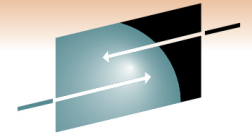


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#8576 - What's New in IMS Open Database (ODBM) Room 211B

Kenny Blackman
kblackm@us.ibm.com

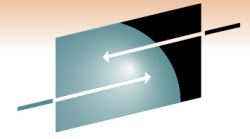




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Open Database Topics

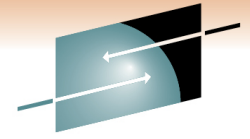
- Open Database Manager
- IMS Connect
- IMS Universal Drivers



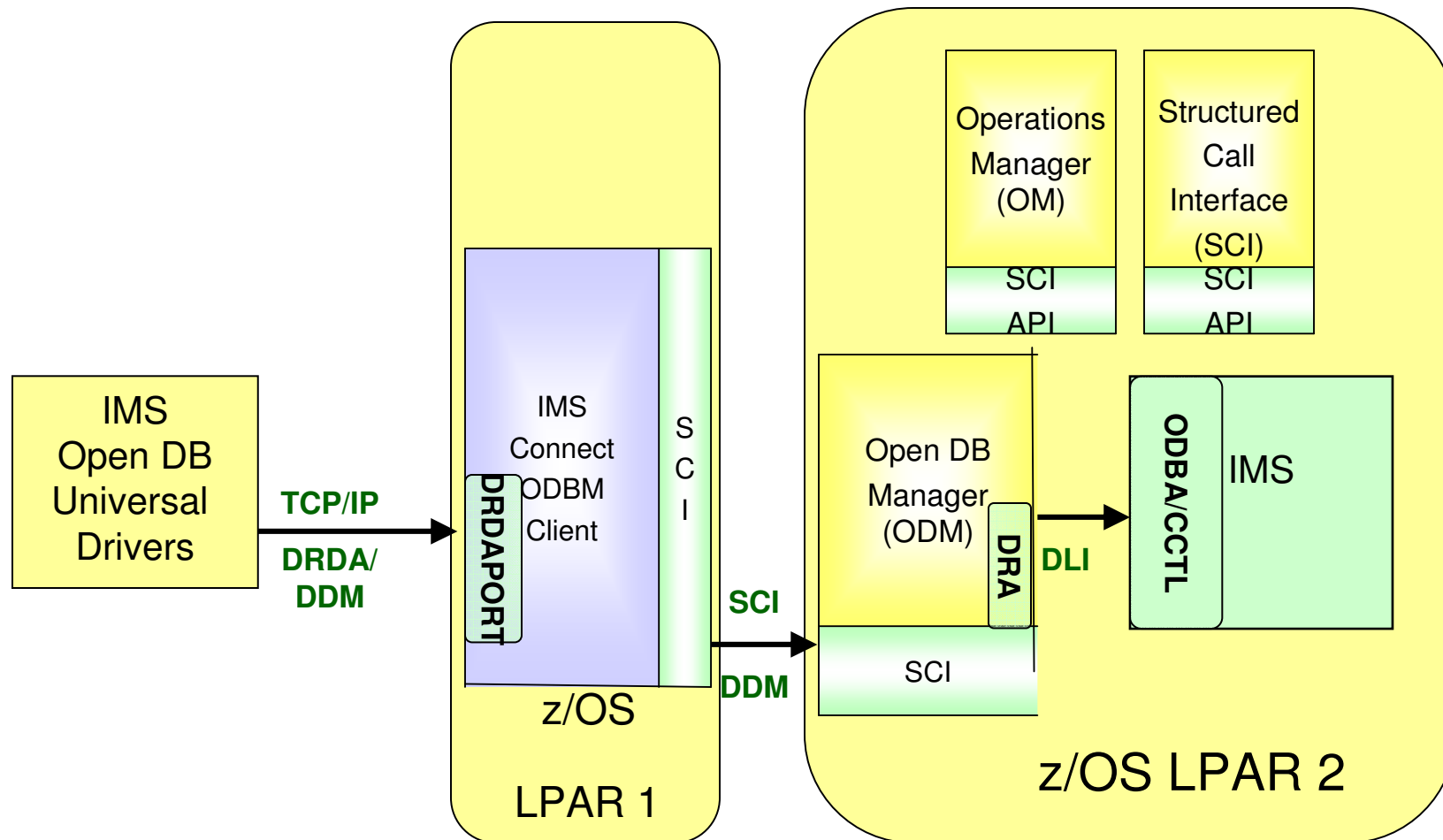
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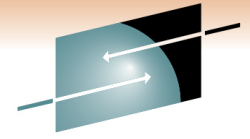
IMS Open Database

- Solution Statement
 - Offer scalable, distributed, and local access to IMS database resources
- Value
 - Business growth
 - Allow more flexibility in accessing IMS data
 - Market positioning
 - Enable IMS databases as a standards-based data server
- Key differentiators
 - Standards-based approach
 - Java Connector Architecture
 - JDBC
 - SQL
 - DRDA
 - Solution packaged with IMS
- Enables new application design frameworks and patterns
 - Java EE
 - Web 2.0
 - Cognos



IMS 11 Open Database Components

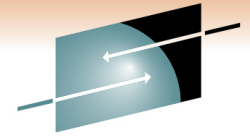




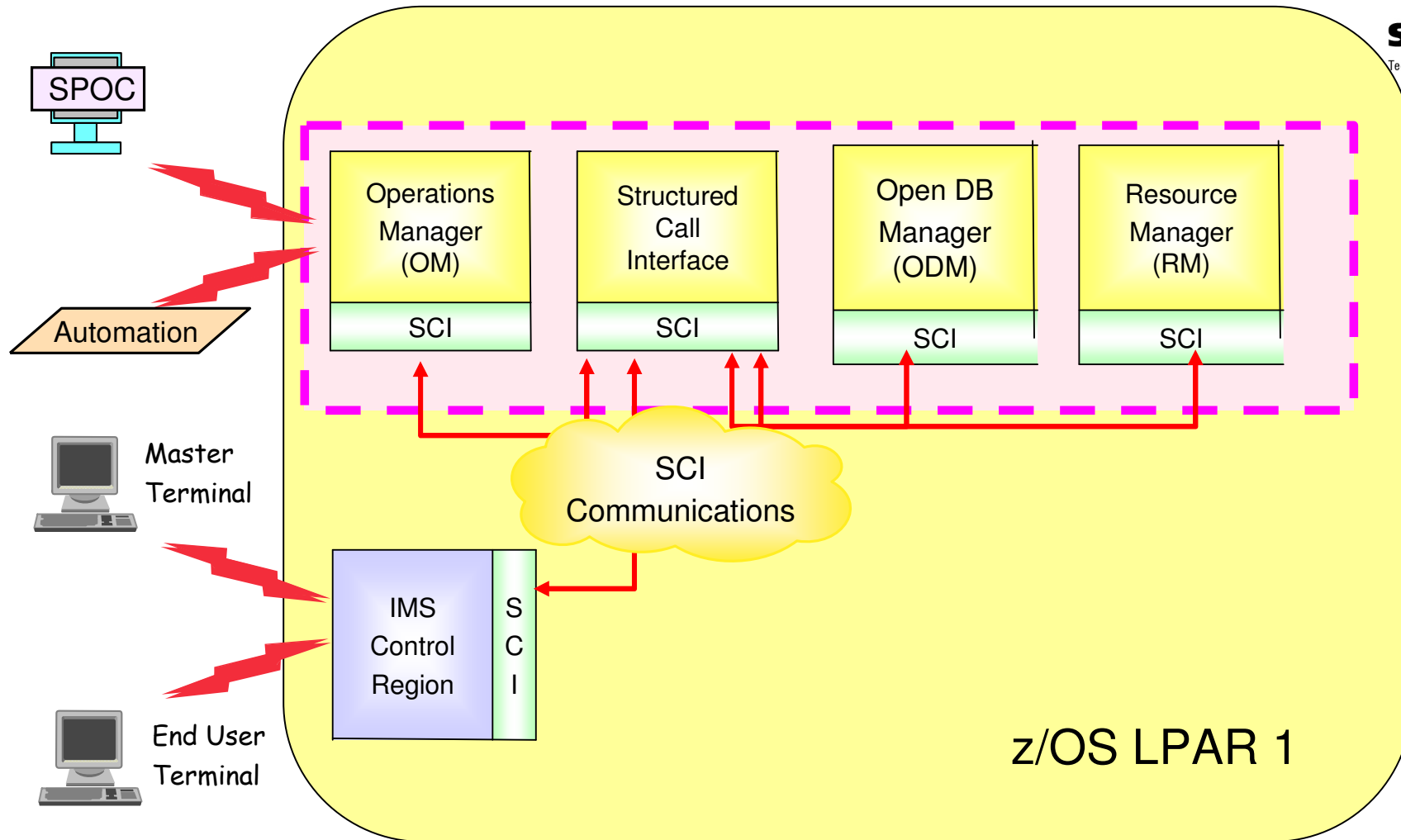
Open Database Manager

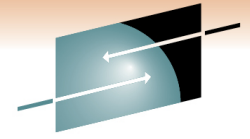
- **Open Database Manager (ODBM)** Common Service Layer component
 - **Receives** database connection requests from IMS Connect
 - **Translates** incoming database requests from the DDM protocol into DLI calls expected by IMS
 - **Translates** responses to the client into the DDM protocol
 - **Manages** connections to IMS DB
 - Implements the DRA interface
 - **Supports** Two-phase commit semantics
 - RRS=Y RRS provides sync point coordinator role
 - **Supports** Single-phase commit semantics
 - RRS=N syncpoint management must be performed by the ODBM client.

