"Broadcast Contributions and Distributions… over the Internet"

May 20, 2015

Live Broadcast Quality Video Delivery over the Internet!?!

Multi-platform
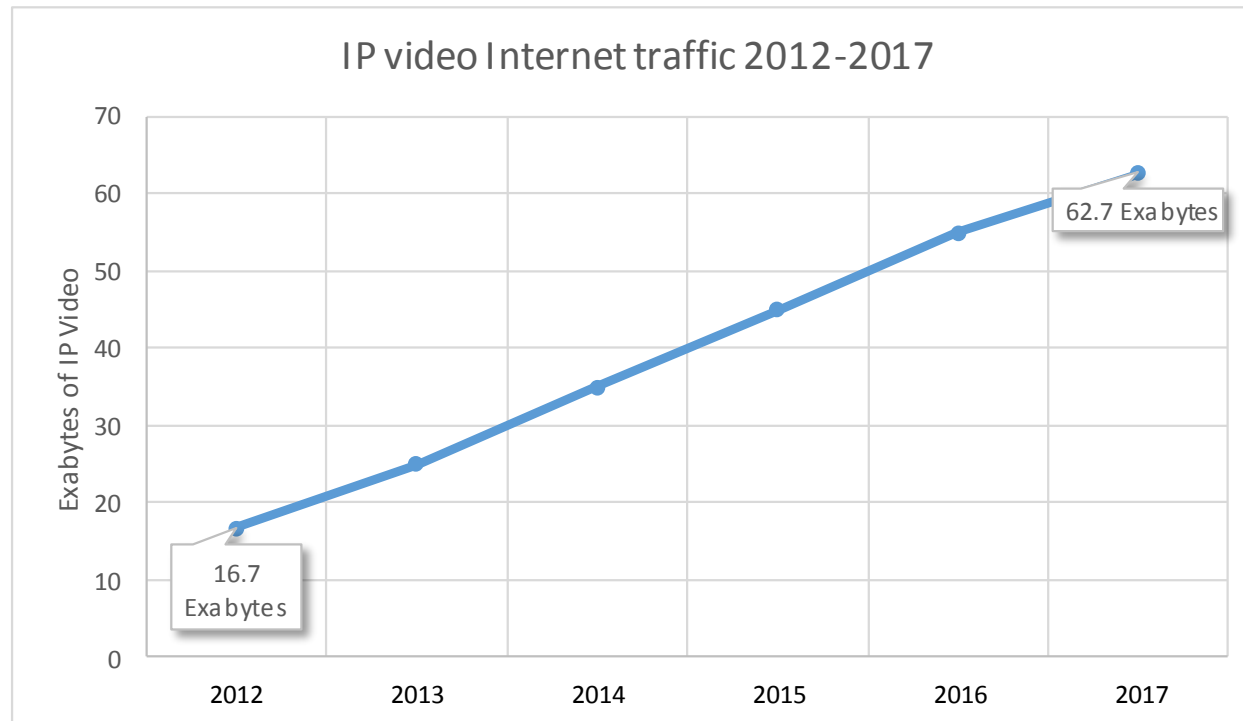
Convenient

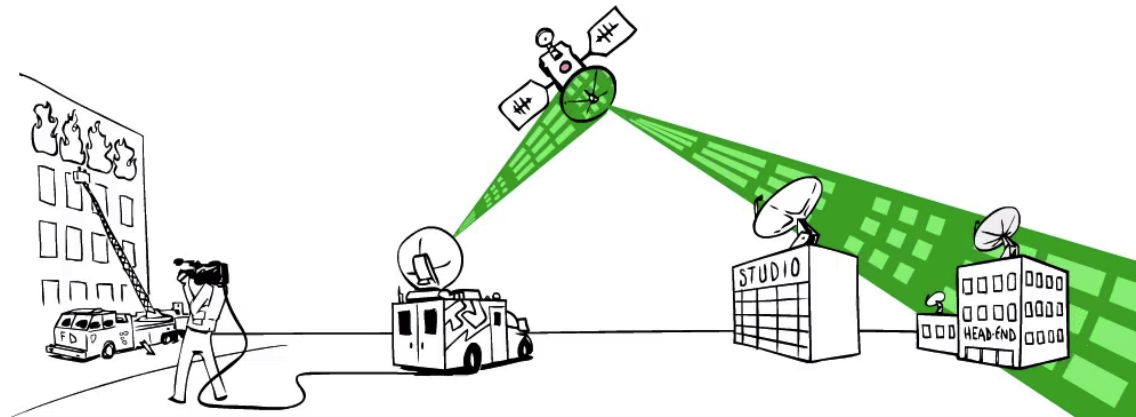Cost-effective

Reliable

Secure

Scalable

Disruptive

The Trend: Video over the Internet

IP video Internet traffic 2012-2017

Exabytes of IP Video

- 2012: 16.7 Exabytes
- 2017: 62.7 Exabytes

(Y-axis: 0, 10, 20, 30, 40, 50, 60, 70)
(X-axis: 2012, 2013, 2014, 2015, 2016, 2017)

Broadcasters, live event producers, content distributors and enterprises are looking to transport **live** studio-quality video over the Internet

Source: Cisco Visual Networking Index, Internet Video Forecast

How video moves today

- Cameras capture live events
- Uplinked via satellite and fiber
- Received at studio for production
- Satellite and fiber used to distribute to consumers/affiliates
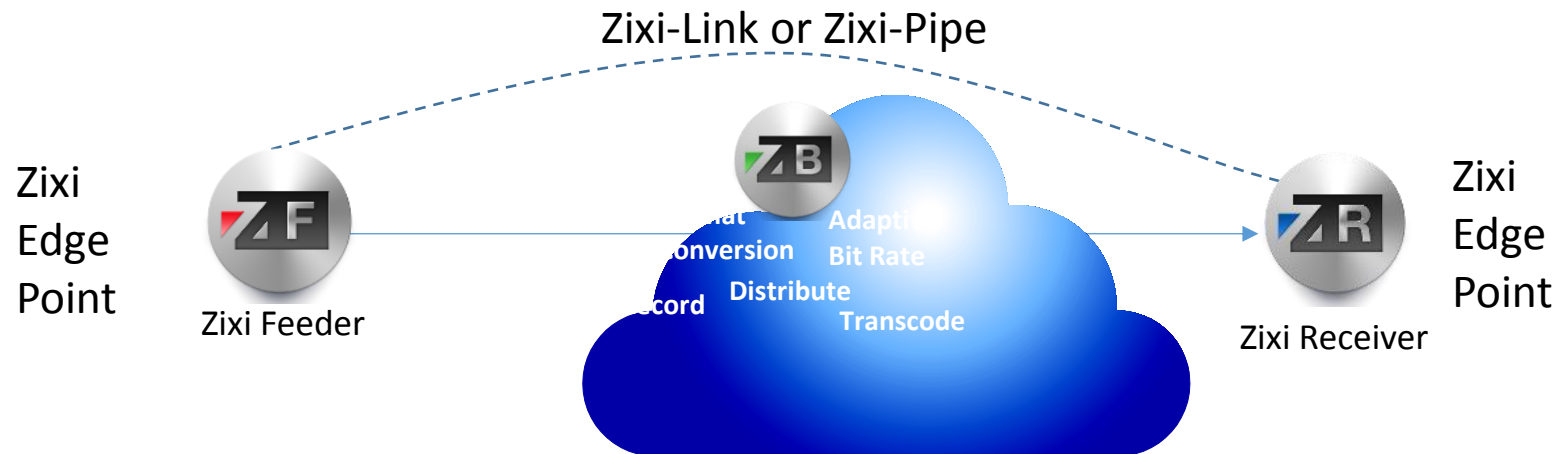- *Expensive, time-consuming and capital-intensive*

