

America Online and AOL 9.0: Comparative Analysis of AOL 9.0, AOL 8.0, EarthLink Plus, EarthLink, NetZero HiSpeed, NetZero Platinum and MSN

Test report prepared under contract from AOL

Executive summary

America Online commissioned VeriTest to compare Web download times for their new AOL 9.0 client to those of their AOL 8.0 client, EarthLink's EarthLink Plus and standard service, NetZero's Platinum and HiSpeed service and MSN's standard service using VeriTest's Internet BenchMark™ testing.

The AOL 9.0 client, the AOL 8.0 client, the EarthLink Plus service and NetZero HiSpeed service use parent proxy servers, local proxy servers and protocol compression between the parent and local proxy servers to reduce the amount of time required to download and display Web pages.

For these tests, we downloaded 19 different Web pages a minimum of 71 times each using standard Internet BenchMark™ clients called dialbots. Dialbots are personal computers 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. In addition to the proprietary Internet BenchMark™ software we installed AOL 9.0 for Windows build 4148.411a, AOL 8.0 for Windows build 4129.6011a, NetZero HiSpeed v4.3.1QS and the EarthLink Plus accelerator v1.2.5.523 on all of the dialbots.

The results in figure 1 show that the AOL 9.0 client finished downloading Web pages significantly faster than EarthLink Plus, the AOL 8.0 client, NetZero HiSpeed service, EarthLink, MSN and NetZero.

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.

Key findings

- ❑ The AOL 9.0 client completed 89.8% of all complete Web page downloads within 10 seconds. EarthLink Plus completed 80.9% in the same time.
- ❑ The AOL 9.0 service required less time to download a complete Web page (5.6 seconds) than did the EarthLink Plus service (7.1 seconds).
- ❑ AOL 9.0 required significantly less time to download a complete Web page than did NetZero HiSpeed, AOL 8.0, EarthLink, NetZero and MSN.

Service	Downloads Completed within 10 Seconds
AOL 9.0	89.8%
EarthLink Plus	80.4%
AOL 8.0	57.0%
<u>NetZero HiSpeed</u>	61.1%
EarthLink	42.7%
MSN	34.1%
<u>NetZero</u>	29.6%

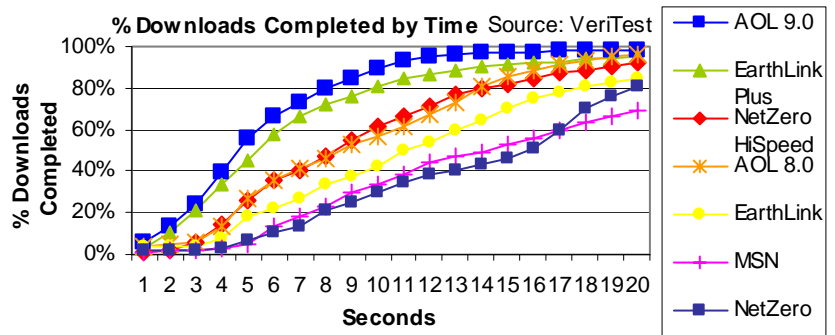


Figure 1: Downloads completed within a given time. Higher values at earlier times are better.

Testing methodology

AOL commissioned VeriTest to compare the performance of the following services or clients:

- America Online 9.0 (using AOL 9.0)
- America Online 8.0 (using AOL 8.0)
- EarthLink Plus (using a DUN connection)
- EarthLink (using a DUN connection)
- [NetZero HiSpeed](#) (using the NetZero HiSpeed client)
- [NetZero](#) (using the HiSpeed client with a Platinum account)
- MSN (using a DUN connection)

The AOL 8.0 client, the AOL 9.0 client, the EarthLink Plus service and the [NetZero HiSpeed](#) service all access data through a local proxy server that in turn accesses a parent proxy server that the service providers operate. These accelerators achieve performance gains in two ways. When Internet Explorer requests data that is already cached, these services substitute cached data. Additionally, these services implement protocol compression between the parent and local proxy servers in order to achieve further performance gains when Internet Explorer requests new or obsolete data.

Hardware

For these tests, we employed the VeriTest Internet BenchMark™ testing equipment to automate the process of connecting to services and requesting a series of URLs with the clients listed above. The goal of the testing was to compare the time to download Web pages for those clients.

