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In these last two tumultuous months we've seen political upheaval, more mass surveillance revelations and more - all of which promise long-lasting changes for Australia, the global tech industry and the way people rely on technology.

Locally, we've had a change of government in Australia, at an election where ICT was front and centre in the form of the two major parties' National Broadband Network policies. As a result of the change, the NBN's foundation will move from fibre-to-the-premises (FTTP) to fibre-to-the-node (FTTN).

Looking abroad, further leaks from Edward Snowden about governments' capabilities to intercept internet traffic have continued to shock the world. The revelations have engendered even greater cynicism among internet users, who are growing increasingly paranoid about their privacy online. Tech companies are racing to allay those worries, fearing for their bottom lines.

The revelations have also sparked concerns in those businesses that rely on cloud-based solutions and are legally obliged to safeguard their customers' data. Others worry what the revelations might mean for foreign corporate espionage.

The above, and more, are covered in this issue.

Andrew Collins, Editor

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Flash: saviour of the data centre?

Stephen Withers

The widespread use of smartphones, tablets, ultrabooks and various other electronic devices means flash storage has become part of everyday life for many people, but it is also playing an important role in the data centre.



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The vendors we spoke to for this article were unanimous about the significance of flash in the data centre.

Flash is “the biggest change we’ve seen in storage for some time”, said John Martin, principal technologist, NetApp.

“Oracle has long been a proponent of flash in the data centre,” said Jason Schaffer, senior director product management - disk storage at Oracle. For example, flash is used

throughout the company’s Engineered Systems to provide high availability and to optimise database performance.

Adrian De Luca, Asia Pacific chief technology officer at Hitachi Data Systems, said HDS had provided “enhancements right across the board” with performance, efficiency and economic improvements to flash technology.

“The technology has a role throughout the data centre,” said Darren McCullum, XtremIO regional sales manager, EMC. The company led the use of flash in data centre storage around five years ago and now few Symmetrix or VMAX arrays

storage performance improvements, but there is now a realisation of the business benefits that can stem from say the fivefold improvement that can come from the selective application of flash to a database.

Where database performance is needed, “PCIe [flash] cards in the host are probably the best way of achieving that”, especially with x86-based servers. The idea is to put the storage as close as possible to the processor.

But what happens when you need to be able to move the application between servers? Barker said this requires PCIe flash cards to be fitted to both, taking

“One IBM customer that trialled the use of flash in conjunction with analytics software saw results 50 times faster while reducing the CPU requirements.”

ship without flash storage,” he said. “It’s an accepted medium in the data centre.”

The benefits of flash fall into three broad areas: speed, density and power consumption.

Speed

Flash is “the change that’s been needed”, said Garry Barker, storage specialist, IBM Systems Technology Group Australia and New Zealand, explaining that disk technology has not become appreciably faster in the last 10 years and is unlikely to do so in the next 10. Flash is still getting cheaper, so while it can already reduce the total cost of most ‘everyday’ applications such as Oracle and SAP, the savings will likely increase.

Martin pointed out that until the arrival of technologies such as in-memory databases there was little pressure for significant

you back around a decade to the use of direct attached storage (DAS) with good performance but inferior utilisation, making it harder to cost-justify flash. There are also limits on the number of PCIe cards and therefore the total amount of flash storage that can be installed in one server.

The good news is that according to Barker, flash-based SAN arrays can give very similar performance to PCIe flash cards. He suggests that once four or five flash devices are needed it becomes more cost and performance effective to use SAN-based flash instead.

McCullum said EMC’s XtremSF PCIe cards can be used with XtremSW Cache server flash caching software to combine the performance of onboard flash with the data protection that comes from writing through to a storage array in case the server or the card fails. This software

“almost genericises flash in the data centre, at least in the server”, he said, as it also works with third-party PCIe cards and SSDs, providing common management and automation.

The technology that EMC gained in its recent ScaleIO acquisition allows it to virtualise any server direct attached storage (including disk, SSD and PCIe flash) into a storage array. It scales to thousands of units, McCullum said, and means that data can be stored very close to the application while still enjoying the data protection and other facilities provided by storage arrays.

The NetApp EF540 flash array is “the IOPS monster” according to Martin. It is said to deliver more than 300,000 IOPS with submillisecond latency and 6 GBps throughput. The EF540 can “easily beat pure flash players’ [products]”, he said.

If that is still not enough, HDS’s all-flash Hitachi Unified Storage can deliver up to one million IOPS. “That’s quite a huge number,” said De Luca. The company has also developed its own flash controller ASIC for better wear levelling, allowing it to offer a five-year endurance warranty on flash storage.

Relative newcomer Nimble Storage has a distinctive approach to building hybrid arrays. It puts newly written data into mirrored NVRAM, but unlike other vendors it then compresses the data, coalesces what can be as many as tens of thousands of small chunks of data into one large buffer and then stripes it across multiple hard disks. Gavin Cohen, director of marketing and technology, explained that relatively inexpensive SATA drives “can sustain incredibly low latencies” under these conditions.

To obtain high read performance, Nimble stores a second copy of the data on SSD



and the controller ensures that ‘hot’ data stays there. 96% of reads in real-world installed systems come from SSD, Cohen claimed, so the company’s products deliver almost the same performance as all-flash arrays despite being around one-fifth the price. He said Nimble has more than 10 times the customers and installed systems as any other storage vendor of similar age, “the ultimate proof that this is a successful approach”. Local customers include one of the major banks, which uses Nimble with mission-critical applications.

Martin says that while every workload can benefit from hybrid arrays because they allow the use of a smaller number of higher capacity disk drives and are therefore cheaper for a given level of performance, there are two standout applications for pure flash arrays. One is Oracle or SQL Server databases, the

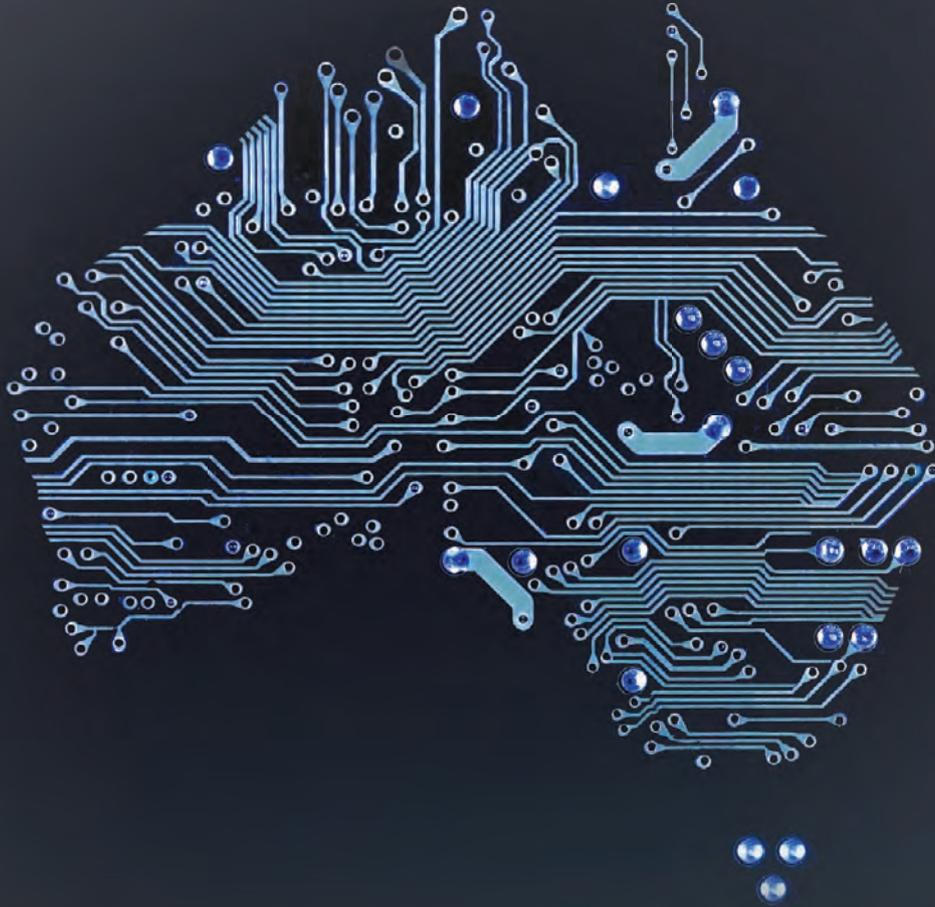
other is virtual desktops. The latter is “incredibly I/O intensive”, he said - 1000 desktops can be more I/O intensive than a large bank’s core system.

