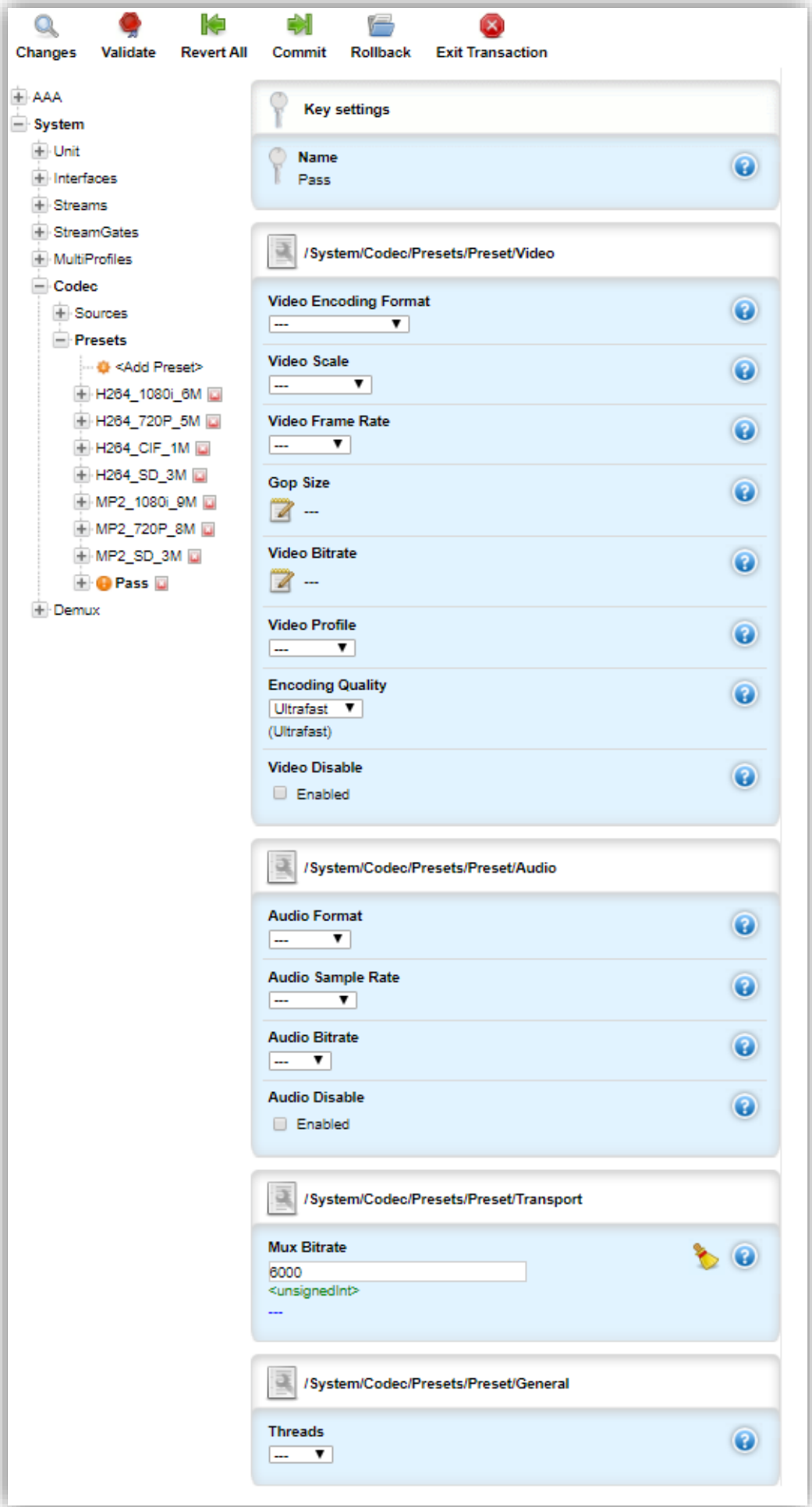


4. Press and expand the Codec
5. Press and expand the **Presets**
6. Press **<Add Preset>**
    a. Type a name, in this example: Pass:



b. Press the add button.

7. A new window will appear:


Changes
Validate
Revert All
Commit
Rollback
Exit Transaction
AAA
System
Unit
Interfaces
Streams
StreamGates
MultiProfiles
Codec
Sources
Presets
<Add Preset>
H264_1080i_6M
H264_720P_5M
H264_CIF_1M
H264_SD_3M
MP2_1080i_9M
MP2_720P_8M
MP2_SD_3M
Pass
Demux
Key settings
Name
Pass
/System/Codec/Presets/Preset/Video
Video Encoding Format
Video Scale
Video Frame Rate
Gop Size
Video Bitrate
Video Profile
Encoding Quality
Ultrafast
(Ultrafast)
Video Disable
Enabled
/System/Codec/Presets/Preset/Audio
Audio Format
Audio Sample Rate
Audio Bitrate
Audio Disable
Enabled
/System/Codec/Presets/Preset/Transport
Mux Bitrate
6000
<unsignedInt>
/System/Codec/Presets/Preset/General
Threads

8. Locate the ‘Mux Bitrate’ and type 6000 (6mbit for this example)
9. Press Commit when done.

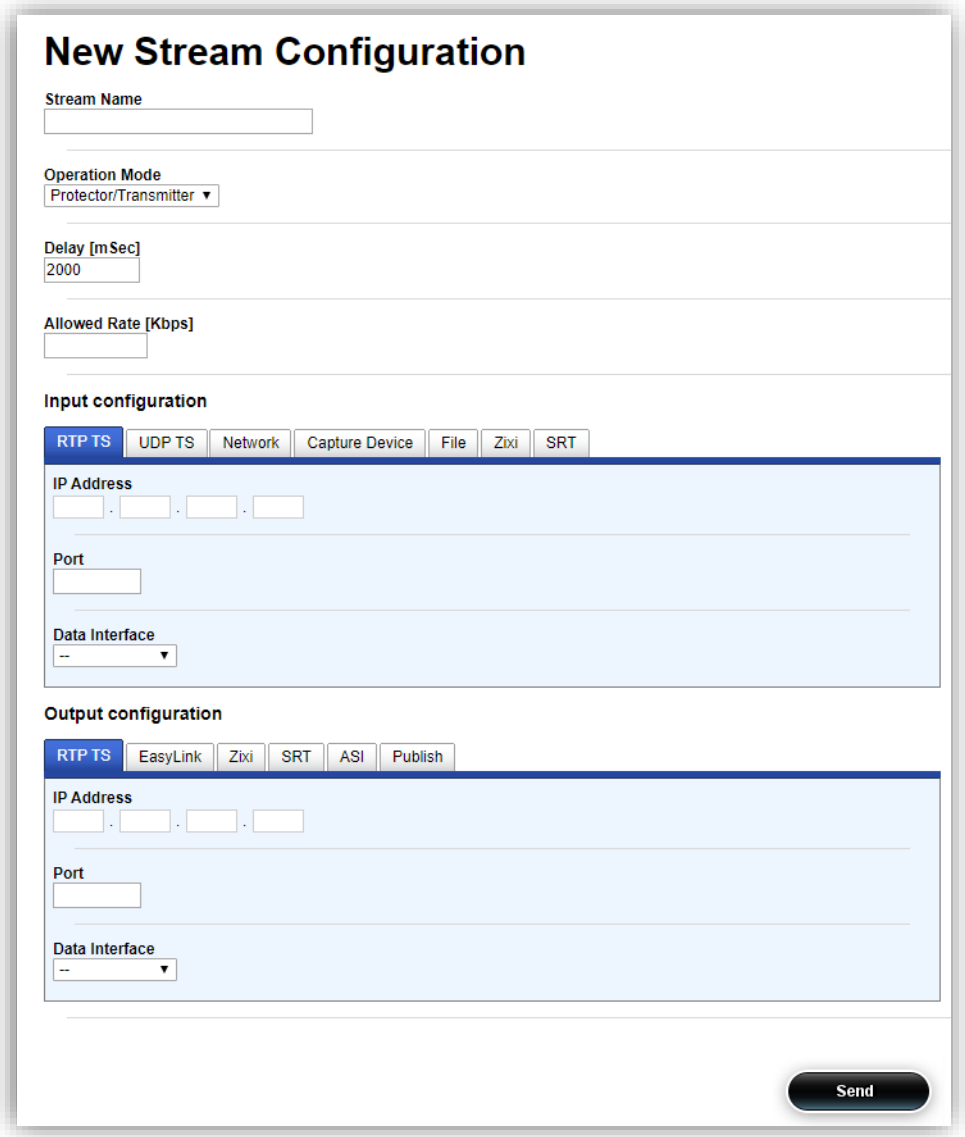
4.3 Adding a Stream

At this stage, we are going to be Adding a stream which is comprised of three steps:

1. Adding stream
2. Setup the stream's input interface and properties
3. Setup the stream's SRT output and interface properties Add Stream

