POWER PLAY

Inside The Data Centres Fuelling Our Digital Economy

NEXTDC

DIGITAL ECONOMY

CONTENTS

Australia's digital economy was worth $79 billion in 2015, with Deloitte Access Economics predicting it will hit $139 billion by 2020. This digital economy already accounts for more than 5 per cent of our gross domestic product but the insatiable demand for cloud-based services accessed through smart mobile devices means this contribution is sure to keep growing.

This increasingly important section of the economy is powered by next-generation data centres, which house, protect and connect the remote data storage, transfer and compute infrastructure. Building and managing these facilities requires massive capital investment in materials and equipment. IBISWorld estimates the cost of building a new data centre at anywhere between $50 million and $200 million. Older in-house data centres require substantial refits to cope with modern demands, while electricity costs associated with power and cooling are also prohibitive, which makes outsourcing data centre requirements an increasingly attractive option.

So it's no surprise demand for third-party data centre services is huge and continues to grow rapidly. The Australian data centre market recorded annual growth of 16.8 per cent during the past five years, according to IBISWorld research, with more than 30 operators now employing approximately 2,230 people. Frost & Sullivan predicts Australia's colocation data centre market will generate annual revenue of $1.2 billion by 2020.

This growth is being fuelled predominantly by the shift to cloud computing as companies of all sizes look for new ways to improve efficiency, enable innovation and find a competitive edge. Other factors include increased adoption of bandwidth-hungry consumer applications, like social media and high-definition video, and the growing complexity associated with managing IT environments as mobile access breaks down traditional concepts of the workplace.

Demand for data centre services is being fuelled predominantly by the shift to cloud computing as companies of all sizes look for new ways to improve efficiency, enable innovation and find a competitive edge.

DESIGN DRIVERS

NEXTDC was established in 2010 to build and operate carrier- and vendor-neutral data centres. Before the company was created, there were no neutral operators with a presence outside of Sydney.

It currently has five next-generation facilities in Brisbane, Melbourne, Sydney, Canberra and Perth with a combined IT load of 42 megawatts (MW). Two more facilities in Brisbane and Melbourne will add up to 31MW of additional capacity.

To compete with the largest global colocation firms, NEXTDC's data centre facilities are crammed with innovations in engineering design, equipment selection, commissioning, testing and operation. These are the six design drivers that inform every new build:

HIGH RELIABILITY

The starting point for any next-generation data centre. You need to be confident your mission-critical IT systems and applications will be secure and available.

ENERGY EFFICIENCY

Operating data centres is an expensive business. Staying at the forefront of energy efficiency is the only way to keep costs down without sacrificing reliability.

SPEED TO MARKET

A commitment to capital efficiency has enabled the creation of Australia's first truly national, carrier-neutral colocation data centre operator.
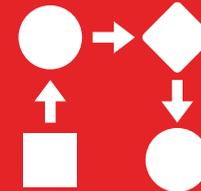
CUSTOMER EXPERIENCE

Designing the data centre to operate smoothly as a shared facility and deliver an outstanding customer experience.
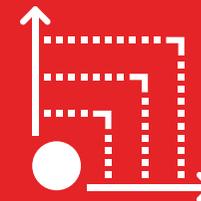
SCALABILITY

Flexible design allows for rapid scaling of infrastructure to support increasing market demand or custom requirements.
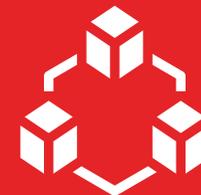
FLEXIBILITY

Deliver a rack-ready design to enable fast on-boarding while catering for specialised kit without compromising on service levels.

POWER INNOVATIONS

NEXTDC's national network of next-generation data centres have been designed to fuel the digital economy. It all starts with the mechanical systems that power operations around the clock. The engineering team went through an exhaustive analysis of all electrical design options, with scale identified as a key input in the final decision. NEXTDC developed an award-winning combination of Diesel Rotary Uninterruptible Power Supply (DRUPS) and Piller's unique Isolated-Parallel Bus electrical distribution scheme to improve resilience.

This highly reliable and low-risk power distribution system is the first of its kind in the Asia-Pacific region. It was instrumental in NEXTDC being awarded the Uptime Institute's 2015 Brill Award for Efficient IT. It's the first of its kind to be used in the Asia-Pacific region. The IP Bus aligns all DRUPS in a ring and, if one experiences performance issues, the others automatically increase their output. This means spare capacity can be used anywhere in the data centre when required.

