



REPORT FOR GOOGLE

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

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Contents

1	Google's network infrastructure investments generated benefits to the connectivity ecosystem, leading to greater usage of the internet in Australia	4
2	These investments generate social benefits by supporting new use cases and economic benefits in the form of GDP growth and jobs	6
3	Investments in network infrastructure continue to drive security, reliability and performance improvements in cloud services, while cloud dependence is booming	8
4	Australia's regulatory and investment regime is conducive to network infrastructure investments	8

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Google's network infrastructure investments in Australia

Investments in submarine cables

Indigo

2019

CABLE LANDING POINTS
Singapore, Australia,
Indonesia

JGA-S

2020

CABLE LANDING POINTS
Australia, Guam

8

cities with
GGC nodes

14

peering locations
in 2 cities

Benefits to digital connectivity

SUPPORT USE-CASES FOR
POST-PANDEMIC DIGITAL TRANSFORMATION:



Cloud services



e-Commerce



Video-conferencing



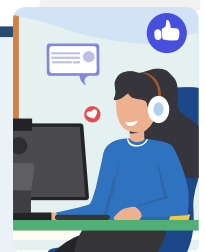
2026 FORECAST

23%
USAGE
OF INTERNET
ENABLED

7ms
REDUCTION
IN END-USER
LATENCY

10%
REDUCTION
IN IP TRANSIT
PRICES

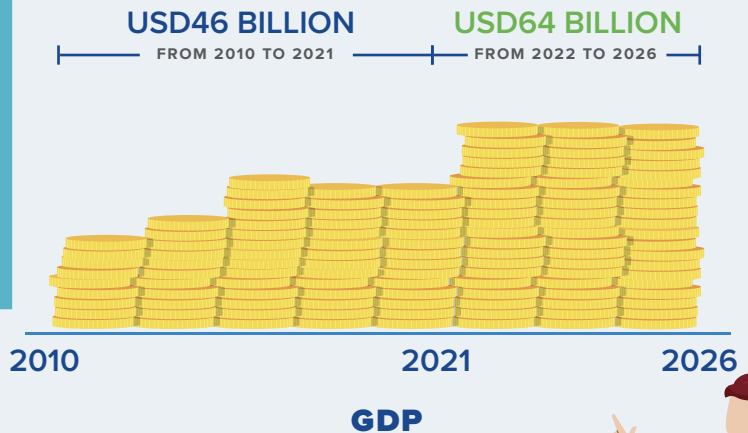
16%
INCREASE
IN INTERNET
BANDWIDTH



Economic impact

Forecast to support up to
68 000
additional jobs
in 2026

Supported up to
41 000
additional jobs
in 2021



Regulatory and investment regime

Australia offers best practices for other APAC economies to follow

Deployment and landing
of submarine cables



Protection and maintenance
of submarine cables



Potential areas of progression



Empower a centralised party to lead application processes and reduce complexities when dealing with various authorities



Increase the number of cable corridors to prevent potential overcrowding issues and increase route diversity to other parts of Australia

This report is an update of the *Economic impact of Google's APAC network infrastructure – focus on Australia* report, released in 2020.¹ We have further refined our methodology first used in 2020.² Since 2020, digital connectivity and the economic landscape of Australia have seen significant development, largely due to the impact of the Covid-19 pandemic. This report will refresh our quantitative impact estimates in line with these developments and our improved methodology.

Australia has one of the most developed telecoms landscapes in APAC and, as of 2020, 91% of its population was connected to the internet. Internet traffic generated across both fixed and mobile networks has grown strongly at an average of 44% annually from 2010 to 2021, reaching 34EB in total in 2021.

Overall, Australia has a strong regulatory framework for building and maintaining submarine cables, covering application processes, foreign investments policies, cable protection zones, cabotage laws and enforcement. Consequently, Australia's regulatory and investment regime is conducive to further network infrastructure investments in the future and is an example of a best practice jurisdiction in APAC.

There are three main telecoms service providers in Australia:

- **Telstra** – the incumbent operator
- **Optus** – backed by Singtel Group
- **TPG Corporation** – formed by 2020 merger of Vodafone Hutchison Australia and TPG Telecom

Together with the national wholesale network operator, NBN Co, Australia's domestic access networks provide extensive coverage and high-quality broadband. As of June 2021, NBN Co's access network had reached more than 12 million premises and connected 8.2 million consumer and business premises.³ Around 99% of the population is also within range of 4G mobile coverage.⁴

In terms of international connectivity, Australia was connected to the rest of the world through 13 international submarine cable systems⁵ that, as of 2021, offered a total of 241Tbit/s in potential capacity.

