# The **nbn™** broadband access network for business – a foundation of digital transformation

A report for NBN Co

# Summary

The demand for high-performance, business-grade broadband connectivity continues to grow as data-centric operating models are adopted. Businesses are prioritizing investments designed to leverage data to improve customer experience, improve internal processes and create new opportunities. Big data and artificial intelligence (AI) are the cornerstones on which leading businesses such as Amazon and Google have been built. These cornerstones rely on connectivity as the enabler for interactions.

NBN Co and the service provider community are continuing to support Australian businesses by providing the underlying infrastructure for their communications needs, from basic voice to superfast fibre links. NBN Co has expanded both its product offering and the level of support to ensure all businesses can benefit from this investment in national infrastructure.

NBN Co's standard mass-market broadband and **nbn**™ Enterprise Ethernet products provide a range of high-speed tiers, symmetrical speeds, traffic prioritisation and fault assurance time frames to meet the unique needs of businesses. These wholesale products give flexibility to select anything from a standard broadband internet service to a symmetrical enterprise-grade direct-fibre service for the vital data transmission needs of a range of businesses.

Recognising the challenges of large organisations to smoothly transition large legacy networks onto a new platform, NBN Co has introduced a range of new resources to support service providers and their business customers in planning and executing their network migrations.

For businesses, the rollout of the **nbn**™ broadband access network opens up not only a new choice of access products but also increased availability of services across the country, as well as a wider choice of service providers.

Business managers now have greater choice when considering their needs for best-efforts internet as well as a committed information rate (CIR), network downtime risk management and redundancy alternatives.

The availability of high-speed broadband can help to support digital transformation investments by Australian businesses. Increases in information technology (IT) investments and the adoption of new operating models, including moving business processes to the cloud and use of Software-as-a-Service (SaaS), all require access to quality infrastructure. These investments will support the flexibility and agility that's increasingly needed to compete in the global economy.

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# The digital pipeline

The concept that "data is the new oil" has been used to illustrate the emergence of data-centric businesses as the new leaders in the global economy. Amazon, Facebook, Alibaba, Tencent, Google and Netflix have grown over the last two decades to become some of the largest and most influential global brands. Though not to the same scale, local examples of data-centric businesses include leaders like carsales.com, Computershare, REA Group and Xero. These 'digital natives' have harnessed the power of data to build enormous customer bases and embedded themselves into the lives of many.

Technology continues to evolve, introducing new opportunities to capture information and transform data into value. The growth in big data and AI – and the opportunities from the growth of the Internet of Things (IoT) to enhance process execution and decision-making – is supporting improvements in customer experience, productivity and creating new business opportunities.

Central to the emergence of digital businesses is the reliance on the communications network: the pipelines of the digital world. While voice communications remain essential, the network continues to support an explosion of information transfers, supporting business communications with customers, suppliers and staff, as well as enabling applications, interactions and new ways of doing business.

# business **nbn**™: ready for business

NBN Co as a wholesaler and its service provider partners have been engaged since the initiation of the **nbn**™ rollout to ensure businesses would derive benefits and opportunities from the rollout of the **nbn**™ access network. This has included working as an industry to develop products and services that meet businesses' current and future needs, and to ensure these businesses can smoothly migrate to the new network.

The project has always included the business sector, with NBN Co's mandate obliging it to ensure all premises, residential and business, have access to a fast broadband service. NBN Co has progressively introduced new product and service enhancements in order to meet the demands of this segment. The business community was also the beneficiary of agreements that ensured medium and large enterprise organisations would not only benefit from the rollout of the **nbn**™ access network but would also continue to benefit from competition resulting from service providers' own investments in direct fibre.

The breadth of the national rollout addresses one of the challenges facing buyers of business broadband services. The large distances in regional areas have historically limited the availability of services in regional towns and rural areas, with even basic digital subscriber line (DSL) broadband services not available across the board. No longer will long copper runs limit businesses to low-bandwidth connections, such as integrated services digital network (ISDN). No longer is the footprint of Ethernet and multiprotocol label switching (MPLS) nodes restricted geographically. Traditionally, this had limited the adoption of digital services in smaller communities and in rural industries such as agriculture.

The rollout of the **nbn**™ access network has lowered these barriers, opening up digital opportunities in regional towns and more remote parts of the country. This allows businesses to go beyond urban

business districts when planning their network, reaching deeper into regional areas and improving service delivery and operational efficiency.

Business services have been a focus over the last four years, with progress made in:

- Extending the business product portfolio to meet current and future business needs;
- Improving the performance of network installations at business premises;
- Readying the industry for the migration of legacy network services; and
- Building NBN Co's capabilities for servicing the specialised needs of business customers through improved support.

The expanding availability of business products, both in terms of reach and functionality, will allow Australia to upgrade from relatively inflexible legacy technologies (such as ISDN), which have now been in service for several decades. Equipping the business sector with a flexible, nationwide network platform better positions businesses, large and small, to adopt the latest applications and business models needed to be competitive now and into the future.

## NBN Co's wholesale access products

NBN Co has two wholesale access products designed to support the needs of the Australian business community: mass-market **nbn**™ Ethernet, and **nbn**™ Enterprise Ethernet.

### *Mass-market broadband*

**nbn**™ Ethernet product comes standard with Traffic Class 4 (TC4). It has the features to support residential-grade services, but can also be set up to be 'fit for purpose' for smaller businesses with the option to include enhanced performance and service levels.

