

UICC Card Profile Development

Version Control

Document Name	Version	Date
Process for UICC Card profile development	V001.04	13-06-2022

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Revision History

Issue	Date	Reason for change
V001.01	26-01-2021	Naming Convention Abbreviations: Product
V001.02	13-05-2021	Added Best Practice details
V001.03	03-02-2022	Added new version for requirement template and updated PE user guide.
V001.04	13-06-2022	Addition of Applet test report and timestamp during integration.

Introduction

This document outlines the standard process for development of the BAP cards against the customer requirement and the GSMA standards. BAP card development is a part of the BAP process.

Pre-requisite:

- Pre-development Inputs –
 - UICC_Profile_Requirement_Gathering_Checklist_v1.2
 - UICC Requirement Template_v003.00
 - Customer Specification | Customer Requirement
 - Input file
 - Output file format
 - Module
 - OS
- Tools –
 - Profile Editor tool
 - WorkzPersoTool
 - SDMS
- Output file
 - Perso Script
 - Workz factory input file
 - Output file
- Development Checklist

Roles and Responsibilities

Technical Consultant:

Please ensure below points should be covered before freezing the customer requirement

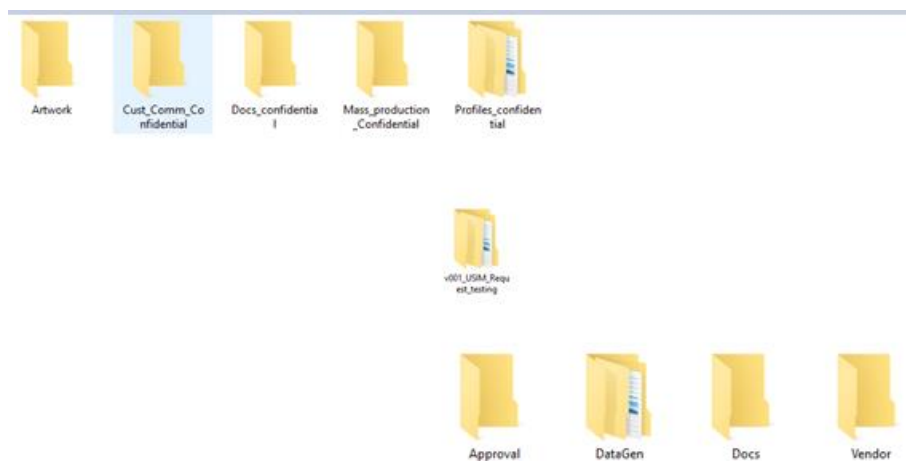
- UICC_Profile_Requirement_Gathering_Checklist_v1.2.xlsx must be filled.
- Customer should be commercially qualified to start the profile development.
- Share the quote template with Sales support team if required and get the approval to start the profile development.
 - Profile development efforts
 - Applet development efforts (if required)
 - Testing efforts
- Get the sign-off on customer requirement to start the profile development (an email confirmation can suffice the sign-off requirement)
- Identify the right module as per the customer requirement
- Identify the correct OS as per the customer requirement

Developer:

Please ensure below points should be covered before starting the profile development

- To ensure the technical spec is received and sign-off by customer or email confirmation.
- To ensure if there is any third-party applet is added, then the applet document must be provided by customer to configure in the profile.
- To ensure if there is any in-house applet to be configured in the profile then the applet must have followed the Applet Development SOP. Additionally, the Applet Developer/integrator must ensure the integrity of the applet based on that the Final Applet Test report duly signed by the Applet developer and the Validator.
- To ensure as per the customer requirement correct module has been chosen.
- To ensure as per the customer requirement correct OS has been chosen.
- Always use the latest version of the Profile Editor and SDMS

Please follow the below folder structure to archive the technical elements received from customer and to start the profile development.



Placed all the technical elements in the respective folders.

Naming conventions for -

Dgs:

<Operator><Country>_<Network Application>_<SpecialApplication>_<Browser>_v<MajorVersionNumber>Dot<MinorVersionNumber>

E.g., ZainIraq_USIM_LTE_WIB_v06.00

Note: Other details can be added In Dgs description, like “with MSISDN” or “with MSISDN and Expiry” etc.