As part of its goal to support new and emerging industries, transition existing industries to net zero emissions and make it easier to commercialise innovation and technology, the Australian government has committed significant investment to digitalisation initiatives, including the National Reconstruction

¹ Analysys Mason – Economic impact of Google's APAC network infrastructure, see: [analysismason.com/consulting-redirect/reports/impact-of-google-network-apac-2020/](https://www.analysismason.com/consulting-redirect/reports/impact-of-google-network-apac-2020/)

² We have updated the list of cables with additional “open-cable” effect to include not just Google cables but that of other CASPs. We have also assessed the impact differently for each Google cable depending on a combination of factors including the number of international submarine cables landing in the country, the number of Google cables landing in the country, the consortium members participating in the cable, and Google's level of contribution to the consortium.

³ Based on information from NBN 2021 Annual Report

⁴ Analysys Mason Research

⁵ As of November 2022, the number of international submarine cable systems connecting Australia to the world is 14 with the Oman Australia Cable being RFS from October 2022

Fund.⁶The new government will continue to focus on cyber security and initiatives associated with digital transformation and has promised to invest over AUD 1 billion in an investment fund in their bid to make Australia a technology nation. This bid also includes a pledge taken by Prime Minister Albanese to increase the number of tech-related jobs in the country to over 1.2 million in 2030.⁷ Through his cabinet selection, Prime Minister Albanese has also shown a positive push for the digital economy by assigning tech-related portfolios to ministers who have been long-term advocates of skills development, technology policy and communications. The Government also plans to invest in the NBN by expanding fibre broadband to 1.5 million more premises in Australia.⁸

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

Google's edge network and submarine cable investments in Australia boost traffic by improving the performance and reliability of Google services and content, as well as the overall internet infrastructure of the economy. New submarine cables bring new supply and improve international cable route diversity while directly supporting Google's edge infrastructure. Internet service providers (ISPs) and end users benefit from lower latency, faster speeds and low international connectivity costs, and consequently there is an uptake of new internet use cases and applications.

In 2019, Google invested in Indigo, the open cable system connecting Australia, Singapore and Indonesia, while also directly connecting Sydney and Perth along the south coast of Australia. In the same year, Google invested in JGA-S, a second cable to land in Australia, which connects Australia to Guam, and in turn connects on to Japan (see Figure 1). Together, Indigo and JGA-S have added 72Tbit/s of international bandwidth capacity to the Australian connectivity landscape. Google also continues to purchase international capacity from local carriers, and this purchased bandwidth accounts for the majority of its network capacity to Australia.

