IMS 14 Application Enhancements

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Topics

- ICAL with Control Data
- New DLI MRR call
- Native SQL Enhancements
- Cascaded Transactions
- ESAF Enhancements
- Miscellaneous

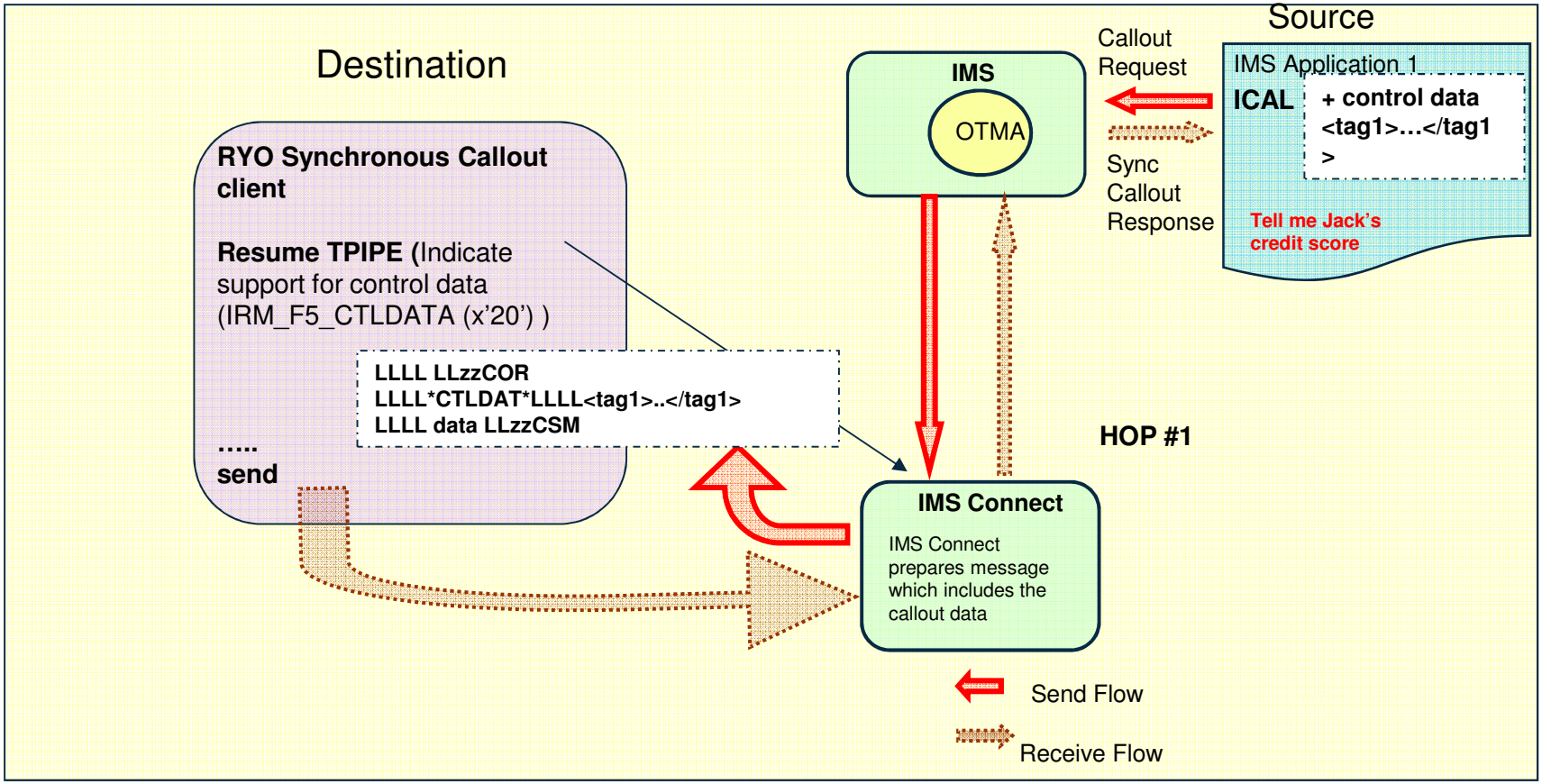
DL/I ICAL Support for Control Data

DL/I ICAL Support for Control Data

- **Challenge Addressed**
  - ICAL DL/I call needs to support various user-provided control information, unlimited converter name override for soap messages, and unique security token for end client
- Solution
  - Add a new optional control data area to the ICAL DL/I call so that any type of control data can be specified and passed to IMS Connect and its clients
  - E.g., with SOAP Gateway support, IMS Connect will be able to override the XML converter for the outbound message
- Business Value
  - Provides flexibility for callout messages with additional control-type of data
    - E.g., XML converter override, security credentials, endpoint information
      - Strengthens callout security with the security token included in control data
      - Reduce the number of OTMA destination descriptors in the system due to unique converter names

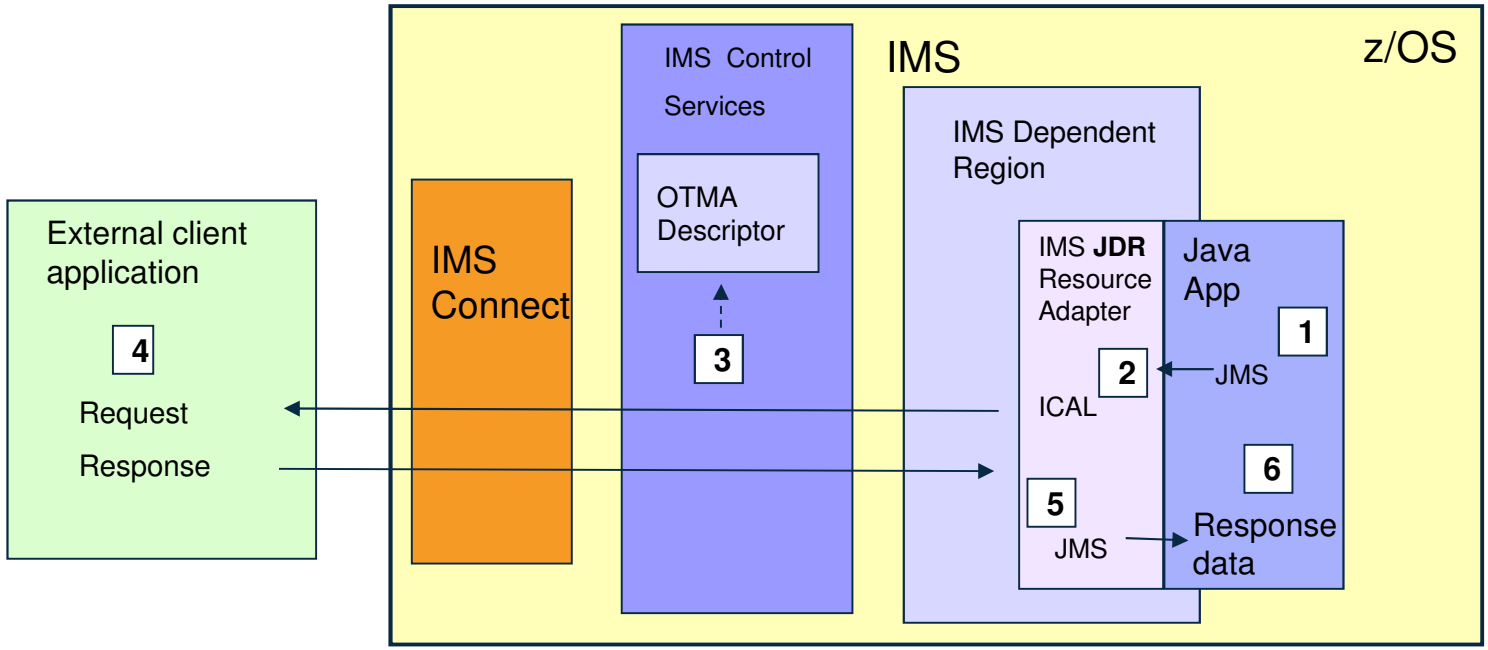
Callout with ICAL control data …

- **EXAMPLE: ICAL Control data contains "data about the data"**
  - Provides information to the hops for special processing



