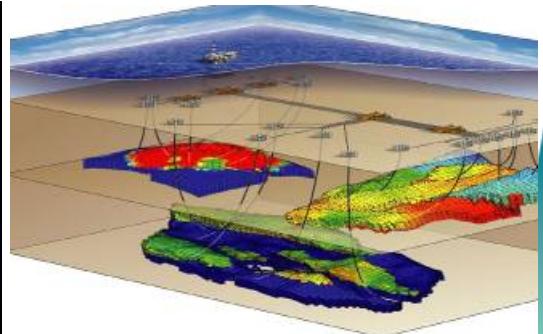
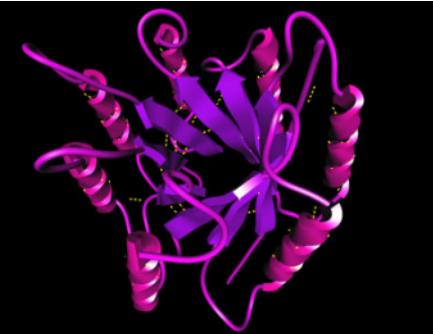


Pawsey Supercomputing Centre



Pawsey Supercomputing Centre

Purpose

To be a supercomputing centre of international standing with the infrastructure and people that enable solutions to big science problems, bring benefits to government, society and industry, and provide future prosperity for the State and Nation.

About Pawsey

Unincorporated joint venture, 40 staff, founded in 2000. Funded by partners, WA Government and the Australian Government.



Curtin University



Australian Peak Facilities and eResearch Centres



Pawsey History

2001-2009	State/partner funded
2009-onwards	Federal/state/partner funded

- ⇒ Larger supercomputers.
- ⇒ More competitive to get access to supercomputing resources.
- ⇒ Higher expectations on science outcomes and simulation sizes.

