Remote Access for Medical Students

Author: Martin Van Eker
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1. Introduction

This paper presents the technical solution to provide consistent and stable connectivity for the University of Bristol's medical students (MBChB programme), who are on placement in NHS teaching hospitals in the south west.

A constant theme of this technical solution is that it has needed to be flexible in design so that each NHS Trust could agree a local solution that they and the University were happy with. The solution has also had to change and adapt to new opportunities e.g. the NHS/HE gateway, and to respond to changing needs of the students and staff who use the service.

Good working relationships between University staff and Trust IT staff have been key to the success of this on-going project. This working partnership requires an investment of time and energy from both parties but pays dividends in the longer term as collaboration is needed for future developments that require reconfigurations and enhancements.

2. Background

The Clinical Academies model, as described by David Mumford1, was set up in response to the need to support increased student numbers and reduced numbers of placements at NHS trusts.

Medical students at the University of Bristol spend years 3 -5 of their study at Clinical Academies based across a number of NHS hospitals. Students spend up to 6 months at each academy receiving all of their teaching, clinical activities and pastoral care, providing students with a rich and varied clinical experience. A key requirement of the delivery of such a distributed course (one curriculum, many sites) is for students to have equal access to electronic learning resources and journals, and systems such as the university's VLE, medicine's Intranet, and email.

The Clinical Academy network was set up in 2003/4 in partnership between the IT staff at the University and the IT staff at the NHS Trusts. It has fulfilled the design brief and has resulted in a stable platform which provides student access to all of their learning resources at Bristol.

The network also provided connectivity services for the nursing students from the University of the West of England (UWE).

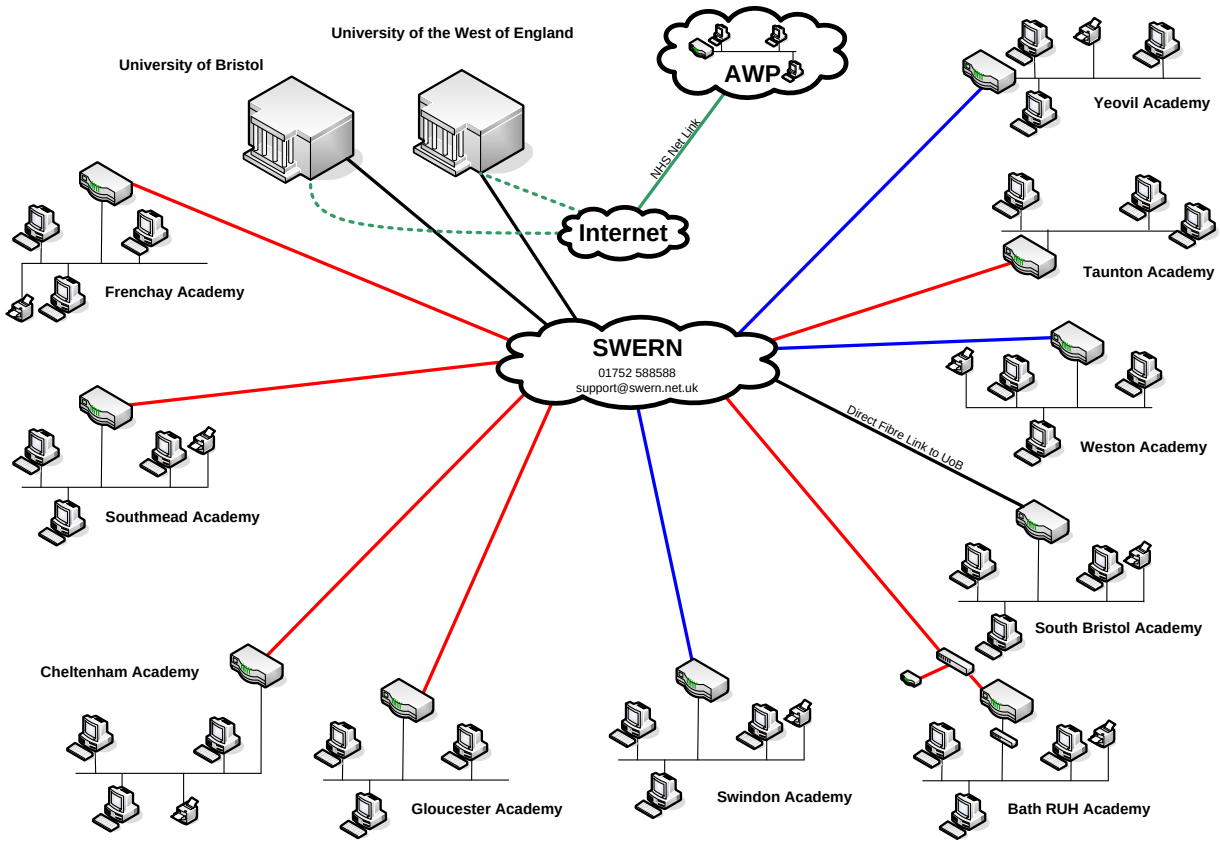
[1] Mumford (May 2007) "Clinical Academies: Innovative School–Health Services Partnerships to Deliver Clinical Education" Academic Medicine, Vol. 82, No. 5

