



MEASURING  
BROADBAND  
AUSTRALIA

## Report 9, May 2020

In 2017, the Australian Competition and Consumer Commission (ACCC) launched its project to measure internet performance. SamKnows was appointed to supply their Whiteboxes to internet users in Australia to measure the quality of experience for fixed-line internet.

The goal of Measuring Broadband Australia is to increase transparency and encourage greater performance-based competition and better internet performance throughout the country.

SamKnows prepares these reports each quarter for publication by the ACCC. The metrics are also presented by the ACCC in a public dashboard at <https://www.accc.gov.au/consumers/internet-phone/broadband-performance-data>.

The program tests fixed-line services. It does not test fixed wireless and satellite services.

# Overview

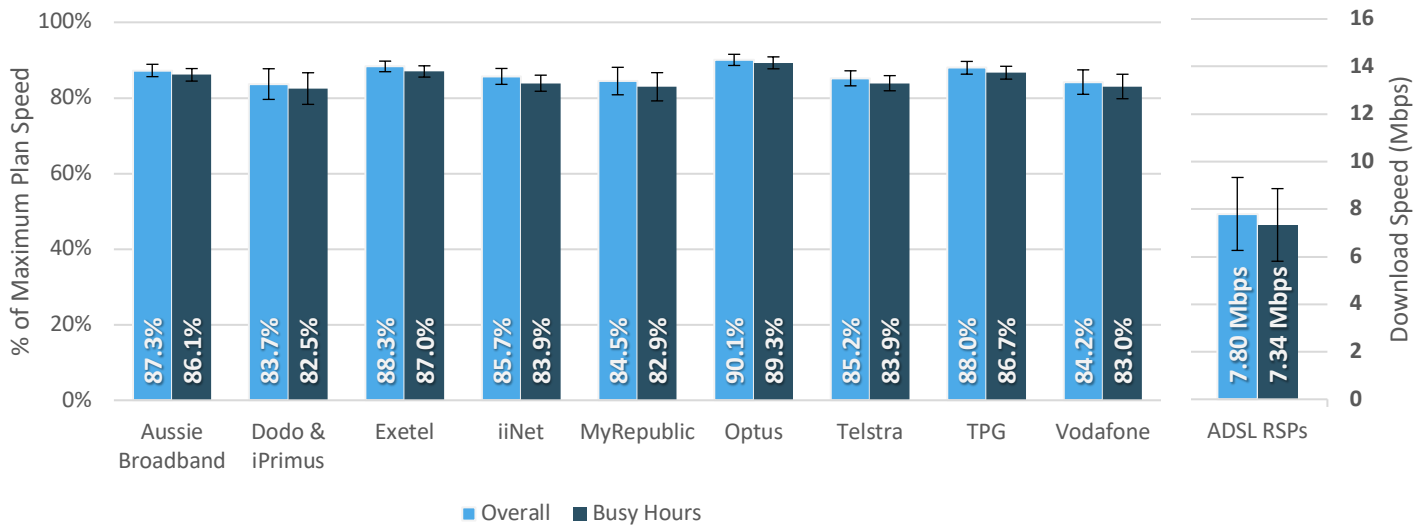
1 February 2020 – 29 February 2020

This is the ninth report issued as part of the Measuring Broadband Australia project and the first report using data from 2020.

This report shows the performance across a range of broadband plans, either at the network (NBN fixed-line or ADSL) level, or at the RSP (Retail Service Provider) level, on a like-for-like basis.

Figures in this report relating to download and upload speed are generally expressed as a percentage of the maximum speed that can be achieved by the service plan. Hence, where the report outlines speed measures below 100 percent of maximum plan speeds, this should not be interpreted as the RSP having failed to provide the speed measures that it advertised.

## Average download speed



During the month of February 2020, users on NBN connections received an average download performance of 86.7% of maximum plan speeds during all hours, decreasing to 85.4% during the busy hours (between 7pm and 11pm) which is when networks experience heavier user activity. There has been no overall change in download performance across NBN services since the previous report, in which we reported download performance of 86.6% during all hours decreasing to 85.3% in busy hours.

ADSL<sup>1</sup> connections averaged speeds of 7.8Mbps, a small decrease on the 8.0Mbps observed in the previous report and well within the ranges seen since the beginning of the Measuring Broadband Australia program.

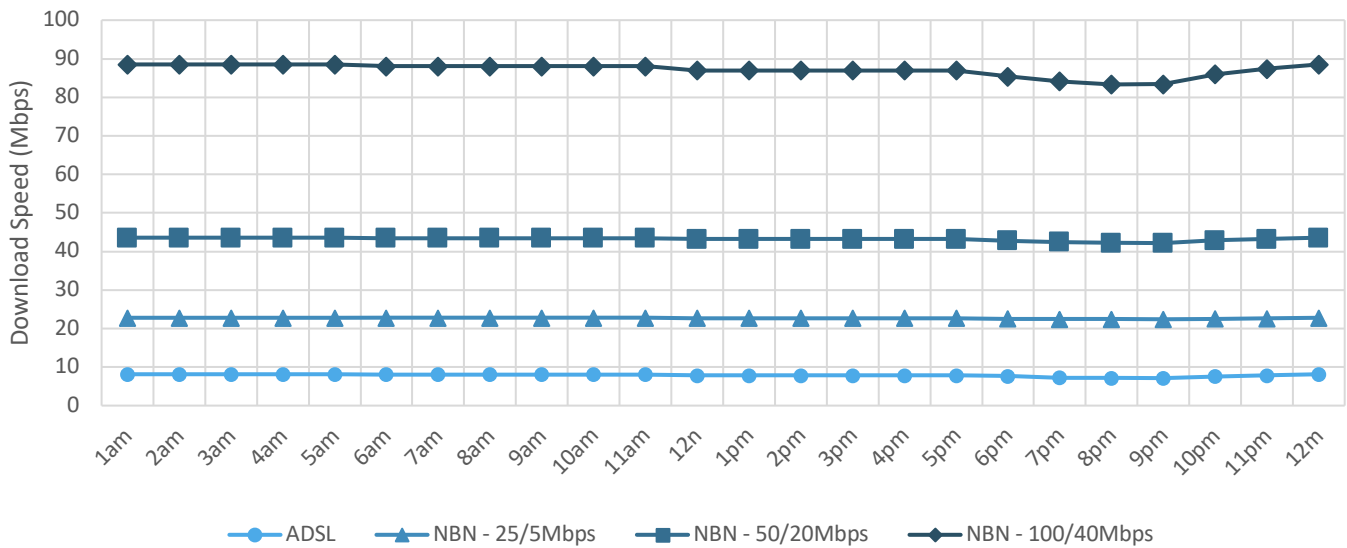
Performance across RSPs ranged from averages of 83.7% to 90.1% during all hours, and from 82.5% to 89.3% during busy hours. The gap between RSPs' NBN download performance has narrowed since the previous report, in which download performance ranged by RSP from 81.7% to 90.8% during all hours and from 80.0% to 89.9% during busy hours. The Vocus brands, Dodo & iPrimus, showed the greatest improvement of 2.0 percentage points since the previous report.

As with previous reports, the 95% confidence intervals in the chart are a measure of how certain we are (in this case, 95% certain) that the true average download speed lies between the upper and lower boundary indicated by the thin black lines. For example, Optus had an average download performance of 90.1% with a confidence interval

<sup>1</sup> There were 26 Whiteboxes on ADSL plans which reported data during the month of February 2020. Normally only plans with at least 40 online Whiteboxes would be included in reporting, however since the results are in line with previous reports, and ADSL performance overall has historically been very stable, ADSL has been retained in this report. Nevertheless, any results for ADSL should be considered as indicative only.

