Technology program

Information Management

PUBLIC

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1   Document Background

1.1   Purpose of this document

The purpose of this document is to outline a business case for a proposed program of work that will form part of AusNet Services' Technology EDPR submission.

1.2   References

Document	Version	Author
AusNet Services FY19-FY23 Technology Plan	V1.00	AusNet Services

1.3   Document History

Date	Version	Comment	Person
	V0.1	Pre SME input	
	V1.1	Post SME input	
	V1.2	Minor changes	
	V2.1	Post any additional major input	
06/03/2019	V2.2	Benefits updated	Graeme Young
08/03/2019	V2.3	Minor updates	Janine Perri
18/03/2019	V2.4	Consistency edits	John Hancock
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18/11/2019	V4.1	Incorporated feedback	Samantha Scanlon
14/1/2020	V4.2	Incorporated feedback	Samantha Scanlon

1.4   Approvals

Position	Date
Technology Leadership Team	

2 Executive summary

2.1 Program summary

The table below provides a summary of the program discussed in this brief. Additional information is provided following the table and throughout the brief.

Table 2-1 Summary table

Key objective(s) of the program	The IM program will extend the information management (IM) platform, which will enable rapid access to timely, accurate data across all critical systems, assets, processes, and support more advanced analytics and reporting					
Key benefits	Applying analytics to the vast amounts of useful data that AusNet Services collects, offers an opportunity to: • Improved forecasting and customer usage/demand management to better meet changing customer needs and expectations • Enable DER, efficient asset renewal and outage management to improve customer satisfaction in an increasingly complex environment • Monitor and maintain the network more effectively and prudently in an increasingly complex environment • Improve compliance with regulatory requests, which contributes to the meeting of the National Electricity Objective					
Cost allocation	Electricity Distribution	49%	Electricity Transmission	30%		
	Gas Distribution	21%				
Program type	**Recurrent**		☐			
	Non-Recurrent		☒			
	Client Devices		☐			
Program timings	Program duration:	5 years				
Expenditure forecast	**($m)**	**FY20222**	**FY2023**	**FY2024**	**FY2025**	**FY2026**	**Total**
	CAPEX	[C-I-C]					
	OPEX						
	Electricity Distribution Cost						
	Total program cost						
Estimated life of system	This program will cover the entire EDPR period from FY22-FY26					

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Customer Engagement	As the first DNSP in Australia to trial the New Reg process, we held deep dive workshops with stakeholders, including the Customer Panel, on ICT. In that engagement we described the importance and need for ICT expenditure to meet our customers' evolving needs and to support compliance with regulatory and legal obligations. Material associated with all our deep-dives is available on AusNet Services' website. A key theme of our engagement with the Customer Forum was the need for us to provide clarity on what we were proposing and what the expected customer benefits were. We acknowledge this feedback and have taken it into consideration when proposing the most appropriate option for this business case.

AusNet Services is continuing to work to improve outcomes for customers by using data to improve decision making. This work is carried out in a context where there is pressure to bring enhancements to achieve two opposing goals, making upgrades to the network, whilst controlling expenditure and customer rates. There is also pressure to bring enhancements to improve grid availability and security and renewable energy, distributed generation, and other advanced technologies online. Many advanced sensors and smart meters deployed across the network create valuable sources of data, which can be leveraged by the business to achieve these goals. This data is analysed and mined for insights which allow AusNet Services to better monitor, manage and control the network as well as optimise its operations.

A number of opportunities have been identified to improve the insights to the depth and with the speed, accuracy and responsiveness required to meet the evolving business and customer requirements for analytics:
- Processes for sourcing and analysing data are not consistent
- Data is sourced from multiple systems, spreadsheets and documents with no standard patterns or methodologies and significant duplication
- Quality governance and critical reporting requires a high level of manual intervention to validate data before any analysis can commence
- Data acquisition and analysis depends on experience and domain knowledge
- There is no common, integrated representation of the network or equipment information.

This program of work will extend the information management (IM) platform currently being commissioned in 2019, to address these limitations, now and in the future through a cloud based solution. There is already a number of critical programs of work underway to retire and replace existing data warehouse solutions, tools and databases to address the limitations outlined. Current programs of work as well as this continuation in the forecast regulatory period will produce the following key benefits (including but not limited to):
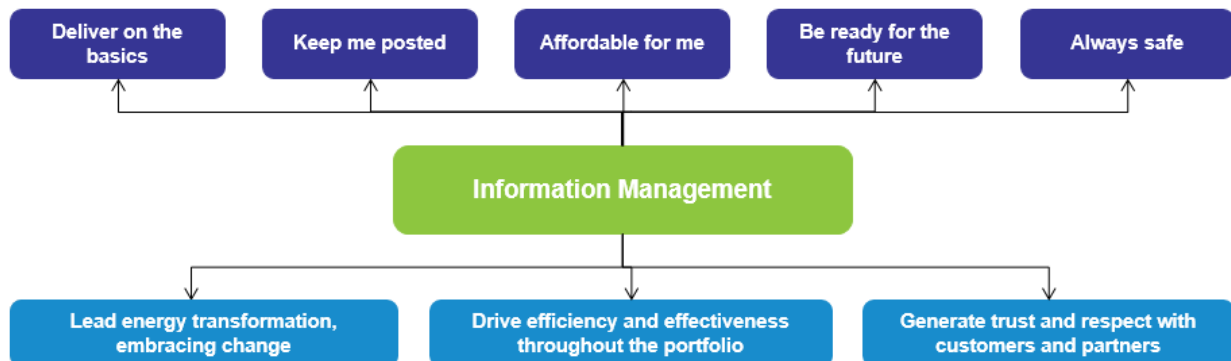- Integrated reporting, analytics & self service capabilities that drives efficiency and fact based decision making, allowing the business to augment and manage the network more effectively, limiting planned and unplanned outages for customers
- Reduce operations cost with improved planning, monitoring & control and increased availability of information, resulting in more efficient management of the network and ultimately reducing network charges for customers
- Single source of truth, to provide an enterprise view of consistent trusted information across systems, allowing the business to rapidly respond to disruptions in the network, improving the overall safety and reliability of the AusNet Services Distribution network for customers
- Improved overall efficiency for information management by rationalising tools and technology, allowing the business to be more responsive to changes in customers' demands, expectations and usage requirements

This will begin to alleviate and remedy many of the current limitations on information management and analytics at AusNet Services. The process of developing and executing the new IM platform will

take many years and continue well into the forecast regulatory period FY2022-26. The associated costs and specific initiatives within this program account for this and have been defined accordingly.