Wholesale TC4 transmission speeds[1] over the **nbn**™ access network are available from:

- 12Mbps downstream / 1Mbps upstream, to;
- 1000Mbps downstream / 400Mbps upstream.[2]

TC4 is typically leveraged by smaller businesses to access the internet when they do not have a need for higher end business grade features.

business **nbn**™ features on the fixed line footprint of the **nbn**™ Ethernet product include network traffic classes to allow prioritisation of applications and enhanced service levels to service providers to deliver better fault rectifications and limit downtime for end customers who require higher grades of service.

The additional traffic classes are available to business end users to address the concern of traffic congestion by prioritizing traffic across the network. By assuring data delivery ahead of the best-efforts traffic routing of the mass-market **nbn**™ Ethernet, applications that are sensitive to packet delay (jitter) or packet loss can be supported with confidence.

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[1] Speeds experienced by end users are impacted by a range of factors, including RSP network configuration, in-building set-up, network congestion and data traffic source capacity.
[2] Speed tiers available are subject to the network technology deployed in each rollout area.

The two additional product feature options available are:

- Traffic Class 1 (TC1) – primarily designed to support voice services and applications requiring committed data rates, where a committed bandwidth with low latency and jitter is needed to maintain high quality, and
- Traffic Class 2 (TC2) – primarily designed to support high-performance data for applications and services that require consistent, predictable download and upload speed requirements, including videoconferencing and network connections using MPLS.

Service providers have a range of broadband and voice services available using business **nbn**™. Examples include multi-line business telephone systems that are configured with an allocation of enhanced traffic connectivity to ensure calling quality, virtual private network (VPN) circuits, managed data and direct internet connections.

Further, the inclusion enhanced service levels to help expedite rectification of network faults provide a higher level of support to service providers, which can then, in turn, provide a faster rectification of critical services for their business customers.

### *nbn*™ *Enterprise Ethernet*

In October 2018, NBN Co launched the wholesale **nbn**™ Enterprise Ethernet solution. This product enables service providers to offer their customers symmetrical bandwidth speeds of between 10Mbps and 1000Mbps[3] via dedicated fibre links. As an Ethernet product designed to be compliant with the Metro Ethernet Forum's Carrier Ethernet 2.0 standard, **nbn**™ Enterprise Ethernet provides a multi-Class of Service (multiple performance tiers), managed (standardized fault management and performance monitoring) and interconnected (standardized exchange of traffic between providers) network aligned with existing fibre Ethernet services in the market.

NBN Co's **nbn**™ Enterprise Ethernet product involves provisioning a dedicated fibre connection from a fibre access node on our transit network into the business premises from the nearest **nbn**™ fibre infrastructure. This allows the service to be made available throughout NBN Co's fixed line network footprint, or to over 90% of premises across Australia when the network rollout is completed. This opens the market and allows RSPs without fibre assets, or with fibre infrastructure limited to central business districts, to address a much larger footprint.

For enterprise customers, the charging model to the RSPs is expected to be similar to other enterprise Ethernet services. Unlike standard **nbn**™ access network products, the charging model may include both an upfront build cost (where a build is necessary) plus the normal ongoing monthly service fees.

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[3] Regardless of the Retail Service Provider (RSP), the actual wholesale speeds delivered by the **nbn**™ Enterprise Ethernet product will be less than 1000Mbps due to equipment and network limitations. An end user's experience, including the speeds actually achieved over the **nbn**™ broadband access network, depends on the **nbn**™ access network technology and configuration over which services are delivered to their premises, whether they are using the internet during the busy period (typically, 7pm to 11pm), and some factors outside of NBN Co's control (like an end user's equipment quality, software, chosen broadband plan, or how their RSP designs its network).

## Business considerations

NBN Co is deploying a wholesale access network capable of providing businesses with quality broadband. The standard, unaugmented broadband service available across the country to residences and businesses alike may be sufficient for many sole traders and smaller business operators.

As the degree of reliance on broadband and voice services increases alongside business size and complexity, the need for business owners and network managers to invest in prioritized traffic, direct fibre and enhanced service levels also increases. Businesses need to work with their service provider to ensure their current and future needs are being met and avoidable risks are being addressed.

### *Best efforts vs committed data rates*

Latency and jitter-sensitive applications such as voice services, videoconferencing and cyber-physical systems (such as power network management and security systems) need committed bandwidth to ensure high levels of quality and performance. For these applications, allocations of CIR or prioritized bandwidth such as TC1 or TC2 should be provisioned. Identification and sizing of these requirements should be undertaken in partnership with a business' service provider.

Voice services are the widest used application where quality of service is essential. For a business interacting with its customers and suppliers, the availability of reliable, clear communications is essential.

Appropriate sizing also needs consideration for standard internet connectivity. Sufficient bandwidth is needed to support the ongoing efficient use of applications and to help ensure business activities are not hampered.

### *Network downtime and enhanced Service Level Agreements*

Few businesses can afford losing access to their voice and data links. Whether it is the basics of talking with customers or processing transactions and electronic payments, businesses need confidence that their services will be brought back online quickly in case of a network fault.

In urban areas, NBN Co is required to rectify faults in the access network, such as cable damage resulting from third-party construction work, by 5pm the next business day following notification of a problem. In rural and remote areas, this time frame is extended to 5pm on the second and third business day, respectively.

As the risk of 24 or 36 hours without business connectivity may be considerable, business operators need to consider the cost of loss of communications and associated fallback plans for periods without a service. In considering these costs, businesses should weigh the options available from their service provider for enhanced network repairs. NBN Co provides retail providers accelerated fault rectification within its network, assuring services are brought back online in as little as four hours within the Fixed Line footprint when no site visit is required. If a site visit is required, rectification times between NBN Co and the RSP are within four to 12 hours in urban areas, within 18 to 26 hours in regional and rural areas, and within 32 to 40 hours in remote areas.

