



Mexico

State of Mobile Networks

March 2019

Analysis of Tutela crowdsourced data from over 197 billion mobile network measurements.

For further information about the methodology, data and tools used to create this report, please contact analysis@tutela.com.

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Executive Summary

Mexico's networks and citizens are embracing mobile data at an increasingly rapid pace. Mobile connections grew nearly 5% last year(1), the nation's largest operator launched mobile home broadband products(2), and spectrum from 2G and 3G is being converted to faster 4G(3).

But while networks continue to invest in the latest LTE technology and new spectrum, the demands are greater than ever. Smartphone penetration is up, and new use-cases like connected wearables and fixed wireless access further challenge the nation's mobile networks.

As the industry prepares for this change, Tutela has delved into its crowdsourced dataset of billions of mobile network tests to evaluate how networks are coping with current demand, and discover which carrier is best positioned for future challenges.

In its 2019 State of the Networks report, Tutela is using data from nearly two million unique devices to assess the network quality being provided to consumers. To compile the report, we examined a total of 5.3 billion records, including 24 million speed and 388 million latency tests conducted against our own servers.

Key numbers

197 billion measurements
24 million speed tests
388 million latency tests
~ 2 million mobile devices

1st September 2018 -
28th February 2019

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(1)GSMA Intelligence, "<https://www.gsmainelligence.com/markets/2395/dashboard/>"
Retrieved March 21st 2019









(2)Telcel now offering household internet via mobile network, Mexico News Daily,
"<https://mexiconewsdaily.com/news/telcel-now-offering-household-internet/>"
Retrieved March 21st 2019

(3)En México hay espacio para mejoras significativas en calidad de servicio, TeleSemana,
"<https://www.telesemana.com/blog/2019/02/07/en-mexico-hay-espacio-para-mejoras-significativas-en-calidad-de-servicio/>"
Retrieved March 21st 2019

Measuring network quality

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Best performing networks – Mexico 2019

Operator	Basic Consistent Quality	Excellent Consistent Quality	4G Download speed	4G Upload speed	Latency
 AT&T					
 telcel					
 movistar					

Key findings

- ▶ Movistar delivered the best download speed over a 4G connection, while AT&T was the best on 3G; the gap between first and last place was just 3.1 Mbps, however, indicating little performance difference between all three national operators.
- ▶ Telcel's coverage across the country is unmatched by AT&T and Movistar; in many rural locations, it's the only carrier providing service to users.
- ▶ AT&T's superior latency performance put it on top for Tutela's excellent consistent quality metric; however, Telcel's wide-reaching network provides the best basic consistent quality score.

