# Report 16 Appendix, March 2022

# NBN fixed-line services tables

# NBN video streaming tables

The following tables show information on the proportion of NBN services on the main NBN fixed-line plans which would be able to reliably stream (with a low chance of stopping and starting) a varying number of videos from Netflix simultaneously during busy hours. Data from underperforming and impaired services is included.

A High Definition stream from Netflix takes up around 2.2 Mbps data rate on average. For consumers with premium Ultra High Definition (4K) video stream, an Ultra High Definition stream from Netflix takes up 12 Mbps data rate on average. The actual data rate will vary during video streaming: for example Netflix would use a higher data rate during a fast-paced action scene. The actual data rate will also depend on how many other users are using Netflix.

The Whitebox measures the total downstream data rate available from Netflix's servers. Therefore, by using multiples of 2.2 Mbps (for High Definition) and 12 Mbps (for Ultra High Definition) it allows us to infer whether a NBN fixed-line service would be able to support different numbers of simultaneous streams. This assumes no other use of the connection at the time, i.e. that Netflix is the only application running.

| Download plan | 1 HD (2.2 Mbps) | 2 HD (4.4 Mbps) | 3 HD (6.6 Mbps) | 4 HD (8.8 Mbps) | 5 HD (11 Mbps) | Panel size |
|---|---|---|---|---|---|---|
| NBN12 | 100% | 100% | 100% | 95% | 84% | 19 |
| NBN25 | 100% | 100% | 100% | 100% | 100% | 98 |
| NBN50 | 100% | 100% | 100% | 100% | 100% | 630 |
| NBN100 | 100% | 100% | 100% | 100% | 100% | 398 |
| Download plan | 1 UHD (12 Mbps) | 2 UHD (24 Mbps) | 3 UHD (36 Mbps) | 4 UHD (48 Mbps) | 5 UHD (60 Mbps) | Panel size |
| NBN25 | 100% | 80% | 0% | 0% | 0% | 98 |
| NBN50 | 100% | 97% | 87% | 65% | 0% | 630 |
| NBN100 | 100% | 100% | 99% | 97% | 91% | 398 |

| RSP | Download plan | 1 UHD | 2 UHD | 3 UHD | 4 UHD | Panel size |
|---|---|---|---|---|---|---|
| Aussie Broadband | 50 | 98% | 96% | 78% | 39% | 80 |
| Dodo & iPrimus | 50 | 100% | 98% | 89% | 60% | 47 |
| Exetel | 50 | 100% | 100% | 96% | 87% | 48 |
| iiNet | 50 | 100% | 97% | 90% | 66% | 91 |
| Optus | 50 | 100% | 99% | 93% | 81% | 67 |
| Telstra | 50 | 100% | 98% | 90% | 74% | 106 |
| TPG | 50 | 100% | 100% | 90% | 78% | 81 |
| RSP | Download plan | 1 UHD | 2 UHD | 3 UHD | 4 UHD | Panel size |
| Aussie Broadband | 100 | 100% | 100% | 100% | 93% | 69 |
| iiNet | 100 | 100% | 100% | 100% | 98% | 40 |
| Optus | 100 | 100% | 100% | 98% | 96% | 55 |
| Telstra | 100 | 100% | 100% | 100% | 100% | 54 |
| TPG | 100 | 100% | 100% | 100% | 93% | 43 |

# NBN RSP tables

The following tables show statistical information on download speeds, upload speeds, and outages for each RSP across all NBN plans, and for individual NBN plans 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 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 97.5% of plan speed for Dodo & iPrimus across all NBN plans with a 95% confidence interval of ±3.0%. If we were to repeat our sampling 100 times, we expect that this average would fall between 94.5% and 100.5% in at least 95 cases.

| Period | RSP | Download average % of plan speed (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| All hours | Aussie Broadband | 96.1% | 14.0% | 94.1% - 98.1% | 194 | 39,437 |
| All hours | Dodo & iPrimus | 97.5% | 14.1% | 94.5% - 100.5% | 84 | 18,173 |
| All hours | Exetel | 104.5% | 7.7% | 102.7% - 106.2% | 74 | 15,449 |
| All hours | iiNet | 96.7% | 14.4% | 94.5% - 99.0% | 158 | 35,056 |
| All hours | Launtel | 100.3% | 13.0% | 96.8% - 103.8% | 52 | 9,245 |
| All hours | MyRepublic | 99.8% | 14.0% | 95.7% - 103.9% | 45 | 9,225 |
| All hours | Optus | 100.8% | 14.6% | 98.4% - 103.3% | 137 | 29,137 |
| All hours | Telstra | 99.6% | 15.6% | 97.4% - 101.9% | 192 | 42,690 |
| All hours | TPG | 98.1% | 14.6% | 95.9% - 100.3% | 167 | 32,173 |
| All hours | Superloop | 96.5% | 10.7% | 93.9% - 99.0% | 69 | 13,920 |
| All hours | Vodafone | 96.3% | 14.9% | 92.3% - 100.2% | 54 | 10,027 |