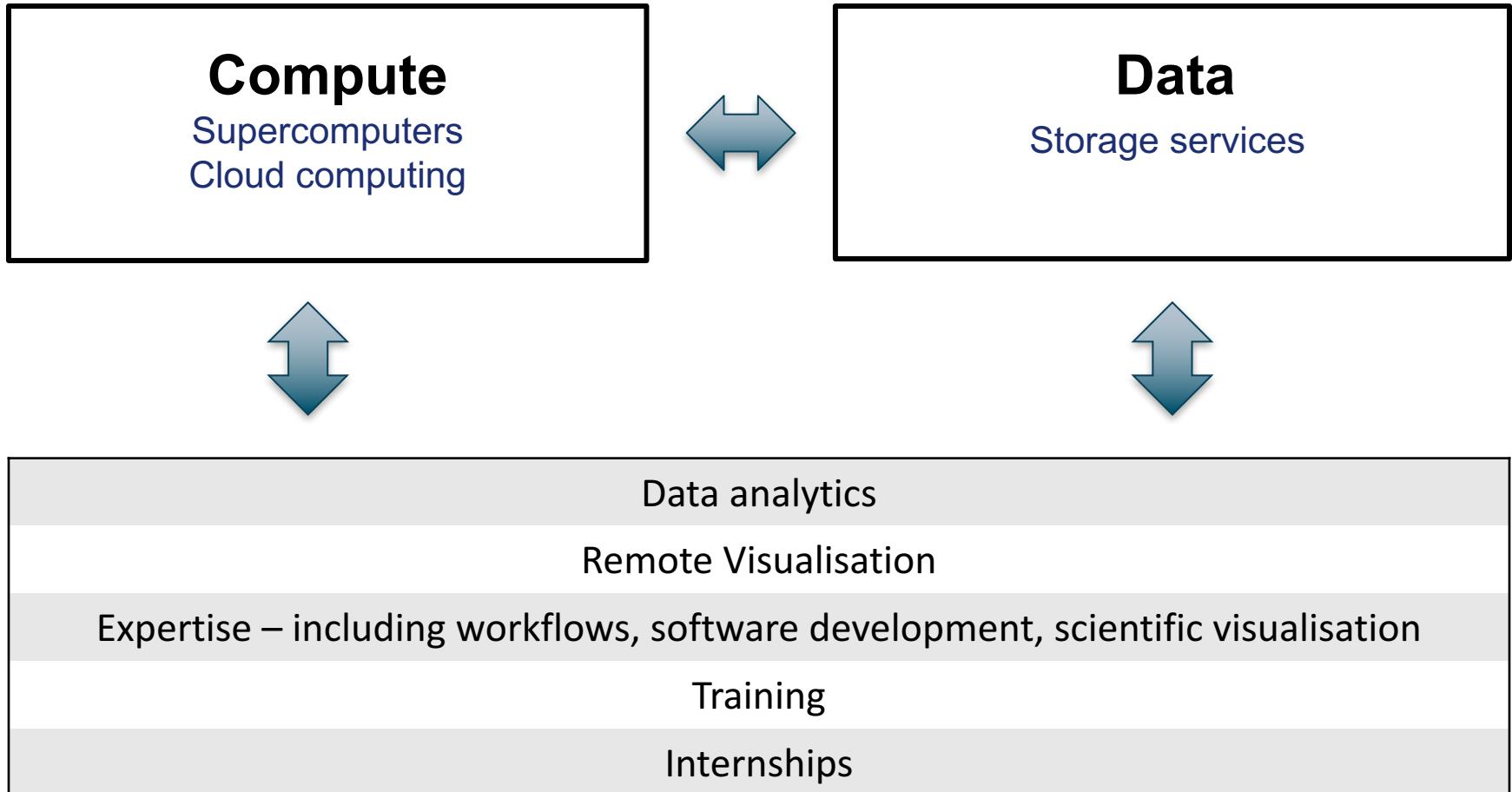
iVEC, Pawsey, and Super Science

In 2009 the Federal Government chose iVEC to establish and manage \$80M Pawsey Centre project

- \$80M included the data centre, supercomputers, data storage, visualisation, networking, pre/post processing cluster.
- Renamed iVEC to Pawsey Supercomputing Centre in 2014



Pawsey Services



Magnus Supercomputer



Cray XC40 containing 1488 nodes. 35,712 Intel Haswell cores giving 1.1 PFLOPs peak performance.

- Cray Aries interconnect. Run 10,000's of cores efficiently
- Linux
- 3PB high speed temporary storage

Galaxy Supercomputer



Cray XC30 (325 Tflops peak)

- 472 nodes of Intel E5-2690v2 ‘Ivy Bridge’, and
- 64 NVIDIA K20X GPU nodes (w/ Sandy Bridge host)
- Sonnexion 1600 telescope buffer – Lustre 1.3PB (30GB/sec)

Real-time system for ASKAP and processing for MWA

Zeus Cluster

- Remote visualisation
- Pre/post processing for Magnus
- Large shared memory

More suitable for some bio-informatics codes, mesh generation than a supercomputer



Zeus – cluster of 40 nodes. Each has 128, 256 or 512GB memory, and either a Nvidia Quadro K5000 or K20 GPU.

Zythos – 1 large memory node in Zeus cluster. 6TB memory, 4x K20 GPUs.

Remote Visualisation

Visualise from the Zeus cluster.

- No need to move data outside Pawsey Centre!
- Large-memory ($\geq 128\text{GB}$ per node)
- Nvidia Quadro graphics
- Linux-only applications
- High speed network (10Gbps)



Nimbus

- Free National cloud service
- Ideal for workflows that might not be suitable for Magnus (high-throughput, smaller core count jobs, long wall times, etc.)
- Toolkits for data analytic workflows
- VMs available in a range of sizes
- OpenStack based system



Petascale Storage Facility



Pawsey has multiple storage options available to researchers

- Online storage of big data
- 20PB storage
- Hard disk cache (hierarchical storage)
- Tape is highly energy efficient!

Pawsey Storage Services

Available Storage:

- Pure disk (low latency) storage
- Mixed disk and tape (medium latency) storage
- Pure disk has a fixed capacity and more stringent quota requirements

At Pawsey:

- Data management tools to host and share high quality data collections
- Dedicated staff to support researchers using data services

Supercomputing Expertise

- Parallel programming
- Supercomputing workflows
- Computational science
- GPU accelerators
- Cloud computing
- Scientific visualisation
- Data-intensive computing

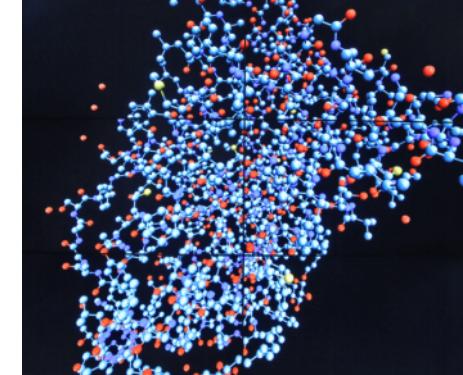
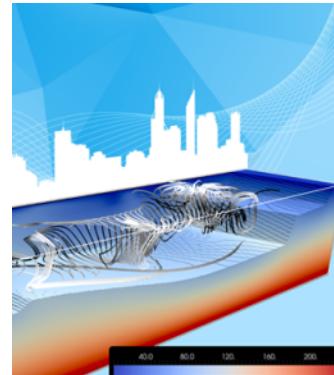
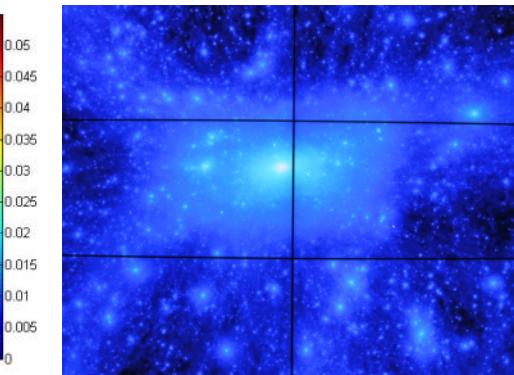
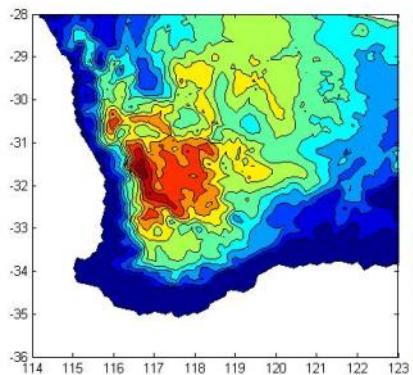
Data Expertise

