



Semantic Web Fred
Framework and Demonstration
or
'my PhD-Thesis in 30 min'

Michael Stollberg, 14-Dec-2004

Content

1. SWF Framework

- Conceptual Architecture for SWS: realization & extensions
- Service Collaboration of Symmetric Partners

2. SWF demonstration

- SWF Use Case (virtual marketplace)
- Dynamic Discovery Management
- Architecture of Discoverers

all available at SWF journal paper draft (and in PhD thesis..)

Conceptual Architecture (CA) for SWS

C. Priest: *A Conceptual Architecture for Semantic Web Services*. In Proceedings of the 3rd International Semantic Web Conference (ISWC 2004), 2004, pp. 395 - 409.

Main merits:

1. epistemology of “(Web) Service”:

1. = value adding ‘service’ from business perspective
 2. = (re)usable computational resource invocable over WS technologies
 3. = negotiation protocol between requester and provider
- => a Web Service contains all 3 aspects

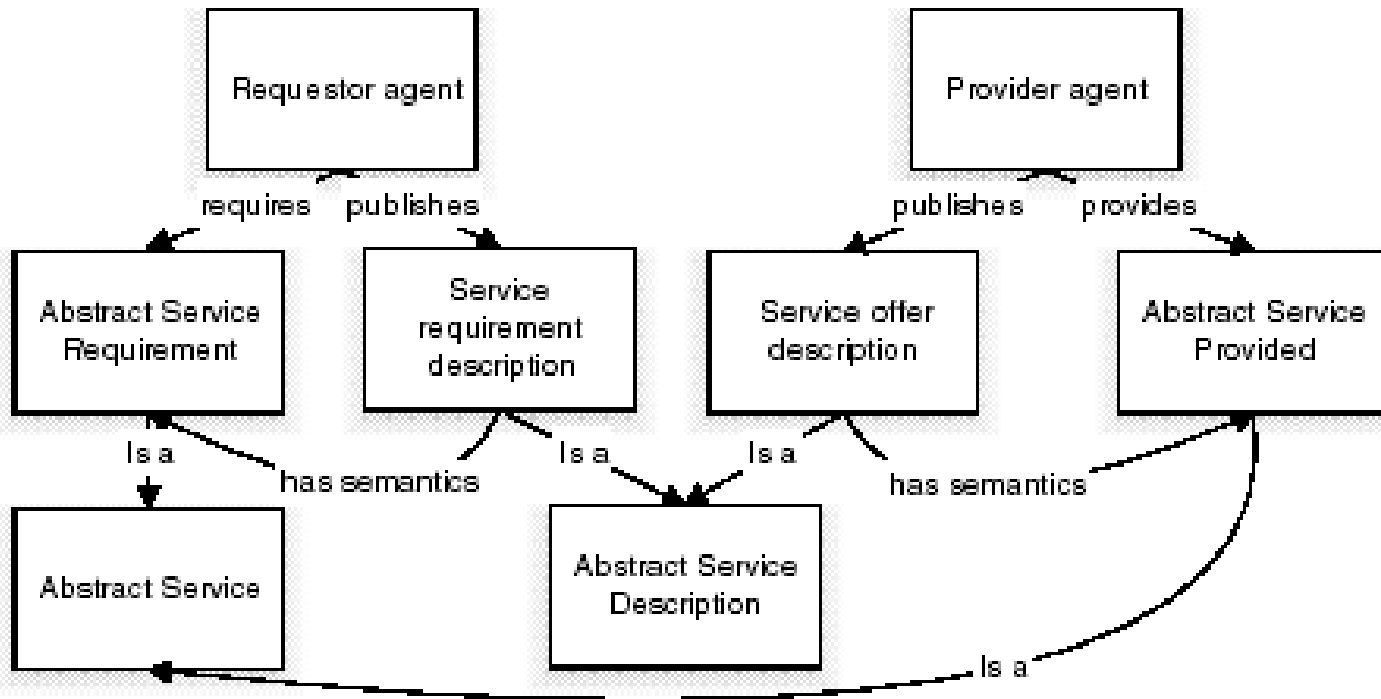
2. types of services:

- concrete service = service executed / delivered
- abstract service (has service description)
- agreed service (functionality, usage, and choreography agreed between requester and provider)

