

From WS-Agreement to SLA negotiation

Oliver Wäldrich
CoreGRID WP6 meeting, 14. March, Dortmund

Full Copyright Notice



Copyright (C) Open Grid Forum (2005,2006,2007,2008). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works.

The limited permissions granted above are perpetual and will not be revoked by the OGF or its successors or assignees.

Outline

- WS-Agreement overview
- Negotiation use cases
- Negotiation model
- Renegotiation use cases
- Renegotiation model
- Open issues

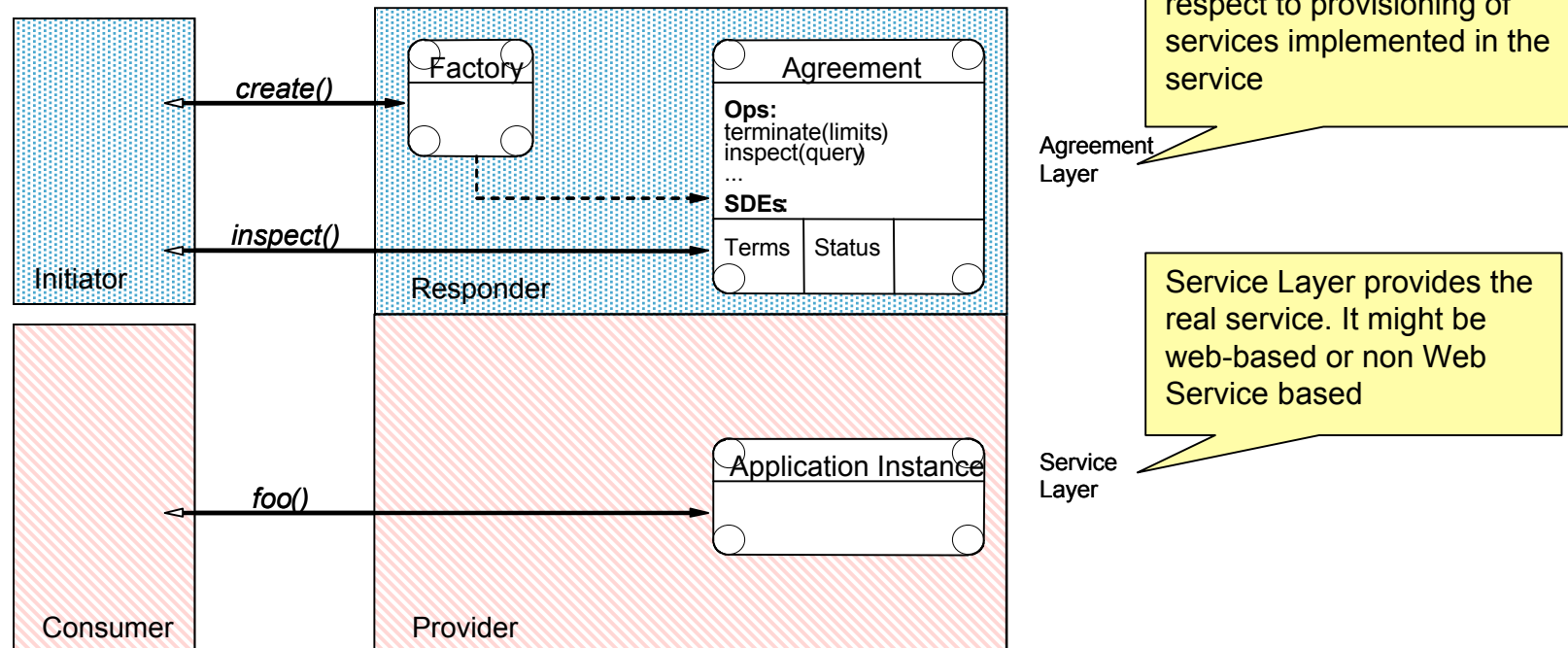
- **WS-Agreement**

- Term language to describe services, their properties, and associated guarantees
- Protocol bindings to create, monitor and terminate SLA
- Synchronous or asynchronous creation
- Proposed recommendation since may 2007

