

# WS-DAI RDF(S) Specification Discussion

## DAIS Working Group

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# RDF(S) Specification Discussion Agenda



- Overview & Updates (*Isao*)
- Ontology Specification (*Miguel*)
- Querying Specification (*Isao*)
  - *Implementation Status&Plan*
- Discussions

# WS-DAI-RDF(S) Standard Structure

## What is all about?

- *Providing an access mechanism to RDF(S) data resources*

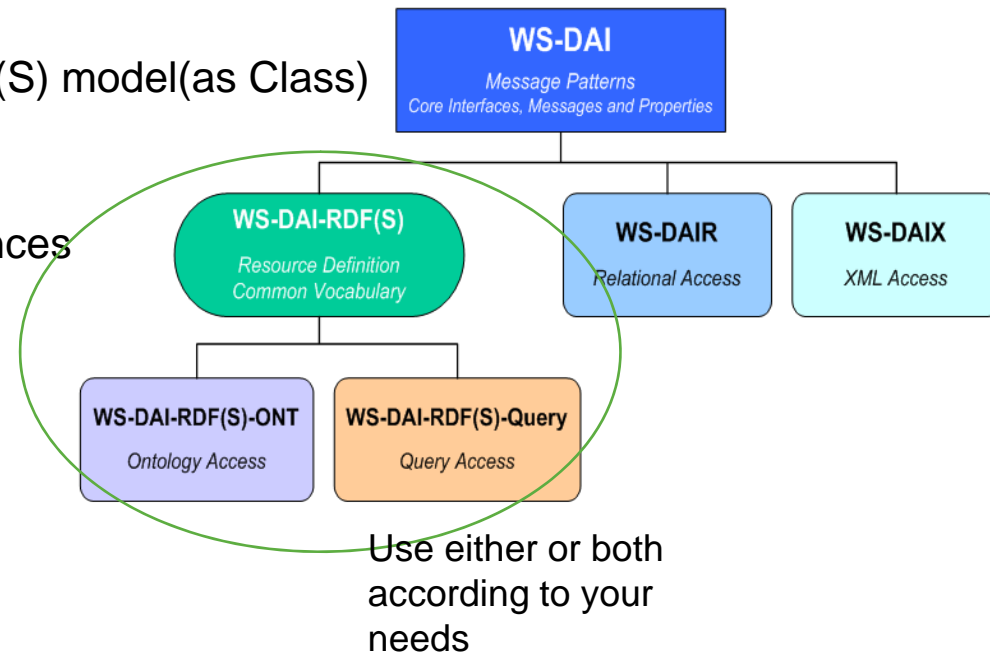
New WS-DAI realization for RDF(S) data  
which will consist of 2 complementary specifications