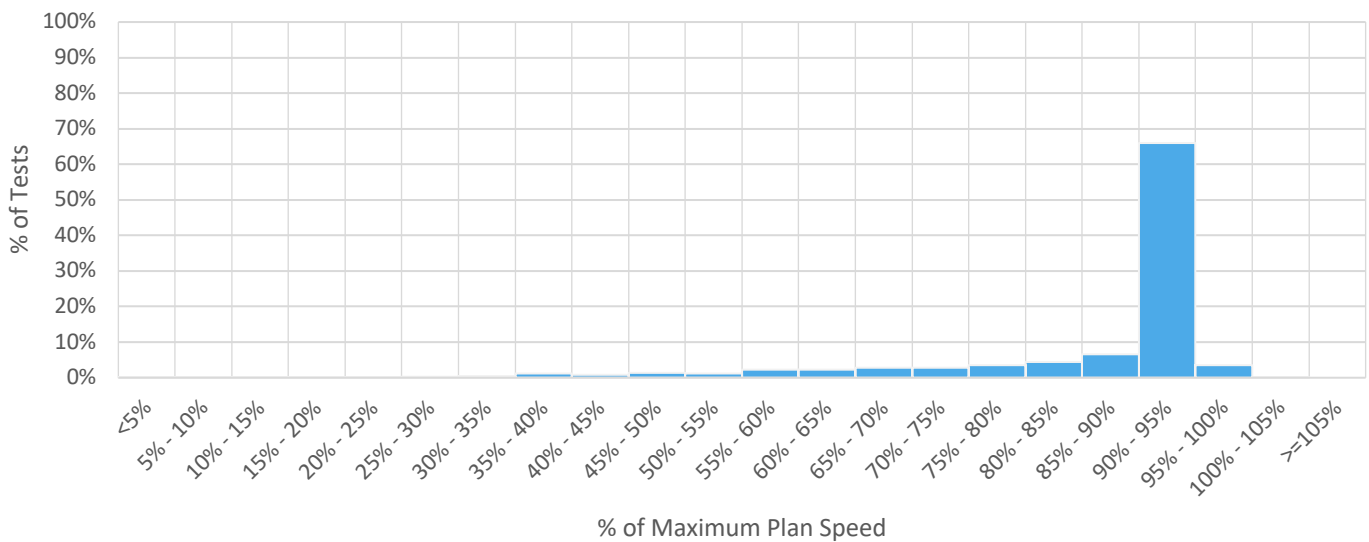
of  $\pm 1.5\%$ . This means that if we were to repeat our sampling 100 times, we expect that average performance would fall between 88.6% and 91.6% in at least 95 cases.

### Average hourly download speeds – ADSL and NBN plans



Average download speeds held steady throughout the day for users on most NBN speed tiers as well as for those on ADSL connections. The 100/40Mbps NBN tier remains most affected by increased user activity in the evening hours: speeds typically started to decrease after 5pm, dipping to 5.2Mbps below the day's maximum by 8pm, and would recover to higher levels after 11pm.

### Frequency of download speeds attained during tests – NBN plans



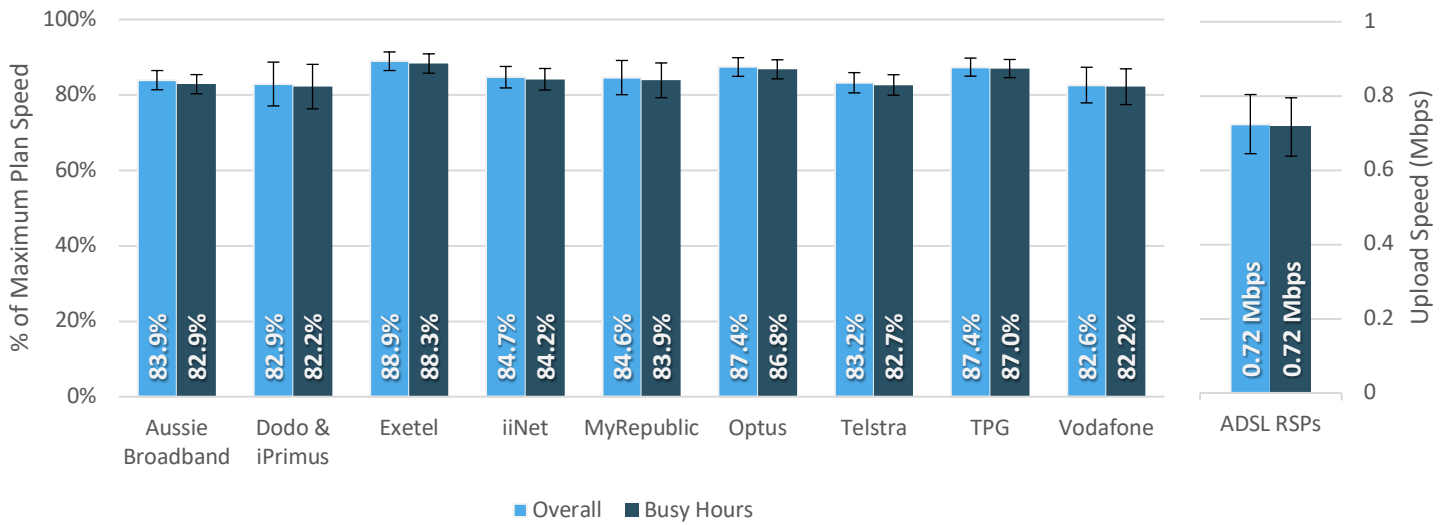
254,586 download speed tests were performed across 1,270 Whiteboxes connected to fixed-line NBN infrastructure during the month of February 2020. 69.56% of tests conducted achieved a download speed of at least 90% of the maximum plan download speed – this is a decrease from 69.9% in the previous report.

Although 69.56% of tests achieved at least 90% of maximum plan speed, the highest test results obtained by NBN tier ranged from 95.0% of maximum plan speed to 95.6% of maximum plan speed. This reiterates the point raised in previous reports that NBN tier speeds are not provisioned so that maximum plan speeds are attainable after accounting for protocol overhead.<sup>2</sup>

<sup>2</sup> Protocol overhead include packet headers, which are added to network communications to ensure that they arrive at the right network address. Packet headers take up space, which means that the connection has less room for whatever data is being sent.

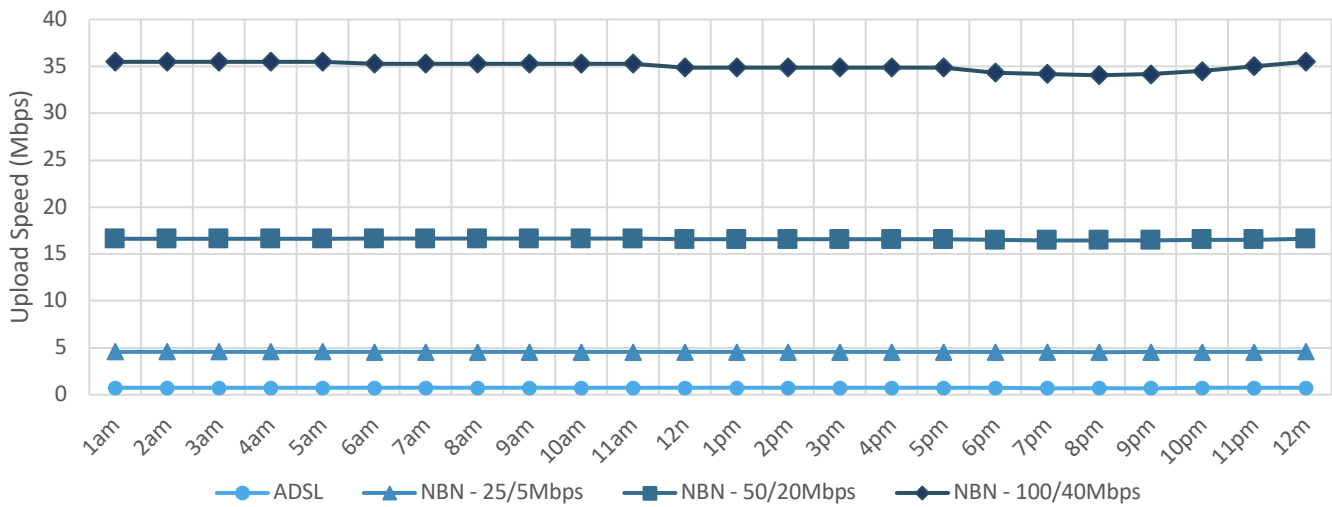
5.9% of tests achieved less than 50% of the maximum plan speed; for reference, in the previous report 4.7% of tests had failed to meet the 50% mark.

