z/TPFDF V1.1

TPF Users Group Spring 2008

Application Development using SDODF

Name: Glenn Katzen
Venue: Applications Development Subcommittee

AIM Enterprise Platform Software
IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

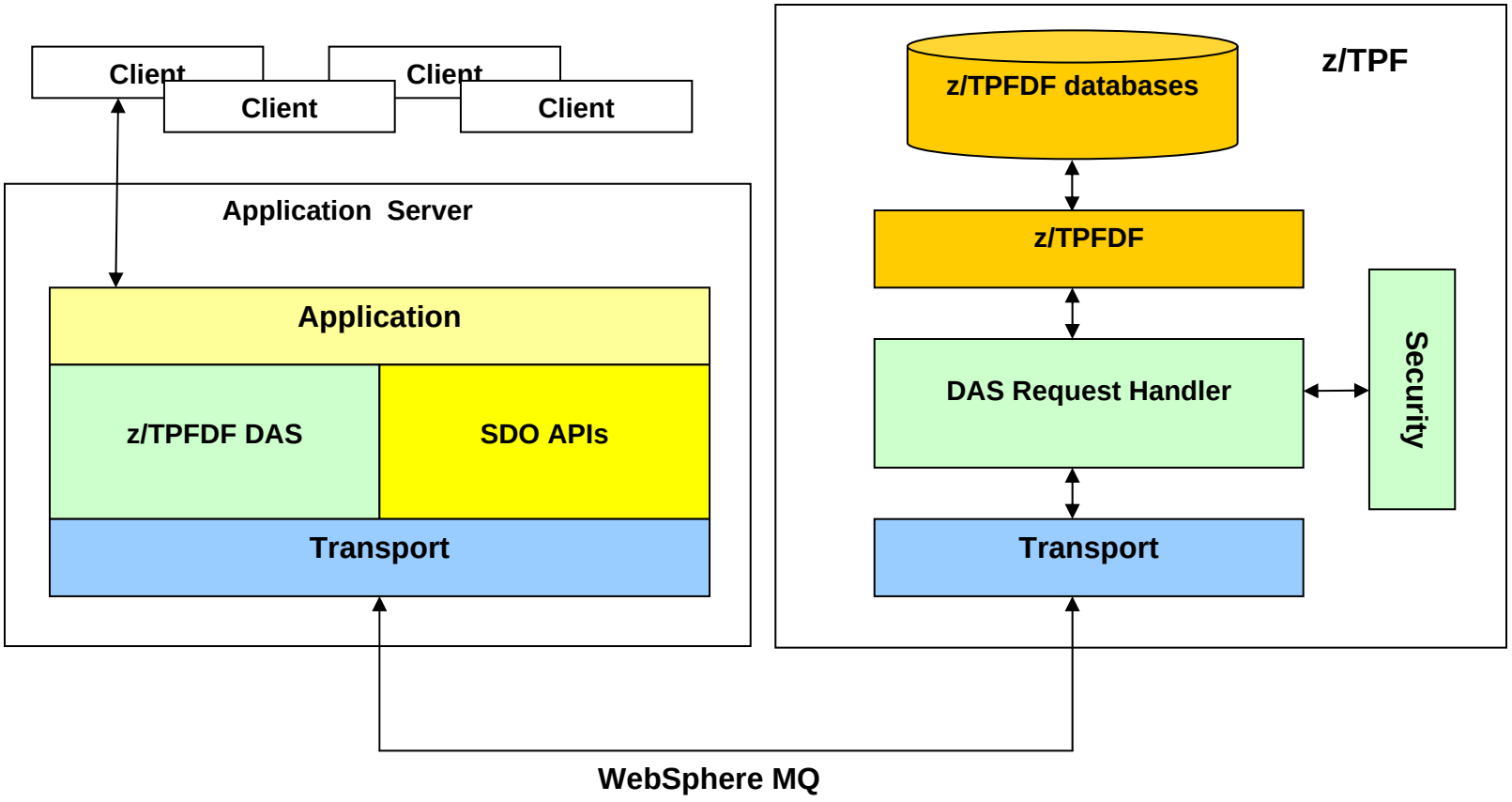
Agenda

- **SDODF Overview**
- **Service Data Objects (SDO)**
- **Mapping z/TPFDF to SDO**
- **Programming with SDODF**
- **SDODF Considerations**

SDODF Overview

- **SDODF provides access to z/TPFDF databases using Service Data Objects.**
- **Remote client applications written in Java can use SDODF to retrieve data and make updates.**

