APPENDIX ONE

SSA IT Investment Strategy 2020 - 2024

1. Contents

2. Introduction

2.1. Executive summary

In January 2015, Richmond and Wandsworth Councils announced their intention to develop a Shared Staffing Arrangement (SSA) serving both organisations. A joint IT Strategy was agreed, and an IT programme established to help implement the SSA and support the desired state of 'joined-up IT systems' by 2019. The previously disparate IT Infrastructures of Richmond and Wandsworth have now largely been merged including:

- Joined Network
- Single Telephony Switch
- Single vendor firewalls
- Single vendor Anti-Virus
- Single Domain space
- Single Hyper-converged server estate

In March 2020, The SSA advised staff to work from home as per UK government advice for Covid-19. Work is underway to determine the scale of future flexible working within the SSA but it can be assumed that, in line with trends pre coronavirus this will be more extensive from now on [flexible working encompassing a work anywhere approach – in the office, on site, at home, from Council partner offices etc].

To enable this, IT Infrastructure must evolve from being primarily positioned to deliver an end to end controlled environment (council network/datacentre centric) to a partially controlled environment (home wifi/cloud-centric). Such a shift must maintain the highest levels of information and data security. Any such change should aim to minimise the performance gap between office and remote access and wherever possible, improve the experience.

Whilst remote working strategies have been in place throughout the formation of the SSA; certain workstreams have been accelerated or modified in consideration of the new guidance such as faster adoption of Microsoft Teams and increased capacity/compute power for Remote Access.

Any investment in IT at the Council must have improving service delivery to our residents as a core overarching objective. The changes proposed in this strategy are compatible with that objective - a move of corporate infrastructure to the cloud is considered the best way for the Council to continue to provide a cost effective, secure and future proofed platform for its IT so that it can continue to innovate and modernise online engagements and interactions with all service users.

2.2.Technology Investment Principles

The supporting technology suite for the IT SSA will be selected based on the optimal balance of the following principles: -

- Flexibility for home or office working and location-independent performance, leading to a more effective workforce better able to improve service delivery to residents and other users
- Resilience
- Security
- Cloud and Software as Service (SaaS) first
- **'Microsoft first'** – the SSA has signed an Enterprise Agreement software licensing arrangement with Microsoft and intends to use Office365 and Azure services moving forward. It is recommended that the SSA leverage this offering by adopting a 'Microsoft first' approach when evaluating technologies. It should be noted that although such an approach will realise economies of scale, there are some areas where such an approach might not be advisable. Particular care should be taken when evaluating technologies that are not mature, or technologies where network security is weak

3. Business Context

Whilst a move to remote working might cause some minor operational problems in the short term, the ability to augment remote working styles with a more agile, flexible and cost-effective infrastructure represents an opportunity for IT to accelerate current transformational workstreams. Services across the SSA have adopted 'Cloud-First' as a principle for new application purchases. Cloud represents an opportunity for applications to be delivered in a modern feature-rich fashion while providing access without the need for complex VPN (remote access) Technology.

Whilst Cloud-based applications continue to become the norm (such as the now-ubiquitous Office365) the business strategy for flexible working style should now drive all elements of IT Infrastructure to a cloud-first approach. As such, Telephony and raw server Infrastructure should be considered for accelerated migration to cloud platforms.

With disparate computing domains across two different councils, such cloud migrations have previously been difficult to enact. Such concerns have been addressed by the previous strategy, which was largely focussed on rationalising infrastructure across the two Councils and are no longer a concern for Cloud migrations.

New working patterns also bring new security challenges. IT security is therefore addressed in a way to compliment the increased ways of working and rather than seen as a potential blocker; security should now enable new technologies.

