Zixi Broadcaster User Guide

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Introduction to Zixi Broadcaster

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, on the customer's cloud, or 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/MPEG-DASH/RTMP/FLV/MPEG-TS over HTTP
- **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 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 (priorities 1 and 2)
- **Content Analysis** - analysis of the stream's audio and video content, including audio levels, audio silence detection, frozen video detection, and more.
- **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.
- **Network bonding with hit-less fail-over** – reunites divided streams coming from multiple network channels into a single stream, enabling simultaneous load balancing between multiple networks and ensuring high availability of the stream.
- **Hitless failover** - hitless failover for inputs enables undisrupted streaming when switching from one source to another. Zixi's new hitless failover feature is based on the SMPTE 2022-7 standard, which specifies "seamless" or hitless failover between binary-identical streams with synchronized RTP headers.
- **IFB Support** - a monitoring and cueing system for one-way communication from the director or assistant director to on-air talent or a remote location. IFB support has been

implemented in Zixi Broadcaster Pull and UDP outputs, allowing the decoder with a Zixi Receiver to send audio back to the encoder with a Zixi Feeder.

- **AES stream encryption and decryption** - UDP, File and RTMP input streams can be encrypted by Zixi Broadcaster using a fixed key (AES 128, AES 192, AES 256), which can be entered into the input settings or automatically generated. Zixi Broadcaster can also decrypt contribution streams using a matching key, or securely forward encrypted streams to receivers, without being able to see or analyze the traffic.

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

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.
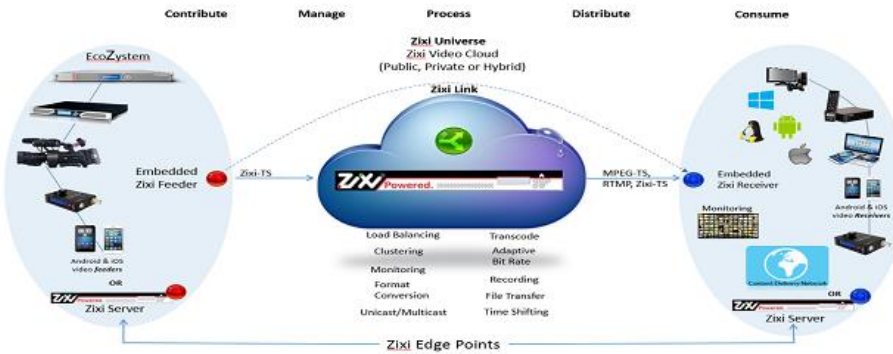
Supported Protocols

Input:
- Zixi protected transport
- MPEG-TS over UDP and/or RTP with SMPTE-2022 and/or RIST (TR-06-1)
- RTMP pull from CDNs and/or other sources
- RTMP push
- RTMPS
- RTSP input
- 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)

Transcoding Options

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

- Video Decoding – MPEG2, H.264/AVC , H.265/HEVC
- Video Encoding – MPEG2, H.264/AVC , H.265/HEVC
- Audio Decoding – AAC, MPEG-1 Audio Layer I / II / III, MPEG-2 Audio Layer I / II / III
- Audio Encoding – AAC only, AAC only; Pass through – any audio codec (MPEG1/2 / AAC / AC-3)

Recording Options

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

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.

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.

VOD Options

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

Latency Considerations

Latency defines the delay in which the video stream will be delivered to the endpoint. 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 milliseconds 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. Two common modes include:
1. Interactive mode - 500ms
2. Non-interactive mode – 4000ms

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

Logging into the Broadcaster

➡ **To log in to Zixi Broadcaster:**

1. In the web browser, navigate to http://localhost:4444. A user authentication window opens.
2. In the **User Name** field, type **admin** and in the **Password** field, type '**1234**'.
3. Click **OK**.

Activating Your License

In order to start using Zixi Broadcaster, first activate your license. Zixi Broadcaster and its optional features are activated by license files. Before using Zixi Broadcaster, and when adding optional features, **activate** the appropriate license.
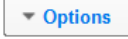
Broadcaster Status page - Activation Key

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

> Note: The following procedure requires connectivity to the Internet. If you are not able to connect, you can activate by **Loading License Files**.
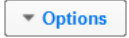
➡ **To Activate the License:**

1. In the Zixi Broadcaster **Status** page, click ▼ Options . 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.

Loading License Files

If you want to activate your license without an internet connection, you can upload a license file. To obtain a license file, please contact Zixi support.

➡ **To Load the License File:**

1. In the Zixi Broadcaster **Status** page click ▼ Options . The Options menu is displayed.
2. Click **Load License.** The directory of the local drive opens.
3. Select the license file and click **Open**.

Reloading the License

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

➡ **To Reload the License:**

1. In the Zixi Broadcaster **Status**, click ▼ Options . The various options are displayed.
2. Click **Reload.** The license has been reloaded.

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:**

In the Zixi Broadcaster **Status** page, the **General** area, **Network Status** area, **License Information** area**, Machine Information** area and **Operating System** area are displayed.

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/ MPEG-TS over HTTP (in Kbps)
kBytes Sent	The cumulative traffic transmitted (in Kbps)
kBytes Received	The cumulative traffic received (in Kbps)
RTMP Server	Active – the RTMP server is enabled (See Settings > Live Protocols > RTMP Server section) Off – the RTMP server is disabled

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.
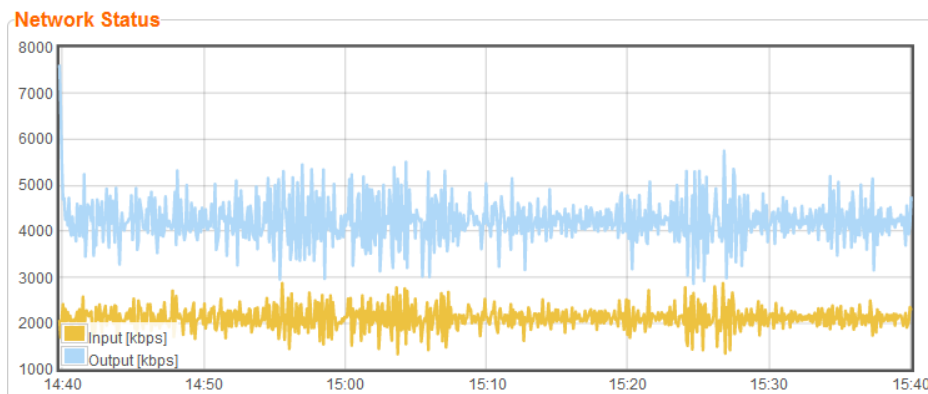
Viewing Current License Information

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

The section includes the following elements:

Element	Description
Basic Information	**Product** - the name of the product
	Key - a link to the license status page.
	Expiration - the expiration date of the license

Machine Information

Metered Usage Restrictions	License usage restrictions. Unlimited - no restrictions.
Features	List of enabled/disabled features.

Machine Information

This pane shows information about the machine on which the Broadcaster is installed.
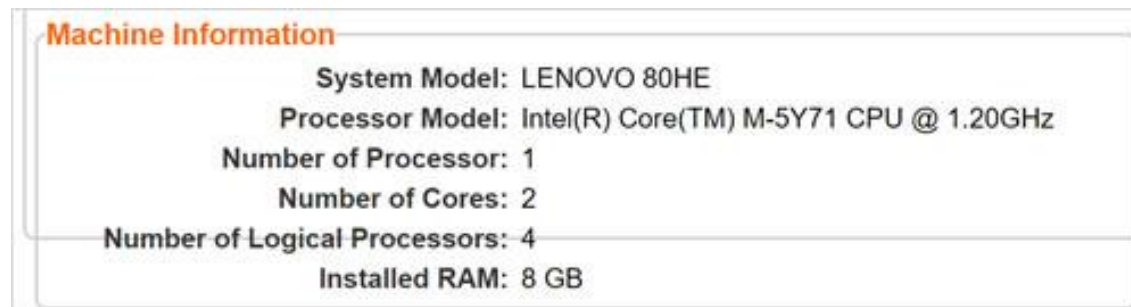
The pane includes the following data:

Parameter	Description
System Model	The model of the machine on which the Broadcaster is installed.
Processor Model	The model and specifications of the machine's processor.
Number of Processor	The number of CPUs installed on this machine.
Number of Cores	The number of cores per processor (for each processor).
Number of Logical Processors	Total number of threads (calculated as Number of cores x thread(s) per core)
Installed RAM	The size of the RAM installed on the machine.

Operating System Information

This pane shows information about the operating system running on the machine.

Network Cards (Linux only)
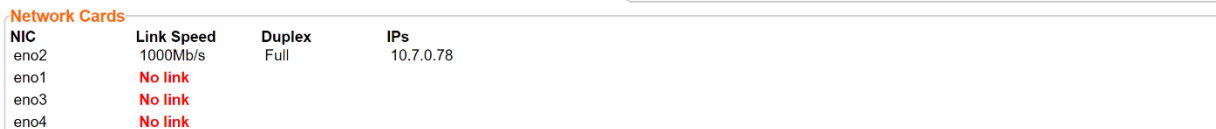
The pane Includes the following data:

Parameter	Description
OS	The operating system running on the machine.
Build	The operating system build (version) number.
Architecture	The system architecture of the operating system, number of bits.

Network Cards (Linux only)

This pane shows information about the network cards running on the machine. Each line represents another network card.

The pane Includes the following data:
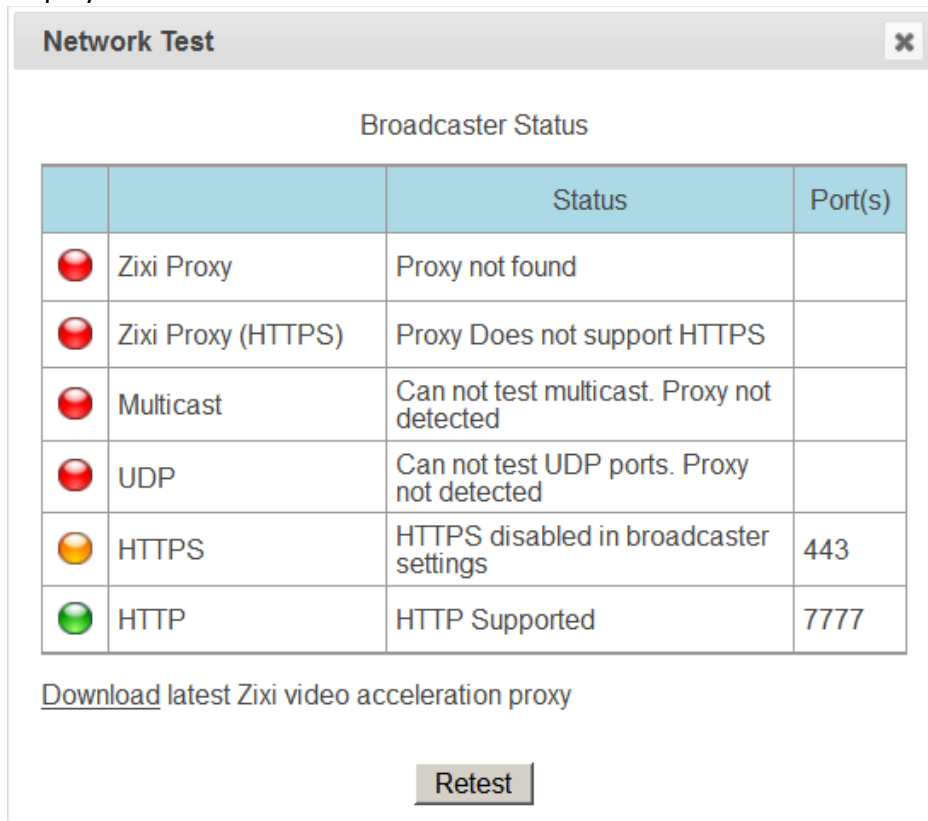
Parameter	Description
NIC	The name of the Network Interface Controller (a.k.a network card).
Link Speed	The link speed capability of the network card.
Duplex	Full - full duplex Half - half duplex
IPs	The IP of the network card.

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. In the Zixi Broadcaster **Status** page, click [🔊 Network Test]. The **Network Test** screen is displayed:

The Broadcaster 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.

Broadcaster Inputs

You can add input streams to Zixi Broadcaster from one of the following sources:
- **Zixi Feeder** – the Zixi feeder 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.
- **UDP streams** - the source is a UDP or RTP stream, over unicast or multicast.
- **Delayed** - input stream will be stored on the local disk, while a variant of the input is created and delayed according to the specified duration.
- **Local files (for VOD)** – the source in this case is a local transport stream file from your local computer or local network.
- **RTMP streams** - The source is an RTMP stream, pushed into the Zixi Broadcaster, or pulled by it.
- **RTSP** - The source is an RTSP stream, pushed into the Zixi Broadcaster, or pulled by it.
- **HLS** - The source is an HLS stream that is pulled by the Zixi Broadcaster
- **HTTP Pull/Push** - The source is a Transport Stream over HTTP, which is pushed into Zixi Broadcaster or pulled by it.

Adding Input Streams

The Zixi Broadcaster enables you to add various types of streams. When you create a new stream, select the stream type and then fill in the fields that are applicable for that stream type.

Adding Push Streams

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. In the Zixi Broadcaster Navigation menu, click the **Inputs** tab.

Adding Input Streams

2. In the **Menu** bar, click **New Input**. The **Add a new input stream** window is displayed.

3. Enter the unique **Stream ID** for the Broadcaster.

> 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** checkbox to display this stream in the Matrix (see Using the Matrix). Default: Selected.
6. Select **Push** for this input stream.
7. Specify the **Stream Parameters** (see Input Stream Parameters Table below).
8. If you want to **Enable time shift**, select this checkbox (see Input Stream Parameter Table below). 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 Input Stream Parameter Table).
10. If you want to record the stream, you can configure the **Recording Parameters** (see Input Stream Parameter Table).
11. You can decrypt an encrypted stream as it enters Zixi Broadcaster. To decrypt a stream, select the **Decrypt Stream** checkbox and fill in the parameters as describes in the Input Stream Parameter Table below. For more information, see **Decrypting an Input Stream in Zixi Broadcaster.**
12. 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.

Adding Input Streams

Input Stream Parameters Table

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 in the Feeder (in ms). Default: Remote configuration (i.e. use the latency was set in 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	Specify the ID of the Zixi Feeder for which you want to grant priority. The ID of the Zixi Feeder can be found in the **ID** field on the Zixi Feeder's **Status** screen. Upon connection of the Zixi Feeder with this ID, all other existing sources will be disconnected.
Enable time shift	Select this checkbox to record the stream content and broadcast it after the specified delay.
Maximum delay [hh:mm:ss]	Specify the time of the delayed transmission of this stream. Maximum: 24 hours.
Transmit as multicast	Select this checkbox to enable 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. Requires enabling **Multicast Pull** in the **Settings**.
Multicast Only	Selecting this checkbox will force the transmission of this stream only in multicast.
Decrypt stream	Select this checkbox to decrypt the Input stream. Please note that the stream will not be encrypted as it passes through the Zixi path. For more information, see Decrypting an Input Stream in Zixi Broadcaster.
Decryption type (for Decrypt stream enabled)	Specify the type of encryption that is being used in the stream.

Adding Input Streams

Decryption key (for Decrypt stream enabled)	Specify the key for decryption.
Enable Encryption	Select this checkbox to encrypt the Input stream. For more information, see Encrypting an Input Stream in Zixi Broadcaster.
Encryption type (for Encryption enabled)	Specify the type of Encryption (AES 128/192/256).
Encryption key (for Encryption enabled)	Click Generate to generate an encryption key. The generated encryption key must be sent to the end-user to decipher the received encoded stream.
Recording parameters	Select this checkbox to customize the recording parameters.
Max recorded file duration [hours]	Specify the maximum time allotted for recording a video stream. Default: 2 hours
Keep recorded files for [hours]	Specify the maximum time for storing the recording. Default: 0 hours
Custom Path	Optionally specify a storage location for the recorded files that is relative to the root folder. This location bypasses the location specified as the root folder in the **Settings** > **General** screen.
File Name Template	Specify the file name pattern that Zixi will use to generate when saving the recorded content. A separate file will be generated for each recording up to the time specified in the Max recorded file duration parameter (see above). After this duration a new file will be generated.
	The file name pattern can include any string and up to five variables listed below. Only the %T=HH.MM.SS creation time is mandatory. You can change the order of these variables and add text as long as you maintain the legitimate structure of the file in Linux and Windows:
	• %S=stream id - optional.
	• %Y=year - optional
	• %M=month - optional
	• %D=day - optional
	• %T=HH.MM.SS creation time - mandatory
	For example, the following pattern %Y_recording%T.ts will generate the following file name 2017_recording15:32:35.ts.

Adding Pull Streams

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. In the Zixi Broadcaster Navigation menu, click the **Inputs** tab.
2. In the Menu bar, click **New Input**. The **Add a new input stream** window is displayed.
3. Enter the unique **Stream ID.** for the Broadcaster.

> 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). Default: Selected.
6. Select **Pull** for the input stream.

7. Specify the **Stream Parameters** (see Input Stream Parameter table).
8. If you want to **Enable time shift**, select this checkbox (see Input Stream Parameter table). 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 Input Stream Parameter table).

10. If you want to configure the **Recording Parameters**, specify them in the respective fields (see Input Stream Parameter table).

11. You can decrypt an encrypted stream as it enters the Zixi Broadcaster. To decrypt a stream, select the **Decrypt Stream** checkbox and fill in the parameters as describes in the Input Stream Parameter Table below. For more information, see Decrypting an Input Stream in Zixi Broadcaster.

12. 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.

Input Stream Parameters table

Parameter	Description
Stream Parameters	The general stream settings.
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 IP	Selects a local IP address to use, or Any IP address if it can be sourced from any active NIC.
Enable time shift	Select this checkbox to record the stream content and broadcast it after the specified delay.

Adding Input Streams

Maximum delay [hh:mm:ss] (for Time Shift enabled)	Specify the time of a delayed transmission of this stream. Maximum: 24 hours
Transmit as multicast	Select this checkbox to enable 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. Requires enabling **Multicast Pull** in the **Settings**.
Multicast-Only (for multicast enabled)	If desired, specify multicast-only outputs.
Decrypt stream	Select this checkbox to decrypt the Input stream. Please note that the stream will not be encrypted as it passes through the Zixi path. For more information, see Decrypting an Input Stream in Zixi Broadcaster.
Decryption type (for Decrypt stream enabled)	Specify the type of encryption that is being used in the stream.
Decryption key (for Decrypt stream enabled)	Specify the key for decryption.
Enable Encryption	Select this checkbox to encrypt the Input stream. For more information, see Encrypting an Input Stream in Zixi Broadcaster.
Encryption type (for Encryption enabled)	Specify the type of Encryption (AES 128/192/256).
Encryption key (for Encryption enabled)	Click Generate to generate an encryption key. The generated encryption key must be sent to the end-user to decipher the received encoded stream.
Recording parameters	Select this checkbox to customize the recording parameters.
Max recorded file duration [hours]	Specify the maximum time allotted for recording a video stream. Default: 2 hours
Keep recorded files for [hours]	Specify the maximum time for storing the recording.
Custom Path	Optionally specify a storage location for the recorded files that is relative to the root folder. This location bypasses the location specified as the root folder in the Settings > General screen.

File Name Template	Specify the file name pattern that Zixi will use to generate when saving the recorded content. A separate file will be generated for each recording up to the time specified in the Max recorded file duration parameter (see above). After this duration a new file will be generated. The file name pattern can include any string and up to five variables listed below. Only the %T=HH.MM.SS creation time is mandatory. You can change the order of these variables and add text as long as you maintain the legitimate structure of the file in Linux and Windows: • %S=stream id - optional. • %Y=year - optional • %M=month - optional • %D=day - optional • %T=HH.MM.SS creation time - mandatory For example, the following pattern **%Y_recording%T.ts** will generate the following file name: **2017_recording15:32:35.ts**.

Adding UDP Streams

This enables the Broadcaster to receive a UDP stream. The UDP stream is not protected by the Zixi protocol. The UDP streams can be one of the following types:
- UDP – plain UDP
- RTP – Real-Time Transport Protocol
- RTP + SMPTE 2022 FEC - SMPTE 2022 standard with Forward Error Correction

RIST protocol support – Zixi Broadcaster supports RIST streams from any compliant RIST device. Contact your Zixi representative to learn more about interoperability testing between Zixi Broadcaster and 3rd party devices. The RIST protocol can be enabled for any of the stream types mentioned above.

➡ **To Add a UDP Stream:**

1. In the Zixi Broadcaster Navigation menu, click the **Inputs** tab.
2. In the Menu bar, click **New Input**. The **Add a new input stream** window is displayed.
3. Enter the unique **Stream ID.**

> 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). Default: Selected.

Adding Input Streams

6. Select **UDP** for the input stream.

7. Specify the **Stream Parameters** (see Input Stream Parameters Table).
8. If you want to **Enable time shift**, select this checkbox (see Input Stream Parameters Table).
9. If you want to **Transmit as multicast**, select this checkbox (see Input Stream Parameters Table).
10. If you want to configure the **Recording Parameters**, specify them in the respective fields (see Input Stream Parameters Table).
11. If you want to **Enable encryption**, select this checkbox (see Input Stream Parameters Table). For more information, see Encrypting an Input Stream in Zixi Broadcaster.
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.

Input Stream Parameters Table

Parameter	Description
Stream Parameters	

Port	Specify 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 the Multicast IP address (or leave blank in the case of Unicast).
SSM Source	Specify the source IP for a source-specific multicast.
Type	Select the appropriate protocol type from the drop-down list.
Bind to IP	Specify which of the local IP addresses should be used. Select one of the local IP addresses in the drop-down menu.
Max. bitrate [kbps]	Specify 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.
RIST	Select this checkbox to receive RIST streams from any compliant RIST device.
Max Latency [ms]	Specify the maximum latency of the stream in milliseconds.
Remote Port	Specify the remote port in the RIST device. Default: 0 (any port)
Enable time shift	Select this checkbox to record the stream content and broadcast it after the specified delay.
Maximum delay [hh:mm:ss] (for Time Shift enabled)	Specify the maximum time delay of this input.
Transmit as multicast	Select this checkbox to enable 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. Requires enabling Multicast Pull in the Settings.
Multicast-Only (for multicast enabled)	Selecting this checkbox will force the transmission of this stream only in multicast.
Enable Encryption	Select this checkbox to encrypt the Input stream. For more information, see Encrypting an Input Stream in Zixi Broadcaster.
Encryption type (for Encryption enabled)	Specify the type of Encryption (AES 128/192/256).
Encryption key (for Encryption enabled)	Click **Generate** to generate an encryption key. The generated encryption key must be sent to the end-user to decipher the received encoded stream.

Adding Input Streams

Recording parameters	Select this checkbox to customize the recording parameters.
Max recorded file duration [hours]	Specify the maximum time allotted for recording a video stream. Default: 2 hours
Keep recorded files for [hours]	Specify the maximum time for storing the recording.
Custom Path	Optionally specify a storage location for the recorded files that is relative to the root folder. This location bypasses the location specified as the root folder in the **Settings > General screen**.
File Name Template	Specify the file name pattern that Zixi will use to generate when saving the recorded content. A separate file will be generated for each recording up to the time specified in the Max recorded file duration parameter (see above). After this duration a new file will be generated. The file name pattern can include any string and up to five variables listed below. Only the %T=HH.MM.SS creation time is mandatory. You can change the order of these variables and add text as long as you maintain the legitimate structure of the file in Linux and Windows: • %S=stream id - optional. • %Y=year - optional • %M=month - optional • %D=day - optional • %T=HH.MM.SS creation time - mandatory For example, the following pattern **%Y_recording%T.ts** will generate the following file name **2017_recording15:32:35.ts**.

Adding Delayed Streams

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. In the Zixi Broadcaster Navigation menu, click the **Inputs** tab.
2. In the Menu bar, click **New Input**. The **Add a new input stream** window is displayed.
3. Enter the unique **Stream ID.**

> 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**). Default: Selected.
6. Select **Delayed** for the input stream.

7. Specify the **Stream Parameters** (see Input Stream Parameters Table).
8. If you want to **Transmit as multicast**, select this checkbox (see Input Stream Parameters Table).
9. Click **OK**.
10. The "Input added" message appears on the top of the screen. The Delayed Stream is added to the Zixi Broadcaster and now appears in the list of streams available in the Zixi Broadcaster inputs UI.

Adding Input Streams

Input Stream Parameters Table

Parameter	Description
Stream Parameters	
Source	Select one of the input streams that were configured to enable "time shift".
Delay	Specify the delay period relative to the original stream.
Transmit as multicast	Select this checkbox to enable 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. Requires enabling **Multicast Pull** in the **Settings**.
Multicast-Only (for Multicast enabled)	If desired, specify multicast only outputs.

Adding File Streams

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. In the Zixi Broadcaster Navigation menu, click the **Inputs** tab.
   In the Menu bar, click **New Input**. The **Add a new input stream** window is displayed.
2. Enter the unique **Stream ID.**

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

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

6. Specify the **Stream Parameters** (see Input Stream Parameter table).
7. If you want to **Enable time shift**, select this checkbox (see Input Stream Parameter table). 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).
8. If you want to **Transmit as multicast**, select this checkbox (see Input Stream Parameter table).
9. If you want to **Enable encryption**, select this checkbox (see Input Stream Parameter table). For more information, see Encrypting an Input Stream in Zixi Broadcaster.

Adding Input Streams

> 10. 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.