Profile SPE:

<Operator><Country>_<Network Application>_<Special Application>_<Browser>_v<MajorVersionNumber>Dot<MinorVersionNumber>

E.g., ZainIraq_USIM_LTE_WIB_v06.00

Note: This will go into Test/BAP approval form along with internal profile code (e.g., 030200v06)

Full Perso Script (Module wise):

<Operator><Country>_<Network Application>_<Special Application>_<Browser>_<ModuleName-As Per list>_<OSType>_<OSMask>v<MajorVersionNumber>Dot<MinorVersionNumber>

E.g., ZainIraq_USIM_LTE_WIB_9F4_Java_JLu0205_v06.00

Note: The module script versioning is for internal purpose only and this will not be referred in the customer documents.

Naming Convention Abbreviations:**Product Type:**

- UICC_(Consumer/M2M) | eUICC_(Consumer/M2M)

Network Application(s):

- SIM | USIM | ISIM

Special Application(s):

- LTE | PKI | M2M | NFC | NB_IoT

Browser:

- WIB | S@T | Celltick

Applet:

- MI (Multit_IMSI) | IT (IMEI_Trakcer) | IL (IMEI_Lock) | FPLMN (Forbidden FPLMN)

Customer code for new customer entry in SDMS:

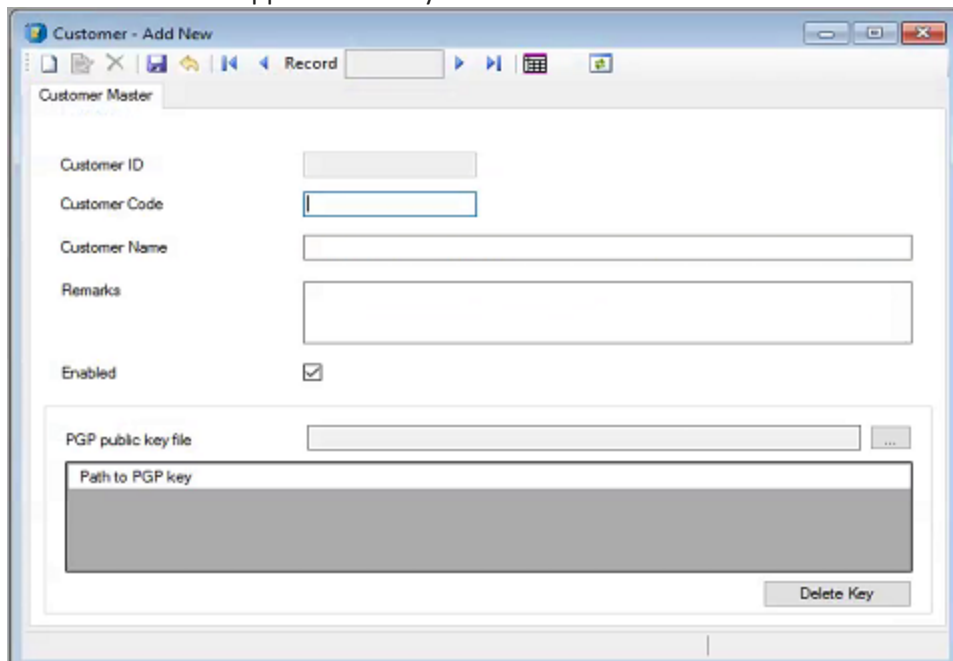
To create new customer entry in the SDMS, please follow the below steps-

1. Click on setup option
2. Click on Customer option
3. Below window will pop-up to create customer entry- click on highlighted option



ID	Code	Customer Name	Remarks	Enabl
111	1Conn...	1Connect Vietnam	1Connect Vietnam	<input checked="" type="checkbox"/>
112	CWC1...	2SM Senegal	2SM_Senegal	<input checked="" type="checkbox"/>
116	Ach01	Achelos Germany		<input checked="" type="checkbox"/>
12	222	Afgan telecom		<input checked="" type="checkbox"/>
85	afg001	AFGHAN WIRELESS AFGHANISTAN	Afghan Wireless	<input checked="" type="checkbox"/>
96	CSC008	Al Madar Libya	Al Madar Libya	<input checked="" type="checkbox"/>

4. Below window will appear to enter the details



Customer - Add New

Customer Master

Customer ID:

Customer Code:

Customer Name:

Remarks:

Enabled: ☒

PGP public key file: ...

Path to PGP key:

Delete Key

5. Customer ID – Unique code (DD/MM/YYYY-01)
6. Customer code – WKZ_Customer_Name
7. Customer Name –
Customer_Name + Country_Name
8. Remarks
It can be specific details related to the customer.