### Average upload speed



Upload performance decreased slightly compared to the previous report: NBN services achieved an overall average upload performance of 85.2% during all hours, as against 85.6% in the previous report. ADSL connections averaged upload speeds of 0.72Mbps during all hours as against 0.75Mbps in the previous report. The average upload performances compared across RSPs ranged between 82.6% and 88.9% during all hours.

### Average hourly upload speeds – ADSL and NBN plans

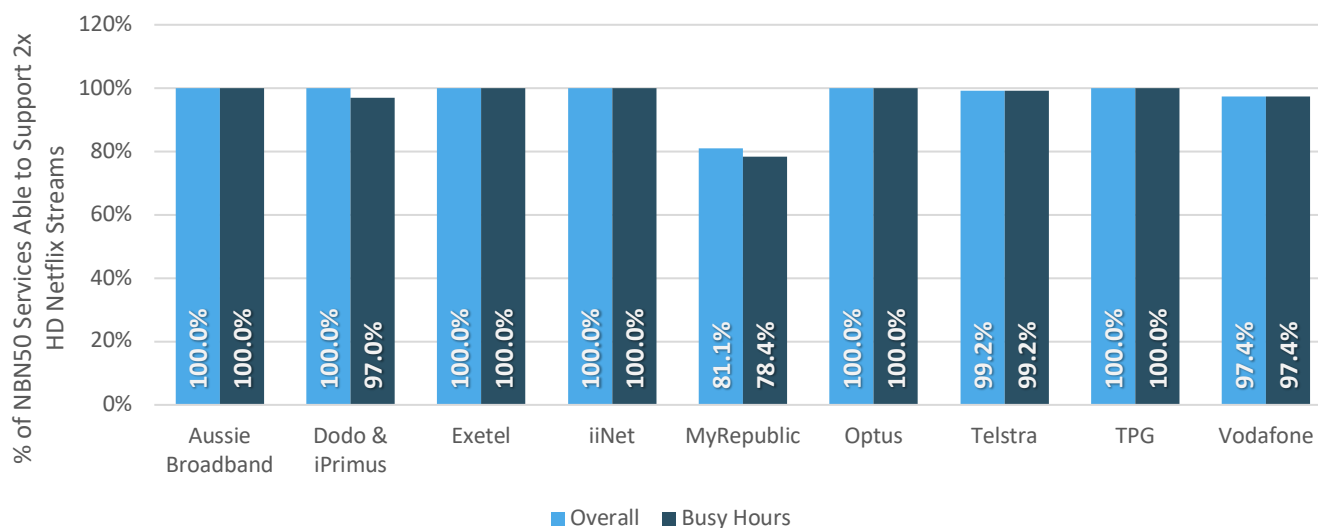


Average hourly upload speeds were steady throughout the day, with negligible change during busy evening hours.

## Video Streaming

New to this report, the Measuring Broadband Australia program has begun running tests to the servers used by video streaming applications Netflix and YouTube. The following chart shows the proportion of NBN services on the 50/20 Mbps plan would be able to stream video in High Definition.

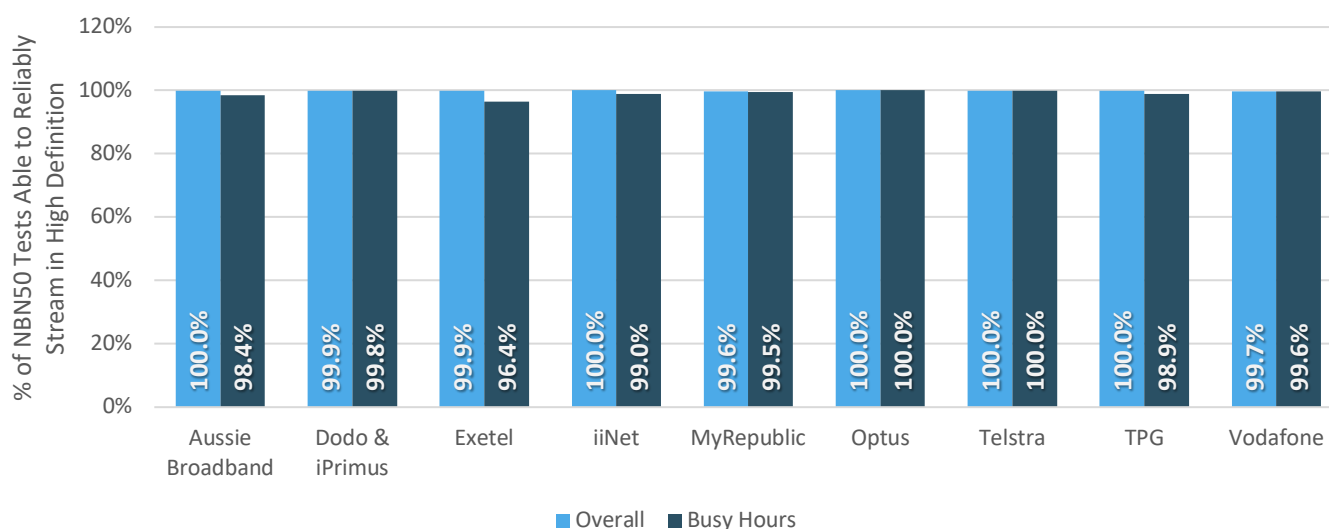
### NBN50 - Netflix HD streaming – at least two simultaneous HD streams



For most RSPs, nearly all NBN50 services would be able to stream from Netflix in High Definition, even if two people were watching different programs at the same time. This remained true even during busy hours.

The following chart shows the proportion of individual tests to YouTube which were able to stream reliably - without any stops or buffering - in High Definition.

### NBN50 - YouTube HD streaming – at least one HD stream



NBN50 plans are generally capable of streaming video in High Definition, although the exact levels of support did vary by RSP across different streaming applications. Users who require the ability to stream in High Definition may not need to upgrade to a faster plan.

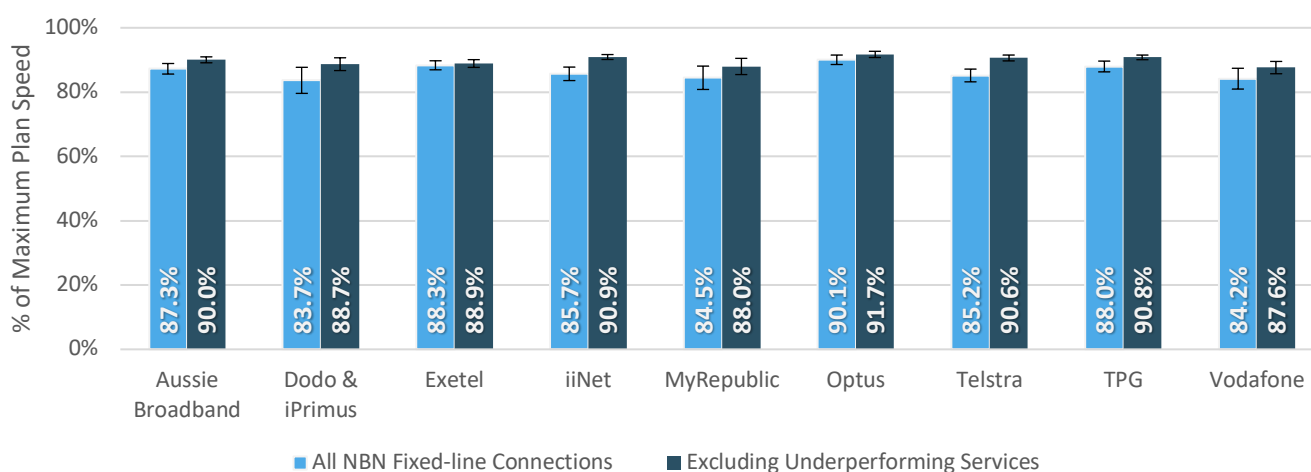
Slower-speed plans will also provide support for video streaming; we aim to quantify exactly what kind of streaming they will support in future reports to compare alongside NBN50.

