## Breakdown

Today’s 3 hour Agenda

<table>
<thead>
<tr>
<th>TIME</th>
<th>CONTEXT</th>
<th>TECHNOLOGY</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 – 9:50</td>
<td>Video in the Enterprise Going Deep</td>
<td>EXPERIENCE Multiscreen Platforms + Protocols</td>
<td>Adobe Video Solutions</td>
</tr>
<tr>
<td></td>
<td>Birth of Enterprise Video for Adobe (0:15)</td>
<td>- RTMP - HTTP Dynamic Streaming - HLS (Apple) - Multicast - Multicast Fusion - Peer Assisted Networking</td>
<td>Video Creation Tools</td>
</tr>
<tr>
<td></td>
<td>Oracle (0:30)</td>
<td>Security</td>
<td>Delivery + Protection Servers</td>
</tr>
<tr>
<td></td>
<td>(prep for Demo) get out your iPads!</td>
<td></td>
<td>Content Management</td>
</tr>
</tbody>
</table>

### TECHNOLOGY

- RTMP
- HTTP Dynamic Streaming
- HLS (Apple)
- Multicast
- Multicast Fusion
- Peer Assisted Networking

### SOLUTION

- Adobe Video Solutions
- Video Creation Tools
- Delivery + Protection Servers
- Content Management
- Custom Experience
- Consistent Playback
- Measurement

---

## What to take away from this class

**Increase your High Quality Video Usage**

**Save your network**

**Make your CEO look great**

**Make Employees Happy**
Why do you need Video in your business?

What are your expectations of video?

What is missing in your solution today?
(in other words – why are you here today?)
Video Streaming is complex and can disrupt a network.

Demonstrating products or services requires great video.
Delivering high quality media within the enterprise on Adobe Flash Platform

VIDEO QUALITY SUFFERS BECAUSE EXISTING TECHNOLOGY DOESN'T SCALE
Video use is restricted or limited

Flash Media Server 4 enables high quality broadcasts inside more networks and devices
So you can look great at work

VIDEO QUALITY SUFFERS BECAUSE EXISTING TECHNOLOGY DOESN'T SCALE
Higher Quality Video = Happy CEO
Flash Media Server 4 makes Multicast better
to change the way you work


Team Collaboration (64%)
Accelerating time to market (24%)

Cost savings / avoidance (76%)
Work/Life Balance (46%)

Customer Service (47%)

Culture / Branding (42%)
Humanize message (35%)

Compliance / Certification (30%)

Safety and Security (43%)

Key Drivers for Use of Enterprise Video

Source: IDC, Enterprise Panel – November 2009
Planned Use of Enterprise Video in the Next 12 Mos

<table>
<thead>
<tr>
<th>Planned Use</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>71%</td>
</tr>
<tr>
<td>Video Conference</td>
<td>79%</td>
</tr>
<tr>
<td>Sales Meetings/Training</td>
<td>53%</td>
</tr>
<tr>
<td>Marketing Launches</td>
<td>34%</td>
</tr>
<tr>
<td>Exec Communications</td>
<td>55%</td>
</tr>
<tr>
<td>Video On Demand</td>
<td>54%</td>
</tr>
<tr>
<td>Partner / Customer</td>
<td>34%</td>
</tr>
<tr>
<td>Surveillance</td>
<td>54%</td>
</tr>
<tr>
<td>Investor relations</td>
<td>25%</td>
</tr>
<tr>
<td>Digital Signage</td>
<td>22%</td>
</tr>
</tbody>
</table>

Source: IDC, Enterprise Panel - November 2009

Enterprise Video Pain Points

- "I don't have resources or skills to build a video solution"
  Out of the box solution

- "The solution needs to integrate with existing systems (LDAP, AD, BPM)"
  Extensible

- "I cannot do an enterprise wide deployment of a new client"
  Leverage Flash

- "I don't want my videos to show up on Youtube. That would be a disaster"
  Secure

- "I don't want to train all the employees on a new product"
  Easy to Use

- "Video bandwidth needs are too high for existing network"
  Low Bandwidth

- "I want to know who watched what video for how long"
  Measurement

What Matters to YouTube (Biggest video site on the web)


- Standard Video Format
  - H.264 (Flash, and some HTML5 browsers)
- Robust Video Streaming
  - HTTP / RTMP Protocols
  - Fine Buffer Controls, Live, dynamic quality control
- Content Protection
  - RTMPe protocol
- Encapsulation + Embedding
  - Embedding content from other sites
- Full Screen Video
  - Hardware Accelerated delivery
- Camera and Microphone Access
  - Easy to use embedded capture

Key requirements for any enterprise video

Secure: Protect videos from being watched by unauthorized viewers.
Content protection is a must have to ensure sensitive content does not get compromised.

Scalable: Be able to work within existing network constraints.
One network for all - data, voice, mission critical apps and video.
Only solution to deliver optimal network resource utilization

Easy to Use: Consumer like simplicity and ease of use to minimize training and increase uptake.
Integration into other Enterprise systems and complete solution along with easy to use UI.

