Oracle FLEXCUBE Investor Servicing®
Development Overview Guide

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1 Preface

This Development Overview document provides the bird's eye view of FLEXCUBE Investor Services Application development. It touches the concepts, frameworks, tools required and documents available for guidance.

1.1 Audience

This Developer Overview book is intended for authorized FLEXCUBE Investor Services Application Developers who are expected to perform the following task:

- To develop a Function ID(User Interface Screen)
- To develop a Web Service
- To develop a Notification
- To Extend FLEXCUBE functionality using with extensibility
- To Interface FLEXCUBE with external systems using Generic Interface
- To upload data into FLEXCUBE using upload adaptors
- To use FLEXCUBE IS framework tools
- To develop BIP Reports
- To develop OBIEE Repository files
- To debug FLEXCUBE at run time
- To Analyze and fix FLEXCUBE IS bugs

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

Table 1.1 – Proficiency and resources

Proficiency	*Resources*
FLEXCUBE Functional Architecture	Training programs from Oracle Financial Software Services.
FLEXCUBE Technical Architecture	Training programs from Oracle Financial Software Services.
Working knowledge of Web based applications	
Working knowledge of Oracle Database	Oracle Documentations
Working knowledge of PLSQL developer	Respective vendor documents
Working knowledge of PLSQL & SQL Language	
Working knowledge of XML files	

1.2 Related Documents

Refer the below documents for more information on FLEXCUBE IS Application development.

1. FCIS-FD01-01-01-Development Overview Guide
2. Open Development Tool
    a. Getting Started
    b. Function ID Development Volume 1
    c. Function ID Development Volume 2
    d. Web Service Development
    e. BIP Report Integration
3. Extensibility
    a. FCIS-FD03-01-01-Extensibility Getting started
    b. FCIS-FD03-02-01-Extensibility Reference Guide
    c. FCIS-FD03-03-01-Extensibility By Example Volume 1
    d. FCIS-FD03-03-02-Extensibility By Example Volume 2
4. Interface
    a. FCIS-FD04-01-01-Interface Getting started
    b. FCIS-FD04-02-01-Generic Interface Configuration Guide
    c. FCIS-FD04-03-01-Upload Adapter Development Guide
5. Tools
    a. FCIS-FD05-01-01-Tools-Getting Started
    b. Reference
    c. Installation and Setup
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6. Support
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    b. FCIS-FD07-02-01-BIP Report Development Guide
    c. FCIS-FD07-03-01-OBIEE repository Development Guide
8. Data model
    a. FCIS-FD08-01-01-Data Model getting started

1.3 Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements (for example, menus and menu items, buttons, tabs, dialog controls), including options that you select.
italic	*i*talic type indicates book titles, emphasis, or placeholder variables for

which you supply particular values.

monospace	Monospace type indicates language and syntax elements, directory and file names, URLs, text that appears on the screen, or text that you enter.

2 Introduction

2.1 How to use this Guide

The information in this document includes:

- Chapter 2, "Introduction"
- Chapter 3, "FLEXCUBE IS Development – Introduction"
- Chapter 4, "FLEXCUBE IS Application Developer Documents"
- Chapter 5, "Developer Glossary"

3 FLEXCUBE IS Development - Introduction

FLEXCUBE IS Application development consists of three parts:

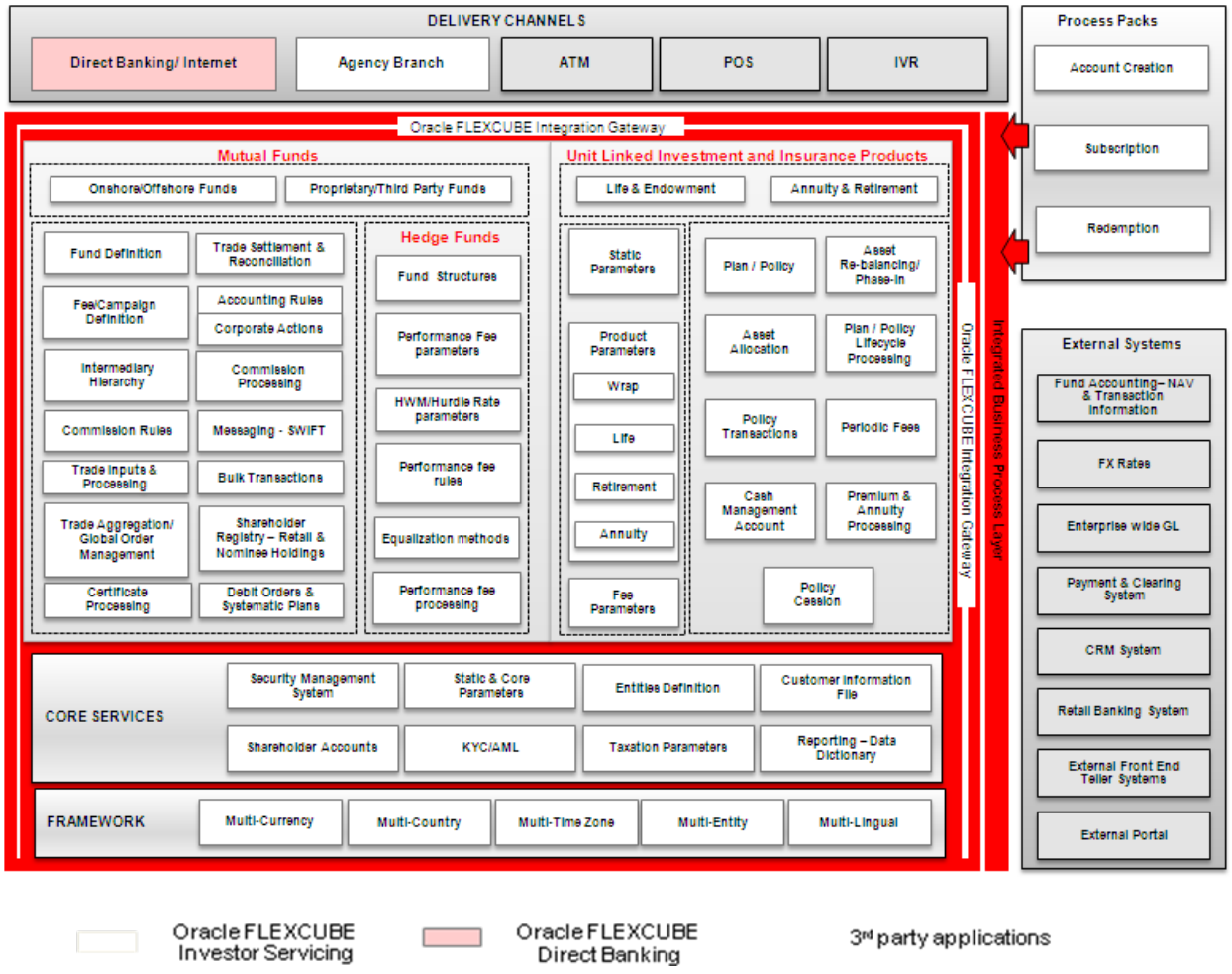
- Framework development
- Tools development
- Application components development using Framework/Tools

This document and associated documents are intended to guide FLEXCUBE IS "Application component development".

3.1 FLEXCUBE Investor Services Functional architecture overview

The given below diagram provides the functional architecture of the FLEXCUBE IS. Refer the respective FLEXCUBE IS user manuals to know functionality.

