< BC – PBC – Cloud Transition >

Cloud Transition
Programme Business Case (PBC)

A Programme Business Case to provide the context, scope and preferred way forward for the widespread transition to cloud hosting for NHS Wales' national digital services.

Document Version	0.2

Status	Draft

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Date approved:	
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STRATEGIC OBJECTIVE	All Objectives apply

WELL-BEING OF FUTURE GENERATIONS ACT	A healthier Wales
If more than one standard applies, please list below: A Globally Resilient Wales A Prosperous Wales A Resilient Wales A More Equal Wales	

DHCW QUALITY STANDARDS	ISO 14001
If more than one standard applies, please list below: ISO 27001	

HEALTH CARE STANDARD	N/A
If more than one standard applies, please list below:	

EQUALITY IMPACT ASSESSMENT STATEMENT	Date of submission:
No, (detail included below as to reasoning)	Outcome:
Statement: Further consideration of the need for an Equality Impact Assessment will be provided following approval of the Business Case and establishment of the Cloud Transition Programme.	

APPROVAL/SCRUTINY ROUTE: Person/Committee/Group who have received or considered this		
COMMITTEE OR GROUP	DATE	OUTCOME
DHCW Execs	04/09/2024	Approved for submission to Programme Oversight Management Board
DHCW Programme Oversight Management Board	12/09/2024	Endorsed (pending minor revisions) for submission to DHCW SHA Board
DHCW SHA Board	26/09/2024	

IMPACT ASSESSMENT	
QUALITY AND SAFETY IMPLICATIONS/IMPACT	Yes, please see detail below
	Numerous factors relating to quality are covered in the Business Case document and will be further explored by the Cloud Transition Programme when established.
LEGAL IMPLICATIONS/IMPACT	No, there are no specific legal implications related to the activity outlined in this report.
FINANCIAL IMPLICATION/IMPACT	Yes, please see detail below
	The document contains and Economic Case and Financial Case which detail the cost, accounting implications and affordability.
WORKFORCE IMPLICATION/IMPACT	Yes, please see detail below
	Transition to cloud services will require re-skilling of elements of the DHCW workforce and this has been considered in the Economic Appraisals and Costs
SOCIO ECONOMIC IMPLICATION/IMPACT	Yes, please detail below
	Assessment of Cloud Migration on Environmental and Sustainability objectives is detailed in the Business Case

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1 DOCUMENT HISTORY

1.1 REVISION HISTORY

Date	Version	Author	Revision Summary
05/09/2024	0.1	Alex Percival, Mark Cox, and Carwyn Lloyd-Jones	Initial draft for submission to the DHCW Programme Oversight Management Board
12/09/2024	0.2	Alex Percival, Mark Cox, and Carwyn Lloyd-Jones	Revision of draft for submission to DHCW SHA Board, rename of Programme/Business Case to Cloud Transition Programme

1.2 REVIEWERS

This document requires the following reviews:

Date	Version	Name	Position
12/09/2024	0.1	N/A	Review by DHCW Programme Oversight Management Board and Endorsement (pending minor revisions) for submission to DHCW SHA Board

1.3 AUTHORISATION

Signing of this document indicates acceptance of its contents.

Author's Name:	
Role:	
Signature:	X_____ Author

Approver's Name:	
Role:	

Signature:	X Approver

1.4 DOCUMENT LOCATION

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2 EXECUTIVE SUMMARY

2.1 INTRODUCTION

This Programme Business Case (PBC) seeks approval to invest a total of £4.004m of capital funding between 2025/26 and 2027/28 and average annual revenue funding of £2.094m from 2025/26 (£18.9m over the term of the business case) for the migration of its national digital services to a cloud hosting arrangement, and the ongoing support of those services in the cloud. It seeks to provide a clear strategic outline and rationale to justify this approach, as well as describing the exploration of options that will be considered as part of the decision-making process and the high-level Programme and Project activity that will be required to deliver the preferred way forward.

2.2 STRATEGIC CASE

2.2.1 THE STRATEGIC CONTEXT

DHCW published its Organisational Strategy in 2024. The document sets out the organisations approach to 2030, stating its vision to provide a world leading digital service that empowers people to live healthier lives. There is significant focus on the ability for digital and data technologies to transform how health and care services are delivered, supporting prevention and self-management as well as supporting the use of data to improve the delivery of health and care services.
The Strategy includes five missions, these are:

- Mission 1: Provide a platform for enabling digital transformation
- Mission 2: Deliver high quality products and services
- Misson 3: Expand the digital health and care record and the use of digital to improve health and care
- Mission 4: Drive better values and outcomes through innovation
- Mission 5: Be the trusted strategic partner and a high quality, inclusive and ambitious organisation

Migrating national digital services into a cloud hosted environment will support DHCW in the delivery of all the above missions, through better and more effective use of data and technology to support services as well as reducing the organisation's carbon footprint and supporting the development of new skills and capabilities within DHCW. This approach also supports DHCW in the achievement of its Wellbeing Objectives in line with the Wellbeing of Future Generations Act 2015.

In addition to the DHCW Organisational Strategy, the DHCW Cloud Strategy was published in 2022 and sets out a vision for how DHCW could operate its services from cloud hosted platforms in the future.

2.2.2 THE CASE FOR CHANGE

DHCW operates two physical, geographically resilient data centres , Data Centre 1 (DC1) and Data Centre 2 (DC2), these two sites host around 80% of DHCW's infrastructure estate, the remainder is already hosted within a cloud environment but this is predominately for test and development capacity and not for the running of live national services.

The current data centre provision means that DHCW is required to use capital expenditure to fund equipment and appliances and this results in significant time and effort to develop investment cases, procure equipment and to maintain and support legacy equipment. In addition, storage requirements mean that additional capacity must be regularly procured to meet demand.

As a modern digital organisation, the expectations in terms of response, pace and dealing with greater variations in demand mean the benefits from adopting Cloud solutions are more attractive. Such approaches align with a more product orientated service model and enable greater options in relation to the service model and support but also support the new open architecture and data access philosophies being adopted by the organisation.

In addition, there are upcoming compelling events which make a shift to a cloud-based hosting model more attractive. The contract for DC1 is due to expire in June 2026 and, having undertaken a data centre transition programme in the 2023/24 financial year to move halls within DC2 due to a legacy contract expiring in that facility, it is unlikely that there will be an appetite (or funding) to perform a similar migration in DC1.

Digital inflation is also placing pressure on the organisation. Post covid, costs for licences and services associated with the physical infrastructure have also increased, placing additional revenue pressures on top of capital demands. While moving to cloud hosted infrastructure is likely to result in an increased revenue spend for the organisation, it allows for an increased use of open-source technologies, which in turn will reduce the reliance on proprietary software licencing in future.

2.3 ECONOMIC CASE

2.3.1 THE LONG LIST

The long list of options was generated considering scope, technical delivery, commercial arrangements, and implementation approaches. Each option was reviewed against the identified investment objectives and critical success factors to produce a short list of options.

SCOPING OPTIONS (SCO)

1. SCO1 – BAU - This option maintains the current status quo of services being delivered predominately on premise with a rolling programme of IT Lifecycle Management (ITLM) to replace and upgrade infrastructure as it ages and goes out of support.
2. SCO2 – Do Minimum – This option would migrate all DHCW services into cloud environments using a mainly Infrastructure as a Service (IaaS)/Re-Host approach combined with simple Platform as a Service (PaaS) adoption to provide basic optimisation. For services unable to migrate to the cloud, these would remain on premise until they are retired.

3. SCO3 – Hybrid- Migrate all DHCW services into cloud environments using a mainly IaaS/Re-Host approach combined with greater PaaS/Function as a Service (FaaS) utilisation to provide enhanced optimisation, replatforming relevant solutions to provide additional benefits of cloud native services. For services unable to migrate to the cloud, these would remain on premise until they are retired.
4. SCO4 – IaaS VMWare Migration - To avoid data centre transition/renegotiation costs in DC1, migrate all DC1 based services into an IaaS VMWare solution. The next step would then be to replatform services to migrate to a Cloud Native solution.
5. SCO5 – Do Maximum - Refactor all DHCW services to cloud native solutions.

TECHNICAL SOLUTION OPTIONS (TSO)

1. TSO1 – Single Cloud Provider - This option would seek to use a single cloud provider (CSP) solution for the delivery of all DHCW services in the cloud.
2. TSO2 – Use Existing Cloud Providers - Utilise existing DHCW commercial agreements for cloud hosting and migrate services according to their requirements to either cloud hosting provider.
3. TSO3 – Procure Additional Cloud Provider Provision - Undertake procurement exercises to provide services with a full scope of Cloud Service Providers (CSPs), this would allow products to utilise the cloud hosting provider that best suited their needs.

SERVICE DELIVERY OPTIONS (SDO)

1. SDO1 – Use Existing DHCW Resources - This option would utilise resources currently existing in DHCW to deliver the scope of the Cloud Transition Programme.
2. SDO2 – Hybrid Approach - Use a mix of existing DHCW resources, new hires to address skill gaps and specialist external resources to support the migration, optimisation and architecting of services
3. SDO3 – Outsource Delivery - This option utilises external specialist resources from third parties to deliver services in the cloud.

IMPLEMENTATION OPTIONS (IMP)

1. IMP1 "Big Bang" Approach - The "big bang" approach to migration would mean services being made ready to move to the cloud and then a full go-live of national services in the cloud over a short space of time.
2. IMP2 – Phased Approach - This option would seek to build on existing scoping activities to identify services in order of readiness to support migration and develop a phased plan of "implementation waves" for services moving into the cloud.

2.3.2 THE SHORT LIST

There are three shortlisted options identified for economic appraisal. As there was only one proposed option for the technical solution, service delivery and implementation options, the economic appraisal will effectively be constrained to the three possible/proposed scoping options, plus Business as Usual. These options are:

- BAU: On-Premise – These are estimated costs based on DHCW **retaining** services in two data centres and operating services in the way that it currently does.
- Option 1: Migrate and Optimise - in this option, cloud ready services are **rehosted** in waves. There are residual on premise costs as those services unsuitable to migrate into the cloud are **retained** on premise until they are **retired**, **repurchased** or **refactored**. Programme costs do not include resources required to **replatform** DHCW Services.
- Option 2: Migrate, Optimise and Re-Platform (Hybrid approach) - this is the preferred solution whereby services that are cloud ready are **rehosted** as per Option 1, but additional programme resource is focused on **replatforming** services to maximise benefits and efficiencies associated with cloud hosting

such as using Open-Source products.

- Option 3: Relocating to an IaaS VMWare Solution – this option focuses on attempting to close Data Centre 1 at the end of the contract in 2026 by relocating to an IaaS VMWare solution. Services will then be rehosted and optimised from this VMware solution and Data Centre 2, as per Option 1.

None of these shortlisted options include the refactoring (rearchitecting) of systems. Where this is required, individual business cases will be developed, examples may be for DHCW's integration engine or for a replacement patient administration system.

2.3.3 KEY FINDINGS

The economic appraisal determined the likely cost of each option. The figures below provide comparison over 10 years.

Option	Capital £000's	Revenue £000's	Total £000's	Efficiencies £000's	Net Cost £000's	Net v BAU £000's
BAU	28,609.0	110,970.4	139,579.4	0.0	139,579.4	-
Option 1	8,489.3	116,901.2	125,390.5	-16,644.1	108,746.4	-30,833.0
Option 2	11,211.7	108,991.9	120,203.6	-26,067.5	94,136.1	-45,443.3
Option 3	14,632.6	126,207.5	140,840.1	-16,888.8	123,951.3	-15,628.1

2.3.4 OVERALL FINDINGS: THE PREFERRED OPTION

The result of the options appraisal activity is that the preferred way forward is for the Cloud Transition Programme to proceed based on a Migrate, Optimise and Re-platform approach, utilising the existing commercial agreements for cloud hosting, a phased implementation and using a hybrid delivery model which will use existing DHCW, incorporate recruitment and where required, buy in skills and expertise from third parties.
While there are marginal differences in the environmental impact of the three cloud options explored in this section, there is a marked reduction in carbon footprint compared to the on-premises scenario. This evidences that cloud migration is the most advantageous approach from an environmental perspective and the preferred way forward reflects that.

From a financial perspective the preferred option generates significant efficiencies (totalling £26m over the term) with an estimated cost avoidance of £19.4m when compared with the baseline BAU option.

2.4 COMMERCIAL CASE

To meet its requirements, DHCW will be required to utilise existing commercial Agreements executed by DHCW's Commercial Services Team.
As part of its wider organisational strategy, DHCW has built capacity within its extant Agreements via two Cloud Service Providers (CSPs) to call off cloud hosting and associated services. However, it must be noted that all call offs must be made in accordance with the constraints of each agreement. These agreements have already been conducted in line with Procurement Regulations (Public Contract Regulations 2015) and have been approved

by Welsh Government and the DHCW Board. As set out in the Economic Case, the preferred way forward for the Cloud Transition Programme will be to make use of these existing arrangements. The advantage of utilising this approach is that these are existing routes to market that provide demonstrable value for money for the organisation and will allow DHCW to move quickly to "scale up" its cloud hosting capability with both CSPs.

In addition to the CSPs, DHCW will need to procure professional services to support the Cloud Transition Programme. Whilst there is already a body of technical knowledge within the organisation in this area, it is anticipated that additional specialist skills and expertise will be required to be outsourced to undertake the following activities:

- to facilitate the migration of certain services into the cloud
- to provide training and support for staff in new technologies
- to offer general consultancy and advice on best practice for cloud adoption, migration and optimisation.

Due to the broad range of potential requirements, DHCW will probably need to use a hybrid procurement approach to secure its requirements to support the right skills and expertise to ensure successful delivery of the Programme. These include "calling off" its extant Resourcing Framework via a series of "work-packages" to securing any additional requirements that cannot be fulfilled by this framework via mini competition processes via Crown Commercial Services, National Procurement Services and NHS SBS framework agreements. It must be noted, that to ensure that value is secured via contractual arrangements they will be subject to:

- DHCW's governance arrangements.
- appropriate contract management and supplier relationship management practices are deployed.

2.5 FINANCIAL CASE

2.5.1 FUNDING ARRANGEMENTS AND PROPOSED SOURCES

This business case seeks approval for **£4.004m** of central capital funding from Welsh Government. This funding will be utilised for the Programme costs to deliver the service transformation required for the preferred way forward. This will be supplemented by **£7.208m** of DHCW discretionary capital being allocated to fund migration activity.

In addition, there is a further requirement for additional revenue funding to support the ongoing delivery of services from the cloud. The business case seeks approval from Welsh Government for an average additional **£2.094m** of revenue funding on an ongoing annual basis (**£18.9m over term**) with DHCW providing support via internal budgets (**£77.704m**) and savings target of **£12.434m** over the period.

2.5.2 OVERALL AFFORDABILITY

The summary requirement and proposed source of funding is presented in the table below:

Expenditure	Total £000's
Capital	
Migration	8,239.4
Cloud Connectivity Costs (NaaS)	22.3

Expenditure	Total £000's
Checkpoint Firewalls	2,640.0
Lifecycle Refresh	310.0
Total Capital costs	**11,211.7**
Revenue	
Migration	**800.0**
DC Facilities	**8,477.0**
Cloud Consumption	**67,345.9**
Software Licences	**9,475.6**
Hardware Operational Costs	**22,893.4**
Total Revenue Requirement	**108,991.9**
Total DHCW costs	**120,203.6**
Funded By	**£000's**
Capital	
DHCW Discretionary Allocation	-7,207.5
Welsh Government Transition Support	-4,004.2
Total Capital Funding	**-11,211.7**
Revenue	
DHCW Revenue	-77,704.3
Cash Releasing Benefits	-12,433.6
Welsh Government Funding Requirement	-18,854.0
Total Revenue Funding	**-108,991.9**
Total Funding	**-120,203.6**

2.6 MANAGEMENT CASE

The Cloud Transition Programme (CTP) Team will need to be established. Due to the complexities and time constraints, it will require significant capabilities and experience in Cloud transformations and will need both internal SMEs as well as 3rd party partners to support the delivery. It is proposed that the team is made up of a blend of in-house resources that are allocated full time and expert consultants. A suitably senior Programme Lead and Project Managers will be appointed to lead this programme.

