Live Streaming: Why Transcoding is so Critical to Quality
Agenda

In this session you will learn how to:

– Transmuxing and repackaging

– Transcoding — converting from one or more codecs, bitrates, or resolutions to others

– Creating several transcoded renditions of a live stream for live adaptive streaming and delivery to a player on a web site

– Special preview of HEVC/H.265 encode/decode

– Using the Transcoder for live video overlays

– Extensive Q&A
Wowza Media Systems

- Simplifying the complexities of video and audio streaming
- In business since 2005
- Customers in 150+ countries
- Wowza Streaming Engine™: award-winning software
Who Uses Wowza?

- **Resorts**  
  (Hotels, Tourism)

- **Public Safety**  
  (Facilities, Banks, Police, Borders)

- **Transportation**  
  (Roads, Public Transit)

- **Webcasting**  
  (Enterprise, Churches, Government)

- **Entertainment**  
  (Sports, Concerts)

- **Education / Distance Learning**  
  (K-12 – University)

- **Events / Local Hotspots**  
  (Shows, Bars, Restaurants)

- **Animals / Nature**  
  (Zoos / Pet Daycare)
WOWZA STREAMING ENGINE™
Wowza Streaming Engine™

- Robust, customizable, and scalable server software that powers reliable streaming of high-quality audio and video to any device anywhere.
- Scale across OSs and architectures.
- From start-up websites to mission critical applications.
Streaming Workflow

Video on Demand

Internet Radio

Input/Publishing

Content Source

Wowza Streaming Engine

Prepare
- Transrate
- Transcode
- Transmux
- Encrypt
  ...all on the fly!

Deliver
- Apple® HLS
- MPEG-DASH
- Adobe® HDS
- Microsoft® Smooth Streaming
- RTSP/RTP
- Multicast
- RTMP

Deploy
- OS-independent Wowza Streaming Engine on your physical server or in the cloud

Your Server

Supported Protocols:
- RTSP/RTP
- MPEG-TS
- RTMP
-ICY

Any 3rd party cloud provider

Output/Playback

Choose Player
Wowza supports all common 3rd party players

Devices
- Gaming
- OTT
- TV
- Tablet
- Mobile
- Computer

Key Capabilities
- Multi-format Streaming
- Live Adaptive bitrate streaming up to 1080P
- Live stream recording & archiving
- Closed caption
- High-quality video streaming (across all devices)
- Security/content protection
- Extensive APIs
- Browser-based manager

Extended Features
- Transcoder AddOn
- nDVR AddOn
- DRM AddOn
Wowza Streaming Engine™: Simply Powerful Streaming

Many formats in...  ...one media server infrastructure...  ...many formats out

- Management, billing, log analysis, DRM key services, etc.

- Wowza Streaming Engine™
  - GoCoder
  - ICY
  - MPEG-TS
  - RTSP/RTP
  - Transcoder
  - DRM
  - nDVR
  - Wowza Streaming Engine
  - [Optional] HTTP caching servers (or) Wowza Edge Servers
  - Wowza Streaming Engine
  - MPEG DASH
  - RTMP/HDS
  - MSS
  - RTSP/RTP
  - HLS
  - MPEG-TS
  - NFS/AFS

- Many formats in...
- Many formats out

- Wowza Streaming Engine™:
  - Simply Powerful Streaming
Demo Workflow

- Raw Video/Audio Feed
- H.264/AAC
- RTMP
- WOWZA STREAMING ENGINE
- ABR Stream
- Apple HLS

At venue
TRANSMUXING & REPACKAGING
Transmuxing

• Rewrapping compressed audio and video (a.k.a. (re)packaging or packetizing)
• Requires minimal hardware resources

Incoming Stream (e.g., RTSP)
H.264 Video & AAC Audio In

Wowza Streaming Engine™

Outgoing manifest (e.g., F4M) & MP4 fragment files (for HTTP)
H.264 Video & AAC Audio Out
Repackaging in Wowza Streaming Engine™

Repackaging is core functionality…

<table>
<thead>
<tr>
<th></th>
<th>Input Files / Streams</th>
<th>Output Streaming Formats</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On-Demand</strong></td>
<td>MP4$^1$ (H.264 video, AAC or MP3 audio$^2$)</td>
<td>HLS, RTMP, RDS, HDS, Smooth, DASH</td>
</tr>
<tr>
<td><strong>Live</strong></td>
<td>RTSP, RTMP, MPEG-TS</td>
<td>HLS, RTMP, RDS, HDS, Smooth, DASH</td>
</tr>
</tbody>
</table>

Notes

1. MP4 files include, but are not limited to, the following variants:
   .mp4, .f4v, .mov, .m4v, .mp4a, .3gp, .3g2, .isma, .ismv
2. Smooth Streaming does not support MP3 audio
TRANSCODING
Transcoding

• Converting from one or more codecs, bitrates, or resolutions to others
• Typically requires significant resources
• Can be combined with packetization

Incoming Stream (e.g., MPEG-TS) → Wowza Streaming Engine™ → Outgoing manifest (e.g., F4M) & MP4 fragment files

e.g., H.264 Video & Speex Audio In* → MBR H.264 Video & AAC Audio Out

Wowza® Transcoder

- Live transcoding for single and adaptive bitrate
- Ingest from live encoders, IP cameras, TV headends
- Leverages commodity GPU acceleration

Wowza Transcoder AddOn converts these formats...

<table>
<thead>
<tr>
<th>Input (Decoding)</th>
<th>Output (Encoding)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>Video</td>
</tr>
<tr>
<td>MP3, AAC (LC &amp; HE), MPEG-1 Part 1/2, Speex, G.711</td>
<td>MPEG-2, MPEG-4 Part 2, H.264/AVC</td>
</tr>
<tr>
<td>AAC (LC &amp; HE)</td>
<td>H.264/AVC, H.263</td>
</tr>
</tbody>
</table>

...and supports these types of GPU Acceleration

<table>
<thead>
<tr>
<th></th>
<th>NVIDIA CUDA</th>
<th>NVIDIA NVENC</th>
<th>Intel Quick Sync</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows 64-bit*</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Linux 64-bit</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*On Windows Server 2008 and 2012, also requires installing .NET Framework 3.5.1+ and Desktop Experience
Live Transcoding & Transrating

Live Transcoding


Live Transrating


Wowza® Transcoder Features

• Graphical Overlays
  – Enable static and dynamic images over video by using a Java-based API
  – Add premium TV-like experiences
  – Applications for overlays include advertising, titling, watermarking, company logos, and tickers used for sporting events and stock markets
Wowza Streaming Engine Pro

**Wowza Transcoder**
Allows you to transform incoming live streams from encoders, IP cameras, IPTV headends and other live sources to H.264 for delivery everywhere.

**Wowza nDVR**
The network Digital Video Recorder stores content in a normalized format as a single live stream cache that enables users to deliver time-shifted playout experience to viewers - on PCs, tablets, smartphones and TVs.

**Wowza DRM**
Wowza DRM (Digital Rights Management) facilitates integration with various digital rights management platforms to deliver on-the-fly encryption for live and video-on-demand content to any screen.
More Information

• Get started with Wowza at: [www.wowza.com](http://www.wowza.com)
  – ModuleTranscoderControl
  – ModulePacketizerControl
  – ModuleDVRRecorderControl
QUESTIONS?
Example of URL Syntax

<table>
<thead>
<tr>
<th>Server IP</th>
<th>Port Number</th>
<th>Application Name</th>
<th>Stream Name</th>
<th>Index file for HTTP Live Streaming</th>
<th>DVR Function</th>
</tr>
</thead>
</table>