- **GRAAP WG**

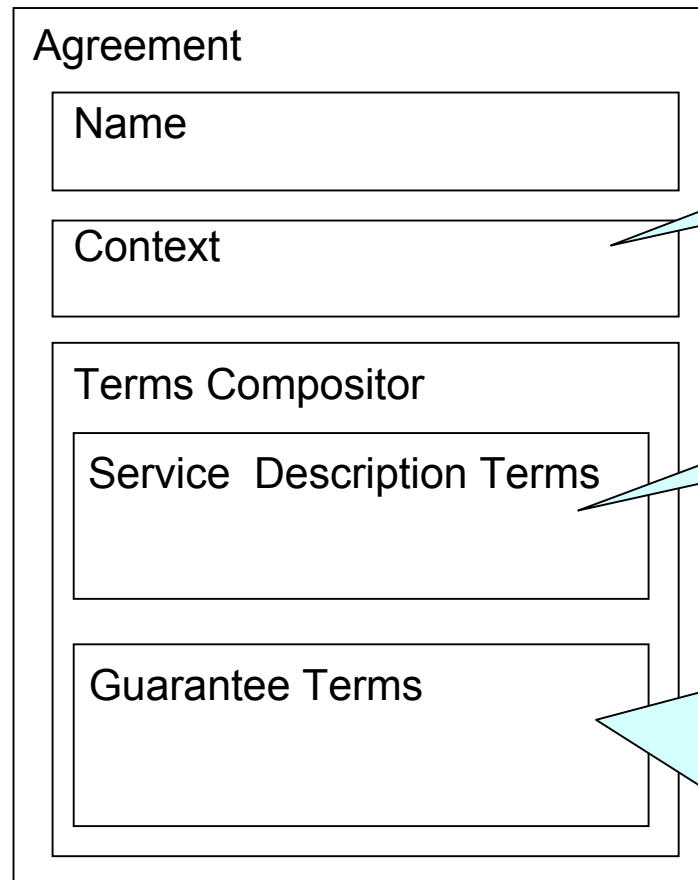
- Working group within OGF
- Grid Resource Allocation and Agreement Protocol Working Group
- Defines and maintains WS-Agreement
- Regular meetings and telephone conferences
- Interoperability tests between different implementations
- Initial discussions and work on WS-Negotiation

A Two Layered Model



- Whether an Agreement Initiator is a Service Consumer or Service Provider (i.e. Agreement Responder becomes a Service Provider or Service Consumer) is domain and application dependent.

Agreement Document Structure



Information about the Agreement Document

- AgreementInitiator
- AgreementResponder
- ExpirationTime
- etc.

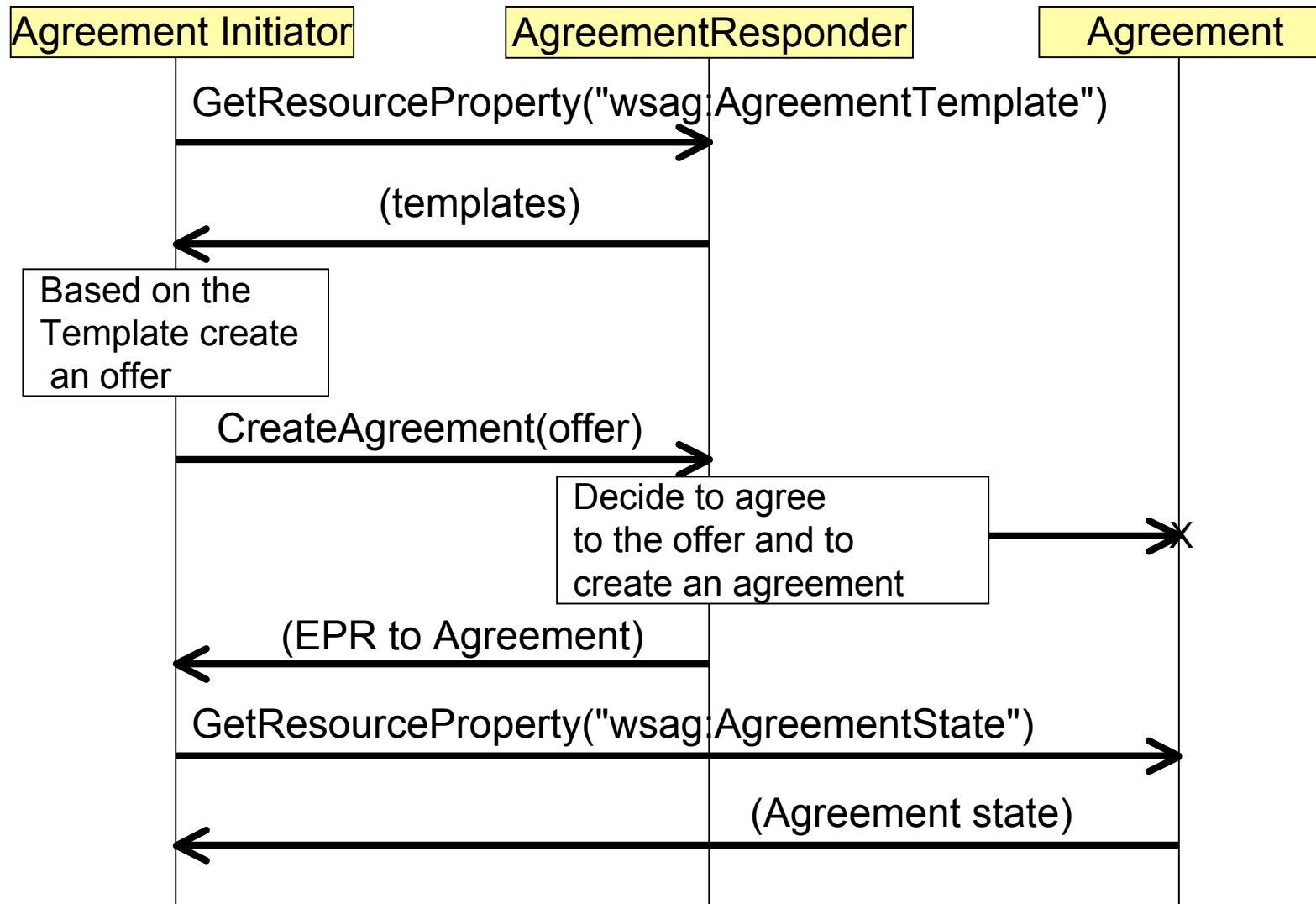
Information about the Service being provided