Figure 2-1 Summary of customer and business drivers of this program

Alignment with AER ICT expenditure assessment framework

In accordance with the framework outlined in the AER's Consultation paper – ICT Expenditure Assessment of May 2019, we have categorised this program as non-recurrent expenditure, on the basis that it relates to new investment in AusNet Services' information management infrastructure.

We have also undertaken NPV analysis in support of the project, as well as developed a detailed business case in support of the chosen option.
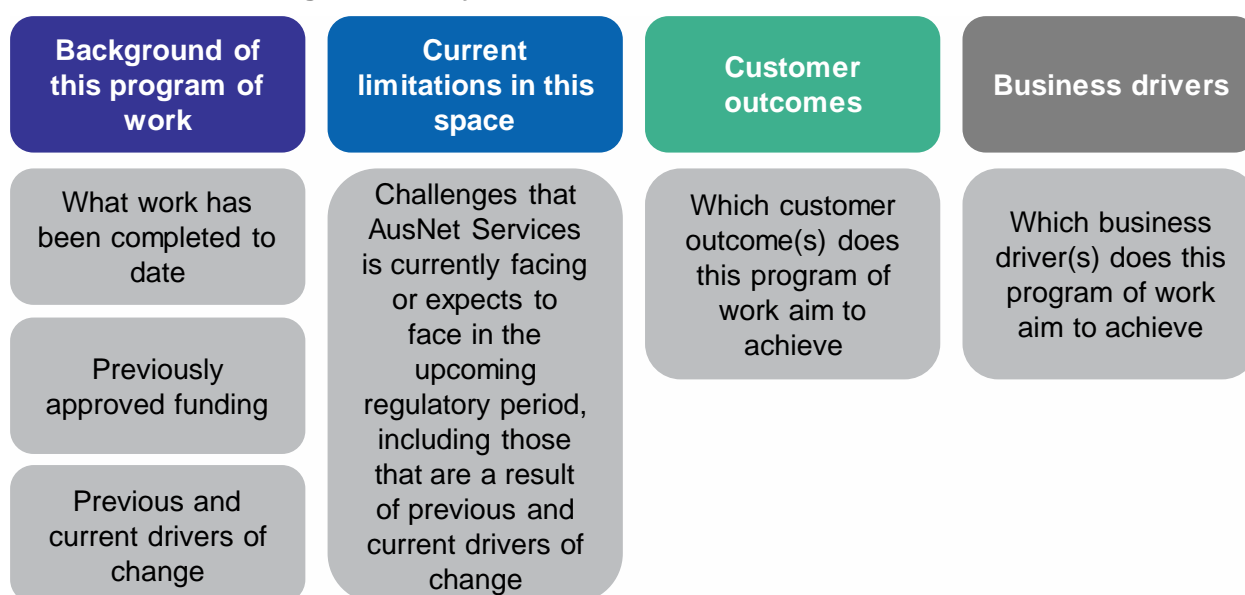
3   Context

The utilities sector is going through a major period of change, driven by increasing customer demand for renewables (distributed energy resources, DER), the emergence of community grids, cost of living pressure, new regulatory requirements, and a strengthened commitment to boost the resilience of the network following recent highly publicised outages in the NEM. AusNet Services continues to evaluate both existing capabilities and where prudent, find new ways to deploy technologies to address these challenges and harness new opportunities to reduce its costs and ensure the reliability and continuity of supply.

This program of work will bring together many disparate sources of data to a unified platform and perform advanced analytics in order to generate insights which can be used to run the network more effectively in an increasingly complex environment. This more advanced information management platform will underpin a more proficient, resilient and reliable supply for customers and more effective use of capital to maintain and manage the network.

Figure 3-1 Key areas of the context to be discussed

Background of this program of work	Current limitations in this space	Customer outcomes	Business drivers
What work has been completed to date	Challenges that AusNet Services is currently facing or expects to face in the upcoming regulatory period, including those that are a result of previous and current drivers of change	Which customer outcome(s) does this program of work aim to achieve	Which business driver(s) does this program of work aim to achieve
Previously approved funding			
Previous and current drivers of change			

3.1   Background

AusNet Services faces increasing challenges as the amount of data flowing through the organisation exponentially increases each year. Smart meters and smart devices, switches and modern network assets deployed across the distribution network are creating larger, richer and more valuable data sources, which the business can leverage to improve operations in a number of critical ways, which are detailed within the proceeding table. If this data is not consistently stored and readily accessible, the insights will not be available to the business and limit their ability to better monitor and manage the network to ensure the reliability and consistency of supply for customers. This is known as 'information management (IM)' and is essentially the collection, management, storage and analysis of information from one or many disparate sources and the distribution of that information to one or more audiences, in a simplified often standardised format.

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Information management at AusNet Services typically supports the business in meeting critical customer expectations by providing the underlying information and often the associated analytics required to perform the following critical activities and to optimise them to operate at their peak efficiency:

Focus area	Impact of IM
Asset and maintenance management	The costs of remote-monitoring sensors and associated analytical systems continues to drop and there are opportunities for the business to use the data they provide to manage assets in increasingly productive ways. Advanced analytics, using real-time performance data and predictive models, helps AusNet Services: • Prevent asset failures • Concentrate management efforts on critical assets • Avoid excess maintenance and premature asset replacements • Embed the valuable knowledge of specialists within the business Analytics and associated reports allow the business to gain greater visibility and control over operational risks and asset-management practices and to use these insights to improve network performance, improve customer outcomes and more effectively manage operations and maintenance expenditure in an increasingly complex environment.
Regulatory compliance for managing data and reporting on supply, cost, safety, etc.	The size, complexity and rate of change of the network continues to grow in scope and complexity. This has meant AusNet Services operations, performance and the associated data underpinning regulatory compliance analytics and reporting is becoming more and more complex. It also means that regulatory reporting becomes an increasingly labour intensive process, particularly if errors are to be minimised. There is a vast array of different classifications of data, such as asset data, usage data, outage data, security information, financial data and metrics, etc. Each are managed by different teams and systems and vary widely in terms of size, shape, and frequency of change. With every new compliance requirement, the business needs to perform new analytics and reporting on specific subsets of data. The more effectively data is rationalised, to a standardised and readily accessible form, with tools and analytics in place to proactively meet key regulatory compliance and reporting needs, the more accurately the business will be able to meet its reporting requirements. Information management and the associated analytics, improve both the accuracy of these reports and the effort with which they can be produced.
Predictive analysis and reporting solutions for all relevant business units i.e. field workers, finance, network planning, outage planning, operation teams, scheduling for internal and field crews	AusNet Services is gathering more data from across the business and must continue improving its ability to analyse this data, many examples of this are outlined above and in the proceeding dot points. This analysis in turn drives a deeper understanding of the business. As outlined above, these analytics drive improved accuracy in predicting equipment failures and outage durations, producing results that allow us to increase customer satisfaction (this is explained in more detail in section 3.4) while more effectively managing operations and maintaining expenditure in an increasingly complex environment. But these same predictive tools can be applied more widely across the business: • Field workers will use the analytics to better schedule work routes, rosters and optimise the works being done in line with routes and maintenance requirements

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Focus area	Impact of IM
	• Network augmentation is supported by analytics to help improve understanding of where and when the network has insufficient capacity • Network life can be extended while preventing outages through more accurate predictions about when to replace failing equipment • Outage plans improve the business' outage response through situational awareness, for example, automated dispatch through real-time identification of an issue and better management of associated performance of assets • Data which is used to support operations is often unstructured and in varying formats. IM systems and analytics can compile and compare this information more easily, using predictive analytics to optimise business operations and performance across the company • Resources scheduling and executing workloads (both back office, field staff and contractors) can be supported by analytics to ensure that service-level agreements (SLAs) and business deadlines are met. Scheduling analytic tools combine historical and predictive analysis by using historical workflow performance, resource availability and capacity, and upcoming workload schedules, to make predictions about possible future workflow execution times and duration • Financial information is critical to shaping the direction of the business moving forward and ensuring prudent and efficient operations. Financial data consists of pieces or sets of information related to the financial health of a business, such as costs, expenses, profitability, etc. Financial analytics combine internal financial information and operational data with external information to address critical business questions with ease, speed and accuracy Each critical area above is not only supported by information management and the associated analytics, but also has a suite of reporting which the business depends upon to interpret the outputs of these analytics, to monitor and manage the respective areas of the business.
Meter data analytics	Meter data management refers to the systems that perform long-term data storage and management for data delivered by smart meters. This data includes usage data and events which are recorded and sent from advanced metering infrastructure (AMI). This metering data and associated analytics is a component of efficient operations at AusNet Services. This data and associated analytics allow AusNet Services to: • Identify customer usage patterns and optimise the network accordingly • Ensure billing accuracy based on more accurate customer usage information • Identify and correct deviations from key performance indicators, reducing risks of failure and optimising operations and maintenance accordingly • Decrease losses from unbilled energy by more accurately measuring usage and network performance The application of this type of information management and supporting analytics is detailed in the metering project briefs, with respect to meter data management.
Customer analytics and billing	Data analytics allows AusNet Services to understand customers and their energy use better. This allows the business to tailor services to meet

Focus area	Impact of IM
	customers' evolving needs and expectations, such as demand-side management programs that reduce electricity use at peak times. This data and associated analytics also allow AusNet Services to provide more accurate information to customers about power outages, grid updates, and repair work by field crews driving improved overall customer service and outcomes (outcomes that we know from our broad based customer engagement that our customers want). This type of analytics also allows the business to accurately bill and monitor for theft.

To meet the complex information demands of the modern grid and ever evolving customer needs and expectations, new thinking and approaches to IM are required.

3.2   Current limitations

The current information management landscape at AusNet services is a core function, which provides analytics and reporting to support and underpin primary business functions. There are a number of critical limitations on current information management practices which are not allowing the business to maximise its operating efficiency and respond to changes in customers' demands, expectations and usage requirements. Furthermore, the increasing density of DER, and growing volume of near real time data on the network, will need to be underpinned by a robust information management solution, which current practices are not suitable to deliver.

The key limitations of the current IM landscape include:

[C-I-C]

As outlined earlier, there are a number of programs of work which are currently underway, which will commence retiring and replacing the existing IM systems, tools and data stores. This will be an ongoing

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process and will continue into the forecast regulatory period FY2022-26. Many of these limitations will still apply to varying degrees and will be closed out as a part of this program of work. There are some existing IM solutions, which do have real time information and a number of unique reports and dashboard. However, these practices and tools do not cover all relevant and necessary systems, data sets and network assets, and in several cases the limitations above hold true and require remediation.