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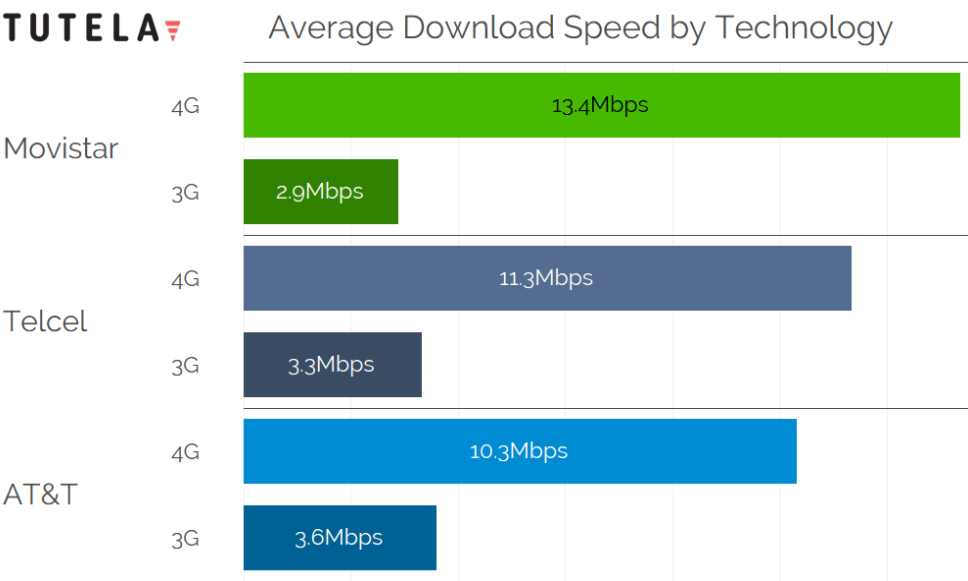
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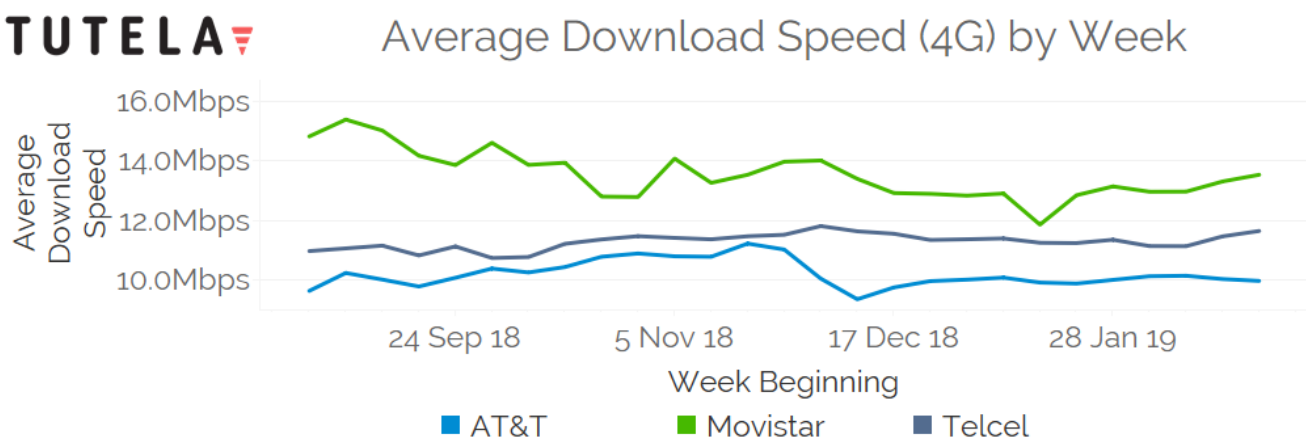
Download speeds

Movistar provided the best 4G average download speed to its users, at 13.4 Mbps. On 4G, Telcel is in the middle of the pack, with an average of 11.3 Mbps. AT&T is exactly 1 Mbps behind Telcel, at 10.3 Mbps. On 3G, the order is reversed: AT&T is in first place, with 3.6 Mbps, Telcel behind at 3.3 Mbps, and Movistar in third place at 2.9 Mbps.



The most important thing that the download speed tests reveal is that all three networks provide good download throughput to their users. A connection greater than 10 Mbps is well in excess of the speed needed for even the most demanding mobile applications, like streaming HD video or conducting a group video call. Even the 3G speeds are fast: 3 Mbps is fast enough for most video streaming, and more than enough for web browsing or social media.

AT&T’s last-place finish for 4G download speed may be surprising, given that the network has the highest percentage of 4G use among all the operators. However, the fact that AT&T has worked hard to refarm some of its 3G spectrum to 4G(4) means that AT&T is more likely (compared to the other operators) to have 4G coverage in rural areas, where signal is likely to be lower and speeds therefore worse.



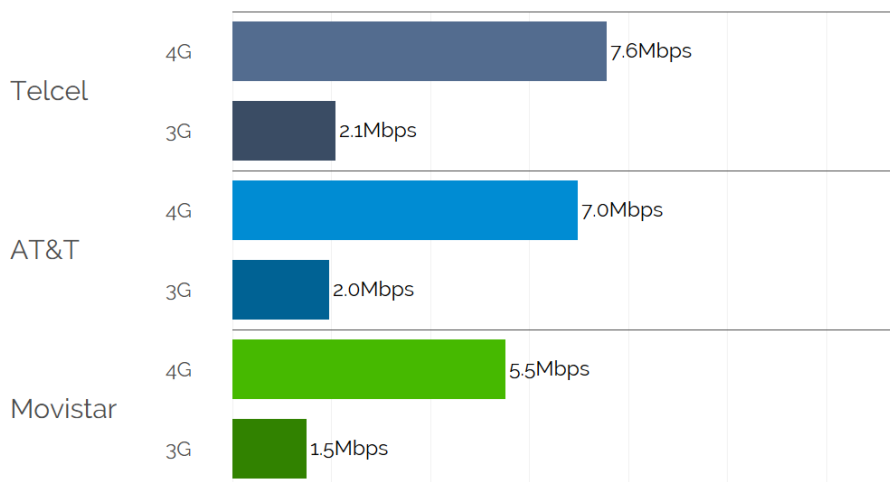
(4)En México hay espacio para mejoras significativas en calidad de servicio, TeleSemana, ["https://www.telesemana.com/blog/2019/02/07/en-mexico-hay-espacio-para-mejoras-significativas-en-calidad-de-servicio/"](https://www.telesemana.com/blog/2019/02/07/en-mexico-hay-espacio-para-mejoras-significativas-en-calidad-de-servicio/)
Retrieved March 21st 2019

