Investment Evaluation Summary (IES) IT.INF.01

Project Details:

Project Name:	Server Refresh and Virtualisation Platform
Project Id:	IT.INF.01
Thread:	IT Infrastructure
CAPEX / OPEX:	CAPEX + OPEX
Scope Type:	C
Service Classification:	Standard Control
Work Category Code:	AMITS
Work Category Description:	IT Software General – Standard Control
Project File Location:	DD17 Infrastructure
Preferred Option Description:	Continue hosting of server infrastructure underpinning business service delivery from TasNetworks facilities, with replacement of server hardware according to the Asset Management Plan.

	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27
Estimate ($M)	[redacted]									
Total ($) 2017-2019	**1,734,850**									
Total ($) 2017-2027	**6,891,000**									

Governance:

Project Initiator:	[redacted]		
Thread Approved:	[redacted]		
Project Approver:	[redacted]	Date:	< APPROVALTIMESTAMP>

Document Details:

Version Number:	1.0

Section 1 (Gated Investment Step 1)

1. Background

This Investment Evaluation Summary (IES) documents planned expenditures for the determination period for server platforms (including dedicated hardware appliances). The document is one of eight planned documents covering anticipated activities as described in the IT Infrastructure Asset Management Plan.

TasNetworks currently hosts both virtualised and physical servers in support of the business's operational requirements. This infrastructure hosts applications such as those utilised by Network Operations and Control teams (operational control systems including Network Operations Control System – NOCS), asset management systems, outage management, human resource management, finance systems, document management, video conferencing, data warehouse, e-mail, internet, and intranet applications.

The initiative scope is documented in detail below in Scope, at a high level the document scope extends to:

[redacted]

4. Server operating system software

[redacted]

1.1 Investment Need

Investment drivers fall into the following categories:

1. Reliable and effective delivery of IT services to the TasNetworks business and external customers.
2. Compliance with state and federal legislative and regulatory requirements, including:
    a. Industry-specific requirements
    b. State and federal privacy legislation
    c. Occupational Health and Safety requirements
3. The need to maximise the efficiency and cost-effectiveness of service delivery.

Activities and requirements driving the need for capital expenditure in this IES are documented in Section 4 of the IT Infrastructure Asset Management Plan. To summarise, server platform upgrade and replacement activities will arise from:

1. Lifecycle replacement and capacity management activities.
2. Requirements to maintain appropriate levels of software assurance and vendor technical support.

1.2 Customer Needs or Impact

TasNetworks server infrastructure is critical to the reliable, timely and effective delivery of business application and data services to operational and administrative staff. These services are directly related to TasNetworks ability to deliver efficient and effective services to our external customers.

The Corporate IT department is strongly focussed on service delivery to internal customers. These services are delivered in a manner that aligns with TasNetworks mission, commitments and values. The customer consultation program for the Infrastructure Program of Work documented in this IES reflects an approach of constant and direct engagement with business customers through:

- Regular direct meetings with management teams from all business units at least every six months. These meetings are broadly scoped and cover all services provided by Corporate IT as well as discussing current and emerging requirements from the business.
- A formal project prioritisation process that includes full transparency, extensive customer consultation and business-determined priorities.
- A fully consultative project management methodology that embeds Corporate IT customers in every stage of the project.

1.3 Regulatory Considerations

As the infrastructure documented in this Investment Evaluation Summary constitutes a supporting platform for TasNetworks business operations, there are no identified direct regulatory considerations.

However, the platforms documented in this Investment Evaluation Summary host applications and data used by TasNetworks staff in day-to-day operational and administrative processes. These processes are critical to ensuring business compliance with regulatory requirements.

