The Evolution of Csironet

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1 INTRODUCTION

The CSIRO computing network, CSIRONET has evolved from a few interactive terminals in Canberra, to over 250 interactive terminals and about 50 PDP-11 nodal computers scattered throughout Australia.

This evolution has occurred within the framework of certain management policies and design principles rather than to an overall detailed plan. The flexibility of this approach has permitted the expansion of the network far beyond that initially envisaged, the provision of facilities not originally contemplated and the utilisation of new equipment, and communications facilities as they have become available.

2 CSIRONET

The CSIRO Computer network has its main computer centre at the CSIRO, Division of Computing Research (DCR) Canberra headquarters. The purpose of the network is to provide a scientific computing service to all Divisions of CSIRO, and to some Australian Government and State Government departments and Universities. As these users are distributed throughout Australia, remote access interactive terminals and batch terminal/concentrators (nodes) have been installed in the majority of user locations, to provide access to the facilities of the large Control Data CYBER 76 system in Canberra via the CDC3600 used as a front end processor.

2.1 Nodes

A typical CSIRONET basic node consists of a PDP11-10 computer with 8K of memory, a console device such as a Teletype ASR-33, a card reader (300 c.p.m.) a line printer (300 l.p.m.) and at least one interactive terminal such as a keyboard display or a teleprinter. Optionally a plotter and up to six additional interactive terminals may be added before more memory is required. With 12K of memory a paper tape reader/punch and a further four interactive terminals may be added, together with a digital cassette unit if required.

At some key sites, particularly at the DCR branches in capital cities, larger nodes are required to handle more interactive terminals and the communication facilities which concentrate the synchronous lines (2400 or 4800 b.p.s.) from other nodes in the city onto a common link to the centre in Canberra.

2.2 Communications

The Canberra central site and the Melbourne and Sydney Branches of DCR are linked by Australian Telecommunications Commission Group-Band services operating at 48,000 bits per second. In order to effectively utilise these high speed lines, blocked data is, in general, transmitted. This requires unblocking for distribution on medium speed synchronous lines to the nodes connected to each centre. Consequently a hierarchy of communications machines has been established consisting at the first level of two 'Transfer' machines which interface between the Control Data system in Canberra and the second level 'Fanout' machines which communicate at 48K b.p.s. with the transfer machines and concentrate the 4800 and 2400 b.p.s. synchronous lines from the nodal computers at the third level. In addition some basic nodes operate through the larger nodes giving a fourth level to the network.

3 MANAGEMENT POLICIES AND DESIGN PRINCIPLES

Management policies and design principles of significance in the evolution of the network include:

- Centralised computing power and specialised peripherals.
- Users remote from the central site should not be at a disadvantage.
- Centralised control of equipment selection, ordering, installation and commissioning. Detailed installation and configuration details provided by DCR staff.
- All nodes of the network are compatible configurations able to run the same software package, suitably configured (Nodecode).
- Nodecode packages are developed and generated on the CYBER 76 by DCR staff and no local variations are permitted.
- Only approved compatible peripherals and terminals may be connected to nodes of the network.
- All communications between nodes or terminals in different buildings employ Telecom leased data lines and modems.
- Dial up interactive terminal connections are permitted only to the Canberra centre due to the high surcharges otherwise levied by Telecom.
- While the network currently has only a single Host Processor, multiple hosts are possible.
- For CSIRO owned equipment, a degree of mobility of equipment is possible so that

equipment may be deployed where it is most needed, and many items are supplied from advance ordered stocks held at DCR Canberra.

- Maintenance of the communication network, excluding interactive terminals, is the responsibility of a single maintenance contractor throughout Australia, administered by central liaison with DCR Canberra.

- The effect of expansion and evolution of the network on users must be minimised.

4 CONCLUSION

The purpose of presenting the above information is to promote discussion on network design and management.

While it is not suggested that the above policies are ideal or comprehensive, or that they are universally applicable, the resultant network is effective, flexible and able to take advantage of new techniques, devices and facilities as they become available.

The evolution of the network has not stopped and no end to the process is contemplated.