How Zixi moves video

- Cameras capture live events
- Camera/encoder sends video stream *over the Internet* in full fidelity to studios, broadcast centers or directly to subscribers
- *Quick, cost-effective and capital efficient*

Zixi Technology

- Software-based Platform allows reliable transmission of broadcast-quality HD video globally over unmanaged internet connections and private IP networks

- Zixi uses advanced technologies to manage jitter, packet-loss and latency to ensure error-free video transmission

- Platform-agnostic. Appliance, standalone installable application or SDK for any platform

- Zixi EcoZystem: Growing number of partners building Zixi into their platforms extending Zixi standard for IP delivery

- Mobile, embedded and on-premise edge-based software, complemented with cloud-based service platform

Zixi-Link or Zixi-Pipe

Zixi Edge Point

Zixi Feeder

Adaptive Bit Rate
Conversion
Distribute
Transcode

Zixi Edge Point

Zixi Receiver

Under the Hood

Video centric

Codec-agnostic

Low latency

Hybrid Z-FEC & Z-ARQ
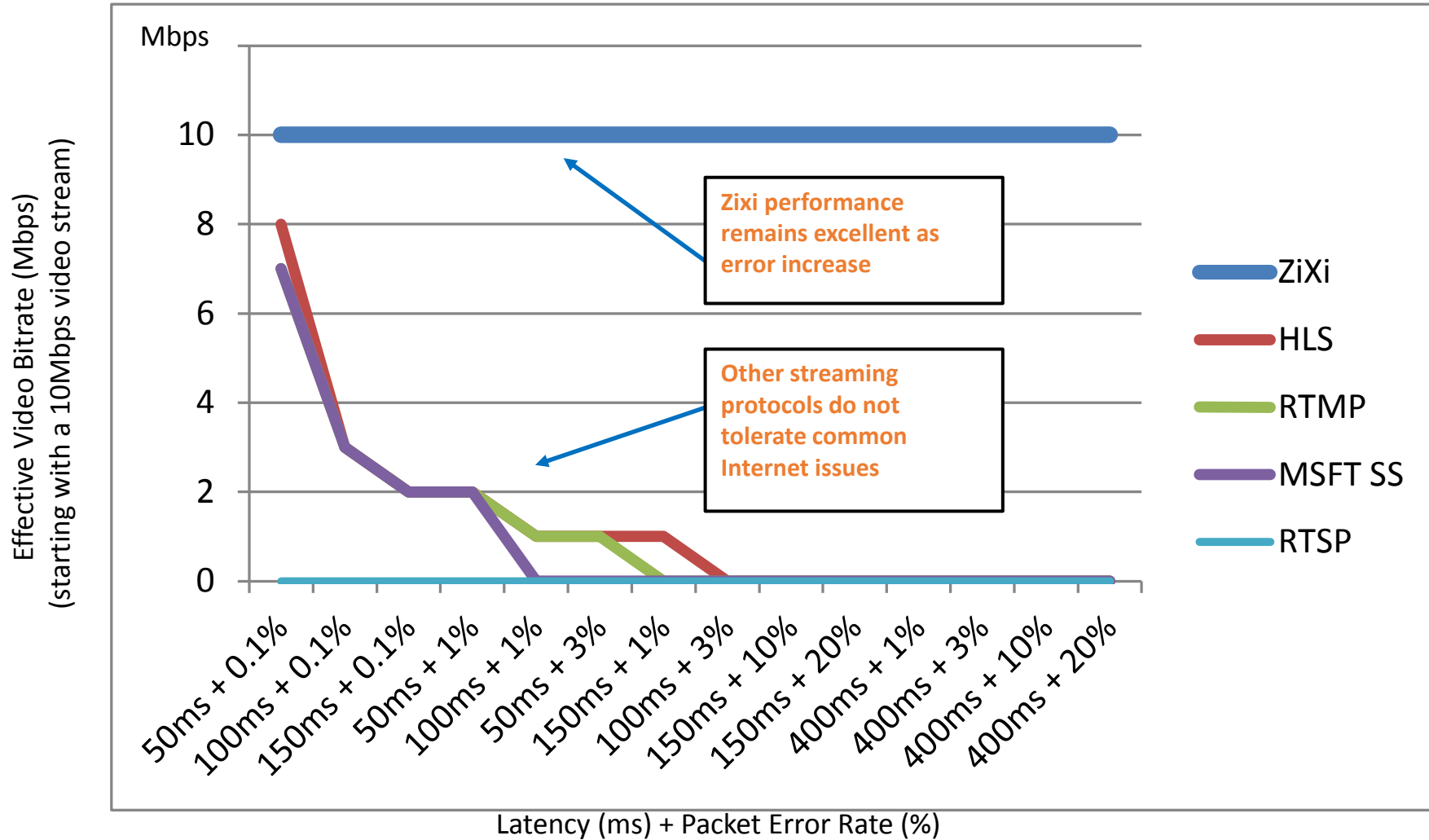
Encryption

Support for all protocols

Network-aware

Zixi provide rock solid broadcast-quality video delivery

Zixi performance remains excellent as error increase

Other streaming protocols do not tolerate common Internet issues

Legend:
- ZiXi
- HLS
- RTMP
- MSFT SS
- RTSP

Y-axis: Effective Video Bitrate (Mbps) (starting with a 10Mbps video stream), Mbps, values 0, 2, 4, 6, 8, 10

X-axis: Latency (ms) + Packet Error Rate (%): 50ms + 0.1%, 100ms + 0.1%, 150ms + 0.1%, 50ms + 1%, 100ms + 1%, 50ms + 3%, 150ms + 1%, 100ms + 3%, 150ms + 10%, 150ms + 20%, 400ms + 1%, 400ms + 3%, 400ms + 10%, 400ms + 20%

Accelerated VoD

Zixi provides up to 1,000x faster VoD file delivery and sustains 4~8x higher quality bit streams vs. HTTP/TCP over the Internet

