Development Workbench - Notifications

Oracle Banking Trade Finance

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Contents

1 Preface

This document describes the steps to develop the notification XML and notification trigger using Oracle FLEXCUBE Development Workbench for Universal Banking.

1.1 Audience

The Development Workbench Notification Development book is intended for the FLEXCUBE Application Developers who perform the following tasks:

- Develop new Notification

To Use this manual, you need conceptual and working knowledge of the below:

Proficiency	*Resources*
FLEXCUBE UBS Development overview	*FCUBS-FD01-01-01-Development Overview Guide*
Interface Getting started	*FCUBS-FD04-01-01-Interface Getting started*
FLEXCUBE Development Workbench for Universal Banking Reference	*User manuals*
Web service development to have query web service in place	*FCUBS-FD02-03-01-RAD Web Service Development*

2 Introduction

How to use this Guide

The information in this guide includes:

- Chapter 3, "Introduction"
- Chapter 4, "Notification - Getting started"
- Chapter 5, "Notification Development "
- Chapter 6, "Deploy Notification"
- Chapter 7, "Test Notification"

3 Notification - Getting started

3.1 What is Notification

Notification framework in FLEXCUBE UBS is used to communicate the business event happened in FLEXCUBE UBS to external systems. Depending upon the event, the XML message is pushed to external system's asynchronous Queues for their consumption.

3.2 Notification Trigger

Notification Triggers is developed to recognize the event and then invoke the notification process. This trigger is developed using Development Workbench.

4 Notification Development

4.1 Pre-request for Notification development and testing

Following are pre-request for notification development:

- Target FLEXCUBE Environment with Notification framework installed
- Development Workbench link mapped to the FLEXCUBE environment
- Required Query Web services developed and tested

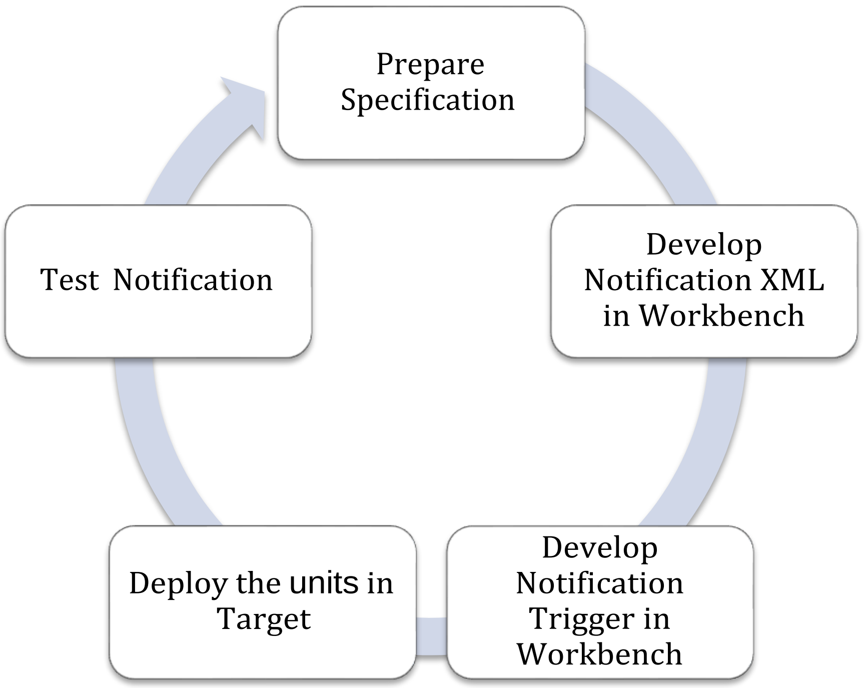

Prepare Specification
Develop Notification XML in Workbench
Develop Notification Trigger in Workbench
Deploy the units in Target
Test Notification

Fig 5.1.1: Development of Notifications

4.2 Notification specification

Identify the notification requirement as below

- What is the Notification function ID name for RAD XML (Third character should be N)?
- What is the Notification code?
- What is the Base table in FLEXCUBE UBS that triggers the notification?
  - What operation at base table triggers (insert/update/delete)?
  - What is the where clause for filter?
- What is the query Web service to be used?
  - What is the operation?
  - What are the tags required?

Example;

- Notification function ID name – *STNCUMOD*
- **Notification code -** *NOTIF_CA_CUSTACC_MOD*
- Base table - *STTM_CUST_ACCOUNT*
  - Operation – *DELETE*
  - Filter – *Account class type in (S , U)*
- Web service to be used – *FCUBSAccService*
  - Operation – *QueryCustAcc*
  - Request node **-** *Cust-Account-IO*

4.3 Notification XML development

Notification RAD XML development creates the following files:

- RAD XML
- SPC
- SQL
- Static Data

4.4 Notification Process

There will be one trigger for the base table of notification and in case of multiple notifications sharing the same base table, there will be no new triggers created. Instead the same trigger created on the base table will be reused. This approach reduces the number of triggers being used for notifications.

4.5 Development process in Development Workbench

The notification development process in Workbench is split into two steps:

1. **Notification Triggers**
2. **Notification Filter Procedure**

The first step is to create notification triggers for base tables. The trigger generated from Workbench will be inserting key details into a static notification log table. The following details will be captured:

- Trigger code: A unique value to for a notification trigger.
- Base Table: The base table on which, the trigger is built.
- When Clause: A simple when clause for the notification trigger.

The second step is to capture details of notifications and generate the notification filter procedure. The following details are captured:

- Notification code: A unique value to identify a notification.
- Description: Meaningful description of the notification.
- Gateway Service:

4.6 Notification Trigger

After successful login to Development Workbench click on Notification Trigger option in the tree as shown below:

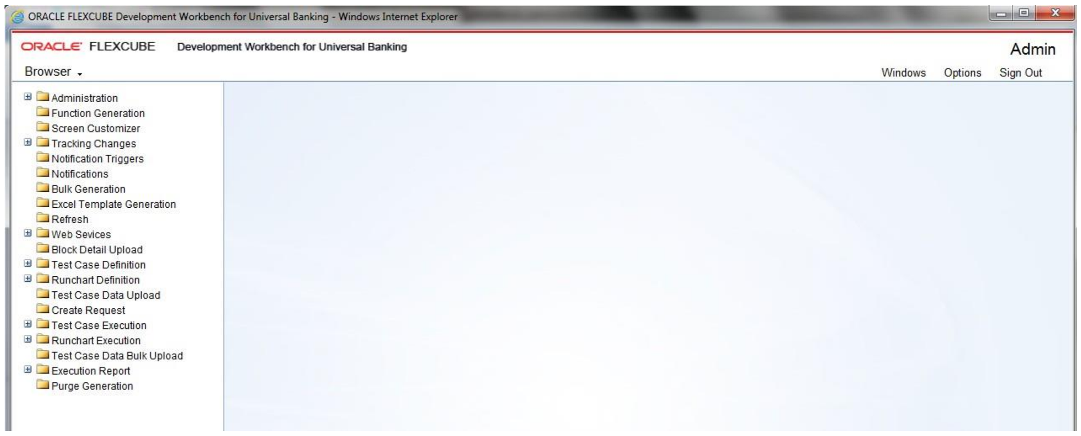
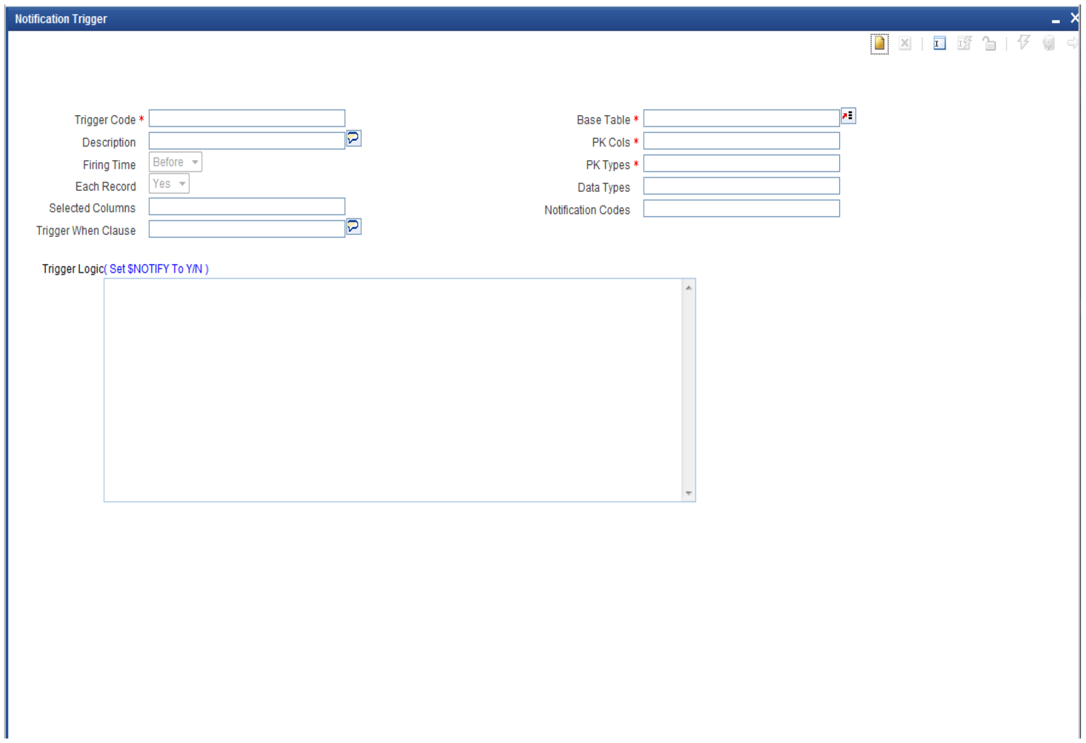