Input Stream Parameters Table

Parameter	Description
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.
Enable time shift	Select this checkbox to record the stream content and broadcast it after the specified delay.
Maximum delay [hh:mm:ss] (for Time Shift enabled)	Specify the maximum time delay of this input.
Transmit as multicast	Select this checkbox to enable 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. Requires enabling Multicast Pull in the Settings.
Multicast Only (for Multicast enabled)	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	Select this checkbox to encrypt the Input stream. For more information, see Encrypting an Input Stream in Zixi Broadcaster.
Encryption type (for Encryption enabled)	Specify the type of Encryption (AES 128/192/256).
Encryption key (for encryption enabled)	Click **Generate** to generate an encryption key. The generated encryption key must be sent to the end-user to decipher the received encoded stream.

Adding RTMP Streams

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

➡ **To Add a RTMP Stream:**

1. In the Zixi Broadcaster Navigation menu, click the **Inputs** tab.
2. In the Menu bar, click **New Input**. The **Add a new input stream** window is displayed.
3. Enter the unique **Stream ID.**

> 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). Default: Selected.
6. Select **RTMP** for the input stream.

7. Specify the **Stream Parameters** (see Input Stream Parameters Table).
8. If you want to **Enable time shift**, select this checkbox (see Input Stream Parameters Table).
9. If you want to **Transmit as multicast**, select this checkbox (see Input Stream Parameters Table).
10. If you want to **Enable encryption**, select this checkbox (see Input Stream Parameters Table). For more information, see Encrypting an Input Stream in Zixi Broadcaster.
11. If you want to configure the **Recording Parameters**, specify them in the respective fields (see Input Stream Parameters Table).

Adding Input Streams

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.

Input Stream Parameters Table

Parameter	Description
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). No additional connection parameters need to be filled. • 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. In Pull mode you can define RTMPS clients with the proven security of a secure socket layer (SSL), by using the rtmps:// url
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.
Disconnect if inactive	Disconnects if inactive.
Enable time shift	Select this checkbox to record the stream content and broadcast it after the specified delay.
Maximum delay [hh:mm:ss] (for Time Shift enabled)	Specify the maximum time delay of this input.
Transmit as multicast	Select this checkbox to enable 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. Requires enabling Multicast Pull in the Settings.
Multicast Only (for Multicast enabled)	Select the check box to force only Multicast outputs.
Enable Encryption	Select this checkbox to encrypt the Input stream. For more information, see Encrypting an Input Stream in Zixi Broadcaster

Adding Input Streams

Encryption type (for Encryption enabled)	Specify the type of Encryption (AES 128/192/256).
Encryption key (for Encryption enabled)	Click **Generate** to generate an encryption key. The generated encryption key must be sent to the end-user to decipher the received encoded stream.
Recording Parameters	
Max recorded file duration [hours]	Specify the maximum time allotted for recording a video stream. Default: 2 hours
Keep recorded files for [hours]	Specify the maximum time for storing the recording.
Custom Path	Optionally specify a storage location for the recorded files that is relative to the root folder. This location bypasses the location specified as the root folder in the **Settings > General screen**.
File Name Template	Specify the file name pattern that Zixi will use to generate when saving the recorded content. A separate file will be generated for each recording up to the time specified in the Max recorded file duration parameter (see above). After this duration a new file will be generated.
	The file name pattern can include any string and up to five variables listed below. Only the %T=HH.MM.SS creation time is mandatory. You can change the order of these variables and add text as long as you maintain the legitimate structure of the file in Linux and Windows:
	• %S=stream id - optional.
	• %Y=year - optional
	• %M=month - optional
	• %D=day - optional
	• %T=HH.MM.SS creation time - mandatory
	For example, the following pattern **%Y_recording%T.ts** will generate the following file name **2017_recording15:32:35.ts**.

Adding RTSP Streams

This enables you to create RTSP streams.

➡ **To Add RTSP Streams:**

1. In the Zixi Broadcaster Navigation menu, click the **Inputs** tab.
2. In the Menu bar, click **New Input**. The **Add a new input stream** window is displayed.

3. Enter the unique **Stream ID.**

> 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). Default: Selected.
6. Select **RTMP** for the input stream.
7. Specify the **Stream Parameters** (see Input Stream Parameters Table).
8. If you want to **Enable time shift**, select this checkbox (see Input Stream Parameters Table).
9. If you want to **Transmit as multicast**, select this checkbox (see Input Stream Parameters Table).
10. If you want to **Enable encryption**, select this checkbox (see Input Stream Parameters Table).
11. If you want to configure the **Recording Parameters**, specify them in the respective fields (see Input Stream Parameters Table).

Adding Input Streams

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.

Input Stream Parameters Table

Parameter	Description
Stream Parameters	The general stream settings.
URL	Type the Stream URL from which the Zixi Broadcaster will access.
Video UDP Port	Specify the UDP port to be used for streaming the video.
Audio UDP Port	Specify the UDP port to be used for streaming the video.
Enable time shift	Select this checkbox to record the stream content and broadcast it after the specified delay.
Maximum delay [hh:mm:ss] (for Time Shift enabled)	Specify the maximum time delay of this input.
Transmit as multicast	Select this checkbox to enable 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. Requires enabling Multicast Pull in the Settings.
Multicast Only (for Multicast enabled)	Select the check box to force only Multicast outputs.
Enable Encryption	Select this checkbox to encrypt the Input stream. For more information, see Encrypting an Input Stream in Zixi Broadcaster.
Encryption type (for Encryption enabled)	Specify the type of Encryption (AES 128/192/256).
Encryption key (for Encryption enabled)	Click **Generate** to generate an encryption key. The generated encryption key must be sent to the end-user to decipher the received encoded stream.
Recording parameters	Select this checkbox to customize the recording parameters.
Max recorded file duration [hours]	Specify the maximum time allotted for recording a video stream. Default: 2 hours

Keep recorded files for [hours]	Specify the maximum time for storing the recording.
Custom Path	Optionally specify a storage location for the recorded files that is relative to the root folder. This location bypasses the location specified as the root folder in the **Settings > General screen**.
File Name Template	Specify the file name pattern that Zixi will use to generate when saving the recorded content. A separate file will be generated for each recording up to the time specified in the Max recorded file duration parameter (see above). After this duration a new file will be generated. The file name pattern can include any string and up to five variables listed below. Only the %T=HH.MM.SS creation time is mandatory. You can change the order of these variables and add text as long as you maintain the legitimate structure of the file in Linux and Windows: • %S=stream id - optional. • %Y=year - optional • %M=month - optional • %D=day - optional • %T=HH.MM.SS creation time - mandatory For example, the following pattern **%Y_recording%T.ts** will generate the following file name **2017_recording15:32:35.ts**.

Adding HLS Streams

This screen enables the Broadcaster to receive an HLS stream. The HLS stream is not protected by the Zixi protocol. There are two options for pulling the stream:

- **Single source (adaptive bitrate)** - the stream can be an adaptive bitrate stream. In this case, Zixi Broadcaster will pull the main playlist to adapt between bit-rates according to network conditions.
- **Multiple sources** - it is possible to pull multiple input streams with static individual bit-rates. In this case, Zixi Broadcaster will automatically create a separate input for each bitrate.

➡ **To Add an HLS stream:**

1. In the Zixi Broadcaster Navigation menu, click the **Inputs** tab.
2. In the Menu bar, click **New Input**. The **Add a new input stream** window is displayed.
3. Enter the unique **Stream ID**.

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

4. Enter 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). Default: Selected.
6. Select **HLS** for the input stream.

7. Specify the **Stream Parameters** (see Input Stream Parameters Table below).
8. If you want to **Enable time shift**, select this checkbox (see Input Stream Parameters Table).

Adding Input Streams

9. If you want to **Transmit as multicast**, select this checkbox (see Input Stream Parameters Table).
10. If you want to configure the **Recording Parameters**, specify them in the respective fields (see Input Stream Parameters Table).
11. If you want to **Enable encryption**, select this checkbox (see Input Stream Parameters Table).
12. Click **OK**.

The "Input added" message appears on the top of the screen. The HLS 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. If the "multiple sources" option was select, Zixi Broadcaster will automatically create a separate input for each bitrate.

Input Stream Parameters Table

Parameter	Description
Stream Parameters	
Master Playlist URL	Specify the URL of the HLS stream.
Download Type	Specify whether the variants will be pulled from a single source (adaptive bitrate) or multiple sources (pull all bitrates).
Smoothing Latency	The Smoothing feature uses a buffer to time packets according to the stream's clock. This is useful when there are bursts in the rate in which the stream arrives. The smoothing features creates a queue in the buffer, allowing smoother entry into the Broadcaster. The Smoothing parameter defines the size of the buffer in Milliseconds. A larger the buffer, will enable smoother entry, however, may influence the latency rate.
Enable time shift	Select this checkbox to record the stream content and broadcast it after the specified delay.
Maximum delay [hh:mm:ss] (for Time Shift enabled)	Specify the maximum time delay of this input.
Transmit as multicast	Select this checkbox to enable 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. Requires enabling Multicast Pull in the Settings.

Adding Input Streams

Multicast Only (for Multicast enabled)	If desired, specify multicast only outputs.
Enable Encryption	Select this checkbox to encrypt the Input stream. For more information, see Encrypting an Input Stream in Zixi Broadcaster.
Encryption type (for Encryption enabled)	Specify the type of Encryption (AES 128/192/256).
Encryption key (for Encryption enabled)	Click **Generate** to generate an encryption key. The generated encryption key must be sent to the end-user to decipher the received encoded stream.
Recording parameters	Select this checkbox to customize the recording parameters.
Max recorded file duration [hours]	Specify the maximum time allotted for recording a video stream. Default: 2 hours
Keep recorded files for [hours]	Specify the maximum time for storing the recording.
Custom Path	Optionally specify a storage location for the recorded files that is relative to the root folder. This location bypasses the location specified as the root folder in the **Settings > General screen**.
File Name Template	Specify the file name pattern that Zixi will use to generate when saving the recorded content. A separate file will be generated for each recording up to the time specified in the Max recorded file duration parameter (see above). After this duration a new file will be generated. The file name pattern can include any string and up to five variables listed below. Only the %T=HH.MM.SS creation time is mandatory. You can change the order of these variables and add text as long as you maintain the legitimate structure of the file in Linux and Windows: • %S=stream id - optional. • %Y=year - optional • %M=month - optional • %D=day - optional • %T=HH.MM.SS creation time - mandatory For example, the following pattern **%Y_recording%T.ts** will generate the following file name **2017_recording15:32:35.ts**.

Adding HTTP Pull Streams

This screen enables Zixi Broadcaster to pulls a Transport Stream over TCP from an HTTP server. In this case, the stream is initiated by your Zixi Broadcaster.

➡ **To Add a Pull Stream:**

1. In the Zixi Broadcaster Navigation menu, click the **Inputs** tab.
2. In the Menu bar, click **New Input**. The **Add a new input stream** window is displayed.
3. Enter the unique **Stream ID**.

> 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). Default: Selected.
6. Select **HTTP Pull** for the input stream.

7. Specify the **Stream Parameters** (see Input Stream Parameter table).
8. If you want to **Enable time shift**, select this checkbox (see Input Stream Parameter table). 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 Input Stream Parameter table).
10. If you want to configure the **Recording Parameters**, specify them in the respective fields (see Input Stream Parameter table).

Adding Input Streams

11. You can decrypt an encrypted stream as it enters the Zixi Broadcaster. To decrypt a stream, select the **Decrypt Stream** checkbox and fill in the parameters as describes in the Input Stream Parameter Table below. For more information, see **Decrypting an Input Stream in Zixi Broadcaster.**

12. 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.

Input Stream Parameters table

Parameter	Description
Stream Parameters	The general stream settings.
TS URL	Enter the URL of the Transport Stream.
Smoothing	The Smoothing feature uses a buffer to time packets according to the stream's clock. This is useful when there are bursts in the rate in which the stream arrives. The smoothing features creates a queue in the buffer, allowing smoother entry into the Broadcaster. The Smoothing parameter defines the size of the buffer in Milliseconds. A larger the buffer, will enable smoother entry, however may influence the latency rate.
Enable time shift	Select this checkbox to record the stream content and broadcast it after the specified delay.
Maximum delay [hh:mm:ss] (for Time Shift enabled)	Specify the time of a delayed transmission of this stream. Maximum: 24 hours
Transmit as multicast	Select this checkbox to enable 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. Requires enabling **Multicast Pull** in the **Settings**.
Multicast-Only (for multicast enabled)	If desired, specify multicast-only outputs.
Decrypt stream	Select this checkbox to decrypt the Input stream. Please note that the stream will not be encrypted as it passes through the Zixi path. For more information, see Decrypting an Input Stream in Zixi Broadcaster.

Decryption type (for Decrypt stream enabled)	Specify the type of encryption that is being used in the stream.
Decryption key (for Decrypt stream enabled)	Specify the key for decryption.
Enable Encryption	Select this checkbox to encrypt the Input stream. For more information, see Encrypting an Input Stream in Zixi Broadcaster.
Encryption type (for Encryption enabled)	Specify the type of Encryption (AES 128/192/256).
Encryption key (for Encryption enabled)	Click Generate to generate an encryption key. The generated encryption key must be sent to the end-user to decipher the received encoded stream.
Recording parameters	Select this checkbox to customize the recording parameters.
Max recorded file duration [hours]	Specify the maximum time allotted for recording a video stream. Default: 2 hours
Keep recorded files for [hours]	Specify the maximum time for storing the recording.
Custom Path	Optionally specify a storage location for the recorded files that is relative to the root folder. This location bypasses the location specified as the root folder in the Settings > General screen.

File Name Template	Specify the file name pattern that Zixi will use to generate when saving the recorded content. A separate file will be generated for each recording up to the time specified in the Max recorded file duration parameter (see above). After this duration a new file will be generated. The file name pattern can include any string and up to five variables listed below. Only the %T=HH.MM.SS creation time is mandatory. You can change the order of these variables and add text as long as you maintain the legitimate structure of the file in Linux and Windows: • %S=stream id - optional. • %Y=year - optional • %M=month - optional • %D=day - optional • %T=HH.MM.SS creation time - mandatory For example, the following pattern **%Y_recording%T.ts** will generate the following file name: **2017_recording15:32:35.ts**.

Adding HTTP Push Streams

In this mode Zixi Broadcaster will receive a Transport Stream over TCP from an HTTP server. In this case, the stream is initiated by the source HTTP Server, while the Zixi Broadcaster remains in "listening mode" until the stream (with the specified stream ID) is initiated.

➡ **To Add a HTTP Push Stream:**

1. In the Zixi Broadcaster Navigation menu, click the **Inputs** tab.
2. In the **Menu** bar, click **New Input**. The **Add a new input stream** window is displayed.
3. Enter the unique **Stream ID** for the Broadcaster.

> 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** checkbox to display this stream in the Matrix (see Using the Matrix). Default: Selected.

Adding Input Streams

6. Select **HTTP Push** for this input stream.

7. Specify the **Stream Parameters** (see Input Stream Parameters Table below).
8. If you want to **Enable time shift**, select this checkbox (see Input Stream Parameter Table below). 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 Input Stream Parameter Table).
10. If you want to record the stream, you can configure the **Recording Parameters** (see Input Stream Parameter Table).
11. You can decrypt an encrypted stream as it enters Zixi Broadcaster. To decrypt a stream, select the **Decrypt Stream** checkbox and fill in the parameters as describes in the Input Stream Parameter Table below. For more information, see **Decrypting an Input Stream in Zixi Broadcaster.**
12. 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.

Input Stream Parameters Table

Parameter	Description
Stream Parameters	

Adding Input Streams

Smoothing	The Smoothing feature uses a buffer to time packets according to the stream's clock. This is useful when there are bursts in the rate in which the stream arrives. The smoothing features creates a queue in the buffer, allowing smoother entry into the Broadcaster. The Smoothing parameter defines the size of the buffer in Milliseconds. A larger the buffer, will enable smoother entry, however may influence the latency rate.
Enable time shift	Select this checkbox to record the stream content and broadcast it after the specified delay.
Maximum delay [hh:mm:ss]	Specify the time of the delayed transmission of this stream. Maximum: 24 hours.
Transmit as multicast	Select this checkbox to enable 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. Requires enabling **Multicast Pull** in the **Settings**.
Multicast Only	Selecting this checkbox will force the transmission of this stream only in multicast.
Decrypt stream	Select this checkbox to decrypt the Input stream. Please note that the stream will not be encrypted as it passes through the Zixi path. For more information, see Decrypting an Input Stream in Zixi Broadcaster.
Decryption type (for Decrypt stream enabled)	Specify the type of encryption that is being used in the stream.
Decryption key (for Decrypt stream enabled)	Specify the key for decryption.
Enable Encryption	Select this checkbox to encrypt the Input stream. For more information, see Encrypting an Input Stream in Zixi Broadcaster.
Encryption type (for Encryption enabled)	Specify the type of Encryption (AES 128/192/256).
Encryption key (for Encryption enabled)	Click Generate to generate an encryption key. The generated encryption key must be sent to the end-user to decipher the received encoded stream.
Recording parameters	Select this checkbox to customize the recording parameters.

Adding Input Streams

Max recorded file duration [hours]	Specify the maximum time allotted for recording a video stream. Default: 2 hours
Keep recorded files for [hours]	Specify the maximum time for storing the recording. Default: 0 hours
Custom Path	Optionally specify a storage location for the recorded files that is relative to the root folder. This location bypasses the location specified as the root folder in the **Settings** > **General** screen.
File Name Template	Specify the file name pattern that Zixi will use to generate when saving the recorded content. A separate file will be generated for each recording up to the time specified in the Max recorded file duration parameter (see above). After this duration a new file will be generated. The file name pattern can include any string and up to five variables listed below. Only the %T=HH.MM.SS creation time is mandatory. You can change the order of these variables and add text as long as you maintain the legitimate structure of the file in Linux and Windows: • %S=stream id - optional. • %Y=year - optional • %M=month - optional • %D=day - optional • %T=HH.MM.SS creation time - mandatory For example, the following pattern %Y_recording%T.ts will generate the following file name 2017_recording15:32:35.ts.

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.
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.
TR 101 209	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 Broadcaster Actions on Input Streams).

Viewing Stream Statistics

You can view all the accumulative statistics for a connected input stream in real-time. It is possible to reset the counters by clicking **Reset**. The statistics may differ between the various stream types.

➡ **To View Stream Statistics:**

1. 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.
Total Packets	Displays the total number of packets that have been transmitted.
Packet Rate	Displays the current number of packets per second.
Remuxing Resets	Remuxing resets can occur when remuxing to CBR (i.e value of 'Remux to bitrate' field is set). In this case, the value is not high enough to remux the

	video+audio+other PIDs data. A possible solution is to increase value of the 'Remux to bitrate' parameter.
Remuxing Overflows	This indicates that the multiplexer internal queues are full.
Smoothing Drops	The Smoothing feature uses a buffer to time packets according to the stream's clock. This is useful when there are bursts in the rate in which the stream arrives. The smoothing drops indicator indicates that the stream is too "bursty".
RTT (ms)	Displays the Round Trip Time (RTT) from the source (in milliseconds).
Jitter (ms)	Displays the current Jitter, measured in milliseconds.
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.

Searching for Input Streams

➡ **To Search for an Input Stream:**

1. In 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 ⬚ .
2. The **Input** screen displays the requested output stream(s).

Broadcaster Actions on Input Streams

Every stream has a shortcut button that can be used to perform relevant actions on the stream. The following actions can be performed through the Actions button:

- Adding Analysis to the Input Stream
- Recording the Input Stream
- Stopping/Starting the Incoming Stream
- Deleting Input Streams from Broadcaster
- Editing Input Settings or Duplicating Input Streams
- Transcoding an Input Stream
- Playing Input Streams with Players
- Add Output

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 the ⚙▾ 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.

Editing Input Settings or Duplicating Input Streams

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

1. In the Zixi Broadcaster **Inputs** page, click the desired 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.

Broadcaster Actions on Input Streams

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

1. In the Zixi Broadcaster **Inputs** page, click the desired 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.

Deleting Input Streams from Broadcaster

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

1. In the Zixi Broadcaster **Inputs** page, click the desired incoming stream that you want to delete.
2. Click the [⚙] button on the right end of the selected row and then **Delete**. The message "Are you sure you want to delete input?" is displayed.

    127.0.0.1:4444 says: ✕

    Are you sure you want to delete input to_bx?

                                        [OK]   [Cancel]
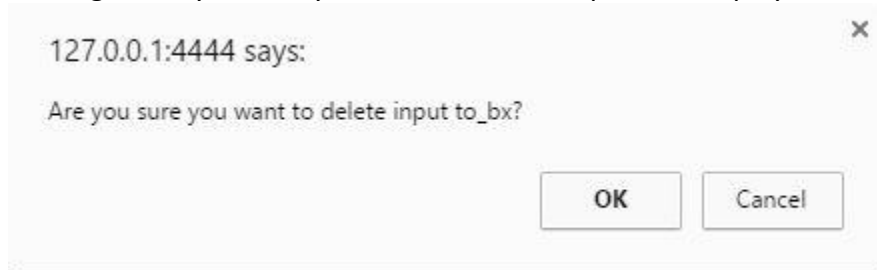
3. Click **OK**. The selected row which was a Connected Incoming Stream will be deleted.

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. In the Zixi Broadcaster **Inputs** page, click the desired incoming stream that you want to record.
2. Click the [⚙] 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.
3. 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.
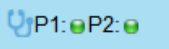
Broadcaster Actions on Input Streams
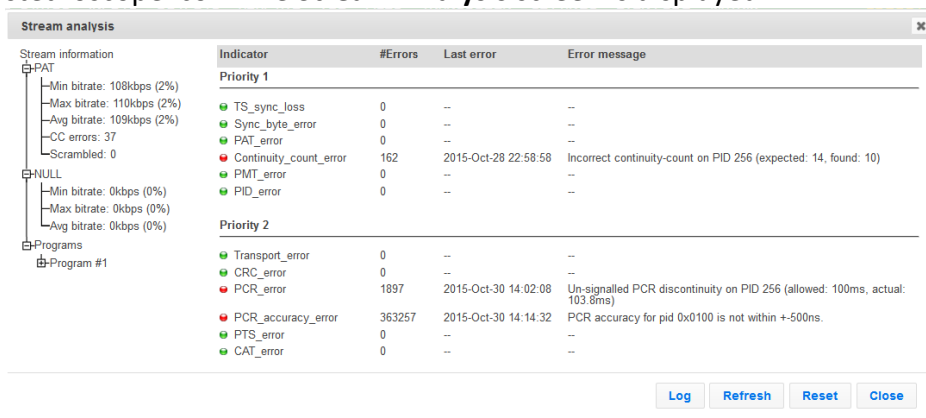
Adding Analysis to the Input Stream

A TR101 analysis can be added to the input stream for the monitoring of the TS while in operation. The analysis can be used to check the integrity of the TS and the most important elements of the stream. The analysis includes priority 1 and 2. To learn more about TR101 analysis see TR 101 290 Technical Report.

➡ To Add Analysis to the Input Stream:

1. In the Zixi Broadcaster **Inputs** page, click the stream for which you want to analyze from the input streams UI.

2. Click the [gear] 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 [P1: ● P2: ●] stethoscope 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.

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:

Broadcaster Actions on Input Streams

- Video Decoding – MPEG2, H.264/AVC, H.265/HEVC
- Video Encoding – MPEG2, H.264/AVC, H.265/HEVC
- Audio Decoding – AAC, MPEG-1 Audio Layer I / II / III, MPEG-2 Audio Layer I / II / III
- Audio Encoding – AAC-LC, AAC-HEv1, Opus; Pass through – any audio codec (MPEG1/2 / AAC / AC-3)

The transcoder comes with pre-set common video profiles:

1080i60 / 1080i59.94, 1080p30 / 1080p25, 720p60, 720p50 / 720p30, 576i60 / 576p25, 480i60 / 480p29.97
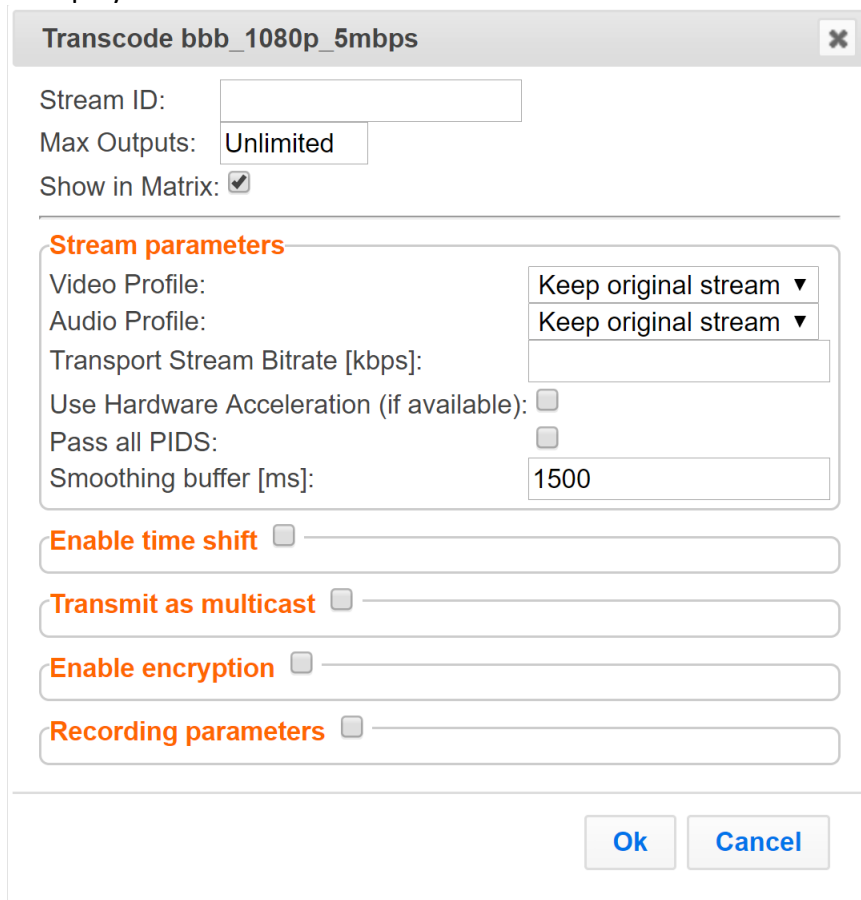
In order to transcode an input stream from the Inputs screen you must first configure the transcoding profiles in the Transcoder screen. For more information, see Error! Reference s ource not found. section below.

