



Data Centre Reform Program Review

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1. Executive Summary

1.1 Introduction

Capstone Asia Pacific were engaged to perform a Post Implementation Review of the Data Centre Reform (DCR) program for the Department of Finance, Services and Innovation (DFSI) during June 2018.

This report details our findings as per the terms of reference which is attached in Appendix A.

1.2 Background

The Department of Finance, Services and Innovation established a business case to consolidate multiple NSW Government data centres (approximately 130) into two purpose-built data centres (GovDC). The Business case commenced in 2009 and after extensive consultation and an extensive process of RFI and two rounds of RFT, the program was initiated. The migration project commenced in mid-2013 and had a target of completing the consolidation by mid-2017.

The data centre locations were chosen after extensive studies and land was acquired in Silverwater and Unanderra. This provided two locations that fitted the criteria set out in the initial studies and allowed for sufficient geographical separation as to avoid a single local disaster to impact both sites. Once the sites were chosen the process to construct the data centres was set out with the contacted party Metronode to then provide the data centres as a Service under a contract to commit a minimum kW demand from date of each site's completion. After that further expansions would be purchased on an incremental basis.

The sites were built and DFSI and its primary tenants began the task of migration to the new facilities. The anchor tenants were Education and NSW Health. Education began early and as part of this work some gaps in service provision were identified. This is part of the story of GovDC, as the sites became further utilised, additional needs and demands became apparent. Assisting agencies to close these gaps and reduce the duplication of effort, many initiatives were undertaken to assist agencies take advantage of their close proximity within the facility.

- The Management Services Backbone (MSB) came into being and is run as a networking service to support interconnectivity of agencies within the facility and to provide services such as Internet and Firewall as a service. This has assisted many agencies reduce costs and simplify processes.
- In addition, the Marketplace was created which facilitates commercial service providers the ability to provide additional services to government agencies within the GovDC environment.

To date, GovDC has successfully achieved a significant migration of services from agencies. The two anchor tenants, NSW Department of Education and NSW Health have both migrated the majority of their commitments to the site along with many other agencies large and small. The journey has not come without some challenges, however the overall program has achieved its primary objectives and is now moving to the next phase of its operations.

1.3 Summary of key findings

1.3.1 Benefits to Government

Although the benefits as defined in the original business case were not fully baselined they have subsequently been measured and are being progressively achieved. The GovDC program has delivered significant benefits to government through reduced costs to operate and build data centres. It has achieved cumulative benefits of over \$52 Million to date and continues to provide services that will support agencies into the future. The success was achieved notwithstanding the fact the program was run more like a 'business as usual' activity rather than a project and there is little evidence that the benefits were continuously tracked, measured and adjusted.

As there are still opportunities to migrate agencies and other government sectors, such as not-for-profits and local councils, there are ongoing benefits to be gained to continue to offer the service.

Feedback gained from a selection of larger tenants indicate they are happy with the quality of the service and would continue to use it, although all were looking at expansion of cloud services as Software as a Service (SaaS) and other cloud offerings becomes a more prevalent element for main stream ICT systems.

1.3.2 Environmental Benefits

The environmental benefits are clear and measurable from the perspective of housing services in facilities rated with a 'NABERS rating for data centres' of 4.5-star efficiency. Using facilities that are highly energy efficient, assist agencies with their own certifications for greenhouse gas emissions. The facility will continue to provide these benefits, and these can be leveraged across any of the entities that choose to use the facility.

1.3.3 Value for Money

Value for money has been a key point for individual agencies. Although the GovDC model has delivered significant benefits across the board both financially and from a quality perspective, some clients either felt they were paying a higher price than they could get in the market or that they were unsure of the value of the pricing. This is an area where the GovDC Team may wish to take more time with the client agencies. The service provided is not always fully understood or properly utilised, such as full redundancies of power on the racks. In simple terms, the program has delivered significant value for money, however the message to customers may need to be refined to ensure they understand the offering they are paying for and that comparisons with other services are performed on a like-for-like basis to ensure the collective benefits such as Greenhouse gas emissions, communications savings and resilience benefits from Uptime Institute Tier III facilities, are fully factored into any decision.

1.4 Summary

Overall, this state-wide project to deliver a pair of NSW Government data centres (real estate) can be viewed as a success. The two data centres provide secure and reliable data centre capacity now in and the future. Therefore, the overall objectives of the data centre Reform Program (DCRP) were achieved. Agencies and market place service providers were in the main satisfied with the level of service received from both Metronode and DFSI

however they found the services from the MSB service provider challenging and they lack responsiveness. The program has evolved to provide additional services as explained above and this has resulted in significant additional benefits that can be achieved, some of these are detailed below:

- The MSB increases the opportunity for data sharing in a secure manner, as the data does not need to leave the facility.
- The GovDC can provide appropriate physical and logical security capability and can house state sensitive information securely. It can now also facilitate the creation of a cyber threat intelligence facility to monitor and manage all external threats to government data within GovDC.
- The GovDC Marketplace brings together commercial providers of ICT services and government consumers of these services.

