

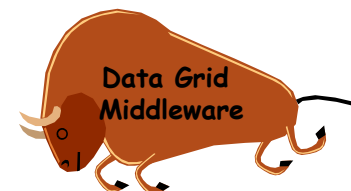
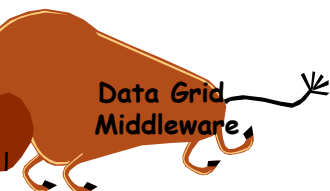


Overview of the DAIS specifications

Mario Antonioletti
DAIS Secretary/EPCC
mario@epcc.ed.ac.uk

What are Grids?

- Framework to promote/facilitate the sharing/collaboration of resources
 - Different requirements and environments need different solutions
 - There are no panaceas
- Need a framework to operate at the boundaries between different solutions
 - Independent of any single application/middleware implementation
 - Allows independent applications/middleware to inter-operate
- To do this we need agreed communications protocols to couple these systems
- Web services are the current vogue for doing this
 - Platform independent
 - Language neutral
- Still have an interoperability requirement
 - Importance of standards
- BUT



What is the correct standard/approach?

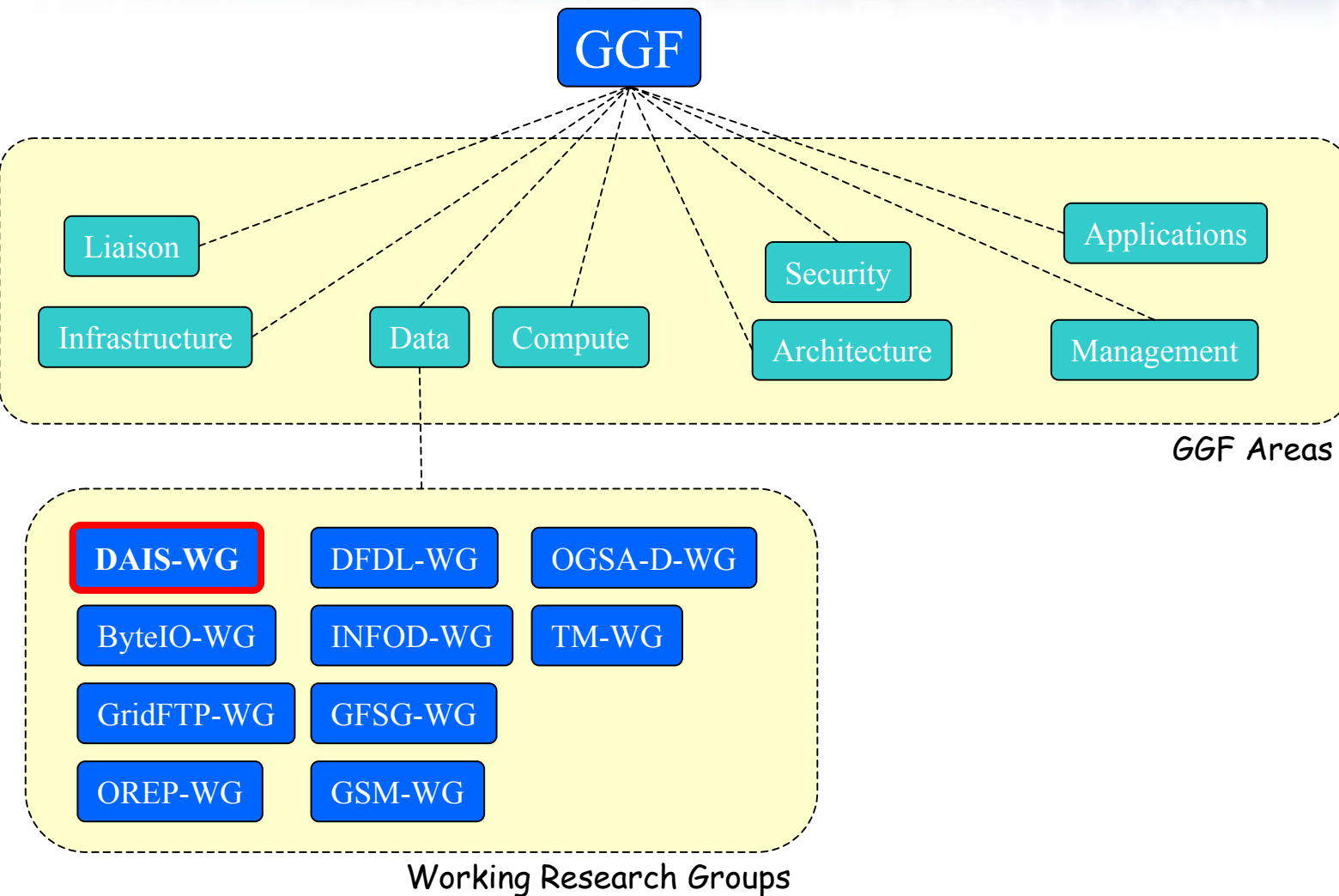
More, More, More ...