McCullum agreed, saying that VDI is one of the applications where flash can already be cheaper than hard disk. The performance of flash allows for real-time inline deduplication, which is especially relevant to virtual disk images.

Big data mostly means getting really good analytics results very quickly, suggested Martin. Such projects typically involve less than 10 TB of data, which if stored in an EF540 only requires 2U of space. (Barker observed that as much as 20 TB of flash can be packed into 1U and then treated as “one big blob [that] we carve up as we like”.) This means the original data can be left wherever it currently resides with a read-only copy for analytics on an EF540, said Martin, who claimed this approach can be cost-justified by associated Oracle licence savings. The speed of flash arrays means CPUs spend less time waiting and more time working, said Martin, so you need fewer processors and therefore fewer Oracle licences.

Barker said one IBM customer that trialled the use of flash in conjunction with analytics software saw results 50 times faster while reducing the CPU requirements. “This is a big step,” he said, as there is an opportunity to do business differently if a particular analysis takes half a minute rather than half an hour.

At Microsoft’s recent TechEd Australia conference, Jeff Woolsey, principal group program manager for Windows Server virtualisation, demonstrated Windows Server 2012 R2’s storage tiering capability using 16 hard drives and four SSDs. An SQL-based application showed a sixteenfold performance improvement from the ‘hot’



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data blocks being delivered automatically from SSD while the ‘cold’ blocks remained on hard disk. Obtaining that level of performance from spinning disks would require 260 15K RPM drives, he said.

“I’m really excited that we’re bringing storage tiering to Windows Server 2012 R2” as it makes SSD viable for a wider range of organisations, said Ben Armstrong, senior program manager lead at Microsoft. Adding a small proportion of SSDs to a collection of hard drives adds slightly to the total cost, “but the performance difference is awesome”.

Flash alone is not necessarily the answer to performance issues. Oracle has offered all-flash arrays for years, said Schaffer, as well as PCIe flash cards for servers. But thanks to Oracle’s ZFS file system, hybrid storage “is actually faster than all-flash systems”, he said, as well as being more scalable and much cheaper. This is because ZFS performs as much I/O from DRAM as possible, giving up to six times the efficiency of an all-flash array. An audit of customers’ systems found 85-90% of I/O is done from DRAM, so at this stage there is no real need for all-flash arrays, he said.

Martin said the combination of flash and very fast networks within data centres is leading to increased interest in remote DMA, the ability to transfer data between storage and a remote system’s memory without going via its CPU.

Remote DMA can provide a significant performance boost. At TechEd Australia, Armstrong demonstrated the live migration of virtual machines between servers. Changes made in Windows Server 2012 R2 reduced the time taken from 1 min 25 s to 32 s, and then the use of remote DMA-enabled hardware slashed it to just 11 seconds.

Cost-effective performance is the main reason for using flash storage, Barker suggested. It also reduces the amount of power and space required, “but that’s the icing on the cake”.

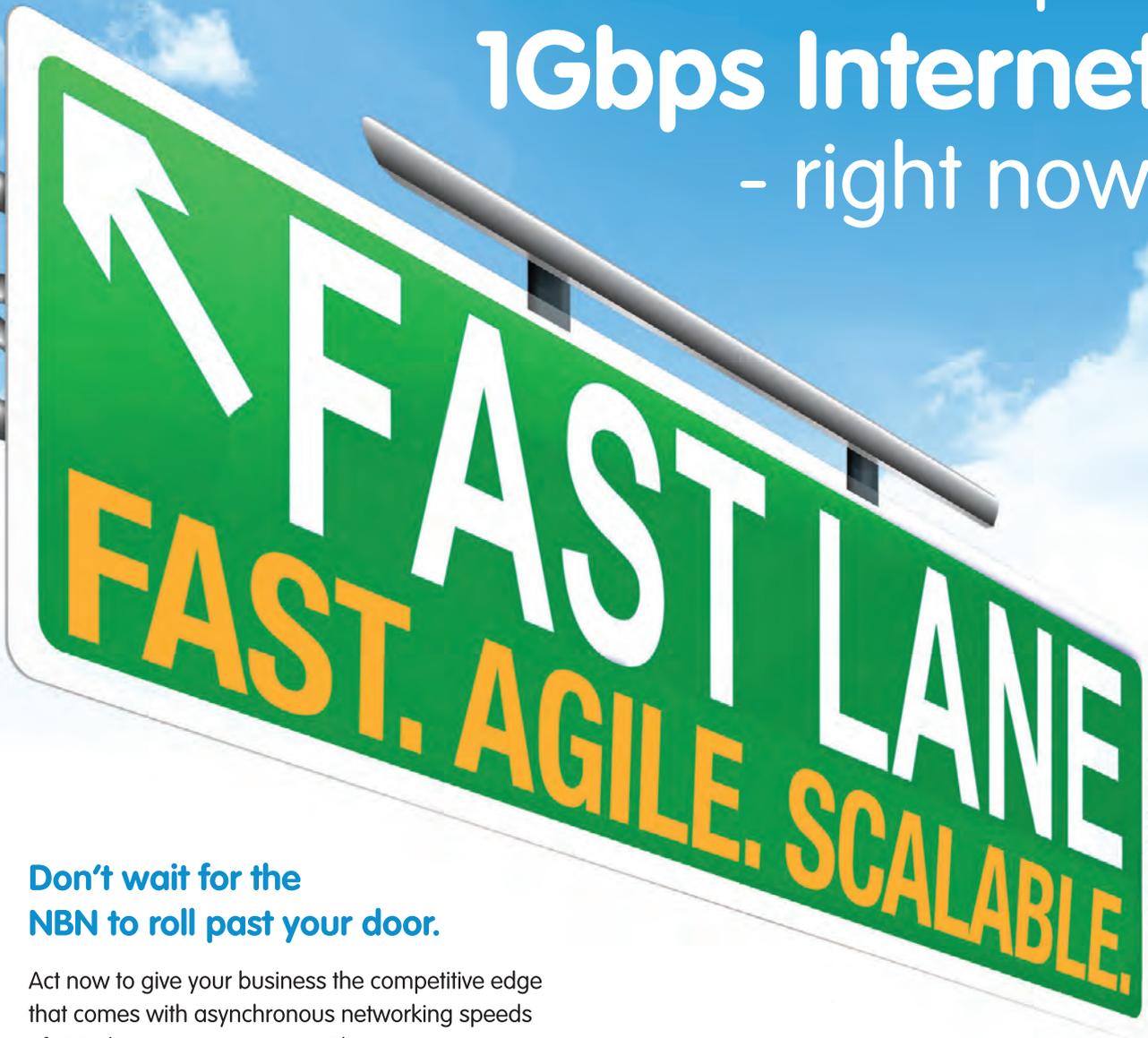
Density

Using flash instead of disk to achieve high I/O rates can save a significant amount of space in the data centre. According to McCullum, a four-node VNX 7500 system capable of delivering one million IOPS occupies approximately half a rack. Getting the same performance from 15K RPM hard drives would require several thousand drives occupying around 10 racks.

Barker gave an example of a customer that wanted to store around 10 TB of data but needed to install 60 TB of disk to get the required performance. “That made it a very expensive proposition”, he said, observing that this is an increasingly common situation. Using flash storage to deliver the required performance reduces the number of devices required and hence the amount of space occupied.

Density considerations are especially important for secondary sites, he said, as they are often located in shared data

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“Spinning disks will remain an efficient, reliable and responsive piece of the storage puzzle, as density and cost issues mean disk remains relevant.”

facilities where there is a direct relationship between cost and space.

But it is not just a case of flash improving on the density of all-disk arrays: De Luca noted that HDS uses flash cards rather than SSDs in order to pack more storage into a given volume.

Power consumption

Those multiple 15K RPM drives previously needed for performance reasons don't just take up more space, they draw more power, said McCullum. The availability of power is a constraining factor in some data centres, encouraging more organisations to turn to flash.

Barker said flash requires around one-fifth of the power consumed by hard disks under everyday workloads, so “it's becoming more commercial[ly viable]”.

Management

Storage management can be a significant part of the total cost of ownership, so you do not want to lose the savings delivered by flash storage to increased management complexity. Fortunately, that can be avoided.

IBM's SAN-attached flash storage looks like a “disk box” but runs approximately 50 times faster, can be administered via any storage management software and does not require changes to applications, said Barker.

