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REPORT FOR GOOGLE

2022 UPDATE: ECONOMIC IMPACT OF GOOGLE'S APAC NETWORK INFRASTRUCTURE

FOCUS ON MALAYSIA

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SEPTEMBER 2022

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Google's network infrastructure investments in Malaysia

Investments in submarine cables

MIST
2023
CABLE LANDING POINTS
Singapore, Malaysia, Myanmar, Thailand, India

IAX
2023
CABLE LANDING POINTS
Singapore, Malaysia, Thailand, India

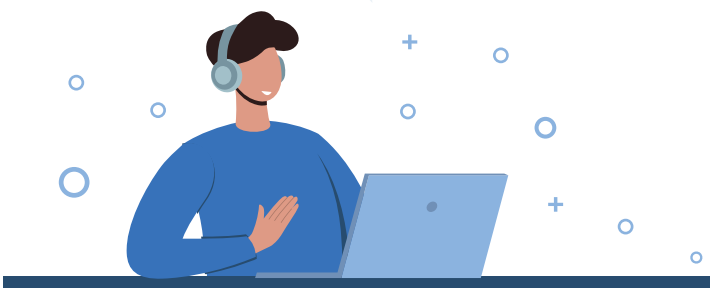
20 cities with GGC nodes

4 peering locations in 2 cities

Benefits to digital connectivity

SUPPORT USE-CASES FOR POST-PANDEMIC DIGITAL TRANSFORMATION:

- Cloud services
- e-Commerce
- Video-conferencing



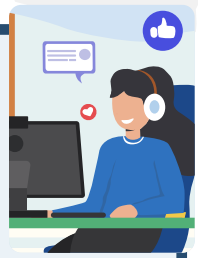
2026 FORECAST

15% USAGE OF INTERNET ENABLED

7% REDUCTION IN END-USER LATENCY

4% REDUCTION IN IP TRANSIT PRICES

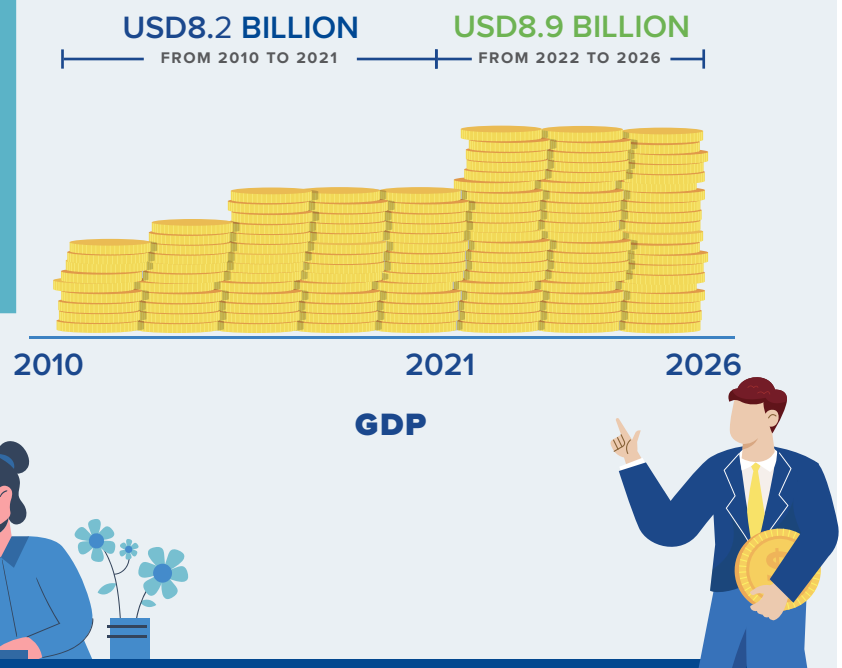
6% INCREASE IN INTERNET BANDWIDTH



Economic impact

Forecast to support up to
40 000 additional jobs
in 2026

Supported up to
18 000 additional jobs
in 2021



Regulatory and investment regime

Need to enable ease of :

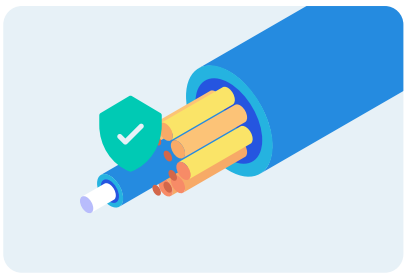
Deployment and landing
of submarine cables