We performed the testing using 20 dialbots. Dialbots are personal computers that are typical of machines purchased for home use. For this test we used Dell OptiPlex GX115 machines with 866-MHz Pentium III processors and 256MB of RAM. We use 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 installed the following software on all of our dialbots.

- Windows Me 4.90.300
- Windows Me Dial-Up Networking (included with this version of Windows Me)
- VeriTest Internet BenchMark™ proprietary testing software
- Internet Explorer 6.0.2800.1106 sp1
- AOL 9.0 build 4148.411a
- AOL 8.0 build 4129.6011a
- [NetZero HiSpeed](#) v4.3.1QSui636.0
- EarthLink Accelerator v1.3.5.523

We connected to the Internet using the AOL 9.0 client when we tested the Web page download performance of the AOL 9.0 client. We connected to the Internet using the AOL 8.0 client when we tested the Web page download performance of the AOL 8.0 client. We connected to the Internet using DUN when we tested the Web page download performance for the EarthLink Plus, EarthLink and MSN services. We connected to the Internet using the [NetZero HiSpeed](#) client when testing the [NetZero Platinum](#) and [NetZero HiSpeed](#) services.

Testbed configuration

We configured our testbed in three separate groups of dialbots. We enabled a different set of software in each group.

	AOL 8.0 Group	AOL 9.0 Group	NetZero Group
Number of Dialbots	7	6	7
Services Tested	AOL 8.0, EarthLink, MSN, EarthLink Plus	AOL 9.0, EarthLink, MSN, EarthLink Plus	NetZero, NetZero HiSpeed

AOL 8.0 Group

We created the AOL 8.0 Group with seven dialbots. We disabled the AOL 9.0 client, installed the active AOL 8.0 account, installed unique EarthLink Plus accounts and enabled the EarthLink Plus accelerator for each dialbot. Before we initiated AOL 8.0 calls, we turned off the EarthLink Plus accelerator using the same method that the *Stop EarthLink Accelerator* shortcut in the Programs menu of the Start bar uses. After each AOL 8.0 call, we turned the EarthLink Plus accelerator back on using the same method that the *Start EarthLink Accelerator* shortcut in the Programs menu of the Start bar uses. Therefore, the hosts entry for ie3.proxy.aol.com is not in effect during AOL calls. The number of downloads using the AOL 8.0 client in the AOL 8.0 group was approximately double that for EarthLink Plus service, the EarthLink service and the MSN service.

AOL 9.0 Group

We created the AOL 9.0 Group with six dialbots. We disabled the AOL 8.0 client, installed a unique AOL 9.0 account, installed unique EarthLink Plus accounts and enabled the EarthLink Plus accelerator for each dialbot. Before we initiated AOL 9.0 calls, we turned off the EarthLink Plus accelerator using the same method that the *Stop EarthLink Accelerator* shortcut in the Programs menu of the Start bar uses. After each AOL 9.0 call, we turned the EarthLink Plus accelerator back on using the same method that the *Start EarthLink Accelerator* shortcut in the Programs menu of the Start bar uses. Therefore, the hosts entry for ie3.proxy.aol.com is , not in effect during AOL calls. The number of downloads using the AOL 9.0 client in the AOL 9.0 group was approximately double that for EarthLink Plus service, the EarthLink service and the MSN service.

NetZero Group

We created the NetZero Group with seven dialbots. We disabled the AOL 8.0 client for each dialbot. The number of downloads using both the [NetZero](#) and [NetZero HiSpeed](#) clients was approximately equal to the number of downloads for AOL 8.0 and AOL 9.0 in their respective groups.

Coverage

For these tests, we dialed the local numbers for AOL 9.0 and AOL 8.0, for EarthLink and EarthLink Plus, for NetZero and NetZero HiSpeed and for MSN.

Service Provider	Phone Number
AOL 9.0	1 415 746 1010
AOL 8.0	1 415 746 1010
EarthLink Plus	1 415 704 0177
EarthLink	1 415 704 0177
NetZero HiSpeed	1 415 200 1700
NetZero	1 415 200 1700
MSN	1 415 358 1304

Web baskets

We call the set of URLs accessed during the test a web basket. These tests used a basket of 19 popular Web pages from sites hosted in the United States. This list contains a number of popular Web sites with diverse geographic locations, providers and content. The sites in the Web basket simulate what a home user in the United States might view on his or her home computer. America Online assisted us in the selection of these sites. We used three sites that were suggested by America Online (*www.aol.com*, *www.barnesandnoble.com* and *www.mtv.com*), which are italicized in the table that follows.

