

## SpeedChecker Ltd: Comments on NICTA Quality of Service Performance Monitoring Paper

[SpeedChecker Ltd](#) is pleased to participate in the public consultation on the Papua New Guinea consultation paper “Draft Rule on Telecommunications Quality of Service Performance Monitoring. The comments and recommendations in our response will offer some help in all these requirements as they relate to the Quality of Service of broadband internet access experienced by the users.

Since 2008 we have helped millions of users get a better understanding of how to make their Internet go faster. Our solutions empower telecoms, governments and researchers in making their Internet infrastructure better and more available for everyone.

Our active measurement networks and speed checking tools that are used to collect datasets all share the spirit of showing true end-to-end performance as experienced by the end users giving realistic metrics and insights.

It is with this expertise and background that we offer our comments. Our comments are confined to questions included in the study to which I believe we have some useful and relevant information. This is mainly in relation to the **Appropriateness of the proposed Quality Parameters as they relate to broadband access**. We then offer some recommendations on how these parameters may be measured to ensure accurate and timely real user performance information.

We believe that the recommendations in our response will help the PNG NICTA attain their aspirations documented in paper and prepare the foundation for the setting of targets in the future.

**SpeedChecker understand that we are on the verge of great innovation and are keen to be part of the discussion to ensure that not only do we reap the benefits of this innovation but that users, regulators and providers are able to ensure that the services are being delivered as promised and as paid for.**

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## Introduction

In the introduction to the consultation paper, NICTA state:

*As part of a review of the Licence Conditions Rules, NICTA has reviewed the continuing relevance and appropriateness of these quality of service obligations with a view to establishing a set of parameters that:*

- a) Relate to the telecommunications services that are of greatest significance to users in PNG, namely mobile telephony and fixed and mobile broadband internet access;*
- b) Relate to the aspects of those services that have the biggest impact on customers;*
- c) Are well-defined and can be measured cost-effectively;*
- d) Will help inform NICTA's understanding of the state of telecommunications markets and the level of performance;*
- e) In time help customers to make better informed choices*

The comments and recommendations in our response will offer some help in all these requirements as they **relate to the Quality of Service of broadband internet** access experienced by the users. In section 2 of the consultation paper PNG NICTA welcome proposals for standardised quality parameters to measure identified quality criteria. We have included our proposals in this response.

SpeedChecker is aware that the [Coral Sea Cable System](#) will be completed soon and this will help PNG expand the coverage of 4G beyond the urban areas currently served. This will also increase demand and expectations for greater reliability and better service from consumers. Having a robust measurement and benchmark scheme in place will help to ensure that satisfactory progress is made.

## SpeedChecker Recommendations

Our recommendations come in five parts and are described in more detail later in this response:

1. Introduction of benchmarks
2. Provide either a dedicated PNG NICTA Mobile App or Crowdsourced Data Collection
3. PNG NICTA Measure Quality of Service - not only speed, latency etc
4. Improve Indicative Implementation Arrangements
5. Use [Crowdsourced Methodology](#)

We believe that consideration should be given as soon as possible to measuring the performance for the end user. Traditional methods of measuring internet performance are unlikely to meet these needs and more dynamic, flexible and timely solutions are required. We believe that crowd sourced solutions measured from end user devices will provide the answers that will not only help the end user identify problems but can also help providers anticipate problems.

[SpeedChecker](#) recommend that benchmark targets are set for the coming years to ensure progress is measured. It is essential that the measurements are accurate, independent and consistent but also that these measurements record the actual user experience as closely as possible. Please see below for a discussion about how this can be delivered using crowdsourced data.

It is essential that compliance with benchmarks, targets and standards are transparent to the end user and this is best achieved by a mobile app that the consumer trusts. Although no benchmarks or targets are currently set we understand that there will be targets set in the future and we recommend taking measurements now so that improvements can be compared with past performance.

## 1 Introduction of Benchmarks

We believe that any benchmark target requires a trusted, accurate and comprehensive measurement methodology. Further, the target benchmark should not only be given as a speed (e.g. 25 Mbps) but also as a Quality of Service requirement. See “Measure Quality of Service ” below.

The agreed benchmarks should be Meaningful, Measurable and Achievable.

### **Meaningful**

A benchmark of, for example, 25 Mbps and even 100 Mbps are useful to show current speeds and how speeds and benchmarks have changed over time but they do little to help determine what this means for the end user. Targets would be better if they included examples of what the end user should expect. For example, should users expect to be able to stream HD or 4K and how much latency or buffering is acceptable.