The CTP will utilise a 'putting people first' approach and will utilise training and third-party expertise to support DHCW staff in the development and accreditation of skills in the new technologies and ways of working that a transition of national digital services to the cloud necessitates.

The programme will be structured by a series of projects to transfer products, services, data and information to the cloud. It will also require a change management focus throughout. A series of projects will set up to manage this in priority order, as determined by the CTP board. Archiving and decommissioning are dependent on the transfer of services being complete and once complete will enable programme closure.

It should be noted that for all products and services, the treatment has been identified through a series of workshops. The majority will be rehost or replatform, with a lesser proportion being refactor or repurchase. As the programme progresses, treatment options will be confirmed once a more detailed assessment has been completed.

2.7 RECOMMENDATION

It is recommended that this Programme Business Case is approved, thereby enabling progress towards further adoption of, and transition to, cloud hosting services within DHCW to support digital service transformation and the delivery of better, more integrated care for NHS Wales.

3 INTRODUCTION

This Programme Business Case (PBC) seeks approval to invest a total of £4.004m of capital funding between 2025/26 and 2027/28 and average annual revenue funding of £2.094m from 2025/26 (£18.9m over the term of the business case) for the migration of its national digital services to a cloud hosting arrangement, and the ongoing support of those services in the cloud. It seeks to provide a clear strategic outline and rationale to justify this approach, as well as describing the exploration of options that will be considered as part of the decision-making process and the high-level Programme and Project activity that will be required to deliver the preferred way forward.

4 STRUCTURE AND CONTENT OF DOCUMENT

This PBC has been prepared using the agreed standards and Five Case Model format for business cases, as set out in Welsh Government's Better Business Case approach. The Five Case Model comprises the following key components.

The **Strategic Case** – setting out the strategic context and case for change, together with the anticipated benefits of the Programme.

The **Economic Case** – demonstrating that the Programme has selected a proposed way forwards which meets the existing and future needs of the service and is likely to optimise value for money.

The **Commercial Case** – outlining any proposed procurement and what a deal may look like.

The **Financial Case** – highlighting funding required and any risks and issues around affordability of the Programme.

The **Management Case** – demonstrating that the Programme can be delivered in accordance with best practice.

5 STRATEGIC CASE

5.1 ORGANISATIONAL OVERVIEW

Digital Health and Care Wales (DHCW) was established in April 2021 as an NHS Wales Special Health Authority for the provision and delivery of digital services for health and care. DHCW operates over 100 services that are used by frontline NHS staff to provide care to their patients. These services are hosted either on premises in two geographically resilient data centres, or more recently, using cloud hosted platforms.

In addition, DHCW is starting to provide patient facing services to enable citizens of Wales to better manage their own health by providing access to their own digital health record. DHCW is also working to improve the use of data via the National Data Resource, to provide better insights and intelligence on how care can be improved. In addition, DHCW works with Welsh Government and the UK Government's National Cyber Security Centre to protect its networks and data against cyber threats, advising the Health Boards and other stakeholders on best practice and due diligence to ensure that threats are appropriately managed.

5.2 BUSINESS STRATEGIES AND AIMS

5.2.1 DHCW STRATEGY

DHCW published its Organisational Strategy in 2024. The document sets out the organisations approach to 2030, stating its vision to provide a world leading digital service that empowers people to live healthier lives. There is significant focus on the ability for digital and data technologies to transform how health and care services are delivered, supporting prevention and self-management as well as supporting the use of data to improve the delivery of health and care services.
The strategy sets out five missions:

Mission 1: Provide a platform for enabling digital transformation

This mission sets the objectives for how digital transformation can be supported by making changes to the infrastructure, data platform and digital architecture. The strategy recognises the importance of Cloud in the providing savings against the cost of infrastructure, improving cyber security and the reduction of complexity across DHCW's services.
In addition, the strategy seeks to accelerate cloud adoption and transition and the role that cloud has to play in enabling scalability of capacity for data stores and using AI to provide better data insights and support decision making.

Mission 2: Deliver high quality products and services

This mission focuses on improving the delivery of DHCW's digital services to support health and care. This includes more linkage of records, the delivery of a single all-Wales Electronic Patient Record and the improved flow of data into the National Data Resource.
This integration and linkage of services can be facilitated by the transition to cloud, allowing services to be designed and built in a more streamlined manner.

Misson 3: Expand the digital health and care record and the use of digital to improve health and care

Mission 3 expands on mission 2 and seeks to maximise the use of the digital health and care by a single record being used across Wales. Again, the transition to cloud technology can help facilitate this, by providing standardised platforms to support the delivery of the components of the single record, supporting more effective flows of information.

Mission 4: Drive better values and outcomes through innovation

This mission provides objectives related to research and innovation to improve the quality of care. The prime focus is on the delivery of a secure data environment for research and the creation of a data insights service. Again, through adopting more services in the cloud, DHCW will be able to leverage AI and Machine Learning more effectively to support the ambitions described in this mission.

Mission 5: Be the trusted strategic partner and a high quality, inclusive and ambitious organisation

Objectives in this mission area include the development of staff, reducing the organisation's carbon footprint and delivering a secure and stable financial position. Through driving cloud adoption and transition, DHCW will be able to leverage new technologies, supporting the development of staff to learn more about new ways of working facilitated by the cloud, as well as accessing training provided by the Cloud Service Providers. In addition, economies of scale mean that the Cloud Service Providers can more effectively explore routes to net

zero and reductions in carbon footprints than DHCW can through using the current data centres. The scalability of cloud services and the ability to increase or reduce capacity based on demand will enable DHCW to be more flexible in responding to the needs of its partner organisations across Wales as well as providing the ability to manage costs in real time and facilitate the development of sustainable models of funding.

5.2.2 WELSH GOVERNMENT POLICY/LEGISLATIVE FRAMEWORK

DIGITAL AND DATA STRATEGY FOR HEALTH AND SOCIAL CARE IN WALES (2023)

Set in the context of the 75th anniversary of the NHS, Welsh Government sets out its vision for how digital and data will help underpin the modernisation of NHS Wales provision of services over the coming years. Central to the policy is a requirement for collaboration to create new ways of working and leverage new technologies. The policy also sets out three key aims (with supporting missions) to help Wales "get ready for digital". While these are extensive and cover a wide range of areas across Health and Social Care and for the citizens of Wales, there are several areas that specifically seek a greater adoption and utilisation of cloud technologies. For example, *Mission 1 - digital skills* sets out the requirement for the development of Centres of Excellence (CoEs) for the use of cloud technologies, and there is a clear emphasis on using training and expertise to help ensure that the workforce has the appropriate skills and capability for the future. As part of the Cloud Transformation Programme, DHCW will support training for its staff to use the new technologies that transition to the cloud will provide.

Mission 4 – digital infrastructure and connectivity provides clear strategic direction that digital services in use across NHS Wales should be transitioned (where appropriate) to the cloud, making as much use as possible of cloud-native architecture. By establishing a Cloud Transition Programme DHCW will be able to realise the ambitions of the Welsh Government and support its partner organisations in ensuring that the technology used across NHS Wales is fit for purpose, future proof and built on the best possible foundations for ensuring reliability, resilience, and information security.

WELLBEING OF FUTURE GENERATIONS ACT 2015

Welsh Government has recently included Digital Health and Care Wales as an additional public body under the Wellbeing of Future Generations Act 2015. In response DHCW has created its Wellbeing Objectives towards achieving the aims of the Act in ensuring that public bodies in Wales think about the long-term impact of their decisions, to work better with people, communities, and each other and to prevent persistent problems such as poverty, health inequalities and climate change.

While not directly applicable to all of the Wellbeing Objectives, there are several areas that a transition of services to the cloud will support. These are set out below:

A Globally Responsible Wales

A globally responsible Wales improves the economic, social, environmental and cultural wellbeing of Wales. In response to this DHCW has developed sustainability and decarbonisation strategies, the Environmental Impact Appraisals set out in section 6.11.3 below demonstrate that a transition of services to cloud represent substantial reductions in DHCW's environmental impacts and as a result demonstrate commitment to the ambitions of the Act.

A Prosperous Wales

A prosperous Wales uses resources efficiently in an economy which generates wealth and employment opportunities. Transition of services to the cloud supports this objective by optimising the performance of NHS Wales Digital Services in order to consume resources more efficiently. In addition, a programmatic approach to transitioning services to the cloud provides for opportunities for DHCW staff to develop new skills and capabilities in cloud technologies.

A Resilient Wales

A resilient Wales maintains healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change. By transitioning services to the cloud, DHCW will be more able to rapidly scale up digital solutions to meet the demands of the service, it will also be able to utilise the latest technologies in preventing cyber crime and providing information security.

A Healthier Wales

A healthier Wales wants everyone to have long, healthy, happy lives with access to the right health and social care services. Transition to the cloud supports improved use of technology and data to ensure that everyone in Wales can get the right care, in the right place, at the right time.

A More Equal Wales

A more equal Wales with a socio-economic duty, tackles inequality at the heart of decision making, and enables people to fulfil their potential no matter what their background or circumstances. Transition to cloud supports the prioritisation of talent and succession planning, aligning to more standardised skills frameworks such as the Digital, Data and Technology Profession (DDAT) framework, which will embed cloud skills into our future workforce planning.

5.3 CASE FOR CHANGE

5.3.1 EXISTING ARRANGEMENTS

DHCW currently operates two on-premises data centres, hosting data and systems that are used by DHCW, and for services across NHS Wales. Currently, this equates to circa 2,400 servers. Currently, around 400 servers are hosting using public cloud providers, meaning that just under 20% of DHCW servers are hosted in a cloud environment.

DHCW's current data centre capacity has been built using capital investment over time, and there will be some continued capital investment as DHCW will continue to need a location to host equipment for providing network connectivity between NHS Wales and other networks such as the internet and HSCN (Health and Social Care Network used by NHS England). To operate its data centres, DHCW is supported by £8.618m of annual revenue costs, which consist of staff, service and maintenance contracts, licencing, and energy consumption.

Due to the reliance on capital expenditure to fund equipment and appliances to run DHCW's services, a great deal of time and effort is expended on the development of business cases, the procurement of equipment and ongoing maintenance and support of legacy/aging equipment. In addition, storage demands increase on an annual basis and DHCW is required to maintain storage servers, procuring new capacity on a regular basis to ensure that this demand continues to be met. DHCW is also responsible for the maintenance of the servers that operate its services and it incurs both direct (via replacement, support and maintenance contracts) and indirect (via DHCW staff being required to patch servers, or replace broken components) costs.

DHCW has been gradually migrating its digital services from the data centre to cloud since 2020. However, in 2017 NHS Wales Informatics Service (now DHCW) was an early pilot adopter of the Microsoft Office 365 cloud service, alongside two other NHS Wales organisations. As part of this implementation, it adopted Microsoft Azure Active Directory (a cloud-based authentication and identity management service) as a supporting technology. Subsequently, in addition to the wide-scale rollout of Microsoft 365 technologies across the organisation, DHCW has adopted a range of further Software as a Service (SaaS) services. Further to this, it has migrated its former on-premises DMZ services (public facing) to the cloud, including Mura Content Management Systems and these use a combination of Platform as a Service (PaaS) and Infrastructure as a

Service (IaaS) implementations. In 2021, DHCW migrated its on-premises Test and Development environments to a cloud-hosted IaaS VMWare platform (Azure VMware Solution - AVS). Recently, DHCW has sought to optimise its Test and Development environments and is currently working through a migration plan to move the environments from the AVS into an Azure native solution. Finally, it has deployed a variety of other hybrid SaaS/PaaS/IaaS services to meet specific needs (e.g., the Test, Trace and Protect Service supporting the Welsh Government's pandemic management strategy the Terminology Service component of the Welsh Reference and Terminology Service, the proof-of-concept API Management and Developer Portal, various integration services with third-party cloud services).

As a modern digital organisation, the expectations in terms of response, pace and dealing with greater variations in demand mean the benefits from adopting Cloud solutions are more attractive. Such approaches align with a more product orientated service model and enable greater options in relation to the service model and support but also support the new open architecture and data access philosophies being adopted by the organisation.

5.3.2 BUSINESS NEEDS

Contract Expiry – Data Centre 1

DHCW currently operates two physical, geographically resilient data centres , Data Centre 1 (DC1) and Data Centre 2 (DC2), In FY 2023/24, due to the impending expiry of its existing contract in DC2, DHCW completed a project to transition its services between its old halls in DC2into a new facility within the same building. This required the procurement of new networking equipment, a new facility itself and required expenditure for staff and third-party services to support the delivery of the project. The new DC2 contract contains provision for the facility until 2030, and if the status quo is maintained a similar project would need to be undertaken to transition infrastructure to a new location. The overall project costs for moving within DC2 were in the region of £3m and it is expected that these would be incurred again.

More pressingly for DHCW, the contract for DC1 is due to expire in June 2026. There is currently no provision to extend the contract within the Agreement with the DC1 supplier, so exploration of robust contracting options will be required and a risk-based decision may need to be taken in relation to modifying the contract outside its existing term. It is likely that this will require further negotiation with the DC1 supplier which may be subject to less preferential terms and/or costs. Conversely if this approach is deemed "too risky", DHCW will need to transition its infrastructure to a new location.

Digital Inflation

Post Covid, DHCW have encountered an increase in its costs for licensing and support for the services that it operates. In the financial years 2023/24 and 2024/25 numerous contracts have been re-negotiated and much higher prices have been provided by suppliers. Two of DHCW's most high-value infrastructure contracts are for Citrix Virtual Apps and Desktop licences (CVAD) and VMware vSphere.

- CVAD: Current contract is £624,000 per annum. The new contract (from Dec 2024) will be £913,760 per annum, despite a 10% reduction in the overall number of licences required.
- VMware: The previous contract was £540,000 per annum. Costs from a tender undertake in August 2024 were £1,190,934 (1-year contract), or £695,000 (3-year contract) for the same number of licences.

DHCW is undertaking a range of activities to reduce these costs but expects that this trend will continue with these and other suppliers in future years, and while there are some costs that will be unavoidable, shifting services to cloud may help to avoid upcoming licensing and capital expenses.

5.3.3 POTENTIAL SCOPE AND SERVICE REQUIREMENTS

The DHCW Organisational Strategy sets out the ambition to "move all our live services to the cloud and close our datacentres" by 2030. This is a bold ambition and provides a very broad scope for what the future service requirements may be. In practical terms, this will be scaling back the footprint in the current data centres to the point where they mostly contain just the networking equipment to provide connectivity between NHS Wales organisations and other networks. As such they will cease being data centres and will become communication hubs.

Engagement with stakeholders across DHCW has resulted in the following considerations for what the potential service requirements for cloud transition could be:

- Any Cloud Service utilised by DHCW should allow for the turning on and off of functionality in order to provide flexibility of costs and support the strategic objective of a secure, long-term financially stable position.
- Cloud Services used by DHCW should provide substantial assurance that data is handled, managed and protected in line with the highest possible standards of cyber security and that utilises innovative approaches to combating the threat of cybercrime.
- Cloud provision will allow DHCW to adhere to the principle of "fail fast, scale fast" by providing the flexibility to quickly host pilot applications for testing in real world scenarios. It should also be responsive enough to allow DHCW to rapidly deploy services at scale following successful conclusion of first of type and proof of concept testing.
- Cloud services should provide resilience and high availability, any disruption to services within the cloud service providers' data centres should be imperceptible to users.
- Cloud transition should also enable DHCW to optimise the delivery of its services on whatever cloud platform is used. New technologies should be available and actively deployed to ensure that DHCW maximises its investment and realise the efficiencies related to hosting services in the cloud.
- Cloud will provide an opportunity for DHCW to automate more of its processes (such as server builds), providing efficiencies for DHCW technical staff to focus on higher value activities.
- By partnering with cloud service providers, DHCW staff should be able to access free (or discounted) resources and training to support the migration of its services to the cloud, make improvements to services and develop skills in new technologies and innovations as these are made available by those providers.