## Impact of underperforming services<sup>3</sup> on download speed

As in previous reports, we present separate measures of download performance exclusive of underperforming services. These are services that do not achieve speeds that approach the maximum plan speeds at any time of the day. These are essentially services that the RSP supplies to a consumer with a maximum plan speed that cannot be attained due to specific physical limitations affecting the service.

This information allows consumers to better understand the reported download and upload speed measures by removing the effect of services which, due to physical limitations, would be better assigned to another plan. At the same time, this comparison provides stronger incentives for service providers to improve service quality for customers on underperforming services; a small number of underperforming services can have an appreciable effect on an RSP's overall performance metrics.

### Average NBN download speeds – all hours (inclusive and exclusive of underperforming services)



Underperforming services represented 10% of the 1,270 NBN services that were tested for this report. 95% of underperforming NBN services are fibre to the node connections. Most are on 50/20Mbps and 100/40Mbps plans. The average download performance once underperforming services are excluded is 90.2% as against the 86.7% figure quoted earlier for all services. This means that if underperforming services had been remediated before the measurements were collected then overall download performance would have been 3.5 percentage points higher than was actually observed during the month of February.

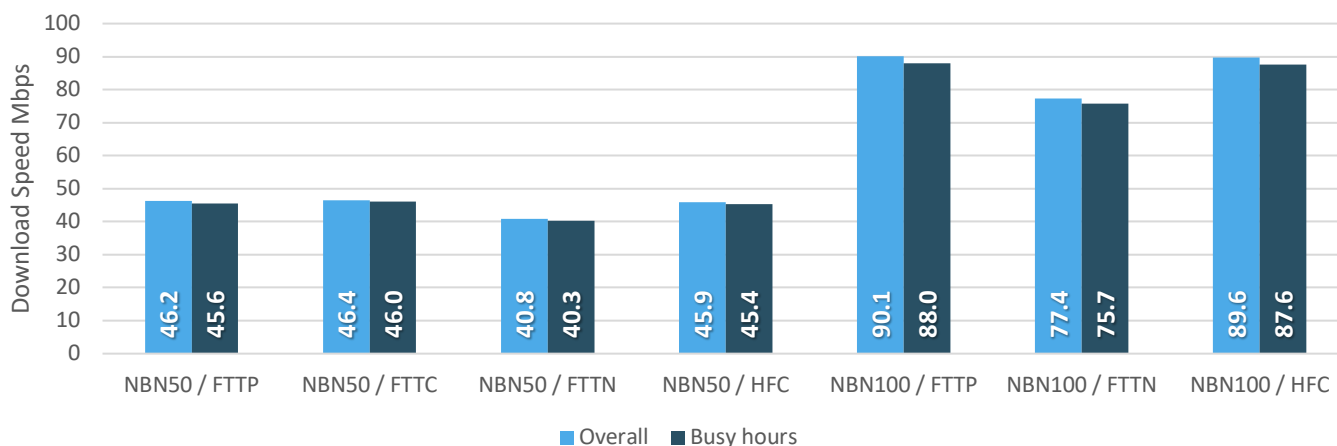
As in previous reports, all RSPs' performance were impacted to some extent by underperforming services during February.

<sup>3</sup> We classify a service as 'underperforming' if no more than 5 percent of speed tests that we conducted over the service achieved a speed that was above 75 percent of maximum plan speed. This test effectively identifies those services with maximum attainable speeds that fall closer to the maximum speed of a lower speed tier than to the maximum speed of the consumer's current plan.

## Download Speed by NBN Plan and Access Technology

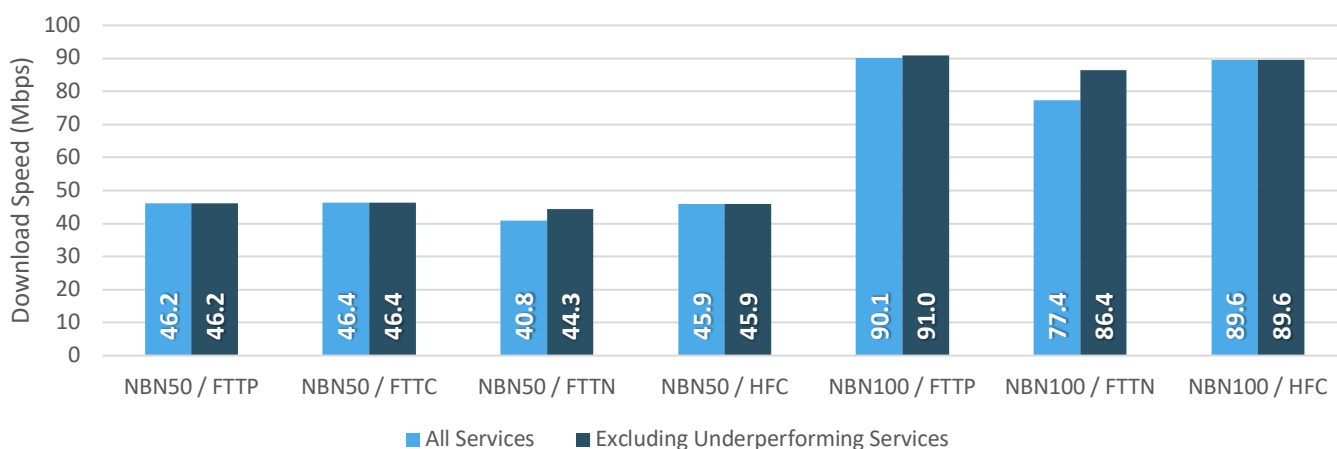
The following chart shows average download speed for different access technologies for different NBN tiers.

### Average NBN download speeds by technology and plan



Within the 50/20 Mbps tier, fibre to the node services had an average download speed around 5 Mbps lower than other technologies. Within the 100/40 Mbps tier, fibre to the node services had an average download speed around 12 Mbps lower than other technologies.

The following chart shows the impact of underperforming services on the average download speed of different tiers.

