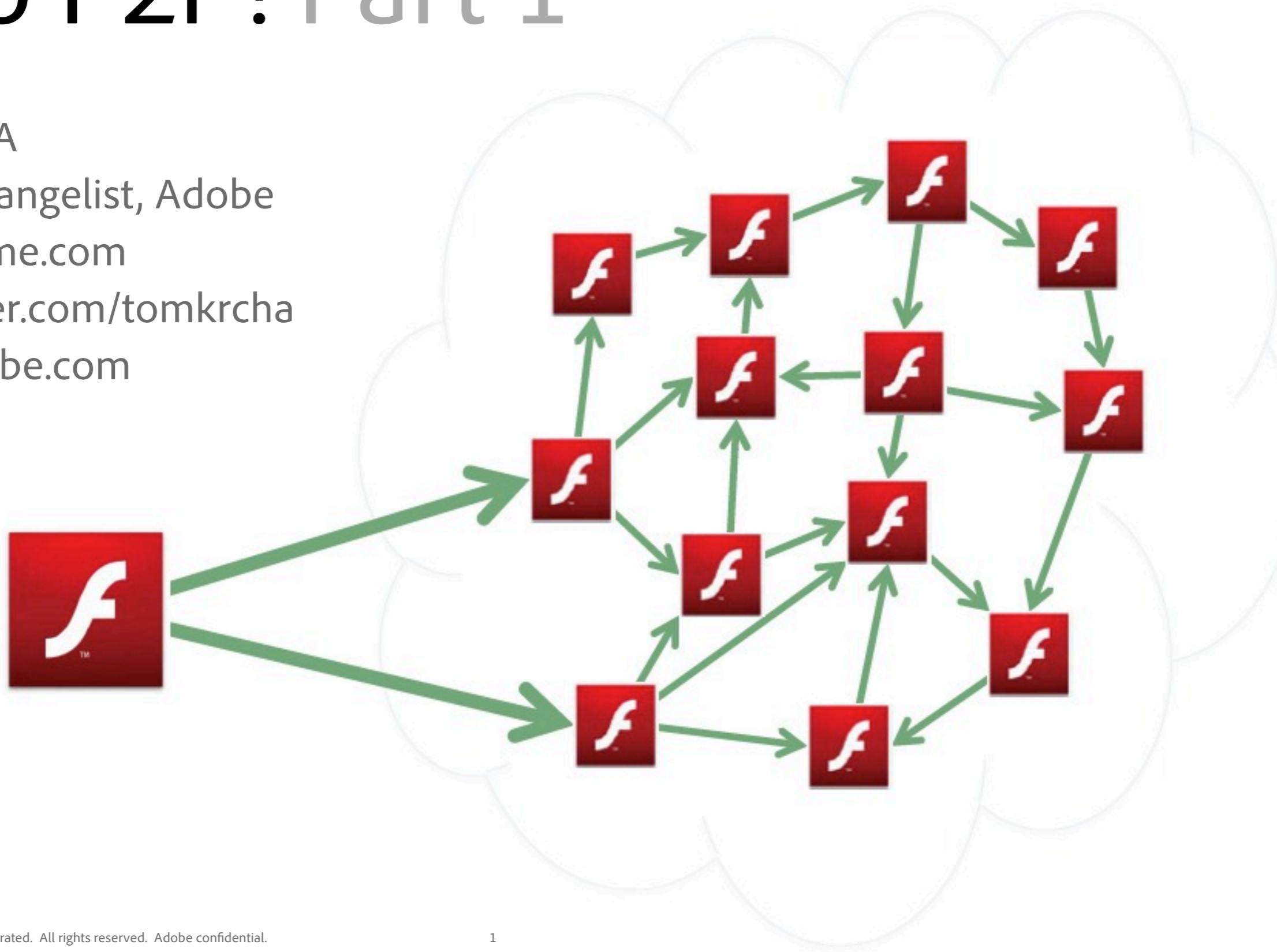
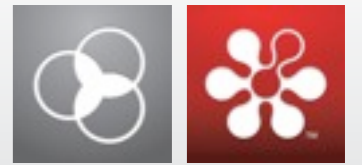


Hello P2P! Part 1

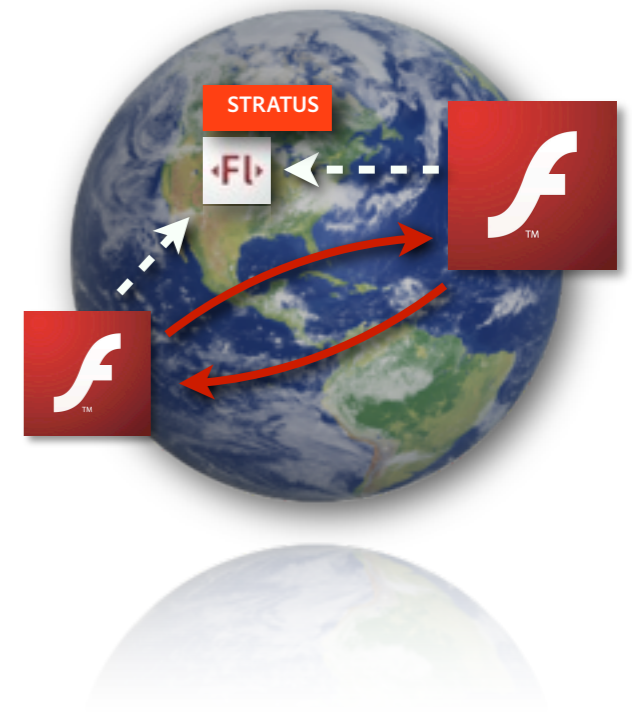
TOM KRCHA
Platform Evangelist, Adobe
FlashRealtime.com
<http://twitter.com/tomkrcha>
tomkr@adobe.com





- ▶ What is Peer-to-peer?
- ▶ RTMFP - protocol and implications
- ▶ Point-to-point app (FP 10)
- ▶ NetGroup app (FP 10.1)
- ▶ Deploying P2P Flash app on Facebook
- ▶ P2P in Adobe LiveCycle Collaboration Service

Tags: Flash, P2P, Realtime, Camera, Microphone





<http://twitter.com/tomkrcha>

WTF P2P?

NAT/Firewall Traversal

NetGroup

Native Multicast

NetGroupSendMode

Fusion

NetGroupSendResult

NetGroupReplicationStrategy

Encryption

RTMFP

IP Address Mobility

NetStream

Directed Routing

IT'S HUGE!

Posting

Application-Level-Multicast

Bootstrap

GroupSpecifier

Topology

NetStreamMulticastInfo

Object Replication

Partial Reliability

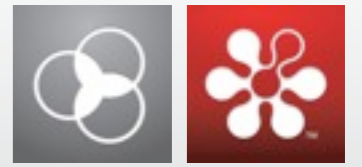
NetGroupInfo

NetGroupReceiveMode

NetConnection

Congestion Control

What is Peer-to-peer?



Hub-and-Spoke network



Centralized server-based service model.

Hub-and-spoke:

- centralized
- Single point of failure
- cost of a server
- adding more clients make network slower
- need failover and backups

P2P network

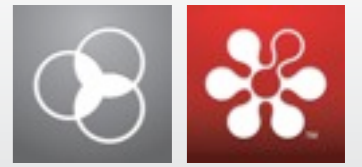


A peer-to-peer system of nodes without central infrastructure.

P2P

- decentralized
- adding more clients make network faster
- robustness, no failover

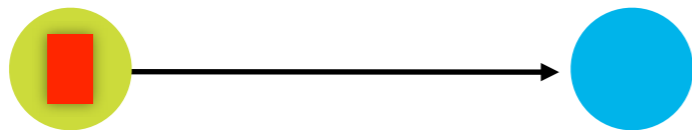
What is Peer-to-peer?



Point-to-point

one-to-one

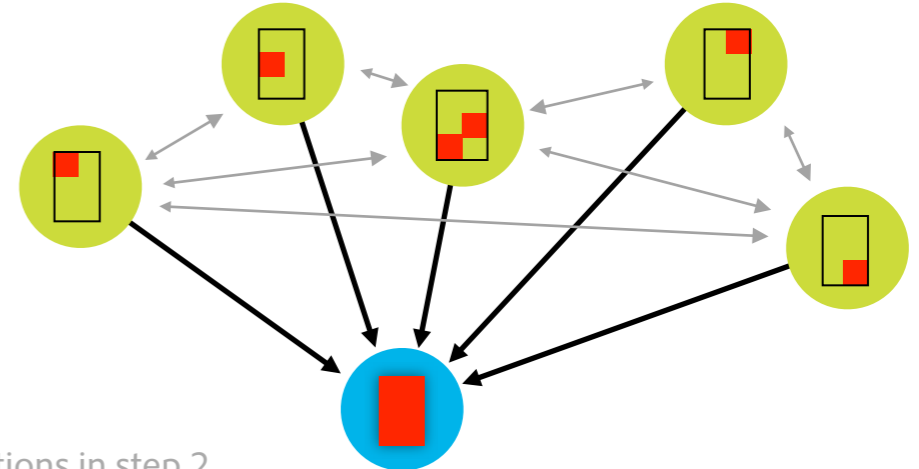
- Live streaming
- Document delivery



"Swarming"

many-to-many

- Large-file download (possibly progressive)

