ZiXi Broadcaster User Guide

Software Version 1.9

Legal Notice

Table of Contents

1 Introduction

The ZiXi Broadcaster is the central component in the ZiXi Video Network. ZiXi Broadcaster takes video streams from ZiXi Feeder, and can process the stream, enabling transcoding, transmuxing, recording, and distribution in multiple bit rates and protocols to any device anywhere. The ZiXi Broadcaster is an intelligent and versatile video distribution component that may reside on premise at a customers site or is offered by ZiXi as a cloud service.

ZiXi Broadcaster offers the following features:

- **Robust content delivery over IP** - communicates with ZiXi Feeder and ZiXi Receiver over UDP-based, video-optimized protocols on private and public IP networks for maximal quality at a predictable latency
- **Adaptive Bit Rate** - Dynamically adjusts stream rate to adapt to changing network conditions, using unicast or multicast, to meet specific application requirements
- **Transcoding** - transcodes to a variety of different profiles and bit rates
- **Format conversion** – supports Internet protocols: HLS/HDS/MPEG-DASH/RTMP/FLV
- **Recording** - store streams as MPEG-TS files.
- **Time-shifting** – records the stream to delay its broadcasting
- **Secure and rapid file transfer** – accelerated and secure file transfers delivered at wire speed and accelerated HTTP delivery including optimized playback of HLS and HDS over UDP
- **VOD** - stored files can be accessed on demand in multiple formats
- **Clustering and load balancing** – supports cluster architectures to provide continuous uptime
- **Transport Stream Analyzer** – MPEG-TS ETSI TR 101-290 analyzer
- **Monitoring** - captures network and content specific statistical information in real-time
- **Supports many to many and any to any -** gateway platform between UDP (unicast/multicast), ZiXi protected stream (unicast/multicast), RTMP, or other supported formats

1.1 ZiXi Technology

ZiXi's transport stream protocol is a content and network-aware protocol that dynamically adjusts to varying network conditions and employs error correction techniques for error-free video streaming over IP. With minimum overhead to physical bandwidth, this dynamic mechanism provides low end-to-end latency, removes jitter, recovers and re-orders packets, smooths video delivery and regenerates video to its original form, *all in real-time*.

ZiXi delivers outstanding performance (at low predictable latency), superior reliability (no packet loss) and broadcast-grade video quality (SD, HD, and UHD) with no tradeoffs to delay, resolution or stutter.

Streaming from one ZiXi-enabled device/server to another ZiXi-enabled device/server protects the stream from quality degradations along the path. It enables the streaming of high-quality video over any distance, while overcoming the varying network conditions of the public Internet, where the amount of network errors, packet loss, jitter and out-of-order packets fluctuate "every second".

The ZiXi transport stream protocol can be also deployed on part of the path. For example, from a ZiXi Feeder to a ZiXi Broadcaster (ZiXi protected path) and on to the end user through UDP or RTMP. In this case, the path that has challenging conditions (e.g. long distance or unstable wireless conditions) will be protected by ZiXi and then delivered on to the end-user on a standard UDP or RTMP protocol.

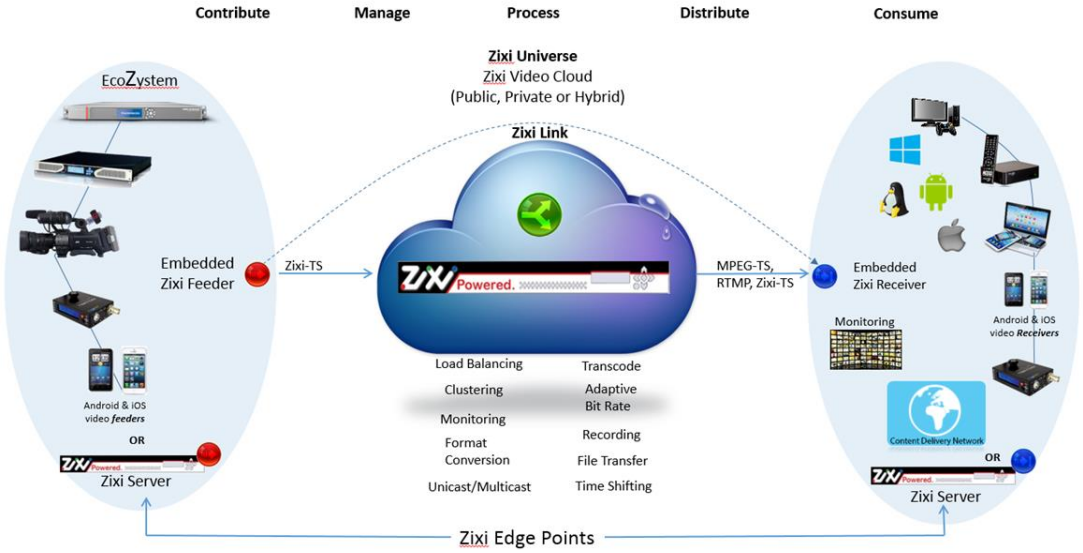
ZiXi's transport stream technology includes the following features for ultimate quality and security:

- Network sensing
- Dynamic de-jitter
- MPEG specific optimizations
- Z-ARQ error recovery
- Z-FEC - Dynamic content aware forward error correction
- Active multi-path error recovery
- Adaptive bitrate over UDP, unicast or multicast
- Rate control and congestion avoidance
- 256 bit AES transport encryption

1.2 ZiXi Platform Architecture

The ZiXi Universe diagram shows how a ZiXi embedded (ZiXi EcoZystem OEM partners) device initiates a ZiXi stream at Acquisition or how ZiXi Feeder running on an appliance or mobile device enables non-ZiXi embedded devices to initiate a live stream. ZiXi Feeder encapsulates the stream in the ZiXi transport protocol and delivers point to point or point to multi-point over standard IP connections. ZiXi can be deployed on premise or in the cloud with the ability to monitor streams anywhere along the path. For management, processing and larger scale distribution capabilities, ZiXi can support complex production workflows for live events capable of transcoding, recording, and more in a clustered environment that supports

reliability and scalability.



1.3 Supported Protocols

Input:

- ZiXi protected transport
- MPEG-TS over UDP and/or RTP with SMPTE-2022
- RTMP pull from CDNs and/or other sources
- RTMP push
- Transport stream files from local file system

Output:

- ZiXi protected transport
- MPEG-TS over UDP and/or RTP with SMPTE-2022
- RTMP push to CDNs and/or other media servers;
- Apple HTTP Live Streaming (HLS)
- Adobe HTTP Dynamic Streaming (HDS)
- FLV over HTTP (HTTP pseudo-streaming)
- MPEG-DASH (DASH264 profile)
- SHOUTcast
- Transport stream files to local file system
- Re-multiplex output streams to strict CBR for extensive compatibility with Integrated Receiver- Decoders (IRDs)

1.4 Transcoding Options

ZiXi Broadcaster can transcode a single input stream using multiple profiles. The transcoder supports the following options:

- Video Decoding – MPEG2, H.264
- Video Encoding – H.264
- Audio Decoding - MPEG1 layer 1/2, AAC
- Audio Encoding – AAC

1.5 Recording Options

Live stream inputs can be stored as MPEG-TS files to a local disk drive or mounted drive.

1.6 Multicast Options

Multicast streams can be received or be sent by the ZiXi Broadcaster. ZiXi Broadcaster serves as a gateway between Unicast and Multicast streams, while allowing reliable streaming over multicast.

1.7 Adaptive Options

ZiXi Broadcaster can create an adaptive group, subsequently editing, recording, or playing it in conjunction with DASH, HLS, HDS or ZiXi. You can also set a Pre-roll video/screen that will be played before the live streaming begins.

1.8 VOD Options

ZiXi Broadcaster supports VOD (Video on Demand) playback of stored files in multiple formats such as TS, MP4, HLS, FLV.

1.9 Latency Considerations

Latency defines the delay in which the video stream will be delivered to the end point. This delay is essentially a buffer that is used for additional processing, thereby improving the quality of video stream. The latency should be considered based on the importance of immediacy. For example, if the video requires interaction (e.g. between a reporter in the field and an anchor in the studio), the latency should be set to a minimum so that the interaction does not suffer from any delay.

Latency can vary from tens of milli-seconds to several seconds.

ZiXi protocol can start benefit from one frame (30ms), while increasing the latency will provide more robustness for the error-recovery.

Latency Considerations

In low latency (below 1500ms) the error recovery is based on hybrid approach of FEC and ARQ. FEC will add overhead of up to 30%(adaptive–without congesting the network) .

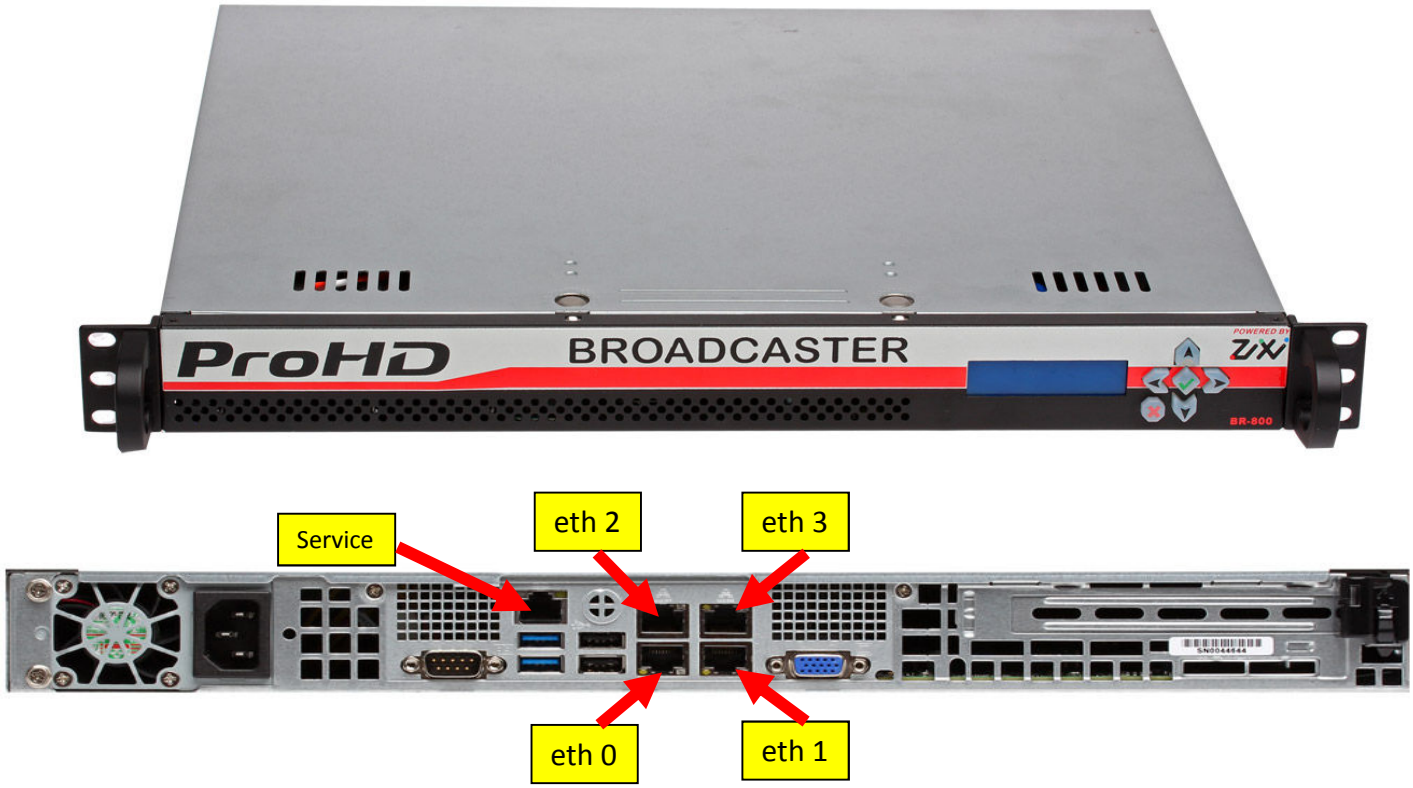
For getting sufficient error-recovery we are recommending to set the Latency at least 3 times larger than the RTT (i.e Latency >= 3* RTT)

Latency can be set to any value, we can propose two common modes:

1. Interactive mode - 500ms
2. Non-interactive mode – 4000ms

Latency below 1500ms will add an FEC overhead of up to 30%

BR-800 – ***ProHD Broadcaster***



Web-based Control Interface: http://**166.44.1.12** :**8080**

User Name: *admin* PW: *jvc1234*

Server IP Address | Control Port#

Important Note:

Server is equipped with 4 Ethernet ports which can be set to DHCP or Static IP addresses.

Ports should not be set to <u>the same</u> Subnet / IP range at any time.

Examples:

OK

Eth0 – 192.168.1.20
Eth1 – DHCP
Eth2 – 10.2.3.44
Eth3 – DHCP

Problem

Eth0 – **192.168.1.20**
Eth1 – DHCP
Eth2 – 10.2.2.7
Eth3 – **192.168.1.44**

Same IP range

Problem

Eth0 – **192.168.0.20**
Eth1 – **192.168.0.3**
Eth2 – 10.2.2.7
Eth3 – 192.168.1.44

Gateway:

It is important to setup *Gateway IP Address* for proper communication.

Do not specify <u>the same</u> ***Gateway IP Address*** for two or more Ethernet ports.

2 Logging into Broadcaster

➔ **To log in to ProHD ZiXi Broadcaster:**

1. From your web browser, navigate to: http://localhost:8080
   A user authentication window opens.
2. In the User Name field, type Admin and in the Password field, type 'jvc1234'.
3. Click OK.

For Zixi branded server login http://localhost:4444 PW: "1234"

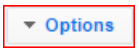
3 Activating Your License

In order to start using ZiXi Broadcaster, you must first activate your license. ZiXi Broadcaster and its optional features are activated by license files. Before you first use ZiXi Broadcaster and when you wish to add optional features, you will need to activate the appropriate license.

3.1 Status page- Activation Key

When logging in for the first time to a ZiXi Broadcaster, you must activate the ZiXi license.

➔ **To Activate the License:**

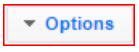
1. From the **Status** page of the ZiXi Broadcaster, click 

on the upper right hand side. The various options are displayed.
2. Click **Activate License.** The **Activate License** window appears.
3. Enter your **Activation Key** and click **Activate**. Once entered, The ZiXi Broadcaster is enabled.