Profile Editor Tool

Profile Editor tool is used for the following

- ✓ To design the profile as per the customer requirements
- ✓ To configure the MSL
- ✓ To configure the authentication algo and parameters
- ✓ To configure the OTA keysets
- ✓ To configure the applet
- ✓ To generate the perso Image
- ✓ To personalize the card
- ✓ To erase and load the OS
- ✓ To validate the profile against the standards
- ✓ To generate the electrical profile (File system, access condition, memory mapping etc.)

Please follow the attached user guide to know more about Profile Editor tool –



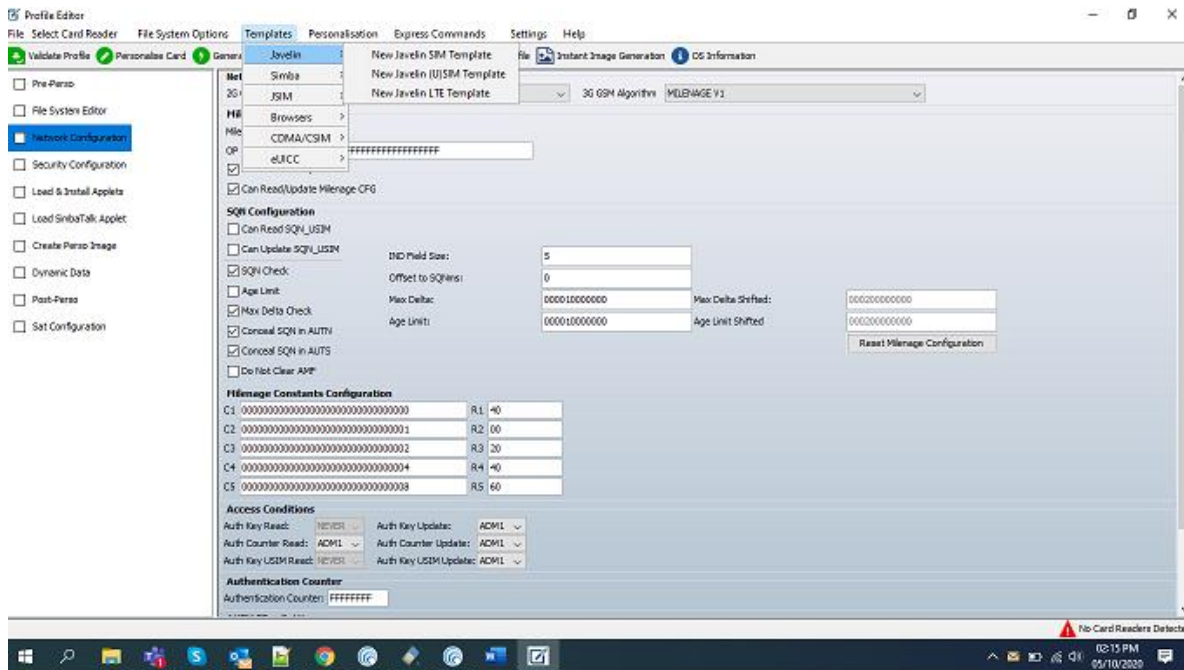
Profile Editor User
Guide.pptx

Template Creation –

Profile editor tool has a default template to create a file system with the default values-

Here is the description –

1. SIM template
2. USIM template
3. LTE Template



Once the template is created you can configure the profile as per the customer requirement. For more details, please refer the above “Profile Editor User Guide.ppt” and “”

Checks –

- ✓ Please ensure the profile template is saved before generating the perso Image.
- ✓ Please validate the profile once the development is completed.
- ✓ In case any of the services are enabled in SST or UST and files are not present then make sure files must be created before freezing the template.
- ✓ If there are any other warning or errors, please ensure template is verified and check against the customer requirement.
- ✓ All RFM read and update must be checked except ICCID

Best Practice –

- ✓ If MSL is not defined by the customer in the technical spec, then as per the best practice configure it to “16”
- ✓ EF_EPSLOCI (6FE3) and EF_EPSNSC (6FE4) must be configured for all profile
- ✓ Service 85 in the UST must be enabled

Support –

- ❖ For any enhancement or any bug related to the profile editor you can raise a ticket to the below email id –
Email Id – support-kigen@arm.com

Some trick and notes –

- ❖ You cannot copy and paste one Elementary file from one DF to another DF.
- ❖ You cannot copy and paste one Elementary file one profile to another profile.
- ❖ You can copy Directory file and its child from one profile to another profile.
- ❖ Ctrl+P is used to see or copy the perso log
- ❖ You can directly set below access condition for all elementary file by selecting one button-
Go to the “File system option—> Select the required option”
 - Set RFM Read and Update access condition for all files
 - Remove RFM Read and Update access condition for all files
 - Set Applet Read and Update access condition for all files
 - Remove Applet Read and Update access condition for all files
- ❖ You can decode the Elementary files data and see in one window
Go to the “File system option—> Select View decoded Data option”
- ❖ Send Recycle commands can be sent via Profile Editor, and it is always recommended to use “Send recycle command” before generating Perso Image.