Fig 4.6.1: Notification trigger



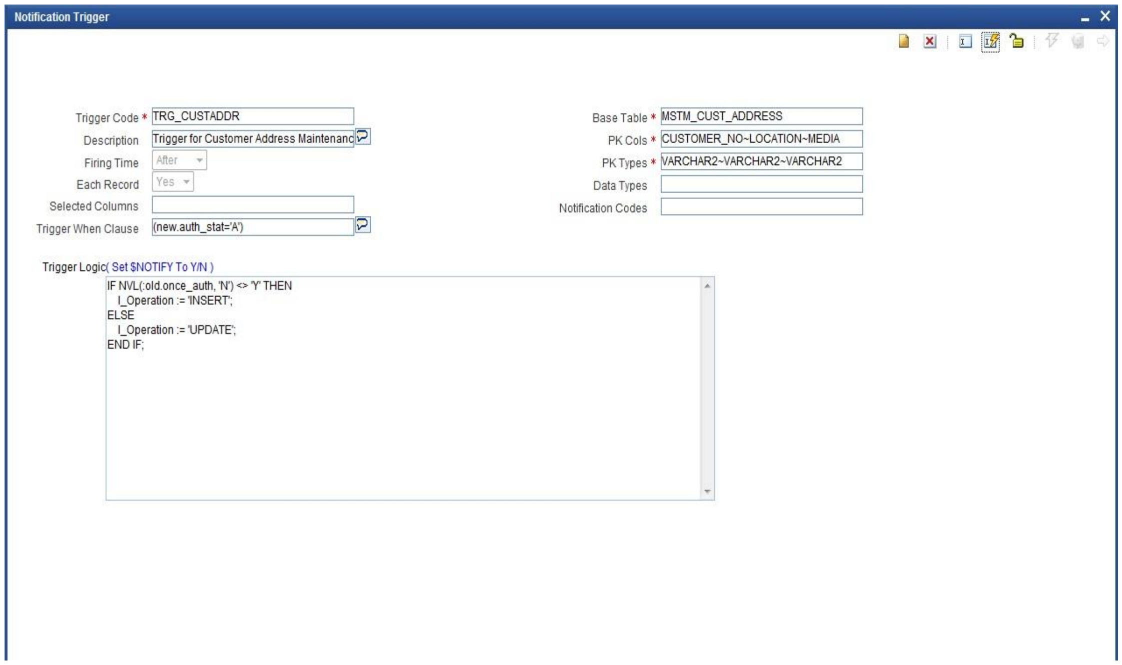
Trigger Code *		Base Table *	
Description		PK Cols *	
Firing Time	Before	PK Types *	
Each Record	Yes	Data Types	
Selected Columns		Notification Codes	
Trigger When Clause			

Trigger Logic(Set $NOTIFY To Y/N)

Fig 4.6.2: Notification trigger options

Notification Trigger we have two options - Add a new Trigger or Modify Existing one.

New:



Trigger Code *	TRG_CUSTADDR	Base Table *	MSTM_CUST_ADDRESS
Description	Trigger for Customer Address Maintenanc	PK Cols *	CUSTOMER_NO~LOCATION~MEDIA
Firing Time	After	PK Types *	VARCHAR2~VARCHAR2~VARCHAR2
Each Record	Yes	Data Types	
Selected Columns		Notification Codes	
Trigger When Clause	(new.auth_stat='A')		

Trigger Logic(Set $NOTIFY To Y/N)

```
IF NVL(:old.once_auth, 'N') <> 'Y' THEN
   l_Operation := 'INSERT';
ELSE
   l_Operation := 'UPDATE';
END IF;
```

Fig 4.6.3: Notification trigger: New option

Trigger Code: A unique value to for a notification trigger. Follow the naming conversion it should start with **TRG_XXXX.**This is mandatory field. This attribute signifies the trigger code created as part of trigger creation step in OTD. Each notification will be linked to a trigger code.

Description : Information field. Meaningful description of Trigger is to be given.

Firing Time : Specify when trigger needs to fired. We can create only BEFORE and AFTER triggers for tables. (INSTEAD OF triggers are only available for views; typically they are used to implement view updates.) (**After/Before**).

Each Record: specify for each row required or not. If FOR EACH ROW option is specified, the trigger is row-level; otherwise, the trigger is statement-level. (**Yes/No**)

Base Table: The base table on which, the trigger is built. This is mandatory field. Select a valid table from available LOV next to the field.

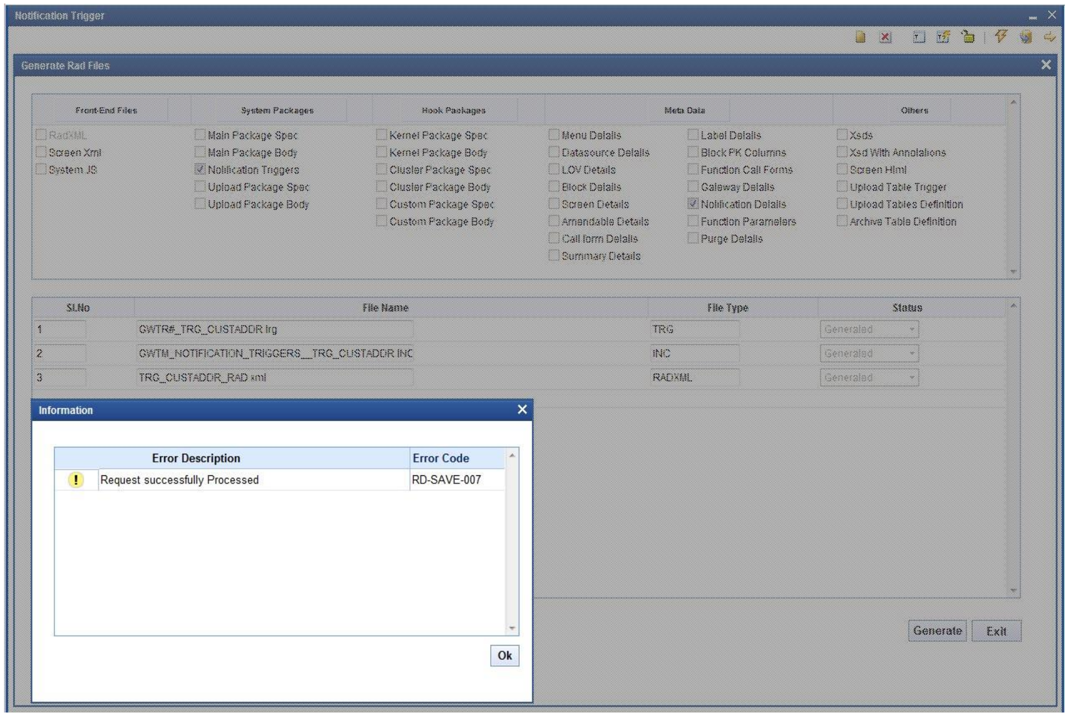
Pk Cols: Enter Primary key fields of table in tilde (~) separated format. This is mandatory field.

Pk Types: Enter Primary key type of the corresponding primary key field. This is mandatory field.

Selected Columns and Data Types: Defunct

Trigger When Clause: A simple when clause for the notification trigger. A trigger restriction can be specified in the WHEN clause, enclosed by parentheses. The trigger restriction is a SQL condition that must be satisfied in order for Oracle to fire the trigger. This condition cannot contain sub queries. Without the WHEN clause, the trigger is fired for each row.

