Development of Maintenance Form
Oracle FLEXCUBE Investor Servicing
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1. Preface

This document describes Maintenance Screens in FLEXCUBE and the process of designing a simple Maintenance form using Oracle FLEXCUBE Development Workbench for Universal Banking

1.1 Audience

This document is intended for FLEXCUBE Application developers/users that use development Workbench to develop various FLEXCUBE components.

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

Proficiency	*Resources*
FLEXCUBE Functional Architecture	Training programs from Oracle Financial Software Services.
FLEXCUBE Technical Architecture	Training programs from Oracle Financial Software Services.
FLEXCUBE Screen Development	*04-Development_WorkBench _Screen_Development-I.docx*
Working knowledge of Web based applications	Self Acquired
Working knowledge of Oracle Database	Oracle Documentations
Working knowledge of PLSQL & SQL Language	Self Acquired
Working knowledge of XML files	Self Acquired

1.2 Related Documents

04-Development_WorkBench_Screen_Development-I.pdf
05-Development_WorkBench_Screen_Development-II.pdf

2. Introduction

2.1 How to use this Guide

The information in this document includes:

3. Overview of Maintenance Screen

Maintenance Function Id’s are used for storing maintenance data which are required for processing of any contracts, batches or for any other maintenance which are dependent on this

Example: Customer maintenance screen

If any customer wants to use the service of a bank, details about the customer will have to be maintained in the system .This will be maintenance data which will be required for other maintenances (creating account for the customer) as well as for transaction processing (debiting of customer account)

Business logic for a maintenance function id would be provided by the Development Workbench generated files .Most of the cases, system provided logic would be sufficient .Extra validations can be coded in the hook packages by the developer.

4. Screen Development

Design and development of a Maintenance function id is similar to any other function Ids. This section briefs the steps in designing a Maintenance screen. STDCINF is sample function id used for demonstration in this document

For detailed explanation, refer the document:

04-Development_WorkBench_Screen_Development-I.pdf

4.1 Header Information

Provide the header information as shown in the figure.

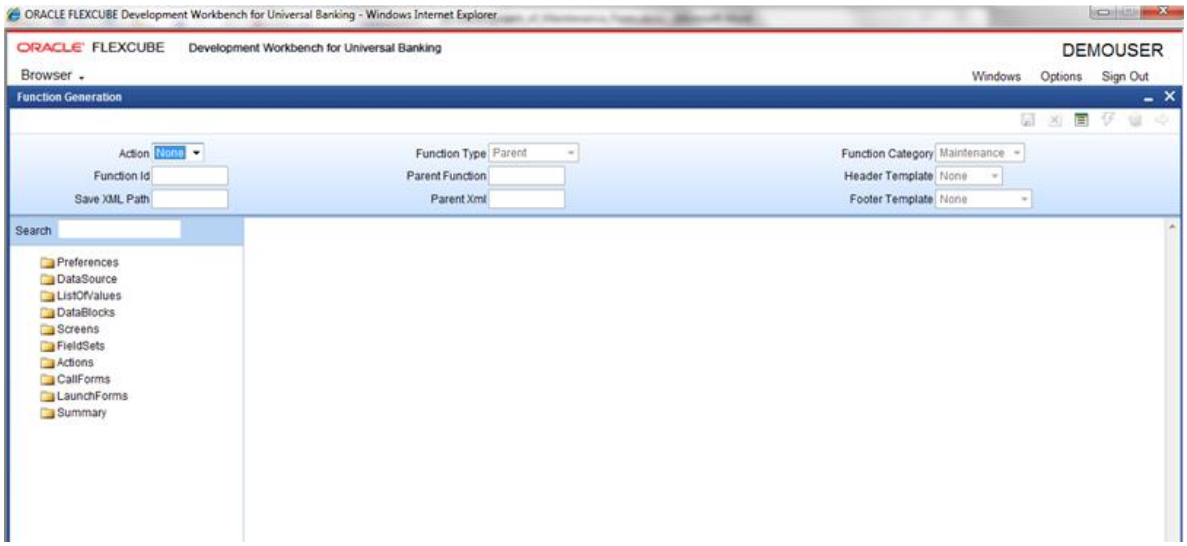

Fig 12.1: Providing Header Information for Maintenance Screen

- For new screen select action As New.
- Enter Function ID → STDCIFD
- Function Type → Parent
- Function Category → Maintenance
- Parent Function Id → None
- Parent Xml → None
- Header Template → None (Only for Process flow screens)
- Footer Template → Maint Audit

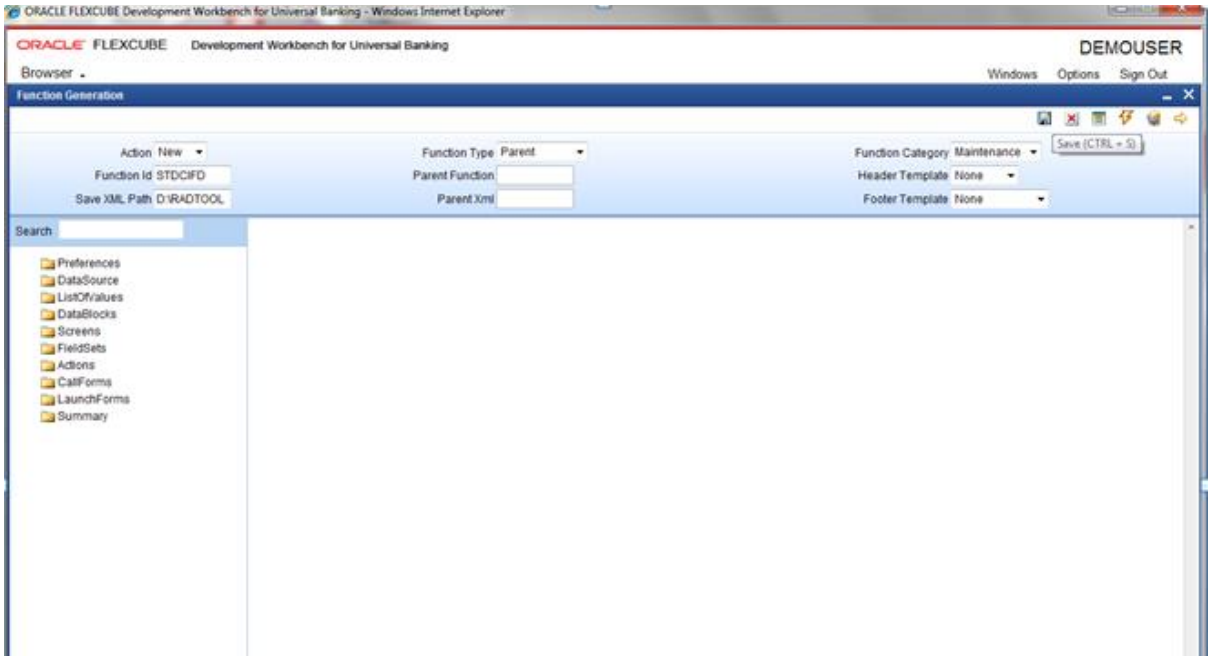

Fig 12.2: Save icon used for saving the radxml

User can save work at any point in time. Click the save icon on top right for the same .In order to work again with it select action as Load and load radxml from the hard disk path

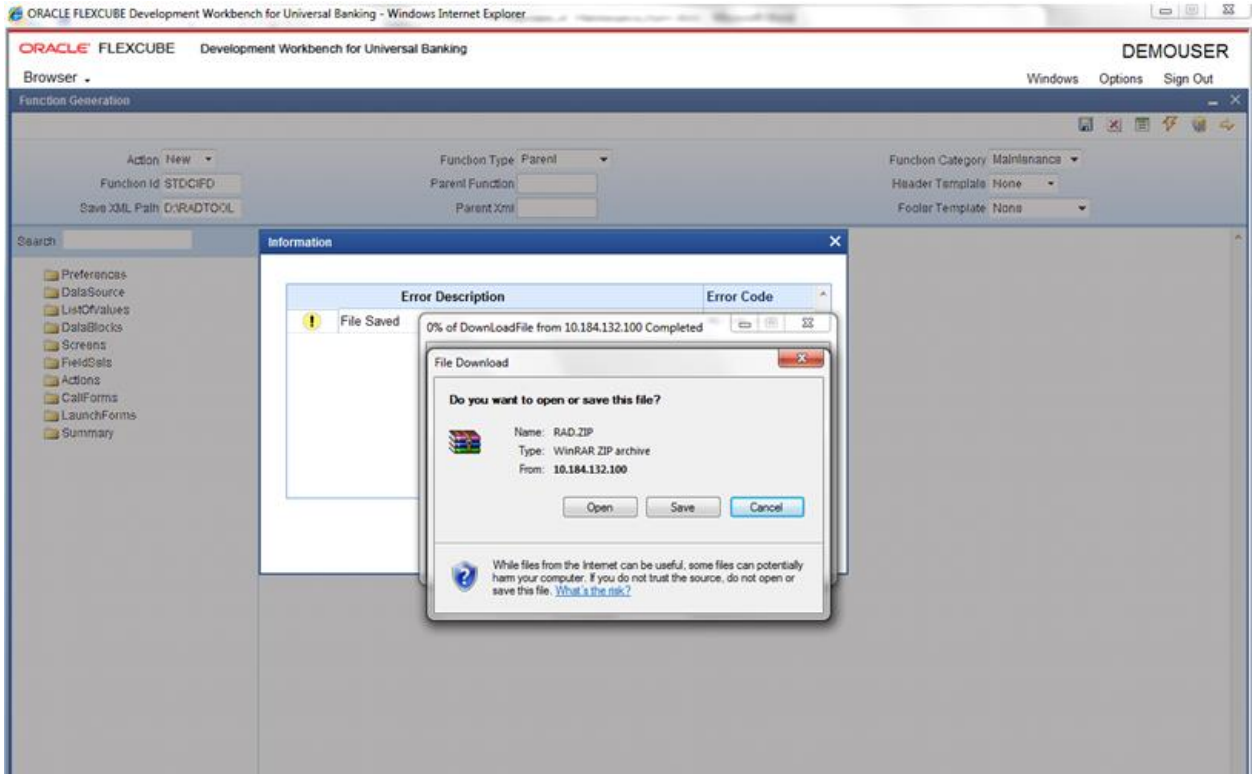

Fig 12.3: Saved File Information page

Note the following while providing header information for Maintenance screen

i) **Naming Convention**:
The third letter of the function id has to be D. Ideally the function id name should have 8 characters.

ii) Footer Template
Make sure that the master data source has the audit columns if footer template is provided as Maint log.

Refer *04-Development_WorkBench_Screen_Development-I.docx* for detailed explanation

4.2 Preferences

- Details entered in Preferences are used in generating INCS for SMTB_MENU, SMTB_FUNCTION_DESCRIPTION and SMTB_ROLE_DETAILS.
- **Control String** → Developer needs to select the actions which should be available for this screen in FLEXCUBE.

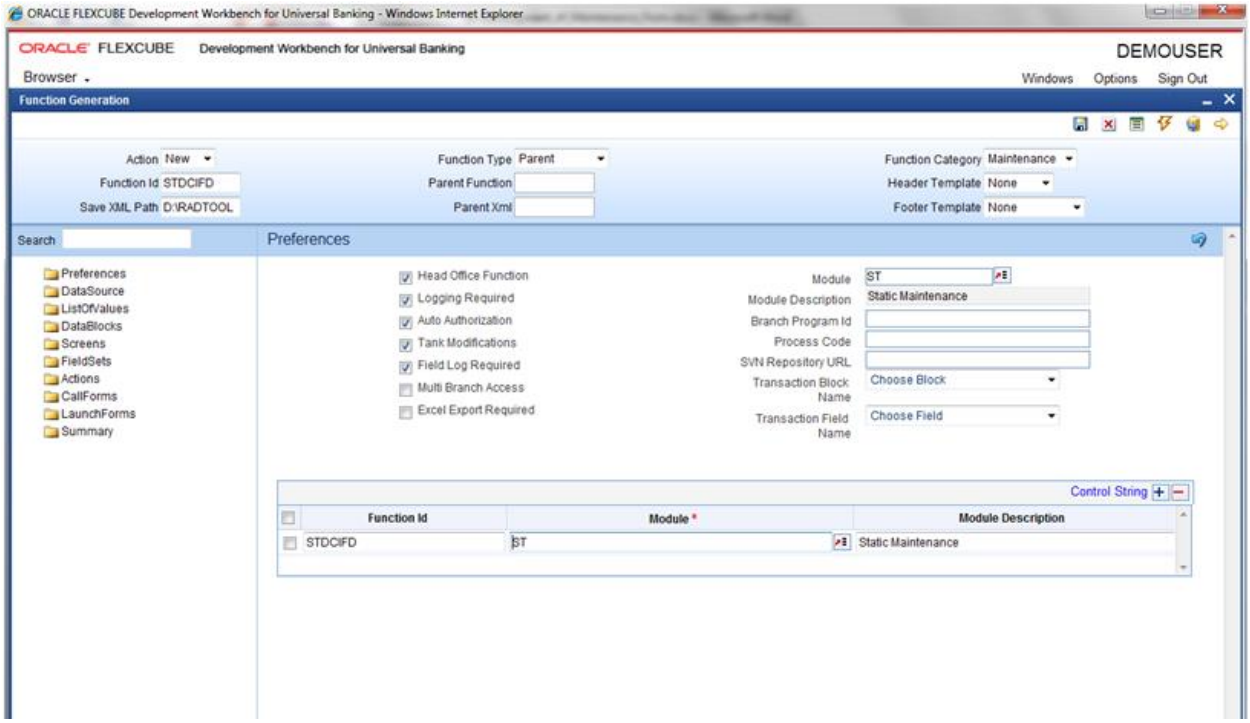

Fig 12.4: Providing Preferences for Maintenance Screen

Note the following points while providing details in Preferences screen

i) Control String

REVERSE, ROLLOVER, CONFIRM, LIQUIDATE, HOLD operations are not applicable for maintenance screens.

ii) Defining Browser Menu Tree

Browser menu tree will be defined in the script generated for ***smtb_function_description.***

The following labels has to be maintained for generation of proper script

Main Menu: LBL_{function id}_MAIN_MENU
Sub Menu 1: LBL_{function id}_SUB_MENU_1
Sub Menu 2: LBL_{function id}_SUB_MENU_2
Description: LBL_{function id}_DESC

Example: For STDCIFD, following labels has to be maintained
LBL_STDCIFD_MAIN_MENU, LBL_STDCIFD_SUB_MENU_1, LBL_STDCIFD_SUB_MENU_2, LBL_STDCIFD_DESC

Refer *Development_WorkBench _Screen_Development-I.docx* for detailed explanation on preferences

4.3 Data Sources

- Right Click on Data Sources; click on Add. Add table window gets opened.
- If user knows the exact table name, he can enter name directly; else go to List Of values to get the list of tables available. Select the required table from the list.

