An Experimental Implementation of OGSA *Advanced* Execution Management Services in NAREGI

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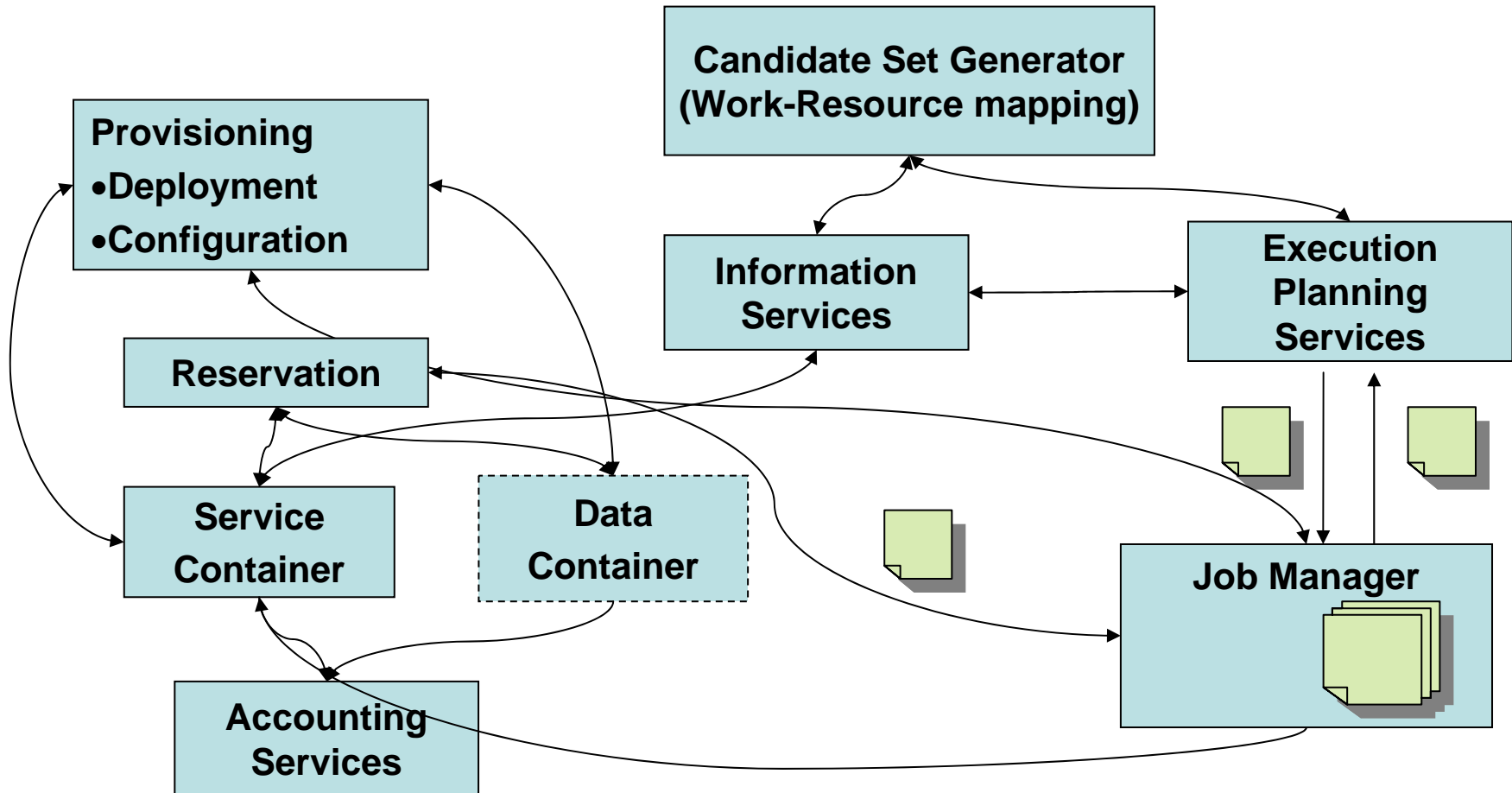
NAREGI Project, Japan