3.3   Objective(s)

As outlined in Section 3.1, applying analytics to the vast amounts of useful data AusNet Services collects offers the business an opportunity to drive the following key benefits:
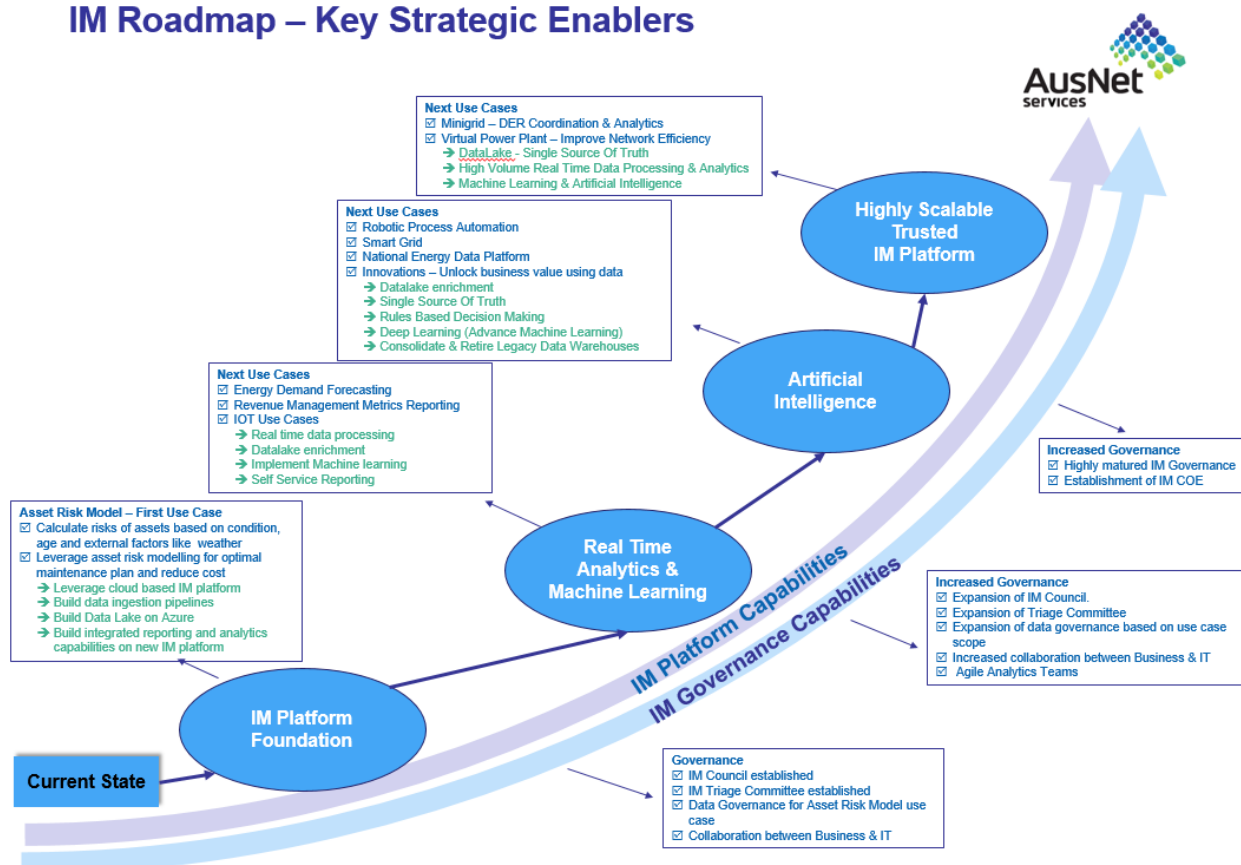
Opportunity	Customer and business outcomes
Uncover and understand customer usage outcomes	Rapidly identify and remedy shortfalls in the network to maintain the reliability and security of supply to customers
Better forecast demand	Driving more targeted investment and upgrades of the network based on customer's needs, again maintaining the reliability and consistency of supply, whilst prudently upgrading the network in line with actual use requirements
Manage energy constraints more effectively	Reduce customer down time by optimising both planned outages and the response to unplanned outages through advanced near real time analytics
Monitor and maintain the network more effectively	Control expenditure and maintain prudent asset maintenance and renewal through network monitoring by concentrating management efforts on critical assets, avoid excess maintenance and premature asset replacements
Improve compliance with regulatory requests	By simplifying, rationalising and standardising both the underlying data and how it is consumed, the new IM platform will have tools, analytics and in turn responsiveness to simplify the business' ability to meet key regulatory compliance and reporting needs
Prevent fraud and reduce loss	By better understanding connection and usage data, the business can readily identify those connected to the network who are not being billed or stealing power. By identifying and remedying theft, the business can bill all customers, maximise revenue and fairly distribute costs across all users
Enable distributed energy management	By predicting the growth of DER per region and the impact variability in generation/load from DER will have on the network, the business can maintain continuity of supply for customers whilst ensuring they are able to connect DER of their own. This will also allow for more controlled and targeted expenditure in line with DER penetration

The IM platform will enable rapid access to timely, accurate data across all critical systems, assets, processes, and support more advanced and standardised analytics and reporting. As outlined earlier, whilst there are some areas of the existing IM solution which do integrate real time monitoring, control and analytics, these are not all encompassing and are isolated cases, with limited ability to scale. This is a primary driver for the new revised IM platform detailed in option 3.

In addition, the business has developed a roadmap for the information management platform. The roadmap below details several critical use cases for the IM platform, which the business will implement as appropriate and the platform can support.

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IM Roadmap – Key Strategic Enablers

Next Use Cases
☑ Minigrid – DER Coordination & Analytics
☑ Virtual Power Plant – Improve Network Efficiency
  → DataLake - Single Source Of Truth
  → High Volume Real Time Data Processing & Analytics
  → Machine Learning & Artificial Intelligence

Next Use Cases
☑ Robotic Process Automation
☑ Smart Grid
☑ National Energy Data Platform
☑ Innovations – Unlock business value using data
  → Datalake enrichment
  → Single Source Of Truth
  → Rules Based Decision Making
  → Deep Learning (Advance Machine Learning)
  → Consolidate & Retire Legacy Data Warehouses

Next Use Cases
☑ Energy Demand Forecasting
☑ Revenue Management Metrics Reporting
☑ IOT Use Cases
  → Real time data processing
  → Datalake enrichment
  → Implement Machine learning
  → Self Service Reporting

Asset Risk Model – First Use Case
☑ Calculate risks of assets based on condition, age and external factors like weather
☑ Leverage asset risk modelling for optimal maintenance plan and reduce cost
  → Leverage cloud based IM platform
  → Build data ingestion pipelines
  → Build Data Lake on Azure
  → Build integrated reporting and analytics capabilities on new IM platform

Increased Governance
☑ Highly matured IM Governance
☑ Establishment of IM COE

Increased Governance
☑ Expansion of IM Council.
☑ Expansion of Triage Committee
☑ Expansion of data governance based on use case scope
☑ Increased collaboration between Business & IT
☑ Agile Analytics Teams

Governance
☑ IM Council established
☑ IM Triage Committee established
☑ Data Governance for Asset Risk Model use case
☑ Collaboration between Business & IT

Note: this is a possible IM roadmap which will be delivered based on business needs

As outlined throughout this program brief, the business has begun retiring existing data stores and rolling out the new IM platform. This program will continue this work and extend the IM platform as detailed within this document.