- Contents are Domain Dependent
- Eg.: Job Description(Program name, Number of nodes etc.)

Information about Service Levels which should be Guaranteed

- QualifyingCondition(An optional condition that must be met (when specified) for a guarantee to be enforced. Eg: Time span when the requests can be submitted: Weekdays, etc)
- ServiceLevelObjective: the condition that must be met to satisfy the guarantee. Eg: Needs 128 MB of memory available ..)

Agreement creation and monitoring



Negotiation use cases



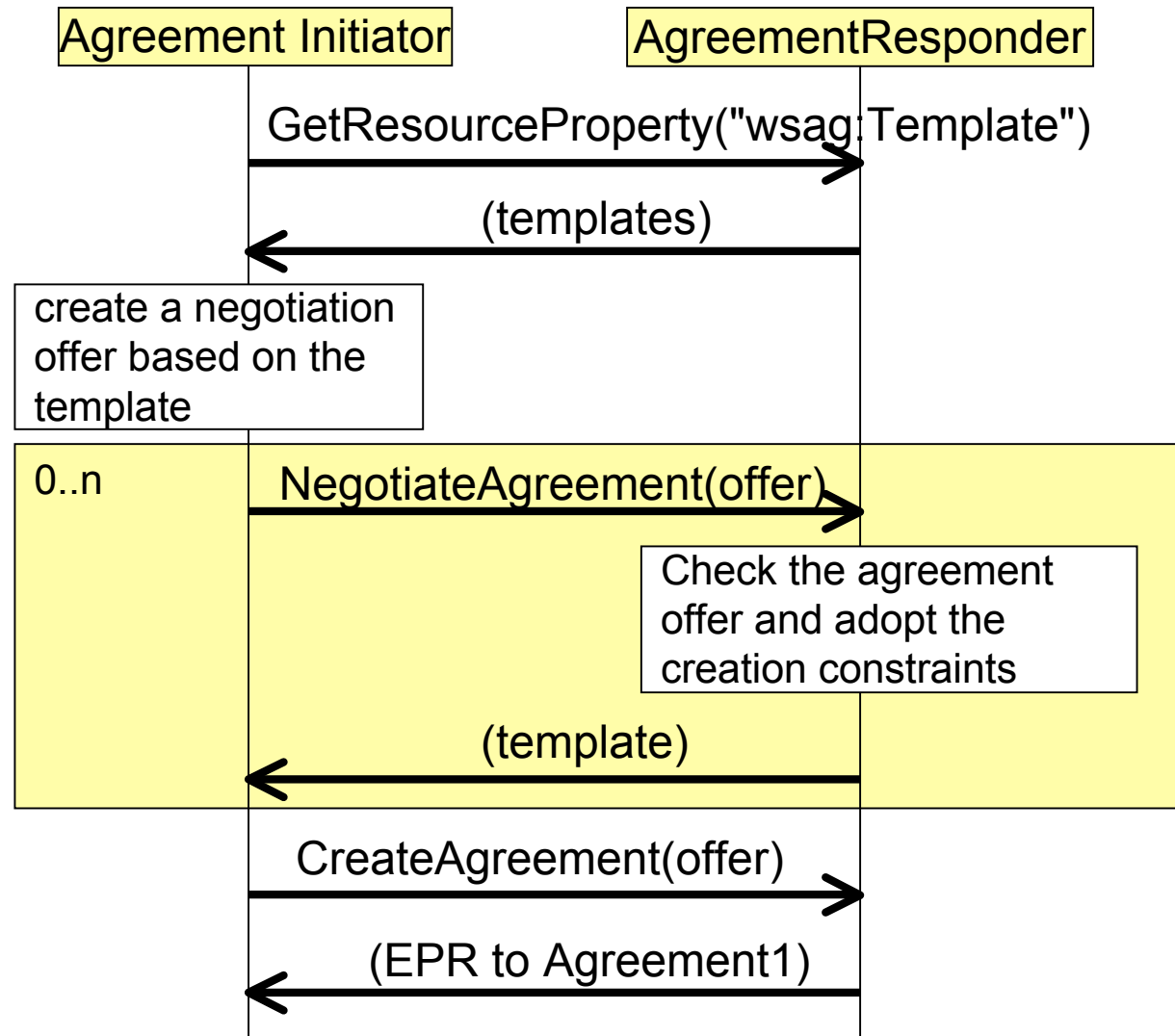
- **Assumption**
 - Templates mostly comprise static information
 - Negotiation is mostly on dynamic values (often time) or multi criteria
- **Negotiation of resource provisioning times**
 - A service provider (agreement initiator) needs to co-allocate resources in different domains
 - Therefore, he needs to find out which resource providers can provide the service at a certain time
 - Minimize creation of temporary agreements
- **Negotiation of multi-criteria agreements**
 - Minimizing turn around time with price optimization
 - Negotiation of amount of resources and price

