



DiGi + Celcom

The synergy of two mobile operators in Malaysia

What future implications could the Telenor and Axiata merger have on the Malaysian market and its users?

July 2019

TUTELA 

Introduction

When it comes to internet usage, the South-East Asian market continues to show positive growth, with 370 million users and a mobile connectivity of 141% as of January 2018(1). To take advantage of this, mobile providers will look to up its competitiveness as much as possible to ensure a majority stake in the market and keep smaller competitors at bay. This is best seen in the recent merger talks between Digi and Celcom in Malaysia.

Tutela has analyzed five key factors that determine how well this new MergedCo could perform to an ever evolving and video-obsessed market:

1. Consistent quality

MergedCo's consistent quality results should continue to improve over time, provided that the network focuses on maximizing network consistency and spectral efficiency, rather than pursuing peak speeds.

2. The potential for streaming video

With streaming video the primary driver behind mobile data growth, ensuring adequate performance for increasingly demanding streaming requirements is key. Tutela data shows that MergedCo's network can deliver consistently sufficient speeds to a significantly greater population than both networks separately.

3. Spectrum holdings and deployment

Once complete, the MergedCo will hold a majority stake in 1800 MHz spectrum and have a wider reach across Malaysia, putting it in a prime position to exploit the potential of 5G.

4. Managing congestion

Celcom currently has the fastest off-peak network. With the right investments, consumers of the MergedCo could expect less frustrating load times, and network capacity could become a competitive advantage for the MergedCo network.

5. Data usage

Both Celcom and DiGi currently provide its users with an adequate amount of data per month, however the supply currently outweighs the demand for the average user. The MergedCo should focus on reducing congestion on the network and prepare for accelerated growth in video streaming demand.

(1) Asean Up, Southeast Asia digital, social and mobile 2018
<https://aseanup.com/southeast-asia-digital-social-mobile/>

Introduction

The Asian telecom market may be about to see a shake-up as two leading companies enter talks to merge into one Pan-Asian commodity.

Telenor Group and Axiata are looking to unite its strengths to provide better service and technologies to its estimated combined total of 300 million users and 60,000 towers over nine countries, but with a potential new population reach of 1 billion(2).

Based solely on equity value rather than a cash merger, Telenor will expect to hold a 56.5% stake after the final proceedings, but it is also important to note that the MergedCo will also have proforma revenue of more than RM50 billion(3).

One of the more intriguing aspects of the merger is the expectation that Celcom (Axiata Group) and DiGi (Telenor Group) will also

merge, potentially carving out a market share of 54%(4) and a new customer base of over 20 million. This would position the MergedCo as the largest telecom company in Malaysia, surpassing Maxis with its current 34% share and subsequently squashing the original term coined to describe DiGi, Celcom and Maxis in Malaysia as 'The Big Three'.

Always just on the outskirts, U Mobile could become a renewed player and disrupt the mix with competitive price and service offerings. As of 2018, U Mobile has a market share of 14% with 6.2 million users, a 2% increase from 2017(5).

In this paper, we will examine the effects of a Celcom-DiGi merger, from the perspective of both customer experience and the wider impact on the Malaysian wireless market.

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(2) Telecompaper, Telenor to merge Asian operations with Axiata, sees USD 5 bln in synergies <https://www.telecompaper.com/news/telenor-to-merge-asian-operations-with-axiata-sees-usd-5-bln-in-synergies--1291449>

(3) Malaysian Wireless, Celcom – Digi Merger: MCMC releases Guidelines on Mergers and Acquisitions <https://www.malaysianwireless.com/2019/05/axiata-telenor-mcmc-merger-guidelines/>

(4) The Star, Big gains for Axiata and Digi <https://www.thestar.com.my/business/business-news/2019/05/08/big-gains-for-axiata-and-digi/>

(5) Live at PC, U Mobile Subscriber Base Surpasses 6 Million <https://liveatpc.com/u-mobile-subscriber-base-surpasses-6-million/>

Consistent Quality

Historically, download speeds have been used as the standard for measuring mobile network performance. For years, the logic has gone like this: the faster the download throughput, the better the network experience for subscribers.

However, as networks (and how subscribers have used them) have evolved, the means used to evaluate them have changed. Adequate download speed is just one of several crucial requirements for a “good” connection, and an over-emphasis on download speeds that are well in excess of what’s required for almost all mobile applications has caused other network performance measurements to be overlooked.

To solve this problem, Tutela has developed a metric called consistent quality. It incorporates five network performance measurements: download speed, upload speed, latency, jitter, and packet loss. Every time Tutela collects those measurements on a mobile connection, we compare them against two sets of thresholds,

Excellent quality

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

Basic quality

Download speeds > 512 Kbps
Upload speeds > 128 Kbps
Latency < 100 ms
Jitter < 50 ms
Packet loss < 5%

which were selected using the minimum performance requirements of popular mobile applications. There are two sets of thresholds, excellent and basic. If all the network measurements meet or exceed the standards for excellent consistent quality, we conclude that the user can use services like Netflix, Skype, YouTube, or other real-time or streaming video applications (in 720p HD) with no noticeable problems or hiccups, since these will exceed the minimum network requirements set by these services. Connections that don’t meet the thresholds may still allow users to use those services, but without the same likelihood of a flawless experience.

