

gov tech review

AI-EMPOWERED
PUBLIC SERVICE

OVERCOMING DATA
SHARING CHALLENGES

INNOVATING GOVT CX
WITHOUT COST BLOWOUTS

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Cover image: Dr Sue Keay photographed by Christian Tiger. Image courtesy of Queensland AI Hub.

Insider



The role of AI in government has been a topic of interest in recent times, but with narrowed focus that fails to see the opportunity in emerging AI research trends, according to Dr Sue Keay, CEO of Queensland AI Hub.

In the lead article this issue, Dr Keay suggests we stop regarding service delivery and decision-making improvement as the end point and take advantage of advances in the field to design and develop tools that will deliver a truly AI-capable public service.

Opportunity abounds in digital twins, with projects currently underway to create digital representations of Australian states and urban areas, enabling governments to locate and protect essential infrastructure and inform risk and resilience decisions. According to Dr Keay, advances in AI and digital technology could see the emergence of digital twins that can operate without human guidance and will support other AI systems to plan and execute tasks safely and effectively.

Also in this issue, and still on the topic digital twins, Mark Fioretto of Dell Technologies ANZ explains how 5G is turbocharging the use of edge computing and in-memory processing to interconnect twins and deliver the essential elements of a smart city and meeting the needs of increasingly switched on citizens.

Of course, widespread intelligence and connectivity come with data... and lots of it. No issue of *GovTech Review* would be complete without a dive into data protection, including the challenges of data sharing and governance, privacy and consent. We also take a look at the implications of the federal government's DTA hosting certification framework via a piece from Monash University's Andrew Mitchell.

Long-time readers may have noticed an editorial change at *GovTech Review*. I've only recently come on board — in the final days of this issue being put to bed, in fact. I'm thrilled to be taking over the reins from Mansi Gandhi, who has moved on to another title within the WF Media stable, and I look forward to delivering the latest news and information from Australia and around the globe.

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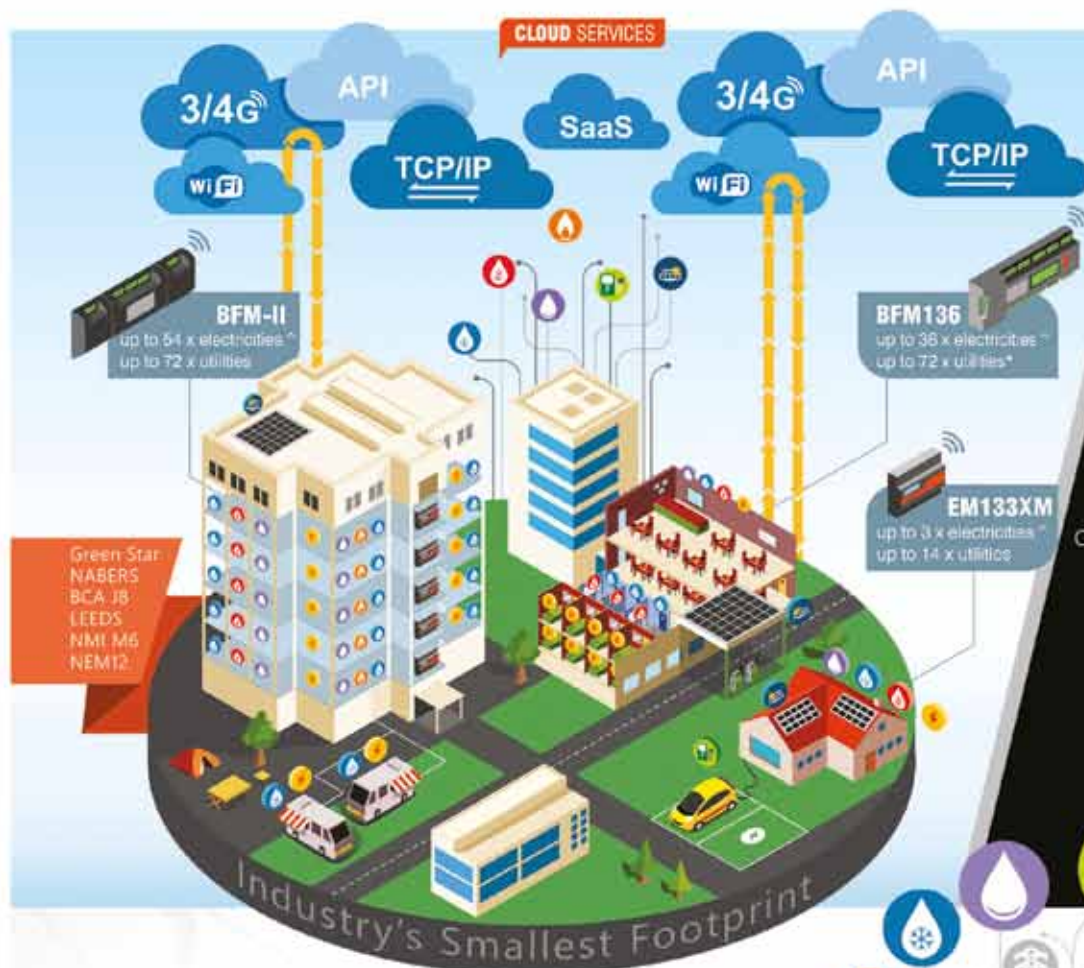
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Artificial intelligence

AN AI-EMPOWERED PUBLIC SERVICE

Dr Sue Keay, CEO, Queensland AI Hub

AS AI CONTINUES TO EVOLVE AT A RAPID PACE, GOVERNMENT HAS A CRITICAL ROLE TO PLAY IN SHAPING THE DEVELOPMENT OF FUTURE TECHNOLOGIES THROUGH REGULATION AND POLICY AND BY DEMONSTRATING BEST PRACTICE AS A FIRST ADOPTER.

The applications of AI to government in Australia have so far focused on improved service delivery and government decision-making. These applications largely rely on established AI methodologies and are not yet taking advantage of advances in the field. Here, I highlight some trends in AI research that will impact government implementation in the future, where machines operate with true autonomy, and we have the tools to build an AI-capable public service.

THE DIGITAL TWIN OPPORTUNITY

A digital twin is a virtual model of the physical environment that acts as a bridge between the physical and digital worlds. NSW is developing a state-wide spatial digital twin to readily locate and protect essential infrastructure and inform risk and resilience decisions, particularly during emergencies.

To plan and build smart infrastructure, a similar spatial model will be required for the Brisbane Olympics before 2032. LA2028, the Los Angeles Organizing Committee for the 2028 Olympic & Paralympic Games, is already collecting data for SoFi Stadium, from construction through to use, to identify new ways to enhance

visitor experience and make the Olympic Games a commercial success.

Such a digital twin requires scaling the lessons learned from smaller commercial real estate digital twins. These models can give far more information than simply allowing 3D visual inspection of assets — the models can also be linked with real-time sensor data that can track information such as traffic and air quality. As digital technology and artificial intelligence become more sophisticated, digital twins will become ubiquitous and there will be models at all scales. We may see intelligent digital twins that can operate without human guidance and will support other AI systems to plan and execute tasks safely and effectively.

SENSORS AND DATA COLLECTION

The dependence on multiple sensors and the data they collect in real time is increasing. Advances in AI and other emerging technologies have seen the production of cheaper, smaller, smarter, self-powering sensors to monitor things such as temperature, proximity and chemical leaks. Even a camera is a type of sensor that collects visual information in real time. Sensors provide important information that can be fed into digital twins, and can also enable real-time operation of autonomous systems, such as self-driving cars.

THE RISE OF ROBOTS


Robots are getting better at extracting information from a variety of sensors to gain real-time situational awareness. Such robots can complement, augment or emulate human physical capabilities and/or human intelligence. The most straightforward application of robotics is through the robotisation of simple processes and existing products, for example, converting a document trolley into an automated ground vehicle to reduce the need for people to undertake manual labour (pushing trolleys).

The rise in adoption of robotic technologies has led to cheaper and more efficient solutions. This, in turn, means we can expand their range of capabilities. Until recently, robot capability has been limited and often restricted to simple, focused tasks. In the future we will have faster, more capable robots that can readily switch tasks (more like humans) and with real-time situational awareness to be able to safely work side by side with humans. As the technology continues to evolve, the cost of robotic systems will also decrease, allowing agencies to deploy multiple robots at an affordable cost.

Robot teaming — robots talking to each other — will then become important with robots sharing a world model, and also communicating with the humans around them. This will allow the robots to tackle different specialised tasks to achieve complex outcomes from simple components. As these robots become more capable, reliable and easier to use, we are likely to see them applied across different government functions for a range of applications, from logistics to customer service. Teaming and a shared world model will break down many of the barriers to human–robot collaboration.

SYNTHETIC DATA

While it may seem that we are already buried in more data than we can handle, the production of synthetic data from computer simulations or algorithms is making it easier to create accurate AI models by filling in the gaps often found in real-world data. Synthetic data is artificial, but it reflects real-world data and can be better at training AI models compared to data based on actual events, objects or people. For example, there may be no real-world training data to account for rare events — this limits the applicability of AI systems, particularly for identifying high-risk activities which are rare but may have catastrophic impact.



“The thing we’re trying to do here is value the human experience of the city over all else. And that includes in my mind, being conscious of where people do and don’t see a role for technology.”

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AI models are crucial for obtaining situational awareness, predicting future events and enabling perception for autonomous systems such as robots. Such models are often limited by the difficulty of accessing large datasets of images labelled by humans, necessary to train them. Using data simulators, which generate contextually relevant data with quality labels, it is now possible to create synthetic data that can be used to train robots and can also be tested against real-world data to ensure accuracy.

EXTENDED REALITY (XR) AND THE PUBLIC SERVICE

The AI strategies of several nations, such as South Korea, highlight that a critical component to AI adoption in any country is the training of public servants. To build an AI-capable public service requires extensive workplace training that can be enhanced with virtual reality (VR) and augmented reality (AR). AR/VR headsets showing holograms of equipment or of a process can be used to provide immersive training for workers before they ever set foot on a site. An example of this is in the use of VR to train Australian firefighters in scenarios that are too dangerous or difficult to recreate in the real world. The training can extend beyond the visual to incorporate physical sensations, such as the feeling of heat and the force of a water hose.

Augmented reality superimposes an image onto the user’s view of the real

world. This kind of technology is not only useful for training purposes, but it can also help with asset inspections, where digital models can be used to check against reality, or against real-time data from sensors to look for any discrepancies, or even to remotely control machines as they interact with holograms. For example, the user may have a 3D model of a robot in front of them that they can control simply by reaching out their hand, grabbing the hologram with a pinch gesture in space and moving the robot. In turn, the robot responds to the command but also ensures that it is safe for it to carry out the requested direction or determines whether it may need to modify its path to avoid an obstacle.

A SMALL WINDOW OF OPPORTUNITY

In the future, we will see AI applied to more complex tasks in government, moving beyond chatbots and prediction engines — even more into the physical world we humans operate in. While there are tremendous opportunities for AI, there are some challenges that prevent its adoption in government. These include: AI treated as an expense rather than an asset in budgets; lack of quantification of benefits through linking AI investment directly to departmental KPIs; lack of in-house skills to understand AI benefits and uses; and fear of the unknown — even the term artificial intelligence can induce trepidation and discourage adoption.

There are also broader issues around whether AI adoption requires the development of new business models, ones that consider ethics, transparency, accountability and fairness. Complexity of ownership has recently emerged as the Australian federal court ruled that AI can be a patent inventor. If the law recognises that our own creations can also create, then complex ownership issues may arise. Recognition of non-humans is a vexed issue; will Australia also recognise robot rights as is being considering in South Korea?

Australia currently ranks 12th in the world according to Oxford’s 2020 Government AI Readiness Index. While we have the intellectual skills and capability, we currently lack the investment and policy support for a sovereign technology industry that can supply AI tools to the public service and help commercialise our AI research. Changes to government policy, including an AI-first strategy that encourages government agencies to be active procurers comfortable with the risks involved in dealing with local technology SMEs and start-ups, would assist in addressing this challenge. We have a small window of opportunity, while the rest of the world leaps headfirst into AI, to follow suit and discover how we can reimagine government through an AI-empowered public service.



