OPEN FORUM | OPEN STANDARDS

HPC Basic Profile

Purpose: Identify a profile of non-proprietary specifications, along with clarifications and restrictions, to promote interoperability among High-Performance Computing applications.

Description: The HPC Profile coordinates the use of the Job Submission Description Language (JSDL) and the OGSA Basic Execution Service (OGSA-BES), along with interoperable security mechanisms, to address the "core" high-performance use case of batch job scheduling for scientific/technical applications.

To specify all necessary job submission parameters, the HPC Profile relies on JSDL. The HPC Profile specifies that, along with basic elements such as JobDefinition and JobName, the jsdl-hpcp:HPCProfileApplication sub-element must be supported. In addition, the following sub-elements of the Resources element must be supported: CandidateHosts, ExeclusiveExecution, OperatingSystem, CPUArchitecture, and TotalCPUCount. This ensures that batch scientific jobs can be specified.

To actually manage batch jobs, the HPC Profile relies on OGSA-BES. The HPC Profile recognizes that the number of computational activities managed in a batch job may get very large. Hence, BES implementations in the HPC Profile may choose not to return the ActivityReference or ContainedResource sub-elements. In this case, though, the TotalNumberOfActivities sub-element *must* be returned. In those cases where a client explicitly requires the complete list of activities or contained resources, they can be requested using the BasicFilter extension.

Interoperable security mechanisms are essential for any distributed system. The HPC Profile makes a number of security environment assumptions:
- An Identity Management infrastructure is deployed
- Trust relationships are pre-configured and uniform
- BES services are well-known to users and may be discovered using common mechanisms, such as DNS or UDDI
- Authorization is based on authenticated user/service identities and attributes carried in the provisioned identity credential

For basic, interoperable message security, the HPC Profile adopts TLS/SSL transport layer security. (This was done because interoperable, message-level security – as represented by the WS-* family of specifications – have not yet reached sufficient adoption or deployment.) The HPC Profile supports the use of TLS/SSL with both X.509 Certificate-based authentication, and Username-Password Client authentication.

Further Information: Link to the latest draft of the document or contact Marty Humphrey