5 REFERENCE

GILBERT, C.D. CSIRONET Hardware Logistics. DECUS Australia Proceedings 1975

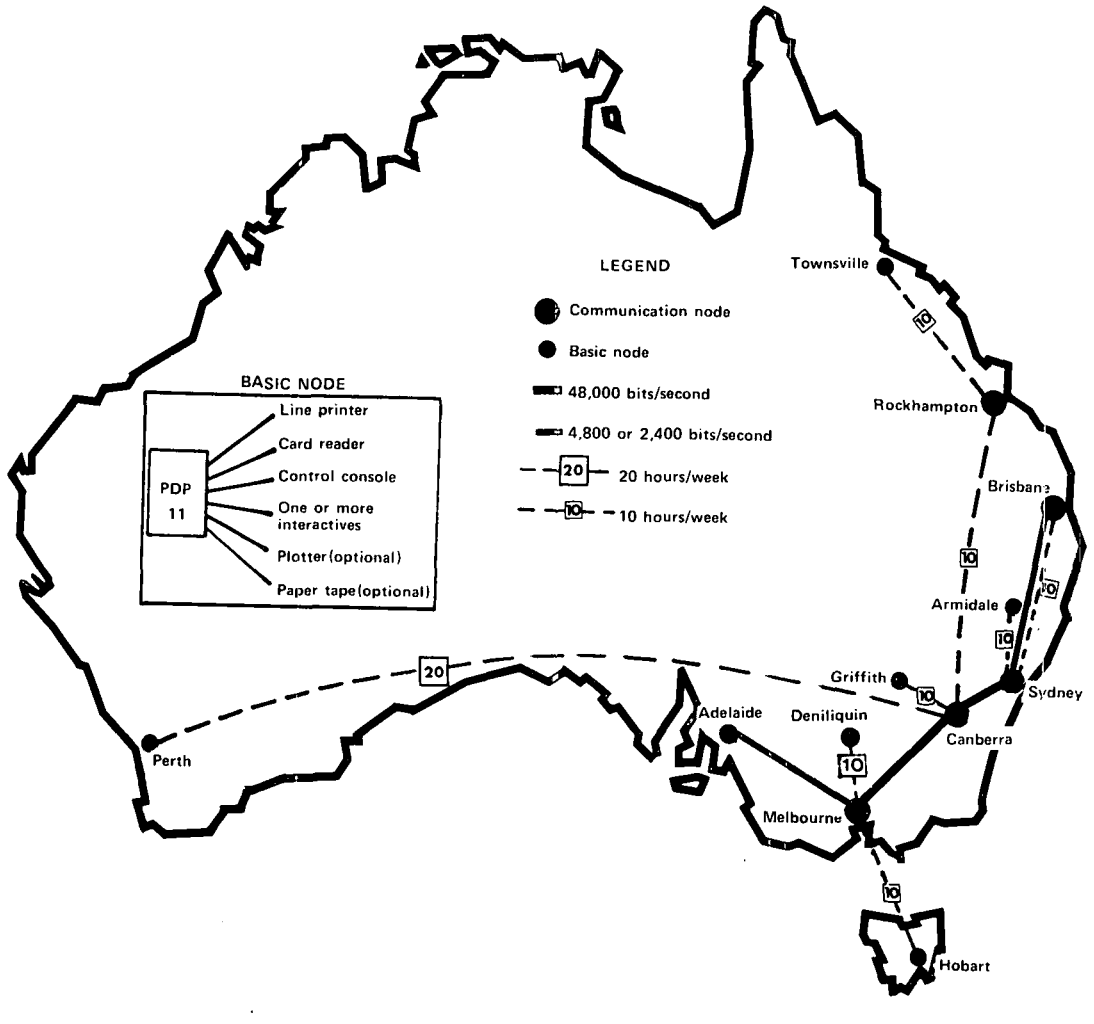

Fig. 1 CSIRONET at November 1975

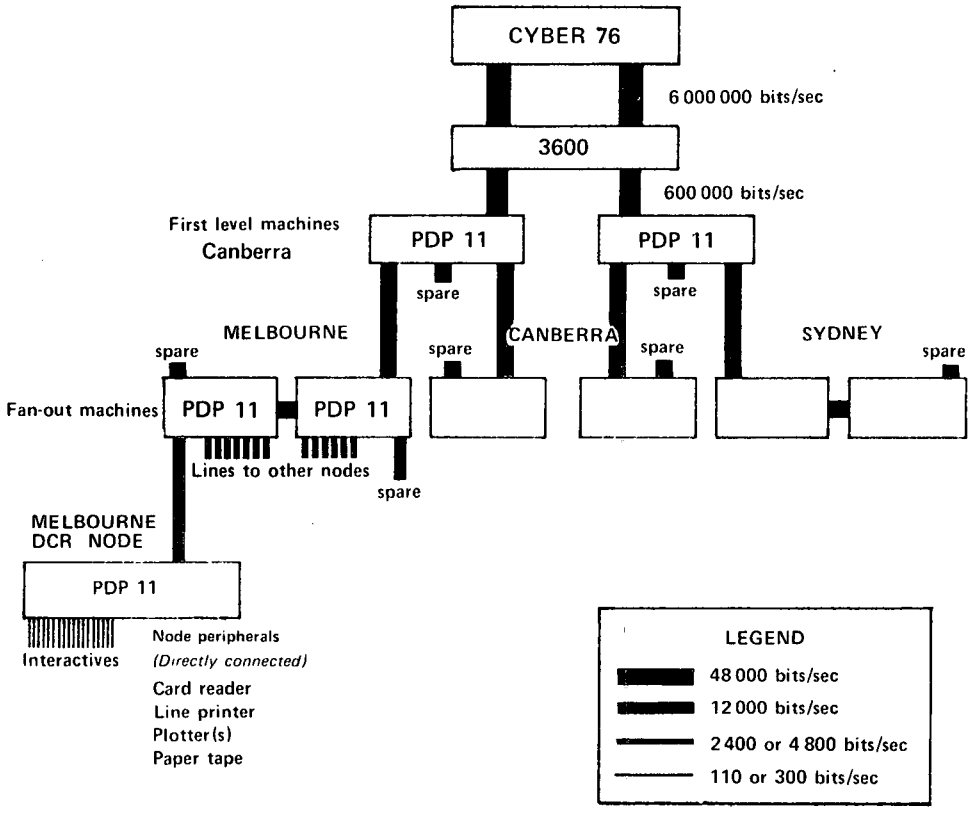

Figure 2

CSIRONET NODES

Canberra

CBR	DCR, Black Mountain
CD•	Bureau of Agricultural Economics, Braddon
CF•	Forestry Research, Yarralumla
CG•	Wildlife Research, Gungahlin
CH•	DCR, AMP Building, Canberra City
CK•	Industries Assistance Commission, Barton
CL•	Land Use Research, Black Mountain
CN•	Entomology, Black Mountain
CP•	Bureau of Mineral Resources, Parkes
CQ•	RAO/Head Office, Canberra City
CT•	Plant Industry, Black Mountain
CW•	Environment & Conservation, Canberra City
CX•	DCR, Black Mountain ‡

Adelaide

ADL	DCR, Adelaide

Armidale

EA•	DCR, Armidale

Brisbane

BNE	DCR, St Lucia
BL•	Long Pocket Laboratory, Indooroopilly †
BP•	Department of Primary Industry, Brisbane
BQ•	RAO, Brisbane

Deniliquin

DN•	Land Resources Management †

Griffith

GR•	DCR, Griffith

Hobart

HH•	Tasmanian Regional Laboratory

Melbourne

MA•	Atmospheric Physics, Aspendale
MD•	Mineral Chemistry, Port Melbourne
MEB	DCR, East Melbourne
MF•	Applied Organic Chemistry, Fishermen's Bend
MH•	Building Research, Highett
MI•	Mechanical Engineering, Highett
MN•	Chemical Physics, Clayton
MP•	Protein Chemistry, Parkville
MQ•	RAO, East Melbourne
MS•	Applied Geomechanics, Syndal
MU•	Tribophysics, Parkville

Perth

PER	DCR, Floreat Park

Rockhampton

ROK	DCR, Rockhampton

SYDNEY

Sydney

SC•	Fisheries & Oceanography
SE•	Radiophysics, Epping
SM•	Mineral Physics, North Ryde
SP•	Animal Physiology, Prospect
SQ•	RAO, Sydney
SR•	Animal Genetics, North Ryde
SYD	DCR, Chippendale

Townsville

TW•	DCR, Townsville

† Not yet operational ‡ Developmental purposes only

Figure 3