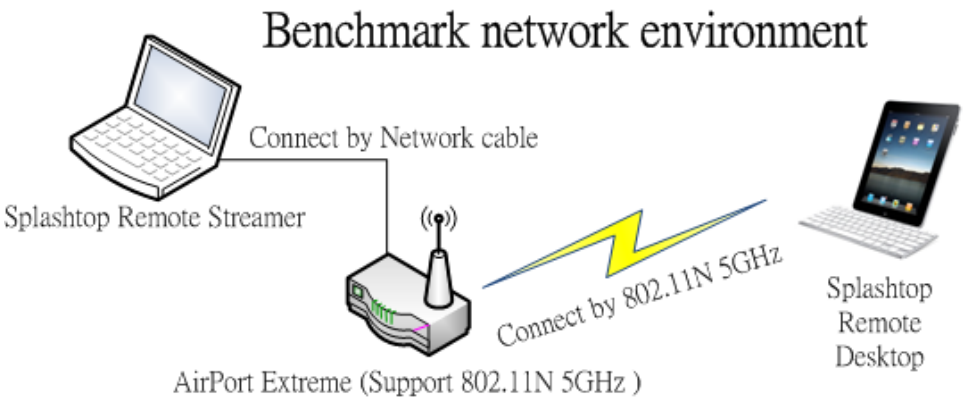
Benchmarking of Splashtop Video Performance

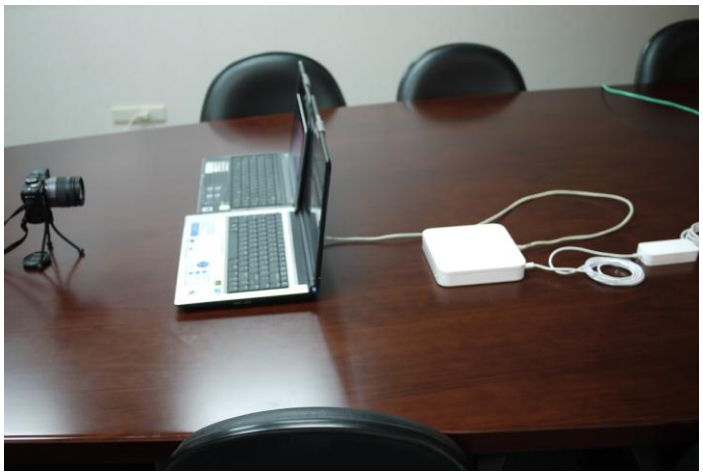
June 14, 2011

Splashtop conducted several in-house benchmarking tests on the video performance of Splashtop Remote Desktop and two competing products. Results show Splashtop to have superior video performance across several important metrics, reflecting the enhanced visual experience reported by users.

THE SETUP



- **Wi-Fi Router**: Apple Airport Extreme (5GHz capable)
- **Media Content Server**: ASUS F8SV (Core2 Duo CPU/NVIDIA GeForce graphics card)
- **Client Device**: iPad 2
- **High-Speed Camcorders**:
  - Panasonic GF1
  - Casio FH100 (capable of 120fps video capture)
- **Source Video**:
  - Windows 7 sample video (wildlife.wmv)
  - Stopwatch video (30fps, with frame#/second# shown on screen)



BENCHMARKING PROCEDURE

- Connect media content server with Apple Airport Extreme through LAN
- Connect iPad 2 with Apple Airport Extreme through 5GHz band WLAN
- Play both wildlife.wmv and stopwatch videos on media content server at the same time (wildlife.wmv in full screen/background, stopwatch video on top-right corner, overlapping wildlife.wmv)
- Use camcorder to capture screens/videos of both server and client

ANALYSIS

We analyzed:

1) The frame rate in frames per second.
2) The latency in frames and milliseconds over a period of 1 second and 30 seconds.
3) The number of frames it took to transition from one distinct scene to a completely difference scene.

For the frame rate, we recorded the frame number displayed on each screen and took the average rate for three different one-second slots (e.g. 5^{th}, 15^{th}, 25^{th}).

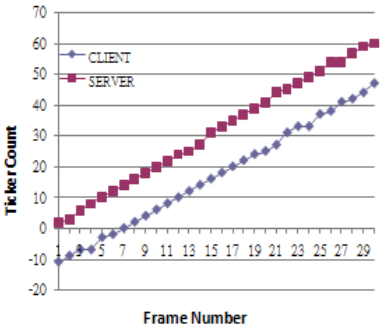
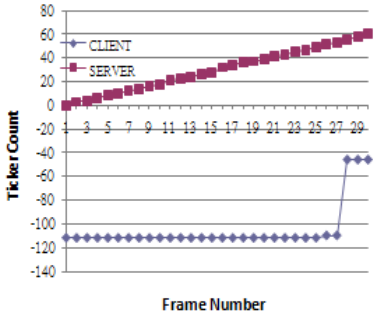
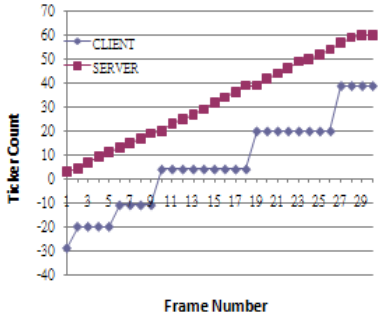
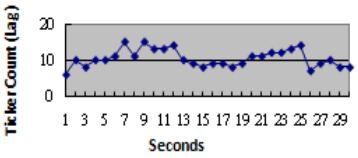
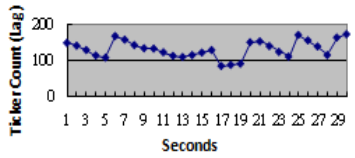
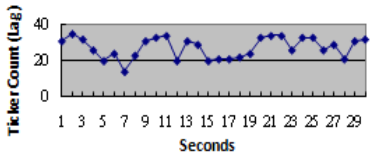
For latency, we observed:

1) The frame number shown on screen of both the server and client within a one-second period.
2) The first frame of every second, and plotted the frame number shown on screen for both the server and the client. These were based on recordings with a camcorder set at 30 frames per second.

For the number of frames to transition, we observed the test video to see how many frames were required to transition from one scene to a different scene based on the test video captured with a camcorder set at 120 frames per second.

Frames to Transition

RESULTS

	Splashtop	Competitor A	Competitor B
Average Frame Rate (frames/second)	30 fps ★	2 fps	6 fps
Latency for Video (milliseconds)	174 ms ★	2,161 ms	457 ms
	Frame latency within one second		
			
	Frame latency over 30 seconds		
			
Frames to Transition	6 frames ★	124 frames	23 frames

The results show that Splashtop Remote Desktop has clear multimedia performance benefits over the competition for these test cases. Although we expect that the results may vary to some extent for different video content, the general results and conclusions should be similar.

Videos taken for the benchmarking tests can be viewed at:

Splashtop: www.youtube.com/watch?v=qvlc2kZKtcg

Competitor A: www.youtube.com/watch?v=DVRSWFdH1nQ

Competitor B: www.youtube.com/watch?v=9wHWssniGbE