Requirements for SLA negotiation



- Requirements
 - Iterative process (may include multiple rounds)
 - Indication of negotiable parameter
 - Indication of their parameter facets
 - Agreement responder should be able to adopt constraints
 - Reproducibility of negotiation paths
- Negotiation of agreement templates
 - Non-binding definitions of acceptable agreements
- Negotiation process initiation
 - By the agreement initiator
 - By the agreement responder (?)

Negotiation process



Renegotiation use cases



- **Reserving More Resources**
 - A service provider (agreement responder) a hosting service
 - A service consumer (web ticketing site) requested service sell concert tickets
 - The sales amount is growing and the service consumer needs more web server
- **Extension of Agreement Expiration Time**
 - A Service provider (agreement responder) provides a hosting service
 - A Service consumer (web shopping site) requested service to sell a new merchandise
 - Original request had been for a certain period
 - Sales amount is much more successful than had been expected
 - Service consumer decides that it would like to extend the service

Renegotiation use case



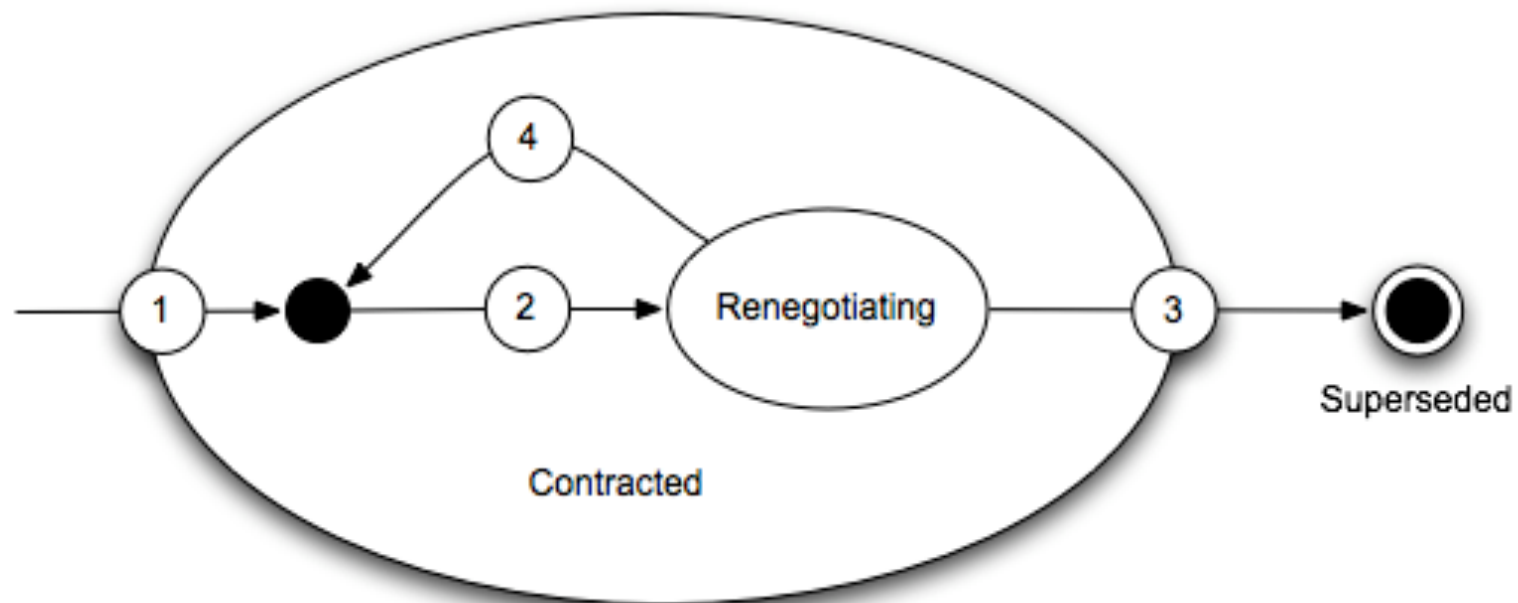
- **Asking for Releasing Resources**
 - A service provider (agreement responder) provides a hosting service
 - A service consumer, a web shopping site, had requested the hosting service in order to sell a new merchandise.
 - The service had been agreed upon and is being serviced
 - Due to unforeseen reasons (e.g. higher priority service consumer requests, server problems, etc.) the service provider realizes that it will not be able to fulfill the SLA
 - The service provider sends an agreement modification request to the service consumers

