



Report Cover Sheet

Report to:	Trust Board	
Date of the Meeting:	24 July 2019	
Agenda Item:	P1-145-19	
Title:	Digital infrastructure refresh and cloud first strategy	
Report prepared by:	James Crowther, Head of IT Operations	
Executive Lead:	James Thomson, Director of Finance	
Status of the Report:	Public	Private
		x

Paper previously considered by:	Digital Board, Finance Committee & Trust Executive Group
Date & Decision:	23/4/19, 17/5/19, 10/6/19 Approval to proceed with option two

Purpose of the Paper/Key Points for Discussion:	<p>The purpose of the paper is to outline the current technical infrastructure supporting our clinical and business systems and to set out the next steps options. This paper outlines the requirements of a digital infrastructure refresh and a new approach to infrastructure strategy by adopting a “cloud first” initiative. The Board is asked to endorse an approach to a cloud first initiative.</p> <p>The paper outlines 2 options:</p> <ol style="list-style-type: none"> 1) Do nothing and renew support and maintenance on existing hardware that is approaching end of optimal life. 2) Consolidate and upgrade infrastructure, with a cloud first strategy <p>This proposal represents a funding challenge, detailed under point 14 in the paper.</p> <p>Key points for discussion include:</p> <ul style="list-style-type: none"> • The importance of refreshing digital infrastructure to maintain ongoing resilience, reliability and performance of key clinical systems • A strategic cloud adoption initiative • Agreement to proceed with an infrastructure refresh, with a cloud first strategic approach.
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Action Required:	Discuss	X
	Approve	X
	For Information/Noting	

Next steps required	<p>The Trust Board is asked to;</p> <ul style="list-style-type: none"> • Support proposals to proceed with the upgrade the digital infrastructure which is end-of-life in Q3 2019. • Agree with the direction to adopt a cloud first strategy, and adopt cloud technologies where appropriate on a system by system basis. • Note the funding challenge, but that the proposed option would be affordable within Trust resources. • Note the complexity of the work alongside multiple other Trust wide changes.
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The paper links to the following strategic priorities (please tick)

Deliver outstanding care locally	X	Collaborative system leadership to deliver better patient care	X
Retain and develop outstanding staff	X	Be enterprising	X
Invest in research & innovation to deliver excellent patient care in the future	X	Maintain excellent quality, operational and financial performance	X

The paper relates to the following Board Assurance Framework (BAF) Risks

BAF Risk	Please Tick
1. If we do not optimise quality outcomes we will not be able to provide outstanding care	X
2. If we do not prioritise the costs of the delivering the Transforming Cancer Care Programme we will not be able to maintain our long-term financial strength and make appropriate strategic investments.	
3.If we do not have the right infrastructure (estate, communication & engagement, information and technology) we will be unable to deliver care close to home.	X
4. If we do not have the right innovative workforce solutions including education and development, we will not have the right skills, in the right place, at the right time to deliver the outstanding care.	
5. If we do not have an organisational culture that promotes positive staff engagement and excellent health and well-being we will not be able to retain and attract the right workforce.	X
6. If we fail to implement and optimise digital technology we will not deliver optimal patient outcomes and operational effectiveness.	X
7. If we fail to position the organisation as a credible research partner we will limit patient access to clinical trials and affect our reputation as a specialist centre delivering excellent patient care in the future.	X
8. If we do not retain system-side leadership, for example, SRO for Cancer Alliance and influence the National Cancer Policy, we will not have the right influence on the strategic direction to deliver outstanding cancer services for the population of Cheshire & Merseyside.	
9. If we do not support and invest in entrepreneurial ideas and adapt to changes in national priorities and market conditions we will stifle innovative cancer services for the future.	
10. If we do not continually support, lead and prioritise improved quality, operational and financial performance, we will not provide safe, efficient and effective cancer services.	

Equality & Diversity Impact Assessment

Are there concerns that the policy/service could have an adverse impact on:	YES	NO
Age		X
Disability		X
Gender		X
Race		X
Sexual Orientation		X
Gender Reassignment		X
Religion/Belief		X
Pregnancy and Maternity		X

If YES to one or more of the above please add further detail and identify if a full impact assessment is required.

Digital Infrastructure Refresh and Cloud First strategy

Preferred Direction

July 2019
v1.5



Connecting for the future is the Clatterbridge Cancer Centre's Global Digital Exemplar (GDE) Programme for transforming cancer care through the use of world-class digital technology.



PURPOSE

1. The purpose of the paper is to outline the current technical infrastructure supporting our clinical and business systems and to set out the next steps options. This paper outlines the requirements of a digital infrastructure refresh and a new approach to infrastructure strategy by adopting a “cloud first” initiative. The Trust Board is asked to endorse an approach to a cloud first initiative.

