


	Data Hosting - AIX Renewal CU2585	 milton keynes council
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Data Hosting -


AIX Renewal CU2585

Richard Taylor
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Version 1.0

Data Hosting – A paper on results of investigations into options available for replacement of AIX (UNIX) Hardware

Distribution

Name	Role	Date Sent
Hazel Lewis	Head of IT & Print	
Paul Wheeler	Contracts & Compliance Manager	

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1. Background

1.1. Current Configuration

Data Hosting Programme is replacing all Data Centre hardware. The partnership with LGSS Business case requires that the LGSS Data Centres at Northampton and Cambridge are used as primary and back up data centres, and that the current data centres in Civic Offices and Saxon Court are closed. This paper details the replacement of the AIX (UNIX) Environment that supports Housing, Revenues and Benefits and Planning systems.

The current equipment is configured with dedicated computer processing and data storage). There are 2 instances of the hardware one in Saxon Court the other in Civic Offices; these are configured to work in live / live environment, providing a level of resilience and Disaster Recovery capability.

1.2. Applications Supported

The AIX Environment supports:


- Northgate Revenue and Benefits system, with an Oracle database and Oracle application server of approximately 1.5 Tb total. This is one of the Councils major business systems.
- Northgate Housing System, with an Oracle database and Oracle application server of approximately 0.5 Tb total.
- Uniform and One Database Server – Oracle databases of approximately 1 Tb.

The above are all business critical applications and loss of service would have a reputational impact.

1.3. Backup Regimes

The data is backed up from the AIX environment daily, using scheduled batch runs to create a copy of the database, and for the copy to be backed up initially to disk drive and then to Tape.

Backups are held in a standard Grandfather/Father/Son regime, Daily backups are held for 7 days, one of these being held as a weekly backup for 4 weeks, then one of the 4 week backups being held for a period of 1 year. All data is subject to data protection legislation.

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1.4. Different environments

The Revenue and Benefits system and the housing system have a Production, Test and Training environment, with Production at Civic, Test and Training at Saxon.

2. Requirements

2.1. Business Critical Applications

Revenue and Benefits and Housing have an return to operation (RTO) of 4 hours. Deployment of new hardware has to provide capability to achieve this 4 hour window.

2.2. Separate the Live, Development and Test environments

The 3 environments should not be able to communicate directly with each other.

The development environments for Revenue and Benefits and Housing systems have access to the Northgate cloud for download of upgrades and patches. This connection has to be managed via a boundary firewall.

Application / client services integration; Northgate host the application form completion web site and this information is then sent to the local application for management and processing

3. Consultations


3.1. LGSS

Data Hosting Programme set up working groups to investigate each area of the designs for migrating compute and data to LGSS Data Centres. Technical Architects and Network Specialists from LGSS Partners were engaged in creating designs and establishing how best to achieve data security and connectivity.

3.2. Specialist Provider

A specialist provider created the current environment and were contacted to establish what potential solutions are viable and to gain an understanding of costs.

3.3. Other investigations

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Use has been made of resource available on the internet to confirm the feasibility and possible complexity of the various solutions. Investigations also established cost boundaries.


3.4. MKC Resource

Discussions on the possibilities were discussed with technical architects and DBA's to formulate the possible options.

4. Risks

The following risks are generic to whatever solution is selected, individual solutions have additional risks which are detailed in Appendix B

- 4.1. **RISK – SAN Allocation** – the interface between the new hardware and the SAN is not achieved in a timely manner. **MITIGATION** – Identify resources required and ensure that a suitable team is created to build the server environment with suitable interfaces to the SAN.
- 4.2. **RISK – Migration** – the migration of the existing application servers to the new environments will create some 'down time' with potential impact on the business area productivity. **MITIGATION** - Use a selected partner to advise and define the migration process, ensuring that down time is minimal and that transition to the new architecture is transparent to the user
- 4.3. **RISK - Supplier failure** - The selected supplier is unable to deliver within required timescales or to required quality standards **MITIGATION** – Full engagement with supplier and communication ensuring that timescales are fully understood
- 4.4. **RISK - Insufficient internal IT resources** - Lack of IT resource could impact on fully realising the anticipated benefits **MITIGATION** - Project management controls (project plan, project team meetings, risk assessment, issue management)

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5. Options considered

The following options have been considered and evaluated the results are in Appendix B

- 5.1. Do Nothing
- 5.2. Lift and Shift existing kit to LGSS Data Centres
- 5.3. Procure Compute and Storage for deployment in LGSS Data Centres
- 5.4. Procure Compute and use LGSS SAN
- 5.5. Use a commercial data centre to externally host.

A summary of each of the options is described below. Appendix B discusses each in detail.