Java Dependent Region (JDR) Resource Adapter Support

- The existing IMS implementation of the Java Message Service (JMS) API provides a standardized front end to the ICAL interface for applications running in JMP and JBP regions
  - The JMS API, delivered in the Universal Java dependent region resource adapter (DFSUTM), invokes the Universal Drivers C library (DFSCLIBU) through JNI calls to issues the calls from C to the AIBTDLI interface with ICAL



DL/I ICAL Trace enhancements

- **Challenge Addressed**
  - ICAL DL/I call needs to make diagnosing problems with synchronous callout processing easier.
- Solution
  - Two new X'6701 record types for messages sent by OTMA
    - ID= field for ACK message displays a value of YAKO
    - ID= field for NAK message displays a value of YNKO

- Business Value
  - The usability of the X'6701 log records for OTMA synchronous callout processing is improved by the introduction of the YAKO and YNKO record types, which enable users to distinguish ACK and NAK messages that are sent by OTMA from ACK and NAK messages that are received by OTMA.

DL/I Multi-Record Retrieve (MRR) call

DL/I MRR Call

- **Challenge addressed**
  - Need for a singe call to retrieve a range of records

- Solution
  - New MRR call (single DL/I call) that can retrieve
    - a series of database records (a root and all its children) or all the segments in a large twin chain
    - Supports full-function and fast path databases

Format

>>-MRR--*aib*--*i/o area*--*header ssa*----------><

DL/I MRR Call

- Scenarios in which the MRR Call might be used include:
  - DL/I application calls
  - Open Database DL/I path used with JDBC driver
  - COBOL Native SQL
  - Open Database Native SQL used with .NET driver
  - IMS Universal JDBC Driver Type-2 processing

- Benefits
  - reduce the number of calls an application program needs to make to retrieve a range of records
  - speed up queries that extract significant amounts of IMS data.

Native SQL Enhancements

Native SQL Enhancements

- **Challenge Addressed**
  - Enhancements for the Native SQL support

- Solution
  - IMS data aggregation
  - SQL result aggregation support for:
    - IMS COBOL applications using SQL
    - Microsoft .NET application accessing IMS DB using IMS .Net Data Provider

- Benefits
  - Application and tooling tends to generate aggregate queries for analytics.
  - Data aggregation on the client side is expensive with heavy network traffic
  - Reduces the overhead of roll your own processing

SQL Keywords

- Support keywords for IMS data aggregation

SQL Keywords	Description
COUNT	Returns the number of rows that matches a specified criteria
SUM	Returns the total value of a numeric column
AVG	Returns the average value of a numeric column
MIN	Returns the smallest value of the selected column
MAX	Returns the largest value of the selected column
GROUP BY	Group result data

SQL Aggregate Function Syntax

- AVG

  SELECT AVG(column_name) FROM table_name

- COUNT

  SELECT COUNT(column_name) FROM table_name

  – The row with NULL values will not be counted.

  SELECT COUNT(*) FROM table_name

  –returns the number of records in a table

- MAX

  SELECT MAX(column_name) FROM table_name

- MIN

  SELECT MIN(column_name) FROM table_name

- SUM

  SELECT SUM(column_name) FROM table_name

SQL GROUP BY Syntax

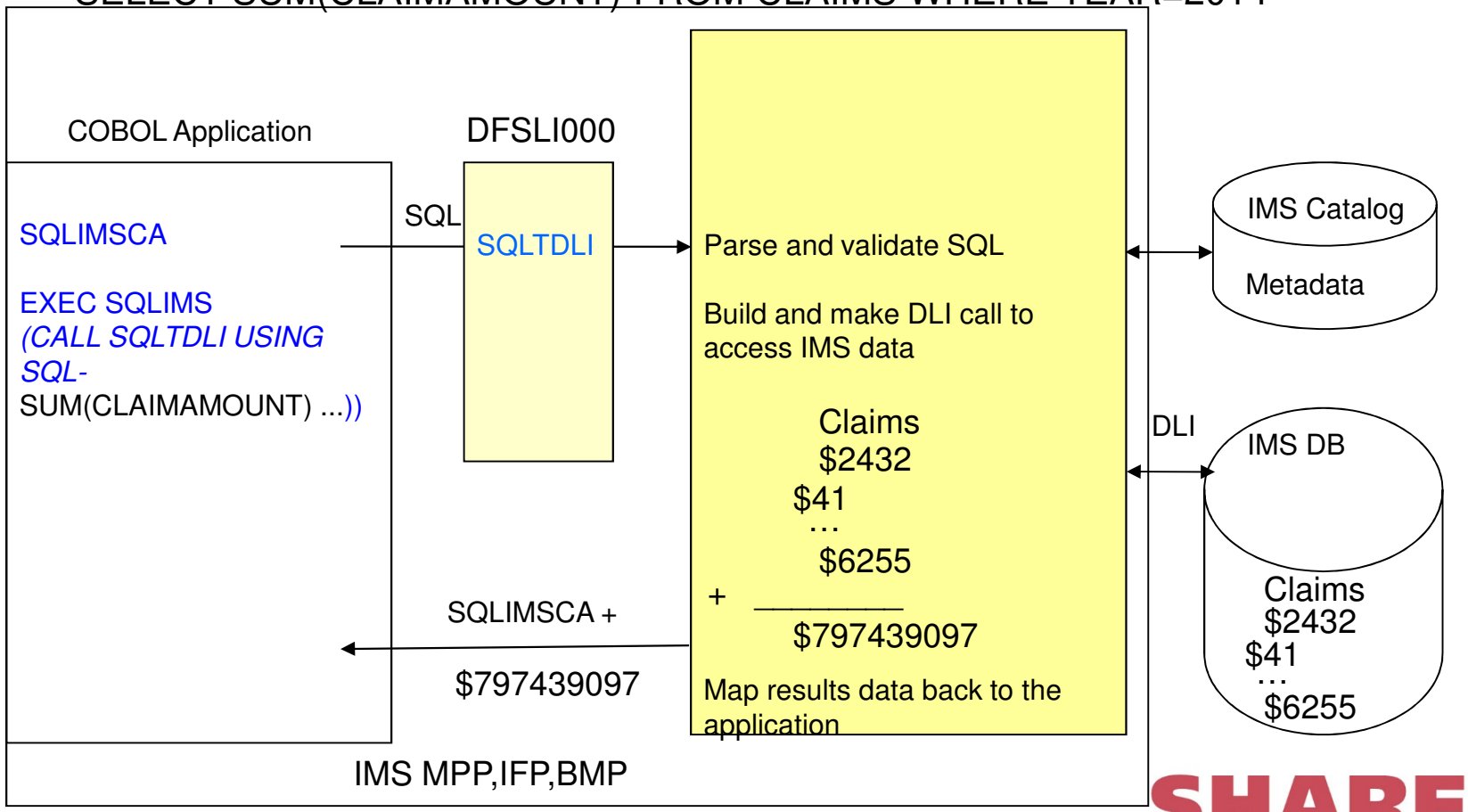
- SELECT column_name, aggregate_function(column_name)
  FROM table_name
  WHERE column_name operator value
  GROUP BY column_name

