



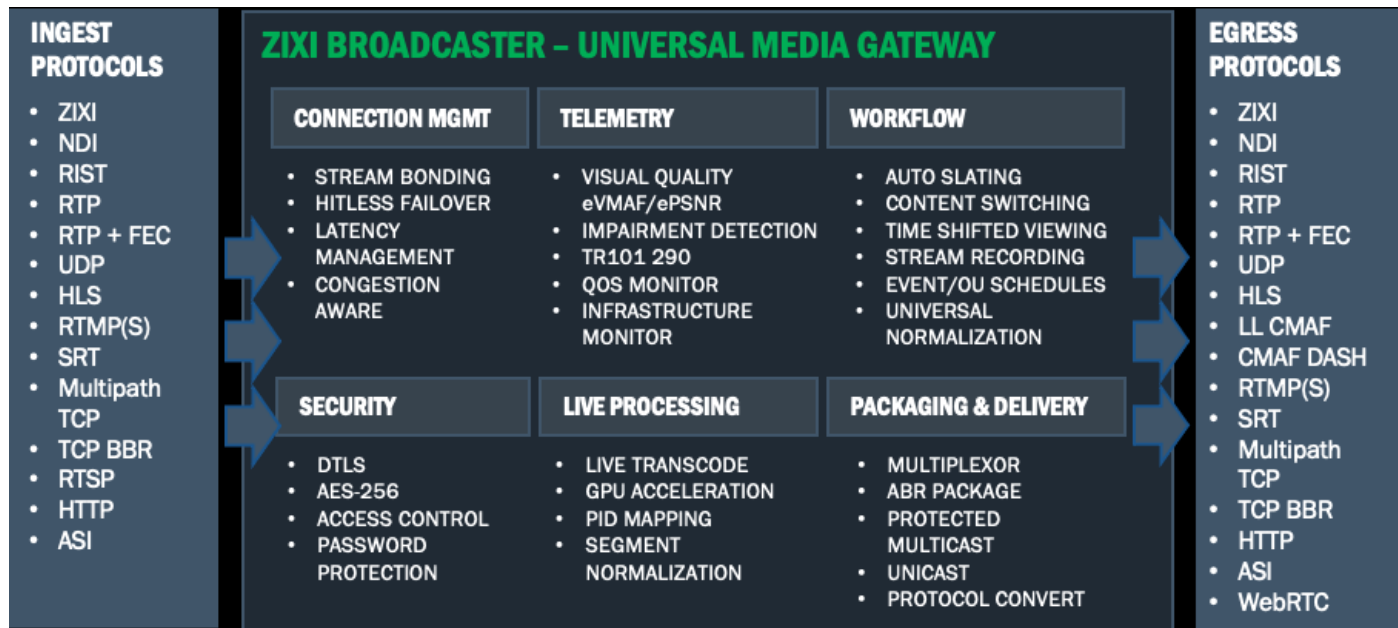
ZIXI BROADCASTER v16

UNIVERSAL MEDIA GATEWAY AND VIDEO PROCESSING SOLUTION

At the heart of the Zixi Software Defined Video Platform (SDVP) is Zixi Broadcaster, a universal media gateway that delivers unparalleled performance, security, resilience, and flexibility. Zixi Broadcaster includes everything needed to enable high performance live video routes between sources and target destinations over any IP network, with advanced in-flight processing, dedicated monitoring, and mission critical reliability. Zixi Broadcaster connects to source feeds, continuously interrogating the network connection and measuring content quality while programmatically normalizing the channel to match the requirements of target destinations. Zixi Broadcaster enables live ultra-low latency accelerated transcoding, transmuxing, program mapping, slate insertion, on-demand recording, and packaged distribution over any protocols optimized for playback on any device. Zixi Broadcaster provide content-aware error correction, bandwidth shaping, and real-time feedback of streaming status enabling content producers to economically transmit premium broadcast quality live video over any network, including commodity internet connections and mobile networks, to support live event and linear production, contribution, primary distribution, re-distribution and OTT workflows.