4.3.1 Steps

1. Click on the  ICON, a 'New Stream Configuration' Window will appear:

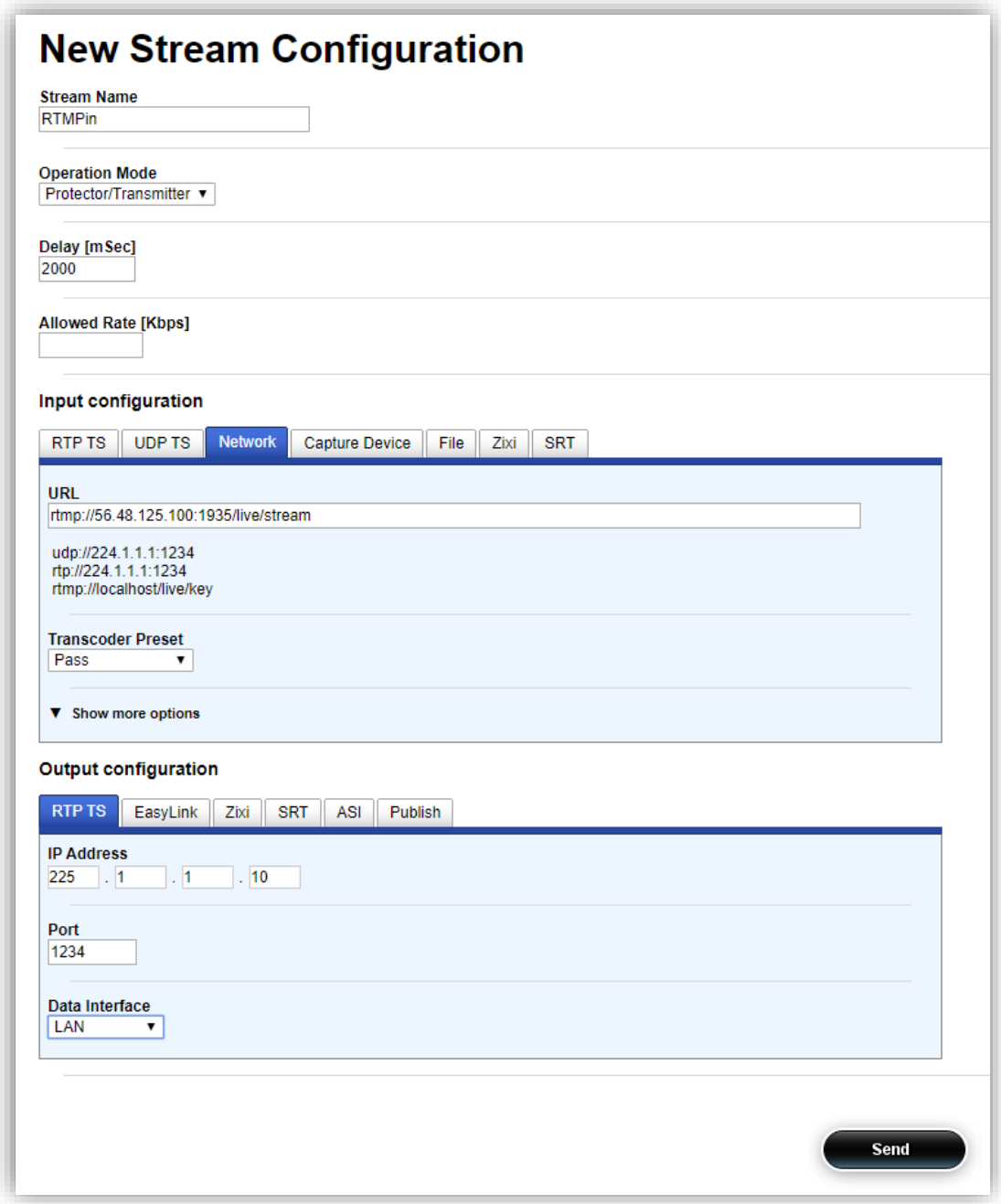


2. Set a name for the stream, in this case 'RTMPin'
3. **Reminder : in this example the Receiving side stream configuration is working in "Protector/transmitter" mode to lower the delay.**

4. Configure the stream's **Input configuration** parameters:
    a. Select the **Network** TAB

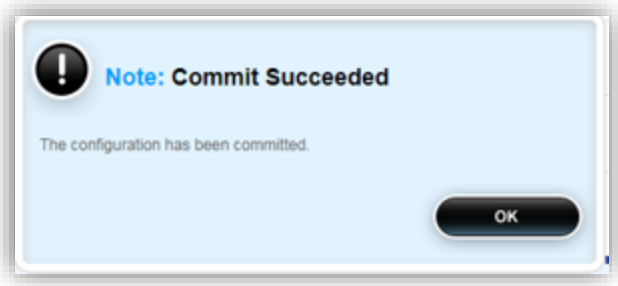
b. Type the source URL: 56.48.125.100:1935/live/stream
c. Select the preset to be ‘Pass’

5. Configure the stream’s **Output configuration** parameters:
   a. Select the **RTP** TAB
   b. Set the IP address to **225.1.1.10**
   c. Set the Port to **1234**
   d. Select the output interface from a pull-down menu, in this example select the **Lan**

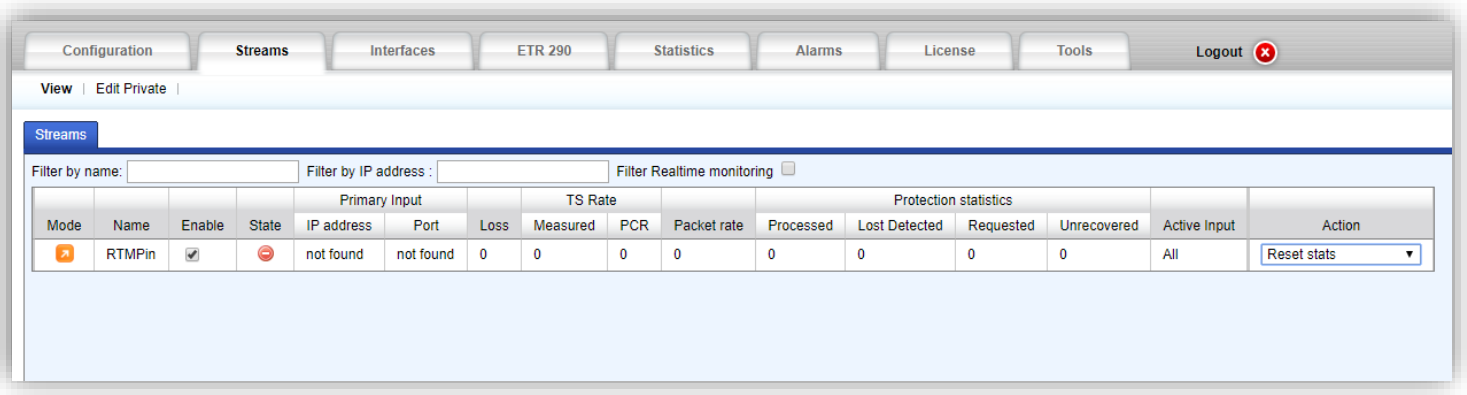


e. Press Send when done

7. Wait for the ‘Commit Succeeded’ window to appear:



8. Close the window
9. A new stream should appear:



At this time the Stream is not available yet (as the Transmitter is not configured).

5 Setting Up the Transmitter at the Remote Site

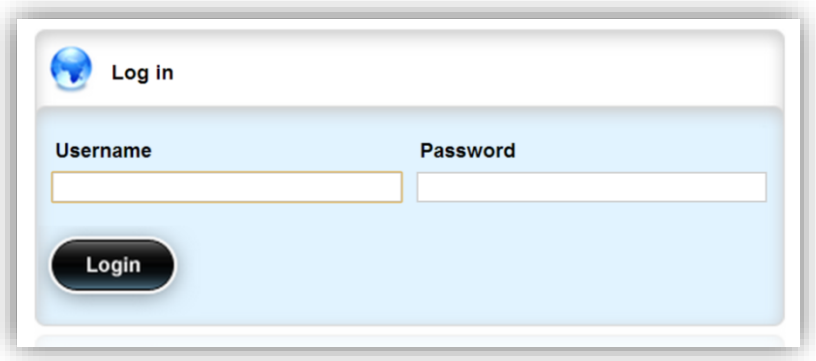
This section will describe the procedure required for configuring the Transmitter side at the remote site. The DVG will act as the Server and allow remote DVG to connect to it as clients.

5.1 DVG Port Setup

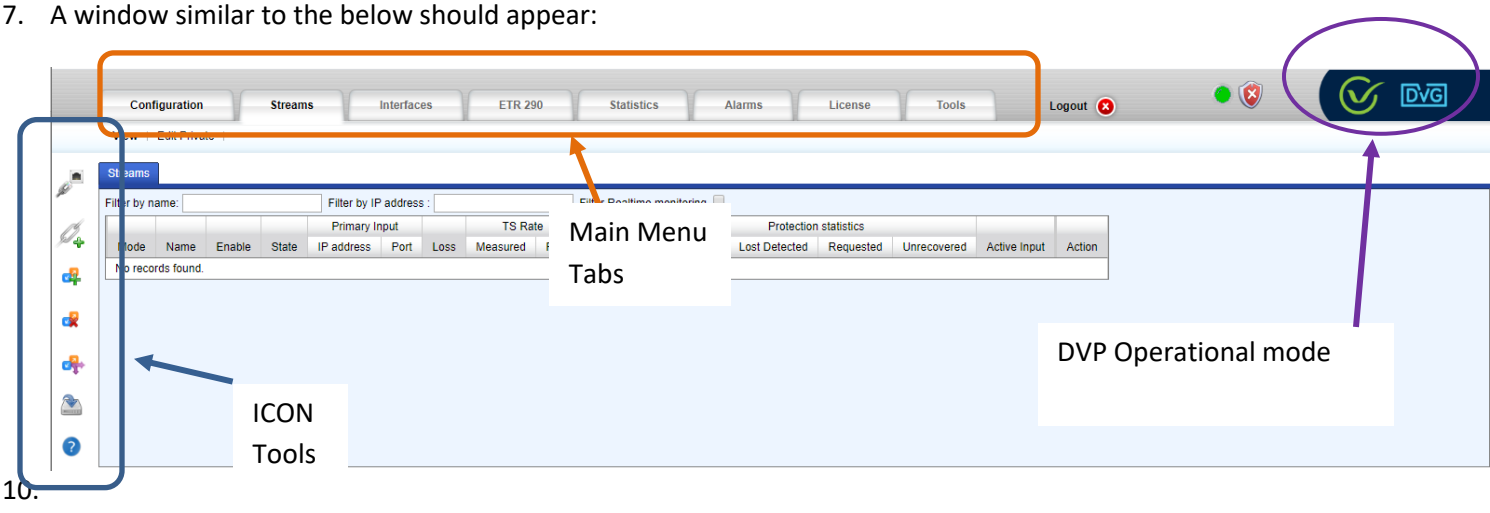
The default device factory management IP address is: 10.0.0.200.