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Geoscape, GeoX partnership to enhance 3D digital maps of Aus

Geoscape Australia, a government-owned geospatial data company, has partnered with Israeli artificial intelligence start-up GeoX to use machine vision and deep learning technology to enhance its 3D digital maps of Australia.

The CEO of Geoscape Australia, Dean Capobianco, said the partnership with GeoX will advance what we know about what's at every address across the country.

"By applying GeoX's patented AI technology to the highest quality aerial imagery, we will significantly evolve our digital model of Australia," Capobianco said.

The company said more accurate digital models of Australia's urban environment will enable the data-driven foundation of digital twin applications that better reflect the real world. The up-to-date data will also improve the assessment of risk for insurers, allow architects to visualise new developments in the context of their surroundings, help noise modellers better understand what will be impacted by noise and power modelling of energy use patterns in commercial and residential buildings.

"Advanced information about the built environment, on a national scale, can drive efficiency, cost reduction, insight and revenue generation across many sectors of the economy, including insurance, property development, energy and telecommunications," Capobianco said.

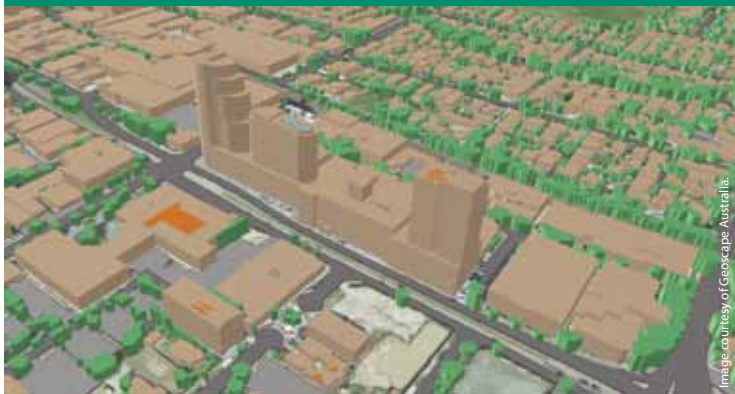
The Co-founder and CEO of GeoX, Izik Lavy, said Geoscape's creation of the digital Australia is one of the most extensive and advanced projects in the world in terms of in-depth mapping of a country's buildings.

"Our machine vision and deep learning technology opens a new generation of accuracy and richness of built environment data, providing a leap forward for Geoscape compared to the technologies used so far," Lavy said.

"By leveraging our tech and Geoscape's continuous data processing capability, every organisation in Australia could access reliable and advanced property data."

Geoscape has mapped all buildings and land cover across Australia using satellite imagery. It also accesses high resolution aerial imagery from Aerometrex's image library.

"We'll re-map more than 10 million buildings using GeoX's AI tech, which will include most urban buildings in Australia. We'll also recapture and enhance all remaining buildings across the country," Capobianco said.



Microsoft for Space Startups Australia launched

Microsoft has announced the launch of Microsoft for Space Startups Australia, a new program to support Australia's space industry.

Through the initiative, Microsoft will offer participating space startups Azure credits as well as access to a range of Microsoft technologies.

Among the initial startups to join the initiative are Spiral Blue, which is developing an onboard computer for Earth observation satellites, and Office of Planetary Observations, which offers satellite environmental data for city councils and other stakeholders.

Microsoft Australia Space Lead Lynn McDonald said the initiative will support the Australian Space Agency's goal of tripling the sector's contribution to GDP to \$12 billion by 2030.

"We are focused on enabling and building an ecosystem of companies committed to taking on some of the toughest issues in the advancement of space technology and exploring uses of this technology for the betterment of humanity and continued exploration in space," she said.

"Microsoft is innovating in space and we're excited to work with startups creating new technologies and innovative capabilities."

Microsoft recently announced the launch into private preview of Azure Orbital, its service which enables customers to connect to satellites directly through Microsoft Azure.

Microsoft is also developing digital technologies to help the space community launch faster, including Azure Orbital Emulator, an emulation environment that conducts satellite constellation simulations at scale.



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City of Geelong modernises operations with Nintex Promapp

The City of Greater Geelong has commenced using Nintex Promapp to support the council's digital transformation and modernisation efforts. The City of Greater Geelong opted for Nintex Promapp because of the software's easy-to-use capabilities and intuitive user interface for process mapping and business-process management. Michael Dugina, Director Customer and Corporate Services, City of Greater Geelong, said the Council's ambition is for local residents to enjoy more consistent service delivery and faster response times as a result of the organisation's focus on process improvements.

"We're looking to map and standardise our processes as part of a major transformation in how we work at the City of Greater Geelong," Dugina said.

Process mapping is underway at the City of Greater Geelong and has been made smoother with Nintex's online training videos and FactoryTen's expertise with the Nintex Process Platform. Jenny Wotherspoon, Business Development Manager at FactoryTen, said the business improvement team at the City of Greater Geelong is rapidly mapping its processes in Nintex Promapp, positioning them to successfully identify critical areas of improvement and understand where automation can be deployed for best effect.

"FactoryTen is a highly regarded, standards-based development house, skilled with process and form digitisation and — as a Nintex partner — was well placed to partner with the City of Greater Geelong to implement this key strategic platform," Wotherspoon said.

The City's initial digital transformation and process improvement efforts are focused within the Customer Service, People & Culture and Financial Services departments. The City strives to have all its processes aligned to its customer relationship management, human resources, recruitment, and finance systems replacement mapped by the end of July 2021. After that, the City will focus on other areas within the organisation.

Services Australia CIO to lead Digital Victoria

Michael McNamara has been appointed as the new Chief Executive Officer of recently established entity Digital Victoria.

With experience leading complex digital change, both within Australia and globally, McNamara has worked in the financial services and energy sectors, including leading ANZ's workplace experience transformation. He will begin in the new role at the end of September with the current acting CEO Vivien Allimonos continuing as acting CEO until then.

Since January 2019, Michael McNamara has been the Chief Information Officer for the Commonwealth agency Services Australia. During the coronavirus pandemic, he led the agency in delivering online services to millions of Australians. He has many years of experience as a senior executive delivering digital and technology transformation, which he will bring to the new group established within the Department of Premier and Cabinet.

Digital Victoria was established in November last year, backed by a \$195.9 million investment to centralise and simplify the government's IT services — reducing the costs and improving the delivery of services to Victorians.

McNamara will lead Digital Victoria's mission to grow the state's digital economy, improve the customer experience and deliver more online services to all Victorians. Service Victoria, which now sits under the umbrella of Digital Victoria, has played a key role providing services for Victorians throughout the pandemic with the Service Victoria check-in app, border entry permits and more.

Minister for Government Services Danny Pearson said, "Michael McNamara is an outstanding leader who brings a wealth of public, corporate and international experience to his new role leading Digital Victoria — I congratulate him on his appointment."



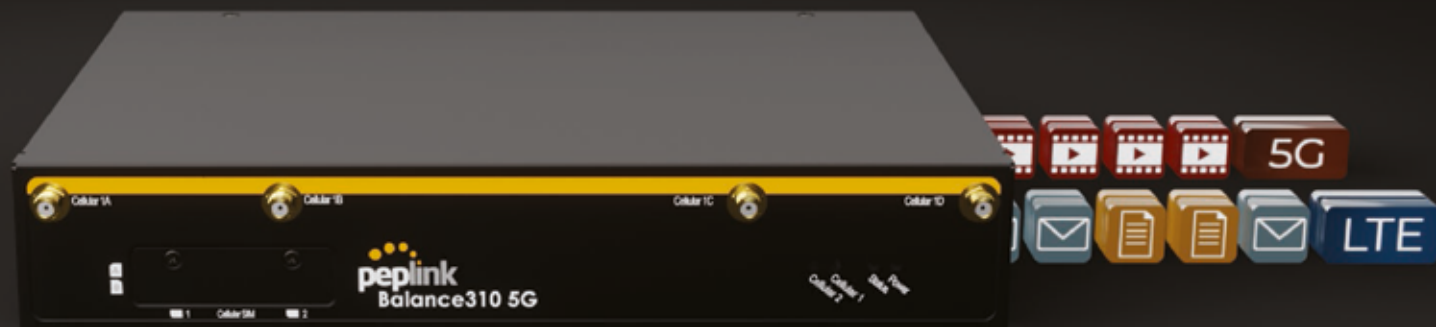
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GOVT REPORTS 34 DATA BREACHES, 74% DUE TO HUMAN ERROR



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Government remained in the top five sectors to report data breaches, with 34 breaches over the last six months, according to the latest data from the Office of the Australian Information Commissioner (OAIC).

While the Privacy Act covers most Australian Government agencies, it does not cover public hospitals, public schools, state, territory and local government agencies and a number of intelligence and national security agencies, OAIC noted.

From January to June 2021, the OAIC received 446 data breach notifications, with 43% of these breaches resulting from cybersecurity incidents. The health sector remains the highest reporting industry sector (with 85 notifications); followed by finance (57); legal, accounting and management services (35); government (34); and insurance (34).

While human error breaches decreased (down 34%) after a significant increase last reporting period, Australian Information Commissioner and Privacy Commissioner Angelene Falk said entities need to remain alert

to this risk, particularly the Australian Government where 74% of breaches fell into this category.

“Human error remains a major source of data breaches. Let’s not forget the human factor also plays a role in many cybersecurity incidents, with phishing being a good example,” she said.

“Organisations can reduce the risk of human error by educating staff about secure information handling practices and putting technological controls in place.”

Data breaches arising from ransomware incidents increased by 24%, from 37 notifications last reporting period to 46.

Commissioner Falk said the increase in ransomware incidents was cause for concern, particularly due to the difficulties in assessing breaches involving ransomware.

“We know from our work and from the Australian Cyber Security Centre that ransomware attacks are a significant cyber threat,” Commissioner Falk said.

“The nature of these attacks can make it difficult for an entity to assess what data has been accessed or exfiltrated, and because of this we are concerned that some entities may not

be reporting all eligible data breaches involving ransomware.

“We expect entities to have appropriate internal practices, procedures and systems in place to assess and respond to data breaches involving ransomware, including a clear understanding of how and where personal information is stored across their network.”

The OAIC was notified of a number of data breaches resulting from impersonation fraud, which involves a malicious actor impersonating another individual to gain access to an account, system, network or physical location.

“The growth of data on the dark web unfortunately means that malicious actors can hold enough personal information to circumvent entities’ ‘know your customer’ and fraud monitoring controls,” Commissioner Falk said.

“We expect entities to notify us when they experience impersonation fraud, where there is a likely risk of serious harm.

“Entities should continually review and enhance their security posture to minimise the growing risk of impersonation fraud.”

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Large and complex datasets provide opportunities for fraudsters

Knowing Thyself: Why accurate data is at the core of good government, and how to achieve it.

‘Know thyself’

These words are the first and most well-known of the maxims carved above the entrance to the Temple of Apollo at Delphi in Ancient Greece. In a building that was both a source of wisdom and a location for political meetings, it’s a concept that would have given pause both to the philosophers and politicians who guided and governed the populace of the time.

It’s an organising idea that can still be applied today, especially in the ways governments utilise the massive data sets that are crucial for delivering services to their constituents. For government departments, ‘knowing thyself’ is all about having access to accurate data. Accurate data is at the core of the business of government — and any government body is only as good as the data to which it has access. Good data leads to good decision-making, while bad data leads to bad decision-making — so the more accurate the data available, the more governments will be able to understand about the people they serve, and so how best to serve them.