The basic consistent quality thresholds follow a similar principle, but for less demanding use-cases. A connection that meets the basic consistent quality thresholds will be sufficient for things like web browsing, email, or a VOIP voice call on a service like WhatsApp or Viber. Tutela set these thresholds based on the network requirements set by the applications (where available). You can read more about how Tutela chose these thresholds and what they represent here⁽⁶⁾.

In the reports, Tutela represents each operators’ consistent quality with a percentage score; this number represents what percentage of tested network connections met or exceeded the excellent or basic consistent quality thresholds. Every connection that meets the excellent consistent quality threshold also exceeds the requirements for basic consistent quality.

(6) Tutela, Introducing Consistent Quality - measuring more than just speed
<https://www.tutela.com/blog/introducing-consistent-quality-measuring-more-than-speed>

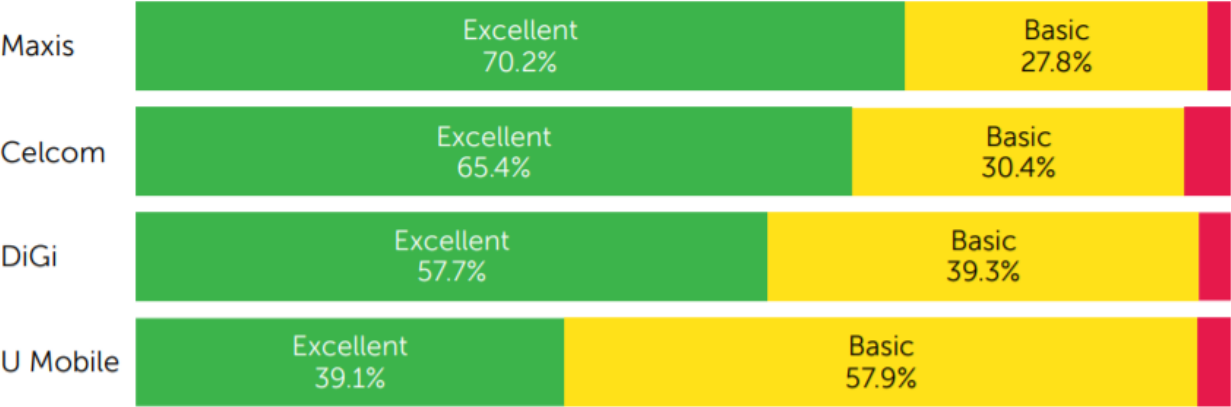
Consistent Quality

One important aspect of the merger is how well the MergedCo will do with providing consistent quality of experience to its current and prospective users. In May, Tutela examined wireless networks in Malaysia and measured its mobile providers on consistent quality, a metric that is calculated using several underlying network performance indicators. Maxis came out on top with a 70.2% 'excellent' consistent quality result, Celcom performed second-best with a 65.4% result and DiGi came in fourth with 57.7%. Evidence from other wireless network mergers shows that it takes months to years for any benefit to materialize for users. Network sharing infrastructure takes time to implement; in the meantime, the MergedCo would occupy

second place for consistent quality, behind Maxis but still ahead of U Mobile. In the long run, we would expect the merged network's consistent quality to continue improving. A high excellent consistent quality result requires the network to ensure that the maximum number of tests exceed the thresholds, rather than focusing on maximizing peak speed. Previous research (and received wisdom) suggests that cell site density and maximizing deployed bandwidth (which requires spectrum holdings) are the key to ensuring consistent performance. If the MergedCo can integrate its cell site and spectrum infrastructure in an efficient way, it will be in a position to offer the best consistent quality of any Malaysian operator.

Consistent Quality Scores

Percentage of tests nationally (on 4G & 3G) in each Consistent Quality Score.





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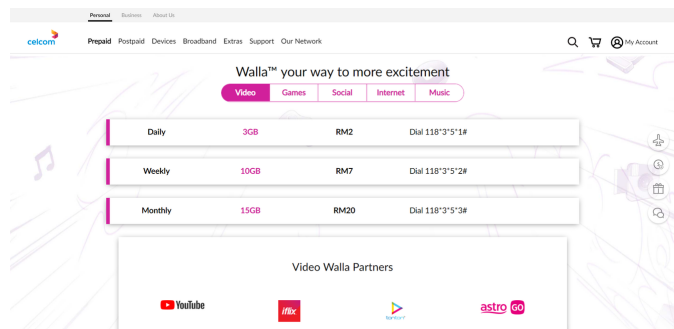
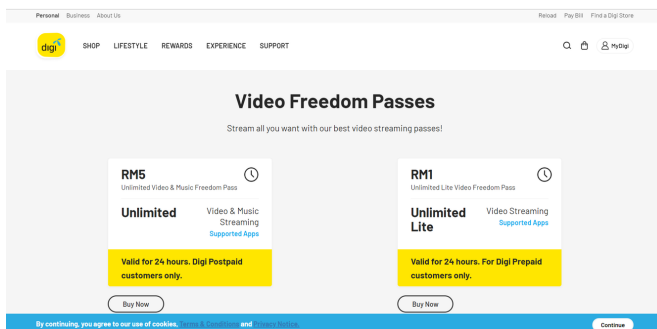
The potential for streaming video

It is becoming increasingly more popular in Malaysia to not only stream videos but to pay for these streaming services as well, with its own homegrown brand (AstroGo) topping the most popular list in a recent survey(6). It has also been found that video consumption is at its highest for South East Asia during Ramadan, with a 48% and 58% watchtime growth for religious videos during Ramadan in Indonesia and Malaysia on Youtube compared to any other month(7).