Common Service Layer

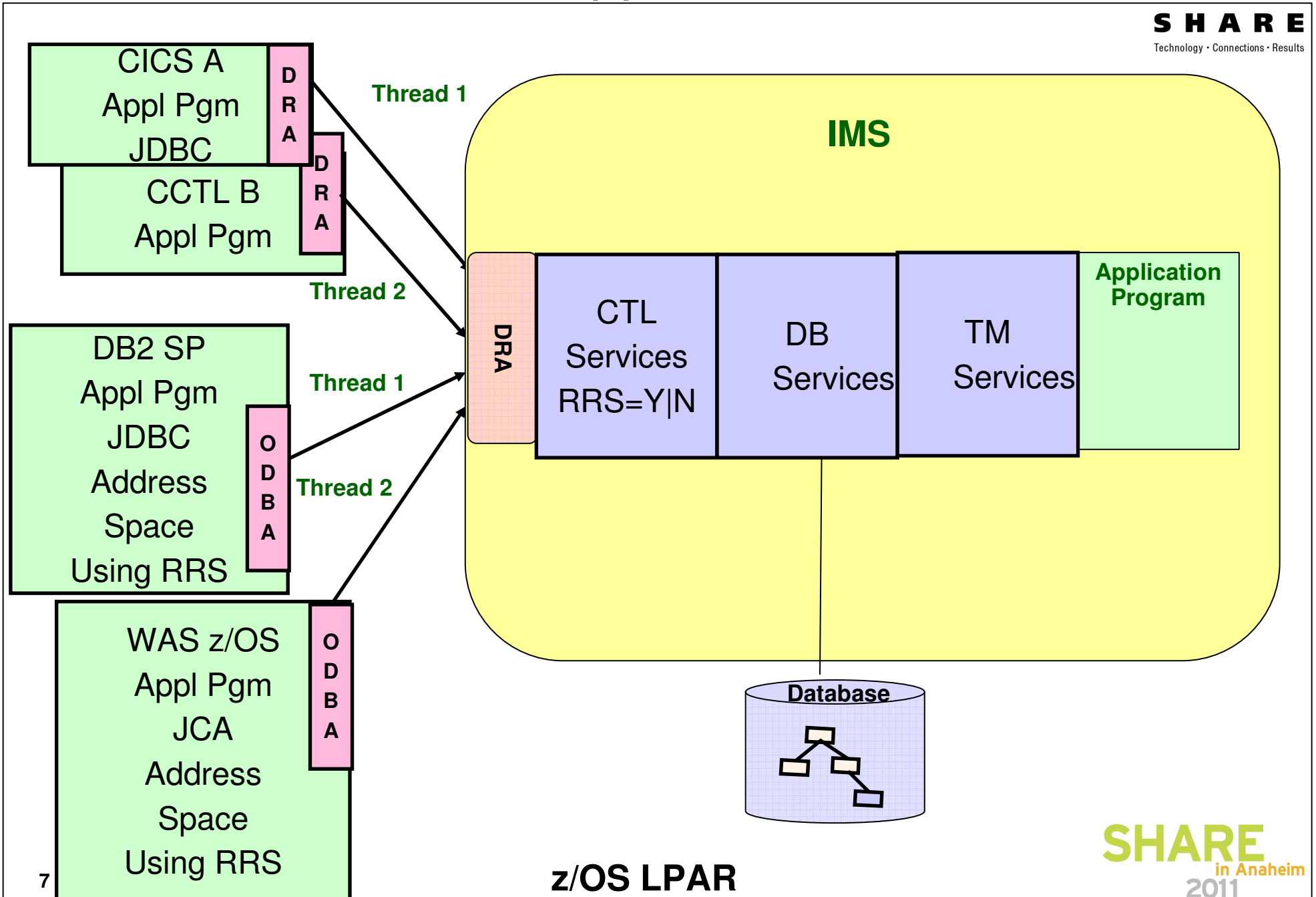


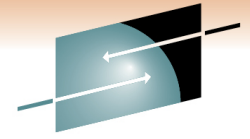
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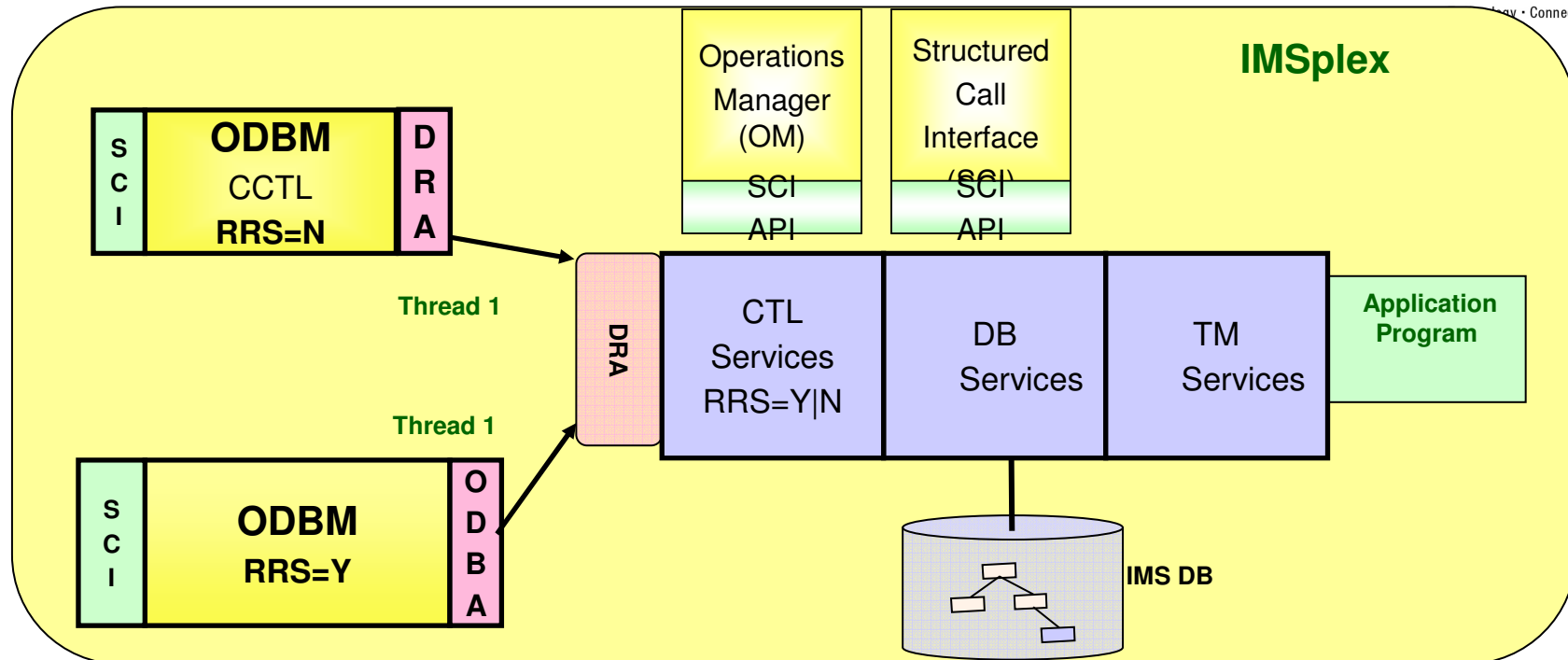


CCTL ODBA and DRA Application Review



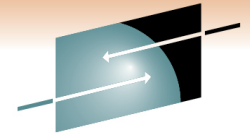


ODBM Interfaces: ODBA and DRA



- ODBM can be started with either RRS=Y or RRS=N
- RRS=Y
 - Use ODBA
- RRS=N
 - Use CCTL

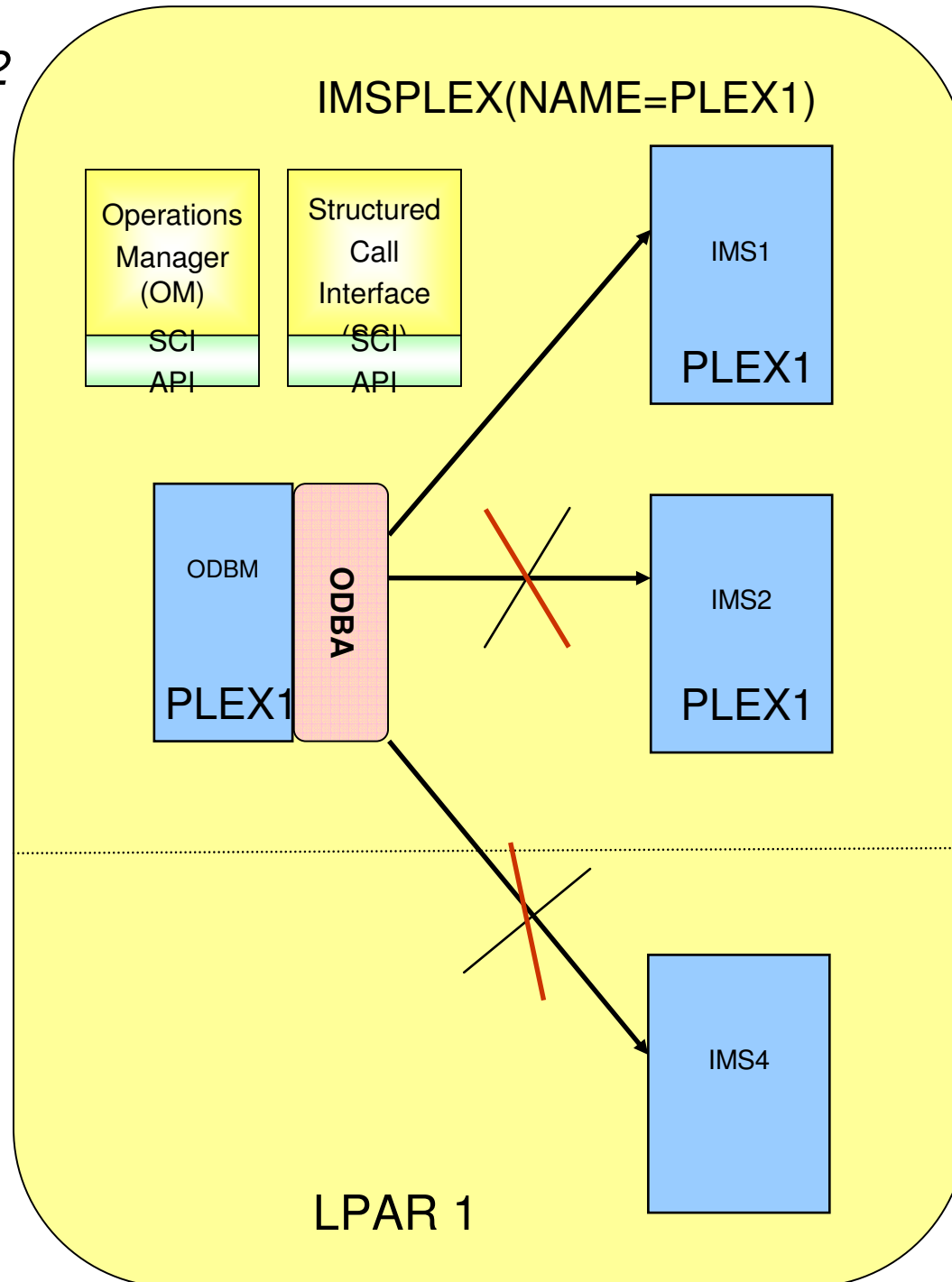
ODBM/SCI auto-(re) connect



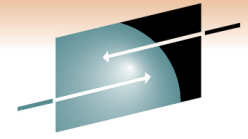
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*SCI notification for IMS2
ODBM re-connects*

*No notification for IMS4
ODBM does not re-
connect
must use an ODBM
command*



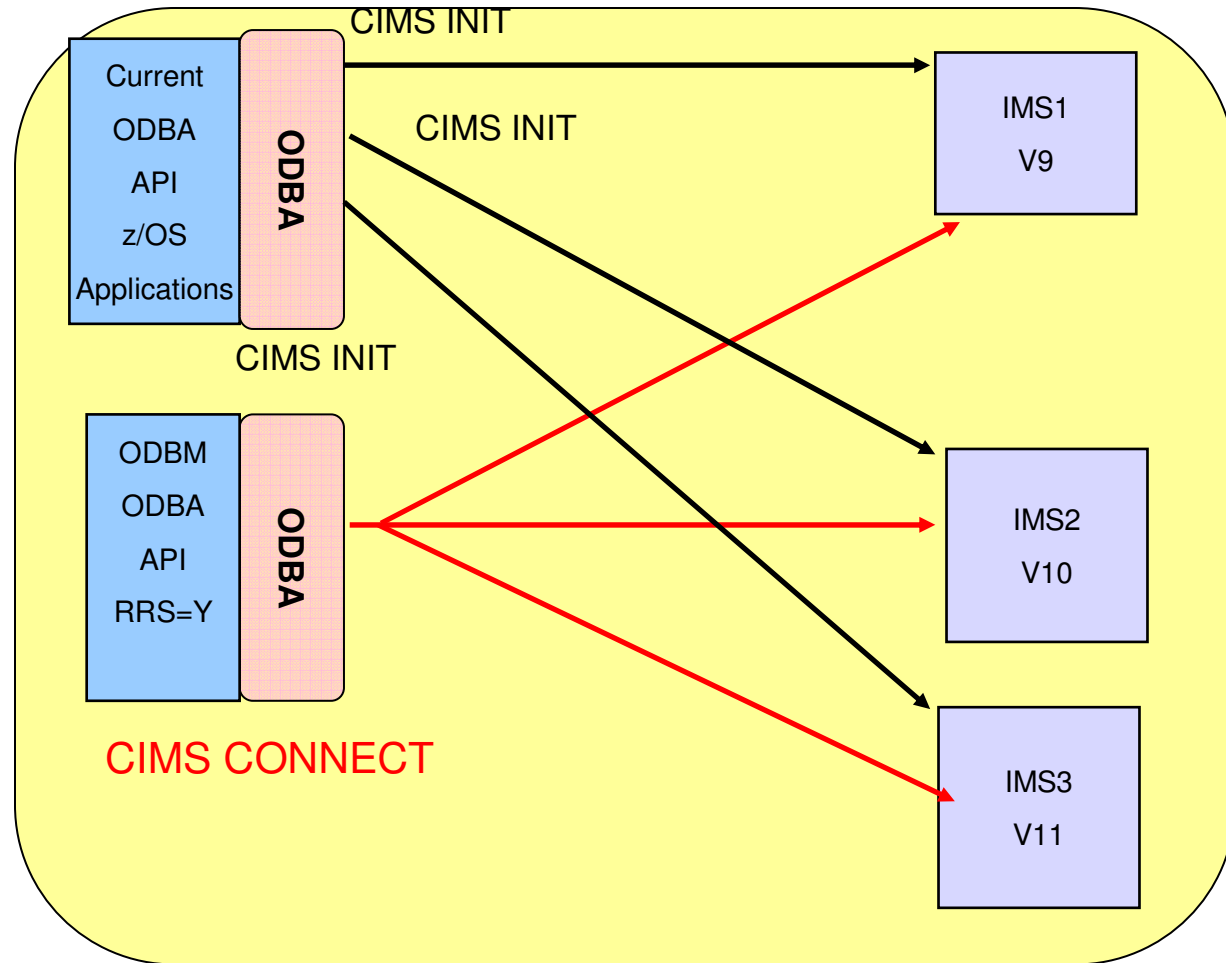
Coexistence –ODBM/ODBA can access IMS 9 / 10/ 11



