Agenda

- What is cloud encoding
- VOD cloud encoding
  - Business models
  - How cloud encoding works
  - Who should switch
  - Choosing a VOD encoder
- Choosing a live cloud transcoder
  - Business models
  - How it works
  - Choosing a live cloud transcoder
What is Cloud Encoding

- Someone either:
  - Builds their own encoding center and rents it to you (encoding.com)
  - Or, integrates with cloud computer vendor (Amazon, Azure) and sells service to you

- High level benefits
  - Lower CAPEX
  - Elastic scalability
Cloud Encoding Models

- Lease your own cloud, install your own encoder
  - Every encoding can be a cloud encoder
- Software as a Service (biggest category)
  - Direct (Encoding.com, Zencoder)
  - Via Amazon (Vantage)
- Platform as a Service (Elemental)
Roll You Own/Do It Yourself

- **Model**
  - You lease the cloud facilities as needed
  - You buy software, install and manage

- **Pros**
  - You have dedicated resources
  - Can run as VPN firewalled from outsiders
  - You don’t buy hardware

- **Cons**
  - Lack of limitless scalability
  - You have to run (need technical resources)
  - You buy software
Software as a Service

- **Model**
  - Service provider makes all cloud hardware decisions
  - You upload, they encode
  - Pricing based upon:
    - Commitment
    - Encoding speed (some)
    - SD/HD
- **Vendors**
  - Encoding.com, Zencoder, Amazon

- **Pros**
  - Simple, easy, usually cheaper

- **Cons**
  - You don’t have dedicated resources; can’t reserve capacity
  - Your files are encoded in shared resources

- **Counterpoint:**
  - Most SaaS vendors are extremely fast (more later) and secure
Platform as a Service

- **Model**
  - You reserve (and pay for) specified resources from vendor
  - You upload, they encode
  - Pricing based upon:
    - Commitment
    - Encoding speed (some)
    - SD/HD

- **Vendors**
  - Elemental

- **Pros**
  - Resources are yours; always available
  - Run as VPN
  - Can control cloud and appliance encodes from single common interface
    - Cloud is extension of appliance

- **Cons**
  - More expensive buy in
  - More administration required
Other Models

- Telestream Vantage:
  - You contract directly with Amazon
  - You commit to (for lower pricing) or pay as you go for CPU/GPU resources and the Vantage app
  - Integrates with non-cloud Vantage installation
    - Can be used for overflow or discrete outputs
How’s it Work – VOD?

- Just like YouTube (except you get to choose the encoding profiles)
  - So, you upload your files
  - Choose your encoding profiles
  - Encode away
  - Larger customers use API, not UI

- Biggest negative
  - Upload time (for local files)
  - Reduced by upload accelerator tools like Aspera
You Upload Your Files

To encode a video, tell us where your source video is located

ftp://login:password@host/path

Or, click here to build your source URL using your credentials.

[ ] FTP  [ ] HTTP  [ ] AMAZON S3  [ ] RACKSPACE CLOUDFILES  [ ] MICROSOFT AZURE  [ ] DROPBOX  [ ] ASPERA  [ ] UPLOAD

Or, learn more about our other workflow options

<table>
<thead>
<tr>
<th>Watch Folder</th>
<th>High speed Desktop uploader</th>
<th>XML API</th>
</tr>
</thead>
</table>

- Most larger sites offer:
  - Direct upload from disc, FTP, HTTP, S3 etc
  - Watch folder support (local, S3, FTP, etc)

- High speed uploader via Aspera
- API for automated integrated operation

Streaming Learning Center
Choose Your Presets and Go

- Presets from Elemental Cloud
- Identical to appliance based product
Who Should Consider Cloud?

- Producers/Distributors opening new markets – need instant scalability without CAPEX
  - HBO Nordic is a video-on-demand service from HBO for Sweden, Norway, Denmark and Finland.
  - Could buy new racks of encoders, or go to the cloud
European Tour – Needed Worldwide Scalability

- Acquired massive new distribution rights
  - Online broadcast in 64 countries without TV
  - Long form replay broadcast rights in countries with broadcast rights (7 days after airing)
  - Rights to 500 hours of premium content
- Essentially using Azure infrastructure that Microsoft assembled for London Olympics
  - For live, sent feed from BT to the Azure platform, who delivered encoded streams to CDNs
Encoding Lots of Cloud Based Content

