STRATEGY AND RESOURCES COMMITTEE
27 SEPTEMBER 2016

EPSOM AND EWELL ICT INFRASTRUCTURE AND DATACENTRE

Report of the: Head of ICT

Contact: Mark Lumley / James Burree

Urgent Decision?(yes/no)   No

If yes, reason urgent decision required: N/A

Annexes/Appendices (attached):   Annexe 1 – Costing Breakdown
                                                  (considered exempt from publication)

Other available papers (not attached):   None

REPORT SUMMARY

The ICT datacentres, servers and storage at both Epsom and Ewell and Elmbridge councils are in need of investment to continue delivering services to officers and residents. This report details a number of options for the Council and recommends an Option to ensure that the Councils are able to replace core infrastructure to continue to provide services

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	Notes
RECOMMENDATION (S) **(1) That Councillors agree Option 3C for the Joint Datacentre with Elmbridge Council hosted at a third party datacentre.** **(2) Agree the funding from existing Capital budgets of £63,000 and the use of £139,600 additional Capital funds as detailed in Annexe 1 – Table 3.** **(3) That the annual revenue saving of £17,800 be transferred into an earmarked reserve for future IT renewals and replacements as detailed in Annexe 1 – Table 3.**	

1   Implications for the Council's Key Priorities, Service Plans and Sustainable Community Strategy

1.1   To ensure that the ICT Infrastructure, systems and data are stable, secure and reliable ensuring the Council is able to deliver high quality services.

1.2   To ensure that the Council can continue to provide secure Digital services to Residents.

1.3   One of the actions of the new ICT Shared Service between Epsom and Ewell and Elmbridge Councils, was to review the Datacentre options for the Councils and this paper explains those options and makes recommendations.

2   Background

2.1   Epsom and Ewell: The original Epsom datacentre was built as part of the original building in the Town Hall, in the 1980's at a time when Councils needed machine rooms with large amounts of cooling and power. Taking up that original space is now the Datacentre, the ICT Training room and the Print Room. Over the years the Council has ensured that the space has been reduced as the technology has improved.

2.2   However, the room is not fit for purpose:

2.2.1 It is not a specifically designed Datacentre.

2.2.2 There is no fire suppression system.

2.2.3 Air conditioning systems are not specific data centre units but designed for office environments.

2.2.4 These units have water pipes running near server units.

2.2.5 Not a clean environment – floors are carpeted, suspended ceiling/floor etc.

2.3   The server infrastructure was procured in 2009, which introduced Server Virtualisation for the council consolidating approximately 50 physical servers down to 3. In 2010 due to the expansion of the number of virtual servers and services (for example document management system & CRM) this increased to 5 servers. As additional virtual servers were continuing to be commissioned more memory was purchased for the physical servers.

2.4   The storage infrastructure was purchased at the same time in 2009, again due to expansion of data and services over the years, the storage was replaced in 2014 providing additional storage capacity and performance.

2.5   Virtual Desktop Infrastructure (VDI) was introduced in 2011 to consolidate the Councils 300+ desktops onto 6 physical servers.

2.6   Backups are currently created on-site at the Town Hall then duplicated to tape, the tapes are stored on the other side of the building apart from the Friday nights tape which is taken off-site to Bourne Hall on the following Monday morning. Disaster Recovery: key servers are replicated to Elmbridge but a larger issue would rely on external contract for ship to site hardware and would be a slow process for restoring from tape.

2.7 The server hardware at Epsom and Ewell is 7 years old, and no longer eligible for manufacturer support and maintenance. Computer resources are being stretched with little options of upgrade available.

2.8 The Council is currently replacing its Network switching – these are the physical hardware that connects everything in the buildings together.

2.9 Elmbridge's datacentre is similar to Epsom's: built at the same time as the building the 1980's. The Council has not done anything with this room for many years and it has original and aged power and cooling. However, it was designed as a datacentre and so meets the needs for ICT.

2.10 There are opportunities with the Elmbridge Datacentre:

2.10.1 It is too big for requirements.

2.10.2 Inefficient power use for air conditioning – cooling an area that is approximately five times too big for the need.