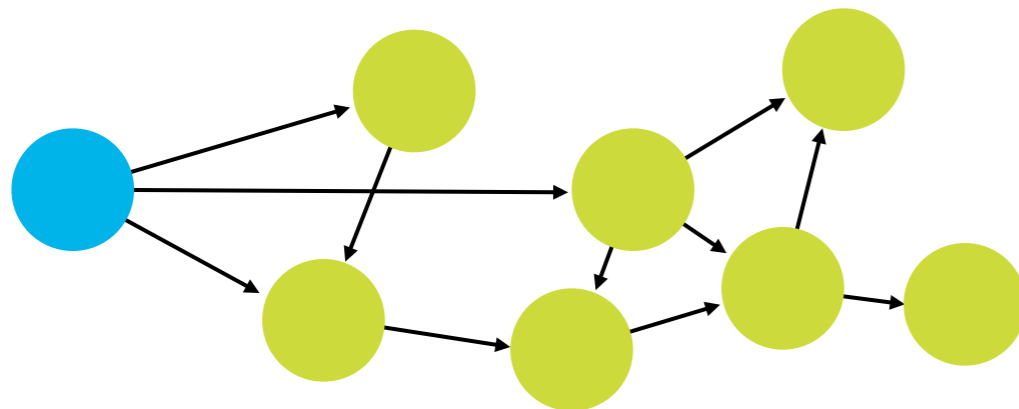


*Connections in step 2

Live Application-Level Multicast

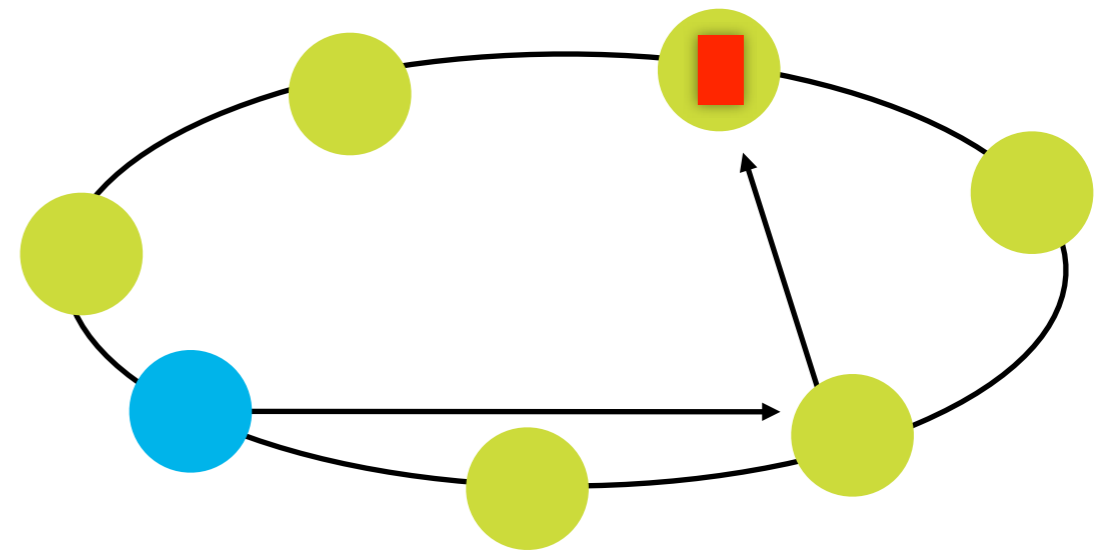
one-to-many

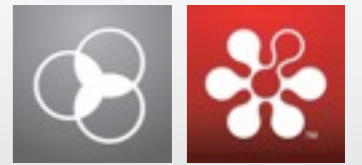
- Broadcast (1 to many, some latency tolerable)
- Interactive (many to many, or 1 to many with feedback, low latency required)



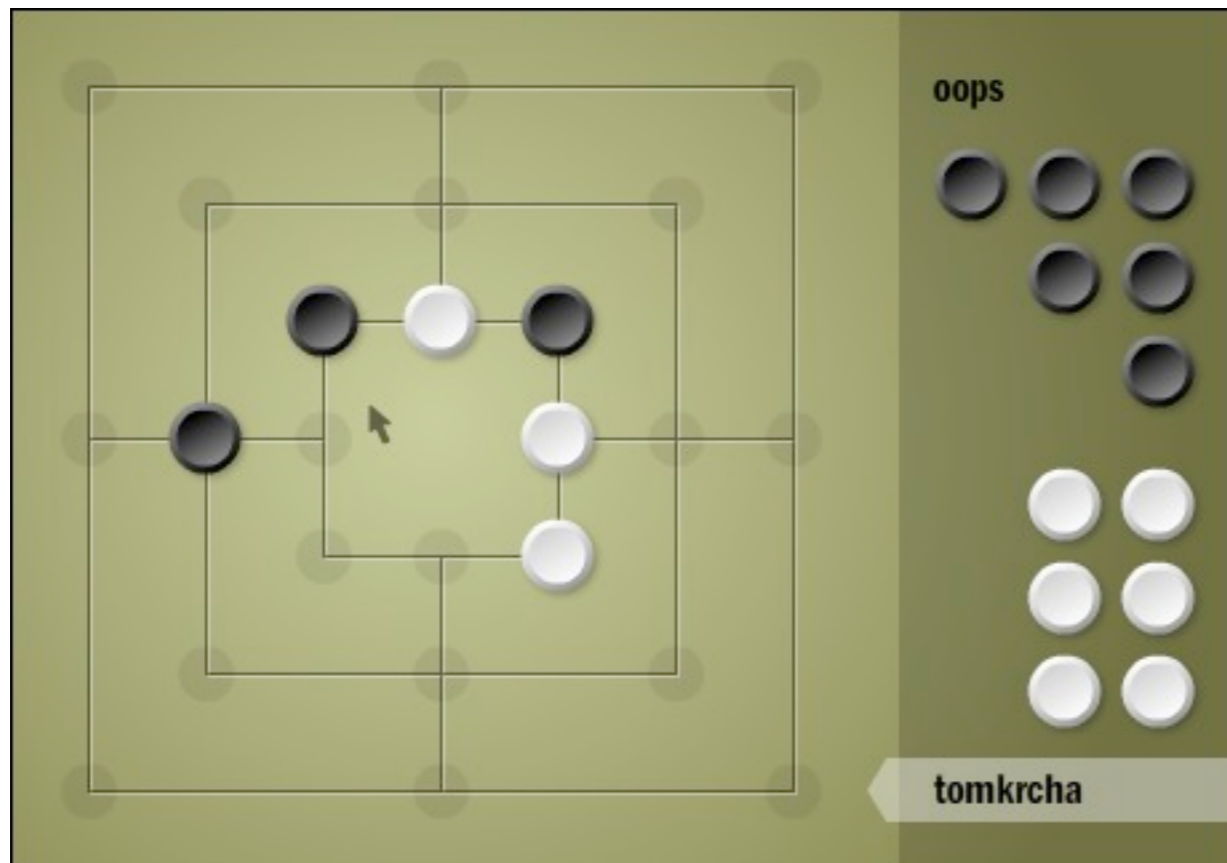
Distributed Data Storage (distributed hash table)

