

# Web Services Data Access and Integration – The Relational Realisation (WS-DAIR)

GGF11 – 8 June 2004

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# WS-DAIR – Agenda

- Changes from GGF10
- Behavioural and Informational Properties
- Direct Data Access Operations
- Derived Data Access Operations
- Data Management

# Changes from GGF10 – 1 of 3

- SQLQuery, SQLUpdate and SQLExecute Operations combined into SQLExecute
  - *Previous Versions were direct mappings of JDBC Calls*
  - *SQLQuery and SQLUpdate were exact subsets of SQLExecute*
  - *The XML Realisation only has one Operation for each “Language”*
  - *ResponseFormat rationalised*
- DBOperationAccess Operation replaced by SQLResponseAccess
  - *getReturnValue, getResultSets, getOutputParameter replaced by GetRowSet, GetRowSetFactory, GetUpdateCount, GetReturnValue, GetOutputParameter, GetSQLCommunicationsArea*
- SQLCommunicationsArea added to Output
  - *The inclusion of Exceptions, Warnings, Success Messages in responses was not catered for in Previous Versions*
- Keyword Consistency
  - *Renaming for consistency across other WS-DAI\* Recommendations*
  - *Capitalisation of the first character of Keywords*

# Changes from GGF10 – 2 of 3

- Service Data Elements
  - Relational
  - Rowset
- DataAccess
  - SQLAccess
    - sqlQuery
    - sqlUpdate
    - sqlExecute
  - RowsetAccess
    - getNextNTuples
  - DBOperationAccess
    - getReturnValue
    - getResultSets
    - getOutputParameter
- Data Properties – Behavioral and Informational
  - Relational Description
  - SQLResponse Description
  - RowSet Description
- Direct Data Access
  - SQLAccess
    - SQLExecute
  - SQLResponseAccess
    - GetRowSet
    - GetUpdateCount
    - GetReturnValue
    - GetOutputParameter
    - GetSQLCommunicationsArea
  - RowSetAccess
    - GetTuples

# Changes from GGF10 – 3 of 3

- DataFactory
  - SQLFactory
    - createService
  - RowsetSelectionFactory
    - createService
  - DBOperationFactory
    - createService
- DataManagement
  - possible via  
SQLAccess::sqlExecute
- Derived Data Access
  - SQLFactory
    - SQLExecuteFactory
  - SQLResponseAccess (→  
SQLResponseFactory)
    - RowSetSelectionFactory
- Data Management
  - Data Service Management
    - Use WS-DM MOWS
  - Data Resource Management
    - Use WS-DM MUWS
    - (Still possible via  
SQLAccess::SQLExecute)

# Behavioural Properties

- Relational Description
  - *LanguageCapabilities*
    - *SQL92Expression, SQL99Expression, SQL03Expression*
    - This will be superceded by a proposal arising from a joint activity of the DAIS-WG and CGS-WG to extend the Common Information Model (CIM). The CGS-WG will submit the proposal to the DMTF and thence to the WSDM TC in OASIS.
- SQLResponse Description
  - *None*
- RowSet Description
  - *CursorDirection*
    - *ForwardOnly or ForwardAndReverse*
  - *CursorHeldOverTxnBoundary*
    - *True or False*

# Informational Properties

- Relational Description

- *RelationalSchema* - describes the schema of the relational data, for example Databases, Domain Tables, Constraints, Columns, ColumnTypes, Keys, Views, Indexes
- *StoredProcedures* - describes the names, input and output types of the stored procedures available.
- *UserDefinedTypes* - describes the names and definitions of the user defined types available.
- *UserDefinedFunctions* - describes the names and definitions of the user defined functions available.
- *Triggers* - describes the names and definitions of the triggers available.
- These will be superseded by a proposal arising from a joint activity of the DAIS-WG and CGS-W to extend the Common Information Model (CIM).
- *SQLExecuteResponseTypes* – defined in WS-DAI document
  - *List of QNames*

- SQLResponse Description

- *NumberOfRowSets*
- *NumberOfUpdateCounts*
- *NumberOfReturnValues*
- *NumberOfOutputParameters*
- *NumberOfSQLCommunicationsAreas*