Notification Codes: If the trigger is associated with a specific notification code, then the particular notification code has to be provided in the field. If the trigger is shared across many Notifications, field can be left empty


Notification Trigger

Generate Rad Files

Front-End Files	System Packages	Hook Packages	Meta Data		Others
☐ RadXML	☐ Main Package Spec	☐ Kernel Package Spec	☐ Menu Details	☐ Label Details	☐ Xsds
☐ Screen Xml	☐ Main Package Body	☐ Kernel Package Body	☐ Datasource Details	☐ Block PK Columns	☐ Xsd With Annotations
☐ System JS	☑ Notification Triggers	☐ Cluster Package Spec	☐ LOV Details	☐ Function Call Forms	☐ Screen Html
	☐ Upload Package Spec	☐ Cluster Package Body	☐ Block Details	☐ Gateway Details	☐ Upload Table Trigger
	☐ Upload Package Body	☐ Custom Package Spec	☐ Screen Details	☑ Notification Details	☐ Upload Tables Definition
		☐ Custom Package Body	☐ Amendable Details	☐ Function Parameters	☐ Archive Table Definition
			☐ Call form Details	☐ Purge Details	
			☐ Summary Details		

Sl.No	File Name	File Type	Status
1	GWTR#_TRG_CUSTADDR.trg	TRG	Generated
2	GWTM_NOTIFICATION_TRIGGERS__TRG_CUSTADDR.INC	INC	Generated
3	TRG_CUSTADDR_RAD.xml	RADXML	Generated

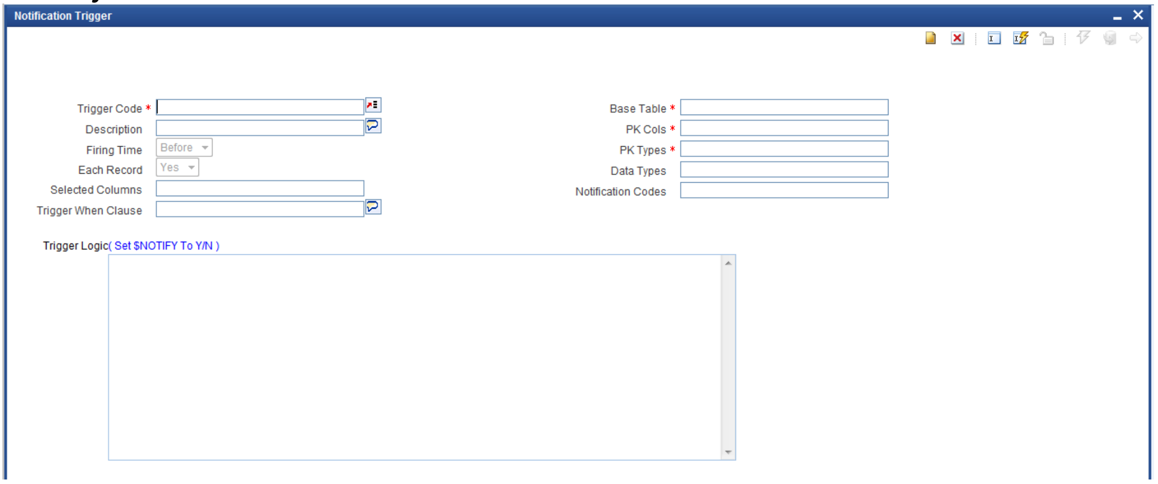
Information

	Error Description	Error Code
!	Request successfully Processed	RD-SAVE-007

Fig 4.6.4: Notification trigger: Generation

On successful save Notification Trigger will generate two files (gwtr#_<trg-code>.trg and GWTM_NOTIFICATION_TRIGGERS_<trg-code>.INC) user needs to compile them in FLEXCUBE schema.

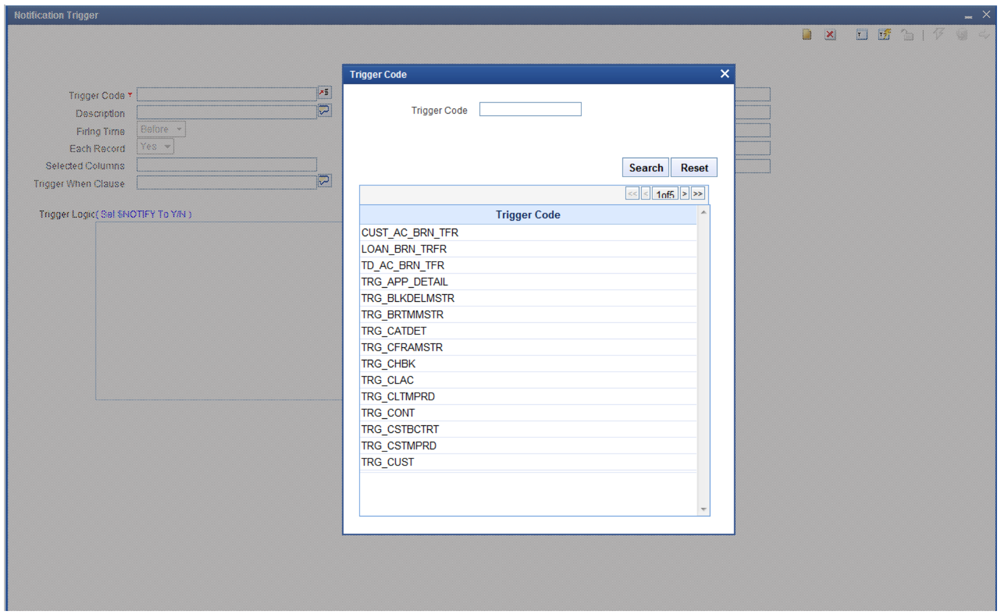
Modify:


Notification Trigger

Trigger Code *		Base Table *	
Description		PK Cols *	
Firing Time	Before	PK Types *	
Each Record	Yes	Data Types	
Selected Columns		Notification Codes	
Trigger When Clause			

Trigger Logic(Set $NOTIFY To Y/N)

Fig 4.6.5: Notification trigger: Modification


Notification Trigger

Trigger Code

Description

Firing Time Before

Each Record Yes

Selected Columns

Trigger When Clause

Trigger Logic(Set $NOTIFY To Y/N)

Trigger Code

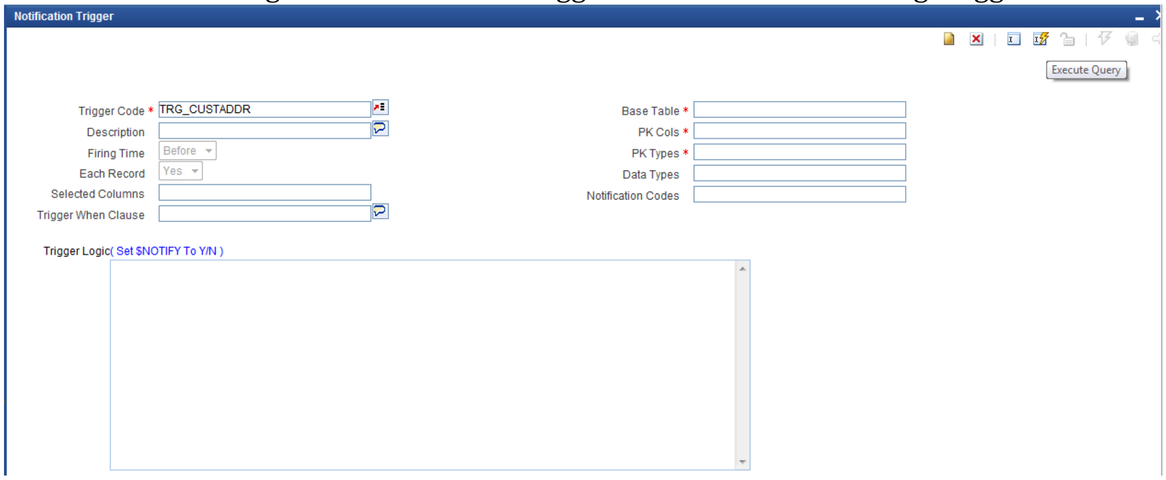
Trigger Code

Search Reset

1of5

Trigger Code
CUST_AC_BRN_TFR
LOAN_BRN_TRFR
TD_AC_BRN_TFR
TRG_APP_DETAIL
TRG_BLKDELMSTR
TRG_BRTMMSTR
TRG_CATDET
TRG_CFRAMSTR
TRG_CHBK
TRG_CLAC
TRG_CLTMPRD
TRG_CONT
TRG_CSTBCTRT
TRG_CSTMPRD
TRG_CUST

Fig 4.6.6: Notification trigger: Modification- Selecting Trigger name


Notification Trigger

Execute Query

Trigger Code * TRG_CUSTADDR

Description

Firing Time Before

Each Record Yes

Selected Columns

Trigger When Clause

Base Table *

PK Cols *

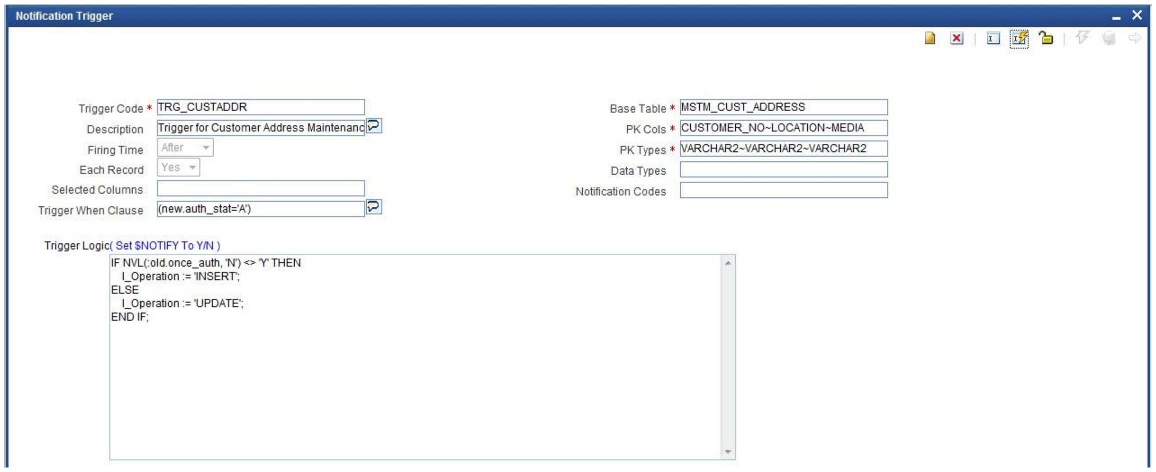
PK Types *

Data Types

Notification Codes

Trigger Logic(Set $NOTIFY To Y/N)

