

Great Works Internet

GWl Broadband DSL Service

Downstream File Transfer Throughput Comparison

of Manually Configured GWl DSL Service versus Time Warner Road Runner Standard Cable Modem Service



Test
Summary

***Premise:** The hotly contested market for residential broadband Internet access is one that often revolves largely around price. But it is important for buyers to pay close attention also to the performance they receive. In this test, in order to determine “best case” results for GWl’s DSL, GWl did not utilize its commercially available tiers, but instead manually set its modems to speeds ranging from 3.84 to 7.96 Mbps, that it thought would produce the best results for its service. Those modems were compared to TWC’s standard 3 Mbps Road Runner cable service. Tests focused on the downstream application throughput delivered by these two services.*

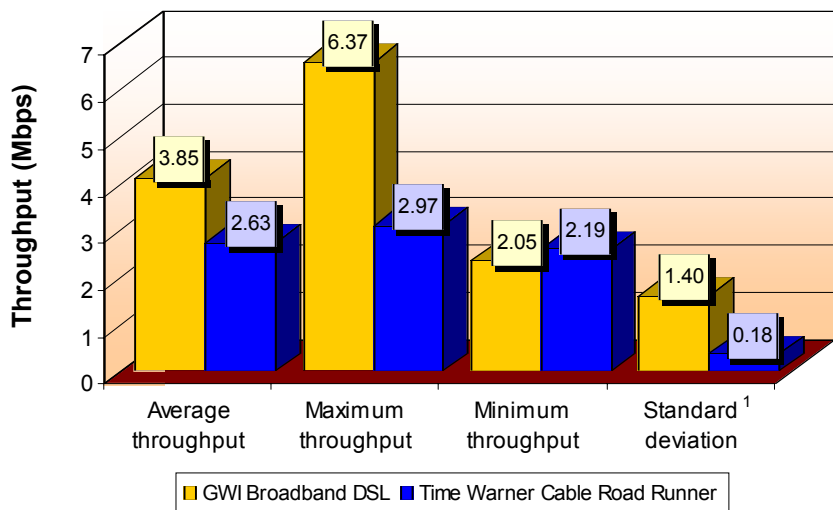
Great Works Internet commissioned The Tolly Group to evaluate its GWl DSL Service, a high-speed broadband service. Tolly Group engineers measured the downstream file-transfer application throughput of the tested GWl DSL service and compared it against throughput offered by Time Warner Cable’s (TWC) Standard 3 Mbps Road Runner cable modem service. Engineers measured application throughput from six GWl users spread across three Maine municipalities — Portland, South Portland and Biddeford¹. GWl offers three tiers of residential broadband service with speeds up to 3 Mbps/768 Kbps (“Regular” @ \$29.95), 5 Mbps/1 Mbps (“Premium” @ \$39.95), and 8 Mbps/1 Mbps (“Redline” @ \$49.95). For purposes of this test, GWl did not utilize any of these commercially available tiers, but instead manually

¹Prior to the production testing, extensive prototype testing was carried out with all DUTs. Upon completion of testing and subsequent analysis, DUT 7 production results were seen to be dramatically lower than prototype results. Upon investigation, the user informed testers that a new firewall had been put in place and that the system was unstable. The results were unreliable and thus dropped.

Test Highlights

- In the six homes tested, GWl’s manually configured modems set at speeds ranging from 3.84 to 7.96 Mbps delivered, on average, faster file transfer throughput than Time Warner Cable’s Standard 3 Mbps Road Runner service
- One GWl DSL modem, set at 7.93 Mbps, achieved a maximum bandwidth of 6.4 Mbps of downstream application throughput, which was more than twice the maximum bandwidth of the TWC Standard 3 Mbps Road Runner cable modem
- At distances over 12,000 feet from the central office to the end user, one of the two GWl DSL modems tested, which was set at 7.93 Mbps, achieved an average of more than 5.5 Mbps of downstream file transfer application throughput

Ixia IxChariot Application Throughput (File Transfer Downstream) Comparison



¹The standard deviation identifies the degree in which the throughput values can vary from the average value reported. The closer the standard deviation is to zero, the greater the chance that users will experience throughput as tested.

