Oracle Banking Digital Experience

Mobile Application Builder Guide – Android Release 19.2.0.0.0

Part No. F25153-01

December 2019



Mobile Application Builder Guide – Android December 2019

Oracle Financial Services Software Limited Oracle Park Off Western Express Highway Goregaon (East) Mumbai, Maharashtra 400 063 India Worldwide Inquiries: Phone: +91 22 6718 3000 Fax:+91 22 6718 3001 www.oracle.com/financialservices/

Copyright © 2019, Oracle and/or its affiliates. All rights reserved.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

U.S. GOVERNMENT END USERS: Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate failsafe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

This software or hardware and documentation may provide access to or information on content, products and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services.

Table of Contents

1.	Pre	face	4
1	.1	Intended Audience	4
1	.2	Documentation Accessibility	4
1	.3	Access to Oracle Support	4
1	.4	Structure	4
1	.5	Related Information Sources	4
2.	OB	DX Servicing Application	5
2	2.1	Prerequisites	5
2	2.2	Create project using Remote UI	7
2	2.3	Local UI	7
2	2.4	Importing in Android Studio	8
3.	Goo	ogle Play Integrity1	D
4.	FC	I Push Notifications1	5
5.	Bui	Id Release Artifacts1	9
6.	OBI	DX Authenticator Application2	7
6	6.1	Authenticator UI (Follow any one step below)2	7
6	6.2	Authenticator Application Workspace Setup	Э
7.	Арр	blication Security Configuration	5

1. Preface

1.1 Intended Audience

This document is intended for the following audience:

- Customers
- Partners

1.2 Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=accandid=docacc.

1.3 Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit

http://www.oracle.com/pls/topic/lookup?ctx=accandid=info or visit

http://www.oracle.com/pls/topic/lookup?ctx=accandid=trs if you are hearing impaired.

1.4 Structure

This manual is organized into the following categories:

Preface gives information on the intended audience. It also describes the overall structure of the User Manual.

The subsequent chapters describes following details:

- Prerequisites
- Configuration / Installation.

1.5 Related Information Sources

For more information on Oracle Banking Digital Experience Release 19.2.0.0.0, refer to the following documents:

• Oracle Banking Digital Experience Licensing Guide

2. OBDX Servicing Application

2.1 Prerequisites

OBDX Android App is supported on Android 6 and above versions.

App will not work for Android 5 and below versions

- a. Download and Install node Js (will be downloaded to default path)
- b. Install node js from https://nodejs.org
- c. Download and Install Android Studio
- d. Download and install Android Studio from https://developer.android.com/studio/index.html
- e. Download and Install Android platforms
- f. Update Android SDK to latest API Level.
- g. Cordova Version: 6.x
- h. Gradle Version: gradle-4.6
- i. Android Gradle Plugin Version (3.2.1): 'com.android.tools.build:gradle:3.2.1'

j. Set Environment variables

- k. Set following system variables:
 - 1. Click on Windows key and type Environment Variables.
 - 2. A dialog box will appear. Click on the Environment Variables button as shown below

System Properties	\times
Computer Name Hardware Advanced System Protection Remote	
You must be logged on as an Administrator to make most of these changes. Performance Visual effects, processor scheduling, memory usage, and virtual memory <u>Settings</u>	
User Profiles Desktop settings related to your sign-in Settings	
Startup and Recovery System startup, system failure, and debugging information Settings	
OK Cancel Apply	

3. NODEJS <nodejs_path> Example: "C:\Program Files\nodejs\".

Add the above variables in "PATH" system variable.

Ι.

