A36

Using ODBA to Access you IMS Databases

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■ Agenda

DBCTL Overview

What is Open Database Access(ODBA)

Setup Process

ODBA Callable Interface connection to IMS DB

Application Interface Block (AIB) and AERTDLI

New and Enhanced calls for ODBA
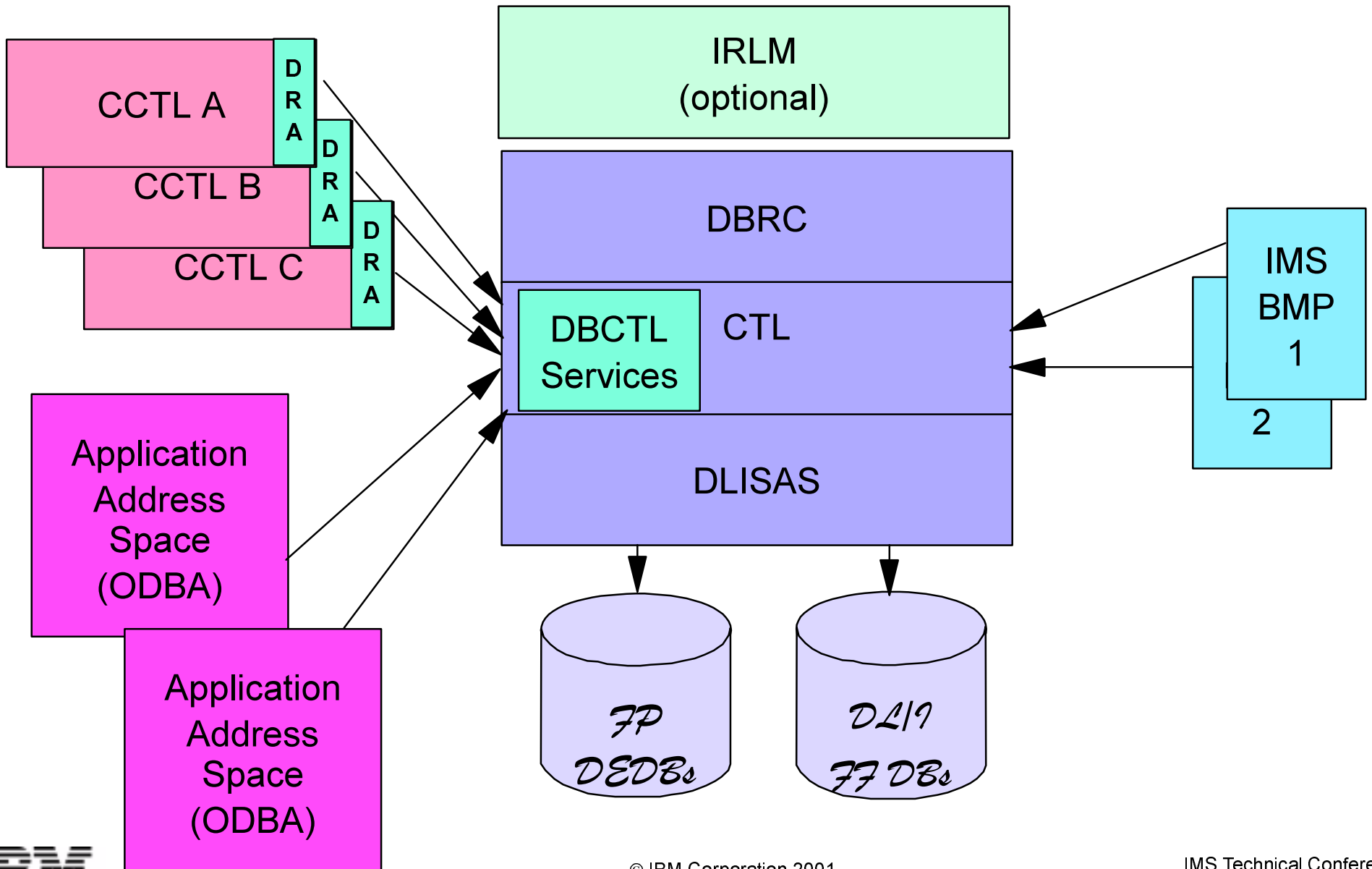
Resource Recovery Services Basic Concepts
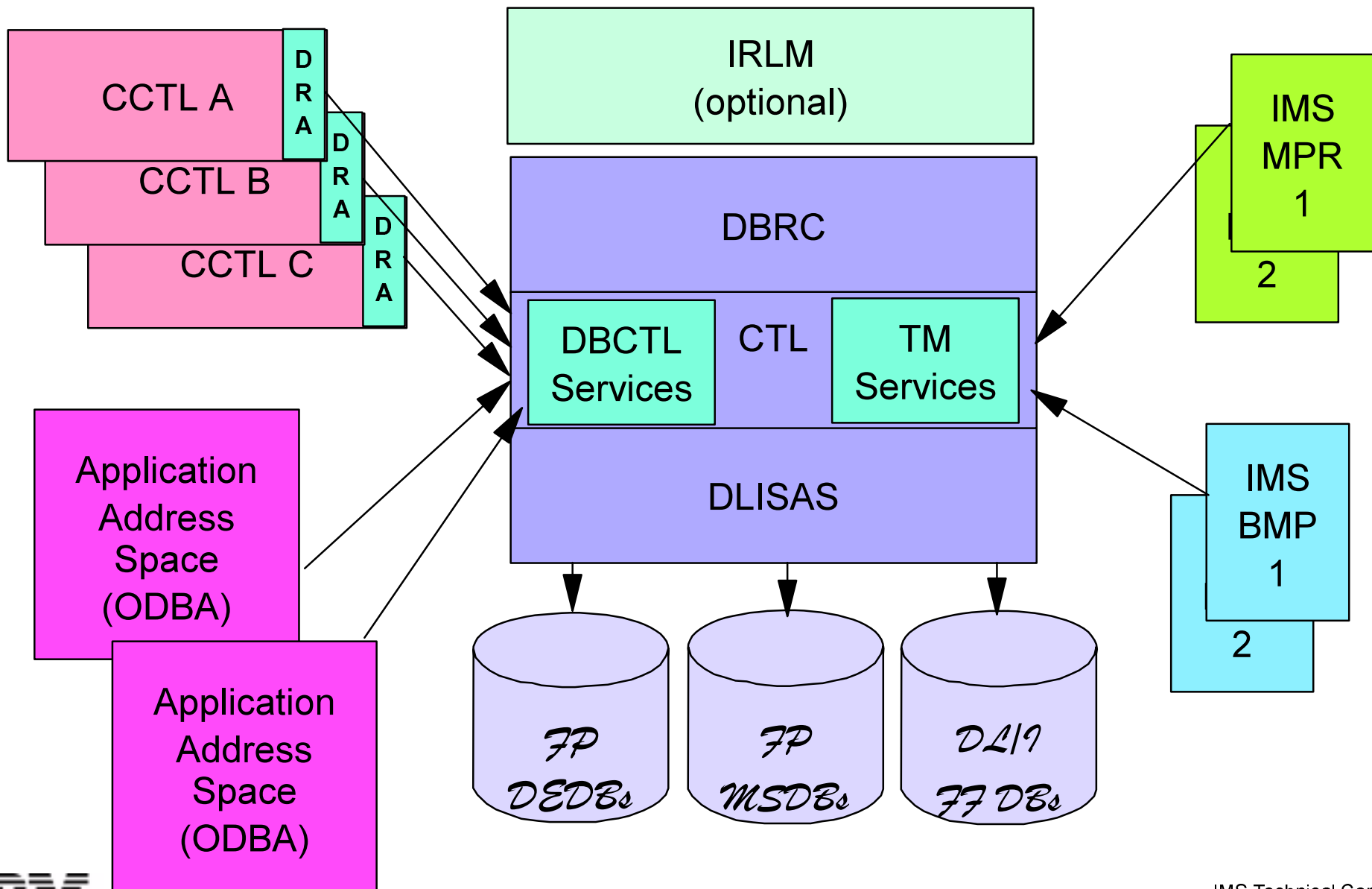
Examples

Connection security

PSB security

Summary

IMS DBCTL Subsystem Structure

CCTL A

CCTL B

CCTL C

D R A

D R A

D R A

Application Address Space (ODBA)

Application Address Space (ODBA)

IRLM (optional)

DBRC

DBCTL Services

CTL

DLISAS

IMS BMP 1

2

FP DEDBs

DL/I FF DBs

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IMS TM/DB Subsystem Structure

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■ What is ODBA?