Fig 4.6.7: Notification trigger: Modification- Entering values

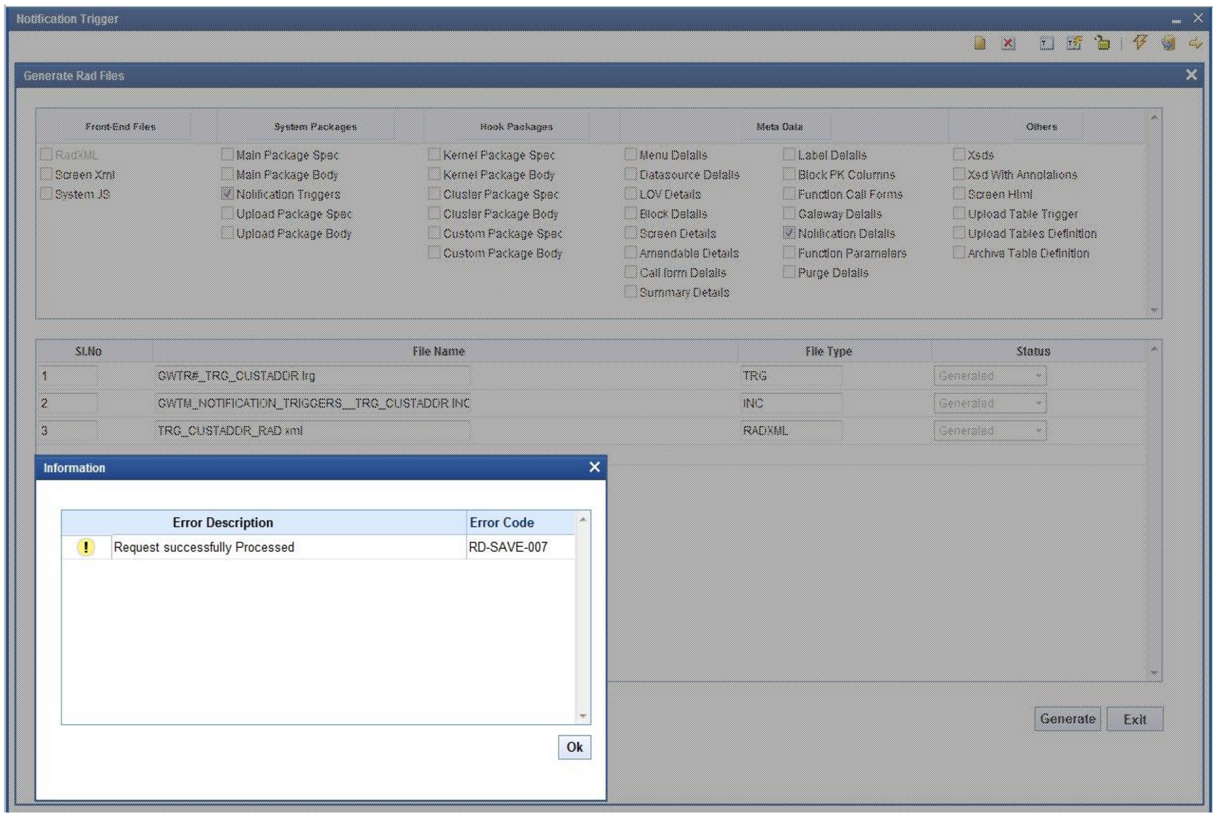

Notification Trigger

Trigger Code *	TRG_CUSTADDR
Description	Trigger for Customer Address Maintenanc
Firing Time	After
Each Record	Yes
Selected Columns	
Trigger When Clause	(new.auth_stat='A')
Base Table *	MSTM_CUST_ADDRESS
PK Cols *	CUSTOMER_NO~LOCATION~MEDIA
PK Types *	VARCHAR2~VARCHAR2~VARCHAR2
Data Types	
Notification Codes	

Trigger Logic(Set $NOTIFY To Y/N)

```
IF NVL(:old.once_auth, 'N') <> 'Y' THEN
   l_Operation := 'INSERT';
ELSE
   l_Operation := 'UPDATE';
END IF;
```

Fig 4.6.8: Notification trigger: Modification- Entering values


Notification Trigger

Generate Rad Files

Front-End Files	System Packages	Hook Packages	Meta Data		Others
☐ RadXML	☐ Main Package Spec	☐ Kernel Package Spec	☐ Menu Details	☐ Label Details	☐ Xsds
☐ Screen Xml	☐ Main Package Body	☐ Kernel Package Body	☐ Datasource Details	☐ Block PK Columns	☐ Xsd With Annotations
☐ System JS	☑ Notification Triggers	☐ Cluster Package Spec	☐ LOV Details	☐ Function Call Forms	☐ Screen Html
	☐ Upload Package Spec	☐ Cluster Package Body	☐ Block Details	☐ Gateway Details	☐ Upload Table Trigger
	☐ Upload Package Body	☐ Custom Package Spec	☐ Screen Details	☑ Notification Details	☐ Upload Tables Definition
		☐ Custom Package Body	☐ Amendable Details	☐ Function Parameters	☐ Archive Table Definition
			☐ Call form Details	☐ Purge Details	
			☐ Summary Details		

Sl.No	File Name	File Type	Status
1	GWTR#_TRG_CUSTADDR.trg	TRG	Generated
2	GWTM_NOTIFICATION_TRIGGERS__TRG_CUSTADDR.INC	INC	Generated
3	TRG_CUSTADDR_RAD.xml	RADXML	Generated

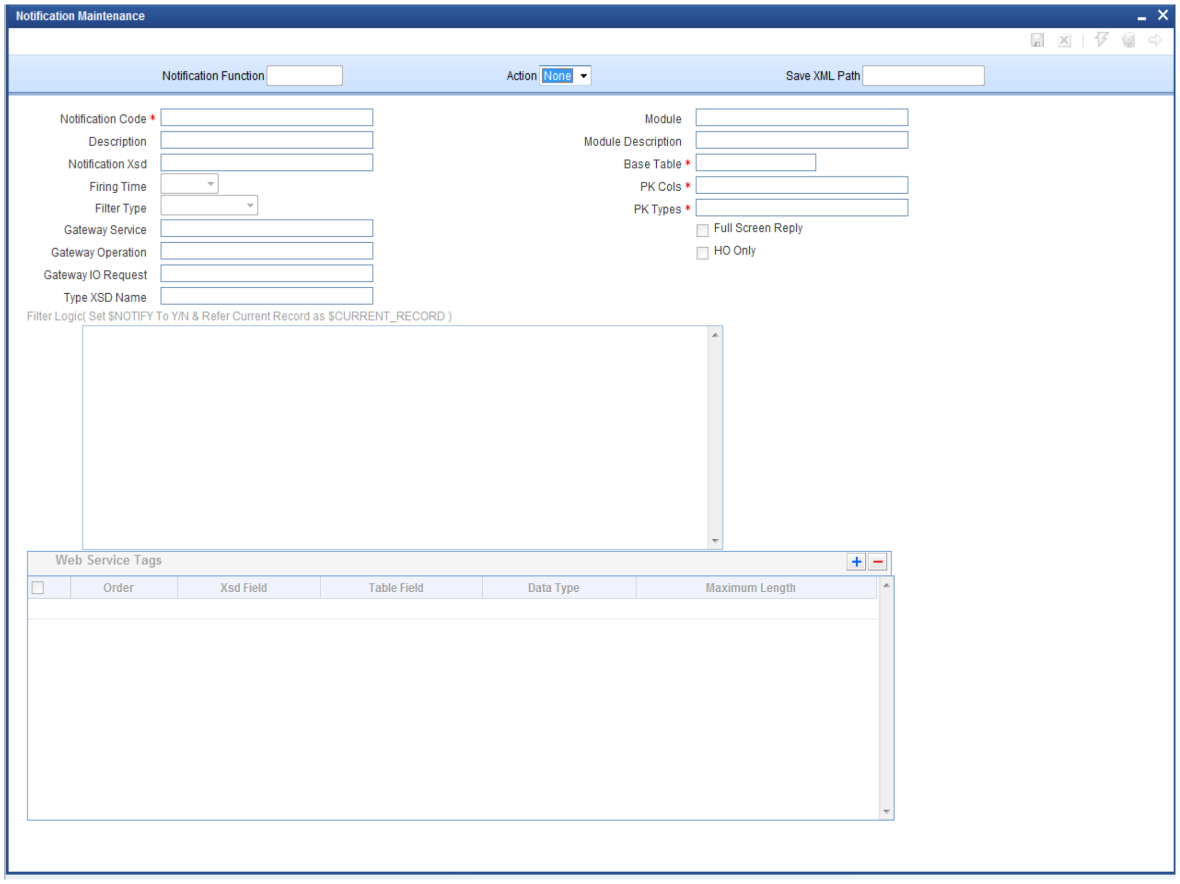
Information

Error Description	Error Code
Request successfully Processed	RD-SAVE-007

Fig 4.6.9: Notification trigger: Modification- Successful Generation

4.7 Notifications

Notifications Screen will be used to create new notification or modify existing notification; here we capture notification information for notification codes. We save notification details into xml.