Fig 3.1 -FLEXCUBE IS Functional architecture

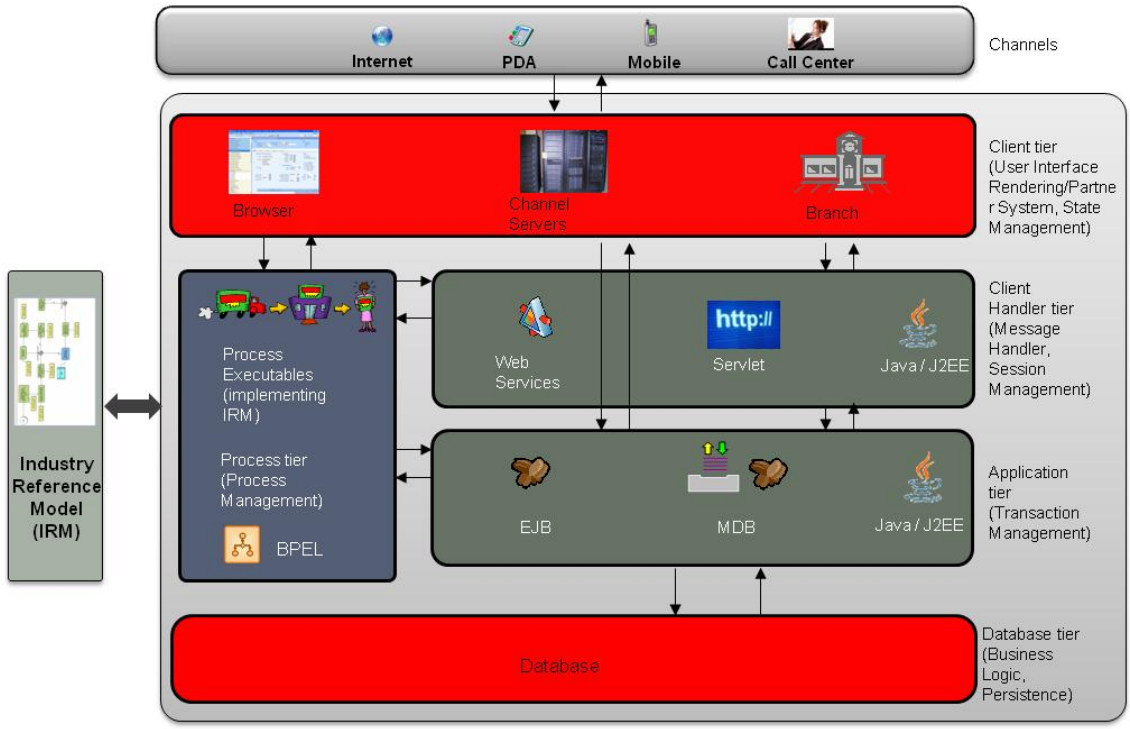


3.2 FLEXCUBE IS Technical architecture overview

The diagram depicted below represents the FLEXCUBE technical architecture and it consists of the following tiers:

- User Interface tier
- Process tier
- Application and Integration tier
- Database tier

Fig 3.2 -FLEXCUBE IS Technical architecture



3.2.1 User Interface tier

The user interface of the application is light-weight in nature and based on JavaScript and XML. The communication between the browser and the web server is using XML. The rendering is done on the client using XSLT. The user interface is configurable. The screen can be easily adapted to different languages.

3.2.2 Process tier

Oracle FLEXCUBE provides for processes to be developed around the natively provided application. One can define processes using Oracle BPEL Process Manager and integrate the same into the application's user interface framework. When deployed in a process centric model, Oracle FLEXCUBE provides a task-based user interface. By default, Task based UI is offered for the branch platform.

3.2.3 Application and Integration tier

Oracle FLEXCUBE does not differentiate partner channels from its own native user interface when it comes to data processing. The Application and Integration tier provides the message handling, session management (for the native user interface) and transaction management in the application.