Please note that many popular Web sites are now multi-homed and receive connectivity from multiple backbone providers. We use BGP peering information to determine the backbone providers that supply connectivity for each Web site, but you should not consider these lists exhaustive. Also, the site locations we provide are metropolitan areas rather than specific locations (e.g., San Francisco-CA represents the greater San Francisco Bay Area).

URL	Content Type	Site Location	Backbone Network Provider
sports.yahoo.com	Portal	San Francisco-CA	Exodus
www.amazon.com	Commercial	Seattle-WA	UUNET
<i>www.aol.com</i>	<i>Portal</i>	<i>Washington-DC</i>	<i>ATDN</i>
<i>www.barnesandnoble.com</i>	<i>Commercial</i>	<i>New York-NY</i>	<i>UUNET</i>
www.cnet.com	News	San Francisco-CA	AboveNet
www.earthlink.net	Portal	Pasadena-CA	EarthLink
www.ebay.com	Commercial	San Francisco-CA	AboveNet, UUNET
www.fool.com	News	Washington-DC	GlobalCrossing
www.imdb.com	Entertainment	Seattle-WA	Internap Network Services
www.ivillage.com	Entertainment	New York-NY	Exodus
www.mcafeehelp.com	Commercial	San Francisco-CA	Genuity, AT&T, Cable & Wireless, UUNET
www.msn.com	News	Seattle-WA	Microsoft
<i>www.mtv.com</i>	<i>Entertainment</i>	<i>Distributed</i>	<i>Akamai</i>
www.nytimes.com	News	New York-NY	Exodus
www.pbs.org	Entertainment	Washington-DC	UUNET
www.smithsonian.org	Entertainment	Washington-DC	UUNET, Verio
www.sony.com	Commercial	New York-NY	Level 3
www.travelocity.com	Commercial	Dallas-TX	InterNAP
www.zdnet.com	News	Boston-MA	Genuity

Figure 3: URLs in web basket.

Connections

We attempt to make dialup connections with our dialbots. We do not make web downloads when the connection fails and we ignore web downloads made by connections which are questionable. We do not start any downloads until the connection has been stable for 90 seconds. We measure various characteristics of the connections made such as the amount of time it took to log in and the initial and final modem connect speeds as well as the final modem transmit speed.

Modem connect speed

We report two modem connect speed results for each completed call: one our software takes immediately after the initial modem negotiation and one our software takes immediately after the call termination. We base the initial receive connect speed metric on either Windows Me's or AOL9's interpretation of the modem's CONNECT message. This metric reflects the connect speed that the Dialup Networking control panel reports to the end user.

Receive connect speeds reflect the speed of the downstream (provider to end user) portion of the connection; transmit connect speeds are the upstream (end user to provider) speed. Modern standards such as V.34 and V.90 allow asymmetric connect speeds. For example, the maximum receive speed for V.90 connections is currently 54.7 kbps, while the maximum transmit speed is only 33.6 kbps.

The modem connect speed calculations include only successful calls; they do not include calls that negotiate properly and report a connect speed, but fail shortly thereafter because of substandard negotiation or other connection problems.

Network tests

After the dialbot establishes a connection, it may perform one or more network test suites to measure network performance. For these tests, the dialbot performed an average of three network tests on average for each successful AOL 8.0, EarthLink, [NetZero](#) and [NetZero HiSpeed](#) call and six network tests on average for each successful EarthLink Plus and AOL 9.0 call. The actual number of tests during any given call may vary from zero to 19, based on a random distribution. Each test suite consists of two tests: a Domain Name System (DNS) test and a Web page download test. We configure each test with a specific Web page Universal Resource Locator (URL) from one of the 19 Web sites in the Web basket of popular Web sites. More details regarding the Web basket are available in the Web basket above.

We attempt a full page Web download before the DNS testing for each Web suite. A failure from the DNS test does not affect the information gathered from the Web download.

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.

The dialbot drives the Internet Explorer browser to download a specified Web page. America Online uses an embedded version of the Internet Explorer browser for all Web tests.

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 both the duration of the Web page download and the number of bytes any Web servers transferred to the dialbot during the download. These calculations include all aspects of page content including graphics, frames and Java applets. The test supports secure Web page downloads (HTTPS).

