In order to decommission the EOS instance of Cúram, the current bespoke implementation of Partner Registration will be migrated from the Cúram EOS instance to an existing partner-facing digital channel.

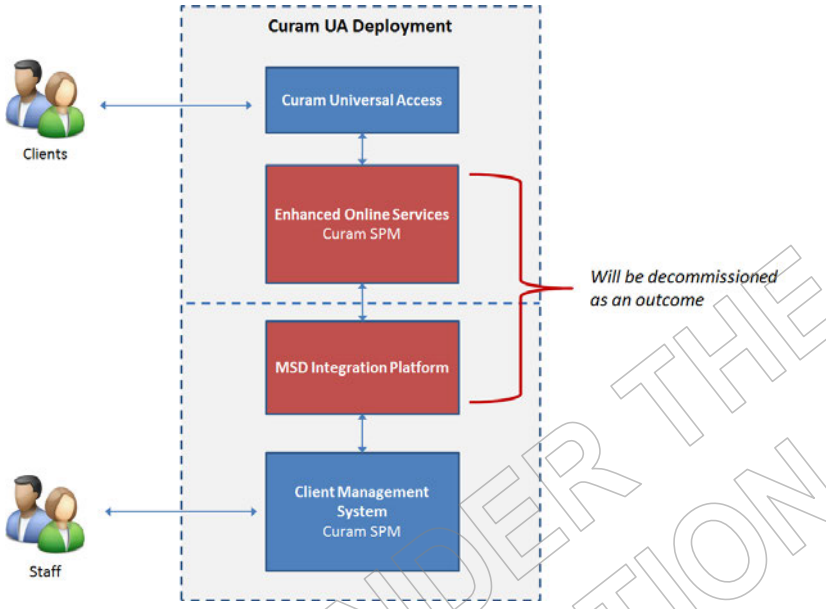


Figure 6: MSD Cúram UA Architecture Deployment

Option 4: *Increase Scalability of Digital Channels and Straight-through Processing*

This option includes all of the initiatives described in the **Increase Scalability of Digital Channels** short listed option. In addition, this option also includes resolving key bottlenecks in the Ministry's straight-through processing architecture. It consists of three key initiatives which are described in more detail below.

Existing implementations of straight-though processes will be prioritised based on their business value, volume of transactions, and severity of bottlenecks, in order to reduce rates of staff intervention and application processing times for clients.

Increased Automation Rate of Straight-through Processing:

This work will reduce the frequency of manual tasks generated by client online applications by focusing on improving the quality and completeness of information being provided in client online applications. Online application forms will introduce greater pre-population, guidance, and pre-validation of client submitted details in order to improve the quality of applications at the time of client submission. Digital channels will enable the gathering of all possible supporting documentation and evidence online (within legislative and policy constraints).

Simpler Task Management Experience for Staff:

This work includes simplifying the business process management technology used to support straight-through processing of client online applications. These processes currently generate a high volume of manual tasks which require staff action to complete straight-through processing of online applications. Many of these manual tasks are hosted on the Ministry's bespoke task management application, Straight to Processing (S2P), which is not sufficiently resilient or scalable enough to support critical client transaction processing.

All tasks related to straight-through processing of online applications will be migrated to the Ministry's business process management platform and/or client management system (depending

on the best-fit for the task), so that they are no longer hosted on the S2P application. This will enable critical business process functions to be retired from the S2P application.

Client Online Application Status:

Lastly, this work will focus on introducing a standardised and transparent lifecycle status for client online applications. By making the complete application lifecycle process and the current status more visible to staff and clients, it is expected that clients will benefit from an improved experience and application processing times will be reduced.

5.5 Delivery Plan and Procurement (Commercial Case)

5.5.1 Preferred Strategic Option

The components of the Ministry's digital channel and straight-through processing architecture (MyMSD, Cúram, BPM, and S2P) are already owned by the Ministry, and there are existing in-house teams that oversee development, configuration, testing, and implementation of these applications.

In order to enable additional capacity in the teams to deliver these recommended changes, the in-house teams will be supported with suitably skilled external labour using existing panel arrangements and external professional services contracts. It is not envisaged that any procurement activity will be required for the components of the solution.

The Ministry's uses the Scaled Agile Framework (SAFe) delivery framework as its technology delivery model. This will enable the MyMSD and Cúram teams to decompose the complete delivery into discrete 3-month sized increments, and thereby avoid the risk of a 'big bang' implementation. These teams have over two years of experience working in this manner and have already delivered a number of complex and large scale changes.

In order to successfully connect the Ministry's digital channel architecture with the Ministry's strategic client identity platform, the MyMSD and Cúram teams will need to coordinate and work closely with the Identity and Access Management (IDAM) programme stream. Due to technical dependencies, these changes will be coordinated at the SAFe program level to ensure alignment of delivery.

5.5.2 Key Constraints and Dependencies

The proposal is subject to the following constraints and dependencies.....These dependencies will be carefully monitored during the programme....

Table 41: Key constraints and dependencies related to the risks identified for this workstream.

Constraints	Notes
Limited Workforce Capacity	A high number of the MSD workforce will be required to participate and support the programme delivery due to their expert knowledge of Ministry business processes and technology systems. This additional demand will compete with existing workforce demand; including delivering existing legislative commitments, implementing the recommendations from the Welfare Expert Advisory Group (WEAG), supporting Business-as-Usual (BAU) organisational activities, and the existing pipeline of technology systems maintenance and change activities.
Limited Organisational Change Capacity	This programme will result in multiple significant changes to key technology systems used by staff over two years. The organisation has a limited capacity to absorb organisational and technology change before it suffers from "change fatigue".

Dependencies	Notes and Management Strategies
Additional Workforce	The Ministry will need to be able to hire the required additional workforce, which is dependent on the availability of specialist business and technology resources in the New Zealand labour market.
Technology and Consulting Vendor Support	The Ministry will require expert advice and resource capacity provided by current and future technology and consulting vendors.
Sequencing of WEAG Delivery	Future legislative changes, including implementing recommended WEAG changes, will be easier to implement if this work is able to progress, and the sequencing of programme deliverables can be coordinated.

5.6 Financial Case for Scalability of Digital Channels and Straight-through Processing

5.6.1 Detailed funding breakdown

Please provide a breakdown of the costs of this initiative

Option 3: Increase Scalability of Digital Channels

($m)	2019/20	2020/21	2021/22	2022/23
Capital Capitalised labour including vendor costs	5.5	1.5	-	-
Capital Software acquisition and implementation	-	-	-	-
Operating FTEs	-	-	-	-
Operating As-a-service fees vendor support fees Software maintenance	-	-	-	-

Notes: Assuming no additional operating costs to support increased client digital usage.

5.6.2 Detailed funding breakdown

Please provide a breakdown of the costs of this initiative

Option 4: Increase Scalability of Digital Channels and Straight-through Processing

($m)	2019/20	2020/21	2021/22	2022/23
Capital Capitalised labour including vendor costs	8.5	4.5	-	-
Capital Software acquisition	-	-	-	-
Operating FTEs	-	-	-	-
Operating As-a-service fees vendor support fees Software maintenance	-	-	-	-

Notes: Assuming no additional operating costs to support increased client digital usage.

6. Software and Security upgrades

6.1 The case for extended funding of Software and Security upgrades

The Ministry has limited budget to cover regular upgrades to hardware, software, security and legislative changes. This is referred to in the Ministry as the 'PEC Backlog'. This funding envelope has been set at circa $44m per annum, whilst a figure of closer to $62m per annum has been identified as being required to stop the Ministry further regressing into technical debt.

The Hardware and Legislation initiatives included in this business case will relieve some of the pressure on existing capital budgets, and the remaining shortfall would be contained in the software and security category.

To have sufficient budget to fund these regular upgrades an additional $2.0m capital will be required in 2019/20 and none in 2020/21. This will augment the allocated funding for the backlog of $43.5m capital in 2019/20 and $60.3m in 2020/21.

This case is only for 2 years. The ongoing capital requirement will be recalculated in the Budget 2020 bid.

6.2 Options considered (Economic case)

6.2.1 Long list of options considered

Option	Description	Status
Strategic option	Capital committed to enable upgrades to software and security	Preferred Option
Do nothing	Fall further behind in upgrade cycle, compounding existing Technical debt	discounted
Defer for 12 months	Fall further behind in upgrade cycle, compounding existing Technical debt	discounted

6.3 Delivery Plan and Procurement (Commercial Case)

6.3.1 Preferred Strategic Option

6.3.1.1 Delivery

The capital allocation within MSD is governed by the Portfolio Executive Committee (PEC) which is a sub-committee of the Investment Strategy Governance Committee (ISGC). This legislative change program would fall under PEC unless an individual capital investment item exceeds $2m, in which case the approval level sits with ISGC.

This funding will be ring-fenced and reported separately on allocation and forecast to ISGC on a quarterly basis.

In addition the Enterprise Portfolio Management Office for large or high risk projects will report to MSD Leadership governance committees and also to Treasury.

This funding would only be used for the projects that specifically adhered to the software and security upgrade criteria.

6.3.1.2 Key Constraints and Dependencies

The proposal is subject to the following constraints and dependencies. These dependencies will be carefully monitored during the programme.

Table 42: Key constraints and dependencies related to the risks identified for this workstream.

Constraints	Notes
Limited Workforce Capacity	A high number of the MSD workforce will be required to participate and support the programme delivery due to their expert knowledge of Ministry business processes and technology systems. This additional demand will compete with existing workforce demand; including delivering existing legislative commitments, implementing the recommendations from the Welfare Expert Advisory Group (WEAG), supporting Business-as-Usual (BAU) organisational activities, and the existing pipeline of technology systems maintenance and change activities.
Limited Organisational Change Capacity	This programme will result in multiple significant changes to key technology systems used by staff over two years. The organisation has a limited capacity to absorb organisational and technology change before it suffers from "change fatigue".
Dependencies	**Notes and Management Strategies**
Available Resource	This project depends on available capacity within the current development and support teams
Technology and Consulting Vendor Support	The Ministry will require expert advice and resource capacity provided by current and future technology and consulting vendors.
Sequencing of WEAG Delivery	Future legislative changes, including implementing recommended WEAG changes, will be easier to implement if this work is able to progress, and the sequencing of programme deliverables can be coordinated.

6.4 Financial Case for Legislation

6.4.1 Detailed funding breakdown

Please provide a breakdown of the costs of this initiative

Legislation Capital: Strategic Option

($m)	2019/20	2020/21	2021/22	2022/23
Capital Capitalised labour including vendor costs	2.0			
Capital Software acquisition and implementation				
Operating FTEs				
Operating As-a-service fees vendor support fees software maintenance				

Notes:

7. Replacing ageing 'on premise' hardware with Infrastructure-as-a-Service and public cloud

7.1 The case for replacing ageing infrastructure and moving the Ministry's technology infrastructure to the cloud

The Ministry's hardware infrastructure (compute and storage) is rapidly aging with nearly two thirds of this infrastructure being over 5 years old. This presents a significant risk to client services if some of these hardware components were to fail.

Other initiatives included in this business case such as Identity and Access Management (IdAM) and Hindin replacement will reduce the size of the aging hardware problem, but significant issues remain. Even with Hindin and IdAM replaced, the Ministry still has significant workloads running on old versions of HP-UX and Solaris operating systems which, in turn, can only operate on old hardware. The real issue with these workloads is the nature of the bespoke applications the Ministry has developed over the years, which will need to be re-architected, or replaced with Software as a Service options.

The risk of storage hardware failure increases over time. Even with MSD's use of good storage practices such as replication and backup, older storage hardware increases the likelihood of disruptive failure. Failures require intervention to restore data and compromise the ability to deliver services to clients.

MSD is the guardian of a significant data asset. Old and obsolete storage technology raises the risk of data loss. Without new investment over the next 2 years, over two thirds of the storage devices will be over 5 years old. The fact that much of the Ministry's hardware is fully depreciated, and at the end of useful life, also represents an opportunity to pivot to a new model. Currently the Ministry purchases hardware as an asset.

The Ministry would much prefer to follow the New Zealand government technology strategy of not owning hardware assets and instead consuming compute and storage as-a-service, either utilising Government IaaS providers or public cloud providers. The Ministry's Te Pae Tawhiti Technology Strategy articulates this 'cloud first' approach.

Historically the Ministry has been unable to move to this model because of the operating cost hurdle. The Ministry has tended to 'sweat' hardware assets and operate them well past the point where they are fully depreciated.

Owing to the 'asset sweating' phenomenon, a direct swap of capital (depreciation) to operating budget will not be sufficient to pay for the new service. This investment will cover the shortfall, and enable the Ministry to overcome the operating cost hurdle. The Ministry has a current backlog of infrastructure projects ready to go if this initiative is not successful, but this will perpetuate the cycle of asset ownership, because it is the only affordable route. This initiative is the 'circuit breaker' designed to prevent that happening.

Workloads such as Windows Virtual Machines (VMs) are already amenable to moving to 'as-a-service' Infrastructure options, and funding is required to achieve this. Red Hat Linux workloads need to be 'containerised' and moved to Infrastructure cloud.

As compute infrastructure moves to infrastructure cloud, so storage capacity needs to move to efficiently serve the applications.

In summary there are four fundamental components to this initiative:

1. Moving off Solaris and HP-UX operating systems (and associated hardware) via re-architecting or replacing the applications that sit on them
2. Containerising Red Hat Linux workloads and moving them to infrastructure cloud
3. Moving Windows VMs to infrastructure cloud
4. Avoidance of data corruption by replacing aging storage devices and aligning storage 'as-a-service' with compute 'as-a-service'

7.2 Background

Many of MSD's servers are old. Many are over 5 years old and some are as old as 14 years. The same picture exists with MSD's storage infrastructure.

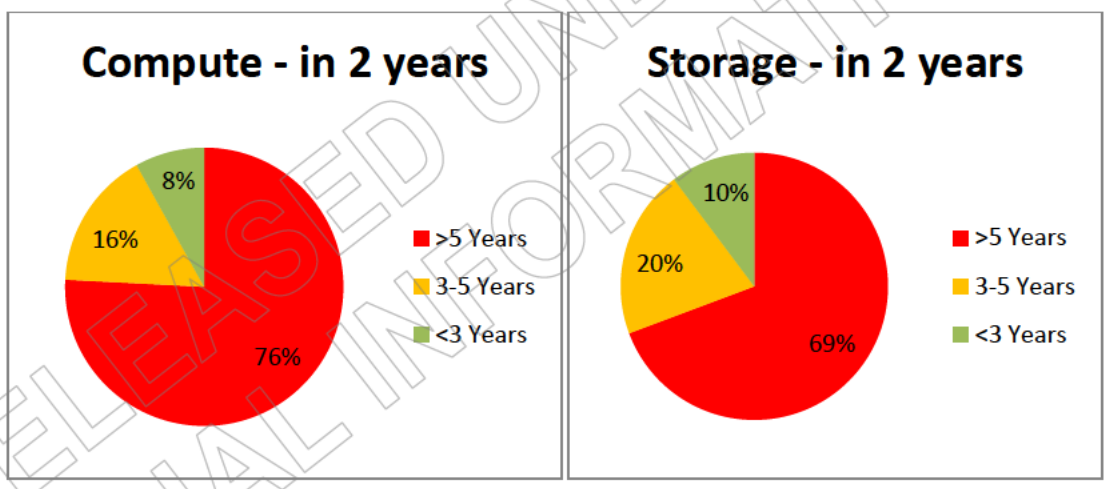
This state of affairs poses a significantly elevated risk of systems failure for computer systems that directly support clients. Older systems become unsupported by vendors and more susceptible to both physical failure and the inability to keep software patched and protected against security vulnerabilities.

Migrating applications to supported infrastructure is often difficult. Software built for old hardware and old operating systems will often not function on modern hardware and operating systems. Significant effort is needed just to test and verify the proper functioning of migrated functionality.

MSD has in recent years directed investment to functional enhancements of the software applications and to delivering new self-service functionality to its clients. This has resulted in a backlog of hardware migration initiatives and resulted in some hardware assets being retained for longer than desirable.

7.2.1 Aging hardware

Many of MSD's servers are now older than 5 years. Some of the servers are as old as 14 years.



Example: MSD invested in new web server hardware in 2008. The web servers run on Sun V240 server equipment that is no longer supported and does not comply with MSD's preferred hardware of X64 commodity blade servers.

Example: Some of MSD's applications were built to run on equipment that is now obsolete. They were moved to run on more modern hardware several years ago using emulation software that mimics the original equipment. Even that replacement hardware is now out of support.

7.2.2 Legacy of the data centre migration

Accelerated hardware investment occurred to support MSD's data centre migration that was undertaken during 2014. That hardware is now reaching end of life.

7.2.3 Application upgrades required – upgrades compete with functional improvements

Hardware upgrades are dependent on software. A typical hardware upgrade will also require the operating systems, middleware and application software to be updated and, at a minimum, regression tested to assure stability.

7.2.4 Hardware upgrades require application changes and testing

More than the application code must be upgrade to deploy on new hardware. The entire 'stack' must be upgraded. This includes:

- Virtualisation – e.g. move from 'bare metal' to VMware
- Operating system – e.g. Change from Solaris or HP-UX to Red Hat Linux
- Middleware – e.g. Java upgraded to supported versions, Oracle Weblogic upgraded to current versions, software libraries, etc.
- Databases – Databases must be upgraded to supported versions
- Security – newer encryption and security measures are mandated. E.g. HTTPS/TLS connections are now required between servers within a data centre whereas previously unencrypted connectivity was acceptable

Even without functional changes to the application code, problems are often encountered. Problem diagnosis and remediation takes time and effort. E.g. Old Java XML libraries are replaced by new versions that require changes to application code. E.g. Network and database drivers may be incompatible with old application code

The effort to upgrade and test the software can be greater than the cost to purchase and deploy the hardware. The project pipeline for the software upgrades requires additional resources if 'business as usual' projects are to be supported alongside the upgrades.

7.2.5 Storage

A significant portion of MSD's storage infrastructure is already over 5 years old. The large amount of storage purchased to support the data centre migration is already 5 years old or will be in the coming year.

7.2.6 Networks

In general the network infrastructure employed by MSD is current and supported. On-going investment will maintain the infrastructure in this state.

7.3 Risks and Benefits

7.3.1 Risks

The primary risk of aging hardware is that a failure will compromise MSD's ability to deliver services, either directly to clients via the self-service channel or via the systems that our staff use to serve clients.

A secondary risk is that the support effort needed to maintain systems hosted on old hardware diverts resources from delivering new value to clients. The effort expended on maintaining old, unsupported infrastructure could more efficiently be expended supporting a

The primary aim is to have MSD's IT systems running on supported and sustainable infrastructure. Restoring MSD's hardware assets to a modern and supported state lowers the likelihood of major failure, or of multiple minor failures, any of which would compromise MSD's ability to deliver core services.

The investment is required in two phases:

1. Move applications to current, supported infrastructure
2. Replace vulnerable hardware with supported infrastructure
3. Institute a sustainable and on-going infrastructure programme to ensure that the same vulnerabilities do not resurface

Initial risk analysis

This section outlines the main risks that have been identified for this work stream. They are examined in terms of the seriousness of their consequence as well as their likelihood. Risk management and mitigation strategies are also outlined for each of these risks.

Table 43: Main Risks

Main Risks	Consequence (H/M/L)	Likelihood (H/M/L)	Comments and Risk Management Strategies
Over 300 applications depend on aging hardware and out of date software. **The risk of failure increases with the age of the infrastructure.** **If a failure occurs MSD risks being unable to deliver services to over 1,000,000 clients.**	H	H	Some of MSD's core systems have moved to more modern systems and to solutions offering greater resilience if a failure or outage should occur. However many of MSD's applications still run on aging hardware, have out of data software or otherwise depend on applications that exhibit those weaknesses. Moving vulnerable applications to modern 'as a service' offerings on supported software will reduce the risk of failure.

A risk register has been developed and will be progressively updated as more detailed analysis is undertaken.

Risks from Change

The tables below deal with the risks of the preferred investment option. Specifically it examines the execution risk which looks at risk associated with doing the work, the residual risks that will be leftover once the work is complete – and any introduced risk that would be created as part of doing this work. It also looks at any mitigations that may be implemented to lessen the effect or consequence of any of these risks becoming material issues that require remediation.

Table 44: Execution Risk

Execution risk	Consequence (H/M/L)	Likelihood (H/M/L)	Assessment Rating	Mitigation
Some applications are more difficult to migrate from aging hardware than anticipated	M	M	M	Early analysis to match applications with solution patterns. Plan to have sufficient time and resources for the more complex problems.
The resources and time allocated are insufficient to migrate the targeted	M	M	M	Prioritisation strategies can be employed to balance the need to migrate the bulk of applications with

applications and some old hardware remains in use.				the need to move the move critical applications. Using the Gartner TIME (Terminate, Invest, Migrate, Eliminate) analysis may be useful to identify the appropriate strategies and priorities.
Some applications may not be suitable for running on 'as a service' or cloud infrastructure. For example, they may be tightly dependent on other applications running on MSD infrastructure.	L	M	L	Develop a range of options for migrating applications. Develop options that require only minor changes to the targeted applications.
Some of the targeted applications are old and there may be difficulties discovering enough about the applications to migrate them	M	M	M	Early discovery of supporting information to allow investigations and analysis where documentation is lacking.

Table 45: Residual Risk

Residual risk	Consequence (H/M/L)	Likelihood (H/M/L)	Assessment Rating	Mitigation
Some applications may still be running on aging hardware after the project has concluded.	L	M	L	Prioritising changes that will address the greatest number of applications, prioritising applications that have long term strategic value to MSD

Table 46: Introduced Risk

Introduced risk	Consequence (H/M/L)	Likelihood (H/M/L)	Assessment Rating	Mitigation
MSD will have greater dependence on 'as a service' offerings and the services provided by infrastructure and cloud vendors.	M	M	M	Develop appropriate practices and tools to manage cloud infrastructure
MSD infrastructure will be more widely distributed over a more diverse infrastructure. Communications and connectivity will be of greater importance.	L	H	M	Develop common network communication patterns and implementations
New technologies are likely to be introduced to manage applications in containers, orchestrated container environments and public	H	M	H	Prepare for training and cross-skilling of staff members

cloud. MSD may not keep pace with technical training needs.				

7.3.2 Benefits

MSD is moving toward mainstream compute infrastructure, often labelled X86 (32-bit) or more recently X64 (64-bit). Historically MSD has utilised SPARC and Itanium servers. Many of the older servers targeted by this business case are SPARC and Itanium. The standardisation on X64 aids the future portability of our applications as 'as a service' and cloud infrastructures are typically hosted on X64 servers.

Shifting the infrastructure from an 'asset ownership' model to a 'service consumption' model will give MSD a modern platform that is always up to date (evergreen). The periodic replacement of assets will no longer be required.

To avoid falling in to the aging infrastructure trap in the future there is a need to change the asset ownership model. A shift to a rental or subscription model allows capital to be deployed elsewhere and instead of using depreciation to fund asset renewal the cost is shifted to an operational expense.

New infrastructure management opportunities, so-called as-a service offerings, allow capital expenditure to be replaced with operational expenses –paying for a service rather than a physical asset.

7.4 Options considered (Economic case)

7.4.1 Long list of options considered

Option	Description	Status
Option 1 Strategic Option	Compute and storage 'as-a-service'; upgraded software. Migrate compute and storage hardware to evergreen, consumption model; remediate software to be compatible with updated hardware. The 'as-a-service' model ensures that hardware is regularly refreshed with reliable, supported models. A range of replacement opportunities exist; combinations of these are likely to be utilised: • Infrastructure-as-a-Service • Platform-as-a-Service • Software-as-a-Service Hosting is likely to include a combination of: • Government cloud • Public cloud	Short listed option (Preferred)

Option 2 Purchase new hardware	• Purchase new hardware to bring the asset age down to an acceptable level; remediate software to be compatible with updated hardware. • Remediate and move software applications to be compatible with updated hardware. • Discounted because the asset ownership model perpetuates the cycle whereby assets must be depreciated and refreshed.	Discounted
Option 3 Do nothing and continue supporting old hardware	• No additional investment; hardware ages further. • No additional investment will result in applications languishing on old servers. • Old servers will become increasingly vulnerable to wear and tear and other failures. Lack of replacement parts will expose MSD and MSD's clients to inconvenience if servers cannot be repaired. • Data stored on old disks will become increasingly vulnerable to data loss as faults occur. • Discounted because the risk of failure of critical systems is too great.	Discounted

7.4.2 Migrating applications from old infrastructure – applies to all new platforms

Software applications that currently run on aging infrastructure need to be moved to supported platforms. There is no single solution that can be applied to all applications. Each application will need to be analysed to determine the best path to eliminate the risks associated with aging infrastructure.

In general, most of these options will apply irrespective of the target platform; whether owned hardware or 'as-a-service' is used to host the re-platformed applications.

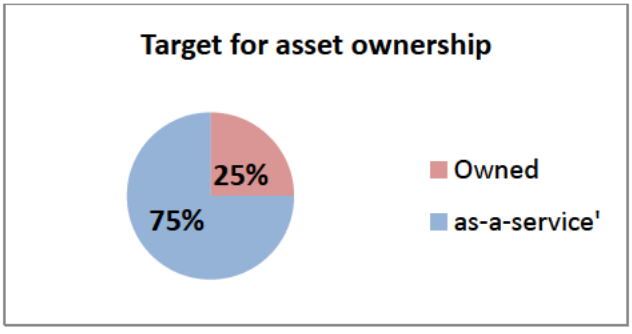
7.5 Delivery Plan and Procurement (Commercial Case)

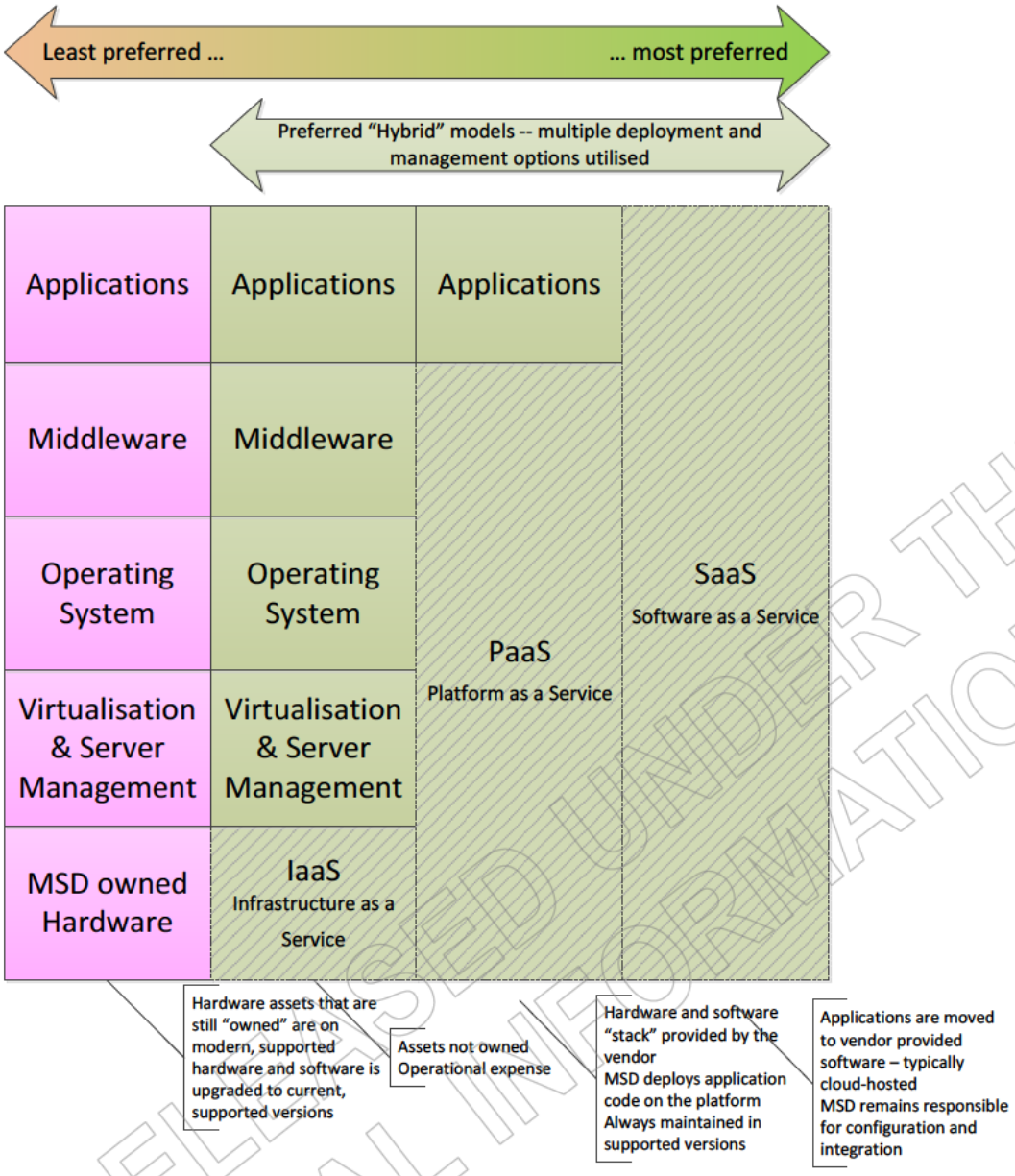
7.5.1 Preferred Strategic Option 1: Compute and storage 'as-a-service'; upgraded software

7.5.1.1 Hardware

The preferred approach is to shift asset ownership to a rental model. Several options exist for 'as-a-service' – refer to the following diagram. No single one of these will be appropriate for all applications to be moved from the vulnerable hardware. All will remain as viable options – the selection will depend on the characteristics of the individual applications.

The remediation options for each application will be driven by MSD's Technology Strategy. This has a broad preference for more complete 'as-a-service' offerings. For example 'Software as a Service' is preferred over 'Platform as a Service'. However SaaS will not be viable for many of the applications currently hosted on aging hardware, therefore other forms of hosting will need to be explored.





7.5.1.2 Software migration

To move software applications to new infrastructure, new operating systems, etc. requires a range of skills. A dedicated multi-disciplinary team to facilitate the migration from aging hardware is proposed. The team will be resourced internally by MSD. A likely set of skills in the team is:

Discipline	Number
Business Analyst	2
Architects	2
Developers	3
Database administrators	1
Middleware & infrastructure support	3
Testers	5
Project Manager	2
Total	**18**

7.5.1.3 *Software Licencing*

Software licencing is required whether applications are run 'in-house' on owned hardware or run on an 'as-a-service' platform. Examples include VMware virtualisation and Red Hat Enterprise Linux (RHEL). It is assumed that the financial implications are neutral.

7.5.1.4 *Support and Maintenance*

Some of the hardware used by MSD incurs ongoing support and maintenance costs. These agreements facilitate rapid support and remediation if and when a fault occurs. With the 'as-a-service' procurement model the onus for hardware support and maintenance shifts to the vendor. The need for support and maintenance surety still exists – responsibility transfers to the vendor of the platform. It is assumed that the cost of these services form part of the 'as-a-service' pricing.

7.5.2 *Option 2: Continue asset ownership; retire old hardware; migrate applications*

An alternative, not preferred, option is to replace aging hardware with modern hardware that is owned and maintained by MSD – essentially a continuation of the historical practice of MSD.

The implications for the costs are mainly that the operational cost of 'as-a-service' will shift to the traditional capital and depreciation model.

The manpower efforts are expected to be the same as the preferred option as each application will need to undergo re-platforming and testing.

7.6 Key Constraints and Dependencies

The proposal is subject to the following constraints and dependencies. These dependencies will be carefully monitored during the programme.

Table 47: Key constraints and dependencies related to the risks identified for this workstream.

Constraints	Notes
Agreement on target infrastructure must be obtained	Some of the solutions will be new to MSD. Ideally there will be general agreement that the solutions are practical and sound.
Resources must be made available to man the migration teams	A variety of skills will be needed within the migration teams. It may take time to find the correctly skilled people to build the teams
Information about the applications to be migrated must be available to the migration team	Discovering relevant information about the systems to migrate may be difficult as some of the applications are old and there may be little institutional knowledge of the applications. Without good sources of information the task of analysing and discovering suitable remediation will be much more difficult.
Dependencies	**Notes and Management Strategies**
Some of the other streams of work are intending to address	Some of the other streams of work are intending to migrate functionality from applications currently running on aging hardware. The Hindin applications are an example. If those streams fail to execute there will be a greater load on the migration team.

7.7 Financial Case for moving the Ministry's technology infrastructure to the cloud

7.6.1 Detailed funding breakdown

Please provide a breakdown of the costs of this initiative

Option 1: Migrate compute and storage hardware to evergreen, consumption model

($m)	2019/20	2020/21	2021/22	2022/23
Capital Capitalised labour	4.8	4.8	-	-
Capital	-	-	-	-
Operating FTEs – Development and testing				
Operating As-a-service fees platform costs	2.5	7.6	10.2	10.2

Notes:

7.6.2 Detailed funding breakdown

Please provide a breakdown of the costs of this initiative

Option 2: Continue asset ownership; retire old hardware; migrate applications

($m)	2019/20	2020/21	2021/22	2022/23
Capital Capitalised labour	4.8	4.8	-	-
Capital Hardware acquisition – compute and storage	6.9	6.9	-	-
Operating FTEs	-	-	-	-
Operating As-a-service fees vendor support fees	-	-	-	-

Notes:

8. Legislative Driven application change

8.1 The case for Legislative Driven application change

Enacting legislation changes requires technology and process change which incurs significant cost. It is forecast (based on previous years) that MSD is required to undertake 12m of legislation driven across the 19/20 and 20/21 financial years.

Historically MSD have absorbed these change costs within capital baseline and have indicated that this practice can no longer be sustained in the minister briefing paper "*Budget 2019 – Operating and capital cost pressures*" on 3rd October 2018.

A recent MSD information technology review identified significant core systems that are at risk of failure, this is a result of limited investment in upgrades and infrastructure as a result of capital funding pressure where MSD has prioritised legislative changes ahead of technology refresh. The capital funding pressure has resulted in legislative being delivered in a minimum needed approach, which frequently depends on manual staff actions and creating further technology debt.

The MSD core application environment consists of are largely legacy systems which are running on out-dated software platforms, the lack of investment has resulted in an environment where the cost of business change is high which has resulted in short term tactical technology decisions. As a result MSD's limited capital reserves are significantly oversubscribed, and the following prioritisation is applied:

- Legislation changes,
- System risk changes,
- Technology maintenance,
- Client experience & efficiency changes.

