Australian Government

Department of Broadband, Communications and the Digital Economy

CONNECTING, COLLABORATING, CREATING

Advancing Australia as a Digital Economy:

AN UPDATE TO THE NATIONAL DIGITAL ECONOMY STRATEGY

nbn.gov.au

National Broadband Network

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FOREWORD

For decades now, information and communication technology (ICT) has been the key driver of global innovation and productivity, pushing the most substantial and rapid transformation of business models and market structures in history.

These changes are already affecting every facet of the Australian economy and society. For example, access to fast broadband and its associated technologies is ending isolation for people living in remote areas. These technologies are also enabling a completely new paradigm for government and commercial service delivery that is more efficient and better meets the needs of users. And we are witnessing impressive advances in support for the education, health and environment sectors.

Australia's future prosperity depends on how effectively we take advantage of such advances: how effectively we become a digital economy.

The Government's 2011 *National Digital Economy Strategy* (the 2011 NDES) set the goal of Australia becoming a leading digital economy by 2020. In doing so, it nominated eight goals to position Australia as a world leader in broadband connectivity and the use of digital technologies, and set out a bold vision for Australia to be a vibrant, trusted hub in the global digital economy.

Advancing Australia as a Digital Economy is an update of the 2011 NDES, building on the 2011 NDES, and laying out the next steps towards delivering our 2020 vision.

The recent *Australia in the Asian Century White Paper* focussed on the enormous social and economic transformation taking place across Asia and the opportunities this growth represents for Australia. To embrace these opportunities, we need to have communications infrastructure that is capable of supporting the burgeoning exchange of ideas and commerce in the Asian region and the necessary skills to participate fully in the global digital economy.

The Government is ensuring that Australia will have worldclass infrastructure by delivering on its commitment to build the National Broadband Network (NBN).

The Government is also working to ensure we have the other enabling capabilities necessary for a thriving digital economy: a safe and secure online environment, a strong ICT sector and skills base, regulations that support online engagement, and a willingness to adopt gamechanging technologies such as cloud computing.

With these enablers in place, Australia will have the essentials of a flourishing digital economy, connecting all cities and regions of Australia, a launching pad from which we can access new ideas and services, and be even more creative, entrepreneurial, efficient and productive.

Stephen Conroy

Senator the Hon. Stephen Conroy
Minister for Broadband, Communications and the Digital Economy
Leader of the Government in the Senate
Minister Assisting the Prime Minister on Digital Productivity

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EXECUTIVE SUMMARY

THIS STRATEGIC UPDATE PROVIDES AN OVERVIEW OF DOZENS OF CURRENT INDIVIDUAL INITIATIVES AND OUTLINES A NUMBER OF NEW INITIATIVES THAT REPRESENT THE PROGRESS BEING MADE BY THE AUSTRALIAN GOVERNMENT TO EMBRACE OUR DIGITAL FUTURE.

THIS IS WHAT WE ARE DOING ...

OVER THE NEXT 4 YEARS THE **DIGITAL FIRST** POLICY WILL ENABLE INDIVIDUALS AND BUSINESSES TO:

- FULLY COMPLETE PRIORITY SERVICES ONLINE
- CHOOSE A SINGLE AUTHENTICATION METHOD TO ACCESS PRIORITY GOVERNMENT SERVICES
- HAVE THE OPTION OF ACCESSING IN-PERSON SERVICES ONLINE VIA VIDEO WHEREVER COST EFFECTIVE
- CHOOSE TO REGISTER FOR PRIORITY GOVERNMENT SERVICES ENTIRELY ONLINE

THE GOVERNMENT WILL INVEST **$6.5 MILLION** OVER FOUR YEARS IN A NEW INITIATIVE CALLED **DIGITAL CAREERS** TO BOOST STUDENT INTEREST IN AN ICT CAREER

ONLINE ENGAGEMENT BY AUSTRALIAN BUSINESS AND NOT-FOR-PROFITS

91.2% of businesses have an internet connection

ONLY **43.1%** have a web presence

SMEs that integrate internet tools into their business models grow twice as fast as those which do not

The Government will expand the **Digital Enterprise program** and develop industry specific **digital business kits** to provide small to medium-sized enterprises (SMEs) and the not-for-profit sector with resources to better engage with the digital economy.

89% OF AUSTRALIANS WERE CONCERNED ABOUT IDENTITY THEFT

61% OF AUSTRALIANS BELIEVED THE RISK OF THEIR IDENTITY INFORMATION BEING STOLEN OR MISUSED WOULD INCREASE OVER THE FOLLOWING YEAR

GOVERNMENT WILL WORK WITH STATE AND TERRITORY GOVERNMENTS TO ENHANCE ACCESS TO THE **DOCUMENT VERIFICATION SERVICE** AND INVESTIGATE THE USE OF HIGHER ASSURANCE DIGITAL CREDENTIALS ISSUED BY COMMERCIAL PROVIDERS

.gov

STATE

TERRITORY

As a proportion of GDP, spending on health is projected to rise

FROM **4.0%** 2009–10 TO **7.1%** 2049–50

As a proportion of GDP spending on aged care is projected to grow

FROM **0.8%** 2009–10 TO **1.8%** 2049–50

The Government will support increased use of digital platforms to provide health and aged care services.

GOVERNMENT IS INCREASING EFFORTS TO EQUIP PEOPLE AND BUSINESSES WITH THE TOOLS AND KNOWLEDGE THEY NEED TO BE SAFE AND SECURE ONLINE

cybersafety help

As at 30 April 2013 the Cybersafety Help Button has been downloaded to over **889 000 DEVICES**

CYBERSAFETY OUTREACH HAS REACHED OVER **670 000** young people, parents and teachers at over **7000** events since 2009

SINCE FEBRUARY 2012 OVER

17 350

PARTICIPANTS ACROSS AUSTRALIA HAVE TAKEN ADVANTAGE OF THE DIGITAL HUBS PROGRAM

BASED ON CURRENT ATTENDANCE IT IS EXPECTED THAT OVER

120 000

TRAINING PARTICIPANTS WILL BENEFIT FROM THE PROGRAM

BY JUNE 2015

As of May 2013 **data.gov.au** includes:

- **1 126** public data sets from the Australian Government and state and territory governments
- **114** contributing government agencies
- **20** apps using government data

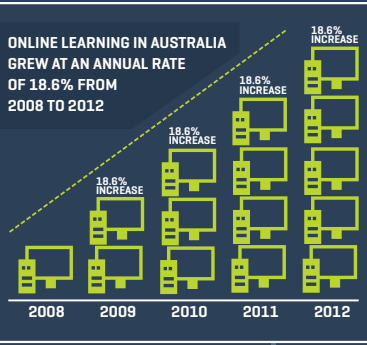
The Government will release its **Big Data Strategy** in 2013, and continue to support the Data Analytics Centre of Excellence.

The NBN will provide high-speed broadband access to 100% of Australian homes, schools and businesses. 93% of premises will have access to a fibre network, delivering speeds of up to one gigabit per second.

DEMAND FOR DATA DOWNLOADED OVER FIXED LINES HAS BEEN GROWING AT A COMPOUND RATE OF 62 PER CENT

- **67%** increase from June 2011 — **4.4 MILLION** PEOPLE STREAM VIDEO
- **71%** increase from June 2011 — **2.1 MILLION** PEOPLE STREAM MUSIC
- **47%** increase from June 2011 — **1.6 MILLION** PEOPLE STREAM TELEVISION PROGRAMS

ONLINE LEARNING IN AUSTRALIA GREW AT AN ANNUAL RATE OF 18.6% FROM 2008 TO 2012

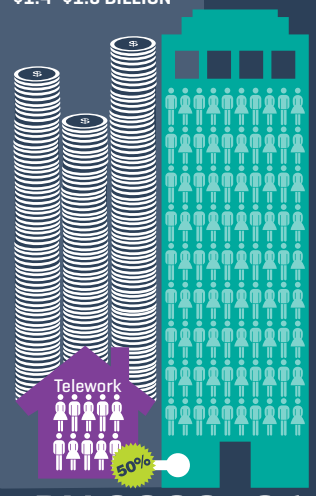


IN 2011

TWO-THIRDS OF VOCATIONAL EDUCATION TRAINING STUDENTS REPORTED USING INTERACTIVE LEARNING RESOURCES IN THE CLASSROOM AS WELL AS AT HOME AND WORK

The Government will encourage access to virtual classes.

IF 10% OF AUSTRALIAN EMPLOYEES WERE TO TELEWORK 50% OF THE TIME, THE TOTAL ANNUAL GAIN TO THE AUSTRALIAN ECONOMY WOULD BE AROUND $1.4–$1.9 BILLION



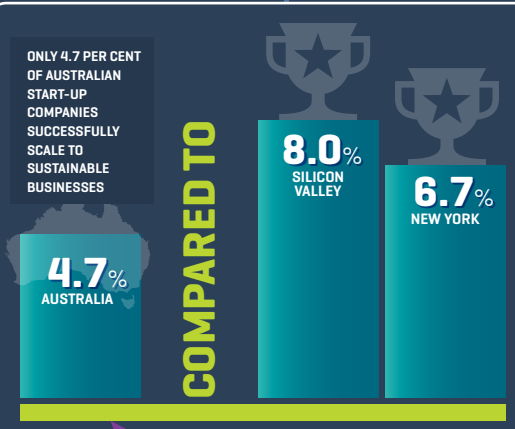
BY 2020–21

TELEWORK ENABLED BY HIGH-SPEED BROADBAND WILL CREATE

25,000 full time jobs

The Government will conduct an annual **National Telework Week** to increase awareness of telework and its benefits.

ONLY 4.7 PER CENT OF AUSTRALIAN START-UP COMPANIES SUCCESSFULLY SCALE TO SUSTAINABLE BUSINESSES



The Government will review the tax treatment of employee share schemes and develop guidance to reduce the administrative burden of establishing such schemes.

INCREASED CLOUD ADOPTION WILL GROW AUSTRALIAN GDP BY

$3.3 BILLION

BY 2020

The Government's National Cloud Computing Strategy promotes increased cloud computing use by governments, SMEs, consumers and not-for-profit organisations and growth of a vibrant Australian cloud supply sector.

- SCALE UP OR DOWN QUICKLY AND CHEAPLY
- ACCESS SERVICES OVER A NETWORK WITH MULTIPLE DEVICES
- SHARE COMPUTING RESOURCES TO HELP REDUCE COST
- MEASURE YOUR CONSUMPTION QUICKLY AND EASILY

EXECUTIVE SUMMARY

In 2013, the use of online services by Australians covers almost every aspect of daily life, from checking tomorrow's weather forecast to preparing a meal, paying bills, arranging a holiday or accessing education or health services from remote locations. Almost every aspect of life can be enhanced through some form of online service delivery. New ideas that apply digital technology to everyday situations emerge almost daily.

Amid the relentless digital transformation of the global economy, more and more services are becoming available online. But there is much more to do before Australia is a leading digital economy.

This strategic update provides an overview of the dozens of individual initiatives, and outlines a number of new initiatives, that represent the progress being made by the Australian Government to embrace our digital future. To advance Australia as a leading digital economy in the networked world, there are many small steps needed to achieve genuine transformation.

The headline initiative is a Digital First commitment for government to offer its services digitally. As part of Digital First, priority government transactions will be end-to-end digital by 2017. Some alternative channels of service will remain so that agencies can provide assistance to those individuals who cannot easily access online services.

'36 per cent of all internet users are from Asia... [and] with an average of 389 million internet surfers per month, Asia is the largest internet crowd among other world regions'

www.hongkiat.com/blog/15-facts-on-global-internet-usage

As the economy moves to a greater reliance on online transactions there will be a corresponding need to improve performance and acceptance of online identity arrangements. The Government will contribute to developments in this critical area by significantly enhancing the existing government Document Verification Service and making this more widely available to the private sector. Businesses will be able to reliably identify customers by matching details from customers' identity documents with records held by the documents' issuing authorities.

Recognising the role secure digital mailboxes can play in secure online communication, the Government will expand the use of digital mail by myGov and conduct proof-of-concept trials for other digital mailboxes. The trials are expected to demonstrate how digital mailboxes can better and more securely connect Australians with essential government services.

The Government will seek to ensure that Australians have the skills required as the digital future unfolds by promoting a more cohesive approach to ICT skills development. In particular, it will develop a lifecycle approach to ICT skills, beginning with completing the Australian Curriculum Assessment and Reporting Authority's development of the Australian Curriculum: Technologies and the development of stronger links between industry and tertiary education institutions.

For Australia to become a leading digital economy, our ICT companies must also be working at the cutting edge of digital and technical innovation. Recognising the need to encourage the development of such companies, the Government will enhance the regulatory environment for innovative ICT start-up companies. For example, the Government will examine possible changes to improve employee share scheme arrangements for start-ups by the end of 2013. Looking even further ahead, the Government will also conduct a review of regulations governing crowd-sourced equity funding.

In parallel to this document, the Government has released Australia's first National Cloud Computing Strategy, which aims to address barriers to adoption while maximising the benefits of cloud computing for the whole Australian economy. It includes a series of actions such as changes to procurement policy to ensure that government agencies consider cloud services for ICT procurements.

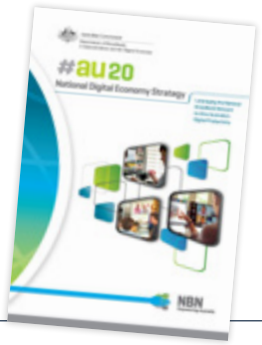
There will be help for digital economy beginners too. Individuals, businesses and not-for-profit organisations yet to engage meaningfully in the digital economy will be given a helping hand to do so. Digital Business Kits containing online skills tutorials that have been specifically tailored for different industries will be developed. Additionally, the Digital Enterprise and Digital Local Government programs will be extended to enhance household and business understanding of and engagement in the digital economy.

High-speed broadband will be used to deliver services to older Australians with chronic disease. The Personally Controlled Electronic Health Record will be strongly promoted, as will Medicare-funded telehealth services. These services have opened up a new avenue for the delivery of health services that will particularly benefit people living in regional and remote Australia as well as those with limited mobility. The Government will also support the increased use of digital platforms to provide aged care services.

Through annual National Telework Weeks the Government will continue to promote the uptake of telework, which is a key tool by which organisations will benefit from the digital economy.

These initiatives are supported by a suite of actions outlined in the next section of this paper, which collectively form an integrated strategy to support our ambition to become a leading digital economy.

This document has been fashioned as a strategic update to the 2011 National Digital Economy Strategy—the first of what is intended to be a regular series—to reflect the fast-moving, rapidly changing environment that is our digital future.



Index of initiatives

DIGITAL SKILLS

Action 1. Complete the development of a new curriculum for technologies
The Australian Curriculum embeds ICT skills as a general capability across all learning areas of the curriculum. It will also include the subjects of Digital Technologies and Design Technologies which all students will study from Foundation to Year 8.

Action 2. Partner with industry to promote digital careers
National ICT Australia will be funded to lead a consortium that will develop programs to promote careers in ICT skills to school students.

TRUSTED ONLINE IDENTITIES AND COMMUNICATIONS

Action 3. Expand the use of the Document Verification Service
The Government will work with state and territory governments to enhance the accessibility, usability and efficiency of the Document Verification Service – and also make the system more widely available to the private sector.

Action 4. Investigate the use of trusted third-party credentials by government
The Government will investigate the use of higher assurance digital credentials issued by commercial providers such as financial institutions and the use of existing digital credentials, including third-party credentials.

SAFETY AND SECURITY

Action 5. Release the Digital Citizenship Best Practice Principles
The Government will release the principles in the second half of 2013 and encourage Australians to practise digital citizenship's core characteristics.

Action 6. Develop the National Plan to Combat Cybercrime
The Australian Government is working with state and territory governments to develop the National Plan to Combat Cybercrime which outlines a strategic framework for how Australian governments will respond to the threat posed by cybercrime. The plan is expected to be released in mid-2013.

SUPPORTIVE ENVIRONMENT FOR DIGITAL INDUSTRIES

Action 7. Review the regulatory arrangements for employee share schemes
The Government will review the tax treatment of employee share schemes and develop guidance to reduce the administrative burden of establishing such schemes.

Action 8. Consult on an Australian crowd-sourced equity funding scheme
The Government will develop a best practice framework for Crowd Sourced Equity Funding.

Action 9. Minimise exemptions under the *Electronic Transactions Act 1999*
The Government will review Electronic Transactions Regulations 2000 to remove outdated exceptions to Commonwealth electronic transaction legislation by December 2014.

HARNESSING THE BENEFITS OF CLOUD SERVICES

Action 10. Promote the adoption of cloud computing in Australia
To promote the smart adoption of cloud computing, the Government will:

> identify training and skills development across the public sector and ensure that agencies consider cloud services for relevant ICT procurements

> develop resources to assist small businesses, not-for-profit organisations and consumers to use cloud services with confidence

> work in partnership with cloud vendors to promote Australia as a trusted hub for data storage and processing, and encourage foreign investment in cloud services.

ENCOURAGING OPEN DATA AND BIG DATA

Action 11. Explore making the G-NAF a freely available data set
The Government will explore options for providing open access to the G-NAF including an analysis of the legal, financial and security implications.

Action 12. Release the Big Data strategy
The Government will release its big data strategy in 2013 and continue to support the Data Analytics Centre of Excellence.

ONLINE GOVERNMENT SERVICE DELIVERY

Action 13. Implement the Digital First initiative
Under Digital First, by December 2017, Government agencies will provide their clients with user-friendly online access to priority services, allowing end-to-end processing for those services through a choice of a single authentication method that enables access to a range of services without needing multiple passwords or multiple tests of credentials.

ONLINE PARTICIPATION BY AUSTRALIAN HOUSEHOLDS

Action 14. Boost the Keeping Seniors Connected program
The Government will provide senior Australians with free access to the latest technology and to training that will educate them on issues of particular concern to them, such as cybersecurity and cybersafety.

ONLINE ENGAGEMENT BY AUSTRALIAN BUSINESS AND NOT-FOR-PROFITS

Action 15. Expand the Digital Enterprise program and develop industry-specific digital business kits
The Government will expand the Digital Enterprise program and develop industry-specific digital business kits to provide small to medium-sized enterprises (SMEs) and the not-for-profit sector with resources to better engage with the digital economy.

HEALTH AND AGED CARE

Action 16. Consider the expansion of the Medicare Benefits Schedule for telehealth items
The Government will undertake a review in 2013 to determine the costs and benefits of an expanded range of MBS telehealth items to include patients participating in videobased consultations with their GP.

Action 17. Evaluate outcomes from telehealth trials and develop action plans to address key challenges
During 2014-15, the Government will evaluate the current telehealth trials, share trial findings and lessons with the healthcare community, and use the findings to develop action plans to address key telehealth issues.

Action 18. Implement video consultations for the after-hours GP Helpline and the Pregnancy, Birth and Baby Helpline
From the second half of 2013, the Government will commence a phased implementation of video-consultation capabilities starting with the after-hours GP Helpline and the 24-hour Pregnancy, Birth and Baby Helpline.

Action 19. Support increased use of digital platforms to provide aged care services
The Government will introduce a range of reforms such as:

> revision of relevant aged care program guidelines to recognise and encourage the use of innovative and digital delivery options for the provision of aged care services

> expansion of the Community Visitors Scheme into home care including through the use of technology

> launch the My Aged Care website to provide coordinated information for aged care services.

EDUCATION

Action 20. Encourage access to virtual classes for vocational education and training (VET) students
The Government will work with the states and territories to promote the virtual delivery of VET.

TELEWORK

Action 21. Conduct an annual National Telework Week
The Government will conduct an annual National Telework Week to promote the benefits of telework and facilitate the take-up of telework.

ENVIRONMENT AND INFRASTRUCTURE

Action 22. Facilitate more efficient use of rail infrastructure
The Government will collaborate with mainland state governments to develop a single national spectrum allocation for interoperable train communication systems in metropolitan and regional areas.

REGIONAL AUSTRALIA

Action 23. Expand the Digital Local Government program
The Government will extend the Digital Local Government program to enable about 15 additional local councils, including many in regional areas, to take advantage of the NBN to improve the efficiency and effectiveness of the services they deliver.

Action 24. Provide free wi-fi access to remote Indigenous communities
The Government will progressively adapt community satellite telephones to provide public wi-fi services to remote Indigenous communities.

Key implementation timeframes for all actions are outlined in the implementation timeline in Appendix B.

CONNECTING, COLLABORATING, CREATING

Part one:

Working towards our digital future

1: Australia in 2020—a view of the future

The National Broadband Network (NBN) will turbo-charge the Australian economy. The exact scope and impact of the change by 2020 is impossible to predict. But there is merit in Australians discussing how the NBN could change lives. This paper identifies some broad directions of change.

By 2020, all government agencies will be using digital platforms as their major channel of service delivery.

Along with the development of improved online security and identity arrangements, this will dramatically reduce the prevalence of hard copy transactions for doing business with government. The use of high-definition video will be common for more complex interactions requiring real-time communication.

Almost every household will make extensive use of high-speed broadband. Most will have multiple internet-connected devices (the Organisation for Economic Cooperation and Development (OECD) predicts possibly up to 50 devices per household by 2022) and sensors. These will deliver significant productivity gains.[1]

The majority of Australian businesses will be using digital platforms for most of their marketing, business administration, service provision, recruitment and training. They will engage beyond their immediate locale with an increasingly broad customer base. Businesses will also make extensive use of video and access a combination of both private and public clouds.

Geography will no longer be the barrier to employment that it currently can be. With the spread of teleworking and the use of digital platforms for business transactions and service access, more Australians will be able to seek employment in industries located in areas other than where they live. Telework will enable more people, including those with disabilities or carer responsibilities, to enter the workforce. The availability of telework will also allow more people to stay in the workforce longer.

Australia's digital industry sector will be thriving. More students will be undertaking courses leading to a career in this sector. The application of creative design-thinking will lead to the development and commercialisation of new digital applications and services for global customers.

Students at all levels of education—living in any part of Australia or even overseas—will have the opportunity to attend virtual classes taught over video technology by specialist teachers, complementing education in the classroom. It will be common place for students and others to undertake virtual visits to cultural, scientific and other institutions, where the opportunity to have these experiences may have previously been out of reach due to geography or lack of resources.

Increasingly, the home will be an integral part of health and aged care service delivery, particularly for those with chronic disease. Care coordinators will use digital platforms to monitor key health indicators and assist with health education, medication management and for rehabilitation of patients who are at home.

The digital economy will transform economic and social opportunities in regional Australia. Fast, reliable and affordable broadband, enabled by the NBN, will allow new businesses to be created in rural and regional Australia, just as it will offer an opportunity for established regional businesses to improve their business practices and expand their markets.

It will even enable businesses that may previously have operated only in metropolitan areas to relocate to regional centres. This would create new local employment and telework opportunities. Such economic growth opportunities, combined with digital delivery of improved education, health and government services, will provide a significant boost to communities in regional Australia.

2: Goals for the digital economy

The 2011 NDES set eight goals for Australia to become a leading digital economy by 2020:

Government service delivery—by 2020, four out of five Australians will choose to engage with the Australian Government online.

Households—by 2020, Australia will rank as one of the top five OECD countries in terms of the proportion of households that connect to broadband.

Businesses and not-for-profit organisations—by 2020, Australia will rank as one of the top five OECD countries in the proportion of businesses and not-for-profit organisations using online opportunities to drive productivity improvements and expand their customer base.

Health and aged care—By 2015, 495,000 patients in rural, remote and outer metropolitan areas will have had virtual access to specialists and by 2020, 25 per cent of all specialists will be participating in delivering telehealth consultations to remote patients. By 2020, 90 per cent of high priority consumers such as older Australians, mothers with babies and those with a chronic disease, or their carers will be able to access individual electronic health records.

Education—by 2020, Australian schools, registered training organisations (RTOs), universities and higher education institutions will have the connectivity to develop and collaborate on innovative and flexible educational services and resources to extend online learning to the home and workplace and the facilities to offer students and learners the opportunity for online virtual learning.

Teleworking—by 2020, Australia will have doubled its level of telework to at least 12 per cent of Australian employees.

Environment and infrastructure—by 2020, the majority of Australian households, businesses and other organisations will have access to smart technology to better manage their energy use.

Regional Australia—by 2020, the gap in online participation and access between households and businesses in capital cities and those in regional areas will have narrowed significantly.

While the 2011 NDES outlined the initial steps to deliver on its goals, it recognised that additional action would be needed. This update to the 2011 NDES sets out the next phase in the drive towards establishing Australia as a leading digital economy and identifies the factors that drive and enable change across each of the goals. It puts forward an agenda for governments, citizens and industry to achieve this change.

Monitoring progress of the digital economy requires robust and targeted statistics. The Essential Statistical Assets (ESA) for Australia initiative has been created to support and prioritise investment in datasets within the National Statistical Service, by identifying statistical assets which are critical to decision making.

The Australian Bureau of Statistics (ABS) recently released the 2013 list of ESA for Australia. The impact of the evolving digital economy on all aspects of Australian society has been identified as one of the emerging fields of statistics that are currently under conceptual development.[2]

CONNECTING, COLLABORATING, CREATING

Part two:

Enablers of Australia's digital economy

3: What are the enablers of a leading digital economy?

A leading digital economy is one where a broad and growing range of economic and social activities are enhanced by digital technologies. Leading digital economies exhibit three key elements as shown in Figure 2, readiness to use digital technologies, a supportive environment and the adoption of emerging digital opportunities.

The 2011 NDES defined eight goals covering online engagement by households, businesses, not-for-profit organisations, regional Australia and governments.

Australia is already delivering world-class infrastructure through the NBN rollout. However, further investment in Australia's digital readiness and digital environment is essential to complement the initiatives already being pursued to increase our digital usage.

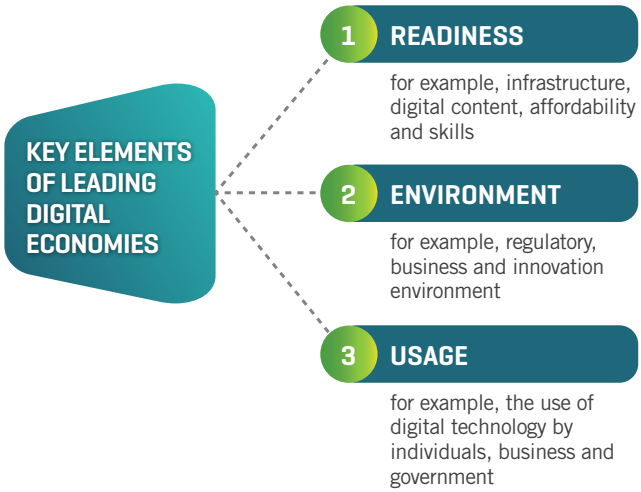


Figure 2 A leading digital economy

Global best practice

Australia ranked twenty-first on the International Telecommunications Union's most recent ICT Development Index (IDI).[3] The IDI assesses the readiness, intensity and impact of ICT access and use across 11 indicators, including internet bandwidth, mobile broadband subscriptions and adult literacy. The top IDI countries—South Korea, Denmark and Sweden—share defining characteristics and have targeted policies to enhance digital environments and enable citizens to engage online:

> they lead OECD indicators for high-speed internet penetration and mobile wireless broadband[4]

> they consistently rank well in the International Finance Corporation (IFC) and World Bank's Doing Business reports, which measure how much business activity is affected by regulations[5]

> South Korea has invested in a series of national master plans embedding ICT throughout the educational system (the final phase of these plans aims to increase the pervasiveness of ICT)[6]

> the Danish Government's *Digital Path to Future Welfare* has mandated digital solutions for citizens to use as the predominant form of communication with the public sector by 2015[7]

> Sweden's *ICT for everyone—a digital agenda for Sweden* commits to a digitally inclusive society by promoting online safety as well as seeking to reduce barriers to effective competition.[8]

These initiatives provide examples of how Australia may be able to take further action to hasten our progress towards becoming a leading digital economy by 2020.

Enablers of digital readiness

Infrastructure

Increasingly, a common feature of leading digital economies will be access to high-speed broadband. Access must be available to all sectors of society—citizens, business and government. While the strength of the relationship varies between studies, international estimates clearly indicate that increasing broadband speed and penetration are associated with economic growth.[9]

Digital skills

Digital skills encompass the ability of both the ICT sector and other sectors to understand the technologies that underpin the economy. Indeed, the extent to which firms benefit from the adoption of ICT is related to their investments in human capital.[10]

Harnessing the benefits of cloud computing

A KPMG study, *Modelling the economic impact of cloud computing,* found significant operational and capital savings to be made by governments and firms adopting cloud technologies.[11] Savings are available across all three typical cloud service offerings: software, platform and infrastructure.

Open data

The results of the most recent *Public Sector Information Survey* suggest that many agencies possess data that could generate significant value if made available for reuse, including by private sector organisations.[12]

Enablers of the digital environment

Online trusted identities

Implicit in any transaction is trust. In 2005, the OECD noted that 25 per cent of consumers in European Union countries lacked trust in the internet as a means of acquiring goods and services. By 2012, this figure had halved to 12 per cent.[13]

The ability to verify identity is crucial for minimising the risks associated with online transactions. Emerging services such as secure digital mailboxes could help to meet this need. Once the identities of both the consumer and the service provider have been verified to each other, they can elect to send and receive correspondence and conduct transactions via a spam-free and secure location such as a digital mailbox.[14]

Safety and security

Malicious online activity can undermine user confidence and prevent Australians from taking full advantage of the benefits of the digital economy. Our efforts must focus on building capacity so that both individuals and businesses take appropriate safety and security measures.

As many instances of cybercrime go unreported, it is difficult to accurately estimate the economic cost of cybercrime in Australia, but it is likely to be significant.[15] The greatest benefits from the digital economy are derived when it is open, safe and secure. Australia will work with the international community to sustain the openness of the internet and achieve greater levels of safety and security for all.

A supportive environment for digital industries

The global digital economy is a dynamic environment, characterised by rapid change. This is a challenge for regulators. As in many countries, some elements of Australia's regulatory framework reflect a time before online engagement was the norm or indeed was possible at all. Many of these elements need updating. Regulation needs to be reviewed to ensure that the activities of Australian enterprises are not unnecessarily hindered.

An international regulatory environment that does not unnecessarily restrict our digital trade ambition or the dynamism that characterises the digital age is essential.[16]

4: Infrastructure

Overview

> **The NBN will provide faster, more reliable broadband access to all Australian homes and businesses.**

> **The complementary nature of the NBN and wireless broadband will be maintained through the effective and efficient allocation of Australia's radiofrequency spectrum.**

Realising the gains from the NBN

The NBN will provide high-speed broadband access to 100 per cent of Australian homes, schools and businesses. It will give up to 93 per cent of premises access to a fibre network, delivering speeds of up to 1 gigabit per second. The remaining 7 per cent of premises will have access to a combination of next-generation fixed wireless and satellite technologies, providing peak speeds of 25 megabits per second download and 5 megabits per second upload.

The high-speed capacity of the NBN will enable the widest possible range of services, including supporting the growing use of mobile broadband enabled devices such as smartphones and tablets.

While pressing ahead with its commitment to deliver the NBN, the Government has also invested $250 million to immediately address connectivity black spots throughout regional Australia by installing 6,000 kilometres of optic fibre cable across Australia. The new links have already improved retail broadband and mobile telephony services to around 100 regional communities and they will assist service providers to connect their existing systems and infrastructure to the NBN.

The NBN will support the trend to greater ownership of mobile devices by giving Australian homes and businesses access to greater wi-fi speeds and capacity. At the moment, most wi-fi routers are connected to the copper network over ADSL or ADSL2+, which has a maximum speed of 24 Mbps and is often much slower, or to a telecommunications carrier's 4G/ Long Term Evolution (LTE) wireless service. Current wi-fi routers are able to support speeds of 300 Mbps or more. The NBN fibre network is capable of offering speeds of up to 1000 Mbps.

Rising demand for data

The NBN has been designed to meet the rapidly increasing demand for data transmission (both upload and download). Over the past four years, demand for data downloaded over fixed lines has been growing at a compound growth rate of 62 per cent a year (see Figure 3 Volume of data downloads). This is driven by:

> **the rising numbers of internet connected (and simultaneously connected) devices in a household**—the OECD estimated that an average household with two adults and two teenage children had 10 internet connected devices in their home during 2012.[17] The OECD predicts this will have risen to 25 devices by 2017, and to 50 devices by 2022.[18]

> **the data intensity of the applications being used**—Cisco estimates that by 2016, 14 billion minutes of video content will cross internet connections within Australia during a calendar year (up from 4 billion minutes in 2011), and that the gigabyte equivalent of all movies ever made will cross global internet protocol (IP) networks every three minutes.[19]

> **the length of time that these applications are being used**—including those applications that are in continuous operation.[20]

More people are streaming content online. For example, during June 2012:

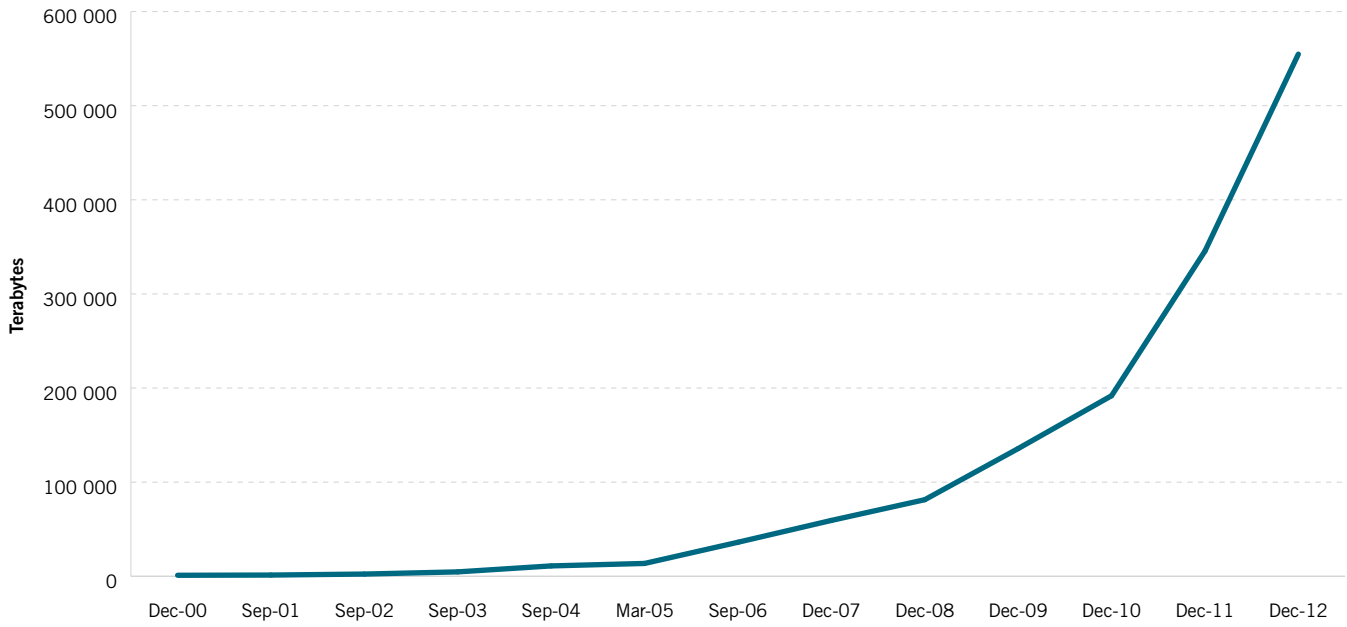
> 4.4 million people streamed videos—67 per cent more than in June 2011

> 2.1 million people streamed music—71 per cent more than in June 2011

> almost 1.6 million people streamed television programs—47 per cent more than in June 2011.[21]

While the increased use of video in recent years has largely related to entertainment, with the NBN it is likely that multi-party video-based interaction will emerge for a much larger range of circumstances including health and aged care, education, work and business.

