

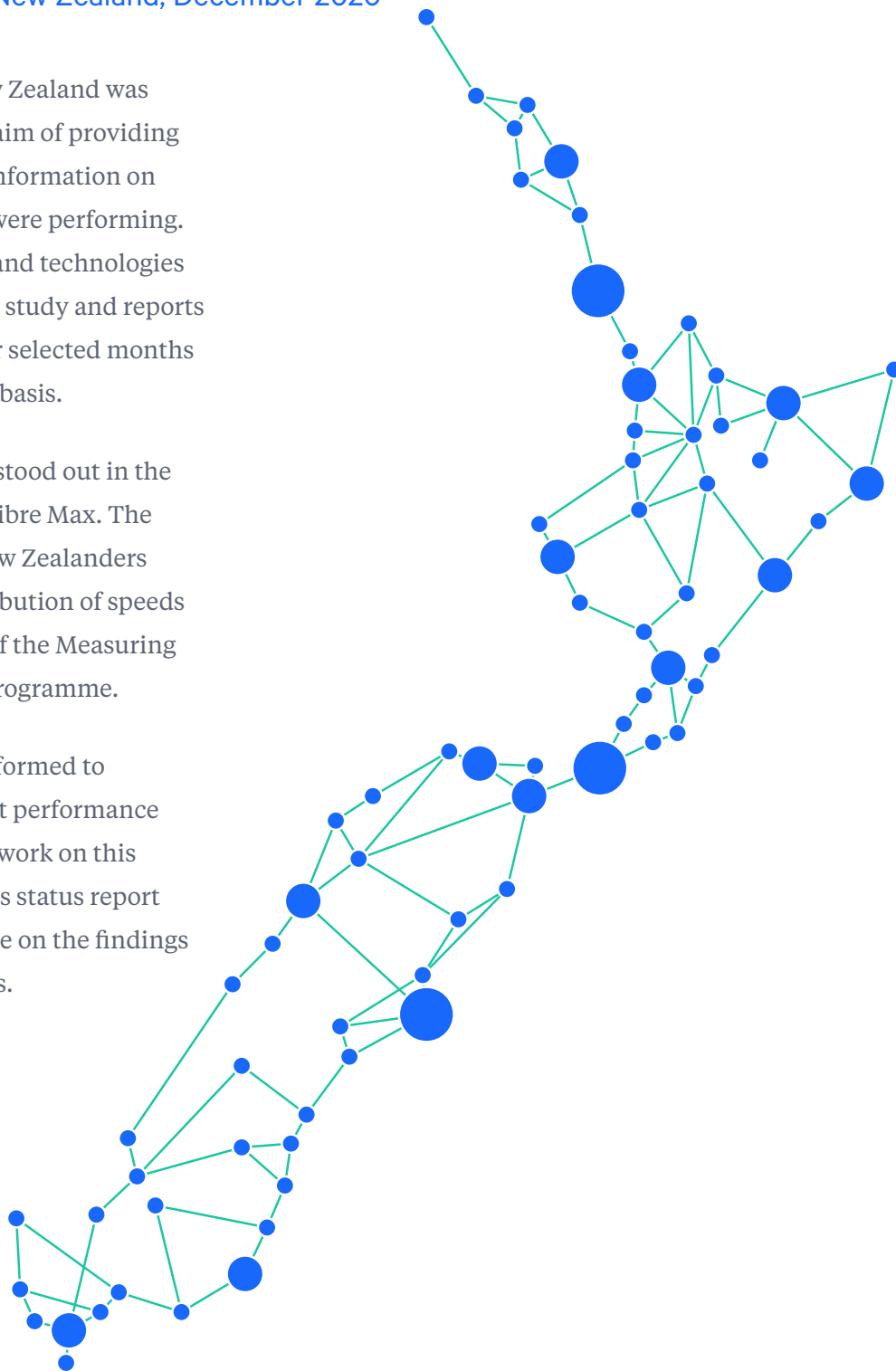
Fibre Max Status Update

Measuring Broadband New Zealand, December 2020

Measuring Broadband New Zealand was launched in 2018 with the aim of providing consumers with accurate information on how their internet speeds were performing. A range of RSPs, products and technologies are measured as part of the study and reports detailing performance over selected months are released on a quarterly basis.

One plan in particular has stood out in the reports published so far - Fibre Max. The fastest plan available to New Zealanders has had a very varied distribution of speeds reporting over the course of the Measuring Broadband New Zealand Programme.