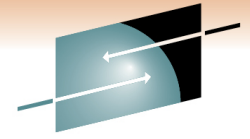
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Coexistence APARS

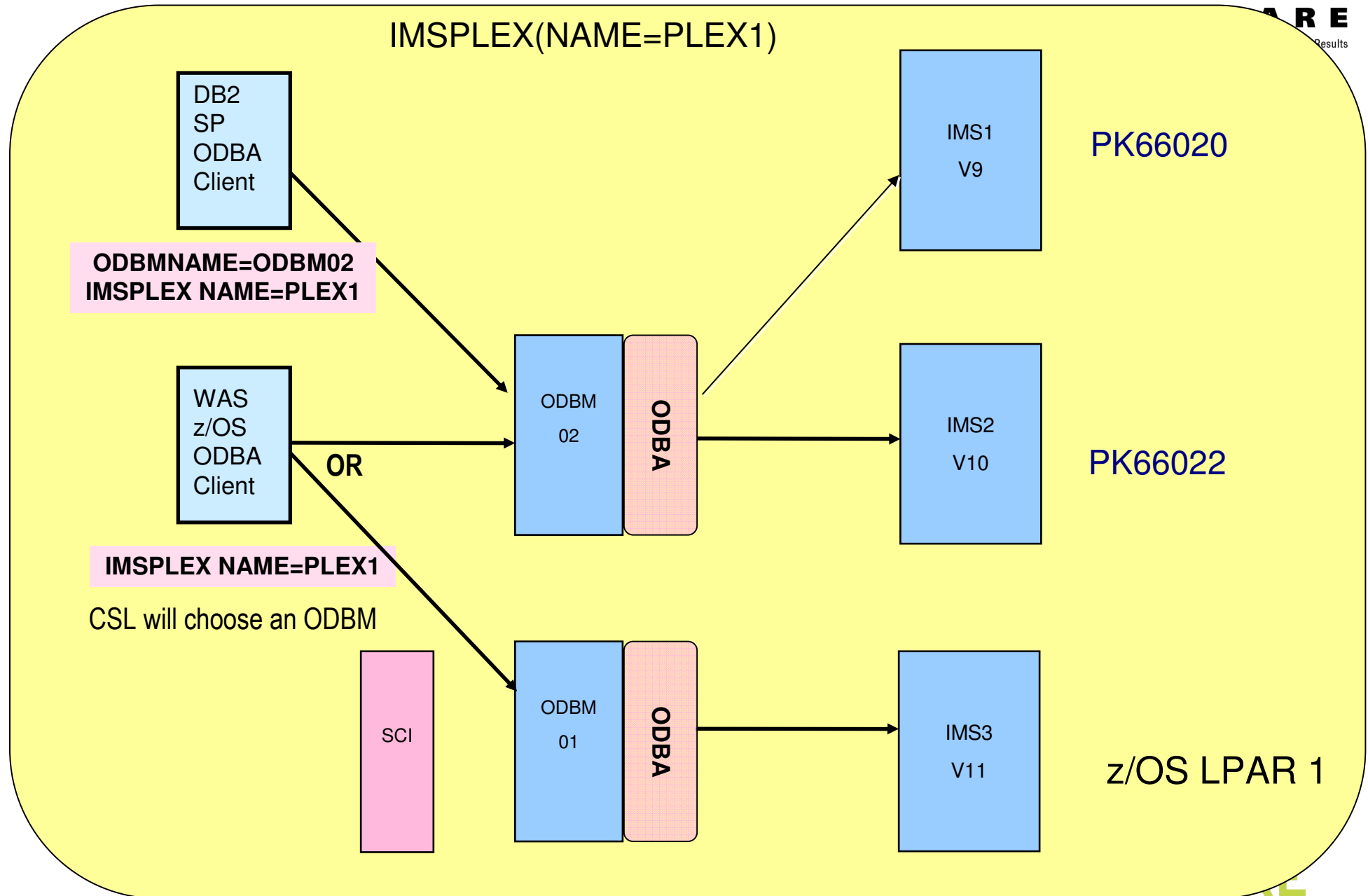
For IMS Version 9: PK66020/UK42176
For IMS Version 10: PK66022/UK42410

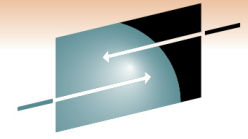


ODBM/ODBA Compatibility Support



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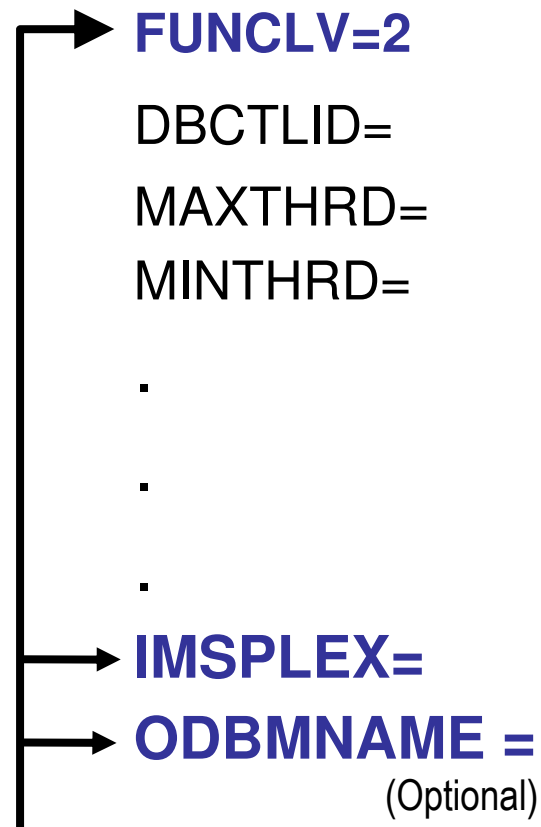


ODBA Compatibility Support

DFSPRP Macro

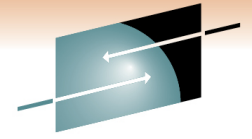
```

//DFSIVP10 EXEC PROC=ASMDRA, MBR=DFSISMA0
//ASM.SYSIN DD *
DFSISMA0 CSECT
    DFSPRP DSECT=NO,
    X
    FUNCLV=2,          ODBA FUNCTION LEVEL          X
    DDNAME=DFSDB2SP,  DDNAME FOR DRA RESLIB          X
    DSNAME=IMS110P.SDFSRESL,  DSNAME FOR DRA RESLIB  X
    DBCTLID=IMSA,     DBCTL IDENTIFIER          X
    USERID=,          USER IDENTIFIER          X
    MINTHRD=1,        MINIMUM NUMBER OF THREADS    X
    MAXTHRD=1,        MAXIMUM NUMBER OF THREADS    X
    TIMER=60,         IDENTIFY TIMER VALUE DEFAULT X
    FPBUF=,           NUMBER OF FP BUFFERS PER THREAD  X
    FPBOF=,           NUMBER OF FP OVERFLOW BUFFERS    X
    SOD=A,            SNAP DATASET OUTPUT CLASS      X
    TIMEOUT=60,       DRATERM TIMEOUT VALUE          X
    IDRETRY=0,        IDENTIFY RETRY COUNT          X
    CNBA=,            TOTAL FP NBA BUFFERS FOR CCTL X
    IMSPLEX=PLEXA,    IMSPLEX NAME                X
    ODBMNAME=OD0A
    END
//*
```



Causes ODBA requests to be routed via ODBM

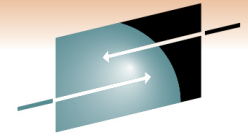
ODBM – Security



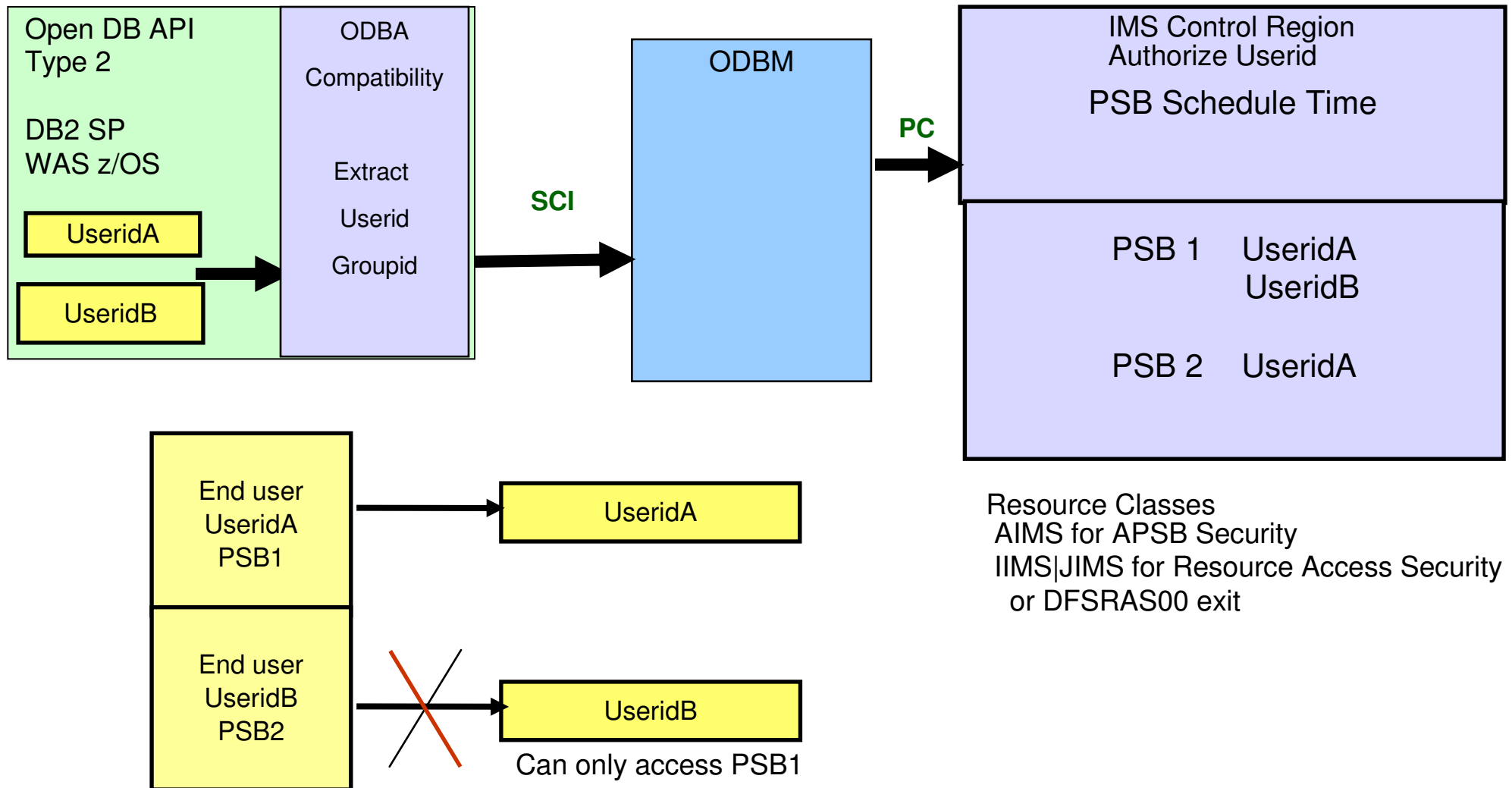
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- ODBM does not perform any user authentication or authorization
 - Assumes the end Client Userid associated with an allocate PSB request has been authenticated.
 - IMS Connect does the authentication
 - IMS does the authorization