Figure 3 Volume of data downloads



Source: ABS (2013), 'Data cubes', Internet activity, Australia, December 2012, cat. no. 8153.0, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8153.0December%202012?OpenDocument (accessed April 2013).

Efficient and effective spectrum allocation

The complementary nature of the NBN and wireless broadband will be important in maximising spectrum efficiency. The Australian Communications and Media Authority (ACMA) estimates that even with the NBN, more spectrum needs to be made available to accommodate the increasing demand for mobile wireless data.[22]

Growth in demand for wireless mobile devices such as smartphones has been striking. For the December 2012 quarter, the ABS reported 17.3 million internet service provider subscribers with internet access connections via a mobile handset, and data downloaded by mobile handset subscribers increased by 38 per cent from the June 2012 quarter.[23]

Third generation (3G) mobile services have been offered in Australia since 2003 and the rollout of next-generation mobile services (Long Term Evolution (LTE) and 4G) is well underway. These technologies offer increased peak data speeds and greater efficiency, but also require larger bandwidths.

In this context, the digital dividend spectrum—the spectrum freed up by the switchover of television transmission from analog to digital—will help deliver significant benefits for mobile consumers, including services that can be delivered through the rollout of next-generation mobile technologies. The digital dividend spectrum has been optimised for mobile broadband and is expected to be available for new uses from 1 January 2015.

The digital dividend auction, which concluded on 7 May 2013, saw Optus and Telstra each purchase spectrum at auction to deploy LTE networks that will deliver next-generation mobile services to Australian consumers. The auction also saw TPG Internet purchase 2 x 10 MHz of the 2.5 GHz spectrum. These auction outcomes will support competition in the communications market place, giving consumers the choice of new and improved services offered by different mobile providers.

The residual spectrum from the digital dividend auction remains in Australian Government hands for now. This spectrum has the potential to be used in future to further bolster 4G networks as demand for mobile broadband continues to grow and the Government will return it to the market in the next few years. Engineering the suitable parts of available spectrum to be able to offer wireless mobile services is about innovation, creativity, productivity and efficiency. Australia's businesses will be able to take advantage of higher data speeds and users will be able to do more 'on the move', wherever they are. Creative content will be more easily available to audiences and consumers.

National Broadband Network construction worker installing fibre optic cable in Gosford.

5: Digital skills

Overview

ICT and the skills to exploit them are fundamental to the growth and competitiveness of the economy. To position Australia for the digital age, the Government will:

> **complete development of the Australian Curriculum: Technologies**

> **work with the ICT industry to fund and develop programs that cultivate student interest in ICT and digital technologies and improve student connections with the ICT industry**

> **establish an ICT industry working group to develop strategies to promote and broaden the attractiveness of ICT as a career of choice.**

Australia's challenge is to improve the digital literacy of all workers, not just the skills of those working in specialist ICT fields. While the 554,000 people working in ICT occupations are a significant sector of the economy, an increasing proportion of workers in all fields, including in sectors such as mining and resources, financial services and health,[24] require ICT skills and aptitudes.

The ICT workforce challenge

Our workforce challenge is twofold: to increase the number of people who are interested in and capable of working in the ICT sector; and to equip all workers with the digital skills that are increasingly needed in our daily working lives.

Historically, the demand for ICT employees has been cyclical. However, analysis by the Australian Workforce and Productivity Agency (AWPA) suggests that demand for ICT workers is likely to continue to increase for the medium to long term, particularly for highly skilled ICT professionals.[25]

The Clarius Skills Ind*ex*—a nationwide survey of skills and vacancies—indicates that there is currently a shortage of approximately 6,000 ICT professionals in Australia.[26] Industry has also reported that Australian ICT workers, including recent graduates, often do not have the skills required to fill vacancies and that the skill needs of the industry are changing rapidly with the development of new technologies and platforms.[27 28]

Consequently, Australia is facing a shortage of ICT professionals across several specialisations.[29] Temporary skilled migration can help to fill such skills gaps and will continue to be required in the short to medium term to do so, but the Government does not view this as a long-term solution.[30]

'...while technical skills will be important and in high demand, it will be entrepreneurial, business and management skills that will enable our workforces to identify opportunities from new technologies, and implement new production methods successfully'.

Business Council of Australia submission to the update to the 2011 NDES, p. 4

It is clear that as the demand for productivity enhancing ICT-related skills increases across a wide range of industry sectors, the growing shortage of these skills represents an increasingly critical challenge for Australia. Meeting this challenge requires a long-term strategy to build digital literacy and an interest in ICT careers.

Further examination of the current and future skills needs of the ICT industry will be undertaken by AWPA. AWPA's ICT Workforce Study will analyse the expected demand for critical ICT skills over the next decade and sources of supply for these skills, identify the key challenges related to ICT skills development and present strategies to support the attraction, retention, development and use of ICT skills. AWPA will consult extensively with industry to develop the study, which will be released in the second half of 2013.

Building a digitally literate workforce

To meet the growing demand for a highly skilled digital workforce we need to expand the pool of students with the interest and capacity to work in this field. To do this, we need to encourage students to study ICT in schools, universities and VET institutions and to choose ICT related careers.[31]

A comprehensive approach is needed to:

> inspire and engage children early in primary and secondary school

> better inform students about ICT related career choices when they are developing preferences for further study and careers during the later years of secondary school

> provide clear transition pathways between school and tertiary education, and tertiary education and work

> ensure that students at universities and RTOs are engaged, complete their studies and emerge with the right skills sets

> promote ongoing learning and up-skilling over the course of a career.

The Australian Curriculum: Technologies will also offer children the opportunity to use technology as a creative tool. They will develop skills ranging from programming to the use of creative software. Industry has emphasised that it is the development of these skills that is the key to generating a healthy pipeline of ICT professionals.

Action 1 Complete the development of a new curriculum for technologies

The Australian Curriculum: Technologies is currently being developed by the Australian Curriculum, Assessment and Reporting Authority (ACARA) in consultation with industry and public stakeholders. ACARA is the independent authority responsible for the development of a national curriculum, a national assessment program and a national data collection and reporting program. A final paper is due in the second half of 2013. ICT will be taught in two ways:

> ICT skills will be one of seven general capabilities to be embedded across all learning areas of the broader curriculum

> The curriculum will include two mandatory subjects from early primary school to Year 8—Digital Technologies, and Design and Technologies.

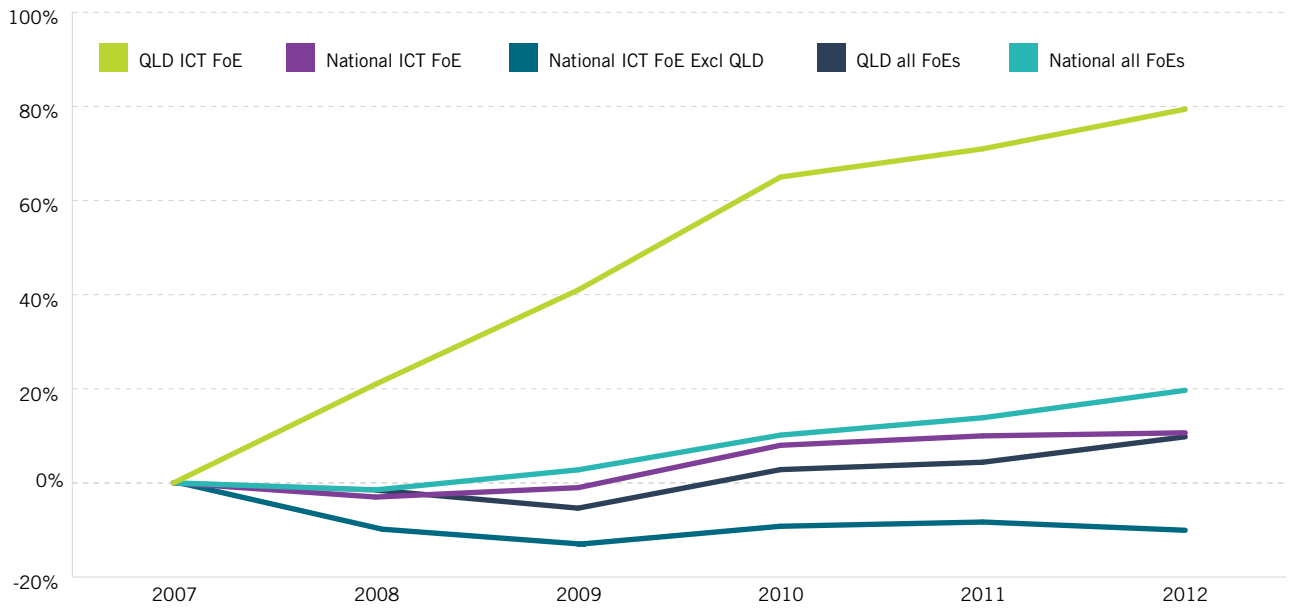
It is critical that teachers are able to effectively deliver the technology curriculum. One initiative that is working in Queensland to ensure the digital literacy of educators is 'Group X Educators'. This program is an ICT resources and information initiative to educate and connect young people in Queensland with the ICT industry and ICT careers.

CASE STUDY GROUP X—AN ICT RESOURCES AND INFORMATION INITIATIVE

Group X was founded in 2008 as a network of tertiary institutions, the Queensland Government and ICT professional organisations to support ICT teaching and to encourage youth interest and engagement in ICT, with a view to training and education in a non-competitive environment.

Since the establishment of Group X, ICT tertiary student numbers in Queensland have increased significantly (some 80 per cent) despite a continued downturn elsewhere in Australia. (See Figure 4: Year on year Queensland v National comparison: 2007–2012 ICT Field of Education (FoE)

Figure 4 Year on year Queensland v National comparison: 2007–2012 ICT Field of Education (FoE)



CASE STUDY THE UNIVERSITY OF WOLLONGONG GRADUATE SCHOOL OF MEDICINE TELEHEALTH SKILLS PROJECT

The University of Wollongong will trial the delivery of telehealth skills training and virtual classes to graduate students training to become medical practitioners in regional and remote areas. The trial will utilise university infrastructure and the NBN.

The project will trial virtual classes in mental health, aged care, dermatology and ultrasound telehealth consultations. Students will experience real-time consultations in the areas of psychiatry, geriatrics and dermatology supported by high-definition videoconferencing and online collaboration tools.

In addition, students will be trained to use handheld in-office ultrasound in the diagnosis of medical conditions and real-time transmission of images for telehealth consulting. Online tools are also available to increase collaboration and communication between medical students and teachers.

Action 2 Partner with industry to promote digital careers

Group X also supports a range of ICT initiatives for young people in Queensland, including ICT focused camps, careers markets and challenges such as RoboCup Junior. Group X aims to educate and connect industry and young people with a view to boosting the number of students interested in undertaking a career in ICT. Following the success of this program in Queensland, the Australian Government will invest $6.5 million over four years in a new initiative called Digital Careers, which will be based on the Group X program but be at the national level.

Digital Careers will engage industry to develop programs that complement the Australian Curriculum, such as extracurricular activities for young people, peer tutoring, school-based traineeships and professional development for teachers. The initiative will initially expand into NSW and the ACT and then into other states and territories.

It is also imperative that students who have an interest in ICT have sufficient access to information and advice to help them transition between school and tertiary education and then on into employment. The Government has taken steps to address this need—three government-funded websites, MyUniversity, My Skills and Myfuture, provide students with information on higher education, vocational education and training, careers and the labour market.

Complementing these sites, National ICT Australia (NICTA) is developing an app to provide ICT sector-specific information about education and careers. The app will be available in late 2013.

It is in industry's interest to invest in ICT education at all levels. It can also play a key role in communicating the benefits of ICT careers and pathways to attract students into the sector.

Several ICT companies and associations already award scholarships and internships to high-performing students as well as participating in careers markets. For example, the Australian Computer Society Foundation gives career advice, research grants and university scholarships to high school and university students. It facilitates relevant industry experience placements for

students with both large and small technology companies. Google, IBM and Microsoft are among its sponsor organisations. National ICT Careers Week is also run each year, showcasing the career choices available to young people in ICT.

The VET sector plays a key role in developing new skills in young people and supporting the re-skilling of workers in other sectors to migrate to the digital economy workforce, particularly mature age workers. The Government will continue to work with Innovation and Business Skills Australia to develop and improve qualifications in the VET sector.

The Government will also facilitate the formation of a group of industry representatives and tertiary education stakeholders to take ownership of the ICT workforce development agenda. It will implement strategies to promote and broaden the attractiveness of ICT as a digital career, share best practice models and work with tertiary education providers to ensure that graduates have appropriate skill sets.

National ICT Australia

NICTA is an NFP joint venture between the Australian Government and the ACT, NSW and Victorian governments, and the Australian National University, the University of New South Wales and University of Melbourne. It also partners with a range of other universities and leading research organisations. NICTA has over 700 researchers, students and professional staff working across five laboratories on innovative ideas to fuel future growth in the digital economy.

NICTA is bolstering Australia's ICT skills base by training students in particular high-value skills, and encouraging young people to study science, technology and maths subjects. For instance, as part of its commitment to primary and secondary education, NICTA is an active member of the Scientists in Schools program, an initiative of the Australian Government and the Commonwealth Scientific and Industrial Research Organisation (CSIRO).[33] It is also helping to build a sustainable ICT sector through its expanding cohort of highly trained ICT researchers.[34] Funding of NICTA in 2015–16 and beyond will be considered in the 2014–15 Budget.

6: Trusted online identities and communications

Overview

Trust and confidence is critical to enabling the digital economy. To facilitate growth in online transactions there is a need to improve our systems for validating, communicating and protecting trusted credentials in online interactions. The Government will:

- **work with state and territory governments to enhance access to, and the usability, efficiency and value of, the Document Verification Service (DVS) and to make it more widely available to the private sector**
- **promote the use of trusted digital communication and delivery systems, such as digital mailboxes**
- **explore opportunities to enable access to online government services using trusted third-party identity credentials produced by the private sector.**

Over the past decade, Australians have become more confident and capable users of digital technologies. This has necessarily involved grappling with various forms of identification. From shopping online, to applying for a credit card, to accessing government services, verifying identity and communicating with trust are now part of many online activities. Yet this is clearly still one facet of the digital economy that worries many people.

A 2012 survey undertaken by the Government indicated that 89 per cent of Australians were concerned about identity theft and misuse, and 61 per cent believed the risk of their identity information being stolen or misused would increase over the following year. The survey identified a range of reasons for these concerns including an increase in online business and commerce.[35] The Government is therefore seeking to facilitate an online environment that is both in harmony with our privacy laws and enables trusted and seamless online interactions. In this environment people should be able to confidently prove their identity online when required, while otherwise maintaining their anonymity.

One of the challenges of online trust and identity is that they must be considered from the perspectives of both individuals and organisations. Four requirements that potentially could be considered are:

- Is the individual or organisation really who they say they are?
- Is there a reliable way to check the validity of identity information online with the agreement of the individual or organisation whose identity information is to be used?
- Can one choose to use the same identity credential (such as username and password) to access different services online including banking and government benefits?
- Can all sensitive communications (such as bank statements and other confidential information) be sent and received online in a secure manner?

A range of activities is being undertaken to foster a trusted online environment. These include building trusted online identities, connecting identity services and facilitating trusted communications.

Trusted online identities

Australians traditionally support their identity claims by physically presenting a range of identity documents. In the offline world they often carry those documents in their wallets or purses.

If Australia is to increase productive online engagement and participation, there need to be processes for government, businesses and consumers to safely and efficiently perform the digital equivalent of checking the physical documents that people commonly hold while protecting individuals' privacy. This requires robust and fit-for-purpose credentials that can be used online, ideally in both the public and private sectors, and that would offer Australians a choice of mechanisms from a range of providers.

By launching myGov, the Government has taken action to advance the use of trusted online identities in Australia. The myGov site now allows citizens to use a single online account to seamlessly access several services offered by government—a significant step towards increasing trusted online engagement. The Government is also building systems to enable the delivery of an increased range of transactions online. The identification needed for these transactions will stimulate the market for online identity verification services in Australia.

Document Verification Service

An individual's identity comprises a number of attributes, such as their name and date of birth. The DVS—a feature of the National Identity Security Strategy—has emerged as a key tool for online verification of core identity attributes contained in a select set of government-issued documents.[36] The DVS is being used to strengthen client registration processes for government services. Importantly for individuals, the DVS is privacy enhancing because it is not a database. No personal information is stored during a document check. This reduces the risk of identity theft and, potentially, the amount of personal information needing to be collected or stored.

How does the DVS work?

The DVS provides a secure, real-time tool to assist organisations in assessing a person's claimed identity by checking the validity of personal information contained in key government-issued documents such as passports, drivers licences and Medicare cards.

Action 3 Expand the use of the Document Verification Service

Currently, the DVS is only available to government agencies. However, in the 2012–13 Budget, the Government allocated $7.5 million to extend access to private sector organisations with client identification obligations under Commonwealth legislation.

In the offline world, government identifiers are commonly used even where there is no requirement under law (such as when checking into a hotel). The commencement of reforms to the *Privacy Act 1988* in March 2014 may enable wider use of government documents by industry through the DVS without compromising strong privacy protections. Eligible organisations satisfying a range of privacy, use and ICT security requirements will be able to use the DVS.

The Government will work with the states, territories and industry to expand the range of organisations eligible to realise the benefits from the DVS. It will also consult with them to examine ways to enhance the usability, efficiency and value of the service. The Government will ensure that the expansion maintains high levels of privacy and is supported by a broad range of high-integrity and high-value documents. The key is to ensure that individuals are in control of how and when their information is used. The Government aims for the extended DVS to be in use in commercial transactions by the end of 2013.

Government-issued online credentials

The myGov initiative enables citizens to access a number of online government services in one place, with one sign-in. Importantly, citizens create and control their own myGov accounts.

Already, myGov is supporting some 1.2 million Australians to access services from the Department of Human Services (Medicare, Centrelink and Child Support), the Department of Health and Ageing (the new Personally Controlled Electronic Health Record) and the Department of Veterans' Affairs. The range of services available through myGov is set to increase over coming months.

Key features of myGov are its usability and security. An individual's business transactions only occur within specific departmental systems and personal information is only shared across agencies with the individual's consent. The Government will investigate the possibility of Australians being able to log into myGov using trusted third-party credentials.

Commercial identity services

Commercial identity services are well established and growing in Australia. The Government welcomes the development of a commercial market that can provide verification of identity attributes to required levels of assurance through authorised channels. These providers will continue to offer consumers innovative, cost effective, authoritative and flexible identity products and services.

The Commercial Service Provider Assurance Framework provides guidance to commercial service providers to support this aim and ensure a high level of reliability.[37]

The framework provides the basis for moving towards acceptance by government agencies of trusted third-party credentials. Depending on the business or organisation in question these can offer varying levels of assurance. For example, an online 'footprint' (evidence of an individual's online activity, including social networking) may be adequate for lower assurance transactions, such as signing up for a library card. For higher assurance transactions, such as applying for government benefits, credentials issued by financial institutions might be required.

A number of countries use third-party credentials:

> **Canada**—Canadians can use their bank authentication credentials to obtain access to online government services through a 'credential broker service'

> **United States**—as part of the United States' National Strategy for Trusted Identities in Cyberspace, the US Postal Service is piloting the use of approved identity credentials issued by third parties for access to online government services

> **United Kingdom**—organisations, including PayPal, the Royal Mail, Experian and Verizon, are assisting the UK Government to deliver secure online identity assurance schemes so citizens can verify their identity via a private sector partner to access online government services

> **New Zealand**—the New Zealand Government and New Zealand Post have developed the online service 'RealMe', which allows users to verify their identity to access a range of government and private sector services. RealMe is underpinned by a verification process similar to that of the DVS.

Governments and the private sector have a role in facilitating the development of trusted third-party credential services and alternative mechanisms to verify identity. However, it will be important to play to respective strengths; that is, government control of high value documents and the private sector's existing and growing capabilities in both strong authentication credentials and the data analysis that provides social footprints.

Action 4 Investigate the use of trusted third-party credentials by government

By early 2014, the Government will investigate and consider opportunities to:

> leverage agencies' use of higher assurance digital credentials issued by commercial providers, such as financial institutions

> use existing digital credentials, including third-party credentials, on a risk management basis.

These initiatives will be accompanied by the development of appropriate trust arrangements that meet the needs of all parties, including individuals, businesses and government agencies, and will complement the authentication service already available through myGov.

Trusted online communications

Online communications of a sensitive nature require greater trust and assurance than conventional SMS and email communications.

Digital mailboxes provide an effective solution. They offer a secure, consumer-oriented environment in which senders can dispatch trusted electronic communications to specified recipients. With the Government, consumers and businesses beginning to use digital mailboxes, a nascent market has already emerged in Australia.

For example, there are already more than 1.5 million citizens using secure online mail to communicate with the Department of Human Services. With the recent launch of myGov this number is expected to grow.

The Government is also actively supporting the development and use of third-party digital mailboxes. The Australia Post Digital Mailbox, launched in October 2012, allows Australians to:

> connect securely with registered service providers, including banks, utilities and government

> receive statements, bills and correspondence, set reminders and make payments using any device, anywhere, anytime with a single login

> use it as a personal digital vault to store digital copies of important documents.

The Australia Post Digital Mailbox is a closed online communications channel, hosted in an Australian cloud. The mailbox will offer businesses and government agencies a secure, efficient and cost-effective digital delivery service, accompanied by a range of payment options. The Department of Human Services and the Australian Taxation Office are conducting a proof-of-concept trial using the Australia Post Digital Mailbox to further connect with Australians about government services. Private sector entities are developing similar trusted online communications services.

7: Safety and security

Overview

Malicious online activity undermines user confidence and can harm our people, economy and nation. This can prevent Australians from taking full advantage of the social benefits, commercial opportunities and improved access to services, which are all part of the digital economy. Improving safety and security online is a responsibility shared between government, business and the community. For its part, the Government will:

- **release the Digital Citizenship Best Practice Principles in the second half of 2013**
- **develop and promote cybersecurity guidance material designed for small to medium-sized enterprises**
- **release a national plan to combat cybercrime in mid-2013**
- **work with the international community to develop international rules and norms as represented by the United Nations Charter and other international laws.**

High levels of connectivity and relative economic prosperity make Australia an attractive target for malicious actors. Improved online safety and security would better protect our people, economy and nation. Enhanced safety and security would boost user confidence in online services and would also make Australia a more attractive business destination.

The Government has pursued a comprehensive safety and security agenda, developing our first cybersafety plan in 2008 and cybersecurity strategy in 2009.[38 39] Indeed, in late 2011 the *Economist* Intelligence Unit ranked Australia third in the Group of 20 for our abilities to withstand cyberattacks and to deploy the digital infrastructure needed for a productive economy.[40]

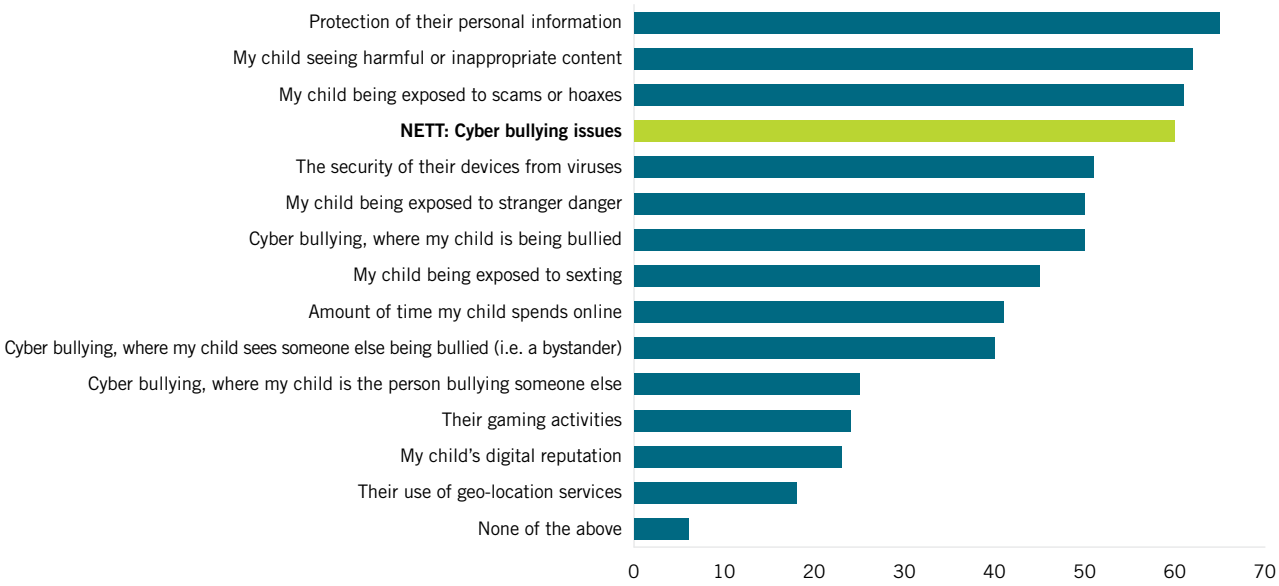
Although most Australian businesses and citizens take steps to minimise risks, some do not. This is largely because they are unaware of the risk or of what they need to do to mitigate it. A survey of parents in 2010 showed that only 46 per cent felt that they are well informed about cybersafety issues.[41] A joint Computer Emergency Response Team and Centre for Internet Safety survey of Australian businesses showed that less than 12 per cent of respondents have in place a plan for cybersecurity that would help to monitor the use of ICT systems and provide mechanisms to protect information and recover lost data.[42]

The Government, in partnership with the private sector and NFP organisations, is increasing efforts to equip people and businesses with the tools and knowledge they need to be safe and secure online. The Government is also bolstering Australia's digital resilience by countering cybercrime and by taking steps to make Australia a hard target for those who seek to use the internet for malicious purposes.

Equipping people and businesses with the tools and knowledge to be safe online

The Government can help individuals and organisations take responsibility for their own safety and security online by equipping them with tools and knowledge to do so.

Figure 5 Protection of personal information



Action 5 Release the Digital Citizenship Best Practice Principles

The Government will develop the Digital Citizenship Best Practice Principles, for release in the second half of 2013, to encourage Australians to follow the core principles of digital citizenship:

> **understanding**—developing knowledge and understanding of online spaces, services and communities

> **choice**—consciously considering decisions about whether and how to engage online and the implications of exchanges of personal information and digital security settings

> **respect and consideration**—when interacting in online environments.

Cybersecurity and safety awareness and education activities

The Government will coordinate a range of additional approaches to cybersecurity and safety education and awareness raising, comprising the following elements:

> Digital Citizenship Best Practice Principles

> Australian Curriculum content

> online safety tools and programs

> government–industry cooperation

> the promoting of safe and secure online practices for small to medium-sized enterprises

> coordinated cybersafety awareness raising.

According to a survey by Telstra in 2013, the most common cybersecurity and cybersafety concerns of parents are protection of their personal information followed by the risk of their child seeing harmful or inappropriate content on the internet. Figure 5 outlines the cybersecurity and cybersafety risks parents are aware of and most concerned about.[43]

CASE STUDY: TAGGED

Young people are navigating an increasingly complex online world. Cyberbullying, sexting and protecting their digital reputation are issues that many now face as more of their daily experiences they move online.

Tagged, a part of the Government's Cybersmart program, is a short film for teenagers that explores these issues in a powerful and realistic way.

Winner of the 2012 Australian Teachers of Media Award for best secondary education resource, *Tagged* has had more than 100,000 views on YouTube and is readily available to schools, along with a kit of comprehensive lesson plans and classroom resources.

53 per cent of children owned or accessed their first internet connected device before they were 10.

2012 Cybersafety Summit at the National Convention Centre in Canberra.

Australian Curriculum content

Australian children need to be taught safe and secure online behaviour from an early age. According to the ABS, 90 per cent of children aged five to 14 years accessed the internet in the 12 months to April 2011.[44]

Education authorities will be able to implement the new Australian Curriculum for technologies from 2014. It includes opportunities for students to learn about online safety and security. Students from Year 3 to Year 10 will learn about cybersafety issues such as maintaining respectful relationships, online interactions and the positive and negative personal, social and ethical impacts of using digital technologies. Detail on the Australian Curriculum is in Chapter 55: Digital skills.

62 per cent of parents are worried about the future consequences of their child's digital activities

Jigsaw Research (2013), Children's technology use and parental perceptions of children's online safety, prepared for Telstra.

Online safety tools and programs

The Cybersafety Help Button provides a one-stop-shop for internet users, particularly children and young people, allowing easy online access to cybersafety information and assistance such as counselling, reporting and educational resources. The Consultative Working Group on Cybersafety is now working to increase the number of school networks and mobile service providers downloading the Help Button onto their devices. Telstra is partnering with the Government to have the Help Button available on some Telstra mobile devices at point of sale. By 30 April 2013, the Help Button had been downloaded to over 889,000 ICT devices.

The Cybersmart suite of resources provides children, teachers and parents with practical and contemporary cybersafety information and advice through the Cybersmart website and Cybersmart Outreach program.

Cybersmart Outreach, which provides free-of-charge cybersafety presentations to school communities, has reached more than 670,000 young people, parents and teachers at about 7,000 events since 2009.

The Stay Smart Online website provides information about cybersecurity risks and on the simple steps that can be taken to protect against cyber risks, such as installing antivirus software and regularly changing important passwords.

The SCAMwatch website also provides information to consumers and small business about how to recognise, avoid and report scams.

CASE STUDY: COOPERATIVE ARRANGEMENTS FOR COMPLAINTS HANDLING ON SOCIAL NETWORKING SITES

In January 2013, the Prime Minister launched the Cooperative Arrangement for Complaints Handling on Social Networking Sites.

Under the Cooperative Arrangement, social networking sites, including Facebook, Google, YouTube, Yahoo! and Microsoft, have put in place policies for acceptable use, such as community guidelines, terms of use, codes of conduct or similar. Social networking sites have also agreed to ensure that their services contain clear information about:

> what constitutes inappropriate behaviour

> the consequences of breaching the acceptable use policy

> mechanisms for reporting inappropriate content, contact or behaviour.

Government-industry cooperation

The Government is working closely with internet service providers (ISPs) to create a culture of cybersecurity, including through:

> a voluntary cybersecurity code of practice, the 'icode', for ISPs—the icode provides a standard approach for ISPs to inform, educate and protect their customers about cybersecurity issues

> the Australian Internet Security Initiative, which complements the icode and provides participating ISPs with daily reports identifying malware-compromised IP addresses on their networks—these reports help ISPs remove malware infections from their customers' computing devices. By mid-2014, the ACMA will offer ISPs a self-help portal that gives additional detail on compromised IP addresses.

Promoting safe and secure online practices for small-to-medium sized enterprises

Small-to-medium sized enterprises (SMEs) are more vulnerable to targeted cybersecurity risks than big businesses because they often lack the specialist knowledge to deal with online risks. A 2012 report by telecommunications company Verizon indicated that 85 per cent of opportunistic attacks worldwide targeted businesses with fewer than 1,000 employees.[45]

The Government has developed specific guidance for SMEs to assist them in mitigating cybersecurity risks. It will promote the guidance through its existing awareness-raising channels, such as the Stay Smart Online website and the Digital Enterprise program.

Coordinated cybersafety awareness raising

Cybersafety awareness raising is important in helping Australians deal with online risks. Responsibility for education and awareness raising rests with all levels of government, industry and non-government organisations. The Government provides information to stakeholders through mechanisms such as:

> the Consultative Working Group on Cybersafety, which includes representatives from industry, non-government organisations and government agencies

> government organised cybersafety and cybersecurity events, including education and awareness raising initiatives to ensure the effective use of government and industry resources

> the Cybersafety Help Button, which acts as a one-stop-shop for cybersafety information, reporting and help for children and their parents and carers

> the Government's top 10 messages on cybersafety and security

- install and update your security software and set it to scan regularly
- turn on automatic updates on all your software, particularly your operating system and applications
- use strong passwords and different passwords for different uses
- stop and think before you click on links and attachments
- take care when buying online—research the supplier and use a safe payment method

Cybersafety Workshop at 2012 Cybersafety Summit at the National Convention Centre, Canberra.

- only download apps from reputable publishers and read all permission requests
- regularly check your privacy settings on social networking sites[46]
- stop and think before you post any photos or financial information online
- talk with your child about staying safe online, including on their smart phone or mobile device
- report or talk to someone if you feel uncomfortable or threatened online—download the Cybersafety Help Button.[47]

Bolstering Australia's digital resilience

The Government is also taking actions to counter cybercrime and to make Australia a difficult target for those who seek to use the internet for malicious purposes. This will increase the overall security and safety of Australians, while also making Australia a more attractive place to invest and do business.

Strategic assessment of current levels of cybercrime

Cybercrime is a serious threat, but the scope and magnitude of its possible impact in Australia are uncertain. The Government, with the states and territories, is undertaking an assessment of the impact of cybercrime on the Australian economic, security and social landscapes. The assessment will provide a snapshot of cybercrime in Australia in 2013 that will inform the development of the National Plan to Combat Cybercrime.

Action 6 Develop the National Plan to Combat Cybercrime

Given the complex, cross-jurisdictional nature of cybercrime, a coordinated national approach is required to address it.

To this end, the Government is working with state and territory governments to develop the National Plan to Combat Cybercrime, which will outline a strategic framework for how Australian governments will respond to the threat posed by cybercrime. The plan is expected to be released in mid-2013. It will set out key principles and priority areas for our approach to cybercrime over the medium-term (addressing both what we want to achieve and how we will achieve it), tie together existing efforts to address cybercrime, and identify areas where we can strengthen our response.