It is expected that the Welfare Expert Advisory Group (WEAG) report[14] recommendations will require significant changes to MSD systems as part of a social policy change programme, further constraining the capability of MSD to execute change outside of legislation

8.2 Risks and Benefits

8.2.1 Risks

The current risks include:

- System changes are often undertaken as minimum needed to ensure legislation is enacted
- Creates further technical debt due to the minimize cost approach required, drives short term technology decisions (e.g. utilizing the Information Analysis Platform (IAP) for operational process purposes)
- Existing legislation benefit entitlements not delivered in a timely and correct manner
- The required speed of legislation system changes has resulted in reliance on manual actions by staff to ensure correct payments are made to clients. This can increase the risk of paying clients incorrectly, MSD increases monitoring to ensure that clients receive correct entitlement however this contributes to administration overhead.

[14] Report expected February 2019

- Strain on MSD's funding, both capital and operating resulting from the historical information system funding model, that is, using baseline funding earmarked for other services and products
- Funding of other critical investments such as client experience is at risk due to prioritization demands of legislation and system risk funding

8.2.2 Benefits

The benefits of capital committed to legislation change:

- Changes are funded, enabling MSD to deploy legislation in an efficient, timely cost effective manner
- Funding would be ring fenced for legislation change, reducing pressure on internal capital funding
- Increased client on-line uptake resulting from funding capacity to invest in online services
- Ensure accurate and timely benefit payments to clients
- Enables core systems to be upgraded and maintained keeping them aligned with current technology standards

8.3 Options considered (Economic case)

8.3.1 Long list of options considered

Option	Description	Status
Option 1 Strategic Option	Capital committed to enable legislative change	Preferred Option
Option 2 Do nothing	Internal capital prioritization to fund legislation change, continues approach of minimum needed to ensure legislative compliance	Discounted
Option 3 Defer for 12 months	Internal capital prioritization to fund legislation change for 19/20, prioritization pressure for changes in that FY continues, with legislation capital funding in 20/21.	Discounted

8.4 Delivery Plan and Procurement (Commercial Case)

8.4.1 Preferred Strategic Option 1

8.4.1.1 Delivery

The capital allocation within MSD is governed by the Portfolio Executive Committee (PEC) which is a sub-committee of the Investment Strategy Governance Committee (ISGC). This legislative change program would fall under PEC unless an individual capital investment item exceeds $2m, in which case the approval level sits with ISGC.

This funding will be ring-fenced and reported separately on allocation and forecast to ISGC on a quarterly basis, with annual return of funding not required to treasury.

Projects within this program have the standard MSD quality assurance oversight from Service Delivery Portfolio Management Office (SD PMO) for delivery, reporting to the Service Delivery Project Board with a Service Delivery Leadership team member as the Senior Responsible Owner (SRO). All projects provide the SD PMO with fortnightly status reporting and visibility provided to the full Service Delivery Leadership team via the SD Portfolio Dashboard Report on a monthly basis along with financial reporting.

In addition Enterprise Portfolio Management Office for large or high risk projects reporting to MSD Leadership governance committees and also to Treasury.

This funding would only be used for the projects that specifically adhered to the legislative compliance criteria. Project underspend will be returned to the legislative change program.

8.5 Financial Case for Legislation

8.5.1 Detailed funding breakdown

Please provide a breakdown of the costs of this initiative

Legislation Capital: Strategic Option

($m)	2019/20	2020/21	2021/22	2022/23
Capital Capitalised labour including vendor costs	6	6		
Capital Software acquisition and implementation				
Operating FTEs				
Operating As-a-service fees vendor support fees Software maintenance				

The Financial Case

The purpose of this section is to set out the Programme financial implications of the preferred way forward.

Total Cost

Table 48: The additional finding required over the four year period

$thousands	2019/20	2020/21	2021/22	2022/23	Total
Preferred Way Forward:					
Total Capital Required	**61,300**	**41,600**	**7,100**	**1,000**	**111,000**
Operating					
As a service costs	6,540	12,720	15,760	16,260	**51,280**
Internal resource	2,200	2,200	2,200	2,200	**8,800**
Depreciation		6,903	15,894	17,900	**40,696**
Capital charge	3,330	6,660	6,660	6,660	**23,310**
Total Operating Required	**12,070**	**28,483**	**40,514**	**43,020**	**124,086**
Total Capital and Operating	**73,370**	**70,083**	**47,614**	**44,020**	**235,086**

Period of analysis

The expenditure of each option was analysed over the four-year period 2019/20 to 2022/23

Composition of costs

Costs include:

- capital expenditure
- as-a-Service costs
- cost of internal resource
- Depreciation
- Capital charge

Description of costs

The following analysis is for the preferred option, including the preferred option for each of the individual cases.

Capital costs

Table 49: The capital requirements for each of the individual cases

$thousands	2019/20	2020/21	2021/22	2022/23	Total
Preferred Way Forward:					
Capital					
Identity Management	11,000	7,300	1,600	-	**19,900**
Centralise Rules Processing - DREW	12,000	5,000	-	-	**17,000**
Foundational Knowledge base- Hindin	10,000	6,000	-	-	**16,000**
Data Warehouse Re-platform	7,000	8,000	5,500	1,000	**21,500**
Digital capability	8,500	4,500	-	-	**13,000**
Software and Security upgrades	2,000	-	-	-	**2,000**
Replacing aging "on premise" hardware with infrastructure as a service and public cloud	4,800	4,800	-	-	**9,600**
Legislation Change Funding	6,000	6,000	-	-	**12,000**
Total Capital Required	**61,300**	**41,600**	**7,100**	**1,000**	**111,000**

As a service costs

As a service costs include cloud service consumption costs, annual software licensing, and infrastructure-as-a-service charges.

$thousands	2019/20	2020/21	2021/22	2022/23	Total
Preferred Way Forward:					
As a service costs					
Identity Management	200	1,300	1,300	1,300	**4,100**
Foundational Knowledge base- Hindin	1,800	1,800	1,800	1,800	**7,200**
Data Warehouse Re-platform	2,000	2,000	2,500	3,000	**9,500**
Replacing aging "on premise" hardware with infrastructure as a service and public cloud	2,540	7,620	10,160	10,160	**30,480**
Total As a service costs	**6,540**	**12,720**	**15,760**	**16,260**	**51,280**

Internal resources

Internal resource includes the operating cost component for all personnel costs for the implementation of the selected project.

$thousands	2019/20	2020/21	2021/22	2022/23	Total
Preferred Way Forward:					
Internal resources					
Centralise Rules Processing - DREW	1,500	1,500	1,500	1,500	**6,000**
Foundational Knowledge base- Hindin	700	700	700	700	**2,800**
Total Internal resources	**2,200**	**2,200**	**2,200**	**2,200**	**8,800**

Depreciation

It is assumed that all assets included in the programme case will be depreciated over a 5 year period.

Capital charge

Capital charge has been calculated using the Treasury specified rate of 6%. It is assumed that 55% of the funding will be drawn down in 2019/20, 37% drawn down in the 2020/21 year, and the remaining 8% will be drawn down in 2021/22 and 2022/23.

Affordability and Funding

Overall affordability

Our Current Capital Position

1. The majority of the investment in the Ministry's critical infrastructure is funded through capital investment
   - This includes the fit out of 182 sites, a fleet of 1150 motor vehicles and critical technology that processes 14 million client interactions per year for over 1 million clients
2. These assets are also used by Oranga Tamariki as part of the shared services agreement. Table 1 details the cost and accumulated depreciation of the assets that the Ministry employs.

Table 50: Cost and accumulated depreciation of assets

	Land	Buildings	Furniture & Fittings	Computer Equipment	Motor Vehicles	Plant and Equipment	Software	Total
Assets at cost	22,820	21,265	139,190	108,566	27,262	10,116	498,037	**827,256**
Accumulated Depreciation	-	(1,141)	(90,388)	(80,722)	(12,716)	(8,701)	(315,800)	**(509,468)**
Net book value	**22,820**	**20,124**	**48,802**	**27,844**	**14,546**	**1,415**	**182,237**	**317,788**

3. Ideally the Ministry should have the value of the accumulated depreciation ($509m), in cash on its balance sheet available to fund the replacement of these assets. In reality only $40 million is available.

4. Over the last decade, there has been a strong incentive on us to:
   - Apply the value of accumulated depreciation (accumulated cash) to immediate capital priorities
   - maintain service continuity
   - return cash to the corporate centre.

5. This approach represents the conscious decision to operate a 'lean capital' approach, i.e. using the cash available to fund strategic business priorities, and has created the flexibility needed to be able to control and respond to changing fiscal parameters.

6. The accumulated impact of these decisions has however reduced future cash availability by at least $290m and this now means that we no longer have the cash available to fund any significant new or replacement investment.

Table 51: Area of cash use

Area of cash use	Capital spend $m
Te Maiaho Youth Justice Facility (Rotorua)	40
Repayment of capital to Crown	80
Simplification (Digital transaction transformation)	80
National office relocation	40
Cúram (Case management)	50
Total	**290**

7. The Ministry expects to generate between $43 million and $65 million of depreciation a year which is used to fund replacement of technology assets. This funding is not sufficient in order to meet the demands and priorities of the Ministry. The following table details the expected funding available to replace technology assets

Table 52: Depreciation to fund technology assets $thousands

Investment by Asset Portfolio	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	8 Year Total
Funding available to replace technology assets	42,938	60,500	64,210	64,481	59,252	55,200	58,824	63,272	468,677

8. In addition to the funding being requested through Budget 19, MSD intends to spend its existing depreciation on replacing aging software assets. The table below details all of the proposed expenditure on IT technology over the four year period.

Table 53: Total IT related expenditure 2019/20 – 2022/23

$thousands	2019/20	2020/21	2021/22	2022/23	Total
Preferred Way Forward:					
Capital					
Identity Management	11,000	7,300	1,600		**19,900**
Centralise Rules Processing - DREW	12,000	5,000			**17,000**
Foundational Knowledge base- Hindin	10,000	6,000			**16,000**
Data Warehouse Re-platform	7,000	8,000	5,500	1,000	**21,500**
Digital capability	8,500	4,500			**13,000**
Software and Security upgrades	45,300	60,300	64,210	64,481	**234,291**
Replacing aging "on premise" hardware with infrastructure as a service and public cloud	4,800	4,800			**9,600**
Legislation Change Funding	6,000	6,000			**12,000**
Total Capital Required	**104,600**	**101,900**	**71,310**	**65,481**	**343,291**
Operating					
As a service costs	6,540	12,720	15,760	16,260	**51,280**
Internal resource	2,200	2,200	2,200	2,200	**8,800**
Depreciation		6,903	15,894	17,900	**40,696**
capital charge	3,330	6,660	6,660	6,660	**23,310**
Total Operating	**12,070**	**28,483**	**40,514**	**43,020**	**124,086**
Funded by:					
Existing Revenue					
Existing Capital	42,938	60,500	64,210	64,481	232,129
Extra Revenue	12,070	28,483	40,514	43,020	124,086
Extra Capital	61,662	41,400	7,100	1,000	111,162
Total	**116,670**	**130,383**	**111,824**	**108,501**	**467,377**

Setting an appropriate contingency

For any financial forecasting there is inherent estimation risk. To accommodate for this risk in this business case a contingency estimating exercise has been undertaken. The approach adopted leverages the standard Quantitative Risk Analysis (QRA) concepts and methodologies. This enables a deeper dive into estimating the contingency as opposed to applying a generic 'one size fits all' contingency estimate across all projects. Undertaking such an exercise forces scrutiny over each of the cost elements to assess its potential variance. This variance estimate is dependent on the level of comfort and effort applied in estimating the particular cost element. Collation of these variance estimates forms the basis for the contingency estimation.

This programme consists of eight projects, each designed to focus on a specific identified risk area. The approach to resolving each risk area varies due to the nature of the risk. As a result, the cost estimation approach for each area also varies. The level of costing analysis for each project also differs as does the level of input and effort in compiling the cost estimates depending on the maturity of the project's assessment. Obviously the more rigorous the costing analysis is the more confidence the programme has over the accuracy of the estimates. Therefore a contingency estimate is likely to be less for projects which have undergone a deeper assessment compared to the projects which are less mature in their assessment.

The Purpose of Using a QRA Approach to Contingency Estimation

The purpose of applying a contingency to the estimated costs is to recognise that, despite best endeavours, there is a reasonable likelihood that the actual cost of a project may be more than the estimates. The QRA approach to contingency estimations uses statistical simulation techniques, based on the variation estimates for each cost element, to provide a quantitative estimate for the contingency for a particular confidence level. For a detailed description on the QRA method employed see Appendix 6.

For the purpose of this business case an 85% confidence level[15] has been used. This means that there is an 85% chance that the actual cost of the programme will not exceed the estimated cost plus the contingency.

Projects in Scope for Contingency Estimation

All the projects in the programme are in scope for contingency estimation except for two; 'Software and Security Upgrades' and 'Legislation Change Funding'. These two have been descoped as the funding approach is one of topping up an existing budget to fund needs in the future based on the prioritised 'PEC Backlog'. Without knowing exactly how the funding for these components will actually be allocated it is impractical to estimate any variance or contingency. Any contingency estimation should happen based on the project(s) to which the funds are applied, as determined by PEC, and should form part of the funding allocation decision by PEC when an allocation is made.

[15] The 85% confidence level matches one standard deviation from the mean for a normally distributed cost profile.

Results

The table below show the results of running the QRA simulation for each of the six projects in scope for the contingency estimation. The two out of scope projects have been included for completeness.

Project	Estimated Total Cost ($k)	85% Confidence Level cost ($k)	Contingency Amount ($k)	Contingency Percentage
Identity Management	24,000	29,697	5,697	24%
Centralise Rules Processing - DREW	23,000	25,243	2,243	10%
Foundational Knowledge base- Hindin	26,000	31,969	5,969	23%
Data Warehouse Re-platform	31,000	39,183	8,183	26%
Digital Capability	13,000	14,531	1,531	12%
Software and Security upgrades*	2,000	2,000	0	0%
Replacing aging "on premise" hardware with infrastructure as a service and public cloud	40,080	47,131	7,051	18%
Legislation Change Funding*	12,000	12,000	0	0%
Total Project Costs	**171,080**	**201,752**	**30,672**	**18%**

* Due to the nature of these projects no contingency estimate is necessary

Running the QRA simulation for each individual project produces contingency estimates ranging from 26% for Data Warehouse Re-platform to 10% for Centralise Rules Processing. A straight summation of the contingency over the whole programme results in a contingency estimate of 18%.

Further analysis shows that the contingency for the projects can be divided into three clusters:

- Cluster 1 - The 'out of scope for contingency' projects which have no contingency
- Cluster 2 – 'Centralise Rules Processing', 'Digital Capability' and 'Replacing aging "on premise" hardware with infrastructure as a service and public cloud' which have low contingency estimates and,
- Cluster 3 - 'Identity Management', Foundational Knowledge Base' and 'Data Warehouse Re-platform' which have higher contingency estimates

Cluster 1 projects have no contingency based on the reasons stated above.

The approach to the Cluster 2 projects is one of completing as much as feasibly possible given the resources employed over a specified time period. These resources will address their in-scope work packages based on a priority in a listed backlog. They will work through the backlog in an attempt to clear as much of the work a possible in the timeframe allocated. This approach has the impact of reducing the cost variance but increases the output variance as there is a risk that not all of the backlog will be completed. This approach results in a lower cost contingency but an increased variance around what will actually be delivered.

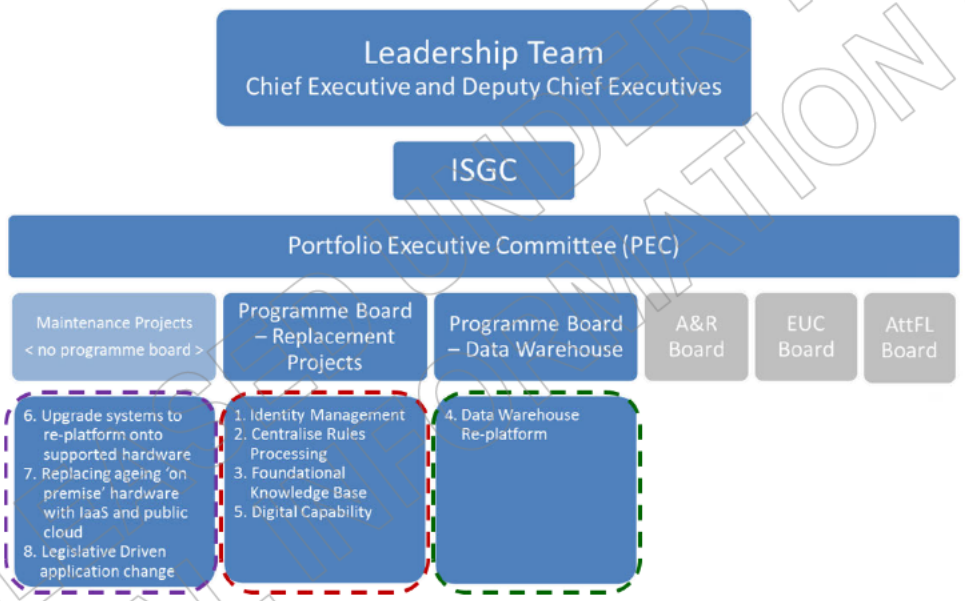
Cluster 3 projects all have a set objective resulting in a tighter scope compared to the Cluster 2 projects. This lack of variability in scope results in an increased risk, or variability, of cost increase. The analysis performed reflects this, resulting in these projects having a higher contingency factor.

The Power of Grouping

By grouping projects and providing a consolidated contingency across the group has the effect of reducing the overall contingency required, i.e. the grouped contingency is less than the sum of the individual contingences. This reduction in contingency stems from sharing the risk across the grouped projects. This is only valid if the contingency is managed as a whole across the projects and no segregation or splitting is permitted. Leveraging governance structures is the preferred way of grouping projects for contingency purposes and allows the contingency to be managed at the appropriated level within the governance structure.

Basing Contingency Estimates on the Governance Model

The governance structure for the Preventing Failure of Critical Services to Clients programme (see the Management case for further details) arranges the eight projects into three distinct groups. This structure enables contingency to be shared amongst the grouped projects yet remain managed at the appropriate governance level. The three groups are highlighted in the governance structure below:



Assuming contingency can be shared as per the governance model, then the overall contingency required is as follows:

Governance Group	Estimated Total Cost ($k)	85% Confidence Level cost ($k)	Contingency Amount ($k)	Contingency Percentage
Maintenance Projects*	54,080	61,131	7,051	13%
Replacement Projects Governance Group	86,000	97,788	11,788	14%
Data Warehouse Re-platform	31,000	39,183	8,183	26%
Total Costs	**171,080**	**198,101**	**27,021**	**16%**

*Note: The 'Maintenance Projects' group includes the two out of scope for contingency projects hence the overall contingency percentage is diluted

The results indicate that for the Replacement Projects Governance Group the contingency can be reduced from 18% to 14% which translates to a reduction in the overall contingency required by $3.65M over the 4-year investment horizon. The 85% confidence level will remain as long as the contingency fund for this group is managed and shared jointly at the appropriate governance level.

The remaining two 'in-scope for contingency' projects, 'Replacing aging "on premise" hardware with infrastructure as a service and public cloud' and 'Data Warehouse Re-platform' are effectively managed separately in the governance structure hence there is no gain available from grouping.

Contingency Values for each financial year

All the contingency estimations and calculations are based over the life of the programme, i.e. the four-year horizon. To understand the contingency required per financial year the contingency factor is applied to the cost for that year.

Based on the results above and applying the relevant contingency factor on financial year basis produces the following result at the grouped level.

Groupings	2019/20	2020/21	2021/22	2022/23	Total
Total Project Cost	70,040	56,520	25,060	19,460	**171,080**
Contingency for Maintenance Projects	1,291	2,185	1,787	1,787	**7,051**
Contingency for Replacement Projects	6,264	3,852	946	726	**11,788**
Contingency for Data Warehouse Re-platform	2,376	2,640	2,112	1,056	**8,183**
Total Contingency	**9,931**	**8,676**	**4,845**	**3,570**	**27,021**
Total Project Cost including Contingency	**79,971**	**65,196**	**29,905**	**23,030**	**198,101**

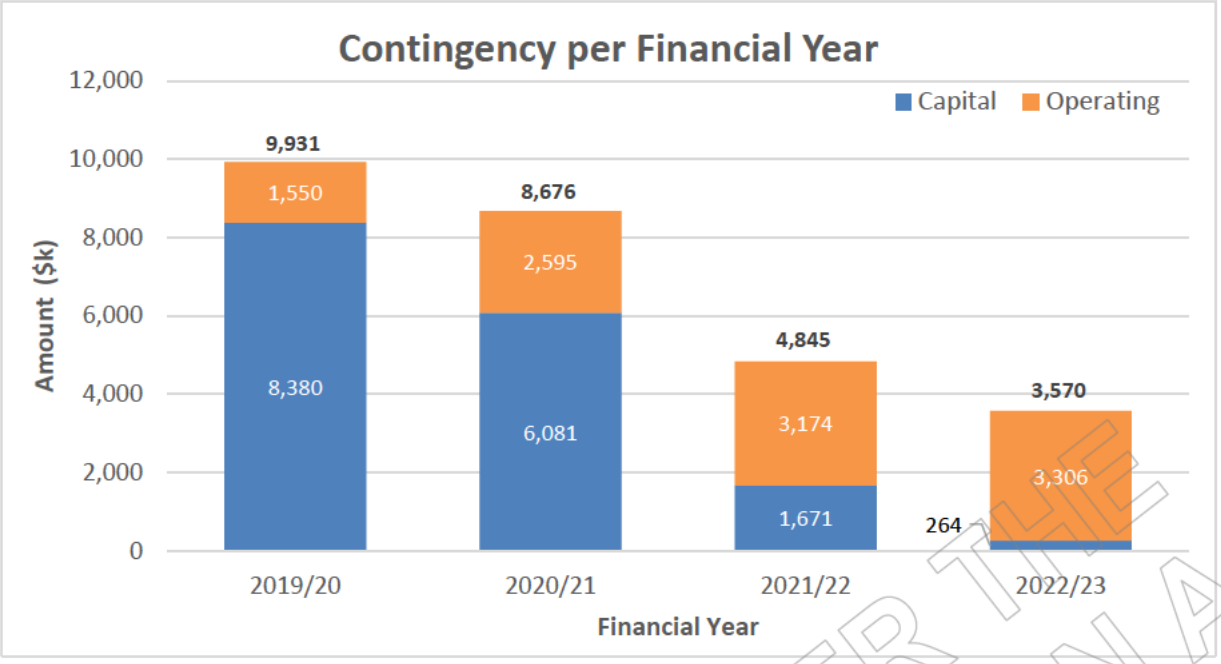
As the programme progresses through its delivery these contingency estimates, as well as the overall costings, will be revisited and revised. This will enable adjustments to be made to the contingency values over the life of the project to ensure adequate provision is made based on the latest available information.

Capital Contingency versus Operational Contingency

The costings for each project can be split into two components: costs to implement the solution, the capital component; and the costs required to run the new solution, the operational component. These two components, although linked, are different in nature and likely to be managed differently under the project. As the build leads the run there will naturally be more build/capital cost in the early years of the programme with the run/operating costs ramping up over time as the new solutions are delivered.

From a contingency perspective, it would be worth understanding how much relates to the capital component and how much relates to the operating component. However, it must be stressed that the contingency must not be split and managed separately (capital and operating) as this will reduce the benefit of risk sharing between these areas. If, from a management or governance perspective, the contingency is split between the capital and operational components then the overall contingency amount required for the 85% confidence level will increase by an estimated $3.4M. Taking such action would be similar to unbundling the benefit from grouping the projects as discuss above.

The graph and table below show the estimated contingency component for capital and operating over the life of the programme.



Groupings	2019/20	2020/21	2021/22	2022/23	Total
Contingency for Maintenance Projects	**1,291**	**2,185**	**1,787**	**1,787**	**7,051**
Capital	844	844	0	0	**1,689**
Operating	447	1,340	1,787	1,787	**5,362**
Contingency for Replacement Projects	**6,264**	**3,852**	**946**	**726**	**11,788**
Capital	5,688	3,125	219	0	**9,033**
Operating	576	726	726	726	**2,755**
Contingency for Data Warehouse Re-platform	**2,376**	**2,640**	**2,112**	**1,056**	**8,183**
Capital	1,848	2,112	1,452	264	**5,675**
Operating	528	528	660	792	**2,508**
Total Contingency	**9,931**	**8,676**	**4,845**	**3,570**	**27,021**
Capital	8,380	6,081	1,671	264	**16,397**
Operating	1,550	2,595	3,174	3,306	**10,624**

Financial costing approach

To determine the cost of the proposed solutions we took the following steps.

1. We identified and blueprinted the future state solutions for each of the projects, and at least one viable option that achieved the same level of risk reduction
2. We described the risk profile of the current state covered by the scope of each project
3. A timeframe of changes was agreed and mapped against other changes already planned in the Ministry. The programme has been prioritised to ensure the changes that delivered the greatest benefit were sequenced correctly.
4. We estimated 'most likely' costs for each project considering:
    - existing asset management plans and investment levels
    - historic support costs
    - experience on previous projects
    - the knowledge of component specialists
    - relevant input from the market engagement
    - impact on the technology support model, and whether there would be any additional on-going operating costs, including additional staff, or whether current resources could be redeployed.
5. Project Resource Estimation uses a standard process for allocating resource type and levels. This process uses standard roles and rate assumptions for the purpose of estimating total cost, but not the specific method of delivery. Estimation is done in this manner because;
    - The delivery organisation is not known. It is not assumed that MSD internal staff are the only option for delivery
    - The estimator may be external. For instance, the Data Warehouse estimation process was performed by an external organisation (Accenture)
    - The delivery mechanism is not pre-determined. Outcomes based contracting, contractors, and MSD internal Agile teams are all possible implementation choices.
    - The assumptions on resourcing need to be realistic. This method shows whether the delivery profile (within the assumptions used) appears unrealistic or unachievable (for instance, the total resource need, the change over time, and proportion of role types can highlight unrealistic estimating assumptions)
    - Resource managers need early advice of upcoming roles required. Role based estimation provides a way for resource managers to estimate possible future demand for types of skills well in advance of the commencement of any initiative

    This estimate becomes the budget envelope that is available to the Governance body to allocate to that particular project.

    Where delivery is by internal MSD teams, the project is broken down into a set of Epics. These are used to inform the Programme Increments, where the detailed resource planning and allocation takes place for each increment, as part of the standard SAFe process.

    Where another delivery mechanism is used, the estimate is used as an additional set of data to assess vendor proposals.

Assumptions made during financial analysis

For the purposes of the financial analysis, the following assumptions have been made.

Assessment period

- The project start date for valuation purposes is assumed to be 1 July 2019.
- The operational life of the proposed assets is assumed to be five years for hardware and eight years for software for purchased assets, and evergreen for as-a-Services services. This is the appraisal period over which the costs are assessed.

Discount rate

- The Treasury specifies a public sector discount rate of 6% per year.
- All costs and benefits are expressed in today's dollar terms.
- As a risk-adjusted real discount rate is used, no further explicit allowances are made for price or wage inflation over the assessment period.

Taxation

- All dollar figures are expressed in GST-exclusive terms.
- Tax is omitted from the cost analysis as it is assumed to be the same across the options.

The Management Case

The management case addresses the achievability of the proposal and planning arrangements required to both ensure successful delivery and to manage programme and programme risks.

Programme management strategy and framework

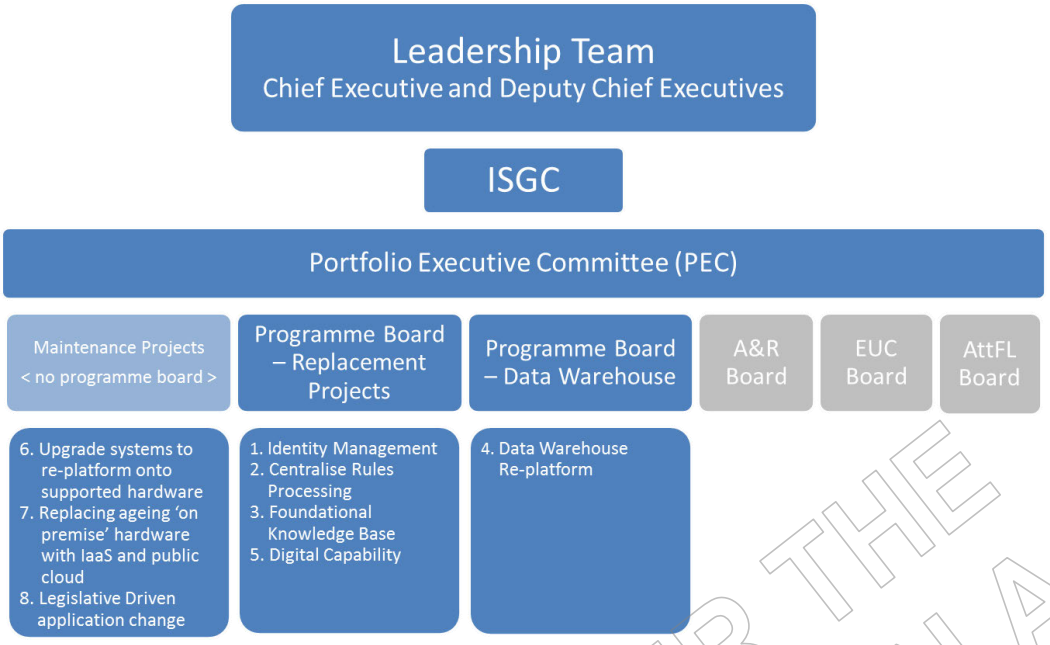
The "Preventing Serious Failure in Client Services programme" brings together thinking and discussions that have been occurring for some time within the Ministry, and argues that a programme be established to progress the work and achieve the desired outcomes.

There is no existing programme addressing the scope of this business case. However it is expected that when initiated, the programme will inherit and make use of:

- Existing MSD successful and mature Agile delivery capability, based on the SAFe delivery framework
- Existing risk management processes, which have identified the issues and proposed remediation
- Existing work being undertaken to upgrade or replace aging legacy systems.
- Existing risk mitigation and strategic asset management.
- Existing MSD technology strategies, including the Te Pae Tawhiti Technology Strategy that aim to reduce the six pain points caused by the current technology, i.e.:
    - No single client view
    - Disparate business processes and lack of automation
    - Slow to deliver government policy change
    - Systems are product centric rather than client centric
    - Staff and clients don't have consistent and accurate advice and information
    - Ageing and complex technology
- Existing strategic aims for the Ministry's technology to create a modern digital experience for clients, partners and staff where key functions are opened to broader social sector participants.

If this Business Case is endorsed and funding allocated, a Programme Office will be established to manage the execution of the projects, reporting to the proposed governance bodies described below.

There will be two governance mechanisms directing the work, reflecting the most appropriate mechanism for the different work packages. Both will operate with the oversight of the Portfolio Executive Committee (PEC). All funding allocation to this programme and other projects will be performed through the PEC process.



For the backlog of work to be covered by the recapitalisation funding (the Maintenance projects), it is appropriate that the existing mechanisms of risk and value based prioritisation are used, with the remediation to be balanced against other emergent risks. This is the responsibility of the Portfolio Executive Committee (PEC), which assesses and prioritises all Ministry investments.

PEC will directly oversee the three Maintenance projects;

6 Software and Security upgrades,
7 Replacing ageing 'on premise' hardware with Infrastructure-as-a-Service and public cloud", and
8 Legislative Driven application change

For the five remaining initiatives (the Replacement projects), two Programme Boards will be established to provide programme governance for the various programme tranches and phases. The first will be chaired by the DCE Corporate Solutions and will include a range of business stakeholders from Service Delivery and other Business Groups.

Included under the Programme Board will be the Replacement projects, focused on specific core services, which are;

1 Identity Management,
2 Centralise Rules Processing,
3 Foundational Knowledge Base,
4 Data Warehouse Replacement, and
5 Digital Capability

Although the main Business Group impacted is Service Delivery because of their ownership of the in-scope client facing systems, most other Business Groups will also be represented, as well as Oranga Tamariki who will continue to use some of the affected services.

The second board includes representatives from HUD and Oranga Tamariki, and is specifically focused on the analytics platform needs of all the participating agencies. This will be chaired by Nic Blakeley, and cover initiative 4 "Data Warehouse Replacement".

The Programme Boards will report on progress, risks and issues to the Investment Strategy Governance Committee (ISGC) and will keep the other Ministry governance committees appraised as necessary. The programme will also ensure that the office of the Government Chief Digital Officer (GCDO) is kept informed of progress.

A Programme Manager will be appointed to manage the programme through and envisaged four tranches of delivery and stage gate funding. Given the broad nature of the initiative, the delivery team will comprise people from most Business Groups as well as IT, plus vendors (data centre vendors, AoG IAAS and TAAS vendors).

The Ministry has a history of successful delivery of large scale Technology projects and programmes as well of Technology enabled business projects and programmes. These include;

- Welfare reform
- Housing transfer from HNZ
- Client management system
- Simplification
- End User Compute
- Availability and resilience

The Ministry's Project Management Methodology is based on a project management method called PRINCE2; an internationally recognised approach to managing projects and consistent with established best practice. PRINCE2 ensures an explicit common understanding of what the programme will create (the scope) and the criteria against which the programme's final product(s) will be assessed. The client's quality expectations will be documented along with how they will be assessed in a quantifiable way.

The Ministry also employs the Scaled Agile Framework (SAFe) and DevOps approaches to assist with management of the entire Technology work portfolio. The key organisational institutions are the Portfolio Executive Committee (PEC) and the Programme Portfolio Management (PPM) function.

PEC and PPM make funding, priority, and resource allocation decisions under the auspices of the ISGC. Successful delivery of the Government funded End User Compute (EUC) and Availability and Resilience programmes at the Ministry have been achieved using this framework, whilst possessing their own programme boards.

Part of the broad philosophy of the agile approach is to minimise risk through the use of Proofs of Concept (PoCs). The PoCs include early validation of the business fit of the target solution, and validity of the high level design as well as a technical PoC to validate the solution will work in the technology environment.

The initial production deployment is, in principle a Minimum Viable Product (MVP) which is then elaborated with additional features in subsequent releases until the full solution is deployed. As the name suggests a Minimum Viable Product has the basic functionality to perform the business function, and subsequent investment in the product needs to be justified in terms of the additional value created. This approach minimises the risk of over-investment in system features that do not provide commensurate value.