BACKGROUND

2. Clatterbridge Cancer Centre NHS Foundation Trust (CCC) is a healthcare organisation deeply invested in digitalisation. As a Global Digital Exemplar (GDE) fast follower, CCC has embarked on an exciting and challenging journey to digitalise clinical pathways, setting the standard on how the use of innovative technology can improve patient outcomes and experiences across the range of specialities that CCC offers.
3. As CCC further embeds digital processes, this increases the clinical dependencies on technology and underlying infrastructure to maintain performance, reliability, availability and security of clinical systems and data.
4. The current digital infrastructure will reach five years old in 2019. In technical terms, this is deemed end-of-life and requires refreshing.
5. This infrastructure hosts the clinical and business systems of the organisation of which the stability and performance is fully dependent upon.
6. As clinical activity and patient experiences becomes more dependent on technology, it is vitally important to maintain investment in a modernised infrastructure to match the demand placed upon it.
7. The paper lays out two options, option one: Do nothing and continue with existing infrastructure and Option two: consolidate and upgrade infrastructure with a “cloud first strategy”.
8. A case in need went to Digital Board In April 2019 and the preferred approach from Digital Board was option two: to refresh the infrastructure and to refer to Finance committee.
9. The case in need subsequently was presented at Finance committee on 17th May and Trust Executive Group (TEG) on 10th June 2019, with approval to progress to Performance Committee and Trust Board in July 2019.

OBJECTIVES AND SCOPE

10. The current infrastructure reaches end of life in Q3 2019. Many of the Trusts business and clinical systems including Meditech EPR reside on the existing aging infrastructure.
11. Once the current maintenance agreements end, the costs to renew support maintenance will increase dramatically with evidence from quotes from the incumbent supplier, ANS. Further to the financial constraints of maintenance renewal costs, the infrastructure is five years old and technically reaching end of life, increasing the risk of unplanned system outages and clinical disruption. For CCC to maintain its digital vision for the future, investment should be made to modernise by implementing a next generation backbone infrastructure for digital systems to reside on.

12. For new investment the phasing would be expected to be two fold as follows:

- a. **Phase 1:** (Year 1-3) Core expectation (high performance, resilient, reliable, scalable, secure)
- b. **Phase 2:** (Year 3+) Future optimisation enablement of the storage platform (machine learning, big data and analytics, data sharing and collaboration driving the rise of precision medicine)

13. Investment in a new infrastructure would fulfil the following objectives:

- Provide a fit for purpose, geographically diverse datacentres between Liverpool CCC (New Hospital) and Wirral CCC. This will ensure maximum system availability and full disaster recovery capability of all critical clinical and business systems, including Meditech Electronic Patient Record (EPR).
- Highly performing – using technologies like “All Flash” to reduce times to create reports and access clinical data across all CCC sites. Increasing performance of digital systems, improving efficiency of clinician’s time spent using systems.
- Fully supported by our existing clinical software partners (i.e Meditech)
- Select the best fit solution for a 5 year strategy to facilitate further technological advancements in areas such as data analytics and machine learning.
- Consolidate multiple environments into a highly performing, scalable and resilient single stack.
- Reduction in multiple maintenance agreements by working with a single vendor with a proven track record of delivering.
- Perform a cloud readiness assessment to migrate compatible applications into the Azure cloud and reduce the inefficient expenditure required to host systems locally where possible. Choose a solution that is interoperable with cloud technologies as part of the digital strategy.
- Implement a solution that meets the high standards of CCC and in consideration of the datacentre facilities at the new hospital.
- Provide modernised technology to facilitate automated “air gaped” backups of critical clinical and business data. Assuring the organisation is best prepared for any potential future cyber and disaster incidents.
- Provide storage infrastructure for vendor neutral archive (VNA), or Independent Clinical Archive (ICA) to migrate legacy MAXIMS and Ascribe data from unsupported systems.

PROPOSED INVESTMENT

14. The proposed direction represents a funding challenge to the Trust. The estimated cost of circa £1.68m (including VAT) is not currently funded in its entirety within the existing capital programme, as the current plan includes £488k (split £292k 2019/20 and £196k 2020/21).

