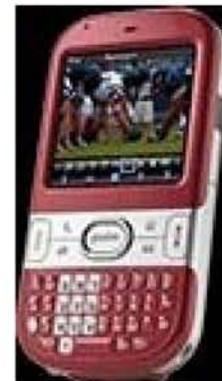




Sling Presentation to FCC November 2009



Overview

- SlingPlayer Mobile provides consumers with a user-friendly and affordable means to view home television programming on a number of different smartphones, using any type of high-speed Internet connection.
- Sling's technology is uniquely designed to help address network congestion issues.
 - One of the key advances in the SlingPlayer Mobile application is the ability to calibrate the video quality in real time to match the available network capacity.
 - Part of that optimization process involves the adjustment of frame rate, bit rate, and video resolution to address network congestion.

Rejection of SlingPlayer Mobile

- The rejection of SlingPlayer Mobile for 3G use on the iPhone by Apple/AT&T warrants close scrutiny.
- SlingPlayer Mobile is available on other devices and other networks.
- Apple and AT&T are the "gatekeepers" of what content can and cannot be used.
- Consumers should not be denied access to desirable applications, when comparable (if not more bandwidth-intensive) affiliated applications are permitted.

AT&T Response to
Wireless Telecommunications Bureau Letter
August 21, 2009

“AT&T’s terms and conditions for 2G and 3G mobile wireless data service prohibit ‘uses that cause extreme network capacity issues’ and expressly identify ‘redirecting television signals for viewing on Personal Computers’ as such a use.”

“In contrast to some video applications, today’s television redirection applications typically do not make any attempt to minimize the frame rate of the content (and thus network usage) in order to reduce network congestion.”

Bit Rate is the important measurement, not frame rate

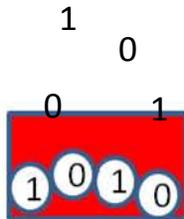
1	0			1	0			1	0	Stream 1
0	1			0	1			0	1	3 Frames / Sec.
										12 Bits / Sec.

0	1	0	0		0	1	0	0	Stream 2
1	0	1	1		1	0	1	1	2 Frames / Sec.
1	0	1	0		1	0	1	0	24 Bits / Sec.

Stream 2 puts more bits on the network at a given time, so it creates more network congestion even though its frame rate is lower.

SlingStream Bitrate Management

Video Source



0 1 0 0
 1 0 1 1
 0 1 0 0
 1 0 1 0
 1 1 1
 0 1 0
 1 0
 0 1

Video Buffer

1 0
 0 1

Slingbox

Here the Video Buffer is filling up because of network congestion, so SlingStream will create smaller frames with less bits in them.

Video Buffer is full into the Red Zone

Cell Phone

Cellular Network

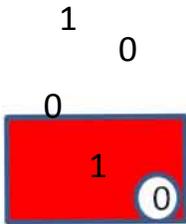
SlingPlayer Mobile

1 0
 0 1

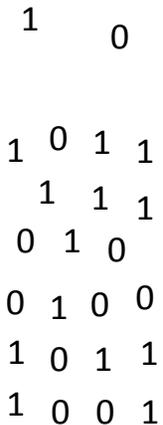
1 0
 0 1

SlingStream Bitrate Management

Video Source



Video Buffer



Slingbox

Here the Video Buffer is nearly empty because the network is running smoothly, so SlingStream will create bigger frames with more bits in them.