Upload speeds

Telcel leads all operators for average 4G download speeds, at 7.6 Mbps. AT&T is a close second, at 7.0 Mbps, while Movistar is in third at 5.5 Mbps. The results for all three operators are impressive, but Telcel's 7.6 Mbps average upload speed stands out. Telcel's average 4G download speed is 11.3 Mbps, which means that its upload speed is two-thirds of its download speed.

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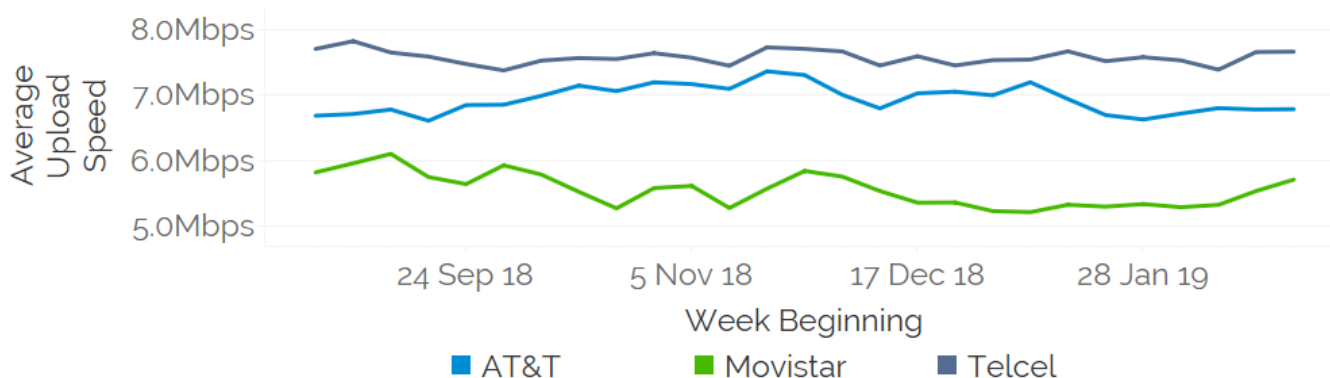
Average Upload Speed by Technology



Even for home broadband, upload speeds tend to be a small fraction of the download speed, so the near-parity here is evidence of a robust network. 3G upload speeds across all three operators are also excellent, given the age of the technology. The 2 Mbps upload speeds of Telcel and AT&T are good enough for even the most demanding uses, like uploading large pictures to social media, and Movistar's 1.5 Mbps upload average isn't far behind.

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Average Upload Speed (4G) by Week