### **Measurable**

Simple speed test measurements are widely available and produce useful results particularly with regard to seeing if a particular connection meets the required benchmark speed. However, consideration should be given to how to measure the user experience and Quality of Service.

We believe that independent / unbiased crowdsourced internet measurement data have the best opportunity to meet these requirements. [Crowdsourced data](#) can be obtained from many independent parties – e.g. private companies such as [SpeedChecker](#) as well as from research organizations etc.

### **Achievable**

Is it reasonable to expect providers to meet these requirements everywhere or should there be different targets depending on the technology available in the area? Perhaps there should be different benchmark targets depending on the size and remoteness of the population. Different targets allow for the available speeds to be maximised across the country.

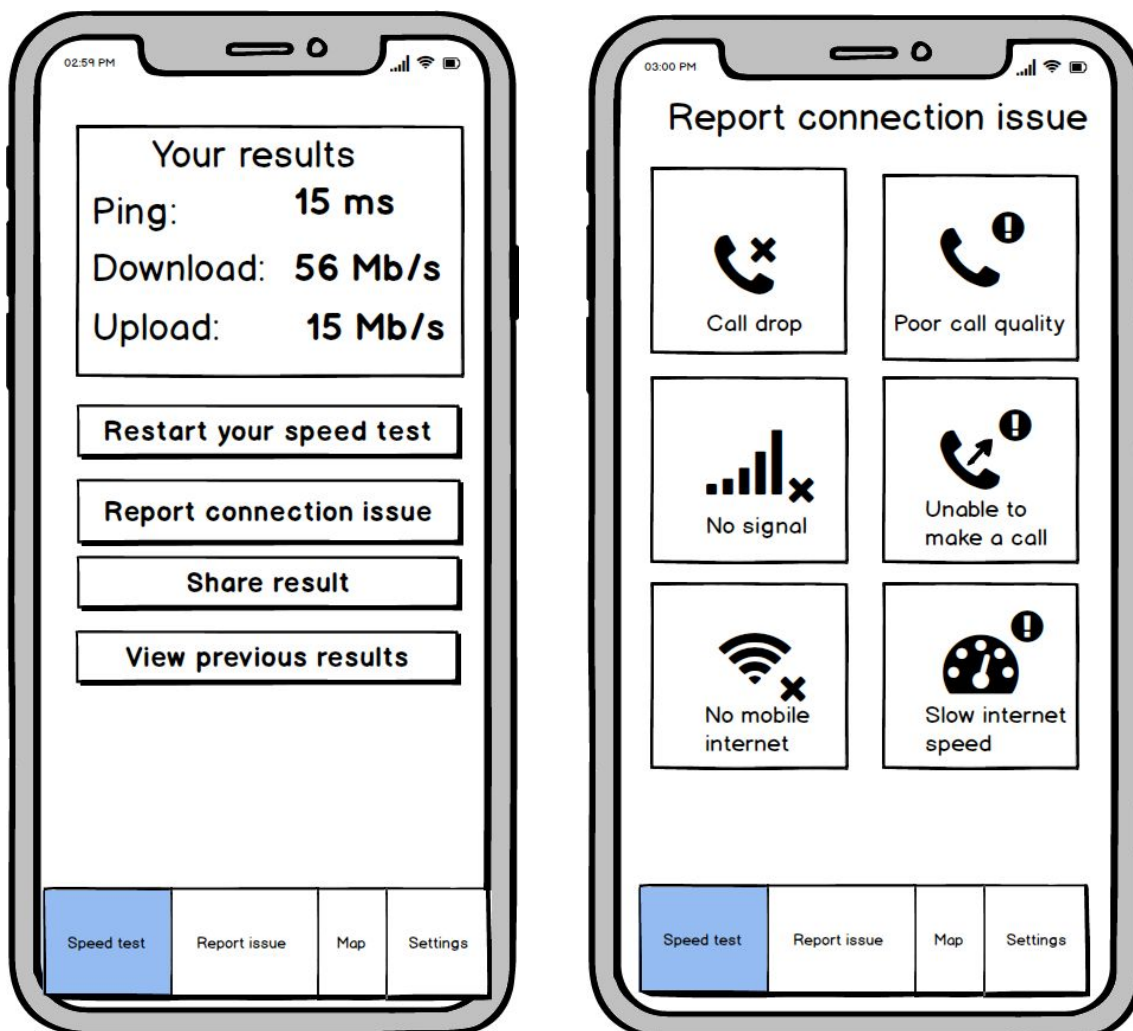
SpeedChecker believe that these requirements are best met using crowdsourced measurements. See “Benefits of Crowdsourced Measurements” below.