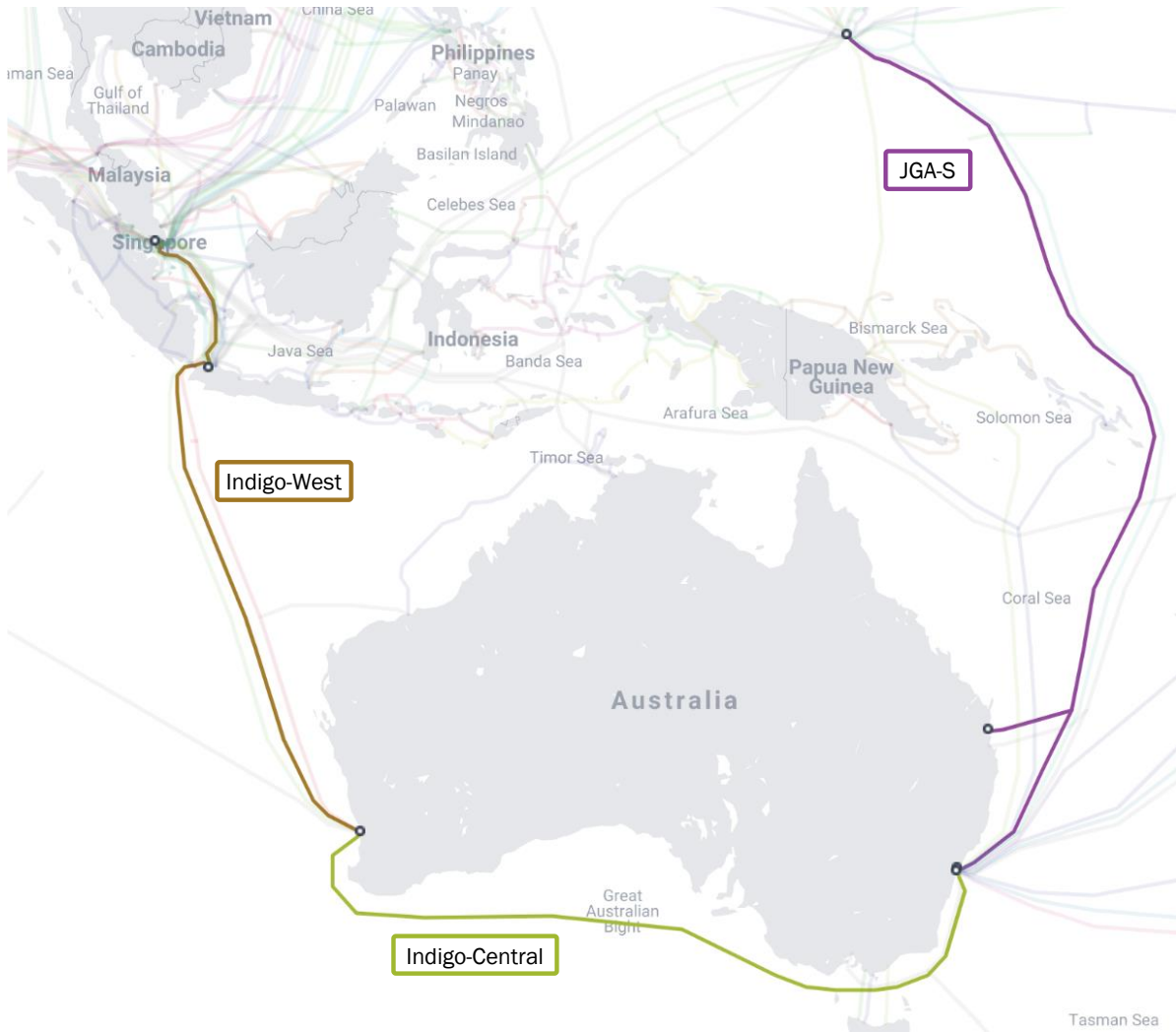
A map of Google's submarine cable investments that connect to Australia is provided in Figure 1. These cables have significantly increased international capacity and internet performance for Australia, therefore enabling sustained traffic growth since 2019 and into the future.

⁶ Australian Government – Digital Economy Strategy 2030, see: digitaleconomy.pmc.gov.au/sites/default/files/2021-07/digital-economy-strategy.pdf

⁷ Australia gets its second shot at being a tech nation: <https://www.afr.com/technology/australia-gets-its-second-shot-at-being-a-tech-nation-20220523-p5ants>

⁸ Albanese ministry boasts tech industry smarts: <https://ia.acs.org.au/article/2022/albanese-ministry-boasts-tech-industry-smarts.html>

Figure 1: Map of Google's submarine cable investments that connect to Australia [Source: Submarine Cable Map, 2022]



Apart from investments in international capacity, Google has also continued its investments in edge infrastructure. Google has deployed points of presence (PoPs) in five private peering facilities and cross-connected to internet exchange points (IXPs) at nine locations as summarised in Figure 2 below.⁹ Google also invests in content caches, with Google Global Cache (GGC) nodes already deployed in eight cities across Australia.

Name of facility / fabric	Type	Location
EdgeIX	Public	Sydney
EdgeIX – Melbourne	Public	Melbourne
Equinix Sydney	Public	Sydney

Figure 2: List of Google peering facilities in Australia [Source:

⁹ Google also has Google Cloud Interconnect (GCI) peering points in Brisbane, Canberra and Perth

Equinix Melbourne	Public	Melbourne	Google, PeeringDB, 2022]
IX Australia	Public	Sydney	
MegalIX	Public	Sydney	
MegalIX Melbourne	Public	Melbourne	
PIPE Networks	Public	Sydney	
IX Australia VIC-IX	Public	Melbourne	
Equinix (SY1/SY2)	Private	Sydney	
Equinix (ME1/ME2)	Private	Melbourne	
Global Switch	Private	Sydney	
NEXTDC S1	Private	Sydney	
NEXTDC M2	Private	Melbourne	

These investments in submarine cables, PoPs and GGC nodes in Australia have continued to bring improvements to the connectivity ecosystem.