- RowSet Description

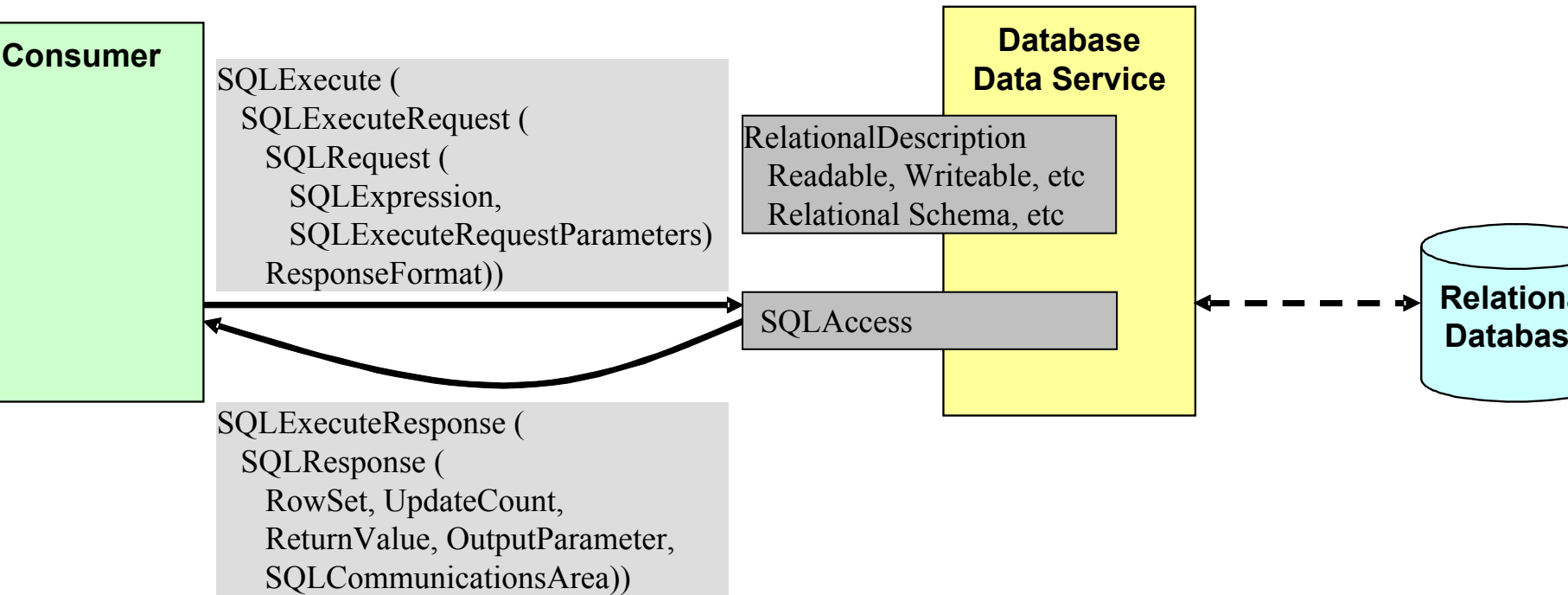
- *RowSetSchema* (e.g. WebRowSet as per JSR114)
- *NumberOfRows*

# Direct Data Access Operations

- **SQLAccess::SQLExecute**
  - Input
    - *SQLExecuteRequest*
      - *SQLRequest*
        - » *SQLExpression* – (1) - any SQL statement
        - » *SQLExecuteRequestParameters* (0 to 1)
          - *InputParameters* – (0 to n)
          - *OutputParameters* – (0 to n)
          - *InOutParameters* - (0 to n)
      - *ResponseFormat* – the format(s), selected from the *SQLExecuteResponseTypes* property, which the *SQLResponse* will conform to.
    - Output
      - *SQLExecuteResponse*
        - *SQLResponse*
          - » *RowSet* - (0 to n) - e.g. *WebRowSet* as per JSR114
          - » *UpdateCount* - (0 to n)
          - » *ReturnValue* - (0 to n)
          - » *OutputParameter* - (0 to n)
          - » *SQLCommunicationsArea* - (0 to n) (*SQLState*, *VendorCode*, *MessageText* – (1 to n), )
    - Faults
      - *InvalidSQLExecuteRequest* - XML syntax error or XML schema non-compliance
      - *InvalidSQLExecuteRequestParameters* - Parameters do not match *SQLExpression*
      - *InvalidResponseFormat* - *ResponseFormat* not valid
      - *OtherFault*

