

Board of Directors Meeting

Report

Subject: IM&T Strategy
Date: 30 January 2014
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Executive Summary

This document is the Information Management and Technology (IM&T) Strategy 2013 – 2016 for Sherwood Forest Hospitals NHS Foundation Trust. This provides a strategic framework for IM&T developments within the Trust, and demonstrates alignment with current national, local and clinical agendas, mapping IM&T developments against the Trust's stated overall and clinical objectives.

The governance and operational frameworks in place will be enhanced to assure and manage the full lifecycle delivery of IM&T services into the Trust.

At the heart of the application strategy is the Integrated Care Record programme, which will move the Trust and the wider Nottinghamshire healthcare community towards a fully electronic patient record. The central strand of this is the replacement of the current PAS, which is the master patient record that all other clinical systems will integrate with.

The Trust will make increasing use of Desktop on Demand to provision PC devices, which alongside the upgrade of existing PC estate will address the performance issues that are perceived with a significant number of the current PCs deployed across the Trust. Additionally the use of laptop, tablet and handheld devices will increase, with the device strategy minimising the number of separate devices staff are expected to carry.

While each project will be subject to its own business case, the indicative cost estimates for delivery of the key strategic components of this strategy require a £13.7m capital investment with a revenue impact of £9.0m over the next five years. These figures do not however include any external sources of funding, or any direct financial benefits realised. This spend is not committed and is subject to capital planning and availability.

Recommendation

Note and approve the Sherwood Forest Hospitals NHS Foundation Trust Information Management and Technology (IM&T) Strategy 2013 – 16

Relevant Strategic Objectives (please mark in bold)

Achieve the best patient experience	Achieve financial sustainability
Improve patient safety and provide high quality care	Build successful relationships with external organisations and regulators
Attract, develop and motivate effective teams	

Links to the BAF and Corporate Risk Register	Response to full board request for IT strategy refresh
Details of additional risks	N/A

associated with this paper <i>(may include CQC Essential Standards, NHSLA, NHS Constitution)</i>	
Links to NHS Constitution	N/A
Financial Implications/Impact	Provides input into capital programme for FY14/15 and future years
Legal Implications/Impact	N/A
Partnership working & Public Engagement Implications/Impact	IT framework for delivery of ICR programme
Committees/groups where this item has been presented before	Executive Management Board NHIS Management Board
Monitoring and Review	N/A
Is a QIA required/been completed? If yes provide brief details	QIA completed, identifying minimal impacts



IM&T Strategic Plan 2013-16

Sherwood Forest Hospitals NHS Foundation Trust

DRAFT v0.7

IM&T Strategic Plan 2013-16

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Approvals

The Sherwood Forest Hospitals NHS Foundation Trusts IM&T Strategic Plan will be delivered in two phases. The interim 2013/14 Plan (Draft version 0.4) set out the high level IM&T strategy, and was used to support the full Sherwood Forest Hospitals NHS Foundation Trusts Strategic Plan which was completed and submitted to Monitor by 31st October 2013. This interim IM&T plan has been refined and developed to ensure alignment with other plans being developed, particularly the Clinical Strategy and Implementation Plan, and the full Sherwood Forest Hospitals NHS Foundation Trusts Strategic Plan. This document forms the full Sherwood Forest Hospitals NHS Foundation Trusts IM&T Strategic Plan, and covers the period 2013-16.

In approving this document, the Trust confirms that:

- The IM&T Strategic Plan is an accurate reflection of the current shared IM&T vision and strategy;
- The IM&T Strategic Plan has been subject to Trust Board scrutiny;
- The IM&T Strategic Plan is supportive of and consistent with the Trust's strategic plans.

Review and Approval Matrix

Name	Role	Version 0.1	Version 0.2	Version 0.3	Version 0.4	Version 0.5	Version 0.6
Eddie Olla	Director of Nottinghamshire HIS	R	R		R	R	
Gary Flint	Head of Technical Service Delivery and Support	R					
Mike Press	Assistant Director of Nottinghamshire HIS	R					
Jaki Taylor	Head of Transformational ICT Services	R					
Penny Jones	Interim ICR Programme Director	R		R			
Fran Steele	Chief Financial Officer	R			R		
Nabeel Ali	Executive Medical Director		R				
Susan Bowler	Executive Director of Nursing and Quality		R		R		
Executive Board					R		R

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1.0 Executive Summary

This document sets out the Information Management and Technology (IM&T) Strategy 2013 – 2016 for Sherwood Forest Hospitals NHS Foundation Trust. It is aimed at providing a strategic framework for IM&T developments within the Trust, and to demonstrate alignment with national, local and clinical agendas, mapping IM&T developments against the Trust's overall and clinical objectives.

The Trust is facing considerable changes in its business environment. Its budget is in deficit, it is in formal breach with Monitor and it was included in the Keogh review due to being an outlier for two consecutive years in national Hospital Standardised Mortality Ratio. The need for IM&T to successfully deliver the transformational capabilities it has committed to is paramount, delivering an integrated care record and removing paper from the processes, along with continuing to enhance the excellence of delivery of the IT basics.

The governance and operational frameworks in place within NHIS will be enhanced to assure and manage the full lifecycle delivery of IM&T services into the Trust, from the identification and design of new capabilities, the delivery process to introduce new capabilities and the on-going support, service management and enhancement processes of that capability. NHIS will utilise the industry standard frameworks TOGAF, PRINCE2 and ITIL to manage this activity.

At the heart of the application strategy is the Integrated Care Record programme, which will move the Trust and the wider Nottinghamshire healthcare community towards a fully electronic patient record. The central strand of this is the replacement of the current PAS, which is the master patient record that all other clinical systems will integrate with. Once all clinical systems have removed paper from their process, and are integrated with the PAS that give an Integrated Care Record within the Trust. For the Care Record to be comprehensive, the Trust will also integrate with Primary and other community care providers, enhancing patient care by ensuring all relevant information relating to that patient is available to the clinician at the right time.

The Trust will make increasing use of Desktop on Demand to provision PC devices, which alongside the upgrade of existing PC estate will address the performance issues that are perceived with a significant number of the current PCs deployed across the Trust. Additionally the use of mobile devices, both laptops, tablets and handhelds will increase, with the device strategy minimising the number of separate devices clinicians and nursing staff are expected to carry.

NHIS will address the lack of Data Centre provision outside of the Kings Mill location through the implementation of off-site failover capability, assuring key services are available for use in the event of a complete failure of provision from the Kings Mill site.

While each project will be subject to its own business case, the indicative cost estimates for delivery of the key strategic components of this strategy require a £13.7m capital investment with a revenue impact of £9.0m over the next five years. These figures do not however include any external sources of funding, or any direct financial benefits realised. This spend is not committed and is subject to capital planning and availability.

2.0 Introduction

2.1 Trust Background

The Trust is a medium sized foundation trust, servicing 400,000 people in and around Mansfield, Ashfield, Newark and Sherwood. In 2012 the Trust has a total of 744 beds and treated almost 85,000 inpatients, as well as almost 391,000 outpatients from two main acute hospitals sites, the King's Mill Hospital in Ashfield, and Newark Hospital.

The Trust had a net deficit in its 2012/13 budget of £15 million primarily due to the cost of the PFI and Monitor intervened at the Trust in October 2012 due to finance and governance breaches.

The market share of the Trust for inpatient activity is 69% within a 5 mile radius, falling to 37% within a 10 mile radius, and 9% within a 20 mile radius. Its main competitors are Nottingham University Hospitals NHS Trust, United Lincolnshire Hospitals NHS Trust, Derby Hospitals NHS Foundation Trust, Circle and Chesterfield Royal Hospital NHS Foundation Trust.

2.2 IM&T Background

The Trust's IM&T provision is delivered by Nottinghamshire Health Informatics Service (NHIS) who are a shared service, hosted and employed by Sherwood Forest Hospitals NHS Foundation Trust.

NHIS is governed by a partnership board whose membership comprises representatives from the Trust and the seven CCGs for whom NHIS provides services, and whose purpose is to ensure that there is full and proper financial governance for the Health Informatics Service.

The strategic management of the Nottinghamshire Health Informatics Service is responsible for the delivery of the objectives set by the NHIS Partnership Board and Sherwood Forest Hospitals NHS Foundation Trust (host), and to set appropriate strategic frameworks to support the delivery of the NHIS services.

The previous NHIS Strategic Plan for the Provision of ICT services to the Trust covered the period 2009 – 11ⁱ. Since that time there have been significant changes in direction of IM&T, and the services envisaged. In July 2013 the Trust board recognised the need to create the future strategic vision for investment in Information Technology (IT) over the next three yearsⁱⁱ, which has driven the creation of this Sherwood Forest Hospitals NHS Foundation Trusts IM&T Strategic Plan, and covers the period 2013-16.

3.0 Trust Objectives

The Trust has recently completed its 2013 – 14 strategic plan, setting out how the Trust will deliver appropriate, high quality and cost-effective services for its patients on a sustainable basis, with a plan to come out of serious breach conditions with Monitor over three years. This plan is delivered in three phases:

- Stabilisation (2012/13 into 2013/14)
- Transformation and transition (2013/14)
- Delivery and sustainability (2014 onwards)

3.1 National Context

3.1.1 Keogh Review

In February 2013, Sir Bruce Keogh, the National Medical Director for the NHS in England was asked to review the quality of care and treatment being provided by those hospital trusts in England that have had higher than average mortality rates over the last two years. The 14 NHS trusts which fell within the scope of this review were selected on the basis that they have been outliers for the last two consecutive years on one of two well-established measures of mortality: the Summary Hospital Level Mortality Indicator (SHMI) or the Hospital Standardised Mortality Ratio (HSMR). The Trust's HSMR was above the expected level in 2010/11 and 2011/12, and the Trust was therefore selected for this review. The outcome of this review was a reportⁱⁱⁱ detailing a number of concerns, and a prioritised list of actions for the Trust.

The report identified urgent actions required to address issues in leadership and governance, clinical and operational effectiveness, patient experience and workforce and safety. The addressing of these actions is part of the strategic planning underway at the Trust. The impact of these on the IM&T strategy will be fully defined in the second iteration of this document.

3.1.2 Digital Care Records

In accordance with the strategy "The Power of Information"^{iv} which set out a clear vision for the more effective use of information technology across the NHS, the Safer Hospitals, Safer Wards Technology Fund was announced by the Secretary of State on 17 May 2013. This fund is seen as a catalyst to assist NHS organisations to move from paper-based to paper-light and effectively paperless, integrated digital care records (IDCRs). It also supports those organisations that seek to achieve demonstrable improvements in efficiency, quality and safety by introducing ePrescribing within acute settings and community settings, linked for optimal benefit to an IDCR.

The Trust is progressing funding requests for the following areas:

1. Interoperability
2. Quality & Safety

The interoperability goals supported by this fund are wholly supported by the Trust, and embedded within the interoperability strategy.

Additional funds have been announced in support of similar objectives, the Nursing Technology Fund which is focussed specifically on nursing and midwifery, and a second round of Safer Hospitals, Safer Wards. The Trust will be pursuing funding through these channels.

3.1.3 National Data Sharing

Care.data is a national programme to extract and link large amounts of primary and secondary data to increase transparency and improve patient outcomes. It will be a monthly data extract and is based on four groups of data; patient demographics, events, referrals and prescriptions.

While the current project phase is targeting primary care data, it is anticipated that secondary care data will be required by 2016. The Trust needs to ensure its interoperability solution is capable of supporting this requirement moving forwards.

3.1.4 Clinical Digital Maturity Index

NHS England and EHI Intelligence use the Clinical Digital Maturity Index^v as a benchmarking tool to enable hospitals to better understand how investing in, then effectively using information technology can improve patient safety and outcomes, reduce bureaucracy, and deliver efficiencies. It defines the building administrative and clinical building blocks that a Trust needs in place to achieve a given level of digital maturity.

While the CDMI is not a rating system to encourage competition, as a result of outlining the steps required to increase the capability and use of digital systems, it does allow the Trust to compare its digital trajectory against other similar Trusts, and benchmark its capabilities.

While it is a useful tool to measure the Clinical and administrative systems that the Trust has in place, and validate this against a national framework, it does not currently give any view as to how the Trust is utilising its systems, or how effectively the different systems interoperate. While increasing the level of maturity on this index is important, it is more important to ensure that the Trust is getting the maximum value from its strategic systems.

9	Advanced e-prescribing	Inpatient e-prescribing ward	Oncology e-prescribing	CDS in use on e-prescribing	
		None	CIS Healthcare (ChemoCare)	None	
8	Simple e-prescribing	Outpatient (TTO) e-prescribing			
		None			
7	Enterprise scheduling	Scheduling	Clinical workflow engine / Integrated care pathways	Blood tracking	
		None	Orion Health (Soprano Disease Management)	None	
6	Clinical noting and document management	Document management	Clinical noting	Observations - vital signs	
		Gael (Q-Pulse)	None	None	
5	Order comms and diagnostic reporting	Order comms	Diagnostic reporting	Bed management	
		Sunquest (ICE Alpine)	Sunquest (ICE)	TPP (SystemOne)	
4	Specialist departmentals	Cardiology	Oncology	Critical Care	
		HD Clinical (Prism)	BookWise Solutions (BookWise)	ICNARC (ICNARC)	
3	Departmentals	A&E	Theatres	Maternity	
		TPP (SystemOne)	CSC (ORMIS)	Orion Health (Orion SDM)	
2	Core ancillary	Pharmacy	Pathology	RIS	PACS
		JAC (Pharmacy Stock Control)	CliniSys (WinPath)	HSS (CRIS)	Agfa (Impax)
1	Foundation	PAS	Discharge letters	Community PAS	Simple BI
		McKesson (TotalCare)	Sunquest (ICE)	TPP (SystemOne)	SAP (Crystal Enterprise)

Figure 1: SFH CDMI Table

The Trusts current maturity gives it a CDMI rating of 64. This places the Trust in the third quartile nationally, which is a ranking that this IM&T strategy seeks to improve.

3.2 Strategic Objectives

The Trusts strategic plan defines its vision to be dedicated to providing quality care locally, and has broken this into five strategic objectives

1. Achieve the best patient experience
2. Improve patient safety and provide high quality care
 - a. To reduce mortality Hospital Standardised Mortality Rate (HSMR) and Summary Hospital Mortality Indicator (SHMI) by 10% (HSMR is currently 116 and SHMI 107)
 - b. To reduce all harmful event, with a specific aim to completely eliminate all avoidable Grade 3 & 4 pressure ulcers
 - c. To reduce average length of stay to less than 6 days and readmissions to less than 8% by improving patient flows (i.e. reducing the number of bed movements during the inpatient stays)
3. Attract, develop and motivate effective teams
4. Achieve financial sustainability
5. Build successful relationships and partnerships with external organisations and regulators

Each strand of the IM&T strategy will be mapped against these objectives to demonstrate how IM&T is aligned to the goals of the Trust.

3.3 Clinical Objectives

At the time of writing, the clinical strategy is still in development, and is expected to deliver in the same timelines as the Interim IM&T strategy. Consequently at this stage it is not possible to ensure full clinical alignment. However, the headline vision is to be the best provider of high quality, integrated and secondary care for more local people - care closer to home.

The work done to date has produced four high level outcomes, which will be used as the basis of mapping IM&T strategy against the clinical objectives

1. Maintaining personal independence and increasing community care
2. An integrated urgent care service
3. “Right people, right place” elective care
4. Re-abling people to go home

3.4 Strategy Map

The Trusts strategic objectives have been mapped out on the horizontal on the diagram below. This map has then been overlaid with the elements of clinical strategy that have been defined to date on the vertical. This provides a map to show how the individual clinical programmes map back to the trust strategy. Analysis has then been done to show how much each strand of clinical strategy is contributing towards the trust strategy.

This map will be used in similar format to show how each of the IM&T application strategy streams is contributing to the delivery of the Trust and Clinical strategies.

