

IMS Open Database

You Need to Know What Application Developers Do Not Know



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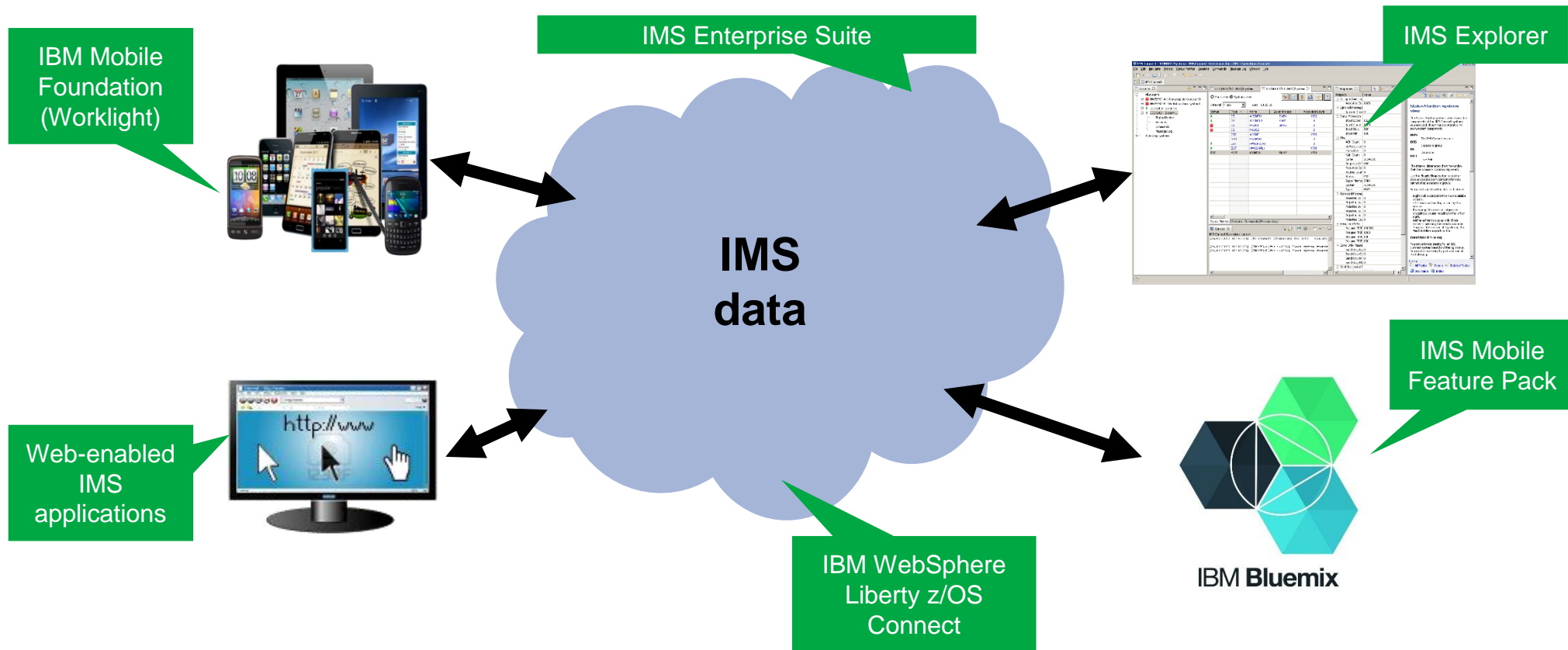
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Agenda

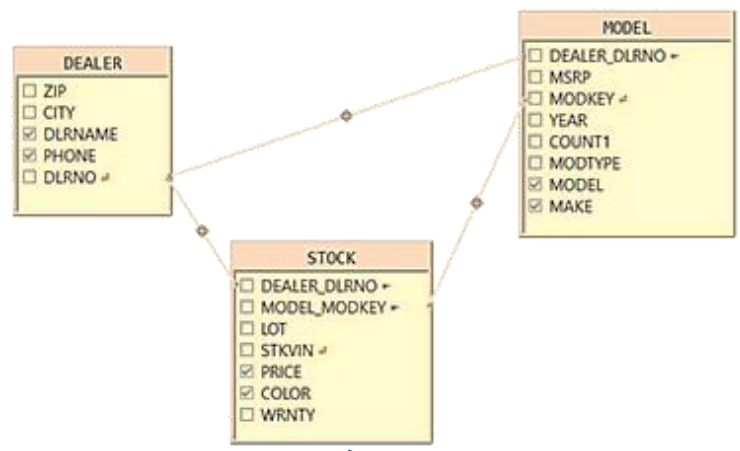
- Open Database environment
 - IMS Connect
 - Open Database Manager (ODBM)
 - DRDA and DDM requests
- Open Database request lifecycle
 1. Start OD conversation
 2. Security clearance
 3. Establish connection to DB
 4. Access the DB
 5. Commit
 6. Finalize connection
- When things go wrong
 - ODBM not available
 - Security issues
 - Request routing issues
 - Allocate PSB (database stopped)
 - IMS-specific DDM parameters
 - Rollback commit
- Open Database management
 - Client connections
 - Managing ODBMs
 - Workload balancing
- Summary and further reading

Open Database environment



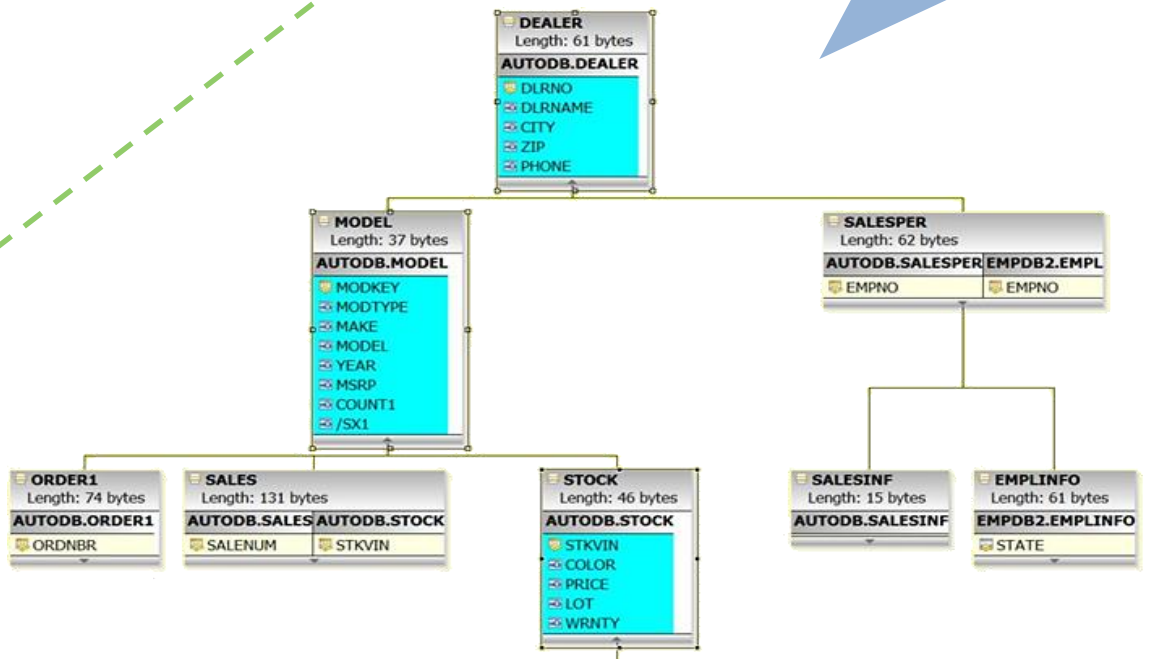
Client applications and IMS: Developers speaking different languages

```
SELECT AUTOLPCB.DEALER.DLRNAME, AUTOLPCB.DEALER.PHONE, AUTOLPCB.MODEL.MODEL,
AUTOLPCB.MODEL.MAKE, AUTOLPCB.STOCK.PRICE, AUTOLPCB.STOCK.COLOR
FROM AUTOLPCB.DEALER JOIN AUTOLPCB.STOCK ON AUTOLPCB.DEALER.DLRNO = AUTOLPCB.STOCK.DEALER_DLRNO JOIN AUTOLPCB.MODEL ON AUTOLPCB.DEALER.DLRNO = AUTOLPCB.MODEL.DEALER_DLRNO AND AUTOLPCB.STOCK.MODEL_MODKEY = AUTOLPCB.MODEL.MODKEY
```



Application Developer
 Relational databases
 Tables
 SQL (Structured Query Language)

IMS Administrator
 Hierarchical databases
 Segments
 SSAs (Segment search arguments)



IMS Connect communications protocols

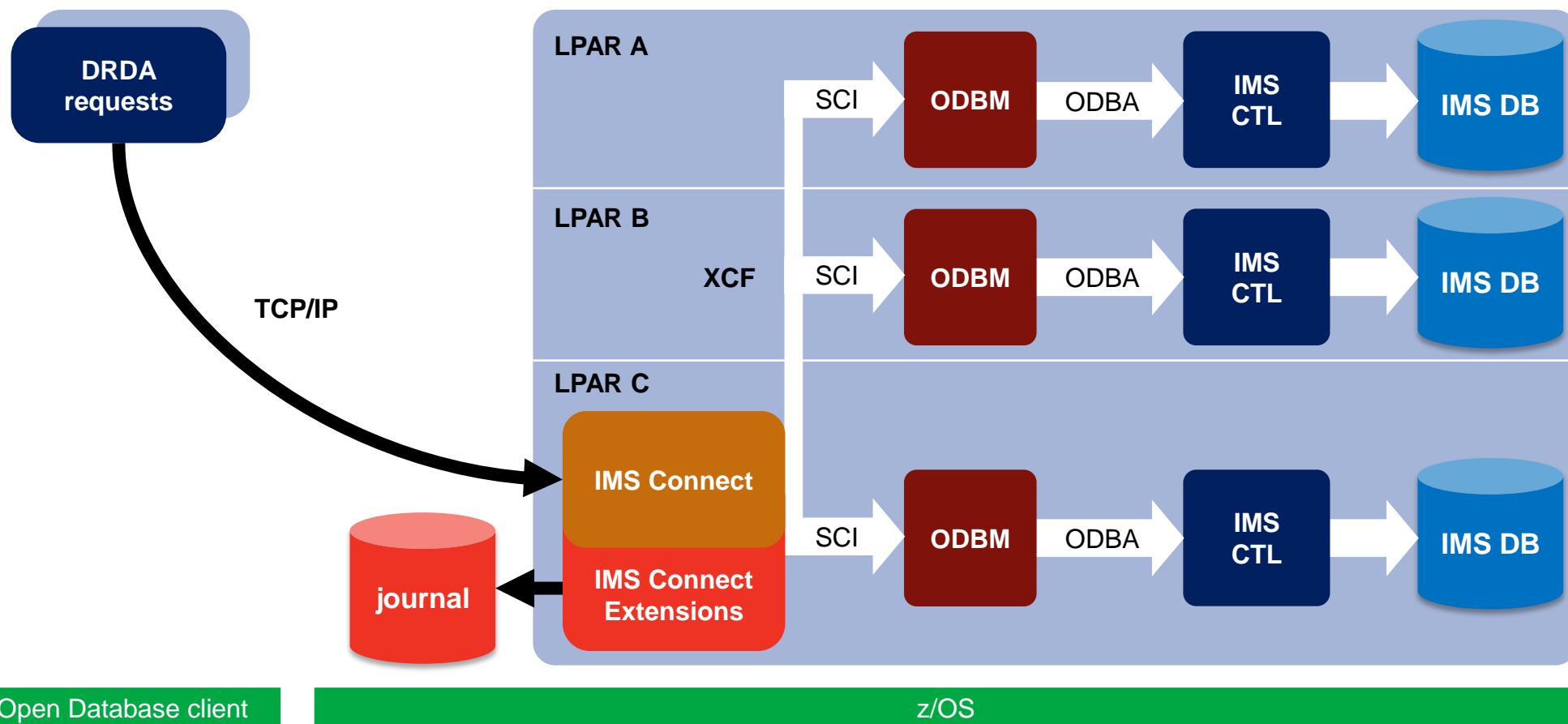
IRM (IMS request message)