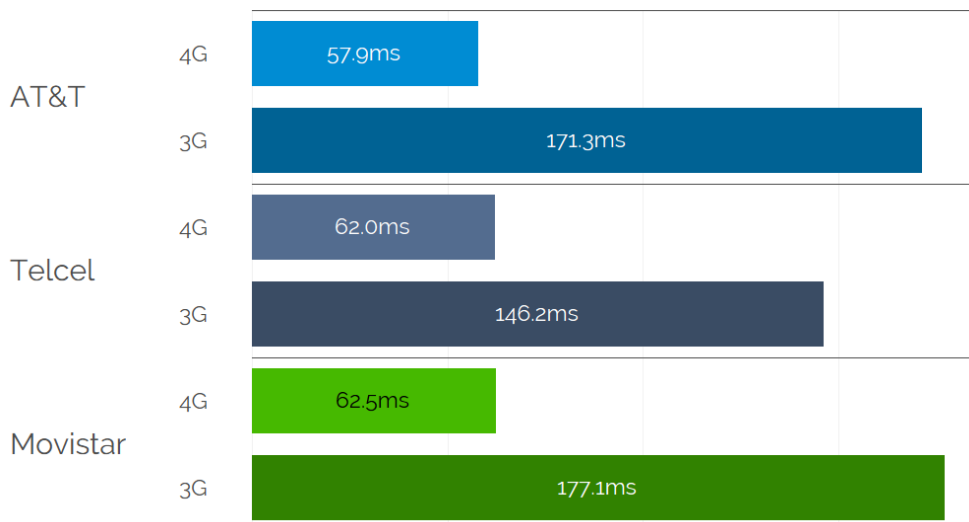


Latency

AT&T comes out on top for average 4G latency, a full 4 ms faster than Telcel. Movistar was in third place, but was just 0.5 ms slower than Telcel on average. For 3G latency, Telcel was in first place by some distance. Its average of 146 ms was significantly better than the 171 ms and 177 ms results of AT&T and Movistar respectively.

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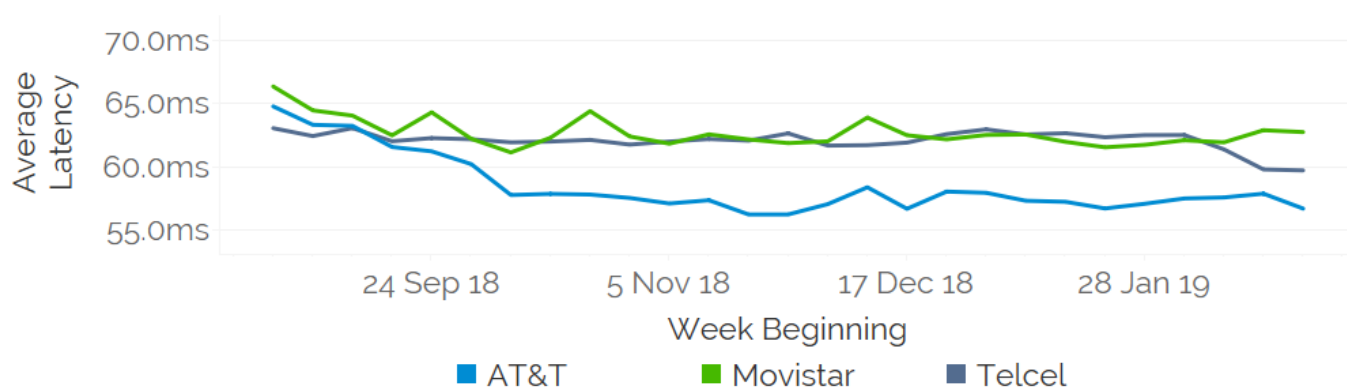
Average Latency by Technology



Across all operators, the gulf between latency on 3G and 4G networks continues to be the biggest difference between the two technologies. As the download and upload speed charts show, a 3G connection often provides the throughput necessary for things like video streaming, but the long latency means that the user experiences sub-par performance for applications such as web browsing, social media app use, or real-time video calling.

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Average Latency (4G) by Week





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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 simplest, 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, the standard defines 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: 1080p 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%