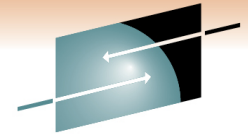
Security ODBM/ODBA Compatibility



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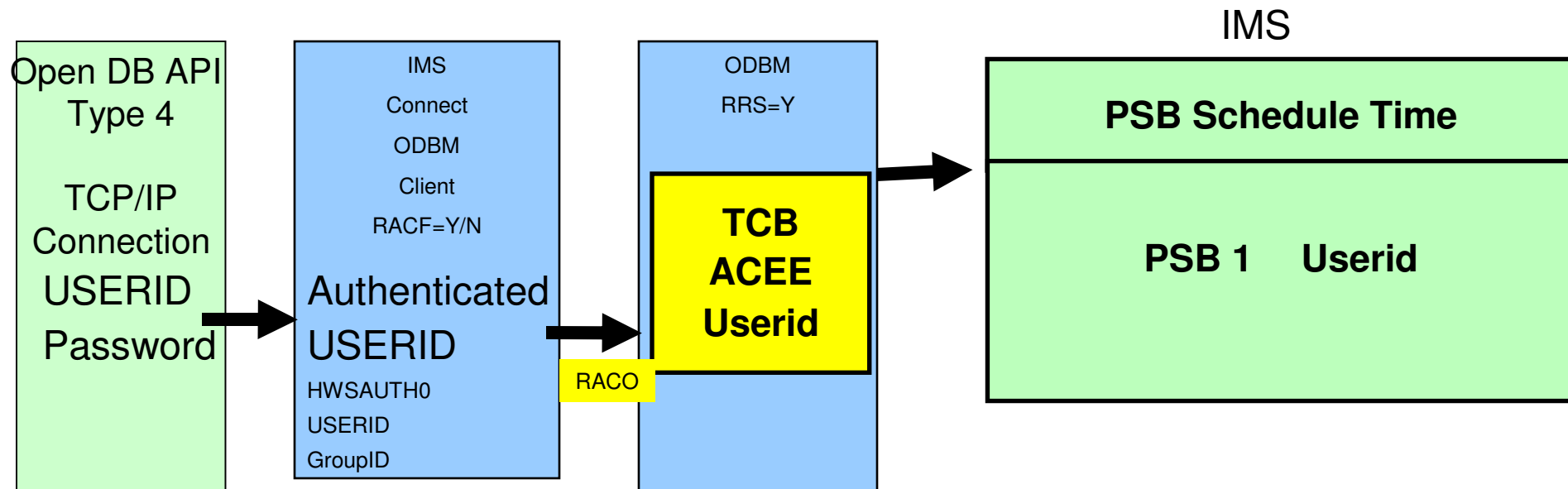


SAF APSSB Security



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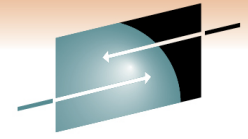
- IMS ODBASE=Y and ODBM RRS=Y
 - TCB ACEE - Authenticated USERID
 - The IMS application group resource class (AIMS or Axxxxxxx)



ODBM uses RACO to create ACEE for ODBM Thread TCB
Userid will represent the end client

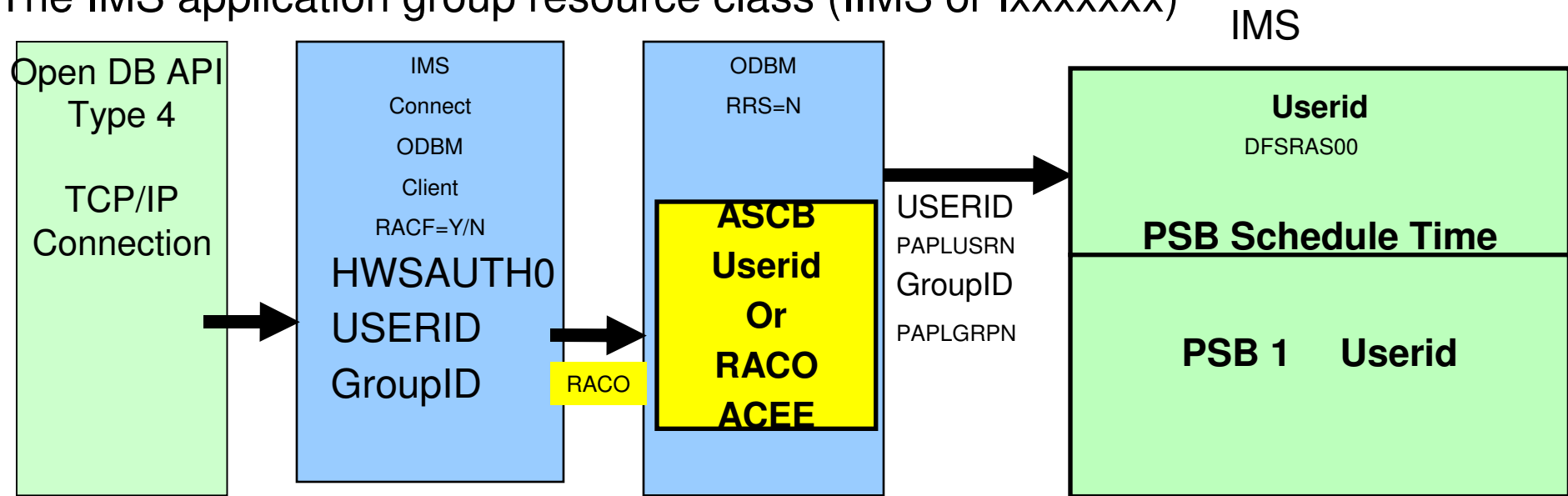
IMS Connect RACF=N a RACO is not provided IMS uses ODBM Job Card UserID

RAS PSB Security



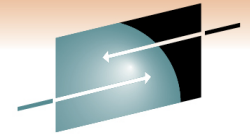
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- IMS ISIS=R or A and ODBM RRS=N
 - ODBM extracts and passes RACO Userid in PAPL
 - No RACO - ODBM JOB JCL USERID extracted from ASCB
 - The IMS application group resource class (IIMS or Ixxxxxxx)



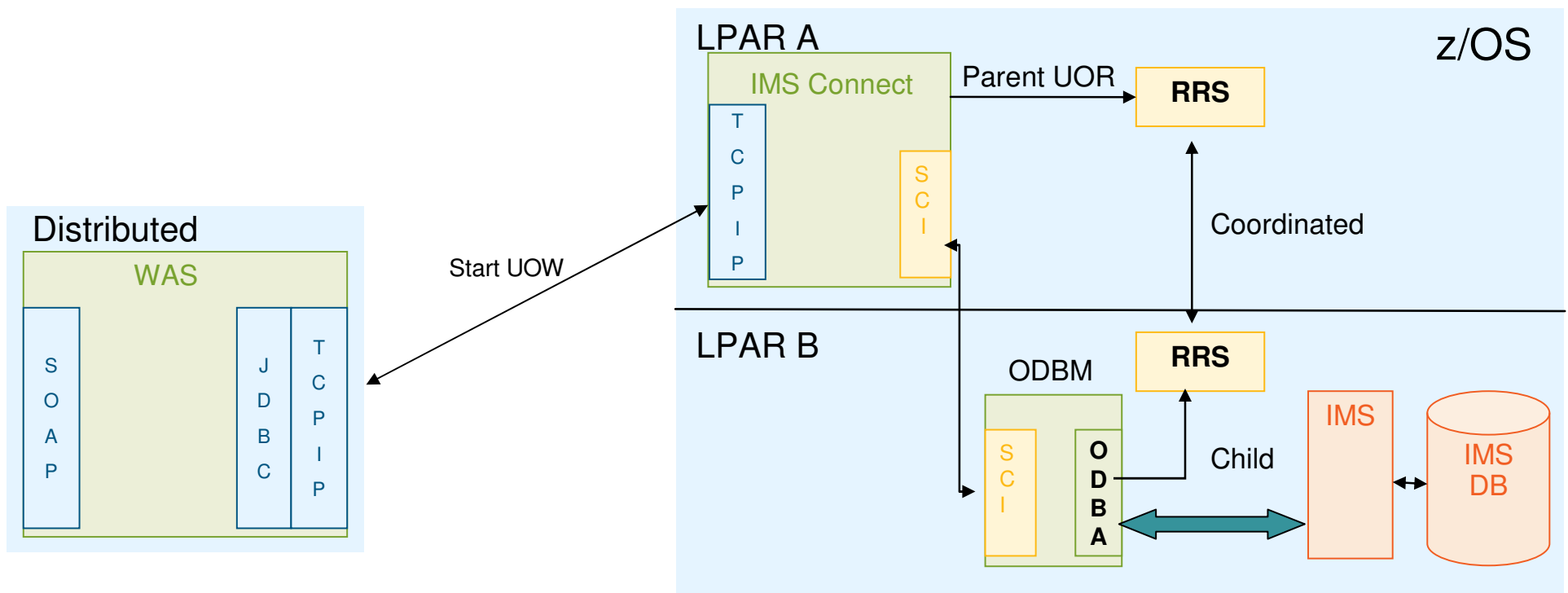
ODBM extracts the UserID from the RACO passes it in PAPL
Userid will represent the end client

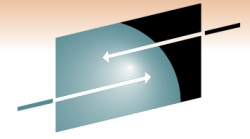
IMS Connect RACF=N a RACO is not provided IMS uses ODBM JOB Card UserID



IMS Open Database

- Distributed Syncpoint (global transaction) requires RRS on z/OS
- Use of RRS with ODBM is optional
 - RRS=Y|N parm for ODBM start-up
 - If RRS=Y (also the default), ODBM will use the ODBA interface
 - If RRS=N, ODBM will use the DRA interface like CICS
 - Global transactions are not supported if RRS=N

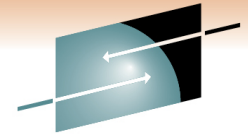




ODBM – Setup

- ODBM Initialization PROCLIB Member
 - CSLDIxxx
- ODBM Configuration PROCLIB Member
 - CSLDCxxx
- ODBM BPE Configuration PROCLIB Member
 - BPECFG=
- ODBM BPE Managed User Exit List PROCLIB Member
 - EXITDEF=

- ODBM Execution Parameters
 - Specifies CSLDIxxx, CSLDCxxx and BPECFG for ODBM startup
 - Can be used to override CSLDIxxx Parameters



Base Primitive Environment Address

BPE Address Space JCL

BPEINI00 is predefined in the default Program Properties Table (PPT) that is shipped with z/OS® V1R4 and later

```
// EXEC PGM=BPEINI00, ....
```

```
PARM= ...
```

```
  BPECFG= Name of BPE PROCLIB member
```

```
  BPEINIT= specific function init module
```

```
  xxINIT= suffix for function PROCLIB member
```

```
  PARM1= function initialization overrides of init PROCLIB  
  member parameters
```

BPE PROCLIB Member

BPE PROCLIB Member

- Shared or dedicated
- Details of traces
- Pointers to Exit Lists

Exit List Member

Exit List Member

- by exit type and component
- Shared or dedicated

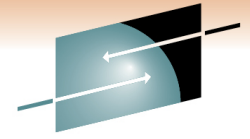
Initialization PROCLIB Member

- Name of BPE Address Space
- Plex name
- Configuration Member name
- ...

Configuration PROCLIB Member

- Configuration parameters
- e.g. HWSCFGxx, CSLDCxxx, etc

BPE provides common services such as dispatching, waiting and tracing



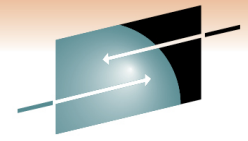
ODBM Execution Parameters Example

```
//CSLODB1 PROC RGN=3000K,SOUT=A,  
//      RESLIB='IMS.SDFSRESL',  
//      BPECFG=BPECONFIG,  
//      ODBMINIT=001,  
//      ODBMCFG=B11,  
//      PARM1=  
//*  
//ODBMPROC EXEC PGM=BPEINI00,REGION=&RGN,  
//  
//      PARM='BPECFG=&BPECFG,BPEINIT=CSLDINI0,ODBMINIT=&ODBMINIT,&PARM  
//      1'  
//*  
//STEPLIB DD DSN=&RESLIB,DISP=SHR  
//      DD DSN=SYS1.CSSLIB,DISP=SHR  
//PROCLIB DD DSN=IMS.PROCLIB,DISP=SHR  
//SYSPRINT DD SYSOUT=&SOUT  
//SYSUDUMP DD SYSOUT=&SOUT  
//*
```

ODBM Initialization Member CSLDI002 Example

```
*****  
* CSLDI002 ODBM CSL PROCLIB MEMBER *  
*****  
  
ODBMNAME=ODBM02      /* ODBM id = ODBM02OD */  
ODBMCFG=B11          /* Suffix for CSLDCxxx member */  
RRS=N                /* Use CCTL/DRA */  
IMSPLEX(NAME=PLEX2) /* XCF group = CSLPLEX2) */
```

ODBM Configuration Member CSLDCB11 Example



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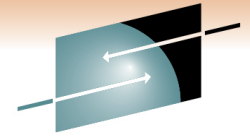
```
*****
* CSLDCB11 ODBM CSL PROCLIB MEMBER *
*****

<SECTION=GLOBAL_DATASTORE_CONFIGURATION>
IDRETRY=5          /* Retry connection 5 times before quit */
MAXTHRDS=10       /* 10 threads max to any IMS Datastore */
TIMER=30          /* 30 seconds between ID retry attempts */
FPBUF=10          /* 10 DEDB buffers per thread */
FPBOF=10          /* 10 Overflow buffers per thread */
CNBA=200          /* (FPBUF*MAXTHRDS) + FPBOF <= CNBA */
```

MAXTHRDS provide parallel processing.
Coordinate with IMS MAXPST

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in Anaheim
2011

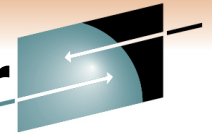
ODBM Configuration Member CSLDCB11 Example ...



