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SlipStream Data Inc.: Competitive Analysis of SlipStream Web Accelerator and Propel Accelerator

Executive summary

SlipStream Data Inc. commissioned VeriTest to compare Web download times of its SlipStream Web Accelerator to those of standard unaccelerated Internet Explorer Web downloads and Propel Accelerator assisted services.

The Slipstream Web Accelerator and Propel Accelerator access data through a local client proxy that in turn accesses a provider-operated proxy server. Acceleration systems provide an improved Web browsing experience through two mechanisms. The first mechanism is an acceleration system that extends the functionality of the local browser cache. The second mechanism is an acceleration system that compresses data which is sent over certain network protocols.

The amount of disk space used by the SlipStream Web Accelerator is 6MB. The amount of disk space used by the Propel Accelerator is approximately 136MB. We calculated these figures by adding the size of the software installed to the nominal space used for caching.

For these tests, we downloaded 50 different Web pages a minimum of 57 times each using VeriTest's standard Internet BenchMark™ clients called dialbots. Dialbots are personal computers considered typical of those machines purchased for home use. We tested using our proprietary software with the goal of approximating an end user's experience connecting to and using the Internet during both an initial access of a Web site and an access of a Web site when the cache is already populated.

In addition to the proprietary Internet BenchMark™ software, we installed either SlipStream Web Accelerator version 3.2.12 for our SlipStream testing, Propel Accelerator version 5.0.0.1053 for our Propel testing, or no accelerator software for our control testing. We established the graphics settings to use for each accelerated service by mathematically determining equivalent image quality, as described on page 3 of the report. We used no graphics compression in the Control testing.

Key findings

- SlipStream Web Accelerator provided up to 7.33x gain on first view web page time to download compared to Internet Explorer. SlipStream's maximum gain is more than 40% higher than Propel's maximum gain.
- Propel took 26.5% longer than SlipStream to download first view Web pages, on average.
- SlipStream improved first view Web page download times by 232% compared to Internet Explorer, on average.
- For both first and repeat views, SlipStream showed better consistency in Web page download times due to lower standard deviations compared to Propel.

Source: VeriTest

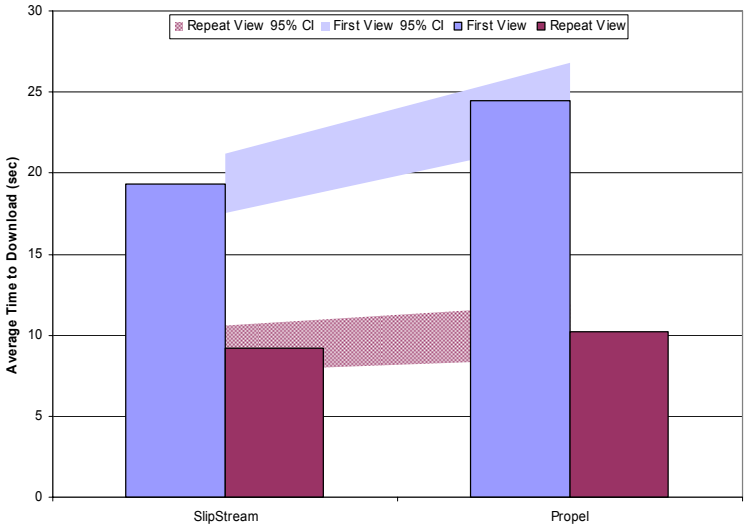


Figure 1: Average Time to Download. Lower values are better.

Figure 1 shows that the average time to download a first view Web page using the SlipStream Web Accelerator is approximately 1.26 times (1.26x) faster than Propel Accelerator, and 2.32 times (2.32x) faster than downloads made with no accelerator. Figure 1 also shows that the SlipStream Web Accelerator showed the fastest average time to download for both first view and repeat view Web page downloads. The SlipStream Web Accelerator downloaded first view Web pages for the 50 URLs in our Web basket on average 5.14 seconds faster and repeat view Web pages 1.02 seconds faster than the Propel Accelerator.

This report contains a detailed methodology including a description of the hardware and software used to collect these data, the methods used to calculate the results, and the results from our testing.

Testing Methodology

SlipStream commissioned VeriTest to compare the performance of the following services:

- SlipStream Web Accelerator using Internet Explorer over a dial-up networking (DUN) connection
- Propel Accelerator using Internet Explorer over a DUN connection
- Control using unaccelerated Internet Explorer over a DUN connection

The Slipstream Web Accelerator and the Propel Accelerator products access data through a local client proxy that in turn accesses a provider-operated proxy server. Acceleration systems provide an improved Web browsing experience through two mechanisms. The first mechanism is an acceleration system that extends the functionality of the local browser cache. The second mechanism is an acceleration system that compresses data which is sent over certain network protocols.