| Period | RSP | Download average % of plan speed (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| Busy hours | Aussie Broadband | 95.1% | 14.5% | 93.1% - 97.1% | 194 | 12,474 |
| Busy hours | Dodo & iPrimus | 96.7% | 14.0% | 93.7% - 99.8% | 83 | 5,694 |
| Busy hours | Exetel | 103.3% | 7.8% | 101.5% - 105.1% | 74 | 4,776 |
| Busy hours | iiNet | 95.8% | 14.5% | 93.5% - 98.1% | 157 | 10,890 |
| Busy hours | Launtel | 98.4% | 13.5% | 94.7% - 102.1% | 52 | 2,914 |
| Busy hours | MyRepublic | 99.1% | 13.9% | 95.0% - 103.2% | 45 | 2,819 |
| Busy hours | Optus | 100.0% | 14.7% | 97.6% - 102.5% | 137 | 8,893 |
| Busy hours | Telstra | 98.7% | 15.7% | 96.5% - 100.9% | 192 | 13,342 |
| Busy hours | TPG | 96.9% | 14.6% | 94.7% - 99.1% | 167 | 9,827 |
| Busy hours | Superloop | 95.4% | 11.0% | 92.8% - 98.0% | 69 | 4,210 |
| Busy hours | Vodafone | 95.1% | 15.1% | 91.0% - 99.1% | 54 | 3,088 |

| Period | RSP | Upload average % of plan speed (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| All hours | Aussie Broadband | 83.1% | 18.1% | 80.5% - 85.6% | 194 | 55,606 |
| All hours | Dodo & iPrimus | 85.3% | 16.8% | 81.7% - 88.9% | 84 | 25,239 |
| All hours | Exetel | 89.0% | 12.4% | 86.2% - 91.9% | 74 | 21,548 |
| All hours | iiNet | 83.0% | 18.3% | 80.1% - 85.8% | 158 | 48,575 |
| All hours | Launtel | 86.8% | 12.0% | 83.6% - 90.1% | 52 | 12,610 |
| All hours | MyRepublic | 85.9% | 17.2% | 80.9% - 90.9% | 45 | 13,427 |
| All hours | Optus | 86.6% | 15.2% | 84.1% - 89.2% | 137 | 41,427 |
| All hours | Telstra | 85.8% | 17.5% | 83.3% - 88.2% | 192 | 59,235 |
| All hours | TPG | 83.9% | 19.7% | 81.0% - 86.9% | 167 | 45,915 |
| All hours | Superloop | 85.9% | 14.7% | 82.4% - 89.3% | 69 | 19,682 |
| All hours | Vodafone | 84.8% | 15.3% | 80.8% - 88.9% | 54 | 13,985 |

| Period | RSP | Upload average % of plan speed (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| Busy hours | Aussie Broadband | 82.7% | 17.9% | 80.2% - 85.2% | 194 | 6,314 |
| Busy hours | Dodo & iPrimus | 84.8% | 17.0% | 81.1% - 88.5% | 82 | 2,917 |
| Busy hours | Exetel | 88.9% | 12.3% | 86.1% - 91.7% | 74 | 2,431 |
| Busy hours | iiNet | 82.6% | 18.5% | 79.7% - 85.5% | 157 | 5,595 |
| Busy hours | Launtel | 86.3% | 12.6% | 82.8% - 89.7% | 52 | 1,443 |
| Busy hours | MyRepublic | 85.8% | 17.1% | 80.8% - 90.8% | 45 | 1,433 |
| Busy hours | Optus | 86.3% | 15.2% | 83.7% - 88.8% | 137 | 4,465 |
| Busy hours | Telstra | 85.4% | 17.5% | 83.0% - 87.9% | 192 | 6,767 |
| Busy hours | TPG | 83.6% | 19.6% | 80.6% - 86.6% | 167 | 5,049 |
| Busy hours | Superloop | 85.3% | 14.7% | 81.9% - 88.8% | 69 | 2,167 |
| Busy hours | Vodafone | 84.5% | 15.3% | 80.4% - 88.6% | 54 | 1,582 |