5.3.4 MAIN BENEFITS

Cloud transition will enable DHCW to realise several tangible benefits. A summary of some of the high-level anticipated benefits are described below.

Delivers more efficient ways of working and a shift to high-value activities

The current DHCW hosting model puts a significant burden on staff across operational teams in terms of routine maintenance and other low-level management tasks, such as patching of applications and operating systems, and replacement of broken hardware components. By offloading responsibility for these activities to the Cloud supplier or to the greater automation capabilities brought about by Cloud transition, these staff can be made available to focus on more productive activities. This will enable the shift to multi-functional product teams which will have an agile, end user focused approach to product delivery.

Carbon emissions and environmental impact

Scale also allows public cloud suppliers to invest in, and make available, more modern, energy-efficient infrastructure, and suppliers have made commitments to being powered using 100% renewable sources in the very near future along with investment in carbon offsetting practices. These, combined with the opportunity to

use improved orchestration toolsets to marry service capacity with demand, will permit DHCW to reduce its overall environmental footprint. As part of our Decarbonisation Strategic Delivery Plan produced in 2021, DHCW has identified improvement targets relating to procurement and the efficiency of data centre consumption and it is envisaged this will be an ongoing requirement that will need to be addressed in the medium and longer term.

Ability to adapt to changes in demand

One of the major disadvantages with hosting physical infrastructure in data centres is that managing changes in demand is difficult, increasing capacity often requires additional capital investment and if demand for services reduces, it is difficult to avoid the sunk costs associated with hosting hardware that is running below its anticipated capacity. Cloud services, with appropriate management, will allow DHCW to rapidly scale services up if there is an increase in demand (as was evidenced during the COVID-19 pandemic) or conversely, to scale capacity down when usage is low (as may be the case at weekends or out of hours). It is possible that this also may be able to be automated, meaning that changes could be made in near-real time to afford DHCW the ability to respond effectively to changing demand.

Enhanced Collaboration

The shortfalls identified by the Welsh Government Architecture Review of 2019 indicate a clear determination to make data resources available to partner organisations in a much more consistent and standards-based manner than previously. Transition to Cloud Services is a key driver to achieving this, both through implementation of technologies such as API Management, but also through further deployment of secure cloud-based data sharing, data analysis and artificial intelligence (AI) capabilities.

Capital Cost Avoidance

Widespread adoption of Cloud services will allow, over time, a corresponding reduction in need for on-premises infrastructure (e g data centre rack “footprint”) This in turn will permit savings to be realised in the large costs of procuring and maintaining these environments so long as the most appropriate cloud technology/services are adopted, and efficient processes are put in place for driving value from the cloud. Furthermore, the transition to Cloud services will provide opportunities for reduced reliance on capital funding as a means of supporting the organisation’s infrastructure. While this model aligns well to a project-based organisation, it is increasingly the case that DHCW’s services are achieving maturity and so there is consequently a need for a more reliable funding model than capital to support ongoing service delivery.

Increased reliability and availability of services

DHCW has been largely successful in delivering highly available, reliable application services to its clients. However, this has required (and continues to require) significant investment to achieve on premises deployments. Many of the technological approaches to delivering this are routinely available in the Cloud, where the advantages of scale are such that the larger Cloud providers can meet and exceed extremely demanding reliability and availability SLAs.

Potential benefits

BEN1	A reduction of DHCW’s overall capital expenditure on server and storage hardware of £1.5m by end of FY 2027/2028.

BEN 2	Increased non-Microsoft patching compliance[1] for the DHCW server estate by end of FY 2027/28
BEN 3	Improved cyber security through the deployment of enhanced cyber security tools on all cloud hosted services by end of FY 2027/28.
BEN 4	Creation of a suite of automation tools for applications to use to provision cloud services
BEN 5	Reduction in DHCW carbon footprint by at least 10% by FY 2027/28
BEN 6	Creation of 15% efficiency savings by FY 2027/28.
BEN 7	Reduced reliance on physical data centre estate, avoiding future requirements for data centre migration activity from 2030 onwards.
BEN 8	More accurate and timely information on the infrastructure costs to support service planning and service costing exercises.
BEN 9	Opportunity to align with Welsh Government accountability conditions of moving towards a more revenue-based cost model and reduce reliance on capital.

5.3.5 MAIN RISKS

The main risks and countermeasures/mitigation are as follows:

Main Risk	Countermeasure/Mitigation
IF DHCW is unable to deliver migration of services to the cloud THEN there will be a requirement for additional capital expenditure RESULTING IN cost pressures on the organisation.	Establishment of Programme to deliver migration of services into the cloud. Business Case development to secure resources for cloud migration.
IF DHCW have underestimated the costs of migrating to the cloud THEN there will be a requirement to find alternative sources of funding RESULTING IN cost pressures on the organisation	Extensive investigation of required costings to support business case development. Exploration of affordability and funding requirements.
IF DHCW does not appropriately scope the technical suitability of services moving to the Cloud THEN there may be services that must remain on prem indefinitely RESULTING IN a failure to achieve the strategic ambitions of the organisation	Engagement during business case development with the service leads to understand the cloud migration strategies associated with each service (7R workshops).
IF the Cloud Transition Programme does not sufficiently engage with staff across DHCW THEN services may be reluctant to support migration activities RESULTING in delays to the Programme	Engagement during business case development with the service leads to understand the cloud migration strategies associated with each service (7R workshops).
IF DHCW fails to deliver efficiencies associated with Cloud services THEN service costs may increase RESULTING IN reduced service delivery and a failure to meet strategic aims	Validation of efficiency savings with third party resources to ensure that these are recorded appropriately in the business case.

[1] This focusses on non-Microsoft patches as the compliance with Microsoft patches is already consistently high.

5.3.6 ASSUMPTIONS

In the development of this Programme Business Case, assumptions have been made that commercial suppliers will be able to meet the requirements of DHCW, for both the hosting and migration of cloud services, as well as any consultancy. There has also been an assumption that funding will be made available to support the proposed activity – this is included in the business case costs.

5.3.7 CONSTRAINTS

Delivery of the Cloud Transition Programme will take place in parallel with that of other key organisational priorities and objectives. As a result, there is likely to be a constraint on resources available to support the delivery of Cloud transition while simultaneously supporting the day-to-day business operations and other programmes of work of DHCW.

5.3.8 DEPENDENCIES

Key dependencies for the Programme include the procurement and implementation of a Network as a Service (NaaS) solution for connectivity to Cloud Services. Procurement activity will also be required for cloud tooling, security tools, training and expert third party consultancy services. There is also likely to be a dependency on recruitment activity in addition to procurement.

Costs to support this dependent activity have been included within this Programme Business Case.

6 ECONOMIC CASE

6.1 INTRODUCTION TO OPTIONS

In accordance with the requirements of HM Treasury's Green Book, this section documents the wide range of options that have been considered in response to the potential scope identified within the Strategic Case. Each option has been evaluated using Investment Objectives and Critical Success Factors as outlined below.

6.2 CLOUD TERMINOLOGY

To ensure a consistency in nomenclature when describing the options, this Programme Business Case has used the "7Rs" model for cloud migration strategies as described by Gartner and Amazon Web Services. These 7Rs are set out below:

Retire – This approach is to be used when terminating or downsizing applications that will no longer be used in production.
Repurchase – Otherwise known as "drop and shop", this approach involves swapping internally developed and operated systems for third party managed solutions.
Retain – This strategy is for solutions that cannot be retired and will continue as is, for DHCW this means that the solution will continue to be run on premise.
Rehost – Otherwise known as "lift and shift", this approach utilises Infrastructure as a Service (IaaS) technology to redeploy workloads on a cloud instance, this allows the migration of on premise applications "as-is" into the cloud.
Relocate – This is also called a "hypervisor-level lift and shift", whereby servers are migrated from an on-premise hypervisor platform (such as VMWare), to a cloud version of that platform.
Replatform – also called "lift and reshape", this approach seeks to leverage cloud native capabilities top optimise the solution while keeping large elements of the application's source code and core architecture the same.
Refactor – also referred to as "re-architect", this is the most complex migration option and this involves an

essential rebuild of an application to make full use of cloud native applications.

6.3 INVESTMENT OBJECTIVES

Each long-listed option was evaluated against the Investment objectives (IO); the aim of the evaluation was to determine if the option would allow the achievement of the Investment objectives.

IO 1	Greater financial control through the ability to scale services up and down according to usage, peaks in demand, or changes to organisational priorities.
IO 2	An improved cyber security posture, leveraging new technologies and approaches to keep patient and staff data safe from cyber threats
IO 3	Avoidance of investment in physical infrastructure beyond 2027/28
IO 4	Increase in overall DHCW efficiencies by utilising high-value activities, use of more automation and self service
IO 5	Ability to utilise new technology to deliver on the needs of services across NHS Wales.
IO 6	Reduction in DHCW carbon footprint by at least 10% by 2027/28
IO 7	Increases the agility of DHCW to deliver essential services to its partner organisations and reduces the overall time to value for new features and functionality.
IO 8	Migration of all eligible[2] National Digital Services to the Cloud by end of FY 2027/28

6.4 CRITICAL SUCCESS FACTORS

The key Critical Success Factors (CSFs) for the project have been derived from the core CSFs contained within the guidance, and validated and amended as appropriate by DHCW following workshops and consultations with the service owners.
These CSFs have been used alongside the investment objectives for the project to evaluate the long list of possible options.

CSF	Description
CSF 1 – Strategic fit and business needs	This considers how well the option meets the agreed spending objectives, related business needs and service requirements, as well as the alignment of the option with other DHCW/NHS Wales strategies, programmes and projects.
CSF 2 – Potential Value for Money	This considers how well the option optimises the value (social, economic and environmental), in terms of the potential costs, benefits and risks.
CSF 3 – Supplier capacity and capability	This considers how well the option matches the ability of suppliers to deliver the required services, and how likely any deal is going to be for suppliers.
CSF 4 – Potential affordability	This considers how well the option can be funded from available sources of finance and aligns with sourcing constraints
CSF 5 – Potential achievability	This considers the likelihood of the option being delivered, given

[2] Services where the assessed Cloud Migration Strategy or "7R Treatment" is either "Retire" or "Retain" will not be included within this Investment Objective.

	the organisations ability to respond to the changes required.

6.5 OPTIONS SUMMARY

The following process was adopted:

- Production of an options framework to detail the scope of the technical architecture solution.
- Utilise the identified Investment objectives to assess the composite options.
- Identify the CSFs: generate a list of critical success factors (CSFs) against which the composite options will be assessed.

Four options categories have been identified, namely:

- Service Scope - the services and technical architecture that will be part of the delivery.
- Service Solution – how the proposed options will be delivered.
- Service Delivery – who will support the delivery of the options
- Implementation - how the service will be implemented, including timescales and programme approaches.

A summary of the options is provided below, followed by more detailed narrative on the outcomes of the options appraisal process.

	Do Nothing/BAU	Do Minimum	Hybrid	IaaS VMWare Migration	Do Maximum
Scope (What)	Continue the BAU approach of all existing services being delivered from DHCW Data Centres. (Discounted)	Migrate all DHCW services into cloud environments using a mainly IaaS/Re-Host approach combined with simple PaaS adoption to provide basic optimisation. For services unable to migrate to the cloud, these would remain on premise until they are retired. (Carry Forward)	Migrate all DHCW services into cloud environments using a mainly IaaS/Re-Host approach combined with greater PaaS/FaaS utilisation to provide enhanced optimisation. Replatform applications to leverage cloud native technologies and support optimisation. (Preferred Way Forward)	To avoid data centre transition/renegotiation costs in DC1, migrate all DC1 based services into an IaaS VMWare solution. The next step would then be to replatform services to migrate to a Cloud Native solution. (Carry Forward)	Refactor all DHCW services to cloud native solutions. (Discounted)
Technical Solution (How)		Utilise a single cloud provider solution for the delivery of all DHCW services in the cloud. (Discounted)	Utilise existing DHCW commercial agreements for cloud hosting (two suppliers) and migrate services according to their requirements to either cloud hosting provider. (Preferred Way Forward)		Undertake procurement exercises to provide services with a full scope of Cloud Service Providers (CSPs) (Discounted)
Service Delivery (Who)		Use existing DHCW resources to deliver migration of services to the cloud. (Discounted)	Use a mix of existing DHCW resources, new hires to address skill gaps and specialist external resources to support the migration, optimisation and architecting of services. (Preferred Way Forward)		Outsource migration, optimisation and architecting of services to a third-party supplier. (Discounted)

Implementation (How/By When)		"Big-Bang" Migration- all services migrated simultaneously to cloud. All eligible National Digital Services migrated to cloud by end of FY 2027/28. (Discounted)	Phased approach following "Wave Planning", services are assessed and prioritised according to readiness to proceed and are migrated sequentially in batches. All eligible National Digital Services migrated to cloud by end of FY 2027/28 (Preferred Way Forward)		

6.6 SCOPING OPTIONS (SCO)

6.6.1 SCO1 – DO NOTHING

Description

This option maintains the current status quo of services being delivered predominately on premise with a rolling programme of IT Lifecycle Management (ITLM) to replace and upgrade infrastructure as it ages and goes out of support.

Currently, DHCW operates most of its services on premises, this means that DHCW has responsibility for the management of all its hardware estate, including the building and commissioning of new servers and hardware. It also undertakes extensive ITLM activities, such as procuring replacement equipment and licences, upgrading Operating Systems and patching of all its server estate.

Advantages and Disadvantages

Scoping Option 1 – Do Nothing		
	Advantages	Disadvantages
Investment Objectives Does the option meet the IOs?	Option partially meets IO5 (New Technologies) and IO6 (Carbon footprint) as DHCW will be able to procure Hardware that supports service needs, and DHCW has delivered reductions in its carbon footprint in the data centres over recent years.	Option does not meet Investment Objectives 1-4 and 7-8.
CSF 1 – Strategic fit and business needs	Option meets current business need, but there are increasing constraints on funding which make it more challenging to deliver services on premise.	Option does not align with DHCW long term strategy or Welsh Government's "cloud first" policy. Option limits how well DHCW will be able to respond to future business needs due to the innate lack of flexibility of capital investment in hardware.
CSF 2 – Potential Value for Money	Option does offer some value for money but limits the ability of DHCW to make efficiency savings.	On premise delivery is over specified for the delivery of services, this is due to the requirement to procure and maintain fully resilient hardware in both data centres that is always on and requires both power and licensing to be in place.
CSF 3 – Supplier capacity and capability	Uses well established suppliers	Commercial terms with suppliers of software/services for on-premises deployments are likely to become more challenging as suppliers seek to generate income from fewer customers.
CSF 4 – Potential affordability	Funding already in place for this option	DHCW is limited in its ability to be flexible. DHCW currently responsible for all ITLM, while there are warranties and support for

		hardware, DHCW is responsible for the procurement of any replacement equipment which increases costs.
CSF 5 – Potential achievability	Approach is already in place.	

6.6.2 SCO2 – DO MINIMUM

Description

This option would migrate all DHCW services into cloud environments using a mainly IaaS/Re-Host approach combined with simple Platform as a Service (PaaS) adoption to provide basic optimisation.

For services unable to migrate to the cloud, these would remain on premise until they are retired.

