


Flexible Delivery and Interactive Experiences on the Adobe Flash Platform

Kevin Towes, Senior Product Manager | Streaming Media West | November 2010




ADOBE® FLASH® PLATFORM

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Breakdown


Today's Agenda



TIME	TOPIC	TOPIC
9:00 - 9:50	Deployment	Development
Toolkit Market and Positioning Flash Media Server 4 Flash Access Development Tools Production Tools	Platforms + Protocols RTMP HTTP Dynamic Streaming Multicast Multicast Fusion Peer Assisted Networking (P2P)	Publishing Workflows with CSS Open Source Media Framework Flash Media Playback Strobe Media Playback

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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

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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



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Flash player 10.1 now at 73% penetration (after 4 months)

Worldwide Ubiquity of Adobe Flash Player by Version - September 2010

	Flash Player 9 & below	Flash Player 10	Flash Player 10.1
Mature Markets ¹	99.0%	97.9%	73.8%
US/Canada	99.5%	98.1%	75.8%
Europe ²	99.0%	98.2%	76.2%
Japan	98.7%	97.0%	65.5%
Australia/New Zealand ⁴	98.8%	97.7%	69.5%
Emerging Markets (from June 2010) ³	98.9%	96.1%	n/a

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

SOURCE: http://www.adobe.com/products/player_census/flashplayer/version_penetration.html

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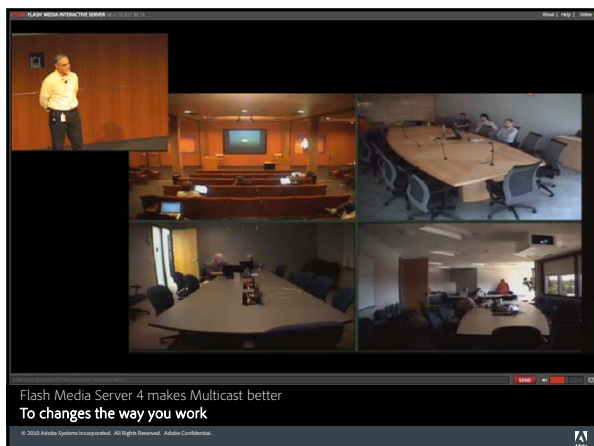
5



The screenshot shows the CBS Survivor website interface. At the top, there's a navigation bar with 'Shows', 'Videos', 'HD Videos', 'Watch & Chat', and 'Schedule'. Below this, the 'Survivor' logo is prominent, along with 'Thursdays 7/6c'. A video player is in the center, showing a group of contestants. To the right of the video is a 'TRIVIA' section with an 'Overall Leaderboard' listing names and scores. At the bottom, there's a chat area with a 'Say something!' input field and an 'APPLAUSE' button. The interface is dark-themed with various interactive elements.







Evolution of Delivery

Adobe innovates on media delivery and interactivity

1950 1970 2000 2003 TODAY

To deliver the best viewing experience on any platform and on any screen

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Video delivery today

Video delivery has become more complex

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

TODAY



- Business owners want to deliver videos to mobile phones, netbooks, TV, set-top box
- Video is easy to create and easy to deliver—but the infrastructure is still complex
- Higher quality content causes network congestion and disrupts experience

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Webcasting has become Broadcasting

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How Far we've come...





1996 Live Broadcasts

- Tina Turner / CHUM Broadcasting (broadcasting at 12kbps)
- Juno Awards Online Backstage Production

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

VIDEO ENCODING	VIDEO DELIVERY PROTECTION	VIDEO PLAYER DEVELOPMENT	VIDEO PLAYBACK	DEVICE
 Adobe Media Encoder CS5	 Flash Media Server	 open source media framework Flash Media Player Strobe Media Player	 Flash Player	 android
 Flash Media Live Encoder 4	 Flash Access  HTTP Dynamic Streaming	 FB	 AIR	 BlackBerry  palm webOS  symbian Many More to Come...

Flash Media Live Encoder 3.1 for Mac

VIDEO ENCODING

- 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!




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Flash Access 2.0

CONTENT PROTECTION

- A content protection and monetization solution
- Online video streaming or download
- Over any protocol (i.e. progressive download, RTMP streaming, HTTP Dynamic Streaming, or file download)
- Using flexible usage rules (e.g. time-based, output protection)
- Support for a variety of business models (e.g. 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)
- Approved by studios as part of DECE (Digital Entertainment Content Ecosystem)



(formerly Flash Media Rights Management Server)

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Introducing Flash Media Server 4

VIDEO INTERACTIVITY AND DELIVERY




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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Flash Media Server 4

2010 Feature Summary



ENTERPRISE Server Deployment	SOCIAL MEDIA / DEVELOPER Media Experience	ENTERPRISE / SERVICES Developer
Full 64 bit systems	HTTP Dynamic Streaming High Capacity	P2P Introductions
Windows + CENTOS + Red Enterprise Linux	Multicast Fusion High quality + Low Cost Enterprise Video	SpiderMonkey 1.8
DiffServ QoS	Smart Buffering + Reconnect	SIP integration (w/Flash Media Gateway)
	Faster Bitrate Switching	
	Absolute Timecode For multi-stream sync	

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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

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Flash Media Streaming Server

WHO IS FLASH MEDIA STREAMING SERVER FOR?

- Individuals or companies that have **basic, low-capacity streaming** requirements
- Bloggers who want to broadcast **live or on-demand streams**
- Videographers who need to allow clients to **securely view videos** on the web
- Small to midsize companies that want to implement **training or broadcast company-wide video messages**
- Website owners who want to **embed and protect high-quality streaming video**



NEW FEATURES


- Leverage full 64 bit server with wide platform support
- Enjoy broad reach with cross platform and out of browser experiences
- Simple content protection
- Deliver HD Quality Video

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Flash Media Interactive Server

WHO IS FLASH MEDIA INTERACTIVE SERVER FOR?