# Direct Data Access Operations

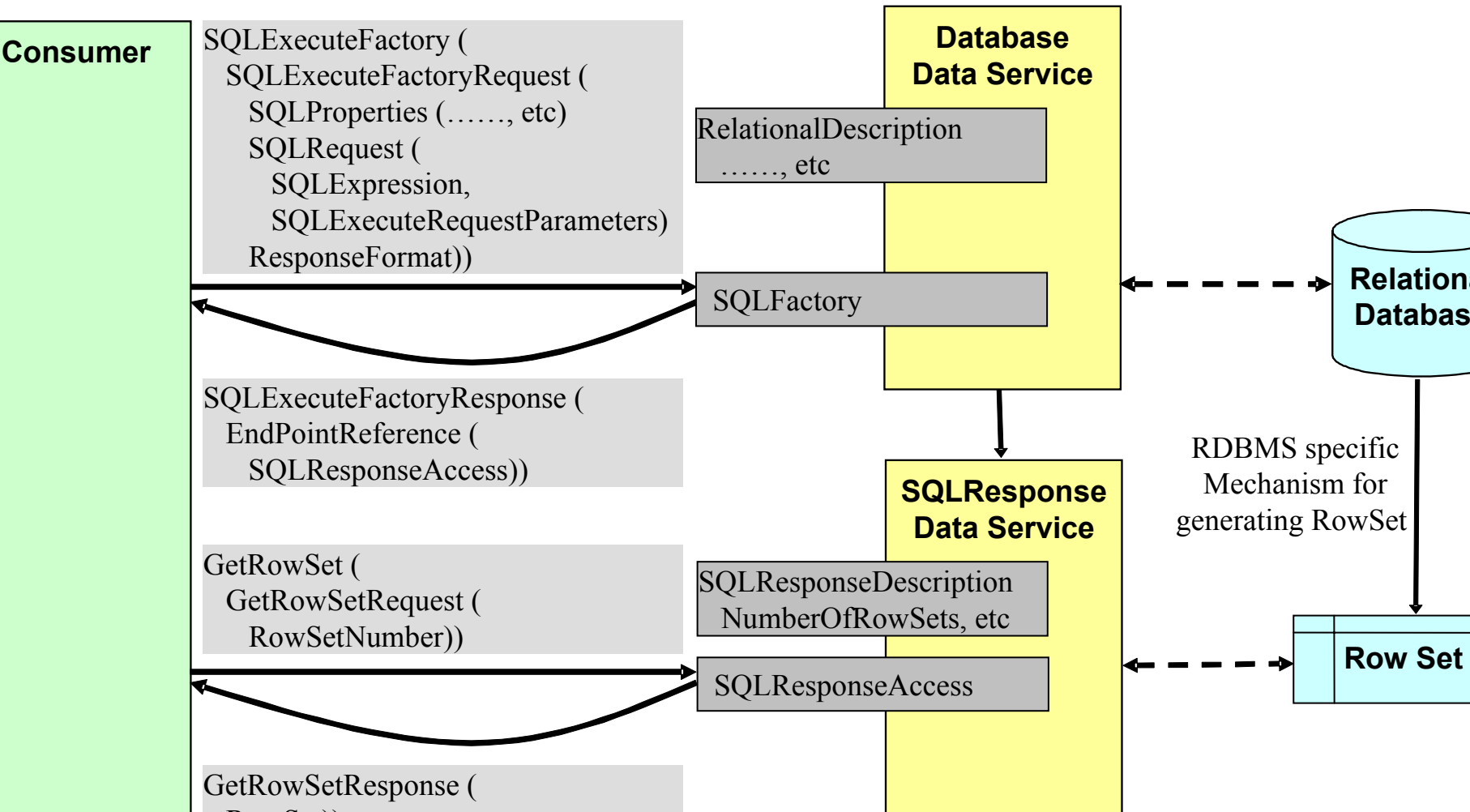
## SQLAccess::SQLExecute



# Derived Data Access Operations

## SQLFactory::SQLExecuteFactory

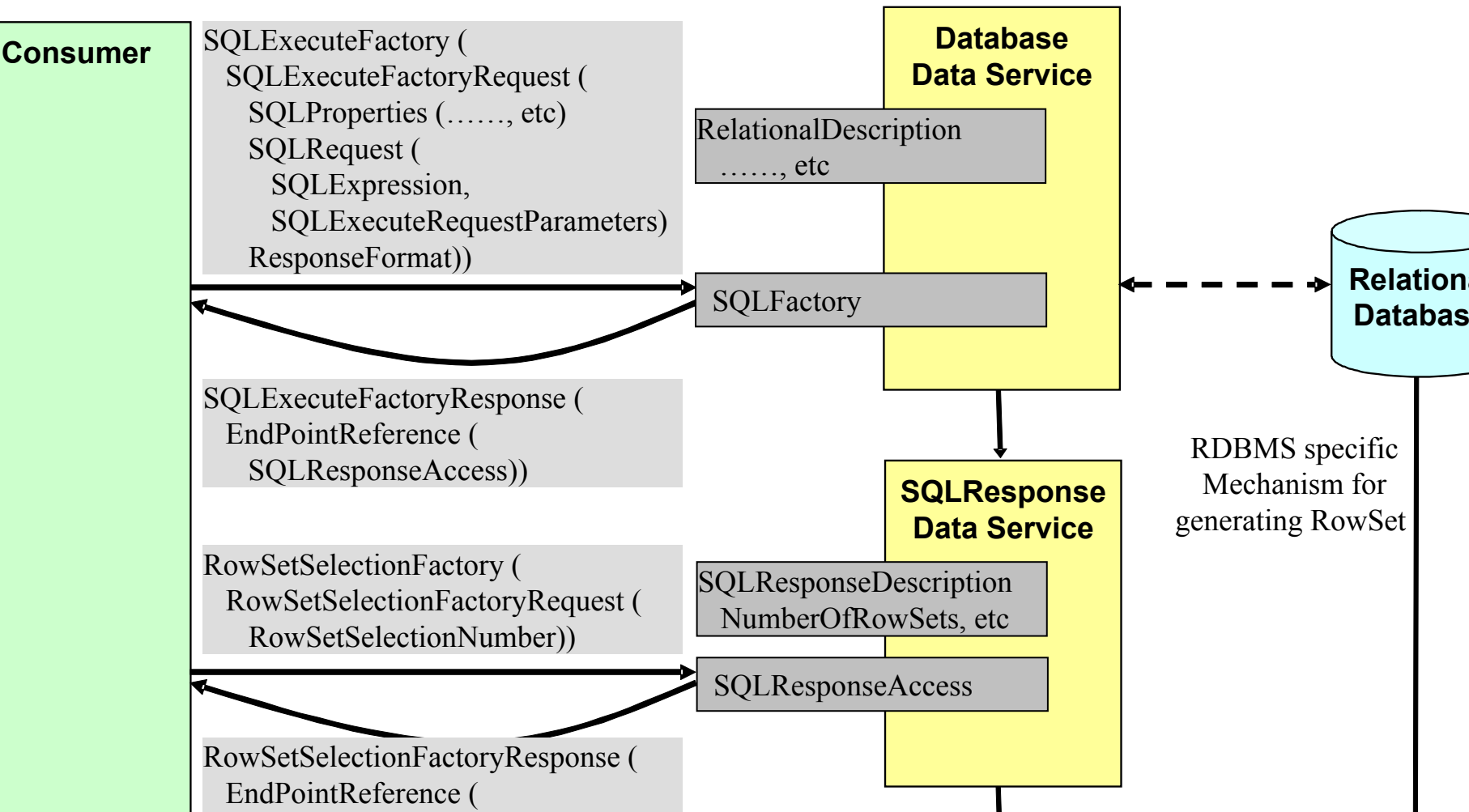
## SQLResponseAccess::GetRowSet



# SQLFactory::SQLExecuteFactory

## SQLResponseAccess::RowSetSelectionFactory

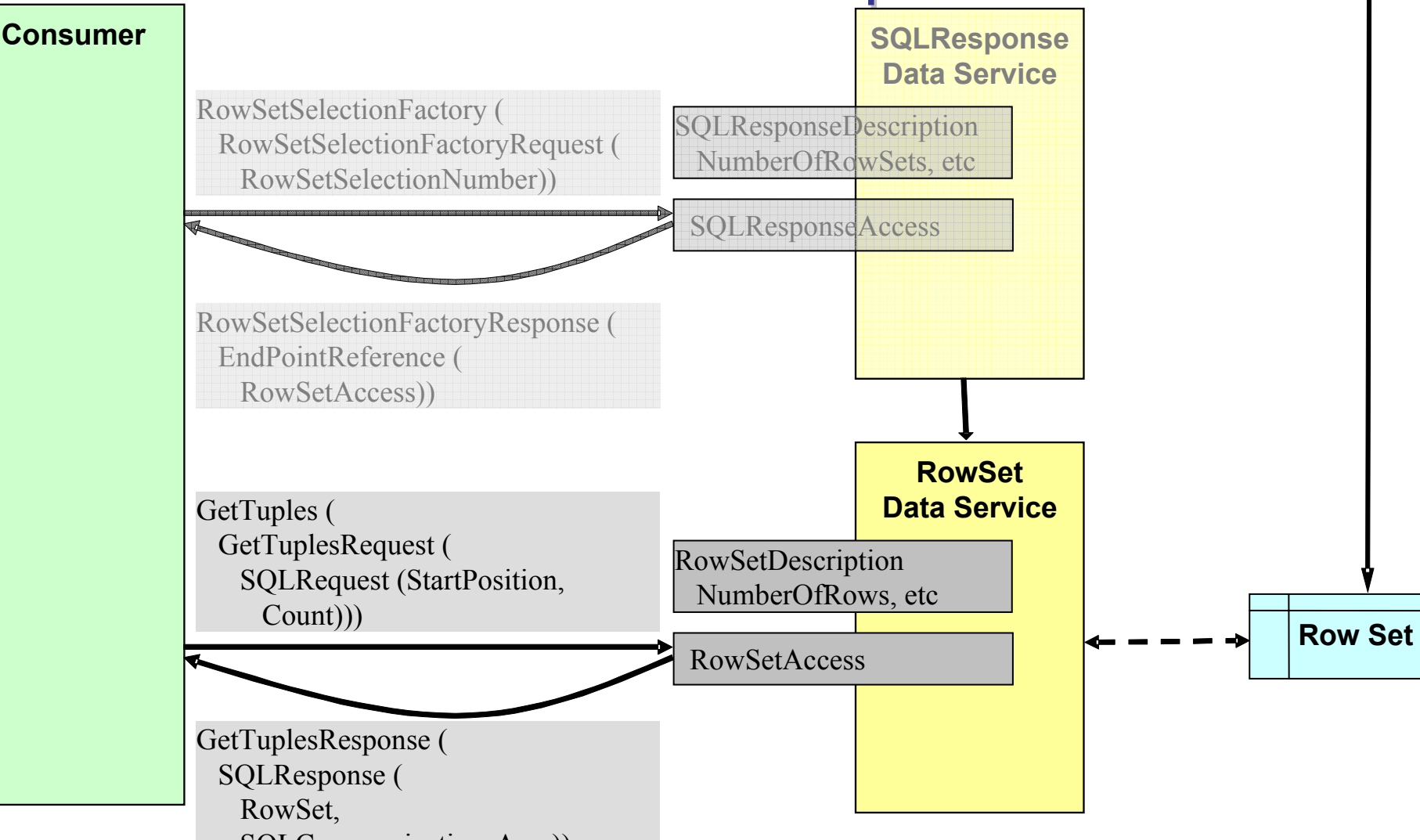
### RowSetAccess::GetTuples – 1 of 2



# SQLFactory::SQLExecuteFactory

## SQLResponseAccess::RowSetSelectionFactory

### RowSetAccess::GetTuples – 2 of 2



# Data Management

- Data Service Management
  - *Out of Scope - use WS-DM MOWS*
- Data Resource Management
  - *Out of Scope - use WS-DM MUWS*
  - *(However some Database Management is possible via SQLAccess::SQLExecute)*

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# Backup Slides

# WS-DAIR – DataAccess Operations

- RowSetAccess::GetTuples
  - Input
    - *GetTuplesRequest*
      - *SQLRequest*
        - » *StartPosition*
        - » *Count*
  - Output
    - *GetTuplesResponse*
      - *SQLResponse*
        - » *RowSet* (0 or 1) - e.g. WebRowSet as per JSR114
        - » *SQLCommunicationsArea* (1 to n) (*SQLState*, *VendorCode*, *MessageText*)
  - Faults
    - *InvalidGetTuplesRequest* - XML syntax error or XML schema non-compliance
    - *InvalidStartPosition* - not a valid StartPosition
    - *InvalidCount* - not a valid Count
    - *OtherFault*

