هيئة تنظيم الاتصالات
Telecommunications Regulatory Authority

Fixed Broadband Analysis Report
01 July 2012 – 30 September 2012 between 00:00:00 and 24:00:00 Bahrain

Published 07 October 2012

Public Document

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Introduction

Broadband, defined as a technology that enables high speed transfer of data, is inextricably linked to the emergence of the Internet. Investment in and adoption of broadband increased exponentially around the world since the middle of the 1990s. Broadband benefit the economy of a country in different ways, direct contribution to the Gross Domestic Products (GDP), productivity gains and specific impact on the economy with the development of eCommerce.

Broadband is part of the Kingdom of Bahrain 2030 vision and it is the duty of TRA to ensure the necessary regulatory environment is in place that will pave the way to the future state of the art infrastructure and services in a healthy competitive environment for the general benefit of citizen and consumers

Whilst ISPs do provide the basic level of information required to allow customers to make decisions relating to price, expected download speed and download threshold, they do not make available information relating to the download, upload and browsing performance experienced on average by consumers.

Via this report TRA aim at providing consumers with data relating to the actual quality of service achieved by each of the monitored ISP Services to allow consumers to make informed decisions with respect to understanding what is likely to be provided by each ISP on the specific measured packages. It is not feasible for the TRA to monitor all the available packages from all ISPs and therefore the choice has been made to focus on the 2 Mbps packages for aDSL, Fiber and WiMax Services from the following ISPs:

aDSL:	2Connect, Batelco, Etisalcom, Kalaam, Lightspeed,
Fiber:	NueTel
WiMax:	Menatelecom, Zain

Beside the difference in access technologies between aDSL, Fiber and WiMax, other important elements such as network load and dimensioning, network capacity towards the global internet and ISPs internal engineering rules based on specific commercial objectives have all an impact on end user experience.

ISPs are continuously working at optimizing their respective networks, results between two specific measurement period are subject to change however after several consecutive quarterly measurements quarters TRA is confident that industry trends have established.

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Measurements Methods Overview

The primary objective of the Broadband Quality of Service monitoring platform is to conduct a pre-defined set of tests each hour of the day, 7 days a week, 52 weeks of the year using standard fixed residential broadband connections supplied by each of the Kingdom's ISPs. The results of these tests are transmitted in near real time to, and stored in a centralised database server.

From each ISP two internet connections have been purchased and are monitored using the Epitiro Broadband Quality of Service monitoring platform. Standardised tests are conducted from test probes that have been deployed on each of the broadband connections under this test program . The tests involve requests being sent towards a standard specified list of public websites as well as dedicated servers located in the Kingdom of Bahrain, USA , Asia and Europe.

To ensure the accuracy of the information gathered each probe is constantly monitored and any issues identified are recorded and resolved remotely by the contractor.

Diagram 1 provides a overview of the system that has been implemented. For the sake of simplicity only three of the eight ISPs connected to the platform and only one of the Epitiro Ltd endpoints have been illustrated.

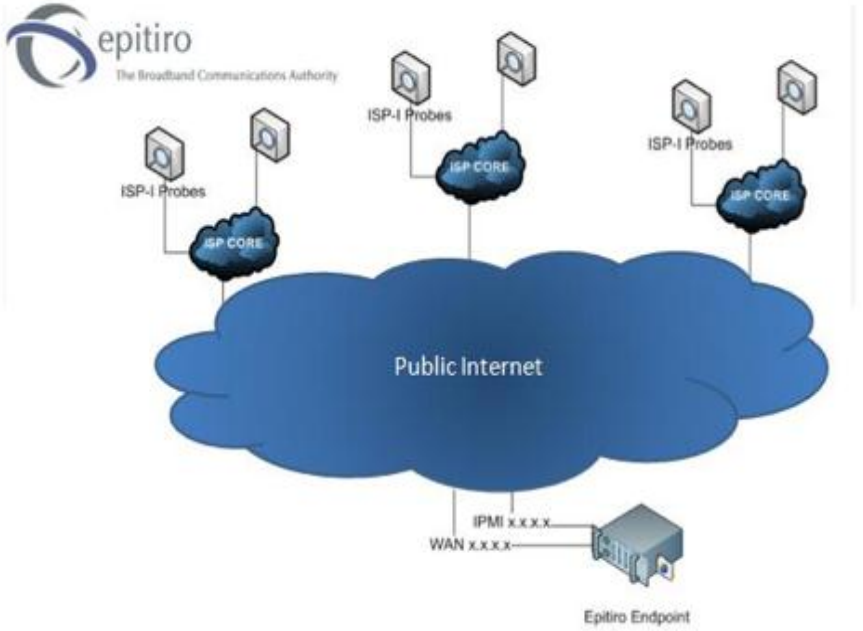

Diagram 1 - Broadband Quality of Service test platform overview

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Noticeable events this Quarter

During this quarter, cross border interference with Kingdom of Saudi Arabia requested WiMax operators Menatelecom and Zain to alter the configuration of their respective networks, creating potential service performance degradation in specific areas not necessarily captured in this audit.

Average TCP download performance remained stable compared to last quarter reaching 1.56 Mbps.

Average TCP upload speed also remained stable compared to last quarter at 0.66 Mbps.

HTTP performance evolution between peak hour and out of peak remains limited within a 10 kBytes/s window for most ISPs.

Average Domain Name Server resolution time slightly increased from 50 milliseconds to 56 milliseconds mainly due to 2Connect performance evolution.

Network latency (ping) performance has stabilized compared to last quarter.

