A need for a simplified architecture

When Mark England started work as the Head of Information Technology at Luton and Dunstable Hospital NHS Foundation Trust, it wasn’t long before he realised that he had inherited a complex architecture.

“It was like a spider’s web,” says Mark. “There were many applications, and over 50 point-to-point interfaces between them.”

This is not necessarily an unusual situation. As the IT industry has evolved, a wide variety of systems and platforms has emerged – most of them with proprietary communication methods that only talk to systems of the same design. This is especially true in the healthcare sector, where an abundance of single-purpose systems – each performing specialised clinical and administrative tasks – means that IT environments are often heavily ‘silod’.

It was Mark’s view that this situation represents a fundamental business problem. “In the healthcare industry we are in a constant state of flux with new regulatory demands, advances in treatment and procedural changes,” he explains. “When you have point-to-point interfaces, every time a system needs to be adapted to cope with these changes it is time-consuming and expensive.”

An additional problem was lack of documentation covering the various applications which made it even more difficult to make changes. More importantly, problems with connecting and integrating the applications made it hard for Mark and his team to meet requests from the business for new information-based services.

Mark decided that he needed to break the tight point-to-point relationship between the applications within the Trust. His aim was to replace the old systems with a minimum amount of rewriting or retesting – and deliver new services more quickly, and for a lower cost.

In the longer term, he also wanted to simplify his IT architecture in readiness for the smooth implementation of a new patient administration system.
A new, service-oriented approach

After some research, Mark concluded that he could best meet his objectives by realigning the Trust’s software applications in a new, service-oriented architecture (SOA).

“The value of the SOA approach is that it enables systems to speak the same language: if all systems can communicate using a common framework, integration becomes less complex and IT can adapt systems more rapidly,” Mark explains. “Deploying software services this way also means that they can be used repeatedly in different business processes without rewriting them. Overall, the SOA approach makes for a very flexible, efficient and vibrant IT infrastructure.”

To make the vision a reality, Mark chose to implement InterSystems Ensemble®, a seamless platform for integration and the development of connectable applications.

“We chose Ensemble because it provides a single, architecturally consistent solution for developing and managing services in a service-oriented architecture,” says Mark. “For example, layering Ensemble on top of our existing infrastructure gives us all the functionality of enterprise service bus (ESB) products commonly used for SOA implementations. More than that, Ensemble gives us a comprehensive application and data abstraction facility – enabling us to reduce the complexity of service integration, and incorporate services and data into different business processes as needed.”

To design and implement the new SOA, Mark worked closely with both the InterSystems team and InterSystems’ partner Integrella – a leading provider of integration services to the healthcare market. The result is a new, simplified architecture built around a ‘Healthbus’ – Luton and Dunstable Hospital’s own version of an ESB – which facilitates communication between applications in a common language.

Overall, the project covers over 50 critical applications – accessed by over 3,000 users from departments including Accident & Emergency, Patient Administration, Pathology, and Electronic Observations.

The benefits of using Ensemble to build a service-oriented architecture

Keeping control of scope and costs

Although the service-oriented architecture approach is designed to save time and money, some SOA projects in the past have received negative publicity for achieving the opposite. Working with InterSystems, Mark encountered no such problems.

“A few years ago SOA projects had become renowned for having a large amount of money and time spent on their design, while not necessarily delivering the benefits to the business that they were supposed to,” says Mark. “Working with InterSystems and Integrella, we were able scope the work down to deliver the benefits of SOA at a well-defined level. This meant we could keep a tight control on the cost of development – and that we could quickly see the benefits.”

Long-term return on investment

As well as keeping control of the initial investment costs, Ensemble is also helping the Trust to save money in the long term.

“Breaking the point-to-point relationship between our applications means we can now replace an old system or introduce a new system with a minimum amount of rewriting of code, or retesting of downstream interfaces,” says Mark. “Whereas before we would pay anything from £25,000 to £80,000 to create new interfaces, now this activity can be done in-house at little or no cost by own team. Over the next three years, this will save the Trust at least £100,000.”
Creating new services from connected applications

By using Ensemble to create an ESB (or ‘Healthbus’), the Trust has already started to improve the efficiency of information services for internal users of its IT systems – which ultimately improves the quality and consistency of service delivery to patients.

“So far we’ve dealt with the basic admission, discharge and transfer messages that are coming from the patient administration system (PAS),” says Mark. “We’ve put them onto our Healthbus and we’ve started adding the subscribing systems. Now we’re also dealing with the more complicated two-way admissions and discharge and transfer interfaces. For example, where registrations are passed back onto the Healthbus when babies are born in maternity, or emergency admissions occur in the A&E department.

“Having a SOA in place also means we can now meet internal challenges and requests for new interfaces in a much more positive fashion – for example, supporting research collaborations where people want to receive results or different information sets and formats. This kind of service can now be provided in a much more flexible manner, and the development costs aren’t prohibitive.”

Preparing for an even more integrated future

One of the other key motivations for adopting a SOA approach using Ensemble was the opening of the contract window for the new PAS in 2011. According to Mark, the Trust is now in a much better position to manage this transition in a way that will minimise disruption, while maximising the benefits of their new investment.

“To pave the way for the new patient administration system and implement it successfully we needed to reduce the web of interfaces that relate to the PAS. Reducing them down provides a single interface and integration platform from which we can then manage the different downstream systems.

“Now that we have installed Ensemble, we will be able to introduce the PAS with minimum testing, risk or code rewriting. Ultimately, this will keep the roll-out costs of the new PAS as low as possible. In today’s economic environment, this kind of cost control is more important than ever,” says Mark.

“Whereas before we would pay anything from £25,000 to £80,000 to create new interfaces, now this activity can be done in-house at little or no cost by our own team. Over the next three years, this will save the Trust at least £100,000.”

Mark England, Head of Information Technology, Luton and Dunstable Hospital NHS Foundation Trust
Executive summary
Luton and Dunstable Hospital NHS Foundation Trust’s IT systems had evolved into a very complex architecture, with many applications and over 50 point-to-point interfaces. The Trust wanted to rationalise the architecture to improve efficiency and productivity – while also paving the way for the implementation of a new patient administration system in 2011. Since installing InterSystems Ensemble® as an ESB as part of a wider SOA approach, the Trust has improved the way information flows across the organisation and enhanced the quality and timeliness of information delivered to clinicians. The project was delivered within budget – and is set to provide a £100,000 return on investment over the next three years.

Fast facts
Organisation: Luton and Dunstable Hospital NHS Foundation Trust
Web site: www.ldh.nhs.uk
Number of employees: 3,400
Country: United Kingdom
Industry: Healthcare

Customer profile
The Luton and Dunstable Hospital NHS Foundation Trust provides a comprehensive range of general medical and surgical services, including Accident & Emergency, for over 300,000 people in Luton, Bedfordshire, Hertfordshire and parts of Buckinghamshire. In 2009/2010 it was rated as the best Acute Care Hospital Trust in the east of England.