The creation of the Australian Cybercrime Online Reporting Network (ACORN)—a centralised online system for reporting cybercrime—will be a key aspect of the plan. ACORN's objective is to provide a 'one-stop-shop' for people to report instances of cybercrime and access general educational advice on recognising and avoiding cybercrime. It will also refer reports to the appropriate agency for further investigation, and collect and aggregate data on cybercrime to create a current picture of the threat environment.

CASE STUDY: VIRTUAL GLOBAL TASKFORCE

The Virtual Global Taskforce seeks to build an effective, international partnership of law enforcement agencies, non-government organisations and industry to help protect children from online child abuse.

Since it was established in 2003, the Virtual Global Taskforce has assisted with:

> the rescue of hundreds of children around the world from sexual abuse

> numerous targeted law enforcement operations into online and offline offending, resulting in more than 1,000 suspects being investigated

> identifying and holding to account hundreds of child sex offenders worldwide.

International rules and norms for cyberspace

Because the digital world has no geographical boundaries, Australia needs to work with the international community to encourage the establishment of a safe, secure cyberspace, where human rights are upheld. Accordingly, Australia will work with the international community to continue to develop global norms and rules for online behaviour.

A balanced set of global rules will encourage dynamism in the global digital economy and growth in diverse, collaborative and creative online communities. Established rules will also contribute to more appropriate online behaviour and encourage the protection of people's online privacy so that all users feel safer in embracing online services.

Australian Cyber Security Centre

As part of its National Security Strategy, the Government has announced the establishment of the Australian Cyber Security Centre, which brings together the Department of Defence's Cybersecurity Operations Centre, the Attorney-General's Computer Emergency Response Team Australia, the Australian Security Intelligence Organisation's Cyber Espionage Branch, elements of the Australian Federal Police High-Tech Crime Operations capability and all source assessment analysts from the Australian Crime Commission.

The Australian Cyber Security Centre will be responsible for:

> developing capabilities to maximise Australia's strategic capacity and reach in cyberspace, enhancing our ability to detect, deter and deny malicious cyber actors targeting Australia

> developing a comprehensive understanding of the threat to Australian Government networks and systems of national interest

> responding to and assisting in the mitigation of cyber incidents affecting government or private sector networks

> working with critical infrastructure sectors and key industry partners to limit the threat to our nation's most valuable networks and systems

> providing key policy agencies with advice and support to develop proactive strategies to counter cyber threats.[48]

Australian Cyber Security Centre

8: Supportive environment for digital industries

Overview

Digital industries often operate in an environment that lags technological developments. Business and government can be slow to demand new digital services, while some regulatory settings can unduly constrain the ICT sector. The Government will:

- **determine the most effective measures to address the barriers faced by start-up companies including reviewing the tax treatment of employee share schemes and developing guidance to reduce the administrative burden of establishing such schemes, by December 2013**
- **undertake a review to determine a best practice framework for crowd-sourced equity funding by April 2014**
- **review the Electronic Transactions Regulations 2000 to remove outdated exceptions to electronic transaction legislation by December 2014.**

If Australia is to keep pace with the world's leading digital economies, we need to ensure that our digital industries are not unduly inhibited by out-dated regulations and business practices. In particular, we must change rules and regulations that inadvertently bind us to outmoded delivery channels, such as hard-copy letters, while promoting innovative solutions as they emerge. We must also continue to pursue balanced solutions to challenges that have emerged in the online world, such as dealing with copyright and ensuring that businesses contribute an appropriate share to the Australian tax base.

A competitive digital economy sector

According to Deloitte Access Economics, Australian technology start-ups are less likely to reach maturity than their international counterparts.[49] Only 4.8 per cent successfully scale to sustainable businesses, compared with 8 per cent in Silicon Valley and 6.7 per cent in New York. The under-capitalisation of the start-up market and difficulties attracting and retaining talent are key impediments. Employee share schemes, crowd-sourced equity funding, and the agglomeration of talent and ideas through the Industry Innovation Precincts Scheme can help to deal with these issues.

Employee share schemes

Attracting and retaining talented staff are important for any business, but particularly so for high-tech start-ups. Employee share schemes (ESSs) provide an extra option for remuneration of talented staff. Australia, like many OECD countries, provides concessions within the taxation system to encourage businesses to establish ESSs, recognising the economic benefits for all companies in aligning the interests of shareholders and employees. Being able to offer employees shares or options is of particular benefit to cash-poor start-up businesses as a way to attract and retain talented staff.[50]

Australian ESS regulations were changed in the 2009–10 Budget as part of a package of measures to better target tax concessions, to ensure all forms of remuneration were treated equally, and to improve integrity in the tax system.[51]

Several industry sectors have raised concerns about the current tax arrangements, particularly as they apply to share options offered by start-up firms. Under current arrangements, staff working for start-ups who receive shares or options as part of their remuneration must pay income tax at the time those shares or options are received. However, early stage start-ups usually have no revenues, and the shares or options are generally not tradeable and may have little or no value. Indeed, given the high-risk nature of start-ups, in many cases an option may never be exercised.

Industry is also concerned about the difficulties presented by additional valuation costs for start-ups that result from taxing shares or options on receipt, and the high overall costs of establishing ESSs. These complexities can make ESSs unattractive for many start-ups, with possible negative implications for the development of start-ups in Australia.

Other countries, including Singapore, the United Kingdom and the United States, have a range of schemes that provide incentives for employee share ownership. These schemes have a variety of taxing points, tax rates and eligibility criteria.[52] Stakeholders have argued that the Australian approach contributes to difficulties in attracting high-quality expatriate and overseas talent and convincing Australia's best to remain here.[53]

Action 7 Review the regulatory arrangements for employee share schemes

The Government recognises that more could be done to support start-ups by reducing the cost and complexity of administering an ESS. By December 2013, the Government will consult with stakeholders to determine the most effective measures to address the barriers faced by start-up companies, including:

> developing guidance to reduce the administrative burden (meaning the cost of valuing shares and options) of establishing an ESS

> adjusting the valuation methodology of options

> examining the point at which share options are taxed for start-up companies.

Crowd-sourced equity funding

Crowd-sourced equity funding (CSEF) is a relatively new way to finance early stage, high-potential, high-risk companies—exactly the type of firm that is on the cutting edge of the digital economy. We need to ensure that our regulatory settings enable reasonable access to this form of capital.

The owners of start-ups will usually rely on their personal resources and investments from their friends and family at the very start of their business, as they are developing the concept. Once they have a solid concept, start-ups generally seek 'angel investment' to build on their ideas. Venture capital typically becomes important when the business is ready to reach the next commercial level and has a need for significant amounts of capital, usually greater than a million dollars.

In recent years, crowd-sourcing has emerged as a new model for raising early stage seed funding complementing traditional friends, family and angel investors. The growth and popularity of social media and trusted internet money transfer services have driven the emergence of these new funding approaches. While providing opportunities for start-up companies, CSEF is a high-risk, low-liquidity investment option. There are also potentially significant risks of fraud.

In Australia, it may be possible to operate schemes similar to CSEF under the existing Australian corporations framework through managed investment schemes. However, as has been the case in the United States, the United Kingdom and Canada, the increasing popularity of crowd sourcing, its value in supporting a vibrant start-up community and the potential risks to investors, necessitate a further examination of our regulatory settings. It will be important that our approach appropriately balances investor protection with commercial viability.

Action 8 Consult on an Australian crowd-sourced equity funding scheme

The Government will conduct a review in consultation with stakeholders to consider:

> whether Australian corporations law appropriately facilitates CSEF

> whether international models can provide guidance

> what would constitute a best practice framework for Australia to balance investor protections and consumer confidence with investment opportunities and access to capital for start-ups, having regard to existing regulations and the Future of Financial Advice reforms.

The review will provide recommendations for a practical CSEF regime by April 2014.

Industry innovation precincts

The Government's *Industry and Innovation Policy Statement (A Plan for Australian Jobs)* announced the forthcoming establishment of up to 10 industry innovation precincts to foster collaboration between industry and the research sector in Australia. [54] The precincts will create new growth opportunities and enhance the competitiveness of Australian businesses.

The digital economy will be an important element of the precinct initiative, which is why the Government has agreed to establish the Industry Innovation Network. This will be a digital platform designed to complement the activities of precincts. The Industry Innovation Network will enable members of a precinct, as well as all other interested parties, to connect online, supporting knowledge sharing and building connections between industry and the innovation system. It will capitalise on the opportunities for greater connectivity created by the NBN, and link firms to other businesses, business advisers, higher education, vocational education, research institutions and government to foster a virtual community of innovation.

Reducing regulatory barriers for the digital economy

There are various areas where regulations need review to keep pace with developments in the digital economy. These range from the *Electronic Transaction Act 1999* to the international regulatory settings affecting Australia.

Electronic Transactions Act 1999

The *Electronic Transactions Act 1999* (the ETA) provides that for the purpose of a law of the Commonwealth, a transaction is not invalid because it took place wholly or partly by means of one or more electronic communications. Specifically, the ETA provides that the following requirements imposed under a law of the Commonwealth can be met in electronic form:

> to give information in writing

> to provide a signature

> to produce a document

> to record information

> to retain a document.[55]

However, the regulations to the ETA include over 150 exemptions to these general rules. There has been significant evolution in technical and business practices, including security and document verification measures, since the enactment of the original ETA and it is now appropriate to review the list of exemptions. An example of an exemption that should be reviewed is that covering the imposed requirement under the *Insurance Contracts Act 1984* to use traditional mail for the delivery of some documents.

Action 9 Minimise exemptions under the *Electronic Transactions Act 1999*

The Government will review the Electronic Transactions Regulations 2000 to ensure that exceptions to the operation of the ETA remain necessary in the light of current and emerging digital channels and consumer preferences.

The review will be led by the Attorney-General's Department and will report to the Attorney General by June 2014. Out-dated exceptions will then be removed by December 2014 to ensure, wherever appropriate, that transactions with the Government can be undertaken digitally.

Flexible copyright regime

Copyright plays an important role in driving creativity and innovation in the digital economy and the Government recognises the need to achieve a balanced and flexible copyright framework. To ensure that business models could be developed and adapted to new and emerging technologies without unnecessary barriers, the Government commissioned a thorough review of Australia's copyright by the Australian Law Reform Commission as the most appropriate avenue for considering all relevant issues and any future reforms.

The commision will explore issues related to copyright and the digital economy, such as whether existing exceptions are appropriate and whether further exceptions should:

> recognise fair use of copyright material

> allow transformative, innovative and collaborative use of copyright materials to create and deliver new products and services of public benefit

> allow appropriate access to, interaction with and use and production of copyright material online for social, private or domestic purposes.

The Australian Law Reform Commission is due to report by 30 November 2013. The Government will consider this report with a view to developing copyright policy that facilitates the development of Australia's digital economy.

GST and online shopping

Online shopping has grown rapidly in recent years, offering convenience and choice for consumers. Most goods purchased online from overseas retailers fall under the threshold of $1,000, above which GST and customs duty apply to imported goods. Australian retailers have argued that this gives overseas retailers an unfair advantage.

In its 2011 report on the retail sector, the Productivity Commission found that while the low value threshold was not the primary factor affecting the international competitiveness of Australian retailers, there were in-principle grounds to reduce the threshold to promote tax neutrality for sales by Australian retailers. However, it also concluded that it would not be cost-effective to lower the threshold without significant improvements in the efficiency of processing low value parcels. The Government subsequently established a taskforce to establish how to improve the efficiency of low value parcel processing. Business cases and implementation plans are being prepared for reforms in this area.

The global regulatory environment

To compete with the world's leading digital economies, we need to ensure that the global regulatory environment supports Australian digital industries. To date, international agreements in electronic commerce, telecommunications and intellectual property have provided a strong regulatory foundation to encourage the digital economy and create opportunities for Australian businesses.

The Government has an ambitious approach for Australian trade in the digital economy, pursuing greater openness, connectivity and interoperability. We work with our trading partners and the broader international community to develop open, secure and well-regulated digital markets, through the negotiation of trade agreements and our involvement in international forums such as the World Trade Organization, the Asia-Pacific Economic Cooperation forum, the International Telecommunication Union and the Organisation for Economic Co-operation and Development.

CSIRO Digital Productivity and Services Flagship

Australia has a proud history of scientific achievements, from the black box flight recorder to the patenting of wi-fi. To become a leading digital economy, we must also be at the forefront of the application of new technologies. Embedded business practices across industry and government must be challenged if we are to continually adapt. This can be accelerated by exposing our leaders to the world's best and brightest digital minds and demonstrating cutting-edge applications. At the same time, continuing to open access to government data can be an important catalyst for innovation.

The CSIRO Digital Productivity and Services Flagship is a $40 million research initiative that targets Australian productivity improvements and growth in the digital economy through services innovation.[56] The flagship will follow three broad approaches to help businesses, industry and government change the way services are created, delivered and consumed:

> effectiveness and efficiency—doing more with the resources we currently have

> doing old things in new ways—changing the way services are delivered

> doing new things in ways we have never thought of before—changing what we do in the digital economy and changing the way people engage with technology.

9: Harnessing the benefits of cloud services

Overview

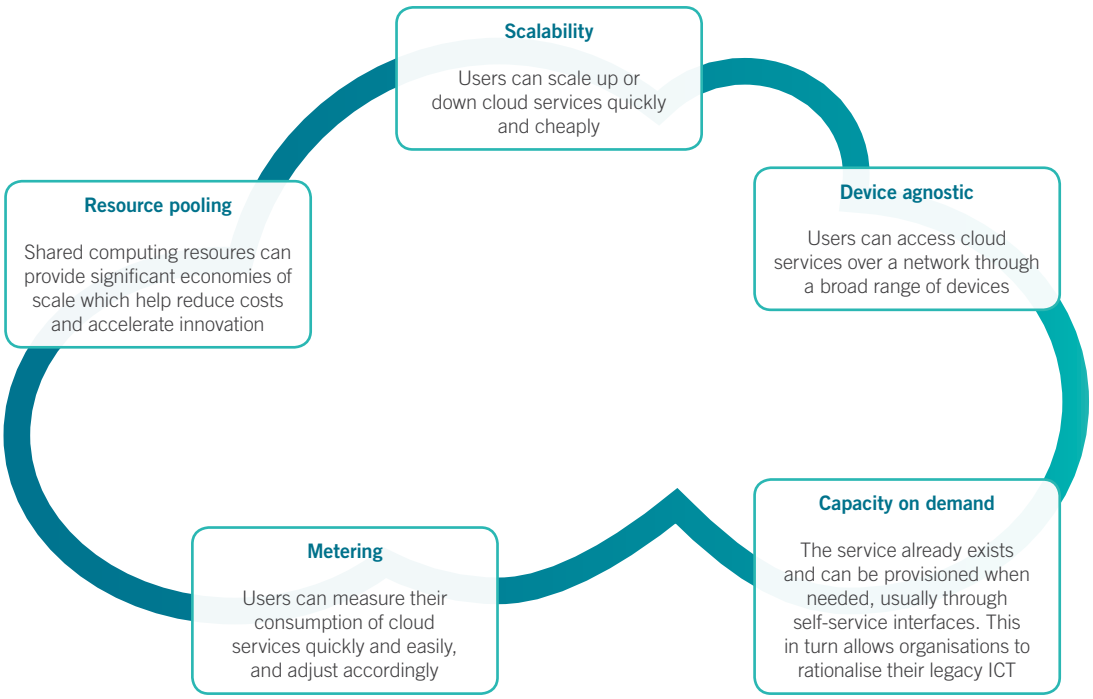
The advent of cloud computing is fundamentally changing the way we think about computing and data management—it allows ICT to be delivered over the internet and be consumed as a service, on demand, across a wide range of devices.

The Government developed the National Cloud Computing Strategy to address barriers to adoption while maximising the benefits of cloud computing in Australia. The strategy includes a series of actions to:

- **maximise the value of cloud in government—including changes to procurement policy to ensure that government agencies consider cloud services for ICT procurements**
- **promote cloud to small businesses, not-for-profits and consumers—as part of this, the Government will encourage industry and consumer groups to develop a cloud consumer protocol to promote information disclosure by cloud providers and support consumers of cloud services being well informed**
- **support a vibrant cloud sector—this will include ongoing collaboration between the Government and industry to promote Australia as a trusted hub for data storage and processing, while encouraging foreign investment and participation.**

Cloud computing is the provision of ICT as a service on demand via the internet.[57] Cloud services can substitute for traditional ICT infrastructure, platforms or software and there is a large range of cloud services already on offer. All of these services are different, but they are characterised by five qualities (see Figure 6).

Figure 6 Five qualities of cloud services



Cloud services and economic growth

There is a growing body of evidence linking the adoption of cloud services with economic growth.[58] For example, a study commissioned by the European Commission into the impact of cloud predicted that the successful adoption of cloud computing by all member countries would boost gross domestic product (GDP) by 1 per cent and create 2.5 million jobs by 2020. The study also reported that a scenario driven by government policies was three times more effective in creating jobs and economic growth than a scenario with no government policy.[59]

The use of cloud computing has the potential to deliver significant productivity benefits to firms and governments through reduced ICT spending, increased flexibility, improved output from a more flexible and productive workforce, and access to the latest technologies and universal resources.

As with traditional ICT, there are also risks with cloud services, such as security, privacy, data ownership and vendor lock-in, that can present barriers to cloud service adoption, particularly for SMEs.[60]

Nonetheless, Australia is well positioned to become the cloud hub of Asia, with strong privacy and financial regulatory settings, an educated workforce and the rollout of world class broadband infrastructure. The Business Software Alliance Global Cloud Scorecard ranked Australia second in the world for cloud computing technology readiness.[61] Australia topped the Asia-Pacific cloud adoption rates for the third consecutive year in the VMWare Cloud Index.[62]

Australian Government cloud activities

Government agencies such as the Department of Education, Employment and Workplace Relations (DEEWR) are leading the way in integrating cloud services into their business activities and cost is only one consideration. To enhance its business continuity arrangements DEEWR put its outwards-facing websites onto the cloud. This enabled it to take advantage of a new technology without having to rebuild its internal capability.

DEEWR is completing a pilot trial of cloud services, including application development environments (development and test), selected infrastructure environments, archiving for long-term storage of data not frequently accessed, and virtual PC hosting for selected groups of developers. The pilot, due in September 2013, is investigating whether the services offered by cloud providers can generate real cost savings, and offer the same or increased service capability and flexibility, without compromising security or other requirements.

Savings for business

Xero is a cloud services firm that provides accounting, banking, reconciliation and payroll services. A client of Xero reported savings of over $60,000 a year using cloud services to reduce IT overheads. The availability of cloud services on mobile platforms and smartphone applications also highlights the value of mobility and flexibility in supporting business people to run their operations while being out of the office.

National Cloud Computing Strategy

On 5 October 2012, the Prime Minister announced that the Government would develop the National Cloud Computing Strategy (NCCS). The NCCS aims to address barriers to adoption while maximising the benefits of cloud computing. In particular, it recognises the potential for cloud computing services, in combination with the NBN, to raise productivity and foster innovation across all sectors of the Australian economy.[63]

The NCCS outlines the Government's vision for cloud computing. To achieve this vision, the strategy outlines three goals:

Maximise the value of cloud services in government

The use of cloud services within government is an important element of their broader adoption throughout the Australian economy. The NCCS outlines how the Government will be a leader in the use of cloud services to achieve greater operating and procurement efficiency and agility.

Key actions include:

> changes to procurement policy to require all government agencies to consider the cloud for ICT procurement decisions

> transitioning public-facing websites to public cloud services as their refresh cycle allows, where those services represent the best value for money

> developing information-sharing initiatives to facilitate continual improvement based on a repository of case studies, better practice risk approaches and practical lessons learned.

Promote the cloud to small businesses, not-for-profits and consumers

The NCCS outlines the actions that the Government will take to ensure that small businesses, not-for profits and consumers have the protection, information and tools they need to acquire cloud services with confidence.

Key actions include:

> encouraging industry and consumer groups to develop a cloud consumer protocol to promote information disclosure by cloud providers and support consumers of cloud services being well informed

> developing information and tools through a range of existing Government initiatives (such as the Digital Enterprise and Enterprise Connect programs)

> developing a regulatory stock take of existing regulatory measures and how they apply to cloud services.

Support a vibrant cloud services sector

The NCCS outlines the actions that the Government will take to further develop a vibrant cloud sector, shaped and supported by:

> a skilled and cloud-aware ICT workforce, able to create as well as adopt cloud services

> effective competition in cloud services

> regulatory settings that support growth, foster innovation and protect users.

A competitive cloud services market will drive efficiency and innovation, which benefits consumers through increased choice, better quality services and lower prices.

To achieve this goal the Government will work to ensure that there are no impediments to the Australian cloud sector's pursuit of new opportunities. The Government will collaborate with industry to support a skilled ICT workforce, promote Australia as a trusted hub to foreign investors, and ensure effective competition through the negotiation of trade agreements and involvement in relevant international forums.

Action 10 Promote the adoption of cloud computing in Australia

To promote the smart adoption of cloud computing in Australia and to realise its vision, the Government will pursue the actions outlined in the National Cloud Computing Strategy. The actions will foster the use of cloud services by government agencies, businesses, NFPs and consumers and support the cloud services sector.[64]

10: Encouraging open data and big data

Overview

'Open data' and 'big data' facilitate innovation and increased productivity. As a commodity, data has transaction and processing costs, but those costs are diminishing as individuals and businesses work towards increasing the efficient flow of data. To continue to support an environment open to harnessing open data and big data, the Government will:

> **release its big data strategy in 2013**

> **continue to expand public sector data on data.gov.au**

> **explore options for providing open access to the Geo-coded National Address File.**

Governments are key collectors and producers of large amounts of data that, when released publicly for reuse, can be used in new and innovative ways. In the past, governments would charge a fee for access to this data, but there is increasing evidence that free access will bolster economic activity and efficiency.

Open data

'Open data' is the commitment that some organisations make to allow data to be freely available for reuse. Many groups and innovators are already 'mashing up' government data to create new stories, visualisations, resources and tools.

The results of the recent Public Sector Information Survey suggest that many government agencies possess data that could generate significant value if made available for reuse, including by private sector organisations.[65 66] The Australian Government has made progress on this front. A recent report by the Office of the Australian Information Commissioner *Open public sector information: from principles to practice,* reported that government agencies are actively embracing an open access and proactive disclosure culture. The high response rate to the Public Sector Information Survey and the widespread and growing use of digital and web technologies to support a transformation is another sign of progress.[67]

Using open data—GovHack

The 2012 GovHack event in Sydney and Canberra resulted in more than 40 projects that used public sector data. One of the category winners, Safe Route, used Geoscience Australia data to create an application that helps users to monitor bush-fires in their region, alert them in case of emergency, and assist with evacuation.

data.gov.au

data.gov.au is an open data initiative that allows users to access and reuse public datasets from the Australian Government and state and territory governments.[68] The Public Sector Information Survey showed that a large proportion of government agencies use data.gov.au to publish public sector information.[69]

The Government has also put in place a number of initiatives to promote access to and the usability of public sector information. Under the Declaration of Open Government, the Government committed to a culture of engagement, built on better access to and use of government held information sustained by the innovative use of technology.[70] This was supported by the amendment of the *Freedom of Information Act 1982* in November 2010 to include a new objects clause, which declares that 'information held by the Government is to be managed for public purposes, and is a national resource.[71]

The Government will continue to expand the data available on data.gov.au. Data will be published in open and standards-based formats that are machine readable.[72]

Maximising the opportunity of spatial data

One suite of public sector information with significant economic value is authoritative location based (or spatial) information. There is growing recognition of the significant impacts that spatial information can have on economic growth, better evidence-based policy making, more effective national security and greater efficiencies in citizen-centric government service delivery across all levels of government.[73]

Australia has a world-leading national geo-coded address data set—PSMA Australia Limited's Geo-coded National Address File (G-NAF).[74] While the G-NAF is currently only accessible under licence, open access to this information could unlock significant opportunities for innovation and information sharing.[75]

Action 11 Explore making the G-NAF a freely available data-set

The Government will explore options for providing open access to the G-NAF and analyse the legal, financial and security implications of those options.

Office of Spatial Policy

The Office of Spatial Policy is the central Australian Government policy unit responsible for facilitating and coordinating spatial data management across agencies.

The office's APS 200 Location Project, focused on developing options to address location information policy, governance, and investment.

A copy of the project outcomes is available at www.ret.gov.au/Department/Documents/osp/APS-200-Location-Project-summary-of-outcomes.pdf

Big data

The digitisation of information has accelerated over the past decade. Over 90 per cent of the world's data was created in the past two years.[76] There are now trillions of pieces of information on consumers, social interactions, businesses, transactions and scientific measurements merged into enormous stored pools of unstructured data. This phenomenon is known as 'big data'.

Analysing large pools of existing data can help create economic and social value through insights that drive innovation and efficient business practices. These insights can even create opportunities for new service industries. For example, Google has analysed its search data to predict the spread of influenza. It designed a model to analyse the billions of search queries for flu information. Compared to the traditional process in which public health authorities collect data through doctors, the model has the advantage of seeing patterns in the spread of flu in near real time.[77]

As well as creating new services, big data can lead to significant efficiency gains. In 2011, the McKinsey Global Institute estimated the value of big data to different sectors of the global economy, including $US 300 billion savings in annual value to the US health care sector, of which $US 200 billion came from a reduction in health care costs[78] In 2012, UK thinktank Policy Exchange reported that cutting-edge big data performance has the potential to achieve up to £33 billion in savings per year for the British Government through improved government operations efficiency and greater effectiveness in detecting fraud and error.[79]

> **'Although changes in technology have been a critical factor making (big data) possible, something more important changed too. There was a shift in mindset about how data could be used. Data was no longer regarded as static or stale, whose usefulness was finished once the purpose for which it was collected was achieved. Rather, data became a raw material of business, a vital economic input, used to create a new form of economic value. With the right mindset, data can be cleverly reused to become a fountain of innovation and new services.'**
>
> Mayer-Schonberger, V and Cukier, K 2013 *Big Data: A revolution that will transform how we live, work and think* Houghton Mifflin Harcourt, Boston

Big data is also opening up new possibilities in research. The increasing volume and complexity of data sets available to researchers has necessitated measures to enable researchers to use that data effectively, including research initiatives under the Government's National Collaborative Research Strategy Infrastructure program and the Super Science Initiative.[80] [81]

Examples include high-performance computing facilities to help analyse and model very large data-sets, such as those arising in astronomy, climate change and geoscience research, as well as the development of a national data storage network for research.

The CSIRO, working in collaboration with Fire and Rescue NSW, has developed a natural disaster impact assessment tool the Fire Emergencies and Natural Disasters Impacts Portal, to provide a better understanding of the social, economic and environmental impacts of natural disaster.[82] The insights developed through these data repositories can assist communities in allocating investments in prevention, preparedness, response and recovery.

As in other areas that deal with big data, effective skills and human capacity, as well as cultural change to enable the research sector's optimal use of big data, are also needed. Recent developments in opening access to publicly funded research data, including announcements by the Australian Research Council and the National Health and Medical Research Council to promote access to the outputs of publicly funded research, will contribute to the cultural change required.[83]

Government and big data

Government agencies collect and generate data that has the potential for further analysis and reuse. To support progress, the Australian Government Information Office (AGIMO) is developing the Government's big data strategy, which will set out the actions that the Government is taking to protect privacy while allowing it to harness the opportunities afforded by big data.[84] The big data strategy will deliver on elements of the Government's APS ICT Strategy 2012–15.

The Government has already established the Data Analytics Centre of Excellence, where agencies can share better practice in meeting the challenges of big data and harnessing it to deliver better outcomes for all Australians. The centre also allows government to pool its resources in an area where skills gaps exist.[85]

Action 12 Release the big data strategy

In 2013, the Government will release its big data strategy and continue to support the Data Analytics Centre of Excellence.

NICTA—using big data to drill

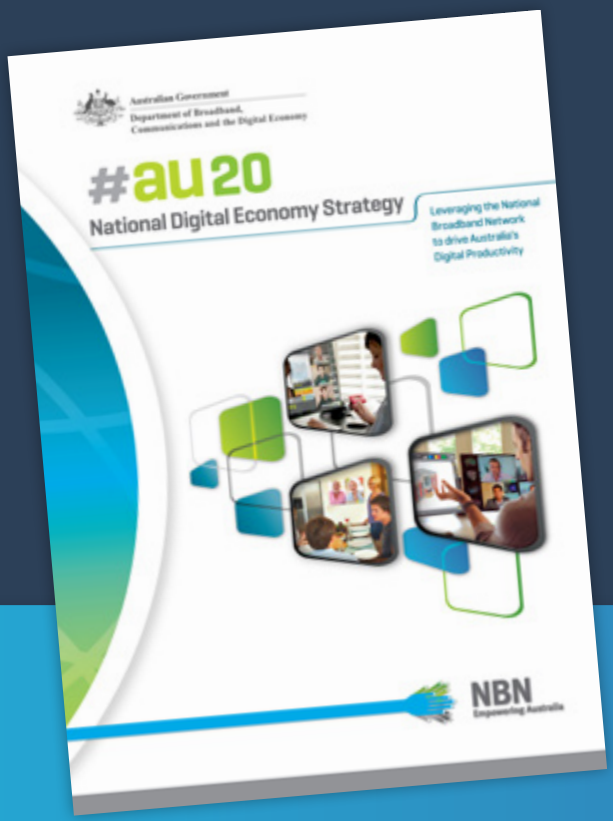
NICTA has applied cutting edge research techniques across large data sets to locate the most promising sites for exploration of geo-thermal energy. This research enables NICTA to better target exploration sites, which could potentially save tens of millions in drilling costs.

CONNECTING, COLLABORATING, CREATING

Part three:

Achieving our goals—

BUILDING ON THE 2011 NATIONAL DIGITAL ECONOMY STRATEGY



11: Online government service delivery

By 2020, four out of five Australians will choose to engage with the Government through the internet or other types of online service.

To advance our progress towards this goal, the Government will adopt the policy of Digital First in the design and delivery of government services. Under the Digital First policy, agencies will:

> **commit to using digital channels as their main form of service delivery**

> **commit to the milestones in the Digital First roadmap**

> **implement end-to-end online processing for government services, with a single authentication process by the end of 2017.**

Engaging with government using digital means is generally more cost and time efficient. The ACMA found in May 2012 that 82 per cent of Australians expect governments to deliver services online while only 6 per cent disagree.[86]

Progress update

In 2011, the use of digital channels for accessing government services appeared to plateau at between 30 and 40 per cent across all levels of government in Australia.[87] However, the past 12 months has seen significant progress in the Government's digital offerings. In a 2012 survey, AGIMO found that there were more than 1,000 government services available online with a further 320 enhanced or new services planned for introduction in 2013–14.[88] High-transaction agencies including the Australian Taxation Office, the Department of Human Services, and the Department of Immigration and Citizenship are leading the way.

The home page of the myGov website.

Recent DHS initiatives include the launch of myGov and the introduction of a mobile online services app that has helped boost the proportion of DHS services conducted online to 50 per cent. Indeed, Australia is a leader in the use of mobile apps for improved access to human services. However, to ensure that the Australian Government's 2020 goal for digital service delivery is met, we will need to continue to build on this progress.

One barrier to lifting the rate of use—lack of access to adequate broadband infrastructure—is being addressed: ubiquitous high-speed broadband connectivity allows high-quality multi-party video interactions to replace counter transactions and enable rapid movement of very large quantities of data.

The easy gains have already been made as most simple services that can be offered digitally have already been converted. Increasingly, it is the more complex services which remain to be converted to a digital channel. It is also the case that some government transactions cannot currently be done entirely online. For example, the process may require in-person identity verification or the lodgement of hard-copy documents. More generally, usability as well as digital trust and identity issues still constrain the uptake of digital services.

RECENT SERVICE INITIATIVES BY THE GOVERNMENT

DEPARTMENT OF HUMAN SERVICES

In 2011, DHS brought together service delivery agencies with the aim of improving the delivery of health related services to the Australian public. This has meant transforming the way services are delivered to enable more convenient access to improved online service delivery options (such as self-managed services), and simplifying transactions through the development of new ICT solutions. There are approximately 6.9 million customers registered for online services.

> Self-service transactions for Centrelink service increased by 24 per cent between November 2011 and November 2012.

> Over 53 million transactions were completed online in 2011–12.

> As of December 2012, 88 per cent of all Medicare claims were submitted electronically.

> Over 1.4 million Australians signed up for online mail.

> Over 6 million transactions have been completed via the DHS Express Plus mobile app since August 2012.

> 1.2 million citizens access services via Australia.gov.au

> As at April 2013, there had been over 500,000 downloads of the DHS Express Plus mobile app.

DEPARTMENT OF IMMIGRATION AND CITIZENSHIP

Introduced in July 2012, SkillSelect is the Government's innovative new system for selecting points-tested skilled migrants. Within the first six months of operation:

> more than 26,000 clients completed the online expression of interest process

> some 430 Australian businesses registered to use SkillSelect, using the secure AUSkey authentication solution.

Online skilled migration applications have subsequently increased by over 200 per cent since the SkillSelect model was implemented. Additionally, through the collection of traveller data in real time, DIAC's new Border Risk Identification System has resulted in 20–30 per cent fewer clients being referred to exception processing at Sydney Airport. This means DIAC has the option of intervening in the process before travellers board the flights to Australia. An iPad version of the system is being developed to enable increased real-time processing at key airport hubs.

Meeting the challenge

Digital First

Submissions to this update to the 2011 NDES from key stakeholders such as IBM, the Australian Industry Group, the Business Council of Australia, Google and the Digital Industry Association for Australia noted the important role that digital government service delivery can play in improving the quality of service and stimulating the broader economy.

To accelerate the provision of government services digitally, the Government will adopt a Digital First policy, committing Australian Government agencies (under the *Financial Management and Accountability Act 1997*) to using digital channels as their primary or preferred form of service delivery. Fundamentally, Digital First means transforming transactions between government agencies and their clients from hard copy to digital and, where face-to-face contact is necessary, from in-person interaction to video interaction where appropriate.

Other channels of service delivery will continue to provide access and equity for more vulnerable clients, including senior Australians, and those with limited means. However, they will become significantly less used as clients are assisted to make the transition to digital. In-person interactions will probably remain necessary for some transactions. This aspect must be considered when applying the Digital First principles.

Action 13 Implement the Digital First initiative

Under the Digital First policy, agencies will commit to:

> using digital channels as their primary or preferred form of service delivery (other channels will remain in place for clients where necessary) and providing assistance to clients to migrate to digital channels

> meeting the commitments and milestones in the Digital First roadmap

> implementing end-to-end online processing for government services with a single authentication process by the end of 2017.