5.1.1 First Time Connection

1. Connect an Ethernet cable between a computer running a browser program to the port labeled Mgmt in the DVP's front panel
2. Change the local LAN settings in your PC to manual IP address
3. Select IP address that is in the same subnet (e.g., 10.0.0.140, Subnet Mask: 255.255.255.0)
4. Browse the Protector's management IP address. A login window similar to the below will appear:



5. Type the default Username: oper
6. Type the default Password: oper
7. A window similar to the below should appear:



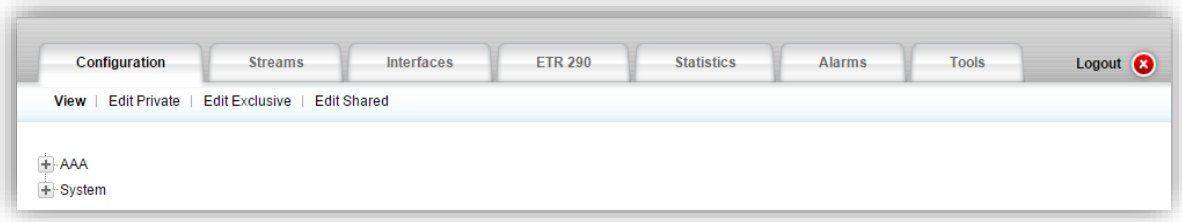
10.

NOTE

If you prefer not to leave the Mgmt IP unchanged, Go to Section 5.1.3

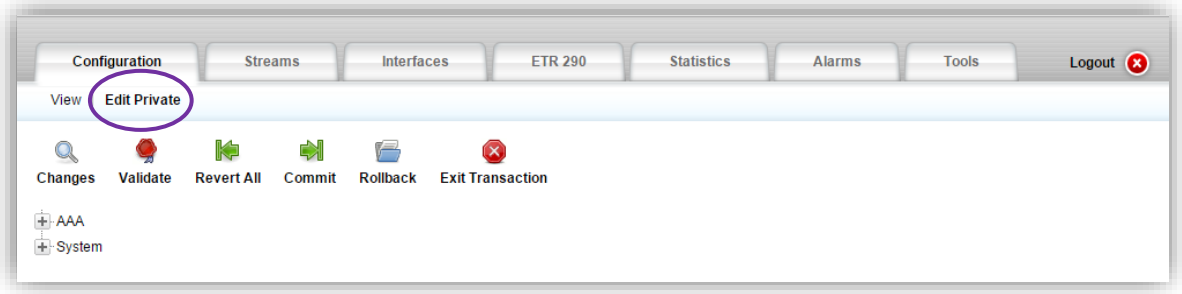
8. Click on the Configuration tab

9. A new page will appear:

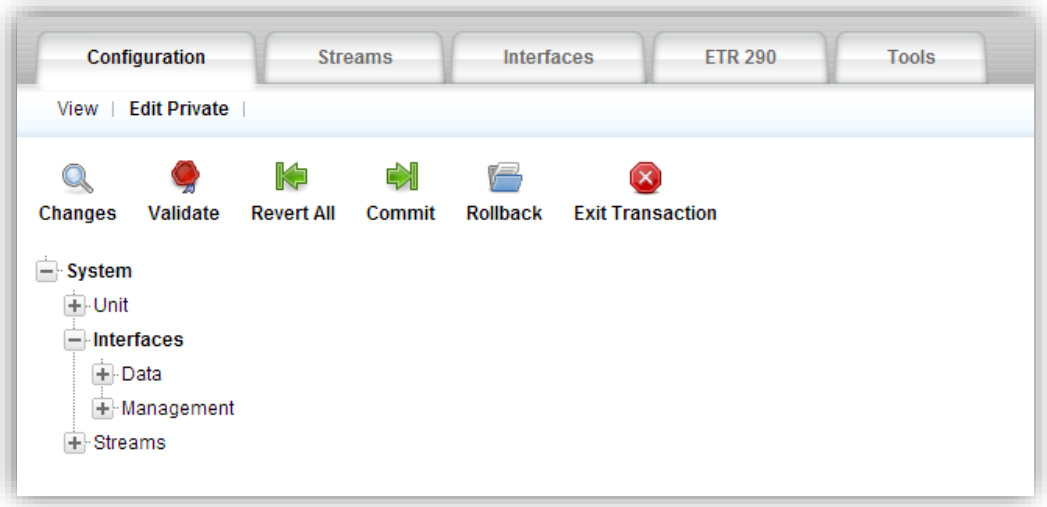


5.1.2 New Management IP Address Setup

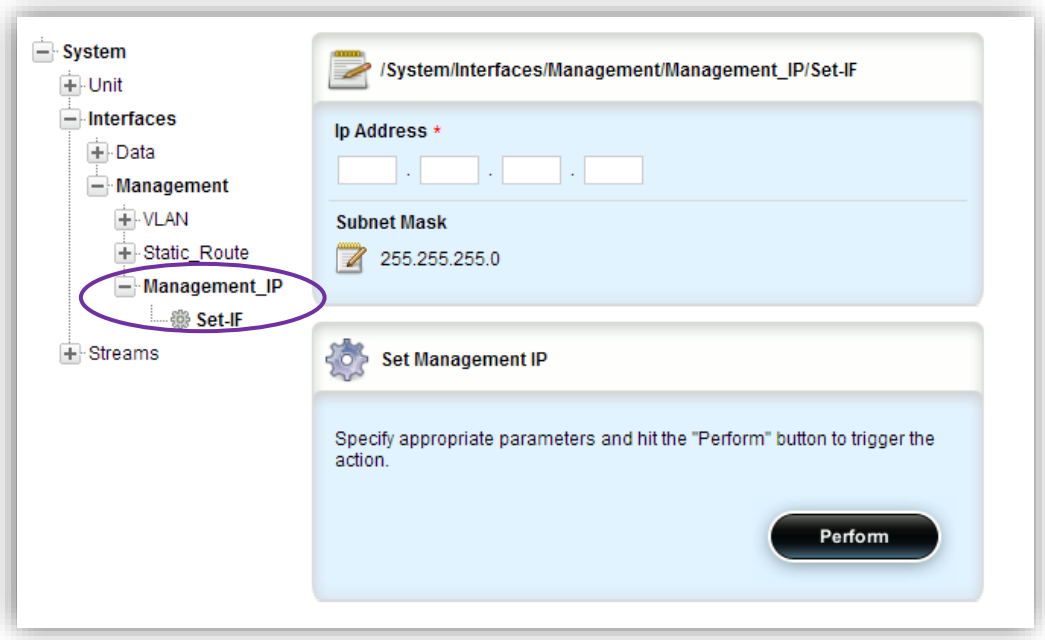
1. Click on the Edit Private mode.



2. Click on the '+' to expand the menu tree. Expand the menu tree further by clicking on Management



3. Click on Management_IP→Set-IF to setup the management interface's IP address.

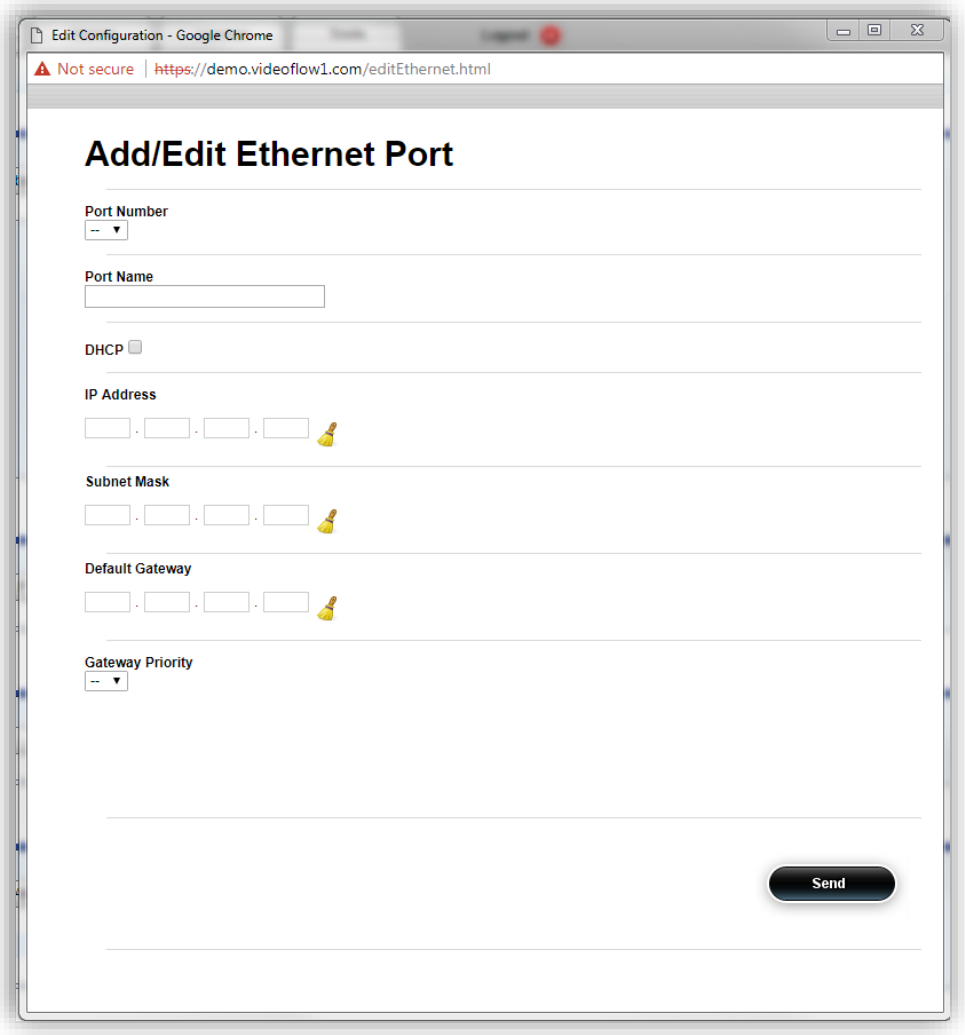


4. Type a new management IP address if required.
5. Modify the management Subnet Mask if required.
6. Click on Perform to apply the changes.
7. The PC and the DVP will disconnect in the case of management IP and/or subnet mask change. Follow the below procedure to reconnect:
    a. *Close the browser window.*
    b. *Change the IP in the PC to the same subnet as the new management IP address.*
    c. *Open the browser and browse the new management IP address.*
8. Once connection with the Protector is resumed, continue to the next section.