2. Project Objectives

The primary objective of this initiative is to ensure TasNetworks ability to deliver prescribed, negotiated and non-prescribed services to customers. This objective is achieved through meeting the following initiative objectives:

1. Provide sufficient compute (server) capacity in order to meet IT service level requirements through the determination period
2. Provide sufficient capacity over the period for:
    a. Growth in existing business services and activities
    b. Anticipated new business services and activities
3. Ensure that the availability of server hardware meets or exceeds IT service level targets through procurement of appropriate support agreements.
4. Support the ability of TasNetworks to recover IT business services and data in accordance with TasNetworks Disaster Recovery/Business Continuity requirements.
5. Ensure that all server software (specifically operating system and hypervisor software) is:
    a. Licensed, and installed in compliance with vendor license requirements
    b. Supported by the vendor to a level appropriate to IT service level objectives
    c. Upgraded or replaced as necessary to meet the requirements above
6. Ensure replacement of server hardware in line with IT Infrastructure Lifecycle policy to meet the investment needs documented above.

The objectives will be met through the execution of maintenance, upgrade and replacement activities as described below.

3. Strategic Alignment

3.1 Business Objectives

The following table highlights the problems that the initiative will solve.

Strategic Goal	Problems this initiative will address
"we enable our people to deliver value"	• The activities proposed in this initiative help to ensure a stable platform to support all IT systems.

"we care for our assets, delivering safe and reliable network services while transforming our business"	• There is substantial risk of doing nothing (see chapter titled 'Current Risk Evaluation'). • 'Do nothing' means TasNetworks IT may fail its remit to provide effective and efficient business systems solutions.

3.2 Business Initiatives

The activity proposed in this initiative underpins most other IT activity as it supports the basic underlying infrastructure to almost all IT systems.

4. Current Risk Evaluation

The TasNetworks Risk Framework details the level of risk the business finds acceptable in each category (Safety & People, Financial, Customer, Regulatory Compliance, Network Performance, Reputation and Environment & Community).

This initiative addresses Financial risks, of which TasNetworks has a **Moderate** appetite.

Not maintaining TasNetworks servers increases the risk of failure and availability due to either aging or capacity demands; this results in outages of systems and applications which affects TasNetworks ability to operate normally. Rectifying these outages would require additional effort and the resulting system outages would negatively impact productivity across the business.

4.1 5x5 Risk Matrix

TasNetworks business risks are analysed utilising the 5x5 corporate risk matrix, as outlined in TasNetworks Risk Management Framework.

Relevant strategic business risk factors that apply are follows:

Risk Category	Risk	Impact	Likelihood	Consequence
Financial	Aging hardware has an increased likelihood of failure	Hardware failure will cause system outages which impact normal operations; additional operational effort required to manage and keep applications available, there is also potential for applications to be unavailable	Possible	Negligible
Financial	Capacity demand outstrips current resource availability	Inability to maintain existing systems or deploy new systems	Likely	Negligible

Section 1 Approvals (Gated Investment Step 1)

Project Initiator:	[Enter name]	Date	
Line Manager:	[Enter name]	Date	
Manager (Network projects) or Group/Business Manager (Non-network projects):	[Enter name]	Date	
[Send this signed and endorsed Summary to the Capital Works Program Coordinator.]			

Actions			
CWP Project Manager commenced initiation:	[Enter date here]	Assigned CW Project Manager:	[Enter name here]
PI notified project initiation commenced:	[Enter date here]	Actioned by:	[Enter name here]

Section 2 (Gated Investment Step 2)

5. Preferred Option

The preferred option is for Corporate IT to continue to provide server and storage infrastructure services from data centre facilities owned and operated by TasNetworks. These services will be provided and maintained through the Program of Work activities described in this section.

Continued in-house provision of server and storage infrastructure is the preferred delivery model for TasNetworks IT. It should be noted however that this option will not preclude alternative hosting arrangements for selected application services (including Infrastructure, Platform and Software-as-a-Service options) where deemed appropriate.

5.1 Scope

The scope of this initiative encompasses the following items:

Item	Description/Notes
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

The initiative scope encompassed the following planned activities:

Project Activity	Schedule	Description
Server hardware capacity upgrade	[redacted]	Increase compute and memory capacity to meet anticipated needs
Server hardware lifecycle refresh	[redacted]	Replace end-of-life server hardware
[redacted]	[redacted]	Review/replace [redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	License and/or maintenance renewal
Server operating system refresh	[redacted]	Upgrade server SOE to latest major OS version
Server operating system license renewal	[redacted]	License and/or maintenance renewal

5.2 Expected outcomes and benefits

Activities and requirements driving the need for capital expenditure in this IES are documented in Section 4 of the IT Infrastructure Asset Management Plan. To summarise, server platform upgrade and replacement activities will arise from:

1. Lifecycle replacement and capacity management activities.
2. Requirements to maintain appropriate levels of software assurance and vendor technical support.