Both Celcom and DiGi already offer consumers extra video streaming packages on top of the standard data plans, ensuring that consumers are able to watch whatever they like from wherever with a limited amount of data that won't affect their already-purchased plans. It serves as an added incentive to keep them entertained and buying smaller doses of data regularly.

Among other regional providers and select services, both have active partnerships in place with YouTube, which is imperative when 48.3% of social networking users in Malaysia are consuming content on YouTube, according to a 2018 internet user survey(8).

Based on this, providing reliable service suitable for Youtube video streaming would seem to be a strategic priority for both brands, in order to maximise customer satisfaction. Using Youtube's requirement of 2.5 Mbps threshold to stream a 720p video on its platform as our base, Tutela has looked at how well the MergedCo may perform when consumers use the video streaming service. The map below shows the areas in Malaysia where the combined network meets these requirements with a high degree of reliability (95% of the time).



(6) Rojak Daily, Astro GO Is Malaysia's No. 1 Video Streaming

Service <http://www.rojakdaily.com/entertainment/article/6985/astro-go-is-malaysia-s-no-1-video-streaming-service>

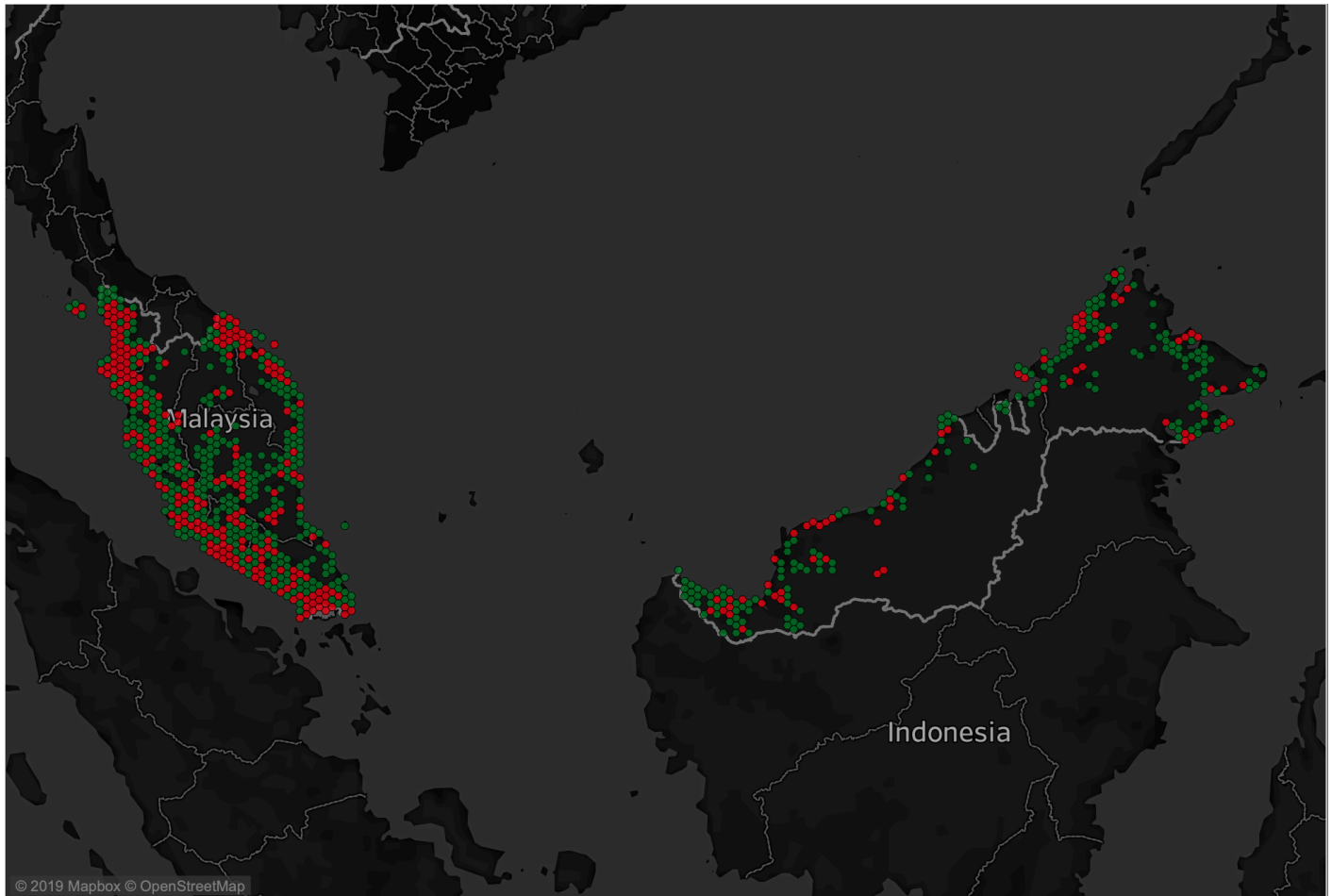
(7) Think With Google, During Ramadan in Malaysia and Indonesia, technology helps out all month long <https://www.thinkwithgoogle.com/intl/en-apac/trends-and-insights/during-ramadan-technology-helps-out-all-month-long/>