Renegotiation requirements



- **Renegotiation process may be initiated:**
 - by agreement initiator (use case 1&2)
 - by agreement responder (use case 3)
- **Consistent state model for agreement negotiation**
 - Successful renegotiation
 - Renegotiation process results in new agreement
 - The old agreement becomes superseded
 - Unsuccessful renegotiation
 - The original agreement is still binding
- **Multiple rounds of renegotiation should be possible**

Renegotiation state machine



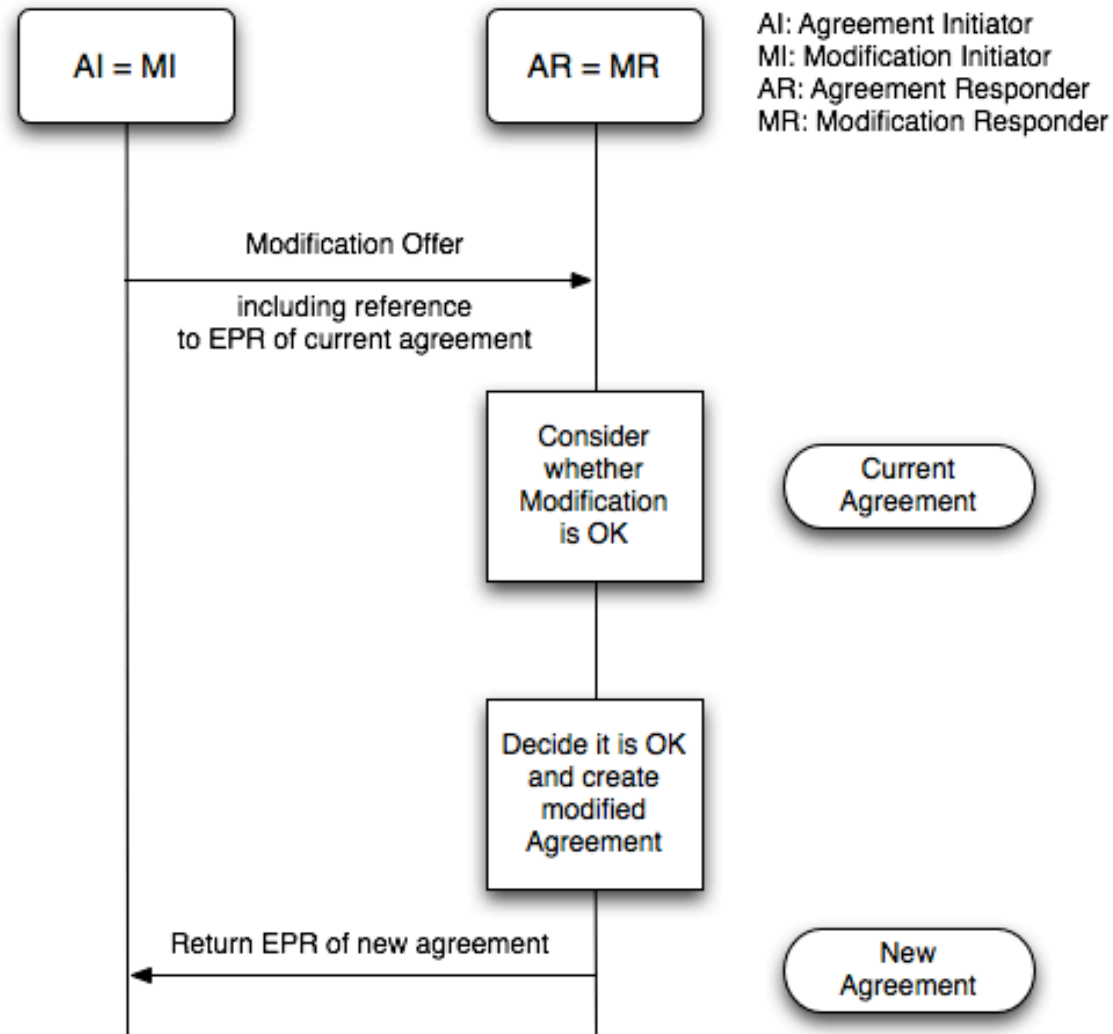
* From *A Contract Re-negotiation Protocol*, Parkin et al.