Stream Index

Mbps

Time (seconds)
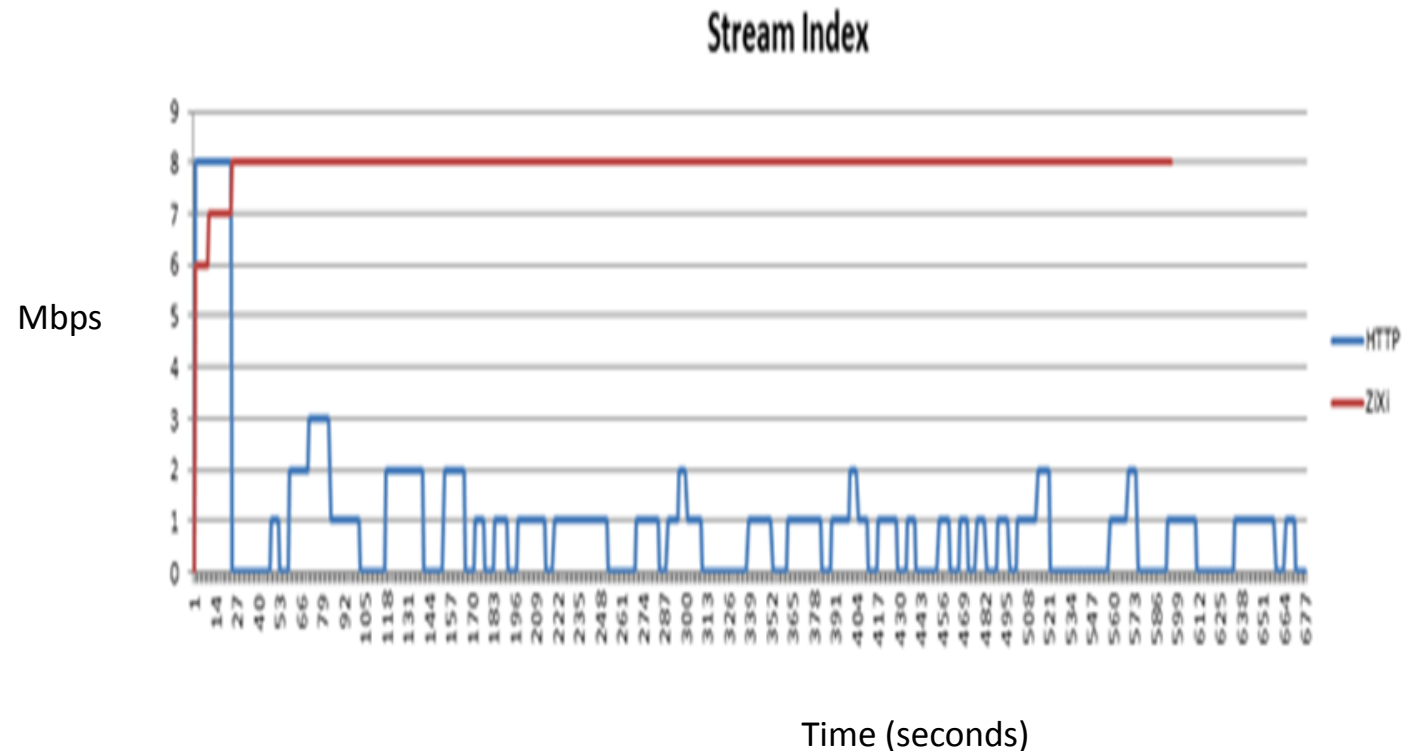
- Tested over a home-grade ADSL, with max 10Mbps bandwidth, and consistent 2% packet loss

Video Quality

Live HDTV Broadcast over the Internet

with ZiXi   vs.   without ZiXi

Pauses and Block Artifacts as alternative internet streams can't play 5mbps video on a 5.3 mbps end-to-end pipe