Based on the current IM roadmap and inflight projects, the business plans to have made the following progress by the beginning of the forecast regulatory period:

Focus area	Outcome by June 2021
[C-I-C]	

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Focus area	Outcome by June 2021
	[C-I-C]

3.4   Customer outcomes

Through customer research carried out by AusNet Services, a succinct list of key customer values and priorities were identified. These customer outcomes are:

- delivering basic services – "deliver on the basics"
- keeping customers informed – "keep me posted"
- affordable services – "affordable for me"
- adaptability – "be ready for the future"
- safety – "always safe".

Additional information on each of these customer outcomes is provided in the overarching Technology EDPR submission FY2022-26. This research has been further validated through the ICT deep drive presented to the customer forum.

All expenditure programs identified and proposed by AusNet Services will have regard to the customer outcomes and can be directly linked to at least one of these five outcomes.

This program of work is most relevant to "**be ready for the future**", as with more advanced analytics capabilities, such as machine learning and cognitive approaches, AusNet Services will derive deep insights on business-critical data. This in turn will underscore improvements in operating efficiency by better enabling the business to understand and reconfigure the network, faster and with improved accuracy ensuring efficient and effective networks for customers.

This program will also ""**deliver on the basics**", as analytics will help AusNet Services better understand customer demand, allowing the business to better manage, configure and optimise the network to ensure customers always have certainty of supply in line with their demand. It also aligns with "**keep me posted**" as analytics capabilities underpinned by the information management platform and associated tools, systems and data sets will enable AusNet Services to more readily understand which customers are impacted by outages. This in turn will allow the business to improve its ability to notify customers effected by outages, keeping customers informed of the impact of changes to the network.

Furthermore, this program is "**affordable for me**" because the optimised information management platform will underpin insights and analytics used to operate and configure the network more effectively, as well as optimise maintenance and asset replacement. This will ultimately drive efficiencies, reducing network charges for customers.

Lastly, this program is "**always safe**" as the standardisation of storage of data on network assets ensures that relevant information will be more freely available to network controllers, allowing them to more readily and rapidly respond to disruptions in the network, improving the overall safety of the AusNet Services Distribution network for customers.

3.5   Business drivers

In the face of significant industry disruption resulting in a period of substantial uncertainty and increasing complexity across the industry, AusNet Services has selected key business drivers which set the direction for the business.

These business drivers are:
- Lead energy transformation, embracing change;
- Drive efficiency and effectiveness throughout the portfolio; and
- Generate trust and respect with customers and partners.

All expenditure programs identified and proposed by AusNet Services will have regard to the business drivers and can be directly linked to at least one of these initiatives.

We consider that this program of work will be most relevant to "drive efficiency and effectiveness throughout the portfolio", as it includes initiatives that bring disaggregated sources of customer data into an enterprise-wide integrated system. This allows AusNet Services to more efficiently use information and data from across the network, business and external sources to drive effectiveness from its operations.

4 Options

4.1 Overview

This section provides an overview of a select number of options which may feasibly alleviate the current limitations set out in section 3.2. Each option represents a combination of initiatives within the overall program of work.

Table 4-1 Brief overview of the options

Brief overview of each of the options	
Option 1	Maintain current information management practices and data stores, which results in: • Complex technology landscape, siloed data and information, inefficiencies and increasing running costs to operate the business • Inability to obtain business efficiency and transformation benefits from latest technology innovation
Option 2	Leverage, extend and build upon existing data stores: (develop existing capabilities and tools, as opposed to a new defined and consistent information management platform): • Extend the useful life of existing information management technology • Continue the usage of legacy databases designed with specific, siloed business unit specific information management (no consistency across business) • Missing or no standards restrict scalability and require complete redesign. Making it costly option with no future readiness Legacy technology does not support the anticipated data growth and data processing required to meet the needs of the business into the future
Option 3 (Recommended)	[C-I-C]

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4.2   Option #1 Maintain current practices

This option involves continuing AusNet Services' current information management practices. This will mean investing in AusNet Services' current systems used for IM, and only upgrading specific functions where necessary to meet regulatory requirements and to limit failures. This will continue the existing limitations detailed in section 3.2, namely:

- Lack of data management, impacting business responsiveness, where data is sourced from systems, spreadsheets and documents with no standard patterns or methodologies and is duplicated with no single source of truth

- Effort to deliver insights and analysis is increasingly costly and time consuming, as data is not integrated across systems and processes, limiting the ability to unlock value, with no clear view of where information is stored, managed and accessed leading to loss of employee productivity and poor employee experience. This will lead to the business managing multiple tools and technologies resulting in increased complexity and cost

- There are fragmented skills, capabilities and knowledge within the IM domain, which will continue to result in suboptimal reuse of information, driving inconsistency in modelling

As the industry continues to evolve, more and more data will be produced from across the network. The existing information management practices, limitations and shortcomings outlined above, will only grow and place increasing pressure on scarce resources. The business has an immediate need for improvements to IM to support the DER project and increased uptake, as well as outage management amongst many others. If the IM platform is not developed and current practices are maintained, the business will struggle to meet the objectives of these critical programs and the needs of its customers to effectively and prudently manage the network and ensure the continuity and reliability of supply.

This option does not involve significant improvements to AusNet Services' IM, data management and associated systems and analytics capabilities and as such is not a viable option given the rate of change across the industry and network.

Alignment to objectives

We do not consider that this option achieves any of the intended objectives of this program of work, as shown in **Table 4-2** below.

Table 4-2 Objectives analysis of option 1

Objective		Comments
Data Acquisition	✘	Data will continue to be stored across many disparate and unlinked systems, with increasing dependence on manual intervention. In order prepare critical analysis, the business will require extensive manual effort, validating and preparing data, so that it is in a usable state.
Data Storage	✘	The business will not have a centralised and standardised place to store and manage data, leading to loss of employee productivity and poor employee experience to perform critical data analysis.
Data Processing	✘	Limited standardised tools for sourcing and cleansing data, which will limit the ability of the business to unlock value from the data. This will also make complex analysis of multiple data sources challenging and time consuming.
Data Consumption	✘	Ongoing discrete analysis, with limited advanced tools, typically focused in excel and word presentation. No consistent approach to sourcing and analysing data, creating quality issues and limited ability to leverage past work. Limited ability for existing practices, tools and technology to scale for future industry demand and disruptions.

