Grid Scheduling Architecture RG

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Agenda

- ## Session #1 and #2

  - ### Progress of the research group

  - ### Talks

    - "Grid capacity planning with negotiation-based advance reservation for optimized QoS" (Radu Prodan)

    - …

  - ### Scheduler interoperation

    - Scenario

    - JSDL profile

    - Scheduling parameters/JSDL micro-specification

  - ### Open issues & discussion

Milestones

- ## Short term
  - Scheduler interoperation feasibility study
  - Practical show-case
  - Within 12 months from now (as of OGF 19)

- ## Long term
  - Definition of a generic Grid scheduling architecture
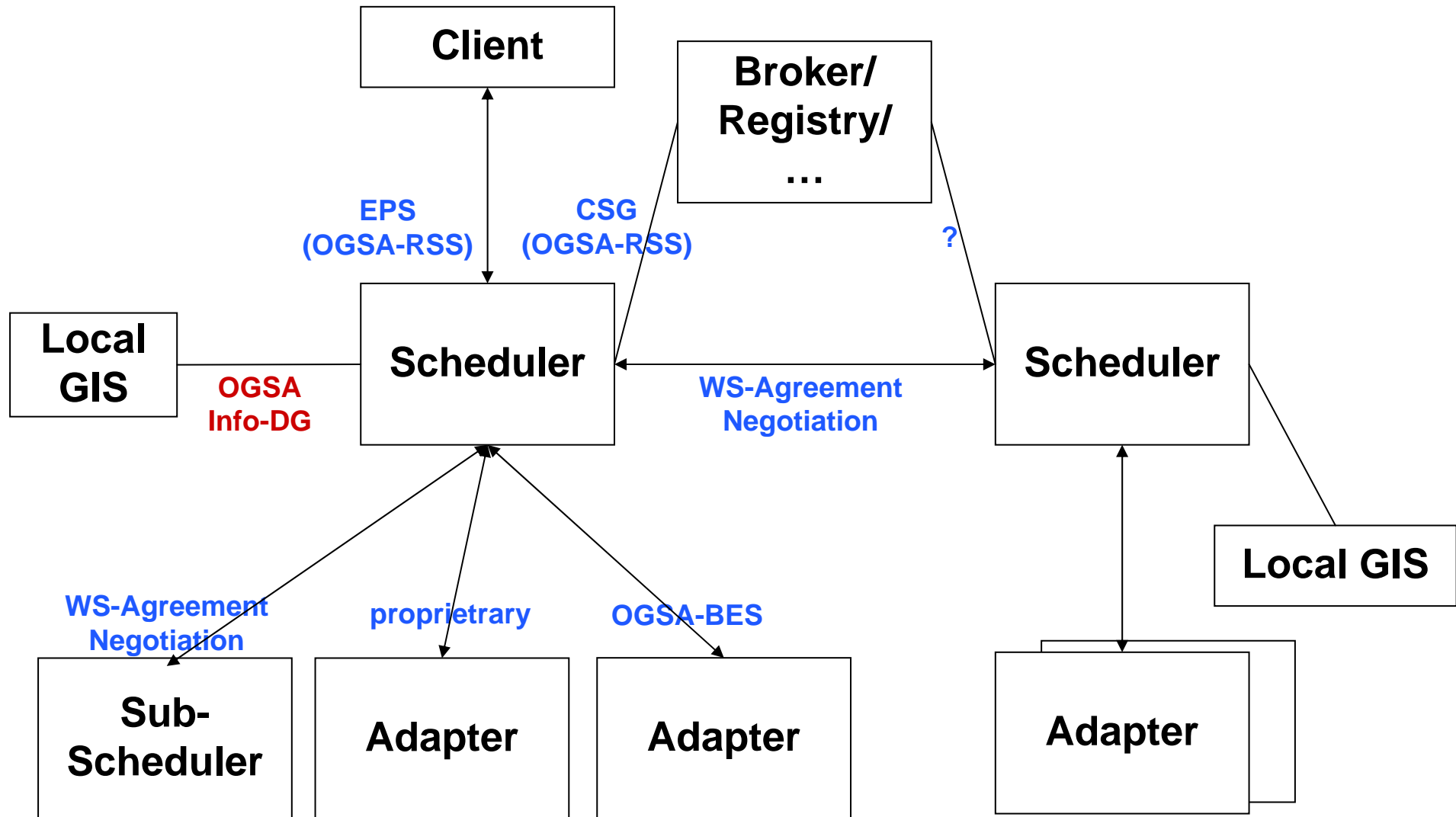
Progress of the Research Group

- Between OGF 19 and OGF 20

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Scheduler interoperation

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Scenario

Place GSA in the landscape

- Continue work on "Global Picture"
  - Interaction of entities
  - Use of existing services, standards, drafts, WGs

- Dive a level deeper from 50tsd ft.

