

The North Western Regional Health Authority has built one of the most advanced Open Systems Interconnection (OSI) compliant wide area networks in the UK.

Independent consultants have described it as "the best in the National Health Service" – and the NWRHA believes that it now has more expertise in the implementation of OSI than any other regional health authority. It was helped in the development by a range of consultancies, including Price Waterhouse, Pareto, Tallis and DMW (see box).

As recently as 1989 the network was, by the authority's own admission, incapable of meeting the increasing demand for IT services. Today, any new device can be plugged into the network at any point and have instant access to any of the corporate systems.

The network is based on enterprise routers from Cray Communications. The NWRHA is one of Cray Communications' biggest clients and its support of the network is valued at more than £50,000 a year. The authority and Cray Communications have together turned it into a showpiece for the rest of the health service.

The NWRHA is the second largest of the 14 regional health authorities in England. It serves four million people from Stockport to Lancaster, encompassing the major urban areas of Manchester, Blackburn, Blackpool and Preston.

The authority's inhouse computing department was set up in 1990 as a trading agency called Professional Datacare. In its first year of business, 1991/92, it had an income of £5.6 million and moved rapidly into a competitive culture. What were its "users", mainly the district health authorities, are now referred to as its "customers". They too have been transformed. Many of them are now Trust hospitals, funded directly by the Department of Health; many others have become "purchasing units".

They can all now choose whether to use the services of

Instant access

Price Waterhouse and other consultancies have helped one of the UK's biggest health regions build a sophisticated data network.

Professional Datacare or to go elsewhere, but the great majority have continued to use Professional Datacare and now have service level agreements in place.

The network which Professional Datacare has to maintain is extremely complex by almost any standards. It consists of several very large machines – mainframes and minicomputers – of different makes, with 2,500 dumb terminals, around 50 file servers and some 500 PCs attached.

The authority has been an ICL mainframe user since the 1970s, upgrading its capacity every few years. At its data centre at Prestwich, on the north side of Manchester, Professional Datacare now has a triple node ICL 3980 mainframe with around 50 gigabytes of online disk storage. The company is currently implementing an accounts payable & purchase order processing system for 14 customers on the mainframe computer.

The network has 44 Cray Communications' routers, each representing a node, which is a LAN at either a hospital or another healthcare site. These nodes vary greatly in size and sophistication.

The largest node is the Manchester Royal Infirmary, which is in turn connected by a fibre optic link to Manchester University and thus to JANET (the Joint Academic Network) and to the international Internet network.

The ICL mainframe at present runs an online general ledger and an online child health system, supporting communications with 400-500 PCs of various makes, mainly IBM, Compaq and Apricot, most of which contain a Cray Communications LAN card.

Front-ending the mainframe are two ICL DRS 6000 mid-range machines,

which provide online payroll input and health information services.

Within each of the 19 original districts of the region there is a Digital VAX superminicomputer supporting a Patient Administration System (PAS) and a McDonnell Douglas Information Systems' Sequoia machine supporting financial and personnel services.

The authority originally ran a networking system based on Dowty CASE (now Cray Communications) DCX 850 nodal concentrators, or asynchronous multiplexer switches. These served the 19 local districts.

Dowty CASE Grapevine hardware was used to mix voice and data on local sites and feed it through to the DCX nodes. The Grapevine hardware allowed the use of telephone points to install new terminals and this avoided laying more cables. To this DCX network were added warehouse terminals and a stock control system, also based on McDonnell Douglas hardware.

End users were thus given a choice of which systems they wanted to communicate with, but the network was far from satisfactory.

"It had grown up without a structure", explained

Professional Datacare's technical services manager Ken Dearden. "We had a networking strategy. It was all applications-driven and the network was just growing system by system."

The result was low network resilience. But in 1989 this began to change very rapidly.