(8) MCMC, Internet Users Survey 2018

<https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/Internet-Users-Survey-2018.pdf>

The potential for streaming video

Combined network - areas where the mobile network meet the 2.5 Mbps required for streaming 720p Youtube video 95% of the time



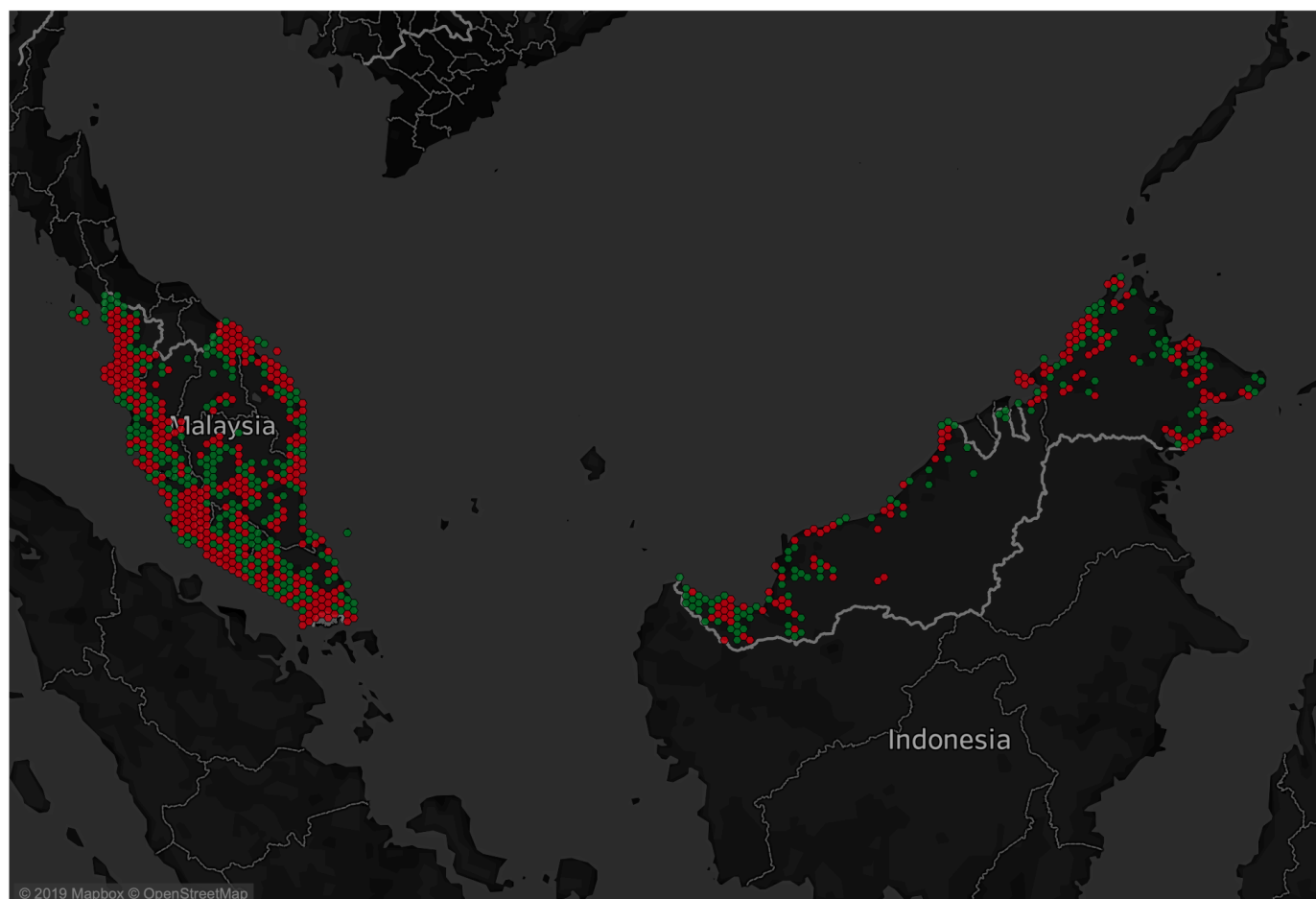
Met minimum 2.5 Mbps 95% of the time



Did not meet minimum 2.5 Mbps 95% of the time

The potential for streaming video

Digi - areas where the mobile network meet the 2.5 Mbps required for streaming 720p Youtube video 95% of the time