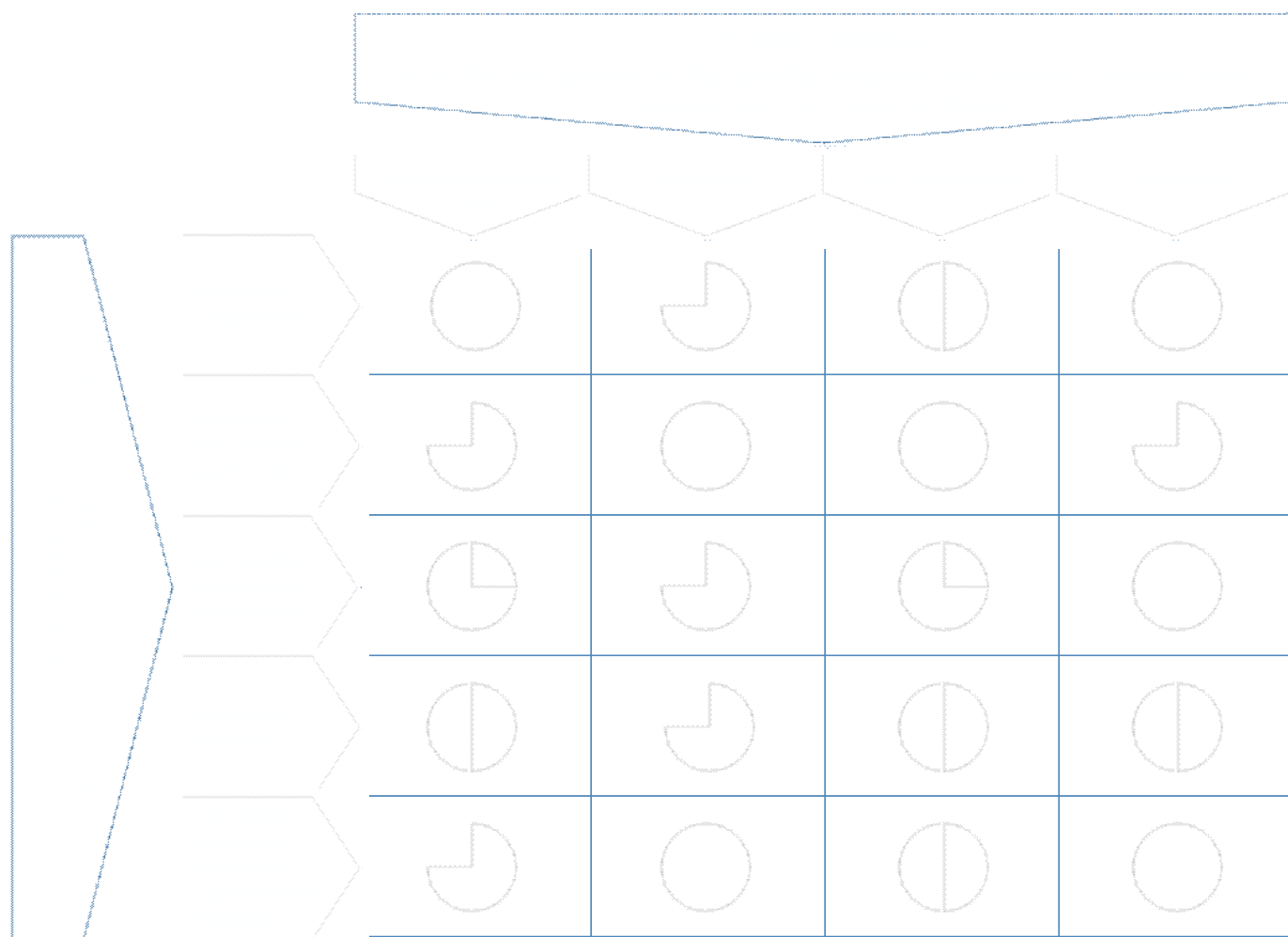


Figure 2: Trust Strategy Map

3.5 IM&T Objectives

NHIS has defined the following priorities for delivering its service

1. To continue the journey to make NHIS more Transparent and Open with our Staff and our Customers.
2. To continue the journey to make NHIS a more Positive, Appreciative and Supportive organisation.
3. To continue to build on our “Cloud” delivery strategy.
4. To continue to “Delight the Customer” using existing ICT Solutions and Services but with a focus on quality.
5. To pursue a strategy of incremental growth in terms of business and our workforce based on the Innovation requirements of our Customers.

Looking at what this means for the Trust, the NHIS strategy is to

- Deliver excellent IT basics, providing the service levels and pro-active communications expected by the Trust
- Accessing data from multiple systems to create an Integrated Care Record, available wherever needed
- Removing the need for paper to support operational processes

4.0 IM&T Landscape

4.1 Current Position

The Trust IM&T provision is structured into two separate pillars delivered by NHIS.

Standard Solutions are commodity items that are defined and delivered under Service Level Agreement between the Trust and NHIS, where the commercial model is for the Trust to cover the unit cost for each Solution, and fund its share of any required enhancements.

Standard Services are procured under the SLA, but are commissioned as required, and have a variable cost based on usage.

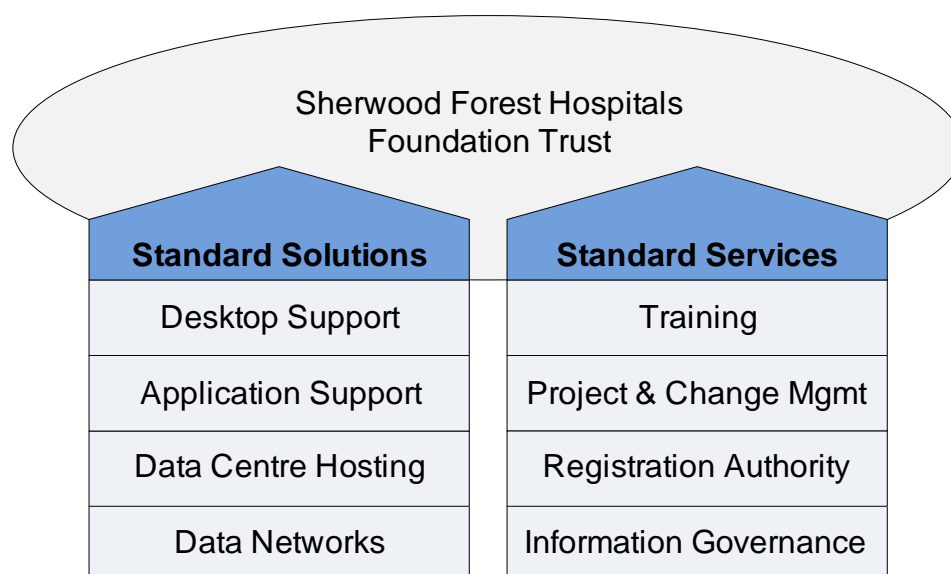


Figure 3: Standard IM&T Solutions and Services

4.1.1 Delivery Organisation

In order to deliver these Solutions and Services into the Trust, NHIS has this year re-structured into three Strategic Business Units (SBUs). These SBUs operate independently to further their goals and meet their financial, quality and delivery targets.

Each SBU is divided into a number of 'Service Lines' which are organised around discrete functions or teams.

Transformational ICT Services					Technical Service Delivery and Support			Innovation and Strategic Development		
Project Implementation and Training	Project and Business Change	Quality Assurance	Data and Information	Data Warehouse	Service Delivery	Service Support	ICT Solutions	Corporate Governance	Marketing	Business Relationship

Figure 4: SBUs and Service Lines

This structure is designed to facilitate a mobile and agile workforce to deliver ‘fit for purpose’ ICT services to the Trust. The model is highly customer focused and consideration has been given to how roles and functions can be strengthened to provide an enhanced customer service and experience. The benefits of this include improvements around the hierarchy of authority (reporting lines), the division of labour (how tasks and activities are shared across specialist teams) and the span of control (ensuring that reporting lines support organisational, team and individual performance).

4.1.2 Transformational ICT Services

This SBU is focussed on the delivery of new and updated services into the Trust. Delivering the following core processes:

- Recording and managing new proposals
- Risk and issue management
- Project planning
- Project tracking
- Project delivery
- Benefits realisation

All of the processes and procedures are built into the Programme Management Office (PMO), which is a bespoke application used to support proactive programme and project delivery throughout their lifecycle, and providing:

- Core repository for project related documentation
- Reporting mechanism at a project, programme and customer level

By structuring the SBU in this fashion, NHIS has strengthened its delivery capability into the Trust, to:

- Reduce the risk of projects failing to deliver to time, cost and quality targets
- Increase the success of projects and programmes in delivering the business value expected
- Make more efficient use of project resources by using a “shared service”
- Make more effective use of scarce skills and resources across projects and programmes

4.1.3 Technical Service Delivery and Support

This SBU is responsible for the technical delivery and on-going service management of IM&T services into the Trust. It is defining and implementing standardised processes to support Incident, Problem and

Change Management, including the request for change process and management of change advisory boards (CABs). Service Level Agreements between NHIS and the Trust are being re-drafted. Increased focus is being given to enhancing customer service and empowering staff with customer insight and intelligence, predominantly through enhanced reporting on performance against service levels.

The capture, management and performance data reporting for all incident type information has been brought together into a single corporate toolset called Manage Engine. This is being used as an enabling corporate application to focus this SBU on proactive customer service and management.

4.1.4 Innovation and Strategic Development

The third SBU is designed to deliver key business processes between NHIS and the Trust such as account management, sales and marketing, quotations and reporting. This is a significant formalisation of the relationship between NHIS and the Trust, and is designed to ensure clear delineation of responsibilities between the two organisations, and to allow unambiguous measurement of performance.

A new Customer Relationship Management (CRM) system has been implemented, based on the MS Dynamics CRM platform. This will improve the visibility of customer information, particularly the correspondence between NHIS staff and the Trust and will support key processes such as:

- Account and contact management
- Management of leads and opportunities
- Production and management of quotes
- Dashboard view of potential, current and historic reporting data

The CRM is integrated with Manage Engine to provide a standardisation of information such as customers and contacts, ensuring Trust incident and problem data will be visible within the CRM.

4.2 Future State

4.2.1 Excellent IT Basics

NHIS is dedicated to enhancing the IM&T capabilities of the Trust, and will do so through significantly increasing its capabilities in the Governance and Control, as well as through on-going development of its Application, Technology, Data and Interoperability services.

Ensuring the delivery of excellent IT basics is a crucial foundation stage for the overall IM&T strategy. This covers all areas of the IM&T provision, but is particularly focussed on the on-going provision of reliable and performant services once they have been deployed, and an effective service desk function to identify and address issues as they arise. The organisational structure is now in place to deliver these services, the next stage is to ensure each component of the organisation is meeting its SLA obligations, and that the service as a whole is integrated across the different SBUs.

4.2.2 Governance and Control

Enhancing the delivery of IM&T services into the Trust will be achieved through strong governance and control. As such NHIS will establish and embed standard frameworks in each SBU to govern the delivery of their objectives. While able to operate independently, these frameworks will be designed to operate together, with defined business processes able to span all frameworks. TOGAF 9 will be introduced to

cover architecture and design activity, PRINCE2 will continue to be used to manage project delivery, and the use of ITIL V3 will be enhanced to support service delivery.

The existing governance processes will be enhanced to ensure all SBUs are aligned to a common set of objectives, which will be tied to the delivery of business outcomes to the Trust.

On behalf of the Trust, NHIS takes responsibility for information security, and will demonstrate its commitment to delivering best practice in this area by progressing towards ISO/IEC 27000-series accreditation. This is a suite of information security standards published jointly by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) which provide best practice recommendations on information security management, risks and controls within the context of an overall information security management system (ISMS).

Transformational ICT Services

The delivery methodology will be enhanced, to provide full lifecycle management of IM&T projects, from inception through to closure. This will include responsibility for managing internal IM&T processes and ensuring the transition between phases and SBUs that each project goes through in its lifecycle.

Responsibility for system testing will also sit within this SBU, providing additional assurance that solutions are robust and meet business requirements before the solution is handed to the business stakeholders for user acceptance.

Technical Service Delivery and Support

The function of this SBU is well defined and comprehensive. The performance targets will be focussed on enhancing the levels of pro-active management of devices and applications, increasing the visibility and availability of the service desk to its user population, and improving the performance of devices and key applications.

Innovation and Strategic Development

Additional capabilities to deliver Architecture planning, requirements definition and solution design will sit within this function. This is focussed on engaging with key Trust stakeholders to understand and define future IM&T requirements, and create viable IT services.

4.2.3 Application Strategy

The core strand of the Trust's application strategy is the Integrated Care Record Programme, which will replace the TotalCare PAS. This is the core system that all other acute applications inter-operate with.

Other functionality enhancements are driven from capabilities provided by the PAS, and inter-operability will ensure the care record is integrated across the clinical systems landscape and available electronically, progressing the Trust towards paper free clinical operations.

4.2.4 Technology Strategy

The technology strategy defines how devices are managed, and used to access Trust services. This includes the types of devices that will be in use across the trust.

It also looks at the provision for the hosting and management of server infrastructure, with the majority of servers being provisioned through a virtual platform

The strategy then reviews the network infrastructure that is in place within the Trust, and how this connects to other local and national organisations, supporting the Trusts interoperability strategy

4.2.5 Data & Interoperability Strategy

The Data & Interoperability Strategy defines how the Trust will manage its data assets, and how different consumers of this data will gain access to it. This covers integration between systems inside the Trust, moving the Trust towards a fully electronic patient record, as well as interoperability with external partners and the wider local and national healthcare community.

5.0 Governance & Control

5.1 Excellent IT Basics

Enhancing the delivery of core IM&T services into the Trust is an important aspect of this strategy, as the planned application transformation relies on both the end product services, and the underlying IT capabilities being resilient and performant. The key to enhancing the delivery of IM&T services into the Trust is implementing strong governance and control processes to manage the delivery of services, and appropriate organisational accountability to ensure agreed service levels are maintained.

5.2 Integrated standards based frameworks

NHIS will continue to utilise the PRINCE2 methodology, which is currently in place in the Transformational ICT Services SBU. This methodology governs project and programme delivery, and spans the full delivery lifecycle.

The Technical Service Delivery and Support SBU will implement ITIL to govern service management.

The Innovation and Strategic Development SBU will implement TOGAF to detail the current and future state IM&T capability in the Trust. This will help the Trust make the right decisions about their future and show them how to get there.

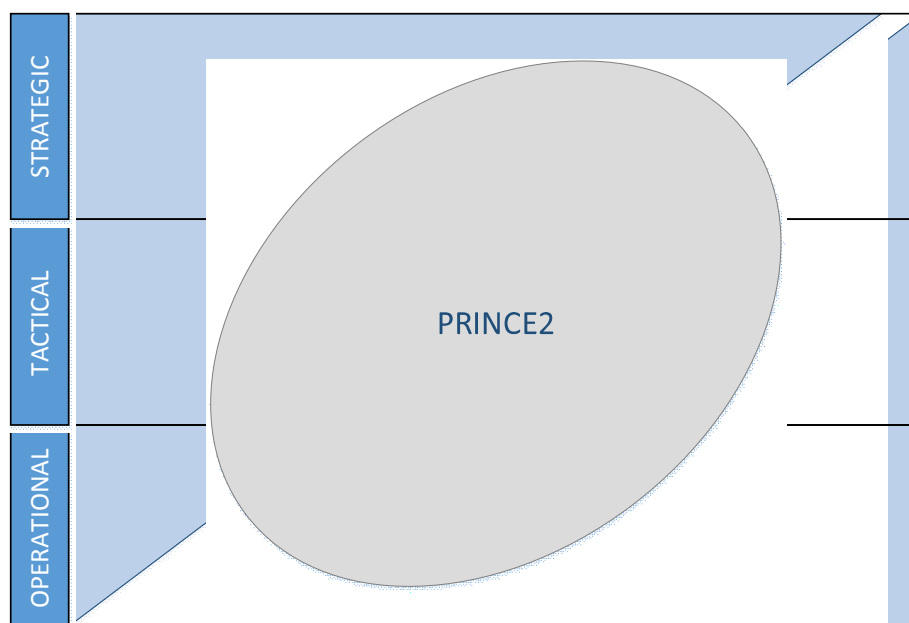


Figure 5: Framework Interoperability

Although these frameworks describe areas of common interest, they do that from different perspectives. ITIL was developed to support Service Management, TOGAF was developed to support the development of Enterprise Architecture and PRINCE was developed to support Project Delivery. The focus of ITIL is therefore on services, TOGAF on architecture and PRINCE on delivery. As the three domains are reliant on each other, is not necessary for NHIS and the Trust to choose between them, as they give specific benefits to their own SBU population, but it is crucial to understand how business processes that overlap SBUs operate together, to deliver a fully integrated methodology.

All three frameworks are designed to allow for the selection of relevant components to be used, and there is an expectation that they will be tailored for use within the Trust. A core set of deliverables for each project are anticipated to be

- Business Case
- Requirements Specification
- Project Plan
- Solution Design
- Test Strategy & Plan
- Service Management Plan
- Deployment Plan
- Value Realisation

5.3 EA Framework: TOGAF 9

The Open Group Architectural Framework (TOGAF) is an industry standard framework (a detailed method and a set of supporting tools) for the development, acceptance, production, use, and maintenance of an enterprise architecture, based on an iterative process model and a re-usable set of architectural assets.

