

Southeast Asia

State of Mobile Networks
February 2019

Analysis of Tutela crowdsourced data from
over 85 billion mobile network measurements.

TUTELA 

Executive Summary

The growth of mobile internet in Southeast Asia is unprecedented. A 2017 Google report suggested that 90% of internet access in the region is via smartphone, and the average user spends 3.6 hours each day accessing the internet on a mobile device.

As mobile internet access becomes ingrained in daily life, wireless operators are responsible for guaranteeing adequate performance. Using 85 billion mobile network measurements collected between December 1, 2018 and January 9, 2019, Tutela has evaluated how each different operator is succeeding in this task.

Unlike other approaches that focus on download performance, Tutela's consistent quality metric and broad dataset provides accurate insight into end-users' Quality of Experience. As a result, Tutela helps mobile operators deliver the best performance for the stakeholders who matter the most – customers.

Key findings

- Malaysia has the best consistent quality of any country, and Maxis's score of 69% is the best of any operator in the region.
- Filipinos rely on WiFi data more than other countries in the region with 77% of mobile data usage in the Philippines over WiFi (and only 23% on 3G and 4G connections). Malaysians rely on 3G and 4G data the most -- 66% of all smartphone data traffic went over a 3G or 4G connection (34% on WiFi).
- Telkomsel in Indonesia has been investing heavily in 4G infrastructure, and the results are apparent -- in our testing, their subscribers had the best coverage, download speeds, and highest consistent quality in the country.

Consistent Quality



What is Consistent Quality?

Download speed is most often used as a proxy for network quality, but while download throughput is important, it's just one of several crucial requirements for a "good" connection. At its most basic, a good connection is one that doesn't get in the way of users doing what they want to do. In the real world, smartphone users aren't running speed tests all day -- they're browsing the web, using apps, voice calling their friends, streaming Netflix and YouTube, or making video calls. To more objectively evaluate when networks are (and are not) enabling users to do those things,

Tutela has developed a standard called consistent quality. The design of the standard is explained in further detail [here](#). Simply put, it's two sets of thresholds, called "excellent" and "basic". If a connection hits the "excellent" standard, it's sufficient for the most demanding mobile use-cases, like HD video calling or 1080p video streaming. A "basic" connection is good enough for simple web browsing, emails, and VOIP calling, but users will experience delays or buffering when trying to use more demanding apps.

Our key performance indicators

"Excellent" quality
Download speeds > 4 Mbps
Upload speeds > 2 Mbps
Latency < 50 ms
Jitter < 30 ms
Packet loss ~ 0%

Intended use cases: 4K video streaming, HD group video calling.

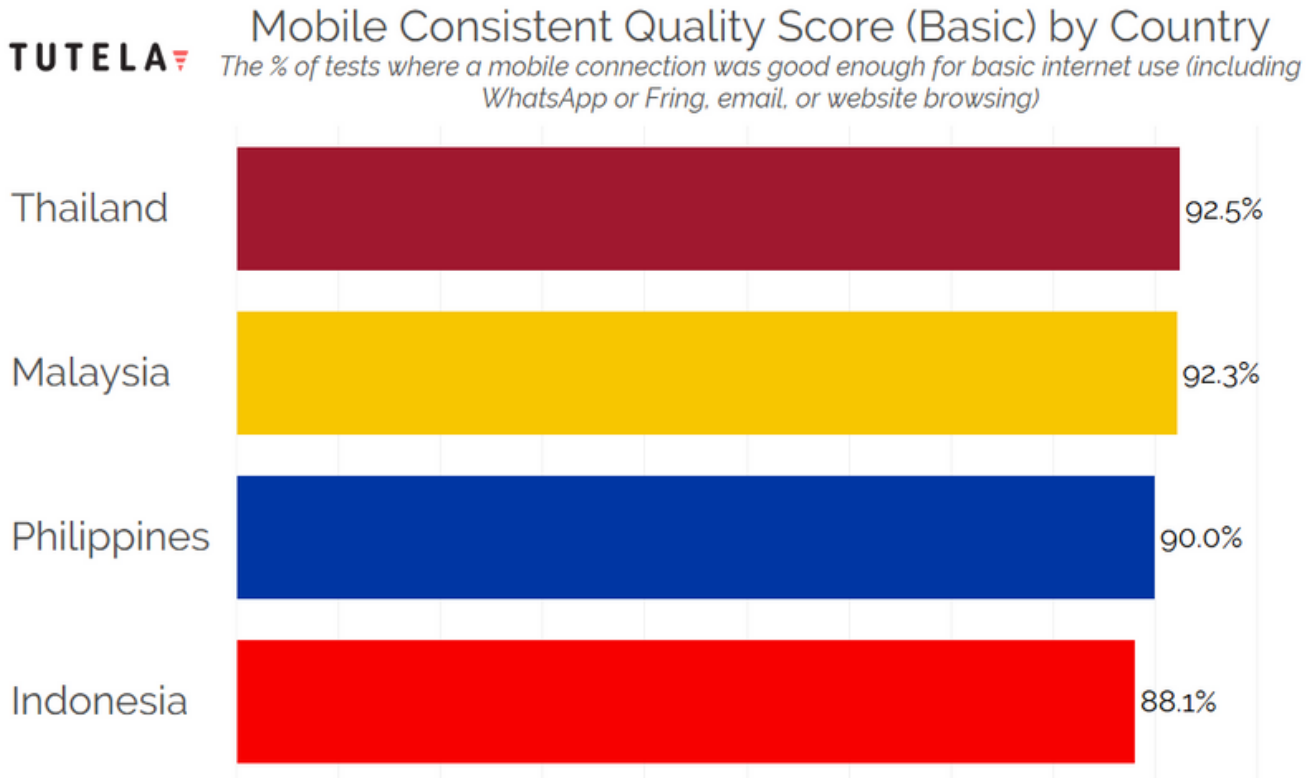
"Basic" quality
Download speeds > 512 kbps
Upload speeds > 128 kbps
Latency < 100 ms
Jitter < 50 ms
Packet loss < 5%

Intended use cases: Web browsing, simple applications (Facebook, WhatsApp, email clients), VOIP calling.

Tutela's consistent quality score simply measures the percentage of time that users - - whether for one operator or a whole country -- can hit the thresholds. The higher the number, the more often users have a basic or excellent connection.

Consistent Quality

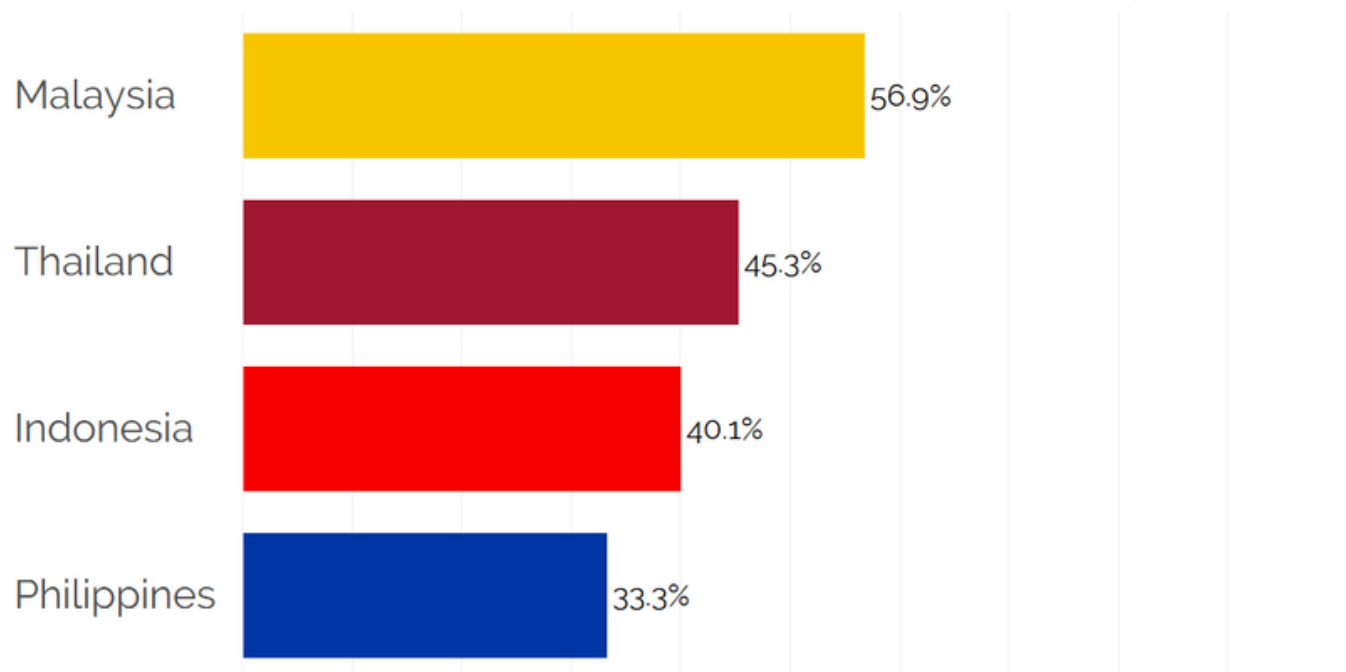
As the chart shows, all four countries in the report are relatively close when it comes to basic quality. Thailand takes first place, with users able to make a VOIP call or check emails at least 92.5% of the time when connected to one of the country's networks. Malaysia was a virtual tie for first place, at 92.3%, while the Philippines and Indonesia were a few percentage points behind.