Hardware

We performed the tests using eighteen (18) dialbots. Dialbots are personal computers that VeriTest considers to be typical of machines purchased for home use. We used Dell OptiPlex GX115 computers with 866-MHz Pentium III processors and 256MB of RAM for this test. We used US Robotics 56K Performance Pro Modems product number USR5610B with hardware version 1.012.0778-D, firmware version 5.22.45 (9/11/01) and DSP version 5.22.45 (9/11/01).

Software

We employed VeriTest's Internet BenchMark™ testing software to automate the process of connecting to the services and requesting a series of URLs for the clients listed above. The goal of the testing was to compare the time to download Web pages for those clients. We downloaded each site on one set of machines with empty Internet Explorer and accelerator caches ("first view") and on another set of machines with already populated Internet Explorer and accelerator caches ("repeat view").

We used the following software on all of our dialbots:

- Windows XP Build 2600.xpsp_sp2_rtm.040803-2158 : Service Pack 2
- Windows XP Dial-Up Networking (DUN) included with this version of Windows XP
- VeriTest Internet BenchMark™ proprietary testing software
- Internet Explorer 6.0.2900.2180.xpsp_sp2_rtm.040803-2158
- SlipStream Web Accelerator 3.2.12 on the dialbots testing SlipStream
- Propel Accelerator 5.0.0.1053 on the dialbots testing Propel

We connected to the Internet using DUN in each instance.

Graphics Configuration

Almost every acceleration product reduces image size by reducing image quality to a certain degree through compression. We used MATLAB image analysis software to compare a representative sample of several original and reconstructed images from both SlipStream Web Accelerator and Propel Accelerator software to verify graphics compression settings. All images were in JPEG format. We used a Mean Squared Error (MSE) metric, an objective metric widely used in academic and industrial settings, to compare the quality of images compressed by the SlipStream and the Propel software at various settings with the original images.

$$MSE = \frac{1}{N}\sum_{i}\sum_{j}(x_{ij} - \bar{x}_{ij})^2$$

where x_{ij} and $\bar{x}_{ij}$, respectively, are the values of the elements of the original and reconstructed image, and N is the number of image pixels.

The settings chosen after this analysis were the default graphics settings. The default setting for SlipStream Web Accelerator is the setting labeled “Acceleration: Very High, Image Quality: Good” on the Image Quality tab of the configuration system tray applet. The default settings for Propel Accelerator were the settings chosen after this analysis of Propel’s software. The default setting for Propel Accelerator is the setting labeled “Very High Acceleration: Reduces image quality moderately” on the Graphics and Ads tab of the configuration system tray applet. These settings produced the closest equivalent MSE values with a slight advantage to Propel.

Testing Procedure

First View

We configured our “first view” dialbots to perform Web downloads when the caches for the Internet Explorer and the applicable acceleration product were both empty. We configured each SlipStream, Propel, and Control dialbot to clear the Internet Explorer cache and the cache of the applicable acceleration product during the system startup process before the accelerator software started. We configured the dialbots to execute the tests once every three hours. To accomplish this, we configured each dialbot to reboot after it completed one set of 50 URL downloads, then sit idle for the remainder of the three-hour time period before beginning the next test cycle.

Repeat View

We configured our “repeat view” dialbots to make Web downloads when the caches for the Internet Explorer and the applicable acceleration product were both populated. We configured each SlipStream, Propel, and Control dialbot so that the test software left the Internet Explorer cache and the cache of the applicable acceleration product intact between test cycles. During each test period, we used the first successful test of each URL to populate both the Internet Explorer cache and the cache of the applicable acceleration product. The data from that first successful download is not included in the final statistical results. We configured the dialbots to execute the tests once every three hours. To accomplish this, we configured each repeat view dialbot to reboot after it completed one set of 50 URL downloads, then sit idle for the remainder of the three-hour time period before beginning the next test cycle.

Coverage

In order to select a POP number for use in these tests, we performed network latency tests for 42 POPs from each of 12 different Internet Service Providers. We collected data over the five-day period from March 4-8, 2005. Our goal was to determine which POP produced short and comparable response times for both the SlipStream and Propel compression servers. We chose a POP from AT&T WorldNet in San Jose, California, which produced a response time of slightly less than 120 ms for both servers on our network latency tests.

ISP	Phone Number
AT&T WorldNet	1-408-960-0030

Testbed configuration

We divided our testbed into six groups of three dialbots. Three groups collected data only for first views, and the other three groups collected data only for repeat reviews. Each group of three tested one of the three services for one-third of the test period. For example, Group A below collected first-view data for the SlipStream accelerator one-third of the test period, the Propel accelerator one-third of the test period, and an unaccelerated Internet Explorer connection for the remaining one-third of the test period.