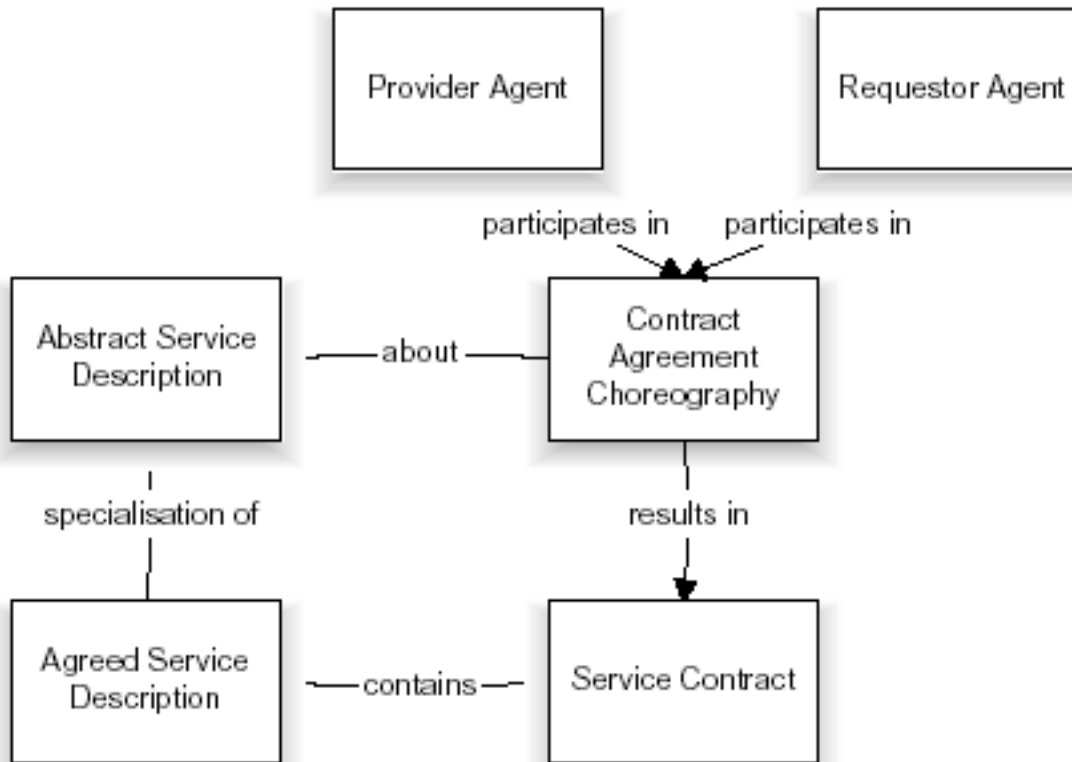
3. 3-step service usage process

incl. which service types are used or derived

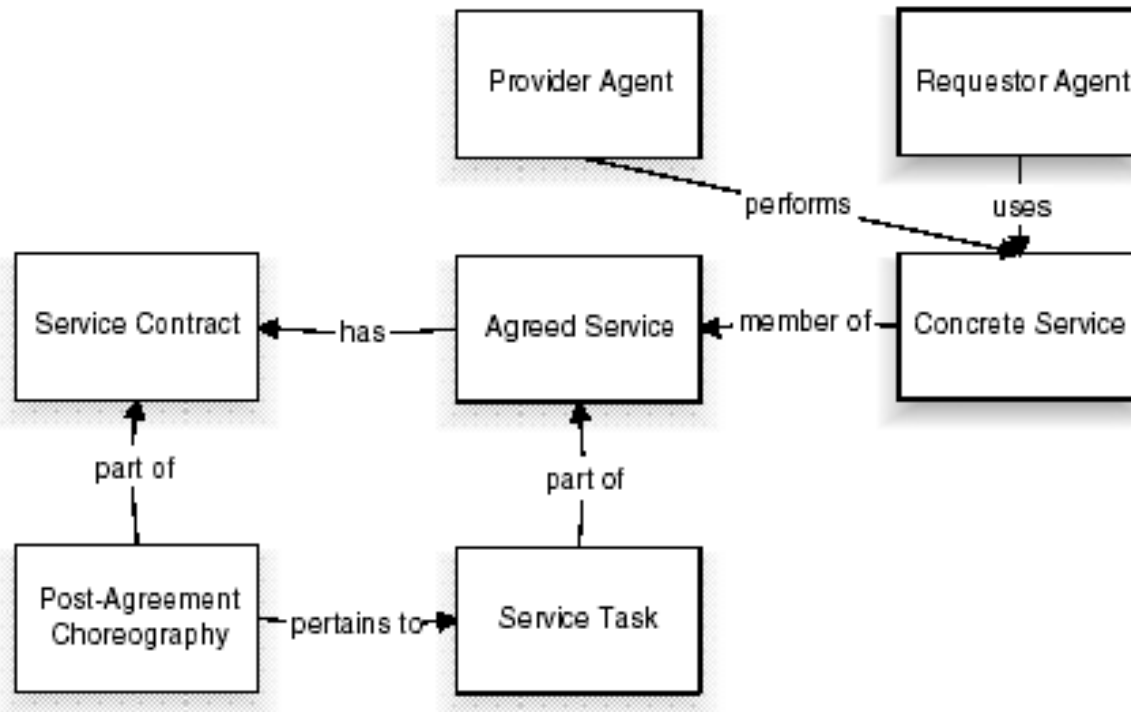
CA Step 1: Discovery



CA Step 2: Contracting



CA Step 3: Delivery

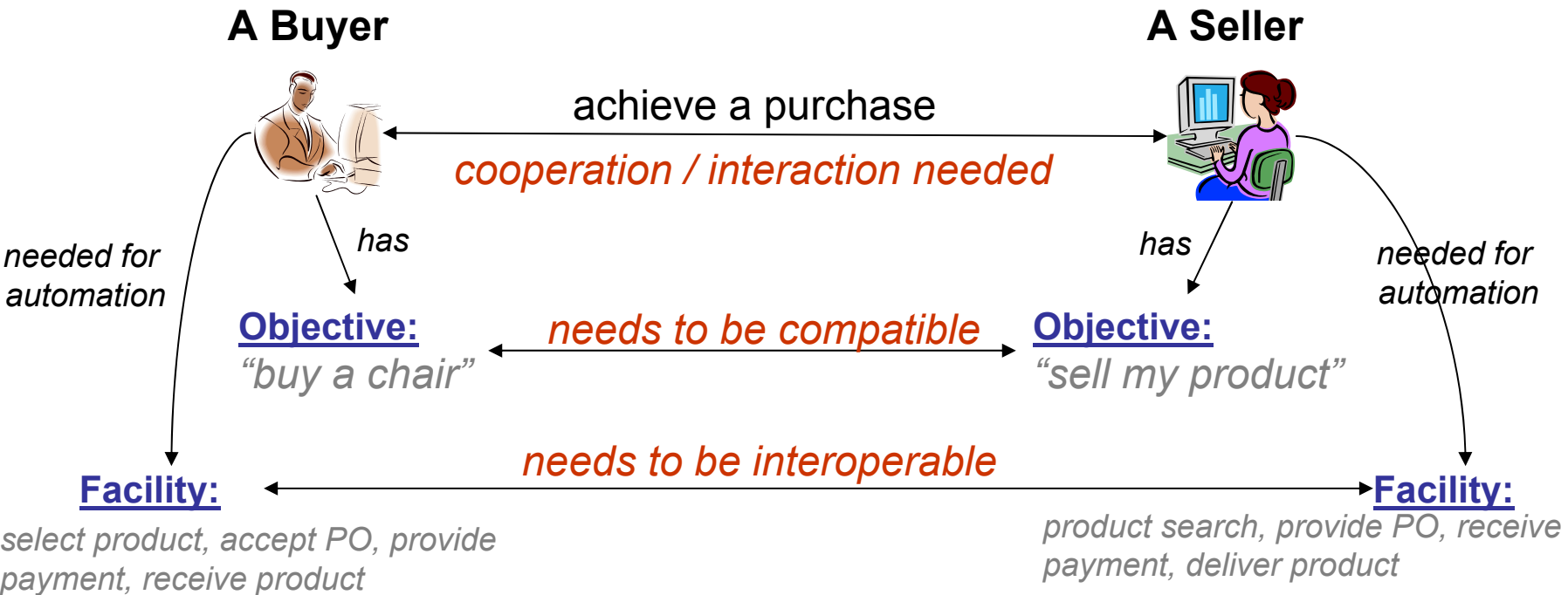


SWF Conceptual Model

- SWF:
 - extends CA by:
 - electronic representatives of “agents” (= entities involved with service usage & provision)