Data Quality	✖	Many different versions of the same information create no single source of truth, this then requires significant manual effort to prepare and validate data. Limited accountability and data ownership, making decision making more complex and time consuming.
Platform Services	✖	Critical network and business operations data is stored across multiple systems, creating a complex process to source relevant information for analysis.

Costs

This option requires significantly less expenditure than options 2 and 3, as it will only maintain current systems and practices, with no growth in capacity or capability. Given the current limitations outlined above and throughout this document, despite resulting in a cost reduction, the disruption to business and inability to fully leverage the benefits of inflight projects, mean that the cost saving will result in a drop in productivity and inability to meet customer expectations, which is not palatable.

Table 4-3 Costs of option 1

($m)	FY2022	FY2023	FY2024	FY2025	FY2026	Total
Capex						
Opex				[C-I-C]		
Electricity distribution cost						
Total program cost						

Benefits

The table below summarises the benefits associated with this option and quantifies them where appropriate data is available or reasonable assumptions can be applied.

Table 4-4 Benefits of option 1

Benefit
Reduce business ongoing expenses associated with IM, by controlling and limiting expenditure on IM, through limited extensions or upgrades of existing practices. Although this option would result in a lower cost of maintenance and ongoing management, the significant risks and limitations it places on the business and its ability to operate efficiently as outlined in section 3.2, outweigh any cost saving benefits.

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Risks

There are a number of risks associated with the implementation of this particular option, as highlighted in the table below. Based on the consequence and likelihood of each risk, we have rated each of the individual risks blue, green, yellow, orange or red (order of severity). See Attachment 1 – Risk level matrix for additional information on this rating system.

Table 4-5 Risks of option 1

	Risks	Consequence	Likelihood	Risk rating
R1.1	Poor business and asset information and data quality / data integrity	Level 4. Limited ability to utilise existing data to inform decision making	Likely	B
R1.2	Inadequate capacity to cater for growth of volume of data and user data volume	Level 3. Increased operating cost due to time spent on mapping and consolidating data manually	Almost Certain	B
R1.3	Lack of real-time spatial and connectivity information	Level 3. Limited visibility of field crews location and estimated completion	Possible	C
R1.4	Unable to meet higher complexity regulatory requirements, due to difficulty and complex process to acquire relevant information	Level 3. This risk is likely to add additional time to develop regulatory reporting but existing practices and experience will inhibit complete failure to meet any obligation	Likely	B
R1.5	Not meet customer evolving need and preferences	Level 3: Increased operating costs due to time spend on responding to customer communications	Likely	B

As we have identified a large number of high risk options, we consider that overall, this option is rated high risk.

Customer related drivers of expenditure

As discussed, five key customer outcomes have been identified through discussions with customers. The table below highlights how this option will achieve these outcomes. Where we consider that a customer outcome is not directly achievable by the option or irrelevant, 'N/A' is applied.

Table 4-6 Customer related drivers of option 1

Customer outcome	How this program achieves this
Deliver on the basics	N/A - Although this will maintain current practices which do deliver some IM capability to the business, by maintaining current practices as data volumes increase, this will ultimately lead to IM at AusNet Services being insufficiently responsive to business needs
Keep me posted	N/A - As the volume of data coming from the network grows, the business will struggle to keep up and ultimately struggle to plan and manage outages leading to an increase in unplanned and un-notified customer outages

Affordable for me	N/A - Maintaining current practices will be more affordable than developing the IM platform, but its shortcomings will create Increased dependence on manual process and internal resources. So, in the long run it does not result in a more affordable IM solution. It also limits the BUSINESS' ability to unlock value from its data and maximize the utility and maintenance of assets.
Be ready for the future	N/A
Always safe	N/A

Business related drivers of expenditure

As discussed in Section 3.5, there are three business drivers that AusNet Services has identified and is focussing on over the next regulatory period. The table below highlights how this option will input into the initiatives where relevant. Where we consider that a business driver is not directly relevant to the option, 'N/A' is applied.

Table 4-7 Business related drivers of option 1

Business drivers	How this program achieves this
Lead energy transformation, embracing change	N/A
Drive efficiency and effectiveness throughout the portfolio	Existing IM analytics enables operating efficiencies across asset maintenance and management, but its capability is currently limited as outlined in section 3.2.
Generate trust and respect with customers and partners	N/A

4.3   Option #2 – Leverage, extend and build upon existing data store

This option proposes to maintain current IM practices but ensure they have sufficient capacity to run and manage the growth in volume and complexity of data expected over the upcoming regulatory period. Despite being able to cope with the volume and nature of data, the IM systems will still suffer the limitation and inefficiencies discussed in the limitations section (3.2).

Operational and IM systems that continue to acquire data but not archive it appropriately, will respond increasingly slowly over time as the system will have to read more and more data in order to satisfy a request. They will also increase their data storage costs and increase the resources and time it takes to back up the data. This leads to an increase in staff as the systems become less stable and an increase in technology costs in order to maintain a reasonable level of performance. As more data sources from both internal and 3rd party sources are needed by the business this problem and its implications will only become worse with time.

Overall this option is not viable for the following key reasons:
- Limited consistency across the business
- Limited standard, repeatable and scalable standards and practices
- Legacy technology does not support the anticipated data growth and data processing required to meet the needs of the business into the future

Alignment to objectives

We do not consider that this option achieves any of the intended objectives of this program of work, as shown in **Table 4-2** below.