Although the program has delivered the business case stated benefits and objectives, now is the time to have a strategic relook at the opportunities and benefits that GovDC can deliver. As government agencies increase their use of cloud services the demand for on-premise data centre hosting will decrease. GovDC will need to remain relevant and to provide cost effective services. Some of the specific areas that need further investigation are:

- The development of a clear strategy, objectives and KPI's. These need to be continually monitored measured and assessed over the life of the program. It must also take into consideration industry trends and directions. The strategy should take input from the market place service providers as well.
- The market capability of services needs to improve this can be accomplished by:
 - The creation of a 'body of knowledge' to assist government agencies with migrating and evaluation of services by leveraging the knowledge gained from the earlier adopters to reduce the costs and risk of future migrations
 - Management of the MSB and ensuring there are clear monthly management reporting against KPIs provided by the MSB service provider.
 - Better articulation and explanation of the costs to enable possible future agencies the ability to evaluate these services against the private market
 - Review of the pricing / plans models adopted particularly with respect to the MSB

2. Detailed Report

2.1 Overview

In 2009 the Department of Finance, Services and Innovation (DFSI) developed a business case for a whole of government data centre strategy. The Business Case was to mandate the development of a pair of new, purpose-built data centre facilities, which would generate cost savings, provide greater resilience and allow for future benefits arising from consolidation of government data centres into a pair of sites.

The DCR Strategy has evolved into the development of the two data centre facilities along with an online portal in which government agencies can consume services in an 'as-a-service' (aaS) model prior to and post migration. Agency migration to GovDC facilities was mandated in the 2013 NSW Government policy circular, 'DFS-C2013-08-Data Centre Reform Strategy'. The policy intended to provide information about the NSW data centre reform strategy and guidance on how agencies should proceed to consolidate and standardise their data centre and computer room infrastructure.

The policy mandated that all agencies must subscribe to capacity in GovDC facilities, through a tenancy agreement with DFSI by August 30, 2017.

2.2 Implementation Appropriateness

2.2.1 Does GovDC deliver the levels of reliability required by agencies?

GovDC is delivering the levels of reliability as required by agencies. GovDC data centres are Uptime Institute Tier III certified for design, build and operations. Tier III provides for 99.982% uptime with no more than 1.6 hours of downtime per year. If the pair of facilities are used in an active configuration, then 100% uptime can be achieved.

2.2.2 Has the DCR program adapted to trends in the industry?

The DCR has remained relevant to NSW Government and has grown with its client base. Many changes and enhancements to the service which can be attributed to DCR's response to market trends, have helped GovDC stay relevant and a viable alternative to commercial operations. The following are areas where changes have been made to improve service and provide options for customers:

- GovDC has opened up a Marketplace for tenants to acquire services from private commercial vendors within the GovDC framework.
- The Managed Services Backbone (MSB) allows agencies to interconnect internally to the GovDC environment making a safer and lower cost alternative. This will become increasingly important over time as agencies share more information to improve services to the state.
- The access to hyper cloud service providers such as AWS, Azure, Google etc., can be acquired via dedicated network connections to these providers through the Equinix or AxonVX 'cloud connect' offerings. This improves speed and security for clients but also

provides flexibility to use these services within the GovDC ecosystem over shared infrastructure.

- 27001 Security and NABERS certifications are also increasingly important for clients and come as part of the service offering.

2.2.3 Is GovDC delivering value for money?

GovDC is delivering value for money on a number of levels for government. The avoided costs of building and acquiring additional data centres on an individual scale was noted in the business cases. This is a significant benefit over the life of these sites. The energy efficiency of the data centres provides long term benefits for a range of clients and will become more significant as the cost to deliver processing units will continue to be impacted by the limits of processes advances in the short to medium term.

The flexibility to acquire services as needed is a great advantage and reduces the complexity of acquisition and therefore the costs associated with these activities.

Benchmarking undertaken by PWC in the midterm report identified the service was on par or better than many – it was particularly competitive with commercial offerings. It is noted that there are few data centres of equivalent security and efficiency in Australia and therefore exact comparisons cannot be made. The fact that the offering is a certified Tier III data centre and 'NABERS for data centres' 4.5-star energy rating do provide the core elements of a high quality and sustainable investment.

The pricing model provided to customers can appear complex, but it is primarily driven by the design parameters of the data centre. As a passively temperature-controlled environment the floor space required to house high consumption equipment may be higher than a data centre that uses active air-conditioning all the time. As a result, some of the traditional approaches to charging by floor space are not appropriate. This does require the user to understand the process in more detail to make clear comparisons to commercial offerings that are normally based on a 'per square meter' footprint basis.