 - collaboration of services with minimal intervention of “agents”
 - WSMO 1.0 enabled
- Approach for Automated Collaboration
 - real world Collaboration Model
 - mapping to technical system
- SWF components
 - overview and interplay of system components
- SWF elements
 - Freds, Goals, Services
 - Supportive WSMO elements: Ontologies, Mediators

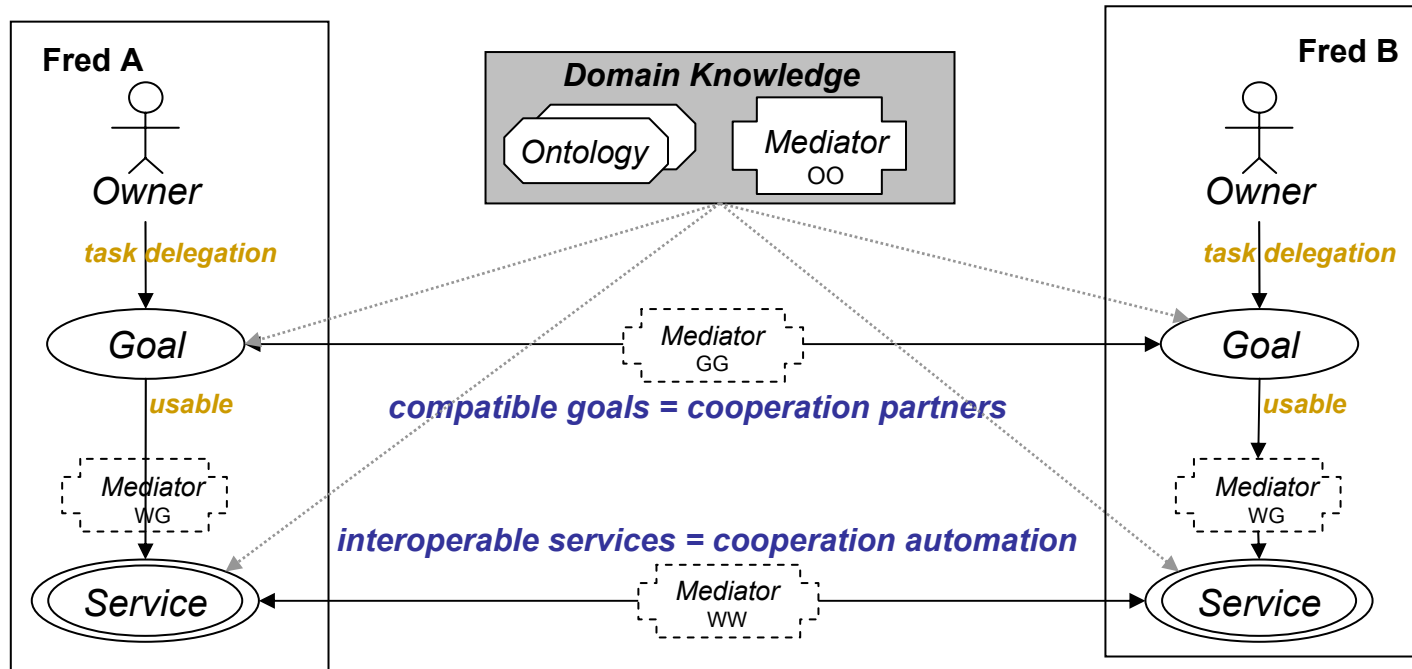
=> Cooperative Goal Resolution as Automated Semantic Web Service Collaboration