Startup Time
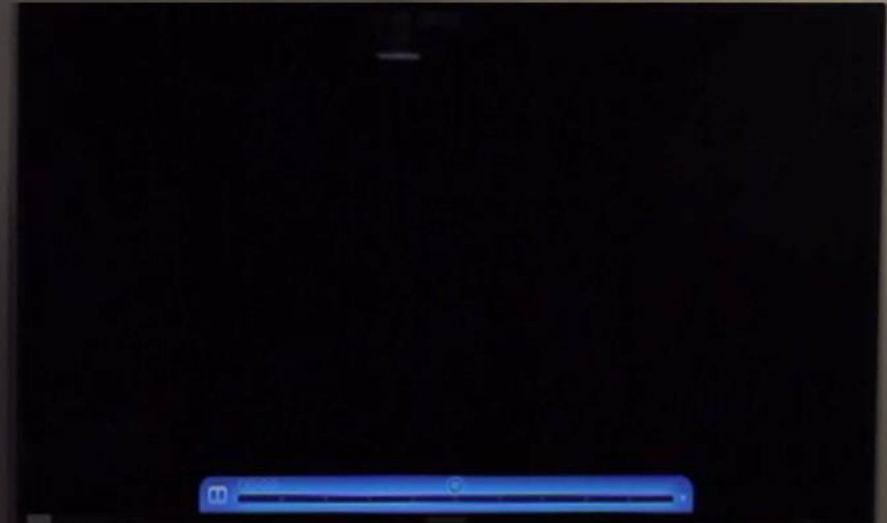

Live HDTV Broadcast over the Internet

with ZiXi   without ZiXi
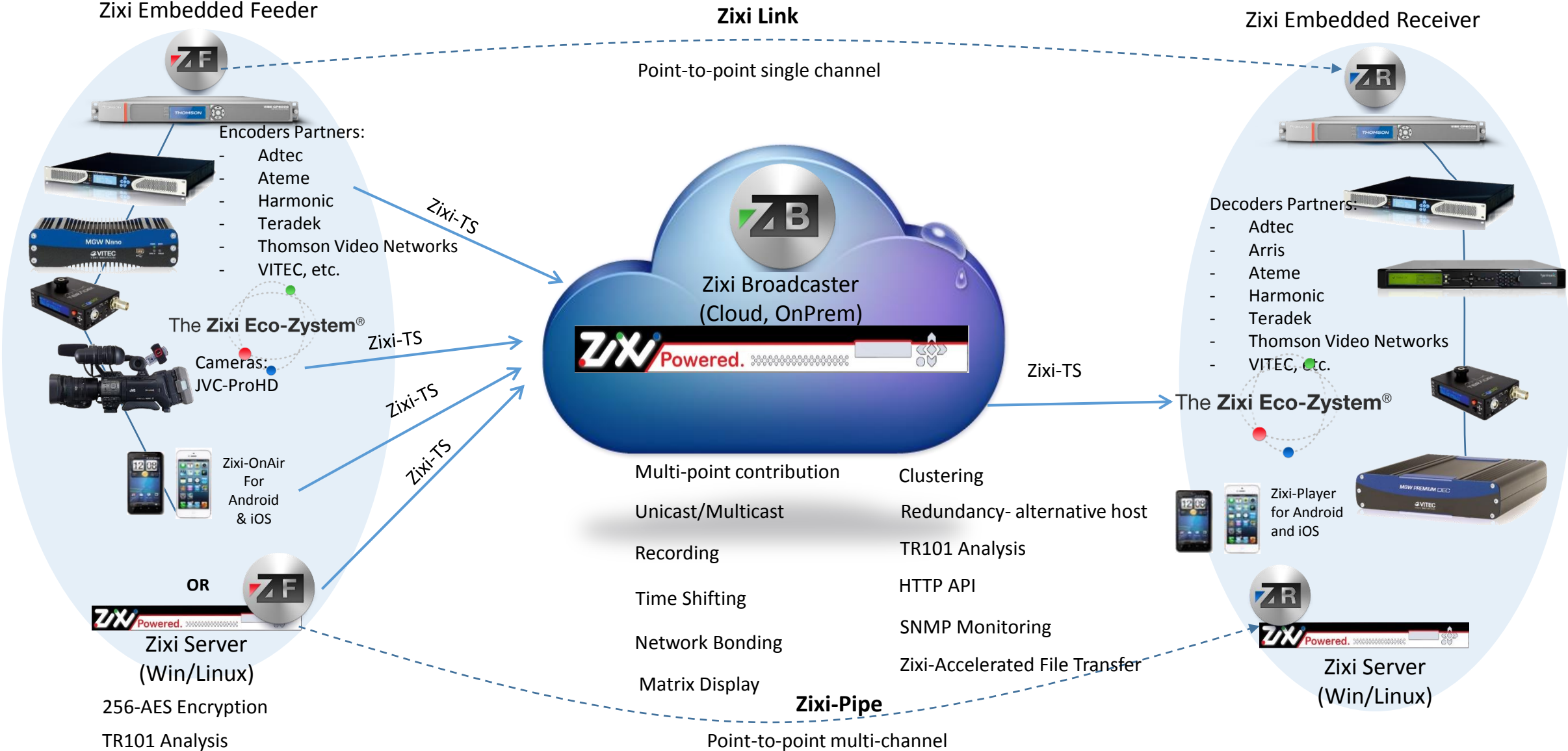
00: 00: 400 seconds   01: 02: 400 seconds
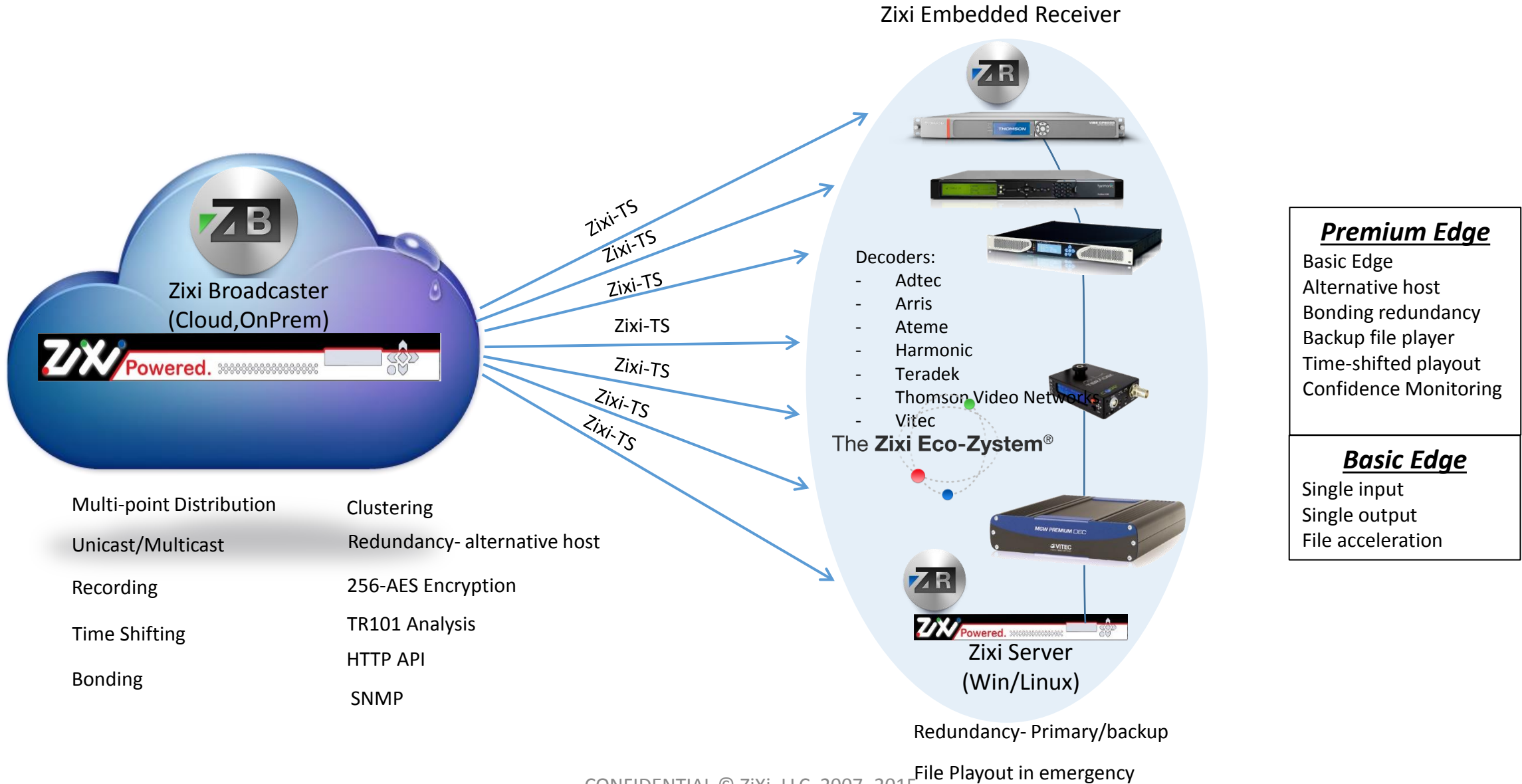
Less than 0.5 seconds

Both TVs streaming the same live news broadcast, a 5Mbps bitrate video, globally via the Internet [from Boston, MA to Singapore to San Jose, CA] over a 5.3 Mbps end-to-end network bandwidth
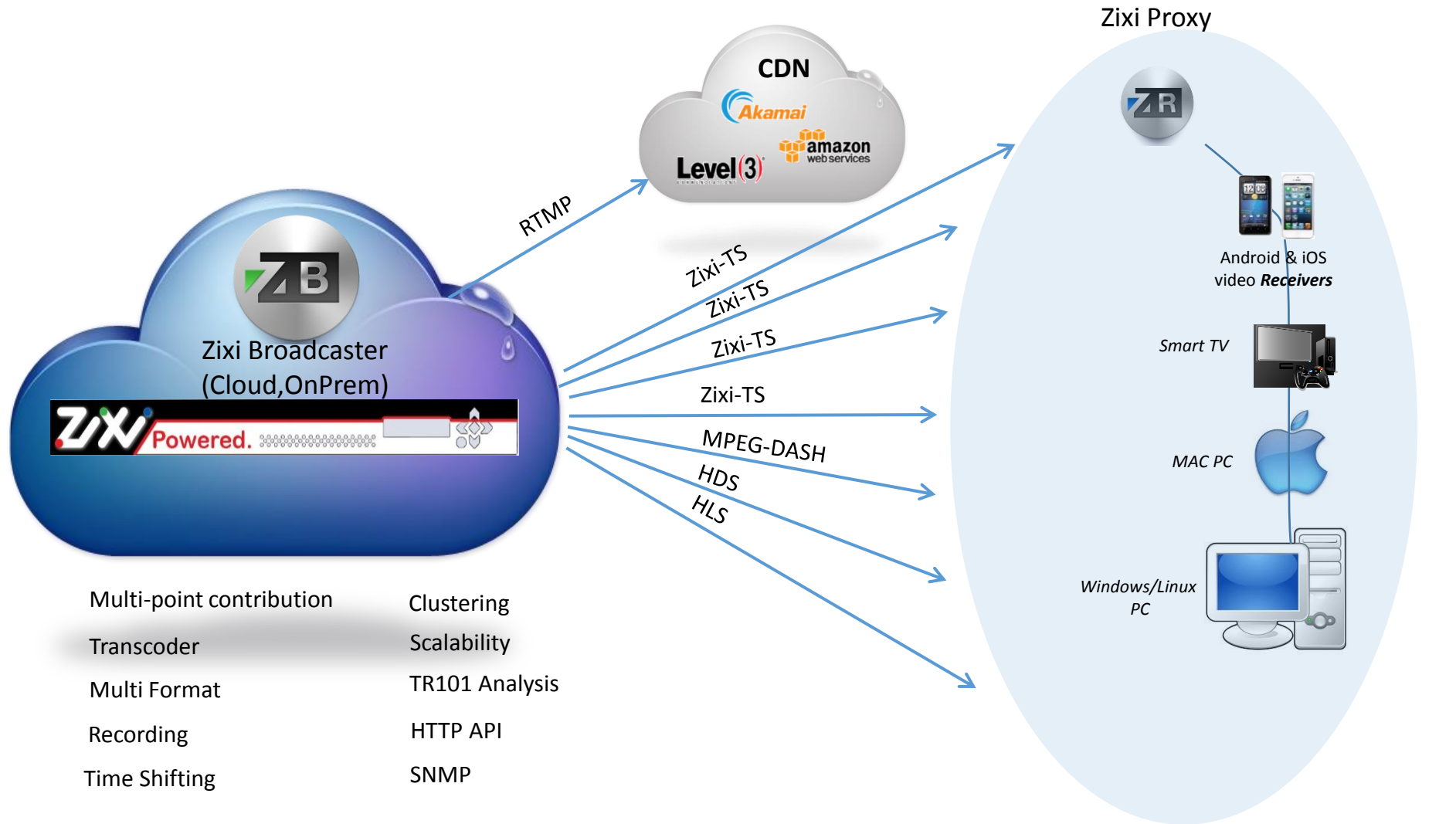
Contributions