- First simple usage scenario:
  - Link existing Grid schedulers to sensibly forward a computational job to another Grid scheduler for execution

  - Extend later; e.g. workflow/co-allocation/orchestration, other resources/jobs/services
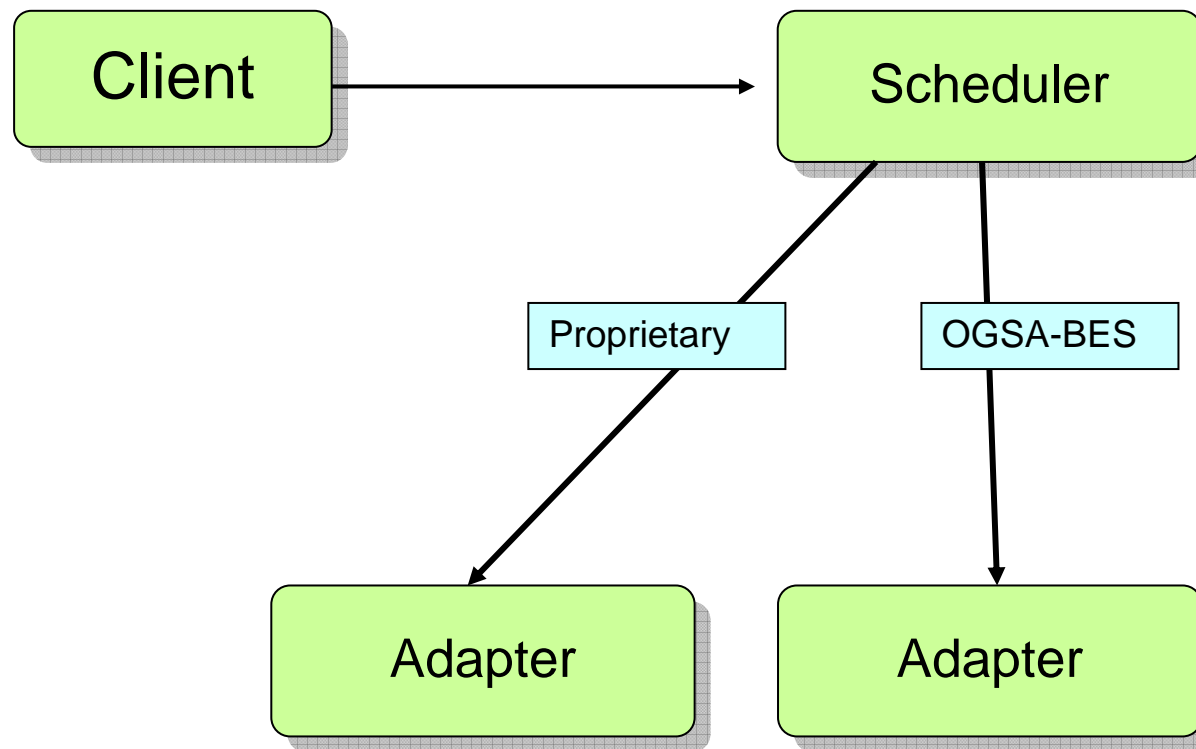
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Example Process including Scheduling and Execution

