

Recommendation on Consultation Paper on Review of
Data Speeds under Wireless Broadband
for





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1. IS THE INFORMATION ON WIRELESS BROADBAND SPEEDS CURRENTLY BEING MADE AVAILABLE TO CONSUMERS IS TRANSPARENT ENOUGH FOR MAKING INFORMED CHOICES?

Information on wireless broadband speeds is inadequate, not fully trustworthy and is not available in the public domain. In terms of data speeds/ experience there are no standards/ benchmarks which can help a common consumer **compare one operator's service with that of the other.**

To bring more transparency regulator has mandated certain disclosures like data speed, contract terms, tariff, latency, etc. to be made by service providers to their customers; compliance of which is submitted by the operators, an interested party. These are not verified by TRAI or any third-party audit agency, hence are not fully trustworthy.

Ideally a consumer who is dissatisfied with the services or prices offered by their operator, should be able to easily switch to another provider, however there are certain challenges like, in the existing mechanism there is a lack of common platform which gives clear comparison of various schemes/ prices/ data packs, level of service expected, popular packs etc. for all service providers in shape and form which is clearly understood by the consumer, so as to enable users to make better informed choices while buying data packs.

2. IF IT IS DIFFICULT TO COMMIT A MINIMUM DOWNLOAD SPEED, THEN COULD AVERAGE SPEED BE SPECIFIED BY THE SERVICE PROVIDERS? WHAT SHOULD BE THE PARAMETERS FOR CALCULATING AVERAGE SPEED?

Instead of indicating the average speed per opted plan, TRAI shall adopt other methodologies which shall give more realistic experience percent per operator.

For every test done, the focus shall be on number of times the test reached a level of Quality instead of average speeds. Each test can be graded on a scale 4 i.e. Excellent (E), Acceptable (A), Poor (P) and Bad (B) for e.g. series of data tests are performed, they can be categorized as:

E : Excellent

- Download of 10MB was performed in less than 10s
- YouTube video without interruption and started in less than 5s
- Web pages loading time is less than 5s
- Live streaming starting in less than 5s, for a 2 minute without any interruption

A : Acceptable

- Download of 10MB was performed in less than 20s
- YouTube video without interruption and started in less than 15s
- Web page loaded in less than 10s
- Live Streaming starting in less than 10, during 2 minutes without any interruption

P : Poor

- Download of 10MB was performed in less than 40s
- YouTube video suffer 1 or more interruption or started in more than 20s
- Web pages being loaded in less than 15s
- Live Streaming with interruption

B : BAD

- Download failure, or timed out after 60s
- **YouTube video failure, or timed out ...**

- Web page loading failure or timeout after 30 secs
- Live Streaming failure

Different types of files testing corresponding to experiences (apk/ipa for downloading an application; jpg/bin/file are typical unbridled files; 3gp/mov/avi etc.).

YouTube streaming can be performed in different quality to give indicators for HD experience for different operators.

These service level test gives more information to the user than Download/Upload speeds and Latency.

The above will then correctly represent more realistic consumer experience percentage per operator, instead of average speeds.

TRAI being a regulator can itself or can appoint an audit agency who can perform these tests as an independent body during peak and off-peak hours to have a holistic view of the consumer experience during different hours of the day.

3. WHAT CHANGES CAN BE BROUGHT ABOUT TO THE EXISTING FRAMEWORK ON WIRELESS BROADBAND TARIFF PLANS TO ENCOURAGE BETTER TRANSPARENCY AND COMPARISON BETWEEN PLANS OFFERED BY DIFFERENT SERVICE PROVIDERS?

The existing framework does not give user a capability to compare the various broadband plans offered by different service providers under one roof nor a rough estimate of what experience percent to expect for the opted plan. One single platform which gives a clear transparency of the afore mentioned is what is most needed.

While the platform gives user the ability to compare various plans offered by the service providers; consumers should also be informed on what level of service in terms of experience percent to expect under each plan i.e. each service provider should provide the kind of experience user will have under different plans.

The platform shall also incorporate guidelines on the typical data consumption for different kind of usage for example:

- Stream one-hour non-HD video and HD video: 250 MB and 2 GB respectively.
- Stream one hour of music or radio: 150 to 175 MB
- One hour of Facebook or similar app: 10 - 20 MB
- Online Gaming: 5 to 10 MB per 5 min
- One hour of web browsing: 10 – 25 MB

Data plans can be grouped based on the data volume offered for different volume chunks by different operators. For example, tariff of all plans for data volume 10 to 500 MB (for every service provider) can be grouped under 1 category. This will give the clear transparency on the different amount being charged by service providers for same data pack. Based on individual usage end-user can opt for relevant plan.

4. IS THERE A NEED TO INCLUDE/DELETE ANY OF THE QOS PARAMETERS AND/OR REVISE ANY OF THE BENCHMARKS CURRENTLY STIPULATED IN THE REGULATIONS?