However — as anyone who has worked with large databases knows — errors created by duplications, changes, typos, or merging different databases together over time can drastically affect the quality of the information within a database, rendering it untrustworthy and virtually unusable. Ultimately, the accuracy of an organisation’s data determines how effective it is. Knowing thyself also means knowing who your main customers are — particularly the suppliers and providers of the services

that are required to fulfill the obligations of governments and do so in a transparent and ethical manner. Not having an accurate understanding of these details leaves a government programme open to the potentiality of waste, fraud, or corruption. So, what’s the solution? How can government organisations achieve the data quality they need to know themselves and so provide effective services?

Achieving accurate data that provides a basis for good government decision-making is a two-step process, which starts with resolving the discrepancies between the individual pieces of data in a database, and then developing an understanding of the relationships between those data points.

Entity Resolution — The Pursuit of the Golden Record

The first step is known as entity resolution.

In the language of databases, an ‘entity’ is a unit of information about a person, an organisation, or any other detail that needs to be stored in that database so that when viewed in relationship to the other entities, a meaningful view of reality is established.

As data is collected in a database, the number of entities within it increases, as does the potential for mistakes and inconsistencies that come about by simple human error. Entity resolution, as a process run by intelligent digital tools, overcomes this issue of human error to produce a single, well-defined version of all the data in a database — a state sometimes described as the “single source of truth”, or more poetically, the Golden Record. Achieving the Golden Record for your data

through entity resolution ensures that 1) you know where your data comes from, 2) you know that it is accurate, and 3) you can trust that data as the basis of meaningful interactions that need to happen to deliver government business effectively.

Entity Resolution is a critical element of database management in a wide range of applications that are relevant to government business. Without a trustworthy database containing verified entities, it would be impossible to effectively carry out any of the following kinds of activities, many of which are core government responsibilities:

- Anti-money Laundering (AML)
- Regulatory compliance
- Fraud Detection
- Electronic Health Records (EHR) maintenance
- Customer Data Management (CDM)
- Homeland security (such as visa screening and border control)
- Counter-terrorism (such as monitoring terrorist watch lists)
- Investigations of individuals and organisations

Database management with Entity Resolution is, at its heart, the pursuit of truth — and to borrow another phrase, the truth will set you free. Once you have this truth as the cornerstone of your database, you will then be positioned to use it to make the informed recommendations — and have at your disposal a tool for uncovering potential unlawful or suspicious activity which would otherwise be hidden.

This brings us to the second step in the process — building entity relationships.



"So far with this new software, I've found seventeen needles, two sewing machines, and a guy trying to buy the haystack with a stolen credit card!"

Entity Relationships — Getting a 360 view of your data

Whether it is in health management, education, regulatory compliance, population data management, or national security, developing a deep understanding of the relationships between the entities in your databases will provide clear insight into the integrity of any programme a government organisation might undertake.

Once you have resolved the entities in a database, analysing the relationships between those entities will assist in the identification of behaviours that may be suspicious, unethical — and potentially criminal or fraudulent. However, if the number of entities you are dealing with runs into the billions, it is effectively impossible to do this without an effective data analytics tool. Such things can be exposed by deploying data solutions for matching and resolving entities and thus exposing deep and concealed relationships within a dataset. A current example of this is the ANGIE project, initiated by the Australian Tax Office.

Standing for Automated Network & Grouping Identification Engine — ANGIE is powered by a graph database that

automatically identifies and groups entities together to detect 'patterns of interest' in the multi-layered relationships between individuals and organisations.

Good data = good government — How to achieve it

Assisting government organisations in building clean data sets is a speciality of Intech Solutions, and we have developed a suite of services that deliver the entity resolution needed to create the kind of Golden Records, and identify entity relationships, key amongst which is our solution known as Single Entity View. The Single Entity View (SEV) framework is a comprehensive data quality and management platform that focuses on extracting, cleansing, and linking all relevant data, potentially across multiple systems, to the correct and uniquely identified entity. This provides a complete and accurate view of information relevant to each entity — that is, the aforementioned Golden Record. The SEV solution can provide multiple benefits to government department databases by increasing operational efficiencies, enhancing reporting capabilities, increasing insights gained from analytics, enabling

effective service delivery, and investigation campaign execution that leverages the benefits of those insights to improve programme delivery and reduced waste. Additionally, Intech Solutions' IQ Office software ingests data, no matter the quality, cleanses and standardises it to produce one well structured, high-quality data set, which is optimised for downstream linking, and can be consumed by a variety of data analytics applications.

The philosophers and politicians of Ancient Greece may have found the maxims of the Oracles to be inspirational for the building and governance of their society, but with the new approaches to entity resolution and Graph-based analytics tools available today, government departments have a fresh opportunity to truly know themselves by better understanding their data and delivering on the potentialities within it.



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CONNECTED FUTURES: MEETING CITIZEN NEEDS WITH SMART CITY TECHNOLOGIES

Mark Fioretto, Senior Vice President, Dell Technologies, Australia and New Zealand

Connectivity is the thread that weaves our futures together — with the potential to make our cities more resilient and bring new opportunities to all. Any vision for building back a better world must reinforce connectivity to enable the next generation of digital innovations. This is crucial to ensure our advancements are inclusive, substantial and sustainable — and the smart city can be the foundation of these aspirations.

The provision of more robust infrastructure is now a palpable human need, with connectivity regarded widely as a human right in the digital age. Basic public services have and continue to digitise; thus, connectivity has a vital impact on the lives of citizens around the world. This is built into the

foundations of urban living as smart cities evolve.

In its recent report, 'Smart Cities and Inclusive Growth', the OECD highlights the exciting role that national governments can play in enabling innovative solution delivery, capacity building, and upscaling.¹

Data and connectivity are the lifeblood of the smart city. As we enter the zettabyte era, with more devices coming on stream, there is a risk that local governments could become overwhelmed if they are not prepared effectively. A zettabyte is the equivalent of 1 trillion gigabytes — about 250 billion DVDs' worth of storage.

Consider that humans and machines will generate, at minimum, 175 Zettabytes of data over the next five years alone and we can understand the

urgency. But we should not fear, as 5G is here, and can drive solutions to our seismic data challenges.

UNLOCKING CONNECTIVITY WITH 5G

5G technologies promise lightning speed digital capabilities that lay the ground for next-generation connectivity opportunities — and everyone should be prepared. The governments that support the digital transformation of their businesses and economies will be at the forefront of cutting-edge innovations. These are only now possible with the convergence of maturing digital technologies. They have the potential to drive flourishing economies and connect citizens to their digital futures.

Preparing for 5G provides a unique opportunity to focus economic recovery on greater equity of access



to transformational technology, for a resilient, digitally hybrid world. That means levelling the playing field when it comes to educating businesses on what 5G really means for them, how to prepare — and how to use 5G to transform. Governments play a key role, helping to keep the pace, elevating economic outlooks and laying the foundations for future innovations.

5G is the key to unlocking experiences that were once just figments of our imagination. It will make hyper-connected and responsive smart cities a reality, with autonomous vehicles and real-time personalised services on the go. It will take today's remote working to the next level, making mixed-reality a real contender in the workplace — whether that's with three-dimensional employee training in enterprise or remote precision surgery in health care. But before we

can truly unlock these opportunities, the foundations must be set.

One of the integral facets to these foundations is Edge computing, which is the prerequisite for 5G connectivity and is already turbocharging IoT devices that connect our cities and homes. By embracing the potential of Edge computing, which can capture, store, process and analyse data where the data is generated, instead of in a centralised data-processing location, we can accelerate and unleash the power of 5G within practical, public and societal settings.

5G UNLEASHED: TURBOCHARGING DIGITAL TWINS

Urban digital twins are a practical example of edge computing today — and the 5G possibilities of tomorrow. Digital twins provide virtual representations of a city's physical assets. They use data analytics and machine learning to update simulation models in real time — as their physical equivalents change. This technology is not new.

The concept of making a duplicate or 'twin' of an asset to enable simulations and predict outcomes based on changes in the operating conditions finds its origins in the 1960s, with the Apollo space program. It has evolved to crunch a two-day process into two hours, with the technology continuing to advance rapidly and meet the needs of a modern and digital urban future.

Advances in edge computing and in-memory processing — enabled by scalable computing, along with new pervasive network technologies like 5G to support streaming data — make it possible to interconnect these twins today. They are becoming an essential part of everything from city planning to improving health care, keeping smart cities running safely and enabling sustainable innovation.

Look no further than Victoria, where the government is investing over \$35 million to build a digital twin of the state so that a centralised data platform will be accessible to all. Through this large-scale and open collaboration, industries, governments and communities will be able to use the data to enhance real-world outcomes through planning and monitoring. It will enable city managers to test accessibility options, see the potential impact of new construction, manage emergency responses and monitor city health.

Thanks to all the potential use cases that exist, the digital twin market is projected to rapidly grow within the next few years. The market was valued at \$3.1 billion in 2020 but is expected to reach \$48.2 billion by 2026.² This wouldn't be possible without the convergence of connective and digital technologies, or the nurturing of innovation.

WHAT'S AHEAD?

Looking ahead, connective technologies like 5G will build our future cities and help ensure we can co-exist equally and sustainably. Digital twin developments provide only a small window into what is possible.

With 5G's rapid speeds and high latency, we have the chance to witness innovation at its finest — making the unimaginable real. Putting this in the smart city arena demonstrates the value this can bring to urban residents, while highlighting the importance of maintaining a citizen-centric design. Ultimately, governments can arm themselves with critical data that will hero the needs of their future citizens — everybody wins.

1. https://www.oecd.org/cfe/cities/OECD_Policy_Paper_Smart_Cities_and_Inclusive_Growth.pdf

2. <https://www.marketsandmarkets.com/PressReleases/digital-twin.asp>

OVERCOMING DATA SHARING CHALLENGES

Bede Hackney, Country Manager ANZ, Databricks



DATA AND THE ABILITY TO DRAW INSIGHTS FROM IT ARE BOTH CRITICAL TO THE PUBLIC SECTOR. THEY CAN PLAY AN IMPORTANT ROLE IN INFORMING PUBLIC POLICY, IMPROVING PRODUCTIVITY AND GENERATING EFFICIENCIES, IN TURN ASSISTING IN DESIGNING BETTER AND MORE INTUITIVE PUBLIC SERVICES.

In recent years, a number of government agencies in Australia have started to invest in data analytics capabilities to attain some of these benefits. However, the full benefits of data and the analytics function can only be realised by sharing this data and collaborating with other government and public sector organisations.

The recently announced intergovernmental data sharing agreement, which will see government agencies share public sector data by default, is a positive development, and it highlights the urgency and necessity for the public sector to share their data and collaborate more effectively. This is a step in the right direction, but while we wait to see the final form of the policy, and how it is implemented, it is worthwhile to assess the current state of things. Today, data sharing between government agencies is hindered by three key challenges — developing robust governance

frameworks, dealing with an outdated data architecture and the widening talent gap for critical data skills. But before diving into these challenges, let's start with why.

NEED FOR ROBUST GOVERNANCE FRAMEWORKS

Data is often at its most valuable when it can be aggregated and shared, so it's promising to see the federal and state governments recognise this. To date, privacy and security concerns are the biggest roadblocks holding the public sector back from extracting the full value from data.

With cybersecurity high on the news agenda, data security is understandably a critical consideration, especially when that data is highly sensitive. The federal government's Protective Security Policy Framework (PSPF) and Information Security Manual (ISM) demonstrate considerable progress in data governance, accountability

and information security. However, more still needs to be done to protect citizens' data and unlock the benefits of interdepartmental data sharing.

Australia's public sector is facing a perception problem when it comes to consent and privacy and government use of citizens' data. According to a recent report by EY, almost half of Australians think that privacy and security risks around how their data is shared outweigh the benefits when it comes to using government services.

These insights support the need for stronger regulatory frameworks around owning, storing and sharing data across all levels of government. However, research by Adobe and Deloitte has also found that tailoring government services to citizens' needs can improve uptake, with more than three-quarters of Australians more or equally likely to use government websites if they are personalised and tailored to their digital profile.

These are not opposing findings, but rather, they reflect the condition for governments to access individuals' data, which in turn can deliver enhanced societal outcomes.