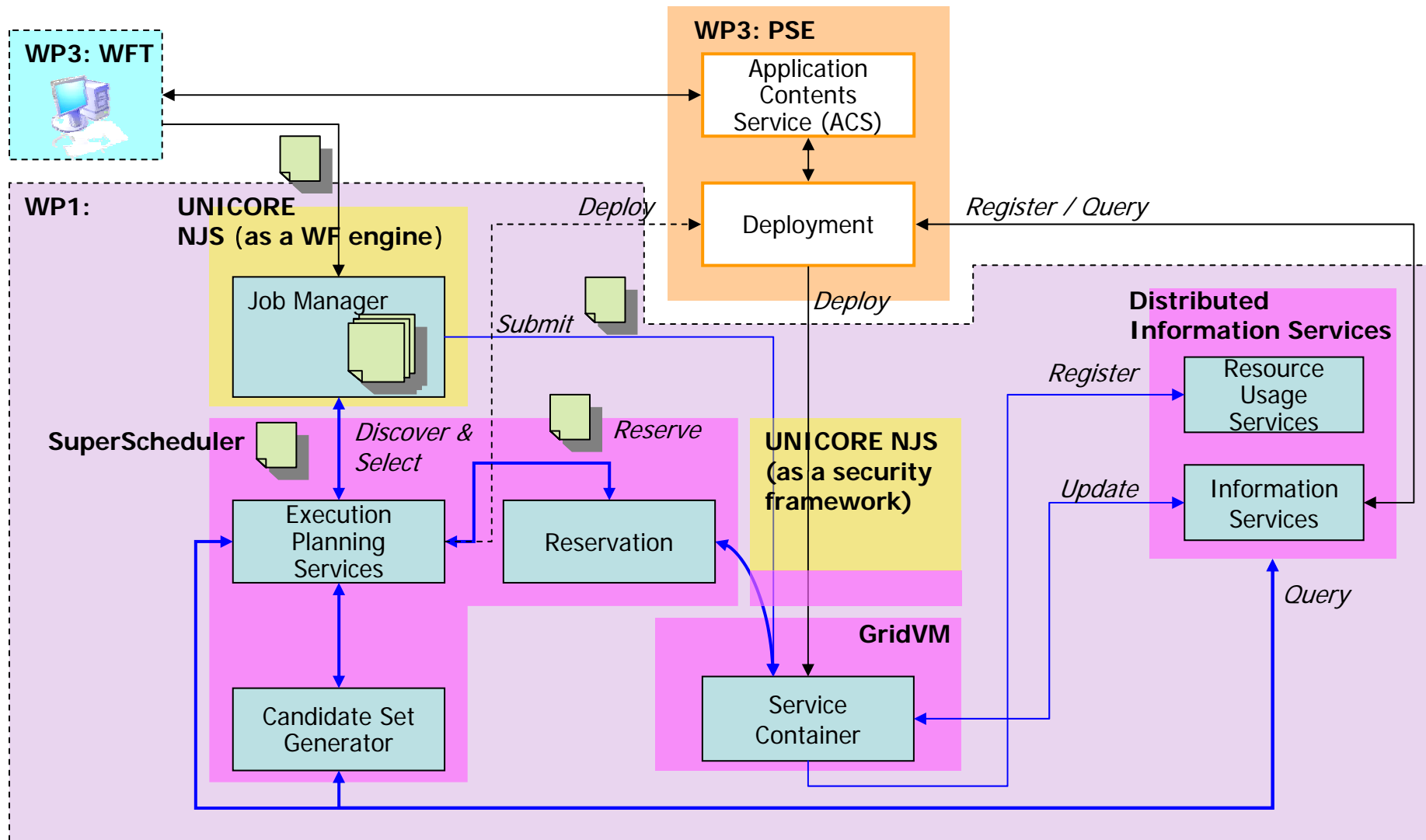- Evaluation of *advanced* features in OGSA-EMS architecture, for complex grid applications such as an "across-sites" job using GridMPI

From Figure 5 "*Interaction of EMS services to execute a legacy BLASH job*" in OGSA Version 1.0 :

NAREGI OGSA-EM Services Structure

NAREGI Super-Scheduler

NAREGI Super-Scheduler consists of grid services based on GGF OGSA-EMS :

→**EPS (Execution Planning Services)**

An EPS is a service that builds mappings called "schedules" between jobs and resources. An EPS will typically attempt to optimize some objective function such as execution time, cost, reliability, etc.

→**CSG (Candidate Set Generator)**

A CSG determines the set of resources on which a task can execute. A CSG generates a set of containers (really their Resource Handles) in which it is possible to run a job.

→**RS (Reservation Service)**

A RS presents a common interface to all varieties of reservable resources on the grid.

naregi:ExecutionPlanningService

→ NAREGI EPS createAgreement() accepts *an abstract JSDL document* which describes the job requirements, then returns the *Agreement* for the abstract JSDL document.

→ NAREGI EPS calls a CSG to get a set of resources, produces *the concrete JSDL documents* for the resources, and calls a RS to co-schedule the resources.

→ NAREGI EPS supports the following portTypes:

portType	operation
wsag:AgreementFactory	wsag:createAgreement
	wsrp:getResourceProperty
wsag:Agreement	wsag:terminate
	wsrp:getResourceProperty
	wsrl:destroy / wsrl:setTerminationTime
	wsnt:subscribe

naregi:CandidateSetGenerator

→ NAREGI CSG accepts an abstract JSDL document, produces and issues the query expressions to information services from the JSDL, and returns a set of resources (their location information such as EPR).

→ NAREGI CSG is implemented as a Web Service rather than a Grid Service.