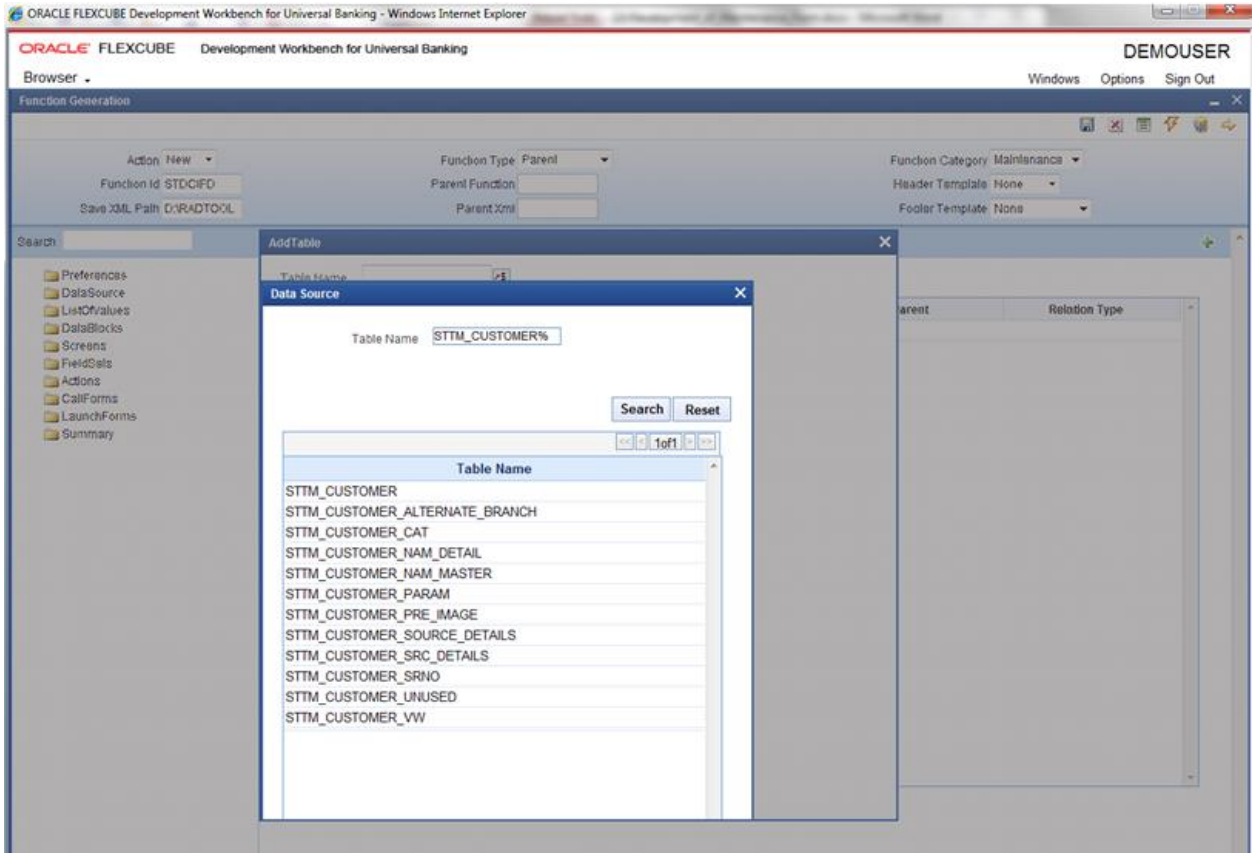

Fig 12.5: Adding Data Sources for the Function id

- Select Master as Yes if added data source is Master Data Source for the screen. Every function id should have one master data source..
- **Primary Key columns** (i.e. Pk Cols) and **Primary Types** (i.e. Pk Types) are mandatory. If it is already maintained in user schema in STTB_PK_COLS it will populated automatically otherwise user needs to enter values without fail. If user misses Pk cols and Pk Types package generation will fail.
  Note: Master Data Source cannot have any parent.

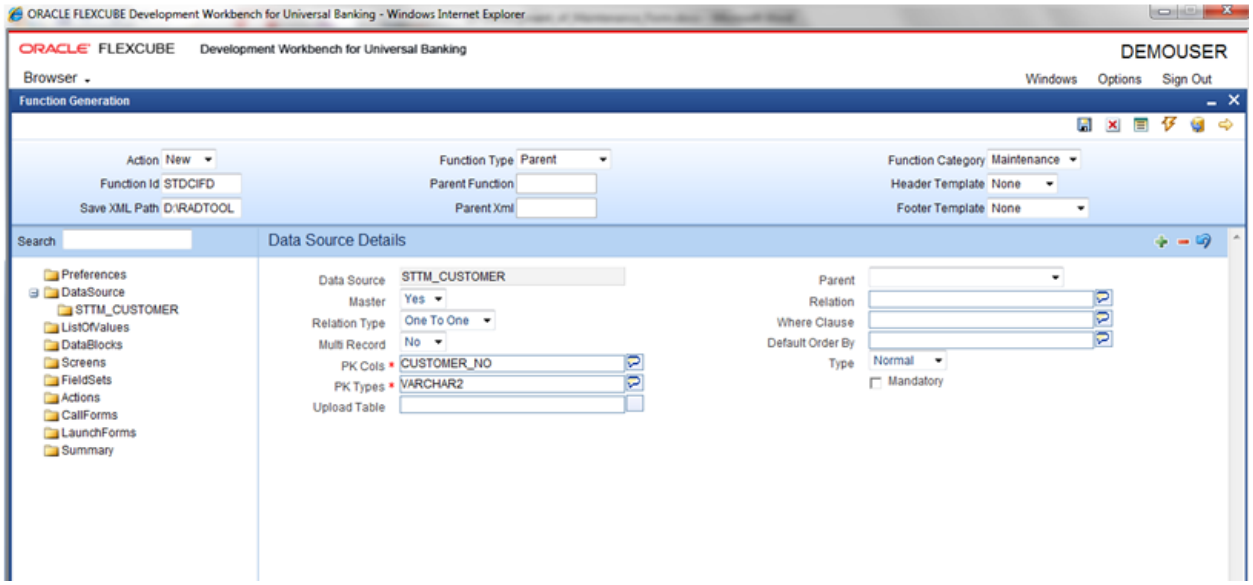

Fig 12.6: Providing master Data Source Properties

- Right Click on Added Table (STTM_CUSTOMER) to add fields to the table. Popup window gets opened with available columns in data source. Select the required fields and click ok. Selected will get added to the Data Source Tree.

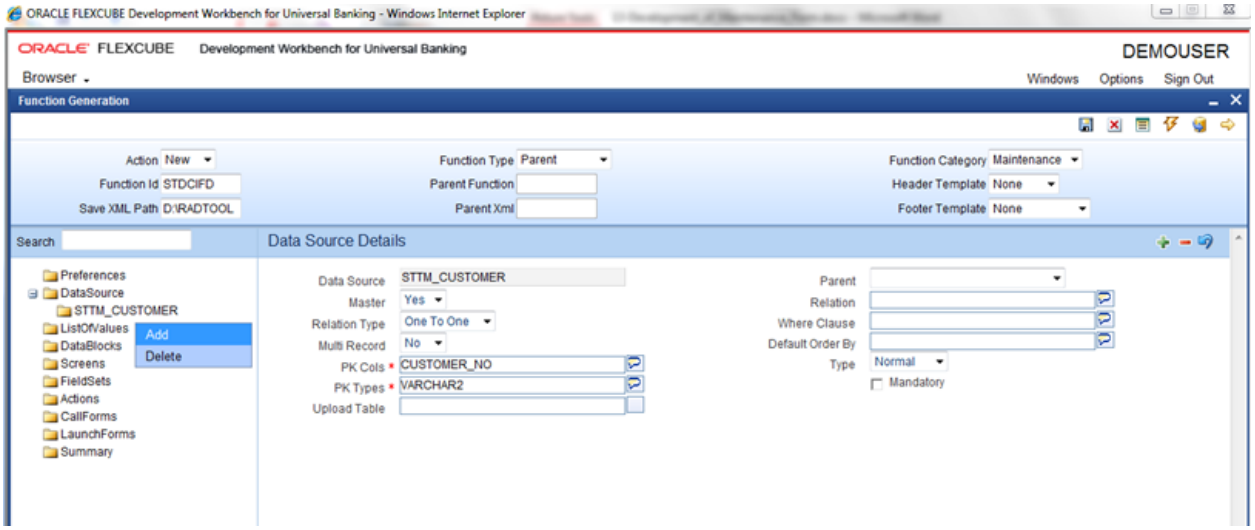

Fig 12.7: Including Data Source Fields for the Data Source

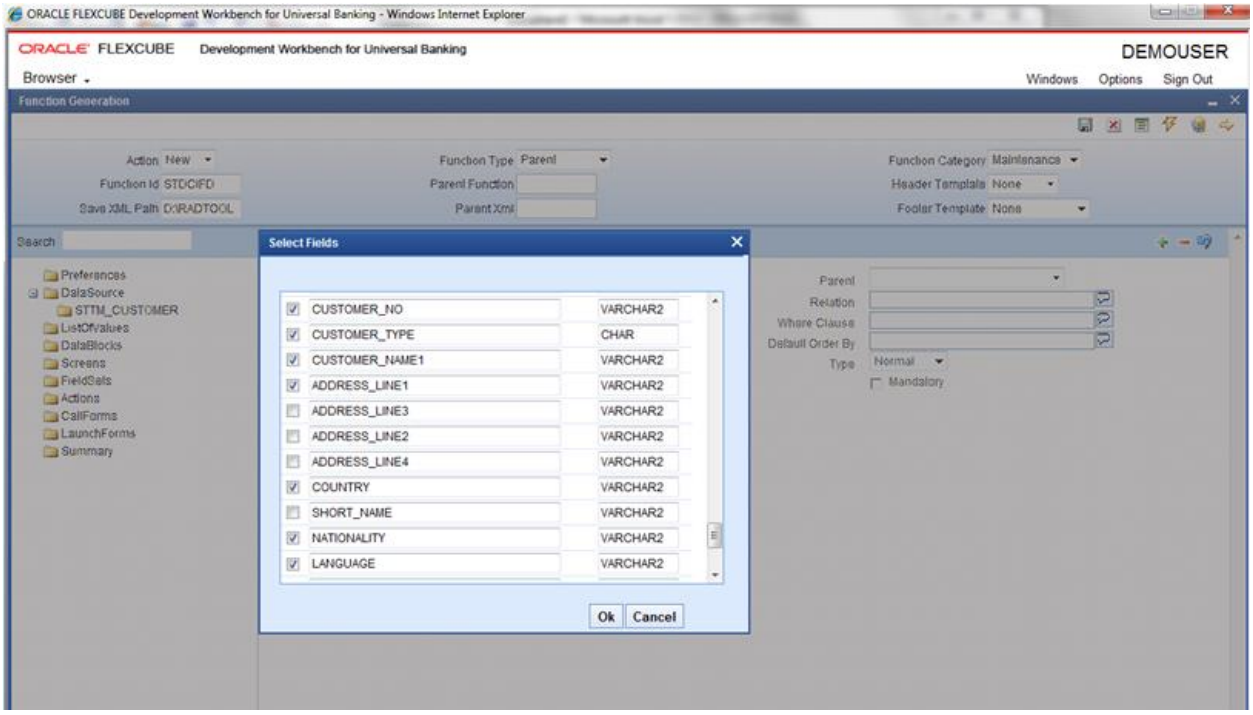

Fig 12.7: Selecting Data Source Fields for the Data Source

Data Source Field Properties:

Only max length can be modified by the developer in data source field properties. Rest will be defaulted from table definition

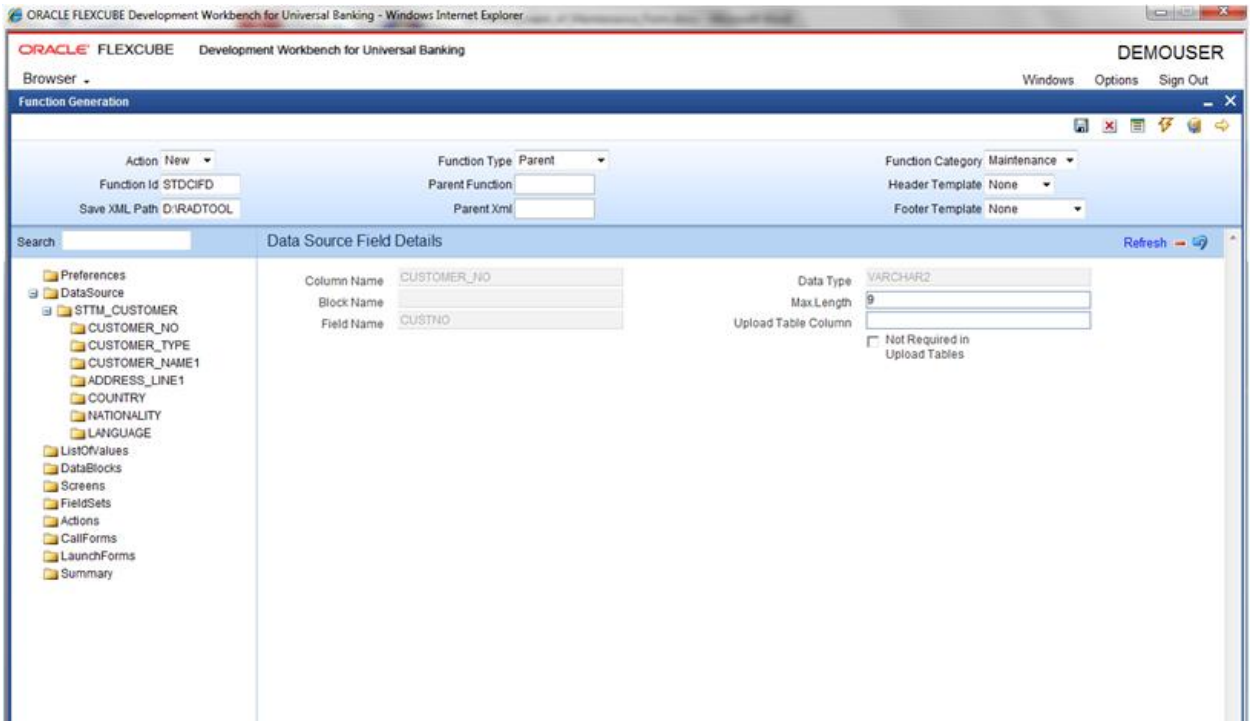

Fig 12.7: Providing properties for Data Source Fields

Data model of a single function id would include multiple tables .All the tables needs to added in the function id. Note the following while adding child data sources

Adding Child Data Source:

- Select Multi Record value as Yes if child data source is Multi record table.
- Child Data Source should always be associated with a parent.
- Relation is mandatory between parent and child. While giving relation, parent data source should come in left side of the relation.

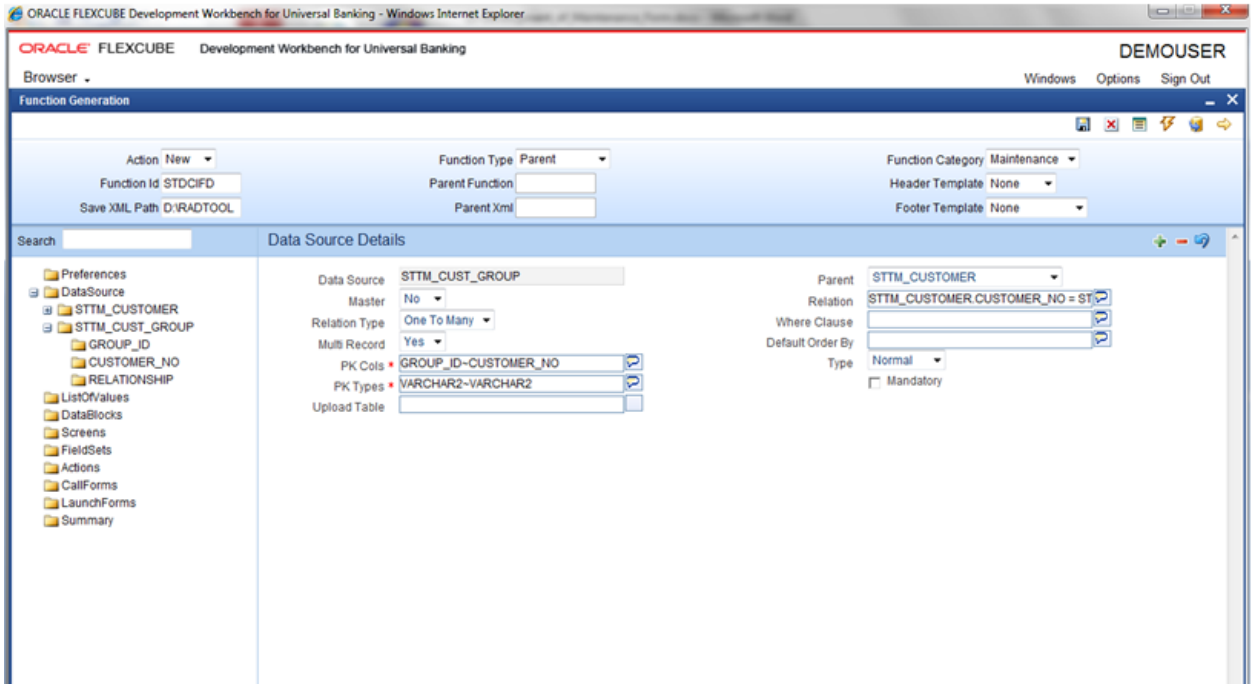

Fig 12.7: Providing properties for Child Data Source

Note: A data source cannot be parent to itself.

Note the following while adding data sources:

i) If the data source is designed with relation type as 1: N with its parent, then it should have at least one more Pk col than its parent (assuming relationship is based on Pk cols).

ii) Master data source needs to have the audit columns if footer template is Maint audit; but those should not be added to data source fields as system will handle it

Refer *Development_WorkBench _Screen_Development-I.docx* for detailed explanation on data sources

4.4 Data Blocks

- Block Name should start with BLK_<short Name equivalent to data source but not exactly same as Data Source name>.