A working group has been formed to investigate the inconsistent performance of the Fibre Max plan. The work on this has now completed and this status report provides a high level update on the findings of the group, and next steps.



Executive Summary

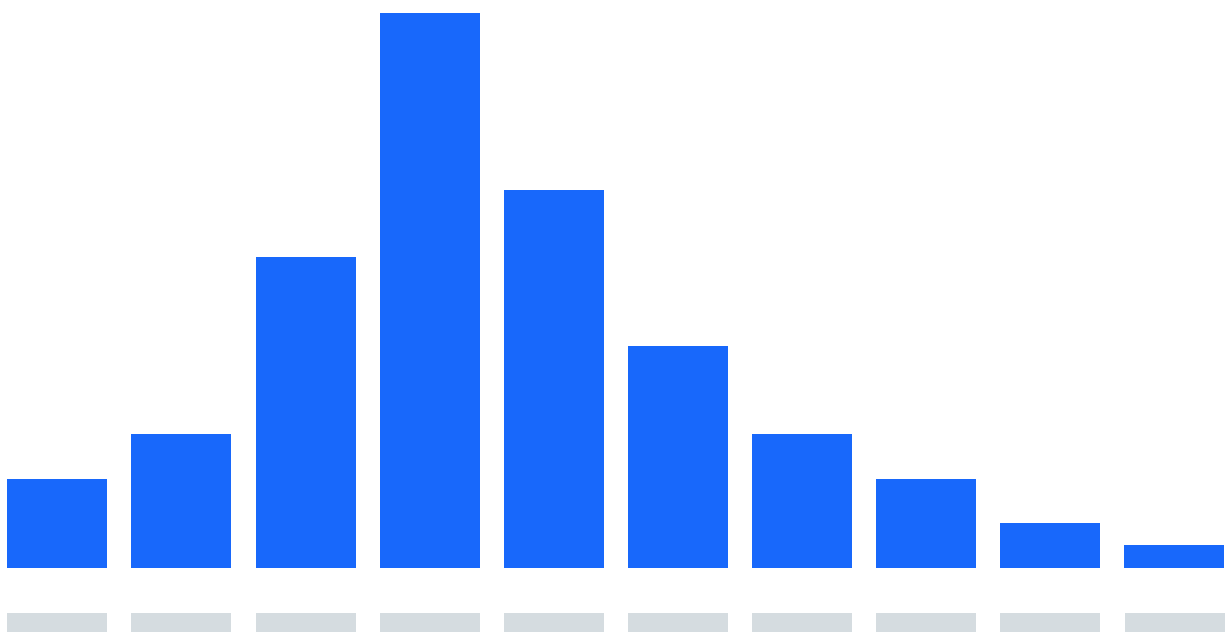
Background

Measuring Broadband New Zealand

Measuring Broadband New Zealand was set up by the Commerce Commission to provide consumers with independent information on broadband performance across different providers, plans and technologies. The most popular products and technologies purchased by New Zealanders are measured in quarterly reports that have been released on the Commission’s website since 2018.

Across different reporting periods since 2018 only a relatively small percentage of households consistently achieve over the 800Mbps speeds which would be expected for Fibre Max lines. In order to establish the cause of these inconsistent results a working group made up of RSPs, LFCs, the Commerce Commission and SamKnows was set up to investigate.

Measuring Broadband New Zealand would like to thank the volunteer RSP and LFC for the time and resource committed to this investigation. Without a focus on improvement the positive changes made as part of this work could not have been achieved. SamKnows promotes openness, transparency and collaboration as part of any national broadband project and the success seen here results in a better service for New Zealanders. All the cooperation and progress made is very much appreciated across the Measuring Broadband New Zealand programme.



Executive Summary (continued)

Investigation

The investigation has been a success and multiple parties have identified changes that could be made to improve performance for Fibre Max subscribers.

A number of issues have been identified during the course of the investigation, including differing ONT performance, peering issues and a potential Linux kernel bug. Most of these have been resolved already and fixes are under development for the remaining ones.

SamKnows believes that one factor in particular, identified by both the LFC and RSP, is the main driver for the varied performance seen on the Fibre Max tier. This relates to packet loss occurring under high-burst conditions on certain models of ONT. This was caused by burst parameter configuration, rather than any congestion factors. This affected broadband connections with higher round-trip latencies to the test servers much more than connections with lower latencies.

This status update shares some of the results seen during the investigation and includes charts demonstrating the positive impact on Fibre Max speeds after some of the changes have been implemented. Please note that this is an interim release and data from a select number of RSPs is shared here.