3. Clinical Academy Network

The initial network plan was to provide 10Mbs LAN Extension Services (LES) links wherever possible to the nearest SWERN (http://www.swern.net.uk/) point of presence. Three of the sites were supplied with 2Mbs links where the LES service was not available, and the main teaching hospital in Bristol was connected via a direct fibre link.

The Mental Health Trust (Avon and Wiltshire Mental Health Partnership) has a widely distributed network infrastructure. It was agreed that we run our thin client technology over their network, and internet gateway, to connect back to the University.

Fig.1 Showing the Clinical Academies connecting via the fixed links



The physical network topology at the teaching hospitals was set up by the NHS IT staff (with recommendations and funding for hardware from the University). This resulted in various network configurations to suit differing local needs, with some NHS Trusts integrating the client PCs into their own networks and some Trusts creating stand-alone networks.

Local NHS IT staff are responsible for the initial set up and on-going maintenance of the computers which were mainly situated in the Trusts' libraries and student common rooms.

4. Student Experience

Thin client computing using Citrix was used to provide a 'remote desktop' back to the University campus. A server farm of 8 Citrix Application servers was installed to provide resilience and a stable experience for up to 750 medical students (years 3 – 5). Remote, secure data storage and all of the normal desktop applications were provided e.g. MS Office, email client, web browsing (un-filtered access) and importantly, electronic journal access.

Printing facility was also enabled via the Universities print charging service. In some NHS Trusts, this printing capability required changes in the firewall configuration to permit the incoming printer connection.

The Citrix remote desktop was a great success. It has been reliable and accessible by the medical students from day one. Although it was not an initial objective of the project, University staff in clinical settings have also used the service to gain access to their University electronic resources.

5. Room for Improvement

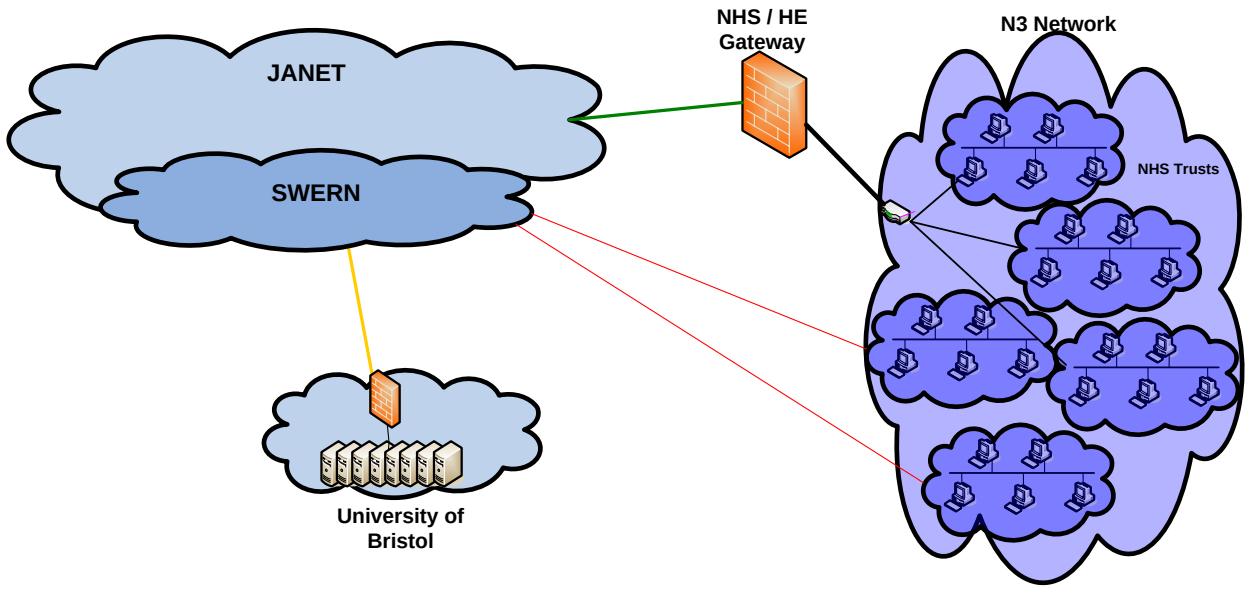
The majority of the computers are located in the Trust libraries although some of the Trusts had student common rooms where network links and computers were also located. Although this has worked well, it has also meant that the placement of computers is not flexible and making connections available for Academy administrator staff has been difficult.

