Engineering and Physical Sciences Research Council





The UK e-Infrastructure Landscape

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Computational science `third leg` of scientific enquiry, alongside experiment and theory;

- Expert users need access to competitive infrastructure to tackle increasingly complex problems: complex simulations and calculations, multi-scale modelling;
- Large experiments (e.g. CERN, telescopes, genomics) need to analyse all the data
- Social, medical, health data analytics plus secure access

New fields now using computational techniques for the first time – large numbers of `non-experts`;

TRADITIONAL VIEW





Tier 2 Centres

Centre	Туре	
Edinburgh	Standard cluster	
Midlands Plus	Standard cluster	
Materials Hub	Standard cluster	
Bristol	ARM	
Cambridge	Knights Landing Data analysis	
Jade	GPU	





Co-location: Sharing of Data Centres, Sharing & Aggregation of Systems

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Integrated AAAI

Pilot projects for proof of concept: can we develop a common AAAI system so that users can have a single sign-on? Interoperability

and integration of existing tools





Collaboration, Coordination & Interoperability - Benefits



- Better and more science: increased productivity, interdisciplinary research and collaborative working
- II Single Sign on: removes a major barrier to access for users
- Enables hardware to be shared across domains
- From a service provider perspective, encourages aggregation and pooling of resources, co-localisation of resources in centres – energy efficient, cost effectiveness
- Allows cloud and data services to work effectively, efficiency and appropriately
 - You know who I am, what I can do, how I'll be measured, and where I live
- Enabling international integration with similar services in other countries.

NOT JUST COMPUTERS





SOFTWARE

- Software is fundamental to research
- II It has a longer life than the computers it runs on
- II It contains the `intellectual property`

III It can be:

- Commercial code
- Community code that everyone in a field uses
- III Open source
- Something hacked together by an individual

Etc.

II Given its importance, it needs to be sustainable

Best practice!

Better software, better research

Software support from EPSRC



HPC Software Development (2010/11)
£5.3M funded over 15 proposals
Software for the Future I (2012/13)
£7.5M funded over 11 proposals
Software for the Future II (2014)

£6M funded over 7 proposals

Flagship call (2016)

III Just closed - £3M

III Collaborative Computational Projects (CCPs) and Consortia

Software support through Scientific Computing Department at STFC

Investing in research for discovery and innovation

CCPForge

III eCSE for users of ARCHER

II Software Sustainability Institute

Not just software – people! RSE Fellows



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Computational approaches now ubiquitous
 Diverse users mean diverse requirements

Keeping up with technology, future-proofingAt national level, integration:

Making it easier for users

Getting more and better science

Cost-effectiveness

Needs investment in software:

Operating system tools

III User applications

Needs investment in people:

Experts to help