- DHT-like structures to form distributed database





Demo game - MILL

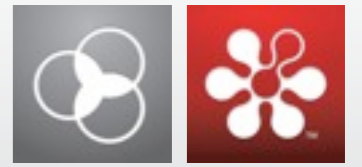


Author

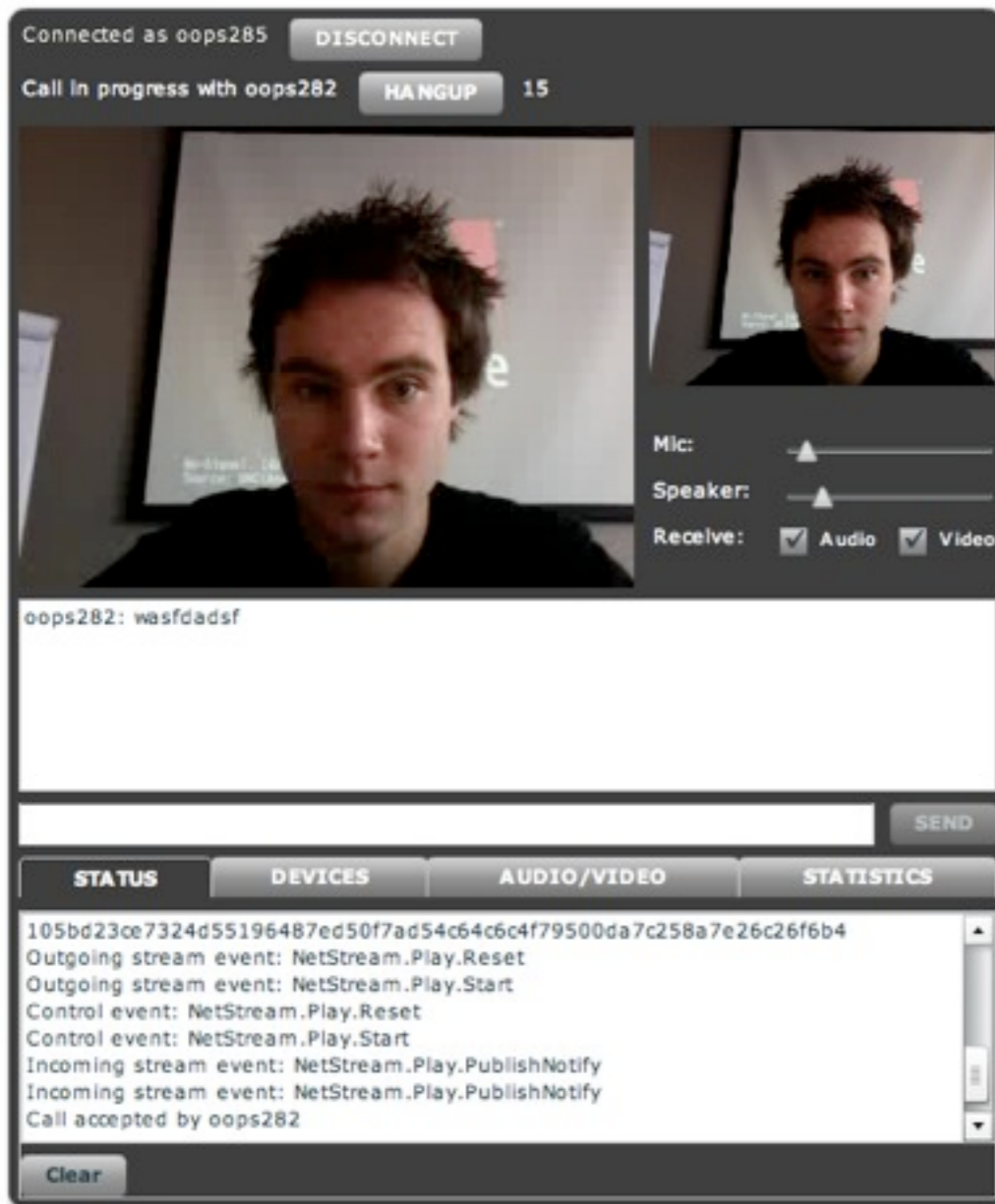
Pavel Šimek, Geewa
Czech Republic

<http://nestor.cz/mill/>

Peer-to-peer in Flash Player



Demo app - Phone

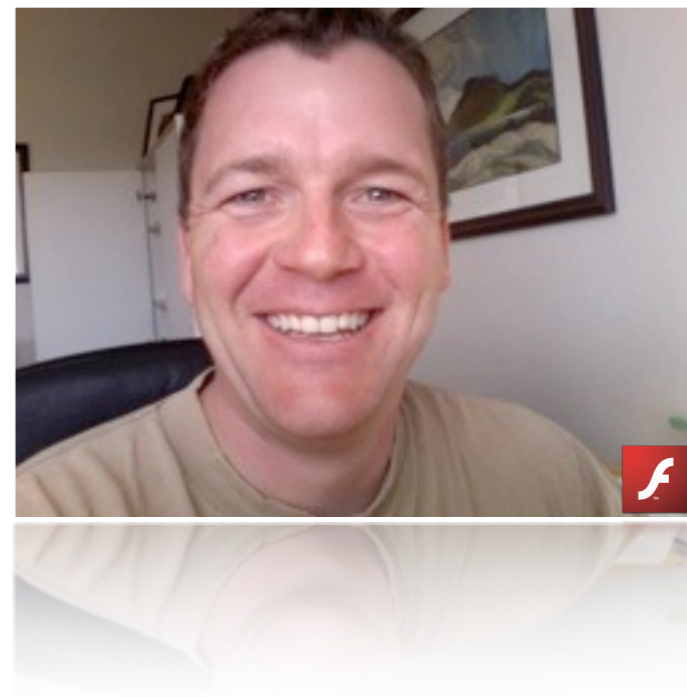
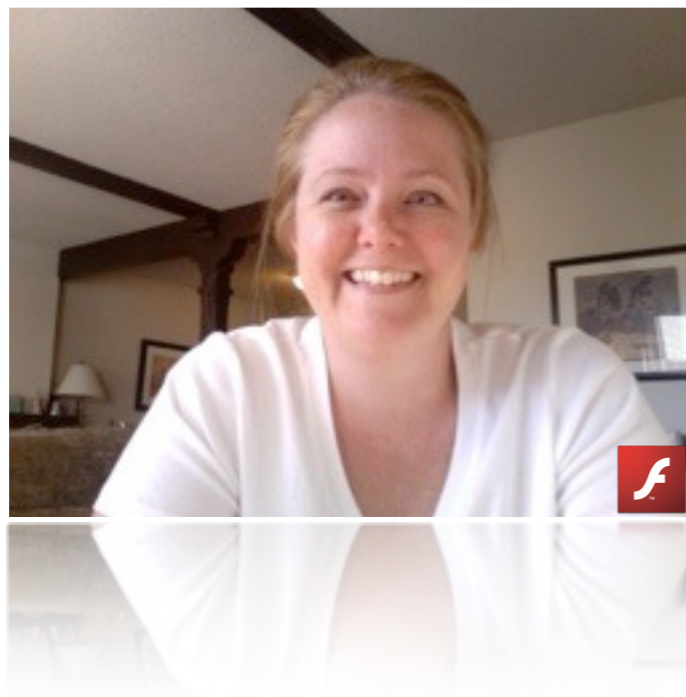


<http://labs.adobe.com/technologies/stratus/samples/>

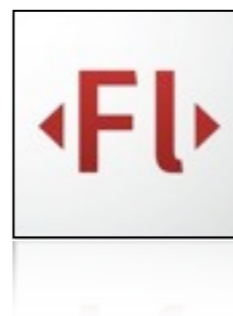


Creating Real Time Experiences with Flash

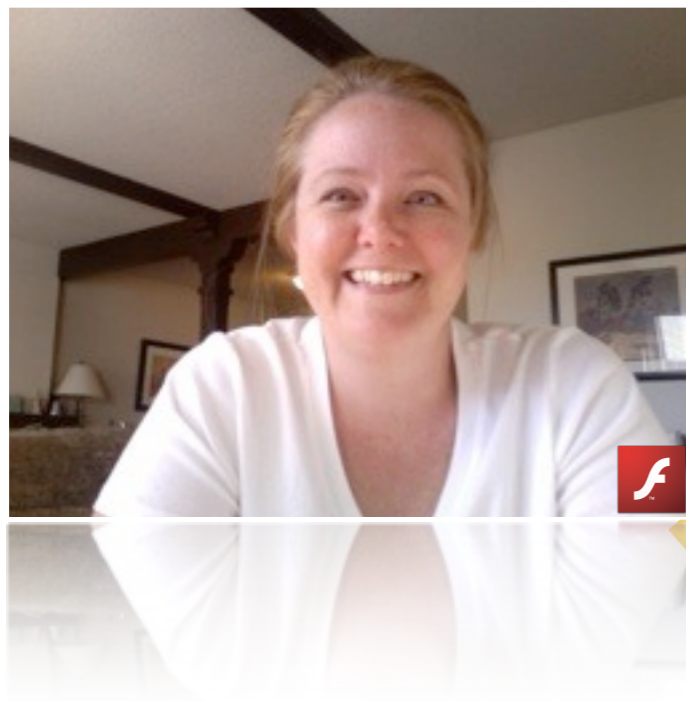
Creating Real Time Experiences with Flash



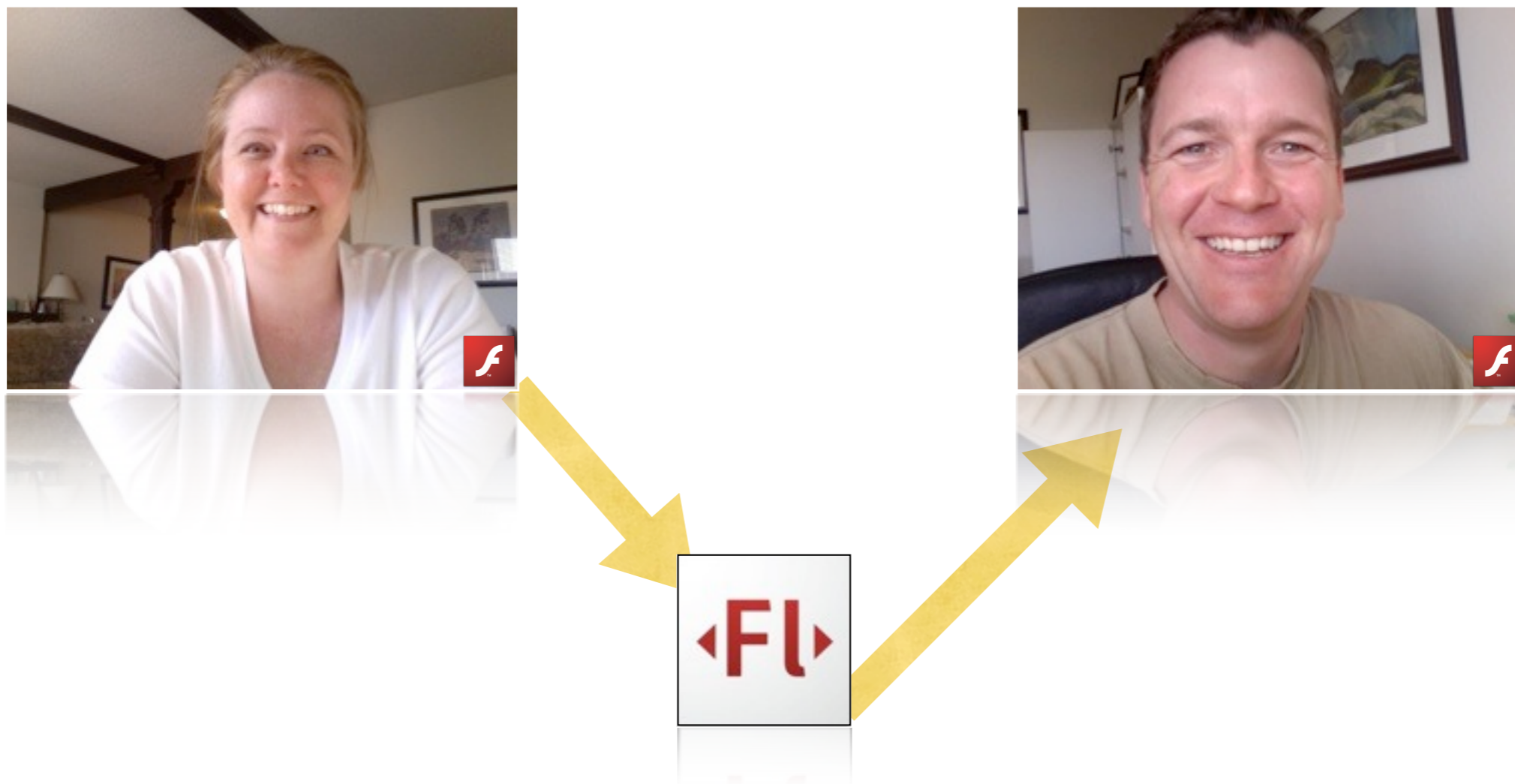
Creating Real Time Experiences with Flash