**ODBA is a callable interface to databases managed by the IMS DB Manager**

ODBA does not require an independent DBCTL subsystem

ODBA allows IMS DB and OS/390 application programs to be developed, installed, and maintained independently of each other
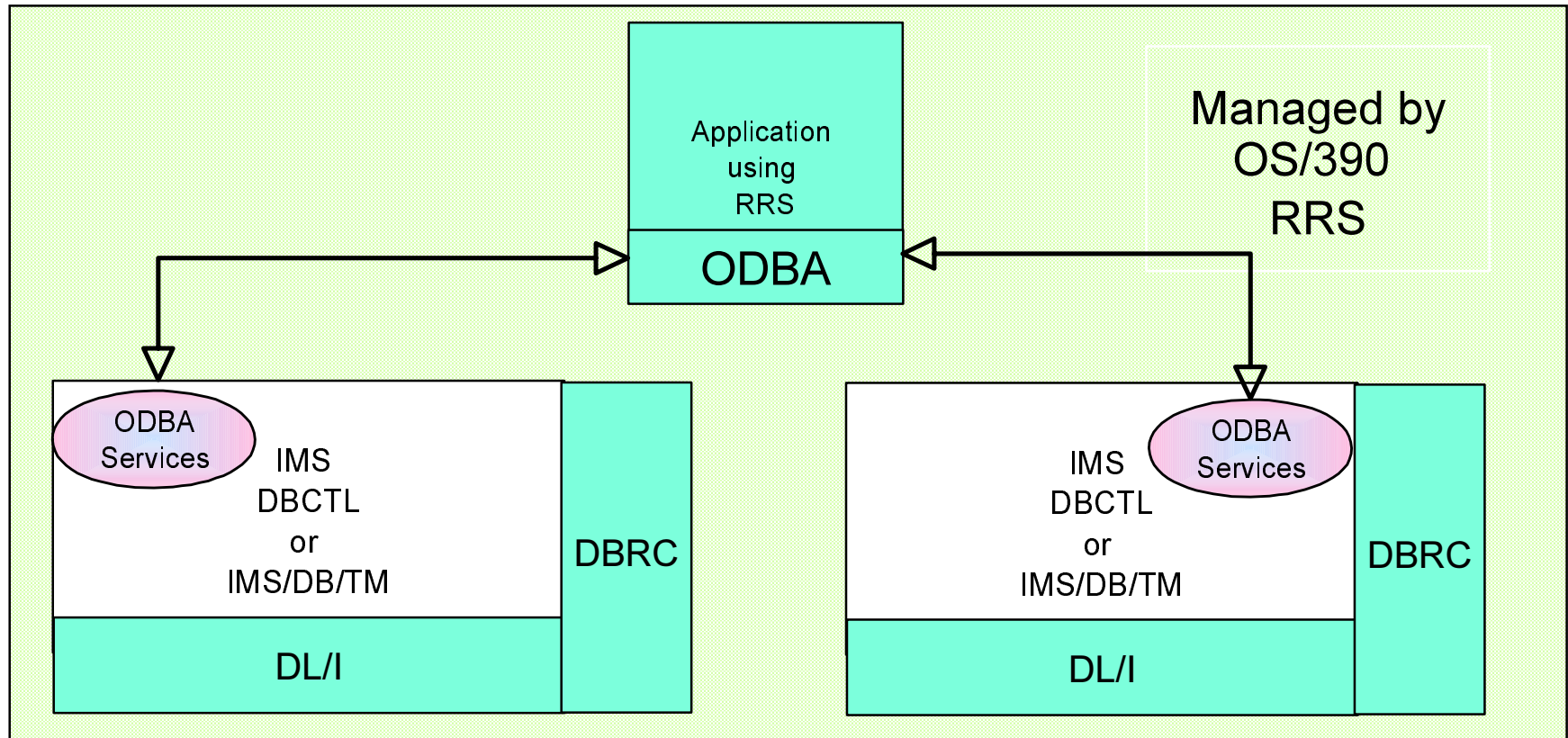
ODBA provides for failure isolation and independent resource recoverability

ODBA requires RRS/MVS for syncpoint management

Multiple Applications to one IMS system
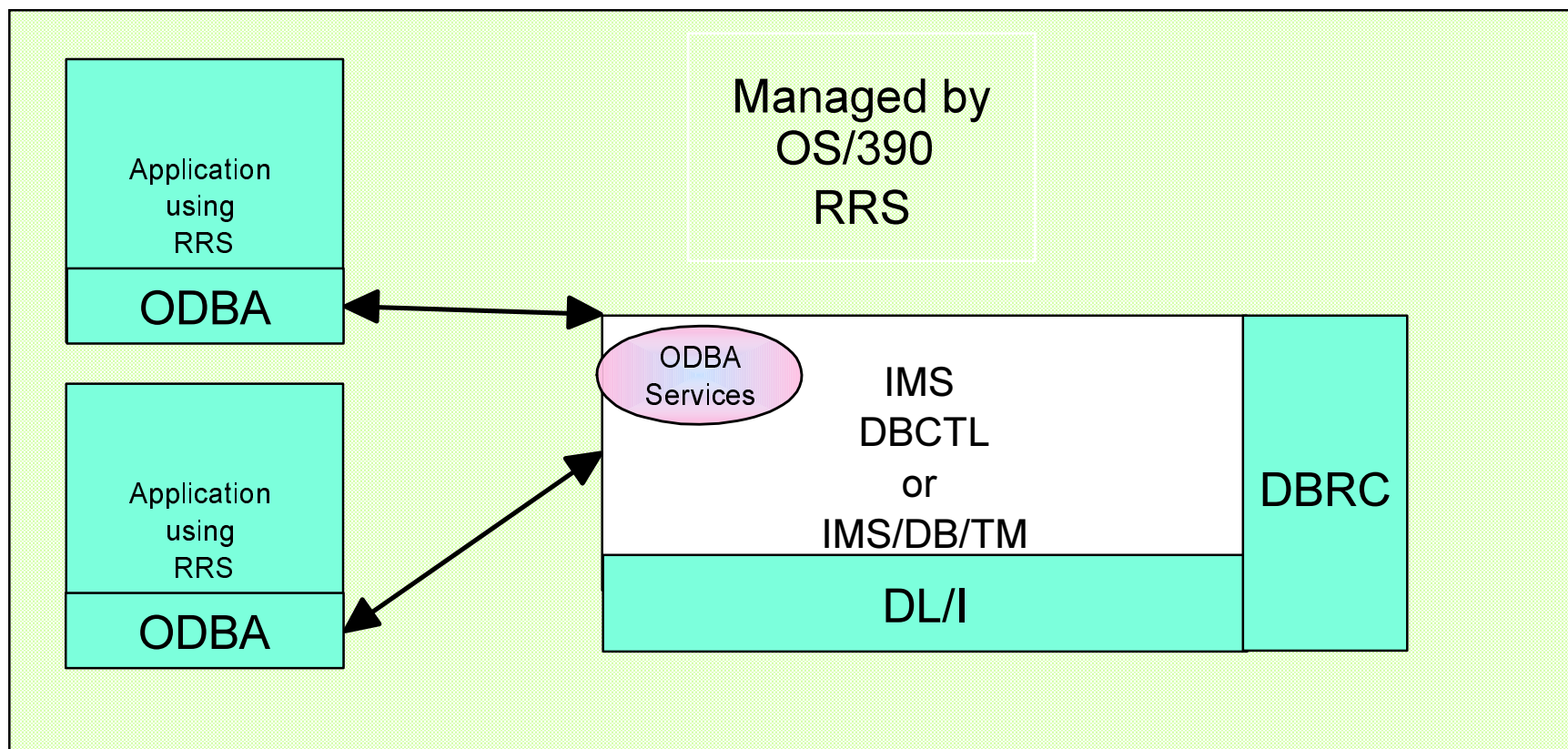
One Application to multiple IMS systems

Defining the Connection

- **A connection is defined with a DRA startup table**

  - Like DBCTL connections from CICS

  - DFSPRP macro is assembled

    - Parameters for IMSID, minimum threads, maximum threads, AGN, etc.

