Theme 3: The Cyber 76

- Years of pressure to upgrade – committees from 1967
- Jan 1970 – CSIRO Information Circular announced the installation of a user terminal in Canberra to provide access to a CDC 6600 run by CDC in Sydney.
  - Peak speed of 3 Mflop/s
  - Already 'old' – first deliveries were in 1965

CSIRO

Theme 3: The Cyber 76

(1) Additional facility

Due to unforeseen delays in the procurement of new
equipment, the load on CSIRO's computing facilities has
increased to a stage where the equipment currently in use
cannot cope with the demand. The Executive has therefore
looked for alternative means of satisfying scientists'
computing needs on modern equipment available in Australia
and has decided that a MARC II 200-User Terminal should be
installed at the premises of the Division of Computing Research
in Canberra. The terminal will be linked by a private
telephone line to the Control Data 6600 in Sydney, owned and
operated by Control Data, Data-Services Division.

Theme 3: The Cyber 76

- October 1972: CoResearch announced a new computer
  - Control Data Cyber 76 (rebadged and enhanced CDC 7600)
- From about 1969 to 1975, the CDC 7600 was generally regarded as the fastest computer in the world (Gordon Bell)
- Australia's first *supercomputer* (and the only one to equal the fastest anywhere else in the world)
- About $5M on the computer and buildings
- 3600 as front-end
- At least 20 more nodes in Divisions

CSIRO

New Computer

Final negotiations are in progress for the purchase of a large capacity computer by the Division of Computing Research.

The new machine, a Control Data Cyber 76, when installed will be one of the largest and fastest machines in the world.

After five years of operation it became obvious that the present installation was nearing saturation usage and in 1967 various committees were set up to investigate the expansion of computing facilities.

The users of the current computer system include, besides CSIRO, government departments such as the Bureau of Mineral Resources, the Bureau of Agricultural Economics, the Departments of Supply, Works and the Tariff Board, account for about 35% of the time and universities for about a further 5% of the time.

Dr Peter Claringbold, the acting Chief, said that the Division of Computing Research supplied a service to meet the commercial applications, scientific and technical computing needs of the users, not for the services such as stores, payrolls and inventories which are done on commercial computers.

For the new installation about seven million dollars will be spent over the next three years on computing equipment and buildings.

The new Cyber 76 machine will be coupled to the existing Control Data 3600 which will now act as a "front end" for the new network.

The high-speed link between the two computers will be carried out with a minimum of disruption to the network users.

The new network when completed, will be one of the most versatile in the world for "remote" computing.

Together with the installation of the Cyber 76, at least twenty more communication nodes (which are remote computers with job entry and interactive equipment) will be installed for Divisions in metropolitan areas, away from actual city centres and in country towns.

Canberra, Sydney, Melbourne, Adelaide, Brisbane, Perth, Townsville, Rockhampton, Griffith and other centres with access to Australian Post Office DATEL Services (STD or leased line) will be able to use the network.

They will be able to draw not only on a computing system with the ability to execute an average of fifteen million instructions per second, but also on a set of technical data bases of massive proportions.