Web Page Download Failures:

Whenever an error message appears as a dialog box for the Internet Explorer browser during a download attempt, we consider it a Web Page Download Failure. We cancel any download that takes longer than four minutes to complete and consider it a Web page timeout. We do not consider HTTP errors that remote Web servers report to be failures since these typically result from content or Web server problems and not from network problems attributable to Internet Service Providers.

Web Page Time to Download:

The Web Page Time to Download is the time it takes for the complete Web page to download, including all page content. We measure this from the time the dialbot sends the first HTTP TCP packet to the server until the last HTTP TCP connection has terminated.

Web Page Byte Count:

The Web Page Byte Count is the total number of payload bytes the Web server transfers to the client during a Web page download. Providers who use Web proxies to compress data may have a smaller apparent Web Page Byte Count. For these providers, a lower Web Page Time to Download might not have a correspondingly higher Web Page Throughput.

Web Page Throughput:

The Web Page Throughput is the effective transfer rate of the connection. We derive this measurement by dividing the byte count by the time to download the Web page and we present the result in kilobytes per second (Kbytes/sec). We derive Web Page Throughput for each call. The test reports contain the average Web throughput measurements. Throughput does not necessarily reflect the actual bandwidth of the connection, but rather the effective Web Throughput the provider achieved using a connection.

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 Latency Response Time, Web Throughput and 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 (Latency, Time to Download, Throughput)
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

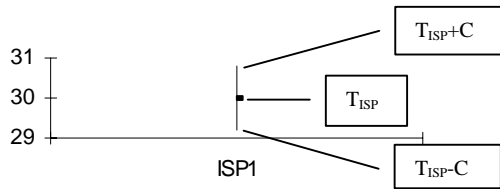
$$T_{ISP} = \text{an average of averages} = \frac{\sum_1^{N_{URL}} T_{URL}}{N_{URL}}$$

$$SD_{ISP} = \sqrt{\frac{\sum_1^{N_{URL}} (S_{URL} * SD_{URL}^2)}{\sum_1^{N_{URL}} S_{URL}}}$$

$$M = \frac{N_{URL}}{\sum_1^{N_{URL}} \frac{1}{S_{URL}}}$$

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

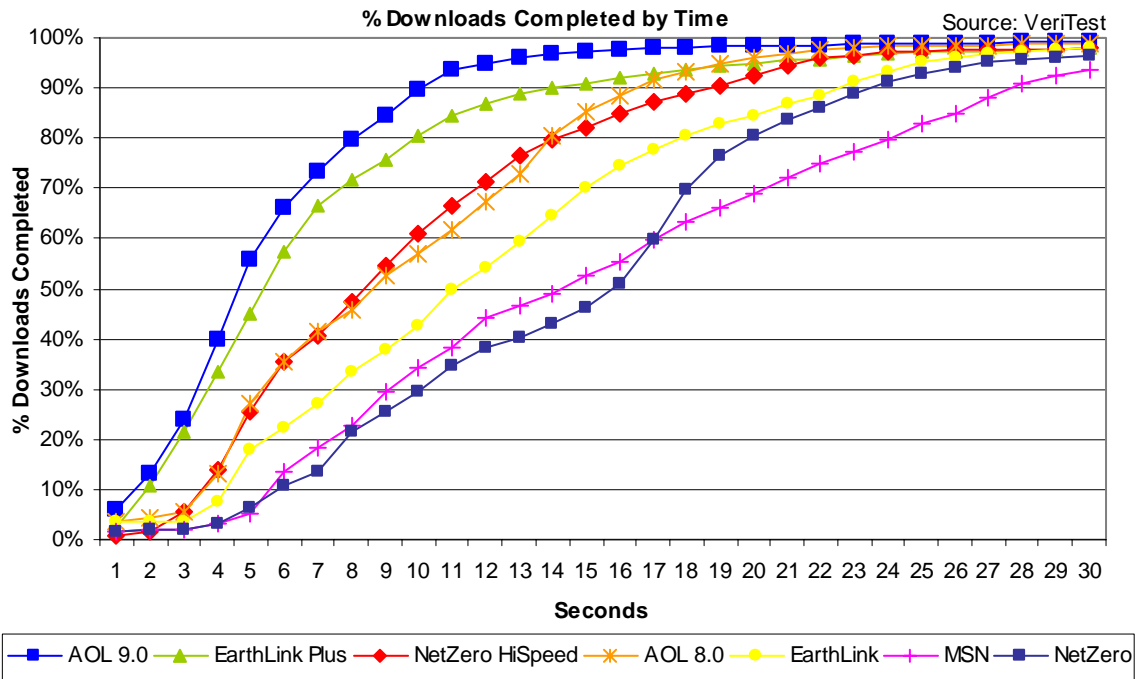
We present graphs with the average metric for each provider and the corresponding 95 percent confidence interval:



Test results

Figure 4 shows a 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.