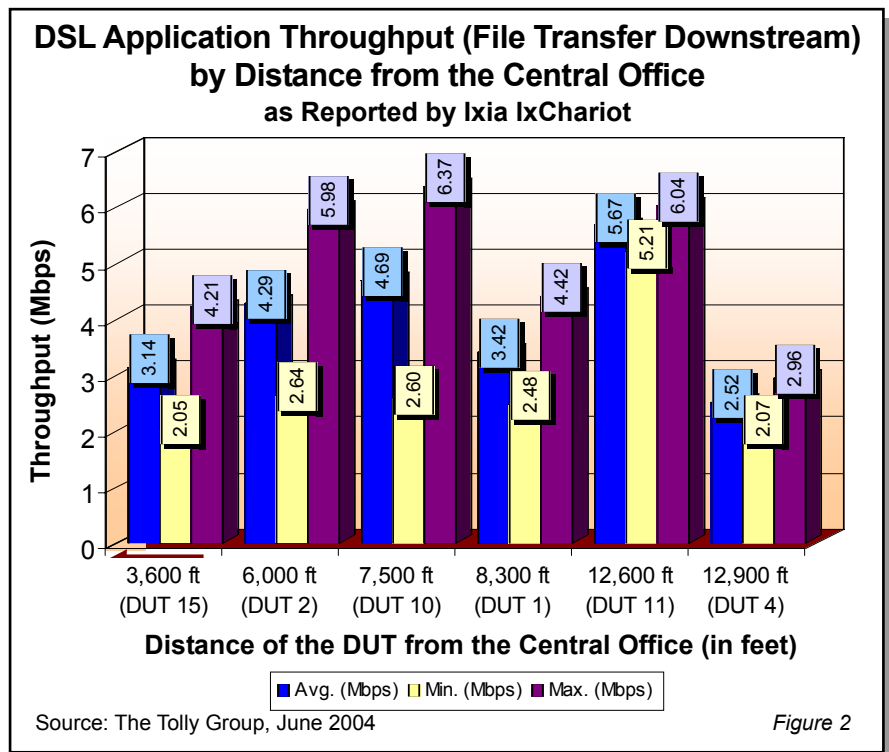
Source: The Tolly Group, June 2004

Figure 1

set its modems to speeds that it thought would produce the best results for its service. As all settings were above 3 Mbps, they would all fall within the ranges of GWl's "Premium" or "Redline" tiers.

TWC offers two tiers of residential broadband service with speed up to 3 Mbps/384 Kbps ("Standard" @ \$44.95), and 6 Mbps/512 Kbps ("Premium" @ \$84.95²). While the broadband services differed in maximum theoretical bandwidth, the TWC service and the two higher end GWl services are all offered in the \$40 to \$50 per month range. Engineers tested the application throughput of the TWC Road Runner standard 3 Mbps, service running the throughput test on three user nodes provided by TWC and five provided by GWl. Tests were conducted in June 2004.

In these tests, the GWl DSL service, when set optimally for each workstation at speeds ranging from 3.84 to 7.96 Mbps, delivered greater average bandwidth than the TWC Road Runner standard 3 Mbps cable modem service. In addition, the GWl DSL user whose speed was set at 7.93 Mbps achieved a maximum bandwidth of roughly 6.4 Mbps, which is approximately twice the maximum bandwidth of the TWC Road Runner standard 3 Mbps service. Moreover, at distances over 12,000 feet from the central office to the end user, one of the two GWl DSL users tested, whose speed was set at 7.96



Mbps, achieved an average of more than 5.5 Mbps of downstream file transfer application throughput.