Consistent Quality

It's when looking at excellent quality that we see the greatest differences between countries. Malaysia's networks achieve the best excellent quality by far, with 56.9% of connections meeting the needs of the most demanding uses. Thailand is in second place, with Indonesia and the Philippines coming in third and fourth.

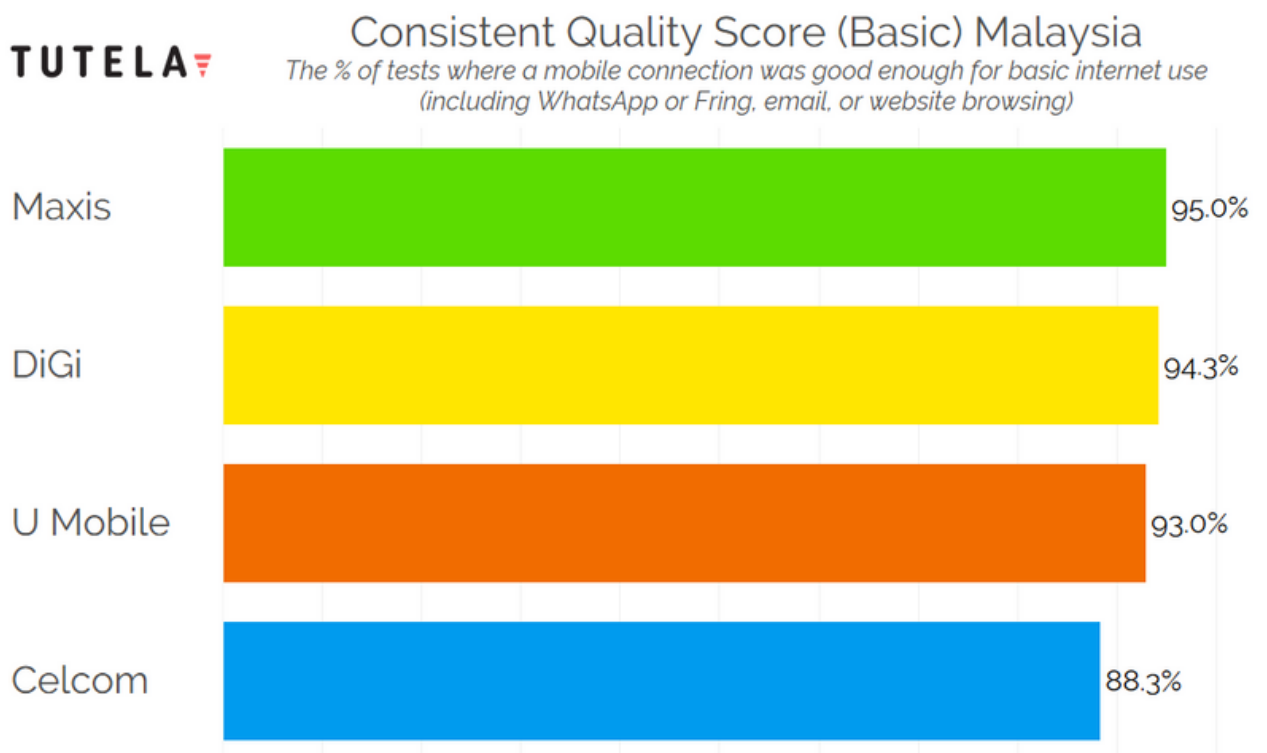
TUTELA  **Mobile Consistent Quality Score (Excellent) by Country**
The % of tests where a mobile connection was good enough for the most demanding popular apps (including HD video Skype calls or 1080p video streaming)



Consistent Quality

Malaysia

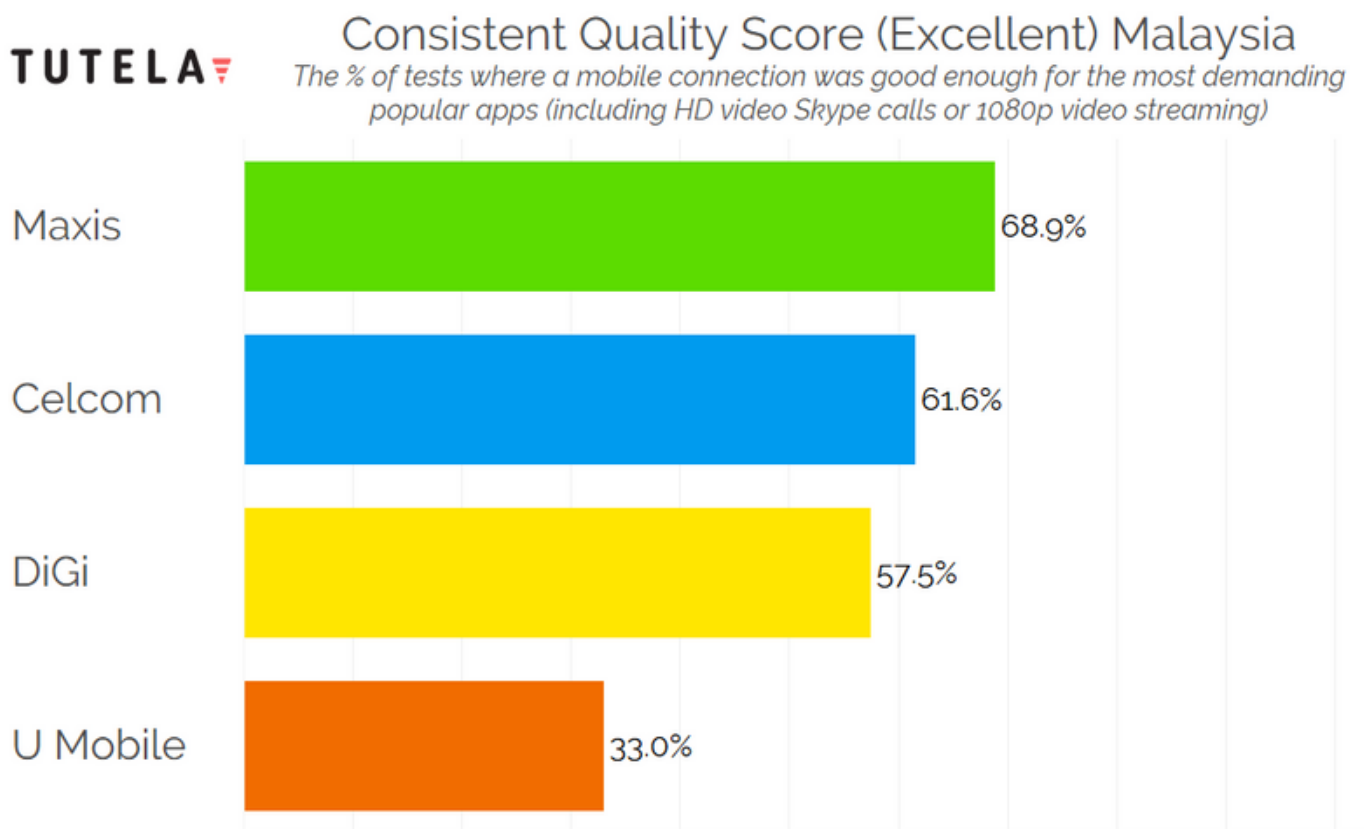
In Malaysia, three of the four operators score above 90% for basic consistent quality, with Maxis just taking first place ahead of DiGi and U Mobile. Celcom, which has the fastest average download speed of any individual operator, was in last place -- showing that there's more to a good network than just fast average download speeds.



Consistent Quality

Malaysia

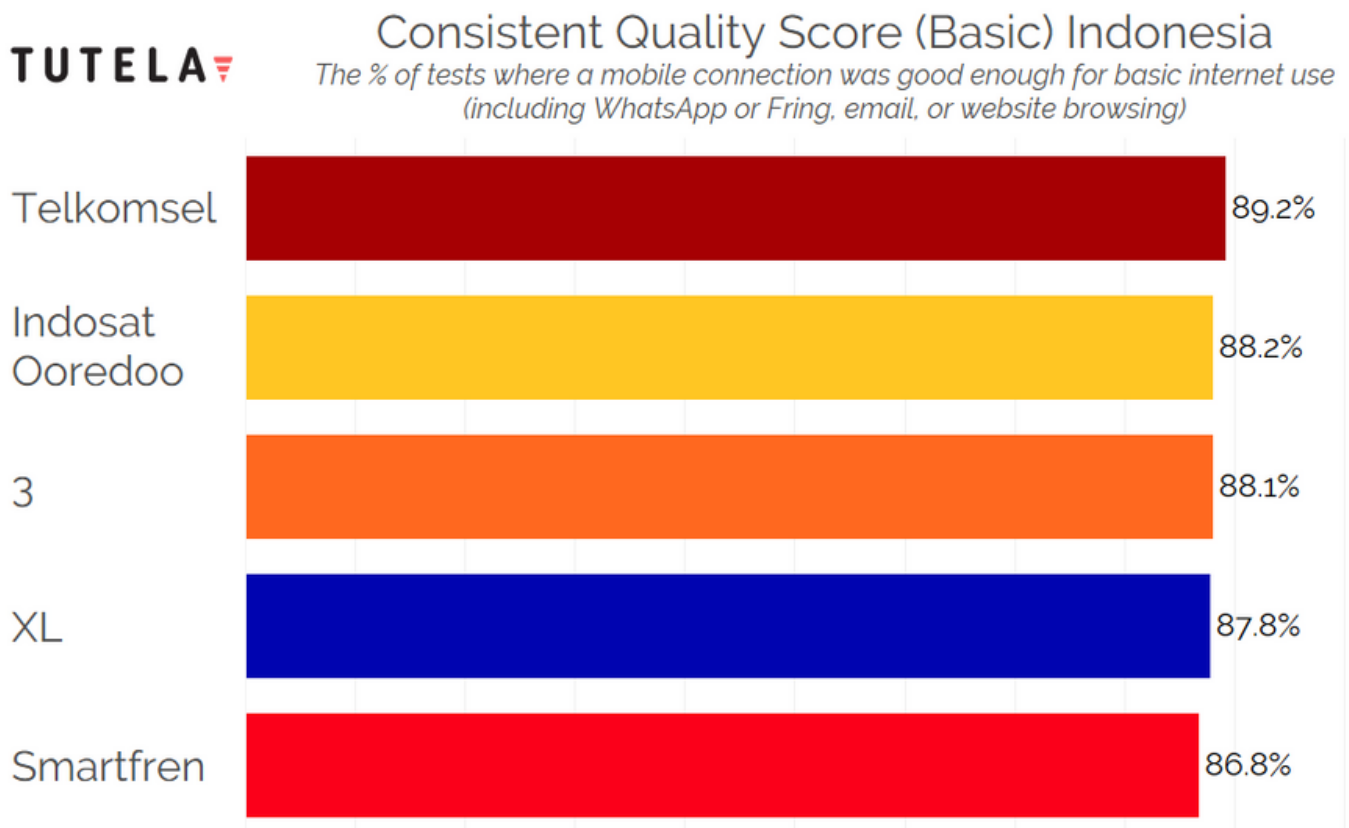
For excellent quality, the picture is reversed -- Maxis is still in the lead, with 68.9%, but Celcom is in second place at 61.6%. DiGi falls to third, with 57.5%, while U Mobile is in a distant last place. U Mobile's last-place finish for excellent quality is unsurprising, given the average download speed is just 4.3 Mbps -- that is barely above the excellent quality threshold, and means that a large number of results will fall below 4.3 Mbps.