| Period | RSP | Download plan | Download average % of plan speed (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|---|
| All hours | Aussie Broadband | 50 | 94.7% | 16.1% | 91.2% - 98.2% | 81 | 17,121 |
| All hours | Aussie Broadband | 100 | 95.4% | 13.0% | 92.3% - 98.5% | 69 | 13,635 |
| All hours | Dodo & iPrimus | 50 | 97.4% | 14.8% | 93.2% - 101.7% | 47 | 10,274 |
| All hours | Exetel | 50 | 104.5% | 8.6% | 102.1% - 106.9% | 49 | 10,003 |
| All hours | iiNet | 50 | 96.0% | 16.0% | 92.7% - 99.3% | 91 | 20,739 |
| All hours | iiNet | 100 | 94.2% | 14.0% | 90.0% - 98.5% | 41 | 8,072 |
| All hours | Optus | 50 | 101.7% | 13.3% | 98.5% - 104.9% | 67 | 14,602 |
| All hours | Optus | 100 | 97.8% | 17.2% | 93.2% - 102.3% | 55 | 11,188 |
| All hours | Telstra | 50 | 98.3% | 16.6% | 95.2% - 101.5% | 107 | 24,198 |
| All hours | Telstra | 100 | 100.4% | 12.1% | 97.2% - 103.6% | 54 | 10,987 |
| All hours | TPG | 50 | 99.3% | 13.6% | 96.4% - 102.3% | 83 | 16,099 |
| All hours | TPG | 100 | 92.4% | 19.9% | 86.4% - 98.3% | 43 | 7,939 |

| Period | RSP | Download plan | Download average % of plan speed (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|---|
| Busy hours | Aussie Broadband | 50 | 93.6% | 17.1% | 89.9% - 97.4% | 81 | 5,492 |
| Busy hours | Aussie Broadband | 100 | 94.5% | 12.9% | 91.4% - 97.5% | 69 | 4,280 |
| Busy hours | Dodo & iPrimus | 50 | 96.9% | 14.7% | 92.7% - 101.1% | 47 | 3,280 |
| Busy hours | Exetel | 50 | 103.5% | 8.7% | 101.0% - 105.9% | 49 | 3,083 |
| Busy hours | iiNet | 50 | 95.1% | 16.0% | 91.8% - 98.5% | 90 | 6,413 |
| Busy hours | iiNet | 100 | 93.1% | 14.2% | 88.8% - 97.5% | 41 | 2,495 |
| Busy hours | Optus | 50 | 101.0% | 13.4% | 97.8% - 104.2% | 67 | 4,457 |
| Busy hours | Optus | 100 | 96.9% | 17.2% | 92.4% - 101.5% | 55 | 3,400 |
| Busy hours | Telstra | 50 | 97.3% | 16.8% | 94.2% - 100.5% | 107 | 7,656 |
| Busy hours | Telstra | 100 | 99.6% | 12.0% | 96.4% - 102.8% | 54 | 3,341 |

| Period | RSP | Download plan | Download average % of plan speed (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|--------|-----|---------------|------------------------------------------------|--------------------|--------------------------------------|------------|-----------------|
| Busy hours | TPG | 50 | 98.3% | 13.8% | 95.3% - 101.2% | 83 | 4,861 |
| Busy hours | TPG | 100 | 91.2% | 19.7% | 85.3% - 97.1% | 43 | 2,451 |

| Period | RSP | Upload plan | Upload average % of plan speed (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|--------|-----|-------------|---------------------------------------------|--------------------|--------------------------------------|------------|-----------------|
| All hours | Aussie Broadband | 20 | 81.4% | 20.1% | 77.8% - 85.0% | 118 | 33,799 |
| All hours | Aussie Broadband | 40 | 89.0% | 8.4% | 86.5% - 91.5% | 43 | 12,057 |
| All hours | Dodo & iPrimus | 20 | 84.5% | 16.5% | 80.3% - 88.7% | 59 | 17,922 |
| All hours | Exetel | 20 | 87.7% | 14.5% | 83.7% - 91.6% | 51 | 14,578 |
| All hours | iiNet | 20 | 80.6% | 20.2% | 76.5% - 84.7% | 93 | 29,315 |
| All hours | Optus | 20 | 84.9% | 17.6% | 81.0% - 88.8% | 78 | 23,852 |
| All hours | Optus | 40 | 88.6% | 12.2% | 85.0% - 92.2% | 44 | 12,885 |
| All hours | Telstra | 20 | 84.2% | 19.3% | 81.1% - 87.4% | 147 | 45,191 |
| All hours | TPG | 20 | 81.5% | 21.3% | 77.2% - 85.8% | 94 | 26,097 |