None of HDS's all-flash competitors can match the company's virtualisation ca-

pabilities such as the ability to virtualise existing arrays, said De Luca. “We're offering the best of both worlds” - storage innovation plus a bridge that allows it to be introduced in a seamless and unified way.

EMC's FAST (fully automated storage tiering) allows organisations to combine the performance of flash with the economy of disk, said McCullum. This operates at a more granular level than traditional hierarchical storage management and is therefore “more reactive and responsive”, he said. FAST currently works at the array level, but will soon be extended across the data centre to automatically store data in the most appropriate place.

The company's XtremIO all-flash arrays take industry-standard SSDs and provide differentiation through software, said McCullum. XtremIO combines the speed of flash storage with enterprise features such as high availability, data protection, thin provisioning and real-time deduplication.

According to Schaffer, Oracle has gone further and now allows applications to manage their own storage on the grounds that they are closest to the data. Oracle Application Engineered Storage combines multiple layers of storage, automation and application-driven tuning. For example, Oracle 12c Database handles tiering and data movement at a granular level, he said. Automation is important, he said, as efficient operation cannot wait for database administrators to do their thing after every change to the system that impacts performance.

Future

The price of flash is already approaching the cost of Tier 1 disk, observed Martin, and it delivers savings in power consumption and rack space. “Most people have some idea of where they're going to put flash,” he said, and predicts that when it becomes cheap enough - not necessarily cheaper than disk - people will use it more widely.

Schaffer expects flash and DRAM to account for an increasing percentage of data centre storage. But the total amount of data will continue to grow and forthcoming 8 TB hard drives mean spinning disks will remain an efficient, reliable and responsive piece of the storage puzzle, as density and cost issues mean disk remains relevant.

Barker goes further, suggesting most primary data will be stored on flash within three to four years. “It will become tier one [storage]” and hard drives will be mostly relegated to storing archived data.

He said IBM is investing \$1 billion over the next three years to develop better application infrastructures through the use of flash storage. “It does change the whole application scenario,” he said. The industry is at or near the tipping point where costs favour flash over hard disks, and “the effect [will be] pervasive”.

Looking ahead, Martin tips phase change memory to replace flash from around 2016-2018 in situations where extreme performance is needed, though some other technology may become the front-runner as “there's so much investment in many different places”.

“It's all about solid state,” he observed, because apart from tape libraries, “disk is the last mechanical thing in the data centre”. ☹



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Providing staff with self-service business intelligence

Cosmetics Cubed, a company in the Australian and New Zealand (ANZ) beauty industry, has implemented a business intelligence solution on a Debian Linux virtual machine. Staff can now conduct self-service data analysis.

Established in 1997, Cosmetics Cubed encompasses three brands - Mecca Cosmetics, Mecca Maxima and Kit Cosmetics - with 41 stores across ANZ offering make-up, skin and hair care, bath, body and fragrance brands.

Cosmetics Cubed has experienced substantial growth across its three brands in the past few years. As a result, the company found itself using an increasing number of different software packages to capture and collate a growing pool of data from across its various business functions and operations.

into spreadsheets. This practice was not only time consuming, but also complex and error prone. As a result, many decision-makers felt unable to access the accurate data they needed, in the time frame required, to make crucial business decisions.

The company implemented a Yellowfin Business Intelligence solution, installed onto a Debian Linux VM running on a Citrix XenServer. The solution generates reports from multiple data sources including MySQL, Oracle, Microsoft SQL, Firebird SQL, Access databases, flat files and a primary in-house data warehouse built using MySQL and Pentaho ETL tools.

The solution allows Cosmetics Cubed to combine its multiple data sets together to conduct meaningful data analysis and produce actionable reports. The company can now gain faster and better insight into its business operations, while eliminating the burden of the reporting process.

“With its open architecture and flexible approach, [the solution] easily accommodated our more unique reporting requirements,” said Cosmetics Cubed IT Manager, Lloyd Shanks.

The solution allows Cosmetics Cubed decision-makers, from executives to store managers, to conduct self-service data analysis, equipping them with the knowledge to make accurate and timely decisions, and continue growing their business. Cosmetics Cubed can control data access based on department, job function and store.

Users can independently view and explore data on a dashboard interface. Decision-makers are able to keep abreast of critical business operations, from

supply chain to store metrics.

Users are able to streamline business processes by analysing, tracking and comparing metrics such as sales by product type and combination, sales by store, staff productivity, customer capture rates, customer transactional details and stock-on-hand figures.



As the number and type of data sources grew, so did the complexity of the reporting requirements and environment, as well as the time required to gather and present all the disparate data sources in a meaningful way.

The company previously relied on Excel for data analysis and reporting, dumping data from its POS and ERP systems



Capturing lightning in a bottle

You can't just throw a bunch of smart people into a room full of sticky notes, whiteboards and Nerf guns and expect that three hours later, your next big product will emerge.



Simon Raik-Allen is CTO at MYOB. An IT professional with more than 15 years of experience in the industry, Raik-Allen is well accustomed to working within innovating industries. With a background in software engineering, he cut his teeth in Silicon Valley working in a variety of companies in areas such as trading exchanges, e-commerce, business intelligence, communications, banking, and media and entertainment.

Finding that next big thing is about as hard as capturing lightning in a bottle. That's the bad news. The good news is, all you need are two things: more lightning and better bottles.

Lighting represents the spark of innovation. They are the ideas that emerge from your employees. It's how you think. It's part of the culture of your organisation. Great ideas are everywhere and can be inspired by anything. The trick is having the mindset and environment that can recognise them, and then evolve them into something special. This usually takes a process and cultural transformation to achieve.

Bottles represent your ability as an organisation to turn an idea into a product. How many times has someone in your company said, "Geez have I got a great idea!" to which someone else said, "Yeah, but we don't have that data available" or "Great, but, it will take too long to develop" or even "We don't have the skills to build that". When that idea comes and your business is not in a position to take advantage of it, then it doesn't matter how many ideas you have as you'll never get anything done.

Don't despair. I'll share some things you can do to start this journey.

Let's start with the lightning.

Requirement specifications. Big documents where you specify up front everything you want another team to build is the number one killer of ideas and innova-

tion in any IT organisation. Don't get me wrong - you absolutely need to plan and absolutely need to set your vision, and absolutely should be setting strong deadlines.

However, everyone on the team needs to be involved in the planning, thinking and reasoning so they have context, and they must be able to adapt as you learn along the way. The best ideas will come from the people in the trenches who actually try things out. The best ideas will 99% of the time be an evolution of something else. If you can't adapt, you can't evolve.

People. Don't forget you've hired the best people and are paying them good money to work with you. If you ask them not to think and only follow orders, then their value potential is going to waste. The best ideas will come from the most unexpected places.

So get rid of those old-school mega specifications tombs, specify everything in little chunks of value you can build in about a day and plan it as you go in 2- to 4-week iterations.

Boiling the ocean. Often in meetings, as soon as the excitement starts to build someone will pipe up with "Hang on ... let's not boil the ocean here" and kill the conversation. Wrong! When you are 'talking' that's absolutely the time to think big and audaciously and get everyone excited. It's exactly that kind of thinking that will lead you a new magical idea. Trust me, you are in no danger of going off and

spending years building the wrong thing just because of one meeting.

Here's what you can do to embrace it - I call it the 'diamond model'. Break every meeting into two halves. The first half is the ideas half where you just go big and wide (like moving from the bottom of a diamond to the middle). Anything and everything related is on the table.

Then, once the new ideas have petered out, you switch to narrowing the best ideas down to the pointy end of the diamond and focus on what is actually possible given the constraints. When you name the two halves it gives everyone the licence to think outside the box without anyone putting down the conversation.

"Big documents where you specify up front everything you want another team to build is the number one killer of ideas and innovation in any IT organisation."

Ok, let's switch our focus to the bottles.

Tools. Many companies heavily lock down the set of tools their employees can use to get their jobs done. Don't. Open it up. Tools guide how people think and define the scope of what is possible, so limiting them just doesn't make sense. Sure it will be harder to manage. You'll lose some control and the cost might be a little more, but that's a very small price to pay for such an amazing enabler. You don't have to go open slather, but

allowing a set of two or three tools in each category will make a big difference to the process and also to employee engagement.

The cloud. If you haven't already, adopt the cloud and put your infrastructure there. If someone has an idea and it's going to take three months to source the hardware for it to run on, the idea is dead on arrival. With cloud infrastructure you can be up and going in about two minutes. That kind of turnaround time allows a high degree of experimentation, which is the key to evolving ideas.