### *Redundancy*

For mission-critical functions, network managers need to consider whether an investment in network redundancy is required. The **nbn**™ access network can be used as either the primary or backup data path for services and locations that need the highest levels of reliability. Basic business broadband is

now commonly offered with a router that has an integrated 4G mobile backup. This provides redundancy, albeit via a connection subject to the congestion of the mobile network, and not all applications may be supported (e.g. services hosted on-premises when a static IP is in use).

For locations where a wireless service would not support the ongoing basic functions of the business, a second fixed path may be required. An **nbn**™ access network-based service may be used as the primary network or to complement a service provider's direct-fibre product, sharing the load and ensuring service continuity if there is a fault or outage suffered by the direct-fibre provider.

# Enabling change and digital transformation

The emergence of data-driven companies as the largest and most influential companies globally highlights the degree to which technology continues to drive change across the business landscape. Online commerce, social networks, digital distribution as well as the hardware and infrastructure needed to support them have changed the model of interacting with customers and doing business.
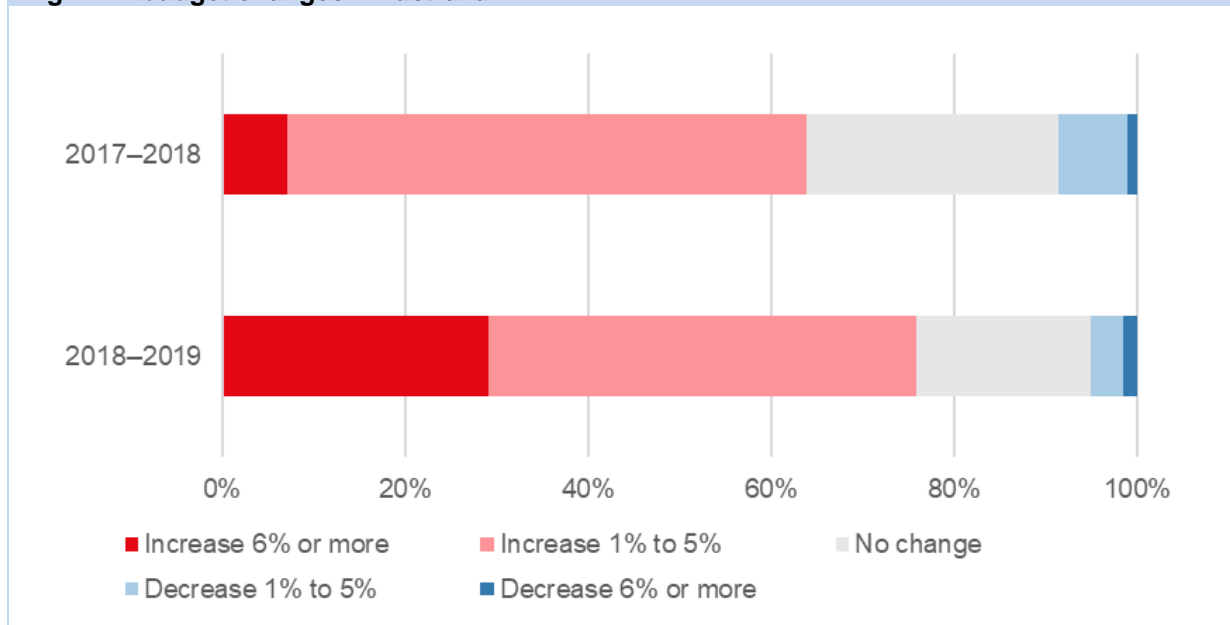
Data and the ability to derive value from it is now a key priority of businesses both large and small. This is seen through the responses to Ovum's surveys of businesses around the world, with enterprises identifying the following as top technology objectives:

- Creating digital capacity;
- Modernising legacy systems; and
- Building the modern workplace.

In pursuit of these objectives, access to quality connectivity is needed as a foundation on which the benefits of these investments rely.

Ovum's ICT Enterprise Insights illustrate the intention by enterprises to increase spending on IT (see Fig. 1). In 2018–2019, nearly 30% of enterprises are expecting to increase their IT budget by 6% or more, and only 9% expect to reduce their IT budget. Included in these spending intentions are increases in spending on communications (fixed line and wireless services), despite the general trend of falling telecommunications prices.

**Fig. 1: IT budget changes – Australia**

The material uplift in IT spending intentions compared to 2017–2018 now brings Australia into line with enterprises globally, with 76% of Australian businesses expecting to increase spending, compared to 73% globally.