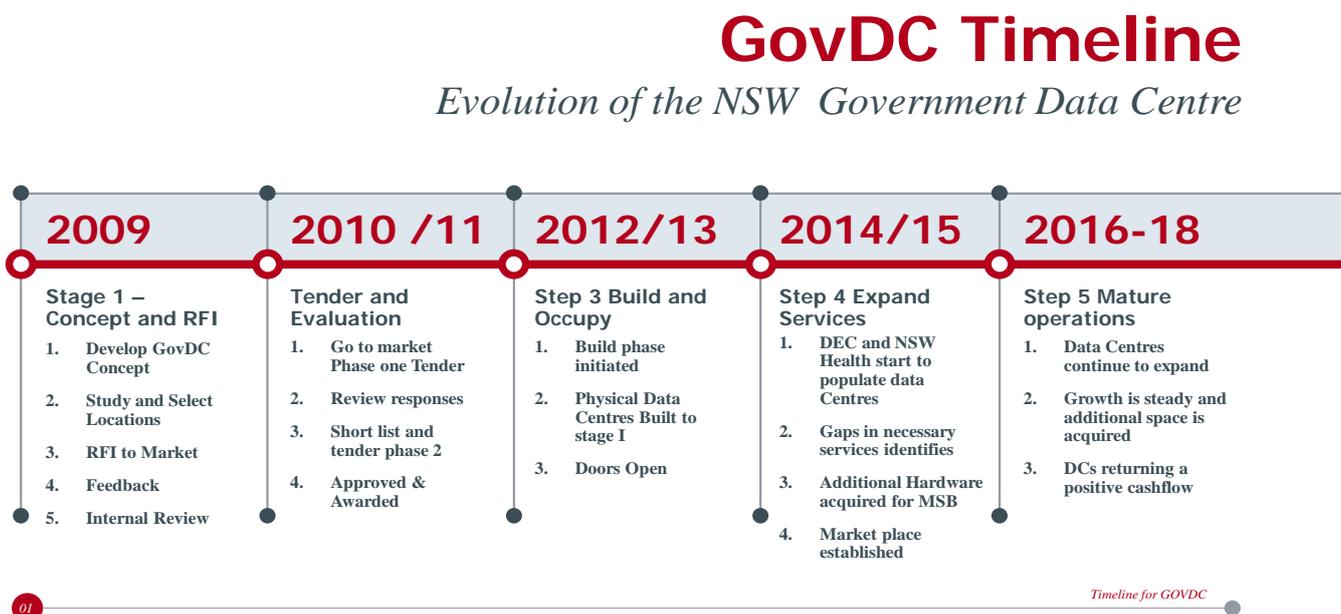
The MSB pricing model is also an area that has come up in discussion with stakeholders and should be reviewed to assess how it can continue to meet the new and growing demands of the client base. Increased flexibility in pricing was flagged as desirable by a number of stakeholders.

2.2.4 What is the level of satisfaction with GovDC?

Overall the agencies interviewed were satisfied with the services and price provided by GovDC. We noted a different level of maturity between agencies specifically with regards to analysing the costs and fees charged and DFSI can benefit with explaining these better to clients. Some of the agencies had a clear understanding of the fees charged.

2.3 Implementation Efficiency

2.3.1 Was the DCR program delivered on time?



The timeline above sets out the actual lifecycle of the program. The timeline was longer than the business case based on the extended time for procurement taken. However, once the tender was let, the process tracked to the contracted timelines.

2.3.2 Was the DCR program delivered to budget?

The data centres were built by a third party and DFSI uses the services under an agreement to buy a minimum contracted kW value. This allowed DFSI to avoid specific exposure to the core data centre build. There was a variation to the program and that related to the connection of fibre to the sites which incurred approximately \$5 million in capital works. However, the program had little exposure for Government in the construction elements. The ongoing exposure is the committed kW use of the data centres to the term of their expiry which are staggered based on the build dates of each 'Data Hall'. There is a cost to government for unused empty space (white space) but the space has been filled fairly efficiently over the life of GovDC. DFSI continue to acquire additional space to match

anticipated demand so it is important to manage this variable to balance cost against flexibility /availability for customers.

The model has proven to be well designed for the purpose and has limited the government's exposure while at the same time gaining most of the benefits of ownership and control.

2.3.3 Where there any changes to scope?

Yes, the scope increased from the original business case. The original scope of the project was to provide a reliable and secure data centre service capacity on demand to agencies. The two major additional scope changes are:

Marketplace

The Marketplace was created during the initial uptake of agencies to move to GovDC. The ICT services catalogue, available through NSWBuy provides a single point of access for agencies to access external vendor capabilities as a service. Software, Platform and Infrastructure (SaaS, PaaS and IaaS) providers are advertised in the service catalogue, for agencies to contact and procure services. This is currently being moved to the new 'Buy.NSW'.

Managed Services Backbone (MSB)

The manage services backbone within GovDC was created after the first agencies were migrated. The main reasons were to simplify and more securely provide:

- interagency connections and data transfers
- connections between Marketplace providers and consumers
- external cloud connections and data transfers
- 'network as a service' including firewalls and Internet gateways