Automation. Automate everything. If a real person has to get involved every time someone needs to provision a system, test a product and move data around etc - where it could be automated - this is a crime against humanity. Every second you spend upfront automating everything you do, as you do it, can save hours and hours for the rest of the time. Bite the bullet early.

APIs. Finally, for everything you build, do so on an API. Having your data and your business logic available via programmatic interfaces is actually an innovation accelerator, because it opens up the richness of your internal ecosystem. And this is exponential: the more that is open, the more possibilities there are to combine things from different parts of the organisation. Adopt an API-first policy.

There you have it. Put these seven easy concepts in place and I guarantee your organisation will generate more ideas and be able to put more of them into practice. ☺



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The rise of enterprise mobility

Enterprise mobility is starting to take centre stage in many organisations and is clearly on the minds of IT managers and CIOs. The proliferation of mobile devices and the consumerisation of IT are significantly changing the IT infrastructure of many businesses. We are all now familiar with acronyms such as BYOD (bring your own device) or CYOD (choose your own device). However, enterprise mobility is far greater than just management of mobile devices. Many other aspects also need to be considered, including managing the applications and security.

IT departments can often no longer dictate what devices their employees use, and many business units within organisations are starting to make their own decisions as to what is relevant for their day-to-day usage. Consequently, organisations must balance the expectations of employees in pursuing an enterprise mobility strategy

while at the same time putting in place adequate governance and security policies.

Heterogeneous mobile environments

The Android OS is clearly starting to become dominant and in several overseas markets has now surpassed the Apple iOS platform in usage. In Australia, both the Android and the iOS platforms are widely across organisations. Blackberry is still the preferred OS in verticals such as government. However, even employees in the government sector are increasingly choosing the more popular iOS and Android platforms for their mobile devices.

In addition, Microsoft has the necessary elements in terms of applications, mobile OS and devices to succeed in the mobility space. For instance, its ability to integrate mobility with its core applications such SharePoint, Office, Outlook, Lync and Skype gives it a major advantage. Micro-

soft is also starting to make inroads in the cloud space, which will also influence the enterprise mobility strategy in many organisations.

According to a Frost & Sullivan survey of 227 IT decision-makers, over 20% of companies in Australia believe that Microsoft Windows will be the preferred mobile operating platform in the next 12-18 months (see Figure 1).

Corporate app stores

Mobile apps have changed the way employees consume applications and have transformed the way both consumers and employees use mobile devices. They have also driven the adoption of smartphones and tablets to the point where they have now become mainstream devices in both the consumer and business environments. Much of this growth has been driven by the app store concept, with the Apple App Store and Google Play being the two main stores. Both stores use a user-friendly interface to make it simple to find and download any app.

Six to seven years ago, whenever employees needed to download and install an application on a PC or laptop, assistance was needed from the IT department. Apps can now be directly downloaded from app stores without any assistance from the IT department. File-sharing applications such as DropBox are already very popular among employees within organisations.

This open environment creates potentially serious repercussions for the IT manager

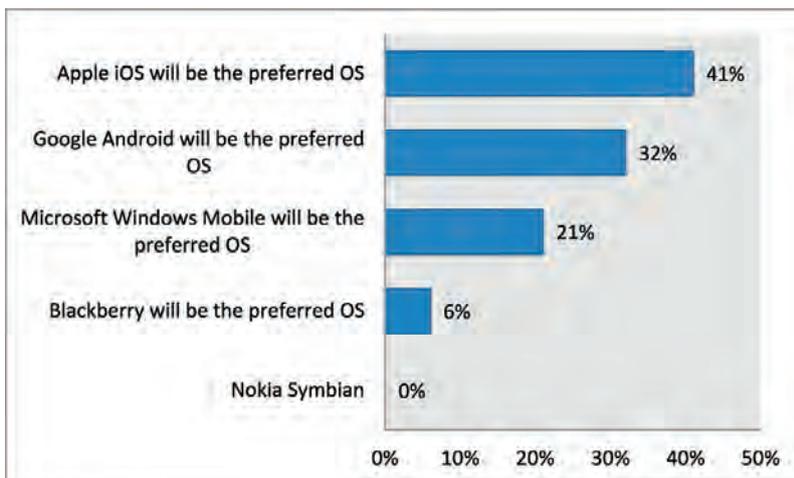


Figure 1: How companies see employee adoption of mobile operating systems changing in next 12-18 months.

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as information and processes can be accessed without the knowledge of the IT department and often falls outside their control. The usage of DropBox, for example, has soared within businesses. Work-related material as well as personal material can be stored on it. Managing such storage facilities will be a major challenge for IT managers.

There are hundreds of other work-related applications, widely used on a day-to-day basis by employees without knowledge of the IT department. OTT (over-the-top) applications are starting to be used widely. For example, in recent months, WhatsApp has seen very strong uptake within the business world, enabling a simple and effective means of communication between employees and external stakeholders.

Attaching corporate data and files to such applications could have serious issues if not monitored closely. Security is the biggest issue and with a more heterogeneous OS environment there are fears about security attacks. Hence, developing an end-to-end security monitoring platform will be critical.

Several IT managers interviewed by Frost & Sullivan have indicated that developing a corporate app store could potentially solve some of these problems. Having an in-house developed app store offers the IT team greater control and security. However, unless these apps have functionality on par with apps in the consumer space, in particular their ease of use, they will soon become redundant

and lead to employees using apps outside such a corporate store.

In addition, building a corporate app store can be very costly and many companies looking to do this will need to consider whether it is better to build one internally or outsource to a third party. Systems integrators, telecom providers and even several consulting firms are starting to become active in this market segment by offering these apps to organisations via a hosted or cloud-based model.

Conclusion

BYOD and CYOD are fast moving into BYOA (bring your own application) and are growing at a rapid rate to become one of the biggest challenges for IT managers or CIOs. While many organisations have chosen to ignore this trend, the growth in use of mobile devices, combined with employees deciding what devices and apps are most suited for their usage, will cause these organisations to re-evaluate their strategy.

The opportunities are also immense in the wider enterprise mobility market segment, which is still in its early stages of growth. Service providers and vendors that can build an end-to-end ecosystem to address these challenges will be well placed to thrive in this market. The opportunities are endless and include areas such as MDM (mobile device management), MAM (mobile application management), network security, access security, device security, fleet management, TEM (telecom expense management), service management and maintenance management. ☺

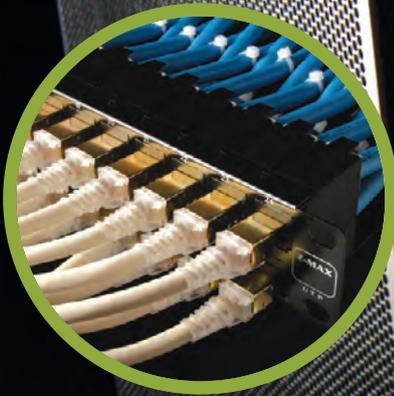


Audrey William is a research director at Frost & Sullivan's Australian and New Zealand ICT Practice. She spearheads research and consulting initiatives in the enterprise communications and collaboration space. Her areas of expertise include unified communications, telephony, conferencing and collaboration, digital signage, contact centres, enterprise cloud-based applications and social media.



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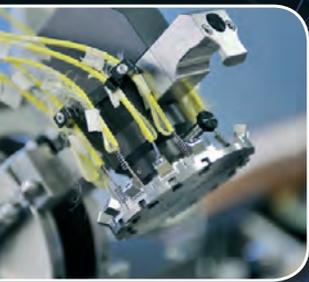
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FROM THE FRONTLINE



What is the reality of cloud?

Andrew Collins

The cloud is probably the most hyped concept in IT right now, and also the one greeted with the most cynicism by wary IT pros. We spoke to four IT leaders to get their honest thoughts on three aspects of the cloud: the OPEX/CAPEX argument, end-user adoption of cloud tools and potential government surveillance of cloud data.





Is cloud really about OPEX vs CAPEX ROI models?

Cloud services typically allow organisations to move what would have been a capital expenditure (CAPEX) to operating expenditure (OPEX). Instead of forking out a big chunk of cash for equipment up front, organisations can instead pay another company a regular stipend to take care of whatever that equipment would have done.

This is one of the defining qualities of the cloud - in fact, cloud providers frequently talk about CAPEX models of ROI when spruiking their wares.

