

HECToR-ARCHER Transition

Grenville Lister, Rosalyn Hatcher, Jeff Cole, Simon Wilson, Willie McGinty, Annette Osprey, Karthee Sivalingam
NCAS-CMS, Dept. Meteorology, University of Reading



ARCHER

- Cray XC30 - 3 008 nodes
- 72 192 processors (Intel Ivy Bridge)
- standard nodes (64GB)
- high-memory nodes (128GB)
- fast parallel file system
- 2 post-processors (2x40 processors), 1TB each
- 230 accounts
- 2 BAU NERC allocation
- 60 NERC projects

RDF – GPFS file system

- 13PB (total)
- data mover nodes
- light path to JASMIN

National Centre for Atmospheric Science

logged in as grenville | Logout | Help/Guide | About Trac | Preferences

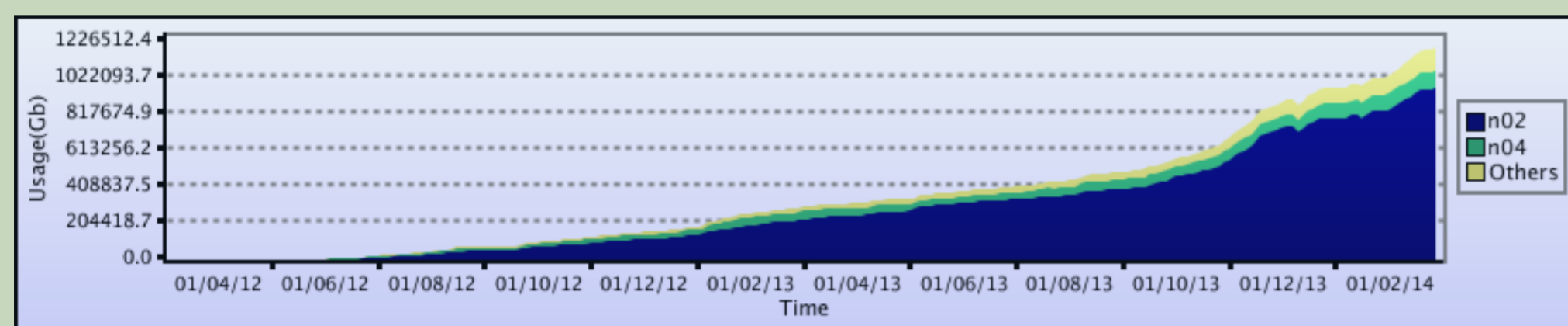
Wiki | Blog | Timeline | View Tickets | New Ticket | Search | Metrics | Admin | FAQs