- MTV – receives hundreds of music videos from many different labels each year
  - Though MTV has their own encoding servers, their workflows were optimized for internal productions
- Uses Encoding.com to produce videos from record labels
  - Since videos were already being uploaded, the most significant negative of cloud VOD is gone
Differentiating the Contenders

- Integration with existing encoding structure (if necessary)
- Input/Output
- Features
- Encoding controls
- Output quality
- Performance
Integration with Existing Encoding Infrastructure

- Several cloud encoding products can integrate with existing encoding facilities
  - Sorenson Squeeze Server (installed in the cloud)
  - Telestream Vantage Cloud
  - Elemental Cloud
- Seamless way to provide scalability to existing system with unified encoding control
Input

- Can the cloud encoding tool access the files where they live
  - Desktop folder(s), FTP, SFTP, Amazon S3, RS Cloud Files, or MS Azure storage locations
  - Amazon Elastic Encoding is from S3 buckets only

- Does the encoding service offer upload acceleration via:
  - Aspera or similar service
  - Multi-threaded FTP ingest
Input

- Can the cloud encoding service input files in the existing format
  - Amazon Elastic Encoding doesn’t input ProRes (currently)
  - Don’t assume, check for formats like MPEG-TS, ProRes, AvidDNxHD, Red, etc.
Output

- Single file
  - H.264
  - WebM
  - HEVC (when?)
  - MPEG-2 (for playout servers)

- Adaptive formats
  - HLS
  - HDS
  - Smooth
  - DASH

- Caption-related
  - CEA-608
  - CEA-708
  - Teletext (and other Euro standards)
  - Sidecar formats
    - SCC
    - SRT

- DRM packaging
  - DivX/Widevine
  - Playready
  - Flash Access
Output

- Delivery options – should be as extensive as input
  - Desktop folder(s), FTP, SFTP, Amazon S3, RS Cloud Files, or MS Azure storage locations

- Syndication integrations
  - YouTube
  - The Platform
  - WordPress
  - Joomla
  - Drupal
Interface and API

- Should match technical capabilities of user
  - Low volume/non-technical
    - All about UI
    - Not all vendors offer a UI (zencoder)
  - High volume production
    - Typically 99% of production is via the API

- API – check for
  - Documentation
  - Typically XML based
  - Wrappers for other programming languages
    - PHP, Java, Cold Fusion, C#
  - Rich progress reporting
H.264 Encoding Controls

- Encoding.com/zencoder enables access to all x264 controls
- Elemental – very limited
- Amazon – very limited
- If you’re a x264 tweaker, this may be frustrating
  - Since quality is generally equivalent, this won’t matter for many users
Pricing – All over the Map

- Encoding.com
  - Based on GB in and out
  - Volume commitments bring down /GB cost

<table>
<thead>
<tr>
<th></th>
<th>Free</th>
<th>Basic</th>
<th>Plus</th>
<th>Max</th>
<th>Clive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing</td>
<td>$0</td>
<td>$19</td>
<td>$49</td>
<td>$299</td>
<td>$799</td>
</tr>
<tr>
<td>Included GB</td>
<td>1GB</td>
<td>5GB</td>
<td>10GB</td>
<td>75GB</td>
<td>375GB</td>
</tr>
<tr>
<td>Maximum Queue</td>
<td>60m</td>
<td>30m</td>
<td>10m</td>
<td>4m</td>
<td>4m</td>
</tr>
<tr>
<td>Max Requests/Second</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Support</td>
<td>online</td>
<td>email</td>
<td>phone</td>
<td>premium</td>
<td>platinum</td>
</tr>
</tbody>
</table>
Pricing – All over the Map

- Zencoder
  - Based on minutes
  - Volume commitments bring cost down
Pricing – All over the Map

- Amazon
  - Based on minutes

<table>
<thead>
<tr>
<th>Region: US East (N. Virginia)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Standard Definition – SD (Resolution of less than 720p) $0.015 per minute</td>
</tr>
<tr>
<td>- High Definition – HD (Resolution of 720p or above) $0.030 per minute</td>
</tr>
</tbody>
</table>
Pricing – All over the Map

- Sorenson
  - Buy Squeeze Server ($5,000) and pay your own Amazon compute charges

- Elemental
  - Pricing based upon commitments for GPU/CPU instances; minimum will be in the low four figures