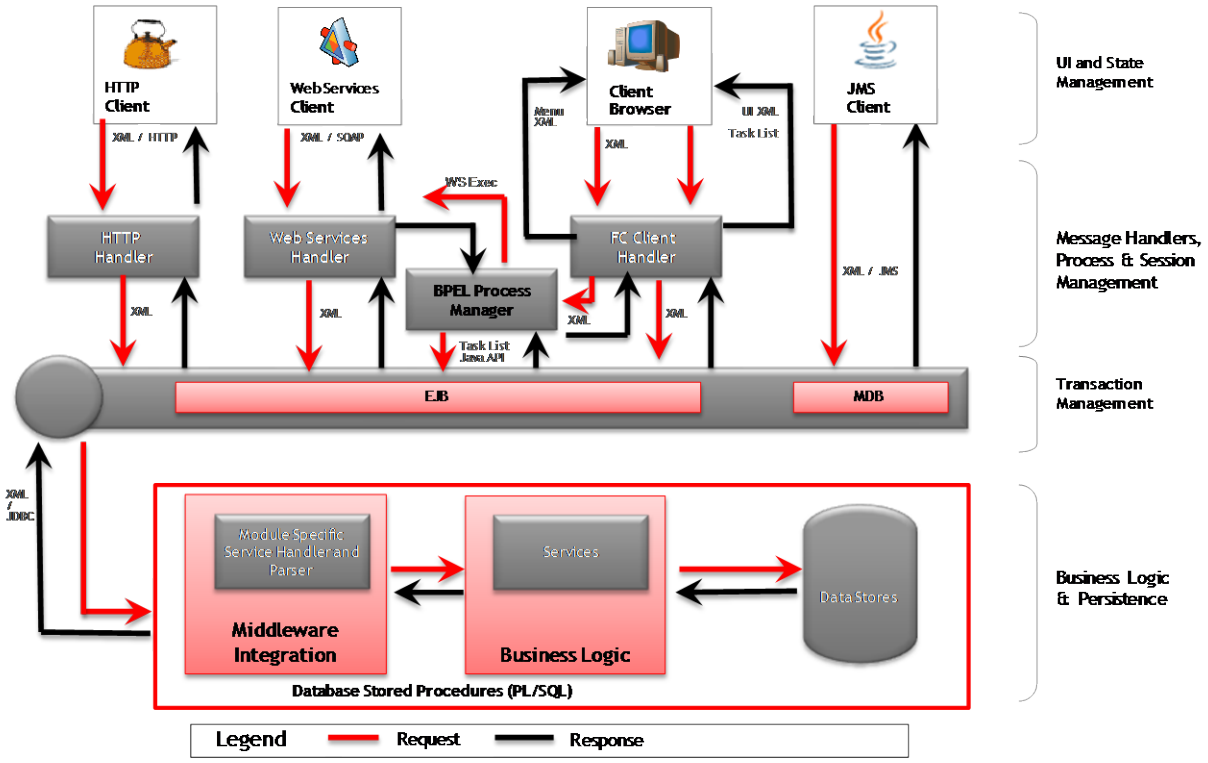
3.2.4 Database tier

The back-end is a relational database management system i.e. Oracle 11g. The database tier ensures integrity of data and also provides business logic written mainly in Oracle PL/SQL from the Oracle database.

3.3 FLEXCUBE IS data flow

The below self explanatory diagram represents the FLEXCUBE IS data flow at run time.

Fig 33 - FLEXCUBE IS Data flow



3.4 FLEXCUBE IS Framework

FLEXCUBE IS Application consists following frameworks to develop the various parts of Application.

3.4.1 **User Interface framework**

This is used to develop and render various FLEXCUBE IS interface (Screens aka Function ID). This consists following sub parts:

- Maintenance
- Online
- Report
- Batch
- Notification
- Process flow

3.4.2 **Gateways**

This framework used to develop various gateway components and support wide integration mechanism. This consists of following sub parts:

- Generic XML Gateway
  - EJB
  - MDB
  - Servlet
  - Web Service
  - Notifications
- Generic ASCII Interface
- EMS Gateway
- Switch Gateway

3.4.3 **Extensible**

This framework allows developing FLEXCUBE IS extensions

3.4.4 **Branch workflow**

This framework used to develop workflow based branch screens.

3.4.5 **Reports**

This framework allows reports development in FLEXCUBE IS Apps. It consists of the following sub parts:

- BIP
- OBIEE rpd

3.4.6 **BPEL process flows**

This framework used to develop the process flows that are centric to SOA architecture.

3.5 FLEXCUBE IS Application components & Tools to be used

This section describes the FLEXCUBE IS components and tools used to develop the components