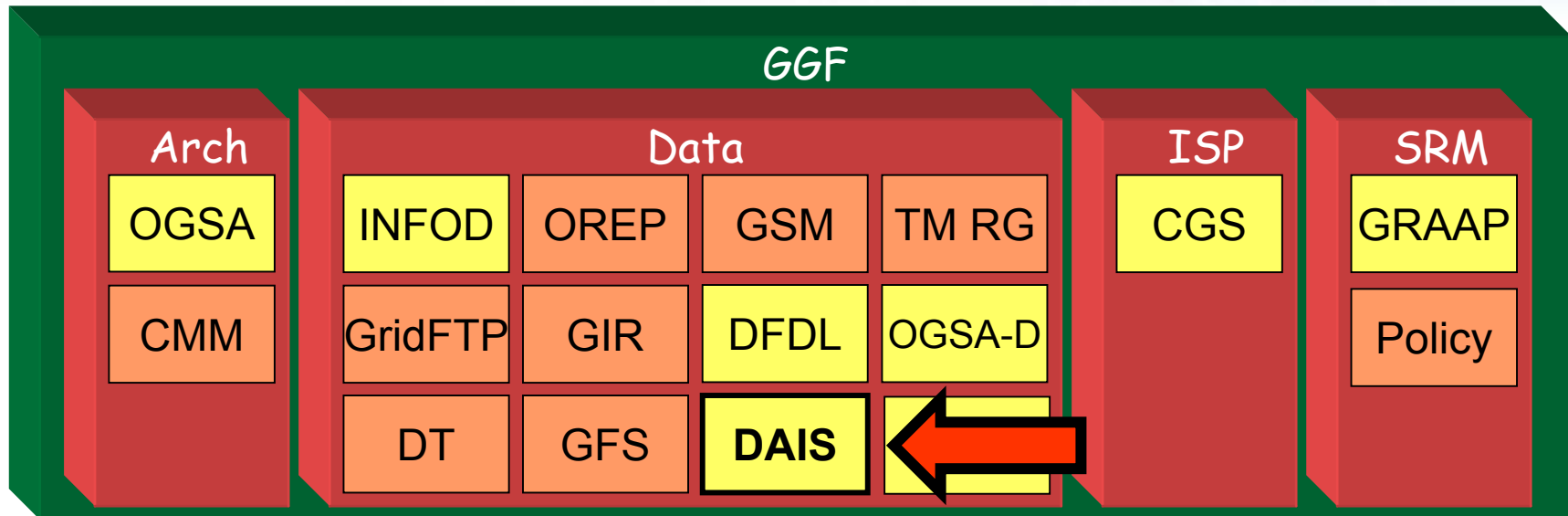


SRB
UDDI
GGF GDS
Service Groups
W3C
OGSA-DAI
OASIS
Namespaces
WS-DAI
WS-Resource
XML Schema
SOAP WSDL
GDSFIS
WS-Addressing
DAI