THE BENEFITS OF IP DRUPS

ELIMINATES BATTERIES
These have a habit of failing every five to seven years, which results in downtime and loss of redundancy. It can also cause hydrogen explosions.

REMOVES HUMAN ERROR
This is the single largest cause of most technology failures, with switching procedures proving particularly risky in data centre environments.

GUARANTEES POWER
Ensures power to both A & B supplies without the need for switching, even if more than one generator or UPS is out of service.

MAINTAINS HIGHER LOADS
Keeping the UPS and engine generators loaded up reduces the risk of cylinder glazing and damage present at lower levels of operation.

COOLING

When our innovation focus was primarily on improving resilience and reliability, we found this flowed into energy efficiency, total cost of ownership and capital efficiency. The same thing happened when we switched our innovation focus to other areas. For example, we designed water-side and air-side cooling systems primarily to reduce power costs but it also minimised the wear on our chillers, improving overall reliability.

Jeff Van Zetten, Head of Engineering, NEXTDC

NEXTDC uses direct and indirect evaporative cooling to maximise efficiency, reducing energy usage and total carbon footprint. Water-side cooling takes advantage of low ambient temperatures in autumn, winter and spring to precool heat exchangers with returned water. Air-side cooling draws cool air from outside the data centre through several layers of filtration to replace excess hot air in the data halls, which is extracted using large dampers and fans. These free air-side and water-side cooling innovations provide important efficiency and reliability benefits:

Two additional cooling methods provide backup to the chillers for most of the year.

Shorter running time reduces chiller maintenance and prevents failure.

A proven reduction in total energy needed to cool equipment.

Other cooling innovations include the world's first oil-free, magnetic-bearing, low-friction compressor, variable-speed cooling towers, rainwater collection to keep the cooling towers topped up and floor-grille optimisation designed in-house by NEXTDC's team of highly skilled engineers. Automatically calculating the ideal floor-grille balance for each rack reduced the amount of fan power by 60 per cent. Hot and cold aisle containment makes it easier to run the right number of redundant fans, which reduces wear and provides a higher level of redundancy.

FIRE SAFETY
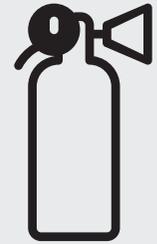
Celox Group is a cloud provider so it's critical we have a stable cooling and power system for our IT infrastructure, but we were facing high monthly service bills to maintain and run our own data centre. By moving our servers to NEXTDC's S1 data centre we lowered the monthly cost of utilities and achieved a much higher level of physical security.

"

Matt Jereb, Systems Integrator, Celox Group

NEXTDC's data centre design uses inert-gas suppression, which completely eliminates water-based sprinkler systems in the data halls where critical IT equipment is stored. Although gas-based fire suppression is more expensive than sprinklers, it's an important design advantage. That's because sprinkler systems are sometimes activated when a single server has an issue, which can result in catastrophic damage to other equipment and risks unnecessary client outages.

Each data hall is designed as a separate fire-rated compartment so fire suppression in one doesn't affect the other halls. ProInert IG55 gas suppresses any fire within a data hall by reducing the level of available oxygen. It is one of the world's most environmentally friendly systems of its kind.

NEXTDC has installed two complete sets of gas suppression tanks in each data centre. This means that if gas fire-suppression is required, the system will continue to protect the facility against a second fire risk. The fire protection systems also include very early smoke detection apparatus (VESDA) developed here in Australia.

SECURITY

NEXTDC has helped ECN to grow Australia-wide. As an ISP servicing corporate Australia we need access to colocation environments of the highest level. We chose NEXTDC because the facilities are first-class, the people are helpful and they provide the online tools we need. The ONEDC portal allows us to monitor our spaces, book deliveries and authorise contractor access. If you want to manage your colocation remotely, then NEXTDC provide the tools to make it easy.

"

Chris Bateman, Operations Manager,
ECN Internet Solutions

Infrastructure hosted with NEXTDC is protected by strict physical security procedures and protocols featuring a multi-layered security access system with individual authentication via biometric fingerprint readers and ID access cards (IDACs). Clients can use the facilities around the clock but access is restricted to authorised personnel and all movements are recorded in an audit trail.

Bullet-resistant security portals control access to the secure areas of the data centres. Each has a front and back door but only one can be opened at any given time, preventing piggybacking and tailgating. If excessive weight is detected because a second person is inside the portal, the occupants are denied access. The stairs in the data centres are only used as emergency exits and going through these doors will set off an alarm. No data halls can be accessed via a stairwell.