Mobile Ready: Support all major mobile phones and tablet platforms including iDevices.
Provide seamless experience across different screens with ease of use securely and efficiently
How Enterprise Video has evolved at Adobe Systems
A special behind the scenes look

Kevin Lynch
CTO, Adobe Systems

Gerri Martin-Flickinger
CIO, Adobe Systems

• 1 server used for the entire Adobe global campus
• Employees working over VPN had a great experience
• Tight partnership between IT/Networking and Conferencing
• No need to deploy faster networks
• Higher Quality and Lower costs – without overwhelming the networks
Delivering high quality media within the enterprise on Adobe Flash Platform

May 2011

Kevin Towes, Sr. Product Manager, Adobe Systems Incorporated

Consistent Video Experiences

- Live, VOD,
- H.264, AAC
- P2P, HTTP, RTMP

Dynamic Streaming

- Adaptive Bitrate
- Enhanced Seek, DVR

Protected delivery

- Encrypted protocol, SWF V

Video Performance

- Mobile Hardware Acceleration
- Optimized Encoding

Powerful Media Framework

### Adobe Video Delivery Technology

**Spelled out**

<table>
<thead>
<tr>
<th>Technology</th>
<th>What it does</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTTP Dynamic Streaming (HDS)</td>
<td>Adaptive bitrate streaming (live+vod) over HTTP to Flash</td>
</tr>
<tr>
<td>(RTMP) Dynamic Streaming</td>
<td>Adaptive bitrate streaming (live+vod) over RTMP to Flash</td>
</tr>
<tr>
<td>RTMPE / SWF Verification</td>
<td>Content Protection for RTMP (in Flash Media Server)</td>
</tr>
<tr>
<td>DRM</td>
<td>Content Protection for HTTP (PDL + HDS)</td>
</tr>
<tr>
<td>Peer Assisted Networking</td>
<td>Enables Flash clients to assist in live video delivery (RTMFP)</td>
</tr>
<tr>
<td>Multicast</td>
<td>Hardware-assisted live video broadcasting</td>
</tr>
<tr>
<td>Multicast Fusion</td>
<td>Adobe’s blending of IP Multicast and P2P</td>
</tr>
<tr>
<td>Flash Media Live Encoder</td>
<td>Live Encoding Software from Adobe</td>
</tr>
<tr>
<td>OSMF</td>
<td>Video player development framework</td>
</tr>
<tr>
<td>Flash Player and AIR</td>
<td>Client Runtime containing codecs, programming engine, protection</td>
</tr>
</tbody>
</table>

Video Delivery Protocols

- Video can be delivered many ways a client
- Delivery protocols are optimized for different scenarios and use cases
  - **HTTP Progressive Download** – single bitrate, on demand, limited QOS
  - **HTTP Streaming** – multi-bitrate, live, good QOS, high latency, optimized for Mobile
    Flash: HTTP Dynamic Streaming  |  Apple: HLS (HTTP Live Streaming)
  - **RTMP Streaming** – low latency, multi-way, real time protection, open protocol
    Adobe Flash Player only
  - **RTSP Streaming** – low latency, 1-way, open protocol
    Windows Media Player and Real Player only
  - **IP Multicast** – Enterprise, hardware assisted, single bitrate, live
  - **Peer 2 Peer Multicast** – Live, On Demand, single bitrate

Adobe Flash Platform supports all forms of transport except RTSP

Broadcasters trust Adobe technology to stream massive live events to the desktop

Standard Video Codecs: **H.264/AAC**
Universal Content Protection: **(RTMPe/Flash Access)**
Consistent Streaming: **RTMP, IP Multicast, P2P, HTTP**
### HTML5: Video feature fragmentation by browser: CODECS

<table>
<thead>
<tr>
<th>Codec</th>
<th>Firefox</th>
<th>Chrome</th>
<th>Safari</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ogg</td>
<td><img src="image" alt="Ogg" /></td>
<td><img src="image" alt="Ogg" /></td>
<td><img src="image" alt="Ogg" /></td>
</tr>
<tr>
<td>H.264</td>
<td><img src="image" alt="H.264" /></td>
<td><img src="image" alt="H.264" /></td>
<td><img src="image" alt="H.264" /></td>
</tr>
<tr>
<td>VP8</td>
<td><img src="image" alt="VP8" /></td>
<td><img src="image" alt="VP8" /></td>
<td><img src="image" alt="VP8" /></td>
</tr>
</tbody>
</table>

Using Flash to reach multiple devices consistently.

Enterprises want to reach audiences using multiple devices...

Live Streaming workflows are complicated and expensive to manage!
Delivering high quality media within the enterprise on Adobe Flash Platform

Simplifying online video broadcast workflows to reach your entire audience potential

Landscape of online video

More people, more content, more screens....