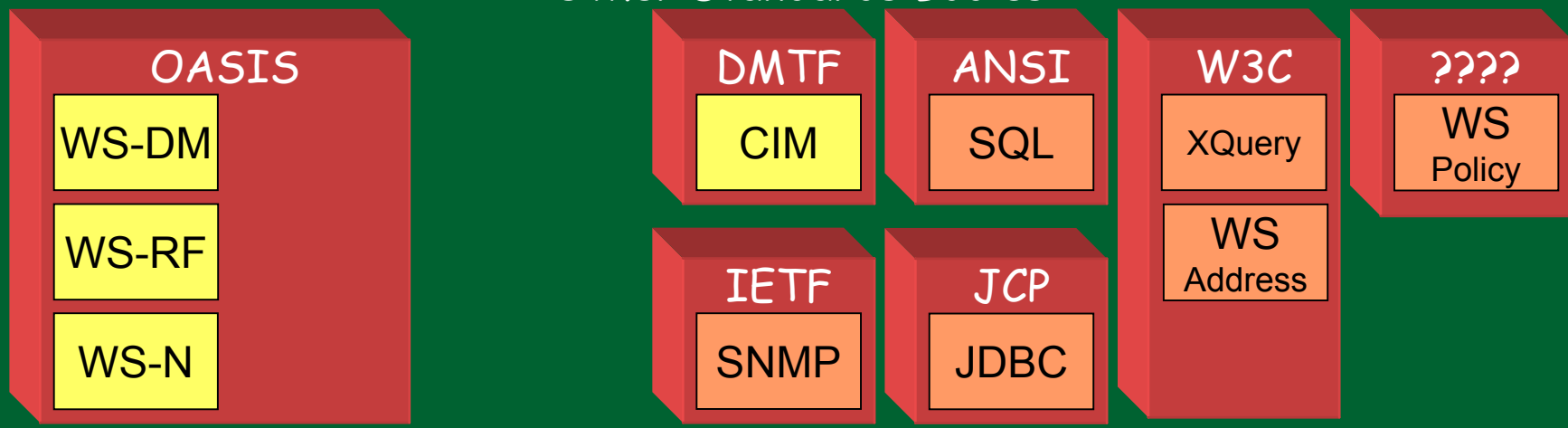






<http://forge.gridforum.org/projects/dais-wg>

Other Standards Bodies

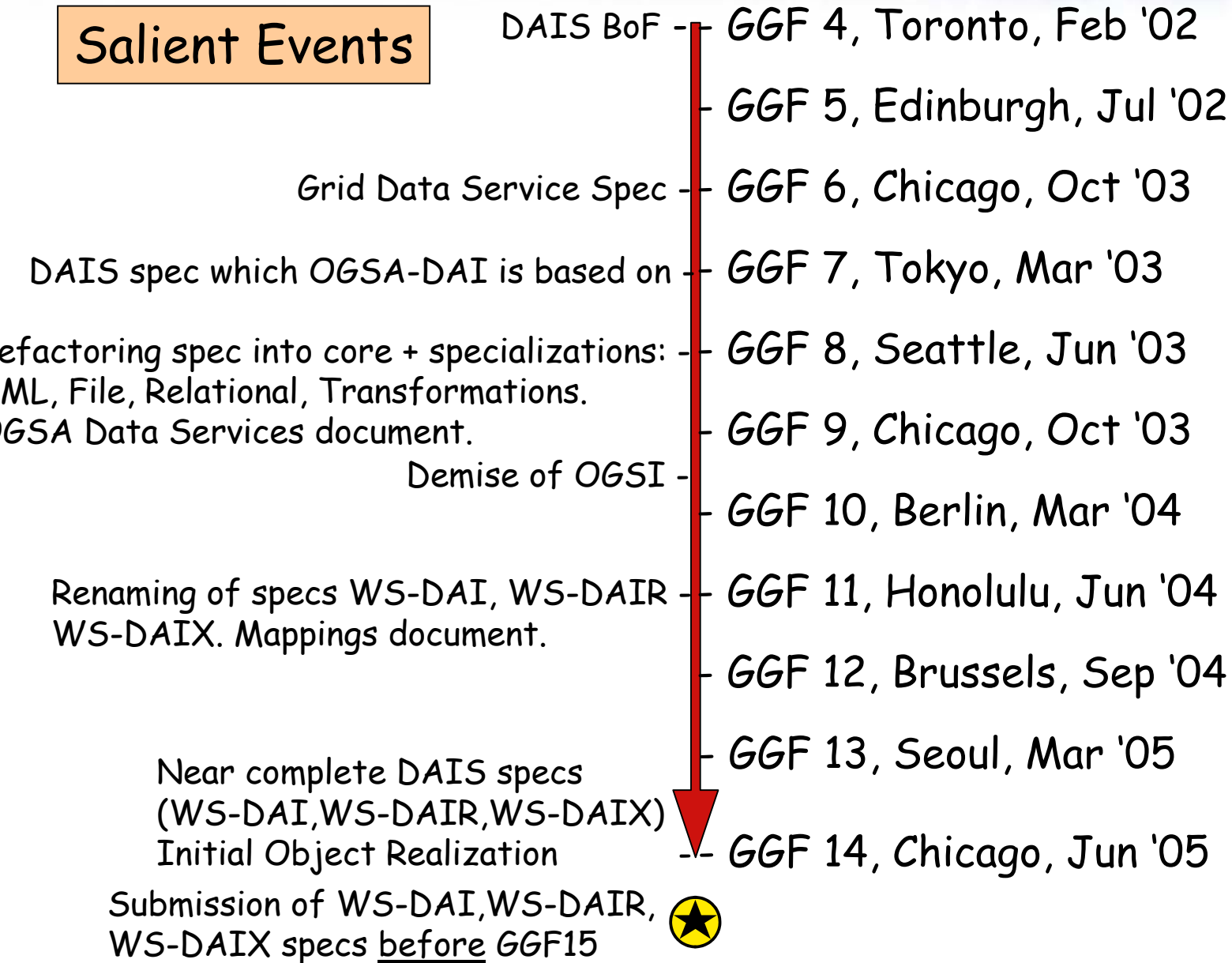


- DAIS Working Group came into being in GGF to:
 - Provide a means to integrate data resources into Grids
 - Do this by defining a set of uniform data access interfaces
- Symbiosis between implementation
 - UK's OGSA-DAI (Data Access and Integration) project
 - <http://www.ogsadai.org.uk>
- And standardisation
 - Global Grid Forum (GGF)
- At the time no vendor was doing this for Grids
 - Got buy in from IBM and Oracle
- DAIS is NOT about
 - Defining new universal query languages/data models
- There is a demand for this
 - OGSA-DAI is being used by many projects

- A consistent set of interfaces to access data resources
- Partial virtualization/abstraction of the data resource:
 - Still need to know what the underlying data resource is
 - Need to target the right kind of queries
