Convergence becomes the enabler for improving patient services while reducing cost

BT systems integration creates an IP-based converged networked IT services solution to unify communications and help improve efficiency at NW London Hospitals NHS Trust

Executive Summary

As part of the 2003 wave of Private Finance Initiative (PFI) projects for the NHS, the North West London Hospitals NHS Trust commissioned the redevelopment of the Central Middlesex Hospital. It decided that it would extend its existing data network to the new building but required an IP Telephony solution that would both serve the new building and interface with legacy PBX systems at other sites.

BT proposed a mixed Nortel and Cisco solution, which would be initially integrated with existing Mitel and Siemens devices. It comprised of a dual-processor Nortel Communication Server 1000 (CS1000E) system with Call Pilot unified messaging, Nortel Contact Centre, and a range of Nortel IP Phones. The BT solution also included the upgrade of the existing Cisco-based LAN infrastructure with Cisco 3750 Series Switches to provide quality of service and Power over Ethernet (PoE) capability and 1Gbps LAN Extension Service (LES1000) connections linking its three principal locations.

The BT solution has provided the Trust with a flexible and resilient converged network solution and a platform for unified communications. Significant cost savings have been realised through lower call charges, reduced systems administration, and the rationalisation of operator services and communications support teams. Further benefits are anticipated from planned enhancements such as the implementation of an interactive voice response capability and integration of the staff paging facility.

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Case study
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Marketplace

The North West London Hospitals NHS Trust serves a local population of over 500,000 people and is one of the largest health trusts in London. It comprises major acute hospital sites – Central Middlesex Hospital and Northwick Park and St Mark’s Hospitals – as well as smaller outreach sites in Edgware, Wembley, and Willesden – providing outpatient, radiology and community hospital services.

The trust employs around 4,600 clinical and support staff. Like many of its counterparts, North West London Hospitals NHS Trust is constantly striving to improve services to patients and leverage best value from its resources. Effective communications and information technology solutions are playing an increasingly significant role in helping it achieve this.

Business opportunity

As part of the 2003 wave of Private Finance Initiative (PFI) projects for the NHS the Trust commissioned the redevelopment of the Central Middlesex Hospital to create a new facility to support the needs of 21st Century medicine. The redevelopment would comprise a new building known as BECAD (Brent Emergency Care and Diagnostics), constructed on the existing Central Middlesex Hospital site, along with adjacent modernised Ambulatory Care and Diagnostics centre (ACAD) buildings.

Early on the Trust decided that it would extend its existing Cisco-based data network to the new BECAD building: however, the voice communications platform would be a much more complex decision. The Trust had made significant investments in its existing PBXs (private branch exchanges) from manufacturers including Mitel, Nortel, and Siemens, much of which would need to remain in use and integrate seamlessly with the new voice communications system for BECAD.

Mike Sanderson, Head of IT at NW London Hospitals NHS Trust says: “We decided to seize the opportunity to implement a converged solution. Looking at cost efficiency it was clearly the way to go. For instance with a traditional PBX and separate data network we would have needed over 6,000 cabling outlets in the new building, but with a converged solution this was reduced to less than half that number.”

The Trust issued an invitation to tender (ITT) for an IP-based telephony system for its BECAD facility. As well as interfacing effectively with legacy systems – particularly with the Mitel SX2000 PBX serving more than 2,500 extensions at Northwick Park and St Mark’s Hospitals – the IP solution would need to operate over a core LAN infrastructure comprising Cisco Catalyst 6500 Series Switches.

BT solution

BT had established a strong relationship with the Trust, built up over many years of collaborative working and was the maintainer of the existing voice PBX and LAN infrastructure at the Central Middlesex Hospital as well as the LAN at Northwick Park and St Mark’s Hospitals. In formulating its response to the ITT, BT considered the key issues of interoperability, resilience, and cost effectiveness – as well as the need for enhanced operator services in a busy acute hospital environment.