Protection and maintenance
of submarine cables

Malaysia can benefit from following best practices from other leading APAC economies

Potential areas of progression

Increase the clarity of licensing and permitting processes to speed up submarine cable-related activities and increase investor confidence



Strengthen cable protection laws and increase flexibility of cabotage provisions for cable repairs and maintenance

Implement non-discriminatory and cost-oriented access to cable landing stations to promote stronger competition between operators

This report is a supplement to our regional-level report for APAC – an update of our 2020 edition entitled *Economic impact of Google's APAC network infrastructure*.[1] In this 2022 update, Malaysia has been added as an economy of focus. This follows Google's announced investments in two submarine cables, the MIST and IAX, which are scheduled to land in Malaysia by 2023.

Malaysia is one of the fastest-growing economies in ASEAN,[2] and its digital economy is spurring this growth. Internet traffic generated across both fixed and mobile networks has increased strongly at 52% on average per annum from 2010 to 2021, reaching 24EB in total in 2021.

There are five main telecoms service providers in Malaysia:

- **Telekom Malaysia** – the incumbent fixed operator in Malaysia
- **Maxis –** majority owned by BGSM Equity Holdings
- **Celcom** – backed by Axiata Group, and in the process of merging with Digi
- **Digi –** backed by Telenor Group
- **U Mobile** – partly owned by Straits Mobile Investment, a subsidiary of Singapore's ST Telemedia.

Malaysia's fixed broadband network has significantly lower coverage than the mobile network. Approximately 62% of households[3] have access to fibre broadband, while 93% of the population are within range of 4G mobile services.[4]

Malaysia was connected to 20 international submarine cable systems as of 2021 and these systems offer a total of 551Tbit/s in potential capacity.[5] According to Malaysia's digital economy blueprint, the Malaysian government aims to have the highest number of submarine cable landings in South-East Asia by 2025.

1 Google's network infrastructure investments generated benefits to the connectivity ecosystem, leading to greater usage of the internet in Malaysia

As of 2021, Google does not have submarine cable investments that land in Malaysia. However, Google has announced that it will be investing in MIST cable system with planned landings in Asian countries including Malaysia. The MIST cable is expected to be ready for service in 2023. It will consist of 12 fibre pairs and provides more than 216Tbit/s of potential capacity[6] in total. Google has

1 Analysys Mason – Economic impact of Google's APAC network infrastructure, see: analysysmason.com/consulting-redirect/reports/impact-of-google-network-apac-2020/

2 Association of Southeast Asian Nations

3 Analysys Mason Research – FTTx coverage and capex worldwide: forecasts and analysis 2020–2026

4 Analysys Mason Research

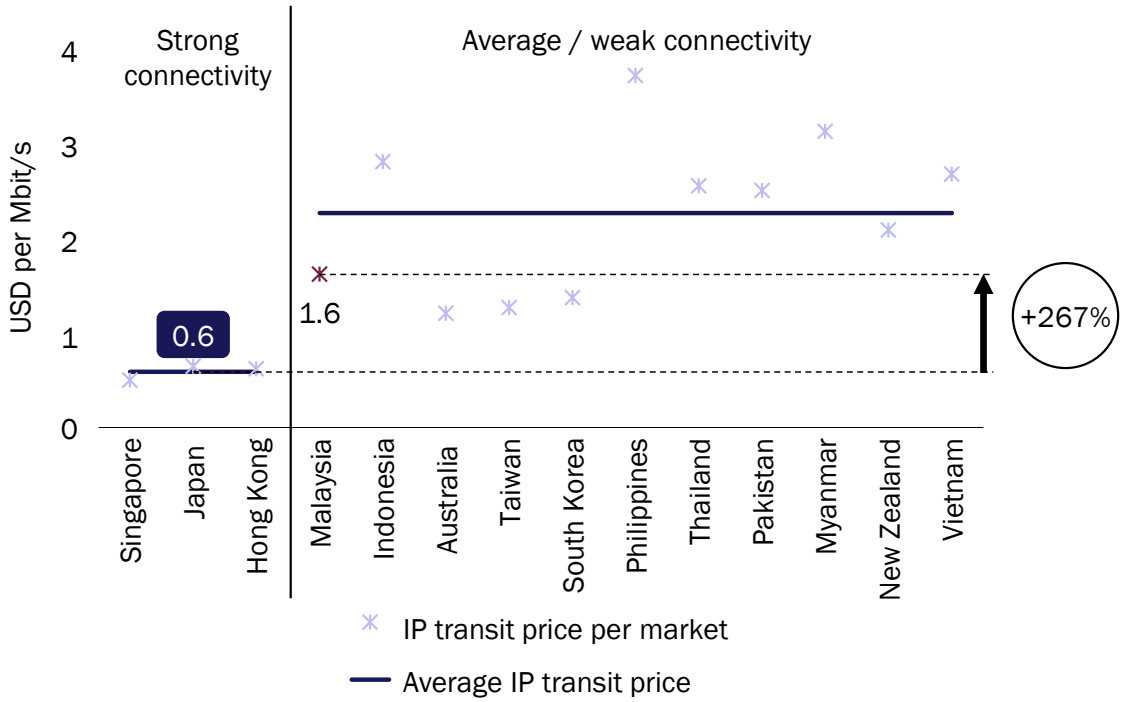
5 Refers to the estimated theoretical maximum capacity that a cable could handle using current technology