Changes to Improve Performance

The LFC implemented a design change in November 2020 to shape downstream traffic at the OLT. This has been rolled out and is expected to improve the Fibre Max performance for some RSPs depending on their specific network configuration.

Additionally, SamKnows is currently working with REANNZ to arrange the deployment of a new test server in Christchurch, to complement the existing servers in Wellington and Auckland. This should reduce latency for users on the South Island, who will currently be using the Wellington test server primarily. SamKnows will also experiment with TCP congestion control algorithms to assess the impact of these on performance.

The working group will continue to assess the performance of Fibre Max plans across New Zealand. Fibre Max performance will be analysed in greater detail in the next Measuring Broadband New Zealand Report - the Summer Report which will be published in 2021.

Historic Distribution of Fibre Max Results

To give some context to Fibre Max performance historically a chart from the Measuring Broadband New Zealand Spring 2020 Report has been included. Figure 1 is indicative of the types of results seen on Fibre Max lines since the Measuring Broadband New Zealand programme was started in 2018.

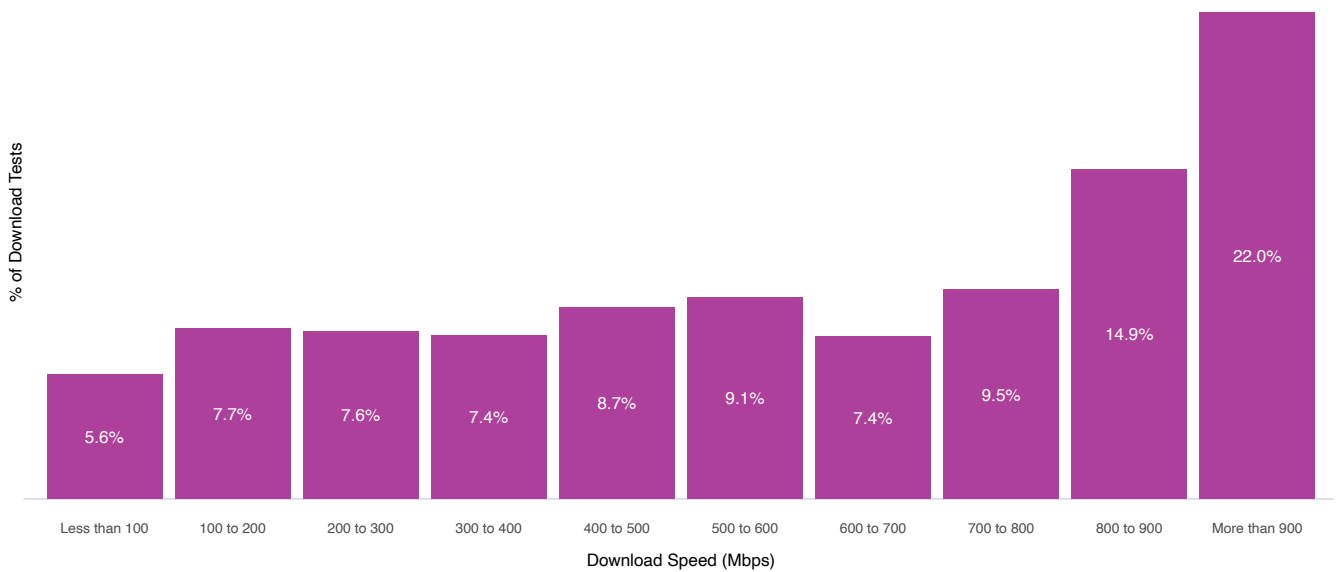
Figure 1 shows the distribution of Fibre Max results from the reporting period of 24th July to 24th August 2020. This illustrates performance across different Fibre Max products before any network changes were made.

Should everything be functioning optimally we would expect to see the majority of test results to be in excess of 800Mbps on Fibre Max lines, however this has not been the case historically.

Figure 1

Download speeds on Fibre Max plans

Distribution of test results. Advertised average download speeds for Fibre Max plans range between 700Mbps and 950Mbps; this varies by RSP and over time.



Key observations

- The performance of Fibre Max plans varies widely. While 22% of tests recorded download speeds above 900 Mbps, the majority recorded speeds below 700 Mbps.
- Within this range of test results, only 35% of households subscribed to a Fibre Max plan had an average download speed above 800 Mbps.

Improvement in Fibre Max Average Download Speeds

Figure 2 shows the average download speed from two anonymised RSPs, X and Y.