Dialbot Group	Dialbots	Function Tested
A	128, 134, 135	First View
B	129, 136, 137	Repeat View
C	130, 138, 143	First View
D	131, 144, 145	Repeat View
E	132, 146, 147	First View
F	133, 148, 149	Repeat View

Time Period	Start (UTC)	End (UTC)	Dialbot Group	Service Tested	Function Tested
Test Period 1	2005-03-30 17:00	2005-03-31 17:00	A	SlipStream	First View
			B	SlipStream	Repeat View
			C	Propel	First View
			D	Propel	Repeat View
			E	Control	First View
			F	Control	Repeat View
Test Period 2	2005-03-31 19:30	2005-04-01 19:00	A	Control	First View
			B	Control	Repeat View
			C	SlipStream	First View
			D	SlipStream	Repeat View
			E	Propel	First View
			F	Propel	Repeat View
Test Period 3	2005-04-02 00:00	2005-04-03 00:00	A	Propel	First View
			B	Propel	Repeat View
			C	Control	First View
			D	Control	Repeat View
			E	SlipStream	First View
			F	SlipStream	Repeat View

Web basket

We refer to the set of URLs accessed during the test as the "Web basket." We used a Web basket of 50 popular pages selected by SlipStream for this test.

Web basket
http://dailynews.yahoo.com
http://english.monster.ca
http://news.bbc.co.uk
http://news.google.ca
http://slashdot.org
http://weather.yahoo.com
http://whatis.techtarget.com
http://www.amazon.com
http://www.anandtech.com
http://www.apple.com
http://www.broadbandreports.com
http://www.canada.com
http://www.canada411.com
http://www.champcarworldseries.com
http://www.cibc.com
http://www.cnn.com
http://www.comcast.net/comcast.html
http://www.dell.com
http://www.dice.com
http://www.discovery.com
http://www.eetimes.com
http://www.eweek.com
http://www.extremetech.com
http://www.ffonline.com
http://www.fodors.com

Web basket
http://www.fool.com
http://www.formula1.com
http://www.godiva.com
http://www.groklaw.net
http://www.hollywoodreporter.com
http://www.icrc.org
http://www.imagestation.com
http://www.imaging-resource.com
http://www.kraftfoods.com
http://www.macobserver.com
http://www.mapsofworld.com
http://www.microsoft.com
http://www.msn.com
http://www.oreilly.com/weblogs
http://www.pbs.org
http://www.pcmag.com
http://www.pogo.com/
http://www.practicallynetworked.com
http://www.rentersnews.ca
http://www.smh.com
http://www.starwars.com
http://www.target.com
http://www.tdcanadatrust.com
http://www.theglobeandmail.com
http://www.travelocity.com

Connections

Once a dialbot makes a connection, we measure the length of time the modem takes to log in, the initial and final modem connect speeds, and the final modem transmit speed. If any of these measurements fall below our minimum performance thresholds, we discard the network data collected for that call.

Modem connect speed

For this test, we used modem command codes to fix the connect speed at 46666 kbps. If a dial-up attempt was unable to negotiate a connection at this speed, we classified the connection as a failed attempt and disregarded any data collected.

Network tests

After the dialbot establishes a connection, it may perform one or more network tests to measure network performance. For these tests, the dialbots attempted to download the 50 pages in our Web basket. The actual number of Web pages downloaded during any given call can vary from zero to 50 based on the success or failure of the download attempts and the integrity of the dial-up connection.

Web page download

The Web Page Download test measures network performance by using an Internet Explorer browser to download a complete Web page from a remote Web server. This provides an accurate measurement of the reliability and performance of a network connection from a typical end user application.

Our test harness drives the Internet Explorer browser to download a specified Web page. Our software detects any failure that Internet Explorer reports during the download process (e.g., connection reset by peer). We also use proprietary network traffic monitoring software to determine the duration of the Web page download. This measurement includes all page content including graphics, frames, and Java applets. The test supports secure Web page downloads (HTTPS).

Web Page Time to Download:

The Web Page Time to Download (TTD) is the time it takes for a complete Web page to download, including all page content. Specifically, we measure the interval between the time the dialbot sends the first HTTP TCP packet to the server and the time that the last HTTP TCP connection terminates.

Statistical Calculations and Data Presentation

We provide 95 percent confidence intervals with most of the averages in the report. These confidence intervals indicate that 95 percent of the time, the actual result would be within the specified range around our measured result. This provides a rough indication of the precision of the metric.