- Video is a pervasive communication tool for companies small and large
- Beyond one-way broadcast
- Video can be social and collaborative
Delivering high quality media within the enterprise on Adobe Flash Platform

Adobe Excels in Video Leadership

- 9 out of the top 10 video sites in the U.S. are using FMS to stream video online today
- 70% of all videos WW viewed are on Flash
- Largest events streamed using Flash Media Server
- Flash Media Server is used to provide multi-user audio and video experiences

Flash player 10.1 now at 85% penetration (December)

Flash Player 10.1 (for Video) is required for
- Multicast, HTTP Dynamic Streaming, Peer Assisted Networking
- Flash Access DRM, GPU Acceleration
- Mobile Devices and Tablets

When to use What

- **"LIVE Enterprise + User Generated Content"**
  - Lowest Deployment cost
  - No CDN
  - Easy Deployment + Protection workflow

- **"Big Broadcaster"**
  - Massive CDN Scale
  - Increased Publishing workflow
  - Requires Flash Access

- **"Mid-size Broadcaster + Enterprise"**
  - High quality of service
  - Maximum reach
  - Easiest Deployment + Protection workflow

Protocol Support with Flash Media Server versions

- **RTMFP**
  - IP Multicast
  - Unicast
  - Peer Assisted
  - Multicast Fusion

- **HTTP**
  - Progressive Download
  - HTTP Dynamic Streaming VOD
  - HTTP Dynamic Streaming Live

- **RTMP**
  - RTMP
  - RTMPE
  - RTMPT
  - RTMPS SSL
Traditional RTMP Streaming

Unicast to Flash using RTMP

**Pros**
- Multi-Bitrate (MBR)
- Seek/Pause/Resume
- Works for non multicast-capable clients

**Cons**
- Scaling tends toward expensive & difficult (possibly less so with HTTP)
- No hard latency bound under congestion (i.e. TCP retransmission)
## RTMP Dynamic Streaming

- Simple Publishing workflows
  - Pre-Packaging - None
  - Pre-Encrypting – None
- Widest possible reach
- Excellent quality of service
  - Adaptive Bitrate
  - Enhanced Seeking
  - Reduced Disruption
- Lowest Latency
- Simple Scalability
  - Advanced Edge Cache management
- Real Time Data push
- Multi-way interactive

## RTMP has delivered the world's largest live events

- 2007 - Operation MySpace
- 2008 - Obama's US Presidential Inauguration
- 2009 - Michael Jackson funeral
- 2010 – FIFA World Cup
- 2011 – Japan Tsunami; Royal Wedding; Osama's death
HTTP Dynamic Streaming (HDS)

Increased capacity through caching
Improved Mobile experience

HTTP Dynamic Streaming

**Replicated the Experience of RTMP**
- Support for all Flash-enabled Codecs
- Standards-based MP4 Fragment format
- Cacheable Content
- Live DVR
- Adaptive Bitrate + Enhanced Seeking + Start Anywhere
- **Content Protection** powered by Flash Access
  - Continuous protection of content throughout the distribution chain
- Pre-built video player (OSMF)
  - for rapid custom video player development
  - easy integration with advertising and analytics
  - Bitrate throttling to help ensure only what is watched is delivered
Delivering high quality media within the enterprise on Adobe Flash Platform

HTTP Dynamic Streaming: Workflow Diagram

- File Format: MPEG4-Fragment (.f4f)
- Protection: Flash Access (Encrypt / SWFV / Output Protection)
- Player Framework: OSMF / Flash Media Playback / Strobe Media Playback
- Live Packager: Adobe Flash Media Server 4
- Flash Player: v10.1 (Desktop, Mobile, etc.), AIR 2.0 (Desktop, Mobile, etc.)

Multicast / Peer Assisted delivery

Ultimate Capacity
Ultimate Cost Reduction

# Multicast on the Adobe Flash Platform

**UNICAST**  
*Public & Internal streaming*  
- HTTP / RTMP Dynamic Streaming  
- Maximum Reach  
- Real Time protection  
- Server/Client relationship  
- RTMP Tunneling over HTTP

**IP MULTICAST**  
*Internal enterprise streaming*  
- UDP Broadcast  
- Hardware-assisted  
- No Server required  
- Limited external reach

**APPLICATION MULTICAST**  
*Massive live delivery (public)*  
- Peer 2 Peer technology  
- Flexible and massive scale  
- No hardware requirements  
- Low cost delivery  
- Rendezvous servers required

**ADOBE MULTICAST FUSION**  
*Internal enterprise streaming with Peer Assist*  
- Delivery higher quality of service  
- Increase reach  
- Hardware + software assisted  
- Rendezvous servers required