 - Do not have to worry about data resource specific infrastructures
 - A framework consistent with other Grid technologies
- Aim to work within the Open Grid Services Architecture
 - Try to be good citizens
 - DAIS members have been putting effort in the OGSA Data WG
- Have worked with many groups within GGF and outside
 - OGSA, INFOD, OGSA-D-WG, ...
 - CIM (DMFT), WSRF, ...

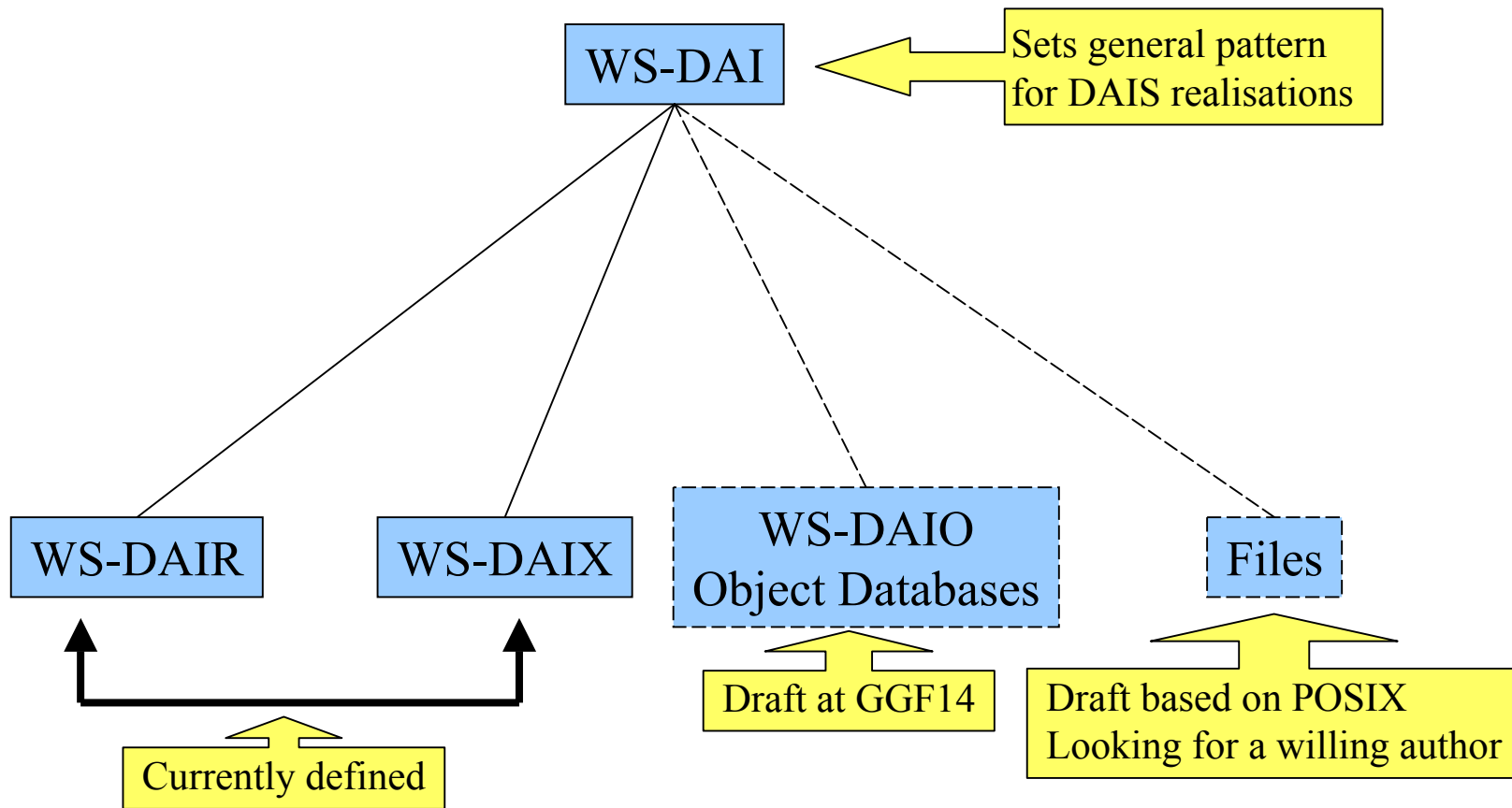
Salient Events

GGFs



- Community:
 - All DAIS participants were scarred by OGIS
 - Not all DAIS participants are committed to WSRF
 - Not all database vendors are committed to WSRF
- Data resources:
 - Not all data resources are naturally modelled using WSRF
 - Lifetime management and naming outside the control of a service
 - Some types of data resource are suitable for WSRF
- Result:
 - Considerable experimentation with “mappings” of DAIS requirements onto different WS-* specifications
 - http://forge.gridforum.org/projects/dais-wg/document/Scenarios_for_Mapping_DAIS_Concepts/en/3