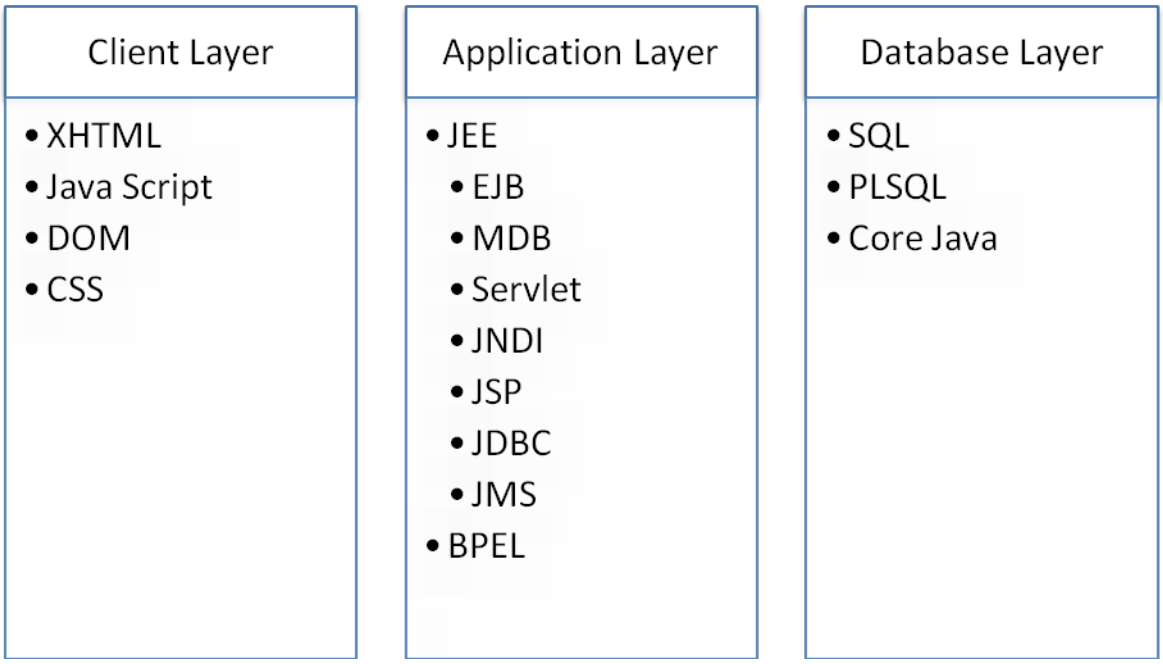
Table 3.1 – Framework, components and Tools

Framework	*Component*	*Tools*
User Interface	Maintenance	Open Development
	Online	Open Development
	Report	Open Development
	Batch	Open Development
	Notification	Open Development
	Branch Screen	Open Development
	Process flows screen	Open Development
Gateway	Web service	Open Development, TrAX
	Gateway XML message	Open Development, TrAX
	Notification	Open Development,TrAX
	ASCII Generic Interface	FLEXCUBE IS
	Upload Adapter	FLEXCUBE IS
Reports	BIP Canned reports	Open Development, BI Publisher
	OBIEE Meta data repository	Open Development, OBIEE Suite
Process flows	Process flows	Open Development,JDeveloper,Oracle BPEL process manager

3.6 FLEXCUBE Programming Language Overview

FLEXCUBE IS Application uses the following programming languages for each layer in technical architecture

Fig 3.4 -FLEXCUBE IS programming languages



3.7 FLEXCUBE Data Model

FLEXCUBE Data model is available for select modules. This helps to get the following

- ER relationships of FLEXCUBE IS Tables
- Table comments
- Column comments with enumeration list

FLEXCUBE IS Data model helps in understanding the Database design and assist to create specific report development and extensibility changes.

3.8 FLEXCUBE IS Object Naming Conventions

It is essential to know the naming conventions to create FLEXCUBE IS application objects. This section helps to understand existing objects naming conventions and to create new ones.

3.8.1 **Module**

Every database object names start with the two-character module codes. The below list provides possible module codes.

Table 3.2 – FLEXCUBE IS Module code list

Module Code	**Module Name**
UT	Unit Trust

LEP	Life and Endowment Products
SMS	Security Management

3.8.2 **Function IDs**

Function IDs created in Open Development need to follow the below naming convention:

<*two character module*><*Type*><*functionality*>

<Type> is as follows:

Table 3.3 – Function ID Type list

Third character	*Type*
D	Detail
S	Summary
R	Report
C	Call form
N	Notification
A	Authorization

Example:

- *UTDUH* - *Detailed screen Unitholder information*
- *UTSUH* – *Summary screen Unitholder information*
- *UTR00048* – *Broker Details Report Screen*
- *UTCPAYDT* – *Transaction Payment details call form*

3.8.3 **Table Names**

- All tables are divided into 3 categories
  - Maintenance Tables
    - Tables that have a front-end form through which data is collected
  - Internal Tables
    - Tables that have no front-end UI for data collection. Their data comes through SQL statements that are executed by program units (either from the back-end or the front-end).
  - Temporary Work Tables
    - Tables that are much like Internal tables. They store data that are required for a short, definite period of time, typically, lasting only as long as the routine that created it is running the given task. These are, generally, cleared automatically after they serve the purpose they were created for. Contrary to the common inference of the table name, these tables are not temporary; rather, the data they contain are.