### 1. RDF(S) Ontology Access

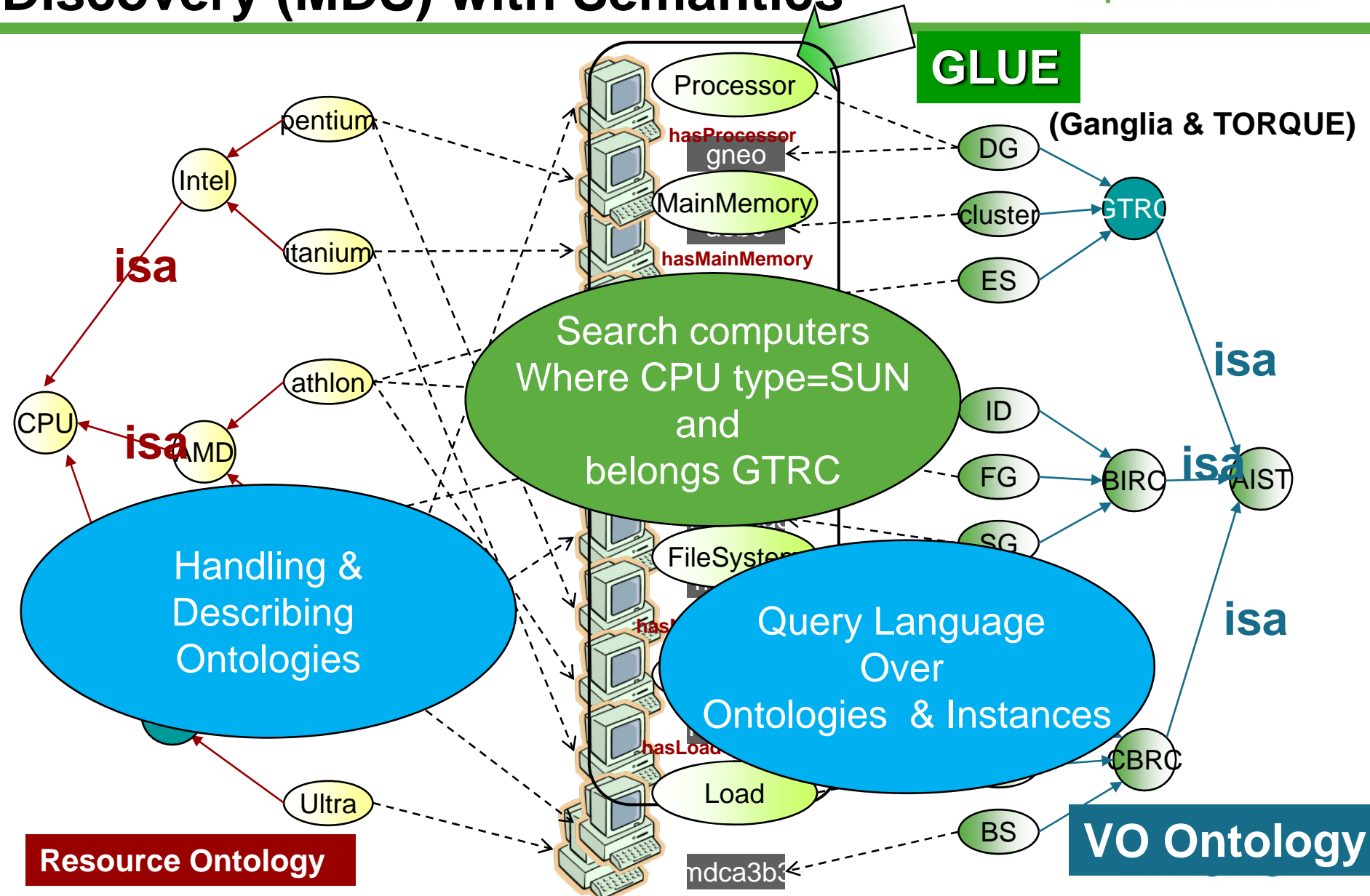
Ontological Primitives based on RDF(S) model(as Class)