Broadcaster Actions on Input Streams

➡ **To Transcode an Input Stream:**

1. In the Zixi Broadcaster **Inputs** page, click the desired 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.

Transcode bbb_1080p_5mbps	✖

Stream ID: [   ]
Max Outputs: [Unlimited]
Show in Matrix: ☑

Stream parameters
Video Profile: [Keep original stream ▾]
Audio Profile: [Keep original stream ▾]
Transport Stream Bitrate [kbps]: [   ]
Use Hardware Acceleration (if available): ☐
Pass all PIDS: ☐
Smoothing buffer [ms]: [1500]

Enable time shift ☐

Transmit as multicast ☐

Enable encryption ☐

Recording parameters ☐

[**Ok**] [**Cancel**]

3. Enter the unique **Stream ID.**, which will correspond to the new transcoded input that will be added.

4. Under **Stream Parameters**, select one of the following options in **Video Profile**:
   - **Keep original stream** – the stream will not be modified.
   - **Remove stream** – the output will not include the video channel (audio only).
   - **Custom profile** – select one of the custom profiles that have been configured in the transcoder.

5. Under **Stream Parameters**, select one of the following options in **Audio Profile**:
   - **Keep original stream** – the stream will not be modified.
   - **Remove stream** – the output will not include the audio channel (video only).

Broadcaster Actions on Input Streams

- **Custom profile** – select one of the custom profiles that have been configured in the transcoder.
6. If you have installed a GPU hardware accelerator on your transcoder you can select the **Use hardware acceleration** checkbox to enable acceleration.
7. If you want to ensure all PIDs (which is used to distinguish between packets containing different types of information) are passed on through the transcoder, select the **Pass all PIDs** checkbox. To learn more about PIDs, see Packet Identifiers (PID).
8. In the **Smoothing buffer** field, enter the buffering time in milliseconds. The buffering helps smoothen the stream, however it will delay its transfer by the duration that is specified in this field. Default: 1500 ms.
9. Select the relevant additional parameters as described below.
10. 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.

Parameter	Description
Enable time shift	Enables a delayed transmission of this input.
Maximum delay [hh:mm:ss] (for Time Shift enabled)	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. Requires enabling Multicast Pull in the Settings.
Multicast Only (for Multicast enabled)	If desired, specify multicast only outputs.
Enable Encryption	Encrypts the Input stream. For more information, see Encrypting an Input Stream in Zixi Broadcaster.
Encryption type (for Encryption enabled)	Specify the type of Encryption (AES 128/192/256).
Encryption key (for Encryption enabled)	Click **Generate** to generate an encryption key. The generated encryption key must be sent to the end-user to decipher the received encoded stream.
Recording Parameters	
Max recorded file duration [hours]	Specify the maximum time allotted for recording a video stream. Default: 2 hours
Keep recorded files for [hours]	Specify the maximum time for storing the recording.

Broadcaster Actions on Input Streams

Custom Path	Optionally specify a storage location for the recorded files that is relative to the root folder. This location bypasses the location specified as the root folder in the **Settings > General screen**.
File Name Template	Specify the file name pattern that Zixi will use to generate when saving the recorded content. A separate file will be generated for each recording up to the time specified in the Max recorded file duration parameter (see above). After this duration a new file will be generated. The file name pattern can include any string and up to five variables listed below. Only the %T=HH.MM.SS creation time is mandatory. You can change the order of these variables and add text as long as you maintain the legitimate structure of the file in Linux and Windows: • %S=stream id - optional. • %Y=year - optional • %M=month - optional • %D=day - optional • %T=HH.MM.SS creation time - mandatory For example, the following pattern **%Y_recording%T.ts** will generate the following file name **2017_recording15:32:35.ts**.

Broadcaster Actions on Input Streams

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 available types of outputs 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). As part of the RTMP output configuration process you can configure YouTube Live and Facebook Live streams.
- **Pull** – 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** – Push streams are Zixi protocol streams destined for other Zixi Broadcasters.
- **HTTP Push** – The HTTP Push output stream can be encapsulated in HLS or DASH. The source of the output stream is a predefined adaptive group that has been configured in the Adaptive Groups screen. The configuration of the stream includes the option to delete outdated stream fragments on the server. Output streams can be pushed to one Zixi Broadcasters or Zixi Receiver.
- **S3 Bucket** – The HTTP output stream (HLS or DASH) can be pushed to an AWS S3 Bucket. The native S3 support includes the ability to configure the S3 authentication credential, including the Region, Access Key, and Secret Key.
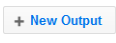
Broadcaster Actions on Input Streams
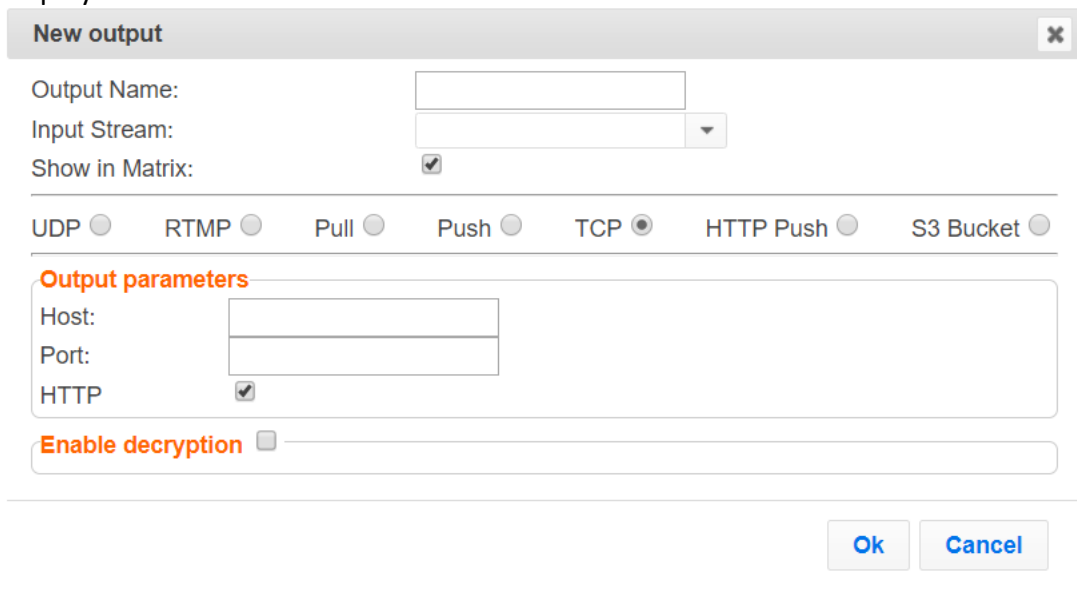
➡ **To Add Output:**

1. In the Zixi Broadcaster Navigation menu, click the **Inputs** tab.

2. Click the Settings button [⚙▾], and then click **New Output**. The **New Output** window with the settings of the selected output stream is displayed.

3. Follow the specific instructions of each output type from one of the following sections:
   - **Adding UDP Outputs**
   - **Adding RTMP Outputs**
   - **Adding Pull Outputs**
   -
   -
   - **Adding TCP Outputs**

TCP protocol provides reliable transmission guarantee for no loss of frame. Its bandwidth probing and congestion control will attempt to use all of the available bandwidth between the server and client, fetching content as quickly as possible while being friendly to other (TCP) traffic on the same links. The TCP output can push the stream directly to a TCP socket or to an HTTP server.

➡ **To Create a TCP Output:**

1. In the Zixi Broadcaster **Outputs** page, click [+ New Output]. The **New Output** window is displayed.

New output	✕

Output Name: _____
Input Stream: _____ ▾
Show in Matrix: ☑

UDP ○   RTMP ○   Pull ○   Push ○   TCP ⦿   HTTP Push ○   S3 Bucket ○

Output parameters
Host: _____
Port: _____
HTTP ☑

Enable decryption ☐

Ok   Cancel

2. Type in the unique identifier for this output in the **Output Name**.

Broadcaster Actions on Input Streams

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). Default: Selected.
5. Select **TCP**.
6. Specify the Output parameters (see **Output Stream Parameters** Table).
7. If the target is an HTTP server, select the HTTP checkbox. In this case, HTTP headers will be added to the stream.
8. Enter additional parameters as necessary (see Output Stream Parameters Table).
9. Click **OK**. The new TCP Output with its settings is created and now appears on the screen.

Output Stream Parameters Table

Parameter	Description
Output Parameters	
Host	The destination host for the stream.
Port	Specify the ports to listen on for Push streams. Default: 2088.
HTTP	If the target is an HTTP server, select the HTTP checkbox. In this case, HTTP headers will be added to the stream.
Enable Decryption	Select this checkbox to enable decryption of an encrypted stream.
Decryption type	If the stream has been encrypted, you can decrypt through the output by selecting this checkbox and specifying the type of encryption that was used. Select Automatic to decrypt a stream that has been encrypted using Automatic encryption. Only if the stream has not been encrypted, select None (default). Important Notice: if the stream has been encrypted you must decrypt it in the output.
Decryption key	Enter the decryption key to decrypt the encrypted stream.

Broadcaster Actions on Input Streams

- Adding HTTP Push Outputs
- **Adding S3 Bucket Outputs**

10. Click **OK**. The **New Output** with its new settings takes effect.

Broadcaster Actions on Input Streams

Playing Input Streams 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 **Broadcaster Outputs** section for more details.

➡ **To Play Input Streams with a VLC Player:**

1. In the Zixi Broadcaster **Inputs** page, click the desired incoming stream that you want to play with VLC.

2. Click the ![button] 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 Incoming Streams with a Flash Player:**

Flash Player enables playing the stream on a native browser with the Flash player.

1. In the Zixi Broadcaster **Inputs** page, click the desired incoming stream that you want to play with Flash Player.

2. Click the ![button] 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 Input Streams with a Shoutcast:**

Shoutcast enables playing an audio file on a native browser.

1. In the Zixi Broadcaster **Inputs** page, click the desired incoming stream that you want to play with Shoutcast.

2. Click the ![button] 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.

Broadcaster Actions on Multiple Inputs

In the Inputs screen, you can perform actions on multiple or all input streams at once by selecting them using the check boxes and then clicking the Marked drop-down menu.
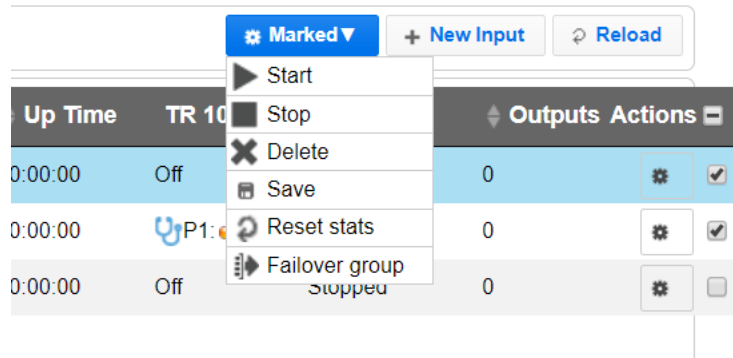
The actions include the following:

Starting and Stopping Multiple Input Streams

You can Start/Stop multiple streams.

➡ **To Start/Stop multiple Incoming Streams:**

1. In the Zixi Broadcaster Inputs screen, select the relevant Inputs by selecting the checkboxes
2. Click the Marked drop-down menu and then click **Stop** or **Start**.
   The selected input streams will be started/stopped.

Deleting Multiple Input Streams

➡ **To Delete Multiple Input Streams:**

1. In the Zixi Broadcaster Inputs screen, select the relevant Inputs by selecting the checkboxes.
2. Click the **Marked** drop-down menu and then click **Delete**.
   The following notification appears:
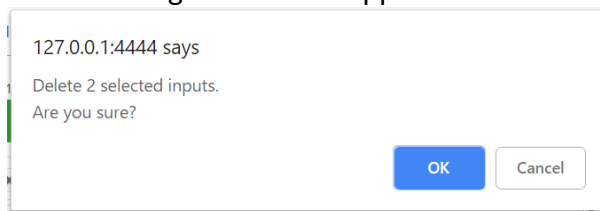
3. Click **OK**.

Saving Multiple Input Streams

➡ **To Save Multiple Input Streams:**

1. In the Zixi Broadcaster Inputs screen, select the relevant Inputs by selecting the checkboxes.
2. Click the **Marked** drop-down menu and then click **Save**.
3. All changes to the input streams are saved.

Resetting Stats for Multiple Input Streams

➡ **To Reset Stats for Multiple Input Streams:**

1. In the Zixi Broadcaster Inputs screen, select the relevant Inputs by selecting the checkboxes.
2. Click the **Marked** drop-down menu and then click **Reset Stats**.
   All accumulated stream statistics are reset.

Creating a Failover Group

Zixi features hitless failover for inputs, enabling undisrupted streaming when switching from one source to another. The hitless failover configuration involves grouping two or more inputs in a "Failover Group". If the inputs are identical (i.e. two or more binary-identical streams with synchronized RTP headers), when one of them is disrupted or interrupted completely, Zixi Broadcaster will seamlessly use the packets of the other input without any disruptions.

> If the streams are not identical, the failover process will not be seamless and may take up to a second.

The following procedure describes how to configure inputs as a Failover Group in Zixi Broadcaster.

➡ **To create a Failover Group:**

1. On the Input screen of Zixi Broadcaster, select the checkboxes of the relevant identical input streams.

Broadcaster Actions on Multiple Inputs

2. At the top of the inputs list, click the **Marked** drop-down menu and then click Failover Group.

3. The **Create a Failover Group** window opens:
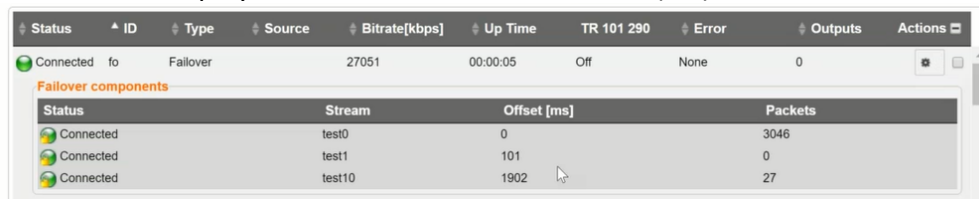
4. In the **Stream ID** field, type a new name for Failover Group. This name will appear in the list of Inputs.
5. In the **Max Outputs** field, type the number of desired concurrent outputs that can use the **Failover Group**. Default: Unlimited.
6. In the **Search Window** field, type the timeframe in which the system can search for the relevant packets in a matching stream. If there is a latency difference between the streams in the group, the **Search Window** value should be higher than the latency difference between the streams.

Encrypting an Input Stream in Zixi Broadcaster

7. In the **Max Bitrate** field, specify the maximum bitrate of the stream. Default: 8000. This is used for internal memory allocation and will not affect the transmitted bitrate. Recommended: double the bitrate of the highest bitrate stream.
8. In the **Max Latency** field, specify the buffer size that Zixi Broadcaster will keep for error correction. For example, 6000 milliseconds would ensure that the stream is protected for six seconds of errors in the network. Default: 6000.
9. Under **Candidates**, if you want to configure one or more of the streams as back up, select the checkbox next to the relevant stream. Backup streams will be used only when all the "Primary" streams are down.
10. Configure additional parameters as required.
11. Click **OK**.

    The Hitless Failover Group is added to the list of inputs, listing the sub-streams that are part of the group. The system will automatically detect the offset between the sub-streams and display it in milliseconds under Offset (ms).

Encrypting an Input Stream in Zixi Broadcaster

You can encrypt a specific input stream using static key AES scrambling encryption (AES 128, AES 192, AES 256). If the stream has been encrypted at the source, it can be encrypted by Zixi Broadcaster only after its decryption (See: **Decrypting an Input Stream in Zixi Broadcaster**). The stream encryption prevents any further processing, such as analysis, transcoding, etc. It is also possible to encrypt a UDP stream dynamically using DTLS. DTLS encryption can be configured on any Input or Output UDP port on the Zixi Broadcaster. This feature is activated and configured in the **Settings** page. For more information, see **Server Settings** section.

➡ **To encrypt an input stream in Zixi Broadcaster:**

1. In **Inputs** screen, click **+New Input**.
2. Select the relevant input type.
3. Fill in the stream parameters.
4. At the bottom, select the **Enable Encryption** checkbox.
5. In the **Encryption Type** field, select **AES 128**, **AES 192**, **AES 256** for fixed encryption.
6. In the **Encryption Key** field, enter your own key or click **Generate** to generate a key by the system. The exact key should be used to decrypt the stream on the other end.

Decrypting an Input Stream in Zixi Broadcaster

7. Click **OK**.

Decrypting an Input Stream in Zixi Broadcaster

Any stream that has been encrypted using standard AES static key can be decrypted in Zixi Broadcaster. You can configure the decryption of a specific stream by entering the decryption key.

➡ **To decrypt an input stream in Zixi Broadcaster:**

1. In **Inputs** screen, click **+New Input**.
2. Select **Push** or **Pull**.
3. Fill in the input details.
4. At the bottom, select the **Decrypt Stream** checkbox.
5. In the **Decryption Type** field, select **AES 128**, **AES 192**, **AES 256** for fixed key.
6. In the **Decryption Key** field, enter the exact same key that was used to encrypt the stream.

Decrypting an Input Stream in Zixi Broadcaster

7. Click **OK**.

Broadcaster Outputs

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.
- **TCP** - TCP protocol provides reliable transmission guarantee for no loss of frame. Its bandwidth probing and congestion control will attempt to use all of the available bandwidth between the server and client, fetching content as quickly as possible while being friendly to other (TCP) traffic on the same links.
- **HTTP Push** - The HTTP Push output stream can be encapsulated in HLS or DASH. The source of the output stream is a predefined adaptive group that has been configured in the **Adaptive Groups** screen. The configuration of the stream includes the option to delete outdated stream fragments on the server. Output streams can be pushed to one Zixi Broadcasters or Zixi Receiver.
- **S3 Bucket** - The HTTP output stream (HLS or DASH) can be pushed to an AWS S3 Bucket. The native S3 support includes the ability to configure the S3 authentication credential, including the Region, Access Key, and Secret Key

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.

Automated Output Configuration with Output Templates
Instead of manually creating an output and then connecting the output to an input, you can define output templates with rules for automatic creation of outputs with predefined settings. The template includes an Input pattern. When an input pattern matches the pattern of an incoming input stream, the output is created automatically. For more information about Output Templates, see **Save Marked Individual** and Multiple Outgoing Streams

Decrypting an Input Stream in Zixi Broadcaster

➡ **To Save Output Streams:**

1. In the Zixi Broadcaster Outputs page, select all outputs by selecting the **Actions** checkbox, located in the header line, or select individual outputs by selecting their checkboxes.
   The Marked drop-down button is displayed.

   | Outputs | Search Outputs | ✖ | 🔍 | 🖉 | | ⚙ Marked ▾ | + New Output | ⟳ Reload |

2. Click the **Marked** drop-down menu and then click **Save**.
   The selected Output Streams are saved.

Reset Stats for Individual and Multiple Outgoing Streams

➡ **To Reset Output Streams:**

1. In the Zixi Broadcaster Outputs page, select all outputs by selecting the **Actions** checkbox, located in the header line, or select individual outputs by selecting their checkboxes.
   The Marked drop-down button is displayed.

   | Outputs | Search Outputs | ✖ | 🔍 | 🖉 | | ⚙ Marked ▾ | + New Output | ⟳ Reload |

2. Click the **Marked** drop-down menu and then click **Reset**.
   The selected Output Streams are reset.

Using Output Templates.

Adding Outputs

Zixi Broadcaster enables you to add various types of outputs. When you create a new output, select the output type and then fill in the fields that are applicable for that output type.

Adding UDP Outputs

➡ **To Create a UDP Output:**

1. In the Zixi Broadcaster **Outputs** page, click [+ New Output]. 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 drop-down list.
4. Select the **Show in Matrix** check box to display this stream in the Matrix (see Using the Matrix). Default: Selected.
5. Select **UDP**.
6. Specify the **Output parameters** (see Output Stream Parameters Table).
7. In the **Host** field, specify the IP address or URL 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 Output Stream Parameters Table).
10. Click **OK**.

The new UDP Output with its settings is created and now appears on the **Outputs** screen.

Adding Outputs

Output Stream Parameters Table

Parameter	Description
Output Parameters	
Host	Specify the destination IP address or URL.
Port	Specify the target UDP port.
TTL	Specify 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 use of the Real-time Transport Protocol.
SMPTE 2022 FEC:	Disables the FEC or specify the type of FEC matrix to D1/ D2.
Bind to IP	Specify the local IP address to use in the output. The IP address can be also sourced from any active NIC. Select the local IP from the drop-down menu.
Local Port	Specify from which local port 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.
Remuxing	Select this checkbox to enable remuxing from VBR MPEG-TS to MPEG-TS CBR (used for professional IRDs).
Remux to bitrate [kbps]:	Specify the CBR bitrate to target for a remuxed stream.
Buffer Size [ms]	Specify the size of the buffer that will be used for the remixing. A larger buffer increases the quality, but also increases latency.
No NULL Packets	
Enable Decryption	Select this checkbox to decrypt an encrypted stream.
Decryption type	If the stream has been encrypted, you can decrypt through the output by selecting this checkbox and specifying the type of encryption that was used.

	Select **Automatic** to decrypt a stream that has been encrypted using **Automatic** encryption.
	Only if the stream has not been encrypted, select **None** (default).
	Important Notice: if the stream has been encrypted you must decrypt it in the output.
Decryption key	If the decryption type includes a key, enter the key to decrypt the stream during output.
Enable IFB/Talkback	Select this checkbox to enable IFB/Talkback for one-way communication from the director or assistant director to on-air talent or a remote location. Selecting the checkbox allows the decoder with a Zixi Receiver to send audio back to the encoder with a Zixi Feeder. This offers the ability to, for example, give audio feedback to the camera operator.
Port	The port that will be used to send the audio feedback.
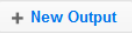
Adding RTMP Outputs

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). As part of the RTMP output configuration process you can configure YouTube Live and Facebook Live streams.

➡ **To create an RTMP Output:**

1. In the Zixi Broadcaster **Outputs** page, click . The **New output** window is displayed.

Adding Outputs

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). Default: Selected.
5. Select **RTMP**.
6. Specify the **Output parameters** (see Output Stream Parameters Table).
   - To configure an RTMP stream using YouTube Live see Creating RTMP Outputs Using You Tube Live.
   - To configure an RTMP stream using Facebook Live see Creating RTMP Outputs Using Facebook Live.
7. Click **OK**.

The new RTMP Output with its settings is created and now appears on the screen.

Output Stream Parameters Table

Parameter	Description
Output Parameters	
URL	Specify the destination Stream URL according to the following format: rtmp://host:[port]/app. You can define RTMPS clients with the proven security of a secure socket layer (SSL), by using the rtmps:// url

Adding Outputs

Backup URL	Enter a backup URL (fallback mode) – will be used in case the primary server is not responsive.
Stream Name	Specify the unique name for the stream that the RTMP server at the other end of the connection expects.
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.
Bitrate (kbps)	Specify the actual bitrate in kbps 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)
Disconnect if inactive	Select this checkbox to disconnect if the stream is not active for 30 seconds.
Ignore TLS certificate errors	Select this option when streaming to a trusted server that does not have a valid certificate. When this option is selected, Zixi Broadcaster will ignore the TLS certificate errors and transmit the stream to its destination.
Enable Decryption	Select this checkbox to enable decryption of an encrypted stream.
Decryption type	If the stream has been encrypted, you can decrypt through the output by selecting this checkbox and specifying the type of encryption that was used. Select **Automatic** to decrypt a stream that has been encrypted using **Automatic** encryption. Only if the stream has not been encrypted, select **None** (default). **Important Notice: if the stream has been encrypted you must decrypt it in the output.**

Creating RTMP Outputs Using YouTube Live

As part of the RTMP output configuration process, you can configure YouTube Live targets. This enables you to send an RTMP stream to YouTube Live using your YouTube authorization/login and settings. Before you configure the YouTube Live output stream in Zixi Broadcaster, you need to set up an Event in your YouTube Live account. This process generates a Primary and Secondary URL for streaming the event. You can then create an RTMP output stream in your

Adding Outputs

Zixi Broadcaster and select a YouTube Live event to which the stream will be sent. You then select either the Primary or Backup URL which is provided by YouTube to stream the event.

> Note: you can increase stability by setting up two parallel output streams using both the Primary and Backup URLs.