  - Startup table module name is: DFSxxxx0

    - xxxx is recommended to be the IMSID
    - Put in PDS accessable by ODBA application address space

■ DRA Startup Table

DFSPRP macro defines DRA Startup parms

Assemble DFSnnnn0

      nnnn = Any 1-4 alphanumeric characters

Where can you find the Parm Descriptions

DFSPRP DSECT=YES

      or

IMS/ESA Install Volume 2

- # DFSPRP parms (trip-up ones anyway)

CNBA
  Total number of FastPath buffers
   FPBUF x MAXTHRD <= CNBA
   Needed for FP DEDB access
MINTHRD & MAXTHRD
   1 <= MINTHRD => 999
   1 <= MAXTHRD => 999
   If MAXTHRD < MINTHRD then MAXTHRD = MINTHRD

The Rest of the DFSPRP parms

- FUNCLV
  - ▶ Function level - Always 1 (one)
- DDNAME
  - ▶ DRA Reslib DDNAME (CCTLDD)
- DSNAME
  - ▶ DRA Reslib (IMS.RESLIB)
- DBCTLID
  - ▶ IMS/DBCTL IMSID (SYS1)
- SOD
  - ▶ Snap Output Dataset (A)
- USERID
  - ▶ User Identifier
- TIMER
  - ▶ IDENTIFY Timer value (60)
- AGN
  - ▶ Application Group Name
- TIMEOUT
  - ▶ DRA Termination Timeout Value (60)
- IDRETRY
  - ▶ ODBA connection parm

Execution Requirements

- **Application program must be linked with DFSCDLI0 or load it**

    - Language interface module for ODBA
    - Provides AERTDLI alias name

        - Invokes DRA interface

- **IMS modules must be available to address space**

    - May be in STEPLIB or JOBLIB

        - DFSAERG0
        - DFSAERM0
        - DFSAERA0
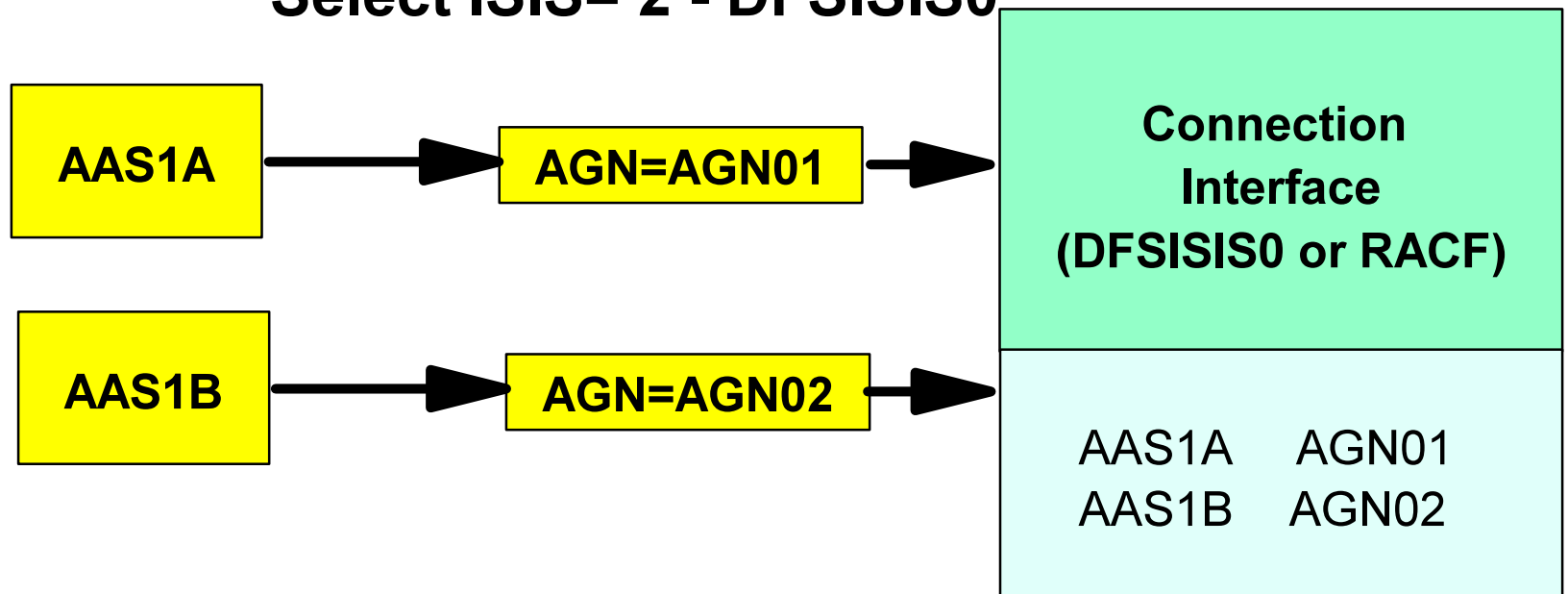   - DRA Startup Table (DFSxxxx0)

Connection Security

ISIS Parameter
Select ISIS= 1 - RACF
USERID from JOBCARD
AGN from Startup Table
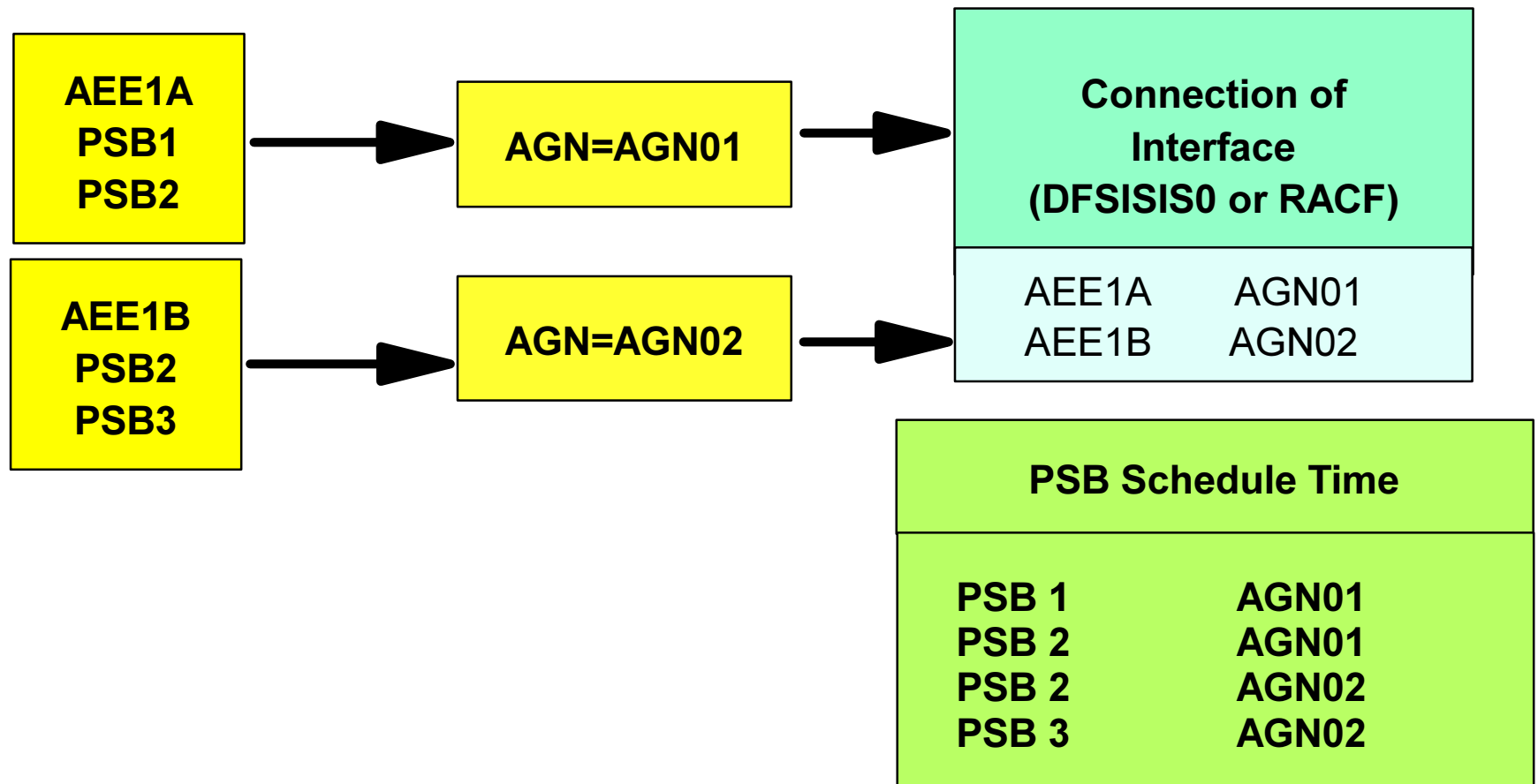Select ISIS= 2 - DFSISIS0