3.2 Upgrading to a newer version

From time to time a new version will be available. To upgrade the server with a newer version, follow the instructions below.

➔ **To Upgrade to a Newer Version:**

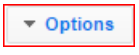
1. From the **Status** page of the ZiXi Broadcaster, click 

on the upper right hand side. The various options are displayed.
2. Click **Upgrade.** The directory of the local drive opens.
3. Select the newer version/file from the appropriate directory and click **Open**. Once completed, the Broadcaster has been upgraded.

3.3 Reloading the license

In the event that your license expires, you must re-enter a new ZiXi license key.

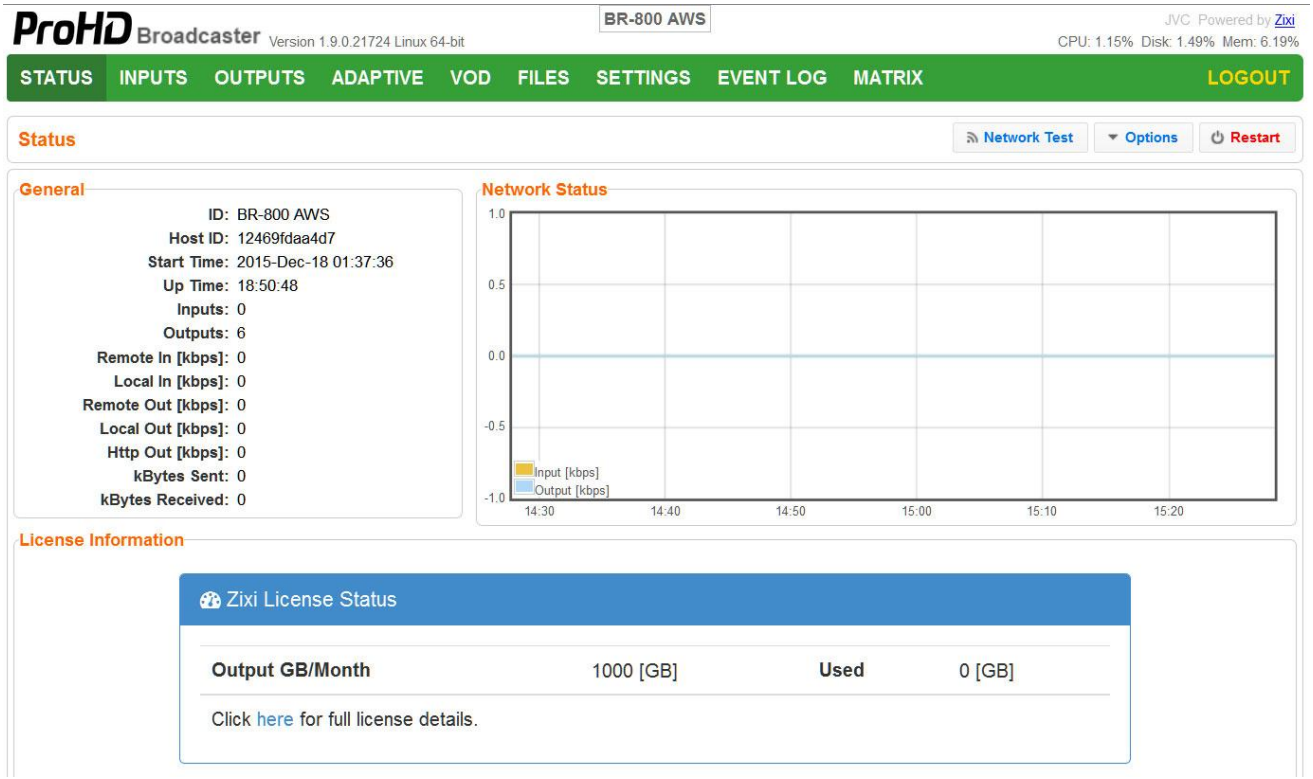
➔ **To Reload the License:**

1. From the **Status** page of the ZiXi Broadcaster, click 

on the upper right hand side. The various options are displayed.
2. Click **Reload.** The license has been reloaded.

3.4 Viewing Current License Information

You can view the current license information at the bottom of the **Status Screen** in the **License Information** section.



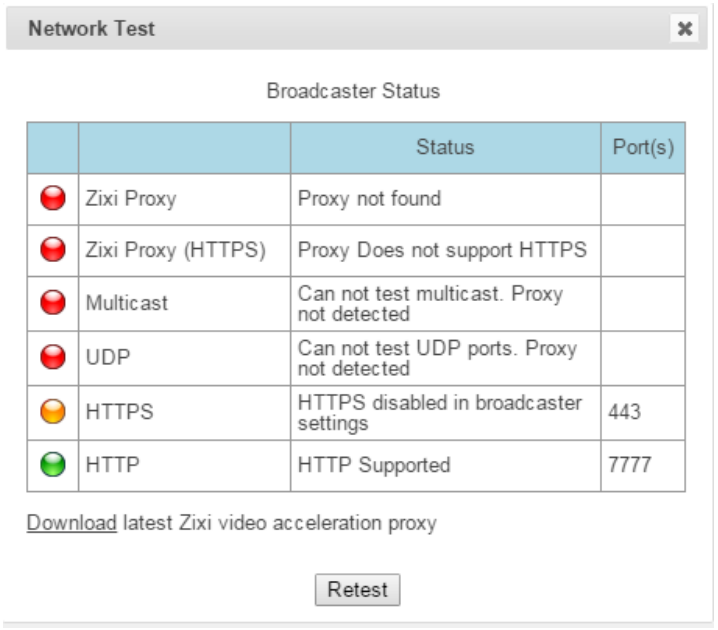
4 Testing the Network

You can test the ZiXi Broadcaster status, the status of the http or https connection with the relevant port, and the status of the ZiXi proxy component. This can be accomplished remotely after the installation of the Broadcaster and subsequently any time after that.

➔ **To Test the Network:**

1. From the **Status** page of the ZiXi Broadcaster, click 

on the upper right hand side. The **Network Test** window is displayed:



The status table lists the various components of the ZiXi Broadcaster with the relevant ports and status (description) and the following health indicators:

- Green – component has been tested and was found available.
- Yellow – component has been disabled.
- Red – component was not found or is not available.

2. Click **Retest** to run an additional test on all the server's current connections and their relative ports.

5 Adding Input Streams to Broadcaster

You can add input streams to ZiXi Broadcaster from one of the following sources:

- **ZiXi Feeder** – the ZiXi feeder (JVC camcorder) pushes the stream to the ZiXi Broadcaster. Since both the ZiXi Feeder and the ZiXi Broadcaster use the ZiXi protocol, the stream is protected by the ZiXi protocol.
- **Another ZiXi Broadcaster** – the ZiXi Broadcaster can pull a stream from another ZiXi Broadcaster. Since both components use the ZiXi protocol, the stream can be protected by the ZiXi protocol.
- **Local files (for VOD)** – the source in this case is a local transport stream file from your local computer or local network.
- **UDP streams** - the source is a UDP or RTP stream, over unicast or multicast.
- **RTMP streams** - The source is an RTMP stream, pushed into the broadcaster, or pulled by it.

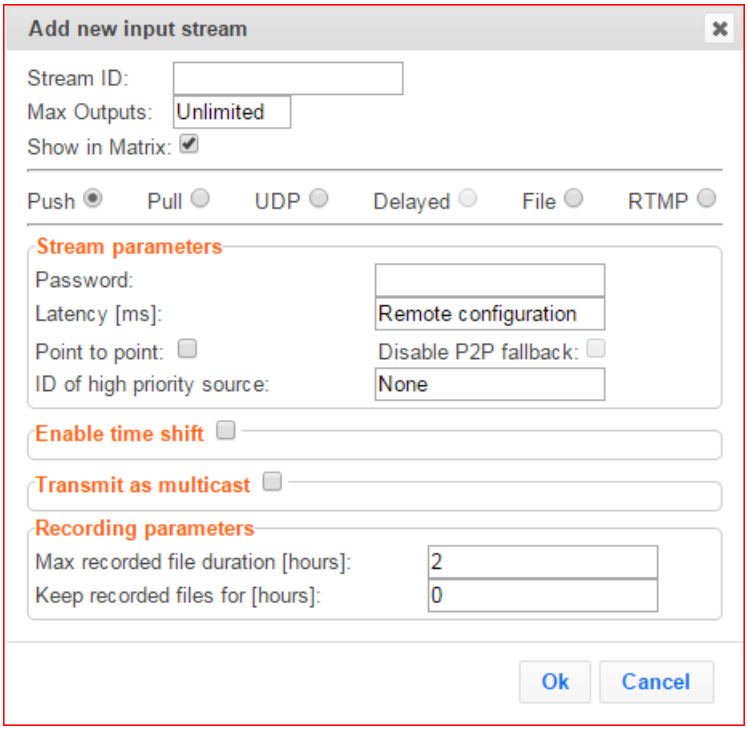
5.1 Adding a Push Stream (JVC camcorder)

Typically a Push Stream is transmitted from a ZiXi Feeder. In this case, the stream is initiated by the ZiXi Feeder, while the ZiXi Broadcaster remains in "listening mode" until the stream is initiated.

➔ **To Add a Push Stream:**

1. Click the **Inputs** tab at the top of the ZiXi Broadcaster administrative screen.
2. Click **New Input** on the upper right hand side of the screen. The **Add a new input stream** window is displayed:

Adding a Push Stream



3. Enter the unique **Stream I.D.** for the Broadcaster.

> ☞ Note this must be identical (case sensitive) to the stream name configured in the ZiXi Feeder / JVC camcorder.

4. Select the maximum concurrent connections to this stream from the **Max. Outputs** drop-down list. Default: Unlimited.
5. Select the **Show in Matrix** check box to display this stream in the Matrix (see **Using the Matrix** on page 60). Default: Selected.
6. Select **Push** for this input stream.
7. Specify the **Stream Parameters** (see table below for additional parameters).
8. If you want to **Enable time shift**, select this checkbox (see table below for additional parameters). The stream will be recorded and broadcasted after the specified delay. The time shift feature is typically used to broadcast a live event across time zones (due to the time differences between locations).
9. If you want to **Transmit as multicast**, select this checkbox (see table below for additional parameters).
10. If you want to record the stream, you can configure the **Recording Parameters** (see table below for additional parameters).
11. Click **OK**.
    The "Input added" message appears on the top of the screen. The Push Stream from the ZiXi Feeder is added to the ZiXi Broadcaster and now appears in the list of input streams available in the ZiXi Broadcaster input UI.

Parameter	Description
Stream Parameters	
Password (Optional)	If desired, enter a password string to use for authentication (must be identical to the string configured on the Feeder)
Latency[ms]	Specify the maximal latency that will override the latency that was defined on the Feeder (in ms). Default: Remote configuration (i.e. use the latency was set on the feeder). (See **Latency Considerations**)
Point to point only	Selecting this checkbox transmits the stream directly (point-to-point) from the Feeder to the Receiver, while only delivering messaging to the Broadcaster. In case there is a problem with the P2P connection, it will re-route the transmission through the ZiXi Broadcaster.
Disable P2P Fallback	Selecting this checkbox will allow only P2P (disabling the option to re-route traffic though the ZiXi Broadcaster)
ID of high priority source	Setting the ID of the source that will be granted a higher priority during connection. A feeder with this ID will disconnect other existing sources.
Enable time shift	Selecting this checkbox stores the stream and its delayed transmission is performed according to the specified time (up 24 hours) delay. Typically used when the live stream is in one time zone and the users are in different time zones.
Maximum delay [hh:mm:ss]	Specify the time of the delayed transmission of this stream. Maximum: 24 hours.
Transmit as multicast	Selecting this checkbox enables the transmission of this stream's outputs as multicast. A ZiXi receiver that will pull the stream will receive it in multicast. By default ZiXi Broadcaster is configured to allow transparent fallback to unicast if it is out of the LAN.
Multicast Only	Selecting this checkbox will force the transmission of this stream only in multicast.
Recording parameters	
Max recorded file duration [hours]	Specifies the maximum time allotted for recording a video stream. Default: 2 hours

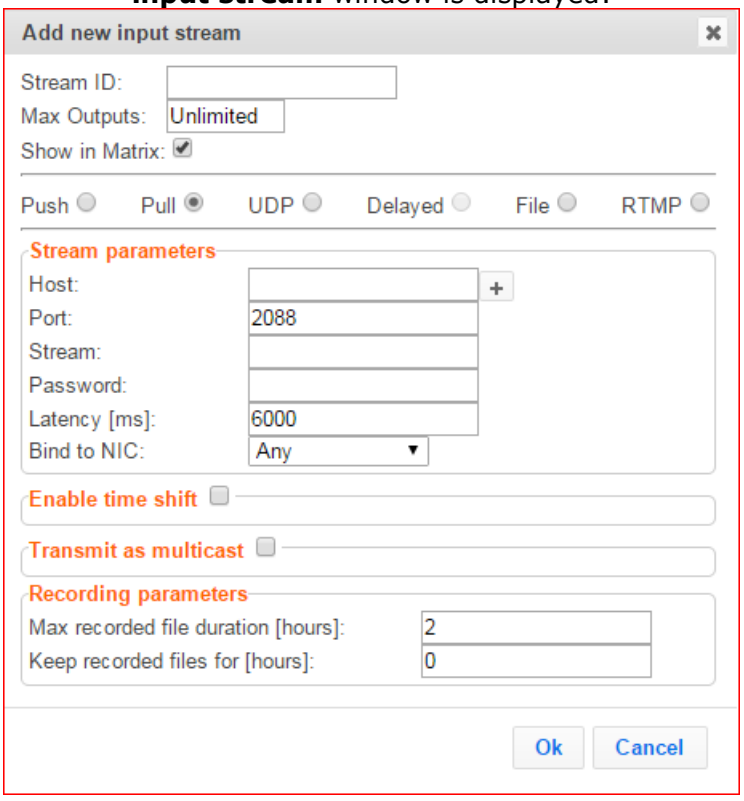
Parameter	Description
Keep recorded files for [hours]	Specifies the maximum time for storing the recording. Default: 0 hours

5.2 Adding a Pull Stream

Typically a Pull Stream is transmitted from another ZiXi Broadcaster. In this case, the stream is initiated by your ZiXi Broadcaster.