Real World Collaboration Model



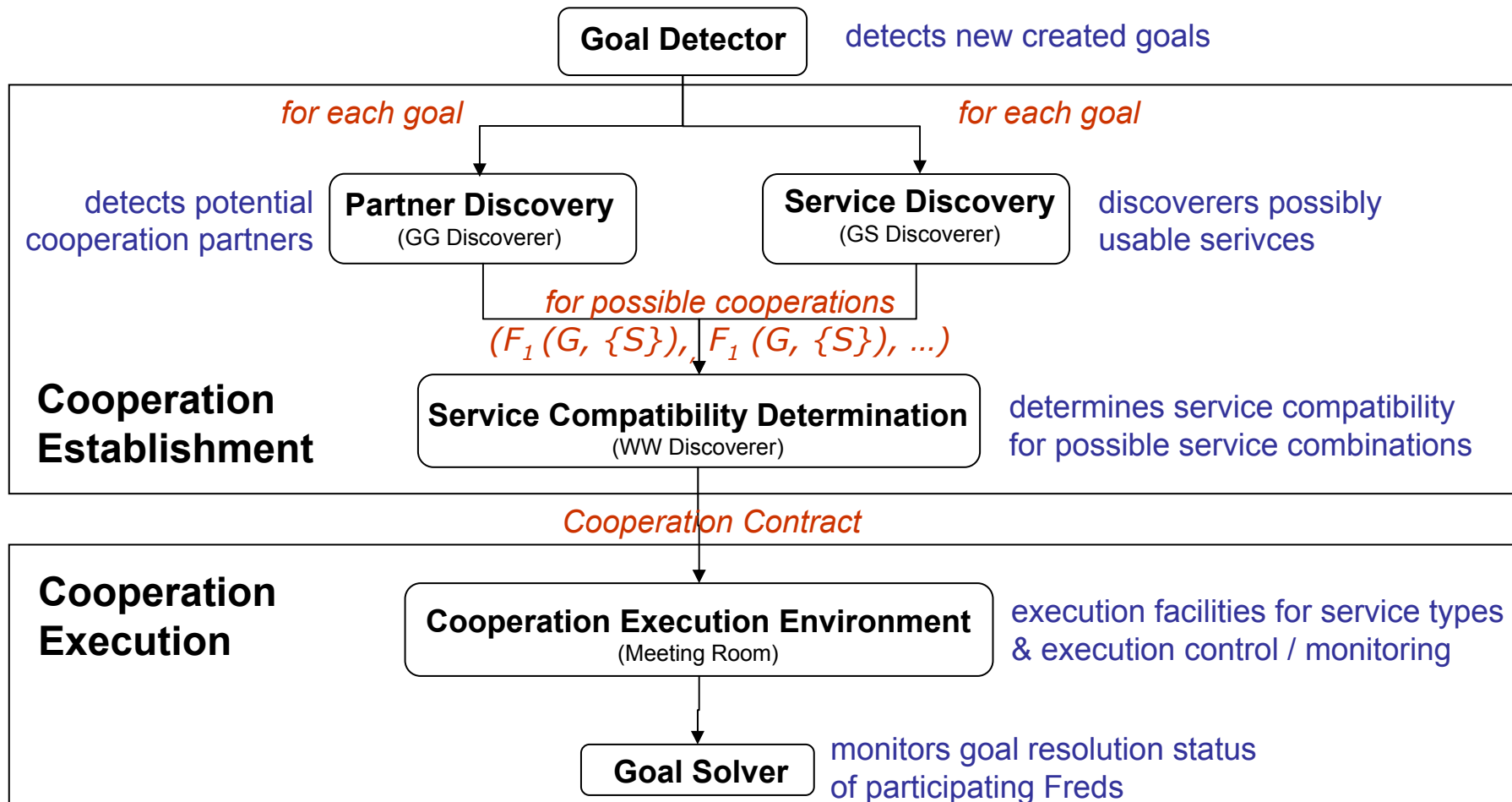
- every entity has objectives and facilities (symmetric partners)
- cooperation only if profitable for each party

