Development of Online Forms
Oracle FLEXCUBE Investor Servicing
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1. Preface

This document describes the features of Online Forms in FLEXCUBE and the process of designing an Online form screen 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.docx

05-Development_WorkBench _Screen_Development-II.docx

2. Introduction

2.1 How to use this Guide

The information in this document includes:

- Chapter 2 , “Introduction”
- Chapter 3 , “Overview of Online Form"
- Chapter 4 , “Screen Development”
- Chapter 5 , "Generated Units”
- Chapter 5 , "Extensible Development”

3. Overview of Online Form

Online Forms are function Id's (screens) which is used for creating Contracts for respective modules. Same contracts can be processed further for Payments, Availments, Amendments, Reassignments and Authorizations also using Online forms.

All the transaction processing in FLEXCUBE is carried out through Online screens

Online form screens should be launched independently.

Example: ***Letter Of Credit (LC) contract***

An LC contract is an instruction wherein a customer requests the bank to issue, advice or confirm a letter of credit, for a trade transaction. An LC substitutes a bank's name and credit for that of the parties involved. The bank thus undertakes to pay the seller/beneficiary even if the remitter fails to pay.

Thus for each module we should develop different function Id's for creating contracts and others online forms for other operations like Payments, Availments, Amendments, Reassignments and Authorizations.

LCDTRONL - Contract Input
LCDAMEND - Amend Confirmation Input
LCDAVMNT - Availment Input
LCDTRPAY - Payment Input
LCDTRANF - Transfer Input
LCDEPMNT - Manual Liquidation Input
LCDTREAS - Contract Reassign
LCDTRAUT - Amend Confirmation Input

On launching the Online form screen, user has to input the respective values to create the contract. Form may have the different user-defined actions like Product-Default, Enrich, and Subsystem-Pickup while creating contract. Once all the user-defined actions performed finally user has to save the contract.

4. Screen Development

Design and development of an Online Form function id is similar to any other function Ids. This section briefs the steps in designing an Online Form screen.
For detailed explanation, refer the document: ***04-Development_WorkBench _Screen_Development-I.docx***

4.1 Header Information

Provide the header information as shown in the figure.

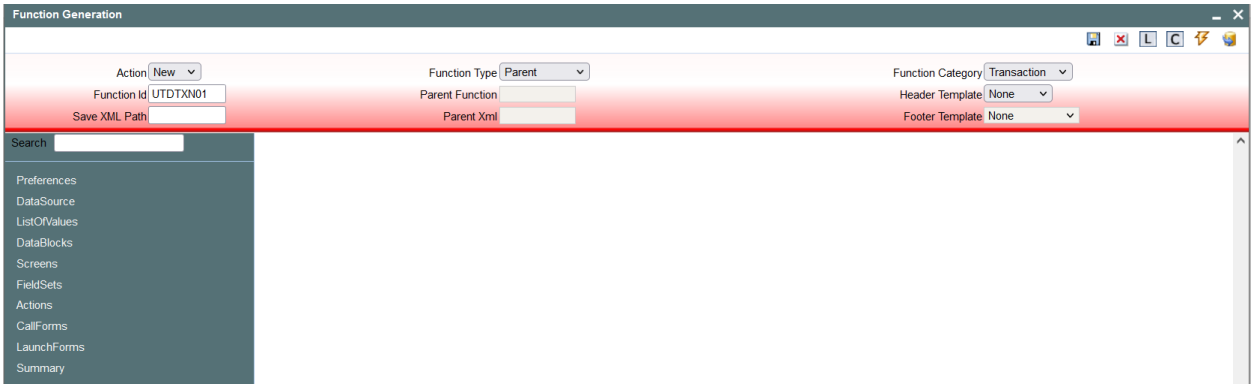


Fig: Online Form header Information

Note the following while providing header information.

i) Name of the Online form :
Online Form name has to have the third character as 'D'. Ideally, the length of the name should be 8 characters.
Example: *UTDTXN01 etc. are valid online form names*

ii) Online Form Category:
Function Category has to be **Transaction**

iii) Footer Template:
For Transaction screens, footer template has to be selected as **NONE**. System does not provide any default template for transaction screens; hence developer has to design the footer portion of the screen manually. Developer has to make sure that footer designed has generic fields like transaction status (TXNSTAT), authorization status (AUTHSTAT) etc.
For Online Process Flow Screens footer template should be selected as **PROCESS**.

iv) Function Type :
Parent and Child functionality is supported for Online forms.

4.2 Preferences

Provide the menu details in the Preferences screen

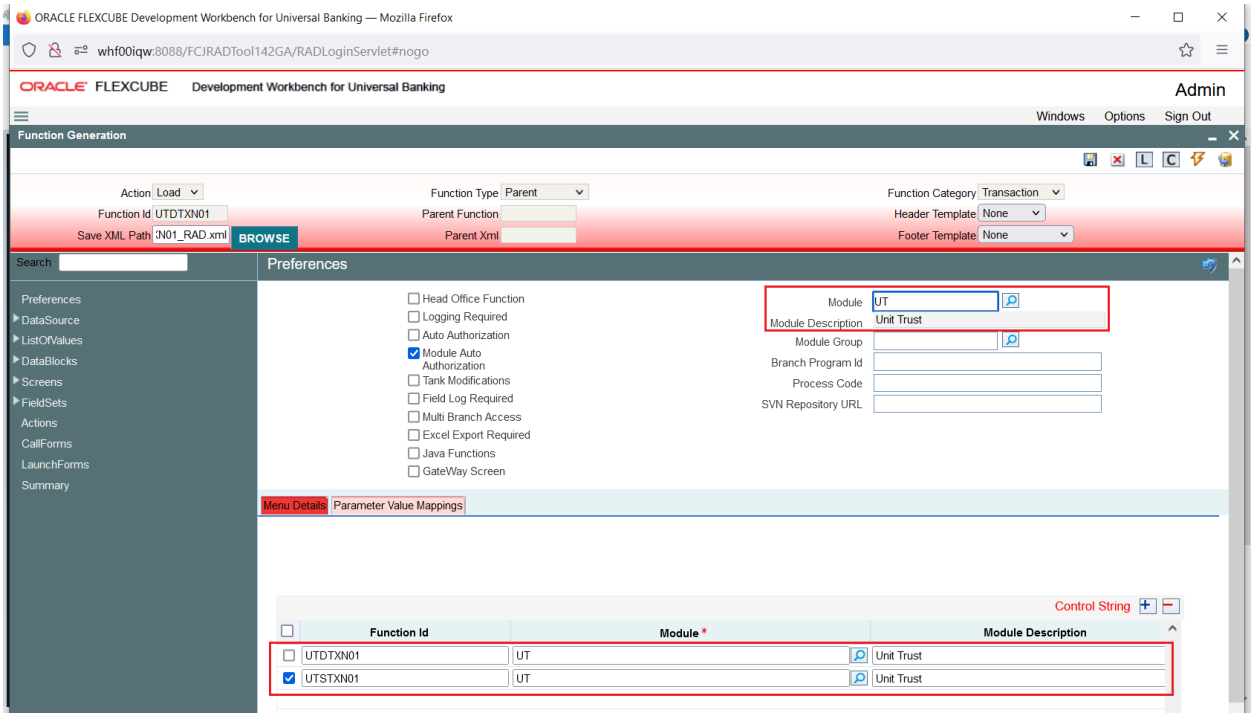


Fig: Online Form Preferences

Note the following while providing Preferences for Online Forms.

i) Module name :
Module name is a mandatory field and has to be provided. It is recommended that the first two letters of the function id is kept as same as the module name. Naming of the generated package will be derived from the module code maintained

ii) Script for the following tables will be generated by Workbench (menu details) which are essential for launching of an Online screen.

1. SMTB_MENU
2. SMTB_FCC_FCJ_MAPPING
3. SMTB_FUNCTION_DESCRIPTION
4. SMTB_ROLE_DETAILS

Type string of the Online screens will be generated as 'O' in ***smtb_menu*** table.

iii) Transaction specific action codes has to checked in the control string whichever applicable
Example: LIQUIDATE, ROLLOVER, REVERSAL etc.

4.3 Data Sources

Identify the tables/views for the Online form. Define data sources and add data source fields as required.