We derive the average Web Page Time to Download using a provider aggregate average of the average performance for each URL. This helps to prevent URL outages or sampling irregularities from biasing results. The corresponding standard deviation is the geometric mean of the per-URL standard deviations.

We calculate the following variables for a given combination of provider and URL:

Variable	Definition
T_{URL}	Average of metric (Time to Download)
SD_{URL}	Standard deviation
S_{URL}	Number of samples

For each provider, we calculate the following variables, which combine results for multiple URLs:

Variable	Definition
T_{ISP}	Average of metric (this is an average of averages)
SD_{ISP}	Standard deviation
N_{URL}	Number of URLs in test
S_{ISP}	Number of samples
M	Harmonic mean of the number of samples
C	95 percent confidence interval

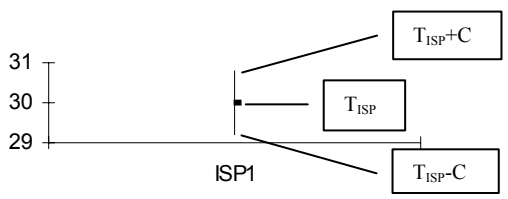
T_{ISP} = an average of averages = $$\frac{\sum_{1}^{N_{URL}} T_{URL}}{N_{URL}}$$

SD_{ISP} = $$\sqrt{\frac{\sum_{1}^{N_{URL}} (S_{URL} * SD_{URL}^2)}{\sum_{1}^{N_{URL}} S_{URL}}}$$

M = $$\frac{N_{URL}}{\sum_{1}^{N_{URL}} \frac{1}{S_{URL}}}$$

C = $$1.96 * \frac{SD_{ISP}}{\sqrt{M}}$$

We present graphs with the average metric for each provider and the corresponding 95 percent confidence interval:



Test results

Figure 2 shows the average time to download a Web page from the Web basket for each tested configuration. The SlipStream Web Accelerator showed the fastest average time to download for both first view and repeat view Web page downloads. The SlipStream Web Accelerator downloaded first view Web pages from the 50 URLs in our Web basket 5.14 seconds faster and repeat view Web pages 1.02 seconds faster than the Propel Accelerator. The table below also shows the standard deviation of the data from each service. The standard deviation of the performance of the SlipStream Web Accelerator software is lower for each test condition than Propel Accelerator software. This means that the SlipStream software showed less variability in the time it took to download the average Web page in our Web basket than Propel and the Control.