- GROUP BY more than one column

- GROUP BY with ORDER BY

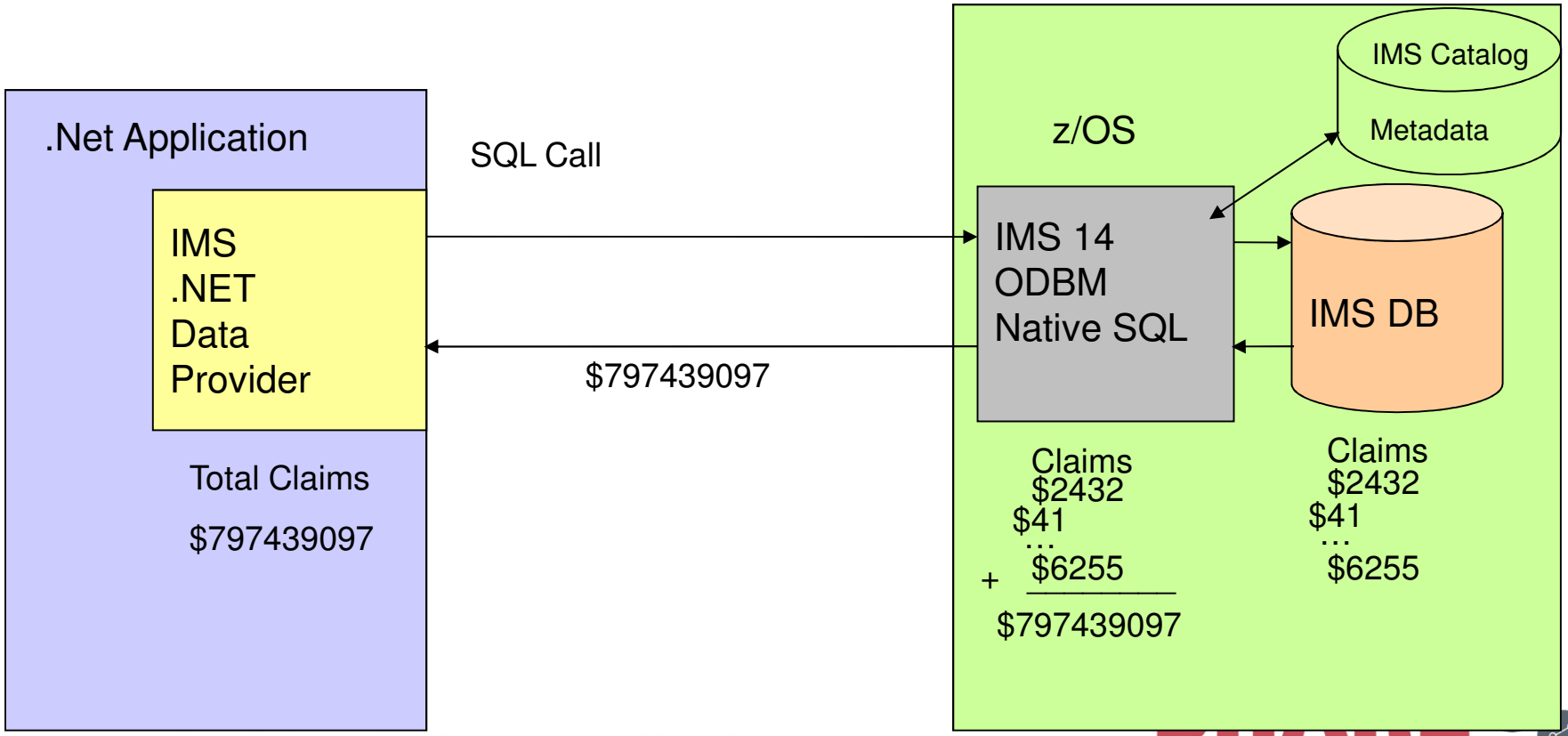
SQL Aggregate Parsing in IMS

- How much money has my insurance company paid out in claims for the year 2014?
  - SELECT SUM(CLAIMAMOUNT) FROM CLAIMS WHERE YEAR=2014



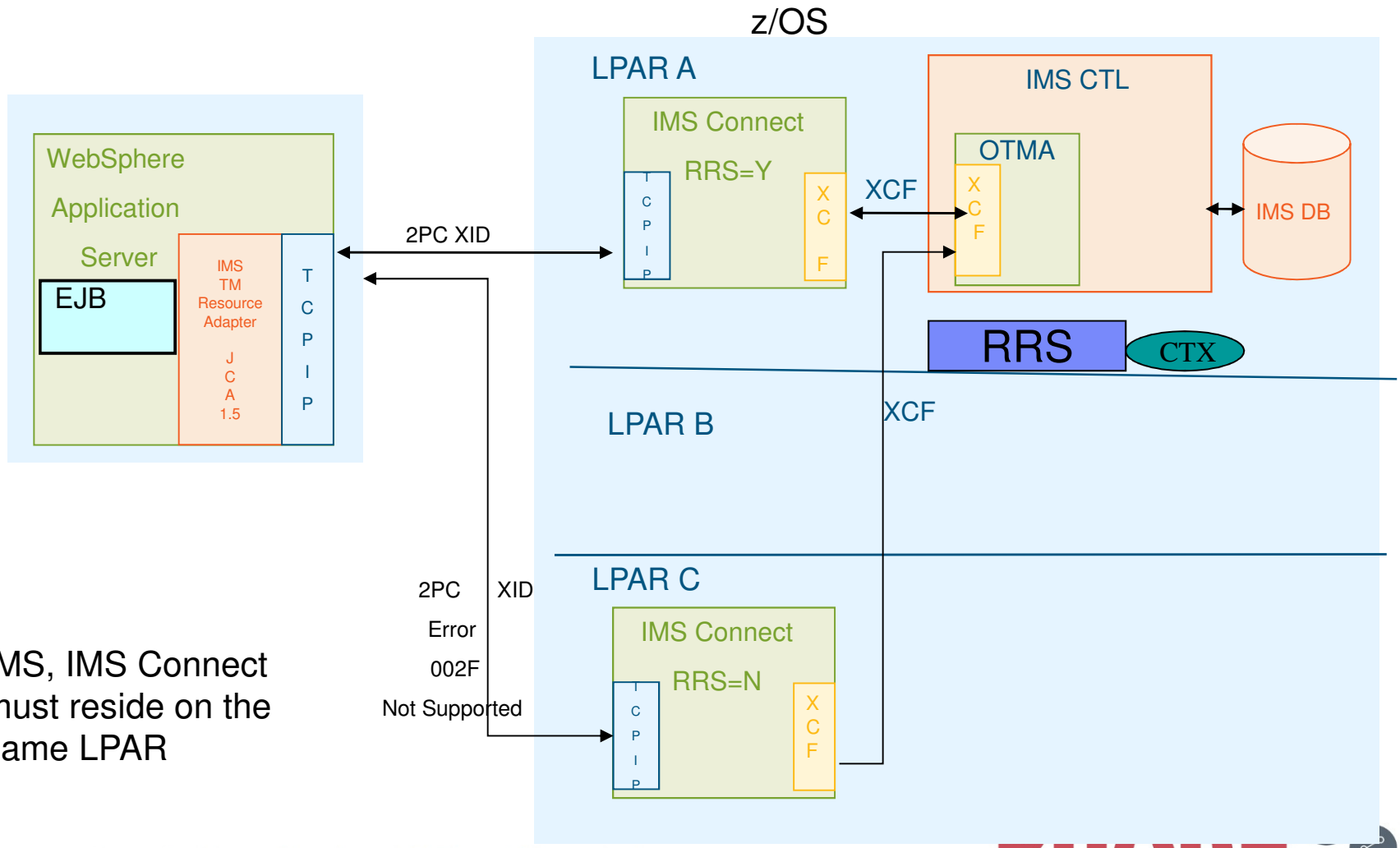
SQL Aggregate Parsing in IMS …

- IMS Enterprise Suite Data Provider for Microsoft .NET
  - How much money has my insurance company paid out in claims for the year 2014?
  - SELECT SUM(CLAIMAMOUNT) FROM CLAIMS WHERE YEAR=2014