TOGAF looks at the architecture of the enterprise through four distinct domains:

- **Business Architecture:** defines the business strategy, governance, organisation, and key business processes
- **Data Architecture:** describes the structure of an organisation's logical and physical data assets and data management resources
- **Application Architecture:** provides a blueprint for the individual applications to be deployed, their interactions, and their relationships to the core business processes of the organisation
- **Technology Architecture:** describes the logical software and hardware capabilities that are required to support the deployment of business, data, and application services. This includes IT infrastructure, middleware, networks, communications, processing, standards, etc.

All architecture will be developed using the Architecture Development Method (ADM), a method for developing and managing the enterprise architecture lifecycle. The basic structure is the ADM cycle, which is shown at high level below.

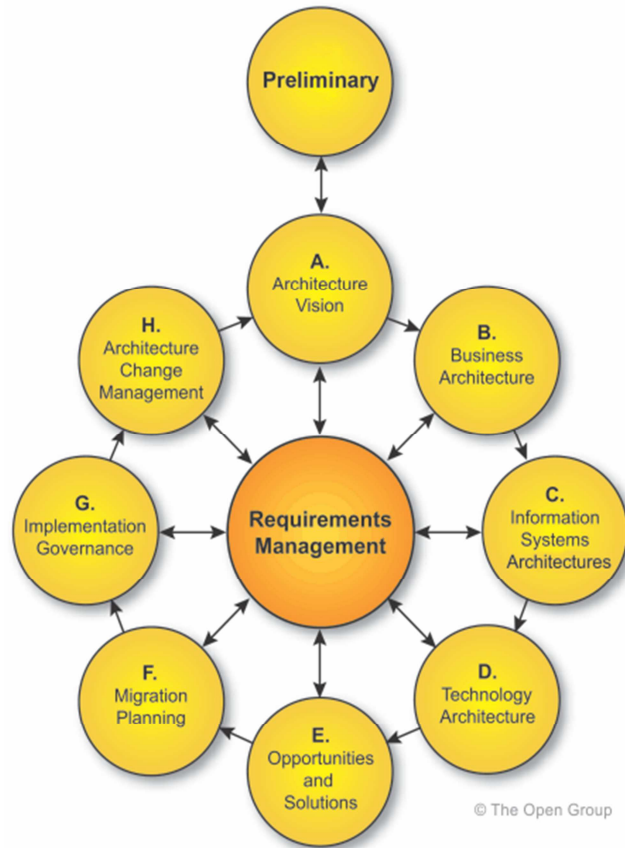


Figure 6: ADM Cycle (© The Open Group)

A key aspect of TOGAF is the concept of re-use. Where all architecture and solution design work draws initially on the generic capabilities already in place, adapting them where possible to meet the needs of individual requirements. This ensures not only a simpler and more cost effective design process, but also that the architectures and solution designs themselves are simpler and more cost effective to implement, as they make use of existing assets and standards within the enterprise where possible.

Not all new solutions can leverage existing assets and standards, so all new architectures and solutions are generalised, to become available for future requirements to draw on if required.

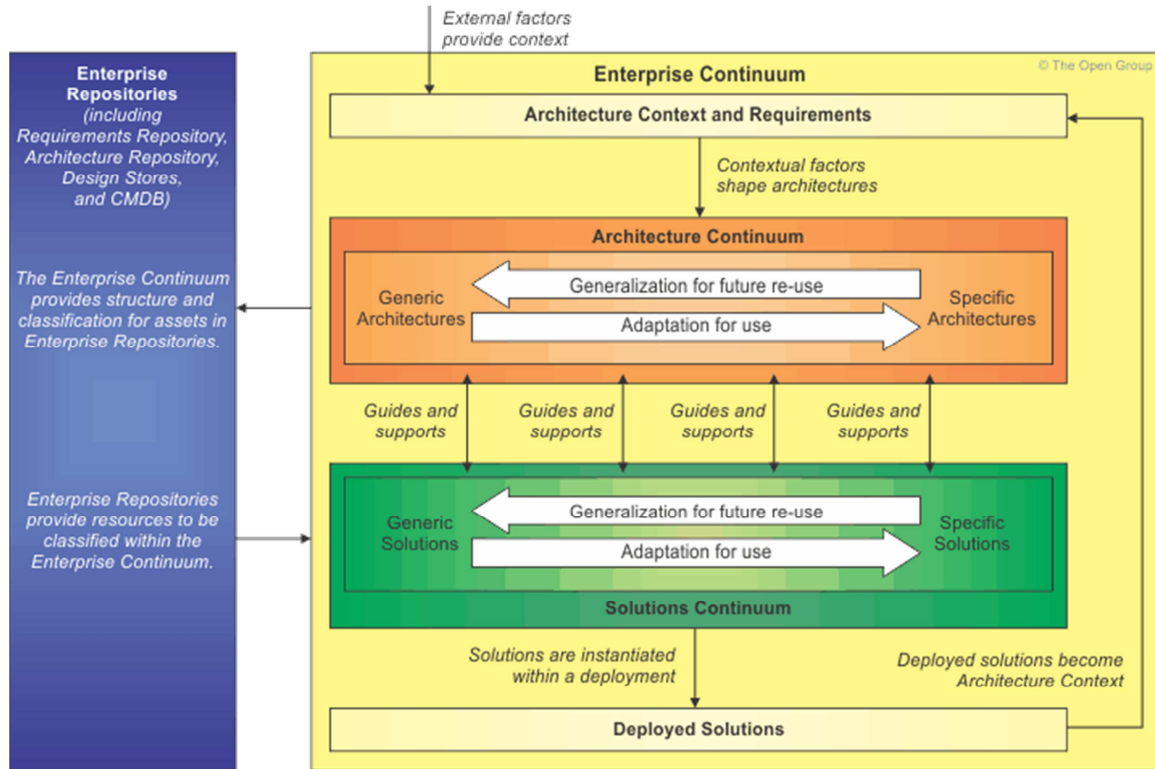


Figure 7: TOGAF Architecture Repository (© The Open Group)

5.4 Programme Delivery Methodology: PRINCE2

PRINCE2® (PProjects IN Controlled Environments), is a widely used, flexible project management method that navigates you through all the essentials for running a successful project regardless of the project's scale, complexity, culture, level of innovation or geography.

It is based on a set of guiding principles, a set of control themes, and a process lifecycle model.

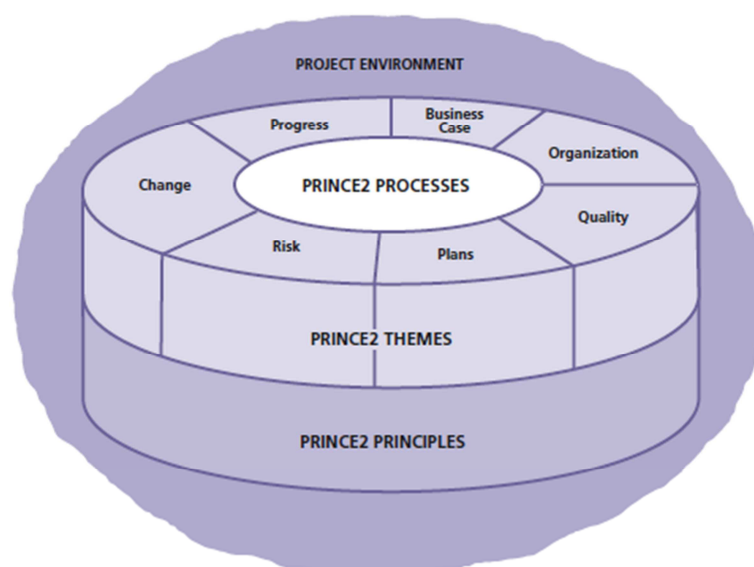


Figure 8: PRINCE2 Structure (© The Stationery Office 2011)

5.4.1 Guiding Principles

There are seven principles that provide a framework of good practice which is designed to maximize the project's ability to succeed.

1. **Business Justification:** A project must have continued business justification
2. **Learning from experience:** Lessons are sought, recorded and acted upon throughout the life of the project
3. **Defined roles and responsibilities:** Defined and agreed roles and responsibilities within an organisation structure that engages the business, user and supplier stakeholder interests
4. **Managed by stages:** Projects are planned, monitored and controlled on a stage-by-stage basis
5. **Management by exception:** Tolerances are defined for each project objective to establish limits of delegated authority
6. **Focus on products:** Focus on the definition and delivery of products, in particular their quality requirements
7. **Tailoring:** Project deliveries are tailored to suit their environment, size, complexity, importance, capability and risk

5.4.2 Control Themes

Sitting on the foundations of the principles are control themes, which are the aspects of project management that need to be addressed continually throughout the project lifecycle. These themes are

1. **Business Case:** Why is the project being run?
2. **Organization:** Who is impacted by this project?
3. **Quality:** What needs to be delivered?
4. **Plans:** How is the project going to be delivered, how long will it take and how much will it cost?
5. **Risk:** What could go wrong, and what is the impact if it does?
6. **Change:** What's the impact to the organisation of the project?
7. **Progress:** What work has been completed, what is currently being done? Where is the project going and is it right that we carry on?

These themes provide the project with a baseline for benefits, risks, scope, quality, cost and time, and describes how to monitor and control the work as the project progresses.

5.4.3 Processes

At the heart of PRINCE2 is the process model used to manage a project. This is a set of activities that are required to direct, manage and deliver a project.

The concept of stages is at the heart of the process methodology, with each project running through a number of stages, and requiring authorisation to progress from one stage to the next.

- **Pre-project:** The activities required to commission the project and to gain commitment to invest in project initiation
- **Initiation:** Creation of an overall Project Plan and defining the baselines for the project performance targets of time, cost, quality, scope, risk and benefits
- **Delivery Stages:** The size of the project dictates what stages each project will use. Typical stages would cover design, build and test. At the end of each stage the Project Board will review the

success of the stage, approve the next Stage Plan, review the updated Project Plan and confirm continued business justification and acceptability of the risks

- **Final Delivery:** The closure of the project, including orderly decommissioning, project acceptance and handover into service and potentially value realisation

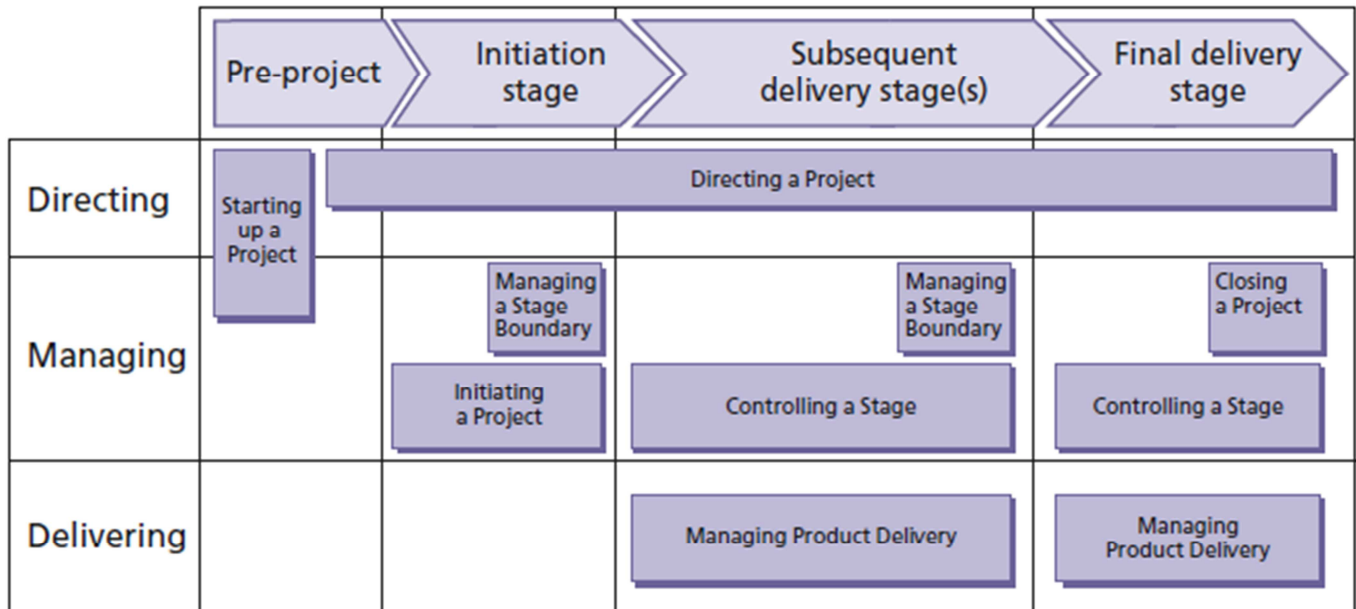


Figure 9: PRINCE2 Process Model (© The Stationery Office 2011)

5.5 Service Management Framework: ITIL v3

ITIL is the most widely adopted guidance for IM&T service management worldwide, providing an extensive body of knowledge, capabilities and skills. It centres on NHIS as the service provider to the Trust understanding the Trusts business objectives and priorities, and the role that IT services play in enabling these objectives to be met.

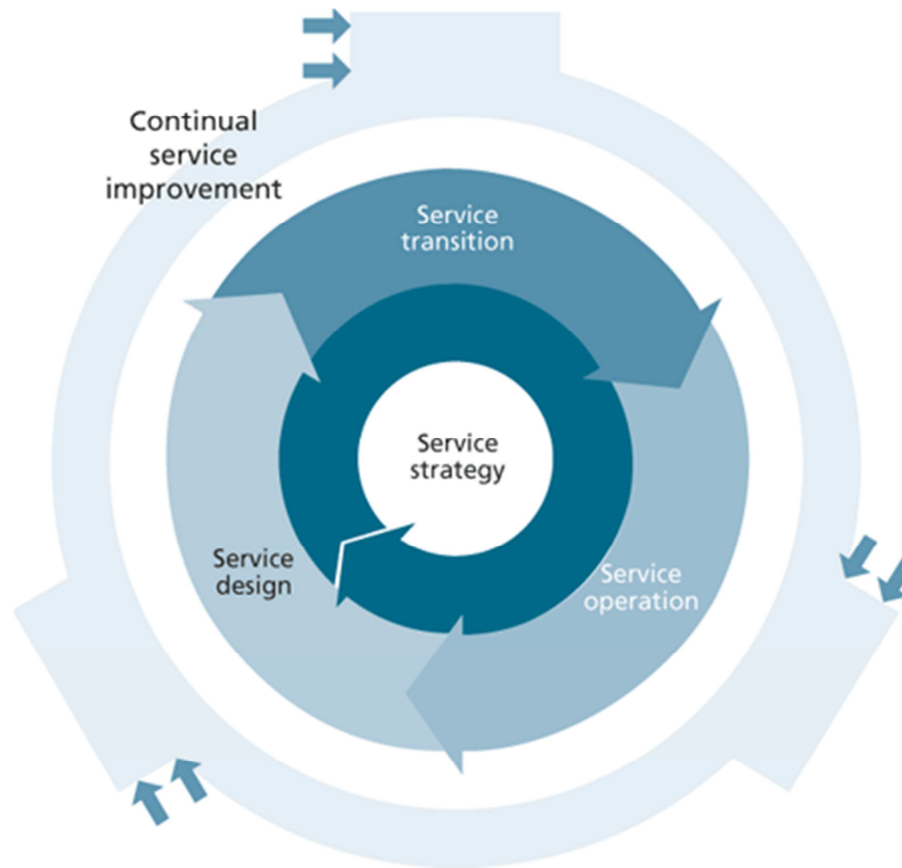


Figure 10: ITIL Service Lifecycle (© Crown Copyright 2011)

ITIL adopts a 'lifecycle' approach, focusing on practices for service strategy, service design, service transition, service operation and continual service improvement.

- **Service strategy:** Sits at the centre of the lifecycle, ensuring the collaboration between business strategists and the IT service provider to develop IT service strategies that support the business strategy
- **Service design:** The design of the overarching IT architecture and each IT service to meet customers' business objectives by being both fit for purpose and fit for use
- **Service transition:** The management and control of changes into the live IT operational environment, including the development and transition of new or changed IT services
- **Service operation:** The delivery and support of operational IT services in such a way that they meet business needs and expectations and deliver forecasted business benefits
- **Continual service improvement:** Throughout the lifecycle, embedding learning from experience and adopting an approach which ensures continual improvement of IT services.

5.6 Security

The ISO 27000 series of standards are reserved by ISO for information security. Within this series are a range of individual standards and documents, the core of which is ISO 2700, which is the specification for an Information Security Management System (ISMS). The standard seeks to "provide a model for establishing, implementing, operating, monitoring, reviewing, maintaining, and improving an Information Security Management System".