- There is core functionality that has no reliance on WSRF
 - Data access
 - Data factory
 - Properties
 - Explicit or no lifetime management
- Superset that has WSRF reliance which buys you:
 - Soft state lifetime management
 - Fine-grained property access
- Provides a migration path for those not ready to use WSRF
- Caveat
 - Require data resource name to be in the message body



- **Data resource:**
 - System that can act as a source/sink of data
 - Scope of DAIS currently is mainly restricted to relational and XML databases
 - Can further subclassify data resources into:
 - **Externally managed data resource**
 - Normally exists outside the scope of DAIS service
 - Lifetime management is not specified by DAIS
 - **Service managed data resource**
 - Does not normally exist outside the service-oriented middleware.
 - Lifetime management is specified in the WS-DAI specification
- A data resource has an **abstract name**
 - Unique and persistent
 - Taken as a URI in the DAIS specs
- **Data service:**
 - Implements a DAIS specified interface and corresponding properties
 - Mainly exposes data resource capabilities to a Grid
- **Data resource address**
 - End Point Reference (EPR) as in WS-Addressing
 - Abstract name contained in the reference parameters
- **Consumer:**
 - Application that exploits a data service to access a data resource

- Defines:
 - Core properties of the data resources being accessed
 - Core messages for accessing the data resources
- These are extended by realisations
 - Cater for different underlying data models
 - Relational data resources
 - XML data resources
 - Possibly object and file based data resources
- Provides some base messages/operations
 - Retrieve a property document
 - Destroy relationship between a data service and a data resource
 - Performing generic query
- Defines some base message exchange patterns for realisations to use

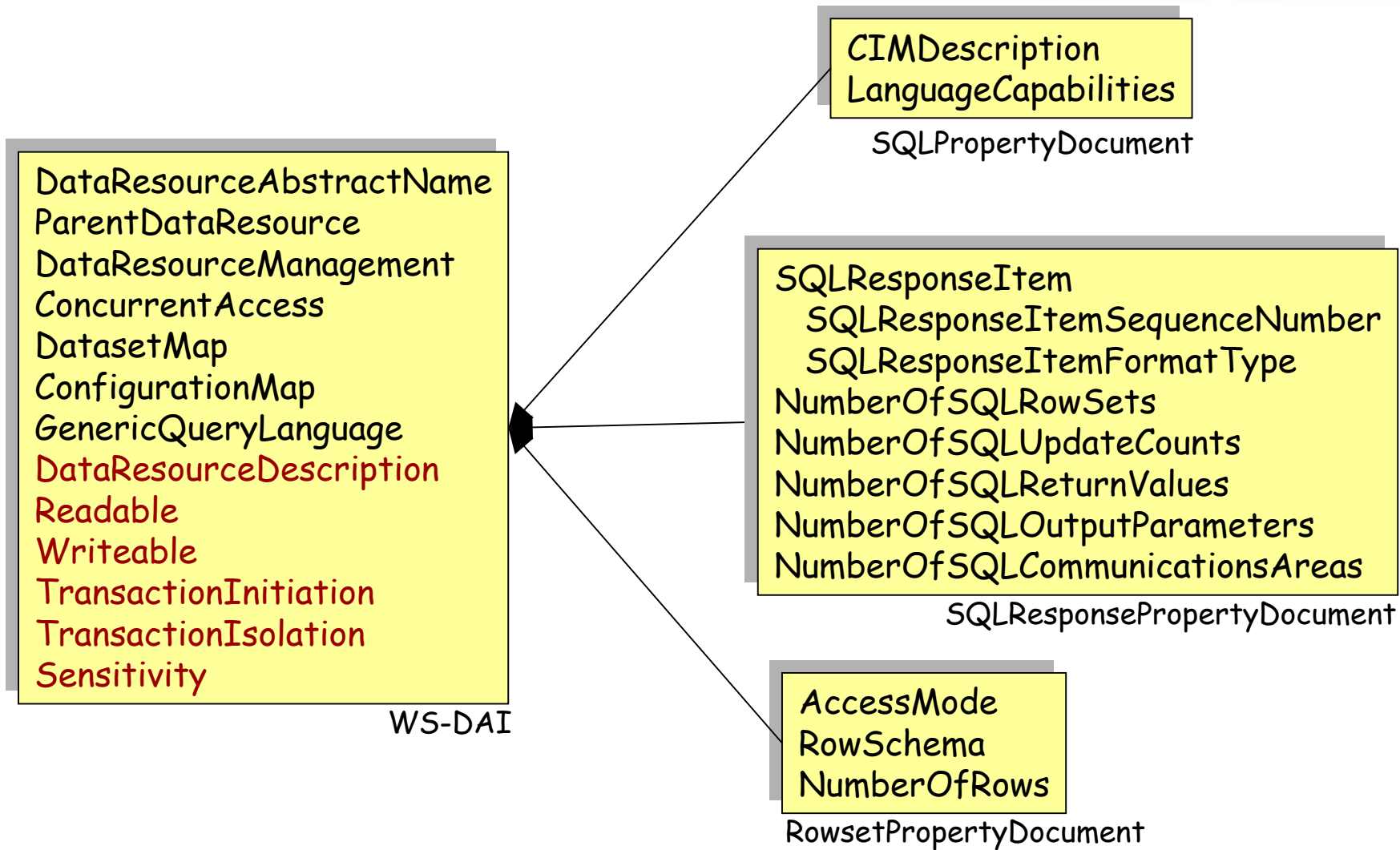
- Uses a classification of interface types
 - Originally postulated in the *OGSA Data Services* document
 - http://forge.gridforum.org/projects/dais-wg/document/OGSA_Data_Services-ggf10/en/1
- Data description
 - Provides metadata about:
 - Data resource and
 - Relationship between the data resource and the data service
 - Implemented as a set of properties
- Data factory
 - Provides service interface for the creation of derived data resources
- Data access
 - Provides access to data through a service interface

- Data management was also originally in interface classification
- Lots of discussion, a management interface could generally be used to:
 - Manage the web service itself
 - Manage the data resource through the web service
 - Manage the relationship between the web service and the data resource
- People had many different opinions regarding this
 - Boundary between the different types of management fuzzy
 - Caused much heated debate ...
- In the end ruled the first two out of scope
 - General management principles wider than just for DAIS
 - OASIS WSDM TC covering similar ground
 - MOWS: Management of Web Services
 - MUWS: Management Using Web Services
 - http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=wsdm
- But management still creeps in ...