The programme plan will involve the draw-down of funding and delivery in tranches. As the programme completes each tranche and based on the progress made against the programme objectives, it will seek approval from the Programme Board to move into the next stage, where approval to draw down the next funding iteration will be sought from Treasury. This stage gating process enables regular reviews, and greater transparency of risk, issues, business benefits and costs. It also allows the Programme Board to ensure the programme remains viable and that there is benefit to MSD in continuing with it.

Outline Programme Plan

It is proposed that the Programme will be implemented in three tranches. Tranche One will be completed by FY2020 and Tranche two by FY2021 with the final, Tranche Three delivered in FY2023.

Tranche One

This tranche will:

- Select the strategic partner and solution for IdAM
- Migrate most business rules from DREW and validate the preferred platform
- Select the preferred knowledge platform, and migrate 25% of the Hindin content
- Migrate and decommission the Complaints function of Hindin
- Select the strategic partner and solution for the Data Warehouse
- Decommission the EOS instance of the Cúram to simplify client experience
- Deliver the new Cúram client channel experience, and complete development of the MyMSD component
- Migrate and decommission half of the obsolete hardware and out of support software, and
- Complete the plans and estimates for Tranche Two.

Tranche Two

This tranche will:

- Deliver Client identity on the new IdAM platform
- Deliver the new Review of Decision, Provider Management systems, and all the Hindin content on the new knowledge platform
- Retire DREW and Hindin
- Deliver the Warehouse MVP and the highest priority information products
- Deliver a more scalable MyMSD client channel, and deliver straight through processing optimisations to reduce the rate of exceptions for staff
- Complete the upgrade of software to supported levels, allowing 75% of compute capacity to be delivered from IaaS
- Complete the plans and estimates for Tranche 3

Tranche Three

This tranche will:

- Deliver Staff identity on the new IdAM platform
- Deliver the required set of information products on the new Warehouse platform
- Retire the old IdAM solution set
- Retire the old Warehouse

The technology solutions to support this implementation roadmap will:

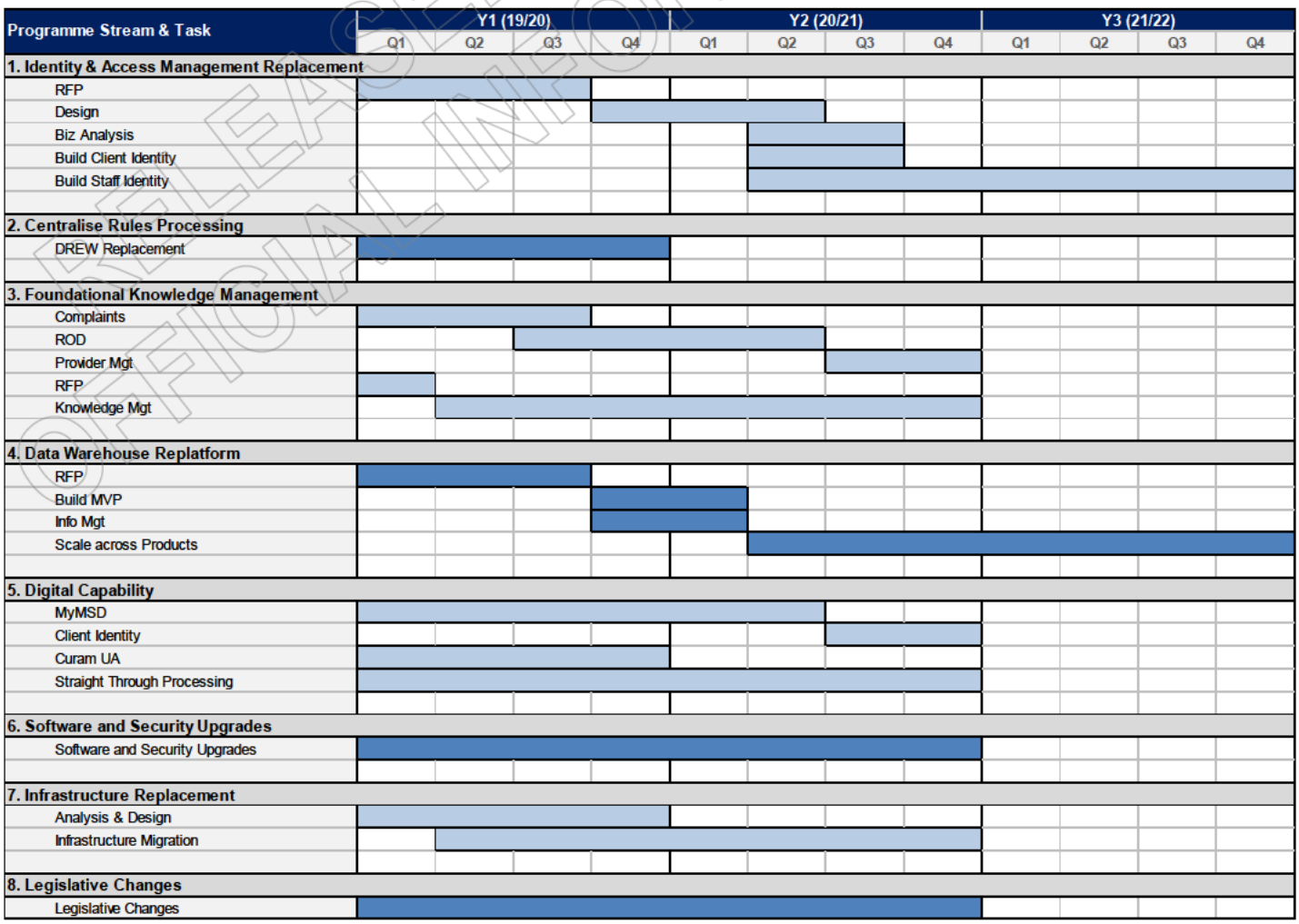
- Remove the operation risks commencing with the highest risks
- Reduce implementation risk by selecting strategic partners where possible

- Reduce implementation and privacy risk by limiting data conversion and manipulation to only those instances where the outcomes require it.

The key programme milestones are:

Proposed Key Milestones	Estimated Timing
Business Case approved	April 2019
Establish programme management and governance	April 2019
Finalise Tranche 1 scope and costs	May 2019
Draw down funding for Tranche 1	June 2019 (effective July)
Stand up programme team including vendor resources	July 2019
Develop benefits realisation framework	August 2019
Finalise Tranche 2 scope and costs	March 2020
Draw down funding for Tranche 2	April 2020
Complete delivery of Tranche 1	May 2020
Finalise Tranche 3 scope and costs	March2021
Draw down funding for tranche 3	April 2021
Complete delivery of tranche 2	November 2021
Complete delivery of tranche 3	June 2022
Programme closure	July 2022

Below is the GANTT view showing the high level project phases:



Programme Variations

If the programme and/or the constituent projects cannot be delivered as per the approved Business Case and it is forecast that cost, time, scope, or benefits are to be altered from the approved baseline plan, the programme will raise a variation request and submit this via the programme board to ISGC for approval. The programme will undertake regular forecasting in order to take remedial action or raise a variation request where needed in a timely manner.

The programme will:

- **Provide visibility** - so all variations are recorded, addressed, and managed to resolution.
- **Drive resolution/mitigation** - to ensure the programme and/or constituent projects are not compromised by a lack of control of variations to programme scope, schedule, cost, benefits.
- **Appropriate authority** - variation requests are processed based upon direction from the appropriate authority including the Programme board, ISGC, GCDO, and Treasury.
- **Define a standard process** - a common mechanism and format for the definition, raising, reporting, and tracking of all project variations.
- **Communication** – Ensure the appropriate parties are aware of the variation requests and any knock on impact.

The programme will have the following thresholds in place for managing the project baseline:

Variation Area	Threshold	Approvals Required
Programme Budget	Zero threshold	**Endorsement:** Project Board and Programme Sponsor **Approval:** ISGC
Benefit Profile		
Project Scope	Full authority*	**Endorsement:** Programme Board **Approval:** Project Sponsor
Programme Schedule		

*as long as no impact on programme budget and/or the benefit profiles occurs.

Programme Resource Planning

Estimation

The estimation process used a combination of internal and external assessments. In particular, the IdAM project sourced implementation and licensing costs (PwC), and the Data Warehouse Re-platform project sourced implementation and transition costs (Accenture). The estimates for DREW, Hindin, and the Digital Scalability projects came from the experience of the internal MSD teams that have worked with these systems for many years, and have a history of accurate estimation and successful delivery.

Project Resource Estimation, whether internal or external, uses a standard process for allocating resource type and levels. This process uses standard roles and rate estimates for the purpose of estimating total cost, but not the specific method of delivery. Estimation is based on 'likely' estimates, with no build-in contingency. These estimates do not include contingency, because that is assessed afterwards via Quantitative Risk Assessment (QRA). Estimation is done in this manner because;

- The delivery organisation is not known. It is not assumed that MSD internal staff are the only option for delivery

- The estimator may be external. For instance, the Data Warehouse estimation process was performed by an external organisation (Accenture)
- The delivery mechanism is not pre-determined. Outcomes based contracting, contractors, and MSD internal Agile teams are all possible implementation choices.
- The assumptions on resourcing need to be realistic. This method shows whether the delivery profile (within the assumptions used) appears unrealistic or unachievable (for instance, the total resource need, the change over time, and proportion of role types can highlight unrealistic estimating assumptions)
- Resource managers need early advice of upcoming roles required. Role based estimation provides a way for resource managers to estimate possible future demand for types of skills well in advance of the commencement of any initiative

This estimate from this process becomes the budget envelope that is available to the Governance body to allocate to that particular project.

Where delivery is expected to by internal MSD teams, the project is broken down into a set of Epics. These are used to inform the 3 monthly Programme Increments, where the detailed resource planning and allocation takes place for each increment as part of the Ministry's preferred Scaled Agile Framework (SAFe) delivery framework. The Ministry has a proven track record of over two year in estimating and delivering complex and large scale initiatives using SAFe. This allows teams to provide groupings of benefits and/or capabilities and it further de-risks delivery.

Where another delivery mechanism is used, the estimate is used as an additional set of data to assess vendor proposals.

Delivery Capability

Delivery of major programmes is not new to MSD. At times, the Ministry had had to scale up both the direct (staff and contractors) and indirect (vendors) delivery capability.

Assessing the feasibility of this programme, we use the estimates from the preferred way forward, and compare them with prior history in both those categories.

Direct Resources

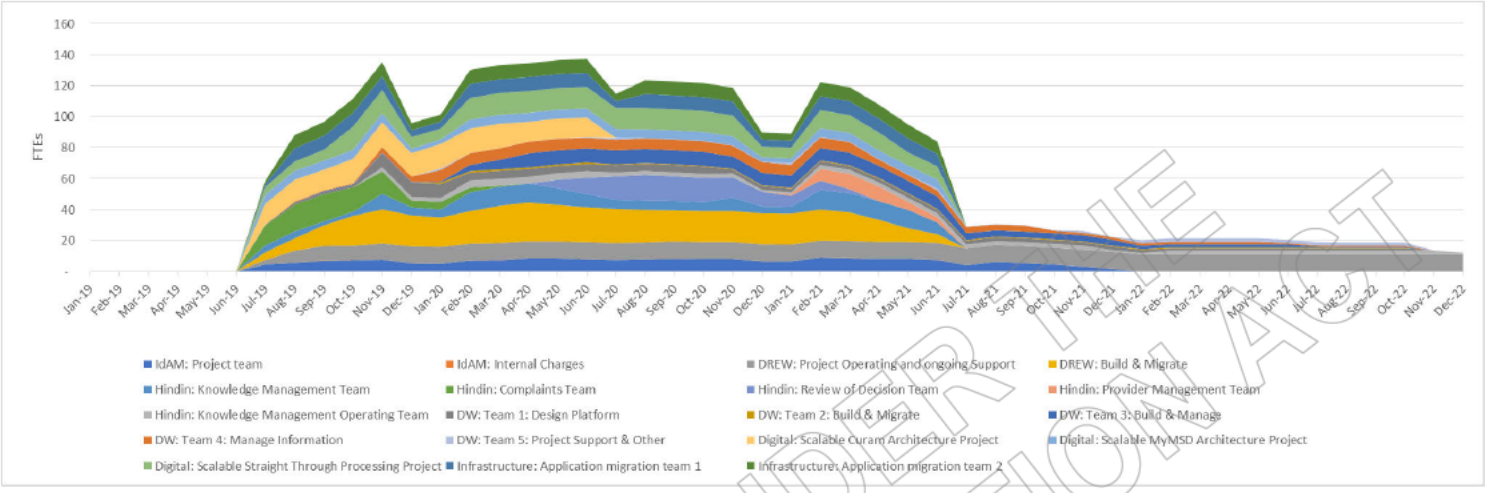
The nature of this programme is heavily labour intensive, with much of the costs coming from labour based estimates. The estimates come from different assumptions and sources, which are detailed below;

Project	Estimation Assumptions
6 Identity Management	• Externally sourced estimates (PwC and others) • Vendor and MSD delivery team
7 Centralise Rules Processing	• Internally estimated • MSD delivery team
8 Foundational Knowledge Base	• Internally estimated • Vendor and MSD delivery team
9 Data Warehouse Replacement	• Externally sourced estimates (Accenture) • Vendor and MSD delivery team
10 Digital Capability	• Internally estimated • Vendor and MSD delivery team
9 Software and Security upgrades	• No additional resource, use existing standing teams
10 Replacing ageing 'on premise' hardware with Infrastructure-as-a-Service and public cloud"	• Internally estimated, based on a standing team • MSD delivery team

11 Legislative Driven application change	• No additional resource, use existing standing teams

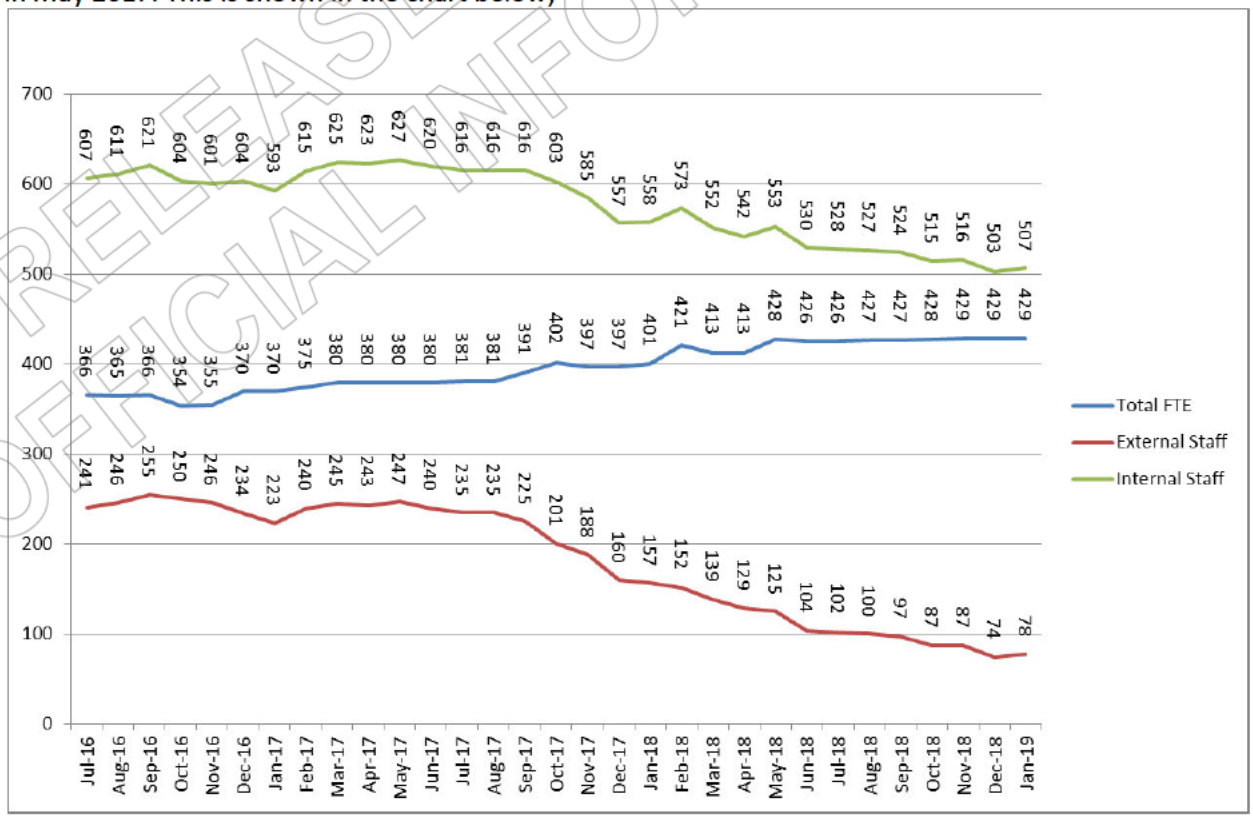
More detailed resource estimates have been developed, and are included in the appendices. They include the project and the ongoing support team estimates. Note the estimates are the pricing and not the delivery estimates.

The chart below shows the total resource requirement.



Resource needs peaks at 160 in April 2020 in this model. With resource planning, the likely peak would be below 140.

Historically, MSD has accommodated this resource level. Currently internal and external ICT FTE are 110 below the peak in May 2017. This is shown in the chart below;



This gives confidence that the Ministry has mechanisms in-place to scale to a programme of this size.

Indirect Resources

The introduction of new vendors adds complexity and risk to delivery. An assessment of the vendor management needs was conducted to estimate the change needed in vendor management capability. The change to the vendor landscape is shown below;

Project	Vendor Assumptions
1 Identity Management	• New vendor selected by procurement process • Loss of existing vendor
2 Centralise Rules Processing	• Existing vendors • Loss of existing vendor
3 Foundational Knowledge Base	• New vendor selected by procurement process and existing vendors • Loss of existing vendor
4 Data Warehouse Replacement	• New vendor(s) selected by procurement process • Loss of existing vendor
5 Digital Capability	• Existing vendors
6 Software and Security upgrades	• Existing vendors
7 Replacing ageing 'on premise' hardware with Infrastructure-as-a-Service and public cloud"	• Existing vendors
8 Legislative Driven application change	• Existing vendors

The assessment is that this is within existing capability, and able to be accommodated by the Ministry.

Estimation Accuracy

The results of the Quantitative Risk Assessment (QRA) gave us a measure of the estimation uncertainty.

Overall, to achieve an 85% confidence level, a contingency of 15% was recommended. This is at the lower end of contingency required for similar programmes.

The detailed results are shown in the Financial Case section.

Risk management strategy

As per Ministry policy, the programme will apply the Ministry's Risk Management Policy and Framework. The purpose of the risk management strategy agrees an approach to manage risk for a project.

Risks for this programme will be considered in the Start Up stage of the project, then further developed during the initiation and delivery stages. The risk register in the Programme Control book will be used to record project delivery risk and will be maintained throughout the programme.

The complete risk register will be presented to the Project Board for a discussion on which risks they would like to monitor on an on-going basis, whether exception based only or a full overview.

Each risk will be clearly identified; with related controls, and will be analysed and assessed in terms of likelihood, consequence, and what further mitigations are required to manage the risks to an acceptable level. This will enable the programme team to keep track of risks, monitor and review them regularly, and use this information to report to the Programme Board and any other related governance board the programme is responsible to.

Programme and business assurance arrangements

This investment proposal has been assessed as high risk using the State Services Commission (SSC) Gateway Risk Profile Assessment tool. Based on this risk assessment, the basis for on-going engagement as part of the business case has been agreed and documented in the scoping document. This agreement accompanies this case.

The proposal is subject to on-going Gateway reviews. The requirement that this Programme Business Case be submitted for a Gate One: Business Justification and Options review will be determined as the capital funding bid process continues.

Such reviews investigate the status of a programme as it nears completion of the Programme Business Case, to confirm that the programme has the appropriate structures and that planning is in place to support the preferred solution options.

The review seeks to confirm that the programme continues to be achievable and likely to deliver what is required.

The Review checks that:

- stakeholders approve the intended benefits from the programme
- linkage with programme and organisational objectives is clear
- the optimum balance of cost, benefits and risk has been identified
- The “long list” of options is sufficient and the “short list” is justified.

This proposal is also subject to independent quality assurance which will be carried out prior to submission in February 2018.

The programme will implement regular continuous improvement activities during the programme, e.g. looking for ways to make the programme management practices more effective or efficient. These will include, but are not limited to:

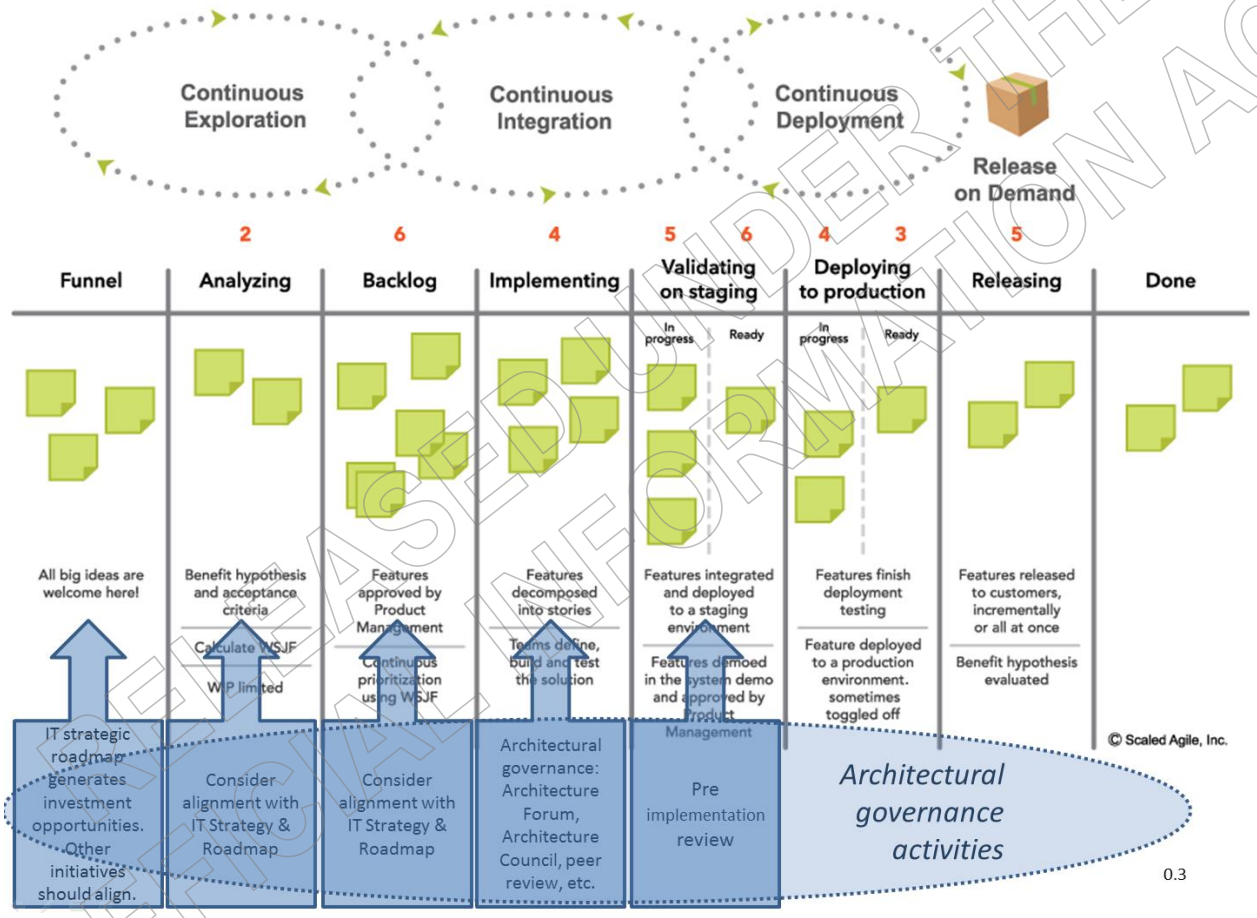
- Stage gate checks
- Independent Quality Assurance
- Internal and external Audits (including Treasury Gateway reviews)
- Use of standard templates & processes

Architectural Governance

Architectural governance is the means by which the alignment to MSD's technology strategy is measured and controlled. Good alignment will achieve more roadmap and strategic initiatives, technological investment will be optimised and less technical debt will be incurred.

The alignment should be managed from investment option inception through to implementation. Not all initiatives derive from the technology strategy or technology roadmap, but all should be consistent with that strategy.

Architectural governance must be aligned with the overall delivery lifecycle. From the Investment Option stage through to Implementation, there should be the ability to identify and guide a solution's alignment with MSD's Technology Strategy. Such alignment should be one of criteria used to approve and prioritise epics entering the delivery pipeline.



Governance needs to be relevant and appropriate. The type and scale of architectural review tasks should be commensurate with the type and size of the initiative.
E.g.:

- Larger initiatives demand greater oversight
- Solutions that use non-strategic technology demand more oversight

Governance must support agile epics and provide appropriate support at all stages of an epic.
E.g.:

- At early stages assistance to select strategically aligned epics that support business needs
- During design and build phases, assistance with option elaboration, selection and endorsement

Appendices

Appendix 1: Impact of Service Failure

The nature of the risk

The Operational risks to the Ministry are highly interrelated but are fundamentally concerned with delays to payments and service to New Zealanders in need.

These risks are in the areas of;

- client payments;
- staff health and safety;
- community safety, and
- reputation.

Client impact

By a conservative estimate there are at least 35 thousand New Zealanders per day significantly impacted by a single day outage to core services:

- At least 10 thousand delayed payments per day (50,000 per week)
- At least 25 thousand incorrect payments per day (125,000 per week).

In addition there are at least 40 thousand clients per day who are unable to have their financial assistance application lodged in the system.

Delayed payments to clients

Computer systems failure has a serious impact on the ability of the Ministry to get new payments to New Zealanders and families in need. This can leads to considerable hardship for many of those families. In these situations long queues quickly develop at service centres with frustrated and sometimes angry clients turned away and asked to rebook there appointments. It can be highly public leading to National media interest and parliamentary questions within 2-3 days. In a scenario where there is a succession of outages the backlog of tasks may overwhelm the ability for front line staff to catch up, leading to a potential Novopay type situation where the clerical backlog grows faster than the ability to process it.

These situations arise from the sheer volume of new applications for financial assistance and the pace of change in client circumstances. The Ministry grants approximately 10,000 new applications for financial assistance **per day**, across the range of:

- Main Benefits such as Jobseeker Support and National Superannuation;
- Supplementary Benefits such as Accommodation Supplement,
- Third Tier assistance such as Food Grants.

The 10,000 grants per day do not include unsuccessful applications. The approximate ratio of these grants is: Main Benefit 20%; Supplementary Benefits 25%; and Third Tier assistance 55%. These applications for assistance are processed through all of the available channels being: the online (digital), phone and face-to-face. There is a fundamental reliance on the Ministry's systems to process these applications for assistance through its computer systems, so that deposits can be made into clients' bank accounts or payment cards.

In the absence of these computer systems, front line staff can only issue 'Hologram Letters' as a manual process for emergency payments. This manual process can only feasibly work for two days at most.

Incorrect Payment amounts being made to clients

In addition, the Ministry processes at least 25,000 Change of circumstances type transactions per day which will require a recalculation of benefit payment. For example

- Change of address
- Declare wages
- Processing Medical certificates
- Stop and resume benefits
- Backdated review
- Moving in or out of social housing

These transactions often affect a client's eligibility and entitlement calculations. Inability to process them leads to underpayments or overpayments being made with potentially serious consequences for clients in both cases

The rate at which client status changes in a short pace of time means that it is critical that core computer systems remain available at all times.

Note that computer systems failure poses slightly less of a threat to established regular client payments for regular main benefit and supplementary benefit payments. If the system failed there are established Business Continuity Plan (BCP) arrangements whereby the previous payment file would be re-run through the banking system. Although this file would rapidly become 'stale' given the churn in the welfare system

The propensity for the Ministry's systems to be brittle and prone to complete failure has evolved over time, with key business processes spanning multiple discrete computer systems that are all required to be populated with data in order to grant an income support application, or a change in circumstances transaction. These applications are generally bespoke, some of which date back as far as progenitor organisations such as the Employment Service and the Income Support service from the 1990's. This large number of systems is a source of operational frailty. If one of the constituent systems fails, it leads to financial assistance not being able to be granted. This has happened on numerous occasions in the past, whereby front line staff have no systems available at all to address client need. In such situations the Ministry is basically closed for business:

- Call centre operators can only request that clients call back later.
- The Digital channel (MyMSD) can provide the full set of client information but cannot fully process client applications for financial assistance
- Service centre staff can issue hologram letters for up to 2 days but cannot process applications through the system.

Staff Health and Safety

System outages have a significant impact on front line staff and there is a correlation between system outages and health and safety incidents recorded in the Ministry's SOSHI system.

A one day outage results in staff taking over 2 weeks to get through the backlog of work created by the outage. This is based on an outage that occurred in February 2017 when the system was unavailable for almost an entire day.

Specific risks to staff health and safety include:

- Notifications about dangerous and trespassed clients cannot be processed potentially resulting in staff being put in unsafe situations
- Frustration and anger is communicated to staff from clients unable to have their needs met, increasing the levels of work related stress
- The backlog of work arising from outages means that front line staff are under intense work pressure until the backlog is cleared

Community Safety

System unavailability results potential delays in recording client status that might put the broader community at risk. A good example of this would be:

- Child sex offender status not being loaded into the system potentially resulting in inappropriate emergency housing arrangement.

Reputational risk and loss of trust and confidence

The volumes of transactions and client interactions that the Ministry needs to deals with mean that any systems failure is highly visible to the public. Our experience is that media enquiries will start to arrive within 24 hours of an ongoing outage. Within 48 hours there are questions in Parliament and stories breaking in national media about government computer systems failures.

This is based on an event that occurred in April 2016, when the system was impaired for 4 business days. Whilst the system was not fully down, it could only run at 40% capacity for 2 days, 60% on day 3, moving up to 100% near the end of day 4.

Media enquiries started to arrive on the morning of day 2. On the evening of day 2 the Deputy Chief Executive for Service Delivery was interviewed on One News. There were stories in national newspapers on day 3 and 4. There were questions in Parliament throughout the week. The story was starting to snow-ball when the underlying problem was fixed late in the week.

Appendix 2: Ministry Wide Risk Register – Technology Systems Availability.

V4.0 **Ministry Wide Risk update. Date to OICGC: 23 January 2019** **Risk Lead: DCE Corporate solutions** **Risk owner/s: CIO**	MINISTRY OF SOCIAL DEVELOPMENT TE MANATŪ WHAKAHIATO ORA
Ministry Wide Risk Description	**#3a Technology Systems Availability** **If the services provided by technology systems (including data systems) are not available for staff and clients at times when they require them then service delivery to clients and defined performance requirements will be impacted and reduction of trust and confidence of stakeholders**
Context for risk including causes	The key components of a technology system include business and system applications (software) and equipment (hardware). Like any other asset that requires to be maintained, our IT assets require regular maintenance to ensure they continue to operate as expected, in the process ensuring the continued delivery of essential business services to our clients, staff and other stakeholders. IT operates a number of key industry standard controls to manage risks and ensure that if issues arise then service is restored as soon as possible. A number of these maintenance activities are relatively minor to complete. However, some activities, like upgrades, require additional investment, significant effort and considerable time. When these activities are delayed, a technical debt is introduced. While some upgrade initiatives are underway, there is still a high level of existing and growing technical debt in MSD's ICT assets (aged, obsolete or unsupported) resulting from constrained funding over time. If not mitigated adequately, the stability of these assets, the reliability and security of the IT services that they support and the availability and performance of systems, cannot be assured. Aged or unsupported ICT assets – which are difficult and expensive to maintain, also inhibit innovation and hinder MSD from benefiting on technology advances. As it stands, the current operational and capital funding are not sufficient to reduce the risk at its current level.

Inherent rating: ***VERY HIGH***	*Likely* *Severe*	**Residual rating:** ***VERY HIGH***	*Likely* *Severe*	**Trend** **Increasing**	**Explanation for the trend:** The IT group has undertaken steps to mitigate this risk within the constraints of funding availability. The risk continues to worsen due to the increasing number of aged and aging technologies that do not support modern software and applications. In the last 6 months, the percentage of IT hardware that are more than 5 years old (that have increased likelihood of failing or malfunctioning anytime) has increased from 40% to 60%. While current service levels are within tolerance, these are at risk, with loss of availability resulting in significant disruption to the delivery of critical business services. Additional investment is in the process of being sought in Budget 19 to address.