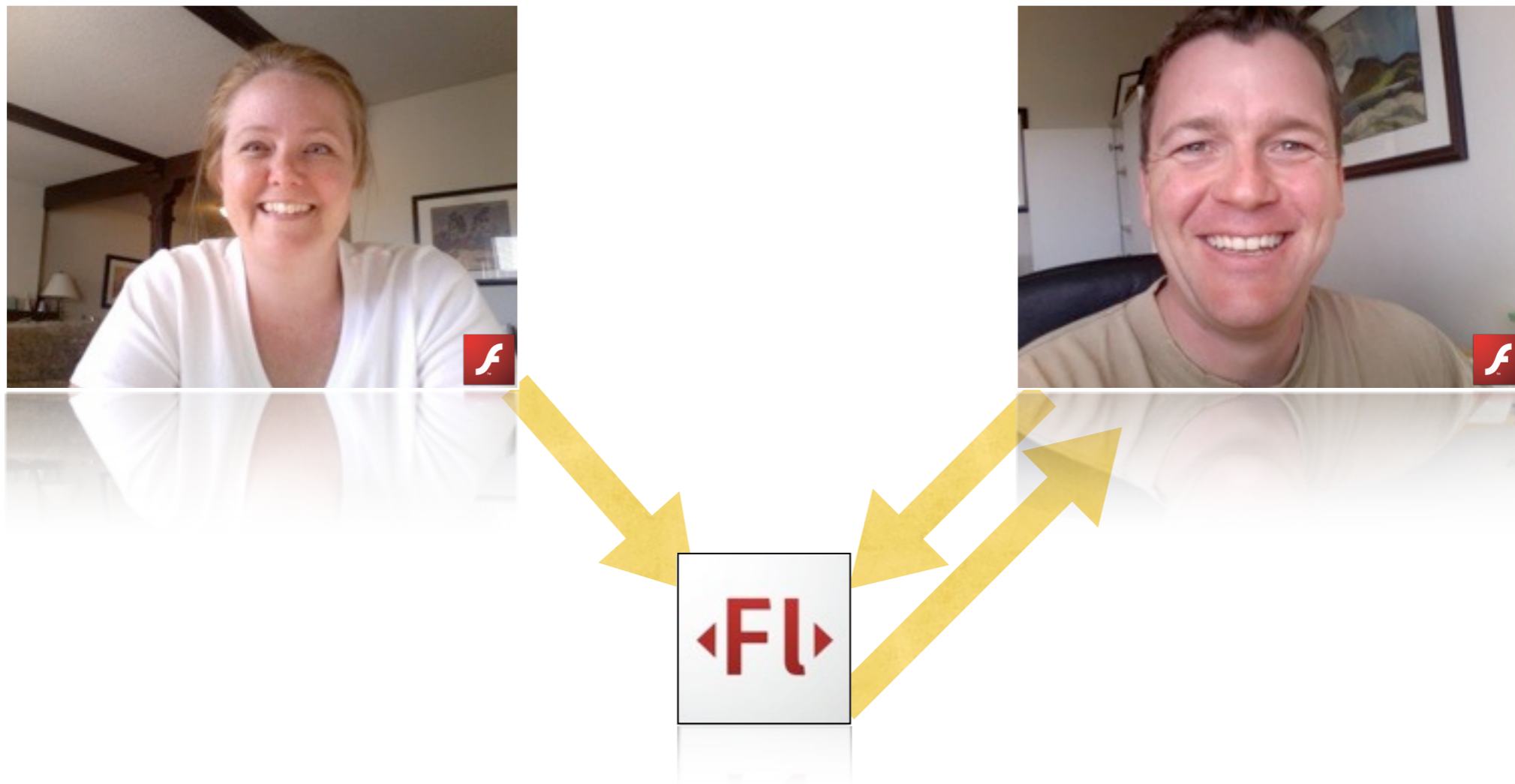
Creating Real Time Experiences with Flash



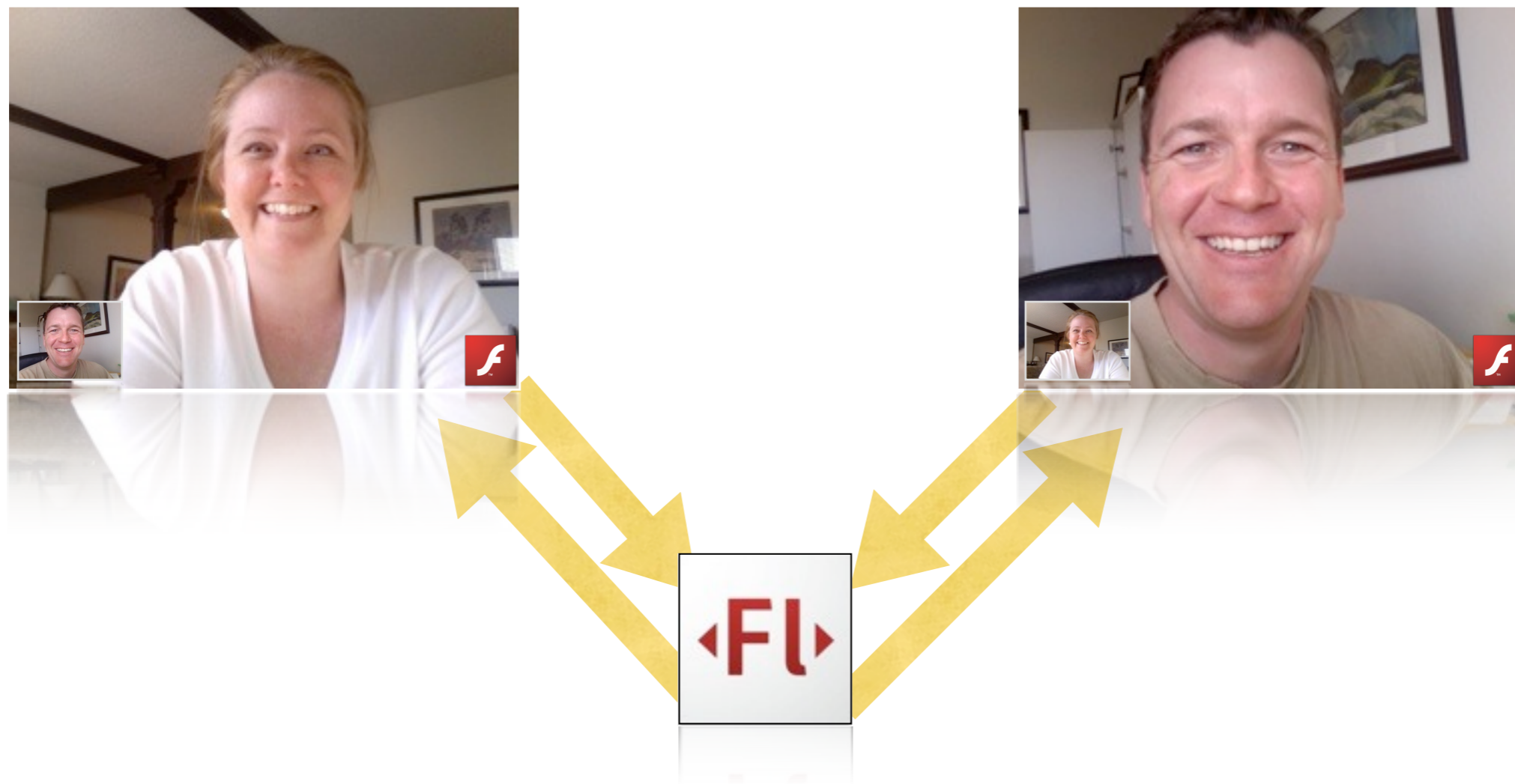
Creating Real Time Experiences with Flash



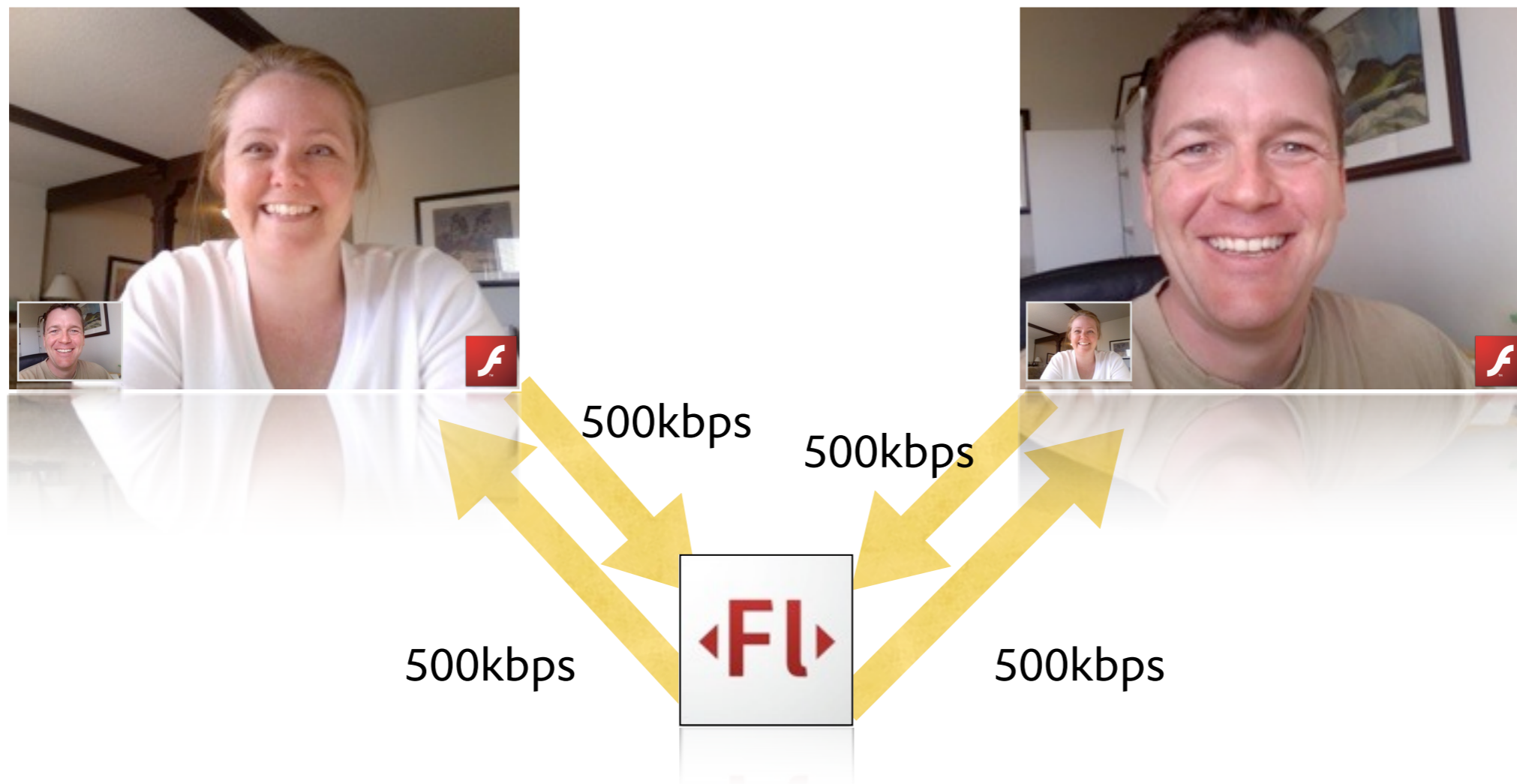
Creating Real Time Experiences with Flash



