ARCHER2 Services

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THE UNIVERSITY of EDINBURGH

Hewlett Packard Enterprise

Outline

- ARCHER2 Overview
 - Hardware/Software
 - Usage
- CSE Services run by EPCC
 - Training
 - Helpdesk
 - Service improvement



ARCHER2 Overview





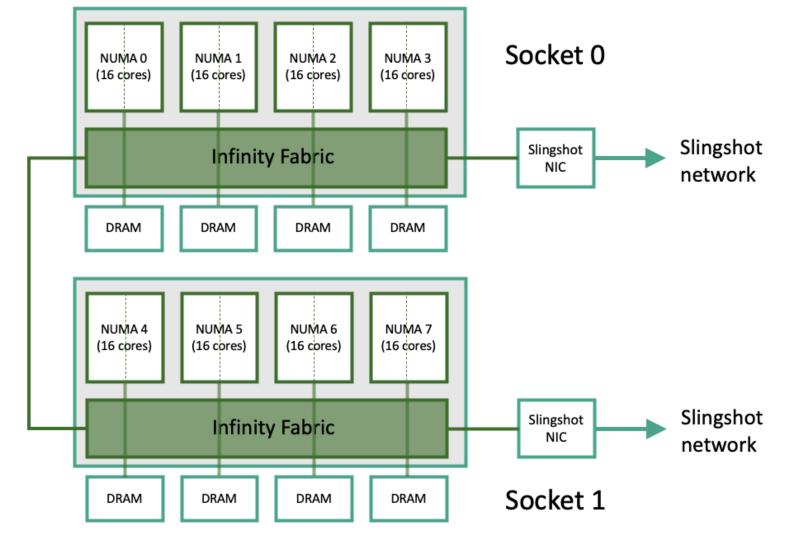
ARCHER2 - HPE Cray EX Supercomputer

- 5,860 compute nodes (750,080 cores)
 - Dual socket AMD EPYC 7742, 64c, 2.0 GHz
 - CPU frequency adjustable within Slurm [1.5, 2.0, 2.25]
 - 256 GiB / 512 GiB memory per node
 - Two 100 Gbps Slingshot interfaces per node
- HPE Cray Slingshot interconnect
 - Dragonfly topology
- 4x ClusterStor L300 Lustre file systems, each 3.6 PB
 - Also 1 PB ClusterStor E1000F solid state storage



ARCHER2 compute node

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Each 16-core NUMA region is made up of two 8-core complexes.

Each 8-core complex contains:

- 8 compute cores with 256-bit AVX2 and FMA;
- Each compute core with 32 kB L1 cache and 512 kB L2 cache;
- Shared 16 MB L3 cache for every 4 cores.

https://docs.archer2.ac.uk/user-guide/hardware/

Jobs & Software

- Slurm Job Scheduling System
 - sbatch launch jobs
 - sacct obtain info on completed jobs
- HPE Programming Environment:
 - Compilers
 - CCE (Cray), GCC, AOCC;
 - Parallel libraries
 - HPE Cray MPICH (OFI/UCX)
 - OpenSHMEM, Global Arrays, PGAS
 - Numerical and IO libraries
 - LibSci (BLAS/LAPACK/ScaLAPACK)
 - FFTW, HDF5, NetCDF;
 - Debugging and profiling tools
 - CrayPAT, Arm Forge, gdb4hpc
- Software provided by Lmod module system
- Support for SingularityCE containers



Current QoS



QoS	Size limits per user	Size limits per job	Time limits	Job limits (running/queue)	Notes
standard	1024 nodes	1024 nodes	24 hours	16 / 64	
highmem	256 nodes	256 nodes	24 hours	16 / 16	
taskfarm	512 nodes	16 nodes	24 hours	32 / 128	
short	32 nodes	32 nodes	20 mins	4 / 16	
long	512 nodes	64 nodes	48 hours	16 / 16	
largescale	5860 nodes	5860 nodes	12 hours	1/8	
lowpriority	1024 nodes	1024 nodes	24 hours	16 / 16	Uncharged
serial	32 cores and/or 128 GB memory	32 cores and/or 128 GB memory	24 hours	4 / 12	Uncharged

