COUNCIL

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DATABASE AND VIRTUAL SERVER INFRASTRUCTURE LICENSING MODEL – ADDITION TO THE CAPITAL PROGRAMME

Portfolio Holder: Councillor Andrew Mackness, Corporate Services

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Summary

Medway service units are constantly examining their business processes to ensure best value and minimise overheads. The ICT service is no different and where opportunities arise the ICT management team are keen to take advantage of reduced costs and improved service delivery.

The Windows 2003 project has created an opportunity to:

- Reduce the annual operating costs for Oracle, MS-SQL and VMware licensing.
- Maintain service in the event of a Datacentre failure
- Provide a faster recovery mechanism in the event of a database failure
- Remove the loss of data due to the current lag in the delayed data replication to the recovery site.

Additional benefits will include:

- Lower operating costs
- Reduced risk of fines for breach of license
- Faster recovery of applications in the event of a failure or loss of service
- Upgrades can be performed without taking databases offline.

This report presents a business proposal to change the ICT infrastructure which in turn will create long term savings in database licensing expenditure. The report seeks approval to secure a budget of £226,000 by using prudential borrowing over a 5 year term. This will require approval by Full Council as an addition to the capital programme.

The proposed approach is essential in the short term to gain efficiencies and mitigate risk. It is consistent with the council's IT strategy to rationalise estate. The council is currently considering its approach to digital transformation, the recommendations here are in no way limit our options going forward.

1. Budget and Policy Framework

1.1 Additions to the Capital Programme are a matter for Full Council.

1.3 There is a short window of opportunity to rationalise the existing Medway Oracle and SQL database environment. SQL and Oracle licences are due for renewal in 2016 and delay would mean the opportunity for financial benefits would be missed until the next annual renewal.

2. Background

2.1 In November 2015 ICT started a project to remove all non-compliant servers (e.g. Windows 2003) and replace them with compliant servers (Windows 208R2 or Windows 2012R2).

2.2 The primary objective of the project was to ensure Medway Council ICT met a PSN compliance audit in July 2016. To achieve this ICT needed to either remove all non-compliant servers, or to demonstrate that there is a clear and committed plan to remove non-compliant as soon after July 2016 as possible.

2.3 During the course of the W2003 project it became apparent that a more resilient and cost effective solution for the installation and licensing of the Medway Oracle databases, MS-SQL Databases and VMWare Virtual Servers was possible.

3. Options

3.1 Option 1 – maintain current arrangements – no change to existing infrastructure.

3.2 Option 2 – revised Oracle and SQL database infrastructure and licensing strategy.

3.3 Option 3 – off premise installation (Cloud based Infrastructure).

4. Advice and analysis

4.1 Option 1 – Current – no change

4.1.1 The current licensing model for Oracle provides a Named User Plus license (NUP) for every individual that is required to access any systems that use an Oracle Database.

4.1.2 The annual maintenance cost of the current Oracle Licence model is £73.8k. Medway predominantly licence each SQL database individually. The annual maintenance cost of the SQL licence is £48k.

4.1.3 Current per user model has a high administrative burden on both purchase and licence management with inherent risks associated with under/over licensing.

4.1.4 Current model for recovery of a MS-SQL database is from monthly backups, to which daily incremental backups and hourly backups are applied. This will facilitate data recovery up to the most recent hourly backup. Data loss is restricted to the hourly back up window.

4.2 Option 2 – revised Oracle and SQL database structure and licensing (recommended option)

4.2.1 This option facilitates rationalisation of both hardware and software, improves licence management and resilience of system functionality. The work involved in this option will support a future move to the cloud. Ultimately there will be a need to 'off premise' a reduced number of high capacity servers as opposed to lots of smaller ones. The more rationalisation is achieved, the easier cloud migration will be in the future.

4.2.2 Licencing rationalisation is still relevant whether using Medway's data centre or cloud. There is still the need to be licensed in the most cost effective way possible.

SQL

4.2.3 Reduces the number of MS-SQL servers from around 30 to approximately four larger servers on new and improved hardware. Each server can support additional databases as systems expand.

4.2.4 New hardware will replace the current VMWare servers and be evenly distributed between Gun Wharf and The Tunnel. The two datacentres will be able to automatically failover to each other if required.

4.2.5 Creation of a new storage network and upgrades to the Storage Array Network (SAN) infrastructure underpin the design of this option enabling all data to be maintained, managed and monitored at both locations simultaneously.

Oracle

4.2.6 Creates a dedicated Oracle Virtual server environment and transfers all Oracle database and application servers to this infrastructure. One physical server will be installed at Gun Wharf and the other at the Tunnel.

4.2.7 This significantly reduces the amount of Oracle Named User Perpetual licences required as the processors on the underlying hardware will be licenced instead.

4.2.8 Virtual Oracle servers will be able to move between the Tunnel and Gun Wharf data centres whilst they are in service. In the event of a complete data centre failover, full service will be automatically resumed in the time it takes servers to restart.

4.3 Option 3 – Off premise installation (Cloud based Infrastructure)

4.3.1 Many organisations (both public and private) are actively pursuing cloud based architecture solutions for their ICT infrastructure requirements. Storage as a Service (StaaS) and Software as a Service (SaaS) meets the needs of many businesses that have limited capital or physical data centre capacity. Cloud infrastructure is generally a subscription service and paid for using an Opex (revenue) budget basis. There is no requirement for up front capital investment in server hardware and generally disaster recovery, data security and back up mechanisms can be included within the contract.