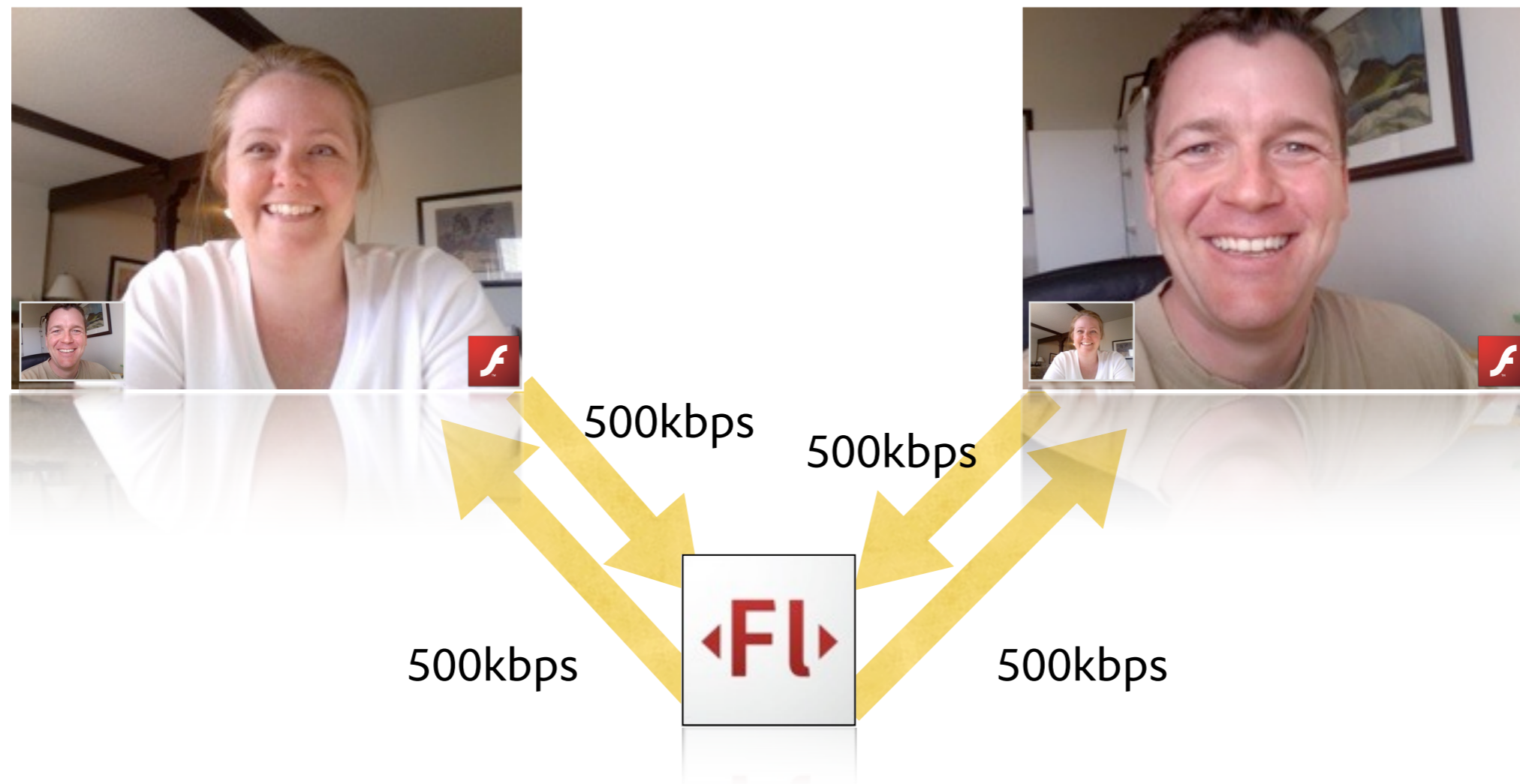
Creating Real Time Experiences with Flash



Creating Real Time Experiences with Flash



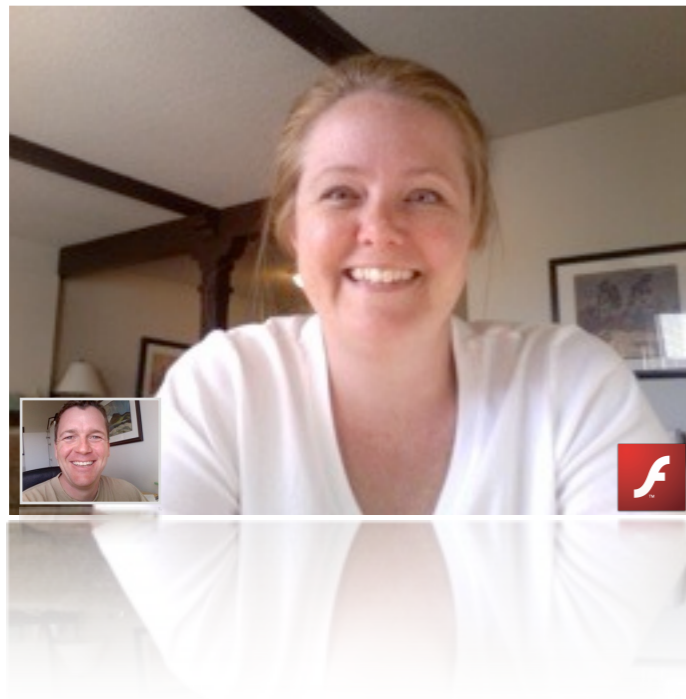
Creating Real Time Experiences with Flash



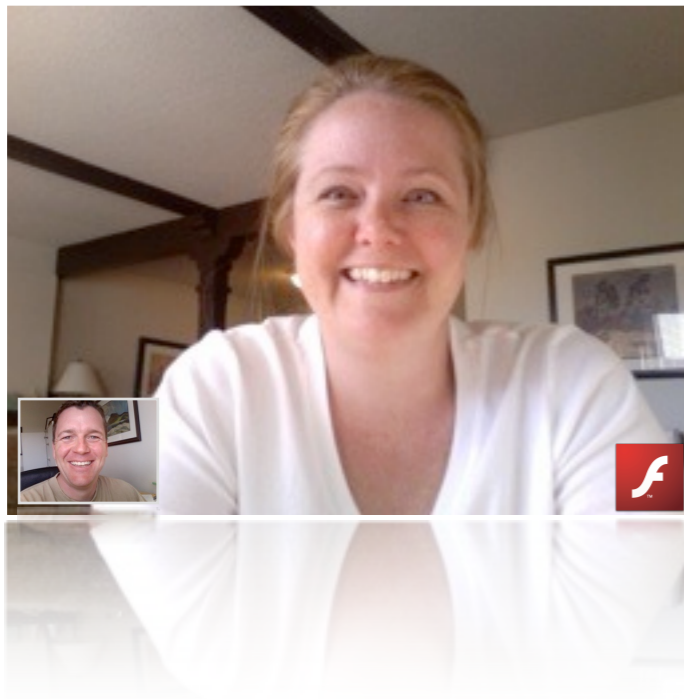
Server will receive 1Mbps and send 1Mbps
After 10 minutes: $37\text{MB}/\text{stream} = 148\text{MB}$