Notification Maintenance

Notification Function | Action None | Save XML Path

Notification Code *
Description
Notification Xsd
Firing Time
Filter Type
Gateway Service
Gateway Operation
Gateway IO Request
Type XSD Name

Module
Module Description
Base Table *
PK Cols *
PK Types *
Full Screen Reply
HO Only

Filter Logic(Set $NOTIFY To Y/N & Refer Current Record as $CURRENT_RECORD)

Web Service Tags

	Order	Xsd Field	Table Field	Data Type	Maximum Length

Fig 4.7.1: Notification Screen

Action:. We can choose either new or Load action. New to create a new notification and Load is used to modify the existing one.

Save Xml Path: Specify the path to save notification xml. This would be considered only if the Save Mode is Client and Work Directory is specified as $CURRENT_DIRECTORY

Notification Function: Specify the notification function-id name.

Conventions:

Maximum 8 chars. 3rd letter must be 'N'.

Example: FTNCONON

Notification Code: Enter the notification code to which we need to capture values. This is Mandatory field.

Recommended Convention for Notification Codes:

NOTIF_<Module Code>_<Description>
Example: NOTIF_LD_CONTRACT
This is the notification indicating that a LD contract has been created/modified

Description: Information field. Meaningful description of the Notification has to be provided in the field

Module: This attribute signifies the module on which the notification is based.

Module Description: Information field. Module Description which would be defaulted from Module LOV

Notification XSD: Notification XSD name will have to be provided in the corresponding Field. Naming convention to be followed while naming Notification XSD is as follows

[Module Name] – [Notification Description] – Notif.xsd
Example: FT-Contract-Notif.xsd

Notification XSD has to be provided only if no Gateway Web Service Query Operation is configured to the Notification

Base Table: Select the base table on which trigger needs to be applied.

Firing Time: Indicates the Operation on the base Table for which Notifications has to be sent. Options available are Insert, Update or Both

Filter Type: This attribute can take the following values.

1. Where clause
2. Plsql block

Pk Cols: Enter Primary key columns of the Base Table.

Pk Types: Enter Primary key field Data Types.

Provide details of Gateway Service, Operation, Type XSD Name and Full Screen Reply if a Query Web Service has to be mapped to the Notification

Gateway Operation: The gateway operation name to execute query for the mentioned Service.

Gateway Service: The gateway service to be used to get the full screen response.

Gateway IO Request: The gateway IO request node to be used in querying operation.

Type XSD Name: This field has to be entered if Notification is mapped to a Service and Request. Name of the Master Type XSD for the service and operation has to be provided here. This can be found in include portion of the Request Msg XSD of particular Service-Operation

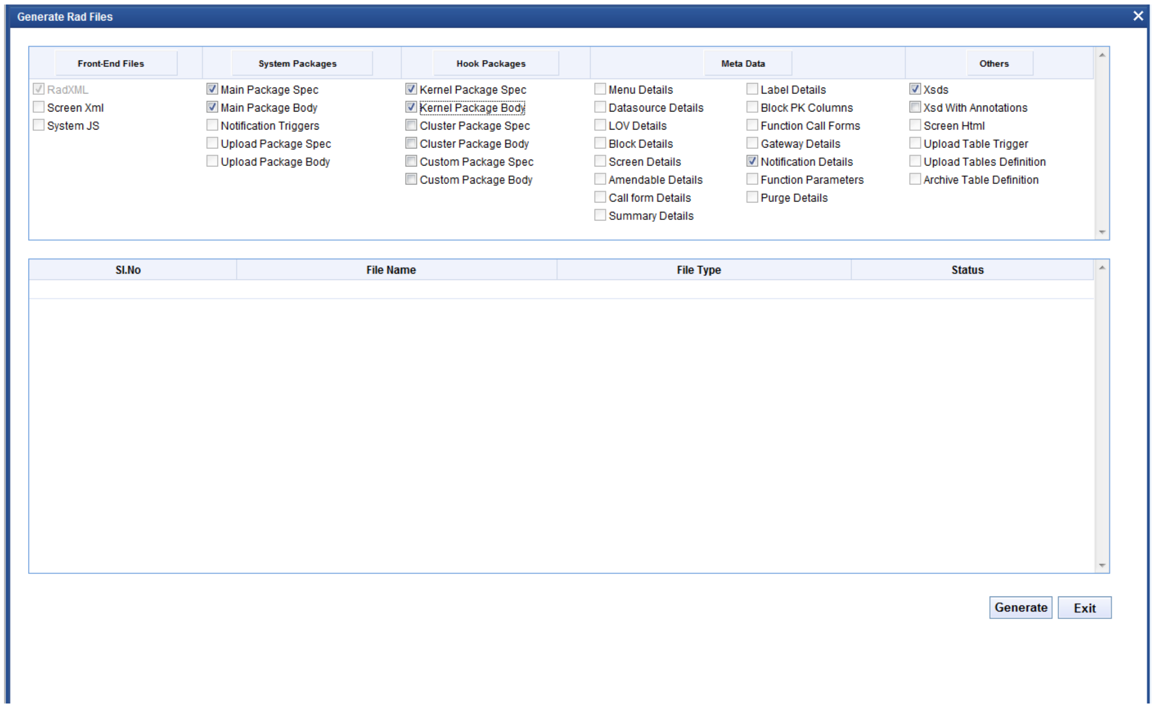
Example: LC-Contract-Types.xsd

Full screen Reply: This attribute decides whether full screen or primary key notification response to be sent. This is applicable only if gateway Service details are provided

HO only: This attribute is used to send notification only from head office.

Filter Logic: The filter logic which decides whether the notification needs to be sent or not. This can be a simple where-clause on base table or a complex pl/sql block.

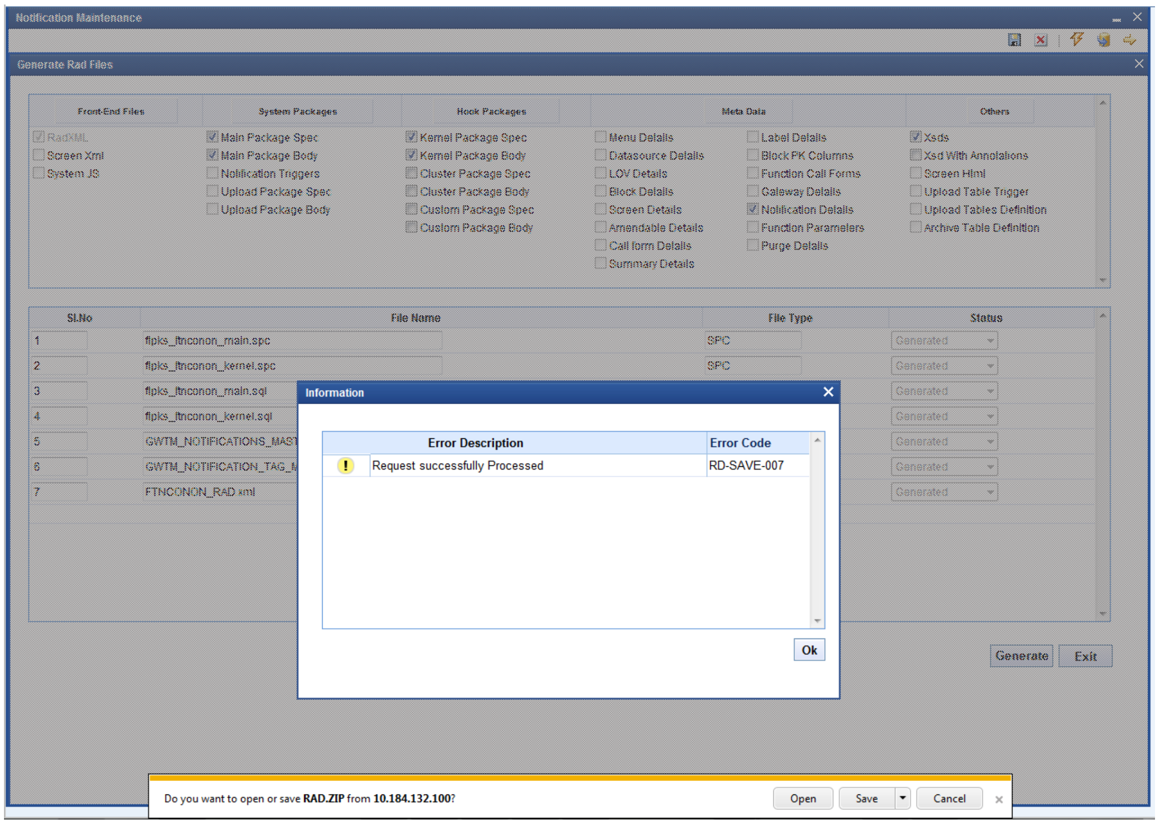
Web service Tags: The columns selected from base table as part of web service tags, will be used to send the full screen notification response. These tags defines the elements of Notification Xml when no Query service is mapped to it:



Front-End Files	System Packages	Hook Packages	Meta Data		Others
✓ RadXML	✓ Main Package Spec	✓ Kernel Package Spec	Menu Details	Label Details	✓ Xsds
Screen Xml	✓ Main Package Body	✓ Kernel Package Body	Datasource Details	Block PK Columns	Xsd With Annotations
System JS	Notification Triggers	Cluster Package Spec	LOV Details	Function Call Forms	Screen Html
	Upload Package Spec	Cluster Package Body	Block Details	Gateway Details	Upload Table Trigger
	Upload Package Body	Custom Package Spec	Screen Details	✓ Notification Details	Upload Tables Definition
		Custom Package Body	Amendable Details	Function Parameters	Archive Table Definition
			Call form Details	Purge Details	
			Summary Details		

Sl.No	File Name	File Type	Status

Fig 4.7.2: Notification Screen generation



Front-End Files	System Packages	Hook Packages	Meta Data		Others
✓ RadXML	✓ Main Package Spec	✓ Kernel Package Spec	Menu Details	Label Details	✓ Xsds
Screen Xml	✓ Main Package Body	✓ Kernel Package Body	Datasource Details	Block PK Columns	Xsd With Annotations
System JS	Notification Triggers	Cluster Package Spec	LOV Details	Function Call Forms	Screen Html
	Upload Package Spec	Cluster Package Body	Block Details	Gateway Details	Upload Table Trigger
	Upload Package Body	Custom Package Spec	Screen Details	✓ Notification Details	Upload Tables Definition
		Custom Package Body	Amendable Details	Function Parameters	Archive Table Definition
			Call form Details	Purge Details	
			Summary Details		

Sl.No	File Name	File Type	Status
1	flpks_ftnconon_main.spc	SPC	Generated
2	flpks_ftnconon_kernel.spc	SPC	Generated
3	flpks_ftnconon_main.sql		Generated
4	flpks_ftnconon_kernel.sql		Generated
5	GWTM_NOTIFICATIONS_MAST		Generated
6	GWTM_NOTIFICATION_TAG_M		Generated
7	FTNCONON_RAD.xml		Generated

Information

Error Description	Error Code
Request successfully Processed	RD-SAVE-007

Do you want to open or save **RAD.ZIP** from **10.184.132.100**?

Fig 4.7.3: Notification Screen Generation Successful

Modifying an Existing Notification RADXML

The process of modifying an existing Notification RADXML is illustrated in the images below

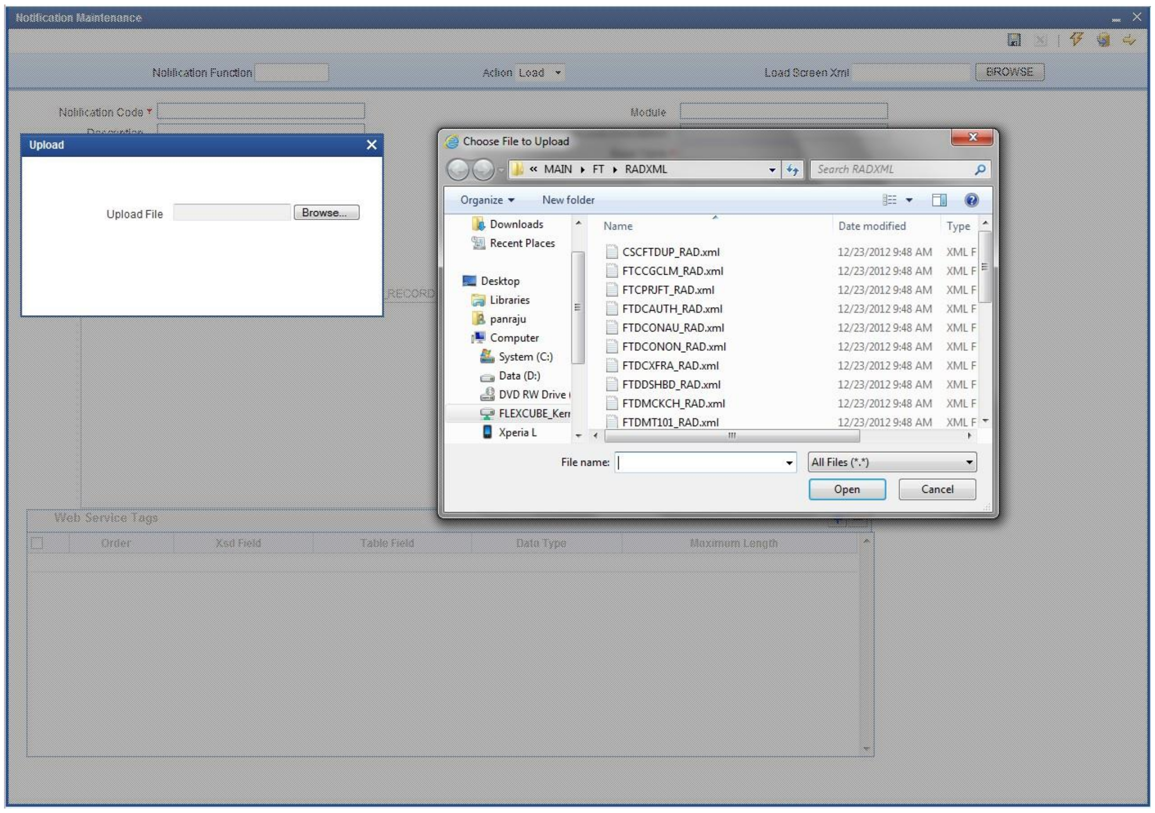
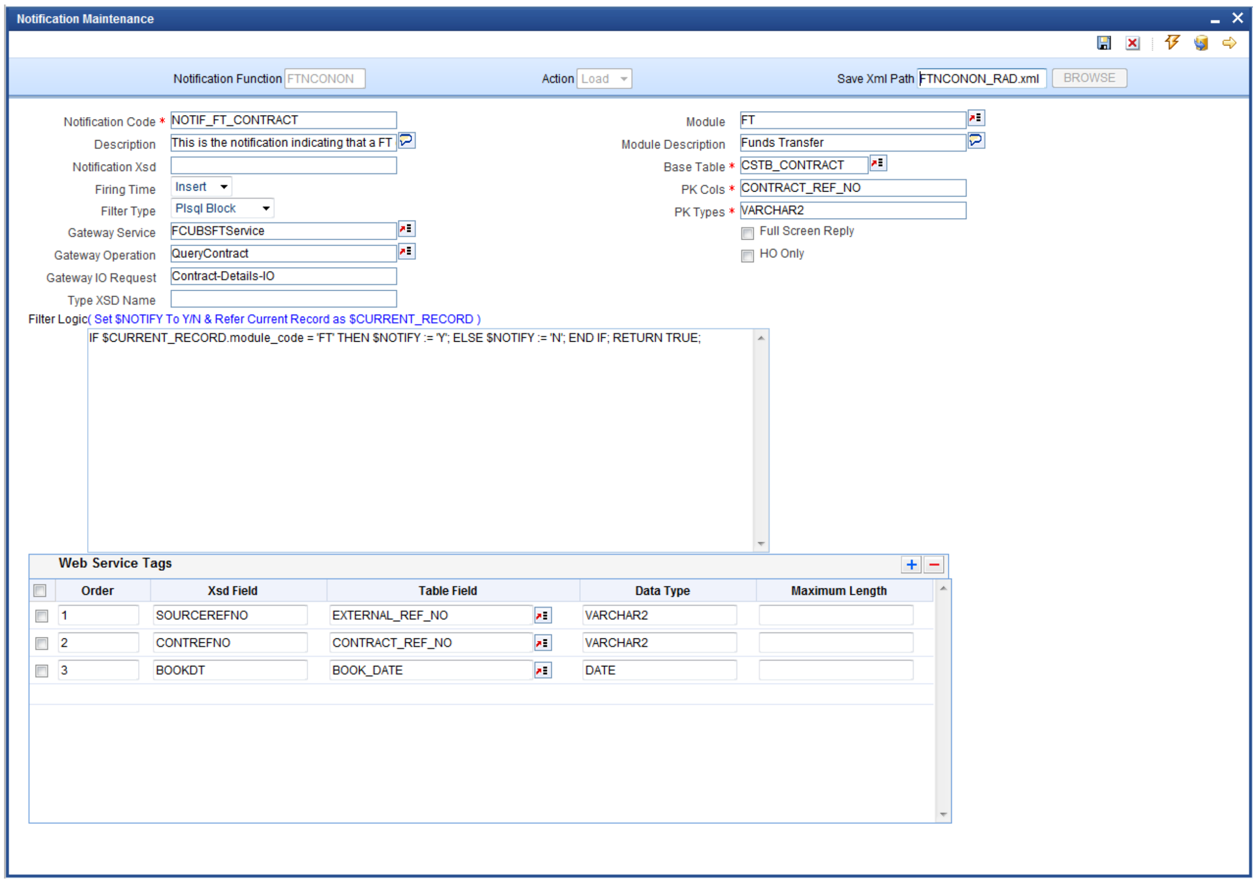