Zixi Embedded Feeder

Zixi Link

Zixi Embedded Receiver

Point-to-point single channel

Encoders Partners:
- Adtec
- Ateme
- Harmonic
- Teradek
- Thomson Video Networks
- VITEC, etc.

Zixi-TS

The **Zixi Eco-Zystem**®

Zixi-TS

Cameras: JVC-ProHD

Zixi-TS

Zixi-OnAir
For Android
& iOS

Zixi-TS

OR

Zixi Server
(Win/Linux)

256-AES Encryption

TR101 Analysis

HTTP API

Zixi Broadcaster
(Cloud, OnPrem)

Zixi-TS

Decoders Partners:
- Adtec
- Arris
- Ateme
- Harmonic
- Teradek
- Thomson Video Networks
- VITEC, etc.

The **Zixi Eco-Zystem**®

Zixi-Player
for Android
and iOS

Multi-point contribution   Clustering

Unicast/Multicast   Redundancy- alternative host

Recording   TR101 Analysis

Time Shifting   HTTP API

Network Bonding   SNMP Monitoring

Matrix Display   Zixi-Accelerated File Transfer

Zixi-Pipe

Point-to-point multi-channel

Zixi Server
(Win/Linux)

Primary Distributions

Zixi Embedded Receiver

Zixi Broadcaster
(Cloud, OnPrem)

Zixi-TS
Zixi-TS
Zixi-TS
Zixi-TS
Zixi-TS
Zixi-TS
Zixi-TS

Decoders:
- Adtec
- Arris
- Ateme
- Harmonic
- Teradek
- Thomson Video Network
- Vitec

The **Zixi Eco-Zystem**®

Multi-point Distribution   Clustering

Unicast/Multicast   Redundancy- alternative host

Recording   256-AES Encryption

Time Shifting   TR101 Analysis

                             HTTP API

Bonding

                             SNMP

Zixi Server
(Win/Linux)

Redundancy- Primary/backup

File Playout in emergency

Premium Edge
Basic Edge
Alternative host
Bonding redundancy
Backup file player
Time-shifted playout
Confidence Monitoring

Basic Edge
Single input
Single output
File acceleration

OTT/Enterprise Live/Confidence Monitoring

CDN

Zixi Proxy

Zixi Broadcaster
(Cloud, OnPrem)

RTMP

Zixi-TS

Zixi-TS

Zixi-TS

Zixi-TS

MPEG-DASH

HDS

HLS

Android & iOS
video *Receivers*

Smart TV

MAC PC

*Windows/Linux
PC*

Multi-point contribution

Transcoder

Multi Format

Recording

Time Shifting

Clustering

Scalability

TR101 Analysis

HTTP API

SNMP

SDK – Linux/Windows/IOS/Android

HTTP output – HTTP/HTTPS/HLS

ZIFT – accelerated file transfer

1. Automated QoS

- Simplify user configuration
- Automatic setting of QOS parameters
  - Setting only Latency, all other parameters are set 'behind the scene':
    - FEC overhead: 30% (if latency < 1500ms)
    - FEC block : 300ms (if latency < 1500ms)
    - Automatic FEC (avoid congestion)

2. Network Bonding

- Use multiple connections to aggregate bandwidth

- Hitless recovery from complete link drops or congestions
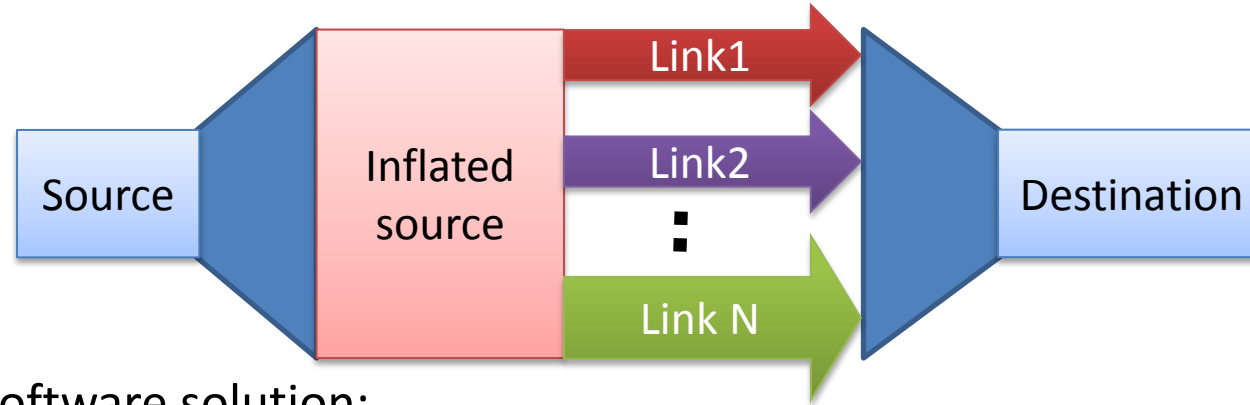
Generic software solution:

Bonding creator is part of:

- Zixi Feeder

- Zixi Feeder SDK

De-bonder is part of:

- Zixi Broadcaster

  - As a licensed feature
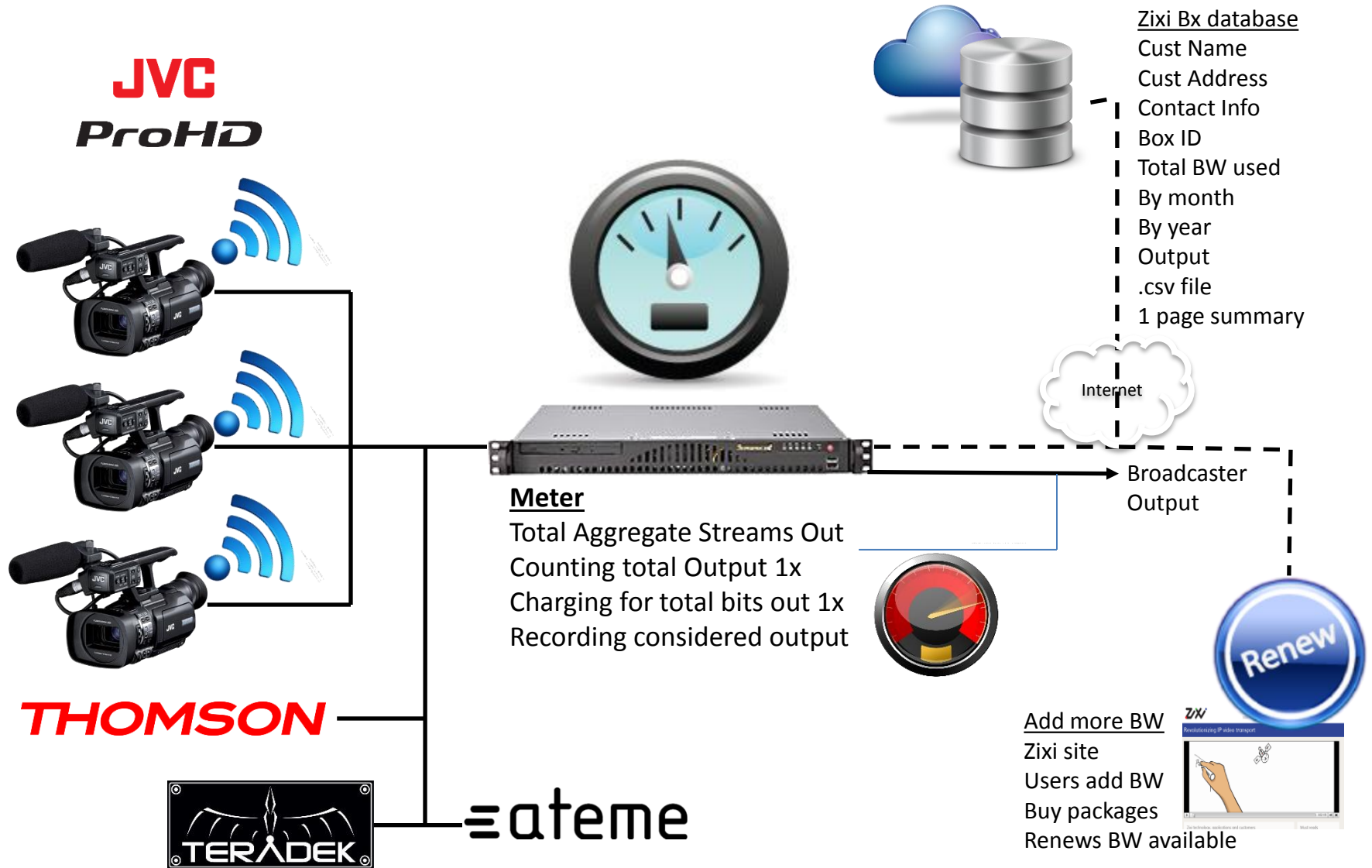
De-Bonder on Broadcaster

Bonded stream

Bitrate Graph

Repackaging and Transcoding

- **Server side transcoding**
  - Running on Windows/Linux machines.
  - Licensing on broadcaster
  - Providing cloud transcoding and ABR solutions.

- **Single server**
  - 'Broadcaster + Transcoder' on a single machine:

Windows/Linux machine

Bit-counting

Zixi Bx database
Cust Name
Cust Address
Contact Info
Box ID
Total BW used
By month
By year
Output
.csv file
1 page summary

Internet

Broadcaster
Output

Meter
Total Aggregate Streams Out
Counting total Output 1x
Charging for total bits out 1x
Recording considered output

Renew

Add more BW
Zixi site
Users add BW
Buy packages
Renews BW available
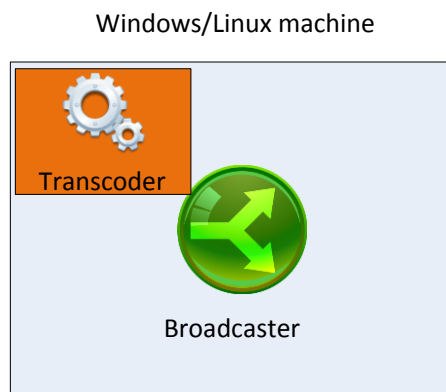
Matrix Display

- A switching and distribution management system

- One page UI panel

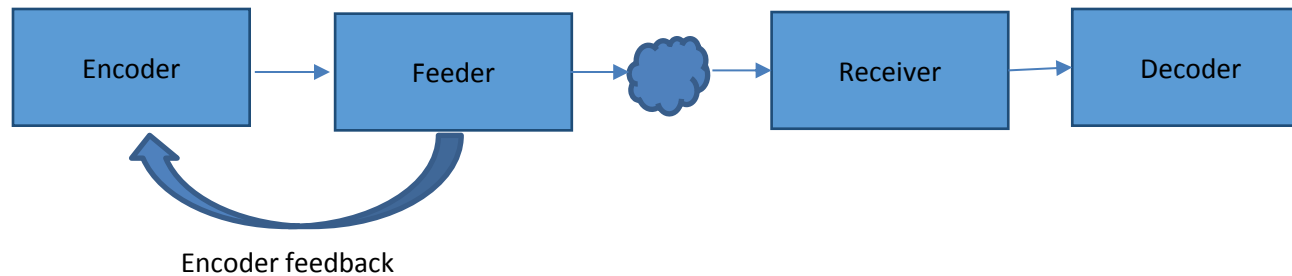- Controls the Broadcaster's Inputs and outputs

- Video preview

Encoder Feedback

- Providing feedback to the encoder of available bandwidth to control its Bitrate

- Provided on:
  - Zixi Feeder SDK – with 'setter' function (tight integration)
  - Zixi Feeder – with external script (loose integration)

Encoder feedback

- 'force padding' – encoder-feedback with CBR padding on the network level to improve the feedback sensing and the control on the encoder.