5.1.3 DVG Data Ports Setup

This section describes how to Add and assign IP addresses to the DVG interfaces. The ports are used for connecting the DVP to either the local network (LAN) or to the external network (WAN).

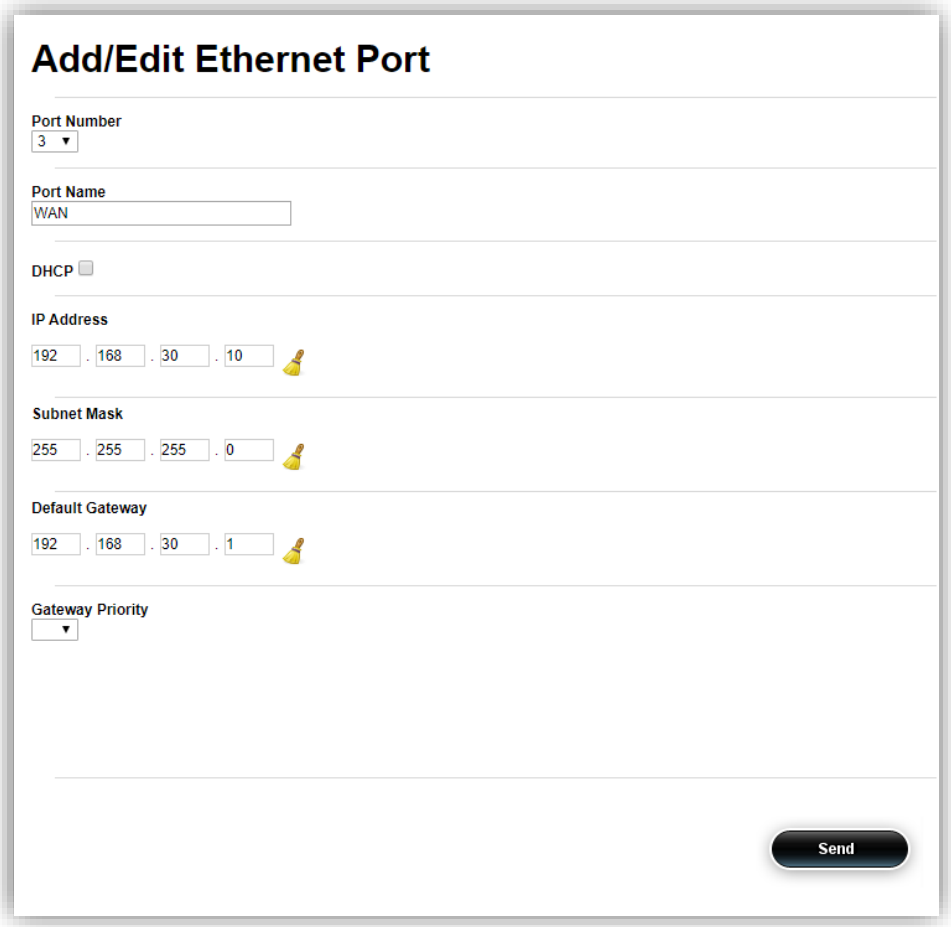
1. Press on the  icon to bring the IP configuration



Select the interface Id number from the pull down list.

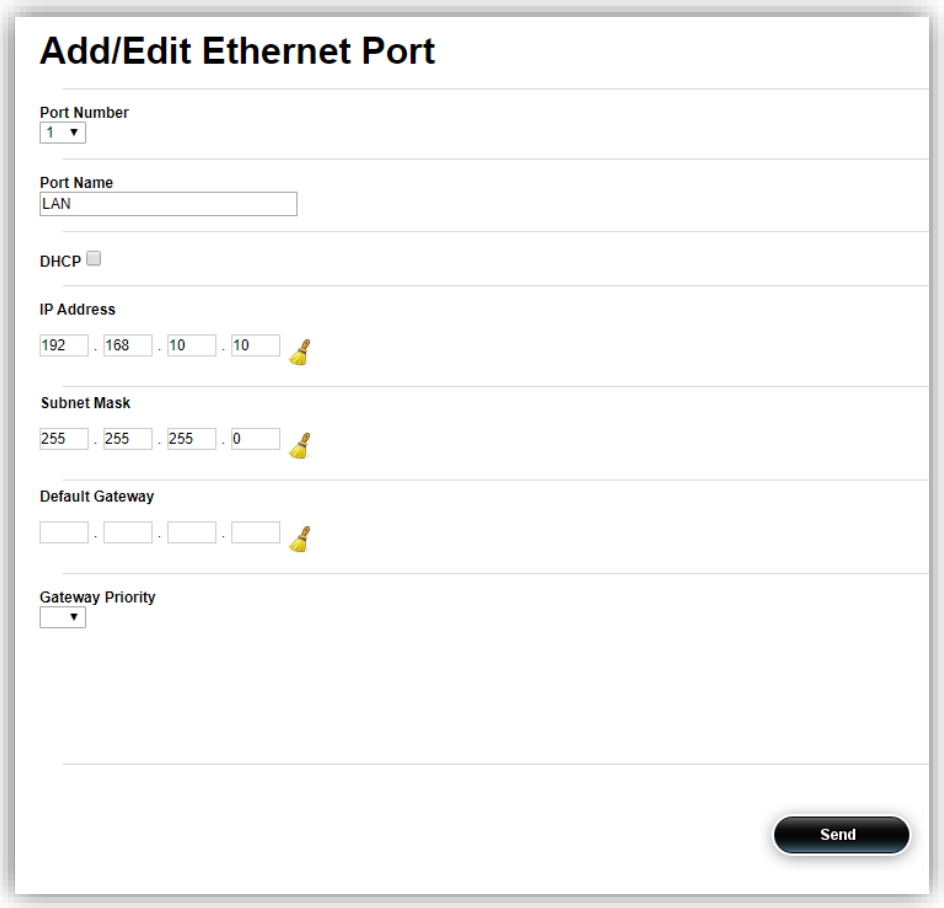
In this guide's network example the external network (the public Internet in this example) is connected to Port3 and the local network is connected to Port 1.

2. Port 1 (to external network) configuration (In this example:):
   Check the 'Enable' check box to enable the Port
   Set the Name field to 'WAN'
   configure IP Address: 192.168.30.10
   configure Subnet Mask: 255.255.255.0
   Configure Default Gateway: 192.168.30.10



To complete configuration click on the ‘Send’ button to apply the configuration changes

3. Repeat the same steps to configure Port 2 (to local network) configuration:

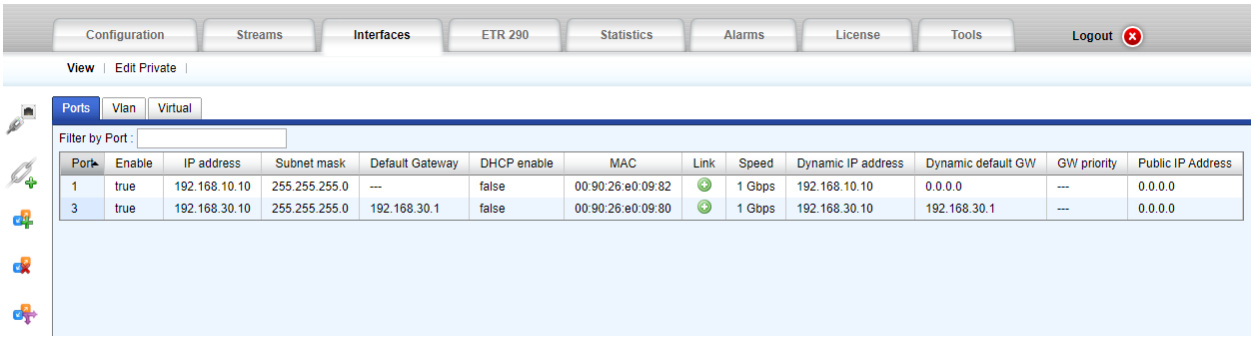


Set the Name field to 'LAN'

IP Address: 192.168.10.10
Subnet Mask: 255.255.255.0
Note that there is no need to configure default gateway to ports connecting to the local network

Close the window when done.