3.8.4 **Package Names**

- Package names generally begin with the module code or module name they belong to.
- All server package names have "PKS" as the 3rd , 4th and 5th characters
- Examples:
  - UTPKS_UTDTXN02_MAIN - Package containing UT subscription transaction related units
  - pkgTransaction - Package containing UT trasaction units
  - pkgPolicyBll - Package containing LEP-related units
  - SMPKCS - Front-end package containing SMS-related units

3.8.5 **Views**

- All view names have ".VW" extenion
- All view file names have <viewname>.vw.
- Example
  - periodicloadtbl - View used to access periodic load data
  - ledplan.vw - View to LEP policy details

3.8.6 **Triggers**

- All trigger names have "TRG" as last 3 characters of the trigger script file name
- Characters from 1st position onwards till "TRG" are used to identify the purpose of the trigger
- Example
  - CONSOLIDATEDTXNTYPETRG - Trigger to update Allotedflag for UT transaction

3.8.7 **Synonyms**

All tables, packages and views are referred only through synonyms in code. Synonym names are formed by adding the character "S" after the module and object type identifier

Example

- SMTBS_CURRENT_USERS - Synonym for table SMTB_CURRENT_USERS
- STTMS_DATES - Synonym for table STTM_DATES
- UTPKSS_UTCFNBAL_MAIN - Synonym for package UTPKS_UTCFNBAL_MAIN

3.8.8 **File extensions**

FLEXCUBE IS Application consists of following file extension types.

Table 3.4 – File extensions list

File extension	*Purpose*	*Tools*
ddl	Table DDL file	DDL Tool
inc	INC file	DDL Tool
seq	DB sequences file	DDL Tool
mf	System created Java meta file	Java tools
jar	JAR file	Java tools/FCIS Installer
rar	RAR compressed file	Java tools/FCIS Installer
war	Web Archive file	Java tools/FCIS Installer
ear	EAR file	Jdeveloper/FCIS Installer
log	System created log files	N/A
rpd	OBIEE repository files	OBIEE
dbc	DB template installation file	Oracle Database
dfb	DB template installation file	Oracle Database
fnc	DB functions	PLSQL Developer
prc	DB procedures	PLSQL Developer
trg	DB Trigger	PLSQL Developer
typ	PLSQL Type file	DDL Tool
vw	DB view file	PLSQL Developer
spc	DB package spec	PLSQL Developer/ Open Development tool
sql	DB package body	PLSQL Developer/ Open Development tool
xml	XML file	Open Development /Textpad/Jdeveloper/TrAX
xsd	XML schema definition file	Open Development /TrAX
sh	Unix shell script	Text pad
xdo	BIP report file	Text pad
adf	GI ascii format definition	Textpad
bat	windows batch file	Textpad
c	C program file	Textpad
cmd	windows batch file	Textpad
ddf	FLEXML - DDF type definition	Textpad
fmt	Advice format	Textpad
frm	Advice format	Textpad
properties	Properties file	Textpad
txt	Text file	Textpad
java	Java source	Textpad/Jdeveloper
js	Java script file	Textpad/Jdeveloper
jsp	JSP file	Textpad/Jdeveloper

wsdl	Web service definition file	TrAX
rtf	BIP RTF report file	Windows word with BIP plug-in

3.8.9 Open Development object naming conventions

Open Development function ID development need to follow the below naming conventions

Table 3.5 – Open Development naming convention list

Item	*Prefix*	*Example*
LOV	LOV_	LOV_BRANCH
Data Block	BLK_	BLK_STTM_CUSTOMER
Labels	LBL_	LBL_CUSTOMER_NO
XSD Tags	*Remove hyphen in column name*	CUSTOMERNO
XSD node names	*From block, replace _ with -*	Sttm-Customer
Buttons	BTN_	BTN_EXIT
Screens	CVS_	CVS_MAIN
Tabs	TAB_	TAB_AUXILIARY
Sections	SECn	SEC1
Partitions	Pn	P2
Field Sets	FST_	FST_1

3.9 FLEXCUBE Hand Coded / Manually developed Components

Other than the Open Development generated pl/sql source code, FLEXCUBE IS consists of core processing database packages. These packages are developed manually. These packages not allowed to be modified as a part of extensibility or customizations.