SDMS tool

SDMS tool is used –

- ✓ To design the data generation template as per the customer requirements
- ✓ To configure the Keys
- ✓ To configure OTA keys
- ✓ To configure the Output file
- ✓ To configure XML file for OTA platform
- ✓ To configure any dynamic value
- ✓ To configure graphical value which needs to be printed on the SIM cards
- ✓ To generate Workz factory input file

The screenshot displays the SIM Data Management v4.0.0.12 application. The 'Profile - Edit' window on the left shows fields for Profile ID (514), MD5 Hash, Version (4), and Customer (Roamability). It also lists Customer Keys with their descriptions and numbers. The 'Job - Edit (TEST DATA)' window on the right shows Job ID (999), Status (GENERATED), Quantity (4), and various parameters like Profile, Description, and Package. It includes a 'Packaging Spec' table and buttons for 'Data Generation Report', 'Regenerate Pack/Workz Be', 'Input Summary', 'Load Job onto Perso Machine', and 'Job Status'.

How to create a customer entry -

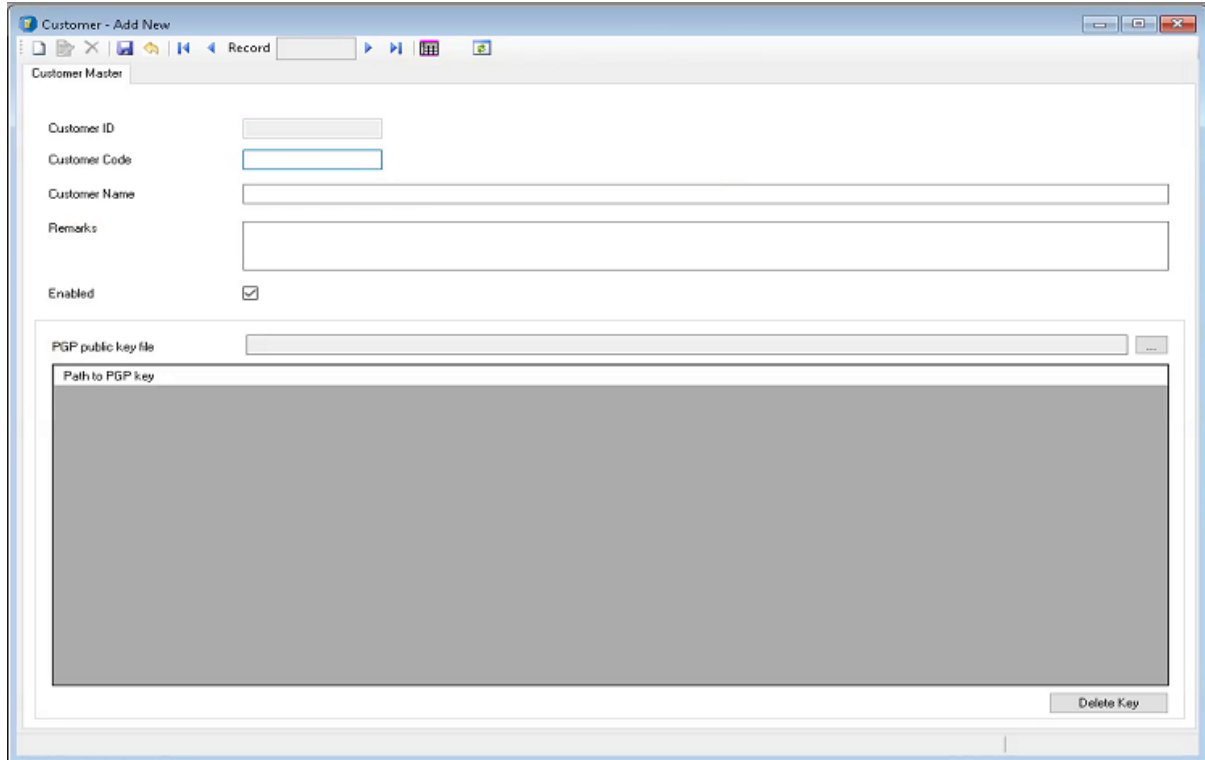
The screenshot displays the 'Customer - View' window of the SIM Data Management v4.0.0.12 application. It shows a table of customer entries with columns for ID, Code, Customer Name, Remarks, Enable, Created By, LastGenerated, Updated By, and Created On.