Consistent Quality

Indonesia

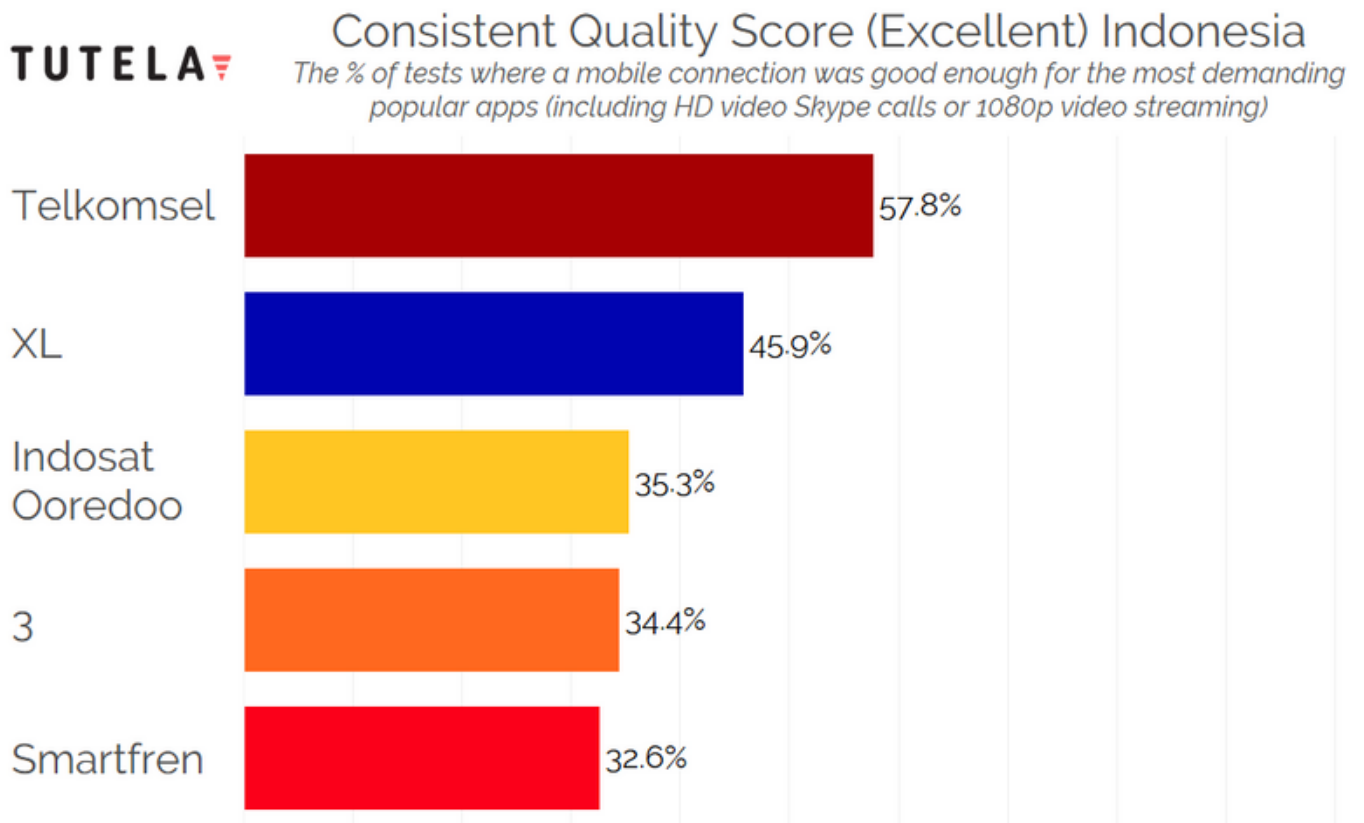
All five of Indonesia's operators have a similar basic consistent quality score. Telkomsel is in the lead with 89.2%, but Smartfren is less than three percent back, at 86.8%. Consistent quality metrics only measure the quality of a network, not the coverage, which explains why Telkomsel -- despite having the biggest network by far -- only has a marginal edge in basic quality.



Consistent Quality

Indonesia

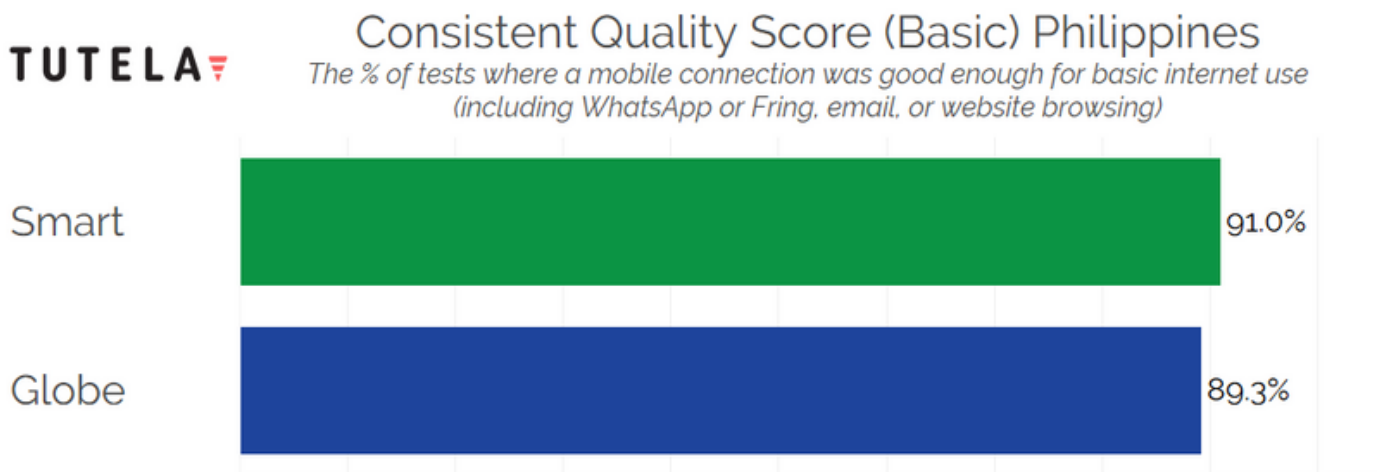
When it comes to excellent quality, however, Telkomsel's advantage over the competition is much more marked. 57.8% of tests over Telkomsel's network were sufficient for the most demanding uses, compared to just 32.6% on last-place Smartfren's network.



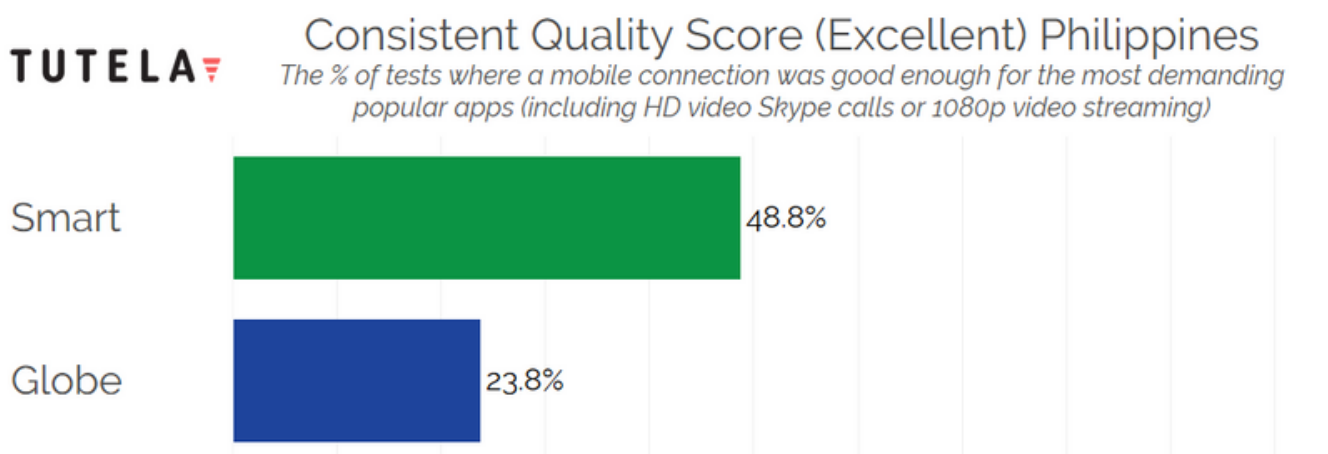
Consistent Quality

Philippines

Smart has a small lead over Globe when it comes to basic quality, but excellent quality is where it really differentiates its network. Smart's score of 48.8% is more than double that of Globe -- a particularly sizeable advantage when you consider that the two networks are only slightly different when looking at average download speeds.