PRINCIPLES

The Digital First policy is based on three overarching principles, which will guide agencies as they transition existing government services to digital delivery and design new services

> **Design online services for the end user**—Digital transactions must be designed to be convenient for clients. They should be available from any widely accepted platform and have reliable support available. Clients should find it easy to update personal details. The services must feature appropriate digital trust, identity and authentication procedures. There must be assistance to help clients migrate to digital channels and alternative channels of service provision for those who cannot access online services.

> **Business process redesign**—Innovative redesign of the business processes and policies behind the online services to make the most of digital capabilities and opportunities has the potential to lead to further benefits for both clients and government. Legislation relevant to individual agencies may also need to be reviewed.

> **Design with integration in mind**—Agencies will collaborate to establish common standards, portals and login credentials, and easy navigation to give the client a consistent and positive experience. This collaborative approach should also allow agencies to take advantage of economies-of-scale for common activities such as providing support for online clients, delivering benefits for both citizens and government.

CASE STUDY: STREAMLINING BUSINESS REPORTING

Regulatory reporting is a significant cost to Australian business. It can be alleviated by government working to standardise activities between agencies and businesses by making the best possible use of digital technologies. The Standard Business Reporting (SBR) program is an initiative of the Australian Government that provides a quicker and simpler way for businesses to report to government. SBR has been available for business use since 1 July 2010 and was delivered as part of the Council of Australian Governments (COAG) Partnership to Deliver a Seamless National Economy. The Productivity Commission's April 2012 report on the impacts of COAG's reforms confirmed that the benefits of SBR for business under the program's current scope are likely to be large—in the order of $500 million per year. While the main focus of SBR to date has been on financial and payroll reporting to government, SBR is being expanded beyond its original scope to further reduce the burden that regulatory reporting places on businesses and the NFP sector.

SBR will be increasingly used for superannuation and taxation reporting, following the announcement of two key initiatives:

> SBR is to be progressively rolled out over 2013–15 as the standard platform for superannuation industry transactions as part of the Government's Stronger Super reforms

> On 6 December 2012, the Government notified COAG that the Australian Taxation Office would adopt SBR technology to rationalise its online reporting channels by 2015–16.

The Australian Taxation Office receives 26 million transactions through its electronic lodgement service each year. From 1 July 2015 all these digital services and more will standardise through SBR. Once SBR is fully implemented, taxation professionals will be able to interact with clients and government more effectively and with reduced reporting costs. Currently, there are over 363,000 businesses registered to use the SBR authentication tool, AUSkey.

COMMITMENTS

The Digital First roadmap in Appendix A sets out the key commitments and timings for building a digital service delivery capability across government out to 2020.

The aim of Digital First is to provide government clients with user-friendly access to priority services online, allowing end-to-end processing for those services without needing multiple passwords and/or multiple online tests of credentials.

To achieve this aim, the Australian Government will meet the following four commitments. Any exemptions to these commitments based on business case or policy grounds will require approval from the relevant portfolio minister and must be identified in agencies' Digital First plans.

> **First, individuals and businesses will be able to complete all priority services online using major platforms, including smartphones and tablets where appropriate, by December 2017**.
  - 'Priority services' are those transaction-based services identified by each agency that will enable them to serve 80 per cent or more of their client base consistent with the Digital First commitments and principles. Digital First is not mandated for any particular service, provided that each agency meets the 80 per cent target in aggregate unless specifically exempted by the portfolio minister. The reasons for an exemption must be reflected in the agency's Digital First plan.

> **Second, individuals and businesses who need to receive inperson services will have the option of accessing those services via video wherever this method is cost-effective and consistent with government policy from December 2015.**

A range of services are delivered on a face to face basis across all Australian Government agencies. Each agency delivering face-to-face services will be required to assess options for the use of video technologies for those services in its Digital First plan. It is expected that in many cases:

- individuals may choose to migrate to online self-service channels from in-person services, to, for example online claiming
- for more complex services, the in person options will continue to be available particularly where that is necessary for policy reasons, cost-effectiveness or both
- for complex services agencies will trial video-based service delivery using online appointment systems to manage demand.

> **Third, individuals and businesses will be able to choose to register for all priority government services entirely online by December 2016**.
  - By December 2016, individuals will be able to choose to register online for participating Australian Government services. Many will be available through myGov (including e:tax, welfare, child support, health and aged care services).
  - Agencies will also develop strategies and investment plans to make all hard-copy communications electronic (for example, claim forms and letters) by enabling people to receive digital mail for services such as e:tax, welfare, child support, health and aged care services in their myGov account or a third-party digital mailbox. These strategies will also take into account the need for access and equity for more vulnerable clients and other legal considerations
  - Businesses are already able to register online for Australian business numbers (ABNs). By December 2016, they will be able to register for all priority government business services online.

> **Fourth, individuals will be able to choose a single authentication method to access priority government services from December 2017**.
  - Individuals will have the option of access to a range of government services online using one set of log on credentials through myGov from 2013. myGov will offer online access to Medicare, Centrelink, child support services, personally controlled electronic health records, and disability, veterans and taxation services with a user friendly interface progressively from 2013.

– The Government will also investigate the use of trusted third-party authentication services with a view to enabling individuals to choose how they access priority government services from a range of authentication providers (when they become available) without the need for multiple passwords. The potential to use third-party credentials in conjunction with myGov or where citizens prefer, independently of myGov will be considered as part of this investigation.

In order to meet these commitments agencies will achieve the following milestones to improve online service delivery:

> **Agencies will publish a Digital First plan on their websites and will keep these plans updated in the light of developments in technologies and client preferences.** Each agency will identify its priority services in its Digital First plan by July 2014.

> **Agencies will plan all new priority services for clients in accordance with Digital First principles and commitments**. From January 2014, this applies to new priority services for which planning processes commence at the time or later.

> **Agencies will identify and make use of suitable tools to understand the customer experience of their online services and to continually improve their online services accordingly.** This could include, for example, information about their services that is being shared through social media channels. A summary of customer feedback on digital services and improvements made should be included in agencies' Digital First plans and updates from July 2014.

CASE STUDY: myGov

Tom and Clare Jones are a typically busy Australian family. Tom works full-time and Clare parttime; they have two children aged six and nine. Their weekends are taken up with the usual mix of kids sports, spending time with family and friends, and other recreational activities.

Tom and Clare use the internet for most of their day-to-day activities such as banking, shopping, paying bills and doing their business with government. Currently, They previously had multiple passwords and accounts with a range of government agencies—including the Australian Taxation Office, Centrelink and Medicare. Remembering all of their usernames and passwords was a challenge in itself!

Under the myGov initiative, Tom and Clare each created a single secure account and linked a range of government services that they deal with to their myGov account. They now each have one username and password that gives them a secure account to do their business with government online.

Tom's and Clare's myGov mailboxes let them receive their Centrelink and Medicare letters and messages in one secure online location. In the future they will also be able to receive ATO letters and messages in that same secure online location. They also have the bonus of the myGov mobile app, which lets them transact with government services from their mobile phones or tablet devices. myGov has a seamless, safe and secure location for them to do their business with a number of government services.

Over time, more and more services will be available via the myGov service, giving Tom and Clare access to even more services in one secure location.

> **Agencies will ensure that services delivered on their behalf by a third-party are consistent with the Digital First principles and commitments.** Services provided on behalf of government by contracted third-party providers should be delivered by digital means, consistent with Digital First. From July 2014, when agencies prepare requests for tender or renew contracts they should stipulate which services should be available digitally (in addition to using traditional channels).

> **The Attorney-General's Department, in consultation with affected agencies, will review the Electronic Transactions Regulations 2000 to minimise exemptions.** The review of exceptions to the provision of government electronic transactions under the Electronic Transactions Regulations will be complete by June 2014. Unnecessary exceptions will be removed by December 2014 (see also Section 8: Supportive environment for digital industries).

GOVERNANCE

Implementation of the Digital First policy will be coordinated centrally by the Digital First Coordination Group led by the Department of Broadband, Communications and the Digital Economy and the Department of Finance and Deregulation. Major service delivery agencies will be invited to be members of the coordination group. This group will report annually on the implementation of the Digital First policy through the Secretaries' ICT Governance Board to the Special Minister of State and the Minister for Broadband, Communications and the Digital Economy. The group will also have responsibility for fostering a coordinated approach to delivering government services digitally through developing guides and resources in consultation with relevant agencies; engaging with industry leaders and academia to consider future directions in digital service delivery; and encouraging cross-agency collaboration to share ideas and best practices. The Australian Government will also undertake regular client and agency surveys to measure progress and to guide further Digital First planning.

Centre of Excellence in Data Analytics

The establishment of the Centre of Excellence in Data Analytics across government was an initiative from the Australian Public Service ICT Strategy 2012–2015. The Centre aims to share information on data analytics skills, tools and techniques. Representatives from departments and several academic institutions came together to share experiences in implementing analytics in the public and private sector and to collaborate on terms of reference for the operation of the Centre of Excellence. Identified benefits of leveraging analytics capability across government include efficiency gains, more innovation, risk mitigation, improved quality, better supported services and insights to shape and inform whole—of—government policy development.

Terry Lee
Hear how Director of Strategy and Major Projects, Terry Lee from Regional Development Australia (RDA), believes the NBN will break down communication barriers for government services and those working and living in regional Australia.
http://www.youtube.com/watch?v=gC48u4RQIOs&list=UUFnuJPIKJDstKUwZgKdVPpQ

12. Online participation by Australian households

By 2020, Australia will rank in the top five OECD countries in terms of the proportion of households connected to broadband at home.

To help achieve this goal, the Government will:

> **complete the Digital Hubs program and promote the internet basics website to help increase digital literacy**

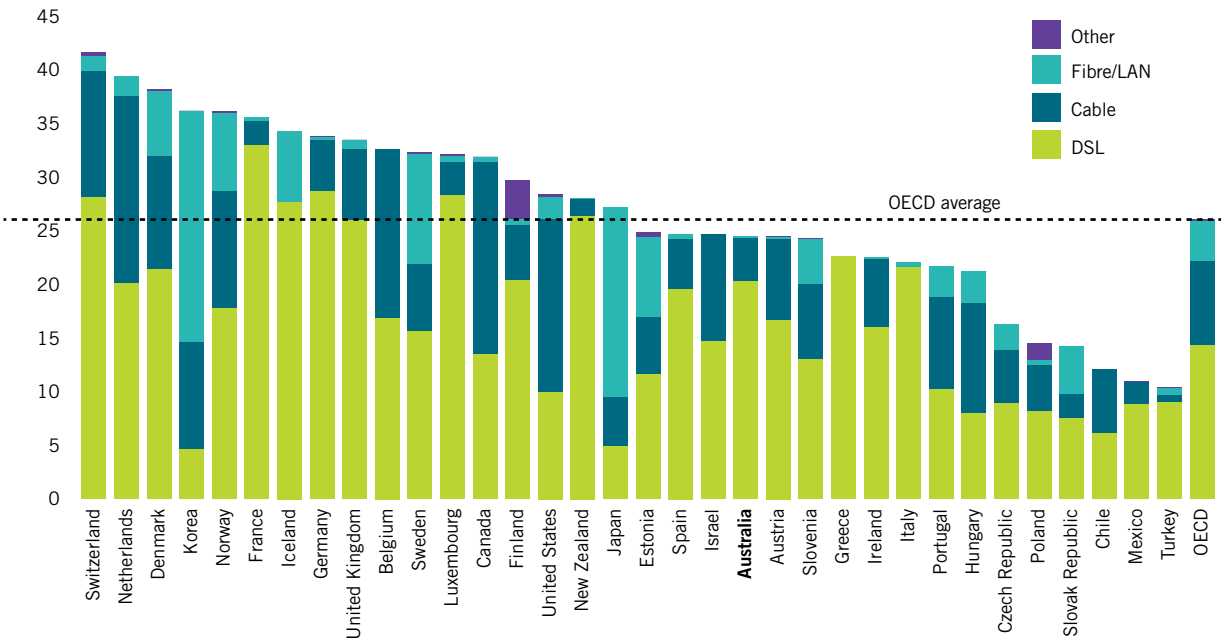
> **further invest in assisting seniors to use the internet and enjoy the benefits of the NBN.**

Significantly increasing household connectivity is a core part of Australia's transformation to a digital economy as it allows greater access to the benefits of other digital innovations such as telehealth and online education. While 73 per cent of Australian households had broadband connections in 2010–11, 21 per cent of Australians aged 15 or over still did not access the internet from anywhere in that year.[89] The figure was higher for retired people, low-income earners, Indigenous Australians and those living in remote areas.

Progress update

The proportion of Australian households with broadband connections increased to 73 per cent in 2010–11, up from 62 per cent in 2008–09. Australia was recently ranked twenty-first among OECD countries for internet access and broadband connections in 2012 (see Figure 7).[90]

Figure 7 OECD countries, fixed broadband subscriptions per 100 inhabitants



A lack of digital skills and understanding of the digital economy is limiting broadband take-up in Australia. The Australian Communications Consumer Action Network has noted that 'a potential barrier to widespread community benefit is a lack of familiarity and comfort with the use of technology'.[91] The Digital Hubs program provides digital literacy training and demonstrates the benefits of high-speed broadband to local communities. Digital Hubs are being progressively established in 40 communities that benefit from the NBN where work on the rollout has already started. Since February 2012, over 17,350 participants across Australia have taken advantage of the free training and mentoring provided by the program.

Current client data indicates improved online engagement by individuals as a result of accessing Digital Hubs program training, with 82 per cent of participants reporting an increased understanding of the benefits and opportunities presented by the NBN. Anecdotal evidence also shows strong qualitative outcomes for individuals participating in Digital Hub training. Based on current attendance, it is expected that over 120,000 training participants will benefit from the program by June 2015.

CASE STUDY: DIGITAL HUB WILLUNGA, SOUTH AUSTRALIA

After seeing an advertisement in the local paper, Ron, 77, has been attending the free training offered at the Willunga Digital Hub operated out of the Willunga Library by the City of Onkaparinga. Before Ron attended training at the Digital Hub, computers were completely alien to him. He had never been exposed to them; nor did he see the need to use one. He had been given an old desktop computer by his son, which he used merely to store photos. When given a laptop computer, Ron decided to learn how to use it and went along to the Digital Hub to gain basic computer skills.

Ron has now gone from being a complete beginner with computers to having his life completely changed and enhanced by his newly found computer skills. Ron can upload photos and send them to others. He communicates regularly through Skype with family in the United Kingdom and is also enjoying using email and Facebook. He describes it as amazing that he is able to communicate with people by simply clicking a few buttons.

Ron cannot speak highly enough of the Willunga Digital Hub trainer, Helen. 'She's fantastic' he explains. 'She's not too pushy and the sessions were very easy to understand.' Learning how to use a computer has opened up a completely new world for Ron. He says he would have never imagined himself sitting inside using a computer rather than doing something else outside.

In March 2013, the Government launched the Internet Basics website (www.internetbasics.gov.au) providing a starting point for internet novices to build the skills and confidence needed to get online. The website explains basic digital literacy concepts and internet terms in plain English and uses videos to help new users understand how the internet can benefit their daily lives.

Internet Basics is designed for the 21 per cent of Australians not accessing the internet. Representatives of this target group were involved in focus group research to determine and validate the site's design and content. The website has also been developed to be highly accessible and complies with Level AA accessibility standards under WCAG 2.0.

The Internet Basics website is a key training resource for the Digital Hubs program and just two months after its launch was achieving nearly 4,000 page views per week.

Internet Basics is being promoted to target groups through Digital Hubs, Digital Enterprise centres, forums and exhibitions specifically aimed at stakeholder groups including seniors, low-income earners, people with disabilities, Indigenous Australians and people living in regional areas, as well as through newsletters and targeted media exposure.

Home page of the Internet Basics website.

Action 14 Boost the Keeping Seniors Connected program

Broadband for Seniors provides more than 2,000 kiosks to enable seniors to access the internet and gain confidence in using computer technology. This program has already delivered benefits to approximately 250,000 senior Australians.

The Government will invest an additional $9.9 million to improve the program's resources and equipment. From 1 July 2013, organisations hosting a Broadband for Seniors kiosk can apply for new technology, including a new computer terminal with touchscreen facilities, and a $2,000 training grant. Through the kiosks, senior Australians will have free access to the latest technology, and to training that will educate them on issues of particular concern to them, such as cybersecurity and cybersafety.

From July 2015, training grants will be available to community organisations to educate senior Australians on the benefits of the internet.

Participants learning how to get online at the Digital Hub in Riverstone, Sydney.

Participants accessing the internet at the NBN-connected Broadband for Seniors kiosks at the George Town Online Access Centre in Tasmania. Courtesy: Department of Families, Housing, Community Services and Indigenous Affairs.

Modbury Digital Hub video
The Modbury Digital Hub in the City of Tea Tree Gully showcases how local residents can use NBN-enabled services and technology.

Adelaide Digital Hub video
See how the Adelaide Digital Hub provides training and assistance to local residents to explain the benefits of participating online and to drive greater digital literacy skills through the NBN.

http://www.dbcde.gov.au/digital_economy/programs_and_initiatives/digital_hubs_program

13: Online engagement by Australian businesses and not-for-profits

By 2020, Australia will rank in the top five OECD countries in terms of the proportion of businesses and NFPs using online opportunities to drive productivity improvements, expand their customer bases and enable jobs growth.

To help achieve this goal, the Government will expand the Digital Enterprise program and develop industry-specific digital business kits to provide small-to-medium sized enterprises, the community, and the NFP sector with the tools needed to enable greater digital engagement.

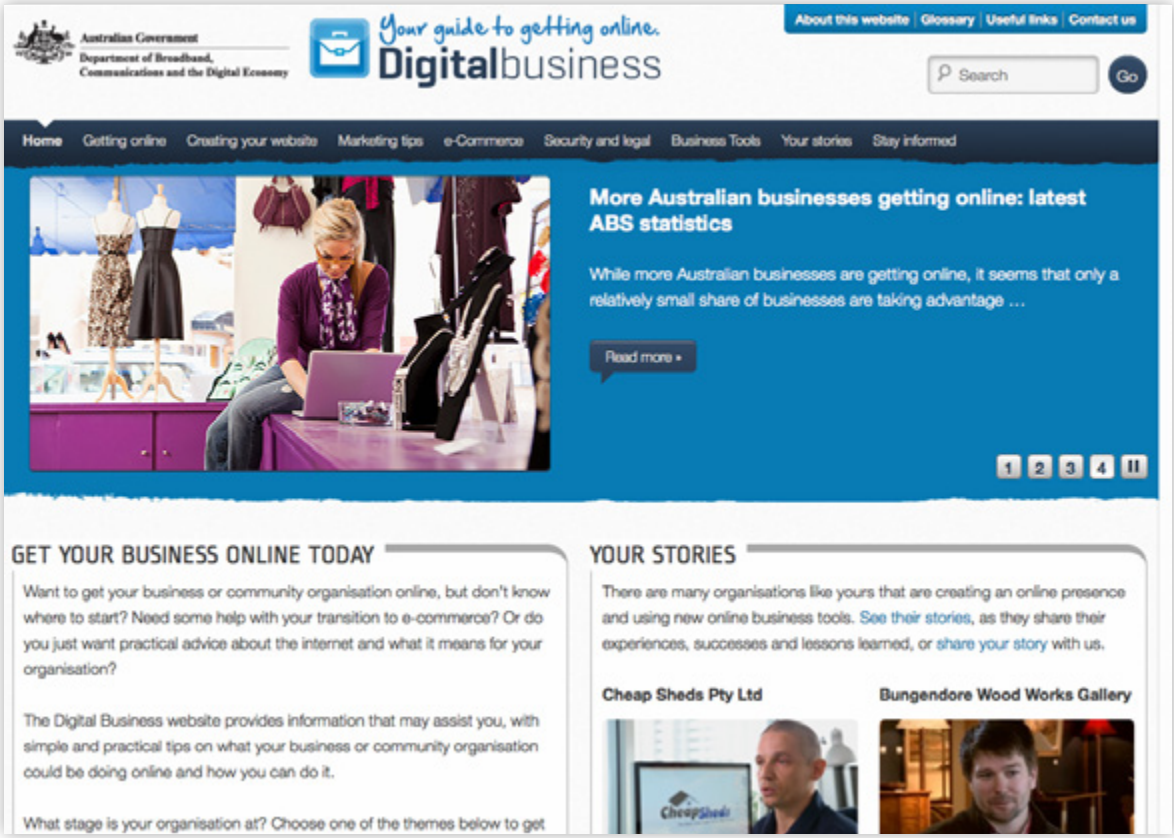
The digital economy offers tremendous opportunities to Australian businesses and NFPs. Small-to-medium sized enterprises (SMEs) that integrate a wide range of internet tools into their business models grow twice as fast as those that do not.[92] Although many Australian businesses are already operating in the digital economy, others are still uncertain about how they can benefit. While 91.2 per cent of businesses have an internet connection, only 43.1 per cent have a web presence. Having a web presence today is as important as having a listing in the Yellow Pages was in the 1990s as consumers search for businesses online.

> 'Small businesses with higher digital engagement have better business outcomes than those with lower engagement, with a $350,000 or 20 per cent increase in annual revenue'.
>
> Deloitte Access Economics
> Connecting small businesses report, 2013

Progress update

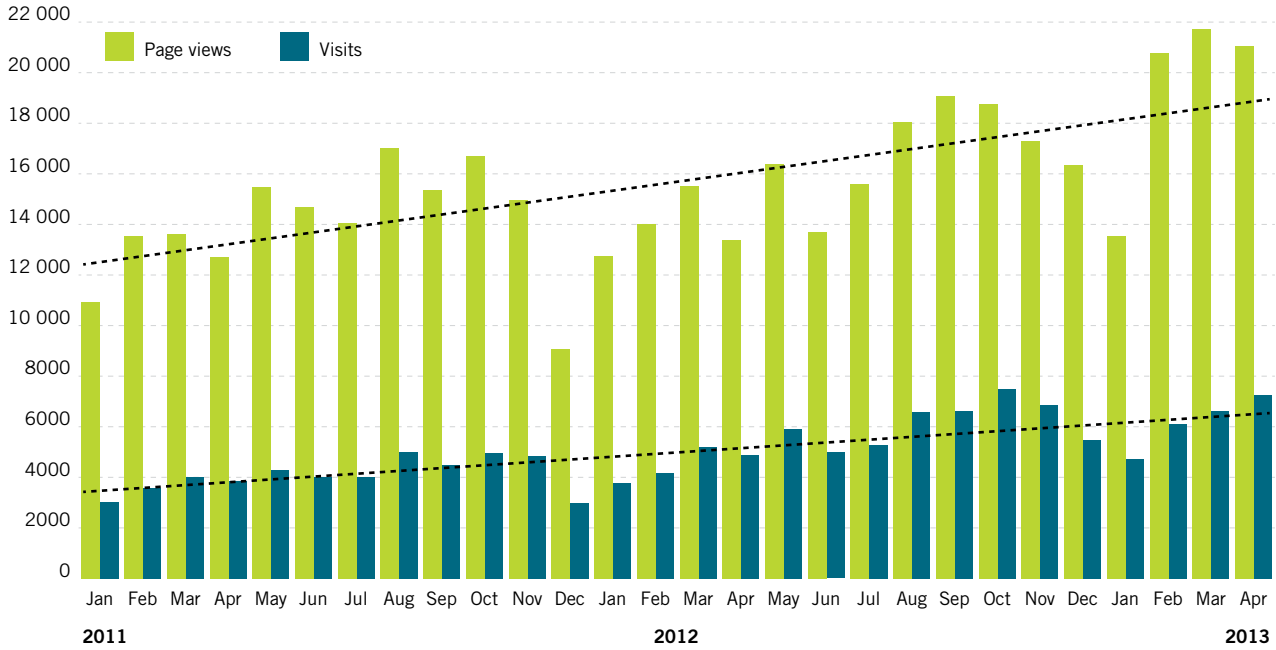
- The latest ABS data suggests that the proportion of businesses with a web presence increased from 40 to 43.1 per cent from 2009–10 to 2010–11; the proportion of orders made and received online increased from 46.5 to 50.8 per cent and 24.8 to 28 per cent respectively over the same period.
- NFP sector-wide statistics suggest that the proportion of NFPs with a website has increased slightly (83 per cent in 2011 compared with 81 per cent in 2008).[93] Additionally, organisations such as BoysTown have found that young people wishing to access counsellors such as Kids Helpline are increasingly turning to email and online chat. BoysTown's online counselling sessions increased by 47 per cent from 2006 to 2011.[94]
- The Government provided $10 million in grant funding over four years in 2011–12 for the Digital Enterprise program which provides free group training and face-to-face support for SMEs and NFPs to help them create efficiencies, increase productivity and improve the way they do business online.
- In December 2012, after extensive user testing, the Government redeveloped www.digitalbusiness.gov.au to provide practical guidance for small businesses and community organisations looking to establish or enhance their online presence. Among many improvements, the website has incorporated a range of new content, social media features and a mobile-responsive layout to cater for the increasing audience visiting through mobile devices.

As shown in the Figure 8 below engagement with digitalbusiness.gov.au has continued to grow both in terms of the number of visits and page views per month.



Home page of the Digital Business website.

Figure 8 Digital Business website, monthly visits and page views, 2011 to 2013



> The Government is continuously improving its digital service delivery capability to assist businesses and start-ups. The business.gov.au website offers the public a rich source of information on starting and growing a business. Business.gov.au now also delivers a national business licensing and information service and a national business account which will help businesses take control of their regulatory compliance activities online at any time.

> The Industry and Innovation Policy Statement (A Plan for Australian Jobs) delivered a number of improvements to the Enterprise Connect program including expanding the program to the ICT sector. Under the program, firms with revenue or expenditure between $1.5 million and $100 million will be eligible to apply for the Business Review service. This service provides firms with an assessment of their operational and strategic position and recommendations for improvements. Through the service firms may also access Technology and Knowledge Connect to assist them in accessing new technological solutions. Following the Business Review, eligible businesses may apply for matched funding support to develop and implement recommended improvements.

> The industry innovation precincts announced by the Government in February 2013 will support Australian businesses to develop effective new business models in partnership with research organisations. The Industry Innovation Network digital platform will also enable all businesses Australia wide to connect to the right information and opportunities and receive many of the benefits of the precincts.

Meeting the challenge

The Government recognises that some SMEs and NFPs will need assistance in reaching their full potential in the digital economy. That is why the Government has introduced the Digital Enterprise program to give SMEs and NFPs advice and training on the digital economy. The program provides funding to local community organisations to deliver training and assist SMEs and NFPs.

The range of topics covered by the Digital Enterprise program is tailored to the demands and interests of the local community and includes helping participants to:

> understand the benefits, opportunities and challenges of participating in the online environment

> develop and maintain a website or other online presence, including the use of rich media

> make use of online transaction opportunities

> participate in online marketing, including search engine optimisation, search engine marketing, effective use of social networking sites and online directories

CASE STUDY: OZFEATHERS

Linda and Kevin Sanders operate OzFeathers, an online promotional banner-making business in Willunga, a small town 47 kilometres south of Adelaide.

OzFeathers uses multiple computers, but before it was connected to the NBN, only one person could use the internet at a time, making it difficult to get jobs done quickly.

Linda explains, 'As the designer, I can now chat to a client on the internet phone and look them up online at the same time. It helps me get a much clearer picture of what they want. Before, I would hang up the call while I looked them up online, then call back'.

Communication with non-English speaking clients has also improved now that Linda can use free translation tools. These are just some of the online tools OzFeathers are using to enhance their business.

> understand the principles of e-commerce and logistics
> learn about data privacy and security
> use online recruitment tools
> access case studies of best practice for online business
> understand cloud computing opportunities
> learn about tools for real-time person-to-person visual communication online
> understand teleworking and its benefits
> understand the benefits and opportunities presented by the NBN, including NBN-enabled apps and tools.

The Digital Enterprise program enables SMEs to understand how they can use the NBN to diversify their operations through improving their online presence and competitiveness, offering new products and services, expanding their market and increasing the ways in which they communicate with customers and suppliers. The program assists NFPs to extend their reach into the community, expand their donor pools or membership and explore more innovative ways of creating awareness for their causes.

Digital Enterprise services have been progressively offered in 44 communities since February 2012. At March 2013, 6209 participants had taken part in the program.

CASE STUDY: DIGITAL ENTERPRISE PROGRAM—DOME

DOME is a community-based NFP employment and training organisation that has been offering services to mature-age unemployed and disadvantaged people in South Australia since 1981. Carole Grubisa attended the Salisbury Digital Enterprise program on behalf of DOME in June 2012. DOME has already had a website for about 10 years and has recently decided to establish a social media strategy.

DOME wanted assistance in setting up a state government funded pilot project around 'social recruiting', leveraging social media for mature-age recruitment. It now has a LinkedIn profile and has also set up a '4T+ Employment Group' for job seekers and employers on the DOME database, where they can interact and, it is hoped, identify work.

Action 15 Expand the Digital Enterprise program and develop industry-specific digital business kits

The Government will expand the Digital Enterprise service in 23 additional communities across Australia. This $6.1 million scale-up will increase online engagement with the SME and NFP sectors in regional and rural areas.

Recognising the particular challenges faced by organisations in remote Indigenous communities, a Virtual Advisor service will be established as part of the Digital Enterprise program expansion. Services will be delivered into remote locations, including through the use of online video delivery channels and community centres with adequate broadband connections.

With these expansions, it is estimated that Digital Enterprises will deliver 3,650 group training and 14,350 one-on-one training sessions to approximately 49,000 SME and NFP participants by June 2016.

The 2012 Deloitte Access Economics *Optus future of business report* indicated that 8 per cent of Australian businesses have an NBN strategy.[95] A 2012 survey by Sensis found that just 15 per cent of small businesses had a digital business strategy.[96] Without appropriate information and assistance many businesses and NFPs may not realise the NBN's full potential.

The Government, through a competitive grants program, will make available funding of $5 million over 4 years (from 2013–14) for 10 national industry peak bodies in 10 different industry sectors to develop digital business kits to help SMEs and NFP organisations in their respective industry sectors to get online and take advantage or the NBN.

Five specific industry sectors—building trades, farming, retail, manufacturing, and retaurants and cafes—will be targeted because of the number of SMEs in those sectors and the opportunities the NBN will provide to these SMEs. A further five industry peak bodies from other sectors will also be funded.

The digital business kits will include examples of innovative ways to interact with customers and suppliers such as interactive virtual tours and real-time online interactions, adoption of cloud and big data technologies and access to new markets.

The Government will deliver the digital business kits through a range of mechanisms including:

> Digital Enterprise service providers

> Enterprise Connect business advisers and facilitators

> the digitalbusiness.gov.au website.

In business with the NBN
A video profiling six real small business owners, from a range of industries and regions, commenting on their view of how the NBN will positively impact their business operations and future success.
http://www.youtube.com/watch?v=gG3idzudzhw&list=UUFnuJPIKJDstKUwZgKdVPpQ

14: Health and aged care

By 2015, 495,000 patients in rural, remote and outer metropolitan areas will have had virtual access to specialists and by 2020, 25 per cent of all specialists will be participating in delivering telehealth consultations to remote patients. By 2020, 90 per cent of high priority consumers such as older Australians, mothers with babies and those with a chronic disease or their carers will be able to access individual electronic health records.

To advance our progress towards this goal the Government will:

- **determine the costs and benefits of a potential expansion of the range of Medicare Benefits Schedule telehealth items**
- **evaluate outcomes from the current telehealth trials to determine possible approaches to achieving expanded take up of telehealth**
- **begin a phased implementation of video-consultation capabilities, starting with the after-hours GP Helpline and the Pregnancy, Birth and Baby Helpline**
- **enhance the functionality of the Personally Controlled eHealth Record**
- **support the increased use of digital platforms to provide aged care services.**

As a proportion of GDP, spending on health is projected to rise from 4.0 per cent in 2009–10 to 7.1 per cent in 2049–50.[97] Aged care spending is projected to grow from 0.8 per cent of GDP in 2009–10 to 1.8 per cent of GDP in 2049–50.[98] Digital delivery of services or telehealth offers a significant opportunity to improve the quality, efficiency and responsiveness of health and aged care services. The Government is considering the following issues to inform policy responses for the development of telehealth options:

- **Sustainable business and care models**—incorporating telehealth into mainstream practice and workflow requires sustainable and flexible business and care models
- **Building the Australian evidence base**—pilots or trials of telehealth service provision and models of care should generate evidence for causality, validity and whether the results are generalised and repeatable
- **Leadership, coordination and sharing of lessons**—experience and expertise in the use of telehealth can be fragmented or occur in isolation with limited opportunity for ongoing coordination and sharing of lessons

CASE STUDY: KIAMA MENTAL TELEHEALTH

Many young people, particularly in regional communities, find it time-consuming and expensive to travel to mental healthcare providers. Some people who would otherwise benefit from treatment either avoid assessments or drop out of treatment when attendance becomes difficult.

As the Inspire Foundation noted in its submission to the update to the 2011 National Digital Economy Strategy 'it will not be possible to meet the current mental health needs of all Australians, using current service models, without imposing a very significant costburden on society [A] new model of service delivery is required—one that will enable us to most efficiently reach the greatest number of people'.

Under the Kiama mental healthcare trial, mental health professionals provide services from the *Headspace Illawarra* headquarters in Wollongong to clients over 30 kilometres away through high-definition videoconferencing.

> **Behaviour and capability**—telehealth introduces new ways of working and requires cultural and behavioural change, as well as new skills and capabilities

> **Interoperable systems**—further evolution, development and agreement around standards within the health IT sector would assist in building the capability for telehealth services to be accessible across the health system

> **Awareness, trust and confidence**—willingness by health care professionals and patients to engage in online health care delivery is critical to the success of telehealth.

Progress update

Personally controlled electronic health records:

> At 8 May 2013, more than 138,000 people had registered for a personally controlled electronic health record. Around 24 per cent were aged 65 years or above

> 56 per cent of these registrations were completed online (with 30 per cent using assisted registration); 14 per cent were completed with the assistance of DHS Medicare call centres and shopfronts or received through the mail

> At 8 May 2013, 11.1 million Medicare documents had been uploaded to the Personally Controlled Electronic Health Record (PCEHR) system.