The AOL 9.0 client downloaded 89.8% of the Web pages within 10 seconds. The EarthLink Plus service downloaded 80.4% of the Web pages within 10 seconds.

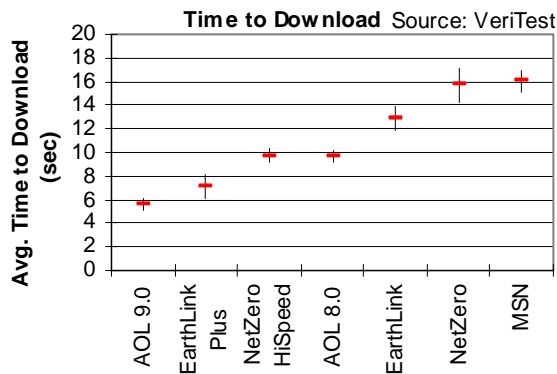


% Downloads Completed within	1 sec	2 sec	3 sec	4 sec	5 sec	6 sec	7 sec	8 sec	9 sec	10 sec	11 sec	12 sec	13 sec	14 sec	15 sec
AOL 9.0	6.1%	13.2%	23.8%	39.9%	55.7%	66.2%	73.2%	79.9%	84.5%	89.8%	93.6%	95.0%	95.9%	96.8%	97.3%
EarthLink Plus	2.5%	10.7%	21.6%	33.6%	44.9%	57.4%	66.4%	71.7%	75.7%	80.4%	84.4%	86.8%	88.8%	90.1%	91.0%
NetZero HiSpeed	0.9%	1.4%	5.6%	14.1%	25.6%	35.3%	40.7%	47.4%	54.5%	61.1%	66.4%	71.3%	76.5%	79.8%	82.2%
AOL 8.0	3.5%	4.4%	5.7%	13.0%	27.1%	35.7%	41.2%	45.9%	52.5%	57.0%	61.8%	67.2%	73.1%	80.6%	85.1%
EarthLink	3.5%	3.6%	3.7%	7.4%	17.9%	22.3%	27.1%	33.5%	37.9%	42.7%	50.0%	54.0%	59.2%	64.6%	70.1%
MSN	1.4%	1.9%	2.0%	3.3%	5.1%	13.6%	18.3%	22.6%	29.5%	34.1%	38.1%	44.4%	46.7%	49.1%	52.5%
NetZero	1.5%	1.9%	1.9%	3.2%	6.3%	10.9%	13.5%	21.4%	25.5%	29.6%	34.6%	38.2%	40.2%	43.2%	46.1%

% Downloads Completed within	16 sec	17 sec	18 sec	19 sec	20 sec	21 sec	22 sec	23 sec	24 sec	25 sec	26 sec	27 sec	28 sec	29 sec	30 sec
AOL 9.0	97.5%	97.8%	98.1%	98.3%	98.3%	98.4%	98.5%	98.6%	98.7%	98.7%	98.9%	99.0%	99.0%	99.1%	99.1%
EarthLink Plus	92.1%	92.7%	93.8%	94.6%	95.0%	95.5%	95.8%	96.4%	96.9%	97.1%	97.2%	97.3%	97.5%	97.7%	98.1%
NetZero HiSpeed	84.8%	87.3%	88.9%	90.6%	92.5%	94.4%	95.8%	96.5%	97.2%	97.4%	97.5%	97.6%	97.7%	97.7%	97.9%
AOL 8.0	88.5%	91.5%	93.4%	94.8%	95.9%	96.8%	97.5%	98.0%	98.2%	98.4%	98.4%	98.5%	98.6%	98.7%	98.8%
EarthLink	74.6%	77.5%	80.5%	82.8%	84.6%	86.8%	88.6%	91.3%	93.2%	95.2%	96.2%	96.9%	97.2%	97.5%	97.9%
MSN	55.6%	59.7%	63.2%	66.3%	69.1%	72.0%	74.8%	77.4%	79.7%	82.7%	85.0%	88.2%	90.9%	92.3%	93.5%
NetZero	51.1%	59.8%	69.8%	76.3%	80.3%	83.6%	86.1%	88.7%	91.3%	93.0%	94.2%	95.0%	95.7%	96.0%	96.3%

Figure 4: Percent of Downloads completed. Higher values at earlier times are better.