(1) 3 4 19 4 10) 7	17-2_app_document_Final.docx - Microsoft Word	- 0 ^
Home Insert Page Layout References	Mailings Review View	
Cut Cuthe Country and the		- 🗛 🖓 Find -
Calibri (Body)	Environment Variables X to ABBCC. ABBCCD	A ab Replace
Paste → ✓ Format Painter B I U → abe ×, ×' Aa→	Title Subtite Em	Styles * 🔓 Select *
Clipboard 🕞 Font	User variables for MGARI	G Editing
	Variable Value	
	PATH C:\Users\MGARI\AppData\Roaming\npm X	
	TEMP %USERPROFILE%\AppData\Local\Temp TMD vanced System Protection Remote	
	The addemention and a strange and a	
	commistration to make most of these changes.	
	no. memory usage, and virtual memory	
	New User vanable	
	Settings	
	Vanable name:	
	Variable value: C:\Program Files\nodejs gr-in	
	Browse Lirectory Browse File OK Cancel Settings	
	OS Windows_NT .and debugging information	
	Path C:\ProgramData\Oracle\Java\javapath;C:\app\MGARI\product\11.2	
	PATHEXT .COM; EXE; BAT; CMD; VBS; VBE; JS; JSE; WSF; WSF; MSC	
	Environment Vatibles	
	New Edit Delete	
	OK Cancel Apply	
	Page 1 22	
Page: 1 of 22 Words: 1,206 🕉		
📲 🔎 🗖 🔲 💭 🖉	😑 🖉 👩 🔼 👎 📴 💐 🖼 🗶 👰 🗠 🔺	日 (12:39 PM ア (12:39 PM) ア (12:39 PM)
		1723/2011
💽 🔄 🔊 - (°) =	MobileAPps.xls [Compatibility Mode] - Microsoft Excel	- 0 ×
Home Insert Page Layout Formulas [MobileAPps.vls [Compatibility Mode] - Microsoft Excel Data Review View	- 0 × 0 - • x
Home Insert Page Layout Formulas [MobileAPps.vls [Compatibility Mode] - Microsoft Excel	- 0 × © - ¤ x
Home Insert Page Layout Formulas []	MobileAPps.xls [Compatibility Mode] - Microsoft Excel	- 0 X
Home Inset Page Layout Formulas [] Home Inset Page Layout Formulas [] A Cut La Copy Paste I T T T A A A	MobileAPps.xts [Compatibility Mode] - Microsoft Excel	- 0 X @_sx
Image: Second secon	MobileAPps.vls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Fill - Soft & Find & Fill - Soft & Find & Environment Variables for MGARI Excerning	- 6 × @_sx
Home Insert Page Layout Formulas I Home Insert Page Layout Formulas I La Copy Paste Format Painter Clipboard C All8 Charles Fort C	MobileAPps.xls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Environment Variables View Environment Variables View Environment Variables View Editing View Editing Environment Variables View Editing Environment Variables View Editing	- 5 X @ - 5 X
Home Insert Page Layout Formulas I Home Insert Page Layout Formulas I Labori - 11 - A' A' Page A Cot D E F G 97	MobileAPps.xls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables User variables for MGARI User variables for MGARI Variable Variable Variable Variable Variable Value H	- C X e - X AB AC
Home Insert Page Layout Formulas I Home Insert Page Layout Formulas I Laibbi • 11 • Å Å Page Layout Formulas I Calibbi • 11 • Å Å B I I • • • • Å • Font Formulas I B I I • • • • Å • Font Formulas I B I I • • • • • • • • • • • • • • • • •	MobileAPps.xls [Compatibility Mode] - Microsoft Excel	-
Home Inset Page Layout Formulas I Home Inset Page Layout Formulas I La Copy Parte Format Painter Clipboard 5 A 118 - 6 for A 118 - 6 for B C D E F G 97 98 99 100	MobileAPps.xts [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Environment Variables Variable for MGARI Variable Value NODESS C:\Program Files\nodejs PAT C:\Users\NGARIApp2ata\Roarning\npm TEMP %USERPROFILE%\App2ata\Loca\Temp	-
Image: Section 1 Image: Section 2 Home Insert Home Insert Page Layout Formulas Image: Section 2 Image: Section 2	MobileAPps.xts [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Environment Variables Variable Value Variable for MGARI Variable Value NODEJS C-\Program File4.nodejs PAT C_\Users/NGARIAppData\Local\Temp TEMP %USERPROFILE%\AppData\Local\Temp dministrator to make most of these charges.	- 0 X - 7 X
Image: Second	MobileAPps.vls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Finite Setting	- 0 X 0 - 0 X 1 - 0 X 2 - 0
Image: State of the state o	MobileAPps.vls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Environment Variables View User variables for MGARI User variables for MGARI Variable Value H Variable Value Value Variable Value Valu	- O X Q - O X AB AC
Home Insert Page Layout Formulas I Home Insert Page Layout Formulas I La Coty Paste Format Painter Clipboard C A 118 - 6 fr A B C D E F G A B C D E F G Boole for Boole	MobileAPps.xls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Environment Variables User variables for MGARI User variables for MGARI User variables for MGARI Variable Value NODEJS CAProgram FileAnodejs PATH CAUsers/MGARIAppDatal/Coal/Temp TMP SUSERPROFILES/AppDatal/Coal/Temp durg.memory usage.and vitual memory	- 0 X 0 - 7 X 1 - 7
Home Insert Page Layout Formulas I Home Insert Page Layout Formulas I La Coty Parter Format Painter Citipboard Format Painter A 118	MobileAPps.xls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Environment Variables User variables for MGARI User variables for MGARI Variable Vari	- 0 X -
Home Insert Page Layout Formulas I Home Insert Page Layout Formulas I Lailori - 11 - A A Faste Format Painter Clipboard - Format Painter A 118 - A Format Painter A B C D E Ford Boose pre- NAGES 100 101 103 103 104 105 105 105 105 105 105 105 105	MobileAPps.xls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Environment Variables User variables for MGARI User variables for MGARI Variable Vari	- 0 X 0 - 0 X 1 - 0
Home Insert Page Layout Formulas I Home Insert Page Layout Formulas I Layout Format Painter Clipboard Format Painter Clipboard Format Painter A 118 - (* format Painter Clipboard Format Painter A 18 - (* format Painter Part Page Layout Formulas I B I I I + (I + A) * A Format Painter Format Painter Page Layout Formulas I B I I I + (I + A) * A Format Painter Page Layout Formulas I B I I I + (I + A) * A Format Painter Page Layout Formulas I B I I I + (I + A) * A Format Painter Page Layout Formulas I B I I I + (I + A) * A Format Painter Page Layout Formulas I B I I I + (I + A) * A Format Painter Page Layout Formulas I B I I I + (I + A) * A Format Painter Page Layout Formulas I B I I I + (I + A) * A Format Painter Page Layout Formulas I B I I I + (I + A) * A Format Painter Page Layout Format Painter Format Page Layout Format Painter Format Page Layout Format Painter Format Page Layout Format Page Layout For	MobileAPps.xls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Image: Compatibility Mode] - Microsoft Excel User variables for MGARI Image: Compatibility Mode] - Microsoft Excel Variable Value NoteDES CiVrogram FileAnodejs PATH CiUsers/MGARI/AppData/Local/Temp TMP %USERPROFILE%/AppData/Local/Temp Models Edit Delete getings System variables ir signin	- 0 X - 7 X -
Image: Second	MobileAPps.xls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables	- O X Q - O X X AB AC
Image: 1 of 2 of	MobileAPps.xls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Fill X AutoSum User variables for MGARI Fill X AutoSum User variables for MGARI Clear Fill Variable Value Clear NODEJS C/Program File*Inodejs X variables PATH C/Users/MGARI/Roaming/npm Variable TMP %USERPROFILE%/AppDatal.LocaNTemp Variables Model Nuce System variables System variables Variable Value Variable Value System variables Variable Value System variables Variable Value Strence System variables r signin setings	- O X Q - O X AB AC A
Image: State of the s	MobileAPps.xls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Fill *** Soft & Find & Fill *** User variables for MGARI Clear ** Fill *** User variables for MGARI Clear ** Fill *** Variable Value Value Fill *** NODEJS C\Program Files\nodejs *** **** PATH C\UsersVInGARIAppDatalLocal\Temp **** ***** TMP %USERPROFILE%\AppDatalLocal\Temp durinstrator to make most of these changes. during: memory usage, and vitual memory System variables ************************************	- 0 X 0 - 7 X 1 - 7 X 4 - 7
Image: Section of the sectio	MobileAPps.xls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Fill Soft & Find & Fill User variables for MGARI Clear Fill Soft & Find & Fill User variables for MGARI Clear Fill Soft & Find & Fill Variable Value Value Fill Soft & Find & Fill NODELS C/Program Files/nodejs Variable Value Fill Soft & Find & Find & Find & Fill NDDELS C/Program Files/nodejs Variable Value Ministrator to make most of these charges. MM SUSERPROFILE%IAppDatail.localI/Temp SuSERPROFILE%IAppDatail.coalI/Temp Delete Setings System variables r signin setings setings setings Variable Value ComSpec C/WINDOWS/system32/cmd exe Setings Op Cool R CCSSORS 4 Setings and debugging information	- 0 X 0 - 0 X 1 - 0
Hone Inset Page Layout Formulas I Hone Inset Page Layout Formulas I La Cut Page Layout Formulas I Page Layout Form	MobileAPps.xls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Fill Soft & Find & Fill User variables for MGARI Fill Soft & Find & Fill Variable Value Fill Soft & Find & Fill NODEJS C:Vrogram Files\nodejs Fill Soft & Find & Fill PATH C:Users/MGARI/AppData/Roaming/npm Fill Fill Soft & Find & Fill TMP %USERPROFILE%AppData/Local/Temp Vanced System Potection Remote dinisitator to mice most of these charges. System variables Variable Value Setings ad debugging information Variable Value Setings ad debugging information and debugging information NUMBER, OF_PROCESSORS 4 OS Windows, NT and debugging information Path C:Vrogram.Data/Oran/ExtaplarystyChappMGABR/product/112 and debugging information and debugging information	- 0 X -
Image: Second	MobileAPps.ubs [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables	- 0 X 0 - 0 X 1 - 0
Image: Second	MobileAPps.xls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables	- 0 X 0 - 0 X 1 - 0
Image: Instant Page Layout Formulas I Home Instat Page Layout Formulas I Image: Image Layout Calibrit 11 Image Layout Formulas I Image Layout Compute Calibrit 11 Image Layout Formulas I Image Layout Compute Image Layout Formulas Image Layout Image Layout <td>MobileAPps.vls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Fill XutoSum User variables for MGARI Fill XutoSum User variables for MGARI Clear Fill Variable Value Variables NODEJS C/Program Files/nodejs Variable PATH C/Users/MGARI/AppDatal.loca/Temp Variable TMP %USERPROFILE%/AppDatal.Loca/Temp Variable System variables Variable Value Variable Value Stream variables Variable Value Stream variables System variables Variable Value System variables Stream variables r signin System variables Variable Value DEFLOCOR C/Vrogram/bata/Crac/Leva/giavapath/c/Lapp/MGARI/product/112 Pathext, C/Morgam/bata/Crac/Leva/giavapath/c/Lapp/MGARI/product/112 Pathext, Com/p.Ets.BAT: New Edit Delete Environment Variables Environment Variables. Environment Variables.</td> <td>- O X W - O X K AB AC</td>	MobileAPps.vls [Compatibility Mode] - Microsoft Excel Data Review View Environment Variables Fill XutoSum User variables for MGARI Fill XutoSum User variables for MGARI Clear Fill Variable Value Variables NODEJS C/Program Files/nodejs Variable PATH C/Users/MGARI/AppDatal.loca/Temp Variable TMP %USERPROFILE%/AppDatal.Loca/Temp Variable System variables Variable Value Variable Value Stream variables Variable Value Stream variables System variables Variable Value System variables Stream variables r signin System variables Variable Value DEFLOCOR C/Vrogram/bata/Crac/Leva/giavapath/c/Lapp/MGARI/product/112 Pathext, C/Morgam/bata/Crac/Leva/giavapath/c/Lapp/MGARI/product/112 Pathext, Com/p.Ets.BAT: New Edit Delete Environment Variables Environment Variables. Environment Variables.	- O X W - O X K AB AC
Image Image <th< th=""><td>Data Review View Environment Variables Fill StatuoSum Fill Fill StatuoSum Fill Fill StatuoSum Fill Fill Fill StatuoSum Fill Fi</td><td>- O X - O X -</td></th<>	Data Review View Environment Variables Fill StatuoSum Fill Fill StatuoSum Fill Fill StatuoSum Fill Fill Fill StatuoSum Fill Fi	- O X -
Image: Second	Data Review View Environment Variables Fill Soft & Find & Fill User variables for MGARI Eter Format Fill Soft & Find & Fill Variables for MGARI Value Fill Soft & Find & Fill NODEJS CAProgram Files/nodejs Fill Soft & Find & Fill PATH CUSers/NGARIAppData/Boaring/npm Variable Variable TEMP %USERPROFILESi/AppData/Local/Temp Variable Value Variable Value Variable Sustemport_Exit Variable Value Variable Sustemport_Exit Variable Value Sustemport_Exit Delete Variable Value Satings ad debugging infomation System variables riggrin Satings ad debugging infomation Path C/ProgramData/local/Vasy, Vasy, Vindews, VIT Delete Satings Path C/ProgramData/local/Vasy, Vasy,	- 0 X 0 - 7 X 1 - 7
Image: Second	Data Review View Environment Variables X AutoSum * Xi AutoSum *	- 0 X -
Image: Second	Data Review View Environment Variables Fill and Status Fill and Status<!--</td--><td>- 0 X 0 - 0 X 1 - 0</td>	- 0 X 0 - 0 X 1 - 0
Image: Second	Data Review View Environment Variables Fill XatoSum Fill XatoSum Fill Setter Find & Fill User variables for MGARI Value Fill XatoSum Fill Setter Find & Fill Variables Value Value Value Value Caluer Setter Find & Fill NODEJS C/Program Files/nodejs Patt+ C/User/MGARI/AppDatal.local/Temp Value Value Value Value Value Value Value Value Setter Find & Gilling Value Value Setter Setter Setting Value Setting Value Value Setting Value Setting Setting Setting Value Setting Setting Value Setting Setting Value Setting	
Image: Instant Page Layout Formulas I Home Instant Page Layout Formulas I Image: Image Layout Calibrit 11 Image Layout Formulas I Image: Image Layout Calibrit 11 Image Layout Formulas I Image: Image Layout Calibrit 11 Image Layout Formulas Image Layout Image Layout Image Layout Formulas Image Layout Image Lay	Data Review View Environment Variables Fill XutoSum Fill View Fill XutoSum User variables for MGAR Clear Fill Sett& Find & Variable Value Variables Clear Sett& Find & NODEJS C/Program Files/nodejs Path Clear Edition PATH C/Users/MGAR/AppDatal.loca/Temp Variable Variable Value TMP %USERPROFILE%/AppDatal.loca/Temp understart to make noat of these charges Variable Value System variables setting Variable Value Delete System variables Variable Value System variables rigg:n System variables C/Vrogram.Data/McA/eb/DesktopProtection worde Setting DEHLOCOR C/Vrogram.Data/McA/eb/DesktopProtection and debugging information Setting DEHLOCOR C/Vrogram.Data/McA/eb/DesktopProtection OK Cancel OK DATHEXT C/McA/EB/SS/SE/LS/SS/S/A OK Cancel OK Cancel OK	
Image Image <th< th=""><td>Data Review View Environment Variables Filler Soft& Find & Filler User variables for MGAR Clear Filler Soft& Find & Filler Variable Value Value Value Value Value Value Soft& Find & Filler Soft& Find & Filler Soft& Find & Find & Filler Soft& Find & Fin</td><td></td></th<>	Data Review View Environment Variables Filler Soft& Find & Filler User variables for MGAR Clear Filler Soft& Find & Filler Variable Value Value Value Value Value Value Soft& Find & Filler Soft& Find & Filler Soft& Find & Find & Filler Soft& Find & Fin	