- Elements in a properties document
 - Static elements (black font)
 - Configurable elements (red font)
 - Factory pattern
- Most self explanatory
- DatasetMap
 - Allows different return types to be supported
- ConfigurationMap
 - Allows different data resources to result from factory messages
 - Factory pattern
- These are extended by the realisations

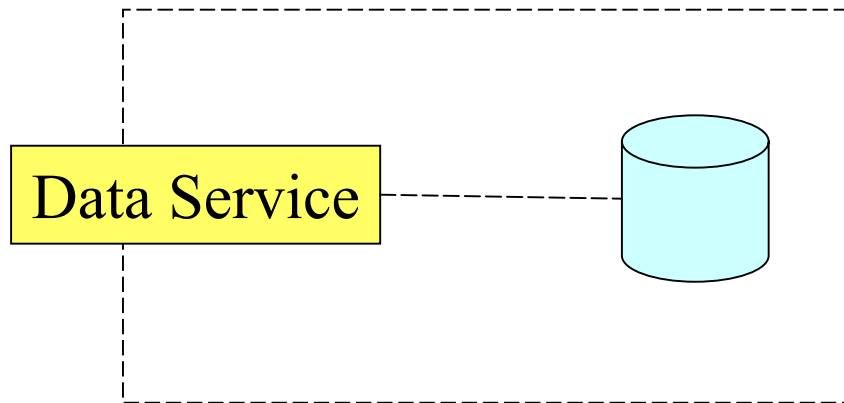
DataResourceAbstractName
ParentDataResource
DataResourceManagement
ConcurrentAccess
DatasetMap
ConfigurationMap
GenericQueryLanguage
DataResourceDescription
Readable
Writable
TransactionInitiation
TransactionIsolation
Sensitivity

WS-DAI



Direct Access

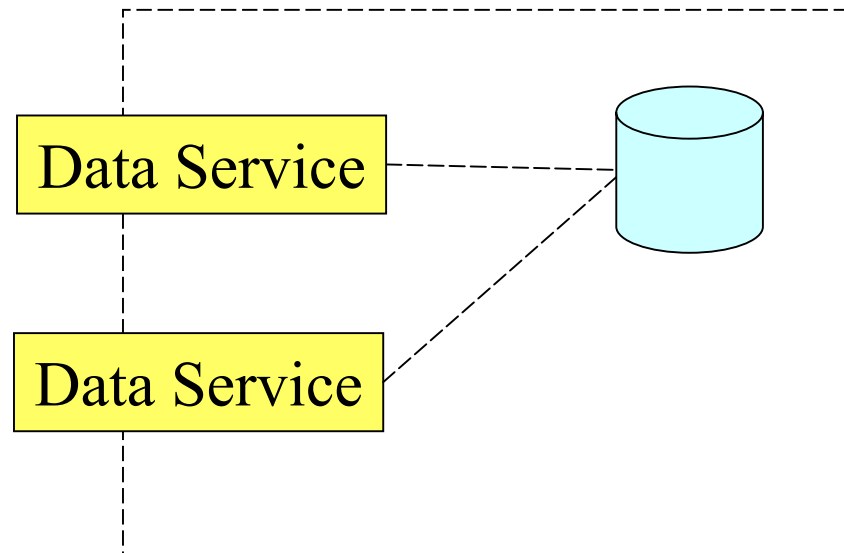
Consumer



Indirect Access

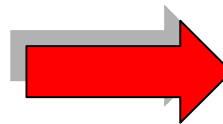
Consumer

Consumer



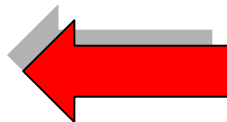
```
<RequestMessage>  
<wsdai:DataResourceAbstractName/>  
<wsdai:DatasetFormatURI/>?  
<RequestDocument/>  
</RequestMessage>
```

Direct Access Request

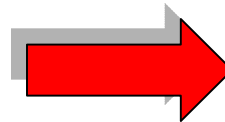


```
<ResponseMessage>  
<wsdai:DatasetFormat/>  
<wsdai:DatasetData>  
  Data goes here formatted according to the  
  DatasetFormat uri in the request message.  
</wsdai:DatasetData>  
</ResponseMessage>
```

Direct Access Response

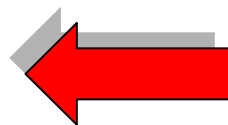


```
<RequestMessage>
  <wsdai:DataResourceAbstractName/>
  <wsdai:PortTypeQName/>?
  <wsdai:ConfigurationDocument/>?
  <RequestDocument/>
</RequestMessage>
```