- **Traditional IMS Connect workload**
- Client message header communicates protocol options to IMS Connect
- Allowed access to IMS transactions

DRDA (Distributed Relational Database Architecture)

- Describes the contents of data objects that flow on messages between client and IMS Connect
- **DDM** (Distributed Data Management architecture) describes the **commands, parameters, data objects** and **messages**
- Client application requests can (optionally) specify an **ODBM alias name** to IMS Connect (otherwise, messages are routed in “round robin” fashion by IMS Connect – but you can get advanced routing and load balancing through **IMS Connect Extensions**)
- Well-established standard published by **The Open Group** (<http://www.opengroup.org/>)

Open Database environment



IMS components for Open Database

IMS Connect

- Supports **Open Database** DRDA client requests over **TCP/IP**
- Instrumentation points (HWSTECL)
- Exit points for customizing security and workload routing (HWSAUTH0 and HWSROUT0)
- **IMS Connect Extensions** adds events journal, routing, workload balancing, security, and more

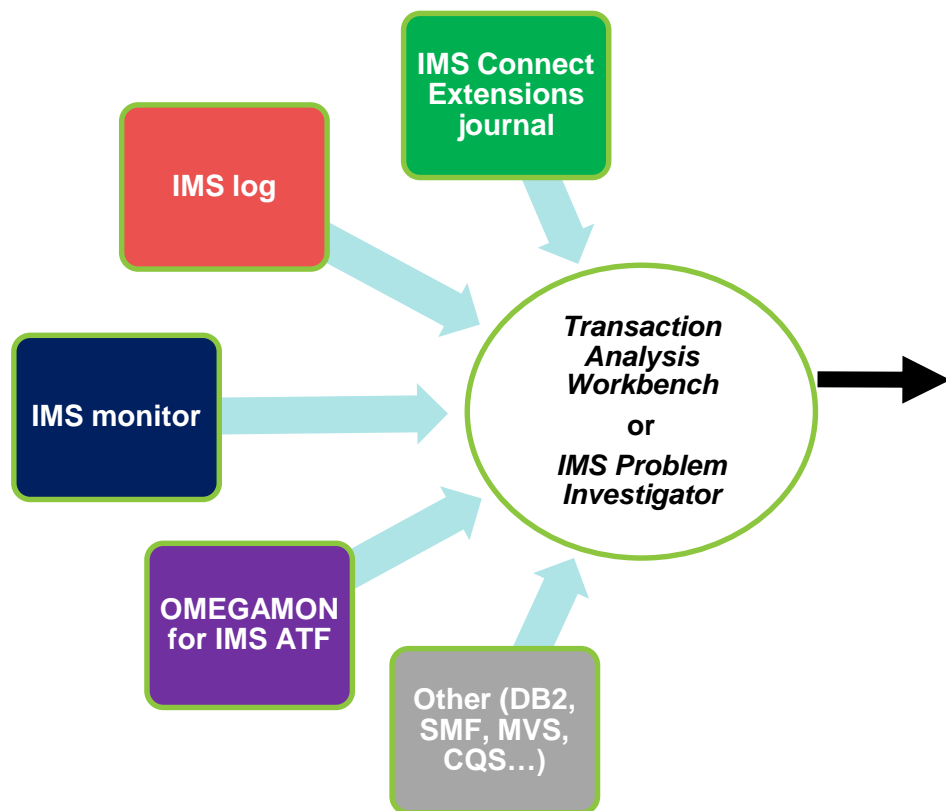
Open Database Manager (ODBM)

- Part of **Common Service Layer (CSL)**
- A path between **IMS Connect** and one or more **IMS datastores**
- Uses the **ODBA (Open Database Access)** callable interface to communicate with IMS
- Each IMS datastore may have one or more **Open Database aliases**
- May have **multiple ODBM address spaces** for each IMS Connect

Tools used in the following examples

Function	Tool	Method
Capture IMS Connect events	IMS Connect Extensions journal	https://www.ibm.com/support/knowledgecenter/SSAVHV_2.4.0/cexu-events-config.html
Capture OMEGAMON ATF event records	Tivoli OMEGAMON XE for IMS	https://www.ibm.com/support/knowledgecenter/SSXS8U_5.3.0/
Analyze IMS Connect Extensions journals (including DDM objects) and IMS logs	IBM Transaction Analysis Workbench ad-hoc log browser	https://www.ibm.com/support/knowledgecenter/en/SSKKZM_1.3.0/fuwutsk_browsing_logs_ad_hoc.htm
	IMS Problem Investigator log browser	https://www.ibm.com/support/knowledgecenter/en/SSAVJ9_2.4.0/alzu-cex.html

Example: DRDA request



```

— 003C Prepare READ Socket                                     13.16.53.026908
— 0049 READ Socket                                           +0.000118
— 005B DRDA 1041 EXCSAT-Exchange Server Attributes           +0.000125
— 0049 READ Socket                                           +0.000151
— 005B DRDA 106D ACCSEC-Access Security                     +0.000182
— 005C DRDA 1443 EXCSATRD-Server Attributes Reply Data      +0.000204
— 004A WRITE Socket                                          +0.000310
— 0049 READ Socket                                           +0.854012
— 005B DRDA 106E SECCHK-Security Check                      +0.854020
— 0063 ODBM Security Exit called                            +0.854053
— 0064 ODBM Security Exit returned                          +0.854126
— 005C DRDA 1219 SECCHKRM-Security Check Reply Message     +0.854142
— 004A WRITE Socket                                          +0.854230
— 0049 READ Socket                                           +1.022542
— 005B DRDA 2001 ACCRDB-Access RDB                          +1.022551
— 005D ODBM begin Allocate PSB (APSB) Program=AUTPSB11     +1.022572
— 0061 ODBM Routing Exit called                             +1.022582
— 0062 ODBM Routing Exit returned                           +1.022740
— 00AA ODBM Trace: Message sent to ODBM                    +1.022880
— 0069 Message sent to ODBM                                 +1.022887
— 06 BMP Scheduling start TranCode=ODBA02CD Region=0004   +1.024870
— 4E02 BMP Scheduling start Region=0004                    +1.024873
— 08 Application Start Program=AUTPSB11 Region=0004       +1.025814
— 5607 Start of UOR Program=AUTPSB11 Region=0004          +1.025815
— 5616 Start of protected UOW Region=0004                 +1.026013
— 4E03 BMP Scheduling end TranCode=ODBA02CD Region=0004   +1.026018
— 00AA ODBM Trace: Message received from ODBM              +1.028028
— 006A Message received from ODBM                          +1.028043
— 005E ODBM end Allocate PSB (APSB) Program=AUTPSB11     +1.029573
— 005C DRDA 2201 ACCRDBRM-Access RDB Reply Message        +1.029600
— 004A WRITE Socket                                          +1.031028
— 0048 Trigger Event for ODBMMSG                            +1.031063
— 003C Prepare READ Socket                                   +1.051454
— 0049 READ Socket                                           +1.051540
— 005B DRDA 200C OPNQRY-Open Query                          +1.051546
— 0049 READ Socket                                           +1.051605
— 005B DRDA CC05 DLIFUNC-DL/I function                      +1.051635
— 0049 READ Socket                                           +1.051658
— 005B DRDA CC01 INAIB-AIB data                             +1.051689
— 0049 READ Socket                                           +1.051712
— 005B DRDA CC04 RTRVFLD-Field client wants to retrieve data +1.051742
— 0049 READ Socket                                           +1.051787
— 005B DRDA CC06 SSALIST-List of segment search argument   +1.051795
— 00AA ODBM Trace: Message sent to ODBM                    +1.052210
— 0069 Message sent to ODBM                                 +1.052221
— 01 DLI GHU Database=AUTOLDB SC=' ' Elapse=0.000364      +1.052811
— 4E60 DLI Call start Region=0004                           +1.052816
— 4E62 DLA00 start Database=AUTOLDB Region=0004 Func=GU    +1.052873
— 4E63 DLA00 end Region=0004 Seg=DEALER SC=' '             +1.053029
— 4E61 DLI Call end Region=0004                             +1.053165
— 00AA ODBM Trace: Message received from ODBM              +1.053760
— 006A Message received from ODBM                          +1.053771
— 005C DRDA 2205 OPNQRYRM-Open Query Complete              +1.053915

```

Open database request lifecycle (1)

1. Start Open Database conversation:

- Initiate a request to access an IMS database and identify requestor (EXCSAT / EXCSATRD)
- Determine type of security checking performed (ACCSEC / ACCSECRD)

2. Security clearance (SECCHK / SECCHKRD)

- Authenticate the user with RACF or other security product
- Check client access (does user and/or IP address have authority?)