Subscribers are unlikely to notice Smart's marginally faster download speed -- the difference is just 2 Mbps -- but a consistent quality more than twice as good as Globe's makes a marked difference in the user's Quality of Experience.



Consistent Quality

Thailand

Thailand's consistent quality scores are the tale of two network technologies. Thanks to its inherent design, 3G struggles to produce the kind of network performance necessary to hit Tutela's bar for excellent quality. Although hitting a download throughput speed of 4 Mbps and latency less than 50 ms is theoretically possible over a 3G connection, it's rare on congested, real-world networks. However, a good 3G network is perfectly adequate to provide a basic connection to users. Looking at the difference between the basic and excellent quality charts, this difference stands out. TrueMove -- which has the best and most widely-available 4G network -- is in last place for basic quality, likely due to differences in signal strength and the quality of its 3G network.

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Consistent Quality Score (Basic) Thailand

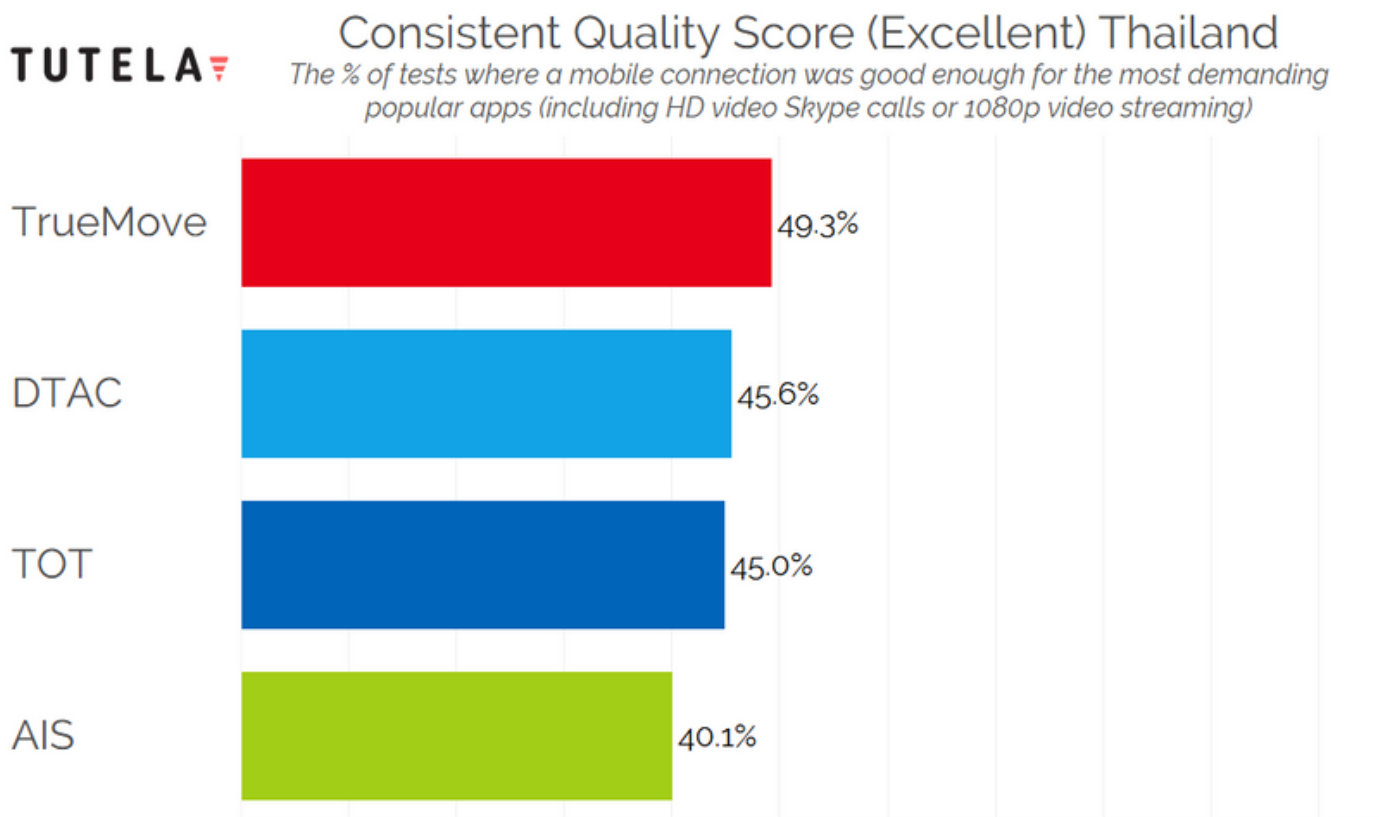
The % of tests where a mobile connection was good enough for basic internet use (including WhatsApp or Fring, email, or website browsing)



Consistent Quality

Thailand

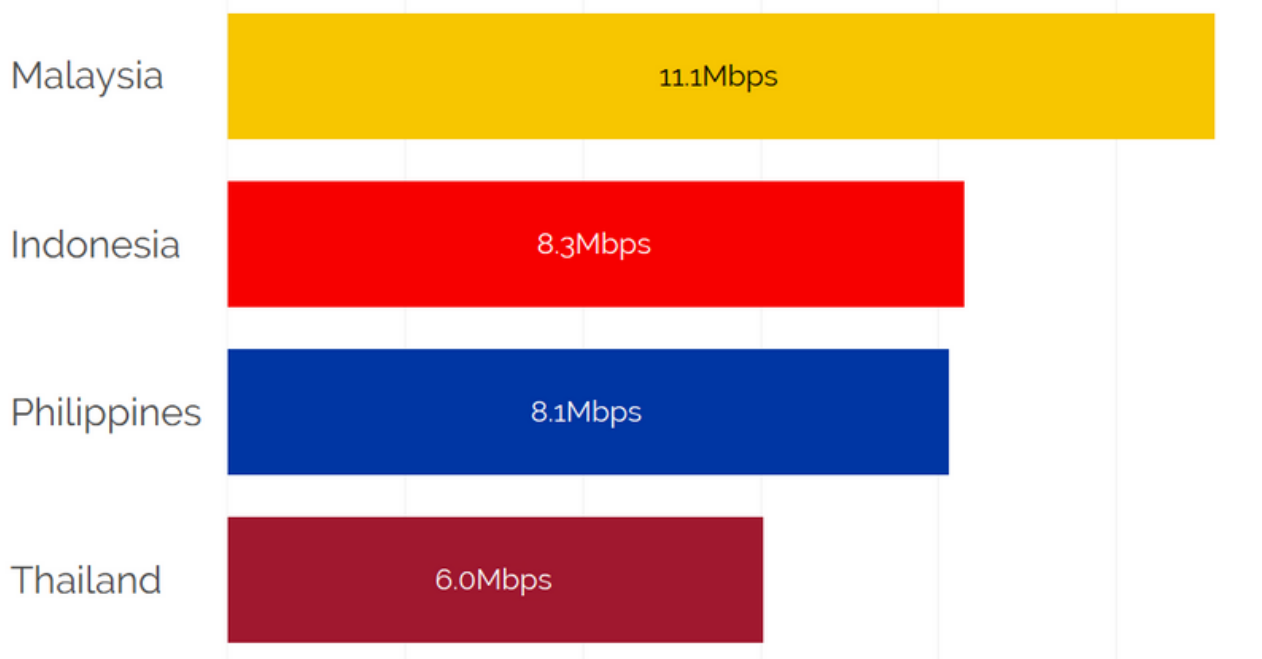
When it comes to excellent quality, however, TrueMove is comfortably on top. Its score of 49.3% is the best of any operator, and comfortably above the national average. As other operators continue to acquire and deploy 4G spectrum, that lead is likely to dwindle, but for the time being, TrueMove's investment in 4G is clearly paying off.



Download speeds

Malaysia has a distinct lead over the other countries in this report, with average download speeds that topped 11 Mbps. Even though Malaysia doesn't appear to have a clear advantage in the amount of time spent on 4G compared to 3G, the speed difference is still significant, indicating that where the LTE network provides coverage, it works well. When comparing only 4G networks, Malaysia's advantage over other countries grows, with an average download speed of nearly 14 Mbps.

TUTELA Average Download Speed (3G & 4G) by Country



Subscribers in Indonesia and the Philippines saw nearly-identical download speeds just above 8 Mbps, putting the two countries in a virtual tie for download speed. When comparing only 4G speeds, the Philippines ekes out a small lead, but since Filipino mobile users spend more time on 3G than anyone else, the average is diminished slightly.