## IP Multicast

IP Multicast required Router Hardware support

Multicast from Adobe is Encrypted all the time

### Pros
- High bitrate capabilities
- Low network impact
- Infrastructure Scaling

### Cons
- Hardware Infrastructure requirements
- Limited QOS options
- No Seek/Pause/Resume
**Flash Media Server 4**

**Facts about RTMFP and Multicast**

<table>
<thead>
<tr>
<th>TRADITIONAL IP Multicast</th>
<th>NEW FROM ADOBE Multicast Fusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• No end-user opt-in</td>
<td>Enterprise friendly!</td>
</tr>
<tr>
<td>• IPv4 and IPv6 multicast supported</td>
<td>• Explicit opt-in to “peer assisted networking”</td>
</tr>
<tr>
<td>• Any-source (traditional) multicast supported</td>
<td>• No client “Supernodes” by design!</td>
</tr>
<tr>
<td>• Source-specific multicast not (currently) supported</td>
<td>Requires RTMFP introducer</td>
</tr>
<tr>
<td>• Runnable in “serverless” mode</td>
<td>• FMS 4 or Adobe Cirrus @ labs.adobe.com</td>
</tr>
<tr>
<td></td>
<td>Bootstraping to neighbors in Group can be</td>
</tr>
<tr>
<td></td>
<td>• Manual: adding peerIDs to groupspec early, or adding to NetGroup at runtime</td>
</tr>
<tr>
<td></td>
<td>• Automatic: via LAN peer discovery - no introducer needed</td>
</tr>
<tr>
<td></td>
<td>• Automatic: via server channel to introducer</td>
</tr>
</tbody>
</table>

P2P support in the Adobe Flash Platform enables Tinychat to offer customers live video calls

Virtually no bandwidth costs and unlimited scalability for interactive communication.
Peer Assisted Networking
on the Adobe Flash Platform

- Reduce Infrastructure costs
- Reduce Bandwidth costs
- Help enable new Social applications
- Foundation for Massive media delivery
Peer Assisted Networking Dialog
- appears after the client connects to the server, and enters a peer group
- Opt-in approach allows end-users to be aware that upload bandwidth will be used
- Your site is identified in the dialog
- Developers can have different responses depending on the user’s response
- No way to disable this dialog

Understanding P2P video delivery
- **IN:** Current bitrate of the video
- **OUT:** Upload bandwidth being distributed
- **CURRENT NEIGHBORS:** Number of neighbors being served by you
- **BUFFERED:** amount of player video buffer
- **ESTIMATED MEMBERS:** number of P2P clients in the group
Peer Assisted Networking

- Peer Assisted Networking helps to lower costs
- Interactive + Social applications that are bandwidth heavy

<table>
<thead>
<tr>
<th></th>
<th>150</th>
<th>150</th>
<th>500 kbps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concurrent Users</td>
<td>10000</td>
<td>60000</td>
<td>10000</td>
</tr>
<tr>
<td>CALC: Webcam Chat (MB/min) 2-way</td>
<td>2.25</td>
<td>2.25</td>
<td>2.25</td>
</tr>
<tr>
<td>Webcam Chat (kbps) 2-way</td>
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<td></td>
<td></td>
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</tbody>
</table>

FMIE (1st year)

<table>
<thead>
<tr>
<th></th>
<th>11,548,828</th>
<th>60,292,968</th>
<th>384,960,938</th>
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</thead>
<tbody>
<tr>
<td>CALC: Bandwidth (GB/yr)</td>
<td>$923,906</td>
<td>$5,543,438</td>
<td>$30,796,875</td>
</tr>
<tr>
<td>Bandwidth Costs (GB/yr)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Server Instance Costs ($/yr)</td>
<td>$18,980</td>
<td>$113,880</td>
<td>$632,667</td>
</tr>
<tr>
<td>Total Costs</td>
<td>$942,886</td>
<td>$5,657,318</td>
<td>$31,429,542</td>
</tr>
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</table>

FMEN (1st year)

<table>
<thead>
<tr>
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<th>5,694</th>
<th>34,164</th>
<th>56,940</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandwidth</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bandwidth Costs (GB/yr)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Server Instance Costs ($/yr)</td>
<td>$5,694</td>
<td>$34,164</td>
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<tr>
<td>Total Costs</td>
<td>$5,694</td>
<td>$34,164</td>
<td>$56,940</td>
</tr>
</tbody>
</table>

The Multicast Advantage: Our Starting Point

- Unicast (client-server) with RTMP or HTTP

**Pros**
- Multi-Bitrate (MBR)
- Seek/Pause/Resume
- Works for non multicast-capable clients

**Cons**
- Scaling tends toward expensive & difficult (possibly less so with HTTP)
- No hard latency bound under congestion (i.e. TCP retransmission)
Flash Player 10.0 (November 2008)

- Introduced in Flash Player 1 (November 2008)
  - Now at 95% penetration
- Allows data flow between Flash Players
  - Managed P2P solution
  - No network probing

Redefining the perception of P2P

- P2P can be good for the network
  - Reduce hardware costs
  - Access control
  - Media flow control
- Peer Assisted Networking uses it’s neighbors to help distribute
  - Send media
  - Send data
  - Send messages
IP Multicast

- IP Multicast leverages UDP network broadcasts to deliver content
- No server connection required
- Single copy of the stream passed through the network

The Multicast Advantage: Step 1

- Scale up using **IP multicast**-enabled routers

  **Pros**
  - Improved latency under congestion
  - Easy and cheap to scale! (from an FMS and bandwidth perspective)

  **Cons**
  - No MBR
  - No Seek/Pause/Resume
The Multicast Advantage: Step 2

- **Fusion** of IP multicast and P2P multicast!