Zixi Broadcaster Key Benefits

- Manage ultra-low latency, highly resilient live video routes over any public, private, wireless or cloud network
- Unparalleled per core video throughput and processing efficiency deliver more video with less infrastructure
- Broadest support for industry-standard video formats and delivery protocols
- Layered security with end-to-end encryption, password protected session establishment and DTLS certificate validation
- Flexibly scale Zixi Broadcaster deployments on-prem, virtually or in the cloud
- Sophisticated video optimized user dashboards and easily integrated programmatic REST Open API simplify operations



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Zixi Broadcaster Common Use Cases

Universal Media Gateway

Standardize source acquisition and normalize channel feeds for live distribution while providing an interoperable solution that will help simplify any broadcast workflow. Zixi Broadcaster is a universal media gateway driven by a simple philosophy; you should be able to ingest a feed in any protocol, transform content to any format, and deliver to any traditional or digital destination with the guaranteed quality of service and highest quality video that broadcasters demand. Some of the largest content aggregation platforms use Zixi Broadcaster every day to ingest, normalize and re-distribute thousands of active premium content channels.

Satellite Rationalization

As C-band spectrum is re-allocated to accommodate for 5G development, broadcasters are exploring alternative transport solutions for content delivery as the amount of bandwidth available diminishes. Zixi Broadcaster can turn any network connection in to a high performance, ultra-low latency and highly resilient video route. Zixi Broadcaster can bond signals delivered across diverse signal paths, for example, 5G and Public Internet, and offers sequenced hitless failover between sources, guaranteeing reliable transmission. Flexibly scale out Zixi Broadcaster deployments to dynamically increase channel capacity in minutes. Global distribution across cloud provider backbones, public internet and private networks deliver international reach at a fraction of the cost of legacy satellite.

Digital Media Supply Chain Processing

Delivering high profile live events and always-on linear channel services to anywhere in the world requires the agility to scale and process content to match the needs of a wide variety of target destinations. Zixi Broadcaster incorporates state-of-the-art accelerated transcoding, live compliance monitoring and sophisticated workflow processing to normalize contribution feeds in to as many discreet deliverables as required. With support for high density GPU accelerated transcoding, Zixi Broadcaster can tailor each output to the exact format requirements of the intended receiver or playout client. A common mezzanine source can be simultaneously routed as ABR packaged streams to partner CDN origins, multiplexed in to a MPTS for delivery to IRDs and multicast directly to subscribing multicast client STBs. Zixi Broadcaster enables interoperability and simplifies complex media supply chain management with powerful processing solutions.

ZIXI BROADCASTER INCLUDES:

- **Robust content delivery over IP** - Active managed highly resilient live video routes with predictable ultra-low latency delivery
- **Adaptive Rate Control** - Dynamically adjusts stream rate to adapt to changing network conditions, using unicast or multicast, to meet specific application requirements
- **Accelerated Transcoding** - support for low latency and GPU accelerated live transcodes to a variety of different profiles and bit rates
- **OTT Format conversion** - supports all internet streaming protocols including HLS/CMAF/DASH/RTMP/MPEG-TS over HTTP and more
- **Recording** - store streams as MPEG-TS files on shared storage
- **Time-shifting** - records the stream to delay its broadcasting
- **File Streaming** - stored files can be accessed and programmed in to a live stream 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 Impairments** - analysis of the stream's audio and video content, including audio levels, audio silence detection, frozen video detection, and more
- **Live Perceptual Quality Analysis** - Real-time and trending VMAF and PSNR score estimation
- **Telemetry Monitoring** - captures and analyzes 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), and 16 other leading protocols
- **Network bonding** - seamlessly bonded delivery over geographic and network diverse signal paths
- **Hitless failover** - hitless failover guarantees uninterrupted streaming when switching 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
- **AES 256 stream encryption** - UDP, File and RTMP input streams can be encrypted by Zixi Broadcaster using a fixed key (AES 128, AES 192, AES 256)
- **DTLS** - Establish certificate verified strong cipher protections around stream connections
- **Multiplexing** - MPTS streams can be demuxed into single SPTS input streams for specific programs and vice versa
- **SCTE-35** - SCTE-35 markers found in the source input are propagated in-band or in ABR manifest formats and used for stream segmentation
- **Low-latency ABR Stream Packaging** - Low latency HLS and CMAF chunked delivery packaging



SYSTEM REQUIREMENTS

Hardware

CPU: Intel i3 dual core CPU or above; AMD Ryzen and Epyc processors.
 RAM: 2 GB RAM (minimum)
 Networking: 2 x 1GB network card

Operating System

Linux
 Zixi Broadcaster - 64-bit CentOS 7.x or an equivalent Linux distribution with glibc 2.14+
 Linux Ubuntu 12 or later, 64-bit
 Linux Debian 7 or later, 64-bit
 Non-GUI server distribution recommended due to conflicts with NetworkManager GUI applications

Windows

Windows® Server 2012/2016/2019, 32-bit or 64-bit
 Windows 8/10, 32-bit or 64-bit
 Windows releases are supported per the Microsoft support schedule. Server OS is preferred for 24/7. Desktop OS, if used, should be configured to disable auto updates and prefer background service priority.