3. Establishing connection to database (ACCRDB / ACCRDBRM)

- Make routing decisions based on availability, capacity, and by PSB name
- Allocate program specification block (PSB) via ODBM

IBM Transaction Analysis Workbench		
—	003C Prepare READ Socket	10.03.34.289664
—	0049 READ Socket	10.03.34.289702
—	005B DRDA 1041 EXCSAT-Exchange Server Attributes	10.03.34.289707
—	0049 READ Socket	10.03.34.289720
—	005B DRDA 106D ACCSEC-Access Security	10.03.34.289737
—	005C DRDA 1443 EXCSATRD-Server Attributes Reply Data	10.03.34.289763
—	005C DRDA 14AC ACCSECRD-Access Security Reply Data	10.03.34.289767
—	004A WRITE Socket	10.03.34.289865
—	0049 READ Socket	10.03.34.290776
—	005B DRDA 106E SECCHK-Security Check	10.03.34.290802
—	0063 ODBM Security Exit called	10.03.34.290836
—	0064 ODBM Security Exit returned	10.03.34.290960
—	005C DRDA 1219 SECCHKRM-Security Check Reply Message	10.03.34.290965
—	004A WRITE Socket	10.03.34.290998
—	0049 READ Socket	10.03.34.670977
—	005B DRDA 2001 ACCRDB-Access RDB	10.03.34.671028
—	005D ODBM begin Allocate PSB (APSB) Program=AUTPSB11	10.03.34.671037
—	0061 ODBM Routing Exit called	10.03.34.671049
—	0062 ODBM Routing Exit returned	10.03.34.671199
—	00AA ODBM Trace: Message sent to ODBM	10.03.34.671374
—	0069 Message sent to ODBM	10.03.34.671379
—	00AA ODBM Trace: Message received from ODBM	10.03.34.736171
—	006A Message received from ODBM	10.03.34.736180
—	005E ODBM end Allocate PSB (APSB) Program=AUTPSB11	10.03.34.736261
—	005C DRDA 2201 ACCRDBRM-Access RDB Reply Message	10.03.34.736282
—	004A WRITE Socket	10.03.34.736381
—	0048 Trigger Event for ODBMMSG	10.03.34.736398

▪
▪
▪

Open database request lifecycle (2)

4. Accessing the database:

- Start read request (OPENQRY)
 - Specify DL/I function (DLIFUNC)
 - Specify AIB data (INAIB) – PCB name at a minimum
 - Specify fields to retrieve (RTRVFLD) – CP, offset, length
 - Qualify the DLI/ call with segment search arguments (SSALIST)
- Send the request to ODBM
- Receive response from ODBM
- Complete the request (OPENQRYRD)

5. Commit all work performed for the current unit of work (RDBCMM / ENDUOWRM)

6. Finalize connection to database

- Deallocate PSB (DEALLOCDB / DEALLOCDBRM)

—	0049	READ	Socket	10.03.34.739696
—	005B	DRDA	200C OPNQRY-Open Query	10.03.34.739700
—	0049	READ	Socket	10.03.34.739713
—	005B	DRDA	CC05 DLIFUNC-DL/I function	10.03.34.739729
—	0049	READ	Socket	10.03.34.739742
—	005B	DRDA	CC01 INAIB-AIB data	10.03.34.739755
—	0049	READ	Socket	10.03.34.739768
—	005B	DRDA	CC04 RTRVFLD-Field client wants to retrieve data	10.03.34.739785
—	0049	READ	Socket	10.03.34.739794
—	005B	DRDA	CC04 RTRVFLD-Field client wants to retrieve data	10.03.34.739811
—	0049	READ	Socket	10.03.34.739823
—	005B	DRDA	CC06 SSALIST-List of segment search argument	10.03.34.739841
—	00AA	ODBM	Trace: Message sent to ODBM	10.03.34.739918
—	0069	Message	sent to ODBM	10.03.34.739926
—	00AA	ODBM	Trace: Message received from ODBM	10.03.34.916775
—	006A	Message	received from ODBM	10.03.34.916792
—	005C	DRDA	2205 OPNQRYRM-Open Query Complete	10.03.34.916882
—	004A	WRITE	Socket	10.03.34.917015
—	0048	Trigger	Event for ODBMMSG	10.03.34.917028
—	003C	Prepare	READ Socket	10.03.34.919183
—	005B	DRDA	200E RDBCMM-RDB Commit Unit of Work	10.03.34.919196
—	00AA	ODBM	Trace: Message sent to ODBM	10.03.34.919311
—	0069	Message	sent to ODBM	10.03.34.919319
—	00AA	ODBM	Trace: Message received from ODBM	10.03.34.924186
—	006A	Message	received from ODBM	10.03.34.924191
—	005C	DRDA	220C ENDUOWRM-End Unit of Work Condition	10.03.34.924255
—	004A	WRITE	Socket	10.03.34.924336
—	0048	Trigger	Event for ODBMMSG	10.03.34.924345
—	003C	Prepare	READ Socket	10.03.34.925132
—	0049	READ	Socket	10.03.34.925153
—	005B	DRDA	C801 DEALLOCDB-Deallocate PSB	10.03.34.925157
—	005F	ODBM	begin Deallocate PSB (DPSB)	10.03.34.925162
—	00AA	ODBM	Trace: Message sent to ODBM	10.03.34.925255
—	0069	Message	sent to ODBM	10.03.34.925260
—	00AA	ODBM	Trace: Message received from ODBM	10.03.34.925953
—	006A	Message	received from ODBM	10.03.34.925957
—	0060	ODBM	end Deallocate PSB (DPSB)	10.03.34.925991
—	005C	DRDA	CA01 DEALLOCDBRM-Name of deallocated PSB	10.03.34.925999
—	004A	WRITE	Socket	10.03.34.926038
—	0048	Trigger	Event for ODBMMSG	10.03.34.926046

DDM

- Distributed Data Management (DDM) architecture
- Used to communicate data management requests
- Requests contained within an object mapped onto a data stream
- Three layers
 - Layer A: Communications management services (flow protocols)
 - Layer B: Agent services (parsing)
 - Layer C: Data management services
- Data Stream Structures (DSS) are how the DDM architecture sees each communication facility

DRDA requests and responses

DDM (**distributed data management**) commands. 'Code points' show flow of DRDA requests and responses

```
VIEW                               Filter                               Row 1 of 3 More
Command ==>                               Scroll ==>
Specify filtering criteria then press EXIT (F3) to apply the filter.
Filter . . . . . DRDAEVT5 +
Description . . . DRDA Requests and responses          _ Activate Track

/ Log Code + Exc Description
_ CON 005B   ODBM DRDA command issued
             Level 1_ Conditions No_ Form _____ + REXX _____
-----
_ CON 005C   ODBM DRDA command reply
             Level 1_ Conditions No_ Form _____ + REXX _____
-----
_ CON 00AA   ODBM Send/Receive Trace
             Level 1_ Conditions No_ Form _____ + REXX _____
-----
```

IBM Transaction Analysis Workbench						
File	Mode	Filter	Time	Labels	Options	Help
BROWSE CEX999.MKT366A.IMSEXP.AUTODB			Record	00000082	More: < >	
Command ==>			Scroll ==>		PAGE	
Navigate < 00.00.01.000000 >			Date/Time	2017-02-10	14.18.04.357187	
/ Filtering			Friday	2017-02-10	Time (LOCAL)	
___	005B	DRDA 1041	EXCSAT-Exchange Server Attributes		14.37.06.041083	
___	005B	DRDA 106D	ACCSEC-Access Security		14.37.06.041127	
___	005C	DRDA 1443	EXCSATRD-Server Attributes Reply Data		14.37.06.041152	
___	005C	DRDA 14AC	ACCSECRD-Access Security Reply Data		14.37.06.041153	
___	005B	DRDA 106E	SECCHK-Security Check		14.37.06.044108	
___	005C	DRDA 1219	SECCHKRM-Security Check Reply Message		14.37.06.044266	
___	005B	DRDA 1041	EXCSAT-Exchange Server Attributes		14.38.15.105913	
___	005B	DRDA 106D	ACCSEC-Access Security		14.38.15.105964	
___	005C	DRDA 1443	EXCSATRD-Server Attributes Reply Data		14.38.15.105986	
___	005C	DRDA 14AC	ACCSECRD-Access Security Reply Data		14.38.15.105990	
___	005B	DRDA 106E	SECCHK-Security Check		14.38.15.108115	
___	005C	DRDA 1219	SECCHKRM-Security Check Reply Message		14.38.15.108248	
___	005B	DRDA 2001	ACCRDB-Access RDB		14.38.15.110831	
___	00AA	ODBM	Trace: Message sent to ODBM		14.38.15.115530	
___	00AA	ODBM	Trace: Message received from ODBM		14.38.15.182813	

These code points include:

- DRDA code points defined by **The Open Group**
- IMS-specific code points

DDM command structure

All DDM commands, reply messages, and chained objects begin with a 6-byte data stream structure header (DSSHDR)

Part	Field	Size
DSSHDR (data stream structure header)	LL (Length of command)	2 bytes
	DDMID (identifier registered with Systems Network Architecture (SNA))	1 byte (Always 'D0' for a DDM command)
	DSSFMT (Format ID)	1 byte: <ul style="list-style-type: none"> • Bits 0-3: DSS chaining and error handling • Bits 4-7: DSS type (Request, Reply, Object, or Encrypted Object)
	RQSCRR (Correlation identifier – ties together the request, the request data, the reply, and the reply data)	2 bytes
DDM command object(s)	LL (Length)	2 bytes
	CP (hexadecimal code point – identifies the command)	2 bytes
	Data (if required by CP type)	Variable

Browse DDM header and objects using IBM Transaction Analysis Workbench or IMS Problem Investigator...

Open Database request lifecycle:

1. Start Open Database conversation

s	005B	DRDA 1041	EXCSAT-Exchange Server Attributes	14.37.06.041083
	005B	DRDA 106D	ACCSEC-Access Security	14.37.06.041127
	005C	DRDA 1443	EXCSATRD-Server Attributes Reply Data	14.37.06.041152

IBM Transaction Analysis Workbench

```

BROWSE      CEX999.MKT366A.IMSEXP.AUTODB      Record 0000082 Line 0000000
Command ==>
Form ==> + Use Form in Filter      Scroll ==> PAGE
                                          Format ==> STD
***** Top of data *****
+0004 Code... 005B DRDA 1041 EXCSAT-Exchange Server Attributes
+005D STCK... D21379C46C8FBE50 LSN... 000000000000F0
Date... 2017-02-10 Friday Time... 14.37.06.041083.894

+0000 CERE_5B_LL..... 006D CERE_5B_ZZ..... 0000 CERE_5B_RECID..... A0
+0005 CERE_5B_EVTID..... 5B CERE_5B_PFXLL..... 0014 CERE_5B_EFLAG..... 08 CERE_5B_VER#..... 24
+000A CERE_5B_TASKID..... ID of task recording event
+000A CERE_5B_COL#..... 01 CERE_5B_TKS#..... 0B
+000C CERE_5B_EVKEY..... D21379C46C088743 CERE_5B_VAR_LL..... 0006 CERE_5B_VAR_APAR... 0001
+0018 CERE_5B_VAR_CODEPOINT..... 1041

+001A DSSHDR..... DSS header for DDM command
+001A DSSlen..... +67 DDMID..... D0 FormatID... 41 DSSChain... 40 DSSType.... 01
+001E RQSCR..... 0001

+0020 Object..... 1041 EXCSAT-Exchange Server Attributes
+0020 Length..... +61 CP..... 1041

+0024 Object..... 115E EXTNAM-External Name
+0024 Length..... +7 CP..... 115E Data..... '225'

+002B Object..... 116D SRVNAM-Server Name
+002B Length..... +10 CP..... 116D Data..... 'ABCDE9

+0035 Object..... 115A SRVRLSLV-Server Product Release Level
+0035 Length..... +33 CP..... 115A Data..... 'OD-ICO

+0056 Object..... 1147 SRVCLSNM-Server Class Name
+0056 Length..... +7 CP..... 1147 Data..... 'DFS'
***** End of data **
  
```

Format the record

Zoom to learn more

Field Zoom

File Menu Help

```

BROWSE      CEX999.MKT366A.IMSEXP.AUTODB      Line 0000000
Command ==>      Scroll ==> PAGE
***** Top of data *****
+001D DSSChain... 40 Data Stream Structure (DSS) Flag: the left half
byte of FormatID

Off Unused.... 80 Unused.
On Chained... 40 1 Indicates that the DSS is chained to the next
DSS, 0 indicates no chaining.
Off Continue... 20 1 indicates to continue when errors occur, 0
indicates otherwise.
Off SameCORR... 10 1 indicates that the next DSS has the same
request correlator,
0 indicates otherwise. If bit 1 is 0, bit 3 is
also 0.
  