Implementation of the recommended option will ensure that server hardware is maintained and replaced in accordance with the Asset Management Plan, and that the [redacted] is appropriately licensed and supported. Replacing server hardware [redacted] as prescribed in the Asset Management Plan leads to several benefits compared to retaining servers over a longer lifespan:

1. Lower overall server count as the performance and density of successive server generations continues to improve
2. This lower server count saves on [redacted], rack space, power and hardware maintenance
3. The reduction in server maintenance and support costs is magnified due to the annual cost of support being higher for older servers

5.3 Regulatory Test

N/A

6. Options Analysis

6.1 Option Summary

Option 0 – Do Nothing

Continue to use existing server infrastructure, replacing only on failure

Criteria	Advantages	Disadvantages
Solution effectiveness		Unable to meet growing demand Unable to update operating system platforms to maintain support
Cost	Minimal CAPEX	Increased OPEX
Business impact		Increased risk of service disruption due to platform failure
Business strategic alignment		
IT strategic alignment		Does not align with IT strategy
Project complexity	Very low	

Risk profile		
Ability to achieve compliance		Unable to maintain security/data integrity safeguards due to unpatched operating system versions
Time - ability to implement within a deadline		

Option 1 – Recommended Option

Carry out the proposed Program of Work as documented

Criteria	Advantages	Disadvantages
Solution effectiveness	Will allow continued vendor support of IT service delivery	
Cost	Positive NPV due to OPEX savings	CAPEX required to implement
Business impact	Provides capacity to meet future demand growth	
Business strategic alignment	Aligns with strategy	
IT strategic alignment	Aligns with IT strategy	
Project complexity	Low-Moderate	
Risk profile	Low technical risk associated with the activity	
Ability to achieve compliance	Allows maintenance of required security patch operations	
Time - ability to implement within a deadline	Known implementation processes, all required skills exist in-house	

Option 2 – Infrastructure as a Service

Extensive use of Infrastructure and Platform as a Service providers for application hosting

Criteria	Advantages	Disadvantages
Solution effectiveness	Increased asset utilization and efficiency	
Cost	Minimal CAPEX	Increased OPEX
Business impact	Allows rapid scaling to meet demand changes	
Business strategic alignment		
IT strategic alignment	Aligns with IT strategy?	
Project complexity		Complex implementation
Risk profile		Increased technical and business risk due to introduction of new architectures and technologies
Ability to achieve compliance		Will require additional activities to safeguard data privacy and integrity
Time - ability to implement within a deadline		Uncertain due to increased technical risk Will require acquisition of new technical skills

Option 3 – Hyper-converged Architecture

Use alternative server architectures, including 'hyper-converged' infrastructure for non-critical application services

Criteria	Advantages	Disadvantages
Solution effectiveness	Increased asset utilization and efficiency	
Cost	Lower CAPEX Reduced OPEX (over preferred option)	
Business impact	Provides capacity to meet future demand growth	
Business strategic alignment		
IT strategic alignment		Partial alignment
Project complexity		Increased complexity due to use of new technologies
Risk profile		Some technical risk due to use of new technologies
Ability to achieve compliance	Allows maintenance of required security patch operations	
Time - ability to implement within a deadline		Will require additional skills to ensure implementation deadlines are met

6.2 Summary of Drivers

The following table compares the options presented with regard to the criteria assessed in the previous chapter.