### 2. RDF(S) Querying

Query Language(SPARQL) for Instances

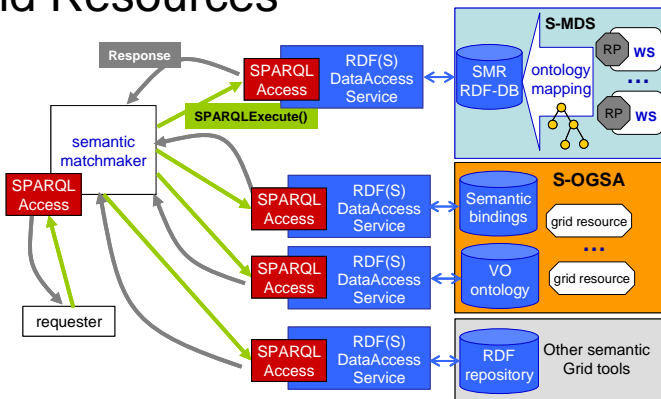


# Example : Grid Resource Monitoring & Discovery (MDS) with Semantics

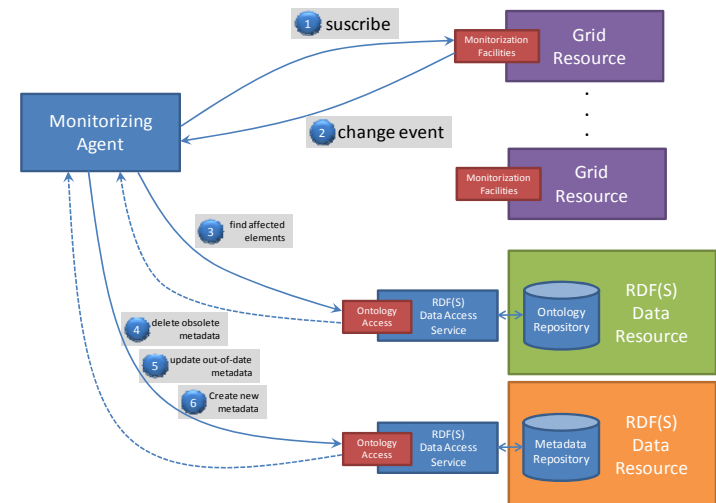


# Usecases – Semantic Web & the Grid

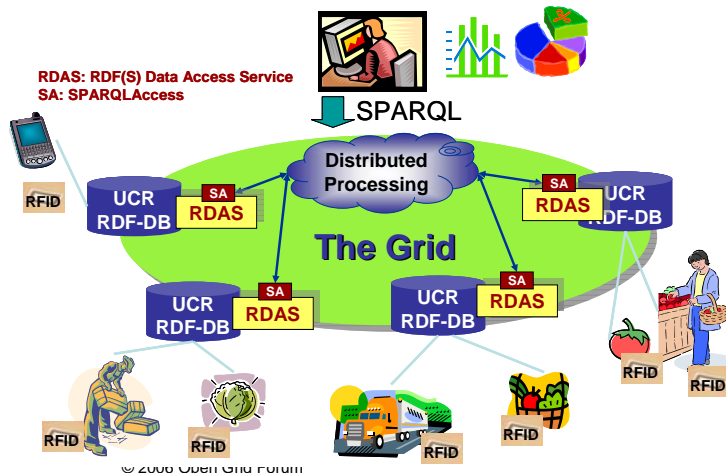
## Query-based Semantic Matchmaking for Grid Resources



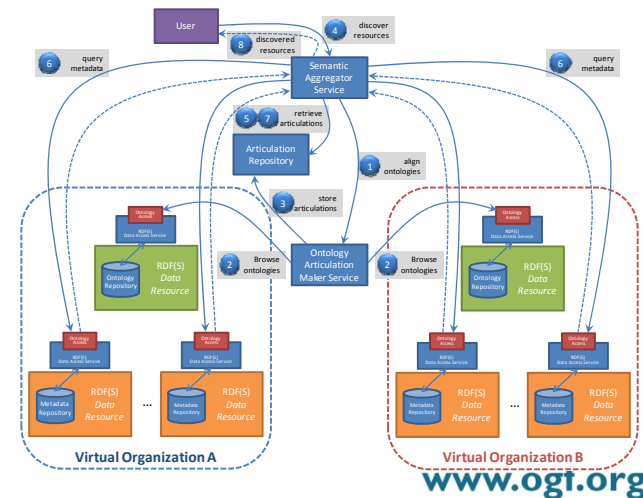
## Grid Resource Monitoring & Annotation



## Distributed SPARQL Processing for Distributed Metadata for RFIDs



## Aggregation of Heterogeneous Grid Resource Metadata



# Uniqueness of the Activity

- **In OGF**
  - Currently only one activity to set the standards for handling RDF data
- **Ontology Access**
  - No corresponding standards in W3C
- **Querying**
  - Support W3C SPARQL and related standards.
  - No indirect access is supported in W3C standards.
- **No such activity that supports both in a single framework.**