BT is a vendor independent company and, for North West London Hospitals NHS Trust, Nortel and Cisco technology was proposed. BT holds ‘Gold Partner’ accreditation from both Cisco and Nortel, but is uniquely placed in having extensive experience and trained resources able to work on all main vendor technologies present in the Trust’s network. Mike Sanderson says: “BT understood our needs and our existing network, and demonstrated first class capabilities in implementing IP Telephony solutions in mixed vendor environments. They were able to show us a similar solution that they had very successfully implemented at Guys and St Thomas’ Hospital and this provided great reassurance.”

At the heart of the solution is a dual-processor Nortel Communication Server 1000 (CS1000E) system with one processor located at ACAD and the other at BECAD, to provide physical as well as functional resilience. The system works as one and
integrates with the existing Mitel SX2000 serving Northwick Park and St Mark’s Hospitals over DPNSS (Digital Private Network Signalling System) links via a Nortel Media Gateway.

The Trust’s call centre requirements within the BT solution are met by Nortel Contact Centre, providing skill-based routing, comprehensive management reporting, and real time displays for supervisors. Nortel Call Pilot – a Windows NT-based multimedia messaging system – provides voicemail and unified messaging capability. A range of different Nortel IP Phones completes the voice solution.

The BT solution also includes the upgrade of the existing Cisco-based LAN infrastructure at ACAD to provide quality of service and Power over Ethernet (PoE) capability. This enables IP Telephony traffic to be routed over the Cisco LAN infrastructure. Each main building in the campus environment is interconnected with 1Gbps LAN Extension Service (LES1000) connections. BT CustomCare maintenance contracts cover the entire Cisco and Nortel infrastructure on a 24*7 basis.

Implementation proceeded in two phases. The first stage, commencing late December 2005, involved the installation of a Nortel CS1000E processor and Media Gateways at ACAD, interconnecting to the existing Siemens DX at Central Middlesex Hospital and the SX2000 at Northwick Park and St Mark’s Hospitals. This implementation acted as a pilot to demonstrate the effectiveness of the IP Telephony environment.

The second stage – the installation of the second CS1000E processor and Media Gateways at BECAD – followed as the new building was completed in April 2006. This again needed to link with the two existing legacy PBX systems and in particular enable parallel working with the Siemens system serving the old Central Middlesex Hospital building to allow for the migration of services into the new environment over a three-week period.

Mike Sanderson comments: “We decided to retain our existing numbering scheme, which was essential to minimise operational disruption within the hospital. This meant significant real time programming and rerouting was required but this complexity was completely transparent to our people. The BT team worked extremely hard to make sure the transition went smoothly and the co-operation and commitment of the BT engineers was phenomenal.”

Results

The BT solution has provided North West London Hospitals NHS Trust with a flexible and resilient converged network solution and a platform for unified communications. The solution supports a multi-vendor environment, allowing the Trust to retain value from key existing assets, whilst beginning the migration towards a fully converged environment through an evolutionary approach.

The new solution has greatly simplified administration of the network and with IP Telephony new extensions can now be easily provided throughout the campus by simply plugging an IP Phone into an available LAN port. This has significantly reduced the cost of, and speeded up both new service provision and moves and changes. The new IP Phones have much higher functionality than previous analogue models. All have displays showing caller details and many have hands free and other advanced call handling facilities to help improve staff efficiency.

Separate voicemail facilities have been replaced with a centralised system providing a consistent user and caller experience. Network cost savings are being realised through more flexible and advanced call barring capability as well as enhanced call logging facilities. With a converged infrastructure in place the hitherto separate voice and data communication teams have been united and restructured, enabling support staff to be reduced by 75 per cent, adding to the financial savings.

Mike Sanderson says: “The project involved a huge amount of work; not just with installing the new converged infrastructure but also the relocation of existing BT network services. From the onset the project management provided by BT was absolutely outstanding. Nothing was too much trouble, communication was superb and each time there appeared to be a problem BT took immediate ownership of the issue and made sure it was solved.”