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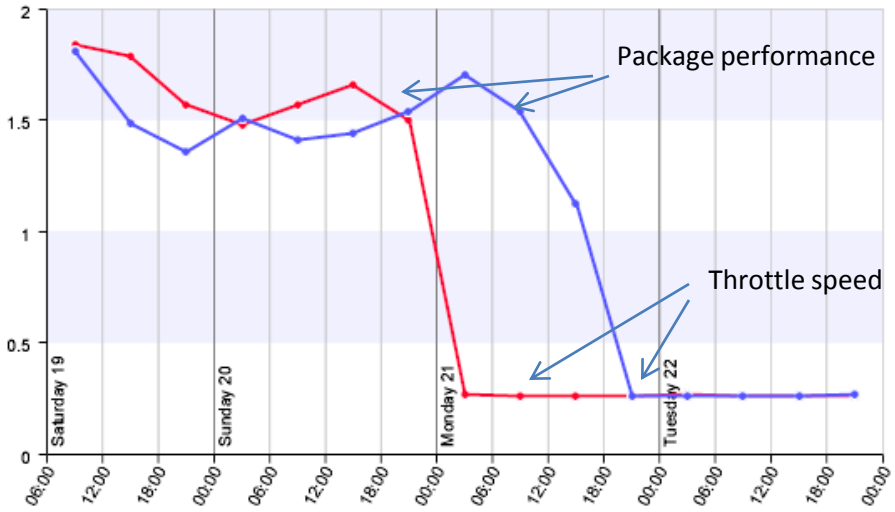
Highlight on Fair Usage Policy

Most Broadband packages in the Kingdom are delivered with FUP or download threshold levels, this means a fixed number of data packets, measured in Bytes (MB or GB), that can be downloaded as part of a specific data package. When the threshold is met, ISPs throttle down connection speed until the start of the next billing month. Consumer can choose to pay extra at published price to keep package performance.

The diagram illustrate FUP mechanism at work for two individual 2Mbps broadband packages being throttle at 256Kbps.

Fair Usage Policy when triggered can have a significant impact of the average performance of a service for the month.

In the example shown FUP was triggered on the 21st of the month, this represent 30% of the time.



For consumer, the presence (or absence) of Fair Usage Policy is an important element to take into account in the choice of a Broadband package. When using the service, knowing FUP consumption allow consumer to better manage download allocation and plan for upgrade to higher threshold level, if necessary, to maintain a continuous performance level throughout the month.

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RESULTS

The following pages present the result of measurements taken every hour for each audited service during the period of Q3 2012, from 00:00:00 on the 1 July 2012 to 24:00:00 on the 30 September 2012.

For each ISP, one set of measurements is taken each hour, 24 hours a day. In this report, results for a given hour are then averaged to determine the average QoS in that hour over the three month period. i.e. all results recorded between 8:00 and 9:00 for an ISP are averaged and reported as one observation on the graph that provide the average performance of this specific time period over a three month period.

This method has the advantage that it can show trends over an audited period as well as show variations during a 24h period.

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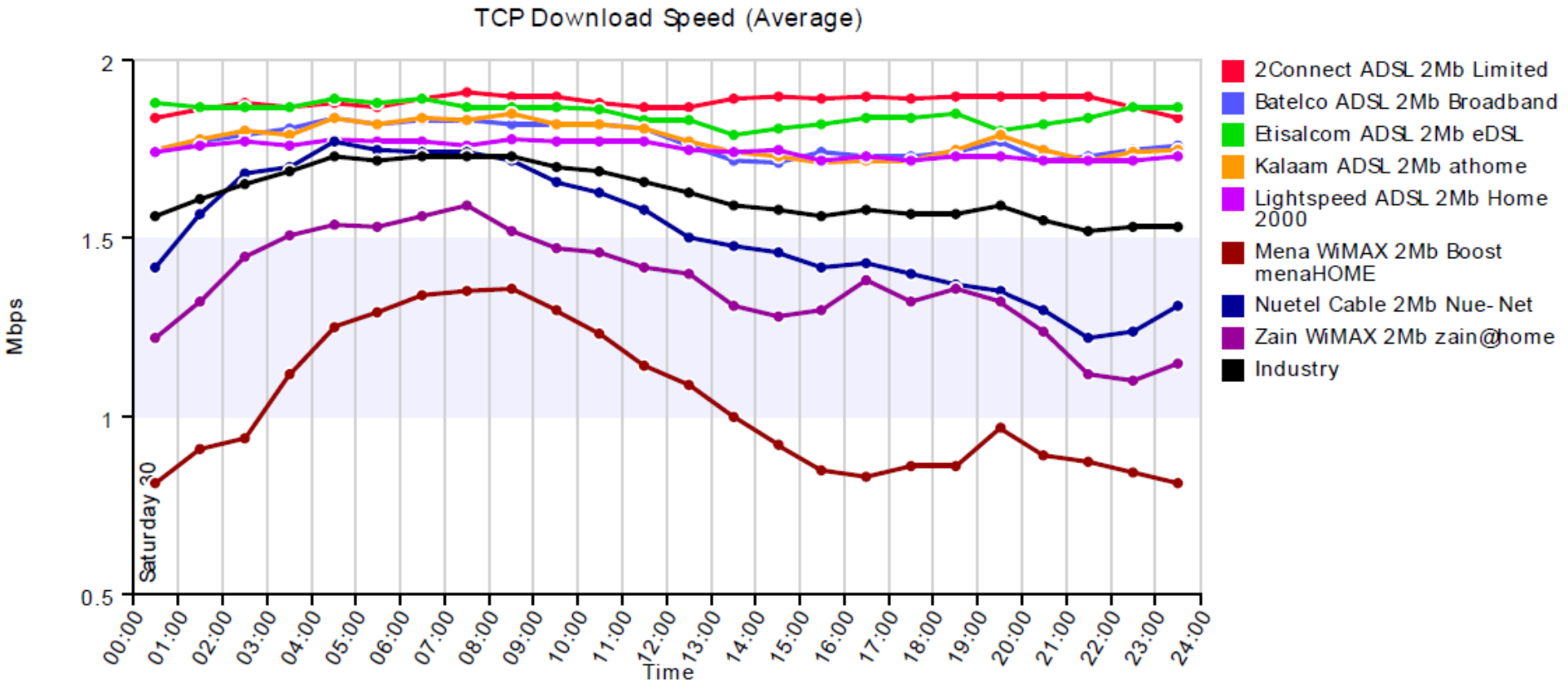
TCP Download Speed (Average)