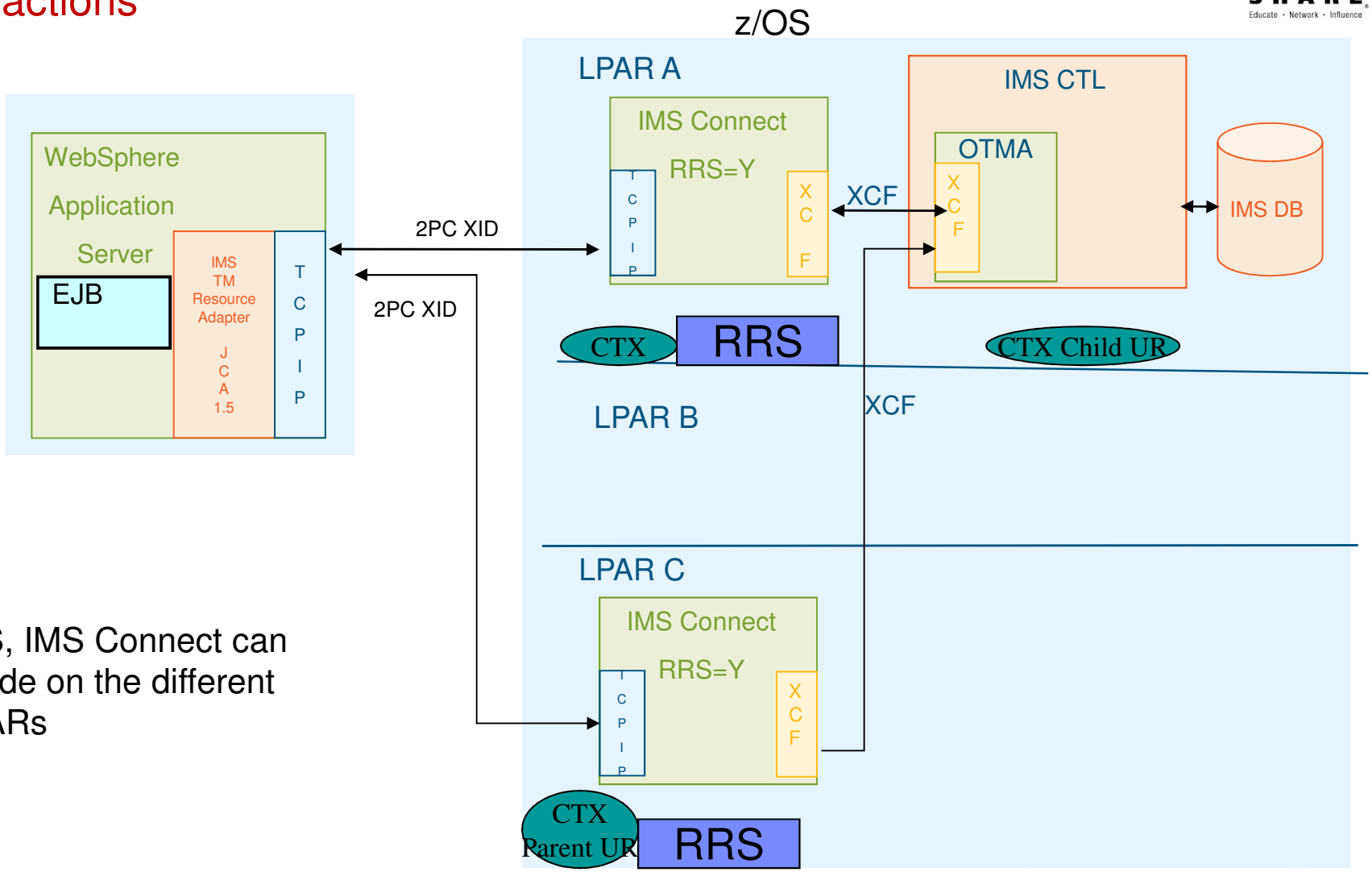
Cascaded Transactions

Current Transaction 2-phase commit support for TM transactions



- IMS, IMS Connect must reside on the same LPAR

New Cascaded Transaction 2-phase commit support for TM transactions



- IMS, IMS Connect can reside on the different LPARs

ESAF

ESAF Subsystem Definition Enhancement

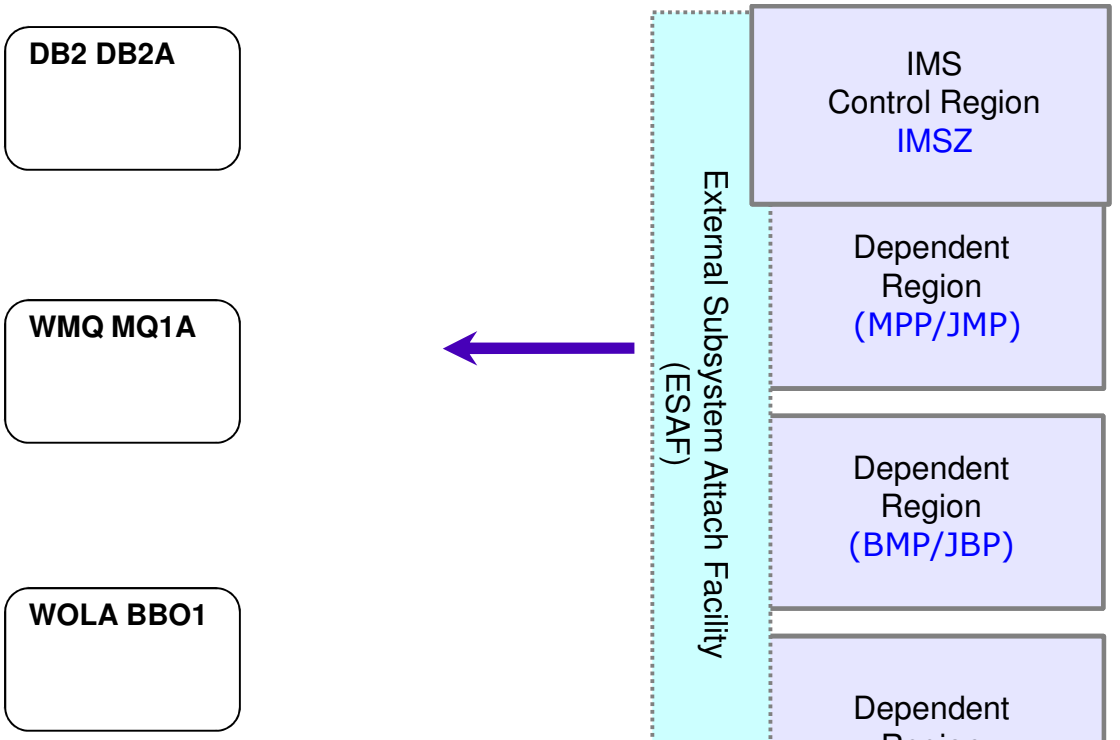
- **Challenge Addressed**
  - Prior to IMS 14, the only valid external subsystem specified type was DB2
    - Could not specify other subsystems, e.g., WMQ or WOLA