Controls in place		* Control Status	Commentary on the control status
CORRECTIVE CONTROLS – *rectify system availability and performance issues after they have happened*			
1	**Business Continuity Plans (BCP)** [people and process] exist for the key IT operations teams in a disaster scenario. These plans are regularly tested and updated.	*Functional*	The Assurance Plan for ICT Operations identifies Business Continuity risks and ensures IT BCPs are reviewed annually or sooner if required. The BCP capabilities are dependent on the recruitment of IT staff in the Auckland region.
2	**Disaster Recovery (DR)** [technology] capabilities exist for some of our systems in a disaster scenario. These enable us to quickly resume operations and reduce the impact of IT service disruption on the delivery of the Ministry's essential services following a disaster. This includes **Technical Recovery Plans** (TRP) and IT **Specific Operational Continuity Plans**. Our systems also have **backups** taken regularly that enable our system and data to be restored when required.	*Defined*	The Monthly IT Service Report includes the state of our Disaster Recovery (DR) environment and test results. While principally used by IT management to understand IT issues, trends, risks, etc, the sections relevant to client services are shared with Service Delivery. Key information in this report is also included in Governance Committee reports. Currently the majority of TRPs are in place but some plans for critical systems require review and updating Our DR capabilities are lacking. As it stands, adequate DR or some DR capabilities, exist for the following applications: • Tier 1 (15%, 12 out of 77) • Tier 2 (4%, 5 out of 102) Mitigating this risk requires new investment to uplift our DR capabilities to avoid trade-offs at the expense of required infrastructure and application upgrades.
3	**IT Incident Management Policy and Processes** provide the mechanism to restore normal IT service operation as quickly as possible in the event of a service interruption or failure.	*Functional*	The IT Monthly Service Report includes incidents and problems that result in IT Service disruption and the underlying causes to prevent recurrence. The Incident and Problem Management policies are reviewed on a three year cycle. The next review is due for completion by 30 June 2019.
4	**IT Problem Management Policy and Processes** ensure underlying cause of the problem are identified and solved to minimize the adverse impact on business operations and ensure that agreed levels of service quality are maintained.	*Functional*	Root causes of problems are identified and action undertaken to address.
PREVENTATIVE CONTROLS - *keep system availability and performance issues from happening*			

5	The **MSD Technology Strategy** (V. 1.0) sets out our future IT direction including a set of related activities to ensure the reliability of IT service delivery. Section 7 Technology Sustainability of the Strategy emphasises "Resilience": Continue to build out the recovery and continuity of our critical functions during unplanned events by diversifying locations including our workforce. It also emphasises, "Availability": Always be on and accessible from anywhere at any time to satisfy the increasing expectation of staff and clients that our services be always available.	*Functional*	The new MSD Technology Strategy (V1) was approved by the Leadership Team in December 2018. It replaces the former IT Strategy and Action Plan (ISAP). Key elements of the ISAP were implemented e.g. Implementing the Single Client Management System and improving MSD's overall system performance through the Availability and Resilience and End User Computing programmes. However some activities were not completed as envisaged because of certain circumstances e.g. the unknowns associated with impacts of establishing Oranga Tamariki and the year on year fiscal constraints on the capital available for strategic intents. The MSD Technology Strategy will be reviewed quarterly as the implementation roadmaps are further developed. There will also be ongoing updates with the evolution of Te Pai Tawhiti, and the release of the Welfare Expert Advisory Group (WEAG) report in February 2019. Led by the IT Enterprise Architecture team, the refresh engages with key stakeholders including the senior IT management, the wider MSD business and the GCDO. The effectiveness of the Strategy in addressing the risk will be demonstrated funding that is being sought through the Budget 19 Business Case 'Preventing Failure of Critical Services to Clients'. The revision cycle of the Strategy and quarterly report backs to the Organisational Integrity and Capability Governance Committee. However the Strategy's effectiveness is dependent on the availability of adequate funding. Further funding will be sought through the proposed Budget 20 Te Pae Tawhiti Business Case which will assist in the retirement of legacy systems.
6	**System Architectural Governance** which includes the management of MSD's Enterprise Architecture which includes principles and standards for maintaining and improving systems availability.	*Defined*	An Architecture Council is in place and operating. Formal minutes are taken and actions/decisions are recorded that implement principles, however not all IT system designs are being taken through the Council.

7	**IT Asset Management**, which includes: The ICT Strategic Asset Management Plan (ICT SAMP) which articulates the strategy, principles, requirements, responsibilities, operational asset management plans, and organisational objectives for the IT asset management and investment functions; The Technology Asset Board has to oversee Asset Management (AM) functions and the development of all AM plans; and The Portfolio Executive Committee (PEC**)** manages the IT investment planning process.	*Functional*	The MSD Technology Strategy will inform the development of technology roadmaps which in turn will inform the revision of the ICT SAMP. The current SAMP is outdated because it is based on the old ISAP. The Strategy has informed the Technology Budget 19 Business Case. Moving this control to an effective state is dependent on the availability of adequate funding to address this risk. The Technology Asset Board is meeting each month to review the asset management plans and commission investment proposals for approval by the Portfolio Executive Committee (PEC). Minutes are recorded and actions monitored. The PEC prioritises the allocation of funds to address identified risks that pose a threat to the continued availability and satisfactory performance of our systems. The PEC meets fortnightly and reports quarterly on investments to the Leadership Team sub-committee Investment Strategy Governance Committee (ISGC). Evidence of effectiveness is the funding and implementation of End User Compute, Availability and Resilience initiatives. Prioritisation of investment as part of the PEC process and budget bid "Preventing Failure of Critical Services to Clients"
8	**IT Change Management Policy and Processes** and the IT Change Advisory Board provide the mechanism to ensure that IT changes are applied in a controlled manner.	*Functional*	The IT Change Advisory Board (CAB), composed of key IT and business stakeholders, provides control by ensuring system changes follow standard process and procedures to minimise the impact of change-related incidents upon IT service quality and availability. Changes are approved by the stakeholders before implementation. The CAB meets weekly. The Monthly IT Service report includes incidents caused by IT changes, including resolution to prevent recurrence.

9	**Cyber Security** • **Patch and Vulnerability Management standards and process** ensure updates to the various elements of our IT systems are applied to ensure the continued availability of our systems • **Malware-defender tools and processes** such as endpoint management (devices that remotely connect to our systems), web and e-mail content filtering, and antivirus that are in place protect our system from malicious software that could cause system availability, performance and information security issues • **User access reviews** that ensure only authorised staff have privileged access prevent unauthorised action that could cause system availability and performance issues ***For more information on Information Security controls, please refer to the Ministry Wide risk 3b Information Security.***	*Functional*	Patch Management Working Group (PMWG) and Vulnerability Management Working Group (VWMG) which are composed on key IT stakeholders provide leadership in managing system weaknesses (vulnerabilities) and required updates (patches). These groups meet monthly. Steps have been undertaken to apply patches and some patches have been applied as part of BAU activities. However, some vulnerabilities are complex and require funding to resolve. As it stands, there are approximately 110 outstanding vulnerabilities recorded in our register. The Monthly IT Service report includes the status of and issues/risks in our patch and vulnerability environments and malwares. Privileged user access reviews are performed every year, or as required. Any exception identified are rectified during the review. Information Security operational risks and controls are being monitored and reported through the Assurance Plan for ICT Operations. Initiatives underway to further improve our IT security environment include Identify and Access Management (IDAM), implementation of Application Whitelisting, Vulnerability Scanning and SIEM (Security Information and Event Management) capabilities. This includes the establishment of a new Security Board that will oversee and govern our security environment.
10	**Capacity management processes** ensure that systems have adequate components (e.g. storage, CPU, network connectivity, etc) to be available and performs as expected as the Ministry copes with changing business needs, natural system growth and technological advances.	*Functional*	The I&S team has tools and support teams that operate 24x7 in identifying and responding to potential capacity issues. Any new incident or problem arising from system capacity issues is being managed through the Incident and Problem Management processes. The Monthly IT Service report includes trend status of storage and CPU utilisation.

11	**Vendor management processes** ensure the agreed services provided by vendors continue to meet our systems availability and performance requirements	*Functional*	Service Level reports are produced by key suppliers every month. Any potential or existing system availability or performance issues are reviewed and discussed between relevant IT managers and vendor representatives. The performance of key suppliers is reported in the Monthly IT Service report. The new Master Services Agreement (MSA) that defines our requirements to ensure our suppliers deliver on our agreed expectations will also help towards the effectiveness of this control.
12	**Assurance Planning for ICT Operations** and resulting plan documents the known operational ICT service and asset risks, controls and mitigation activities planned and active.	*Effective*	The activities specified in the annual Assurance Plan for IT Operations are monitored by IT Management and reported quarterly to the OICGC, and annually to the GCDO. During the year the Plan is updated as risks and controls change. The effectiveness of this control is demonstrated through the visibility of risk and controls which inform our budget bid.
DETECTIVE CONTROLS - ***finds system availability and performance issues after they have occurred***			
13	**IT Monthly Service Reporting** is a key control used by IT Management to continually monitor the status of system availability and performance including Incident and Problem Management.	*Effective*	The IT Monthly Service report is reviewed at a monthly meeting of IT Management where minutes are recorded and actions monitored. Exceptions to standards and service level expectations are discussed at the meeting. OICGC has oversight of the performance of monitoring.

Control Status Key: [NOTE: In some of the above controls, IT has effective planning of the controls but insufficient funding constrains remedial actions and therefore reduces the effectiveness of the controls.]

What is your opinion or view as to the design, operation and effectiveness of the control	***Initial*** *(use of a new or undocumented control)*	***Defined*** *(the control is defined in a policy or process and is being implemented/embedded)*	***Functional*** *(the control is in place and its effectiveness can be assessed/measured)*	***Effective*** *(the control is fully embedded and there is a process of continuous optimisation/improvement)*

	Further actions / mitigations planned	**By when**
A	Secure adequate funding and accelerate the upgrade/replacement of obsolete or unsupported infrastructure assets to ensure the reliable delivery of IT services, beyond MSD's existing balance sheet. Funding is currently being sought through the business case process for Budget 19.	30 May 2019
B	Review the role and responsibilities of the Architecture Council to make sure they are fit for purpose and fully embedded within the organisation. This will ensure appropriate technical governance supports system changes as outlined in the MSD Technology Strategy and address ad hoc implementation approaches that bi-pass or fail to engage with the Architecture Council in a timely manner. Exceptions approval criteria will be revisited during the Architecture Council function review process.	30 April 2019

C	Review and update the ICT Strategic Asset Management Plan to ensure alignment with the new MSD Technology Strategy.	30 June 2019 (depending on resource and funding)
D	Complete the IT operational asset management plans to ensure the effective management of each IT asset's lifecycle.	30 June 2019 (depending on resource)
E	The Availability and Resilience programme, which provides the capabilities that will ensure the availability of our key systems when disaster or unplanned events occur.	31 December 2019
F	Refresh desktops/laptops via the End User Compute project. This will reduce end-user device faults that cause availability and performance issues.	31 July 2019
G	Setup an IT support team outside Wellington. enabling the systems to continue to be supported adequately in a Wellington-disaster scenario.	TBA
H	Review the Incident and Problem Management processes to ensure these are streamlined, centralised and consistently applied	TBA
I	Identify and report on leading indicators for near misses, factors that compound P2s and P3s.	TBA

Appendix 3: Low risk of creating stranded assets on relation to changes in operating model

The Ministry is continuing to elaborate the Te Pae Tawhiti strategy during calendar 2019, which will firm up some changes to the Ministry's operating model. There is a high probability that this will result in proposals in budget 2020 for technology changes to support Te Pae Tawhiti. It is therefore reasonable to ask the question whether any of the proposed Budget 19 investments would be impaired by subsequent changes to the operating model.

The Ministry has assessed that risk (of impaired or stranded assets) as very low.

The budget 2019 business case covers Technology investments that:

- are for systems fundamental to the Ministry's operation,
- remediate elements of the Ministry's technology environment that are most at risk of failure,
- cannot be funded from existing budgets,
- have long term strategic value, and

which are foundational pre-requisites to delivery of the Technology Strategy as a whole
The Ministry's assessment is that all of the proposed investments meet the above criteria and therefore are a low strategic risk. This means that no matter what the outcome of Te Pae Tawhiti is – these investments and the capability they bring are still needed and are foundational to MSD operating as a Ministry and delivering service to New Zealanders.

Hardware Infrastructure

Moving aging out-of-support hardware to All of Government IaaS and other cloud solutions is aligned with the government's Digital strategy. The arrangement is about having the flexibility to turn capacity up and down depending on demand. This is a model that is very adaptable to changing business circumstances. It is necessary to avoid the risk of stranded technology assets in the current owned asset model.

Data Warehouse Platform

There is very little that is business model specific in the Data Warehouse. Its function is to ensure that the wide spectrum of data that the Ministry collects is stored in a central place and that reporting and analytics is possible across the full range of datasets, using contemporary analytics and data science tools.

None of these factors results in the nature of the Warehouse being directly affected by the business model.

If the business model changes there may be associated changes to some of the specific data and datasets that are housed, but these do not affect the underlying architecture. This extends to the performance attributes of the replacement.

The Ministry is likely to always be a large complex organisation with large amounts of data from varying sources, and it is highly likely to continue being a multi-tenanted capability with Oranga Tamariki and the Ministry of Housing and Urban Development are co-users

Software and Security Upgrades

It is essential for any organisation to keep software and security upgrades up to date. Otherwise there is increasing risk of failure and security vulnerabilities being exploited. These upgrades in the main are to the underlying systems and application software (including SaaS) from SAP, Microsoft, Red Hat, IBM, Oracle etc.

MSD also has a growing transaction base and user base that historically leads to increased cost to accommodate such things as extra headcount.

This is not affected in the medium term by any change in business model.

Knowledge base

A knowledge base (or knowledge bases) is a foundational capability required by any large organisation to help staff understand and apply the business processes of the organisation.

Ideally as much of this content as possible would be made available to external parties including clients and partners. Regardless, the architecture and capabilities of the knowledge tool are not impacted by any change in business model. Only the content would change.

Review of decision, complaints, and provider escalations (Hindin Retirement)

Complaints and escalations are generic processes in any organisation that are ideally integrated with the client and/or provider systems. A change in business model would not change the need to have these capabilities.

Review of decision is a prescribed business process determined by legislation and so not affected by any discretionary change to the Ministry's business model.

One source of truth for statutory business rules (DREW retirement)

The statutory rules of the welfare (income support) system are detailed in the Social Security Act (SSA). Ideally these would be codified into a systems rules engine only once and then have every computer process that needs to access them go to that one source of truth.

Changing the rules enshrined in the SSA are a common way for government to enact policy change and simply changing the codified rules in one place would make enacting government policy change easier to deliver.

Given that this particular rule set is determined by the Government of the day and not be the Ministry, changes in operating model will have negligible impact on this investments

Legislative Change

This is type of change mandatory and non-discretionary change. Operating model is not relevant

Digital capabilities

Under Te Pae Tawhiti the capabilities of the digital channel is likely to be expanded, but built on the basis of the existing offering. This business case only seeks to deal with specific weaknesses in the Architecture and then it will be able to scale to meet that future need. The proposal in relation to Digital Capabilities will be required in any feasible future operating model

IdAM

An Identity and Access Management system is a core foundational requirement for any medium or large organisation. The organisation simply cannot function without one and is very largely unaffected by changes to business model. The proposal is simply to replace the current high risk system. This will be required regardless of the Ministry's future

Appendix 4: Cúram Alignment

The Ministry takes very seriously its role in the spectrum of government services that need to be made seamless to New Zealanders. Risk has been identified in the potential for Cúram to be an impediment to delivery of broader government services, for example life events, if it (Cúram) is unable to easily be part of a broader government eco-system. There is also the opportunity cost of continuing to invest in Cúram when government could invest in alternative technologies that might have greater utility and flexibility across the social sector and government. The Ministry has assessed these perspective as well as consequences and risks posed by vendor lock-in, particularly in relation to Cúram software, given that the proposal in this business case is for two of the projects (Hindin and DREW) to expand the already significant footprint that Cúram has in the Ministry.

The conclusions are that:

- There is significant vendor lock-in associated with any new systems acquisition.
- The footprint of Cúram in the organisation now means that the cost of change is already in the hundreds of millions and consequently the degree of lock-in is already very high.
- The risks of vendor lock-in, however, very rarely materialise.
- Systems replacement decisions are generally driven by risk of failure and inflexibility to meet business innovation, and Cúram currently poses neither of those risks.
- The Ministry's strategy is to move off all bespoke applications, preferably to Software as a Service (SaaS) cloud based solutions where they are available and, in the absence of that, to Commercial off the Shelf (COTS) products that can operate in an Infrastructure cloud environment (IaaS). Cúram is an essential element of getting out of legacy custom built applications.
- Cúram is just one component of the Ministry's target architecture to specifically deal with eligibility and entitlement management as well as other specific legislatively mandated case management obligations. Other critical parts of the target architecture include, for example, a cloud based Financial Information System (FMIS) which will take over client payments and debt management from bespoke legacy systems such as SWIFTT and TRACE.
- Another part of the strategy is to keep systems of engagement loosely coupled with the systems of record to allow maximum flexibility and in client interactions and commonality with broad citizen/ government interactions. This is a companion approach to the Application Programming Interface (API) strategy which will allow the Ministry to be a full participant in cross agency life event management.
- There are significant benefits to completing the standardisation onto Cúram software of client related functions. Specifically, this meets the strategic objectives of;
    - A single repository of client information
    - A single consistent repository of legislative and business practice rules
    - Fewer and simpler applications to streamline the work of front-line staff.
- Cúram remains strategically well aligned to meeting the obligations of the Ministry in relation to the Social Security Act (SSA).
- Cúram is only one of the client management systems in use in the Ministry. The Ministry places much higher priority on retiring the higher risk custom built hybrid applications such as SAL, SWIFTT, and TRACE.
- Cúram remains well supported by IBM with a significant modernisation roadmap being delivered.
- The most recently agreed Cúram licencing arrangement had meant that there is no cost for adding desired modules or for adding more users, removing the only potential barrier to growth, and these costs are locked in for the next five years.
- The IT Review conducted by PwC:
    - Endorsed the application rationalisation strategy (onto Cúram)
    - Found no compelling reason to move away from Cúram given the existing investment
    - Found no compelling viable alternative.

- A decision to not to invest further on Cúram signals that it is to be treated as a sunset system. This means that we will have to commence the process of selecting another core client management system and plan the migration. This would probably force a hiatus in the Ministry's ability to meet government policy objectives, for example changes arising from the Welfare Expert Advisory Group.
- The complexity of migrating client records and rules into a potential new system has previously been assessed. The conclusion is that migration to one of the current systems (ideally Cúram as the major repository and supported system) and then migration to the final system is the lower risk and preferred option if Cúram were to become an impediment to the Ministry s or Government strategy.
- On balance the choice of Cúram as a strategic plank for delivery of social programmes is a low risk approach

The concept of vendor lock-in

All system acquisitions involve a level of vendor lock-in, especially when they are bound into important business processes.

For example the Ministry recently acquired SAP's Success Factors to underpin the Human resource Management System (HRMS). Success Factors is a Software-as-a-Service (SaaS) offering. It cost the Ministry millions of dollars to:

- Migrate data into Success Factors
- Integrate Success Factors with the Payroll and Identity management system
- Implement new business processes that Success Factors enabled or required.

To move away from Success Factors to another SaaS offering would require an equivalent data migration, systems integration, and business process integration as the original HRMS project. Effectively the Ministry is 'locked in' to Success Factor for some years. This becomes a particular problem if the vendor becomes insolvent, or fees increase excessively.

In practice those scenarios are extremely rare if care is taken in the upfront Procurement process.

Why systems ultimately need to be replaced

System replacement decisions are not taken lightly due to the cost and the business disruption that must be taken into consideration.

Typically, decisions to replace Applications are made because they have a larger benefit than the cost of change. For example:

- risk to on-going operations
- profound impediment to business process change.

Bespoke systems and applications are particularly prone to this phenomenon, where the available developers are becoming scarce and the code base relies on obsolete and high risk underlying technology. At that phase of the application life-cycle the technology is very difficult to change to support key business innovations and it is prone to damaging failures.

COTS solutions supplied by a vendor are a lower risk over time, because they are being continually modernised and adapted to emergent technology and business conditions.

Note that the system replacement proposals described by this business case: Drew, Hindin, IdAM, and Data Warehouse have these attributes.

There is no strong case for replacing Cúram from the Ministry's perspective

IBM's Cúram product is one of the highest rated systems in the Ministry's catalogue from the perspective that it is low risk and is strategically a good fit for the Ministry's current (and future) business model. What Cúram does very well is integrate statutory rules from the Social Security Act (SSA) with transaction processing and client service planning.

Given the Ministry's key role in administering the SSA, the strengths of Cúram being a purpose built platform for administering Social programmes, based on eligibility and entitlement, means that it remains a very good fit for the Ministry's long term needs.

The Ministry has had a strategy for the last 10 years of "evolve to replace" for the custom built 'back end' applications, including SWIFTT, TRACE, and SAL. Central to the evolve-to-replace strategy has been a multi-year programme of standardising business functions onto the Cúram platform, which has historically progressed when there have been gaps in large legislative programmes and when cash has been available.

In 2016, The Ministry completed a key component of the evolution. This was the migration of the bespoke UCVII and SOLO applications functionality and data into off-the-shelf Cúram modules. Whilst it still remains unacceptably complex, this greatly simplified the user experience for front line staff. Based on this success, more migrations would have been completed if not for the lack of funds to progress those projects.

There remain a set of 11 high use applications that are strong candidates for standardising on Cúram because there is a good functional fit. Completing this process will have major benefits for the user experience of front-line staff.

Cúram is now so embedded into the Ministry's systems fabric that it would take hundreds of millions of dollars to move to another product or products. At this time, there is a far more pressing need to migrate from and retire higher risk and end of life systems SAL, SWIFTT, and TRACE. From a ministry perspective, Cúram is not amongst the candidate systems for retirement given this higher priority backlog.

From a Ministry of Social Development perspective there is no compelling case to move away from Cúram. IBM continues to invest in the product, responding to the needs and requirements of around 100 global customers. In recent times IBM has invested in areas such as:

- RESTful services allowing functionality to be exposed via APIs to other organisations and Applications.
- User experience improvements including responsive Web capability
- Containerisation using Kubernetes allowing more horizontal scaling and movement of the workload to cloud environments.

The 2018 IT review conducted by PwC found that the application rationalisation approach was needed, and also concluded that there was no compelling reason to move off Cúram, and that there was no obvious alternative.

Risk of a hiatus in government policy change

MSD is subject to a constant level of policy change that needs to be reflected in the core eligibility and entitlement systems. At present, this involves changes to multiple systems with the same rule having to be represented in different software, and in different contexts.

The Technology Strategy is focused in simplifying this process and lowering the cost by consolidating rules and processes onto fewer systems. The business case represents changes that move in that direction, with the benefits that change brings.

By contract, adding repositories and end user applications will decrease the pace of change and increase the cost. Introducing a new core client management system, with the lengthy transition that implies, will reduce the capacity of MSD to implement policy change for years to come.

Modular Systems

MSD has been significantly influenced by the experience of other jurisdictions that operate similarly complex social services. The experience of other social welfare agencies has that separating rules, client records, and business processes into separate modular systems was a failure.

In much the same way that an integrated tax solution has been assessed as the preferred way forward for Inland Revenue and other tax agencies, social sector organisations with similar responsibilities to MSD are following the path of integrated client management systems.

A very important element of the Ministry's strategy is to use commodity or utility software and services (e.g. SaaS) in for generic business processes such as office productivity, HRMS, payroll, FMIS (including payments and client debt management), Knowledge Management, Workflow etc. There is a core component to the Ministry's operations regarding administration of the SSA that will always be unique, and the strategic aim is to keep that core as small as possible, in relation to the role that commodity and utility software and services can play.

Appendix 5: MSD IT Score Maturity Assessment

MSD IT Capability				
	Current State	**Transition 1 (BC)**	**Transition 2**	**Target A**
Maturity Models	**Initial level**	**Initial - Developing level**	**Developing – Defined level**	**Managed > Optimizing level**
Value Focus	Minimal compliance focus to maintain Legacy systems (core and enabler systems) and to minimise systems failure. Minimal uptake of the few client facing digital channels. On-going maintenance of depreciated and sometimes out of support Infrastructure	More compliance, transparent, integrated, service outcome focus	Well integrated transparent and more sustainable systems with an increase of insight driven transformation.	Insight driven transformation toward sustainable systems focus
Service Model	Reactive service Model	Intermediated, Less re-active service model	Proactive – Embedded service model	Embedded – Predictive Service Model
Platform	IT-Centric platforms	More enterprise and client centric platform	Some Customer, more enterprise and Information centric platform	More ecosystem centric Platform
Ecosystem	Not government, MSD Centric ecosystem	Government centric Ecosystem	Client and partner more open and engaged centric ecosystem	Engaged toward evolving ecosystem
Leadership	Technology Leadership	More robust technology and business leadership	Business and Information driven leadership	Less business and more Information and innovation driven
Technology Focus	Maintaining legacy system, Minimising outages focus	Legacy maintenance and replacement with a better integration capability focus	Consolidated, more integrated, robust, Information sharing and re-use technology focus	Re-use, sustainability and Intelligence technology focus
Metrics/KPI	% systems downtime	%decrease system failures %more API uptake	% decrease of support efforts, % increase of staff efficiency % increase of consumers of information % Retired legacy systems	% re-use of platforms % less maintenance and development cost % Retired legacy systems % increase of new services

Appendix 6: Detailed Description of Contingency Approach

This appendix details the approach and methodology used to establish the contingency estimates based on the tools and methods associated with Quantitative Risk Analysis.

Process Steps

1. The cost elements for each of the six projects in scope were identified. The depth of the cost elements was based on the level of work and knowledge about each of the projects. At a minimum they were split based on the sub levels under Capital costs, As a Service costs and Internal Resources cost.
2. For each cost element in each project an assessment by SMEs was made as to the possible cost variability based on: The Best Case, A Better Case, The Base Case, A Worse case and The Worst case.
3. Probabilities for each of the five estimated 'Case Buckets' are also estimated by SMEs as to the likelihood that a particular case could occur.
4. A simulation was run for each cost element against the estimated probabilities,
    a. The simulation was run using an evenly distributed random number generator[16] producing a number between 0 and 1, which was converted to a percentage
    b. This randomly generated percentage was applied to the probabilities to select which of the 'Case Buckets' would apply for this particular simulation run.
    c. Each cost element had its own random number generator to produce a unique result per cost element.
    d. Summing the result for each cost element provides an estimated cost for the project based on one simulated run.
5. The simulation was run 20 000 times for each assessed project to generate a range of possible values.
6. A statistical assessment of the results produced a mean and standard deviation which is used to calculate the 85% confidence level and associated contingency as a dollar value and a percentage.

[16] The random number generator uses the Mersenne Twister algorithm to generate the random numbers

Appendix 7: Data Warehouse Full Remediation Options

We commissioned Accenture to analyse options for achieving the target state analytics platform, taking into consideration our current state. The report listed the viable options to remediate the current platform:

1. **Remediate in place**: in this approach we take the current system "as is" and invest in transforming it while still using it. This essentially represents an accelerated version of our current "do nothing" approach that is constrained by resource availability. The observed shortcomings of this approach are: the extreme interconnectedness of the over 7 million lines of largely undocumented code means extricating particular features is time consuming and involves costly impact analysis; the inability to know the exact usage demand of many products and datasets and we have no ability know how they might be re-combined and used further once they leave the warehouse. The conclusion is that this is a very costly and long term approach.

   Significant drawbacks were identified with this approach:

   - High complexity in migration and likely not feasible.
   - High-risk of impacting BAU activities without understanding all interdependencies embedded within code.
   - Would require significant investment but would not fundamentally address desire to move towards an open-standards and modular architecture.
   - Only partial mitigation of high licensing and support costs.
   - Tactical solution only as current software version will be EOL within 3 years.

   And there are two benefits:

   - Leverages investment in existing hardware and licenses.
   - Reuses team's skills and platform-specific IP.

   Due to the large number of drawbacks we discounted this option.

2. **Remediate in parallel**: in this approach we take the current system and maintain it, while building new functionality in parallel to replace the existing products. We would use exactly the current set of technical capabilities and "build beside". This approach does not involve a procurement phase because it essentially makes the ex-ante decision that current capabilities are sufficient to meet needs without an analysis phase - there is significant evidence to suggest this is not true as there are current practices, such as storage and automated testing, and information management that are poorly supported, or not implemented in the current architecture and this will transfer a future cost to the parallel solution.

   Although fewer in number there are still significant drawbacks to this approach:

   - Does not fundamentally address desire to move towards an open-standards and modular architecture.
   - Only partial mitigation of high software and hardware costs.
   - Tactical solution only as current software version will be EOL within 3 years.
   - Has been tried previously and likely to result in further technical debt sprawl.

   And there are more benefits:

   - Leverages investment in existing stack.
   - Reuses team's skills and platform-specific IP.
   - Mitigates risk of in situ remediation.

- Opportunity to “get it right” without requiring investment in newer technologies.

With fewer drawbacks this option is still possible but still costs more than the preferred option, and retains some high risk design elements for the future. With this option we would still require significant investment in the future. We discounted this option.

3. **Rebuild**: this option re-builds the platforms in a modern, modular, extensible, scalable way. This allows for a re-examination of capabilities against current and future requirements that will ensure the emerging platform is future proofed. This also leads to a very clear way for the programme to decommission the older components. Across a broad range of solution options this provides the most assurance that optimal solutions will emerge, and therefore represents the cheapest long term option.

   This has far fewer identified drawbacks:

   - Higher-risk relative to using “known quantity” technologies.
   - Higher complexity for migrating data, and co-existence during development.
   - Low availability of skills internally and in-market may increase delivery costs.

   But at this same time has significant advantages:

   - Architecture aligns to MSD Enterprise Architecture principles.
   - Delivers a future-proof and flexible platform resilient to change.
   - Supports reusing existing front-end consumption technologies, if desired.
   - Public Cloud-first solution supports highly available, scalable, and durable core platform – consistent with GCDO guidance, and also aligned with the Oranga Tamariki Technology strategy and Investment plan
   - Is designed from the ground up to avoid lock-in and allow maximum flexibility for future state operating models.

   This is the preferred option.

Table 1 outlines the three options recommended by Accenture for remediating the current platform and delivering the target state. The below analysis considers the following objectives:

- Better data privacy.
- Less disruption through less regular and less severe outages.
- Deliver insights across digital channels so that information is consistent and relevant.
- Increase speed and accuracy to delivery of products and change.

And, in addition, there are significant flow-on effects associated with failure to deliver:

- Improved client experience.
- Reduced ability to partner with external organisations.
- Low or unknown data quality.
- Improved self-service and real time insights delivery.
- Remediate non data warehouse functionality.
- Avoiding lock-in that may constrain the option set for the target operating model.

- Manageable long term costs.

Note that these options only refer to the technical remediation - other dimensions including partnering to deliver, location of the remediated platform and sequencing of the work are in subsequent sections.

Scale / Objectives	Do Nothing	Minimum: Remediate Current in place	Medium: Remediate Current - in parallel	Maximum: Re-build
Better data privacy	○	◔	◑	●
Less business disruption	○	◔	◑	●
Deliver insights across channels	○	○	●	●
Increased speed to delivery of products	○	○	◑	●
Improved client experience	○	●	●	●
Improved ability to partner with external organisations	○	◔	◔	●
Improve data quality	○	◔	◑	●
Improved self-service & real time insights delivery	○	◔	◔	●
Remediate non data warehouse functionality	○	◑	●	●
Avoiding lock-in that may constrain the option set for the target operating model	○	○	◑	●
Manageable long term costs	○	○	○	●
Short term cost	◔	◔	◔	●
Summary	**Continued for Baseline Comparison**	**Discounted**	**Discounted**	**Preferred**

Table 1: Options for remediating the current state.

Appendix 8: Data Warehouse Partial Targeted Remediation Options

There are scaling options within each remediation option. By doing less in each option we can address some, but not all risks. In some cases we actually increase cost or other risks significantly. The following presents a range of "do some" options and an analysis of the benefits and impacts of only remediating part of the system:

1. **Add Data Lineage:** Retrofit data lineage and meta-data to all current warehouse components: This would go some way towards addressing privacy concerns in the warehouse. However, the 271k spread sheets would largely remain un-catalogued after distributions and privacy breach likelihood would remain there (with emailed spread sheets lose ability to track usage). This approach may also give us some guidance on how to best disentangle the over 7 million lines of code in the future. However, we would remain having large risk of an inability to deliver future work, and have the same operational failures. Collecting data lineage on the full current code base is impossible due to the current lack of meta-data standards and use of base SAS. This solution is at best a partial fix to the privacy breach issue, at the cost of additional complexity.

   Risks mitigated:

   - 30% privacy
   - -20% speed to market (adding complexity to an already complex solution)
   - 20% operational failure (may make impact analysis easier)
   - 0% scale insights into channels
   - 5% ability to delivery current and future strategies
   - -20% manageable long term costs (retro-fitting increases complexity, negative means costs more)

2. **Partial Remediation:** Decommission a discrete set of current functionality (for example, the single view of client, or case manager reports). This would remove the risk of operational failure of the particular component such as operational down time in cases of failure. The remaining risks having to do with likelihood of privacy breaches, and inability to deliver on government policy would, however, remain high. We would also be unable to deliver insights across channels, meaning an inability to support full and correct entitlement, or improve customer experience.

   Decommissioning certain high-risk components, such as the IPV, or others, would address the issues related to that particular component. However, this approach suffers from a serious drawback: there are only two options for where to move the decommissioned functionality.

   - We could absorb it back into current components (into the current state solution). This increases complexity of already hard-to-manage components and thus increases the risk of slower delivery of future services and change. It also does little to reduce the risk of privacy breaches.
   - Create new independent components (a mini version of "remediate in parallel", or "re-build"). This has all the disadvantages of this approach listed above, especially it would leave us with no fewer total components to manage but would result in duplication, and thus more support work. It does nothing to reduce risk of privacy breaches.

   So we could decrease the risk of failure of this one component, but at the expense of having more duplication to maintain, and not fundamentally addressing the privacy issues.
   This option can itself be scaled (decommission more components, up to a level commensurate with funding). For example, at a 50% funding level we could imagine attempting to re-build the top half of highest risk components. This represents a "1/2 rebuild option".

   There is a serious issue with this approach: we can then not decommission the remaining 50% of the warehouse, and we must keep it running. Unfortunately we don't get to save 50% of the running costs because we still need to pay for management of the existing platform, and the licensing costs do not go away. This, together with infrastructure support, constitutes two of the biggest costs.

Therefore, rebuilding 50% of the warehouse in a new environment does not significantly reduce the existing resources, yet turns on another expense to maintain the new components.

A similar option of this type is a partial migration to the cloud. This would take a limited set of high risk components and migrate them to the cloud. This could stabilise some operational components (not all) – for example those reports with high operational impact, but it would not significantly reduce the data privacy risk. A list of high value products to decommission includes:

- The Integrated Person View
- Case Manager Reports
- Legacy tools (briefcase)

Risks mitigated:

- 5% privacy (most privacy issues arise from over 7 million lines of code)
- 10% speed to market (reduction in systems simplifies solutions)
- 30% operational failure (these are some of the most at risk systems)
- 0% scale insights into channels
- 5% ability to delivery current and future strategies
  -30% Manageable long term costs (adding complexity to already complex system, negative means costs more)

3. **Rebuild task management:** There is current functionality in the warehouse that supports operational task management, such as the lists of clients sent to the frontline that case managers use to prioritise client contact. This is functionality that that is a series of undocumented, ad hoc processes and is costly to maintain. The remediation would re-build this component and reduce the maintenance issues at some level, reduce the support cost for the warehouse, but leaves in place the likelihood of serious privacy breaches, and is only a small fraction of the thousands of reports produced by the warehouse, so does not significantly reduce the support burden. In addition, it is likely we could not easily remove the existing code for the reports from the warehouse easily due to the large inter-dependencies between reports. Note that a particular feature of this move is that speed to market slows down.