## New ways of working

The **nbn**™ access network, as one element of the data pipeline, is playing a role in opening new ways to work for Australian businesses.
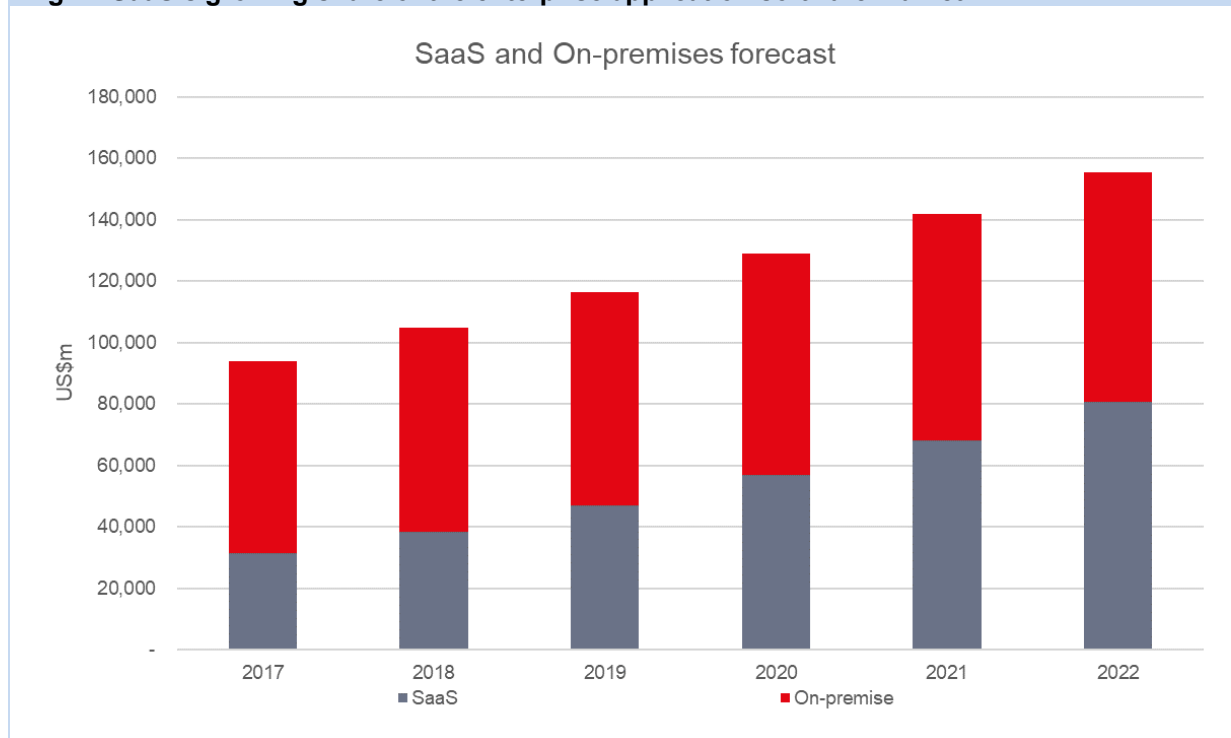
### *Flexible working arrangements*

Greater access to high-speed broadband across the country may encourage the adoption of more flexible working arrangements. The confidence that workers will have reliable access to the full suite of work applications, and the underlying network access supporting their performance, gives business managers options to adopt work arrangements that benefit both employer and employee. These arrangements are also facilitated by the advances in software solutions that support collaboration and mobile work practices.

### *Software-as-a-Service and cloud platforms*

The adoption of the cloud as the platform for delivery of IT services continues with more and more software applications moving to a SaaS model. These solutions are attractive to businesses as it relieves them of the need to manage licence utilisation (and makes usage more scalable), simplifies rollout and version updates, while offering lower cost of use. As the reliance on hosted applications increase, so too does the need for reliable bandwidth to support these applications.

The advantages of SaaS are being embraced by businesses, with Ovum forecasting SaaS's share of the global enterprise applications software market rising from 34% in 2017 to 52% in 2022 (see Fig. 2).

## Fig. 2: SaaS's growing share of the enterprise application software market

SaaS and On-premises forecast



Source: Ovum

In the five years leading to 2022, enterprise SaaS spend is forecast to grow at an average annual rate of 21%.

And SaaS services are not only the domain of large businesses, with small businesses adopting SaaS solutions for accounting, collaboration, CRM and email marketing.

Also following on from the adoption of cloud models is the pursuit of greater agility within the business. Cloud services allow capabilities to be rapidly scaled up and down without the burden of substantial infrastructure costs. This allows businesses to be more responsive to market conditions, so they can take on and trial potentially more experimental opportunities than in the past.

### *Network topography*

The adoption of cloud services also suggests an evolution of enterprise network configuration around the data center. Rather than a company's network being configured to connect key offices together, data centers are now taking the position of the key hub into which offices connect. This approach follows the adoption of public and hybrid cloud strategies by large businesses as computing workloads grow and cloud platforms offer improved performance.

This hub into data centers also opens opportunities for greater direct connection into key partners, whether they be content suppliers, SaaS providers or transaction platforms. The arrival of software-defined networking (SDN) for **nbn**™ products[4] further facilitates changes in network topography,

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[4] https://macquarietelecom.com/blog/macquarie-telecom-signs-milestone-agreement-with-nbn-co/

giving businesses greater agility to reconfigure the data connectivity and processing resources as needs evolve.

*Digital native businesses*

The adoption of digital tools and the flexibility they allow is allowing businesses to transition to digital-first operating models. This is being accelerated with the increasing competition in the global market from businesses that have expanded online without the need for a local physical presence. Digital-first operating models present both a challenge and an opportunity for businesses, with start-ups in particular adopting them.

# The **nbn**™ migration opportunity

The rollout of the **nbn**™ access network will deliver a range of benefits for the Australian business community. Business managers need to consider both the impacts on their current operations and the opportunities that will be unlocked. While there is need for care to ensure a smooth transition to the **nbn**™ access network, there is also the opportunity to consider how an improved communications platform can support new processes and business models.

*Transition from legacy Special Services*

The rollout of the **nbn**™ access network impacts most businesses. In some cases the transition will see technology upgrades that require replacement of existing hardware and interfaces.

For businesses with more complex communications needs, a review of their existing services is needed to identify specialised services that use less common communications protocols or specialised hardware. In many cases, these may be older systems or platforms that work well but no longer have an upgrade path.

ISDN is one of the more common legacy products which that is required to be replaced.