- P2P mesh gets stream to clients not connected to multicast routers
- Similar pros/cons as IP multicast with improved reach but more potential latency in the P2P mesh

FMS Multicast: 10K Foot View

- We’re "relaying" a source Stream into a Group

- Multicast sample app shipping in FMS 4 is a good starting point
Delivering high quality media within the enterprise on Adobe Flash Platform

Deploying Multicast Fusion

- Fusion in CA
- P2P multicast elsewhere
- Unicast for VPN and non-UDP users
Delivering high quality media within the enterprise on Adobe Flash Platform

Flash Groups: the Foundation for FMS Multicast

- Every Group is defined by name, capabilities and hashed passwords for any auth-limited capabilities
- Each multicast stream is scoped to a Group
- Clients use a "groupspec" to join a Group
- Example: "G:01010b...00..."
  - Canonical groupspec is the shared Group ID
  - Groupspec may also encode local client settings

1 in 5 corporate managers deals with sensitive content posted on sites like Youtube. 1 in 6 companies has disciplined an employee for violating media sharing/posting policies in the past 12 months

Source: 2009 Proofpoint Survey
### Flash Access and Flash Media Server

**The right protection and workflow for the use case**

<table>
<thead>
<tr>
<th>USE CASES</th>
<th>FLASH MEDIA SERVER 4</th>
<th>FLASH ACCESS 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protected Streaming</td>
<td>Ad-supported content</td>
<td>DRM</td>
</tr>
<tr>
<td>RTMP/e/SWFv</td>
<td>RTMFP (Multicast / P2P)</td>
<td>Premium Content delivery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prevent content piracy / service cloning + enforce business models</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TARGET</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Enterprise</td>
<td>• Online VOD publishers, IPTV</td>
<td></td>
</tr>
<tr>
<td>• Broadcaster</td>
<td>• Enterprise download &amp; play</td>
<td></td>
</tr>
<tr>
<td>• Live online publisher</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Enterprise streaming</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>FEATURE SET</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Real Time Encryption</td>
<td>• Studio Pre-approval</td>
<td></td>
</tr>
<tr>
<td>• No License Server</td>
<td>• Offline Playback</td>
<td></td>
</tr>
<tr>
<td>• Asset/player binding (SWF Verification)</td>
<td>• Advanced business rules</td>
<td></td>
</tr>
<tr>
<td>• No configuration required</td>
<td>• Persistent encryption</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Asset/player binding (SWF Verification)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Selectable Output Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Revocation and Renewability</td>
<td></td>
</tr>
</tbody>
</table>

### Flash Access 2

- Streaming or Download video
  - *Multi-protocol (RTMP / HTTP)*

- Flexible usage rules
  - *Time-based, output protection*

- Variety of business models
  - *rental, subscription, electronic sell-through*

- Cross-platform
  - *Windows, Mac, Linux*

- Playback in Flash Player 10.1 and Adobe AIR 2.0
  - *desktop only in current version – mobile coming soon*

- Approved by studios as part of DECE
  - *Digital Entertainment Content Ecosystem*

  *(formerly Fl, UV)*
Delivering high quality media within the enterprise on Adobe Flash Platform

SOLUTION
Mapping out Adobe technologies for Enterprise Video

Technologies for Enterprise Video

One Solution For Enterprise Video Needs
Out of the box, secure, easy to deploy and manage solution
(Works only on Adobe Network)
Delivering high quality media within the enterprise on Adobe Flash Platform

Adobe Flash Media Family of Products
Driving consistent media delivery for all Screens

<table>
<thead>
<tr>
<th>VIDEO ENCODING</th>
<th>VIDEO DELIVERY, PROTECTION</th>
<th>VIDEO PLAYER DEVELOPMENT</th>
<th>VIDEO PLAYBACK</th>
<th>DEVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adobe Media Encoder CS5</td>
<td>Flash Media Server</td>
<td>Flash Media Player</td>
<td>Flash Player</td>
<td>Android, BlackBerry, palm webOS, symbian</td>
</tr>
<tr>
<td>Flash Media Live Encoder 4</td>
<td>Flash Access</td>
<td>Strobe Media Player</td>
<td>AIR</td>
<td>Many More to Come…</td>
</tr>
<tr>
<td>HTTP Dynamic Streaming</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

What industries can use Flash Media Server?

- **BROADCAST**
  - Live Event Broadcasts, Streaming TV, Pay per view model
- **GOVERNMENT**
  - Town hall meetings, Presidential address
- **EDUCATION**
  - Live sporting events, guest speakers, curriculum
- **ENTERPRISE**
  - Training, CEO address, Quarterly business reviews, product updates
- **SOCIAL MEDIA**
  - Interactive applications, gaming, advertising

Easy publishing workflows
Simple content protection
Massive reach with multi-protocol
Consistent experience with Flash Player
Innovative multi-user experiences
Delivering high quality media within the enterprise on Adobe Flash Platform

Video Everywhere

We help enterprises communicate and collaborate in the richest way possible by making video easy to create, manage and deliver. We make video simple!