EPS/CSG(?):
OGSA-RSS

Client

Scheduler

Job/Activity/Workflow
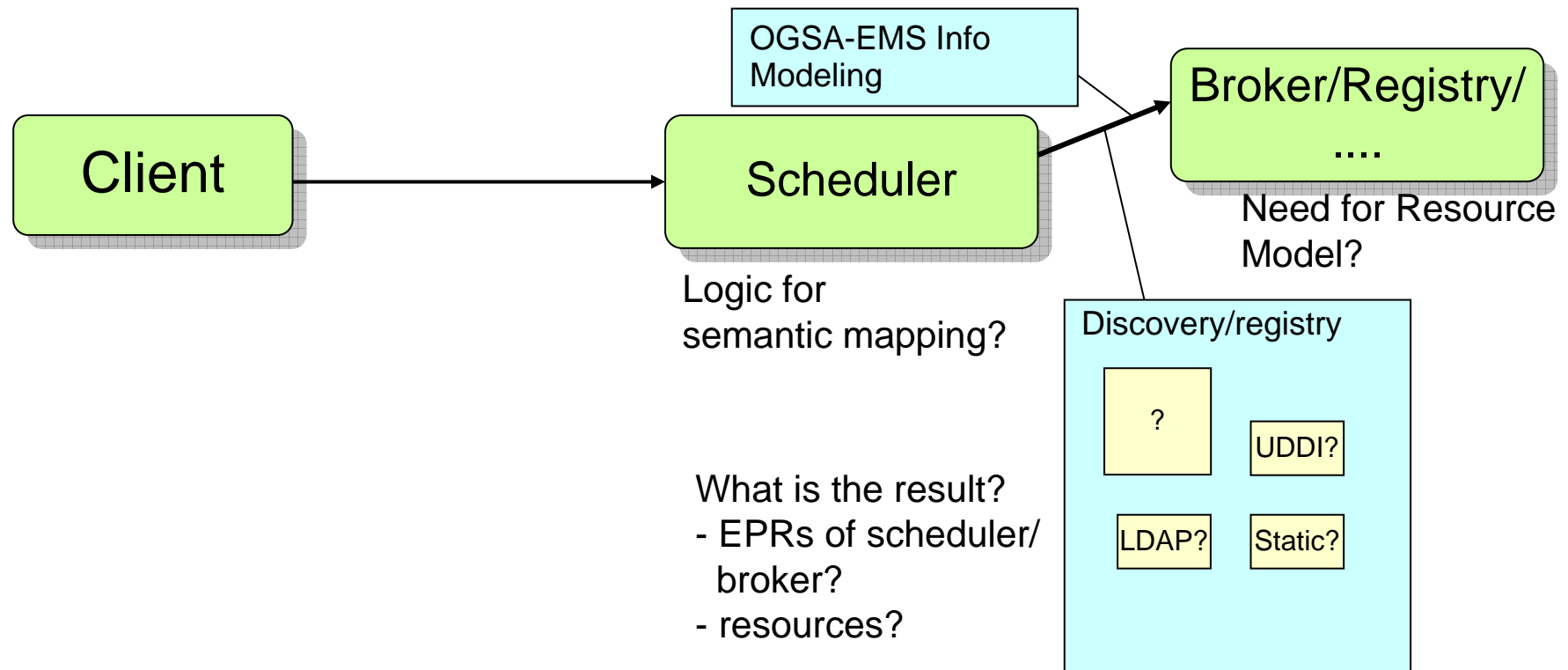
JSDL	?
SDL	WS-A
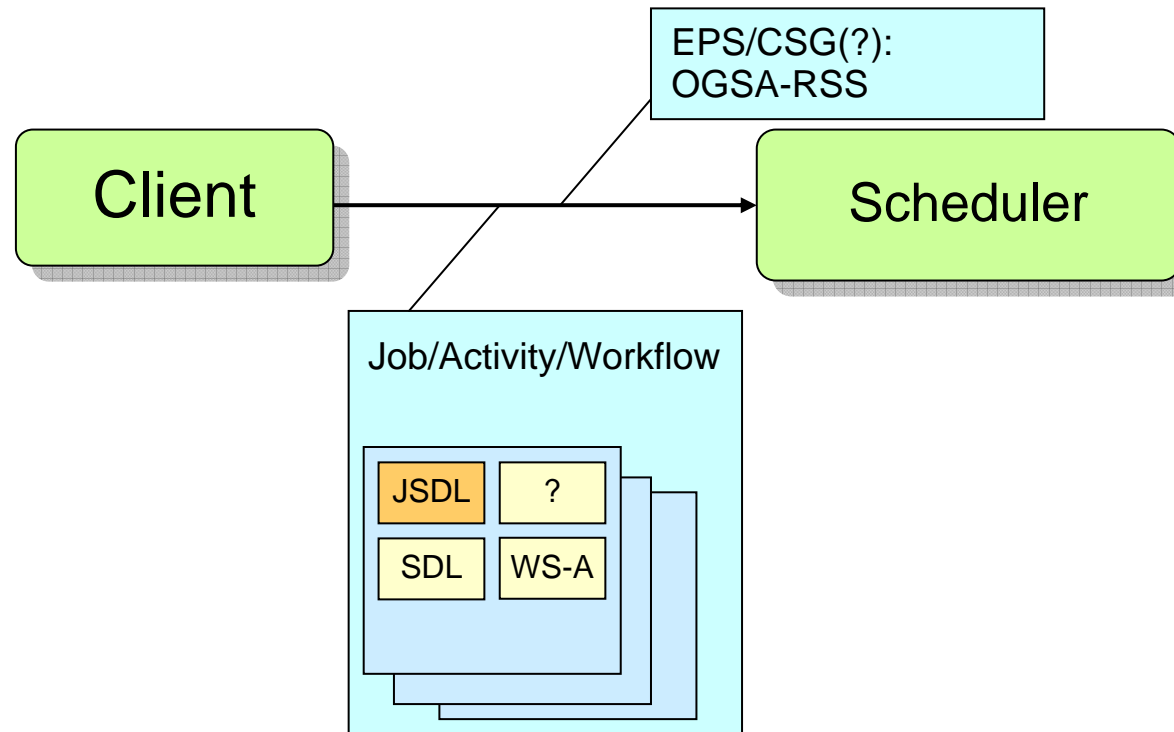
Activity/job/workflow needs to be submitted