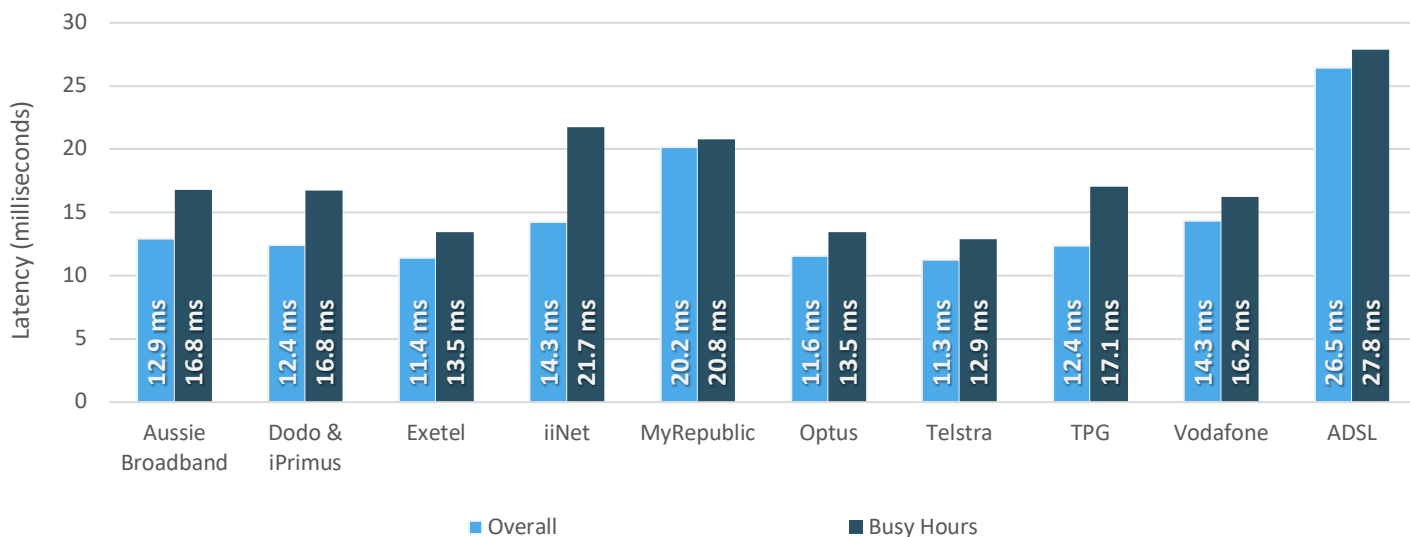


This demonstrates that fibre to the node accounts for the bulk of the impact from underperforming services for both the NBN50 and NBN100 tiers.

## Latency, Webpage Loading Time, and Packet Loss by Plan

The following chart shows average round trip latency, which is the average time required to send a packet of data to the test server and back. Lower latency will result in more responsive behaviour from real-time applications such as VOIP and online gaming.

### Average latency – NBN plans and ADSL

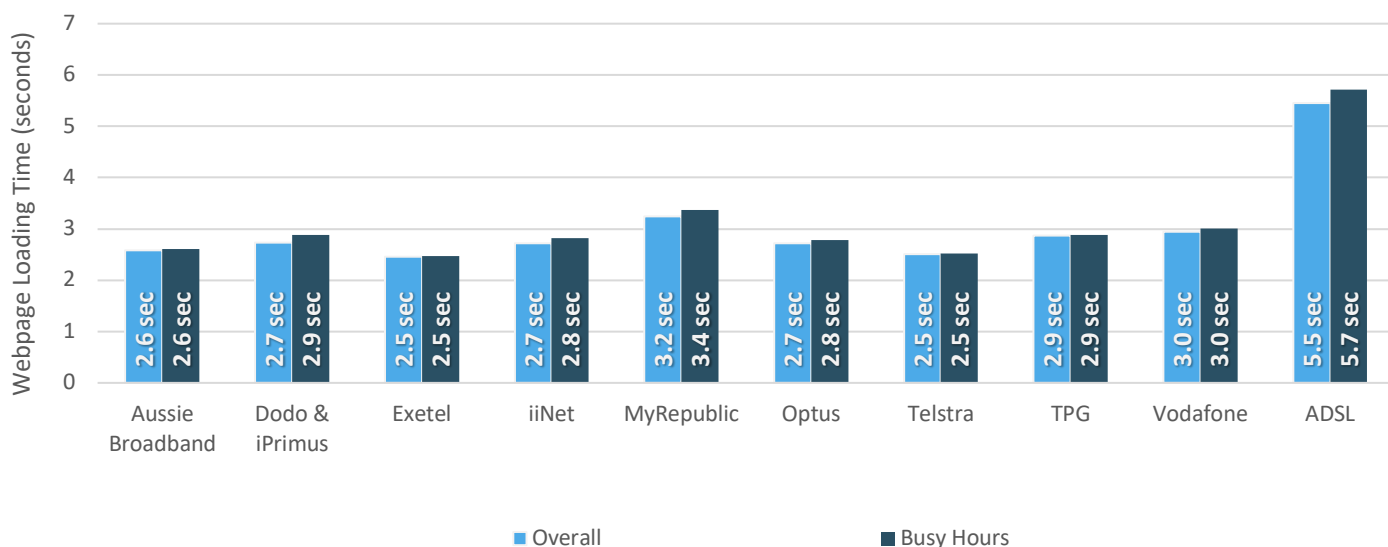


Average latency results from February 2020 are in line with the previous report: average latency was generally below 15ms during all hours across RSPs with the exception of MyRepublic.

Connections served by MyRepublic had higher average latency than connections served by other RSPs, although average latency did remain at around the same level during busy hours. It should be noted that latency at 30ms would have a detrimental effect on only the most latency-sensitive applications.

The following chart shows the average time required to fully load the most popular webpages for Australian users across all NBN speed tiers, per RSP.

### Average webpage loading time – NBN plans and ADSL

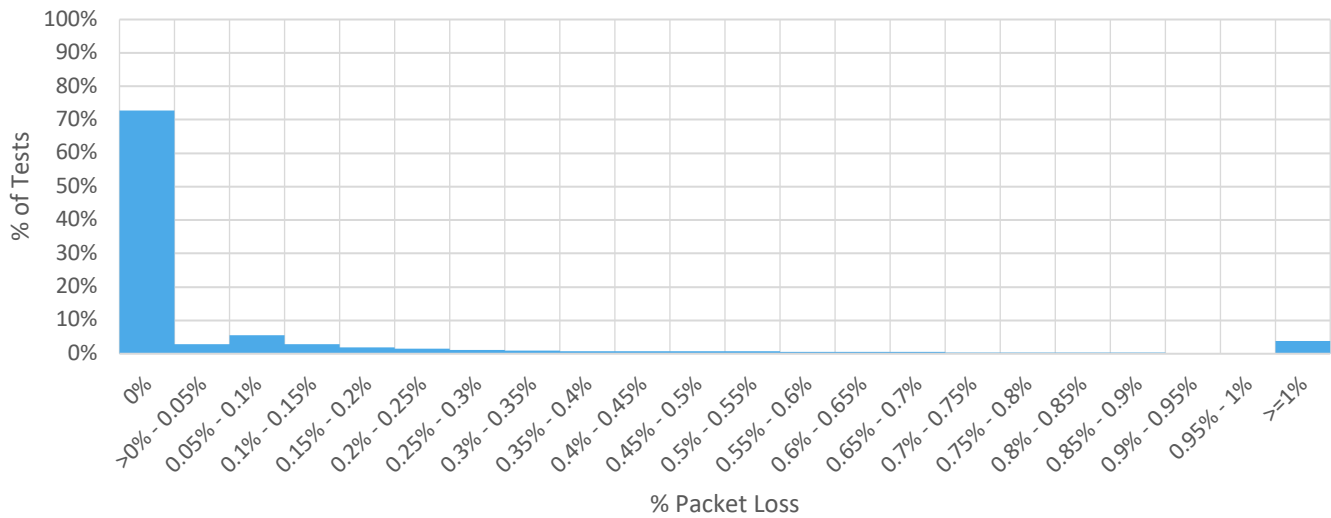


All RSPs were able to serve a webpage in at most 3 seconds on average, with the exception of MyRepublic, and the average time required to serve a webpage did not increase materially during busy hours for any RSP.

The following chart shows the frequency at which different levels of packet loss occurred during tests.



## Frequency of packet loss – NBN plans



A total of nearly 789,000 packet loss tests were conducted over the measurement period. 76% of these tests had packet loss of either zero or less than 0.05%. For reference, in the previous report 79% of tests had packet loss below 0.05%.

At the other end of the scale, 3.8% of tests had packet loss greater than 1% as against 3.2% in the previous report. At levels above 1%, packet loss can cause issues which are detrimental to user experience, such as webpages failing to load.