4. Information Technology

Technologies listed in the strategy have been chosen to allow flexible and collaborative work styles. SSA IT has a considerable ongoing investment in Microsoft through their Enterprise Agreement (EA) and it is recommended that the SSA leverage this offering by adopting a 'Microsoft first' approach when evaluating technologies. It should be noted that although such an approach will realise economies of scale, there are some areas where such an approach might not be advisable. Care should be taken when evaluating technologies that are not mature, or technologies where network security is weak

5.1 Cloud-based modern data centre – Infrastructure as a Service (IaaS)

Whilst IT continues to recommend the adoption of modern cloud-based Software as a Service (SaaS) based applications (such as Office 365) for their ease of use and agility for remote workers, the datacentres continue to be based on-premise. Though hosted on modern hyper-converged Infrastructure (which allows for servers to move between Richmond and Wandsworth in DR situations automatically), on-premise data centres offer the following challenges:

- **Scalability**. Quantity of servers must be 'right-sized' at time of purchase. To ensure capacity, excess servers are often purchased. This investment, of course, cannot be flexed down.
- **Reliance on Facilities and other physical staff.** Power issues and air condition are a traditional concern for on-premise datacentres. Power issues have been seen at Richmond Council with two data centre outages over 2019/2020.
- **Cost** Data Centre technology needs to be replaced in typically 3-5-year cycles. Hardware is, therefore, a significant investment as well as staff costs for procurement exercises and general physical maintenance. Other significant costs include power for servers and electricity with the resultant carbon footprint. Costs for data centre power are expected to reduce by £100,000 per annum whilst Microsoft report their data centres are as much as 93 percent more energy efficient and as high as 98 percent more carbon efficient. This is due to Microsoft's extensive investments in IT efficiency from chip-to-datacentre infrastructure, as well as renewable energy. Microsoft hope to be 'carbon negative' by 2030.

Cloud computing in the form of Infrastructure as a Service (IaaS) is an alternative model to on-premise data centres and offers the following advantages:

- Payment is on demand for **scalable** computing. The organisation would only pay for what is used. In times of high demand, systems can quickly be scaled up and scaled down. Such scalability would be advantageous for the Council in emergencies as was seen with Covid-19. It also allows for maximum flexibility for future business strategies.
- Power. air conditioning, all other environmental controls and support staff **are all the responsibility of the cloud provider**. Cloud providers have economies of scale in this area and typically have the most advanced and resilient Infrastructure.
- **Cost**. No capital investments have to be made for server infrastructure, or any purchases made are significantly reduced.

It is calculated that moving to the cloud could save ***up to*** £**144k per year** by year 2 of adoption with an **initial investment of £365k** in year one (see Appendix A **7.1,7.1.2**)

It is therefore recommended that Corporate IT look to migrate their existing Infrastructure to Cloud-based from **Q4 2020 -Q4 2021** (see Appendix A**7.1.2**) **.**

Initial exercises focus on discovery and analysis of existing applications. Applications will be classified in terms of the portability to the cloud, and wherever possible duplication can be removed. It is estimated this exercise will cost an **additional 56k**(see Appendix A 7.1.3)

By moving to cloud-based Infrastructure, IT can move away from dependencies on physical infrastructure maintenance as well as costly procurement exercises. Cloud-based Infrastructure also allows new opportunities for modern data analytics discussed below in 5.1.1.

5.1.1 Cloud-Based Analytics

Over the last two years, the SSA has continued to make progress in centralising data and analysing data sets for new insight. At the time of writing one data science pilot is nearing completion and a further pilot is underway with Cynozure and Amazon Web Services (AWS).

Whilst existing data is extracted from Enterprise SQL databases, running actual analysis is carried out in a different environment. This is typically in a data warehouse or data lake. Data can, therefore, be analysed without affecting production as well as the area containing the analytical tools necessary. AWS are currently supplying this functionality as a funded exercise.

Any future data projects will require a dedicated area for data extraction, transformation, and analysis. Such areas can be purchased as an adjunct to Cloud IaaS.

It is therefore recommended that an additional Datawarehouse/lake is purchased in addition to Cloud Infrastructure **5.1.**

It is estimated that additional data warehouse costs will be £**50k per annum. This will be a revenue figure on the cloud on going costs.**

By adopting a Data Warehouse, data scientists and analysts will be free to extract insight from rich data sets in Wandsworth and Richmond Councils in order to identify service improvements.

5.1.2 Monitoring in the Cloud

Monitoring continues to be a reactive enterprise. Disk usage or high CPU will often be reported on as real-time events, analysed by engineers but after an incident. Event-driven reporting, though helpful for retrospective analysis, does not prevent outages.

Modern Cloud-based monitoring system can utilise predictive log analytics to pre-empt problems on Infrastructure using Machine Learning (ML) algorithms.

After migrating Infrastructure to the cloud, it is recommended that modern predictive monitoring tools are deployed to the estate. Costs are estimated to be £58k and are included in Year 1 of Cloud Migration.