NHIS will become certified to this standard, gaining external accreditation. This certification process comprises a number of stages

1. **Define Information Security Policy:** NHIS will develop and publish a top level policy, which is likely to be supported by subordinate policies.
2. **Scope Definition:** This will define which part(s) of the organisation will be covered by the ISMS, as well as defining the location, assets and technology to be included.
3. **Risk Assessment:** A risk assessment will be undertaken, to determine the risk exposure/profile, and define the risk mitigation plans
4. **Risk Management:** Implementation of the risk mitigation plan and on-going risk management. A part of this process will be selection of appropriate controls, with the justification for each decision recorded in a Statement of Applicability (SOA), followed by the appropriate implementation of these controls.
5. **Certification:** External certification through a suitable accredited third party.

6.0 Application Strategy

6.1 Application Roadmap

There are a number of key strands to the Trust’s application strategy, which are detailed below. The core is the Integrated Care Record programme, whose central stream of activity is the replacement of the current PAS. The following diagram sets the context of the application strategy, and how the planned functionality integrates with functionality already in delivery, as well as future objectives. It provides multiple views of each application

1. Shows the impact across community and acute care settings, as well as for the individual patient
2. Shows the dependencies and inter-relationships between the functional components
3. Shows the current status of each component
 - a. In deployment: Functionality is available, and is currently being delivered
 - b. Planned: Functionality is in the planning or design stage, delivery is still being planned
 - c. Future: Functionality has been identified as required, however detailed planning has not commenced

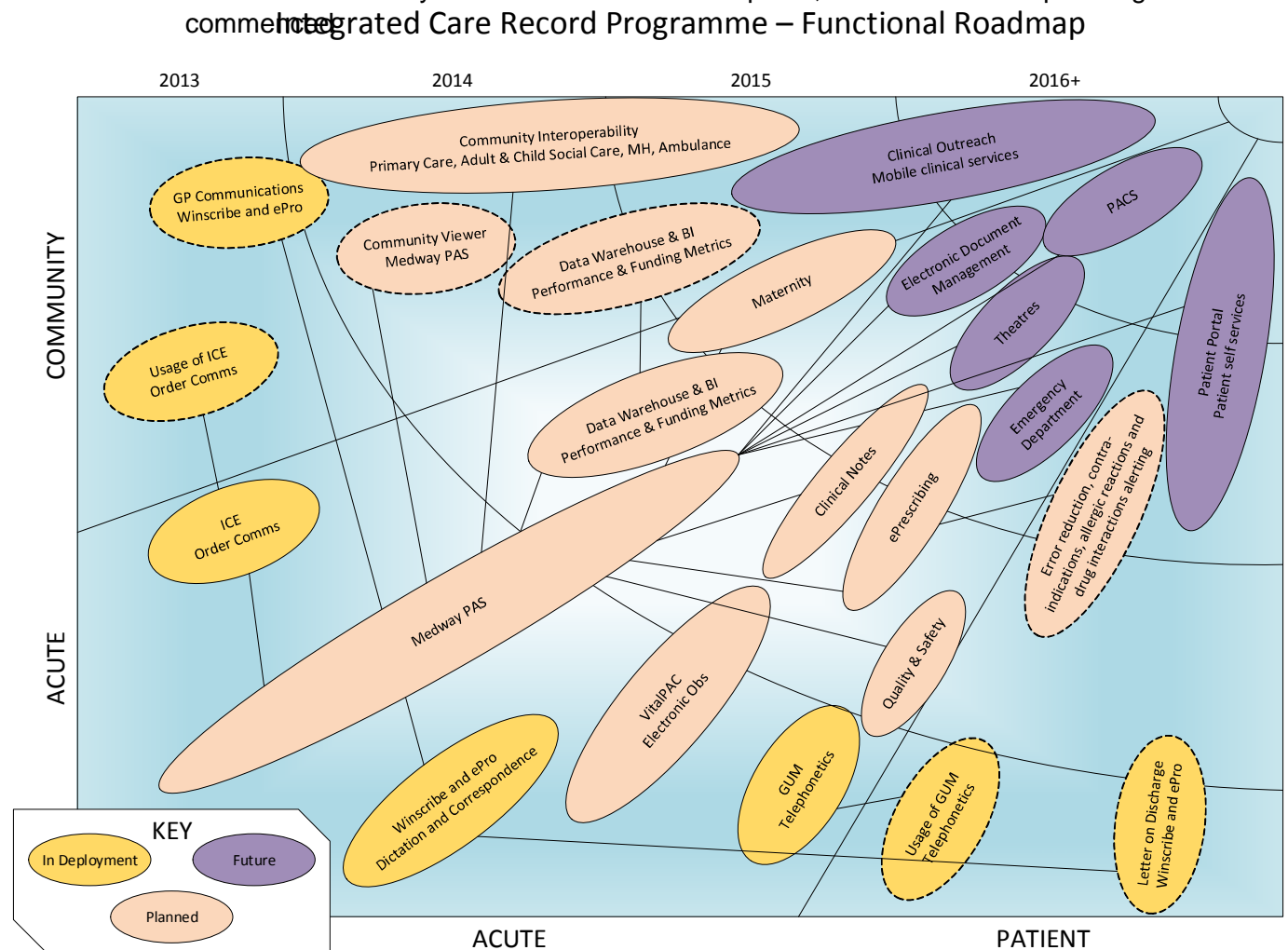


Figure 11: ICR Programme Functional Roadmap

Note that timelines are indicative, and reliant on budget being made available, as well as the ability of the Trust to absorb this level of change. Agreement of prioritisation of the different aspects will be driven through the clinically led Hospitals IT Board.

When the application roadmap is mapped against the CDMI framework, this shows the Trust is making significant change to its digital maturity, both by updating or replacing systems that are currently in place, as well as introducing new digital systems.

Level No	Level Name	System	CDMI Application View	SFH Application Roadmap
9	Advanced e-Prescribing	CDS in use on e-Prescribing	-	OBS Underway
9	Advanced e-Prescribing	Oncology e-Prescribing	CIS Healthcare (ChemoCare)	CIS Healthcare (ChemoCare)
9	Advanced e-Prescribing	Inpatient e-Prescribing Ward	-	OBS Underway
8	Simple e-Prescribing	Outpatient (TTO) e-Prescribing	-	OBS Underway
7	Enterprise Scheduling	Blood Tracking	-	-
7	Enterprise Scheduling	Clinical Workflow Engine / ICP	Orion Health (Orion SDM)	OBS Planned
7	Enterprise Scheduling	Scheduling	-	-
6	Clinical Noting and Document Management	Observations - Vital Signs	-	TLC VitalPAC
6	Clinical Noting and Document Management	Clinical Noting	-	McKesson (System C Medway)
6	Clinical Noting and Document Management	Document Management	Gael (Q-Pulse)	OBS Planned
5	Order Comms and Diagnostic Reporting	Bed Management	TPP (SystemOne)	McKesson (System C Medway)
5	Order Comms and Diagnostic Reporting	Diagnostic Reporting	Sunquest (ICE)	Sunquest (ICE)
5	Order Comms and Diagnostic Reporting	Order Comms	Sunquest (ICE Alpine)	Sunquest (ICE)
4	Specialist Departments	Critical Care	ICNARC (ICNARC)	ICNARC (ICNARC)
4	Specialist Departments	Oncology	BookWise Solutions (BookWise)	BookWise Solutions (BookWise)
4	Specialist Departments	Cardiology	HD Clinical (Prism)	HD Clinical (Prism)
3	Departmentals	Maternity	Orion Health (Orion SDM)	OBS Planned
3	Departmentals	Theatres	CSC (ORMIS)	OBS Underway
3	Departmentals	A&E	TPP (SystemOne)	McKesson (System C Medway)
2	Core Ancillary	PACS	Agfa (Impax)	OBS Underway
2	Core Ancillary	RIS	HSS (CRIS)	OBS Underway
2	Core Ancillary	Pathology	CliniSys (WinPath)	CliniSys (WinPath)
2	Core Ancillary	Pharmacy	JAC (Pharmacy Stock Control)	JAC (Pharmacy Stock Control)
1	Foundation	Simple BI	SAP (Crystal Enterprise)	McKesson (System C Medway)
1	Foundation	Community PAS	TPP (SystemOne)	McKesson (System C Medway)
1	Foundation	Discharge Letters	Sunquest (ICE)	McKesson (System C Medway)
1	Foundation	PAS	McKesson (TotalCare)	McKesson (System C Medway)

Figure 12: CDMI Roadmap

While a significant number of the clinical systems are planned for replacement, where possible the Trust is seeking to leverage the value of investments that have been made, by integrating data currently held in stand-alone applications into an Integrated Care Record, providing a single clinical view of the Trusts patient information.

6.2 Patient Administration System Replacement



Figure 13: PAS Replacement Strategic Mapping

The most significant component of the application strategy is the replacement of the existing Patient Administration System (PAS), TotalCare PAS from McKesson. The support contract for this system expires in March 2014, and McKesson are not offering terms for renewal. While this deadline is driving the timescales for the PAS replacement, the programme is also delivering a significant strand of IM&T and business strategy, and will be the major application transformation delivery over the next two years. The PAS is the core acute system, and interoperability with the rest of the Trust application architecture will be crucial.

Following a lengthy procurement cycle, the Trust has selected McKesson System C Medway PAS as the replacement PAS. This has been developed specifically for the UK healthcare sector and is used in over 40 NHS Trusts. Core modules include

- MPI - comprehensive patient demographic record
- RTT pathway monitoring
- outpatient referral (choose & book enabled) and clinic management
- waiting list management
- multi-resource scheduling
- inpatient and bed management

- document management
- case note tracking
- clinical coding
- patient alerts

6.2.1 Benefits Mapping

Specific mapping of benefits against the Trusts strategic objectives are:

- Achieve the best patient experience
 - Delays on discharge due to delays with prescribing will be eliminated as new systems are introduced and manual processes are replaced.
- Improve patient safety and provide high quality care
 - Enable clinicians to use technology such as interactive whiteboards and mobile computers to improve patient care and increase efficiency.
- Attract, develop and motivate effective teams
 - Current inefficiencies such as dual data entry and the reliance on paper notes to be transferred across the hospital will be eliminated as new systems are introduced and manual processes are replaced, moving the Trust towards the DoH strategy of paper-light or paperless by 2018.
- Achieve financial sustainability
 - The Trust will decrease the amount it is paying on annual license fees for software on a new updated system.
- Build successful relationships and partnerships with external organisations and regulators
 - As part of the ICR programme, which has a focus on data exchange across the wider health system, the PAS replacement programme will ensure interoperability across the Trust, and into the community, in particular with the wider GP systems. The current Trust Interface Engine (TIE) will be used to create this interoperability, utilising the HL7 interface standard which is in line with DoH strategy in the “connect all” approach.
 - The current DoH activity to connect community/GP systems to connect to Care.data for demographics by 2016 is expected to require Acute Trusts to align shortly thereafter. This strategic core systems replacement readies the Trust for that requirement.

6.2.2 PAS Interoperability

The core PAS will utilise the TIE to ensure integration with other clinical systems, such as ED, Bed Management, Whiteboards, Clinical Noting and ePrescribing (where the Trust strategy is to move to a fully electronic prescribing solution, to reduce prescribing errors, provide real time decision support, monitor drug administrations, provide stock control and enable full audit capability.), which are provided by a number of vendors. These systems will be assessed following the introduction of the PAS, and the future clinical systems in this area will be defined. This will be based on business process support, technical capability and commercial value, with options to maintain a best of breed approach, or migrate functionality into additional McKesson EPR modules.

6.2.3 Business Intelligence

Business intelligence and clinical dashboard is provided by Medway BI, a local Business Intelligence solution which allows the Trust to integrate, store, analyse and present information, and is fully integrated with the replacement PAS. This will enable a fully integrated reporting and management information

capability, with real time clinical dash boarding including progress bars, colour coded wait-time indicators and alert notifications.

The BI platform will accept data from other non-McKesson systems, allowing the development of a single source of management information across the Trust. In addition to accepting data from other clinical platforms, financial and HR data will be included in the data set.

This platform will allow the creation of near real time dashboards, displaying information and performance against a set of defined business metrics. Dashboards can be tailored for individual roles, ensuring the relevant information is presented. Traditional reporting is also provided from the same data set, supporting standard reporting as well as enabling trend analysis.

6.2.4 Organisational Change Approach

This programme will touch all areas of the Trusts organisation, and the agreed business process change approach is to align business processes with those in place in the underlying applications, minimising application change. Consequently, the effort involved in ensuring the organisational processes are ready to utilise the new systems, in addition to the staff training needs will be substantial.

The programme will define the organisational change approach in detail, including the strategies for workforce engagement approach, including the workforce impact definition and the project delivery resource planning.

6.3 Observations and Clinical Support System (VitalPAC)

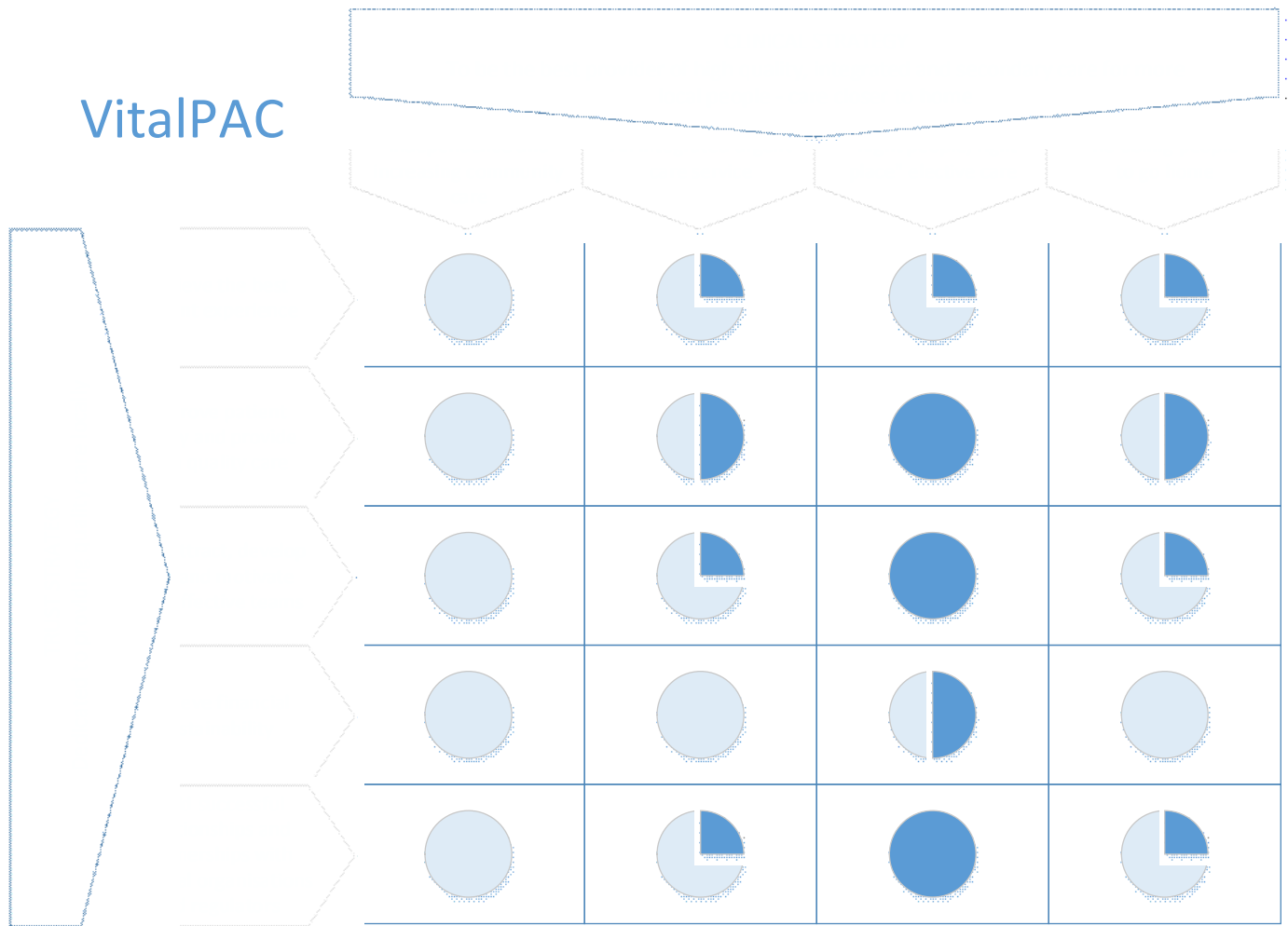


Figure 14: VitalPAC Strategic Mapping

The recent Keogh Review has emphasised a need for the Trust to focus on quality improvement in addition to the reduction in mortality. VitalPAC is a medical system using hand-held mobile technology that enables nurses to collect vital signs observations on admission and throughout an inpatient stay. Combined with data from patient administration, pathology, microbiology and radiology systems, VitalPAC identifies high risk and deteriorating patients and immediately alerts the relevant doctor on their personal hand-held mobile device, without the need for paper based observations to be manually scored and actioned.