DATA ARCHITECTURE

Australia's public sector collects an enormous volume of data every day.

Existing architecture for storing this data remains largely tied to legacy systems like data warehouses, resulting in silos of data distributed across government departments and agencies. A lack of a standardised data architecture also makes it difficult to share data between departments quickly and accurately.

Getting the basics right and establishing a modern data foundation from the outset can eliminate numerous challenges down the line, including data quality issues where rigid systems can lead to duplicated and outdated datasets. This hinders the flow of timely, accurate data and becomes a roadblock when analysing data and implementing AI and ML models. If the input isn't accurate then the output won't be either.

Modernising and improving Australia's data maturity not only requires the right technology foundation, but the right mindset. That mindset is one of openness and promotes a platform built on open protocols and open standards. Taking full advantage of the technologies already widely adopted by enterprises requires a cultural shift towards treating data like an asset to realise its full potential.

THE SKILLS GAP

Having the right data architecture in place is almost redundant if governments

don't have the skills and talent to use it. It is widely acknowledged that Australia is facing a technology skills shortage with data scientists, engineers and analysts among the most in-demand skill sets. This shortage is more evident in the public sector.

Research from the Australian Public Service (APS) Commission revealed 72% of APS agencies identified critical skill shortages within their agency, with data the most commonly reported missing skill set. Data engineers and data scientists were also the top two roles in terms of projected growth rate in the labour market over the next five years.

Cultivating local talent is also a challenge. Before the pandemic, a large proportion of tertiary enrolment in IT degrees derived from international students. With continued uncertainty around border closures and international travel, relying on overseas talent is unsustainable.

It can be argued there is a greater incentive for the public sector to take the lead on closing the skills gap. Partnering with universities and education providers to encourage Australians into these careers is an obvious first step. But beyond this, governments should also focus on enablement inside the workforce. Equip people with the skills they need and then ensure that leveraging data and AI is a priority to enable these skills to develop with real-world applications. Australia's top talent seeks out opportunities to work with cutting-edge technology — investing in improving the public sector's data capabilities goes hand in hand with addressing the skills gap.

THE CASE FOR BIG DATA

As citizens' interactions with the private sector become more personalised, Australians will increasingly come to expect that same level of service and digital experience from the public sector. Governments are aware of this and have been talking about it for

“Modernising and improving Australia's data maturity not only requires the right technology foundation, but the right mindset.”

several years now since the Australian Public Service Big Data Strategy was released in 2013.

There are success stories in the public sector and the recent data sharing agreement demonstrates steps are being taken in the right direction. Driven by changing demand from citizens and the healthcare sector for digital services, HealthDirect recently consolidated its data sources into a single unified platform, delivering significant improvements in data quality, end-to-end processing and reduced overheads.

In the transport sector, Transport for NSW is now using real-time and historical vehicle data to make improvements across the transport network, including predicting trip delays, the impact of weather on services and examining vehicle downtime to optimise routes.

These are both examples of how agencies are leveraging data to better serve the public. More broadly, however, the public sector is ripe for improvements and the COVID-19 pandemic has offered yet another strong case for Australia's public sector to pursue digital transformation underpinned by data. The past year has highlighted the need for a government more connected to its citizens and, in many ways, access to timely, transparent data is the key to strengthening that connection.



Technology priorities of Australian organisations

Research looking back and looking forward

Luke Thomas, Regional Vice President - APAC at Appian

Research soon to be unveiled by Appian, in partnership with the Economist Intelligence Unit, reveals that most Australian executives (89%) believe their organisation encountered operational difficulties in addressing the challenges posed by the pandemic, with 41% describing these as significant. However, Neil Morgan, Chief Operating Officer at Sydney-headquartered insurance giant IAG Limited, said Australia's huge geographical separation from other global marketplaces means there's always been an imperative for professionals to be open-minded and connected into other companies and markets.

"When you're in Australia, everywhere is a long way away," Morgan said. "We've grown up with the distance, whereas other geographies are now feeling the distance quite acutely because — although it's not a big geographic distance to their neighbours — they are currently more restricted than they probably ever have been." Morgan said keeping disparate workers

connected has always been a big priority for IAG. The company invested heavily in collaboration technology and virtual environments for three years prior to 2020. That investment paid dividends when the pandemic hit, meaning IAG was able to ensure 98% of employees could work remotely within two weeks.

While IAG had already invested in the platforms to keep business operations running, other companies made big investments to support remote working last year. Research suggests spending on communication and collaboration software grew by 20% in Australia through 2020.

Pent up technology demand

Now Australian companies are looking to other areas of technology investment. Gartner said IT spending across all industry sectors in Australia will grow 3.6% to reach more than AU\$95.8 billion in 2021, following a 2.8% decline in 2020.

For Morgan, the successful work of IT teams during the past year has created a new

expectation about the role that technology can play in business transformation. Boards have been impressed by how CIOs have used cloud and collaborative technologies to keep businesses operational in extreme circumstances. Now they want more. "I think that the behavioural change we've seen, and the speed of those behavioural changes, has created this additional level of demand. We've definitely seen uptake of digital services accelerate. And that has created this momentum around change," he said. What's more, business project demand is outstripping IT budget growth — which is particularly acute in Australia, with 85% of IT decision-makers saying project requests exceed budget compared to a global average of 64%. This pent-up demand means line-of-business units can seek their own technological solutions to business challenges. Most decision-makers (55%) believe non-IT business units are taking the lead in procuring or developing the applications they use, with as many as three-quarters of IT decision-makers in Australia believing that to be the case.

Nicki Doble, group CIO at Cover-More Group, a travel insurance and medical assistance provider headquartered in Sydney, said one explanation is that Australian bricks and mortar businesses have had to make rapid decisions to transition to online during the past 12 months. Such reactive IT spending decisions are unlikely to sponsor long-term success, Doble said.

“You don’t just move a traditional business online and everything’s fine. I think some business teams are not designing products or services or experiences the way that they would have if they were more influenced by the technology folk. In most cases, they’re thinking: ‘we’re building a website, and the job’s done.’”

The benefits of collaboration

While the survey findings suggest that IT and business colleagues work well together generally, Australian executives identify inadequate collaboration between IT function and business units as the chief barrier to achieving digital objectives. If IT decision-

makers are going to meet the business’s ever-growing appetite for digital, then they’re going to have to find a way to make sure that spending decisions are not made in isolation. Morgan said IAG’s solution to this conundrum comes in the form of cross-functional, multidisciplinary teams. Rather than having IT projects per se, the company creates “strategic change projects”, where the program of work almost always includes some element of technology and is oriented around delivering business outcomes.

“We’ve tried to ensure that our teams are focused on defining the problem statement before talking tech solutions. We need technology specialists to manage the delivery and be part of that team and part of our business. But the key is to know the problem to be solved or the outcome to be achieved, and then look at the enablement opportunities,” he said.

That joined-up approach is likely to pay dividends. Business decision-makers globally regard IT colleagues as highly effective in collaborating on new product development (66%). In Australia, that figure is as high as 77%.

Both Morgan and Doble suggest that one of the key factors supporting that heightened sense of collaboration in Australia is the growing popularity of digital product management, which Gartner defines as the process of conceiving, defining, delivering, monitoring and refining products to maximise business results.

For Morgan, the shift towards product management is part of a wider focus on methods in Australian IT management during the past decade, which helps ensure connectedness between the business people who want technology and the IT people who deliver it.

“When you’ve got technology leaders as part of leadership teams of trading divisions in businesses, ideas become more executable. Some of the delivery norms get pushed, cycle times on figuring out feasibility and decision-making get crushed and become much faster.”

Skills needed in the year ahead

Cloud computing, data science and analytics, and IoT are seen as the technologies that will be most important to the success of Australian organisations during the next 12 months.

Executives are also bullish on the next-generation skills that will be required to power these projects, with most respondents — 80% globally and 81.5% in Australia — believing that they have enough talent to support their AI and/or machine-learning projects.

That level of confidence is somewhat of a surprise, especially given the global battle for data talent. Collaborative technologies are a key factor here. IT professionals can now use cloud-based applications to login and work from anywhere around the globe.

Take the example of Cover-More: even though the firm’s headquarters are in Australia, the company uses global development teams in the US, India, Australia and Dublin. Add in the increased acceptance for remote working during the past 12 months and it’s now much easier to source global technical talent, Doble said.

However, the battle for talent is far from won. Doble recognises there’s a global shortage of technical staff, particularly in key areas such as data science and cybersecurity. This huge demand means that securing the top talent — even in an age of remote working — will be a challenging task. One answer is to build in-house capability.

“Training programs are really important, but it’s about making those individuals recognise that they can be a data scientist or a cybersecurity specialist. It’s about building a culture — you’ve got to have people who know how data is going to improve everything. It might mean going to a different area of the business that might not necessarily use data, showing them the tools and getting them to see the pulling power,” Doble said.

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INNOVATING GOVT CX WITHOUT COST BLOWOUTS

Alex Gelbak*

GOVERNMENTS AT ALL LEVELS ARE GEARING UP TO INJECT LARGE SUMS INTO INFRASTRUCTURE PROJECTS TO HELP ENERGISE THE POST-COVID RECOVERY.

Technology-driven customer service transformation is also high on the agenda, as residents' expectations

of their online interactions with government grow in line with their experiences with business and commercial digital services.

With this in mind, managing IT costs to avoid blowouts while meeting the new expectations of citizens will be more important than ever before.

INNOVATING FOR THE DIGITAL FRONT DOOR

The pandemic has shown us many things, not least that government websites have become the main entry point to government information and customer self-service. Residents are now expecting those digital government experiences to be the same, if not better than their commercial counterparts.

Whilst the dual challenge of delivering 'consumer grade' user experiences and keeping costs under control is significant, governments around the world are stepping up by embracing new paradigms and approaches to customer experience (CX) transformation projects. Below are some key principles to use as a foundation.

FOCUS ON THE FRONT END

Modernising core internal systems to improve operational efficiency and speed is critically important, but these enterprise projects are costly and lengthy affairs. A 2018 McKinsey Government CX report revealed simplicity of digital services ranked higher in driving customer satisfaction outcomes than the speed of service. With that in mind, prioritising more accessible and user-friendly websites and online form upgrades before or in parallel with, rather than after, internal system transformation

will help governments realise quick and cost-effective CX wins.

REDUCE TECH DEBT

Whilst the CX challenges governments face aren't uniform, they are consistent. Custom build used to be the only way agencies could create sophisticated digital services and customer experiences, but with the flexibility of today's low-code/no-code solutions, governments now have a faster, more cost-effective and futureproof path to service transformation. As governments strive to become more responsive to the needs of their community and internal constituents, no-code tools help them achieve this mission by becoming more self-sufficient, reducing scope creep (the gap between what was promised and what was actually delivered) and tech debt, lowering IT costs and accelerating delivery.



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PEOPLE, PROCESS, CULTURE AND THE FLYWHEEL

Technology provides the foundation for CX transformation, but it's the people, process and culture that drive the outcomes. The maturation of low-code/no-code technology has given rise to citizen-developers — non-technical matter experts (SMEs) that can stand up digital experiences without specialist coding skills. As solution delivery shifts from business analysts, product managers and IT teams into the hands of SMEs, it's critically important to find technology partners that impart SMEs with the best practices and skills needed to wield these tools effectively, and deliver high impact outcomes. Not only does building in-house capability result in more engaged staff and self-sufficient teams, it also reduces external consulting costs and dependencies.

When it comes to helping develop this sovereign tech capability, it is

vital technology vendors help their government customers deliver not just outputs, but the outcomes and the skills needed to drive that initiative and keep the innovation flywheel turning.

INVEST FOR THE FUTURE

One of the common fears expressed by IT leaders is that the cost, effort and time to shift from legacy to new technology is too great. However, when you consider the rapid pace that customer expectations are evolving, and the meteoric rise in cybersecurity breaches, the risk and cost of inaction is starting to outweigh the risk and cost of maintaining legacy systems.