- Medium to large businesses that can benefit from **flexible delivery methods (protocols)** and complex deployment requirements (Edge/Origin/C++/SSAS/ACL/LDAP)
- Social networks requiring **real-time communication** such as video chat, VoIP, multiplayer games, or text chat
- Educational institutions that want to create **virtual classrooms** or broadcast live interactive experiences
- Government agencies that want to implement real-time communication or **interactive training**
- Anyone seeking scalable, **secure streaming** with **custom server-side application logic**



NEW FEATURES

- Multi-user experiences
- Increase Scale Via HTTP Dynamic Streaming Delivery (Live)
- IP Multicast

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Flash Media Enterprise Server

WHO IS FLASH MEDIA ENTERPRISE SERVER FOR?

- Large enterprises with media requirements over **multiple locations and networks**
- Companies that deploy **massive social media applications**
- Medium to large companies that need to **maximize delivery capacity** while **minimizing network costs**
- Companies that produce **customer-facing marketing** (such as press conferences or product demos)
- Enterprises that want complete **control over their media delivery**



NEW FEATURES

- Deploy rich interactive experiences using Peer Assisted Networking technology leveraging widely adopted Flash Player
- Multicast Fusion can enable more employees - Reduce server and network impact
- Massive reach with multi-protocol - Extend your video conference infrastructure worldwide to every employee

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Who uses Flash Media Server?

VIDEO
INTERACTIVITY
AND DELIVERYFLASH MEDIA
STREAMING SERVER

small to medium sized businesses who are looking for basic streaming



- Live/VOD Streaming
- RTMPE (Content Protection)
- Easy to use

FLASH MEDIA
INTERACTIVE SERVER

medium to large sized businesses who want to reach more people more efficiently use multi-protocol



- HTTP Dynamic Streaming
- IP Multicast
- Multi-user

FLASH MEDIA
ENTERPRISE SERVER

enterprises or social media who want to stream to the masses with cost saving network efficiencies by reducing the infrastructure required to scale



- RTMFP - Peer assisted delivery
- Multicast Fusion
- Massive social media applications

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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 PricewaterhouseCoopers Survey
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Video Plays Critical Role in the Enterprise



Communicate and Collaborate

- Richest form of communication and collaboration in the enterprise
- Next step in enterprise evolution from phone to email to documents

Growing rapidly

- Used widely already
- Proliferation of end-devices to create and consume video

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Why do Enterprises Use Video?

Key Drivers for Use of Enterprise Video

Team Collaboration (64%)

Accelerating time to market (24%) Culture / Branding (42%)

Humanize message (35%)

Cost savings / avoidance (76%)

Work/Life Balance (46%) Compliance / Certification (30%)

Customer Service (47%) Safety and Security (43%)

Source: IDC, Enterprise Panel - November 2009

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Why do Enterprises Use Video?

Planned Use of Enterprise Video in the Next 12 Mos

Training (71%)

Digital Signage (22%)

Video On Demand (54%)

Sales Meetings/Training (53%) Partner / Customer (34%)

Marketing Launches (34%) Exec Communications (55%)

Videoconferencing (79%)

Investor relations (25%) Surveillance (54%)

Source: IDC, Enterprise Panel - November 2009

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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

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VIDEO PRODUCTION
Adobe Creative Suite Production Premium CS5





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Flash Platform Authoring Tools

 Premiere CS5

 Flash Professional CS5

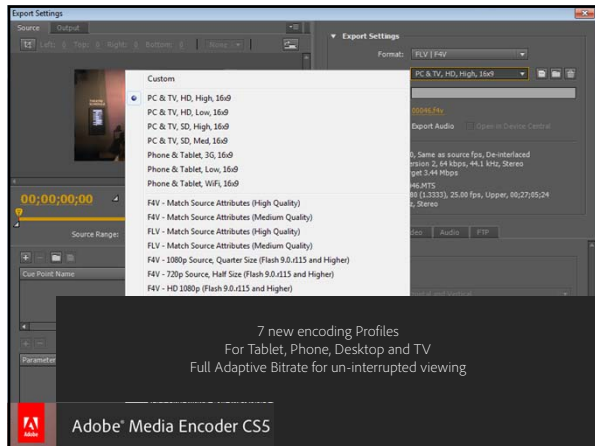
 Flash Catalyst CS5

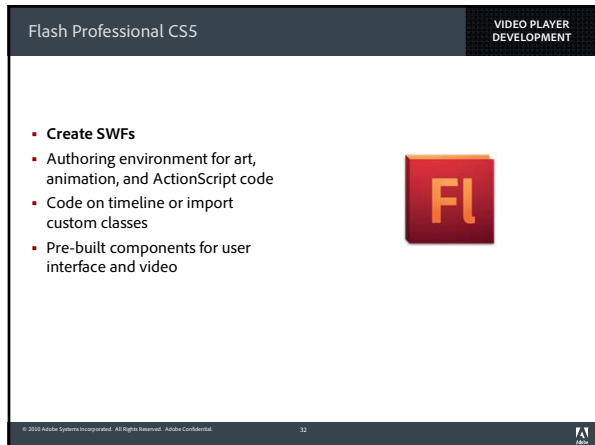
 Flash Builder 4

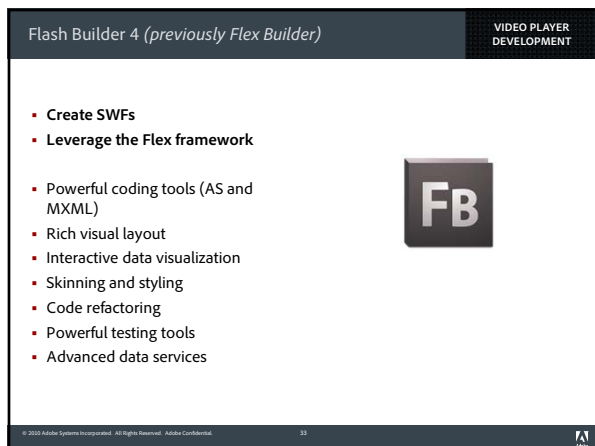


VIDEO PLAYER DEVELOPMENT

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Open Source Media Framework (OSMF)