```

DRDA DDM command architecture reference
https://www.ibm.com/support/knowledgecenter/SSEPH2_14.1.0/com.ibm.ims14.doc.apr/ims_ddm_architecture.htm

IBM Transaction Analysis Workbench

```

BROWSE      CEX999.MKT366A.IMSEXP.AUTODB                               Record 00000082 Line 00000000
Command ==> _____ Scroll ==> PAGE
Form      ==> _____ + Use Form in Filter                       Format ==> STD
*****
***** Top of data *****
+0004 Code... 005B DRDA 1041 EXCSAT-Exchange Server Attributes
+005D STCK... D21379C46C8FBE50      LSN.... 00000000000000F0
      Date... 2017-02-10 Friday      Time... 14.37.06.041083.894

+0000 CERE_5B_LL..... 006D                CERE_5B_ZZ..... 0000                CERE_5B_RECID..... A0
+0005 CERE_5B_EVTID..... 5B CERE_5B_PFXLL..... 0014                CERE_5B_VER#..... 24
+000A CERE_5B_TASKID..... ID of task recording event
+000A CERE_5B_COL#..... 01 CERE_5B_TKS#..... 0B
+000C CERE_5B_EVKEY..... D21379C46C088743      CERE_5B_VAR_LL..... 0006                CERE_5B_VAR_APAR... 0001
+0018 CERE_5B_VAR_CODEPOINT..... 1041

+001A DSSHDR..... DSS header for DDM command
+001A DSSlen..... +67      DDMID..... D0      FormatID... 41      DSSChain... 40      DSSType.... 01
+001E RQSCRR..... 0001

+0020 Object..... 1041 EXCSAT-Exchange Server Attributes
+0020 Length..... +61      CP..... 1041

+0024 Object..... 115E EXTNAM-External Name
+0024 Length..... +7      CP..... 115E      Data..... '225'

+002B Object..... 116D SRVNAM-Server Name
+002B Length..... +10     CP..... 116D      Data..... 'ABCDE9'

+0035 Object..... 115A SRVRLSLV-Server Product Release Level
+0035 Length..... +33     CP..... 115A      Data..... 'OD-ICON 1 OD-ODBM 1,2,3,4,5,6'

+0056 Object..... 1147 SRVCLSNM-Server Class Name
+0056 Length..... +7      CP..... 1147      Data..... 'DFS'
***** End of data *****

```

Data stream structure header (DSSHDR)

EXCSAT command (X'1041')

https://www.ibm.com/support/knowledgecenter/SSEPH2_14.1.0/com.ibm.ms14.doc.apr/ims_ddm_excsat.htm

DSS command objects (length, code point (CP), data)

Open Database request lifecycle:

1. Start Open Database conversation (ODBM not available)

Code	Description	Date	2015-05-25 Monday	Time (LOCAL)
/				
003C	Prepare READ Socket			14.23.38.042689
0049	READ Socket			14.23.38.042721
005B	DRDA 1041 EXCSAT-Exchange Server Attributes			14.23.38.042731
0049	READ Socket			14.23.38.042756
005B	DRDA 106D ACCSEC-Access Security			14.23.38.042771
s 005C	DRDA 1218 MGRDEPRM-Manager Dependency Error			14.23.38.042799
004A	WRITE Socket			14.23.38.042819
0047	Session Error			14.23.38.042825
000C	Begin CLOSE Socket			14.23.38.042841
000D	End CLOSE Socket			14.23.38.042944

IMS Connect message HWSK2915E
 Potential causes:

- No ODBM available.
- All ODBMs do not have associated aliases.
- No ODBM has suitable release level of handshaking.

https://www.ibm.com/support/knowledgecenter/SSEPH2_14.1.0/com.ibm.ims14.doc.msgs/mgs/hwsk2915e.htm

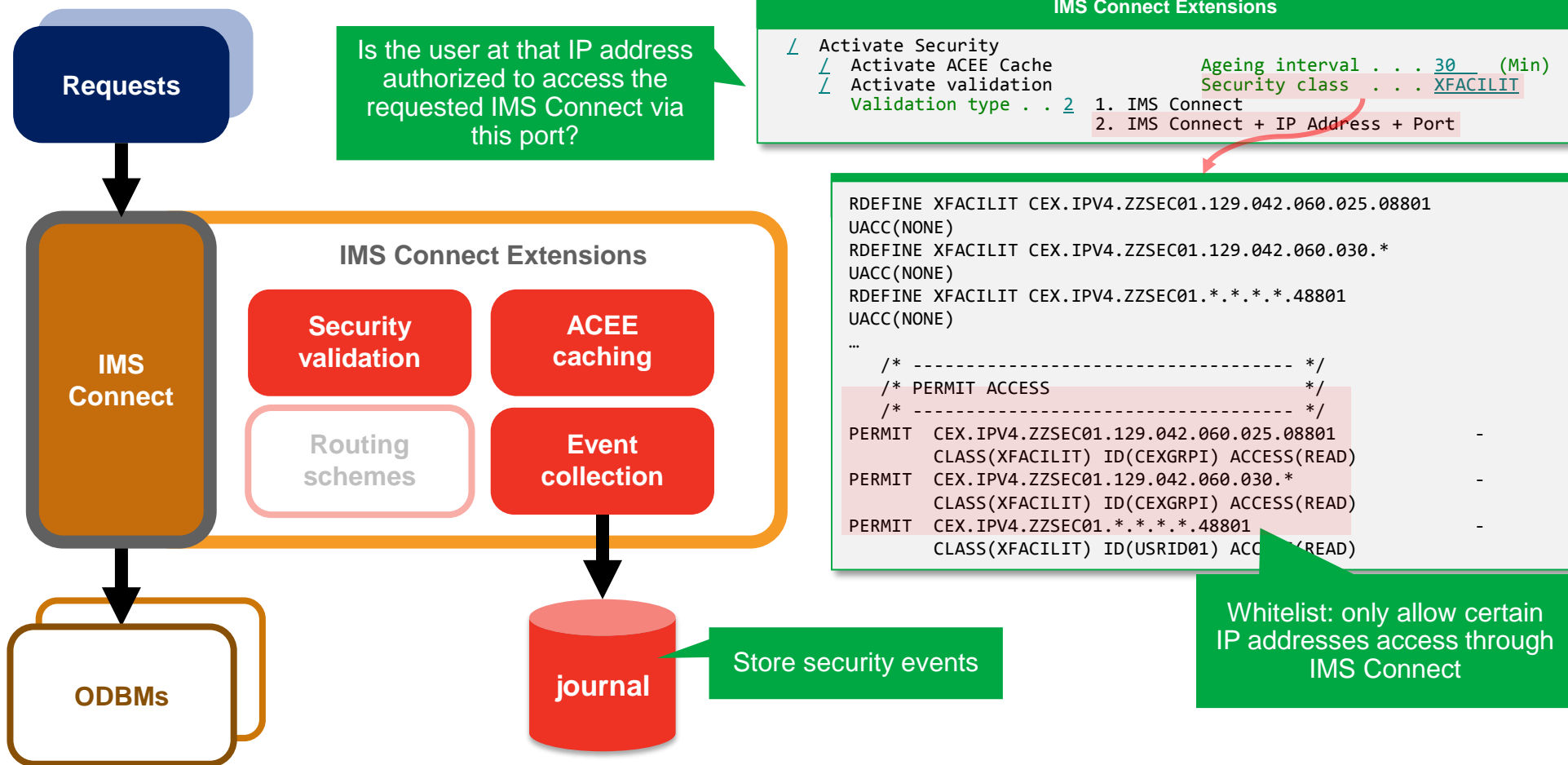
+0041	SVRCOD..... 00	Severity code
Off	INFO..... 00	Informational only
Off	WARNING.... 04	Warning
On	ERROR..... 08	Error
Off	SEVERE..... 10	Severe
Off	ACCDMG..... 20	Access damage
Off	PRMDMG..... 40	Permanent damage
Off	SESDMG..... 80	Session damage

+0020	Object.....	1218	MGRDEPRM-Manager Dependency Error
+0020	Length.....	+95	CP..... 1218
+0024	Object.....	119B	DEPERRCO-Manager Dependency Error
+0024	Length.....	+5	CP..... 119B Data ... 01
+0029	Object.....	1149	SVRCOD-Severity Code
+0029	Length.....	+6	CP..... 1149
+002D	Data.....		severity code
+002E	SVRCOD.....	08	
+002F	Object.....	1153	SRVDGN-Server Diagnostic Information
+002F	Length.....	+80	CP..... 1153
+0033	Data.....		Object data
+0000	C8E6E2D2	F2F9F1F5	C540E3C8 C5D9C540
+0010	C9E240D5	D640D6C4	C2D440C1 E5C1C9D3
+0020	C1C2D3C5	40C6D6D9	40C4C1E3 C1C2C1E2
+0030	C540C1C3	C3C5E2E2	5E40D77E F4F8F8F5
+0040	F5404040	6B40D47E	D4D9C3E5

```
*HWSK2915E THERE *
*IS NO ODBM AVAIL*
*ABLE FOR DATABAS*
*E ACCESS; P=4885*
*5 , M=MRCV *
```

'SVRCOD', DRDA, Version 4, Volume 3 Distributed Data Management (DDM) Architecture, *The Open Group*, page 865 – or simply point and shoot on SVRCOD to see the same information in IBM Transaction Analysis Workbench

Security validation



Open Database request lifecycle: 2. Security clearance (cache hit)