EMBRACING ENTERPRISE INTELLIGENCE

As we cast our minds forward to what's next, technology leaders are moving towards something more than just publishing and workflow tools — they

are embracing enterprise intelligence. Imagine intelligent government websites and social channels that anonymously track customer sentiment and service usage trends, and autonomously tailor information, online services and overall digital experience for people based on those insights.

This need not be limited to digital interactions either — offline customer interaction data recorded during phone calls and service centre visits, or out in the community via IoT devices, could automatically inform what people see when they come to the homepage of their local government website. This is particularly important for local governments where community needs trend differently by season and during emergency events.

We're starting to see examples of governments and councils looking at all the data available across the various touch-points with the community, both digital and offline, to inform better digital experiences without needing someone to consult and check multiple sources. The aim is to have connected experiences that optimise in real time.

With digital transformation high on the agenda, and many promising new technology enablers waiting in the wings, it's vital that cost blowouts don't threaten the success of projects and the viability of continuing transformation efforts. This is integral to keeping government responsive at a time when people need it most.



**Alex Gelbak is the General Manager of Global Platform Strategy at Granicus and the founder of Australian GovTech platform OpenCities, which was recently acquired by Granicus.*



Identity is the new perimeter for protecting critical government assets

Thomas Fikentscher, Regional Director, ANZ at CyberArk

The COVID-19 pandemic has spurred many Australian government organisations to accelerate the deployment of digital technologies over the past 18 months. This has been driven by increasing demand for government services, support for a remote workforce and virtual service delivery requirements for citizens, in conjunction

with other societal pressures to shift and evolve priorities. This has presented government organisations with new opportunities for innovation, using technologies and data to build trust, agility and resilience in the public sector. It's also opened up more doors for cross-agency collaboration to drive positive citizen outcomes during the pandemic and beyond. While this transformation has been

absolutely necessary, it's also made the public sector a prime target for cybercriminals due to the sensitive data collected by government departments, as well as their increased reliance on cloud-based services.

The Australian Cyber Security Centre (ACSC) responded to more than 2,266 cybersecurity incidents in the 12 months to 30 June 2020. 436 of these targeted Australia's Federal Government, while



367 were against State and Territory Governments.

This was particularly highlighted in June 2020, when a sophisticated state-based actor targeted all levels of the Australian government, posing significant threats to the country's security. According to the [ACSC](#), "Access to government networks remained a top priority for malicious cyber actors. Cyber operations deliberately targeted

Commonwealth entities with an intent to obtain information of strategic value to undermine our advantage and strengthen theirs."

The rise in cyberattacks on the sector is a wakeup call for all government organisations to review their cybersecurity hygiene levels. Cybersecurity maturity levels continue to vary across different organisations and a sustained effort is required to meet the evolving threat environment.

Controlling who has access to what

Australian government organisations are entrusted with holding copious amounts of highly sensitive personal information relating to over 25 million Australian citizens and on the nation's critical operations. Part of reviewing their cybersecurity strategy should involve tightening who has control and access to highly-privileged critical information and systems.

With more users, devices and applications than ever before, however, many government organisations are struggling to maintain visibility and control across the accounts and credentials that allow this privileged access. A clear 'stock take' and subsequent removal of unnecessary privilege must be undertaken to reduce the risk of attacks, on an ongoing basis.

Taking an identity security approach

It is crucial to secure privileged access; according to Forrester, 80% of all security breaches involve default, lost, stolen or compromised privileged credentials.

Government organisations must examine how to deploy a comprehensive identity security solution, focused on authenticating every identity accurately, authorising them with the proper permissions and providing access to privileged assets in a structured manner — all in a way that can be audited or accounted for.

Implementing least privilege is an important component of the effort to secure privileged

access and identities for the cloud-based infrastructure and applications that are essential to IT operations in the public sector.

In a perfect world, each identity is configured to have only the privileges and permissions needed to perform its intended functions — nothing more, nothing less. This is the crux of the principle of least privilege and a core tenet of zero trust — "never trust, always verify."

Gaining control of critical information and systems

Identity security offers government organisations the peace of mind that their most critical assets are secure, while accelerating their ability to provide agile, digitally-enabled citizen services.

Think of identity security as the ultimate gatekeeper for who gets access to what, where and for how long. Government organisations gain complete protection, control and visibility of privileged access across critical networks, systems and applications. At the same time, they achieve the ability to mitigate security risks and protect against unauthorised privileged account access, impersonation, fraud and theft.

As the guardians of sensitive personal data for Australian citizens, the government sector plays a fundamental role in ensuring the privacy and security of that confidential information. Addressing who has control and access to this critical information must form part of good governance for all Australian government organisations. To find out more, listen to [CyberArk's government podcast series](#) which includes commentary from Alastair MacGibbon, former cyber security advisor to the Prime Minister and Robert Deakin, Director of Cyber Security at ACCC.



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LOOKING INTO THE FUTURE SUSTAINABLE INTENSIFICATION, DATA, PRIVACY AND CONSENT

Dr Ian Opperman, Chief Data Scientist, NSW Government



The Australian Bureau of Statistics told us that there were 305,832 registered births in Australia in 2019, a decrease of 3.0% from

2018. Despite the drop, Australia's population will continue to increase partly because the significant majority of these 305,832 children are likely to live well beyond 100 years of age, taking them into the 22nd century.

During their 100+ year life, each of these children will see unprecedented change. These children will still be pre-teen in 2030, the horizon that many infrastructure planners use as an accessible planning horizon. They will be around 30 years old when they hit 2050 and will already face very significant societal, technological and environmental changes. When they

reach 2100 at the age of 81, the world will be unimaginably different.

As context, these children are born into a wider world of an estimated 7.6 billion other inhabitants of our planet. By 2030¹, this number grows to an estimated 8.5 billion, and by the time our child enters 2050, there are an estimated 9.7 billion other inhabitants on the planet. During this time, there is no more land created, no more water produced and no more natural resources beyond what we have already in our closed system.

We also know the world's population is getting older on average and moving to densely populated cities. Some of these global trends will be directly relevant to us here in Australia, some less so because of our unique national circumstances. Nonetheless, we need to think carefully about how we use the resources we have,

and plan how we build and live in our cities in anticipation of the changes which are inevitably coming our way.

DRIVERS OF CHANGE

Focusing on the nearer term of these horizons, the burning problem is ensuring that the sizable infrastructure spends planned by different governments within Australia are targeted at the problems and opportunities we will face in 2030 and beyond, rather than those we faced in 2020. COVID has impacted some of the plans and trends impacting Australia, but not as much or as profoundly as you might imagine. Our response to COVID has led to the acceleration of some trends, but many of these trends are decadal in nature.

For a child born today, there are major drivers of change coming from the



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“The use of these aggregate, people-centric datasets were an important element in governments’ response to COVID but raise the issue of the inherent need to create and maintain trusted frameworks to use these data for agreed (and important) purposes.”

Australia². Widespread access to reliable network connectivity therefore becomes an even greater long-term consideration for all communities.

Whilst we debate the causes of climate change, we have seen the impact on towns in Qld and NSW, once unimaginable, needing to truck water in to keep communities going³. Future systems which ignore the impact of a changing climate — whether it be water availability, or the growing intensity and frequency of natural disasters — do so at their peril. The ability to understand the impact of natural disasters on communities and infrastructure, or to the ability to deliver effective responses to disaster events requires increased use of data in many forms, ranging from environment sensing, understanding economic activity or movement of people and goods.

TRUSTED DATA SHARING

The use of data underpins the ability to become smarter. COVID highlighted the need to understand a city in near real time, and to have realistic, data-driven models which allowed options to be explored. Access to unprecedented datasets from mobile communications⁴ to credit card transactions — all in aggregate form to protect individual privacy — gave governments the ability to understand the effectiveness of health order restrictions on movement, and economic impact of these same restrictions as well as the subsequent economic stimulus. The use of these aggregate, people-centric datasets were an important element in governments’ response to COVID but raise the issue of the inherent need to create and maintain

trusted frameworks to use these data for agreed (and important) purposes.

These challenges will continue to impact Australia into the future, nonetheless, during the course of the life of the child born today; the expectation remains for an ever-improving quality of life in the face of these global and national influences. These are challenging factors to reconcile and must be met with broad ‘outcomes-based’ thinking which clarifies what we are trying to achieve, how we can tell when we are achieving the outcomes and the means to understand why we are not. It also requires us to make our cities and places ‘smarter’ whereby we can understand in fine detail what is happening in a city or community, identify root causes of problems, even be able to predict when things will go wrong and plan adaptive scenarios able to respond to changing needs.

In August, the NSW Government announced the Smart Western City Program⁵, which lays out the plans for the infrastructure, services and resources needed to ensure the Western Parkland City is a future-focused, digitally enabled city. This program outlines the need for ‘digital plumbing’ to be considered in the planning of the city and deployed across the city as part of construction. High-capacity conduit, common access ducts, a network of ‘smart poles’ and smart street furniture are essential foundations for the future city. The connectivity layers identified in the Program are critical to the success of a digital Western Parkland City. They will be needed to handle the massive growth in data demands resulting from the future, hyperconnected city.

intersection of our growing, ageing and urbanising population, from technological advances, from changes in society, from a changing climate and from global shocks. Data and digital services help us understand these changes as well as developing responses to them.

The advent of COVID-19 restrictions showed just how effectively we could move online for many job types. It also showed just how dependent we have become on network connectivity. Those regions with limited connectivity were least able to adapt to living and working online. Those industries and job types least able to move online remain significant employers and drivers of Australia’s economy. The blend of online and real-world interactions is nonetheless likely to move towards increasing use of online, digital services in all parts of

The ability to harness a wide range of large, constantly evolving and highly personalised datasets will be a fundamental driver of productivity and supports the creation of new, high-value services. The ‘smart’ in grid, cities and systems comes from accessing and using data.

PRIVACY AND CONSENT

It also leads to considerations of personal privacy. There is currently no unambiguous, nationally accepted test for personal data (PD), personal information (PI) or personally identifiable information (PII) in a dataset. Often the terms are conflated. Most privacy assessments worldwide rely on tests of judgment described in terms such as “reasonably” or “likely”.

If datasets are linked and analysed to provide rich new services, a great deal of PD or PI may be contained in the joined data, possibly sufficient to reidentify the individuals represented therein. Most privacy assessments rely on tests of judgment described in terms such as “reasonably” or “likely”.

The challenge is to quantify the amount of PD or PI in a dataset at any point in time and in any given context. This extends to developing threshold tests for when an individual is ‘reasonably identifiable’, while considering personal attributes, temporal and spatial aspects of data, and rich contextual environments. Some of these challenges are yet to be fully addressed.

The very nature of locally optimised and delivery of highly personalised services create these challenges. To take advantage of these services, new methods for providing and handling consent, new frameworks for sharing and using data, and new considerations for security in highly complex networks will need to be considered.

OUR HYPER-CONNECTED FUTURE

We have explored the journey to 2030 using the metaphor of a child born today and used this to explore a little of what that world will look like and some of the aspects that we would like to influence in terms of outcomes.

This child’s future is digital, hyper-connected and critically dependent on technology. Smart cities are being built now with this in mind.

As technology and digital solutions continue to play a key role in driving the economy and society forward, they become increasingly embedded into business operations, across key service offerings and into our personal lives.

By 2030, it will have become a self-reinforcing process which is being accelerated by increased use of artificial intelligence (AI) to make sense of the rising tide of data, to continue to locally optimise services delivery and to increasingly personalise. By 2050 the world is likely very different to today as our early career child engages in a new definition of “work”, which is almost certainly digital and augmented by AI, and possibly virtual. By 2100, the child born today will hopefully be retired, but to a world we would not recognise.

Surrounded by complex smart systems operating at gigahertz speeds producing rich services based on performing analytics on input from potentially billions of devices, the gulf between the world of data and rates of human judgement represent a challenged we need to address well before 2030. Exploring the issues of privacy in a hyper-connected digital world and developing frameworks for meaningful consent are concepts we should be working on now.