## 2 Dedicated PNG NICTA Mobile App (iOS / Android) or Crowdsourced Data Collection

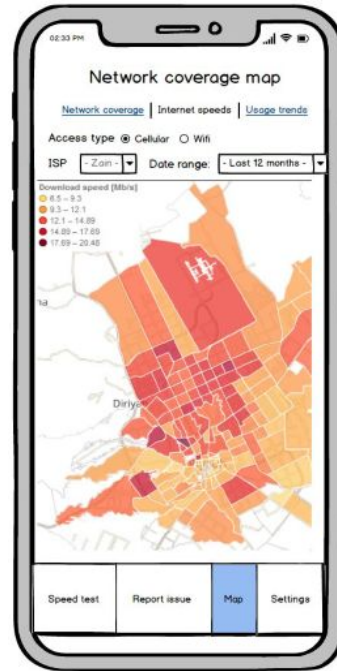
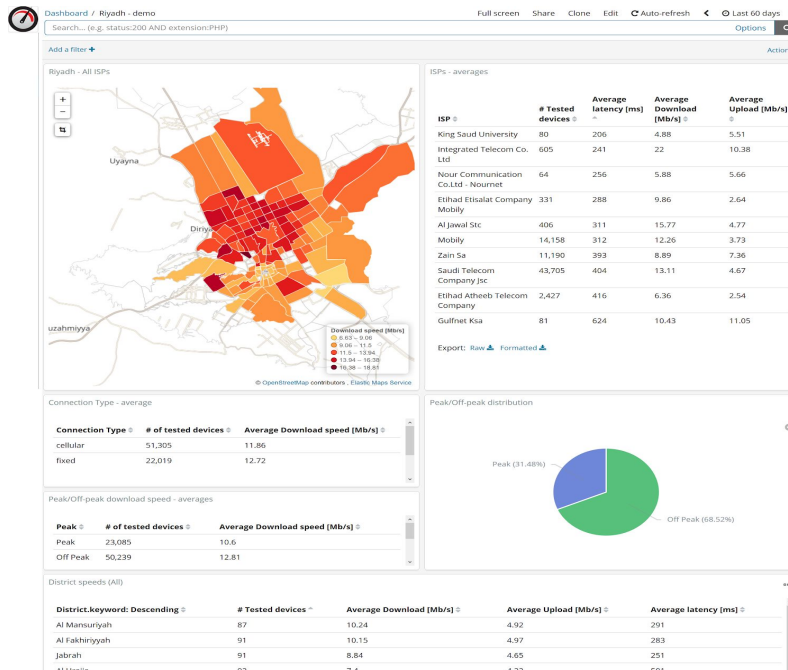
We recommend that PNG provides end users with the opportunity to use a dedicated app that provides all the metrics that the user needs to measure performance. These metrics should also include information that will help NICTA and service providers identify the cause of any shortcomings. The example in the mockups below show a typical results page that the user would see.

If time or budget does not allow for a dedicated app then similar results can be achieved using crowdsourced data from third parties such as [SpeedChecker Crowdsourced Data](#). The budget can be controlled by putting a limit on the number of results. This would not include an option for the user to report issues.

The user would, at a touch of a button, immediately be able to report an issue. This would be sent along with the KPIs to NICTA. Information should also be recorded that will be more useful to NICTA or service providers such as device specification, router connection if applicable, provider details, connection type and strength.



The data collected by the user tests would then be aggregated to produce dashboard information for NICTA and coverage information for the end user. For NICTA this will help to identify where the user is being well-served and where more infrastructure may be required. Similarly, the end user will be able to identify hot spots and dead zones and plan accordingly.



### 3 Quality of Service Measurement

We note in the consultation paper that the QoS parameters for broadband internet access are:

- Availability
- Speed
- Latency
- Reliability

The parameters being % of availability, cut-off, kbit/s, ping time, speed, delay, failure % and packet loss. These parameters are important and provide an excellent foundation and clear way to compare services between different providers, various locations and over time.