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```
/* **** */
/* Define DATASTORE properties for ODBM01 */
/* **** */
<SECTION=LOCAL_DATASTORE_CONFIGURATION>
ODBM(NAME=ODBM01, /* Define parms for ODBM01
*/
DATASTORE(NAME=IMS1, /* IMSID on LPAR A */
ALIAS(NAME=IO1A,NAME=IO1B), /* Names for APPL sets 1 & 2*/
FPBUF=0,FPBOF=0,CNBA=0 /* No FastPath on this IMS */
)
DATASTORE(NAME=IMS2, /* IMSID on LPAR A */
ALIAS(NAME=IO2A,NAME=IO2B), /* Names for DEDB apps */
FPBUF=50,FPBOF=50,CNBA=500, /* FastPath on this IMS */
MAXTHRDS=5 /* Throttle down threads */
)
)
```

ODBM BPE Configuration PROCLIB Member Example



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```
TRCLEV=(*,LOW,ODBM) /* DEFAULT
  ODBM TRACES TO LOW */
TRCLEV=(CSL,HIGH,ODBM) /* CSL TRACE
  ON HIGH */
TRCLEV=(ODBM,HIGH,ODBM) /* ODBM
  GENERAL TRACE ON HIGH */
TRCLEV=(PLEX,HIGH,ODBM) /* IMSPLEX TRACE ON HIGH */

#
# USER EXIT LIST PROCLIB MEMBER SPECIFICATION
#

EXITMBR=(CSLEXOB0,BPE) /* SPECIFY PROCLIB DATASET */
/* MEMBER CSLEXOB0 AS BPE'S */
/* USER EXIT LIST MEMBER */
EXITMBR=(CSLEXDM0,ODBM) /* SPECIFY
  PROCLIB DATASET */
/* MEMBER CSLEXDM0 AS ODBM'S */
/* USER EXIT LIST MEMBER */
```


ODBM Type-2 QUERY Command

- Overview of QUERY ODBM commands
 - monitor connections, status, and configuration of ODBM

QRY ODBM TYPE(ALIAS)

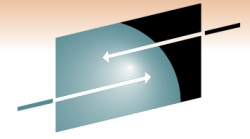
QRY ODBM TYPE(CONFIG)

QRY ODBM TYPE(DATASTORE)

QRY ODBM TYPE(SCIMEMBER)

QRY ODBM TYPE(THREAD)

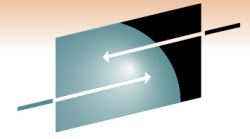
QRY ODBM TYPE(TRACE)



ODBM Type-2 UPDATE Command

- Overview of UPDATE ODBM commands
 - update connections, status and configuration of ODBM

UPD ODBM START(TRACE)
UPD ODBM STOP(TRACE)
UPD ODBM START(CONNECTION)
UPD ODBM STOP(CONNECTION)
UPD ODBM TYPE(CONFIG)

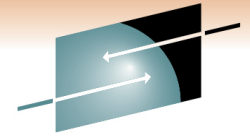


ODBM Client API

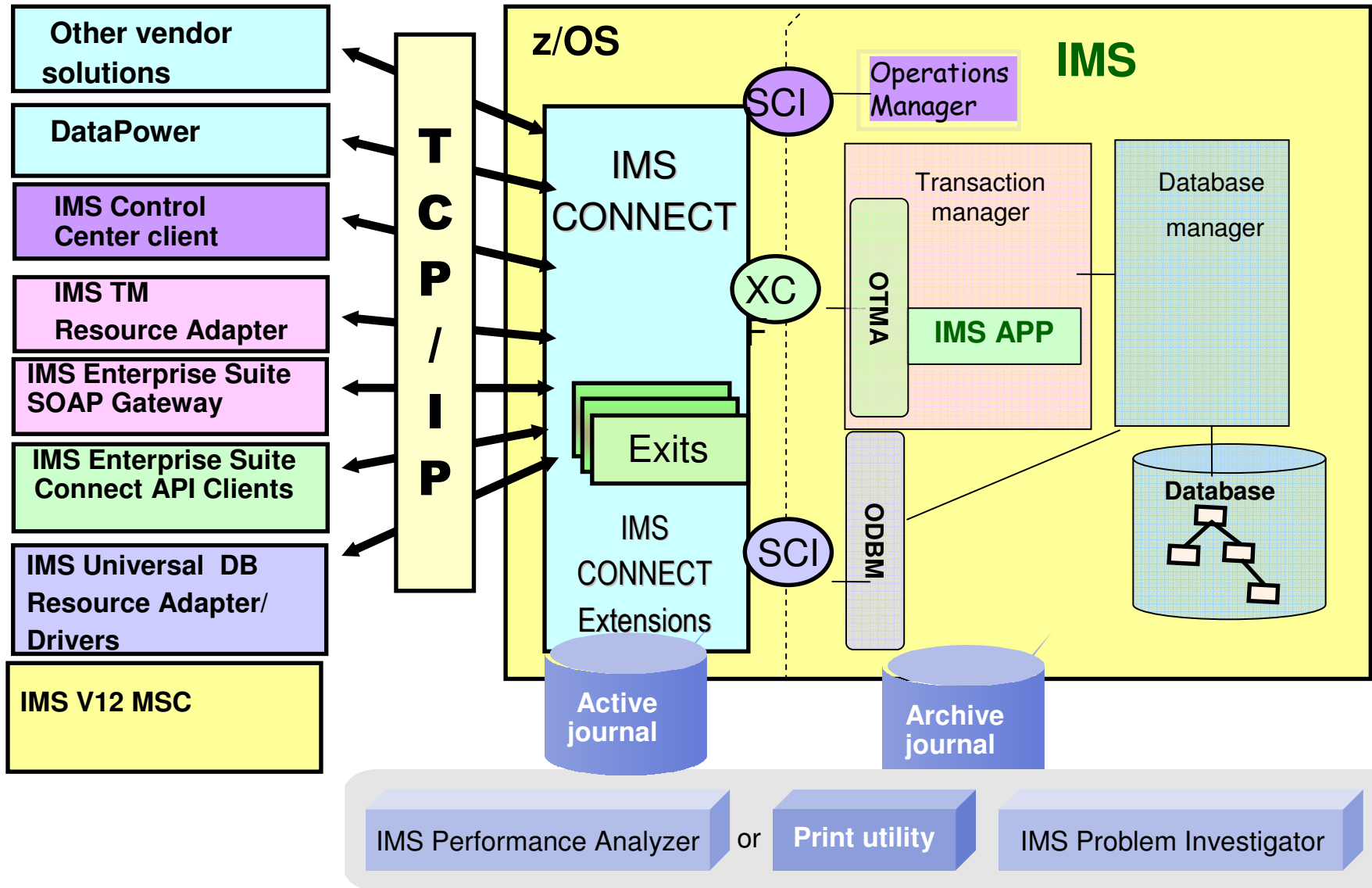
- ODBM Client request flow
 - CSLSCREG – Register to SCI
 - CSLDMREG – Register to ODBM
 - CSLSCRDY – Enable the ODBM client for SCI processing
 - CSLDMI FUNC= – API function calls
 - CSLSCBFR – Release output buffer
 - CSLDMDRG – Deregister from ODBM
 - CSLSCDRG – Deregister from SCI

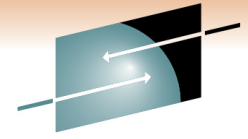
CSL macros are documented in “IMS Version 11 System Programming APIs”

IMS Connect

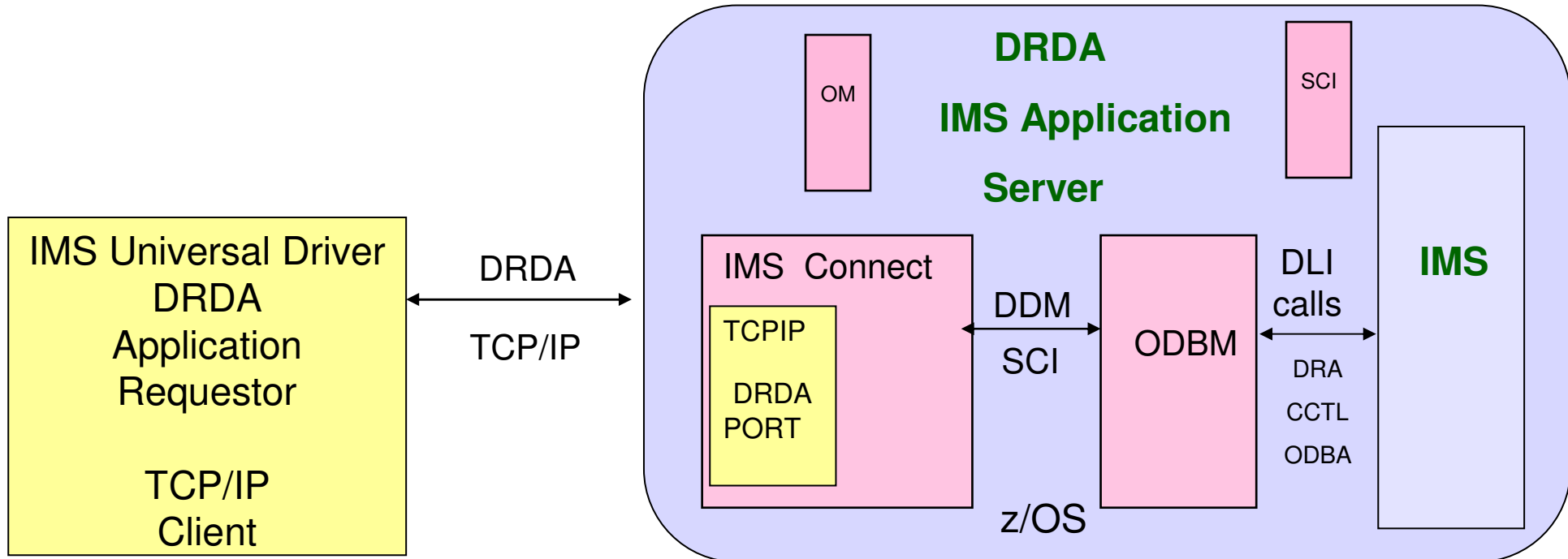


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IMS 11 Connect and ODBM DRDA Server

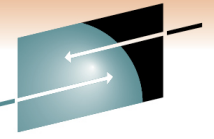


IMS Open Database – IMS Connect Highlights



- IMS Connect Configuration member HWSCFGxx
 - New ODACCESS statement
 - DRDA ports, timeout value, IMSplex name etc.
- Changes to existing commands
 - VIEWHWS, VIEWWDS, VIEWPORT
- New Commands
 - STARTOD, STOPOD, STARTIA, STOPIA, VIEWIA, SETOAUTO
- New User Exits
 - HWSROUT0 – Routing Exit for ODBM
 - HWSAUTH0 – Security Exit for ODBM

IMS Connect Routing and Security Exits for ODBM



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- BPE managed and refreshable User Exits
 - **Routing user exit – HWSROUT0**
 - Override the IMS Connect selection of an ODBM and/or ALIAS
 - **Security user exit – HWSAUTH0**
 - Authenticate the input user ID and password or passticket
 - Provide the RACF group ID to be authenticated
 - Always called by IMS Connect if it exists

```
EXITDEF(TYPE=ODBMROUT,EXITS=(HWSROUT0),ABLIM=8,COMP=HWS)
```

```
EXITDEF(TYPE=ODBMAUTH,EXITS=(HWSAUTH0),ABLIM=8,COMP=HWS)
```

IMS Connect HWSCFGxx Configuration Member ...