The existing parameters do not include online streaming video/audio services; with the advent of technology and speeds on 4G, the most common and highest data consumption services are expected to be video streaming which is expected to cross more than 50% of all content consumed by the user.

These QOS parameters can be measured by an independent party and submitted to TRAI; the methodology and procedure to collect these QOS parameters can be agreed with Service Providers and incorporated in the standard audit process of TRAI.

These services can be regularly audited by TRAI using SIM cards available in the market to eliminate the possibility of special provisioning/throttling etc.

Additionally, there are no set Quality parameters for Short Messaging Service (SMS). Majorly all banking transactions need to receive SMS within 30/ 60 sec, if not the transaction will expire. This at times result in indirect loss to consumer e.g. booking a railway ticket in tatkal.

5. SHOULD DISCLOSURE OF AVERAGE NETWORK PERFORMANCE OVER A PERIOD OF TIME OR AT PEAK TIMES INCLUDING THROUGH BROADBAND ACTS/ LABELS BE MADE MANDATORY?

From a consumer view, user should be made aware of the typical speeds and experience that one should practically get for his connection and average speeds are more relevant to the customer.

Networks choppy performance can get captured with the average speeds for over a certain file size or sizeable period of time for the test. (explained more in the section below). These intermittent speeds can result in direct (voice instead of VoIP for international calls, which is more sensitive to jitter) and indirect loss to consumer in different aspects like while doing banking transactions, booking online tickets etc. (which are more sensitive to latency).

Hence we submit that multiple services should be captured, including Peak DL/UL Speeds, Video Experience and Latency/HTTP latency and Web Experience for the end-user to decide the actual levels of service.

6. SHOULD STANDARD APPLICATION/ WEBSITES BE IDENTIFIED FOR MANDATING COMPARABLE DISCLOSURES ABOUT NETWORK SPEEDS?

Comparison of the network speeds shall be done to promote healthy competition and to ensure consistent performance however comparison based on standard applications and websites shall not be adopted.

To ensure that actual user mobile network experience is correctly represented, a platform needs to be created which acquires data directly from different smartphones applications of the consumers, e.g. streaming app like YouTube, Netflix, Hotstar, gaming and other apps etc. from the consumers who are willing to contribute; the radio conditions and the GPS reference can indicate the location of the user.

This data can then be used to analyze and compare the network speeds of different mobile broadband service providers based on mobile, apps, time etc.

7. WHAT ARE THE PRODUCTS/TECHNOLOGIES THAT CAN BE USED TO MEASURE ACTUAL END-USER EXPERIENCE ON MOBILE BROADBAND NETWORKS? AT WHAT LEVEL SHOULD THE MEASUREMENTS TAKE PLACE (E.G., ON THE DEVICE, NETWORK NODE)?

In the present scenario of fast changing technology, multiple features are being introduced for existing networks e.g. Wi-Fi offloading, Carrier aggregation, MIMO etc., not to mention introduction of 5G in the near future. This makes it extremely difficult & expensive to capture and measure the end-user experience at network node. The actual experience can only be captured most reliably at the user device level.

Since equipment, technology and end-user usage undergoing significant change, the solution is to has to be future proof, proven and globally accepted.

These methods are used globally by the operators such as ARCEP, to capture the end-user experience based on the **predefined KPI's**

The method to capture these is also added with other methods of data collection to mimic the customer experience such as Drive testing.

The Application is provided to customer as a Crowdsourcing Mobile Application such as 4G Mark and user experience data is regularly captured to a GIS platform.

Such a platform is able to correlate data from the Drive Test, Network Statistics (volume to data used, Average User throughput etc.) and Crowdsourcing Mobile Agent to provide the actual experience of the user

Some of the KPI's which are captured globally are:

1. Latency:

Send a "Ping" command to a dedicated server. Measure latency (round-trip time) and detect lost packets. Send 10 **'echo' messages to the remote host, count received 'echo replies' then measure latency between an 'echo' and received 'echo reply' (round-trip)**. Packet size can be set from 64 bytes.

KPIS

Result: OK/Failure/Timeout

Max: value of fastest ping (ms)

Average: value of average ping(ms)

Min: value of slowest ping (ms)

Lost packets: percent of lost packets (%)

2. HTTP latency:

The latency test is equivalent to carrying out a series of 3 consecutive attempts to connect to a data server (defined by its IP address or its URL). The round-trip time to the server is measured for each of the 3 attempts; only the best value is retained.