TCP Download Speed (Average) Line Chart (Peer view)

01 Jul 2012 - 30 Sep 2012, between 00:00:00 and 24:00:00 Asia/Bahrain



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TCP Download Speed (Average) Line Chart Values (Peer view)

01 Jul 2012 - 30 Sep 2012, between 00:00:00 and 24:00:00 Asia/Bahrain

	00:00, 30 Jun	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
2Connect ADSL 2Mb Limited	1.84	1.86	1.88	1.87	1.88	1.87	1.89	1.91	1.90	1.90	1.88	1.87	1.87	1.89	1.90	1.89	1.90	1.89	1.90	1.90	1.90	1.90	1.87	1.84
Batelco ADSL 2Mb Broadband	1.75	1.77	1.79	1.81	1.84	1.82	1.83	1.83	1.82	1.82	1.82	1.81	1.76	1.72	1.71	1.74	1.73	1.73	1.74	1.77	1.72	1.73	1.75	1.76
Etisalcom ADSL 2Mb eDSL	1.88	1.87	1.87	1.87	1.89	1.88	1.89	1.87	1.87	1.87	1.86	1.83	1.83	1.79	1.81	1.82	1.84	1.84	1.85	1.80	1.82	1.84	1.87	1.87
Kalaam ADSL 2Mb athome	1.75	1.78	1.80	1.79	1.84	1.82	1.84	1.83	1.85	1.82	1.82	1.81	1.77	1.74	1.73	1.71	1.72	1.72	1.75	1.79	1.75	1.72	1.74	1.75
Lightspeed ADSL 2Mb Home 2000	1.74	1.76	1.77	1.76	1.78	1.77	1.77	1.76	1.78	1.77	1.77	1.77	1.75	1.74	1.75	1.72	1.73	1.72	1.73	1.73	1.72	1.72	1.72	1.73
Mena WiMAX 2Mb Boost menaHOME	0.81	0.91	0.94	1.12	1.25	1.29	1.34	1.35	1.36	1.30	1.23	1.14	1.09	1.00	0.92	0.85	0.83	0.86	0.86	0.97	0.89	0.87	0.84	0.81
Nuetel Cable 2Mb Nue-Net	1.42	1.57	1.68	1.70	1.77	1.75	1.74	1.74	1.72	1.66	1.63	1.58	1.50	1.48	1.46	1.42	1.43	1.40	1.37	1.35	1.30	1.22	1.24	1.31
Zain WiMAX 2Mb zain@home	1.22	1.32	1.45	1.51	1.54	1.53	1.56	1.59	1.52	1.47	1.46	1.42	1.40	1.31	1.28	1.30	1.38	1.32	1.36	1.32	1.24	1.12	1.10	1.15

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TCP download measurements (Mbit/s)

TCP (Transfer Control Protocol) throughput tests measuring download speeds are conducted at a raw socket level (a socket that allows access to the underlying transport provider (ISP) that is supported by protocols such as IPv4 and IPv6) in order to test the full capacity of the connection. The probe is configured to initiate multiple TCP sessions and simultaneously use all of the open sessions for the transmission of data. This effectively “floods” the connection and reports the throughput capacity of the line.

The test is conducted using a server endpoint running proprietary software that is hosted in a well peered data centre. Whilst the port through which the test is typically conducted is configurable, it is normal for port 80 to be used since this minimises the possibility of the traffic being managed or throttled during the test by an ISP. Once the session has been initiated standard data files are transmitted from the endpoint server to the probe and measurements taken of the download throughput of the connection. The test probe measures the time taken to transfer data and the volume of data transferred in a specific time. From these measurements the TCP download speeds can be derived.

The higher is the download speed the better is the performance.

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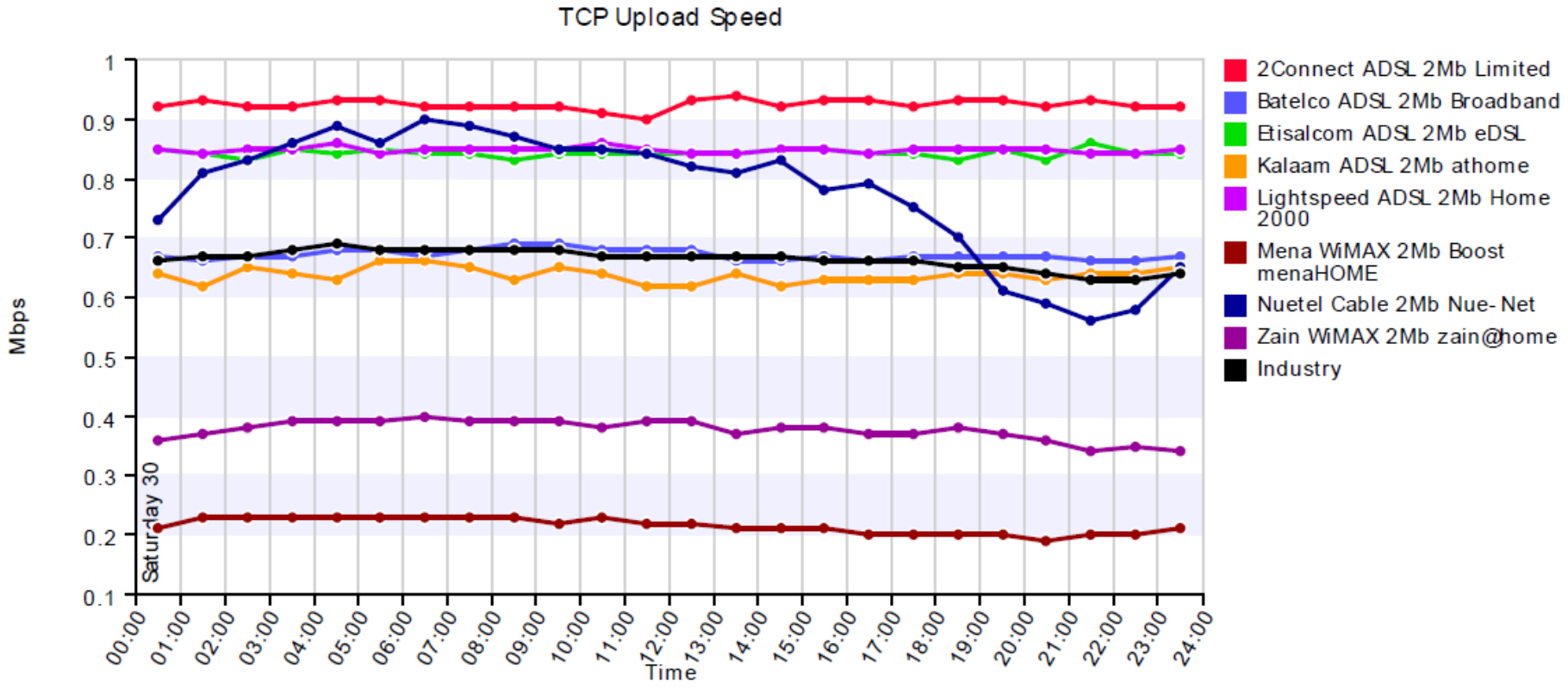
TCP Upload Speed (Average)

