**ICP Billing Workflow**

**How to tackle BRM Exception**

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# The exceptions

Normally exception can only detected during EAI-BRM process. This is due to BRM is the last point in the process flow.

Exceptions can be occurring in several ways.

1. Technical issue
2. Data inconsistency
3. Missing compulsory value on FList

Firstly, try to understand Oracle BRM architecture in order to understand the whole exception process in ICP Billing.

Oracle BRM standard architecture as below

1. Connection Manager (CM)
   1. The Oracle BRM connection
   2. CMs provide an interface between clients and the rest of the system. All client applications connect to the BRM system through a CM.
2. Facilities Module (FM) – Under Connection Manager(CM) tier
   1. The Oracle BRM opcode type
   2. Each FM is dynamically linked to a CM when the CM starts. You can link optional or custom FMs to any CM.
3. External Module (EM) – Under Connection Manager(CM) tier
   1. The Oracle BRM opcode type
   2. External Module (EM) is similar to an FM; it is a set of opcode that perform BRM functions. However, it is not linked to a CM in the same way that an FM is. Instead, it runs as a separate process that you must start and stop.
4. Data Manager (DM)
   1. The Oracle database connection between BRM and database
   2. DM translates requests from CMs into a language that the database can understand. For the BRM database, the language is SQL.

Below is the standard architecture of Oracle BRM.

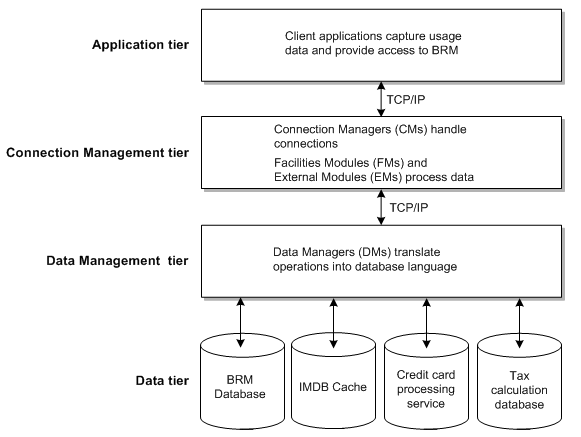


Diagram 1.0

## What is opcode?

Opcode is under FM tier and normally in Oracle BRM it’s called FM Opcode. Opcode is a process name that use for certain request. Example to add a service into customer account, opcode PCM\_OP\_CUST\_MODIFY\_CUSTOMER will be use.

## What is Flist?

Every opcode has the set of data to be filled in. It is either compulsory or not. The set of data under certain opcode is called Flist. Example for opcode PCM\_OP\_CUST\_MODIFY\_CUSTOMER, the compulsory data can be account poid, service to be add, login etc

# ICP Billing Process

ICP Siebel

OSM

EAI

ICP BRM

Diagram 1.1

Ordering process

* User create an order on ICP Siebel
* Siebel will send the data thru OSM
* OSM will send to EAI
* EAI will send the request to BRM and store product/service/discount detail in their XREF (add product/service) mapping or check EAI table before sent any product/service/discount (cancel product/service) to BRM.
* BRM will accept any request from EAI. In BRM, the logic checking is as below
  1. BRM will check the opcode send by EAI
  2. BRM will check all the compulsory value in the Flist for the opcode
  3. BRM will execute the request
* In example for purchase a product request (if all above process is success), BRM will return purchase\_product\_poid to EAI. EAI will store the poid in the XREF table mapping. Then the billing cycle would be start at that time in BRM (if account/service already active).
  1. This process applies to all of the request such as create account, create service, terminate account, terminate service etc.
* EAI will return back to the OSM/Siebel that the process is success.
* For simple straight forward flow please refer Diagram 1.1

In ICP Billing structure, BRM front end covered by web service, then the Connection Manager (CM). For opcode reading under Connection Manager (CM), Facilities Module (FM) will be use. For database interaction Data Manager (DM) will be use.

Below are the steps in ICP Billing.

1. BRM receive request thru BRM Web Service
2. BRM Facilities Module(FM) will check the opcode sent by EAI
3. BRM Facilities Module(FM) will check the Flist structure, then check the compulsory value in the Flist structure
4. BRM will do process to interact with Database Manger (DM).