➔ **To Add a Pull Stream:**

1. Click the **Inputs** tab at the top of the ZiXi Broadcaster administrative screen.
2. Click **New Input** on the upper right hand side of the screen. The **Add a new input stream** window is displayed:



3. Enter the unique **Stream I.D.** for the Broadcaster.

Note this must be identical (case sensitive) to the stream name configured in the other ZiXi Broadcaster.

4. Select the maximum concurrent connections to this stream from the **Max. Outputs** drop-down list. Default: Unlimited.
5. Select the **Show in Matrix** check box to display this stream in the Matrix (see **Using the Matrix** on page 60). Default: Selected.

6. Select **Pull** for the input stream.
7. Specify the **Stream Parameters** (see table below for additional parameters).
8. If you want to **Enable time shift**, select this checkbox (see table below for additional parameters). The stream will be recorded and broadcasted after the specified delay. The time shift feature is typically used to broadcast a live event across time zones (due to the time differences between locations).
9. If you want to **Transmit as multicast**, select this checkbox (see table below for additional parameter).
10. If you want to configure the **Recording Parameters**, specify them in the respective fields (see table below for additional parameters).
11. Click **OK**.
    The "Input added" message appears on the top of the screen. The Push Stream from the ZiXi Feeder is added to the ZiXi Broadcaster and now appears in the list of streams available in ZiXi Broadcaster inputs UI.

Parameter	Description
Stream Parameters	
Host	Enter the IP Address of the remote Broadcaster server. Note that additional (failover) destinations can be added by clicking the adjacent "+" button
Port	Enter the port through which the Broadcaster receives the stream from another Broadcaster server. Default: 2088 The default input port for ZiXi Broadcaster is UDP port **2088**. This port *must be open* on any firewalls between ZiXi Broadcaster and other devices it is communicating with
Stream	Enter the unique stream ID from another Broadcaster server.
Password (Optional)	If desired, enter the string for authentication. It must be identical to the string configured on the other ZiXi Broadcaster.
Latency[ms]	Specify the maximum number of milliseconds that ZiXi Broadcaster should protect the stream for. For example, 6000 milliseconds would ensure that the stream is protected for up to six seconds of delay in the network. This setting affects memory usage as higher levels of protection require more buffering. Default:6000.
Bind to NIC	Selects a local IP address to use, or Any IP address if it can be sourced from any active NIC.
Enable time shift	

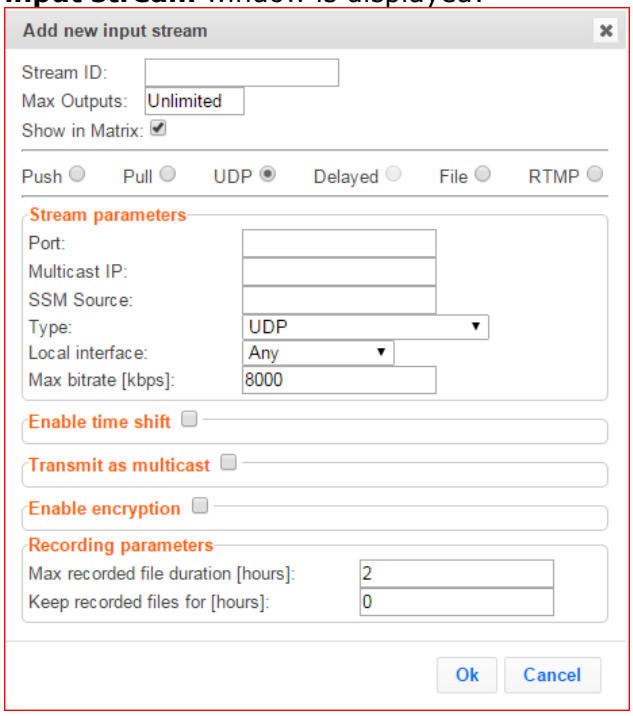
Parameter	Description
Maximum delay [hh:mm:ss]	Specify the time of a delayed transmission of this stream. Maximum: 24 hours
Transmit as multicast	Enables the transmission of this stream's outputs as multicast. A ZiXi Broadcaster that will pull the stream will receive it in multicast. By default ZiXi Broadcaster is configured to allow transparent fallback to unicast if it is out of the LAN.
Multicast-Only	If desired, specify multicast-only outputs.
Recording parameters	
Max recorded file duration [hours]	Specifies the maximum time allotted for recording a video stream. Default: 2 hours
Keep recorded files for [hours]	Specifies the maximum time for storing the recording.

5.3 Adding a UDP Stream

This enables the Broadcaster to receive a UDP stream. The UDP stream is not protected by the ZiXi protocol.

➔ **To Add a UDP Stream:**

1. Click the Inputs tab at the top of the ZiXi Broadcaster administrative screen.
2. Click **New Input** on the upper right hand side of the screen. The **Add a new input stream** window is displayed:



3. Enter the unique **Stream I.D.**

Note this must be identical (case sensitive) to the stream name configured in the ZiXi Feeder.

4. Select the maximum concurrent connections to this stream from the **Max. Outputs** drop-down list. Default: Unlimited.
5. Select the **Show in Matrix** check box to display this stream in the Matrix (see **Using the Matrix** on page 60). Default: Selected.
6. Select **UDP** for the input stream.
7. Specify the **Stream Parameters** (see table below for additional parameters).
8. If you want to **Enable time shift**, select this checkbox (see table below for additional parameters).

9. If you want to **Transmit as multicast**, select this checkbox (see table below for additional parameters).
10. If you want to configure the **Recording Parameters**, specify them in the respective fields (see table below for additional parameters).
11. If you want to **Enable encryption** select this checkbox, (see table below for additional parameters).
12. Click **OK**.
    The "Input added" message appears on the top of the screen. The UDP Stream from the ZiXi Feeder is added to the ZiXi Broadcaster and now appears in the list of streams available in the ZiXi Broadcaster inputs UI.

Parameter	Description
Stream ID	Specifies the unique identifier for this stream.
Max Outputs	Specifies the maximum number of allowed outputs. Default: Unlimited.
Stream parameters	
Port	Specifies the port to listen on. This port must be open on all firewalls between the ZiXi Broadcaster and other devices it is communicating with.
Multicast IP	If multicast, type "join" in the Multicast IP address (or leave blank in the case of Unicast).
SSM Source	Specifies the source IP for a source-specific multicast.
Type	Select the appropriate protocol type from the drop-down list.
Local Interface	Select the desired network interface on the local machine. The following options are available: Any – when the source can be any active NIC Localhost – the designated local IP address X.X.X.X – the specific IP address of the NIC.
Max. bitrate [kbps]	Specifies the maximum expected bitrate for memory allocation. Recommended: 2X the actual bitrate, which will prevent buffer overruns (especially with VBR streams). Default: 8000. Note – Overflows will typically occur when the Max Bitrate isn't sufficient.
Enable time shift	Enables a delayed transmission of this input.

Parameter	Description
Maximum delay [hh:mm:ss]	Specifies the maximum time delay of this input.
Transmit as multicast	Enables transmission of this stream's outputs as multicasts. A ZiXi receiver will receive it in multicast (unless it is out of the LAN in which case it will receive as unicast). You can also force Multicast only outputs.
Multicast-Only	If desired, specify multicast only outputs.
Enable Encryption	
Encryption type	Specify the type of Encryption (AES 128/192/256). Selection of **Automatic** will generate an AES 256 bit encryption and exchange it securely between the applications automatically.
Encryption key	Click **Generate** and the encryption key for the input stream will appear in the adjacent text box. Send it to the end-user to decipher the received encoded stream.
Recording parameters	
Max recorded file duration [hours]	Specifies the maximum time allotted for recording a video stream. Default: 2 hours
Keep recorded files for [hours]	Specifies the maximum time for storing the recording.

5.4 Adding a Delayed Stream

You can delay the broadcasting of an input stream by enabling "time shifting". In this case the input stream will be stored on the local disk, while a variant of the input is created and delayed according to the specified duration.


The duration of the delayed stream should be less or equal to the time shifted stream.

➔ **To Add a Delayed Stream**

1. Click the **Inputs** tab at the top of the ZiXi Broadcaster administrative screen.
2. Click **New Input** on the upper right hand side of the screen. The **Add a new input stream** window is displayed.
3. Select **Source**.
4. Set the Delay (up to the time shift delay that was set).
4. Click **OK**.

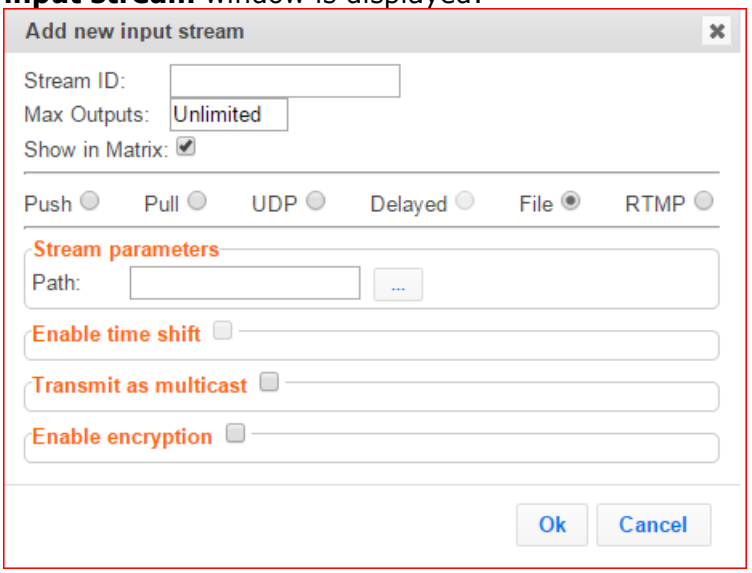
5.5 Adding a File Stream

This creates a file input for the broadcaster from a local or mounted disk and subsequently streams it to the end-user.

➔ **To Add a File Stream:**

1. Click the **Inputs** tab at the top of the ZiXi Broadcaster administrative screen.

2. Click **New Input** on the upper right hand side of the screen. The **Add a new input stream** window is displayed:



3. Enter the unique **Stream I.D.**

> Note this must be identical (case sensitive) to the stream name configured in the ZiXi Feeder.

4. Select the maximum concurrent connections to this stream from the **Max. Outputs** drop-down list. Default: Unlimited.
5. Select the **Show in Matrix** check box to display this stream in the Matrix (see **Using the Matrix** on page 60). Default: Selected.
6. Select **File** for the input stream.
7. Specify the **Stream Parameters** (see table below for additional parameters).
8. If you want to **Enable time shift**, select this checkbox (see table below for additional parameter).
9. If you want to **Transmit as multicast**, select this checkbox (see table below for additional parameter).
10. If you want to **Enable encryption**, select this checkbox (see table below for additional parameters).
11. Click **OK**.
    The "Input added" message appears on the top of the screen. The Push Stream from the ZiXi Feeder is added to the ZiXi Broadcaster and now appears in the list of streams available in the ZiXi Broadcaster inputs UI.

Parameter	Description
Stream ID	Specifies the unique identifier for this stream.

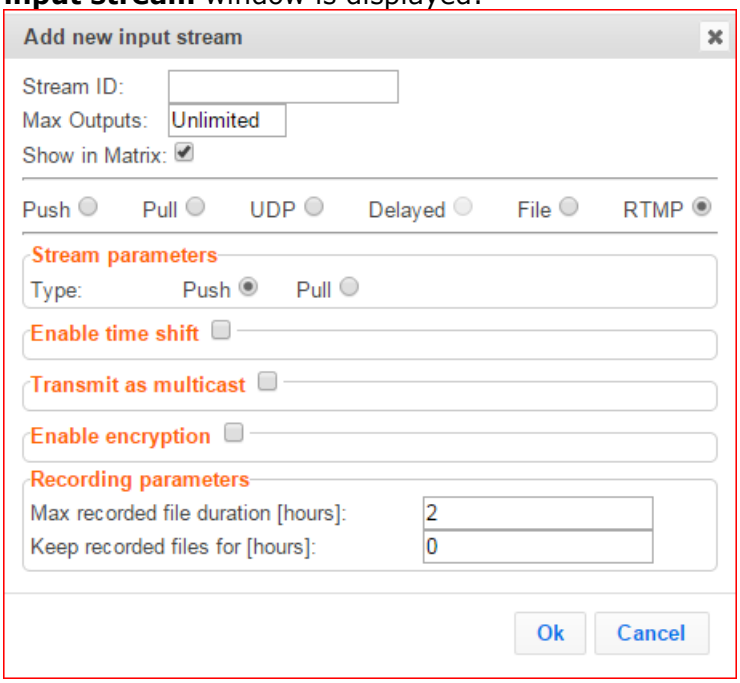
Parameter	Description
Max Outputs	Specifies the maximum number of allowed outputs. Default: Unlimited.
Show in Matrix	Show input in Matrix.
Stream Parameters	
Path	Type the local or mounted (Linux) disk or click the adjacent browse button to select the desired one. The suffix .ts indicates a transmitted stream.
Transmit as multicast	If desired, select the checkbox to transmit as a multicast.
Multicast Only	If desired, specify force multicast-only outputs. A ZiXi receiver will receive it in multicast (unless it is out of the LAN in which case it will relay in as unicast). You can also force Multicast only outputs.
Enable Encryption	
Encryption type	Select the type of Encryption from the drop-down list. Automatic will produce the Encryption key for you.
Encryption key	The generated encrypted key which must be sent to the end-user to decipher the received encoded stream.