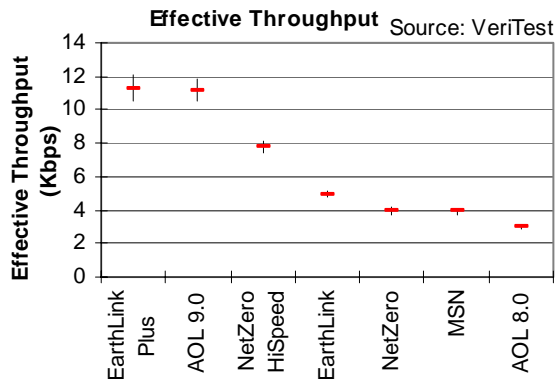
The results in Figure 5 show that the Internet BenchMark™ software measures a 1.5 second difference between the average time it takes the AOL 9.0 client to download a complete Web page and the average time it takes the EarthLink Plus service to download a complete Web page. AOL 9.0 downloads pages more than twice as fast as the EarthLink, NetZero and MSN unaccelerated services.



Service	Time to Download	Successful Attempts	Standard Deviation
AOL 9.0	5.6	2722	3.0
EarthLink Plus	7.1	2997	6.1
NetZero HiSpeed	9.7	2890	3.7
AOL 8.0	9.7	2859	3.4
EarthLink	12.9	2911	6.2
NetZero	15.7	3178	9.8
MSN	16.0	2879	6.1

Figure 5: Average Download Time. Lower times are better.

Figure 6 shows the Effective Throughput for each provider. The difference between the Effective Throughput for the AOL 9.0 client and the EarthLink Plus service was not statistically significant. The AOL 9.0 client and EarthLink Plus service performed significantly better than the NetZero HiSpeed service, the standard EarthLink service, the NetZero Platinum service, the standard MSN service and the AOL 8.0 client.



Service	Throughput (Kbps)	Successful Attempts	Standard Deviation
EarthLink Plus	11.3	2997	4.8
AOL 9.0	11.2	2722	3.6
NetZero HiSpeed	7.8	2890	2.3
EarthLink	5.0	2911	1.2
NetZero	4.0	3178	1.6
MSN	3.9	2879	0.8
AOL 8.0	2.9	2859	0.6

Figure 6: Effective Throughput. Higher values are better.

Figures 7a and 7b show the average Time to Download a Web page by URL for each tested service.