TCP Upload Speed (Average) Line Chart (Peer view)

01 Jul 2012 - 30 Sep 2012, between 00:00:00 and 24:00:00 Asia/Bahrain



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TCP Upload Speed (Average) Line Chart Values (Peer view)

01 Jul 2012 - 30 Sep 2012, between 00:00:00 and 24:00:00 Asia/Bahrain

	00:00, 30 Jun	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
2Connect ADSL 2Mb Limited	0.92	0.93	0.92	0.92	0.93	0.93	0.92	0.92	0.92	0.92	0.91	0.90	0.93	0.94	0.92	0.93	0.93	0.92	0.93	0.93	0.92	0.93	0.92	0.92
Batelco ADSL 2Mb Broadband	0.67	0.66	0.67	0.67	0.68	0.68	0.67	0.68	0.69	0.69	0.68	0.68	0.68	0.66	0.66	0.67	0.66	0.67	0.67	0.67	0.67	0.66	0.66	0.67
Etisalcom ADSL 2Mb eDSL	0.85	0.84	0.83	0.85	0.84	0.85	0.84	0.84	0.83	0.84	0.84	0.84	0.84	0.84	0.85	0.85	0.84	0.84	0.83	0.85	0.83	0.86	0.84	0.84
Kalaam ADSL 2Mb athome	0.64	0.62	0.65	0.64	0.63	0.66	0.66	0.65	0.63	0.65	0.64	0.62	0.62	0.64	0.62	0.63	0.63	0.63	0.64	0.64	0.63	0.64	0.64	0.65
Lightspeed ADSL 2Mb Home 2000	0.85	0.84	0.85	0.85	0.86	0.84	0.85	0.85	0.85	0.85	0.86	0.85	0.84	0.84	0.85	0.85	0.84	0.85	0.85	0.85	0.85	0.84	0.84	0.85
Mena WiMAX 2Mb Boost menaHOME	0.21	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.22	0.23	0.22	0.22	0.21	0.21	0.21	0.20	0.20	0.20	0.20	0.19	0.20	0.20	0.21
Nuetel Cable 2Mb Nue-Net	0.73	0.81	0.83	0.86	0.89	0.86	0.90	0.89	0.87	0.85	0.85	0.84	0.82	0.81	0.83	0.78	0.79	0.75	0.70	0.61	0.59	0.56	0.58	0.65
Zain WiMAX 2Mb zain@home	0.36	0.37	0.38	0.39	0.39	0.39	0.40	0.39	0.39	0.39	0.38	0.39	0.39	0.37	0.38	0.38	0.37	0.37	0.38	0.37	0.36	0.34	0.35	0.34

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TCP upload measurements (Mbits/s)

TCP (Transfer Control Protocol) throughput tests measuring upload speeds are conducted at a raw socket level (a socket that allows access to the underlying transport provider (ISP) that is supported by protocols such as IPv4 and IPv6) in order to test the full capacity of the connection. The probe is configured to initiate multiple TCP sessions and simultaneously use all of the open sessions for the transmission of data. This effectively "floods" the connection and reports the throughput capacity of the line.

The test is conducted using a server endpoint running proprietary software that is hosted in a well peered data centre. Whilst the port through which the test is typically conducted is configurable, it is normal for port 80 to be used since this minimizes the possibility of the traffic being managed or throttled during the test by an ISP. Once the session has been initiated standard data files are transmitted from the probe to the endpoint server and measurements taken of the upload throughput of the connection. The test probe measures the time taken to transfer data and the volume of data transferred in a specific time. From these measurements the TCP upload speeds can be derived.

The higher is the upload speed the better is the performance.