As from below standard process, most common exception in ICP Billing can occur in step 2, 3 and step 4. Please refer Diagram 1.2

EAI

Step 1

Connection Manager (CM)

Oracle BRM

Step 2/3

Step 4

Data Manager (DM)

BRM Database

Diagram 1.2

# 

# Type of exceptions

In Oracle BRM, the exception can be divided into 3 tiers

1. Error location
   1. The error that start with keyword ***PIN\_ERRLOC\_***
   2. Due to Connection Manager(CM) , Data Manager (DM) , Facilities Module (FM), Java Server Framework issue etc
2. Error class
   1. The error that start with keyword ***PIN\_ERRCLASS\_***
   2. Due to system failed to commit during process, custom application passing invalid data to BRM etc
3. Error code
   1. The error that start with keyword ***PIN\_ERR\_***
   2. Due to data inconsistency , wrong Flist structure, missing value in database etc

Every exception BRM will show all of error types above. But the return value get by EAI is Error Code. So in this documentation, we will discuss about Error Code.

## Exception example

As example in ICP Billing, if customer wants to add service for particular account, BRM will receive request from EAI. BRM will check the opcode and compulsory value. BRM will send the data to database to commit.

1. If the compulsory value such as service login empty in the Flist, FM will return the exception PIN\_ERROR\_BAD\_VALUE.
2. If the compulsory Flist structure such as account poid missing from the Flist array, PIN\_ERR\_NOT\_FOUND will be throw
3. If FM check all the data is there and then it will send to DM. But suddenly DM checks the login already in BRM. Here DM will told FM the login already been use in BRM. Here exception PIN\_ERROR\_BAD\_VALUE - ‘Duplicate login’ will be throw.

Please note that every request sent that not meet BRM requirement on opcode type for particular Flist array structure, Flist compulsory field and missing value in database will return an exception too.

# ICP Billing Exceptions

In this documentation, it will explain on Error Code that BRM and technical issue (CM or Web Service down).

There are also suggestion so that we can reduce the exception or minimal the response time to get the process order complete faster

### ERROR\_BAD\_VALUE

|  |  |
| --- | --- |
| **Opcode Received** | PCM\_OP\_CUST\_MODIFY\_CUSTOMER |
| **BRM exception remarks** | Duplicate login value |
| **Workaround** | * Ask Siebel team the login existence in Siebel. If the login not available in Siebel, terminate the login. Ask Siebel to re-trigger then |

|  |  |
| --- | --- |
| **Opcode Received** | PCM\_OP\_CUST\_MODIFY\_CUSTOMER |
| **BRM exception remarks** | Cannot add services for a closed account |
| **Suggestion** | * Ask Siebel L2 team the BA status in Siebel. If active, activate back the account else ask Siebel L2 team to do recovery |

|  |  |
| --- | --- |
| **Opcode Received** | PCM\_OP\_CUST\_MODIFY\_CUSTOMER |
| **BRM exception remarks** | Cost Center not found in BRM |
| **Suggestion** | Forward IRIS, this issue to Siebel L2 team. They will patch the right cost center and re-trigger |

|  |  |
| --- | --- |
| **Opcode Received** | PCM\_OP\_CUST\_MODIFY\_PROFILE |
| **BRM exception remarks** | Cost Center not found in BRM |
| **Suggestion** | Forward IRIS, this issue to Siebel L2 team. They will patch the right cost center and re-trigger |

### ERROR\_NOT\_FOUND

|  |  |
| --- | --- |
| **Opcode Received** | PCM\_OP\_SUBSCRIPTION\_PURCHASE\_DEAL |
| **BRM exception remarks** | Due to service poid sent not exist in BRM |
| **Suggestion** | * Forward issue to EAI team. |

|  |  |
| --- | --- |
| **Opcode Received** | PCM\_OP\_READ\_OBJ |
| **BRM exception remarks** | Due to poid sent not exist in BRM |
| **Suggestion** | * Forward issue to EAI team. |

|  |  |
| --- | --- |
| **Opcode Received** | 30001/30002 |
| **BRM exception remarks** | For now Means Product already cancel. EAI sent to cancel. BRM will return error.  Before this Product already cancel. EAI sent to cancel. BRM return success |
| **Suggestion** | * Azhar has proposed EAI to check status before terminate. Target deploy on May 2016. This kind of exception should be no longer available after that * If still happen, please forward to EAI team with poid detail. Example :   ***[EAI] Purchased Poid = '0.0.0.1 /purchased\_product 533183384443 0'+Product/Discount Type = '0.0.0.1 /product 117589' already cancelled in BRM*** |