Enterprise Video Use Cases

<table>
<thead>
<tr>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Town halls</td>
<td>Corporate communication</td>
</tr>
<tr>
<td>Live broadcasts</td>
<td>Product information</td>
</tr>
<tr>
<td>Internal communication</td>
<td>Marketing</td>
</tr>
<tr>
<td>E-Learning / Training</td>
<td>Customer / Partner Training</td>
</tr>
<tr>
<td>Knowledge sharing</td>
<td>Product launch</td>
</tr>
<tr>
<td>Expert Search</td>
<td>Broadcast conferences</td>
</tr>
<tr>
<td>Tutorials</td>
<td>Extranet / Partner solutions</td>
</tr>
<tr>
<td>Social features</td>
<td>Video syndication</td>
</tr>
<tr>
<td>...Many more</td>
<td>...Many more</td>
</tr>
</tbody>
</table>

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Webcasting has become Broadcasting

How Far we've come...

1996 Live Broadcasts
- Tina Turner / CHUM Broadcasting (broadcasting at 12kbps)
- Juno Awards Online Backstage Production
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Integrating into the Enterprise

Flash Media Server 4
2010 Feature Summary

**Server Deployment**
- Full 64 bit systems
- Windows + CENTOS + Red Enterprise Linux
- DiffServ QoS

**Media Experience**
- HTTP Dynamic Streaming
  - High Capacity
- Multicast Fusion
  - High quality + Low Cost Enterprise Video
- Smart Buffering + Reconnect
- Faster Bitrate Switching
- Absolute Timecode
  - For multi-stream sync

**Developer**
- P2P Introductions
- SpiderMonkey 1.8
- SIP integration (w/Flash Media Gateway)
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Flash Media Live Encoder

- Multi-bitrate support
- DVR/PVR Support
- H.264 + AAC support
- Local Archiving
- Auto Adjust (new for 3.1)

- Works on both PC and MAC
- 100% Free!

Introducing Flash Media Server 4

A video solution for every type of user – from a small publisher to the enterprise

- Flash Media Streaming Server
- Flash Media Interactive Server
- Flash Media Enterprise Server

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Delivering high quality media within the enterprise on Adobe Flash Platform

Who uses Flash Media Server?

<table>
<thead>
<tr>
<th>FLASH MEDIA STREAMING SERVER</th>
<th>FLASH MEDIA INTERACTIVE SERVER</th>
<th>FLASH MEDIA ENTERPRISE SERVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>small to medium sized businesses who are looking for basic streaming</td>
<td>medium to large sized businesses who want to reach more people more efficiently use multi-protocol</td>
<td>enterprises or social media who want to stream to the masses with cost saving network efficiencies by reducing the infrastructure required to scale</td>
</tr>
</tbody>
</table>

- Live/VOD Streaming
- RTMPE (Content Protection)
- Easy to use
- HTTP Dynamic Streaming
- IP Multicast
- Multi-user
- RTMFP – Peer assisted delivery
- Multicast Fusion
- Massive social media applications

Understanding Amazon Web Services

- ALL Global Datacenters for EC2
  - US-East (Virginia)
  - US-West (California)
  - APAC (Singapore)
  - EMEA (Ireland)
  - Japan (Tokyo)
- S3 Storage
- EBS (Elastic Block Store)

Additional Services from Amazon
- CloudFront CDN
- CloudWatch

NOT SUPPORTED
- Virtual Private Cloud (VPC)
- Reserve Instances
- Spot Instances

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### Key Use Cases for FMS on AWS

- Core functions of FMS are leveraged through server side applications (live, vod, http dynamic streaming and multicast)
- FMS on EC2 will be fully customizable using SSAS, C++ plugins
- Additional pre-built server side apps can be developed to increase usage, and reduce complexity – some may require client side examples

<table>
<thead>
<tr>
<th>Theme</th>
<th>Use Cases (server side apps)</th>
<th>Details</th>
</tr>
</thead>
</table>
| Interactive Media Applications (Social Media) | • Simple RTMFP Introduction Services  
• Interactive App Development (SSAS)  
• Multi-user Game Play  
• Simple Scaling App (scaling to additional images)  
• P2P Video Chat applications  
• Sample application deployment | Allow developers to deploy sample applications from FMS cookbook, and start developing additional server side apps to solve common use cases; these could be the catalysts for FMS services |
| Small Scale Streaming         | • Application Multicast publishing (p2p)  
• RTMP Caching  
• Live/DVR  
• VOD  
• Multipoint publish | Many streaming apps are already available.                                                                                                                                   |
| Streaming Origin              | • HTTP Live Packaging  
• RTMP VoD burst |                                                                                              |
What is Amazon EC2

- **Amazon Web Services**
  - Cluster of servers and networks deployed in 6 regions worldwide
  - Amazon controls and are used to sell virtual server time, storage and services
  - Amazon does not host or manage FMS server instances for customers

- **Elastic Cloud (EC2)**
  - Amazon’s global server cluster
  - Partitioned into virtual servers with pre-installed operating systems that are sold “per hour” - called **Amazon Machine Images (AMI)**
  - Each virtual server product has a size rating that are priced differently: configured with different CPU/ RAM/ Disk/ I/O/ Operating Systems
  - **Elastic Storage (S3)** is a virtual disk volume that can be used by developers