For e.g.

- PKGALCIPOSUB - Performs allocation services
- PKGMCCY - Performs all currency serices
- PKGSETTLEMENTPROCESS - Performs Settlement related services
- PKGFMGEODBOD - Performs EOD process

4 FLEXCUBE IS Application Developer Documents

This section describes and links the various Developer documents that are required for FLEXCUBE IS Application components development.

4.1 Document classifications

The documents are classified as three types

Table 4.1 – Developer documents classification list

Type	*What it contains*	*Documents*
Concepts	This explains the concepts and bring user to	• FCIS-FD01-01-01-Development Overview Guide

	development context.	• Getting Started • FCIS-FD03-01-01-Extensibility Getting started • FCIS-FD04-01-01-Interface Getting started • FCIS-FD05-01-01-Tools-Getting Started • FCIS-FD06-01-01-Support Getting started • FCIS-FD07-01-01-Report Getting started • FCIS-FD08-01-01-Data Model getting started
Procedure	This explains step by step procedure with screen shots on how to do a given component development	• Function ID Development Volume 1 • Function ID Development Volume 2 • Web Service Development ▪ BIP Report Integration ▪ BIP Report Integration ▪ FCIS-FD03-03-01-Extensibility By Example Volume 1 ▪ FCIS-FD03-03-02-Extensibility By Example Volume 2 ▪ FCIS-FD04-02-01-Generic Interface Configuration Guide ▪ FCIS-FD04-03-01-Upload Adapter Development Guide ▪ FCIS-FD06-02-01-Support By Example ▪ FCIS-FD07-02-01-BIP Report Development Guide • FCIS-FD07-03-01-OBIEE repository Development Guide
Reference	These are reference documents provided by tools	▪ FCIS-FD03-02-01-Extensibility Reference Guide

	for all possible features.	▪ Reference ▪ Installation and Setup ▪ FCIS-FD05-03-01-DDL-Reference ▪ FCIS-FD05-04-01-TrAX-Reference

4.2 Document contents

This section briefs the contents of the developer documents available for FLEXCUBE IS application development.

- FCIS-FD01-01-01-Development Overview Guide

  This provides the bird's eye view of FLEXCUBE IS Development and set the basic foundation for developer including concepts, architecture, framework, tools and global glossary. *This is the document that you are currently reading*.

  - Open Development Tool
    - Getting Started
      This document gives head start to use Open Development tool for FLEXCUBE Application development. It covers the Open Development life cycle and specification needed to develop Open Development function IDs.
    - Function ID Development Volume 1
      This document explains the step by step procedure to develop the function ID using extensible Open Development.
    - Function ID Development Volume 2
      This document explains the step by step procedure to develop the function ID using non extensible Open Development.
    - Web Service Development
      This document explains the step by step procedure to develop Web service. It covers development life cycle, deployment and testing of web service.
    - BIP Report Integration
      This document explains the step by step procedure to integrate the BIP developed in BIP server with FLEXCUBE IS function ID. This integration helps to launch BIP reports from FLEXCUBE IS URL.
  - Extensibility
    - FCIS-FD03-01-01-Extensibility Getting started

This document gives head start to work on FLEXCUBE IS extensible framework. It explains the various business areas that extensibility available and concepts behind it.

- FCIS-FD03-02-01-Extensibility Reference Guide
  This reference guide provides extensibility framework concepts and features.

- FCIS-FD03-03-01-Extensibility By Example Volume 1
  This document explains the step by step extensible development with simple examples that includes layout changes, addition of UI elements and functional extensibility using SDE/UDF.

- FCIS-FD03-03-02-Extensibility By Example Volume 2
  This document explains the step by step extensible development with medium complex example that covers processing and UI changes.

- Interface
  - FCIS-FD04-01-01-Interface Getting started
    This document explains the various Integration and interface concepts of FLEXCUBE IS. It covers the overview diagrams to set context.

  - FCIS-FD04-02-01-Generic Interface Configuration Guide
    This document explains step by step procedure to define GI outgoing and incoming interface.

  - FCIS-FD04-03-01-Upload Adapter Development Guide
    This document explains step by step procedure to create spreadsheet based FCIS upload adapters that are used for data migration into FLEXCUBE IS.