Medicare Benefits Schedule telehealth consultations:

> Since 1 July 2011, the Medicare Benefits Schedule (MBS) has expanded to include 40 new items for online video telehealth consultations with specialists and clinically relevant services provided by health practitioners supporting the patient

CASE STUDY: TOWNSVILLE DIABETES TELEHEALTH

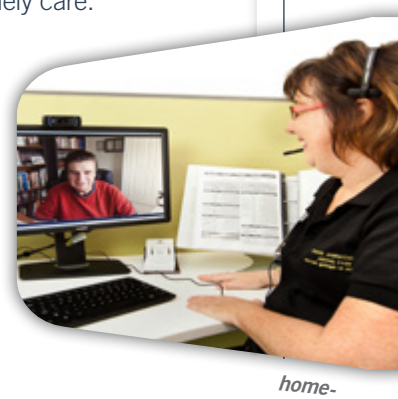
The Townsville diabetes telehealth trial is using the NBN to assist Australians with Type 2 diabetes to better manage their condition. The trial uses innovative home-based communication technologies to help patients monitor their blood sugar levels and blood pressure and to manage their medication with assistance from a centralised care-coordinator.

In-home monitoring provides patients with regular and timely information about their own key health indicators, enabling them to make better choices in managing their condition. The data collected is also transmitted via high-speed broadband to a nurse who coordinates patient care. These care-coordinators monitor patient data and, where necessary, recommend changes to diet or lifestyle based on analysis of the patient's key health indicators. By supporting the patients to manage their own condition, the trial reduces the need for them to consult their general practitioner.

As part of the trial, patients with Type 2 diabetes can also consult health professionals using high-definition video-conferencing from their own homes. In-home consultations allow patients to cut down on travel for routine health appointments which can be time-consuming, stressful and costly for them and their carers.

For participating health professionals, high-definition multi-party video-conferencing, combined with access to data collected by regular monitoring, enhances the quality and timeliness of information, allowing them to provide more timely care.

The trial is also expected to increase the productivity of health professionals, such as general practitioners, by allowing them to provide more targeted and specialised services rather than more routine monitoring and education. These vital but more routine services can be undertaken by care coordinators.



home-ros tta.

Local patient and care-coordinator demonstrate in-home health monitoring at the Townsville NBN-Enabled Diabetes Telehealth Trial Launch.

> At 31 March 2013, more than 77,000 telehealth consultations had been processed by DHS across a range of specialities. More than 7,700 practitioners had helped more than 33,600 patients get the specialist care they needed without the time and expense of travelling long distances

> By 31 March 2013, more than 11 per cent of specialists had provided an MBS telehealth service.

Meeting the challenge

Health care reforms

The introduction of MBS funded telehealth consultations was a significant change in MBS arrangements. It has increased patient access to specialist care, particularly for those outside major cities or in aged care facilities. The possible expansion of telehealth arrangements to general practitioners and allied health providers represents an opportunity to use innovative technologies to increase access to primary health care services and to improve health outcomes, although careful consideration of policy and financial implications is required.

The accessibility of health services is a particular challenge in regional communities. Distance from health services can contribute to poor health.[99] People living in rural and remote areas tend to have higher levels of disease risk factors and illness than those in major cities.[100] The CSIRO notes that Australians living in remote regions of Australia experience gaps in health service availability.[101]

Those set to benefit most from the digital delivery of health and aged care services include people living in regional and remote communities, and older Australians at home or in residential aged care.

Action 16 Consider the expansion of the Medicare Benefits Schedule for telehealth items

In 2013, the Department of Health and Ageing (DoHA), in collaboration with the Department of Veterans' Affairs (DVA), will lead a review to determine the costs and benefits of expanding the range of MBS telehealth items to include patients participating in video-based consultations with their GPs. The review will ensure that any expansion in telehealth items will:

> target the delivery of services to improve health outcomes and equity

> see that consultations are practised in a safe and clinically effective manner

> be a cost effective use of government resources.

The Government, in conjunction with state and territory health agencies, Medicare Locals, aged care providers, research agencies and telehealth industry vendors, is implementing a range of telehealth trials (see Appendix C). The trials make use of high-speed broadband to facilitate a team-based approach to health care for clients. They also test different ways of using high-speed broadband to improve the quality of care delivery to make it more efficient and reduce

the need for access to primary or acute care services by delaying entry into residential aged care. Telehealth can effectively address complex co-morbidity issues as Australia's population ages by meeting health needs through coordinated telehealth care. Other examples of health services that might be delivered efficiently using video include wound management, palliative care and rehabilitation services. The current trials will test how best to take advantage of high-speed broadband in these areas, where it is safe, clinically appropriate and efficient to do so.

Action 17 Evaluate outcomes from telehealth trials and develop action plans to address key challenges

During 2014–15, DoHA and DVA will evaluate the current telehealth trials and ensure the trials' findings and lessons are shared across the health-care community and inform future policy development. They will report to the Government on the lessons learned and on possible approaches to achieving expanded take-up of telehealth and incorporating it into mainstream health and aged care service delivery.

Demonstration of high definition multi-party video consultation between patient, specialist and nurse.

Additionally, during 2014–15 DoHA and DVA will develop action plans based on these findings to address key challenges associated with telehealth. This could include mechanisms such as:

> business and care models

> skills and training for the health and aged care workforce

> ongoing stakeholder engagement and collaboration

> opportunities to generate productivity benefits using eHealth and telehealth

> opportunities to leverage high-capacity, high-speed broadband delivered by the NBN

> pathways towards mainstream integration of eHealth and telehealth.

Action 18 Implement video-consultations for the after-hours GP Helpline and the Pregnancy, Birth and Baby Helpline

From mid-2013, DoHA will commence a phased implementation of video-consultation capability through Healthdirect Australia starting with the after-hours GP Helpline and the 24 hour Pregnancy, Birth and Baby Helpline.[102] Should the technology and service model prove successful in these settings, DoHA will consider expanding the video-consultation capability of the National Health Call Centre Network.

Personally controlled electronic health records

The national PCEHR system, which went live on 1 July 2012, places the individual at the centre of their own healthcare by enabling access to health information when and where it is needed. This record can then be shared electronically with all the health professionals who treat the patient.

The PCEHR offers significant benefits including reducing avoidable hospital admissions and GP visits through more effective medication management, stronger consumer participation in the management of chronic conditions, enhanced coordination across care settings, better clinical assessment and treatment selection, improved system monitoring and health systems intelligence, and less duplication of tests.

Since the PCEHR implementation in July 2012, DoHA and DVA have worked with the health care community and health consumers to enhance the functionality of the PCEHR to meet the needs of users. This includes the National Prescription and Dispense Repository to enable access to prescribed and dispensed medication information by both the consumer and their health care providers. This work will continue.

In addition, the Government will monitor take-up of the PCEHR by target groups and undertake further activity to raise awareness of the benefits for health professionals and consumers. DVA will continue to work closely with DoHA and healthcare providers to ensure that the veteran community, a key target group, has appropriate registration channels and is aware of the benefits of an eHealth record.

Aged care reforms

The Living Longer Living Better aged care reforms, announced in April 2012, will modernise Australia's aged care system. A central component of the reforms will be the establishment from July 2013 of the Aged Care Gateway including, the My Aged Care website and a national contact centre to provide information on ageing and aged care services. The functionality of the My Aged Care website will be enhanced over time and will include the ability to use social media technology.

Key features of the Aged Care Gateway include a central (electronic) client record as well as a central service provider register. It also offers an assessment capability to identify needs based on a nationally consistent assessment framework and standardised tools. It offers a linking service to identify and support older people with multiple needs by assisting them to access appropriate care and services in and beyond aged care.

Ultimately, the Aged Care Gateway will include the real time exchange of information between service provider businesses and government which will inform the central client record and service availability mechanisms, exposing service availability to patients and carers.

From 1 July 2013, under reforms to Home Care Package program guidelines, new Consumer Directed Care arrangements and guidelines will provide greater flexibility in care and services, which could include increased access to a defined range of technologies and innovations (such as remote monitoring). These arrangements will be evaluated during 2014 to inform the way in which Consumer Directed Care packages will be rolled out to all home care consumers from 1 July 2015.

The Australian Government's Home and Community Care Program (HACC) funds service system development activities that specifically allow for projects and services designed to support the development of the service system, including service delivery models incorporating new technologies. Through the 2013–14 funding round for HACC, DoHA will consider how it can target specific digital and virtual service projects.

From 1 July 2015, the Government will establish the national Commonwealth Home Support Program. As part of the development of the program, consideration is being given to digital and virtual service options and to specifically identifying them in any new program material.

Through the implementation of new program arrangements commencing in 2013, DoHA and DVA will continue to encourage innovation and flexibility in the delivery of aged care services, including the use of digital delivery channels. Ongoing analysis of program outcomes, costs and benefits will contribute to the evidence base for telehealth and digital service delivery.

Action 19 Support increased use of digital platforms to provide aged care services

To increase options for the digital delivery of aged care services, the Government will:

> develop an introductory statement to all relevant aged care guidelines advising that
  - where safe, effective and clinically appropriate, aged care providers will be encouraged to use innovative and digital delivery options to provide services
  - references to a particular form of service delivery should not be read as precluding the use of digital means

> expand the Community Visitors Scheme into home care, including through the use of technology

> revise the Home Care Package guidelines to encourage innovation and digital delivery options

> consider innovative digital delivery options as part of the HACC growth funding rounds

> launch the early deliverables of the Aged Care Gateway, such as the My Aged Care website in July 2013, to provide coordinated information and the evolution of the Aged Care Gateway point for aged care services and further developments planned over the next two years

> develop new Commonwealth Home Support program guidelines that will include and recognise digital channels for the provision of aged care services

> clarify the types of telehealth equipment that aged care providers can purchase with aged care subsidies on behalf of clients.

Townsville telehealth diabetes trial video
See how Townsville—Mackay Medicare Local is trialling the NBN to assist Australians living with Type 2 diabetes to better manage their condition.
http://www.nbn.gov.au/case-study/townsville-telehealth-diabetes-trial/

NBN: Grampians Rural Health Alliance
David Ryan of Grampians Rural Health Alliance located in Ballarat, VIC shares his vision for the future of health services enabled by the NBN.
http://www.youtube.com/watch?v=DbIld1sPYNg&list=UUFnuJPIKJDstKUwZgKdVPpQ

The Alfred Hospital's Head of the Cystic Fibrosis Service Professor—John Wilson
Hear Professor John Wilson, Head of the Cystic Fibrosis Service at Alfred Hospital discuss the benefits of the National Broadband Network in healthcare.
http://www.nbn.gov.au/2012/08/09/the-alfred-hospitals-head-of-the-cystic-fibrosis-service-professor-john-wilson/

15: Education

By 2020, Australian schools, registered training organisations and higher education institutions will have the connectivity to develop and collaborate on innovative and flexible educational services and resources to extend online learning resources to the home and workplace and to offer students who cannot access courses via traditional means, the opportunity for online virtual learning.

To advance our progress towards this goal the Government will:

> **encourage the expansion of the number and range of courses accessible to schools through virtual classes**

> **encourage better access to vocational education and training for working age Australians, especially through virtual classes.**

Australia requires a well-educated population to maintain its long-term social wellbeing and economic prosperity. High-speed broadband is transforming the education sector by creating sustainable, accessible models of learning and education for the future and innovative ways of delivering education for those living in regional, rural and remote Australia. This is especially important against a backdrop of a shortage of teachers in some disciplines. High-speed broadband also allows greater collaboration and research within education sectors in our region and globally.

The NBN is a critical component of the education reform agenda. Improving education opportunities for Australians is, in many ways, about facilitating access to quality teachers, quality learning and a wide range of subjects. Improvements in physical schools and Registered Training Organisations (RTO) are one way of ensuring that student needs are met and performance improves. The NBN provides extended learning opportunities through enabling virtual classes, online tutoring and access to information which can operate in conjunction with traditional forms of delivery. This is especially important for Australians residing in regional and remote locations.

CASE STUDY: ASIA CONNEXION

The University of New England's Asia ConneXion project will use high-definition video conferencing technology to deliver live video interaction between 30 Australian schools and 30 partnering schools in Asian countries for cross-cultural exchange. Partnering schools will be in Korea, Japan, China, Indonesia and India. Schools will be connected using NBN and equivalent infrastructure.

Regular video conferencing sessions will be held between pairs of Australian and Asian primary and secondary schools to facilitate the exchange. Learning about Asian cultures is a primary focus. Students will also be provided with the opportunity to practise Asian language skills. Australian students will have opportunities to interact with Asian peers, experience Asian cultures and think about cultural similarities and differences. Sessions will be held on a range of topics, including national customs, language, popular culture, festivals and sports.

Progress update

Online learning in Australia grew at an annual rate of 18.6 per cent between 2008 and 2012.[103] Advances in technology and faster internet connections are making online study more viable for learners and educational institutions. In 2011, two-thirds of VET students reported using interactive learning resources in the classroom as well as at home and work. Sixty-six per cent reported that they expected improved employment outcomes in the future because of the e-learning in their course.[104]

Students and a teacher at Kiama Primary School take a virtual tour of the National Museum of Australia using a mobile robot from the Kiama Digital Hub, March 2013.

CASE STUDY: MONASH UNIVERSITY—NBN VIRTUAL SCHOOL OF EMERGING SCIENCES

The NBN Virtual School of Emerging Sciences program enables Year 10 students, anywhere in Australia, to learn and research the leading edge fields of astrophysics, quantum physics and nanotechnology in innovative and interactive ways. Students are interacting with specialist teachers at the John Monash Science School using high-definition videoconferencing and are accessing and using remote laboratories. They will graduate from the project with hands-on experience in researching science and applying scientific practice, including in defending their work to peers and leading academics.

The first interschool collaboration using state-of-the-art collaboration tools was held throughout Semester One, 2013, for students from Willunga High, Gungahlin College and the Tasmanian eSchool (mainly home-tutored children).

Meeting the challenge

School (including early childhood) education

The National Plan for School Improvement will help every Australian child get access to a world-class education, no matter where they live or which school they attend.

The plan will make an important contribution to achieving Australia's goal of moving into the world's top five schooling nations for reading, science and mathematics by 2025.

Under the plan, every Australian student will have the opportunity to learn about Asia through the Asia and Australia's Engagement with Asia cross-curriculum priority. Students will also have the opportunity to study an Asian language from their first day of school.[105] This will require schools to have access to teachers with appropriate language proficiency. Alternative models of delivering Asian language classes such as NBN-enabled virtual classes will complement the aims of the National Plan for School Improvement.

To understand how the NBN can assist in achieving these goals, the Government—in conjunction with relevant state and territory agencies, schools, school associations, cultural institutions, research organisations and technology vendors—is undertaking a range of trials (see Appendix C).

Through the NBN-enabled Education and Skills Services (NBN-EESS) program, the Government is supporting online education and skills services that take advantage of high-speed broadband connections made available through the NBN. These trials include enabling virtual access by school students to specialist teachers covering a wide range of disciplines, learning environments and immersive digital content.

The creation of a digital education environment has had a profound and lasting impact on teaching practice. There is great potential to use ICT to change the way teachers work by making it easier for them to connect and collaborate with each other. This makes it possible to deliver differentiated learning experiences and to reduce administrative workloads. The increased adoption of technologies together with a national curriculum can significantly increase teachers' productivity as they plan, deliver, assess and report activities.

The Government has supported a number of national level initiatives aimed at providing access to curriculum-aligned and quality-assured online digital resources. Programs such as the ABC Splash online portal, Supporting the Australian Curriculum Online and the National Digital Learning Resource Network are establishing rich digital collections of educational resources and enhancing existing national infrastructure for the storage and discovery of digital resources, their distribution and access to them.

ABC Splash online portal, available at splash.abc.net.au

Vocational education

Through the National Agreement for Skills and Workforce Development, COAG aims to halve the proportion of Australians without qualifications at Certificate III level or above, and double the number of higher level (diploma and advanced diploma) qualification completions by 2020. Hitting these targets by 2020 would raise Australia's GDP by about 2 per cent.[106]

Australia continues to face a shortage of teachers across a range of subjects in the VET sector. Virtual classes using the NBN can enable all RTOs to provide students with access to specialist teachers, irrespective of the size or location of the RTO and the number of its students seeking specialist tuition.

Current state and territory government funding arrangements mainly provide funding support to students who live within the particular state or territory. The Australian Government is working with the COAG Standing Council on Tertiary Education, Skills and Employment to improve opportunities for the virtual delivery of VET courses and remove disincentives to cross-border delivery.

The Government, in conjunction with a range of VET organisations, is also taking advantage of the NBN to trial the delivery of VET courses (see Appendix C). The National Partnership Agreement on Skills Reform has recognised the need for RTOs to innovate to deliver better education to more students. Under the agreement, all state and territory governments will make training more accessible for working-age Australians, subsidise training places for a first Certificate III qualification and provide a VET FEE HELP student loan scheme for all qualifications, starting at diploma level including online study. The agreement also supports greater access to virtual VET delivery, particularly for people living in rural and regional areas.

Action 20 Encourage access to virtual classes for VET students

The Government will encourage the states and territories to consider implementing innovative ways of delivering VET to a wider reach of working-age Australians regardless of where they are located.

Higher education

The Government has set a goal of 40 per cent of 25–34 year olds attaining a bachelor degree or higher by 2025.[107] To support this goal, in 2012 the Government introduced a demand driven funding system for bachelor degree places, in which universities are funded for every domestic bachelor degree student they enrol in eligible courses. Funding for teaching, learning and research is projected to increase to $14 billion in 2013, up from $8 billion in 2007.

Open Universities Australia, which delivers online courses for a range of education providers, reports enrolment growth of more than 33 per cent since 2004.[108] Internationally, there is also growth in the number of elite universities offering free online learning opportunities.

At the same time, the development of MOOCs (massive open online courses) is challenging traditional university business models. Although the responsibility for responding to these challenges rests primarily with universities, regulations and guidelines that aim to ensure quality in university courses must also support innovation and the capacity of universities to compete with overseas competitors.[109] The Higher Education Standards Panel may consider this issue as part of its review of the Higher Education Standards.

An educator at the National Museum of Australia shows Phar Lap's heart to students in Kiama using the CSIRO Museum Robot.

NBN: Professor Jim Barber, University of New England (Broadband Champion)
Professor Barber, Vice-Chancellor, shares his vision for ubiquitous, high-quality education enabled by the NBN.
http://www.youtube.com/watch?v=Ax_tgzaXxME&list=UUFnuJPIKJDstKUwZgKdVPpQ

NBN: Professor Ian Atkinson
Hear how research specialist Professor Ian Atkinson has made a huge difference to the way his family works, studies and plays.
http://www.youtube.com/watch?v=Zhf64VacgJQ&list=UUFnuJPIKJDstKUwZgKdVPpQ

NBN: Stuart Hamilton, Open Universities Australia (Broadband Champion)
Stuart Hamilton shares his vision for the future of education enabled by the NBN.
http://www.youtube.com/watch?v=tLjCfvHGyCU&list=UUFnuJPIKJDstKUwZgKdVPpQ

Sydney Opera House connects with Willunga High for NBN-enabled drama class
Watch a demonstration of an interactive online drama workshop with the Bell Shakespeare Company Sydney Opera House and students at Willunga High School in South Australia.
http://www.youtube.com/watch?v=p4AYKpI01j4&list=UUFnuJPIKJDstKUwZgKdVPpQ

16: Telework

By 2020, the level of telework in Australia will have doubled so that at least 12 per cent of employees will have a formal telework arrangement.

To advance our progress towards this goal the Government will:

> **coordinate an annual National Telework Week**

> **trial telework using high-speed broadband in seven Australian Government departments and agencies during 2013**

> **advertise telework opportunities in Australian Public Service (APS) job vacancies from July 2014**

> **promote the benefits of telework in public debates on measures to address traffic congestion and engage with private sector leaders in telework.**

'Telework' is the practice of working from home on a scheduled or regular basis (that is, it is not an ad hoc arrangement) while using high-speed broadband to stay connected to the office.

Telework can produce significant benefits. Research has shown that if 10 per cent of Australian employees were to telework 50 per cent of the time, the total annual gains to the Australian economy would be around of $1.4–$1.9 billion.[110] By 2020–21, the workplace participation impacts of NBN-enabled telework could grow annual GDP by $3.2 billion and create the equivalent of an additional 25,000 full-time jobs.[111]

The availability of teleworking can:

> **increase productivity**—seven out of 10 people report being more productive when working remotely and a recent Stanford University study found a 13 per cent performance increase in call centre operations[112]

> **reduce staff turnover**—the cost of replacing skilled employees can be up to 150 per cent of the departing employee's annual salary[113]

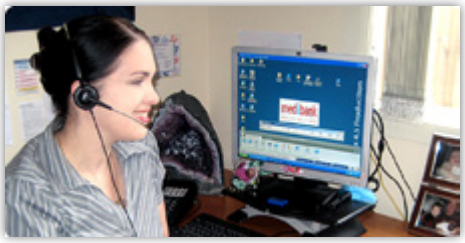
> **facilitate access to a wider pool of employees**—just over 50 per cent of people with family or carer responsibilities, with disabilities or living in regional and remote Australia, who want to telework, would change industries to do so

> **reduce costs of operation**—Microsoft has been able to reduce its office accommodation by around 25 per cent by introducing telework[114]

CASE STUDY: MEDIBANK PRIVATE

Medibank is Australia's largest provider of private health insurance and health solutions with over 4,400 employees. Medibank has adopted telework across its business, employing over 1,600 health professionals who deliver services from their home and another 1,000 regular teleworkers.

Initially, Medibank chose its work@home strategy as a way to attract experienced doctors and nurses in the face of local shortages in the healthcare workforce. Today, success with work@home has led to trials of telework in other parts of the organisation.



Medibank has adopted telework across its business, employing over 1,600 health professionals who deliver services from their home and another 1,000 regular teleworkers.

> **strengthen business continuity**—during Hurricane Sandy, Citibank and Goldman Sachs staff, whose New York offices were in the evacuation area, continued to work from home[115]

> **reduce employee transit costs**—employees in Australia's major capital cities face average commute times similar to those in cities such as New York, Tokyo and London.[116]

Progress update

Recent data indicates that Australia continues to lag internationally on levels of telework. The ABS estimated in 2008 that about 6 per cent of Australian employees have a telework arrangement with their employer.[117] It is estimated that about 10 per cent of all US employees work from home at least one day a month.[118] Take-up of telework in Australia is rising, but this increase is concentrated in the private sector. Across the Australian Public Service only about 4 per cent of employees telework.[119]

To facilitate greater awareness of the benefits of telework and to drive further take-up, the Government, in collaboration with over 130 Telework Partners, held 31 events involving more than 4,800 people across Australia during National Telework Week 2012. The community's engagement with National Telework Week was evidenced by an exceptionally high level of traditional and social media coverage estimated to have generated over 48 million points of engagement with the week's key messages.

Meeting the challenge

There are two major barriers to meeting the telework goal. The first is the lack of reliable and ubiquitous high-speed broadband connections that would enable high-quality videoconferencing and collaborative tools. This barrier will be addressed progressively as the NBN is rolled out.

The second major barrier is workplace culture and trust of employees within organisations.[120] Although 'culture' is a broad concept, one key factor is management skill. Effective telework management involves managing for work outcomes, rather than through direct oversight. Another important skill is using collaboration and communication tools for remote management.

Awareness of telework and its benefits has increased through a number of major initiatives including National Telework Week, when the Prime Minister announced a goal for the Australian Public Service to achieve 12 per cent take-up of telework by 2020. This greater awareness of telework has laid the groundwork for higher take-up in Australia with the roll-out of the NBN.

On 11 February 2013, the Government announced a package of amendments to the *Fair Work Act 2009*.[121] The amendments include extending the right to request flexible work arrangements to more categories of workers including carers, workers with disability, mature-aged workers and workers experiencing domestic violence. These amendments support flexible working arrangements and may help to increase the number of teleworkers. The Fair Work Amendment Bill 2013 was introduced in Parliament on 21 March 2013.

Action 21 Conduct an annual National Telework Week

To draw on the success of the first National Telework week, it will be conducted each year for the duration of the telework goal. The Government will seek additional Telework Partners to increase awareness of telework and it's benefits, facilitate take-up and showcase a greater range of telework case studies.

Australian Government agencies to trial telework during 2013

Seven Australian Government agencies will trial telework from July 2013 using high-speed broadband. The trials will assist agencies to meet the goal of 12 per cent of Australian Public Service employees having a formal telework agreement by 2020.

Agencies participating in the trials are:

> the Australian Bureau of Statistics

> the Australian Taxation Office

> the Department of Broadband, Communications and the Digital Economy

> the Department of Education, Employment and Workplace Relations

> the Department of Immigration and Citizenship

> the Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education

> the Treasury.

From July 2014 all agencies in the Australian Public Service will advise staff of which specific positions are suitable for telework. Agencies will then review those positions excluded from telework on an annual basis.

Microsoft Australia recently won the Aon Hewitt 'Best of the Best Employer' award after implementing telework and 'anywhere working' across the business.

Green Building Council of Australia
See why the Green Building Council of Australia says sustainability includes telework.
http://www.telework.gov.au/Telework_in_action/videos/video_case_study_green_building_council_of_australia

Rae and Partners
For law firm Rae and Partners, the NBN will allow teleworkers to engage with clients outside the office.
http://www.telework.gov.au/Telework_in_action/videos/video_rae_and_partners

Microsoft Australia
Microsoft Australia, the Aon Hewitt 'Best of the Best' employer.
http://www.telework.gov.au/Telework_in_action/videos/video_microsoft

17: Environment and infrastructure

By 2020, most Australian households, businesses and other organisations will have access to smart technology to better manage their energy use.

The Government will work actively to identify, develop and promote smart and energy-saving technologies. In a recent example, the Government has committed to collaborate with mainland state governments to develop the mechanisms to provide a national spectrum allocation to form the basis for interoperable rail signalling systems for metropolitan and regional areas.

Greater engagement in the digital economy can reduce pressure on infrastructure, enable more efficient resource management and lower carbon emissions.

Digital technologies can improve productivity and contribute to environmental sustainability through better infrastructure management.[122] For example, sensor networks in farming can indicate the best places to plant crops and help reduce fertiliser and water consumption. Digitally-monitored and managed roads can reduce travel times, fuel consumption and greenhouse gas emissions. NBN-connected smart grid technologies can reduce energy demand and reduce energy costs.

The ubiquity of high-speed broadband provided by the NBN will allow disparate digitally-managed systems to be better integrated, allowing each network to communicate with the others. This macro-level system management has the potential to change our urban landscape.

Progress update

The *Smart Grid, Smart City* project is testing the commercial-scale deployment of a smart grid to inform the broader deployment of smart grids across Australia. The initiative is transforming the traditional electricity network by adding a chain of new smart technologies, such as smart sensors and smart meters, and testing them both the grid and within households. More than 30,000 households are participating in the trial to help test new generation smart meters and other technologies.

The trial's in-home display and web portal provides participants with real-time and historical energy usage data including greenhouse gas emissions, real-time billing information, a breakdown of details on appliance energy use, suggestions on how to save energy, and a comparison of usage with similar households. The trial will be completed by October 2013, with a final report due in December 2013. Across the country more than 1.5 million smart meters have been installed, most of them in Victoria.[123]

The Broadband Smart Home in Armidale is demonstrating the home of the future with a connection to the NBN fibre. It contains smart electricity and water meters, remote education and video conferencing equipment, assisted living technologies for aged care and in-home support, and remote vision-testing equipment.

The Managed Motorways initiative in Melbourne is showing how coordinated freeway ramp signals and sensor networks can help reduce congestion on major roads, making travel more efficient while making better use of existing infrastructure and delivering better network performance, all without the need for expensive capital upgrades. With the completion of the M1 Upgrade, which included the implementation of the managed motorway, considerable benefit in reduced peak hour travel times has been achieved. Travel time has been reduced on average by over 20 per cent during the morning peak and afternoon peak on sections of the M1 freeway, with even greater reductions on some sections. Work has now commenced on the concept design and environment assessment for the M4-managed motorway in Sydney.

Sense-T (a sensor network used in Tasmania) is demonstrating the contribution of sensors to improving productivity and innovation in the logistics, water, agriculture and aquaculture industries. By harnessing the NBN, Sense-T is combining real-time and historical data and making it available to the community through user-friendly applications.

The Australian Research Council recently announced that Sense-T's Pathways to Market project would receive $2.5 million funding under the Industrial Transformation Research Hub scheme. That adds to the $7.6 million Sense-T has already raised for the project from industry and research organisations.

Modern, wireless-based European standard signalling systems for metropolitan train services are being introduced in many capital cities to improve the efficiency of existing rail infrastructure. Industry studies indicate that the new advanced digital communication systems will allow more trains to operate on existing infrastructure leading to increased capacity. If the higher capacity leads to a switch to public transport, there is potential to reduce accidents, congestion and pollution.

In recognition of the importance of wireless signalling systems to rail infrastructure productivity and enhanced consumer benefit, the Government is offering a national allocation of 1800 MHz spectrum at a concessional public interest price to the five mainland states. This would enhance the efficiency of rail systems across Australia. Discussions with the states are currently underway to progressively implement a common national standard of wireless access for rail signalling systems, which will provide both environmental sustainability and rail efficiency benefits.

Meeting the challenge

While sensor networks in the transport and agricultural sectors are gaining wider acceptance, a lack of information about the benefits and costs of installing similar, home-based technologies is hindering wider adoption. According to the *Smarter 2020: Report*,[124] there are high up-front costs for installing ICT transit and logistics systems and a lack of information on the benefits which may discourage investment in smart technologies. Similarly, individual consumers are still largely unaware of the benefits of smart grid technology.[125]

Adoption can be increased by promoting compatibility between available smart technologies and by ensuring greater standardisation to improve coordination, particularly in transport systems and smart meter deployment across jurisdictions. The Policy Framework for Intelligent Transport Systems in Australia provides guidance to each jurisdiction to ensure that the technology used is compatible and developed around agreed policy principles.[126] The Energy Strategy has outlined the intention to develop a national framework to guide the development of smart meters.[127]

CASE STUDY: THE SMART FARM

Kirby Farm, also known as the SMART Farm, is one of the University of New England's (UNE) commercial farms in Armidale, NSW. The SMART Farm is being transformed to a national demonstrator site showcasing the latest smart technologies, underpinned by the NBN.

Access to fast broadband connectivity is a key part of SMART farming. Under the SMART Farm model and utilising the NBN, farmers would have access to a wealth of information and data from a network of wireless sensors monitoring soil, crops, or pastures, livestock, machinery and environmental conditions on the farm.

SMART farmers could keep an eye on cattle in the paddock from the comfort of their own home or know where there are green pastures for their cattle to feed. It could mean locating machinery and equipment or joining a teleconference with local farmers to discuss crop prices.

Farmers on a SMART farm could access remote expertise and assistance for diagnosing or troubleshooting issues such as the breakdown of an important piece of machinery. High-definition video conferencing systems in a SMART farmhouse could also provide a platform for education and social networking for the whole family.

The SMART Farm will demonstrate practical and realistic NBN-enabled pathways for increasing productivity and improving environmental outcomes, safety, business resilience and social inclusion on Australian farms.

Scientists at CSIRO's ICT Centre and UNE's Precision Agriculture Group supported by the Australian Centre for Broadband Innovation are currently deploying a range of technologies including a living soil moisture map, wireless cattle tracking ear tags and GPS collars, a 360 degree camera system to monitor livestock and a SMART Farm Control Portal.

The SMART Farm is a great example of how NBN and sensor technologies are the future of farming in Australia. Visit http://acbi.net.au/smartfarmofthefuture/ for more details.

Next steps

At a broader level, the potential and role of ICT as an enabler for improving efficiency and productivity are poorly understood. There is a role for the Government in promoting the benefits of increased use and investment in smart technologies.

Making information about the efficiency benefits of using smart technologies publicly available can contribute to improved community understanding of the benefits of smart technology. For example, the Government will make information about the Smart Grid Smart City project available when the final report on the project is released in December 2013. This will include information about the net benefit of improved environmental outcomes and productivity and efficiency gains. It will also include assessments of the following indicators for the energy, transport, manufacturing, agriculture and building sectors:

> improving productivity and efficiency in the use of existing energy infrastructure and transport systems, including reduced congestion on networks

> reducing pressure on capital cities by enabling businesses and government to establish and conduct their operations online from any location including in regional and rural Australia

> teleworking assisted by the ubiquitous availability of high-speed broadband

> improving productivity and reducing emissions through the provision of remote health and education services online

> improving efficiency and reducing energy use by households and businesses through the use of smart technologies, such as smart meters and in-home monitoring tools.

Action 22 Facilitate more efficient use of rail infrastructure

The Australian Government will collaborate with mainland state governments to develop a single national spectrum allocation that will form the basis for interoperable train communication systems for all Australian metropolitan and regional areas.

18: Regional Australia

By 2020, the internet usage gap between households and businesses in capital cities and those in regional areas will have narrowed significantly.

To advance our progress towards this goal the Government will:

> **expand the Digital Local Government program**

> **provide wi-fi access to remote Indigenous communities**

> **fund an industry peak body to develop a Digital Business Kit for use by businesses in the farming sector.**

The transition to a digital economy will provide a transformational opportunity to regional communities across Australia. More business activity will be conducted through high-speed broadband. It will make regions more livable and attractive to new and current residents by enabling greater digitally-enabled access to services and social connections. Such opportunities for economic growth, diversification and wellbeing contribute to stronger regions and a strong national economy.

The NBN represents an unprecedented investment in telecommunications infrastructure in regional Australia. Regional Australia will obtain significant economic and social benefits from the digital economy as the NBN is offered to telecommunication providers at a uniform, national wholesale price and through the rollout occurring concurrently with metropolitan areas. The rollout of the NBN will reduce the disparity in the availability of high-speed broadband in regional Australia.[128] Over 93 per cent of homes and businesses will receive fibre-to-the-premises when the NBN is completed.

CASE STUDY: NBN-ENABLED TELEWORK, RAE AND PARTNERS, TASMANIA

Rae and Partners is a Tasmanian law firm, operating in Launceston and Scottsdale. Scottsdale was one of the first locations in Australia to have homes and businesses connected to the NBN.

For Ross Hart, Managing Partner of the firm, being able to use the NBN to work out of Scottsdale is essential to the firm's client engagement: '…because it's a rural community it's important to have that commitment.' The NBN enables the law firm '…not only connect to our remote offices via video conferencing, but also connect to our clients.'

According to Mr Hart, the NBN is also a key part of enabling the firm's staff to work from home to deliver premium services to his clients: 'It's essential, for us to attract and retain the best graduates, that we offer flexible working environments', he said. Rebecca Crawford, a litigation lawyer at Rae and Partners and a new mother, says 'Being able to work from home is absolutely a factor that made me chose Rae and Partners'. For Rebecca, the NBN 'will make working from home just that much more consistent and reliable'.

