BEAR User Forum

24 June 2013

What is BEAR?

We currently provide:

- BlueBEAR HPC service
- High-end visualisation
- Collaboration Tools
- Hosting and maintaining servers for research groups
- Training
- Relationship with other resource providers

And will shortly add

- Windows HPC service

And in the longer term will add

- Render farm

What is BlueBEAR?

- 50 standard nodes, 16 cores, 32 GB RAM

- 2 SMP nodes, 16 cores, 256 GB RAM

- 3 GPU-accelerated nodes with Quadro5000 GPGPU

- 150 TB filestore

- Standard 2-day walltime jobs and the possibility of 10 day walltime

SMP nodes, GPGPU nodes and long queue are considered as scarce resources and access requires prior discussion with IT Services

High-end visualisation
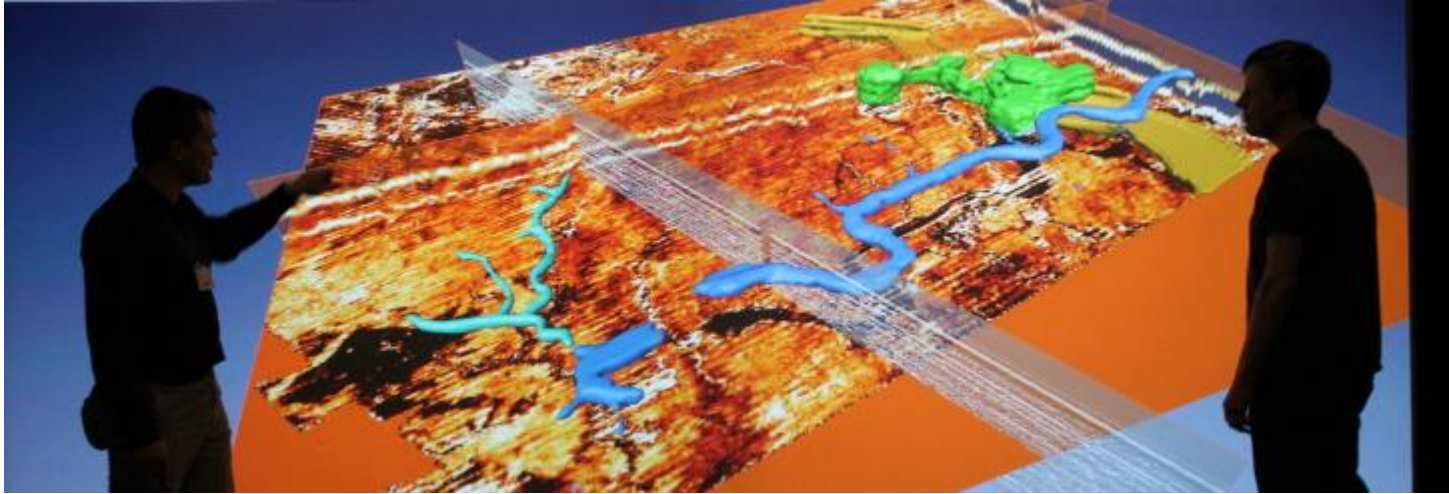
- IBM Visual and Spatial Technology Centre
- Partnership with IBM, Mechdyne, NVIDIA and OCF
- 4m by 2m Powerwall
- Back projected
- Active Stereo and head tracking
- Being integrated into BEAR services

Currently access is by prior discussion with IT Services

Collaboration

Collaboration is important to many research groups.

Based in the Visualisation Centre we offer:

- Low-latency video and audio feeds between multiple sites, typically international
- Natural conferencing environment with multiple microphones, multiple speakers, multiple cameras, hardware echo cancellation – just sit round a table and talk
- Peer-to-peer shared visualisation; all parties interact and manipulate a common image without sharing raw data
- Purely IP based; just requires a standard internet connection and free client software

Currently access is by prior discussion with IT Services

Hosting servers for others

Per-core performance is levelling off or decreasing. Cluster management is expensive, in terms of skills and infrastructure. We offer to:

- Smooth the design and purchase of servers through IT Services' framework agreement with OCF
- Incorporate these servers into the existing cluster using the BlueBEAR infrastructure, including switches and filestore
- Put policies in place to manage access to these servers as required by the owner.