Each data centre is protected by CCTV surveillance and monitored around the clock by security personnel. In addition to monitoring the facilities, security rooms also have access to news and weather channels to notify staff of heightened alerts including the threat of terrorist attack, industrial accidents or severe storms.

Visitors are only allowed to enter the data centres if they register 48 hours in advance and must be accompanied by an authorised person. An approved permit must also be in place prior to any contractor commencing potentially hazardous work.

SOLAR ENERGY

The solar array will regularly produce at least 5 per cent of the electricity used by customers. In helping reduce our peak demand for energy from the grid, it improves supply stability and reduces reliance on fossil fuels. The electricity being generated is clean and sustainable – factors that benefit us, our clients and their customers.

"

Simon Cooper, Chief Operating Officer, NEXTDC

A $1.2 million photovoltaic solar energy system on the roof of NEXTDC's M1 data centre in Melbourne generated more than 500 megawatt hours in 2015, reducing the facility's carbon footprint by an estimated 1,215 tonnes. Within a year of operation it generated enough energy to offset the production of the entire system. It was the first data centre in the region to make direct use of solar power. Built by Energy Matters, the array features more than 1500 high-performance solar panels and puts about 6,000m² of rooftop space to valuable use.

The system is expected to pay for itself with 10 years. From a customer perspective it means NEXTDC can offer clients renewable energy and provide carbon footprint readings based on the ratio of solar and grid power consumption.

Management is now exploring the possibility of hosting solar panels on the rooftop of neighbouring buildings as a way to expand its renewable energy strategy. This would be managed through power purchasing agreements where a developer builds, operates and maintains the panels and NEXTDC buys its electricity output over a set period of time.

Power-usage effectiveness (PUE) is the global standard for measuring a data centre's energy efficiency. NEXTDC's investment in energy-efficient infrastructure and design has enabled an average PUE at peak IT design load of between 1.3 and 1.6. The reported industry average is 1.7 but many operators report much worse scores in corporate social responsibility documents.

ENVIRONMENTAL RATING

NEXTDC is on target to operate Australia's first five-star mega data centre as rated by the National Australian Built Environment Rating System (NABERS). Although the non-mandatory rating system is based on carbon emissions, it sets an independent benchmark for the comparison of data centre efficiency and leading operators are expected to use it as a differentiator. It has great potential to make energy usage transparent and debunk unproven claims of efficiency. In addition to reducing costs, this will become increasingly important for larger companies required to report on carbon output.

WHERE THE CLOUD LIVES

Cloud is transforming the way we communicate and do business. Organisations across all industries are shifting steadily towards cloud-first strategies that enable digital transformation.

As hubs for cloud connectivity, colocation data centres have become the strategic connection point between cloud and enterprise IT. They're where your business can seamlessly connect all its services and infrastructure.

NEXTDC's data centres are home to an independent network of approximately 250 IT service providers, carriers and cloud providers, creating a dense interconnection environment. This is Where The Cloud Lives®.

PREMIER PARTNERS

ABOUT NEXTDC

NEXTDC is an ASX300-listed technology company enabling business transformation through innovative data centre outsourcing solutions, connectivity services and infrastructure management software.

Innovative design is one of the fundamental reasons why customers put their faith in NEXTDC as a regional colocation partner. NEXTDC's S1 data centre was presented with the inaugural 2014 DatacenterDynamics APAC Award for "Innovation in the Mega-Data Centre". NEXTDC was one of just 15 companies around the world to win a Brill Award for Efficient IT in 2015. A year earlier NEXTDC was crowned Australian Data Centre Provider of the Year by Frost & Sullivan.

The company's expert in-house engineering team adds significant operational and customer engagement value on all non-standard design requirements. The same engineers who design and build the facilities also work with large enterprise customers to create solutions tailored for their specific needs.

As Australia's leading independent data centre operator with a national network of Tier III facilities, NEXTDC provides enterprise-class colocation services across the country.

NEXTDC is a technology pioneer, connecting Australia to the world's leading networks and cloud platforms, integrating the next generation of IT services so customers can take full advantage of a digitally interconnected world.

The digital economy is here and your organisation needs to be part of it. Contact us today to find out how NEXTDC and its Cloud Centre ecosystem – Australia's largest independent network of carriers, cloud and IT service providers – can power your company's IT transformation.

1300 639 832   **info@nextdc.com**

N E X T D C