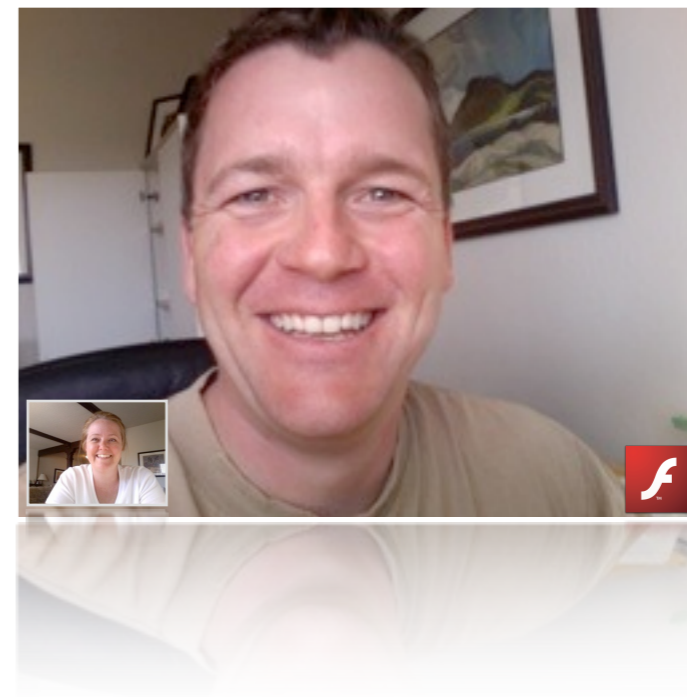
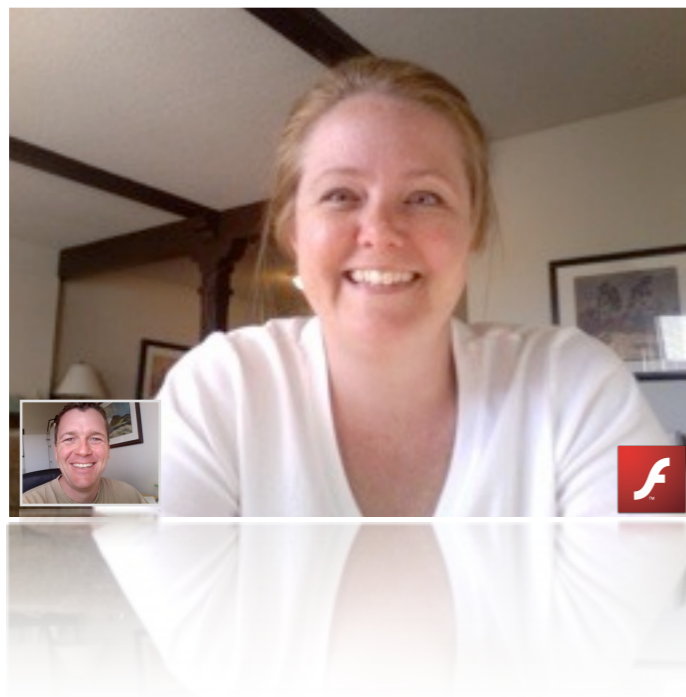
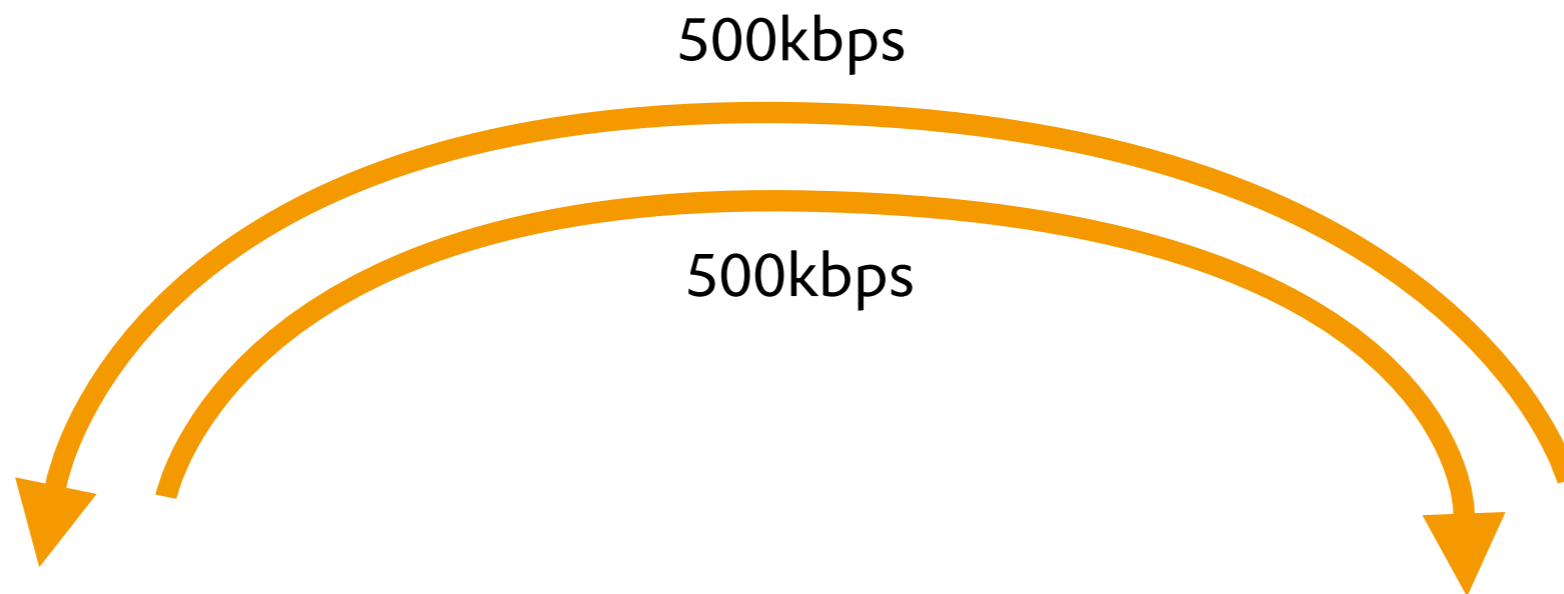
Creating Real Time Experiences with Flash



Creating Real Time Experiences with Flash



Creating Real Time Experiences with Flash

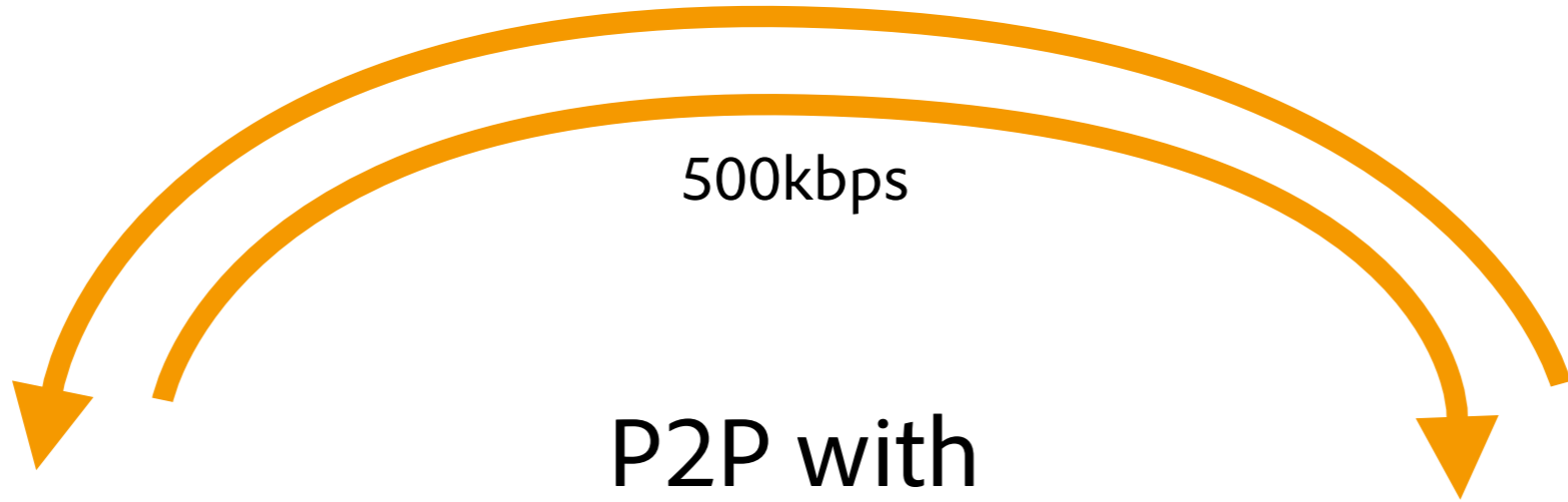


Creating Real Time Experiences with Flash

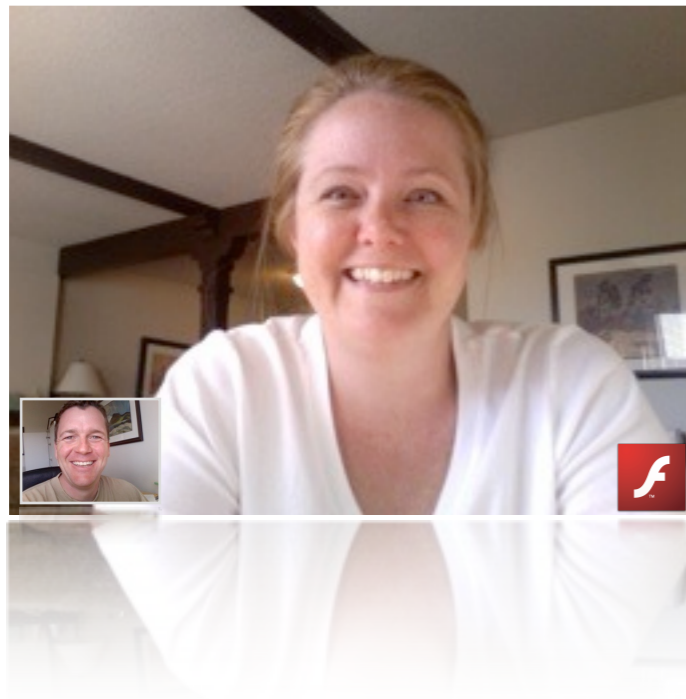


500kbps

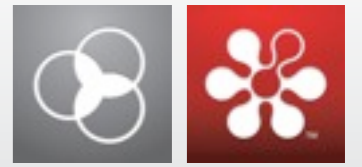
500kbps



P2P with
Adobe Stratus



Creating Real Time Experiences with Flash



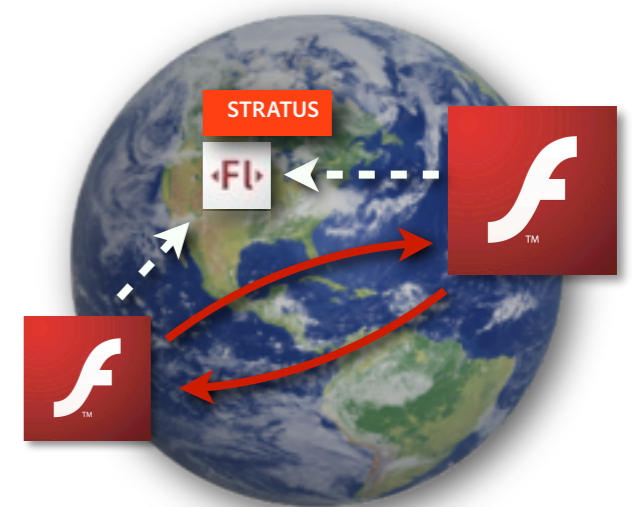
Hosted rendezvous service

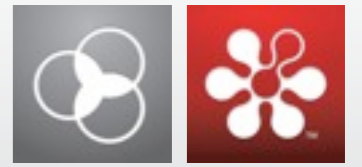
<rtmfp://stratus.adobe.com>

Looks like FMS, but...