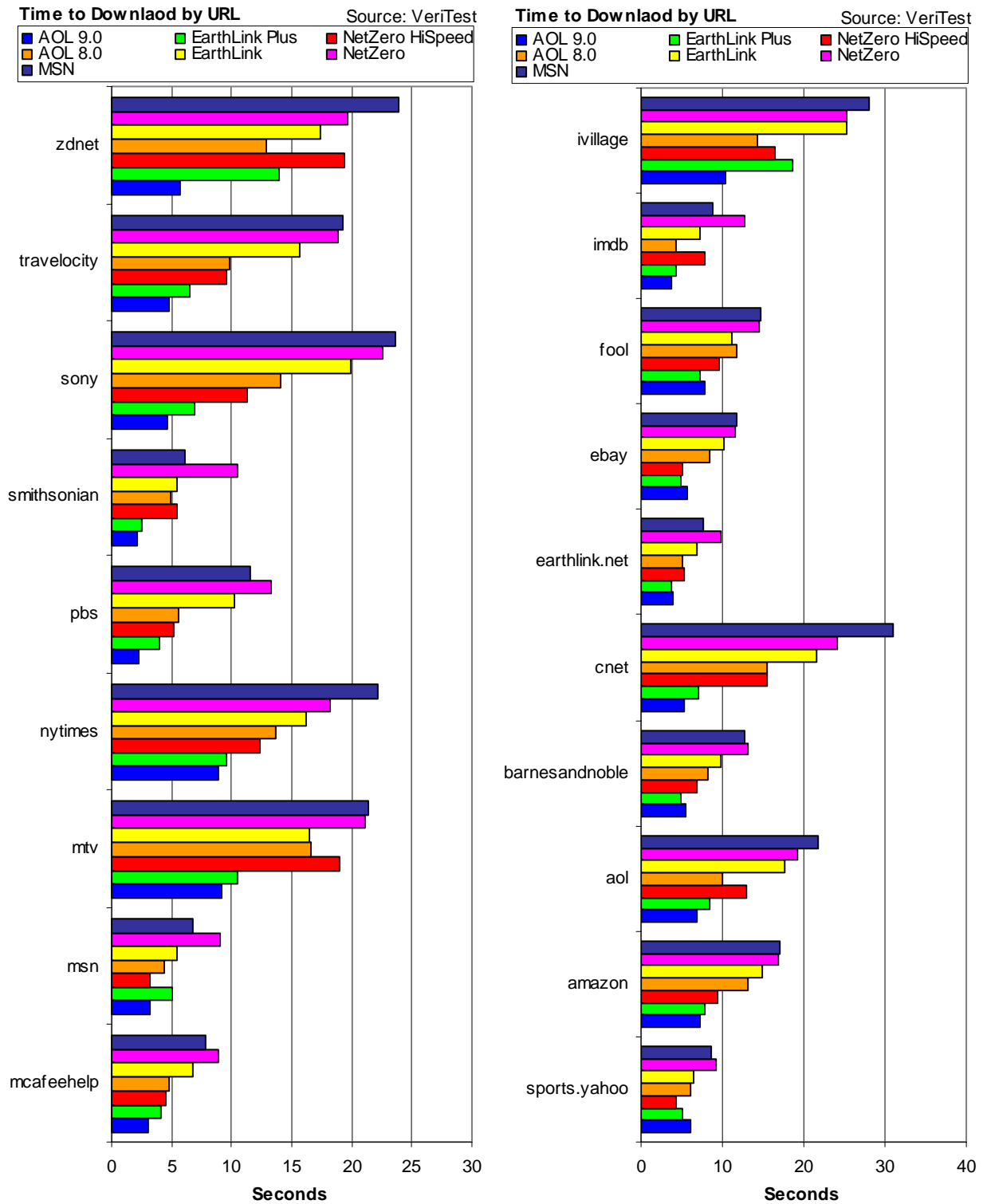


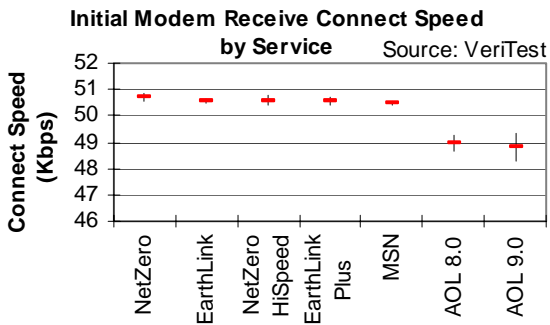
Figure 7a: Average Time to Download by URL. Lower values are better.

Service	sports.yahoo	amazon	aol	barnesandnoble	cnet	earthlink.net	ebay	fool	imdb	ivillage
AOL 9.0	6.13	7.30	6.85	5.47	5.21	4.00	5.70	7.88	3.64	10.46
EarthLink Plus	5.04	7.76	8.34	4.96	7.05	3.72	5.00	7.28	4.33	18.72
NetZero HiSpeed	4.32	9.49	12.95	6.94	15.54	5.34	5.11	9.69	7.79	16.42
AOL 8.0	6.14	13.06	10.02	8.20	15.54	5.09	8.52	11.72	4.37	14.40
EarthLink	6.46	14.83	17.71	9.71	21.57	6.88	10.29	11.12	7.32	25.35
NetZero	9.21	16.78	19.25	13.15	24.17	9.82	11.55	14.61	12.70	25.26
MSN	8.56	17.12	21.73	12.81	31.02	7.70	11.75	14.72	8.89	28.03

Service	mcafeehelp	msn	mtv	nytimes	pbs	smithsonian	sony	travelocity	zdnet
AOL 9.0	3.04	3.20	9.18	8.86	2.22	2.13	4.59	4.84	5.73
EarthLink Plus	4.10	4.98	10.48	9.50	3.93	2.51	6.84	6.44	14.00
NetZero HiSpeed	4.49	3.22	19.02	12.29	5.24	5.48	11.34	9.56	19.40
AOL 8.0	4.81	4.43	16.64	13.70	5.56	4.97	14.03	9.77	12.81
EarthLink	6.75	5.46	16.47	16.15	10.26	5.48	19.97	15.60	17.36
NetZero	8.83	8.98	21.11	18.24	13.26	10.43	22.61	18.81	19.65
MSN	7.88	6.75	21.36	22.11	11.57	6.13	23.64	19.21	23.84