➡ **To set up an event in your YouTube Live account:**

1. Log in to your YouTube account.
2. Click the **User** icon to display the user menu.
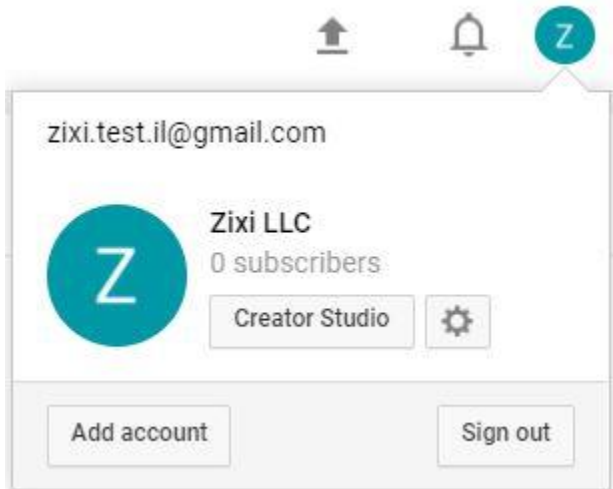
3. Click **Creator Studio**. Your **Creator Studio Dashboard** is displayed.
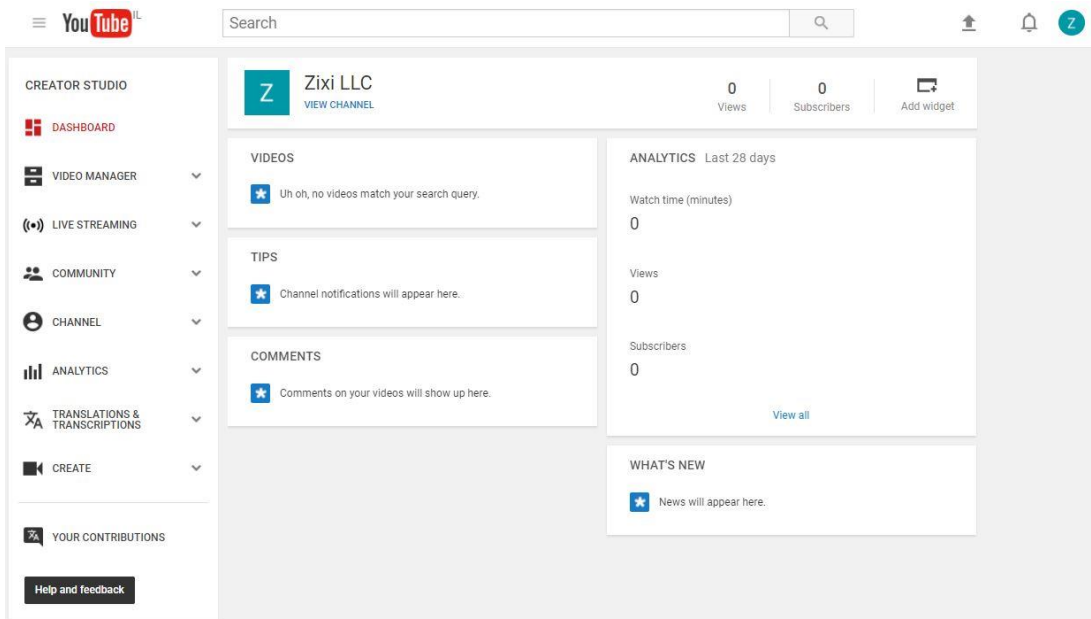
4. In the Creator Studio menu panel, click **Live Streaming**. The drop-down list of Live Streaming options is displayed.

Adding Outputs

CREATOR STUDIO

DASHBOARD

VIDEO MANAGER

((•)) LIVE STREAMING

Stream now
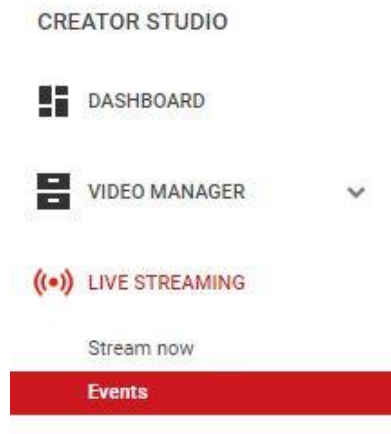
Events

5. Click **Events**. The Events page is displayed.

Events 0   New live event

☐ Actions ▾   View: Upcoming ▾
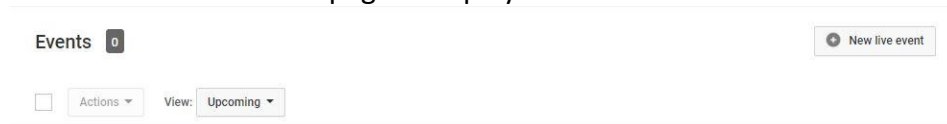
You don't have any upcoming events.
Schedule a new event.

Adding Outputs

6. Click **New live event**. The Event setup page is displayed.

7. In the **Title** field, enter a title for the event.
8. In the **Date** field, enter a date for the event.
    *   The default date is *Today*.
    *   To select a different date, click on the date box (where *Today* is shown) to display a calendar, and select a date for the event.
9. In the **Time** field, enter a time for starting the event.
    *   The default time is the beginning of the upcoming hour.
    *   To select a different time, click the Time box (where the default time is shown). Either select a time from the drop-down list of times (every half hour) or type in a specific time for starting the event.
10. If you would like to set an end time for the event, click **Add end time** and select the time for the event to end.

> Note: the time zone for which the time is selected is displayed below the Date and Time boxes. To change the time zone click **Edit** and select the correct time zone.

11. If you would like to add a Description and/or Tags for the event, enter them in the appropriate fields.
12. Select the access status (Public (default), Unlisted or Private).
13. If you would like to share the event on Google+ or Twitter, click the checkbox next to the icon.
14. In the **Type** section, click **Custom**.
15. Click **Create Event**.

The Live Event Configuration page opens:

16. Select Basic ingestion (default) and choose the maximum bitrate from the drop-down list. A notification at the top of the page shows that the event has been successfully saved.

17. In the **Select your encoders** section, select **Other encoders** from the drop-down list. The event is set up in YouTube. You can now configure the event stream on your Zixi Broadcaster.

Adding Outputs

➡ **To create an RTMP Output on your Zixi Broadcaster using YouTube Live:**

1. In the Zixi Broadcaster **Outputs** page, click [+ New Output]. The New output window is displayed.

New output	✖

Output Name: _____

Input Stream: _____ ▼

Show in Matrix: ☑

UDP ○   RTMP ◉   Pull ○   Push ○   TCP ○   HTTP Push ○   S3 Bucket ○

Output parameters

▶️ f

URL (rtmp://host:[port]/app): `rtmp://`

Backup URL: _____

Stream name: _____

Username: _____

Password: _____

Bitrate [kbps]: `0`

Reconnect [sec]: `5`

Send timecode: ☐

Disconnect if inactive: ☐

Ignore TLS certificate: ☐

Enable decryption ☐

Ok   Cancel

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). Default: Selected.
5. Select **RTMP**.
6. Click the ▶️ icon. An authorization window opens.

Youtube stream selection	✖

Please authorize access to youtube account.   Authorize

7. Click **Authorize**.
   The YouTube login page opens in your browser.

Adding Outputs

8. Log in to your account using your YouTube username and password.
   Your YouTube Events are displayed in the Events window.
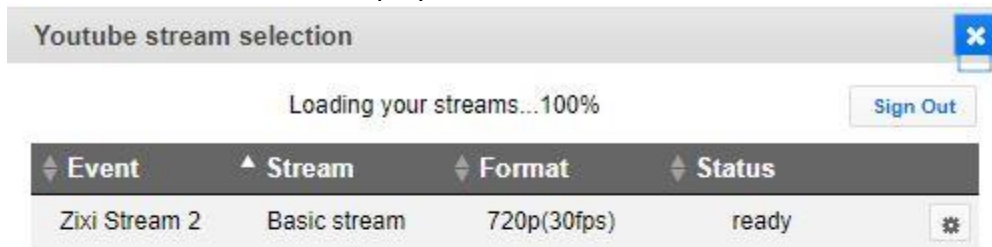
9. Click on an event.
10. Click **Stream to Primary** or **Stream to Backup**.
    The Output configuration window is displayed with the **URL** and **Stream Name** fields completed.
11. In the **Bitrate** field, enter the stream's bitrate.
12. Click **OK**.

The new RTMP YouTube Live Output with its settings is created and now appears on the Outputs screen.

Creating RTMP Outputs Using Facebook Live

As part of the RTMP output configuration process, you can configure Facebook Live targets for your Zixi Broadcaster. This enables you to send an RTMP stream into Facebook Live using your Facebook authorization/login and settings. You can set the privacy authorization to determine who can access the stream. You can also configure how it will be posted to Facebook (e.g. User feed, Page, Event or Group). For *Regular Streams*, with a limited duration, you have the option of saving the stream as VOD to enable subsequent viewing.

➡ **To creat an RTMP ouput using Facebook Live**

1. In the Zixi Broadcaster Outputs page, click ⊞ New Output .
   The **New output** window is displayed.

Adding Outputs

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). Default: Selected.
5. Select **RTMP**.
6. Click the [f] icon.
   An authorization window opens.

7. Click **Authorize**.
   The Facebook login page opens in your browser.
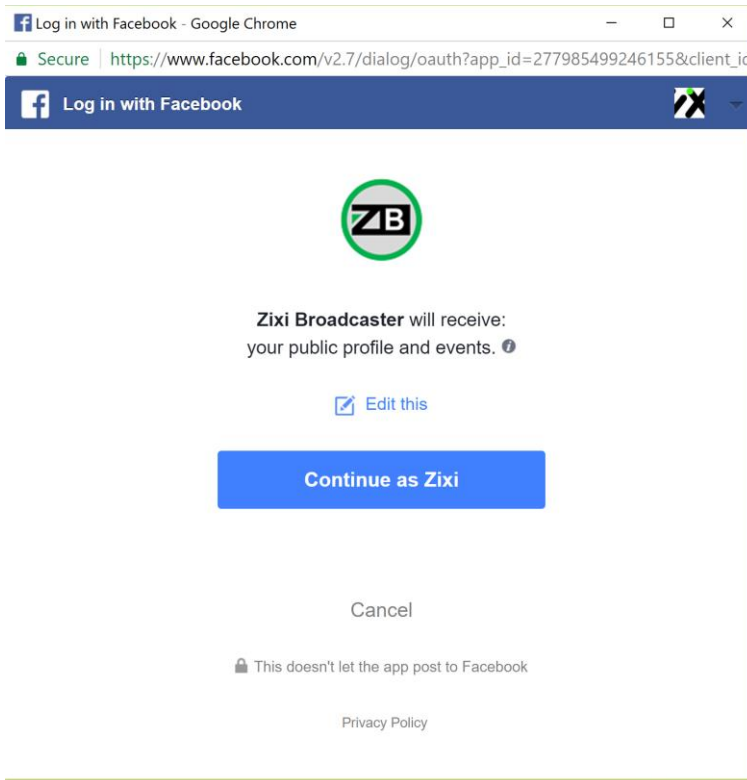
Adding Outputs

8. Log in to your account using your Facebook username and password.
   The Facebook privacy authorization screen is displayed.
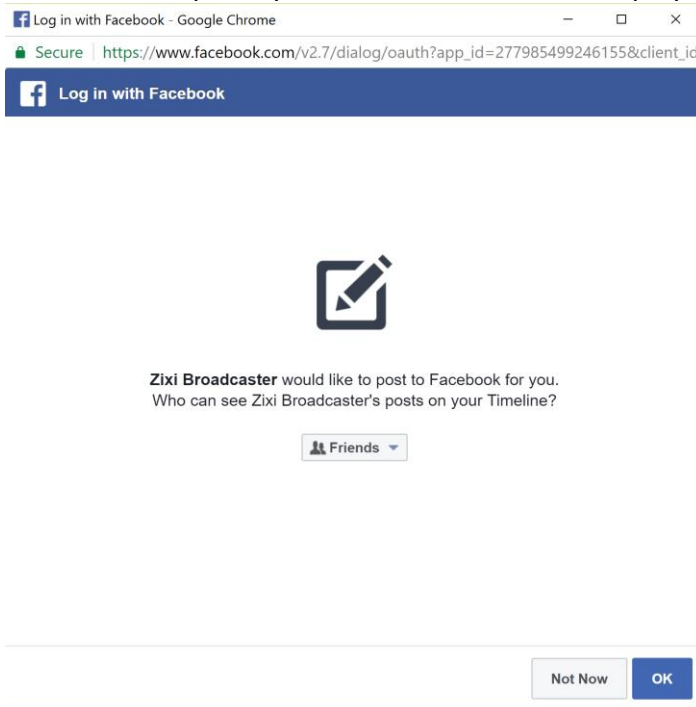
Adding Outputs

9. To set the privacy authorization for your Zixi Broadcaster posts, click the **Friends** button. A drop-down menu appears.
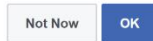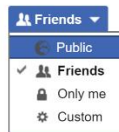
10. Select who is authorized to view your posts. The authorization options are:
    - **Public** – Your post will be available to the general public and is visible to search engines.
    - **Friends** – Only your Facebook *Friends* can view your post.
    - **Only me** – No one else can view your post.
    - **Custom** – You can specify which individuals or groups are able to view your post.
11. Click **OK**.

Adding Outputs

The **Manage Pages** screen is displayed. This enables Zixi Broadcaster to post the stream to your Pages and Groups.
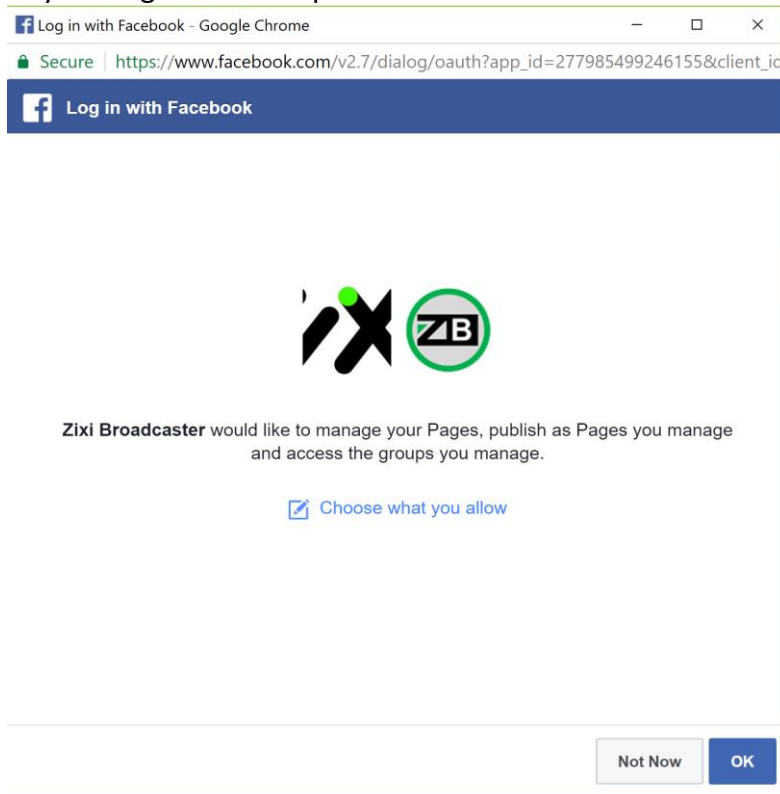
12. Click **OK**.

The **Facebook Video Stream** setup page is displayed.
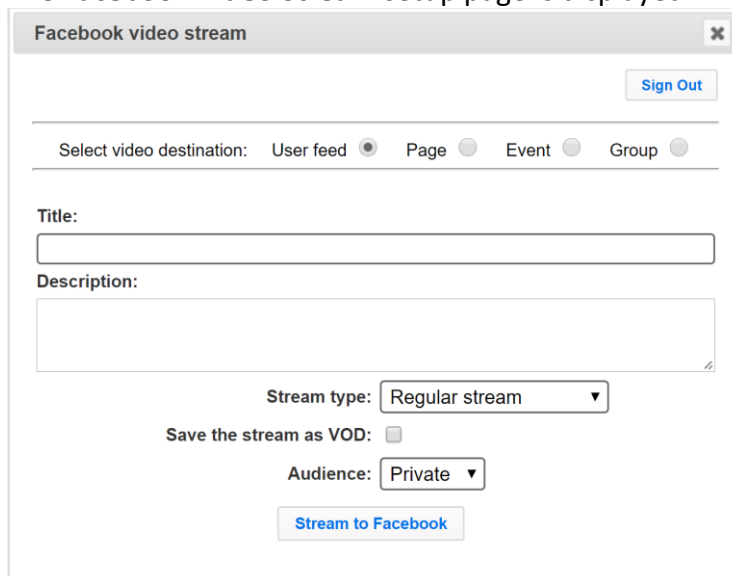
13. Select the stream destination. The destination options are:

- **User feed** – The stream will be posted as part of your User feed.

Adding Outputs

- **Page** – The stream will be posted to a Facebook Page associated with your account.
- **Event** – The stream will be posted to a Facebook Event page associated with your account.
- **Group.** The stream will be posted to a Facebook Group to which you are authorized to post.

14. If you selected **Page, Event** or **Group** as the destination, then a list of existing *Pages*, *Events* or *Groups* respectively are displayed. Select the relevant entity.

> You can search for the relevant Page, Event or Group using the search box.

15. In the **Title** field, enter a title for the event.
16. In the **Description field**, you can enter a description of the event (optional field).
17. Select the Stream type from the drop-down menu. The options are:
    - **Regular stream** – A stream that has a limited duration that does not exceed the limits set by Facebook.
    - **Continuous broadcast** – A stream with an unlimited duration.

Adding Outputs
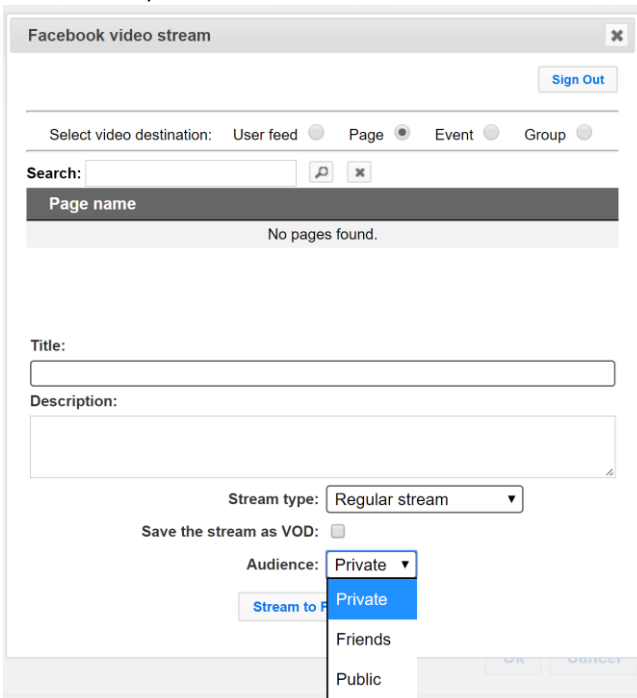
18. For a **Regular Stream**, you have the option to select **Save this stream as VOD,** to enable subsequent viewing of the stream, by clicking the check-box.

> If you selected **Continuous broadcast** then the **Save this stream as VOD** option is not available.

19. Select the privacy authorization for this stream from the dropdown menu. The options are **Private**, **Friends** or **Public**. Default: *Private*.

Adding Outputs

20. Click **Stream to Facebook**.
    The Output configuration window is displayed with the **URL** and **Stream Name** fields completed.
21. In the **Bitrate** field, enter the stream's bitrate.
22. Click **OK**.
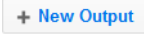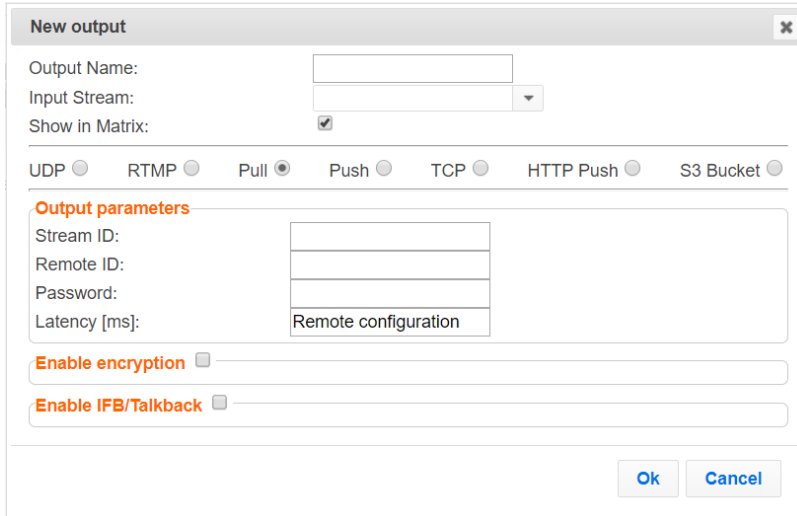
The new RTMP Facebook Live output with its settings is created and now appears on the Outputs screen.

Adding Pull Outputs

➡ **To Create a Pull Output:**

1. In the Zixi Broadcaster **Outputs** page click `+ New Output` . 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). Default: Selected.
5. Select **Pull**.
6. Enter the **Output Parameters** (see Output Stream Parameters Table).
7. Click **OK**.

The new Pull Output with its settings is created and now appears on the screen.

Output Stream Parameters Table

Parameter	Description

Adding Outputs

Output Parameters	
Stream ID	Specify the unique Stream ID that the remote Zixi Receiver/Broadcaster expects (recommended – identical to 'Input Stream').
Remote ID	Specify the Zixi Receiver/Broadcaster ID (shown in the Zixi Receiver/Broadcaster **Status** window) that will be allowed to pull the stream.
Password	Specify 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 will be able to maintain 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 Zixi Receiver/Broadcaster. Otherwise use a value to override the value configured in the Zixi Receiver/Broadcaster.
Enable Encryption	Select this checkbox to encrypt the Output stream.
Encryption type (for Encryption enabled)	Specify the type of Encryption (AES 128/192/256). Click **Generate** to generate an encryption key or enter another encryption key.
Enable IFB/Talkback	Select this checkbox to enable IFB/Talkback for one-way communication from the director or assistant director to on-air talent or a remote location. Selecting the checkbox allows the decoder with a Zixi Receiver to send audio back to the encoder with a Zixi Feeder. This offers the ability to, for example, give audio feedback to the camera operator.
Port	The port that will be used to send the audio feedback.

Adding Push Outputs
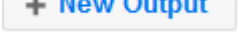
Output streams can be pushed to one or more Zixi Broadcasters and Zixi Receivers. You can specify multiple destinations (Broadcasters/Receivers) by adding them in the Links section. You can also split a single stream using multiple links and then bond them into a single stream in target Zixi Broadcaster using the Bond Links feature. For each of these links, you can specify the max bitrate that can be used. In addition, some links may be specified as backups. The backup links will be used if the bandwidth across all the non-backup links are not enough for the stream
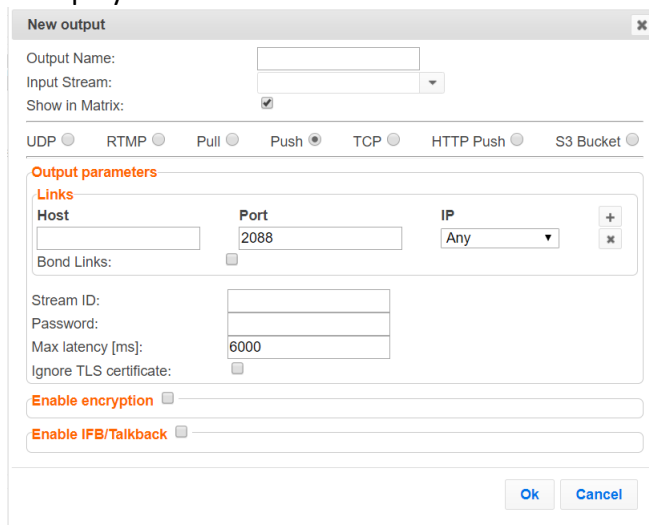
Adding Outputs

(i.e. if a non-backup link is not available, it will not use the backup). Only if the accumulated bandwidth of non-backup links is not enough, then the Broadcaster will stream to a backup link.

➡ **To Create a Push Output:**

1. In the Zixi Broadcaster **Outputs** page, click [+ New Output]. 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). Default: Selected.
5. Select **Push**.
6. Do one of the following:
   - **Stream to multiple destinations** - you can stream the same identical stream to multiple destinations by entering the destination parameters and then clicking the **"+"** button to add another destination (see **Output Stream Parameters** Table).
   - **Bonded link to a single destination** - you can split the stream into multiple links, which will be forwarded to a single Zixi Broadcaster by selecting the **Bond Links** checkbox (see **Using Network Bonding for Hitless Failover**).
7. Enter additional parameters as necessary (see Output Stream Parameters Table)
8. Click **OK**. The new Push Output with its settings is created and now appears on the screen.