CoResearch October 1972
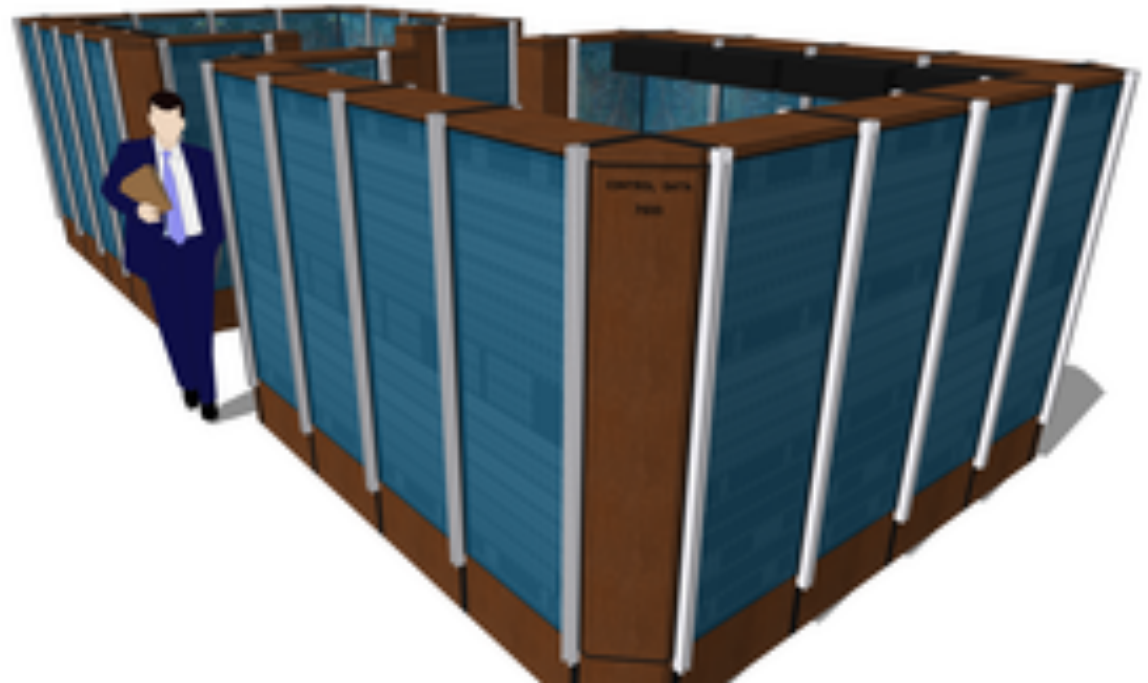
Theme 3: The Cyber 76

- The Cyber 76 / 7600 – (first installation c. 1969), a breakthrough machine with multiple parallel <u>pipe-lined</u> functional units, and a follow-on from the CDC 6600.   Seymour Cray designs.
- The Cyber 76
  - clock rate of 27.5 ns, peak speed of 36 Mflop/s
  - 64 k of 60-bit words main memory (SCM – small-core-memory)
  - 256 k of 60-bit large-core memory
    - Later extended to 512 k words, to support interactive usage
    - could comfortably support 100 users across the country doing editing, etc.
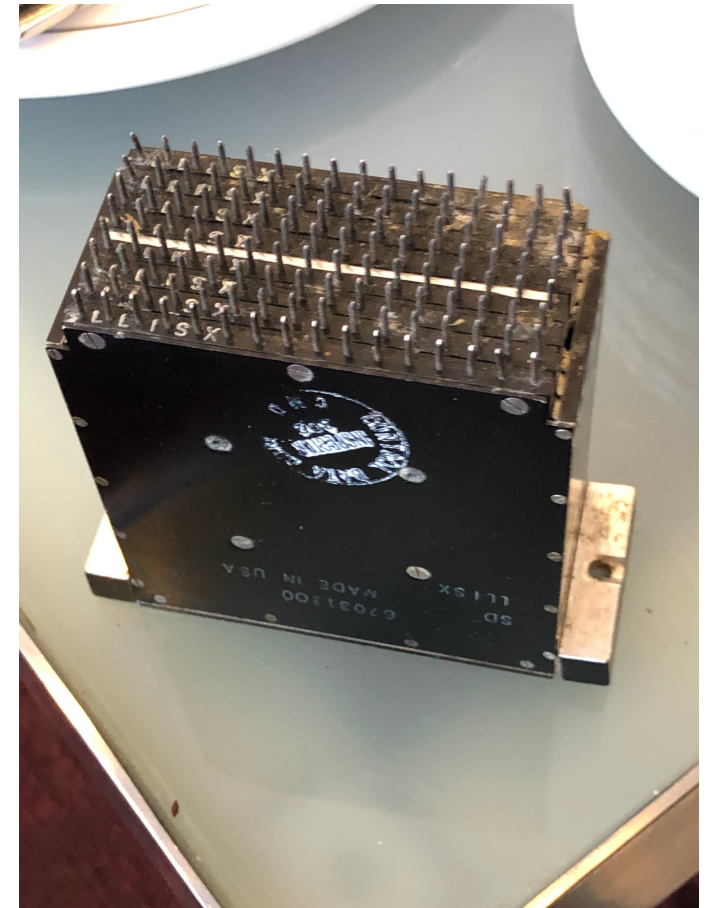- RISC

