

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

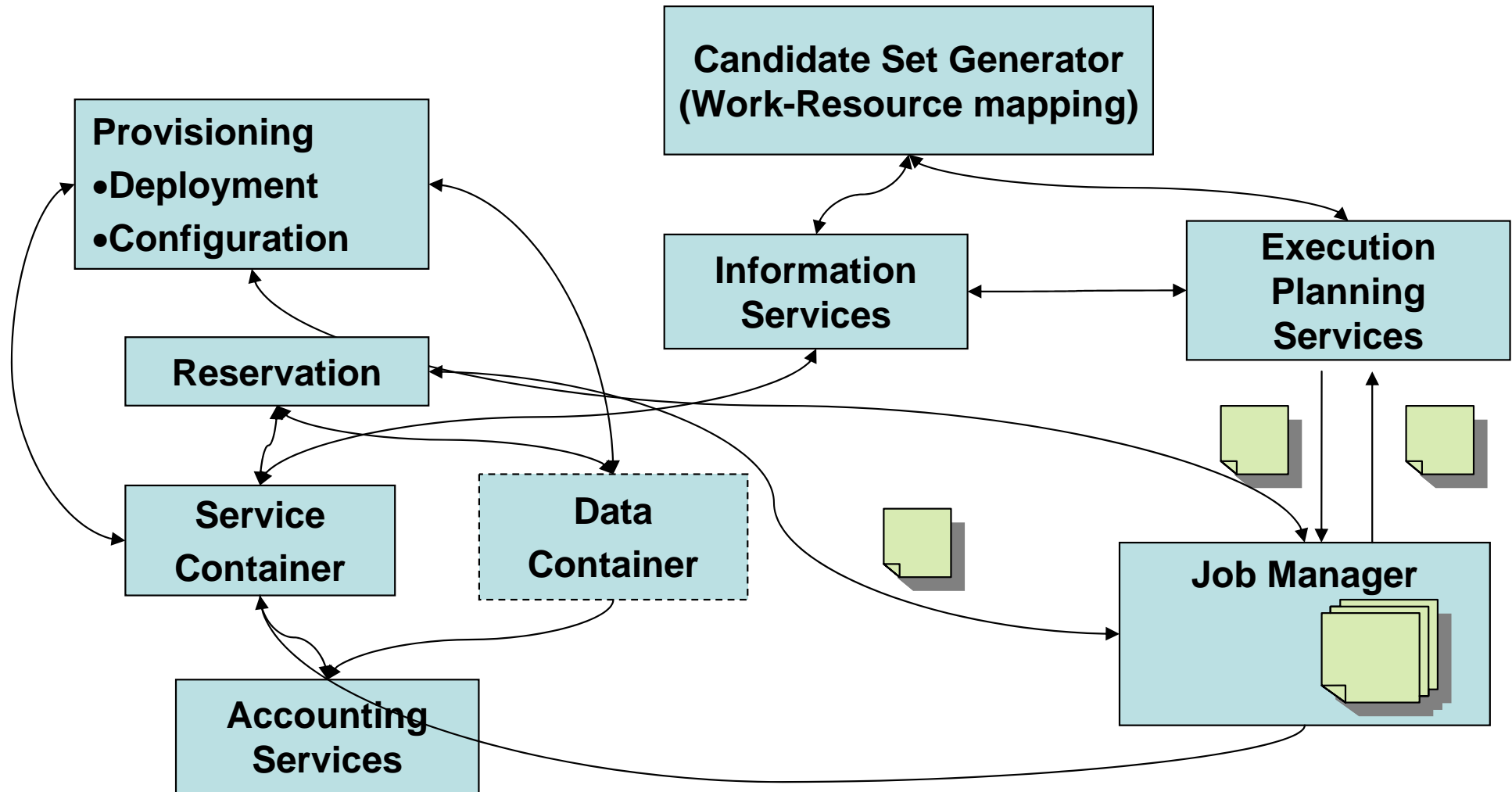
March 2005

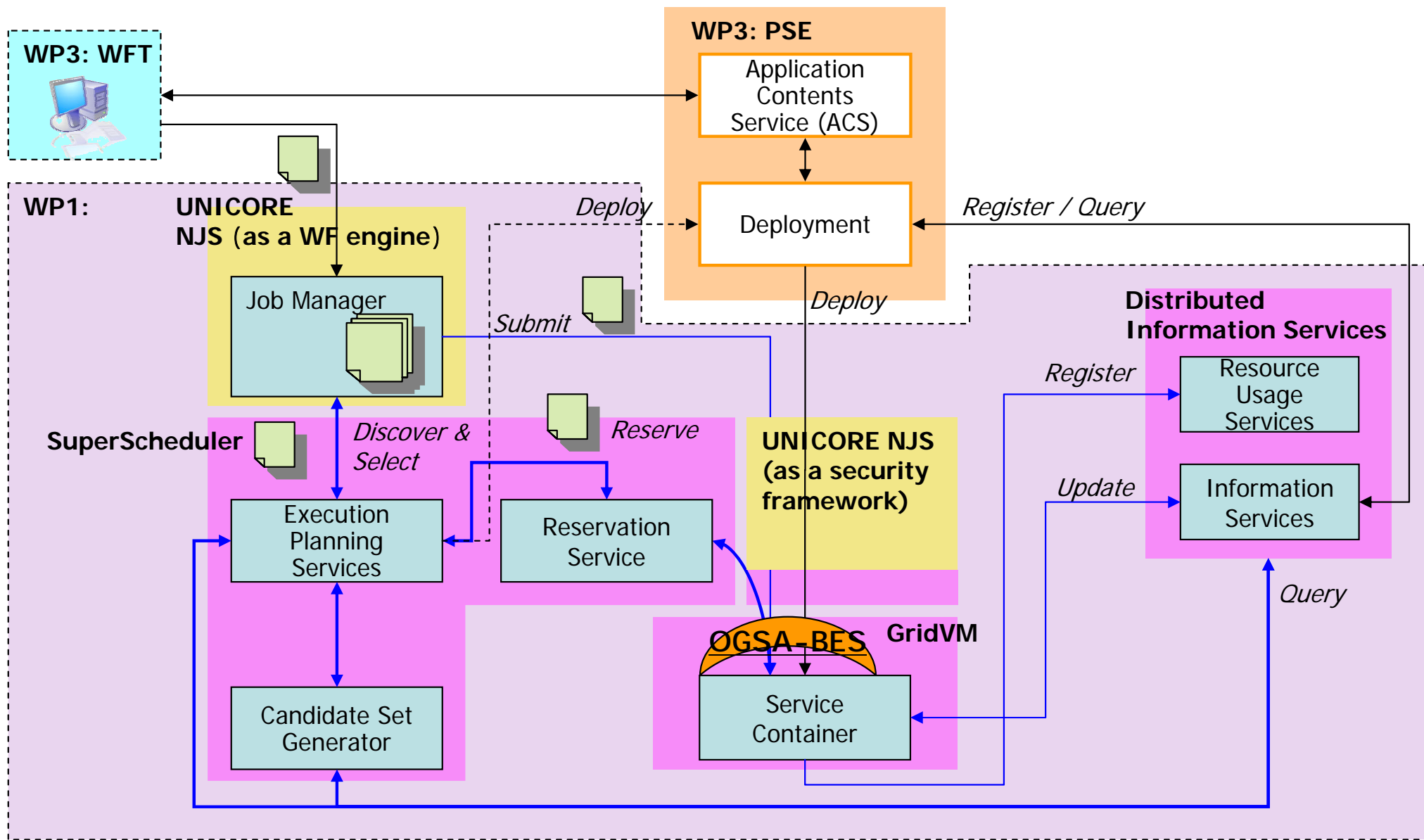
NAREGI Project, Japan



- 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 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 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 incomplete 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:

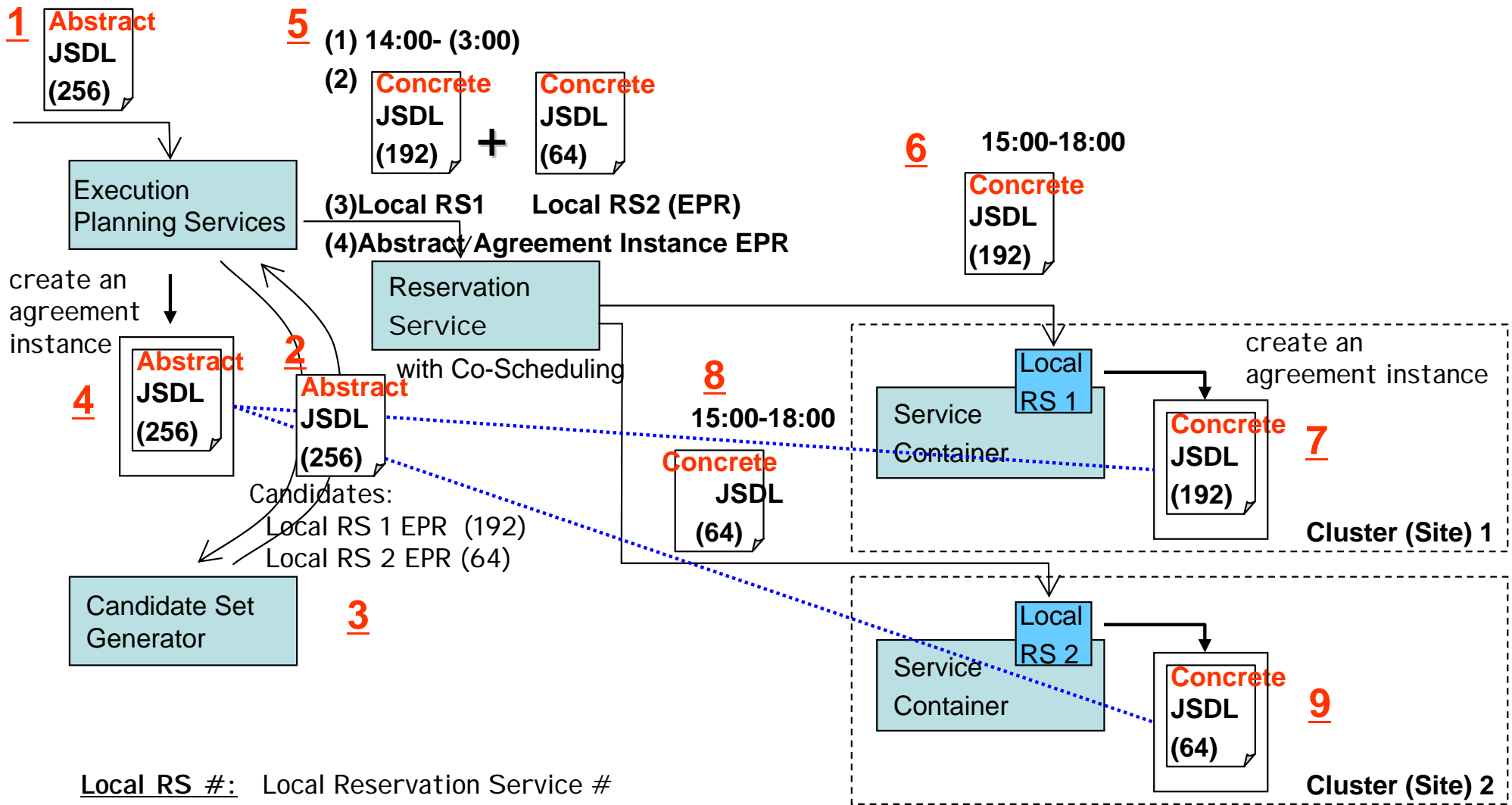
portType	operation
naregi:CSG	naregi:generateCandidateSet

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 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:

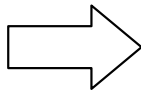
portType	operation
wsag:AgreementFactory	wsag:createAgreement
	wsrp:getResourceProperty
wsag:Agreement	wsag:terminate
	wsrp:getResourceProperty
	wsrl:destroy / wsrl:setTerminationTime
	wsnt:subscribe