   Risks mitigated:
   - 0% privacy
   - -20% speed to market
   - 10% operational failure
   - 0% scale insights into channels
   - 10% ability to delivery current and future strategies
   - -25% Manageable long term costs

4. **Functionality upgrades**: There are a set of high value functionality upgrades that could be added to the platform:

   - Upgrade Data Engineering tooling – a more modern data engineering product studio could enable better data engineering practices.
   - Migrate Data Storage to open standards – could allow more value generation by allowing more analytics tools access to data warehouse data parts.

   In this case some of the risk of slow speed to market could be addressed, although this would not appreciably change the data privacy, nor would any change in the ability to scale into channels result.

Risks mitigated:

- 0% privacy
- 10% speed to market
- 20% operational failure
- 0% scale insights into channels
- 5% ability to delivery current and future strategies
- -20% Manageable long term costs (negative means costs more)

5. **Upgrade version**: The current version of SAS will likely be end-of-life in three years. SAS has a major version upgrade called VIYA. It is unclear, by itself, how much of the risk would be addressed purely by doing this alone without a redesign of the fundamental architecture; although it is likely some stability and additional functionality to scale into channels would be possible. However, built on top of our current implementation it is likely that the privacy, operational failure and speed to market risks remain essentially unchanged unless this was accompanied by the bulk of the process and engineering change present in the full "rebuild" remediation. In addition this represents poor business practice as we would be embarking on a major new product launch without the requisite procurement rigor.

   Risks mitigated:

   - 0% privacy
   - 0% speed to market
   - 10% operational failure
   - 20% scale insights into channels
   - 5% ability to delivery current and future strategies
   - 0% Manageable long term costs (negative means costs more)

These scaling options are all possible, however they all make some compromise against either risk of privacy and/or system failure versus ability to deliver and cost. The scaling options are summarised in **Error! Reference source not found.**.

	Add Data Lineage	Partial Remediation	Rebuild task management	Version Upgrade	Functionality upgrades
Rank Prioritisation	1	2	3	4	5
Extent to which this option mitigate risk of privacy breaches	◑	◔	○	○	○
Extent to which this option mitigates risk of slow speed to market	○	◔	◔	○	◔

◔

Extent to which this reduces operational failures		◔	◔	◔	◔
Extent to which this option allows scaling of insights into channels	○	○	○	◔	○
Avoiding lock-in that may constrain the option set for the target operating model	○	○	◔	○	○
Extent to which this option manages long term costs		◑	◔	◑	◔
Cost	**$3M**	**$10M**	**$2M**	**$3M**	**$5M**
Cumulative cost	**$3M**	**$13M**	**$15M**	**$18M**	**$23M**

Table 2: Partial Targeted Remediation Options.

Each option is described in the text and represents a "do something now" approach in contrast to the full remediation.

Appendix 9: Data Warehouse Service Solution Options

MSD is currently providing services for both OT and The Ministry of Housing and Urban Development. It is important to consider how we might partner with these organisations in the development of a new platform. Both agencies have agreed that partnering to deliver warehousing functionality is desirable. Data collection and storage is very similar for housing, the benefit system and child services and therefore all three agencies have similar needs so it makes sense to explore where we may work together to develop a combined solution. There are three distinct possibilities:

1. Split immediately: In this option we could immediately plan to separate our data warehousing functionality and develop independently. This offers several advantages:

   - Each agency has full and independent design control over their solution.
   - Each agency could, in theory, move faster.

   However there are several drawbacks too:

   - The designs are highly likely to be largely similar and we could therefore design the same thing three times.
   - The cost would likely be much higher as currently all the data resides in MSD and the act of cloning these systems in current state would essentially transfer all the known issues teach new agency meaning there would have to be three separate mitigations.

     We discount this option.

2. MSD, OT and HUD can co-design a common solution and, assuming the solution delivery is in the cloud, once designed and data migrated agencies could take a view on the costs and benefits of separation at that stage. The benefits of this approach are:

   - A combined design approach leverages the skills of all three agencies.
   - Readiness: OT and HUD could start now.
   - In the preferred remediation approach of a cloud based solution splitting out would be easier at the end of the implementation phase.
   - Potential options for co-managing parts of the solution can be examined and there will almost certainly be options for cost savings at that stage – for example, shared platform management.
   - This solution costs the least for all three agencies as development of almost identical solution designs is done once.
   - This solution preserves options at each stage: agencies can choose to separate after design, or after build, or not at all.
   - Greater level of management complexity.

   Although there are drawbacks, this is the preferred option.

Note: platform. Table shows a single version of the second option, where the agencies co-design the platform. However there are two options after implementation: both agencies could split and clone the warehouse at the end of build and they would then have two separate solutions and manage them independently; or alternatively, they could enter a co-management arrangement. Decisions on operating can be deferred until near the end of the project, especially if the warehouse is built in the cloud because cloning the warehouses or sharing data is easily accomplished at that stage and the decision will be better informed once the initial warehouse is near completion. This is a major reason for choosing a cloud implementation.

An analysis of the options against the outcomes desired follows:

Scale / Objectives	Re-platform with OT and HUD separately	Re-platform with OT and HUD as co-developers
Better data privacy	●	●
Less business disruption	○	●
Deliver insights across channels	◑	●
Increased speed to delivery of products	◑	●
Improved client experience	◑	●
Improved ability to partner with external organisations	◔	●
Improve data quality	◔	●
Improved self-service & real time insights delivery	●	●
Remediate non data warehouse functionality	●	●
Avoiding lock-in that may constrain the option set for the target operating model	◑	●
Manageable long term costs	○	●
Short term cost	◔	●
Meets GCDO Policy	○	●
Summary	**Discounted**	**Preferred**

Table 3: Options for partnering to deliver the remediated platform.

The preferred option is to co-design the data warehouse, and to make decision related to co-management after build.

Appendix 10: Data Warehouse Service Delivery Options

Service delivery options involve a spectrum of on premises or cloud only:

1. **On-premises option**: this represents a continuation of the status quo: MSD owns and manages hardware and infrastructure. This is the current status. Disadvantages of this approach are:
   - It is difficult to scale to large data.
   - It is expensive to maintain.
   - It requires dedicated specialists to manage hardware and application software.
   - Adding additional functionality is time consuming and costly.

   However it does have some advantages:
   - Can use current hardware and expertise.
   - No issues related to potential data sovereignty.
   - Social License potentially easier.

   We discount this option as the expense and lack of flexibility are major contributors to the current slow speed to market.

2. **Mixed option**: this allows for a combination of the first two with MSD retaining on-premises management of certain infrastructure whilst also utilising some public cloud components. This options retains some of the drawbacks of the on-premises options But also have the following disadvantages:
   - Requires maintaining two separate platforms thus further increasing the cost – below a certain size you cannot save more because it requires a certain minimum resource to maintain the on-premises option.

   This option is possible, but more expensive than the cloud-only option and does not add any significant advantages versus cloud only.

3. **Cloud-only option:** this fully leverages IAAS and PAAS in a public cloud. In this option platform and application services are managed. The disadvantages of this approach are:
   - It is susceptible to future cloud changes beyond MSD's control, such as cost, functionality or changes in social license.
   - Future changes to cloud regulation or data sovereignty may impact ability to keep data in cloud.
   - Requires major change in skill and culture of the organisation.

   Yet it has advantages:
   - Solutions are infinitely scalable (at a cost).
   - Many more technologies are accessible in which to provide solutions.
   - It much more easily supports sharing of design patterns across agencies because it standardises on patterns in widespread use around the world.
   - The base platform is inherently more secure and stable because of the economies of scale.
   - It is much less expensive.

   This is the preferred option.

An analysis of these three options against the objectives is in **Table 4**

Scale / Objectives	On Premises	Mixed Public cloud / Private cloud	Complete Public Cloud
Better data privacy	●	●	●
Less business disruption	●	●	●
Deliver insights across channels	●	●	●
Increased speed to delivery of products	●	●	●
Improved client experience	●	●	●
Improved ability to partner with external organisations	◑	●	●
Improve data quality	●	●	●
Improved self-service & real time insights delivery	●	●	●
Remediate non data warehouse functionality	●	●	●
Avoiding lock-in that may constrain the option set for the target operating model	◑	◕	●
Manageable long term costs	◑	◑	●
Short term cost	○	◔	●
Latency	●	?	?
Summary	**Discounted**	**Possible**	**Preferred**

Table 4: Options for delivering the remediated platform: on-premises versus cloud, or mix.

The preferred option is to build in cloud only: it completely removes the cost of in-house infrastructure management and has unlimited performance scaling. Indications from around the world are that costs are also continuing to decrease for this approach.

Appendix 11: Data Warehouse Implementation Options

Options in implementation primarily focus on three approaches

1. Development towards a final state in phased functional groups. This would involve end to end complete solutions around particular business functions, such as “performance reporting”. This may be described as “mini-waterfall”. This has several disadvantages:
   - By focussing on a single function the emergent design may reflect the requirements of a narrow slice of the business that will be expensive to extend later.
   - Past experience has indicated that functional siloes are a high risk in this type of solution.
   - Past experience has also indicated that this approach, under delivery pressure, encourages establishment of technical debt that is then propagated to other functions before being remediated.

   Yet it does have an advantage
   - With an end to end view, business outcome delivery occurs early.

2. A different implementation would involve delivering complete slices of capability across layers of architecture, such as “all data storage”, or “all ETL”. Disadvantages of this approach include:
   - No delivery of business value until late in development dramatically increases risk. With no link to delivery of value, historically this has proven difficult to manage and to know “how much is good enough”.
   - Full build out of a piece of the solution does not account for lessons learned once business products are delivered, and at this time remediation is expensive.

   But the major advantage is:
   - It is possible to end up with consistent architecture across the enterprise.

   This option is discounted.

3. The third option involves designing and developing a minimum viable product (MVP) solution, then building this out. In this approach we think of building a series of capabilities centred on data products. Starting with an initial design, an initial build and test occurs, followed by a series of on-going development phases and overseen by strong business governance. This is essentially an approach that is fully agile. This has the disadvantage:
   - Initial delivery can feel very minimalistic and users require training to engage with this approach as they are used to seeing “finished products”.
   - Requires discipline by developers to continuously evaluate and refine – may be in short supply in the market.

   However the advantages are many:
   - Managed properly this is a faster path to final delivery, and gets to a working system faster
   - It is more adaptable to business needs.
   - Has a natural stopping point because user feedback is continuous, and less prone to scope creep and projects overruns.
   - Innovative efforts, particularly in data and analytics, are founded on the premise that the end result is not well known, and there's no known path to it. The result of the agile "project" is often a "product" that can then either be discarded or more fully explored.

- Business capabilities that contribute to service improvement typically require much more frequent change to the software, and much more frequent reordering of the backlog of work associated with it, again lending itself to an agile product based approach.

This is the preferred option as it allows for the most flexibility in delivery, and follows the PI process already established at MSD.

Analysis of the options against objectives is shown in **Table 5**.

The preferred implementation approach is to develop MVP capabilities and to scale up as needed. This approach helps with development of a componentised system and can be developed in agile ways, while staying close to business needs. It closely corresponds to the Programme Increment approach already being used successfully at MSD, and is easy for our governance committees to manage risk in scope and delivery.

Preferred Option for Implementation Details

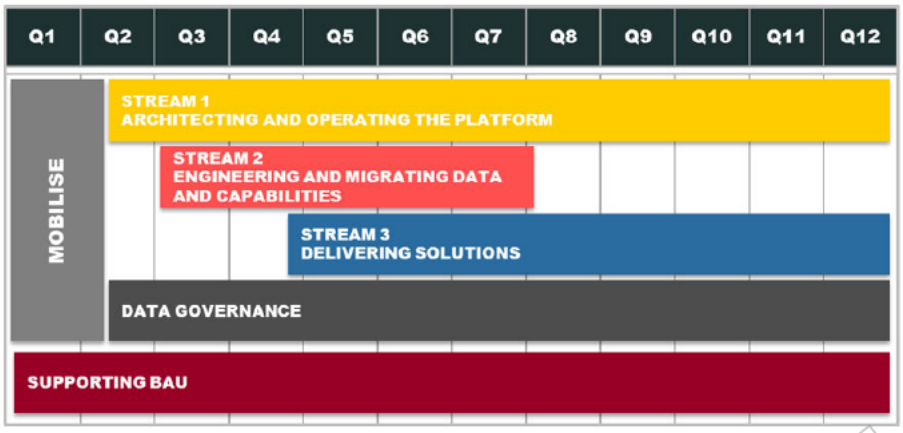
Figure 7 elaborates on the proposed sequencing of work for delivery of the preferred option. We need five concurrent streams of work to transition from our current state to deliver the target model. They are:

1. Architecting new Business Intelligence platform including the delivery of Minimal Viable Product (MVP) foundational shared data and information components.
2. Engineering new fit for purpose information and data assets.
3. Developing business solutions in the new environment.
4. Concurrently mature the information and data governance and practices to support the new platforms.
5. Supporting BAU, including:
    a. Decouple and separate operational capabilities.
    b. Decommission legacy components

The project end-state is to deliver a complete re-platform in 36 months, and decommissioning the current platform to leave the following capabilities in place:

- Ingesting data source pattern
- Information management modules
- Shared data platform – representative patterns
- Data warehouse – patterns for reporting as a priority
- Platform engineering capability
- Discovery & Intelligence platform integration – first patterns

To be clear, existing capabilities such as any current tools or products supporting business processes (including broader MSD or Insights) would need to be rebuilt in this option. Examples include dashboards, the profile building tool used in business intelligence. Our implementation teams would look at the current state and make an assessment about how much of worth in the current state can be re-used on a case by case basis.



STREAM 1 ARCHITECTING AND OPERATING THE PLATFORM. This workstream is focused on establishing, operating, and subsequently building upon, core data ingestion, data storage, data warehouse, and information management capabilities.

STREAM 2 ENGINEERING AND MIGRATING DATA AND CAPABILITIES. This workstream is focused on transitioning existing data and data feeds onto the new platform and continuing to develop and refine the data ingestion patterns to support delivering data engineering at-speed.

STREAM 3 DELIVERING SOLUTIONS. This workstream is focused on developing new solutions and refreshing existing BAU solutions to leverage the new platform, supported by incremental technology delivery as required.

Figure 7: Five streams of work develop design, data engineering, solution delivery, data governance and supporting BAU.

Scale /Objectives	Phased horizontally by function	Phased vertically by capability (ingest>data>analytics)	Scale MVP
Better data privacy	●	●	●
Less business disruption	●	●	●
Deliver insights across channels	●	●	●
Increased speed to delivery of products	●	◑	●
Improved client experience	●	●	●
Improved ability to partner with external organisations	●	●	●
Improve data quality	●	●	●
Improved self-service & real time insights delivery	●	●	●
Remediate non data warehouse functionality	●	●	●
Avoiding lock-in that may constrain the option set for the target operating model	◕	◕	●
Manageable long term costs	◔	◔	●
Short term cost	◔	◔	●
Aligns to organisation delivery	○	○	●
Summary	**Discounted**	**Discounted**	**Preferred**

Table 5: Options for implementing the remediated platform: phased by function versus phased by component versus growing an MVP

Appendix 12: Data Warehouse Analytics Delivery Options

In addition to collecting data and generating insights, a critical capability of a data warehouse platform is to deliver analytics results back into other systems so that they are actionable. We have identified three patterns that the target state model will be able support:

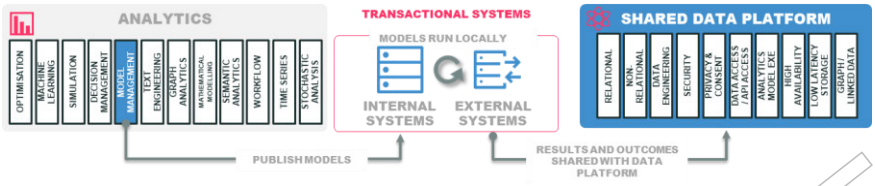


Figure 8: Analytics delivery pattern 1, Model for embedding analytics into transaction platforms.

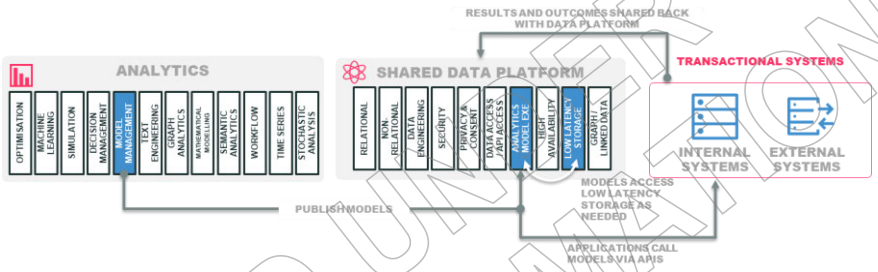


Figure 9: Analytics delivery pattern 2, low latency delivery from shared data platform

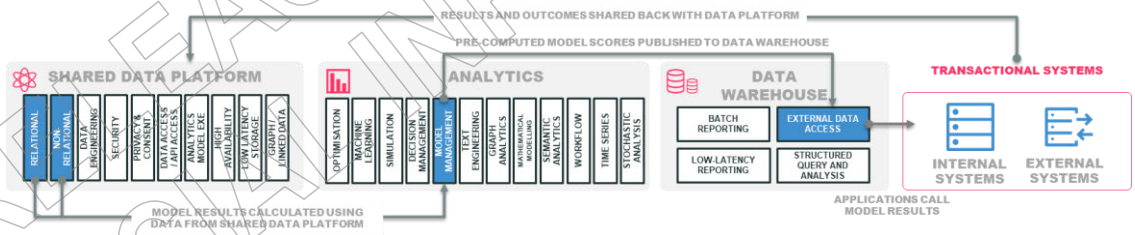


Figure 10: Analytics delivery pattern 3, delivering pre-computed results from shared data platform.

These patterns for integration into other systems are in scope for this bid. The patterns are supported by the target state architecture (Figure 2) and allow the platform to flexibly deliver results in the manner most suitable for the consuming system.

Appendix 13: Detailed Estimate Breakdowns

IdAM – Cost Summary

Financial year starting	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Operating Costs					
License Costs - Support IGA	—	143,000	143,000	143,000	429,000
License Costs - Support AM	—	396,000	396,000	396,000	1,188,000
License Costs - Support LDAP/VD	—	121,000	121,000	121,000	363,000
Ongoing operations and support IGA	—	143,000	143,000	143,000	429,000
Ongoing operations and support AM	—	242,000	242,000	242,000	726,000
Infrastructure design and build (operational support %FTE) IGA	—	27,500	27,500	27,500	82,500
Infrastructure design and build (operational support %FTE) AM/VD	—	27,500	27,500	27,500	82,500
Service Aggregator (On-site managing all IdAM relationships)	192,500	192,500	192,500	192,500	770,000
Total Operating Costs	**192,500**	**1,292,500**	**1,292,500**	**1,292,500**	**4,070,000**
Capital Costs					
Licence Costs IGA (one off cost) (Source PwC)	—	1,000,000	—	—	1,000,000
Service Provider Project Resource Costs IGA (Source PwC)	1,750,000	750,000	500,000	—	3,000,000
Service Provider Project Resource Costs AM (Source PwC)	1,250,000	812,500	—	—	2,062,500
Service Provider Project Resource Costs LDAP/VD (Source PwC)	875,000	531,250	—	—	1,406,250
Service Provider - Service Transformation (Source PwC)	375,000	125,000	—	—	500,000
Organisational Change Costs (MSD)	500,000	375,000	500,000	—	1,375,000
MSD Project Resources (from resource shreadsheet)	1,832,450	2,108,990	610,438	—	4,551,878
Adoption and integration costs (including external and internal)	1,625,000	1,625,000	—	—	3,250,000
RFP Costs	150,000	—	—	—	150,000
External client platform components	1,125,000	—	—	—	1,125,000
External client platform delivery	1,500,000	—	—	—	1,500,000
Total Capital Costs	**10,982,450**	**7,327,740**	**1,610,438**	**—**	**19,920,628**
Overall Total	**11,174,950**	**8,620,240**	**2,902,938**	**1,292,500**	**23,990,628**

IdAM – Yearly Resource Costs

Team and Roles	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Project team					
Business Analyst # 1	234,500	226,000	94,500	—	555,000
Business Analyst # 2 (perm)	210,300	226,000	64,500	—	500,800
Business Process Analyst	42,525	54,375	31,875	—	128,775
Better Business Case Writer	11,125	—	—	—	11,125
IdAM Solution Architect	180,800	180,800	26,040	—	387,640
Infrastructure Architect	75,250	59,200	10,750	—	145,200
Application Architect	69,750	98,775	21,975	—	190,500
Security Programme Architect	36,150	36,600	71,250	—	144,000
Enterprise Architect	21,350	21,350	10,938	—	53,638
Security Consultant	7,640	16,800	—	—	24,440
Unix Specialist (LDAP) perm	39,040	39,040	10,400	—	88,480
Project Manager	339,000	339,000	145,650	—	823,650
Scrum Master/Delivery Lead	113,750	141,250	—	—	255,000
Communications Specialist	21,000	12,200	3,250	—	36,450
Organisational Change Manager	45,000	21,600	—	—	66,600
Procurement Specialist	33,125	—	—	—	33,125
Test Manager	35,500	30,500	13,375	—	79,375
Test Analyst # 1	124,000	180,500	53,500	—	358,000
Test Analyst # 2	20,000	76,400	12,800	—	109,200
Lead Developer/integration specialist	85,500	226,250	13,375	—	325,125
Developer/integration specialist	30,320	69,800	8,560	—	108,680
Training Analyst	20,250	10,750	—	—	31,000
Environment/Release manager	18,100	22,600	10,700	—	51,400
Total	**1,813,975**	**2,089,790**	**603,438**	**—**	**4,507,203**
Internal Charges					
Release Train Manager	14,175	14,700	7,000	—	35,875
CISO Manager	4,300	4,500	—	—	8,800
Total	**18,475**	**19,200**	**7,000**	**—**	**44,675**
Overall Total	**1,832,450**	**2,108,990**	**610,438**	**—**	**4,551,878**

IdAM –Monthly Resource Numbers

Teams and Roles	2019						2020												2021					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Project team																								
Business Analyst # 1	1.00	1.00	1.00	1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00
Business Analyst # 2 (perm)	0.50	0.80	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00
Business Process Analyst	–	–	–	0.05	0.10	–	–	0.25	0.25	0.25	0.25	0.25	0.25	0.25	–	–	–	–	–	0.25	0.25	0.25	0.25	0.25
Better Business Case Writer	0.25	0.15	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
IdAM Solution Architect	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00
Infrastructure Architect	0.10	0.20	0.50	0.50	0.50	0.25	0.25	0.30	0.30	0.30	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.20	0.20	0.25	0.25	0.25	0.25	0.25
Application Architect	–	0.10	0.25	0.25	0.25	0.30	0.30	0.30	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.40	0.40	0.40	0.40	0.40	0.40	0.15
Security Programme Architect	0.05	–	0.05	0.10	0.10	0.10	0.10	0.10	0.10	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Enterprise Architect	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Security Consultant	0.05	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–	0.25	0.25	0.25	0.25	–	–	–	–	–	–	–
Unix Specialist (LDAP) perm	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Project Manager	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00
Scrum Master/Delivery Lead	–	–	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
Communications Specialist	0.25	–	–	0.20	0.20	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Organisational Change Manager	–	–	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Procurement Specialist	–	0.50	0.50	0.25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Test Manager	–	0.25	0.25	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Test Analyst # 1	–	–	–	0.25	0.50	0.50	1.00	0.50	0.50	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	0.50
Test Analyst # 2	–	–	–	–	–	–	0.25	–	–	0.25	0.50	0.25	0.25	0.25	0.25	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Lead Developer/integration specialist	–	0.10	0.10	0.25	0.25	0.50	0.10	0.10	0.50	0.50	0.50	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50
Developer/integration specialist	–	–	0.10	0.10	0.50	0.10	0.10	0.25	0.25	0.25	0.25	–	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.10	0.10	0.10
Training Analyst	–	–	–	–	–	–	–	–	–	0.50	0.25	0.25	–	0.25	0.25	–	–	–	–	–	–	–	–	–
Environment/Release manager	–	–	0.10	0.10	0.10	0.10	–	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	–	0.10	0.10	0.10	0.10	0.10
Total	4.45	5.45	6.85	7.15	7.60	5.15	4.90	6.95	7.20	8.55	8.50	7.90	7.40	7.80	8.30	8.05	8.05	6.50	6.40	9.05	8.55	8.15	8.15	7.40
Internal Charges																								
Release Train Manager	–	–	0.10	–	–	0.10	–	–	0.10	–	–	0.10	–	–	0.10	–	–	0.10	–	–	0.10	–	–	0.10
CISO Manager	–	–	0.10	–	–	–	–	–	0.10	–	–	–	–	–	0.10	–	–	–	–	–	0.10	–	–	–
Total	–	–	0.20	–	–	0.10	–	–	0.20	–	–	0.10	–	–	0.20	–	–	0.10	–	–	0.20	–	–	0.10
Overall Total	4.45	5.45	7.05	7.15	7.60	5.25	4.90	6.95	7.40	8.55	8.50	8.00	7.40	7.80	8.50	8.05	8.05	6.60	6.40	9.05	8.75	8.15	8.15	7.50

Teams and Roles	2021						2022												2023					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Project team																								
Business Analyst # 1	0.50	1.00	1.00	1.00	0.50	0.50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Business Analyst # 2 (perm)	0.50	1.00	1.00	0.50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Business Process Analyst	0.25	0.25	0.25	0.25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Better Business Case Writer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
IdAM Solution Architect	0.05	0.50	0.25	0.25	0.25	0.25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Infrastructure Architect	0.25	0.25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Application Architect	0.15	0.15	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Security Programme Architect	–	0.50	0.50	0.50	0.50	0.25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Enterprise Architect	0.05	0.05	0.05	0.05	0.05	0.05	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Security Consultant	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Unix Specialist (LDAP) perm	0.20	0.20	0.20	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Project Manager	0.50	1.00	1.00	0.80	0.80	0.50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Scrum Master/Delivery Lead	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Communications Specialist	0.05	0.05	0.05	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Organisational Change Manager	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Procurement Specialist	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Test Manager	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Test Analyst # 1	0.50	0.50	0.50	0.50	0.50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Test Analyst # 2	0.50	0.25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lead Developer/integration specialist	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Developer/integration specialist	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Training Analyst	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Environment/Release manager	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	**3.90**	**6.10**	**5.30**	**4.35**	**3.10**	**1.65**	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Internal Charges																								
Release Train Manager	–	–	0.10	–	–	0.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CISO Manager	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	–	–	**0.10**	–	–	**0.10**	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Overall Total	**3.90**	**6.10**	**5.40**	**4.35**	**3.10**	**1.75**	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

DREW Replacement - Cost Summary

Financial year starting	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Operating Costs					
Multi-Disciplinary Support team	1,310,727	1,408,965	1,408,965	1,408,965	5,537,622
Vendor Professional Services: DXC, Venturi, Xpert rule, and IBM	200,000	100,000	100,000	100,000	500,000
Total Operating Costs	**1,510,727**	**1,508,965**	**1,508,965**	**1,508,965**	**6,037,622**
Capital Costs					
Dev/test/implement (build) team	5,018,753	4,628,223			9,646,976
Vendor Professional Services: DXC, Venturi, Xpert rule, and IBM	1,250,000	400,000			1,650,000
IBM sponsored user program for CER abstraction component	5,750,000				5,750,000
Total Capital Costs	**12,018,753**	**5,028,223**	**—**	**—**	**17,046,976**
Overall Total	**13,529,480**	**6,537,188**	**1,508,965**	**1,508,965**	**23,084,598**

DREW Replacement - Cost Breakdown

Cost Breakdown	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Capital					
Build Team (Dev/ Test/ Implement)					
Programme Manager	89,250	76,500	—	—	165,750
Project Manager	306,000	280,500	—	—	586,500
Product Manager	223,253	246,348	—	—	469,601
Senior Developer	433,500	344,250	—	—	777,750
Senior Business Analyst	459,000	242,250	—	—	701,250
Test Engineer	459,000	280,500	—	—	739,500
Test Analyst	441,000	556,500	—	—	997,500
Business Analyst	357,000	430,500	—	—	787,500
Business Rule Analyst	338,250	363,000	—	—	701,250
Solution Architect	497,250	267,750	—	—	765,000
Developer	409,500	420,000	—	—	829,500
Scrum Master	280,500	293,250	—	—	573,750
Dev Support - Release Analysts	304,500	336,000	—	—	640,500
Infrastructure/ Middleware/ DBA	369,750	433,500	—	—	803,250
Change Manager	51,000	57,375	—	—	108,375
Vendor Professional Services (DXC, Venturi, Xpert rule, and IBM)	1,250,000	400,000	—	—	1,650,000
IBM sponsored user program for CER abstraction component	5,750,000	—	—	—	5,750,000
Total Capital	**12,018,753**	**5,028,223**	**—**	**—**	**17,046,976**
Operating					
Multi-Disciplinary Support Team (MDT)					
Capability Lead/ Product Manager	184,761	184,761	184,761	184,761	739,044
Developer *(perm)*	41,547	124,641	124,641	124,641	415,470
Senior Developer *(perm)*	141,302	154,148	154,148	154,148	603,746
Senior Business Analyst *(perm)*	160,571	154,148	154,148	154,148	623,015
Test Engineer *(perm)*	114,254	124,641	124,641	124,641	488,177
Test Analyst *(perm)*	110,462	110,462	110,462	110,462	441,848
Business Analyst *(perm)*	104,449	139,266	139,266	139,266	522,247
Business Rule Analyst *(perm)*	312,674	416,899	416,899	416,899	1,563,371
Solution Architect *(perm)*	140,706	—	—	—	140,706
Vendor Professional Services (DXC, Venturi, Xpert rule, and IBM)	200,000	100,000	100,000	100,000	500,000
Total Operating	**1,510,726**	**1,508,966**	**1,508,966**	**1,508,966**	**6,037,624**
Overall Total	**13,529,479**	**6,537,189**	**1,508,966**	**1,508,966**	**23,084,600**

DREW Replacement – Monthly Resource Numbers

Teams and Roles	2019						2020												2021					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Build Team																								
Programme Manager	0 50	0 50	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0 25	0 25	0 25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0 25	0 25	0 25
Project Manager	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	0 50	0 50
Product Manager	0 50	0 50	1.00	1.00	1.00	1.50	1.50	1.50	1.50	1.50	1 50	1 50	1 50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.00	1 00	1 00	1 00
Senior Developer	—	—	1.00	1.00	2.00	1.50	1.50	2.00	2.00	2.00	2 00	2 00	2 00	2.00	1.00	1.00	1.00	1.00	1.00	2.00	1.50	1 00	—	—
Senior Business Analyst	1 00	1 00	1.00	2.00	2.00	1.50	1.50	2.00	2.00	2.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0 50	—	—
Test Engineer	—	1 00	1.00	1.00	2.00	1.50	1.50	2.00	2.00	2.00	2 00	2 00	2 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	—	—
Test Analyst	—	—	1.00	1.50	1.50	1.50	1.50	2.00	3.00	3.00	3 00	3 00	3 00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	1 00	0 50	—
Business Analyst	—	—	1.00	2.00	2.00	1.50	1.50	1.00	2.00	2.00	2 00	2 00	2 00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.50	1 00	1 00	1 00
Business Rule Analyst	1 00	1 00	1.00	1.50	2.00	1.50	1.50	1.00	2.00	3.00	3 00	2 00	2 00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2 00	1 00	1 00
Solution Architect	1 00	1 00	1.00	2.00	2.00	2.00	1.50	2.00	2.00	2.00	1 50	1 50	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	0 50	—
Developer	—	1 00	1.00	2.00	2.00	2.00	1.50	2.00	2.00	2.00	2 00	2 00	2 00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1 00	1 00	—
Scrum Master	—	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	0 50
Dev Support - Release Analysts	—	—	1.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1 50	1 50	1 50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1 00	1 00	0 50
Infrastructure/Middleware/DBA	—	—	1.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1 50	1 50	1 50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1 50	1 00	1 00
Change Manager	—	—	—	—	0.25	0.25	0.25	0.25	0.25	0.25	0 25	0 25	0 25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	—	—	—
Build Total	**5.00**	**8.00**	**13.25**	**19.25**	**22.00**	**20.00**	**19.00**	**21.00**	**24.00**	**25.00**	**23.50**	**22.50**	**22.00**	**21.00**	**20.00**	**20.00**	**20.00**	**20.00**	**20.00**	**20.00**	**18.50**	**14.25**	**8.75**	**5.75**
Multi-Disciplinary Support Team																								
Capability Lead /Product Manager	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Developer (perm)	—	—	—	—	—	—	—	—	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Senior Developer (perm)	—	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Senior Business Analyst (perm)	—	1 00	1.50	1.50	1.50	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Test Engineer (perm)	—	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Test Analyst (perm)	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Business Analyst (perm)	—	—	—	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Business Rule Analyst (perm)	—	1 00	2.00	2.00	3.00	4.00	4.00	4.00	4.00	4.00	4 00	4 00	4 00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4 00	4 00	4 00
Solution Architect (perm)	1 00	2 00	2.00	1.00	1.00	1.00	1.00	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MDT Total	**3.00**	**8.00**	**9.50**	**9.50**	**10.50**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**
Overall Total	**8.00**	**16.00**	**22.75**	**28.75**	**32.50**	**31.00**	**30.00**	**32.00**	**35.00**	**36.00**	**34.50**	**33.50**	**33.00**	**32.00**	**31.00**	**31.00**	**31.00**	**31.00**	**31.00**	**31.00**	**29.50**	**25.25**	**19.75**	**16.75**

Teams and Roles	2021						2022												2023					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Build Team																								
Programme Manager	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Project Manager	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Product Manager	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Senior Developer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Senior Business Analyst	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Test Engineer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Test Analyst	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Business Analyst	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Business Rule Analyst	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Solution Architect	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Developer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Scrum Master	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Dev Support - Release Analysts	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Infrastructure/Middleware/DBA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Change Manager	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Build Total	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Multi-Disciplinary Support Team																								
Capability Lead /Product Manager	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Developer (perm)	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Senior Developer (perm)	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Senior Business Analyst (perm)	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Test Engineer (perm)	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Test Analyst (perm)	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Business Analyst (perm)	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Business Rule Analyst (perm)	4 00	4 00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4 00	4 00	4 00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4 00	4 00	4 00
Solution Architect (perm)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MDT Total	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**
Overall Total	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**	**11.00**