However, **It is important that the standards not only collect these statistics but also quantify the actual Quality of Service** that our users are experiencing and that these should adapt to the changing needs of the users. We believe that services such as those provided by SpeedChecker and other measurement companies should be able to adapt to the new requirements.

In this section we explain some of the methodologies [SpeedChecker](#) currently use to measure the Quality of Service of YouTube, Netflix and Social Media customers. As new services are made available with 5G we will be adapting these to ensure that measurements are useful to users, providers and regulators alike.

#### YouTube test methodology

SpeedChecker's YouTube video streaming test provides the following KPIs:

- Video download speed
- Video streaming bitrate
- Video start up time
- Number of rebuffering events
- Latency

#### Netflix test methodology

SpeedChecker's Netflix video test provides the following KPIs:

- Download speed
- Video streaming bitrate
- Latency

#### Social media methodology

SpeedChecker identified the uniqueness of social media and the requirement for responsiveness when users are interacting in real-time.

SpeedChecker's tests provide KPIs on following social media services: Facebook, Twitter and Instagram.

We provide the following KPIs:

- DNS latency
- SSL latency
- HTTP latency
- Webpage loading time

## 4 Improve Indicative Implementation Arrangements

We note that in Attachment C that forms are provided to record key pieces of information regarding availability of Mobile and Fixed Broadband. Useful information included in these reports is periods of downtime or time when capacity is lower than expected. International traffic is measured separately from national traffic and we agree with this.

We would, however, recommend that:

1. Consideration is given to further separating out rural and urban performance within PNG.  
This will help to identify to what extent there is a two-tier system in existence with the urban areas receiving better service.
2. In all cases (national, international, rural and urban areas) that average (mean and median) download speeds are also measured.  
This will be useful in identifying progress over time as well as highlighting any unacceptable differences in quality of service in certain use cases.

## 5 Benefits of [Crowdsourced Measurements](#)

We believe that crowdsourced internet measurement data have the best opportunity to meet these requirements. In this section we describe how crowdsourced measurements help to produce realistic user Quality of Experience data. This can be achieved via third parties such as SpeedChecker but also by a dedicated NICTA app that can provide more functionality. More information is available here: [SpeedChecker Mobile apps](#).

The following points illustrate this argument:

- **Independent / unbiased** – Crowdsourced data can be obtained from many independent parties – e.g. private companies such as SpeedChecker as well as from research organizations etc. These are independent measurement companies that can be trusted to provide accurate and trustworthy results. The NICTA can and should acquire data from many sources and combine them together to ensure that they give unbiased insights as well as ensuring that they complement data sources which may have gaps in coverage.
- **High data granularity** – Crowdsourced internet speed test data are collected with accurate location alongside other collected KPIs. Location is typically collected using GPS or Wi-Fi geolocation which can provide street-level geolocation accuracy. This greatly improves the spatial granularity, particularly in rural areas, to ensure the best possible information.
- **Frequency of updates** – Crowdsourced data are continuously updated and can provide insights much sooner about how the connectivity changes in different areas. This has the added advantage of being able to identify the improved speeds as a result of recent changes.
- **Data recency** – data can be collected in real-time and integrated to mapping.

You can read more about this methodology including some of the drawbacks in [recommendations given to FCC](#) in 2018 by SpeedChecker Ltd and you can see how this was used to analyse mobile speeds before, during and after Hajj in Mecca [here](#).

### New approaches

Crowdsourcing data can utilize different approaches:

- **Website data collection** – Utilizing speed test websites such as <https://www.broadbandspeedchecker.co.uk> can provide a lot of throughput measurements which can show the maximum attainable speed at the time of the test. On the downside, those measurements lack wi-fi or mobile signal data which are crucial for data quality checks.
- **Mobile speed test apps** – Utilizing speed test apps on popular platforms such as iOS or Android can provide a lot of measurements as well as a wide range of KPIs which provide additional ways to filter data quality.
- **Mobile speed test SDKs** – Rather than relying on a limited set of apps to collect KPIs, the data collection campaign can be extended by implementing SDKs into a lot of different apps which have location permission (as well as user consent). This technique increases the coverage of the data points available for analysis.
- **Active vs passive testing** – Mobile apps can utilize active test methodology which is generating traffic load on the network and measures the KPIs at the time of the increased traffic generation to establish maximum possible speed. Also, there are new alternative



approaches which look at existing traffic generated by the user and analyzing network congestion to determine maximum possible speed.

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