Output Stream Parameters Table

Parameter	Description

Adding Outputs

Output Parameters	
Links	
Host	The destination host for the push stream. **Note:** additional failover destinations can be added by clicking the adjacent "**+**" button.
Port	Specify the ports to listen on for Push streams. Default: 2088.
IP	Specify the local IP address.
Max Bitrate (for Bond Links enabled)	Relevant for Bond Links option. Specify the max bitrate in Kbps for the specific link.
Bond Links	Click this checkbox to split the stream into multiple links, which will be forwarded to a single Zixi Broadcaster.
Backup (for Bond Links enabled)	Relevant for Bond Links option. Select this checkbox to define the link as a backup. The backup will be used only if the accumulated bandwidth of the non-backup links is not sufficient.
Stream ID	Specify the unique Stream ID that the remote Zixi Broadcaster expects.
Password	Optional - Specify a string to be used 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 will keep for error correction. For example, 6000 milliseconds would ensure that the stream is protected for six seconds of errors in the network. Default:6000
Ignore TLS certificate errors	Select this option when streaming to a trusted server that does not have a valid certificate. When this option is selected, Zixi Broadcaster will ignore the TLS certificate errors and transmit the stream to its destination.
Enable Encryption	Select this checkbox to encrypt the Output stream.
Encryption type (for Encryption enabled)	Specify the type of Encryption (AES 128/192/256). Click **Generate** to generate an encryption key or enter another encryption key.
Enable IFB/Talkback	Select this checkbox to enable IFB/Talkback for one-way communication from the director or assistant director to on-air talent or a remote location. Selecting the

Adding Outputs

	checkbox allows the decoder with a Zixi Receiver to send audio back to the encoder with a Zixi Feeder. This offers the ability to, for example, give audio feedback to the camera operator.
Port	The port that will be used to send the audio feedback.

Adding TCP Outputs

TCP protocol provides reliable transmission guarantee for no loss of frame. Its bandwidth probing and congestion control will attempt to use all of the available bandwidth between the server and client, fetching content as quickly as possible while being friendly to other (TCP) traffic on the same links. The TCP output can push the stream directly to a TCP socket or to an HTTP server.

➡ **To Create a TCP Output:**

1. In the Zixi Broadcaster **Outputs** page, click [+ New Output]. 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). Default: Selected.
5. Select **TCP**.
6. Specify the Output parameters (see **Output Stream Parameters** Table).
7. If the target is an HTTP server, select the HTTP checkbox. In this case, HTTP headers will be added to the stream.
8. Enter additional parameters as necessary (see Output Stream Parameters Table).
9. Click **OK**. The new TCP Output with its settings is created and now appears on the screen.

Adding Outputs

Output Stream Parameters Table

Parameter	Description
Output Parameters	
Host	The destination host for the stream.
Port	Specify the ports to listen on for Push streams. Default: 2088.
HTTP	If the target is an HTTP server, select the HTTP checkbox. In this case, HTTP headers will be added to the stream.
Enable Decryption	Select this checkbox to enable decryption of an encrypted stream.
Decryption type	If the stream has been encrypted, you can decrypt through the output by selecting this checkbox and specifying the type of encryption that was used. Select Automatic to decrypt a stream that has been encrypted using Automatic encryption. Only if the stream has not been encrypted, select None (default). Important Notice: if the stream has been encrypted you must decrypt it in the output.
Decryption key	Enter the decryption key to decrypt the encrypted stream.

Adding HTTP Push Outputs

The HTTP Push output stream can be encapsulated in HLS or DASH. The source of the output stream is a predefined adaptive group that has been configured in the **Adaptive Groups** screen. The configuration of the stream includes the option to delete outdated stream fragments on the server. Output streams can be pushed to one Zixi Broadcasters or Zixi Receiver.

➡ **To Create an HTTP Push Output:**

1. In the Zixi Broadcaster **Outputs** page, click + New Output.
   The **New Output** window is displayed.

2. Select the **HTTP** Push option (radio button).
3. Type in the unique identifier for this output stream in the **Output Name**.
4. Select an **Input Adaptive Group** to be made available on this output from the adjacent drop-down list. To create an Adaptive Group, see **Adaptive Groups**.
5. Select the **Show in Matrix** check box to display this stream in the Matrix (see Using the Matrix). Default: not selected.
6. Enter the **Output Parameters** (see Output Stream Parameters Table).
7. Click **OK**.

Adding Outputs

Output Stream Parameters Table

Parameter	Description
Output Parameters	
Encapsulation Options	• HLS Encapsulation - the output stream, which includes all the streams in the selected Adaptive group, will be encapsulated in HTTP Live Streaming format. • Dash Encapsulation - the output stream, which includes all the streams in the selected Adaptive group, will be encapsulated in MPEG DASH format.
Target URL	The URL of the destination host for the push stream.
Delete outdated stream fragments on server	Select this checkbox to delete any outdated stream fragments from the server.
Ignore TLS certificate errors	Select this option when streaming to a trusted server that does not have a valid certificate. When this option is selected, Zixi Broadcaster will ignore the TLS certificate errors and transmit the stream to its destination.

Adding S3 Bucket Outputs

The HTTP output stream (HLS or DASH) can be pushed to an AWS S3 Bucket. The native S3 support includes the ability to configure the S3 authentication credential, including the Region, Access Key, and Secret Key.

➡ **To Create an S3 Bucket Output:**

1. In the Zixi Broadcaster **Outputs** page, click + New Output . The **New Output** window is displayed.

2. Select the **S3 Bucket** option (radio button).
3. Type in the unique identifier for this output stream in the **Output Name**.
4. Select an **Input Adaptive Group** to be made available on this output from the adjacent drop-down list. To create an Adaptive Group, see **Adaptive Groups**.
5. Select the **Show in Matrix** check box to display this stream in the Matrix (see Using the Matrix). Default: not selected.
6. Enter the **Output Parameters** (see Output Stream Parameters Table).
7. Click **OK**.

Adding Outputs

Output Stream Parameters Table

Parameter	Description
Output Parameters	
Encapsulation Options	• HLS Encapsulation - the output stream, which includes all the streams in the selected Adaptive group, will be encapsulated in HTTP Live Streaming format. • Dash Encapsulation - the output stream, which includes all the streams in the selected Adaptive group, will be encapsulated in MPEG DASH format.
Bucket URL	The URL address of the destination host for the S3 Bucket.
Delete outdated stream fragments on server	Select this checkbox to send delete messages to S3 to delete the outdated stream fragments from the servers.
Ignore TLS certificate errors	Select this option when streaming to a trusted server that does not have a valid certificate. When this option is selected, Zixi Broadcaster will ignore the TLS certificate errors and transmit the stream to its destination.
Regions	Select the Amazon AWS Region.
Access key	Enter your AWS S3 Access key.
Security key	Enter your AWS S3 Security key.

Viewing Existing Outputs

The Outputs screen displays all the output streams that have been created.

⇕ Status	▲ Name	⇕ Type	⇕ Destination	⇕ Bitrate[kbps]	⇕ Uptime	⇕ Latency	⇕ Input ID	Actions ☐
🔴 Offline - None	dfdf	Pull	klkls@	0	00:00:00	0	bbb_1080p_5mbps	⚙▾ ☐
🔴 Offline - None	Live Broadcast	Facebook	rtmps://rtmp-api.facebook.com:443/rtmp	0	00:00:00	1000	bbb_1080p_5mbps	⚙▾ ☐

Hovering the cursor on the status indicator of a stream shows 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.
Actions	Provides access to various actions to be performed on this output stream (see Performing Actions on Output Streams below).

Stats Pane

The Stats pane on the bottom of the page shows data about the activity of the selected stream.
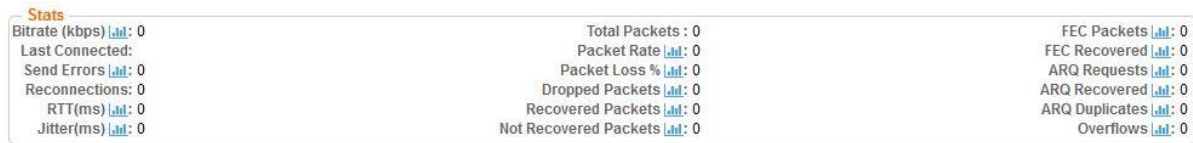
Click the icon next to a parameter to show the graph of historical data for the specified parameter.

Field	Description
Bitrate (kbps)	Displays the current bitrate of the output stream
Last Connected	Displays the date and time in which the stream was connected.
Send Errors	Displays the number of errors generated after sending the stream.
Reconnections	Displays the number of reconnection attempts.
RTT (ms)	Displays the Round Trip Time (RTT) from the source (in milliseconds)
Jitter	Displays the current Jitter, measured in millisecods.
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 the packet loss rate (how many packets were lost out of the total number of packets).
Dropped Packets	Displays the total number of packets that were dropped since the beginning of the stream.
Recovered Packets	Displays the total number of dropped packets that have been recovered since the beginning of the stream.
Not Recovered Packets	Displays the number of non-recovered packets.
Failed Sends	Displays the number of failed attempts to send the stream.
FEC Packets	Displays the number of FEC packets transmitted.
FEC Recovered	Displays the number of FEC packets that were recovered.
ARQ Requests	Displays the number of requests for transmission 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	Displays the number of packets lost due to buffer overflow. Note: overflow is usually the result of the Max Bitrate being too low.

Searching for Output Streams

➡ **To Search for an Output Stream:**

In the Zixi Broadcaster **Outputs** page, 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).

Performing Actions on Output Streams

Every stream has a shortcut button that can be used to perform relevant actions on the stream. The following actions can be performed through the Actions button:

- **Deleting Output Streams from Broadcaster**
- **Switching Input**

Deleting Output Streams from Broadcaster

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

1. In the Zixi Broadcaster **Outputs** page, select the output stream you want to delete, and then click [⚙▾].
2. Click **Delete** to the selected stream. The selected input stream was deleted and is not displayed anymore.

Switching Input

➡ **To change the input associated with the selected output:**

1. In the Zixi Broadcaster **Outputs** page, click [⚙▾] and select **Switch Input**. The **Switch source** window is displayed.
2. In the **New Input** drop-down, select the desired input, and click **OK**. The newly designated input is now associated with the selected output.

Performing Actions on Multiple Outputs

Delete Marked Individual and Multiple Outgoing Stream

➡ **To Delete Output Streams:**

1. In the Zixi Broadcaster Outputs page, select all outputs by selecting the checking the Actions checkbox at the header line, or select individual outputs by selecting their checkboxes.
   The Marked drop-down button is displayed.

2. Click the **Marked** drop-down menu and then click **Delete**.
   The selected Output Streams are deleted.

Start and Stop Marked Individual and Multiple Outgoing Streams

➡ **To Stop/Start Output Streams:**

1. In the Zixi Broadcaster Outputs page, select all outputs by selecting the **Actions** checkbox, located in the header line, or select individual outputs by selecting their checkboxes.
   The Marked drop-down button is displayed.
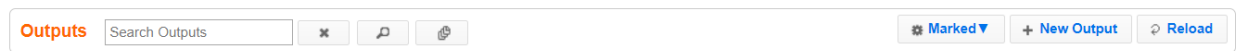
2. Click the **Marked** drop-down menu and then click **Start/Stop**.
   The selected Output Streams are started/stopped.

Save Marked Individual and Multiple Outgoing Streams

➡ **To Save Output Streams:**

3. In the Zixi Broadcaster Outputs page, select all outputs by selecting the **Actions** checkbox, located in the header line, or select individual outputs by selecting their checkboxes.
   The Marked drop-down button is displayed.
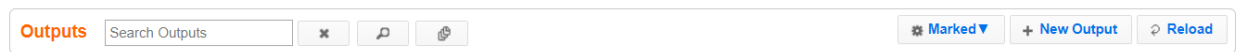
4. Click the **Marked** drop-down menu and then click **Save**.
   The selected Output Streams are saved.

Reset Stats for Individual and Multiple Outgoing Streams

➡ **To Reset Output Streams:**

5. In the Zixi Broadcaster Outputs page, select all outputs by selecting the **Actions** checkbox, located in the header line, or select individual outputs by selecting their checkboxes.
    The Marked drop-down button is displayed.
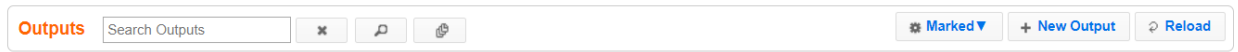
6. Click the **Marked** drop-down menu and then click **Reset**.
    The selected Output Streams are reset.

Using Output Templates

Instead of manually creating an output and then connecting the output to an input, you can define output templates with rules for automatic creation of outputs with predefined settings. The template includes an Input pattern. When an input pattern matches the pattern of an incoming input stream, the output is created automatically.

➡ **To create a new Output template:**

1. Click the **Outputs** tab at the top of the Zixi Broadcaster administrative screen.

2. In the **Menu** bar, click the **Templates** ( ) button.
    The **Output Templates** window is displayed:
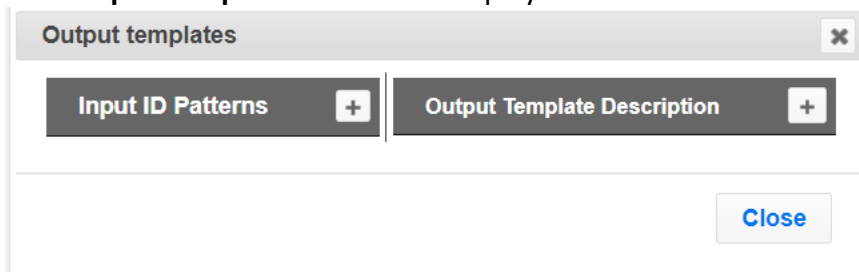
3. Under **Input ID Parameters**, click the **'+'** button.
    The **New Output Pattern Template** window is displayed:
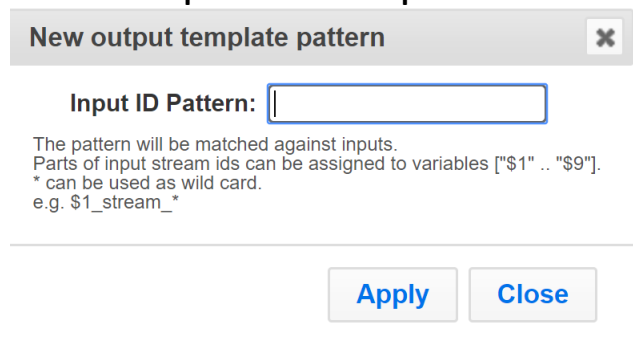
4. In the **Input ID Pattern** field, enter a pattern for the Stream ID of the input stream for which an output will be automatically created. This pattern will be used to identify the input stream and can include variables that are marked with the "$" sign followed by a number (e.g. $1, $2, etc.) and/or with an asterisk "*" wildcard.
   The patterns should also include a part of the string that requires an exact match.
   For example, the pattern "$1_stream_$2kbps" will match an input stream "talk_show_stream_600kbps".
5. Click **Apply**.
   The newly created input ID pattern is added to the **Input ID Patterns** list.
6. From the **Input ID Patterns** list, select a pattern for which you want to relate an output template.
7. In the **Output Template Description** section click the "**+**" button.
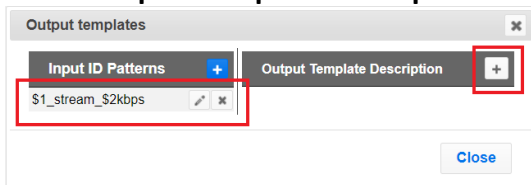
The **New Output Template** window is displayed:
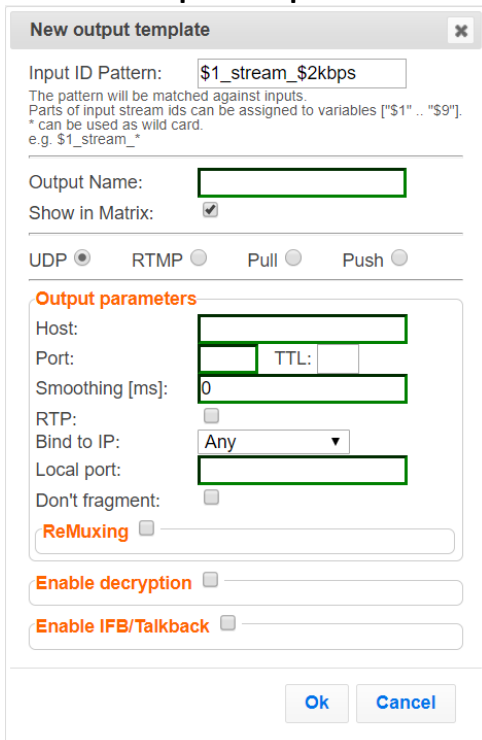
8. In the **Output Name** field, enter a name for the output that will be created. The name can include variables used in the **Input Pattern** field.

9. Select the desired output type and fill-in the relevant Output parameters according to the instructions of the relevant section:
    - **UDP Output** – Follow the instructions in the **Adding UDP Outputs** section.
    - **RTMP Output** – Follow the instruction in the **Adding RTMP Outputs** section.
    - **Pull Output** - Follow the instruction in the **Adding Pull Outputs** section.
    - **Push Output** - Follow the instruction in the **Adding Push Outputs** section.

10. Click **OK**.

    The template is added to the **Output Template Description** list. When an input pattern will match the pattern of an incoming input stream, the defined output is created automatically.

Broadcaster Network Bonding

Zixi's Network Bonding feature enables you to divide a stream into several network channels by utilizing multiple NICs and links and then subsequently reuniting them at the Zixi Broadcaster side. For example, a 5 Mbps stream can be streamed using two links, one 2 Mbps link that uses a mobile network and another 3 Mbps Wifi network. The stream is automatically bonded at the Zixi Broadcaster side without any special configuration (as long as the Push input is defined and the two NICs are setup in the machine running the Zixi Broadcaster). Network Bonding can be used for load balancing between multiple links in the following configurations:

- **Zixi Feeder with Multiple NICs to a single Zixi Broadcaster NIC** - the stream is divided at the Zixi Feeder end and then bonded at the Zixi Broadcaster end. This configuration requires configuring Network Bonding in the Zixi Feeder.
- **Zixi Feeder with Multiple NICs to multiple Zixi Broadcaster NICs** - the stream is divided at the Zixi Feeder end, sent to multiple IP addresses (each Zixi Broadcaster NIC has a separate IP address), and then bonded at the Zixi Broadcaster end. This configuration requires configuring Network Bonding in the Zixi Feeder. Each destination (i.e. each Broadcaster NIC is configured in a separate network bonding link by using a different Host IP address).
- **Zixi Feeder with single NIC to Multiple Zixi Broadcaster NICs** - the stream is sent to multiple IP addresses (each Zixi Broadcaster NIC has a separate IP address), and then bonded at the Zixi Broadcaster end. This configuration requires configuring Network Bonding in the Zixi Feeder. Each destination (i.e. each Broadcaster NIC is configured in a separate network bonding link by using a different Host IP address).
- **Zixi Broadcaster with multiple NICs to another Zixi Broadcaster with a single/multiple NICs** - a Zixi Broadcaster can transfer a stream to another Zixi Broadcaster through multiple NICs at the source Broadcaster and single/multiple NICs at the destination Broadcaster. This configuration requires configuring Network Bonding in the Zixi Broadcaster (see Broadcaster Output with Network Bonding).

Using Network Bonding for Hitless Failover

The Network Bonding feature can be used to ensure high availability of the stream. The feature ensures hit-less failover between multiple networks and network cards (i.e. network and hardware protection). As part of the configuration of the network bonding feature it is possible to set a NIC (which may be connected to a separate network) as a "Backup". In this case, the backup link will only be utilized if the stream has used all other available capacity. For example, a stream can be configured to be transferred on a WiFi network as the main link and a mobile network as a backup. If the WiFi link is compromised (either completely unavailable or limited bandwidth), the stream will be transferred, in full or partially through the backup mobile link and then bonded at the Zixi Broadcaster end, enabling uninterrupted streaming and high availability.
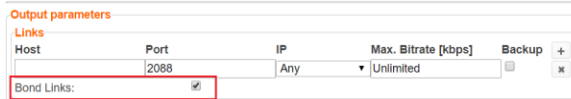
Broadcaster Output with Network Bonding

A Zixi Broadcaster can push a stream to another Zixi Broadcaster that has been divided into multiple network channels by utilizing multiple NICs. The Zixi Broadcaster at the destination will subsequently reuniting them into a single input stream.
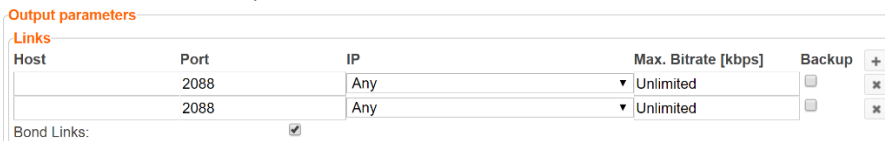
➡ **To add network bonding to a Push Output:**

1. Create a **Push Output**, by following the instructions in the **Adding Push Outputs** section.
2. In the **Output Parameters** section, select the **Bond Links** checkbox.

3. In the **Links** section, click the **+** button to add a second link:

4. In the **Host** field, type the IP address of the destination Zixi Broadcaster.
5. In the **Port** field, type the destination port number of the Zixi Broadcaster to which you want to stream. Default: 2088
6. In the **NIC** field, select the NIC in the Zixi Broadcaster (source) that you want to use to stream.
7. In the **Bitrate Limit** field, do one of the following:
   - If you want to limit the bitrate that will be used in this link, enter the limit value in Kbps.
   - If you DO NOT want to limit the bitrate, leave the default value - "0".
8. In the **Backup** field, do one of the following:
   - If you want to use this link only if there is not enough bandwidth in the other links, select the Backup checkbox.
   - If you want to use this link in parallel to other links, DO NOT select the Backup checkbox.
9. Configure additional parameters as required.
10. Click **OK** to save the Zixi Broadcaster Output.

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).
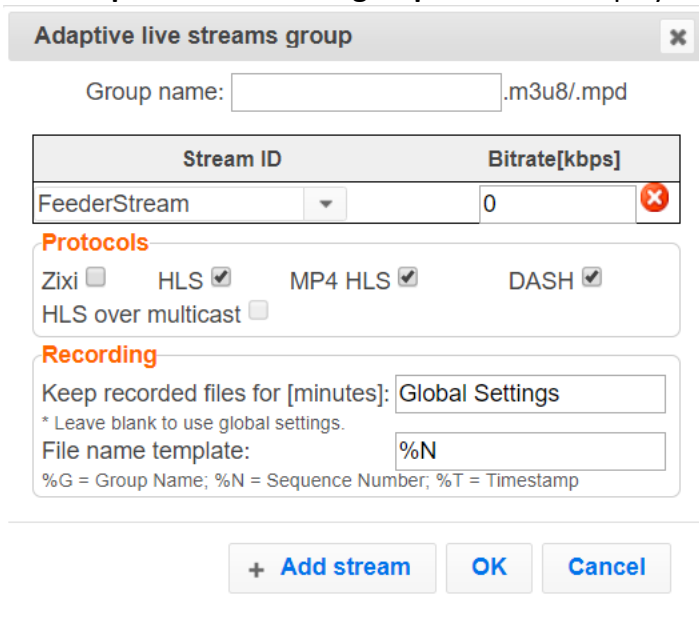
You can optionally create adaptive group templates that will automatically group streams in adaptive groups instead of defining groups in advance.

Creating New Adaptive Groups

➡ **To Create a New Adaptive Group:**

1. In the Zixi Broadcaster administrative screen, click the **Adaptive** tab.
2. Click **Add Group**.
   The **Adaptive live streams group** window is displayed:

3. In the **Group Name** field, enter the unique string as the adaptive group's name.
4. Under **StreamID**, select a stream from the drop-down list to create an adaptive bitrate.
5. Enter the desired **Bitrate[kbps]** for that stream in the adjacent field to **Stream ID**.
6. Click [+ Add stream] to add 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 one or more **Protocols** that will be supported for this adaptive group.

8. Specify the duration to **Keep recorded files for [minutes]**. If the file is left as blank, the system will use the global settings, specified in the **Settings > Live Protocols** screen in the **HLS DVR Maximum Recording Duration** field.
9. In the **File name template** field, specify the file name pattern that Zixi will use to generate when saving the recorded content.
10. Click **OK**.
    The new Adaptive Group is created and appears on the Adaptive screen.

Parameter	Description
Group Name	Specify the unique identifier for this group.
Stream ID	Specify the unique name for the stream.
Bitrate [kbps]	Specify the bitrate for selected stream.
Protocols	Zixi, HLS, HDS, DASH, HLS over multicast
Recording	
Keep recorded files for [minutes]	Specify the maximum time for storing the recording. If the file is left as blank, the system will use the global settings specified in the **Settings > Live Protocols** screen in the **HLS DVR Maximum Recording Duration** field.
File name template	Specify the file name pattern that Zixi will use to generate when saving the recorded content. A separate file will be generated for each recording up to the time specified in the Max recorded file duration parameter (see above). After this duration a new file will be generated.
	The file name pattern can include any string and up to five variables listed below. Only the %T=HH.MM.SS creation time is mandatory. You can change the order of these variables and add text as long as you maintain the legitimate structure of the file in Linux and Windows:
	%S=stream id - optional.
	%Y=year - optional
	%M=month - optional
	%D=day - optional
	%T=HH.MM.SS creation time - mandatory
	For example, the following pattern %Y_recording%T.ts will generate the following file name 2017_recording15:32:35.ts.

Adding Streams to Existing Adaptive Groups

You can add additional streams to existing adaptive groups.

➡ **To Add Streams to an Adaptive Group:**

1. In the Zixi Broadcaster administrative screen, click the **Adaptive** tab.

2. Select the Group to which you want to add a stream, and click [⚙▾] button, and then **Edit**. The **Adaptive live streams group** window is displayed.

3. Click [**+ Add stream**] button for as many streams as you want to include in the group. Another Stream row will be added in the above table to which a desired **Bitrate** must be specified. When clicking on the red ⊗ at the end of any of the stream rows, the stream will be deleted from the group.