Ingest

Zixi, NDI, RIST, RTP, RTP+FEC, UDP, HLS, RTMP(S), SRT, Multipath TCP, TCP BBR, RTSP, HTTP, ASI

Egress

Zixi, NDI, RIST, RTP, RTP+FEC, UDP, HLS, LL-HLS, LL-CMAF, DASH, RTMP(S), SRT, Multipath TCP, TCP BBR, HTTP, ASI, WebRTC

Captions

ATSC 608/708 ES passthrough to Zixi TS, HLS, DASH, and RTMP
 DVB track passthrough to Zixi TS
 WebVTT generation from ATSC 708 Elementary Stream

Video Processing

MPTS De-multiplexing
 Passthrough
 10-bit to 8-bit color downscaling
 Thumbnail extraction as HLS playlist
 Deinterlacing (non-telecine) on all input codecs
 Interlaced output (only with X264 S/W encoder and NDI)
 PID mapping and PID pass-thru
 Black bar insertion
 Cropping
 Smooth framerate conversion - up and down
 Image Overlay/Logo Insertion
 Copy GOP from source or generate new GOP
 GOP synchronization when generate new GOP
 Omit or keep closed captions
 I-frame synchronization of outputs with different FPS
 I-frame injection at SCTE-35 markers
 Preserve all video source color primaries

Video Decode

Up to 1080p60 MPEG-2 4:2:0
 Up to 2160p60 H264 4:2:0
 Up to 2160p60 HEVC 4:2:0|4:4:4 8-bit|10-bit
 NDI
 CDI
 JPEG-XS

Video Encode

Up to 1080i30 MPEG-2 4:2:0
 Up to 2160p60 H264 4:2:0|4:4:4 8-Bit
 Up to 2160p60 HEVC 4:2:0|4:4:4 8-bit|10-bit
 NDI

Audio Processing

Transcode up to 16 audio tracks
 Passthrough of all audio tracks
 PID mapping and pass-thru
 Audio Sample Rate Conversion - 44.1KHz to/from 48KHz

Audio Decode

AAC Low Complexity, High Efficiency V1, High Efficiency V2
 ADTS and LATM encapsulation
 AC3 (Dolby Digital)
 MP2 (MPEG-2 Audio Layer II)
 MP1 (MPEG-1 Audio Layer II)
 Opus

Audio Encode

AAC Low Complexity, High Efficiency V1, High Efficiency V2
 E-AC-3 (Enhanced Dolby Digital)
 Opus

Advanced Features

ML-based adaptive bitrate control based on network conditions

Ad Insertion

SCTE-35 passthrough to Zixi TS
 SCTE-35 converted to CUE-OUT/CUE-IN in HLS
 SCTE-35 converted to Splice Events in DASH
 SCTE-35 converted to OnCuePoint in RTMP
 API Injection with output to SCTE-35 in Zixi TS
 API Injection with output to CUE-OUT/CUE-IN in HLS
 API Injection with output to Splice Events in DASH
 API Injection with output to OnCuePoint in RTMP

NETWORK PORT ACCESS REQUIREMENTS FOR FULL FUNCTIONALITY

Port	Type	Direction	Description
2088	UDP	Inbound	Push to Broadcaster from Feeder or another Broadcaster, Zixi protocol **
7088	UDP	Inbound	Push to Broadcaster from Feeder or another Broadcaster, Zixi protocol with DTLS **
2077	UDP	Inbound	Pull from Broadcaster by Receiver or another Broadcaster, Zixi protocol **
7077	UDP	Inbound	Pull from Broadcaster by Receiver or another Broadcaster, Zixi protocol with DTLS **
1935	TCP	Inbound	Encoder push to Broadcaster, RTMP protocol
1935	TCP	Outbound	Broadcaster push to CDN or RTMP server, RTMP protocol
7777	TCP	Inbound	HTML5 video player or CDN pull from Broadcaster, HTTP streaming protocol - HLS or DASH
4444	TCP	Inbound	Web management UI, HTTP protocol
80/443	TCP	Outbound	Outbound + return - Zixi License server - license.zixi.com - 52.72.218.41 - 34.195.97.223
53	DNS	Outbound	Outbound + return - communication to license server, Broadcaster/Feeder/Receiver host name resolution

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