Table 4-8 Objectives analysis of option 2

Objective		Comments
Data Acquisition	✗	• Data will continue to be stored across many disparate and unlinked systems • There will be expanded capacity to store this information, but limited enhancements to manage it, maintaining current dependence on manual and ineffective methods
Data Storage	✗	• The business will not have a centralised and standardised place to store and manage data, leading to loss of employee productivity and poor employee experience to perform critical data analysis

Data Processing	✗	• Although this initiative will scale the ability to process data it will not alleviate the inefficiencies and poor existing practices detailed in this brief, namely:
		   o Limited standardised tools for sourcing and cleansing data, which will, limit the ability of the business to unlock value from the data
		   o This will also make complex analysis of multiple data sources challenging and time consuming

Data Consumption	✗	• As outlined above, data consumption issues detailed in the brief will remain, but the business will expand its ability to consume larger quantities of information, the ongoing issues include:
		   o Ongoing discrete analysis, with limited advanced tools, typically focused in excel and word presentation
		   o No consistent approach, creating quality issues and limited ability to leverage past work
		Limited ability for existing practices, tools and technology to scale for future industry demand and disruptions

Data Quality	✗	• Many different versions of the same information, create no single source of truth • Requires significant manual effort to prepare and validate data • Limited accountability and data ownership, making decision making more complex and time consuming
Platform Services	✗	• Critical network and business operations data is stored across multiple systems • Complex process to source relevant information for analysis

Notwithstanding that Option 2 is a very expensive option, the fact that the data is decentralised, makes this option almost intrinsically unsuited to cost effectively achieve future requirements.

This reflects the dramatic increase in data services which we know the business will require in this forecast period.

Costs

To maintain current IM practices, tools and data sets in line with the expected growth and increasing complexity of data from across the business, AusNet Services will require increased expenditure. There are multiple disparate sources of information, as these sources expand the cost of maintaining them will also continue to grow. Marinating many unique data stores, systems and analytics tools with increasing volume of usage and data will be increasingly expensive.

Table 4-9 Costs of option 2

($m)	FY2022	FY2023	FY2024	FY2025	FY2026	Total
Capex						
Opex			[C-I-C]			
Electricity distribution cost						
Total program cost						

Benefits

The benefits associated with this option are summarised below and quantified where appropriate data is available or reasonable assumptions can be applied.

By being able to handle new data sets as well as growing volumes of data, AusNet Services will be able to predict growth of DER per region and the impact variability in load from DER will have on the network. This will allow the business to ensure customers are able to connect their own DER to the network without impacting the overall continuity and consistency of supply.

By ensuring the IM systems and tools have sufficient capacity to handle growing volumes of data the business will be able to integrate all relevant source data required for operations. This applies to both internal and external data sources. The limitation set out in section 3.2, will still prevail and as more data is added they will only be exacerbated, limiting the business responsiveness to change.

Risks

There are a number of risks associated with the implementation of this particular option, as highlighted in the table below. Based on the consequence and likelihood of each risk, we have rated each of the individual risks blue, green, yellow, orange or red (order of severity). See Attachment 1 – Risk level matrix for additional information on this rating system.

Table 4-10 Risks of option 2

	Risks	Consequence	Likelihood	Risk rating
R2.1	Poor business and asset information and data quality / data integrity	Level 4. Limited ability to utilise existing data to inform decision making, this risk remains. Despite increased ability to capture growing volumes of data, this option does not solve the underlying quality issues outlined throughout the document	Possible	B
R2.2	Inadequate capacity to cater for growth of volume of data and user data volume	Level 3. Increased operating cost due to growing existing storage and processing capacity in line with data growth	Unlikely	D
R2.3	Lack of real-time spatial and connectivity information	Level 3. Limited visibility of field crews location and estimated completion, as existing practices are ongoing and the current limitations remain	Possible	C
R2.4	Unable to meet higher complexity regulatory requirements, due to difficulty and complex process to acquire relevant information	Level 3. This risk is likely to add additional time to develop regulatory reporting, but existing practices and experience will inhibit complete failure to meet any obligation	Possible	C

We consider that overall, this option is rated medium risk. Despite doing very little to solve the complex IM landscape and quality issues, by catering for the growth in volume of data this initiative is able to manage risks associated with IM at AusNet Services.

Customer related drivers of expenditure

As discussed, five key customer outcomes have been identified through discussions with customers. The table below highlights the how this option will achieve these outcomes. Where we consider that a customer outcome is not directly achievable by the option or irrelevant, 'N/A' is applied.

Table 4-11 Customer related drivers of option 2

Customer outcome	How this program achieves this
Deliver on the basics	Although this option will ensure the business can manage and process the volume of data required into the future, it still maintains the decentralised approach to data capture and storage and only improves some of the underlying management of information.
Keep me posted	By ensuring the business can handle the growing volume of data that will be coming from network assets, it will be able to continue to understand those effected by outages and their relevant impact. This in turn allows AusNet Services to notify relevant customers
Affordable for me	Maintaining current IM practices at a larger scale will not control costs, and will see growing overall spend in IM, as inefficient practices are amplified and consume more scarce and

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	expensive resources. This option does not meet customer's needs to maintain an efficient and affordable network.
Be ready for the future	Although this option ensures data growth into the future can be managed and maintained, it does not do so in the most efficient way.
Always safe	N/A

Business related drivers of expenditure

As discussed in Section 3.5, there are three business drivers that AusNet Services has identified and is focussing on over the next regulatory period. The table below highlights how this option will input into the initiatives where relevant. Where we consider that a business driver is not directly relevant to the option, 'N/A' is applied.

Table 4-12 Business related drivers of option 2

Business drivers	How this program achieves this
Lead energy transformation, embracing change	N/A
Drive efficiency and effectiveness throughout the portfolio	• Cost reduction can be driven by proactively monitoring and operating assets, ensuring upgrades are on a needs basis to increase capital productivity, saving on maintenance expenses These advanced analytics tools will also support new opportunities to add automation to existing work practices increasing the efficiency of the workforce
Generate trust and respect with customers and partners	• Advanced analytics will increase reliability by preventing outages through more accurate estimates of when to replace failing equipment

4.4   Option #3 [C-I-C] (RECOMMENDED)

[C-I-C]

Alignment to objectives

[C-I-C]

Table 4-13 Objectives analysis of option 3

[C-I-C]

[C-I-C]

Costs

[C-I-C]

Table 4-14 Costs of option 3

($m)	FY2022	FY2023	FY2024	FY2025	FY2026	Total
CAPEX						
OPEX			[C-I-C]			
Electricity Distribution Cost						
Total program cost						

[C-I-C]

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Benefits

Table 4-15 Benefits of option 3

Benefit
[C-I-C]
[C-I-C]
[C-I-C]

Table 4-15 Benefits of option 3

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[C-I-C]

[C-I-C]

[C-I-C]

Risks

[C-I-C]

.