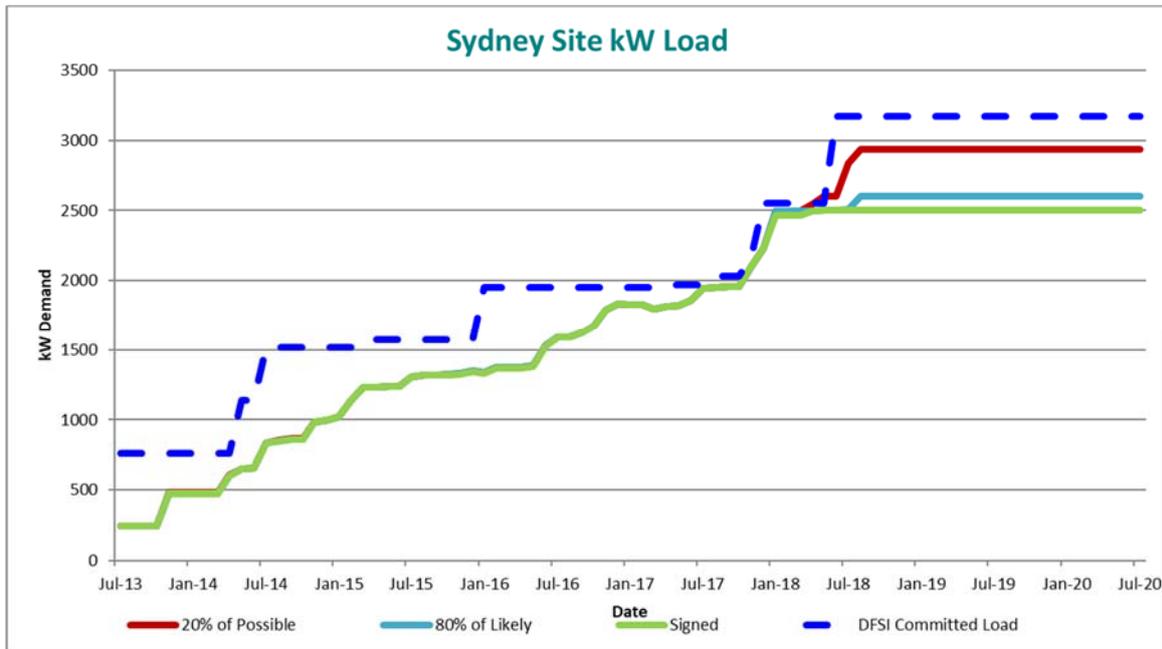
Some of these services which has grown over time are: public cloud services, GovDC Marketplace services, agency connectivity, Plug 'n Play, tenant independence/multi-tenancy, demilitarised zone domain (DMZ), internal protection domain, secure administration zone, high availability, network visibility, clean pipe, converged networking, infrastructure orchestration, modular, scalable and secure, IPv6 centralised management

2.4 Outcomes Effectiveness

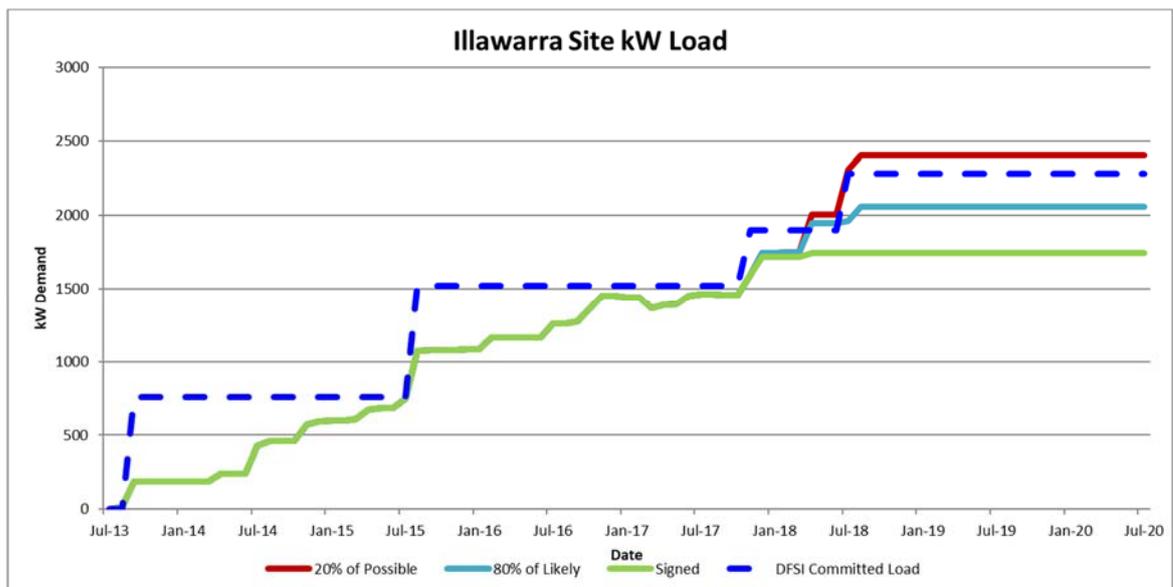
2.4.1 Has the space at GovDC been filled efficiently?

The data centres have been progressively filled up and then expanded over the past 4 years. The following graphs provide a summary of the growth pattern and the stepping of the committed capacity acquired by DFSI to ensure smooth access to capacity in a just in time setting.