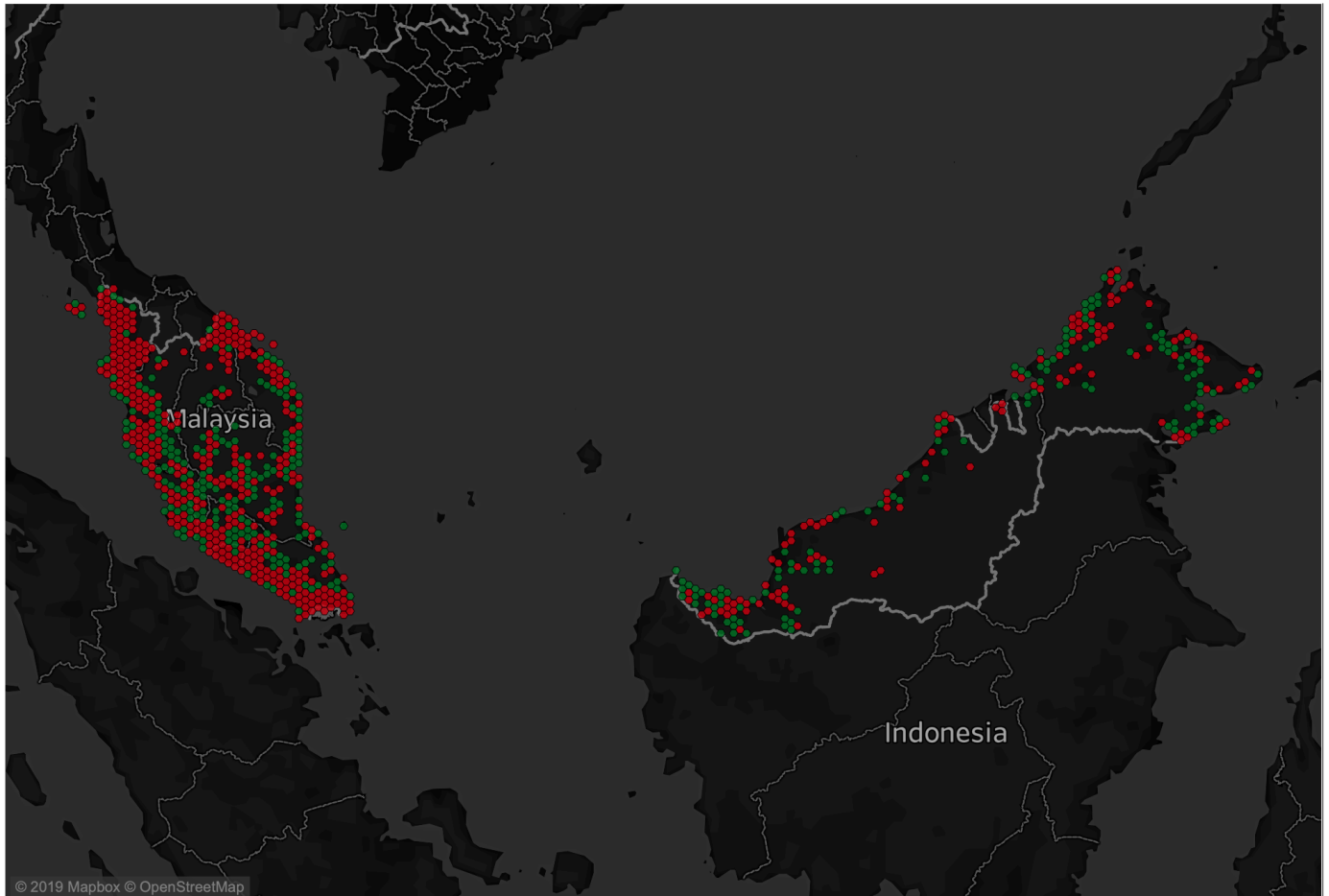
Met minimum 2.5 Mbps 95% of the time



Did not meet minimum 2.5 Mbps 95% of the time

The potential for streaming video

Celcom - areas where the mobile network meet the 2.5 Mbps required for streaming 720p Youtube video 95% of the time



Met minimum 2.5 Mbps 95% of the time



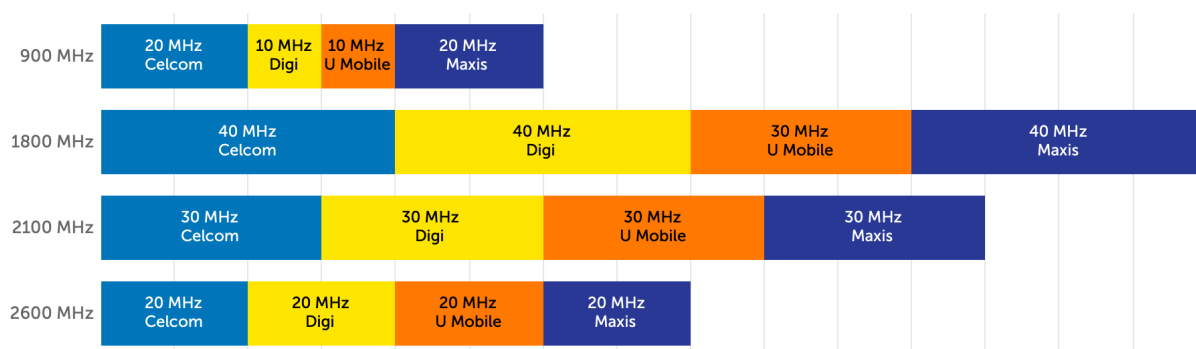
Did not meet minimum 2.5 Mbps 95% of the time