Advantages and Disadvantages

Scoping Option 2 – Do Minimum – IaaS/Rehost and Optimise		
	Advantages	Disadvantages
Investment Objectives Does the option meet the IOs?	This approach will meet all Investment Objectives, except for IO3, which will be partially met.	Services remaining on premise until retirement may result in additional capital expenditure and not meet IO3 to the maximum extent.
CSF 1 – Strategic fit and business needs	Option meets the high-level strategic aims of DHCW/NHS Wales/Welsh Government	Progress in moving services not currently suited to cloud migration to a cloud platform will be limited by the lifecycle of those services.
CSF 2 – Potential Value for Money	Could represent up to 15% efficiency savings compared to BAU processes.[3]	
CSF 3 – Supplier capacity and capability	Suppliers can provide IaaS and PaaS solutions and DHCW is able to leverage these using existing commercial agreements.	
CSF 4 – Potential affordability	Approach likely to be affordable due to reduction in capital expenditure.	
CSF 5 – Potential achievability	While more complex than the do-nothing approach (SCO1), there is a high confidence that the option can be delivered by the end of the FY 2027/2028.	

[3] Based on data from third party subject matter experts.

6.6.3 SCO3 - HYBRID

Description

Migrate all DHCW services into cloud environments using a mainly IaaS/Re-Host approach combined with greater PaaS/Function as a Service (Faas) utilisation to provide enhanced optimisation, replatforming relevant solutions to provide additional benefits of cloud native services..

For services unable to migrate to the cloud, these would remain on premise until they are retired.

Advantages and Disadvantages

Scoping Option 3 – Hybrid		
	Advantages	Disadvantages
Investment Objectives Does the option meet the IOs?	This approach meets all Investment Objectives	
CSF 1 – Strategic fit and business needs	Option meets the high-level strategic aims of DHCW/NHS Wales/Welsh Government	
CSF 2 – Potential Value for Money	Could represent up to 20% efficiency savings compared to BAU processes[4]	
CSF 3 – Supplier capacity and capability	Suppliers can provide IaaS, PaaS and FaaS solutions and DHCW is able to leverage these using existing commercial agreements.	
CSF 4 – Potential affordability	Approach likely to be affordable due to reduction in capital expenditure.	More resource intensive due to parallel workstreams for migrating most services, while refactoring others.
CSF 5 – Potential achievability	While more complex than the do nothing (SCO1) and do minimum (SCO2) approaches, there is a high confidence that the option can be delivered by the end of the FY 2027/2028.	

6.6.4 SCO4 – IAAS VMWARE MIGRATION

Description

To avoid data centre transition/renegotiation costs in DC1, migrate all DC1 based services into an IaaS VMWare solution.

The next step would then be to replatform services to migrate to a Cloud Native solution.

Advantages and Disadvantages

[4] Based on data from third party subject matter experts.

Scoping Option 4– IaaS VMWare Migration		
	Advantages	Disadvantages
Investment Objectives Does the option meet the IOs?	This approach meets most Investment Objectives	Less likely to achieve IO8 as focus would be on migrating elements of all services from DC1 into the Cloud. There would then be the requirement for additional programme resources. Generally, the time to realise efficiencies will be slower due to the need to perform two migration activities, firstly to IaaS and then to cloud native.
CSF 1 – Strategic fit and business needs	Option meets the high-level strategic aims of DHCW/NHS Wales/Welsh Government	Will achieve the migration of services into the cloud, but only for services in DC1 in the first instance.
CSF 2 – Potential Value for Money	Could provide efficiency savings compared to BAU processes.	Efficiency savings unlikely to be realised until migration to cloud native hosting.
CSF 3 – Supplier capacity and capability	Suppliers can provide VMWare solutions to support this approach.	
CSF 4 – Potential affordability	Approach likely to be affordable in the long term.	More resource intensive due to requirement to migrate to VMWare platform and then migrate into a cloud native environment. DHCW have operated a VMWare solution in cloud for Test and Development, but it has proved more cost efficient to migrate into a cloud native environment.
CSF 5 – Potential achievability		Process is achievable but would require the most resources to complete and would also likely push timescales beyond the end of the FY 2027/28.

6.6.5 SCO5 – DO MAXIMUM

Description

Refactor all DHCW services to cloud native solutions.

Advantages and Disadvantages

Scoping Option 5 – Do Maximum		
	Advantages	Disadvantages
Investment Objectives	This approach meets most Investment Objectives	Less likely to deliver on the timescales of IO8 due to requirement to refactor all

Does the option meet the IOs?		services.
CSF 1 – Strategic fit and business needs	Option meets the high level strategic aims of DHCW/NHS Wales/Welsh Government	Delivery likely to go far beyond the end of FY 2027/28 due to intense resource requirements.
CSF 2 – Potential Value for Money	Could represent up to 25% efficiency savings compared to BAU processes.	
CSF 3 – Supplier capacity and capability	Suppliers can provide IaaS, PaaS and FaaS solutions and DHCW is able to leverage these using existing commercial agreements.	
CSF 4 – Potential affordability	Approach likely to be affordable in the long term.	Approach will result in capital expenditure in the short-medium term as an increased number of services would be required to stay on premise beyond the end of the 2027/28 financial year compared with other cloud-based options. More resource intensive due to requirement to work with all services to refactor for cloud native.
CSF 5 – Potential achievability		Process is achievable, but would require the most resources to complete and would also likely push timescales beyond the financial year 2027/28.

6.6.6 SCOPING OPTIONS – SUMMARY FINDINGS

	BAU SCO1	Do Minimum SCO2	Hybrid SCO3	AVS Migration SCO4	Do Maximum SCO5
Investment Objectives					
IO1 - Greater financial control	No	Yes	Yes	Yes	Yes
IO2 – Improved Cyber Security	No	Partial	Yes	Yes	Yes
IO3 – Capex reduction	No	Partial	Partial	Partial	No
IO4 – Increased Efficiencies	No	Yes	Yes	Partial	Yes
IO5 – New Technologies	Partial	Partial	Yes	Partial	Yes
IO6 – CO2 Reductions	Partial	Yes	Yes	Yes	Yes
IO7 – Product Approach	No	Yes	Yes	Yes	Yes

IO8 – Migration of all eligible services by end of FY 2027/28	No	Yes	Yes	Partial	Partial
Critical Success Factors					
CSF 1 – Strategic fit and business needs	No	Yes	Yes	Partial	Partial
CSF 2 – Potential Value for Money	Partial	Yes	Yes	Partial	Partial
CSF 3 – Supplier capacity and capability	Yes	Yes	Yes	Yes	Yes
CSF 4 – Potential affordability	Partial	Partial	Yes	Partial	Partial
CSF 5 – Potential achievability	Yes	Yes	Partial	Yes	Partial
SUMMARY	Discounted	Possible	Proposed	Possible	Discounted

6.6.7 SCOPING OPTIONS – CONCLUSION

SCO1: Do nothing/BAU – Discounted. While the current status quo has been managed by DHCW for a long time, there are increasing pressures on the system that suggest a different approach is required. This is reflected in DHCW and Welsh Government's cloud strategies and as such some movement of services to cloud will be required before the end of the 2027/28 financial year to ensure the needs of the business are met.

SCO2: Do Minimum - Possible. While this option does support optimisation and will be likely to release some efficiency savings, this approach is unlikely to realise the potential benefits of moving to the cloud when compared with SCO3.

SCO3: Hybrid – Proposed. While this approach is more complex than SCO2, this scoping option represents the approach that will meet most of the investment objectives and critical success factors detailed above.

SCO4: IaaS VMWare Solution – Possible. This option supports some optimisation and would reduce the pressure on the organisation of having to maintain DC1 beyond 2026, it is likely that migration to IaaS VMWare is likely to be more costly and a longer programme would be required to first move from on-premise to IaaS VMWare and then move services into a cloud native solution.

SCO5: Do Maximum – Discounted. While this option may offer the best opportunity to maximise efficiency savings in the cloud these are likely to be diminished by the ongoing requirement to replace hardware long beyond June 2026. It is also likely that a greater number of resources will be required to support the rearchitecting of National Digital Services.

6.7 TECHNICAL SOLUTION OPTIONS (TSO)

6.7.1 TSO1 – SINGLE CLOUD PROVIDER

Description

This option would seek to use a single cloud provider (CSP) solution for the delivery of all DHCW services in the cloud.

Currently DHCW has commercial agreements with two cloud hosting providers, Microsoft Azure and Google Cloud Platform. This approach would likely see DHCW favouring one supplier and migrating services hosted in the other environment to the preferred provider.

Advantages and Disadvantages

Technical Solution Option 1 – Single Cloud Provider		
	Advantages	Disadvantages
Investment Objectives Does the option meet the IOs?	This option meets most Investment Objectives.	This option is less likely to satisfy IO8 as additional procurement activity will be required.
CSF 1 – Strategic fit and business needs		While this approach would satisfy the high level "cloud first" set out in WG and DHCW strategy, DHCW's Cloud Strategy explicitly describes a "multi cloud" approach for the management of cloud services in the future.
CSF 2 – Potential Value for Money	Using a single supplier could result in achieving greater economies of scale and efficiencies by being able to maximise PaaS and FaaS services offered by the provider. There may be an opportunity to receive bulk discounts from using a single supplier.	Using a single supplier for Cloud might result in some loss of flexibility as services may not be truly "agnostic".
CSF 3 – Supplier capacity and capability	There are numerous providers in the marketplace that can offer common IaaS and PaaS services.	This would restrict the more specialist PaaS services available for DHCW to consume.
CSF 4 – Potential affordability	This approach is likely to be affordable in the long term.	Significant costs to migrate services to a single cloud provider
CSF 5 – Potential achievability	It would be more straightforward to provide training and development for staff in one single cloud resource.	As DHCW currently hosts some services with two cloud providers, if this option was utilised services would need to be migrated to the preferred supplier, this could prove to be technically challenging, and some IaaS/PaaS services provided by one CSP may not be available from another.

6.7.2 TSO2 – USE EXISTING CLOUD PROVIDERS

Description

Utilise existing DHCW commercial agreements for cloud hosting and migrate services according to their requirements to either cloud hosting provider.

DHCW currently has agreements in place with Google Cloud Platform and Microsoft Azure and there is scope

within both agreements to increase utilisation of the hosting platforms to run DHCW services, as these agreements have been developed with consideration for DHCW's Cloud Strategy.

Advantages and Disadvantages

Technical Solution Option 2 – Use Existing Cloud Providers		
	Advantages	Disadvantages
Investment Objectives Does the option meet the IOs?	This option meets all Investment Objectives.	
CSF 1 – Strategic fit and business needs	This option provides a clear fit with both the DHCW Cloud Strategy and the "Cloud First" policy of Welsh Government.	
CSF 2 – Potential Value for Money	Allows a deal of flexibility to shift between platforms to provide additional efficiencies. Potential opportunity to drive savings and discounts from both suppliers to secure ongoing business.	There is a risk that DHCW may not meet the required commit levels for either supplier if services predominately prefer one platform over the other. There could also be missed opportunities to leverage technologies from alternative cloud providers
CSF 3 – Supplier capacity and capability	The two current suppliers can deliver the cloud services that DHCW needs as part of the cloud migration programme.	
CSF 4 – Potential affordability	This approach is likely to be affordable.	
CSF 5 – Potential achievability	This option is effectively already implemented, with a route to market for both platform providers in place. Skills in both cloud platforms used by DHCW exist in the organisation and providing development and training for staff in a smaller number of cloud platforms will is more likely to be achievable.	

6.7.3 TSO3 – PROCURE ADDITIONAL CLOUD HOSTING AGREEMENTS

Description

Undertake procurement exercises to provide services with a full scope of Cloud Service Providers (CSPs), this would allow products to utilise the cloud hosting provider that best suited their needs. There would be a requirement for additional procurement activity and a broad range of skills to support the delivery of a fully cloud agnostic approach.

Advantages and Disadvantages

Technical Solution Option 3 – Procure additional cloud hosting agreements		
	Advantages	Disadvantages
Investment Objectives Does the option meet the IOs?	This option meets most Investment Objectives.	This option is less likely to satisfy IO8 as additional procurement activity will be required.
CSF 1 – Strategic fit and business needs	This option provides a clear fit with both the DHCW Cloud Strategy and the "Cloud First" policy of Welsh Government.	Unlikely that this approach will satisfy the cloud strategy ambition of having 65% of National Digital Services hosted in the cloud by June 2026 due to the lead times required for procurement.
CSF 2 – Potential Value for Money	Provides an opportunity for competition between all cloud providers, which may drive greater savings for services. Services could be truly platform "agnostic" and could switch between platform providers to better leverage functionality that suited their delivery roadmap.	There is a risk that DHCW may not meet commit levels for certain cloud providers.
CSF 3 – Supplier capacity and capability	There are numerous providers in the marketplace that can offer cloud services.	
CSF 4 – Potential affordability	The approach is likely to be affordable.	Adding a third supplier will add some costs, but these are not significant.
CSF 5 – Potential achievability	Would offer a diverse range of platforms and may enable DHCW to recruit and develop a wider skill base of staff to support.	Management of multiple platforms may provide challenges for staff delivering services and make the management of product sets more complex. Likely to result in increased training and development requirements to ensure that staff/teams have the necessary skills to support.

6.7.4 TECHNICAL SOLUTION OPTIONS – SUMMARY FINDINGS

	Single Cloud Provider TSO1	Use existing agreements with Cloud Providers TSO2	Procure additional cloud hosting agreements TSO3
Investment Objectives			

IO1 - Greater financial control	Yes	Yes	Yes
IO2 – Improved Cyber Security	Yes	Yes	Yes
IO3 – Capex reduction	Yes	Yes	Yes
IO4 – Increased Efficiencies	Yes	Yes	Yes
IO5 – New Technologies	Yes	Yes	Yes
IO6 – CO2 Reductions	Yes	Yes	Yes
IO7 – Product Approach	Yes	Yes	Yes
IO8 – Migration of all eligible services by end of FY 2027/28	Partial	Yes	Partial
Critical Success Factors			
CSF 1 – Strategic fit and business needs	No	Yes	Partial
CSF 2 – Potential Value for Money	Partial	Partial	Partial
CSF 3 – Supplier capacity and capability	No	Yes	Yes
CSF 4 – Potential affordability	Partial	Yes	Yes
CSF 5 – Potential achievability	Partial	Yes	Partial
SUMMARY	Discounted	Proposed	Discounted

6.7.5 TECHNICAL SOLUTION OPTIONS – CONCLUSION

TSO1: Use Single Cloud Provider – Discounted. While there may be some economies of scale and some slightly higher discounts available with this step, DHCW currently has two CSPs that it has agreements with. This approach would not satisfy multi cloud requirements and represents a retrograde step against DHCW's stated strategic ambitions.

TSO2: Use existing cloud hosting agreements – Proposed. This approach makes use of existing routes to market which DHCW has available to it. It also supports the multi cloud approach and as there would be no procurement of commercial negotiations required to action this approach, it is the most achievable of the Technical Solution Options.

TSO3: Procure additional cloud hosting agreements – Discounted. While this approach would provide the most flexibility for services and may represent the truest testing of the market, the amount of time required to procure routes to market for a diverse range of cloud providers and the likely requirement for training and development in those cloud platforms makes this option less attractive.

6.8 SERVICE DELIVERY OPTIONS (SDO)

6.8.1 SDO1 – USE EXISTING DHCW RESOURCES

Description

This option would utilise resources currently existing in DHCW to deliver the scope of the Cloud Transition Programme. This would require service delivery teams to support cloud migration activity (regardless of

migration strategy) while simultaneously requiring those teams to continue to deliver their service level commitments to their service users.