Fig 4.7.4: Notification Screen Loading



Notification Maintenance

Notification Function	FTNCONON	Action	Load	Save Xml Path	FTNCONON_RAD.xml

Notification Code *	NOTIF_FT_CONTRACT	Module	FT
Description	This is the notification indicating that a FT	Module Description	Funds Transfer
Notification Xsd		Base Table *	CSTB_CONTRACT
Firing Time	Insert	PK Cols *	CONTRACT_REF_NO
Filter Type	Plsql Block	PK Types *	VARCHAR2
Gateway Service	FCUBSFTService	Full Screen Reply	☐
Gateway Operation	QueryContract	HO Only	☐
Gateway IO Request	Contract-Details-IO		
Type XSD Name			

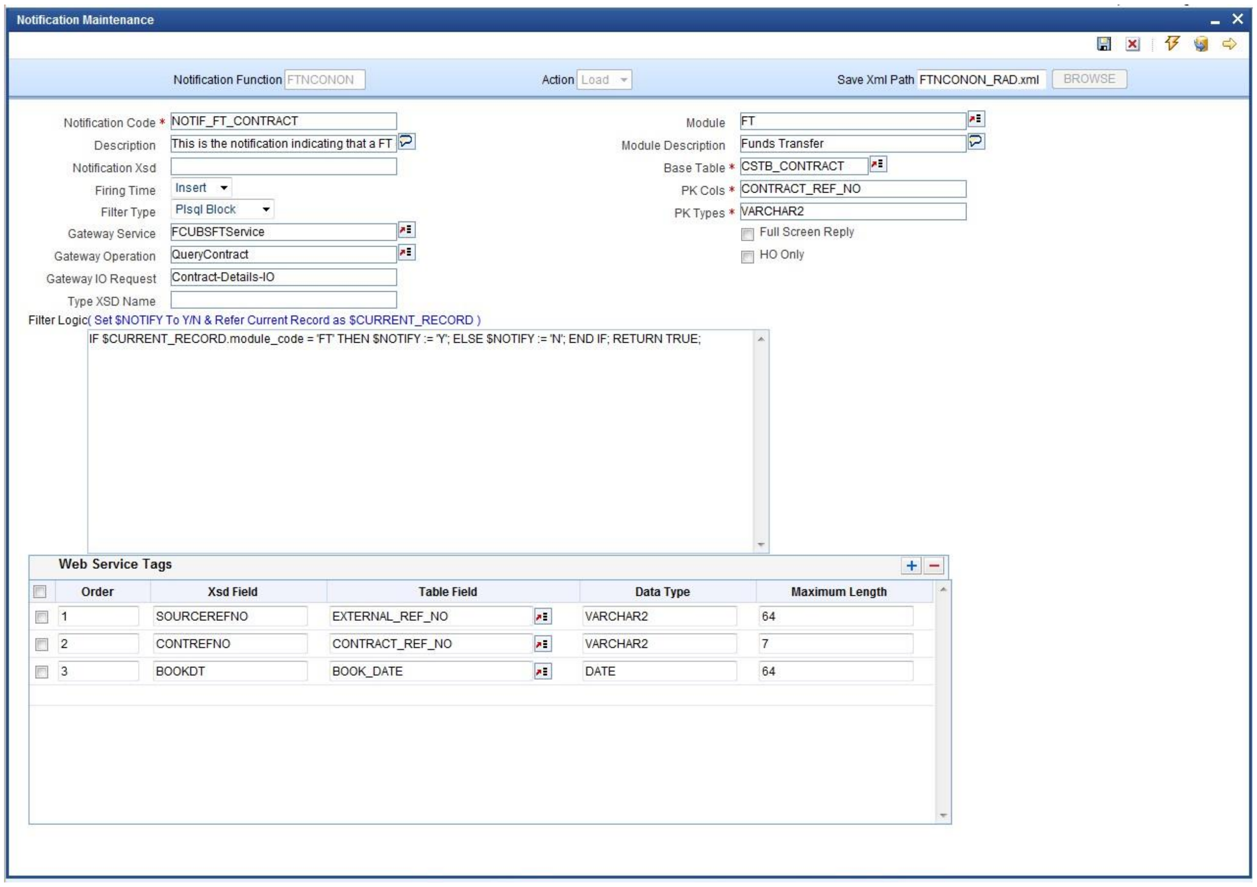
Filter Logic(Set $NOTIFY To Y/N & Refer Current Record as $CURRENT_RECORD)

```
IF $CURRENT_RECORD.module_code = 'FT' THEN $NOTIFY := 'Y'; ELSE $NOTIFY := 'N'; END IF; RETURN TRUE;
```

Web Service Tags

Order	Xsd Field	Table Field	Data Type	Maximum Length
1	SOURCEREFNO	EXTERNAL_REF_NO	VARCHAR2	
2	CONTREFNO	CONTRACT_REF_NO	VARCHAR2	
3	BOOKDT	BOOK_DATE	DATE	

Fig 4.7.5: Notification Screen Loaded



Notification Maintenance

Notification Function FTNCONON | Action Load | Save Xml Path FTNCONON_RAD.xml | BROWSE

Notification Code *	NOTIF_FT_CONTRACT
Description	This is the notification indicating that a FT
Notification Xsd	
Firing Time	Insert
Filter Type	Plsql Block
Gateway Service	FCUBSFTService
Gateway Operation	QueryContract
Gateway IO Request	Contract-Details-IO
Type XSD Name	
Module	FT
Module Description	Funds Transfer
Base Table *	CSTB_CONTRACT
PK Cols *	CONTRACT_REF_NO
PK Types *	VARCHAR2
Full Screen Reply	☐
HO Only	☐

Filter Logic(Set $NOTIFY To Y/N & Refer Current Record as $CURRENT_RECORD)

```
IF $CURRENT_RECORD.module_code = 'FT' THEN $NOTIFY := 'Y'; ELSE $NOTIFY := 'N'; END IF; RETURN TRUE;
```

Web Service Tags

Order	Xsd Field	Table Field	Data Type	Maximum Length
1	SOURCEREFNO	EXTERNAL_REF_NO	VARCHAR2	64
2	CONTREFNO	CONTRACT_REF_NO	VARCHAR2	7
3	BOOKDT	BOOK_DATE	DATE	64

Fig 4.7.6: Notification Screen Loaded and Modified

5 Deploy Notification

5.1 Notification - Workbench related deployment

Compile the following files in Target FLEXCUBE UBS Database schema

- Notification Main Package generated from ODT
- Hook Packages
- GWTM_NOTIFICATION_TAG_MAP____<Notification Function ID>_.INC
- GWTM_NOTIFICATIONS_MASTER_____<Notification Function ID>_.INC

5.2 Notification Trigger deployment

Compile the following files in Target FLEXCUBE UBS Database schema

- GWTM_NOTIFICATION_TRIGGERS__TRIG_CONTRACT.INC
- GWTR#_TRIG_CONTRACT.TRG

6 Test Notification

This section explains the run time notification flow and testing steps.

6.1 Notification flow

The notification process occurs as two parts:

1. Oracle JOBs created using FCJ Scheduler framework that sends data required for notification to an internal JMS queue.
2. Gateway MBD that lists on internal JMS queue, that picks the notification XMLs and prepare full web service response and send to external system queues.

6.2 Scheduler based notification

The Notification Process in FLEXCUBE can be done using the jobs scheduler as follows:

The trigger generated from Workbench will be inserting key details into a static notification log (STTB_NOTIFICATION)

Once Job is triggered, a request is sent to EJB layer from job execution class and the notification log table will be polled for unprocessed records.

Each unprocessed record is locked.