A major expansion of the PAS and a move to LAN-based host systems was planned. At the same time, a new system was needed to manage orders direct to suppliers and the region decided to introduce a new general ledger system based on the ICL mainframe. All of this has involved an extra 600 dumb terminals and another 300 PCs, increasing the total to around 2,500 devices on the network.

These requirements forced a change in the whole networking system, because the existing asynchronous network could not communicate easily with the ICL mainframe which used block mode protocols.

This led to a review of the networking strategy. A £1.7 million project budget was set up to cope with the transition and Price Waterhouse consultants were asked to recommend a strategy based on the International Standards

CONSULTANCIES

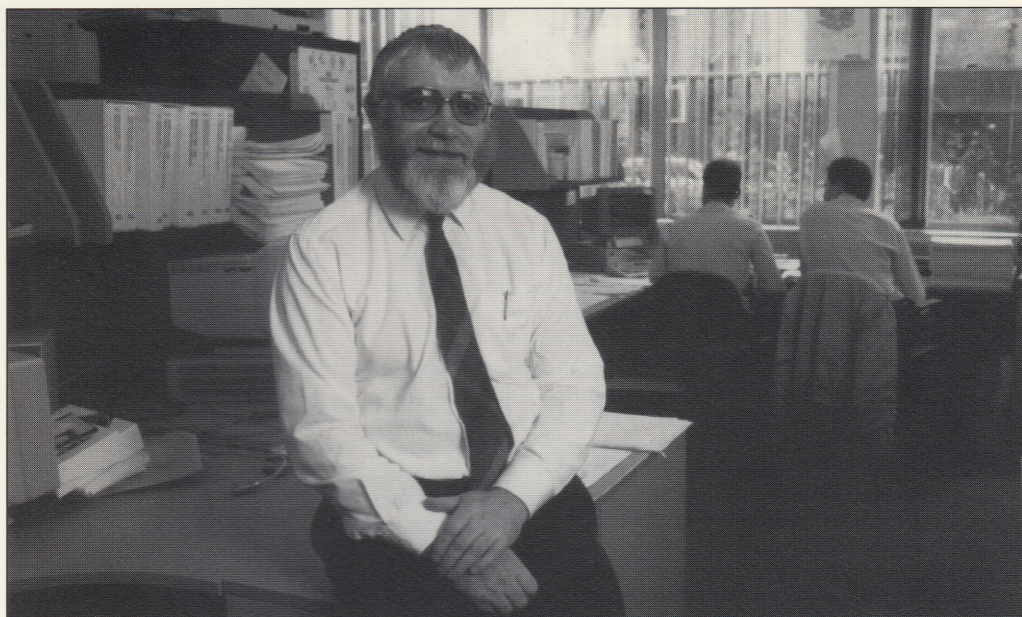
As well as Price Waterhouse (see main article) the North Western Regional Health Authority has used three other management consultancies.

The DMW Group is a specialist independent networked systems consultancy. Established in 1989, the firm focuses on enabling businesses to exploit modern networks, distributed systems and telecommunications facilities.

Pareto Consulting, established in 1990, specialises in the public sector, especially healthcare consultancy. The

firm has so far carried out about 200 assignments for 100 clients, working for one in six of the UK's hospitals. It specialises in planning, managing and delivering IT projects. Like DMW, the firm was set up by former Andersen Consulting professionals.

Tallis consultancy is a unit within BT specialising in communications consultancy services. The firm has around 40 staff, and offers advice and support covering communications technology, voice, data and related business issues.



KEN DEARDEN: "WE ACKNOWLEDGE THAT THERE ARE RISKS IN BEING A LEADER IN INTRODUCING NEW TECHNOLOGY"

Organisations OSI model.

OSI was then being strongly encouraged by the Department of Health's Information Management Centre, in line with a European Commission directive on government communications standards. The objective was for the authority to move gradually towards conformance with the Government OSI Profile (GOSIP).

The PW consultants were briefed that a principal consideration was to protect the authority's heavy investment in existing network equipment.