4. Click **OK**. The group has been modified accordingly.

Adaptive Groups Templates

Instead of defining adaptive groups in advance and then relating specific input streams to these groups, you can define templates with rules for automatic grouping of streams in adaptive groups. Every time a new input stream, which matches the conditions of the template, is added, it will be automatically added to the adaptive group that was defined in the template. Specific streams are identified by naming patterns and added to the group by setting static naming patterns and bitrates or dynamic patters.

➡ **To create a new adaptive group template:**

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

2. In the Menu bar, click the **Templates** ( ) button.
   The Adaptive Groups Templates screen is displayed:

   Adaptive groups templates   ✖

Input ID Pattern	Adaptive Group Name	+

                                              Close
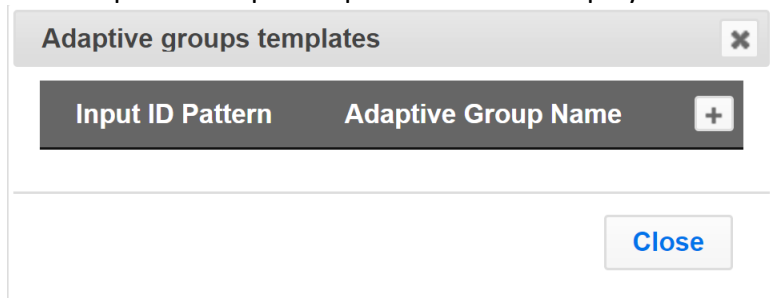
3. Click the **+** button.
   The **Adaptive Group Template** window is displayed:

Adaptive group template ✖

Input ID Pattern will be matched against inputs.
Parts of input stream ids can be assigned to variables ["$1" .. "$9"].
* can be used as wild card.
e.g. $1_stream_profile_*

Input ID Pattern: [   ]

Adaptive Group Name: [   ]

Variables from Input ID pattern can be used to form adaptive group name.
e.g. $1_adaptive_stream

Adaptive group properties

Zixi ☑   HLS ☑   HDS ☑   DASH ☐

HLS over multicast ☐

Record ☐

Keep recorded files for [minutes]: [   ]

* Leave blank to use global settings.

File name template: [%N   ]

%G = Group Name; %N = Sequence Number; %T = Timestamp

Adaptive group stream patterns

Streams expected in adaptive group may connect later.

Dynamic streams acquisition ○   Static streams set ●

Stream pattern   **Bitrate [kbps]**   [+]

Apply   **Close**

4. In the **Input ID Pattern** field, enter a pattern for the Stream ID of the input stream that will be automatically added to newly created adaptive group. This pattern will be used to identify the input stream and can include variables that are marked with the "$" sign followed by a number (e.g. $1, $2, etc.) and/or with an asterisk "*" wildcard. The patterns should also include a part of the string that requires an exact match. For example, the pattern "$1_stream_$2kbps" will match an input stream "talk_show_stream_600kbps". String parts that were matched again $X variables, can be reused in other settings, however, string parts that were matched against an asterisk wildcard cannot be reused in other settings.

5. In the **Adaptive Group Name** field, enter a string that will be used as the name of the adaptive group. You can use the $X variables that were used in the Input ID Pattern field

above. For example, based on the above example, if you write "$1_group", the group name will be "talk_show_group".

6. Under the **Adaptive Group Properties**, select the checkboxes of the protocols with which these streams will be transmitted (Zixi, HLS, HDS, DASH, HLS over multicast).

7. If you want to record an HLS stream, select the **Record** checkbox and in the **Keep recorded files for [minutes]**, specify the maximum time (in minutes) to record. Default: the time defined in the global settings, specified in the **Settings > Live Protocols** screen in the **HLS DVR Maximum Recording Duration** field.

8. Under **Adaptive Group Stream Patterns**, select the method in which the streams in the adaptive group will be created:

   - **Dynamic Streams Acquisition:** this method will automatically add input streams that match the defined **Input ID Pattern** and give them a bitrate value based on the **Bitrate Pattern**. This option is based on the assumption that the bitrate value is part of the input stream's ID. Based on the example above, by entering the value "$2" in the **Bitrate Pattern** field, the system will automatically add the incoming "talk_show_stream_600kbps" stream, while giving it a 600 Kbps Bitrate setting (according to the definition in the **Input ID Pattern** field, the $2 was assigned a value of 600kps). If another stream that matches the input ID patters comes in (e.g. talk_show_stream_700kbps") with a different bitrate, for example, 700kbps, this stream will be also added to the same adaptive groups, however the bitrate setting will be 700 kbps.

   Adaptive group stream patterns
   Streams expected in adaptive group may connect later.

   Dynamic streams acquisition ◉   Static streams set ◯

   Any stream matching 'Input ID Pattern' will be added.
   Bitrate pattern: $2

   To add a Dynamic Streams Acquisition bitrate pattern:
   1. In the **Bitrate Pattern** field add the pattern as described above.
   2. Click **Apply**.
      The new template is added to the **Adaptive Groups Templates** list:

      Adaptive groups templates   ✖

Input ID Pattern	Adaptive Group Name	+
$1_stream_$2kbps	$1_adaptive_stream	✏ ✖

                                                    Close

   - **Static Stream Set:** if the input streams do not have the bitrate value in their ID names, you can manually define the ID and the bitrate for each stream that will

be included in the group. You can define streams that are not currently connected, but will be connected at a later stage.

To add a Static Steam Set:
1. Click the **+** button
2. In the **Steam Pattern** field, enter a pattern for the stream ID (you can use the variables used in the Input ID Pattern field and add additional variables as needed). This pattern will be used to identify the stream and add it to the group (e.g. "comedy_HD").
3. In the **Bitrate [Kbps]** field, enter the Bitrate value of the stream.
4. Click the **+** button for as many streams as you want to include in the group and repeat the steps above for every stream that is added to the group.
5. Click **Apply** to save all changes.
   The new template is added to the **Adaptive Groups Templates** list:

Note: the group will be active only when all the streams defined will be connected.

Deleting and Adaptive Group

Play Dash

➡ **To delete an Adaptive Group:**

1. In the Zixi Broadcaster **Adaptive Groups** page, click the adaptive group row that you want to delete.

2. Select the Group to which you want to add a stream, and click ⚙▾ button, and then **Delete**. The message **"Are you sure you want to delete group <group_name>?"** is displayed.

> localhost:4444 says: ×
>
> Are you sure you want to delete group Test1?
>
> **OK**   Cancel
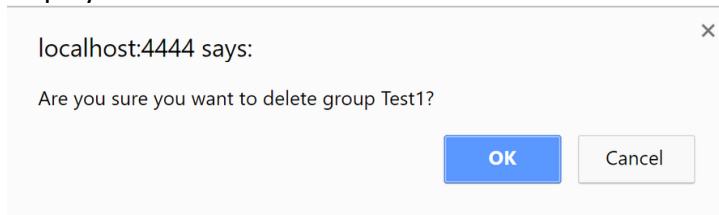
3. Click **OK**. The selected row adaptive group will be deleted.

Play Dash

Zixi Broadcaster can generate links to play the Adaptive Group stream in MPEG DASH format.

➡ **To Play MPEG DASH:**

1. In the Zixi Broadcaster **Adaptive Groups** page, click the adaptive group row that you want to playback.

2. Select the Group to which you want to add a stream, and click ⚙▾ button, and then click **Play Dash**.
   The following window is displayed:

> **Link description**   ✖
>
> MPEG-Dash
>
> http://10.7.0.78:7777/adaptive1.mpd
>
> MPEG-DASH link for players supporting the protocol
>
> Play from server
>
> **Close**
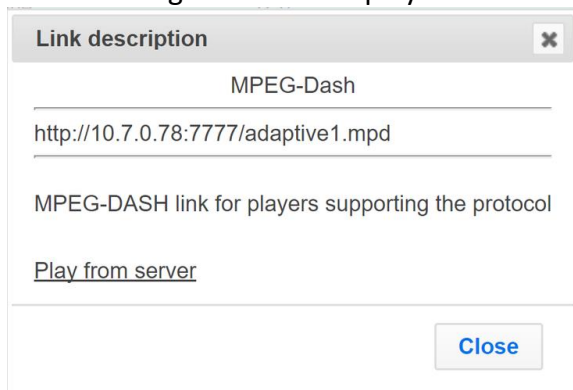
3. Do one of the following:
   - If you have a locally installed MPEG DASH compatible player - click the link to stream the data to your player.
   - If you DO NOT have a player - click **Play from server**. The stream will open in a web-based player.
4. Click **Close** when finished.
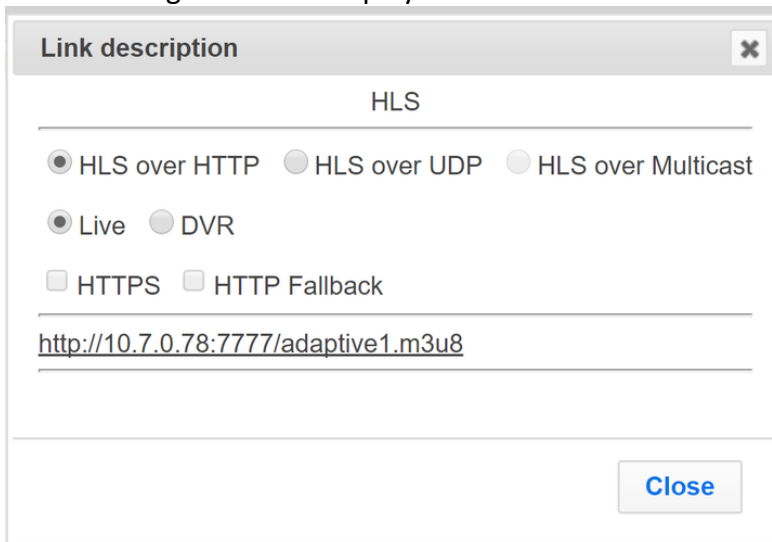
Play HLS

Zixi Broadcaster can generate links to play the Adaptive Group stream in HLS format over HTTP, UDP, or Multicast (requires Multicast enabled).

➡ **To Play HLS:**

1. In the Zixi Broadcaster **Adaptive Groups** page, click the adaptive group row that you want to playback.

2. Select the Group to which you want to add a stream, and click [⚙▾] button, and then click **Play HLS**.
   The following window is displayed:

3. Do one of the following:
   • **HLS over HTTP** - streams the adaptive stream over HTTP. Select **Live** to stream a live stream or select **DVR** to select a recorded stream. To stream from an encrypted HTTPS link, select the **HTTPS** checkbox. To stream from a secondary/backup server, select the **HTTP Fallback** checkbox.
   • **HLS over UDP** - streams the adaptive stream over UDP. Select **Live** to stream a live stream or select **DVR** to select a recorded stream. To stream from an encrypted HTTPS link, select the **HTTPS** checkbox. To stream from a secondary/backup server, select the **HTTP Fallback** checkbox.
   • **HLS over Multicast** - streams the adaptive stream over UDP. Select **Live** to stream a live stream or select **DVR** to select a recorded stream. To stream from an encrypted HTTPS link, select the **HTTPS** checkbox. To stream from a secondary/backup server, select the **HTTP Fallback** checkbox.

4. Copy the link that is generated at the bottom of the window and paste it into a player/browser for playback.

Set Preroll

5. Click Close when finished.

Set Preroll

A preroll transport stream file is a video/audio file that is played before the adaptive group video is played. Before setting the preroll, you should make sure that the file is available for VOD and that VOD is enabled in the File Transfer and VOD settings.

➡ **To set a Pre-roll:**

1. Upload the Pre-roll TS File to the designated Root folder on the Zixi Broadcaster server. To find your Root folder location, go to Settings > General. The Root path is specified in the Root Folder field.

   Enable read only user: ☐
   Enable HTTPS administration: ☐
   Root folder: C:/Program Files\Zixi\Broadcaster\files
   Max disk quota [%]: 85

2. In the **Settings > File Transfer & VOD** screen, select the **VOD** checkbox.
   The following window is displayed:

   HLS Indexing: ☐
   MPEG-DASH Indexing: ☐
   VOD: ☑
   Encrypt downloads: ☐
   Max download speed [kbps]: 100000   ~100.0 Mbit/s

3. In the Zixi Broadcaster Adaptive Groups screen, click the desired adaptive group for which you want to add the preroll.

4. Click the [⚙▾] button on the selected row and then click **Set Preroll**.
   The following window is displayed:

   Preroll File Selection   ✖

   Group ID: [▾]

   Preroll File: [   ] [...]

   Set an empty preroll file in order to remove a group

                                    OK   Cancel

5. In the **Group ID** field, select the adaptive group for which you want to add the preroll.
6. In the **Preroll File** field, click the **Browse** button and select the desired file.
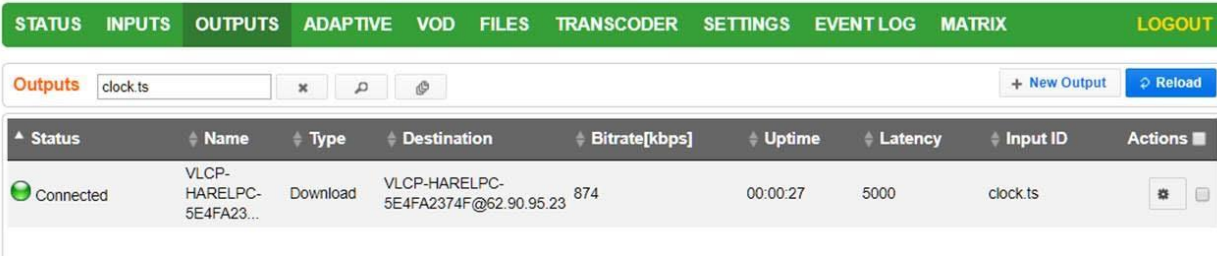
Set Preroll

7. Click **OK**.

VOD (Video on Demand)

The VOD feature enables you to upload stream-able (.ts and mp4) files to the file system of the server on which Broadcaster is installed as well as make a previously recorded input stream available on demand (VOD). The VOD content is accessed through a local folder, where the Zixi Broadcaster is located. This local folder can be optionally mapped through a symbolic link or shortcut to a remote folder. The Broadcaster creates a unique URL for each file.

The streams can be played back using VLC (with Zixi Plugin for Zixi streams) and/or streamed to a Zixi Receiver or to a Zixi Broadcaster. During playback, an Output (with output type – Download) will be created automatically on the Source Zixi Broadcaster, as shown below.

VOD Configuration

If you have a VOD-enabled license you will still need to activate the VOD feature in the Settings screen.

➡ **To activate the VOD feature:**

1. In the **Settings** page, click **File Transfer & VOD**.
2. Select the **VOD** checkbox.

3. Click **Apply**.

VOD Files Location

The VOD files are located in the following location by default -
`<Broadcaster_Installation_Folder>\Zixi\Broadcaster\files`
The contents of this folder are displayed in the **VOD** screen on the Zixi Broadcaster GUI –

VOD Files Location
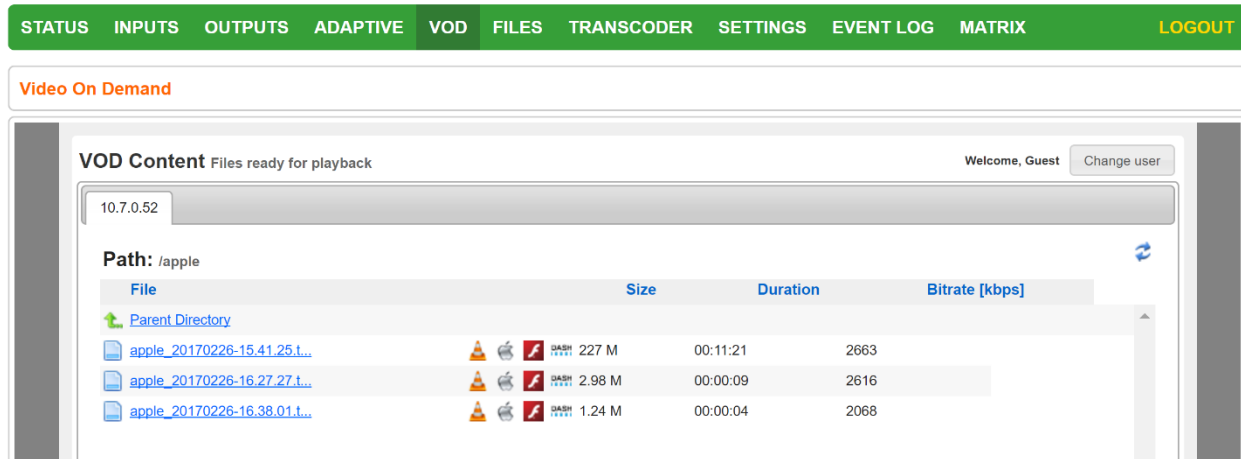
The VOD screen displays the following information:

Parameter	Description
File	Name of the file or folder. If in file level (not folder level), click the file name to preview the stream in the Matrix screen.
<Icons>	The following icons are displayed: ![VLC icon] - **VLC Playback** – click this icon to see the VLC playback URL and additional details, such as VLC plugin download link, and link to stream the file. ![HLS icon] - **HLS Playback** – click this icon to see the following three HLS playback URLs: local HLS playback (not Zixi protected), HLS playback using Zixi Proxy (Zixi Protected), HLS playback using Zixi Proxy through HTTPS (Zixi protected). The Zixi Proxy links require the installation of Zixi Proxy software in the receiving device/machine. The dialog includes links for downloading the Zixi Proxy for Windows and Mac. ![HDS icon] - **HDS Playback** – click this icon to see the Adobe HTTP Dynamic Streaming Protocol playback URL. The Play from server link, plays back the stream directly from the server. ![Flash icon] - **Flash Playback** – click this icon to see the following three Flash playback URLs: local Flash playback (not Zixi protected), Flash playback using Zixi Proxy (Zixi Protected), Flash playback using Zixi Proxy through HTTPS (Zixi protected). The Zixi Proxy links require the installation of Zixi Proxy software in the receiving device/machine. The dialog includes links for downloading the Zixi Proxy for Windows and Mac. ![Dash icon] - Dash Playback - click this icon to see the MPEG-DASH playback URL. The Play from server link, plays back the stream directly from the server.
Size	The size of the file.
Duration	The duration of the playback.

Bitrate [kbps]	The bitrate of the file in Kbps.

Changing the Files folder location

➡ **To change the Files folder location:**

1. In the Zixi Broadcaster installation folder
   (`<Broadcaster_Installation_Folder>\Zixi\Broadcaster\`) open the
   following file: **broadcaster-info.xml**.
2. Edit the <Folder> parameter with the desired path.
   ```
   <?xml version="1.0" encoding="utf-8"?>
   <ROOT_SETTINGS>
        <FOLDER>C:\Program Files\Zixi\Broadcaster\files</FOLDER>
        <MANAGED>false</MANAGED>
        <MANAGEMENT-ENABLED>false</MANAGEMENT-ENABLED>
   </ROOT_SETTINGS>
   <TUNNEL>
        <ALLOW>false</ALLOW>
        <MANAGED>false</MANAGED>
        <MANAGEMENT-ENABLED>false</MANAGEMENT-ENABLED>
   </TUNNEL>
   ```

3. Save the file.

Adding Files to VOD

There are two ways to add files into the VOD Files folder:

- **Adding files to the folder** – using the operating system on which Zixi Broadcaster is
  installed, add the desired files to the Files folder
  (`<Broadcaster_Installation_Folder>\Zixi\Broadcaster\Files`)

- **Uploading using the Broadcaster GUI** – on the **Files** screen, click the **New Upload** button, browse to the desired file location, select the file and click **Upload**.
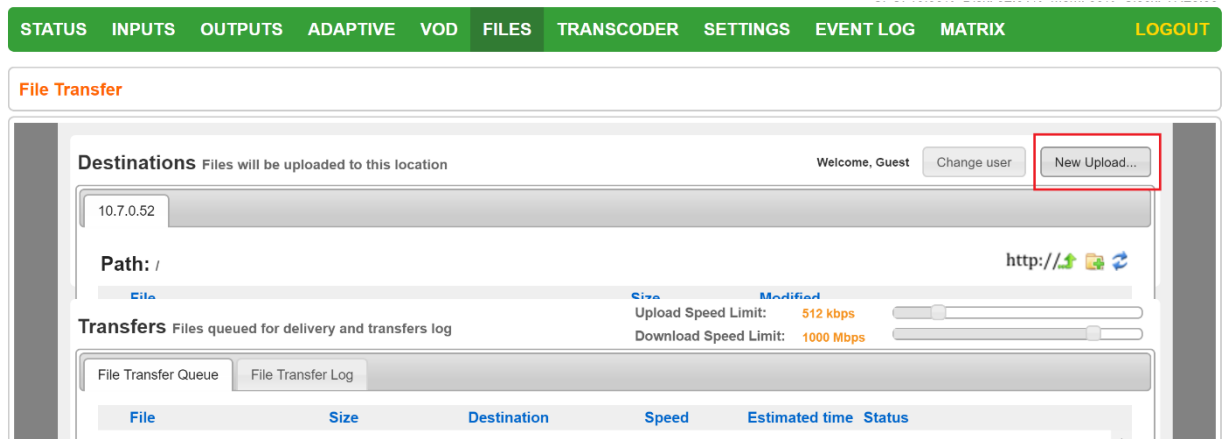
Playing back VOD content

The VOD content can be played back using VLC (with Zixi Plugin for Zixi streams) and/or streamed to a Zixi Receiver or to a Zixi Broadcaster by using the following methods:

- **URL (Static)** – entering a specific URL of a file. To find the URL of a specific file, go to the VOD screen, navigate to the specific file, and click on the relevant playback icon:

  - ○ - **VLC Playback** – click this icon to see the VLC playback URL and additional details, such as VLC plugin download link, and link to stream the file.

  - ○ - **HLS Playback** – click this icon to see the following three HLS playback URLs: local HLS playback (not Zixi protected), HLS playback using Zixi Proxy (Zixi Protected), HLS playback using Zixi Proxy through HTTPS (Zixi protected). The Zixi Proxy links require the installation of Zixi Proxy software in the receiving device/machine. The dialog includes links for downloading the Zixi Proxy for Windows and Mac.

  - ○ - **HDS Playback** – click this icon to see the Adobe HTTP Dynamic Streaming Protocol playback URL. The Play from server link, plays back the stream directly from the server.

  - ○ - **Flash Playback** – click this icon to see the following three Flash playback URLs: local Flash playback (not Zixi protected), Flash playback using Zixi Proxy (Zixi Protected), Flash playback using Zixi Proxy through HTTPS (Zixi protected). The Zixi Proxy links require the installation of Zixi Proxy software in the receiving device/machine. The dialog includes links for downloading the Zixi Proxy for Windows and Mac.

Playing back VOD content

- o ![DASH] - Dash Playback - click this icon to see the MPEG-DASH playback URL. The Play from server link, plays back the stream directly from the server.
- **API (Dynamic)** – you can use the Zixi API to implement dynamic access to the VOD content. For example, you can create an application that enables navigation throughout the VOD library (including folders and sub-folders) to access files in a dynamic fashion. The API GET request is: http://<broadcaster_location><web_server_port>/vod_ls.json

Accelerated File Transfer

Zixi Broadcaster features the ability to transfer files between two Zixi components (Zixi Broadcaster to Zixi Receiver or to another Zixi Broadcaster), using the Zixi protocol. The transfer can also be to a non-Zixi component with a Zixi Proxy or with a Zixi Plugin. This enables the reliable and fast transfer of large files over a wireless/wifi connections.

File Transfer Configuration

Before using the file transfer feature, you will need to activate the file transfer feature and configure the following file transfer settings.

➡ **To activate and configure the file transfer feature:**

1. In the **Settings** page, click **File Transfer & VOD**.
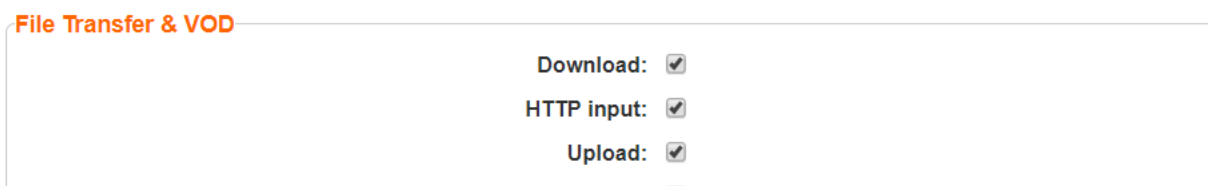
2. Select the **Download** checkbox to enable the download of files from the current Zixi Broadcaster.
3. Select **HTTP Input** checkbox to enable HTTP forwarding.
4. Select the **Upload** checkbox to enable the uploading of files by registered users to the current Zixi Broadcaster.
5. Specify additional optional **file transfer setting parameters** (see File Transfer Setting table below).
6. Click **Apply**.

File Transfer Settings

Parameter	Description
Download	Enables the file transfer download from this Zixi Broadcaster.
HTTP Input	Enables HTTP acceleration mode. In this mode, instead of specifying a file location on the server's hard disk, the Zixi Broadcaster receives an HTTP address from which it will retrieve the file and then transfer it to the Client.
Upload	Enables the file transfer upload to this Zixi Broadcaster server.
Encrypt Downloads	Enables the Zixi auto encryption for all file transfer downloads.

Max download speed [kbps]	Specifies the maximal download speed in Kbps for file transfer.
Max upload speed [kbps]	Specifies the maximal upload speed in Kbps for file transfer.
Initial bitrate [kbps]	Specifies the initial download bitrate. The recommended bitrate can be the bitrate of the stream.
HTTP/Origin cache size [MB]	This setting is relevant for HTTP acceleration mode and/or Origin/Edge architecture, where the Zixi Broadcaster retrieves the file from another Origin or HTTP server and then delivers it to the Client. This setting determines the cache size allocation on the Zixi Broadcaster. The cache is used to accelerate the delivery of files that have been previously requested.

