RAL

DESIGN & DISCOVERY

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RUTHERFORD APPLETON LABORATORY

SCIENCE AND ENGINEERING RESEARCH COUNCIL

Computer Network Infrastructure

Users of computing facilities at RAL include scientists, engineers and administrators both on the RAL site and in other academic establishments. Their requirements range from low speed communications for hardcopy devices to high speed for workstation and computer to computer connections. The equipment and media used are extensive and supplied by many manufacturers.

Atlas Centre communications equipment

This provides the main focus point for RAL computer communications. There are, however, a number of smaller areas around the site for additional equipment.

The equipment includes:

Gandalf PACX
- a Terminal Switching System which allows terminals to be connected directly to computers of the users' choice. This system is capable of handling 768 connections.

Gateways
- from Joint Academic Network (JANET) to British Telecom (BT) Packet SwitchStream Network (PSS) allow controlled access to the public network by the academic community.

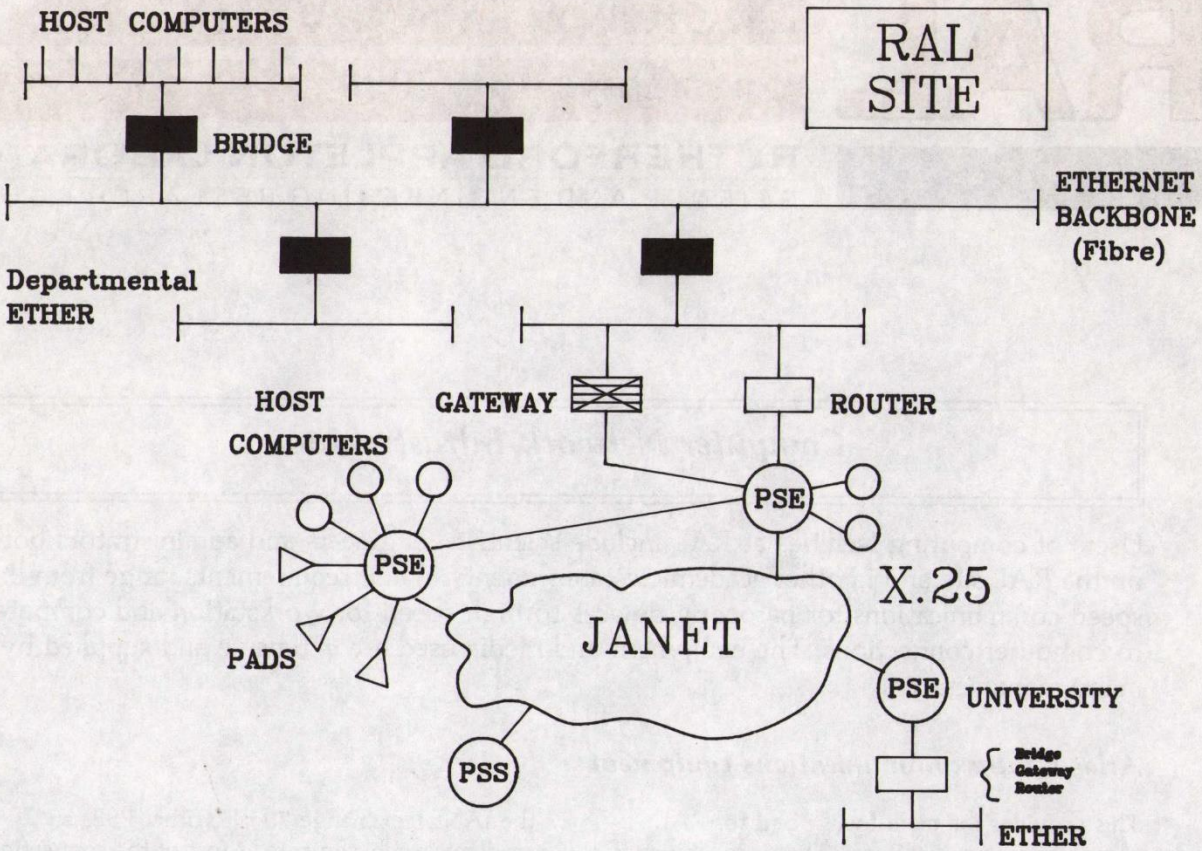
News systems
- an information board for users to gain information on JANET network services.

Packet Switch Exchanges (PSEs)
- for the site and JANET. These host connections for computer systems and Packet Assemblers Disassemblers (PADs) to allow *packets* of information to be transmitted from system to system. The JANET PSE connects to the public network, other academic sites within the UK and overseas. The *local* PSEs have 80+ connections, the JANET exchange 70+ to other PSEs at academic establishments. Most of the connections are relatively low speed 9.6 to 64Kbits per second (bps); however, enhancements being introduced support line speeds up to 2Mbps. The speed of the links between major JANET exchanges is 512Kbps+.

Ethernet equipment
- for the Local Area Network (LAN) includes: *bridges* to manage departmental ethernets; *routers* to route protocol from ethernet to another carrier type network; gateways to connect different networks together, ie ethernet (LAN) to X.25 Wide Area Network (WAN). The cabling within a department is coaxial, but fibre optical cabling is used between department ethernets via the *bridges*.

Multiplexor equipment
- used extensively to reduce cabling across the site. A multiplexor connects 32 individually connected devices and multiplexes the traffic over a single fibre optical cable pair.

BT analogue termination units
- are the customer connection points for leased analogue lines. They provide communications to remote sites. The units contain test facilities to help diagnose faults.



BT digital lines
- Kilostream and Megastream.[1] Digital lines at speeds up to 2Mbps (2,000,000 bits per second) for higher speed, reliable point to point communications - used extensively within the academic community.

Mercury digital lines
- at speeds up to 2Mbps, provide alternative routes from those of BT.

Modems
- convert digital computer signals into analogue signals for transmission over analogue (speech quality) lines. Models are also available to allow users to use terminals from their own homes.

PADS - Packet Assemblers Disassemblers
each support up to 16 terminal connections. The terminal traffic is assembled into the *packets* that are required to be carried over the X.25 network. PADs are also available to connect directly onto the ethernet.

Channel Extender - PIXNET XL.
- allows SERC Head Office at Swindon to be connected via a 2Mbps link directly onto an IBM mainframe channel. This gives the remote user fast, direct access.

Front End Processors
- connect a multitude of devices and lines onto IBM mainframe channels.

Network Operation Centre

From within the centre the operator monitors the network and responds to any fault observed or reported. The centre contains system monitors of network services, monitoring and patching equipment to allow for interrogation of suspect components. Details of each connection are maintained on-line and a copy filed for easy access. Faults are recorded onto a database and statistics on traffic levels and faults produced.

1 Kilostream and Megastream are registered British Telecom trademarks.