In 19.2, you can create app in two ways-using local UI or using remote UI (if want to create using remote go to 2.2 else directly to 2.3)

2.2 Create project using Remote UI

a. Index.html changes(use Android Studio or any other editor)

👳 a	ndroid [D	:\trunk\r	nobile\android\service\wk_inst_to_	check\workspace_installer\zigbank\platfo	rms\android]\ap	p\src\main\ass	ets\www\index.htm	nl [app] - Android S	itudio			- c	h X
	android	🔉 📭 apı	s 👌 🔨 🖼 app 👻 🗔 And								- 🖬 🗈	ng 🖳 🍳	Q 📃
			🛔 list_item_quick_links.xml ×	릚 obdxwear\\AndroidManifest.xml 🔾	< 🔒 config.js 🛛	🔒 help.js 🗵	🚑 app\\Andro		👼 app.prop		G FirebasePlug		•== 2 🗬
ager	1	DOC</td <td>TYPE html></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>× 9</td>	TYPE html>										× 9
													đ
		<pre>chead</pre>	> meta http-equiv="X-UA-Com										
•			meta content="width=devic										
8			link rel="preconnect" hre link rel="preconnect" hre	f="https://static.oracle.com/"									- 11
~													
			script type="text/javascr script type="text/javascr	ipt" charset="utf-8" src="cord ipt" charset="utf-8">									
		2											_
2													
													0
													Devi
													8
													ē
													plor
													¢ - [≈]
		. =	: Logcat 🗮 TODO 🛂 Termin										ent Log
													s 🕈 🚡 👮
	۶ ب		e 😑 📻 💽	🗜 🧿 🙊 🤀 🛙	5 🖭 👳		🤹 😹	*		я ^я ^	ti 🖬 🖉	5:39 PN 1/2/202	; □

- 1. In var server_url ,put the same KEY_SERVER_URL to be used in app.properties.xml
- 2. In var jet_url , put the url where your JET libraries are hosted or if not hosted on any particular server use: <u>https://static.oracle.com/cdn</u>

after this proceed to 2.4 Importing in Android Studio directly

2.3 Local UI

2.3.1 Adding UI to workspace.

Use any 1 option below

a. Building un-built UI (required in case of customizations)

Refer to User Interface Guide and then create a copy of index.html in the same folder and rename it to home.html.

Note: When copying to www, index.html already present in the workspace should be replaced)

- B. Using built UI (out of box shipped with installer)
 - i. Go to path OBDX_Patch_Installer/installables/ui/deploy
 - ii. Create a copy of index.html and rename the copy to home.html
 - iii. Copy folders(components, extensions, framework, images, flows, json, lzn, home.html, partials, resource, index.html, build.fingerprint) to workspace (platforms/android/app/android/app/src/main/assets/www/)
 - iv. Replace the index.html present in the workspace_installer folder

Ensure webhelp folder is not copied.

2.4 Importing in Android Studio

Open Android Studio

1. Import zigbank/platforms/android in android studio by clicking on Open an Existing Project.



- 2. For Adding Facebook (Required for social payments only)
 - a. Open facebookconnect.xml
 - b. Replace FB_APP_ID with your fb app id generated from facebook developer console
 - c. Replace FB_APP_NAME with the App name

As shown below

I	ſS		Docs Tools	Support	My Apps), Search developer	s.facebook.com	
ZigBank 🔻	APP ID: 1 8 21 92 9	96 15 18			ON	Status: Live	→ View Analytics	(?) Help
Dashboard	Facebook Analytic	:5						
Roles >	View Vour Ar	nalutice						
Alerts 2	View Your Ar	naryucs				1	iew Analytics	
App Review	Use Analytics to si	see now people use your app, me	asure retention, track conve	ision and opur	nze ior growth.			
ODUCTS 🕀	UNIQUE USE	ERS						
Facebook Login 🛛 🕨	-							
Analytics >	10						Monthly Weekly	
Messenger >>							Daily	
Activity Log	0 Nov 15	5 Nov 18 Nov 21 Nov	24 Nov 27 Nov 30	Dec 03	Dec 06 Dec 09	Dec 12		
froid (D\182_installer\zigbank) dt. View Nexisste Code A	lplatformstandroid) - "tapptsrch	mairiyesiyaluet/facebookconnectur sola UPS Weeksar Hele	ni (app) - Android Studio					0
₩ 8 0 4 + X	(D) (1 Q (R +)	 A Morg apache cordova 	whitefist in app 🗠 🕨 🔶	0.6.00		1 ?		Q
facebookconnect.emi = 👔	AndroidManifestaml = 🕐 ap	np =						
(Tesostos)								
<string name<="" td=""><td>"fb_spp_name">Sigdank(/</td><td>string></td><td></td><td></td><td></td><td></td><td></td><td></td></string>	"fb_spp_name">Sigdank(/	string>						
C Fescusoes								

9

3. Google Play Integrity

- a. Go to URL <u>https://console.developers.google.com/</u>
- b. Create a new Project and set name of you project

- c. Choose 'API's & Services' option from side bar.
- d. In API's & Services > Dashboard > Choose 'Enable APIS AND SERVICES'.

API	APIs & Services	APIS & Services + ENABLE APIS AND SERVICES
۰.	Dashboard	
ᇤ	Library	You don't have any APIs available to use yet. To get started, c
0-	Credentials	
:2	OAuth consent screen	
	Domain verification	
≡¢	Page usage agreements	

e. This will redirect to 'Library' where we need to search 'Google Play Integrity API'.

← → C	google.com/apis/library/b	rowse?organizationId=0&project=symmetric-sylph-374507&q=Google%20Play%20Integrity	à 1	⊩ □	6) I
E Google Cloud : Sar	mple Project 👻		•	0	: (S
RPI API Library		Q, Google Play Integrity				
API Library 🗲 "Google Play Integrity	r					
= Filter Type to filter	2 results					
Visibility	· 🕨 📂	Google Play Integrity API Google				
Public	2)	The May integrity API helps you check that you're interacting with your genuine app on a genuine Android device powered by Google May services. The Play Integrity API has replaced SafetyNet Attestation and Android Device Verification.				
Mobile (2)	Android Device Verification (DEPRECATED) Google DEPRECATED. The SafetyNet Attestation API is deprecated and has been replaced by the Google Play integrity API. Please see the link below for				
		more information.				

f. Click on Google Play Integrity API and enable it.



g. If the application usage is high, the quota request form needs to be submitted. Please fill quota request form from below site. Also select below options.