Mapping to Technology

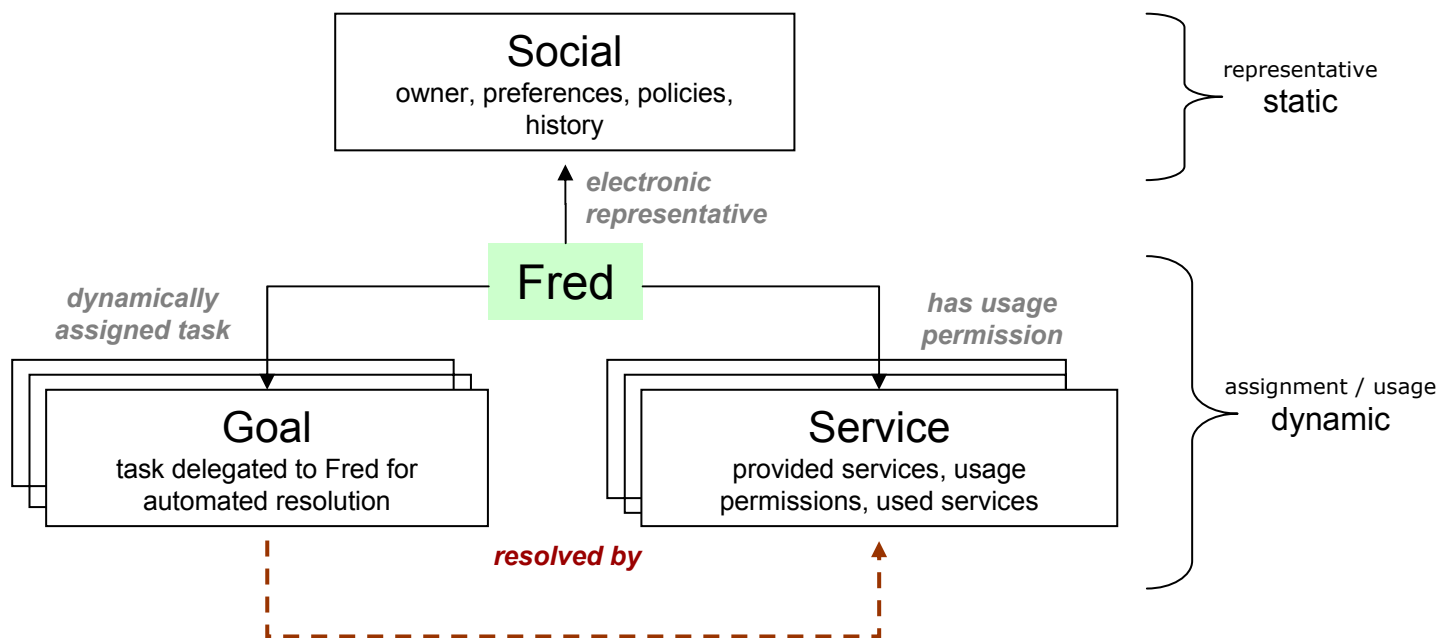


- symmetric cooperation partners
- cooperation partners = compatible objectives (goals)
- automated cooperation execution = service collaboration
- WSMO-enabled

