



Web Services Data Access and Integration (WS-DAI)

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GGF-11 DAIS Spec Team

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- Susan Malaika.
- Norman Paton.

- ... *not* a closed group!



Outline of Presentation

- Specification context and changes.
- Terminology and notions.
- Data Description.
- Data Access.
- Data Factory.
- Data Management.
- Mapping to WSDL.
- Relevant Sessions.
- Issues.



Rules of Engagement

- Happy to be stopped for questions *en route*.
- Have allowed around 30 minutes for handling of questions (and have some issues to discuss).
- Will seek to progress at a speed that allows complete specification to be presented.
- We will be very happy to receive feedback offline orally, by messages to the list, at telcons, etc.



Names

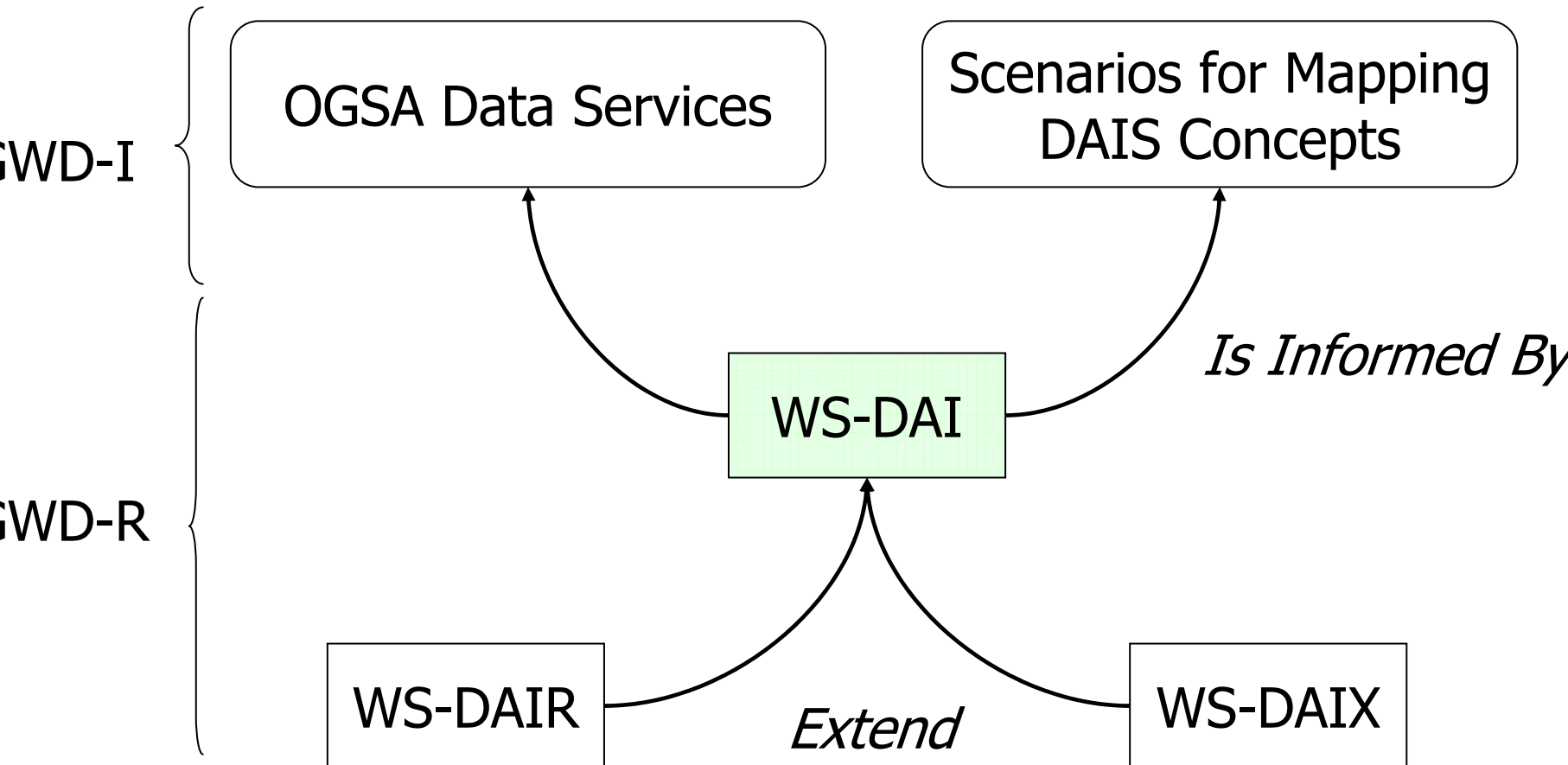
- Web Services Data Access and Integration (WS-DAI):
 - The specification formerly known as the Grid Data Service Specification.
 - A paradigm-neutral specification of descriptive and operational features of services for accessing data.
- The WS-DAI Realisations:
 - WS-DAIR: for relational databases.
 - WS-DAIX: for XML repositories.