Average results for the GWl DSL service tested (3.84 to 7.96 Mbps) were above 3.8 Mbps and thus higher than the 2.6 Mbps average for the TWC Road Runner standard 3 Mbps service.

RESULTS

DOWNSTREAM APPLICATION THROUGHPUT

Engineers measured the average file download throughput using Ixia IxChariot's "Throughput" script. Data traffic flowed from the server to the client.

The results for five cable stations provided by GWl and three provided by TWC were extremely close thus assuring

²At the time these tests were conducted in June 2004, TWC was not yet offering its 6 Mbps service to residential customers.

Application Throughput Downstream Nodes (Detailed Data)											
DUT #	Local connected device	Distance from Central Office (in feet)	DUT location	Transmission rate in Mbps	DUT manufacturer/ model	Operating system	CPU	RAM (Mbytes)	Service utilized by DUT	Network backbone	Customer premises equipment
1	None	8,300	Portland	4.92	Home built - N/A	WinXP	AMD 900 MHz	228	GWl Broadband	Lucent Stinger	Westell 36R15
2	Linksys router	6,000	Portland	7.96	Home built - N/A	WinXP	AMD 2.0 GHz	512	GWl Broadband	Lucent Stinger	Westell 36R15
3	Linksys router	N/A	Portland	N/A	Home built - N/A	WinXP	AMD 2700+	1,000	TWC Road Runner	Cisco 7246VXR	Motorola SBV-4200
4	Netgear hub	12,900	South Portland	3.84	Hewlett-Packard - Pavilion IV	WinXP	Pentium 4 2.0 GHz	512	GWl Broadband	Lucent Stinger	Westell 36R15
5	Linksys router	N/A	Biddeford	N/A	Home built - N/A	WinXP	AMD 1.7 GHz	512	TWC Road Runner	Cisco 7246VXR	Motorola CG4501
6	Linksys router	N/A	South Portland	N/A	IBM - 8315KHU	WinXP	Celeron 2.0 GHz	256	TWC Road Runner	Cisco 7246VXR	Motorola CG4501
7	Unix BSD firewall	13,500	Biddeford	N/A	Home built - N/A	WinXP	Pentium 4 3.0 GHz	1,000	GWl Broadband	Lucent Stinger	Westell 36R15
8	Netgear router	N/A	Biddeford	N/A	Dell - Inspiron 1100	WinXP	Pentium 4 2.2 GHz	128	TWC Road Runner	Cisco 7246VXR	Motorola CG4501
9	None	N/A	Biddeford	N/A	Dell - Dimension 4600	WinXP	Pentium 2.4 GHz	512	TWC Road Runner	Cisco 7246VXR	Motorola CG4501
10	None	7,500	Biddeford	7.93	Dell - Dimension 4600	Win2K	Pentium 3 900 733 MHz	256	GWl Broadband	Lucent Stinger	Westell 36R15
11	Belkin router	12,600	Biddeford	7.93	Home built - N/A	WinXP	AMD 1600+	640	GWl Broadband	Lucent Stinger	Westell 36R15
12	None	N/A	South Portland	N/A	Dell - Latitude D600	WinXP	Intel P4 1.6 GHz	512	TWC Road Runner	Cisco 7246VXR	Orion/2000
13	None	N/A	Biddeford	N/A	Dell - Latitude D600	WinXP	Intel P4 1.6 GHz	512	TWC Road Runner	Cisco 7246VXR	Orion/2000
14	None	N/A	Portland	N/A	Dell - Latitude D600	WinXP	Intel P4 1.6 GHz	512	TWC Road Runner	Cisco 7246VXR	Orion/2000
15	None	3,600	Biddeford	6.75	Micron PC - Transport ZX	Win2K	Pentium 3 1.0 GHz	512	GWl Broadband	Lucent Stinger	Westell 36R15

Source: The Tolly Group, June 2004

Figure 3

engineers that the cable results were legitimate. For the purposes of summarizing results for public distribution, they were combined.