Video Buffer is full into the Green Zone

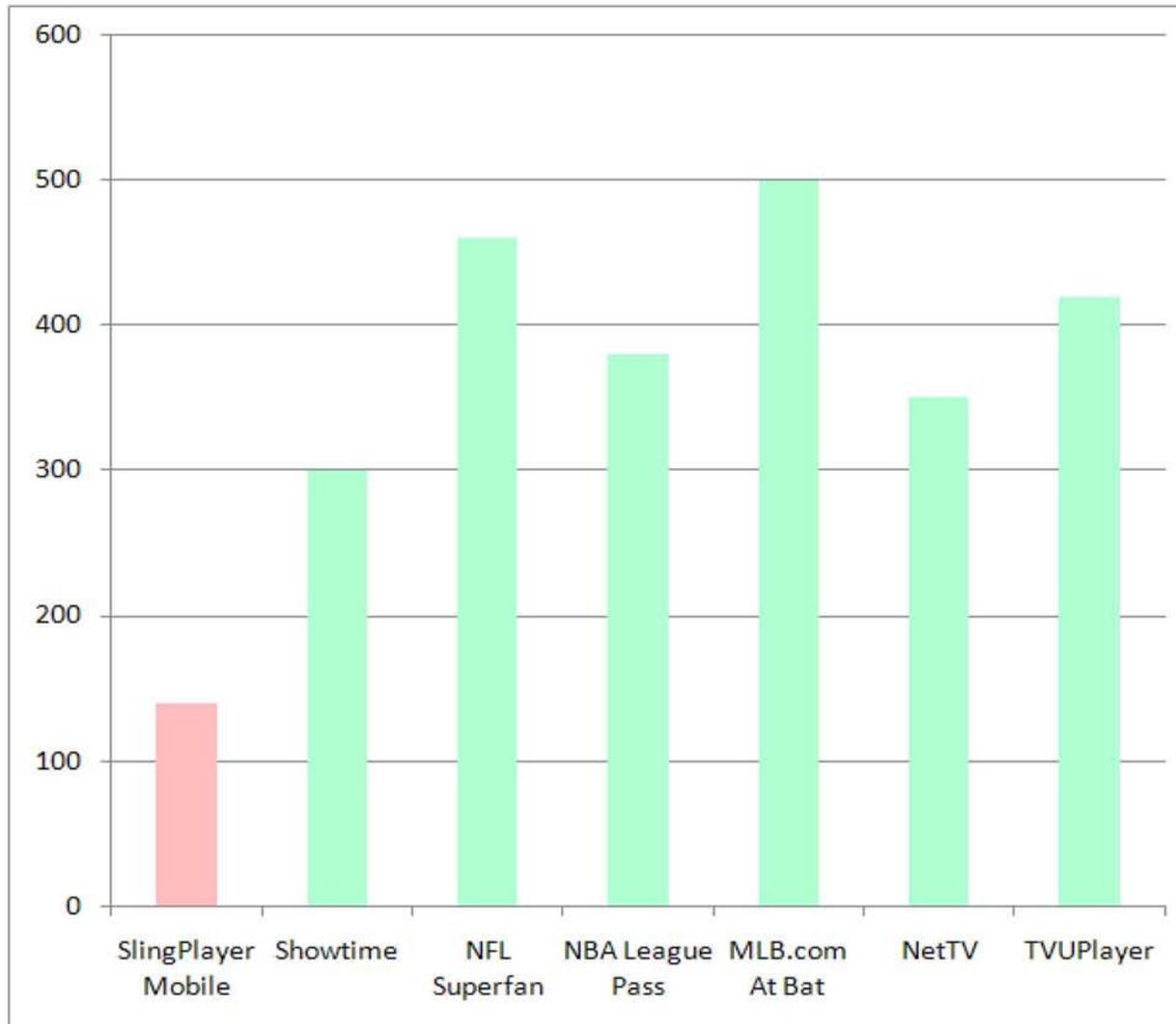
Cell Phone

Cellular Network

SlingPlayer Mobile



iPhone TV Apps Comparison: Kilo-Bits per Second



Green = Approved by AT&T / Apple
Red = Rejected by AT&T / Apple

iPhone TV Apps Comparison

Developer	Application Name	Content Shown	iPhone AT&T 3G Bitrate
Major League Baseball	MLB.com At Bat	Live MLB games	500 kbps
DirecTV	NFL Superfan	Live NFL games	460 kbps
MobiTV	NBA League Pass	Live NBA games	380 kbps
Showtime Networks	Showtime	Full length episodes of original Showtime programming such as Dexter and Nurse Jackie Live TV programming from 300 channels worldwide, including CBS and Spike in the US	300 kbps
TVU Networks	TVUPlayer	Live TV programming from 200 channels worldwide, including MSNBC in the US	CBS: 420 kbps Spike: 351 kbps
Chestnut Soft	NetTV	Live TV programming from the user's home TV	MSNBC: 350 kbps
Sling Media	SlingPlayer Mobile		140 kbps

Green = Approved by AT&T / Apple
 Red = Rejected by AT&T / Apple

How Do We Know An Application's Bitrate?

It's available in the Settings on the iPhone:



- 1) Tap Settings
- 2) Tap General
- 3) Tap Usage and scroll to bottom
- 4) $1 \text{ MB} / \text{minute of streaming} = 133 \text{ kilo-bits} / \text{second}$
- 5) Don't forget to tap the 'Reset Statistics' button between tests

Conclusion

- Sling users have paid for their content and should be able to access it on any device.
- “Redirected” TV consumes no more bandwidth than TV from any other source.
- In fact, Sling’s technology is uniquely designed to help address network congestion issues.
- All applications should be treated in a nondiscriminatory manner.