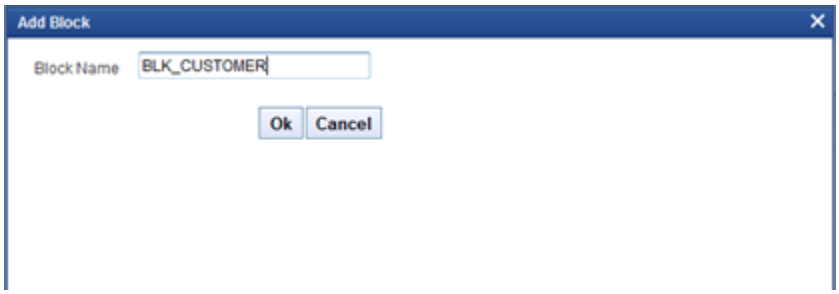

Fig 12.8: Creating a new Data Block

- Select Parent block if added block is not Master Block.
- Select Multi Record (Yes/No) based on this value, available data sources will displayed in data source available text area.

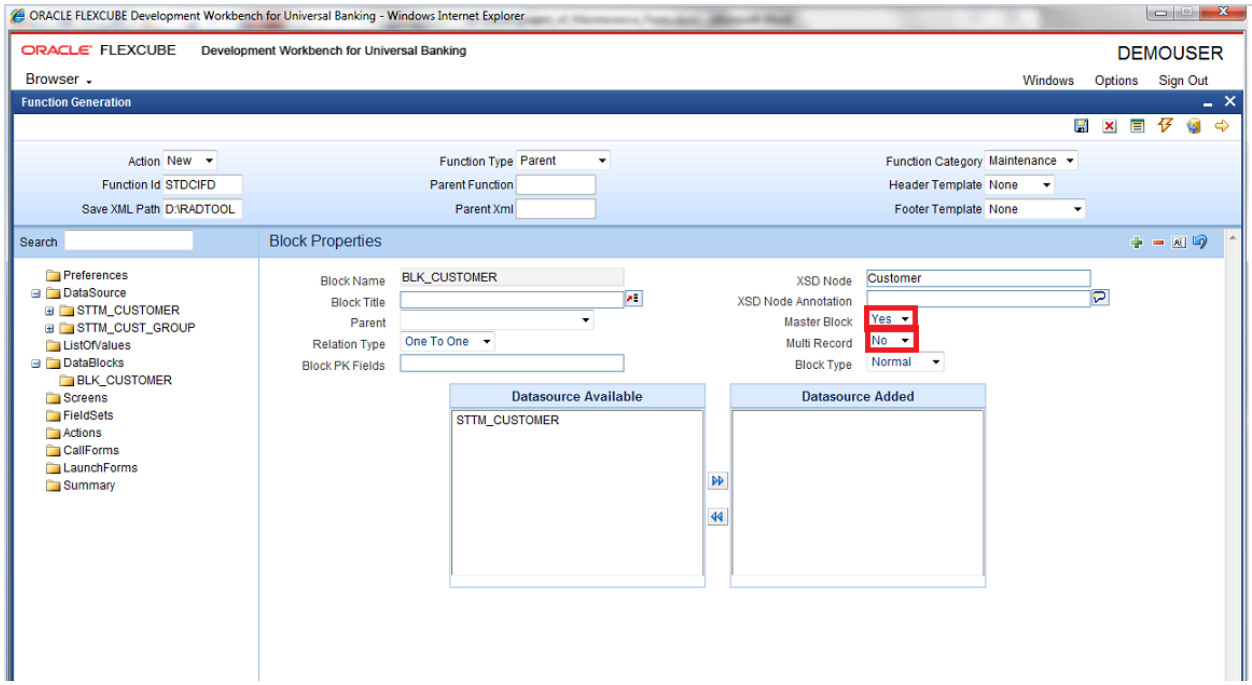

Fig 12.9: Providing properties for Data Block

- Select the required data source and click move button to attach Data Source to the block

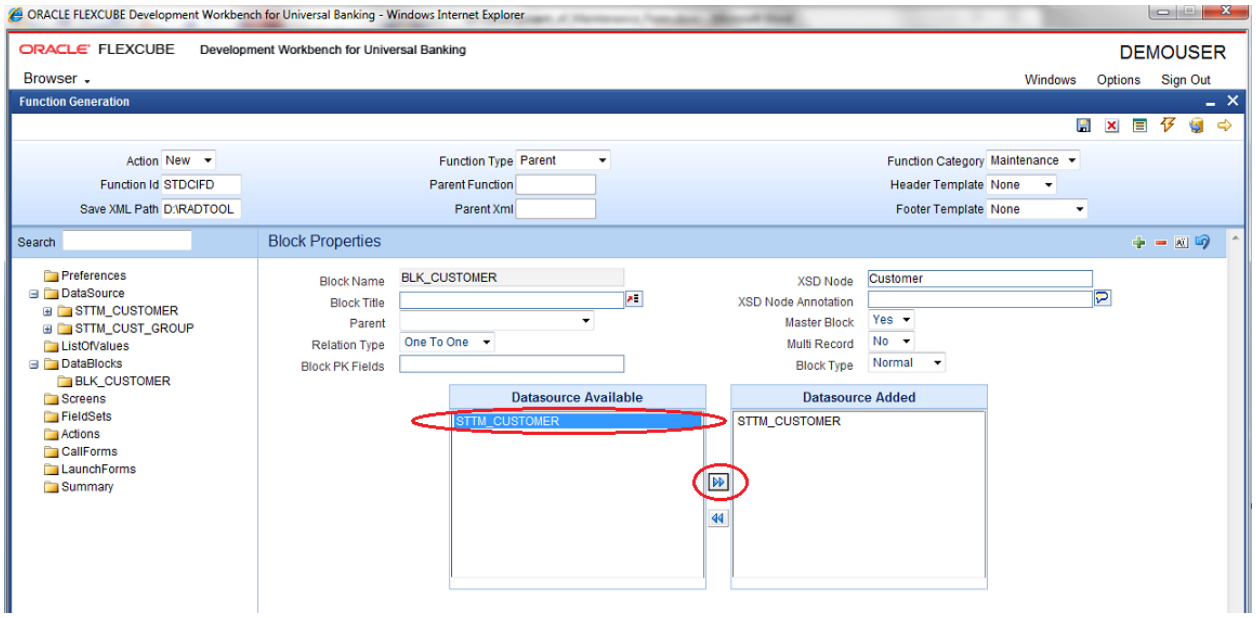

Fig 12.10: Attaching Data Sources to Data Block

Adding multi record data source to data block:

User on selecting Multi record Yes in data block properties all the data sources with multi record Yes will be populated. ***Multi Data Source once used to one block won't available for reuse where as single record data source can be used in multiple blocks***

Select Block Fields:

- Right click on added block. Select Fields window will get opened. Developer needs to check the right side check box to add the required fields.
- **Field Name**: It should not be the same as column name .Special characters are also not allowed in the field name (including underscore and space)
- **Label Code**: It will be automatically populated based on field name.

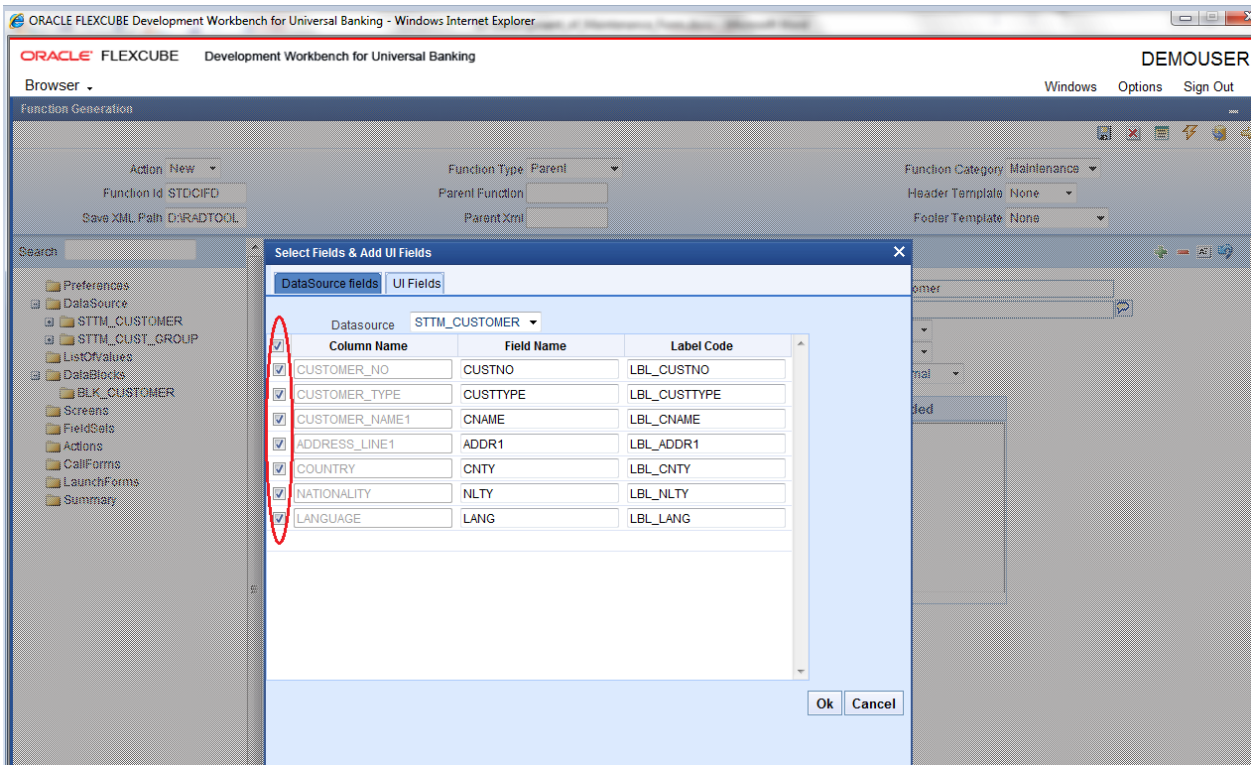

Fig 12.11: Adding Block Fields to Data Block

Refer *Development_WorkBench _Screen_Development-I.docx* for detailed explanation on data blocks and block field properties

4.5 Screens

- Right click on Screens node to add a new screen
- Screen Name should start with CVS_<Name>..
- By default screen are divided into 3 parts.
- One Main Screen is Mandatory.
- Tabs can be defined on any of the screen portions as required
- User can add sections to tabs.
- Each section can be divided into partitions.

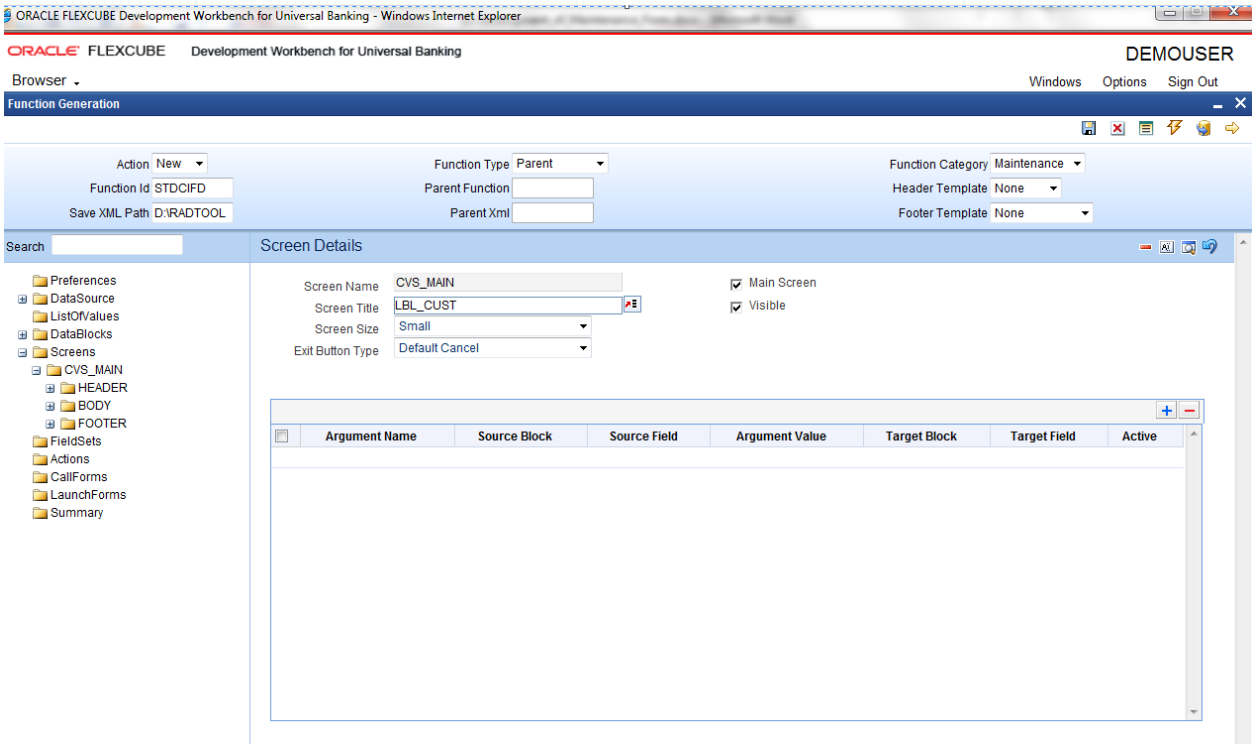

Fig 12.12: Providing properties to new Screen

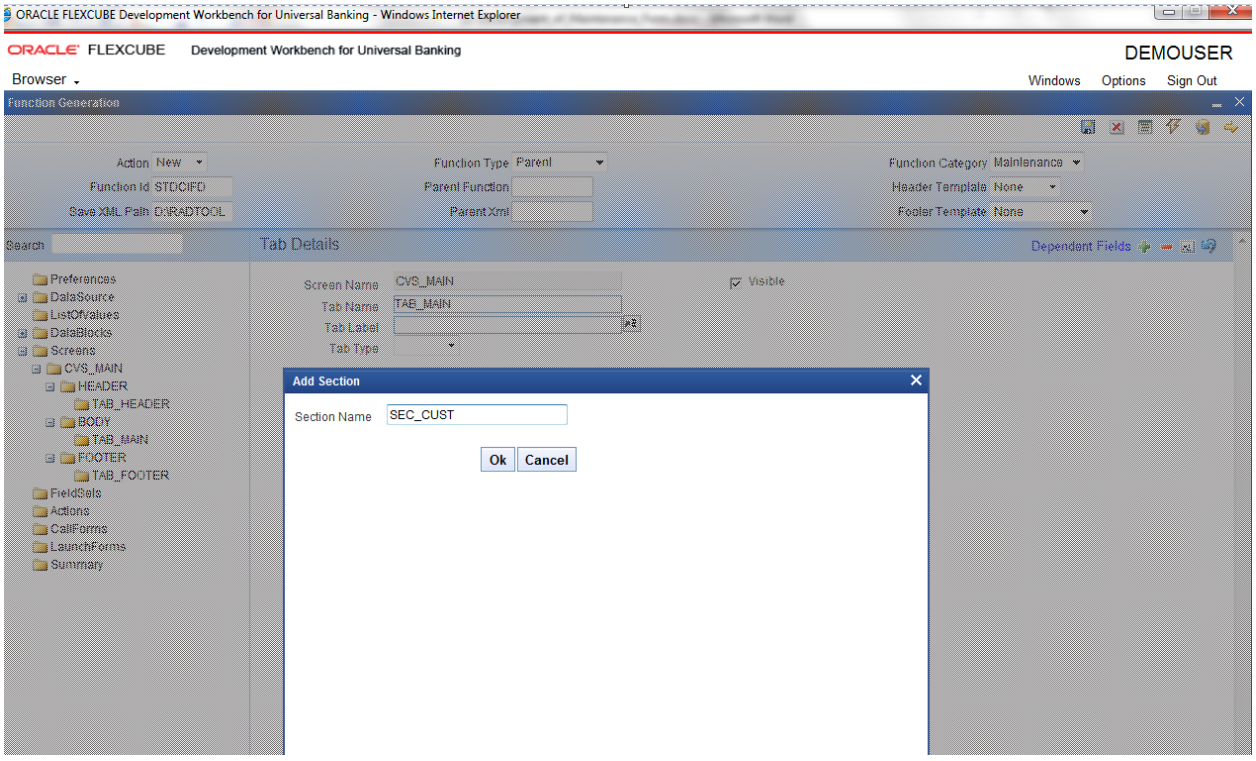

Fig 12.13: Creating new section in TAB_MAIN in the body of screen CVS_MAIN

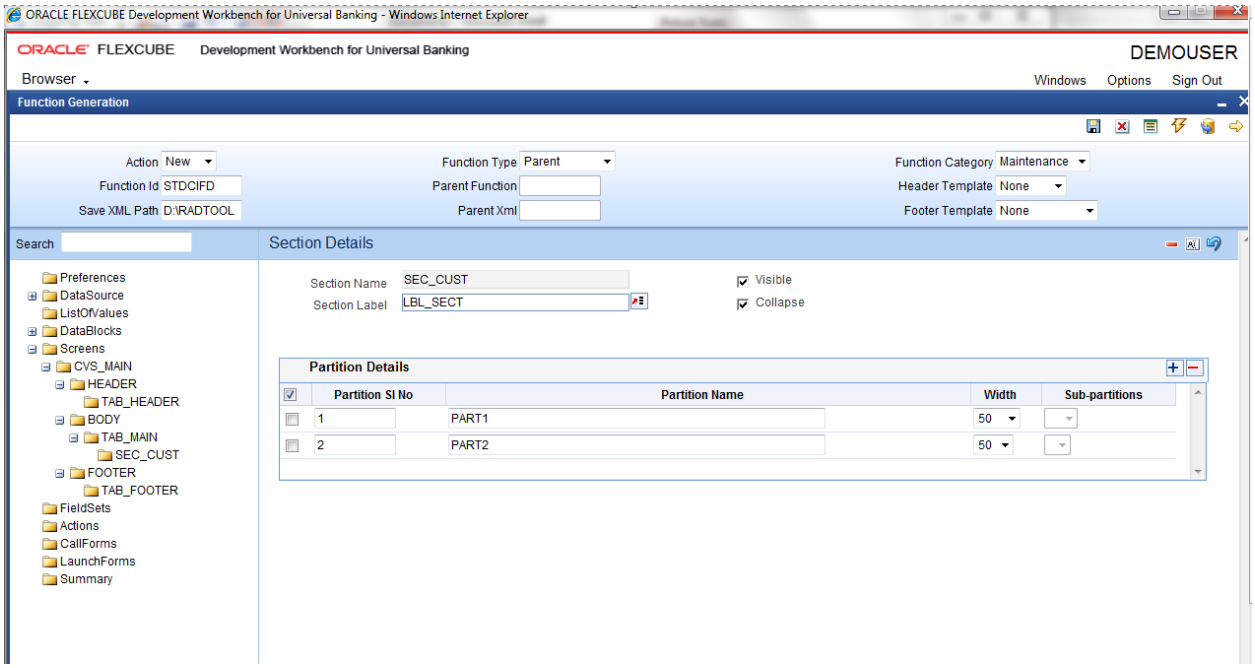

Fig 12.14: Defining partitions for the Section

4.6 Field Sets

A group of fields can be grouped together in a Field set which can be placed together in the screen