← → C ≜ support.google.com/go	oogleplay/android-developer/contact/piaqr		Ů ☆	* 🗆 (
Oracle Login - Sin 🚬 19.2 SUS IT - Ora.	🚔 JFrog 🂢 Environments - Or 🂢 18.1 - Oracle Bank 🧭 Index of obdx-np 🂢 18.2 - Oracle Ban 🧧	Login - Futura Bank	Archive Extractor		
■ Play Console Help C	Describe your issue			Ш	8
	Disc late suits ADI				
	Play Integrity API				
	The Play Integrity API helps you check that interactions are coming from your genuine app, installed t Play, running on a genuine Android device. When you detect risky and unknown interactions, you can appropriately to fight attacks and abuse.	by Google respond			
	You can use the form below to provide feedback, report issues, or request to increase your daily mash number of requests. By default, apps are subject to a daily maximum of NO.000 requests per day. Bet requesting increased usage, review the Play Integrity API documentation including the recommended practices to ensure you have implemented the API correctly.	imum fore d security			
	At this time, we can only respond to emails sent in English, Chinese, Japanese, and Korean.				
	* Required field				
	Please specify: *				
	Increase maximum number of daily requests				
	O Provide feedback				
	O Report issue				
	Name of requesting organization/person *				

https://support.google.com/googleplay/android-developer/contact/piaqr

\leftrightarrow \rightarrow C \triangleq support.google.com/go	ogleplay/android-developer/contact/piaqr 🖞 🛧 🕭	I (3)
Oracle Login - Sin 🔀 19.2 SUS IT - Ora	🎽 JFrog 💢 Environments - Or 🎽 18.1 - Oracle Bank 🔇 Index of obdx-np 🎽 18.2 - Oracle Ban 🧧 Login - Futura Bank 🚦 Archive Extractor	
■ Play Console Help O	Describe your issue	III (S
	How are you calling the Play Integrity API? * My app is calling the API directly	
	A third party I'm using in the app is calling the API, please specify	
	How often will you call the API for each user? *	
	Once per day or less	
	Once per 15 min	
	Once per 5 min or more	
	Is there any PII or SPII used for the nonce (e.g. user id, user name, phone number, Android ID, SSN, etc)? *	
	Yes, but hashed or encrypted Yes in plain-text	
	 No 	

av Console Help	Describe your issue	 6
ay Console help	How are you validating Play Integrity API responses?* Server side - by calling Play's server to decrypt and verify Server side - by calling Play's server to decrypt and verify In my app - by calling Play's terver to decrypt and verify In my app - by calling Play's terver to decrypt and verify In my app - by calling Play's terver to decrypt and verify In my app - by decrypting and verifying with self-managed API keys Other, please specify How does your app retry in case of Play Integrity API errors?* No netry A small number of retry attempts within a short time window Retry with exponential backoff Other, please specify	

au Canaala Uala	O Departies your leaves		
ay Console Help	C Describe your issue		
	How will your app act when the Play Integrity API detects risky traffic? *		
	Please answer with your end goal in mind even if your app is not acting yet. As a reminder, your app should also be able to deal with Play Integrity API errors and the API being unavailable.		
	Deny access to functionality (for example, users won't be able to log-in). I want unauthorized usage of my app to go down.		
	Alter or limit specific features (for example, only users on good devices will be allowed on a leaderboard). Overall usage of my app might stay the same.		
	A mix – deny access for some responses and change features for other responses. I want some unauthorized usage of my app to go down.		
	O No action. I'm only collecting data.		
	O Other, please specify		
	Guota request - Estimated total queries per day -		

Quota request - Estimated total queries per day * \rightarrow The approximate load, Play Integrity API is called once each time the app in opened

Quota request - Estimated peak queries per second \rightarrow Leave blank

h. To enable Play Integrity responses please follow below steps-

Go to Google Play Console->Side Menu->Setup->App Integrity

> () > ilit (m) - ()	 lesting Reach and devices App bundle explorer Setup App integrity 	App integrity Protect your app and your users Show more Integrity API responses off - Releases signed by Google Play
	Internal app sharing Advanced settings	Integrity API App signing
Gn	w	۲
* 🔉	Store presence Main store listing Custom store listings Store listing experiments Store settings Translation service	Protect your apps and games from risky and fraudulent interactions with the Play integrity APL Link to a Google Cloud project to get started. Learn more Link project

b. Click on Link project and then link your existing google cloud project. If it is not created then create new and link the same.

Release	App integrity	
Link Google Cloud pro	ect	×
Link your Google Cloud project to use	2 integrity API	
Google Cloud project	Link existing project By Inking your Google Cloud project, you agree to the Terms of Service. Sample Project Finter project number manually	
	Create new project	
	Discard changes Link project	

Release	App integrity	
Link Google Cloud	project	×
Link your Google Cloud project to	use the integrity API	
Google Cloud project	 Link existing project By linking your Google Cloud project, you agree to the Terms of Service. Sample Project Enter project number manually 	
	Create new project	
	Discard changes Link pro	oject

i. Add project number in below property of app.properties

<string name="GOOGLE_CLOUD_PROJECT_NO">@@GOOGLE_CLOUD_PROJECT NO</string>

You will get the project number on google cloud console project.

E Google Cloud Play Integrity Search (/) for resources, docs, products and more Q Search	ft 🗔 🕢 🗇 🗄 🌀
•	
🛆 Welcome	
You're working in Play Integrity	
Project number: 420817979115 👩 Project ID: play-integrity-t4q4qu1he3dectm 🛅	
Dashboard Recommendations	
Create a VM Run a query in BigQuery Create a GKE cluster Create a storage bucket	

j. Mention the time in seconds to which app can hit the play integrity api. By default it is 300 seconds but you can configure as per the requirement. Please use below property in RootCheckFlags.java(workspace_installer/zigbank/platforms/android/app/src/main/java/com/of ss/digx/mobile/android/)

long playIntegrityAPICallTime = your_time_in_seconds;

4. FCM Push Notifications.

- a. Go to URL https://firebase.google.com/
- b. Traverse to console and create a project

😕 Firebase		Go to docs	٩	0
	Welcome to Firebase!			
	Tools from Google for developing great apps, engaging with your users, and earning more through mobile ads.			
	Q Learn more ■ Documentation □ Support			
	Recent projects			
	OBDX obdx-639e5			
	Add project			
	Explore a demo project			

c. Download google-services.json from below page and save to (zigbank\platforms\android\app) directory.

d. Remember to keep the projects package name and firebase package name same.

<u>></u>	Firebase	OBDX 👻	Settings	Settings G				۵	0	
♠	Project Overview 🌼		Project name	obdx 🎤						
Develop			Project ID 🕥	obdx-639e5						I
Develop			Cloud Firestore location	us-central						
	Authentication		Web API Key	Veb API Key AlzaSyBnymFz0dRmembxyXWJt87mS9HdaneE0Gg						
	📮 Database									
	🖿 Storage Public settings									
S	Hosting		These settings control instances	of your project	shown to the public					
()	Functions		Public-facing name 💿	obdx 🎤						
ML	ML Kit		Support email	oraclefcd	bmobiledev@gmail.com					ļ
Crashlytics, Performance, Test Lab										
		'	our apps							
Ana	aytics						Add app			
- 1	Dashboard									
Spa Free	rk Upgrade \$0/month		Android apps		Download the latest config file		ces.json			
	<		com.ofss.digx.mobile.android		This file contains configuration details such as keys and identifiers for the services you just enabled					-

e. Traverse to cloud messaging tab Enable Firebase Cloud Messaging API(V1) by clicking on Manage API in Google Cloud Console.

← → C		ebase.g	oogle.com/project/o	bdx-639e5/settings/clo	udmessaging/androi	d:com.ofss.zigbank			₫	\$	5 *		0 :
Oracle Login	n - Sin 🔀 19.2	2 SUS IT -	Ora 🎇 JFrog 🗦	🕻 Environments - Or 🎽	18.1 - Oracle Bank	🞽 18.2 - Oracle Ban	O Login - Futura Bank	Archive Extractor	React Native		»	All Boo	okmarks
と Fireb	ase		OBDX 👻						6	?	P	۰	0
Project Overview Project settings													
Project shortouts General Cloud Messaging Integrations Service accounts Data privacy Users and permissions													
🖌 Test La	b	- 1											
🖏 Crashly	tics	- 1			-								
. Analytic	Analytics Dashboard App Check			Firebase Cloud Messaging API (V1) 🛇 Enabled			Manage API in Goo	gle Cloud	2				
App Che				Recommended for most u	use cases. <u>Learn more</u>	2		Console		-			
G Messag	jing	- 1		Sender ID		Service Account							
Product categor	ries			1062626365675		Manage Service	Accounts 🛛						
Build		~											

f. Get the Project ID from Project Setting in Firebase console

← → C	se. aooale.com/project/obdx-639e5/settings/aeneral/android:com.ofss.zigbank 🖞 🖧 🏚 🛙	
Oracle Login - Sin 2 19.2 SUS	s IT - Ora 🎽 JFrog 🎽 Environments - Or 🎽 18.1 - Oracle Bank 🎽 18.2 - Oracle Ban 🧿 Login - Futura Bank 👶 Archive Extractor 📓 React Native 🧼 🗎 All Be	okmarks
と Firebase	OBDX -	0
A Project Overview	Project settings	
Project shortcuts	General Cloud Messaging Integrations Service accounts Data privacy Users and permissions	
🗹 Test Lab		
🗞 Crashlytics	Your project	
Analytics Dashboard		
App Check	Project name OBDX 🧨	
G Messaging	Project ID (2) obdy-639a5	
Product categories	Project number (?) 1062626365675	
Build ~	Default GCP resource location ⑦ nam5 (us-central)	
	Web ADI You AlizeBourneYdDmembw/WW H97mS0LidenaE0Cn	
Release & Monitor V	neo ner ney Arzadyonymi zadninemozy nation manecody	
Analytics ~	Environment	
Engage ~	This setting customizes your project for different stages of the app lifecycle	
	Environment type Unspecified	
Spark Upgrade		
No-cost \$0/month	Public settings	
<		

g. Update FCM URL in below table as-

update DIGX_FW_CONFIG_ALL_B set prop_value = 'https://fcm.googleapis.com/v1/projects/YOUR_PROJECT_ID/messages:send' where prop_id = 'FCM_URL';