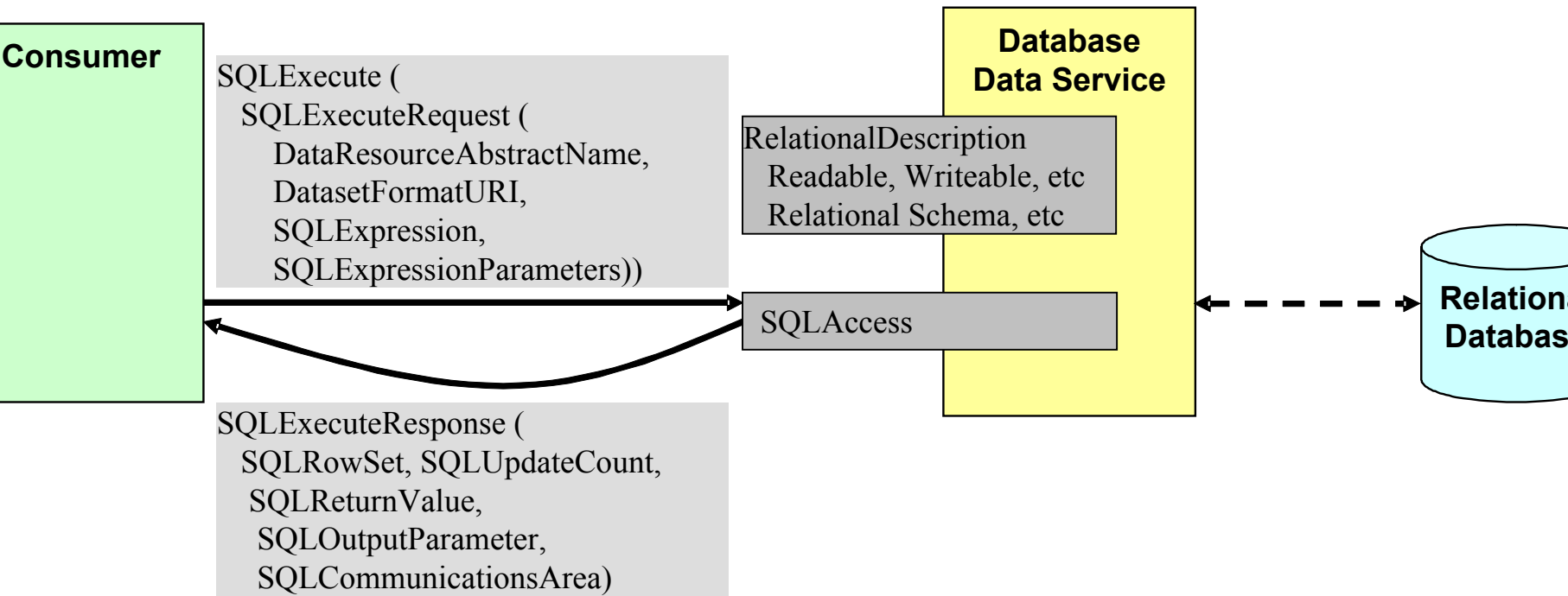


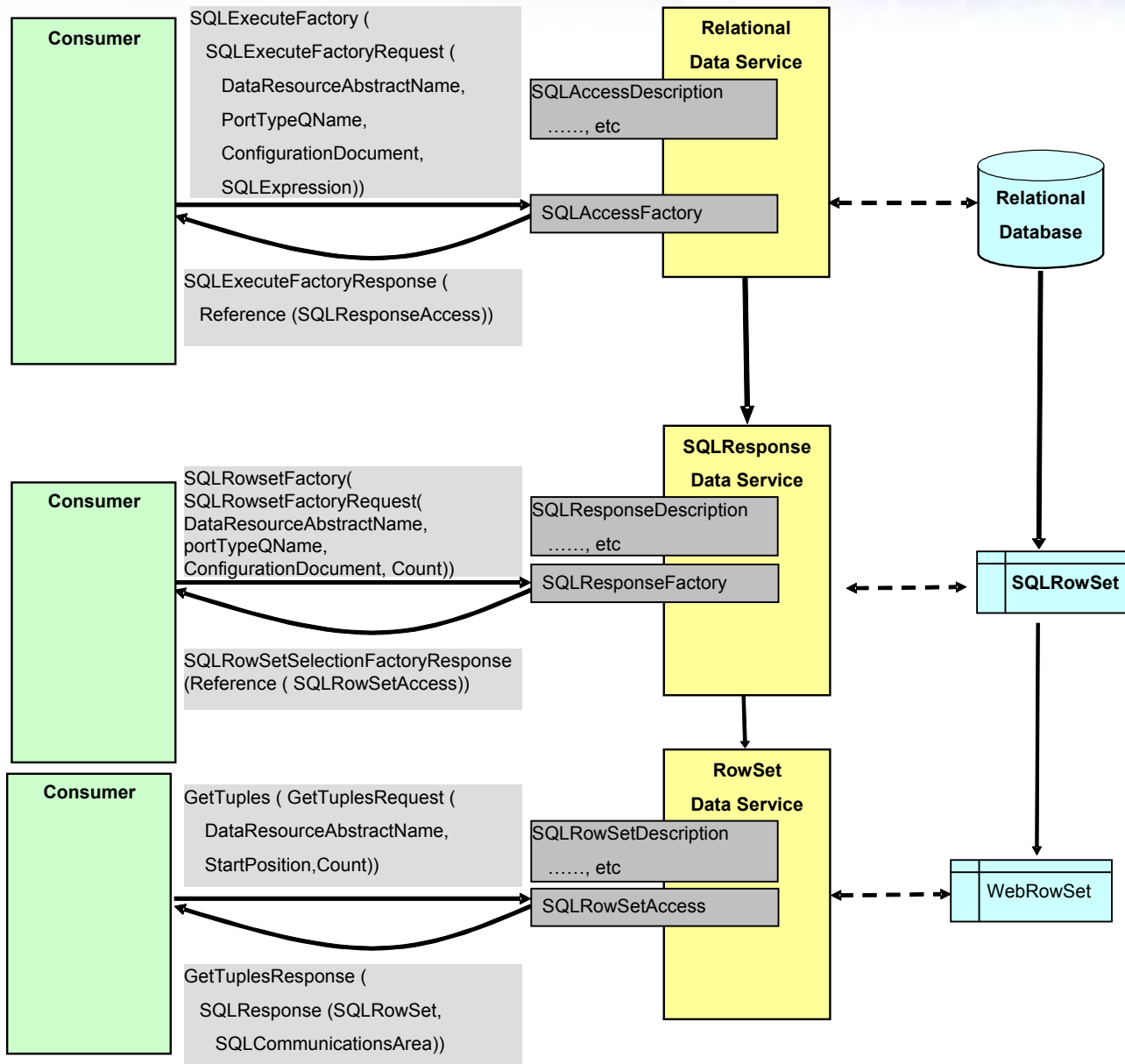
Factory Access Pattern

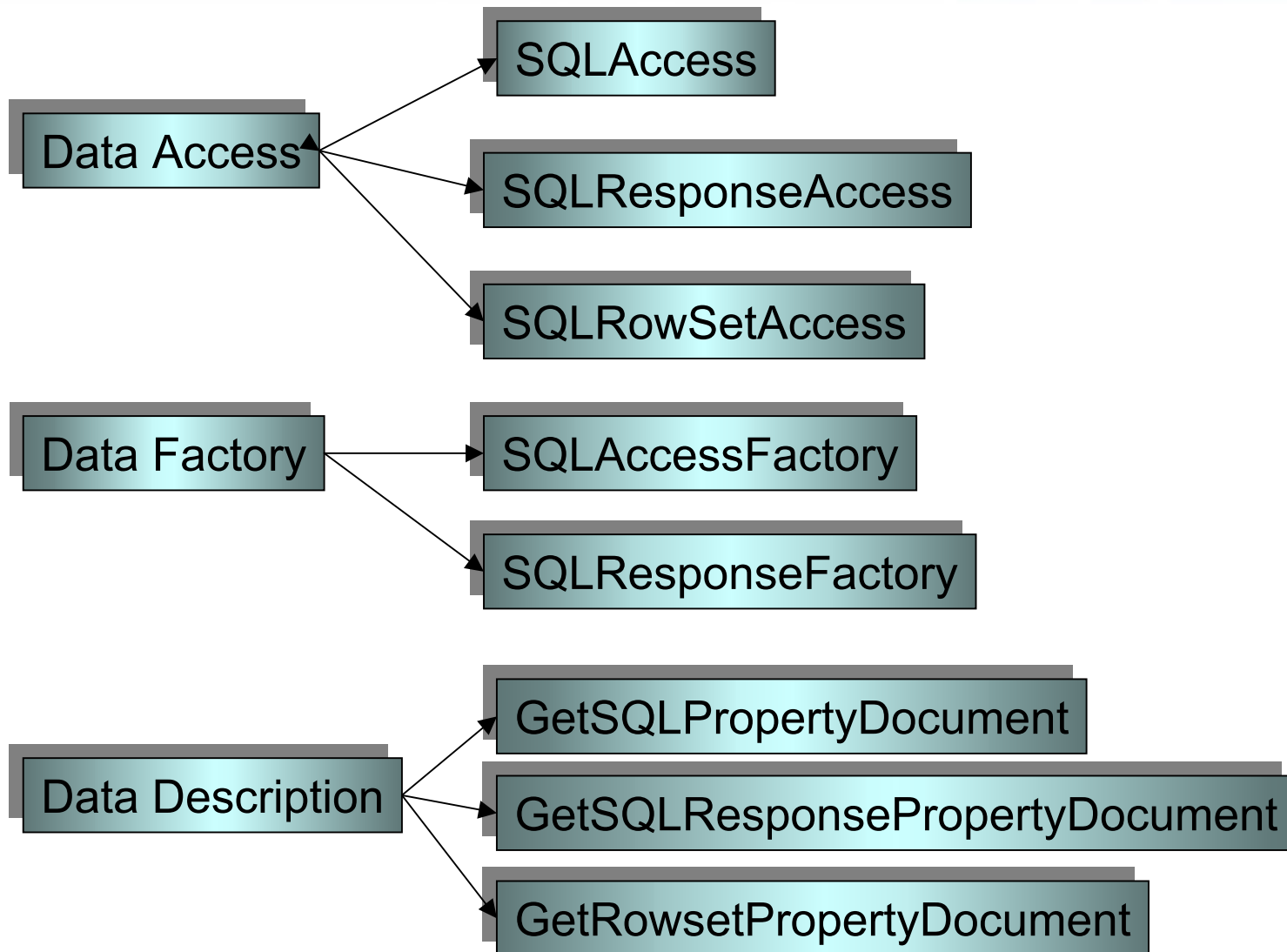
```
<wsa:EndPointReference>
  <wsa:ReferenceParameters>
    <wsdai:DataResourceAbstractName/>?
  </wsa:ReferenceParameters>
</wsa:EndPointReference>
```