In return, IT Services ask that:

- Jobs belonging to other users can run on these servers when they are not in use, but such jobs will be killed when a job belonging to the owner is queued on these nodes. Users would opt-in to these extra resources

Research Councils, especially EPSRC, are usually more sympathetic to this model than funding hardware purely for a single project

Relationships with other resource providers
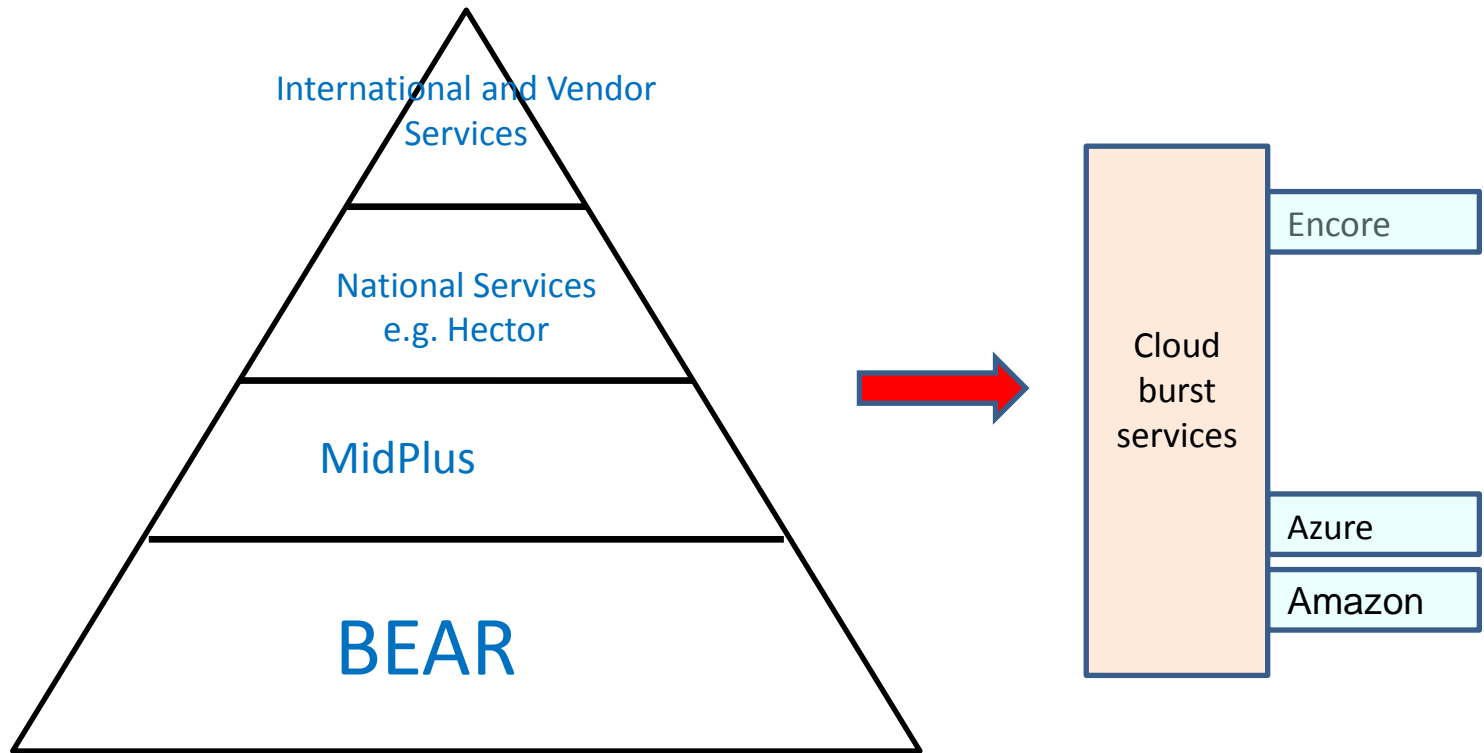
Windows HPC (soon)

Windows HPC-aware applications can submit work fairly transparently to a remote Windows HPC cluster without leaving the application's familiar desktop environment but:

- The Windows scheduler is not smart enough to handle multiple users with different requirements
- No control or reporting by group or project
- Little control of individual job resources

IT Services have a joint project with Adaptive Computing to run their scheduler on a Windows cluster to address these limitations.

This will compliment, not replace, the BlueBEAR HPC service. Access will be by prior discussion, including application licensing, with IT Services

Render Farm (later – end-2013?)

Off-line (batch) rendering of scene files into individual frames or animations is an unmet requirement of the BEAR services. We intend to:

- Install an off-line render farm running under the Qube render framework

- Make Blender, 3DSMax and Maya available

Current position

BlueBEAR cluster went into service fairly smoothly and has provided a reliable service. There are some current concerns:

- Demand outstrips supply leading to long queuing times
- Having a small number of fat nodes, unlike the previous service, leads to scheduling problems
- Relaxing one user per node may increase capacity but could have adverse side-effects, especially if a multi-threaded job is running on one of the cores
- Partitioning the cluster into different queues can, and often does, lead to under-utilisation
- Consider adding dedicated servers to the cluster and/or using alternative resources, as discussed earlier

Please contact IT Services when you are having problems, not afterwards, to enable us to look at the queues and the load on the machine at the time.