- ▶ No client-server streaming
- ▶ No recording
- ▶ No server-side scripts or application logic
- ▶ Requires (free) developer key to connect

Emerging technology





RTMFP

- ▶ Real Time Media Flow Protocol
- ▶ Introduced in Flash Player 10 and upgraded in FP 10.1
- ▶ Based on UDP (lossy, better latency)
- ▶ Encrypted 128-bit AES
- ▶ Need to accept every incoming connection

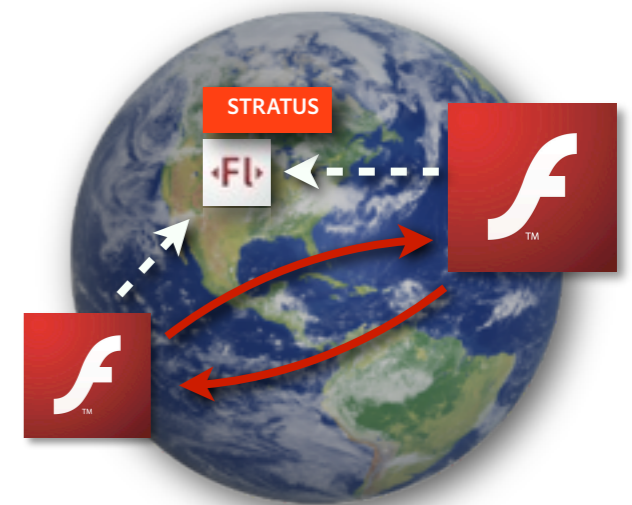
USE CASES

- ▶ Multiplayer games,
- ▶ VoIP
- ▶ Audio/Video
- ▶ Collaboration
- ▶ Chat

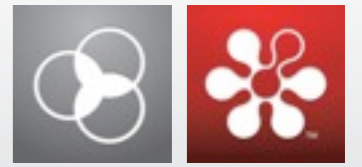
Firewall fallback to RTMP/T (Flash Media Server)

Adobe Stratus

Hosted rendezvous service
`rtmfp://stratus.adobe.com`

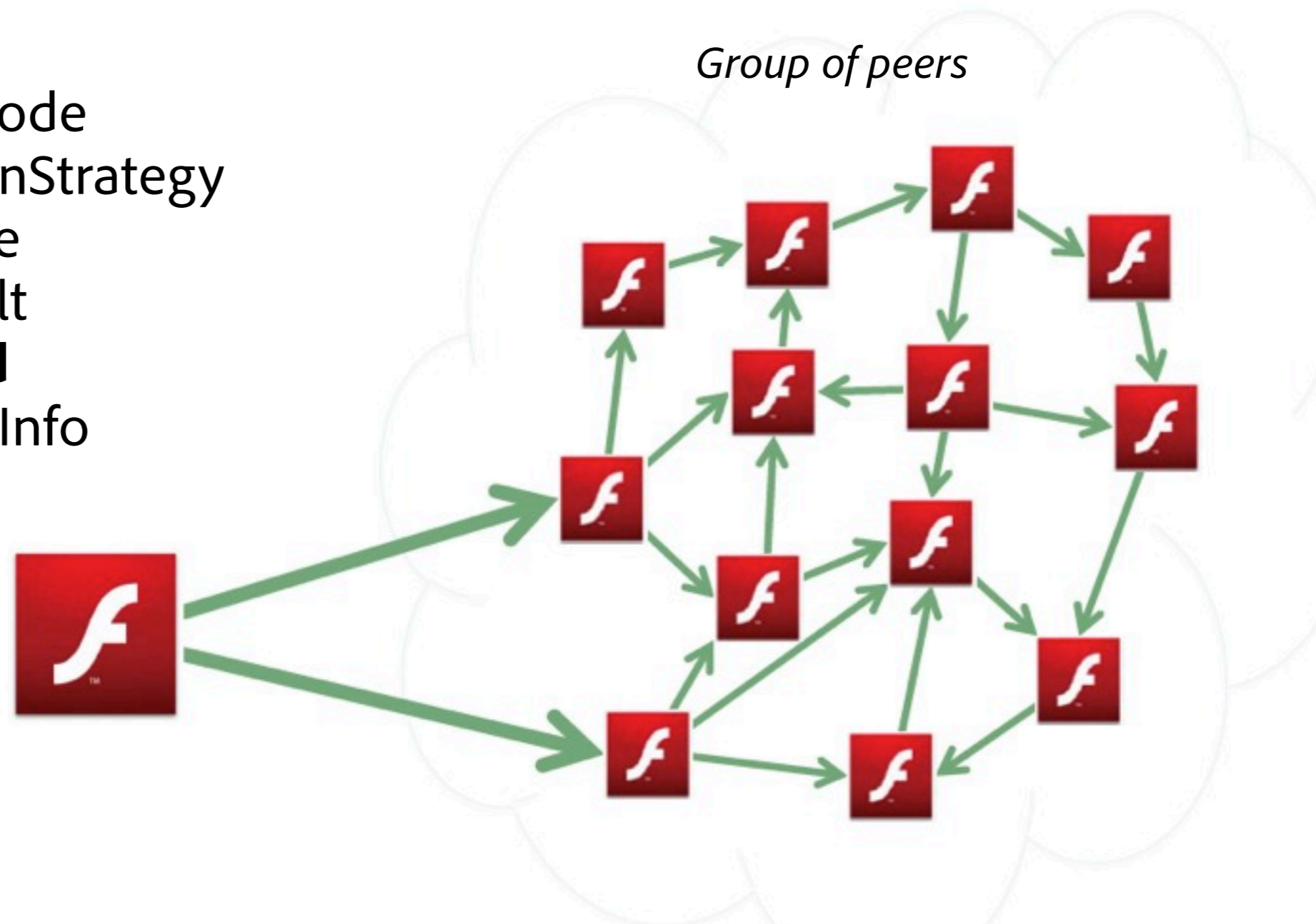


Demo: P2P point-to-point



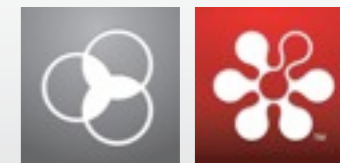
Groups & Multicast

- ▶ **GroupSpecifier**
- ▶ **NetGroup**
- ▶ **NetGroupInfo**
- ▶ **NetGroupReceiveMode**
- ▶ **NetGroupReplicationStrategy**
- ▶ **NetGroupSendMode**
- ▶ **NetGroupSendResult**
- ▶ **NetStream updated**
- ▶ **NetStreamMulticastInfo**