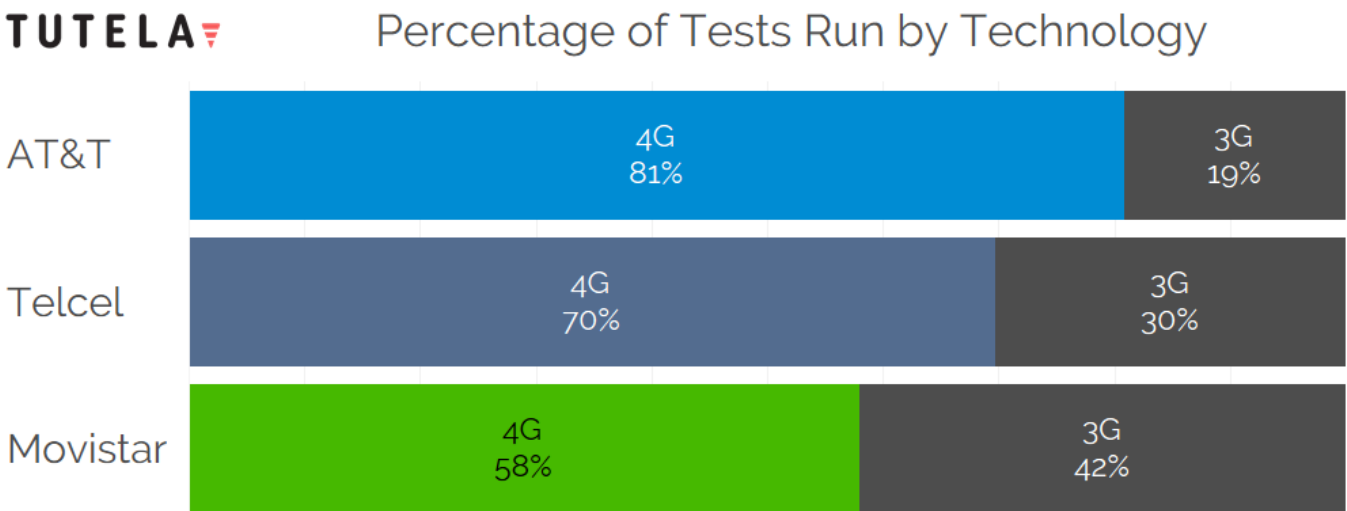
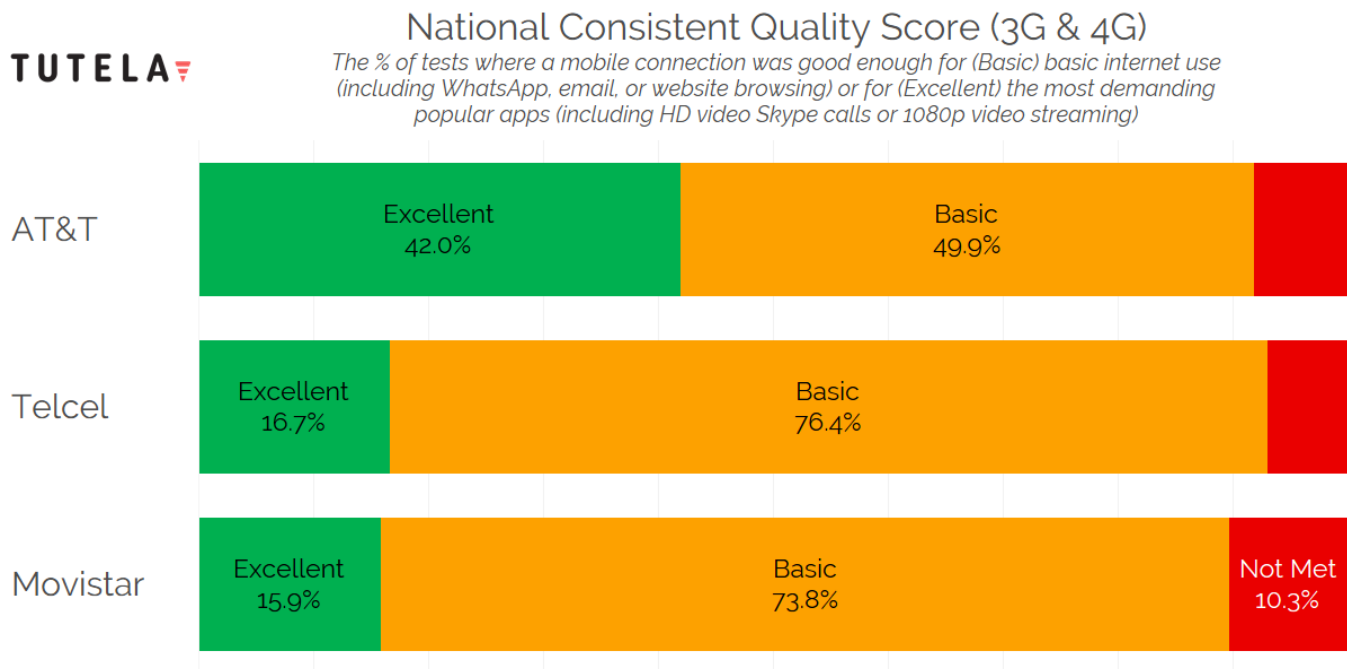
Intended use cases: Web browsing, simple applications (Facebook, WhatsApp, email clients), VOIP calling