# DAIS for RDF: History

- **2006.02: GGF16 at Athens**
  - DAIS for RDF BOF: Share the Motivation
- **2006.05: GGF17 at Tokyo**
  - Charter Discussion
  - Focus on RDF and RDF Schema (RDF(S))
  - Scope/Roadmap/Deliverables
- **2006.06: RDF F2F at Edinburgh**
  - Decide to make an informational document
    - Motivational Document : Structure Discussion
- **2006.09: GGF18 at Washington**
  - Motivational Doc Presented
- **2007.02: OGF19 at Chapel Hill, NC**
  - 2 initial Specification Documents Presented
- **2007.05: OGF20 at Manchester**
  - Initial version of the “Glossary of the Terms” is presented
  - More Use Cases Presented.
- **2007.09: OGF21 at Seattle**
  - Documents updated
    - Glossary of Terms
    - Executive summary for Querying spec is presented.
  - Roadmap/Schedule is revised
- **2008.02: OGF22 at Boston**
  - Agreed Terms Presented
  - Documents updated



# Current Documents

## 4 documents are on the forge

*Please download and have a look*

1. **DAIS RDF(S) Background & Motivational Scenarios**
2. **WS-DAI RDF(S) Querying**
3. **WS-DAI RDF(S) Ontology Access**
4. **Glossary of Terms**



*Any comments and feedbacks are welcome*

## 5. Executive summary of Querying Specification

*Brief overview and motivational use cases  
- To promote this activity to wider audience*



# Terminology

- **RDF(S) Data Resource**
  - Data source/sink that is based on the **RDF data model + management infrastructure** which may exhibit **RDF(S) model** based views

## Relationships of Terms between 2 specs.

### *Ontology*

- **Repository**

- A set of RDF Triples

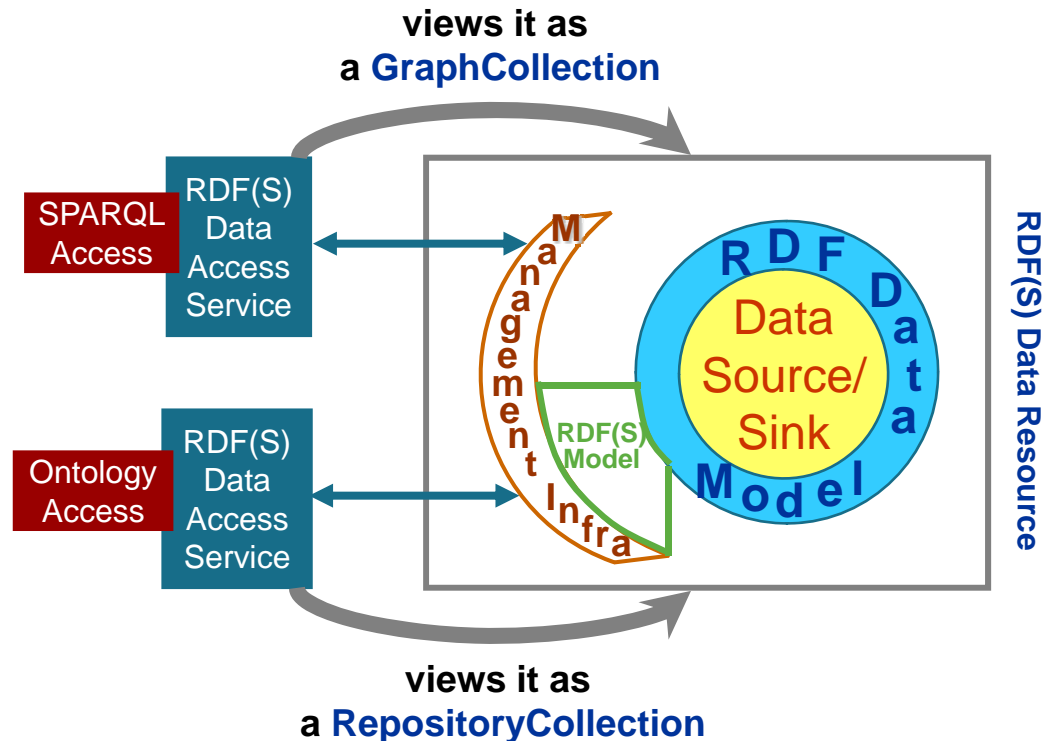
- **RepositoryCollection**  $\leftrightarrow$  **GraphCollection**