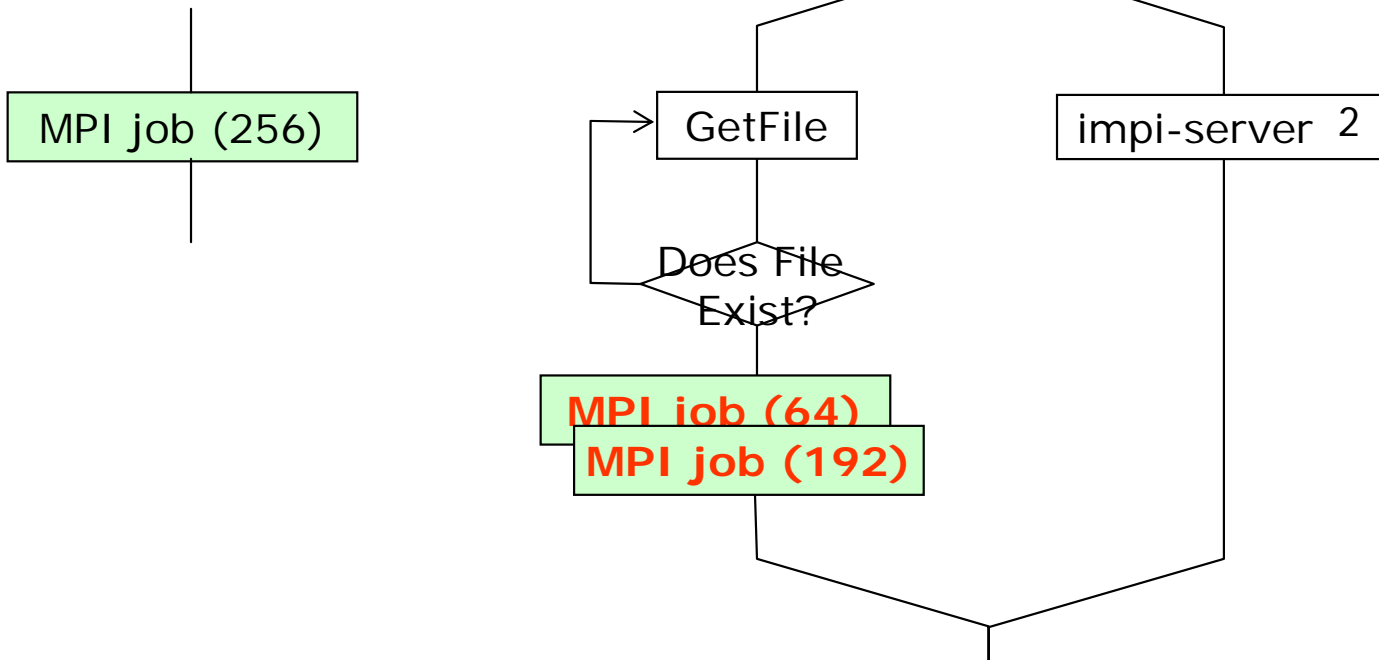


1. Our services needs to dynamically produce the workflow according to the brokering results.

abstract  
job



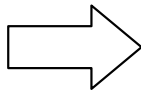
concrete  
job (workflow)