4. Check the connectivity,



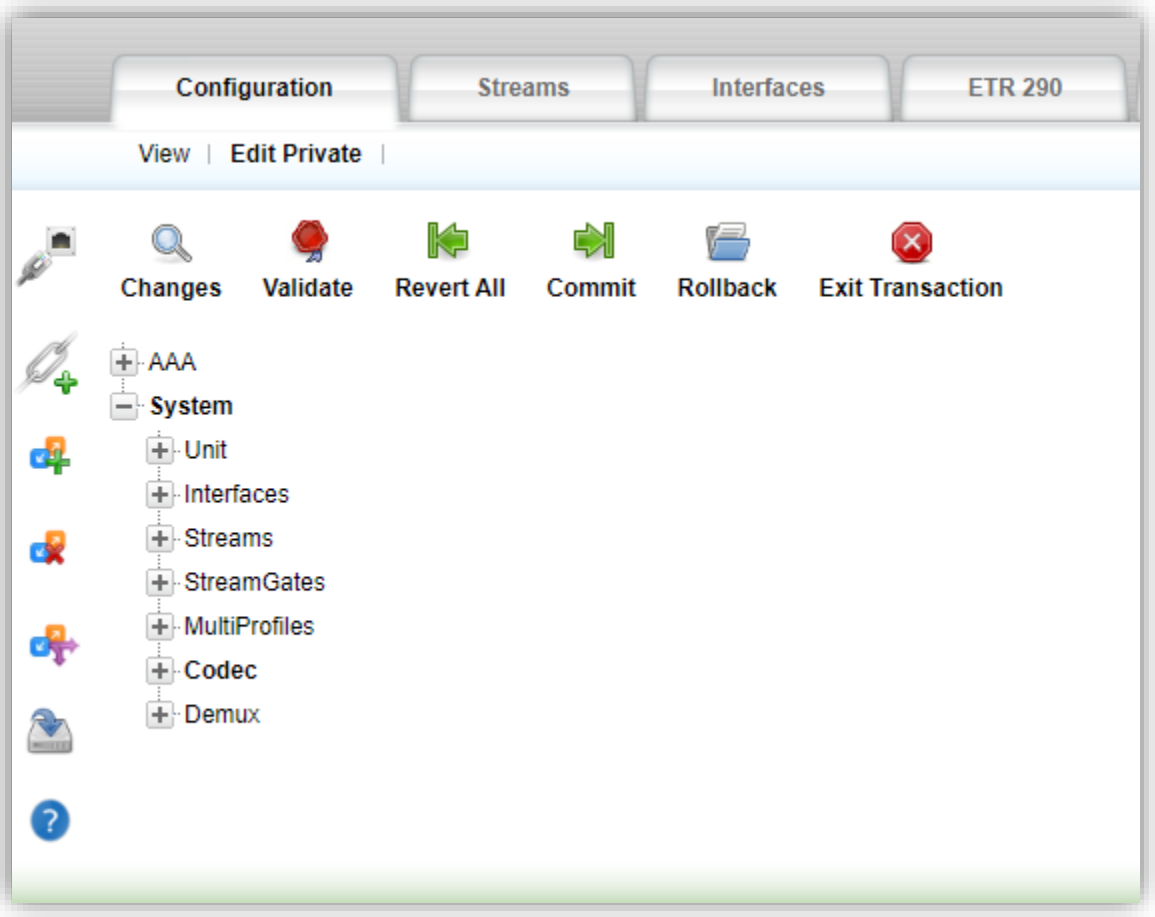
5.2 Adding the Stream

5.3 Create new Passthrough Codec preset

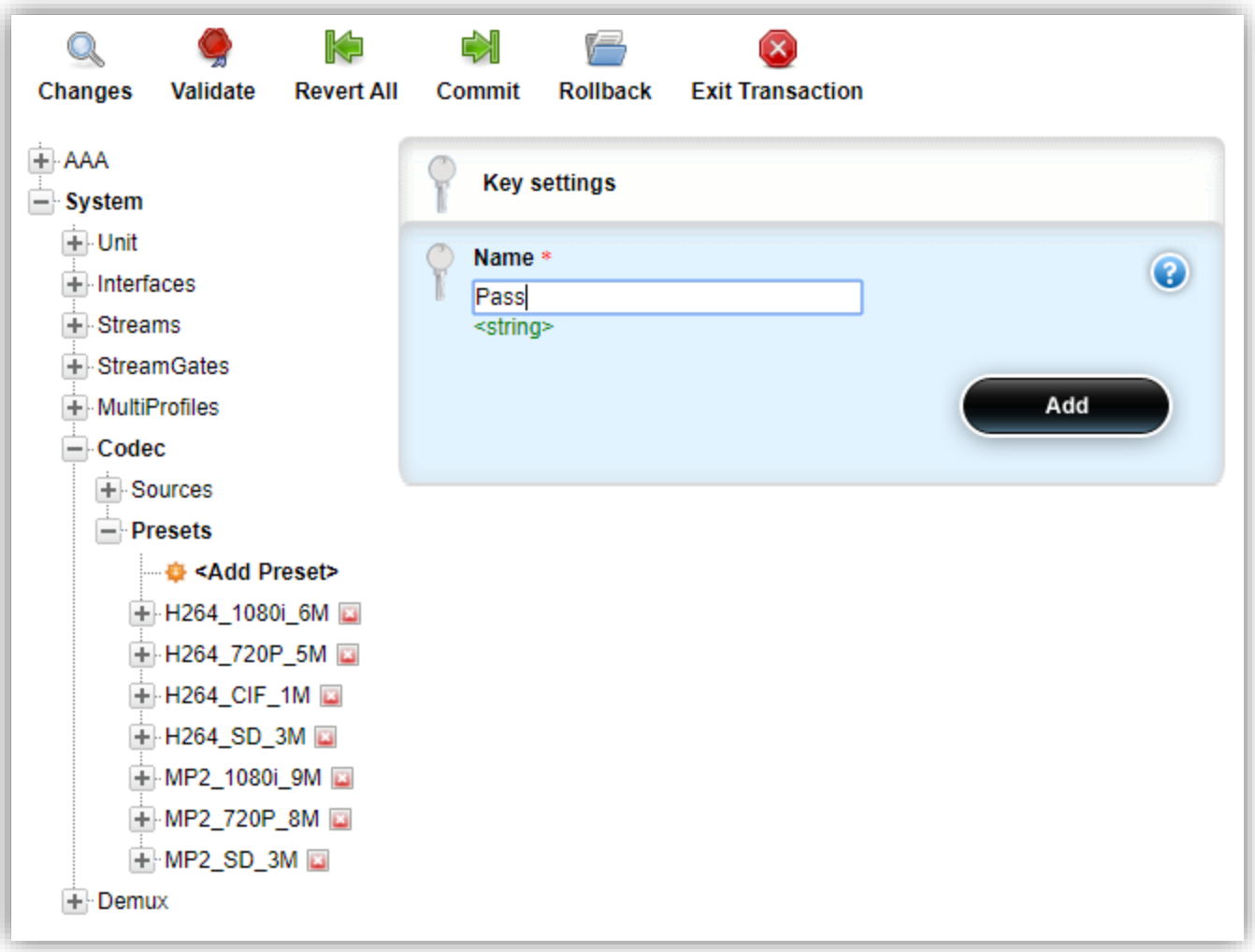
For the purpose of handling the RTMP with FFMPEG, we will need to instruct the FFMPEG not to reencode the incoming RTMP and keep its original Video and Audio codecs.

To create a new preset, follow these steps:

10. Select the Configuration TAB
11. Enter '**Edit Private'** mode
12. The outcome should look like the following:

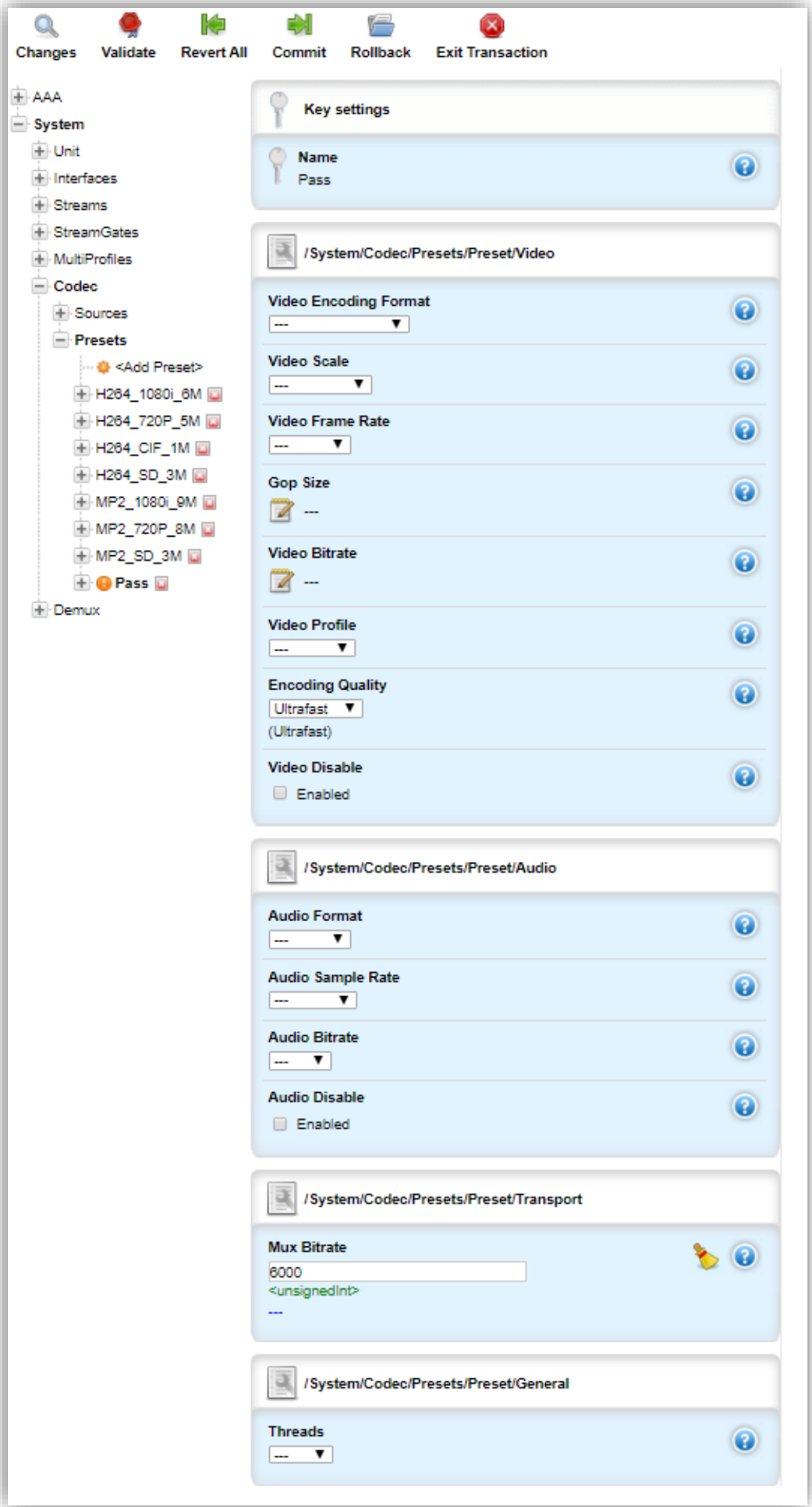


13. Press and expand the Codec
14. Press and expand the **Presets**
15. Press **<Add Preset>**
    a. Type a name, in this example: Pass:



b. Press the add button.