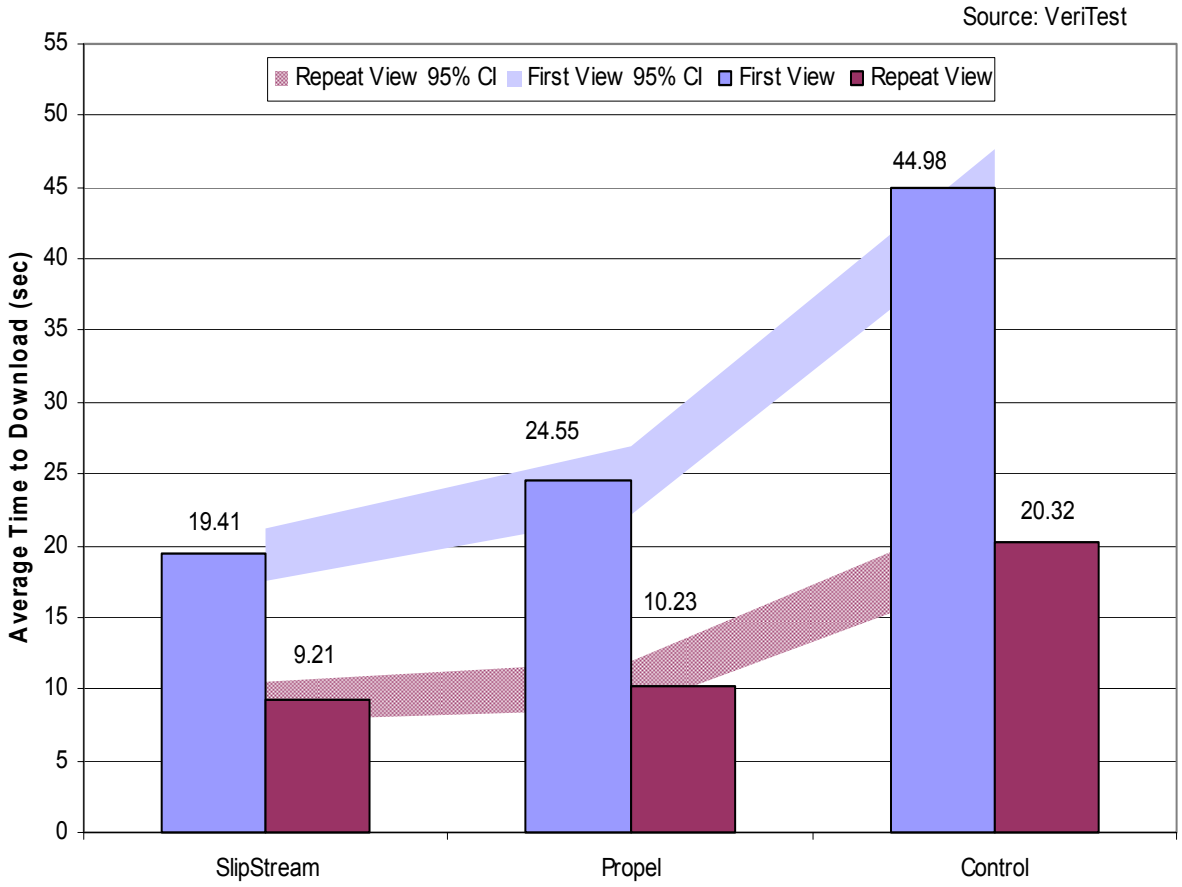
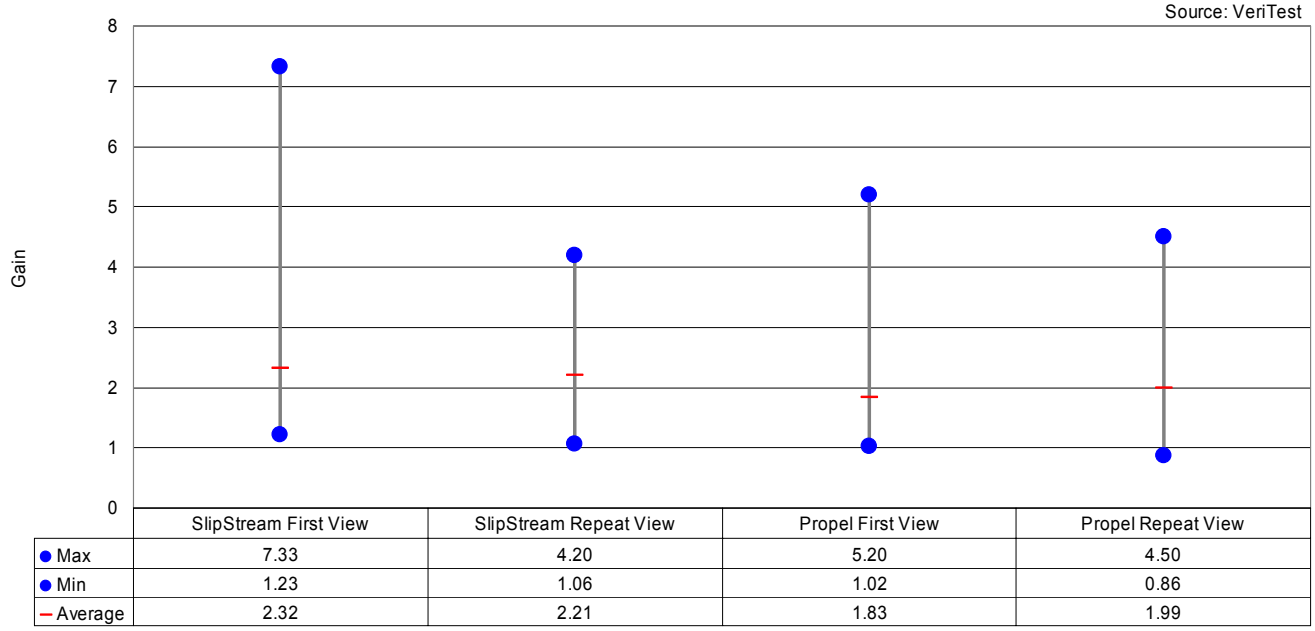


Figure 2: Average Time to Download.
Lower values are better.