Up | Start Page | Index | Home

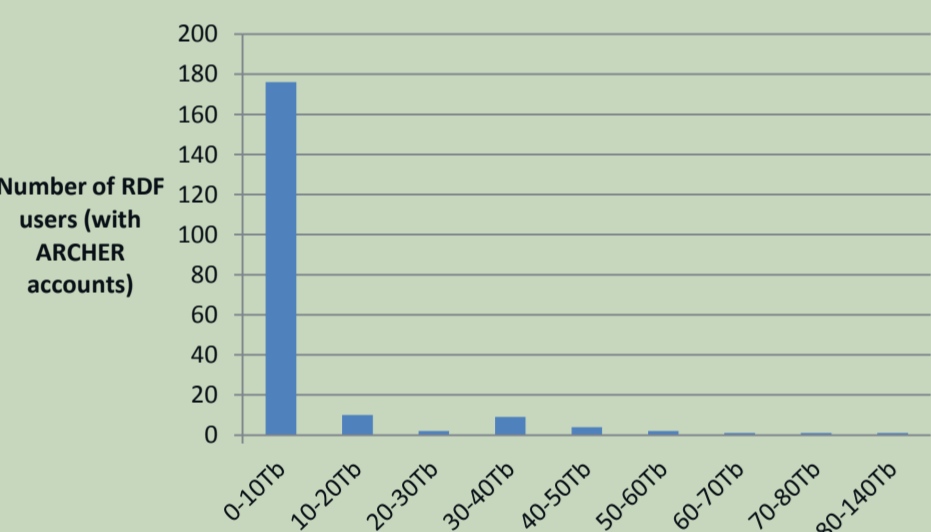
HECToR-ARCHER Comparison

UM Version	ARCHER compiler	Description	EWxNS	Run Length	Dump Frequency	HECToR Job Id	HECToR Walltime	ARCHER Job Id	ARCHER Walltime	Bit Cmp CRUN	Bit Cmp Proc decomp	HECToR AU cost	ARCHER AU Cost
6.1	cce	HIGEM1a	8x15	10 days	10 days	xjzn	01:13:46	xjzo	00:30:22	yes	yes	584	900
6.1	intel	HIGEM1a	8x15	10 days	10 days	xjzn	01:13:46	xjzp	00:29:33	yes	yes		
6.6.3	cce	HadGEM2-AMIP	12x8	10 days	1 day	xjcd	00:18:27	xjcc	00:07:21	yes	yes		
6.6.3	intel	HadGEM2-AMIP	12x8	10 days	1 day	xjcg	00:18:27	xjce	00:07:52	yes	yes		
6.6.3	cce	HadGEM2-CC60	12x8	30 days	10 day	xjcg	01:43:00	xjcf	00:44:31				
6.6.3	cce	HadGEM2-AO	12x8	30 days	10 day	xjcy	00:53:57	xjch	00:23:58			345	576
6.6.3	cce	HadGEM2-AO	6x8	30 days	10 day			xjch	00:41:14				492
6.6.3	cce	HadGEM2-AO	6x4	30 days	10 day			xjch	01:16:00				450
6.6.3	cce	HadGEM2-ES	12x8	3 days	1 day	xjct	00:12:58	xjcu	00:05:32			83	132
7.3	cce	HadGEM3-A (2.0)	4x6	10 days	10 days	xehf	01:50:42	xjey	00:54:40				
7.3	cce	UKCA Tropisop N48L60	8x9	10 days	10 days	xjfy (c.f. xmf)	00:21:52	xjfy (c.f. xmf)	00:09:11				
8.2	cce	GA4.0 N66 AMIP OpenMP/2 (This)	8x12	10 days	10 days	xgwtg	00:23:48	xjey	00:11:56				528
8.2	cce	GOS.0 ORCAO25 (NEMO v3.4)	8x12	5 days	5 days	xjyla	01:16:56	xjyc	00:23:03			480	552
8.2	cce	PS30 Global	6x16(x4)	1 days	6 hrs	xiekb	03:26:20	xjkb	01:29:09			5376	2160
8.4	cce	N66 UKCA OpenMP	24x16	10 days	10 day	xjnjc			00:15:52	No	No		
8.4	cce	HG3A GA4.0 OpenMP (2 This)	8x12	10 days	10 days	xgwtq	00:21:10	xjeyf	00:10:03				480

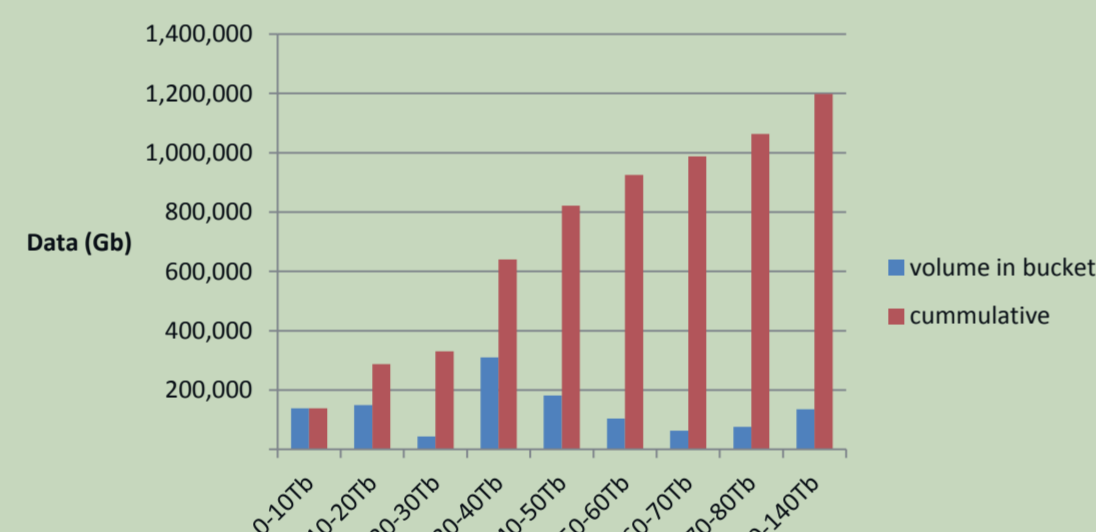
NCAS-CMS have ported UM versions 4.5, 6.1, 6.6.3, 7.3, 7.5, 8.2, 8.4, 8.5 and 8.6 to ARCHER. The table above is a section of our results for this process. Note the speed up (in general a factor of 2) for ARCHER jobs running with the same processor decomposition as their HECToR equivalent.