WS-DAI and the Grid

- Relationship to web service standards:
 - WS-DAI specifications are in terms of WSDL.
 - WS-DAI will depend (explicitly or in practice) on several Web Service standards.
- Relationship to GGF activities:
 - Provides service-based access to structured data resources as part of OGSA architecture.
 - Complimentary to other data grid activities within GGF, for example, on Information Dissemination, Resource Description, ...

DAIS Specification Landscape





WS-DAI Since GGF10

- Removal of dependency on OGSi.
- Reorganisation of document to:
 - Provide mapping-neutral core material (Sections 1 to 8).
 - Provide an indicative mapping to WSRF (Section 9).
 - Tighten-up various aspects of service description and behaviour.
- Functionality scope much the same.



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Terminology - 1

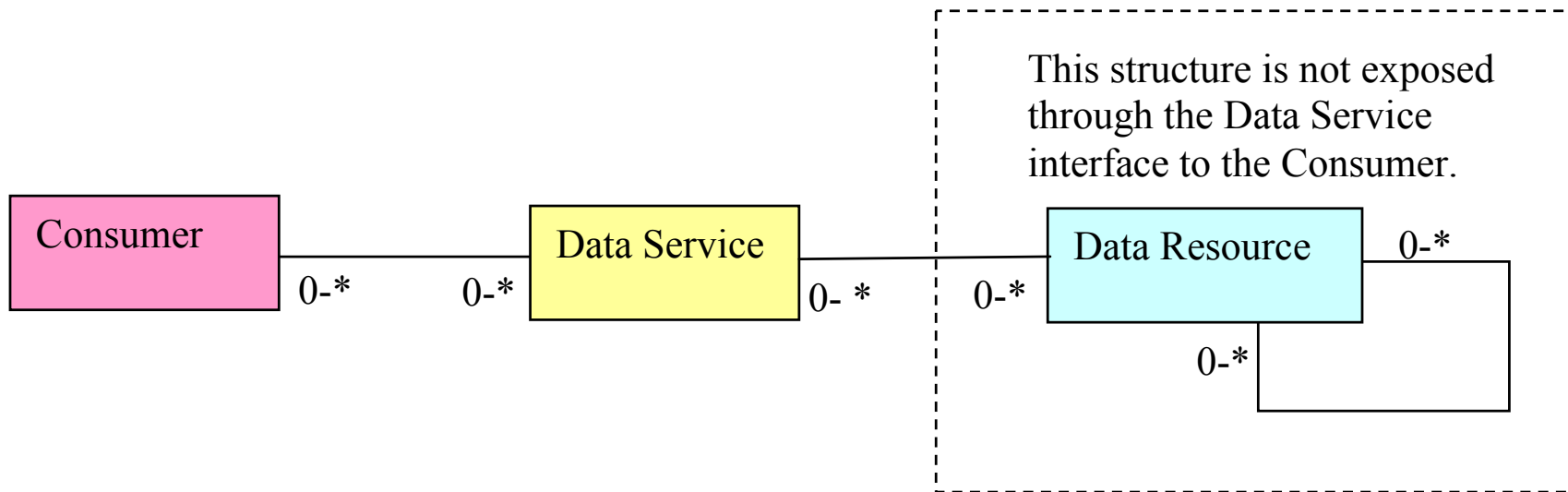
- *Data Service*: a web service that conforms to one of the DAIS specifications.
- *Data Resource*: any system that can act as a source or a sink of data (e.g. a relational database).
- *Consumer*: an application that exploits a Data Service to access a Data Resource.
- *Data Set*: an encoding of data suitable for externalising data outside a Data Resource.