Silverwater



Illawarra / Unanderra



2.4.2 What recovery of costs has been achieved from tenants of GovDC?

Cost recovery is built into the GovDC model and recovery of investment over 15 years. Ongoing expenses are passed on to customers in the pricing model. The current operations are now in surplus as can be seen below. As the data centre footprint grows there are stages where DFSI does carry additional cost that needs to be absorbed while the space is absorbed.

GovDC Financial Performance 2013/14 - 2017/18						
	2013/14	2014/15	2015/16	2016/17	2017/18	TOTAL
	Actual	Actual	Actual	Actual	Forecast	
REVENUE						
Sale of Goods & Services	2,744,049	6,630,346	10,657,470	16,876,395	22,128,053	59,036,313
Other Revenue						-
TOTAL REVENUE	2,744,049	6,630,346	10,657,470	16,876,395	22,128,053	59,036,313
EXPENSES						
Salaries & Wages	-	-	-	9,288	8,091	17,379
Contractors	90,767	427,264	118,629	303,235	391,597	1,331,492
Voluntary Redundancy						-
EMPLOYEE RELATED EXPENSES	90,767	427,264	118,629	312,523	399,688	1,348,870
GovDC Lease	4,834,751	8,056,020	11,766,452	15,700,553	19,370,237	59,728,012
Other Operating Expenses	252,151	149,898	206,189	495,195	698,505	1,801,937
TOTAL OPERATING EXPENSES	5,086,901	8,205,918	11,972,640	16,195,748	20,068,742	61,529,949
TOTAL EXPENSES	5,177,669	8,633,182	12,091,269	16,508,271	20,468,429	62,878,820
NET SURPLUS / (COST)	(2,433,620)	(2,002,836)	(1,433,800)	368,124	1,659,624	(3,842,507)
CAPEX	(5,862,528)	(918,472)	(1,291,699)	(1,584,821)	(251,000)	(9,908,519)

In 2017/18 the forecast surplus can be seen to be \$1.66 million dollars. The Capex line included the building trenches for the fibre optic lines to the data centres and has finding for the initial hardware for the Managed Backbone service. Additional funds were capitalized for migration support services. The ongoing model appears on track to recover costs progressively over the life of the program.

2.4.3 Have the data centres been reliable and secure?

Reliability

There have been no known and / or documented reliability issues noted. In addition, independent verification of the effectiveness of reliability controls was performed by a certification body.

We can therefore summarise that the data centres have been reliable. Uptime to date has been 100%.

Secure

There have been no known and / or documented security breaches of any of the controls managed by the three service providers (DFSI, Metronode and Secure Logic). In addition,

there was also independent verification of the effectiveness of these controls by an independent certification body.

We can therefore summarise that the data centres were appropriately secured.

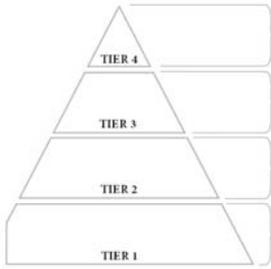
2.4.4 What certifications for reliability and security have been achieved?

Reliability

Data centre standards exist to evaluate the quality and reliability of a data centre's server hosting ability. The Uptime Institute uses a four-tier ranking system as a benchmark for determining the reliability of a data centre. This proprietary rating system begins with Tier I data centres, which are basically warehouses with power, and ends with Tier IV data centres, which offer 2N redundant power and cooling in addition to a 99.99% uptime expectancy.

A Tier III data centre is concurrently maintainable, allowing for any planned maintenance activity of power and cooling systems to take place without disrupting the operation of computer hardware located in the data centre. In terms of redundancy, Tier III offers N+1 availability. Any unplanned activity such as operational errors or spontaneous failures of infrastructure components can still cause an outage. In other words, Tier III isn't completely fault tolerant. A Tier 4 data centre is fault-tolerant, allowing for the occurrence of any unplanned activity while still maintaining operations. Tier 4 facilities have no single points of failure.

Both data centres are certified to Tier III standards.

<p style="text-align: center;">Data Center Tiers</p> 	<p>Tier 3 data centre specifications and feature:</p> <ul style="list-style-type: none">• 99.982% uptime (Tier III uptime)• No more than 1.6 hours of downtime per year• N+1 fault tolerant providing at least 72 hour power outage
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The following table details the actual Uptime Institute certifications for the two data centres.

Tier	Certification Name
Tier III	Certifications of Design Documents Silverwater Illawarra
Tier III	Certification of Constructed Facility Silverwater Illawarra
Tier III	Certification of Operational Sustainability Silverwater Illawarra

Security

ISO27001 is an Information Security Management System (ISMS) certification based on policies and procedures that address the risk management process. GovDC's facilities utilise the ISO27001 certification for physical assets. The use of the MSB provides this certification for ICT assets which comply with the ISO27001 policies for risk management of technical, physical and legal operations.

ISO/IEC 27001 requires that management:

- Systematically examine the organization's information security risks, taking account of the threats, vulnerabilities, and impacts;
- Design and implement a coherent and comprehensive suite of information security controls and/or other forms of risk treatment (such as risk avoidance or risk transfer) to address those risks that are deemed unacceptable; and
- Adopt an overarching management process to ensure that the information security controls continue to meet the organization's information security needs on an ongoing basis.