VIDEO PLAYER DEVELOPMENT

- 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


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Flash Player 10.1

VIDEO PLAYBACK

A Robust and secure media delivery platform

- HD delivery with H.264
- Multiple protocol including
 - RTMP/e
 - HTTP Streaming
 - Peer Assisted Networking
 - IP Multicast
- Real Time Interactive experiences
- Content Protection with Flash Access
- Streaming Protection (RTMPe)
- Standards-based video/audio codec
- Dynamic Streaming



Flash Player "Gala"
Hardware acceleration on Mac OS X 10.6.3 or later (HD H.264 only)


- MacBooks shipped after January 21st, 2009
- Mac Minis shipped after March 3rd, 2009
- MacBook Pros shipped after October 14th, 2008
- iMacs that shipped after the first quarter of 2009

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Flash Player 10.1

VIDEO PLAYBACK


- 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



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Adobe AIR 2.0 VIDEO PLAYBACK

- 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 VIDEO PLAYBACK

- 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:







Singular experience, multiple devices




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DROID BY MOTOROLA

ANDROID MARKET


PRIMETIME LIVE

SCOPE

CONCENT

ADOBES FLASH PLAYER


There's no such thing as a free lunch, and here, the Droid 2 delivers full Adobe® Flash® Player support built in, for a truly rich web experience. You'll breeze through all your favorite sites, and watch videos, as they were meant to be viewed.




Adobe® Flash® 10.1 Support

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- New workflows optimized for mobile
- By 2014: Mobile video will join games as the top apps on mobile
 - \$1.3B market (source: eMarketer)
- Partners are driving the Business of Video
 - Commerce
 - Advertising
 - Merchandising
- Introduce CSG



Don't forget to fill out and turn in the course evaluations, please!




Adobe.tv

VIDEO
PLAYBACK

- YouTube in a box
- Encoding/search
- Upload and encode
- Create a searchable repository

- [SLIDES or more details? Screenshot?]

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PART TWO: Multi-Protocol Delivery

Flexible Delivery and Interactive Experiences on the Adobe Flash Platform

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Breakdown

Today's Agenda



ONE	TWO	THREE
Toolkit 9:00 - 9:50	Deployment 10:00 - 10:50	Development 11:00 - 11:50
Market and Positioning Flash Media Server 4 Flash Access Development Tools Production Tools	Platforms + Protocols RTMP HTTP Dynamic Streaming Multicast Multicast Fusion Peer Assisted Networking (P2P)	Publishing Workflows with CSS Open Source Media Framework Flash Media Playback Strobe Media Playback

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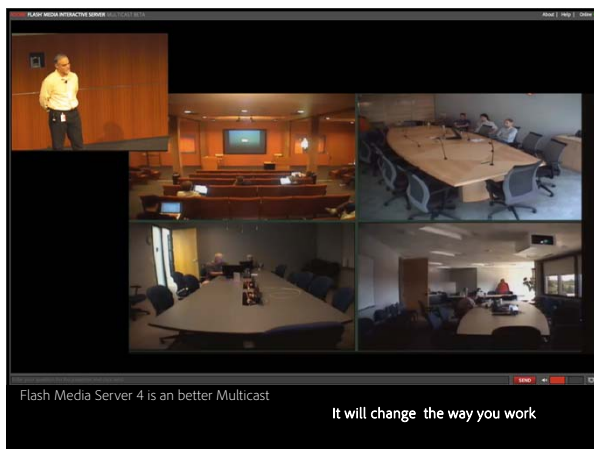


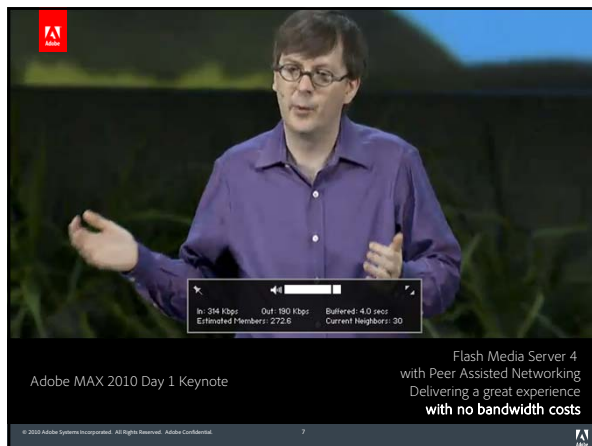


Demonstrating products or services requires great video









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


Consistent Video Experiences


	Adobe Flash Flash Player 10.1	HTML5 Browser-based	Apple iOS Quicktime
Delivery Options	Progressive, RTMP, HTTP Streaming, Multicast, p2p	Progressive Only <small>(HTML5 Tag is protocol agnostic)</small>	HTTP Streaming
Quality of Service	HTTP Dynamic Streaming RTMP Dynamic Streaming	X	Adaptive Bitrate
File Formats	FLV, F4V, F4F	MP4	MPEG2-TS (Segmented)
Codecs	Video: H.264, VP6 Audio: AAC MP3, Speex, Nellymoser	dependent on Browser Video: H.264 Audio: AAC	Video: H.264 Audio: AAC
Protection	RTMPE, RTMPF, SWFV, Flash Access DRM	X	Encryption only

- Traditional Streaming
RTMP with Flash Media Server
- HTTP Progressive Download
- HTTP Dynamic Streaming **(new!)**
- Application Multicast **(new!)**
with Peer Assisted Networking
- IP Multicast Broadcast **(new!)**

Flash Player 10.1:
multiple streaming protocols


multiple screens



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Protocol Support with Flash Media Server versions