For Panazzolo, whose company SA Power is using services from cloud provider Accellion, this focus on OPEX was not a benefit when justifying a move to the cloud - if anything, it had the potential to be detrimental. This is because of the way the electricity regulator has structured the business environment.

“The way the regulator drives the utilities business, it’s traditionally been very CAPEX-focused. CAPEX is normally seen as a good thing, and OPEX not so much,” which makes cloud “a harder argument” for Panazzolo’s team to make, he said.

However, business requirements often override this factor. “The financial model doesn’t obviate the need for the business to have the capability that it requires. So we work around that. But it’s not so much that ROI driver for us, because of the way our market is regulated.”

Now, this favouring of CAPEX over OPEX is factor specific to the utilities industry and definitely won’t apply to everyone. However, Panazzolo’s experience highlights that the purported benefits of a technology - in this case, the OPEX focus of cloud - aren’t always as they appear.

A start-up formed in early 2013, SwipeAds chose to go with the cloud for many of its business functions from the get go - for both functional and expenditure reasons.

“It’s in our blood. As developers, in our other projects and in our own habits, we switched to cloud-based solutions a long time ago. So when we did start up, it made sense to use that as much as possible, just knowing we’d always be on the move - it just makes it a lot easier,” Ford said.

SwipeAds is hosting its Funccaptcha service on Ninefold and also employs various cloud services like Dropbox, SugarSync, Google Docs and GitHub.

“It also really makes it a lot cheaper. That’s really great when you’re a start-up - you want to save all the money you possibly can. That’s just the way the financials work. You don’t want to spend excess money at the beginning.

“Even \$100 - if we spend \$100 on a solution now, instead of keeping in equity, we’re giving up \$1000 or \$10,000 down the track,” he said.



How have users coped with your move to the cloud?

Across all technologies, one of the biggest challenges IT managers face is changing or managing users’ behaviour. According to several of our panellists, the cloud is no exception. Wishart, whose company Service Stream is using cloud-based ServiceNow for ITSM and other functions, describes user adoption as one of the bigger problems facing cloud.

“The biggest challenge you always face - the one that you’re most concerned about - is user adoption. Are people going to be able to transition to this? The problem is somewhat far-reaching. Now that they’ve got this new iPad device, are they really going to do work on it or use it for other things?”

OUR PANEL



Dr Wissam Raffoul,
Advisor, IBRS



Adrian Panazzolo,
Enterprise Architect,
SA Power Networks



Craig Wishart,
CIO, Service Stream



Matthew Ford,
co-founder, SwipeAds



Wishart said these concerns drive a need for mobile device management (MDM), something his team is now investigating.

“If you buy [cloud] ... then be prepared that it will highlight significant gaps elsewhere in your frameworks, and one of them in our example is MDM.”

Panazzolo said his team was able to avoid most of these user adoption problems by deploying the technology to users when it was deemed helpful, on a case-by-case basis, rather than pushing it onto the entire user base all at once.

“A lot of the time a company will buy a really nice technology and they just let it loose and leave people to decide how they might make use of it,” a technique that will generally result in lower user acceptance, Panazzolo said.

“What we’ve done is deployed it out to users as they have a use case where that technology suits. Someone’s got a problem that they’re trying to get a solution to, and if you go there with something that solves that problem for them, they tend to be happy that you’ve given them something that actually get them out of a bind.”

By following this strategy, Panazzolo said he’s had a “generally positive” experience with user adoption.

Have recent leaks about governments spying on internet traffic changed your use of cloud?

Lawyers, academics and cloud providers are still arguing about how real an issue data sovereignty is (you can guess who says it doesn’t matter), but the recent

leaks from Edward Snowden about the NSA’s ability to spy on internet traffic have caused many to again question the security of cloud services.

Dr Raffoul said that the main reservations about the cloud have so far been around security, particularly regarding the unknown location of data stored in the public cloud, and customers having little capacity in their contracts to dictate the security practices of public cloud providers.

Recent leaks will make people more concerned about cloud security, he said.

Dr Raffoul pointed out that “there’s always a way to break security from the technology perspective”, but he said organisations can limit this possibility by including certain terms in their contract with their service provider that, if broken, would open the provider up to legal consequences.

Specifically, he said you should:

1. Get your service provider to adhere to your organisation’s security policy;
2. Demand the capability to track how the provider is handling your security; and
3. Dictate to the provider the country in which your data is located.

Wishart said the company hasn’t had to face data sovereignty as yet, and the Snowden leaks haven’t bothered him because he’d already covered his company’s backside.

He said that “legislation is king” and that when he considers a potential provider, he’ll present information on them - like their encryption, security

protocols, data centre locations and so on - to the lawyers.

“Then I ask the lawyers: does it pass? If the lawyers say you’ll be in breach of the legislation, I’ll say okay, we’re not doing it. Taking a risk is just silly.”

Ford was the only panellist who voiced significant concern about the leaks - but not as a business operator.

This is because SwipeAds doesn’t keep sensitive information on customers using the Funcaptcha service on its websites - just basic information like email address, SwipeAds account password and website domain.

But personally, he said, “I think it should concern everybody, because I think that the internet should be a big public good, and it should have the confidence of its public, and part of that confidence is knowing that what you think is private actually stays private. So as an internet citizen, of course I’m concerned.

“Companies want to be confident that [providers] can keep trade secrets. It’s not just the government - it’s also espionage.

“If you can’t trust encryption, or if encryption has been broken with back doors, it just makes espionage that much easier. Espionage from other countries and other companies I think is also a very real threat.

“I think that’s more relevant to us as a start-up. We’d be concerned that if there’s some government somewhere that says ‘We really like this technology but we don’t want to buy or license it - let’s just go ahead and steal it’, are they able to get into our GitHub, our Dropbox? Are they able to get into our stuff to be able to use it themselves?” ☹



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TECHNICALLY SPEAKING

The [big] data revolution

What businesses need to do today
to prepare for tomorrow

*Alan Perkins**

It is no accident that we have recently seen a surge in the amount of interest in big data. Businesses are faced with unprecedented opportunities to understand their customers, achieve efficiencies and predict future trends thanks to the convergence of a number of technologies.

Businesses need to take every opportunity to store everything they can. Lost data represents lost opportunities to understand customer behaviour and interests, drivers for efficiency and industry trends.

A perfect storm

Data storage costs have fallen dramatically. For instance, in 1956 IBM released the first hard disk drive, the RAMAC 305. It allowed the user to store five megabytes of data at a cost of \$50,000 - that's around

\$435,000 in today's dollars. In comparison, a four-terabyte drive today can fit in your hand and costs around \$180. If you were to build the four-terabyte drive using 1956 technology, it would cost \$350 billion and would take up a floor area of 1600 km². Also, 10-megabyte personal hard drives were advertised circa 1981 for \$3398 - that's \$11,000 today, or \$4.4 billion for four terabytes.

Gordon Moore's prediction in 1965 that processing capacity doubles approximately



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every two years has proved astoundingly accurate. Yet the amount of data we can generate has far outstripped even this exponential growth rate. Data capture has evolved from requiring specialised engineers, then specialised clerical staff, to the point where the interactive web allowed people to capture their own data. While this was a revolutionary step forward in the amount of data we had at our disposal, it pales before the most recent step: the 'Internet of Things', which has opened the door for machines to automatically capture huge amounts of data, resulting in a veritable explosion of data, way outstripping Moore's Law. The result: the data load became too much for our computers, so we simply threw a lot away or stopped looking for new data to store.

With the price of storage decreasing sharply, the economies of storage have meant we can afford to capture more data:

it has become increasingly important to find new ways to process all the data being stored at the petabyte scale. A number of technologies have emerged to do this.

Pets versus cattle

Traditionally computer servers were all-important - they were treated like pets. Each server was named and maintained with great attention to ensure that everything was performing as expected. After all, when a server failed, bad things would happen. Under the new model, servers are more like cattle: they are expendable, easily replaced. Parallel processing technologies have superseded monolithic approaches and allow us to take advantage of using many low-cost machines rather than increasingly more powerful central servers.

Hadoop is one project that has emerged to handle very large data sets using the cattle approach. Hadoop uses a 'divide

and conquer' approach, which enables extremely large workloads to be distributed across multiple computers, with the results brought back together for aggregation once each intermediate step has been performed. To illustrate Hadoop: imagine having a deck of cards and someone asks you to locate the Jack of Diamonds. Under a traditional approach you have to search through the cards until you locate the card. With Hadoop, you can effectively give one card each to 52 people, or four cards each to 13 people, and ask who has the Jack of Diamonds. Much faster and much simpler when complex processes can be broken into manageable steps.