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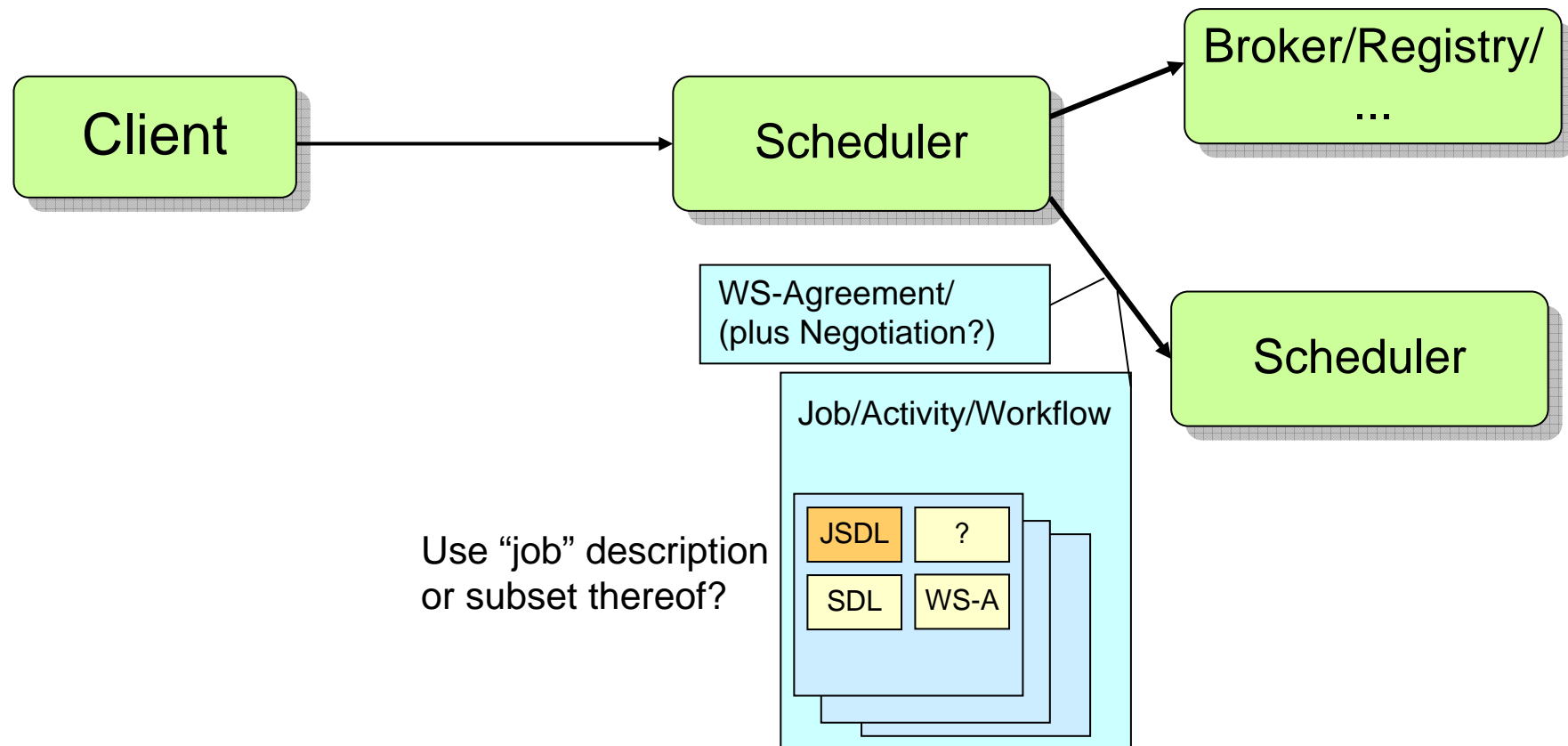
Example Process including Scheduling and Execution (cont.)