| Period | RSP | Upload plan | Upload average % of plan speed (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|--------|-----|-------------|----------------------------------------------|--------------------|--------------------------------------|------------|-----------------|
| Busy hours | Aussie Broadband | 20 | 81.1% | 20.0% | 77.5% - 84.7% | 118 | 3,878 |
| Busy hours | Aussie Broadband | 40 | 88.3% | 8.3% | 85.8% - 90.8% | 43 | 1,344 |
| Busy hours | Dodo & iPrimus | 20 | 84.2% | 16.7% | 79.9% - 88.5% | 58 | 2,096 |
| Busy hours | Exetel | 20 | 87.5% | 14.4% | 83.6% - 91.5% | 51 | 1,656 |
| Busy hours | iiNet | 20 | 80.1% | 20.3% | 75.9% - 84.2% | 92 | 3,394 |
| Busy hours | Optus | 20 | 84.6% | 17.5% | 80.7% - 88.5% | 78 | 2,614 |
| Busy hours | Optus | 40 | 88.0% | 12.5% | 84.3% - 91.7% | 44 | 1,338 |
| Busy hours | Telstra | 20 | 83.9% | 19.3% | 80.8% - 87.0% | 147 | 5,136 |

| Period | RSP | Upload plan | Upload average % of plan speed (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|--------|-----|-------------|---------------------------------------------|--------------------|-------------------------------------|------------|-----------------|
| Busy hours | TPG | 20 | 81.1% | 21.2% | 76.8% - 85.4% | 94 | 2,895 |

| RSP | Average daily outages lasting longer than 30 seconds | Standard deviation | 95% confidence interval of the mean | Panel size |
|---|---|---|---|---|
| Aussie Broadband | 0.35 | 1.04 | 0.20 - 0.49 | 194 |
| Dodo & iPrimus | 0.39 | 1.47 | 0.07 - 0.70 | 84 |
| Exetel | 0.20 | 0.27 | 0.14 - 0.26 | 74 |
| iiNet | 0.21 | 0.57 | 0.12 - 0.30 | 158 |
| Launtel | 0.61 | 0.95 | 0.35 - 0.87 | 52 |
| MyRepublic | 0.35 | 0.83 | 0.11 - 0.59 | 45 |
| Optus | 0.32 | 0.80 | 0.18 - 0.45 | 137 |
| Telstra | 0.23 | 0.56 | 0.15 - 0.31 | 192 |
| TPG | 0.40 | 1.66 | 0.15 - 0.65 | 167 |
| Superloop | 0.34 | 0.67 | 0.18 - 0.50 | 69 |
| Vodafone | 0.42 | 1.49 | 0.02 - 0.82 | 54 |

| RSP | Percentage of outages lasting 30-60 sec | Percentage of outages lasting 1-3 min | Percentage of outages lasting 3-10 min | Percentage of outages lasting 10 min or more |
|---|---|---|---|---|
| Aussie Broadband | 25.8% | 28.3% | 32.9% | 13.0% |
| Dodo & iPrimus | 10.5% | 20.6% | 30.1% | 38.8% |
| Exetel | 20.0% | 32.2% | 28.3% | 19.5% |
| iiNet | 26.7% | 29.2% | 29.6% | 14.5% |
| Launtel | 31.8% | 24.6% | 32.5% | 11.1% |
| MyRepublic | 19.9% | 32.9% | 28.7% | 18.5% |
| Optus | 42.6% | 29.7% | 13.8% | 13.9% |
| Superloop | 25.5% | 22.1% | 43.4% | 9.0% |
| Telstra | 21.1% | 23.9% | 19.7% | 35.3% |
| TPG | 38.4% | 29.6% | 20.5% | 11.5% |
| Vodafone | 31.6% | 45.7% | 15.6% | 7.1% |

# NBN plan tables

The following tables show statistical information on download and upload speeds for each NBN plan, including all tested RSPs.

- The overall speed is the average speed (download or upload) for the particular NBN plan, measured as a percentage of 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 96.7% of plan speed for users subscribed to 100Mbps NBN fixed-line plans with a 95% confidence interval of ±1.3%. If we were to repeat our sampling 100 times, we expect that this average would fall between 95.4% and 98.1% in at least 95 cases.