NoSQL, which was intended to mean "not only SQL", is a collection of database technologies designed to handle large volumes of data - typically with less structure required than in a typical relational database like SQL Server or MySQL. Databases like this are designed to scale out to multiple machines, whereas traditional relational databases are more suited to scaling up on single bigger servers. NoSQL databases can handle semi-structured data; for example, if you need to capture multiple values of one type or obscure values for one person. In a traditional database, the structure of the database is typically more rigid. NoSQL databases are great for handling large workloads but they are typically not designed to handle atomic transactions: relational SQL databases are better designed for workloads where you have to guarantee that all changes are made to the database at the same time, or no changes are made.

Network science

Network science studies the way relationships between nodes develop and behave in complex networks. Network concepts apply in many scenarios; examples include computer networks, telecommunications networks, airports or social networks.

“UPS was able to save almost 32 million litres of fuel and shave 147 million km off the distance its trucks travelled in 2011 by placing sensors throughout the trucks.”

Given a randomly growing network, some nodes emerge as the most significant and, like gravity, continue to attract additional connections from new nodes. For example, some airports develop into significant hubs while others are left behind. As an airport grows, with more connections and flights, there are increasingly compelling reasons why new airlines will decide to fly to that airport. Likewise, in social networks, some people are far more influential either due to the number of associations they develop or because of the effectiveness of their communication skills or powers of persuasion.

Big data can help us to identify the important nodes in any contextual network. Games console companies have identified the most popular children in the playground and given them a free console on the basis that they will have a lot of influence over their friends. Epidemiologists can identify significant factors in the spread of diseases by looking at the significant nodes and then take steps to prevent further contamination or plan for contagion. Similarly, marketers can use the same approaches to figure out what is more likely to ‘go viral’.

Benefits

Big data assists businesses to gain a better understanding of customers, treating each customer as an individual - the so-called marketing segment of one. Understanding what moves customers can build strong brand loyalty and evoke an emotional response that can be very powerful. Imagine an airline that recognises that a particular passenger travels

from A to B every Monday to Thursday. However, if that passenger plans to stay in B for two weeks, imagine how much loyalty could be generated by offering them a free flight over the weekend to C, a discounted flight for their spouse from A to C, and a discounted hire car and room for the weekend away together.

Digital body language and buying habits can lead online retailers to be able to make astute decisions about what product to offer customers. Target was able to identify pregnant customers very early by their shopping patterns: customers buying certain combinations of cosmetics, magazines, clothes would go on to buy certain maternity products months later.

Big data can be used to drive efficiencies in a business. The freight company UPS, for example, was able to save almost 32 million litres of fuel and shave 147 million km off the distance its trucks travelled in 2011 by placing sensors throughout the trucks. As a side benefit, they learned that the short battery life of their trucks was due to the drivers leaving the headlights on.

By analysing customer relationships, T-Mobile was able to mitigate the risk of a domino effect when one customer decided to leave its service. It did this by identifying the customers who were most closely related digitally to the person churning and making a very attractive offer to those people, preventing the churn from spreading. Further, by analysing people’s billing, call dropout rates and public comments, they were

able to act in advance to reduce churn by 50% in a quarter.

CERN conducts physics experiments at the Large Hadron Collider involving sending 3.5 trillion electron volts in each direction around an underground ring, resulting in particle collisions that provide an understanding of the basic building blocks of matter. The Higgs-Boson was proven by analysing the data that was generated in smashing the particles together. 15,000 servers are used to analyse the one petabyte of data that is generated per second and 20 gigabytes is actually stored. This is orchestrated using cloud techniques built on OpenStack and designed and supported by Rackspace.

Conclusion

We have reached a point where it is now better to start storing everything today so that we have a business case for analytical tools tomorrow. Once we start getting used to the idea that everything is available to us, we will find new ways to think about how we leverage our information. The businesses that succeed in the future will be those that constantly look for ways to mine the information they have gleaned. ☺



**Alan Perkins is Chief Technology Officer, Asia Pacific at Rackspace. Prior to joining Rackspace, Perkins spent more than 10 years at Altium, including seven years as CIO. Perkins was named by The Australian as one of the Top 20 people to watch in technology 2012, and in 2009 won an Enterprise Innovation Award for Cloud Innovation from IDC.*

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OFFICE 365 REVIVES THE Y2K FRENZY

Matt Ramsay, Regional Director Asia Pacific for Centrify Corporation

Cloud infrastructure, we are told, offers ubiquitous and compelling advantages. It is forcing everybody to re-evaluate their infrastructure and reconsider the cost-benefit trade-offs. Almost any piece of IT can be 'cloudified' it is said, so everything is under scrutiny.

The last time we saw this sort of fierce frenzy was for Y2K remediation in the run-up to the Year 2000.

Avoiding the cloud totally is impractical. In some cases, the best tool for the job simply is not available 'on premise', such as Salesforce. Other services inherently belong in the cloud, such as Webex.

With promises of efficiency and lower IT headcounts, finding money for cloud projects seems to be easy. Consequently many enterprises have handed over a great deal of very important data to cloud applications. Vertical apps for sales and customer-facing staff are frequently deployed – at times without IT involvement – because it is so easy to do.

The “800-pound gorilla” of cloud applications, Microsoft Office 365, is now well on its way to building a customer base, with significant deployment numbers, including in Australia.

Few pieces of IT infrastructure touch more staff, process more sensitive data and are more critical to overall business operations than email. With the advent of Office 365, that is all heading for the cloud.

As I've travelled around Asia during the past six months, it has come as little surprise that many CIOs and senior IT managers have expressed concern over security, control, reliability and compliance as roadblocks

on their path to cloud adoption. They are also trying to determine how to tackle the problems that are being handed to them by those unauthorised cloud installations: “Now it's business critical, we just need to find a way to make it work ...”

On the 'pro' side, cloud can deliver economies of scale. Multiple tenant architectures leverage expensive hardware. Purchasing and managing many servers is more efficient than managing just a few. Not just the hardware, but air con, electricity, communications and security etc can be bought in bulk.

The costs of sophisticated management tools are amortised across many clients, improving reliability and reducing staff and thus costs further. The largely homogeneous nature of the infrastructure further contributes to reliability – with many 'beating' on it, faults should show up fairly quickly.

On average, the solution should be rolled out more professionally too – after all, these folks do nothing else all day.

Cloud infrastructure is quick to deploy as it's usually automated, which is cheaper and faster. It has no accessibility issues. As these solutions tend to be deployed with the open Internet in mind, allowing access from any device at any location any time, there's no DMZ, firewall or VPN to worry about.

Cloud solutions have built-in fault tolerance, of course, along with backups and disaster recovery sites.

It rather sounds as if this cloud business has solved all of the world's problems – so what's not to like?



One point on the converse side is that not all cloud operators are created equal.

Cloud solutions need much more robustness than local ones, due to cascading faults. Robustness prevents one small rogue app/server dragging everybody else down with it. It is a good idea to make sure your cloud provider is certified and audited regularly for what they are supposed to do – lest they cut corners to chase the mighty dollar. A good starting point for certifications is SSAE16 SOC2.

Don't just assume your cloud provider actually delivers disaster recovery, high availability and backups – check it! Thoroughly! After all, it is your data and business-critical application – and that's the important bit.

Or maybe it isn't your data? What data sovereignty rules govern your cloud provider? Can you get your data back if you want to switch providers? As usual, leaving a relationship often turns out to be much harder than entering one.

What about data security? Who has access to your data? Is your cloud provider (legally?) collaborating with security agencies – or perhaps required by law, such as the US Patriot Act – to hand over your bits?

Where is this cloud? Is it in your country? Does your country have privacy rules about where you can store citizens' information?

What assurances can your cloud provider give that they will not ship your data off to some foreign country that it's not allowed to go to in the name of fault-tolerance and disaster recovery?

Has the new cloud application introduced yet another identity store that proliferates the username/password explosion, which can lead to sharing and writing down credentials?

And how do you reliably de-provision those users? Are the people who flash their plastic to get a cloud service for an employee taking proper care of it? Were they trained for that? Almost certainly not.

Who can you trust to provide you with identity solutions that link your usual Identity store – Active Directory – to the cloud apps you need, so a single click can provision – and more importantly de-provision – a user?

You also need to consider continuity contingencies in case your cloud provider goes out of business.

These are not trivial considerations – they all cost money.