Advantages and Disadvantages

Service Delivery Option 1 – Use Existing DHCW Resources		
	Advantages	Disadvantages
Investment Objectives Does the option meet the IOs?		This approach likely limits DHCW's ability to deliver on the investment objectives as progress is likely to be slower, there may be gaps in skills and knowledge that result in the ability to make efficiency savings, resulting in higher than anticipated capital and revenue expenditure.
CSF 1 – Strategic fit and business needs		This approach could have an impact on the delivery of Integrated Medium Term Plan milestones, resulting in an overall poor performance by the organisation.
CSF 2 – Potential Value for Money		Unlikely to represent long term value for money.
CSF 3 – Supplier capacity and capability	N/A	N/A
CSF 4 – Potential affordability	Likely to be affordable as current establishment would be utilised.	Other costs likely to be increased due to gaps in capabilities and delays to delivery, could be additional financial consequences for the organisation if resources are not prioritised appropriately.
CSF 5 – Potential achievability		Unlikely to be achievable due to capacity and capability constraints.

6.8.2 SDO2 – HYBRID APPROACH

Description

Use a mix of existing DHCW resources, new hires to address skill gaps and specialist external resources to support the migration, optimisation and architecting of services.

As DHCW does not currently possess the full range of capabilities and skills required to deliver the Cloud Transition Programme, this approach seeks to bring in the skills from external providers, either via training or delivery to provide DHCW with the capability to deliver on its cloud strategy. This approach also allows for knowledge transfer from specialist external resources to ensure a sustainable approach to service delivery in the future. This is also in full alignment with Mission 2 (digital economy) of the *Digital and data strategy for health and social care in Wales* which states "We will complement our workforce with external delivery partners".

Advantages and Disadvantages

Service Delivery Option 2 – Hybrid Approach		
	Advantages	Disadvantages
Investment Objectives Does the option meet the IOs?	This approach provides DHCW the opportunity to utilise external resource to address gaps and make use of specialist skills to better drive achievement of the Investment Objectives.	
CSF 1 – Strategic fit and business needs	Aligns to Cloud Strategy approach and provides an opportunity for skills development and sustainable service delivery within DHCW.	
CSF 2 – Potential Value for Money	While there will be a short-term investment to deliver the programme, by facilitating effective knowledge transfer, this approach is more likely to leverage long term efficiency savings.	
CSF 3 – Supplier capacity and capability	Specialist services and consultancies exist that can support this activity, in addition to advice and support from the cloud hosting providers.	
CSF 4 – Potential affordability		This approach will require additional investment to deliver.
CSF 5 – Potential achievability	This approach represents a better approach for achievability when compared to SDO1	

6.8.3 SDO3 – OUTSOURCE DELIVERY

Description

This option utilises external specialist resources from third parties to deliver services in the cloud. These terms would work on migration and migration activities exclusively, with only the minimum input from service delivery/product teams to complete this work and run services.

Advantages and Disadvantages

Service Delivery Option 3 – Outsource Delivery		
	Advantages	Disadvantages
Investment Objectives	This approach is likely to meet the Investment Objectives as specialist cloud	

Does the option meet the IOs?	delivery skills would be utilised.	
CSF 1 – Strategic fit and business needs		This approach does not align with DHCW Cloud Strategy, which focuses on the development of its staff to deliver services in the cloud in a sustainable way.
CSF 2 – Potential Value for Money	Efficiency savings likely to be realised, but there will be a significant overhead associated with the outsourced delivery.	
CSF 3 – Supplier capacity and capability	There are suppliers in the marketplace that can deliver cloud services on behalf of their clients.	
CSF 4 – Potential affordability		This approach is likely to be the most expensive option.
CSF 5 – Potential achievability	This approach is likely to be more achievable than SDO1 due to the availability of specialist resources to support the required activity.	

6.8.4 SERVICE DELIVERY OPTIONS – SUMMARY FINDINGS

	Use Existing DHCW Resources SDO1	Hybrid approach SDO2	Outsource delivery SDO3
Investment Objectives			
IO1 - Greater financial control	Yes	Yes	Yes
IO2 – Improved Cyber Security	Partial	Yes	Yes
IO3 – Capex reduction	Partial	Yes	Yes
IO4 – Increased Efficiencies	Partial	Yes	Yes
IO5 – New Technologies	Partial	Yes	Yes
IO6 – CO2 Reductions	Yes	Yes	Yes
IO7 – Product Approach	Yes	Yes	Yes
IO8 – Migration of all eligible services by end of FY 2027/28	Partial	Yes	Yes
Critical Success Factors			
CSF 1 – Strategic fit and business needs	No	Yes	Partial
CSF 2 – Potential Value for Money	No	Yes	Partial
CSF 3 – Supplier capacity and capability	N/A	Yes	Yes
CSF 4 – Potential affordability	Partial	Partial	No
CSF 5 – Potential achievability	No	Yes	Yes

SUMMARY	Discounted	Proposed	Discounted

6.8.5 SERVICE DELIVERY OPTIONS – CONCLUSION

SDO1: Use Existing DHCW Resources– Discounted. While this is likely to be the most affordable option, there are existing gaps within DHCW's teams and specialist resources will be required to ensure effective delivery. This approach is likely to have an impact on existing service delivery and other IMTP requirements.

TSO2: Use hybrid approach – Proposed. By using training, recruitment or third parties to address gaps in DHCW's cloud capability, this approach represents an achievable and sustainable option for delivery that is in line with the ambitions set out in DHCW's Cloud Strategy.

TSO3: Outsource Delivery – Discounted. While this approach may be the most achievable, it is likely to not be affordable, it also does not support the development of skills and capabilities within DHCW, and this may have long term impacts on DHCW's ability to deliver its services.

6.9 IMPLEMENTATION OPTIONS (IMP)

6.9.1 IMP1 – "BIG BANG" APPROACH

Description

The "big bang" approach to migration would mean services being made ready to move to the cloud and then a full go-live of national services in the cloud over a short space of time.

Advantages and Disadvantages

Implementation Option 1 – "Big Bang" Approach		
	Advantages	Disadvantages
Investment Objectives Does the option meet the IOs?	This approach would meet most investment objectives.	Likely to impact on DHCW's ability to drive efficiencies and financial control and opportunities to learn lessons from migration would be diminished.
CSF 1 – Strategic fit and business needs		
CSF 2 – Potential Value for Money		There may be impacts to live services associated with a big bang approach, there would also be no opportunity to learn lessons to inform future migration activity.
CSF 3 – Supplier capacity and capability	Suppliers supporting migration activity are unlikely to be supportive of the approach as it is a high-risk activity.	Potential risks to service from undertaking this approach, there could be downtime and reputational damage which could have unforeseen costs for DHCW.

CSF 4 – Potential affordability		The high risk associated with this approach would be reflected in higher migration costs. The approach could be affordable but would see a large spike in revenue costs following migration.
CSF 5 – Potential achievability		This approach would be resource intensive over a short space of time and is likely to result in service outages if issues are encountered.

6.9.2 IMP2 – PHASED APPROACH

Description

This option would seek to build on existing scoping activities to identify services in order of readiness to support migration and develop a phased plan of "implementation waves" for services moving into the cloud. This would allow DHCW to better optimise services, learn lessons from migration and deliver value more sustainably over the lifecycle of the Cloud Transition Programme.

Advantages and Disadvantages

Scoping Option 1 – Do Nothing		
	Advantages	Disadvantages
Investment Objectives Does the option meet the IOs?	This approach would meet all investment objectives.	
CSF 1 – Strategic fit and business needs	This approach is the most likely to facilitate ongoing service delivery with as minimal impact to services as possible.	
CSF 2 – Potential Value for Money	This approach is the list risky and allows the learning of lessons to derive value and inform future migrations.	
CSF 3 – Supplier capacity and capability	Suppliers supporting migration are more likely to support this approach, this is more in line with best practice for cloud migration than IMP1.	
CSF 4 – Potential affordability	This option will have a tapered move to cloud, so likely that financial controls and optimisation could be delivered in a more focused and coherent manner.	
CSF 5 – Potential achievability	This approach is more likely to be achievable than IMP1.	

6.9.3 IMPLEMENTATION OPTIONS – SUMMARY FINDINGS

	Use Existing DHCW Resources IMP1	Phased approach IMP2
Investment Objectives		
IO1 - Greater financial control	Partial	Yes
IO2 – Improved Cyber Security	Yes	Yes
IO3 – Capex reduction	Yes	Yes
IO4 – Increased Efficiencies	Partial	Yes
IO5 – New Technologies	Partial	Yes
IO6 – CO2 Reductions	Yes	Yes
IO7 – Product Approach	Yes	Yes
IO8 – Migration of all eligible services by end of FY 2027/28	Yes	Yes
Critical Success Factors		
CSF 1 – Strategic fit and business needs	No	Yes
CSF 2 – Potential Value for Money	No	Yes
CSF 3 – Supplier capacity and capability	No	Yes
CSF 4 – Potential affordability	Partial	Yes
CSF 5 – Potential achievability	No	Yes
SUMMARY	Discounted	Proposed

6.9.4 IMPLEMENTATION OPTIONS – CONCLUSION

IMP1: "Big Bang" Approach– Discounted. Given the volume and variation of DHCW services, as well as the clinical critical nature of some of those services, this approach is too risky to be feasible for the implementation of services in the cloud.

IMP2: Phased Approach – Proposed. By using a phased implementation, DHCW will be able to learn lessons from migration to provide continuous improvement of its migration activities and this option also represents a lower level of risk to the ongoing delivery of services.

6.10 SHORTLISTED OPTIONS

There are three shortlisted options identified for economic appraisal. As there was only one proposed option for the technical solution, service delivery and implementation options, the economic appraisal will effectively be constrained to the three possible/proposed scoping options, plus Business as Usual. These options are:

- BAU: On-Premise – These are estimated costs based on DHCW retaining services in two data centres and operating services in the way that it currently does.

- **Option 1: Migrate and Optimise -** in this option, cloud ready services are **rehosted** in waves. There are residual on premise costs as those services unsuitable to migrate into the cloud are **retained** on premise until they are **retired**, **repurchased** or **refactored**. Programme costs do not include resources required to **replatform** DHCW Services.
- **Option 2: Migrate, Optimise and Re-Platform (Hybrid approach)** - this is the preferred solution whereby services that are cloud ready are **rehosted** as per Option 1, but additional programme resource is focused on **replatforming** services to maximise benefits and efficiencies associated with cloud hosting such as using Open-Source products.
- **Option 3**: **Relocating to an IaaS VMWare Solution** – this option focuses on attempting to close Data Centre 1 at the end of the contract in 2026 by **relocating** to an IaaS VMWare solution. Services will then be **rehosted** and optimised from this VMware solution and Data Centre 2, as per Option 1.

None of these shortlisted options include the **refactoring** (rearchitecting) of systems. Where this is required, individual business cases will be developed, examples may be for DHCW's integration engine or for a replacement patient administration system.

6.11 ECONOMIC APPRAISAL

This section provides an explanation of the general approach taken to the identification and calculation of the costs and benefits shown within the Economic Appraisals. In addition, it provides an overview of the key findings that result from each of the short-listed options.

6.11.1 BENEFITS APPRAISAL

Benefits are typically classed as quantitative (financial or economic) and qualitative. At this stage the benefits set out in the Investment Objectives have not been fully quantified. The Cloud Transition Programme will work to fully quantify these benefits as part of its benefits planning and tracking exercises, therefore the following benefits appraisal has used a simple scoring methodology against each of the Investment Objectives to provide a qualitative benefits appraisal for the purpose of identifying a Preferred Way Forward for the Cloud Transition Programme. The scores were allocated as follows:

- No contribution to the Investment Objective = 0 points
- Partial contribution to the Investment Objective = 5 points
- Full contribution to the Investment Objective = 10 points

The outcome of the appraisal is set out in the table below:

	Migrate and Optimise Option 1	Migrate, Optimise and Re-platform (Hybrid) Option 2	Migrate to IaaS VMWare Solution Option 3
Investment Objectives			
IO1 - Greater financial control	10	10	10
IO2 – Improved Cyber Security	5	10	10
IO3 – Capex reduction	5	5	5
IO4 – Increased Efficiencies	10	10	5
IO5 – New Technologies	5	10	5

IO6 – CO2 Reductions	10	10	10
IO7 – Product Approach	10	10	10
IO8 – Migration of 65% of Services by June 2026	10	10	5
TOTAL	65	75	60
RANK	2nd	1st	3rd

6.11.2 RISK APPRAISAL

Risk scoring has been undertaken using the standard DHCW risk scoring mechanism of Impact x Likelihood. The risk matrix is set out below:

Likelihood						
	5 = Almost Certain	(Moderate) 5	(Significant) 10	(Critical) 15	(Critical) 20	(Critical) 25
	4 = Likely	(Moderate) 4	(Moderate) 8	(Significant) 12	(Critical) 16	(Critical) 20
	3 = Possible	(Low) 3	(Moderate) 6	(Significant) 9	(Significant) 12	(Critical) 15
	2 = Unlikely	(Low) 2	(Moderate) 4	(Moderate) 6	(Moderate) 8	(Significant) 10
	1 = Rare	(Low) 1	(Low) 2	(Low) 3	(Moderate) 4	(Moderate) 5
		1 = Low	2 = Minor	3 = Moderate	4 = Major	5 = Catastrophic
	Impact					

The main risks and their related scores against each option are shown in the following table:

Risk Description	Migrate and Optimise Option 1	Migrate, Optimise and Re-Platform (Hybrid) Option 2	Migrate to IaaS VMWare Solution Option 3
IF DHCW is unable to deliver migration of services to the cloud THEN there will be a requirement for additional capital expenditure RESULTING IN cost pressures on the organisation.	L3 x I4 = 12	L3 x I3 = 9	L3 x I4 = 12
IF DHCW have underestimated the costs of migrating to the cloud THEN there will be a requirement to find alternative sources of funding RESULTING IN cost pressures on the organisation	L3 x I4 = 12	L3 x I4 = 12	L3 x I4 = 12
IF DHCW does not appropriately scope the technical suitability of services moving to the Cloud THEN there may be services that must remain on prem indefinitely RESULTING IN a failure to achieve the strategic ambitions of the organisation	L3 x I4 = 12	L2 x I4 = 8	L3 x I4 = 12
IF the Cloud Transition Programme does not sufficiently engage with staff across DHCW THEN services may be reluctant to support migration activities RESULTING in delays to the	L2 x I4 = 8	L2 x I4 = 8	L2 x I4 = 8

Programme			
IF DHCW fails to deliver efficiencies associated with Cloud services THEN service costs may increase RESULTING IN reduced service delivery and a failure to meet strategic aims	L3 X I4 = 12	L2 x I4 = 8	L4 X I4 = 16
Total (Highest score = Most Risk)	56	45	60
Rank (Lowest risk score will rank highest)	2nd	1st	3rd

6.11.3 ENVIRONMENTAL IMPACT APPRAISAL

A comparison of the carbon footprint of the four shortlisted options has been undertaken. The methodology is described below.

- For the on-premises equipment:
  - The carbon footprint associated with the manufacturing of the equipment has been determined from the manufacturer's literature where available, and estimated where not. It is divided by the expected life of the asset, to obtain an annual CO2e footprint associated with the manufacturing of the device.
  - The actual power consumption of the data centres has been used and converted into CO2e as per guidance from the GOV.UK website[5]
  - A 20% reduction has been applied to reflect that some services are being retired or decommissioned as a result of moving to fully managed services delivered from suppliers' data centres.
- For the cloud:
  - CO2e footprint data has been obtained from the Azure Portal for an existing system deployed by DHCW and scaled up as appropriate.
- Using the above, a CO2e footprint over a 10-year period has been calculated for the four shortlisted options.