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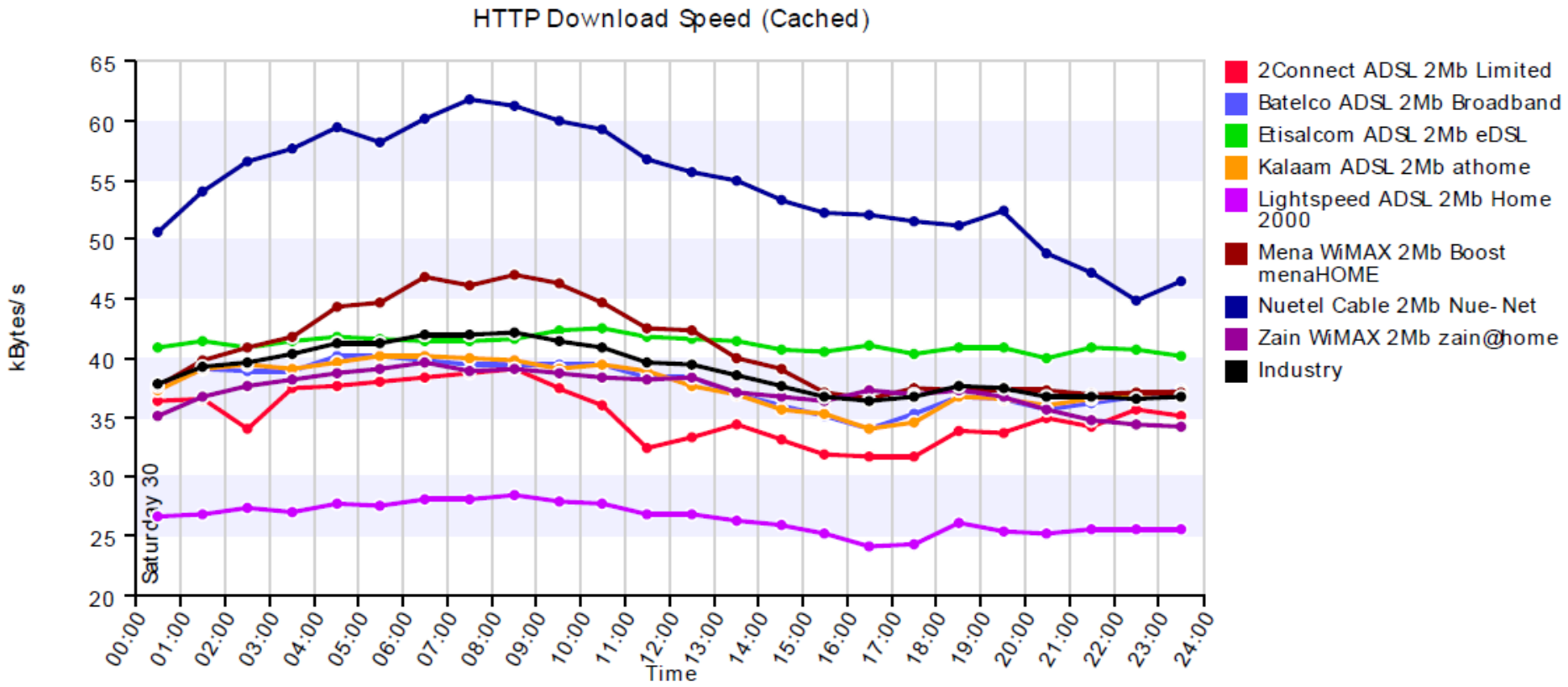
HTTP Download Speed (Cached)

HTTP Download Speed (Cached) Line Chart (Peer view)

01 Jul 2012 - 30 Sep 2012, between 00:00:00 and 24:00:00 Asia/Bahrain



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HTTP Download Speed (Cached) Line Chart Values (Peer view)

01 Jul 2012 - 30 Sep 2012, between 00:00:00 and 24:00:00 Asia/Bahrain

	00:00, 30 Jun	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
2Connect ADSL 2Mb Limited	36.29	36.63	33.99	37.45	37.68	37.99	38.40	38.80	39.07	37.42	35.97	32.42	33.34	34.44	33.16	31.93	31.79	31.64	33.87	33.62	35.00	34.19	35.64	35.18
Batelco ADSL 2Mb Broadband	37.48	39.07	38.85	38.85	40.16	40.21	39.86	39.50	39.39	39.40	39.44	38.31	38.29	36.88	36.09	35.15	34.07	35.35	36.83	36.56	35.65	36.28	36.82	37.35
Etisalcom ADSL 2Mb eDSL	40.95	41.38	40.94	41.43	41.74	41.54	41.39	41.43	41.62	42.27	42.44	41.76	41.68	41.35	40.74	40.51	41.01	40.40	40.93	40.91	40.02	40.94	40.70	40.22
Kalaam ADSL 2Mb athome	37.23	39.11	39.41	39.13	39.61	40.11	40.24	39.93	39.71	39.07	39.42	38.94	37.61	37.00	35.71	35.34	34.11	34.66	36.75	36.47	35.98	36.47	36.93	37.10
Lightspeed ADSL 2Mb Home 2000	26.70	26.81	27.40	27.10	27.83	27.60	28.04	28.17	28.39	27.92	27.77	26.89	26.75	26.22	25.94	25.22	24.09	24.24	26.10	25.46	25.17	25.51	25.54	25.64
Mena WiMAX 2Mb Boost menaHOME	37.62	39.87	40.83	41.73	44.29	44.60	46.76	46.03	47.04	46.28	44.59	42.57	42.28	39.94	39.11	37.13	36.59	37.53	37.25	37.32	37.37	37.00	37.12	37.19
Nuetel Cable 2Mb Nue-Net	50.58	54.03	56.54	57.59	59.35	58.08	60.13	61.68	61.14	59.91	59.20	56.66	55.67	54.84	53.30	52.27	51.95	51.52	51.22	52.47	48.87	47.24	44.81	46.46
Zain WiMAX 2Mb zain@home	35.08	36.79	37.67	38.17	38.73	39.02	39.69	38.87	39.15	38.80	38.29	38.15	38.32	37.08	36.80	36.33	37.20	36.95	37.37	36.78	35.62	34.81	34.34	34.17

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HTTP Measurements (Download Speed - Cache) (Kbytes/s)

The HTTP (HyperText Transfer Protocol) test makes a request to a specified URL (Uniform Resource Locator) and records the time taken and the amount of data downloaded, from which the speed of the download is derived. Depending on the configuration of the test, test probe is also able to download the embedded content (e.g. images on a web page) in any HTML (HyperText Markup Language) that results from the HTTP request.

Any additional content downloaded is reflected in the captured timings and size of data downloaded. Additionally, the HTTP test can be configured to run in one of two modes of operation: cached and non-cached. When the test downloads from the specified URL in “cached” mode, the speed of the download could be impacted by any caching mechanisms implemented by the network provider.

The higher is the download speed the better is the performance.