By utilising Cloud Monitoring we will be able to predict faults more accurately and take preventative action. Monitoring also allows us to see high cost applications in terms of compute and storage costs.

5.2 Flexible Wide Area Network (WAN)

The Wide Area Network (WAN) consists of all parts of the network not directly associated with Wandsworth and Richmond main campuses. Whilst previously more focus might have been applied to the Local Area Network (LAN), for reasons explained in sections **2.1** and **3 ,** future strategies will involve a focus on improving WAN services.

Current WAN users consist of both home working staff and remote office staff.

Individuals working at home are currently well placed to take advantage of WAN technology when using Windows 10 in conjunction with Direct Access (DA). DA uses the concept of 'split tunnelling' only traffic that needs to be routed to the SSA data centre gets routed back. Any other traffic goes directly to the cloud or hosting provider from the individual's location. An example might be Office 365 traffic that would follow a path directly from the individuals home broadband to Microsoft. This gives advantages on performance with fewer hops being involved as well as reducing complexity for IT staff in terms of infrastructure management. In this case, the limitation would be the users' broadband, which IT recommend should be upgraded to Fibre to the Cabinet (FTTC) or 'superfast' wherever possible. DA is, therefore, well placed to meet the aim of minimising the performance gap between office and remote access. It should be noted that at time of writing both ingress bandwidth to the Council and DA compute power have been increased to their maximum levels, the consequences of which are increasing network bills should we continue to work in a legacy shared network fashion.

Remote sites continue to use a Multiprotocol Label Switching [MPLS] based WAN. MPLS provides a direct point to point connections to the SSA data centres. Any cloud access for services such as office 365, therefore, must traverse the SSA IT Infrastructure. Whilst this works well in most cases, performance improvements can be gained by routing the traffic directly to the cloud provider, as mentioned in the previous paragraph. MPLS cannot provide this currently and bringing on and removing circuits from the current contract is both costly and time-consuming.

Software-Defined WAN(SD-WAN) is an agile technology that only aims to tunnel back traffic that is required much in the same way as Direct Access, over inexpensive internet links. SD-WAN has the advantage of being able to add quality of service measures to sites that might have multiple users competing on the same internet link.

It is therefore recommended that during Q4 2020 through to 2021, existing remote sites should be migrated to SD-WAN wherever possible.

SD-WAN involves a one-off capital spend on hardware as well as relatively cheap data circuits.

Current costs for MPLS WAN are £168k per annum for Wandsworth and £120k for Richmond. It is estimated that 90% of circuits can be migrated to SD-WAN. This would see cost reductions on circuit rental (expected 75% reduction) but additional costs for SD-WAN compliant hardware.

Hardware costs for SD-WAN are estimated to be a capital spend of £**192k**(see Appendix A7.2) with a lifetime of 5 years.

By investing in SD-WAN remote council sites will have more guaranteed performance to cloud based services.

5.3 Telecoms

Office 365 tools continue to form the basis of SSA collaboration. The primary tools used have been both Skype and Microsoft Teams. Whilst Skype is useful for quick video or voice calls, Microsoft Teams offers more opportunities to collaborate, such as sharing/editing documents real-time and integration with SharePoint. It is for this reason that our corporate approach is to encourage the use of Microsoft Teams for all collaboration and communication moving forward, recognising that nevertheless there will be circumstances where other tools are needed such as Zoom or Google Hangouts.

Previous telecoms strategies have successfully merged the telecoms switches across both councils. Having one telecoms switch means the adoption of Session Initiation Protocol (SIP)trunks has been possible and indeed SIP trunks are earmarked for delivery during Q3 2020. SIP trunks give the added flexibility of being able to integrate with software-defined telecom platforms such as Microsoft Teams. By merging modern SIP trunks with Microsoft Teams, end-users could associate their DDI number with their Teams account. They would then be able to make calls to any known DDI number from their laptop. Users would streamline into having one device for collaboration that encompasses their entire inline and telecoms identity. As this technology can be used independent of location, the need for different handsets on site is also reduced.

It is therefore recommended that Microsoft Teams be integrated directly with SIP trunks during Q2 and Q3 2020 whilst handsets are phased out in parallel.