- Solution
  - IMS PROCLIB Subsystem Member (SSM) keyword format Subsystem Type supports new values:
    - SST = DB2 | MQ | WOLA
  - Commands and log records changed to show SST values
    - /DIS SUBSYS
    - /DIS OASN SUBSYS
    - Log Records
      - X'40' Checkpoint Subcode X'31' (External subsystem Identifier)
      - X'56' External Subsystem Subcode X'000009‘ (Ext subsys disconnected)
      - IMS Fast Database Recovery (FDBR) users with IMS ESAF

- Benefits
  - Improves ESAF usability

ESAF Subsystem Definition Enhancement Example

- IMS.PROCLIB(IMSZSSN1)
  - SST=DB2,SSN=DB2A,LIT=,ESMT=,REO=,CRC=
  - SST=MQ,SSN=MQ1A,LIT=,ESMT=,REO=,CRC=
  - SST=WOLA,SSN=BBO1,LIT=,ESMT=,REO=,CRC=



Miscellaneous

CSL ODBM Input user exit routine Apar: PI06019 NEWFUNC

CSL ODBM Input user exit routine new function

This APAR adds a new function that allows modification of the PSB and/or Alias names sent in by the client before allocating the PSB

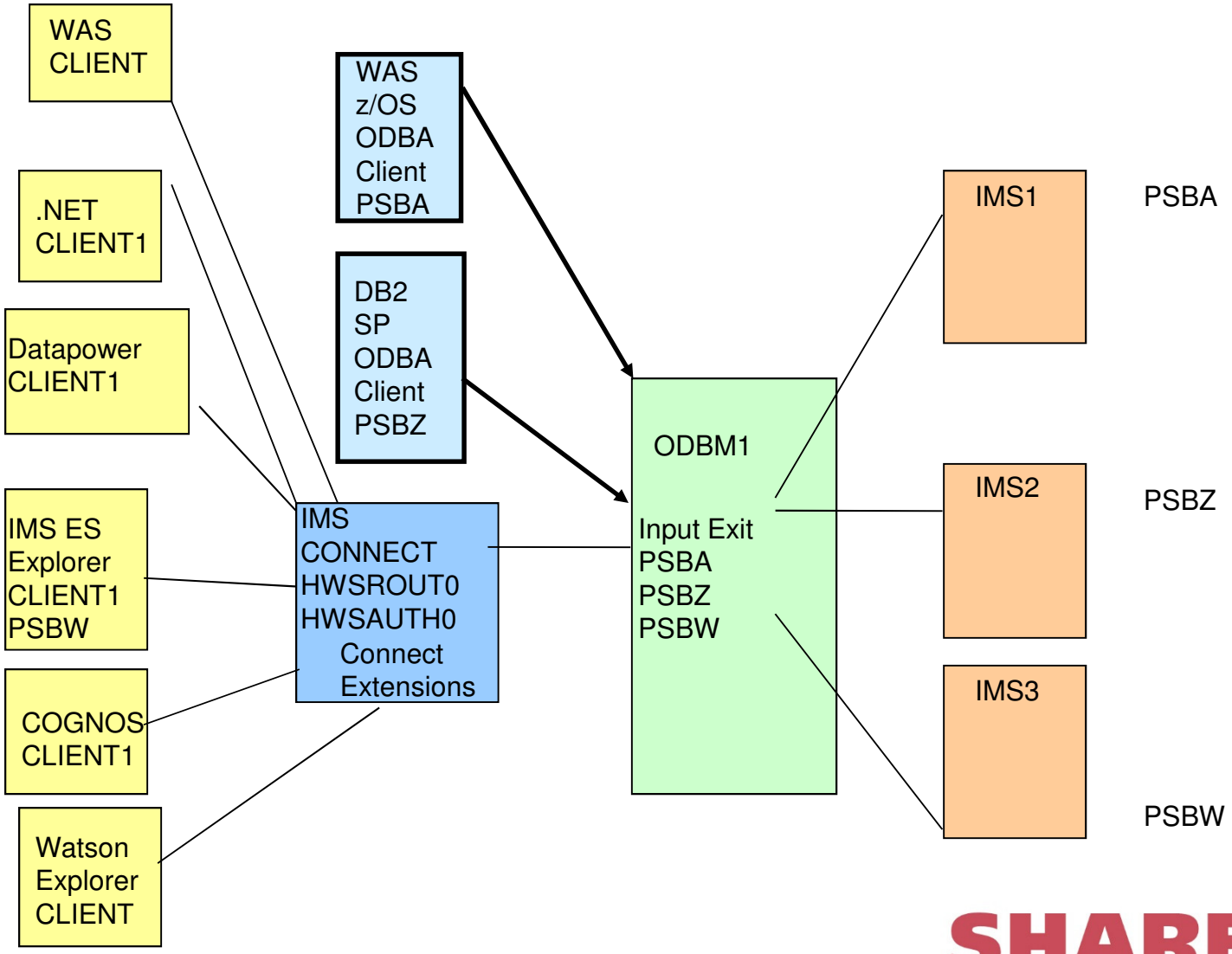
New function code 3

New fields added to parameter list

The CSL ODBM Input user exit routine is driven for the following events:

- All CSLDMI FUNC=ODBMCI requests
- FUNC=ODBMCLIENT APSB requests
- FUNC = ODBMCLIENT APSB Pre-processing request
  - Note: When the function code is 3, all parameter list fields are zero except the following:
    - Client ID fields (if available)
    - z/OS Resource Recovery Services parent UR token (if available)
    - User-defined request token (if available)
    - PSB name
    - Alias name