At the top of the list is identity management, along with the associated provisioning processes and procedures. This is followed closely by support and help desk considerations.

We also need to consider the cloud in terms of BYOD, as this is not going away and is an opportunity for businesses to more cost-effectively manage their employees' access to enterprise data. After all, a central promise of cloud is ubiquitous access – but it's a double-edged sword, because it introduces the risk of lost devices and potential data leaks that somehow need to be managed.

The Office 365 case is special. By default, it requires ADFS (Active Directory Federation Services) infrastructure, which is billed as 'free' – except for the half dozen servers, the frenzy of firewall rules and resulting configuration nightmare. ADFS is also restricted to authenticating just a few apps. Ironically, this cloud application requires a whole host of local infrastructure to take full advantage of it.

There are, however, Microsoft-approved Federation Services providers that do not require local infrastructure and can deal with thousands of web, SAML and mobile applications from an identity management perspective. So it pays to shop around – although that adds yet another hidden cost.

So, migrating to the cloud, just like Y2K, does consume a lot of resources. However, once the tedious work of identifying appropriate cloud applications and safely hosting them on appropriate cloud infrastructure is done, your world does become a better place.

As a result of this process, you now have a federated identity infrastructure that ties your Active Directory to many local and cloud applications – perhaps even to mobile phone apps.

This was something most IT departments probably dreamt of doing, but could never find the budget. That means, if you get it as a side effect of a cloud project, you are laughing all the way to the bank.

Matt Ramsay is Asia-Pacific Regional Director for Centrify, a leader in Unified Identity Services across data centre, cloud and mobile.



750% more pages per toner after print overhaul

ComfortDelgro and Cabcharge (CDC) has replaced its old printer fleet with new print devices and technologies. The company is saving 40% on its total monthly cost per copy fee and getting 15,000 pages per toner, compared to the 2000 of the previous system - an increase of 750%.

CDC operates the Hillsbus, Westbus, Deane's Buslines and Hunter Valley buses services.

The company recently decided to evaluate its print requirements and replace its existing fleet with the latest print devices and technologies, as they were nearing obsolescence and were too costly to run and maintain.

CDC had many different models across 15 separate locations which were proving difficult to manage. In addition, the

company did not have the right mix of equipment to meet its needs - numerous devices were rarely utilised, in particular the company's costly A3 devices.

CDC's main objective was to reduce the total cost of ownership (TCO) of its equipment, as well as gaining better control of their document devices.

After a six-month evaluation process, Kyocera was selected from a shortlist of six vendors to provide a managed print solution for CDC across its 15 sites in NSW.

Kyocera conducted an audit of CDC's document equipment and its usage, identifying that CDC had a large number of A3 devices yet A3 printing was not actually required by many users. The results of this audit enabled Kyocera to propose a solution that would both meet the organisation's needs and be cost-effective.

The solution simplified operations for CDC, taking it from a 15-site company with 13 different printer and copier models to a standardised platform with one model A4 mono MFP and an A3 colour MFD - the TASKalfa colour series - for use in the larger depots that had a greater need for A3 printing, higher volume output and document finishing features such as hole punching and stapling.

Kyocera's web-based admin platform allows management of the MFDs and printers, providing a summary of all devices, alerting CDC to when toner or paper needs replacing and producing a simple usage report at the end of each month.

The solution "eliminated the need for us to do manual meter reading," said John Mouawad, information technology manager, CDC. "This had been taking up an enormous amount of our time, calling each site and getting a reading for each individual machine. Now we just get emailed a monthly report showing our usage and get billed accordingly."

The Managed Print Services (MPS) solution provides the same cost per copy charge (CPC) across all devices, regardless of whether printing on the smaller A4 MFP or printing to their workgroup MFD, decreasing costs significantly.

CDC is now achieving a toner yield of around 15,000 pages per toner compared to 2000 pages with their previous vendor.

"We have saved 40% on our total monthly cost per copy fee. We've simplified the fleet, have more reliable technology and it's costing us less to run," Mouawad said.



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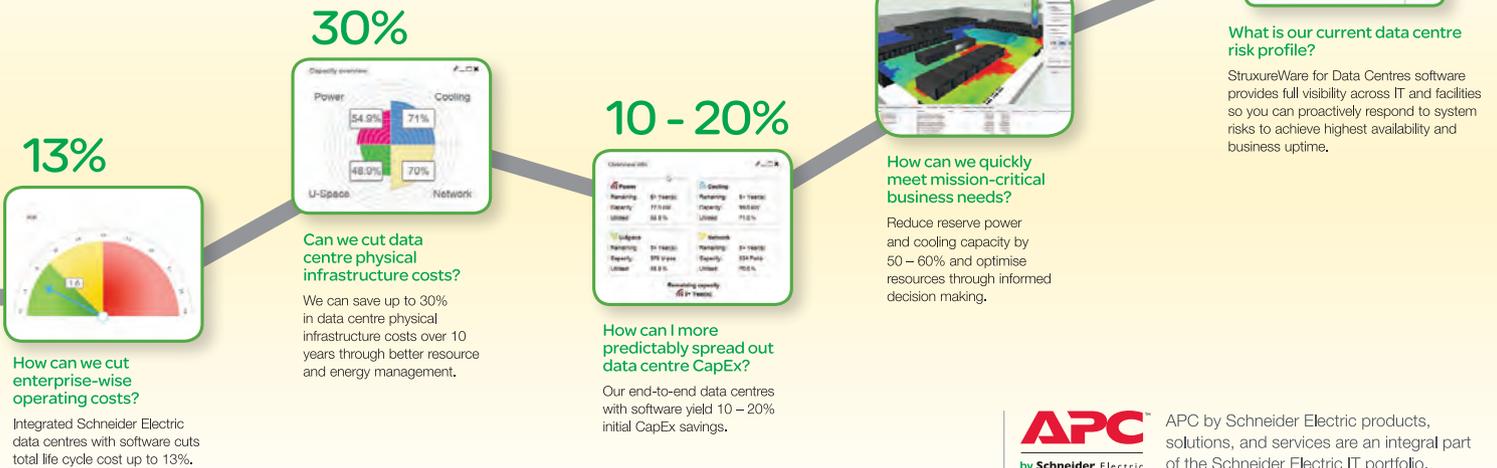
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The light at the end of the fibre

With the federal election now past, the opportunity for the incoming Coalition government to deliver on its plans for growing the economy and make real traction requires strong leadership, efficient and effective collaboration and decisive action within the first six months of government.



Peter Lee, Chief Executive Officer, Internet Industry Association (IIA)

IIA

For an industry that has been in a recent state of hiatus, particularly in infrastructure investment, there is still plenty of light at the end of the tunnel (or the fibre) to reinvigorate the industry and stimulate new and sustainable growth in our economy.

Hidden under the guise of the 'services sector' in our national ABS data, which represents approximately 70% of Australia's GDP and employs upwards of 80% of the Australian workforce, is the information and communications technology (ICT) and telecommunications sector. Depending on the source data and criteria used, the ICT/telco sector alone is said to contribute between 4 and 8% of total GDP and employs between 290,000 and 550,000 people.

However, it is not just the ICT/telco sector in which we need to stimulate investment opportunities and growth, but it is this sector that provides the underlying platforms for delivering innovative products and services to other sectors of our economy. The services sector as a whole is not only reliant on the innovative products and services delivered by the ICT/telco sector but also on government providing the supporting framework that allows Australian businesses and consumers to take full advantage of technology evolution if we are to become a truly competitive and sustainable economy.

The Coalition government's commitment to support investment in ICT skills, use technology more effectively in the public sector and encourage innovation and research will all be key factors in lifting our productivity and economic competitiveness.

The term 'digital economy' is used widely and often in today's digital age, but it is the Australian economy as a whole and our ability to compete effectively in a global economy that remains the underlying and fundamental challenge.

With approximately 20% of recent GDP growth in advanced economies being attributed to internet and digital technologies, the government needs to play a leadership role to encourage adoption, use and ongoing innovation in order for all Australians to leverage the real benefits of technology.

A cultural change is also needed to address the risk-averse nature of investment in Australia if we are to encourage future investment and growth in the technology sector that allows Australian start-ups to compete effectively with their international counterparts. This requires accelerating the creation of an environment promoting investment in the local high-tech industry via tax incentives for local R&D and technology investment, government supported co-investment programs, alternative equity funding schemes and support for Australia's nascent industry of technology start-ups and high-tech incubators.