Add YOUR_PROJECT_ID in url which is captured on above step

- h. If proxy address is to be used, provide the same in database as mentioned in point 3.
- i. Generate private key for your service account by using below steps-

- In the Firebase console, open Settings > Service Accounts

- Click Generate New Private Key, then confirm by clicking Generate Key

You can also follow below google doc -

https://firebase.google.com/docs/cloud-messaging/auth-server#provide-credentials-manually

Sr. No.	Table	PROP_ID	CATEGORY _ID	PROP_VALUE	Purpose
1	DIGX_FW_C ONFIG_VAR _B	FCM	DispatchDeta ils	<server_key></server_key>	Service account json file content captured in above step
2	DIGX_FW_C ONFIG_ALL_ B	FCMKeyStore	DispatchDeta ils	DATABASE or CONNECTOR	Specifies whether to pick server key from database or from connector. Default DB (No change)
3	DIGX_FW_C ONFIG_ALL_ B	Proxy	DispatchDeta ils	<protocol,proxy _address></protocol,proxy 	Provides proxy address, if any, to be provided while connecting to APNS server. Delete row if proxy not required. Example: HTTP,148.50.60.8

If CONNECTOR is selected in Step 2 update password as below

ORACLE WebLogic Server Ad	ministration Console 12c	
Change Center	🏦 Home Log Out Preferences 🖂 Record Help	
View changes and restarts	Home >Summary of Deployments >com.ofss.digs.connector.rar >Roles	
Configuration editing is enabled. Future changes will automatically be activated as you modify, add or delete items in this domain.	Create a New Security Credential Mapping	
Domain Structure	and the lance lance	
obdx_domain D-Domain Partitions D-Environment Deployments	EIS User name and Password Configure the EIS User Name and Password that you would like to map the WebLogic Server * Indicates required fields	Jeer to:
B: Service Security Realms D: Interoperability Diagnostics	Enter the EES User Name: * EES User Name:	FCM
	Enter the ELS Password: * ELS Password:	
How do I	* Confirm Password::	
Create outbound credential mappings	Back Next Finish Cancel	
System Status		
Health of Running Servers as of 10:32 AM		
Failed (0) Critical (0) Overloaded (0) Warning (0) Ok (2)		

5. Build Release Artifacts

- 1. Clean and Rebuild your project in Android Studio.
- 2. In Android Studio, on the menu bar Click on Build -> Edit Build Types -> select release

android - [C:\Users\vpenta\Desktop\17.2 docur Project Structure	×	- • ×
Eile Edit View Navigate Code Analyze Re		
	Properties Signing Flavors Build Types Dependencies	۹ 🖪
android 🕑 build.gradle SDK Location	debug + Name: release	
n D Project v ⊕ ÷ ☆ I+ C Project	release	cordova_plugins.js × 😹 json.js × 🖃
Developer Services		
H resources.nls Ads	Debuggable (talse)	adle
P Tetail 4 Authentication Nuclearly Authentication	Jni Debuggable (false) 🔻	
configuration.html	Contract on Contract	
e Modules	signing config	
E cordova_plugins.js	Renderscript Debuggable (false) 🔻	
🖓 🗈 index.html 6 🔂 ObdxLib	Renderscript Ontim Level (3)	
▶ build		
e cordova	Minify Enabled (false)	
Part CordovaLib	Pseudo Locales Enabled	
7		
Deduction 7	Proguard File	
	Application Id Suffix	
> Tares 7	Version Name Suffix	
▶ 📑 src 7		
gitignore	Zip Align Enabled (true)	
android.iml		
😄 📾 android.json 🛛 🕫		
📲 🧕 Android Manifest.xml 🛛 🚳		
g 🕑 build.gradle		
a gradle.properties		
The gradlew B		
gradlew.bat		An
e la local.properties		drai
E Inf project.properties		d M
Settings.gradie		del
	OK Cancel	
🖷 👷 Anarola Monitor 🔤 🖉 Messages	7.hu-7.1	LEA LITE DA Contents on contents
Androic Mopilar & Mercares	/ Chais / 3:4	Z Event Log State of State of State
📑 ailed 🖉 finalis 🖵 ssion 🧲 T 🖉 🗖 🖕 🔍 FLIC 🥥 . PR 🖉 SER S	🕂 je c 🕮 n't b 🎯 alle 🔯 data/🚑 / con 💸 dig 🕮 alle 🛷 old - 🖓 di in 🚣 beca 🕼 rovic 🔲 (today 11:59 AM) - 50:	

3. Set Minify Enabled -> True & click on Proguard File selection -> Navigate to proguard-rules.pro (zigbank\platforms\android)

💮	android Edit	- [C:\Users\vpenta\Desktop\17.2 docur		×	-	0	×
-	<u>∈</u> unt ⊫ (7	5 ♥ ♠ ¼ 🕅 🐧 Q. Q. + - Properties Signing Flavors Build	Types Dependencies			Q	П
	androi	👳 Select Path X	Name: release				
oject	D Pro	🔗 📼 😨 🕞 🖙 🗙 🌿 🎆 Hide path			i cordova_plugins.js × 📴 json.j	s × -≡2	٢
1: Pro		enta\Desktop\17.2 documentaion\demo app\zigbank\platforms\android\proguard-rules.pro	Debuggable	(false)		9	radle
~		CordovaLib	Jni Debuggable	(false) 🔻			
ant		gradie	Signing Config				
Strue		▶ DbdxLib	Renderscript Debuggable	(false)			
4		▶ □ platform_www ▶ □ res	Renderscript Optim Level	(3)			
ø	•	► 🗖 src	Minify Enabled	true			
Captur	-	.gitignore .gadroid imi	Pseudo Locales Enabled				
۲		android.json	Proguard File				-
		AndroidManifest.xml	Application Id Suffix				
	-	Gi gradle.properties	Version Name Suffix				
	•	gradlew	Zip Align Enabled	(true) 🔻			
		Gil local.properties					
ants		proguard-rules.pro					
Vari	_	in project.properties					
Build		G wrapper gradie				-	-
÷		platforms.ison					-
		D plugins					۰
ite:		Tres					ndn
Favo		▶ ► www.	- â				oid N
~		Urag and drop a file into the space above to quickly locate it in the tree					Ande
*	÷ 6: /	OK Cancel Help		OK Cancel	1 Event Log 🗐 Grad	lle Console	-
	- 21			7 chars 73:4	4 LF+ UTF-8+ Context: <no conte<="" td=""><td>xt> B</td><td>0</td></no>	xt> B	0
	► 4: Ri Failed 4	nn - ¹⁰ 1000 Annail 🕮 ann 😋 tal 🧮 leo 🔊 rui 🥏 rui 🥏 an 🚰 en 🖓 - a 🖼 n Lui Signi an Signi ann -	🗱, 🖭	oid- 1. 🐋 t in 🔼 beca 🍂 rovic 🔲 (today 11:59 AM) - 50:	· □ 팊 예 _{7/24}	PM /2017	D

4. Click on OK -> again click on OK

- 5. Adding URLs to app.properties.xml (customizations/src/main/res/values/)
 - a. NONOAM (DB Authenticator setup)

SERVER_TYPE	NONOAM
KEY_SERVER_URL	Eg. https://mumaa012.in.oracle.com:18443
WEB_URL	Eg. https://mumaa012.in.oracle.com:18443
SERVER_CERTIFICATE_KEY	Refer point 6.7

b. OAM Setup (Refer to installer pre requisite documents for OAuth configurations)

SERVER_TYPE	OAUTH3
KEY_SERVER_URL	Eg. http://whf00bpp.in.oracle.com:17778
WEB_URL	Eg. http://whf00bpp.in.oracle:17777
KEY_OAUTH_PROVIDER_URL	E.g.http://whf00ebe.in.oracle.com:15100/oauth2/rest/to ken
APP_CLIENT_ID	<base64 clientid:secret="" of=""> of Mobile App client</base64>
APP_DOMAIN	OBDXMobileAppDomain
WATCH_CLIENT_ID	<base64 clientid:secret="" of=""> of wearables</base64>
WATCH_DOMAIN	OBDXWearDomain
SNAPSHOT_CLIENT_ID	<base64 clientid:secret="" of=""> of snapshot</base64>
SNAPSHOT_DOMAIN	OBDXSnapshotDomain
LOGIN_SCOPE	OBDXMobileAppResServer.OBDXLoginScope
SERVER_CERTIFICATE_KEY	Refer Application Security Configuration (For SSL Pinning) section- 7
REDIRECT_URI	zigbank://oauthredirect

c. IDCS Setup

SERVER_TYPE	IDCS
KEY_SERVER_URL	Eg. https://mumaa012.in.oracle.com:18443 (This URL must be of OHS without webgate)
WEB_URL	Eg. https://mumaa012.in.oracle.com:18443
KEY_OAUTH_PROVIDER_UR	http://obdx- tenant01.identity.c9dev0.oc9qadev.com/oauth2/v1/toke