Spectrum holdings and deployment

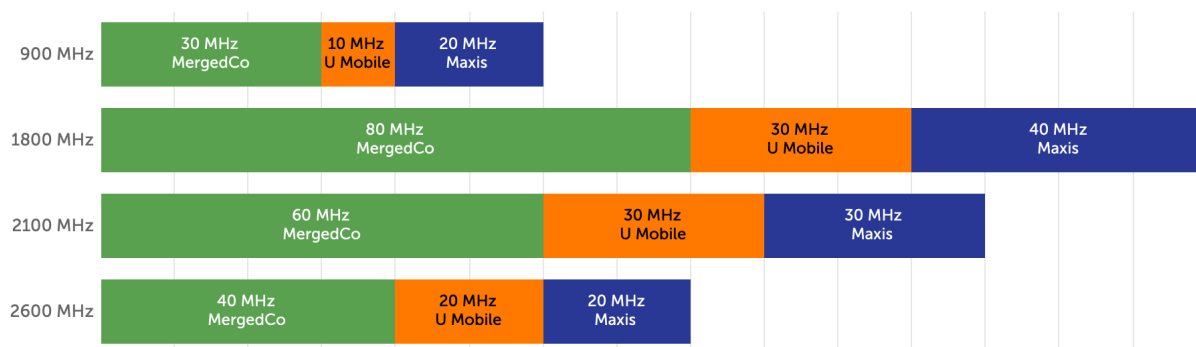
According to spectrum license data, Celcom and DiGi have a nearly-equivalent amount of spectrum in each band. This means the MergedCo will effectively be able to double its spectrum holdings, and therefore be able to cover urban and rural area with some ease and cater its plans to each of its current strengths.

DiGi is also the only provider to have 900 MHz spectrum deployed on a significant proportion of its cell towers (22%). As 900 MHz spectrum offers superior range and building penetration compared to 1800 MHz (or higher) spectrum, this existing infrastructure should give the MergedCo an edge in coverage. Once complete, the MergedCo will hold a majority stake in 1800 MHz spectrum, and with the Malaysian government expected to make a decision on 5G auction by October 2019, it could bid much lower than if it was competing against each other. In the meantime, the combined network offers a wider reach across Malaysia, making it potentially easier for the combined entity to meet any current or future government and regulator coverage goals. For example, the Malaysian government plans to achieve mobile broadband speeds of 30 Mbps in 98 percent of populated areas by 2023(9).

Spectrum holdings before the merger



Spectrum holdings after the merger



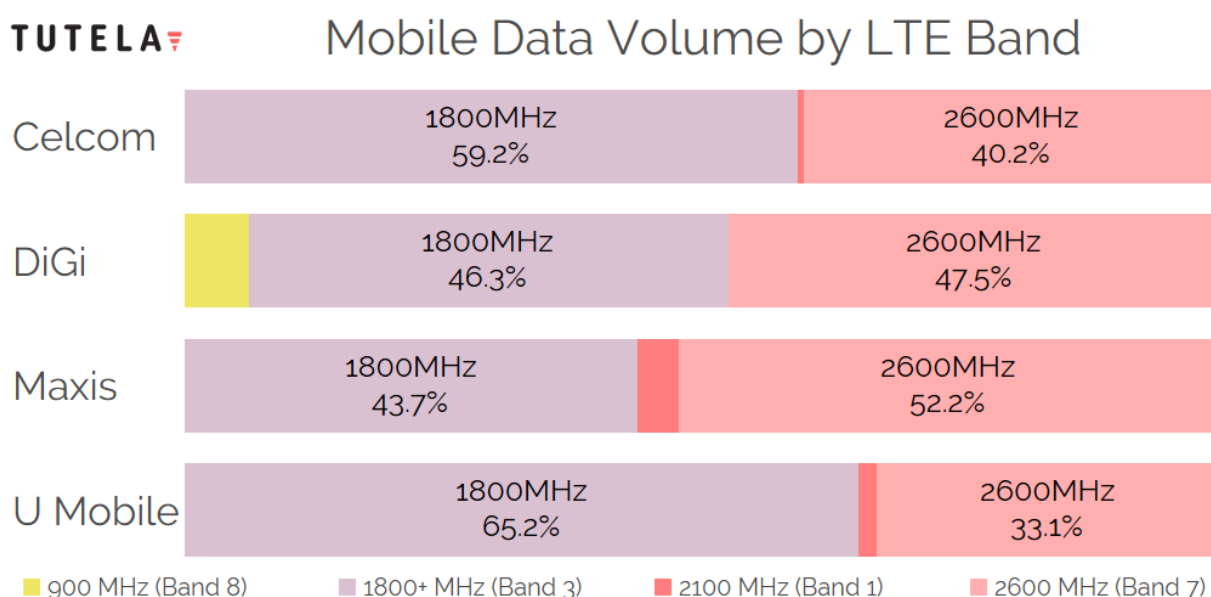
Source: SMTA Global Mobile Spectrum Allocation Database, June 2019. Total includes uplink + downlink