1. <https://www.un.org/development/desa/en/news/population/world-population-prospects-2019.html>
2. See for example ACS Digital Pulse 2021 <https://www.acs.org.au/insightsandpublications/reports-publications/digital-pulse-2021.html>
3. See for example <https://www.abc.net.au/news/2021-01-10/southern-queensland-still-in-drought-while-north-floods/13039008>
4. See for example <https://www.themandarin.com.au/129871-federal-nsw-governments-use-vodafone-data-to-see-if-public-is-following-covid-19-restrictions/>
5. <https://www.dpie.nsw.gov.au/our-work/strategy-and-innovation/smart-places/Smart-Places-in-Action-Programs/smart-western-city-program>

Filling shot glasses with a fire hose — the reality of data management

Jeff Park, ANZ Country Manager, Seagate Technology

Seagate's 2020 Rethink Data report revealed that enterprise data is expected to grow, in 2021 alone, at an average annual rate of 42%. IDC also predicts an astonishing increase in the total data generated from 64ZB in 2020 to 180ZB by 2025.

While this data growth is fuelled by growth in Internet of Things (IoT) devices (especially cameras), and automated M2M interactions including utility smart meters and healthcare device management systems, Government organisations are significant contributors. This is the case particularly around smart city initiatives with substantial needs for ramping up its data analytics infrastructures and intelligent transport systems.

The value and power of this data is considerable, but so too are the challenges standing in the way of managing the data effectively to drive innovation. Indeed, the process of trying to access data can sometimes feel a lot like trying to fill shot glasses with a fire hose. As a result, just 32% of enterprise data gets used — because capturing, storing, and managing the data deluge can be tricky, as can accessing and transporting mass data.

Organisations that overcome the cost and complexity challenges of data lakes are rewarded with an asset whose value grows rather than a data sink hole that is complex and costly.

The question is — how to reach that point? That requires answering two key questions — how can we get more value from our data

in the distributed world, and what kinds of storage strategy can reduce impediments to the movement of massive data sets?

Ten years ago, organisations debated between storing data in the public or private cloud. Now, the situation is far more nuanced.

Data flows through endpoint devices, edge, and cloud systems, but the pace and rapidly rising volumes of that movement must be accounted for. According to Seagate's Mass Data on the Go report, today the leaning is toward multi-cloud and hybrid cloud models, which can help optimise where data gets stored and how to best distribute, access, and use it.

While the Australian federal government has a clear digital transformation strategy and mature service capabilities, it still faces the same data pains that enterprises around the world encounter — that is network capacities do not keep up with the data growth. According to the Mass Data on the Go report, in addition to network and capacity constraints, limited access to fibre-optic networking, hidden costs, data security and compliance concerns, and storage capacity limitations also constrict the effective movement of data.

So, what kind of storage strategy can assist? Today, data creation is particularly vibrant at the edge, which means the decade-old model of choosing whether to keep data local or in the cloud has proven too simplistic. While 47% of enterprises today use a centralised cloud storage architecture, in two years that number will fall to 22%. Conversely, the number of those that currently have a hybrid storage architecture spanning centralized and

edge locations will jump from 25% to 47% in the same period.

The next storage technology leap forward for Government organisations will likely involve a shift toward using storage-as-a-service offering that complements but does not replace existing storage services. Seagate Lyve™ Cloud is a great example of this — a world-class object storage service where data can find permanent, cost-effective residence, be activated for a host of applications, and be instantly available for flowing to edge locations via high-speed backbone links. At the data centre level, the self-healing high-density high-performance storage system, Exos CORVAULT, enables streamlined mass storage management and reduces human intervention for edge and data centre environments. The next-gen storage intelligence automates maintenance and reduces e-waste while delivering maximum data density and security without controller-level overhead.

The deluge of enterprise data is not going away any time soon, and this affects Government organisations. Thankfully, data storage and management tools have come a long way — from storage-as-a-service to physical mass data shuttles and self-healing storage systems — so we can fit the right ways to get the most out of data to the right data sets, no matter how big.



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LEADING CHANGE

VIC COUNCIL IMPLEMENTS CLOUD-BASED MODERNISATION PROGRAM

As part of a cloud-based digital modernisation program, Manningham Council in Melbourne's North East has deployed Dynamics 365 to serve both as a lens, delivering clarity about the needs of the community, and a catalyst, for enhanced employee and community experiences through ongoing innovation. The modernisation has enabled citizens to use Manningham's Snap Send Solve app to take and submit a photo of something that needs council attention, prompting a workflow on the back end.

Reporting has also been transformed — instead of a council employee developing monthly reports that just revealed bald volumes of activity, Dynamics 365 and Power BI combine to deliver richer reports in four hours, which cover six separate channels with data updated every night.

Sasha Lord, Managing of Citizen Connect for Manningham Council, said that the council receives about 1000 citizen communications every day, approximately 300 of which are recorded in Dynamics 365. "Dynamics 365 provides complete transparency about each and every one. In the past there was no easy way to understand what customers were requesting, how well council was responding or if it was meeting service level agreements. Now all of that's been opened up to us," Lord said.

Implementing a modern CRM was identified as a critical element in Manningham Council's plan to prioritise its citizens. Dynamics 365 was selected as the best platform. While there were some delays due to Melbourne's COVID-related lockdowns, the council, working with Microsoft partner Fusion5, is now live with Dynamics 365 CRM and is exploring additional modules.

"We're going through our first phase of implementation and I think the community will start to see some really exciting benefits in our second phase. What I'm seeing already is efficiency for our people — it's so much easier for our teams to manage our customer requests. From entering customer feedback in to Dynamics 365 to following its journey and then looking at integration opportunities," Lord said.

Aware that its 550 employees were facing challenges associated with rolling lockdowns, the council crafted a comprehensive change management program to ensure people were able to use Dynamics 365 as soon as it went live. A team of 30 super users who undertook early training supported other users as they started to learn about the platform, with Microsoft Teams providing support to new users. "Our CEO also ran a session on our new CRM. He hosted the session, and we just threw the floor open for people to ask questions and they did. And they weren't backwards in coming

forward. It definitely kept the lines of communication open and really engaged our users," Lord said.

As employees have moved across to the new system, much more data has been collected, which has upgraded the reporting process with a granular report available for executives that shows all the metrics about the council's response to telephone calls, to in-person requests and digital communications. "I can give them almost a 360 view of how our customers are engaging with us. And that's helping data-driven decision-making when it comes to improving our customers' experience and measuring our organisation's KPIs," Lord said.

Lord added that this is all built within Power BI, noting that the organisation is now building bespoke dashboards for different areas. "We're doing some work with our HR teams and helping our grants team to set up a new dashboard based on businesses that are in CRM. It has really expanded Manningham's possibilities," Lord said.

Priyanka Morjaria, Manningham Council's Project Manager, said Dynamics 365 is now established as the foundation for ongoing innovation and workflow automation to drive extra efficiency. The council is currently working on Dynamics 365 Field Service for its Infrastructure & City Projects service unit.

"Manningham has different maintenance management systems — but they are silos, and many still involve manual, paper-based processes," Morjaria said.

The council plans to digitise with Field Service and integrate with its asset management system. This will introduce mobility for field staff, helping them streamline operations, reduce data duplication and improve customer experiences.

"It's a clear example of how the right modern digital platform can provide a clear runway delivering efficiency, enhanced experiences and encouraging ongoing innovation," Morjaria said.

How spatial data is helping government plan more sustainable communities

Spatial technology company Aerometrex has developed a diverse suite of climate change mitigation and urban management data services for their government clients to help manage the built environment and improve the health of their constituents.



Measure the entire urban forest with LIDAR



Plan sustainable green rooftops quickly and at scale



From left to right: RGB imagery, classification of visible ground, full semantic classification

Together the Tree Canopy Coverage, Green Rooftop and Solar Panel Placement, and Permeable and Impermeable Surface Mapping reports give a deep understanding of how to maximise our city spaces for better health and environmental outcomes.

Canopy Coverage Measurement and Change

The Tree Canopy Coverage data suite uses LiDAR-derived data to measure total tree canopy coverage, canopy coverage change, and the change distribution across different land ownership types.

Increasing urban greenness, vegetation and urban tree canopy cover has become one of the most critical considerations for strategic planning within all levels of government. The City of Unley, Aerometrex's project partner in developing the data, now has a deep understanding of the tree canopy area, coverage, and change to base policy decisions on. Further, they have the data to communicate more accurately and effectively with the community on tree management. Aerometrex generated that Canopy Coverage data from repeated council-wide LiDAR capture and LiDAR data-derived assessments of the City of Unley in 2018 and 2021. The 2021 data capture was within two calendar weeks of the 2018 capture to minimise seasonal foliage variations. The output reports show both the overall canopy change statistics and precise information about where changes have occurred.

Green Rooftops and Solar Panel Placements

A project funded by the City of Melbourne led Aerometrex to develop identification and measurement processes for living rooftop green spaces, green building facades, and a method to determine viable new rooftop garden and solar

panel locations. The latest data suite helps city councils meet their urban greening and cooling targets and implement more climate change mitigation activities with strong data backing. Aerometrex used 7km² of their 2013, 2017, and 2021 3D city models as the spatial data source. True orthomosaics and digital surface models derived from the 3D models combined with object-oriented imagery analysis and machine learning techniques classified the surface cover into different categories. Final manual quality checks validated the data. Aerometrex's project outputs give relevant information and data to improve greening outcomes in new buildings and developments. The datasets will act as a demonstration and research tool for other local and state governments and industry to learn from. This project's other benefits and future research relate to humidity, aesthetics, noise reduction, and local air quality improvement.

Permeable and Impermeable Surface Mapping

Another LiDAR-derived data suite, developed during ACT and SA state government projects, maps the ground surface permeability across the urban landscape. In simple terms, the surface permeability reports identify whether water can flow freely through the ground covering. Ground surface type and distribution in the urban environment is a strong indicator of an area's livability, sustainability, and resilience to the ongoing impact of climate change. Surface types directly affect heat buildup, water flow and runoff, and options for reaching greening targets.



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THE FEDERAL GOVERNMENT SET AN EXAMPLE FOR STATE AND TERRITORY COUNTERPARTS IN EARLY JUNE WHEN IT ANNOUNCED THAT ALL RELEVANT GOVERNMENT DATA UNDER THE DIGITAL TRANSFORMATION AGENCY'S HOSTING CERTIFICATION FRAMEWORK WILL SOON NEED TO BE STORED ONLY IN EITHER 'CERTIFIED ASSURED' OR 'CERTIFIED STRATEGIC' DATA CENTRES.

The government's move follows concerns about the acute data challenges confronting the Australian public sector, including data sovereignty, supply-chain vulnerabilities and cybersecurity threats. The challenge once faced by Australian governments was completing their digital transformations; now, it's about figuring out how to adequately protect government systems that are hosted in the cloud.

More and more countries are addressing these data and digital issues through policy and regulation. Data localisation and targeted government procurement of digital goods and services are two ways governments may seek to secure their data, and the systems and infrastructure that rely on it.

Data localisation means keeping data within Australian borders — not just when it's stored, but also when it's processed.

Targeted or sovereign procurement means not just selecting contractors that are operating in Australia but selecting those that aren't subject to the legal influence of foreign jurisdictions.

But these policies are often condemned in international trade law circles as discriminatory trade barriers. Government policy claiming to pursue the legitimate objective of data protection may be accused of promoting data protectionism in disguise. With Australia continuing to push ahead with trade liberalisation and wishing to maintain its reputation for honouring its international trade obligations, government data challenges will need to be addressed through balanced and proportionate measures.

I argue in a forthcoming report that a level of digital sovereignty is required for securing and developing Australia's national interests. The report also finds that Australia retains the regulatory

autonomy under international trade agreements to adopt digital sovereignty measures that balance its liberalised trade agenda with its national interests.

The federal government now requires relevant government data to be hosted only by certified data companies. This is data at the 'protected' level or data belonging to whole-of-government systems.