Terminology - 2

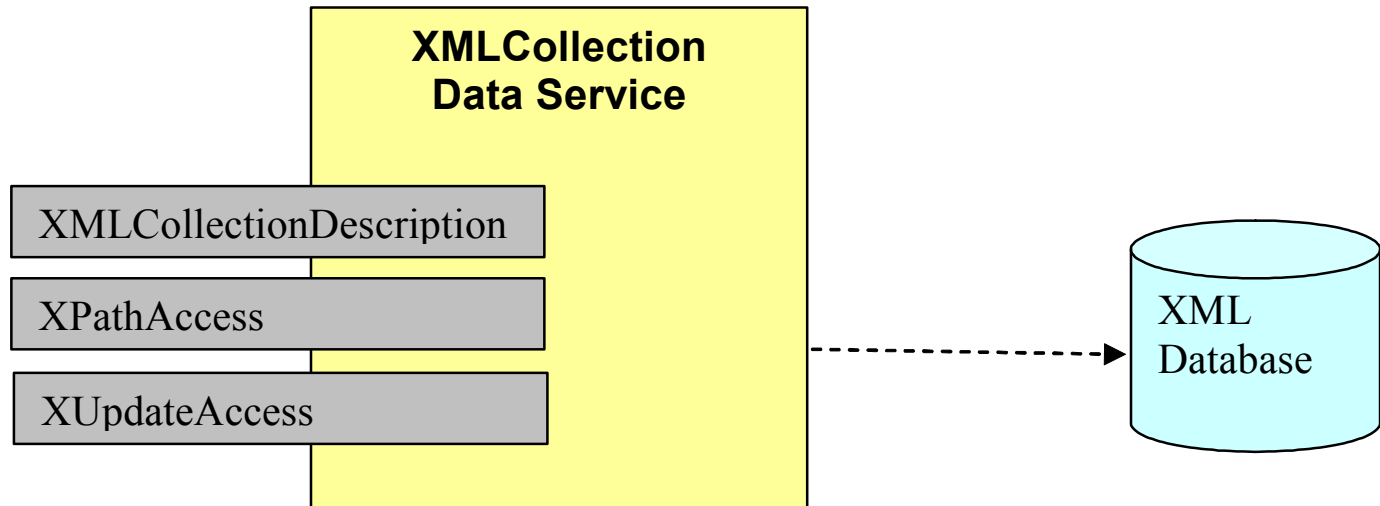
- *Data Description*: provides metadata about a data resource and the relationship of that resource to a service interface.
- *Data Access*: provides access to data through a service interface.
- *Data Factory*: exposes derived data through a service interface.
- *Data Management*: manages the relationship between a service and the data resource that it exposes.

Data Service Model



Interface Composition

- The specification does not mandate how interfaces are composed into services. A possible example is:





Identity

- A Data Resource **MUST** be identifiable within the context of a Data Service and **MAY** be identifiable in a wider context.
- The *mechanism* by which a resource is identified within a Data Service is mapping specific.



Informational Properties

- Describe the characteristics of a Data Resource and the Data Service's relationship with that resource.
- The values of informational properties: SHOULD be made available through a data service; MAY change over time; and MAY NOT be settable by the consumer.
- Informational Properties are described in the Data Description sections of the specifications.



Behavioural Properties

- Describe the behavioural characteristics of a Data Service.
- The values of behavioural properties: SHOULD be made available through a Data Service; and SHOULD NOT change over time.
- Behavioural Properties are described alongside Data Access and Data Factory operations, whose behaviour they describe.



Sessions

- DAIS specifications do not describe how multiple requests to a Data Service are correlated.
- The inter-relating of multiple requests is left to other specifications such as WS-Coordination or WS-Context.



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Data Description

- Few informational properties are described:
 - */wsdai:Name*: The name associated with the Data Resource represented by the Data Service. The scope and structure of this name is not defined.
 - */wsdai:Description*: A free format textual description of the Data Resource as represented by a Data Service.