The facility is certified, and tenants can leverage this as part of their services. The following Information Security Management Systems are in place and complies with the ISO/IEC 27001:2013 for the following scope areas:

Department Finance Service and Innovation

The onboarding, monitoring and governance of the GovDC data centre facilities (in accordance with the Service Deed) and the GovDC Managed Services Backbone, on accordance with the DFS Statement of Applicability V2.0, dated 22nd August 2016.

Metronode

Facility management and operations in accordance with the “Statement of Applicability Year 4 – 2018 (V1.6, 15/9/2017).

Secure Logic

Delivery and operation of the following services:

- Managed Services – Managed Security Services
 - Cybersecurity Services,
 - Cryptographic services
 - Hybrid Cloud Services
 - Cyber Threat Intelligence Centre and
 - 247 Security Operation Centre
- Professional Technical Services
 - Software Development for propriety security software tools (MCS, EPO, Security Awareness Training)
- Service Delivery Management
 - Core business support functions
 - Human resources
 - Finance and
 - Office Administration functions

In accordance with the Statement of Applicability “SLF120-03 Statement of Applicability SoA V3.0”

2.4.5 Have there been any serious problems or incidents at GovDC?

We have reviewed the management report and to date there have been no serious problem or incident at any of the GovDC data centres.

2.4.6 Have the benefits defined in the business case been delivered?

Reduced Operation Costs

We have reviewed the benefits realised from a financial perspective and where possible have rolled forward or checked the assumptions from the 2016 Benefits realisation analysis. Overall, there have been significant benefits derived from the program and they continue to accrue to the program. There are further opportunities for benefits to accrue through further migrations from inefficient sites and through the increased use of services within the GovDC

ecosystems such as the MSB and links to the hyper cloud providers such as Microsoft Azure, AWS, Google etc.

The areas below are either linked to the original business case or were identified subsequent to the start of the program.

DCR-01 – Derived Benefits Model

This benefit is attributed to about 70% of the agencies who would have considered building a data centre or who hosted their own data centre.

This benefit is based on the net savings between the Build Option costs and the DCR Project Option costs as follows:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	
	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Estimated benefit based on the BMP Board Committed Load of 3.04 MW and 3.47 MW (Baseline Measure)	12,943	11,413	9,777	9,121	4,888	4,825	52,967
Benefit realised based on the actual provisioned take up at 30 June 2016	12,943	10,859	9,715	8,952	4,888	4,825	52,182

Based on the actual take up rate / load at 30 June 2016, the benefit for 2015-16 is \$8.952 million as compared to the baseline model of \$9.121 million. The benefit has been reduced proportionally by the actual load that was marginally less than the baseline estimated loads.

Since the 2016 assessment the projections have been confirmed for committed space and have increased above the original projection as demand has continued to grow. Current committed as at 1 July 2018 will be 5450kW. Actual is sitting at 4245kW.

DCR-02 – Reduced Lease Costs

This benefit is attributed to about 30% of the agencies who leased data centre space.

Benefits have been identified for those Government agencies who have signed MOUs up to 30 June 2016 and who leased data centre space before migrating to GovDC. The benefits are as follows:

2015-16						
Agency	Provisioned Load Silverwater (kW)	Provisioned Load Unanderra (kW)	Previous Lease Cost per kW / annum	Source	Migration Date	Actual Savings in Lease Cost
Businesslink	100		\$12,000	IBM/Glasshouse Migration High Level Design Report	Nov-14	\$670,000
Sydney Catchment Authority	10	3	\$9360+\$1800/ rack	ac3 quote provided to DFSI DCR Team	Jun-14	\$62,338
WorkCover (SRWSD)	20	16	\$4,950	Assumed same price as ac3 annual service fee with Global Switch	Oct-13	-\$9,624
Office of Environment and Heritage	14		\$8,500	Glasshouse Migration and High Level Plan and Costing Report	Jun-14	\$44,800
Rural Fire Service	4	27	\$9360+\$1800/ rack	ac3 quote provided to DFSI DCR Team	Apr-15	\$150,682
Board of Studies (BOSTES)	41	37	\$9360+\$1800/ rack	In the absence of available figures, assumed ac3 quote provided to DFSI DCR Team	Apr-15	\$372,162
ServiceFirst		120	\$9360+\$1800/ rack	In the absence of available figures, assumed ac3 quote provided to DFSI DCR Team	Jul-14	\$581,520
Total						\$1,871,878

Lease Cost Per Annum at Silverwater for 2015-16 based on 3% CPI: \$5,300 Lease Cost Per Annum at Unanderra for 2015-16 based on 3% CPI: \$5,114 *Note: Discounted lease costs ceased at the end of 2014-15.*

Summary of DCR-02 – Reduced Lease Costs for 2015-16	Benefit Amount
Estimated benefit based on the BMP Board Committed Load of 3.04 MW and 3.47 MW (Baseline Measure)	\$662,373
Benefit realised based on agencies who have signed MOUs, moved into GovDC and who previously leased data centre space	\$1,871,878

The above table indicates that the benefits realised in 2015-16 are above expectations due to the previous high lease rates paid by agencies (as compared to GovDC) which included an estimated 50% of white space.