## Download speed during the busiest hour

In this report, the busiest hour speed is the fifth-lowest average hourly download speed across each busy hour within the month.<sup>4</sup> The month of February had a total of 29 days with 4 busy hours each, totalling 116 busy hours in the month. For each busy hour, we calculate the average download performance (download speed as a percentage of maximum plan speed) for each RSP. We take each RSP's fifth-lowest hourly download performance as an indicator of performance during the busiest hours when networks are under the highest levels of stress.

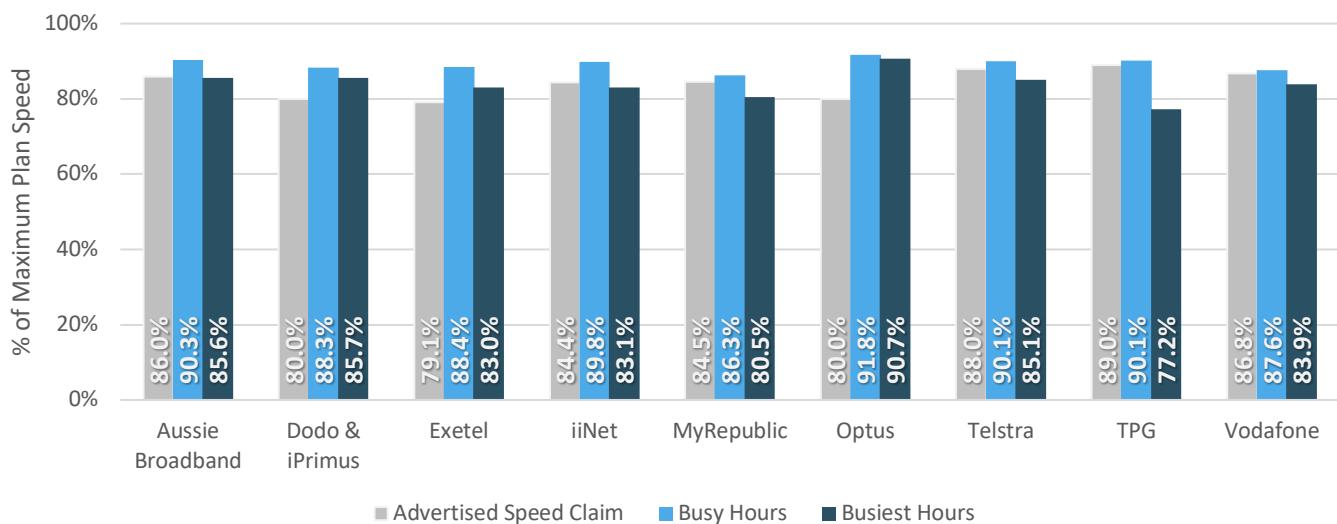
The chart below considers NBN 50/20Mbps and NBN 100/40Mbps products and has three columns for each RSP. The first is a weighted average of the typical busy hour speeds advertised for these products by RSPs at the end of February, expressed as a percentage of the maximum speed achievable by the product. The weighting factor for each product in this average is the number of Whiteboxes online on that product. The second column shows download performance during busy hours. The third column shows download performance during the busiest hour (i.e. the fifth-lowest hourly average as explained above).

A result in which the busiest hour speed is relatively close to average busy hour speed indicates that the plan is relatively unaffected by higher demand at especially busy times. Results in which busiest hour speeds are further below average busy hour speeds indicate that the plan is more affected by particularly high demand peaks.

At the end of February, RSPs advertised download speeds for their NBN 50/20Mbps and NBN 100/40Mbps products that were between 79% and 89% of the maximum achievable by the products, with Exetel advertising the lowest speeds, and TPG the highest.

Any services which are underperforming (as defined above), or which have an acknowledged impairment which prevents maximum plan speed from being delivered, have been excluded.

**Advertised speeds and average download speeds**  
(50/20Mbps and 100/40Mbps plans, exclusive of underperforming and impaired services)

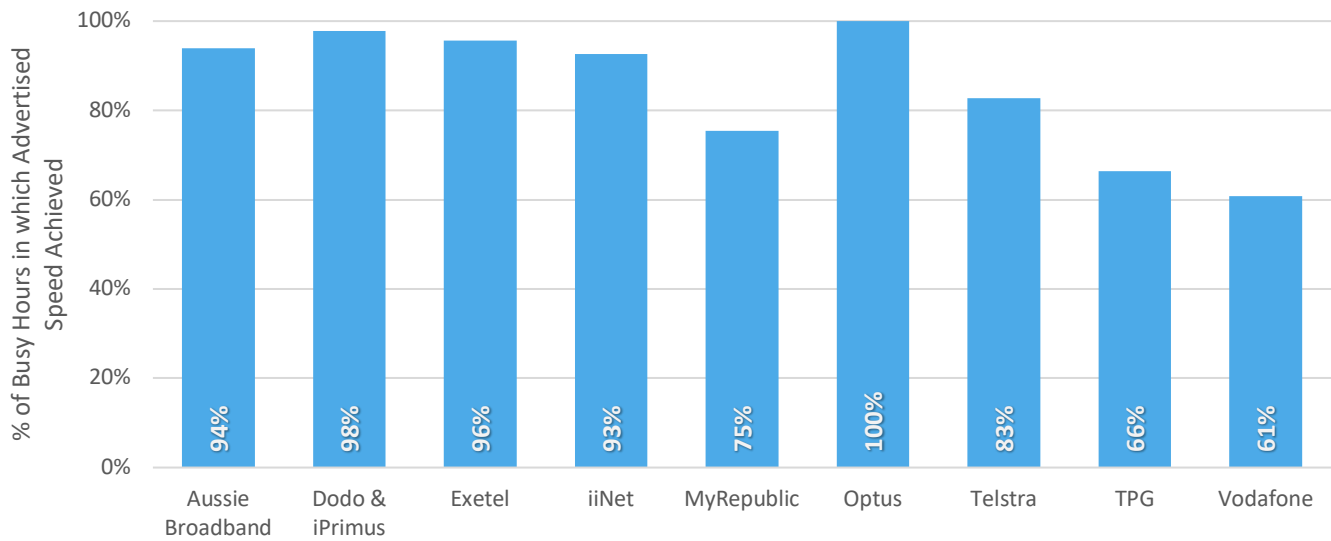


From these results we can see that if all underperforming services and impaired services had been remediated – or limited to supporting more appropriate plans - then all RSPs would have average speeds that exceeded advertised speed claims during the busy hours, however only three would have exceeded advertised speed claims during the busiest hour.

The chart below shows the percentage of busy hours during the month of February in which test speeds for NBN 50/20Mbps and NBN 100/40Mbps products met or exceeded the speeds advertised by RSPs.

<sup>4</sup> In reports prior to February 2019 (Reports 1 to 4), the busiest hour download speed was the average of the fifth-lowest download speed achieved by each Whitebox on an NBN connection during the busy evening hours. Consequently, the busiest hour speeds presented in this report are not directly comparable to those presented in Reports 1 to 4.

## Proportion of busy hours where advertised speed was achieved (50/20Mbps and 100/40Mbps plans, exclusive of underperforming/impaired services)



If all underperforming services and impaired services had been remediated – or limited to supporting more appropriate plans - then the proportion of busy hours when RSPs met their advertised speed claims would have ranged between 61% and 100% depending on provider.

## NBN RSP tables

The following tables show statistical information on overall download speeds, upload speeds, and outages on the basis of RSPs overall, and at the individual speed tier level in instances where at least 40 Whiteboxes reported successfully during the test period.

The overall speed is the average speed (download or upload) for the RSP, measured as a percentage of maximum plan speed. Standard deviation is a measure of how widely or narrowly test speeds are distributed in the data set. The 95% confidence interval is a range in which the 'true' average value is estimated to lie and is a function of the sample size (i.e. number of Whiteboxes online) and standard deviation. If the standard deviation is larger then the confidence interval will be wider, reflecting greater variability in the underlying data. If the sample size is larger then the confidence interval will be narrower, reflecting more certainty in the underlying data.