Direct access to resources through BES or some other protocol

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Example Process including Scheduling and Execution (cont.)

OpenGridForum

OGSA-EMS Info Modeling

Client → Scheduler → Broker/Registry/ ....

Need for Resource Model?

Logic for semantic mapping?

What is the result?
- EPRs of scheduler/ broker?
- resources?
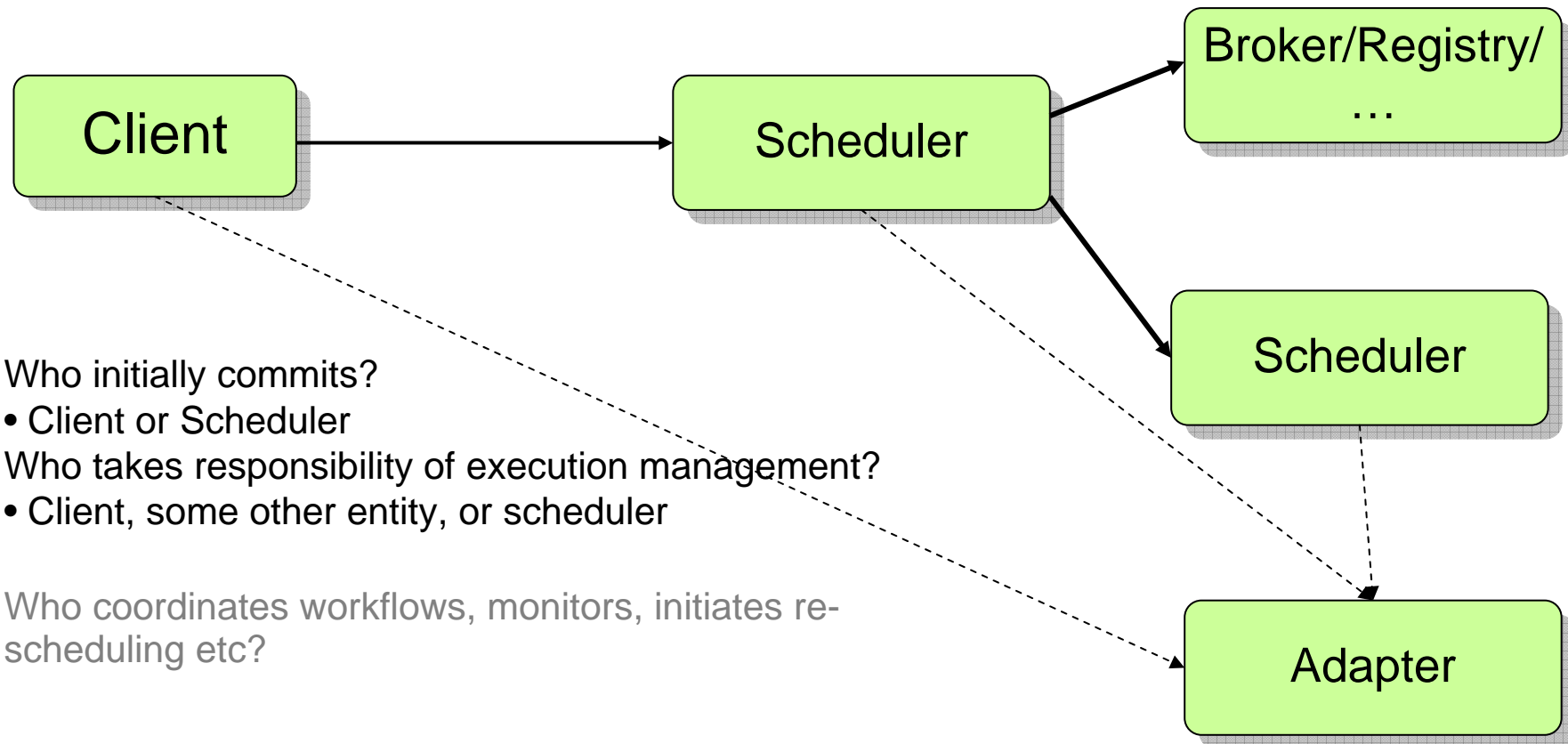
Discovery/registry

