Trial of AMT Technology: AT&T and Major League Gaming (MLG)

March 30, 2011

Goal of Multicast Pilot

Demonstrate both internally and to external customers that AMT Multicast is ready to become a scaled, production content distribution service

- AMT Multicast is a more efficient delivery service for both AT&T (network) and the content provider (servers)

- Incremental work by the content provider is more than justified in cost and operations efficiencies

- End user experience is transparent with multicast delivery vs. unicast delivery
  - No additional help desk calls/emails/chats

- End user performance is as good or better with multicast delivery vs. unicast delivery

Pilot Trial Overview

- Pilot was with an external customer MLG – and partner Octoshape

- Multicast source and download manager plug-in were the responsibility of the partner (Octoshape)

    – Octoshape provided the AMT GW in their plug-in client and the end user support

    – Octoshape was responsible for the distribution of the client

    – Error detection/correction was the responsibility of the download manager

- Network multicast and AMT Relay were the responsibility of AT&T

- No authentication/authorization was required on the content delivery

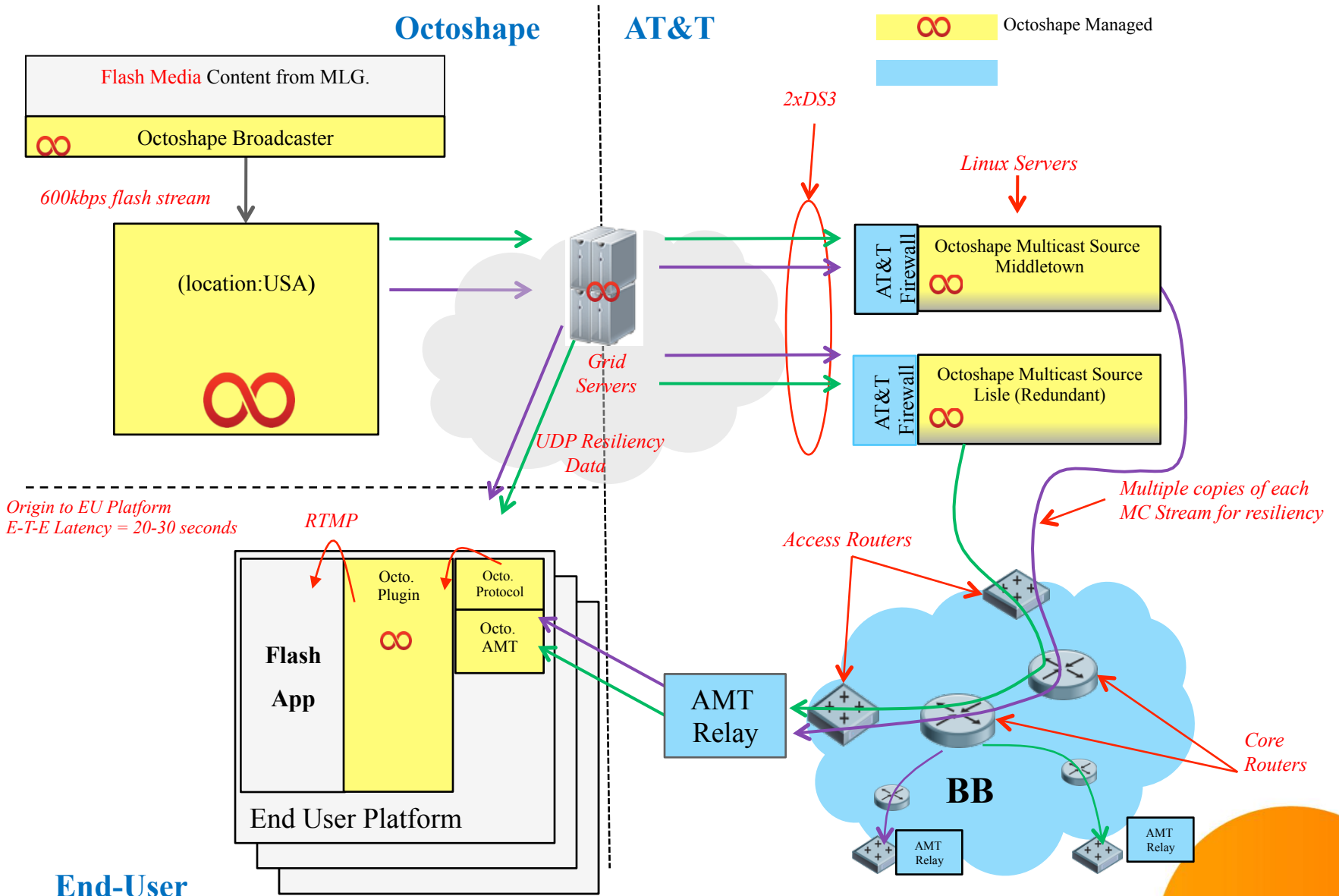- Octoshape collected W3C files from the clients