5.6 Adding an RTPM Stream

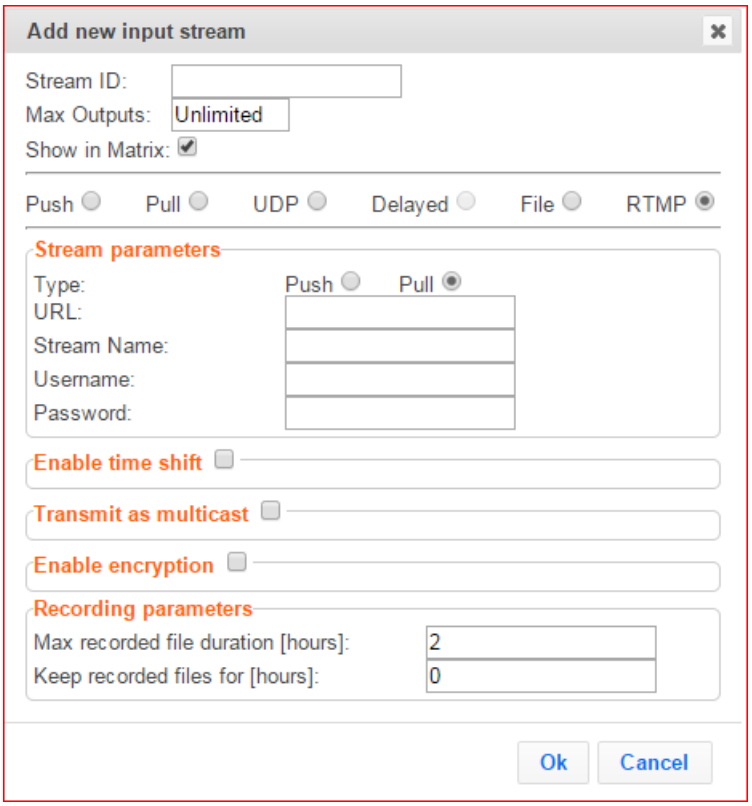
This enables you to create a Push or Pull RTPM input stream.

➔ **To Add a RTPM Stream:**

1. Click the **Inputs** tab at the top of the ZiXi Broadcaster administrative screen.
2. Click **New Input** on the upper right hand side of the screen. The **Add a new input stream** window is displayed:



Adding an RTPM Stream



3. Enter the unique **Stream I.D.**

> Note this must be identical (case sensitive) to the stream name configured in the ZiXi Feeder.

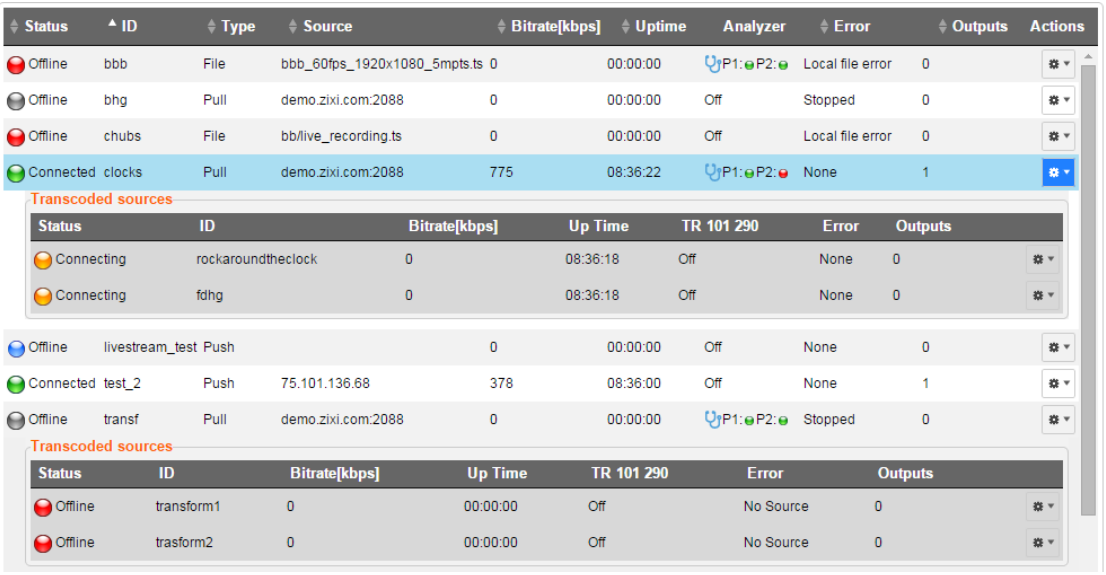
4. Select the maximum concurrent connections to this stream from the **Max. Outputs** drop-down list. Default: Unlimited.
5. Select the **Show in Matrix** check box to display this stream in the Matrix (see **Using the Matrix** on page 60). Default: Selected.
6. Select **RTMP** for the input stream.
7. Specify the **Stream Parameters** (see table below for additional parameters).
8. If you want to **Enable time shift**, select this checkbox (see table below for additional parameter).
9. If you want to **Transmit as multicast**, select this checkbox (see table below for additional parameter).
10. If you want to **Enable encryption** , select this checkbox (see table below for additional parameters).
11. If you want to configure the **Recording Parameters**, specify them in the respective fields (see table below for additional parameters).
12. Click **OK**.
    The "Input added" message appears on the top of the screen. The RTMP Stream is added to the ZiXi Broadcaster and now appears in the list of streams available in the ZiXi Broadcaster inputs UI.

Parameter	Description
Stream ID	Specify the unique identifier for this stream.
Max Outputs	Specify the maximum number of allowed outputs. Default: Unlimited.
Show in Matrix	Select the checkbox to show the stream in the Matrix.
Stream Parameters	
Type	Select the desired type for the RTMP stream: Push – the stream is pushed to the ZiXi Broadcaster (not initiated by the ZiXi Broadcaster) Pull – ZiXi Broadcaster will initiate the stream by accessing it through the following parameters:
URL	Type the Stream URL from which the ZiXi Broadcaster will access.
Stream Name	Type the unique name for the stream that has been defined in the RTMP server.
User Name	Specify the User name to authenticate on the remote RTMP server
Password	Specify the string that is used for authorization on the remote RTMP server.
Enable time shift	
Maximum delay [hh:mm:ss]	Specify the maximum time delay of this input.
Transmit as multicast	Enables transmission of this stream's outputs as multicasts. A ZiXi receiver will receive it in multicast (unless it is out of the LAN in which case it will relay in as unicast). You can also force Multicast only outputs.
Multicast Only	Select the check box to force only Multicast outputs.
Encryption Parameters	
Encryption type	Specify the type of Encryption. Automatic will generate the Encryption key for you.
Encryption key	Displays the generated encrypted key which must be sent to the end-user to decipher the received encoded stream.
Recording Parameters	
Max recorded file duration [hours]	Specifies the maximum time allotted for recording a video stream. Default: 2 hours

Parameter	Description
Keep recorded files for [hours]	Specifies the maximum time for storing the recording.

5.7 Viewing Existing Input Streams

The **Inputs** screen displays all the input streams that have been created. At the bottom of the screen you can also view accumulative utilization statistics for any connected streams selected. Hovering the cursor on the status indicator of a stream will provide you with the stream configuration information and basic utilization statistics, where applicable.



Any of the columns in the following table can be sorted in ascending/descending order by clicking on its heading. The Search text box in the upper left hand side of the screen can be used to search for a specific input stream by entering the desired Stream ID.

Field	Description
Status	Displays the status of input stream. The following colored indicators are displayed: • Green = Connected • Yellow = Connecting • Red = Disconnected with an error condition • Blue = Offline with no connection attempts • Grey = Offline and stopped
ID	Displays the unique ID of the stream, as defined in the ZiXi Broadcaster.
Type	Displays the type of input stream.

Field	Description
Source	Displays the source host and port number.
Bitrate [kbps]	Displays bitrate of the connected input stream.
Uptime	Displays the amount of time the stream has been active.
Analyzer	Displays if the Analyzer is active and the streams that are being analyzed according to the TR101 protocol. **P1** and **P2** are error priorities.
Error	Displays connection and transmission errors.
Outputs	Displays the amount of outputs currently configured for this input stream.
Actions	Provides access to various actions to be performed on this input stream (see Performing Actions on Input Streams below).

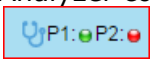
5.8 Performing Actions on Input Streams

5.8.1 Adding Analysis to the Input Stream

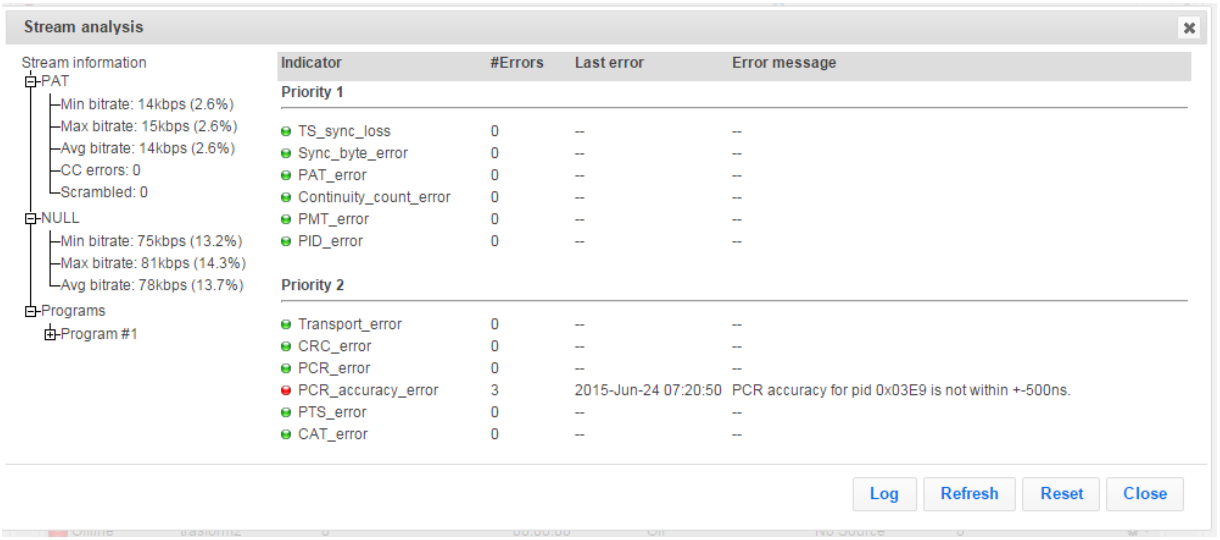
You can add a TR101 analysis of the stream. The analysis displays cumulative P1 and P2 errors.

➔ **To Add Analysis to the Input Stream:**

1. On the **Inputs** page of ZiXi Broadcaster, click the stream for which you want to analyze from the input streams UI.
2. Click  button on the right end of the selected row and then select **Analyze**. The statuses of a **P1** (high priority error) and **P2** (low priority error) are indicated by an adjacent green or red button displayed in the Analyzer column.

   You can view the detailed analysis by clicking on the adjacent 

   statoscope icon. The Stream Analysis screen is displayed



The following can be done from the **Stream Analysis** screen:

- **Log**- start sending the events of this stream to the event log ('stop logging' will stop the reporting of events).
- **Refresh** – refreshes the data that is displayed.
- **Reset** – resets all the field's values to zero.

On the left-hand side of the screen is a stream information tree that displays accumulative statistics regarding the stream. Click the + icons to expand the tree.

3. Clicking **Stop Analysis** will discontinue the action.

5.8.2 Recording the Input Stream

You can record an input stream, and store it as .TS file. The duration of the time the recording will be kept on the server is defined in the Input Stream configuration.

➔ **To Record the Input Stream:**

1. On the **Inputs** page of ZiXi Broadcaster, click the desired row of the stream for which you want to record.
2. Click  button on the selected row and then choose **Record**. A small red dot appears in the green circle at the left-hand side of the selected row indicating that the input stream is being recorded.
   Clicking **Stop Recording** will stop the recording of the Input Stream and the newly recorded file will appear in the designated file directory in the **Files** page.

5.8.3 Stopping/Starting the Incoming Stream

If the input stream has been configured as Pull, you can start or stop the incoming stream at any time.

➔ **To Stop/Start the Incoming Stream:**

1. On the **Inputs** page of ZiXi Broadcaster, click the desired row of the incoming stream that you want to stop.
2. Click  button on the right end of the selected row and then **Stop**. The selected row which was a Connected Incoming Stream is no longer displayed and appears below as **Offline**.
   To continue the Incoming Stream click **Start** from the same menu.

5.8.4 Deleting an Input Stream from Broadcaster

➔ **To Delete an Input Stream from Broadcaster:**

1. On the **Inputs** page of ZiXi Broadcaster, click the desired incoming stream that you want to stop.
2. Click  button on the right end of the selected row and then **Delete**. The selected row which was a Connected Incoming Stream will be deleted.

5.8.5 Editing Input Settings or Duplicating an Input Stream

➔ **To Edit the Configuration of an Input Stream:**

1. On the **Inputs** page of ZiXi Broadcaster, click the desired row of the incoming stream that you want to edit.
2. Click  button on the right end of the selected row and then **Edit**. The Edit input stream name window is displayed. You can modify any of the settings.
3. Click **OK**. The new settings will take effect.

➔ **To Duplicate the Configuration of an Input Stream:**

1. On the **Inputs** page of ZiXi Broadcaster, click the desired row of the incoming stream that you want to duplicate.
2. Click  button on the right end of the selected row and then **Duplicate**. The **Duplicate *input stream name*** window with the settings of the original input stream is displayed. You can modify any of these settings.
3. Click **OK**. The duplicate input stream with its new settings will be created.

5.8.6 Transcoding an Input Stream

ZiXi Broadcaster offers live transcoding, enabling users to create multiple bitrate streams from a single input stream.

Supported Video and Audio formats include:

- Video(decoding): MPEG2, H.264

- Video(encoding): H.264
- Audio(decoding): MPEG1 layers I/II/III (MP3), AAC
- Audio(encoding): AAC, AC3(pass-through)

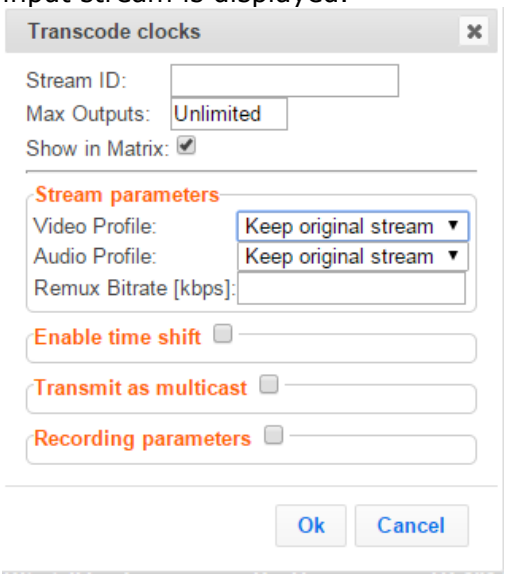
The transcoder comes with pre-set common video profiles:

1080i60 / 1080i59.94, 1080p30 / 1080p25, 720p60, 720p50 / 720p30, 576i60 / 576p25, 480i60 / 480p29.97

In order to transcode an input stream from the Inputs screen you must first configure the transcoding profiles in the **Transcoder** screen. For more information, see Transcoder section below.

