



Steve Crouch, IGE

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IGE/EMI INTEROPERABILITY DEMONSTRATOR

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Motivation

- Scientific requirements for compute always increasing
- Don't always have enough local institution compute capacity
- EU has plentiful compute resources
 - ...but heterogeneous middlewares!
 - ...multiple client usage and maintenance problem
- How to use them efficiently to access and use more compute?

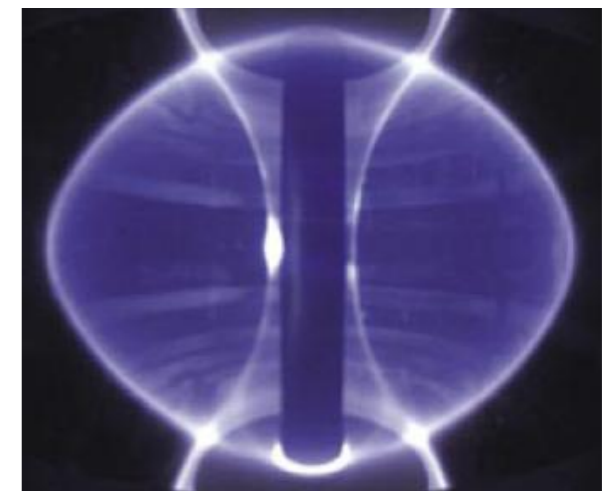


Introduction

- Open Grid Forum – www.ogf.org
 - Efforts to standardise compute
 - Grid Interoperability Now (GIN-CG)
- OGF HPC-Basic Profile Interoperability Demonstrator
 - Illustrates what is possible **now**
 - Between IGE/Globus and EMI (and others)
- Application
 - Physics: Plasma Charge Minimization
 - Total system energy minimization of point charges around surface of sphere



HPC Basic Profile v1.0
- OGSA BES v1.0
- JSDL v1.0
- HPC Profile
Application Extension v1.0
HPC File Staging Profile v1.0





- Initially shown at OGF27, Banff, Canada, Oct 09
- SuperComputing: Nov 09, Nov 2010, Nov 2012
- ETSI Plugtests, FZJ, UK AHM, Dec 09
- OGF28, OGF30, OGE34, OGF36, OGF37
- Demonstrators: David Wallom, Peter Stefan, Morris Riedel, Shahbaz Memon, Oxana Smirnov, Steve Crouch

```
Generating JSDLs...
- Generating JSDL for uncore_fg for job 1...
- Generating JSDL for genesis_fg for job 2...
- Generating JSDL for qcg_computing for job 3...
- Generating JSDL for arc_ng for job 4...
- Generating JSDL for gridsam_gridway for job 5...

Uploading input files to remote storage...
- To qcg_computing: minem_3_3.in (ftp),
- To arc_ng: minem_3_4.in (ftp),
- To genesis_fg: minem_3_2.in (ftp),
- To gridsam_gridway: minem_3_5.in (ftp),
- To uncore_fg: minem_3_1.in (ftp),

MINEM Process: Submitting JSDLs to middlewares...
- Submitting jSDL/minem-arc_ng-4.jsdl to arc_ng using gridsam ...
- Submitting jSDL/minem-genesis_fg-2.jsdl to genesis_fg using gridsam ...
- Submitting jSDL/minem-gridsam_gridway-5.jsdl to gridsam_gridway using gridsam ...
- Submitting jSDL/minem-qcg_computing-3.jsdl to qcg_computing using gridsam ...
- Submitting jSDL/minem-uncore_fg-1.jsdl to uncore_fg using gridsam ...

Checking jobs until completion...
```

In demo:

**ARC (EMI-2,
FutureGrid)**

UNICORE (EMI-2, FutureGrid)

GridSAM/GridWay (IGE-3.1, IGE Testbed)

**QCG Computing
Genesis II (FutureGrid)**

Previously demo'd:

**BES++ (RENKEI)
Microsoft Compute Cluster
VENUS-BES**



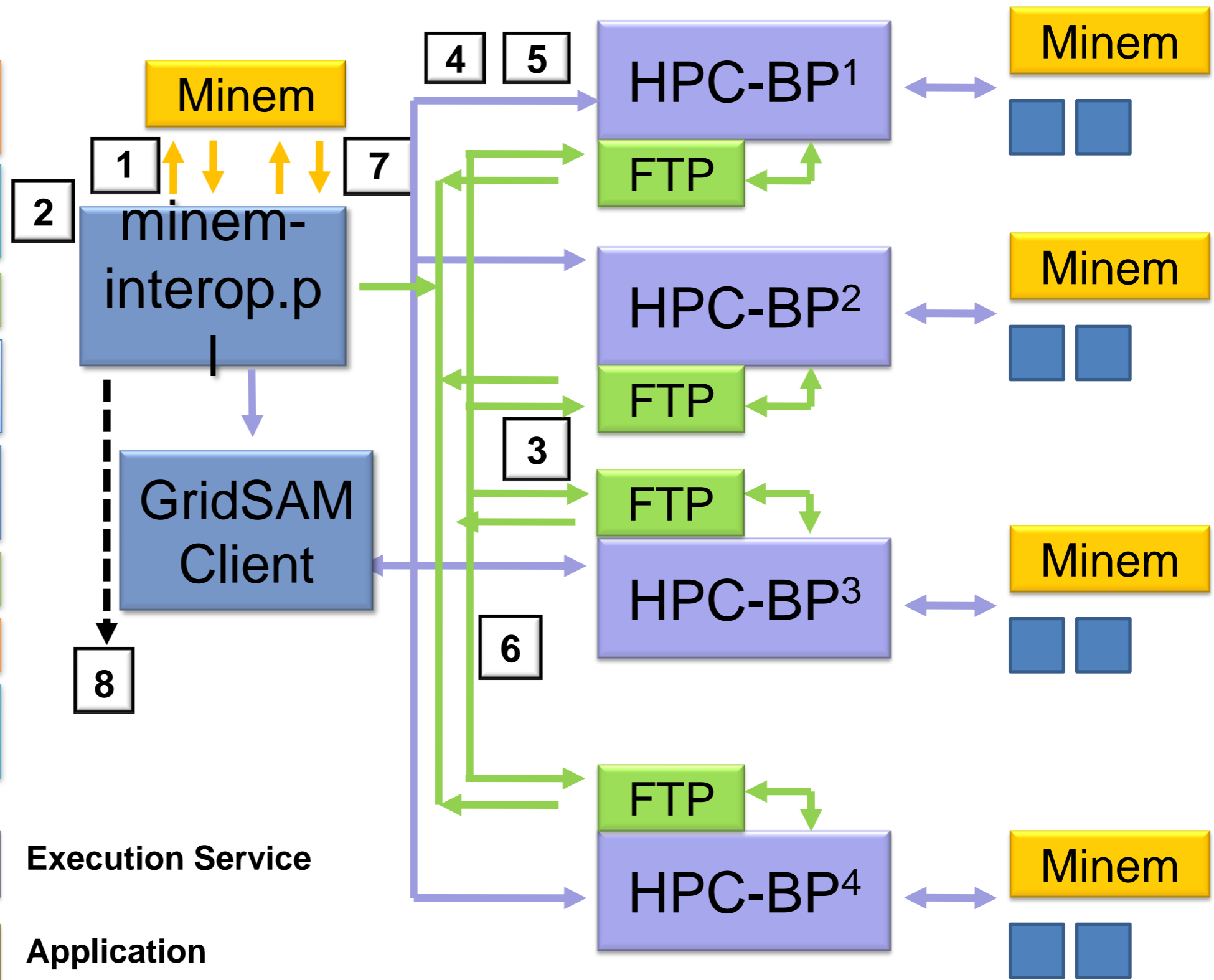
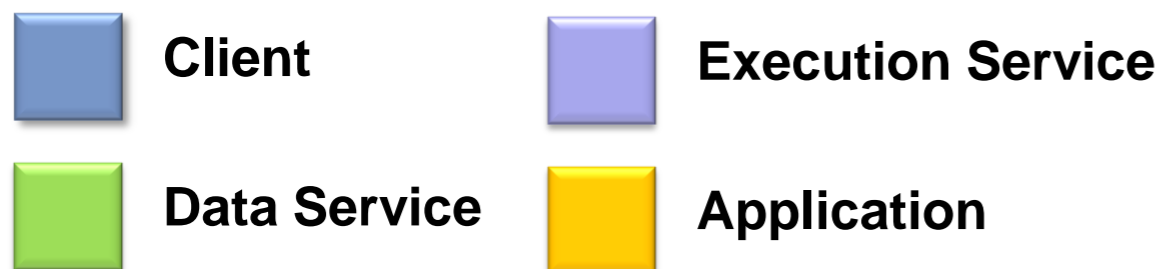
Client/Service Compatibility

Middleware	BES++ Client		GridSAM Client	
	Invocation	Application	Invocation	Application
ARC (EMI-2, FutureGrid)	✓	✓	✓	✓
BES++	-	-	✓	✓
Genesis II (FutureGrid)	✓ (w.sol.)	✓ (w.sol.)	✓	✓
GridSAM+GridWay (IGE v3.0)	✓	✓	-	-
Microsoft Compute.Clus.	✓		✓	
RENKEI			✓ (w.sol.)	✓ (w.sol.)
QCG Computing	✓	✓	✓	✓
UNICORE (EMI-2, FutureGrid)	✓	✓	✓	✓
VENUS-BES			✓ (w.sol.)	✓ (w.sol.)



How the Interoperability Demo Fits Together...