IBM Transaction Analysis Workbench		
—	005B	DRDA 106E SECCHK-Security Check 02.45.21.964812
—	0063	ODBM Security Exit called 02.45.21.964823
s	0040	End SAF call 02.45.21.964896
—	003F	Begin SAF call 02.45.21.964908
—	0040	End SAF call 02.45.21.965099
—	0064	ODBM Security Exit returned 02.45.21.965237
—	005C	DRDA 1219 SECCHKRM-Security Check Reply Message 02.45.21.965259
—	004A	WRITE Socket 02.45.21.965284
—	0047	Session Error 02.45.21.965292
—	000C	Begin CLOSE Socket 02.45.21.965304
—	000D	End CLOSE Socket 02.45.21.965428
—	0048	Trigger Event for CLOSE 02.45.21.965440

```

+0004 Code... 0040 End SAF call
+0041 STCK... D1B34CEF9CB60868 LSN... 000000000000AB8
Date... 2016-11-26 Saturday Time... 02.45.21.964896.525

+0000 CERE_40_LL..... 0051
+0002 CERE_40_ZZ..... 0000 CERE_40_RECID..... A0
+0005 CERE_40_EVTID.... 40 CERE_40_PFXLL..... 0014
+0008 CERE_40_EFLAG..... 00 CERE_40_VER#..... 24
+000A CERE_40_TASKID.... ID of task recording event
+000A CERE_40_COL#..... 01 CERE_40_TKS#..... 00
+000C CERE_40_EVKEY..... 'EVNT'

+0014 CERE_40_SLL..... Security Facility Information block
+0014 CERE_40_SLL..... 0024 CERE_40_BLKID..... 03
+0018 CERE_40_VVRR..... 1410
+001A CERE_40_APAR_SEQ... 0003 CERE_40_FLAG1..... 03
+001F CERE_40_DIAG..... 40 CERE_40_RQ_USERID..... 'CEX002'
+0028 CERE_40_RQ_CLASS... 0000000000000000
+0030 CERE_40_RQ_RC..... 00000000
+0034 CERE_40_RQ_REA.... 00000000

+0038 SAF_EXTENSION..... Variable extension to SAF events
+0038 CERE_40_SXT_LL.... 0009
+003A CERE_40_SXT_APAR... 0002
+003C CERE_40_SXT_CNTL1..... 00 CERE_40_SXT_SACT... C8
+003E CERE_40_SXT_FLAG1..... 03 CERE_40_SXT_DIAG... 40
+0040 CERE_40_SXT_CEX.... 00
  
```

```

+003E CERE_40_SXT_FLAG1..... 03 Flag field 1
Off CERE_40_SXT_FL1_VERIFY.... 80 Request is verify
Off CERE_40_SXT_FL1_FAUTH..... 40 Request is fastauth
Off CERE_40_SXT_FL1_DEL..... 20 Request is delete
Off CERE_40_SXT_FL1_LIST..... 10 Request is list
Off CERE_40_SXT_FL1_NEWPASS... 04 Request is new password
On CERE_40_SXT_FL1_CACHEHIT... 02 Request satisfied by Cache hit
On CERE_40_SXT_FL1_ISSBYCEX... 01 Request issued by CEX
  
```

```

+003D CERE_40_SXT_SACT... C8 Security flag providing information about
the security features that are active.

On CERE_40_SXT_SA_ACEE..... 80 IMS Connect extensions ACEE
caching feature is active.
On CERE_40_SXT_SA_IPCK..... 40 IMS Connect extensions IP address
checking feature is active.
Off CERE_40_SXT_SA_APPL..... 20 IMS Connect extensions
application checking feature is
active.
Off CERE_40_SXT_SA_CHDEV..... 10 IMS Connect extensions ACEE
caching feature has been
deactivated due to an error.
On CERE_40_SXT_SA_ENF71..... 08 IMS Connect extensions is
listening on the ENF interface
for event 71.
  
```

ACEE cache hit

User ID

Active security features

Request details

Open Database request lifecycle: 2. Security clearance (FASTAUTH)

```

IBM Transaction Analysis Workbench
--- 005B DRDA 106E SECCHK-Security Check      02.45.21.964812
--- 0063 ODBM Security Exit called           02.45.21.964823
--- 0040 End SAF call                         02.45.21.964896
--- 003F Begin SAF call                      02.45.21.964908
s 0040 End SAF call                         02.45.21.965099
--- 0064 ODBM Security Exit returned         02.45.21.965237
--- 005C DRDA 1219 SECCHKRM-Security Check Reply Message 02.45.21.965259
--- 004A WRITE Socket                       02.45.21.965284
--- 0047 Session Error                      02.45.21.965292
--- 000C Begin CLOSE Socket                 02.45.21.965304
--- 000D End CLOSE Socket                   02.45.21.965428
--- 0048 Trigger Event for CLOSE            02.45.21.965440
  
```

```

+0004 Code... 0040 End SAF call

+0014 CERE_40_SLL..... Security Facility Information block

+0014 CERE_40_SLL..... 0024 CERE_40_BLKID..... 0
3
+0018 CERE_40_VVRR..... 1410

+001A CERE_40_APAR_SEQ... 0003 CERE_40_FLAG1..... 4
1
+001F CERE_40_DIAG..... 40 CERE_40_RQ_USERID..... 'CEX002 '

+0028 CERE_40_RQ_CLASS... 'XFACILIT'

+0030 CERE_40_RQ_RC..... 00000008

+0034 CERE_40_RQ_REA..... 00000008

+0038 SAF_EXTENSION..... Variable extension
+0038 CERE_40_SXT_LL..... 0009
+003A CERE_40_SXT_APAR... 0002
+003C CERE_40_SXT_CNTL1..... 40 CERE_40_SXT_SACT... C
8
+003E CERE_40_SXT_FLAG1... 41 CERE_40_SXT_DIAG... 4
0
+0040 CERE_40_SXT_CEX... 00

+0041 IP_PROFILE..... Variable extension to SAF events
+0041 CERE_40_SXT_IPPRFLL..... 0044
+0043 CERE_40_SXT_IPA_APAR..... 0001
+0045 CERE_40_SXT_RPEYEC..... 'CEX.'
+0049 CERE_40_SXT_RPFAMILY..... 'IPV4.'
+004E CERE_40_SXT_RPVARID..... IP profile variable data

+0000 D8C1C1C3 C6C7F1C1 4BF1F7F2 4BF0F1F7 *QAACFG1A.172.017*
+0010 4BF0F6F9 4BF0F3F0 4BF0F8F8 F0F14040 *.069.030.08801 *
+0020 40404040 40404040 40404040 40404040 * *
+0030 40404040 4040 * *
  
```

FASTAUTH issued by
IMS Connect Extensions

```

+003E CERE_40_SXT_FLAG1..... 41 Flag field 1

Off CERE_40_SXT_FL1_VERIFY..... 80 Request is verify
On CERE_40_SXT_FL1_FAUTH..... 40 Request is fastauth
Off CERE_40_SXT_FL1_DEL..... 20 Request is delete
Off CERE_40_SXT_FL1_LIST..... 10 Request is list
Off CERE_40_SXT_FL1_NEWPASS... 04 Request is new password
Off CERE_40_SXT_FL1_CACHEHIT... 02 Request satisfied by Cache hit
On CERE_40_SXT_FL1_ISSBYCEX... 01 Request issued by CEX
  
```

On CERE_40_SXT_SA_ENF71..... 08 caching feature has been deactivated due to an error. IMS Connect extensions is listening on the ENF interface for event 71.

Open Database request lifecycle: 2. Security clearance (access denied)

IBM Transaction Analysis Workbench		
—	005B DRDA 106E SECCHK-Security Check	02.45.21.964812
—	0063 ODBM Security Exit called	02.45.21.964823
—	0040 End SAF call	02.45.21.964896
—	003F Begin SAF call	02.45.21.964908
—	0040 End SAF call	02.45.21.965099
—	0064 ODBM Security Exit returned	02.45.21.965237
s	005C DRDA 1219 SECCHKRM-Security Check Reply Message	02.45.21.965259
—	004A WRITE Socket	02.45.21.965284
—	0047 Session Error	02.45.21.965292
—	000C Begin CLOSE Socket	02.45.21.965304
—	000D End CLOSE Socket	02.45.21.965428
—	0048 Trigger Event for CLOSE	02.45.21.965440

```

+0020 Object..... 1219 SECCHKRM-
Security Check Reply Message
+0020 Length..... +113          CP..... 1219

On INFO_CONT..... 19 INFO Continue - require more security
context information for authentication.

+0024 Object..... 11A4 SECCHKCD-
Security Check Code
+0024 Length..... +5          CP..... 11A4

+0028 Data..... SECCHKCD -
Security Check Code SYNCATYPE
+0028 SECCHKCD... 19

+0029 Object..... 1149 SVRCOD-
Severity Code
+0029 Length..... +6          CP..... 1149

+002D Data..... severity code

+002E SVRCOD..... 10

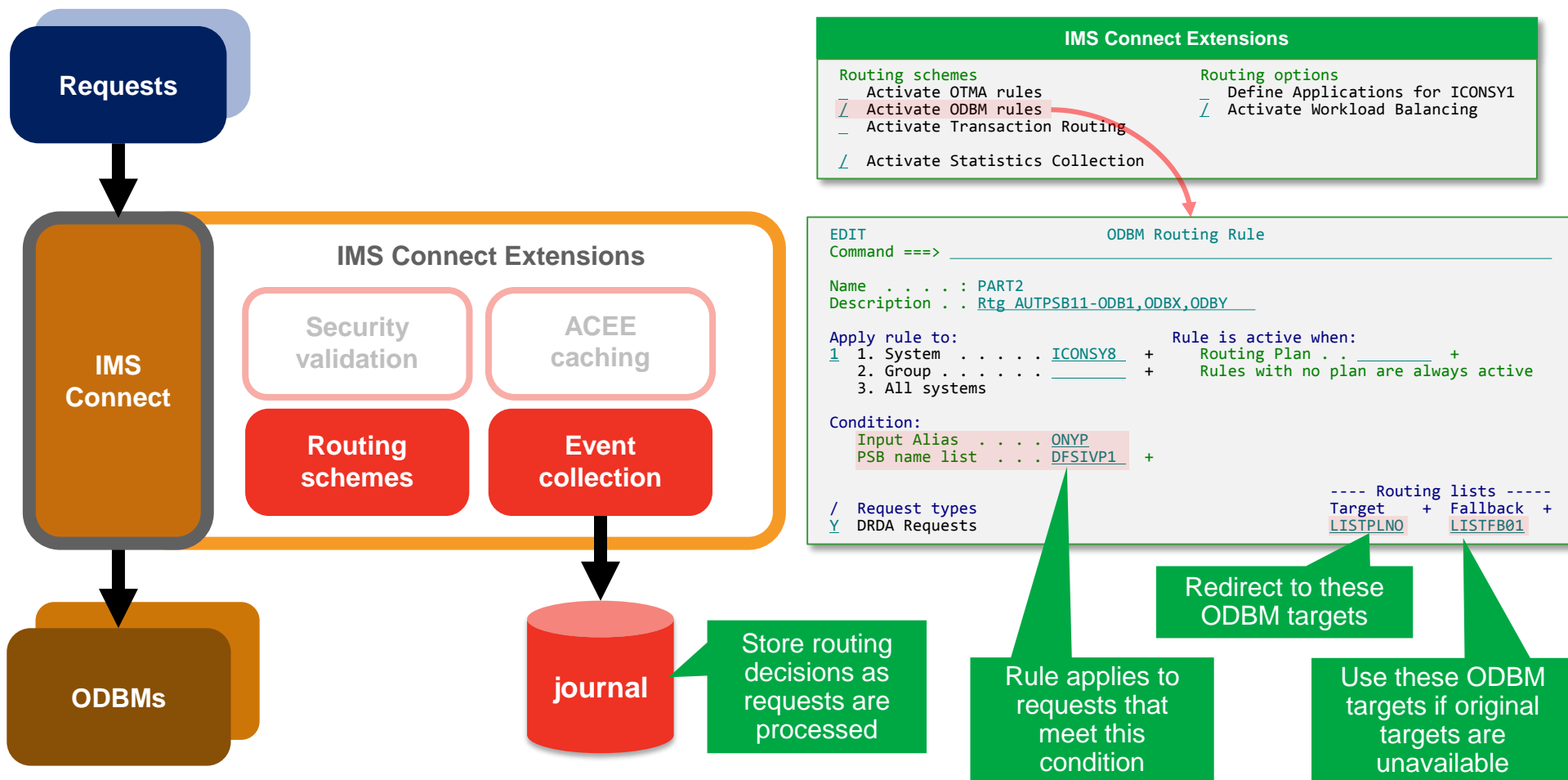
+002F Object..... 1153 SRVDGN-
Diagnostic Information
+002F Length..... +98          CP..... 1153

+0033 Data..... Object data
+0000 C8E6E2D2 F2F8F6F5 C540E2C5 C3E4D9C9 *HWSK2865E SECU
*
+0010 E3E840E5 C9D6D3C1 E3C9D6D5 5E40D97E *TY VIOLATION; R=
*
+0020 F0F1F1F6 6B40C37E D6C4C2F8 F1C3F8F4 *0116, C=ODB81C84
*
+0030 6B40E47E C3C5E7F0 F0F24040 6B40D9C1 *, U=CEX002 , RA
*
+0040 C3C6D9C3 7EF0F0F0 F86B40D9 C1C3C6D9 *CFRC=0008, RACFR
*
+0050 E27EF0F0 F0F06B40 D47ED4D9 C3E5 *S=0000, M=MRCV
  