		Flash Media Streaming Server	Flash Media Interactive Server	Flash Media Enterprise Server
UDP	RTMFP	IP Multicast	✓	✓
		Unicast	✓	✓
		Peer Assisted	✓	✓
		Multicast Fusion		✓
TCP	HTTP	Progressive Download	✓	✓
		HTTP Dynamic Streaming VOD	✓	✓
		HTTP Dynamic Streaming Live	✓	✓
TCP	RTMP	RTMP	✓	✓
		RTMPE	✓	✓
		RTMPT	✓	✓
		RTMPS SSL	✓	✓

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When to use What

UDP

RTMFP

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

TCP


HTTP

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

TCP

RTMP

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

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Traditional RTMP Streaming



RTMP 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



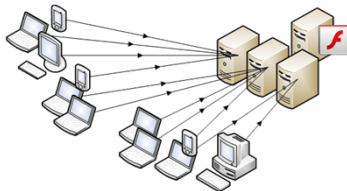
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The Multicast Advantage: Our Starting Point

- 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)

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HTTP Dynamic Streaming



Increased capacity
Lower delivery cost

HTTP Dynamic Streaming

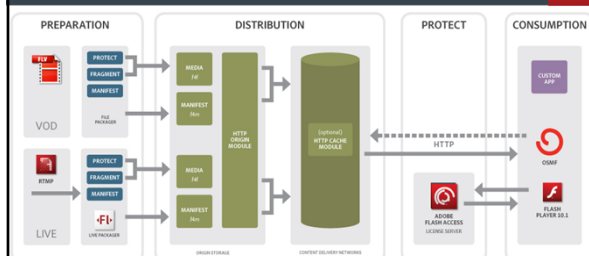
Replicated the Experience of RTMP

- 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

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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.)

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Adobe tool	Description	Reference
File Packager for video on demand	Free tool that creates MP4 fragmented media (F4F) from existing content encoded for Flash. The tool also creates the manifest file (F4M) and (optionally) encrypts using Flash Access.	Download www.adobe.com/products/httpdynamicstreaming
Live Packager	Server solution that ingests a live RTMP stream and creates MP4 fragmented (F4F) media. The tool also (optionally) encrypts using Flash Access.	Contact Flash Media Server 4 www.adobe.com/go/fms/
HTTP Origin Module for Apache	Free Apache module required for VOD delivery. The Origin Module needs to be installed in the same location as the content storage. For live streaming, the Origin Module creates the manifest file as a virtual file.	Download www.adobe.com/products/httpdynamicstreaming
Open Source Media Framework	ActionScript framework used to parse and play media sets and manifest files, requesting media, monitoring QoS, and rendering playback in Flash Player 10.1.	Download http://opensource.adobe.com/wiki/display/osmf/Downloads
Strobe Media Playback	Compiled OSMF-based sample player to get you started quickly.	Download www.osmf.org/developers.html
Adobe Flash Access 2k	File and stream protection that can be integrated into existing content preparation workflows. Enables delivery of protected content to Flash Player or Adobe AIR [®] applications, allowing users to stream, progressively download, or download premium content to Mac OS, Microsoft [®] Windows [®] , or Linux [®] desktops. The server side of Flash Access is distributed as a software development kit (SDK) and includes a reference implementation.	Learn more www.adobe.com/products/flashaccess

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

Dynamic Streaming Compare: RTMP + HTTP

	HTTP Dynamic Streaming	RTMP Dynamic Streaming with Adobe Flash Media Server
Flash Player	Reduced reach until Flash Player 10.1 is widely adopted	Flash Player 10 or later support (99% of all connected PCs)
File format	F4F format compatible only with HTTP Dynamic Streaming—same files cannot yet be delivered using RTMP streaming Note: Progressive download is supported but requires additional development.	Support for all Flash formats, including FLV and F4V Note: F4F is not supported by Flash Media Server.
Publishing workflow	Additional workflow steps required to prepare content; special origin server required	Simple publishing workflow
Content protection	Requires Flash Access 2	RTMPE/SWF file verification for simple workflow; Flash Access 2 supported
Live latency	Increased latency on live streams due to media fragmentation/encryption process before delivery	Low latency depending on deployment and buffer settings

HTTP Dynamic Streaming Workflow services	
Service offering	Description
Encoding	Encode live or prerecorded media into Flash supported codecs (H.264/AAC). Encoders create multiple bitrates, align keyframes, and insert metadata and timecode.
F4F packaging for VOD	Prepackage and protect FLV or F4V media into the MP4 fragment format (F4F), apply encryption, and generate a manifest file (F4M)
F4F packaging for live	Prepackage and protect live streams into F4F, apply encryption, and generate F4M. Typically, services will also act as live HTTP origins.
Origin services	Serve fragment requests. Typically, origins are tied to a remote archive or live packaging solution.
Delivery services	Allow fragment requests to be passed to the origin and cached (typical CDN) with a HTTP-based network. Also provide basic access restrictions including geo filtering and token authentication.
License server hosting services	Serve Flash Access license keys for encrypted media (live or on demand).
Player development (OSMF)	Create custom media experiences based on the Open Source Media Framework.