- A set of Repositories or RDF Graphs

### *Querying*

**RDF Graph**

# Terminology



- The naming duality is due to the way in which each specification views the RDF(S) data resources
- (The location transparent names via an End Point Identifier (EPI) can be used to identify the resource sameness)

- *Specification Document Updates*
  - *Based on the agreed terms.*
    - *Will be Presented Here*  
*Query Spec is almost stable*
- *Update the Charter to include RDF(S) Activity*
  - *Deliverables: Re-scheduled*

# **WS-DAI RDF(S) Ontology Access**

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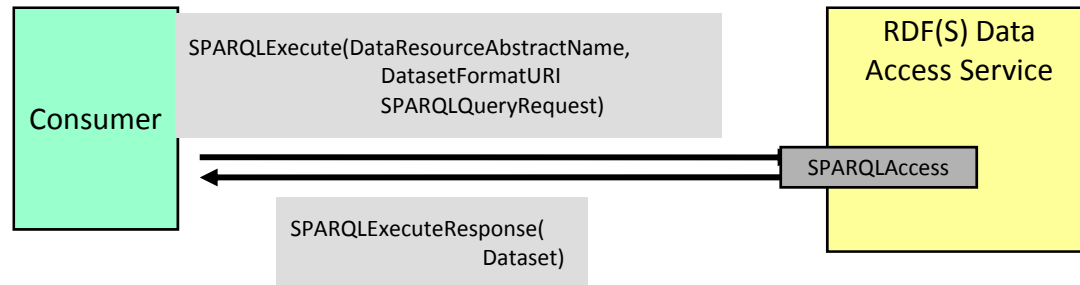
# **WS-DAI RDF(S) Querying Specification Discussions**

**OGF22 DAIS Working Group**

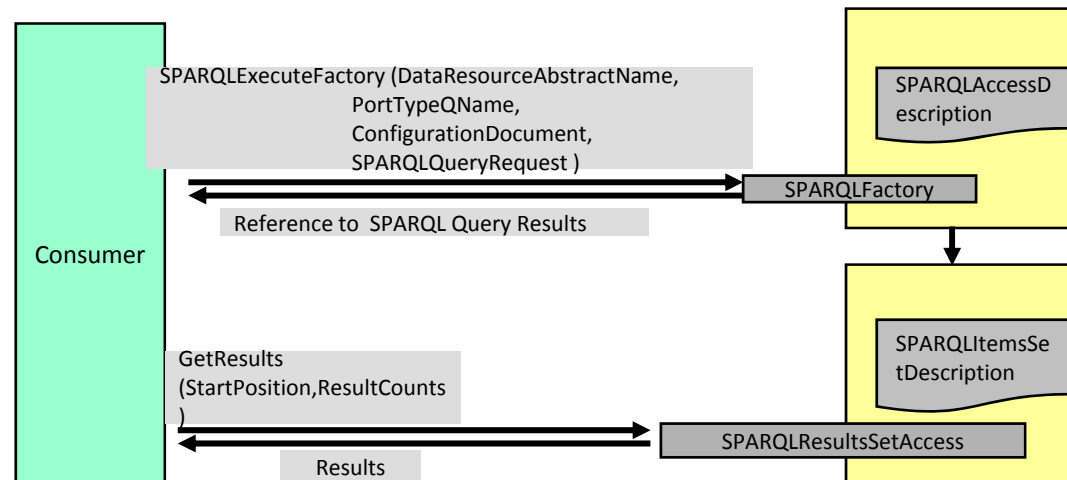
# Querying Specification Overview

- Direct and Indirect Access for RDF data using SPARQL
  - Based on the WS-DAI core model

## Direct Access



## Indirect Access



# Querying Specification Status

- Slightly modified
  - Based on the agreed terms.
  - Most of the current doc is already stable.
    - No serious impact