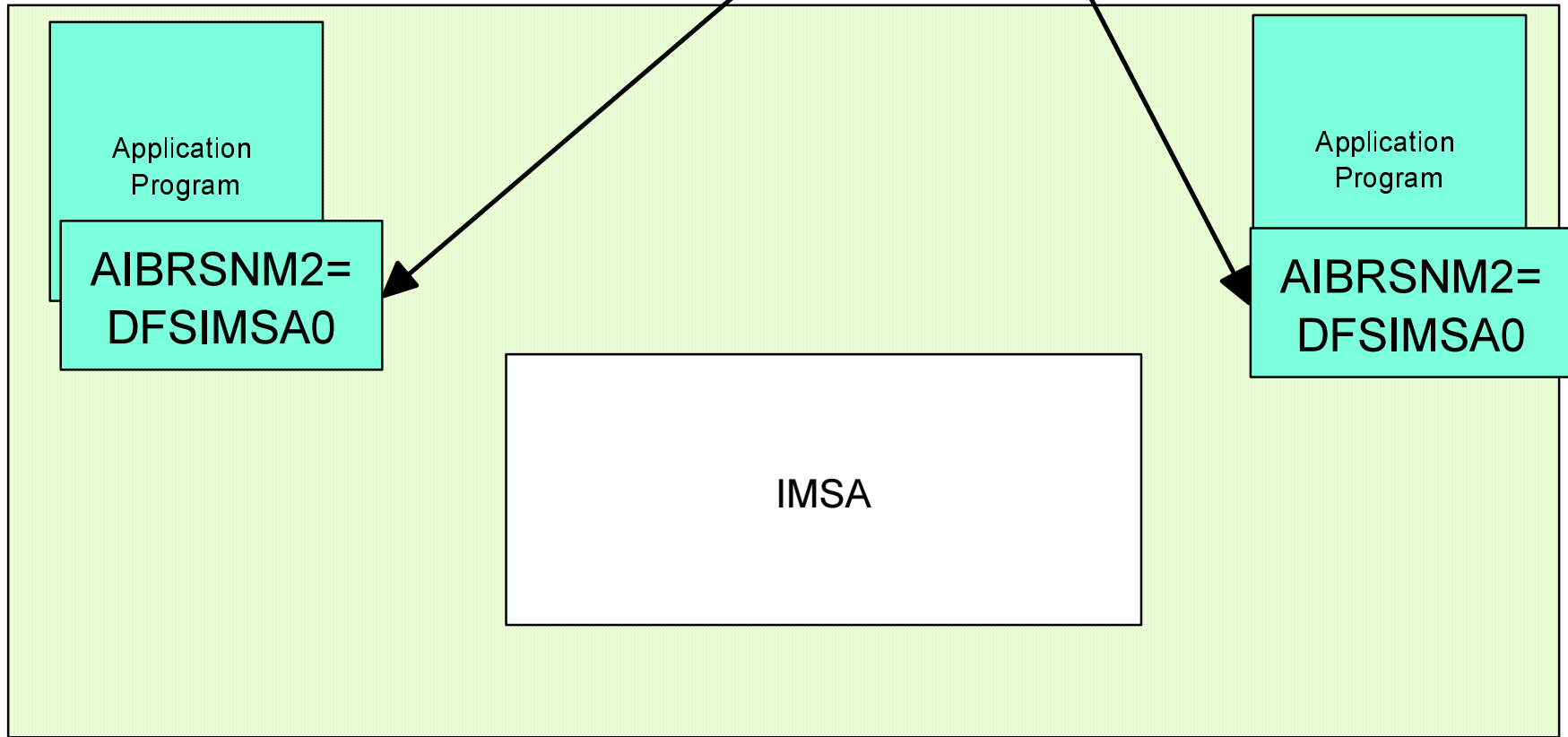| AAS1A	→	AGN=AGN01	→	**Connection Interface (DFSISIS0 or RACF)**
AAS1B	→	AGN=AGN02	→	AAS1A AGN01 AAS1B AGN02

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PSB Security

⏶ ISIS=1 or 2
- ■ AGN

| AEE1A
PSB1
PSB2 | → | AGN=AGN01 | → | **Connection of Interface (DFSISIS0 or RACF)** |
| AEE1B
PSB2
PSB3 | → | AGN=AGN02 | → | AEE1A   AGN01
AEE1B   AGN02 |

Connection of Interface (DFSISIS0 or RACF)

AEE1A   AGN01
AEE1B   AGN02

PSB Schedule Time

PSB 1   AGN01
PSB 2   AGN01
PSB 2   AGN02
PSB 3   AGN02

ODBA connection to IMS

//ODBA DD DSN=IMS.SDFSRESL(DFSIMSA0)

Application
Program

AIBRSNM2=
DFSIMSA0

Application
Program

AIBRSNM2=
DFSIMSA0

IMSA

DFSPRP
DBCTLID=IMSA

ODBA connection to IMS

//ODBA DD DSN=IMS.SDFSRESL(DFSIMSA0)

Application Program

AIBRSNM2=
DFSIMSA0

MAXPST=100

Application Program

AIBRSNM2=
DFSIMSA0
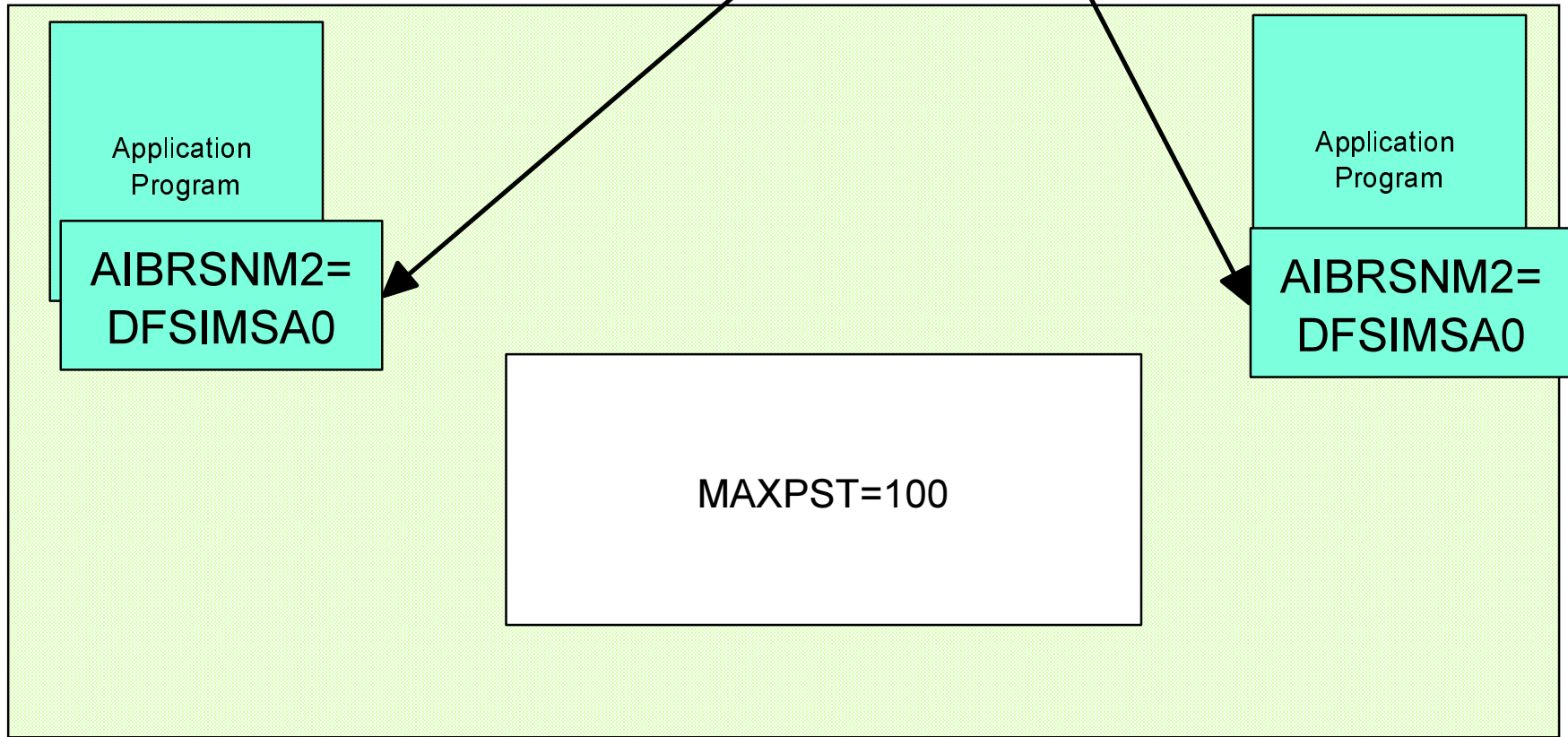
DFSPRP
MINTHRD=10
MAXTHRD=25

MAXTHRD=50

MPP/BMP=4

CCTL A | **D R A**
CCTL B | **D R A**
CCTL C | **D R A**

IRLM (optional)