2.10.3 Rental opportunity with the space.

2.10.4 UPS and air conditioning are due for replacement.

2.11 Elmbridge server infrastructure was procured in 2010 and like Epsom and Ewell's, was the introduction to Server Virtualisation consolidating approximately 50 physical servers to 5. The hardware has never been upgraded after its initial install.

2.12 The storage was purchased at the same time as the servers and over the years has required additional capacity. Due to architectural differences than Epsom and Ewell this storage has been expanded to its maximum capacity rather than replaced.

2.13 Virtual Desktops were introduced at the same time as Epsom and Ewell through a joint procurement in 2011 which conciliated the 400+ desktops on 7 physical servers.

2.14 Backups are handled similarly to Epsom and Ewell, tapes are stored securely offsite using a 3rd party company. Disaster Recovery: would rely on external contract for ship to site hardware and would be a slow process for restoring from tape.

2.15 The server and storage hardware at Elmbridge is 6 years old and no longer eligible for manufacturer support and maintenance. Both Councils have a Third Party break fix support agreement in place for the short term, to ensure some cover.

2.16 The Network switching for Elmbridge was recently replaced in December 2015.

3   Datacentre Options

3.1   It is essential for the continuation of services for both Councils that the infrastructure is replaced.

3.2   Head of ICT and Infrastructure Manager have been reviewing options for the past 6 months and they are detailed below.

Option 1 - Do nothing

Epsom and Ewell

Current revenue cost for Server and Storage maintenance is £20,000. As the majority of hardware is no longer supported by the manufacturers a third party support contract is in place.

Elmbridge

As above with current revenue costs at £30,000.

Benefits

- Zero capital cost

Disadvantages

- Systems are running near capacity with no room for growth. This could impact large software updates such as Office 2016/365 or Windows 10.
- Backups and restores are traditional and labour intensive
- Aging hardware starting to cause reliability issues in the future
- Aging hardware starting to see Speed and performance issues – as near capacity
- No centralised management – more complex administration
- No direct manufacturer support - relying on external provider
- Different virtualisation software across Epsom and Elmbridge - more complex administration
- Hosted in two locations requiring cooling and maintenance
- Elmbridge datacentre is too large and costly
- Epsom and Ewell datacentre unsuitable – no fire suppression, noisy and inefficient cooling

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Option 2 - Replace servers and storage individually, hosted at individual local authority

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Epsom and Ewell

Replacing the server hardware and network switches with current supported models and upgraded specification. As the Storage is only two years old, there is no immediate requirement for this to be replaced.

Backup system to also be replaced from traditional tape based to Cloud storage.

Elmbridge

Replacement of all server and Storage hardware with current supported models and upgraded specification. Backup system to also be replaced from traditional tape based to Cloud storage.

Benefits

- Supported systems with capacity to deliver services
- Efficient backup and restore capabilities
- Improved business continuity/ disaster recovery arrangements
- Improved performance

Disadvantages

- No centralised management – more complex administration
- Different virtualisation software across Epsom and Ewell and Elmbridge - more complex administration
- Hosted in two locations requiring cooling and maintenance
- Elmbridge datacentre is too large and costly
- Epsom datacentre unsuitable – no fire suppression, noisy and inefficient cooling

Option 3A - Replace servers and storage into a shared infrastructure, hosted at Elmbridge.

Epsom and Ewell

Purchase shared servers to be used between both Councils. The solution would be redesigned to host the servers in blades rather than traditional rack mount to reduce power, size, cooling, increased network performance, and centralised management.

Servers to be placed onto Elmbridge recently replaced datacentre switches. The existing Storage would be moved to Elmbridge and used exclusively for Epsom storage until such time it needs replacing. At this point additional storage can be purchased for the Elmbridge Storage and data migrated into a shared pool.

Backup systems to be consolidated between authorities and replicated to Cloud based storage.

Elmbridge

As above and to include replacement of the storage.

Benefits

- Supported systems with capacity to deliver services
- Improved performance
- Pooled licensing
- Pooled hardware reducing power and required maintenance
- Centralised efficient backup and restore capabilities
- More stable Virtualisation platform
- Centralised management and reporting

- Reduced power consumption at Epsom and Ewell

Disadvantages

- Single point of failure at Elmbridge - not a fully redundant datacentre (e.g. power)
- Elmbridge datacentre too large and costly
- Risk of link from Epsom and Ewell to Elmbridge failing. Resiliency would need to be included.