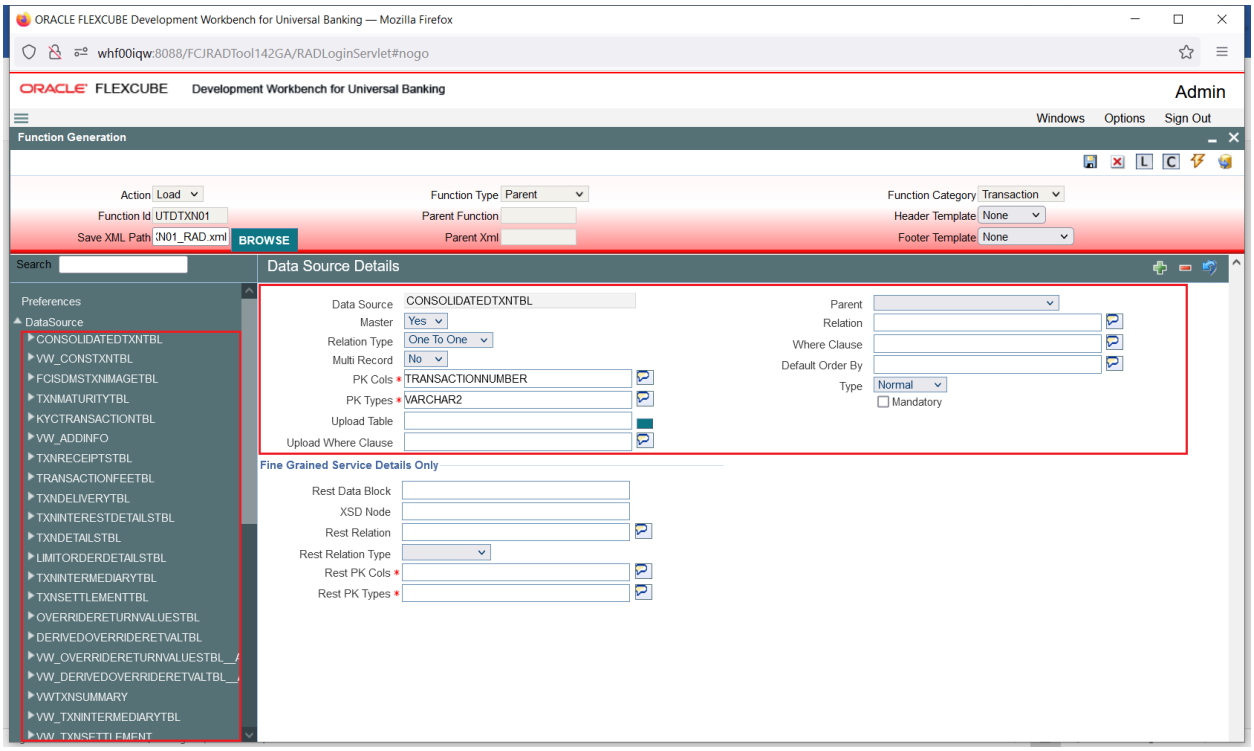


Fig: Adding data sources and maintaining properties

Note the following while creating data sources

i) Master Data Source has to be a single entry data source.

ii) Logical Relationships has to be maintained for all data sources except the parent

iii) Provide PK Cols and PK types for all data sources.
If data source is a multi-record block, then make sure it has at least one more pk than its parent which helps to uniquely identify each record of multi record block

iv) ***Minimize the use of views in the data sources***. For transaction screens, system generated upload logic (fn_sys_upload_db) is not called within the system package. It is up to the developer to decide whether the system generated code can be used or not. ***If views are used in data sources, then this function should not be used by the developer.***

v) Usually for Online forms, a separate view can be used for summary purpose. This view will have all the fields required to be displayed in the summary.
Example: UTDTXN01_SUMMARY

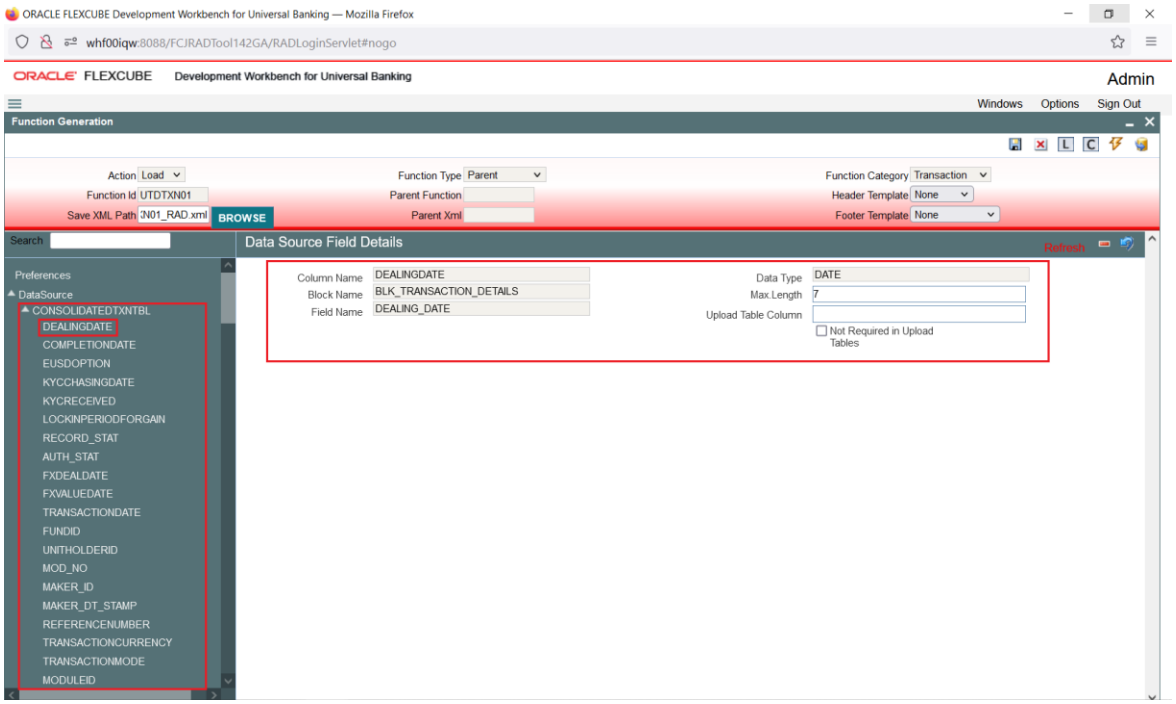


Fig: Adding data sources fields and its properties

Max length of the data source field can be modified as per requirement

4.4 Data Blocks

Determine the block structure for the function id .Define Data Blocks as per the design

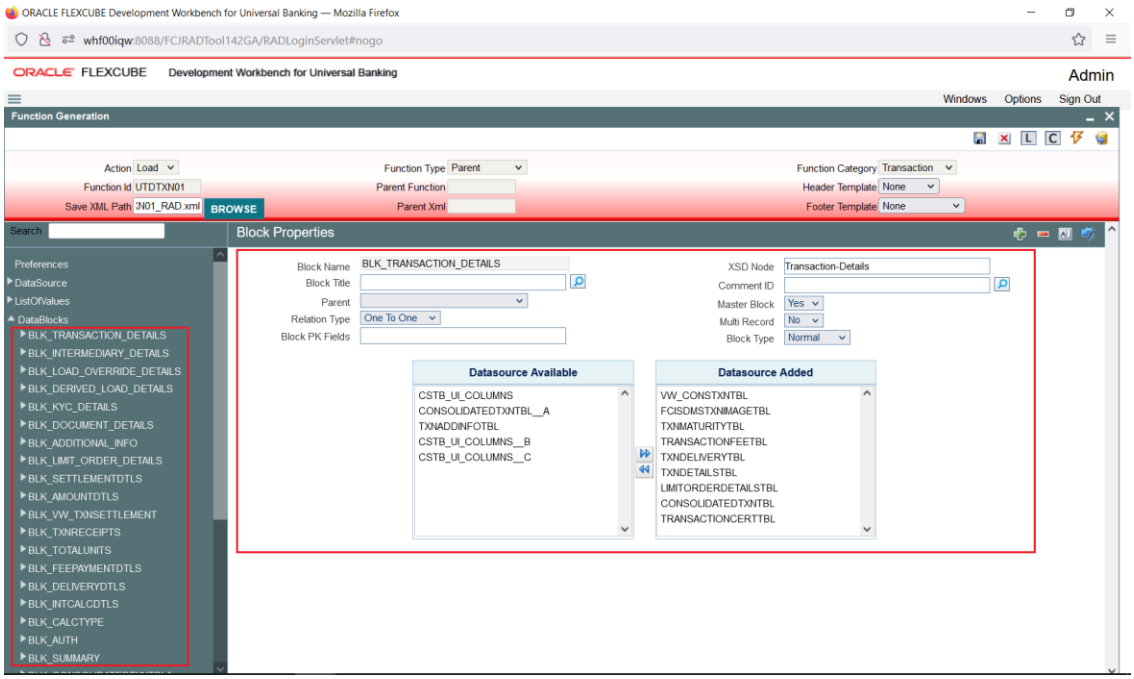


Fig: Defining Data Blocks and maintaining its properties

Note the following while creating data blocks

i) Master Data block has to be a single entry data source.

ii) Provide Xsd node name if the block is normal and is required in gateway request

iii) Block order and block field order can be changed by re arranging blocks and block fields in the browser tree (drag and drop).**Note that all units will have to be regenerated if block or block field order is changed** (including xsd's)

iv) Related currency fields should be placed above the amount field in the tree

Add block fields to the data block as required.