- Field Set Name should start with FST_<>.
- Select the Block adding to field set.
- All fields available to the block will be displayed in to the data block fields text area. Move fields from data block fields to Field set fields.
- The order of fields in *field set fields* will reflect in the screen as well

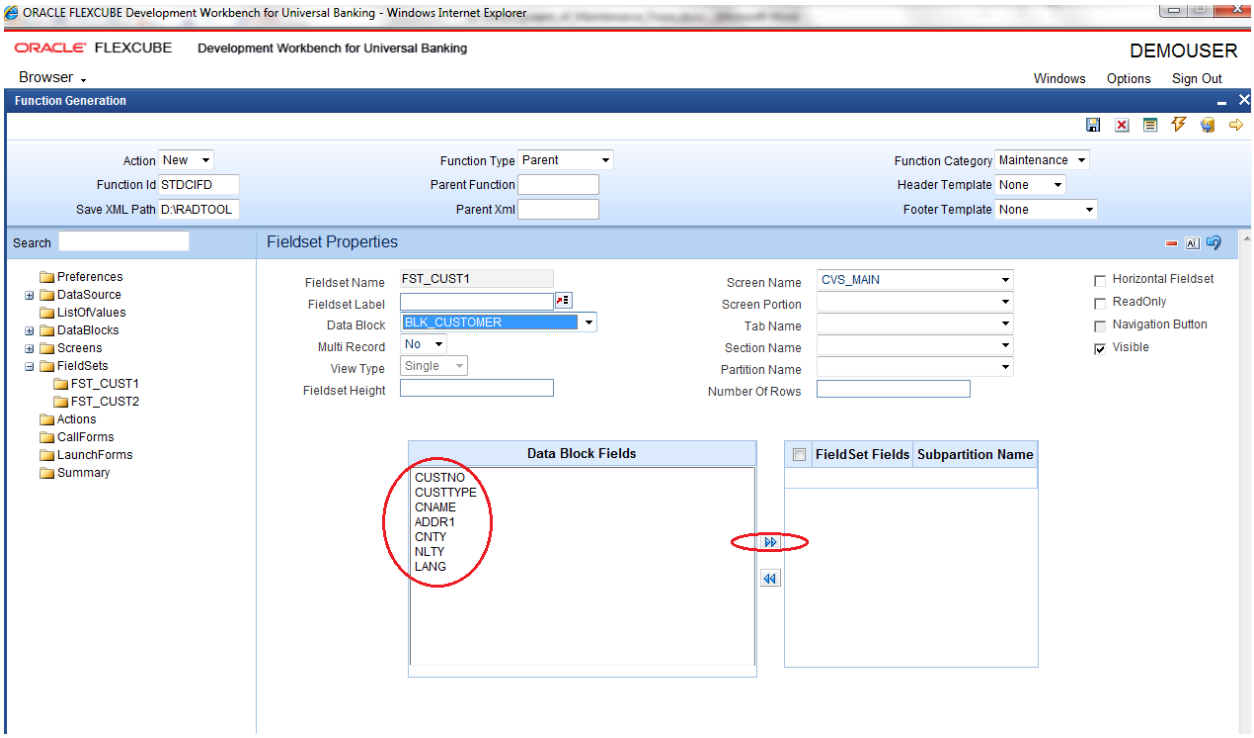

Fig 12.14: Attaching Fields to a Field set

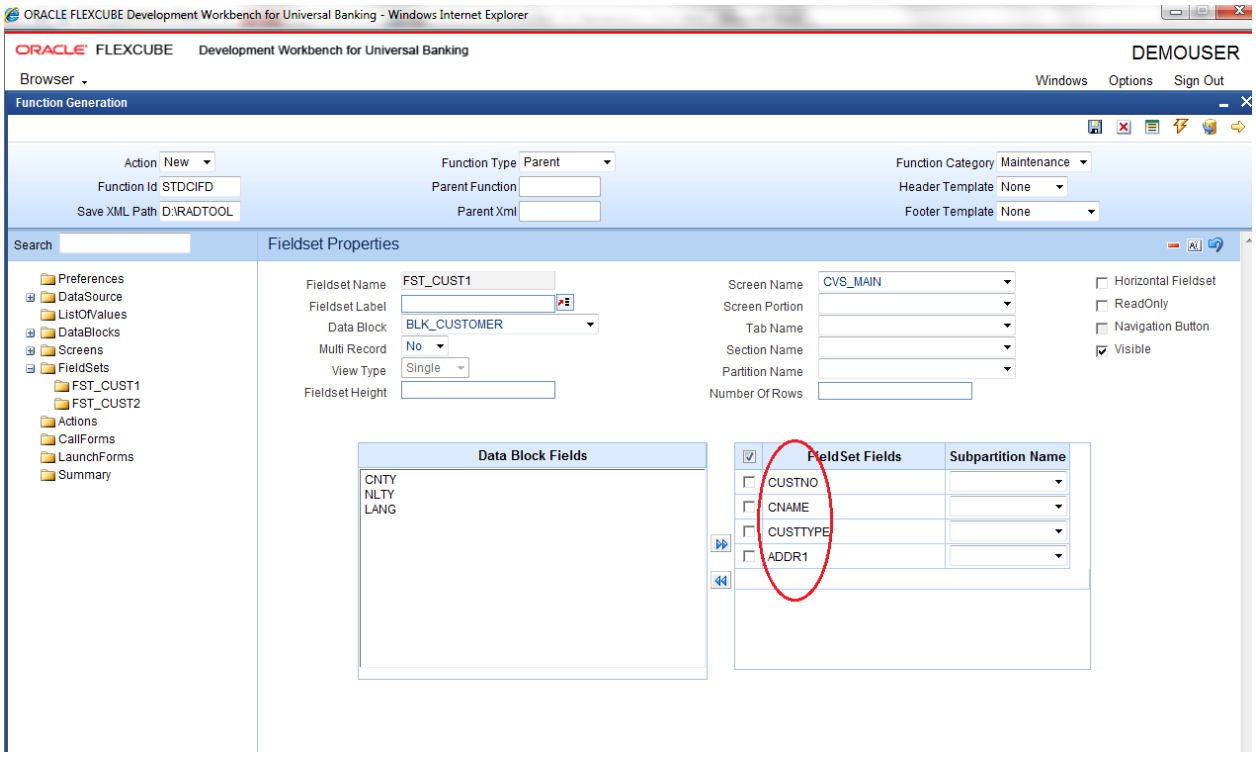

Fig 12.14: Order of fields in the field set highlighted

- Select the screen portion (Header/Body/Footer) where this field set has to be placed. Select remaining details like tab, section and partition.

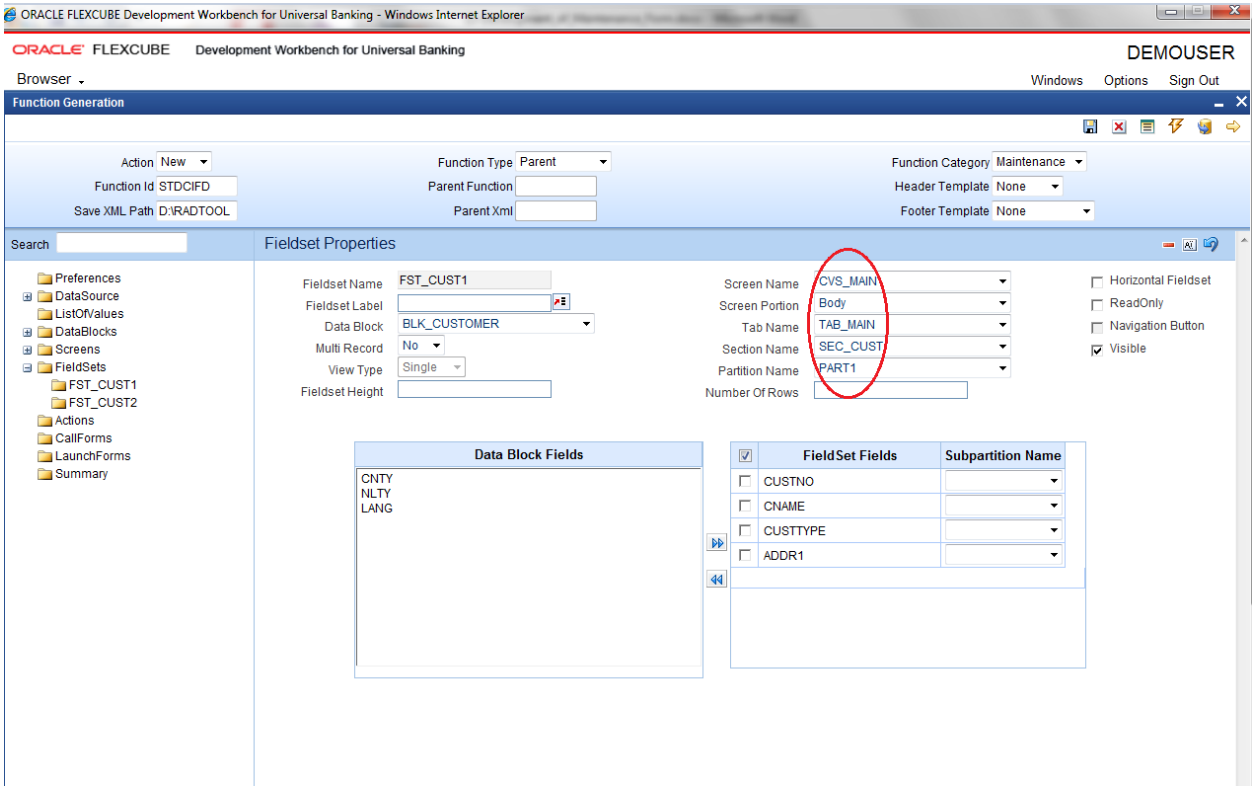

Fig 12.15: Providing details where Field Set has to be placed

Once fields are added to field set, developer can check the preview of the designed screen. Right click on Screen Name and click on Preview.

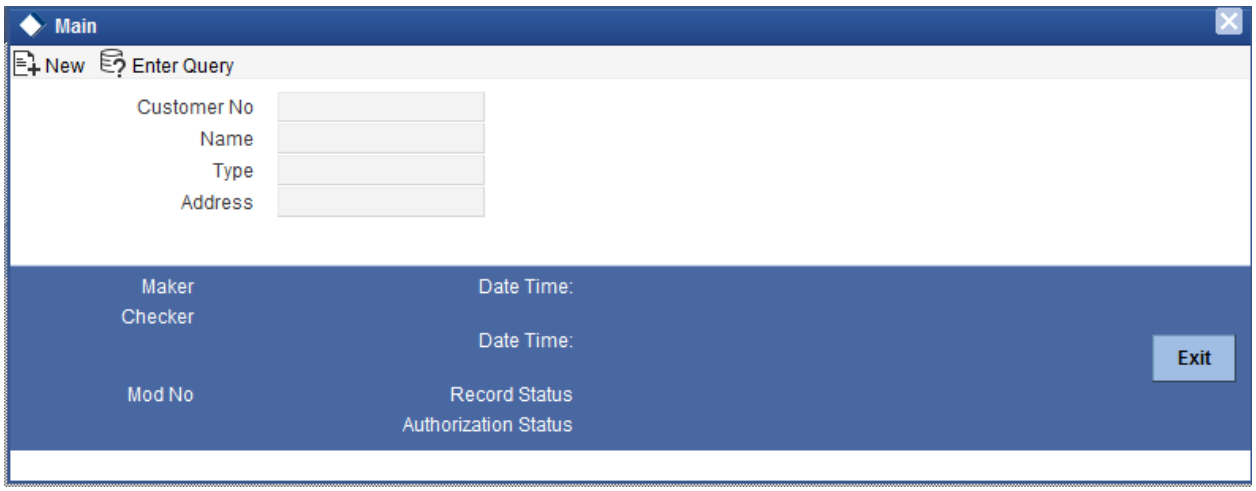

Fig 12.16: Preview of the designed Screen

Adding Multi entry block to field set.

- On selecting a multiple block, Multi Record Property will be defaulted to Yes..
- In case of Multi record, View type can be either Single or Multiple (By Default).

Below image shows a multiple view multi record field set

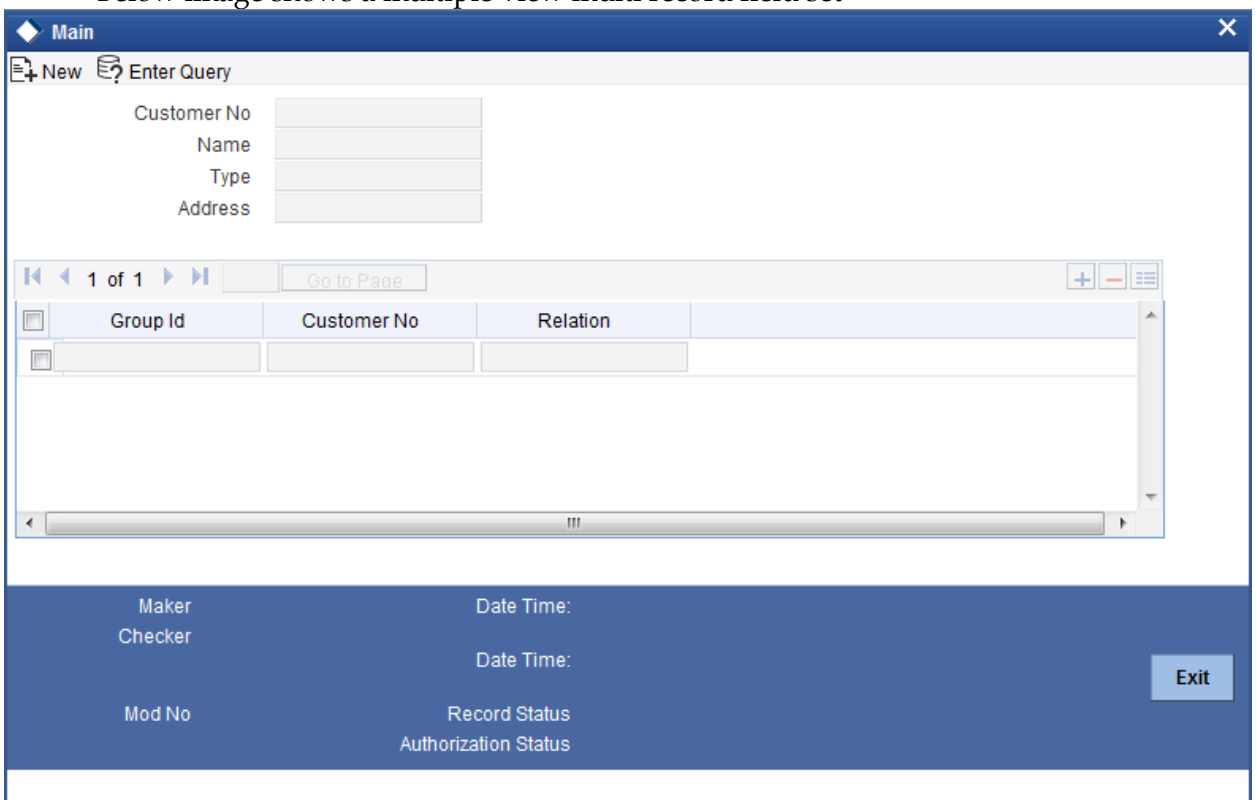

Fig 12.17: Multiple View Multi Record Field set

- For multi record single view navigation button should be checked.