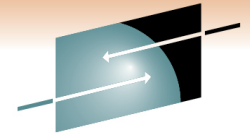


- New ODACCESS statement

```
ODACCESS=(ODBMAUTOCONN=Y|N,ODBMTMOT=,  
          DRDAPORT=(ID=,KEEPAV=,PORTTMOT=),  
          IMSPLEX=(MEMBER=,TMEMBER=))
```

- Only DRDAPORT=... is needed to define IMS Connect as a DRDA server
- You can have multiple occurrences of DRDAPORT=(....)
 - i.e. you can setup multiple DRDA ports into IMS Connect

IMS Connect Startup Proc



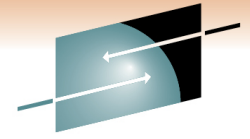
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HWSCFG00

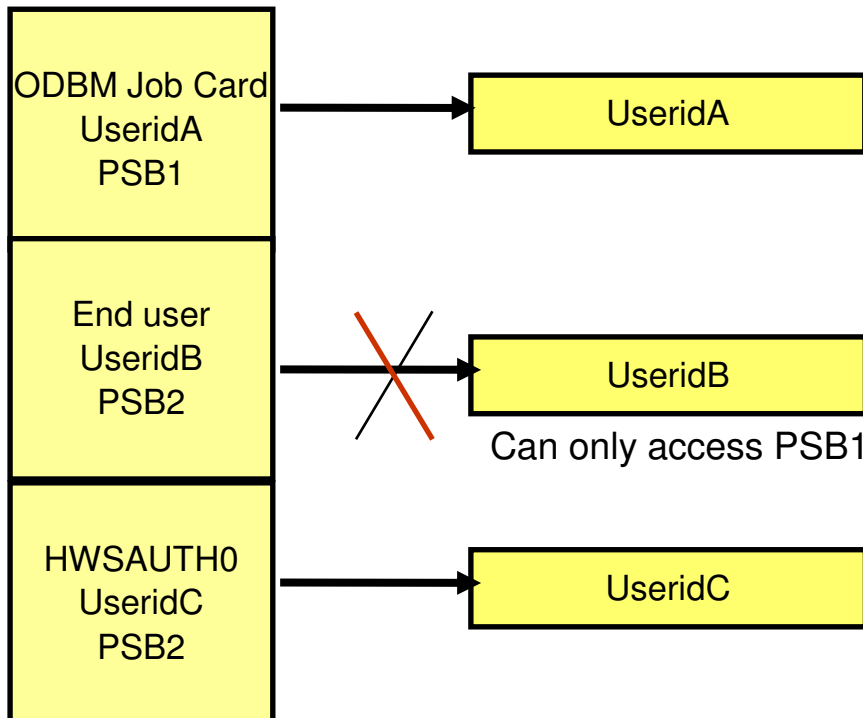
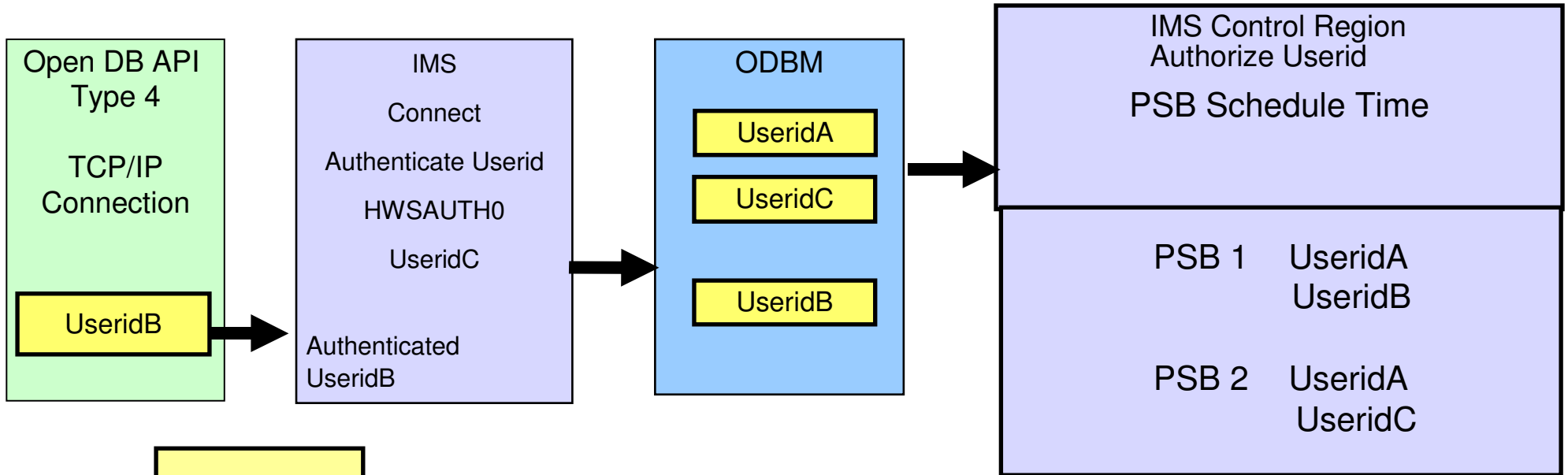
* IMS Connect example for IMS Universal drivers
and DRDA client support

```
HWS (ID=IMSCON01,PSWDMC=R,RRS=Y,RACF=Y,XIBAREA=20)
TCPIP (HOSTNAME=MVSTCPIP,RACFID=RACFID,MAXSOC=2000,
ECB=Y,IPV6=Y,MAXSOC=70,NODELAY=Y)
ODACCESS (DRDAPORT=(ID=1111,KEEPAV=5),
DRDAPORT=(ID=2222,KEEPAV=10,PORTTMOT=500)),
IMSPLEX=(MEMBER=IMSPLEX1,TMEMBER=PLEX1),
ODBMAUTOCONN=Y,ODBMTMOT=50000
```

Security



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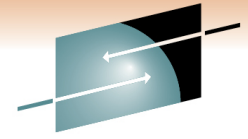


Resource Classes
 AIMS for APSB Security
 IIMS|JIMS for Resource Access Security
 or DFRAS00 exit

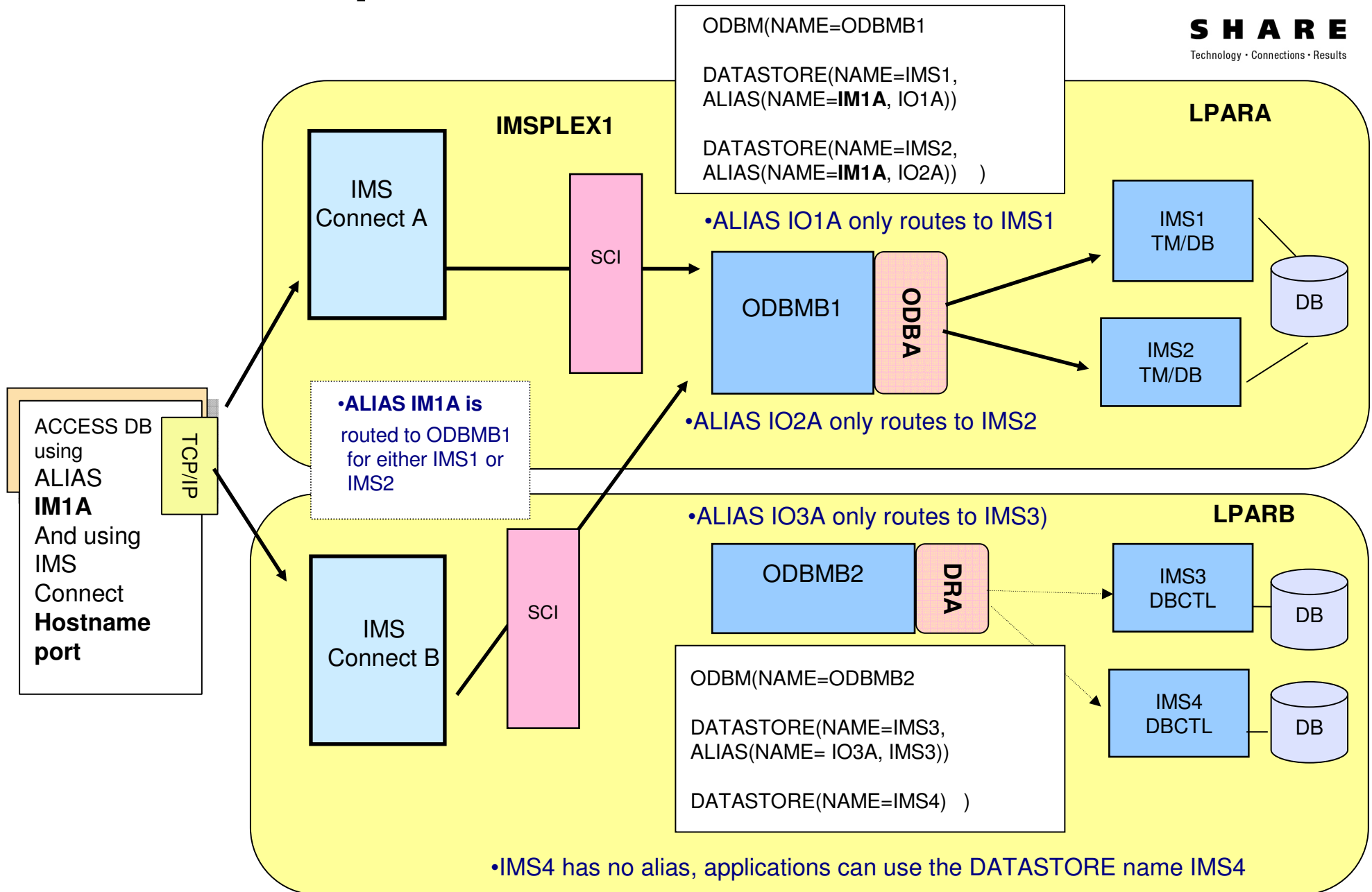
IMS Open Database – IMS Connect

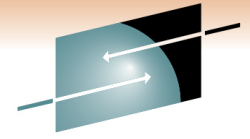
- IMS Connect Workload Distribution
 - ODBM clients can specify an IMS “ALIAS” in the message
 - Alias represents the IMS datastore that the client wants to access
 - Multiple Alias names for an IMS datastore can be defined in the ODBM configuration member
 - If the client sends a message with a blank alias, IMS Connect will route the message to all ODBM using a round robin algorithm
 - If an alias points to multiple ODBMs, IMS Connect will route the message to one of those ODBMs using a round robin algorithm