Theme 3: The Cyber 76

- Installation started in June 1973
- CoResearch July 1973:
  - $4M on computer
  - $1M on batch terminals
  - 30 tons
 - $50k for air charter
- 3600 went in 1977
- Workhorse until 1985

Theme 3: The Cyber 76

- Processor module
  - John Morrissey

Theme 4: Printing and microfiche

- Jan/Feb 1975 Newsletter announced "COM Unit is Ordered" – installed in July
- The COMp 80 provided output to microfilm, microfiche, 35 mm film and bromides.
- Microfiche became the default way to store large amounts of output for Csironet users.
- Sep 1976 DCR Newsletter: about 100,000 pages were being printed on the CSIRO network in prime shift, and as many as 40,000 outside that.
  - Totals about 56 boxes of paper per day, or about a tonne!
  - It was hoped to save a lot of money and forests with microfiche
  - 420 A4 pages, 280 11" x 15" per fiche
  - Ideal for documentation – users could have the complete documentation on their desk with viewer

UM1   INTRODUCTION TO CSIRONET

CSIRONET USER MANUALS   87/07/01
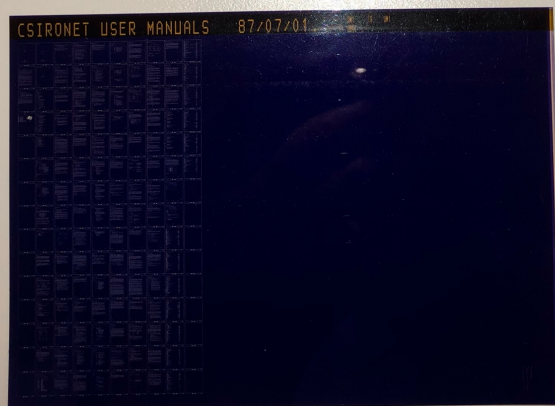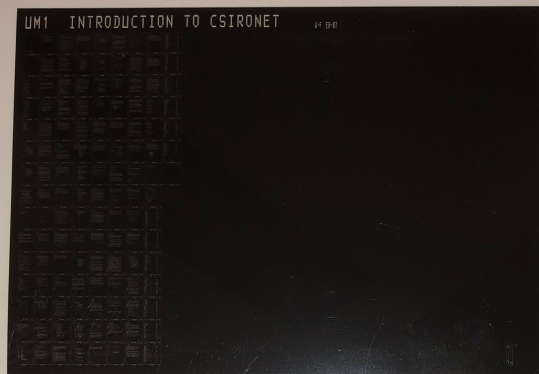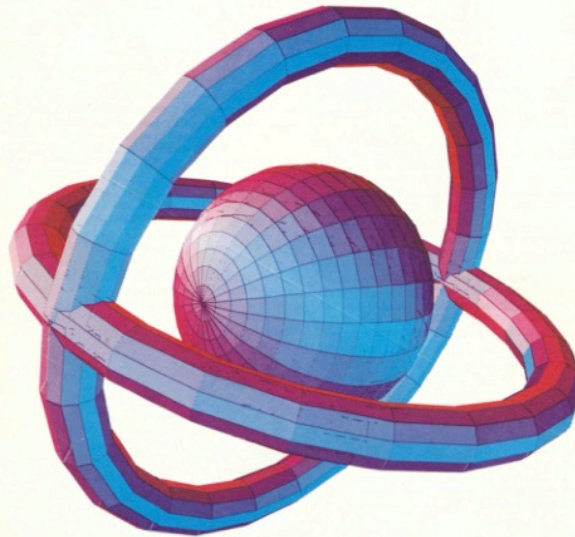
SPACE-AGE GRAPHIC

This picture was made from three positives, of an object, produced on the COMp 80, the object being defined and illuminated mathematically using Cyber software. The three positives were obtained by illuminating the object from different directions. Each positive was then given a colour value (yellow, blue, red), screened, and printed.