It should be noted that contact centre staff would continue to use dedicated handsets while integrated contact centres can be researched more thoroughly.

The cost of upgrading **Microsoft Teams to SIP compliant will be £272k up front cost with an ongoing revenue cost of £214k (See Appendix A 7.2.2)**

It should be noted that should headsets be requested the costs for 2,000 is currently £**56k**

Enabling Microsoft Teams integration will allow users to seamlessly use voice communications through one modern platform regardless of location.

5.4 Cyber Security

5.4.1 Cloud Access Security (CASB) and Data Loss Prevention (DLP)

Encouraging cloud adoption brings a new set of security challenges. Cloud services are typically deployed to the Internet, an area previously considered 'unsafe' by cybersecurity professionals. Cloud service also increasingly host data that formerly sat within the boundaries of an organisation and was thus deemed safe and adhering to the body's regulatory compliance frameworks.

Traditional firewalls and web filters can, therefore, only restrict access. Enabling consumption of cloud services is consequently on a per user basis. This is both time consuming for administrators and users. Once access has been allowed, further inspection of activities such as uploading of data cannot be policed.

A solution is required that allows users to access the rich set of cloud services available whilst taking a risk-based approach with respect to the cloud provider. In turn, IT would be able to control data leakage from the organisation to the cloud. Such demands can be met with CASB and DLP.

CASB combined with DLP aims to deliver the following: -

i) **Visibility.** By parsing logs, CASB can baseline what the organisation is consuming by way of cloud services. CASB will advise on the threat level of each cloud service and block or grant permission on an individual basis.

ii) **Data Security & Compliance enforcement**. After baselining of the user's activity, policies can be enforced at a global or per-user level. Example could be blocking a cloud music library globally while allowing access to Dropbox but not for documents labelled as 'sensitive'. It should be noted that such compliance is only achieved within the wider context of Information Security policies.

Web filtering is currently deployed to all Windows 10 endpoints. It is recommended that CASB and DLP are added to the web filtering suite.

Current costs for web filtering are £189k and is renewed every five years. Additional CASB would see an annual cost of £163k plus upfront cost of £30k (See Appendix A **7.2.1)**

DLP is an additional subscription to the existing Microsoft EA and is estimated **to cost £64k annually (**See Appendix A **7.2.2)**

CASB and DLP deployments will give users the flexibility to use modern Cloud services unimpeded whilst giving security staff the necessary control to reduce cyber risks.

5.4.2 Security information and event management (SIEM)

'All over the world, the COVID-19 pandemic has been the headline over the past few weeks. COVID-19 has also forced organisations and individuals to embrace new practices such as social distancing, hand washing/sanitising and remote working. Governments are reconsidering ways to ensure that their countries are stable by developing and enforcing new economic plans. Nevertheless, while the world is focused on the health and economic threats posed by COVID-19, cybercriminals around the world undoubtedly are capitalising on this crisis.

March 2020 - COVID-19's Impact on Cybersecurity -Tope Aladenusi, Cyber Risk Services Leader - Deloitte)'

It is generally agreed that the activity of malicious actors has increased during the crisis. The challenge is to mitigate all potential attack vectors.