Further lease cost savings will continue to accrue as other sites come up for renewal across agencies.

DCR-03 – Reduced Cost of Carbon Emissions

This benefit is based on a lower PUE in GovDC. The calculations for this benefit for the 2015-16 financial year are as follows:

Summary of DCR-03 – Reduced Cost of Carbon Emissions	Benefit Amount
Estimated benefit based on the BMP Board Committed Load of 3.04 MW and 3.47 MW (Baseline Measure)	\$442,201
Benefit realised based on the actual provisioned take up at 30 June 2016	\$422,264

Ongoing emissions savings will be attributed to throughout the life of the program. As further sites are decommissioned the Carbon emissions reductions will increase. In 2017 / 2018 actual kW are 4245kW vs the estimated base of 3470kW committed giving an extra 775kW of carbon emission efficient delivery.

DCR-07 – Reduced Network Costs

A number of Government Marketplace network services have been purchased by 7 agencies which has resulted in reduced costs.

The benefits are as follows:

2015-16								
Agency	Configuration	Type of Link	Start Date	Cost of Link Per Month	Cost of Link Per Annum	Benchmark Cost Per Month	Benchmark Cost Per Annum	Total Benefit
Businesslink/FACS (2 Links)	10GB single unprotected link	Silverwater to Global Switch	Jul-14	\$4,000	\$48,000	\$39,000	\$468,000	\$420,000
ServiceFirst	10GB single unprotected link	Silverwater to Unanderra	Jul-14	\$6,900	\$82,800	\$12,750	\$153,000	\$70,200
ServiceFirst	10GB single unprotected link	Silverwater to Global Switch	Jul-14	\$2,000	\$24,000	\$19,500	\$234,000	\$210,000
ServiceFirst	10GB single unprotected link	Unanderra to Global Switch	Jul-14	\$6,900	\$82,800	\$12,750	\$153,000	\$70,200
ac3	10GB single unprotected link	Silverwater to Global Switch	Oct-14	\$2,000	\$24,000	\$19,500	\$234,000	\$210,000
DEC	10GB dual unprotected link	Silverwater to Unanderra	Jul-14	\$15,000	\$180,000	\$25,500	\$306,000	\$126,000
DEC	8GB dual unprotected link	Silverwater to Unanderra	Jul-14	\$13,500	\$162,000	\$20,400	\$244,800	\$82,800
eHealth NSW	10GB dual unprotected link	Silverwater to Unanderra	Oct-14	\$13,200	\$158,400	\$25,500	\$306,000	\$147,600
Transport NSW	10GB dual unprotected link	Silverwater to Unanderra	Dec-15	\$13,200	\$92,400	\$25,500	\$178,500	\$86,100
Transport NSW	1GB dual unprotected link	Silverwater to Unanderra	Dec-15	\$4,800	\$33,600	\$9,200	\$64,400	\$30,800
WorkCover	1GB single unprotected link	Silverwater to Unanderra	Dec-15	\$2,500	\$17,500	\$4,600	\$32,200	\$14,700
Total								\$1,468,400

The link between the Silverwater data centre and Global Switch is a 10GB single unprotected metropolitan link. The cost for this link is \$2,000/month. The benchmark cost (devised by PwC as part of the review of Metronode's Supplementary Tender) for a similar service, based on a Sydney to Sydney unprotected 3km link, is \$19,500/month.

The 10GB link between the Silverwater data centre and the Unanderra data centre is a single unprotected 130 km link. The cost for this link is \$6,900/month. The benchmark cost (devised by PwC as part of the review of Metronode's Supplementary Tender) for a similar service, based on a Sydney to Newcastle unprotected 170 km link, is \$12,750/month (75% of \$17,000).

The 1GB link between the Silverwater data centre and the Unanderra data centre is a single unprotected 130km link. The cost for this link is \$2,500/month. The benchmark cost (devised by PWC as part of the review of Metronode's Supplementary Tender) for a similar service, based on an unprotected 130km link, is \$4,600/month.

Dual links are costed as provided in the table above. Benchmarks for dual links have been estimated at double the cost of a single link.

Summary of DCR-07 – Reduced Network Costs	Benefit Amount
Estimated benefit based on 5% of savings identified in the Original Business Case	\$500,000
Benefit realised based on agencies that have purchased Government Market network services as at 30 June 2016	\$1,468,400

The above table indicates that the benefits realised in 2015-16 far exceed expectations due to the reduced network service rates that are able to be facilitated through the Government Marketplace. This continues to be a key area of ongoing saving as at June 2018.

DCR-15 – Reduced Licence Costs for CableSolve

This benefit was identified in 2014-15 and is based on agencies using the single instance, available whole of government licence and saves agencies having to purchase licences for ICT Asset Management Software (CableSolve) and not having to pay for maintenance and support.

The head count of agencies that have migrated to GovDC increased by two during 2015-16 which excludes marketplace providers or increase in loads.

The licence costs saving is based on the single instance whole of government licence which for 30 agencies is \$300,000 compared to \$600,000 for individual licensing (equates to a saving of \$10,000 per Agency).