Theme 5: The growth of the service

- Power of systems
- Network
- Storage
- Range of applications
- Range of users
- Distributed computing
- Users
- Documentation
- Newsletters
- Regional Computing Committees
- Staff

CSIRO CRS/DCR/Csironet Staff Numbers

Legend: CBR, Mel, Syd, Adl, Per, Bne, Griffith, Townsville, Rockhampton, Armidale, Hobart
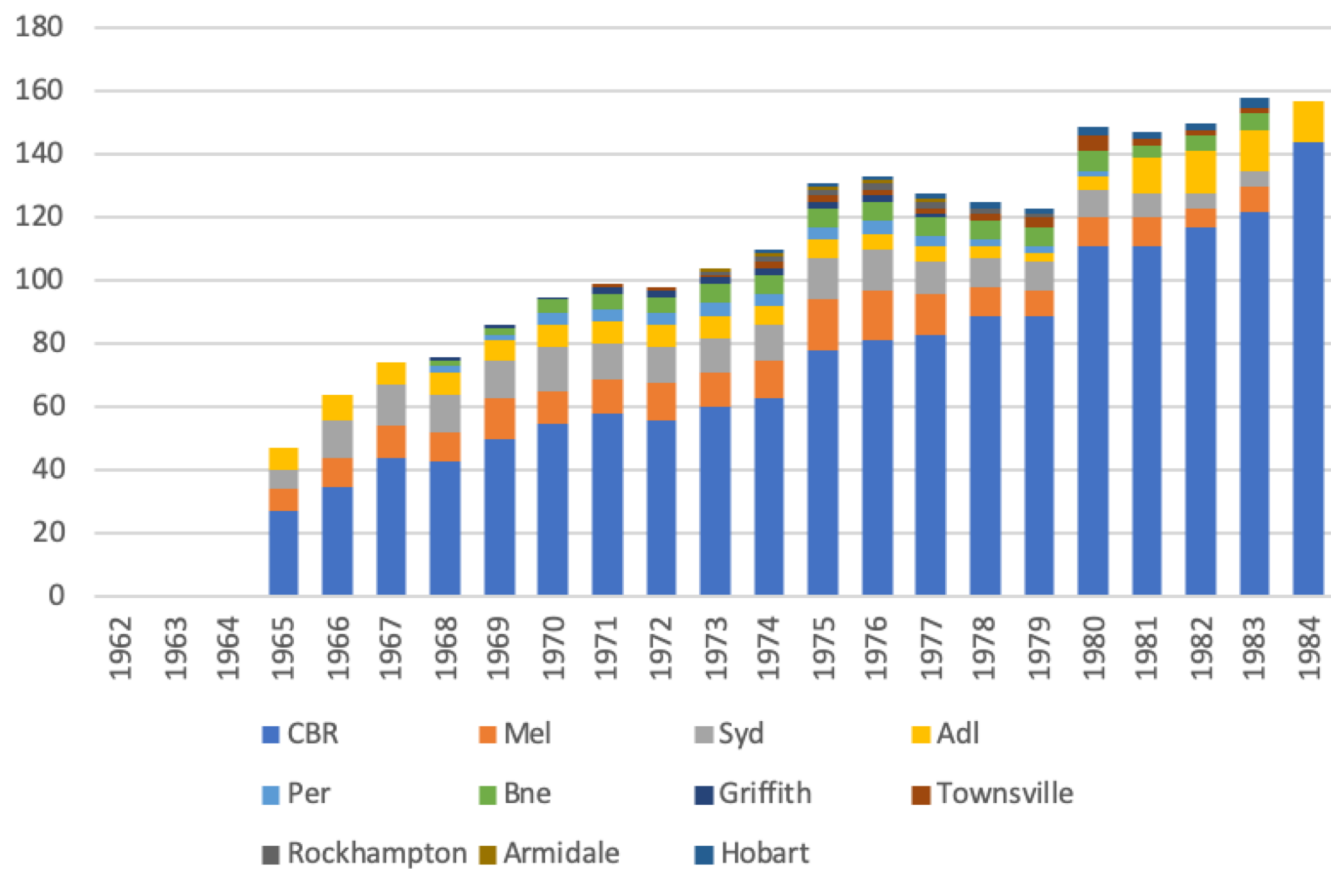
Theme 6: The policy framework