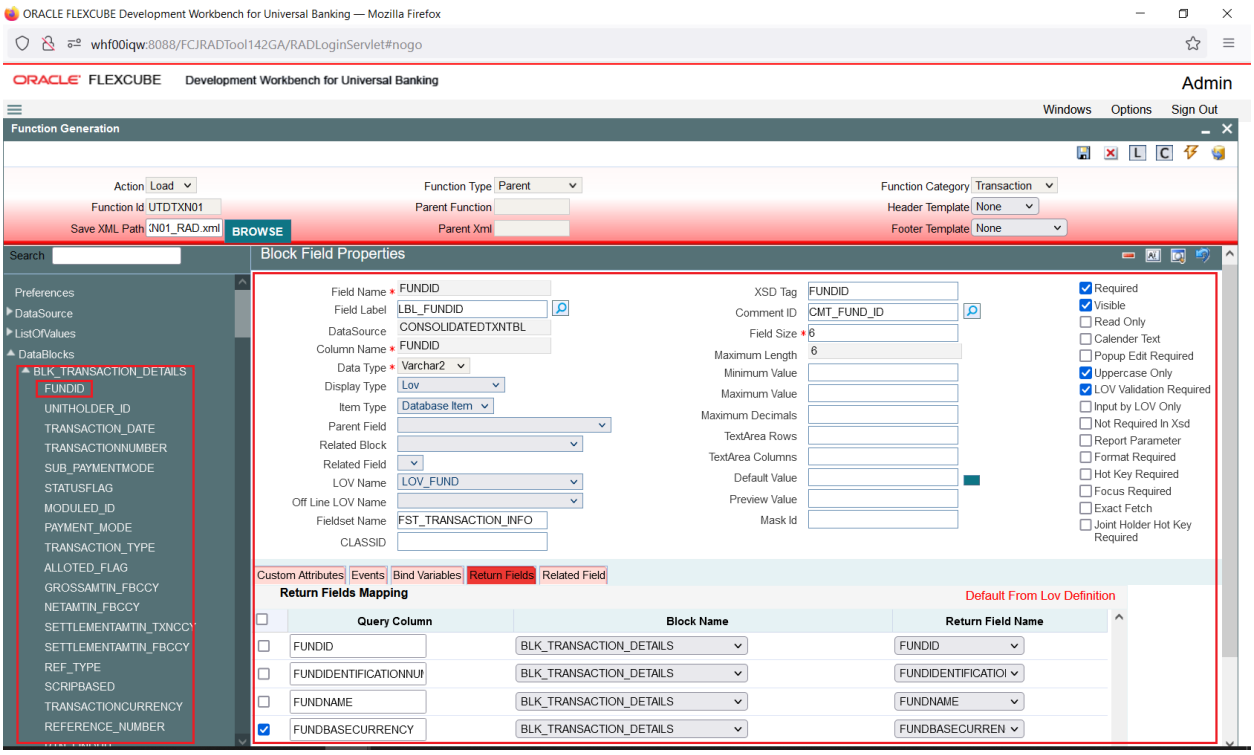


Fig: Attaching Block Fields and maintaining its properties

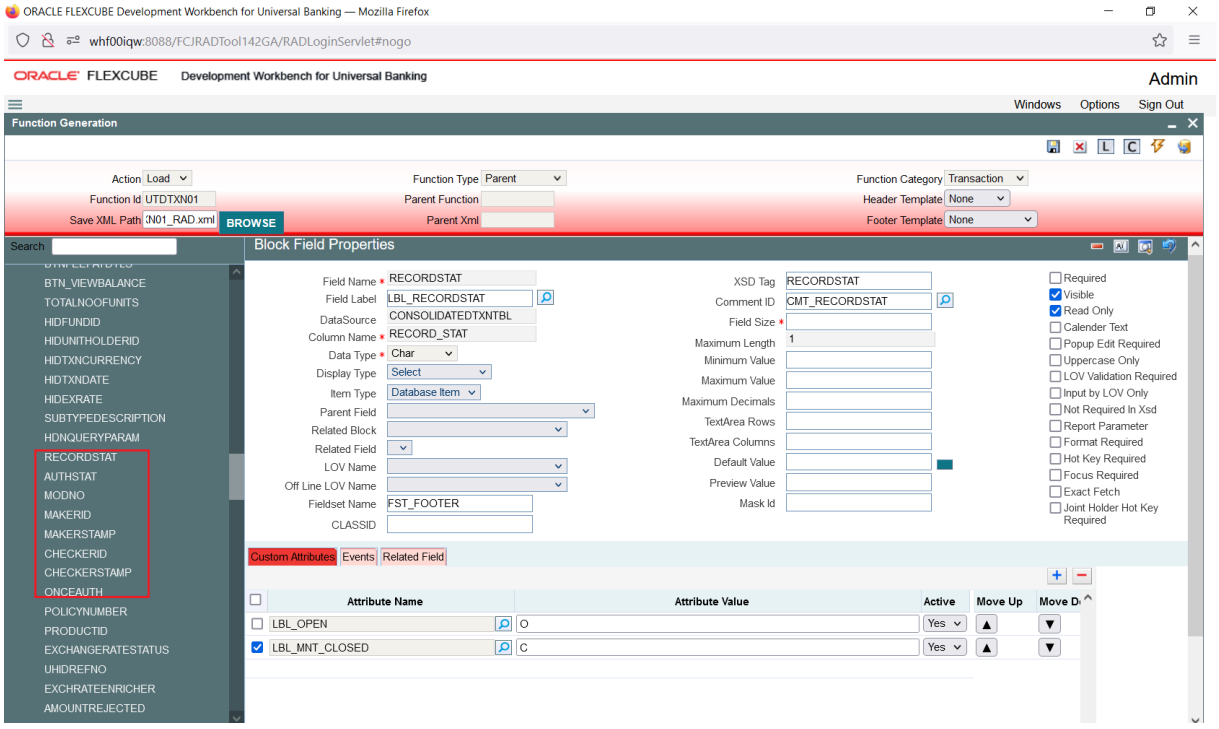
Note the following while attaching block fields to data blocks

i) In case the field is not required in XSD, check not Required XSD

ii) Ensure that Related Block and Field are given for Amount Fields

iii) Minimize the use of query data sources by using DESC fields wherever possible. *Note: Query data sources is rarely required for an Online Form screen; as launch form can be used for query only screens*

iv) Master block should contain reserved field names like AUTHSTAT, RECORDSTAT, ONCEAUTH, MODNO, MAKERID, CHECKERID, MAKERDTSTAMP and CHECKERDTSTAMP are added as part of the footer of the screen.