L	n
APP_CLIENT_ID	<base64 clientid:secret="" of=""> of Mobile App client</base64>
WATCH_CLIENT_ID	<base64 clientid:secret="" of=""> of wearables</base64>
SNAPSHOT_CLIENT_ID	<base64 clientid:secret="" of=""> of snapshot</base64>
LOGIN_SCOPE	obdxLoginScope
OFFLINE_SCOPE	urn:opc:idm:myscopes offline_access
SERVER_CERTIFICATE_KEY	Refer point 6.7

6. Adding chatbot support to mobile application (Optional)

CHATBOT_ID	The tenant ID
CHATBOT_URL	The web socket URL for the ChatApp application in IBCS

7. If using http protocol for development add (android:usesCleartextTraffic="true") to application tag of AndroidManifest.xml (on app & obdxwear target)



8. **For Generating Signed Apk:** To Generate release-signed apk as follows:

On menu bar click on Build -> Generate Signed Apk

👳 android - [D:\lnstaller\01Installer\Workspace\zigbank	\platforms\android] - [app]\app\src	\main\AndroidManifest.xml - Android Studio 3.0.1		– 🗆 ×
<u>File Edit View Navigate Code Analyze Refactor</u>	Build Run Tools VCS Window	Help		
android) 📑 app) 🖿 src) 🖿 main) 🗟 AndroidM	K Make Project Ctrl+F9	5 100	app 💌 📐 🕂 🎄 🎼 🕐 💽 📕 😻 🌿	95 L L D Q /
	Make Module 'app'	and a second sec		
	Clean Project	or app.properties.xmi × MaroldManirest.xmi × *=	Gradie projects	
android D:\Installer\U1Installer\Workspace\zigi	Rebuild Project		Ø + - 💿 🗄 🐜 🏴 🖻	
.gradie	Refresh Linked C++ Projects	sion android:name="android.permission.WRITE_EXTERNAL	🗸 🔻 💽 android	
.idea	Refresh Linked C++ Projects	sion android:name="android.permission.READ_PHONE_STAT	Android (root)	
e app	Edit Build Types	sion android:name="android.permission.ACCESS_NETWORK_	S 🕨 🕑 :app	
е развити на	Edit Flavors	sion android:name="android.permission.ACCESS_CLARSE_L	→ Imp-lib	
BarcodescannerLib	Edit Libraries and Dependencies	sion android:name="android.permission.RECEIVE SMS" />	BarcodescannerLib	
V Cordova	Select Build Variant	sion android:name="android.permission.READ_SMS" />	CordovaLib	
CordovaLib	Build APK(s)	<pre>sion android:name="android.permission.CAMERA" /></pre>	Customizations	
S Customizations	Generate Signed APK	sion android:name="android.permission.FLASHLIGHT" />	iobdxcore	
gradie	Analyze APK		iobdxwear	
i i i i i i i i i i i i i i i i i i i	Deploy Module to App Engine	hardwareAccelerated="true"	 b cobdxwear-lib 	
obdxwear	31 🗃 android	1:icon="@mipmap/icon"		
	32 android	1:label="ZigBank"		
	33 android	i:usesCleartextTraffic="true"		
Analogo and a stand a sta	34 android	i:supportsRt1="true">		
a gradle propertier	36 ADCIVI	<pre>iroid:configChanges="orientation keyboardHidden keyboar</pre>	nd	
gradiew	37 and	troid:label="@string/launcher name"		
gradlew.bat	38 and	iroid:launchMode="singleTop"		
keystore.iks	39 and	<pre>troid:name="com.ofss.digx.mobile.android.MainActivity"</pre>		
local properties	40 and	<pre>iroid:tneme="@android:style/Theme.DeviceDefault.NoActio legid.windewFoftInnutMede="adjustDesign"></pre>	n	
> project.properties	42 A C/acti	ivity>	4	
E settings.gradle	43 Activi	ity android:name="com.ofss.digx.mobile.android.SplashAc	st	
wrapper.gradle	4.4 and	iroid:configChanges="orientation keyboardHidden keyboar	Gan't use Subversion con	amand line client: svn
Ill External Libraries	45 and	<pre>iroid:label="@string/launcher_name"</pre>	Probably the path to Subv wrong Fix it	ersion executable is
8	46 and	iroid:launchMode="singleTop"	wrong, <u>tix it</u> ,	
/orit	47 and 48 and	troid:theme="gstyle/SplashTheme" troid:windowSoftInputMode="adjustResize">		
Fav	49 - <1	ntent-filter android:label="%string/app name">	Platform and Plugin Upda	ites
*	Text Margard Manifest		Android Studio is ready to	update.
	Text Merged Manifest			
Gradia build Enished in 7a 150 me (badeu 2:55 DM)	Profiler 🥜 🖉 Version Control 🔛	i Terminal 🔤 🖉: Messages	29-1 CPLEA UTE 9 Com	ent Log 🔄 Gradie Console
Module: app				•
	[Previous Next	Cancel	Help

android	[D:\Ameet\QA\Patchset Releases\MobileApp\MobileWorkspace\work View Navigate Code Analyze Befactor Build Run Tools \	sspace_installer\zigbank\platforms\android]\app\src\main\AndroidManifest.xml [app] - Android Studio	- 0	9	×
android	d > ■ app > ■ src > ■ main > ∰ AndroidManifest.xml	E へ = obdavear ▼ ▶ ↑ 章 G の 義 = 成	<u>n</u>	ې 📭	a B
ъ 🌞 An	droid 👻 💮 😤 🌣	- 💼 index.html × 😹 config.js × 💼 app.properties.xml ×			
 1: Proje 1 <li1< li=""> 1 1 1 1<</li1<>	pp manifests iş generatedJava	15 <uses-permission android:name="android.permission.WRITE_EXTENDA_STORAGE"></uses-permission> 20 <uses-permission android:name="android.permission.RZBD_FERME_STATE"></uses-permission> 21 <uses-permission android:name="android.permission.RZBD_FERME_STATE"></uses-permission>			Gradle
Resource Manager	la assets la res ipp=lib arcodexannerLib Cordovalib	Generate Signed Bundle or APK Server (> Serve			
Al Layout Captures	ustomizatons Jobáxcore Jobáxwear Jobáxwear-II-D Jradle Scripts	Verticate a signa dap under to quote to approxime on the following defetto:			
Build:	Build Output × Sync × A android: synced successfully at 1/14/2020 3:17 PM with 1 warning	APK Build a signed APK that you can deploy to a device nalNativeBuildTasks()' is obsolete and has b	een repla	¢ -	-
avorites IK Build Variants	 ♥ Ø Run build D\/Amet(QA/Patchset Releases\/MobileApp\/Mobile	Previous Next Cancel Help 57 2015. 94/ms To determine what is calling variant.getExternalNativeBuildTasks(), use -P 75 286 ms 14 5 245 ms 14 5 245 ms	<u>-avoidanc</u> android.d		Device File Explorer
≡ тог	>O I Terminal ▲ Build <u>E 6</u> : Logcat		🕘 Ev	ent Log	g
Source	generation ended in 14 s 520 ms (11 minutes ago)	33:44 CRLF \$ UTF-8 4 spa	ces 🗘 🔒	06	3 🕀
	८ 🧟 🖬 🤮 🍯 📼 👰	D 📾 📾 🗛 😵 💽 📓 🗿 💆 🖶 👘 🕵 🔮	3:29 PN	20	Ş.

9. If you have an existing keystore.jks file then select choose Existing else click on Create New

👳 Generate Signed APK X							
Key store path:	C:\Users\adipatel\My Documents\keystore.jks						
	<u>C</u> reate new C <u>h</u> oose existing						
Key store <u>p</u> assword:							
K <u>e</u> y alias:	Keystore						
Key pass <u>w</u> ord:							
Remember passv	words						
	Previous Next Cancel Help						