- Charging by usage!
  - Started with just computing time: then storage, then everything had a cost – printing, transmission, tape mounting
  - 100-page charges document!
- Flight to minicomputers, and later, PCs
  - Led to underutilisation
  - Led to higher charging rates to cover fixed costs
- Requirement to service the needs of Government Departments
  - commercial systems (FACOMs) in the 1980s
- CSIRO was unable/unwilling to break out of the fee for service model
- Csironet was privatised in late 1980s
- CSIRO then acquired its own systems – enterprise and scientific
- Set up new 'science' service from 1990 with a Cray Y-MP and Supercomputing Support Group

Theme 7: The lessons

- Innovation!
- Resource allocation vs charging vs share model is crucial
  - Drawbacks to free-for-all – waste, contention, queuing
  - Drawbacks of charging – inhibiting science, under-utilisation, fragmentation
  - Share model from 1990 – share of system proportional to contributions
- Always pressure on storage! Critical for users.
- Csironet perhaps missed the PC revolution
  - Most CSIRO Divisions had minicomputers
  - Flight from central computing services (now called the cloud)
- Privatisation led to death:
  - R&D and new services declined
  - Marketing increased
  - Common belief that if we have a big machine, industry will flock to use it (Csironet, ACCI, QSL, ANSTO, LET, SRF, xPACs)

8. Trends: CSIRO: 13 orders of magnitude increase in peak available computing speed
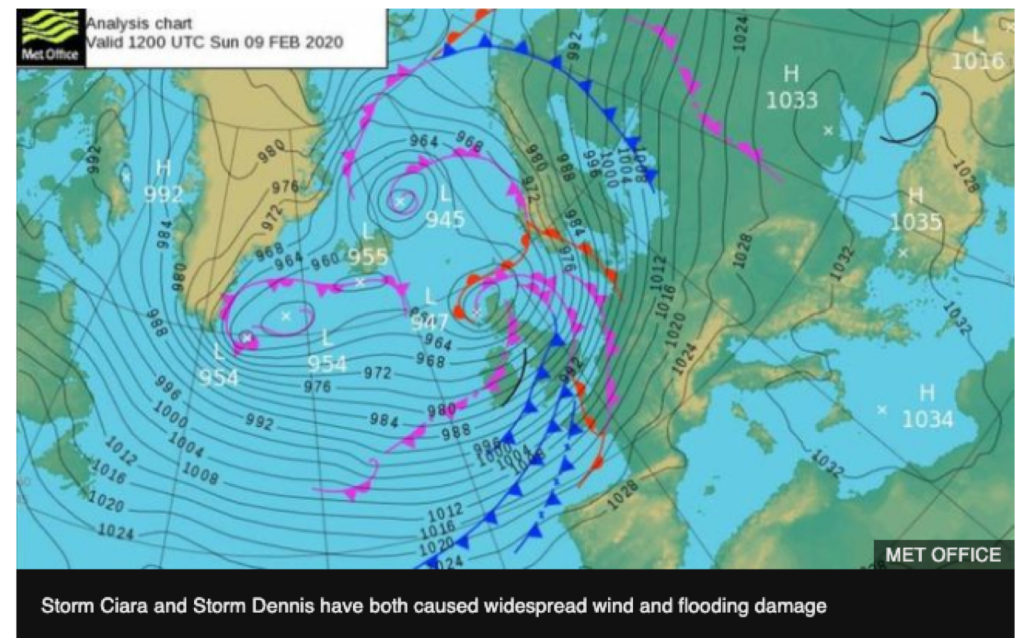
CSIRO Peak Available Computing Systems