We have also been aware of the difficulties for the Trusts' IT teams in maintaining a separate network of computers that have a non-NHS software build. Often, with no remote management capabilities of this separate academic network, and little knowledge of the 'academic computers' among the Trust IT staff, it can take some time to resolve networking or hardware issues.

6. NHS/HE Gateway

With the advent of the NHS/HE gateway pilot, the University of Bristol were keen to explore opportunities of connecting to the University over the NHS N3 network. Trials of the new network were started in November 2007 by switching the link at 3 Clinical Academies (Weston, Yeovil and Taunton hospitals) to run over the NHS N3 network and the NHS/HE gateway.

Fig. 2 showing the 3 Clinical Academies connecting via the NHS / HE gateway



At this stage, the direct links via the SWERN network were left in place as they were used to carry the Citrix printing traffic and the university wanted to be confident in the stability and resilience of the new gateway before releasing the links.

Users reported no change in performance of the Citrix remote desktop and the new link appeared to be highly resilient. However, printing via the University's print charging service continued to use the direct link as it is not possible to route traffic from JANET to the N3 network.

7. From Citrix to Microsoft RDP

Around this time, the University of Bristol was exploring the use of Microsoft's Remote Desktop (RDP) application for a student and staff wide deployment. As the Citrix farm deployment was 6 years old, it made sense to move to a more widely supported platform, both within the University and in the NHS environment.

In 2008 the Citrix RDP desktop client was replaced with the Microsoft RDP client and the University replaced the Citrix server farm with virtual (Hyper-V R2) Microsoft 2008 server farm and a Cisco load-balancer front end. The Remote desktop has been customised for the medical students with links to applications that are relevant for them.

In order to increase security and prevent infection of the local computers, the RDP client application for NHS Trusts' desktops has been customised and locked to prevent access to local drives.

8. Printing

In order for the printing service to work without the need of the direct link, it was decided to move away from the University's print charging service and allow printing directly to the local networked printer. The local NHS librarians have the freedom to arrange local policies to charge for printing with an honesty box or other mechanism as they see fit. This enabled the complete disconnection of the fixed links to the SWERN POP and the flexibility (in theory) to locate a Clinical Academy PC anywhere within the Trust network and also enable the support of University staff working in the Trust to connect from their NHS PC.

Due to lack of reliability and consistency of the user experience with the Microsoft 'built in' RDP printing service, the University decided to invest in a third party printing management software. Screwdrivers software (tricerat.com) is licenced on a per server basis and allows installation of the client software on unlimited computers.

The Screwdrivers, client software (by default), will use the local default printer and does not require the server to have multiple print drivers installed. Screwdrivers printer management has eliminated all of the printing issues and produced a reliable printing solution and simplified the management of the server farm.

9. Summary

The focus and priority of the NHS Trust IT team, quite rightly, is to support the Trust in providing high quality patient care. Although the Trust also has a duty to provide an IT service to the medical and nursing students on placement, the University needs to promote their communication needs and work hand-in-hand with the Trust to overcome communication barriers.

Good working relationships with the NHS Trust IT staff have been crucial to the success of this of this on-going project and will continue to influence the future development.

The objective of the project was to provide the medical students with consistent access to their electronic learning resources at Bristol. This goal has been achieved, first with Citrix and later with Microsoft's Remote Desktop. Students find the system easy to use and now they can also assess the same RDP system from their own laptops whilst in their accommodation.