?
UDDI?
LDAP?
Static?

- Access resources through another broker/scheduler
- Identify available other scheduler/brokers through registry, statically, somehow?

Example Process including Scheduling and Execution (cont.)


```
Client ──────────────▶ Scheduler ──────────────▶ Broker/Registry/...
                                    ──────────────▶ Scheduler
```

WS-Agreement/
(plus Negotiation?)

Job/Activity/Workflow

JSDL	?
SDL	WS-A

Use "job" description
or subset thereof?

- Access resources through another broker/scheduler
- Communicate with remote scheduler about potential agreement

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Example Process including Scheduling and Execution (cont.)

Who initially commits?
- Client or Scheduler

Who takes responsibility of execution management?
- Client, some other entity, or scheduler

Who coordinates workflows, monitors, initiates re-scheduling etc?

Transition to execution management?

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Feasibility study

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Goal & Interactions

- Simple use case: Two schedulers interoperate with each other

- Goal: Show feasibility through implementation

- Concrete interactions to reach agreement on delegation of scheduling decision:
  1. Scheduler A cannot fulfil a scheduling request
  2. Request is passed to Scheduler B
  3. Scheduler B checks its capabilities
  4. Scheduler A & B agree/disagree on conditions to fulfil the request
  5. [Potentially it is possible to re-negotiate the conditions]
  6. Scheduler B fulfils the scheduling request

Candidate "standards"

"Standard" descriptions:

- Common job description: JSDL
- Common resource model: OGSA Info model?
  - OR semantic translation services between different models
- Add. scheduling parameters: JSDL extensions?

"Standard" protocols

- Agreement creation: WS-Agreement
- Negotiation: WS-Negotiation?

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Participating projects

Confirmed

- Grid Resource Management System (GRMS)

- MetaScheduling Service (MSS)

- D-Grid

Interested

- GridWay

- … your project?

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Issues, questions, …

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Issues to discuss

- Is the current extension to WS-Agreement feasible?

- Schedulers remain automonous. All information needed has to be passed via one scheduler interoperation interface. Do we cover all aspects

- There is no common information model shared between the schedulers. Solution?

- ….

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Entities involved

- ## Main entities
  - Client
  - Scheduler
  - Adapter
- ## Utility entities
  - Registry
  - Local GIS (Grid Information Service)