### ERR\_NULL\_PTR

|  |  |
| --- | --- |
| **Opcode Received** | 30001/30002 |
| **BRM exception remarks** | Product mismatch |
| **Suggestion** | BRM to do recovery. Pass to Siebel/EAI the template. |

|  |  |
| --- | --- |
| **Opcode Received** | Any opcode |
| **BRM exception remarks** | Account Object sent is BLANK |
| **Suggestion** | EAI need to check the account poid before submit the opcode due to it is compulsory field |

|  |  |
| --- | --- |
| **Opcode Received** | PCM\_OP\_READ\_OBJ |
| **BRM exception remarks** | Wrong value format - sent by EAI <flist><POID>256298999</POID></flist> |
| **Suggestion** | EAI need to check the poid structure before submit the opcode |

|  |  |
| --- | --- |
| **Opcode Received** | PCM\_OP\_SEARCH |
| **BRM exception remarks** | Null value for field PIN\_FLD\_SERVICE\_OBJ/<SERVICE\_OBJ/> sent by EAI |
| **Suggestion** | EAI check compulsory field in Flist before proceed |

### PIN\_ERR\_STORAGE

|  |  |
| --- | --- |
| **Opcode Received** | PCM\_OP\_CUST\_UPDATE\_SERVICES |
| **BRM exception remarks** | Duplicate login value in BRM alias\_t table |
| **Suggestion** | BRM to delete one row of older login from alias\_t table  Siebel L2 to re-trigger |

|  |  |
| --- | --- |
| **Opcode Received** | PCM\_OP\_CUST\_COMMIT\_CUSTOMER |
| **BRM exception remarks** | Field name in the FList is more than 90 char. Max in BRM database is 90 char |
| **Suggestion** | Ask L2 to get user and change to shorter name |

### ERR\_BAD\_ARG

|  |  |
| --- | --- |
| **Opcode Received** | 30002/30001/Any opcode trigger event |
| **BRM exception remarks** | * Data inconsistency |
| **Suggestion** | * Bypass, BRM do recovery and pass template to EAI/L2 |

### ERR\_BAD\_TYPE

|  |  |
| --- | --- |
| **Opcode Received** | PCM\_OP\_SUBSCRIPTION\_TRANSFER\_SUBSCRIPTION |
| **BRM exception remarks** | * Data inconsistency |
| **Suggestion** | * BRM to testnap, check cm.pinlog which filed need to be fixed in group sharing table |

### ERR\_STREAM\_EOF

|  |  |
| --- | --- |
| **Opcode Received** | PCM\_OP\_CUST\_COMMIT\_CUSTOMER |
| **BRM exception remarks** | Missing cost center |
| **Suggestion** | Ask L2 get the right cost center mapping  Then re-trigger |

## Not BRM Exception

Below exception is totally not BRM exception. But as far we know, user not aware about this. So every order that not complete/processing at Siebel will be redirect to ICP Billing exception team.

### EAI XREF issue

|  |  |
| --- | --- |
| **Event Name** | evBRMUpdateServiceView |
| **EAI exception remarks** | Example return value: Service POID does not exists in EAI XREF! Unable to update service [Asset Id: 1-X2EKAF] [Service POID: BLANK] |
| **Suggestion** | * Forward issue to EAI team * Remarks - [EAI] Unsync Asset Integration ID between SIEBEL - EAI |

### java.lang.NullPointerException issue

|  |  |
| --- | --- |
| **Event Name** | evBRMUpdateServiceView |
| **EAI exception remarks** | Example return value : java.lang.NullPointerException:  null |
| **Suggestion** | * Due to EAI cannot find value during query for BillingActivationDate where the BillingActivationDate value greater than ACTIVE\_DATE * Need our L1 to aware that this is not a BRM exception * Please redirect to EAI team for this kind of exception |

### Incorrect result size: expected 1, actual 2

|  |  |
| --- | --- |
| **Event Name** | evBRMUpdateServiceView |
| **EAI exception remarks** | Unexpected result from BRM |
| **Suggestion** | * Please redirect to EAI team for this kind of exception |

## Technical issue (Connection and server)

This section is more on Connection Manager (CM) down issue, Web Service down issue and Database down issue. All below exception can be just re-trigger