Uniform national wholesale pricing

Uniform national wholesale pricing of NBN services will result in more equitable retail broadband prices between regional and metropolitan Australia, assisting regional Australia to compete on a more equal footing. This goal has been supported by a range of actions:

> In December 2010, shareholder ministers issued a statement of expectations requiring NBN Co to charge access seekers uniformly for services across its network for all technologies and for the basic service offering

> NBN Co lodged a special access undertaking with the Australian Competition and Consumer Commission (ACCC) in December 2012 to provide long-term certainty on pricing and cost recovery, including to support the delivery of uniform national wholesale pricing

> NBN Co's commitment to uniform national wholesale pricing is further reflected in its corporate plan and the products it has in the marketplace

> The Minister for Broadband, Communications and the Digital Economy announced on 6 February 2013 that NBN Co would offer 25/5 megabits per second services on its fixed wireless and long-term satellite platforms at the same price as they are offered on its fibre network

> As part of the Government's broader telecommunications reforms, the ACCC has been empowered to determine up-front terms and conditions, including price, for access services including domestic transmission capacity. This means that retail service providers in regional areas requiring such capacity have the benefit of obtaining access at regulated prices.

Regional Australia and the digital economy

An NBN-enabled digital economy can also help regional Australia to:

> **increase business opportunities**—businesses are already moving their operations to regional centres where the NBN is available and where operating costs are lower; for example, telecommunications provider Anittel Group Ltd is partnering with James Cook University to create a purpose-built data centre facility on the outskirts of Townsville [129]

> **increase employment opportunities**—Colmar Brunton and Deloitte Access Economics estimate that by 2020–21, telework may create approximately 10,000 additional jobs in regional Australia

> **improve access to health aged care services** through greater access to telehealth

> **improve access to education** through virtual classes delivered by the best teachers

> **improve access to other government services** without having to travel

> **improve access to retail and other business services** such as video-based customer support.

Progress update

Seven per cent of Australian premises will be served by a combination of next-generation fixed wireless and satellite technologies, providing peak speeds of up to 25 megabits per second download and 5 megabits per second upload (25/5 Mbps).

Pending the arrival of its long-term satellite service in 2015, NBN Co has introduced an interim satellite service (ISS). Priority for ISS access is given to eligible customers who currently do not have access to commercial broadband services. By 8 May 2013, 30,465 services had been activated over the NBN ISS. One hundred and sixty-five remote schools and educational facilities, 43 remote health care facilities and 69 local government facilities have registered for the ISS.

CASE STUDY: SARAH AND ANTHONY CRABB, ORGANIC AND RAW, ON THE BENEFITS OF CONNECTING TO THE NBN

Sarah and Anthony Crabb run a growing business called Organic and Raw, which sells a fermented health drink, Mojo Kombucha. The drink is produced locally in Willunga where they live and is sold throughout Australia.

Sarah and Anthony's business has benefitted since connecting via fibre to the National Broadband Network.

'Our business wouldn't be the same without the NBN', says Sarah. 'Before, our internet was quite slow and there were drop outs. Now, for a price on par with our previous service, we're getting a faster, more reliable connection.'

The Crabb's can do more in less time, thanks to the NBN. 'Now we can manage and market our business online in a more cost-effective, competitive way,' says Anthony 'It's going to open up a whole range of opportunities for us in the future'.

The Crabbs balance their hectic work-life with raising two small children, and a more efficient business means they can devote more time to family and community.

'It's a good balance', says Anthony.

NBN Co is also making steady progress with the rollout of its fixed wireless network. At 6 May 2013, more than 17,300 homes and businesses could connect to the NBN fixed wireless network in areas surrounding Armidale, Ballarat, Darwin, Geraldton, Tamworth and Toowoomba. NBN Co expects to complete the fixed wireless rollout in 2015.

Meeting the challenge

The Government has invested in a range of programs designed to increase digital literacy in regional areas as the NBN is rolled out:

> 23 Digital Hubs have been established in regional Australia to enhance digital literacy and understanding of the NBN

> 27 Digital Enterprise providers are located in regional Australia to assist businesses and NFP organisations to become engaged in the digital economy and take advantage of the NBN

> 27 of the 55 Regional Development Australia committees have been provided with around $700,000 to undertake activities to raise awareness of the opportunities the digital economy can bring to their regions

> 22 regional organisations have become telework partners in a network of organisations working to encourage awareness and take-up of telework

> Under the National Partnership Agreement element of the Indigenous Communications Program, funding is provided for the installation and maintenance of public internet access facilities in remote Indigenous communities. To date, 96 communities have received internet access facilities through the program. In addition, ongoing training and support are provided to community members to improve digital literacy skills and participation in the digital economy. By May 2013, more than 4,000 Indigenous Australians had received computer and internet training through the program

> Approximately half (17) of the local councils working to improve their online services under the Digital Local Government program are located in regional Australia

> Many of the health, education and other NBN trials currently being conducted (see Appendix C) are focused on improving service delivery to people in regional Australia

> With the establishment of the myregion.gov.au website, there is now access to regional spatial and socio-economic data, information on grants and news in one central location.

The expansion of the Digital Enterprise program includes 12 additional eligible regional centres. The Digital Enterprise Virtual Advisor Program will primarily provide online training to assist Indigenous Australians, SMEs and NFPs located in regional and remote areas to help them to improve their online presence and maximise the opportunities provided by the NBN.

The Government will also partner with a relevant peak industry association to develop a digital business kit to raise awareness and educate businesses in the farming sector on how to take advantage of high-speed broadband. The kit will include examples of innovative ways for farmers to undertake their day-to-day operations, including remote monitoring of livestock and plantations, taking online orders, receiving payments and the adoption of cloud technologies.

Digital Local Government program

The Digital Local Government Program (DLGP) encourages local government to develop online services that are replicable and scalable, and that other local governments across Australia can adapt and use. It helps local governments to deliver innovative online services to homes and businesses. It also encourages improvement in the quality, availability and speed of local government services.[130] With more than half the DLGP projects being implemented by regional councils, ratepayers have access to better, more accessible and more convenient services without having to travel long distances to be there in person.

Examples of projects funded under the DLGP include:

> online customer support, which people can access from their home or business using videoconferencing (such as Toowoomba Regional Council, Queensland)

> live community consultation and engagement services, which people can access from their home or business using videoconferencing (such as Kiama Municipal Council, New South Wales)

> planning and development application services, which enables people to lodge and track applications online (such as George Town Council, Tasmania)

> an emergency management system, which enables emergency service personnel to communicate and share data in real time using videoconferencing (such as Sorell Council, Tasmania).

CASE STUDY: KIAMA MUNICIPAL COUNCIL, USING THE NBN TO ENGAGE WITH THE COMMUNITY

Through the DLGP, Kiama Municipal Council's online community engagement project, Kiama Connect, is providing greater access to council services for residents and businesses.

Kiama Connect helps community members who for social, demographic or mobility reasons, are not able to attend face-to-face workshops and forums to participate in council activities. Around 30 per cent of workshop participants who were surveyed, including seniors, at-home parents and people with caring responsibilities, said they would not have been able to participate if the videoconference had not been held.

The diverse range of topics covered so far includes small business forums, waste management, and Children's Story Time through the Kiama library. The council is increasingly using the videoconferencing system for regular weekly meetings with consultants and other agencies.

The Kiama Connect project is reaching those in the community that the council has had difficulty engaging with and the videoconferencing of workshops, information sessions and meetings is saving people time and money.

CASE STUDY: CHRIS AND JULIE STOTT, 'INVERNESS' FARM, NSW, ON THE BENEFITS OF USING THE ISS

A satellite connection to the NBN has revolutionised the way Chris and Julie Stott run multiple businesses from their farm, Inverness, in the central tablelands of NSW.

The NBN means Julie Stott can service her IT consulting and web design business clients at a time that suits her and them, as well as working with the family's farming interests.

For Chris Stott, a marketing specialist, the network has improved his communication with colleagues at DataDot Technology, a microdot antitheft company, and its overseas clients, as well as with his clients at the Bathurst flying school he cofounded in 2010.

Chris says, 'before NBN, we'd be off the air one day and on the air the next and just when you'd set up an appointment with someone in Taipei or Shanghai, you'd suddenly find you didn't have a connection'. Before the NBN arrived at Inverness, lack of connectivity made travel to Sydney and overseas essential for Chris. As a businesswoman with clients expecting speedy attention to their IT and website needs and problems, Julie is also delighted to be able to do all her work from home.

Action 23 Expand the Digital Local Government program

The Government will invest a further $5.7 million in the Digital Local Government program over the 2013–14 and 2014–15 financial years. This will enable additional councils, including many in regional areas, to take advantage of the NBN to improve the efficiency and effectiveness of the services they deliver to residents and businesses.

Action 24 Provide free wi-fi access to remote Indigenous communities

Over the past four years, the Government's Indigenous Communications Program has progressively rectified the lack of basic communications services in approximately 300 remote Indigenous communities through the installation of satellite community telephones.

Six of the phones have been converted to enable the provision of public wi-fi on a trial basis. The trial has clearly succeeded, with high rates of usage of the wi-fi for social, education, business and personal use. Residents of the communities have thus been able to participate in the digital economy for the first time, with a clear benefit to their quality of life. The Government will now progressively adapt more of these community telephones to provide public wi-fi services to these communities.

A fixed satellite community phone upgraded with wi-fi capability at the Festival Ground near Laura (Cape York), where the Aboriginal Dance Festival is held.

NBN: Jennifer Willcox
Learn how Jennifer Willcox, a resident of Walpole on Western Australia's isolated South Coast, sees how the NBN will benefit her and the rest of the Walpole community.
http://www.youtube.com/watch?v=V4DgjY09uPE&list=UUFnuJPlKJDstKUwZgKdVPpQ

Conclusion

The advent of the virtual world is changing how we interact and how we work. Increased engagement in the digital economy translates to a stronger and more productive national economy and can enhance our lifestyles.

Digital technology and connectivity are automating chores such as paying bills or buying groceries. They allow us to share our experiences through social media and helps many of us to work away from the office. The digital world provides options to make life better—whether on the beach or in a factory.

Our vision is for Australia to be a leading digital economy by 2020, globally competitive and well positioned to reap the social and economic benefits of the digital age.

To make this vision a reality we must achieve the goals we set in the 2011 NDES. We must increase online participation by Australian households. We must also increase online engagement by Australian businesses and NFPs and embrace options such as telework.

Regional Australia must be a particular focus, given the huge potential to overcome the traditional hurdles faced by those in remote locations. Our health, aged care and education services must use the potential of digital technology. Indeed, all government service delivery must be improved through digital channels.

These goals represent what Australia needs to do if we are to be a leading digital economy, yet there are challenges. Some are physical and some are less tangible. Some are built into existing regulation, and some reflect the nature of the virtual world. This update to the National Digital Economy Strategy outlines a comprehensive agenda to address these challenges to become a leading digital economy. It sets out the building blocks—seven core enablers—that will ensure we meet our digital economy goals.

The enablers—world class infrastructure, digital skills, online identities, safety and security, a supportive regulatory environment, cloud computing and open data—will help all sectors of society to embrace digital technology, regardless of their level of digital proficiency. All Australians will benefit from the rollout of the NBN and the Government's move to Digital First. Businesses, large and small, will benefit from changes to regulatory arrangements and improvements in the ICT skills pipeline. And businesses and individuals not engaging online will benefit from digital literacy programs, including industry-specific digital business kits, Digital Enterprise, and the Keeping Seniors Connected program.

In the past 12 months, biomedical engineers used 3D printing to create a human ear using living cells. Self-driving cars became legal in Nevada, using sensors and cameras that send huge amounts of data to cloud servers in real time. A person with quadriplegia was able to control a robotic arm via electrodes placed in her brain. Science is catching up to our imaginations.

Australia can be a leading digital economy by 2020. We are building the best infrastructure in the world, and we have the imagination to use it well. All we need now is the commitment and ability to change. With this strategy, the Government has confirmed its continuing commitment. We will take action ourselves, and provide the enablers for others to do the same.

To ensure that all possible impediments are identified and as far as possible removed, the Government will convene a series of ministerial digital economy advisory forums. Initial forums will focus on the implementation of Digital First and telehealth.

The forums will be chaired by the Minister for Broadband, Communications and the Digital Economy and Minister Assisting the Prime Minister on Digital Productivity, and will consist of:

> relevant ministers, at the invitation of the chair

> relevant departmental secretaries

> the Secretary of the Department of Broadband, Communications and the Digital Economy

> six leaders from the business community with expertise in the area being discussed at the forum.

Appendix A Digital First implementation and roadmap

The Digital First roadmap (see Figure A1) shows the Digital First commitments and milestones (see Chapter 14: Online government service delivery) over the period from 2013 to 2020. These culminate in a digital government service delivery capability that will allow the Australian Government to meet its 2020 goal.

The roadmap outlines some high-level coordination and governance commitments as well as agency commitments. A Digital First Coordination Group that will be led by the Department of Broadband, Communications and the Digital Economy and the Department of Finance and Deregulation will be established. Major service delivery agencies will be invited to be members of the coordination group. The group will report annually through the Secretaries' ICT Governance Board to the Special Minister of State and the Minister for Broadband, Communications and the Digital Economy. It will be supported by staff within the Australian Government Information Management Office (AGIMO) and the Department of Broadband, Communications and the Digital Economy to:

> foster greater adoption of digital service delivery models in government agencies

> develop and maintain the Digital First principles

> prepare an annual report on the progress of agencies towards the Government's digital economy goals

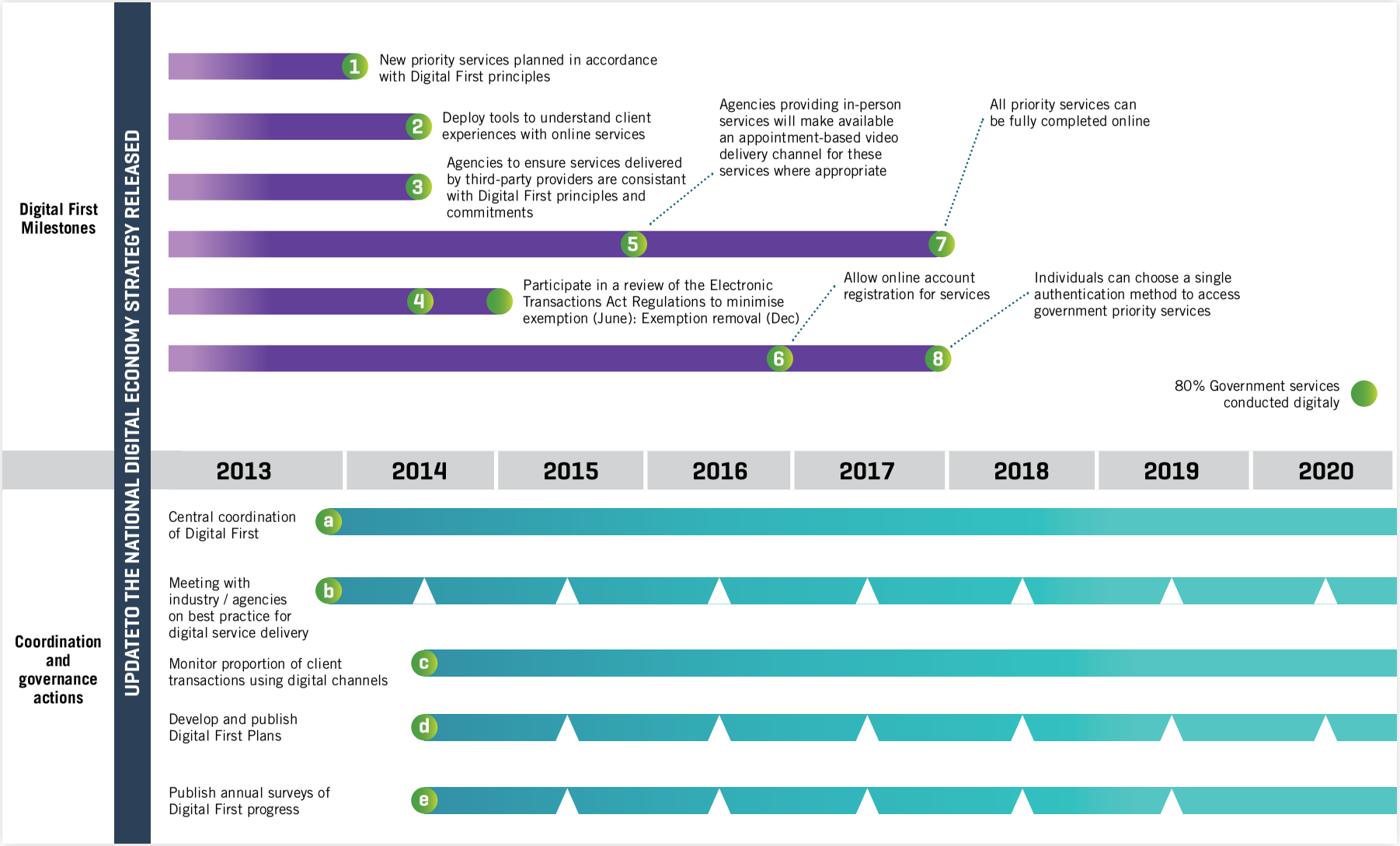
> engage annually with industry leaders and academia to consider future directions in digital service delivery

> promote the sharing of ideas and best practices across agencies, including in relation to engagement with states and territories

> develop advice to assist agencies to meet Digital First commitments and milestones (for example, common platforms for video delivery and approaches for collecting Digital First metrics)

> convene a six-monthly meeting of agencies to share information on successful approaches to the roadmap (these discussions will inform amendments and additions to Digital First).

Figure A1 The Digital First roadmap



Appendix B Implementation timeline

Enablers of the Digital Economy

	LEAD AGENCY		2013	2014	2015	2016	2017
DIGITAL SKILLS	DEEWR	**Action 1. Complete development of a new curriculum for technologies** The Australian Curriculum embeds ICT skills as a general capability across all learning areas of the curriculum. It will also include the subjects of Digital Technologies and Design Technologies, which all students will study from Foundation to Year 8.	Design	Implementation/ongoing			
	DBCDE	**Action 2. Partnering with industry to promote digital careers** National ICT Australia will lead a consortium that will develop programs to promote careers in ICT skills to school students.	Design	Implementation/ongoing			
TRUSTED ONLINE IDENTITIES	AGD	**Action 3. Expanded use of the Document Verification Service** Government will work with state and territory governments to enhance access, usability, and efficiency of the Document Verification Service – and also make the system more widely available to the private sector.	Design	Implementation/ongoing			
	DoFD	**Action 4. Use of trusted third party credentials by government** Government will investigate the use of higher assurance digital credentials issued by commercial providers such as financial institutions, and utilise existing digital credentials, including third party credentials.	Design	Trial	Implementation/ongoing		
SAFETY AND SECURITY	ACMA	**Action 5. Digital Citizenship Best Practice Principles** Government will release the Principles in mid 2013 and encourage Australians to practice digital citizenship's core characteristics.		Implementation/ongoing			
	AGD	**Action 6. National Plan to Combat Cybercrime** Government is working with state and territory governments to develop the National Plan to Combat Cybercrime, which outlines a strategic framework for how Australian governments will respond to the threat posed by cybercrime. The plan is expected to be released in mid 2013.		Implementation/ongoing			
SUPPORTIVE ENVIRONMENT FOR DIGITAL INDUSTRIES	Treasury DIICCSRTE	**Action 7. Review the regulatory arrangements for Employee Share Schemes** Government will review the tax treatment of employee share schemes and develop guidance to reduce the administrative burden of establishing employee share schemes.		Implementation/ongoing			
	Treasury DIICCSRTE	**Action 8. Consultation on an Australian crowd sourced equity funding scheme** Government will develop a best practice framework for Crowd Sourced Equity Funding.		Implementation/ongoing			
	AGD	**Action 9. Minimise exemptions under the Electronic Transactions Act 1999** Government will review Electronic Transactions Regulations 2000 to remove out dated exceptions to Commonwealth electronic transaction legislation by December 2014.		Implementation/ongoing			
HARNESSING THE BENEFITS OF CLOUD SERVICES	DBCDE	**Action 10. Promoting the adoption of cloud computing in Australia** To promote the smart adoption of cloud computing, the Government will: • identify training and skills development across the public sector and ensure that agencies consider cloud services for relevant ICT procurements; • develop resources to assist small businesses, not-for-profit organisations and consumers acquire cloud services with confidence, and • work in partnership with cloud vendors to promote Australia as a trusted hub for data storage and processing, and encourage foreign investment in cloud services.	Design	Implementation/ongoing			
ENCOURAGING OPEN DATA AND BIG DATA	DBCDE/ Office of Spatial Policy	**Action 11. Explore making the G-NAF a freely available data set** Government will explore options for providing open access to the G-NAF; this will include an analysis of the legal, financial and security implications.		Implementation/ongoing			
	DoFD	**Action 12. Developing the Government's Big Data strategy** Government will release its Big Data Strategy in 2013, and continue to support the Data Analytics Centre of Excellence.		Design	Implementation/ongoing		

Advancing Australia as a Digital Economy—Implementation Timeline Design Trial Implementation/ongoing

Goals of the National Digital Economy Strategy

	LEAD AGENCY		2013	2014	2015	2016	2017
ONLINE GOVERNMENT SERVICE DELIVERY		**Action 13. Digital First** Under Digital First, by December 2017, Government agencies will provide their clients with user-friendly online access to priority services, allowing end-to-end processing for those services through a choice of a single authentication method that enables access to a range of services without needing multiple passwords and/or multiple tests of credentials.	Implementation/ongoing				
ONLINE PARTICIPATION BY AUSTRALIAN HOUSEHOLDS	FAHCSIA	**Action 14. Keeping Seniors Connected program** The Government will provide senior Australians with free access to the latest technology and to training that will educate seniors on issues of particular concern to them, such as cyber security and cyber safety.	Implementation/ongoing				
ONLINE ENGAGEMENT BY AUSTRALIAN BUSINESSES AND NOT-FOR-PROFITS	DBCDE	**Action 15. Expand the Digital Enterprise program and develop industry specific Digital Business Kits** The Government will expand the Digital Enterprise program and develop industry specific digital business kits to provide small to medium enterprises (SMEs), the community, and the not-for-profit (NFP) sector with resources to better engage with the digital economy.		Implementation/ongoing			
HEALTH AND AGED CARE	DoHA/DVA	**Action 16. Consideration of expansion of the Medicare Benefits Schedule for telehealth items** The Government will undertake a review in 2013 to determine the costs and benefits of an expanded range of MBS telehealth items to include patients participating in video based consultations with their GP.		Design			
	DoHA/DVA	**Action 17. Evaluate outcomes from telehealth trials and develop action plans to address key challenges** During 2014-15, the Government will evaluate the current telehealth trials; share trial findings and lessons with the healthcare community; and use the findings to develop action plans to address key telehealth issues.			Design		
	DoHA	**Action 18. Video-consultation for the after-hours GP Helpline and the Pregnancy Birth and Baby Helpline** From the second half of 2013, the Government will commence a phased implementation of video-consultation capability starting with the after-hours GP Helpline and the 24 hour Pregnancy, Birth and Baby Helpline.		Implementation/ongoing			
	DoHA	**Action 19. Support increased use of digital platforms to provide aged care services** The Government will introduce a range of reforms such as : • revision of relevant aged care program guidelines to recognise and encourage the use of innovative and digital delivery options for the provision of aged care services • expansion of the Community Visitors Scheme into home care including through the use of technology, and • launch the 'My Aged Care' website to provide coordinated information for aged care services.		Design	Implementation/ongoing		
EXPANDED ONLINE EDUCATION	DIICCSRTE	**Action 20. Encourage access to virtual classes for VET students** The Government will work with the states and territories to promote virtual delivery of VET.		Implementation/ongoing			
TELEWORK	DBCDE	**Action 21. Conduct an annual National Telework Week** The Government will conduct an annual National Telework Week to promote the benefits of telework and facilitate uptake.		Design			
ENVIRONMENT AND INFRASTRUCTURE	DBCDE	**Action 22. Facilitate more efficient use of rail infrastructure** The Government will collaborate with mainland state governments to develop a single national spectrum allocation for interoperable train communication systems in metropolitan and regional areas.		Implementation/ongoing			
REGIONAL AUSTRALIA	DBCDE	**Action 23. Expansion of the Digital Local Government program** The Government will extend the Digital Local Government program to enable around fifteen additional local councils, including many in regional areas, to take advantage of the NBN to improve the efficiency and effectiveness of the services they deliver.		Implementation/ongoing			
	DBCDE	**Action 24. Provide free Wi-Fi access to remote Indigenous communities** The Government will progressively adapt community satellite telephones to provide public Wi-Fi services to remote Indigenous communities.		Implementation/ongoing			

Advancing Australia as a Digital Economy—Implementation Timeline Design Trial Implementation/ongoing

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FaHCSIA—Broadband for Seniors	
Policy issue	The ABS's Household Use of Information Technology survey of 2010–11 indicated that 71 per cent of Australians aged 55–64 years and 37 per cent of seniors aged 65 years or more used the internet in the previous 12 months. This was significantly lower than the 88 per cent of Australians aged 15–55 years who had used the internet that year.
Desired outcomes	Broadband for Seniors provides senior Australians with free access to computers and the internet, as well as training in basic digital literacy skills. Broadband for Seniors supports seniors in gaining the confidence and skills in using new technology, as well as providing opportunities for community participation and social inclusion.
Description of project	Broadband for Seniors provides seniors with free access to computers, the internet and computer training. Broadband for Seniors assists senior Australians to understand the benefits of engaging in the digital economy, helping them to: > access government services > maintain relationships with family and friends > pursue interests and hobbies > access information online > remain informed of, and participate in, community events. Senior Australians who access Broadband for Seniors can benefit from the guidance, ongoing support and training provided by volunteer tutors in a friendly face-to-face environment on topics such as how to email, surf the internet, Skype and stay safe online. Kiosks are located in places that seniors regularly visit and that provide existing services to them such as community centres, retirement villages, libraries and local clubs. From 1 July 2013, organisations hosting a Broadband for Seniors kiosk can apply for new technology, including a new computer terminal with touchscreen facilities, and a $2,000 training grant. Through the kiosks, senior Australians will have free access to the latest technology, and to training that will educate them on issues of particular concern to them, such as cybersecurity and cybersafety. From July 2015, training grants will be available to community organisations to educate senior Australians on the benefits of the internet.
Number of participants involved and results to date	Since 2008, approximately 2,000 Broadband for Seniors kiosks have been established across Australia and have provided more than 250,000 seniors with access to computers and the internet.
Demonstration of the NBN	This program contributes to the National Digital Economy Strategy goal of improved online participation by Australian households.

Digital Local Government—online customer support	
Policy issue	Local governments deliver a wide range of vital customer support services to their ratepayers. However, access to these services is often limited to those ratepayers who can travel to a council in-person to lodge an inquiry during normal business hours. This means that certain demographics, including full-time workers, small business operators, the elderly and the mobility impaired, have limited access to some customer support services.
Desired outcomes	The objective of this project is to use the NBN to make local governments' general customer support services more accessible online, enabling them to interact with a number of demographics that would otherwise have limited access to their council support services.
Description of project	Local governments undertaking general customer support projects are implementing online customer support services using the high-speed connectivity of the NBN. This involves the development and implementation of new workflow processes to receive and resolve customer inquiries online. Ratepayers can make an inquiry with a customer support officer in real-time using a cloud-based videoconferencing platform. The platform can be accessed online from the user's home or business, reducing the need for ratepayers to attend council in person to make an inquiry.
Number of councils involved and results to date	The 13 local governments implementing online customer support services under the Digital Local Government program are: > Adelaide Hills Council > Armidale Dumaresq Council > Auburn City Council > Blacktown City Council > City of Greater Geraldton > City of Prospect > City of Tea Tree Gully > Clarence City Council > Moorabool Shire Council > Moreland City Council > Penrith City Council > Toowoomba Regional Council > Townsville City Council Local governments are using high-definition videoconferencing to successfully deliver general customer support services online. Customer support officers from Moreland City Council, for example, have participated in more than 135 videoconferencing sessions since February 2013 to resolve inquiries. Peter Brown, CEO of Moreland City Council says 'This is a great opportunity for Moreland Council, we are able to showcase our innovation and have opened a new service channel for our citizens.' Oscar Yidliz, Mayor, Moreland City Council adds 'This project is a great opportunity for our community to see how the use of video and NBN can be of benefit.'
Demonstration of the NBN	> The NBN enables ratepayers to participate in high-definition videoconferencing sessions. This includes multiparty videoconferencing where up to eight users can participate in the same session. > High-definition videoconferencing enables local governments to replicate the process of in-person service delivery. > The NBN enables local governments to deliver customer support services to more ratepayers and overcomes constraints such as premise location, premise capacity, travel requirements, etc.

Digital Local Government—Online Emergency Management System	
Policy issue	Sorell Council plays a central role in coordinating and facilitating responses to a range of emergencies. Local hazards include flooding, bushfires, storms, infrastructure failure and road accidents. The current way of managing these incidents relies on complex communication structures and occurs by telephone, two-way radio, fax, written instructions and in-person briefings. This service is highly person-power and resource-intensive, primarily due to these communication inefficiencies.
Desired outcomes	The objective of this project is to use the NBN to enable rapid and comprehensive information and data exchange between all key participants involved in emergency management and recovery. The project aims to improve emergency management responses to incidents and to reduce the cost and time needed to manage an emergency and subsequent recovery phase.
Description of project	Sorell Council has implemented an Online Emergency Management System (OEMS) using the high bandwidth available through the NBN. The system incorporates videoconferencing and advanced mapping capabilities. The project includes a cloud-based IT platform, using the NBN, on which emergency management stakeholders can interact and exchange information in real time.
Number of councils involved and results to date	Sorell Council is the only council in the Digital Local Government program implementing an online emergency management project. However, the model used by Sorell could be readily replicated by other councils. During the recent bushfires in Tasmania, Sorell Council was able to use elements of the OEMS. The council was able to establish RSS feeds from the media and Bureau of Meteorology, send alerts, use its mobile app for asset tracking, and validate and add Safer Places using live mapping. 'The loss of all power and some communications in the affected area validated the usefulness of having a communications layout as part of the OEMS intelligence overlays,' said Bill Costin, CEO, Sorell Council.
Demonstration of the NBN	> High-definition videoconferencing enabled by the NBN. > Data exchange and cloud storage capabilities at speeds required in an emergency. > Improved connectivity between the emergency management assets and key agencies and/or emergency services. > Ability to manage emergencies from multiple locations using a combination of high-speed broadband and a cloud-based management system.

Digital Local Government—online community engagement	
Policy issue	Local council community engagement teams work closely with individuals and organisations to provide education, training and outreach services as well as to consult ratepayers on significant local matters. These services are less accessible to residents with limited transport options, the elderly, those with mobility issues, individuals living outside the area and people with disability.
Desired outcomes	The objective of this project is to use the NBN to improve access to councils' community engagement and consultation services. These services include online forums, online consultation workshops and interactive training sessions. Engaging with the community using high-definition videoconferencing enables councils to better reach a variety of underserved demographics, such as youth, the elderly, families, businesses and people with disability. There is increased participation in issues of local importance, and reduced travel time for participants.
Description of project	Councils are implementing online community engagement and consultation services using the high-speed connectivity of the NBN. Primarily, this involves the development and hosting of interactive community workshops that are delivered via web-based videoconferencing platforms, and accessible from residents' homes and businesses.
Number of councils involved and results to date	The 14 local government authorities in the Digital Local Government program implementing a community engagement component in their project are: > ACT Government > Adelaide Hills Council > Auburn City Council > City of Prospect > City of Salisbury > City of Whittlesea > Clarence City Council > Hawkesbury City Council > Ipswich City Council > Kiama Municipal Council > Kingborough Council > Melville City Council > Moreland City Council > Penrith City Council Topics of workshops being run by councils include food handling and safety, waste management education, bush care, recycling, and youth and Indigenous services. Moreland City Council had 33 online participants across four sessions, while Kiama Municipal Council has held six workshops with approximately 10 online participants attending each session. The Mayor of Kiama Municipal Council, Brian Petschler, said 'The Digital Local Government program has enabled Kiama Council to deliver its services online to many more residents than previously possible, through the use of a state-of-the-art videoconferencing platform and the National Broadband Network. Through this program, Kiama Council is delivering workshops, information sessions and meetings online to greater numbers of people than ever before, both locally and interstate. The project has also enabled residents with limited mobility, at-home-parents and those working out of the area to participate from the comfort of their own home or office.'
Demonstration of the NBN	> NBN services allow residents and other parties to connect remotely to workshops via publicly accessible videoconferencing solutions.

Digital Local Government—online building and development applications	
Policy issue	Councils have an essential role in the development and planning of their local government areas. Building and development applications require large, complex documents to be submitted and often a series of complex interactions between council and stakeholders, including developers, residents, architects and surveyors during the assessment process. The approval process can be lengthy and travel is often required for relevant parties involved in the lodgement, discussion and assessment of the applications. The paper-based building and development application process used by many councils is cumbersome and inefficient.
Desired outcomes	The objective of this project is to use the NBN to lodge, track and share online the large documents required for building and development applications. The project will streamline the lodgement and assessment process, reducing the time taken for the consideration of applications. The use of videoconferencing between the relevant parties complements the online application system by bringing stakeholders together virtually and minimising the need for travel.
Description of project	Councils delivering online building and development services are incorporating high-definition videoconferencing technology to improve their development assessment services and access to their planning services. These projects include the capability to track building applications online and the ability to interact with council staff and development professionals. The systems allow councils to manage and store development and building applications efficiently. Residents and businesses can track the progress of applications and communicate with council planning officers.
Number of councils involved and results to date	There are nine councils in the Digital Local Government program implementing an online building and development application component in their projects: > City of Onkaparinga > Break O'Day Council > Brisbane City Council > Coffs Harbour City Council > Dorset Council > George Town Council > Glamorgan Spring Bay Council > Launceston City Council > Town of Victoria Park Some councils have launched their online building/development application and videoconferencing services. Early statistics from Dorset Council indicate that four online building and development applications were received within two weeks of the council launching its services. Dorset Council Mayor Barry Jarvis says, 'This is the first step towards making it easier to engage with council … in many ways we will be better connected and, as a council, that will make us even more accountable.' On using the online application system, Kevin Walker from Hydro Tasmania said, 'Our application was lodged online and the search function enables us to track the status of our application online with ease.'
Demonstration of the NBN	> The reliability of the NBN enables the submission of large, complex building and development applications online. > The building and development application process is streamlined to enable the lodgement, assessment and approval processes to be conducted seamlessly.