(9) Telecompaper, Malaysia consults on 700 MHz, 2300 MHz, 2600 MHz spectrum allocation <https://www.telecompaper.com/news/malaysia-consults-on-700-mhz-2300-mhz-2600-mhz-spectrum-allocation--1300222>

Spectrum holdings and deployment

Although technological advancement (5G and next-generation Wi-Fi) is expected to play a significant role in that development, the spectrum and infrastructure holdings of the MergedCo would make such a roll-out more feasible for the MergedCo network. New technologies, such as LTE-Advanced and 5G, require wider bands or multiple channels to aggregate, conditions that would be easier to meet with 210 MHz of spectrum post-merger.

Maxis, which is still for the moment the largest telco company in Malaysia, is looking at a rather large disruption to its once safe spectrum positionings. Moreover, the merger will dramatically change national spectrum licensing plans that were recently drawn up by the government, in 2016.



With its 210 MHz of spectrum, MergedCo has nearly double the total available bandwidth of Maxis, and significantly more than U Mobile. That gives the combined network more capacity for growth in LTE traffic, as well as less of a need to add new spectrum for 5G via auction.

This dominant spectrum portfolio is likely to be a focus of regulators when examining the merger. Previous major mobile network mergers have required the merged company to divest spectrum as a condition for merger approval, and the condition remains a popular regulatory tool.

Percentage of sites with LTE band deployed

	900 MHz	1800 MHz	2100 MHz	2600 MHz
Celcom	0.2%	94.5%	5.8%	59.7%
DiGi	22.1%	60.2%	0.5%	45.5%
Maxis	0.2%	97.1%	18.6%	78.0%
U Mobile	0.0%	92.5%	10.1%	58.6%

Managing congestion

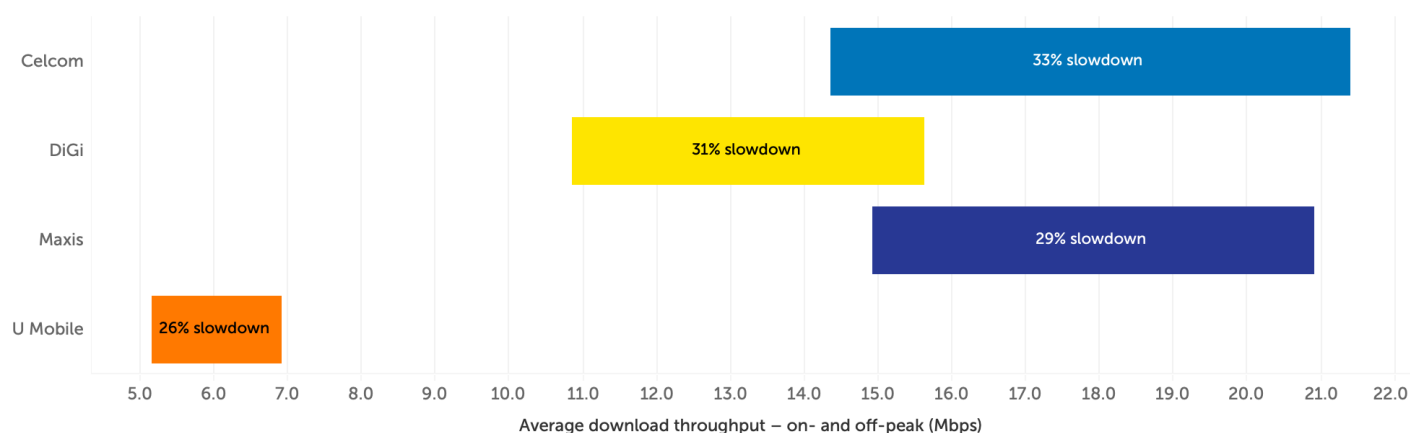
Measuring the percentage change between on-peak and off-peak download speeds can offer a glimpse into how mobile networks are coping with the increased demands on their network at peak times -- in short, it's a proxy for network congestion. As the graph below shows, Celcom has the fastest off-peak network, just ahead of Maxis. At peak times however, Celcom's network slows down by more than Maxis, dropping Celcom to second place during the critical peak hours for mobile network traffic.

Currently, both Maxis and U Mobile have less congestion than the two merging networks, albeit by a small margin, and Maxis has the fastest on-peak average download speed. However, the radio network efficiencies that can be gained by combining networks should lead to a net capacity increase, and with the right investment in the right areas to target congestion, the MergedCo consumers can look forward to less loading frustrations.

Despite U Mobile being the fastest-growing operator in Malaysia, and having the lowest percentage slowdown, our data suggests it is by far the slowest network on average during both on- and off-peak hours. With the MergedCo expected to leverage its new spectrum and infrastructure to improve its network capacity (and peak throughput), U Mobile will be in a vulnerable market position.