Option 3B - Replace Servers and Storage into a shared infrastructure, (as Option 3A), but hosted in Surrey Datacentre

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Epsom and Ewell

Same as Option 3A, although Surrey Datacentre is unable to host blade systems due to the highly condensed power and cooling requirements. Therefore, all servers to be in a rack format.

Elmbridge

As above and to include replacement of the storage.

Benefits

- As Option 3A
- Reduced power consumption at Elmbridge
- Partnership working with the Surrey Datacentre
- Elmbridge would be able to release the space of the current datacentre – and therefore obtain income.
- ICT independent of the buildings, so if something happened to either Town Hall/Civic Centre staff would still be able to fully operate

Disadvantages

- Risk of link from Epsom and Ewell/Elmbridge to Datacentre failing. Resiliency would need to be included.
- Increased power consumption and therefore cost (as not able to use blades)
- Surrey datacentre does not have the cooling or power capacity for blades
- Surrey datacentre charges for power usage – therefore an additional cost

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Option 3C - Replace servers and storage into a shared infrastructure, (as Option 3A), but hosted in third party Datacentre

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Epsom and Ewell

Same as Option 3A, hosted at third party datacentre

Elmbridge

As above and to include replacement of the storage.

Benefits

- As Option 3A
- Reduced power consumption at Elmbridge
- Elmbridge would be able to release the space of the current datacentre – and therefore obtain income.
- ICT infrastructure independent of the buildings, so if something happened to either Town Hall/Civic Centre staff would still be able to fully operate
- Reduced power consumption as able to operate in blade environment
- Industry standard secure datacentre
- Would look to procure services within the local area if possible
- Datacentre staff would provide 'remote hands' to replace any faulty hardware

Disadvantages

- Risk of link from Epsom and Ewell/Elmbridge to Datacentre failing. Resiliency would need to be included.

> **Option 4 - Migrate all virtual servers into a Cloud based service. Externally hosted by Cloud provider (for example Amazon AWS / Azure / Surrey Cloud).**

Epsom and Ewell & Elmbridge

Move all data and services from local infrastructure into the Cloud. No server or storage equipment would be required at either site.

Benefits

- Supported infrastructure with capacity to deliver services
- Improved performance
- Pooled licensing
- Centralised efficient backup and restore capabilities
- More stable Virtualisation platform
- Centralised management and reporting
- Takes the maintenance and support of the hardware out of Council's hands
- ICT infrastructure independent of the buildings, so if something happened to either Town Hall/Civic Centre staff would still be able to fully operate

Disadvantages

- Shift from traditional Capital based expenditure to revenue based expenditure
- Not a fixed revenue cost as charged for memory and space consumed and used – this could change on an hourly basis
- No other Council has fully migrated all servers to the cloud
- The technology is still new and is not yet recommended for full migration by Microsoft or Amazon.
- Not yet Public Sector Network compliant – for secure links to government services
- No control over Virtualisation software
- Limited application compatibility with Council software and suppliers.

Summary of Key Advantages and Disadvantages

	Stability and Performance	Reduced Costs	Manufacturer Supported	Improved Backup	Improved DR
Option 1 As is	✘	✔	✘	✘	✘
Option 2 Hosted locally	✔	✘	✔	✔	✔
Option 3a Together at EBC	✔	✔	✘	✔	✔
Option 3b Together at SCC	✔	✔	✔	✔	✔
Option 3c Together at 3rd Party	✔	✔	✔	✔	✔
Option 4 Cloud	?	✘	n/a	✔	✔

4   Financial and Manpower Implications

4.1   Budgetary costs are included in Annexe 1 for the various options.

4.2   There would need to be some reconfiguration of ICT and Power budgets internally, moving the budget currently used for ICT Third Party Maintenance and ICT Power spend into an ICT Datacentre budget.