Table 4-16 Risks of option 3

[C-I-C]

[C-I-C]

Customer related drivers of expenditure

[C-I-C]

Table 4-17 Customer related drivers of option 3

[C-I-C]

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Business related drivers of expenditure

29/ 35
[C-I-C]

Table 4-18 Business related drivers of option 3

[C-I-C]

Business related drivers of expenditure

5   Assessment and recommended option

5.1   Assessment of the options

To identify a recommended option for this program of work, we have selected a number of criteria to assess each of the options. We consider that these criteria represent a comprehensive view of each option, in achieving AusNet Services' business and customer objectives as well as requirements of the AER in ensuring that any expenditure is both prudent and efficient.

The table below summarises our assessment of each of the options against the criteria.

Table 5-1 Summary table of the assessment of the options

	Option 1	Option 2	Option 3
Alignment to objectives			
Costs			
Benefits		[C-I-C]	
Overall risk rating			
Alignment to customer related drivers of expenditure			
Alignment to business related drivers of expenditure			

Based on this assessment, Option 3 is the recommended option. This is because:
- Option 1 creates a serious risk to business operations, as it will struggle to maintain the required levels of service and responsiveness with the expected growth in data volumes
- Option 2 requires significant investment; AusNet Services considers does not represent prudent investment to achieve the outcomes sought. In addition, it will not remedy the current limitations for IM within the business as set out in section 3.2
- Option 3 [C-I-C]

Furthermore, this option is the lowest risk of the three options and aligns to all of the customer drivers and all three of the business drivers.

NPV analysis

AusNet Services has undertaken NPV analysis for each program option to examine the cost effectiveness and value of each option for its non-recurrent programs of work.

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As this program includes 100% non-recurrent expenditure, Table 5-2, below shows the NPV analysis for this program, further demonstrating the cost effectiveness of Option 3, the recommended option.

Table 5-2 NPV analysis ($FY21m)

	Costs (NPV)	Benefit (NPV)	Net benefit (NPV)
Option 1			
Option 2		[C-I-C]	
Option 3			

We have captured six primary benefits for this program:
- The benefits for customers in reduced outages
- Improved staff productivity in responding to outages in an increasing complex environment
- Improved staff productivity in reducing time spent on customer interactions in a more complex world
- Improved employee productivity by improving data and information management to maintain services in the more disruptive network
- Improved employee productivity by improving reliability-based asset management (RBAM) process savings

As Option 1 involves maintaining current information management practices and data stores, we do not consider that there will be any benefits captured with this option above the current baseline. As a result, we have not identified or quantified any benefits for Option 1 for this NPV analysis.

We consider that both Options 2 and 3 will decrease the number of outages incurred by AusNet Services' network and customers. We have conservatively estimated that AusNet Services will reduce its outages by [C-I-C]% cumulatively across the 22-28 period for Option 2. These benefits will result from leveraging and extending the existing data stores to better plan and manage outages and represent a $[C-I-C] million improvement. The reductions for Option 3 are increased to be [C-I-C]% due to the enhanced information platform that will drive more proactive outage planning and management. The resultant cost savings to customers will be $[C-I-C]m.

We have also quantified the benefit of improved employee productivity in relation to improved staff ability to respond to outages. This will be driven by enhanced field information, providing more contextual information that enables their decision making and operational activities. We assume that Options 2 and 3 will both result in a cumulative reduction across the 22-28 period resulting in a cost saving of $[C-I-C]m for Option 2 and $[C-I-C]m for Option 3. This cost savings should be considered relative to increased complexity in the management of future networks.

Also captured in our NPV analysis is the value of productivity savings gained through improved information management technology to enable data driven decision making across the business. We assume that Options 2 and 3 will both result in a cumulative reduction across the 22-28 period resulting in a cost saving of $[C-I-C]m. This cost saving would be offset against the requirement to hire additional staff to manage the increasingly complex network.

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We also consider that there are additional employee productivity savings related broader information management and employees' increased ability to find and manage data. Data is increasing exponentially so it is critical, that AusNet Services manages this process more effectively to continue to provide services using a sustainable cost basis. We have lastly identified additional incremental benefits associated with RBAM process savings and regulatory reporting process savings. We assume that Options 2 and 3 will both result in a cumulative reduction across the FY22-FY28 period resulting in a cost saving of $[C-I-C]m.

Based on our NPV analysis, Option 3 has the largest positive NPV and therefore is our recommended option.

5.2   Recommended option

[C-I-C]

Table 5-3 Confirmation of scope of recommended option

In scope	Out of scope	Dependencies
[C-I-C]		

Below in **Table 5-4**, we have identified techniques or actions to mitigate the risks identified for this option.

Table 5-4 Option 3 risks and mitigation actions

	Risk	Rating	Mitigation
R3.1	Poor business and asset information and data quality / data integrity	C	The implementation of the data governance framework to manage the new data platform will identify where data quality issues exist providing insights so that data quality remediation can occur.
R3.2	Inadequate capacity to cater for growth of volume of data and user data volume	D	The new IM platform will be cloud based to ensure its ability to rapidly scale and change in line with demand and data volumes.
R3.3	Unable to meet higher complexity regulatory requirements, due to difficulty and complex process to acquire relevant information	D	This solution specifically manages increasingly complex regulatory requirements. AusNet Services will also engage with and stay in close communication with the Regulator to understand, at an early stage, what rule changes may be implemented and what may be required of AusNet Services to meet these requirements.

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6 Attachment 1 – Risk level matrix

The figure below shows the risk level matrix to which we have assessed each of risks within the options. Risks of highest concern are rated red, whereas those of lowest concern are rated blue.

Figure 6-1

Likelihood \ Consequence	1	2	3	4	5
Almost Certain	C	C	B	A	A
Likely	D	C	B	B	A
Possible	E	D	C	B	A
Unlikely	E	D	D	C	B
Rare	E	E	D	C	C

Consequence Rating	
5	Catastrophic
4	Major
3	Moderate
2	Minor
1	Insignificant

Overall Risk Rating	
A	Extreme
B	High
C	Medium
D	Low
E	Very Low