### ERROR\_NAP\_CONNECT\_FAILED

### ERR\_STREAM\_EOF

### ERR\_TIMEOUT

### ERR\_IM\_CONNECT\_FAILED

### ERR\_TRANS\_ALREADY\_OPEN

### ERR\_DEADLOCK

### ERR\_TRANS\_LOST

|  |  |
| --- | --- |
| **Opcode Received** | Any opcode |
| **BRM exception remarks** | Due to CM down or server cannot be reach. Normally happen to large account |
| **Suggestion** | Need OSM/L2 to re-trigger - the transaction not yet commit |

### 

### TIUP termination/or any bulk order

BRM Exception spike normally due to batch program. If this happen, hold until the entire example: TIUP process end. Then may ask Siebel L2 to re-trigger

L2 may refer below sql to be query at OSM database to get the entire order id that hit BRM Exception

### SQL for Siebel-L2

SELECT OOF2.ORDER\_SEQ\_ID AS "OSM ID"

,ooh.reference\_number AS "SIEBEL ID"

,oot.order\_type\_description AS "ORDER TYPE"

,OT2.TASK\_MNEMONIC AS "TASK"

,to\_char(oof2.date\_pos\_started , 'dd-Mon-yyyy hh24:mi:ss') AS "TIMESTAMP"

,replace(replace(TEMP.ooi\_node\_value\_text,chr(13),''),chr(10), '') as "ERROR\_MESSAGE"

*--,TEMP.ooi\_node\_value\_text "ERROR MESSAGE"*

FROM osm.om\_order\_flow oof2

INNER JOIN OSM.OM\_TASK OT2 ON (OOF2.TASK\_ID = OT2.TASK\_ID)

INNER JOIN osm.om\_state os ON (os.STATE\_ID = oof2.STATE\_ID)

INNER JOIN osm.om\_cartridge oc2 ON (oc2.cartridge\_id = oof2.cartridge\_id)

INNER JOIN osm.om\_order\_header ooh ON (oof2.order\_seq\_id = ooh.order\_seq\_id)

INNER JOIN osm.om\_ospolicy\_state oos ON (ooh.ord\_state\_id = oos.ID)

INNER JOIN osm.om\_process op ON (OP.PROCESS\_ID = oof2.PROCESS\_ID)

INNER JOIN osm.om\_order\_type oot ON (ooh.order\_type\_id = oot.order\_type\_id)

LEFT JOIN (

SELECT ooi.order\_seq\_id AS ooi\_order\_seq\_id

,oof.order\_seq\_id AS oof\_order\_seq\_id

,ooi.node\_value\_text AS ooi\_node\_value\_text

,oof.state\_id AS oof\_state\_id

,oof.hist\_seq\_id AS oof\_hist\_seq\_id

FROM osm.om\_order\_instance ooi

JOIN osm.om\_order\_flow oof ON (ooi.order\_seq\_id = oof.order\_seq\_id)

JOIN osm.om\_order\_data\_dictionary oodd ON (ooi.data\_dictionary\_id = oodd.data\_dictionary\_id)

WHERE oodd.data\_dictionary\_mnemonic = 'response\_error\_message'

AND oof.task\_type = 'M'

AND ooi.hist\_seq\_id = CASE

WHEN oof.state\_id = '1'

THEN (

SELECT a.hist\_seq\_id\_from

FROM osm.om\_hist$flow a

JOIN osm.om\_hist$flow b ON (a.hist\_seq\_id = b.hist\_seq\_id\_from)

WHERE b.hist\_seq\_id = oof.hist\_seq\_id

AND b.order\_seq\_id = ooi.order\_seq\_id

AND a.order\_seq\_id = ooi.order\_seq\_id

)

ELSE (

SELECT a1.hist\_seq\_id

FROM osm.om\_hist$flow a1

JOIN osm.om\_hist$flow b1 ON (a1.hist\_seq\_id = b1.hist\_seq\_id\_from)

JOIN osm.om\_hist$flow c1 ON (b1.hist\_seq\_id = c1.hist\_seq\_id\_from)

JOIN osm.om\_hist$flow d1 ON (c1.hist\_seq\_id = d1.hist\_seq\_id\_from)

WHERE a1.order\_seq\_id = ooi.order\_seq\_id

AND b1.order\_seq\_id = ooi.order\_seq\_id

AND c1.order\_seq\_id = ooi.order\_seq\_id

AND d1.order\_seq\_id = ooi.order\_seq\_id

AND d1.hist\_seq\_id = oof.hist\_seq\_id

)