```

IMS Connect message HWSK2865E:

- RACF verification failed for the user ID and password from a client. The user ID and password were contained in the **SECCHK** DDM command.
- Client ID = ODB91C84
- User ID = CEX002
- RACF return code = 8 (The password or password phrase is not authorized)

Connecting to an ODBM via routing



Open Database request lifecycle:

3. Establishing connection to the database (with routing)

```

BROWSE CEX240.QAAUTO.P000000.EVNTLOG(RXORP24A) Record 00000001 More: < >
Command ==> _____ Scroll ==> CSR
Forwards / Backwards . . HH.MM.SS.THMIJU Time of Day . . _____
Code Description Date 2015-04-
30 Thursday Time (LOCAL)
/ _____
_ 005B DRDA 2001 ACCRDB-
Access RDB 06.54.35.107101
_ 005D ODBM begin Allocate PSB (APSB) Program=DFSIVP1 06.54.35.107105
_ 0061 ODBM Routing Exit called 06.54.35.107112
_s 0062 ODBM Routing Exit returned 06.54.35.107172

```

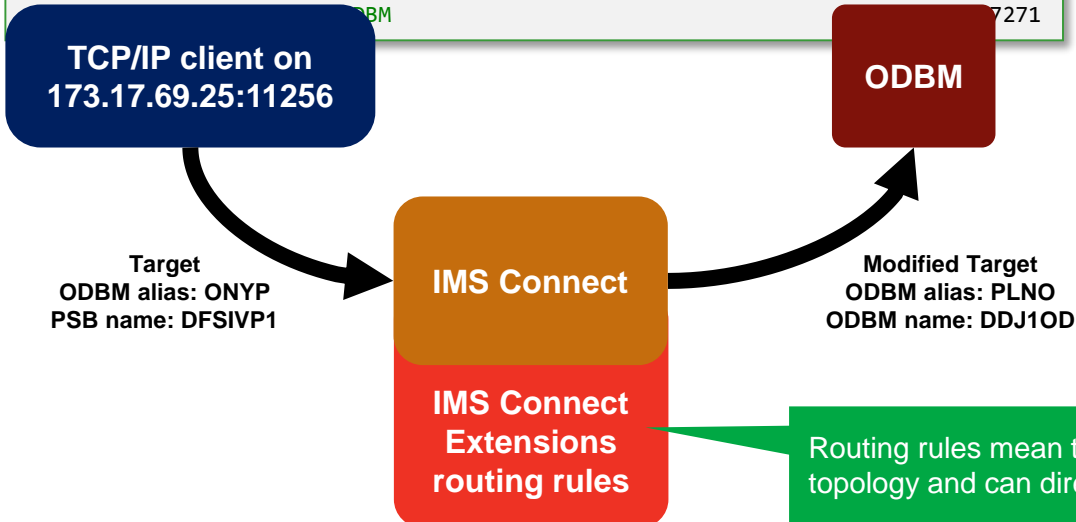
```

+0038 CERE_62_ROUT_EXT... DRDA Routing Exit parameter list
+0038 CERE_62_ROUT_EXT_SLL..... 002A
+003A CERE_62_ROUT_EXT_APAR..... 0001
+003C CERE_62_ROUT_EXT_PVER..... 00
+003E CERE_62_ROUT_EXT_FUNC..... 'ROUT'
+0042 CERE_62_ROUT_EXT_IN_ALIAS..... 'ONYP'
+0046 CERE_62_ROUT_EXT_IN_PSBNM..... 'DFSIVP1'
+004E CERE_62_ROUT_EXT_OUT_ALIAS..... 'PLNO'
+0052 CERE_62_ROUT_EXT_OUT_ODBMNM..... 'DDJ1OD'
+005A CERE_62_ROUT_EXT_RC..... 00000000
+005E CERE_62_ROUT_EXT_RSN..... 00000000

+0062 CERE_62_SVT..... DRDA Routing Exit Returned event SVT
+0062 CERE_62_SVT_OD_LL..... 003E
+0064 CERE_62_SVT_OD_APAR..... 0002
+0066 CERE_62_SVT_OD_AFLAG1..... 20
+0067 CERE_62_SVT_OD_TFLAG1..... E0
+0068 CERE_62_SVT_OD_TFLAG2..... 00
+0069 CERE_62_SVT_OD_FLAG1..... 80
+006A CERE_62_SVT_OD_RES02..... 00
+006B CERE_62_SVT_OD_RES01..... 00
+006C CERE_62_SVT_OD_CLIENTID.... 'ODB1A784'
+0074 CERE_62_SVT_OD_OUSERID.... 'CEX001'
+007C CERE_62_SVT_OD_OGROUP.....

+0084 CERE_62_SVT_OD_IPV4..... Client ID structure in IPV4 format
+0084 CERE_62_SVT_OD_FAMILY..... +2
+0086 CERE_62_SVT_OD_PORT..... +11256
CERE_62_SVT_OD_IPA..... '173.17.69.25'
+008C CERE_62_SVT_OD_RES..... 00000000

```



Routing rules mean that clients do not need to know anything about the IMS topology and can direct workload based on logical rather than physical locations.

Open Database request lifecycle: 3. Establishing connection to the database (no ODBM)

IMS Problem Investigator

Code	Description	Date	Time (LOCAL)
005B	DRDA 2001 ACCRDB-Access RDB	2015-05-25 Monday	14.36.26.386732
005D	ODBM begin Allocate PSB (APSB) Program=DFSIVP1		14.36.26.386741
0061	ODBM Routing Exit called		14.36.26.386752
0062	ODBM Routing Exit returned		14.36.26.386786
S 005C	DRDA 2211 RDBNFNRM-RDB Not Found		14.36.26.386813
0047	Session Error		14.36.26.386856
000C	Begin CLOSE Socket		14.36.26.386877
000D	End CLOSE Socket		14.36.26.386982
0048	Trigger Event for CLOSE		14.36.26.386994

The screenshot shows the 'Aliases' tab in the IMS Connect Extensions Operations Console. The table below lists the configured aliases for the system HWSOPGS1.

Status	System	Name	Alias
●	HWSOPGS1	DEA10D	ODB1
●	HWSOPGS1	DEA10D	ODBA
●	HWSOPGS1	DEA10D	ODBB
●	HWSOPGS1	DEA20D	ODB1
■	HWSOPGS1	DEA20D	ODBX
●	HWSOPGS1	DEA20D	ODBY

IMS Connect Extensions Operations Console

```

+0020 Object..... 2211 RDBNFNRM-
RDB Not Found
+0020 Length..... +167          CP..... 2211

+0024 Object..... 2110 RDBNAM-
Relational Database Name
+0024 Length..... +16          CP..... 2
+0028 Data..... 'DFSIVP1.WIBB'

+0034 Object..... 1149 SVRCOD-
Severity Code
+0034 Length..... +6          CP..... 1149
+0038 Data..... severity code
+0039 SVRCOD..... 08

+003A Object..... 1153 SRVDGN-
Server Diagnostic Information
+003A Length..... +136        CP..... 1153

+003E Data..... Object data
+0000 C8E6E2D2 F2F8F7F5 E640D5D6 40D6C4C2 *HWSK2875W NO ODB
*
+0010 D440C9E2 40C1E5C1 C9D3C1C2 D3C540C6 *M IS AVAILABLE F
*
+0020 D6D940D4 C5E2E2C1 C7C540D9 D6E4E3C9 *OR MESSAGE ROUTI
*
+0030 D5C75E40 C37ED6C4 C2F8F5F0 F0F46B40 *NG; C-035004,
*
C9D4E2C1 755660C0 C06B10B7 75546050
F5F54040
C26B40D6
6B40D97E
D4D9C3E5
    
```

**PSBNAME = DFSIVP1
Alias = WIBB**

08 = Error

**IMS Connect message HWSK2875W.
Potential causes:**

- The IMS is not associated with any ODBM known to IMS Connect (not found)
- The IMS is unavailable (inactive)

CHECK?

The requested PSB name and alias does not exist!

Open Database request lifecycle:

3. Establishing connection to the database (PSB stopped)

IMS Problem Investigator

Code	Description	Date	Time (Relative)
/		2015-04-30 Thursday	
005B	DRDA 1041 EXCSAT-Exchange Server Attributes		09.23.37.107554
0049	READ Socket		+0.000017
005B	DRDA 106D ACCSEC-Access Security		+0.000033
005C	DRDA 1443 EXCSATRD-Server Attributes Reply Data		+0.000057
005C	DRDA 14AC ACCSECRD-Access Security Reply Data		+0.000059
004A	WRITE Socket		+0.000089
0049	READ Socket		+0.034254
005B	DRDA 106E SECCHK-Security Check		+0.034307
0063	ODBM Security Exit called		+0.034317
0064	ODBM Security Exit returned		+0.034369
003F	Begin SAF call		+0.034378
0040	End SAF call		+0.035447
003F	Begin SAF call		+0.035530
0040	End SAF call		+0.035537
005C	DRDA 1219 SECCHKRM-Security Check Reply Message		+0.035549
004A	WRITE Socket		+0.035597
0049	READ Socket		+0.053287
005B	DRDA 2001 ACCRDB-Access RDB		+0.053327
005D	ODBM begin Allocate PSB (APSB) Program=DFSIVP1		+0.053337
0061	ODBM Routing Exit called		+0.053347
0062	ODBM Routing Exit returned		+0.053378
00AA	ODBM Trace: Message sent to ODBM		+0.053497
0069	Message sent to ODBM		+0.053507
00AA	ODBM Trace: Message received from ODBM		+0.056357
006A	Message received from ODBM		+0.056359
s 005C	DRDA 221A RDBAFLRM-RDB Access Failed Reply Message		+0.056407
004A	WRITE Socket		+0.056456
0048	Trigger Event for ODBMMSG		+0.056475
003C	Prepare READ Socket		+0.078201
0047	Session Error		+0.078213
000C	Begin CLOSE Socket		+0.078225
000D	End CLOSE Socket		+0.078370
0048	Trigger Event for CLOSE		+0.078382