PW's recommendation was for a hybrid network of multiplexer and OSI local area network equipment, allowing a migration to OSI-compliant systems which would protect that investment and minimise disruption to users.

A number of the districts were already starting to implement their own local area networks. So it was decided to re-structure the regional network on a LAN arrangement rather than on the X.25 system, based on international standard interfaces to the BT packet-switched service PSS.

Many other regional health authorities have preferred to adopt X.25, but Price Waterhouse advised that because of the existing investment in networking equipment the high cost of converting to X.25 could not be justified.

The PW report said they should aim for "any-to-any-connectivity" – in other words, a single desktop system should be able to access any system on the network.

The PW recommendations were accepted and Dowty Communications was appointed to manage the project, which was begun at the end of 1989 and completed early in 1991. The authority began to migrate to a LAN-based structure, with each district having its own LAN, and invested in Dowty CASE routers to achieve this. Dowty CASE routers were added to the network and became its backbone, replacing the DCX nodes as the first step of the migration to OSI.

Dowty CASE was the single source for all the hardware and software involved in the project – routers, terminal, servers, gateways and an OSI stack on the PCs. This project led to a huge improvement in the network, but it still left a number of issues to be resolved. These included communication between the Internet TCP/IP and OSI protocols and slow response times on the PCs because of the difficulty of using asynchronous-based protocols in a LAN environment.

Many other users in both the public and private sector have been grappling with these types of problem and Professional Datacare thinks

it has now found some of the solutions.

By use of additional software above the OSI stack, it has managed to increase the efficiency of communications directly between the ICL mainframe and PCs.

The PCs run the Network Designers Ltd product HPLAN software over the Cray OSI stack, providing online services to the ICL general ledger system.

After the successful completion of the OSI migration project, Cray Communications supplied Professional Datacare with PC software to support the OSI FTAM (file transfer, access and management) standard. This fulfils the important need of the authority for OSI-compliant file transfer between PCs and ICL, DEC or Unix-based (ICL DRS 6000 and Hewlett-Packard 9000) host machines.

FTAM is seen as a key element of Professional Datacare's network strategy. Ken Dearden believes that there are still very few sites which have implemented FTAM as fully as this.

Last February, Professional Datacare upgraded the regional network to new Cray Communications enterprise routers. The aim was to allow it to implement the National Health Service Network Service Access Point (NSAP) addressing system and to install software which would tighten security by controlling user access to remote devices.

Cray Communications' enterprise routers are based on 32 MIPS RISC processors, providing a hardware platform fast enough to give backbone capacity for various types of LAN and protocol. This makes them an obvious choice to support such complex corporate systems as Professional Datacare's.

Ken Dearden said the £80,000 upgrade had been handled extremely efficiently by Cray Communications and he was impressed by the new emphasis on quality since the integration of Dowty into Cray Communications.

Professional Datacare is not resting on its laurels, but has far-reaching plans aimed at holding its lead in OSI.

After commissioning further studies by Tallis, DMW Group and Pareto, it last year launched three new projects: first, to move towards an X.400-based messaging system; secondly, to install an X.25 gateway to Racal's Healthlink system, the banking systems BACS and BT's PSS; and thirdly, to extend the regional OSI-based communications network to general practitioners and to the family health service authorities.

"We acknowledge that there are risks in being a leader in introducing new technology, and we have sometimes paid the price for that, but we believe that the rewards we get justify taking those risks," says Ken Dearden.

"Now we can plug in any device anywhere on our network and get instant access to any service. We can also much more easily implement a new service. It works as easily as the phone system, but it is also all under central control. I don't believe that any other health authority in the country yet has this degree of flexibility."

Not surprisingly, some other health authorities are starting to come to Professional Datacare for advice on their connectivity problems, encouraging Professional Datacare's hopes of being eventually able to sell its services to a wide range of customers outside the NWRHA.