- ISDN is a digital network technology that simultaneously supports voice and data over a single public switched telephone network (PSTN) line. It is used to supply connectivity for multi-line voice systems, videoconferencing services and network connectivity. As a digital platform, it offered improved voice quality and the ability to concurrently support multiple applications – including fax and wide area network (WAN) access – but was largely superseded by DSL and other more contemporary technologies.
- Australia has joined the growing number of countries where ISDN is being phased out, having been first made available in 1988. Deutsche Telekom shut down its last German ISDN services in 2018, following the lead of the incumbent operators in Slovakia, Macedonia and Switzerland. Orange is also set to close ISDN services in France in 2020, with BT following in the UK in 2025.
- The data rates offered by ISDN are low and, today, would not generally be considered as a broadband service. ISDN services still may be used as a backup link or for applications with low bandwidth and low latency requirements such as automatic teller machines (ATMs).
- For voice services, ISDN services are being replaced with session initiation protocol (SIP) 'trunking', although this requires a replacement of the private branch exchange (PBX) interface.

- The arrival of the **nbn**™ access network and the disconnection of Telstra's copper network marked the end of the line for ISDN services. Having ceased taking new ISDN orders from 30 June 2018, Telstra will commence decommissioning ISDN services from 30 September 2019. Aligned with the remaining rollout of the **nbn**™ access network, all ISDN services will be decommissioned by 2022.
- Monthly charges for ISDN ranged from around $101 per month for ISDN2, up to $465 per month for ISDN30. Substitution with TC1 or TC2-enabled links should be less expensive, with no charge for the **nbn**™ access network installation.

Other copper-based products that have been identified as requiring additional attention during the **nbn**™ access network migration (and benefiting from longer migration windows) include:

- Asynchronous Transfer Mode (ATM);
- CustomNet;
- Data Access Radial;
- Digital Data Services (DDS) Fastway;
- Ethernet Lite BDSL;
- Frame relay;
- Megalink.

NBN Co has worked with service providers to ensure there is a migration path for these Special Services that featured performance characteristics not aligned with NBN Co's core broadband product. As part of these arrangements, customers have been allowed an extended migration period to ensure service provider product offerings are ready and to minimise customer disruption.

Table 1 outlines the migration path for both common services and the (now rare) legacy exchange-based copper services. In each case, the customer has the option of retaining the existing service functionality (to avoid changes to other hardware) to transition to an IP-based service. As legacy services are now at or past their recognised useful life, few scenarios remain for retention of legacy functionality. Indeed, enterprises have been transitioning to all-IP platforms for more than a decade.

For each service, NBN Co will install a Network Termination Device and the service provider will provide network elements beyond the access network (e.g. interstate and international capacity, interconnect with other networks, etc.).

**Table 1: Illustrative migration roadmap**

| **Business voice** | |
|---|---|
| *Existing service*: **PSTN – traditional voice services.** | *Use case*: Single line voice. |
| *NBN Co reference product*: Standard **nbn**™ access network connection with RSP SIP-enabled Voice over IP router (or NBN Co voice port, subject to technology). Will also support broadband needs. | *Required*: Standard TC4 bitstream service.<br><br>*Optional*: eSLA for service recovery. |
| *Existing service*: **ISDN – multi-line voice services.** | *Use case*: PBX office phones. |
| *NBN Co reference product*: CIR access connection with RSP IP PBX. Other ISDN use cases can, where required, continue to be supported with an ISDN-IP or ISDN-Ethernet appliance. Will also support broadband needs. | *Required*: Bitstream service with TC1 or TC2 CIR capacity to support multiple high-quality voice calls.<br><br>*Optional*: eSLA for service recovery. |
| *Existing service*: **SIP-based voice services.** | *Use case*: Multi-line voice. |
| *NBN Co reference product*: CIR access connection with the RSP's hosted voice platform. Will also support broadband needs. | *Required*: Bitstream service with TC1 or TC2 CIR capacity to support multiple high-quality voice calls.<br><br>*Optional*: eSLA for service recovery. |
| **Business broadband** | |
| *Existing service*: **xDSL – basic broadband.** | *Use case*: Internet connectivity, basic IP VPN. |
| *NBN Co reference product*: Standard **nbn**™ access network connection. | *Required*: Standard TC4 bitstream service.<br>*Optional*: eSLA for service recovery. |
| **Legacy data** | |
| *Existing service*: **Frame relay – frame-switched data carriage.** | *Use case*: WAN connectivity (symmetrical committed rate access speeds of up to 44Mbps). |
| *NBN Co reference product*: Standard **nbn**™ access network connection. | *Required*: TC2 CIR capacity.<br>*Optional*: eSLA for service recovery. |
| *Existing service*: **ATM – cell-switched data carriage.** | *Use case*: WAN connectivity (sustain information rate circuit up to 152Mbps). |
| *NBN Co reference product*: Standard **nbn**™ access network connection at lower bandwidths, **nbn**™ Enterprise Ethernet for higher bandwidths. A replacement interface card will be required to maintain ATM links, although, where NBN Co deploys VDSL, alternative device may be installed. | *Required*: TC2 CIR capacity to substitute for constant bit rate links, TC4 to support peak information rate requirements.<br><br>*Optional*: eSLA for service recovery. |
| *Existing service*: **DDS Fastway – dedicated point-to-point transmission service.** | *Use case*: Dedicated or WAN connectivity over copper (speeds up to 2Mbps). |
| *NBN Co reference product*: CIR access connections. To retain existing product specifications for an end user will require the RSP also supply time-division-multiplexing-over-packet customer premises equipment (CPE). | *Required*: Bitstream service with TC2 CIR capacity.<br><br>*Optional*: eSLA for service recovery. |
| *Existing service*: **Megalink – high-speed data transmission plus voice, facsimile and video communications.** | *Use case*: Dedicated and WAN connectivity over copper or fibre (speeds up to 2Mbps). |
| *NBN Co reference product*: CIR access connections. An RSP-supplied G.703-compliant interface CPE would be required for end users to retain the Megalink product. | *Required*: Bitstream service with TC2 CIR capacity.<br><br>*Optional*: eSLA for service recovery. |
| **IP data** | |
| *Existing service*: **IP and Ethernet data links.** | *Use case*: WAN connectivity, IP VPN (up to 1Gbps). |
| *NBN Co reference product*: Standard **nbn**™ access network and CIR access connections as required. **nbn**™ Enterprise Ethernet links for key links. | *Required*: Standard bitstream service with TC2 CIR capacity, as required.<br><br>*Optional*: eSLA for service recovery. |