6 Submarine Cable Networks – *see:* submarinenetworks.com/en/systems/intra-asia/mist

also announced investments in the IAX cable which will provide more than 200 Tbit/s of potential capacity connecting India to Thailand, Malaysia and Singapore.[7]

These new cables will improve the supply of bandwidth, end-user latency and route diversity in Malaysia. IP transit prices in Malaysia are still high compared to other economies in APAC (see Figure 1). We expect that further stimulation of submarine cables investments, in particular from non-incumbent telecoms operators, will reduce the cost of international capacity transit to Malaysia.

Figure 1: IP transit prices[8] across APAC [Source: TeleGeography, Analysys Mason, 2022]



Google has also invested in edge infrastructure in Malaysia. Google deployed points of presence (PoPs) in three private peering facilities (mainly for cloud services) and cross-connected to one internet exchange points (IXPs), as shown in Figure 2. Google Global Cache (GGC) nodes are also deployed in operator networks in 20 cities across Malaysia.

7 Submarine Cable Networks - See: https://www.submarinenetworks.com/en/systems/intra-asia/iax/jio-moves-forward-with-iax-and-iex-projects

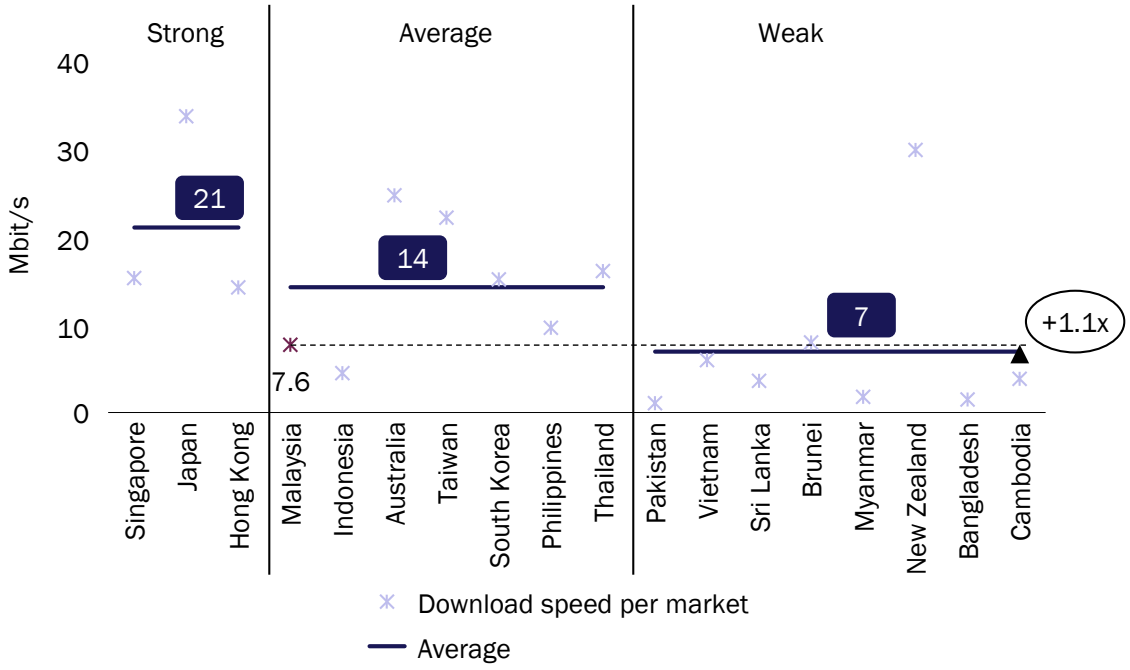
8 Refers to USD per Mbit/s of IP transit prices in 2020 based on the committed data rate of 10Gbit/s from TeleGeography; calculation is based on average price per Mbit/s in a country or region after accounting for the mix of port sales generated by that country or region. IP transit price data for 10Gbit/s is referenced, as it provides the highest number of available data points (14 APAC economies with submarine cables)