- **Option 1** – do nothing - This option is not viable as all compute and storage is to be removed from Civic Offices by 30th June 2017 and from Saxon Court by the end of 2017.
- **Option 2** – Lift and Shift existing kit to LGSS Data Centres – Discounted as hardware is at end of economic life and out of manufacturer support.
- **Option 3** - Procure Compute and Storage for deployment in LGSS Data Centres – Additional cost of storage when LGSS Storage available, Low risk, known technologies, excellent performance, Ability to test without downtime, System down time minimal during data transfer.- **3 Year cost £255,500 / Raw Risk Level 10 / Residual Risk level 5**
- **Option 4** - Procure Compute and use LGSS SAN – Low cost, Low risk utilizes available storage. Ability to test without downtime, System down time minimal during data transfer. - **3 Year cost £171,000**
- **Option 5 – Tender to procure Application Servers using OJEU Open/Restricted Tender process– (utilising the existing Storage Area Network)** – Discounted as OJEU Open/Restricted Tender process is unlikely to deliver better value than using a framework. Framework has 30 suppliers which have been selected by CCS through a procurement process. Mini-competition under the framework will be more efficient.
- **Option 6** - Procure Rental of hardware from an external hosting company – Migrate all applications and data - High cost to set up, revenue cost for rental, Ability to test without downtime, System

	Data Hosting - AIX Renewal CU2585	 The logo for Milton Keynes Council, featuring the letters 'MK' in a stylized blue and green font, with the text 'milton keynes council' below it, and a green and blue horizontal bar at the bottom.
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down time minimal during data transfer. - **3 Year cost £433,000 /
Raw Risk Level 10 / Residual Risk level 5**

6. Summary

It is recommended that Option 4 is selected. It is low risk and 2nd cheapest option. It also maintains, and is supported by, the business case for joining the LGSS partnership.

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Appendix A – PSN Requirements

[PSN Requirements](https://www.gov.uk) are explained fully on the Government website <https://www.gov.uk>.


MKC require connection compliance certificate enabling access to DWP data. To achieve this certification we need to demonstrate;

- 1) Operational Security – Policies, Processes and procedures
 - a. Vulnerability Management (Patch Management)
 - b. Secure Configuration
 - c. Physical Security
 - d. Protective Monitoring and Intrusion Detection
 - e. Security Incident Response
- 2) Authentication and access control
- 3) Boundary Protection and Interfaces
- 4) Protecting data at rest and in transit
- 5) User and administrator separation of data
- 6) Users
- 7) Testing Security

Of the above internal firewalls support the “4) Protecting data at rest and in transit” – defined as;

It should be noted that the other items are met as below;

- 1) The recent procurement of new hardware and updates to patch management processes
- 2) Secure Passwords and use of specialist software for remote access
- 3) Use of External Firewalls – these will also need replacing and will be the subject of another paper in February 2017
- 4) Internal Firewalls
- 5) Achieved by restricting user accounts (an individual will only have access to general corporate and business related programs)
- 6) MKC uses the Baseline Personnel Security Standard (BPSS) in staff recruitment
- 7) Testing is annual and provided by an approved agent

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Introduction

Each of the options noted in 6 above are described in more detail below.

A Risk score based on the risk – Loss of service – is included to assist in determining the preferred option.

Option 1- Do Nothing


Option	Pros	Cons
Do Nothing		Not viable as accommodation is disappearing.
Costs: Not applicable		

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Option 2 – Lift and Shift

Pick up and move the hardware from Milton Keynes locations and re-install at LGSS Data Centres is not a viable option as the hardware is at end of economic life (It was installed in 2010) and no longer has manufacturer support.

Option	Pros	Cons
Lift and Shift existing kit to LGSS Data Centres		<ul style="list-style-type: none"> • Kit is end of life and can no longer be covered by IBM hardware maintenance. Existing 3rd Party cover would need to be extended to cover the move. High probability that some hardware would fail as a result of physical movement, especially disks. • Hardware is at end of Economic life (Initially installed 2010)
Costs: Not applicable		

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Option 3 – Procure Compute and Storage

This option would procure like for like hardware and install at LGSS Data Centres. It is low risk as hardware can be deployed and tested without impact on the existing systems. Data Migration would be in phases, moving the Dev and test systems first allowing UAT of the migration and assurance that connectivity and is maintained. Early moves also allow for a failover test (Disaster Recovery) to the secondary site. When signed off the live data can be transferred across the link in a controlled and managed manner at a time that is suitable for the business. Down time can be managed and disruption to the business kept to a minimum.

It is also expected that using supplier provided associated storage would produce a high performance system.