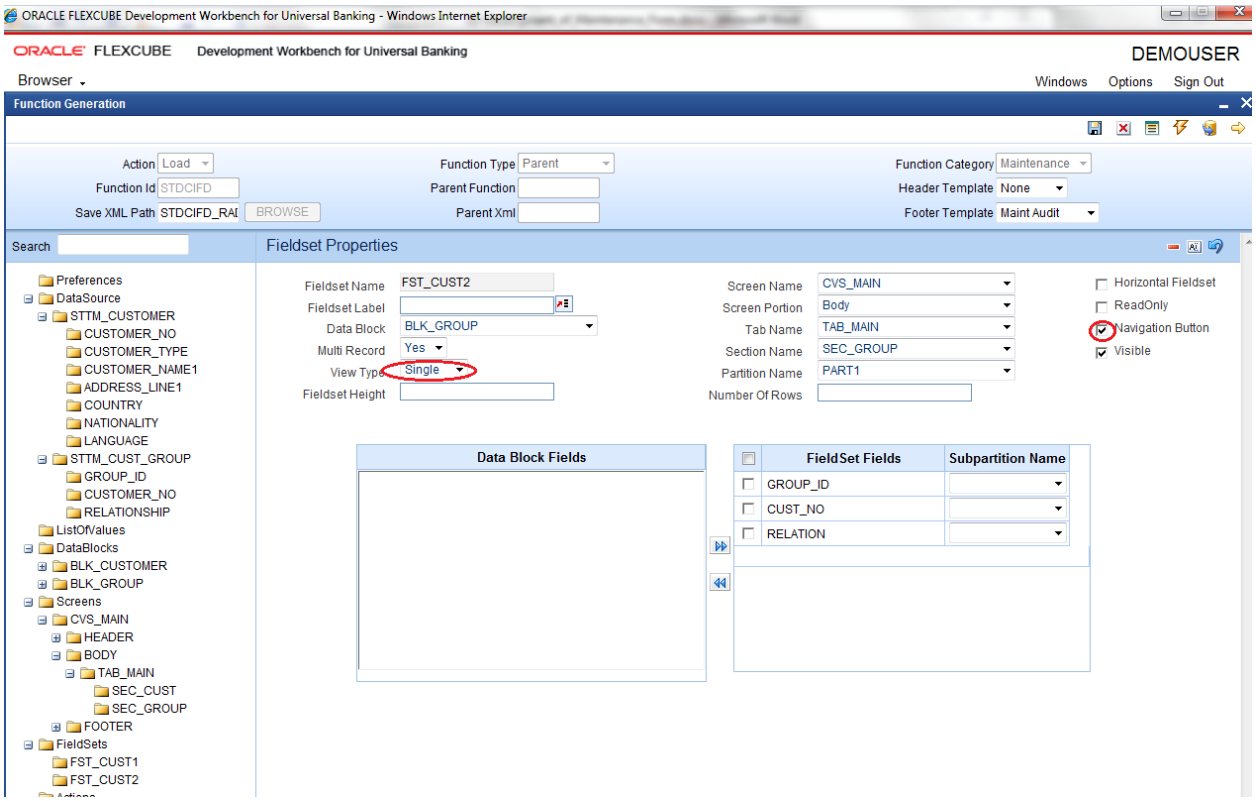

Fig 12.18: Properties for Single View Multi Record Field set

Below figure shows the preview of a single view multi record field set

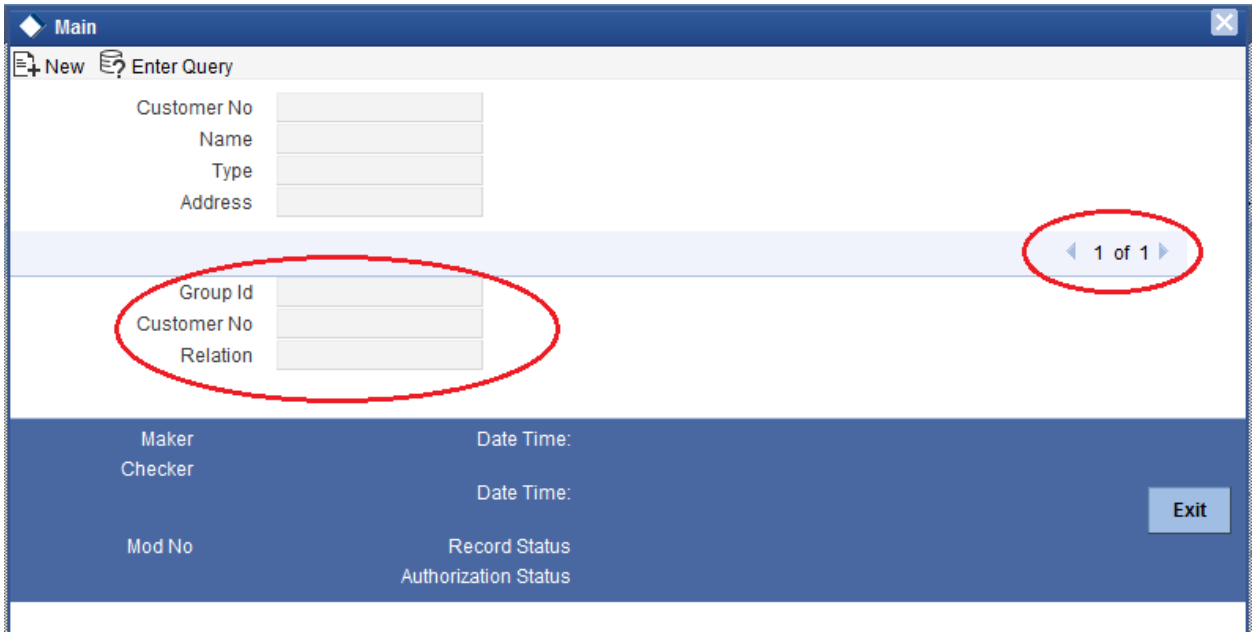

Fig 12.18: Preview for Single View Multi Record Field set

4.7 LOV

List Of values can be defined for the function id using LOV node

- To add LOV right click on List of Values Node. LOV Name should start with LOV_<name>.
  Example: LOV_COUNTRY.
- LOV Type - This field can be Null or Internal.
- Enter valid query and click on populate button.

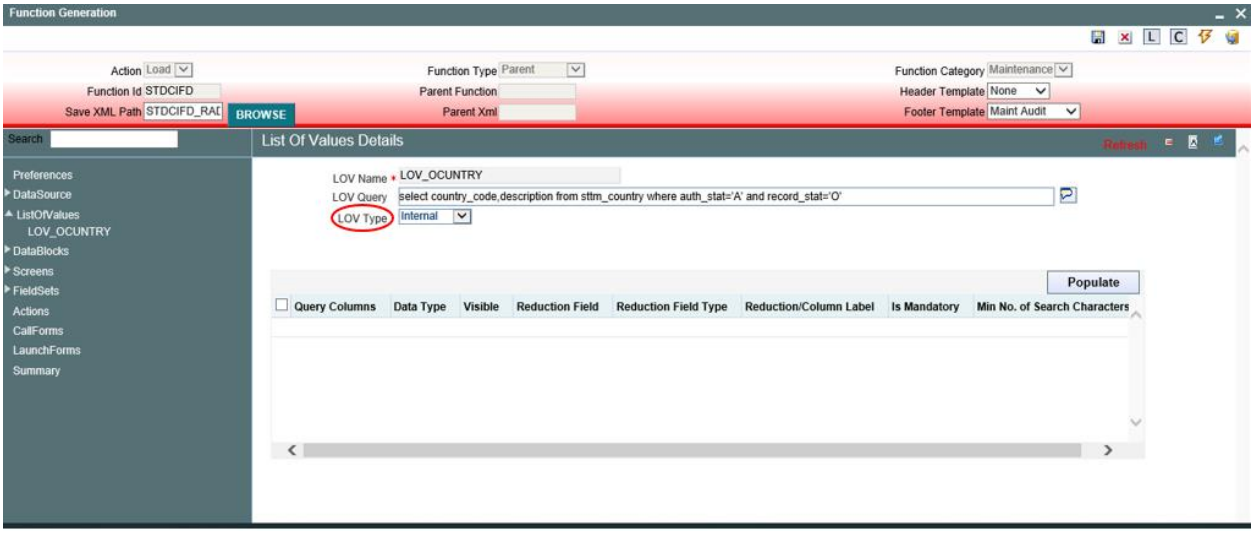

Fig 12.19: Defining new LOV

Fig 12.20: Providing LOV query

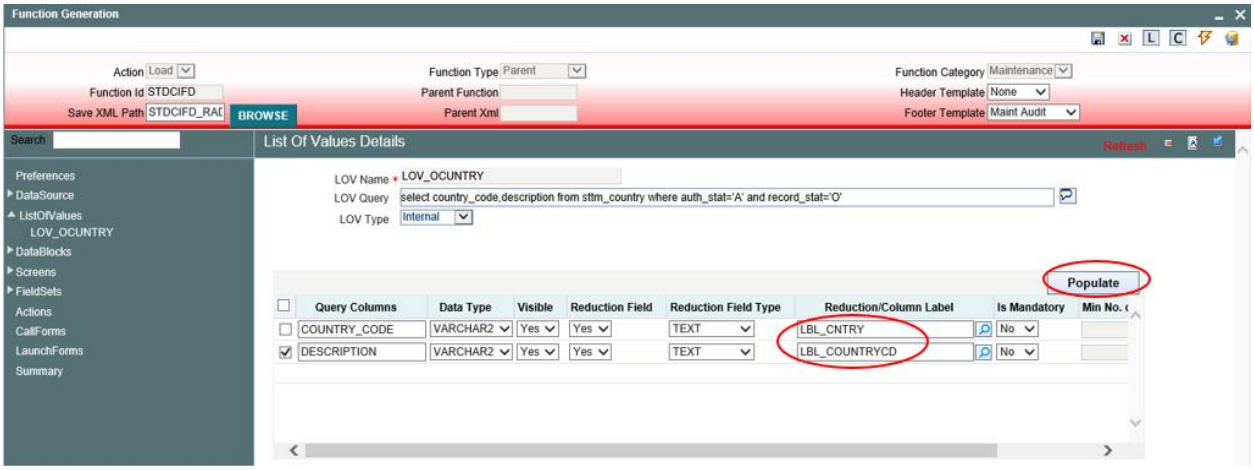

Fig 12.21: Providing LOV details

- Redn/Col Labels are mandatory. If user won't provide will get error on click of LOV button after deployment in FLEXCUBE
- After defining LOV go to block and corresponding field where the LOV has to be attached.

Block Field Properties to attach LOV to the field

- **Display Type:** Select display type as Lov.
- **Lov Name**: Select the required Lov name from the list of all defined LOV's.
- Click on return fields tab. The result fields maintained in the LOV query will be populated on click of ***Default from Lov Definition*** button

- Select the desired field (and its block)to which the result of the LOV query should be defaulted
- If return field is not required to be defaulted to any field in the screen, return field value can be left blank

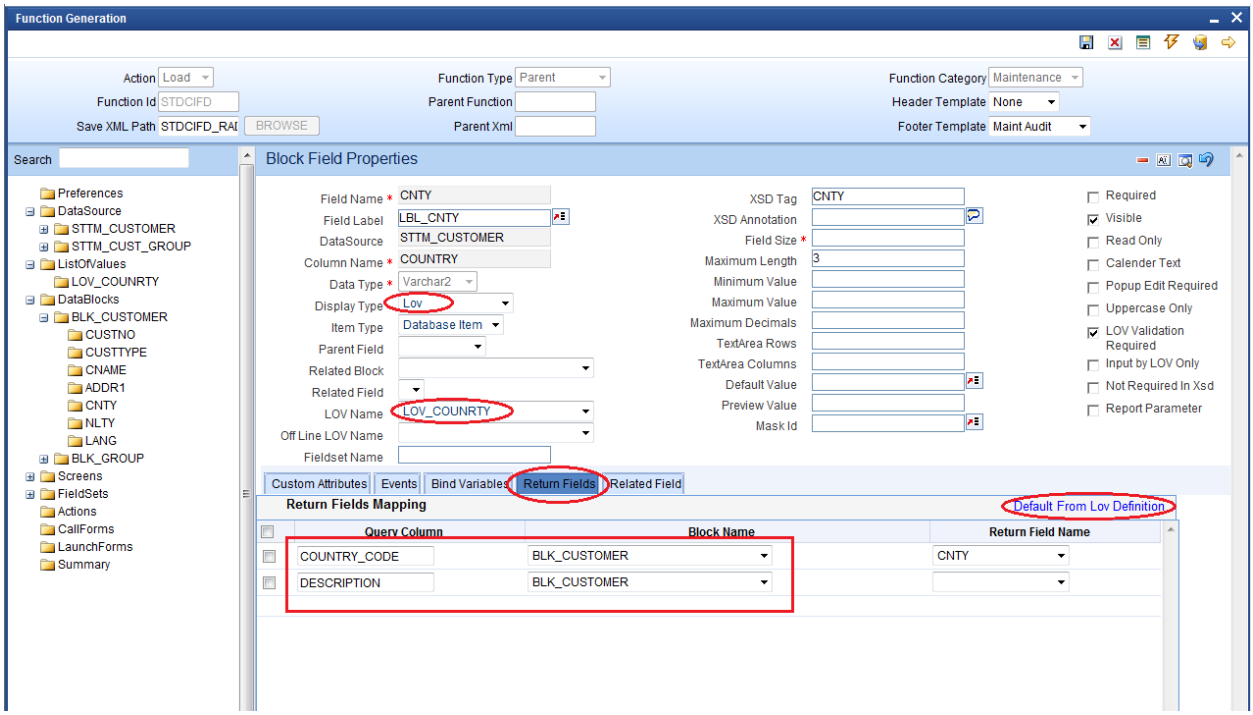

Fig 12.22: Attaching LOV to a block Field

Use of Bind Variable

If the list of values should be based on any other field value from the screen, bind variables can be used.

