

CASE STUDY

The North Western Regional Health Authority has built one of the most advanced OSI-compliant wide area networks in the country.

Independent consultants have described it as "the best in the National Health Service". The NWRHA believes that it now has more expertise in the implementation of OSI than any other Regional Health Authority.

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's biggest clients and its support of the network is valued at more than £500,000 a year. The Authority and Cray Communications have together turned it into a showpiece for the rest of the health service.

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 in-house computing department was set up in 1990 as a trading agency called

Market Sector:
<i>Health</i>
Products and Services:
<i>LAN's and DCX</i>

Professional Datacare (PDC). 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".

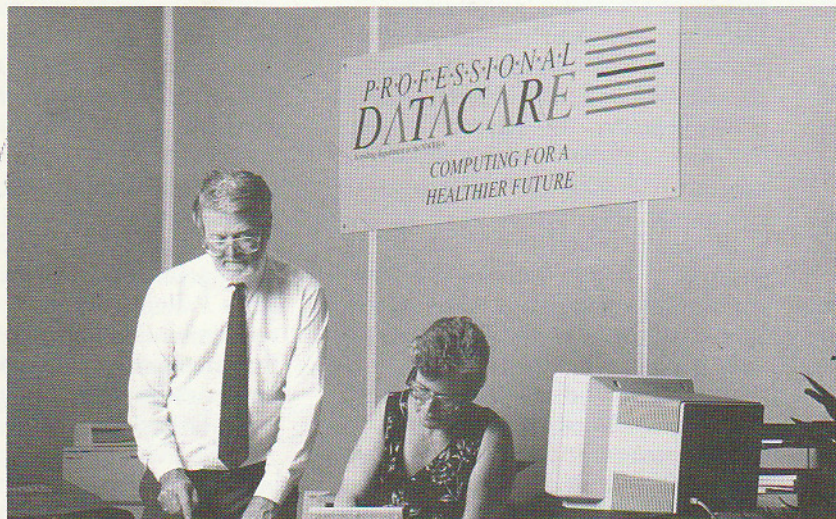
They can all now choose whether to use the services of PDC or go elsewhere, but the great majority of them have continued to use PDC and now have service level agreements in place.

PDC continues to focus primarily on serving their needs, but also has an eye to selling its services more widely, especially to other Regional Health Authorities. PDC is at present seeking to obtain the BS5750 quality certificate to help it retain its existing customers while expanding into new markets.

The network which it 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 personal computers 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, PDC now has a dual node ICL 3980 mainframe with around 50 gigabytes of on-line disk storage.

It is planned to add accounts payable and purchase order processing systems to the



mainframe and to allow for the expansion in the number of mainframe users PDC will add another ten gigabytes of storage and an extra node.

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 the International Internet network.

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

Front-ending the mainframe are two DRS 6000 mid-range machines, which provide on-line payroll input and health information services.

Within each of the nineteen 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 thus 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 system they wanted to communicate with, but the network was far