Thailand has both the slowest 3G and slowest 4G network; but while the average speeds may appear poor, the network is at least consistent, and nonetheless provides sufficient capacity for most subscribers to use the apps and services they value the most.

Download speeds

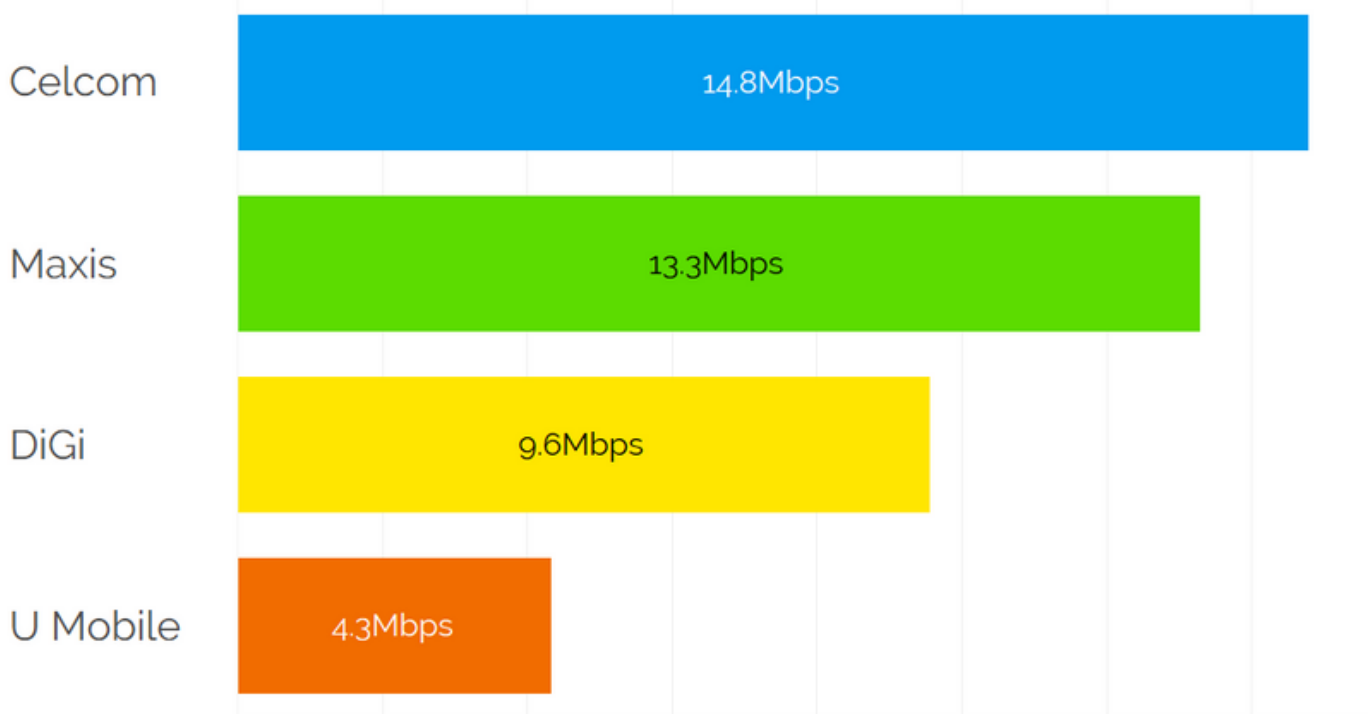
Malaysia

Within Malaysia, Celcom had the fastest network, with average download speeds of nearly 15 Mbps. Maxis was in a close second place, and its average download speed of 13.3 Mbps is nearly indistinguishable from that of Celcom.

There's more of a drop from second to third place, as DiGi's subscribers experienced an average download speed of 9.6 Mbps. U Mobile was in last place with an average of just 4.3 Mbps, much closer to Tutela's threshold of the minimum download speed necessary for an excellent connection.

TUTELA 

Average Download Speed (3G & 4G) Malaysia



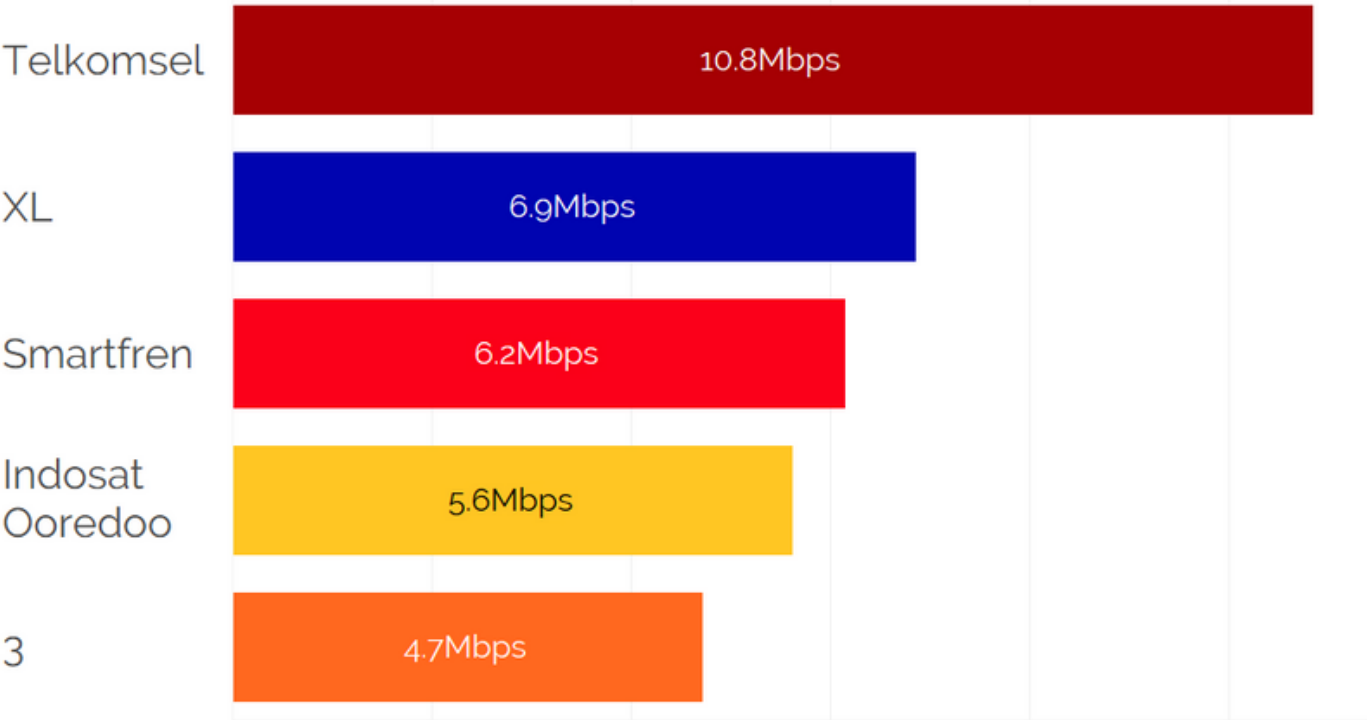
Download speeds

Indonesia

Telkomsel leads all operators in average download speed for Indonesia, and was the only operator to score an average in the double digits. XL, Smartfren, and Indosat Ooredoo subscribers all saw similar average download speeds of around 6 Mbps, comfortably in excess of Tutela’s excellent quality threshold.

3 was the outlier with its last-place finish; the 4.7 Mbps average was dragged down by a greater reliance than other operators on 3G rather than 4G; that said, 3 had the slowest network on both connection technologies.

TUTELA Average Download Speed (3G & 4G) Indonesia



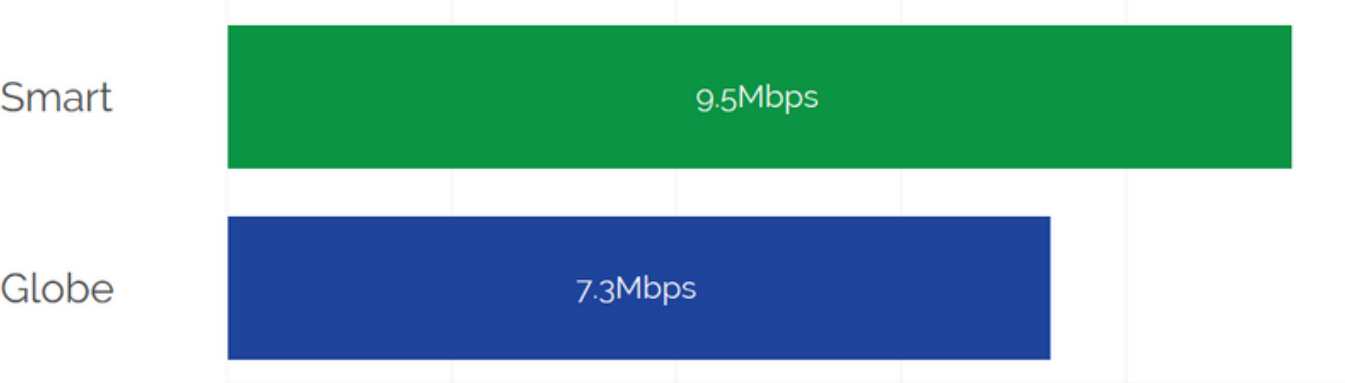
Download speeds

Philippines

Customers in the Philippines only have two wireless networks to choose from, and both provide an adequate average download speed, although Smart has a clear edge over Globe.