Example:

Define lov as shown in below query; where clause should contain condition with '?'.

```
SELECT cust_ac_no,  branch_code, ccy
 from sttms_cust_account
  where cust_no = ?
    and record_stat = 'O'
    and once_auth = 'Y'
    and  ac_stat_de_post = 'Y'
```

In the block field, after selecting return fields, click on bind variables tab. Click on ***Default from Lov Definition*** *button. New rows will be created depending on the number of bind variable provided in the LOV query. Select the bind filed in the screen (and its block) for the LOV. Data type of the field has also to be selected.*

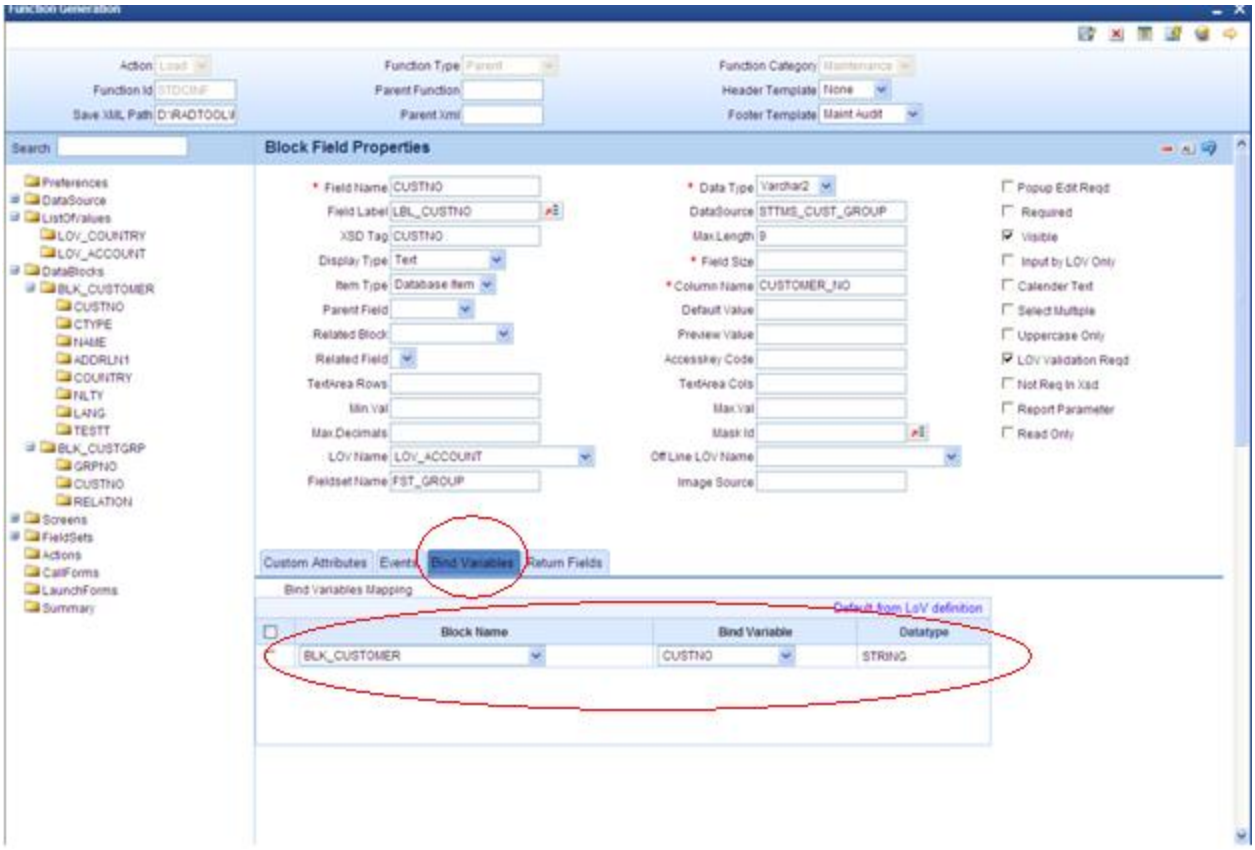

Fig 12.23: Defining bind variable for the LOV

4.8 Attaching Call forms

Maintenance Call forms can be attached to a maintenance screen. Refer the document 15-Development of Call Form.docx for developing call forms

Attaching Call forms

- Add button to block to launch call form on button click.
    - Right click on Block
    - Select Add fields. Select fields and Add UI field's window will be launched
    - Select UI Fields tab. Click add row button. Enter button name and click ok.
    - Select display type as button and enter field label.

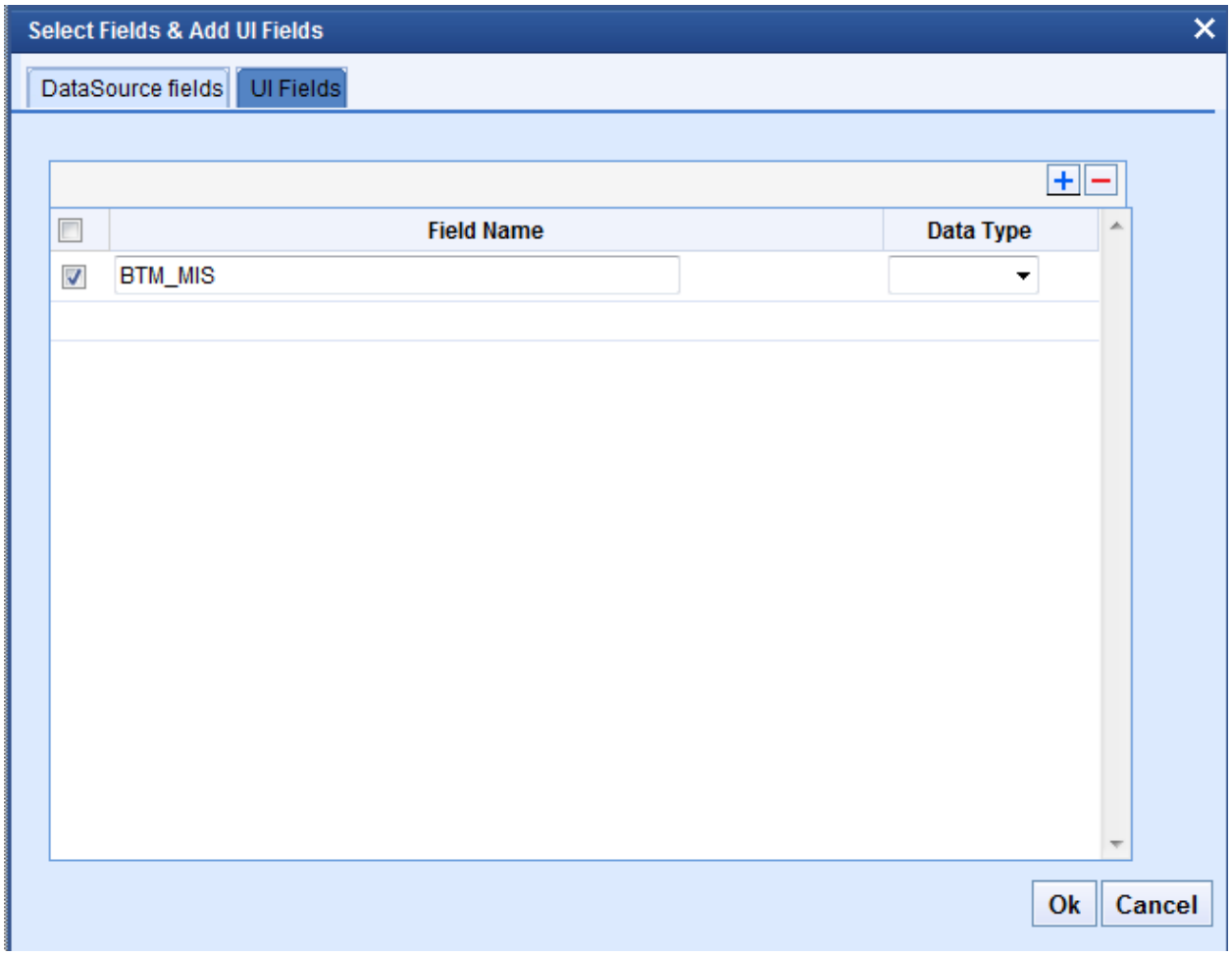

Fig 12.24: Defining Button field

- Add Call form details to Call form node

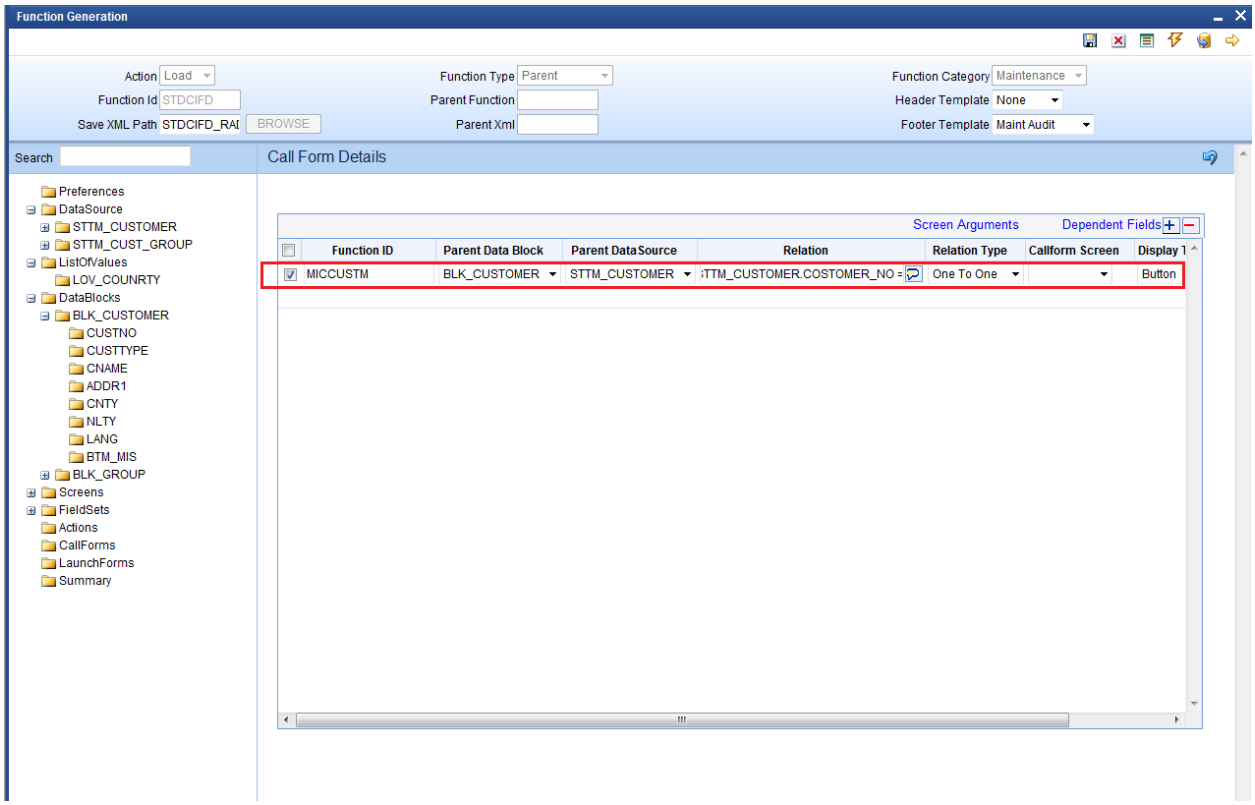

Fig 12.25: Defining details of the Call form to be attached in call form node

- Add event to button.
  - On selecting event type as call form or launch form or sub screen button will be displayed on bottom of the screen.
  - If user needs to place button position in desired place on the screen, event type should be Normal .User has to write code in release specific JavaScript file to launch the screen

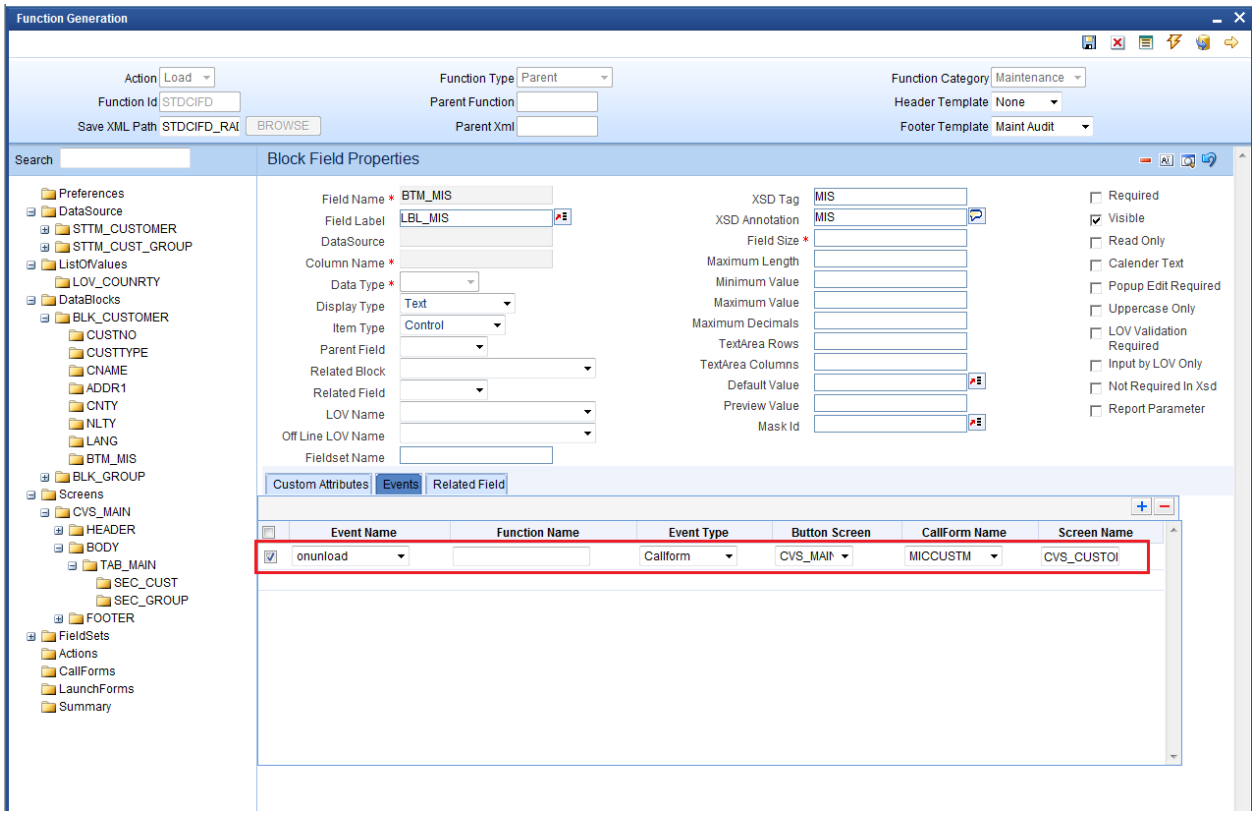

Fig 12.26: Defining event to the button such that call form is linked to the button

- Check the preview.