SDODF Overview



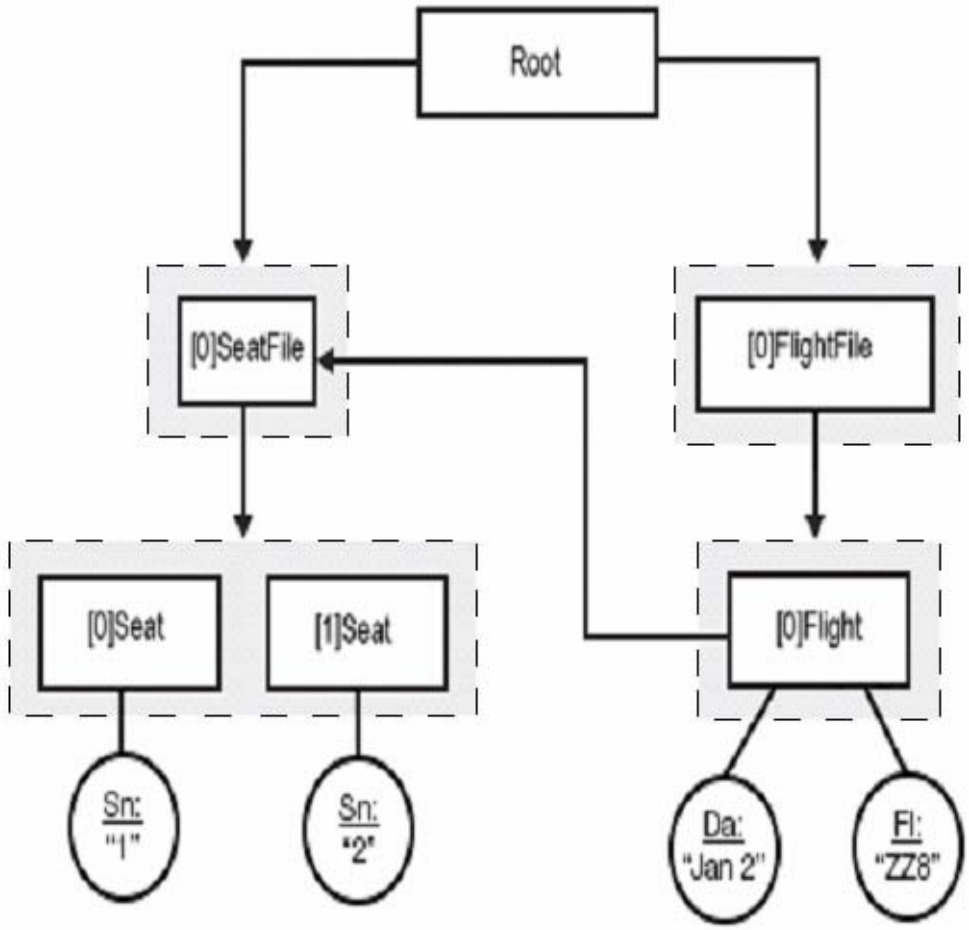
Service Data Objects

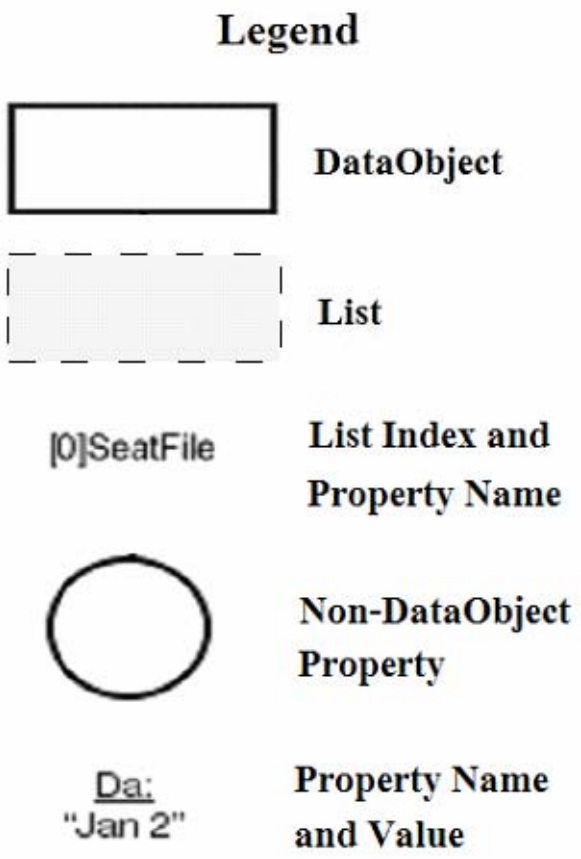
- **DataGraph**
  - A collection of one or more DataObjects
  - Always has a single root DataObject
- **DataObject**
  - A collection of one or more Properties
- **Property**
  - Has a unique name and a type
  - May be single-valued or many-valued

Mapping z/TPFDF to SDO

- **The root DataObject has a many-valued property for each file retrieved. The values of these properties are lists of DataObjects representing subfiles.**
- **A subfile DataObject has a many-valued property for each LREC type retrieved. The values of these properties are lists of DataObjects representing LRECs.**
- **An LREC DataObject has a single-valued property for each field within the LREC.**

Mapping z/TPFDF to SDO





Programming with SDODF

- **z/TPFDF DAS**
  - readData – method to obtain a DataGraph
  - applyChanges – method to apply updates made to a DataGraph
- **SDO**
  - Methods to traverse and make changes to a DataGraph
  - These methods are not tied to z/TPFDF and are applicable for any data source.