- **Amazon DevPay** is an option for software vendors to preinstall software and pre-configure AMI’s

- **Amazon CloudFront** is Amazon’s CDN (using FMS) and is offered as a CDN for developers using EC2

---

### Price Sheet Example

<table>
<thead>
<tr>
<th>Region</th>
<th>Adobe License Limit</th>
<th>Amazon Server Product</th>
<th>Customer Price/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>US-E</td>
<td>RTMFP100</td>
<td>Large</td>
<td>$0.44</td>
</tr>
<tr>
<td>US-E</td>
<td>RTMFP100</td>
<td>High-Memory Extra Large</td>
<td>$0.60</td>
</tr>
<tr>
<td>US-E</td>
<td>RTMFP1000</td>
<td>Extra Large</td>
<td>$1.30</td>
</tr>
<tr>
<td>US-E</td>
<td>RTMFP1000</td>
<td>High-CPU Extra Large</td>
<td>$1.30</td>
</tr>
<tr>
<td>US-E</td>
<td>RTMFP10K</td>
<td>High-Memory Double Extra Large</td>
<td>$4.60</td>
</tr>
<tr>
<td>US-E</td>
<td>RTMFP10K</td>
<td>High-Memory Quad Extra Large</td>
<td>$5.60</td>
</tr>
<tr>
<td>APAC</td>
<td>RTMFP100</td>
<td>Large</td>
<td>$0.48</td>
</tr>
<tr>
<td>APAC</td>
<td>RTMFP100</td>
<td>High-Memory Extra Large</td>
<td>$0.67</td>
</tr>
<tr>
<td>APAC</td>
<td>RTMFP1000</td>
<td>Extra Large</td>
<td>$1.38</td>
</tr>
<tr>
<td>APAC</td>
<td>RTMFP1000</td>
<td>High-CPU Extra Large</td>
<td>$1.38</td>
</tr>
<tr>
<td>APAC</td>
<td>RTMFP10K</td>
<td>High-Memory Double Extra Large</td>
<td>$4.74</td>
</tr>
<tr>
<td>APAC</td>
<td>RTMFP10K</td>
<td>High-Memory Quad Extra Large</td>
<td>$5.88</td>
</tr>
</tbody>
</table>
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## Flash Platform Authoring Tools

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premiere CS5.5</td>
<td></td>
</tr>
<tr>
<td>Flash Professional CS5.5</td>
<td></td>
</tr>
<tr>
<td>Flash Catalyst CS5</td>
<td></td>
</tr>
<tr>
<td>Flash Builder 4</td>
<td></td>
</tr>
</tbody>
</table>

### Adobe Media Encoder CS5.5

- Full Adaptive Bitrate for un-interrupted viewing
- For Tablet, Phone, Desktop and TV
- 7 new FLASH encoding Profiles
- 7 new APPLE encoding Profiles

Delivering high quality media within the enterprise on Adobe Flash Platform

**Flash Professional CS5.5**

- **Create SWFs**
- Authoring environment for art, animation, and ActionScript code
- Code on timeline or import custom classes
- Pre-built components for user interface and video

**Flash Builder 4 (previously Flex Builder)**

- **Create SWFs**
- Leverage the Flex framework
- Powerful coding tools (AS and MXML)
- Rich visual layout
- Interactive data visualization
- Skinning and styling
- Code refactoring
- Powerful testing tools
- Advanced data services
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Open Source Media Framework (OSMF)

- Simplifies the development of media players
- Pluggable component architecture
- High quality, rich playback experiences
- Solves common problems
- API integration
- Quality of Service
- Reporting and analytics
- Lowers development costs, facilitates faster turnaround
- Open framework facilitates collaborative development
- Benefits publishers, Adobe tool users, and ecosystem partners
- FREE

www.OSMF.org

Adobe Flash Player

A Robust and secure media delivery platform

- HD video delivery with standard codecs H.264/AAC
- Desktop + Mobile Hardware Acceleration PC, MAC, Android, Blackberry
- Multiple streaming protocols RTMP/e, HTTP Streaming, Peer Assisted Networking, IP Multicast
- Real Time Interactive experiences video and audio capture (with Echo Cancelation)
- Robust and Simple Content Protection Adobe Flash Access and RTMPe
- Live/VOD Adaptive Bitrate (HTTP and RTMP)
  Adobe Flash Media Server

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Flash Player 10.1

- Flash Player 10.1 allows your content to reach your customers wherever they are:
  - Desktops
  - Smartphones
  - Netbooks
  - Other Internet-connected devices
- Consistent and broadly adopted runtime
- Reuse code while adapting to individual device capabilities
  - GPU acceleration for video decoding and animation
  - Multi-touch gesture support
  - Accelerometer support
- Robust content protection powered by Flash Access 2.0
- HTTP Dynamic Streaming support

Adobe AIR

- Desktop applications
- HTML/Javascript (AJAX), SWF content
- Cross-platform
- Repurpose existing content for online/offline delivery
- Play downloaded content protected with Flash Access (desktop only)
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Open Screen Project

- Built on the Flash Platform
  - Widest reach across operating systems and devices
  - A community of more than one million developers
  - Powerful, rich authoring tools
- Consistent runtime for standalone applications and web browsing
  - Optimized for high performance on mobile screens
  - Leverages native device capabilities (contextual applications)
  - Availability expected in the first half of 2010
- Support for major device platforms:
  - Android
  - BlackBerry® platform
  - Symbian® OS
  - Palm® webOS
  - Windows Mobile®
- Close to 70 ecosystem partners
- New partners include:

Video is more than just playback

If we were just focused on Video playback – we would have been done many years ago.