+0020	Object.....	221A RDBAFLRM-RDB Access Failed Reply Message	
+0020	Length.....	+142 CP.....	221A
+0024	Object.....	1149 SVRCOD-Severity Code	
+0024	Length.....	+6 CP.....	1149
+0028	Data.....	severity code	
+0029	SVRCOD.....	08	
+002A	Object.....	2110 RDBNAM-Relational Database Name	
+002A	Length.....	+12 CP.....	2110
+002E	Data.....	'DFSIVP1 '	
+0036	Object.....	CC02 OUTAIBDBPCB-Concat of AIB and DBPCB data structures	
+0036	Length.....	+22 CP.....	CC02
+003A	AIB.....	aibStream	
+003A	AIBflag....	00 AIBused....	+0 AIBretc....
+0043	AIBreas....	0000030C AIBerrc....	C4C6E2C9
+004B	DBPCB.....	dbpcbStream	
+004B	DBPflag....	FF	
+004C	Object.....	1153 SRVDGN-Server Diagnostic Information	
+004C	Length.....	+98 CP.....	1153
+0050	Data.....	Object data	
+0000	C3E2D3F4 F1F0F1C5	40C19540 D6C4C2D4	*CSL4101E An ODBM*
+0010	40C4D361 C9408381	93937EC1 D7E2C240	* DL/I call=APSB *
+0020	86818993 85844B40	40C1C9C2 D9C5E3D9	*failed. AIBRETR*
+0030	D57EF0F0 F0F0F0F1	F0F840C1 C9C2D9C5	*N=00000108 AIBRE*
+0040	C1E2D57E F0F0F0F0	F0F3F0C3 40C1C9C2	*ASN=0000030C AIB*
+0050	C5D9D9E7 E37EC3F4	C3F6C5F2 C3F9	*ERRXT=C4C6E2C9 *

08 = Error

PSBNAME = DFSIVP1

X'108/X'30C'

Common Service Layer (ODBM) message CSL4101E

- Failed DL/I call made by ODBM = APSB (Allocate PSB)
- AIB return and reason codes (AIBRETR/AIBREASN) = X'108/X'30C' ('PSB is marked permanently bad')

Open Database request lifecycle:

3. Establishing connection to the database (client timeout)

IMS Problem Investigator

Code	Description	Date	Time (LOCAL)
/		2015-05-25 Monday	
005B	DRDA 1041 EXCSAT-Exchange Server Attributes	13.29.22.455027	
0049	READ Socket	13.29.22.455046	
0049	READ Socket	13.29.22.455059	
005B	DRDA 106D ACCSEC-Access Security	13.29.22.455066	
005C	DRDA 1443 EXCSATRD-Server Attributes Reply Data	13.29.22.455083	
005C	DRDA 14AC ACCSECRD-Access Security Reply Data	13.29.22.455090	
004A	WRITE Socket	13.29.22.455103	
0049	READ Socket	13.29.22.490119	
0049	READ Socket	13.29.22.490148	
005B	DRDA 106E SECCHK-Security Check	13.29.22.490151	
0063	ODBM Security Exit called	13.29.22.490189	
0064	ODBM Security Exit returned	13.29.22.490323	
003F	Begin SAF call	13.29.22.490332	
0040	End SAF call	13.29.22.493816	
003F	Begin SAF call	13.29.22.493828	
0040	End SAF call	13.29.22.493830	
005C	DRDA 1219 SECCHKRM-Security Check Reply Message	13.29.22.493838	
004A	WRITE Socket	13.29.22.493877	
0049	READ Socket	13.29.22.514918	
0049	READ Socket	13.29.22.514947	
005B	DRDA 2001 ACCRDB-Access RDB	13.29.22.514955	
005D	ODBM begin Allocate PSB (APSB) Program=DFSIVP1	13.29.22.514967	
0061	ODBM Routing Exit called	13.29.22.514981	
0062	ODBM Routing Exit returned	13.29.22.515023	
00AA	ODBM Trace: Message sent to ODBM	13.29.22.516839	
0069	Message sent to ODBM	13.29.22.516847	
0045	Time-out	13.32.42.517315	
s 005C	DRDA 1232 AGNPRMRM-Permanent Agent Error	13.32.42.517363	
004A	WRITE Socket	13.32.42.517655	
0047	Session Error	13.32.42.518456	
000C	Begin CLOSE Socket	13.32.42.518499	
000D	End CLOSE Socket	13.32.42.518602	

```

+001A DSSHDR..... DSS header for DDM command
+001A DSSlen..... +157      DDMID..... D0      FormatID... 02
+001D Type..... 02      RQSCRR..... 0001

+0020 Object..... 1232 AGNPRMRM-Permanent Agent Error
+0020 Length..... +151      CP..... 1232

+0024 Object..... 1149 SVRCOD-Severity Code
+0024 Length..... +6      CP..... 1149
+0028 Data..... severity code
+0029 SVRCOD..... 10

+002A Object..... 2110 RDBNAM-Relational Database Name
+002A Length..... +11      CP..... 2110      Data..... 'DFSIVP1'

+0035 Object..... 1153 SRVDGN-Server Diagnostic Information
+0035 Length..... +130      CP..... 1153
+0039 Data..... Object data
+0000 C8E6E2D1 F2F5F3F0 E640C140 C3D6D5D5 *HWSJ2530W A CONN*
+0010 C5C3E3C9 D6D540C6 D6D940C1 40C3D3C9 *ECTION FOR A CLI*
+0020 C5D5E340 C1C3C3C5 E2E2C9D5 C740C9D4 *ENT ACCESSING IM*
+0030 E240C4C2 40E3C9D4 C5C440D6 E4E35E40 *S DB TIMED OUT; *
+0040 C3D3C9C5 D5E37EF4 F8F8F5F5 4040406D *CLIENT=48855 *
+0050 D6C4C2F2 F1F9F8F6 5E40D6C4 C2D47EC4 *ODB21986; ODBM=D*
+0060 C5D1F1D6 C440406B 40C3D77E C1C3C3D9 *EJ10D , CP=ACCR*
+0070 C4C24040 40406B40 D47ED4C3 E5C3 *DB , M=MCVC *
  
```

PSBNAME = DFSIVP1

IMS Connect message HWSJ2530W

- Connection for client ID 'ODB21986' on port 48855 timed out before IMS Connect received a response to DDM command ACCRDB (Access RDB) from ODBM DEJ10D

Balancing Open Database workloads to reduce running costs

```

IMS Connect Extensions

Routing schemes
- Activate OTMA rules
- Activate ODBM rules
- Activate Transaction Routing
- Activate Statistics Collection

Routing options
- Define Applications for ICONSY1
- Activate Workload Balancing
  
```

Reduce costs by moving to cheaper datastores during off-peak and weekend timeslots

```

EDIT ODBM Routing Rule
Command ==>

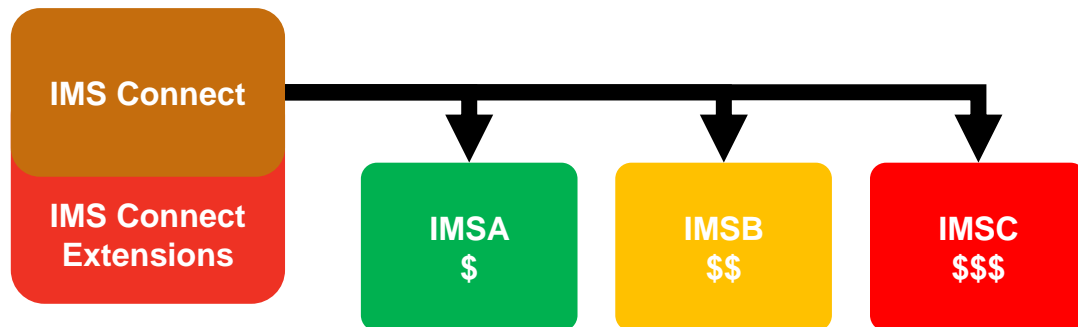
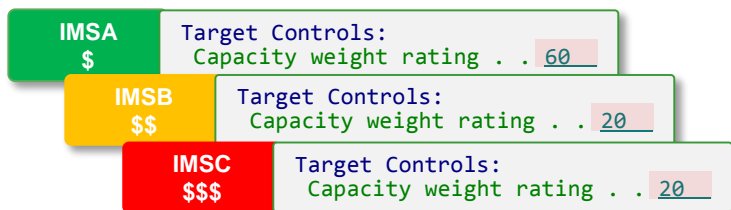
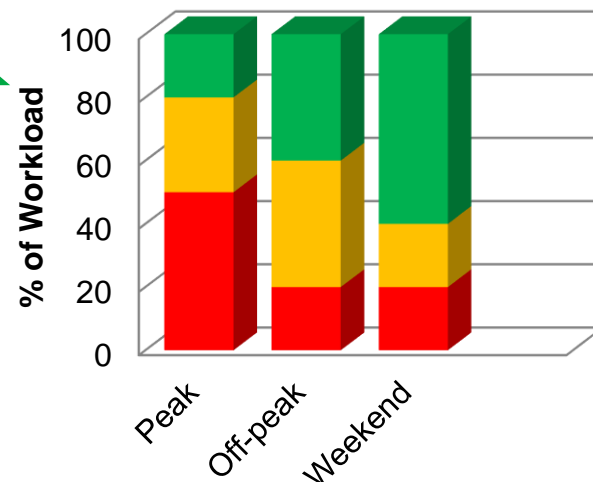
Name . . . . . : PART2
Description . . : Rtg AUTPSB11-ODB1,ODBX,ODBY

Apply rule to:
1 1. System . . . . . : ICONSY8 + Rule is active when:
   2. Group . . . . . : + Routing Plan . . : WEEKEND +
   3. All systems + Rules with no plan are always active

Condition:
Input Alias . . . . . : ONYP
PSB name list . . . : DFSIVP1 +

----- Routing lists -----
/ Request types Target + Fallback +
Y DRDA Requests LISTPLNO LISTFB01
  
```

Associate rule with a plan.
Use command to activate a plan.