- Vantage
  - Buy encoding functionality from Amazon directly
  - Pricing not yet set
Pricing Bottom Line

- Estimate usage in GB/minutes
- Choose most appropriate plan for your expected use
- Perform your own pricing estimates with each vendor
- Compare the results
Quality

- Initial tests Encoding.com, Amazon and Elemental
  - Minimal quality difference
- Later tests; Zencoder, Encoding.com and Elemental
  - Very minor differences in quality
  - Not commercially relevant
Comp 1

Streaming Learning Center
Comp 2

Streaming Learning Center
Comp 3
Quality Perspective

- Many cloud vendors use x264
  - Same codec, quality should be close
- Others use their own codec (Elemental)
  - Have been competing with x264 for many years
- All companies are reputable
  - Despite claims of superior quality, there’s just not that much difference
  - I wouldn’t make a vendor selection based upon quality
Performance

- Will be a major differentiator
- But, tough to get to apples-to-apples comparison with disparate system types

<table>
<thead>
<tr>
<th></th>
<th>Elemental</th>
<th>Encoding</th>
<th>Zencoder</th>
<th>Amazon</th>
</tr>
</thead>
<tbody>
<tr>
<td>52 min file to 11 presets</td>
<td>29:33</td>
<td>17:49</td>
<td>23:58</td>
<td>2:35:20</td>
</tr>
<tr>
<td>210 min SD file to one output</td>
<td>28:54</td>
<td>22:58</td>
<td>18:01</td>
<td>26:12</td>
</tr>
<tr>
<td>6 848x480 files ~ 45 minutes to 11 outputs</td>
<td>33:19</td>
<td>14:08</td>
<td>34:33</td>
<td>Did not attempt</td>
</tr>
</tbody>
</table>
Comparison Issues

- Different encoding paradigms
  - Elemental is per job
  - By breaking up a single job into two components, can reduce 11 file encoding time to under 20 minutes
- All encoding.com times in twin turbo mode
- Elemental times (and others) will depend upon whether instances are running or need to be spun up (which takes 5 minutes)
Bottom Line

- Apple-to-apples performance comparisons will be tough to formulate
  - May change based upon pricing plans (queue times)
  - Assumptions about instance start up (PaaS)
  - Performance option selected
- May not be relevant to many users
Overall

- ID architectural factors
  - Does the system need to integrate with existing encoder

- ID inputs and outputs
  - Make sure vendor can:
    - Input your source; deliver required outputs
    - Retrieve and deliver files as necessary

- ID interface requirements
  - UI vs. API
  - Robustness and utility of API
  - Integration requirements
  - Gather data for pricing estimates and estimate pricing
  - Run some performance trials at different times
  - Make sure performance is reasonable
Choosing a Live Transcoder

- Workflow
- Key benefits
- Use cases
- Business models
Live Transcoding Workflow

One stream out to cloud (720p@4 mbps)

Real Time Transcode

Ten streams out for delivery (20 mbps total bandwidth)

Flash adaptive group

HLS adaptive group
Key Benefits – Live Transcode

- Traditional benefits
  - Lower CAPEX/Scalability
  - Don’t need an encoder that can produce 10 streams simultaneously
- Reduces outbound bandwidth requirements
  - Encode to 10 streams on site, need 20 mbps outbound bandwidth
  - Encode to one stream, transcode in the cloud, need 4 mbps outbound bandwidth (or less)
Use Cases

- Companies with infrequent events with multiple streams that would require expensive encoder
  - Live transcoding limits CAPEX
- Companies broadcasting from sites with limited outbound bandwidth
  - Live transcoding limits output bandwidth requirements
  - Could save having to bring satellite truck in to broadcast event
Business Models

- Roll Your Own
  - Buy Wowza Transcoder, install in the cloud
  - Send stream in; distribute streams as desired

- SaaS
  - Zencoder as standalone service provider
  - Send stream in/they send multiple streams out
  - Also integrated component of Brightcove Live
    - Review of service coming up in Streaming Media Mag
Business Models

- Live transcoding as integrated service or more comprehensive product
  - Not available for outside jobs
  - Haivision, iStreamPlanet
Choosing a Live Transcoder

- Market fairly nascent, still developing
  - Wowza obvious choice for DIY
  - Zencoder for third-party (though there are other contenders and this market will become crowded very soon)
  - Choose integrated service provider based upon the totality of the service offering
Questions?