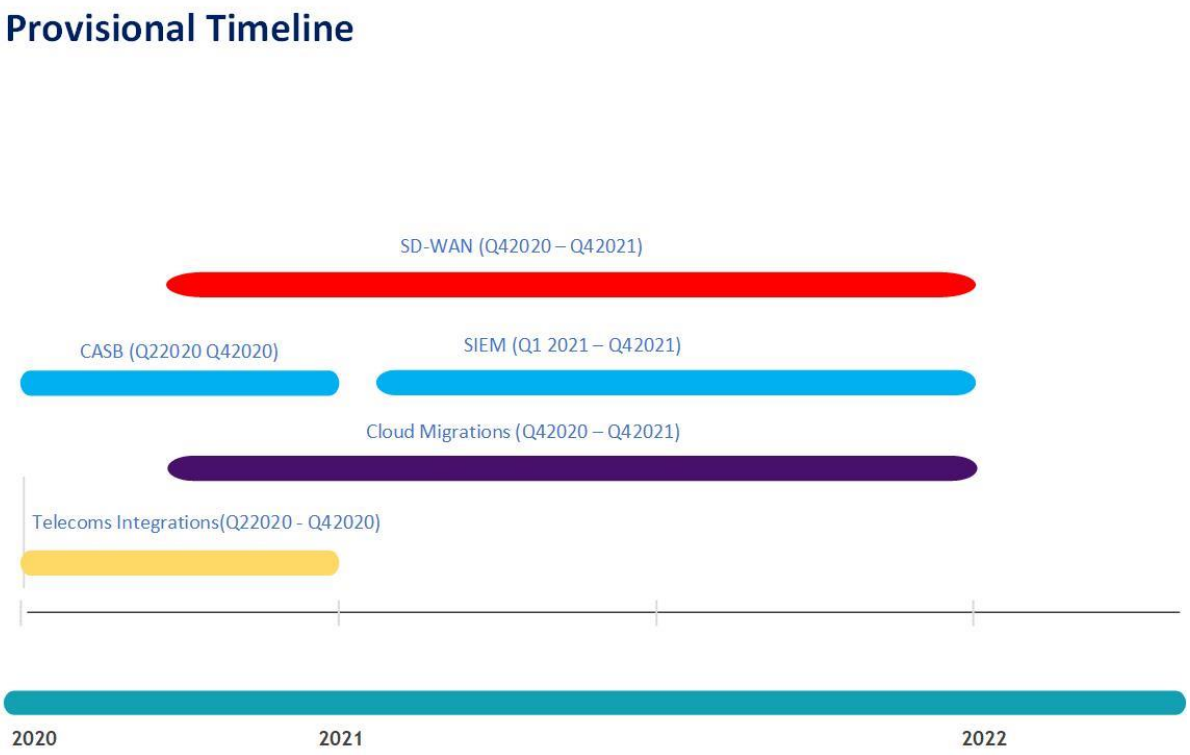
Having visibility of all security devices can be difficult, and the ability to translate complex logs almost impossible for security staff. A single point of view that uses algorithms to identify threats from logs is therefore required in the form of a SIEM.

A SIEM can provide real-time analysis of security alerts generated by applications and network hardware by using Machine Learning. In this way, security staff can be alerted to malicious activities and take appropriate actions.

There are various SIEMs available on the market, and their discussion is beyond the scope if this document. However, it is estimated that the cost of a SIEM would be £75,000 in YR1. And £67,000 per annum Y2 onwards.

5. Timeline

Detailed programme plans for the implementation of all the technologies proposed above have yet to be worked up, but a likely high-level indicative timeline is as follows:



6. Summary of Investments

All of the costs below are derived from extensive soft marketing discussions with a number of suppliers and have been verified by Gartner as being reasonable best estimates of the actual costs that will be incurred. The procurement of all products and technologies will be undertaken in line with Council procurement processes using mainstream existing frameworks.

Line Item	Cost YR1 capital	Cost YR 1 Revenue	Cost YR 2-4 (revenue)	Reference
Cloud IaaS	290,500	98,300	128,500	**Appendix A 7.1.2**
Network Links	75,000	0	75,000	**Appendix A 7.1.2**
SD-WAN Hardware	192,000	0	0	**Appendix A 7.2**
Headsets	56,000	0	0	**See 5.3 above**
Microsoft Teams	272,000	0	214,000	**Appendix A 7.2.2**
DLP	64,000	0	64,000	**Appendix A 7.2.3**
CASB	30,000	0	163,000	**Appendix A 7.2.1**
SIEM	0 (covered in previous capital bid)	75,000	67,000	**See 5.4.2 above**
	979,500			

7. Appendix A

7.1. Cloud

7.1.1. Costs on-premise

Current capital costs for core IT Infrastructure stand at approximately **£475,000** on an annual basis.

Item (Revenue)	Annual Cost(£)
Power Consumption (servers and Aircon)	150,000
Firewalls	142,000
Servers	59,000
Networking Switches	32,000
VMWare	92,941
Total	**475,941**

7.1.2. Costs for proposed Cloud IaaS

The following budgetary figures have been submitted by a Microsoft partner for supporting the SSA's data centres in the cloud On-premise costs versus cloud hosted data centre

YR1- Capital Microsoft costs

Item	Price (£)
Application Migrations	232,272
1 YR managed services	58,228
Total YR 1 Investment	**290,500**