System Components

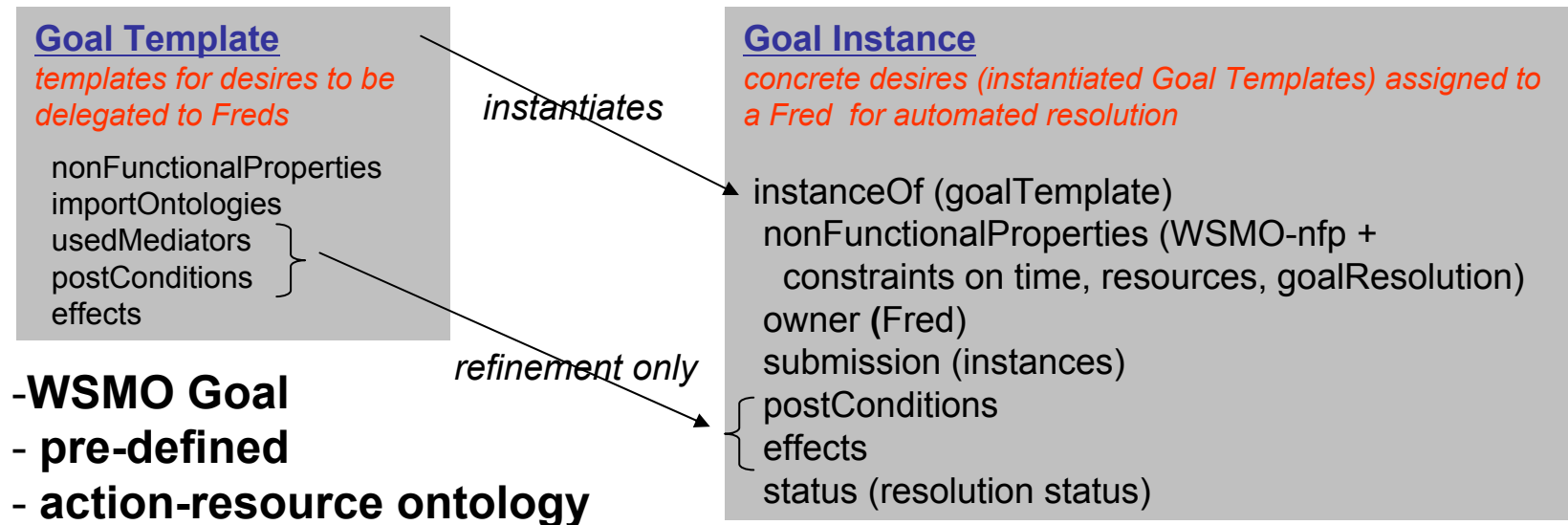


Freds



- electronic representative of entities involved in service usage & provision
- autonomous, goal driven, interface agent, cooperative
- not (pro / re) active: central system control

Goals



- extended WSMO 1.0 Goal definition
- Goal Instance Creation / Task Assignment to Freds
 - o by user via SWF user interface
 - o dynamically during cooperation establishment

Services

○ SWF Service Types

1. Plans = internal service implemented in Java
2. Process = multiple-step / nested service
3. external Web Services (invoked via WSDL description)

Services

*a computational resource available in the system, described as WSMO
Web Services*

nonFunctionalProperties **ofType** nonFunctionalProperties
importOntologies **ofTypeSet** ontology
usedMediators **ofTypeSet** {ooMediator, wgMediator}
capability **ofType** capability
 preconditions **ofTypeSet** axiom
 assumptions **ofTypeSet** axiom
 postconditions **ofTypeSet** axiom
 effects **ofTypeSet** axiom
choreography **ofType** choreography

- **1 common service description language**
- **Orchestration not of interest**

Demonstration

Cooperation Establishment and Execution Walkthru

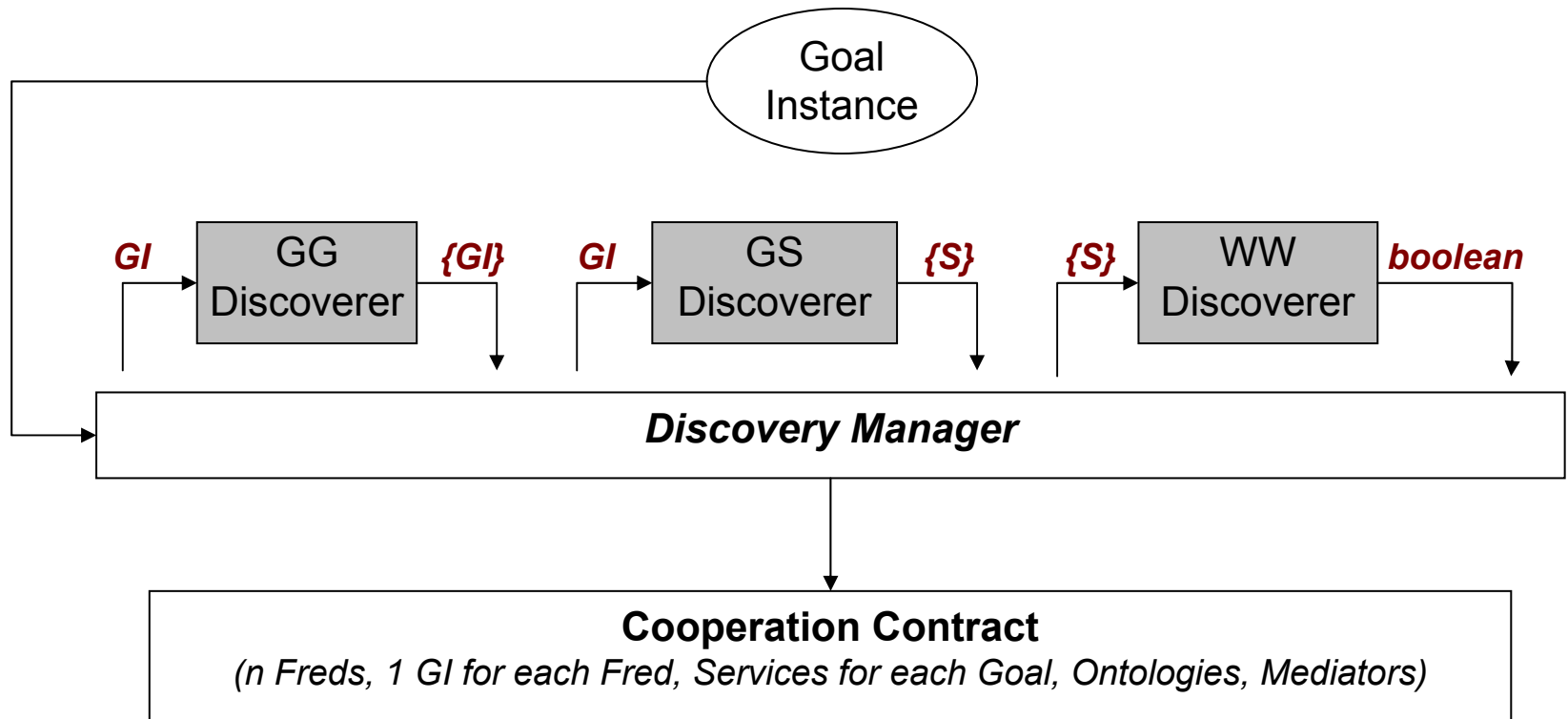
○ SWF Use Case

- virtual marketplace for purchasing furniture
- 3 domain ontologies: Furnishing, Marketplace, Location
- Freds, Goals, Services for Buyers & Sellers

