Atlas CENTRE
Computing Services

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Communications at RAL

Users of the computing facilities at RAL include administrators, engineers and scientists on the RAL site and researchers in UK universities. Their requirements for data communications range from a low speed connection for a hardcopy unit to a megabit per second link for inter-computer working and support of advanced graphics terminals; from local to international connections. The data communication equipment and transmission media needed to satisfy all these requirements are extensive.

The two main areas in data communications are **networks** and **terminal access**.

Networks

"Networks" mean different things to different people: here, we mean the ability to connect computers to their peripherals, to their terminals, and to other computers. The devices may be on the same site, in which case it is a **Local Area Network** (LAN), or in different locations - or even in different countries - in which case it is a **Wide Area Network** (WAN). Types of services offered by a network include:

- use of the remote computer as if it were at the local site (interactive access);
- transfer of files between computers, useful for collaborative projects;
- submission of jobs to a remote computer and receiving back results;
- electronic mail.

Networks at RAL

At RAL the following networks are used.

Ethernet
RAL operates a fibre optic backbone to which departmental Ethernets are connected via a MAC-level bridge. The advantages of this architecture are:

- protocol transparency;
- traffic management;
- freedom from topological restriction;
- security.

Departments are responsible for managing their own Ethernets, with Central Computing Department being responsible for the backbone and general coordination.

The main protocols used are IP and DECnet, with a small amount of Pink Book traffic. Gateways and Routers connect the Ethernet to the X.25 network.

This network supports over 500 devices, ranging from the IBM 3090 to DEC VAXes, Sun workstations, PCs and DECservers (which support DEC type terminals).

The local IP network is connected to the JANET IP service (JIPS) which is itself connected to the world-wide IP networks.

The local area X.25 network
X.25 is the CCITT standard for packet switch networks and is widely supported in the academic community and by most national carriers, including British Telecom (BT).

The network is based on a number of **Packet Switching Exchanges** (PSEs) supporting both host and JNT PAD (**Packet Assembler Disassembler**) connections. Currently, there are approaching 100 host and JNT PAD connections at RAL.

The PSEs connect into the **Joint Academic Network** (JANET) to allow access to and from Universities, other Research Council sites, PSS, EARN, IXI and other X.25 networks worldwide.

RSCS
The Remote Spooling and Communications Subsystem is an IBM product for use on IBM or IBM lookalike systems for workstation communications and for controlling printers.

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Terminal access at RAL

Terminals are connected to the computers at RAL in various ways. These include

Via a network
More than 1000 terminals use this type of connection over the local ethernet and X.25 network.

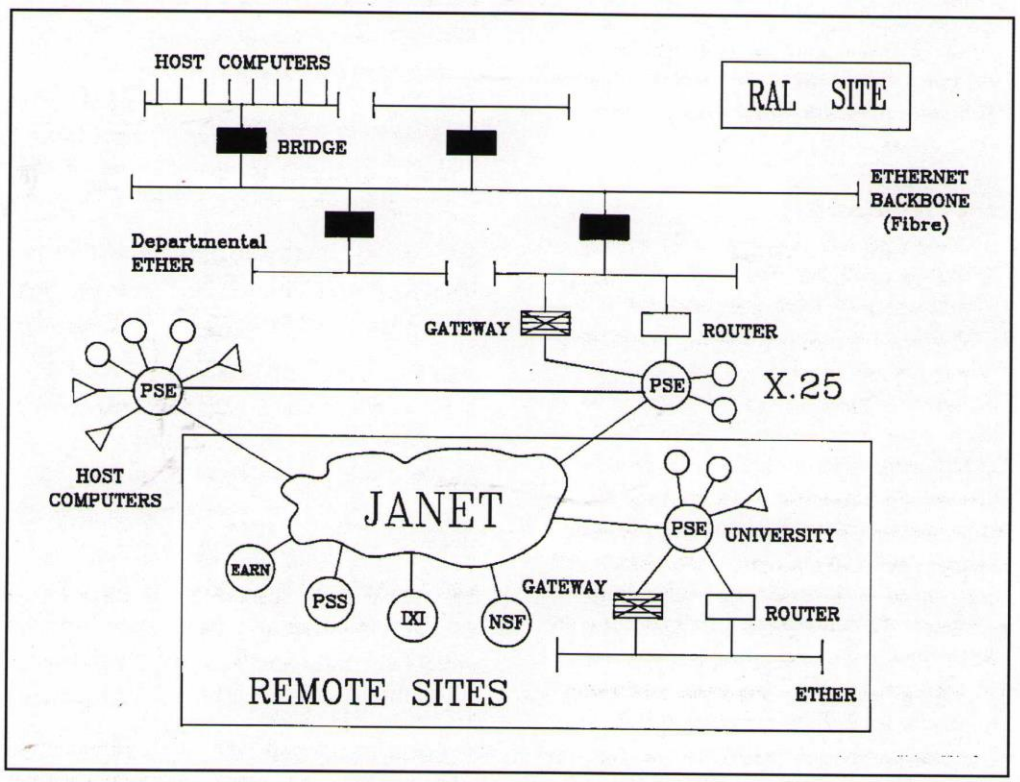
Direct connection
Here terminals, or special peripheral devices, are connected directly into the required system. Examples of these are the "screen" devices used on the central system and the CAD/CAM workstations used on minicomputers. There are over 400 connections of this type on the RAL site.

Via a dial-up connection
This allows users to connect from any available telephone line by use of suitable dial-up modems. Speeds up to 9600 bps, data compression and error correction are supported.

Further Information

For more information on the networks at RAL, please contact:

Telecommunications Manager
Tel: Abingdon (0235) 44 6281



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Video Facility

The Video Facility allows users to generate animation sequences on normal videotape from their computations. As such, it replaces the film output facility that used to be provided at the Atlas Centre. However, video technology means that many more facilities can be provided directly, such as several sequences at different speeds - all from one original sequence.