4.3   Capital budgets of £68,000 are already approved in 16/17 capital programme, (underspend in the Intranet project).

4.4   The ICT Shared Service operates in budgetary terms on a 60:40 split between Elmbridge and Epsom and Ewell. In order to meet the split Epsom and Ewell requires additional Capital funds of £139,600 on top of the already approved £68,000.

4.5   This proposal starts to move the Council off a capital based approach to core ICT expenditure to a revenue based approach through the accumulation of a reserve.

4.6   The Head of ICT to continue working with Finance by regularly reviewing current ICT budgets.

4.7   ***Chief Finance Officer's comments:*** *The timing of this report and the urgency of the replacements has meant that this new Capital bid has not been discussed by the Capital Member Group. The replacements were initially intended to be funded from revenue, however, given the current revenue position of the Council it is now recommended that the funds are taken from Capital Reserves.*

4.8   *The funding recommendation for total Capital costs of £202,600 is:*

4.8.1 *£63,000 from already approved Capital budgets for 16/17; and*

4.8.2 *The release of an additional £139,600 from Capital Reserves.*

4.9 *Should Option 3C be approved there will be an estimated revenue expenditure saving of £17,800 per annum. It is recommended that this be transferred annually to an IT earmarked reserve for future funds towards similar cyclical renewals and replacements.*

4.10 *Option 3C represents the best model financially and protects the revenue budget over the next 5 years with the addition of an estimated £89,000 contribution to reserves by end of 2021/22. For the reasons detailed above this is the reason Option 3C and its funding proposals is the option supported by Officer's.*

5 Legal Implications (including implications for matters relating to equality)

5.1 There is an existing Memorandum of Agreement between the two Councils for the ICT Shared Service. The Head of ICT would ensure that any significant changes to service provision are detailed here to ensure that the Council is covered.

5.2 Elmbridge will be the lead authority for the procurement and purchasing of the systems and hardware.

5.3 Procurement will be through a framework

5.4 ***Monitoring Officer's comments:*** *It is important to have regard to the information governance implications of each of the options, in order for the Council to meet its obligations under legislation such as the Data Protection Act 1998 and, at least prior to "Brexit", the forthcoming EU General Data Protection Regulation (scheduled to take effect in mid-2018). So, for example, the Council has an obligation to take appropriate technical and organisational measures to prevent unauthorised or unlawful processing of personal data and against accidental loss or destruction of or damage to personal data. These obligations are relevant to the choice of datacentre solution, and are an integral part of the balance of risks and opportunities assessed in relation to each option.*

6 Sustainability Policy and Community Safety Implications

6.1 None for the purposes of this report

7 Partnerships

7.1 This project is part of the existing ICT Shared Service arrangements and could be expanded in the future for other partners.

8 Risk Assessment

8.1 Immediate risk of hardware failure and exceeding capacity should nothing be done.

8.2   Links to and from the datacentre failing. Resilient links will mitigate which are included in the project.

8.3   Proposed Option reduces risk of failure for the Council due to aging infrastructure and lack of fire suppression in the datacentre.

9   Conclusion and Recommendations

9.1   The datacentres, servers and storage and both Epsom and Ewell and Elmbridge councils are in need of investment to continue delivering services to officers and residents. From lessons learnt of the initial implementation, following current ICT trends, best practises and being able to utilise premium technologies. Management recommend consolidating the infrastructure and hosting at an external third party datacentre. Option 3C.

9.2   Although the infrastructure will be shared, the information and services remains logically separated meaning each Council will retain full control of its own servers/services and data. Software upgrades and purchases are still maintained and progressed by each individual authority.

9.3   ICT staff will not be relied on for managing manual tasks such as changing backup tapes, replacing failed disks/parts or rebooting failed servers. Automation within the systems will mean faulty parts are shipped to the datacentre and replaced by teams there.

9.4   The council will have unrestricted access to the physical hardware which will be supervised by 24/7 manned on-site security, fire detection and suppression, indoor and perimeter CCTV.

9.5   There will be no changes to how officers or members access or use the systems, all the changes are to the backend infrastructure.

9.6   Using this model of shared infrastructure and ICT services could be expanded opening opportunities for hosting and supporting other authorities.

WARD(S) AFFECTED: All