Hindin – Migration Cost Summary

Financial year starting	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Operating Costs					
Knowledge Management Tool SaaS fees	1,800,000	1,800,000	1,800,000	1,800,000	7,200,000
Knowledge Management Operating	698,760	700,800	699,600	700,800	2,799,960
Total Operating Costs	**2,498,760**	**2,500,800**	**2,499,600**	**2,500,800**	**9,999,960**
Capital Costs					
Knowledge Management Tool	5,000,000	—	—	—	5,000,000
Knowledge Management Team (including RFP and knowledge base)	2,301,920	2,597,840	—	—	4,899,760
Complaints Team	2,277,480	—	—	—	2,277,480
Review of Decision Team	396,600	2,505,120	—	—	2,901,720
Provider Management	—	890,520	—	—	890,520
Total Capital Costs	**9,976,000**	**5,993,480**	**—**	**—**	**15,969,480**
Overall Total	**12,474,760**	**8,494,280**	**2,499,600**	**2,500,800**	**25,969,440**

Hindin – Yearly Resource Costs

Team and Roles	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Knowledge Management Team					
BA	181,200	—	—	—	181,200
SA	194,400	57,480	—	—	251,880
Content Writer 1	193,200	258,600	—	—	451,800
Content Writer 2	193,200	258,600	—	—	451,800
Content Writer 3	193,200	233,400	—	—	426,600
Tester 1	166,800	271,200	—	—	438,000
Tester 2	121,200	—	—	—	121,200
IDAM Integration Engineer	84,000	—	—	—	84,000
PM	219,000	133,440	—	—	352,440
IT Application Owner	76,920	14,400	—	—	91,320
IT Security	181,800	25,200	—	—	207,000
SME	219,000	—	—	—	219,000
Vendor	278,000	342,800	—	—	620,800
BA	—	144,000	—	—	144,000
SA	—	42,840	—	—	42,840
PM	—	53,280	—	—	53,280
Cúram Developer	—	109,800	—	—	109,800
MyMSD developer	—	109,800	—	—	109,800
Content Writer	—	156,600	—	—	156,600
Tester	—	109,800	—	—	109,800
SME	—	109,800	—	—	109,800
Vendor	—	166,800	—	—	166,800
Total Knowledge Management Team	**2,301,920**	**2,597,840**	**—**	**—**	**4,899,760**
Complaints Team					
Cúram Developer 1	89,400	—	—	—	89,400
Cúram Developer 2	89,400	—	—	—	89,400
Cúram Developer 3	88,920	—	—	—	88,920
Cúram BA 1	89,400	—	—	—	89,400
Cúram BA 2	89,400	—	—	—	89,400
Cúram Tester 1	89,880	—	—	—	89,880
Cúram Tester 2	90,600	—	—	—	90,600
Cúram PM	89,880	—	—	—	89,880
Cúram SA	37,980	—	—	—	37,980
Complaints SME	51,600	—	—	—	51,600
BPM Developer 1	121,200	—	—	—	121,200
BPM Developer 2	121,200	—	—	—	121,200
BPM Developer 3	120,600	—	—	—	120,600

Team and Roles	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
BPM BA 1	121,200	—	—	—	121,200
BPM BA 2	120,720	—	—	—	120,720
BPM Tester 1	122,640	—	—	—	122,640
BPM Tester 2	119,520	—	—	—	119,520
BPM PM	121,200	—	—	—	121,200
BPM SA	65,400	—	—	—	65,400
BPM Complaints SME	52,920	—	—	—	52,920
IIB / DP Developer 1	36,480	—	—	—	36,480
IIB / DP Developer 1	35,400	—	—	—	35,400
IIB / DP BA 1	36,480	—	—	—	36,480
IIB / DP Tester 1	35,400	—	—	—	35,400
MyMSD Developer 1	36,480	—	—	—	36,480
MyMSD Developer 2	36,480	—	—	—	36,480
MyMSD Developer 3	36,120	—	—	—	36,120
MyMSD Tester 1	35,820	—	—	—	35,820
Data Migration Developer 1	47,280	—	—	—	47,280
Data Migration Tester 1	48,480	—	—	—	48,480
Total Complaints Team	**2,277,480**	**—**	**—**	**—**	**2,277,480**
Review of Decision Team					
Cúram Developer 1	49,200	158,640	—	—	207,840
Cúram Developer 2	12,600	147,600	—	—	160,200
Cúram Developer 3	12,600	147,600	—	—	160,200
Cúram Developer 4 half time	—	74,400	—	—	74,400
Cúram BA 1	49,200	147,600	—	—	196,800
Cúram BA 2	25,200	147,600	—	—	172,800
Cúram PM	24,600	158,640	—	—	183,240
Cúram SA	37,200	69,600	—	—	106,800
Cúram SME	24,600	85,200	—	—	109,800
Cúram Tester 1	12,600	171,240	—	—	183,840
Cúram Tester 2	—	135,600	—	—	135,600
BPM Developer 1	12,600	158,040	—	—	170,640
BPM Developer 2	—	134,400	—	—	134,400
BPM BA 1	37,200	160,200	—	—	197,400
BPM PM	24,600	101,760	—	—	126,360
BPM SA	24,600	39,000	—	—	63,600
BPM SME	24,600	95,880	—	—	120,480
BPM Tester 1	12,600	145,440	—	—	158,040
IIB Developer 1	12,600	51,600	—	—	64,200
IIB Developer 2	—	48,600	—	—	48,600
IIB Tester 1	—	46,440	—	—	46,440
Data Migration Developer 1	—	44,040	—	—	44,040
Data Migration Tester 1	—	36,000	—	—	36,000
Total Review of Decision Team	**396,600**	**2,505,120**	**—**	**—**	**2,901,720**
Provider Management Team					
Cúram Developer 1	—	58,320	—	—	58,320
Cúram Developer 2	—	62,640	—	—	62,640
Cúram Developer 3	—	61,080	—	—	61,080
Cúram BA 1	—	60,840	—	—	60,840
Cúram BA 2	—	58,320	—	—	58,320
Cúram Tester 1	—	58,920	—	—	58,920
Cúram PM	—	60,480	—	—	60,480
Cúram SA	—	27,360	—	—	27,360
Cúram SME	—	36,000	—	—	36,000
BPM Developer 1	—	65,640	—	—	65,640
BPM Developer 2	—	68,160	—	—	68,160
BPM BA 1	—	68,160	—	—	68,160
BPM Tester 1	—	60,600	—	—	60,600
BPM PM	—	46,080	—	—	46,080
Data Migration Developer 1	—	48,960	—	—	48,960
Data Migration Tester 1	—	48,960	—	—	48,960
Total Provider Management Team	**—**	**890,520**	**—**	**—**	**890,520**
Knowledge Management Operating Team					
BA	154,800	271,200	272,400	271,200	969,600
Developer	154,800	133,440	134,040	133,440	555,720
Tester	140,160	83,520	79,560	83,520	386,760
PM	94,200	79,200	79,560	79,200	332,160
Content Writer	154,800	133,440	134,040	133,440	555,720
Total Knowledge Management Operating Team	**698,760**	**700,800**	**699,600**	**700,800**	**2,799,960**
Overall Total	**5,674,760**	**6,694,280**	**699,600**	**700,800**	**13,769,440**

Hindin –Monthly Resource Numbers

Teams and Roles	2019						2020												2021					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Knowledge Management Team																								
BA	0.50	0.50	–	0.50	1.00	0.50	0.50	1.00	1.00	1.00	1.00	–	–	–	–	–	–	–	–	–	–	–	–	–
SA	0.50	0.50	0.50	0.50	1.00	0.50	0.50	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	–	–	–	–	–
Content Writer 1	0.50	0.50	–	–	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	0.50
Content Writer 2	0.50	0.50	–	–	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	0.50
Content Writer 3	0.50	0.50	–	–	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	0.50	–
Tester 1	–	–	–	–	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00
Tester 2	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	–	–	–	–	–	–	–	–	–	–	–	–
IDAM Integration Engineer	–	–	–	–	–	–	–	1.00	1.00	1.00	0.50	–	–	–	–	–	–	–	–	–	–	–	–	–
PM	0.50	0.50	0.50	0.50	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.50	0.50	0.50	0.50	0.50
IT Application Owner	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	–	–	–	–	–	–	–	0.20	0.20	0.20
IT Security	0.50	0.50	0.50	0.50	1.00	0.50	0.50	1.00	1.00	1.00	0.50	–	–	–	–	–	–	–	–	–	–	–	0.50	0.50
SME	0.50	0.50	0.50	0.50	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	–	–	–	–	–	–	–	–	–	–	–	–
Vendor	–	–	–	–	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.30	0.50	0.50	0.50	0.50	0.50
BA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.50	0.50	0.50	1.00	1.00	1.00	1.00	0.50
SA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.50	0.20	0.20	0.50	0.20	0.10	0.10	–
PM	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.50
Cúram Developer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	0.50
MyMSD developer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	0.50
Content Writer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.00	0.50	0.50	1.00	1.00	1.00	1.00	0.50
Tester	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	0.50
SME	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	0.50
Vendor	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.50	0.20	0.20	1.00	1.00	0.50	0.50	0.20
Total	4.50	4.50	2.50	2.70	10.20	5.20	5.20	12.20	12.20	12.20	10.70	8.50	6.00	6.00	6.00	5.70	8.70	4.50	4.30	12.70	12.40	12.00	12.00	7.40
Complaints Team																								
Cúram Developer 1	0.50	0.70	0.70	0.80	0.80	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cúram Developer 2	0.50	0.70	0.70	0.80	0.80	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cúram Developer 3	–	–	0.80	0.80	0.80	0.50	0.40	0.30	0.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cúram BA 1	0.70	0.70	0.70	0.70	0.50	0.10	0.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cúram BA 2	0.70	0.70	0.70	0.70	0.50	0.10	0.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cúram Tester 1	0.70	0.70	0.70	0.70	0.70	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cúram Tester 2	–	0.70	0.70	0.70	0.70	0.20	0.30	0.30	0.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cúram PM	0.50	0.50	0.50	0.50	0.70	0.20	0.20	0.20	0.30	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cúram SA	0.50	0.50	0.25	0.20	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Complaints SME	0.50	0.50	0.50	0.25	0.25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BPM Developer 1	1.00	1.00	1.00	1.00	0.70	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BPM Developer 2	1.00	1.00	1.00	1.00	0.70	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BPM Developer 3	–	1.00	1.00	1.00	1.00	0.20	0.50	0.20	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BPM BA 1	1.00	1.00	1.00	1.00	0.70	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BPM BA 2	0.20	1.00	1.00	1.00	0.70	0.50	0.50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BPM Tester 1	0.50	1.00	1.00	1.00	0.70	0.20	0.30	0.20	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BPM Tester 2	–	1.00	1.00	1.00	0.70	0.50	0.50	0.20	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BPM PM	1.00	1.00	0.50	0.50	0.70	0.50	0.40	0.30	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BPM SA	1.00	1.00	0.50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BPM Complaints SME	0.50	0.50	0.50	0.30	0.25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
IIB / DP Developer 1	0.50	0.50	0.40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
IIB / DP Developer 1	–	–	0.50	0.50	0.40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
IIB / DP BA 1	0.50	0.50	0.40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
IIB / DP Tester 1	–	–	0.50	0.50	0.40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MyMSD Developer 1	0.50	0.50	0.40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MyMSD Developer 2	0.50	0.50	0.40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MyMSD Developer 3	–	–	–	0.50	0.50	0.20	0.30	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MyMSD Tester 1	–	–	–	–	0.80	0.50	0.50	0.30	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Data Migration Developer 1	–	–	–	–	–	0.50	0.50	1.00	0.20	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Data Migration Tester 1	12.80	17.20	17.60	15.70	14.50	4.40	4.90	3.00	0.70	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	–	–	–	–	0.80	0.50	0.50	0.30	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Teams and Roles	2019						2020												2021					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Review of Decision Team																								
Cúram Developer 1	–	–	–	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.40	–	–	–
Cúram Developer 2	–	–	–	–	–	–	–	–	–	–	–	0.50	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	–	–	–	–
Cúram Developer 3	–	–	–	–	–	–	–	–	–	–	–	0.50	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	–	–	–	–
Cúram Developer 4 half time	–	–	–	–	–	–	–	–	–	–	–	–	0.50	0.50	0.50	0.50	0.50	0.50	–	–	–	–	–	–
Cúram BA 1	–	–	–	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	–	–	–	–
Cúram BA 2	–	–	–	–	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	–	–	–	–
Cúram PM	–	–	–	–	–	–	–	–	–	–	0.50	0.50	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.40	–	–	–
Cúram SA	–	–	–	–	–	–	–	–	–	–	0.50	1.00	1.00	1.00	0.50	0.20	–	–	–	–	–	–	–	–
Cúram SME	–	–	–	–	–	–	–	–	–	–	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	–	–	–	–	–
Cúram Tester 1	–	–	–	–	–	–	–	–	–	–	–	0.50	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.40	–	–	–
Cúram Tester 2	–	–	–	–	–	–	–	–	–	–	–	–	0.50	1.00	1.00	1.00	1.00	0.50	0.50	–	–	–	–	–
BPM Developer 1	–	–	–	–	–	–	–	–	–	–	–	0.50	0.50	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.40	–	–	–
BPM Developer 2	–	–	–	–	–	–	–	–	–	–	–	–	0.50	1.00	1.00	1.00	0.50	0.50	0.50	0.50	–	–	–	–
BPM BA 1	–	–	–	–	–	–	–	–	–	–	0.50	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	–	–	–	–
BPM PM	–	–	–	–	–	–	–	–	–	–	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.30	0.30	0.50	0.50	–	–	–
BPM SA	–	–	–	–	–	–	–	–	–	–	0.50	0.50	0.50	0.50	0.50	–	–	–	–	–	–	–	–	–
BPM SME	–	–	–	–	–	–	–	–	–	–	0.50	0.50	1.00	1.00	0.50	0.50	0.50	0.30	–	–	–	–	–	–
BPM Tester 1	–	–	–	–	–	–	–	–	–	–	–	0.50	0.50	0.50	1.00	1.00	1.00	0.50	0.50	0.50	0.40	–	–	–
IIB Developer 1	–	–	–	–	–	–	–	–	–	–	–	0.50	1.00	1.00	–	–	–	–	–	–	–	–	–	–
IIB Developer 2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.50	0.50	0.50	0.50	–	–	–	–	–	–
IIB Tester 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.50	0.50	0.50	0.40	–	–	–	–	–	–
Data Migration Developer 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.50	0.50	0.50	0.40	–	–	–	–	–
Data Migration Tester 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.00	0.50	–	–	–	–	–	–
Total	–	–	–	–	–	–	–	–	–	–	5.50	10.50	15.00	16.50	16.00	15.70	13.00	9.50	7.20	6.00	2.50	–	–	–
Provider Management Team																								
Cúram Developer 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.20	0.80	0.80	0.40	0.20	–
Cúram Developer 2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.80	0.80	0.80	0.10	0.10
Cúram Developer 3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.40	0.80	0.80	0.30	0.20
Cúram BA 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.20	0.80	0.80	0.40	0.20	0.10
Cúram BA 2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.20	0.80	0.80	0.40	0.20	–
Cúram Tester 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.40	0.50	0.50	0.50	0.50
Cúram PM	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.20	0.50	0.50	0.50	0.50	0.30
Cúram SA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.10	0.50	0.50	–	–	–
Cúram SME	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.10	0.50	0.50	0.40	–	–
BPM Developer 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.50	1.00	1.00	0.20	–
BPM Developer 2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.50	1.00	1.00	0.20	0.10
BPM BA 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.50	1.00	1.00	0.20	0.10
BPM Tester 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.50	1.00	0.80	0.20
BPM PM	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.50	0.50	0.50	0.20	0.20
Data Migration Developer 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.40	0.80	0.80
Data Migration Tester 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.40	0.80	0.80
Total	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.00	7.50	10.00	9.50	5.20	3.40
Knowledge Management Operating Team																								
BA	–	–	–	–	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00
Developer	–	–	–	–	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.50	0.50	0.50	0.50	0.50
Tester	–	–	–	–	0.50	0.50	0.50	1.00	1.00	0.80	0.80	0.80	0.30	0.30	0.30	0.30	0.30	0.20	0.20	0.30	0.30	0.30	0.30	0.30
PM	–	–	–	–	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.30	0.30	0.30	0.30	0.30	0.10	0.10	0.30	0.30	0.30	0.30	0.30
Content Writer	–	–	–	–	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.50	0.50	0.50	0.50	0.50
Total	–	–	–	–	2.50	2.50	2.50	4.50	4.50	4.30	4.30	4.30	2.60	2.60	2.60	2.60	2.60	1.20	1.20	2.60	2.60	2.60	2.60	2.60
Overall Total	17.30	21.70	20.10	18.40	24.70	9.60	10.10	15.20	12.90	12.20	16.20	19.00	21.00	22.50	22.00	21.40	21.70	14.00	12.50	26.20	24.90	21.50	17.20	10.80

Teams and Roles	2021						2022												2023					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Knowledge Management Operating Team																								
BA	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00
Developer	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.50	0.50	0.50	0.50	0.50
Tester	0.30	0.30	0.30	0.30	0.30	0.10	0.10	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.20	0.20	0.30	0.30	0.30	0.30	0.30
PM	0.30	0.30	0.30	0.30	0.30	0.10	0.10	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.10	0.10	0.30	0.30	0.30	0.30	0.30
Content Writer	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.50	0.50	0.50	0.50	0.50
Total	2.60	2.60	2.60	2.60	2.60	1.10	1.10	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	1.20	1.20	2.60	2.60	2.60	2.60	2.60
Overall Total	2.60	2.60	2.60	2.60	2.60	1.10	1.10	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	1.20	1.20	2.60	2.60	2.60	2.60	2.60

Data Warehouse Rebuild – Cost Summary

Financial year starting	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Platform Costs					
Subscription Software (Opex)	1,406,000	1,448,000	1,491,000	1,536,000	5,881,000
IaaS	414,000	718,000	933,000	1,213,000	3,278,000
Platform ops (opex becomes BAU in year 4)	—	—	—	263,825	263,825
Total Platform Costs	**1,820,000**	**2,166,000**	**2,424,000**	**3,012,825**	**9,422,825**
Resourcing Costs					
Core Design/Architecture Team (Capex for build)	2,132,075	1,443,650	857,125	221,000	4,653,850
Data Engineering (Capex for build/data ingestion/migration)	2,122,725	3,413,900	2,843,450	420,300	8,380,075
Platform Ops	1,061,700	2,471,275	918,775	63,750	4,451,750
IM Stream	1,188,650	1,674,800	577,820	74,800	3,441,270
Total Resourcing Costs	**6,505,150**	**9,003,625**	**5,197,170**	**779,850**	**21,485,795**
Phasing Option 2: balanced by smoothing Year 2	**7,000,000**	**8,000,000**	**5,500,000**	**1,000,000**	**21,500,000**
Overall Total (with smoothing)	**8,820,000**	**10,166,000**	**7,924,000**	**4,012,825**	**30,922,825**

Data Warehouse Rebuild – Yearly Resource Costs (without smoothing)

Team and Roles	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Team 1: Design Platform					
Project Manager	300,750	366,000	291,000	63,750	1,021,500
Solution Architect - MSD	213,000	148,600	98,000	34,000	493,600
Data Architect - MSD	213,000	148,600	74,000	17,000	452,600
Data Architect - OT	277,000	148,600	74,000	17,000	516,600
Data Architect -HUD	213,000	148,600	74,000	17,000	452,600
Information Management Lead	159,750	93,450	18,750	—	271,950
Enterprise Architect	277,000	148,600	98,000	34,000	557,600
Security Architect	171,450	74,025	55,125	19,125	319,725
Cloud Architect	307,125	167,175	74,250	19,125	567,675
Total Team 1: Design Platform	**2,132,075**	**1,443,650**	**857,125**	**221,000**	**4,653,850**
Team 2: Build & Migrate					
Senior Data Architect	107,325	109,800	110,250	38,250	365,625
Data Architect	240,000	329,000	245,000	85,000	899,000
Cloud Architect	95,400	65,800	49,000	17,000	227,200
Data Engineer 1	210,000	427,000	376,250	29,575	1,042,825
Data Engineer 2	210,000	427,000	376,250	40,775	1,054,025

Team and Roles	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Data Engineer 3	150,000	305,000	268,750	29,125	752,875
Data Engineer 4	150,000	305,000	268,750	29,125	752,875
Data Engineer OT	150,000	305,000	268,750	29,125	752,875
Data Engineer HUD	150,000	305,000	268,750	29,125	752,875
Legacy SME	120,000	244,000	215,000	23,300	602,300
SAS Developer	120,000	164,500	122,500	23,300	430,300
Product Owner / Business	60,000	122,000	122,500	23,300	327,800
Scrum Master	120,000	122,000	122,500	23,300	387,800
Security SME	240,000	182,800	29,200	—	452,000
Total Team 2: Build & Migrate	**2,122,725**	**3,413,900**	**2,843,450**	**420,300**	**8,800,375**
Team 3: Build & Manage					
DevOps/Support Lead	225,750	366,000	183,750	63,750	839,250
DevOps/Automation 1	103,750	305,000	108,125	—	516,875
DevOps/Automation 2	76,250	305,000	108,125	—	489,375
Container Dev 1	61,000	244,000	86,500	—	391,500
Cloud Architect	202,000	329,000	110,600	—	641,600
Tech Arch	176,750	287,875	96,775	—	561,400
Platform Engineer 1	101,000	244,000	86,500	—	431,500
Platform Engineer 2	66,400	195,200	69,200	—	330,800
Platform Engineer 3	48,800	195,200	69,200	—	313,200
Total Team 3: Build & Manage	**1,061,700**	**2,471,275**	**918,775**	**63,750**	**4,515,500**
Team 4: Manage Information					
IM Lead	283,500	321,000	99,600	12,750	716,850
IM Consultant	196,250	267,500	83,000	10,625	557,375
DQ Consultant	150,000	267,500	83,000	10,625	511,125
DQ Developer	120,000	214,000	66,400	8,500	408,900
Data Matching Developer	120,000	214,000	66,400	8,500	408,900
Business Data Gov Lead	144,400	97,600	59,900	8,500	310,400
Tester	96,000	171,200	53,120	6,800	327,120
Scrum Master	78,500	122,000	66,400	8,500	275,400
Total Team 4: Manage Information	**1,188,650**	**1,674,800**	**577,820**	**74,800**	**3,516,070**
Team 5: Project Support & Other					
External QA Specialist	15,200	48,800	17,600	—	81,600
Project Coordinator	9,600	19,520	19,600	6,800	55,520
Training	—	—	96,000	68,000	164,000
Training	—	—	96,000	68,000	164,000
Release Manager	3,280	19,520	19,600	6,800	49,200
Total Team 5: Project Support & Other	**28,080**	**87,840**	**248,800**	**149,600**	**514,320**
Overall Total	**6,533,230**	**9,091,465**	**5,445,970**	**929,450**	**22,000,115**

Data Warehouse Rebuild – Monthly Resource Numbers

Teams and Roles	2019						2020												2021					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Team 1: Design Platform																								
Project Manager	0.50	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Solution Architect - MSD	–	–	–	–	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Data Architect - MSD	–	–	–	–	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Data Architect - OT	–	0.50	0.50	0.50	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Data Architect -HUD	–	–	–	–	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Information Management Lead	–	–	–	–	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
Enterprise Architect	–	0.50	0.50	0.50	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Security Architect	–	–	–	–	1.00	1.00	1.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Cloud Architect	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Total Team 1: Design Platform	**0.50**	**1.50**	**1.50**	**1.50**	**9.00**	**9.00**	**9.00**	**5.20**	**5.20**	**5.20**	**4.70**	**4.70**	**4.70**	**4.70**	**4.70**	**4.70**	**2.50**	**2.50**	**2.40**	**2.40**	**2.40**	**2.40**	**2.40**	**2.40**
Team 2: Build & Migrate																								
Senior Data Architect	–	–	–	–	–	–	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Data Architect	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Cloud Architect	–	–	–	–	–	–	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Data Engineer 1	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Data Engineer 2	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Data Engineer 3	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Data Engineer 4	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Data Engineer OT	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Data Engineer HUD	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Legacy SME	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SAS Developer	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Product Owner / Business	–	–	–	–	–	–	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Scrum Master	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Security SME	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20
Total Team 2: Build & Migrate	–	–	–	–	–	–	**12.50**	**12.50**	**12.50**	**12.50**	**11.90**	**11.90**	**10.90**	**10.90**	**10.90**	**10.90**	**9.80**	**9.80**	**9.80**	**9.50**	**9.50**	**9.50**	**9.50**	**9.50**
Team 3: Build & Manage																								
DevOps/Support Lead	–	–	0.50	0.50	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DevOps/Automation 1	–	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DevOps/Automation 2	–	–	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Container Dev 1	–	–	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cloud Architect	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Tech Arch	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Platform Engineer 1	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Platform Engineer 2	–	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Platform Engineer 3	–	–	–	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total Team 3: Build & Manage	–	–	**0.50**	**0.50**	**0.50**	**0.50**	**0.50**	**4.00**	**6.00**	**9.00**	**9.00**	**9.00**	**9.00**	**9.00**	**9.00**	**9.00**	**8.00**	**8.00**	**8.00**	**8.00**	**8.00**	**8.00**	**8.00**	**8.00**
Team 4: Manage Information																								
IM Lead	–	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50
IM Consultant	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50
DQ Consultant	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50
DQ Developer	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50
Data Matching Developer	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50
Business Data Gov Lead	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Tester	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50
Scrum Master	–	–	–	–	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Total Team 4: Manage Information	–	**0.50**	**0.50**	**0.50**	**3.50**	**3.50**	**7.50**	**7.50**	**7.50**	**7.50**	**7.50**	**6.90**	**6.90**	**6.90**	**6.90**	**6.90**	**6.90**	**6.90**	**6.90**	**6.90**	**6.90**	**3.90**	**3.90**	**3.90**
Team 5: Project Support & Other																								
External QA Specialist	–	–	–	–	–	–	1.00	–	–	–	–	–	1.00	–	–	–	–	–	1.00	–	–	–	–	1.00
Project Coordinator	–	–	–	–	–	–	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Training	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Training	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Release Manager	–	–	–	–	–	–	–	–	–	–	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Total Team 5: Project Support & Other	–	–	–	–	–	–	**1.10**	**0.10**	**0.10**	**0.10**	**0.20**	**0.20**	**1.20**	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**	**1.20**	**0.20**	**0.20**	**0.20**	**0.20**	**1.20**
Overall Total	**0.50**	**1.50**	**2.00**	**2.00**	**9.50**	**9.50**	**23.10**	**21.80**	**23.80**	**26.80**	**25.80**	**25.80**	**25.80**	**24.80**	**24.80**	**24.80**	**20.50**	**20.50**	**21.40**	**20.10**	**20.10**	**20.10**	**20.10**	**21.10**

Teams and Roles	2021						2022												2023					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Team 1: Design Platform																								
Project Manager	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	–	–	–	–	–	–	–	–
Solution Architect - MSD	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	–	–	–	–	–
Data Architect - MSD	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Data Architect - OT	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Data Architect -HUD	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Information Management Lead	0.10	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Enterprise Architect	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	–	–	–	–	–
Security Architect	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Cloud Architect	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Total Team 1: Design Platform	2.40	2.40	2.40	2.40	2.30	2.30	1.90	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	–	–	–	–	–	–	–	–
Team 2: Build & Migrate																								
Senior Data Architect	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	–	–	–	–	–
Data Architect	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	–	–	–	–	–	–	–	–
Cloud Architect	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Data Engineer 1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Data Engineer 2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.20	0.20	0.20	–	–	–	–	–	–	–	–
Data Engineer 3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.20	0.20	0.20	–	–	–	–	–	–	–	–
Data Engineer 4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.20	0.20	0.20	–	–	–	–	–	–	–	–
Data Engineer OT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.20	0.20	0.20	–	–	–	–	–	–	–	–
Data Engineer HUD	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.20	0.20	0.20	–	–	–	–	–	–	–	–
Legacy SME	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.20	0.20	0.20	–	–	–	–	–	–	–	–
SAS Developer	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	–	–	–	–	–	–	–	–
Product Owner / Business	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	–	–	–	–	–	–	–	–
Scrum Master	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	–	–	–	–	–	–	–	–
Security SME	0.20	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total Team 2: Build & Migrate	9.50	9.40	9.40	9.40	9.40	9.40	9.30	9.30	9.30	5.80	5.80	5.80	5.80	2.70	2.70	2.70	–	–	–	–	–	–	–	–
Team 3: Build & Manage																								
DevOps/Support Lead	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	–	–	–	–	–	–	–	–
DevOps/Automation 1	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	–	–	–	–	–	–	–	–	–
DevOps/Automation 2	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	–	–	–	–	–	–	–	–	–
Container Dev 1	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	–	–	–	–	–	–	–	–	–
Cloud Architect	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	–	–	–	–	–	–	–	–	–
Tech Arch	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	–	–	–	–	–	–	–	–	–
Platform Engineer 1	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	–	–	–	–	–	–	–	–	–
Platform Engineer 2	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	–	–	–	–	–	–	–	–	–
Platform Engineer 3	0.50	0.50	0.50	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	–	–	–	–	–	–	–	–	–
Total Team 3: Build & Manage	4.50	3.90	3.90	3.90	3.90	3.90	2.10	2.10	2.10	2.10	2.10	2.10	0.50	0.50	0.50	0.50	–	–	–	–	–	–	–	–
Team 4: Manage Information																								
IM Lead	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
IM Consultant	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
DQ Consultant	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
DQ Developer	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Data Matching Developer	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Business Data Gov Lead	0.40	0.40	0.40	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Tester	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Scrum Master	0.50	0.50	0.50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Total Team 4: Manage Information	3.90	3.90	3.90	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	0.80	0.80	0.80	0.80	0.80	–	–	–	–	–	–	–	–
Team 5: Project Support & Other																								
External QA Specialist	–	–	–	–	1.00	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Project Coordinator	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Training	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	–	–	–	–	–	–	–	–
Training	–	–	–	–	–	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	–	–	–	–	–	–	–	–
Release Manager	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	–	–	–	–	–	–	–	–
Total Team 5: Project Support & Other	0.20	0.20	0.20	0.20	1.20	0.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	–	–	–	–	–	–	–	–
Overall Total	16.60	15.90	15.90	15.90	16.80	15.80	15.50	15.00	15.00	11.50	11.50	11.50	9.90	6.80	6.80	6.80	–	–	–	–	–	–	–	–

Digital Capability – Cost Summary

Financial year starting	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Operating Costs					
—	—	—	—	—	—
Total Operating Costs	—	—	—	—	—
Capital Costs					
Scalable Cúram Architecture Team	3,938,063	—	—	—	3,938,063
Scalable MyMSD Architecture Team	1,519,850	1,519,850	—	—	3,039,700
Scalable STP Architecture Team	2,987,225	2,975,600	—	—	5,962,825
Total Capital Costs	**8,445,138**	**4,495,450**	—	—	**12,940,588**
Overall Total	**8,445,138**	**4,495,450**	—	—	**12,940,588**

Digital Capability – Yearly Capital Costs

Team and Roles	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Scalable Cúram Architecture Project					
Project Manager / Scrum Master	366,000	—	—	—	366,000
RTE / Project Coordinator	70,250	—	—	—	70,250
Lead Business Analyst	193,125	—	—	—	193,125
Business Analyst #1	154,500	—	—	—	154,500
Business Analyst #2	59,000	—	—	—	59,000
Enterprise Architect	36,600	—	—	—	36,600
Solution Architect	208,875	—	—	—	208,875
Infrastructure Architect	174,063	—	—	—	174,063
Cúram Technical Lead	244,000	—	—	—	244,000
Cúram Developer #1	244,000	—	—	—	244,000
Cúram Developer #2	213,500	—	—	—	213,500
Cúram Developer #3	148,500	—	—	—	148,500
Cúram Developer #4	148,500	—	—	—	148,500
Integration Specialist #1	50,300	—	—	—	50,300
Integration Specialist #2	69,200	—	—	—	69,200
Test Manager	286,563	—	—	—	286,563
Performance Test Manager / Lead	113,000	—	—	—	113,000
Test Analyst # 1	244,000	—	—	—	244,000
Test Analyst # 2	244,000	—	—	—	244,000
Test Analyst / Automation Engineer # 3	142,150	—	—	—	142,150
Performance Test Engineer	178,938	—	—	—	178,938
Support - Env / Release Manager	61,000	—	—	—	61,000
Support - Infrastructure Specialist #1	144,000	—	—	—	144,000
Support - Infrastructure Specialist #2	144,000	—	—	—	144,000
Total Scalable Cúram Architecture Project	**3,938,063**	—	—	—	**3,938,063**
Scalable MyMSD Architecture Project					
Project Manager / Scrum Master	339,000	339,000	—	—	678,000
Business Analyst	113,000	113,000	—	—	226,000

Team and Roles	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Enterprise Architect	33,900	33,900	—	—	67,800
Solution Architect	141,250	141,250	—	—	282,500
MyMSD Technical Lead	141,250	141,250	—	—	282,500
MyMSD Developer #1	113,000	113,000	—	—	226,000
MyMSD Developer #2	113,000	113,000	—	—	226,000
Test Analyst # 1	113,000	113,000	—	—	226,000
Test Analyst # 2	113,000	113,000	—	—	226,000
Infrastructure Architect	141,250	141,250	—	—	282,500
Support - Env / Release Manager	45,200	45,200	—	—	90,400
Support - Infrastructure Specialist	113,000	113,000	—	—	226,000
Total Scalable MyMSD Architecture Project	**1,519,850**	**1,519,850**	**—**	**—**	**3,039,700**
Scalable Straight Through Processing Project					
Project Manager / Scrum Master	339,000	339,000	—	—	678,000
Business Analyst #1	226,000	175,000	—	—	401,000
Business Analyst #2	192,500	175,000	—	—	367,500
Business Analyst #3	82,000	—	—	—	82,000
Enterprise Architect	121,650	33,900	—	—	155,550
Solution Architect	282,500	152,500	—	—	435,000
STP Technical Lead	282,500	256,250	—	—	538,750
MyMSD Developer	161,000	205,000	—	—	366,000
Cúram Developer	161,000	205,000	—	—	366,000
BPM / ODM / APEX Developer	161,000	205,000	—	—	366,000
API / C360 Developer	161,000	205,000	—	—	366,000
ESB Integration Developer	80,500	113,000	—	—	193,500
Support - Test Manager	100,625	141,250	—	—	241,875
Test Analyst # 1	161,000	205,000	—	—	366,000
Test Analyst # 2	161,000	175,000	—	—	336,000
Test Analyst # 3	161,000	175,000	—	—	336,000
Support - Infrastructure Architect	40,250	56,500	—	—	96,750
Support - Env / Release Manager	32,200	45,200	—	—	77,400
Support - Infrastructure Specialist	80,500	113,000	—	—	193,500
Total Scalable Straight Through Processing Project	**2,987,225**	**2,975,600**	**—**	**—**	**5,962,825**
Overall Total	**8,445,138**	**4,495,450**	**—**	**—**	**12,940,588**