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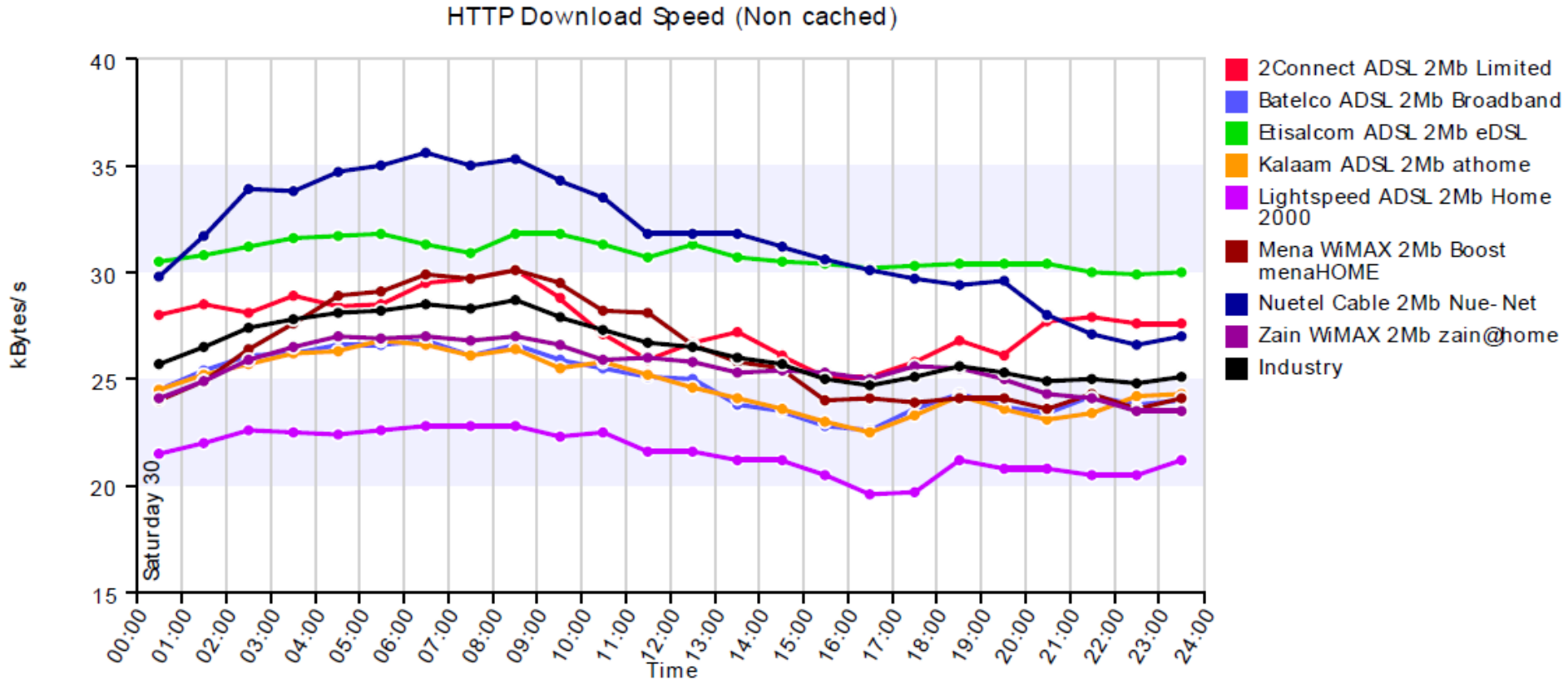
HTTP Download Speed (Non cached)

HTTP Download Speed (Non cached) Line Chart (Peer view)

01 Jul 2012 - 30 Sep 2012, between 00:00:00 and 24:00:00 Asia/Bahrain



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HTTP Download Speed (Non cached) Line Chart Values (Peer view)

01 Jul 2012 - 30 Sep 2012, between 00:00:00 and 24:00:00 Asia/Bahrain

	00:00, 30 Jun	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
2Connect ADSL 2Mb Limited	28.01	28.49	28.12	28.88	28.35	28.54	29.51	29.74	30.07	28.83	27.06	25.92	26.69	27.22	26.12	25.05	25.14	25.75	26.79	26.09	27.66	27.88	27.62	27.63
Batelco ADSL 2Mb Broadband	24.49	25.37	26.10	26.18	26.60	26.65	26.77	26.10	26.56	25.88	25.54	25.15	25.01	23.84	23.53	22.82	22.65	23.56	24.29	23.71	23.39	24.19	23.84	24.04
Etisalcom ADSL 2Mb eDSL	30.45	30.77	31.22	31.63	31.69	31.82	31.31	30.86	31.82	31.77	31.34	30.66	31.25	30.73	30.54	30.40	30.21	30.29	30.41	30.44	30.38	29.97	29.90	29.97
Kalaam ADSL 2Mb athome	24.53	25.19	25.66	26.17	26.26	26.80	26.63	26.12	26.39	25.51	25.76	25.21	24.56	24.14	23.59	23.03	22.54	23.30	24.19	23.61	23.07	23.42	24.16	24.32
Lightspeed ADSL 2Mb Home 2000	21.51	21.97	22.65	22.51	22.40	22.56	22.78	22.76	22.76	22.33	22.48	21.59	21.61	21.23	21.23	20.46	19.63	19.73	21.21	20.83	20.76	20.52	20.54	21.17
Mena WiMAX 2Mb Boost menaHOME	23.95	24.93	26.44	27.61	28.86	29.08	29.90	29.72	30.09	29.45	28.19	28.10	26.55	25.79	25.45	24.02	24.05	23.89	24.08	24.07	23.59	24.33	23.59	24.12
Nuetel Cable 2Mb Nue-Net	29.83	31.74	33.85	33.75	34.73	34.97	35.62	35.05	35.33	34.31	33.50	31.75	31.82	31.76	31.19	30.57	30.08	29.72	29.43	29.59	27.96	27.15	26.60	26.95
Zain WiMAX 2Mb zain@home	24.12	24.93	25.92	26.52	26.98	26.87	27.00	26.77	26.98	26.60	25.91	26.03	25.82	25.28	25.35	25.26	25.03	25.58	25.52	24.97	24.27	24.07	23.47	23.53

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HTTP Measurements (Download Speed - Non Cache) (Kbytes/s)

The HTTP (HyperText Transfer Protocol) test makes a request to a specified URL (Uniform Resource Locator) and records the time taken and the amount of data downloaded, from which the speed of the download is derived. Depending on the configuration of the test, test probe is also able to download the embedded content (e.g. images on a web page) in any HTML (HyperText Markup Language) that results from the HTTP request.