## AIST Implementation Started

- *Based on our OGSA-DAI-RDF*
- To support core WS-DAI
- To validate WSDLs in the spec document

▪



# Implementation: OGSA-DAI RDF

- A Set of RDF Processing Activities & Utilities
  - **V1.0 (DAI2.2 based) is available**
    - <http://dbgrid.org/OGSA-DAI-RDF>
  - **V2.0 (DAI3.0 based)**
    - Will be public as Technical Preview
    - **Currently Used for limited applications**
      - **Monitoring database of S-MDS**
        - Records history of monitoring data with OWL
        - Rule based statistical Processing
      - **Service Repository of AIST Semantic SOA**
        - Service Workflow is represented with RDF and stored.
      - **Federated SPARQL prototype**

# WS-DAI Implementation

- **RDF(S) specific interfaces are implemented**
  - WS-DAIRDF(S) Querying
  - All WSDLs in the RDF(S) Querying document is validated
  
- **Planned to demonstrate at SC08**
  - Will support WS-DAI core
  - Will support WS-DAIRDF(S) Ontology level 0
  
- **Currently No WS-DAI core support**
  - Our implementation is also based on OGSA-DAI3.0
  - Q: our implementation can be independent one with OGSA-DAI team?  
(Yes) Will create yet another WS-DAI core implementation  
Or :  
(No) Reuse OGSA-DAI based WS-DAI(X) codes

# Discussion Issues on Querying Spec



- New issue raised in terminology discussion
  - Need to support of *Reasoning/Inference* functions
    - Discussions still within AIST
      - Currently we have no good/agreed way to support it
  - Spec without reasoning
    - ➔ Already stable & completed
  - Spec with reasoning
    - ➔ Still need to discuss how to support it.

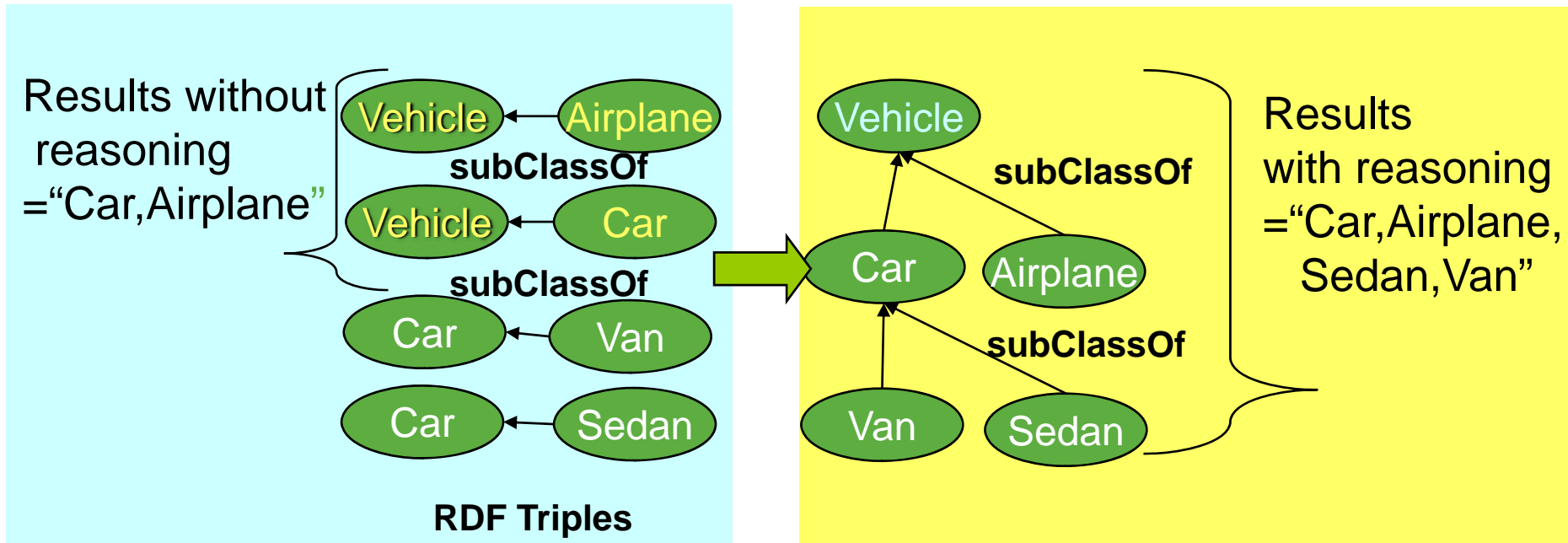
## Discussion:

**Submit current spec as Profile0?**

**Put the reasoning function into Profile1**

# Reasoning/Inference: introductory example

Query: Get the subclasses of “Vehicle”



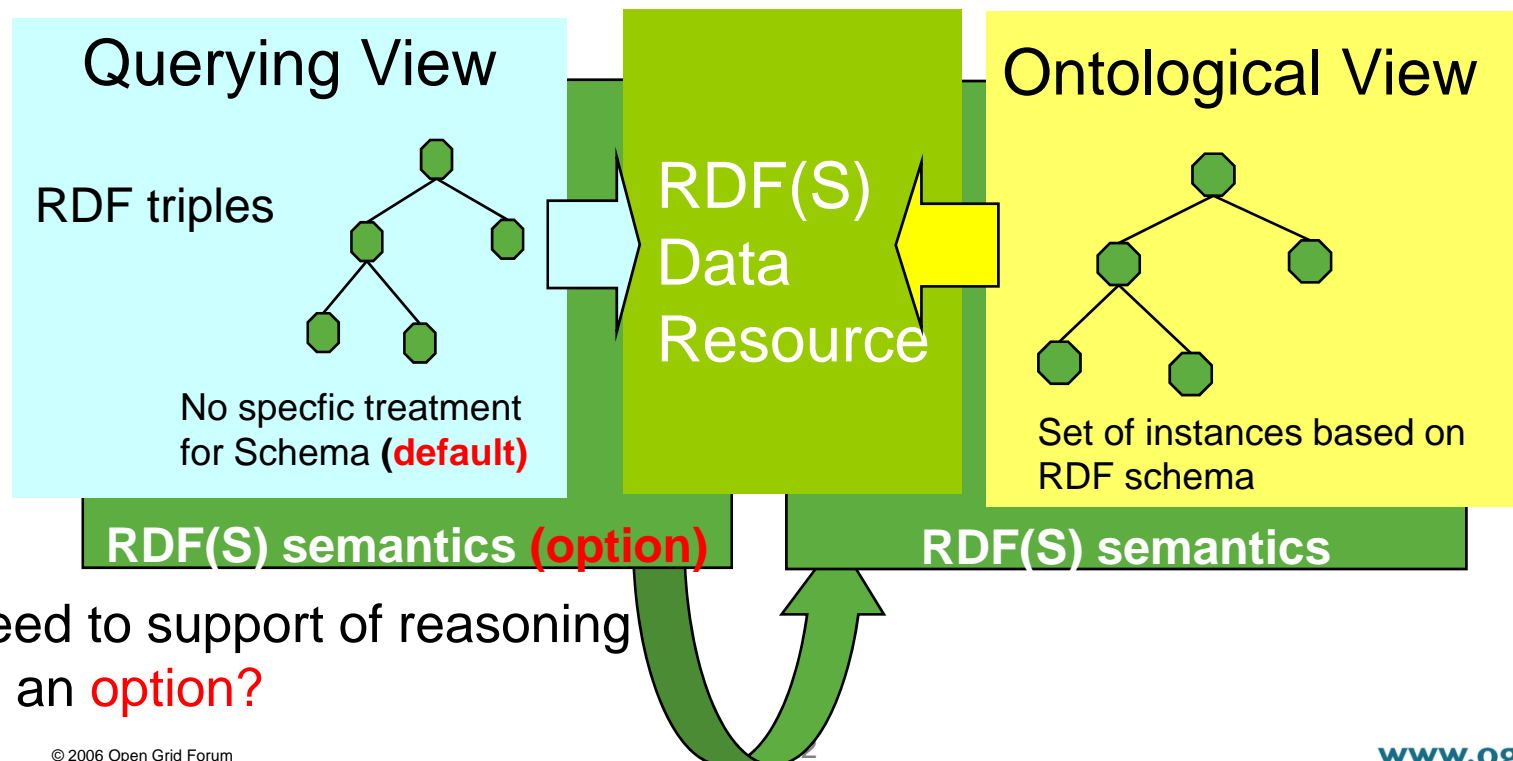
Reasoning is done by using some specific semantic model  
(**RDFS**, OWL-lite/DL/full, etc)