END

) TEMP ON (

oof2.order\_seq\_id = TEMP.oof\_order\_seq\_id

AND oof2.hist\_seq\_id = TEMP.oof\_hist\_seq\_id

)

WHERE oos.mnemonic = 'in\_progress'

AND OC2.cartridge\_id = ot2.cartridge\_id

AND oc2.cartridge\_id = ooh.cartridge\_id

AND oc2.cartridge\_id = op.cartridge\_id

AND OOF2.TASK\_TYPE = 'M'

AND OT2.TASK\_MNEMONIC LIKE 'Exception%BRM%'

# Tools for checking BRM Exception – For BRM team

All Accenture inherited documentation can be found on the shared folder.

## 

## Database detail - for Siebel/OSM/EAI/BRM

### Siebel database

ICP\_READ

ICP\_READ123

NSBLPRD =

(DESCRIPTION =

(ADDRESS\_LIST =

(ADDRESS = (PROTOCOL = TCP)(HOST = 10.41.33.92)(PORT = 1521))

)

(CONNECT\_DATA =

(SERVICE\_NAME = NSBLPRD)

)

)

### OSM database

ICP\_READ

ICP\_READ123

NOSMPRD =

(DESCRIPTION =

(ADDRESS\_LIST =

(ADDRESS = (PROTOCOL = TCP)(HOST = 10.41.33.140)(PORT = 1521))

)

(CONNECT\_DATA =

(SERVICE\_NAME = NOSMPRD)

)

)

### BRM database

Use your own username password

NBRMPRD =

(DESCRIPTION =

(ADDRESS\_LIST =

(ADDRESS = (PROTOCOL = TCP)(HOST = 10.41.68.94)(PORT = 1521))

)

(CONNECT\_DATA =

(SERVICE\_NAME = NBRMPRD)

)

)

### EAI Database

Username: EAI\_READ

Password : EAI\_READ

NEAIPRD =

(DESCRIPTION =

(ADDRESS\_LIST =

(ADDRESS = (PROTOCOL = TCP)(HOST = 10.41.33.110)(PORT = 1521))

)

(CONNECT\_DATA =

(SERVICE\_NAME = NEAIPRD)

)

)

## 

## BRM Exception team

All Accenture inherited documentation can be found on the shared folder.

1) icarePrime web support tools

http://10.41.86.34:7281/iCareEAI\_Web\_Support\_Tool\_war/index.jsp

Please liase with aswad/EAI team to get username/password for this

2) XML to FList java coding

* This program I develop by myself.
* I’ll already email my team member the coding and jar file

### Opcode to be use after getting advice from Siebel L2

0 PIN\_FLD\_BILLINFO\_OBJ POID [0] 0.0.0.1 /billinfo 296903909748081805 0

0 PIN\_FLD\_POID POID [0] 0.0.0.1 /service/telephony 254345691369 0

0 PIN\_FLD\_TO\_OBJ POID [0] 0.0.0.1 /account 585876475661 0

0 PIN\_FLD\_FROM\_OBJ POID [0] 0.0.0.1 /account 254047299051 0

0 PIN\_FLD\_PROGRAM\_NAME STR [0] "TRANSFER OWNER EAI|585876475661|SR|254047299051"

XXX

xop 40007 0 1

0 PIN\_FLD\_POID POID [0] 0.0.0.1 /account 229514339207 0

0 PIN\_FLD\_PROGRAM\_NAME STR [0] "EAI"

0 PIN\_FLD\_END\_T TSTAMP [0] (1458527007) 21/03/2016 10:23:27

0 PIN\_FLD\_SERVICES ARRAY [0] allocated 4, used 4

1 PIN\_FLD\_STATUS\_FLAGS INT [0] 4

1 PIN\_FLD\_POID POID [0] 0.0.0.1 /service/telephony 229514339442 0

1 PIN\_FLD\_INHERITED\_INFO SUBSTRUCT [0] allocated 1, used 1

2 PIN\_FLD\_ALIAS\_LIST ARRAY [\*] NULL

1 PIN\_FLD\_STATUS ENUM [0] 10103

0 PIN\_FLD\_DESCR STR [0] "Termination of Service"

XXX

xop PCM\_OP\_CUST\_UPDATE\_SERVICES 0 1