Uploading Files for File Transfer

You can upload files to the server on which Zixi Broadcaster is installed to make them available for download using Zixi protocol. The location of the files that will be uploaded is relative to the Root folder that was specified in the **Settings > General** screen.

> Before you upload a file, make sure Zixi Proxy is installed on your computer. If it is not installed, you will be prompted with a notification and a link for download and installation.

➡ **To upload a file for file transfer:**

1. In Zixi Broadcaster, click the **Files** tab.
2. Click **New Upload**.
   The **Select Files to Upload** dialog opens:

Downloading Files
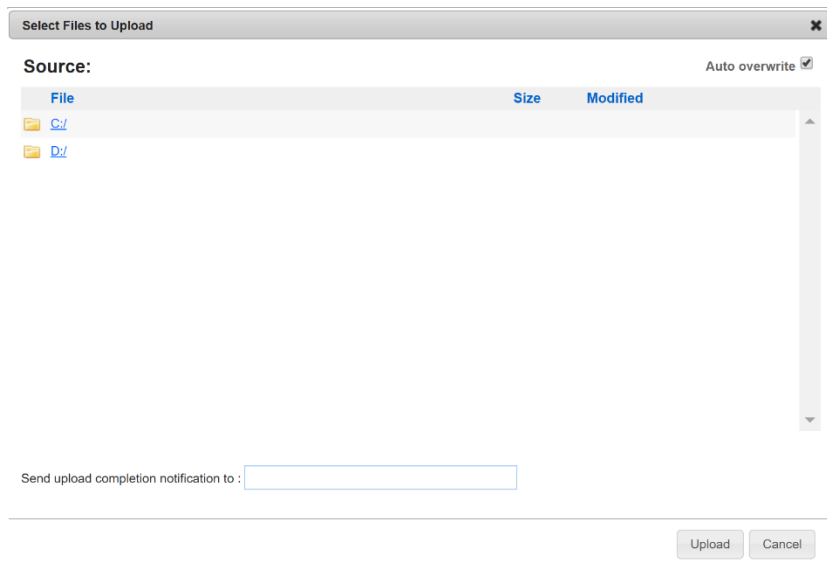
3. Navigate to the path in which the files is located and select the file.
4. For very large files, it is possible to receive an email notification when the upload process was completed. To enable this feature, type the desired email address, or multiple email addresses separated by commas in the **Send upload completion notification to** field.
5. Click **Upload**.
   The file will be uploaded using the Zixi protocol. The upload process is displayed at the bottom of the screen (**Files Transfer Queue** tab). When the upload is complete, it will be recorded in the **File Transfer Log** tab.

You can limit the upload speed by dragging the **Upload Speed Limit** slider.

The overall maximal limit determined by the **Max upload speed [kbps]** setting in the **Settings > File Transfer & VOD** screen.

Downloading Files

The files can be downloaded using the Zixi Protocol, through the Zixi Broadcaster UI.

➡ **To download a file:**

1. In Zixi Broadcaster, click the **Files** tab.
2. Under **Destinations**, navigate to the desired file.

3. Hover your mouse over the desired file and click **Download**.
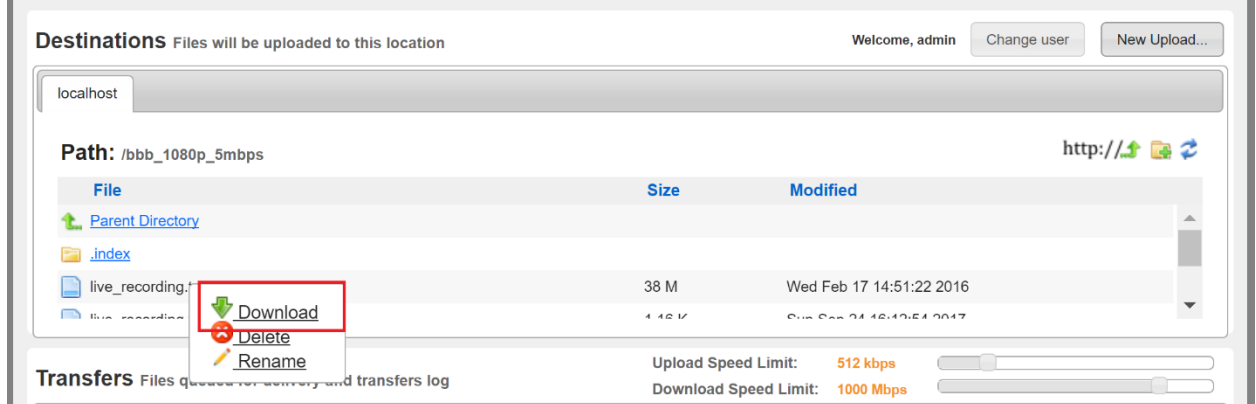
4. In the **Select Download Destination** window, select the local folder as a destination for the file download.
   The file will be downloaded using the Zixi protocol. The download process is displayed at the bottom of the screen (**Files Transfer Queue** tab). When the download is complete, it will be recorded in the **File Transfer Log** tab.

> You can limit the download speed by dragging the **Download Speed Limit** slider.
>
>
>
> The overall maximal limit determined by the **Max download speed [kbps]** setting in the **Settings > File Transfer & VOD** screen.
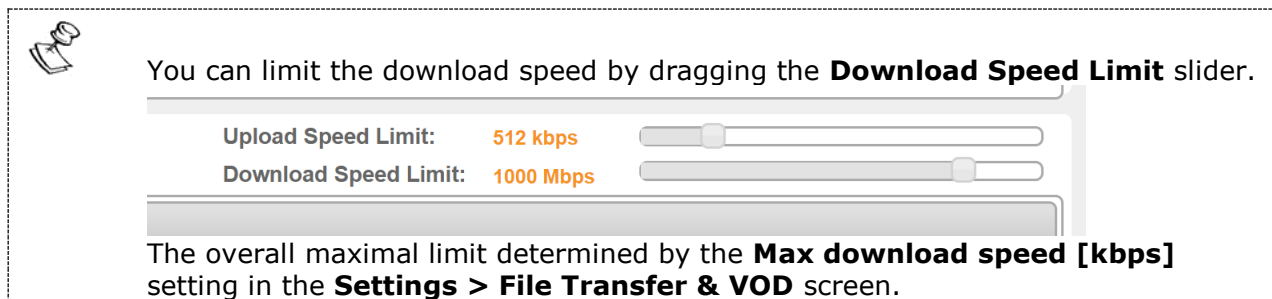
Generating Accelerated URLs

Instead of downloading files from the server on which Zixi Broadcaster is installed, it is possible to use Zixi Broadcaster to retrieve the file from a remote HTTP server. Zixi Broadcaster converts the remote server URL to an Accelerated URL. By using this accelerated URL to download the file, Zixi Broadcaster will retrieve the file from the remote server and use the Zixi Protocol to transfer the file to the Client.

➡ **To generate an accelerated URL:**

1. In Zixi Broadcaster, click the **Files** tab.

2. Under **Destinations**, click the http://⬆ icon.
    The following window appears:

Convert remote HTTP URL to a localhost URL for accelerated download	✖
URL:	↻

    Type a URL and press the 'refresh' button to generate accelerated URLs

    Close

3. In the **URL** field, type the URL of file in the remote HTTP server.
4. Click the ↻ icon.
    Two URLs are generated:

Convert remote HTTP URL to a localhost URL for accelerated download	✖
URL: http://zixi.dkpplfl/dkoffk.htm	↻

    http://127.0.0.1:4500/HOST_localhost/HTTP_zixi.dkpplfl/PORT_2077/ZiXi_params_end/dkoffk.htm

    https://localproxy.zixi.com:4501/HOST_localhost/HTTP_zixi.dkpplfl/PORT_2077/ZiXi_params_end/dkoffk.htm

    Close

    The top URL is an HTTP URL and the bottom is an HTTPS URL.

Creating a New Folder

You can use the Zixi Broadcaster UI to create folders in the server on which Zixi Broadcaster is installed.
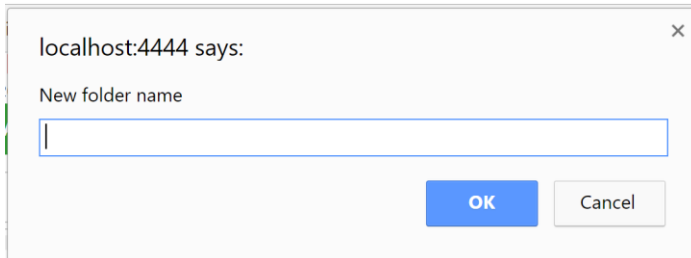
➡ **To create a new folder:**

1. In Zixi Broadcaster, click the **Files** tab.

2. Under **Destinations**, click the icon.
   The following window appears:

3. In the **New folder name** field, type a name for the folder.
   The folder is created.

Renaming a File/Folder

You can rename a folder or a file through the Zixi Broadcaster UI.

➡ **To rename a folder/file:**

4. In Zixi Broadcaster, click the **Files** tab.
1. Under **Destinations**, navigate to the desired file.
2. Hover your mouse over the desired file and click **Rename**.
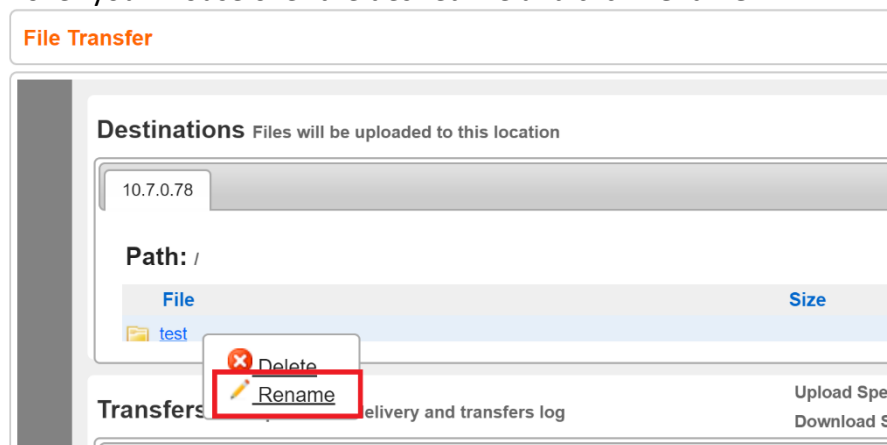
3. In the field, enter the new folder/file name. The location of the files/folder is relative to the Root folder that was specified in the **Settings > General** screen.

Deleting an Existing File/Folder
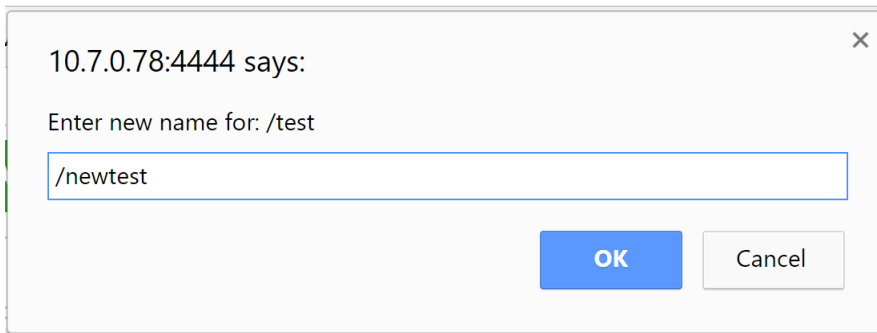
4. Click **OK**.

Deleting an Existing File/Folder

You can delete a folder or a file through the Zixi Broadcaster UI.

➡ **To delete a folder/file:**

1. In Zixi Broadcaster, click the **Files** tab.
2. Under **Destinations**, navigate to the desired file.
3. Hover your mouse over the desired file and click **Delete**.
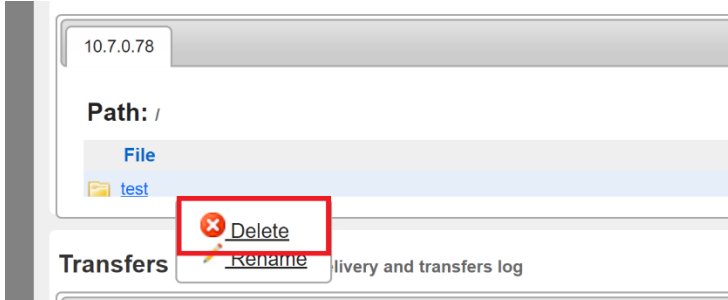
The following dialog is displayed:
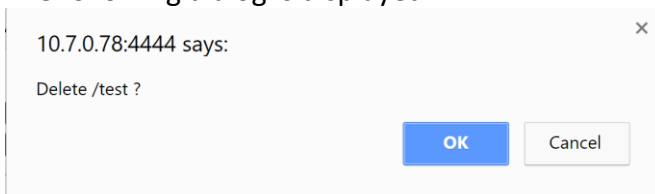
4. Click **OK**.

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.

General

The General Settings screen includes basic configuration parameters for the server including the server's ID, access ports, authorizations, security, and storage.
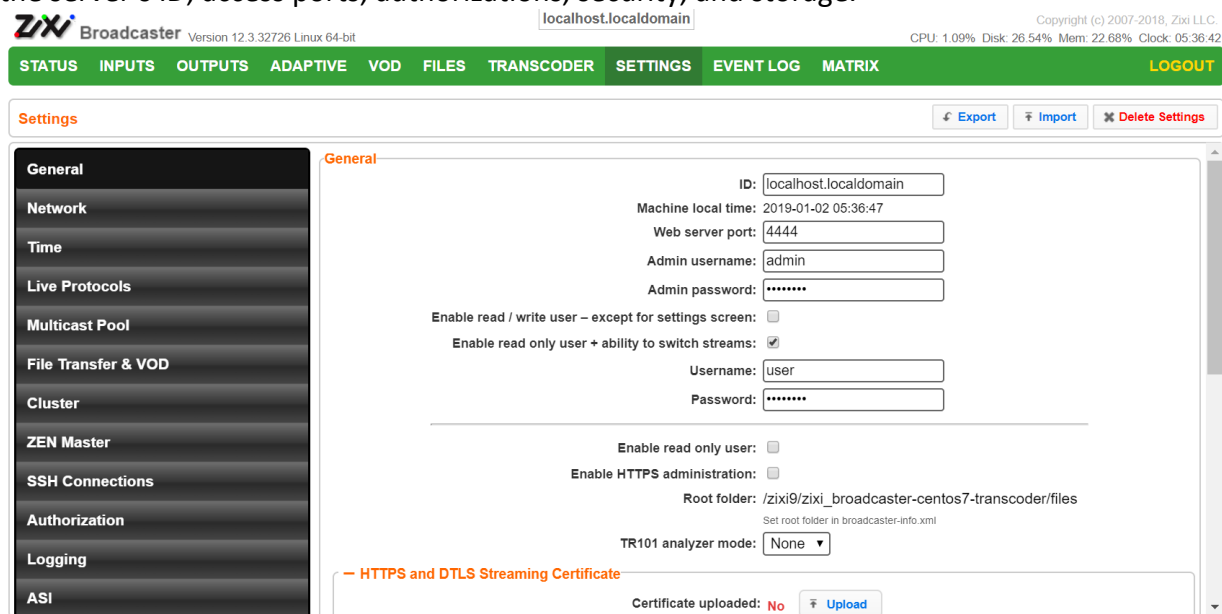
Field	Description
General	
ID	The unique (alphanumeric) name of the Zixi Broadcaster server. Typically: host name. This field is editable.
Machine local time	Shows the current time for the machine.
Web Server Port	The port number of the web server administration. You can configure this parameter to any 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.
Enable read / write user - except for settings screen	Select this checkbox to enable an "Operator" user. This type of user can read and write throughout all of the screens, except for the screens under the Settings menu. You can modify the user name (i.e. enter another name instead of Operator) and password.
Enable read-only user +ability to switch streams	Select this checkbox to enable a "User" user. This type of user can read throughout all of the screens as well as the ability to switch between existing streams. You can modify the user name (i.e. enter another name instead of User) and password.
Username	The account Username.
Password	The account password.
Enable read only user	Select this checkbox to enable an "Observer" user. This type of user can read throughout all of the screens. You can modify the user name (i.e. enter another name instead of Observer) and password.
Enable HTTPS administration	Enables secure HTTPS connection to the server for administration. Enabling HTTPS requires the relevant certificates and private keys. To enable HTTPS, click on the checkbox and upload the required files.
HTTPS certificate uploaded (for HTTPS enabled)	If no certificate has been uploaded, click **Upload** and navigate to the file location.
HTTPS private key uploaded (for HTTPS enabled)	If no private key has been uploaded, click **Upload** and navigate to the file location.
HTTPS private key passphrase (for HTTPS enabled)	Enter the Private key passphrase for your HTTPS account.
SSL Setup Status	Displays the status of the SSL certificate upload process. Incomplete – the SSL setup process is incomplete. OK – the SSL setup process is complete.
Root folder	Displays the configured root folder. You can modify the root folder by modifying the broadcaster-info.xml, which is located in the Zixi Broadcaster installation folder (<Broadcaster_Installation_Folder>\Zixi\Broadcaster\)

Server Settings

General

TR101 analyzer mode	Select the mode in which the TR101 analyzer will operate: None – no TR101 analysis ATSC – based on the Advanced Television Systems Committee recommendations. DVB – based on the Digital Video Broadcasting specifications.

HTTPS and DTLS Streaming Certificate

Certificate uploaded (for DTLS enabled)	If no certificate has been uploaded, click Upload and navigate to the file location. **Note:** This is the same certificate as the HTTPS certificate.
Private key uploaded (for DTLS enabled)	If no private key has been uploaded, click Upload and navigate to the file location.
Private key passphrase (for DTLS enabled)	Enter the Private key passphrase for your DTLS account.

Input ports

Port	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. Click '+' to add additional ports. Default: 2088
IP	Enter an IP address. The default enables **Any** IP address.
DTLS	Click the DTLS check box to activate DTLS automatic encryption of the streams.
+ (add ports)	Click + to add additional ports. **Note:** For each port you can select whether or not to activate DTLS encryption. This enables streaming of non-encrypted streams on one port and encrypted streams on a separate port.

Output ports

Port	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. Click '+' to add additional ports. Default: 2077
IP	Enter an IP address. The default enables **Any** IP address.
DTLS	Click the DTLS check box to activate DTLS automatic encryption of the streams.

General

+ (add ports)	Click + to add additional ports. **Note:** For each port you can select whether or not to activate DTLS encryption. This enables streaming of non-encrypted streams on one port and encrypted streams on a separate port.
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
GPU [%]	The GPU utilization threshold. If this limit is exceeded, the GPU indicator at the top of the screen will appear in red, and an alarm will be generated in the event log. Default: 0
Input Bandwidth [kbps]	Bandwidth utilization threshold for input streams. Default: Unlimited.
Output Bandwidth [kbps]	Bandwidth utilization threshold for output streams. Default: Unlimited.

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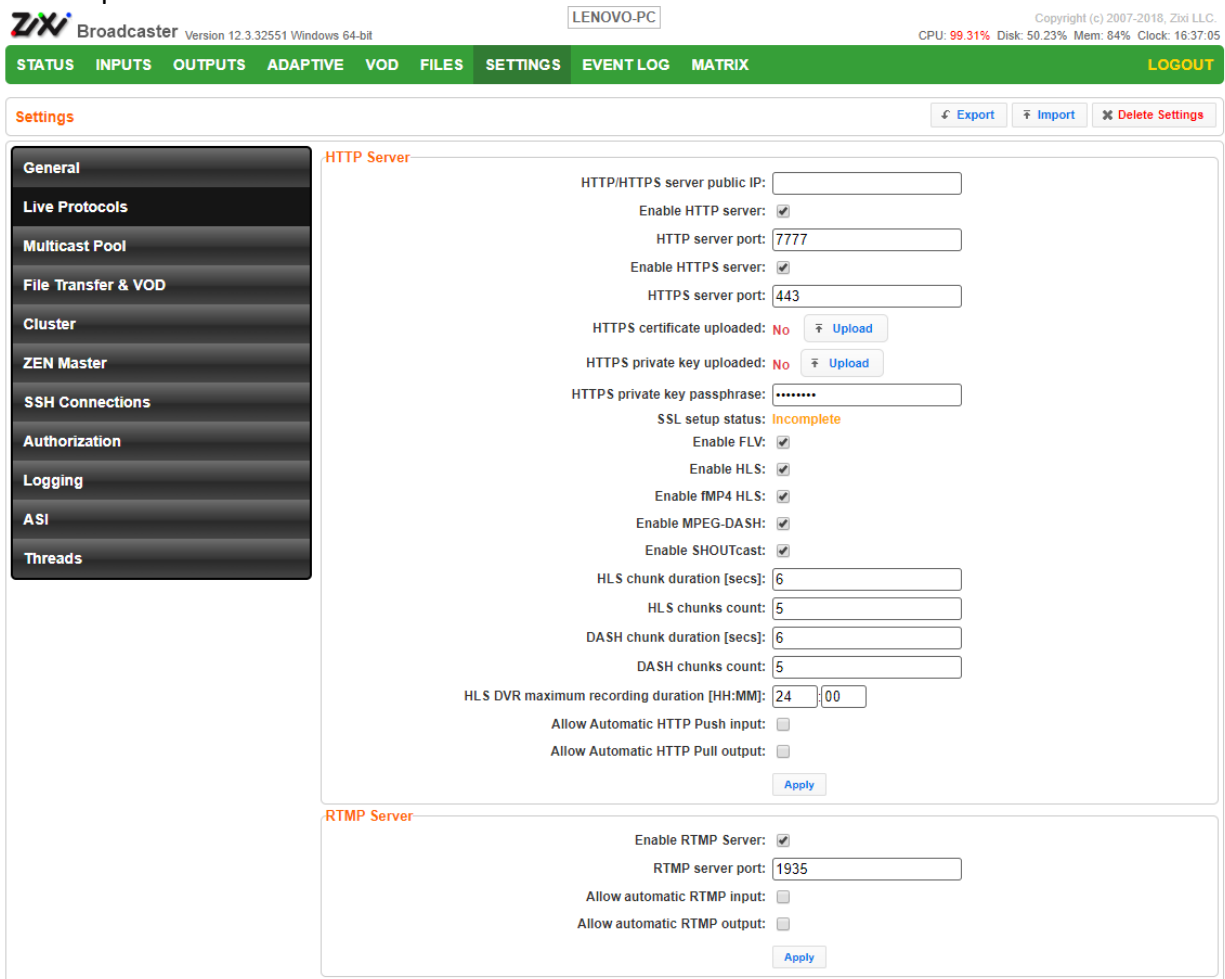
Field	Description
HTTP Server	
HTTP/HTTPS Server Public IP	Override the Zixi IP (e.g. download.Zixi.com) with a public IP.
Enable HTTP Server	Enable a non-secure connection over HTTP.
HTTP Server Port	Defines the HTTP Server Port. Default:7777

Live Protocols

Enable HTTPS Server	Enable a secure connection over HTTPS.
HTTPS Server Port	Defined the HTTPS server port. Default: 443
HTTPS certificate uploaded (for HTTPS enabled)	If no certificate has been uploaded, click Upload and navigate to the file location.
HTTPS private key uploaded (for HTTPS enabled)	If no private key has been uploaded, click Upload and navigate to the file location.
HTTPS private key passphrase (for HTTPS enabled)	Enter the Private key passphrase for your HTTPS account.
SSL Setup Status	Displays the status of the SSL certificate upload process. Incomplete – the SSL setup process is incomplete. OK – the SSL setup process is complete.
Enable FLV	Enable the streaming via the FLV protocol.
Enable HLS	Enable the streaming via the HLS protocol.
Enable fMP4 HLS	Enable the streaming via the Fragmented MP4 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
DASH chunk duration [secs]	Configuration of the duration in seconds of MPEG-DASH chunks for adaptive streaming. Default: 5 seconds
DASH chunks count	Defines how many chunks are in a playlist.

Live Protocols

HLS DVR Maximum Recording Duration [HH:MM]	Defines the maximum recording duration for HLS DVR. Default: 24 hours.
Allow Automatic HTTP Push input	Automatically creates an HTTP Push input without the need to define it in the Input screen.
Allow Automatic HTTP Pull output	Automatically creates an HTTP Pull output without the need to define it in the Output screen. This works in tandem with Zixi Feeder (Remote HTTP Pull Output setting, which enables sending a Zixi-protected stream to Zixi Broadcaster and then Zixi Broadcaster automatically outputs the stream as HTTP Pull) and SDK (which includes a zixi_http_pull_out_config option). By enabling this option, the HTTP Pull streams will be automatically created as they arrive into Zixi Broadcaster and displayed in the Output screen.
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 Zixi Feeder (**Remote RTMP Output** setting, which enables sending a Zixi-protected stream to Zixi Broadcaster and then Zixi Broadcaster automatically outputs the stream as RTMP) and SDK (which includes a **zixi_rtmp_out_config** option). By enabling this option, the RTMP streams will be automatically created as they arrive into Zixi Broadcaster and displayed in the Output screen.

Multicast Pool

Multicast pool is a collection of multicast IP addresses that automatically assign a multicast IP when an input is being pulled out of the Zixi Broadcaster. When the "multicast pool" setting is enabled, 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. When the multicast stream is connected, it will appear in the Status table at the bottom of the screen.