— Peak Speed (Gflop/s)
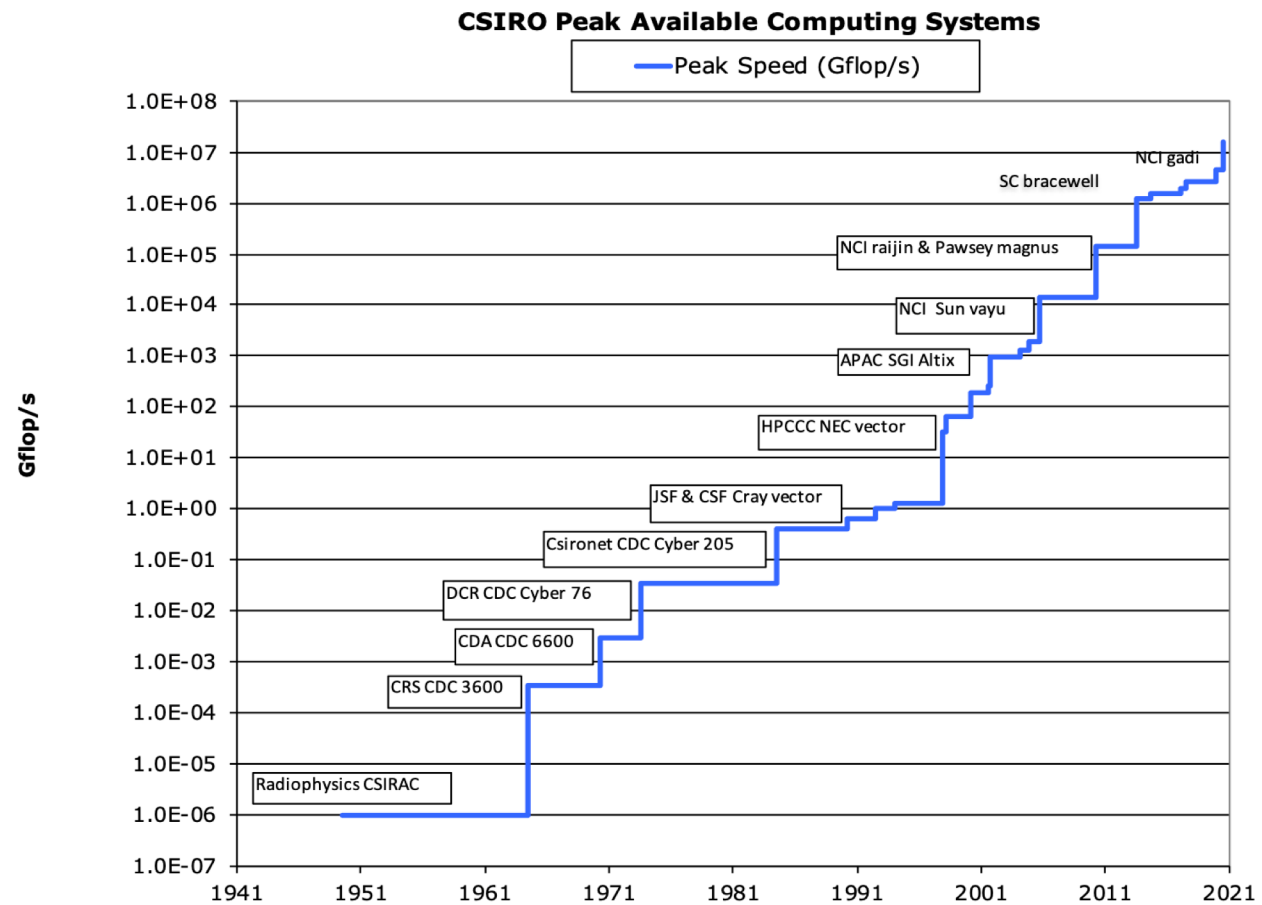
Big machines for big challenges

Met Office forecasters set for 'billion pound' supercomputer

By David Shukman
Science editor

17 February 2020

Share

Analysis chart
Valid 1200 UTC Sun 09 FEB 2020

MET OFFICE

Storm Ciara and Storm Dennis have both caused widespread wind and flooding damage

Thank you

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