RDF usage increasing over time – the HECToR tape archive began migration Autumn 2013 resulting in the steep increase in volume at that time.



Distribution of RDF data across (n02) ARCHER users

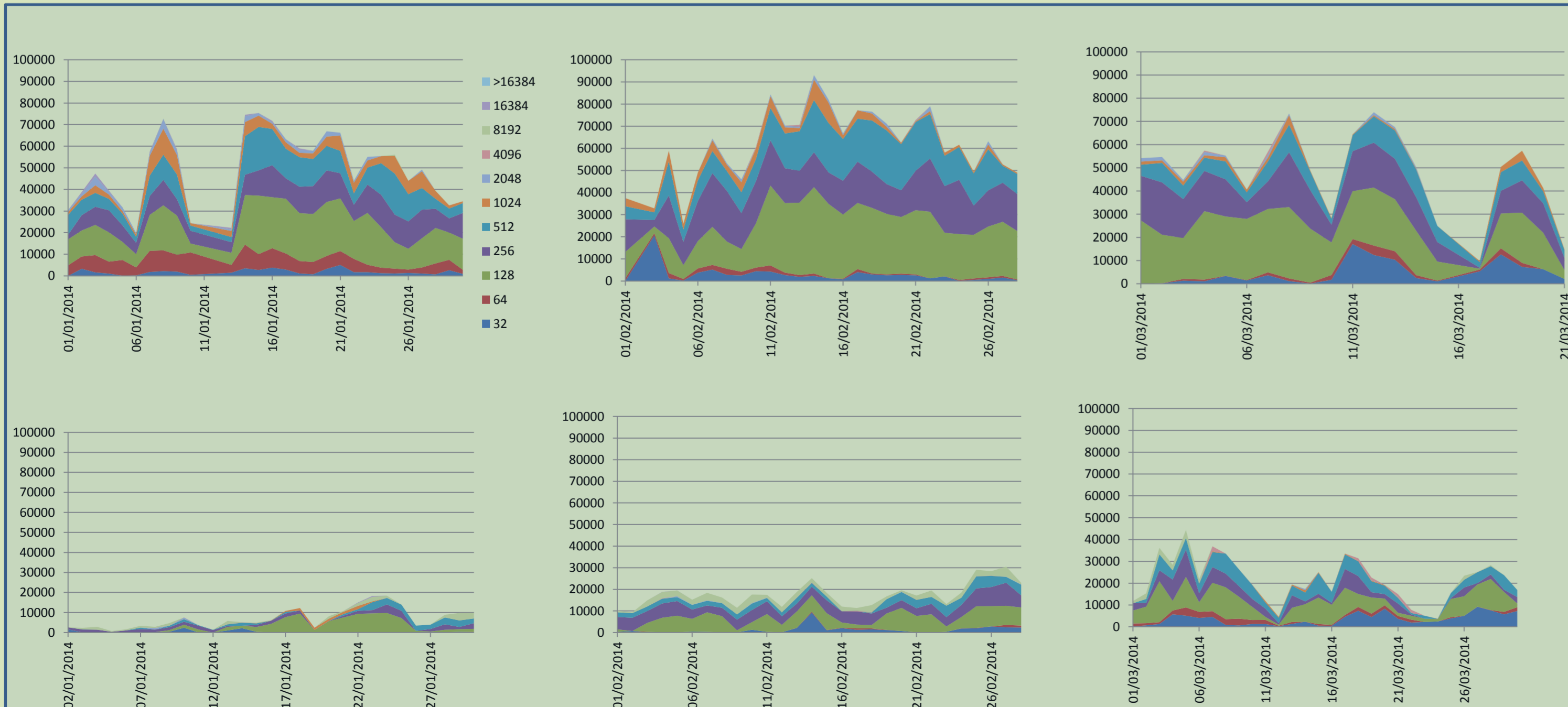
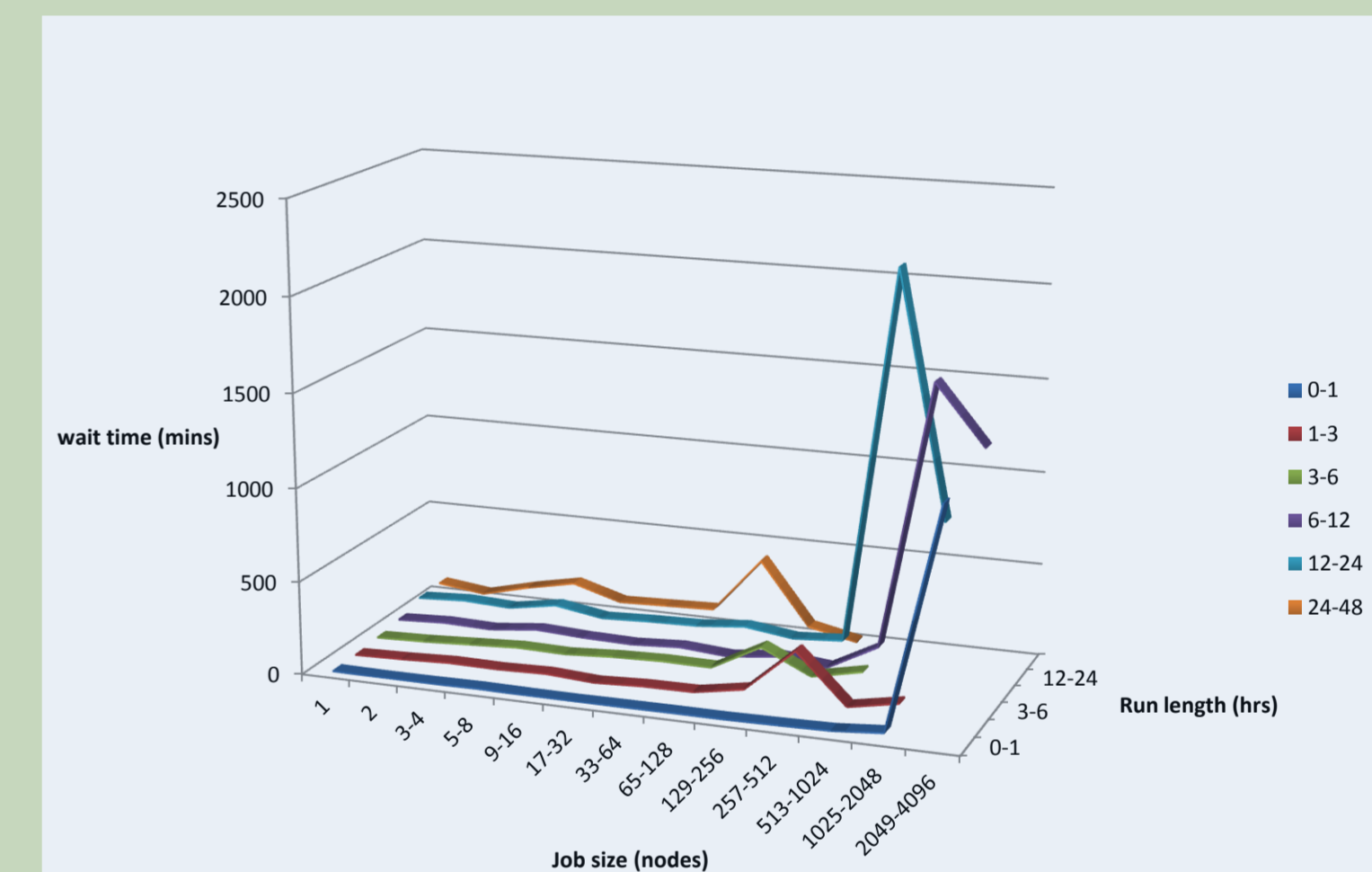


The Research Data Facility (RDF) accessible by both HECToR and ARCHER during the transition period provided an efficient and convenient means of data transfer between the two machines to ensure minimum disruption and fast setup on the new system.

The HECToR tape archive now resides on the RDF.

NCAS users (n02 in the figure to the left) are by far the major users of the RDF

The figure to the right shows wait times for jobs submitted to the ARCHER parallel queues as a function of job size in nodes (1 node = 24 processors) and run length. As might be expected, jobs requesting a significant fraction of the machine wait longest before being granted that resource. Wait times for typical NCAS-type runs are modest.



Graphs to the left represent HECToR usage for its final three months; those below are for ARCHER for Jan – June. The total wallclock time for a given processor count is plotted for the day in which the used time began. The same colour scale applies to all plots (see leftmost upper). Note that 1 wallclock-hr of ARCHER for a given number of processors represents approximately 2 wallclock-hrs of HECToR for the same number, resulting from the overall improvement in CPU speed, memory bandwidth, and interconnect. NERC users are slowly exploiting ARCHER's capability-computing potential.