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

File Transfer & VOD

The File Transfer and VOD settings screen enables the download of files and the playback of VOD content and, in addition, specifies the speed limits (download/upload). The settings in this screen are related to the VOD and Files screens.

Field	Description
File Transfer & VOD	
Download	Enables download of files through the Files menu of the Zixi Broadcaster.
HTTP Input	Enables download of files over HTTP (web server)
Upload	Enables upload of files through the Files menu of the Zixi Broadcaster
Automatically index VOD files	Indexes the VOD files in the various VOD folders. In some cases, the indexing of VOD files can affect performance. Using this control, you can decide when to index the VOD files in order to ensure optimal performance during peak times.
Scan on startup	Indexes the files in the VOD folder that have not been indexed during startup of the Zixi Broadcaster.
HLS indexing	Enables indexing of HLS streams. The indexing creates an M3U8 playlist file.
MPEG-DASH indexing	Enables indexing of MPEG-DASH streams. The indexing creates a .mpd (MPEG-DASH Media Presentation Description) file.
VOD	Enables the VOD feature.

File Transfer & VOD

Encrypt downloads	Encrypts files that are downloaded.
Max download speed [kbps]	Limits the amount of bandwidth used to download files
Max upload speed [kbps]	Limits the amount of bandwidth used to upload files
Initial bitrate [kbps]	Limits the amount of bandwidth used during initial download/upload (before cache)
HTTP/Origin cache size [MB]	Limits the amount of cache memory that can be used for cache

Cluster

Zixi Broadcaster enables two types of configurations:

- **Cluster configuration** - a cluster of Zixi Broadcaster servers 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. Default: 2088
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. Default: 2088

Cluster

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]	Specify the buffer size between the edge and the origin.
Timeout [s]	Specify 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	Specify the Time To Live parameter.
Port	Specify the port that are used in all the participating Broadcaster servers in the cluster.
Local IP	Specify 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.
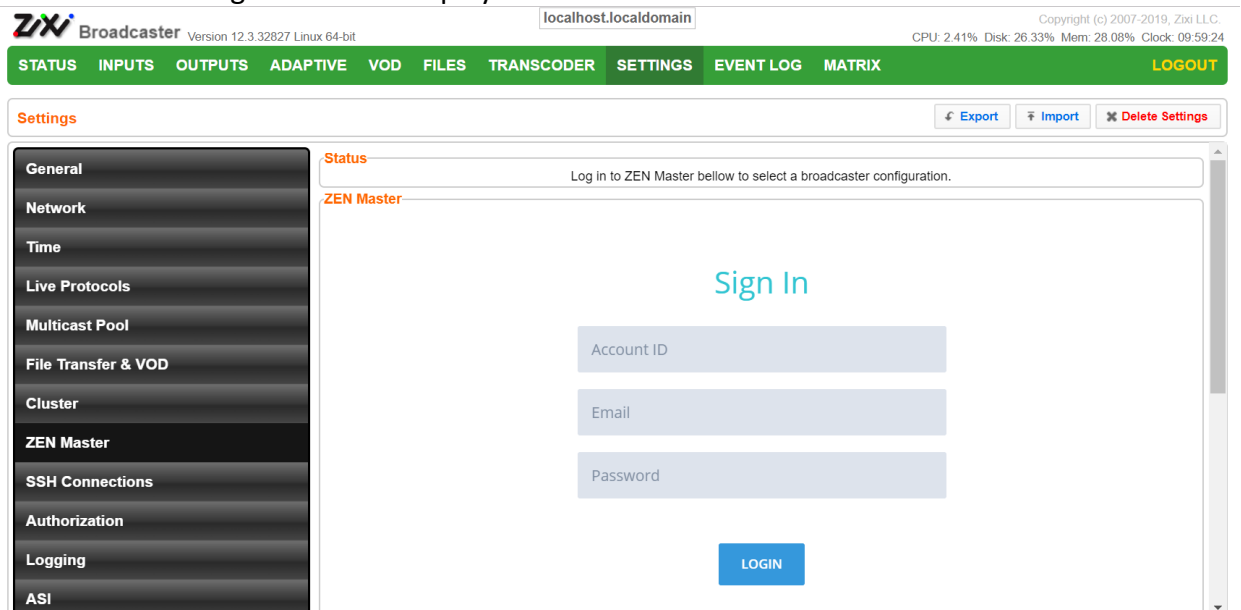
Zen Master

The ZEN Master screen is used to add the current Zixi Broadcaster to an existing Broadcaster Cluster in Zen Master that has been configured for "Manual Scaling". This process involves pre-configuring a "manual scaling" Broadcaster Cluster in ZEN Master, then, still in ZEN Master, creating a manual Zixi Broadcaster within this cluster, and then finally from the ZEN screen of the current Zixi Broadcaster UI, selecting the previously created Broadcaster Cluster and Zixi Broadcaster (that we had created though the ZEN Master UI). This process will generate a connection between the logical representation of the Zixi Broadcaster in ZEN Master and the Zixi Broadcaster system.

➡ **To connect the current Zixi Broadcaster to ZEN Master:**

1. In **ZEN Master**, create a "manual scaling" Broadcaster Cluster and add a Broadcaster entity to it by following the procedure described in the **Adding a Broadcaster Cluster – Manual Scaling** section in the **ZEN Master User Guide**.
2. In ZEN Master, in the main navigation, click **Settings**.
3. In the **SSH Keys** tab, click **Download** on the relevant SSH Key to download the key to your machine.
4. Login to the **Zixi Broadcaster** UI (it could be a locally installed Zixi Broadcaster, e.g. http://localhost:4444 or a remote Zixi Broadcaster).
   The Zixi Broadcaster UI opens.
5. Go to **Settings > ZEN Master**.
   The ZEN Master login fields are displayed:

6. In the **Account ID** field, enter the customer domain of your ZEN Master account (e.g. if you login to ZEN at *demo.zen.zixi.com* then your Account ID is *'demo'*).
7. In the **Email** field, enter the username for your ZEN Master account.

8. In the **Password** field, enter the password from your ZEN Master account.
9. Click Login.
   A list of Broadcasters configured in ZEN Master is displayed.
10. For the Broadcaster that you are adding, which should currently be in **Pending** mode, click **Select**.
    Details about the Broadcaster are shown in the **Status**
11. Click **Refresh.**
    The connection is configured automatically.
12. In **ZEN Master**, in the main navigation, click **Broadcasters**.
13. Verify that the status of the newly configured Broadcaster cluster is **OK.**
14. Verify that the status of each Broadcaster that was added to the cluster has changed from **Pending** to **OK.**

SSH Connections

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. As part of the SSH configuration, you can configure a connection to the server and then configure any number of SSH tunnels to the same server.

➡ **To create an SSH connection to a server:**

1. Click the **Add Connections** button.
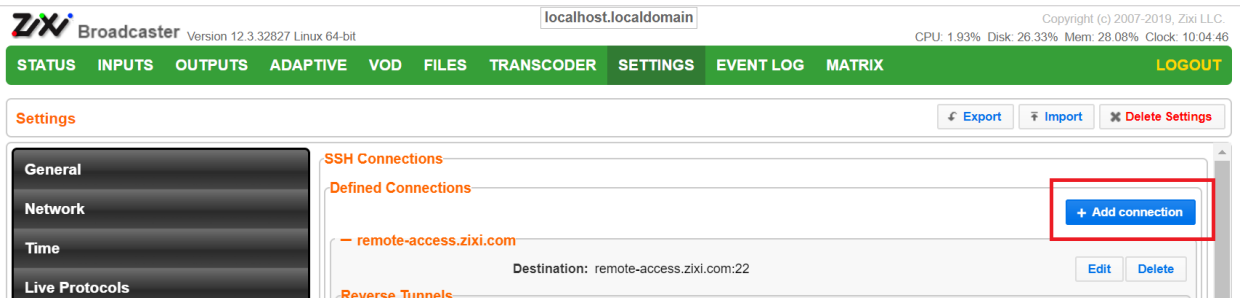
2. In the **Host** field, enter the IP address or host name of the host that you wish to access.
3. In the **Port** field, enter the port number to access the host.
4. Click **Apply**.
   The connection to the specified server is configured.

➡ **To create a reverse tunnel to the same server:**

1. Under the destination that you have configured, click **Edit Credentials**.
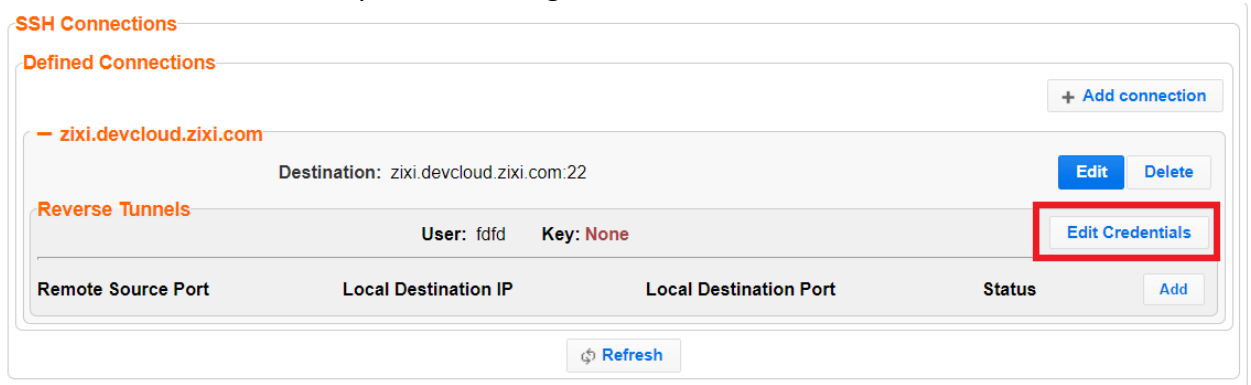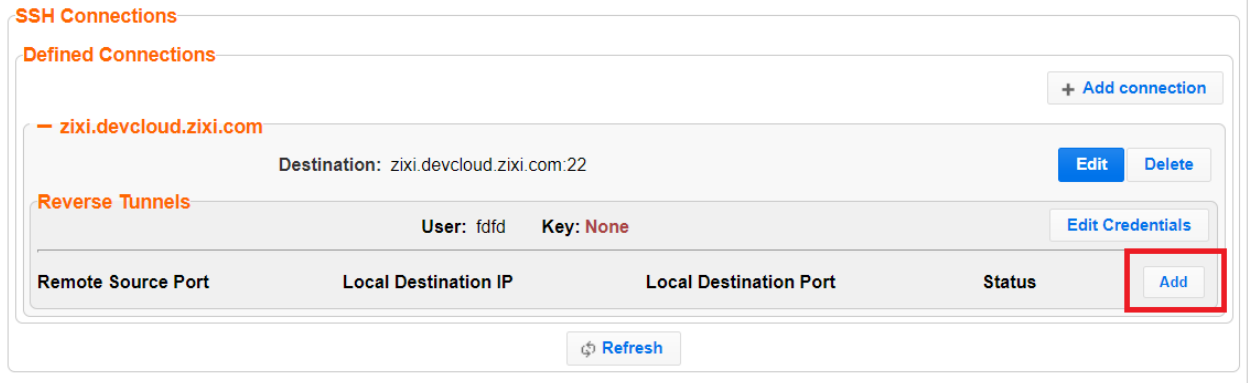
   The **Connection Credentials** dialog appears.
2. In the **User** field, enter the user name to access the tunnel.
3. Click **Private Key**, navigate to the file location and select the file.
4. Click **Apply**.

5. Click **Add** to add a reverse tunnel.

The **Tunnel details** dialog appears.

6. In the **Remote Source Port** field, enter the port number of the remote server.
7. In the **Local Destination IP** field, enter the IP address of the local server.
8. In the **Local Destination Port** field, enter the port number to connect the tunnel.
9. Click **OK**.
10. Repeat steps 5-9 to add additional tunnels.

Authorization

Authorization can be configured for any incoming or outgoing streams.
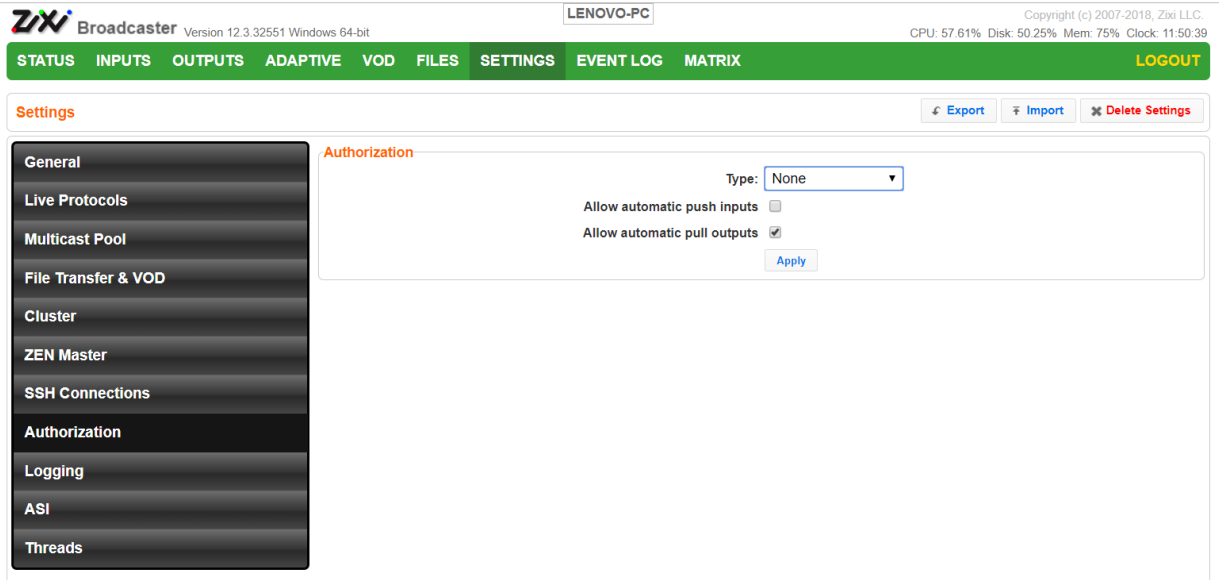
Field	Description
Authorization	
Type	**None (default)** - authorization will be defined in the Input and Output streams. In this case you will need to define the password in the Input and the Output streams. **Global Password** – a single password that will be used for all access requests. If you select this option, fill in the following details: **HTTP Server** – Zixi Broadcaster will generate an HTTP request to an external server on every connection. **Stream access –** access authorization on the stream level. The password needs to be the same as the password to access the stream**.** **Windows Users** – uses the built-in authorization of the Windows operating system. **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. If you have selected an option that is not **None**, fill in the following details: **Parameter** - specify the password that you would like to use for access. **Separate user folders** – select this checkbox to enable access by user folders. **Logging** - select the checkbox to enable logging of the connections. **Threads** - specifies that number of CPU threads allowed.

Authorization

	Other override authorization techniques are available. For more information contact Zixi support
Allow Automatic Push inputs	If this checkbox is selected, the Zixi Broadcaster will automatically create an input stream each time it receives a push stream from a source.
	However, if this checkbox is not selected, only predefined Push Input streams with the defined credentials will be allowed in (this is the default setting and the behavior in previous versions).
	Default: not selected.
Allow Automatic pull outputs	If this checkbox is selected, any Zixi Receiver that requests a Pull output will be granted access. In this case, a Pull output will be automatically created in the Zixi Broadcaster (this is the default setting and the behavior in previous versions).
	However, if this checkbox is not selected, only predefined Pull output streams with the defined credentials will be pulled by the Zixi Receiver.
	Default: selected.

Logging

The Logging screen defines the logs location and preferences for debugging purposes.

Field	Description
Logging	
General Level	The Severity Level that will be collected in the log, from Info, Warning, Error, to Fatal. Selection of lower severity levels will include all higher-level logs. Default: None, since Logging is resource-intensive and only enabled when necessary.
Path	The log file name and path where the collected event information will be stored.
Max log files	The maximal number of log files.
Max log file size (MB)	The maximal size of each log file.
Send crash reports	Select the checkbox to send a crash report to Zixi Support.

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	Specify the port number used by the ASI protocol.
Data Direction	Specify the direction of the data being transmitted by the ASI protocol.

SNMP (Linux Only)

The SNMP screen includes basic configuration parameters for the configuration of Simple Network Management Protocol, which enables monitoring and control of Zixi Broadcaster by a monitoring system. For further information on how to enable and configure SNMP on Zixi Broadcaster, see

Field	Description
Service	Click the button to **Start/Stop** the snmpd service.
SNMP V3 Users	For **SNMPv3** monitoring systems, click the **+** button to add authentication credentials and fill-in the following fields: **User name** - enter the SNMP user name **Write access** - select the checkbox to allow Read-Write access rights. If the checkbox is not selected, the user will have Read-only access rights. **Password** - enter the SNMP user's password.
Trap Receivers	Specify SNMP Trap receivers that will listen to the SNMP Traps that will be sent by Zixi Broadcaster. Click the **+** button to add authentication credentials of the Trap Receiver, by filling-in the following fields: **Community** - Specify the community name for access. **Host** - Specify the IP address to which the Trap messages will be transmitted.

SNMP (Linux Only)

Field	Description
	Port - Specify the Port number to which the Trap messages will be sent transmitted.
Read-only Community Name	Used in **SNMPv1** and **SNMPv2**, this parameter is used to specify the Community Name to enable read-only access to the Zixi Broadcaster monitored information. If the community string is correct, Zixi Broadcaster will respond with the requested information. If the community string is incorrect, Zixi Broadcaster will simply ignores the request and will not respond.
Read-write Community Name	Used in **SNMPv1** and **SNMPv2**, this parameter is used to specify the Community Name to enable read-write access to Zixi Broadcaster. Read-write objects include, for example, zbiActive, which indicates and/or sets the Active state of an Input stream

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 are displayed in the server time (not local time) and can be exported as a .cvs file.
In Linux, the event log is written to a file located in the following location on the disk:
/log/var/messages

➡ **To Clear the Log:**

In 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:**

In 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:**

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

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.

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.

Disconnecting Output from Input

➡ **Disconnect an Input to an Output:**

1. Click on the To 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.

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.

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.

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.

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.	
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.

Viewing Stream Details

➡ **To View Stream Details:**

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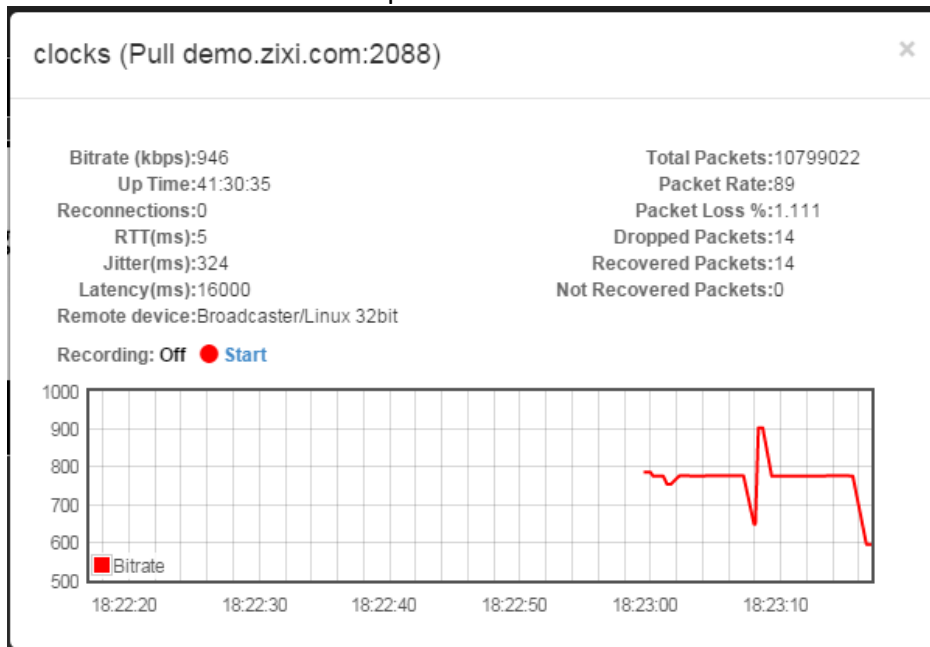
Configuring SNMP

Zixi Broadcaster enables monitoring and control via SNMP (on Linux only). The monitoring system can receive SNMP Trap messages from Zixi Broadcaster as well as access monitored objects with read-only and read-write access privileges (objects and their access permissions are defined in the MIB). Zixi Broadcaster supports SNMPv1, SNMPv2, and SNMPv3. Before using SNMP you need to ensure that SNMP is enabled in your Zixi Broadcaster license, run a script, as described below, and configure the SNMP settings in the Settings >SNMP screen.

> The SNMP feature is not enabled by default. If you do not see this screen, please contact Zixi Support.

Activating SNMP

➡ **To Activate SNMP:**

Run the script file ./install_snmp.sh, located in the Broadcaster folder, where Zixi Broadcaster was installed. The events on the log screen are deleted.

> Note: Running the script may cause Zixi Broadcaster to restart.

Configuring SNMP Settings

➡ **To configure SNMP:**

1. In Zixi Broadcaster UI, go to **Settings > SNMP**.

Configuring SNMP Settings

2. In the **Service** field, click the button to activate the service.

3. Do one of the following:

    *   For SNMPv1 or SNMPv2, fill in the read-only and/or read-write community name in the **Read only community name**, and **Read-write community name** fields.
    *   For **SNMPv3**, under the SNMPv3 Users section, click the + button.
        The following screen appears:

SNMPv3 user details	✖
User name:	[ ]
Write access:	☐
Password:	[ ]
	Apply **Close**

    *   In the **User Name** field, enter the SNMP user name.
    *   In the **Write Access** field, select the checkbox to allow *Read-Write* access rights. If the checkbox is not selected, the user will have *Read-only* access rights.
    *   In the **Password** field, enter the SNMP user's password.

4. Under the **Trap Receivers** section, specify SNMP Trap receivers that will listen to the SNMP Traps that will be sent by Zixi Broadcaster, by clicking the **+** button to add a trap receiver. The following screen appears:

Trap receiver	✖
Community:	[ ]
Host:	[ ]
Port:	162
	Ok **Close**

5. In the **Community** field, specify the community name for access.
6. In the **Host** field, specify the IP address to which the Trap messages will be transmitted.
7. In the **Port** field, specify the Port number to which the Trap messages will be sent transmitted.
8. Click **Apply**.

Viewing MIB Information

You can view the *"Root MIB"* (which defines the Zixi Broadcaster tree root definitions) and the **"Broadcaster MIB"** (which describes the Zixi Broadcaster MIB tree definition, including all its objects).

➡ **To view MIB information:**

1. In Zixi Broadcaster UI, go to **Settings > SNMP**.

2. At the upper right-hand corner click the **Root MIB** and/or **Broadcaster MIB** links.

Configuring Hitless Failover

Zixi features hitless failover for inputs, enabling undisrupted streaming when switching from one source to another. The hitless failover feature is based on the SMPTE 2022-7 standard, which specifies "seamless" or hitless failover between binary-identical streams with synchronized RTP headers. Zixi's patent-pending hitless failover technology works by comparing the transport stream payload, without relying on sequences being synchronized. Zixi then applies a proprietary sequencing algorithm to identify missing parts and fill-in missing packets.

The Hitless Failover feature is supported in the inputs of Zixi Feeder, Broadcaster, and Receiver.
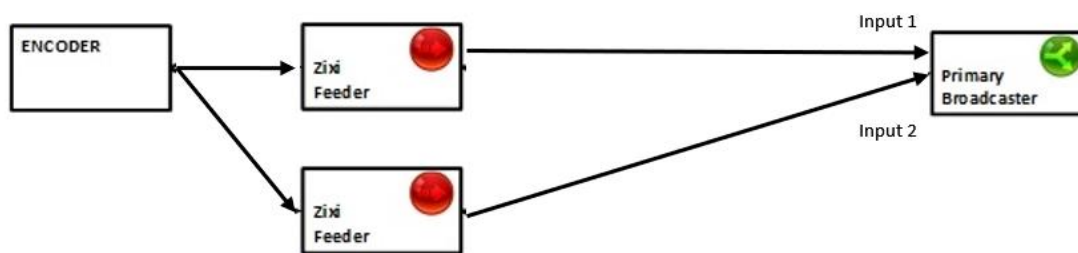
The hitless failover configuration involves grouping two inputs in a "Failover Group". If the two inputs are identical (i.e. two or more binary-identical streams with synchronized RTP headers), when one of them is disrupted or interrupted completely, Zixi Broadcaster will seamlessly use the packets of the other input without any disruptions.

> If the streams are not identical, the failover process will not be seamless and may take up to a second.

A Failover Group can comprise two or more inputs. In a group of three or more, you can define one or more streams as a "Backup". In this case the system will always try to recover packets from "Primary" streams first and only if there are no available primary streams, it will use the backup streams. When one of the primary streams becomes available, the system will automatically jump to the primary stream.

While the Broadcaster GUI only enables configuration of primary streams at a single priority level, through the Zixi Broadcaster API it is possible to assign different priorities as follows:

- Priority 0 – means backup. It will be used only if all other streams are unavailable.

- Priority greater than 0 - means primary.

The Failover Group has its own Stream ID, just like an Input Stream, and will appear in the Inputs list. Although the topology above shows only one Zixi Broadcaster, it is also possible to have multiple targets (e.g. two or more Zixi Broadcasters), each with its own Failover Group of inputs to enable a more complete system-level redundancy.

To configure a Failover Group, follow the instructions in the **Creating a Failover Group** section.