For example: during testing, we measured an average download performance of 87.3% of maximum plan speed for Aussie Broadband across all NBN tiers with a 95% confidence interval of  $\pm 1.7\%$ . If we were to repeat our sampling 100 times, we expect that this average would fall between 85.6% and 88.9% in at least 95 cases.

RSP	Download Average % of Maximum Plan Speed (all hours)	Standard Deviation	95% Confidence Interval	Sample Size
Aussie Broadband	87.3%	11.8%	85.6% - 88.9%	201
Dodo & iPrimus	83.7%	14.8%	79.6% - 87.7%	51
Exetel	88.3%	6.8%	86.9% - 89.7%	90
iiNet	85.7%	14.7%	83.6% - 87.8%	188
MyRepublic	84.5%	15.1%	80.8% - 88.1%	66
Optus	90.1%	9.2%	88.6% - 91.5%	148
Telstra	85.2%	15.3%	83.2% - 87.2%	226
TPG	88.0%	11.6%	86.3% - 89.7%	181
Vodafone	84.2%	14.1%	81.0% - 87.4%	73

RSP	Upload Average % of Maximum Plan Speed (all hours)	Standard Deviation	95% Confidence Interval	Sample Size
Aussie Broadband	83.9%	18.4%	81.4% - 86.5%	201
Dodo & iPrimus	82.9%	21.2%	77.1% - 88.7%	51
Exetel	88.9%	11.8%	86.5% - 91.4%	89
iiNet	84.7%	19.9%	81.9% - 87.6%	188
MyRepublic	84.6%	18.8%	80.1% - 89.2%	66
Optus	87.4%	15.4%	84.9% - 89.9%	148
Telstra	83.2%	20.7%	80.5% - 85.9%	226
TPG	87.4%	16.5%	85.0% - 89.8%	181
Vodafone	82.6%	20.6%	77.9% - 87.4%	73

RSP	Speed Tier	Download Average % of Maximum Plan Speed (all hours)	Standard Deviation	95% Confidence Interval	Sample Size
Aussie Broadband	50/20 Mbps	86.6%	13.1%	83.5% - 89.7%	68
Aussie Broadband	100/40 Mbps	87.4%	11.4%	85.2% - 89.7%	98
Exetel	50/20 Mbps	89.1%	6.9%	87.3% - 90.9%	59
iiNet	50/20 Mbps	84.3%	15.8%	81.2% - 87.4%	101
iiNet	100/40 Mbps	85.9%	13.8%	82.4% - 89.3%	61
Optus	50/20 Mbps	90.6%	8.6%	88.7% - 92.4%	83
Optus	100/40 Mbps	89.0%	10.3%	86.4% - 91.7%	57
Telstra	50/20 Mbps	83.6%	16.2%	80.8% - 86.3%	137
Telstra	100/40 Mbps	86.1%	14.7%	82.6% - 89.6%	67
TPG	50/20 Mbps	88.1%	10.6%	86.0% - 90.2%	96
TPG	100/40 Mbps	86.4%	14.7%	82.7% - 90.1%	60

RSP	Speed Tier	Upload Average % of Maximum Plan Speed (all hours)	Standard Deviation	95% Confidence Interval	Sample Size
Aussie Broadband	50/20 Mbps	80.6%	21.6%	75.5% - 85.8%	68
Aussie Broadband	100/40 Mbps	85.0%	16.0%	81.8% - 88.1%	98
Exetel	50/20 Mbps	88.4%	12.8%	85.1% - 91.7%	58
iiNet	50/20 Mbps	79.0%	24.3%	74.3% - 83.8%	101
iiNet	100/40 Mbps	88.9%	10.4%	86.3% - 91.5%	61
Optus	50/20 Mbps	86.6%	17.9%	82.7% - 90.4%	83
Optus	100/40 Mbps	89.1%	11.1%	86.2% - 92.0%	57
Telstra	50/20 Mbps	80.5%	23.5%	76.5% - 84.4%	137
Telstra	100/40 Mbps	85.8%	16.1%	82.0% - 89.7%	67
TPG	50/20 Mbps	85.1%	17.6%	81.6% - 88.6%	96
TPG	100/40 Mbps	87.9%	14.9%	84.2% - 91.7%	60

RSP	Average Daily Outages Lasting Longer than 30 Seconds	Sample Size
Aussie Broadband	0.43	201
Dodo & iPrimus	0.26	52
Exetel	0.23	90
iiNet	0.14	188
MyRepublic	0.19	65
Optus	0.46	147
Telstra	0.15	226
TPG	0.19	181
Vodafone	0.49	72

## NBN speed tier tables

The overall speed is the average speed (download or upload) for the particular NBN speed tier, measured as a percentage of maximum plan speed. Standard deviation is a measure of how widely or narrowly test speeds are distributed in the data set. The 95% confidence interval is a range in which the 'true' average value is estimated to lie.

For example: during testing, we measured an average download performance of 86.4% of maximum plan speed for users subscribed to 100/40Mbps NBN fixed-line plan with a 95% confidence interval of  $\pm 1.2\%$ . If we were to repeat our sampling 100 times, we expect that this average would fall between 85.2% and 87.6% in at least 95 cases.

For the 12/1Mbps tier, the sample size is considered low and results are indicative only.

Period	Speed Tier	Download Average % of Maximum Plan Speed (all hours)	Standard Deviation	95% Confidence Interval	Sample Size
All Hours	12/1 Mbps	91.5%	3.6%	90.2% - 92.8%	29
All Hours	25/5 Mbps	90.6%	8.8%	88.9% - 92.3%	99
All Hours	50/20 Mbps	86.1%	13.5%	85.1% - 87.2%	671
All Hours	100/40 Mbps	86.4%	12.8%	85.2% - 87.6%	460

Period	Speed Tier	Download Average % of Maximum Plan Speed (busy hours)	Standard Deviation	95% Confidence Interval	Sample Size
Busy Hours	12/1 Mbps	90.5%	4.2%	89.0% - 92.1%	29
Busy Hours	25/5 Mbps	89.8%	9.1%	88.0% - 91.6%	99
Busy Hours	50/20 Mbps	85.1%	13.6%	84.1% - 86.2%	664
Busy Hours	100/40 Mbps	84.5%	13.1%	83.3% - 85.7%	457

Period	Speed Tier	Upload Average % of Maximum Plan Speed (all hours)	Standard Deviation	95% Confidence Interval	Sample Size
All Hours	12/1 Mbps	99.0%	11.0%	95.0% - 103.1%	29
All Hours	25/5 Mbps	91.2%	9.5%	89.3% - 93.0%	99
All Hours	50/20 Mbps	82.8%	21.1%	81.2% - 84.4%	670
All Hours	100/40 Mbps	87.0%	14.3%	85.7% - 88.3%	460

Period	Speed Tier	Upload Average % of Maximum Plan Speed (busy hours)	Standard Deviation	95% Confidence Interval	Sample Size
Busy Hours	12/1 Mbps	98.8%	11.4%	94.6% - 102.9%	29
Busy Hours	25/5 Mbps	90.9%	9.6%	89.1% - 92.8%	99
Busy Hours	50/20 Mbps	82.4%	21.0%	80.8% - 84.0%	663
Busy Hours	100/40 Mbps	85.7%	14.7%	84.3% - 87.0%	454

## NBN technology tables

The following tables show statistical information on overall download speeds, upload speeds, and outages, on a per-technology basis.

The overall speed is the average speed (download or upload) for the technology type, measured as a percentage of the maximum plan speed for each subscriber. Standard deviation is a measure of how widely or narrowly test speeds are distributed in the data set. The 95% confidence interval is a range in which the 'true' average value is estimated to lie.