The overall objective of this project is to improve patient safety and outcomes in relation to mortality and quality of care by early recognition of deterioration and prevention of unexpected deaths. It will also help the Trust to achieve quality standards, help secure the delivery of CQUIN payments, improve communication and team-working, and free up nursing staff from administrative tasks allowing them more time to care for their patients.

The use of Apple iPod touch as the VitalPAC handheld mobile device will drive a de-fact standard of mobile device into the clinical setting, and this will form a core component of the device strategy.

6.4 Integrated Clinical Environment (ICE)

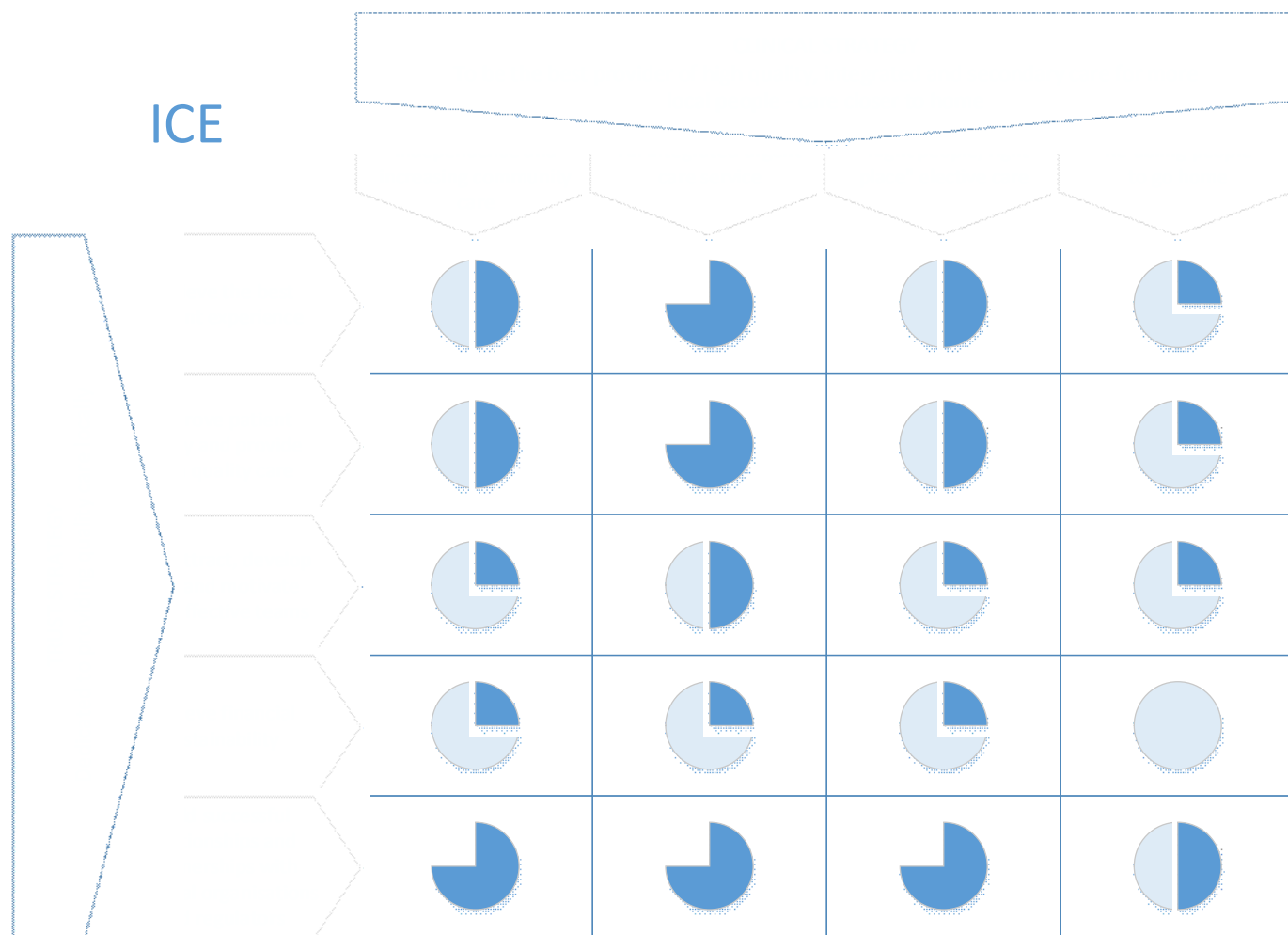


Figure 15: ICE Strategic Mapping

The Trust is making significant advances in eliminating paper from the requests and results process within pathology and radiology through the implementation of Sunquest ICE, a portal for laboratory test communications from the clinic to ancillary departments.

This product has been selected as the strategic system of choice within Nottinghamshire, enabling interoperability with the primary care setting, providing:

- Automated ordering and receipt of Chemistry, Haematology and Immunology blood tests
- Automated ordering and receipt of Plain Film Radiology Reports
- Automated receipt of Discharge Correspondence from Kings Mill and Newark Hospitals

Interoperability has been validated with the following primary care platforms, meaning ICE is invoked from within the clinical system, negating the need to log onto multiple systems. The two primary care systems in use within Nottinghamshire are TPP and EMIS, both of which are included.

- The Phoenix Partnership (TPP) - SystemOne
- iSoft – Synergy
- EMIS – LV
- In Practice Systems – Vision

In day to day use, ICE is not used directly by either the requester, or the receiving department, who continue to use their existing information systems. ICE ensures key information is recorded for each modality requested, and facilitates interoperability between systems.

In addition to reducing paperwork, this gives the ability for all parties to track requests from the point of creation, significantly reducing risk of requests going astray, and reducing queries and discussions.

6.5 ePrescribing

The prescribing process currently in place is heavily paper based, with the majority of prescriptions and drug charts being hand written. ePrescribing replaces hand written prescriptions, reduces paper usage and offers a computerised solution for prescribing. This helps reduce the risk of medication errors associated with poor handwriting, illegible faxes and additional key strokes, as well as providing the ability to easily audit information on drug usage, prescription monitoring and wastage patterns.

Clinical decision support will also be embedded into the process, which helps prescribers create orders based on full information regarding patient details and the medicines in use. Clinical decision support is also available during administration, where appropriate providing a nurse with information such as additional instructions at the time of administration.

ePrescribing will provide a comprehensive coverage, including outpatients, discharge (TTO), inpatient, oncology and theatres.

6.6 Electronic Document Management Service (EDMS)

Recognising that not all systems can become paper free in their current form, the Trust will implement EDMS to replace paper Health Records with digitised versions. Any records that do not reside in the Trust's clinical information systems will be digitised, and available within the EDMS digitised records store. This makes records available when and where they are needed, improving the quality of services at the point of care and reducing lead times from referral to treatment. Moving from paper to digital records will allow rapid access and sharing of information, supporting the Trust in its delivery of high quality care.

As well as digitising paper records, the Trust will also move towards electronic workflow, removing paper from processes wherever possible.

6.7 Quality & Safety

Auditing and reporting on the quality and safety of care provided is an important Trust activity, both for demonstrating compliance to national standards, as well as driving local enhancements to the care provided.

Currently there are a number of systems in place that deliver this capability, but are not interlinked, and require a significant amount of paper based data capture that is then manually transcribed into IT systems. A new Quality & Safety solution will provide a single mobile interface for the direct capture of quality and safety metrics, as well as a mechanism to view and analyse the results, and use these to input into individual action plans, as well as for national reporting.

Areas covered will include:

- Quality & Safety Auditing
- Infection Control Auditing
- Patient feedback
- Compliance Monitoring and Reporting
- Action Planning

6.8 Theatres

The current ORMIS theatres solution was provisioned under NPfIT, This solution is now aging, and functionality gaps mean it is supplemented by a number of other systems and manual processes to manage patient care and clinical processes. However, these solutions are unable to fully meet the wide range and growing needs of the Trust and a more comprehensive and integrated replacement system is required. The trust wishes to create a 'paperless operating theatre' environment for the safe and timely management of patients, including:

- A single system to manage surgical patients, fully integrated with the patient electronic care record, with all clinical information able to be accessed by different health care workers in a format to meet their needs.
- An intuitive and sophisticated user interface;
- Trust wide theatre scheduling with support for list time assessment, easy visual access to real-time waiting list information, identification of gaps, and easy replacement of 'lost patients' at short notice.
- Clear clinical view of theatre lists including capture of procedures, outcomes to enable easier coordination of lists
- Capture clinical information and data within theatre environment to provide electronic records
- Support patient generated pre-op assessments
- Integration with bed management showing real time view of patients location
- Strong reporting capability allowing the Trust to interrogate clinical datasets to get consultant, theatre and session level information, including outcomes.

6.9 Picture Archiving and Communications System (PACS)

The current Agfa PACS solution was provisioned under NPfIT, and the contract expires mid-2016, with no options for further extension. Accordingly a replacement solution will be required. The Trust is currently a participant in the East Midlands Radiology Procurement Consortium (EMRAD) which seeks to establish a connected PACS/RIS across East Midlands, allowing access to 'Any image, any patient, anywhere'. EMRAD is currently shortlisting suppliers, with detailed solution specification, tendering and contracting due to complete in June 2014. This will create a Framework Contract for PACS, RIS, Storage and Managed Service for Trusts in the East Midlands with a Prime Contractor. At this point, the Trust will need to decide whether to procure its replacement services through this Framework, or procure a solution independently.

6.10 Maternity

Maternity within the Trust is a bespoke pathway developed in Orion SDM. This can only be accessed when connected to the Trusts network, and none of the data captured is made available to any other Trust system.

While wishing to maintain the ability to support local patient care processes, the trust does not wish to continue to develop this as an in-house solution, as it sees significant benefit to implementing an off the shelf product that benefits from an on-going development roadmap, and allows integration with wider Trust systems.

The solution will fully integrate with the Trusts ICR, and support all maternity, labour management, fetal medicine and neonatal care.

As a fully electronic solution the solution will be compliant with all major standards such as CNST, National Data Set, NICE and NHS Numbers for Babies, support mobile working, track patient care against care plans and NICE Guidelines, feed information into clinical dashboards and provide audit trails of activity, data and patient workflow.

6.11 Finance

The Trust uses the Integra Financial Management Software Suite, including general, purchase and sales ledgers, purchase order processing system and stock, asset, cash and expenses management. This is managed by NHIS as a shared service on behalf of a number of other customers in addition to the Trust. NHIS provides financial ledger management functions, development of bespoke reporting tools, and ensures the integrity of the data.

Currently there is a significant amount of manual processing taking place to support finance processes which is consuming significant resource, and hindering the delivery of financial planning and control. Finance department. Additional systems functionality will be required in support of the envisaged wide reaching changes to current finance processes.

6.11.1 Supply Chain Management

The implementation of electronic visibility of workflow from business case approval, through procurement, order placement to GRN and Invoice scanning will significantly reduce the amount of manual processing and reconciliation work undertaken by the finance team. This will include the ability to call off defined items against an agreed rate, rather than undertaking competitive tender for a large number of relatively low value items.

6.11.2 Management Information

Leveraging the BI capabilities delivered through the McKesson product implementation, management information will become significantly more dashboard driven, with a greater focus on self-service information generation. By ensuring all reporting is undertaken in a single platform, against a common data set, concerns around the availability and reliability of information can be addressed.

As the management information available matures, the Trust will move towards patient-level information and costing systems (PLICS). This gives a suite of clinical costing standards which will provide the Trust with the ability to measure the resources consumed by individual patients.

6.11.3 Budgeting and Forecasting

Currently budgeting and forecasting is a slow and highly labour intensive manual process that does not guarantee budgets are aligned with strategic objectives, does not provide accurate financial forecasting and does not give finance the levels of visibility needed to predict and adapt to changes in the Trusts business. Data is collected and manipulated in spread sheets, creating a risk of data integrity issues and a lack of process visibility. Performing detailed and accurate “what-if” scenario planning and forecasting based on different assumptions and drivers is difficult to achieve and retaining a detailed audit trail of changes is impossible.

Implementing systemic budgeting and forecasting, integrated with the ESR allows generation of a Payroll Budget for the year using individual employees’ details. The import and maintenance of cost drivers for the apportionment and allocation of budget data enables the spreading of fixed costs across multiple budgets. The module provides the tool to manage the budget setting process and will support hierarchy workflow. Security allows the restriction of access by individuals or user groups to programs or to sensitive data.

6.12 Human Resources

The Electronic Staff Record (ESR) is a national solution that provides the full range of functionality available to the NHS. The ESR provides interfaces to professional registration bodies, e-Learning functionality, compliance tools that enable tracking of statutory and mandatory training requirements, appraisals, absence management and self-service.



Figure 16: ESR Functionality

The trust seeks to build out future HR functionality within this platform, fully exploiting the capabilities that are available, ensuring the data held in ESR is accurate and using this as the reliable source of information for all staff listings and costing, managing staff within this platform.

In May 2011 the Department of Health announced its commitment to retain ESR as the central Workforce Solution for the NHS after August 2014. An ESR re-procurement project is now underway, being led by the Department of Health.

6.13 Patient Outreach

In the longer term, the Trust will outreach to its patients through the introduction of telemedicine, patient portal, patient applications and social media. This will support greater focus on provision of care outside of the acute setting, and reducing the number of admissions through pro-active patient monitoring. The development of these capabilities will be progressed in conjunction with the development of the associated clinical services that will follow the release of the clinical strategy.

6.14 Service Improvement Planning

The Trust is managing an on-going Service Improvement process, which is driving cost reduction and service enhancement. The very high level IM&T requirements that have come out of this process have provided input into the application roadmap, and are included for reference in Appendix B: Service Improvement - IM&T Outputs

7.0 Technology Strategy

7.1 Device Strategy

The Trust is currently accessing services from a wide variety of devices. While predominant devices are desktop and laptop PCs, vocera communications and mobile telephony, there is a significant amount of variation in these device specifications, and little integration in terms of access to the same data from multiple device types. This has led to individuals carrying multiple devices to perform their daily functions.

The Trust is looking to move to viewing devices as an access channel to services. While some devices will remain specialised in the services they provide access to, other devices should provide access to multiple services, giving device specific access to common functionality, and reducing the number of standalone devices individuals are required to use.

In the longer term, the Trust is looking to deliver application functionality over web interfaces, allowing applications to be accessed through a web browser, rather than requiring local applications to be installed and run from the client device. Where local applications remain, for instance in mobile devices, their communications with the backend application servers will use the same APIs that the web interface uses.

7.1.1 Mobile Devices

Tablet devices, predominantly Apple iPad's are increasingly being used within the Trust. iPad's will be deployed to all board members, and all board papers will be distributed electronically on these devices, rather than printing out papers every meeting.

iPad devices are also able to provide an interface into the replacement PAS via the Desktop on Demand platform. This enables clinicians to input notes directly into the PAS, and access information at the bed side, rather than deal with paper notes that then need to be transcribed into the PAS. This capability will be expanded beyond the core PAS, as the trust progresses to a full EPR.

The implementation of VitalPAC requires the deployment of handheld iOS devices, which will be used to input the observations data. For standalone devices the iPod touch will be deployed, however where the staff member also requires voice capability, whether through mobile telephony, vocera or winscribe dictation capability, iPhone devices will be deployed.

On the Kings Mill site, internal clinical communications, including crash bleeps, are delivered through the Vocera communications system. This consists of central system software that controls and manages call activity, and a lightweight, wearable, voice-controlled communication device that is carried by all clinicians. This operates over the Trusts wireless network and allows clinicians and other hospital personnel to instantly communicate with others throughout the hospital site. While the current deployment utilises wearable Vocera B3000 Communication Badges, there is the option to utilise apple iOS devices, which could allow device consolidation with both the mobile telephony platform as well as the VitalPAC solution.

Given the solutions that are being deployed, the Trust has a de-facto standard of Apple iOS devices for its mobility capabilities.

7.1.2 Desktop

Desktop PCs are predominantly delivered through fixed desktops having applications installed locally, although the desktop on demand (DoD) platform is being piloted in a limited context. The strategy is to

migrate relevant (fixed clinic and ward based) local desktops onto the virtual platform, centralising the desktops, applications and backend servers in the same physical data centre rather than on local hardware and delivers them to users on demand. This cost-effective and secure replacement for traditional PC management enables workers to access their desktop and applications wherever they are, on any device. This platform also allows traditional windows applications to be accessed from mobile devices, creating a convenient and optimised user experience on any device, including tablets and smartphones.