Scalable and Failsafe

Source

Zixi Transmission Network

Target

Clustering and Node Redundancy

Active / Active or Active Passive Routing

Path redundancy

Primary / Backup Path Delivery
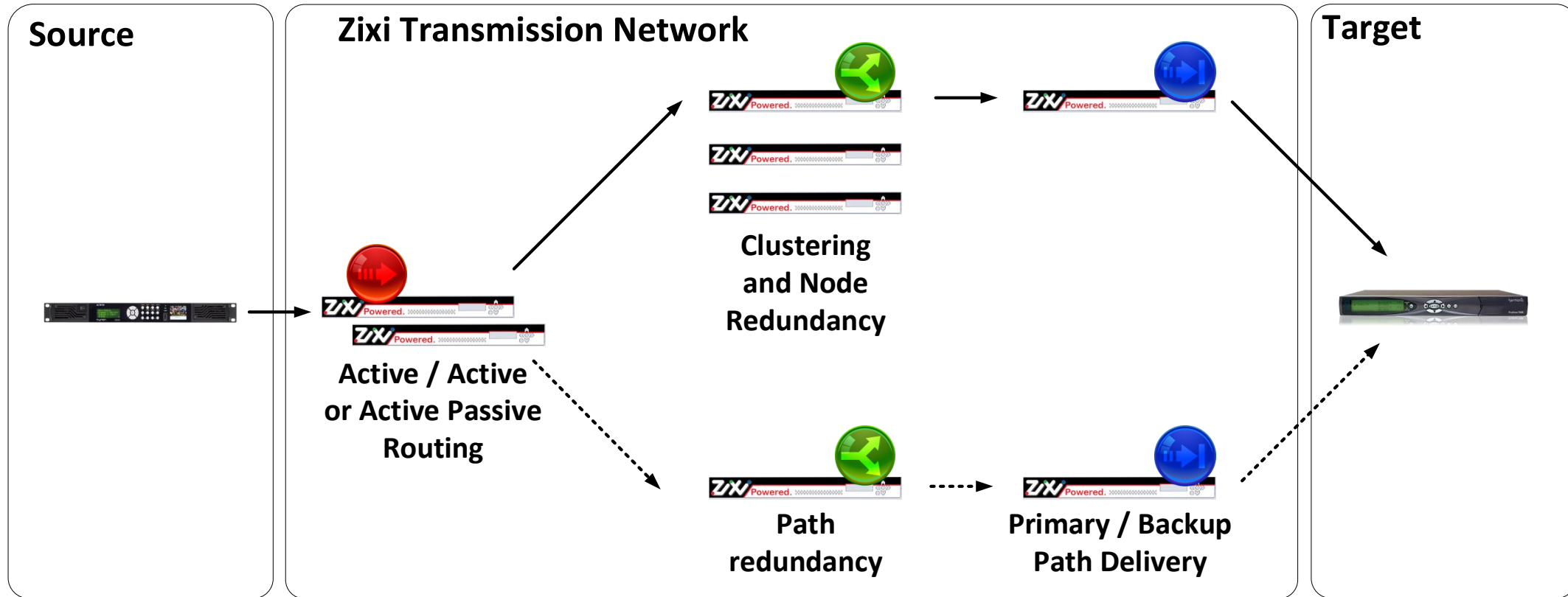
Full Scalability and Redundancy can be introduced at each point within the Zixi-powered network

Zixi Broadcaster Platform

Contribution

Distribution

"Video Internet Hub" (On Premise or Cloud)

Zixi

LIVE

Playout | **Transmuxing** | **Transcoding**

Internet

- **Encoders**
- **Cameras**
- **Streams**
- **Feeder Files**

- Playout, recording, replication, conversion
- Live streams, VOD & accelerated file transfers
- Scalable with backup/failover capabilities

- **Zixi TS**
- **MPEG-TS (UDP/RTP)**
- **RTMP (Pull or Push)**
- **ASI**

HW Decoders

Manages and delivers video streams wherever & whenever needed

- **IRDs**
- **CDNs**

- **Zixi TS**
- **MPEG-TS (UDP/RTP)**
- **RTMP**
- **HLS (Pull)**
- **HDS (Pull)**
- **FLV (Pull)**
- **DASH**
- **TS Files**

- **Android**
- **iOS**
- **Windows**
- **MAC**
- **STBs**

Zixi Customers

Enabling Live *Broadcast-quality* Video Transport from *Anywhere to Anywhere*

- Broadcasters
- Live Event Producers
- Content Providers
- Media Service Providers
- Enterprise
- Government
- House of Worship

April 23, 2015

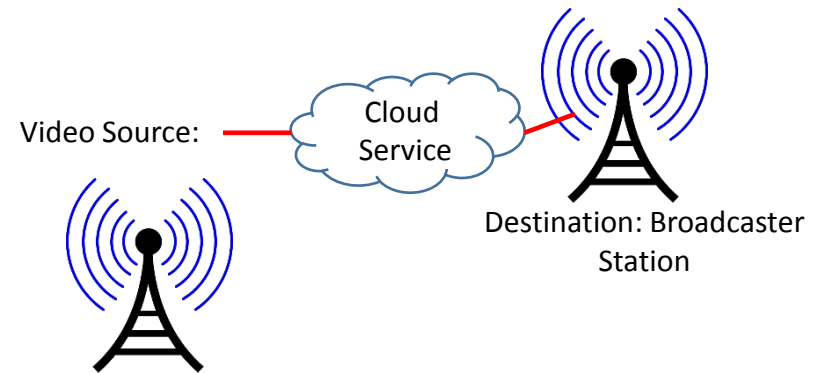*"Guys, I LOVE the system. It's blowing the minds of our traditional TV engineers over here."*

VP Chief Information Officer
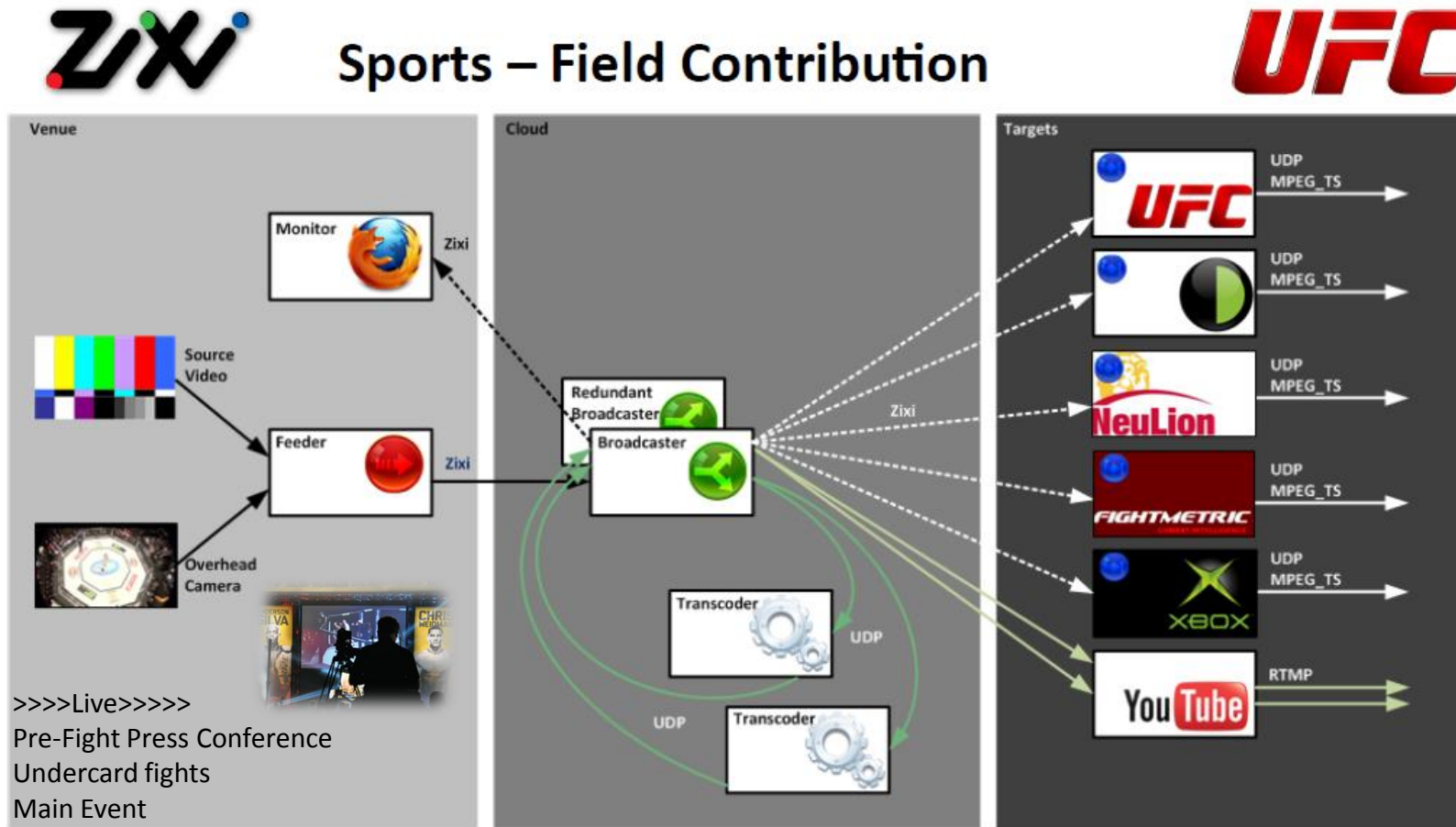*Major USA Live Event Producer*