IMS MPR 1
2

DBRC

MAXTHRD=25

DBCTL Services | **CTL** | **TM Services**

Application Address Space (ODBA)

DLISAS

Application Address Space (ODBA)

IMS BMP 1
2

FP DEDBs

FP MSDBs

DL/I FF DBs

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ODBA connection to IMS

Application
Program

AIBRSNM1=
IMSAPSB1

IMSA

Application
Program

AIBRSNM1=
IMSAPSB1

APPLCTN PSB=IMSAPSB1,SCHDTYP=PARALLEL

```
PCB
TYPE=DB,DBDNAME=IMSADBD1,PROCOPT=A,KEYLEN=4,PCBNAME=IMSAPCB1
      PSBGEN LANG=ASSEM,PSBNAME=IMSAPSB1
      END
```

ODBA TCBs

OS/390
Z/OS

IMS A

IMS B

JobStep TCB

Caller TCB

ODBA Main TCB

ODBA IMSA TCB

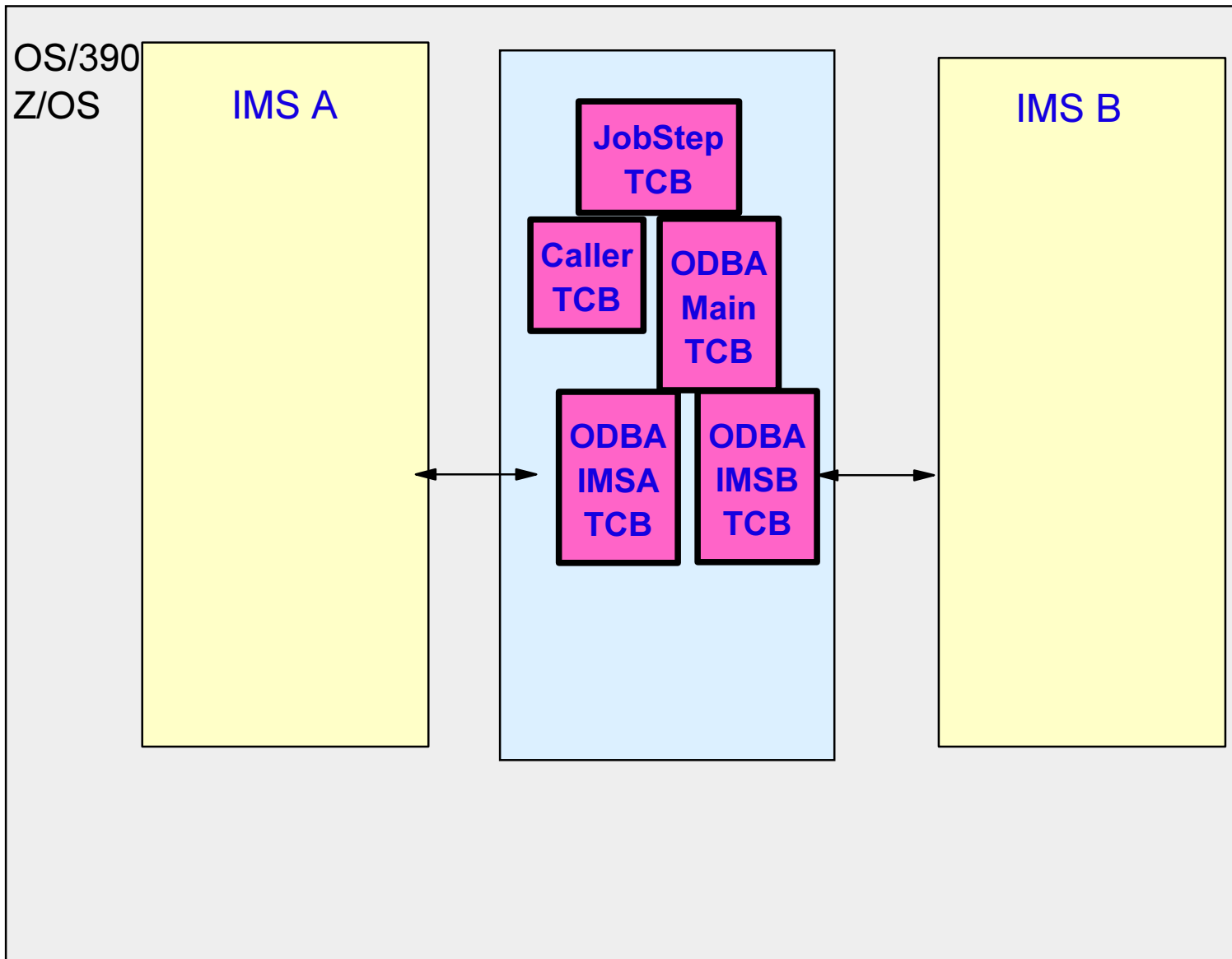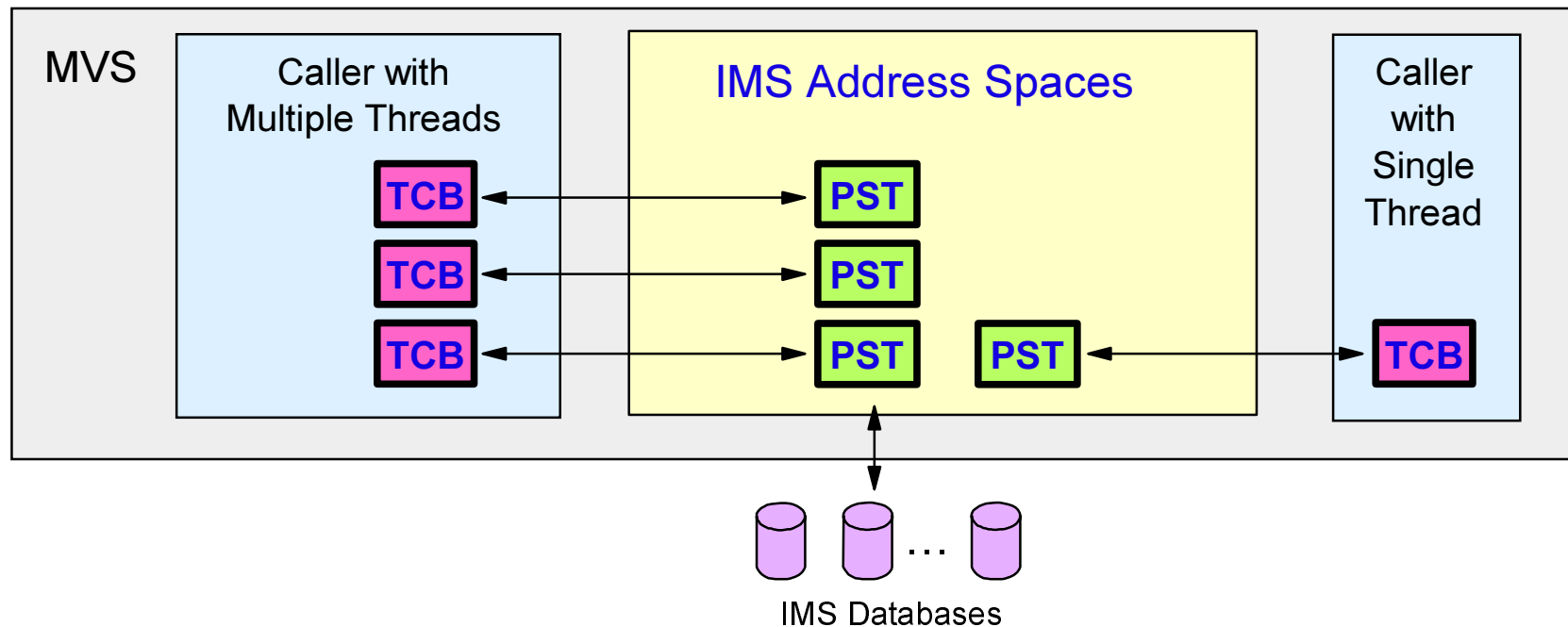**ODBA IMSB TCB**

Caller TCB/PST

- **Multiple concurrent connections**

  - Connectors may have multiple threads

    - Each thread requires a TCB in caller
    - Each thread uses a PST in the control region

ODBA Calls

- **IMS Calls must use AIB interface with AERTDLI**

  - CIMS
    - Establishes and terminates the connection

  - APSB
    - Allocates a PSB

  - DPSB
    - Deallocates a PSB when changes committed

  - DLI calls
    - Usual access to databases (GU, GN, ISRT, ...)