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

| Period | Download plan | Download average % of plan speed (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| All hours | 12 | 102.0% | 5.0% | 99.8% - 104.2% | 20 | 4,376 |
| All hours | 25 | 102.4% | 9.3% | 100.5% - 104.2% | 101 | 22,280 |
| All hours | 50 | 98.3% | 15.1% | 97.2% - 99.5% | 640 | 136,321 |
| All hours | 100 | 96.7% | 13.7% | 95.4% - 98.1% | 401 | 79,015 |
| All hours | 250 | 101.1% | 14.5% | 97.9% - 104.3% | 80 | 16,487 |

| Period | Download plan | Download average % of plan speed (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| Busy hours | 12 | 100.7% | 5.7% | 98.1% - 103.2% | 19 | 1,354 |
| Busy hours | 25 | 101.5% | 9.4% | 99.7% - 103.3% | 101 | 7,004 |
| Busy hours | 50 | 97.4% | 15.4% | 96.2% - 98.6% | 639 | 42,432 |
| Busy hours | 100 | 95.6% | 13.7% | 94.3% - 97.0% | 401 | 24,271 |
| Busy hours | 250 | 99.5% | 14.6% | 96.3% - 102.8% | 80 | 5,079 |

| Period | Upload plan | Upload average % of plan speed (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| All hours | 1 | 95.8% | 10.8% | 91.1% - 100.5% | 20 | 6,137 |
| All hours | 5 | 87.6% | 16.2% | 83.9% - 91.4% | 72 | 22,206 |
| All hours | 20 | 83.3% | 19.1% | 82.0% - 84.6% | 795 | 234,088 |
| All hours | 40 | 87.7% | 11.3% | 86.3% - 89.1% | 257 | 71,217 |

| Period | Upload plan | Upload average % of plan speed (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| Busy hours | 1 | 95.1% | 11.2% | 90.1% - 100.2% | 19 | 684 |
| Busy hours | 5 | 87.4% | 16.1% | 83.7% - 91.1% | 72 | 2,547 |
| Busy hours | 20 | 82.9% | 19.1% | 81.6% - 84.3% | 793 | 26,467 |
| Busy hours | 40 | 87.2% | 11.5% | 85.8% - 88.6% | 257 | 7,792 |

# NBN technology tables

The following tables show statistical information on 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 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 104.3% of plan speed for fibre to the premises NBN fixed-line services with a 95% confidence interval of ±0.9%. If we were to repeat our sampling 100 times, we expect that this average would fall between 103.4% and 105.1% (rounded to 1 decimal place) in at least 95 cases.

| Period | Technology | Download average % of plan speed (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| All hours | Fibre to the premises - FTTP | 104.3% | 7.8% | 103.4% - 105.1% | 310 | 64,686 |
| All hours | Fibre to the curb - FTTC | 100.2% | 8.8% | 98.6% - 101.8% | 117 | 23,259 |
| All hours | Hybrid fibre-coaxial - HFC | 104.0% | 8.1% | 103.0% - 105.0% | 248 | 50,637 |
| All hours | Fibre to the node - FTTN | 92.7% | 17.1% | 91.3% - 94.0% | 591 | 124,401 |

| Period | Technology | Download average % of plan speed (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| Busy hours | Fibre to the premises - FTTP | 103.1% | 8.1% | 102.2% - 104.0% | 310 | 19,959 |
| Busy hours | Fibre to the curb - FTTC | 99.3% | 9.1% | 97.6% - 100.9% | 117 | 7,224 |
| Busy hours | Hybrid fibre-coaxial - HFC | 102.9% | 8.5% | 101.8% - 103.9% | 248 | 15,789 |
| Busy hours | Fibre to the node - FTTN | 91.7% | 17.2% | 90.3% - 93.1% | 589 | 38,551 |

| Period | Technology | Upload average % of plan speed (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| All hours | Fibre to the premises - FTTP | 91.2% | 7.2% | 90.3% - 92.0% | 310 | 90,962 |
| All hours | Fibre to the curb - FTTC | 90.8% | 6.8% | 89.6% - 92.1% | 117 | 32,875 |
| All hours | Hybrid fibre-coaxial - HFC | 90.7% | 9.6% | 89.5% - 91.9% | 248 | 70,937 |
| All hours | Fibre to the node - FTTN | 78.2% | 21.8% | 76.5% - 80.0% | 591 | 174,489 |