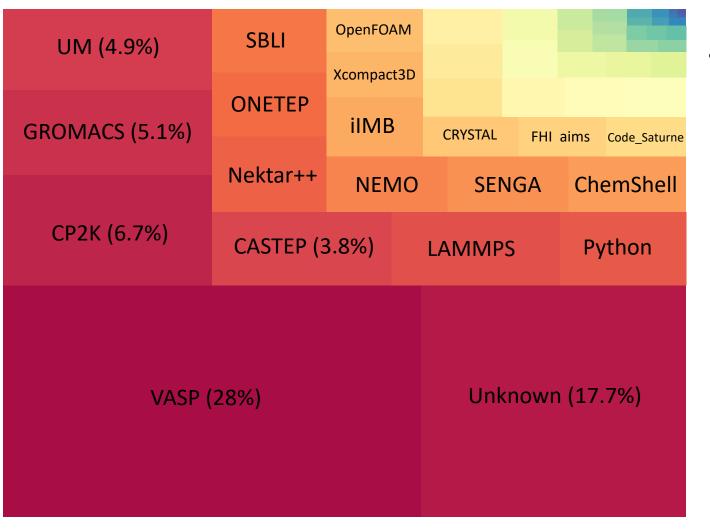
https://docs.archer2.ac.uk/user-guide/scheduler/#quality-of-service-qos

ARCHER2 Usage





ARCHER2 Usage % by Code



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• Unlabelled boxes account for 8%

Dec 2021 to Jan 2023 (49.3 million node hours)

Analysis by Michael Bareford

ARCHER2 Usage % by Research Area

Combustion Biomolecular Plasma Phys. (5.6%) Chemistry Atomic Phys. Unknown (20.4%) Climate/Ocean CFD (10.8%) (7.7%) Materials Science (48.1%)

Dec 2021 to Jan 2023 (49.3 million node hours)

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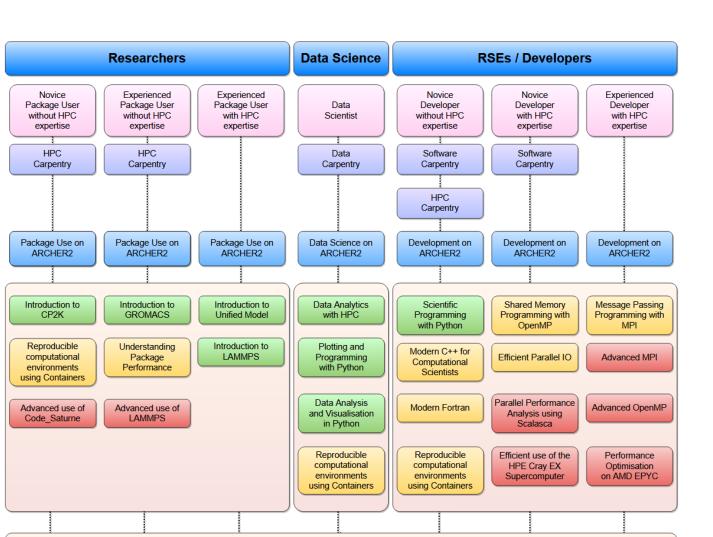
- Unlabelled boxes account for 0.5%
 - Optical Phys.
 - Monte Carlo
 - Engineering
 - Med. Phys.
 - Mesoscale
 - Seismology



Training

- Online webinars or in person
- Different levels from introductory to advanced
- Free for academics
- Access to past recordings and materials

<u>https://www.archer2.ac.uk/training/</u>



Virtual Tutorials



Training



- ARCHER2 for Package Users
 - 7 December 2023 09:30 15:30 GMT
 - <u>https://www.archer2.ac.uk/training/courses/231207-package-users/</u>

- ARCHER2 for Software Developers
 - Online already accessible
 - <u>https://www.archer2.ac.uk/training/courses/221202-software-developers/</u>

Helpdesk service



- Team of 4-5 HPC specialists
- 15 days to help you understand/solve your problems on ARCHER2
 - Compilation issues
 - Performance discrepancies
 - Investigating software/parallelisation bugs

- Documentation: <u>https://docs.archer2.ac.uk</u>
- Email: support@archer2.ac.uk

Service Improvement



- Team working on improving the user experience:
 - Writing documentation
 - Testing and documenting new tools
 - Benchmarking the system (IO performance, networking etc.)
 - Testing new versions of software before being rolled out to everyone
 - Testing bug fixes
 - ...

Dr Alfonso Bueno Orovio

Questions?