Service	Avg TTD (sec)	Standard Deviation	Downloads
SlipStream (Repeat View)	9.21	5.63	3222
Propel (Repeat View)	10.23	6.99	3396
Control (Repeat View)	20.32	9.39	3302
SlipStream (First View)	19.41	8.00	3693
Propel (First View)	24.55	10.37	3744
Control (First View)	44.98	11.92	3875

Figure 3 shows the minimum, maximum, and average gain per URL for all URLs in the Web basket for the SlipStream and Propel Web Accelerators relative to the Control. The SlipStream Web Accelerator provided an average gain of approximately 2.32x the performance of the Control for first views. SlipStream showed an average gain on every URL for both first and repeat views. SlipStream's average gain by URL ranged from 1.23x to 7.33x for first view downloads and from 1.06x to 4.20x for repeat view downloads. The Propel Accelerator provided an average gain of approximately 1.83x over the performance of the Control for first views. However, Propel did not show an average gain for every URL in the Web basket. Instead, Propel's average gain by URL ranged from 1.02x to 5.20x for first view downloads and from 0.86x to 4.50x for repeat view downloads. In the case of three URLs (http://www.starwars.com, http://www.canada411.com, and http://dailynews.yahoo.com), Propel took longer on average than the Control to complete repeat view Web page downloads. While this resulted in an average net gain of less than 1.0 for Propel for these URLs, our analysis shows that the amount by which these values dropped below 1.0 is not statistically significant. Please refer to pages 12 and 13 for details.



	SlipStream First View	SlipStream Repeat View	Propel First View	Propel Repeat View
Max	7.33	4.20	5.20	4.50
Min	1.23	1.06	1.02	0.86
Average	2.32	2.21	1.83	1.99

Figure 3: Gain per URL by test condition.
Higher values are better.

Figure 4 shows the cumulative distribution of the percentage of completed downloads within a given time period. We calculate these values as the average percentage of each Web page completed within each time period, so that we weight each Web page equally in the final value.

For example, the SlipStream Web Accelerator downloaded 70.9% of repeat view Web pages within 10 seconds. The Propel Accelerator downloaded 65.2% of repeat view Web pages within 10 seconds.