ALIAS Example



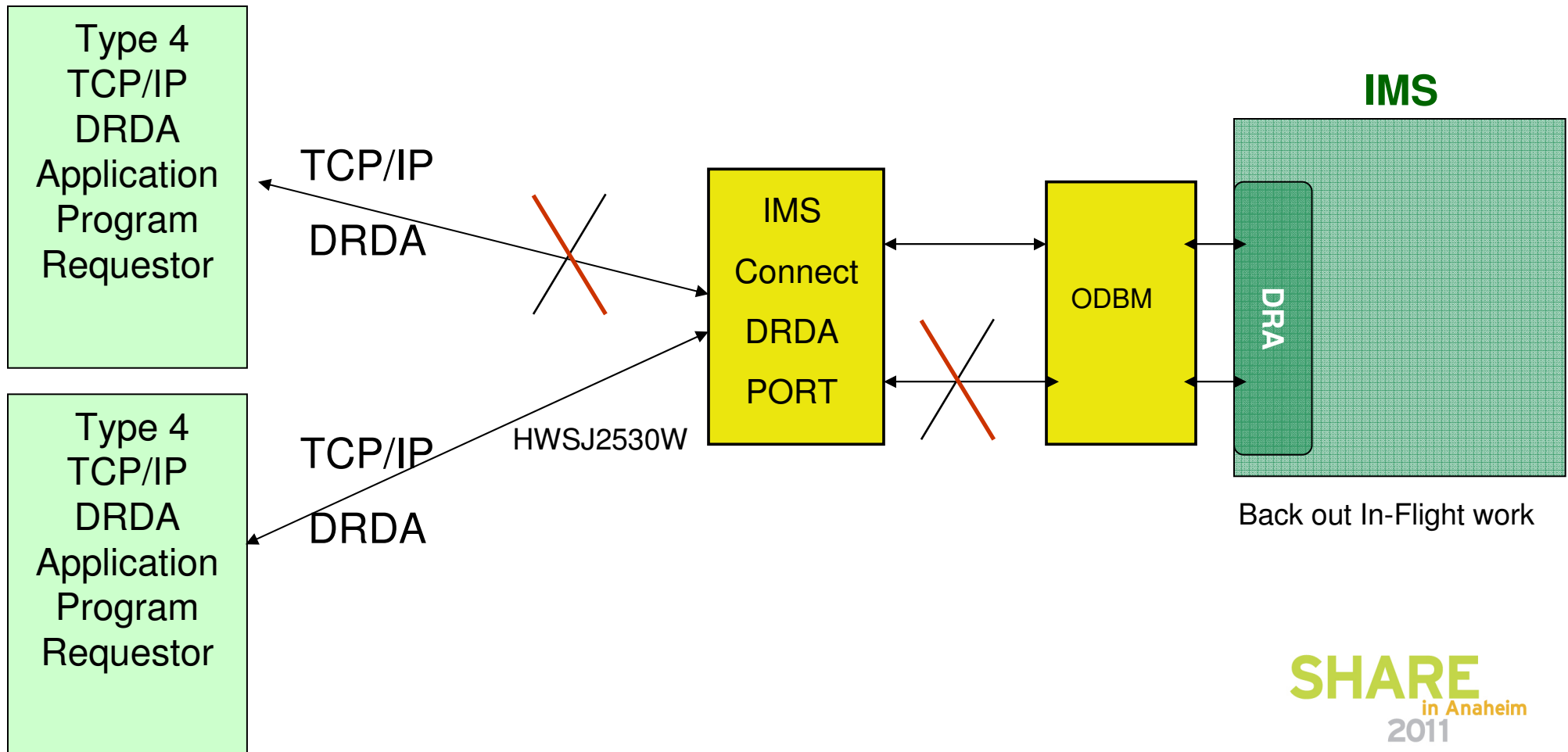
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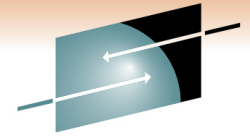


Timeouts

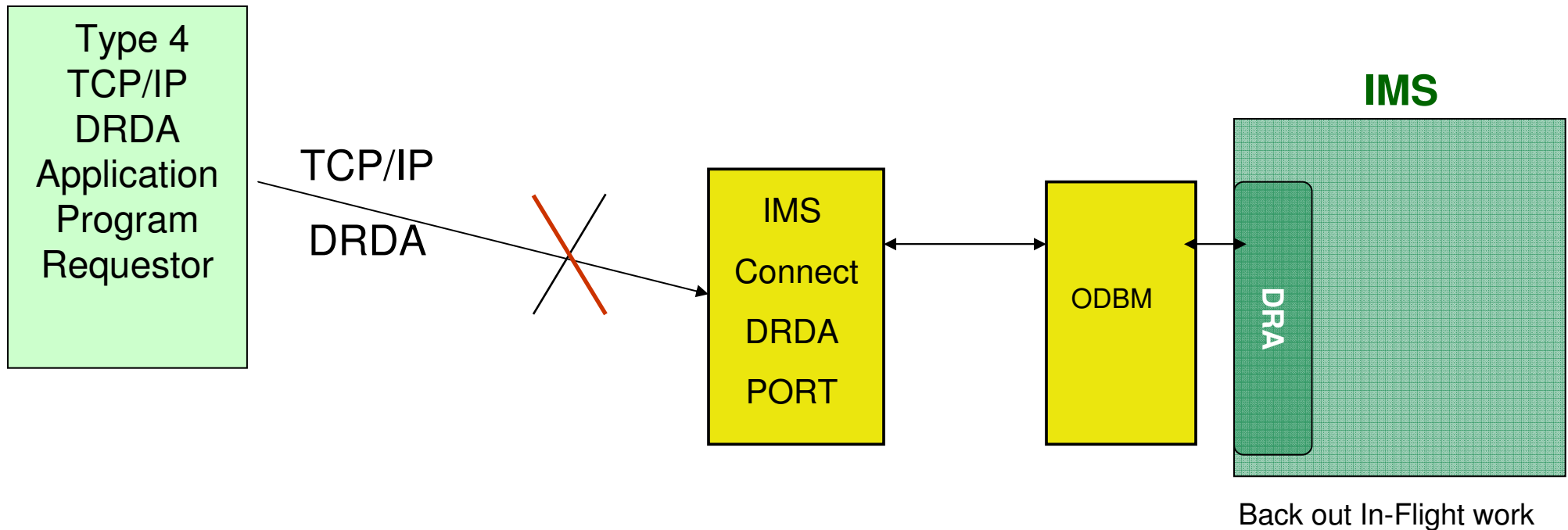
- ODBMTMOT= Defines the amount of time that IMS Connect waits::
 - A response message on connections with ODBM
 - An initial input message from TCP/IP client application



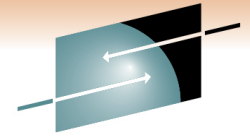
Timeouts



- PORTTMOT= Defines the amount of time that IMS Connect waits::
 - An subsequent input messages from TCP/IP client application



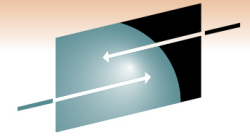
IMS Open Database API



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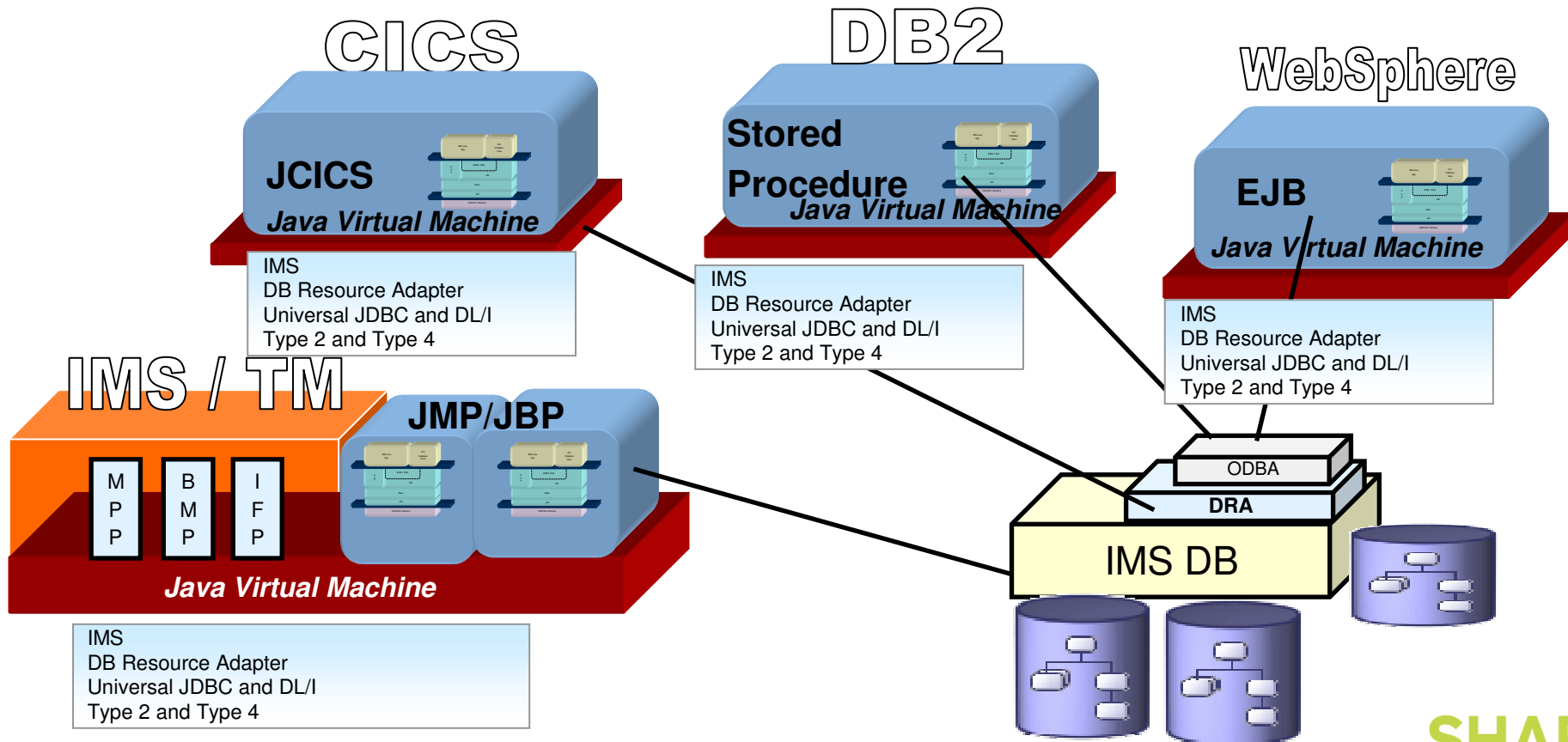
- IMS Open Database offers access to IMS database resources anywhere in the IMSplex directly from z/OS and distributed environments
 - Using industry standard Distributed Relational Database Architecture (DRDA) to communicate with IMS Connect
 - Different API layers are provided to leverage the DRDA protocol
 - IMS Universal DB Resource Adapter
 - JDBC SQL access to IMS data in a JEE environment
 - IMS Universal JDBC driver
 - JDBC SQL access to IMS data in a Non-JEE environment
 - IMS Universal DL/I driver
 - IMS Java DL/I calls to access IMS data in a Non-JEE Java environment
 - RYO
 - Use a programming language of your choice to issue DRDA commands
 - IMS Connect becomes the gateway to IMS Transactions and IMS Data

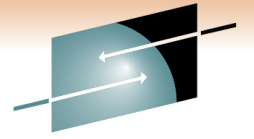
IMS Solutions for Java Development



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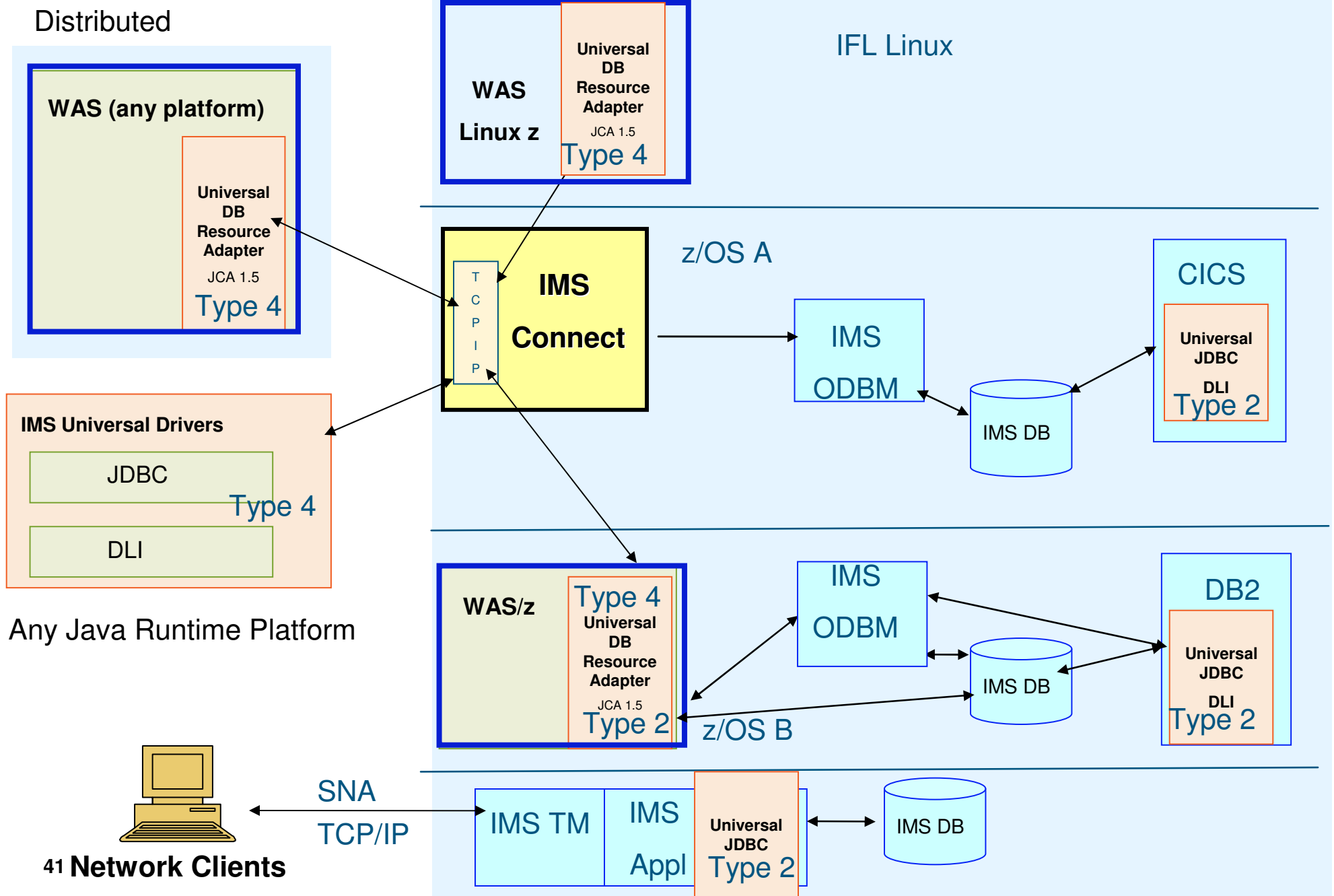
- IMS 11 Open Database APIs JDBC 3.0
 - IBM SDK V5 z/OS
 - CICS, DB2, WebSphere
 - IBM SDK V6 z/OS
 - IMS TM
- IMS 9,10 Java Drivers JDBC 2.1
 - IBM SDK V1.3.1 IMS 9
 - IBM SDK V1.4.2 IMS 9
 - IBM SDK V5 z/OS IMS 10