Major League Gaming Event

- Competition among video gamers November 5 & 6, 2010, in Dallas, Texas

- US-based event, with international internet audience (approximately half from the United States)

- MLG Website provided live streaming of competition:
  - Total of 8 simultaneous streams – 4 free and 4 paid
  - The lower bandwidth (600Kb/s) streams were offered free
  - The higher bandwidth (1.2-1.5 Mb/s) streams are pay-to-view

- MLG provided one (free) 600 Kbps stream for multicast delivery
  - Octoshape provided the content sources, grid technology, clients, and service features
  - AT&T provided the AMT Relays and multicast distribution

- Benefits of MLG event
  - Low risk test of AMT multicast capabilities

Architecture

Octoshape

AT&T

Octoshape Managed

Flash Media Content from MLG.

Octoshape Broadcaster

600kbps flash stream

(location:USA)

2xDS3

Linux Servers

AT&T Firewall

Octoshape Multicast Source Middletown

AT&T Firewall

Octoshape Multicast Source Lisle (Redundant)

Grid Servers

UDP Resiliency Data

Multiple copies of each MC Stream for resiliency

Origin to EU Platform
E-T-E Latency = 20-30 seconds

RTMP

Access Routers

Octo. Plugin

Octo. Protocol

Octo. AMT

Flash App

End User Platform

AMT Relay

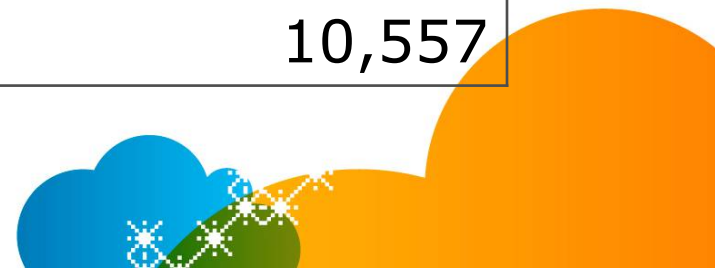Core Routers

BB

AMT Relay

AMT Relay

End-User

Major League Gaming Pilot Statistics

- November 5 & 6, 2010, in Dallas, Texas
- MLG provided one 600 Kbps stream for multicast delivery
- Octoshape responsible for non-multicast delivery
- 3 AMT Relays, 2 Multicast Sources

Unique Users	19,192
Peak Users	1,765
Peak Multicast Users	1,686
Total Multicast Sessions	77,246*
Peak AMT Unicast Streams	3,372
Peak Outbound Relay Traffic	642 Mbps
Average Session Duration	13min 41sec
Average Unique User Time	33min 0sec
Total User Hours	10,557

* With Octoshape technology each end point had 2 multicast sessions

Major League Gaming Pilot Summary

Pilot Objective	MLG Result
AMT multicast is a more efficient delivery mechanism for the AT&T Network and for Content Provider/CDN	1970 GB delivered multicast 768 GB delivered unicast, grid server, peer to peer (Note: this ratio of multicast to unicast is dictated by Octoshape's resilient delivery technology and not by the inherent capabilities of multicast.)
No impediments that would prevent scaling of AMT relays	None identified
No impediments that would prevent scaling of streams	None identified
End user experience is as good as or better than unicast delivery	No difference in start times No difference in session duration
End user performance is as good as or better than unicast delivery	No differences in packet loss/errors
No additional help desk contact from end users	No reported end user problems
High percentage of end users can receive multicast	95.5% of end points able to receive multicast delivery

MLG Pilot End-Point Platforms

OS	Unique Users	Percentage
Windows 7	9900	47%
Windows Vista	4458	23%
Windows XP	4091	21%
Mac OS X	1684	9%
Other	100	<1%

Geographic Distribution (104 Countries)

Country	Unique Users	Percentage
United States	9958	52.0%
Canada	1762	9.2%
Denmark	1174	6.1%
United Kingdom	950	4.9%
Other	5,348	27.8%