ID	Code	Customer Name	Remarks	Enable	Created By	LastGenerated	Updated By	Created On
111	1Conn...	1Connect Vietnam	1Connect Vietnam	✓	DamanjeetC		JitendraB	13/10/2011
112	CWC1...	ZSM Senegal	ZSM_Senegal	✓	JitendraB		JitendraB	14/10/2011
116	Ach01	Achelios Germany		✓	ArjunK			15/12/2011
12	222	Algan telecom		✓	tester		ArjunK	28/03/2011
85	afg001	AFGHAN WIRELESS AFGHANISTAN	Afghan Wireless	✓	DamanjeetC		ArjunK	15/05/2011
96	CSC008	Al Madar Libya	Al Madar Libya	✓	JitendraB			16/07/2011
130	CWC2...	ArgoNET Austria	ArgoNET Austria	✓	JitendraB			28/03/2021
44	ARM L...	ARM Limited		✓	DamanjeetC		ArjunK	22/11/2011
25	CIG001	ASIACELL TELECOMMUNICATION COMPANY LTD	ASIACELL IRAQ	✓	jinesht		Manish	17/04/2011
145	CWC...	Athonet Italy	Athonet Italy	✓	JitendraB			03/10/2021
43	C00021	Azerfon LLC		✓	ArjunK			20/11/2011
21	Az01	Azur Congo		✓	ArjunK			11/04/2011
88	CTJ001	Bahdon Tajikistan		✓	ArjunK			30/05/2011
19	BH01	BAHRAIN TELECOMMUNICATION COMPANY		✓	jinesht		ArjunK	05/04/2011
87	BK001	Bakcell Azerbaijan	Bakcell Azerbaijan	✓	JitendraB			30/05/2011
17	bi001	Batelco Bahrain	Bateleco for testing	✓	ArjunK			04/04/2011
13	BH02	BATELCO.TES		✓	jinesht		ArjunK	29/03/2011
99	BH_Te...	BH_Telecom_BH	BH_Telecom_BH	✓	DamanjeetC			02/06/2011
93	Bosnia	Bosnia	Telecom_Bosnia	✓	JitendraB			13/05/2011
48	CSC002	CABLE & WIRELESS (SEY) LTD		✓	ArjunK			10/12/2011
104	CWC2...	Cablenet	Cablenet	✓	JitendraB			22/09/2011
95	CC01	Card Centric Limited	Card Centric Limited	✓	ArjunK			15/07/2011
53	Cavli ...	Cavli Wireless		✓	damanjeetc			09/01/2011
107	CM01	Cellcom_Malaysia		✓	AdityaNa			02/10/2011
7	CDM014	CONNECT ARABIA LLC		✓	Manish			17/03/2011
69	c00w	CUBIC TELECOM		✓	ArjunK		ArjunK	25/03/2011
69	Dh001	DHIVEHI RAAJJEYGE GHULHUN PLC		✓	ArjunK			28/03/2011

- Click on “Setup” → Click on “Customer”
- Above window will appear with the customer list
- Click on New