Hardware

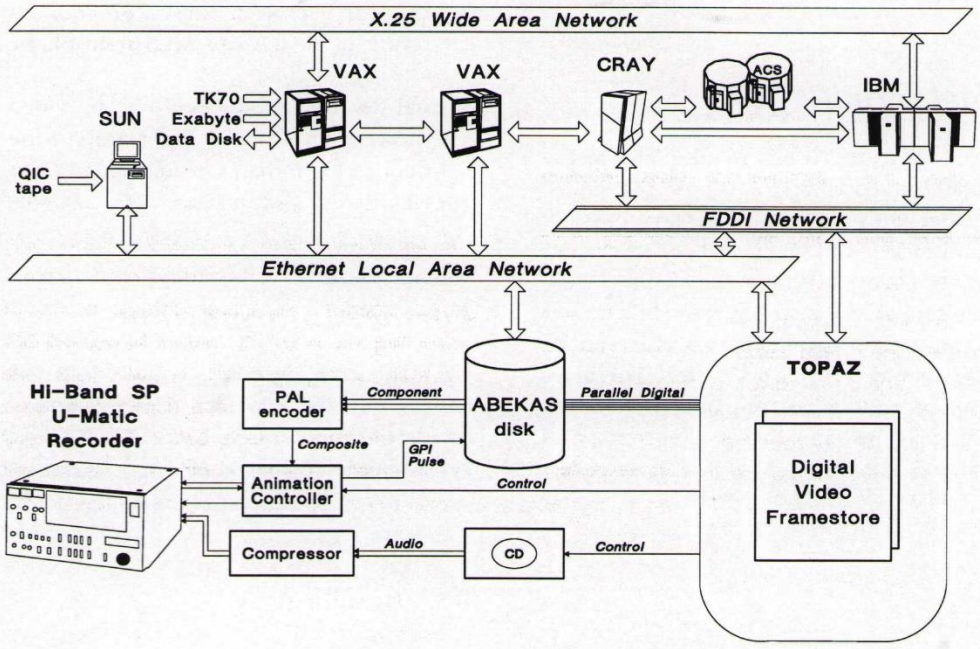
The video system is now based on an Abekas A60 digital video disk - a standard broadcast quality machine - which stores 750 frames of video. Pictures are put onto the disk by a Primagraphics TOPAZ computer which generates them from user files. The TOPAZ system contains a full broadcast quality, 24-bit framestore, genlocked to a studio quality sync source; this allows frame-accurate editing when producing the videotape.

The Abekas disk allows repeated sequences to be produced at normal speed, faster or slower than normal, or even reversed. For instance, a cyclic sequence of pictures only needs to be stored once on the disk and can then be recorded onto videotape many times for convenient viewing.

The output from the Abekas disk is finally written to a Sony U-Matic Hi-Band SP recorder under the control of a Lyon-lamb animation controller, which allows one or more sequences to be combined onto one tape.

Users may take the Hi-Band U-Matic SP master tapes or copies made on Lo-Band U-Matic or VHS formats if they prefer. Direct output from the Abekas disk to other formats, such as Betacam or D2, is possible if a relevant recorder can be brought to the Atlas Centre.

ATLAS VIDEO FACILITY



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1992

Software

All the software for the video system has been developed by the Atlas Centre. This includes software that accepts a variety of file formats and produces the pictures, software for titling and software for controlling the Abekas disk and video recorder.

Many users send files to the facility in ISO Computer Graphics Metafile (CGM) format. This is convenient as it is a completely self-contained and self-describing file format.

Pictures are also acceptable in a number of other forms:

- direct colour raster form (RGB triples or rows);
- indirect colour raster form with an explicit or implicit RGB colour table (e.g. WINSOM 676 output);
- NCAR repackaged CGM files;
- UNIRAST form (Cray binary format only supported at present).

The video system software controls the production of pictures in the TOPAZ computer's framestore and the transfer of these to the Abekas disk. When a sequence is complete in the Abekas, the software then simultaneously instructs the Abekas to play it back and the Lyon-Lamb animation controller to record it onto videotape.

Post-Production

In many cases, users require not just a single sequence, but a set of sequences, together with captions, titles and possibly soundtrack and musical background and/or effects. Where the demands are quite simple - for instance, some title frames and a spoken commentary - this can be done within the Atlas Centre. For more complex editing we are able to use the editing suite in RAL's Reprographics section.

Access

The Video Facility is a service freely available to Supercomputing and SERC grant-holders. For other users, a scale of charges is outlined in a separate leaflet.

Input to the Video Facility can be accepted in a number of ways, including Unix "tar" format files on QIC tapes, VAX BACKUP format tapes on half-inch, TK50/TK70 tapes or Exabytes, by file transfer over JANET or Ethernet / FDDI file transfer from computers at the RAL site such as the IBM 3090 and Cray Y-MP.

Examples of Use

The Video Facility has produced a large number of sequences and complete videos, many of which have been included in UK television broadcasts such as Tomorrow's World, Horizon and Open University programmes. Examples include:

Oceanography presentation of the results of the FRAM oceanographic model and a contribution to the discovery of the effect of the Indian Ocean in heating the Gulf Stream;

Atmospheric Physics presentation of the many simulations conducted by the UGAMP project and preliminary results of the UARS / MLS atmospheric sensing satellite;

Virtual Reality production of a video showing an artificial flight around the floor of the Indian Ocean, created from GLORIA side-scan sonar data.

Further Information

For further information contact:

Head of Computer Graphics
Tel: Abingdon (0235) 44 6565