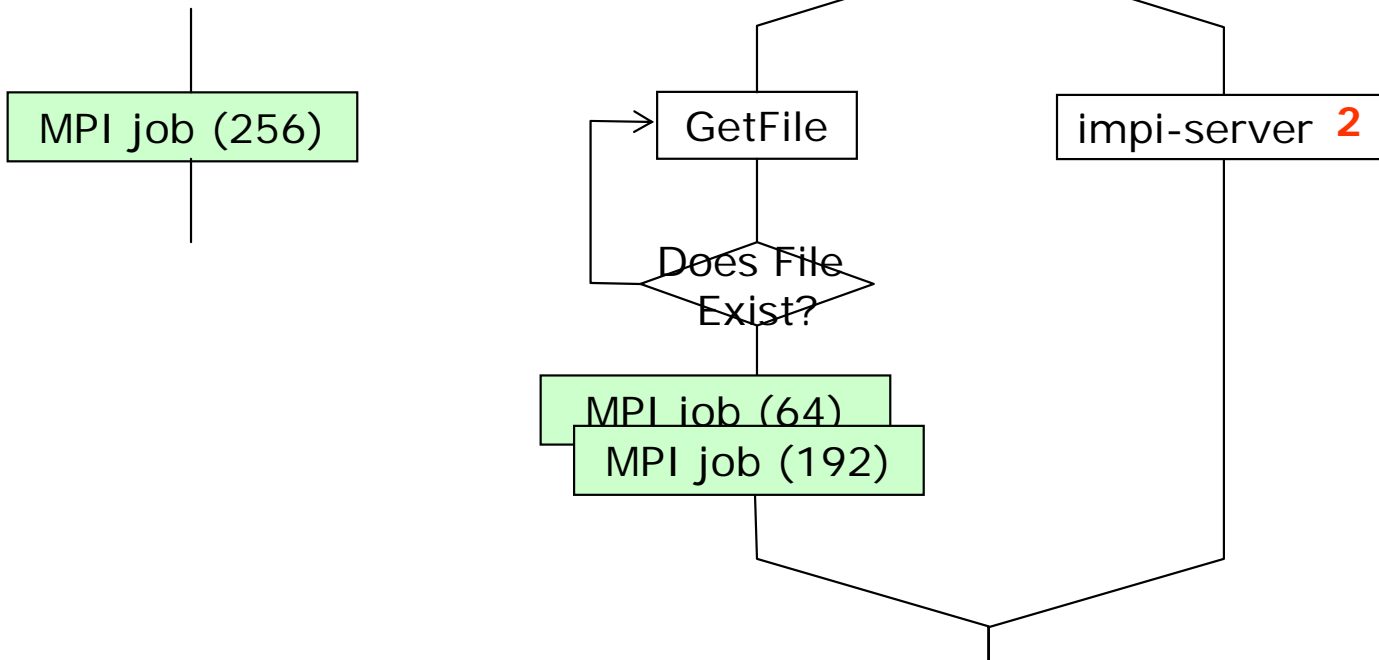


## 2. Our services needs to reflect the brokering results into the JSDL document.

abstract  
job



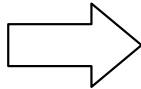
concrete  
job (workflow)



# From our experience

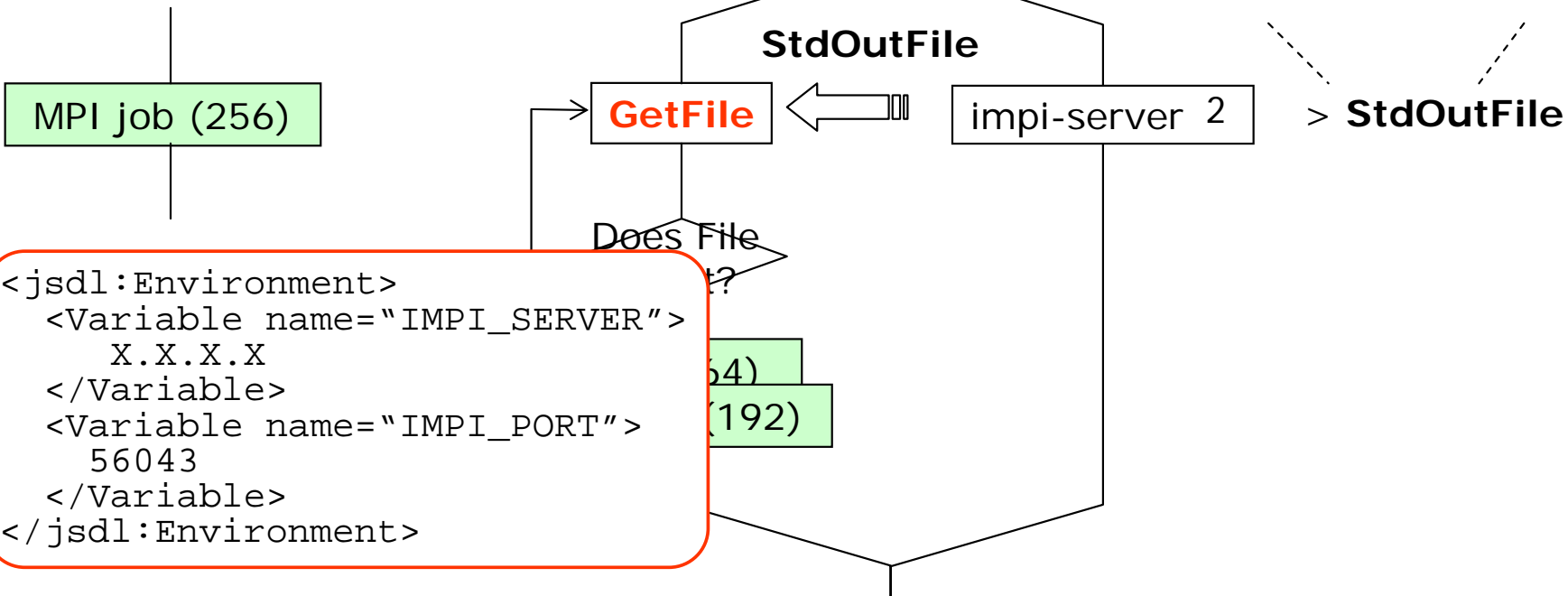
- Our services needs to reflect the execution result of other workflow task into the JSDL document.