Option	Pros	Cons
<p>Procure Compute and Storage for deployment in LGSS Data Centres</p>	<p>Providing a live and standby deployment with LGSS East as the secondary site to be used in the event of an invocation. Test and Dev would be deployed at LGSS East and used in the event of an Invocation</p> <p>System builds can be checked before cutover. Each system can be migrated separately.</p> <p>Reduced downtime as installation can be carried out while services run on existing hardware.</p> <p>Hardware which will be manufacturer supported for some time to come</p>	<p>Additional rack space required</p>

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Appendix B - Options



	<p>Localised Storage is known technology Low running costs after initial purchase. 3yrs hardware maintenance included in initial purchase.</p>	
<p>Costs:</p> <p>Fibre Link: The links to LGSS Data Centres are already in place there would be no additional Fibre Costs.</p> <p>Racking: The space requirements for the new hardware would mean rental of an additional Rack in the data centres at each site circa £12,000 per annum. 3 year cost of £36,000</p> <p>Compute costs: including 3 years maintenance and support £126,000</p> <p>Storage Costs: including 3 years support and maintenance £68,500</p> <p>Setup costs (Professional Services) £25,000</p> <p>Total 3 year cost £126,000+£68,500+£36,000+£25,000 = £255,500</p> <p>Raw Risk score: Likelihood - 1 Consequence - 5 = 5 Green</p> <p>Mitigated (residual) Risk Score: Likelihood - 1 Consequence – 5 = 5 Green</p>		

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Appendix B - Options



Option 4 – Procure Compute and use LGSS Storage

This option would procure like for like compute hardware and install at LGSS Data Centres, connecting that hardware to the LGSS SAN, leveraging available resource to reduce costs.

It is low risk as hardware can be deployed. Connected to the SAN and tested without impact on the existing systems. Data Migration would be in phases, moving the Dev and test systems first allowing UAT of the migration and assurance that connectivity and is maintained. Early moves also allow for a failover test (Disaster Recovery) to the secondary site. When signed off the live data can be transferred across the link in a controlled and managed manner at a time that is suitable for the business. Down time can be managed and disruption to the business kept to a minimum.


Option	Pros	Cons
<p>Procure Compute and use LGSS SAN</p> <p>This option utilizes the LGSS SAN for data storage, connectivity to the SAN will require additional interface devices</p>	<p>System builds can be checked before cutover. Each system can be migrated separately.</p> <p>Reduced downtime as installation can be carried out while services run on existing hardware.</p> <p>Newer hardware, which will be manufacturer supported for some time to come</p> <p>Lower hardware cost, maintenance cost and rack-space fees (than 1.4 above)</p>	<p>Possible compatibility issues with SAN – RISK...</p> <p>Lack of available skills</p> <p>Introducing disk heavy applications on AIX to sharing the LGSS SAN with windows disk resource.</p> <p>Loss of existing site to site DR with 4Hr failover.</p>

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Appendix B - Options




	Lower running costs after initial purchase. 3yrs hardware maintenance included in initial purchase.	
<p>Costs:</p> <p>Fibre Link: The links to LGSS Data Centres are already in place there would be no additional Fibre Costs.</p> <p>Racking: The space requirements for the new hardware can be accommodated in the racks assigned</p> <p>Compute costs: including 3 years maintenance and support £126,000</p> <p>Interface devices to LGSS SAN: including 3 years maintenance and support £20,000</p> <p>Setup costs (Professional Services) £25,000</p> <p>Total 3 year cost £126,000+£20,000+£25,000 = £171,000</p> <p>Raw Risk score: Likelihood - 2 Consequence - 5 = 10 Amber</p> <p>Mitigated (residual) Risk Score: Likelihood - 1 Consequence - 5 = 5 Green</p>		

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Option 5


Tender to procure Application Servers using OJEU Open/Restricted Tender process– (utilising the existing Storage Area Network) - OJEU Open/Restricted Tender process is unlikely to deliver better value than using a framework. Framework has 30 suppliers which have been selected by CCS through a procurement process. Mini-competition under the framework will be more efficient.

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Option 6 – Use hardware rental with an external Data Centre

As the title implies compute and storage Hardware would be rented from a data centre provider, with full support and DR capability.

Option	Pros	Cons
Rental of new hardware from an external hosting company	<ul style="list-style-type: none"> System builds can be checked before cutover. Each system can be migrated separately. Reduced downtime as installation can be carried out while services run on existing hardware. Newer hardware, which will be manufacturer supported for some time to come No on-site maintenance or support of hardware necessary Likely higher performance than currently Resilience and availability of a Tier 3 data centre 	<ul style="list-style-type: none"> Data off-site, so no easy visibility of security and integrity. Likely to be expensive or very expensive, depending on SLA Networking costs to connect securely to the provider.
<p>Costs: 2 Options High Availability or Standard DR – HA means no down time in event of disaster.</p> <p>Using a supplier site will also involve a Fibre connection based on a locally based host data centre provider the cost for a 1gb Link is circa £10,000 to install with an annual maintenance charge of £7,000 – total 3 year cost £31,000</p> <p>HA Option £170,000 per annum rental plus set up costs of £42,000 plus Fibre connection costs – Total 3 Year cost £510,000+£42,000+£31,000 = £583,000</p>		

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<p>DR Option: £125,000 per Annum rental plus set up costs of £27,000 plus Fibre connection costs – Total 3 year cost £375,000+£27,000+£31,000 = £433,000</p> <p>Raw Risk score: Likelihood - 2 Consequence - 5 = 10 Amber</p> <p>Mitigated (residual) Risk Score: Likelihood - 1 Consequence – 5 = 5 Green</p>
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