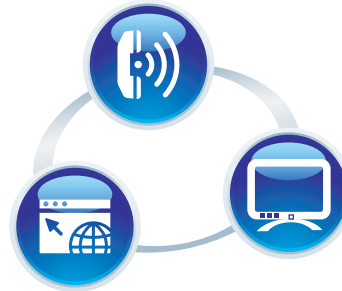


## Concurrent FTP Throughput Testing—Testing the Fastest Internet



The JDSU SmartClass TPS tester is the ideal tool for technicians who install, troubleshoot, and maintain Triple-Play services.

### Test Challenge

File Transfer Protocol (FTP) throughput testing is a popular method for verifying the bandwidth available to customers. The advantage of using FTP throughput testing is that it replicates user behavior, such as browsing the Internet and downloading files. Based on the state aware TCP/IP protocol with acknowledgment, typically the throughput likely will never reach the full physical link speed. FTP throughput testing depends upon factors such as frame size, round-trip time, window size, and file size. If frame size, round-trip time, and window size are managed correctly, it is possible to stress test the line with just one stream but because this is difficult to control a multiple-stream session is the practical approach to stress test the line. In best practice networks, where the FTP server is located near the Digital Subscriber Line Access Multiplexer (DSLAM), user available bandwidth (which is measured with the FTP test) in best cases achieves approximately 96-percent utilization of the very high-speed digital subscriber line 2 (VDSL2) link speed. For example, on a very high-speed digital subscriber line (VDSL) link with a useable Layer 2 payload of 25 Mbps, the FTP throughput never exceeds 24 Mbps. In reality, one FTP session often does not pass 10 Mbps. Even with a high-performance FTP server near a VDSL2 DSLAM delivering 50 Mbps, the maximum FTP throughput measured for one session generally is less than 35 Mbps. The full bandwidth cannot be seen with only one FTP session.

### Addressing the Challenge with SmartClass TPS

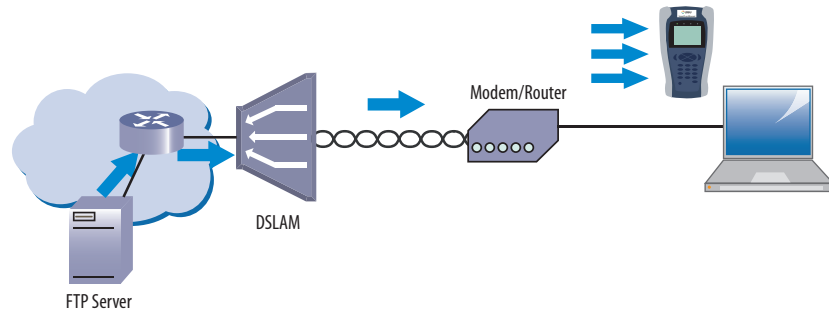
The SmartClass Triple-Play Services (TPS) can generate up to three concurrent FTP download or upload sessions and properly stress test a DSL link. The example below shows a standard FTP download test that resulted in an approximate download rate of 8.01 Mbps on a VDSL 25-Mbps link. A second test was performed with three concurrent download sessions, filling the VDSL pipe. Doing this helps the technician prove what user bandwidth can be achieved while emulating/recreating typical, real-world scenarios. Examples of typical real-world scenarios include multiple workstations installed or multiple sessions running on a personal computer (PC).

File Transfer Test	
Status	Complete
Percent Transferred	100 %
File Size	722 MB
Bytes Transferred	722 MB
Transfer Rate	8.01 Mbps
Total Transfer Time	12:01
Pretransfer Time	312 ms
Start Transfer Time	779 ms
* Clear Status      Start File Transfer #	

One FTP download with limited throughput.

File Transfer Test			
Total Rate		23.9 Mbps	
✓			
	FTP 1	FTP 2	FTP 3
Status	Complete	Complete	Complete
Rate	7.75 Mbps	7.75 Mbps	7.41 Mbps
%	100 %	100 %	100 %
* Clear Status      Start File Transfer #			

Three concurrent FTP downloads filling up the VDSL 25 Mbps physical link.



SmartClass TPS concurrent FTP throughput guarantees a realistic customer service verification. A full bandwidth utilization test is conducted on the Application layer.

### Conclusion

The SmartClass TPS concurrent FTP throughput test verifies realistic customer use cases. Fully testing a VDSL2 link, for example 50 Mbps, is now achievable with typical user application data. With subscribers signing up for higher bandwidth plans, operators and service providers can use the concurrent FTP throughput test to verify that customers receive acceptable bandwidth performance based on their DSL contract (for example, a 50 Mbps DSL line is normally more expensive than a 25 Mbps line) – in other words, that the customer is getting what they pay for.

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