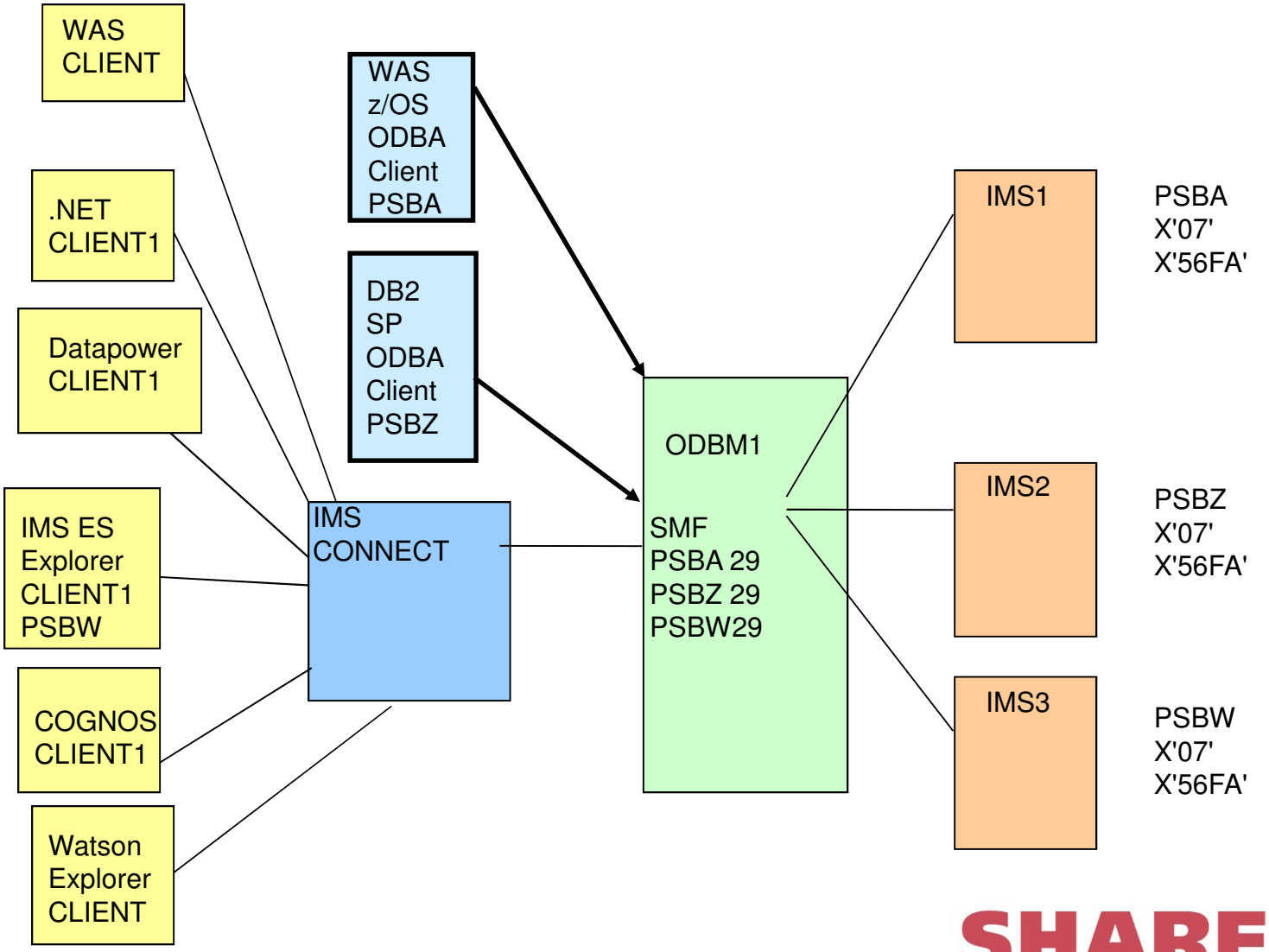
CSL ODBM Input user exit considerations



ODBM Accounting

- ODBM Unit of Work
  - Single UOW activity for charge back.
    - UOW is defined as allocate PSB thru deallocate PSB
- IMS.PROCLIB ODBM Initialization member CSLDIxxx
  - Optional parameter, LOGOPT=(ACCOUNTING)
- SMF log record type 29 (x'1D') with subtype of 1
  - SMF supports logstream or dataset for logging
- Benefits
  - Provides a way for charge back of ODBM processing.

ODBM Accounting



IMS Catalog API

Application programs can retrieve database and program specification block definitions from the IMS catalog through the IMS catalog application programming interface (API).

The IMS catalog API is a release-independent assembler macro interface provided by the IMS DFS3CATQ macro.

An application that uses the IMS catalog API has the following general structure:

DFS3CATQ FUNC=DESCT - Include the API DSECTS
DFS3CATQ FUNC=OPEN - Open access to IMS Catalog managed datasets
DFS3CATQ FUNC=GET - get an object definition
DFS3CATQ FUNC=LIST - get a list of object names
DFS3CATQ FUNC=CLOSE - Close access to IMS Catalog managed datasets

IMS Catalog API

DFS3CATQ FUNC=GET - get an object definition
format-type to return the requested object definition.
Return in ACBLIB format.
Return in DBDLIB format.
Return in PSBLIB format.

object-type following values:

ANY

Any object type is requested.

DATABASE

Database types are requested.

PSB

Program specification block types are requested.

IMS Catalog API

DFS3CATQ FUNC=LIST - get a list of object definition

object-type following values:

ANY

Any object type is requested.

DATABASE

Database types are requested.

PSB

Program specification block types are requested.

Programming with the classic Java APIs

The classic Java APIs for IMS are no longer supported in IMS 14.
IMS Version 13 is the last release to support the IMS classic Java APIs.

Recommendation: Customers using these APIs should migrate to the IMS Universal drivers.

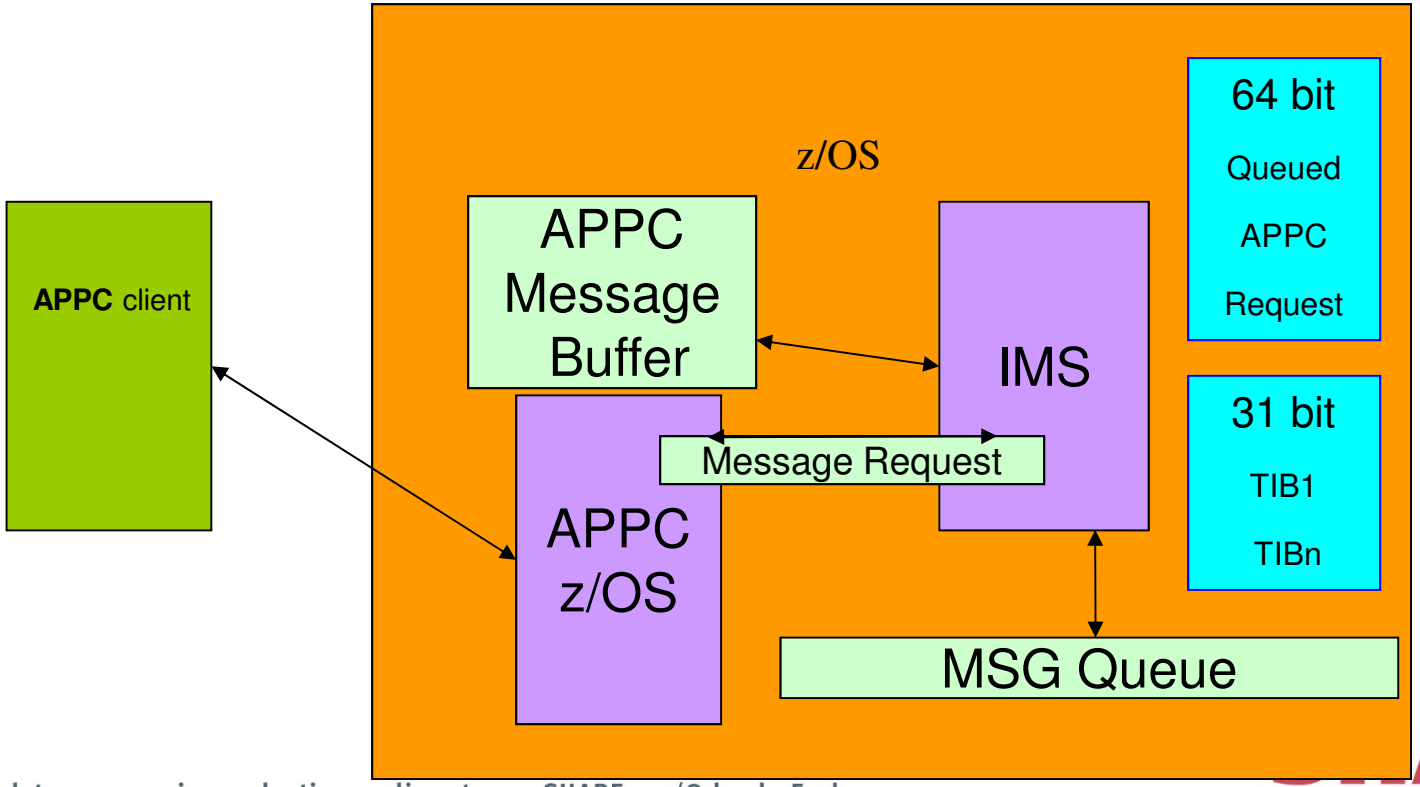
APPC/IMS flood control

- **Challenge Addressed**
  - IMS 31 bit APPC control block storage exceeded
  - IMS can abend
- Solution
  - APPC conversation request queued in 64 bit storage
  - User defined threshold
  - DFSDCxxx member of the IMS PROCLIB data set