## Market impacts

### New product choice

NBN Co offers a range of wholesale business-grade access products with symmetrical bandwidth up to 1Gpbs[5]. RSPs have flexibility to offer products tailored to their customer base and bundle a broad range of other business services.

NBN Co's wholesale offering is being used to develop targeted products that can closely meet both the immediate and long-term connectivity requirements of businesses. The combination of a range of traffic quality and bandwidth options gives businesses greater opportunity to design and maintain their network in line with their evolving needs.

For enterprises, service providers are also adding the **nbn**™ access network to their SDN product portfolios. These services put all the flexibility and scalability available from NBN Co's wholesale product suite in the hands of the network administrator via a control console. This provides the agility to meet short-term network demands and improved control over corporate network structure.

### Choice of provider

As a wholesale provider, NBN Co has facilitated competition by offering a neutral, wholesale platform to retailers and wholesalers alike. NBN Co lists well over 150 retailers, many of which offer services to business customers. The introduction of the **nbn™** Enterprise Ethernet product also has the potential to allow small-scale business specialists to enter the market, adding connectivity to other cloud, software or professional services.

### Network reach

NBN Co is obliged to provide services to any address in Australia that does not already have access to an equivalent fast broadband service. This reach is delivered via a range of solutions including fibre, Hybrid Fibre Coaxial, copper, wireless and satellite. On completion of the rollout in 2020, this will ensure Australian businesses have access to a broadband service delivering at least 25Mbps, irrespective of where they are located.

The substantial deployment of fibre as part of the rollout has enabled NBN Co to offer its **nbn**™ Enterprise Ethernet product across its fixed line footprint (over 90% of Australian residential and business premises, once the rollout is complete). In areas outside existing business precincts/districts, the viability of buying a direct-fibre service has been transformed, with smaller service providers now able to target this market. For the business operator, this product has the potential to open opportunities in regional areas and give much greater flexibility when selecting business locations.

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[5] Regardless of the Retail Service Provider (RSP), the actual wholesale speeds delivered by the **nbn**™ Enterprise Ethernet product will be less than 1000Mbps due to equipment and network limitations. An end user's experience, including the speeds actually achieved over the **nbn**™ broadband access network, depends on the **nbn**™ access network technology and configuration over which services are delivered to their premises, whether they are using the internet during the busy period (typically, 7pm to 11pm), and some factors outside of NBN Co's control (like an end user's equipment quality, software, chosen broadband plan, or how their RSP designs its network).

# Verticals

IT needs vary greatly from sector to sector and among businesses of different sizes. We look at seven industry sectors and how services over the **nbn**™ access network are playing a role delivering the future benefits from investments in digital innovation.

## Retail

As the retail sector transitions to unified commerce and omnichannel engagement, reliance on real-time, sophisticated IT systems and quality connectivity grows. While online sales only make up 5.6% of total sector turnover (including food and restaurants), retailers are investing heavily to drive productivity, improve customer experience and ward off the threat from digital natives such as Amazon.

Innovations extend beyond the e-commerce sales channel with IT priorities, including:

- Unifying the retailers brand experience across the online and in-store experience;
- New payment and point-of-sale solutions;
- Improved demand planning, supply chain and warehouse management.

These innovation activities have seen the retail sector rank second – only behind the technology, media and telecom (TMT) sector – in terms of the proportion of businesses actively undertaking innovation activities. In 2016–17, 54% of retail businesses had an innovation activity underway.[6]

At a localized level, the shopfront is being transformed in response to the recognition that the shopping experience has changed. Today, most transactions are digital, requiring fast payment execution, Wi-Fi is an appreciated value-add, and 'click and collect' is gaining popularity.

Smaller retailers also have access to solutions offering cloud-based security monitoring, foot traffic analysis and digital loyalty programs. All these services add to the requirement for quality broadband, in addition to phone services.

The adoption of the **nbn**™ access network to support these needs is well underway in the Australian retail sector. Where available, **nbn**™ services have joined wireless to support internet, payments and corporate networking requirements. Critical point-of-sale equipment is being supported by an even mix of wireless and fixed (**nbn**™) infrastructure, with larger retailers also using enterprise-grade fibre as part of their WANs. Upstream capacity supporting the data generated by the store network is particularly important, with the retail sector (alongside banking) leading the sectors reviewed for amount of upstream capacity provisioned.

Across the Australian retail sector, Ovum has forecast spending on communications to grow at approximately 3.7% in the coming years. Part of this spend will transition to the **nbn**™ access network, with some notable deals announced in early 2019. Woolworths and Coles have signed deals with service providers to transition thousands of their retail outlets to Fibre-to-the-Premises connections.