In addition to the capability benefits, it means that the desktop itself is no longer a performance bottleneck. This means the desktop asset can be used until the point at which it fails, and can then be replaced with a thin client device. Traditional PC devices will be maintained where there is a business need, particularly in corporate services.

7.1.3 Laptops

For mobile workers the Trust issues laptop devices. Other than their portability, these have the same functionality as the desktop builds. While the use of the DoD platform on a mobile device is possible, with the ability to run the virtual desktop even when not connected to the network, the usability of such a solution is not optimal, so it is anticipated that laptop devices will remain as a full local build.

Ruggedised laptops are also available. These are used in settings where mobile capability is critical, but the devices need to be protected from damage. Ambulance is a core use case for this technology, where all data is captured electronically, and made available to ED when the ambulance arrives

7.1.4 Fixed Telephony

Fixed line telephony is currently provided by Skanska as part of the PFI arrangement, and the strategy is to retain this provision in its current form. If it is possible to address this issue, the Trust will review its current communications approach, and identify whether there is benefit to providing a unified communications capability, with email, telephony, messaging, contact centre, voice & video conferencing and presence functionality through an integrated platform.

7.1.5 Printing

The Trust has a large number of printing devices, with a mixture of multifunction devices accessible over the Trust network and devices connected to individual desktop machine. While the Trust will reduce the use of paper, it recognises that it cannot be eliminated. The Trust will make greater use of multifunction devices available over the network, retiring locally connected printers.

The major concern with printing to networked printers accessible by many people is the security of the documents to be printed, as sensitive information may be contained on the printed document. To address this, a technology known as pull printing will be used. This allows print jobs to be sent from the desktop and collected ("pulled") from any printer on the network. The print is pulled to a particular printer when the user either:

- Enters a security code on the printer panel
- Swipes a card on a card reader attached to the printer
- Scans their fingerprint on a biometric scanner attached to the printer
- Uses an app on their phone which the printer recognises

This allows users to send print jobs securely without the need to rush to the printer to pick up their printed documents. Until the user is at the printer, the print job remains unprinted, and can be cancelled if required. If one printer is busy, prints can be collected from another, reducing bottle-necks. Additionally, wasted prints are eradicated, as any uncollected print jobs can be deleted from the print queue before they are ever printed.

7.1.6 Choose your own device (CYOD)

For devices detailed above, NHIS will create a set of standard devices and applications with individual price points, or a variety of specifications, allowing budget holders the option to select the devices they wish to procure. As the devices are called off from a defined list, NHIS can ensure all devices meet corporate standards, whilst providing variety and choice to the device purchaser.

By integrating this process with the capital code that will be used for procurement NHIS will ensure CapEx and RevEx costs are correctly allocated, and that the asset ownership and management process is initiated.

7.1.7 Bring your own device (BYOD)

The Trust will seek to enable the use of personal devices to access both clinical and non-clinical systems through a secure gateway. This would be an optional policy to support staff that wanted to utilise their own devices, and would not be mandated on any staff.

Security and risk management is the most important aspect to get right for BYOD to be operationally fit for purpose. All devices would be secured and access to trust data would require authentication. Trust data will be managed through a management platform allowing mobile device management (MDM) and mobile application management (MAM), which would allow for the remote wiping of trust data, or even of the whole device in the event of the device being lost or compromised.

7.1.8 Asset Management

IM&T asset management is critical to the success of the NHIS service delivery, as it documents and manages the lifecycle of each asset from the point of request through to its retirement. There is a clear understanding of what each asset is and where it resides. ITIL provides the framework for asset management, ensuring

- Cost effective procurement of appropriate assets
- Optimisation of the use of each asset
- Managing the disposal of assets when cost of maintaining them exceeds their benefits
- Providing information necessary for regulatory compliance, license renewal, and contract renewal

In addition to the value of the above, asset management allows for better incident and problem management by providing the service desk with asset details, improving resolution rates and timescales. It is easier to move, add, or change configurations by connecting service information to specific assets, and enables the use of software licenses and warranties to be managed.

Data is also included as an asset that will be managed, which is of particular importance where BYOD means data assets may reside on assets whose ownership does not sit with the Trust.

7.2 Server Provisioning

7.2.1 Data Centre Hosting

NHIS delivers its server hosting from two data rooms located at Kings Mill Hospital. Services such as network access and applications including TotalCare PAS and Sage Integra are designed to fail over between data rooms, but other services are delivered from a single data room, and they are not configured to provide complete failover capability for each other.

While all servers and services have been designed to be resilient to component failure within the data rooms, the lack of a second data centre provision in a diverse physical location exposes all services to the risk that unavailability of the Kings Mill data rooms would result in all IM&T services being unavailable. In order to quantify the level of risk that this presents, NHIS service delivery will work with the Trust stakeholders to define the level of availability required for each service, and then review the existing solution design. Modelling the financial and operational risks as a result of downtime allows analysis of whether the estimated cost of downtime within a specified time unit exceeds the amortized capital costs and operational expenses involved in providing a higher level of availability within the data centre design.

A number of high level options are available

1. Take no action, accepting the risk associated with delivery of IM&T services from a single location on the basis that Kings Mill Hospital is the primary location for the Trust, and if it was unavailable the lack of IM&T provision would not be the most pressing issue for the Trust at that time.
2. Provisioning a new data room in another Trust location, installing all servers and equipment needed for core services to fail over to this location in the event of an issue in the core Kings Mill location.
3. Rental of space in a commercial data centre, installing all servers and equipment needed for core services to fail over to this location in the event of an issue in the core Kings Mill location.
4. Contract with a cloud services provider, allowing data to be backed up to the cloud, and the required services to be delivered from there in the event of failure of the mail data rooms.

While these options need to be worked through in detail, given the business critical services that are served from the Kings Mill data rooms, taking no action is not seen as a viable option, and no other trust location has a data room that can be utilised. NHIS are reviewing options with a number of potential off site suppliers to provide hosting capability.

7.2.2 Virtual Server Hosting

NHIS currently delivers services to the Trust using servers hosted on a number of separate virtualised server environments. The strategic decision has been taken to consolidate these environments on to a single, new virtualisation infrastructure based on the Cisco Unified Computing System (UCS)^{vi}, based on the VMware vSphere 5 product suite with an EMC VNX storage backend. The new UCS infrastructure will be used to support a new suite of VMware vSphere 5 hosts, which will allow the current virtual Machines (VM) workloads to be rehomed. In addition the initial vSphere 5 environment will provide short term capacity for new projects and due to its modular nature, will be scalable to allow additional hosts to be added in future.

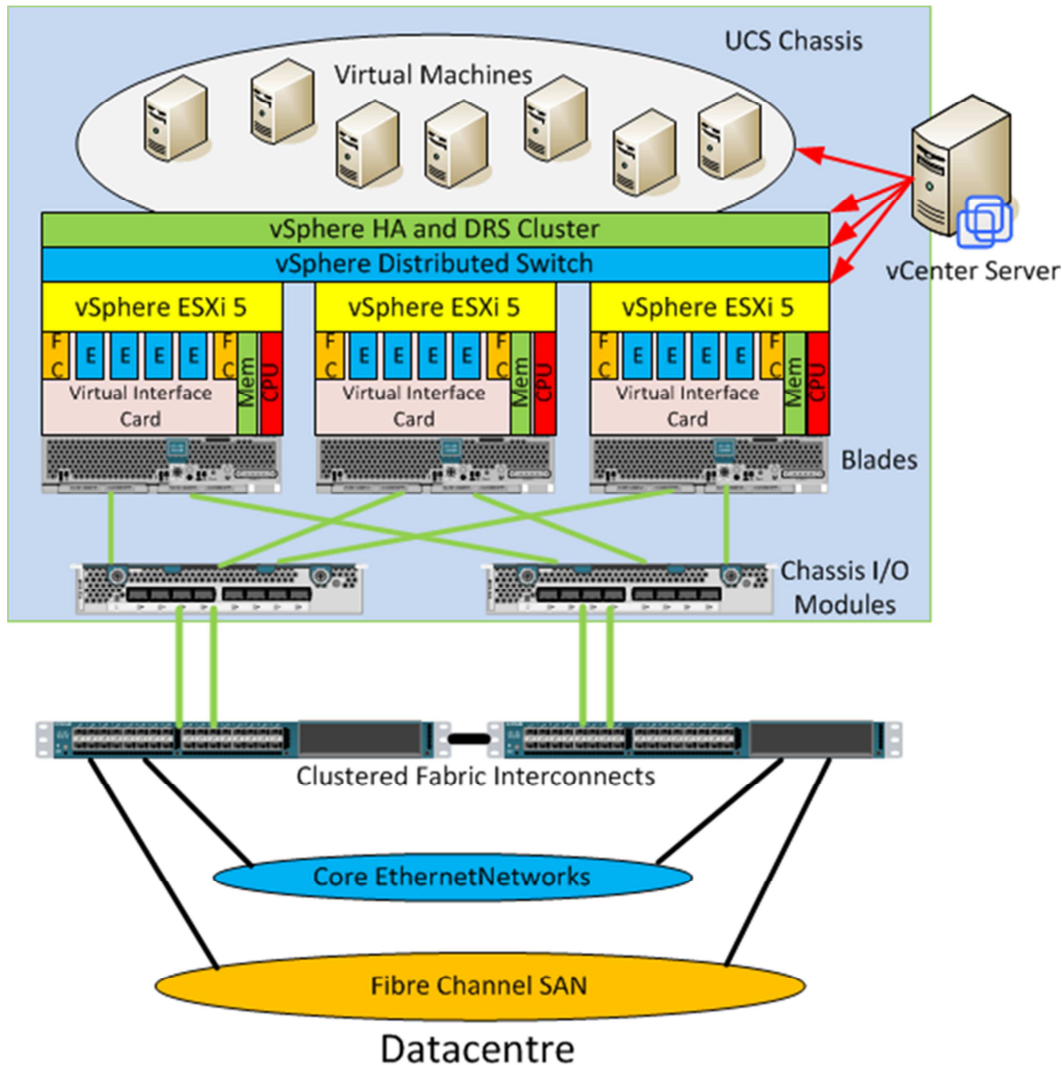


Figure 17: UCS Logical Design

The new infrastructure will be implemented alongside the current server environment in Core 2, the data centre in Kings Mill Hospital. This approach will provide an immediate platform to provision ESXi servers for new application VM's and facilitate a migration of the current VM workload and the decommissioning of the existing rack mounted servers.

7.2.3 Physical Server Hosting

While the strategy is to virtualise all servers where possible, it is recognised that there is likely to remain some servers for whom virtualisation is either not possible, or where it is not beneficial to do so. The data centre solution will be able to support this limited amount of physical servers. The physical servers will have access to the same EMC VNX storage backend as the virtual solution, meaning data can be stored and accessed from a common platform regardless of whether the server is virtual or physical.

7.2.4 Virtual Desktop Infrastructure

For desktops delivered through a VDI solution, NHIS has implemented a hosting solution in Core 2 data centre based on Pivot3 vSTAC VDI appliance arrays. This platform provides high performance, high availability and no single point of failure, operating as shared resource pools. As vSTAC VDI appliances are "stacked" together, the system dynamically aggregates, load-balances and optimizes shared storage,

compute and network resources to ensure optimal desktop performance. The array is designed to withstand end-to-end failures; from desktops to disks to appliances.

This solution eliminates the need to implement a supporting SAN capability, as storage is held within and automatically load balanced across the appliances.

The platform is highly scalable, as each appliance supports over 125 virtual desktops, and there is no limit to the number of appliances that can be implemented.

7.3 Networking

The Kings Mill Hospital site comprises of two discrete network components. There is the KMH LAN, which is the local area network used by staff to connect devices onto the network. KMH is also a data centre location, and this area of the network is a separate entity from the LAN. This is to ensure security of access into the Data Centre.

The network design also encompasses a second Data Centre that is physically located in another location. As discussed previously, this site is not currently in existence.

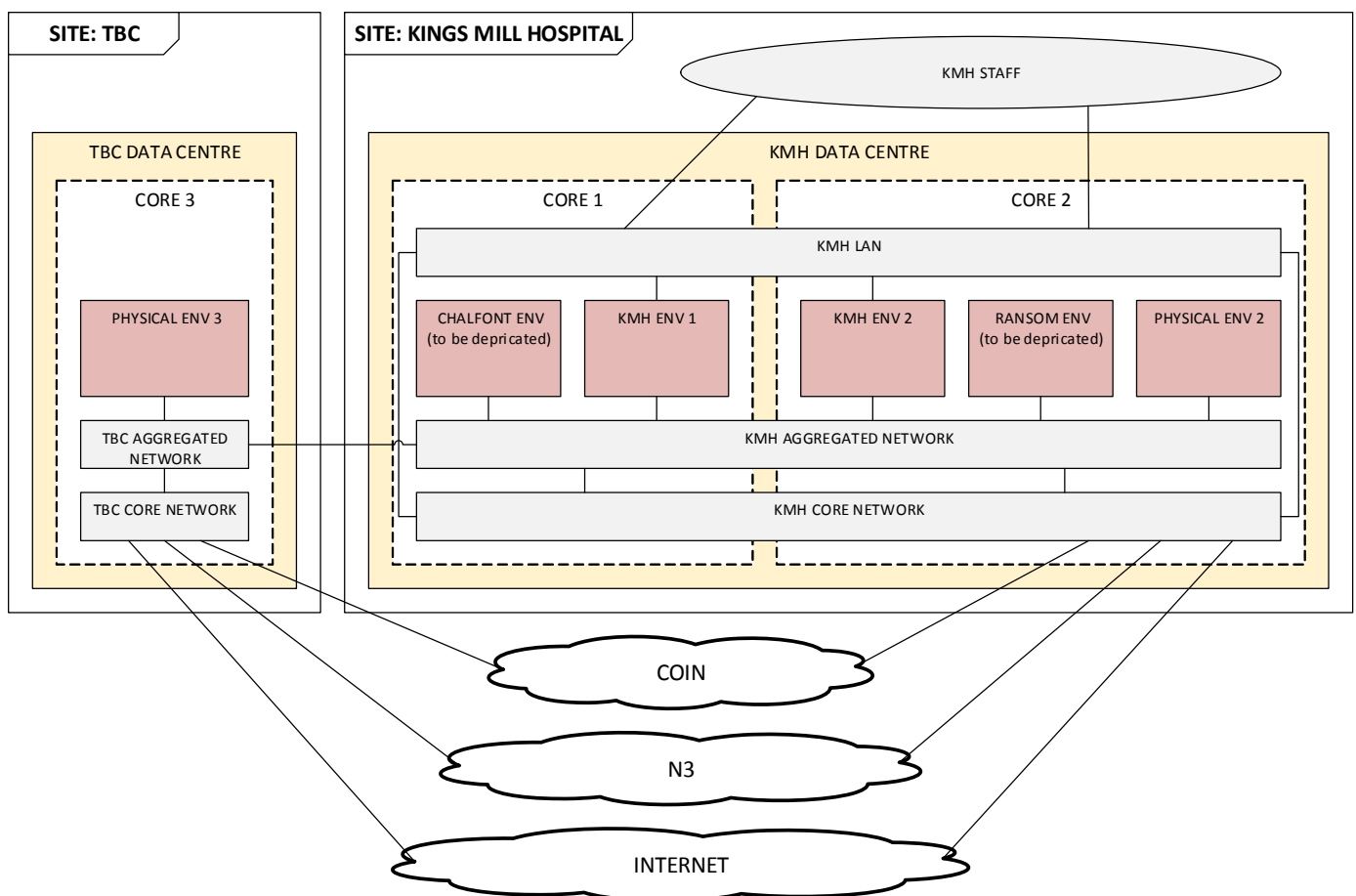


Figure 18: Trust Local Area Network

The trust network does not sit in an isolated environment, but is interconnected with a number of other networks. It forms part of a Community of Interest Network (COIN), which provides networking capability

across the local health community. It also forms part of the national N3 network, which securely connects all NHS locations together.

