OGSA HPC Profile Working Group
Global Grid Forum, Computing Area
Charter

Administrative Information
Name and Acronym:
> OGSA HPC Profile WG (ogsa-hpcp)

Chairs:
> Marvin Theimer   Microsoft Corp.
> Marty Humphrey   University of Virginia

Secretary(s)/Webmaster(s) (both optional):

Email list:
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Focus/Purpose

> The objective of this working group is to work on the profile and specifications needed to realize the vertical use case of batch job scheduling of scientific/technical applications. This use case is often referred to as the "core" high performance computing (HPC) use case. It is anticipated that much of the needed functionality has already, or is being defined in existing specifications such as JSDL [JSDL] and BES [BES]. Therefore the primary output of this working group is anticipated to be a normative profile (to be called the HPC Profile, or HPCP for short) that defines how existing specifications should be combined to achieve the desired use case. The Working Group will follow the "OGSA Profile Definition" guidelines [OGSA Profile Definition] where appropriate. However, in defining the HPC profile the working group will also identify any changes/extensions that are deemed necessary to existing protocol specifications and will work with the relevant working groups to try to effect the identified changes/extensions. Also, to the extent that it is discovered to be necessary, the working group may identify additional protocol specifications that need to be defined and will either work on their definition or spin them out to additionally defined working groups.

> Batch job scheduling requires, broadly speaking, two types of interaction among clients and job schedulers, as well as among multiple job schedulers: there must be an interface for specifying and submitting and scheduling jobs and there must be an interface for bulk data staging. These two types of interaction are each independently useful and therefore two separate "sub-profile" recommendations will be created: one for job scheduling and one for data staging.

> In recognition that batch job scheduling is only part of the larger design space of execution management services and that there are both simpler and more complex forms of batch job scheduling – some of which still have open research questions attached to them – the approach that will be taken by the working group will be an evolutionary one. A simple base case will be defined that we expect to have universally implemented by all batch job scheduling clients and schedulers. All additional functionality will be defined in terms of optional extensions. Since extensions will be required to implement several commonly occurring HPC use cases, we expect that some extensions may eventually become, in-practice, universally available (with only certain special-case environments sticking with the simplest base case as the lowest level of interoperability). The working group will define an HPC profile for both the simplest base case that it settles on as well as for some number of common use cases (as extensions) that are anticipated to be widely applicable. In the spirit

of employing an evolutionary approach, it is anticipated that ongoing definition of additional common extensions will occur over time. Furthermore, since this working group will itself dissolve (see below) after having defined the simple base case and a few widely applicable extensions, it is anticipated that additional extensions will be defined under the aegis of other workings groups, as appropriate.

The base and common use cases that the HPC profile should cover have already, for the most part, been developed in discussions in the OGSA-WG. The next steps to take are to discuss the design issues that the HPC profile work must concern itself with; in particular and most importantly, what the framework should be for defining extension profiles.

The milestones this working group must meet are particularly ambitious due to the needs of several existing job scheduling vendors. In order to satisfy the need to define an HPC profile for the base use case by August of 2006, the initial focus of the working group will be on defining the base use case profile and a framework for how to define future extension profiles.

Scope

The scope of this working group is restricted to batch job scheduling for Web-Services-based job scheduling services. This will cover two broad topics: an interface for job scheduling and an interface for bulk data staging. The subject of job scheduling will cover the topics of resource reservation, provisioning, and execution, as applicable to the HPC use cases that have been identified. Data staging will concern itself primarily with the topic of transferring (and associated naming issues) un-interpreted data in the form of files and directories of files. The subject of interpreting the structure of staging data will be considered out-of-scope.

Goals

This group will deliver the following documents.

- OGSA HPC Use Cases – Base Case and Common Cases (GFD-I)
- OGSA HPC base case profile specification (GFD-R.P)
- OGSA HPC initial common cases extension profile specification (GFD-R.P)

Milestones

Milestones for each document are as follows:

Document name	First draft available	Ready for Public Comment review	GFD publication
OGSA HPC Use Cases	April 2006	July 2006	Sept. 2006
OGSA HPC base case profile	Aug. 2006	Nov. 2006	Mar. 2007
OGSA HPC initial common cases extension profile	Jan. 2007	Apr. 2007	Aug. 2007

Management Issues

The working group will conduct most of its business via email, but will have teleconferences at least once a month, and will have face-to-face meetings between GGF meetings. If required or requested by WG members, it will join OGSA F2F meetings. The WG will have joint review discussion with the OGSA-WG before every milestone.