16. A new window will appear:


Changes
Validate
Revert All
Commit
Rollback
Exit Transaction
AAA
System
Unit
Interfaces
Streams
StreamGates
MultiProfiles
Codec
Sources
Presets
<Add Preset>
H264_1080i_6M
H264_720P_5M
H264_CIF_1M
H264_SD_3M
MP2_1080i_9M
MP2_720P_8M
MP2_SD_3M
Pass
Demux
Key settings
Name
Pass
/System/Codec/Presets/Preset/Video
Video Encoding Format
Video Scale
Video Frame Rate
Gop Size
Video Bitrate
Video Profile
Encoding Quality
Ultrafast
(Ultrafast)
Video Disable
Enabled
/System/Codec/Presets/Preset/Audio
Audio Format
Audio Sample Rate
Audio Bitrate
Audio Disable
Enabled
/System/Codec/Presets/Preset/Transport
Mux Bitrate
6000
<unsignedInt>
/System/Codec/Presets/Preset/General
Threads

17. Locate the ‘Mux Bitrate’ and type 6000 (6mbit for this example)
18. Press Commit when done.

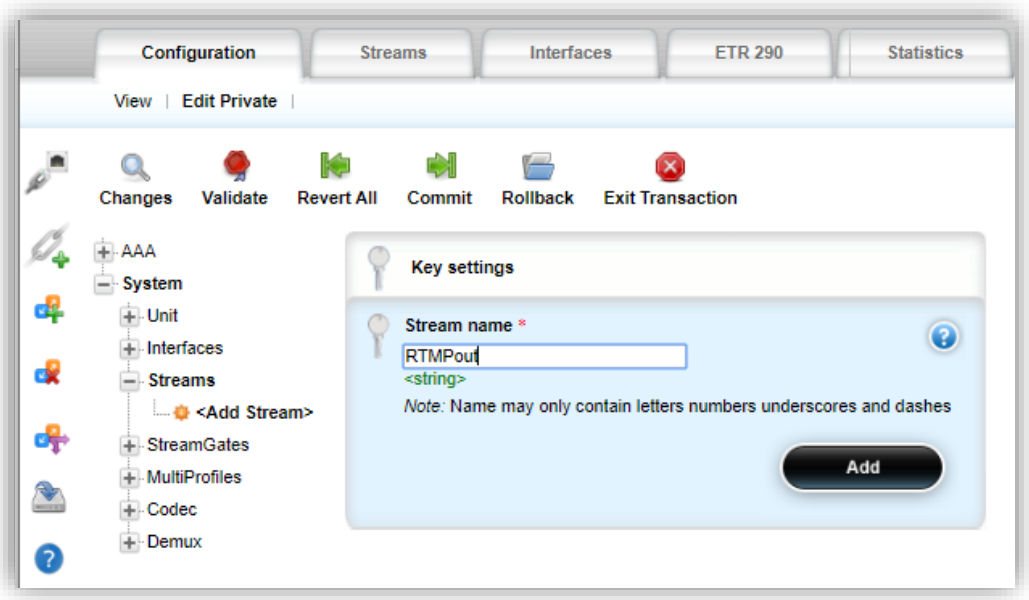
5.4 Adding a Stream

At this stage, we need to add streams to our setup. Adding a stream is comprised of three steps:

1. Adding stream
2. Setup the stream’s input interface and properties
3. Setup the stream’s output interface and properties

5.4.1 Add Stream

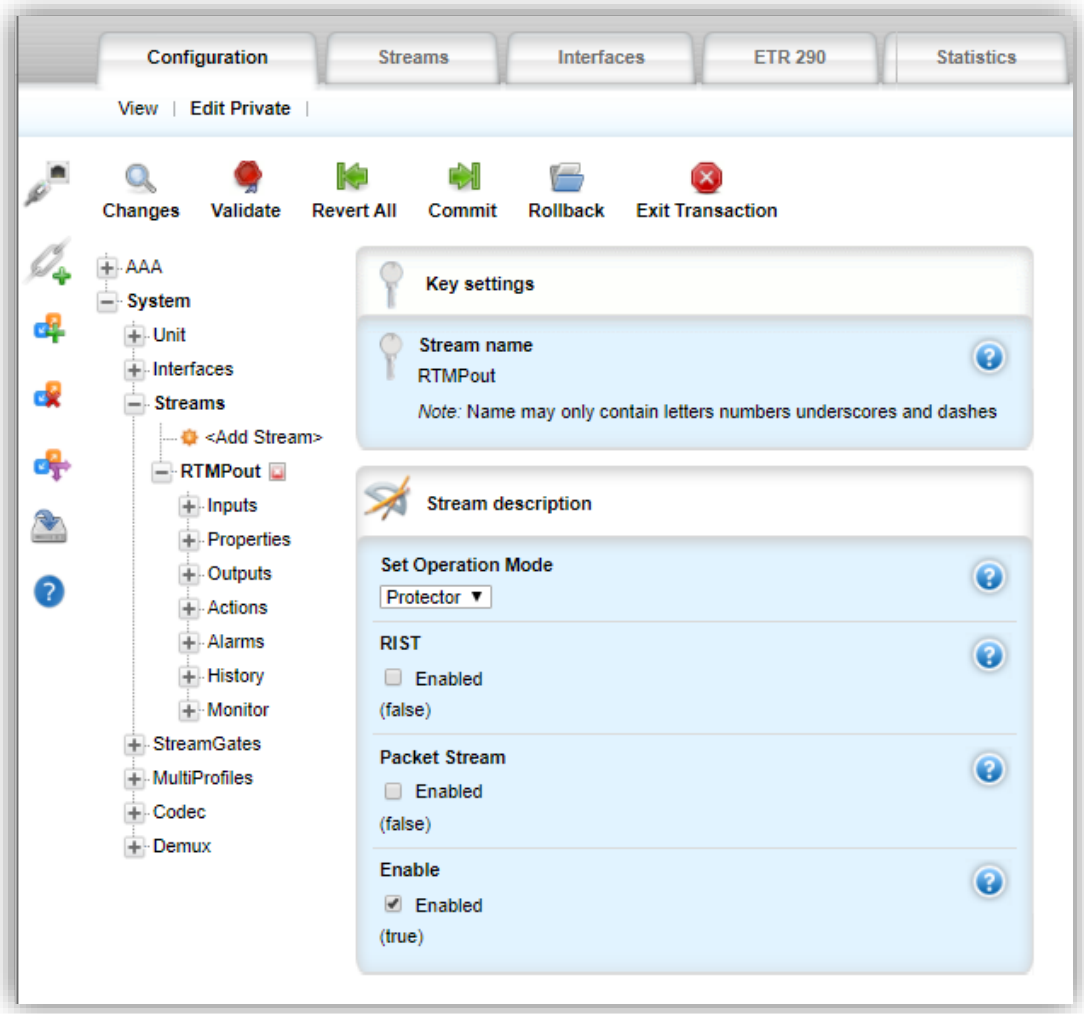
1. Go to Configuration TAB and expand the **Streams** leaf
2. Press <Add Stream>
3. Set a name for the stream, in this case ‘RTMPout’



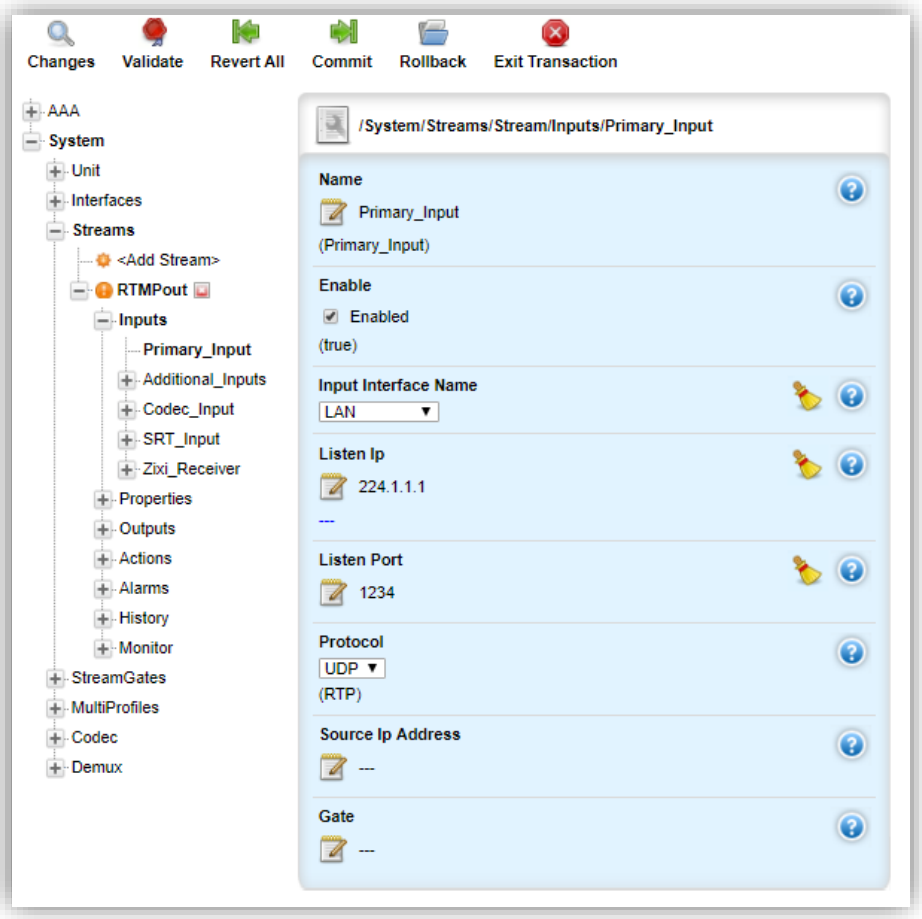
Press **Add** button

A new window will open:

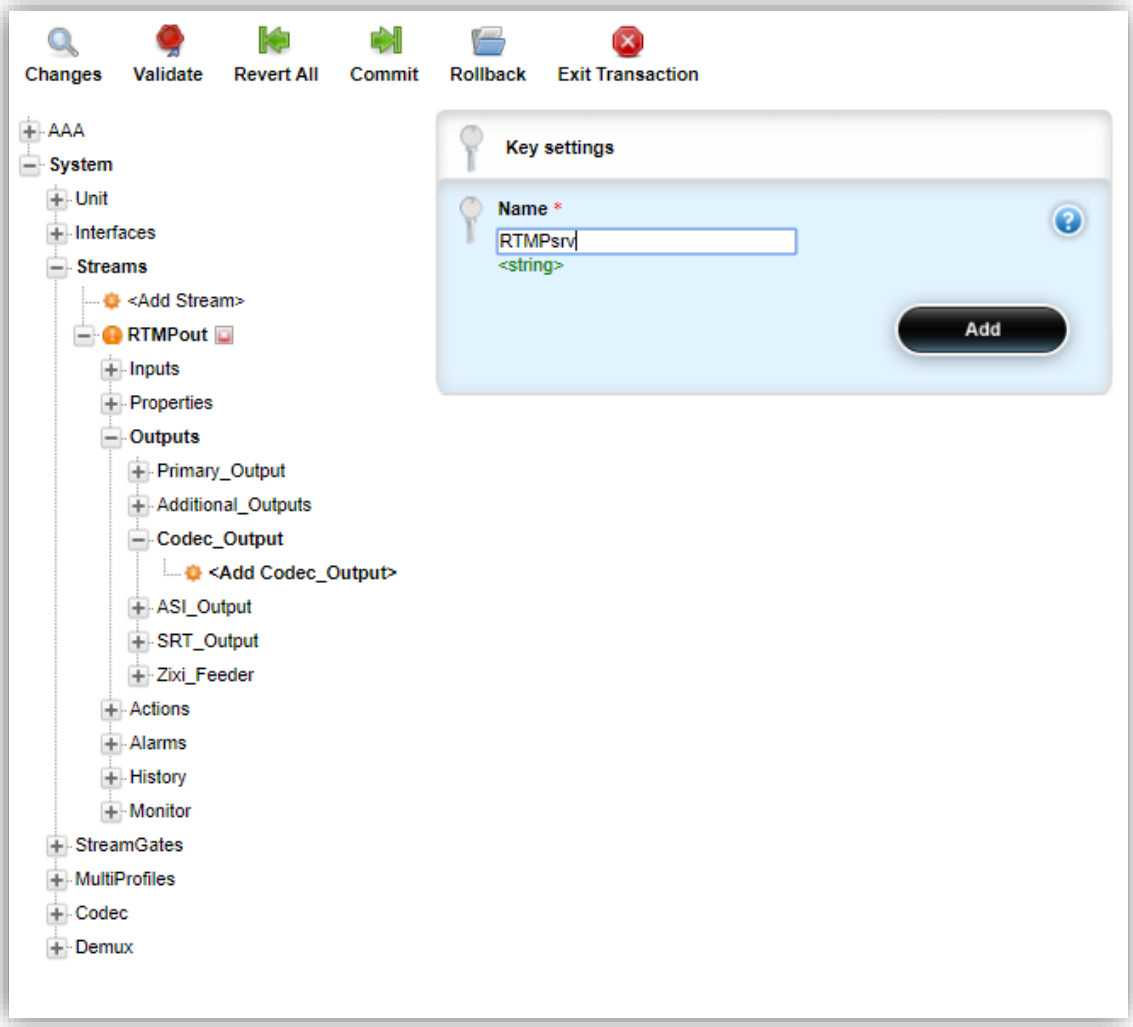
Chane ‘Set Operation Mode to **Protector**



4. Press the **Inputs**
    a. Press **Primary_Input**

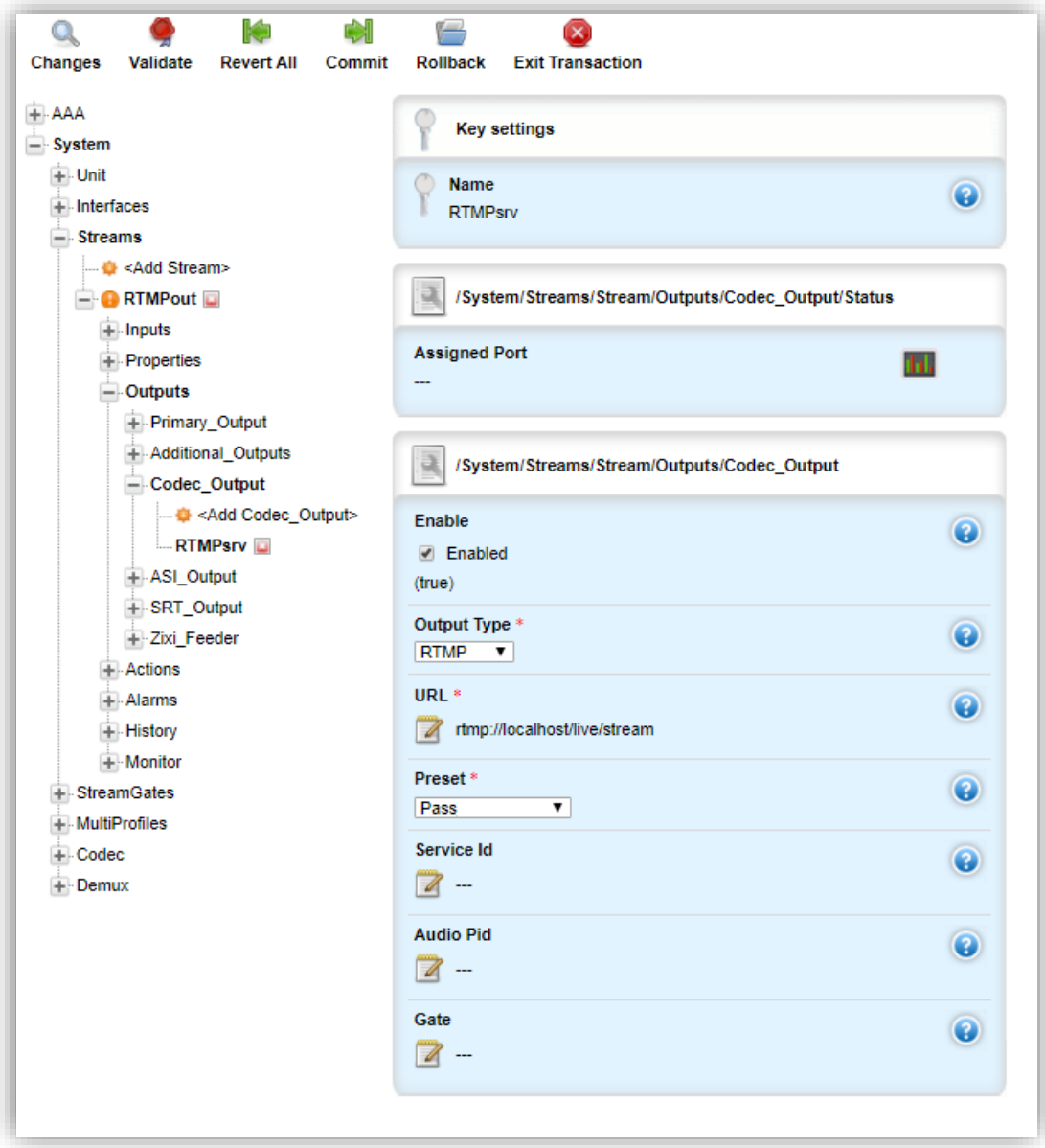


5. Configure the stream's **Input configuration** parameters:
    a. Configure Listen Ip according to the stream's destination IP address (224.1.1.1 in this example)
    b. Configure Listen Port according to the stream's UDP port (1234 in this example)
    c. Select the Data interface from the Input Interface Name drop down menu (**LAN** in our example)
    d. Configure the Protocol to **UDP**
6. Configure the stream's **Codec Output configuration** parameters:
    a. Select **Outputs** leaf
    b. Expand the **Codec_Output**
    c. Press the **<Add Codec_ Output>**
    d. Set a name to be RTMPsrv