4.3.2 Licensing of software and data integrity is still the responsibility of the customer.

4.3.3 It would be wholly possible to ‘off premise’ the Oracle and SQL database infrastructure to a cloud based supplier thereby reducing the hardware cost elements in option 2. However, it is important to consider the data held within the database systems, the integration required to ‘on premise’ systems (Confirm, IDOX, Lagan etc.) and the timescales needed to move the existing infrastructure to the cloud.

4.3.4 A move to off premise would take many months of preparation and implementation. There is a short window of opportunity to make significant savings in licensing arrangements for Oracle and SQL database systems which would be missed if Medway embarked on a cloud based implementation. In addition revenue budgets are being squeezed with savings expected over the next 4 years or so in line with budget reductions dictated by central government.

4.3.5 Annual costs to replicate the existing ICT infrastructure are significantly more than the current running costs of the Gun Wharf Data Centre (GWDC). The GWDC infrastructure would need to be maintained whilst Medway are still hosting solutions for customers. Income generation from external customers equate to around £360K per annum with annual running costs at £260k (power).

4.3.6 The indicative cost for an Azure cloud environment alternative based on existing infrastructure is shown in table 2.

4.3.7 Oracle costs in Azure would remain the same as present at £73,821 PA as ICT would no longer be able to licence the physical infrastructure that would underpin the to-be virtual environment.

4.3.8 All costs are taken directly from the online Microsoft Azure pricing calculator. No bulk or government discounts have been applied.

4.3.9 Calculations are based on estimates of the Medway ICT environment. ie. the council has around 420 virtual servers and 120TB of “usable” SAN storage.

5. Risk management

5.1 Risk management is an integral part of good governance. The Council has a responsibility to identify and manage threats and risks to achieve its strategic objectives and enhance the value of services it provides to the community.

Risk	Description	Action to avoid or mitigate risk	Risk rating
Under /over licensing of software	The current method of database licensing means that under/over licensing of database products is possible. This is an inefficient licensing strategy that could lead to increase costs or financial penalties from suppliers.	Enterprise license management as described in Option 2	Medium

Inability to fund the prudential borrowing repayments	Lack of funds in revenue budgets to pay back the borrowing requirement from base budgets	The detailed financial assessment has demonstrated that the existing base budget is sufficient to repay the borrowing requirement and create a surplus of £205k over a 5 year period	Low

6. Consultation

6.1 Full consultation has been undertaken with the Portfolio holder and senior management. In addition, consultation and discussion has taken place with the Head of Finance to ensure that the finance package proposals meet prudential borrowing protocols.

7. Cabinet

7.1 The Cabinet considered this report on 7 June 2016 and recommended Option 2, as set out in paragraph 4.2 of the report, to Full Council as an addition to the Capital Programme (decision no. 86/2016).

8. Financial implications

8.1 Option 1

8.1.1 This option maintains a minimum of existing budgetary needs with limited options for savings. Costs would be expected to increase as more NUP/server licences become necessary.

8.2 Option 2

8.2.1 The capital funding of £226k is incurred within the first quarter of 2016/17 (see table 1 below), therefore revenue savings are achievable, pro-rata to the date the new infrastructure is on-line. Savings of £367.5k over a 5 year period are achievable. After factoring in the cost of the prudential borrowing to fund the project, i.e. £245k over 5 years including interest, net savings of £122.5k are deliverable from within existing resources.

8.2.2 In order to achieve the savings within the projected time period the investment is required in Quarter 3, 2016, otherwise the current annual licence maintenance will renew.

Table 1

	2016/17	2017/18	2018/19	2019/20	2020/21	Total
	£000s	£000s	£000s	£000s	£000s	£000s
Existing operating costs	148.4	112.8	106.6	161.5	123.2	
New Operating Costs (post investment)	64.6	48.0	49.5	70.6	52.5	
Net saving on operating costs	(83.8)	(64.8)	(57.2)	(90.9)	(70.8)	(367.5)
Est PRU borrowing costs (5 year loan @ 2.9%)	49.0	49.0	49.0	49.0	49.0	245.0
Net savings after borrowing costs	(34.8)	(15.8)	(8.2)	(41.9)	(21.8)	(122.5)

8.3 **Option 3**

8.3.1 Azure Costs - The Azure cloud server specification chosen would be considered the minimum specification for council requirements. Significantly more Medway servers require much more computer (memory / cpu).

8.3.2 Azure virtual servers come with a minimal amount of HDD space therefore 120TB has been added to reflect approximate SAN storage the council owns.

8.3.3 MS-SQL databases are charged for by the number of databases and the storage in which they consume. The figures quoted below represent the absolute minimum required. More analysis is required to confirm that the numbers and options are accurate. It is important to note that other Azure options for MS-SQL are significantly more expensive.

8.3.4 Backups are not included. Azure backups would consume more space and therefore cost more.

Table 2

Description	Unit (Month)	QTY	Cost (Month)	Cost (Year)	Cost (5Year)
Virtual Clouds Server (2x Cores - 3.5 GB RAM)	£ 81.81	420	£ 34,360.20	£ 412,322.40	£ 2,061,612.00
Storage Hot Data (TB)	£ 15.01	120	£ 1,801.20	£ 21,614.40	£ 108,072.00
SQL Databases s3 (7.5TB Total SQL Storage)	£ 916.29	25	£ 22,907.25	£ 274,887.00	£ 1,374,435.00
					£ 3,544,119.00

9. Legal implications

9.1 There are no direct legal implications arising from the proposal to rationalise the database server infrastructure.

10. Recommendation

10.1 The Council is asked to approve Option 2, as set out in paragraph 4.2 of the report, as an addition to the Capital Programme.

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Appendices
None

Background papers
None