The average download speed for the Philippines overall is extremely similar to that for Indonesia, but with a different distribution of records. While customers in Indonesia have the choice between a fast network, a slow network, and a series of average networks, customers in the Philippines have a choice of two networks barely separated by 2 Mbps for download speed.

TUTELA Average Download Speed (3G & 4G) Philippines



Download speeds

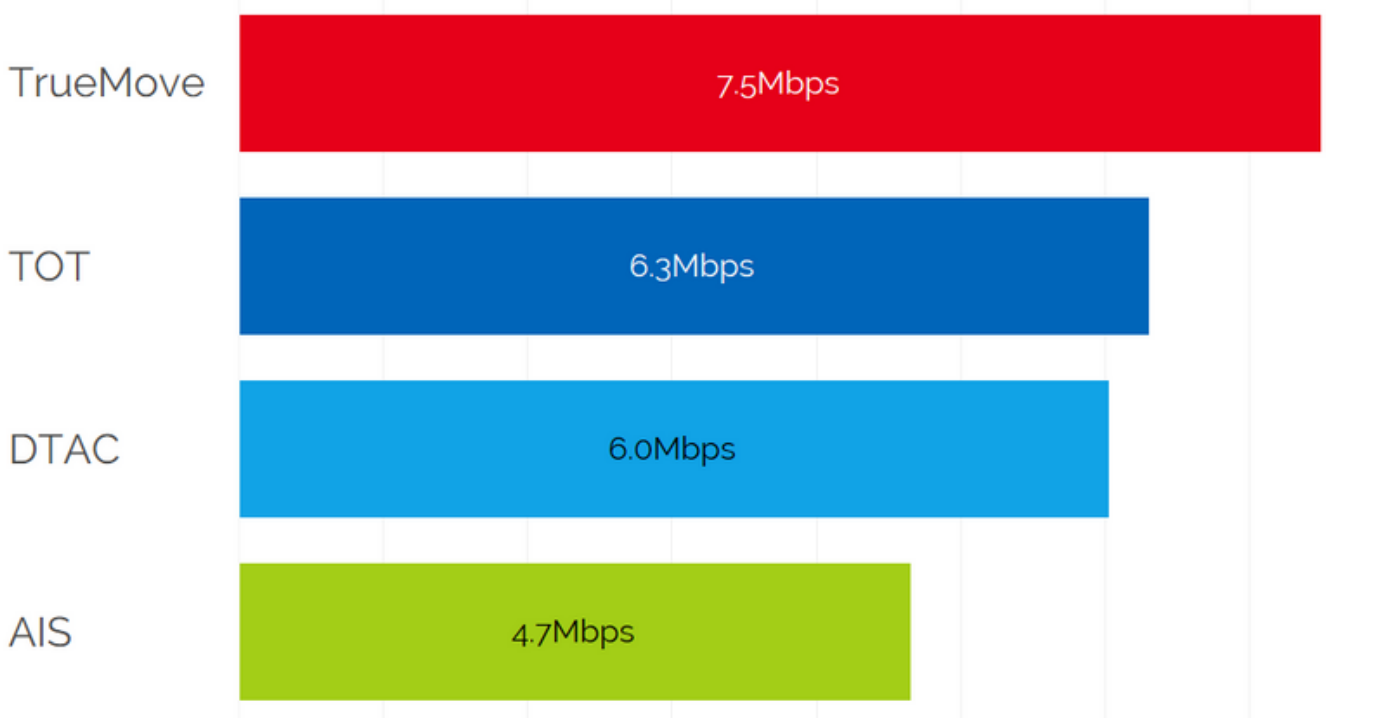
Thailand

TrueMove leads Thailand's four operators in download speed, with customers recording an average throughput of 7.5 Mbps over combined 3G and 4G connections. However, there wasn't a significant gap in performance between TrueMove and the competition: TOT was in second with 6.3 Mbps, DTAC was third with 6.0 Mbps, and AIS recorded an average of 4.7 Mbps.

While there's a difference of less than 3 Mbps between first-place TrueMove and last-place AIS, there is an appreciable gap in consistent quality between TrueMove and AIS. An average download speed of 4.7 Mbps put AIS's users much closer to the consistent quality threshold than those of other operators, and the difference is visible in the consistent quality scores.

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Average Download Speed (3G & 4G) Thailand



Discover Tutela Explorer

Tutela Explorer is a powerful cloud-based solution for real-time analysis of crowdsourced data. Using the platform, mobile operators can:

- Create coverage and quality maps
- Benchmark network quality and coverage across all operators
- Drill down to any KPI at city, street or even building level
- Analyse spectrum utilisation, performance and more



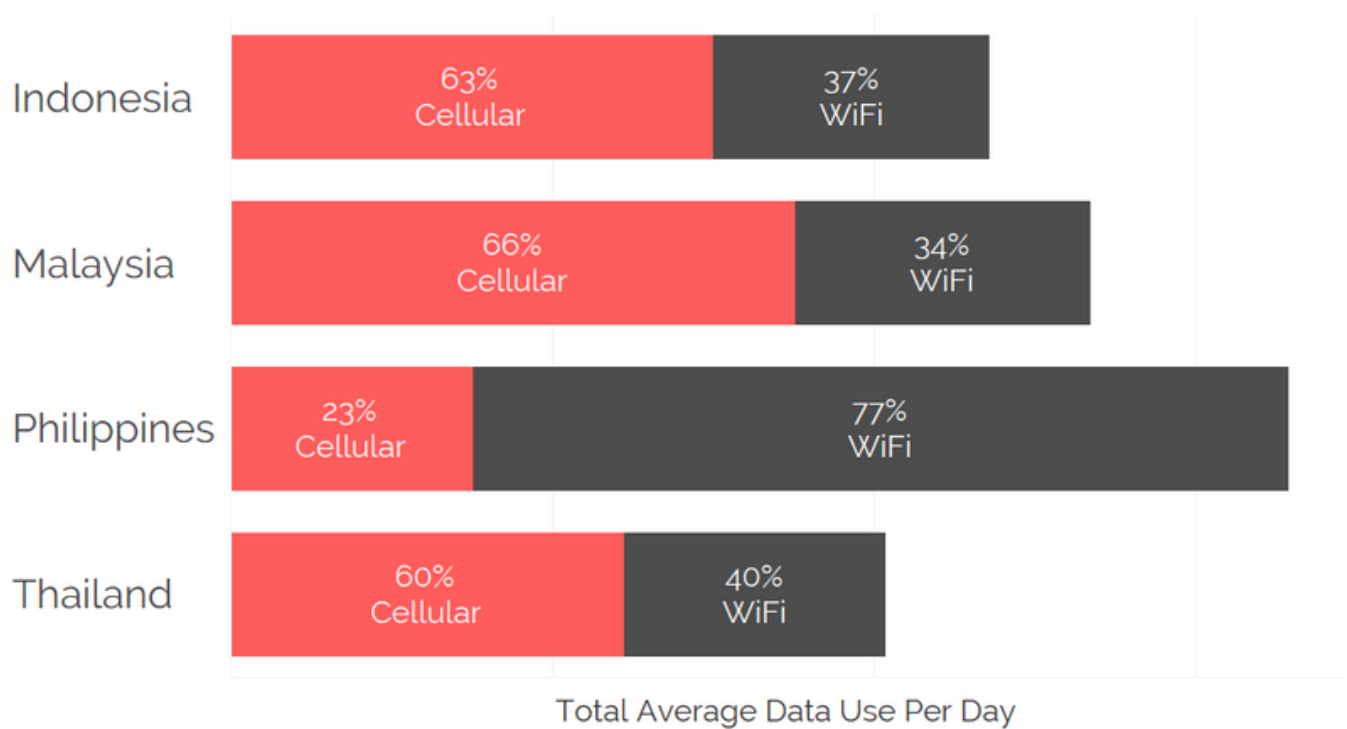
<https://www.tutela.com/explorer>

Data usage

Despite [recent competition](#) driving down the price of mobile data in the Philippines, the country remains an outlier for its love of Wi-Fi data. Smartphone owners used Wi-Fi for over three-quarters of their data use, relying on a mobile connection for just 23% of their smartphone data needs.

Smartphone owners in Malaysia utilize their mobile connection the most heavily, with cellular connections handling two-thirds of all smartphone data traffic. Indonesia was close behind with 63% of data going over 3G or 4G networks; Thailand ranked in a close third place, with a 60/40 split between cellular and Wi-Fi.