YR1 – Capital Costs non Microsoft

Item	Price (£)
Additional network links	**75,000**

YR 1 Revenue

Item	Price (£)
Azure hosting costs	89,880
Enterprise Cloud provision	32,000
Microsoft Discount	-23,600
Total Yr 1 Revenue	**98,280**

YR2-4

Item	Price per annum(£)
Azure Hosting Costs [Revenue]	**128,500**
Annual additional network links [Revenue]	**75,000**
Total	**203,300**

Please note:

i) By moving to cloud we would aim to reduce our Infrastructure spend for on-prem data centre by 90% by Year 2.

ii) The above investment would require additional network links at a cost of approximately 75k per annum [included as above].

iii) An additional sum of £52k cloud monitoring is required

7.1.3. Application Analysis

Application Analysis

Item	Price(£)
Review of Applications across the Estate [one off cost, already funded from existing IT budgets]	56,000

7.2. WAN Costs

WAN Costs

Time Period	Circuit Costs Wandsworth	Circuit costs Richmond	SD-WAN Hardware	Cost Change from 2020/21
2020/2021	168,000	120,000	**192,000**	**192,000**
2021/2022	100,000	100,000	0	-88,000
2022/2023	100,000	100,000	0	-88,000
2023/2024	100,000	100,000	0	-88,000

7.2.1. CASB costs

Item (Revenue)	YR 1	YR 2	YR 3	YR 4
Forcepoint Web Filter with CASB	30,000	163,000	163,000	163,000

7.2.2. Microsoft Teams Costs

YR1

Item Name	Monthly Cost	Annual Cost	Total
Phone Sys ShrdSvr ALNG SubsVL MVL PerUsr	£5.18	£62.16	£186,169.20
Phone Sys EDU ShrdSvr ALNG SubsVL MVL PerUsr	£2.15	£25.80	£27,760.80
			£213,930.00

YR1	
Item Name	**Total Cost**
Microsoft setup fee	58,000
Total	**£271,930.00**

7.2.3. DLP

Advanced Threat Detection

Quantity	Item Name	Monthly Cost	Annual Cost	Total
4071	Advanced threat detection Licence	£1.30	£15.60	**£63,507.60**

9. Glossary of Technical Terms

Office365 (O365) - Microsoft Office365 is a Web-based version of Microsoft's Office suite of enterprise-grade productivity applications

Azure - A Microsoft services-based operating environment (also called a cloud computing platform) that will let developers build and host services on Microsoft's Infrastructure. Windows Azure is an open platform that support both Microsoft and non-Microsoft languages and environments.

Local Area Network (LAN) - A geographically limited communication network that connects users within a defined area. A LAN is generally contained within a building or small group of buildings and is managed and owned by a single enterprise.

Enterprise Agreement (EA) is a volume licensing package offered by Microsoft. It primarily targets large organisations which have 500 or more personal computers

Quality Of Service (QOS) A networking term that specifies a guaranteed throughput level

MPLS - MPLS is short for ***M**ulti**p**rotocol **L**abel **S**witching* MPLS gives network operators a great deal of flexibility to divert and route traffic around link failures, congestion, and bottlenecks.

WAN - A wide-area network (WAN) spans a relatively large geographical area and typically consists of two or more local-area networks (LANs).

Virtual Private Network (VPN) - VPN, or virtual private network, is a network that is constructed by using public wires — usually the Internet — to connect to a private network, such as a company's internal network.

Microsoft DirectAccess - VPN-like technology that provides intranet connectivity to client computers when they are connected to the Internet. Unlike many traditional VPN connections, which must be initiated and terminated by explicit user action, DirectAccess connections are designed to connect automatically as soon as the computer connects to the Internet

Software as a Service (Saas) - Software as a Service (SaaS) is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet.

Infrastructure as a Service (IaaS) - Infrastructure as a Service (IaaS) is a form of cloud computing that provides virtualised computing resources over the Internet. IaaS is one of three main categories of cloud computing services, alongside Software as a Service (SaaS) and Platform as a Service (PaaS).

VMware is a cloud computing and virtualization company founded in 1998 that has been instrumental in changing how hardware setups power workloads and support architectures. VMWare at the SSA is primarily concerned with running multiple virtual servers on physical hosts.

Hyper-Converged Infrastructure. A type of server that has storage and compute combined meaning less overhead for storage costs and administration.

This page is intentionally left blank