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The F4F File format

- Fragments
- Segments
- Multiplexed hint tract
- Bootstrap information
- Random Access Point
- URL Derivation Scheme

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The F4F File format

- HTTP URL Sample
- `http://server_and_path/QualityModifierSeg'segment_number'-Frag'fragment_number'`

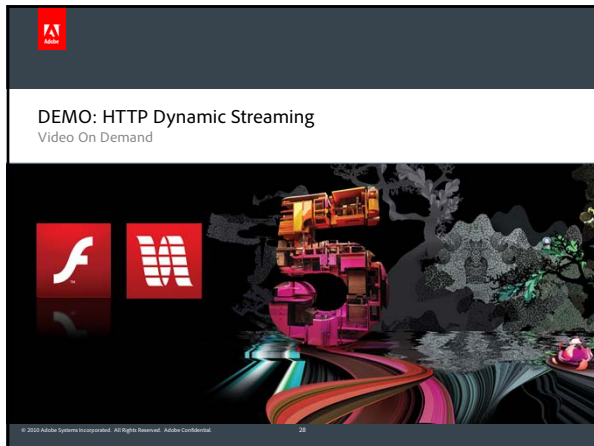
server_and_path	Web server path to the content
qualityModifierSeg	Name used for the multibitrate or trick play files (optional)
segment_number	Number (without leading zeros) associated with the segment
fragment_number	Number (without leading zeros) associated with the fragment

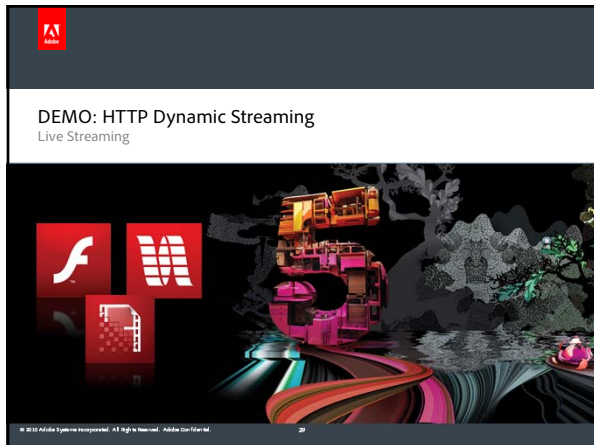
- **SAMPLE:** `http://myserver.com/mypath/1080pSeg43-Frag210`

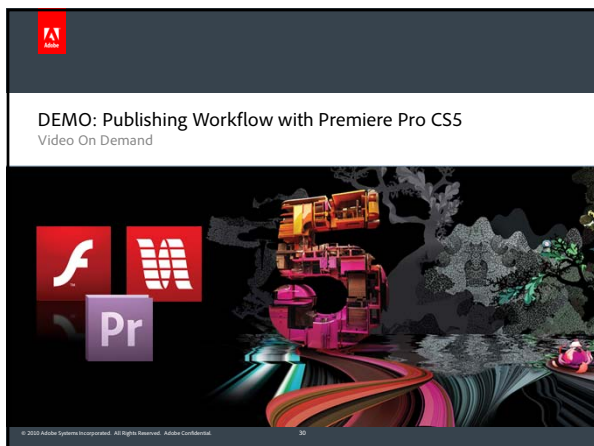
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Multicast / Peer Assisted delivery



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

APPLICATION MULTICAST

Massive live delivery (public)

- Peer 2 Peer technology
- Flexible and massive scale
- No hardware requirements
- Low cost delivery
- Rendezvous servers required

IP MULTICAST

Internal enterprise streaming

- UDP Broadcast
- Hardware-assisted
- No Server required
- Limited external reach

ADOBE MULTICAST FUSION

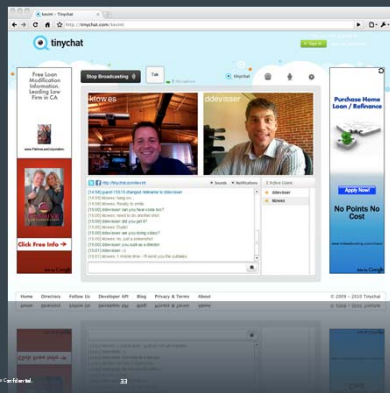
Internal enterprise streaming with Peer Assist

- Delivery higher quality of service
- Increase reach
- Hardware + software assisted
- Rendezvous servers required

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

Virtually no bandwidth costs and unlimited scalability for interactive communication.



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Peer Assisted Networking


on the Adobe Flash Platform

Reduce Infrastructure costs

Reduce Bandwidth costs

Help enable new Social applications

Foundation for Massive media delivery



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Peer Assisted Networking

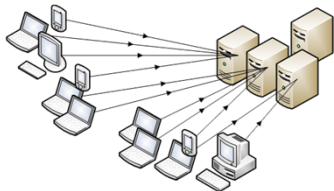
- Peer Assisted Networking helps to lower costs
- Interactive + Social applications that are bandwidth heavy

Webcam Chat (kbps) 2-way	150	150	500
CALC: Webcam Chat (Mbps) 2-way	2.25	2.25	7.5
Concurrent Users	10000	60000	100000
FMIE (1st year)			
CALC: Bandwidth (GB/yr)	11,548,828	69,292,969	384,960,938
Bandwidth Costs (GB/yr)	\$ 923,906	\$ 5,543,438	\$ 30,796,875
CALC: Number of Servers @ 900Mbps	3	20	111
Server Instance Costs (/yr)	\$ 18,980	\$ 113,880	\$ 632,667
Total Costs	\$ 942,886	\$ 5,657,318	\$ 31,429,542
FMEN (1st year)			
Bandwidth	0	0	0
Number of Servers @ 10000/svr	1	6	10
Server Instance Costs (/yr)	\$ 5,694	\$ 34,164	\$ 56,940
Total Costs	\$ 5,694	\$ 34,164	\$ 56,940

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The Multicast Advantage: Our Starting Point

- Unicast (client-server) with RTMP or HTTP

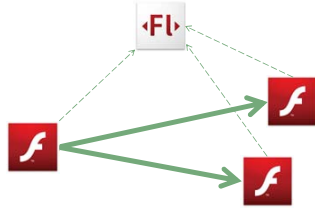


- Pros**
 - Multi-Bitrate (MBR)
 - Seek/Pause/Resume
 - Works for non multicast-capable clients
- Cons**
 - Scaling tends toward expensive & difficult (possibly less so with HTTP)
 - No hard latency bound under congestion (i.e. TCP retransmission)

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Flash Player 10.0 (November 2008)

- Introduced in Flash Player 10.0 (November 2008)
 - Now at 95% penetration
- Allows data flow between Flash Players
- Managed P2P solution
- No network probing