Name of facility / fabric	Type	Location
DE-CIX Kuala Lumpur	Public	Kuala Lumpur
AIMS Kuala Lumpur	Private	Kuala Lumpur
CSF CX1/TelcoHub1	Private	Cyberjaya
CX2/MY01	Private	Cyberjaya

Figure 2: List of Google peering facilities in Malaysia [Source: Google, Peering DB, 2022]

These investments in edge infrastructure and PoPs bring popular Google content physically closer to end users in Malaysia, which has contributed to slightly faster download speeds in Malaysia.[9] In 2021, the average download speed in Malaysia was 7.6 Mbit/s, only somewhat higher than that of less well-connected economies (see Figure 3).

Figure 3: Download speed comparison[10] [Source: M-lab, 2021]



Improvements in latency and internet speed increase the ability of internet service providers (ISPs) to deliver innovative cloud services, video conferencing and gaming. Low latency is also critical for transactional services, including e-commerce.

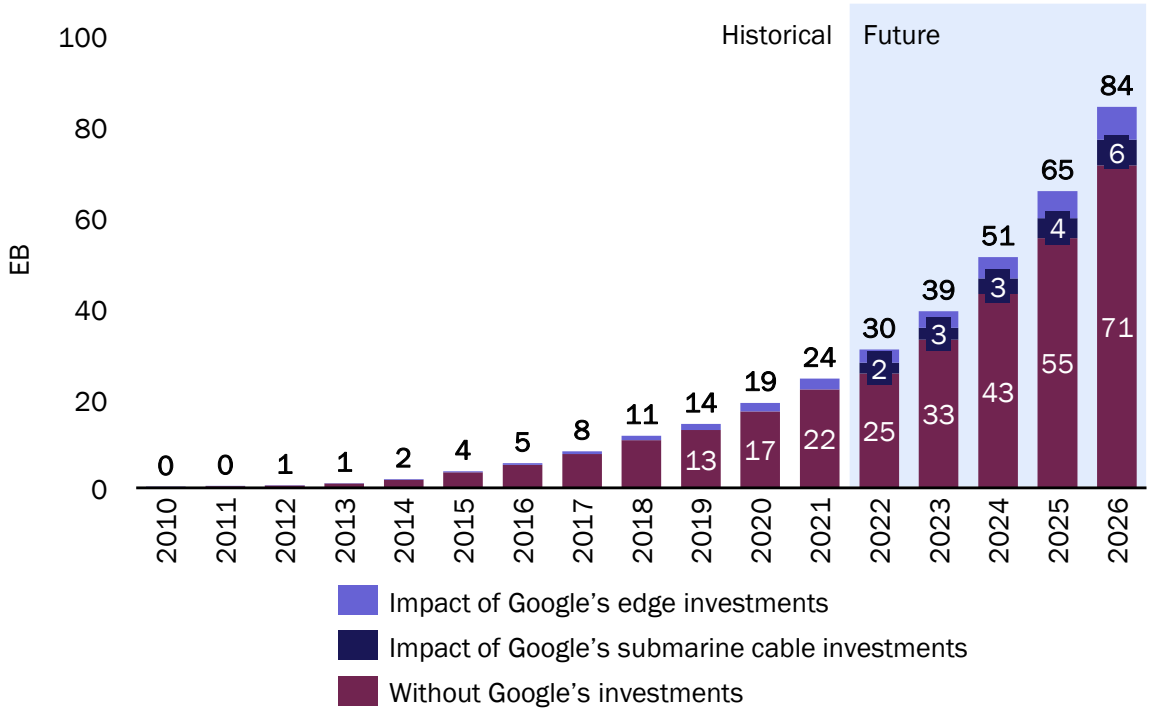
The end result of these improvements is greater demand for the internet in Malaysia: based on our modelling, we estimate that Google's infrastructure investments enabled 2.4EB or 10% of traffic in 2021,