Open database request lifecycle: 4. Access the database (request)

IBM Transaction Analysis Workbench

```

005B DRDA 200C OPNQRY-Open Query          12.31.15.343991
0049 READ Socket                          12.31.15.344004
0049 READ Socket                          12.31.15.344017
005B DRDA CC05 DLIFUNC-DL/I function      12.31.15.344021
0049 READ Socket                          12.31.15.344030
0049 READ Socket                          12.31.15.344043
005B DRDA CC01 INAIB-AIB data             12.31.15.344047
0049 READ Socket                          12.31.15.344059
0049 READ Socket                          12.31.15.344068
005B DRDA CC04 RTRVFLD-Field client wants to retrieve data 12.31.15.344072
0049 READ Socket                          12.31.15.344085
0049 READ Socket                          12.31.15.344107
005B DRDA CC04 RTRVFLD-Field client wants to retrieve data 12.31.15.344110
0049 READ Socket                          12.31.15.344120
0049 READ Socket                          12.31.15.344132
005B DRDA CC04 RTRVFLD-Field client wants to retrieve data 12.31.15.344136
0049 READ Socket                          12.31.15.344145
0049 READ Socket                          12.31.15.344158
005B DRDA CC04 RTRVFLD-Field client wants to retrieve data 12.31.15.344162
0049 READ Socket                          12.31.15.344171
0049 READ Socket                          12.31.15.344188
005B DRDA CC06 SSALIST-List of segment search argument 12.31.15.344188
s 00AA ODBM Trace: Message sent to ODBM 12.31.15.344235
0069 Message sent to ODBM                 12.31.15.344239
00AA ODBM Trace: Message received from ODBM 12.31.15.344868
006A Message received from ODBM          12.31.15.344873
005C DRDA 2205 OPNQRYRM-Open Query Complete 12.31.15.344937
004A WRITE Socket                         12.31.15.345014
0048 Trigger Event for ODBMMSG           12.31.15.345023

```

```

+0004 Code... 00AA ODBM Trace: Message sent to ODBM
+0111 STCK... D228BD585AB6BCA6 LSN... 00000000000013F
      Date... 2017-02-27 Monday Time... 12.31.15.344235.790
-----
+0038 Object.... 200C OPNQRY-Open Query
+0038 Length.... +38 CP..... 200C
-----
+0042 Object.... C907 PCBNAME-PCB name
+0042 Length.... +12 CP..... C907 Data..... 'AUTOLPCB'
-----
+0064 Object.... CC05 DLIFUNC-DL/I function
+0064 Length.... +12 CP..... CC05 Data..... 'RETRIEVE'
-----
+0076 Object.... CC01 INAIB-AIB data
+0076 Length.... +24 CP..... CC01
-----
+007A Object.... C901 AIBRSNM1-PCB Name
+007A Length.... +12 CP..... C901 Data..... 'AUTOLPCB'
-----
+0094 Object.... CC04 RTRVFLD-Field client wants to retrieve data from
+0094 Length.... +12 CP..... CC04
+0098 Data..... 0000003F00000018
      ... (data is truncated)
-----
+00DC Object.... CC06 SSALIST-List of segment search argument
+00DC Length.... +53 CP..... CC06
-----
+00E0 Object.... C905 SSACOUNT-Number of segment search arguments
+00E0 Length.... +6 CP..... C905 Data..... 0003
-----
+00E6 Object.... C906 SSA-Segment search argument
+00E6 Length.... +15 CP..... C906
+00EA Data..... 'DEALER *D '
-----
+00F5 Object.... C906 SSA-Segment search argument
+00F5 Length.... +15 CP..... C906
+00F9 Data..... 'MODEL *D '
-----
+0104 Object.... C906 SSA-Segment search argument
+0104 Length.... +13 CP..... C906
+0108 Data..... 'SALES '

```

Record offset: 0000003F
Field Length: 00000018

IMS Connect Extensions 00AA "ODBM Trace event" encapsulates all the important information being sent to ODBM using IMS-specific code points https://www.ibm.com/support/knowledgecenter/en/SSEPH2_14.1.0/com.ibm.ims14.doc.apr/ims_ddm_architecture.htm

Open database request lifecycle: 4. Access the database (response)

IBM Transaction Analysis Workbench

005B	DRDA	200C	OPNQRY-Open Query	12.31.15.343991
0049	READ	Socket		12.31.15.344004
0049	READ	Socket		12.31.15.344017
005B	DRDA	CC05	DLIFUNC-DL/I function	12.31.15.344021
0049	READ	Socket		12.31.15.344030
0049	READ	Socket		12.31.15.344043
005B	DRDA	CC01	INAIB-AIB data	12.31.15.344047
0049	READ	Socket		12.31.15.344059
0049	READ	Socket		12.31.15.344068
005B	DRDA	CC04	RTRVFLD-Field client wants to retrieve data	12.31.15.344072
0049	READ	Socket		12.31.15.344085
0049	READ	Socket		12.31.15.344107
005B	DRDA	CC04	RTRVFLD-Field client wants to retrieve data	12.31.15.344110
0049	READ	Socket		12.31.15.344120
0049	READ	Socket		12.31.15.344132
005B	DRDA	CC04	RTRVFLD-Field client wants to retrieve data	12.31.15.344136
0049	READ	Socket		12.31.15.344145
0049	READ	Socket		12.31.15.344158
005B	DRDA	CC04	RTRVFLD-Field client wants to retrieve data	12.31.15.344162
0049	READ	Socket		12.31.15.344171
0049	READ	Socket		12.31.15.344188
005B	DRDA	CC06	SSALIST-List of segment search argument	12.31.15.344188
00AA	ODBM	Trace:	Message sent to ODBM	12.31.15.344235
0069	Message	sent	to ODBM	12.31.15.344239
00AA	ODBM	Trace:	Message received from ODBM	12.31.15.344868
006A	Message	received	from ODBM	12.31.15.344873
005C	DRDA	2205	OPNQRYRM-Open Query Complete	12.31.15.344937
004A	WRITE	Socket		12.31.15.345014
0048	Trigger	Event	for ODBMMSG	12.31.15.345023

+0004	Code...	00AA	ODBM Trace: Message received from ODBM	
+0145	STCK...	D228BD585ADE4804	LSN....	000000000000141
	Date...	2017-02-27	Monday	Time... 12.31.15.344868.500
<hr/>				
+0038	Object....	2205	OPNQRYRM-Open Query Complete	
+0038	Length....	+10	CP.....	2205
<hr/>				
+003C	Object....	1149	SVRCOD-Severity Code	
+003C	Length....	+6	CP.....	1149
+0040	Data.....		severity code	
+0041	SVRCOD....	00		
<hr/>				
+0064	Object....	241B	QRYDTA-Query Answer Set Data	
+0064	Length....	+157	CP.....	241B
+0068	AIB.....	aibStream		
+0068	AIBflag....	00	AIBused....	+229 AIBretc.... 00000000
+0071	AIBreas....	00000000	AIBerrc....	00000000
+0079	DBPCB.....	dbpcbStream		
+0079	DBPflag....	00	DBflag....	00 DBname.... 'AUTOLDB'
+0083	SL.....	'03'	SC.....	' ' Segment.... 'SALES'
+008F	KFBAflag..	00	KFBAlen....	+32
+0094	KFBA.....	'1234FORD	FOCUS	20021111'
+00B4	IOarea....	IO area		
+0000	F1F2F3F4	E2C1D540	D1D6E2C5	40C6D6D9 *1234SAN JOSE FOR*
+0010	C4404040	40404040	40404040	40404040 *D *
+0020	4040C6D6	D9C44040	40404040	C6D6C3E4 * FORD FOCU*
+0030	E2404040	4040F2F0	F0F2F1F1	F1F1D3C9 *S 20021111LI*
+0040	C7C8E340	C2D3E4C5	F1F6F0F0	F0 *GHT BLUE16000 *
<hr/>				
+0107	Object....	220B	ENDQRYRM-End of Query	
+0107	Length....	+62	CP.....	220B
<hr/>				
+010B	Object....	1149	SVRCOD-Severity Code	
+010B	Length....	+6	CP.....	1149
+010F	Data.....		severity code	
+0110	SVRCOD....	04		
<hr/>				
+0111	Object....	CC02	OUTAIBDBPCB-Concat of AIB and DBPCB data structures	
+0111	Length....	+52	CP.....	CC02
+0115	AIB.....	aibStream		
+0115	AIBflag....	00	AIBused....	+61 AIBretc.... 00000900
+011E	AIBreas....	00000000	AIBerrc....	00000000
+0126	DBPCB.....	dbpcbStream		
+0126	DBPflag....	00	DBflag....	00 DBname.... 'AUTOLDB'
+0130	SL.....	'01'	SC.....	'GE' Segment.... 'DEALER'
+013C	KFBAflag..	00	KFBAlen....	+4 KFBA..... '9999'

Warning

Status code: Segment not found

Open Database request lifecycle

5. Commit all work (or rollback)

Code	Description	Date 2015-04-30 Thursday	Time (LOCAL)
/			
005C	DRDA 2205 OPNQRYM-Open Query Complete		09.24.47.087409
005B	DRDA 200A EXCSQLIMM-Execute Immediate SQL Statement		09.24.47.133944
005B	DRDA CC05 DLIFUNC-DL/I function		09.24.47.133973
005B	DRDA CC06 SSALIST-List of segment search argument		09.24.47.134007
005C	DRDA 2218 RDBUPDRM-RDB Update Reply Message		09.24.47.134640
005B	DRDA 200E RDBCMM-RDB Commit Unit of Work		09.24.47.150272
005C	DRDA 220C ENDUOWRM-End Unit of Work Condition		09.24.47.156094
005B	DRDA 200C OPNQRY-Open Query		09.24.47.208804
005B	DRDA CC05 DLIFUNC-DL/I function		09.24.47.208836
005B	DRDA CC01 INAIB-AIB data		09.24.47.208864
...			
005B	DRDA CC04 RTRVFLD-Field client wants to retrieve data		09.24.47.347561
005B	DRDA CC04 RTRVFLD-Field client wants to retrieve data		09.24.47.347590
005B	DRDA CC06 SSALIST-List of segment search argument		09.24.47.347621
005C	DRDA 2205 OPNQRYM-Open Query Complete		09.24.47.348082
005B	DRDA 200F RDBRLLBCK-RDB Rollback Unit of Work		09.24.47.361557
005C	DRDA 220C ENDUOWRM-End Unit of Work Condition		09.24.47.365603
005B	DRDA C801 DEALLOCDB-Deallocate PSB		09.24.47.383073
005C	DRDA CA01 DEALLOCDBRM-Name of deallocated PSB		09.24.47.384012

DRDA requests to Commit

DRDA requests to Rollback

DRDA responses indicate success or failure

Summary

- Understanding Open Database standards vital to diagnosing problems when they occur
- Expertise required when tracing client requests
 - The client application programmer may only know SQL, but the tools provide insights into how that SQL is translated into DRDA requests and IMS calls
- Tooling can also help you with:
 - Instrumentation and problem diagnosis
 - Security
 - Workload distribution and balancing
 - Automation

IMS and Open Database: further reading

- DRDA DDM command architecture reference (IMS)
https://www.ibm.com/support/knowledgecenter/SSEPH2_14.1.0/com.ibm.ims14.doc.apr/ims_ddm_architecture.htm
- DRDA, Version 4, Volume 3: Distributed Data Management (DDM) Architecture
<http://www.opengroup.org/standards/ea>
- Capturing DRDA/DDM events for later analysis
<http://www.ibm.com/support/knowledgecenter/SSAVHV/welcome>
- Browsing and analyzing logs containing DRDA/DDM events
https://www.ibm.com/support/knowledgecenter/en/SSKKZM_1.3.0/fuwutsk_browsing_logs_ad_hoc.htm

Comments & Questions?

IBM **THANK**
YOU