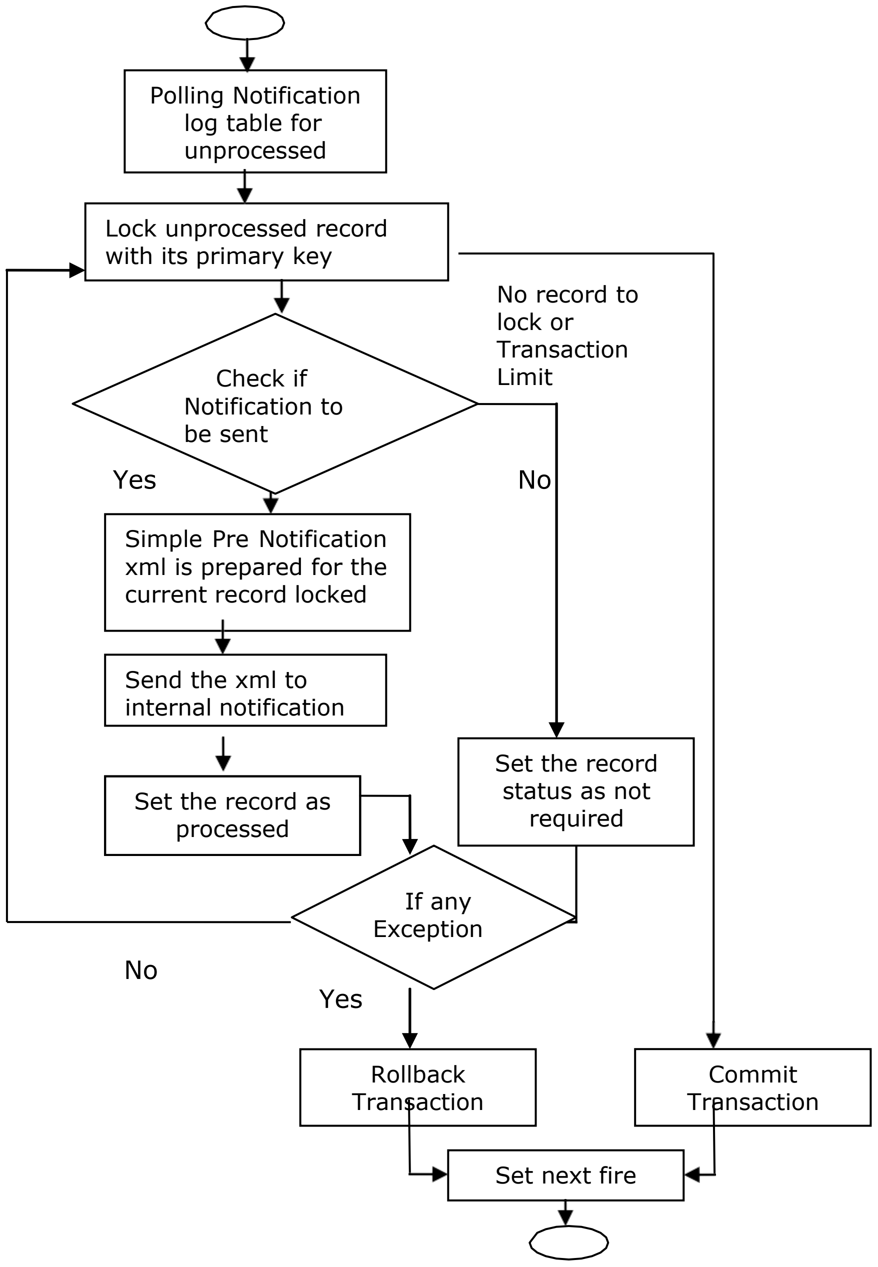
The record is verified against the notification maintenance and checked whether notification is to be sent or not.

If notification is to be sent, pre notification message xml is built and it is sent to internal NOTIFY_QUEUE(JMS queue) configured in Gateway layer.

The job is then rescheduled to fire next time based on the previous execution.

Refer Gateway Installation documents on how to setup the Queues.

Flow Chart for Notification Flow in Scheduler

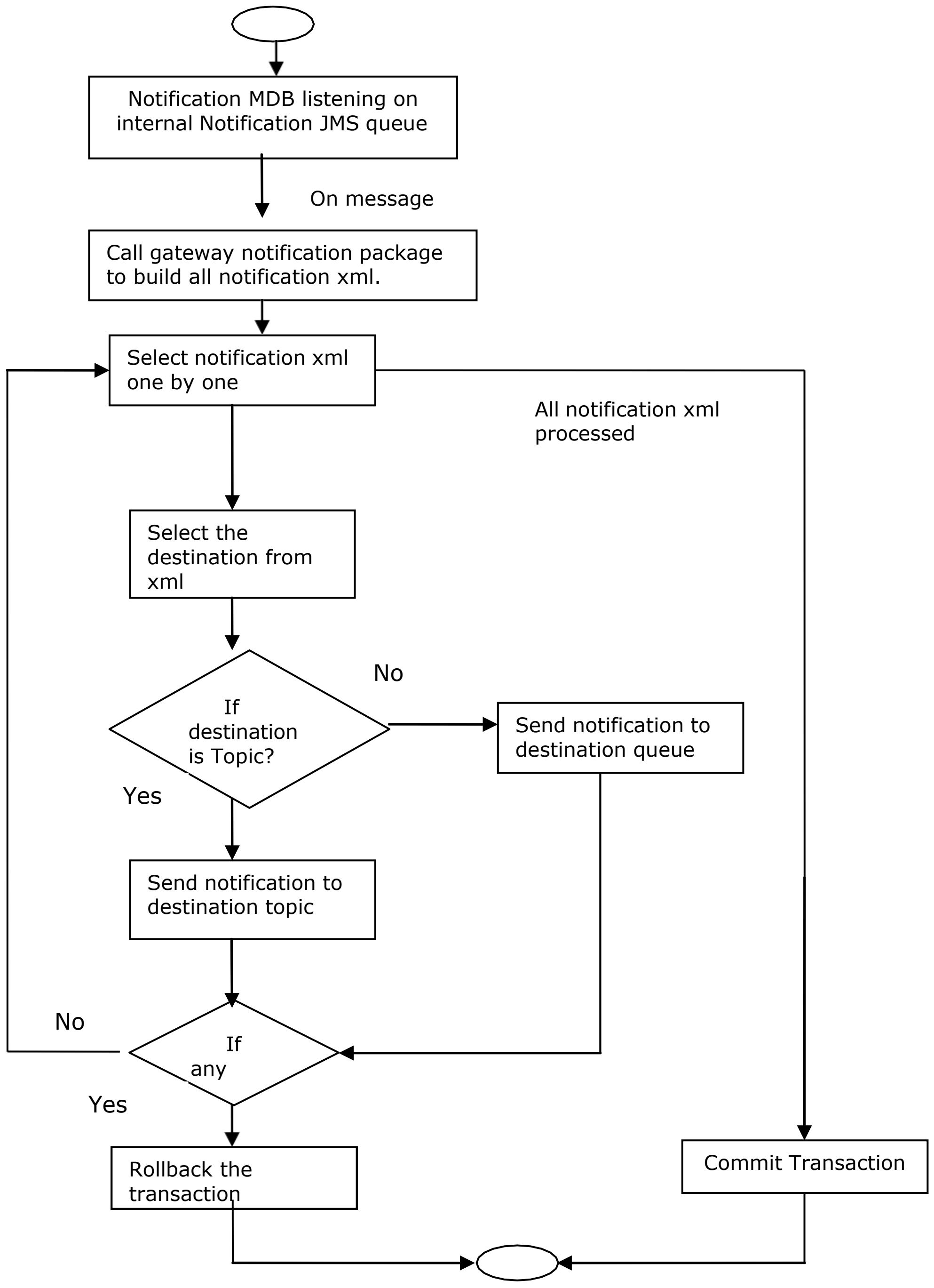

Polling Notification log table for unprocessed
Lock unprocessed record with its primary key
No record to lock or Transaction Limit
Check if Notification to be sent
Yes
No
Simple Pre Notification xml is prepared for the current record locked
Send the xml to internal notification
Set the record as processed
Set the record status as not required
If any Exception
No
Yes
Rollback Transaction
Commit Transaction
Set next fire

6.3 MDB based notification flow

Notification processes in MDB are as follows:

1. Notification MDB listens on the internal NOTIFY_QUEUE(JMS queue)
2. On any message received, the MDB identifies which schema to connect using the JNDI name being present as part of the message xml.
3. Gateway notification processing package is called from MDB to build notifications.
4. In MDB, the notifications built is processed and sent to the destination specified in corresponding notification.
5. In case of exception the transaction is rolled back.
6. If all notifications are successfully processed, transaction is committed.

Flow Chart for Notification Flow in MDB


Notification MDB listening on internal Notification JMS queue
On message
Call gateway notification package to build all notification xml.
Select notification xml one by one
All notification xml processed
Select the destination from xml
If destination is Topic?
No
Yes
Send notification to destination queue
Send notification to destination topic
No
If any
Yes
Rollback the transaction
Commit Transaction

6.4 Triggering notification and testing

Follow the below steps to test notification:

- Simulate a case where base table under goes data change.
- Check record populated at STTB_NOTIFICATION table
- Check Notification message GWTBS_NOTIFICATIONS_LOG.NOTIFICATION_MESSAGE

Development Workbench - Notifications

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