9 Google traffic is a significant contributor to network traffic in APAC and contributes approximately 12% of total uplink and downlink network traffic, according to Sandvine

10 The data extracted from M-lab ranges from January to November 2021. M-lab aggregates and groups data to establish log scale 'buckets'. The sets of data are then randomised and calculated from random samples daily. M-lab then counts the samples that fall into each bucket and obtains the frequencies for the histogram. The eventual download speeds from M-lab are measured as log average throughputs (Mbit/s)

rising to 12.9EB or 15% of traffic by 2026[11], following the deployments of MIST and IAX (see Figure 4). Further stimulation of network infrastructure investments in Malaysia will enable greater traffic growth in the future.

Figure 4: Impact of Google's network infrastructure investments on internet data traffic in Malaysia [Source: ITU, Analysys Mason Research, Analysys Mason, 2022]



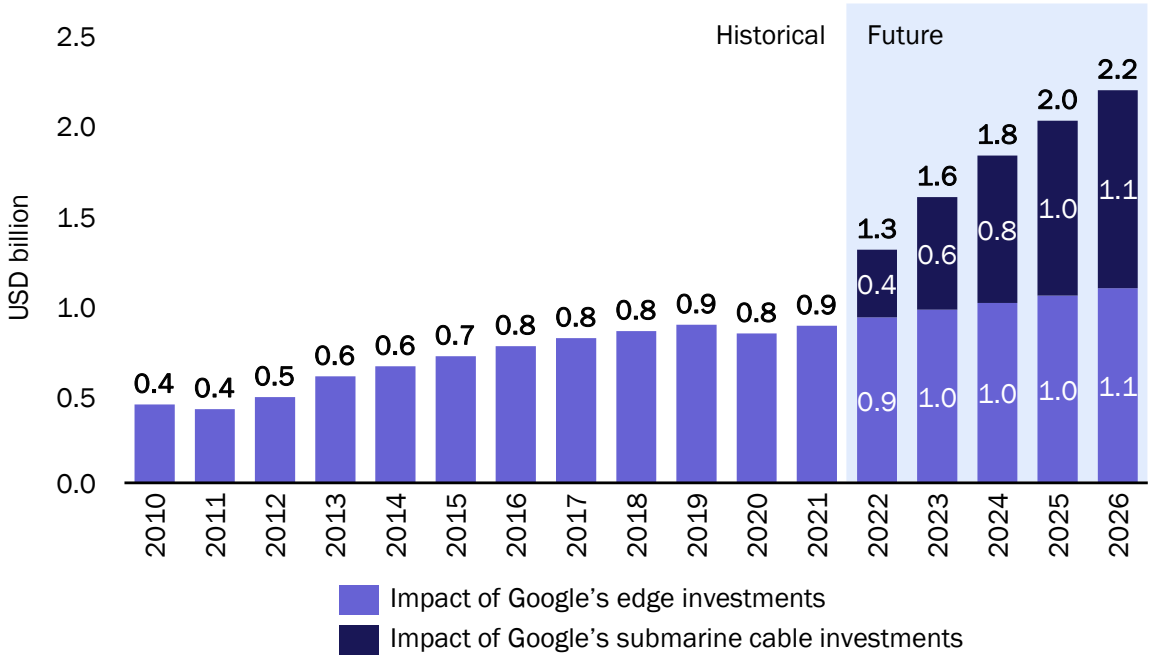
2 These investments generate social benefits by supporting new use cases and economic benefits in the form of GDP growth and jobs

Increased internet use has a positive impact on economic activity across various sectors, leading to benefits for consumers and businesses. We estimate that the increase in internet usage in Malaysia contributed an additional cumulative USD8.2 billion in GDP (in real terms[12]) from 2010 to 2021. Google's continued network investments from 2021 onwards, including two submarine cable deployments, are expected to spur higher internet traffic usage. Google's historical and continued investments are expected to contribute an additional cumulative USD8.9 billion in GDP from 2022 to 2026, of which USD2.2 billion would be in 2026 alone (see Figure 5 below).