1	android 👌 📷 app 👌 🖿 src 🤇 🖿 main 👌 🛲 AndroidManifest.xml				E 🔨	× ,	obdxwear 🔻	▶ 4	÷ ≇ (G. 🔿 🛔	5, II. A	g 🖳 🕯	a Q	12	B
¥	🖷 Android 👻 😳 😤 🌣	— 👬 index.html	× 🚮 config.js × 👩	app.properties.xml \times	🛲 AndroidMan	nifest.xi	ml ×								A
🍓 <u>1</u> : Proje	♥ ■ app ▶ ■ manifests ▶ ■ generatedJava	19 20 21	<pre><uses-permission <uses-permission="" ar="" ar<="" pre=""></uses-permission></pre>	droid:name="androi droid:name="androi droid:name="androi	d.permission. d.permission. d.permission.	WRITE READ ACCES	EXTERNAL PHONE STAT	STORAGE TE" /> STATE"	" /> />						Gradle
Aanager	Trassets Trassets Trassets	🦝 Generate Signer	d Bundle or APK			×	S FINE LOC VE_SMS" /:	ATION"	/>					1	
* Resource h	BarcodescannerLib CordovaLib Tip customizations	Module	app			× R	A" /> LIGHT" />								
out Captures	III_ obdxcore ▷ III obdxwear III_ oddxwear-IIb ▷ #V Grade Scripts	Key store path	∶et Releases\MobileA	pp\MobileWorkspace\ke	rystore\keystore.jk C <u>h</u> oose existing	jes 									
ture Øllay		Key alias	key0		5		en keyboar	rd scree	nSize]	locale"					
= 2: Struc	Build: Build Output × Sync ×	key password	Remember passw	ords									\$	_	
vorites IK Build Variants	Image: The superconductive of the supercondu	pace/workspace_insta	Previous 947 m 11 m 7 s 286 m 212 m 14 s 245 m siller/zigbank	Next Cance	Help Help Help Help Help Help Help Help	ing va	alNativeB f 2019. :://d.andro riant.getB	aildTask Did.com/ External	rs()' is ' <u>r/tools</u> Nativel	s obsolet s/task-co BuildTas)	ce and ha onfigurat cs(), use	s been : <u>ion-avo</u> -Pandr	replace <u>idance</u> . oid.deb	· + → IP ± ■ ■	Device File Explorer
6													Event	Log	-
	Source generation ended in 14 s 520 ms (11 minutes ago)								33:44	4 CRLF ÷	UTF-8 4	spaces ¢	<u>а</u>		0

10. Select **Build Type** as **Release**, **Signature Version as V1(JAR Signature) and V2(Full APK Signature)** and Change APK Destination folder if you want and click on Finish

👳 Generate Signed E	Bundle or APK	\times
Destination Folder:	\android\service\workspace\zigbank\platforms\android\app	
	debug	
	release	
Build Variants:		
Signature Versions:	✓ V1 (Jar Signature) ✓ V2 (Full <u>A</u> PK Signature) Signature	Help
	Previous Finish Cancel Help	

11. This will generate APK by the given name and destination folder. Default APK Destination folder is zigbank\platforms\android\app\release

- 12. Run the App and select Device or Simulator.
- 13. Repeat same steps (From step 8 and obdxwear as module) for OBDX Wear App for Release Signing. Use proguard-rules.pro from workspace_installer\zigbank\platforms\android\obdxwear using explorer. The select obdxwear as the module and follow same signing steps with same keystore.
- 14. The application has a config page at launch to enter the URL of the server (for development only). To remove this page, update the config.xml as shown below

The application has config page to add URL. This is for development purpose only and can be removed using below step. (Update content src tag)

	android [~/Desktop/W	rkspace_Android/18.3/April/19thApr/workspace_installer/zigbank/platforms/android]/app/src/main/res/xml/config.xml	[app]
${\color{red} \blacksquare} {\color{black} and roid } > {\color{red} \blacksquare} {\color{black} app } > {\color{red} \blacksquare}$	src) 🖿 main) 📷 res) 🖿 xml) 🚄 config	xml) 🔨 🖬 obdxwear 👻 🕨 🕴	5.0 5 = 🕂 🖬 Q 🖂
👳 🌞 Android 👻	0 -	· 🏚 — 🧕 Android Manifest.xml 🛛 👼 app.properties.xml 🛪 🧕 Android Manifest.xml 🛪 🧕 Android Manifest.xml 🛪 🔒 config	axml ×
App App-IIb Barcodescamp Convertig Convertig App-IIb Barcodescamp Convertig Convertig App-IIb Barcodescamp Convertig App-IIb Barcodescamp App-IIb App	arLib	<pre>1</pre>	dgets"> O Ge
Build: Sync			☆ -
sauovity 7 ★ suuriun pijirel ¥	up: synced successfully at 19/04/19, 3	25 PM	385 ms
E 6: Logcat III TODO	D 🔃 Terminal 🔨 Build		C Event Log
Gradle sync finished in 4	92 ms (from cached state)	23 chars 10	19 LF 🗘 UTF-8 Context: <no context=""> 🏪 🕀</no>

15. Application will work on https only. If you want to run application on http then set targetSdkVersion, compileSdkVersion to 30 and buildToolsVersion to 30.0.3 in app's build.gradle(zigbank\platforms\android\app\) and replace below code block from obdx.conf(config/obdx.conf).

IfModule mod_headers.c>

<If "%{HTTP_USER_AGENT} =~ /obdx-mobile-android/">

Header edit Set-Cookie ^(.*)\$ \$1;SameSite=None;Secure

</lf>

```
<If "%{HTTP_USER_AGENT} =~ /obdx-softtoken/">
```

Header edit Set-Cookie ^(.*)\$ \$1;SameSite=None;Secure

</lf>

</lfModule>

With below one as,

```
IfModule mod_headers.c>
```

<lf "%{HTTP_USER_AGENT} =~ /obdx-mobile-android/">

Header edit Set-Cookie "SameSite=Strict" ""

</lf>

<lf "%{HTTP_USER_AGENT} =~ /obdx-softtoken/">

Header edit Set-Cookie "SameSite=Strict" ""

</lf>

</lfModule>

Note: We strongly recommend you to use https setup with sdk 31 only, as google play store won't allow app's below sdk 31.

6. **OBDX** Authenticator Application

6.1 Authenticator UI (Follow any one step below)

6.1.1 Using built UI

For Non-OAM - Unzip dist.tar.gz directory from OBDX_Patch_Mobile\authenticator\non-oam

For OAM - Unzip dist.tar.gz directory from OBDX_Patch_Mobile\authenticator\oam

6.1.2 Building UI manually

1. Extract authenticator_ui.tar.gz from OBDX_Patch_Mobile\authenticator\unbuilt_ui. The folder structure is as shown:

^ Name	Date modified	Туре	Size
🥏 _build	10/25/2018 2:42 PM	File folder	
🥏 components	7/27/2018 12:02 PM	File folder	
🥏 css	7/27/2018 12:02 PM	File folder	
🥏 framework	7/27/2018 12:03 PM	File folder	
🥏 images	7/27/2018 12:03 PM	File folder	
🥏 non-oam	7/27/2018 12:03 PM	File folder	
🥏 pages	7/27/2018 12:03 PM	File folder	
🥏 resources	7/27/2018 12:02 PM	File folder	

2. Build UI based on selected Authentication mechanism.

a. OAM based Authentication

- Open command prompt at "_build" level.
- Run following command :

```
npm install -g grunt-cli
npm install
node render-requirejs/render-requirejs.js
grunt authenticator --verbose
```

• After running above commands and getting result as "Done, without errors." a new folder will be created in "ui" with name as "dist".

b. NON-OAM Based Authentication

- Copy "non-oam /login" folder and paste it at location "components/modules" location. This will replace existing "login" folder.
- Open command prompt at "_build" level.
- Run following command :

npm install -g grunt-cli npm install node render-requirejs/render-requirejs.js grunt authenticator --verbose

• After running above commands and getting result as "Done, without errors." a new folder will be created in "ui" folder with name as "dist".

C:\WINDOWS\system32\cmd.exe				 	_	×	
Running "add-cordova" task Reading/dist/framework/js/pages/ Writing/dist/framework/js/pages/	require-co require-co	nfig.js nfig.js				^	
Execution Time (2017-07-21 13:12:29	UTC+5:30)						
loading tasks							
clean:preBuildCleanUp							
copy:main							
sass:dist							
htmlmin:min							
inlinecss:main							
uglify:updatedBuild							
<pre>string-replace:genericReplacements</pre>							
require							
requirejs:compile							
clean:postBuildCleanUp							
authenticator-tasks							
add-cordova							

N	ame	Date modified	Туре	Size
0	_build	10/25/2018 2:51 PM	File folder	
0	components	7/27/2018 12:02 PM	File folder	
0	CSS	7/27/2018 12:02 PM	File folder	
	dist	10/25/2018 2:50 PM	File folder	
0	framework	7/27/2018 12:03 PM	File folder	
0	images	7/27/2018 12:03 PM	File folder	
Ø	non-oam	7/27/2018 12:03 PM	File folder	
Ø	pages	7/27/2018 12:03 PM	File folder	
0	resources	7/27/2018 12:02 PM	File folder	

6.2 Authenticator Application Workspace Setup

1. Copy UI (Directories – components, css, framework, images, pages, resources)from /dist directory to workspace/installer/app/src/main/assets/www/

. . . www < > ‱ ≡ ш … 000 ~ * ~ Ô \odot Q Search AndroidManifest.xml app.properties components Favourites assets cert_keys.json cordova_plugins.js AirDrop 📄 cordova-js-src res www Recents cordova.js CSS Applications 📄 framework Desktop 📄 images 🔲 img Documents 📄 pages Downloads plugins resources Locations settings.html C iCloud Drive Android... 🔺 SmartSV... ≜ Remote Disc Tags Red