Operators have already shown their willingness to plan data volumes and other add-ons as the competitive differentiator; if the MergedCo's network has the capacity to sustain significantly more data per subscriber than U Mobile, then the MergedCo will be able to lower the cost-per-GB of its plans without decreasing its ARPU. The network metrics suggest that U Mobile (and, to a lesser extent, Maxis) would be unable to increase its data volume to compete without unacceptably diminishing performance.

**Mobile network congestion:
change in download throughput between on- and off-peak hours**



Data usage

According to its latest financial report, each month Celcom's data subscribers use 12.4GB on average, and with only 997.3 million GB used overall in 2018(10). However, the plans on offer are providing customers with more than what they can get through in a month. The lowest postpaid plan on offer is 20GB at a cost of 80 RM (\$19.31 USD) - with 10GB of that free on the weekends. For prepaid, the Ultra Pass provides 15GB for RM 20 (\$4.83 USD).

The same could be said for DiGi, with its latest financial report showing an average data usage of 10.2GB(11), but plans' data limit starting around the 20GB mark. The cheapest postpaid plan on offer is the JomStart Plan, 20GB for 58 RM (\$14 USD) a month. The breakdown of this being the user is given 5GB usage during the week, 5GB on the weekend, and 10GB for Youtube streaming.

In comparison, Maxis reported its consumers on a postpaid plan on average used 12.2GB(12) in Q1 2019 and stayed consistent compared to last year. or prepaid consumers, average data usage sits at 11.5GB. FMaxis appears to have one mobile plan, MaxisONE Plan, with four different

variations available, with the cheapest starting at 98 RM (\$23 USD) for 30GB.

The data usage numbers suggest that Celcom is already competing with other leading networks for total data volume, but that the demand for data (among the average consumer, at least) is not necessarily equal with supply. As a result of the merger, the combined network should be able to lower the congestion on its network going forwards, cope with data demand growing to meet the supply, and reduce the number of limitations on its tariffs.

In conclusion, the merger of Celcom and DiGi into one commodity should have a positive outcome for its current and prospective consumers, and a rather large redistribution of competitor rankings in Malaysia, forcing others to rethink strategies. To keep a competitive lead, the MergedCo should focus on maximizing network consistency, continue to improve upon its video streaming services for a market that demands consistent video quality, and reducing congestion.

(10) Axiata, Integrated Annual Report 2018 https://axiata.com/investors/2018/assets/pdf/axiata_iar-full_report.pdf

(11) Telecompaper, Digi's profit drops 5%, total revenue plunges 7% <https://www.telecompaper.com/news/digis-profit-drops-5-total-revenue-plunges-7--1289705>

(12) The Star, Maxis Q1 net profit up 53.7% at RM409m from preceding quarter <https://www.thestar.com.my/business/business-news/2019/04/26/maxis-q1-net-profit-up-53pt7pct-at-rm409m-from-preceding-quarter/>

Methodology

Tutela measures network quality based on the real-world experience of millions of users. We employ software installed in more than 3,000 partner apps to actively test network performance, conducting download, upload, and server response tests against Tutela-configured servers. The tests are conducted randomly and in the background to avoid sampling bias, with a testing configuration designed to emulate and measure real-world user activity, not maximum network throughput.

At the heart of Tutela's throughput testing is our use of small, lightweight files (2MB for download and 1MB for upload), which are designed to mimic the way that people actually use their devices. The most common smartphone uses include things like web browsing, using weather apps, written communication with friends and colleagues, playing games, or reading the news⁽¹³⁾ -- all of which involve sending and receiving small data packets. How a network performs depends on the size and type of data packets being sent and received, which is why Tutela uses a small, fixed file size to test how the network handles typical traffic -- rather than huge files of several hundred megabytes, which are representative of downloading huge apps, entire movies to watch offline, and little else.

Unlike traditional methods of benchmarking mobile network performance, the crowdsourcing techniques employed by Tutela don't inherently offer a head-to-head comparison of operators in exactly the same location. Crowdsourcing is complementary to drive-test techniques and measures network performance wherever users are actually using the network -- which, if you're seeking to examine the real-world experience of subscribers using their own devices on the network, is exactly what you'd be after.

In addition to working in the background (to eliminate user-initiation bias) and testing using representative packet sizes, Tutela also employs the largest crowdsourced population in the world for mobile network testing. Our software is present on over 250 million Android and iPhone devices globally, and our network collects over 10 billion mobile data measurements every day. Our data scientists analyze results for countries on a monthly basis and tabulate the results into reports. Our custom analytics solution, Tutela Explorer, updates with new measurements on a daily basis, and enables operators to chart, map, and filter over 80 key performance indicators into customized dashboards to help them better understand network performance, enhance customer Quality of Experience, and benchmark their network against competitors.

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

(13) Something for everyone, Why the growth of mobile apps is good news for brands, IPSOS
"<https://www.ipsos.com/sites/default/files/2017-08/Google-mobile-apps-report-2017.pdf>"

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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.

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