The table below shows the summary of the CO2e footprint over a 10-year period:

Option	10-year CO2e footprint
BAU: On Premises	3,520,497 kg CO2e
Option 1: Migrate and Optimise	2,756,867 kg CO2e
Option 2 Migrate, Optimise and Re-Platform (Hybrid approach)	2,761,785 kg CO2e
Option 3: Relocating to an IaaS VMWare Solution	2,824,429 kg CO2e

What is clear is that there is a clear reduction in carbon footprint (approximately 20%) for all cloud options, compared to staying on-premises. The difference between the carbon footprint for the three cloud options is marginal and should not materially affect the decision about which option is taken forward.

[5] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2024

6.11.4 COST APPRAISAL

This section describes the likely costs associated with each of the shortlisted options. At this stage, these costs are indicative and have been developed by working with third party suppliers to explore the Total Cost of Ownership (TCO) of hosting DHCW services in the cloud. As the three shortlisted options are a divergence from the current status quo, the business-as-usual costs have also been presented to show any differences in costs between a primarily on-premise hosting environment and utilisation of the cloud. The cloud cost assumptions have included training requirements, the costs associated with utilising Network as a Service connectivity, as well as the costs associated with hosting of servers, licensing and software assurance.
All options appraisals are based on the current DHCW estate, there are no costs included for new systems, large-scale data acquisitions or other major changes to DHCW operations.
Costs are across multiple years to demonstrate both the cost requirements for capital replacement and licences for on premise services, as well as the ongoing revenue costs of hosting services in the cloud.

CURRENT (BAU) COSTS

BAU costs have been calculated based on current operational costs, known lifecycle replacement costs have also been factored in and an uplift based on market trends has been applied to licencing costs. Costs have been estimated on a 10-year period from 2024/2025 through to end of the 2033/2034 financial year.

Year	Capital £000's	Revenue £000's	Total £000's	Efficiencies £000's	Net £000's
2024/25	1,390.0	8,046.9	9,436.9	0.0	9,436.9
2025/26	6,124.0	11,254.4	17,378.4	0.0	17,378.4
2026/27	2,180.0	9,727.3	11,907.3	0.0	11,907.3
2027/28	3,500.0	11,964.1	15,464.1	0.0	15,464.1
2028/29	1,470.0	10,429.6	11,899.6	0.0	11,899.6
2029/30	1,390.0	9,619.9	11,009.9	0.0	11,009.9
2030/31	4,924.0	12,519.2	17,443.2	0.0	17,443.2
2031/32	4,820.0	13,260.4	18,080.4	0.0	18,080.4
2032/33	860.0	11,946.8	12,806.8	0.0	12,806.8
2033/34	1,951.0	12,201.8	14,152.8	0.0	14,152.8
Total	28,609.0	110,970.4	139,579.4	0.0	139,579.4

OPTION 1 – MIGRATE AND OPTIMISE COSTS

Migrate and optimise costs have been calculated based on cost analysis conducted with third party consultancies based on a rehost of DHCW's systems using IaaS. Using the efficiency calculation provided by the suppliers, it has been assumed that there will be an incremental efficiency saving as services optimise and mature following their migration to the cloud.

Year	Capital £000's	Revenue £000's	Total £000's	Efficiencies £000's	Net £000's

2024/25	517.2	7,754.5	8,271.7	0.0	8,271.7
2025/26	3,247.4	10,794.2	14,041.6	0.0	14,041.6
2026/27	2,715.0	10,818.8	13,533.8	-489.5	13,044.3
2027/28	569.7	12,764.9	13,334.6	-1,468.6	11,866.0
2028/29	720.0	12,709.8	13,429.8	-2,447.7	10,982.1
2029/30	0.0	12,411.8	12,411.8	-2,447.7	9,964.1
2030/31	0.0	12,411.8	12,411.8	-2,447.7	9,964.1
2031/32	0.0	12,411.8	12,411.8	-2,447.7	9,964.1
2032/33	0.0	12,411.8	12,411.8	-2,447.7	9,964.1
2033/34	720.0	12,411.8	13,131.8	-2,447.7	10,684.1
Total	8,489.3	116,901.2	125,390.5	-16,644.1	108,746.4

OPTION 2 – MIGRATE, OPTIMISE AND RE-PLATFORMING COSTS

Migrate and optimise costs have been calculated based on cost analysis conducted with third party consultancies based on a rehost of DHCW's systems using IaaS. Using the efficiency calculation provided by the suppliers, it has been assumed that there will be an incremental efficiency saving as services optimise and mature following their migration to the cloud. In addition, services that are re-platforming into a cloud native solution will require extended support to achieve this, but the assumed efficiency savings will be larger as a result, and this has been factored into the calculation.

Year	Capital £000's	Revenue £000's	Total £000's	Efficiencies £000's	Net £000's
2024/25	517.2	7,754.5	8,271.7	0.0	8,271.7
2025/26	3,928.0	10,481.8	14,409.8	0.0	14,409.8
2026/27	4,076.2	10,194.0	14,270.2	-1,468.6	12,801.6
2027/28	1,250.3	12,040.6	13,290.9	-2,570.0	10,720.9
2028/29	720.0	11,668.5	12,388.5	-3,671.5	8,717.0
2029/30	0.0	11,370.5	11,370.5	-3,671.5	7,699.0
2030/31	0.0	11,370.5	11,370.5	-3,671.5	7,699.0
2031/32	0.0	11,370.5	11,370.5	-3,671.5	7,699.0
2032/33	0.0	11,370.5	11,370.5	-3,671.5	7,699.0
2033/34	720.0	11,370.5	12,090.5	-3,671.5	8,419.0
Total	11,211.7	108,991.9	120,203.6	-26,067.5	94,136.1

OPTION 3 – IAAS VMWARE MIGRATION

Year	Capital £000's	Revenue £000's	Total £000's	Efficiencies £000's	Net £000's
2024/25	984.2	9,475.9	10,460.1	0.0	10,460.1
2025/26	6,085.8	13,922.8	20,008.6	0.0	20,008.6
2026/27	3,016.4	13,838.3	16,854.7	-367.1	16,487.6
2027/28	2,726.4	13,266.3	15,992.7	-1,101.4	14,891.3
2028/29	1,099.8	13,143.2	14,243.0	-2,570.0	11,673.0
2029/30	0.0	12,512.2	12,512.2	-2,570.0	9,942.2
2030/31	0.0	12,512.2	12,512.2	-2,570.0	9,942.2
2031/32	0.0	12,512.2	12,512.2	-2,570.0	9,942.2
2032/33	0.0	12,512.2	12,512.2	-2,570.0	9,942.2
2033/34	720.0	12,512.2	13,232.2	-2,570.0	10,662.2
Total	14,632.6	126,207.5	140,840.1	-16,888.8	123,951.3

SUMMARY OF COSTS

Option	Capital £000's	Revenue £000's	Total £000's	Efficiencies £000's	Net Cost £000's	Net v BAU £000's
BAU	28,609.0	110,970.4	139,579.4	0.0	139,579.4	-
Option 1	8,489.3	116,901.2	125,390.5	-16,644.1	108,746.4	-30,833.0
Option 2	11,211.7	108,991.9	120,203.6	-26,067.5	94,136.1	-45,443.3
Option 3	14,632.6	126,207.5	140,840.1	-16,888.8	123,951.3	-15,628.1

6.12 PREFERRED WAY FORWARD

The result of the options appraisal activity is that the preferred way forward is for the Cloud Transition Programme to proceed based on a **Migrate, Optimise and Re-platform** approach, utilising **the existing commercial agreements for cloud hosting**, a **phased implementation** and using a **hybrid delivery model** which will use existing DHCW, incorporate recruitment and where required, buy in skills and expertise from third parties.

While there are marginal differences in the environmental impact of the three cloud options explored in this section, there is a marked reduction in carbon footprint compared to the on-premises scenario. This evidences that cloud migration is the most advantageous approach from an environmental perspective and the preferred way forward reflects that.

From a financial perspective the preferred option generates significant efficiencies (totalling **£26m** over the term) with an estimated cost avoidance of **£19.4m** when compared with the baseline BAU option.

7 COMMERCIAL CASE

7.1 INTRODUCTION

To meet its requirements, DHCW will be required to utilise existing commercial Agreements executed by DHCW's Commercial Services Team. This section sets out a high-level approach for the Cloud Transition Programme's commercial activities and the sourcing arrangements that are available to ensure the successful delivery of the Programme.

7.1.1 CLOUD SERVICES PROVIDERS (CSPs)

As part of its wider organisational strategy, DHCW has built capacity within its extant Agreements via two Cloud Solution Providers (CSPs) to call off cloud hosting and associated services. However, it must be noted that all call offs must be made in accordance with the constraints of each agreement. These agreements have already been conducted in line with Procurement Regulations (Public Contract Regulations 2015) and have been approved by Welsh Government and the DHCW Board. As set out in the Economic Case, the preferred way forward for the Cloud Transition Programme will be to make use of these existing arrangements. The advantage of utilising this approach is that these are existing routes to market that provide demonstrable value for money for the organisation and will allow DHCW to move quickly to "scale up" its cloud hosting capability with both CSPs. The approach of using either of these two agreements is that they provide service owners with choice around the provider which would be best placed to host services[6] and should allow DHCW to be cloud agnostic in its future design and development of services.

7.1.2 PROFESSIONAL SERVICES

In addition to the CSPs, DHCW will need to procure professional services to support the Cloud Transition Programme. Whilst there is already a body of technical knowledge within the organisation in this area, it is anticipated that additional specialist skills and expertise will be required to be outsourced to undertake the following activities:

- to facilitate the migration of certain services into the cloud
- to provide training and support for staff in new technologies
- to offer general consultancy and advice on best practice for cloud adoption, migration and optimisation.

Due to the broad range of potential requirements, DHCW will probably need to use a hybrid procurement approach to secure its requirements to support the right skills and expertise to ensure successful delivery of the Programme. These include "calling off" its extant Resourcing Framework via a series of "work-packages" to securing any additional requirements that cannot be fulfilled by this framework via mini competition processes via Crown Commercial Services, National Procurement Services and NHS SBS framework agreements. It must be noted, that to ensure that value is secured via contractual arrangements they will be subject to:

[6] In accordance with DHCW's Cloud Strategy and governance mechanisms.

- DHCW's governance arrangements.
- appropriate contract management and supplier relationship management practices are deployed.

7.1.3 NETWORK AS A SERVICE (NaaS)

A key enabler for the Cloud Transition Programme is the procurement and implementation of a Network as a Service (NaaS) solution. NaaS will provide connectivity from NHS Wales Datacentres and Networks into the CSPs hosting environments. This is a key step in ensuring that migration and optimisation activity can take place by providing stable and resilient connections (with sufficient bandwidth) into the cloud.

Activity to procure a NaaS solution is currently underway with DHCW subject matter experts developing its requirements to establish an appropriate contractual arrangement to ensure that there is sufficient flexibility to call off its requirements over a multi-year period. This procurement is subject to the OJEU Open Procedure.

8 FINANCIAL CASE

8.1 INTRODUCTION

The primary purpose of this section of the Business Case is to set out the financial implications of the preferred way forward as set out in the Economic Case.

8.2 SUNK COSTS TO DATE

The sunk costs incurred to date relate mainly to research and investigations into the estimates included within this Business Case. These will not be accounted for in this document.

8.3 SOURCE OF FUNDING

This business case seeks approval for **£4.004m** of central capital funding from Welsh Government. This funding will be utilised for the Programme costs to deliver the service transformation required for the preferred way forward. This will be supplemented by **£7.208m** of DHCW discretionary capital being allocated to fund migration activity.

In addition, there is a further requirement for additional revenue funding of £31.3m to support the ongoing delivery of services from the cloud. The business case seeks approval from Welsh Government for an average additional **£2.094m** of revenue funding on an ongoing annual basis (**£18.9m over term**) and savings target of **£12.434m** over the period. DHCW will also be providing financial support via internal budgets totalling **£77.704m**.

8.4 AFFORDABILITY

The summary requirement and proposed source of funding is presented in the table below:

Expenditure	Total £000's
Capital	
Migration	8,239.4
Cloud Connectivity Costs (NaaS)	22.3
Checkpoint Firewalls	2,640.0
Lifecycle Refresh	310.0
Total Capital costs	11,211.7
Revenue	
Migration	800.0
DC Facilities	8,477.0
Cloud Consumption	67,345.9

Software Licences	9,475.6
Hardware Operational Costs	22,893.4
Total Revenue Requirement	108,991.9
Total DHCW costs	120,203.6
Funded By	£000's
Capital	
DHCW Discretionary Allocation	-7,207.5
Welsh Government Transition Support	-4,004.2
Total Capital Funding	-11,211.7
Revenue	
DHCW Revenue	-77,704.3
Cash Releasing Benefits	-12,433.6
Welsh Government Funding Requirement	-18,854.0
Total Revenue Funding	-108,991.9
Total Funding	-120,203.6

8.5 ACCOUNTING TREATMENT

The financial case makes several assumptions which will not be confirmed with regards to financial treatment until the detailed circumstances, relationships and activity commissioned as a consequence of any procurement are finalised.

8.5.1 CAPITALISATION OF MIGRATION AND IMPLEMENTATION COSTS

The implementation costs incurred in the preferred option cloud computing arrangement which is a service contract (i.e., no Software asset is obtained under the arrangement) will be analysed to determine whether any Implementation costs should be capitalised.

In a cloud computing arrangement that is a service contract, up-front implementation costs are usually required to be expensed when the related implementation service is performed. This is because the software to be accessed in the future is not an asset controlled by the entity.

However, for DHCW the circumstances differ. It is assumed that DHCW will continue to control the internally developed software as an intangible asset, with the cost of that asset including the directly attributable costs of preparing the software for its intended use. Under paragraph 28 of International Accounting Standard (IAS) 38, these costs include employee benefits and professional fees arising directly from bringing the software to its working condition, and costs to test whether the software functions properly.

Consistent with a cloud service contract, implementation costs that give rise to a separate intangible asset under IAS 38 are also capitalised.

Therefore, the case assumes implementation costs such as testing, configuration and customisation of the software activities are capitalised because they form part of the cost of the software intangible asset.

The approach within the business case is to capitalise those qualifying activities described by the technical leads. Each cost element will require reassessment at the time of procurement to ensure consistency with IAS 38.

8.5.2 VAT RECOVERY

DHCW has submitted a provisional position to recover VAT and will continue to secure subject matter expert advice before finalising the approach. Whilst there may be potential to build a strong case for at least partial VAT recovery on the supply of this Cloud migration solution under Heading 14 of the Contracted Out Services (COS) Direction. This would cover 2 potential strands to include:-

- IT Solutions that have required extensive technical work to meet the specifications of DHCW as well as collaboration with the preferred solution provider.
- Hosting/consumption of existing solutions that support critical bespoke NHS Wales applications such as RISP, LIMS, WPAS, WPOCT etc.

The key determination on the eligibility for VAT recovery under Heading 14 is the nature of the IT services being procured. From a VAT perspective, it is irrelevant whether the costs are characterised as revenue or capital. The eligibility for VAT recovery is that the Cloud solution has been designed and developed to the specification of DHCW or, more broadly, NHS Wales. The complexity, scale and detailed specification of this IT procurement does help support the argument for potential VAT recovery on eligible costs.

The IT expenditure that is integral to the deployment of the Cloud Migration Solution so it can operate as required may also be eligible for VAT recovery under the current interpretation of Heading 14 of the COS Direction. This is based on the principle of 'dovetailing' the contracts that create the IT solution and solve the problem identified by DHCW. This may include ancillary/third-party software, security software, APIs and HPIs. It may also extend to costs relating to legacy systems that must work be operational during and post implementation.

Prudently, the business case financial profiles reflect the "gross" position assuming that VAT is non recoverable at this stage pending further investigation.