- Benefits
  - Fewer unplanned outages
  - Less 31 bit storage used
  - Less checkpoint/restart processing

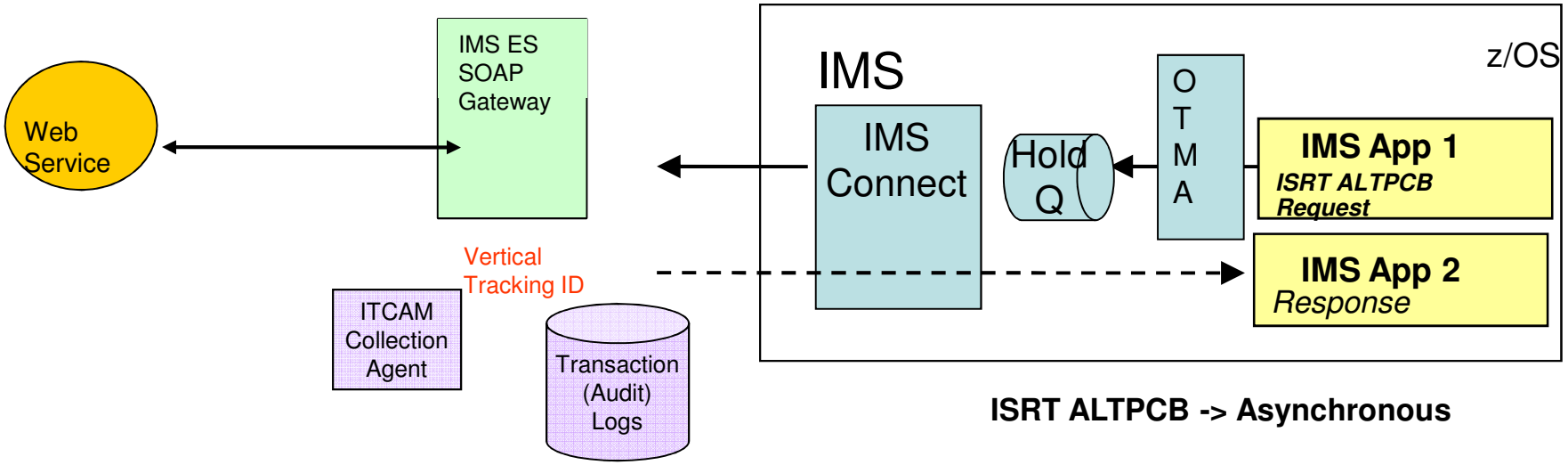
APPC/IMS processing using 64 bit storage

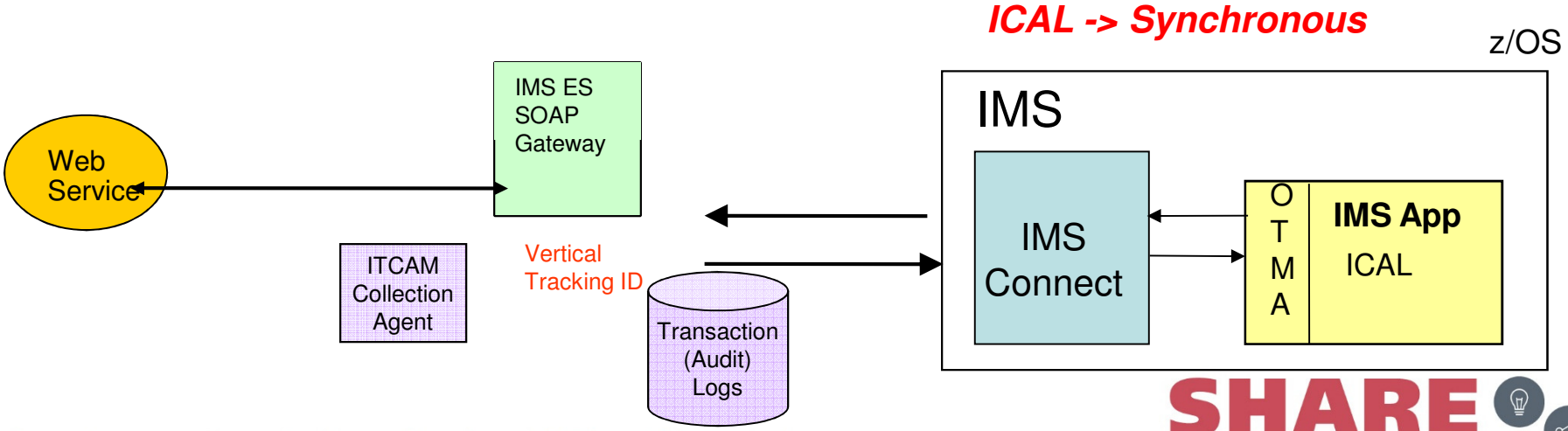
- APPC flow
  - APPC message request comes in from client and APPC/zOS sends request to IMS
  - IMS receives request
    - Builds 31 bit APPC Control Block (TIB)
    - For Standard and Modified IMS Applications queues message to msg-queue
    - If threshold reached, put APPC/zOS request into 64 bit storage and process it later
      - Note input message remains in APPC Message Buffer