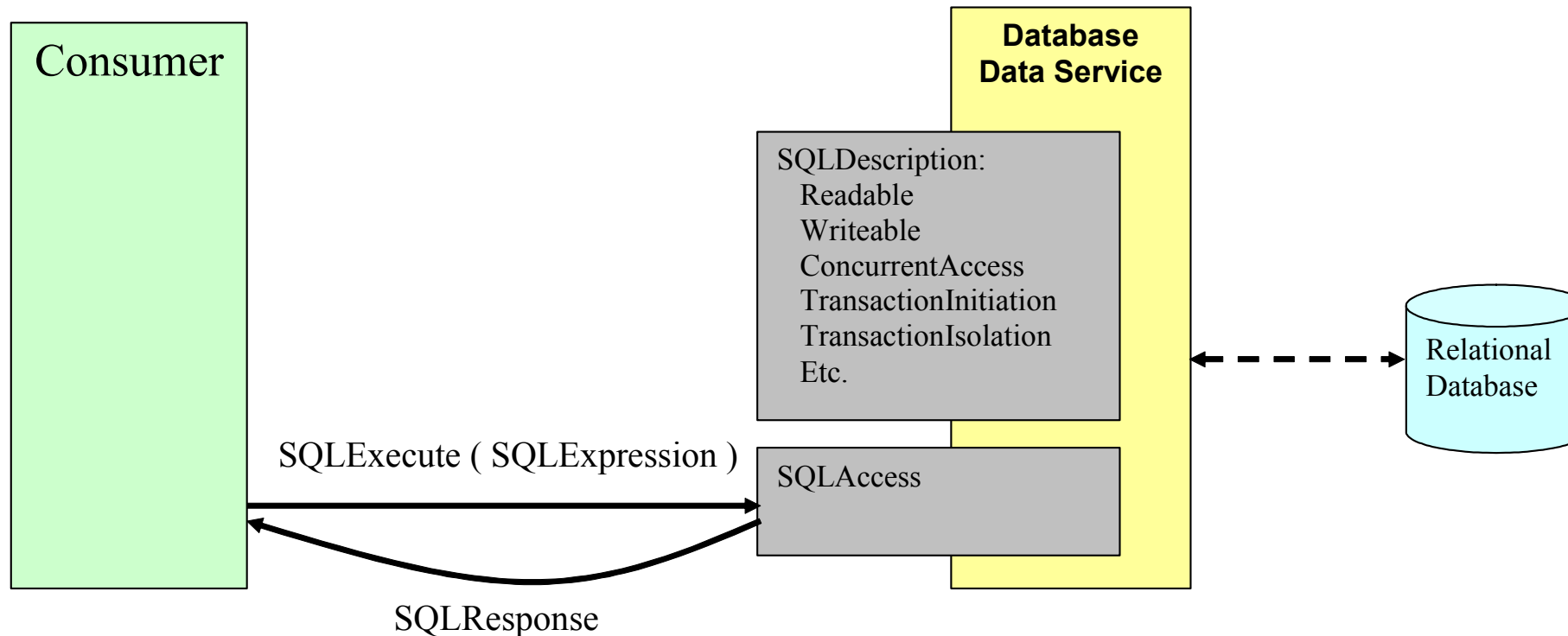


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Data Access

- Data Access collects together messages that access and/or modify a resource.





Behavioural Properties

- The following behavioural properties are defined:
 - Readable (boolean).
 - Writeable (boolean).
 - Concurrent Access (boolean).
 - Transaction Initiation (enumeration).
 - Transaction Isolation (enumeration).
 - Sensitivity (enumeration).
- Realisations MAY extend this list.



Transaction Initiation

- Defined values:
 - *NotSupported*: Does not support Transactions.
 - *Automatic*: Transaction initiated for each message.
 - *Manual*: Transaction context under control of the Consumer.



Transaction Isolation

- Defined values:
 - *NotSupported.*
 - *ReadUncommitted.*
 - *ReadCommitted.*
 - *RepeatableRead.*
 - *Serialisable.*
- Terminology from SQL standard.



Operations

- No DataAccess operations are defined in the WS-DAI specification.
- Realisations **MUST** define one or more DataAccess operations.