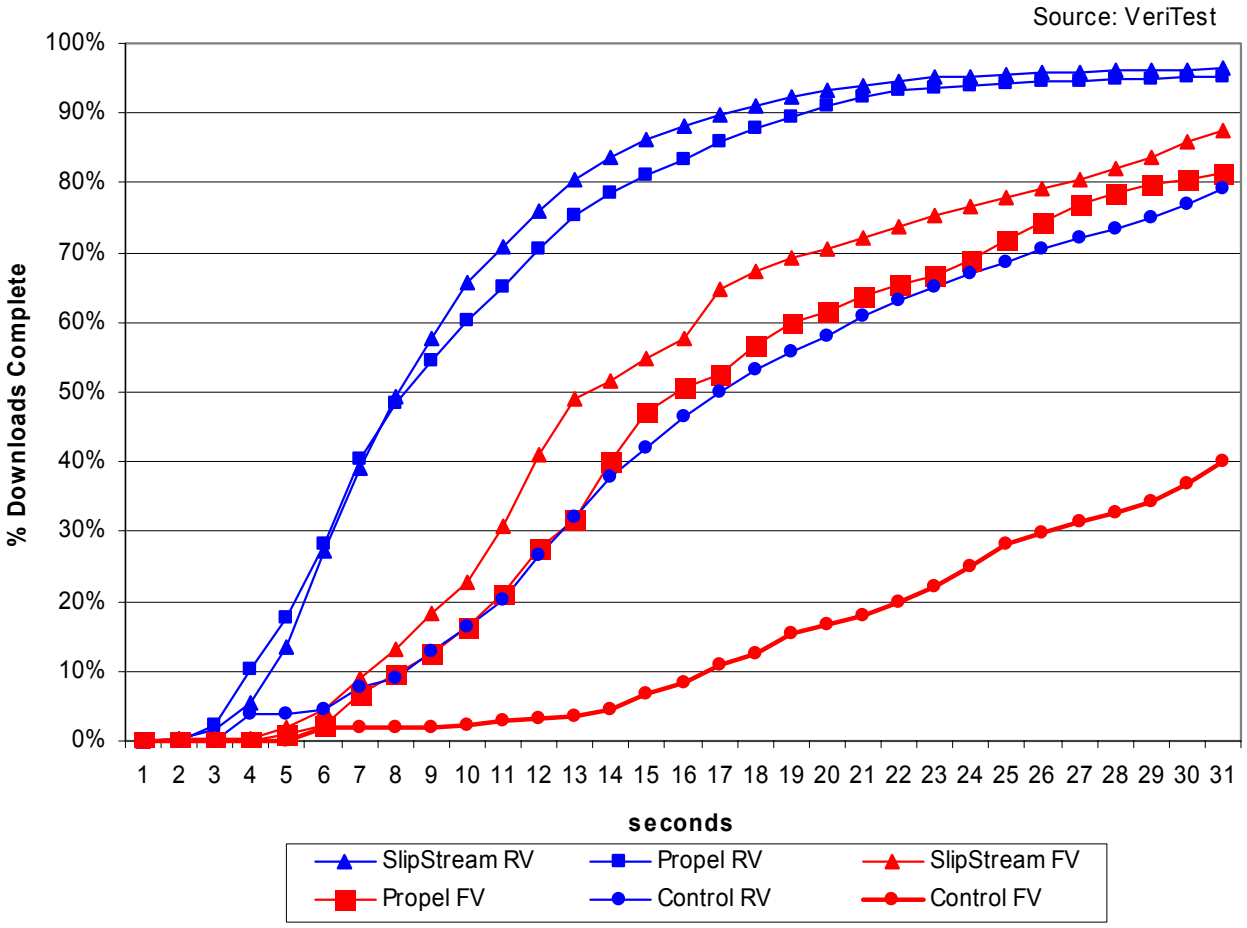


Figure 4: Percent of Downloads completed over time (in seconds). Higher values at earlier times are better.

Condition	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SlipStream Repeat View	0.28%	1.68%	5.40%	13.47%	27.16%	39.23%	49.29%	57.85%	65.58%	70.92%	75.85%	80.35%	83.55%	86.13%	88.02%
Propel Repeat View	0.00%	2.15%	10.37%	17.73%	28.36%	40.40%	48.32%	54.33%	60.19%	65.19%	70.58%	75.38%	78.53%	81.24%	83.42%
SlipStream First View	0.24%	0.24%	0.24%	2.00%	4.47%	8.96%	13.21%	18.17%	22.91%	30.73%	40.94%	48.98%	51.75%	54.73%	57.54%
Propel First View	0.00%	0.00%	0.00%	0.93%	2.11%	6.73%	9.70%	12.45%	16.21%	21.21%	27.51%	31.68%	40.04%	47.17%	50.64%
Control Repeat View	0.00%	0.00%	3.73%	3.97%	4.39%	7.63%	8.90%	12.93%	16.29%	20.35%	26.71%	32.04%	37.83%	42.13%	46.58%
Control First View	0.08%	0.08%	0.08%	0.08%	2.01%	2.04%	2.04%	2.04%	2.27%	2.79%	3.25%	3.66%	4.57%	6.86%	8.23%

Condition	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
SlipStream Repeat View	89.88%	91.06%	92.30%	93.17%	94.04%	94.54%	95.07%	95.22%	95.44%	95.69%	95.87%	96.03%	96.12%	96.24%	96.43%
Propel Repeat View	85.92%	87.93%	89.52%	91.14%	92.23%	93.23%	93.67%	94.02%	94.23%	94.52%	94.67%	94.88%	94.99%	95.14%	95.17%
SlipStream First View	64.83%	67.42%	69.08%	70.48%	72.08%	73.68%	75.44%	76.69%	77.88%	79.10%	80.37%	82.13%	83.78%	85.87%	87.52%
Propel First View	52.51%	56.68%	59.99%	61.62%	63.92%	65.54%	66.75%	68.88%	71.74%	74.44%	76.92%	78.53%	79.67%	80.50%	81.28%
Control Repeat View	49.88%	53.30%	55.63%	58.09%	60.84%	63.17%	65.05%	67.05%	68.75%	70.41%	71.99%	73.29%	74.98%	76.92%	79.04%
Control First View	11.05%	12.52%	15.33%	16.83%	17.91%	19.85%	22.14%	25.08%	28.13%	29.75%	31.38%	32.67%	34.22%	36.98%	40.08%

Figure 5 shows the average times to download Web pages broken down by URL and test condition. For purposes of brevity, we have truncated the URL names for display. We removed “http://” or “http://www.” from the beginning of the URL browser command. Also, we removed “.com” from top-level domain names.

Condition	dailynews.yahoo	english.monster.ca	news.bbc.co.uk	news.google.ca	slashdot.org
SlipStream First View	14.80	8.81	10.69	10.26	6.52
SlipStream Repeat View	8.93	5.89	5.47	6.85	4.44
Propel First View	19.89	11.26	13.92	11.62	7.15
Propel Repeat View	14.97	5.89	6.80	13.89	6.09
Control First View	32.48	41.87	31.53	21.55	13.33
Control Repeat View	14.50	13.76	11.48	18.38	10.15

Condition	weather.yahoo	whatis.techtarget	amazon	anandtech	apple
SlipStream First View	12.38	16.10	12.61	11.15	11.02
SlipStream Repeat View	7.21	9.10	6.47	7.92	5.46
Propel First View	13.56	19.13	13.81	34.73	12.86
Propel Repeat View	8.39	9.15	6.22	12.42	4.54
Control First View	37.64	41.01	29.18	81.69	33.71
Control Repeat View	20.68	30.73	12.12	21.33	9.55