# WS-DAIR – DataAccess Operations

- SQLResponseAccess::GetRowSet
  - Input
    - *GetRowSetRequest*
      - *RowSetNumber*
  - Output
    - *GetRowSetResponse*
      - *RowSet (1)* - e.g. WebRowSet as per JSR114
  - Faults
    - *InvalidGetRowSetRequest* - XML syntax error or XML schema non-compliance
    - *InvalidRowSetNumber* - not a valid RowSetNumber
    - *OtherFault*

# WS-DAIR – DataAccess Operations

- SQLResponseAccess::RowSetSelectionFactory
  - Input
    - *RowSetSelectionFactoryRequest*
      - *RowSetNumber*
  - Output
    - *RowSetSelectionFactoryResponse*
      - *EndPointReference* - as per WS-Addressing
  - Faults
    - *InvalidRowSetSelectionFactoryRequest* - XML syntax error or XML schema non-compliance
    - *InvalidRowSetNumber* - not a valid RowSetNumber
    - *OtherFault*

# WS-DAIR – DataAccess Operations

- SQLResponseAccess::GetUpdateCount
  - Input
    - *GetUpdateCountRequest*
      - *UpdateCountNumber*
  - Output
    - *GetUpdateCountResponse*
      - *UpdateCount* (1)
  - Faults
    - *InvalidGetUpdateCountRequest* - XML syntax error or XML schema non-compliance
    - *InvalidUpdateCountNumber* - not a valid UpdateCountNumber
    - *OtherFault*

# WS-DAIR – DataAccess Operations

- SQLResponseAccess::GetReturnValue
  - Input
    - *GetReturnValueRequest*
      - *ReturnValueNumber*
  - Output
    - *GetReturnValueResponse*
      - *ReturnValue* (1)
  - Faults
    - *InvalidGetReturnValueRequest* - XML syntax error or XML schema non-compliance
    - *InvalidReturnValueNumber* - not a valid ReturnValueNumber
    - *OtherFault*

# WS-DAIR – DataAccess Operations

- SQLResponseAccess::GetOutputParameter
  - Input
    - *GetOutputParameterRequest*
      - *OutputParameterNumber*
  - Output
    - *GetOutputParameterResponse*
      - *OutputParameter* (1)
  - Faults
    - *InvalidGetOutputParameterRequest* - XML syntax error or XML schema non-compliance
    - *InvalidOutputParameterNumber* - not a valid OutputParameterNumber
    - *OtherFault*

# WS-DAIR – DataAccess Operations

- `SQLResponseAccess::GetSQLCommunicationsArea`
  - Input
    - *GetSQLCommunicationsAreaRequest*
      - *SQLCommunicationsAreaNumber*
  - Output
    - *GetSQLCommunicationsAreaResponse*
      - *SQLCommunicationsArea* (1)
  - Faults
    - *InvalidGetSQLCommunicationsAreaRequest* - XML syntax error or XML schema non-compliance
    - *InvalidSQLCommunicationsAreaNumber* - not a valid *SQLCommunicationsAreaNumber*
    - *OtherFault*

# WS-DAIR – DataFactory Operations

- SQLFactory::SQLExecuteFactory
  - Input
    - *SQLExecuteFactoryRequest*
      - *SQLProperties* - Terms
      - *SQLRequest*
        - » *SQLExpression*
        - » *SQLExecuteRequestParameters* (0 to n) (*InputParameter*, *OutputParameter*, *InOutParameter*)
      - *ResponseFormat*
  - Output
    - *SQLExecuteFactoryResponse*
      - *EndPointReference* - as per WS-Addressing
  - Faults
    - *InvalidSQLExecuteFactoryRequest* - XML syntax error or XML schema non-compliance
    - *InvalidSQLExecuteRequestParameters* - SQLExecute RequestParameters do not match SQLExpression
    - *InvalidDataServiceParameters* - Parameters not valid
    - *InvalidResponseFormat* - ResponseFormat not valid
    - *OtherFault*