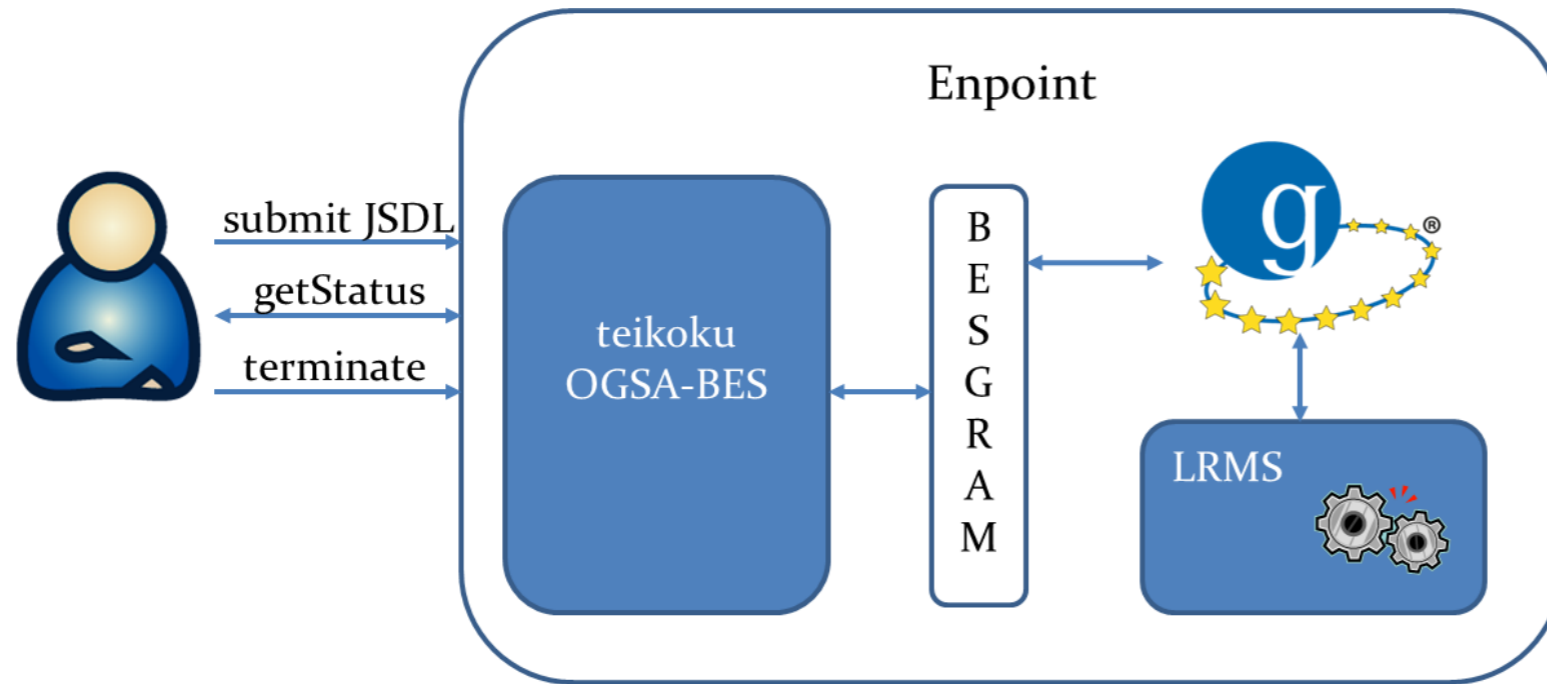
1. Create Minem input files
2. Generate JSDLs from template
3. Upload input files
4. Submit JSDLs across middlewares
5. Monitor jobs until completion
6. Download output files
7. Select best result
8. Generate output image from results



...



Time for the Demo!



```
matthias@ubuntu:/opt/saga-adaptors-bes/external/libhpcbp/test$ ./test_bes besgra
m.epr /bin/true
<JobDefinition xmlns="http://schemas.ggf.org/jsdl/2005/11/jsdl">
  <JobDescription>
    <Application>
      <HPCProfileApplication xmlns="http://schemas.ggf.org/jsdl/2006/07/jsdl-
hpcpa">
        <Executable>/bin/true</Executable>
      </HPCProfileApplication>
    </Application>
  </JobDescription>
</JobDefinition>
Successfully submitted activity: <ActivityIdentifier xmlns="http://schemas.ggf.o
rg/bes/2006/08/bes-factory"><Address xmlns="http://www.w3.org/2005/08/addressing
">https://127.0.0.1:8443/ogsabes-gram-0.5/activities/22ecadd0-3a90-412e-aea-ca9
5031efbdb</Address></ActivityIdentifier>
```




- Bring in other endpoint types and production grids
 - Volunteer your HPC Basic Profile-compliant service!
 - Extra points if service on a production grid!
 - XSEDE!
- Go beyond FTP for data transfer
 - Only data protocol supported by all middlewares
 - This is changing (GridFTP e.g. UNICORE, GridSAM, ARC, Genesis II)
- Another application?
 - Currently use Minem, but suggestions welcome!
 - -> *Looking into Haddock (molecular dynamics)*