➔ **To Transcode an Input Stream:**

1. On the **Inputs** page of ZiXi Broadcaster, click the incoming stream that you want to transcode.
2. Click  button on the right end of the selected row and then **Transcode**. The **Transcode <*input stream name*>** window with the settings of the selected input stream is displayed.



3. Enter the unique **Stream I.D.**, which will correspond to the new transcoded input that will be added.
4. Under **Stream Parameters**, select the desired **Video Profile** and the desired **Audio Profile**. If you have not configured a video or audio profile you can select **Keep original stream**. In this case the video or audio input will not be transcoded.
5. Click **OK**.
   The transcoded input stream is created and appears in an embedded window labeled **Transcoded sources** under the original input stream from which it was created.

5.8.7 Playing an Input Stream with Players

You can preview the input streams through the following video players:

- VLC Player
- Flash Player
- Shoutcast

In order to preview an input stream you must first configure its output. See Creating an Output section for more details.

➔ **To Play an Input Stream with a VLC Player:**

1. On the Inputs page of ZiXi Broadcaster, click the incoming stream that you want to play with VLC.
2. Click  button on the right end of the selected row and then **Play with VLC.** The **Link Description** window with the directory path for the desired file is displayed.
3. Click **Run VLC.** The selected file is downloaded to the computer.
4. Double-click on the newly downloaded file. This configured file runs using the VLC player and appears on a new output line on the **Output** screen wherein it can be monitored.

   Alternatively, copy the path and send it to the user so it can be entered in the Network URL of the VLC player.

➔ **To Play an Incoming Stream with a Flash Player:**

Enables playing the stream on a native browser with the Flash player.

1. On the **Inputs** page of ZiXi Broadcaster, click the row of the incoming stream that you want to play with VLC.
2. Click  button on the right end of the selected row and then **Play with Flash.** The **Link Description** window with the directory path and proxy path for the desired file is displayed.
3. Click **Run** to view the .flv file that appears on the first line of the window or **Run Accelerated** to run the file from the proxy server with better results.

➔ **To Play an Input Stream with a Shoutcast:**

Enables playing an audio file on a native browser.

1. On the **Inputs** page of ZiXi Broadcaster, click the row of the incoming stream that you want to play with VLC.
2. Click  button on the right end of the selected row and then **Play with Shoutcast.** The **Link Description** window will open with the directory path for the desired file.

5.8.8 Add Output

This is an alternative method (shortcut) to adding an output to a specific input stream instead of configuring it through the **Outputs** screen. The four available types of ZiXi Broadcaster output streams are:

UDP – Target is a UDP or RTP stream, over unicast or multicast.

RTMP – Real Time Messaging Protocol streams can be played on systems that accept this protocol as input. Originally designed to enable Adobe® Flash® streams to be sent between a server and a client, RTMP has become a popular protocol for streaming into content-delivery networks (CDNs).

Pull Stream – Pull streams are ZiXi protocol streams destined for ZiXi Receivers. In this case, the ZiXi Broadcaster can offer status and statistics for a stream that is being pulled from it by another device.

Push Stream – Push streams are ZiXi protocol streams destined for other ZiXi Broadcasters.

➔ **To Add Output:**

1. On the **Inputs** page of ZiXi Broadcaster, click the desired row of the incoming stream to which you want to add new output.
2. Click  button on the right end of the selected row and click **New Output**. The **New Output** window with the settings of the selected input stream is displayed. You can modify any of these settings.
3. Click **OK**. The **New Output** with its new settings takes effect.

5.9 Viewing Stream Statistics

You can view all the accumulative statistics for a connected input stream in real-time.

➔ **To View Stream Statistics:**

- On the **Inputs** page of ZiXi Broadcaster, click the desired incoming stream for which you want to view statistics for. The stream's statistics are displayed on the bottom of the screen.

Field	Description
Bitrate (kbps)	Displays the current bitrate of the input stream.
Uptime	Displays the amount of time the stream has been active.
Reconnections	Displays the number of reconnection attempts.
RTT (ms)	Displays the Round Trip Time (RTT) from the source (in milliseconds).
Jitter (ms)	Displays the current Jitter, measured in milliseconds.

Field	Description
Latency (ms)	Displays the stream latency configured on the source Feeder.
Total Packets	Displays the total number of packets that have been transmitted.
Packet Rate	Displays the current number of packets per second.
Packet Loss %	Displays current percentage of the packets that were dropped on route from the source.
Dropped Packets	Displays the total number of packets dropped between the Feeder and the Broadcaster since the beginning of the stream.
Recovered Packets	Displays the number of dropped packets that have been recovered since the beginning of the stream.
Non Recovered Packets	Displays the number of non-recovered packets.
FEC Packets	Displays the number of FEC packets transmitted.
FEC Recovered	Displays the number of FEC packets recovered.
ARQ Requests	Displays the number of requests for retransmission of dropped packets made with ARQ.
ARQ Recovered	Displays the number of dropped packets recovered via ARQ.
ARQ Duplicates	Displays the number of duplicate recovery packets received via ARQ.
Overflows	The number of packets lost due to buffer overflow. **Note:** Overflow is usually the result of the Max Bitrate being too low

5.10 Searching for Input Streams

➔ **To Search for an Input Stream:**

- On the **Inputs** page of ZiXi Broadcaster, type in the specific input stream name in the search text box on the left- hand top of the screen and click  . The **Input** screen displays the requested output stream(s).

6 Creating an Output

ZiXi Broadcaster supports the following output types:

- **UDP** – Target is a UDP or RTP stream, over unicast or multicast.
- **RTMP** – Real Time Messaging Protocol streams can be played on systems that accept this protocol as input. Originally designed to enable Adobe® Flash® streams to be sent between a server and a client, RTMP has become a popular protocol for streaming into content-delivery networks (CDNs).
- **Pull Stream** – Pull streams are ZiXi protocol streams destined for ZiXi Receivers. ZiXi Broadcaster can offer status and statistics for a stream that is being pulled from it by another device. **You normally do not need to set up a Pull output stream in ZiXi Broadcaster.** If your application uses ZiXi Receiver, you should configure the stream as input on ZiXi Receiver and point it to the IP address and output port (default 2077) of the ZiXi Broadcaster. ZiXi Receiver will pull the stream and automatically create the proper output definition in the ZiXi Broadcaster.
- **Push Stream** – Push streams are ZiXi protocol streams destined for other ZiXi Broadcasters and "Accept mode" ZiXi Receivers.

When ZiXi Receiver pulls a stream, a Pull stream definition is generated automatically in ZiXi Broadcaster, the stream is identified in the Name and Destination columns of ZiXi Broadcaster with the ID and IP address of the ZiXi Receiver that pulls the stream.

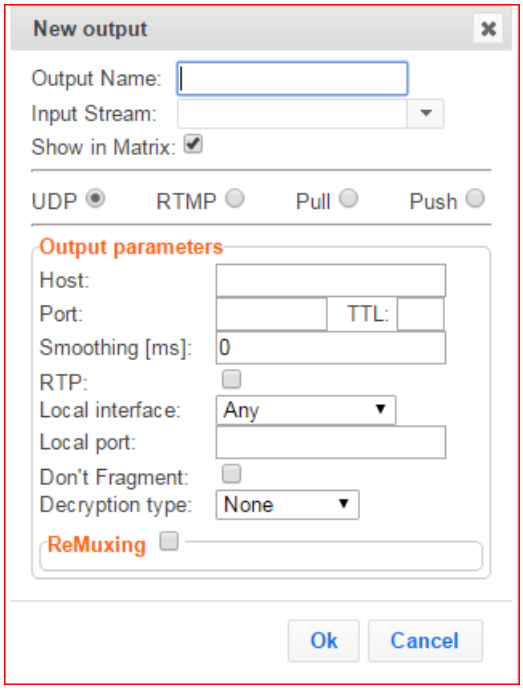
6.1 Creating a UDP Output

➔ **To Create a UDP Output:**

1. On the **Outputs** page of ZiXi Broadcaster, click 

on the upper- right end corner of the screen. The **New output** window is displayed:

Creating a UDP Output



2. Type in the unique identifier for this output in the **Output Name**.
3. Select an **Input Stream** to be made available on this output from the drop-down list.
4. Select the **Show in Matrix** check box to display this stream in the Matrix (see Using the Matrix on page 60). Default: Selected.
5. Select **UDP**.
6. Specify the **Output parameters** (see table below for additional parameters).
7. In the **Host** field, specify the IP address of the stream destination.
8. In the **Port** field, specify the port of the destination.
9. If you want to remux the stream to CBR (used for professional IRDs) in order to avoid bandwidth waste, select **Remuxing** and configure the respective parameters (see table below for additional parameters).
10. Click **OK**.
    The new UDP Output with its settings is created and now appears on the Outputs screen.

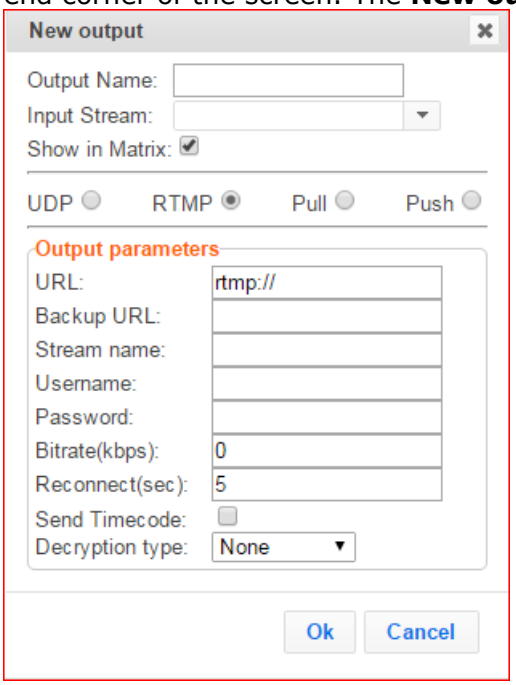
Parameter	Description
Stream ID	Specifies the unique identifier for this output stream.
Input Stream	Specifies the input stream that is associated with this output.
Show in Matrix	Enables stream to be shown in Matrix.
Output Parameters	

Parameter	Description
Host	Specifies the destination address of this output.
Port	Specifies the port to listen on.
TTL	Specifies the time-to-live (TTL). Used mainly to limit the range (or "scope") of a multicast transmission. Leaving it as blank uses the default value specified by the operating system.
Smoothing [mms]	Enables transmission of the output at the correct rate. Required when the receiving device is sensitive and can't lock on to the stream (in such a case, the recommended latency is 100 - 1000 ms).
RTP	Enables the Real-time Transport Protocol
SMPTE 2022 FEC:	Disables the FEC or specifies the type of FEC matrix to D1/ D2
Local Interface	Specifies the local IP address to use, or any one which can be sourced from any active NIC.
Local Port	Specify the local port from which to source the stream, if desired (instead of randomly chosen by the operating system).
Don't Fragment	Select this option if you do not want to fragment IP packets in a stream.
Decryption type	Specifies the type of Encryption.
Remuxing	Enables remuxing to CBR (used for professional IRDs).
Remux to bitrate [kbps]:	Specifies the CBR bitrate to target for a remuxed stream.

6.2 Creating an RTMP Output

➔ **To create an RTMP Output:**

1. On the **Outputs** page of ZiXi Broadcaster, click + New Output on the upper- right end corner of the screen. The **New output** window is displayed:



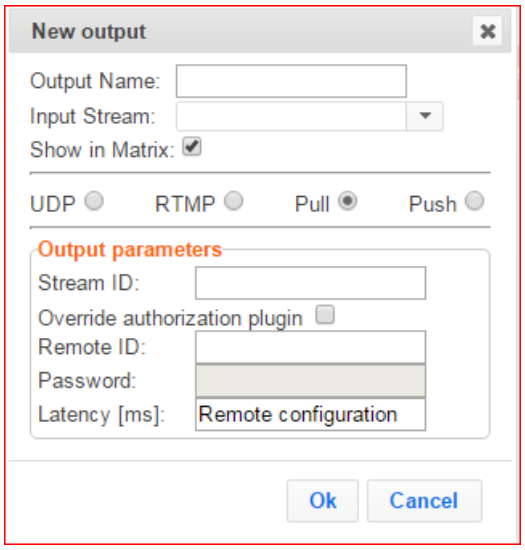
2. Type the unique identifier for this output in the **Output Name**.
3. Select an **Input Stream** to be made available on this output from the drop-down list.
4. Select the **Show in Matrix** check box to display this stream in the Matrix (see Using the Matrix on page 60). Default: Selected.
5. Select **RTMP**.
6. Specify the **Output parameters** for the RTMP receiver at the other end of the connection (see table below for additional parameters).
7. Click **OK**.
   The new RTMP Output with its settings is created and now appears on the screen.

Parameter	Description
Output Parameters	
URL	Specifies the Stream URL of the remote RTMP server.
Backup URL	Enter a backup URL (fallback mode) – will be used in case the primary server is not responsive.
Stream Name	Specifies the unique name for the stream that the RTMP server at the other end of the connection expects.
User Name	Specifies the User name to authenticate on the remote RTMP server
Password	Specifies the string that is used for authorization on the remote RTMP server.
Bitrate (kbps)	Specifies the actual bitrate or the maximum stream bitrate in case of a VBR stream.
Reconnect (sec)	If the stream drops, this value represents the time between reconnection attempts (in seconds)Default: 5.
Send Timecode	Converts the MPEG-TS SEI section to RTMP ONFI command (pass the encoder timecodes to the RTMP server)
Decryption type	Specifies the type of key used to decipher the encrypted output stream.