○ Discoverer Realization

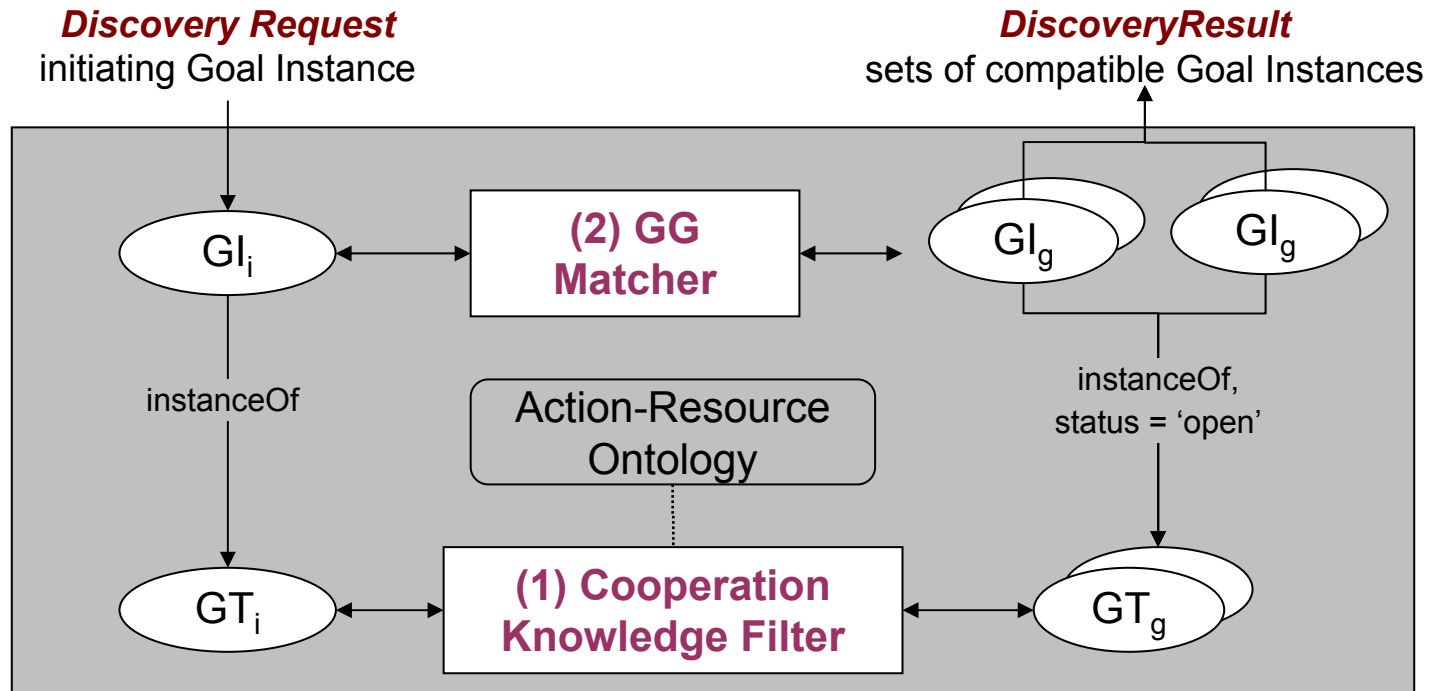
- General Architecture: Disc. Request -in- Discoverer -out- Disc. Result
- Action <-> Object Knowledge (action-resource ontology)
- Set-based resource modeling
- Matchmaking with Vampire