Digital Capability – Monthly Capital Numbers

Teams and Roles	2019						2020												2021					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Scalable Cúram Architecture Project																								
Project Manager / Scrum Master	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00												
RTE / Project Coordinator	0.25	0.25	0.25	0.25	0.20	0.20	0.20	0.20	0.20	0.25	0.25	0.25												
Lead Business Analyst	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50												
Business Analyst #1	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50												
Business Analyst #2	—	—	—	0.50	0.50	0.50	0.50	0.50	0.50	—	—	—												
Enterprise Architect	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10												
Solution Architect	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.25												
Infrastructure Architect	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.25												
Cúram Technical Lead	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00												
Cúram Developer #1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00												
Cúram Developer #2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50												
Cúram Developer #3	—	—	—	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50												
Cúram Developer #4	—	—	—	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50												
Integration Specialist #1	—	—	0.20	0.50	0.50	0.25	0.25	0.25	0.25	0.10	0.10	0.10												
Integration Specialist #2	—	—	0.10	1.00	1.00	0.25	0.25	0.25	0.25	0.10	0.10	0.10												
Test Manager	1.00	1.00	1.00	0.75	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00												
Performance Test Manager / Lead	—	0.10	0.10	0.10	0.25	0.25	0.75	0.75	0.75	0.50	0.50	0.50												
Test Analyst # 1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00												
Test Analyst # 2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00												
Test Analyst / Automation Engineer # 3	—	0.20	0.20	1.00	1.00	1.00	0.75	0.75	0.75	0.50	0.50	0.50												
Performance Test Engineer	—	0.20	0.20	0.50	0.50	0.50	0.75	0.75	0.75	1.00	1.00	1.00												
Support - Env / Release Manager	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25												
Support - Infrastructure Specialist #1	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50												
Support - Infrastructure Specialist #2	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50												
Total Scalable Cúram Architecture Project	**13.60**	**14.10**	**13.40**	**15.95**	**16.05**	**15.05**	**15.80**	**15.80**	**15.80**	**12.80**	**12.80**	**12.80**												
Scalable MyMSD Architecture Project																								
Project Manager / Scrum Master	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00
Business Analyst	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
Enterprise Architect	0.10	0.10	0.10	0.10	0.10	0.05	0.05	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.05	0.05	0.10	0.10	0.10	0.10	0.10
Solution Architect	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
MyMSD Technical Lead	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
MyMSD Developer #1	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
MyMSD Developer #2	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
Test Analyst # 1	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
Test Analyst # 2	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
Infrastructure Architect	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
Support - Env / Release Manager	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.20	0.20	0.20	0.20	0.20
Support - Infrastructure Specialist	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
Total Scalable MyMSD Architecture Project	**5.80**	**5.80**	**5.80**	**5.80**	**5.80**	**2.90**	**2.90**	**5.80**	**5.80**	**5.80**	**5.80**	**5.80**	**5.80**	**5.80**	**5.80**	**5.80**	**5.80**	**2.90**	**2.90**	**5.80**	**5.80**	**5.80**	**5.80**	**5.80**
Scalable Straight Through Processing Project																								
Project Manager / Scrum Master	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00
Business Analyst #1	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Business Analyst #2	-	0.50	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Business Analyst #3	-	0.50	1.00	1.00	1.00	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterprise Architect	1.00	1.00	1.00	0.10	0.10	0.05	0.05	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.05	0.05	0.10	0.10	0.10	0.10	0.10
Solution Architect	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
STP Technical Lead	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	0.50	0.50
MyMSD Developer	-	-	-	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	0.50	0.50
Cúram Developer	-	-	-	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	0.50	0.50
BPM / ODM / APEX Developer	-	-	-	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	0.50	0.50
API / C360 Developer	-	-	-	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	0.50	0.50
ESB Integration Developer	-	-	-	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
Support - Test Manager	-	-	-	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
Test Analyst # 1	-	-	-	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	1.00	1.00	0.50	0.50
Test Analyst # 2	-	-	-	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Test Analyst # 3	-	-	-	1.00	1.00	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Support - Infrastructure Architect	-	-	-	0.20	0.20	0.10	0.10	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.20	0.20	0.20	0.20	0.20
Support - Env / Release Manager	-	-	-	0.20	0.20	0.10	0.10	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.20	0.20	0.20	0.20	0.20

Teams and Roles	2019						2020												2021					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Support - Infrastructure Specialist	-	-	-	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25	0.50	0.50	0.50	0.50	0.50
Total Scalable Straight Through Processing Project	5.00	6.00	7.00	15.00	15.00	7.50	7.00	14.00	14.00	14.00	14.00	14.00	13.50	13.50	13.50	13.50	13.50	7.00	7.00	11.50	11.50	11.50	8.50	8.50
Overall Total	24.40	25.90	26.20	36.75	36.85	25.45	25.70	35.60	35.60	32.60	32.60	32.60	19.30	19.30	19.30	19.30	19.30	9.90	9.90	17.30	17.30	17.30	14.30	14.30

Infrastructure – Migration Cost Summary

Financial year starting	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Operating Costs					
IaaS	2,500,000	7,600,000	10,200,000	10,200,000	30,500,000
Other	—	—	—	—	—
Total Platform costs	**2,500,000**	**7,600,000**	**10,200,000**	**10,200,000**	**30,500,000**
Capital Costs					
Application migration team 1	2,379,125	2,416,750	—	—	4,795,875
Application migration team 2	2,379,125	2,416,750	—	—	4,795,875
Total Resourcing Costs	**4,758,250**	**4,833,500**	—	—	**9,591,750**
Overall Total	**7,258,250**	**12,433,500**	**10,200,000**	**10,200,000**	**40,091,750**

Infrastructure – Yearly Resource Costs

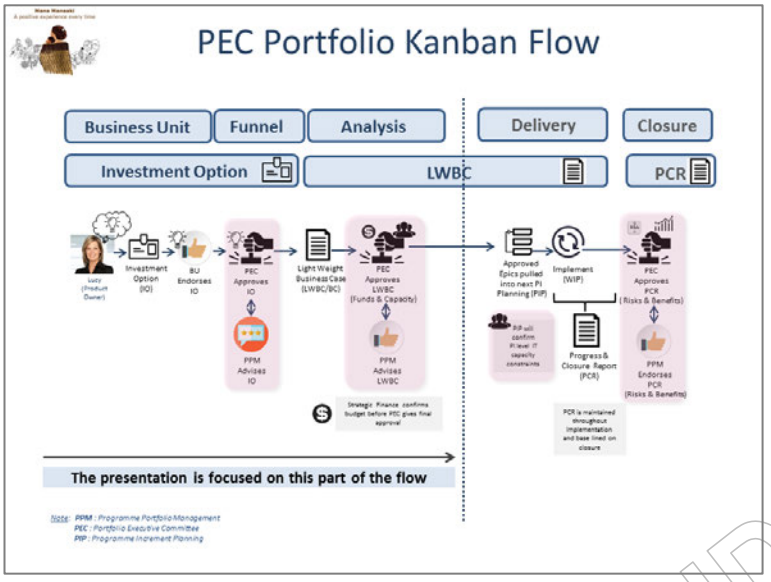
Team and Roles	FY 2019	FY 2020	FY 2021	FY 2022	Total Cost *(over project)*
Application migration team 1					
Project Manager	395,500	376,250	—	—	771,750
Architect	395,500	357,875	—	—	753,375
Developer 1	253,750	268,750	—	—	522,500
Developer 2	126,875	134,375	—	—	261,250
DBA	126,875	134,375	—	—	261,250
Middleware / Infrastructure 1	253,750	268,750	—	—	522,500
Middleware / Infrastructure 2	126,875	134,375	—	—	261,250
Tester 1	203,000	215,000	—	—	418,000
Tester 2	192,500	215,000	—	—	407,500
Tester 3	101,500	107,500	—	—	209,000
BA	203,000	204,500	—	—	407,500
Total team 1	**2,379,125**	**2,416,750**	—	—	**4,795,875**
Application migration team 2					
Project Manager	395,500	376,250	—	—	771,750
Architect	395,500	357,875	—	—	753,375
Developer 1	253,750	268,750	—	—	522,500
Developer 2	126,875	134,375	—	—	261,250
DBA	126,875	134,375	—	—	261,250
Middleware / Infrastructure 1	253,750	268,750	—	—	522,500
Middleware / Infrastructure 2	126,875	134,375	—	—	261,250
Tester 1	203,000	215,000	—	—	418,000
Tester 2	192,500	215,000	—	—	407,500
Tester 3	101,500	107,500	—	—	209,000
BA	203,000	204,500	—	—	407,500
Total team 2	**2,379,125**	**2,416,750**	—	—	**4,795,875**
Overall Total	**4,758,250**	**4,833,500**	—	—	**9,591,750**

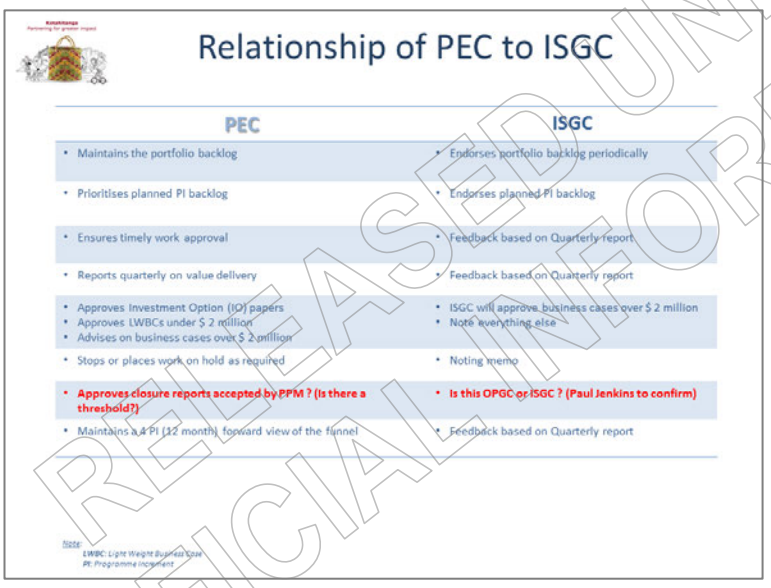
Infrastructure – Monthly Resource Numbers

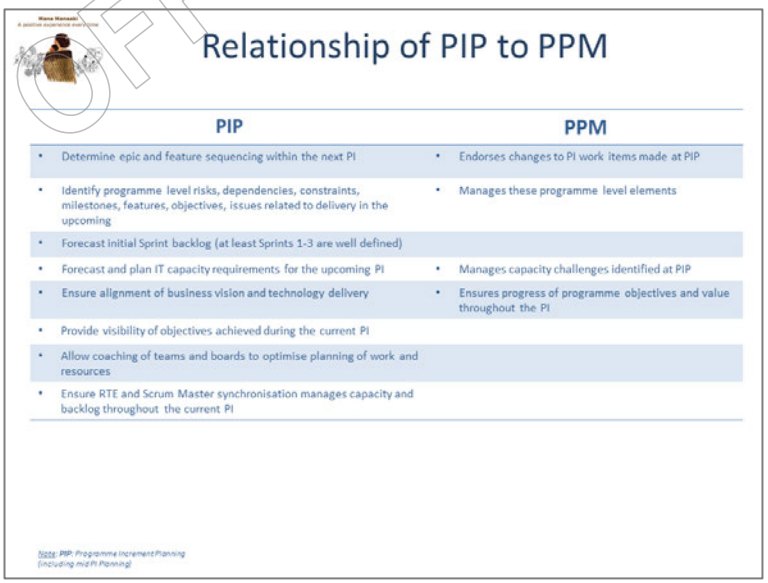
Teams and Roles	2019						2020												2021					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Application migration team 1																								
Project Manager	1	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	1
Architect	1	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	0.5
Developer 1	0	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	1
Developer 2	0	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5
DBA	0	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5
Middleware / Infrastructure 1	0	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	1
Middleware / Infrastructure 2	0	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5
Tester 1	0	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	1
Tester 2	0	0.5	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	1
Tester 3	0	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5
BA	0	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	0.5
Total	**2**	**9**	**9**	**9**	**9**	**5**	**4.5**	**9**	**9**	**9**	**9**	**9**	**4.5**	**9**	**9**	**9**	**9**	**4.5**	**4.5**	**9**	**9**	**9**	**9**	**8**
Application migration team 2																								
Project Manager	1	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	1
Architect	1	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	0.5
Developer 1	0	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	1
Developer 2	0	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5
DBA	0	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5
Middleware / Infrastructure 1	0	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	1
Middleware / Infrastructure 2	0	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5
Tester 1	0	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	1
Tester 2	0	0.5	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	1
Tester 3	0	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5
BA	0	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	1	1	0.5	0.5	1	1	1	1	0.5
Total	**2**	**9**	**9**	**9**	**9**	**5**	**4.5**	**9**	**9**	**9**	**9**	**9**	**4.5**	**9**	**9**	**9**	**9**	**4.5**	**4.5**	**9**	**9**	**9**	**9**	**8**
Overall Total	**4**	**17**	**18**	**18**	**18**	**9**	**9**	**18**	**18**	**18**	**18**	**18**	**9**	**18**	**18**	**18**	**18**	**9**	**9**	**18**	**18**	**18**	**18**	**16**

Appendix 14: PEC Process

The following slides explain the PEC Process:







Relationship of PPM to PEC

PPM	PEC
• Checks and recommends feasibility of funnel and backlog items (capability /capacity/RPA/delivery risks/technology architecture)	• Endorses PPM recommendations
• Advises on delivery sequencing and optimisation	• Endorses PPM recommendations • Prioritises and release epics for delivery
• **Advises on new IO papers before tabled at PEC ?**	• Endorses PPM recommendations
• Supports quarterly reporting	• Reports quarterly on value delivered
• Reviews closure reports	• Approves closure reports
• Reports on PI delivery progress • Manages current PI execution	• Reviews PI delivery progress
• Manages PIP resources assignments for current /next PI	• Prioritises new work for next PI
• Recommends delivery process improvements and optimisations	• Endorses PPM recommendations

Note: RPA: Risk Profile Assessment

Roles and Responsibilities

Governance Matrix

Document	ISGC	PEC	PPM	BU Board
Annual Budget	Ap	E	-	-
Investment Option	I	Ap	C	E
Business Case > $2m	Ap	E	C	E
LWBC <= $2m	-	Ap	C	E
PCR (Progress)	-	I	C	C
PCR (Closure)	I	Ap	E	E

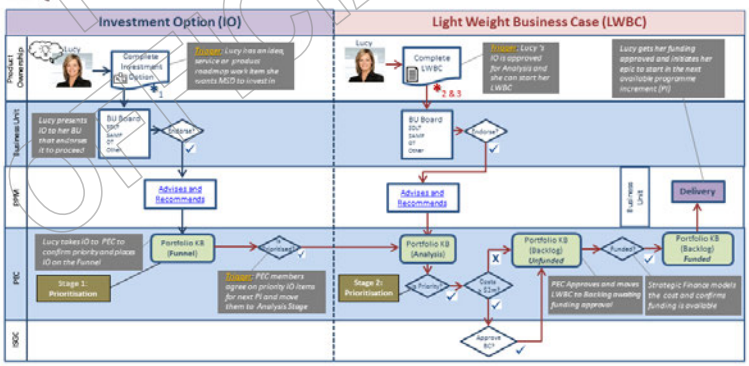
Legend:
***C** – Consulted (gets advice from)*
***I** – Informed (is kept up to date)*
***Ap** – Approves*
***E** – Endorses*

RACI Matrix

Document	EPMO	Value Office	Owner / Sponsor	Finance / Procurement / Enterprise Architect
Investment Option	C(Re)	C(Re)	A,R	S
LWBC / Business Case	C(Re)	C(Re)	A,R	S
PCR (Progress)	I	I	A,R	S
PCR (Closure)	C(Re)	I	A,R	S

Legend:
***R** – Responsible (completes action)*
***Re** – Reviews (checks quality)*
***A** – Accountable (for the outcome)*
***C** – Consulted (get advice from)*
***I** – Informed (is kept up to date)*
***S** – Support (provide additional information for decision making/action)*

Portfolio Kanban Process Map



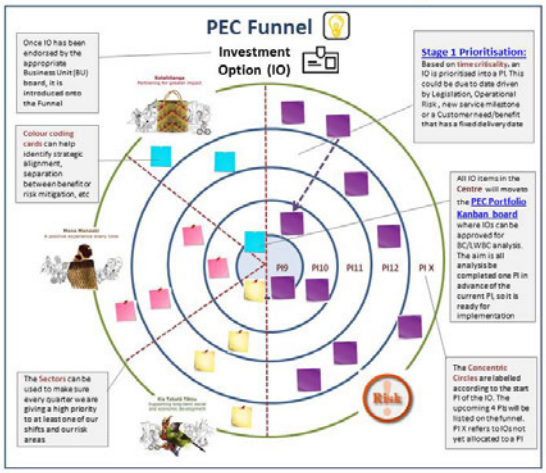
*1 If you require support for your IO or LWBC or BC please check in with EMPO and/or Value Office (if technology changes are required). They can also help with Investment Logic Mapping, Benefits Mapping and Benefits Realisation Planning.

*2 Complete Risk Profile Assessment (RPA) before completing LWBC

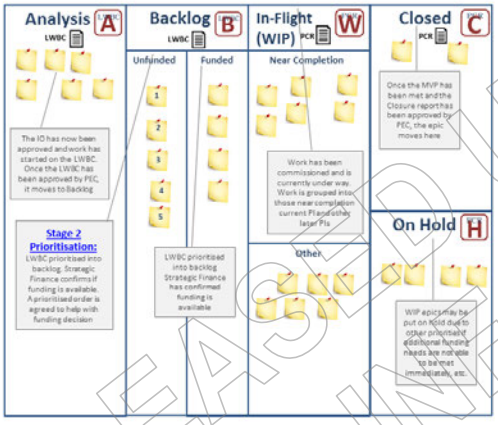
*3 If RPA is Medium/High Risk and/or **WOLC** > $15m, follow Treasury's Gateway process.

*Note: **IO**: Investment Option*
***PPM**: Programme Portfolio Management*
***PEC**: Portfolio Executive Committee*
***LWBC**: Lightweight Business Case*
***WOLC**: Whole of Life Costs*
***KB**: Kanban Board for portfolio*

PEC Portfolio Funnel Layout



PEC Portfolio Kanban Board Layout



Decision-making Criteria

Prioritisation or Sequencing Criteria

Stage 1 (Funnel) Investment Option

This is a simple **time criticality** assessment to prioritise IO into a PI. This could be due to a date driven by *legislation*, operational *risk* outside of appetite (e.g. technology risk like a critical platform no longer being supported), *vendor* delivery dates that cannot be moved, critical *dependent* work items, new service *milestone*, an *urgent customer need* or benefit that has a *fixed delivery* date.

Stage 2 (Portfolio Backlog) Business Case or LWBC

Criteria for prioritisation could include all or some of the following:

1. Initiative **cost** (including Whole of Life Costs and affordability)
2. **Value** (financial/non-financial benefits and optimisations)
3. **Risk** remediation (risk reduction/opportunity enablement)
4. **Strategic** alignment (will provide outcomes that are linked to foundational elements or 3 shifts or other SOI impacts)
5. Implementation **size** (smaller work items can be completed in shorter timeframes).

Work Sizing ('T-Shirt')

Analysis Cost (to develop BC/LWBC)

Size	Amount
Extra Large	up to $500k
Large	up to $100k
Medium	up to $50k
Small	up to $20k

Implementation Cost

Size	Amount	Approval (Internal)	External (Assurance)
Extra Large	>$15m	ISGC	Gateway *
Large	> $2m <$15m	ISGC	
Medium	> $500k <$2m	PEC	
Small	<= $500k	PEC	

** If WOLC (Whole of Life Costs) > $15 million the gateway process is followed*

Appendix 14a: PEC Terms of Reference

Portfolio Executive Committee Terms of Reference

This document was approved by the Investment Strategy Governance Committee on 23 August 2018. Last amended: 21 September 2018.

1. Introduction

1.1. The Portfolio Executive Committee (PEC) is a sub-committee of the Investment Strategy Governance Committee (ISGC). This Terms of Reference sets out the function and role of PEC, and defines the relationship between ISGC and PEC.

2. Purpose of the committee

2.1. The purpose of PEC is to optimise the use of MSD's resources (with a particular emphasis on capital investment) related to IT-enabled investments.

3. Scope and authority

3.1. Within limits set by ISGC, PEC has delegated responsibility to make all relevant decisions to prioritise, start, change, or stop MSD's IT-enabled investments.

3.2. ISGC may impose whatever limitations it chooses on PEC's role, including financial decision-making limits and reporting obligations.

3.3. For decisions outside PEC's delegations, PEC will make recommendations to ISGC that PEC considers are in the best long-term interests of MSD.

4. Key requirements

4.1. PEC is required to:

- take a whole-of-Ministry approach to all of its work and decision-making
- develop and apply criteria to bring a consistent and rigorous basis to the assessment and prioritisation of investment options
- consider resource impacts and the impact of change (and capacity to absorb change) in all parts of the Ministry
- create and operate a system that generates and manages a pipeline of investment options (the Portfolio)
- conduct and oversee activity in a way consistent with an Agile methodology, including requiring the development of Epics; managing a Portfolio Backlog; and managing workflow through clear and well-publicised Programme Increments
- ensure appropriate levels of accountability for all relevant activity
- ensure activities and outcomes are aligned as well as possible with Ministry strategies

- identify and manage risks and ensure appropriate mitigation plans are in place
- ensure good stewardship of relevant resources to support MSD's longer-term interests, including capability development, capacity management, a focus on sustainability and adherence to legislation.

5. Overview of working arrangements

5.1. PEC is expected to carry out its role and responsibilities within, and making use of, the following working arrangements.

- *Investment Strategy Governance Committee (ISGC)* – the role of ISGC is to govern, oversee and periodically review PEC to ensure the arrangements, delegations and activities are in the best long-term interest of MSD. ISGC will also make decisions that are outside PEC's delegations (or outside any other limitations ISGC has imposed) – including those outlined in Appendix One.
- *Portfolio Executive Committee (PEC)* – As set out in this document, PEC is the lead decision-making body for optimising MSD's IT-enabled investments. It should fulfil the mandate and requirements of this document, making efficient use of a working group as described below.
- *Programme Portfolio Management (PPM)* – PEC's decisions will be informed by the work of the Programme Portfolio Management group (PPM, or other similar mechanism where appropriate); a working group focussed on detailed design, assessment, achievability, implementation and evaluation of investment options. A fuller overview of the activities of PPM is set out in Appendix One.

5.2. The relationship between ISGC, PEC and PPM is further described in Appendix Two.

6. Direction, planning and reporting

6.1. PEC will develop and regularly update an 18-24 month forward view of investment options that allows both PEC and ISGC to make decisions that take into account expected future options.

6.2. PEC (via the Chair) will provide a monthly report to ISGC to summarise activity over the previous four months, to ensure transparency of PEC's work and decisions made and visibility of the value created.

6.3. PEC may also provide other reports, papers or briefings to ISGC as it considers desirable, in response to requests made of PEC by other groups in the Ministry or other stakeholders.

6.4. PEC is also required to ensure that ISGC is informed about any matter within PEC's scope that could have a significant negative impact on the Ministry's reputation, performance or ability to achieve strategic objectives.

7. Membership

7.1. The commencement chair of PEC is the Associate DCE, Corporate Solutions. Subsequent Chair appointments will be made by ISGC (without any limitation to ISGC's decisions, such as regarding term, renewal or replacement).

7.2. The Chair may appoint a Deputy Chair.

7.3. The Chair is responsible for ensuring adequate membership of the committee. Committee members will be appointed by ISGC.

7.4. Committee members will be representatives from across the Ministry and have a balance of skills, knowledge, experience and perspectives required to ensure that the committee is equipped to effectively carry out its work (and most likely be Tier 3 and Tier 4 staff).

7.5. Membership includes non-voting members who provide the committee with advice and support.

7.6. A centralised secretariat function will be provided by the EPMO.

8. Role of the Chair

8.1. The Chair is expected to create a culture within the committee of value-for-money, stewardship, collaboration and co-operation.

8.2. The Chair will ensure that:

- PEC's focus is consistent with this document and priorities of the day to give effect to PEC's purpose
- all committee members are treated even-handedly and fairly, and are encouraged to make a contribution
- meetings are properly planned and focussed, and that minutes accurately reflect the deliberations and decisions of the committee
- key decisions are clearly understood by the committee.

8.3. The Chair may seek assistance to fulfil the above expectations, including from a Deputy Chair.

9. Role of members

9.1. Committee members are expected to:

- take a whole-of-Ministry focus
- make contributions that are consistent with operating at a governance level
- robustly test issues and proposals to ensure the committee makes the best possible decisions
- constructively discuss business, including issues, challenges, risks and responsibilities
- work towards consensus decision-making
- collectively own the decisions the committee makes
- commit sufficient time to fulfil the responsibilities of being a member.

10. Accountability

10.1. Members of PEC are expected to contribute to the best of their ability, treating PEC as a key work priority. Members share collective accountability for the quality of PEC's work (both directly and indirectly through PPM) and decision making.

11. Meetings

11.1. The majority of committee business will likely be conducted in committee meetings (with initial expectations that these may be about fortnightly). The committee may also discuss or approve committee matters via email, as required.

11.2. For all engagements, the Chair will ensure good practice, in relation to agenda preparation, agenda management and maintaining constructive discussion.

11.3. The quorum required for decision-making is two thirds of the members, one of whom must be the Chair or Deputy Chair.

11.4. If a member is unable to attend a meeting, they must advise the committee secretariat prior to the meeting.

Substitutes are able to attend in place of committee members, with the limitation that substitutes may not act as the Chair or Deputy Chair.

11.5. Other non-members may participate in meetings at the committee's discretion.

11.6. Minutes will be taken for all meetings and distributed to members for review prior to being finalised and adopted by the committee.

12. Conflicts of interest

12.1. Members are responsible for declaring any conflicts of interest, whether financial or non-financial (including any role-related interests in investment options considered by PEC).

12.2. In all cases where a conflict of interest exists, or may be reasonably perceived to exist, the Chair shall rule on whether the member, having disclosed the interest:

- may participate in the discussion and/or the decision
- may remain in the meeting room but not participate in the discussion or the decisions or
- shall leave the room and be excluded from any considerations.

12.3. In cases where the Chair also has a conflict of interest, the Deputy Chair will make this ruling.

12.4. To actively manage conflicts of interest, declaration of such interests will be maintained in a centralised register and will be a standing agenda item.

13. Communication of discussion and decisions

13.1. The committee's work should be as open and transparent as possible. In keeping with this, committee papers and minutes should, as far as practicable, be published to *Doogle* for other staff to access. For the avoidance of doubt, the committee may choose not to publish papers and minutes when it considers there are good reasons.

13.2. The committee should also consider what summary information may be usefully shared or published with specific groups of interested parties.

14. Overarching committee limitation

14.1. The Committee must not take, allow or approve any action or circumstance in the name of the Ministry that is in breach of the law, is imprudent, or which contravenes any organisation specific or commonly held business or professional ethic.

15. Evaluation and review

1.1. Around each anniversary of the committee's establishment, the committee will review its purpose, direction, Terms of Reference and overall approach and provide an evaluation report to ISGC for its consideration.

1.2. Alongside consideration of the committee's report, ISGC will review the committee's performance and Terms of Reference.

Appendix 14b: Roles & Responsibilities

What is their role?

Programme Portfolio Management (PPM) (Delivery lens)

PPM manages delivery and is accountable to PEC

"This is how we will achieve it"

- Table business cases for approval to be added to Portfolio backlog
- Through PI Planning, determine epic / project sequencing within PI
- Synchronise resource planning with Service Delivery Project Board
- In conjunction with the PI Board, execute the PI plans for the approved WIP
- Via a dashboard report, provide PEC with a summary of:
  - PPM activity over the over a rolling previous four month period
  - Report on delivery progress and MVPs
  - Provide forward view of capacity changes or constraints
- Operate within their delegated thresholds, as set out by PEC & ISGC

Portfolio Executive Committee (PEC) (Delivery with Strategic viewpoint)

PEC manages the portfolio backlog, is accountable to ISGC, and governs the activities of PPM. Empowered by ISGC to make timely decisions on epics / business cases.

"This is what we need to do"

Approve = granting permission; indication of agreement with proposal; acknowledge it meets requirements (only approving when operating within ISGC agreed thresholds, when outside of this recommendation goes to ISGC for approval)

- Approve Epics / business cases (within threshold, or if outside of that, make a recommendation to ISGC for approval)
- Operate/maintain/prioritise and update Portfolio backlog using a prioritisation framework that balances value, risk, and achievability criteria to:
  - promote new epics / projects from Portfolio Backlog for upcoming PI to WIP
  - cease (return to backlog) or slow down inflight (WIP) work if required to meet capacity
- Approve PI plans for delivery
- Provide a monthly dashboard to ISGC to summarise PEC activity over a rolling previous four month period to ensure transparency of decisions made and value created. Includes a run/grow/transform portfolio view, accompanied by a high level sense of spending allocation and progress made.
- Operate within their delegated thresholds, as set out by ISGC
- Recommend to ISGC any thresholds that the PPM can operate within and adjust as required

Investment Strategy Governance Committee (ISGC) (Strategic/Investment lens for MSD)

Governs PEC and is accountable to Leadership Team. Sets high level priorities for PEC

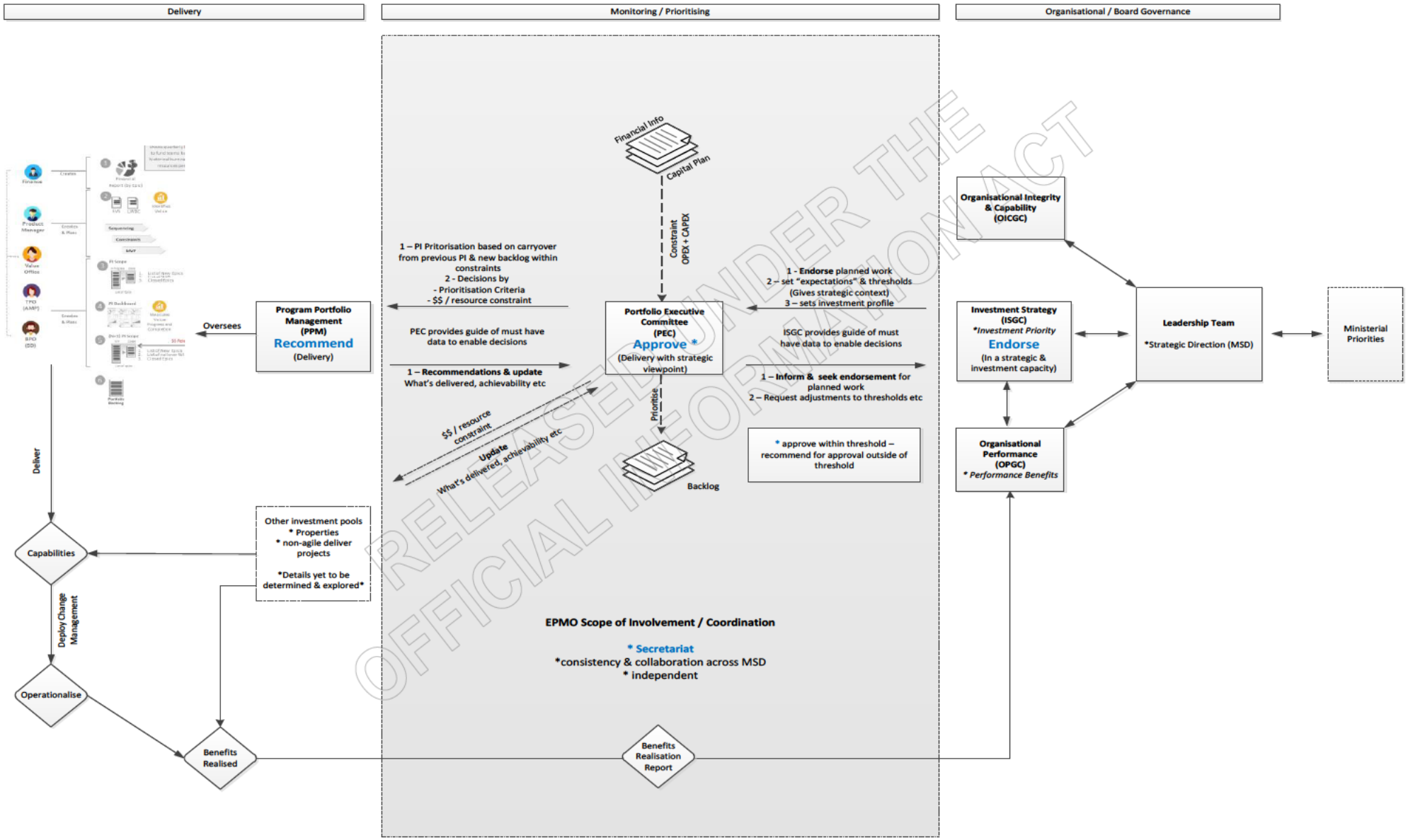
"Is this helping us meet our strategic objectives"

Endorse = seal of approval; backing; acceptance; championship; patronage

- Endorse Epics / business cases (Approve where they are outside of PEC thresholds)
- Endorse / note updated portfolio backlog when changes are made
- Note closure reports (benefits go to OPGC)
- Endorse PEC recommendations on forward capacity, WIP and Portfolio backlog
- Set high level priority through approval of the roadmap, ensuring this links to the long term investment plan
- Note the monthly dashboard from PEC and provide any recommendations and guidance if required
- Set operating thresholds for the PEC to operate the portfolio backlog within, alongside the agreed thresholds for the PPM to operate the delivery pipeline within – adjust as required

Need to have key endorsement checks – alignment with strategy; value for money, benefits realisation (these will be developed in due course)

Appendix 14c: Governance Interconnect



Appendix 15: Budget Initiative Template

Below is the Budget Initiative Template, that was submitted on December 14th as part of the business case process. It is included here for reference.