- **Synchronization done with SRRCMIT or ATRCMIT**

■ Application Interface Block aka...AIB

Introduced in IMS/ESA V3

Extended in IMS/ESA V6

Request IMS resource PCB by name

AIB in user defined storage

Minimum size of 264 for ODBA usage

CIMS Function=INIT

Call AERTDLI parmcount, CIMS, AIB

- parmcount = set to n (optional)
- AIB = Address of AIB
  - AIBSFUNC=INIT(required)
  - AIBRSNM2 = 1-4 character DRA ID (optional)
    - example IMSA
      - load DFSIMSA0 DRA Startup Table

//ODBA DD DSN=IMS.SDFSRESL(DFSIMSA0)

APSB call

Call AERTDLI parmcount, APSB, AIB

- parmcount = set to 2 (optional)
- AIB = Address of AIB (required)
  - AIBRSNM1 = 8 character PSB name   (required)
    - example IMSAPSB1
  - AIBRSNM2 = 1-4 character startup table identifier (required)
    - example IMSA

APPLCTN PSB=IMSAPSB1 ...

//ODBA DD DSN=IMS.SDFSRESL(DFSIMSA0)

DL/I call

Call AERTDLI parmcount, xxxx, AIB, ...

- parmcount = set to n (optional)
- xxxx = Call function (required)
- AIB = Address of AIB
  - (required-must be same as APSB AIB)
  - AIBRSNM1 = 8 character PCB name (required)
    - example IMSAPCB1

```
PCB
TYPE=DB,DBDNAME=IMSADBD1,PROCOPT=A,KEYLEN=4,PCBNAME=IMSAPCB1
        PSBGEN LANG=ASSEM,PSBNAME=IMSAPSB1
        END
```

DPSB call

Does not initiate sync point processing

Call AERTDLI parmcount,DPSB, AIB

- parmcount = set to 2 (optional)
- AIB = Address of AIB (required)
  - AIBRSNM1 = 8 character PSB name   (required)
    - example IMSAPSB1
  - AIBSFUNC = PREP (optional)
    - Used to perform Phase One of syncpoint
    - Database changes In-Doubt

CIMS Function=TERM

Call AERTDLI parmcount, CIMS, AIB

- parmcount = set to n (optional)
- AIB = Address of AIB
  - AIBSFUNC=TERM(required)
  - AIBRSNM2 = 1-4 character DRA ID (required)
    - example IMSA
      - uses DFSIMSA0 DRA Startup Table

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CIMS Function=TALL

Call AERTDLI parmcount, CIMS, AIB

- parmcount = set to n (optional)
- AIB = Address of AIB
  - AIBSFUNC=TALL(required)

■ Resource Recovery Services(RRS)

A sync-point manager to coordinate the two-phase commit process

Implementation of the SAA Commit and Backout callable services for us by application programs

A mechanism to associate resources with an application instance

Manages Unit of Recovery(UR)

■ RRS Commit & Backout Stubs

ATRCMIT or SRRCMIT

Commit unit of work

CALL SRRCMIT(RETCODE)

CALL ATRCMIT(RETCODE)
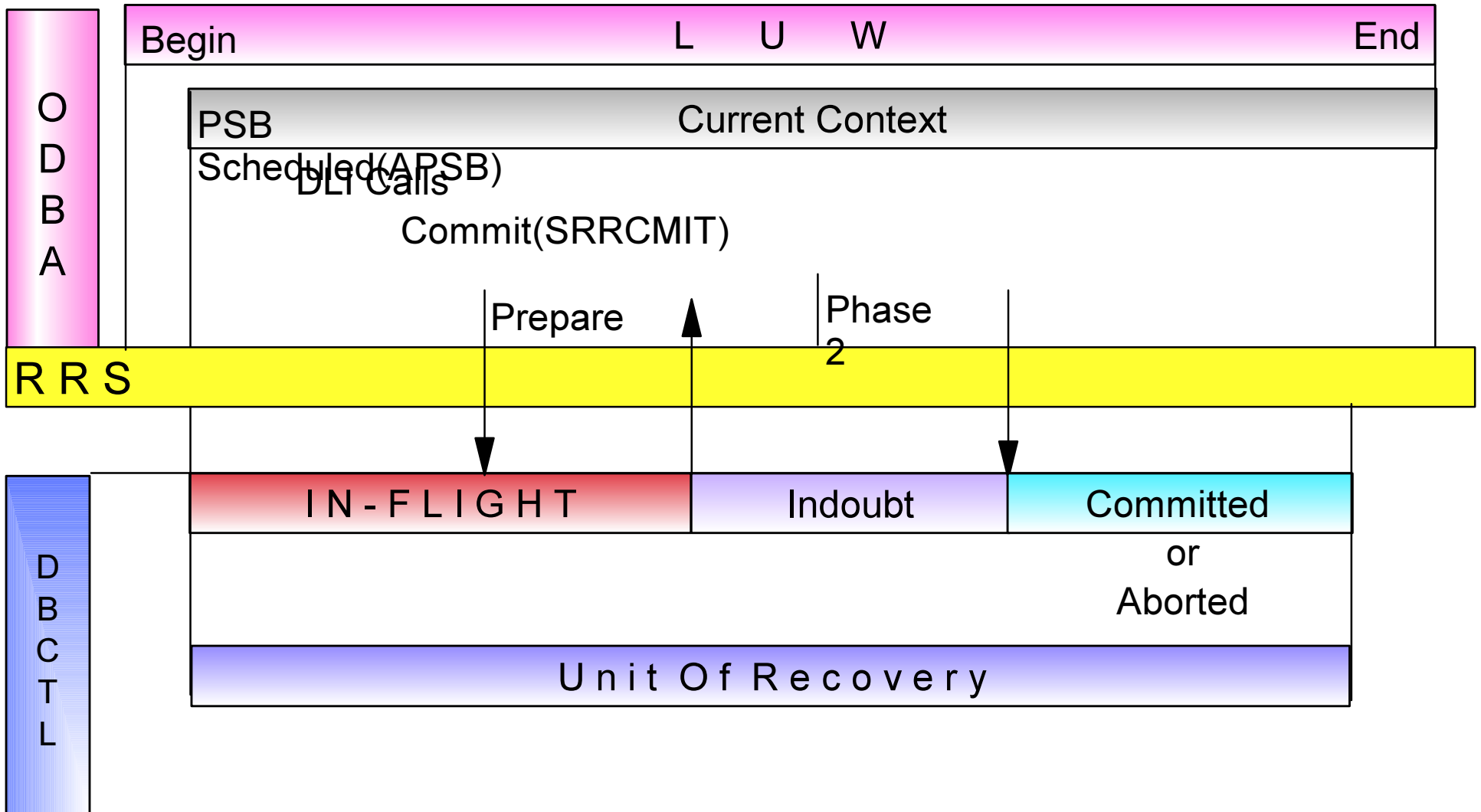
ATRBACK or SRRBACK

Backout unit of work

CALL SRRBACK(RETCODE)