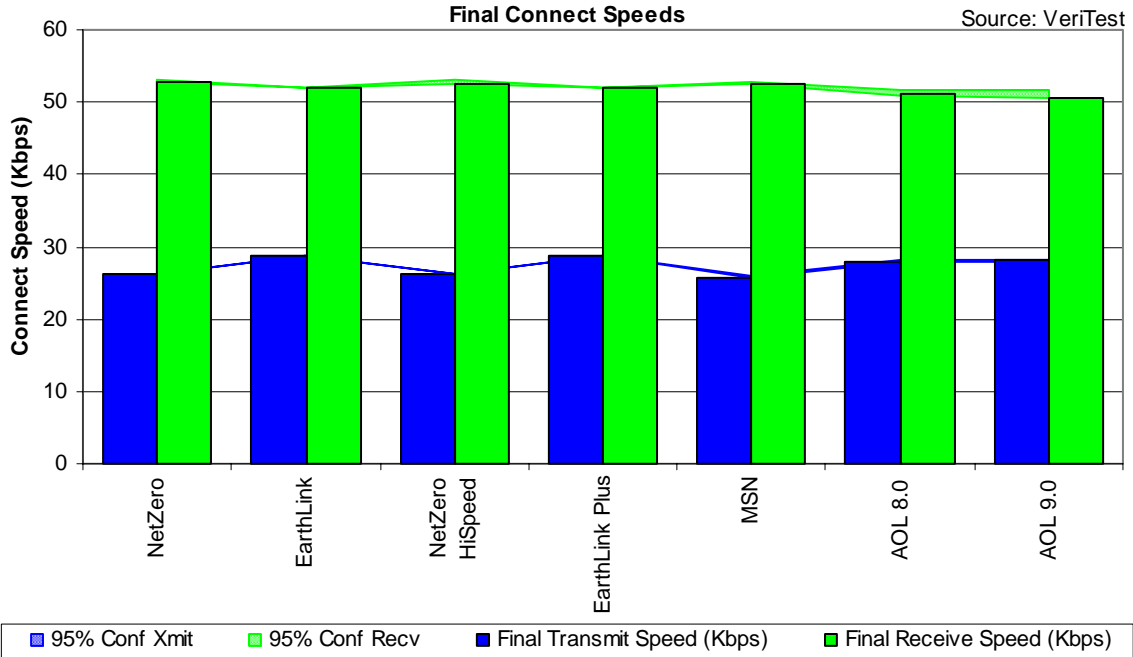
Figure 7b: Average Time to Download by URL. Lower values are better.

Figure 8 and Figure 9 show that the connections speeds measured for the AOL 9.0 client were no better on average than those for any other service tested. Therefore, the measured download performance differences are not due to superior connections.



Service	Initial Receive Speed (Kbps)	Standard Deviation	Successful Connections
NetZero	50.7	2.7	1056
NetZero HiSpeed	50.6	3.1	996
EarthLink	50.6	1.6	1118
EarthLink Plus	50.5	1.5	532
MSN	50.5	1.3	1103
AOL 8.0	49.0	5.2	1094
AOL 9.0	48.8	5.8	518

Figure 8: Initial Connect Speed. Higher values are better.



Service	Final Receive Speed (Kbps)	Final Receive StdDev	Final Transmit Speed (Kbps)	Final Transmit StdDev	Successful Connections
NetZero	52.8	2.9	26.4	0.3	1040
EarthLink	51.9	1.1	28.8	0.6	1117
NetZero HiSpeed	52.7	3.4	26.4	0.3	983
EarthLink Plus	51.9	1.0	28.8	0.6	532
MSN	52.6	1.4	25.8	1.0	1102
AOL 8.0	51.0	5.9	28.0	1.6	1092
AOL 9.0	50.7	6.5	28.2	1.5	517

Figure 9: Final Connect Speeds. Higher values are better.

VeriTest (www.veritest.com), the testing division of Lionbridge Technologies, Inc., provides outsourced testing solutions that maximize revenue and reduce costs for our clients. For companies who use high-tech products as well as those who produce them, smoothly functioning technology is essential to business success. VeriTest helps our clients identify and correct technology problems in their products and in their line of business applications by providing the widest range of testing services available.

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, Canada, 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.

For more information email us at info@veritest.com or call us at 919-380-2800.

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