4.5 Screens

Design the screen layout based on the requirement

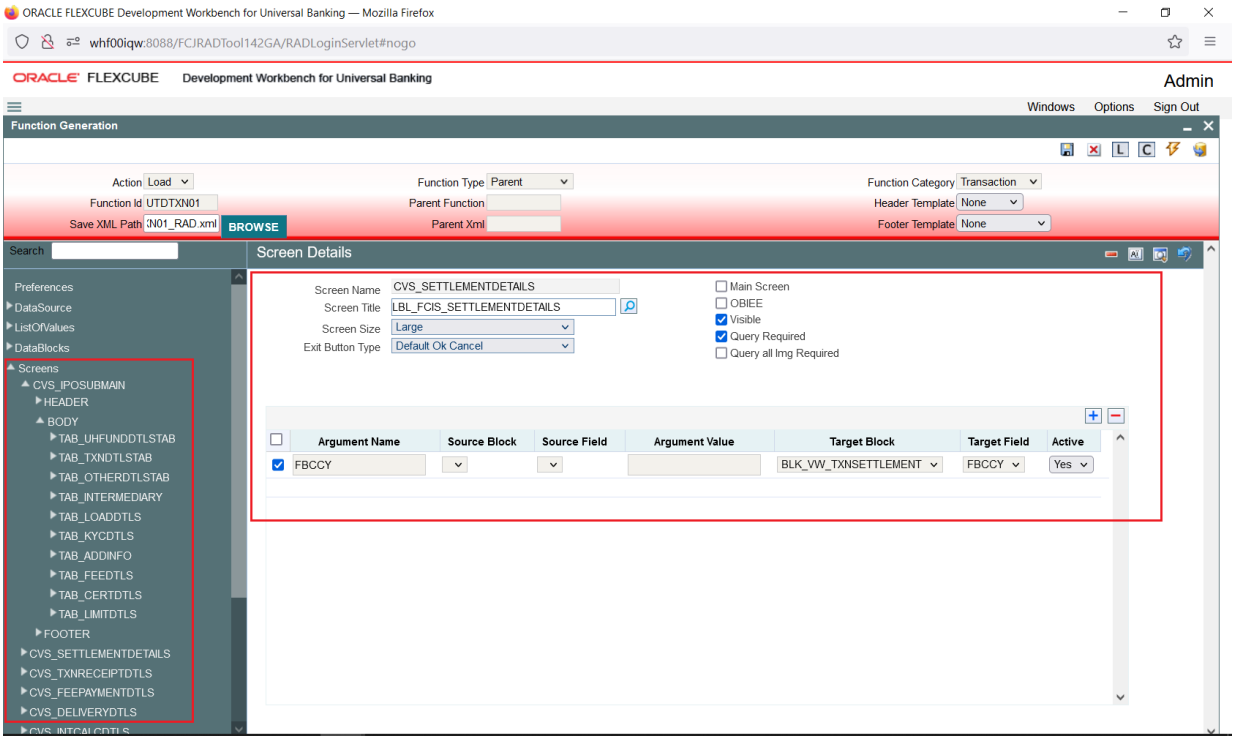


Fig: Designing Screens and providing Screen Properties

Note the following while creating screens

- One Screen should be identified as the main screen.

Add Tabs, sections and partitions as per the screen design

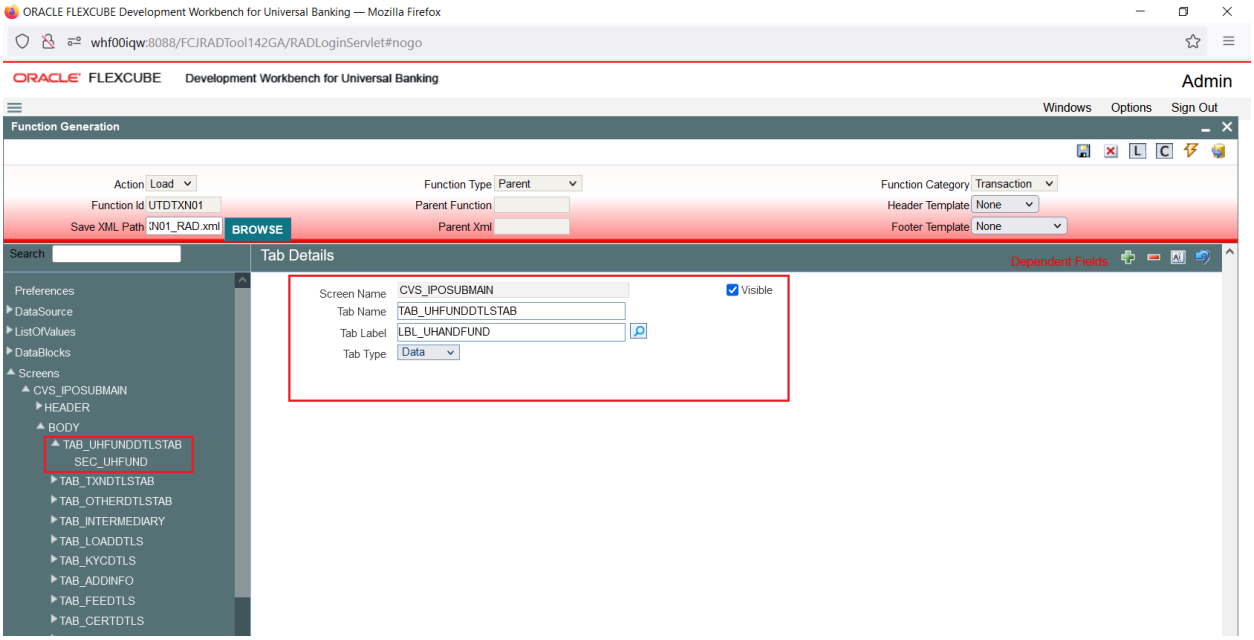


Fig: Creating Tabs and maintaining Properties

Note the following when creating tabs and sections for the screen

i) If the screen does not have multiple tabs, then only the TAB_MAIN needs to be used. TAB_HEADER should not contain any sections in this scenario

ii) Normally Online forms are large screens with multiple tabs. In this case, all the tabs needs to be used .TAB_HEADER should contain the header information. TAB_MAIN should be the first tab in the body .Other tabs has to be added in the body portion as required

iii) Footers are often designed by the developer for Online forms. Provide sections in TAB_FOOTER as required. ***Note that in large screens ,footer supports 4 partitions while other portions support 3 partitions***

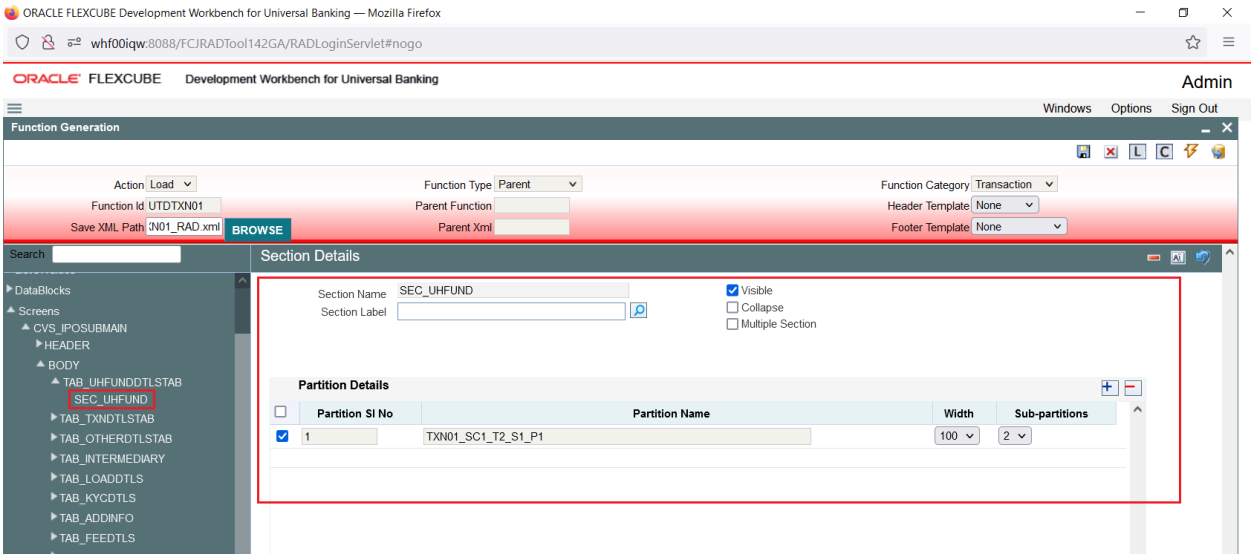


Fig: Section Properties

Multiple Screens can be designed if required.