Townsville NBN Diabetes Telehealth trial	
Policy issue	Diabetes is a chronic condition that has reached epidemic proportions. About 1.7 million Australians have diabetes mellitus (type 2) today. By 2031 this will almost double to 3.3 million.[131] Diabetes and its complications contribute to ill health, disability, poor quality of life and premature death. Costs to the health system from diabetes are projected to grow faster than the cost of any other health condition. Using current health delivery models, costs from Type 2 diabetes alone will rise by 520 per cent by 2033.[132]
Desired outcomes	The objective of the trial is to identify efficient means of empowering patients with diabetes to better manage their own health condition (for example, by significantly reducing their blood sugar levels) without having to visit the doctor as often. For patients who need assistance from health professionals, the trial will test whether high-speed broadband can be used to deliver this in a more timely, efficient and effective manner. The overarching objective is to establish whether the use of telehealth in this way is cost effective in reducing the impact of diabetes on the health system.
Description of project	A nurse coordinator employed by the Townsville–Mackay Medicare Local has been assisting diabetes patients, who are at home and connected to the NBN, to take regular readings of key health indicators and to transmit the results via broadband to the nurse coordinator. The nurse coordinator uses high-definition videoconferencing to discuss the impact of diet and exercise on the readings with the patient. They also assist the patient to manage their medication. If health indicators for a particular patient move outside parameters determined by the patient's doctor, the nurse coordinator will arrange a video-based, three-way consultation with the doctor or other allied health professional as recommended by the doctor. This enables more timely diagnosis using rich data on changes in the patient's condition.
Numbers of patients involved and results to date	As at 17 May 2013, 35 patients have consented to be on the trial with 21 patients and 15 doctors currently participating in the trial. Another 85 patients have been identified as possible participants once they have access to the NBN. Early results show that approximately two thirds of patients currently participating have been able to significantly reduce their blood sugar levels over a sustained period. Trial care coordinator, Julie Randall, says, 'The benefit of the whole trial is that the patient gets a good control and understanding of their diabetes so they can manage it at home.' This is confirmed by patient reports, including comments such as this from one patient: 'I've got a lot out of it [the diabetes telehealth service] so I think it's a big plus and I'd recommend it to anyone in a similar situation.' The CEO of Townsville-Mackay Medicare Local says of this model of care, 'I see this type of service delivery adding enormously to the benefits that we'll be able to deliver across our whole Townsville-Mackay Medicare Local.'
Demonstration of the NBN	Provision of telehealth services under the trial requires the capabilities of the NBN, in particular the high upload speeds that are essential for high-definition videoconferencing. The reliability of the NBN will ensure system availability and encourage patient and practitioner confidence, and the ubiquity of the NBN will allow all patients in need to access appropriate health services from the comfort of their own homes. As an adjunct to the main trial, NBN Co's interim satellite service may also be tested as a platform for delivering telehealth services to rural and remote patients.

NSW NBN Telehealth to the Home trial—chronic disease	
Policy issue	Chronic disease poses a significant morbidity, mortality and health care cost burden in Australia. More than 15 million Australians, including over 80 per cent of those aged 65 plus,[133] are directly affected by at least one chronic disease. In addition, more than half of all potentially preventable hospitalisations are because of a range of chronic conditions.[134] The burden of chronic disease will continue to grow, particularly as a result of the ageing of Australia's population. Best practice management of chronic disease involves coordinated and planned care, with greater patient access to multidisciplinary teams and appropriate support for patients to self-manage their condition.
Desired outcomes	The aim is to establish whether the use of telehealth can lead to better self-management of chronic conditions resulting in reduced hospitalisations and better quality of life, and more timely and targeted health interventions for those who need them. Because members of the care team are often in different locations and are extremely time-poor, it is difficult to deliver coordinated care using traditional care models. Providing in-home telehealth services using the NBN to monitor patients in their homes and adjusting treatment in a timely manner based on changes in health indicators, will help reduce the chance of the patient's condition deteriorating, and emergency medical assistance or hospitalisation being required. For patients who need urgent assistance, multi-party videoconferencing can be used to ensure that the care team is brought together quickly to determine the best health care options.
Description of project	These trials are providing in-home telehealth services using the NBN to older Australians living in Armidale and Kiama with chronic health conditions (such as chronic obstructive pulmonary disease, congestive heart failure and coronary artery disease) who are at high risk of hospitalisation. The trial uses home-based communication technologies to help patients monitor key health indicators and to manage their medication with video-based assistance from a care-coordinator. The nurse/care coordinator can, where appropriate, recommend changes to diet or lifestyle, based on the analysis of a patient's key health indicators. Patients also consult health professionals using high-definition videoconferencing from their own homes, reducing travel time and costs for routine health appointments, for them and their carers.
Numbers of patients involved and results to date	At 9 May 2013, 96 patients had enrolled in the chronic disease elements of the trial and 79 had received services. Early benefits include savings in travel costs and the timely treatment of trial participants by health professionals where monitoring indicated worsening key health indicators. In one case, the patient thanked trial staff for pushing her to go to her GP as soon as her symptoms changed, saying she did not know whether she would have been around if they had not, as she had become very ill very quickly. Another patient added, 'I felt really cared about when [the care coordinator] vc'd me with [team member] in my home after [team member] felt that the wound on my shin looked bad. Care coordinator (via vc) agreed and I was referred to the community nurse who came around a few times and helped me with dressing it. I felt very special.'
Demonstration of the NBN	The high upload and download speeds of the NBN are essential for high-definition videoconferencing, which is an important component of the trial. The reliability of the NBN will ensure system availability and encourage patient and practitioner confidence, and the ubiquity of the NBN will allow patients to access appropriate health services from their homes.

Kiama Youth Mental Health trial	
Policy issue	Mental disorders constitute the leading cause of disability burden in Australia, accounting for an estimated 24 per cent of the total years lost due to disability.[135] Australians in the 18–24 age group comprise the greatest number of people with a mental illness, and almost two-thirds of people with mental health problems experience their first episode before the age of 25.[136] The impact of mental health problems on young Australians and their families can be severe, involving long-term consequences on young people's growth and development, and the erosion of their quality of life by affecting their employment, education, personal relationships and self-confidence. Treating mental health problems in their early stages leads to improved outcomes as well as a reduction in the likelihood and severity of future mental health problems. Access to psychological services, however, is constrained by a number of factors, including a shortage of practitioners in regional Australia.
Desired outcomes	The trial aims to test the use of high-speed broadband to improve the ability of young people to access psychological services in a timely manner. It will also reduce the requirement for them to travel to psychologists in major metropolitan centres or to wait for the psychologists to visit them, which involves both delays and costs. By allowing young people to access these services from home or another access point, there will be a reduced impact on their attendance at school or work.
Description of project	The project uses high-definition videoconferencing to provide assessment and treatment services to young people (aged 12–25 years) living in NBN-enabled areas in Kiama with, or at risk of, mental illness or drug-related problems. Services are being delivered to clients in their homes in Kiama, as well as at two public access points (North Kiama Neighbourhood Centre and Kiama Library) which allow clients not connected to the NBN to access the services. Psychologists and other mental health professionals are located in Wollongong. Services include initial assessment via a web-based portal and the development of an early treatment plan, client triage, home-based or access point-based videoconferencing and case conferencing.
Numbers of patients involved and results to date	At 30 April 2013, three clients were receiving services from a community-based access point and three were receiving services from home. The trial is helping to reduce the extent to which the care provided to participants affects their ability to attend school or work, making treatment more manageable and convenient. The parent of a young client preferred the in-home service, commenting that 'the in-home service provides both the clinician and client with a convenient, easy-to-use service that is of a very high quality.' The service is being promoted through the local community. The aim is to increase participation to 30 clients once the NBN is more widely available in Kiama.
Demonstration of the NBN	The delivery of mental telehealth services under the trial requires high upload and download speeds for high-definition videoconferencing between psychologists and clients. The ubiquity of the NBN also allows clients who live at a distance from mental health service providers, or those with mobility issues, to access appropriate online mental health services in a timely manner without the expense and disruption associated with travel.

Uniquest—Comprehensive Online Telehealth Assisted Care (ConTAC)	
Policy issue	By 2030, the proportion of Australians aged over 80 years is expected to rise by 140 per cent, while the prevalence of chronic diseases and conditions will simultaneously increase as people live longer.[137] This scenario presents the following policy implications: > The demand on residential aged care facilities in Australia is expected to increase three-fold by 2045[138] > The demand for home-based services is expected to rise significantly as increasing numbers of older people remain living at home > The demand for palliative care is increasing. A recent survey reported that 73 per cent of Australians prefer to die at home.[139] Health-care services will need to respond accordingly. The challenge will be to deliver high-quality healthcare to older Australians at a sustainable cost.
Desired outcomes	Key desired outcomes include: > improved access to appropriate and timely health care services for aged care clients, including access to specialist care and rehabilitation services > more efficiently managed and coordinated healthcare services > a telehealth service model that is scalable and sustainable.
Description of project	The project will provide services to approximately 650 aged care clients at their primary place of residence in Queensland. Rather than needing to travel to access health services or wait for health professionals to visit aged care facilities, participants will be able to: > access telehealth consultations with medical specialists, GPs, community care providers and rehabilitation professionals from their place of residence > connect to their social support and clinical care networks > use hardware and software solutions that interface effectively and efficiently and are tailored to their needs and circumstances > make use of education and training resources. The project will target high-cost activities associated with aged care, including transition care, residential aged care and extended aged care in the home. Once established in aged care services, the model could be broadened and further enhanced to support palliative care and cancer care.
Numbers of patients involved and results to date	The project has a target of 650 participants. The identification and recruitment of participants has begun. First services are expected to commence from the second half of 2013.
Demonstration of the NBN	The trial will deliver services using NBN fibre and fixed wireless in several locations across Queensland. It will take advantage of the capabilities of the NBN, including: > high upload and download speeds, which are essential for clinical videoconferencing > the increased reliability of the broadband network, which will support system availability and encourage patient and practitioner confidence in using digital platforms for services > the ubiquity of the NBN, which will ensure that patients can use high-speed broadband to access appropriate health and aged care services from their places of residence, including aged care facilities.

Hunter New England Local Health District—Cancer Care Self-Management NBN Telehealth Program	
Policy issue	One-third of the total burden of illness and injury in Australia is attributable to cancer.[140] If a person lives to 85 years of age, they will have a one in two chance of a diagnosis of cancer.[141] As the Australian population ages and grows, cancer care will occupy increasing amounts of health-care and community resources. Current trends indicate that, while cancer incidence is increasing (there is a projected 28 per cent increase in the number of new cancer cases by 2021)[142], survival from cancer also continues to increase. As cancer survivors are four to five times as likely as the general population to have general health problems after treatment,[143] morbidity associated with cancer will continue to increase. Cancer patients and cancer survivors living in regional and remote areas are at particular risk due to their lack of access to cancer care programs, specialists, and rehabilitation or self-management programs.
Desired outcomes	The key objective of the project is to test the use of high-speed broadband to improve the delivery of cancer care and self-management support for diagnosed cancer patients in regional areas. Specific outcomes sought will be to: > reduce debilitating short and long-term effects of cancer treatment > increase adherence to self-management plans > reduce unplanned hospital and primary health care visits > reduce the burden on cancer treatment patients, carers and the health care system > develop a delivery model that can be adopted on a system-wide basis.
Description of project	Hunter New England Local Health District will use the NBN to deliver cancer self-management and care coordination telehealth services. Cancer patients will use in-home monitoring equipment to assess and manage their cancer symptoms in a timely manner with the support of a care coordinator. They will also be able to consult health professionals through high-definition multi-party videoconferencing made possible by the NBN. By reducing the need to travel for routine health appointments, the trial will remove obstacles to cancer treatment and assist patients to improve their quality of life. Self-management plans will be developed collaboratively between cancer patients, their carers, GPs and specialist teams. This approach makes patients more responsive to changes in their condition, which can reduce unscheduled hospitalisations.
Numbers of patients involved and results to date	The project has a target of 80 participants. The recruitment of participants has begun, and the first patients received initial training in April 2013 before services began to be delivered. By mid-2013, 10 per cent of participants are expected to be receiving services.
Demonstration of the NBN	The trial will deliver services using NBN fibre, fixed wireless and potentially the Interim Satellite Service in Armidale and surrounding areas. It will take advantage of the capabilities of the NBN, including: > high upload and download speeds, which are essential for clinical videoconferencing > the increased reliability of the broadband network, which will support system availability and encourage patient and practitioner confidence in using digital platforms for services > the ubiquity of the NBN, which will ensure that patients can use high-speed broadband to access appropriate cancer care services from their own homes.

CSIRO—NBN-enabled Tele-Eye Care Project	
Policy issue	Earlier diagnosis, advice and intervention for eye diseases can avoid disease complications and avoid preventable blindness. If caught early, 75 per cent of blinding conditions can be treated.[144] Data from the Western Australia Patient Assisted Travel Scheme indicates ophthalmology as the second highest cause for referrals (3,216 referrals in 2009–2010). This costs state and federal health systems millions of dollars each year. Avoiding the need to transfer rural patients for routine appointments reduces the cost of providing care, inconvenience to the patients and metropolitan hospital outpatient demand. Evidence suggests that tele-eye care can reduce travel from remote areas by up to 83 per cent.[145] [146] One study of tele-ophthalmology in Western Australia indicates a more than 40 per cent reduction in the cost of service provision.[147]
Desired outcomes	The long-term aim of this project is to reduce blindness in older Australians living in rural and remote communities through the development of a sustainable model of successful telehealth service delivery into NBN satellite service areas. More specifically, the trial will test whether tele-ophthalmology can enable significant health gains at a lower cost.[148] Additionally, by determining which telehealth features adapt best to satellite delivery, the model may be expanded to other medical specialties and services, such as ear, nose and throat treatment, dermatology, and trauma care. This could lead to the establishment of regional or remote medical hubs to facilitate a wide variety of medical services.
Description of project	The project will use the Interim Satellite Service (ISS) to provide tele-ophthalmology services to approximately 900 older Indigenous and non-Indigenous Australians living in rural and remote communities in Western Australia and Queensland. Telemedicine-based eye care enables the early detection of vision-threatening eye disease by providing direct video-based access to expert diagnostic services based in major medical centres in metropolitan areas without the need for the patient to travel to those centres. With the help of a nurse, a patient's retinal images and medical data is captured using an ophthalmic diagnostic device. Data is sent by high-speed broadband securely to a specialist for disease diagnosis and management. Diagnostic advice is then provided by the specialist to the patient via video conferencing, followed by ongoing management of the disease. Currently, these patients may have to travel hundreds of kilometres to access this kind of service.
Numbers of patients involved and results to date	The project has a target of 900 participants. The identification and recruitment of participants have commenced with services commencing mid-2013.
Demonstration of the NBN	The trial will deliver services using the NBN ISS in remote areas of Western Australia and the Torres Strait islands. The ISS has delivered a step-change in performance compared with satellite services previously available, making around six times the bandwidth per user available even at the busiest times during the day. This project takes advantage of the ISS to enhance access to videoconferencing and support the transmission of large files from remote areas of Australia.

Flinders University—Telehealth in the Home—Aged and Palliative care in SA	
Policy issue	As Australia's population ages and the burden of chronic disease progression increases, the demand for palliative care will increase. Most palliative care patients indicate that they would prefer to be cared for, and die, at home.[149 150] Care in the community commonly requires support from family or friends, who fulfil a vital carer role that enables the patient to remain at home. It also requires flexible and responsive health care provision to ensure continuity of care and to support changing health needs. The Australian Government's national palliative care strategy states that each year there are between 36,000 and 72,000 people with potential palliative care needs. There are increased demands for aged care services, a preference by the elderly to live at home, reduced access to carers and families, and escalating workforce pressures. Many older Australians with complex health needs would benefit from increased access to multidisciplinary teams of health professionals to coordinate their care and treatment.
Desired outcomes	For patients, carers and clients; better quality of healthcare for those ageing or requiring palliative care at home, improved access to the right care, in the right place to ensure earlier issue resolution and evidence that NBN/Telehealth infrastructure can help older Australians to live independently for longer. For healthcare professionals; reduced travel time for outreach and home visit services; the development of guidelines, practices and policies for telehealth in the home, improved team-based case management using NBN-enabled communications and improved clinical decision-making through improved clinical information. For the health and aged care systems; a model of providing care that uses technology to reduce the costs of providing a home-based visiting program, which currently limits the client contact activity that can be achieved in one day, a reduced burden on specialised aged and palliative care facilities and hospitals, more timely interventions in healthcare and a reduction in the presentation of acute episodes.
Description of project	The project is based on a team approach that integrates the patient, carer, primary health care provider, aged care facility and specialist services, in three focus areas: > integrating videoconferencing and other technologies with current community care provision to support palliative care delivery to people who are dying in their own homes > using technology, including videoconferencing and activity monitors, to better connect aged care patients (including those with dementia) and their carers with the range of services and providers they commonly access (such as GPs and specialists) > technology-enabled home-based rehabilitation for the elderly, including people recovering from stroke or fractures, testing how this improves recovery and reduces carer burden.
Numbers of patients involved and results to date	The project has a target of 145 participants. Services commenced in May 2013. By mid-2013, 10 per cent of participants are to be receiving services.
Demonstration of the NBN	The trial will deliver services using the NBN in locations across South Australia. It will take advantage of the capabilities of the NBN, including: > high upload and download speeds, which are essential for clinical videoconferencing > the reliability increased reliability of the broadband network, which will support system availability and encourage patient and practitioner confidence in using digital platforms > the ubiquity of the NBN, which will ensure that patients can use high-speed broadband to access appropriate palliative and aged care services from their own homes.

Department of Veterans' Affairs—In-Home Telemonitoring for Veterans trial	
Policy issue	The impact of chronic disease on the ageing population is an acknowledged pressure on health and aged care costs. A significant proportion of the veteran community are aged care clients, and approximately 76 per cent of the treatment population is aged over 65 (228,266 at December 2012). Home-based monitoring and support can assist veterans with co-morbidities and complex care needs to monitor and manage their conditions, reducing the likelihood of a worsening in condition that may require hospitalisation or a move to residential care. Regular transmission of data on key clinical indicators can alert health professionals to changes in a patients' condition, allowing for early intervention. This method of care delivery assists in the effective use of our health workforce and can reduce the pressures on individuals, their families, their carers and other support networks.
Desired outcomes	The trial will assess whether telemonitoring over high-quality, high-speed broadband is a safe, effective and efficient complement to conventional veterans' health services, and determine the potential for NBN-enabled in-home monitoring and videoconferencing to assist in achieving quality of care and improved health outcomes for veterans. Expected benefits include: > increased access to high-quality health care services at home > enhanced monitoring and management of complex chronic conditions, delivering more responsive care to reduce preventable hospitalisations, the length of stays in hospitals and avoidable readmissions > support for Gold Card holders to continue living in their own homes for longer, delaying their need to move to residential aged care > increased quality of life brought about by the responsive management of chronic conditions > increased health workforce productivity as nurses take on the role of monitoring health and involving the veterans' GPs appropriately (according to the coordinated care plan), and reduced carer burden.
Description of project	DVA will deliver the In-Home Telemonitoring for Veterans Trial using the NBN. The trial will involve Gold Card holders, including veterans, war widow/ers and their dependants with specific chronic conditions (congestive heart failure, coronary artery disease, chronic obstructive pulmonary disease and diabetes). The trial builds on the existing Coordinated Veterans' Care Program, which is a GP led model of care in which GP nurses act as care coordinators. Under the DVA trial, GP nurses will adopt a similar care coordinator role, which will help embed telehealth into the GP model of care. The trial uses home-based communication technologies to help patients monitor their vital signs to manage their treatment with assistance from a care coordinator.
Numbers of participants involved and results to date	The trial will involve a cohort of around 300 veterans and a data control of approximately the same number of veterans. Recruitment of participants has commenced in Armidale initially, to provide an opportunity to test the business and clinical model, the technology, training requirements and service delivery and to ascertain any issues and/or required changes, before expanding to other sites in 2013.
Demonstration of the NBN	The provision of telehealth services under the trial requires the capabilities of the NBN, in particular the high upload and download speeds that are essential for high-definition video conferencing. The reliability of the NBN will ensure system availability and encourage patient and practitioner confidence, and the ubiquity of the NBN will allow participants to access appropriate health services from the comfort of their own homes.

Metropolitan South Institute of TAFE—Diabetes Health and Wellness Program	
Policy issue	Diabetes is a chronic condition that has reached epidemic proportions. Around 1.7 million Australians have type 2 diabetes mellitus. By 2031, that number will almost double to 3.3 million.[151] With up to 60 per cent of cases of Type 2 diabetes being preventable, education is a key tool in fighting this growing social health problem, particularly in regional and Indigenous communities.[152]
Desired outcomes	The project will test whether high-speed broadband can be used to: > educate medical and health industry students, along with health care-workers, on the topic of diabetes > deliver education and training to meet skill shortages in this area of health care in a more efficient way.
Description of project	The Metropolitan South Institute of TAFE will deliver six interactive learning modules on Diabetes Health and wellness topics to TAFE and university students in regional Queensland using an e-learning technology platform. Students will use course materials that make use of high-definition video, 3D image simulators and high-definition videoconferencing. They will also participate in virtual classes, tutorials and study groups and interact with expert practitioners using videoconferencing. Students will be able to experiment with the interactive course content to gain a greater understanding of the implications of diabetes health care decisions. The learning modules will use interactive game like technology to lead the leaner through different medical scenarios. Teachers will be able to prepare medical scenarios using high-definition video, 3D imagery and simulations to demonstrate diabetes treatment. Using high-definition videoconferencing and collaboration teachers will be able to bring external medical experts, such as a doctor, into a virtual lesson.
Numbers of students involved and results to date	Delivery of services is expected to commence from July 2013. The target participation number for the trial is 700 students.
Demonstration of the NBN	The use of 3D simulations, multi-party high-definition videoconferencing and collaboration will particularly demonstrate the speed and reliability of the NBN, as those technologies require high bandwidth. The trial will deliver services to NBN fibre and fixed wireless locations in regional Queensland.

ABC—ESA Education Portal	
Policy issue	The development and implementation of the Australian Curriculum for Foundation to Year 12 is well underway; the key learning areas of English, history, mathematics and science are already being implemented up to Year 10. To support the implementation of the Australian Curriculum, it is essential to ensure that teachers, parents and students have access to quality-assured digital teaching and learning resources that are aligned to the curriculum.
Desired outcomes	This project aims to: > explore new possibilities for interactive learning in rich, immersive digital environments > provide engaging and immersive digital learning experiences to engage students and parents in the home to support their learning at school > make available to students, parents and teachers resources aligned to the Australian Curriculum, drawing upon the extensive collection of Australia's national broadcaster, the ABC > provide lessons for the development and implementation of future digital learning projects.
Description of project	The ABC—ESA Education Portal (called ABC Splash) is providing approximately 2,400 pieces of digital content and learning resources from the ABC to the end of 2014, including contemporary and archival video and audio clips, articles, interactive and still images. The resources are supported by educational content and linked to the Australian Curriculum. Students, teachers and parents can access ABC Splash at school, at home or from community facilities. The project comprises two stages: > Stage 1 involves the identification and digitisation of contemporary and archival ABC content enhanced for maximum educational value, directly aligned to the Australian curriculum. > Stage 2 involves the production, acquisition and licensing of interactive educational resources that will use the capacity of high-speed broadband, such as the NBN.
Number of visitors and result to date	The beta version of ABC Splash went live on 30 October 2012 with Stage 1 content. As of 31 March 2013, ABC Splash had received 930,000 page views from 134,000 unique visitors. Usage is continuing to increase, as the Australian Curriculum continues to be implemented and more digital content is being made available. Initial feedback from users has been generally positive and, in some cases, has been constructive in identifying and fixing technical difficulties.
Demonstration of the NBN	This project is enabling the ABC to continue its role as a leading source of information and education by digitising content and creating innovative, interactive learning tools that can be accessed by all Australians through the NBN. A range of interactive learning initiatives are being rolled out, including multi-player games, immersive 3D learning environments and synchronous video collaborations that demonstrate the value of the NBN in delivering digital education services. This project contributes to the Australian Government's National Digital Economy Strategy goal of expanded online education.

CSIRO—Mobile Telepresence for Museums	
Policy issue	A significant proportion of Australians cannot easily visit Australia's national institutions, such as museums, galleries and cultural spaces, and so lack access to important aspects of their cultural heritage and wider educational resources.
Desired outcomes	The technology developed in the Mobile Telepresence for Museums pilot offers a blueprint for a solution allowing all Australians with a high-speed broadband connection to visit our national cultural institutions via a mobile telepresence system (a robot). A successful trial will result in: > the demonstration that a mobile telepresence robot can deliver a compelling experience for remote visitors to a museum (beyond that possible through visiting the museum's website) > the demonstration of enhanced educational outcomes, beyond those achieved by simply reading about museum objects and exhibits.
Description of project	The pilot is developing and trialing technology that will allow people to 'visit' a museum using a semi-autonomous mobile robot and an immersive web interface. The system is designed to allow remote visitors to feel as though they are on a real tour in the museum. CSIRO is conducting the trial at the National Museum of Australia's Landmarks: People and Places Across Australia Gallery, which features Australian icons such as Phar Lap's heart and the Holden Prototype No. 1 (the original Holden motor car). During the trial, the robot is accessible by schools and libraries with NBN connections. Remote visitors, such as a class of school students in rural or regional Australia, are able to independently control their own view of the museum exhibits and interact with an expert in museum education through the robot, providing an interactive learning experience.
Number of patients/ students/clients involved and results to date	At 26 April 2013, tours had been conducted with students in Townsville (three classes on three separate occasions) and Kiama (five students on individual connections from the Kiama Library on two separate occasions). Demonstration tours had also been performed linking three branches of the Townsville Library, the Cathedral School in Townsville, the Kiama Library, the Kiama Digital Hub, the North Kiama Neighbourhood Centre, Museum Victoria, Yea Public Library and the Gungahlin Digital Hub. The results of the pilot will provide a blueprint to inform the ongoing provision of the service in the National Museum of Australia, and demonstrate how similar services could potentially be deployed more broadly in other cultural or scientific institutions.
Demonstration of the NBN	This initiative is demonstrating how the NBN can transform access to major Australian cultural institutions (such as the National Museum of Australia). Due to the high bandwidth requirements of the application (over 10 megabits per second per remote visitor) and the need for synchronous communications, this pilot demonstrates the high-bandwidth nature of the NBN as the enabler for rich and interactive online educational experiences that can complement classroom learning. The project contributes to the Australian Government's National Digital Economy Strategy goals for expanded online education, and greater digital engagement in regional Australia.

Department of Immigration and Citizenship—Virtual English Tuition for Migrants trial	
Policy issue	The Adult Migrant English Program (AMEP) is a national settlement program administered by the Department of Immigration and Citizenship to help new migrants and humanitarian entrants develop English language skills to assist them to settle successfully in Australia. A key issue for the program is that some clients find it difficult to attend traditional courses due to such factors as timing, work commitments, travel difficulties and cost.
Desired outcomes	The objective of the project is to use NBN capability to test an additional learning pathway for AMEP clients, which will increase access and participation in the program, and support better client and settlement outcomes. Currently, AMEP distance learning clients are not able to benefit from the social and community interaction offered in the more traditional classroom setting. The virtual classroom model gives clients the flexibility to be able to study English at a place convenient to them, including in their own home, while also enabling them to engage with other clients and develop social and other support networks they may not otherwise have access to.
Description of project	The trial tests a virtual classroom platform, where groups of four to six AMEP clients can come together in an online setting. Students can see each other and their teacher, and interact as a group, as if in a more traditional face-to-face learning environment. Virtual 'break-out rooms' allow clients to work in pairs or small groups to complete tasks together and practise pronunciation. Teachers can work one-on-one with students requiring extra help, while the others work together on group tasks. The virtual classroom functionality includes: media elements embedded in the interface so that video and sound can be shared between teacher and students, an electronic instruction whiteboard for the teacher to share and distribute materials, and the ability to embed learning objects that teachers can use in their sessions.
Numbers of participants involved and results to date	The trial expects to enable up to 200 clients to access virtual classes. Clients in selected NBN locations in Victoria, NSW and the ACT have commenced participating in classes, particularly via NBN digital hubs. The identification and recruitment of clients in additional locations, particularly clients who are at home, will continue in line with expanding NBN availability.
Demonstration of the NBN	Using the extended e-learning capability provided by the virtual classroom environment, in conjunction with NBN speeds and functionality, has the potential to transform the learning experience for many AMEP clients, and enhance teaching and delivery options for AMEP service providers. Grouping otherwise remote AMEP clients together in the e-learning space will provide them with the opportunity to interact both socially and academically with their peers, and help to reduce isolation, particularly for those in regional and rural areas.

Coordinated aged care services to the home	
Policy issue	By 2030, the number of Australians aged over 80 years is expected to rise by 140 per cent while chronic diseases and conditions will also increase as people live longer.[153] Identified challenges in meeting the needs of our ageing population include: > an increase in the demand for health and aged care services > aged people's preference to live at home > pressure on the hospital and aged care system > the delivery of equitable access to services, particularly in regional communities > an ageing workforce and escalating workforce pressures.
Desired outcomes	The aims of these projects are to test the use of high-speed broadband to improve access to care from home, deliver better coordinated care, increase support for patients to manage their own condition, reduce preventable hospitalisations, reduce the need to travel, improve quality of life, and reduce social isolation. In addition, the projects will seek to develop scalable and sustainable telehealth service delivery models in multiple health care settings.
Description of projects	These projects involve in-home telehealth services supported by nurse telehealth coordinators. Feros Care is using in-home monitoring and high-definition video—conferencing to connect clients in Coffs Harbour with nurse coordinators in Coolangatta. The delivery of services using high-speed broadband will reduce travel by aged care nurses to and from client's homes. The Royal District Nursing Service, in collaboration with Medicare Locals and other project partners, will deliver a virtual nursing service, involving remote health monitoring and videoconferencing with nurse coordinators. Through the Leading Age Services Australia project, patients will have access to in-home telehealth services, including vital sign monitoring, medication prompts and video consultations with health professionals. Isolated clients will also have access to socialisation opportunities. The CSIRO, in collaboration with a range of health service providers, will pilot telehealth services in six different settings in four states and the ACT. The project will deliver in-home monitoring and allow patients to consult health professionals using video—conferencing. integrated-living will deliver in-home telehealth services to older Aboriginal and Torres Strait Islander Australians, as well as establishing telehealth hubs in local community centres. The trial will also provide opportunities for intergenerational engagement.
Numbers of patients involved and results to date	These projects have a combined target of 850 participants. The identification and recruitment of participants have commenced. Some projects had already started to deliver services from 30 April 2013. By mid-2013, 10 per cent of participants are expected to be receiving services.
Demonstration of the NBN	These projects will deliver services using the NBN in more than 30 locations across NSW, Victoria, Tasmania, Western Australia, Queensland and the ACT. They use the capabilities of the NBN, including: > high upload and download speeds, which are essential for clinical videoconferencing > the increased reliability of the broadband network, which will support system availability and encourage patient and practitioner confidence in using digital platforms for services > the ubiquity which will ensure that patients can use high-speed broadband to access appropriate health and aged care services from the comfort of their own home or local community facility.

Bendigo Senior Secondary College—Victorian Virtual Learning Network	
Policy issue	Local shortages of specialist teachers and low enrolment numbers in some subjects are preventing senior secondary school students in Victoria, particularly in remote and regional areas, from accessing the broad spectrum of subjects offered under the Australian Curriculum. This limits both student choice and student pathways to further education and training. New ways of delivering Australian Curriculum content and resources are needed to ensure that students in regional and remote locations have the same opportunities for learning as their peers in metropolitan areas.
Desired outcomes	The project will test whether high-speed broadband can be used to: > increase access to Australian Curriculum content and resources for Victorian students at school or home > generate cost savings for schools through the online delivery of curriculum content > facilitate the professional development of teachers in the use of technology for interactive learning.
Description of project	Bendigo Senior Secondary College is providing senior secondary school students across Victoria with significantly increased access to curriculum through the creation of high-quality, interactive digital content delivered asynchronously to ensure that students can access it any time, in any location. This is supported by a synchronous component using high-definition video connections between the teacher and students online to facilitate a 'virtual classroom' running in real time. Students are using interactive learning resources with embedded voice, animations, simulations, text and assessment tasks. Initially, the Year 12 Victorian Certificate of Education (VCE) physics course will be delivered to students across Victoria free of charge. Further resources for Year 11 and Year 12 VCE subjects will be delivered over the duration of the project, including for chemistry, legal studies, psychology, health and human development. Schools in Bacchus Marsh, Ballarat, Brunswick, Princes Hill, Gladstone Park and Melton are the first to participate in the project.
Numbers of students involved and results to date	Delivery of services commenced in February 2013. To date, 30 students in 10 Victorian schools are participating in the project. The project has a target of 200 students over the duration of the trial, increasing to 2,000 when the project transitions into a sustainable model of service delivery.
Demonstration of the NBN	High-speed broadband is used to deliver high-quality interactive Australian Curriculum content and resources and enable high-definition videoconferencing.

Graduate School of Medicine—Telehealth Skills Training and Implementation	
Policy issue	Science, technology, engineering and mathematics (STEM) are important skills for participation in the digital economy. Employer demand for a workforce with these skills is outpacing supply. Enrolments in STEM subjects in secondary schools and universities have declined over the past few years. Data from the Trends in International Mathematics and Science Study 2007 show that less than 10 per cent of Year 4 and Year 8 students in Australia achieved advanced performance benchmarks in mathematics and science—a lower percentage than that achieved by many of Australia's Asian neighbours. Telehealth consulting is emerging as an important solution for providing timely access to specialist advice to onsite health practitioners and for patients in regional and remote locations. Limited access to skills training in this area is creating a shortage in the rural medical workforce. New and innovative ways of teaching telehealth skills are needed to ensure access to and the scalability of telehealth activities in Australia.
Desired outcomes	The project will test whether high-speed broadband can be used to: > increase the number of medical practitioners with the skills to engage in telehealth consultation and education, particularly in regional, rural and remote Australia > deliver education and training to improve rural medical workforce recruitment and retention in a more efficient way.
Description of project	The University of Wollongong will use high-speed broadband to deliver telehealth skills training and virtual clinics involving medical students, GP trainees, GPs and medical specialists in regional, rural and remote Australia. The trial is focused on service delivery in NSW and Victoria. The trial will use telehealth consultations as a 'real patient learning' experience for students, GP trainees and GPs. The participants will actively engage in the patient's journey through the health system; they will be involved in telehealth referral workshops, consultation debriefs and follow—ups with patients. Medical specialists will participate in referring for telehealth consultations. A series of interactive telehealth virtual clinics will be held, in which a clinician based at one of the university's teaching hubs or in a private facility will provide clinical teaching to participating sites in NBN—connected or early release areas. Sessions will be provided on a range of topics, such as X-rays, ultrasound, psychiatry, neurology and geriatrics, with real patient volunteers.
Numbers of students involved and results to date	Delivery of services is expected to commence from August 2013. Seventy-four learners, including a cohort of medical students, GP trainees and GPs, will participate in the project. Funding agreement negotiations for a deployment trial grant have commenced.
Demonstration of the NBN	High-speed broadband is required for the delivery high-definition synchronous web-based videoconferencing and virtual clinics to NBN-connected locations. The use of NBN-enabled technology will demonstrate a cost-effective model for telehealth consulting and training that could be used nationally.