KPIS

Result : OK/Failure/Timeout

Delay: value of time for roundtrip (ms)

3. File Download and Upload: (TCP / FTP):

Downlink file transfer tests reproduce downloading a non-compressible file of a defined size (1 MB, 2MB, 5 MB, [...], 250 MB). These files vary depending on technology 2G, 3G or 4G. The file is stored and downloaded from an

available test server. The test is carried out within a maximum allowed time (e.g. 10s, 30s, 5 min, etc.) or timeout. The uplink transfer test is similar, but in the other direction; the purpose is to upload a file to the test server. The objective of this test is, first, to verify that the upload/download was started (connection made to the data network, server access has not failed, etc.) and that the connection was not interrupted. Second, the bandwidth for data transmission is measured; in other words, the ratio between the volume transmitted (or the volume exchanged) and the time it takes. Transfers are singled threaded in order to respect customer usage. Files are non-compressible (and loaded for uploading). The volume exchanged is measured in real time on the basis of actual file bytes exchanged or traffic statistics by telephone. All types of files are available and the test is compatible with https servers.

FTP: need to create specific login to have access to the dedicated folder for upload and download.

KPIS

Result: OK/Failure/Timeout

Delay: value of time for complete transfer (ms)

Initial Delay: value of time before 1st byte exchanged (ms)

Bitrate: bitrate from the file transfer (includes packets and headers) (kbps)

4. Web Navigation:

The web navigation test reproduces launching an URL in a web browser and ascertaining whether the web page is displayed or not. This allows accessibility and the time to display the web page within a given time to be measured. The browser cache is emptied before the test is run.

KPIS

Result: OK/Failure/Timeout

Delay: value of time for full page loaded (ms)

Initial Delay: value of time before 1st 'onPageStarted' message.

Bitrate: bitrate from the Web Page (include packets and headers) (kbps)

5. YouTube:

The streaming test reproduces the playback behavior of a video from the YouTube servers according to the playback quality chosen. The final file from the YouTube servers located via the video ID and the quality requested (and set). This information is noted during playback to calculate the indicators: the time to launch the video sequence, time to load the video (from the query until the video is fully loaded in the cache), number of buffering pauses/lags in the sequence and the total waiting time during the sequence (in seconds).

KPIS

Result: OK/Failure/Timeout

Delay: value of time for full video loaded or played (settings) (ms)

Initial Delay: value of time before video starts playing (ms)

Lag Delay: value of time of all video interruptions (ms)

Lag count: number of video interruption (count)

Bitrate: bitrate from the Web Page (include packets and headers) (kbps)

8. ARE THERE ANY LEGAL, SECURITY, PRIVACY OR DATA SENSITIVITY ISSUES WITH COLLECTING DEVICE LEVEL DATA?

A) IF SO, HOW CAN THESE ISSUES BE ADDRESSED?

No there are no Legal, Security or Privacy issues in collecting the device level data from the User - experience Mobile Applications.

These Mobile applications do not capture any user logs related to the usage of the end-user and only captures the data from the OS level of the device.

The issue can also be addressed by performing a strong security and privacy audit before the launch of any such application to the end-user and be also tied to contractual obligations to adhere to these.

B) DO THESE ISSUES CREATE A CHALLENGE FOR THE ADOPTION OF ANY MEASUREMENT TOOLS?

None of the above-mentioned issues create a challenge for the adoption of the measurement tools (Crowdsourcing tools, or Drive Test Tools)

However there are certain key precautions which have to be taken when displaying the results of such tools. This is because these tools should be reflective of the actual picture on ground and should not tamper-proof.

1. Not more than 4 readings should be taken per IMEI or IMSI for a same location throughout the day. This location can be defined as 50 or 100 mtrs.
2. If the results of a particular handset (IMEI) or model of device is consistently below the median, then this should be highlighted in the report and its readings can be eliminated or adjusted to the overall score.
3. The results should be displayed as a range (as mentioned in Pt. 1) with color codes on the GIS platform as against the actual values for easy interpretation of the end-user e.g. Green - Excellent (E), Blue - Acceptable (A), Yellow - Poor (P) and Red - Bad (B)

Also, since the crowdsourcing data is captured from multiple devices, the results may vary based on the OS, Handset Type and Model used for different Handset Providers. These can however easily be addressed by analysing the data. It can also help in isolating the issues related to end-user device in some cases, given the network is stable for other end-users.

9. WHAT MEASURES CAN BE TAKEN TO INCREASE AWARENESS AMONG CONSUMERS ABOUT WIRELESS BROADBAND SPEEDS, AVAILABILITY OF VARIOUS TECHNOLOGICAL TOOLS TO MONITOR THEM AND ANY POTENTIAL CONCERNS THAT MAY ARISE IN THE PROCESS?

TRAI already has no. portability implemented to provide the power to the end-user in case he is not satisfied with the levels of service received.

A platform which is regularly update for the entire country which provides the details of the performance of different service providers on a GIS platform will provide the correct information to the end-user to take the informed decision and the independence to decide which service provider to choose.

10. ANY OTHER ISSUE RELATED TO THE MATTER OF CONSULTATION.

We strongly feel that TRAI should strongly consider an approach of collating multiple data sources, like Drive Test, Crowd source and Network Performance data to provide the end-user a simple, understandable common view to the Quality of Service on the lines of globally accepted procedures followed by another regulator e.g. ARCEP.