<i>End-user latency</i>	End-user latency will reduce by an additional 7 milliseconds by 2026 with Google's investments
<i>IP transit prices</i>	IP transit prices are forecast to be 10% lower by 2026 due to the increased internet supply from the JGA-S and Indigo cables
<i>Download speeds</i>	In 2021, the average download speeds in the country were more than three times that of less well-connected economies
<i>Internet traffic</i>	By 2026, we forecast that the impact of Google's investments will have enabled 23% of internet traffic ¹⁰

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

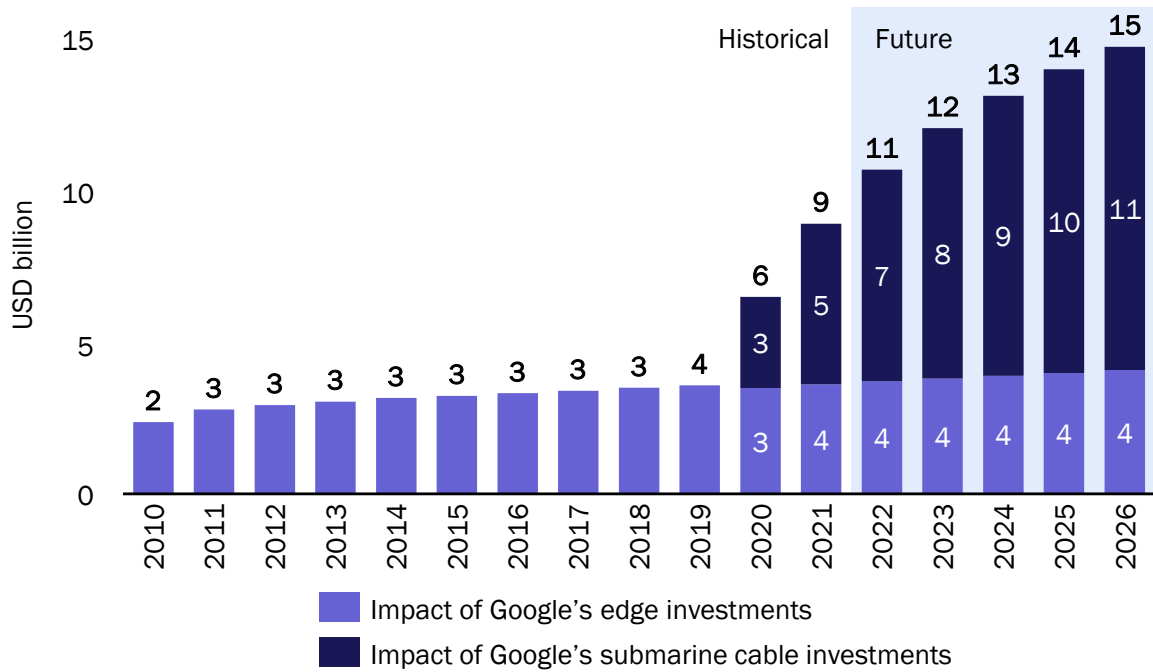
One of the impacts of the Covid-19 pandemic was a notable increase in remote working and online activity, significantly expanding the economic reliance that Australia has on internet connectivity. We estimate that the additional internet usage enabled by Google's network infrastructure investments has driven an additional cumulative USD 46 billion in GDP (in real terms¹¹) in Australia from 2010 to 2021. Following the deployment of JGA-S and Indigo, we forecast an additional cumulative USD

¹⁰ We forecast that Google's network infrastructure investments will drive an additional 30% increase in internet traffic beyond forecasts without these investments by 2026. This results in 23% of total traffic being attributed to Google's network infrastructure investments in Australia.

¹¹ 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

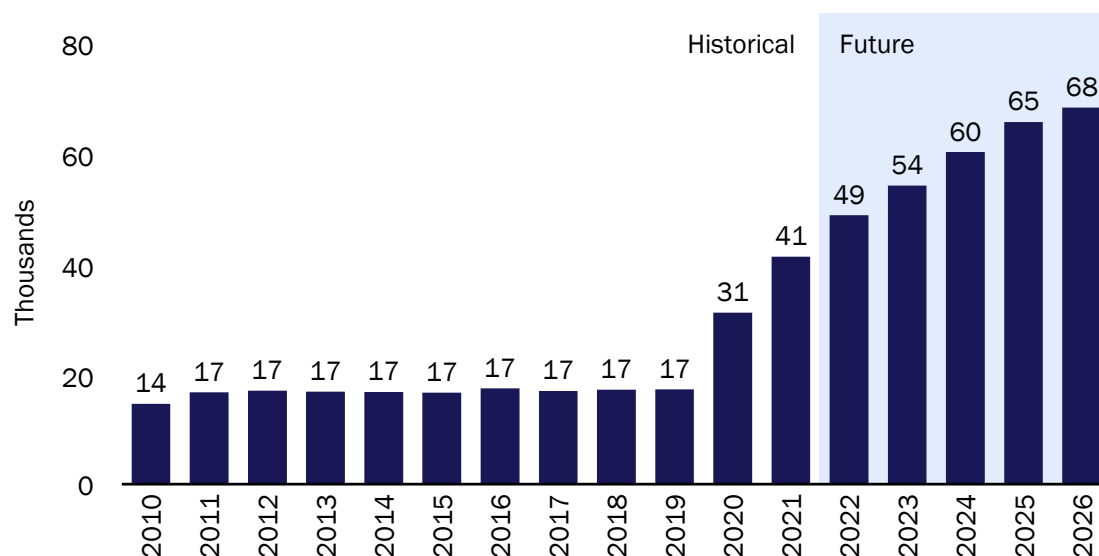
64 billion in GDP enabled by Google's network infrastructure investments between 2022 and 2026 (see Figure 3 below).