Condition	broadbandreports	canada	canada411	champcarworldseries	cibc
SlipStream First View	7.46	29.08	3.84	21.03	11.51
SlipStream Repeat View	5.75	19.81	2.64	13.01	4.03
Propel First View	9.18	28.95	4.17	25.04	14.75
Propel Repeat View	5.84	20.90	3.25	13.07	3.30
Control First View	14.80	65.64	4.80	72.13	22.55
Control Repeat View	9.72	42.83	2.87	53.22	6.69

Condition	cnn	comcast.net	dell	dice	discovery
SlipStream First View	23.23	60.46	8.52	7.30	42.88
SlipStream Repeat View	13.91	13.16	4.96	5.74	31.48
Propel First View	28.06	74.51	11.15	8.96	58.93
Propel Repeat View	12.85	14.82	8.46	5.32	43.83
Control First View	51.78	81.31	15.81	21.23	83.49
Control Repeat View	22.52	23.67	12.28	12.11	44.88

Condition	eetimes	eweek	extremetech	ffonline	fodors
SlipStream First View	14.12	29.20	20.54	11.20	11.92
SlipStream Repeat View	10.68	14.49	10.05	6.88	8.27
Propel First View	14.94	25.92	17.21	12.60	11.50
Propel Repeat View	11.36	14.04	10.84	6.42	7.84
Control First View	51.77	67.47	55.18	65.51	34.81
Control Repeat View	28.13	33.21	26.88	28.90	18.18

Condition	fool	formula1	godiva	groklaw.net	hollywoodreporter
SlipStream First View	13.76	26.73	10.11	7.12	15.97
SlipStream Repeat View	7.75	14.83	5.72	5.50	10.70
Propel First View	15.56	34.38	13.02	12.17	22.51
Propel Repeat View	8.12	11.19	5.48	4.94	12.27
Control First View	38.91	61.35	29.63	18.88	64.31
Control Repeat View	20.65	27.68	10.77	11.43	36.64

Condition	icrc.org	imagestation	imaging-resource	kraftfoods	macobserver
SlipStream First View	4.58	29.96	17.79	11.48	22.85
SlipStream Repeat View	3.67	8.19	12.72	5.65	20.23
Propel First View	5.31	22.47	16.94	13.62	24.11
Propel Repeat View	4.28	9.11	9.48	6.30	17.64
Control First View	15.49	47.60	26.42	24.59	53.26
Control Repeat View	8.41	13.80	13.51	19.86	31.01

Condition	mapsofworld	microsoft	msn	oreillynet.com/weblogs	pbs.org
SlipStream First View	5.45	9.80	8.20	8.34	9.43
SlipStream Repeat View	2.08	5.17	3.82	5.08	4.85
Propel First View	5.69	9.64	7.88	13.65	10.93
Propel Repeat View	1.48	3.94	5.20	6.22	4.86
Control First View	17.98	26.38	19.38	21.86	30.96
Control Repeat View	2.45	12.31	10.64	14.66	15.00

Condition	pcmag	pogo	practicallynetworked	rentersnews.ca	smh
SlipStream First View	55.78	15.79	17.02	10.60	80.87
SlipStream Repeat View	16.32	10.65	12.28	6.76	4.29
Propel First View	80.74	26.49	19.12	13.07	155.88
Propel Repeat View	15.04	17.68	13.55	6.16	2.69
Control First View	109.69	39.54	38.18	23.04	159.23
Control Repeat View	34.41	29.43	36.37	13.51	6.31

Condition	starwars	target	tdcanadatrust	theglobeandmail	travelocity
SlipStream First View	92.09	29.21	5.89	29.05	15.89
SlipStream Repeat View	20.89	9.89	4.94	18.41	7.28
Propel First View	102.21	42.59	6.86	31.60	17.21
Propel Repeat View	38.01	10.88	4.10	14.40	8.15
Control First View	112.97	95.20	13.30	54.48	33.91
Control Repeat View	32.77	22.64	11.30	32.42	18.98

Figure 5: Time to Download displayed by URL and test condition. Lower values are better.

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VeriTest created the suite of industry-standard benchmark software that includes WebBench, NetBench, Winstone, and WinBench. We've distributed over 20 million copies of these tools, which are in use at every one of the 2001 Fortune 100 companies. Our Internet BenchMark service provides the definitive ratings for Internet Service Providers in the US, Mexico, and the UK.

Under our former names of ZD Labs and eTesting Labs, and as part of VeriTest since July of 2002, we have delivered rigorous, objective, independent testing and analysis for over a decade. With the most knowledgeable staff in the business, testing facilities around the world, and almost 1,600 dedicated network PCs, VeriTest offers our clients the expertise and equipment necessary to meet all their testing needs.

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