- Tools
  - FCIS-FD05-01-01-Tools-Getting Started
    This document gives head start for development tools available .

  - Reference
    This document provides reference information of extensible Open Development that includes all features available and concepts

  - Installation and Setup
    This document provides the installation and setup steps for extensible Open Development

  - FCIS-FD05-03-01-DDL-Reference
    This document provides the reference information of DDL tool features and its usage.

    Note: *This tool in internal to Oracle Financial Software Services and this document may not be available externally.*

- FCIS-FD05-04-01-TrAX-Reference
  This document provides the reference information of TrAX tool features and its usage.
  Note: *This tool in internal to Oracle Financial Software Services and this document may not be available externally.*

- Support
  - FCIS-FD06-01-01-Support Getting started
    This document provides the possible FLEXCUBE IS software issues and various tools available for support.

  - FCIS-FD06-02-01-Support By Example
    This document provides uses cases that explain the FLEXCUBE IS software support that covers issue analyze/fix.

- Reports
  - FCIS-FD07-01-01-Report Getting started
    This document gives head starts on reports development in FLEXCUBE IS using BIP or OBIEE meta data repository.

  - FCIS-FD07-02-01-BIP Report Development Guide
    This document explains the step by step procedure to develop the BIP report.

  - FCIS-FD07-03-01-OBIEE repository Development Guide
    This document explains the step by step procedure to develop OBIEE Meta data repository.

- Data Model
  - FCIS-FD08-01-01-Data Model getting started
    This document helps to start using FLEXCUBE IS data model artifacts.

5 Developer Glossary

This section provides the developer glossaries that are applicable in all developer documents.

Acronym	*Meaning*
AUDF	Ascii User Defined Field
Back-end	Represents the Database layer
BIP	Business Intelligence Publisher
BLK	Block (used in Open Development screen development)
CI	Configurable Item
CVS	Canvas
DDL	Data Definition Language
DOM	Document Object Model
DSN	Data Source Name (Microsoft ODBC)
EAR	Enterprise ARchive file
EJB	Enterprise Java Bean
EMS	Electronic Media System
EOD	End Of Day
ER	Entity Relationship
FC BRN	FLEXCUBE Branch
FCJ	FLEXCUBE Java
Front-end	Represents the client layer(browser)
FS-FS	Full Screen - Full Screen (Web service pattern)
FST	Field Set (used in Open Development screen development)
FTP	File Transfer Protocol
GI	Generic Interface
GW_WS	Gateway Web Service
IDE	Integrated Development Environment
IE	Microsoft Internet Explorer
IMPL	Implementation files (used in web services)
INC	File extension used to represent static data (Insert statements)
IO-FS	Input Only - Full Screen (Web service pattern)
IO-PK	Input Only - Primark Key (Web service pattern)
JDBC	Java Data Base Connectivity
JEE	Java Enterprise Edition
JMS	Java Messaging Standard
JS	Java Script file
LBL	Label (used in Open Development screen development)
LOV	List Of Value (used in Open Development screen

	development)
MDB	Message Driven Bean
MSG	Message
NQS	Network Queuing System
OBIEE	Oracle Business Intelligence Enterprise Edition
OLTP	On Line Transaction Processing
PK	Primary Key of Database Table
PK_Cols	Primark Key columns names
PK_Types	Primark Key columns types
RPD	OBIEE Repository(meta data) file
RTF	Rich Text Format
SDE	System Data Element
SEC	Section (used in Open Development screen development)
SEQ	Oracle database SEQuence
SMS	Security Management System
SOAP	Simple Object Access Protocol
SPC	Oracle database package SPeCification
SQL	Oracle database package body
SWIFT	Society for Worldwide International Fund Transfer
SYS	System Java script file
TIX	Tilda separated in XML format
TNS	Oracle TNS entries
TrAX	Tracking and Analyzing xsd's Tool
TS	Tilda Separated
IS	FLEXCUBE Investor Servicing
UDF	User Defined Field
UI	User Interface
UT	Unit Trust
UIXML	User Interface XML (runtime file)
WAR	Web Archive file
WS	Web Service
WSC	Web Service Custodian
WSDL	Web Service Description Language
XDO	Extensible Data Object
XHTTP	XML HTTP format
XML	Extensible Markup Language
XSD	XML Schema Definition

6 List of Figures

7 List of Tables

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