8.6 ESTIMATED CASH & NON-CASH RELEASING EFFICIENCIES

8.6.1 COST AVOIDANCE

Widespread adoption of Cloud services will allow, over time, a corresponding reduction in need for on premises infrastructure (i.e. data centre rack "footprint"). This in turn will permit savings to be realised in the large costs of procuring and maintaining these environments with the adoption of appropriate Cloud technology/services and efficient processes put in place for driving value from the Cloud. Furthermore, the adoption of Cloud services will provide opportunities for reduced reliance on capital funding as a means of supporting the organisation's infrastructure: whilst this model aligns well to a project-based organisation, it is increasingly the case that DHCW's services are achieving maturity and so there is consequently a need for a more reliable

funding model than capital to support ongoing service delivery.

8.6.2 SHIFT TO HIGH-VALUE ACTIVITIES

The current DHCW hosting model puts a significant burden on staff across operational teams in terms of routine maintenance and other low-level management tasks, such as patching of applications and operating systems, and replacement of broken hardware components. By offloading responsibility for these activities to the Cloud supplier or to the greater automation capabilities brought about by Cloud transition, these staff can be "freed-up" to focus on more productive activities. This will enable the shift to multi-functional product teams which will have an agile, end user focused approach to product delivery.

8.6.3 INCREASED RELIABILITY AND AVAILABILITY OF SERVICES

Whilst DHCW has been largely successful in delivering highly available, reliable application services to its clients, this has required, and continues to require, significant investment to achieve on premises deployments. Many of the technological approaches to delivering this are routinely available in the Cloud, where the advantages of scale are such that the larger Cloud providers can meet and exceed extremely demanding reliability and availability SLAs.

8.6.4 CARBON EMISSIONS AND ENVIRONMENTAL IMPACT

Scale also allows Cloud suppliers to invest in, and make available, more modern, energy-efficient infrastructure, and have made commitments to being powered using 100% renewable sources in the very near future along with investment in carbon offsetting practices. These, combined with the opportunity to use improved orchestration toolsets to marry service capacity with demand, will permit DHCW to reduce its overall environmental footprint.

8.6.5 QUANTIFICATION

During the business case DHCW has consulted with external subject matter experts to assess the efficiencies and benefits realisable as a consequence of the proposed preferred cloud transition option:

- Cost Avoidance: When using BAU as the baseline, some £19.4m in costs is anticipated to be avoided over the term, £17.4m of this is capital and supports the shift from a capital to a revenue-based service model.

- Cash Releasing Efficiencies: As a consequence of process efficiencies, the case sets out an obtainable target of £12.4m of cash releasing savings.

- Non-Cash Releasing Efficiencies: As a consequence of process efficiencies, the case sets out an obtainable target of £13.6m of non-cash releasing savings.

- Sustainability & Decarbonisation : Over the business case term, the "On Prem" option consistently emits around 352,050 kg CO2e annually, showing no reduction in emissions. In contrast, the preferred option initially increases emissions in the early years, but these then significantly decrease, stabilising at around 237,100 kg CO2e from FY 27/28 onwards. This reduction results in a total annual decrease of 114,900 kg CO2e by FY 33/34, making these cloud options more environmentally sustainable in the long term

compared to the steady emissions of the "On Prem" setup. The cloud alternative is targeted to achieve a total CO2 reduction of approximately 765,000 kg over 10 years compared to the "On Prem" option, making them significantly more eco-friendly choices.

8.7 ESTIMATED CAPITAL AND REVENUE COSTS – THE PREFERRED WAY FORWARD

	Total £000's	2024/25 £000's	2025/26 £000's	2026/27 £000's	2027/28 £000's	2028/29 £000's	2029/30 £000's	2030/31 £000's	2031/32 £000's	2032/33 £000's	2033/34 £000's
Expenditure											
Capital											
Migration	8,239.4	334.9	2,578.0	4,076.2	1,250.3	0.0	0.0	0.0	0.0	0.0	0.0
Cloud Connectivity Costs (NaaS)	22.3	22.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Checkpoint Firewalls	2,640.0	0.0	1,200.0	0.0	0.0	720.0	0.0	0.0	0.0	0.0	720.0
Lifecycle Refresh	310.0	160.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Capital costs	**11,211.7**	**517.2**	**3,928.0**	**4,076.2**	**1,250.3**	**720.0**	**0.0**	**0.0**	**0.0**	**0.0**	**720.0**
Revenue											
Migration	**800.0**	**50.0**	**376.0**	**374.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
DC Facilities	**8,477.0**	**1,656.4**	**1,570.4**	**1,271.4**	**1,038.4**	**738.4**	**440.4**	**440.4**	**440.4**	**440.4**	**440.4**
Cloud Consumption	**67,345.9**	**1,553.3**	**3,278.6**	**5,268.6**	**7,874.4**	**8,228.5**	**8,228.5**	**8,228.5**	**8,228.5**	**8,228.5**	**8,228.5**
Software Licences	**9,475.6**	**2,038.6**	**2,165.0**	**991.0**	**843.0**	**573.0**	**573.0**	**573.0**	**573.0**	**573.0**	**573.0**
Hardware Operational Costs	**22,893.4**	**2,456.2**	**3,091.8**	**2,289.0**	**2,284.8**	**2,128.6**	**2,128.6**	**2,128.6**	**2,128.6**	**2,128.6**	**2,128.6**
Total Revenue Requirement	**108,991.9**	**7,754.5**	**10,481.8**	**10,194.0**	**12,040.6**	**11,668.5**	**11,370.5**	**11,370.5**	**11,370.5**	**11,370.5**	**11,370.5**
Total DHCW costs	**120,203.6**	**8,271.7**	**14,409.8**	**14,270.2**	**13,290.9**	**12,388.5**	**11,370.5**	**11,370.5**	**11,370.5**	**11,370.5**	**12,090.5**
Funded By											

	Total £000's	2024/25 £000's	2025/26 £000's	2026/27 £000's	2027/28 £000's	2028/29 £000's	2029/30 £000's	2030/31 £000's	2031/32 £000's	2032/33 £000's	2033/34 £000's
Capital											
DHCW Discretionary Allocation	-7,207.5	-517.2	-2,000.0	-2,000.0	-1,250.3	-720.0	0.0	0.0	0.0	0.0	-720.0
Welsh Government Transition Support	-4,004.2	0.0	-1,928.0	-2,076.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Capital Funding	**-11,211.7**	**-517.2**	**-3,928.0**	**-4,076.2**	**-1,250.3**	**-720.0**	**0.0**	**0.0**	**0.0**	**0.0**	**-720.0**
Revenue											
DHCW Revenue	-77,704.3	-7,754.5	-7,772.2	-7,772.2	-7,772.2	-7,772.2	-7,772.2	-7,772.2	-7,772.2	-7,772.2	-7,772.2
Cash Releasing Benefits	-12,433.6	0.0	0.0	0.0	-478.2	-956.4	-1,434.6	-1,912.9	-1,912.9	-2,869.3	-2,869.3
Welsh Government Funding Requirement	-18,854.0	0.0	-2,709.6	-2,421.8	-3,790.2	-2,939.9	-2,163.7	-1,685.4	-1,685.4	-729.0	-729.0
Total Revenue Funding	**-108,991.9**	**-7,754.5**	**-10,481.8**	**-10,194.0**	**-12,040.6**	**-11,668.5**	**-11,370.5**	**-11,370.5**	**-11,370.5**	**-11,370.5**	**-11,370.5**
Total Funding	**-120,203.6**	**-8,271.7**	**-14,409.8**	**-14,270.2**	**-13,290.9**	**-12,388.5**	**-11,370.5**	**-11,370.5**	**-11,370.5**	**-11,370.5**	**-12,090.5**

9 MANAGEMENT CASE

9.1 PROGRAMME MANAGEMENT

The Cloud Transition Programme (CTP) Team will need to be established. Due to the complexities and time constraints, it will require significant capabilities and experience in Cloud transformations and will need both internal SMEs as well as 3rd party partners to support the delivery. It is proposed that the team is made up of a blend of in-house resources that are allocated full time and expert consultants. A suitably senior Programme Lead and Project Managers will be appointed to lead this programme.

The programme will be structured by a series of projects to transfer products, services, data and information to the cloud. It will also require a change management focus throughout. A series of projects will set up to manage this in priority order, as determined by the CTP board. Archiving and decommissioning are dependent on the transfer of services being complete and once complete will enable programme closure.

It should be noted that for all products and services, the treatment has been identified through a series of workshops. The majority will be rehost or replatform, with a lesser proportion being refactor or repurchase. As the programme progresses, treatment options will be confirmed once a more detailed assessment has been completed.

9.2 PROJECT MANAGEMENT

The transfer of DHCW services to the cloud will in some cases impact on external organisations and end users. This will require, planning, engagement and strong communications as well as effective decision making. This can be achieved through the creation of smaller projects, which will conduct weekly checkpoints and regular workshops to ensure that there is agreed prioritisation of programme activity, aligned plans and mechanisms to raise and mitigate risks.

9.3 GOVERNANCE STRUCTURE

A governance structure will be implemented which gives the programme strategic oversight from across the organisation.

- The Programme Sponsor will be the Executive Director of Operations.
- The Senior Responsible Owner (SRO) will be the Chief Cloud Officer.
- The Delivery Lead will be the Associate Director of Digital Delivery. The programme team will report into them.
- Senior Users will be appointed from DHCW, this will include from key areas across the organisation and other major programmes of work such as the National Data Resource, Digital Services for Patients and the Public, and the Primary, Community and Mental Health Directorate.
- A representative from the Directors of Digital group will represent NHS Wales organisations
- Senior Suppliers will be appointed as required at different stages of the programme

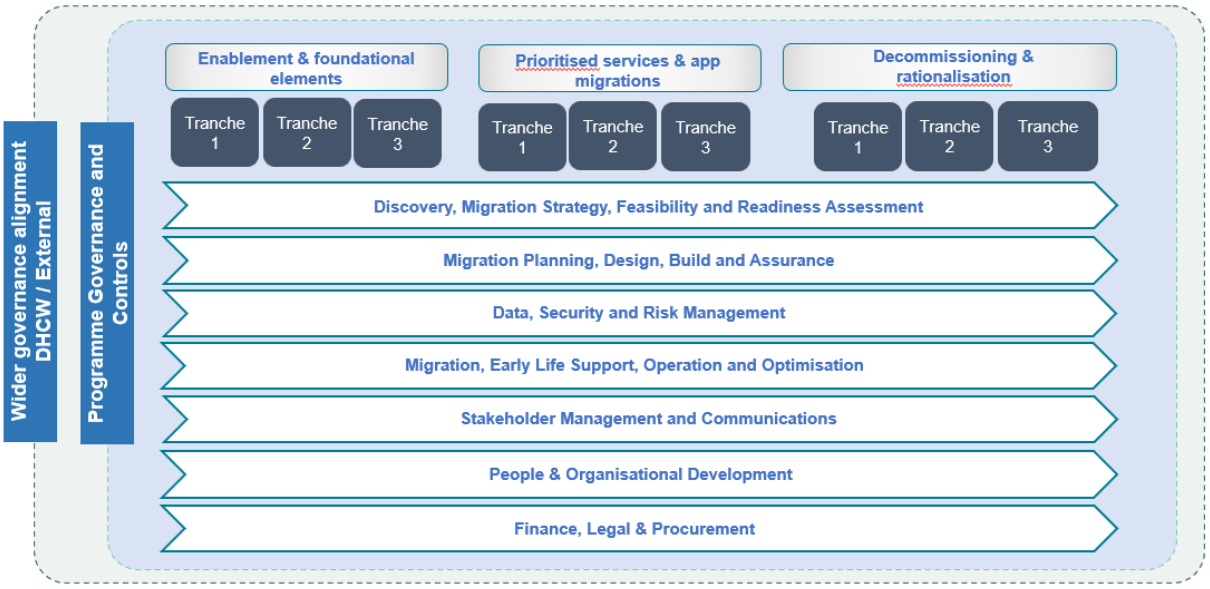
Representation from each key group that is impacted by any change at the programme's boards will allow all escalated issues and risks to be addressed without delay. To meet this need, the following structure is proposed:

- Cloud Transition Programme Board
    - It is proposed that the structure will provide the internal governance to deliver the programme of work, as a Service Provider to the wider health sector, DHCW will be working in a complex political landscape, and will be required to navigate the different strategic needs and priorities of multiple external partners
- Project Delivery Boards

- There will be a series of smaller project boards that govern the successful delivery of the specific projects that sit within the programme. These will ensure that risks are effectively managed along with any dependencies both intra programme and external to the programme. Each project will have a sponsor or lead that will act as chair. Any suppliers will also attend the board and their delivery held to account. These boards will provide and update and escalation into the CTP Programme Board.

9.4 PROJECT IMPLEMENTATION PLAN

The Programme Design is currently depicted below. A more detailed implementation plan and timeline will be developed as the Programme exits its initiation phase.



9.5 BENEFITS MANAGEMENT

The classifications of programme benefits will include, but not be limited to, technological, financial, and operational outcomes. Consequently, ownership of the benefits case will sit across DHCW and will not reside within one group alone. These will be monitored by CTP Programme Team and Digital Delivery Team and reviewed at appropriate points of implementation, as agreed with the CAP Programme Board.

9.6 RISK MANAGEMENT

The programme will operate an effective Risk Management process where risks, issues, dependencies and constraints will be logged in a RAID log and mitigations identified or escalated where appropriate.
The Project Teams will record all risks, issues, impact assess and identify valid mitigations for resolution. Any mitigations that are not within the control of the project will be escalated appropriately to the CTP Programme Board.

10 DEFINITIONS

Abbreviation	Definition	Abbreviation	Definition
BAU	Business as Usual	COS	Contracted Out Services
CSP	Cloud Service Provider	CTP	Cloud Transition Programme
CVAD	Citrix Virtual Apps and Desktop	DC1	Data Centre 1
DC2	Data Centre 2	DHCW	Digital Health and Care Wales
FaaS	Function as a Service	IaaS	Infrastructure as a Service
IAS	International Accounting Standard(s)	IMP	Implementation Option(s)
ITLM	Information Technology Lifecycle Management	NaaS	Network as a Service
NWIS	NHS Wales Informatics Service	PaaS	Platform as a Service
PBC	Programme Business Case	SCO	Scoping Option(s)
SDO	Service Delivery Option(s)	SRO	Senior Responsible Owner
TCO	Total Cost of Ownership	TSO	Technical Solution Option(s)