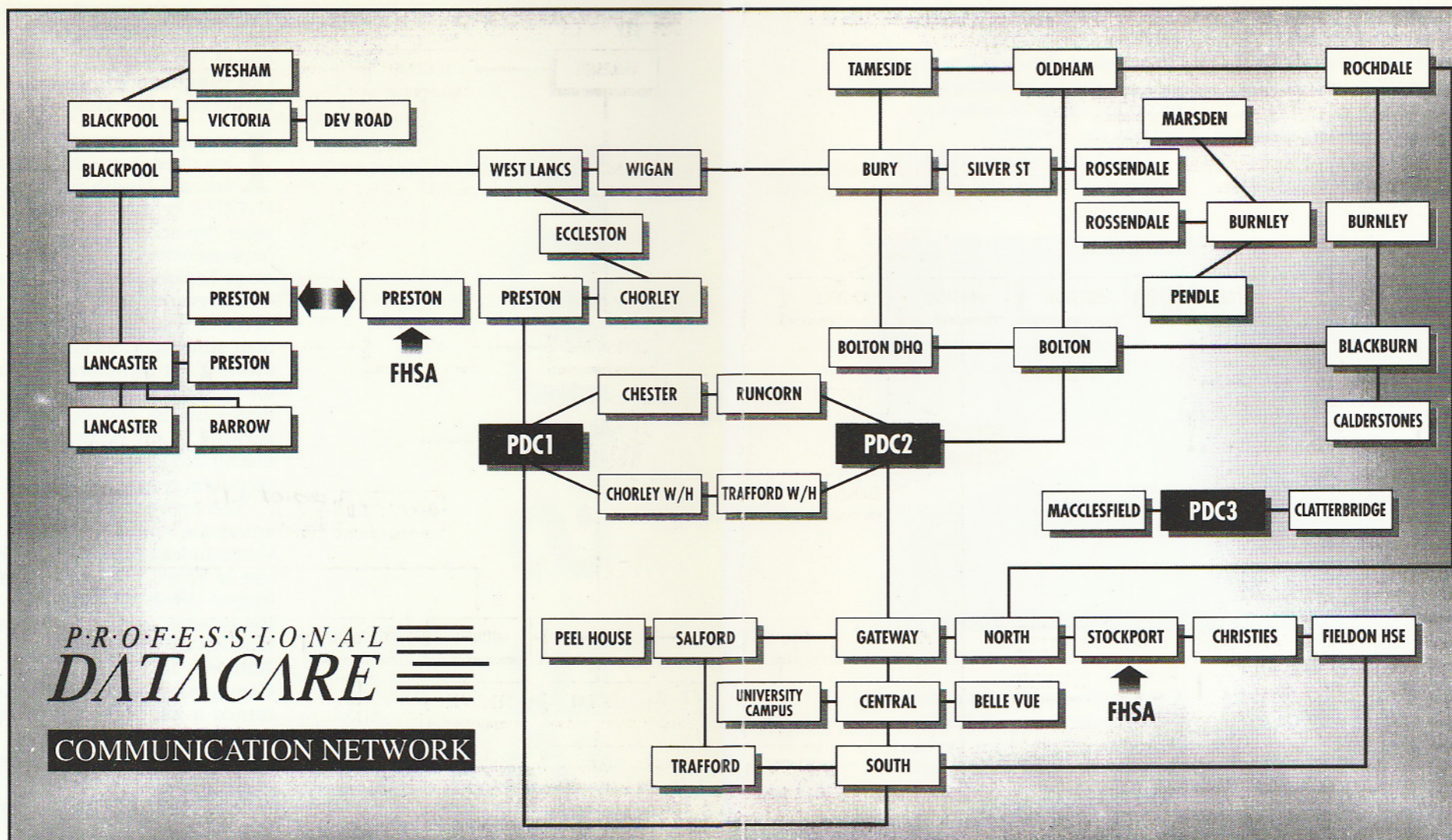


Diagram reproduced with kind permission from Professional Datacare Services.

from satisfactory.

"It had grown up without a structure," explained PDC's technical services manager Ken Dearden. "We had no 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 it all began to change very rapidly.

It was planned to launch a major expansion of the PAS and undertake a move to LAN-based host systems. 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 involved an extra 600 dumb terminals and another 300 personal computers, 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 £1.7million project budget was set up to cope with the transition and management consultants from Price Waterhouse were asked to recommend a strategy based on the International Standards Organisation's Open Systems Interconnection (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 management consultants were briefed that a principal consideration was to protect the authority's heavy investment in existing network equipment.

Price Waterhouse'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.

It was therefore decided to restructure 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 Price Waterhouse 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 Price Waterhouse 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.

So 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 the 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 the private sector have been grappling with these types of problem and PDC thinks it has now found some of the solutions.

By the 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 personal computers run the Network Designers Limited product HQLAN software over the Cray OSI stack providing on-line services to the ICL general ledger system.

After the successful completion of the OSI migration project, Cray Communications supplied PDC with personal computer 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 DRS6000 and Hewlett-Packard 9000) host machines.

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

In February, PDC 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 32mips 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 PDC'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.

In September 1992 Cray Communications was formed by the acquisition by Cray Electronics of Dowty's information technology division. This brought together the resources and networking activities of the former Dowty CASE, Dowty Information Systems and Craycom companies.

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

After commissioning further studies by management consultancies Tallis, DMW Group and Pareto, it has this 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 system 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

come to PDC for advice on their connectivity problems, encouraging PDC's hopes of being able eventually to sell its services to a wide range of customers outside the NWRHA.

The close working relationship between NWRHA and Cray



we have sometimes paid the price for that, but we believe that the rewards we get justify taking those risks," said 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

Communications was developed with the assistance of NHS Supplies - North West Division. This has brought substantial benefits to both the NWRHA and Cray Communications.

Ken Dearden commented: "For us the biggest benefit of working with Cray Communications is that we have a one-stop supplier for our networking products. This gives us a special relationship with them - we can tell them what we want and ask them to deliver a solution as quickly as possible."

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