The options for funding this gap include reviewing contribution from GDE funding, utilising the IM&T contingency in the capital programme (£300k p.a. from 2021/22 onwards), and potentially earmarking part of the £1.6m additional PSF funding received in 2018/19. If the proposed direction is approved other funding options (e.g. financing, leasing, collaboration with other NHS Trusts etc.) will be reviewed as part of the full business case

15. The table below gives an indicative cost breakdown of investment to provide a modernised state of the art infrastructure over 5 years
Approx. **£1.4M +VAT**.
Indicative cost breakdown

Component	Cost
Storage	£ 800,000
Server Compute	£ 280,000
Licencing	£ 70,000
Consultancy	£ 70,000
Maintenance	£ 180,000
Total	£ 1,400,000

16. If the Trust were to choose not to invest in new infrastructure, but renewed the support and maintenance of the legacy environment. The table below gives indicative costs to maintain the equipment over the next 5 years

Contract	Initial Term	Contract value	Expiry Date	12 Month Renewal Cost	First 12 month increase %	est. 5yr cost (10% yoy)
1	60	£ 243,000.00	31/10/2019	£ 109,000.00	124%	£ 660,000.00
2	60	£ 150,000.00	14/10/2019	£ 30,000.00	0%	£ 183,000.00
3	36	£ 134,000.00	31/12/2019	£ 78,000.00	33%	£ 480,000.00
Total						£ 1,323,000.00

CASE FOR CHANGE

17. The benefits for the business are as follows:
- ✓ Enabler to stabilise and future proof existing digital environment
 - ✓ Improve performance of clinical & business systems
 - ✓ Reduce RTO (Recovery Time Objective) and RPO (Recovery Point Objective) of digital systems

- ✓ Facilitate full geographically diverse disaster recovery capabilities
- ✓ Platform to drive forward further digitalisation of clinical pathways
- ✓ Provide assurance for disaster recovery readiness to the board.

18. The risks and consequences of non-action are as follows:

- ☒ Existing infrastructure reaching end of life
- ☒ Performance degradation
- ☒ Increased maintenance support costs
- ☒ Increase risk of outage, loss of clinician confidence in digital strategy
- ☒ Legacy design and Disaster Recovery capability – risk to a digitally enabled and dependent organisation on providing patient care.

19. A pre-requisite to refreshing the infrastructure is undertaking a system cloud readiness assessment to identify which systems are compatible to be migrated into the cloud. This will facilitate a more accurate design proposal of an internal infrastructure for systems that need to be locally hosted. Adopting a hybrid-cloud model introduces many benefits including business continuity, opportunity for innovation, scalability, increased speed to market for future systems and reduce total cost of ownership.

20. The future of digital infrastructure is destined for the cloud. The market is still in an early phase and not all systems (due to the complex nature of their design) are cloud compatible yet; however this will change over the next 3-5 years. The sector will start to see systems being delivered as a service (i.e. EPaaS), facilitating more streamlined management and upgrade paths. A cloud adoption strategy should not be taken lightly, it has to be planned and managed carefully. This is why it must be completed in phases, migrating the fully compatible and supported systems first with the more complex systems further into the future. This will place CCC as a pioneer for technological innovation in the healthcare sector.

AVAILABLE OPTIONS

21. **Option 1 – Do Nothing – Continue with existing infrastructure**

Advantages:

- Capital funding not required to upgrade

Disadvantages:

- Increase in maintenance support costs, increasing year on year
- Increase risk of failure
- Increased risk of outages to clinical and business systems due to hardware failures
- Clinical and business systems performance degradation
- Unable to support new clinical pathway digitalisation.
- Loss of stake holder confidence in digitalisation due to performance degradation and full outages.

22. **Option 2 – Consolidate and upgrade infrastructure, with a cloud first strategy.**

Advantages:

- Vastly improve performance of the digital systems
- Future proof and secure the digital strategy for next 5 years.
- Increase stake holder confidence in digitalisation
- Opportunities for future optimisation and developments in research, machine learning, AI, data analytics
- Reduce foot print of physical infrastructure, reducing estates costs.
- Consolidate into single support contract, simpler to manage and maintain.

- Provide a true Active-Active datacentre to minimise the risk of systems outages, and the impact on clinical activity.
- Mitigate increasing maintenance support costs on legacy infrastructure.
- Prepare for Meditech upgrade (Expanse in 2020)

Disadvantages

- Requires capital financial funding

PREFERRED SOLUTION

23. The Trust Board is asked to support the option to modernise the infrastructure as part of the next refresh cycle. (Option 2)

KEYPOINTS FOR DISCUSSION

24. The key points for discussion include:
- The importance of refreshing digital infrastructure
 - A strategic cloud adoption initiative
 - Agreement to proceed with an infrastructure refresh, with a cloud first strategic approach.

NEXT STEPS REQUIRED

25. Trust Board is asked to;
- Support proposals to proceed with the upgrade the digital infrastructure which is end-of-life in Q3 2019.
 - Agree with the direction to adopt a cloud first strategy, and adopt cloud technologies where appropriate on a system by system basis.
 - Note the funding challenge, but that the proposed option would be affordable within Trust resources.
 - Note the complexity of the work alongside multiple other Trust wide changes.