| Period | Technology | Upload average % of plan speed (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| Busy hours | Fibre to the premises - FTTP | 90.9% | 7.3% | 90.0% - 91.7% | 310 | 10,176 |
| Busy hours | Fibre to the curb - FTTC | 90.4% | 7.4% | 89.1% - 91.7% | 117 | 3,681 |
| Busy hours | Hybrid fibre-coaxial - HFC | 90.1% | 9.7% | 88.8% - 91.3% | 247 | 7,935 |
| Busy hours | Fibre to the node - FTTN | 77.9% | 21.7% | 76.2% - 79.7% | 589 | 19,705 |

| Technology | Average daily outages lasting longer than 30 seconds | Standard deviation | 95% confidence interval of the mean | Panel size |
|---|---|---|---|---|
| Fibre to the premises - FTTP | 0.20 | 0.65 | 0.13 - 0.28 | 310 |
| Fibre to the curb - FTTC | 0.46 | 1.43 | 0.20 - 0.72 | 117 |
| Hybrid fibre-coaxial - HFC | 0.37 | 0.93 | 0.25 - 0.48 | 248 |
| Fibre to the node - FTTN | 0.34 | 1.11 | 0.25 - 0.43 | 591 |

| Technology | Percentage of outages lasting 30-60 sec | Percentage of outages lasting 1-3 min | Percentage of outages lasting 3-10 min | Percentage of outages lasting 10 min or more |
|---|---|---|---|---|
| Fibre to the curb - FTTC | 45.2% | 28.8% | 15.7% | 10.3% |
| Fibre to the node - FTTN | 23.0% | 26.3% | 30.7% | 20.0% |
| Fibre to the premises - FTTP | 36.1% | 28.9% | 23.3% | 11.7% |
| Hybrid fibre-coaxial - HFC | 25.6% | 31.3% | 23.9% | 19.2% |

# NBN state tables

This table shows statistical information on download speeds on a per-state basis. In this report, we have been able to draw upon all of the test results from a range of locations.

- The overall speed is the average speed (download or upload) for the state, measured as a percentage of the plan speed for each panellist.

- 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 95.3% of plan speed for NBN fixed-line services in WA, with a 95% confidence interval of ±3.3%. If we were to repeat our sampling 100 times, we expect that this average would fall between 92.0% and 98.5% (rounded to 1 decimal place) in at least 95 cases.

| Period | State or Territory | Download average % of plan speed (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| All hours | NSW | 99.4% | 13.4% | 98.1% - 100.7% | 402 | 83,487 |
| All hours | ACT | 95.6% | 15.8% | 91.7% - 99.5% | 64 | 13,210 |
| All hours | VIC | 98.6% | 14.1% | 97.1% - 100.1% | 352 | 71,896 |
| All hours | QLD | 97.8% | 14.1% | 95.9% - 99.8% | 205 | 42,261 |
| All hours | WA | 95.3% | 17.4% | 92.0% - 98.5% | 109 | 23,339 |
| All hours | TAS | 98.2% | 15.1% | 94.3% - 102.1% | 57 | 12,215 |
| All hours | NT + SA | 100.9% | 10.3% | 98.6% - 103.2% | 77 | 16,575 |

# NBN50 and NBN100 advertised speed tables

The figures in the following table are based on the typical evening hour speeds that were the predominant speed advertised by RSPs during the measurement period. The single weighted average speed claim is calculated based on the number of Whiteboxes online for each RSP for each plan (excluding underperforming and impaired services).

| RSP | NBN50 advertised % of plan speed | NBN100 advertised % of plan speed | Number of NBN50 Whiteboxes (excluding underperforming and impaired services) | Number of NBN100 Whiteboxes (excluding underperforming and impaired services) | Weighted advertised % of plan speed |
|---|---|---|---|---|---|
| Aussie Broadband | 96.0% | 97.0% | 59 | 54 | 96.5% |
| Dodo & iPrimus | 100.0% | 92.0% | 40 | 18 | 97.5% |
| Exetel | 100.0% | 100.0% | 46 | 16 | 100.0% |
| iiNet | 100.0% | 90.0% | 72 | 34 | 96.8% |
| Optus | 100.0% | 100.0% | 56 | 45 | 100.0% |
| Superloop | 96.0% | 93.0% | 17 | 34 | 94.0% |
| Telstra | 100.0% | 100.0% | 85 | 48 | 100.0% |
| TPG | 100.0% | 90.0% | 71 | 32 | 96.9% |
| Vodafone | 100.0% | 90.0% | 27 | 19 | 95.9% |