Dynamic Discovery Management



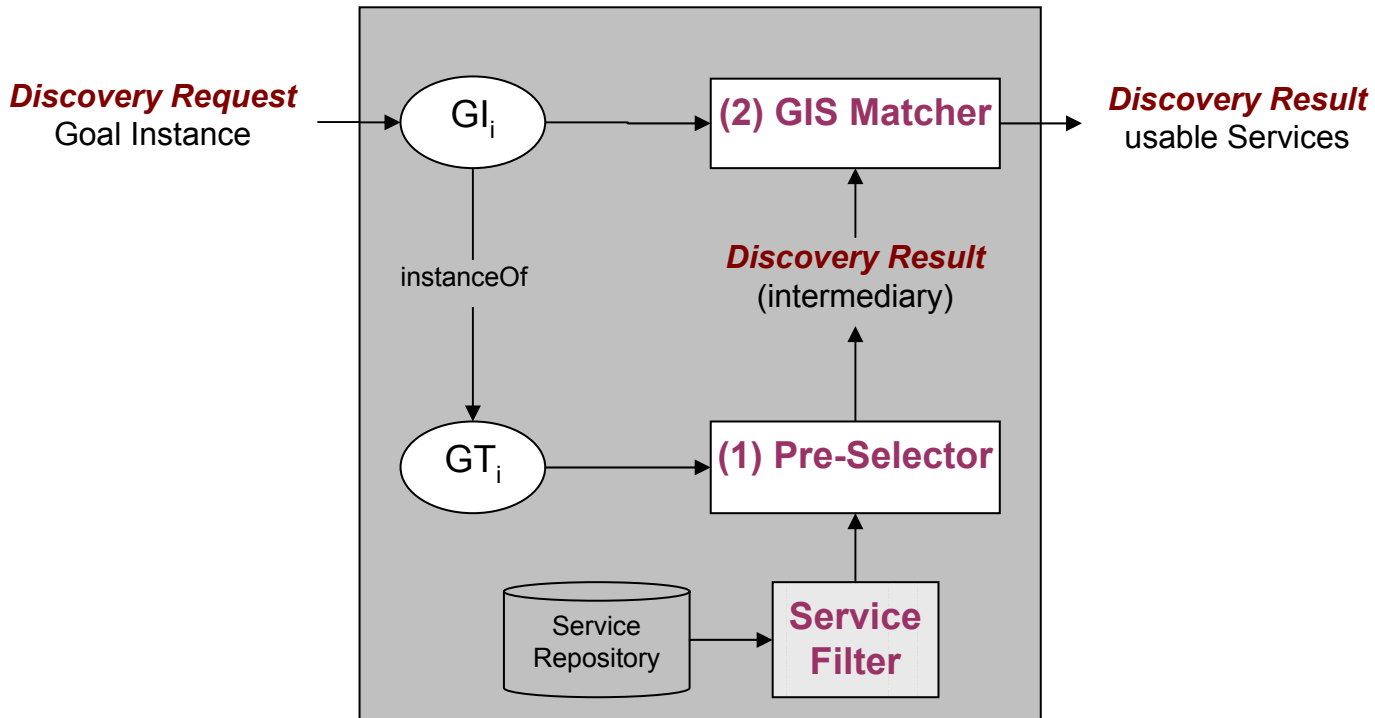
Partner Discovery

(GG Discoverer)



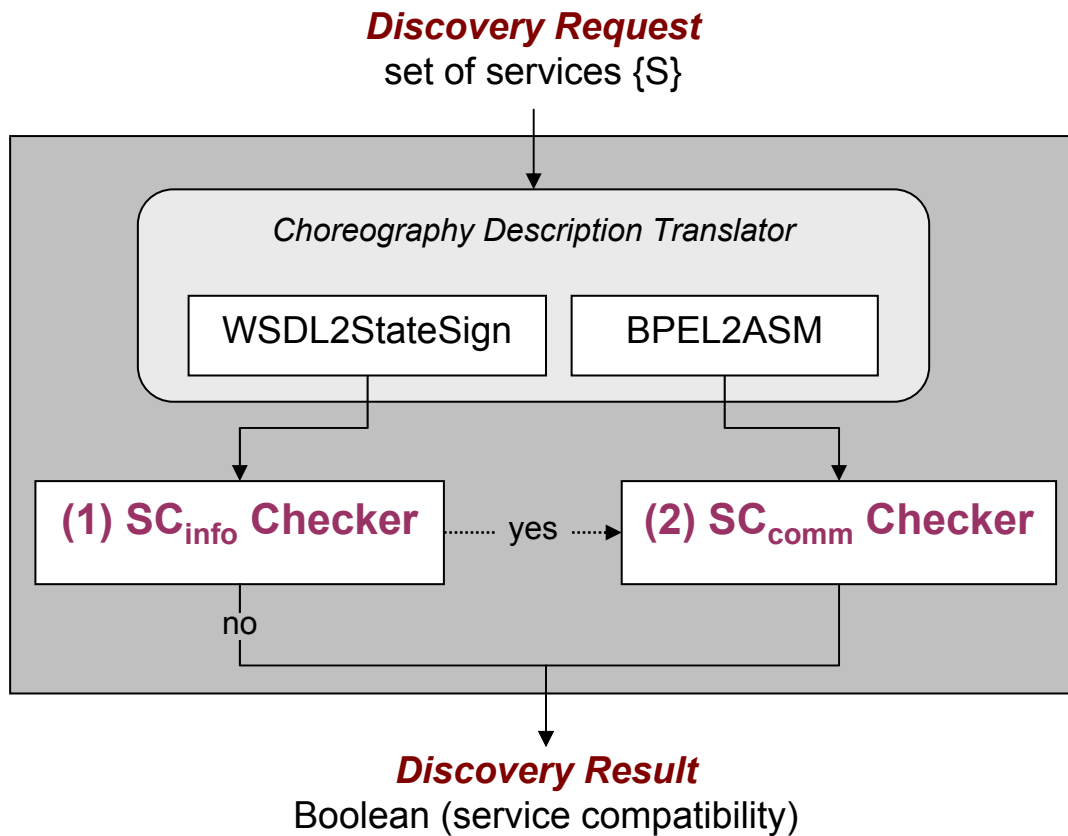
Service Discovery

(GS Discoverer)



Service Compatibility Determination

(WW Discoverer)



</ SWF – Automated Collaboration with Semantic Web Services >