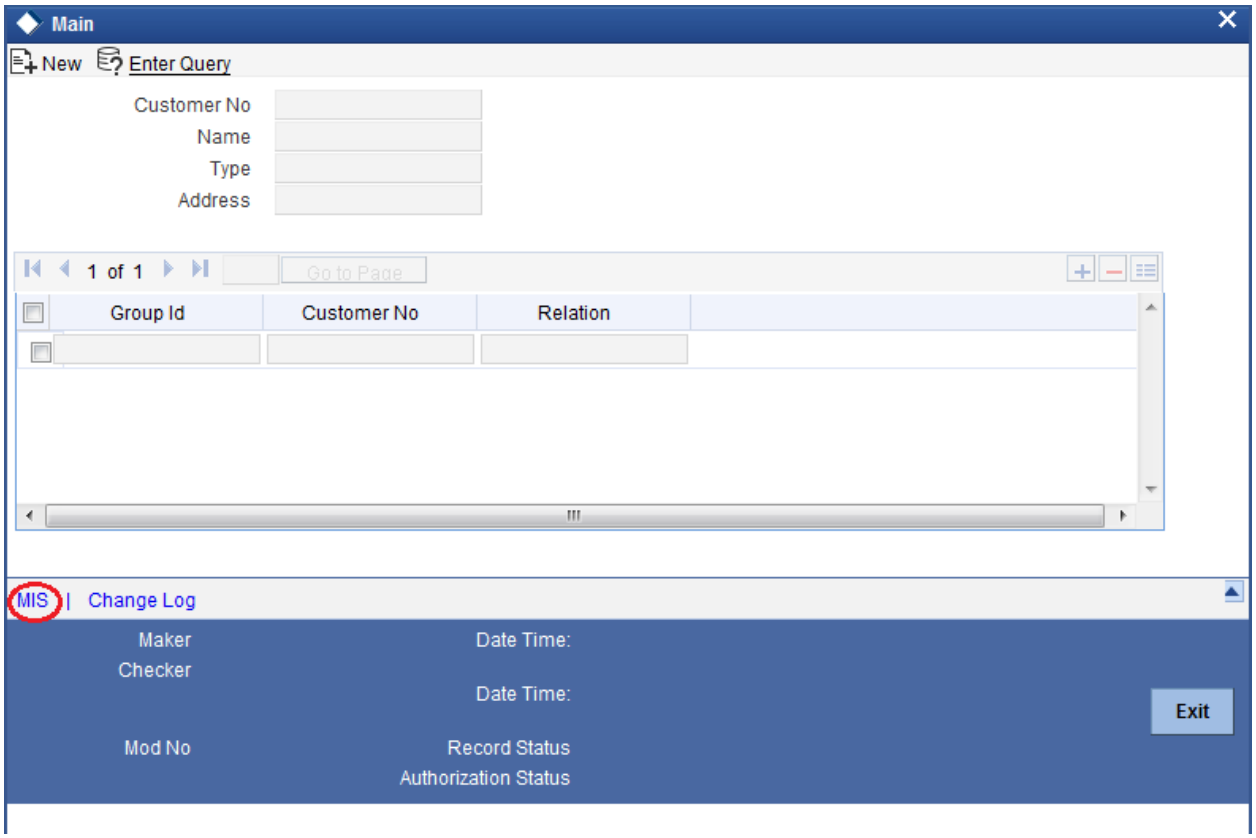

Fig 12.27: Preview of the screen with the Call Form button

4.9 Adding Summary

1) Add entry in Preferences node for Summary screen

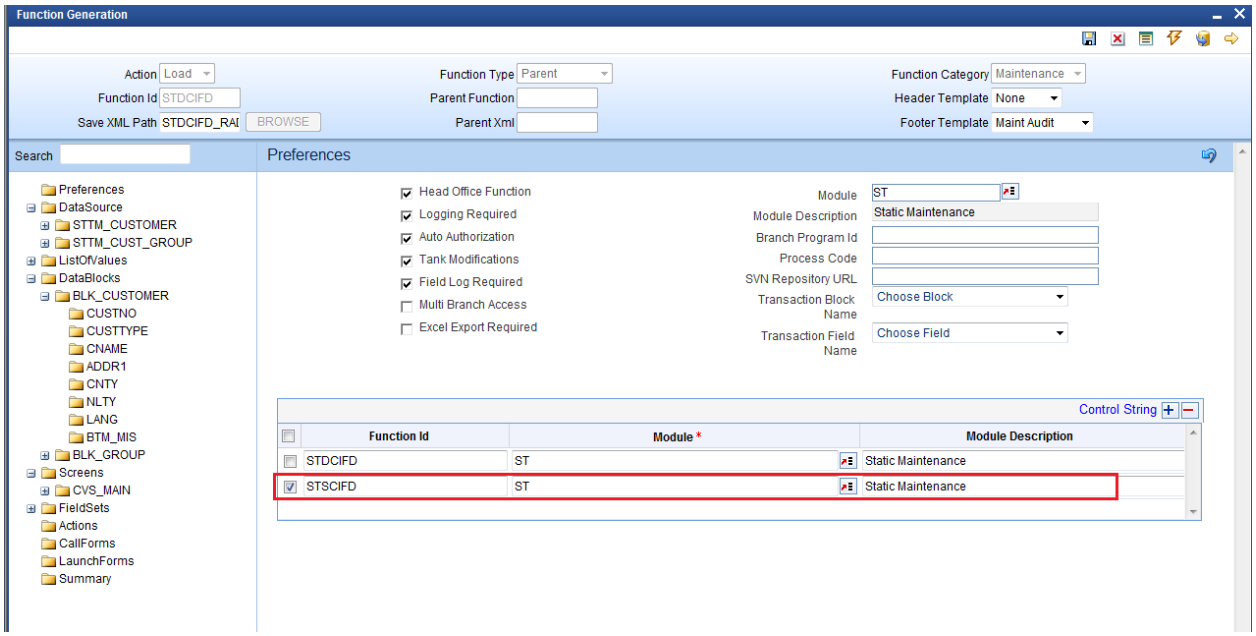

Fig 12.27: Adding Summary screen details in Preferences node

2) Click on Summary Node.

- Enter Summary title .Select label code from lov.
- Select Data Block master block and summary blocks will be displayed. Select required block from drop down list.

- Select Data Source for summary.
- Select Summary Type.
- Select Summary Screen size.
- Enter if any where clause is required.
- Enter Default order by if required.
- Enter Multi Branch where clause if required.
- Attach the fields required in the summary result grid
- If the field is required as part of filtering, query has to be checked for the particular field
- Provide the position of fields in Result grid and Summary Query set .

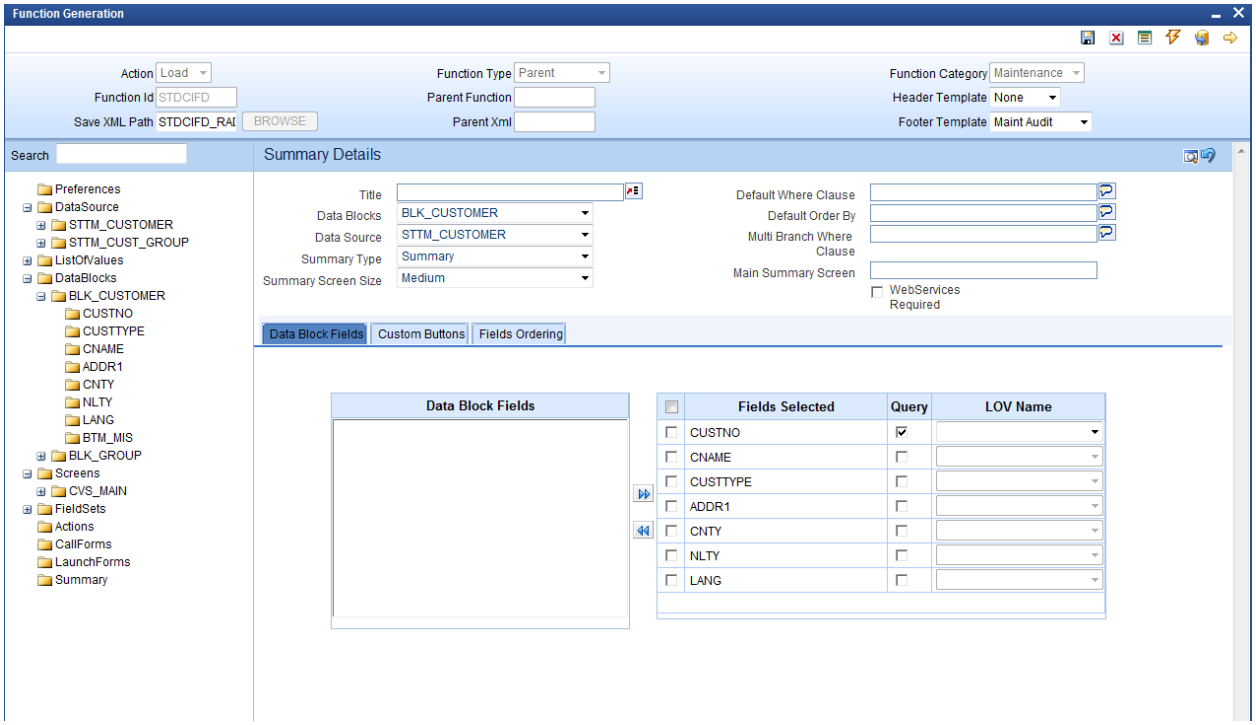

Fig 12.28: Providing Properties for Summary Screen

Summary Preview

Right click on summary node and click on preview.

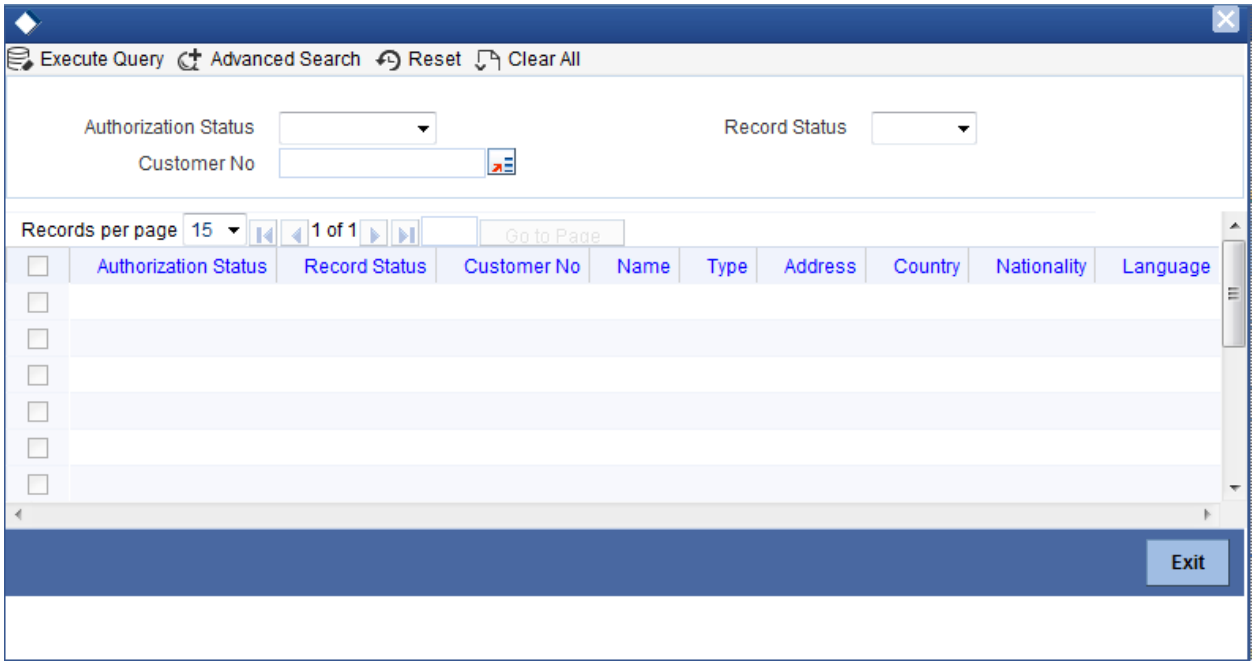

Fig 12.29: Summary Screen Preview

4.10 Amendable fields Maintenance

Amendable Fields

If user needs to modify data of a particular field on unlock, in Workbench developer has to maintain fields as amendable.

- Click ACTIONS node.
- Click on *Amendables* button next to the action for which the field has to be made amendable
- Select the fields in each block which user can modify for the selected action.

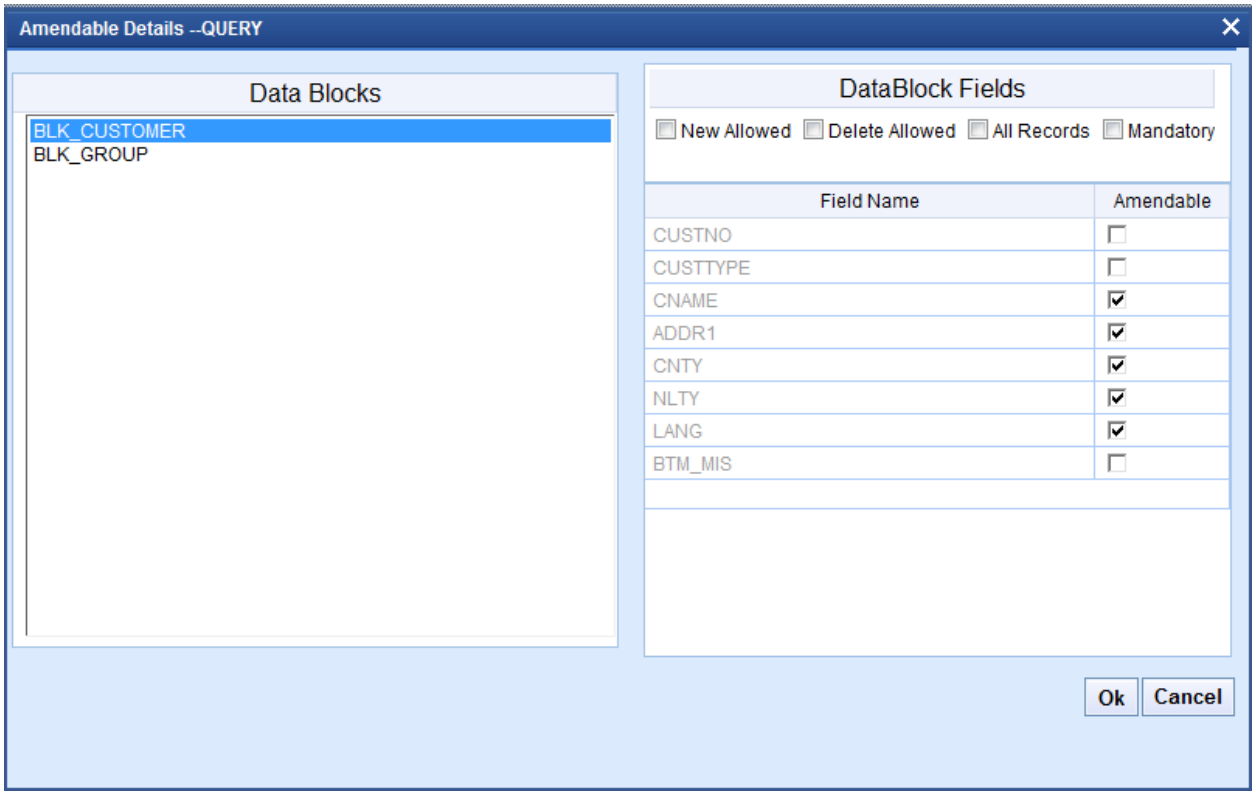

Fig 12.30: Maintaining amendable fields

5. Generation and Deployment of files

Generate Files

- Click on generate button select the required files to generate and click on Generate button.

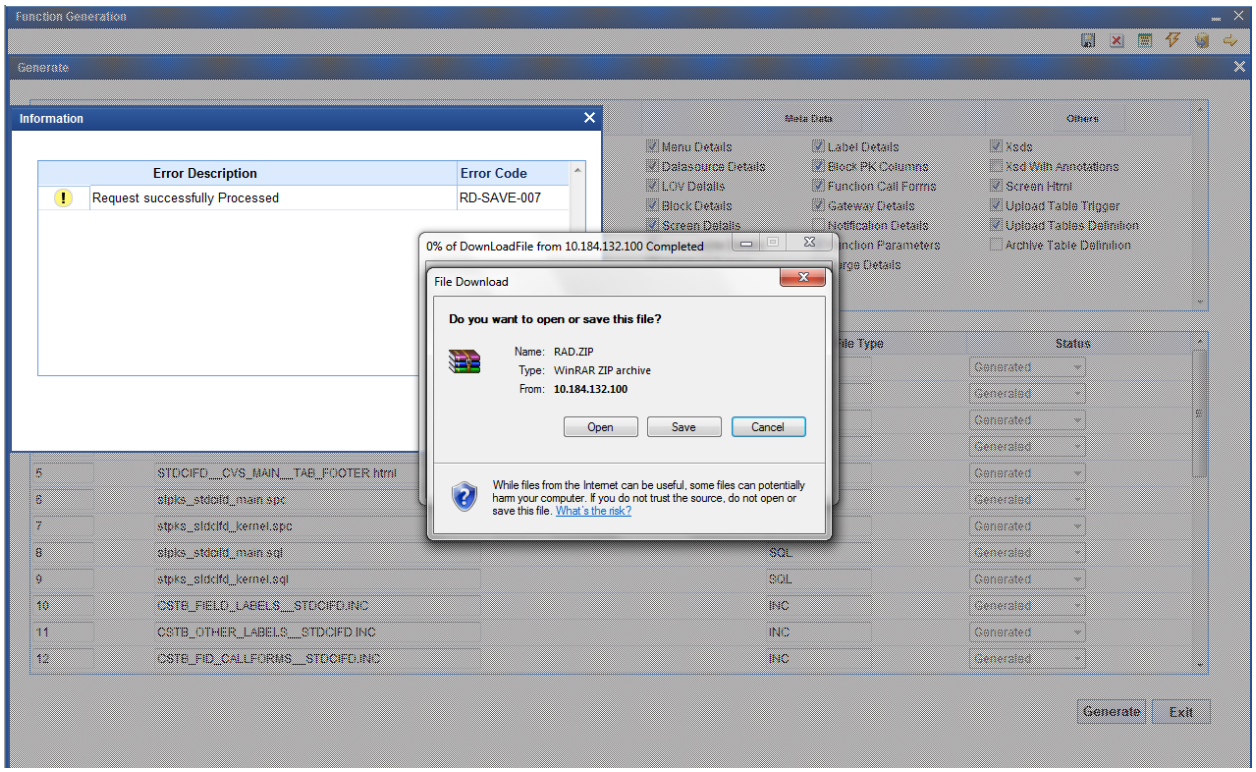

Fig 12.30: Generation of Files

Deploy files

- Click on deploy button select the required files to deployed to server and click on deploy. On successful deployment status will be displayed as Deployed.