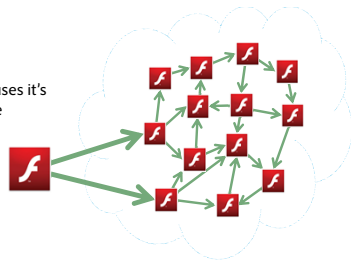
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Redefining the perception of P2P

- 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



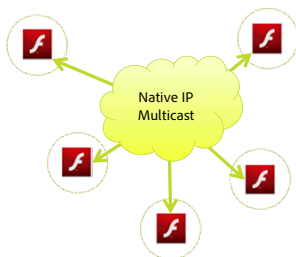
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IP Multicast

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



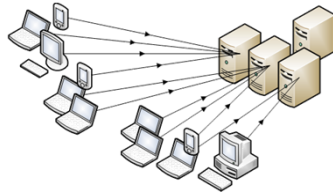
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The Multicast Advantage: Our Starting Point

- 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)

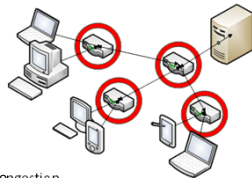
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The Multicast Advantage: Step 1

- 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

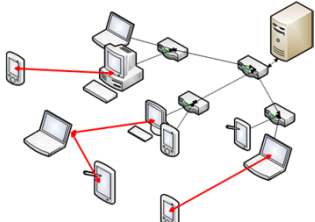
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The Multicast Advantage: Step 2

- Fusion of IP multicast and P2P multicast!**

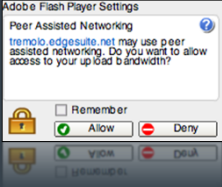


- P2P mesh gets stream to clients not connected to multicast routers
- Similar pros/cons as IP multicast with improved reach but more potential latency in the P2P mesh

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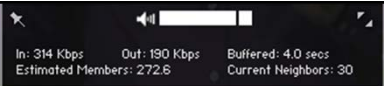
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Peer Assisted Networking Dialog

- 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

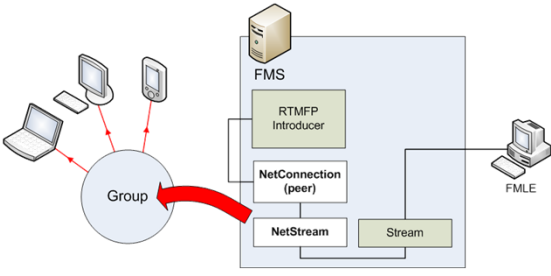


Understanding P2P video delivery

- **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

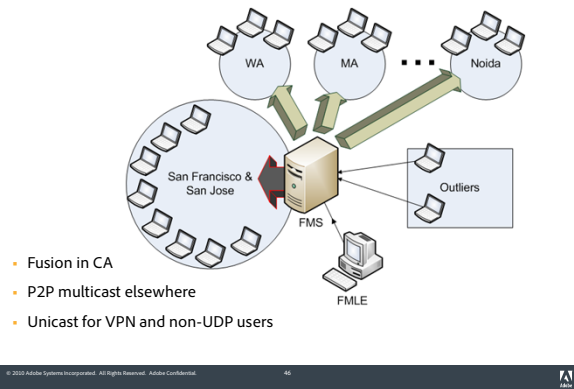
FMS Multicast: 10K Foot View

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



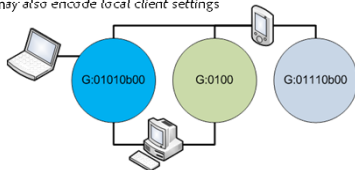
- Multicast sample app shipping in FMS 4 is a good starting point

FMS Multicast: Case Study



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



Flash Media Server 4

Facts about RTMFP and Multicast

TRADITIONAL IP Multicast	NEW FROM ADOBE Multicast Fusion
<ul style="list-style-type: none"> • No end-user opt-in • IPv4 and IPv6 multicast supported • Any-source (traditional) multicast supported • Source-specific multicast not (currently) supported • Runnable in "serverless" mode 	<p>Enterprise friendly!</p> <ul style="list-style-type: none"> • Explicit opt-in to "peer assisted networking" • No client "Supernodes" by design! <p>Requires RTMFP introducer</p> <ul style="list-style-type: none"> • FMS 4 or Adobe Cirrus @ labs.adobe.com <p>Bootstrapping to neighbors in Group can be</p> <ul style="list-style-type: none"> • Manual: adding peerIDs to groupspec early, or adding to NetGroup at runtime • Automatic: via LAN peer discovery - no introducer needed • Automatic: via server channel to introducer

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PART 3: Developing Interactive Playback Applications

Flexible Delivery and Interactive Experiences on the Adobe Flash Platform

Kevin Towes, Senior Product Manager | Streaming Media West | November 2010



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Breakdown

Today's Agenda

TOOLKIT
9:00 - 9:50

- Market and Positioning
- Flash Media Server 4
- Flash Access
- Development Tools
- Production Tools