This two-fold classification is a recognition of two realities. First, the threats posed by failure to protect government data are very different to those for other types of data. Second, there are particular vulnerabilities inherent in hyperscale cloud systems, where information belonging to various agencies is hosted together.

An inability to monitor, control and protect overseas data centres is an overt practical risk of using foreign clouds. It means uncertainty about the operational reliability of overseas data



A SOVEREIGN FRAMEWORK

Andrew Mitchell*



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centres. Physical attacks, shutdowns, blackouts, natural disasters and regulatory interference are less able to be managed far away.

There are also risks of foreign interference by overseas governments and private actors, which are often legal in nature. Foreign agencies can exercise authority over cloud and data companies that are legally subject to foreign jurisdictions.

Australia's proposed bilateral agreements with America under the US CLOUD Act is an oft-cited example. Under that law, a US-based company can be asked by US authorities to relinquish access and control over data regardless of where the data is located.

Other vulnerabilities relate to weak points in the distributed supply chains of multilayered cloud systems, or the security defects of large-scale cloud providers that house multiple tenants' data simultaneously.

Importantly, accepted technological principles that emphasise security processes over data location don't account for other, non-cybersecurity-related risks. Data stored outside Australia may be stored in countries with political, social and economic interests that don't necessarily align with Australia's national interests, or by providers with obligations to such countries. Foreign facilities and personnel may not be subject to the same legal, regulatory and physical controls as domestic suppliers operating onshore.

So digital sovereignty concerns are intensifying because of the inherent risks associated with hosting government data in foreign clouds, and the threats that those risks pose to Australia's national interest.

It's this combination of urgent risks and threats that gives Australia sufficient latitude under international trade law to introduce proportionate, tailored digital sovereignty measures for the public sector rather than data protectionism.

Cybercrime and commercial cyberespionage against private citizens and enterprises are serious issues in their own right. But the consequences are potentially much graver when they affect government data.

Australian defence and intelligence agencies continue to rely more heavily on cloud computing and other emerging digital technologies to carry out operations. And digital technology is part of Australia's offensive and defensive cyber arsenals.

This dependence on digital technology is expanding even more rapidly in critical infrastructure sectors, where cloud technology and various cyber-physical systems are being used to control infrastructure. Recent remote attacks on power plants, refineries and gas pipelines have highlighted some dangerous vulnerabilities.

Measures designed to afford competitive advantages to domestic

businesses may be seen as merely protectionist. However, the line between building stronger domestic digital sectors for industrial policy purposes and securing an adequate level of strategic autonomy is quickly fading.

The widespread integration of digital technologies and their central role in government and other critical sectors has illustrated the legitimacy of protecting or promoting domestic capacities.

The federal government's tightening of its certification framework is a welcome acknowledgement of these risks and legitimate policy concerns that remains to be embraced by governments at the subnational level.

However, there is now an opportunity for all Australian governments to improve on the federal approach. Companies certified under the current framework don't need to be Australian owned and controlled or even have their operations exclusively in Australia.

A better approach, and one that's commensurate with the risks, would be much stronger provisions to ensure that data hosts are Australian owned and based.

The personnel and supply-chain assessment procedures and strict requirements that limit changes in ownership and control under the current framework may be sufficient to maintain Australian government control over its own data. But as they currently stand, the existing arrangements fall short of a truly sovereign framework for government data.

**Andrew Mitchell is a professor in the Faculty of Law at Monash University and a member of the indicative list of panellists for World Trade Organization disputes. This article is based on independent research supported by funding from Macquarie Telecom Group.*

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DIGITAL DASHBOARDS TO DELIVER RELIABLE DATA

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The \$2.1 million Digital Health Cooperative Research Centre (CRC) project to collect patient data in one place aims to better equip healthcare workers when making critical and life-saving clinical decisions.

The project will deliver live streams of clinical analytics and reporting information in the form of online dashboards. The dashboards will drive quality improvement, safety assurance and more efficient accreditation in a hospital setting. The data will be drawn from hospital electronic medical records (EMR) and the Victorian Health Incident Management System (VHIMS).

The project will be led by the Monash University Faculty of Information Technology and Eastern Health Clinical School, and the Australian Council on Healthcare Standards, with Eastern Health and the Department of Health (Victoria) as collaborators. Professor David Plunkett, Chief Executive of Eastern Health, said the project will be led by Executive Director of Information, Technology and Capital Projects Zoltan Kokai and will display streamed data on dashboards extracted from Eastern Health hospital systems.

“Importantly, it will bring together the areas of clinical practice, technology and the very important requirement of

accreditation, to proactively improve the quality and safety of how care is provided,” Professor Plunkett said.

Professor Peteris Darzins, Executive Clinical Director of Aged Medicine and Director of Geriatric Medicine at Eastern Health, added that this venture will facilitate and improve patient care in a timely manner. The project will build on investments in digitisation of healthcare in Victorian hospitals. EMR and other clinical data sources will also be used to ensure health services can be ready at any time for accreditation. At the same time, clinical datasets will be put into the hands of clinicians to drive local quality improvement.

Neville Board, Victoria’s Chief Digital Health Officer, said digital technologies will empower hospitals to provide real-time data for clinical decision-making and for accreditation against national standards set by the Australian Commission on Safety and Quality in Healthcare. Chris Bain, Professor of Practice in Digital Health at Monash University, added that the project uses innovative technologies to address a need in the healthcare sector for reliable, quick and easy-to-access data.

“The dashboards will combine data engineering techniques with user-friendly visualisations to surface key

information from large data-sets. These dashboards will enable clinicians to better understand the quality of care needed on a continuous daily basis, leading to improved quality standards, better patient care and overall support for clinicians,” Professor Bain said.

Accreditation of safety and quality in health services aims to ensure the health system is better informed, supported and organised to deliver safe and high-quality care. On completion, the project will develop a roadmap for Australian hospitals to adopt live digital dashboards with new models to support proactive, continuous quality improvement and accreditation. The implementation of the digital dashboards will benefit many hospital areas, including clinical governance, preventing and controlling healthcare-associated infection, medication safety, comprehensive care, blood management, recognising and responding to acute deterioration, communicating for safety, and partnering with consumers.

The four-year project will demonstrate the impact of the dashboard framework on clinical practice, hospital audit teams and external accreditation.

Ransomware: Top concerns in the to pay or not to pay debate

Garrett O'Hara, Field Chief Technologist, APAC, Mimecast

There has been a dramatic shift in the level of conversation about ransomware this year, with the issue a high priority for business leaders and governments. We know ransomware is on the rise, with Mimecast reporting that more than six out of ten Australian companies suffered a ransomware attack last year, up from 48 per cent in the prior year in its annual [State of Email Security \(SOES\) Report 2021](#). The Office of the Australian Information Commissioner (OAIC) has reported that data breaches arising from ransomware incidents increased by 24 per cent in the first half of the year, prompting Australia's Privacy Commissioner to warn that such attacks "are a significant cyber threat" that may be under-reported.

The extent of ransomware is unclear, and calls for greater transparency are coming from several quarters worldwide. The federal government is considering the implementation of a mandatory ransomware reporting scheme, where organisations that pay criminals to recover their files would be required to report this activity to the government.

To pay or not to pay?

Everyone is on notice, with corporate organisations and government agencies alike all reviewing their security policies and risk management procedures.

In July, security professionals attending [Mimecast's Cyber Resilience Executive](#)

[Society Roundtable \(CRES\)](#) all reported widespread concern over the increasing frequency of ransomware and nation-state attacks. As such, what are the top concerns for businesses and IT departments in the "to pay or not to pay?" debate.

Getting the business back up and running quickly:

- It is a no brainer that companies will want to get back online and recover critical data as soon as possible. Effectively, the longer they are offline and without access to vital information, the more money they will lose, which is why many companies end up paying the ransom.
- Additionally, there is no guarantee that the hackers will release the data once the ransom is paid. Mimecast's SOES report shows that of the 54 per cent of Australian businesses that paid a ransom, 76 per cent recovered their data and 24 per cent didn't get their data back despite paying.

The risk profile of ransom payments:

- Many companies are still weighing the benefits of a payment, to avoid having data leaked in increasingly common 'double extortion' attacks. Here malicious code quietly exfiltrates as much corporate data as possible, sending it back to its authors before the ransomware encryption begins. This gives cybercriminals more leverage as they pressure companies to pay up or risk having sensitive data and corporate secrets made public.

- The cyber resilience panel noted that ransomware criminals rely on insurance companies to pay companies' ransoms, for this attack method to remain lucrative. In response, some insurance companies are starting to refuse to pay ransoms on the basis that customers need to proactively protect themselves, and ensure they can recover quickly and effectively in the event of a successful attack.

What are the next steps for government and businesses?

Support for mandatory reporting and stronger government action against ransomware were two of the key themes to emerge from Mimecast's cyber resilience roundtable, as well as increased Australian government involvement in corporate ransomware response.

For businesses, a ransomware response means strengthening cyber resilience as part of their ongoing approach to business continuity planning, and mitigating the impact of attacks. Every organisation needs to ensure that critical data is protected with advanced security, and that affected data can always be recovered. Businesses also need a robust continuity plan to ensure staff have uninterrupted, secure access to data throughout any planned or unplanned downtime, not last minute or complex workarounds.

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Building Digital Capability for the Public Sector

Digital transformation in both the public and private sector is critical to resolving Australia's declining productivity. Australia is already lagging in digital readiness with a lower than global average digital maturity index. And while the Australian government is on the case with the setup of the Digital Transformation Agency (DTA) and Prosperity Through Innovation plan, the government needs to adopt the following blueprint for the future to catch up with the rest of the world and leading corporations on the digital front.

A Modern Digital Blueprint for the Future:

1. Like the private sector, the public sector must embrace digital transformation.

The new DTA must ensure that government agencies utilise a robust, private, fast, scalable and secure information exchange

and interconnection platform to streamline multiagency information exchange, meeting private sector demands.

2. A modern IT architecture should prioritise convenience and remove complexities.

The Australian government must integrate a digital chain of consumer networks, industry systems and agency partners to be in close proximity with them and ensure instantaneous service delivery.

3. Government modernisation requires nationwide interconnection.

In line with Vision 2025, the Australian government must be prepared to ride the next wave of digital innovation with greater agility to allow citizens to access all government services digitally with distributed interconnected IT platforms.

4. Transforming network architecture at the edge enhances critical capabilities.

5G networks, machine learning (ML), and quantum computing platforms at the digital

edge accelerate critical agency data collection and vital analysis, resulting in instant insights to enable swift emergency responses.

5. Future-proof your smart nation to manage disasters and health crises

IoT and sensor-based trend analytics with localised insights equip governments with integrated policy-based crisis recovery tools and operational efficiency in addressing challenges in real time and maximising public resources, improving the quality of life.

A Modern Infrastructure:

Government agencies need a new architecture offering direct interconnection to clouds, partners, and ecosystems with closer proximity to consumers and other agencies. The seamless and integrated experience provides a digital supply chain of rich ecosystems of agencies, industry, clouds, networks, and partners.

When it comes to a modern infrastructure, by deploying hybrid and multicloud



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infrastructures, the government can integrate cloud seamlessly with other infrastructure capability. The localised control points achieved through cloud effectively simplify applications, data and multicloud integration to streamline interagency operations.