Renegotiation for WS-Agreement

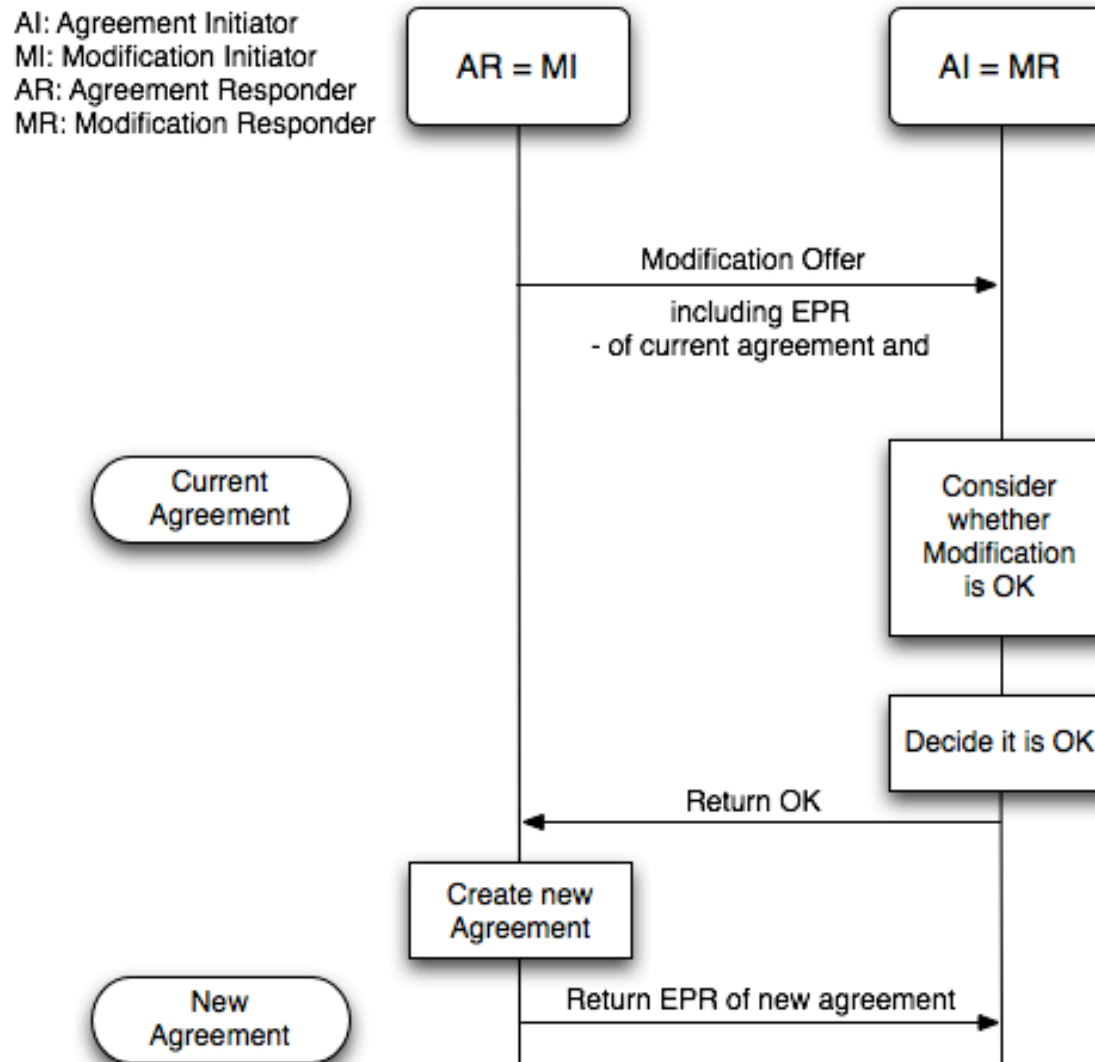


- **Assumption**
 - WS-Negotiation should be aligned with WS-Agreement specification
- **Renegotiation process was successful**
 - Agreement initiator and responder found an acceptable solution
 - New agreement is created
 - Original agreement becomes superseded
- **Problems with modification of agreements**
 - The agreement is a resource hosted by the agreement responder
 - Modification initiated by initiator of the negotiation
 - Modification initiator might be agreement initiator or agreement responder