In case any popup appears, click replace

2. Launch Android Studio and open existing project

	Welcome to Android Studio
workspace_installer ~/Desktop/SVN/18orkspace_installer	
android ~/Desktop/Workspplatforms/android	
main ~/Desktop/Worksproid/app/src/main	
android ~/Desktop/Workspplatforms/android	Android Studio
workspace_installer ~/Desktop/SVN/18orkspace_installer	Version 3.3.2
android ~/Desktop/Workspplatforms/android	+ Start a new Android Studio project
android ~/Desktop/Workspplatforms/android	Check out project from Version Control -
android ~/Desktop/Workspplatforms/android	🚰 Profile or debug APK
android ~/Desktop/Workspplatforms/android	Import project (Gradle, Eclipse ADT, etc.) Import an Android code sample
android ~/Desktop/Workspplatforms/android	
android	🗘 Configure 🗸 Get Help 🗸

3. Open OBDX_Installer/workspace_installer folder in Android Studio.

		workspace_installer	٢	Q		
Favorites Recents Applications Desktop Documents Documents Documents Documents Cocations Locations Cloud Drive Android Stu 4 SmartSVN 4 Remote Disc Media Music Photos	 Android App IOS 	 12thApr 13thApr 	Work	kspace_installer	android.json app app-lib build build.gradle cordova CordovaLib gradle gradle.properties gradlew.bat keystore.jks keystore.properties local.properties platform_www proguard-rules.pro project.properties settings.gradle workspace_installer.iml	6 6 6 6 6 6
New Folder					Cancel Open	

4. Open gradle.properties file and update following properties with relevant proxy address if required



```
systemProp.http.proxyHost = <proxy_address>
systemProp.https.proxyPort = <port_number>
systemProp.https.proxyHost = <proxy_address>
systemProp.http.proxyPort = <port_number>
android.enableJetifier=true
android.useAndroidX=true
```

5. Open "assets app. properties" file and update following properties as per requirement



```
connection_timeout = <timeout_in_milliseconds>
ssl_pinning_enabled = <YES or NO>
shared_server_url = <server_url>
shared_oam_url = <oam_url>
otp_type = <HOTP or TOTP>
```



Note: If selected authentication mechanism is not OAM based then remove "shared_oam_url" property.

- 6. Click Build \rightarrow Clean & Build \rightarrow Rebuild project in Android Studio.
- 7. Click on Build \rightarrow Edit Build Type \rightarrow app \rightarrow release

Enable minify \rightarrow true

Add progurard file from workspace_installer/proguard-rules.pro

Click OK

8. If using http protocol for development add (android:usesCleartextTraffic="true") to application tag of AndroidManifest.xml



9. For Generating Signed Apk: To Generate release-signed apk as follows:

On menu bar click on Build -> Generate Signed Apk

• • •	Generate Signed Bur	ndle or APK
🔿 Android App E	Bundle	
Generate a sigr	ned app bundle for upload to a	pp stores for the following benefits:
 Smaller down On-demand a Asset-only m 	load size pp features odules	
Learn more		
💿 АРК		
Build a signed a	APK that you can deploy to a c	device
? Cancel]	Previous Next

	Generate Signed Bundle or APK
Module	app 🗸
Key store path	/Users/adi/Desktop/Android/keystore
	Create new Choose existing
Key store password	•••••
Key alias	key1 🔚
Key password	••••••
	Remember passwords
? Cancel	Previous Next
1.14	
	Generate Signed Bundle or APK
Destination Folder:	Generate Signed Bundle or APK [18.3_Authenticator/Android/13thApr/workspace_installer/app]=]
Destination Folder:	Generate Signed Bundle or APK [18.3_Authenticator/Android/13thApr/workspace_installer/app]=] debug
Destination Folder:	Generate Signed Bundle or APK 18.3_Authenticator/Android/13thApr/workspace_installer/app debug release
Destination Folder:	Generate Signed Bundle or APK '18.3_Authenticator/Android/13thApr/workspace_installer/app debug release
Destination Folder:	Generate Signed Bundle or APK 18.3_Authenticator/Android/13thApr/workspace_installer/app debug release
Destination Folder: Build Variants:	Generate Signed Bundle or APK 18.3_Authenticator/Android/13thApr/workspace_installer/app debug release
Destination Folder: Build Variants:	Generate Signed Bundle or APK '18.3_Authenticator/Android/13thApr/workspace_installer/app debug release
Destination Folder: Build Variants:	Generate Signed Bundle or APK 18.3_Authenticator/Android/13thApr/workspace_installer/app debug release
Destination Folder: Build Variants:	Generate Signed Bundle or APK 18.3_Authenticator/Android/13thApr/workspace_installer/app debug release
Destination Folder: Build Variants:	Generate Signed Bundle or APK 18.3_Authenticator/Android/13thApr/workspace_installer/app debug release 0 V1 (Jar Signature) V2 (Full APK Signature) Signature Help

Click Finish to generate .apk

The application has config page to add URL. This is for development purpose only and can be removed using below step. (Update content src tag)



7. Application Security Configuration

Root Check → Ensure Step 3.1 is completed

1. Open google developer console. Select your app then navigate to

Setup-> App Integrity-> change option of Response Encryption

In the window that appears, click Manage and download my response encryption keys and follow below steps to generate response encryption keys-

a. Create a new private-public key pair. RSA key size must be 2048 bits using below command-

openssl genrsa -aes128 -out your_path/private.pem 2048

Then use your password phrase for creating private.pem and also use the same password for verifying the private.pem. Then hit the below command.

openssl rsa -in your_path/private.pem -pubout -out your_path/public.pem

Enter the same password which you have used while creating private.pem. These two files will now appear on your mentioned path. Then upload the public.pem file on the window which was appeared after clicking on Manage and download my response encryption keys option.Once you upload the public.pem file it will automatically download your_app_pkg_name.enc file. Then hit below command as,

openssl rsautl -decrypt -oaep -inkey your_path/private.pem -in your_app_pkg_name.enc -out your_path/api_keys.txt

Enter the password for private.pem. It will create api_keys.tx file on your path. It must be consist of VERIFICATION_KEY and DECRYPTION_KEY.

2. Maintain this VERIFICATION_KEY and DECRYPTION_KEY in **DIGX_FW_CONFIG_ALL_B** table corresponding to the following keys respectivel:

PLAY_INTEGRITY_ENCRYPTION_KEY and PLAY_INTEGRITY_DECRYPTION_KEY

An example query will be:

update DIGX_FW_CONFIG_ALL_B set prop_value = 'YOUR_DECRYPTION_KEY' where prop_id = 'PLAY_INTEGRITY_DECRYPTION_KEY';

update DIGX_FW_CONFIG_ALL_B set prop_value = 'YOUR_ENCRYPTION_KEY' where prop_id = 'PLAY_INTEGRITY_ENCRYPTION_KEY';

3. Similarly, Obtain the same keys for authenticator app by using above step 1 and then maintain those in **DIGX_FW_CONFIG_ALL_B** table corresponding to the following keys respectivel:

PLAY_INTEGRITY_ENCRYPTION_KEY_AUTHENTICATOR PLAY_INTEGRITY_DECRYPTION_KEY_AUTHENTICATOR

and

An example query will be:

update DIGX_FW_CONFIG_ALL_B set prop_value = 'YOUR_DECRYPTION_KEY' where prop_id = 'PLAY_INTEGRITY_DECRYPTION_KEY_AUTHENTICATOR';

- update DIGX_FW_CONFIG_ALL_B set prop_value = 'YOUR_ENCRYPTION_KEY' where prop_id = 'PLAY_INTEGRITY_ENCRYPTION_KEY_AUTHENTICATOR';
- 4. Similarly, we also have to maintain package names of Servicing and Authenticator app in the same table, i.e. **DIGX_FW_CONFIG_ALL_B** corresponding to the following keys respectively:

ANDROID_SERVICING_PACKAGE and ANDROID_AUTHENTICATOR_PACKAGE

An example query will be:

insert into digx_fw_config_all_b (PROP_ID, CATEGORY_ID, PROP_VALUE, FACTORY_SHIPPED_FLAG, PROP_COMMENTS, SUMMARY_TEXT, CREATED_BY, CREATION_DATE, LAST_UPDATED_BY, LAST_UPDATED_DATE, OBJECT_STATUS, OBJECT_VERSION_NUMBER) values ('ANDROID_SERVICING_PACKAGE', 'mobileconfig', 'com.ofss.zigbank', 'N', '', 'Stores device id in OUD', 'ofssuser', sysdate, 'ofssuser', sysdate, 'Y', 1,);

SSL Pinning

5. Get the list of Base 64 encoded SHA256 hashed certificates' public keys of server's valid certificates. Use below command to generate this hash for your certificate. Replace '<certificate.der>' with the path to your certificate.

openssl x509 -inform der -in <certificate.der> -pubkey -noout | openssl pkey -pubin -outform der | openssl dgst -sha256 -binary | openssl enc -base64

6. Add the hashed keys generated in point 6 to zigbank\platforms\android\customizations\src\main\res\values\app.properties.xml file in 'certificate_public_keys' array. Append this key to 'sha256/' in an <item> tag as shown below. Multiple certificate keys can be added to 'certificate_public_keys' array by adding them in <item> tags.

Eg.:

Eg. for multiple certificates (In case OAM/IDCS is used):