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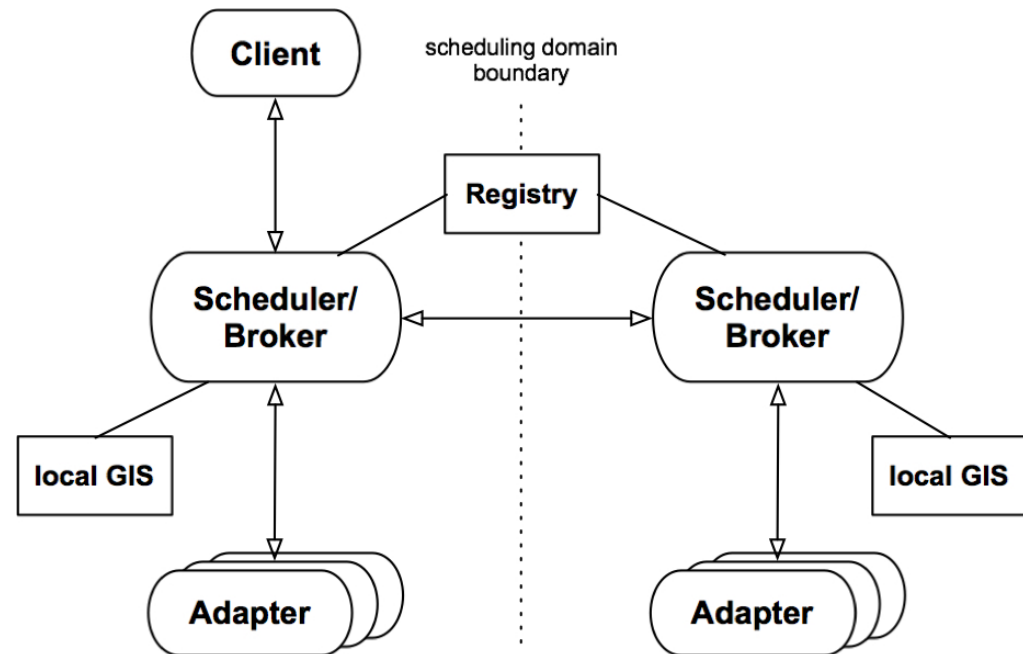
Communication Stages

1. Information gathering
2. Non-binding negotiation/ request for offers
3. Reservation/commitment
4. Job control/job monitoring
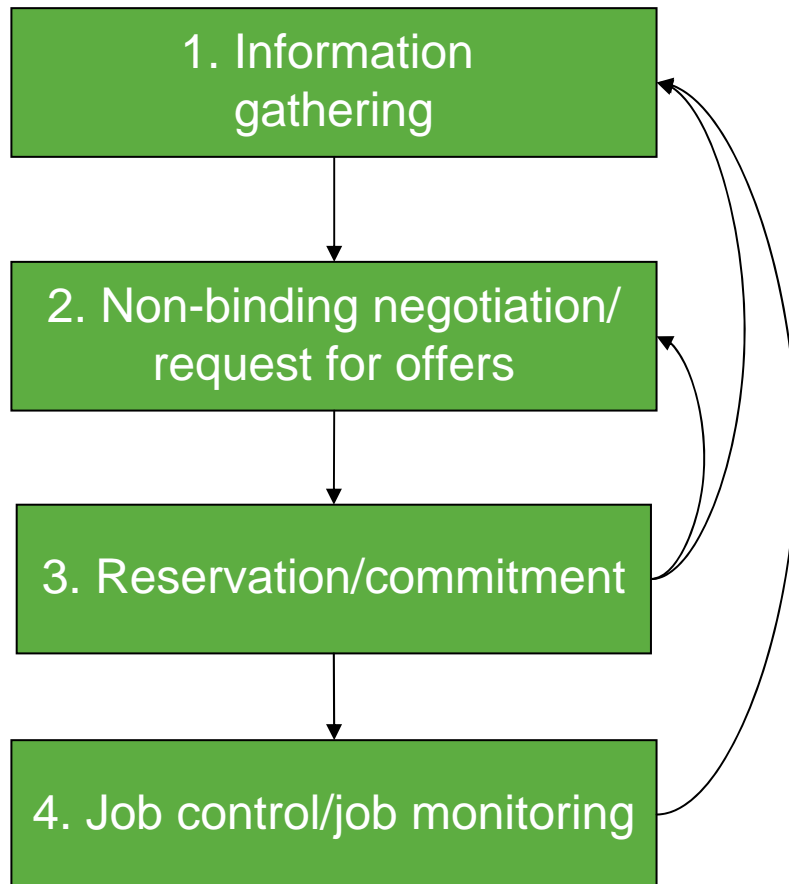
1. Information gathering about available remote Grid schedulers
2. Non-binding negotiation may end up with several possible agreement alternatives (possibly in parallel)
3. Agreement creation and commitment; may fail and require return to previous stages
4. Handing over job control to remote Grid scheduler (responsibility remains at initiator)

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