GWI DSL results varied widely from approximately 2 Mbps to over 6 Mbps. GWI said that the distance from the central office as well as other line conditions contribute to this.

It is also important to note that while GWI offers three different DSL service levels to customers, the DSL stations in the test do not map to these. As the test focused on illustrating the best available DSL service for a given set of conditions, GWI modems were configured uniquely, based on their ability to hold the ideal data signaling rate over that distance. The results thus reflect a "best possible" case for GWI compared to TWC Road Runner standard 3Mbps cable modem service. In addition, TWC offers two different levels of service (3 Mbps and 6 Mbps), but only the standard 3 Mbps service was tested as the 6 Mbps service was not available at the time of the test¹.

ANALYSIS

Broadband users frequently download files from Internet-based servers. Higher effective throughput will reduce the time it takes to download any file and allow users to work with downloads more quickly.

In the six homes tested, the GWI DSL service tested (with speeds set at 3.84 to 7.96 Mbps) delivered an average of 3.85 Mbps of effective downstream application throughput during a file transfer test, versus 2.63 Mbps for TWC's Road Runner standard 3 Mbps service. Moreover, one GWI Broadband DSL user, set at 7.93 Mbps, achieved a maximum application throughput of 6.4 Mbps, which is ideal for gaming and other high-bandwidth applications.

Moreover, at distances over 12,000 feet from the central office to the end user, one of the two GWI DSL users tested, set at 7.96 Mbps, achieved an average of more than 5.5 Mbps of downstream file transfer application throughput.

TEST CONFIGURATION AND METHODOLOGY

For performance tests, The Tolly Group tested manually configured GWI Broadband DSL service and TWC Road Runner standard 3 Mbps cable modem service to determine the downstream application throughput.

The test plan called for Ixia IxChariot to be used to measure the network throughput between some dozen geographically dispersed client stations connected either to DSL or to cable modem services. IxChariot agents on these stations communicated, separately (*i.e., not simultaneously*), with a partner agent running on a "hardwired" server on the "back end" of the network. This server was positioned within GWI's infrastructure closest to a peering point.

Engineers focused the test on file transfer downloaded rates. All DSL and back-end infrastructure was set up by GWI. The Tolly Group relied on information supplied by GWI pertaining to test configurations as well as to the CO distances for DSL tests.

There were six GWI DSL stations used for the test, which were selected by GWI. There were eight TWC cable modem stations used for the test — five selected by GWI and three selected by TWC, which participated in the testing. (*Please see Equipment Acquisition and Support section for more info.*)

Tests were conducted morning, mid-day and evening with two of those time periods chosen for each test day with mid-day always included. Thus, some 10 to 20 repetitions of each test took place for each end-user PC over the course of the test. There were times when some PC end-stations did not respond to activation (e.g., inadvertent power off) and the test could not be run. This explains why the number of test runs for each device is not identical.

EQUIPMENT ACQUISITION AND SUPPORT

As per The Tolly Group's Fair Testing Charter, Time Warner was approached to participate in the tests.