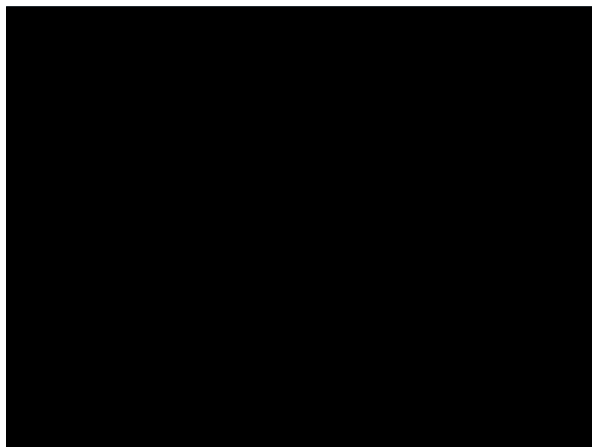
DEPLOYMENT
10:00 - 10:50

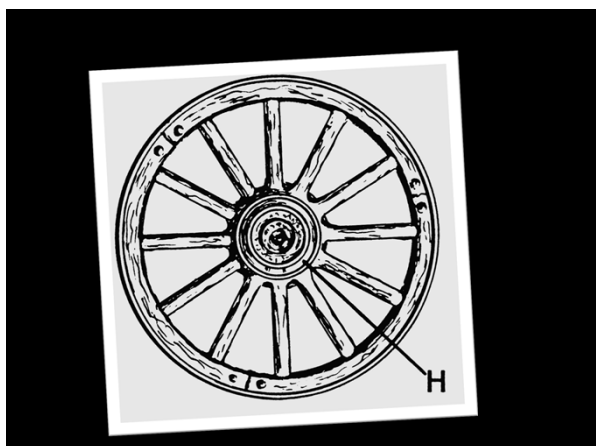
- Platforms + Protocols
- RTMP
- HTTP Dynamic Streaming
- Multicast
- Multicast Fusion
- Peer Assisted Networking (P2P)

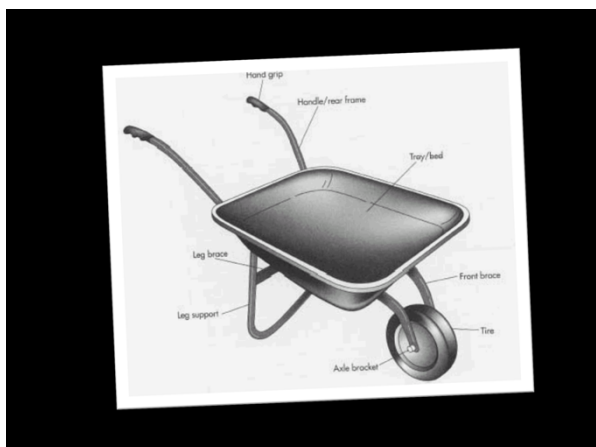
DEVELOPMENT
11:00 - 11:50

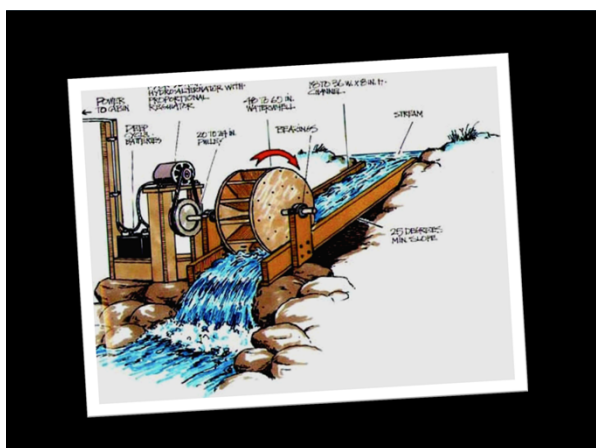
- Publishing Workflows with CSS
- Open Source Media Framework
- Flash Media Playback
- Strobe Media Playback

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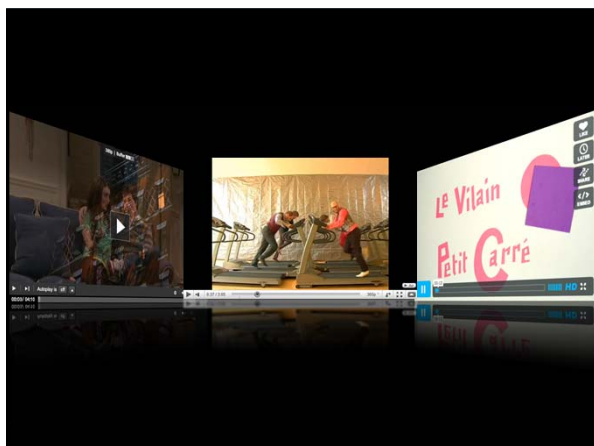












Introducing OSMF...



open source
media framework

is the standard media player
framework from Adobe for
monetizing video on the web

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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

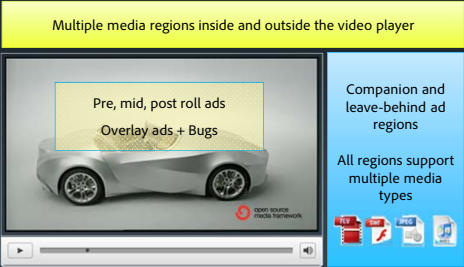
Ecosystem Partners can focus their services, not on
player integration

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Build rich media experiences that drive monetization

Multiple media regions inside and outside the video player




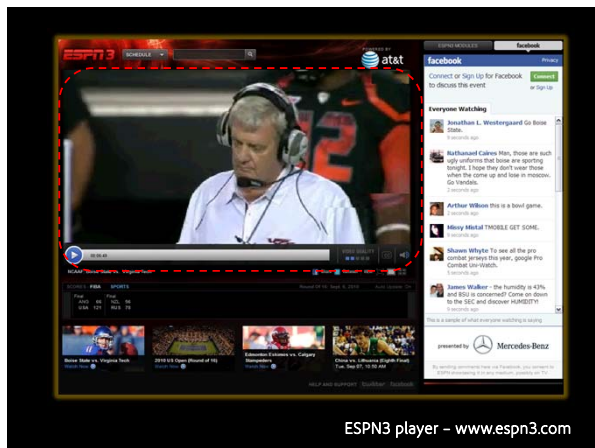
Pre, mid, post roll ads
Overlay ads + Bugs