TUTELA Average Data Use per User by Connection Type



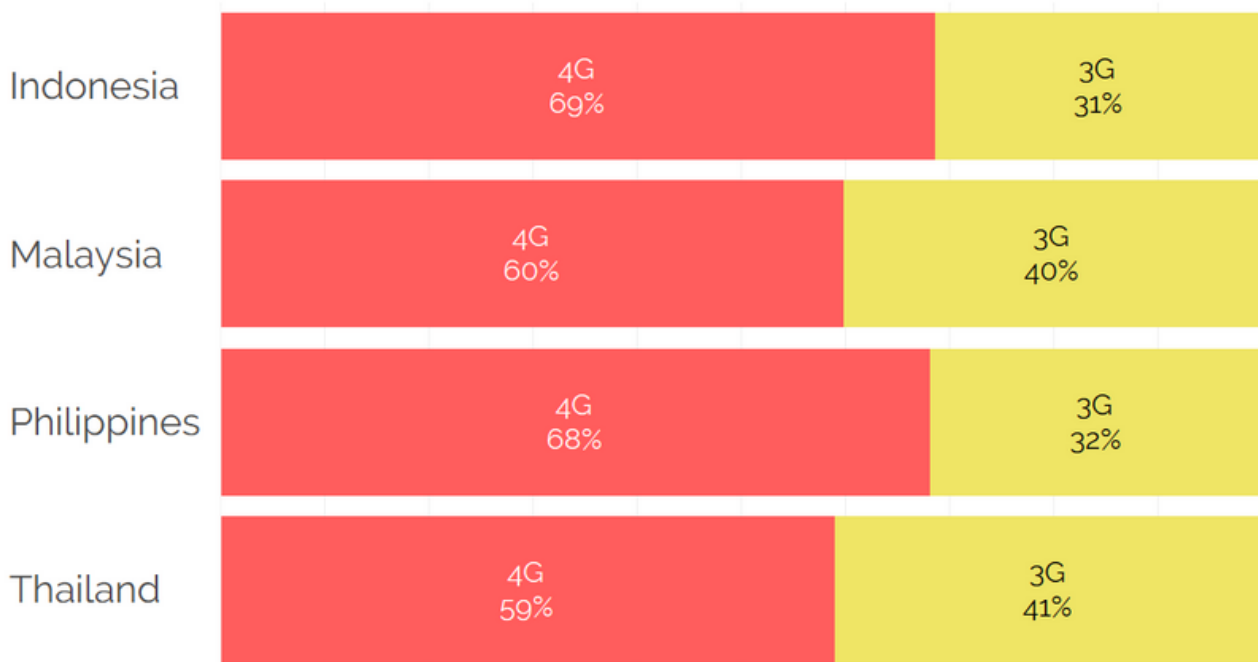
Wireless technologies

When it comes to 3G versus 4G, Malaysia and Thailand are in a different category to Indonesia and the Philippines. In Malaysia and Thailand, around 40% of mobile data connections happened on a 3G network, while that number shrank to around 30% for Indonesia and the Philippines.

Notably, however, the advantage in 4G availability didn't pay off in speed or consistent quality for the Philippines and Indonesia. Of all the countries in the report, Malaysia -- which saw 40% of all tests happen on a 3G connection -- scored top for excellent network quality and download speed.

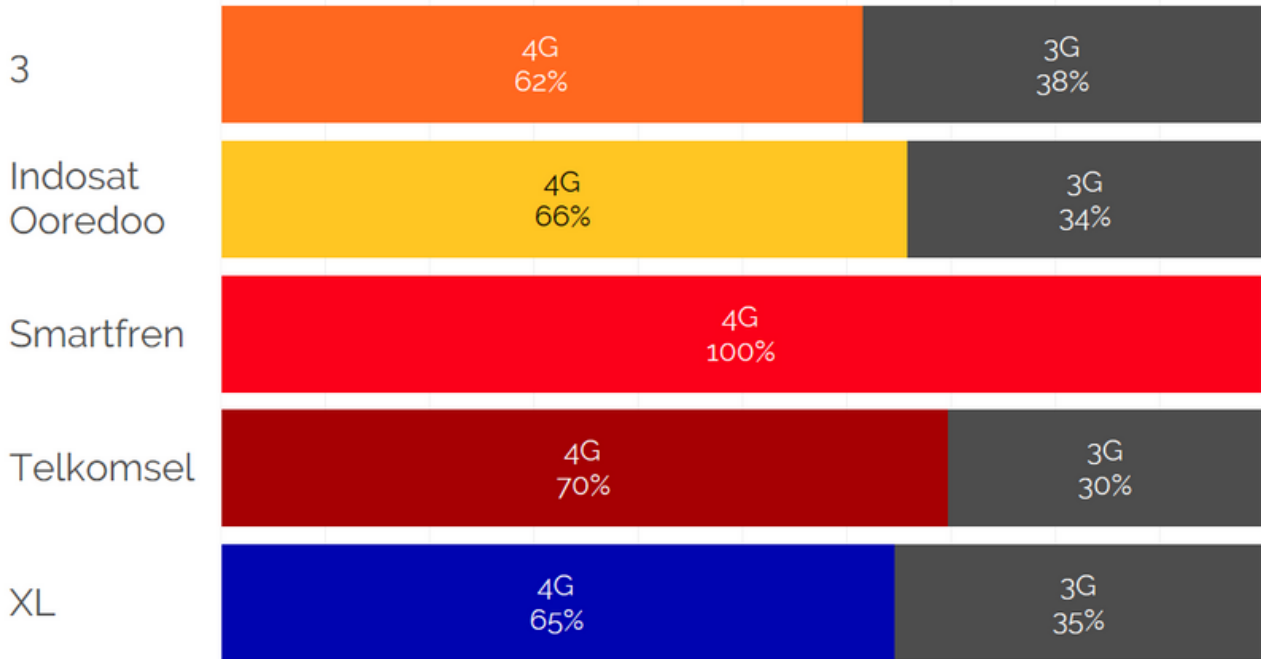
Among the operators that operate both 4G and 3G networks, TrueMove and AIS in Thailand lead the way in 4G availability, at 87% and 74% respectively. Telkomsel's 70% 4G availability is particularly impressive given the operator's geographic coverage: having better coverage than its competitors whilst also having a higher percentage of that coverage be on 4G is a difficult feat to pull off.

TUTELA Percentage of Tests Run by Mobile Technology

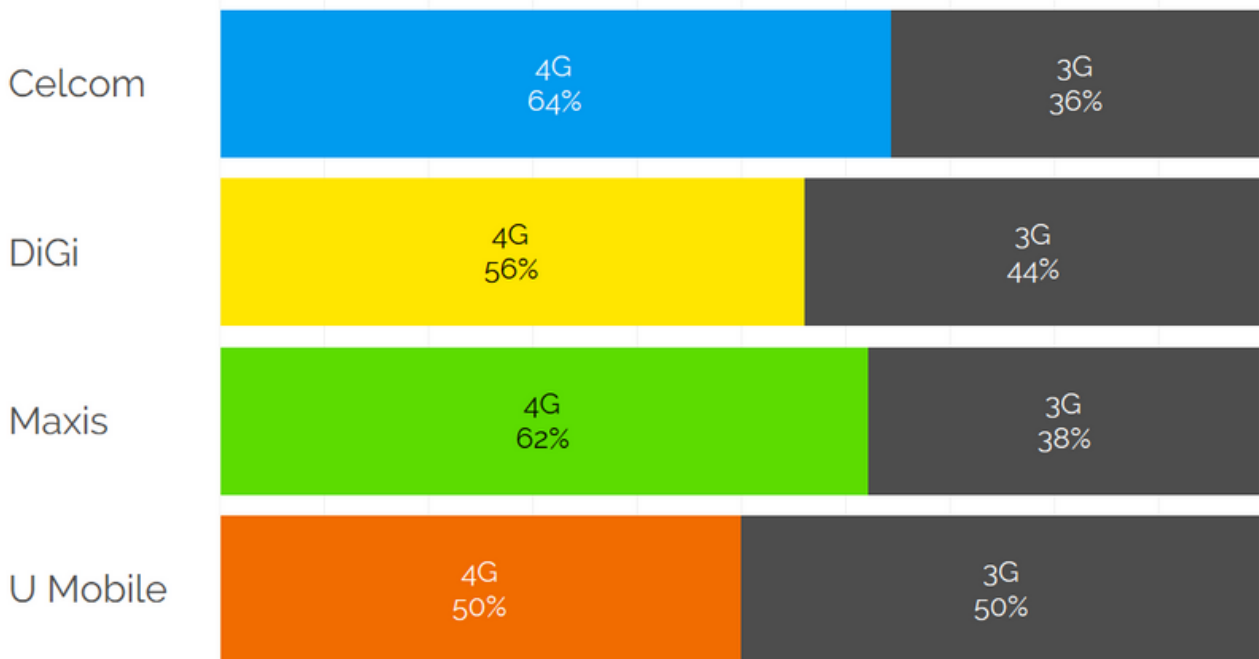


Wireless technologies

TUTELA Percentage of Tests Run by Technology (Indonesia)



TUTELA Percentage of Tests Run by Technology (Malaysia)

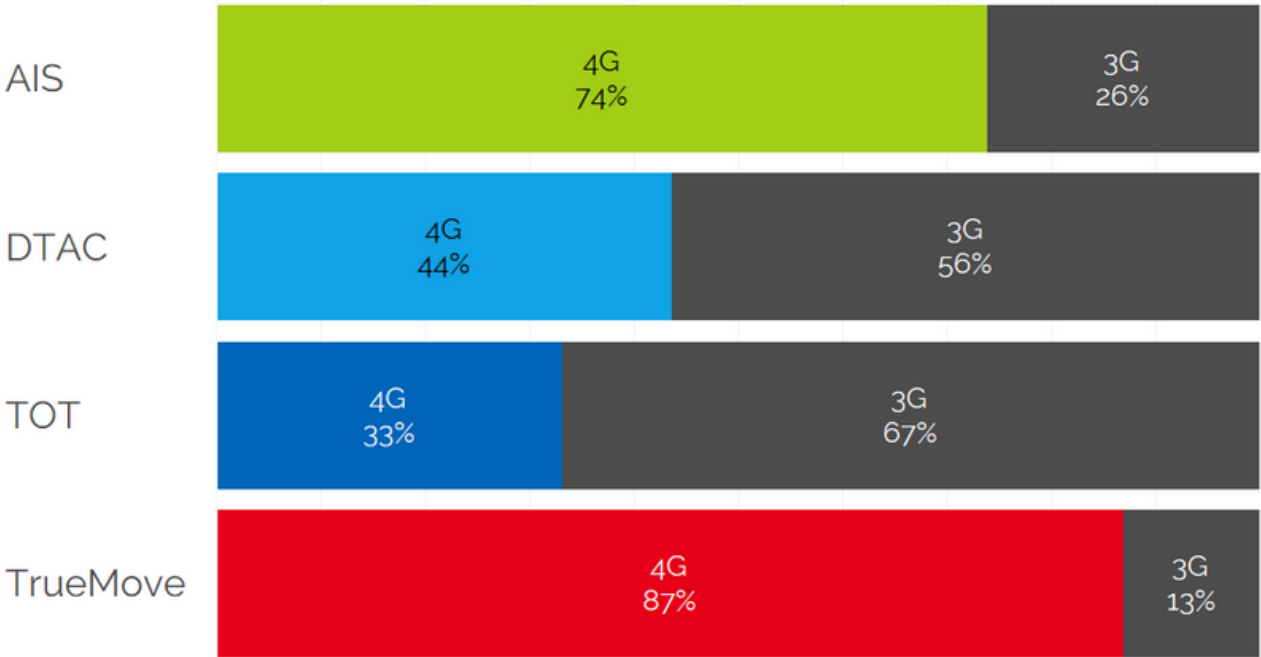


Wireless technologies

TUTELA Percentage of Tests Run by Technology (Philippines)