4.6 Field Sets

Create Field sets and attach the fields to the field sets as required

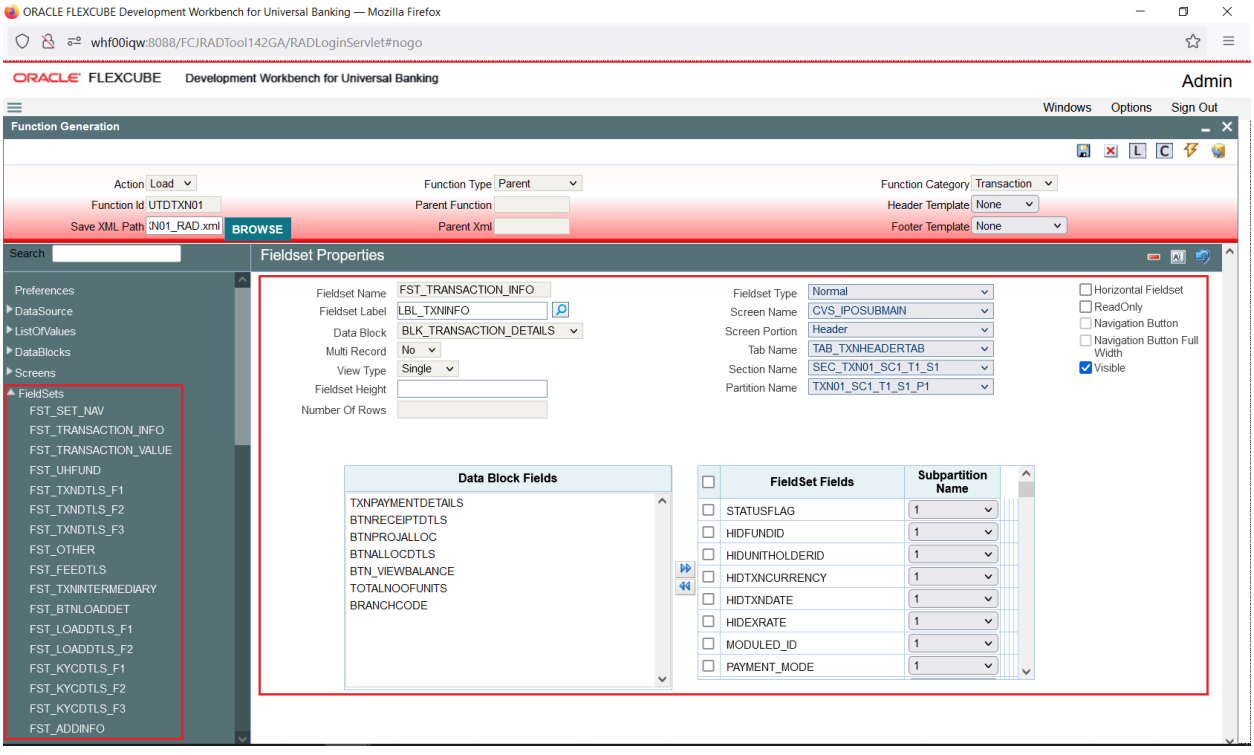


Fig: Field Set Properties

Note the following when attaching field to a field set

i) If a field is not required in the screen, but kept as hidden and value defaulted; then **The field has to be made invisible and attached to a field set**. If it is not attached to any fields set, the screen html won't contain the field and may result in script error while accessing the field.

4.7 Actions

Mention the web service and amendable information in Actions Screen

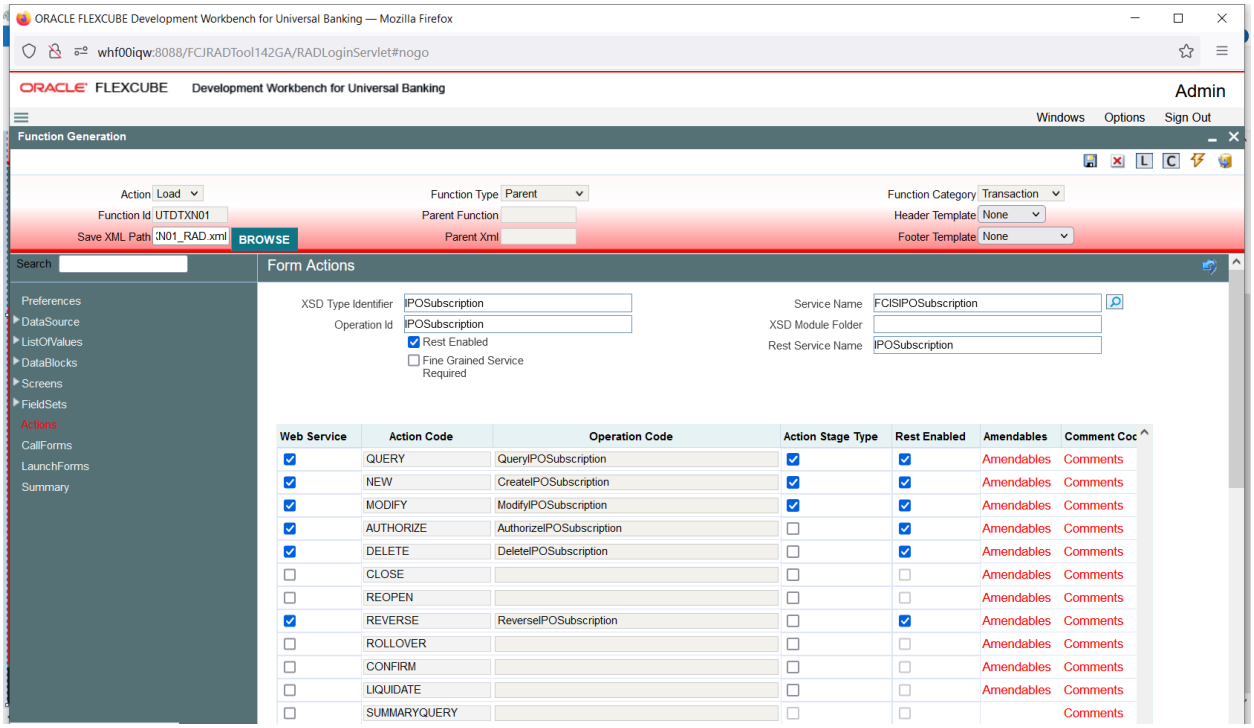


Fig: Actions Screen

Note the following while maintaining web services and amendable information

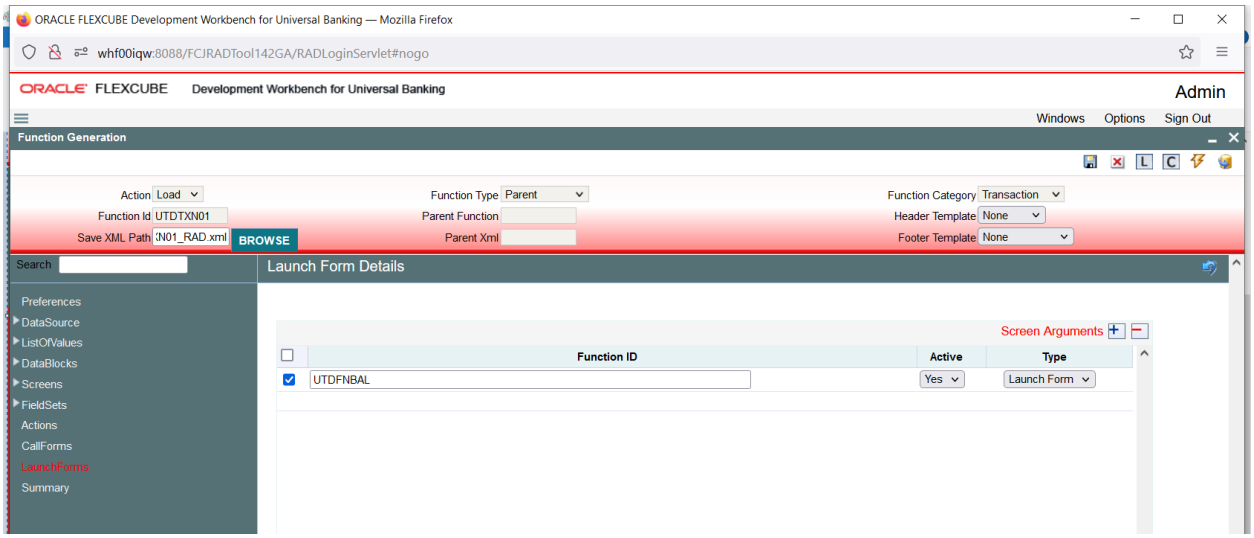
i) Online forms will generate Type XSD and Message XSD.
Operation specific message xsd's will be generated.
Example: *for the example given in the figure, name of the xsd generated will be*
UT-FCISTransaction-Types.xsd (Type XSD for UT)
UT-QueryTransaction-Res-Full-MSG.xsd (Create Message XSD for UT)
UT-QueryTransaction-Req-IO-MSG.xsd (Create Message XSD for UT)
UT-CreateTransaction -Res-Full-MSG.xsd (Create Message XSD for UT)
UT-CreateTransaction -Res-PK-MSG.xsd (Create Message XSD for UT)

ii) Operation Id and Operation Code need be maintained for the above mentioned reason