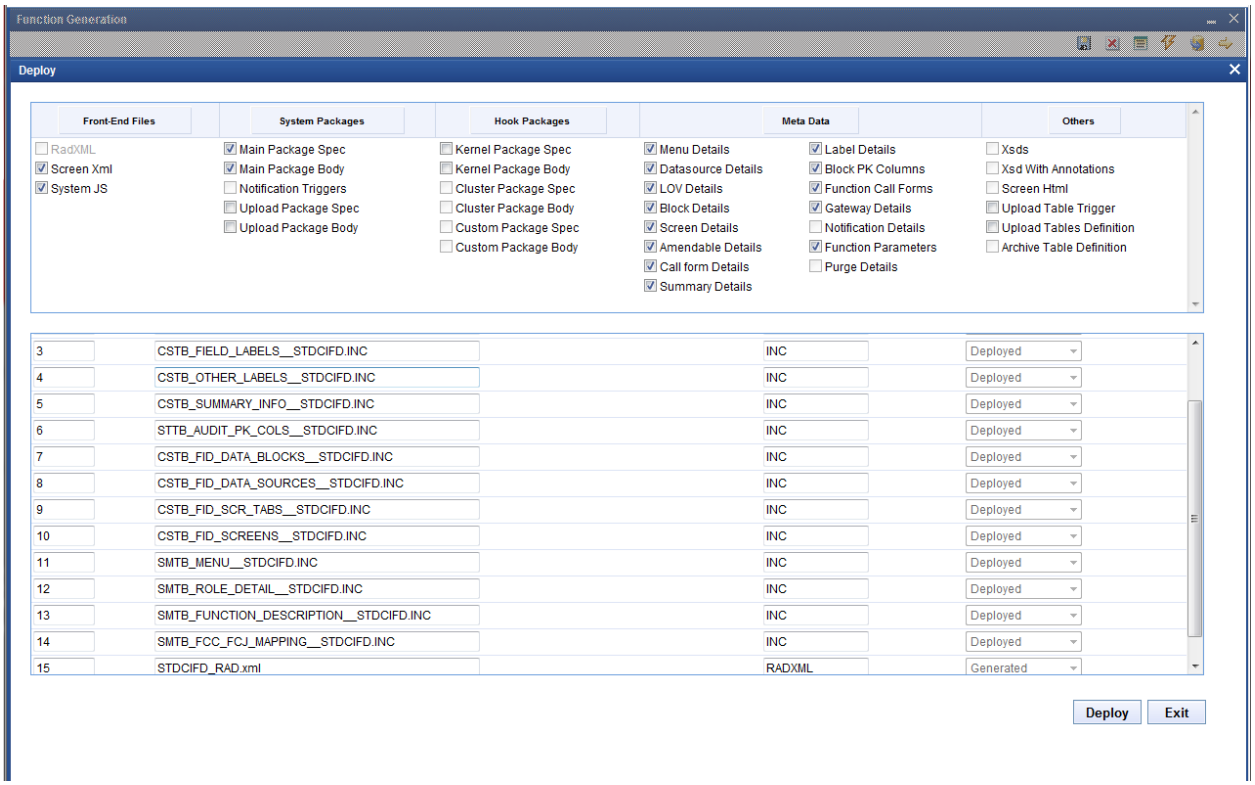

Fig 12.30: Deployment of Files

Testing

- Launch the screen from FLEXCUBE
- Try sample operations on the screen (NEW,MODIFY,QUERY etc)

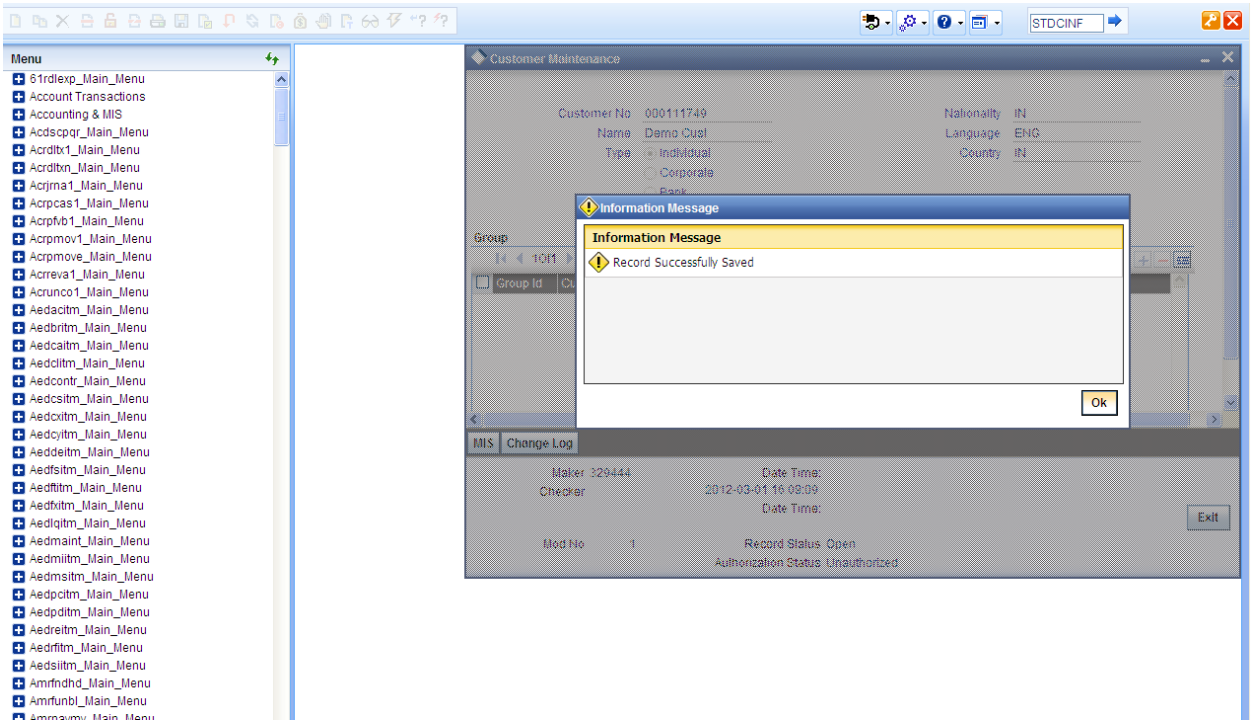

Fig 12.30: Saving Record for the function id in FLEXCUBE

6. Generated Units

The following units will be generated for a Maintenance screen.

Refer document *Development_WorkBench _Screen_Development-II.docx* for detailed explanation on the same

6.1 Front End Units

6.1.1 Language xml

This file is an XML markup of presentation details, for the designed Call Form specific to a language.

6.1.2 SYS JavaScript File

This JavaScript file mainly contains a list of declared variables required for the functioning of the screen

6.1.3 Release Type Specific JavaScript File

This file won't be generated by the Tool. It has to be manually written by the developer if he has to write any code specific in that release

6.2 Data Base Units

6.2.1 Static Scripts

The following static scripts generated are required for the proper functioning of a Call Form screen. Refer document on generated units for detailed explanation

i) Menu Details
Scripts for SMTB_MENU and SMTB_FCC_FCJ_MAPPING, SMTB_ROLE_DETAIL, SMTB_FCC_GCJ_MAPPING are required for the functioning of Maintenance screen

ii) Lov Details

iii) Amendable Details

iv) Label details

v) Screen Details

vi) Block details

vii) Data Source Details

viii) Call form details

ix) Summary Details

6.2.2 System Packages

The Main Package contains the basic validations and backend logic for the Maintenance function id. The Main package contains the mandatory checks required. It will also contain function calls to the other packages generated by Workbench.
The main package has the below stages for a maintenance form:

- Converting Ts to PL/SQL Composite Type
- Checking for mandatory fields
- Defaulting and validating the data
- Writing into Database
- Querying the Data from database

- Converting the Modified Composite Type again to TS

Each of these stages has a 'Pre' and 'Post' hooks in the Kernel, Cluster and Custom Packages. And these Hooks are called from the Main Package itself
Main Package has the system-generated code and should not be modified by the developer
Kernel, Cluster and Custom Packages are the packages where the respective team can add business logic in appropriate functions using the Pre and Post hooks available

6.2.3 Hook Packages

Release specific packages will be generated based on the release type (KERNEL.CLUSTER or CUSTOM). Developer can add his code in the release specific hook package.
The Main Package has designated calls to these Hook Packages for executing any functional checks and Business validations added by the user. The structure for all the Hook Packages are the same, like:

Fn_Post_Build_Type_Structure

Fn_Pre_Check_Mandatory

Fn_Post_Check_Mandatory

Fn_Pre_Default_and_Validate

Fn_Post_Default_and_Validate

Fn_Pre_Upload_Db

Fn_Post_Upload_Db

Fn_Pre_Query

Fn_Post_Query

These Functions are called from the Main package using the Pre and Post Hooks available in the Main Package. The 3 Hook Packages namely Kernel, Cluster and Custom Packages have similar structure and are for the respective teams to work on.

6.3 Other Units

6.3.1 Xsd

Xsd 's will be generated if gateway operations are required for the particular function id. Maintenance for the same has to be done in ***Actions*** node

7. Extensible Development

Developer can add his code in hook packages and release specific JavaScript file.

7.1 Extensibility in JavaScript Coding

For release specific JavaScript coding, code has to be written in release specific JavaScript file.

It follows the naming convention as : (Function Id)_(Release Type).js
Example: Code in STDCIFD_CLUSTER.js is exclusive to cluster release

This JavaScript file allows developer to add functional code and is specific to release.

The functions in this file are generally triggered by screen events. A developer working in cluster release would add functions based on two categories:

- Functions triggered by screen loading events
  Example: fnPreLoad_CLUSTER(), fnPostLoad_CLUSTER()
- Functions triggered by screen action events
  Example: fnPreNew_ CLUSTER (), fnPostNew_ CLUSTER ()

7.2 Extensibility in Backend Coding

Release specific code has to be written in the Hook Packages generated.

7.2.1 Functions in Hook Packages

Different functions available in the Hook Package of a Maintenance Form are:

1) **Skip Handler : Pr_Skip_Handler**
   This can be used to skip the logic written in another release**.**
   Example: logic written in KERNEL release can be skipped in CLUSTER release
2) **Fn_post_bulid_type_structure**
   If any change has to be made in the field values obtained from the form befor start of processing, code can be written here
3) **Fn_pre_check_mandatory**
4) **Fn_post_check_mandatory**
   Any extra mandatory checks on the field values from the screen can be written here.
5) **Fn_pre_query**
6) **Fn_post_query**
   Any specific logic while querying can be written in these functions. It is called from fn_query of the main package
7) **Fn_pre_upload_db**
8) **Fn_post_upload_db**
   Any logic while uploading data to tables can be written here **.**
9) **Fn_pre_default_and_validate**
10) **Fn_post_default_and_validate**
    Any release specific logic for defaulting and validation can be written here . It is called from the fn_default_and_validate in the main package

7.2.2 Flow of control through Hook packages

The flow of control through the Hook Packages for a particular stage is as explained in the figure below

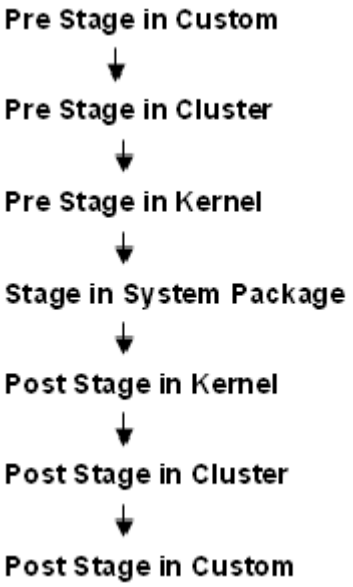

Fig 12.31: Flow of control through Hook Packages

Example: For Fn_check_mandatory, flow will be as

STPKS_ STDCIFD_MAIN. Fn_Check_Mandatory

↓

STPKS_ STDCIFD_CUSTOM.Fn_Pre_Check_Mandatory

↓

STPKS_ STDCIFD_CLUSTER.Fn_Pre_Check_Mandatory

↓

STPKS_ STDCIFD_KERNEL.Fn_Pre_Check_Mandatory

↓

STPKS_ STDCIFD_MAIN .Fn_Sys_Check_Mandatory

↓

STPKS_ STDCIFD_KERNEL.Fn_Check_Mandatory

↓

STPKS_ STDCIFD_CLUSTER.Fn_Check_Mandatory

↓

STPKS_ STDCIFD_CUSTOM.Fn_Check_Mandatory

7.2.3 By passing Base Release Functionality

There are auto generated functions like FN_SKIP_<RELEAE_TYPE> which would determine whether or not a particular hooks needs to be called.

Developer also has an option to bypass the base release hook if need be. For example if the validations written in *STPKS_STDCINF _KERNEL.FN_PRE_CHECK_MANDATORY* are not required or not suitable for the Cluster release, system provides an option to bypass the code written by Kernel team. Similarly a Custom release can also bypass the code written by Kernel and Custom Releases. This can be achieved by calling procedures ***PR_SET_SKIP_<RELEASE_TYPE>*** and ***PR_SET_ACTIVATE_<RELEASETYPE>.*** These procedures will be made available in the main package and the development teams of Customization teams can use these procedures to skip and re-activate the hooks of parent release.
The Developer should avoid adding validations or Checks in the Pre Stage of any function, like Fn_Pre_Check_Mandatory, etc and should aim to add all the validations in the Fn_Post_Default_and_Validate.

For Example let us see the flow for the Mandatory Stage for STDCIFD:

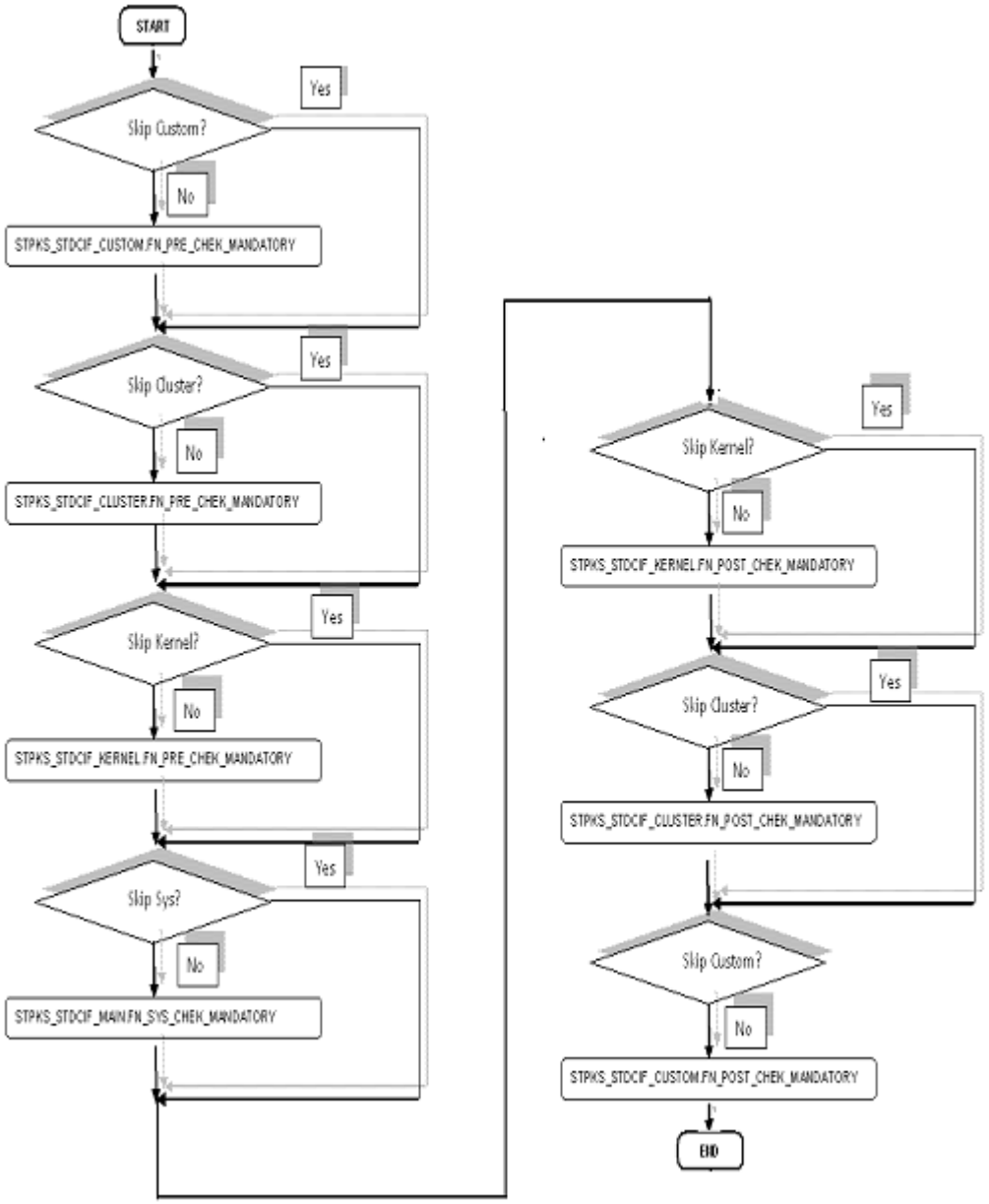

Fig 12.31: Flow of control explaining skip logic in pacakges

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