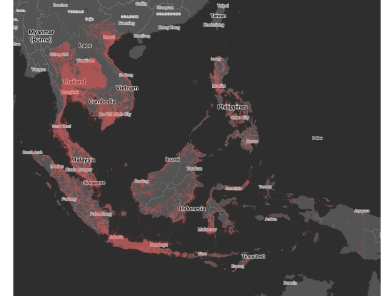


TUTELA Percentage of Tests Run by Technology (Thailand)



Coverage

To see full coverage maps for all countries please visit <https://tute.la/SEAcoverage>



Malaysia

Celcom has a distinct advantage over the other operators when it comes to 4G coverage; its LTE network is dominant in all major cities and extends to most population centres in East Malaysia. 3G coverage is most apparent for Celcom in the inland parts of the Malay Peninsula, and rural areas of East Malaysia.

Neither Maxis nor DiGi can match Celcom's 4G coverage across the whole country, but both networks do have 4G coverage in the largest cities in both East and West Malaysia. Maxis also appears to have particularly good 3G coverage on the country's smaller islands.

U Mobile has [promised expansion](#) of its 4G network, with a target set of 90% population coverage by the middle of this year. The coverage in the latter half of 2018, however, shows that the network still lags the competition in 4G coverage. Outside of the west coast of the peninsula, 4G coverage is still sorely lacking, and its lack of presence in East Malaysia is apparent.

Indonesia

Telkomsel is the dominant mobile provider in Indonesia: its 192 million subscribers in 2018 gave it around 50% of the market share. It has used its resources to invest heavily in its 4G infrastructure, adding thousands of new cell towers per quarter.

The capital spend has clearly paid off: Telkomsel has the best coverage of any operator by far, and more impressively, the majority of its network is 4G. 3G mostly provides coverage off the main islands or deeply inland, with 4G present in all major population centres.

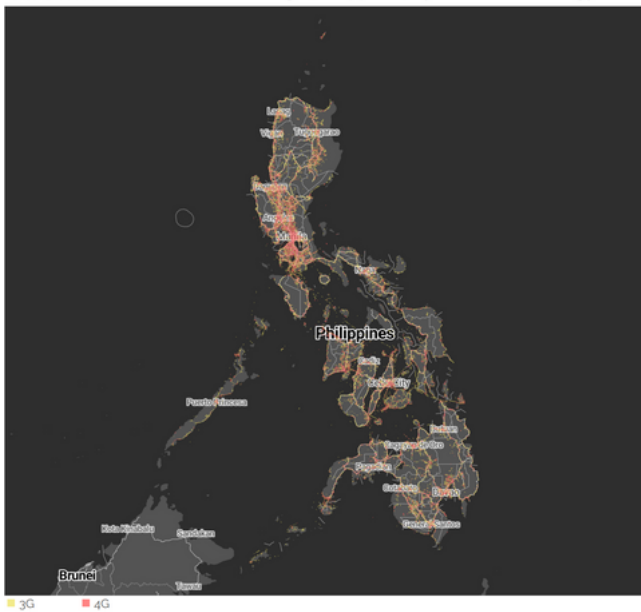
The remaining networks differ in their coverage: XL, for example, comes the closest to rivaling Telkomsel's geographic coverage, but with greater reliance on 3G, while Smartfren has impressive 4G coverage on Java, but is limited in its coverage outside of major cities.

Coverage

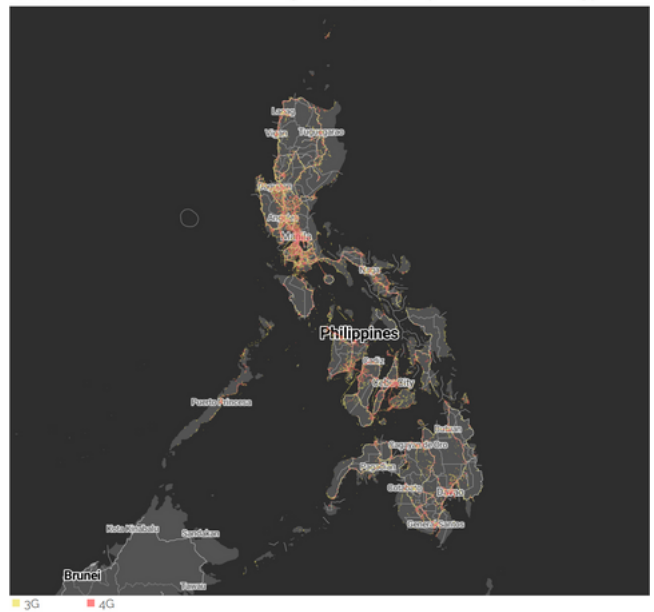
Philippines

Although Smart has the edge over Globe when it comes to speed, the story is reversed for coverage. Globe's network appears to have both more 4G coverage and more geographic coverage overall.

TUTELA  Globe Coverage (Philippines) by Mobile Technology



TUTELA  Smart Coverage (Philippines) by Mobile Technology



To see coverage maps for more countries and operators, visit <https://tute.la/SEAcovrage>

Thailand

All four operators have approximately similar geographic coverage, but the type of coverage is what sets them apart. AIS and TrueMove have 4G coverage across the majority of their networks, but DTAC and TOT rely much more heavily on 3G.

In the case of AIS and TrueMove, 4G appears to be present across almost all of their networks, although TrueMove does have an edge over AIS. Further exploration of the data reinforces this view: 74% of all connections by AIS customers are on 4G, while an impressive 87% of connections for TrueMove customers are on 4G. That compares favourably to the national average, which is just 59%.

The reason why the national average is so low becomes clear when looking at DTAC and TOT's networks. DTAC has a mixture of some 4G and 3G, while TOT's network appears to rely entirely on 3G outside of the largest cities. TOT's 4G coverage is entirely provided through a [joint deal with DTAC](#) to utilize the 2300 MHz TDD spectrum, while DTAC also provides 4G coverage on 2100 MHz.

Methodology

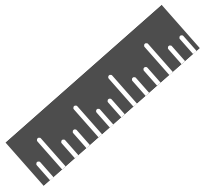
Tutela measures network quality based on the real-world performance of users in the field. Results in this report are based on a testing configuration to represent typical (not maximum) performance of users. We used a 2 MB file to perform our download testing and a 1 MB file to perform our upload testing. Tutela employs software installed on more than 3,000 partner apps to complete frequent, lightweight tests of around 2 MB.

Our results differ from other network testing companies which measure the peak performance of networks under ideal conditions (such as downloading a 500MB file).

In total, Tutela's software operates on over 250 million Android and iPhone devices globally, collecting over 10 billion mobile data measurements every day. Our data scientists analyze results for each country every month, and our analytics platform, Tutela Explorer, lets operators chart, map, and filter over 80 key performance indicators into customized dashboards to help them better understand industry performance and benchmark against competitors.

Report facts

The information in this report was taken from our crowdsourced data between 1st December 2018 and 9th January 2019.



85 billion
Measurements



6 million
Download tests



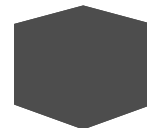
6.4 million
Upload tests



125 million
Latency tests



125 million
Jitter tests



125 million
Packet loss tests

Meet us at Mobile World Congress

Mobile World Congress is just around the corner, and we're back for another exciting event to showcase our latest crowdsourced solutions for the mobile industry.

Schedule a meeting with us where you can:

- See a live demonstration of Tutela's data and tools for your markets
- Discover our products and roadmap and learn how Tutela's data and insights can help your business
- Start a free trial of our tools and data for your evaluation purposes
- Meet with our team

Find out more: <https://tute.la/MWC2019>

Meet with our team

Join us in Barcelona to learn more about the mobile experience in your markets.



Book a meeting

About Tutela

Tutela is a mobile data and analytics company serving the mobile and telecommunications industry with software is embedded in over 3000 diverse mobile applications installed on over 250 million mobile Android and iOS handsets. Tutela continuously monitors network quality of experience all across the world. We collect more than 10 billion measurements every single day, and through our interactive toolset, enable our customers to turn those numbers into actionable intelligence for their businesses.

For more information, visit www.tutela.com or contact us at info@tutela.com