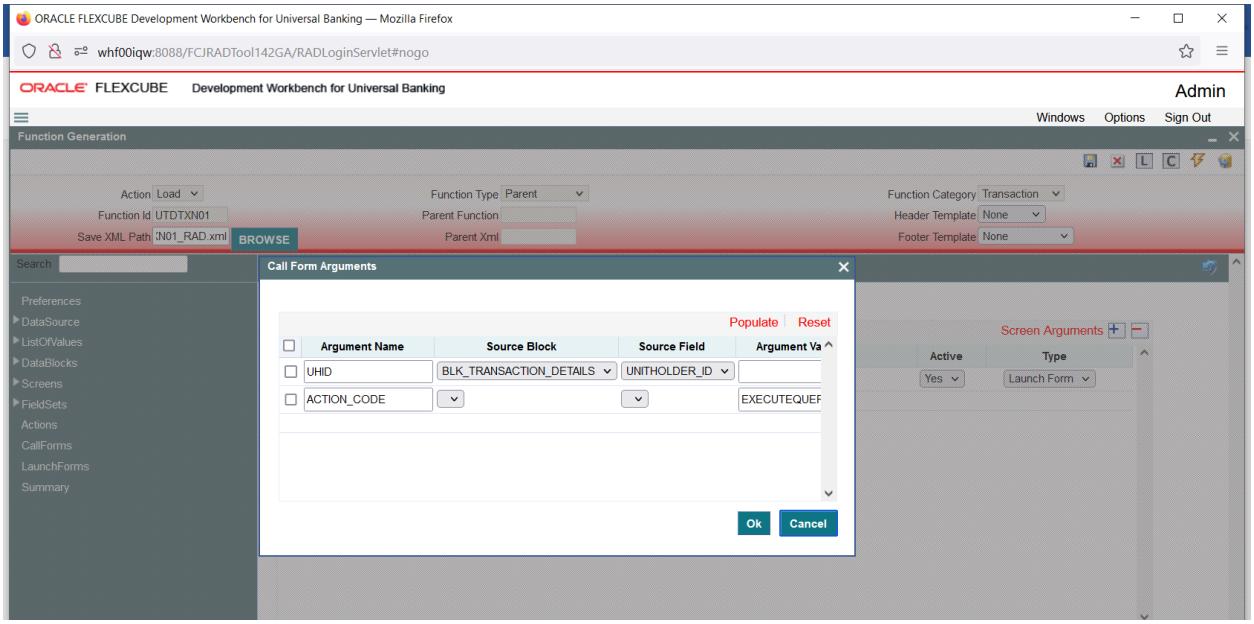
iii) Amendable information has to be maintained similar to any other function ids.

4.8 Launch Forms

Launch Forms can be attached to Online form screen.



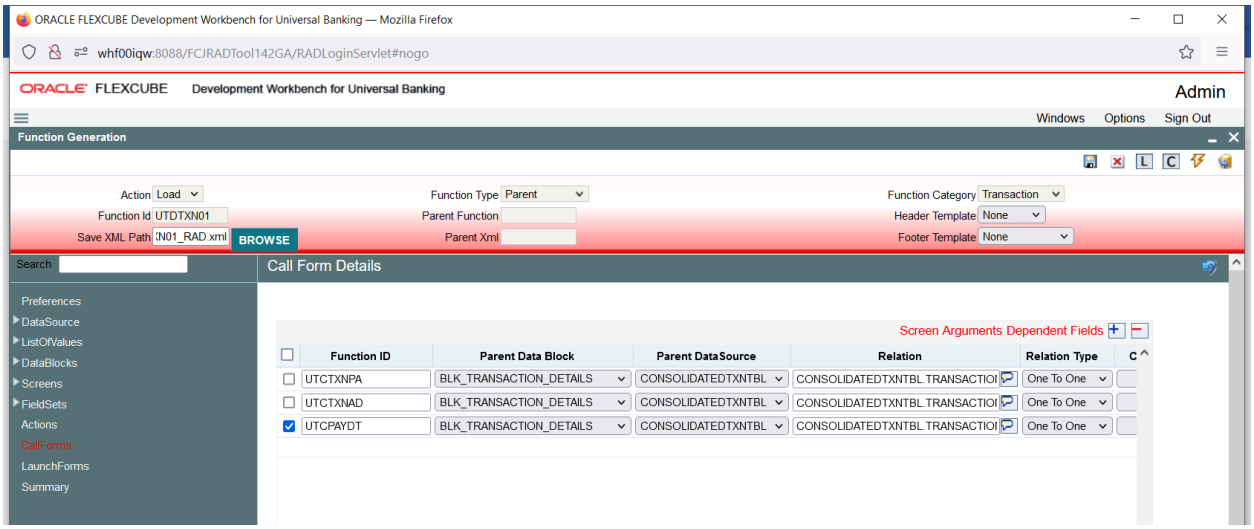
Screen Arguments should be maintained for the launch form to query the proper contract record from the main online functions.



Process to attach launch forms is similar to any other function Id's.

4.9 Call Forms

Call forms can be attached to Online form. Each call form should be mapped to Parent Data Block, Parent Data Source and proper relations should be maintained with parent data source of main online form.



Sreen Arguments should be given to each callform. So that the call form will display the respective data of calling main fuinction.
Dependent Fields are required to re default the call form values when the user changes input data in the main form.
Each of the subsytem pickup logic will have to be coded by the developer in release specific packages. Processing logic (sub system pickup) for the attached call forms has to be called from the main form package.

4.9.1 Sub System Pickup/Processing

Subsystem pickup refers to the process of picking up the values in sub systems. Normally values in sub systems will be defaulted based on the data given in the main screen of the online form.

1) **Defaulting of sub system**
   After providing values in the main screen, user may click on any sub system to view or change the value.
   On clicking the sub system for the first time, sub system values will be defaulted based on the values provided in the main screen. Action code passed will be **SUBSYSPKP**. The code for defaulting will have to written by the developer in corresponding hook packages in function ***Fn_Post_Subsys_Pickup***
   In this case SUBSYSSTAT for all subsystems will go as 'D' and processing done based on this flag for each sub system (call form). Note that SUBSYSPKP action will default values for all subsystems and not only the sub system being launched
   Example:
   MICTRMIS:D;ISCTRSTL:D;TACTRTAX:D;CSCTRUDF:D;CFCTROCH:D;CSCTRADV:D;FTCCGCLM:D;
   If user saves the contract without visiting any call forms, then all the subs systems will be defaulted before saving

2) **Uploading of sub system**
   If after launching the subsystem with defaulted values; User changes the value in subsystem; the new user input values has to be uploaded to the system. Hence while saving, ***the***

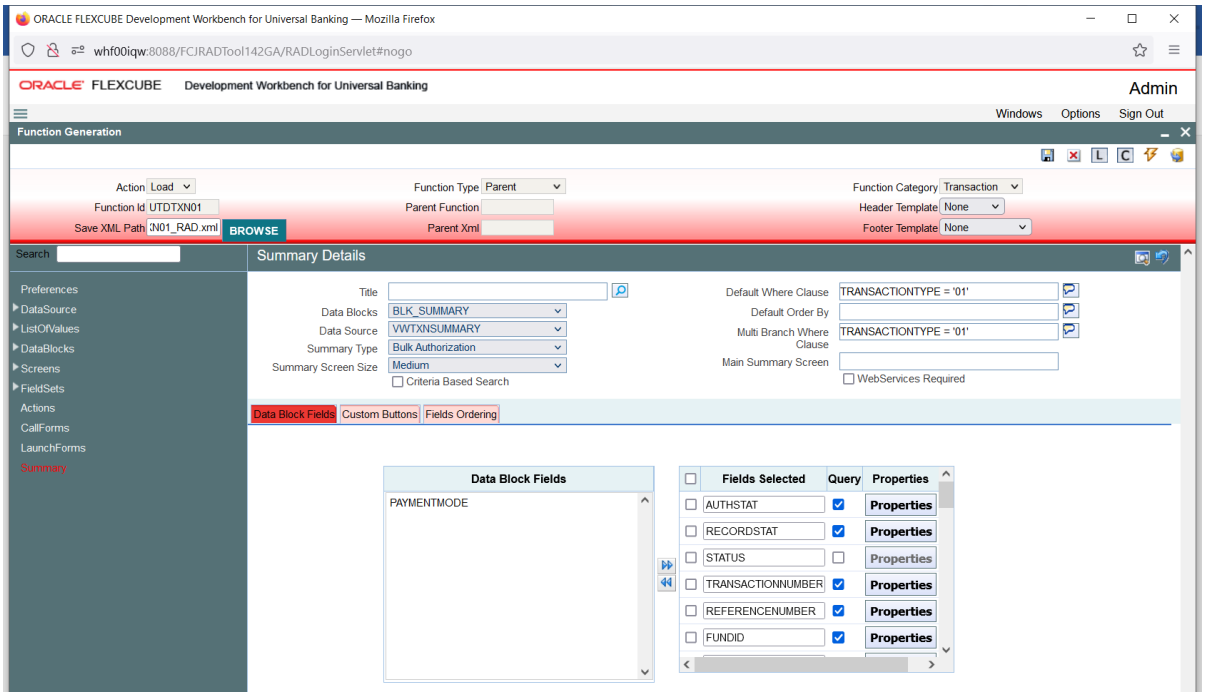
subsystems which has been modified by user will be uploaded while others will be defaulted.
In this case SUBSYSSTAT for the subsystem which has been modified will go as 'U' .Developer has to write code for processing based on the flag
Example: if user changes MIS details (MICTRMIS) from what was defaulted; then SUBSYSSTAT will go as MICTRMIS:U;ISCTRSTL:D;TACTRTAX:D;CSCTRUDF:D;CFCTROCH:D;CSCTRADV:D;FTCCGCLM:D;