There are many benefits for integrating cloud. Firstly, the government can optimise cloud networks to control costs while monitoring bandwidth to increase capacity, reduce latency, and improve distribution, resilience and security. Driver and Vehicle Standards Agency (DVSA), a U.K. government organisation, chose to move services to the cloud with an interconnection strategy Digital Transformation for Government with Equinix Cloud Exchange Fabric® (ECX Fabric®). By doing so, they cut latency by two-thirds and time to add new connections from months to hours.¹ Many agencies can also access cost-effective hybrid multicloud by moving applications

into clouds, leveraging compliance partners, and developing flexible, consumption-based contracts. This modern IT infrastructure provides smart and convenient services managed by digital platforms and helps to remove complexity. The Australian government is growing cloud partner ecosystems to enhance distributed cloud security. They are also building workforce skills to drive cloud adoption and implementation. Cloud complexity is escalating as agencies increasingly leverage hybrid multicloud infrastructures to optimise and scale application performance. Hybrid multicloud architectures represent the best path to engage with a rapidly changing infrastructure landscape. It allows you to manage legacy data-intensive processes while simultaneously embracing new “born-in-the-cloud” data frameworks. A hybrid multicloud architecture achieves this integration within the context of a single platform that can cope with a heterogeneous environment and that is capable of supporting colocation and virtual services. This integrated approach allows you to access multiple digital and business ecosystems either physically or virtually. Services in the cloud connect government services behind the scenes for a seamless, consistent experience. Governments can integrate their capabilities with multicloud by deploying applications in clouds and choosing application programming interface (API) services built for elasticity. The hybrid multicloud interconnects cloud processing to provide innovative and better services to increase productivity. The key is implementing a simplified platform that does not compromise reliability, security or control and that is delivered by an organisation that understands this complexity.

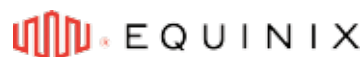
What's Next?

Interconnection leaders like Equinix provide best practices to ensure successful hybrid and multicloud IT infrastructure deployments for both the private and public sector. Such scalable and optimisable platforms transform manual services to real digital applications that are continuously available public

services for government agencies. They also ensure cost reduction by economies of scale. To facilitate interagency requirements, Equinix can assess your current technology environments and offer valuable advice on digital transformation for a digitally ready state. The lines between cloud and edge are blurring as applications shift to being cloud-enabled at the digital edge. This is bound to evolve in the coming decade with 5G technology as accessing data instantly at the periphery becomes the new norm. A modern and smart nation requires an interconnected digital government where population centres, commerce, and digital and business ecosystems meet and interact in real time. At Equinix, we want government to take advantage of the adoption of cloud through hybrid multicloud deployments. We recognise the security-related priorities governments need to think about — including information classification and aggregated data risk — and we have a track record of fulfilling those requirements. We also have all the required accreditation applicable to the housing and storage of government data. We particularly understand that as data sovereignty policies and legislation changes, it will become more important for executives to consider how governments and enterprises collect, process, and store information. With this in mind, not only can Equinix work with agencies to get their workloads to the cloud, we can foster a tailor-made hybrid/multi-cloud strategy suitable for any specific requirements. This is important for ensuring an agile approach that will cater to shifting priorities for years to come.

1. Equinix, “DVSA Deploys to the Cloud, Reduces Latency with ECX Fabric.” <https://www.equinix.com/resources/casestudies/dvsa/>.

To watch the replay of the Equinix Expert Panel to explore why your data matters, visit <https://youtu.be/OUScbs3F0xk>



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ROAD TO THE CLOUD

HORNSBY SHIRE COUNCIL COMPLETES TRANSITION TO AZURE

Hornsby Shire Council has completed a modernisation project involving the transition of a range of on-premise applications into Microsoft Azure. While this cloud transition delivers immediate efficiencies and benefits, it also sets the council up for accelerated innovation in the future. To achieve this cloud transition, the council mapped out its long-term vision and strategy, centred on the key themes of ensuring the area remains livable, sustainable, productive and collaborative. To do that, it needs to serve the needs of its diverse population of around 150,000 people.

When Sharon Bowman, Manager of Technology and Transformation for Hornsby Shire Council, first canvassed the idea, she was told that it would be difficult to achieve, because the undertaking was scheduled in the midst of the COVID-19 pandemic. However, the council has largely completed the transition, working with Data Addiction and supported by Microsoft Fast Track, and is now reaping the first round of benefits from being in the cloud.

When Bowman took on her role in 2020, the immediate challenge was to

assess, then fix some of the technology challenges that people were facing. Except for a couple of SaaS applications — including Microsoft 365 — most of the council's systems were on premise and somewhat unreliable. As an existing user of Microsoft 365, and midway through the deployment of Dynamics 365 Customer Insights, which was supported by Data Addiction, it made sense to consider Microsoft Azure as the platform to underpin the transformation to the cloud and further reduce the complexity.

"The migration to Azure piece was incredibly quick and we had some fairly tight timelines which we had set ourselves because we did want to decommission our on-premise infrastructure — we had some end-of-life issues. The cloud transition piece was probably about four months in total. The Data Addiction team just absolutely powered through, kept everybody on track," Bowman said.

Ben Johnson, Managing Director of Data Addiction, stated that the company wanted to use Microsoft to make a difference. "Both our team and the team at Hornsby Shire Council believe we have achieved exactly that and we are proud of our partnership. Because we are specialists in Azure, we have the privilege

of being able to reduce the cost and complexity of transformations like this. It's a great outcome," Johnson said.

The council's initial cloud transition is a lift and shift to the cloud, which has set the council up for further modernisation down the track. The transition to the cloud has also delivered operational benefits to Hornsby Shire Council's IT team through reduced complexity and 'single pane of glass' for operations. The team no longer has to manage ongoing maintenance of the 92 virtual machines using multiple on-prem systems; instead, the rationalised set of servers can be managed easily using tools in the Azure cloud infrastructure provided by Microsoft.

The simplification and reduction in overheads has been one of the first benefits, with more anticipated as innovation gathers pace. For example, Hornsby and Data Addiction are working on a proof of concept dubbed 'citizen on a page' that will leverage the Azure cloud to collect and interpret all of the information that the council has about a resident in order to understand and tailor the best services to meet that resident's needs.

"We are working with our customer service team to pilot use of this 'single view of the customer' at the front line, and then also having a look at how we can use it to give better information to our executive team and managers about the customer experience we are delivering," Bowman said.

Instead of having to trawl through multiple systems, the solution collates everything and serves up a holistic view of the resident. This is one of the concepts being led by Hornsby's team that is focused on digital and business transformation. A recent audit revealed as many as 500 largely paper-based forms used in council processes, many of which Bowman believes will be able to be streamlined, digitised and modernised using Microsoft Power Platform, in order to help bring the council's vision of the future to reality.

How physical security can help government organisations navigate a post-COVID world

George Moawad, Country Manager ANZ, Genetec

At the time of writing (mid-August 2021) NSW, Melbourne and Darwin are in lockdown with millions of Australians in the public and private sector working remotely and uncertainty lies ahead as state and federal government strive to contain the Delta variant outbreak.

Of course, it isn't the first lockdown for the nation, but the current debate around the feasibility of achieving Covid Zero in NSW does mean that businesses and organisations must work even harder to ensure they have the right protocols in place to protect citizens and employees from Covid-related risk.

It's absolutely necessary to have these safeguards, but it can be problematic for organisations already grappling with flatlined (or reduced) budgets and ambitious productivity mandates. The silver lining in this, is that many physical security solutions can be used to go beyond their traditional applications to help manage today's Covid issues, as well as continuing to play a strategic role when the pandemic is finally behind us.

Genetec has worked with our public and private sector clients across the globe over the last 18 months to adapt our existing solutions and create new ones to address emerging needs around Covid management. During this time, we've identified four important ways that physical security systems can help government organisations today and in the future:

Monitoring occupancy levels

This was one of the first challenges that arose when the pandemic first hit in 2020, with many entities resorting to manual counting of staff and visitors on entry. As a stop gap measure this was better than nothing, but ultimately, it's inefficient and prone to error; not to mention ineffective as there's no way of knowing where the people move to once they're inside an office, venue or stadium. By contrast an occupancy management solution such as the Genetec Occupancy Management Package uses cameras already deployed in a physical security system to generate real-time data that video analytics can use in a variety of ways to monitor occupancy levels. For example, the system can be set up to deliver notifications when the occupancy in a building reaches a certain threshold, allowing the operations staff to start limiting the number of people entering. Reports can also be produced to demonstrate compliance with local measures.

Managing travel restrictions with ALPR

To better enforce travel restrictions, cities and governments across the globe are deploying automatic license plate recognition (ALPR) solutions. These types of solutions can be used to enforce interstate restrictions and ensure that only essential workers are on the roadways during a curfew.

Monitoring patients at a distance

We fervently hope that Australia's healthcare system doesn't become as overwhelmed as

other countries have sadly been, but to help manage surging patient numbers we've seen innovative examples of global hospitals deploying remote patient care systems. One of our clients, a New York City hospital, has used SIP intercom-enabled cameras to allow nurses to remotely monitor and communicate with patients. From the nurse's station, they can respond to patient requests using Genetec Sipelia™, the communications module in Security Center. This can help save time, decrease their risk of infection, and ensures hospitals save PPE for when it's needed most.

Sharing evidence in the cloud

At the moment, the less physical content the better so for the police and those in law enforcement, physically delivering and handing over paper reports, CDs, or other digital storage media can be risky. A cloud-based evidence-based management system such as Genetec Clearance™ avoids physical hand-off and speeds up the transfer of critical information.

It's clear that the pandemic is likely to be with us for some time and as a result both the public and private sector will continue to face challenges, but I'm optimistic that with smart planning and lateral thinking, we can work together to address the most pressing issues around managing and protecting our citizens and employees.

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Nokia and the City of Melbourne have conducted a trial using Nokia Scene Analytics artificial intelligence (AI) technology to develop a deeper understanding of waste disposal behaviour. This will help the city tackle the issue of waste dumping more efficiently and keep laneways even cleaner, safer and free of garbage.

To reduce the frequency of waste contractor visits to busy areas, the City of Melbourne has offered local residents and businesses subscription-based access to the large-capacity compactor facilities. With the compactor in place, Council wanted to understand how the service was being utilised and how to mitigate illegal waste dumping, which can create safety and hygiene issues in the area.

Under its 'emerging technology testbed' initiative, the City of Melbourne worked with Nokia to leverage an existing network of installed cameras as Internet of Things (IoT) sensors to monitor one of the compactors. The Nokia Scene Analytics solution employed an AI-powered

algorithm to filter and collage data from the cameras, while also combining other data sources, such as operational data on the compactor itself, to create real-time alerts and produce reports. Initial trial results found that Scene Analytics can support the City's objectives for better, safer citizen experiences while lowering maintenance and downtime costs for waste management services.

The trial allowed for real-time monitoring and detection of activity in the vicinity of the compactor using a virtual tripwire. Object detection and object counting was used to identify and count items to show how the compactor was impacted by items incorrectly placed within it, while also identifying potentially dangerous items. Anomaly detection identified unusual movements, such as illegal waste dumping during the night, while face and licence plate blurring maintained individual privacy during the trial.

Using these reports, City of Melbourne can better understand the correlation between illegal waste-dumping activities and compactor

downtime, to keep maintenance teams better informed and minimise issues. It also allows the City to address waste dumping activities before they become a hazard, viewing locations in real time to observe any obstructions to service vehicle access and adapting their schedule to reduce unnecessary visits and minimise their carbon footprint. By understanding patterns of compactor usage and waste dumping activities, the city of Melbourne can also patrol the area more effectively, while developing a campaign to inform and educate the community.

This innovative use of Scene Analytics has been recognised, with the partnership between Nokia and the City of Melbourne shortlisted for the Communications Alliance's ACOMMS awards in the Artificial Intelligence category. City of Melbourne Lord Mayor Sally Capp said this project will help to avoid hazards and make streets even cleaner by allowing waste services to better understand behaviour trends related to the illegal and dangerous dumping of waste.

"This is a great example of using new technology to help remove illegal waste more quickly, make our city cleaner and protect the environment. Our partnership with Nokia is another way we are gathering data to make Melbourne a safer, smarter and more sustainable city," the Lord Mayor said.

Rob McCabe, Head of Enterprise of Australia and New Zealand, Nokia, said the City of Melbourne is using robust AI technology to offer its citizens, visitors and businesses a greener and more livable community. "In helping the City of Melbourne monitor and enhance services with real-time driven actions, Nokia Scene Analytics is supporting the safety, security and operational continuity of this city in a proactive and automated way," McCabe said.

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