The solution has also enabled the unification of operator services. Previously there were two separate sets of switchboard operators and separate numbers to call. This has now been rationalised with all calls answered by a single service on a single number, enabling savings from the redeployment of people and improved customer service.

With the core network established the Trust is looking to roll out other added value applications to improve the contactability and productivity of its staff. Mike Sanderson concludes: “The BT solution has provided us with a firm foundation for the future and a means to improve communication and patient care. We are so pleased with the solution that the Trust Board has recently approved additional investment in technology to further enhance capability.”

Future projects include: the implementation of enhanced call answering and routing through an internal directory system integrated with interactive voice response (IVR) capability, to allow callers to connect with Trust employees and departments directly; integration with the staff paging facility; and the implementation of flexible working capability with remote access enabled over a secure dial-up virtual private network (VPN) connection.

Why BT?

- BT vendor independence and ability to support and deliver a multi-vendor solution
- Longstanding collaborative relationship meaning that BT had a clear understanding of the Trust’s needs
- Mutual trust and confidence in BT capability
- Future proof technology platform with the capability to support the deployment of advanced IP-based applications
Technology blueprint

Nortel Communication Server 1000 (CS1000E) is a server-based, full-featured IP PBX, providing the benefits of a converged network plus advanced applications and over 450 world-class telephony features. Telephones are a mixture of Nortel IP Phone 2002s for basic applications, Nortel IP Phone 2004s incorporating a larger display and enhanced features for more advanced applications and the IP Conference Phone 2033. Selected hospital employees also have access to the Nortel IP 2050 Softphone allowing them to set up and receive calls from personal computers.

At day one the solution supported 1,917 IP Phones, making it the largest deployment of IP Telephony at any UK Health Trust at that time. The solution also supports 340 analogue telephone devices, enabling the integration of essential legacy services (such as paging) and the automated routing of critical telephony services – utilising power fail transfer units – in the unlikely event of a catastrophic failure.

The CallPilot unified messaging application provides the ability to combine voicemail, email, and fax messages into a single mailbox – accessible by phone, any desktop PC, or mobile email enabled devices (PDAs). System management capability is provided by Nortel’s Communications Server 1000 Telephony Manager, which enables the Trust to configure, control and analyse the network either through a Windows graphical user interface or a web browser. Nortel Call Centre capability is initially restricted to a 50-user trial focused on the IT department, with the expectation to roll this capability out to other departments that need to deal with a high volume of incoming telephone enquiries, such as patient appointments.

The LANs at all sites are based on the Cisco Catalyst 6500 switch at the core and Cisco Catalyst 3750 Switches deployed at the edge. In the older buildings the Cisco Catalyst 3750 Switches being provided by BT replace existing Cisco equipment. This enables Layer 3 switching, with the prioritisation of mission critical voice traffic over the LAN, and supports line powering of IP Phones over a single cable against the IEEE 802.3af standard.

The new architecture provides for all calls to be answered at Northwick Park Hospital, which is linked to the IP infrastructure through a Media Gateway (that is part of the CS1000). This connectivity is enabled through four 2Mbps DPNSS links, to the retained legacy Mitel SX2000 PBX. The Media Gateway also provides interconnection with the LAN through a Cisco Catalyst 6500 Switch that in turn is interconnected over the LES1000-based campus network.

Main BT products and services

- BT supplied Nortel Communication Server 1000 with Telephony Manager
- BT supplied Nortel IP Phone 2002, 2004, 2033 and 2050
- BT supplied Nortel Contact Centre and Nortel Call Pilot applications
- BT supplied LAN upgrade including Cisco Catalyst 3750 Switches
- BT LAN Extension Services (LES1000)
- BT CustomCare Express maintenance providing 24*7 service support for the entire Nortel and Cisco converged solution

Offices worldwide

The services described in this publication are subject to availability and may be modified from time to time. Services and equipment are provided subject to British Telecommunications plc’s respective standard conditions of contract. Nothing in this publication forms any part of any contract.

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