- Volume data transfers (including staging) & movement
- Data Analytics (including Hadoop)
- Data Image compression
- Data Asset Management (via LiveARC) including access
- Data Management
- Data Provenance
- Data Ethics & Copyright
- Use Research Cloud for Data Intensive Applications

Visualisation Expertise

- Volume visualisation and segmentation
- High resolution image capture and interactive display
- Image and volume processing
- 3D reconstruction from photographs (Photogrammetry)
- Novel data presentation including 3D printing, 3D glasses free display
- Computational geometry

Working with Pawsey

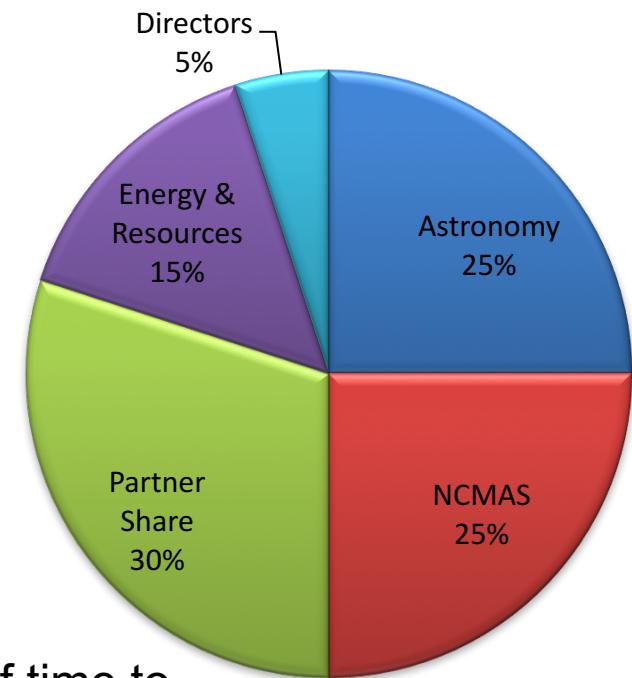


Access to Pawsey Supercomputers

Annual calls (open in Oct/Nov) for:

- NCMAS (25%)
- Energy & Resources Scheme (15%)
- Pawsey Partner Scheme (30%)

These are by competitive merit, and free



Responsive-mode for:

- Director's Share (5%) – smaller allocations of time to support development and initial experiments. Industry can buy time in this share.

Astronomy share (25%) for telescope operations

Access to Pawsey Storage

Pawsey Data Portal <https://data.pawsey.org.au>)

- Web interface (navigate, search, edit, drag n' drop upload, download)
- Script upload (ashell.py)
- Online application process (data >5TB*)
[*some exceptions]
<https://data.pawsey.org.au/apply/>
- Designed for collaboration, not for 'primary' copy of data

Be part of the intern program

Workplace-based learning opportunity, in scientific computing space

- 10-week research project over summer for undergraduates
- \$6,000 tax free

Annual call:

- Projects in June/July
- Students in August/September

You can:

- Propose a project to explore new areas
- Encourage your students to apply

Join the community

News, events and activities:

- Subscribe to Pawsey Friends mailing list (via our website)
- Come to seminars
- Attend training
- Suggest training

Find new collaborators:

- Meet other researchers in WA and beyond
- We can introduce you to industry and other researchers
- We can co-host visitors

Documentation

<https://support.pawsey.org.au/>

- Documentation
- Pawsey-supported Software list
- Maintenance / outages

For application-specific issues not related to HPC, try Google, mailing lists.

Citing Pawsey

- Publications
- Acknowledge Pawsey. E.g. “The work was supported by Pawsey through the use of advanced computing resources”.
- Grant Applications
- When applying for grants, add in-kind contributions from Pawsey. Contact us for what amounts to use.

Thank you - questions welcome

help@pawsey.org.au

For more information see

<http://www.pawsey.org.au/>