Programming with SDODF – Scenario

- **Assume a simple database exists on z/TPFDF containing flight information and that metadata has been created.**
- **We would like to develop an SDODF application which can add, delete, and update LRECs in the top-level file.**
- **We will need to take the following steps:**
  1. Instantiate a z/TPFDF DAS.
  2. Use readData to obtain a DataGraph.
  3. Traverse the DataGraph and perform the add, update, or delete operation.
  4. Use applyChanges to make the change on z/TPFDF.

Programming with SDODF – Instantiating a DAS

- **Instantiating a z/TPFDF DAS requires:**
  - Location of an XML configuration file
  - Database name
  - Subsystem name (optional)
  - Subsystem user name (optional)
  - Username
  - Password (optional)
  - Encryption specification for password (optional)
  - User parameters (optional)

Programming with SDODF – Instantiating a DAS

The Java code below instantiates a z/TPFDF DAS for the “Flight” database with username “User1”, password “Pass”, encryption type “Unencrypted”, and no user parameters. A configuration file in the current directory named “ConfigFile.xml” is used.

```
DatabaseParameter databaseParam =
  new DatabaseParameter(  “Flight” );

AuthorizationModule authModule =
  new AuthorizationModule( “User1”, “Pass”, “Unencrypted”, null );

ZTPFDFDAS das =
  new ZTPFDFDAS( “ConfigFile.xml”, databaseParam, authModule );
```

Programming with SDODF – Using readData

- **Retrieving a DataGraph requires:**
  - z/TPFDF file to retrieve
  - Path to retrieve (optional)
  - Top-level filter (optional)
  - Interleave/Partition value (optional)
  - Search conditions (optional)
  - Properties to retrieve

Programming with SDODF – Using readData

The Java code below retrieves a DataGraph containing the Flight file. A top-level filter of 15 is specified. This top-level filter represents the algorithm string for the top-level file. A search condition is established to retrieve all LRECs with a flight number of 123. A wildcard (“*”) is used for properties so that all fields in the resulting LRECs will be returned.

```
PathParameter pathParam = new PathParameter( 15 );

SearchParameter searchParam = new SearchParameter();
searchParam.addCondition( “FlightFile”, “Fl”,
                                  SearchOperator.EQUAL, “123” );

PropertiesParameter propertiesParam = new PropertiesParameter( "*" );

DataGraph dataGraph = das.readData( “FlightFile”, pathParam,
                                                searchParam, propertiesParam );
```

Programming with SDODF – Working with a DataGraph

- **After readData is used to obtain a DataGraph, you can:**
  - Traverse the DataGraph
  - Add DataObjects
  - Delete DataObjects
  - Update DataObjects
- **Metadata defines which LREC fields are visible and which fields can be altered.**

Programming with SDODF – Traversing a DataGraph

The DataObjects within a DataGraph are accessed starting at the root DataObject. DataObject property values are retrieved using "get" methods.

```
DataObject root = dataGraph.getRootObject();

List<DataObject> subfiles = root.getList( "FlightFile" );
DataObject flightSubfile = subfiles.get( 0 );

List<DataObject> lrecs = flightSubfile.getList( "Flight" );
DataObject flightLREC = lrecs.get( 0 );
```

Programming with SDODF – Traversing a DataGraph

A DataGraph may also be traversed using XPath syntax. The code below retrieves the same flight LREC as the code on the previous slide.

```
DataObject root = dataGraph.getRootObject();

DataObject flightLREC =
  root.getDataObject( “FlightFile.0/Flight.0” );
```

Programming with SDODF – Creating an LREC

A new LREC is created by calling the createDataObject method on a subfile DataObject. The fields of the new LREC can then be set.

```
DataObject newFlightLREC =
  flightSubfile.createDataObject( “Flight” );

newFlightLREC.setString( “Fl”, “234” );
```

Programming with SDODF – Deleting an LREC

An LREC is deleted by calling the delete method on the LREC DataObject.

```
flightLREC.delete();
```

Programming with SDODF – Updating an LREC

LREC fields can be updated using the appropriate "set" methods on an LREC DataObject.

flightLREC.setString("Fl", "345");

Programming with SDODF – Using applyChanges

Once the desired changes have been made to the DataGraph, applyChanges is called to make the corresponding updates on z/TPFDF.

```
try {

  das.applyChanges( dataGraph );

} catch ( UpdatesNotAllowedException e ) {

} catch ( DataChangedException e ) {

}
```

SDODF Considerations

- **Optimistic locking is used**
- **Only one subfile can be modified per applyChanges call**
- **No support for transactions (commit/rollback)**
- **Message size is limited to 4 MB**
- **z/TPFDF DAS is not thread-safe**

Follow-up Information

- **PK60030**
  - z/TPFDF APAR (will be available)
- **PJ32720**
  - Co-requisite z/TPF APAR (will be available)
- **Java z/TPFDF DAS code will be available for download on the TPF web site as a JAR file.**
- **SDO libraries are freely available:**
  - http://www.eclipse.org/modeling/emf
  - http://incubator.apache.org/tuscany/

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