6.3 Creating a Pull Output

➔ **To Create a Pull Output:**

1. On the **Outputs** page of ZiXi Broadcaster, click + New Output on the upper- right end corner of the screen. The **New Output** window is displayed:



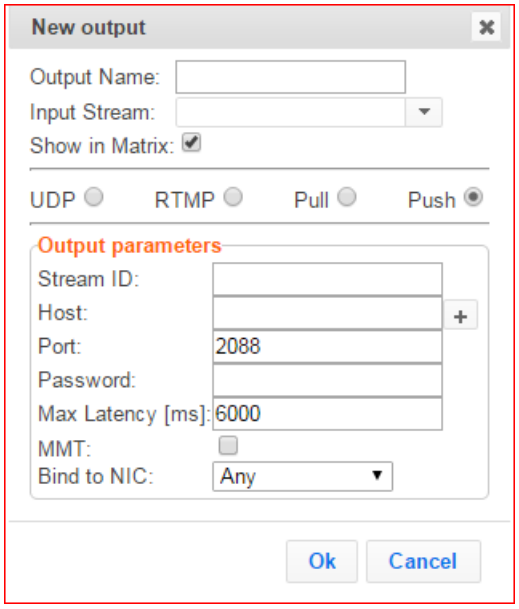
2. Type in the unique identifier for this output in the **Output Name**.
3. Select an **Input Stream** to be made available on this output from the adjacent drop-down list.
4. Select the **Show in Matrix** check box to display this stream in the Matrix (see **Using the Matrix** on page 60). Default: Selected.
5. Select **Pull**.
6. Enter the **Output Parameters** (see table below for additional parameters).
7. Click **OK**.
   The new Pull Output with its settings is created and now appears on the screen.

Parameter	Description
Output Parameters	
Stream ID	Specify the unique Stream ID that the remote receiver expects (recommended – identical to 'Input Stream').
Remote ID	Specifies the Receiver ID that allowed to pull that stream.
Password	Specifies a string that can be used to authenticate that the ZiXi Receiver is authorized to pull this stream (Optional).
Latency [ms]	Specify the buffer size that ZiXi Broadcaster is keeping for error correction. For example, 6000 milliseconds would ensure that the stream is protected for six seconds of errors in the network. Default: Remote configuration. Remote configuration – use the latency configured in the Receiver. Otherwise use a value to override the value configured in the Receiver.

6.4 Creating a Push Output

➔ **To Create a Push Output:**

1. On the **Outputs** page of ZiXi Broadcaster, click + New Output on the upper- right end corner of the screen. The **New Output** window is displayed:

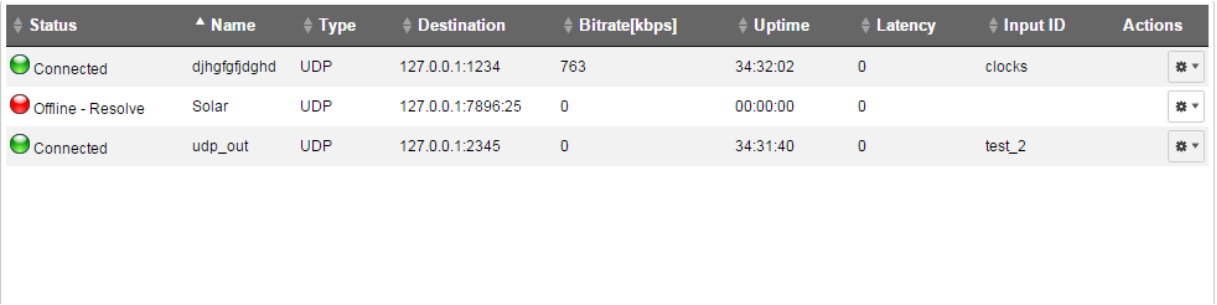


2. Type in the unique identifier for this output in the **Output Name**.
3. Select an **Input Stream** to be made available on this output from the adjacent drop-down list.
4. Select the **Show in Matrix** check box to display this stream in the Matrix (see **Using the Matrix** on page 60). Default: Selected.
5. Select **Push**.
6. Enter the **Output Parameters** (see table below for additional parameters).
7. Click **OK**. The new Push Output with its settings is created and now appears on the screen.

Parameter	Description
Output Parameters	
Stream ID	Specify the unique Stream ID that the remote ZiXi Broadcaster expects.
Host	The destination host for the push stream. Note that additional failover destinations can be added by clicking the adjacent "**+**" button.
Port	Specify the ports to listen on for Push streams. Default: 2088.
Password	Optional - Specifies a string to be used ~~to authenticate~~ at the receiving ZiXi Broadcaster to authenticate that the pushing Broadcaster is allowed to push this stream.
Max Latency [ms]	Specify the buffer size that ZiXi Broadcaster is keeping for error correction. For example, 6000 milliseconds would ensure that the stream is protected for six seconds of errors in the network. Default:6000
Bind to NIC	Select a local IP address to use, or **Any** IP address if it can be sourced from any active NIC

6.5 Viewing Existing Outputs

The **Outputs** screen displays all the output streams that have been created. At the bottom of the screen you can also view cumulative utilization statistics for the selected connected streams. Hovering the cursor on the status indicator of a stream will provide you with the stream configuration information and basic utilization statistics, where applicable.



Any of the columns in the following table can be sorted in ascending/descending order by clicking on its heading. The **Search** text box in the upper left hand side of the screen can be used to search for a specific input stream by entering the desired Stream ID.

Field	Description
Status	Displays the status of output stream. The following colored indicators are displayed: • Green = Connected • Yellow = Connecting • Red = Disconnected with an error condition • Blue = Offline with no connection attempts • Grey = Offline and stopped
Name	Displays the name of the output stream, as defined in the ZiXi Broadcaster.
Type	Displays the type of output stream.
Destination	Displays the IP address of the host that will be receiving the stream.
Bitrate [kbps]	Displays bitrate of the connected output stream.
Uptime	Displays the amount of time the stream has been active.
Latency	Displays the configured latency
Input ID	The ID of the related Input stream.

Field	Description
Actions	Provides access to various actions to be performed on this ouput stream (see Performing Actions on Output Streams below).

6.6 Searching for Output Streams

➔ **To Search for an Output Stream:**

- On the **Outputs** page of ZiXi Broadcaster, type in the specific output stream name in the search text box on the left- hand top of the screen and click  . The **Output** screen displays the requested output stream(s).

6.7 Performing Actions on Output Streams

6.7.1 Stopping/Starting an Output Stream

➔ **To Stop/Start an Output Stream:**

1. On the **Outputs** page of ZiXi Broadcaster, click  in the far- right column labeled **Actions**. The list of actions is displayed.
2. Click **Stop** to the selected stream.
   Clicking **Start** will reactivate the stream.

6.7.2 Editing or Duplicating an Output Stream

➔ **To edit an Output Stream:**

1. On the **Outputs** page of ZiXi Broadcaster, click  in the far- right column labeled Actions. The list of actions is displayed.
2. Click **Edit**. The Edit output window with selected streams settings is displayed.
3. Modify any of the fields according to your needs and click **OK**. The new settings are immediately effective.

➔ **To Duplicate an Output Stream:**

1. On the **Outputs** page of ZiXi Broadcaster, click  in the far- right column labeled Actions of the output stream you want to copy. The list of actions is displayed.
2. Click **Duplicate** to the selected stream. The Edit output window with the original's output stream settings is displayed.

3. Modify any of the fields according to your needs and click **OK**. A new output stream has been created and appears on the screen.

6.7.3 Deleting an Output Stream from Broadcaster

➔ **To Delete an Output Stream from the Broadcaster:**

1. On the **Outputs** page of ZiXi Broadcaster, click  in the far- right column labeled **Actions** of the output stream you want to delete. The list of actions is displayed.
2. Click **Delete** to the selected stream. The selected input stream was deleted and is not displayed anymore.

6.7.4 Switching Input

➔ **To Switch Input:**

1. On the **Outputs** page of ZiXi Broadcaster, click  in the far- right column labeled **Actions** of the stream you want to switch input. The list of actions is displayed.
2. Click **Switch Input** to change the input associated with the selected output. The **Switch source** window is displayed.
3. From the **New Input** field, select the desired input from an adjacent drop-down list.
4. Click **OK**. The newly designated input is now associated with the selected output.

7 Viewing Status

The **Status** screen displays aggregated statistics on all the input and output streams and a graph representing the network utilization of active streams over time.

➔ **To View the Status of the Streams:**

On the **Status** page of ZiXi Broadcaster, the **General** information, **Network Status** and **License Information** is displayed.

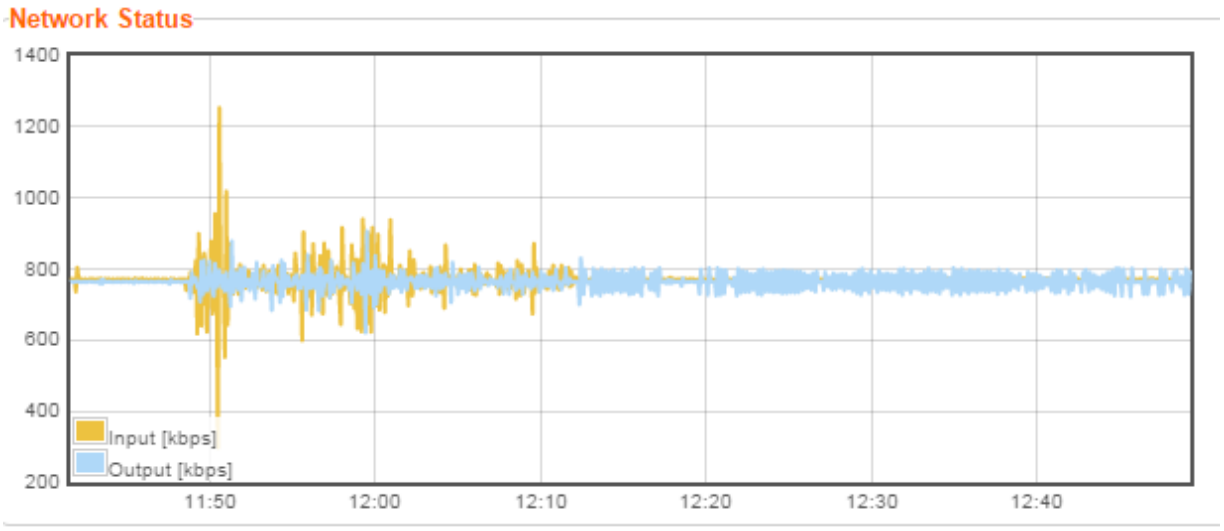
7.1 General Status

General	
ID	The ZiXi Broadcaster ID number
Host ID	Displays the ID of ZiXi Broadcaster host.
Start Time	Displays the time that the ZiXi Broadcast began to actively stream content.
Up Time	The duration of time that the broadcast is running.
Inputs	The number of current active inputs
Outputs	The number of current active outputs
Remote In [kbps]	The current aggregate input bitrate from remote sources – ZiXi Push/Pull (in Kbps)
Local In [kbps]	The current aggregate input bitrate from local sources – UDP streams (in Kbps)
Remote Out [kbps]	The current aggregate output bitrate to remote destinations (in Kbps)
Local Out [kbps]	The current aggregate output bitrate to local destinations (in Kbps)
Http Out [kbps]	The current aggregate output bitrate for HTTP streams - FLV/RTMP/HLS/HDS (in Kbps)
kBytes Sent	The cumulative traffic transmitted (in Kbps)
kBytes Received	The cumulative traffic received (in Kbps)

7.2 Network Status

The network status graph displays the total input/output bitrate during the last hour. The changes in the amplitude of both the input (gold) and output (blue) presented in 10 minute intervals.

Network Status



8 Configuring VOD

This feature enables you to upload stream-able (.ts and mp4) files to the server or alternatively make a previously recorded input stream available on demand (VOD). The Broadcaster creates a unique URL for each file.

➔ **To Configure the VOD:**

1. From the **Settings** page, click **File Transfer & VOD**. The **File Transfer & VOD** settings pane is displayed.
2. Confirm the default settings (selected) for VOD.
   Clear the default setting for VOD to disable VOD.

9 Transcoder

ZiXi Broadcaster offers live transcoding, enabling users to create multiple bitrate streams from a single input stream. The transcoding converts the video and audio live streams to a variety of profiles and bitrates.

It is typically employed in the following cases:

- Where a target device does not support the format
- Where a target has limited storage capacity that requires a reduced file size
- To convert incompatible obsolete data to a better-supported or modern format.
- You can add video (H.264) and audio (AAC) profiles.

9.1 Creating a New Profile

In order that the Broadcaster can switch from one encoding into another, different profiles must be configured first.

Supported Video and Audio formats include:

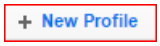
- Video(decoding): MPEG2, H.264
- Video(encoding): H.264
- Audio(decoding): MPEG1 layers I/II/III (MP3), AAC
- Audio(encoding): AAC, AC3(pass-through)

The transcoder comes with the following pre-set common video profiles:

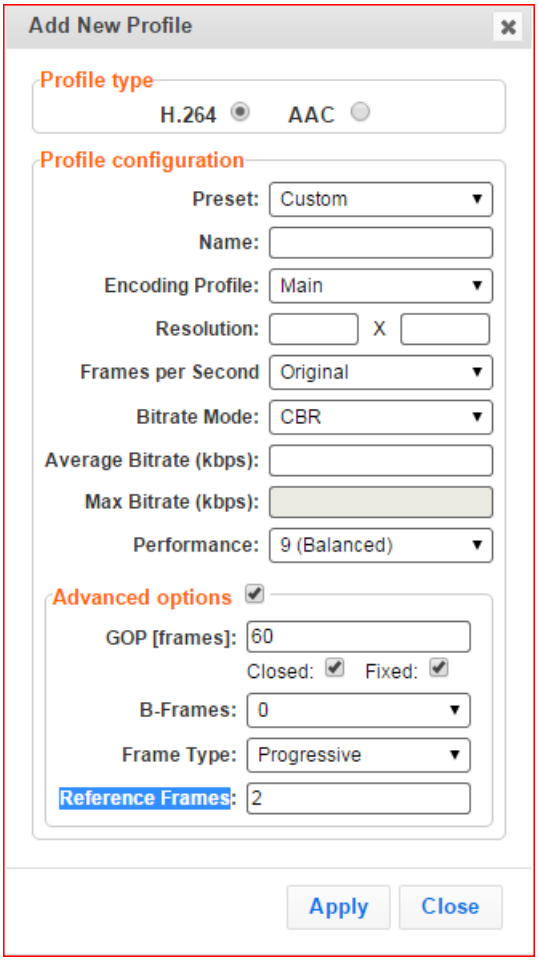
1080i60 / 1080i59.94, 1080p30 / 1080p25, 720p60, 720p50 / 720p30, 576i60 / 576p25, 480i60 / 480p29.97

However you can define your own custom profiles.