(2002: Flash Player 6 and 7 introduced streaming + Progressive Delivery)

Adobe Innovations + standardization

- High quality Live
- Standard Video/Audio Codecs
- Standard Delivery protocols (RTMP / HTTP/P2P/Multicast)
- Real Time Protection – driving new revenue channels on Video
- High quality delivery – Multi-bitrate, Stream Reconnection,
- Bonus Features – DVR functionality, SMPTE timecode, multicamera
- Standard Video player Framework (OSMF)
- DRM
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Adobe Flash Media Solution Providers
www.adobe.com/go/fmsp

- Content Delivery
  - Over 20 CDN's Worldwide
- Encoding
  - Over 15 partners worldwide
- Publishing
  - Over 17 partners worldwide
- Development
  - Over 10 partners worldwide
- Advertising
  - Over 10 partners worldwide


When to use HTTP Dynamic Streaming

- Delivery cost reduction
- Utilize Internet caching infrastructure
- Easier firewall traversal
- Higher burstable capacity
- Utilize standard CDN load-balanced networks and HTTP infrastructure caching

Introducing OSMF...

open source media framework

is the standard media player framework from Adobe for monetizing video on the web
Delivering high quality media within the enterprise on Adobe Flash Platform

May 2011

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Delivering high quality media within the enterprise on Adobe Flash Platform

May 2011

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Accelerate development of media players

**Open Source Media Framework**
- Latest media features from the Flash Platform
- Enables workflow and services around video playback
- Pure AS3 framework
- Extensible architecture
- Free!

**Content Providers** can focus on user experience, not on player plumbing

**Ecosystem Partners** can focus their services, not on player integration

Build rich media experiences that drive monetization

**Multiple media regions inside and outside the video player**

- Pre, mid, post roll ads
- Overlay ads + Bugs
- Companion and leave-behind ad regions
- All regions support multiple media types
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ESPN3 player – www.espn3.com

MAX Online

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Instant integration with 3rd party services via plug-ins

Platforms | CDNs | Ads | QoS/Analytics | Feature
--- | --- | --- | --- | ---
Kick Apps | Akamai | FreeWheel | Omniture | YouTube
Kaltura | edgecast | trend media | CONVIVA | CC

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Flash / Strobe Media Playback...

Flash Media Playback and Strobe Media Playback are turnkey media players built on OSMF

- Supports all types of video delivery and playback
- Content protection through RTMPe and Flash Access
- UI and chrome designed by Adobe’s experience design (XD) team
- Compatible with OSMF plug-ins
- Roadmap includes support of future Flash Platform features (e.g. Multicast)
- Free!

Flash Media Playback is the hosted version of the player

Strobe Media Playback is the open source version of the player
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Strobe Media Playback in action

Royal Standard de Liege Official Site - standard.sudpresse.be

MORE INFORMATION

Where to go from here...

Adobe.com
Adobe Developer Connection
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Strobe Media Playback in action

```javascript
for (var i = 0; i < parameters.length; i++) {
    var parameterName = parameters[i].name;
    var parameterValue = parameters[i].value;
    if (fl.parameters[parameterName]) {
        fl.parameters[parameterName].value = parameterValue;
    }
}

// Embed the player SWF:
varObject.embedSWF("http://example.com/flashplayer.swf",
    "playerContainer", parameters, 1000);
```

More Information

- **CIRRUS**

- **FMS on AMAZON**

- **Flash Media Enterprise Server 4**
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F4F file format Spec: www.adobe.com/devnet/f4v.html

Full File format details
DRM Metadata Structure
Format options

HTTP Dynamic Streaming Whitepaper

18 Page technical overview
- Technical Details
- HTTP Dynamic Streaming Tools
- DRM + Protection
- Deployment Options
- Key Use Cases
- File Formats
- Online Resource Guide

CIRrus ("Codename")

- Enables companies to leverage p2p functionality within Flash Platform without deploying servers or infrastructure
  - Future Hosted Service from Adobe – not for commercial use
- What it does
  - Provide P2P Introduction services – required to leverage P2P functionality inside Flash Player or AIR
  - No server management required and no custom server side application deployment
- Alternative ways to access p2p functionality in Flash Player
  - Flash Media Enterprise Server license
  - Flash Media Server on Amazon Web Services (from $0.44/hr)
  - Live Cycle Collaboration Services (LCCS)