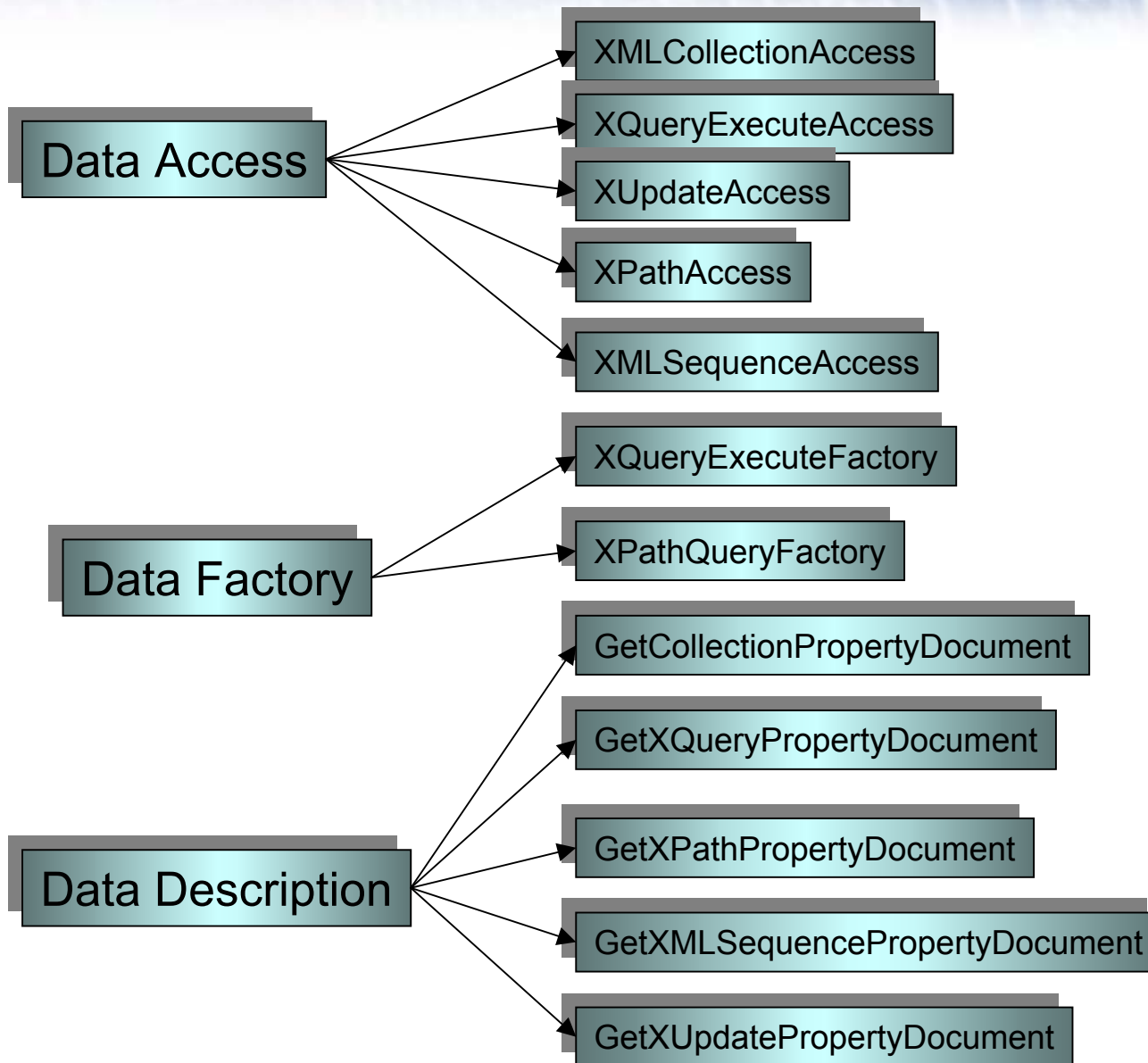


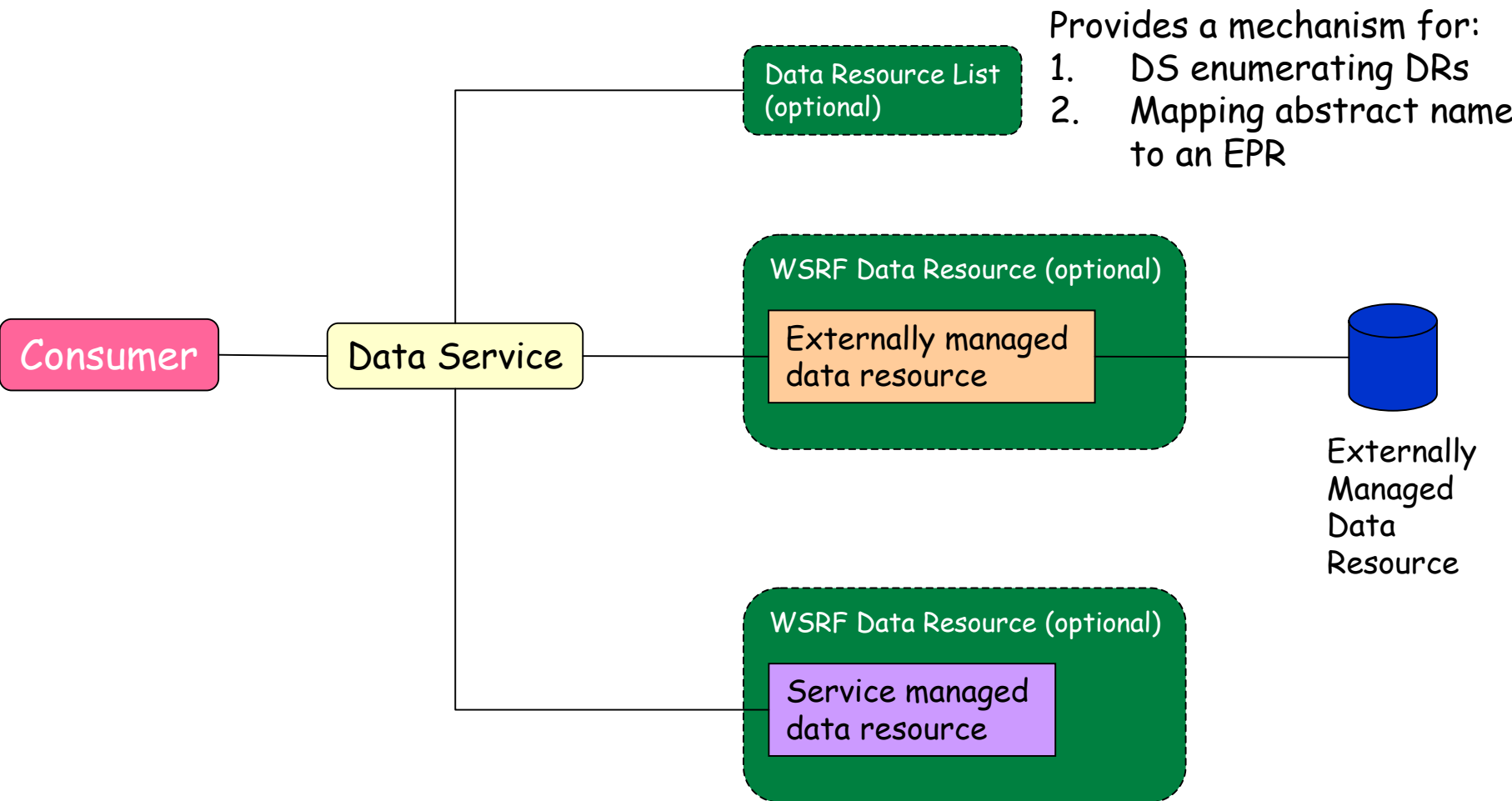
Factory Response Pattern











- Specifications do not mandate how interfaces are composed into services
 - Interfaces may be used in isolation
 - Composed with others
- Expectation is that:
 - DAIS operations will be combined with others to form new portTypes
 - Best practices will emerge
- Implementations:
 - OGSA-DAI plan to implement specs
 - Ohio State University have interest in the XML specification

- **Published GGF Documents to Date:**
 - GFD.13: Grid Database Access and Integration: Requirements and Functionalities
 - <http://www.ggf.org/documents/GFD.13.pdf>
- **Plan to submit the following as Proposed Recommendations:**
 - Web Services Data Access and Integration (WS-DAI)
 - Web Services Data Access and Integration - The Relational Realisation (WS-DAIR)
 - Web Services Data Access and Integration - The XML Realisation (WS-DAIX)
- **Submission should be happening real soon**

- Read the draft specifications and comment

<http://forge.gridforum.org/projects/dais-wg/>

- Look under current documents:
 - Grid_Data_Service – WS-DAI
 - Relational_Realisation – WS-DAIR
 - XML_Realisation – WS-DAIX
- Or wait for the public comment period after submission
- Looking for people to implement the specifications
 - Need two independent interoperable implementations to reach GGF recommendation status