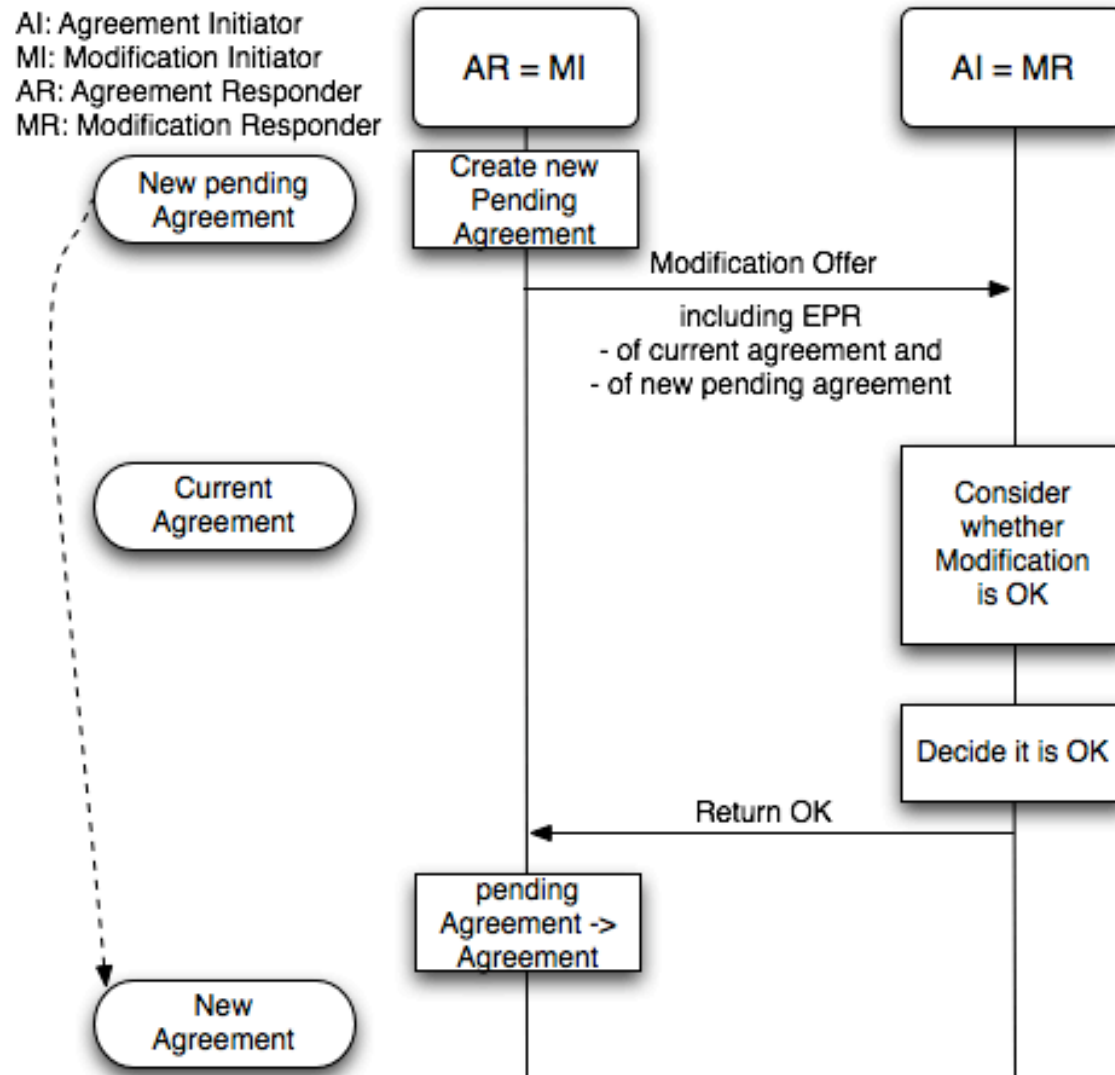
Modification of the agreement



Modification of the agreement



Modification of the agreement



How to solve these issues

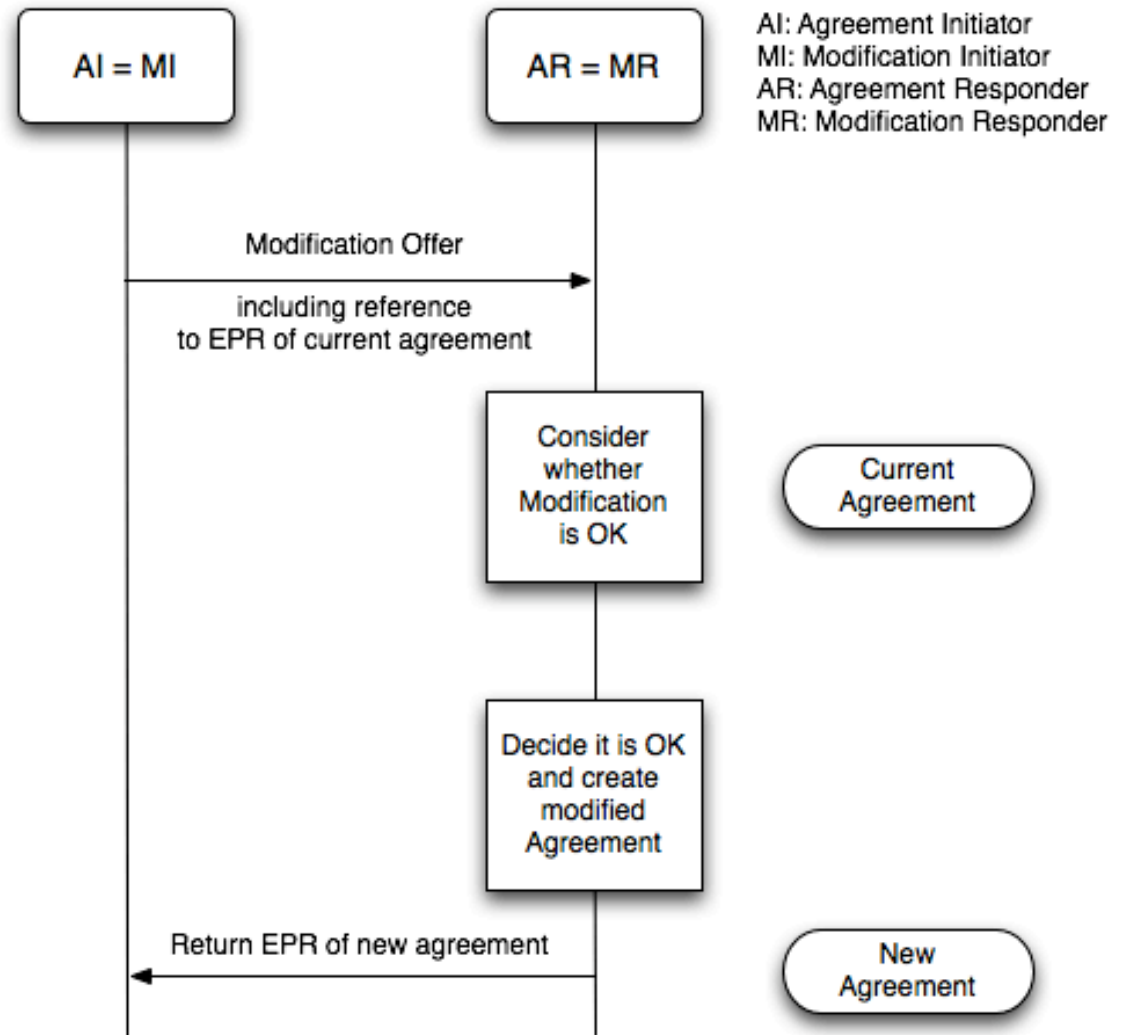
- **Assumption**

- Negotiation initiator is Modification initiator
- Therefore, modification initiator may be agreement initiator or agreement responder

- **Better solution**

- Negotiation initiator may be agreement initiator or agreement responder
- modification initiator must be agreement initiator

- Discussion in the group



Summary

- Collection of use cases
- Wiki pages with renegotiation wish list on GRAAP gridforge sites
- Proposal for renegotiation model, protocol from M. Parkin et al.
- WS-Negotiation will be an extension to WS-Agreement
- Discussion if protocol rendering for WS-Agreement negotiation
- Negotiation and renegotiation still work in progress

*Still open issues and lots of discussions,
but work progresses.*