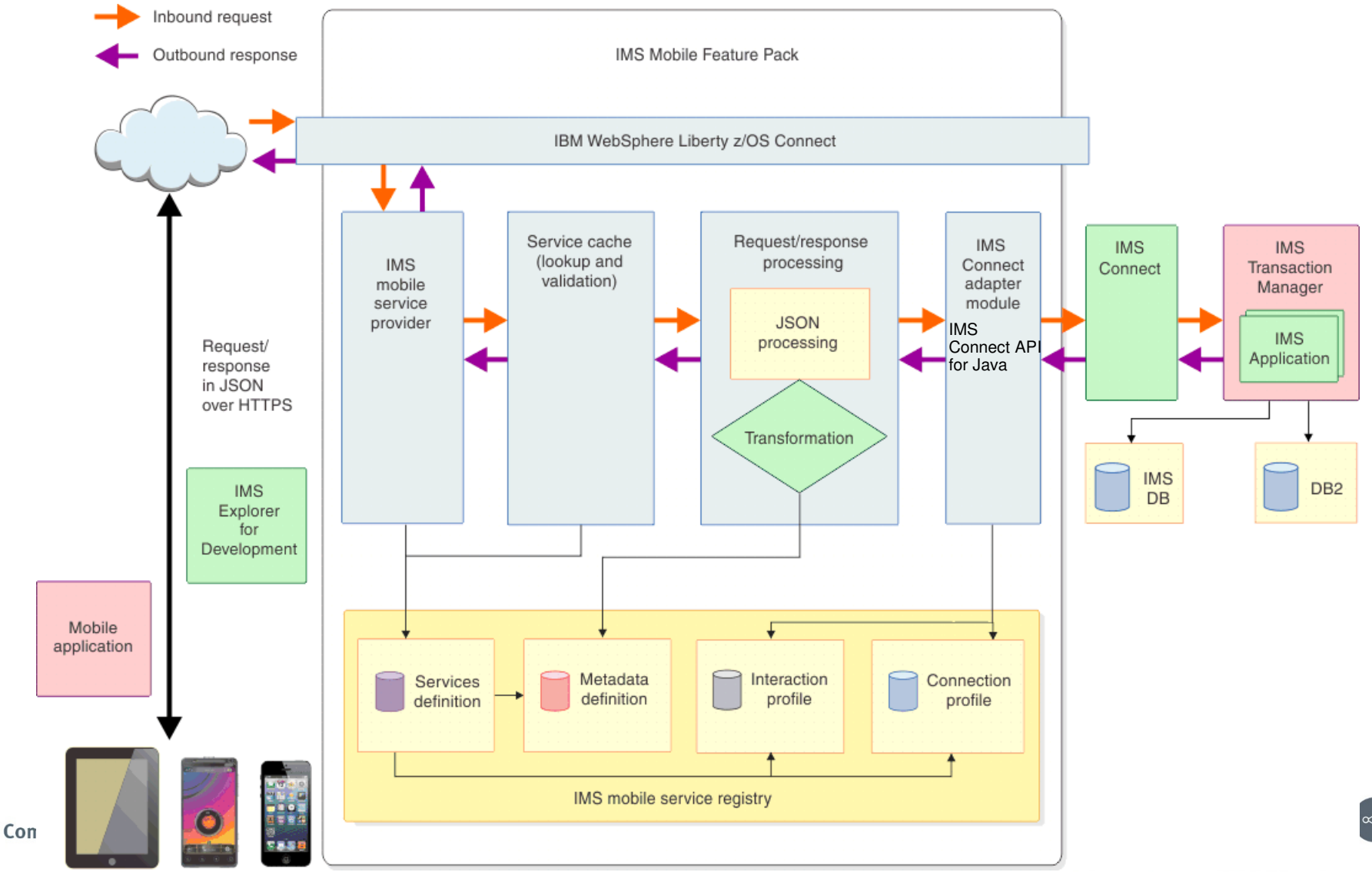
IMS Enterprise Suite

IMS SG Callout Tracking Architecture

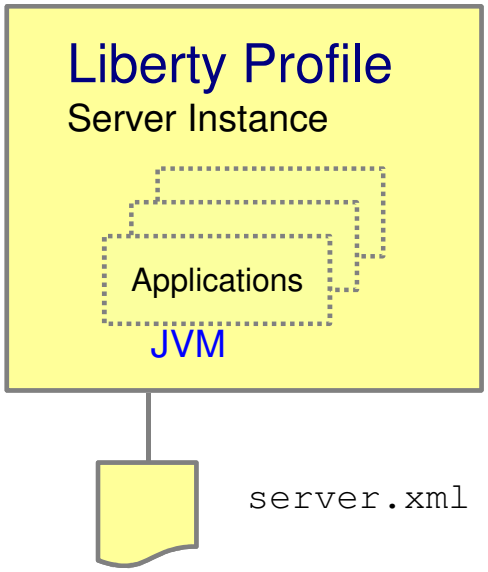




IMS Mobile Solution Version 3.1.1



WebSphere Liberty Profile and zOS

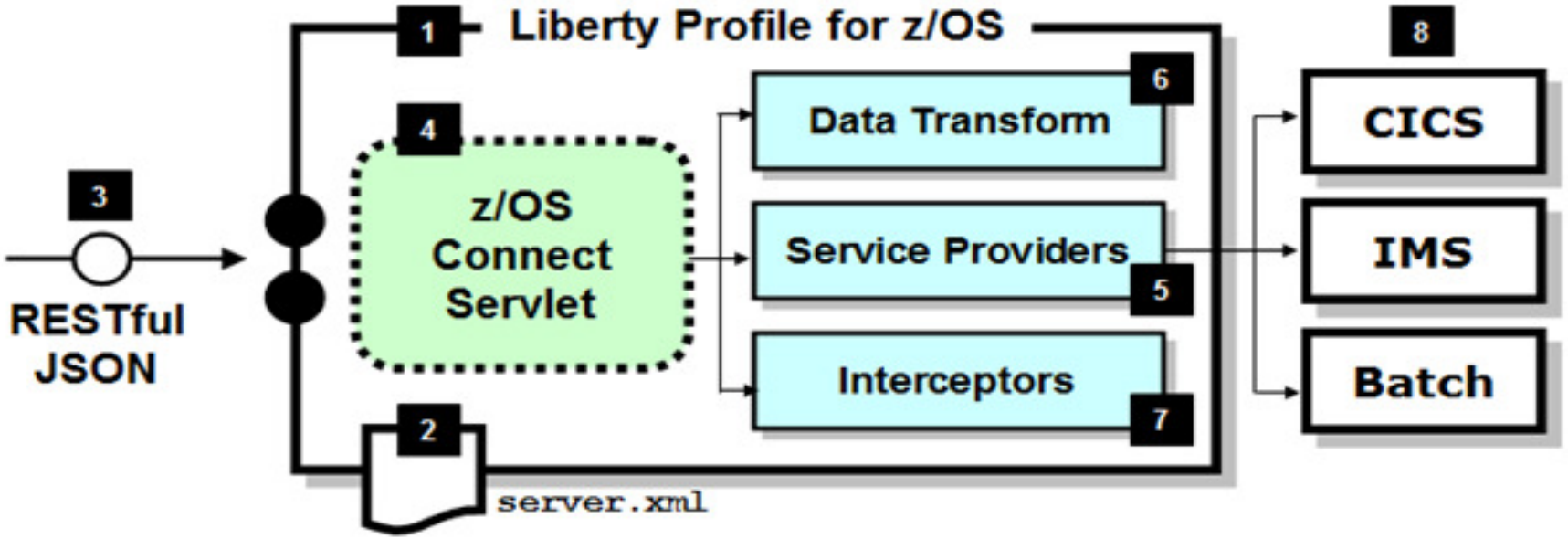



```
<server>
  <featureManager>
<feature>zosConnect-1.0</feature>
<feature>imsmobile:imsmobile-1.0</feature>
```

- A single JVM server model:
  Lightweight - relatively small footprint
  Composable - configure only function needed
  Dynamic - configuration changes, application deployments
  Fast - server starts in as little as a few seconds
- Simple configuration and operations
- Feature management
  - Features are the units of functionality
    - z/OS Connect - feature
- On z/OS start as UNIX process or started task
- z/OS Extensions:
  - SAF - use SAF as repository for authentication data and SSL key and trust store
  - WLM - classify work into separate service or reporting classes
  - RRS TX - use JDBC Type 2 with RRS TX support
  - MODIFY - use z/OS MODIFY to process dump actions

z/OS Connect

WebSphere Liberty Profile z/OS that provides a REST & JSON interface (or a “gateway”) to z/OS programs and applications



1. z/OS Connect is software function that runs in Liberty Profile for z/OS.
2. z/OS Connect is described and configured in the Liberty `server.xml` file
3. z/OS Connect is designed to accept RESTful URIs with JSON data payloads
4. One part of z/OS Connect is a servlet that runs in Liberty Profile z/OS.
5. A ‘Service Provider’ is software that provides the connectivity to the backend system
6. z/OS Connect provides the ability to transform JSON to the layout required by backend
7. ‘Interceptors’ are callout points where software can be invoked to do things such as SAF authorization and SMF activity recording
8. Initially the backend systems supported will be CICS, IMS and Batch