Great Works Internet

GWI Broadband DSL Service

Downstream File Transfer Throughput



Great Works Internet GWI Broadband DSL Service Service Specifications*

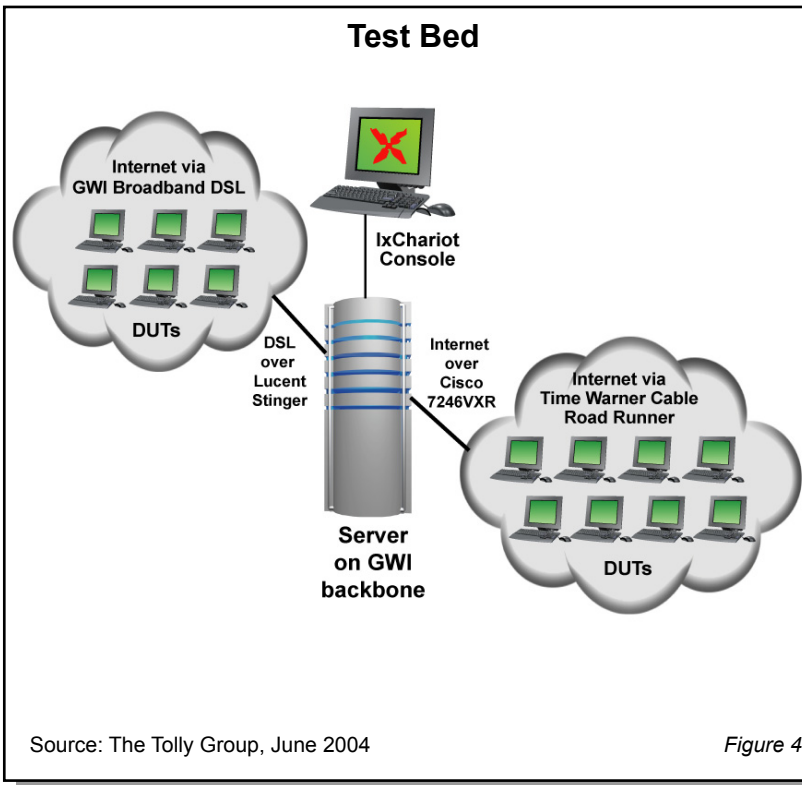
Feature

- Service available in Maine and New Hampshire
- Available in three speeds: Regular, Premium and Redline
- No long-term contracts or hardware purchase necessary
- Works on your existing phone line
- Always on...no dialing in
- Secure and consistent speeds
- Full unlimited access to the Internet and the World Wide Web
- Free modem
- Connect up to five (5) computers in your household
- Five (5) E-mail addresses/mailboxes
- 40 megabytes of space on our server for your E-mail and homepage (Additional space is available)
- SPAM filtering and virus protection service
- GWI WebMail to access your E-mail while on the road
- Toll-free, local 24/7 technical support
- Back-up dial-up account
- Travel access service (@ \$0.09 per minute)

For more information contact:

Great Works Internet
8 Pomerleau Street
Biddeford, ME 04005
Phone: (207) 286-8686 ext. 133
Fax: (207) 286-2061
URL: <http://www.gwi.net>

**Vendor-supplied information not verified by The Tolly Group*



The company responded quickly and agreed to participate. Their natural concern was to be certain that Tolly Group testing accurately reflected Road Runner service at the time of the test. To this end Tolly requested and was provided three nodes. Time Warner was not told that its 3 Mbps Standard service would be compared to GWI’s manually configured modems.

As per our policy, we shared only the Road Runner throughput results with Time Warner. Company representatives had expressed some questions/concerns about some of the transaction tests but since it was determined not to publish these tests, this was not an issue. They did not express any issues with the file transfer download test results for the Road Runner results.

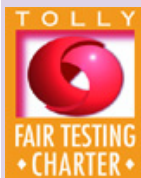
The Tolly Group gratefully acknowledges the providers of test equipment used in this project.

Vendor	Product	Web address
Ixia	IxChariot Console v5.0	http://www.ixiacom.com
Ixia	IxChariot EndPoint v5.0	http://www.ixiacom.com

PERFORMANCE VERIFIED
By **IXIA**

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For info on the Fair Testing Charter, visit: <http://www.tolly.com/Corporate/FTC.aspx>

PROJECT PROFILE

- Sponsor:** Great Works Internet
- Document number:** 204135
- Service class:** Broadband DSL Service
- Services under test:**
 - GWI Broadband DSL
 - Time Warner Cable Road Runner
- Testing window:** June 2004

For more information on this document, or other services offered by The Tolly Group, visit our World Wide Web site at <http://www.tolly.com>, send E-mail to sales@tolly.com, call (561) 391-5610.

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