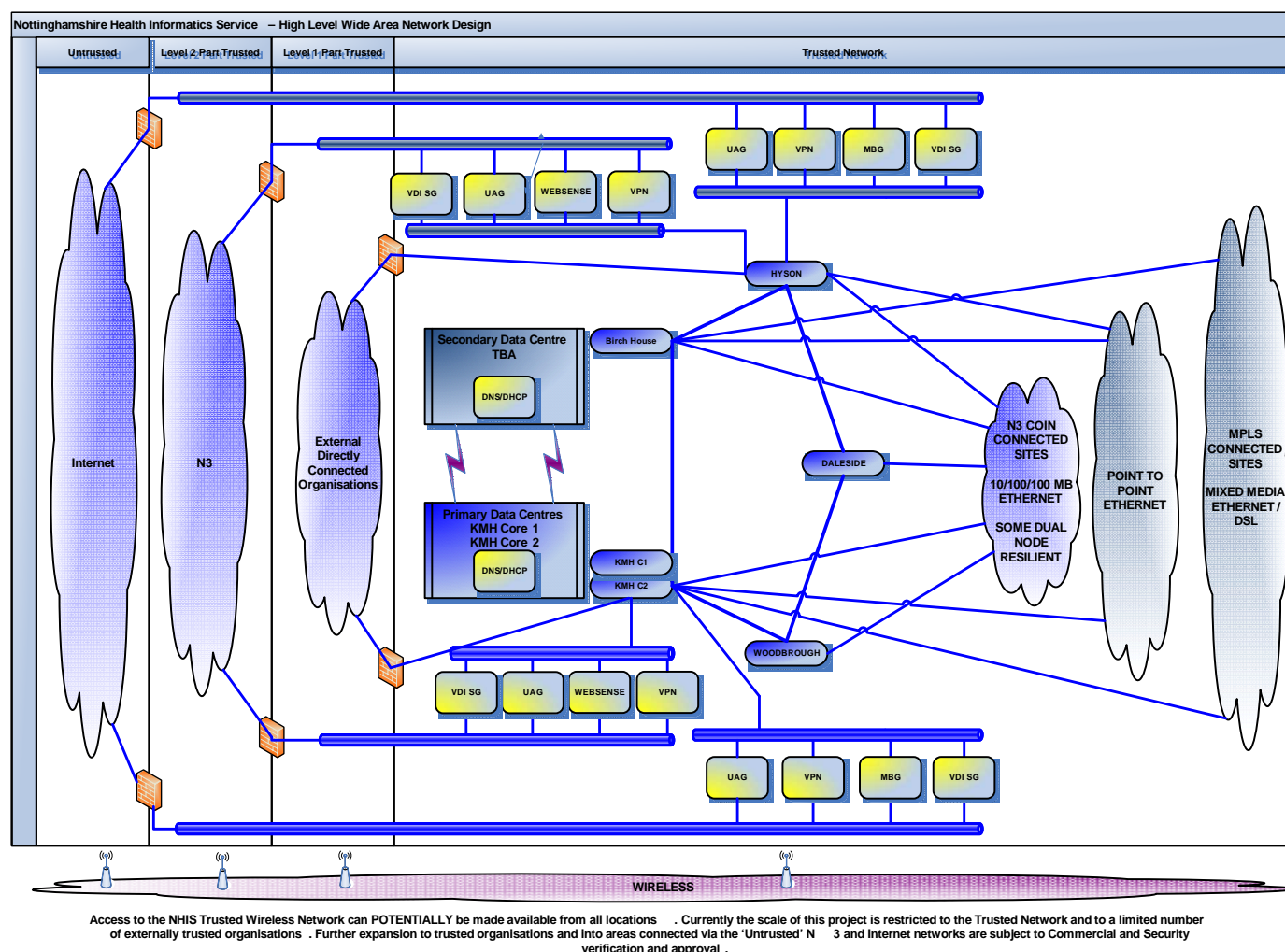


Figure 19: Wide Area Network

Figure 19: Wide Area Network shows the design of the network, and that it is broken into four distinct components:

- Trusted Network
- Level 1 Part Trusted
- Level 2 Part Trusted
- Untrusted

7.3.1 Trusted Network

The heart of the network is the trusted network. Devices connected to the trusted network can transparently access IM&T services such as applications, file shares and printers. Direct access to this network is limited to machines administered by NHIS.

As discussed previously, also sited within the trusted network is the data centre. While this is logically separated from the rest network, it is a trusted location.

7.3.2 Part Trusted

Devices connected to other COIN and N3 sites are NHS devices, but are not controlled and managed by NHIS. There are security devices in place to ensure the Trust is not exposed to risk, but there is access available between the Trust and these locations, supporting data sharing and inter-connectivity

7.3.3 Untrusted

Devices on the untrusted network are not controlled and managed by NHIS. As security and authentication cannot be guaranteed, devices on this network can only access services through an authentication and security gateway.

7.3.4 Wireless Connectivity

Wireless connectivity is available on Trust locations, which allows suitably secured devices to connect into the network without a physical connection. This is utilised by laptops, and by mobile devices such as Vocera, VitalPAC and iPad devices, as well as by future patient Wi-Fi provision.

Upgrade to the wireless network is required to ensure it is suitably managed and maintained, and future capacity growth is planned.

7.3.5 Capacity

As additional IM&T services are made available, utilisation of the network is always increasing. The current network design does require investment in the underlying technology to ensure there are no network bottlenecks and slowdowns. A full design review has been commissioned, and indicative costs have been included in the budget forecast.

7.3.6 Remote Access

Approved users and devices can access the trusted network over the internet through the establishment of a virtual private network (VPN). This enables a computer to act as if it were directly connected to the trusted network, wherever its physical location.

VPN access requires the device to be configured with the appropriate security software. The individual is authenticated through the use of two factor authentication.

- Factor 1: Something only the user knows (PIN)
- Factor 2: Something only the user has (number provided by a token)

The token number changes every 60 seconds, and the token itself is available either as a physical device, or as a software installation on the users smartphone.

7.3.7 Patient Wireless Provision

As part of its goal to enhance the patient experience, the trust will look to provide a wireless access capability, for the use of patients and their family and friends, who can connect their own mobile, tablet or laptop devices and gain access to the internet, whilst ensuring access is filtered, controlled and recorded.

This provision will be managed by an external party, who will take responsibility for all interaction with the end users of the system. NHIS will manage the physical wireless network itself, and will ensure all patient

data is fully segregated from traffic running over the clinical wireless network. All patient traffic will be passed to the external party, who will manage the experience from that point, including provision of patient portal, managing the authentication process, payment mechanisms and customer service needs.

7.4 Data Storage

Data storage needs are currently met through the provision of a Storage Area Network (SAN), a centralised data repository. As data storage requirements increase, the capacity of this SAN will need to keep pace. It is not currently anticipated that further investment will be required in this area until 2016/17.

8.0 Data & Interoperability Strategy

8.1 Trust Integration Engine (TIE)

The TIE utilises Orion Health Rhapsody Integration Engine (Rhapsody), which provides connectivity between Trust systems, and with the wider community. Rhapsody's standard healthcare communication protocols library supports a wide range of protocols and standards including Web Services, XML and HL7 v2 and v3. Using HL7's acknowledgement protocol, Rhapsody can guarantee message delivery and present a real time view of system performance and error alerting.

8.2 Interoperability Standards

HL7 provide a framework (and related standards) for the exchange, integration, sharing, and retrieval of electronic health information. These standards define how information is packaged and communicated from one party to another, setting the language, structure and data types required for seamless integration between systems. HL7 standards support clinical practice and the management, delivery, and evaluation of health services, and are recognized as the most commonly used in the world.

The current Trust standards are based on HL7 version 2.4. As the new McKesson PAS also uses this version of HL7 (although with some aspects of version 2.5 as well) this will remain the default version.

In addition to HL7, the McKesson PAS can utilise API Interface protocols to connect and engage with other systems, and will expose APIs to allow real time access to data and functionality.

8.3 Integrated care provision

Interoperability with the wider Nottinghamshire health community is critical to enable the trust to progress towards an Integrated Care Record. Currently, information sharing across Nottinghamshire between Health providers is limited and sharing between Health and Social care does not occur electronically. Implementing the necessary linkages between care providers is being progressed under the Connected Nottinghamshire Programme, whose objectives are:

1. Improved sharing of Health Information to support business transformation
2. Improved sharing of Health and Social care information to support business transformation
3. Improvements in collaborative working between Health (and Social Care) IT Providers

In order to achieve the greatest benefit from new capabilities, individual projects are aligned to specific patient groups or pathways i.e. Frail Older People, Cardiac and Diabetes. This ensures early benefits realisation for individual pathways, rather than delivering all of the value at the end of the programme.

The ultimate outcome is for the Trust to have introduced electronic data sharing with the following care settings

- Ambulatory Care
- Primary Care
- Community Care
- Hospital Care
- Social Care

In addition to this, the programme seeks to enable

- Patient access to information to support self-management of care
- Use of assistive technology to support self-management of care
- Improved referral through use of electronic referrals and tasks
- Better use of information to support transformation programmes
- Improved access to IT systems across organizational boundaries

8.4 Medical Interoperability Gateway (MIG)

The MIG is a commercial service that provides a set of secure services for exchanging data between third party systems and EMIS, INPS and TPP primary care practices, meeting NHS CFH's Interoperability Toolkit (ITK) and HL7 interoperability standards. It can be used to

- View patient detailed care records - different healthcare teams involved in the care of a patient can share vital clinical data for improved health outcomes as well as save time by not duplicating patient demographic data
- Exchange electronic discharge summaries and clinical documents - for example outpatient documents and discharge summaries sent to the patient's GP practice for immediate after care
- Chronic disease record views - front line staff can share patient data for easier and more informed management of patient's complex long term conditions
- Medication record views - access to a patient's current medication information in an unscheduled care setting can help increase patient safety as well as improving diagnoses
- Exchange of Child Health information - sharing of key child health information such as immunizations conducted in the primary care which can be electronically sent directly into a Child Health system, thus eliminating duplication of data entry.

The Trust will review use of the MIG as a mechanism for integrating with Primary Care as part of the PAS replacement, rather than implementing direct integrations with the individual systems.

8.5 Data model and dictionary

All Trust applications will be compliant with the NHS Data Model and Dictionary. This dictionary is maintained and published by the NHS Data Model and Dictionary Service and all changes are assured by the Information Standards Board for Health and Social Care. It provides a reference point for assured information standards to support health care activities within the NHS in England. It has been developed for everyone who is actively involved in the collection of data and the management of information in the NHS.

The data model defines the classes, attributes and relationships of NHS Data. A Class is something that you want to describe and the Attributes define the detail for the Class. Relationships are the links between different classes.

The data dictionary details data elements and business definitions. A Data Element is the definition of the information which is usually transmitted in a Data Set.

The NHS Data Model and Dictionary is accessible from

http://www.datadictionary.nhs.uk/web_site_content/navigation/main_menu.asp

8.6 Data flows and master data

In order to understand the interactions between Trust services, NHIS will maintain an understanding of the data flows between systems. This will allow clear understanding of the wide scale impact of changes to any system, and the data that is consumed or distributed. It will also make it clear which systems hold the master data for each item of data. The master data is the system which is the trusted source for that particular item of data. This is often, but not necessarily, the system in which the data is initially captured.

8.7 Data quality

Accountability and responsibility for data quality rests with the clinical owner of each system. They are provided with data analyst support for data checking and availability, who also ensure consistency of data between systems where the data flows do not enable automated updating.

This data is used internally for operational and reporting purposes, and also for providing data to The Health and Social Care Information Centre, which has responsibility for collecting data from across the health and social care system. The comprehensive list of all collections approved by the Review of Central Returns (ROCR) is contained in the ROCR schedule of approved collections^{vii}

8.8 Information Governance

NHIS provides Information Governance as a function to the trust, ensuring compliance with all the legal rules, guidance and best practice that apply to the handling of information, based on the national IG standards maintained in the Information Governance Toolkit (IGT). This toolkit comprehensively covers all aspects of information governance including

- data protection and confidentiality
- information security
- information quality
- health and care records management
- corporate information

8.9 Registration Authority

Registration Authorities are required by NHS policy to verify the identity of all healthcare staff who need to have access to sensitive data, and to establish and provide only the degree of access they need to do their jobs. Identity verification is managed to the mandated UK eGovernment Interoperability Framework standard (e-GIF Level 3). Access provision is managed through the provision of a smartcard and a passcode. Use of the Smartcard and passcode is required to log on to clinical systems, and to access and use clinical information.

9.0 Roadmap

9.1 Transformation Roadmap

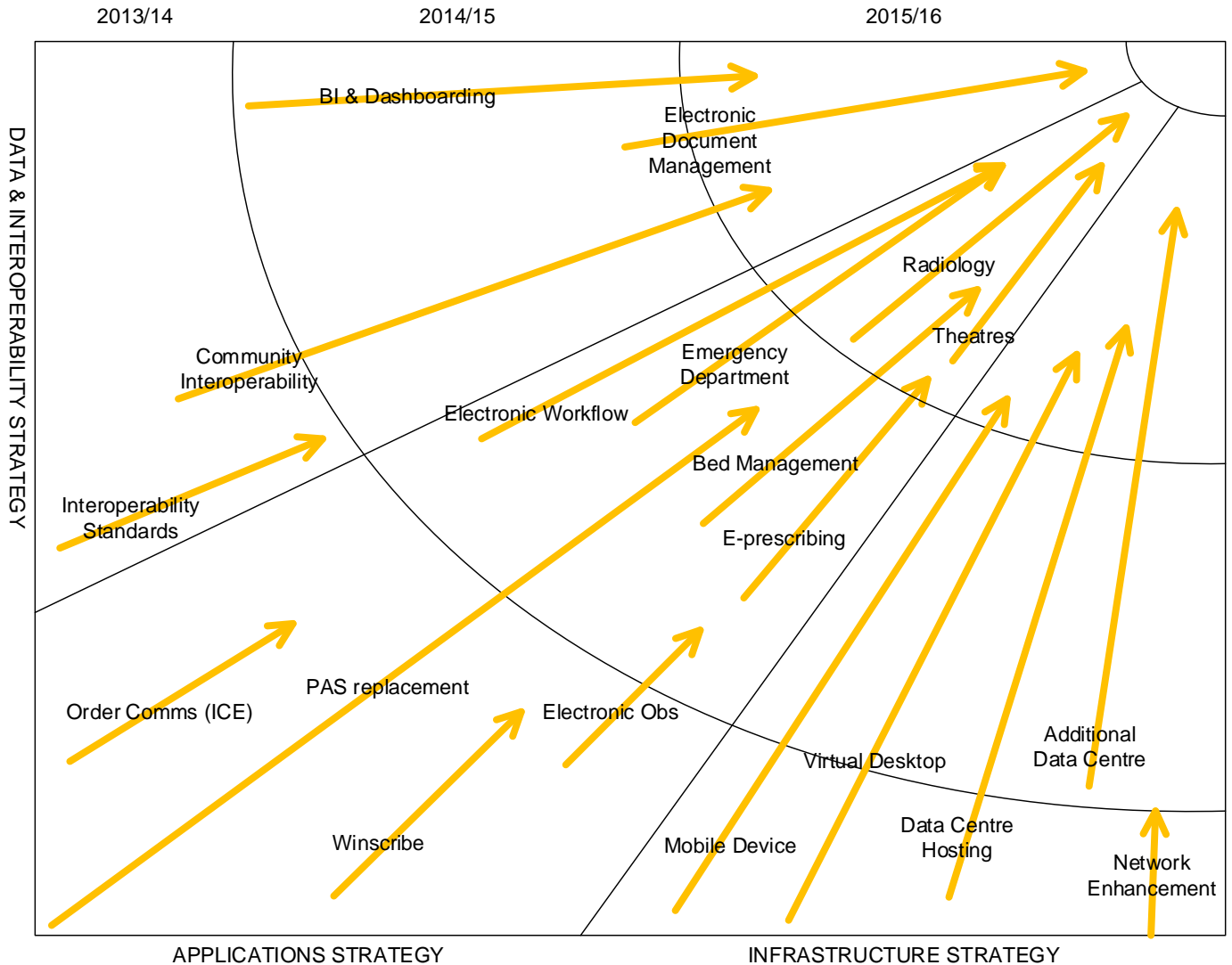


Figure 20: Three Year Transformation Roadmap

The IM&T transformation roadmap over the next three years identifies the major transformative projects that are expected to support the Trust across the Data & Interoperability, Application and Infrastructure domains. These are all subject to individual business case approval, and are not committed deliveries, however this lays out the key IM&T deliveries that will act as enablers for the wider Trust objectives, setting out the scope of transformation that is envisaged from within the IM&T organisation.