➔ **To Create a New Profile:**

1. From the **Transcoder** page, click 

on the upper right-hand corner of the screen. The **Add New Profile** window is displayed:



2. Select the desired **Profile type -** H.264 for video profile and AAC for audio profile.
3. Enter in the desired fields in the **Profile configuration** (see table below for additional parameters).
   Selecting a specific configured **Preset** will fill in the settings automatically or alternatively leaving the default as **Custom** requires you to configure it by yourself.
4. If you want to configure the **Advanced options** for the H.264 profile, select **Advanced options** and fill out the respective fields (see table below for additional parameters).
5. Click **Apply**.
   The newly configured profile is created and appears on the screen.

Parameter	Description
Profile configuration	
Preset	Displays list of preset configured profiles. Default: Custom

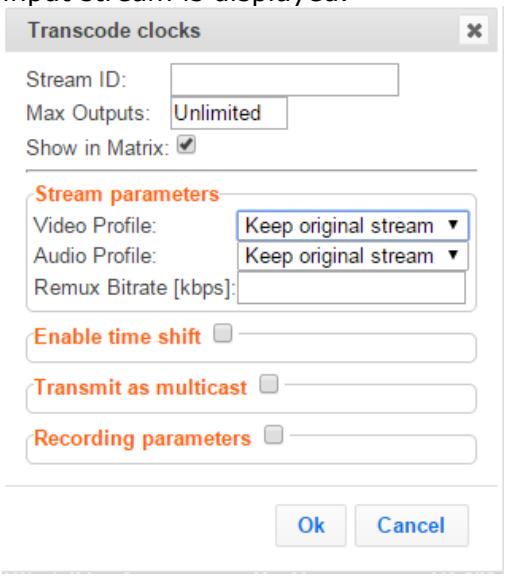
Parameter	Description
Name	Enter a unique name for the profile.
Encoding Profile	**For H.264:** High / Main / Baseline Default: Main **For AAC:** AAC Low Complexity **/** AAC High Complexity 1 **/** AAC High Complexity 2 Default: AAC Low Complexity
Resolution	The new resolution, if resizing the video.
Frames per Second	Select a new frame rate, or select **Original** to use the original frame rate of the stream. Default: Original
Bitrate Mode	Specifies the bitrate mode for the profile. Either the transcoder will strive for the optimum in VBR (Variable Bitrate) or the most constant in CBR (Constant Bitrate). Default: CBR
Average Bitrate (kbps)	Specifies the average bitrate for the profile.
Max Bitrate (kbps)	Specifies the maximum bitrate for the profile.
Performance	the performance of the transcoding will span between ***Fastest*** and the ***Best*** Quality with ***Balance*** in the middle. Default: 9 (Balanced)
Advanced Options	
GOP [frames]	Specifies the number of frames in a **GOP** (Group of Pictures). Default:60
	Default settings: **Closed**, **Fixed**
B-Frames	Specifies the maximal number of consecutive B frames in the **GOP**. Default:0
Frame Type	Specifies the frame type – progressive or interlaced. Default: Progressive
Reference Frames	Specifies the number of frames that can be referenced for each frame. Default: 2

9.2 Transcoding an Input Stream

Once you have created the profile, you can use it to transcode an input stream.

➔ **To Transcode an Input Stream:**

1. On the **Inputs** page of ZiXi Broadcaster, click the desired row of the incoming stream that you want to transcode.
2. Click  button on the right end of the selected row and then **Transcode**. The **Transcode <*input stream name*>** window with the settings of the selected input stream is displayed.



6. Enter the unique **Stream I.D.** for the new transcoded input stream.
7. Under **Stream Parameters**, select the desired **Video Profile** and/or **Audio Profile** that you have configured. If you have not configured a video or audio profile you can select **Keep original stream**. In this case the video or audio input will not be transcoded.
8. Click **OK**.
   The transcoded input stream is created and appears in an embedded window labeled **Transcoded sources** under the original input stream from which it was created.

10 Adaptive Groups

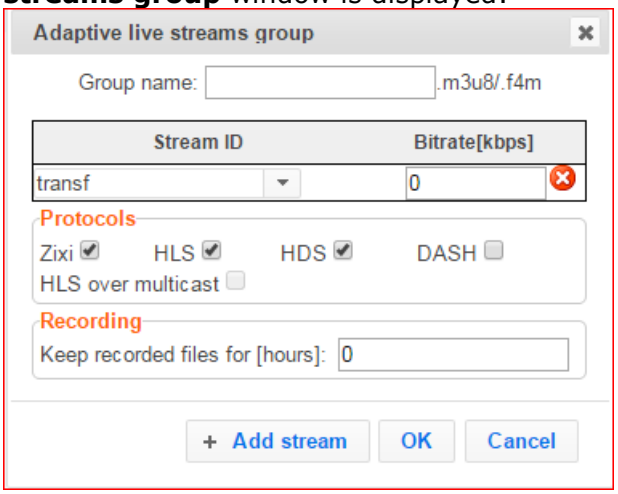
ZiXi Broadcaster features the ability to create multiple bitrate profiles for a single input stream and set it as an adaptive group that can be used by a supporting client. The client will automatically switch between the various bitrate profiles of the stream according to the network conditions during playback.
After creating a group with different bitrates you can test them all out by playing them with the different 3rd party players (via the  Actions menu).

10.1 Creating a New Adaptive Group

➔ **To Create a New Adaptive Group:**

1. Click the **Adaptive** tab at the top of the ZiXi Broadcaster administrative screen.

2. Click **Add Group** on the upper right hand side of the screen. **The Adaptive live streams group** window is displayed:



3. Enter in the unique string for the **Group name** field.

4. Select a stream from the drop-down list for which you would like to create an adaptive bitrate.

5. Enter the desired **Bitrate[kbps]** for that stream in the adjacent field to Stream ID.

6. Click  for as many streams as you want to include in the group and repeat steps 4 and 5 for every stream that is added to the group.

7. Select the **Protocols** with which these streams will be transmitted.
8. Specify the duration of time to **Keep recorded files for [hours]**.

9. Click **OK**.
The new Adaptive Group was created and appears on the Adaptive screen.

Parameter	Description
Group Name	Specifies the unique identifier for this group.
Stream ID	Specifies the unique name for the stream.
Bitrate [kbps]	Specifies the bitrate for selected stream.
Protocols	
	ZiXi, HLS, HDS, DASH, HLS over multicast
Recording	
Keep recorded files for [hours]	Specifies the maximum time for storing the recording. Default: 0 hours

10.2 Adding Streams to an Adaptive Group

You can add additional streams to a pre-existing group.

➔ To Add Streams to an Adaptive Group:

1. Click the **Adaptive** tab at the top of the ZiXi Broadcaster administrative screen.
2. Select the Group to which you want to add a stream.
3. Click  button on the right end of the selected row and then **Edit**. The **Adaptive live streams group** window is displayed.
4. Click 

for as many streams as you want to include in the group. This adds another Stream row in the above table to which a desired **Bitrate** must be specified.
Clicking on the red X on the end of any of the stream lines will delete that stream from the group.
5. Click **OK**. The group has been modified accordingly.

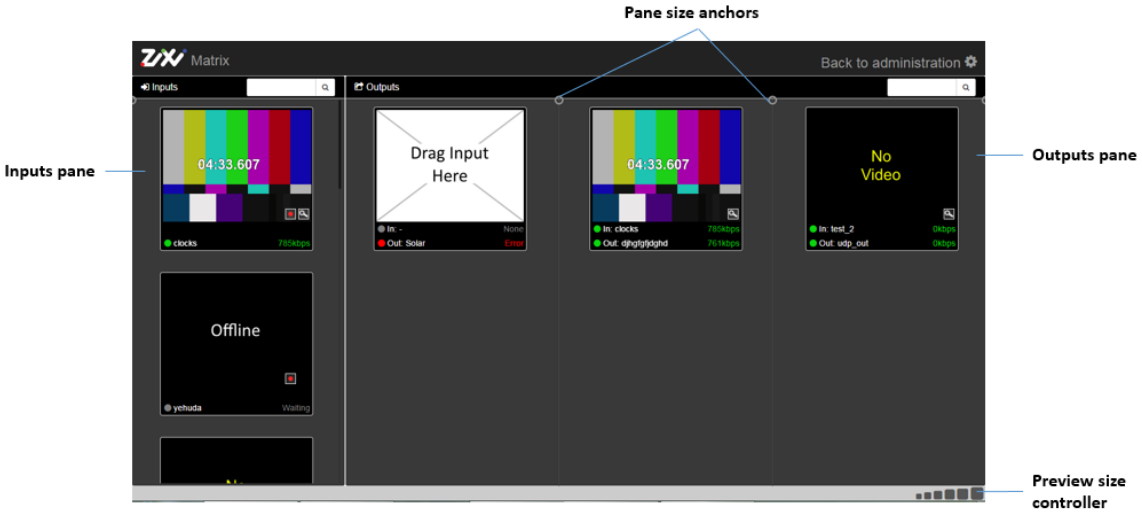
11 Using the Matrix

The ZiXi Matrix view provides a visual-based alternative to managing the streams, by previewing the input and output streams with their current status. Matrix offers drag and drop capabilities to connect input streams to outputs as well as some of the actions that were covered in the Performing Actions on Input Streams and Performing Actions on Output Streams sections above..

11.1 Matrix Interface Elements

The Matrix view displays preview thumbnails of the Input and Output streams. Preview thumbnails of input streams are presented in the **Inputs pane** and preview thumbnails of output streams are presented in the **Outputs pane**.

- If the stream is active - the live video will be shown in the preview thumbnail.
- If an input stream is not active – the preview thumbnail will include an "Offline" message.
- If an output stream has been created, but has not been connected to an input – the preview thumbnail will include the following message - "Drag Input Here".
- If a connected output stream does not receive a live stream - the preview thumbnail will include a "No Video" message



11.1.1 Changing Matrix View

You can modify the size of the panes, the size of the preview thumbnails, and re-arrange the order the preview thumbnails.

➔ **To modify the size of the panes:**

- Click on one of the rounded **pane size anchors** (see screenshot above)

➔ **To modify the size of the preview thumbnails:**

- Click on one of the sizes in the **preview size controller** (see screenshot above).

➔ **To re-arrange the order the preview thumbnails:**

- Drag and drop the preview thumbnail to the desired position within the pane.

11.1.2 Searching for Specific Streams

➔ **To Search for a Specific Stream:**

- Type in the specific stream name in the appropriate (Input or Output) search text box on the top of the console and click  .
  The relevant stream will be the only one to be displayed in the pane.

11.2 Preview Thumbnail Elements

The preview thumbnail includes the following elements:

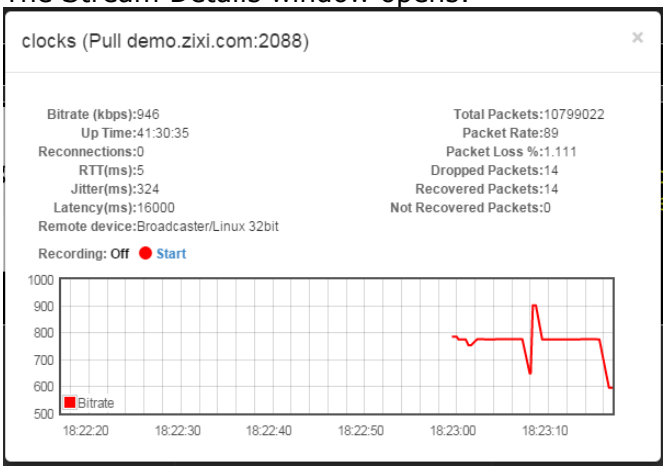
Element	Description	Action
Status Indicator	Displays the unique identifier for this group.	
Stream ID	Displays the unique name for the stream.	
Bitrate [kbps]	Displays the bitrate of the active stream.	

Element	Description	Action
Uptime	Displays the amount of time the stream has been active.	
Record	Stream recording	Click the record button to start recording. Click again to stop recording
Zoom	Opens the stream in a larger preview window with sound	Click the Zoom icon to open the larger preview screen.

11.2.1 Viewing Stream Details

➔ **To View Stream Details:**

- Click anywhere on the preview thumbnail.
  The Stream Details window opens:



11.3 Connecting Input to Output

An easier method of connecting inputs to outputs.

➔ **To Connect an Input to an Output:**

- Drag the desired input thumbnail and drop it over a specific output thumbnail.
  The desired input is connected to the selected output.

11.4 Disconnecting Output from Input

➔ **To Disconnect an Input to an Output:**

1. Click on the connected stream that you want to disconnect. The **Input stream data** window is displayed.
2. Click **Unlink**. A confirmation window is displayed.
3. Click **Confirm**. The Output is disconnected from the Input.

12 Viewing Events Log

The Event Log screen displays all the events (errors, connections, configuration changes, analysis events etc.) that occurred in the ZiXi broadcaster. The logs can be exported as a .cvs file.

➔ **To Clear the Log:**

- From the **Event Log** screen, click **Clear** on the upper right-hand corner. The events on the log screen are deleted.

➔ **To Save the Log as a File:**

- From the **Event Log** screen, click **Save** on the upper right-hand corner. A .cvs file is created and saved to the local destination.

➔ **To Refresh the Screen:**

- From the **Event Log** screen, click **Refresh** on the upper right-hand corner. The data on the screen is updated.

13 Server Settings

ZiXi Broadcaster is pre-configured with default settings, so generally there is no need to change the server settings. However, some users may want to change specific settings to meet their specific needs.

The server setting is allowing the ability to control and configure many different configurations related to different applications like broadcast delivery, monitoring, OTT delivery, Enterprise distribution and more.

13.1 General Settings

The General Settings screen includes basic configuration parameters for the server including the server's ID, access ports, authorizations, security, and storage.

