CSIRO Scientific Computing Site Report

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DMF Users Group | June 2018

What is the Commonwealth Scientific and Industrial Research Organisation?

The *Science and Industry Research Act 1949* defines our purpose and the functions we undertake for the benefit of Australia:

- To carry out scientific research for any of the following purposes:
  - Assisting Australian industry;
  - Furthering the interests of the Australian community;
  - Contributing to the achievement of Australian national objectives or the performance of the national and international responsibilities of the Commonwealth; and
  - Any other purpose determined by the Minister;

- To encourage or facilitate the application or utilisation of the results of such research.

What is CSIRO doing?

With more than 1,800 patents, we are Australia's largest patent holder. This ever-increasing wealth of intellectual property is a vast source of commercial opportunity and has already resulted in more than 150 spin-off companies.

Even just considering six CSIRO contributions, the Australian economy reaps $5 billion a year in benefits from

- the Australian Animal Health Laboratory
- our work in cotton
- our longwall mining technology
- our Opticool energy control system
- our Novacq prawn feed
- our water resource assessment work.

What has CSIRO done?

How big is CSIRO?

We have more than 5,000 experts based in 55 centres and extensive local and international networks.

We collaborate with 3,000 customers each year, including

- Australian federal, state and local government bodies
- small, medium and large businesses
- the majority of Research Development Corporations, Cooperative Research Centres and Australian universities
- more than 150 international partners.

RV Investigator

Not to be confused with:

Computing at CSIRO

- 1949 - CSIR Mk1 - the fifth computer in the world, weighing 7 tonnes, using 30kW of power for its 2000 valves (vacuum tubes), initially with 768 20-bit words of mercury acoustic delay line RAM. Later renamed to CSIRAC.
  - https://csiropedia.csiro.au/the-computer-csirac-1965/
  - https://en.wikipedia.org/wiki/CSIRAC
- 1955 - CSIRO decides to pursue cloud seeding rather than computing, so CSIRAC transferred to University of Melbourne.
- Time passes…
- 1990 - Cray Research Y-MP2/216 (Cherax #1)
- 1991 – DMF 2.0 or 2.1 with manually mounted 3480 tape cartridges
- 1993 - StorageTek 4400 tape library

Cherax #1

- Cray Y-MP2/216 – “big” (1.2 GB), expensive, fast disk
  - Turned a compute problem into a storage problem!

HSM at CSIRO

- 1 combined HPC system & DMF server (UV3000) in Canberra with:
  - hybrid filesystems with quotas
  - Copan MAID
  - DCM
  - STK T10kC/D tapes, plus some T10kB still being phased out
  - FCoIP link to interstate tape drives
  - Same DMF-managed $HOME filesystem since 1991
  - Compute and DMF functions are to be separated from each other
- 3 dedicated DMF servers in Canberra (to become 2)
- 2 dedicated DMF servers in Melbourne (to become 1)
- 10 other HSM servers
  - 2 each in Canberra, Melbourne, Brisbane, Perth & Hobart (to become 1 each)

DMF stats (May 2018)

	units	ruby(*)	dmfact03	dmfact04	dmfact05	dmfvic02	dmfvic03
Purpose		data	rsync	data	data	data	rsync
Data managed	TB	11,625	4,835	1,438	1,729	248	2,432
Inodes	M	198	2,435	160	0.834	9.1	2,120
Mig files	M	60	406	154	0.291	8.1	268
Data mig	TB/mth	373	459	87	66	104	39
Files mig	k/mth	2,432	19,328	346	107	7.5	1,783
Files del/mod	k/mth	1,440	12,452	0	0.001	110	5,109
Data rcl	TB/mth	860	2.3	37	43	1.7	2.2
Files rcl	k/mth	524	11	15	0.426	0.059	19
Tape mnts	/mth	14,921	7,010	869	327	183	4,857

(*) Just the user accessible data filesystem shown, 4 rsync filesystems omitted

Thank you

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