If there is a single theme to the transformation of the Australian economy flowing from digitisation and the internet, it is trade exposure across all industry sectors. The Department of Foreign Affairs and Trade (DFAT) has acknowledged that the services sector plays an increasingly important role in our international trade, with services exports growing by an average of 4% per annum between 2006 and 2011. According to DFAT, in 2011 total trade in services

accounted for 17.9% of Australia's total trade in goods and services, and services exports accounted for 16% of Australia's total exports.

The Internet Industry Association (IIA) agrees with DFAT in that an efficient services sector is critical to Australia's trade and economic growth. It is also well recognised globally that the businesses and industry sectors with the highest levels of productivity tend to be those who are early adopters of technology and have the skills and innovative resources to fully recognise the benefits. As such, the relative importance of the services sector in Australia embracing technology evolution cannot be underestimated.

The Australian economy is also highly dependent on the safety and security of the internet. This means that the stakeholders, in securing the internet, extend to a diverse range of interest groups including service

providers, government and consumers. The IIA supports a framework that will ensure Australia's infrastructure security is strong and effective but operating with due process and a high degree of accountability and transparency in order to build business and consumer confidence in the security of online information.

In what has been historically recognised as a highly regulated sector, we now need a regulatory framework suited to a more digitalised economy. Existing regulatory settings across the economy are under pressure, such as the taxation system as it operates in relation to imported goods and services supplied online from offshore, the regulatory framework governing Australian media, our copyright laws, the regulation of gambling and the content classification system.

More than ever the rules imposed on Australian businesses can determine whether new, more efficient businesses are allowed

to grow and whether global businesses base themselves in Australia or choose to supply into Australia from overseas. Updating outdated legislation and providing more appropriate levels of regulation is vital to making the Australian economy more competitive.

Underpinning the need to stimulate investment opportunities and growth across all sectors of the Australian economy is government investing proportionally in our national infrastructure, such as the National Broadband Network (NBN), that supports innovation, new digital technologies, meets market demand and provides for increased productivity and growth.

Whether the NBN itself is fibre to the premises (FTTP), fibre to the node (FTTN) or a mix of optimal technologies, there still remains light at the end of the tunnel (fibre) for the Australian economy and we all have a role to play to keep it burning bright. ☺

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Coalition's ICT plans promising - if they can deliver

Dylan Bushell-Embling

The Australian ICT community is closely watching the new Coalition government to determine what impact the change of guard will have on the sector, as well as on government usage of ICT.

The consensus among analysts interviewed for this report appears to be that the Coalition is putting out the right messages on ICT, but that it's early days yet and these messages will need to be backed up with substantive policies.

Ovum's research director for Asia-Pacific IT, Kevin Noonan, said the immediate technology-related challenges the new government will face revolve around "the ministerial line-up and the break-up of agencies, and then the Commission of Audit that the Coalition has promised". He said the real challenge for the ministerial line-up is who's going to be responsible for ICT. Traditionally, the finance ministry has taken responsibility, but it could be shifted to the communications portfolio. In the Coalition's pre-election policy document, it was recommended that the Department of Prime Minister and Cabinet take on the role. "Either way, I think the industry would be very happy, so long as there's somebody there who has a pragmatic understanding of ICT," Noonan said.

Next, reshaping government agencies will likely require modifications to current IT contracts and will result in changes to the working of departments," he added. "Administrative changes [generally spell] good news for IT, because there's usually a great deal of IT work to be done." Ian Bertram, Asia-Pacific head of research for Gartner, said the incoming government will place a major emphasis on improving productivity through technology.

"This government wants to be agile ...wants to be a 21st-century government, and to be a 21st-century government they're going to have to use the technology that's available to them. So that indicates that there's going to be a continued investment in technology, but not just for the sake of technology. As you start to read a lot of the [policy] documents, it's about productivity."

Making meaningful changes to processes like government procurement of ICT products may prove tricky, as it will require new legislation. But the stated intentions and aspirations of the new government bode well for the Australian ICT sector, Bertram said. "There's going to be a lot of opportunity, let's put it that way."

Emilie Ditton, IDC Australia's research manager, said it may take some time for the change of government to have a meaningful impact on Australian ICT. "I think the likelihood is that they'll be so focused on other promises that they've made for at least the first two years in government that it's unlikely that they'll do anything really substantial around ICT policy until at least the end of this term," she said.

In terms of government procurement and usage of ICT, policy documents indicate that the government's initial priority will be understanding how things stand and where the opportunities to save are, she said. "I think that kind of watch and wait approach is the most likely one at this stage." The Coalition's pre-election ICT policy document places a heavy emphasis on cloud computing, including a goal of moving all light government users of IT onto the cloud where possible. But analysts differ on whether this will make a meaningful impact on cloud adoption in the public sector.

"Certainly they intend to deploy cloud, but other governments have made those announcements too, and the deployment of cloud in government is still fairly slow in Australia," Ditton said. "It's all well and good to have a high-level policy, but that's quite different to actually put it in place across government."

Noonan by contrast believes that the Coalition's cloud policy has the potential to translate to a more meaningful impact on cloud adoption than Labor's cloud strategy.

"The requirement for cloud is something that now has bipartisan agreement. [But] one of the big differences I see is the Coalition sees cloud not only as something that will add productivity to government, but will also use the government's buying power to build a cloud capability within the country."

The Coalition's approach is also likely to spur public sector cloud adoption specifically, he said, "The Coalition government has signalled that it's not going to put up with excuses for not taking up cloud. This means that government CIOs will not only need to consider the cloud as the current policies did, but they'll need to seriously consider the cloud."

The pre-election policies also include a section on e-government. The Coalition has set some specific goals, including making the internet the default way of engaging with government for every frequent interaction - defined as any that take place more than 50,000 times a year - by 2017. Noonan said that with the internet and mobile devices becoming so ubiquitous across Australia, this kind of upheaval is inevitable. "The government's policy of moving transactions online is not really something where we have any choice. We have to do this, simply because the community will demand it."

But Ditton feels that this and the Coalition's other e-government and digital economy pledges oversimplify the difficulty of actually enacting such changes.

"I think absolutely that's the right objective to have, the [2017] target is a really good, well-defined target. Whether or not it can be delivered really remains to be seen. Coalition governments previously haven't been very successful at delivering digital economy platforms."

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FORWARD THINKER



Predicting the future with data

Elizabeth Rudd,
Director, FutureNous

Will big data - the collecting of vast amounts of data about nearly everything - finally help us predict the future? Organisations spend billions of dollars annually on forecasts to reduce uncertainty about the future including stock analysis and performance, weather forecasting, technology forecasting and market research.

Data is portrayed in popular media as able to assist and improve decision-making of all types, including crime reduction, product development and investments. Television shows like *Numb3rs* and *Person of Interest* portray the use of mathematics and algorithms to predict behaviour. Nate Silver, an American statistician and writer, recently 'predicted' the outcome of the US Presidential election, correctly calling the outcome of 49 states.

Big data, the potential to have all the information necessary to make decisions, offers the promise of improving decisions and business performance. However, data is one input to the process - what about the impact of humans? There are three points in the decision process susceptible to the behaviour of

humans: choosing which data and how it is collected; analysing the data including both what data is used and how it is weighted; and interpreting the data and making a decision.

It has been said greater amounts of data often does not lead to better decisions. Many people believe more data can decrease the quality of a decision. With large amounts of data, it is easier to believe correlation is actually causation. But just because things may happen in what seems to be a pattern, one action is not necessarily causing the other. Greater amounts of data can lead us to falsely conclude that the data 'proves' what it is we want to believe.

Greater quantities of data can lead to too much information being collected, which can increase complexity and lead to overanalysis and reliance on the data. Humans must still be relied on to manage these factors around the decision process, and humans are subject to cognitive biases, which influences the way we process and interpret information.

When having vast amounts of data available for analysis and decision-making,

there are several types of cognitive bias that are particularly relevant: the gambler's fallacy, framing bias and the ambiguity effect. The gambler's fallacy is giving greater weight to previous events, believing they impact future outcomes (the best example is flipping a coin).

Secondly, every set of data used for decision-making can be presented to reflect a certain point of view, or framed. Think of a debate: both sides use the same information in support of opposing views.

Thirdly, when people are given a choice between two possibilities - one with a known probability and one with an unknown probability - people have a tendency to choose the first option. This is called the ambiguity effect and can lead to decision-makers giving more weight to some data.

The availability of data has the potential to improve decision-making. However, humans are still needed to make decisions and the better we can understand the human bias which influence the decision-making process, the better use your organisation can make of its data.

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