Field	Description
ID	The unique (alphanumeric) name of the ZiXi Broadcaster server. Typically: host name.
Web Server Port	The port number of the web server administration. You can configure this parameter to any legal port number which is supported by your Firewall. Default: 4444
Admin User Name	The user name of the administrator. The administrator is authorized to modify all parameters in the system as well as manage all the outputs and inputs on the server.
Admin Password	The password of the administrator.
User username	The user name of the user. The user is authorized to view all the activity of the server and switch between existing inputs and outputs, but cannot modify configurations or create new input and outputs.
User Password	The password of the user.
Enable HTTPS	Enables secure HTTPS connection to the server. Enabling HTTPS requires the relevant certificates and private keys.
HTTPS certificate uploaded	Displays whether the HTTPS certificate has been uploaded (Yes – uploaded, No – not uploaded). Click **Upload** to upload your certificate file.
HTTPS private key uploaded	Displays whether the HTTPS private key has been uploaded (Yes – uploaded, No – not uploaded). Click **Upload** to upload the private key file.
HTTPS private key passphrase	The HTTP encrypted key passphrase as defined in the HTTPS certificate. Typing in a new passphrase will override the current one.

General Settings

Field	Description
Input ports	The port that is used for Input streams. You can modify the port number and/or add additional ports by adding a "," between them. Adding additional ports may be necessary when there is a chance that the ISP will block a certain port. Default: 2088
Output ports	The port that is used for the Output streams. Displays the Output port(s). You can modify the port number and/or add additional ports by adding a "," between them. Adding additional ports may be necessary when there is a chance that the ISP will block a certain port. Default: 2077
Root folder	Displays the folder location in which VOD files will be stored. Default: /downloads/
Max. disk quota [%]	Displays the maximum disk space percentage that will be allocated for storing recordings. When the amount is exceeded, ZiXi Broadcaster will begin a rotation (deleting older content). Default: 85%

Field	Description
Limits	Configuration of thresholds for generating an alarm.
CPU [%]	The CPU utilization threshold. If this limit is exceeded, the CPU indicator at the top of the screen will appear in red, and an alarm will be generated in the event log. Default: 90
Memory [%]	The memory utilization threshold. If this limit is exceeded, the Memory indicator at the top of the screen will appear in red, and an alarm will be generated in the event log Default: 90
Input Bandwidth [kbps]	Bandwidth utilization threshold for input streams. Default: Unlimited.
Output Bandwidth [kbps]	Bandwidth utilization threshold for output streams. Default: Unlimited.

13.2 Network Settings

The Network Settings screen includes configuration parameters for the network interfaces in the physical server. There are slight differences in the settings between Linux and Window systems.

Field	Description
-eth0/-eth1/-eth2/ -eth3	NIC interface configurations. To configure the interface, click the Interface name to open additional settings.
Custom Link Settings	Select this checkbox to configure the link speed settings. If you do not select the checkbox the link speed will be unlimited.
Speed	The speed of the physical connection in MB.
Duplex	Indicates which type of duplex is in use. **Full Duplex** - concurrent sending and receiving of traffic. This is usually desirable and enabled when your computer is connected to a switch. **Half Duplex** - requires a card to only send or receive at a single point of time. When your machine is connected to a Hub, it auto-negotiates itself and uses half duplex to avoid collisions. Default: Full
Firewall filtering	IP table rules on specific NIC
Allow administration	allow web administration and SNMP only
Allow initiating connections	Allow stream creation Adding: - Push output - Pull input - RTMP output - UDP output
Allow listening to connections	Allows accepting remotely initiated connections Adding: - Push input - Pull output - RTMP push input - UDP input

Network Settings

Field	Description
Addresses	Displays the IP, Mask and Gateway addresses. Indicates if DHCP and VLAN are enabled. You can add another IP address by clicking the "+" button or edit the existing settings by clicking the < > button.
DNS servers	
Use DHCP DNS servers	Select this checkbox to enable DHCP. You can also configure the IP addresses manually.
DNS1	Specifies the address of the DNS1 server. Available only if the **Use DHCP DNS server** option is not selected.
DNS2	Specifies the address of the secondary DNS2 server. Available only if the **Use DHCP DNS server** option is not selected.

➔ **To Display the Network Statistics:**

1. From the **Settings** page of the ZiXi Broadcaster, click **Network** on the left hand side. The various Network settings are displayed.
2. Click Statistics on the right-hand side**.** The UDP statistics window is displayed.

Field	Description
####Packets received	Number of packets on network received.
####packets to unknown port received	Number of packets to unknown port on network received.
####packet receive errors	Number of packets on network which received errors.
####packets sent	Number of packets on network sent.
####SndbufErrors	Number of Sent buffer errors.

Refresh button will update the data, while **Close** will close the window.

13.3 Time

ZiXi Broadcaster can synchronize its clock by connecting to an NTP server. However you can also turn off the NTP synchronization service and set the clock manually. In the Time screen you can configure the NTP Server(s) that will be used to synchronize the clock, enable/disable the NTP service, and set the time manually.

➔ **To Manually Set the Time:**

1. From the **Settings** page of the ZiXi Broadcaster, click **Time** on the left hand side. The various NTP settings are displayed.
2. If you want to turn **Service Off**, select this checkbox. Otherwise the override will not be effective and will revert back to the same time.
3. Click **Set** on the right-hand side under **Machine Time.** The **Set machine time** window is displayed.
4. Enter in the exact time that the machine is connecting to the server and click **OK**. The machine connects to the server at the exact time that was entered.

➔ **To Configure Additional NTP Servers:**

1. From the **Settings** page of the ZiXi Broadcaster, click **Time** on the left hand side. The various NTP settings are displayed.
2. Click  on the right-hand side of the section labeled NTP Servers. The **Add NTP Server** window is displayed.
3. Enter in the Host's IP address and click **OK**. The newly defined NTP server appears in the list of NTP Servers.

13.4 SNMP

ZiXi Broadcaster can export events to a monitoring system via SNMP. You can either use version 2 in which you need the Community names or version 3 (more secure) which requires the SNMPv3 user and SNMP authentication key. By defining the SNMP access you can enable the monitoring system to query the ZiXi Broadcaster (read/write queries). Alternatively, you can configure ZiXi Broadcaster to notify the monitoring system when an event occurs, by defining the monitoring system as a "Trap Receiver".

 You must first run a script to install the SNMP service.

➔ **To Enable the SNMP Service:**

1. From the **Settings** page of the ZiXi Broadcaster, click **SNMP** on the left hand side. The various NTP settings are displayed.
2. If you want to **Enable Service On**, select this checkbox.
3. Enter in the Host's IP address and click **OK**. The newly defined NTP server appears in the list of NTP Servers.

Field	Description
Read only community name (for version 2)	Typically: Public
Read-Write community name (for version 2)	Typically: Public
SNMPv3 user	
SNMPv3 authentication key	

13.4.1 SNMP Trap Receiver

You can configure the destination for SNMP messages that will be sent from the ZiXi Broadcaster to the monitoring system.

➔ **To Add a Trap Receiver:**

1. From the **Settings** page of the ZiXi Broadcaster, click **SNMP** on the left hand side.
2. Click **+** to the right of Port on the bottom of the screen. The **Trap Receiver** window is displayed.

Field	Description
Community	The name of community for the monitoring software. Public or Private.
Host	The destination IP address of the monitoring software.
Port	Displays the destination ports used to transmit the SNMP messages to the monitoring software. Default: 162

13.5 Live Protocols

The Live Protocols screen enables the configuration of the HTTP/HTTPS/RTMP server that will broadcast the streams using live streaming protocols, particularly for adaptive streaming and internet protocols.

Field	Description
HTTP Server	
HTTP/HTTPS Server Public IP	Override the ZiXi IP (e.g. download.ZiXi.com) with a public IP.
Enable HTTP Server	Enable a non-secure connection over HTTP.
HTTP Server Port	Defines the HTTP Server Port. Default:7777
Enable HTTPS Server	Enable a secure connection over HTTPS.

Field	Description
Enable FLV	Enable the streaming via the FLV protocol.
Enable HLS	Enable the streaming via the HLS protocol.
Enable HDS	Enable the streaming via the HDS protocol.
Enable MPEG-DASH	Enable the streaming via the MPEG-DASH protocol.
Enable SHOUTcast	Enable the streaming via the SHOUTcast protocol.
HLS Chunk Duration [secs]	Configuration of the duration in seconds of HLS chunks for adaptive streaming. Typically 2- to 4-seconds long.
HLS Chunk Count	Defines how many chunks are in a playlist
HLS DVR Maximum Recording Duration [HH:MM]	Defines the maximum recording duration for HLS DVR. Default: 24 hours.

Field	Description
RTMP Server	
Enable RTMP Server	Enables ZiXi Broadcaster to handle incoming RTMP streams.
RTMP Server Port	The port through which the RTMP stream will be transmitted. Default: 1935
Allow Automatic RTMP Input	Automatically creates an RTMP input without the need to define it in the Input screen.
Allow Automatic RTMP Output	Automatically creates an RTMP output without the need to define it in the Output screen. This works in tandem with Feeder and SDK which should enable RTMP input. By enabling this option, the streams will be automatically displayed in the Output screen.

13.6 Multicast Pools

Multicast pool is a collection of multicast IP addresses which provides a multicast IP automatically when an input is being pulled out of the ZiXi Broadcaster. When multicast pools is enables you do not have to define a specific multicast IP address for every push stream. Instead you simply enable the **Multicast Only** parameter and ZiXi Broadcaster will assign the multicast IP automatically when it pulls the stream out.

Field	Description
Configuration	
Enabled	Enables multicast pool
Address	Specifies the range of IP addresses (CIDR format).
Port	Specifies the port that will be shared by all of the members of the pool.
NIC	Specifies the network card to use for the outgoing multicast traffic.
TTL	Specifies the Time To Live.

13.7 Cluster

ZiXi Broadcaster enables two types of configurations:

Cluster configuration - a cluster of ZiXi Broadcaster server in a LAN for load balancing purposes. The different ZiXi Broadcaster servers will communicate with each other and are "aware" of the Input/Output traffic of each node in order to redirect the streams to the least occupied ZiXi Broadcaster instance.

Edge-Origin configuration - the cluster may be used to forward the stream from one ZiXi Broadcaster server (origin) to other ZiXi Broadcaster servers (edge) which are closer to the user or is located in a less sensitive environment. When the end-user connects to the edge server to view a certain stream, the edge server will retrieve the stream from the origin server and will seamlessly deliver it to the end-user.

Field	Description
Origin	
Enabled	Enables Edge-Origin configuration.
Host	The primary host IP address of the origin server.
Port	the port number in the origin server for transmitting the stream.
Alternative Host	The IP address for a secondary server. If the primary origin server is unavailable the data will be retrieved from the secondary origin server.
Port	The port number for the secondary origin server.

Field	Description
HTTP/origin cache size [MB]	The size of the cache that will be used to serve multiple users. The edge server will retrieve the data from the origin and cache it for additional users in order to save bandwidth and increase performance.
Live Streams	
Latency [ms]	Specifies the buffer size between the edge and the origin.
Timeout [s]	Specifies the maximum amount of time in which the edge will attempt to connect to the origin. After the timeout period the edge server will attempt a connection with the secondary origin server.
Cluster	
Enabled	Enables Cluster configuration.
Public IP	The public-facing IP address of this ZiXi Broadcaster server for external access. A unique Public IP must be assigned to each broadcaster in the cluster.
Cluster Internal IP	The internal IP (multi-cast) address for communication between the various servers in the cluster. This address is used to communicate load information forwarding the streams within the cluster. The same multicast IP address should be used across all instances in the cluster.
TTL	Specifies the Time To Live parameter.
Port	Specifies the port that are used in all the participating Broadcaster servers in the cluster.
Local IP	Specifies the local IP address which the network employs for internal communication.
Balance Inputs	Enables the balancing of the inputs.
Balance Outputs	Enables the balancing of the outputs.

13.8 SSH Tunnel

SSH (Secure Shell) is a network protocol that allows a secure access over an encrypted connection. Reverse SSH is a technique that can be used to access systems (that are behind a firewall) from the outside world

Field	Description
Server connection	
Host	Displays the Host name or IP address for the SSH connection
SSH Port	Displays the port for the SSH connection. Default:22
Username	Displays the username. SSH assumes the username on the remote computer is the same as that on the local one.
Key File	Displays the name of the key file. Clicking **Upload Key** will upload the key file to the server.
Reverse Tunnel	
Remote Source Port	Displays the remote source port.
Local Destination IP	Displays the IP address of the local destination.
Local Destination Port	Displays the port number of the local destination.
Status	Displays the status of the SSH tunnel.

13.9 Authorization

Authorization can be configured for any incoming or outgoing streams.

Field	Description
Authorization	Enables authorization
Type	Default: None - authorization will be defined in the Input and Output streams. In this case you will need to define the password in the Input and the Output streams. Text File – this option manages authorizations in a text file. This option is useful for large OTT operations, as it does not require configuration for every user. The text file contains pairs of stream name and password that are used for the input streams. For the outputs, it contains the stream name, user and password of the viewer. HTTP Server – ZiXi Broadcaster will generate an HTTP request to an external server on every connection. Linux Server – uses the built-in authorization of the operating system. Global Password – a single password that will be used for all access requests. If you select this option, you must define the global password in the **Parameter** field below. Other override authorization techniques are available. For more information contact ZiXi support.
Parameter	The global password (applicable when Global password is selected).
Separate user folders	Any user will be on separate folder
Logging	Add logging

13.10 Logging

The Logging screen defines a log for debugging purposes.

Field	Description
Logging	
Severity Level	The Severity Level that will be collected in the log, from **Info**, **Warning**, **Error**, to **Fatal**. Default: **None**, since Logging is resource-intensive and only enabled when necessary.

Field	Description
Path	The log file name and path where the collected event information will be stored.
Save Periodic Reports	Takes snapshots every few seconds of the table of inputs and outputs and saves it into a log file.
Inputs	Enables the snapshot of the inputs in the specified intervals.
Outputs	Enables the snapshot of the outputs in the specified intervals.
Folder	Specifies the folder where the snapshots are stored.
Interval [secs]	Specifies the interval in seconds between the snapshots.

13.11 ASI

If there is an ASI card in the machine you can reverse the direction of the Input to Output and vice versa.

➔ **To Reverse the Direction of the Stream:**

1. From the **Settings** page of the ZiXi Broadcaster, click **ASI** on the left-hand side. The various **ASI settings** are displayed.
2. Click the desired **RESET** button to the right of the stream that you want to reverse**.** A confirmation window is displayed with the notification that the service must first be restarted before the direction is reversed.

Field	Description
Available ports	
Name	Specifies the port number used by the ASI protocol.
Data Direction	Specifies the direction of the data being transmitted by the ASI protocol.