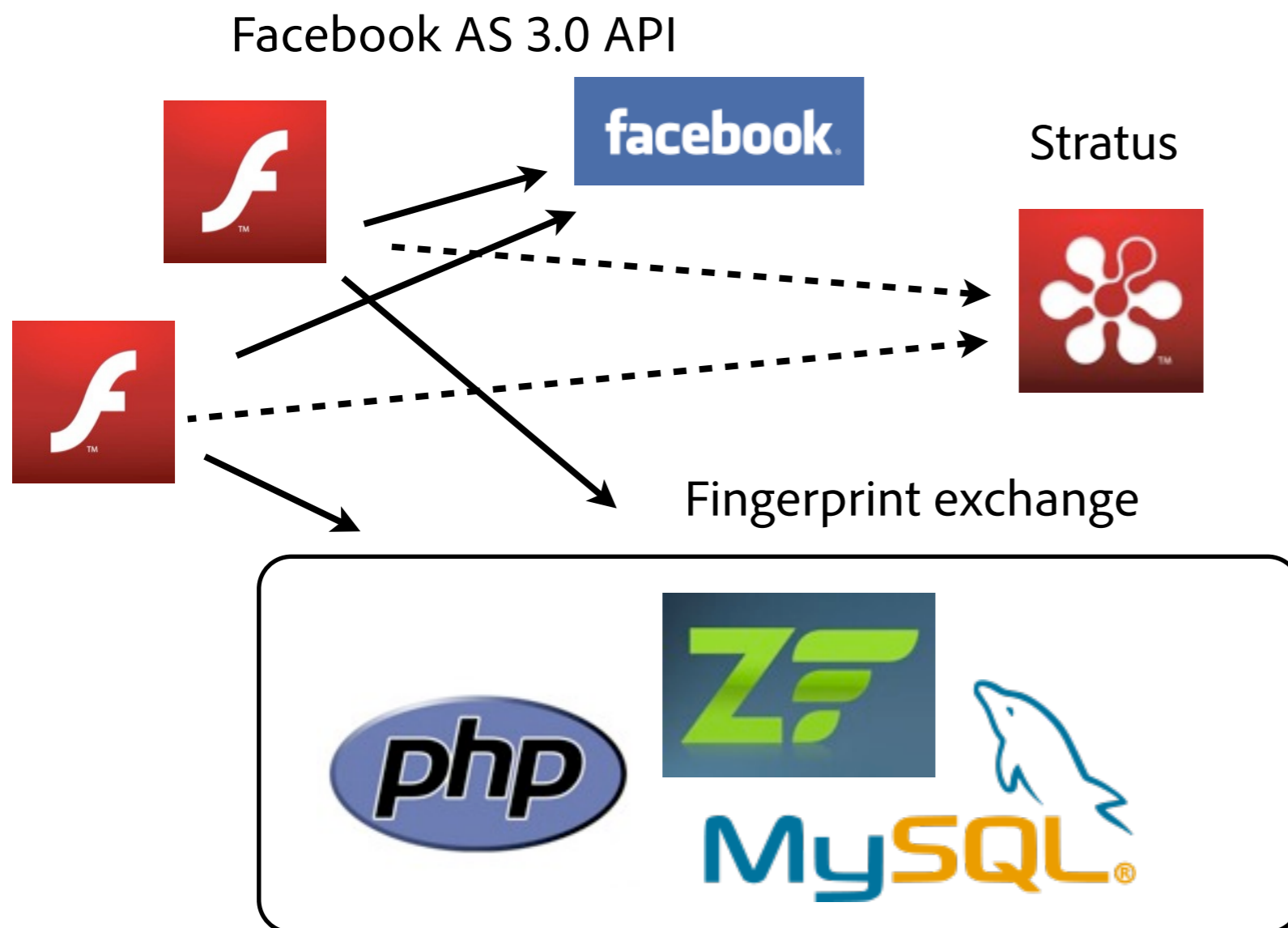
Demo: P2P Groups

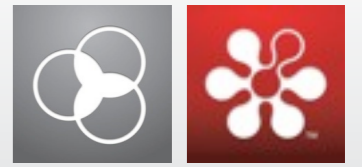
Deploying Flash P2P app to Facebook



Placing our P2P game to Facebook

- ▶ Login into our P2P app with Facebook login
- ▶ Exchange fingerprints
- ▶ Connect our friends and exchange data with them



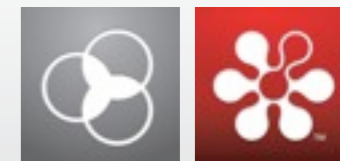


- ▶ Hosted service
- ▶ Flash Media Server architecture
- ▶ SDK for Flash Player 9 and 10
- ▶ Supports P2P
- ▶ Ready-made components
- ▶ Totally customizable
- ▶ Source available
- ▶ Roles and rights
- ▶ Flash only version (Flex-free) 55kB compiled
- ▶ AIR SDK Navigator
- ▶ Pricing available



SDK: <http://afcs.acrobat.com>

Acrobat.com Tables



ACROBAT.COM LABS Table Edit Insert View Help

Column Text

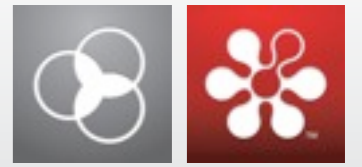
	A	B	C	D	E	F	G	H	I
	Some things to try with this sample:	Compar		Type	Industry	Project	Stage	Proj Size	Budg Com
1	Filter by Acct Mgr, Budget Committed, or other information	Earth To		Rich Media	Media	Tunes for You	Opportunity	\$35,000	
2	Filter on more than 1 column heading	Custom C		Rich Media	Media	Olympics Teaser	Proposal	\$5,000	
3	Unhide Column J (See video 3 for details)	Financial C		Web	Financial Services	Diamond Card	Opportunity	\$45,000	
4	Hover over J1 to see the formula	Custom C		Web	Media	News Alerts	Proposal	\$4,500	
5	See formulas in Columns J & K, and formulas in the Summary section	JSOI		Web	Services	Music Tutor	Opportunity	\$67,500	
6	Scroll down to see Summary row information	Darby		Web	Media	Desktop Poker	Opportunity	\$65,000	
7	Check off Budget Committed; see totals change	Earth Touch		Web	Publishing	Early Reader Program	Lead	\$8,000	
8	Add some rows & then add some data	JSOI	Rein	Gaming	Media	School Time Online	Proposal	\$34,000	
9	Share this table & give it a spin with a friend	Global Retail	Qualizza	Productivity	Retail	Check My Order	Proposal	\$75,000	
10	Create your own table & share it with your team	Earth Touch Pubs	Hickey	Rich Media	Media	Top 100 Video	Lead	\$56,500	
11	Click Help to learn more	JSOI	Woodmansee	Rich Media	High Tech	Atlas Program	Lead	\$10,000	
12	Send us feedback	JSOI	Dolgov	Rich Media	Media	Mkt Research Outreach	Opportunity	\$34,000	
13		Darby	Stanziano	Web	Media	Express Sports Scores	Opportunity	\$66,000	
14		Custom Comm	Hickey	Web	High Tech	Picture Sharing	Contract	\$45,000	
15		Airlines Inc	Dulaney	Web	Transportation	Travel Alerts	Opportunity	\$45,000	
16		Darby	Qualizza	Web	Media	Latest Baseball Scores	Contract	\$45,500	
17		Darby	Rein	Gaming	Media	Gamer's Heaven	Contract	\$98,000	
18		Substrate Corp	DeHoyos	Social network	Publishing	Yankees vs RedSox	Opportunity	\$45,000	

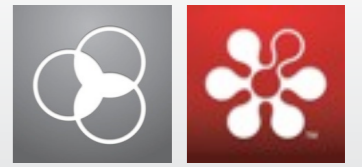
Deals with Budget 8

Share Josh Lowensohn Author viewing

- Sort A - Z
- Sort Z - A
- Copy Column
- Paste Column
- Insert Column
- Delete Column
- Filter...
- Hide Column
- Unhide

Rosetta Stone TOTALE

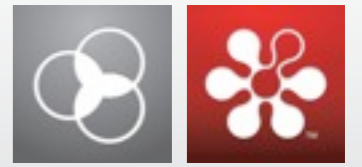




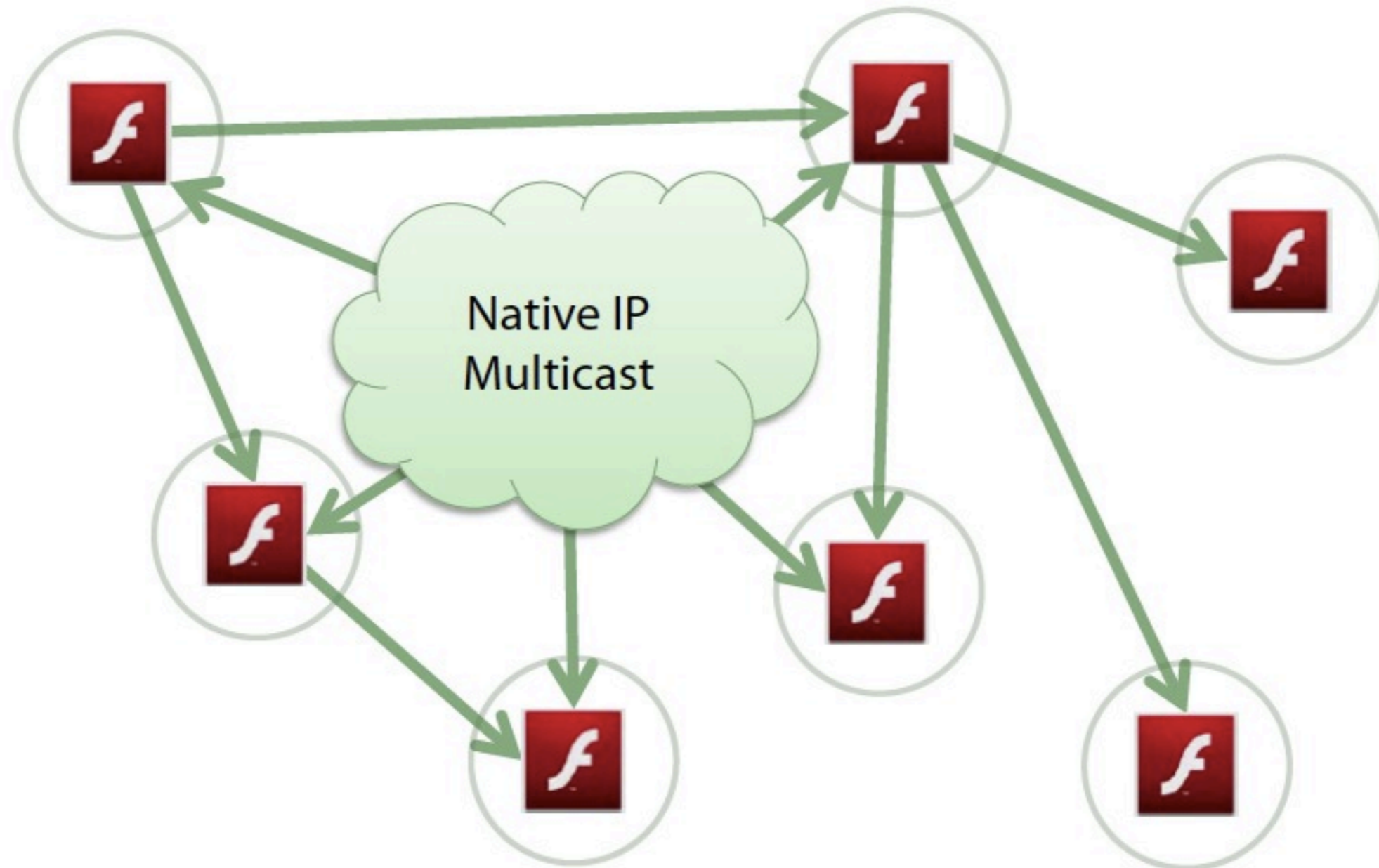
- ▶ only for Audio/Video
- ▶ if someone in the room can't use P2P
 - ▶ then everybody is switched to hub-and-spoke
- ▶ set protocol to "rtmfp" instead of "rtmp"
- ▶ in future it will be automatic



SDK: <http://afcs.acrobat.com>



Advanced Multicast, Security, Managing NetGroup, Future FMS



Q/A

<http://twitter.com/tomkrcha>