There were 124 busy hours across the 31 day period from 1st December 2021 to 31st December 2021. The following table shows the proportion of busy hours in which each RSP's average speed for each plan met the advertised claims above.

| 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 | 5% | 98% |
| Dodo & iPrimus | 49% | 94% |
| Exetel | 89% | 89% |
| iiNet | 46% | 94% |
| Launtel | 74% | 81% |
| MyRepublic | 52% | 99% |
| Optus | 49% | 99% |
| Superloop | 67% | 96% |
| Telstra | 31% | 96% |
| TPG | 40% | 98% |
| Vodafone | 60% | 88% |

# NBN Whiteboxes connected to underperforming services

The following table shows the number of Whiteboxes on NBN services 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 | 194 | 16 | 8% |
| Dodo & iPrimus | 84 | 6 | 7% |
| Exetel | 74 | 1 | 1% |
| iiNet | 158 | 10 | 6% |
| Launtel | 52 | 2 | 4% |
| MyRepublic | 45 | 3 | 7% |
| Optus | 137 | 10 | 7% |
| Other RSPs | 40 | 2 | 5% |
| Superloop | 69 | 4 | 6% |
| Telstra | 192 | 15 | 8% |
| TPG | 167 | 15 | 9% |
| Vodafone | 54 | 4 | 7% |
| Total | 1,266 | 88 | 7% |

As highlighted earlier in the report, the majority of underperforming services are connected to fibre to the node infrastructure. The following table shows the number of Whiteboxes on fibre to the node services for each plan, alongside the number of underperforming services.

| Technology | Plan | NBN Whiteboxes | NBN Whiteboxes on underperforming services | % NBN Whiteboxes on underperforming services |
|---|---|---|---|---|
| Fibre to the node - FTTN | 12 | 12 | 0 | 0% |
| Fibre to the node - FTTN | 25 | 65 | 2 | 3% |
| Fibre to the node - FTTN | 50 | 376 | 52 | 14% |
| Fibre to the node - FTTN | 100 | 129 | 24 | 19% |
| Fibre to the node - FTTN | Other NBN plans | 9 | 0 | 0% |
| Fibre to the node - FTTN | All NBN Plans | 591 | 78 | 13% |

# NBN very high speed services tables

The figures in the following table are based on very high speed services, where the underlying wholesale product sold by NBN Co has a download/upload speed range of 500-990/50 Mbps.

| Period | Plan | Download average Mbps (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| All hours | Very High Speed | 779 Mbps | 195.5 Mbps | 746.5 Mbps - 811.5 Mbps | 139 | 26,902 |

| Period | Plan | Download average Mbps (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| Busy hours | Very High Speed | 730.9 Mbps | 198.7 Mbps | 697.8 Mbps - 764.1 Mbps | 138 | 8,523 |

| Period | Plan | Upload average Mbps (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| All hours | Very High Speed | 45.5 Mbps | 3.2 Mbps | 44.9 Mbps - 46 Mbps | 139 | 39,222 |

| Period | Plan | Upload average Mbps (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| Busy hours | Very High Speed | 45.1 Mbps | 3.3 Mbps | 44.5 Mbps - 45.6 Mbps | 138 | 4,491 |

| Plan | Average daily outages lasting longer than 30 seconds | Standard deviation | 95% confidence interval of the mean | Panel size |
|---|---|---|---|---|
| Very High Speed | 0.25 | 0.56 | 0.2 - 0.34 | 138 |

| Plan | Percentage of outages lasting 30-60 sec | Percentage of outages lasting 1-3 min | Percentage of outages lasting 3-10 min | Percentage of outages lasting 10 min or more |
|---|---|---|---|---|

# NBN fixed wireless services tables

| Period | Plan | Download average Mbps (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| Very High Speed | 18.3% | 24.2% | 20.9% | 36.7% | | |

The figures in the following table are based on both the 25/5Mbps fixed wireless plan and the Fixed Wireless Plus plan.