# Our RDF(S) Data Resource

- Querying = SPARQL is RDF triple matching/constructing language which focus on instances. (**withoas default**)
- Ontology= based on RDF(S) semanti**ut semantics** cs.

**These 2 specs share the same definition of RDF(S) data resource**

Difficult to use both in one application?



- W3C SPARQL and Related Standards.
  - *No support of reasoning*
    - SPARQL = Triple matching/constructing language which focus on RDF triples
    - Reasoning is out of focus of the querying standard.
- Existing Software Products
  - *Most of them supports reasoning*
    - In various ways

- Need of Reasoning?
  - **very useful**
    - One querying usecase assumes the reasoning
    - Our OGSA-DAI-RDF already supports reasoning...
  - **Originally out of focus of SPARQL standards**
    - Might collide with future W3C activity.
    - We left the update function for the same reason....
- How?



# Supporting Reasoning Functions with SPARQL Query Processing

## 1. Create inferred graph explicitly

- *Ex. Jena (, current version of our OGSA-DAI-RDF)*
  - Create a yet another graph as a result of the reasoning
  - Issue a query to the created graph.

## 2. Reasoning flag/switch when querying

- *Ex. Allegrograph*
  - Query processing engine supports reasoning option.
  - If the switch=true, the query processing is done with reasoning

## 3. Configure the resource whether it needs the reasoning or not

- *Ex. Sesame2*
  - Specify whether the resource uses reasoning or not when creating/configuring a resource.
  - The query to the resource is always done with reasoning when the resource is configured to do so.

# Current Possible Solutions

1. Define separate SPARQL interface
  - ex. SPARQLQuerywithRDF(S)reasoning
  - 1. No need to modify the current spec.
  - 2. Users should know different querying interface specs.
  - 3. Possible extension to have future SPARQLQuerywithOWLreasoning....?
2. Extend the current SPARQL interface
  - Add a parameter for the reasoning switch(true/false)
  - 1. Need to extend the current spec with adding parameters
  - 2. Will be difficult to have future extensions for other reasoning functions
    - It is very difficult for defining the parameter which supports various reasoning
3. Define the resource with configurable parameter
  - ex. Configurable description of the resource to support RDF(S) reasoning
  - 1. No need to modify the current spec.
  - 2. Seems to be an elegant solution
  - 3. Fixed type of reasoning is always done for the resource
    - = User could not specify whether he needs to perform the reasoning or not.

**User of the current system wants to specify whether the query uses reasoning or not.**

**(Sesame has the switch to include the inferred result.....)**

- Need of Reasoning?
  - **very** useful
    - One querying usecase assumes the reasoning
    - Our OGSA-DAI-RDF already supports reasoning
  - Originally out of focus of SPARQL standards
    - We left the update function for the same reason....
    - Might cause future batting with W3C activity.
- **How? – No good way at now.**
  1. Additional new query interface
  2. Add parameters
  3. Add Configurable DescriptionEtc.
- **Put this function to Profile1?**
- **Need to have Usecases?**
  - Which combines querying and ontology

# Discussions

## DAIS Working Group

## Directions & Schedules

- Glossary of Terms Doc.
- Motivational Doc.
- Specification Docs.