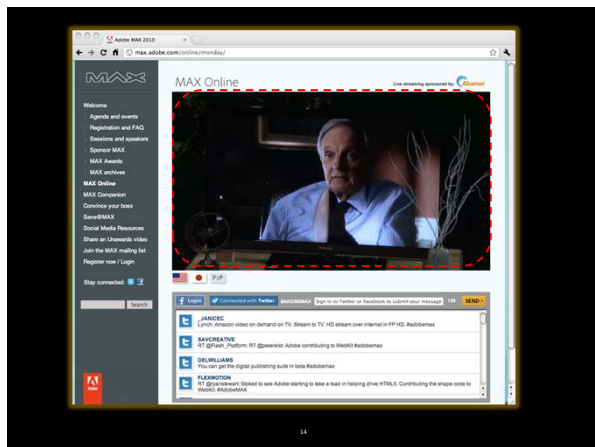
Companion and
leave-behind ad
regions

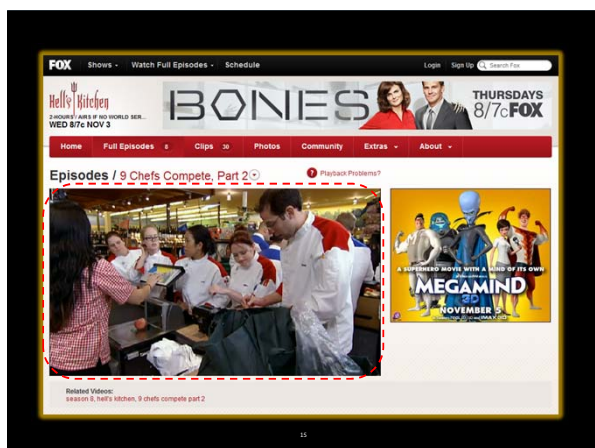
All regions support
multiple media
types

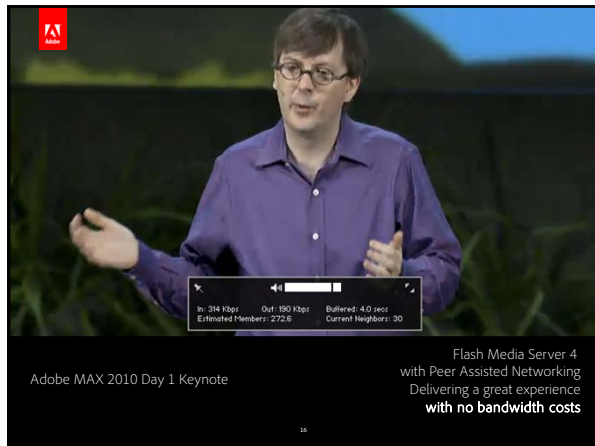
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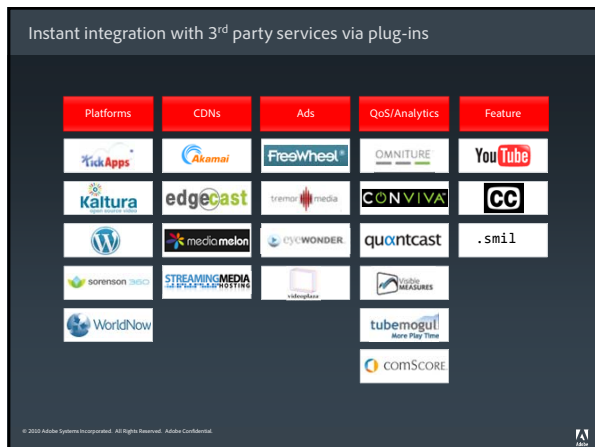














Flash / Strobe Media Playback...


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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FMP configurator + Dreamweaver demo

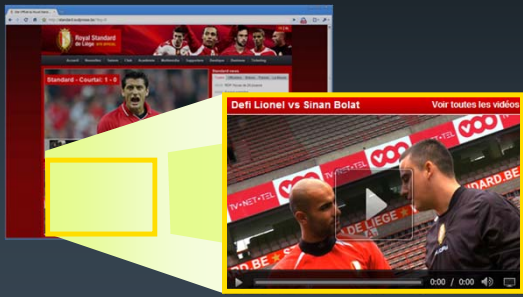


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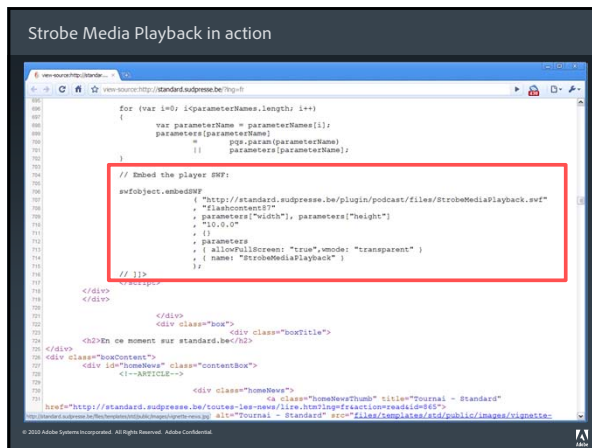
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Strobe Media Playback in action

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



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Roadmap		
May 2010	Fall 2010	2011
<ul style="list-style-type: none"> • HTTP Dynamic Streaming • Flash Access 2.0 • MBR switching rules • Plug-in API <p>OSMF</p> <ul style="list-style-type: none"> • Serial and parallel compositions <p>F / SMP</p> <ul style="list-style-type: none"> • Custom skinning • XML configuration • Optimized buffering algorithm 	<ul style="list-style-type: none"> • Multicast for broadcasting within and beyond your network without increasing bandwidth costs <p>OSMF</p> <ul style="list-style-type: none"> • Stream Reconnect for reducing unnecessary breaks in playback <p>F / SMP</p> <ul style="list-style-type: none"> • JavaScript API for controlling playback and creating controls through HTML / CSS / JavaScript • HTML5 fallback including detection and seamless UI 	<ul style="list-style-type: none"> • Mobile • Digital Home <p>OSMF</p> <ul style="list-style-type: none"> • Configuration API • Fast switch for MBR • Plug-in examples <p>F / SMP</p> <ul style="list-style-type: none"> • Mobile skin • HTTP pseudo-streaming