There is also a saving for agencies for maintenance and support. Maintenance and support is charged at \$48 per kW per annum based on the Committee Load which for 2015-16 is 2,817 kW.

The calculations for this benefit for the 2015-16 financial year are as follows:

Summary of DCR-15 – Reduced Licence Costs for CableSolve	Benefit Amount
Estimated benefit based on predicted number of agencies migrating to GovDC in 2015-16	\$241,600
Benefit realised based on 2 new agencies saving licence costs, and savings on maintenance and support costs based on the Committed Load at 30 June 2016.	\$155,216

DCR-16 – Reduced Costs for Compliance Activities

This benefit was identified in 2014-15 and is based on agencies who have migrated to GovDC not having to pay for external expertise to undertake compliance activities to meet NABERS and Government Resource Efficiency Policy (GREP) requirements. It estimated that this external expertise costs an Agency \$20,000 per annum.

25 agencies have migrated to GovDC as at 30 June 2016.

The calculations for this benefit for the 2015-16 financial year are as follows:

Summary of DCR-16 – Reduced Cost for Compliance Activities	Benefit Amount
Estimated benefit based on predicted number of agencies migrating to GovDC by 30 June 2016	\$660,000

Ongoing savings will continue on this basis to 30 June 2018 – as further site migrate this will continue to add value.

Reduced Risk

Reliability and availability risks have been reduced. GovDC provides Tier III configurations as required by the tenant agencies. This approach ensures critical systems are located in facilities with matched levels of high reliability and availability.

Reduced Greenhouse Gas Emissions

DCR-03 – Reduced Cost of Carbon Emissions

This benefit is based on a lower PUE in GovDC. The calculations for this benefit for the 2015-16 financial year are as follows:

Summary of DCR-03 – Reduced Cost of Carbon Emissions	Benefit Amount
Estimated benefit based on the BMP Board Committed Load of 3.04 MW and 3.47 MW (Baseline Measure)	\$442,201
Benefit realised based on the actual provisioned take up at 30 June 2016	\$422,264

The greenhouse benefits continue to accrue based on kW use.

Improved Capability

Agency initiatives often depend on new or existing ICT systems. The capacity shortfalls in many department's data centres that delay State initiatives are now eliminated.

Improved real estate flexibility

The centralised data centre capability enabled Government to benefit from a more agile real estate model where buildings that are vacated and new buildings occupied without the need to consider the data centre capabilities of the new building.

Improved Capacity Management

Real estate capacity management has been approved. The centralised, capacity on demand model eliminates the pockets of capacity constraint, reduce the capacity oversupply, improve service delivery time and delay upgrade expenses until it is necessary.

Reduced Disruption

Disruption to existing staff is reduced because data centre procurement now does not require rigorous tendering processes.

Improved Data Security

Data security has been improved. Physical security is standardized and certified. The MSB allows for additional centralized logical security controls being implemented and certified to ISO 27001 standard. Some of these are: firewall administration, agency connectivity, Demilitarised zone domain (DMZ), Internal protection domain, Secure administration zone,

2.5 Sustainability

2.5.1 What effect has the introduction of the data centres had on greenhouse gas emissions?

PUE for old data centres continues at 2.34 (as per Business Case Review - blended from Education, Health and estimated at 2.8 for small, legacy data centre). The PUE for GovDC is approximately 1.2 or less than half of some legacy sites.

2.5.2 What is the 'NABERS for data centres' rating for the data centres used by GovDC and how does this compare with other facilities?

The GovDC sites are NABERS rated at 4.5 stars – at this time no other NSW Government data centre is as efficient from an energy consumption perspective.

3. Appendix A - Review Objectives

The broad objectives of the evaluation were to:

1. assess whether the DCR has delivered benefits to the government;
2. assess whether the DCR has delivered environmental benefits;
3. assess whether the DCR has delivered value for money;
4. benchmark the government data centres against other commercial facilities; and
5. review the process carried out to implement the DCR.

The evaluation domains and specific evaluation questions are outlined in the table below:

Domains	Evaluation Questions
Implementation: Appropriateness	<ul style="list-style-type: none"> • Does GovDC deliver the levels of reliability required by agencies? • Has the DCR program adapted to trends in the industry? • Is GovDC delivering value for money? • What is the level of satisfaction with GovDC?
Implementation: Efficiency	<ul style="list-style-type: none"> • Was the DCR program delivered on time? • Was the DCR program delivered to budget? • Where there any changes to scope?
Outcomes: Effectiveness	<ul style="list-style-type: none"> • Has the space at GovDC been filled efficiently? • What recovery of costs has been achieved from tenants of GovDC? • Have the data centres been reliable and secure? • What certifications for reliability and security have been achieved? • Have there been any serious problems or incidents at GovDC? • Have the benefits defined in the business case been delivered?
Sustainability	<ul style="list-style-type: none"> • What effect has the introduction of the data centres had on greenhouse gas emissions? • What is the 'NABERS for data centres' rating for the data centres used by GovDC and how does this compare with other facilities?

IDG GTP