JVC – Zixi inside their cameras

Zixi Use Case: News

Video Source: ☁ Cloud Service

Destination: Broadcaster Station

Zixi Use Case: Live Sports

Zixi Innovation Award at IBC 2014

BROADCASTPRO
MIDDLE EAST
ISSUE 45 | MARCH 2014
TECHNOLOGY INTELLIGENCE FOR TV, FILM AND RADIO

CABSAT

BLACK BEAUTY
Exclusive review of the
Blackmagic 4K camera

CASE STUDIES
• Al Mada launches in Iraq
• DVB installation in Qatar
• HD/3G upgrade in Dubai

DISRUPTIVE
INNOVATORS

Sky News Arabia puts new
spin on broadcasting with
groundbreaking technology

CPI MEDIA GROUP

Sky News Arabia (SNA) embarked on a **cutting-edge project** last year that was finally completed last month and will be rolled out to its bureaux this quarter with the **intention of truly empowering its journalists to provide content anytime, from anywhere to the channel's viewers.** To enable this, the technical team at SNA, headed by CTO Domi... engineered a futuristic sys... that serves several objecti... which is to provide its jour... the ability to access feeds... internet or private network...

Streaming real-time HD video over the internet is not easy; it breaks up constantly due to dropped packets. We found a company called Zixi, which adds a management layer to transcend these unreliable networks. Testing this took a lot of R&D, but TCH has acted as a test bed and incubator for a lot of new technologies. We have since implemented what we learnt in Islamabad and Ramallah, instead of MPLS to deliver real-time high-res HD video (over 20mbps); we use

Cloud-based Processing - TV Everywhere
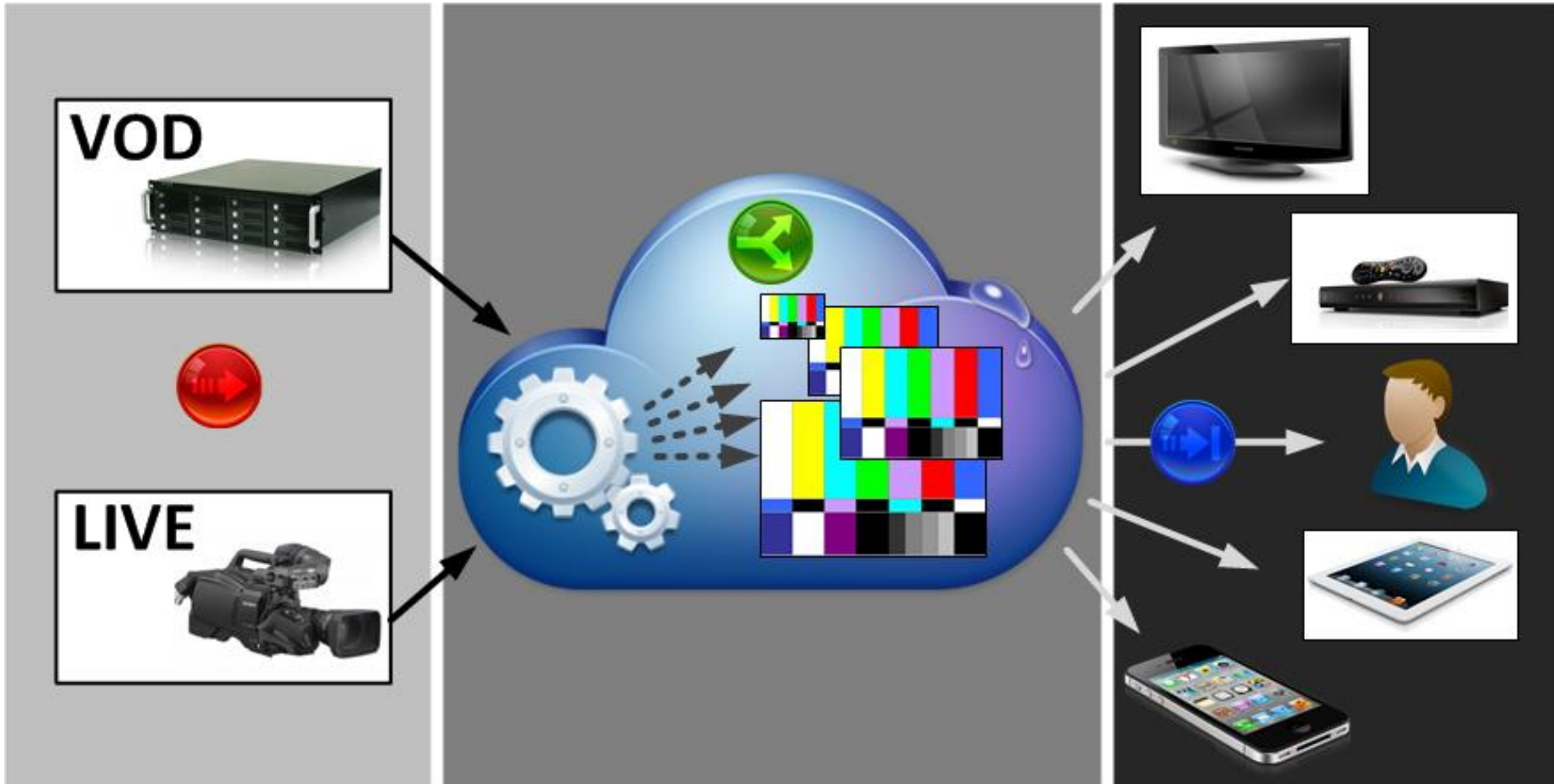
- Live Event and Live Linear Content
- Cloud Transcoding
- Adaptive Bitrate delivery

- Ad Insertion
- Nielsen Ratings
- PCs, Macs, Tablet, Mobile phones

Partner integrations

Sample customers

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www.zixi.com