University of New South Wales—Education 2020: Enabling learning in science, engineering and mathematics	
Policy issue	Science, technology, engineering and mathematics (STEM) are important skills for participation in the digital economy. Employer demand for these skills is outpacing supply. Enrolments in STEM subjects in secondary schools and universities have declined over the past few years. Less than 10 per cent of Year 4 and Year 8 students in Australia achieved advanced performance benchmarks in mathematics and science—a lower percentage than that achieved by many of Australia's Asian neighbours.[154] Part of the challenge is to better engage and excite school students in the study of STEM subjects to meet the Australian Government's priority of lifting student participation rates in science and mathematics.
Desired outcomes	This project will test whether high-speed broadband can be used to: > increase student access to STEM subjects and specialist teachers, particularly in regional Australia > deliver specialist STEM subjects in a more efficient and inspirational way that leads to increased enrolments in STEM subjects in the future > facilitate the professional development of teachers in the use of technology for interactive learning > improve Australia's international competitiveness in science capabilities.
Description of project	The project is being delivered by the University of New South Wales in partnership with the Powerhouse Museum and Sydney University. Using high-speed broadband, students are able to remotely control tele-operable Mars rover equipment (located at the Powerhouse Museum) that is equipped with hazard avoidance, data collection and onboard camera capability with a student–friendly graphical user interface. This permits students to conduct experiments and learn the science and maths involved in the exploration of another world. Students and teachers are participating in interactive telepresence workshops with experts in mathematics, science and engineering.
Numbers of students involved and results to date	Delivery of services to schools commenced 27 March 2013. To date, 30 students in four NBN-connected schools in Willunga (South Australia), Scottsdale (Tasmania) and Armidale (NSW) have participated in the project. The project has a target of 800 students and 16 teachers. Professional development for teachers commenced in March 2013.
Demonstration of the NBN	High-speed broadband is required for students to control remote equipment and conduct experiments. It is also required to allow users to connect synchronously and asynchronously with scientists, engineers and education experts.

University of New England—Asia ConneXions Utilizing HD Videoconferencing	
Policy issue	Australia recognises the importance of strategic and economic participation in the Asian region. Australians need to build deeper Asian cultural literacy, including proficiency in Asian languages, to enhance mutual understanding and respect, to encourage the exchange of ideas and to boost Australia's productive collaboration with its Asian neighbours. Australia's education and training systems, from early childhood through to tertiary education, will be central to Australians developing these skills. Schools, particularly those in regional and remote locations, have limited access to specialist Asian language teachers. New ways of accessing Asian language and cultural studies in schools are needed to prepare the future workforce to interact with and operate in Asia.
Desired outcomes	This project will test whether high-speed broadband can be used to: > increase Australian students' access to Asian cultural exchange and language education, particularly for those attending regional and remote schools > deliver specialist Asian cultural and language studies more effectively through real—time interaction with Asian schools, using video—conferencing > provide students with improved skills to participate effectively in the Asian region > facilitate the professional development of teachers in the use of technology for interactive learning.
Description of project	The University of New England is using high-speed broadband to deliver high-definition videoconferencing sessions between students participating in Asian languages and studies in 30 Australian schools and 30 partnering schools in Asian countries for cultural exchange and language education. The partnering Asian schools are in South Korea, Japan, China, Indonesia and India. In the high-definition video conferencing sessions, students will take turns talking about their own cultures, demonstrating relevant activities to their peers, and engaging in open discussion. The learning content for the sessions is curriculum-based and includes topics such as language, history, national identity, national values, etiquette and youth culture. The videoconferencing sessions will be recorded so that students, parents and caregivers will be able to access this material from their homes. Teachers will receive training and professional development sessions on the effective use of videoconferencing.
Numbers of students involved and results to date	Delivery of services is expected to commence from July 2013. The target participation numbers are 1,670 students and 60 teachers in Australian and Asian schools.
Demonstration of the NBN	High-speed broadband is required for Australian students and teachers to interact with students and teachers at overseas schools in fully synchronous high-definition videoconferencing sessions.

Gordon Institute of TAFE—Remote delivery of school-based traineeships to regional and rural students in Victoria	
Policy issue	Skills in digital interactive media are becoming more highly sought after and employers are increasingly seeking skilled workers with demonstrable work experience. Game designers are in demand, and the industry is experiencing critical skill shortages. Education and training to address this shortage is not always available to students in regional and remote locations. The need to travel distances to attend classes often restricts enrolments.
Desired outcomes	This project will test whether high-speed broadband can be used to: > increase access to VET, particularly in regional and rural Australia > deliver education and training to address skill shortages in a more efficient way.
Description of project	The Gordon Institute of TAFE is partnering with Lightmare Studios to deliver virtual classes and high-quality videoconferencing to help students in regional and rural areas access media training. The project will include: > a live interactive virtual class in a school-based traineeship in Certificate III in Media for students in rural and remote Victorian areas, including access from home > a virtual environment in which remote learners can join on-campus peers via a fully interactive video link > real-time online assistance, allowing trainers to individually demonstrate or assist remote learners. Schools in Bacchus March, Shepparton, Cobram and Numurkah are participating in the project.
Numbers of students involved and results to date	The project has a target of 100 Year 10–12 students in regional and rural areas. Delivery of services commenced in February 2013 with nine students in rural Victorian schools participating in the school-based traineeship.
Demonstration of the NBN	High-speed broadband is required for the delivery of virtual classes and to enable peer-to-peer interaction with on-campus peers via a fully interactive video link. High-speed broadband is also required to enable collaborative two-way instruction between teachers and students via videoconferencing.

Monash University—NBN Virtual School of Emerging Sciences	
Policy issue	Science, technology, engineering and mathematics (STEM) are important skills for participation in the digital economy. Employer demand for these skills is outpacing supply. Enrolments in STEM subjects in secondary schools and universities have declined over the past few years. Less than 10 per cent of Year 4 and Year 8 students in Australia achieved advanced performance benchmarks in mathematics and science, a lower percentage than that achieved by many of Australia's Asian neighbours.[155] Students have limited opportunity to study specialist subjects due to the shortage of local teaching expertise, particularly in regional and remote locations. New and innovative ways of increasing participation in STEM subjects in school, VET and higher education are needed.
Desired outcomes	This project will test whether high-speed broadband can be used to: > increase student access to STEM subjects and specialist teachers, particularly in regional Australia > deliver specialist science courses in a more efficient way > facilitate the professional development of teachers in the use of technology for interactive learning.
Description of project	Monash University, in conjunction with the John Monash Science School and Pearson Australia, is delivering virtual classes in emerging sciences to Year 10 students in Victoria, South Australia, Tasmania and the ACT. The project will initially focus on those four states and then scale up nationally. Students are learning and researching in leading edge scientific fields such as astrophysics, quantum physics, nanoscience and nanotechnology. They are connecting into one virtual classroom and collaborating in real time with each other, as well as with local and remote teachers. Using high-definition video conferencing technology, students are connecting with world scientific experts for their classes. Throughout the trial they will also be able to undertake open-ended scientific experiments and participate in a virtual science fair involving parents, teachers and academics. Students will graduate from the project with hands-on experience in research science and applying scientific practice, including defending their work to peers and leading academics.
Numbers of students involved and results to date	Delivery of services commenced in February 2013. To date, 24 Year 10 students and four teachers from Gungahlin College (ACT), Willunga High (South Australia) and the Tasmanian eSchool have participated in the project. The project has a target of 2,900 students and 155 teachers.
Demonstration of the NBN	High-speed broadband is required for students to connect with world experts in emerging science fields using high-definition videoconferencing, undertake open-ended experiments and to collaborate in real time with peers around the country.

University of New South Wales—Biomedical Education, Skills and Training (BEST) Network.	
Policy issue	Science, technology, engineering and mathematics (STEM) are important skills for participation in the digital economy. Employer demand for these skills is outpacing supply. Enrolments in STEM subjects in secondary schools and universities have declined over the past few years. Less than 10 per cent of Year 4 and Year 8 students in Australia achieved advanced performance benchmarks in mathematics and science, a lower percentage than that achieved by many of Australia's Asian neighbours.[156] The expertise, quality content and technical resources required to develop and maintain quality online education in biomedicine have traditionally been very high. This has been compounded by the lack of shared content between educational institutions. The high costs limit the scope of students, teachers and professionals to gain access to up-to-date resources in biomedical education.
Desired outcomes	This project will test whether high-speed broadband can be used to: > increase access to specialised biomedical resources for students, teachers and professionals to improve education outcomes;generate cost savings through more effective sharing of biomedical resources across different educational and industry sectors > facilitate the professional development of teachers in the use of technology for interactive learning.
Description of project	The University of New South Wales is delivering interactive virtual biomedical resources in seven trials to build capability in biomedical science. Project activities will include students: > participating in virtual laboratories and tutorials in interactive learning environments > using adaptive tutorials with a virtual patient simulator to learn about observing patient symptoms, dispensing medicine, and medical techniques such as taking blood pressure or using a defibrillator > using virtual microscopy images from the BEST Network slide repository to analyse high-definition virtual slides and digital images for pathology, histology, anatomy and radiology. The trial targets end users in high schools, TAFEs, universities and professional development, including rural students Australia-wide.
Numbers of students involved and results to date	First services commenced in February 2013. To date, approximately 300 students from the University of Melbourne have used virtual microscopy images to analyse high-definition virtual slides via the BEST Network National Medical Image Bank.
Demonstration of the NBN	High-speed broadband is required for the delivery of interactive virtual biomedical content, including students' access to interactive online laboratories, clinical and dissecting simulators, and the National Medical Image Bank.

Australian Youth Orchestra (AYO)—Digital Connection Trial	
Policy issue	The cultural workforce in Australia continues to grow and generate significant value for the Australian economy. In 2011, it represented 5.3 per cent of the workforce, an increase of almost 70,000 jobs since 2006. Local communities, particularly in regional Australia, are sustained and made vital through investments in community-based arts practice, cultural infrastructure and development opportunities for young people.[157] While the cultural sector is important both nationally and locally, students in regional and remote areas have limited access to arts programs, including music programs, and specialised teachers. This is due to geographical and financial barriers associated with travelling for arts training.
Desired outcomes	This project will test whether high-speed broadband can be used to: > increase access to music education and talent identification programs for music students and young musicians around Australia, particularly in regional areas > deliver music education and talent identification programs more efficiently and cost-effectively using videoconferencing and live online streaming > facilitate professional development for music teachers to enhance classroom teaching through the use of technology for interactive learning > increase the cultural workforce in Australia.
Description of project	The Australian Youth Orchestra will use the NBN for the online delivery of music education and talent identification programs across Australia for students from pre-primary to tertiary levels, teachers, mentors and musicians. Students from NBN-connected schools will participate. Specialist instrument master classes will be held virtually, with participants able to interact and watch specialist classes from home. Participants will be selected from available NBN sites and from Australian Youth Orchestra applicants and students. Using mobile video conferencing kits, the project will allow students and young musicians in regional areas to audition in real time for Australian Youth Orchestra programs from their local area. Australian Youth Orchestra concerts will be streamed online, enabling participants connected to the NBN to view the performances live at home. Other trial activities include interactive virtual music training workshops, open rehearsals, music tutorials and demonstrations.
Numbers of students involved and results to date	Delivery of services commenced in April 2013. The project has a target of 220 students, 21 teachers and performers, 35 audition candidates, 6 auditioners, 550 Australian Youth Orchestra program participants and 500 audience participants.
Demonstration of the NBN	The guaranteed high upload and download speeds of the NBN are required for the delivery of high-quality audio and video during two-way interactive music classes, workshops, concerts and auditions. Participants will use an NBN connection from their home for some project activities, such as the live concert streaming and master classes.

Sydney Opera House—From Bennelong Point to the Nation	
Policy issue	The cultural workforce in Australia continues to grow and generate significant value for the Australian economy. In 2011, it represented 5.3 per cent of the workforce, an increase of almost 70,000 jobs since 2006. Local communities, particularly in regional Australia, are sustained and made vital through investments in community-based arts practice, cultural infrastructure and development opportunities for young people.[158] While the cultural sector is important both nationally and locally, students in regional and remote areas have limited access to arts programs and specialised teachers. This is due to geographical and financial barriers associated with travelling for arts training. School teachers in regional areas also have limited access to professional development in the arts, which contributes to regional skills shortages.
Desired outcomes	The project will test whether high-speed broadband can be used to: > increase student access to performing arts programs and awareness about career pathways in the performing arts, particularly in regional Australia > deliver drama, music and dance education programs more efficiently and cost-effectively using videoconferencing and live online streaming > facilitate professional development for drama, music and dance teachers in the use of technology for interactive learning.
Description of project	The Sydney Opera House is using high-speed broadband to deliver real-time interactive virtual workshops in performing arts education, vocational learning and professional skills development. The trial is focusing on NSW and Tasmania initially, and will progress towards national delivery. Project participants will have access to and learn from the nation's major performing arts companies, including the Sydney Symphony Orchestra, the Bell Shakespeare Company and the Australian Ballet. Project activities will include: > students participating in career pathway workshops, with behind-the-scenes tours of the Sydney Opera House, and drama workshops with professional actors > teachers participating in professional development workshops in drama, music and dance > families participating in live behind-the-scenes tours of the Sydney Opera House, live streamed performances and interactive drama workshops.
Numbers of students involved and results to date	Delivery of services is expected to commence in May 2013, aligned with the commencement of Term 2 of the first school semester. The target participation numbers for the trial are 600 students, 240 teachers, 20 artists and 24 family groups.
Demonstration of the NBN	High-speed broadband is required for synchronous high-quality videoconferencing sessions for the performing arts and career workshops, live streamed performances and live roaming behind-the-scenes tours of the Sydney Opera House.

Hunter Institute of TAFE—eLinks Deployment Trial: Enabling TAFE Training	
Policy issue	The Central Coast of NSW has regional skill shortages in the areas of aged care, child care, tourism and hospitality.[159] Unemployment on the Central Coast is currently around 6 per cent. Education and training to address skill shortages is not always available locally to people in the region. The need to travel distances to attend classes, the cost and lack of child care and difficulties with disabilities and coordinating part time employment with study often restrict enrolment.
Desired outcomes	This project will test whether high-speed broadband can be used to: > increase access to VET for students in the NSW Central Coast region, particularly for disadvantaged groups > deliver education and training to address regional skill shortages in aged care, child care, tourism and hospitality in a more efficient way through flexible online delivery of courses > improve career prospects for students in the NSW Central Coast region, leading to better community services over the long term.
Description of project	The Hunter Institute of TAFE NSW will use high-speed broadband to offer delivery of nationally accredited courses at Certificate III and above in residential aged care, child care and tourism and hospitality. Delivery will be focused on the NSW Central Coast region, and may extend to the broader Hunter region of NSW. Project deliverables include: > a virtual college personal learning environment > the online delivery of 13 full qualification courses with high-definition video resources, virtual classes and teacher support using high-definition video/web conferencing > free 'taster' training modules that link to TAFE full qualification courses > a short online course in teleworking > an introductory module on how the NBN can assist people with disabilities > a video relay service for hearing-impaired students, using high-definition video/web conferencing.
Numbers of students involved and results to date	Delivery of services is expected to commence from July 2013. The target trial participation number is 342 students.
Demonstration of the NBN	High-speed broadband is required to enable high-definition video/web conferencing in the delivery of virtual classes, teacher support and collaboration, and video relay services to support hearing impaired students.

Association of Independent Schools NSW—Independent Schools and the NBN: Transforming the Education Digital Supply Chain	
Policy issue	Technology infrastructure capability and accessibility across Australia's independent schools are not efficient and are barriers to schools fully participating in digital education. Many independent schools have only a limited ability to access and consume rich digital content and collaborate with other schools, and both students and teachers are constrained in their ability to benefit from new ways of teaching and learning, such as virtual classes and meeting rooms. Independent schools in regional, rural and remote Australia, including remote Indigenous schools, are particularly disadvantaged.
Desired outcomes	This project will test whether high-speed broadband can be used to: > increase access to Australian Curriculum resources enabled by rich digital content for students and teachers > facilitate professional development of teachers in the use of technology for interactive learning.
Description of project	The Association of Independent Schools of NSW will use high-speed broadband to deliver a range of virtual activities for students. The project will use high-quality videoconferencing, such as excursions to museums, expert lessons, vocational workshops and a gifted education program. Virtual meeting rooms and a virtual 3D videoconferencing environment will enable students to collaborate across schools to work on projects, and online home tutoring will assist boarding school students with homework and schools with an after-school homework program. Students will also engage in an online Indigenous awareness course embedded with high-quality video instruction and animation. A national presentation network will enable the professional development of teachers using web-based videoconferencing. Schools will improve their nternal ICT capability by creating and sharing digital resources that address the general capabilities identified in the Australian Curriculum including literacy, numeracy and ICT.
Numbers of students involved and results to date	Delivery of services is expected to commence from July 2013. The target participation number for the trial is 110 schools nationally.
Demonstration of the NBN	High-speed broadband is required for the delivery of synchronous virtual activities (such as classes and tours), collaboration and professional development involving students and teachers using high-quality videoconferencing.

eduONE NBN-enabled Education Trial

The *eduONE NBN-enabled Education Trial* comprises the delivery of online vocational education and training and university pathway activities as well as literacy and numeracy skills development.

eduONE NBN-enabled VET and University Pathway Element	
Policy issue	Australia continues to face a shortage of teachers across a range of subjects in the VET sector, particularly in regional and remote locations. This impedes Australians' access to education and training necessary to address local skills shortages. The VET sector's support for high-level skills and workforce development will be essential as the Australian economy undergoes a major transformation, including the transition to a knowledge-and service-based economy. Increasing the number of Australians with post-school qualifications by 2020 would raise Australia's GDP by about 2 per cent.
Desired outcomes	> Increased access to education and training to address regional skill shortages > More students studying subjects not normally available in their locations > A more efficient way of delivering specialist courses > Cost savings for TAFEs, universities and private RTOs through online course delivery > A contribution to addressing national priorities, such as teacher shortages > Professional development for teachers in the use of technology for the delivery of interactive learning > A model of NBN-enabled education service delivery for other TAFEs, universities and private RTOs around Australia.
Description of project	As part of the eduONE NBN-enabled Education Trial, which comprises the delivery of online VET and university pathway activities as well as literacy and numeracy skills development, TAFE NSW New England Institute, in partnership with the University of New England, is delivering virtual classes and free interactive self-paced learning via an NBN-enabled interactive media learning space accessible through the www.eduone.net.au website. Learners engage in activities that incorporate high-definition media streaming, interactive video and real-time 3D rendered graphics. Virtual classes in animal care and husbandry and business courses are delivered through high-definition videoconferencing. Learners are able to submit assessment tasks in a variety of digital formats, including high-definition video. The project promotes lifelong learning and provides access to new pathways to knowledge, learning, training and education.
Numbers of students involved and results to date	Delivery of services commenced in February 2013. To date, over 200 students are participating in virtual classes for TAFE New England Institute courses. In addition, over 300 members of the public have accessed eduONE open learning resources.
Demonstration of the NBN	The guaranteed high upload and download speeds of the NBN are required for high-definition videoconferencing, high-definition media streaming and real-time 3D rendered graphics. The speed, stability and reliability of the NBN will enhance the delivery of education content and assist in improving online learning outcomes.

QuickSmart Online (Numeracy) for Adult Job Seekers Element	
Policy issue	Low levels of adult literacy and numeracy are a significant barrier to participation in further education and employment in Australia. Results from a 2006 ABS survey suggest that over 40 per cent of the Australian working-age population have language, literacy and numeracy abilities below the minimum level required to meet the complex demands of everyday life and work in the emerging knowledge-based economy. Efforts to enhance language, literacy and numeracy in the working-age population have the capacity to improve employment outcomes.
Desired outcomes	> Increased access to education and training to address regional skill shortages > Improved access for adult job seekers to foundation skills training necessary for sustainable employment or further education > Improved employment outcomes for adult job seekers > A more efficient way of delivering foundation skills courses.
Description of project	The SiMERR National Research Centre of the University of New England is delivering QuickSmart Online (Numeracy) through the eduONE NBN-enabled learning platform. Using an online media-rich resource, learners engage in interactive activities to learn and practise numeracy skills. Teachers provide assistance to learners in real-time using high-definition videoconferencing.
Numbers of students involved and results to date	Delivery of services commenced in February 2013. To date, 73 users, including job seekers, are accessing the QuickSmart Online (Numeracy) resource. Full results will not be known until early July 2013; however early indications are encouraging.
Demonstration of the NBN	The guaranteed high upload and download speeds of the NBN are required for media-rich interactive numeracy activities and real-time assistance using high-definition videoconferencing.

Attorney General's Department—NBN Regional Legal Assistance Program	
Policy issue	The recruitment and retention of legal practitioners in rural, regional and remote areas is recognised as a growing problem. A 2009 Law Council of Australia report on rural, regional and remote area lawyers noted a decline in legal services in regional areas and attributed it partly to a lack of professional support and training for legal practitioners. The Law Council's research revealed that 42 per cent of surveyed legal practitioners currently working in regional areas do not intend to practise law in five years time.
Desired outcomes	The expected outcomes of this program are: > residents of regional and remote areas will have increased access to legal assistance services > legal assistance staff in regional and remote areas will be better supported to do their jobs on-site through NBN-based training, mentoring and other support > the legal assistance sector will understand the potential of the NBN and will be in an informed position to use it in service delivery and staff support > collaboration will be improved between legal assistance providers and with other service providers.
Description of project	The program seeks to improve access through the NBN to legal assistance services for people living in regional Australia. Australian Government-funded legal assistance service providers (such as legal aid commissions, family violence prevention legal services, Indigenous legal services and community legal centres) are trialing innovative NBN-based projects that seek to strengthen and increase legal assistance delivery in regional and remote areas. Priority is being given to projects that involve collaboration between providers.
Number of clients involved and results to date	Since October 2011, NBN regional legal assistance services have been progressively established in Sorell and Smithton, Tasmania; Willunga, South Australia; and Armidale, NSW. From 1 October to 31 December 2012, a total of 21 clients accessed legal services via the NBN. In addition, three legal assistance staff in these areas used the NBN to access professional development training. Additional services will be established during 2013. Round 2 applications were received in March 2013 and new projects are expected to commence from July 2013.
Demonstration of the NBN	This program is demonstrating the benefits of the NBN by increasing client access to legal assistance through videoconferencing with legal experts in other areas. It will also provide better support for professional staff via videoconferencing training sessions and webinars. This pilot contributes to the Australian Government's National Digital Economy Strategy goal of greater digital engagement in regional Australia.

FaHCSIA—Remote Hearing and Vision Services for Children	
Policy issue	There is a significant disparity between the support available for people with disabilities in regional or remote areas and those in metropolitan areas. The Productivity Commission's inquiry into disability care and support found that 'people in non-metropolitan areas either have to go without support, or travel long distances at considerable expense to receive support.' Children with hearing and/or vision impairment in regional, remote and rural areas who do not receive early intervention require more intensive assistance in mainstream schools and may miss key development milestones. Their families face significant hardship in travelling to major cities to access regular treatment. This issue is particularly significant in Indigenous communities, where children face a disproportionate likelihood of hearing impairment.
Desired outcomes	The main objective of the Department of Families, Housing, Community Services and Indigenous Affairs program is to use broadband technologies such as the NBN to provide greater access to remote allied health and education services for children with hearing and/or vision impairment in outer regional and remote areas of Australia. The success of the initiative will be measured through the number of clients receiving services who otherwise would not have been able to receive the support they require in their local areas.
Description of project	This program is using videoconferencing in community facilities and family homes to provide access to health and educational professionals. This increases the availability of disability services in rural and remote areas, where children with hearing and/or vision impairment may currently miss out on support or have to travel significant distances to receive services. Delivering the program using broadband technologies such as the NBN enables health and educational professionals to see the participating children clearly, offer responsive advice as the children participate in exercises and everyday activities such as eating and playing, and make more accurate diagnoses than previously possible.
Number of students involved and results to date	Since the availability of the VidKids service in January 2013, a total of 45 children have been enrolled in the program (to 20 March 2013). Five of these children will receive support services via the NBN. The quality of service available to NBN and non-NBN clients will be monitored over the course of the pilot to ensure that all clients receive an adequate quality of service.
Demonstration of the NBN	The initiative will seek to use the NBN to generate benefits such as: > better diagnosis of hearing and vision impairments > more cost-effective service access (saving time and travel costs for families and clients) > more reliable services > greater access to services by delivering to people in more areas. This program contributes to the National Digital Economy Strategy goals of improved online health, online education and online government service delivery.

Department of Human Services—Leveraging the NBN to Enhance face-to-face Service Delivery	
Policy issue	The Department of Human Services (DHS) provides a range of services and programs through such agencies as Medicare Australia, Centrelink and the Child Support Agency. The accessibility of these services is a key priority, particularly for people in regional, rural and remote Australia, people with disability, working families and people facing social disadvantage. A range of geographical and circumstantial barriers also exist preventing some customers from accessing services equitably, particularly customers requiring face-to-face interaction with the department.
Desired outcomes	The aim of the pilot is to use the high-speed download and upload capability of the NBN to allow more customers flexible and tailored access to government services by multiparty videoconferencing. High-quality videoconferencing enabled by the NBN now presents significant opportunities to improve access to these services and enhance service delivery. Successful implementation of this pilot will reduce disadvantage, increase the accessibility of services, support individuals' economic and social participation, and enhance education services for health professionals. The pilot will test the technology and underpinning systems required to roll out the additional services virtually to customers.
Description of project	The pilot is being rolled out in three phases: 1. connecting people from residential homes to DHS sites, where travelling to a DHS site may be difficult 2. connecting people across DHS sites to access specialised services that would otherwise be unavailable 3. connecting people to or from third-party sites, such as community organisations and healthcare facilities. To achieve this, DHS will provide the following services via videoconferencing: planning for and managing retirement (financial information seminars, already underway), claiming the disability support pension (job capacity assessments, commencing), participation intervention, (support for job seekers), accessing urgent assistance (crisis assistance), coordinating complex services for hearing-impaired customers, health and allied health professionals (education seminars for health professionals, commencing).
Number of clients involved and results to date	From 25 July 2012 to 20 March 2013, four seminars on planning for and managing retirement were held, with a total of 124 participants. DHS is progressively establishing the remaining pilot videoconferencing services throughout 2013–14, including the job capacity assessments which began in May 2013, crisis assistance which will begin in mid-2013, education seminars for health professionals which began in May 2013, virtual participation intervention which will begin in 2014, and coordinating complex services which will begin in 2014. It is intended to allow at least 5,000 videoconferencing interactions across all services over the life of the initiative.
Demonstration of the NBN	Through the NBN, access to face-to-face services will be enhanced for targeted customer groups and locations through access and online assistance technologies. This pilot contributes to the Australian Government's National Digital Economy Strategy goal of improved online government service delivery and engagement, with the aim that Australia will be among the world's leading digital economies by 2020.

Glossary

Big data	Massive and complex collections of data that are beyond the capability of conventional analytical tools.
Cloud computing	An ICT sourcing and delivery model for enabling convenient, on-demand access to a shared pool of configurable computing resources over the network (for example, networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and comprises five essential characteristics: on demand self service, broad network access, resource pooling, rapid elasticity, and measured service.
Critical infrastructure	Those physical facilities, supply chains, information technologies and communication networks which, if destroyed, degraded or rendered unavailable for an extended period, would significantly reduce the social or economic wellbeing of the nation or affect Australia's ability to conduct national defence and ensure national security.
Crowd-sourced equity funding (CSEF)	Venture capital raising using web-based platforms to invite people to pool their funds to support or invest in business proposals.
Cyber	Relating to electronic communication networks and virtual reality.
Cyberattack	Includes deliberate acts through cyberspace to manipulate, disrupt, deny, degrade or destroy computers or networks, or the information on them, with the effect, in cyberspace or the physical world, of seriously compromising national security, stability or prosperity.
Cyberbullying	The use of digital technology to support deliberate, repeated and hostile behaviour by an individual or group, which causes the recipient distress and risks their wellbeing. Cyberbullying can be a continuation of offline behaviour.
Cybercrime	A wide range of offences comprising crimes directed at digital technology and crimes in which the internet or digital technology is integral to the commission of the offence.
Cyber espionage	The extraction of information from government, the private sector or individuals by state sponsored individuals or groups for political or economic gain.
Cybersafety	The mitigation of the social and personal risks associated with the use of technology, including through awareness, education and the promotion of positive online behaviours. A key component of responsible digital citizenship.
Cybersecurity	The full range of measures (strategy, policy and technology) associated with securing and strengthening our digital environment. A key component of responsible digital citizenship.
Cyberspace	The internet and anything connected to it. Can be conceived as: > a medium where things happen (e.g. social networking, online banking, online gaming) or through which things happen (i.e. a global conduit between private enclaves ranging from home computers to industrial control systems), or > a virtual manifestation of 'real life', which coexists in parallel with the physical world.

Digital age	Also known as 'the computer age' or 'the information age'. The digital age has emerged as a result of the pervasive use of internet connected devices and the wide ranging impact that enhanced connectivity has had on the global economy and civil society. It marks the progression from economies and societies shaped primarily by the industries created following industrialisation to ones in which the production and transmission of information through digital networks is increasingly central to the structures that underpin our daily lives.
Digital citizen	A person with the skills and knowledge to use digital technologies effectively to participate in society, to communicate with others, and to create and consume digital content. A digital citizen is a person who engages confidently in online communities and networks..
Digital citizenship	Making informed choices and engaging online in a competent and knowledgeable manner, while considering impacts on others. A key enabler of access to and participation in Australia's growing digital economy. Includes confident online engagement with digital society and networks.
Digital economy	The global network of economic and social activities that are enabled by digital technology, such as the internet and mobile networks.
Digital identity management	The authentication and management of personal identifying information on ICT devices.
Digital literacy	The skills and ability to participate safely, securely, confidently and lawfully online in order to take full advantage of the opportunities available in the digital age.
E commerce	Electronic commerce—business to business transactions, business to consumer transactions, and government commercial transactions occurring over open networks, such as the internet.
Employee share scheme	A scheme offering shares or options to employees as part of a remuneration package.
Hacking	The discovery and exploitation of security weaknesses in computing systems for malicious or benign purposes.
icode	A voluntary code of practice for internet service providers, developed by the Internet Industry Association in conjunction with the Australian Government. Designed to provide a consistent approach to help inform, educate and protect customers in relation to cybersecurity risks.
Identity security	Measures for the protection of identity information, including the evidence a person uses to prove who they are. Incorporates: > confidentiality and privacy—protecting an individual's evidence of identity from being compromised (e.g. stolen, duplicated, misused) > integrity—maintaining the integrity or correctness of an individual's identity information > availability—maintaining the availability of identity information for those who should have access.
Internet	The global system of interconnected computer networks.
Malware	Malicious software designed to subvert the confidentiality, integrity or availability of a computer system.
National Broadband Network (NBN)	An Australian Government initiative that will deliver high speed broadband to all Australian premises. A wholesale only, open access broadband network offering equivalent terms and conditions to all access seekers or service providers.
National Digital Economy Strategy	The Australian Government's national goals and vision for Australia to realise the benefits of the NBN and position Australia as a leading digital economy by 2020. Released in May 2011.

National Identity Security Strategy	Articulates current federal, state and territory identity security policy and provides a framework for intergovernmental cooperation to strengthen Australia's personal identity management processes.
Online	Connected to the internet and able to share data and information with other computing devices.
Open data	Data that is freely available to the public.
Priority services	In the Digital First principles, transaction-based services identified by each agency that will enable them to serve 80 per cent or more of their client base.
Smartphone	A mobile phone that offers advanced features, such as internet access and other features traditionally associated with computers.
Social media	Online technologies and practices that people use to share opinions, insights, experiences and perspectives. Can take many different forms, including internet forums, social networking, social blogs, wikis, podcasts, pictures, video, rating and bookmarking.
Software	Programs used to operate computers and related devices.
Telework	Working from home on a scheduled or regular basis, while using high-speed broadband to stay connected to the office.
Virus	A computer program that can self replicate and spread among connected computers.
Wiki	A website whose users can add, modify or delete its content via a web browser using a simplified mark up language or a rich text editor.

Abbreviations and acronyms

2011 NDES	National Digital Economy Strategy
ABS	Australian Bureau of Statistics
ACARA	Australian Curriculum, Assessment and Reporting Authority
ACCC	Australian Competition and Consumer Commission
ACMA	Australian Communications and Media Authority
ACORN	Australian Cybercrime Online Reporting Network
AGIMO	Australian Government Information Management Office
AMEP	Adult Migrant English Program
AWPA	Australian Workforce and Productivity Agency
COAG	Council of Australian Governments
CSEF	crowd-sourced equity funding
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CVC Program	Coordinated Veterans' Care Program
DEEWR	Department of Education, Employment and Workplace Relations
DHS	Department of Human Services
DIAC	Department of Immigration and Citizenship
DLGP	Digital Local Government Program
DoHA	Department of Health and Ageing
DVA	Department of Veterans' Affairs
ESA for Australia	Essential Statistical Assets for Australia
ESS	employee share scheme
ETA	Electronic Transactions Act 1999
GDP	gross domestic product

G-NAF	Geocoded National Address File
GP	general practitioner
HACC	Home and Community Care Program
ICP	Indigenous Communications Program
ICT	information and communications technology
IDI	ICT Development Index
ISP	internet service provider
ISS	interim satellite service
MBS	Medicare Benefits Schedule
NBN	National Broadband Network
NBN-EESS	NBN-enabled Education and Skills Services
NCCS	National Cloud Computing Strategy
NFP	not-for-profit
NICTA	National ICT Australia
OECD	Organisation for Economic Co-operation and Development
PCEHR	Personally Controlled Electronic Health Record
RTO	registered training organisation
SBR program	Standard Business Reporting program
SMEs	small to medium-sized enterprises
STEM	science, technology, engineering and mathematics
UNE	University of New England
VCE	Victorian Certificate of Education
VET	vocational education and training

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