Criteria	Option 0	Option 1	Option 2	Option 3
Solution effectiveness				
Cost				
Business Impact				
Business strategic alignment				
IT strategic alignment				
Project complexity				
Risk profile	N/A			
Ability to achieve compliance				
Time - ability to implement within a deadline	N/A			

6.3 Summary of Costs

Option	Total Costs ($)
Option 0 – Do Nothing	No Capital Expenditure
Option 1 - Recommended	$6,891,000
Option 2 - IaaS	Unclear, although Gartner reports that IaaS implementations cost on average 40% more than internally provided server infrastructure
Option 3 – Hyper-converged platform	Unclear due to volatile market, however early indications are that up to 50% savings can be made with this approach compared to traditional server and storage. These savings would be reflected across IT.INF.01 and IT.INF02 (by combining them) which further complicates the economic analysis.

6.4 Preferred Option Cost Breakdown

	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27
Estimate ($M)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total ($) 2017-2019	**1,734,850**									
Total ($) 2017-2027	**6,891,000**									

6.5 Summary of Risk

The preferred option addresses Financial risks, as analysed utilising the 5x5 corporate risk matrix, as outlined in TasNetworks Risk Management Framework.

Risk Category	Risk	Impact	Likelihood	Consequence
Financial	Aging hardware has an increased likelihood of failure - mitigated by replacing hardware	Hardware failure will cause system outages which impact normal operations; additional operational effort required to manage and keep applications available, there is also potential for applications to be unavailable	Rare	Negligible
Financial	Capacity demand outstrips current resource availability	Inability to maintain existing systems or deploy new	Rare	Negligible

	- mitigated by replacing hardware with increased capacity	systems		

The risks associated with completing the preferred option are associated with a potential change in business decision to decrease datacentre infrastructure and seeing an unanticipated increase in resource requirements. Both have a low financial impact.

6.6 Economic analysis

Option No.	Option description	NPV	Reason got selection/rejection
0	Do nothing	$0	
1	Preferred option	$840,834	
2	Infrastructure as a Service		
3	Hyper-converged Architecture		Market for these technologies is still relatively volatile, high technical risk and high uncertainty regarding pricing over this planning horizon

Further details of the NPV calculations can be found here:

IT.INF.01 NPV Calculations.xls

6.6.1 Quantitative Risk Analysis

N/A

6.6.2 Benchmarking

N/A

6.6.3 Expert findings

The emerging technology of hyper-converged systems have not been costed in detail due to the uncertainty over this planning horizon. This approaches should definitely be considered fully at the appropriate phases of the TasNetworks project management methodology. Indications from Gartner are that these technologies can save 45-55% compared to a more traditional approach[1]

[1] Cox, Roger W. - Gartner IT Infrastructure Summit (2015) *The Economics of Storage-Defined Software*

6.6.4 Assumptions

ITA-008	[redacted]
ITA-009	[redacted]
ITA-010	[redacted]
ITA-011	No major stepwise increase in server requirement from initiatives outside of Infrastructure
ITA-012	The outcome of [redacted] will either be OPEX neutral, or decrease ongoing OPEX
ITA-013	Requirement for physical servers can be met with approx [redacted] - any other requirement will be funded by external projects
ITA-014	Server warranties and replacements are being aligned for 2017 by infrastructure project activity during 2015/2016
ITA-104	Equivalent compute capacity between similarly priced servers 5 years apart is 4x (based on existing compute infrastructure compared to the replacement equipment quoted in the detailed costs)
ITA-105	Costs savings regarding [redacted] rack space, annual hardware maintenance/support and power consumption are based on this 4x increase in host count over 5 years and linearly interpolated (starting at zero in the first year)
ITA-106	This analysis breaks down beyond 6-7 years as it is no longer possible to acquire hardware maintenance contracts on equipment of this age. For the purposes of this NPV any savings are capped at the level of +5 years. A more practically relevant analysis would require that replacement of servers is unavoidable at year +6 or +7 and those capital costs should be accounted for in those years.

Section 2 Approvals (Gated Investment Step 2)

Project Initiator:	[Enter name]	**Date:**	
Project Manager:	[Enter name]	**Date:**	

Actions			
Submitted for CIRT review:	[Enter date of CIRT here]	**Actioned by:**	[Enter name]
CIRT outcome:	[Enter details here] [Reference any minutes as appropriate.]		