3) **Re defaulting of sub system**

After launching and changing subsystem values; if user changes any values in main screen which are dependent field for the subsystem: subsystem values will have to be defaulted again based on the new main screen values. Hence the sub system will be re defaulted. In this case value entered by the user in subs system will be lost.
In this case SUBSYSSTAT for the subsystem whose dependent fields has been modified will go as 'R'. .Developer has to write code for processing based on the flag
Example: In a Funds Transfer Contract Input Screen, assume that charge subsystem (CFCTROCH) is dependent on the values entered for debit and credit account. After launching the sub system and changing the charges manually; if user changes the account again the charges will have to re defaulted. The manually entered charges will not be considered. SUBSYSSTAT will go as MICTRMIS:U;ISCTRSTL:D;TACTRTAX:D;CSCTRUDF:D;CFCTROCH:R;CSCTRADV:D;FTCCGCLM:D;
Values for other subsystems will depend on each of their dependencies.

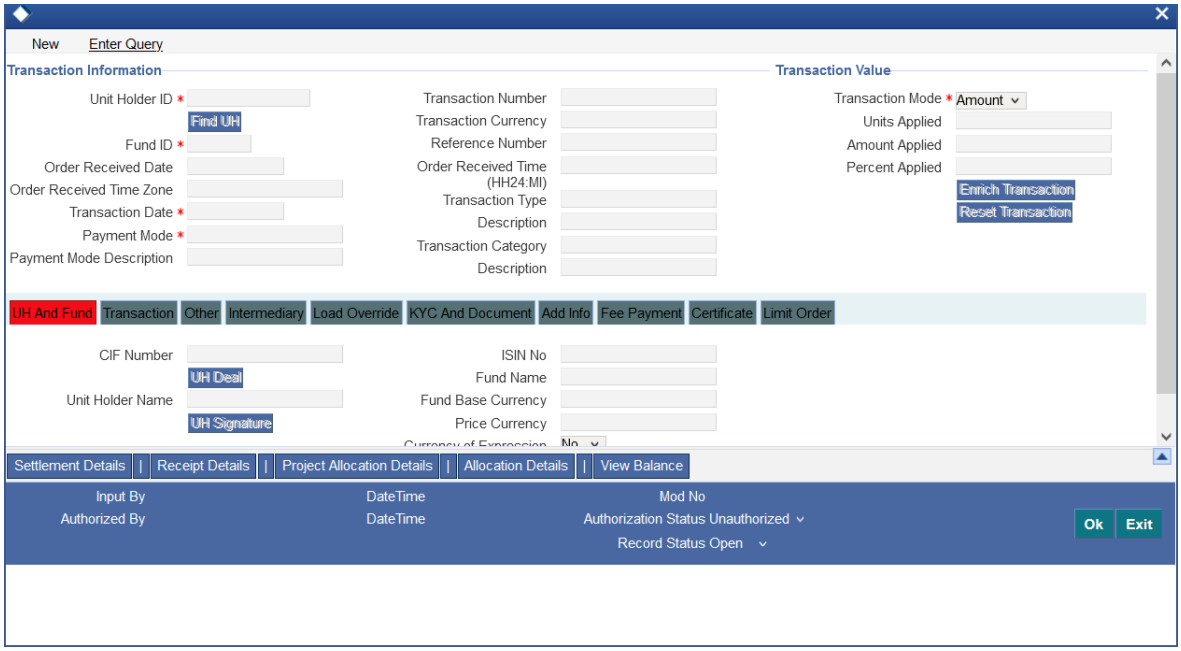
4.10 Summary

Summary screens can be designed for Online Form if required

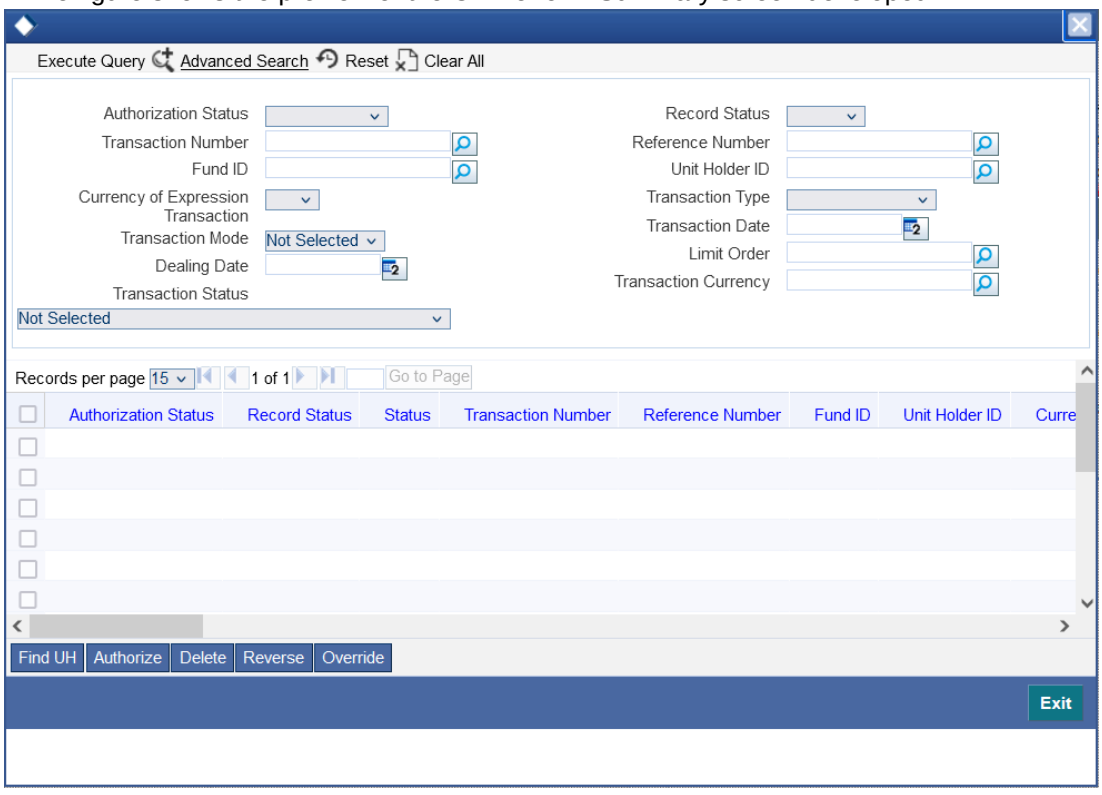


4.11 Preview

The figure shows the preview of the Online form Input screen developed



The figure shows the preview of the Online form Summary screen developed



Generate the units for Online form and deploy them in the FLEXCUBE server for unit testing.

5. Generated Units

The following units will be generated for an Online Form screen.
Refer document on generated units on detailed explanation on the same.