11 We forecast that Google's network infrastructure investments will drive an additional 18% increase in internet traffic beyond forecasts without these investments by 2026. This results in 15% of total traffic being attributed to Google's network infrastructure investments in Malaysia.

12 GDP figures are in constant USD using 2020 as the base year and using a fixed exchange rate to USD in 2020; GDP statistics in USD are sourced from the World Bank and Euromonitor

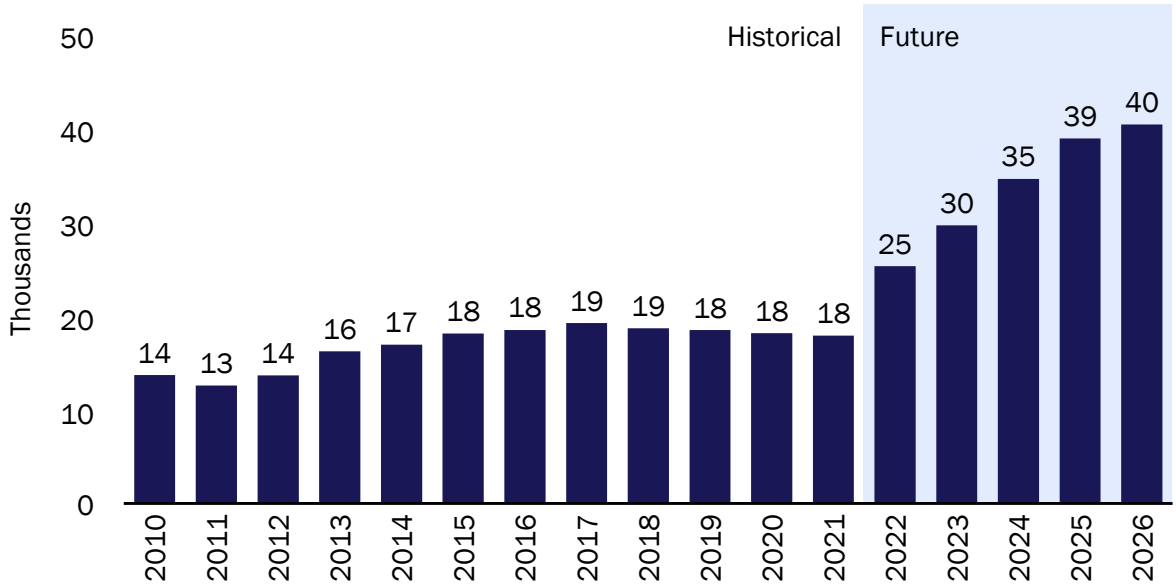
Figure 5: Increase in real GDP attributable to Google's network infrastructure investments in Malaysia[13] [Source: Analysys Mason, 2022]



The economic benefits arising from Google's network infrastructure investments lead to direct job creation in sectors such as telecoms and construction. Indirect job creation is prominent in industries that can benefit most from improved internet connectivity and digitalisation, namely IT, financial and professional services, and manufacturing. Based on our assessment of the gross value added (GVA) of the abovementioned industries, we estimate that Google's network infrastructure investments and its impact on GDP translated to around 18 000 jobs by 2021, growing to 40 000 jobs by 2026 (see Figure 6 below).

13 Figures rounded to the nearest USD100 million

Figure 6: Jobs supported by Google's network infrastructure investments in Malaysia [Source: Analysys Mason, 2022]



3 Investments in network infrastructure continue to drive security, reliability and performance improvements in cloud services, which is an important part of the Malaysia's digital transformation journey

As discussed in our original report, Google's network infrastructure investments are beneficial to ISPs and end users in various ways, by providing route diversity, reducing latency, and increasing availability and network resilience. Cloud services, including Google Cloud, can in turn offer improved service quality, security and reliability to their users. Google's infrastructure also delivers cloud traffic directly, which means that traffic from Google Cloud customers is shielded from internet exposure, making it less likely to be susceptible to attacks.