Evidence of commitments to carry out WG tasks

Several of the interested parties have already committed to seeing this through and are working as an "HPC design team" within the OGSA-WG since February 2006. Microsoft, Platform Computing, the University of Virginia, and others have agreed to continue participation.

- Marvin Theimer (Microsoft)
- Marty Humphrey, Glenn Wasson (UVa)
- Chris Smith (Platform computing)
- Hiro Kishimoto (Fujitsu)
- Susanne Balle (HP)

Pre-existing Document(s) (if any)

There are a number of existing documents. Directly relevant are the JSDL and BES specifications [JSDL], [BES], as well as the paper "An Evolutionary Approach to Realizing the Grid Vision" [Grid Vision]. Various use case documents have direct or partial relevance. The document titled "HPC Use Cases – Base Case and Common Cases" has been written to directly address the use cases relevant to this working group [HPC Use Cases]. Other use case documents that are partially relevant have been written by the OGSA, EMS, and other WGs. Although not as far along as JSDL or BES, the work and documents from various related WGs, such as CDDLM, RSS, Byte-IO, DMIS, and the OGSA data group are relevant.

Exit Strategy

When the recommendation profiles have passed through necessary public comment and editor review and published as GFDs, the working group will be dissolved.

Any other relevant information

References

[Grid Vision] Theimer, M., Parastatidis, S., Hey T., Humphrey, M., Fox, G., "An Evolutionary Approach to Realizing the Grid Vision", February 2006. https://forge.gridforum.org/projects/ogsa-wg/document/An_Evolutionary_Approach_to_Realizing_the_Grid_Vision

[HPC Use Cases], Theimer, M., "HPC Use Cases – Base Case and Common Cases", April 2006, https://forge.gridforum.org/projects/ogsa-wg/document/HPC_Base_and_Common_Use_Cases/

[JSDL] Anjomshoaa, A., Brisard, F., Drescher, M., Fellows, D., Ly, A., McGough, S., Pulsipher, D., and Savva, A. (ed.) Job Submission Description Language (JSDL) Specification, Version 1.0, Global Grid Forum, Lemont, Illinois, U.S.A., GFD-R-P.056, November 2005. http://www.ggf.org/documents/final.htm

[BES] Grimshaw, A., Newhouse, S., Pulsipher, D., Morgan, M., "OGSA Basic Execution Services Version 1.0", February 2006, https://forge.gridforum.org/tracker/download.php?group_id=90&atid=414&file_id=754&aid=1761

[OGSA Profile Definition] Maguire, T., Snelling, D. OGSA Profile Definition. Global Grid Forum, Lemont, Illinois, U.S.A., GFD-I.059, January 2006. http://www.ggf.org/documents/final.htm

The Seven Questions

1. Is the scope of the proposed group sufficiently focused?

The working group is focused just on HPC batch job scheduling and data staging. The working group already has use case documents to base discussions upon.

2. Are the topics that the group plans to address clear and relevant for the Grid research, development, industrial, implementation, and/or application user community?

Yes. Batch job scheduling is central to HPC, distributed computing, and web-services.

3. Will the formation of the group foster (consensus–based) work that would not be done otherwise?

The work will almost certainly happen in one form or another in the near future. It could be done in other venues, such as OASIS, but is logically part of a grid design and hence most appropriately done within GGF.

4. Do the group's activities overlap inappropriately with those of another GGF group or to a group active in another organization such as IETF or W3C? Has the relationship, if any, to the Open Grid Services Architecture (OGSA) been determined?

No, this work will build upon work taking place in other GGF groups, such as JSDL and BES. However these are "horizontal" specifications and this working group will define a "vertical" profile utilizing these specifications. It does not overlap with work taking place in other organizations such as IETF or W3C. This WG will define an HPC profile within the OGSA architecture and it will be the first "vertical" OGSA profile.

5. Are there sufficient interest and expertise in the group's topic, with at least several people willing to expend the effort that is likely to produce significant results over time?

Yes. The people involved have done designs and implementations of this type of service in the past. In particular, representatives of several of the major job scheduling vendors have indicated that they will participate in the group.

6. Does a base of interested consumers (e.g., application developers, Grid system implementers, industry partners, end-users) appear to exist for the planned work?

Yes. The existing community of users of HPC job scheduling systems is interested in this work.

7. Does the GGF have a reasonable role to play in the determination of the technology?

Yes. In particular, the proposed work expects to build on existing GGF activities such as JSDL and BES.