| Period | Technology | Download average % of plan speed (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
|---|---|---|---|---|---|---|
| All hours | Fixed Wireless | 93.4% | 27.7% | 87.0% - 99.9% | 71 | 14,662 |
| Period | Technology | Download average % of plan speed (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
| Busy hours | Fixed Wireless | 79.8% | 29.8% | 72.9% - 86.7% | 71 | 4,561 |
| Period | Technology | Upload average % of plan speed (all hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
| All hours | Fixed Wireless | 59.0% | 20.6% | 54.2% - 63.8% | 71 | 20,530 |
| Period | Technology | Upload average % of plan speed (busy hours) | Standard deviation | 95% confidence interval of the mean | Panel size | Number of tests |
| Busy hours | Fixed Wireless | 48.9% | 22.5% | 43.6% - 54.1% | 71 | 2,304 |

| Technology | Average daily outages lasting longer than 30 seconds | Standard deviation | 95% confidence interval of the mean | Panel size |
|---|---|---|---|---|
| Fixed Wireless | 0.2 | 0.38 | 0.1 - 0.29 | 71 |

| Technology | Percentage of outages lasting 30-60 sec | Percentage of outages lasting 1-3 min | Percentage of outages lasting 3-10 min | Percentage of outages lasting 10 min or more |
|---|---|---|---|---|
| Fixed Wireless | 26.6% | 31.0% | 19.4% | 23.0% |

# Test Definitions

| | Test | Definition |
|---|---|---|
| | Download | The speed at which data can be transferred from the SamKnows test server to your computer, measured in megabits per second (Mbps). |
| | 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, measured in milliseconds (ms). The shorter the latency, the better. |
| | Jitter | The variation in the delay of received packets, measured in milliseconds (ms). Essentially it is a measure of the stability of latency. |
| | Packet loss | Packet loss counts packets that are sent over a network and don't make it to their destination, measured as a percentage of packets lost out of all packets sent. |
| | Webpage loading time | The time it takes for a specific webpage to fully load. This is a combination test that includes download, latency and DNS in one test that accurately mimics real-world usage. |
| | Outages | The outages metric tracks how many times per day your broadband connection goes offline for at least 30 seconds. Outages between 12am and 6am are excluded from this metric as this is when network maintenance typically occurs. |
| | Video streaming | Measures the highest bitrate (in Mbps), and therefore quality level, you can reliably stream from real content servers. |

# Glossary

| Term | Definition |
|---|---|
| SamKnows | The independent testing provider appointed to conduct testing for Measuring Broadband Australia. https://samknows.com/ |
| Whitebox | A purpose-built hardware measurement agent manufactured by SamKnows, installed in volunteers' homes. |
| Testing Infrastructure | SamKnows-maintained test servers hosted within Australia. |
| Customer-Premises Equipment (CPE) | Network equipment provided by an RSP (generally including a home router/gateway). |
| NBN Service | A proxy for a single household which accesses the internet through the NBN. |
| Very High Speed service | Services where the underlying wholesale product sold by NBN Co has a download/upload speed range of 500-990/50 Mbps (referred to by NBN Co as 'Home Ultrafast'). |
| Underperforming service | Services which reach above 75% of plan speed in no more than 5% of download tests. These are services which rarely or never attain plan speed. |
| Impaired service | FTTN / Fibre to the Node services where the maximum attainable line speed measured by NBN Co is below plan speed. |
| Plan / Plan | A retail product, for example 50/20 Mbps or 100/40 Mbps. |
| Plan Speed | The download and upload speeds associated the relevant retail plan. For example, plan speeds for NBN50 are 50 Mbps down and 20 Mbps up. |
| Advertised Speed | The speed claim made by an RSP for a given plan during a Measuring Broadband Australia reporting period. May be the same as or lower than plan speed. |
| Download Performance | Measured download speed expressed as a percentage of plan speed. e.g. for an NBN50 service, 100% download performance would be 50 Mbps. Prior to overprovisioning this was capped at 100%. Since NBN has begun overprovisioning services, results above 100% are common. |

| Term | Definition |
|---|---|
| All hours | Refers to tests conducted at any time of the day. |
| Busy hours | Refers to tests conducted between 19:00:00 and 22:59:59, Monday to Friday. |
| Busiest hour | Fifth lowest hourly average speed out of all busy hours in the month (including weekends cf. 'busy hours'). |
| Fixed-Line | For reporting, fixed-line encompasses the FTTP (Fibre to the Premises), FTTB (Fibre to the Building), HFC (Hybrid Fibre-Coaxial), FTTC (Fibre to the Curb), and FTTN (Fibre to the Node) access technologies. |
| FTTN / Fibre to the Node | Measuring Broadband Australia treats the FTTN / Fibre to the Node and FTTB / Fibre to the Building access technologies as identical for reporting. |