5.1 Front End Units

5.1.1 Language xml

This file is an XML markup of presentation details, for the designed Online Form specific to a language.
Example – **UTDTXN01.xml** (UIXML for UT Screen)

5.1.2 SYS JavaScript File

This JavaScript file mainly contains a list of declared variables required for the functioning of the screen
Example – **UTDTXN01_SYS.js** (JS for UT Screen)

5.1.3 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
Example – **UTDTXN01_KERNEL.js** (JS for KERNEL Release)
Example – **UTDTXN01_CLUSTER.js** (JS for CLUSTER Release)
Example – **UTDTXN01_CUSTOM.js** (JS for CUSTOM Release)

5.2 Database Units

5.2.1 Static Scripts

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

5.2.2 System Packages

Main package would be generated by the Tool and should not be modified by the developer.

Example – *utpks_utdtxn01_main.spc,*
utpks_utdtxn01_main.sql (Main Package for UT screen)

Main package contains functions for:

- Converting Ts to PL/SQL Composite Type
- Calling fn_main.

- Resolve Ref Numbers (fn_resolve_ref_numbers)
- Mandatory checks (fn_check_mandatory).
- Product Default (fn_product_default)
- Subsystem Pickup(fn_subsys_pickup)
- Enriching (fn_enrich)
- Default and validation(fn_default_and_validate)
- Uploading into DB tables(fn_upload_db)
- Processing the contract input values(fn_process)
- Querying(fn_query)
- Converting the Modified Composite Type again to TS

Except the functions for type conversions, others functions calls the respective hook functions in hook packages of the Online forms. Thus no processing logic within the main package is used

But the package contains many other system generated functions for operations like

- Mandatory checks(fn_sys_check_mandatory)
- Default and validation(fn_sys_default_and_validate)
- Uploading to DB(fn_sys_upload_db)
- Query operation (fn_sys_query) etc

These functions are not called anywhere in the package. These functions if required can be called by the developer from the release specific package. Otherwise developer can write his own logic for the same in the Hook Packages.

5.2.3 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.
Example – utpks_utdtxn01_kernel.spc, utpks_utdtxn01_kernel.sql (Kernel Package)
utpks_utdtxn01_cluster.spc, utpks_utdtxn01_cluster.sql (Cluster Package)
utpks_utdtxn01_custom.spc, utpks_utdtxn01_custom.sql (Custom Package)

5.3 Other Units

5.3.1 Xsd

Only Type XSD and message XSD will be generated for an Online Form function Id.
This type xsd will be used in the type xsd of any function which uses the particular online form.
Example – UT-FCISTransaction-Types.xsd (Type XSD for UT)
UT-CreateTransaction -Req-Full-MSG.xsd (Create Message XSD for UT)
UT-CreateTransaction -Req-PK-MSG.xsd (Create Message XSD for UT)
UT-CreateTransaction -Res-Full-MSG.xsd (Create Message XSD for UT)
UT-CreateTransaction -Res-PK-MSG.xsd (Create Message XSD for UT)

6. Extensible Development

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

6.1 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 UTDTXN01_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 ()

6.2 Extensibility in Backend Coding

For online forms, generated code does not provide any business logic. Insert statements won't be present as part of generated code in online packages. Developer has to write the business logic in release specific packages (or make call l to server functions from release specific packages).

Hooks will be provided in the following stages
Resolving reference numbers

- Checking mandatory fields
- Defaulting and validating
- Uploading to db
- Process
- Subsystem pickup
- Enrich
- Product Default
- Query

Note that the system generated code for uploading; defaulting etc. (*fn_sys_default_and_validate, fn_sys_upload_db etc.*) won't be called by the main package in online flow. If it is required, developer has to call it explicitly from release specific packages.

Note that in online flow, upload to base tables happens first and processing is done on the inserted data after uploading. After processing, the response type will be build

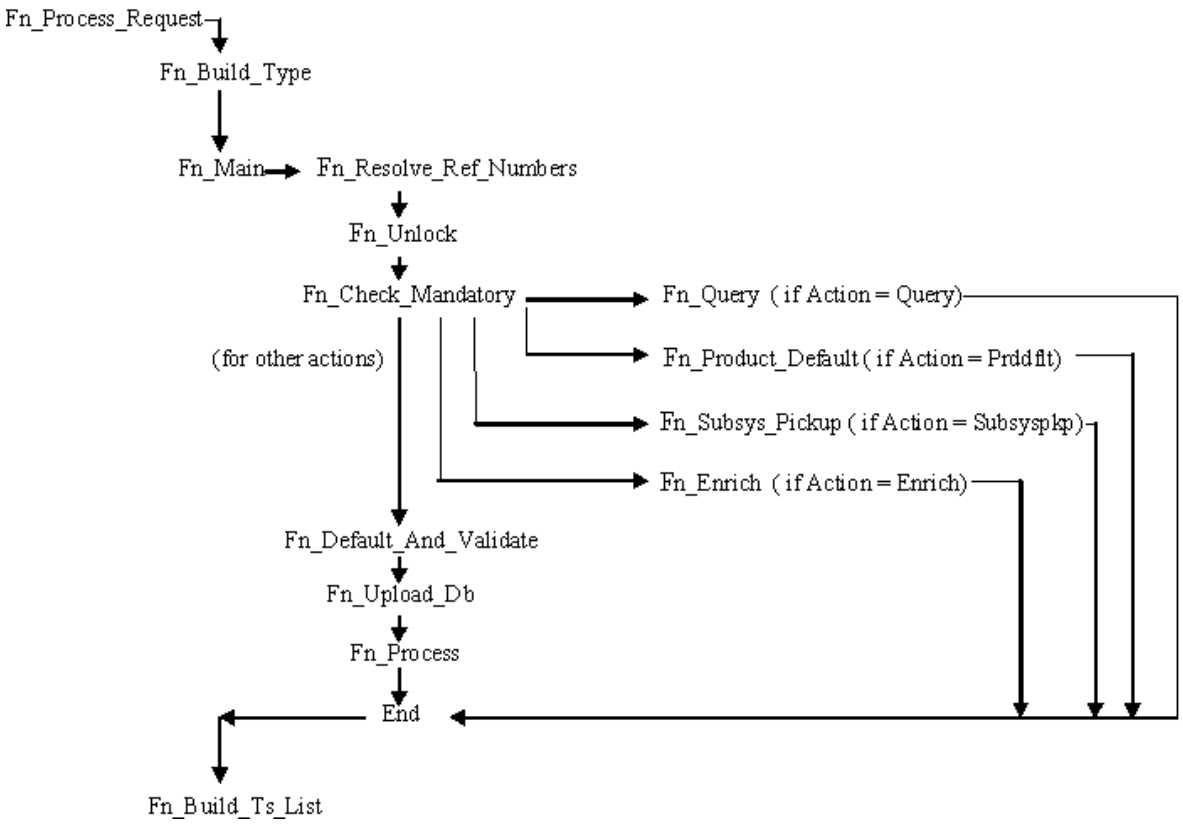


Fig Flow of control in an Online main package

Release specific code has to be written in the Hook Packages generated. Different functions available in the Hook Package of an Online 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 Main**
   This is called form the fn_main in main package.

3) **Fn_pre_resolve_ref_numbers**

4) **Fn_post_resolve_ref_numbers**
   This function validates the reference number. It is called from fn_ resolve_ref_numbers of the main package.

5) **Fn_pre_unlock**

6) **Fn_post_unlock**
   This function holds the contract level validations and modification logic for existing contract. It is called from fn_unlock of main package.

7) **Fn_pre_check_mandatory**

8) **Fn_post_check_mandatory**
   Any mandatory checks can be validated here. It is called from fn_chchk_mandatory of main package.

9) **Fn_pre_query**

10) **Fn_post_query**
    Any specific logic while querying can be written in these functions. It is called from fn_query of the main package

11) **Fn_pre_product_default**

12) **Fn_post_product_default**
    This function has the logic to default the values for the contract based on the product maintenance. It is called from fn_product_default of main package.

13) **Fn_pre_subsys_pickup**

14) **Fn_post_subsys_pickup**
    This function does the subsystem pickup for the subsystem's (call form's) as per product maintenance for the contract. It is called from fn_subsys_pickup of main package.

15) **Fn_pre_enrich**

16) **Fn_post_enrich**
    After product default, user can default others values. That logic can be put here.
    it is called from fn_enrich of main package.

17) **Fn_pre_default_and_validate**

18) **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.

19) **Fn_pre_upload_db**

20) **Fn_post_upload_db**
    Any logic while uploading data to tables can be written here**.** It is called from fn_upload_db of main package.

21) **Fn_pre_process**

22) **Fn_post_process**
    These hook functions are specific to transaction online form screens. This function should have the call to all the server functions which process the input data for the contract as per the functionality. These are called from fn_process of the main package.

Development of Online Forms
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