Message Patterns - 1

- To encourage consistency in the realisations, the following message pattern is provided by WS-DAI:

```
<wsdai:RequestMessage>  
    <wsdai:RequestDocument/>  
    <wsdai:ResponseFormat/>?  
</wsdai:RequestMessage>
```

- The ResponseFormat, if present, **MUST** contain a QName from the *RequestMessageResponseTypeList* informational property.



Message Patterns - 2

- **SQLExecute using the message pattern:**

```
<xsd:element name="SQLExecuteRequest">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element ref="wsdair:SQLExpression"
        minOccurs="1" maxOccurs="1"/>
      <xsd:element ref="wsdai:ResponseFormat"
        minOccurs="0" maxOccurs="1"/>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
```

- **Where:**

```
<xsd:element name="ResponseFormat"
  type="xsd:QName"/>
```



Outline of Presentation

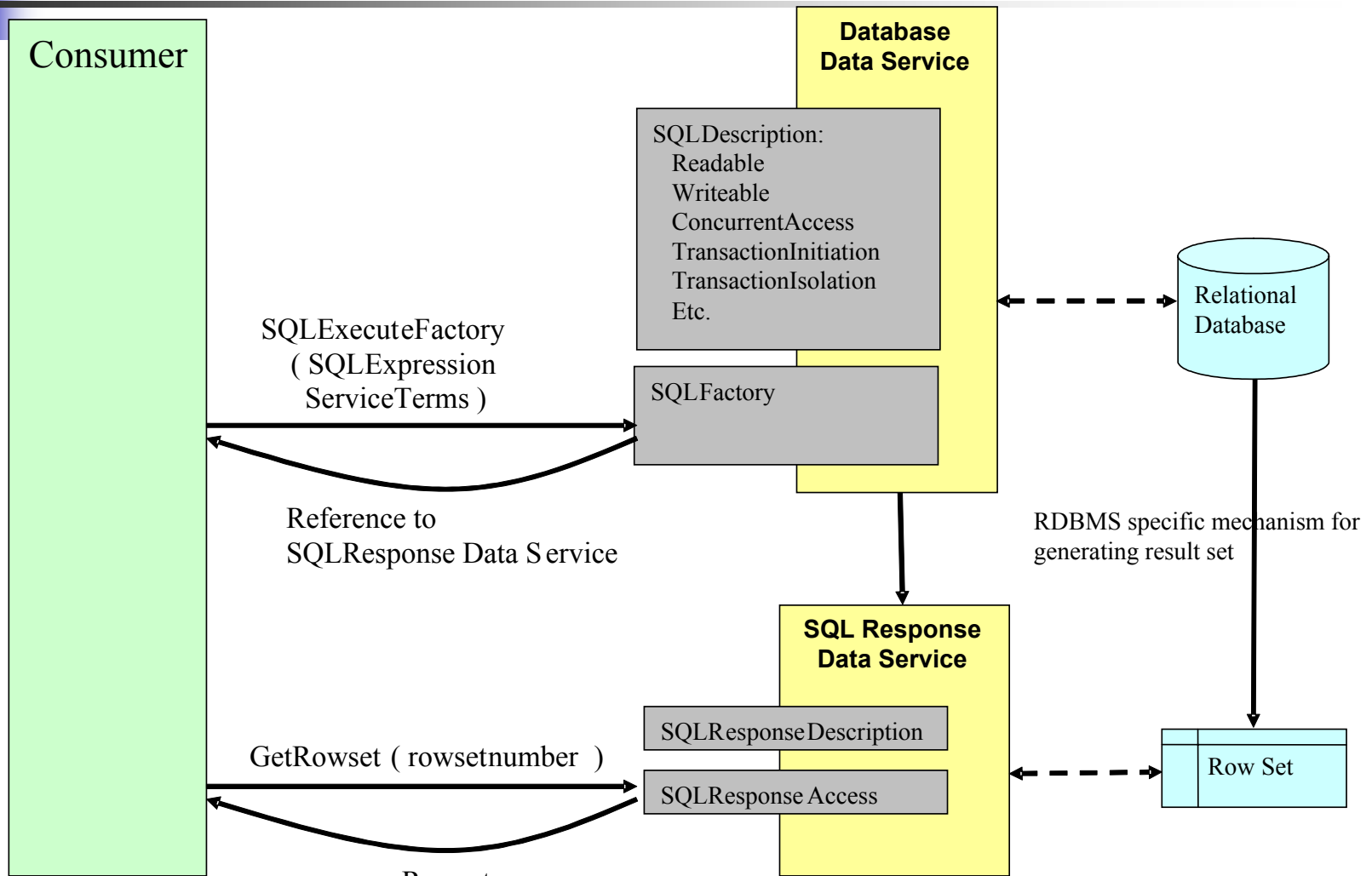
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Data Factory

- Data Factory collects together messages that implement the factory pattern.
- This factory pattern is used principally to support flexible handling of the results of requests.