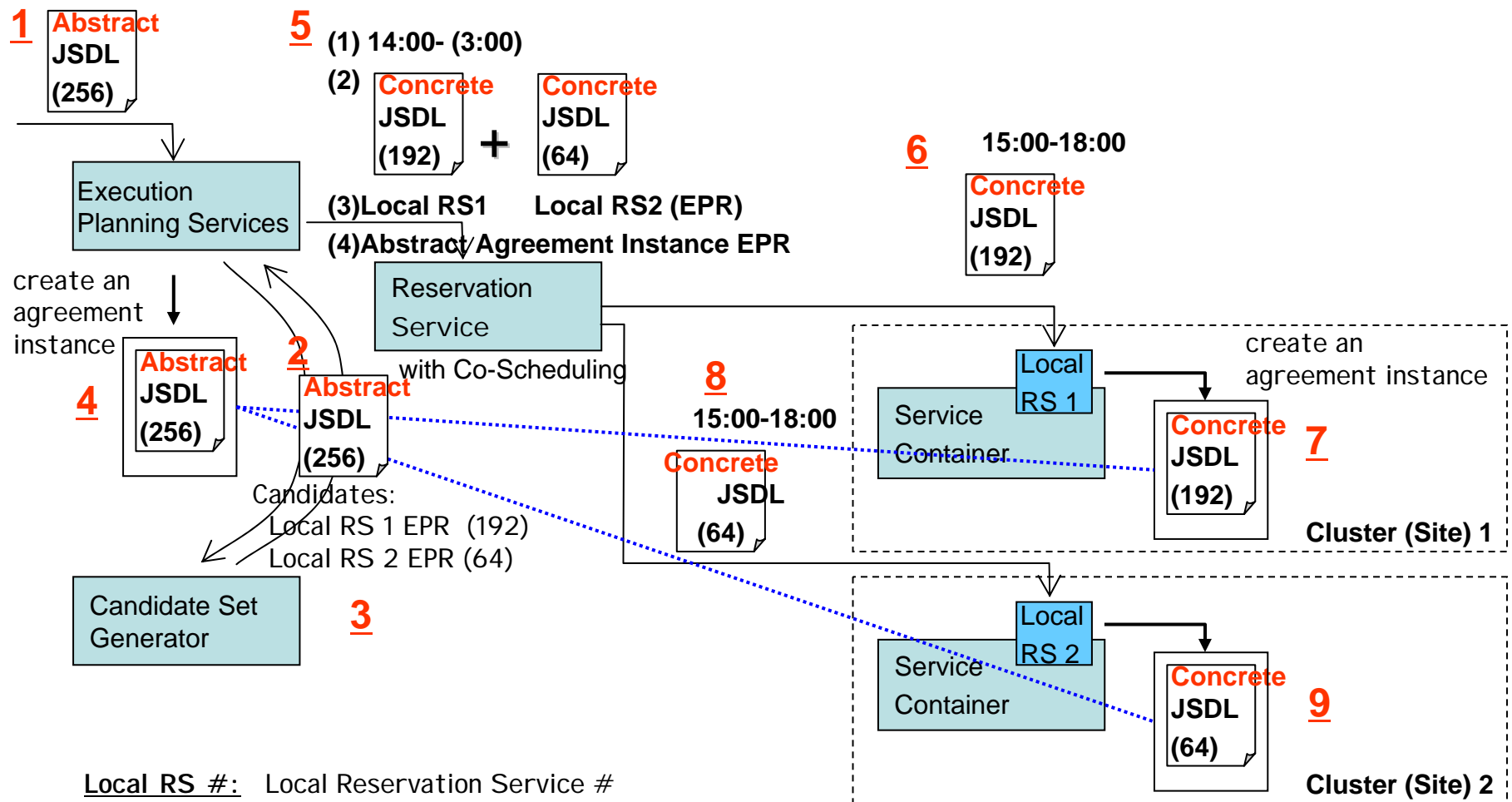→ NAREGI CSG supports the following portType:

portType	operation
naregi:CSG	naregi:generateCandidateSet

Note that NAREGI CSG directly takes the job submission description (JSDL) as a input parameter due to lack of job resource registry, while OGSA-EMS compliant CSG will access the specified job resource and get the job submission description (JSDL). Also, NAREGI CSG returns the EPR (End Point Reference) of Reservation Service on each candidate container.

naregi:ReservationService

→ NAREGI RS aggregates the operations to resource-level reservation services.

→ NAREGI RS provides synchronous reservations to co-schedule a parallel job across sites.

→ NAREGI RS supports the following portTypes:

portType	operation
wsag:AgreementFactory	wsag:createAgreement
	wsrp:getResourceProperty
wsag:Agreement	wsag:terminate
	wsrp:getResourceProperty
	wsrl:destroy / wsrl:setTerminationTime
	wsnt:subscribe

Conclusion

1. Advanced EM Services needed brokering extensions of JSDL language.
2. Advanced EM Services needed to dynamically produce the complete JSDL documents and/or the workflow according to the resource availabilities for the given JSDL document.
3. Advanced EM Services needed to reflect resource brokering results and execution results of other jobs, not only job requirements on target job.