RSP X discovered a higher than expected rate of packet discards under certain conditions that they suspected could be harming performance. In late August 2020, they made a change based on this theory and deployed it to a single broadband connection, which resulted in its measured download speeds improving from 300-500Mbps to around 900Mbps.

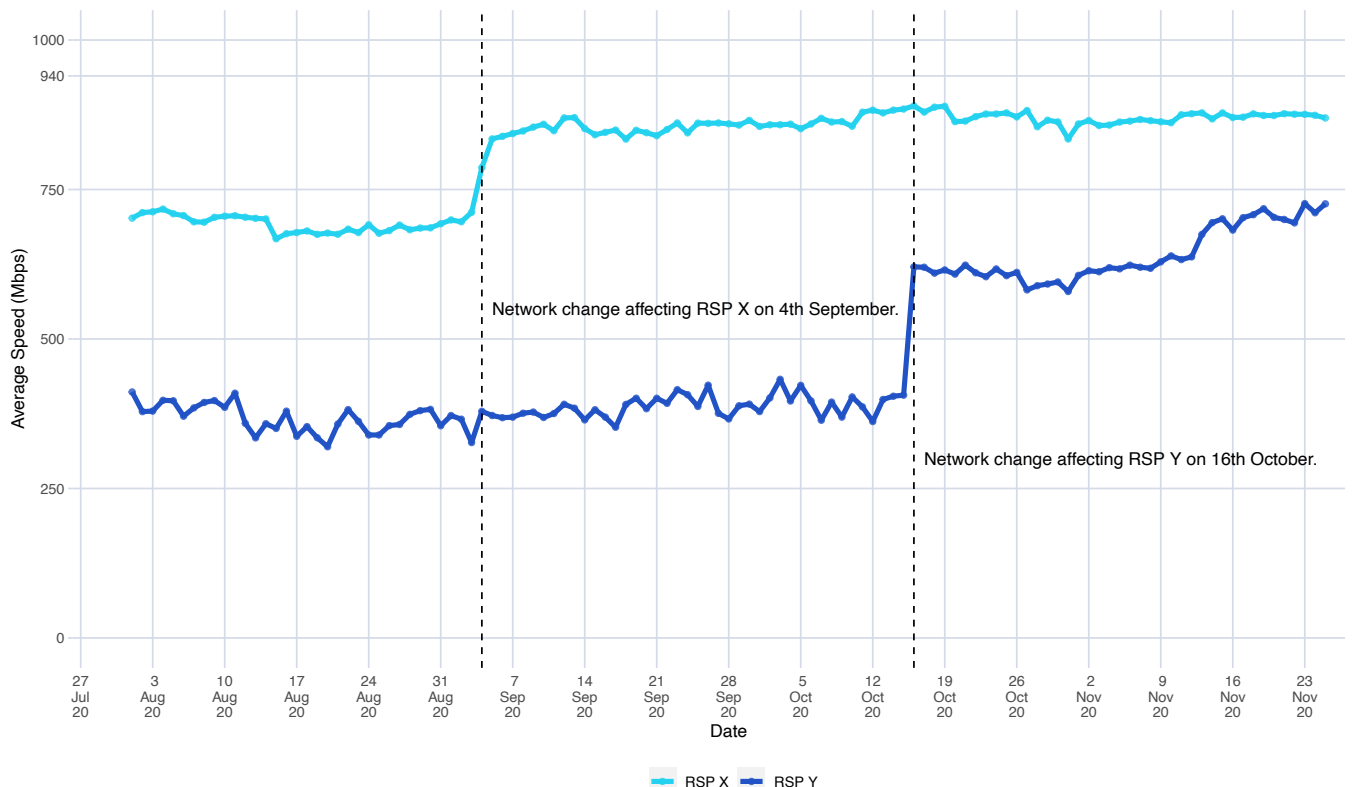
On September the 4th 2020, RSP X deployed the change across their whole customer-base to work around the issue they had seen. A significant improvement in average download speed can be seen after the 4th of September. Average speeds go from under 750Mbps to above 900Mbps which is in-line with what we would expect to see on Fibre Max lines.

RSP Y made their changes on the 19th of October. A similar step change in performance can be seen following these changes.

Later in November 2020, the LFC rolled out a design change that means the workaround is no longer needed, however other RSPs may still need to make network changes to see improvements. The next report will review further improvements across all RSPs across the month of December.