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

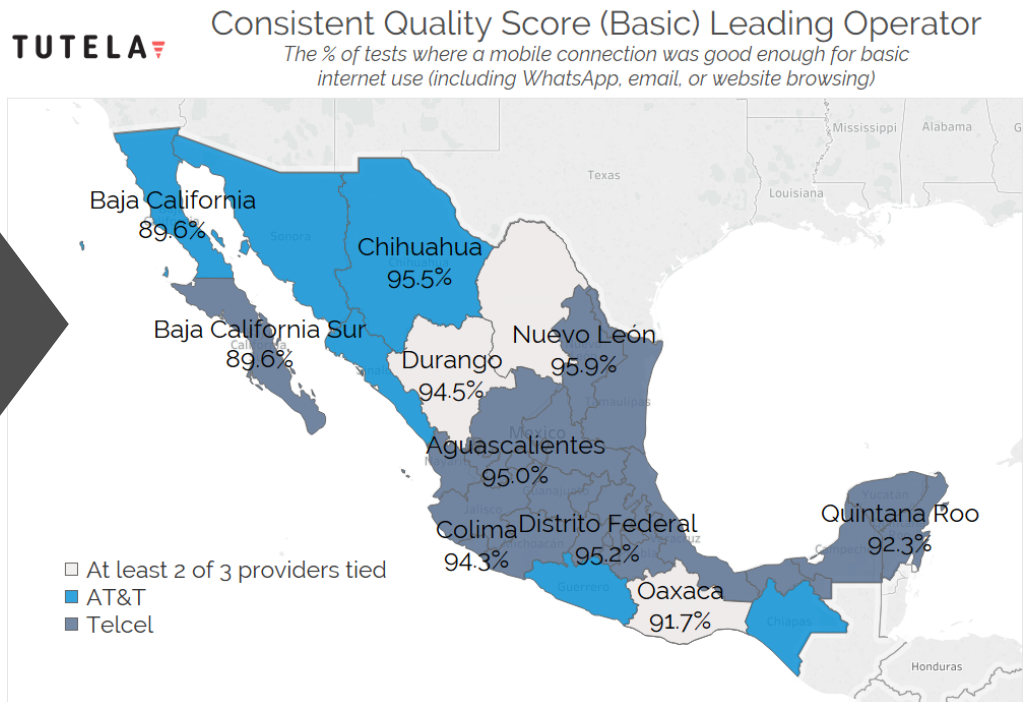
In Mexico, AT&T has the highest excellent consistent quality by a significant margin, 42% compared to results close to 16% for the other two operators. This advantage is explained by two things: AT&T's superior 4G latency performance, and the fact that AT&T has a greater proportion of its network on 4G. As the latency results show, almost any connection on 4G is going to have a lower latency than on 3G. AT&T tests used 4G the

most often out of any operator, with 4 out of 5 tests on AT&T's network using the newer technology. Telcel was in second place, while Movistar's 4G network only accounted for 58% of results. When looking at basic rather than excellent consistent quality, the results are very different. Telcel came out on top, with 93.1% of connections good enough for email or VOIP voice calls (like WhatsApp). AT&T was second on 91.9%, and Movistar was third with 89.7%.



Consistent quality

Looking at basic consistent quality by region shows some of the regional strengths of AT&T and Telcel. AT&T is strong in the north part of the Baja Peninsula, for example, while Telcel has better network quality in the southern part.



AT&T's national-level advantage in excellent consistent quality also translates to a dominance of the per-region results. Telcel's strength in the middle of the country continues, while Movistar takes first place in excellent consistent quality in the Distrito Federal.



Methodology

Tutela measures network quality based on the real-world performance experienced by users in the field. Results in this report are based on a testing configuration to represent typical (not maximum) performance of mobile devices. 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 tests.

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 network performance and benchmark against competitors.

Report facts

The information in this report was taken from our crowdsourced data between 1st September 2018 and 28th February 2019.



197 billion measurements



24 million speed tests



388 million latency tests



774 million jitter & packet loss tests

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