CALL ATRBACK(RETCODE)
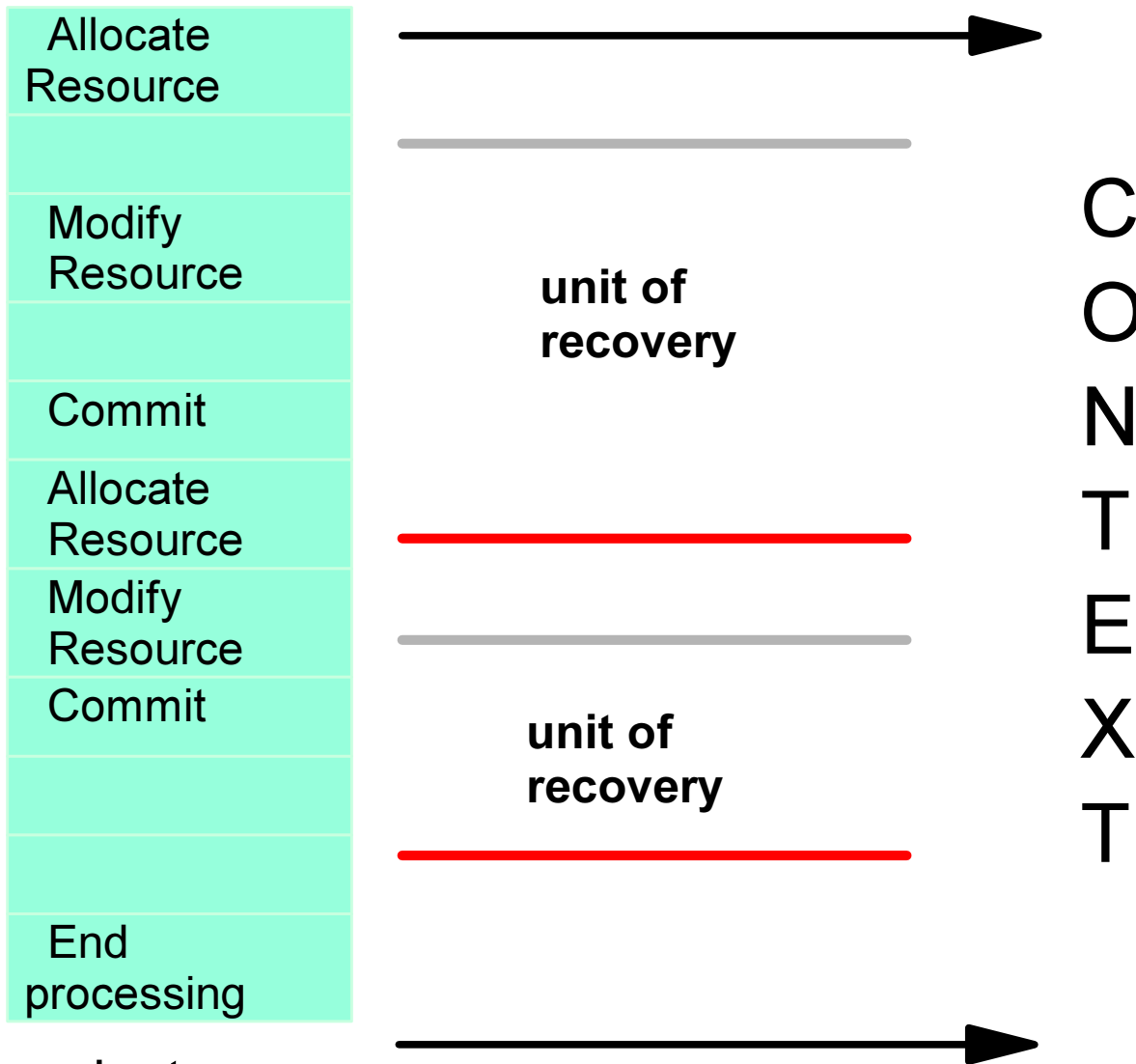
RRS stub code module used to access RRS

ATRRCSS from SYS1.CSSLIB

Two Phase Commit

Begin   L   U   W   End

O D B A

PSB   Current Context

Scheduled(APSB)

DLI Calls

Commit(SRRCMIT)