Cloud services will support Malaysia in its recovery from the Covid-19 pandemic and the Government has already put in place MyDigital, the digital transformation blueprint for the public sector. Google has been supporting the Government in this journey and has participated in a cloud framework agreement which enables public sector agencies easy and cost-effective access to Google Cloud services.[14] Besides this, Google has also announced the intent to launch a cloud region in Malaysia which further represents the commitment to supporting digital transformation in Malaysia and across the APAC region.[15]

14 ComputerWeekly - Malaysian government inks agreement with Google Cloud, see: https://www.computerweekly.com/news/252517919/Malaysian-government-inks-agreement-with-Google-Cloud

15 https://cloud.google.com/blog/products/infrastructure/announcing-new-google-cloud-regions-in-asia-pacific

4 Malaysia could consider adoption of regulatory best practices to stimulate more investment in network infrastructure

Malaysia is well positioned to attract new investments for submarine cables given its strategic geographical location in South-East Asia. Furthermore, Singapore's role as a regional hub for digital infrastructure may be waning due to supply constraints (e.g. shortage of land). Malaysia could potentially replace Singapore as the regional hub for digital infrastructure such as submarine cables and data centres.

However, Malaysia's regulatory landscape is volatile which has dampened investor confidence. Some of the key concerns include uncertainty around the cabotage law and cloud licensing regulations.

> "The choice of country to participate in the Apricot undersea Internet cable (subsea cable) installation plan is decided by Facebook and Google. Malaysia was not listed (bypassed) as one of the countries involved in the landing of the submarine cable station due to the unresolved Cabotage Policy exemption issue."
>
> **Communications and Multimedia Minister – Malaysia (translated)**

In 2019, Malaysia relaxed its cabotage law, which allowed foreign-registered vessels to perform submarine cable maintenance in Malaysia's territorial waters. However, this was subsequently revoked in November 2020.[16] As a result of this revocation and the general uncertainty in the regulatory landscape, multiple mega submarine cable projects including Echo, Bifrost and Apricot have chosen to bypass Malaysia as a cable landing destination.[17] The Malaysian government has since provided more clarity on the use of foreign vessels for submarine cable maintenance by introducing the e-Domestic Shipping Licence (eDSL). The eDSL maps out the licence approval process for the use of foreign-registered vessels in Malaysia's territorial waters, limits the approval process to ten working days, and provides a process flow chart. This level of clarity is expected to improve investor sentiment and boost network infrastructure investments in Malaysia.

The Malaysian government also noted that it intended to impose cloud licensing regulations in 2022. While the MCMC has gathered industry feedback and released an information paper in December 2021,[18] the implementation of the cloud regulation licence (e.g. the licence application process) remains unclear. Lack of clarity on the implementation could continue to impede further investments into the country.

In order to improve investor confidence and promote Malaysia as a regional hub for digital infrastructure, the Malaysian government could consider adopting regulatory best practices for network infrastructure. The introduction of policies to promote investments has also been outlined

16 SoyaCincau – Malaysia govt's latest decision may delay undersea cable repairs and maintenance, see: soyacincau.com/2020/11/18/undersea-cable-repair-maintenance-vessel-cabotage-exemption-revoked-malaysia/

17 DAPMalaysia – see: dapmalaysia.org/en/statements/2021/10/08/33887/

18 MCMC, see: mcmc.gov.my/en/media/announcements/information-paper-on-regulating-cloud-services

in the Digital Economy Blueprint (MyDIGITAL).[19] Examples of regulatory best practices by other jurisdictions in the region include clear licensing procedures, relatively straightforward permitting processes, fair and cost-oriented access to cable landing stations, investment policies that are open to foreign investors, cable protection laws and flexible cabotage provisions for cable repairs and maintenance. Other best practice jurisdictions also have strong regulatory enforcement principles that adhere to lawful procedures.

19 Malaysia Economic Planning Unit, see: epu.gov.my/sites/default/files/2021-02/malaysia-digital-economy-blueprint.pdf