Any additional content downloaded is reflected in the captured timings and size of data downloaded. Additionally, the HTTP test can be configured to run in one of two modes of operation: cached and non-cached. When the test downloads from the specified URL in ““non-cached” mode a random query parameter is appended to the end of the URL, which will result in the request bypassing any caches present in the network, and the request will be serviced by the web server specified in the URL as opposed to any cache.

The higher is the download speed the better is the performance.

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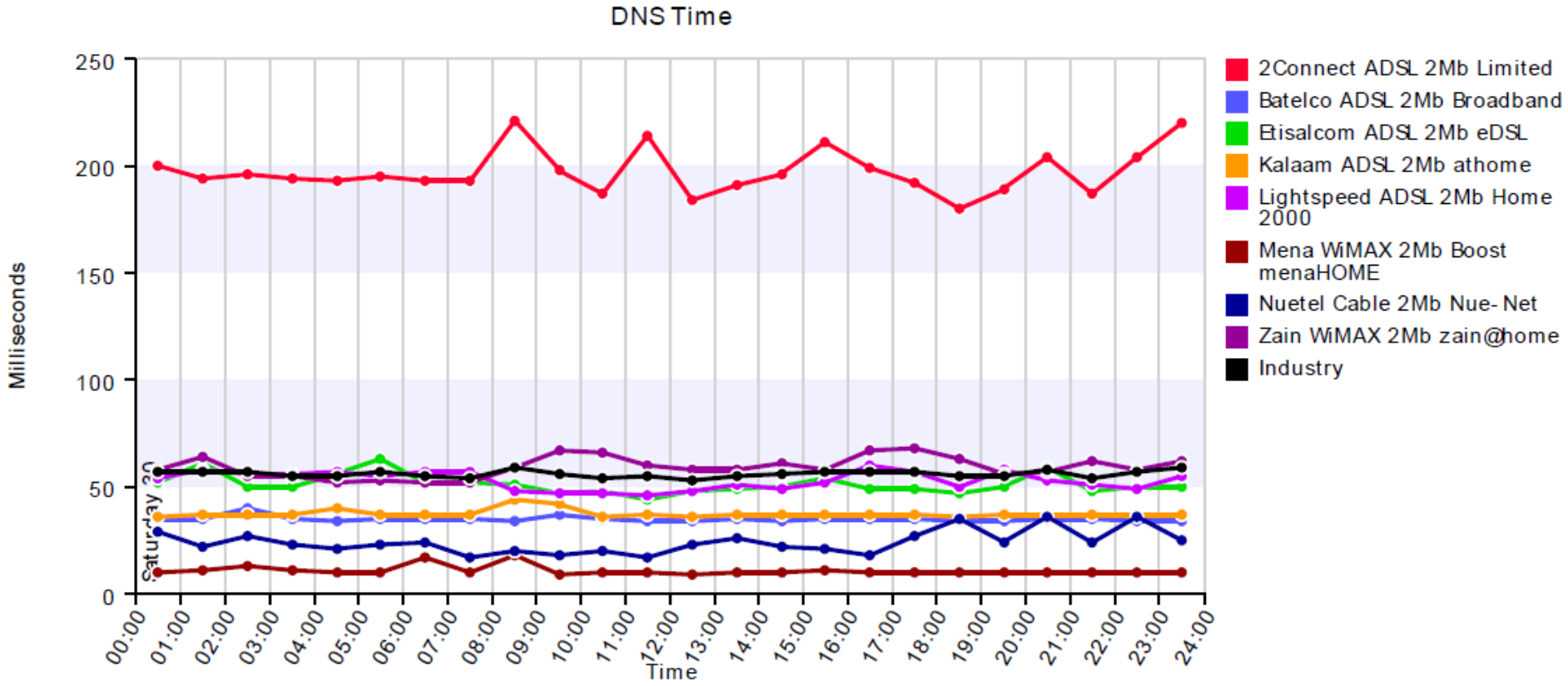
DNS Time

DNS Time Line Chart (Peer view)

01 Jul 2012 - 30 Sep 2012, between 00:00:00 and 24:00:00 Asia/Bahrain



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DNS Time Line Chart Values (Peer view)

01 Jul 2012 - 30 Sep 2012, between 00:00:00 and 24:00:00 Asia/Bahrain

	00:00, 30 Jun	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
2Connect ADSL 2Mb Limited	200	194	196	194	193	195	193	193	221	198	187	214	184	191	196	211	199	192	180	189	204	187	204	220
Batelco ADSL 2Mb Broadband	35	35	40	35	34	35	35	35	34	37	35	34	34	35	34	35	35	35	34	34	35	35	34	34
Etisalcom ADSL 2Mb eDSL	52	61	50	50	56	63	52	52	51	47	48	44	48	49	50	54	49	49	47	50	59	48	50	50
Kalaam ADSL 2Mb athome	36	37	37	37	40	37	37	37	44	42	36	37	36	37	37	37	37	37	36	37	37	37	37	37
Lightspeed ADSL 2Mb Home 2000	54	58	56	56	57	55	57	57	48	47	47	46	48	51	49	52	60	57	50	58	53	51	49	55
Mena WiMAX 2Mb Boost menaHOME	10	11	13	11	10	10	17	10	18	9	10	10	9	10	10	11	10	10	10	10	10	10	10	10
Nuetel Cable 2Mb Nue-Net	29	22	27	23	21	23	24	17	20	18	20	17	23	26	22	21	18	27	35	24	36	24	36	25
Zain WiMAX 2Mb zain@home	58	64	55	55	52	53	52	52	59	67	66	60	58	58	61	58	67	68	63	56	57	62	58	62

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DNS Time (Domain Name System) (Milliseconds)

The DNS test records the time taken (in milliseconds) to resolve a fully qualified domain name to a corresponding IP address. The DNS servers used for the query are the DNS servers (primary and secondary) dynamically assigned by the service provider when the network connection is initiated. Alternatively a specific DNS server can be configured for use during DNS tests. The test probe disables the Windows DNS Client Service responsible for caching the results of DNS requests so that the DNS query is performed on the DNS servers, and not returned from any local cache.