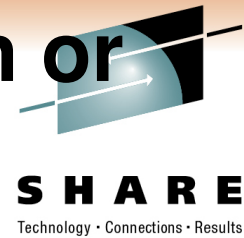


Universal Drivers

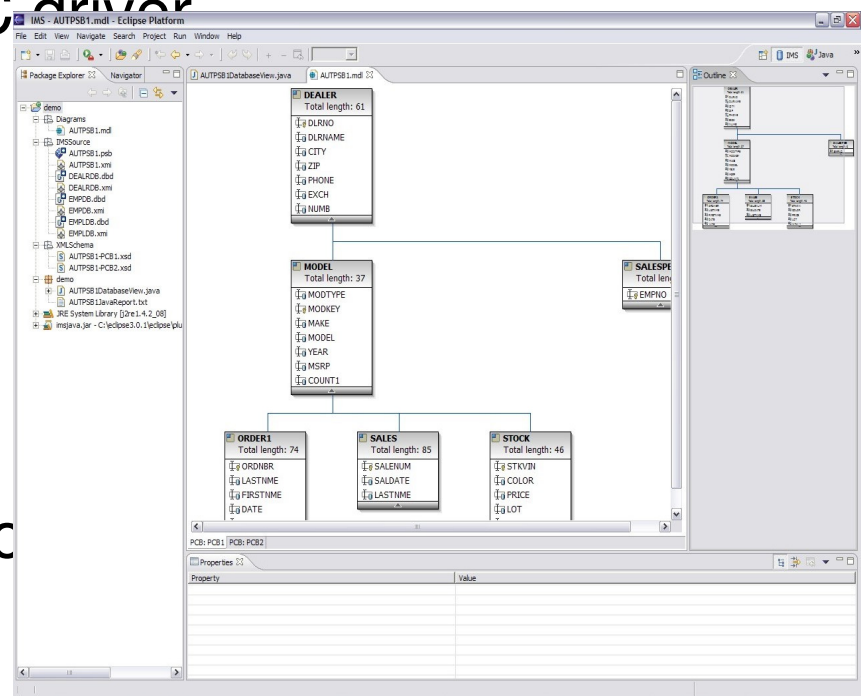
System z

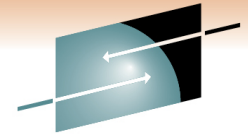


IMS Enterprise Suite DLIModel Utility Plug-in or IMS Enterprise Suite Explorer



- IMS database visualization tool
 - Visualize an entire IMS PSB
 - Can view and print each PCB individually
 - Hierarchy, segments, fields, types, etc
- IMS database metadata generation tool
 - Generates the necessary metadata that is consumed at runtime by IMS JDBC driver and XML-DB support
 - Database metadata
 - XML schema
- Bottom-up tooling approach
 - Parses PSB and DBD source
 - Optional COBOL copybook definitio
 - An Eclipse 3.x plug-in





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IMS ES Explorer DatabaseView

```
package AUTPSB11;

import com.ibm.ims.db.*;

public class AUTPSB11DatabaseView extends DLIDatabaseView {

    // This class describes the data view of PSB: AUTPSB11
    // PSB AUTPSB11 has database PCBs with 8-char PCBNAME or label:
    //     AUTOLPCB
    //     AUTS1PCB
    //     AUTS2PCB
    //     AUSI2PCB
    //     EMPLPCB

    // The following describes Segment: DEALER ("DEALER") in PCB: AUTOLPCB ("AUTOLPCB")
    static DLTypeInfo[] AUTOLPCBDEALERArray= {
        new DLTypeInfo("DLRNO", DLTypeInfo.CHAR, 1, 4, "DLRNO", DLTypeInfo.UNIQUE_KEY),
        new DLTypeInfo("DLRNAME", DLTypeInfo.CHAR, 5, 30, "DLRNAME"),
        new DLTypeInfo("CITY", DLTypeInfo.CHAR, 35, 10, "CITY"),
        new DLTypeInfo("ZIP", DLTypeInfo.CHAR, 45, 10, "ZIP"),
        new DLTypeInfo("PHONE", DLTypeInfo.CHAR, 55, 7, "PHONE")
    };

    static DLISegment AUTOLPCBDEALERSegment= new DLISegment
        ("DEALER", "DEALER", AUTOLPCBDEALERArray, 61);

    // The following describes Segment: MODEL ("MODEL") in PCB: AUTOLPCB ("AUTOLPCB")
    static DLTypeInfo[] AUTOLPCBMODELArray= {
        new DLTypeInfo("MODTYPE", DLTypeInfo.CHAR, 1, 2, "MODTYPE"),
        new DLTypeInfo("MODKEY", DLTypeInfo.CHAR, 3, 24, "MODKEY", DLTypeInfo.UNIQUE_KEY),
        new DLTypeInfo("MAKE", DLTypeInfo.CHAR, 3, 10, "MAKE"),
    };
}
```

IMS ES Explorer JDBC SQL access

Project Explorer

- dlvhjdj05
 - program
 - psbejk05
- DEMOIOD
- dummy
- Hospital
 - bmp255
 - JRE System Library [Java60]
 - imsjava.jar - C:\\$cc71\marilene_Workbench_Dev_marilene
 - database
 - program
- incomeltePSB
 - autpsb11
 - JRE System Library [Java60]
 - imsjava.jar - C:\\$cc71\marilene_Workbench_Dev_marilene
 - database
 - program
- UX2
- UXDemo

Data Source Explorer view

Data Source Explorer

- %databases.category
 - BIRT Classic Models Sample Database
 - Derby Sample Connection
 - IMS DB
 - IMS DB
 - IMS Hospital
 - IMS Hospital
 - Catalogs
 - BMP255
 - Roles
 - Users
 - SAMPLE [DB2 Alias]
- ODA Data Sources
 - Classic Models Inc. Sample Database
 - Flat File Data Source
 - JDBC Data Source
 - Web Services Data Source
 - XML Data Source

Properties for IMS Hospital

type filter text

- Common
 - Default Schema Filter
 - Default Stored Procedure Filter
 - Default Table Filter
 - Driver Properties
 - Version

Driver Properties

Drivers: IMS Version 11 Universal JDBC Driver

Properties

General Tracing Optional

Connection name: IMS Hospital

Datastore:

Host: ecdv13.vmec.svl.ibm.com

Port number: 5555

User name: test

Password:

Save Password

Metadata source

Metadata source provides information about...

[Learn more...](#)

Metadata class: BMP255.BMP255DatabaseView

Local IMS Workbench project

Project: [dropdown]

PSB: [dropdown]

Local file system

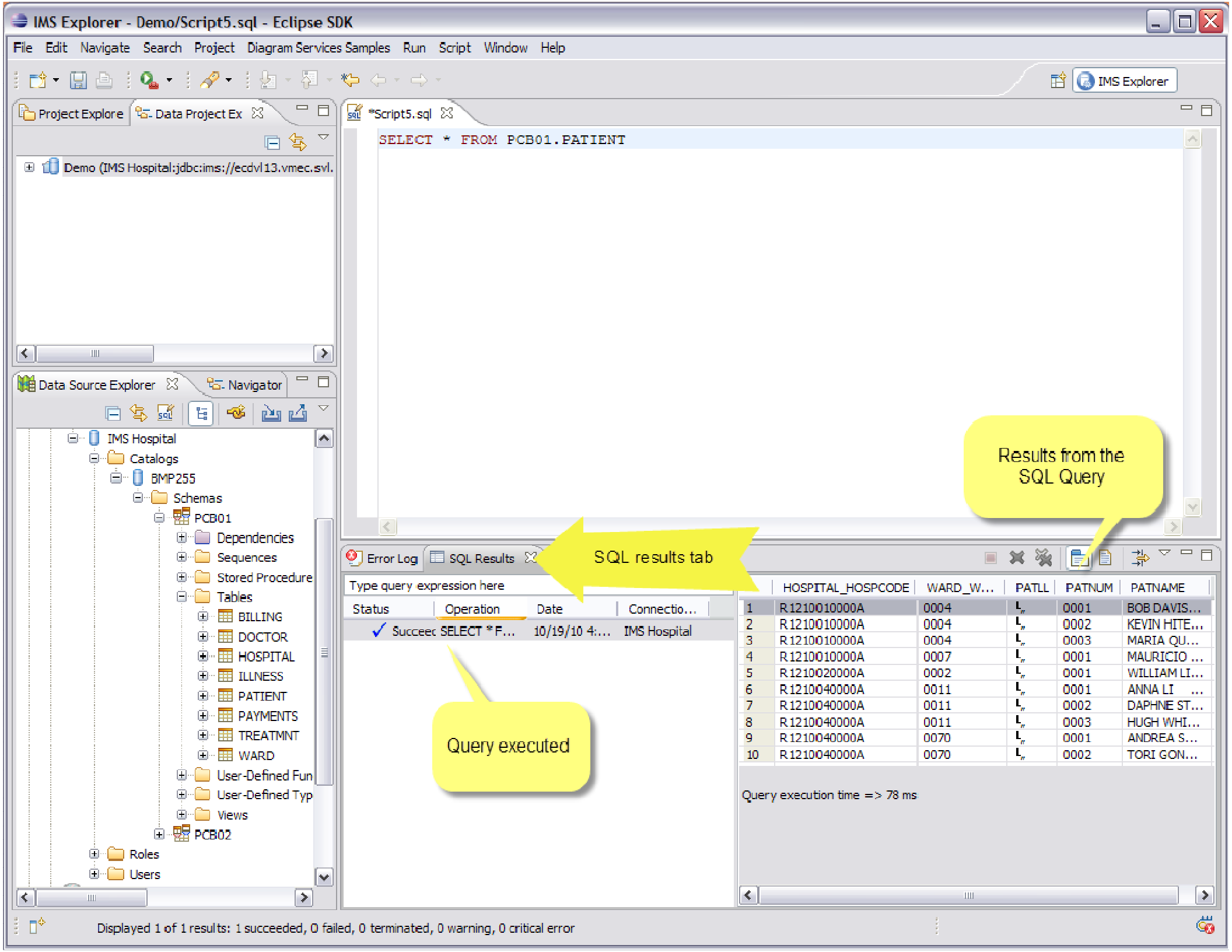
File Location: [dropdown] [Browse...]

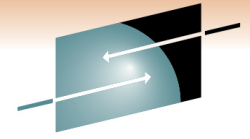
Test Connection

OK Cancel

Connection to an IMS DB using the Universal JDBC Driver

Host IP and Port





Summary

- Open Database Capabilities
 - Supports open-standards for connectivity to online IMS databases
 - Across z/OS LPARs
 - Across networks
 - Direct access from distributed platforms
 - Provides an environment that manages access to online IMS databases
 - Provide
 - Ease

IMS 11 Open Database

ases

SG24-7856-00

Install IMS Open Database and its prerequisites

Implement Java client access to IMS and DB2 data

Integrate Mash up Center with IMS Open Database