Figure 2
Average download speed on Fibre Max for RSPs X and Y

Average download speeds seen on Fibre Max Lines for RSPs X and Y



Distribution of Fibre Max Results for RSP X

Figure 3 shows the distribution of Fibre Max results for an anonymised RSP referred to as RSP X, comparing performance before changes were made to their network and since those changes have taken effect.

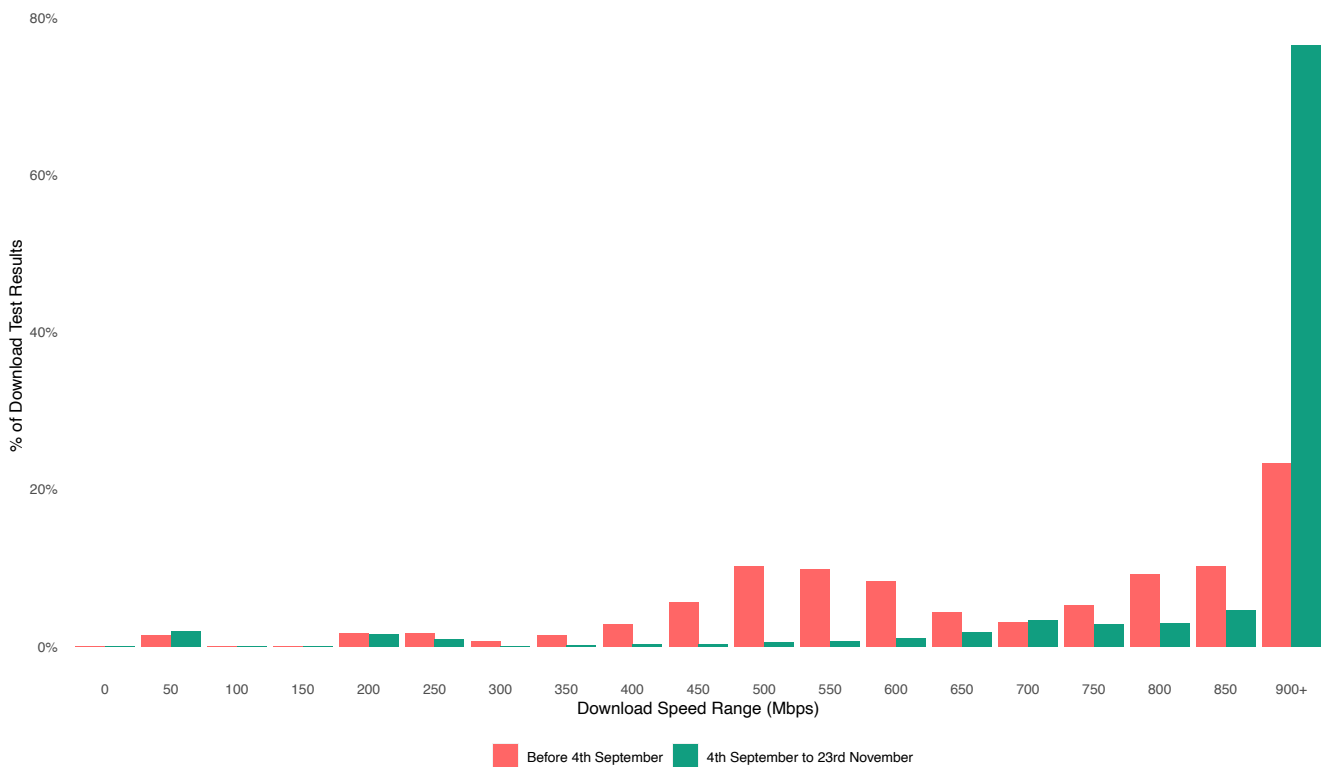
The distribution of results since the change is much tighter, and closer to 900Mbps. Of the total number of tests run, 76% now achieve above 900Mbps. This is more in line with performance of 1Gbps speed tiers in other countries.

A total of 84% of completed tests achieve over 800Mbps for RSP X. This is a vast improvement on the previous results in which only 46% of completed tests would achieve 800Mbps and above.

Figure 3

Distribution of Fibre Max speed for RSP X following network changes

Distribution of test results for RSP X, comparing before and after network changes. X axis shows speed range (e.g. 200-250, 250-300 etc.)



Key observations

- The network changes in September have significantly improved performance. Since 4th September 76% of tests completed achieved 900Mbps or above.
- These improvements are also reflected in the percentage of tests achieving 800Mbps or above. Prior to the changes 46% of completed tests reached speeds of 800Mbps or above. Following the changes 84% of tests completed reached 800Mbps or above.