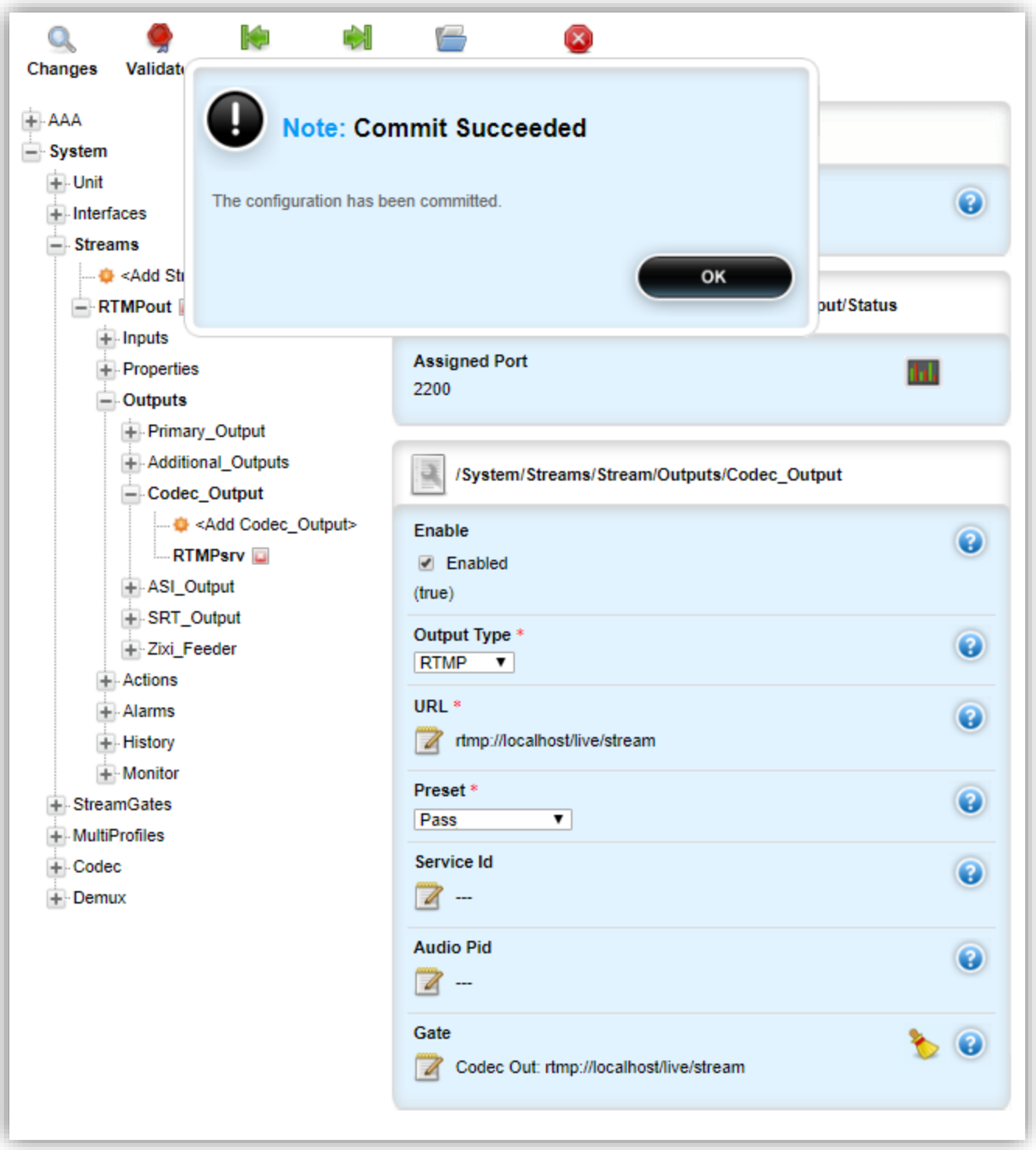
e. Press the **Add** button.
f. A New Window will open.

g. Configure the **Output Type** to be RTMP
h. Configure the **URL** to be: rtmp://localhost/live/stream
i. Configure the **Preset** to use ‘Pass’

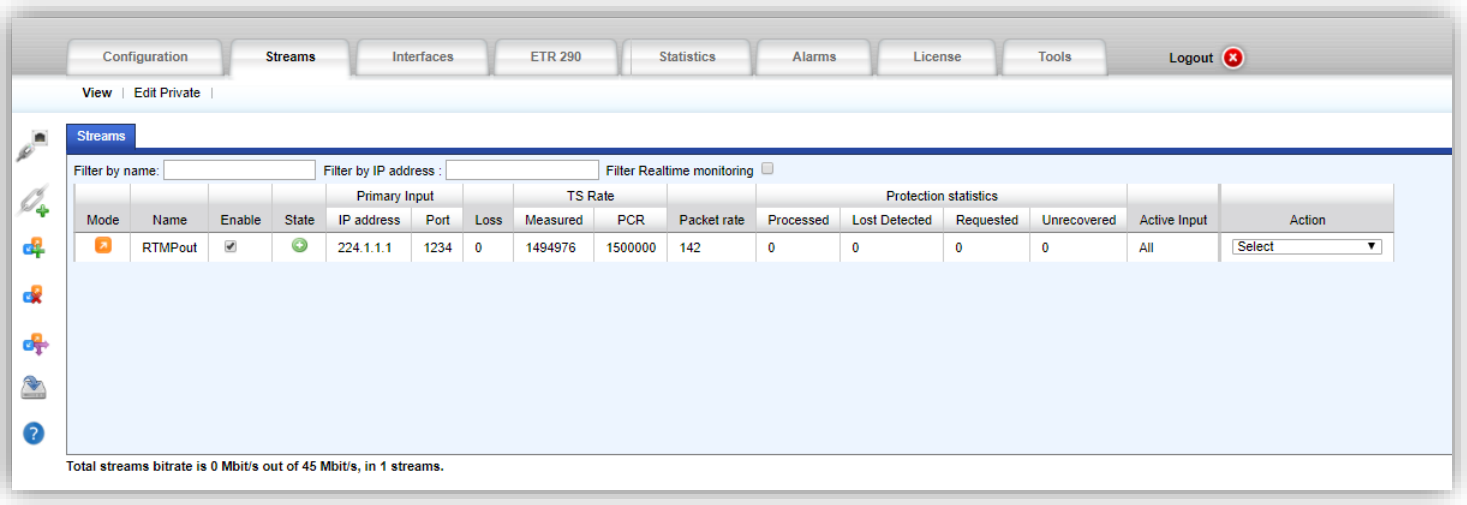


j. Press **Commit** button when done

10. Wait for the 'Commit Succeeded' window to appear:

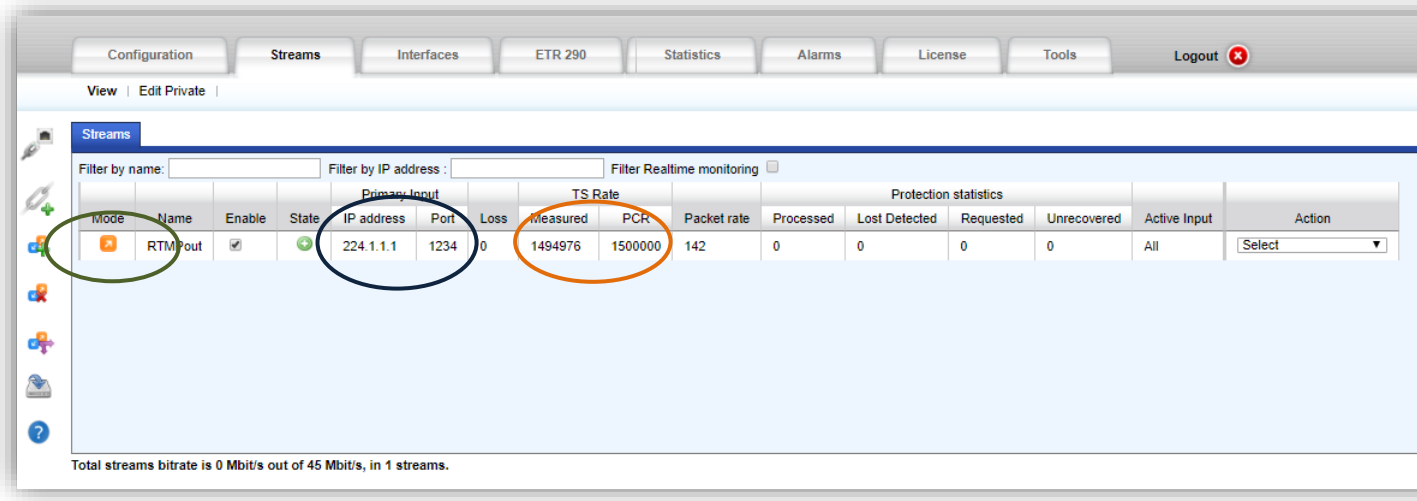


11. Close the window
12. A new stream should appear:



5.4.2 Verify Stream Configuration in the transmitter

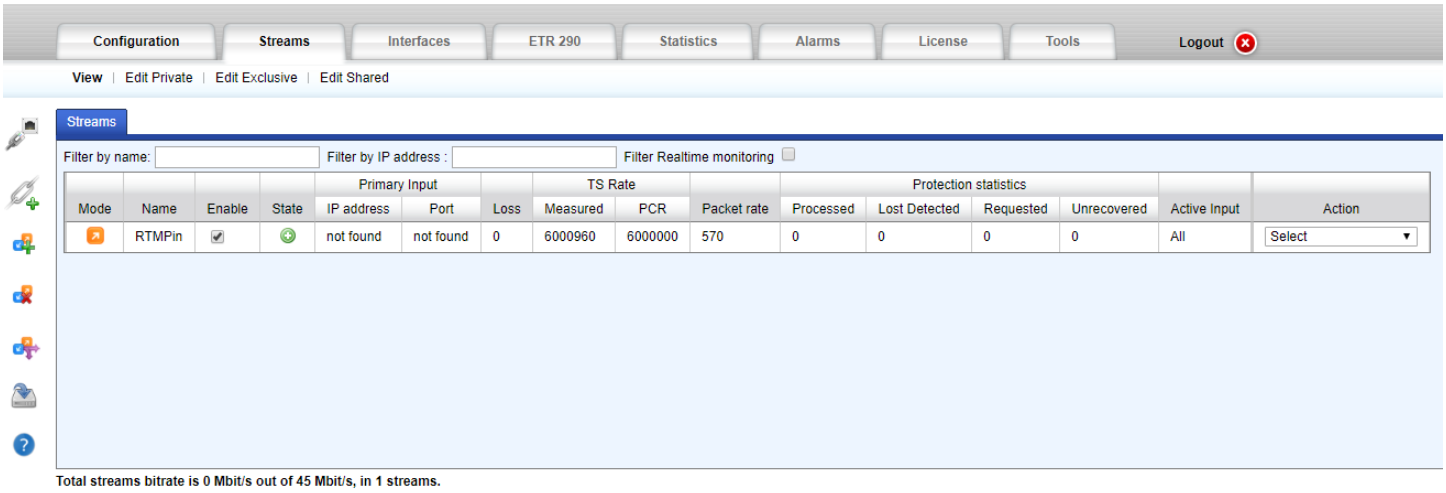
1. Click on the Streams Tab from the Main Menu:



2. Verify
    a. The stream shown
    b. Packet rate is shown and valid
    c. Both Measured and PCR TS rate are shown and valid

5.4.3 Verify Stream Configuration in the Receiver

Click on the Streams Tab from the Main Menu:



2. Verify
    a. The stream shown
    b. Packet rate is shown and valid (Note that the Preset was to encapsulate the RTMP into 6mbit)
    c. Both measured and PCR TS rate are shown and valid