11 APPENDICIES

11.1 OPTION COST APPRAISAL

BAU

	£000's										
	Total	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Capital											
Migration	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Datacentre Migration	2,400.0	0.0	0.0	0.0	1,200.0	0.0	0.0	0.0	1,200.0	0.0	0.0
DC Migration ACI Equipment Refresh	2,881.0	0.0	0.0	0.0	1,440.0	0.0	0.0	0.0	1,440.0	0.0	1.0
Checkpoint Firewalls	3,120.0	0.0	1,200.0	0.0	0.0	720.0	0.0	0.0	0.0	0.0	1,200.0
Lifecycle Refresh	20,208.0	1,390.0	4,924.0	2,180.0	860.0	750.0	1,390.0	4,924.0	2,180.0	860.0	750.0
Total Capital costs	28,609.0	1,390.0	6,124.0	2,180.0	3,500.0	1,470.0	1,390.0	4,924.0	4,820.0	860.0	1,951.0
Migration											
Training	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC Facilities											
On Prem Data Centre Costs (Power & Rack Costs)	15,966.0	1,713.0	1,569.0	1,575.0	1,581.0	1,588.0	1,588.0	1,588.0	1,588.0	1,588.0	1,588.0
Datacentre Migration	3,840.0	0.0	0.0	0.0	1,920.0	0.0	0.0	0.0	1,920.0	0.0	0.0
	19,806.0	1,713.0	1,569.0	1,575.0	3,501.0	1,588.0	1,588.0	1,588.0	3,508.0	1,588.0	1,588.0
Cloud Consumption											
Existing Cloud Spend (Azure)	18,760.9	1,183.0	1,301.0	1,431.0	1,575.0	1,720.0	1,892.0	2,081.2	2,289.3	2,518.3	2,770.1
Existing Cloud Spend (GCP)	12,186.3	570.3	684.4	821.3	985.5	1,182.6	1,300.9	1,431.0	1,574.1	1,731.5	1,904.7
Cloud Hosting Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	30,947.2	1,753.3	1,985.4	2,252.3	2,560.5	2,902.6	3,192.9	3,512.2	3,863.4	4,249.8	4,674.8
Software Licences											
VMWARE Costs	4,360.0	760.0	720.0	360.0	360.0	360.0	360.0	360.0	360.0	360.0	360.0
Software Assurance	7,216.6	526.6	577.0	688.0	739.0	781.0	781.0	781.0	781.0	781.0	781.0
ESU	720.0	0.0	0.0	60.0	240.0	60.0	0.0	0.0	60.0	240.0	60.0
SQL Farm Licencing	2,617.0	112.0	255.0	265.0	275.0	285.0	285.0	285.0	285.0	285.0	285.0
Citrix/Parallels RAS Licences	5,654.0	688.0	804.0	571.0	513.0	513.0	513.0	513.0	513.0	513.0	513.0
	20,567.6	2,086.6	2,356.0	1,944.0	2,127.0	1,999.0	1,939.0	1,939.0	1,999.0	2,179.0	1,999.0
Hardware Operational Costs											
On Prem Hardware Growth	1,410.0	75.0	97.0	119.0	141.0	163.0	163.0	163.0	163.0	163.0	163.0
Network Support Costs	3,421.6	274.0	287.0	330.0	346.6	364.0	364.0	364.0	364.0	364.0	364.0
Checkpoint Firewalls	12,360.0	790.0	1,005.0	1,230.0	1,235.0	1,350.0	1,350.0	1,350.0	1,350.0	1,350.0	1,350.0
Hardware Support	10,178.0	1,255.0	1,275.0	1,187.0	923.0	923.0	923.0	923.0	923.0	923.0	923.0
Lifecycle Refresh	12,280.0	100.0	2,680.0	1,090.0	1,130.0	1,140.0	100.0	2,680.0	1,090.0	1,130.0	1,140.0
	39,649.6	2,494.0	5,344.0	3,956.0	3,775.6	3,940.0	2,900.0	5,480.0	3,890.0	3,930.0	3,940.0
Total Revenue Requirement	110,970.4	8,046.9	11,254.4	9,727.3	11,964.1	10,429.6	9,619.9	12,519.2	13,260.4	11,946.8	12,201.8
Total DHCW costs	139,579.4	9,436.9	17,378.4	11,907.3	15,464.1	11,899.6	11,009.9	17,443.2	18,080.4	12,806.8	14,152.8

Option 1

	£000's										
	Total	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Capital											
Migration	5,517.0	334.9	1,897.4	2,715.0	569.7	0.0	0.0	0.0	0.0	0.0	0.0
Cloud Connectivity Costs (NaaS)	22.3	22.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Checkpoint Firewalls	2,640.0	0.0	1,200.0	0.0	0.0	720.0	0.0	0.0	0.0	0.0	720.0
Lifecycle Refresh	310.0	160.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Capital costs	8,489.3	517.2	3,247.4	2,715.0	569.7	720.0	0.0	0.0	0.0	0.0	720.0
Migration											
Training	800.0	50.0	376.0	374.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	800.0	50.0	376.0	374.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC Facilities											
On Prem Data Centre Costs (Power & Rack Costs)	6,507.4	1,656.4	1,370.0	1,071.0	672.0	538.0	240.0	240.0	240.0	240.0	240.0
Cloud Connectivity Costs (NaaS)	1,803.6	0.0	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4
	8,311.0	1,656.4	1,570.4	1,271.4	872.4	738.4	440.4	440.4	440.4	440.4	440.4
Cloud Consumption											
Existing Cloud Spend (Azure)	11,812.0	983.0	871.0	1,001.0	1,145.0	1,302.0	1,302.0	1,302.0	1,302.0	1,302.0	1,302.0
Existing Cloud Spend (GCP)	10,157.1	570.3	684.4	821.3	985.5	1,182.6	1,182.6	1,182.6	1,182.6	1,182.6	1,182.6
Cloud Hosting Costs	53,603.1	0.0	2,035.6	4,071.1	6,785.2	6,785.2	6,785.2	6,785.2	6,785.2	6,785.2	6,785.2
	75,572.2	1,553.3	3,591.0	5,893.4	8,915.7	9,269.8	9,269.8	9,269.8	9,269.8	9,269.8	9,269.8
Software Licences											
VMWARE Costs	2,020.0	760.0	720.0	360.0	180.0	0.0	0.0	0.0	0.0	0.0	0.0
Software Assurance	1,583.6	526.6	577.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
ESU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SQL Farm Licencing	128.0	64.0	64.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Citrix/Parallels RAS Licences	5,654.0	688.0	804.0	571.0	513.0	513.0	513.0	513.0	513.0	513.0	513.0
	9,385.6	2,038.6	2,165.0	991.0	753.0	573.0	573.0	573.0	573.0	573.0	573.0
Hardware Operational Costs											
On Prem Hardware Growth	331.0	75.0	97.0	119.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0
Network Support Costs	1,148.4	151.2	166.8	96.0	100.8	105.6	105.6	105.6	105.6	105.6	105.6
Checkpoint Firewalls	11,852.0	818.0	1,093.0	1,293.0	1,298.0	1,225.0	1,225.0	1,225.0	1,225.0	1,225.0	1,225.0
Hardware Support	4,404.0	1,255.0	1,335.0	441.0	185.0	198.0	198.0	198.0	198.0	198.0	198.0
Lifecycle Refresh	5,097.0	157.0	400.0	340.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
	22,832.4	2,456.2	3,091.8	2,289.0	2,223.8	2,128.6	2,128.6	2,128.6	2,128.6	2,128.6	2,128.6
Total Revenue Requirement	116,901.2	7,754.5	10,794.2	10,818.8	12,764.9	12,709.8	12,411.8	12,411.8	12,411.8	12,411.8	12,411.8
Total DHCW costs	125,390.5	8,271.7	14,041.6	13,533.8	13,334.6	13,429.8	12,411.8	12,411.8	12,411.8	12,411.8	13,131.8

Option 2

	£000's										
	Total	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Capital											
Migration	8,239.4	334.9	2,578.0	4,076.2	1,250.3	0.0	0.0	0.0	0.0	0.0	0.0
Cloud Connectivity Costs (NaaS)	22.3	22.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Checkpoint Firewalls	2,640.0	0.0	1,200.0	0.0	0.0	720.0	0.0	0.0	0.0	0.0	720.0
Lifecycle Refresh	310.0	160.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Capital costs	11,211.7	517.2	3,928.0	4,076.2	1,250.3	720.0	0.0	0.0	0.0	0.0	720.0
Migration											
Training	800.0	50.0	376.0	374.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	800.0	50.0	376.0	374.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC Facilities											
On Prem Data Centre Costs (Power & Rack Costs)	6,673.4	1,656.4	1,370.0	1,071.0	838.0	538.0	240.0	240.0	240.0	240.0	240.0
Cloud Connectivity Costs (NaaS)	1,803.6	0.0	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4
	8,477.0	1,656.4	1,570.4	1,271.4	1,038.4	738.4	440.4	440.4	440.4	440.4	440.4
Cloud Consumption											
Existing Cloud Spend (Azure)	11,812.0	983.0	871.0	1,001.0	1,145.0	1,302.0	1,302.0	1,302.0	1,302.0	1,302.0	1,302.0
Existing Cloud Spend (GCP)	10,157.1	570.3	684.4	821.3	985.5	1,182.6	1,182.6	1,182.6	1,182.6	1,182.6	1,182.6
Cloud Hosting Costs	45,376.8	0.0	1,723.2	3,446.3	5,743.9	5,743.9	5,743.9	5,743.9	5,743.9	5,743.9	5,743.9
	67,345.9	1,553.3	3,278.6	5,268.6	7,874.4	8,228.5	8,228.5	8,228.5	8,228.5	8,228.5	8,228.5
Software Licences											
VMWARE Costs	2,110.0	760.0	720.0	360.0	270.0	0.0	0.0	0.0	0.0	0.0	0.0
Software Assurance	1,583.6	526.6	577.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
ESU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SQL Farm Licencing	128.0	64.0	64.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Citrix/Parallels RAS Licences	5,654.0	688.0	804.0	571.0	513.0	513.0	513.0	513.0	513.0	513.0	513.0
	9,475.6	2,038.6	2,165.0	991.0	843.0	573.0	573.0	573.0	573.0	573.0	573.0
Hardware Operational Costs											
On Prem Hardware Growth	392.0	75.0	97.0	119.0	101.0	0.0	0.0	0.0	0.0	0.0	0.0
Network Support Costs	1,148.4	151.2	166.8	96.0	100.8	105.6	105.6	105.6	105.6	105.6	105.6
Checkpoint Firewalls	11,852.0	818.0	1,093.0	1,293.0	1,298.0	1,225.0	1,225.0	1,225.0	1,225.0	1,225.0	1,225.0
Hardware Support	4,404.0	1,255.0	1,335.0	441.0	185.0	198.0	198.0	198.0	198.0	198.0	198.0
Lifecycle Refresh	5,097.0	157.0	400.0	340.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
	22,893.4	2,456.2	3,091.8	2,289.0	2,284.8	2,128.6	2,128.6	2,128.6	2,128.6	2,128.6	2,128.6
Total Revenue Requirement	108,991.9	7,754.5	10,481.8	10,194.0	12,040.6	11,668.5	11,370.5	11,370.5	11,370.5	11,370.5	11,370.5
Total DHCW costs	120,203.6	8,271.7	14,409.8	14,270.2	13,290.9	12,388.5	11,370.5	11,370.5	11,370.5	11,370.5	12,090.5

Option 3

	£000's										
	Total	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Capital											
Migration	10,460.3	801.9	3,535.8	3,016.4	2,726.4	379.8	0.0	0.0	0.0	0.0	0.0
Data Centre Migration	480.0	0.0	480.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC Migration ACI Equipment Refresh	720.0	0.0	720.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cloud Connectivity Costs (NaaS)	22.3	22.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Checkpoint Firewalls	2,640.0	0.0	1,200.0	0.0	0.0	720.0	0.0	0.0	0.0	0.0	720.0
Lifecycle Refresh	310.0	160.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Capital costs	14,632.6	984.2	6,085.8	3,016.4	2,726.4	1,099.8	0.0	0.0	0.0	0.0	720.0
Migration											
Training	800.0	50.0	376.0	374.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	800.0	50.0	376.0	374.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC Facilities											
On Prem Data Centre Costs (Power & Rack Costs)	6,507.4	1,656.4	1,370.0	1,071.0	672.0	538.0	240.0	240.0	240.0	240.0	240.0
Cloud Connectivity Costs (NaaS)	1,803.6	0.0	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4
	8,311.0	1,656.4	1,570.4	1,271.4	872.4	738.4	440.4	440.4	440.4	440.4	440.4
Cloud Consumption											
Existing Cloud Spend (Azure)	11,812.0	983.0	871.0	1,001.0	1,145.0	1,302.0	1,302.0	1,302.0	1,302.0	1,302.0	1,302.0
Existing Cloud Spend (GCP)	10,157.1	570.3	684.4	821.3	985.5	1,182.6	1,182.6	1,182.6	1,182.6	1,182.6	1,182.6
Cloud Hosting Costs	61,970.4	1,721.4	5,164.2	6,885.6	6,885.6	6,885.6	6,885.6	6,885.6	6,885.6	6,885.6	6,885.6
	83,939.5	3,274.7	6,719.6	8,707.9	9,016.1	9,370.2	9,370.2	9,370.2	9,370.2	9,370.2	9,370.2
Software Licences											
VMWARE Costs	2,310.0	760.0	720.0	360.0	270.0	200.0	0.0	0.0	0.0	0.0	0.0
Software Assurance	1,583.6	526.6	577.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
ESU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SQL Farm Licencing	128.0	64.0	64.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Citrix/Parallels RAS Licences	5,654.0	688.0	804.0	571.0	513.0	513.0	513.0	513.0	513.0	513.0	513.0
	9,675.6	2,038.6	2,165.0	991.0	843.0	773.0	573.0	573.0	573.0	573.0	573.0
Hardware Operational Costs											
On Prem Hardware Growth	475.0	75.0	97.0	119.0	101.0	83.0	0.0	0.0	0.0	0.0	0.0
Network Support Costs	1,148.4	151.2	166.8	96.0	100.8	105.6	105.6	105.6	105.6	105.6	105.6
Checkpoint Firewalls	11,852.0	818.0	1,093.0	1,293.0	1,298.0	1,225.0	1,225.0	1,225.0	1,225.0	1,225.0	1,225.0
Hardware Support	4,909.0	1,255.0	1,335.0	646.0	435.0	248.0	198.0	198.0	198.0	198.0	198.0
Lifecycle Refresh	5,097.0	157.0	400.0	340.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
	23,481.4	2,456.2	3,091.8	2,494.0	2,534.8	2,261.6	2,128.6	2,128.6	2,128.6	2,128.6	2,128.6
Total Revenue Requirement	126,207.5	9,475.9	13,922.8	13,838.3	13,266.3	13,143.2	12,512.2	12,512.2	12,512.2	12,512.2	12,512.2
Total DHCW costs	140,840.1	10,460.1	20,008.6	16,854.7	15,992.7	14,243.0	12,512.2	12,512.2	12,512.2	12,512.2	13,232.2

11.2 OPTION BENEFITS APPRAISAL

Option 1

£000's											
	Total	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Cost Avoidance	14,188.9	1,165.2	3,336.8	-1,626.5	2,129.5	-1,530.2	-1,401.9	5,031.4	5,668.6	395.0	1,021.0
Effiencies	9,183.9	0.0	0.0	489.5	1,181.7	1,873.8	1,586.9	1,300.0	1,300.0	726.1	726.1
Cash Releasing	7,460.2	0.0	0.0	0.0	286.9	573.9	860.8	1,147.7	1,147.7	1,721.6	1,721.6
	30,833.0	1,165.2	3,336.8	-1,137.0	3,598.1	917.5	1,045.8	7,479.1	8,116.3	2,842.7	3,468.7

Option 2

£000's											
	Total	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Cost Avoidance	19,375.8	1,165.2	2,968.6	-2,362.9	2,173.2	-488.9	-360.6	6,072.7	6,709.9	1,436.3	2,062.3
Effiencies	13,633.9	0.0	0.0	1,468.6	2,091.8	2,715.1	2,236.9	1,758.6	1,758.6	802.2	802.2
Cash Releasing	12,433.6	0.0	0.0	0.0	478.2	956.4	1,434.6	1,912.9	1,912.9	2,869.3	2,869.3
	45,443.3	1,165.2	2,968.6	-894.3	4,743.2	3,182.6	3,310.9	9,744.2	10,381.4	5,107.8	5,733.8

Option 3

£000's											
	Total	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Cost Avoidance	-1,260.7	-1,023.2	-2,630.2	-4,947.4	-528.6	-2,343.4	-1,502.3	4,931.0	5,568.2	294.6	920.6
Effiencies	9,093.9	0.0	0.0	367.1	1,101.4	1,948.3	1,613.6	1,326.6	1,326.6	705.0	705.0
Cash Releasing	7,794.9	0.0	0.0	0.0	0.0	621.7	956.4	1,243.4	1,243.4	1,865.0	1,865.0
	15,628.1	-1,023.2	-2,630.2	-4,580.3	572.8	226.6	1,067.7	7,501.0	8,138.2	2,864.6	3,490.6

12 ATTACHMENTS

N/A