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[6] Australian Bureau of Statistics, Summary of IT Use and Innovation in Australian Business (2016–17)

Shopfronts are now no longer standalone, and integration of increasingly complex supply chains is raising the need for business-grade data links, enhanced service levels and the increased bandwidth offered by **nbn**™ access network service providers.

# Health and aged care

Health and aged care connectivity meets the dual need of the communications needs of residents and the business operations needs of management. Progressively, this is being augmented by the introduction of innovative health and safety solutions.

While older residents may not have adopted the full breadth of broadband applications now in use across the community, their need for community connection supports the ongoing need for voice and broadband services. Services that support ongoing personal interactions and independent living are essential when maintaining quality of life.

Operators of aged-care facilities also have access to a range of innovative solutions supporting resident care and efficiency. Biometric and video-based solutions backed by AI analysis can be used for unobtrusive, real-time monitoring to identify illness, injury or falls, and can therefore improve care reaction times.

There are also telemedicine opportunities for remote consultations and health record maintenance. This is particularly attractive with less mobile residents to reduce specialist call-outs.

As campus structures, health and aged-care facilities can benefit from high-quality, high-bandwidth solutions with service costs shared across residents and the care provider. In some cases this will require a transition from the individual PSTN services now servicing each residence, but it does open opportunities for additional services to be supported.

The importance of voice and monitoring services creates the demand for dedicated or committed information services such as NBN Co's symmetrical TC2 wholesale business products with enhanced service-level features.

# Logistics and transport

Productivity requirements and the explosion in volumes are driving increasingly sophisticated systems for tracking and optimizing the delivery of goods (and people) across the country. The logistics sector is being asked to extend the low-friction online shopping experience by delivering instant gratification through rapid delivery. Indeed, the global benchmark is the two-hour delivery of groceries and essentials available to Amazon Prime customers in some international markets.

To deliver on these rising expectations, logistics operators continue to invest in systems, including:

- Automation and robotics (Amazon, for example, has over 100,000 robots, including AI-enabled robots in its fulfillment centers);
- AI-driven dock and delivery management;
- IoT-based predictive demand systems;
- Sophisticated warehouse management systems, featuring:
  - Supply chain integration;
  - Stock placement optimization;
  - AI damage recognition; and

o Pick and pack voice guidance.

These investments are leading to the emergence of the fully automated fulfillment center and real-time tracking of stock movement from production to end consumer. Implementation of these solutions requires enterprise-grade connectivity in the logistics control center, supplier systems and delivery partners to ensure efficient integration of processes.

As 24-hour operations, large fulfillment centers also require backup platforms and redundancy to ensure downtime is avoided.

In the Australian context, the pursuit of reduced delivery times may see the increased adoption of decentralized fulfillment models to reduce the distance to customer. The availability of the **nbn**™ access network can give operators increased flexibility when considering the location of smaller but equally sophisticated distribution centers.

This service demand aligns well with NBN Co's capabilities, both for standard broadband and **nbn**™ Enterprise Ethernet. Industry feedback suggests a high level of interest in the **nbn**™ Enterprise Ethernet service as a communications alternative.

While these innovation opportunities are emerging, the Australian transport and warehousing sector appears to have yet to fully adopt an innovation agenda. The Australian Bureau of Statistics notes that only 40% of businesses had innovation activities underway, leaving the sector ranked fifteen of seventeen across the economy.

# Motor industry

As the complexity of the modern motor vehicle increases, so have the requirements for the industry ecosystem that supports it. Cars are now upgradeable, featuring complex engine management, navigation and autonomous driving systems, as well as in-car entertainment and communications.

Vehicle management and maintenance systems now require connectivity to manufacturer's systems in order to access specialised diagnostic reports, while repairs need access to volumes of complex technical information. Access to these data sources is now an essential element of service and repair businesses.

Cutting-edge vehicles like the Tesla receive regular software updates, requiring transmission of data that can measure in the hundreds of gigabytes. While these updates can be supported over the air, fast transmission via the fixed line broadband network ensures updates are applied in a timely manner, and vehicle downtime, even in the middle of the night, is limited.

Into the future, the complexity of vehicles will only increase as autopilot systems become more common and ownership models evolve. While data requirements in the moment will be served by wireless platforms, fixed line services will continue to support periodic activity including maintenance and software upgrades.

Equally, stock availability and part management across the industry has become more integrated, with communications up through the supply chain increasingly important. The communications ecosystem extends to registration, lending and insurance systems.

Services over the **nbn**™ access network are being adopted within the motor industry, with quality internet access now essential for many systems. For the most part, this is an opportunity to upgrade

services to meet growing requirements, rather than a component of a digital transformation program. Capacity requirements are relatively low, with the automotive sector trailing the other sectors reviewed when comparing the amount of bandwidth provisioned.

## Local and state government

The digital agenda of government is broad, with a focus on improving internal efficiency of existing systems, the introduction of new services for the digital citizen, the enablement of smart city infrastructure, and support for economic development. Adoption of cloud services for government is now maturing, with many government bodies now committed to cloud services.

The rise of the digital citizen has created opportunities to develop innovative online services for the community. A plethora of new applications are now being supported by the networks of service centers that can flexibly respond to and assist with customers' needs. This augments the online service capabilities and mobile apps deployed to bring services online.

The opportunities from IoT are also being seized with investments in smart-city solutions. Applications such as smart lighting, smart parking and smart traffic management have been rolled out and are now generating masses of data.

To support these new services, as well as cloud and smart-city strategies, governments are investing in additional communications infrastructure. Ovum expects total spending by Australian government bodies to increase at an average annual rate of 7.5% across fixed line and wireless communications networks.