9.2 2013/14 Delivery Plan

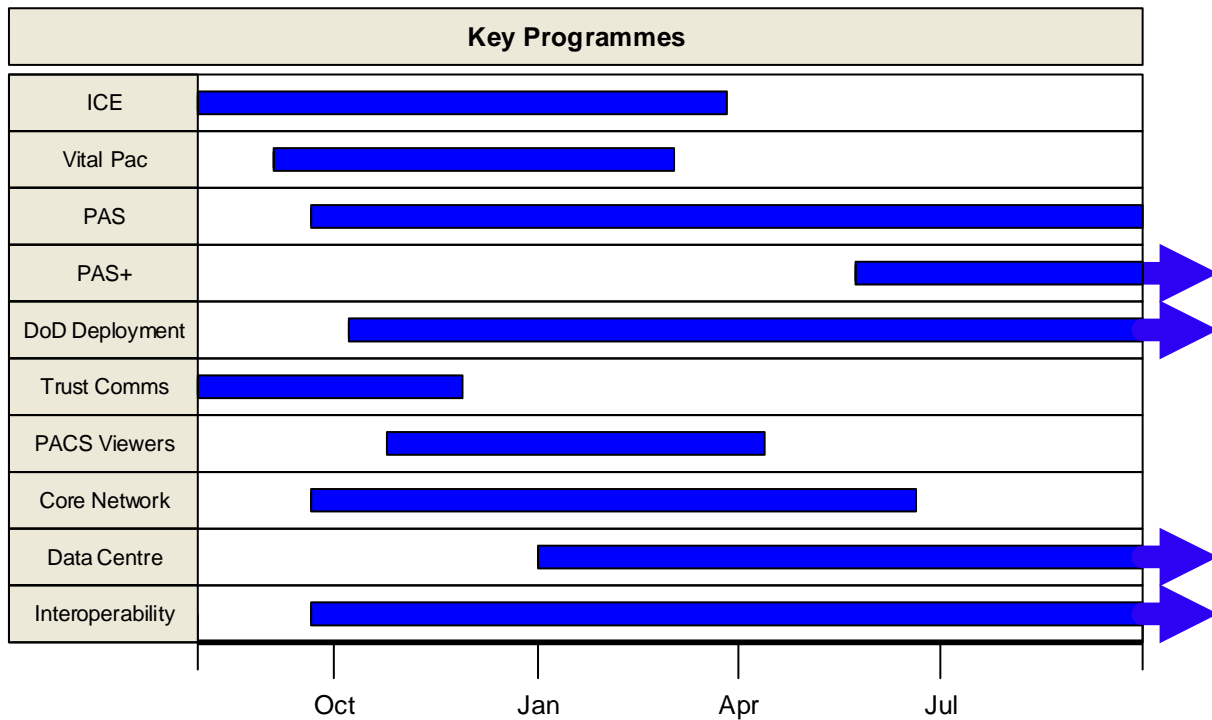


Figure 21: 2013/14 Delivery Plan

The above delivery plan does not reflect the total scope of project delivery, but draws out the key Trust programmes either in terms of business and clinical impact, or in terms of capital expenditure, that are planned to complete or commence over the next year.

10.0 Financial Estimates^{viii}

Note that financial estimates are the indicative budgetary estimates for the key strategic projects, and do not include interest, tax, depreciation or amortisation. Each project will produce its own business case for approval, and external funding sources are potentially available for certain projects, which are not included in this breakdown. This is not a committed spend profile, and is subject to capital planning, budget approval and funding availability.

10.1 Projected Capital Expenditure

	2013-14	2014-15	2015-16	2016-17	2017-18	Total
NHIS Governance	£ -	£ -	£ -	£ -	£ -	£ -
ICR - PAS Replacement	£ 769,000	£ 1,929,000	£ -	£ -	£ -	£ 2,698,000
ICR-VitalPAC	£ 200,000	£ 84,000	£ -	£ -	£ -	£ 284,000
Integrated Clinical Environment	£ 19,000	£ -	£ -	£ -	£ -	£ 19,000
ICR-ePrescribing	£ -	£ 989,340	£ 80,000	£ -	£ -	£ 1,069,340
EDMS	£ -	£ -	£ 320,000	£ 320,000	£ 320,000	£ 960,000
Innovation Fund	£ 704,000	£ 510,000	£ 510,000	£ 220,000	£ 220,000	£ 2,164,000
Orion Upgrade	£ 36,000	£ -	£ -	£ -	£ -	£ 36,000
Ice Hardware	£ 32,000	£ -	£ -	£ -	£ -	£ 32,000
HSS Upgrade	£ 41,000	£ -	£ -	£ -	£ -	£ 41,000
Clinical Illustration Printing Services	£ 23,000	£ -	£ -	£ -	£ -	£ 23,000
PAS / EPR	£ 297,000	£ -	£ -	£ -	£ -	£ 297,000
JAC Pharmacy system Upgrade	£ 51,000	£ -	£ -	£ -	£ -	£ 51,000
Clinical Devices	£ -	£ 290,000	£ 290,000	£ -	£ -	£ 580,000
PC Replacement	£ 96,000	£ 100,000	£ 100,000	£ 100,000	£ 100,000	£ 496,000
Printers	£ 12,000	£ -	£ -	£ -	£ -	£ 12,000
Boardpad	£ 6,000	£ -	£ -	£ -	£ -	£ 6,000
Outpatient Check In	£ -	£ 20,000	£ 20,000	£ 20,000	£ 20,000	£ 80,000
Trust Communication Device Replacement	£ 76,000	£ 100,000	£ 100,000	£ 100,000	£ 100,000	£ 476,000
Infoflex	£ 21,000	£ -	£ -	£ -	£ -	£ 21,000
IT General / FOCUS IT	£ 13,000	£ -	£ -	£ -	£ -	£ 13,000
PC Upgrade / Desktop on Demand	£ 130,800	£ 500,000	£ 443,501	£ 443,501	£ 443,501	£ 1,961,302
Printing	£ -	£ 44,600	£ -	£ -	£ -	£ 44,600
Data Centre	£ -	£ -	£ 300,000	£ 300,000	£ 300,000	£ 900,000
Server Virtualisation	£ -	£ -	£ -	£ -	£ -	£ -
Networking	£ 221,000	£ 192,000	£ 150,000	£ -	£ -	£ 563,000
ICR - Interoperability	£ -	£ 755,411	£ 100,000	£ -	£ -	£ 855,411
Quality and Safety	£ -	£ 129,000	£ -	£ -	£ -	£ 129,000
ICR-Theatres	£ -	£ -	£ 450,000	£ -	£ -	£ 450,000
PACS	£ -	£ 200,000	£ 500,000	£ -	£ -	£ 700,000
Infection Control	£ -	£ 121,188	£ 15,409	£ 15,409	£ 15,409	£ 167,415
ORION Upgrade	£ -	£ 230,000	£ -	£ -	£ -	£ 230,000
Data Storage	£ -	£ -	£ -	£ 200,000	£ -	£ 200,000
ICR-Maternity	£ -	£ -	£ 320,000	£ -	£ -	£ 320,000
Total	£ 2,043,800	£ 5,684,539	£ 3,188,910	£ 1,498,910	£ 1,298,910	£ 13,715,068

Figure 22: Capital Expenditure

10.2 Projected Revenue Expenditure

	2013-14	2014-15	2015-16	2016-17	2017-18	Total
NHIS Governance	£ -	£ 51,000	£ 15,300	£ 15,300	£ 15,300	£ 96,900
ICR - PAS Replacement	£ 200,000	£ 274,000	£ 548,000	£ 548,000	£ 548,000	£ 2,118,000
ICR-VitalPAC	£ 175,000	£ 412,000	£ 464,000	£ 464,000	£ 464,000	£ 1,979,000
Integrated Clinical Environment	£ 3,800	£ 3,800	£ 3,800	£ 3,800	£ 3,800	£ 19,000
ICR-ePrescribing	£ -	£ 20,740	£ 82,960	£ 82,960	£ 82,960	£ 269,620
EDMS	£ -	£ -	£ 64,000	£ 128,000	£ 192,000	£ 384,000
Innovation Fund	£ 140,800	£ 102,000	£ 102,000	£ 44,000	£ 44,000	£ 432,800
PC Upgrade / Desktop on Demand	£ 164,376	£ 164,376	£ 164,376	£ 164,376	£ 164,376	£ 821,880
Printing	£ -	£ 4,000	£ 4,000	£ 4,000	£ 4,000	£ 16,000
Data Centre	£ -	£ -	£ 30,000	£ 60,000	£ 90,000	£ 180,000
Server Virtualisation	£ -	£ 160,000	£ 160,000	£ -	£ -	£ 320,000
Networking	£ 44,200	£ 102,600	£ 132,600	£ 132,600	£ 132,600	£ 544,600
ICR - Interoperability	£ -	£ -	£ 126,164	£ 126,164	£ 126,164	£ 378,492
Quality and Safety	£ -	£ 5,000	£ 44,000	£ 44,000	£ 44,000	£ 137,000
ICR-Theatres	£ -	£ -	£ 90,000	£ 90,000	£ 90,000	£ 270,000
PACS	£ -	£ 40,000	£ 140,000	£ 140,000	£ 140,000	£ 460,000
Infection Control	£ -	£ 24,238	£ 24,238	£ 24,238	£ 24,238	£ 96,950
ORION Upgrade	£ -	£ 46,000	£ 46,000	£ 46,000	£ 46,000	£ 184,000
Data Storage	£ -	£ -	£ -	£ 40,000	£ 40,000	£ 80,000
ICR-Maternity	£ -	£ -	£ 64,000	£ 64,000	£ 64,000	£ 192,000
Total	£ 728,176	£ 1,409,754	£ 2,305,438	£ 2,221,438	£ 2,315,438	£ 8,980,242

Figure 23: Revenue Expenditure

Appendix A: Assumptions

Ref	Assumption
A1	The current Trust strategic plan will not be substantively changed as a result of the additional submission to Monitor in October 2013
A2	The trust will continue to align its strategic planning with national strategic objectives
A3	The estates strategy will not require major rework to any IM&T service provision through the closure or opening of new physical locations
A4	All costs are exclusive of VAT
A5	Project revenue expenditure calculations do not include interest, taxes, depreciation or amortization

Appendix B: Service Improvement - IM&T Outputs

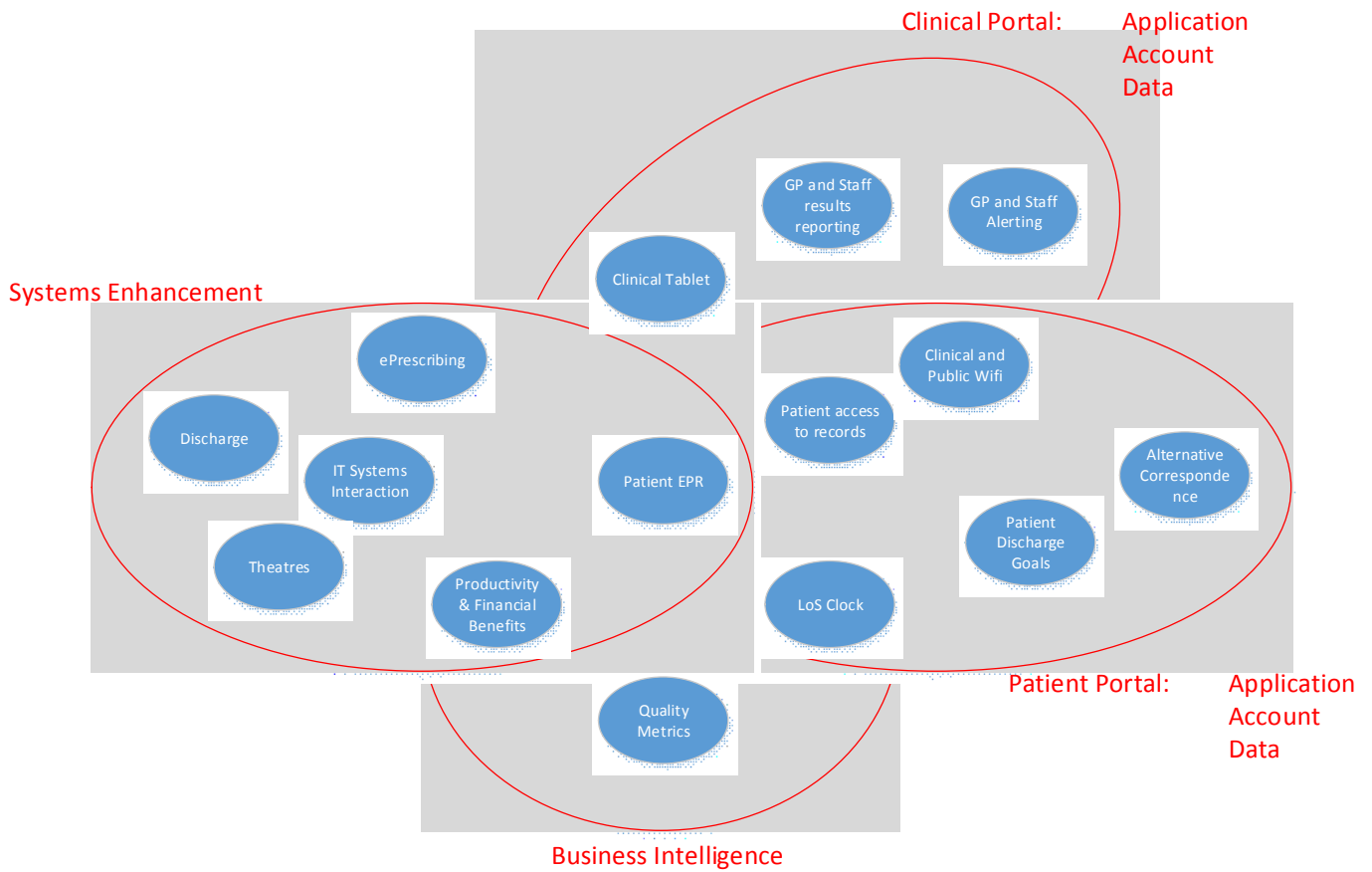


Figure 24: SIP Forum - IM&T Output

The diagram above shows the logical grouping of the IT requirements identified in the Service Improvement Forum events that took place in Autumn 2013. While these four groupings are identified in the application roadmap, the underlying detail is useful to understand.

Appendix C: References

- ⁱ Provision of ICT operational and development services for Sherwood Forest Hospitals NHS Foundation Trust Strategic Plan 2009 – 2011 (<http://extranet.notts-his.nhs.uk/strategicprogrammes/ICRprogramme/ICRProgrammeDocuments/SFHFT%20IT%20architecture/Strategy/Background/Full%20Strategy%20Final%20v1.1.3.doc>)
- ⁱⁱ Rebooting the IT Strategy July 2013 (<http://extranet.notts-his.nhs.uk/strategicprogrammes/ICRprogramme/ICRProgrammeDocuments/SFHFT%20IT%20architecture/Strategy/Background/IT%20Strategy%20Refresh%20Process%20V3.pptx>)
- ⁱⁱⁱ Rapid Responsive Review Report for Sherwood Forest Hospitals NHS Foundation Trust (<http://www.nhs.uk/NHSEngland/bruce-keogh-review/Documents/outcomes/Sherwood%20Forest%20Hospitals%20NHS%20Foundation%20Trust%20RRR%20report.pdf>)
- ^{iv} The power of information: Putting all of us in control of the health and care information we need (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/213689/dh_134205.pdf)
- ^v Clinical Digital Maturity Index November 2013 (<http://www.ehi.co.uk/ehi-intelligence/cdmi.cfm>)
- ^{vi} Cisco UCS Implementation Detailed Design (<http://extranet.notts-his.nhs.uk/strategicprogrammes/ICRprogramme/ICRProgrammeDocuments/SFHFT%20IT%20architecture/infrastructure/NHIS%20UCS%20Deployment%20-%20Design%20Document%20v1-1.docx>)
- ^{vii} ROCR schedule of approved collections (http://www.hscic.gov.uk/media/11698/ROCR-schedule-of-approved-collections/pdf/ROCR_Schedule_incl_burden_and_cost_April_2013-PDF.pdf)
- ^{viii} Financial Estimates Spreadsheet (<http://extranet.notts-his.nhs.uk/strategicprogrammes/ICRprogramme/layouts/xlviewer.aspx?id=/strategicprogrammes/ICRprogramme/ICRProgrammeDocuments/SFHFT%20IT%20architecture%20-%20restricted%20access/Strategy/Artifacts/Financial%20Estimates%20v0.13.xlsx&Source=http%3A%2F%2Fextranet%2Enotts%2Dhis%2Enh%2Euk%2Fstrategicprogrammes%2FICRprogramme%2FICRProgrammeDocuments%2FForms%2FAllItems%2Easpx%3FRootFolder%3D%252Fstrategicprogrammes%252FICRprogramme%252FICRProgrammeDocuments%252FSFHFT%2520IT%2520architecture%2520%252D%2520restricted%2520access%252FStrategy%252FArtifacts&DefaultItemOpen=1&DefaultItemOpen=1>)