Prepare   Phase 2

R R S

I N - F L I G H T   Indoubt   Committed

or

Aborted

D B C T L

U n i t O f R e c o v e r y

Context Example

TCB - private start

Allocate Resource

Modify Resource

Commit

Allocate Resource

Modify Resource

Commit

End processing

unit of recovery

unit of recovery

C O N T E X T

TCB - private end

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RRS Global Transaction

Application using RRS

Managed by OS/390 RRS

ODBA

DB2 RRSAF

ODBA Services

IMS DBCTL or IMS/DB/TM

DB2
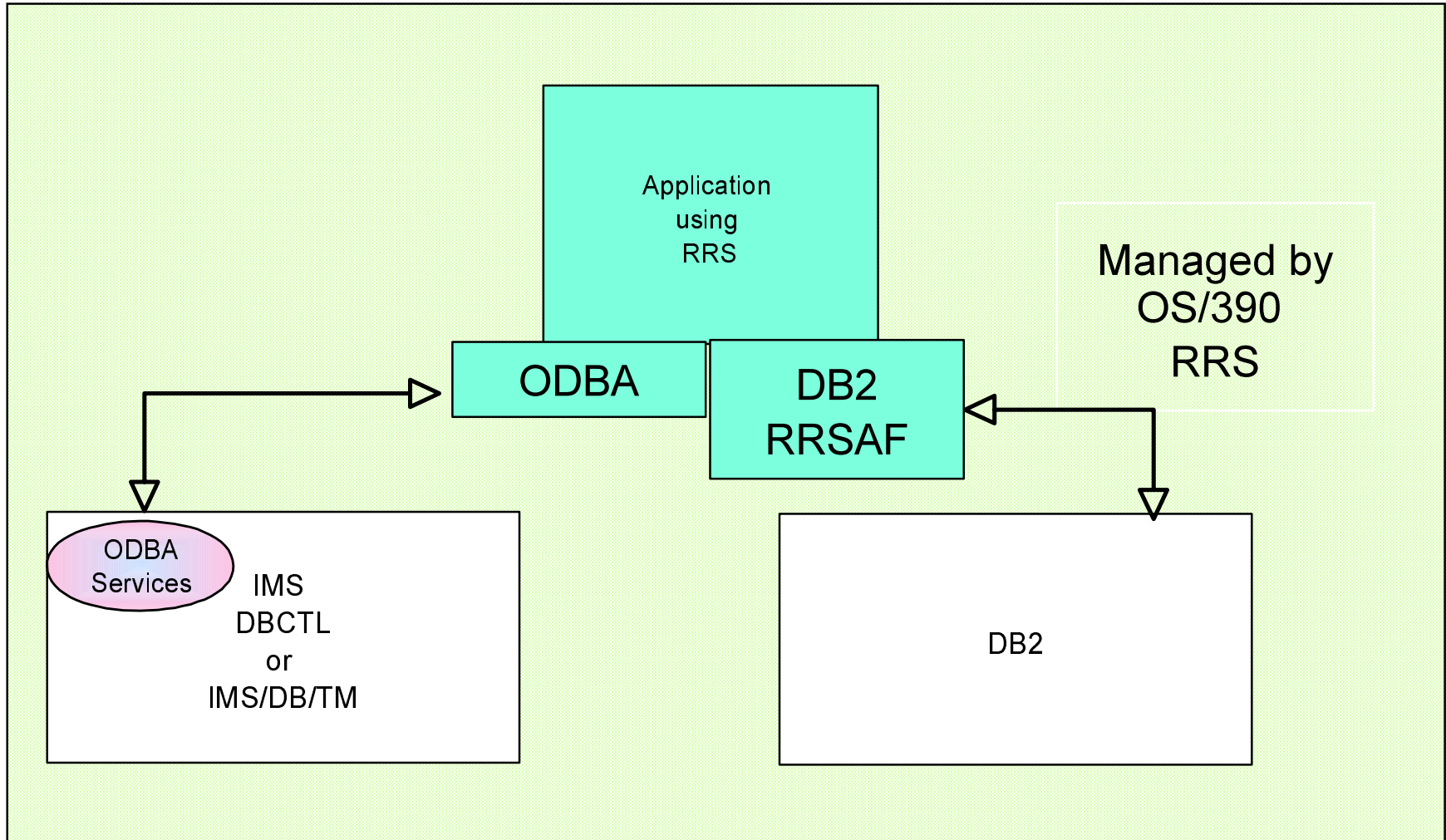
■ RRS Logging

ARCHIVE - archive log   (optional)
  completed UR information
RM.DATA - resource manager data log
  Registered Resource Managers information
MAIN.UR - main UR state log
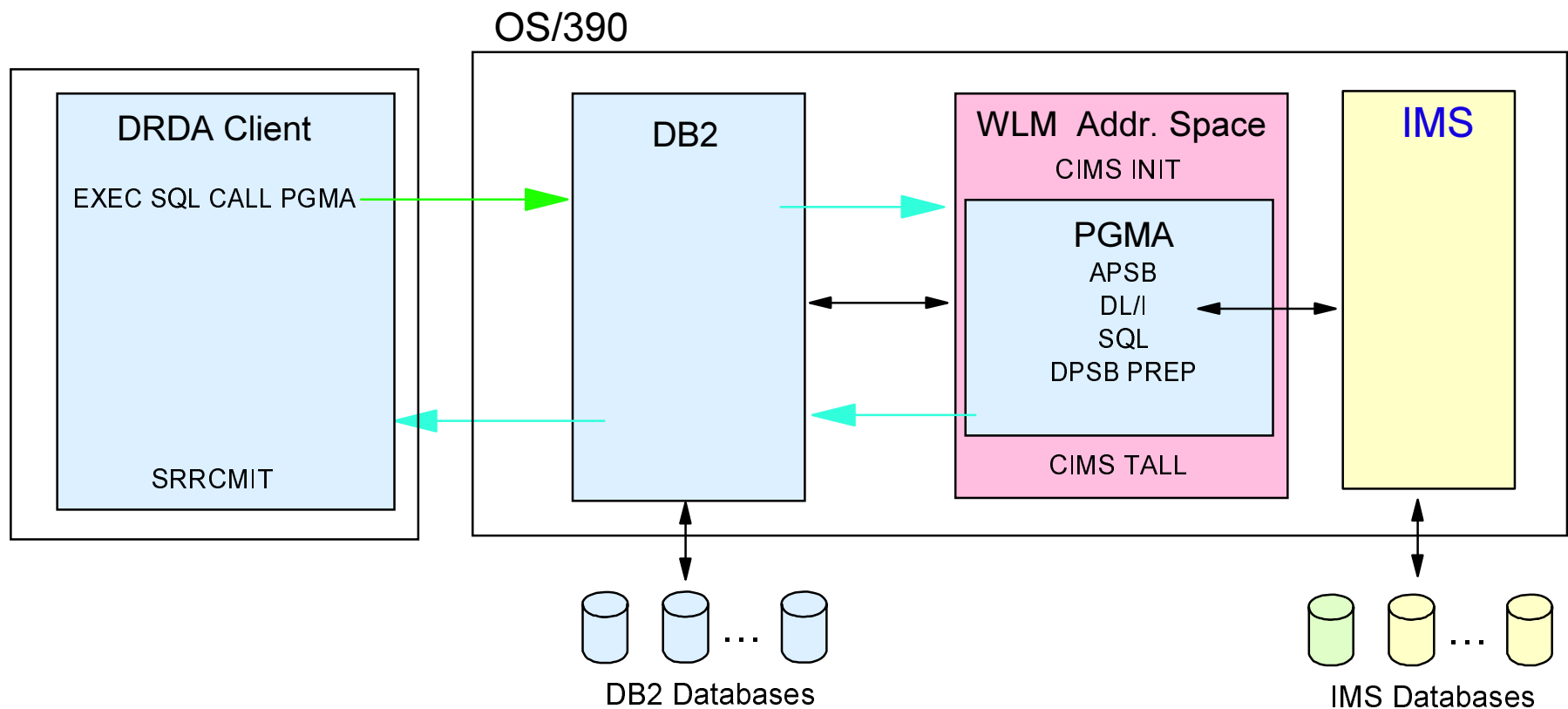 **current state of active URs**
DELAYED.UR - delayed UR state log
  current state of active URs that have been delayed
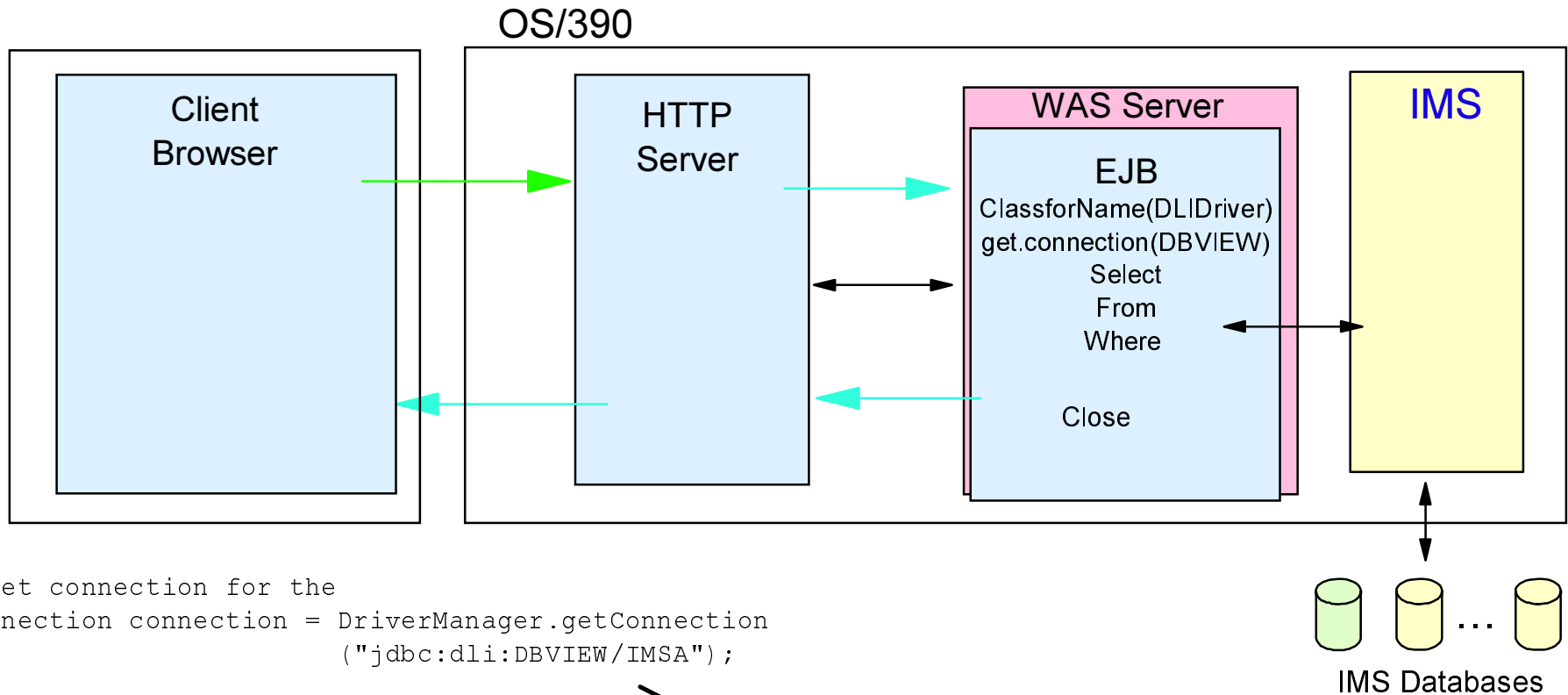**RESTART - restart log**
  incomplete URs information needed for restart

ODBA DB2 Stored Procedure Example

- DB2 stored procedure example
  - Requires DB2 Version 5 or later and WLM managed stored procedures address spaces
  - DRDA Client issues SQL for stored procedure
  - DB2 invokes stored procedure
  - Stored procedure does SQL and DL/I calls
  - Client program does commit when stored procedure returns
    - or DB2 can issue SRRCMIT

OS/390 WebSphere Application Server
Example using IMS Java Classes

OS/390

| Client Browser | | HTTP Server | | **WAS Server**

EJB
ClassforName(DLIDriver)
get.connection(DBVIEW)
Select
From
Where

Close | | **IMS** |

```
//Get connection for the
Connection connection = DriverManager.getConnection
                ("jdbc:dli:DBVIEW/IMSA");
```

IMS Databases

//ODBA DD DSN=IMS.SDFSRESL(DFSIMSA0)

Summary

ODBA Interface is a new way to connect to IMS DB.

AIB only interface.

RRS is required.