Template 1: Budget Initiative template

There are five sections of this template agencies need to fill out:

- Overview and context
- Detail on the investment proposal
- Wellbeing impacts and analysis
- Cost understanding and options
- Collaboration

Overview and context

Key Question/area	Comment/answer
Agency to complete	
Portfolio of lead Minister	Minister Sepuloni
Portfolio(s) of other Ministers involved (if this is a joint initiative)	N/A
Votes impacted	[List all of the Votes that are impacted by this initiative]
Initiative title	Organisational pressures: Preventing failure of critical services to clients
Initiative description	This funding will avert the risk of serious failure in providing services to over 1 million New Zealanders, and making $24B in essential payments annually. This funding will address the backlog of technology investment, which includes the upgrades to software applications and hardware replacements as well as replacement of selected obsolete systems, to reduce the risk of severe failure of the Ministry's computer systems.
Type of initiative	**Priority aligning/non-discretionary cost pressure/out of scope** Non-discretionary cost pressure
If this initiative relates to a priority, please outline the specific priority/ies it contributes to	Please specify the priority/ies this initiative aligns with. You can name more than one if relevant. • Creating opportunities for productive businesses, regions, iwi and others to transition to a sustainable and low-emissions economy • Supporting a thriving nation in the digital age through innovation, social and economic opportunities • Lifting Māori and Pacific incomes, skills and opportunities • Reducing child poverty and improving child wellbeing, including addressing family violence • Supporting mental wellbeing for all New Zealanders, with a special focus on under 24s
Does this initiative relate to a commitment in the Coalition Agreement, Confidence and Supply Agreement, or the Speech from the Throne?	**Y/N** No
Agency contact	s9(2)(a) s9(2)(a)
Responsible Vote Analyst	s9(2)(a)

Funding

Funding Sought ($m)	2019/20	2020/21	2021/22	2022/23 & outyears[17]	TOTAL
Operating	12.070	28.483	40.514	43.020	124.086

Funding Sought ($m)	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	TOTAL
Capital[18]	61.662	41.400	7.100	1.000	-	-	-	-	-	111.162

1. Executive Summary

1.1 EXECUTIVE SUMMARY

A. Short summary of the proposed initiative and expected outcomes.

This initiative is necessary to avert the risk of serious failure in providing services to over 1 million New Zealanders, and making $24B in essential payments annually. Significant technology risk of failure has built up over a number of years due to the Ministry having to prioritise other expenditure ahead of the upkeep of the existing Technology assets (see Financial Case). The Ministry has also tended, over the years, to deliver sub-optimal and non-strategic solutions to meet tight legislative deadlines and constrained project budgets, and this has created additional compounding technical debt .

Exacerbating the shortfall in funding, the risk is rapidly accelerating due to: existing technical debt, ongoing deferred maintenance, increased complexity from new services, such as digital; and increasing volumes.

The investments articulated in this document are required in Budget 2019, regardless of any downstream changes to the Ministry's target business operating model. They are primarily involved with supporting the Ministry's obligations as described in the Social Security Act and are therefore not subject to changes to the operating model. Any investments to support Te Pae Tawhiti are likely to be presented for consideration in Budget 2020.In 2018, the Ministry has developed a new Technology Strategy, which is aligned with the Statement of Intent. That strategy describes the critical technology investments required over the next 7-10 years that underpin the Ministry's business strategy. This includes the delivery of the Government's overall digital and data strategies. All of the investment requested in this business case is required by the Technology Strategy.

The Ministry has an existing budget allocated to maintaining technology assets. This budget is insufficient to prevent the Ministry's risk position worsening given the previous years of underinvestment. The five system replacement projects are for very old software assets that have largely been fully depreciated and no provision has been made for their eventual replacement

2. The Investment Proposal

This section asks you to outline your overall investment proposal and intervention logic. It should be supplemented with a one page intervention logic map showing the progression from outputs, outcomes and impacts of the initiative. See template 5 for an example of an intervention logic map that you can use as a template or guide.

2.1 Description of the initiative and problem definition

What is this initiative seeking funding for?	This bid is seeking funding for the upkeep of computer systems the Ministry of Social Development required to support core business operations. The investment is to replace or upgrade selected technology assets with a high risk of failure and a high degree of impact on the Ministry's services. This business case covers the investments that:

[17] If funding is time-limited and does not carry on into out-years please delete the reference to "& outyears"

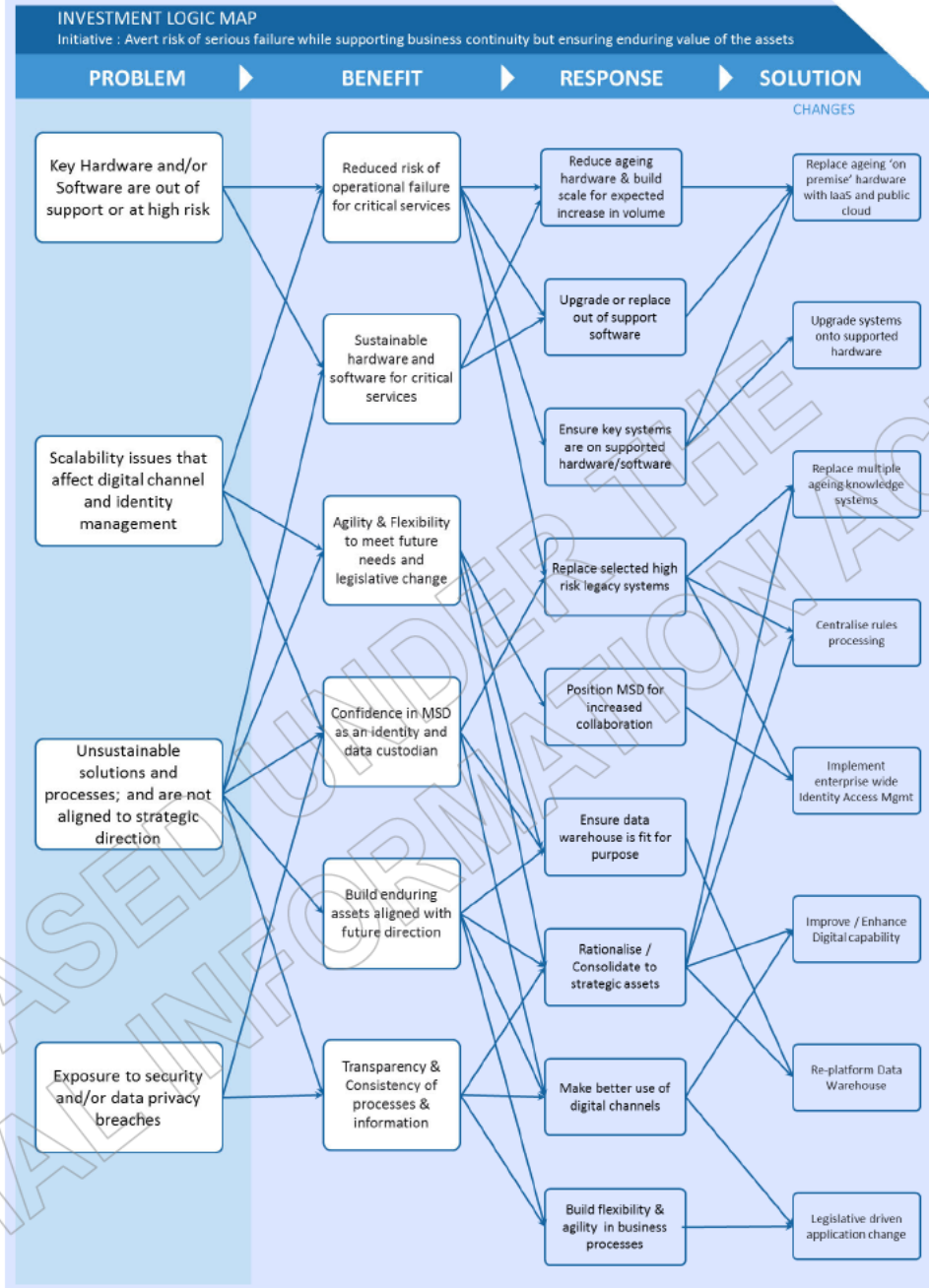
[18] The first 10 years of capital investment is counted against the multi-year capital allowance. Please reflect the full 10 year profile in the table.

	• remediate elements of Ministry's technology environment that are most at risk of failure, • cannot be funded from existing budgets, • have long term strategic value, and • which are foundational pre-requisites to delivery of Technology Strategy as a whole The investments covered by this business case include the following one-off investments (the 'Replacement' projects): • **Replacement of the Identity and Access Management System (IdAM)**, which controls all staff access to the Ministry's computer systems according to their access rights • **Replacement of DREW**, a 22 year old tool used by all frontline case managers and call centre staff[19] to calculate eligibility and entitlement related to income support applications. • **Replacement of Hindin**, a 17 year old platform used by all front-line staff that houses a number of knowledge bases in use across the Ministry, and client related processes such as Review of Decision and Complaints • **Replacement of the Data Warehouse**, which is used for the of the Ministry's internal and external reporting, daily operational support, Data matching with other agencies to prevent benefit fraud, and analytics functions to inform policy and operations • **Replacement of Digital Channels components**, providing on-line self-service, used by 650,000 clients. In addition, the Business Case covers Investment to cover ongoing 'Business as Usual' upgrades designed to keep technology current and for which the Ministry lacks sufficient budget (the 'Maintenance' projects): • **Software and security upgrades** for third party software as a part of ongoing maintenance as vendors such as Oracle, IBM, and Microsoft release new versions, and includes upgrades to address emerging security threats and vulnerabilities • **Hardware upgrades** to move off aging hardware owned by the Ministry to evergreen as-a-service consumption models • **Legislative changes** that arise on a regular basis, the cost of which the Ministry is expected to absorb The Replacement and Maintenance projects proposed represent the minimum case required to address the risk of operational failure.
Why is it required?	The Ministry's technology environment is aging and complex, and is the result of short term thinking and expedient solutions. The overall condition of the Ministry's hardware assets is poor with 59% being over 5 years old. The condition of the software assets is also poor with 61% of software not fully supported. Consequently, the risk of operation failure is rated as 'very high' using the Ministry's risk management framework and this risk has a worsening trend in the immediate term. The Ministry's capital base has also been depleted, resulting in sweating technology assets to support other developments. This underinvestment has gone on for a significant period of time and we are now at the point where, there are significant risks of operational failure. As a result of all these factors, the Ministry has a backlog of urgent technology investment needed to continue to provide service. This includes the upgrades to software applications and hardware replacements, as well as stabilisation of the data warehouse. This business case is the first step in addressing this backlog. There are also significant pain points in the current IT environment that are being felt across the Ministry and the social services sector. These directly affect the quality and efficiency of services delivered to clients. The complexity also makes implementation of policy changes difficult (which has implications for WEAG/Welfare Overhaul). Following Simplification, the criticality of digital channels for

[19] There are over 2,800 client facing front line staff and 5,500 total users of client oriented systems

	delivering key services has increased, leading to a commensurate increase in risk as these systems age. The systems that have the greatest impact on client services and the highest risk of failure have been selected to be part of this business case. Eight projects have been identified, which are described in sub-business cases as part of this programme case.
2.2 Options analysis and fit with existing activity	
What other options were considered in addressing the problem or opportunity?	Within the potential scope of this proposal, the main programme options were identified by key stakeholders, and assessed against the key objectives. Potential programme options identified but discounted include; **Do nothing** The do nothing option would involve: • running the bulk of the hardware infrastructure further beyond the end of its useful life with increasing failure rates • accepting that the rules processing application currently used by front line staff might not be able to be changed in a timely manner to address Welfare Expert Advisory Group (WEAG) recommendations accepted by government • accepting that the current knowledge services platform will continue to confuse and misinform front line and call centre staff so they give inconsistent answers to clients • accepting that the current identity management systems will continue to prone to error and not enable future digital initiatives for clients • accepting the current risk of unauthorised access to information, including client records • accepting that the current digital platform is likely to be unable to scale up to process rising levels of client self-service transactions. Overall, failing to replace these components will worsen the overall risk of systems failure for the Ministry and increase the cost, time and risk of any urgent system changes needed. It is therefore not a preferred option. **Reduce Services** The Ministry could reduce services that depend on technology and thereby cut down on the number of systems that need to be supported, with the result that costs would come down. In particular this approach could be applied to systems that are not directly used in providing services to clients. This approach would be very difficult to measure in that loss of staff productivity would likely lead to cost pressures elsewhere in the organisation or unintended adverse consequences for clients. This option is also not preferred because the great majority of the Ministry systems do in fact deal with client services, so it is highly unlikely that sufficient savings could be made. **Rationalise the number of Technology systems** This option involves reducing the number of technology systems whilst maintaining (or increasing) the services supported. This will reduce costs (which may be offset by volume increases). The Ministry's Te Pae Tawhiti Technology Strategy does plan for a reduction in the number of supported systems, and an elimination of large scale bespoke applications. The target environment has two broad approaches for retirement of legacy applications: 1. Standardising specialist eligibility and entitlement based functionality and client management onto the IBM Cúram COTS product 2. Moving all commodity and utility type applications to the cloud This is part of the Ministry's long term strategy and is aligned with the New Zealand government digital strategy, but it is not preferred for budget 2019. This is due to the high risk of the current situation and higher cost in the short term. The long term strategy will take some years to put into place given the scale of the Ministry's operations. In the meantime the Ministry will be obliged to keep the systems up to date running for the next three to four years in order to reduce the current risk of failure. **Defer investment until budget 2020**. The Te Pae Tawhiti Technology strategy has identified a number of technology initiatives required to transform the Ministry. The system replacements in this proposal are in that set of initiatives, and need to be done in the short term because these systems are: • beyond end of life, or • have significant architectural flaws, and

	• are pre-requisites to the full Te Pae Tawhiti strategy. In developing the Technology strategy the Ministry has identified some serious pain points attributable to that Technology landscape that need to be addressed regardless of Te Pae Tawhiti: • no single client view • disparate business processes and lack of automation • slow to deliver government policy change • product based systems rather than client outcome based • staff and clients not having access to consistent and accurate advice • aging and complex technology. This investment will result in reducing most of these pain points. The defer investment option is not preferred because it will increase the Ministry's risk in the short term and will mean that the pain points will hamper staff and clients for a longer time.
What other similar initiatives or services are currently being delivered?	Many New Zealand government organisations are navigating large scale systems replacement including a substantial move to the cloud. Similar to the Ministry of Social Development, they have the dilemma of keeping public facing systems going until they can affect those changes.
What other, non-spending arrangements in pursuit of the same objective are also in place, or have been proposed?	The Ministry has a considerable number of manual processes to compensate for the deficiencies described but these are complex and prone to failure. The Ministry has a well-defined Business Continuity Plan (BCP) which describes the manual processes adopted in the situation of a large scale systems failure. This BCP involves such things as running the previous week's payment file and issuing hologram letters to new clients. With the advent of digital channels and the volume of new applications for financial assistance (approx. 45,000 New Zealanders a week applying for some form of financial assistance) the BCP is only viable to operate for two days. Repeated outages within a two week period could result in a full suspension of services as manual processes become overwhelmed.
Strategic alignment and Government's priorities/direction	The Ministry's Te Pae Tawhiti Technology strategy is fully aligned with the Government's digital strategy which is to move away from Technology asset ownership and adopt cloud solutions wherever possible. Other components of the government digital strategy are to organise services to citizens around life events and ensure that citizen interactions can be passed seamlessly between agencies via APIs and other automated methods. The Ministry is planning to make a significant contribution in this area. The Identity, Rules, Knowledge and Digital asset replacements are foundational elements in achieving this objective. The Ministry will work with the GCDO to ensure that there is maximum re-use of existing system wide Technology assets and that whatever the Ministry develops is potentially re-usable across the system
2.3 Outcomes	
Overall outcomes expected from this initiative	There are two main outcomes from this investment proposal Firstly, to reduce and avert the risk of severe systems failure. Severe events could cause: • high profile loss of confidence by the Government in the Ministry and its ability to achieve goals. • critical IT systems unavailability to all staff or clients, preventing the Ministry's achievement of core business objectives and outcomes • loss of integrity in financial systems with extreme financial consequences • serious and/or sustained high profile breaches of: health and safety of our people, security of our IT systems and premises. Secondly, to create foundational technology capabilities that are pre-requisites to the Te Pae Tawhiti Technology and which begin to address the Ministry's Technology pain points An ILM was conducted to describe the problems and outcomes. It is included below.



2.4 Implementation, Monitoring and Evaluation[20]

How will the initiative be delivered?

There is no existing programme addressing the scope of this business case. However it is expected that when initiated, the programme will inherit and make use of:

- Existing MSD successful and mature Agile delivery capability, based on the SAFe delivery framework
- Existing risk management processes, which have identified the issues and proposed remediation
- Existing work being undertaken to upgrade or replace aging legacy systems.
- Existing risk mitigation and strategic asset management.

[20] This doesn't necessarily have to include a full implementation and evaluation plan, however the information provided must provide confidence that the proposal will be successfully delivered and there is a plan to ensure that the outcomes described are actually achieved.

	• Existing MSD technology strategies, including the Te Pae Tawhiti Technology Strategy that aim to reduce the six pain points caused by the current technology, • Existing strategic aims for the Ministry's technology to create a modern digital experience for clients, partners and staff where key functions are opened to broader social sector participants. The Programme Boards will report on progress, risks and issues to the Investment Strategy Governance Committee (ISGC) and will keep the other Ministry governance committees appraised as necessary. The programme will also ensure that the office of the Government Chief Digital Officer GCDO is kept informed of progress. A Programme Manager will be appointed to manage the programme through and envisaged four tranches of delivery and stage gate funding. Given the broad nature of the initiative, the delivery team will comprise people from most Business Groups as well as IT, plus vendors (data centre vendors, AoG IAAS and TAAS vendors). The Ministry has a rich history of successful delivery of large scale Technology projects and programmes as well of Technology enabled business projects and programmes. These include; • Welfare reform • Housing transfer from HNZ • Client management system • Simplification • End User Compute • Availability and resilience The Ministry's Project Management Methodology is based on a project management method called PRINCE2, an internationally recognised approach to managing projects and consistent with established best practice. PRINCE2 ensures an explicit common understanding of what the programme will create (the scope) and the criteria against which the programme's final product(s) will be assessed. The client's quality expectations will be documented along with how they will be assessed in a quantifiable way. The Ministry also employs the Scaled Agile Framework (SAFe) and DevOps approaches to assist with management of the entire Technology work portfolio. The key organisational institutions are the Portfolio Executive Committee (PEC) and the Programme Portfolio Management (PPM) function. PEC and PPM make funding, priority, and resource allocation decisions under the auspices of the ISGC. Successful delivery of the Government funded End User Compute (EUC) and Availability and Resilience programmes at the Ministry have been achieved using this framework, whilst possessing their own programme boards. The broad philosophy of the agile approach is to minimise risk through the use of Proofs of Concept and the initial production deployment of Minimum Viable Products (MVPs) which are then elaborated with additional features in subsequent releases until the full solution is deployed. As the name suggests a Minimum Viable Product has the basic functionality to perform the business function, and subsequent investment in the product needs to be justified in terms of the additional value created. This approach minimises the risk of over-investment in system features that do not provide commensurate value. The programme plan will involve the draw-down of funding and delivery in tranches. As the programme completes each tranche and based on the progress made against the programme objectives, it will seek approval from the Programme Board to move into the next stage, where approval to draw down the next funding iteration will be sought from Treasury. This stage gating process enables regular reviews, and greater transparency of risk, issues, business benefits and costs. It also allows the Programme Board to ensure the programme remains viable and that there is benefit to MSD in continuing with it.
How will the implementation of the	If this Business Case is endorsed and funding allocated, there will be two governance mechanisms directing the work, reflecting the most appropriate mechanism for the different work packages.

initiative be monitored?	Both will operate with the oversight of the Portfolio Executive Committee (PEC). All funding allocation to this programme and other projects will be performed through the PEC process. For the backlog of work to be covered by the recapitalisation funding (the Maintenance projects), it is appropriate that the existing mechanisms of risk and value based prioritisation are used, with the remediation to be balanced against other emergent risks. This is the responsibility of the Portfolio Executive Committee (PEC), which assesses and prioritises all Ministry investments. PEC will directly oversee the three Maintenance projects; 6. "Software and Security upgrades", 7. "Replacing ageing 'on premise' hardware with Infrastructure-as-a-Service and public cloud", and 8. "Legislative Driven application change" For the five remaining initiatives (the Replacement projects), two Programme Boards will be established to provide programme governance for the various programme tranches and phases. The first will be chaired by the DCE Corporate Solutions and will include a range of business stakeholders from Service Delivery and other Business Groups. Included under the Programme Board will be the Replacement projects, focused on specific core services, which are; 1 "Identity Management", 2 "Centralise Rules Processing", 3 "Foundational Knowledge Base", 4 "Data Warehouse Re-platform", and 5 "Digital Capability" Although the main Business Group impacted is Service Delivery because of their ownership of the in-scope client facing systems, most other Business Groups will also be represented, as well as Oranga Tamariki who will continue to use some of the affected services. The second board includes representatives from HUD and Oranga Tamariki, and is specifically focused on the analytics platform needs of all the participating agencies. This will be chaired by Nic Blakeley, and cover initiative 4 "Data Warehouse Replatform". **Programme and business assurance arrangements** This investment proposal has been assessed as high risk using the State Services Commission (SSC) Gateway Risk Profile Assessment tool. Based on this risk assessment, the basis for on-going engagement as part of the business case has been agreed and documented in the scoping document. This agreement accompanies this case. The proposal is subject to on-going Gateway reviews. The requirement that this Programme Business Case be submitted for a Gate One: Business Justification and Options review will be determined as the capital funding bid process continues. Such reviews investigate the status of a programme as it nears completion of the Programme Business Case, to confirm that the programme has the appropriate structures and that planning is in place to support the preferred solution options. The reviews seek to confirm that the programme continues to be achievable and likely to deliver what is required. The Review checks that: • stakeholders approve the intended benefits from the programme • linkage with programme and organisational objectives is clear • the optimum balance of cost, benefits and risk has been identified • The "long list" of options is sufficient and the "short list" is justified.

	This proposal is also subject to independent quality assurance which will be carried out prior to submission in February 2018. The programme will implement regular continuous improvement activities during the programme, e.g. looking for ways to make the programme management practices more effective or efficient. These will include, but are not limited to: • Stage gate checks • Independent Quality Assurance • Internal and external Audits (including Treasury Gateway reviews) • Use of standard templates & processes
Describe how the initiative will be evaluated	It will be the responsibility of the programme to track and report the evaluation metrics. All metrics are report to OEC and are issued for prioritisation and resource allocation. Evaluation of the first object (risk reduction) will be made against the Ministry's Risk Framework, and track the reduction in risk against the present profile. In addition, each of the eight projects has specific risks and mitigates identified, which will be tracked in each project. The second objective of creating assets of enduring value will be assessed by alignment of the solution to the Technology Strategy. The framework for measuring that alignment will be developed as part of programme initiation.

3. Wellbeing Impacts and Analysis

This section builds on the information provided in section 2 above and goes into further detail on the impacts, evidence and assumptions underpinning the intervention logic. It also asks that you demonstrate how your initiative will impact on wellbeing domains, the four capitals and risk and resilience.
The focus is on showing a strong narrative underpinned by evidence rather than monetisation of benefits and showing a positive return on investment. However, the use of the CBAx tool and monetisation is encouraged for key impacts with good evidence where it will strengthen the case for intervention.
Completion of this section is strictly limited to a maximum of three pages. This section helps the Treasury to assess and advise how the proposed initiative will impact the wellbeing of New Zealanders relative to the counterfactual. It may be provided to Ministers to support Budget prioritisation.

Impact summaries need to be framed against the three components of the Living Standards Framework, with supporting evidence where available:

- ***Wellbeing domains** – identify the value to New Zealand, magnitude and timeframe (up to 50 years) for impacts on the primary and (up to three) secondary domains targeted.*
- ***Four capitals** – identify the draw-downs, build-ups and/or transfers across the four capitals (physical, social, natural, human) resulting from funding the initiative.*
- ***Risk and resilience** – linking to the counterfactual and intervention logic, explain how the initiative adapts to or absorbs risk and/or how it maintains or builds resilience*

Please be aware that impacts or evidence are not mutually exclusive between wellbeing domains, capitals, and risk and resilience. They are interrelated cuts of the same information, we would expect that some answers may be duplicated.

3.1 Wellbeing domains – People's experience of wellbeing over time	
Identify and quantify how the initiative impacts on wellbeing domains	The following table has been completed to reflect the loss of wellbeing if the initiative is not funded. The wellbeing domains are outlined here for you to use in your table:

Civic engagement and governance 	Jobs and earnings 
Cultural identity 	Knowledge and skills 

Environment 	Safety 
Health 	Social connections 
Housing 	Subjective wellbeing 
Income and consumption 	Time-use 
	Other

3.1 Wellbeing domains – People's experience of wellbeing over time

Note: Impact to wellbeing if proposed initiative is not funded.

Domains List domains, using the key above, where there is an impact. Order domains by magnitude of impact,	**Impact(s) description** Identify the impacts, with a separate line for each impact relating to a specific domain	**Who are affected?** Individuals/families/government/etc? Be as specific as possible. Are there distributional differences?	**Magnitude of impact** Relative to the counterfactual key assumptions, quantified to extent possible, and where possible monetised	**How big?** High/ Moderate/ Low, or where possible present value	**Realised** in <5 / 5-10 / 10+ years	**Evidence base** Nature of evidence and key references	**Evidence quality** High/ Medium/ Low
Safety **Primary**	Inability to process applications mean clients are left in vulnerable situations	Benefit application	Nov 2018 Statistics – 120k applications (60,000 online)	High All clients	<5 years immediate	Experience of recent outage Regular Online Uptake Tracking (Nov 2018)	High
	Inability to access emergency resources	New benefit application Hardship Application Change in Circumstances	Nov 2018 statistics, (monthly) • Applications (see above) • 300K Change in Circumstances Benefit Fact Sheets: • Sep 2018 Hardship assistance : 344,731 and a total of $100.5m	High All clients	<5 years immediate	Experience of recent outage Regular Online Uptake Tracking (Nov 2018) Benefit Fact Sheets (MSD Website)	High
	Payments to clients not made	All beneficiaries $2B payments / month	Close to 1M clients @ $2B payments / month	High All clients	<5 years immediate	Experience of recent outage Regular Online Uptake Tracking (Nov 2018)	High
Jobs and earnings Secondary	Jobseeker allowance not paid	All Work and Income clients	For Sep 2018: • 129,643 in receipt of Job Seeker Support	High All clients	<5 years immediate	Experience of recent outage Regular Online Uptake Tracking (Nov 2018) Benefit Fact Sheets (MSD Website)	High
	Inability to update earning details	All Work and Income clients	300K Change in circumstances of which at least 50% are 'declare wages' transactions.	High All W&I clients	<5 years immediate	Experience of recent outage Regular Online Uptake Tracking (Nov 2018)	High
	Inability to inform of 'change in circumstances' (e.g., change in accommodation costs)	All Clients	Around 300K change in circumstance transactions (CIC) in November, with 41% online		<5 years immediate		
Housing Secondary	Inability to access emergency accommodation	Those in receipt of accommodation supplement or are waiting for public housing as captured in the housing register	292,000 in receipt of Accommodation Supplement (Sep 2018) 9,536 clients in Housing register (Sep 2018)	High All clients	<5 years immediate	Experience of recent outage **Benefit Fact sheets (MSD website)** **Housing Register (MSD Website)**	High
Health Secondary	Increased emotional and physical stress due to MSD's inability to meet the needs	Vulnerable clients	Difficult to quantify.	High	<5 years immediate		
Income and Consumption	Financial cost of visiting nearest service centre to apply or inform of changes or fulfil obligations (e.g., re-application) when digital channels are down	Close to 50% of clients (based on %age of online applications and $age of change in circumstances)	Difficult to quantify.	High	<5 years immediate	Regular Online Uptake Tracking (Nov 2018)	
Time Use	Having to visit the service centre to complete tasks instead of better use of time to attend training and/or look for employment	Close to 50% of clients (based on %age of online applications and $age of change in circumstances)	Difficult to quantify.	Medium (clients and service centre staff)	<5 years immediate	Regular Online Uptake Tracking (Nov 2018)	

3.2 Wellbeing capitals – Sustainability for future wellbeing

Wellbeing capitals	Please fill out the table below to demonstrate how your initiative may contribute positively, negatively or neutrally to the four capitals.

Capitals	**Describe the impact and its magnitude** **NOTE: The impacts are described as the negative impact of a loss of service**	**Realised in** <5 / 5-10 / 10+ years
Financial/Physical	**Decrease** Due to an increase in personal hardship and stress, and the inability to access necessary support services	<5 years immediate
Human	**Decrease** Due to an increase in personal, family and community hardship and stress.	<5 years immediate
Natural	**Maintain**. This initiative has no impact on natural capital.	
Social	**Decrease** This initiative has a broad impact on community wellbeing and cohesion.	<5 years immediate

3.3 Risk and resilience narrative

Does the initiative respond to or build resilience?	The initiative is focused on avoiding a loss of wellbeing. The loss of MSD services decreases community resilience, and greatly increases individual, family and community risk.

4. Costing understanding and options

This section will provide further information on the costs of delivering the initiative and options for scaling and phasing to support assessment, prioritisation and decision-making.

4.1 Detailed funding breakdown

Please provide a breakdown of the costs of this initiative

Based on current estimates, the anticipated cash flows for the investment proposal over its intended life span are set out in the table below.

$millions	2019/20	2020/21	2021/22	2022/23	Total
Preferred Way Forward:					
Capital					
Identity Management	11.000	7.300	1.600		**19.900**
Centralise Rules Processing - DREW	12.000	5.000			**17.000**
Foundational Knowledge base- Hindin	10.000	6.000			**16.000**
Data Warehouse Re-platform	7.000	8.000	5.500	1.000	**21.500**
Digital capability	8.500	4.500			**13.000**
Software and Security Upgrades	45.300	60.300	64.210	64.481	**234.291**
Replacing aging "on premise" hardware with infrastructure as a service and public cloud	4.800	4.800			**9.600**
Legislation Change Funding	6.000	6.000			**12.000**
Total Capital Required	**104.600**	**101.900**	**71.310**	**65.481**	**343.291**
Operating					
As a service costs	6.540	12.720	15.760	16.260	**51.280**
Internal resource	2.200	2.200	2.200	2.200	**8.800**
Depreciation		6.903	15.894	17.900	**40.696**
capital charge	3.330	6.660	6.660	6.660	**23.310**
Total	**12.070**	**28.483**	**40.514**	**43.020**	**124.086**
Funded by:					
Existing Revenue					
Existing Capital	42.938	60.500	64.210	64.481	232.129
Extra Revenue	12.070	28.483	40.514	43.020	124.086
Extra Capital	61.662	41.400	7.100	1.000	111.162
Total	116.670	130.383	111.824	108.501	467.377

Our Current Capital Position

9. The majority of the investment in the Ministry's critical infrastructure is funded through capital investment
   - This includes the fit out of 182 sites, a fleet of 1150 motor vehicles and critical technology that processes 14 million client interactions per year for over 1 million clients
10. These assets are also used by Oranga Tamariki as part of the shared services agreement. Table 1 details the cost and accumulated depreciation of the assets that the Ministry employs.

Table 1

	Land	Buildings	Furniture and Fittings	Computer Equipment	Motor Vehicles	Plant and Equipment	Software	Total
Assets at cost	22,820	21,265	139,190	108,566	27,262	10,116	498,037	827,256
Accumulated Depreciation	-	(1,141)	(90,388)	(80,722)	(12,716)	(8,701)	(315,800)	(509,468)

Net book value	22,820	20,124	48,802	27,844	14,546	1,415	182,237	317,788

11. Ideally the Ministry should have the value of the accumulated depreciation ($509m), in cash on its balance sheet available to fund the replacement of these assets. In reality only $40 million is available.

12. Over the last decade, there has been a strong incentive on us to:

    - Apply the value of accumulated depreciation (accumulated cash) to immediate capital priorities
    - maintain service continuity
    - return cash to the corporate centre.

13. This approach represents the conscious decision to operate a 'lean capital' approach, i.e. using the cash available to fund strategic business priorities, and has created the flexibility needed to be able to control and respond to changing fiscal parameters.

14. The accumulated impact of these decisions has however reduced future cash availability by at least $290m and this now means that we no longer have the cash available to fund any significant new or replacement investment.

Table 2 – area of cash use

Area of cash use	Capital spend $m
Te Maiaho Youth Justice Facility (Rotorua)	40
Repayment of capital to Crown	80
Simplification (Digital transaction transformation)	80
National office relocation	40
Cúram (Case management)	50
Total	290

15. The Ministry expects to generate between $43 million and $65 million of depreciation a year which is used to fund replacement of technology assets. This funding is not sufficient in order to meet the demands and priorities of the Ministry. The following table details the expected funding available to replace technology assets

Table 3 – Depreciation to fund technology assets $m

Investment By Asset Portfolio	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	8 Year Total
Funding available to replace technology assets	42,938	60,500	64,210	64,481	59,252	55,200	58,824	63,272	468,677

4.2 Options for scaling and phasing

Scaling, phasing or deferring - including 75% and 50% scenarios

There is no viable option for deferring without acceptance that the failure risk will worsen in the next 6 months.

A 75% scaling option would hold the current (elevated) risk level steady

5. Collaboration

This section provides information on how agencies have engaged both within and outside of their own departments in the development of this initiative. Cross-agency and cross-portfolio collaboration are both important in this context. Please ensure this section is clear and succinct, and no longer than one page.

5.1 Collaboration and evidence	
What type of cross-agency and/or cross-portfolio initiative is this?	The initiatives are focused on risk reduction, and involve MSD specific services in most cases. The data warehouse provides a service to Oranga Tamariki and Housing and Urban Development, and the proposed governance structure reflects the collective responsibility for this project. Oranga Tamariki receives shared services from MSD. Failure risk of MSD systems has the potential to impact Oranga Tamariki services. This is also reflected in the proposed governance structure.
Agencies and Ministers that have been engaged in initiative development	The responsible Minister has been briefed in the drivers for this initiative. In developing this proposal, Treasury and GCDO have been consulted. GCDO have also been consulted on the Technology Strategy, with their review not yet complete.
Impact of cross-agency collaboration	Covered in 2.3
Risks and challenges	There have been no challenges to collaboration for this proposal