Data Factory - 2





Behavioural Properties

- The behavioural properties of `DataAccess` are relevant to `DataFactory`.
- No additional behavioural properties are defined on `DataFactory`.



Operations

- No DataFactory operations are defined in the WS-DAI specification.



Message Patterns - 1

- To encourage consistency in the realisations, the following message pattern is provided by WS-DAI:

```
<wsdai:RequestMessage>  
    <wsdai:RequestDocument/>  
    <wsdai:ServiceTerms/>  
</wsdai:RequestMessage>
```



Message Patterns - 2

- The *ServiceTerms* are initial values for the behavioural properties of the DataService used to access the result of this message.
- The *ServiceTerms* document MUST specify the type of interface that is required to result from the factory message (e.g. using the QName of the portType).



Message Patterns - 3

- The ServiceTerms document has the following schema:

```
<xsd:complexType name="TermDocumentType">
  <xsd:sequence>
    <xsd:element name="PortType" type="xsd:QName"
      minOccurs="1" maxOccurs="unbounded"/>
    <xsd:element name="Terms" minOccurs="1"
      maxOccurs="1">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:any/>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>
```



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Data Management

- Data Management is not yet defined.
- Themes:
 - Managing the resource.
 - Managing the service.
 - Managing the service-resource relationship.
- Awaiting the outcome of Web Services Distributed Management (WSDM)
[WSDM] TC in OASIS.



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Mapping to WSDL

- The Mapping to WSDL should be seen as indicative. A wider discussion of Mapping issues for DAIS is provided in:
 - S. Laws, S. Malladi, S. Parastatidis, Scenarios for Mapping DAIS Concepts, Informational Draft, GGF11.
- Part of the point of the restructuring has been to separate discussion of the mapping from core Data Service concepts.



Mapping to WSRF

DAIS Concept	WSRF Concept
Data Resource	WS-Resource
Data Resource Identity	Endpoint Reference
Informational Properties	WS-Resource-Properties
Behavioural Properties	WS-Resource-Properties
Factory Pattern	Factory Pattern



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Relevant Sessions

- DAIS-2: Realisations (Tue: 12.30)
- DAIS-3: Related Standards (Tue: 16.00)
- DAIS-4: Mappings (Wed: 10.00)
- Access to Data in Files BOF (**Wed: 14.30-16:00 Sea Pearl 5 & 6**)
- CGS-1 & 2: DMTF CIM for DAIS (Mon: 6.00, Wed: 8.00)
- OGSA-II: OGSA Data Architecture (Mon 12:30)



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Questions

- Scope:
 - Are things omitted or excluded that are relevant?
 - Are things included that stand in the way of certain plausible realisations?
- Behavioural properties:
 - Do we have these right?
 - Readable/Writeable, Concurrent Access, Transaction Initiation, Transaction Isolation, Sensitivity.



Issues - 1

- Model of derived data:
 - Behavioural properties for derived data need further exploration.
 - Not yet fully explored for updating data.
 - Not necessarily consistent across likely realisations.
- Lifetime:
 - The lifetime of a data resource is not directly discussed (nature of discussion may be mapping-specific).



Issues-2

- Response formats:
 - The patterns defined here raise issues that are wider than DAIS:
 - In terms of description of options.
 - In terms of selection of required approach.
- Derived data:
 - The patterns defined here raise issues that are wider than DAIS:
 - In terms of description of options.
 - In terms of selection of required approach.



Issues - 3

- To do:
 - Detailed examination of relationship to other emerging specifications.
 - Data Management.
 - Faults.
 - MUST, SHOULD, etc, need tested.