Figure 3: Increase in real GDP attributable to Google's network infrastructure investments in Australia
 [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. We estimate that up to 41 000 direct and indirect jobs were supported through Google's network infrastructure investments in 2021, growing to 68 000 by 2026 (see Figure 4).

Figure 4: Jobs supported by Google's network infrastructure investments in Australia [Source: Analysys Mason, 2022]



3 Investments in network infrastructure continue to drive security, reliability and performance improvements in cloud services, while cloud dependence is booming

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.

At the end of 2021, Google Cloud deployed in 11 cloud regions in APAC, two of which are in Sydney and Melbourne. The GCP region in Sydney was launched in 2017 and contains three availability zones. The cloud region in Melbourne was launched in July 2021. It has three availability zones and it is the most recent cloud region in APAC.

4 Australia's regulatory and investment regime is conducive to network infrastructure investments

The regulatory regime in Australia continues to be seen as an example of best practice in terms of stimulating investments in network infrastructure. As discussed in our previous report, foreign investments are welcomed with no equity limits, the ACMA's application process for landing submarine cables is transparent, and other federal and state authorities are responsive and efficient. These factors enable ease of deployment and ease of landing of submarine cables in Australia.

In terms of ongoing maintenance and protection, there are strong laws in place in Australia to protect submarine cables. Cable protection zones have been introduced that prohibit human activities such as

fishing and anchoring, and criminal penalties can be imposed for cable damage. Cabotage laws have also been deregulated for submarine cable repair works, which allows critical repair works to happen within the fastest possible timeframe whenever cable cuts occur. The efficacy of the existing policies was illustrated when a swift repair of the Australia Singapore Cable was done within a very short timeframe of 13 days.

Case study: Robust regulatory framework was instrumental to the fast restoration of Australia Singapore Cable in August 2021

In August 2021, the Australia Singapore Cable (ASC) was damaged after a container ship allegedly dropped its anchor in the cable protection zone. Services passing into and out of Perth were impacted by this incident.¹²

Marine repair partner SubCom was quickly engaged to commence repairs of the ASC. The required permits and approvals were provided by the authorities within four days after the break occurred. The repair took another nine days including a two-days disruption due to bad weather conditions. The entire restoration process, which would normally take months to complete, was done with the resumption of normal services in just 13 days.

Aside from the efficiency of the marine repair partner, the robust regulatory framework put in place for submarine cable repair works (i.e. required permits and approvals obtained within four days) was instrumental to the fast restoration of the ASC.

Australia is also seen as a jurisdiction with strong regulatory enforcement principles. It scores well on the Rule of Law index, with a regulatory enforcement factor score of 0.82, which is one of the best scores amongst APAC countries.¹³ This boosts investors' confidence, particularly in the context of capital-intensive investments such as the deployment of submarine cables.

There are best practice processes in other jurisdictions that may be beneficial if applied to Australia. To further facilitate applications for new submarine cable investments, the Australian government should consider empowering a centralised agency that would lead the application process between submarine cable owners and other government entities and reduce complexities in dealing with both federal and state authorities. In addition, increasing the number of cable corridors could help to prevent potential overcrowding issues within the three existing cable corridors (i.e. Northern Sydney, Southern Sydney and Perth) and increase route diversity to other parts of Australia.

¹² Vocus news release – Australia Singapore Cable repairs completed in record time of just 13 days, see <https://www.vocus.com.au/news/australia-singapore-cable-repairs-completed-in-record-time-of-just-13-days>

¹³ World Justice Project – Rule of Law Index 2021, see worldjusticeproject.org/rule-of-law-index/