The transition of services to the **nbn**™ access network is well underway, with councils tending to be early adopters of **nbn**™ services when they become available. The **nbn**™ access network is supporting voice services, internet access and WAN needs, combined with direct-fibre services. Bandwidth requirements are relatively high, trailing only banking when comparing average downstream capacity requirements.

## Banking

Like retail, the banking sector is going through a period of rapid change with fintech services emerging to disrupt the market, and incumbent providers investing heavily to drive productivity and retain customers through improved service experiences. Cloud adoption is currently becoming mainstream, with security and compliance concerns largely addressed, as well as SaaS and data-intensive AI increasing in popularity.

The sector continues to focus on investments in online banking but is also prioritizing projects that improve branch services. Indeed, in Ovum's latest survey of Australian retail banks' IT project priorities, branch infrastructure topped the list, ahead of online banking and compliance support.

In the commercial banking sector, there is a trend towards network redesign and the adoption of hub and spoke networks. The centralization of processing centers and the deployment of hybrid cloud services has driven critical connectivity requirements. Cloud is now the preferred operating model, even for platforms deemed to be mission critical.

The banking sector needs highly reliable, high-bandwidth services that can support its large branch and ATM networks. Of the sectors reviewed, banking had the highest business internet bandwidth

requirements. The closure of copper services creates impetus for the upgrade of services, with the **nbn**™ access network an alternative for ATMs connected via ISDN and legacy ATM networks.

**nbn**™ Enterprise Ethernet is an attractive new option for the sector. It creates the opportunity to migrate branches to direct-fibre links in areas where fibre has previously been uneconomic, and can be a high-bandwidth alternative link for mission-critical platforms.

# Utilities

While not a leader in adopting digital transformation, the utilities sector is nonetheless using IT solutions to drive business performance and improve infrastructure management. The rise of renewable energy is also creating new challenges for operators.

Ovum's Enterprise Insights survey found increased ICT spend in supervisory control and data acquisition (SCADA), smart grids and data management were the leading three priorities for the surveyed Australian utility companies.

Like all other service providers, utility companies have been upgrading customer interfaces to improve service levels and automate interactions. Retailers have also looked at new product opportunities, with some adding broadband from the **nbn**™ access network to their portfolio of services that can be marketed to, and bundled by, their customers.

The deployment of smart grids is also changing the landscape. Improving metering and providing customers greater control over their consumption, smart grids are creating new streams of data to be processed and stored in the cloud.

SCADA systems are essential for supporting the robust operation of utility networks. Identifying and diagnosing network issues, managing capacity across the network and responding to events, these systems rely on extensive communications links to nodes across the network. Bandwidth requirements tend to be high, with video monitoring capabilities deployed for security and fault diagnosis.

Renewable energy is expanding the network footprint of energy producers. Wind and solar farm locations are dispersed to allow for diversity of local weather conditions but still need communications links for control and monitoring. The decentralization of these facilities is well catered for by NBN Co's network reach, with fixed line, wireless and satellite business products available.

Utilities use a mix of self-provisioned communications and service provider solutions. Long investment horizons see some use of legacy communications solutions, and NBN Co has products available as these services come to end of life. More immediately, Ovum believes NBN Co is well positioned to play a role supporting the rollout of renewable energy generation, a segment requiring connectivity to regional areas.

# Business connectivity review

Whether or not businesses are in an area where services over the **nbn**™ access network are available, they should be periodically reviewing their connectivity needs with their service provider to ensure current and future requirements can be met. The following checklist includes some of the issues businesses should consider.

**Is your network structure fit for purpose?**

- Evaluate your current network structure and how it fits your business needs. Does current bandwidth satisfy peak traffic requirements?
- Review usage by staff, applications and customers/visitors to ensure appropriate bandwidth is available to satisfy peak traffic requirements.
- Evaluate the future needs of your network based on plans for business objectives or growth. Consider reviewing your digital strategy and communications product needs with ICT and benchmarking firms.
- Assess opportunities to upgrade existing services, equipment or software in line with other technology migration activity.

**Service continuity**

- Evaluate the need for an alternative network platform or service provider for network redundancy.
- Understand service levels and consider enhanced service levels to reduce/minimise network downtime in case of a network fault.

**Infrastructure**

- Consider the consolidation of infrastructure/assets. For example, are there opportunities (such as voice services) to consolidate services onto a centralized or cloud platform?
- Consider internal wiring and cabling requirements.
- Confirm landlord approval of installation of new services.

**Temporary Special Services disconnection**

- Understand when **nbn**™ services will be available and the timing for disconnection of legacy copper services.
- Identify devices and services that may require additional migration support or testing (e.g. some alarm, lift and fire services).
- Ensure there is a plan for migration of copper services that are scheduled to be disconnected.
- Identify any services that may have special time frames for disconnection and check schedule for timing on disconnection of copper services in your area.

**business nbn™ support**

- Consider opportunities for network infrastructure upgrade options by speaking with a business **nbn**™ representative or your preferred RSP.
- For large-scale business migrations or transitions, meet with business **nbn**™ account managers to discuss and plan your strategy.

# Ovum Consulting

Ovum was commissioned to produce this report by NBN Co to provide an overview of the opportunities for Australian businesses to leverage the **nbn**™ access network as they digitally transform their businesses.

We hope that this analysis will help you make informed and imaginative business decisions. If you have further requirements, Ovum's consulting team may be able to help you. For more information about Ovum's consulting capabilities, please contact us directly at consulting@ovum.com.

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