For example: during testing, we measured an average download performance of 90.8% of maximum plan speed for fibre to the premises NBN fixed-line connections with a 95% confidence interval of  $\pm 0.7\%$ . If we were to repeat our sampling 100 times, we expect that this average would fall between 90.1% and 91.5% in at least 95 cases.

Technology	Download Average % of Maximum Plan Speed (all hours)	Standard Deviation	95% Confidence Interval	Sample Size
Fibre to the premises - FTTP	90.8%	7.4%	90.1% - 91.5%	393
Fibre to the curb - FTTC	91.4%	5.5%	90.2% - 92.7%	72
Fibre to the node - FTTN	82.0%	16.1%	80.7% - 83.3%	594
Hybrid fibre-coaxial - HFC	90.8%	5.4%	90.0% - 91.5%	203

Technology	Upload Average % of Maximum Plan Speed (all hours)	Standard Deviation	95% Confidence Interval	Sample Size
Fibre to the premises - FTTP	92.2%	8.4%	91.4% - 93.0%	392
Fibre to the curb - FTTC	92.7%	6.1%	91.3% - 94.1%	72
Fibre to the node - FTTN	77.9%	23.3%	76.0% - 79.8%	594
Hybrid fibre-coaxial - HFC	90.7%	6.3%	89.9% - 91.6%	203

Technology	Average Daily Outages Lasting Longer than 30 Seconds	Sample Size
Fibre to the premises - FTTP	0.20	393
Fibre to the curb - FTTC	0.29	72
Fibre to the node - FTTN	0.31	594
Hybrid fibre-coaxial - HFC	0.33	201

Technology	Percentage of Outages Lasting 30-60sec	Percentage of Outages Lasting 1-3min	Percentage of Outages Lasting 3-10min	Percentage of Outages Lasting 10min or more
Fibre to the premises - FTTP	56.1%	30.3%	5.8%	7.7%
Fibre to the curb - FTTC	56.7%	29.5%	8.3%	5.6%
Fibre to the node - FTTN	26.5%	26.8%	36.8%	10.0%
Hybrid fibre-coaxial - HFC	28.2%	30.2%	31.6%	9.9%

## NBN state tables

This table shows statistical information on overall download speeds on a per-state basis.

The overall speed is the average speed (download or upload) for the technology type, measured as a percentage of the maximum plan speed for each subscriber. Standard deviation is a measure of how widely or narrowly test speeds are distributed in the data set. The 95% confidence interval is a range in which the 'true' average value is estimated to lie.

For example: during testing, we measured an average download performance of 83.8% of maximum plan speed for NBN fixed-line connections in ACT, with a 95% confidence interval of  $\pm 4.3\%$ . If we were to repeat our sampling 100 times, we expect that this average would fall between 79.5% and 88.1% in at least 95 cases.

State/Territory	Download Average % of Maximum Plan Speed (all hours)	Standard Deviation	95% Confidence Interval	Sample Size
ACT	83.8%	17.5%	79.5% - 88.1%	64
NSW	87.0%	12.7%	85.8% - 88.2%	410
NT + SA	88.6%	9.4%	86.5% - 90.7%	79
QLD	85.4%	14.6%	83.3% - 87.5%	186
VIC	88.4%	11.3%	87.2% - 89.6%	340
TAS	86.5%	11.2%	83.7% - 89.4%	58
WA	83.4%	13.8%	81.0% - 85.8%	125

## Number of busy hours where RSP advertised download speeds were met or exceeded

The figures in the following table are based on the typical evening hour speeds that were advertised by RSPs at the end of February 2020.

There were 116 busy hours across the 29 days in February 2020.

RSP	% of busy hours in which advertised download speed met or exceeded	% of busy hours in which advertised download speed met or exceeded (excluding underperforming and impaired services)
Aussie Broadband	41%	94%
Dodo & iPrimus	55%	98%
Exetel	94%	96%
iiNet	36%	93%
MyRepublic	31%	75%
Optus	100%	100%
Telstra	31%	83%
TPG	23%	66%
Vodafone	32%	61%



## NBN Whiteboxes connected to underperforming services

The following table shows the number of Whiteboxes on NBN connections for each RSP, alongside the number of Whiteboxes connected to underperforming services.

RSP	NBN Whiteboxes	NBN Whiteboxes on underperforming services	% NBN Whiteboxes on underperforming services
Aussie Broadband	201	16	8%
Dodo & iPrimus	54	7	13%
Exetel	91	2	2%
iiNet	189	26	14%
MyRepublic	66	6	9%
Optus	148	8	5%
Telstra	227	33	15%
TPG	182	14	8%
Vodafone	73	7	10%
Other RSPs	39	3	8%
<b>Total</b>	<b>1270</b>	<b>122</b>	<b>10%</b>

The following table shows the number of Whiteboxes on fibre to the node connections for each speed tier, alongside the number of Whiteboxes connected to underperforming services.

Speed Tier	Technology	NBN Whiteboxes	NBN Whiteboxes on underperforming services	% NBN Whiteboxes on underperforming services
12/1 Mbps	Fibre to the node - FTTN	13	0	0%
25/5 Mbps	Fibre to the node - FTTN	70	2	3%
50/20 Mbps	Fibre to the node - FTTN	388	81	21%
100/40 Mbps	Fibre to the node - FTTN	126	34	27%
<b>Total</b>	<b>Fibre to the node - FTTN</b>	<b>597</b>	<b>117</b>	<b>20%</b>

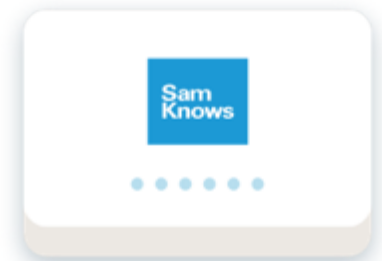
# SamKnows One Analytics

- ◆ View all your data in one place.
- ◆ Create customised charts and save the results that mean the most to you.
- ◆ Track changes in your connection over time.



## Measuring from homes across Australia











- ◆ The SamKnows Whitebox is a purpose-built testing agent that connects to your router.
- ◆ Measures every aspect of your internet service delivered to your home.
- ◆ Runs at regular intervals when you're not using the internet.



[Volunteer today!](#)

## Test Packages

We're running a bunch of tests and look to add more in the future. See below to find out more!

Tests	Definitions
 Download	The speed at which data can be transferred from the SamKnows test server to your computer, measured in megabits per second (Mbps). We also measure the percentage of the maximum plan download speed achieved. For example, a busy hour speed measure of 90% means that an RSP with maximum 100Mbps speed plans is supplying an average speed of around 90Mbps in the evening busy hours. For its 50Mbps plans, it is supplying around 45Mbps, and for 25Mbps plans it is supplying around 22.5Mbps.
 Upload	The speed at which information is transferred from your computer to the SamKnows test server, measured in megabits per second (Mbps).
 Latency	How long it takes a data packet to go from your device to our test server and back to your device. The shorter the latency, the better.
 Jitter	Jitter is the variation in the delay of received packets, essentially it is a measure of the stability of your latency.
 Packet Loss	Packet loss is the number of packets that are sent over a network that don't make it to their destination, measured as a percentage of packets lost out of all packets sent.
 DNS	The Domain Name System (DNS) connects the website address to the actual website.
 Website load	The time it takes for a specific website to fully load. This is a combination test that includes download, latency and DNS in one test that accurately mimics real-world usage.
 Outage	The outages metric tracks how many times per day your broadband connection goes offline for at least 30 seconds.
 YouTube	Measures the highest bitrate you can reliably stream of the most popular video in the country.
 Netflix	An application-specific test, supporting the streaming of binary data from Netflix's servers using the same CDN selection logic as their real client uses. The test has been developed in direct cooperation with Netflix.