The shorter the DNS resolution time is the better is the performance.

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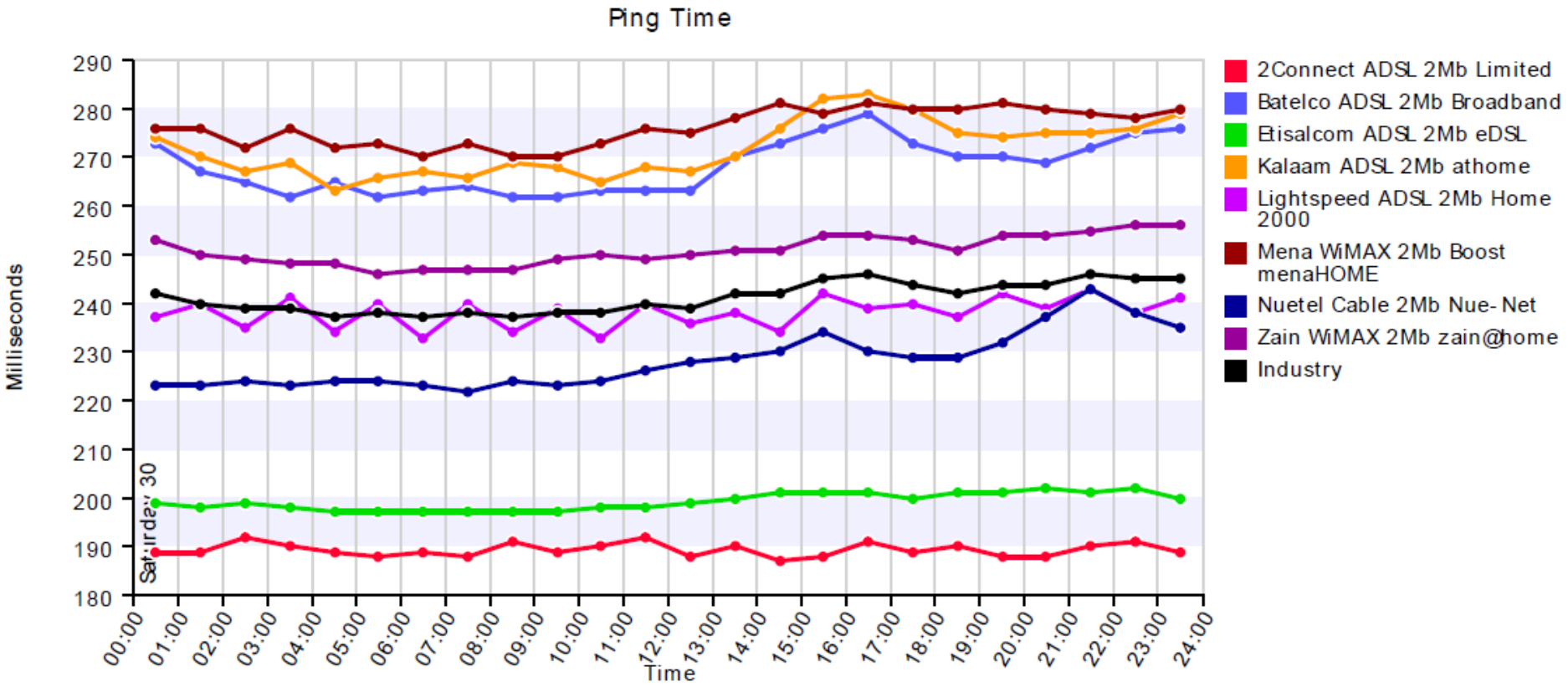
Ping Time

Ping Time Line Chart (Peer view)

01 Jul 2012 - 30 Sep 2012, between 00:00:00 and 24:00:00 Asia/Bahrain



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Ping Time Line Chart Values (Peer view)

01 Jul 2012 - 30 Sep 2012, between 00:00:00 and 24:00:00 Asia/Bahrain

	00:00, 30 Jun	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
2Connect ADSL 2Mb Limited	189	189	192	190	189	188	189	188	191	189	190	192	188	190	187	188	191	189	190	188	188	190	191	189
Batelco ADSL 2Mb Broadband	273	267	265	262	265	262	263	264	262	262	263	263	263	270	273	276	279	273	270	270	269	272	275	276
Etisalcom ADSL 2Mb eDSL	199	198	199	198	197	197	197	197	197	197	198	198	199	200	201	201	201	200	201	201	202	201	202	200
Kalaam ADSL 2Mb athome	274	270	267	269	263	266	267	266	269	268	265	268	267	270	276	282	283	280	275	274	275	275	276	279
Lightspeed ADSL 2Mb Home 2000	237	240	235	241	234	240	233	240	234	239	233	240	236	238	234	242	239	240	237	242	239	243	238	241
Mena WiMAX 2Mb Boost menaHOME	276	276	272	276	272	273	270	273	270	270	273	276	275	278	281	279	281	280	280	281	280	279	278	280
Nuetel Cable 2Mb Nue-Net	223	223	224	223	224	224	223	222	224	223	224	226	228	229	230	234	230	229	229	232	237	243	238	235
Zain WiMAX 2Mb zain@home	253	250	249	248	248	246	247	247	247	249	250	249	250	251	251	254	254	253	251	254	254	255	256	256

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Ping Time (Latency) (Milliseconds)

The Ping test measures network latency by sending an ICMP (Internet Control Message Protocol) echo request to the specified server. The time recorded by test probe is the total round trip time (in milliseconds) from the request to the echo response being received from the server.
The measurements reported are the average time for tests to servers located in Bahrain, Europe and the USA.

The shorter the Latency is the better is the performance.

End of document

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