abstract  
job



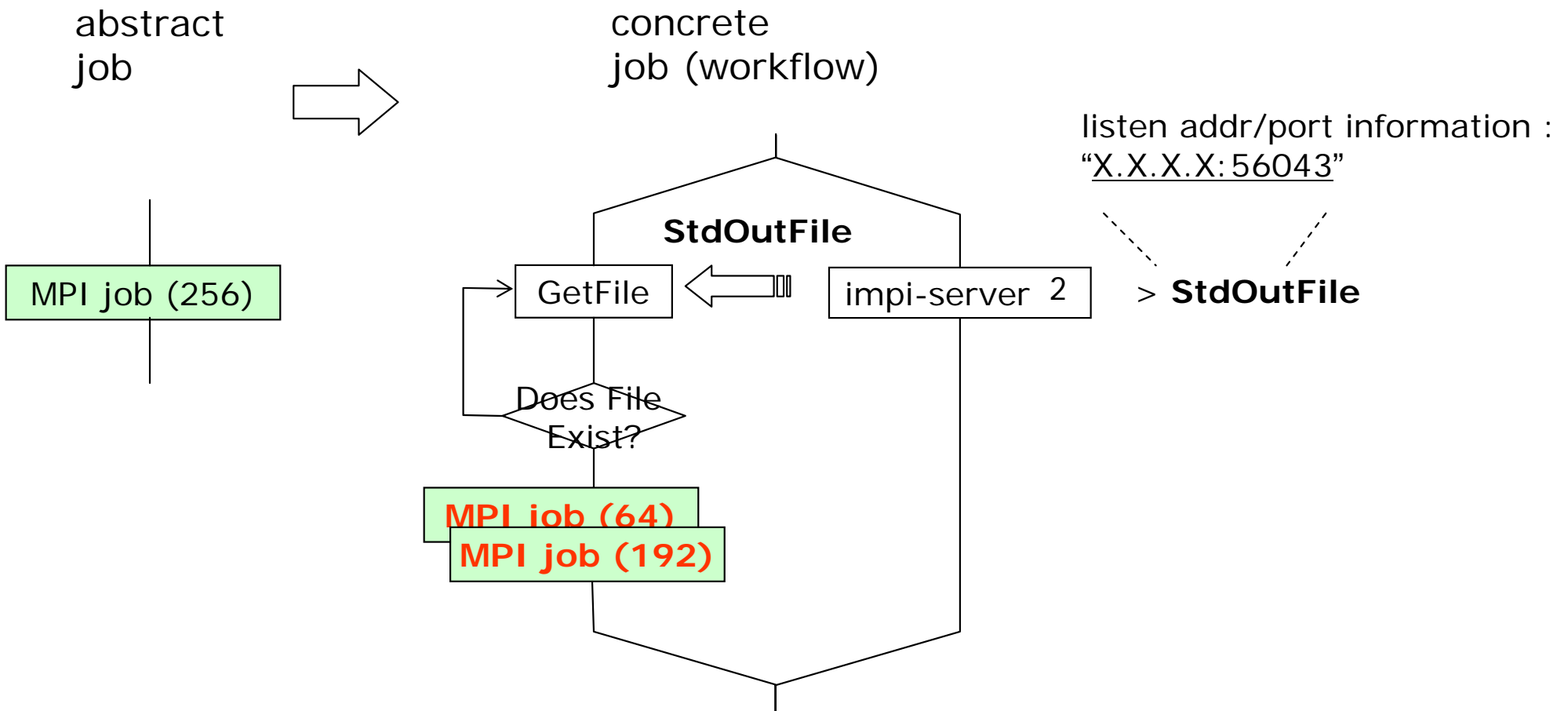
concrete  
job (workflow)

listen addr/port information :  
"X.X.X.X:56043"



# From our experience

- Our services needs to renegotiate the Agreement in order to reflect the runtime information.





- There are some large gaps between basic EM Services and advanced EM Services:
  1. Advanced EM Services may handle the workflow to refine the abstract job to the concrete jobs.
  2. Advanced EM Services may manage the brokering flow and the execution flow in the single workflow.
  3. Advanced EM Services may process the runtime information of applications or their tools.

Thank you !