- Click on “New” below window will appear



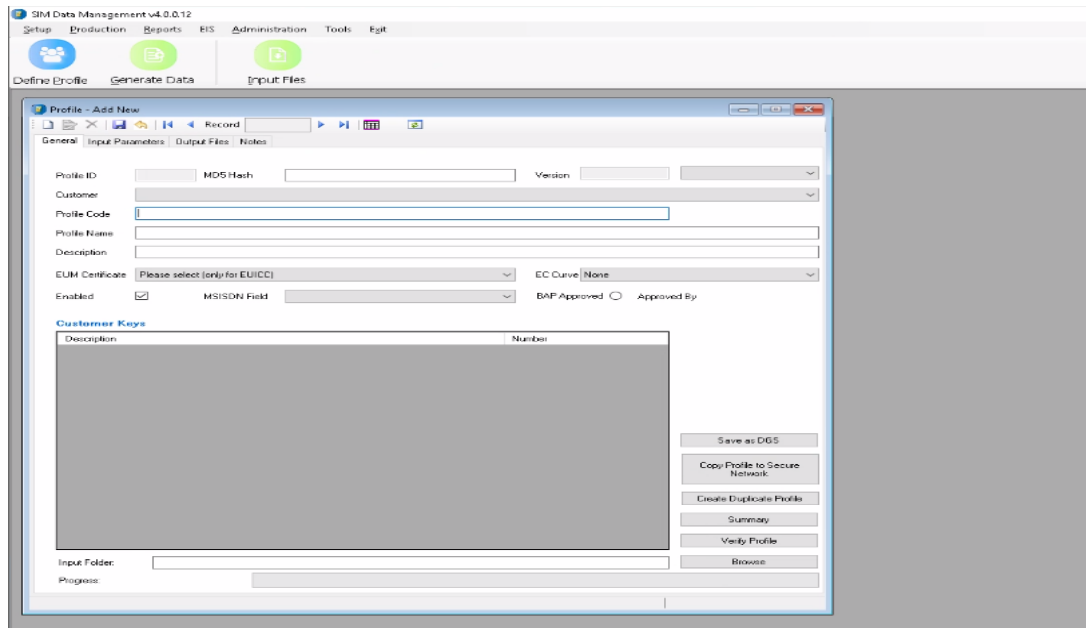
- Enter the customer code – Customer code can be entered
- Enter the customer’s name – “CustomerName_CountryName”
- Enter the Remarks – “CustomerName_CountryName” with some description, if required
- Click on save button to save the customer details



- To delete click on delete button to save the customer details



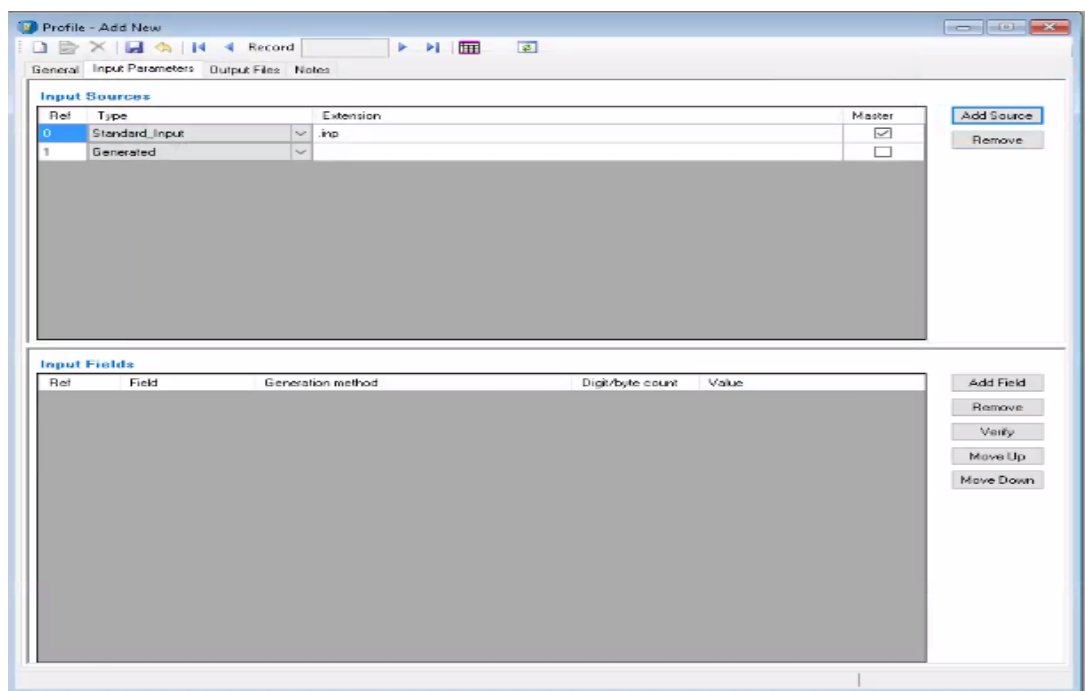
How to create a new template –



General Tab-

1. Click on “Define profile”, new window will pop-up
2. Select the customer from the customer drop-down list
3. Enter the profile code
4. Enter the profile name “make sure EP profile name and DGS profile name should be same”
5. To save the DGS, click on “Save as DGS” and enter the name
6. To transfer the DGS template click on “Copy profile to secure network”
7. To create duplicate profile, click on duplicate profile and it will create new template with the same information.

Input Parameters-



Input sources

1. Click on “Add Source” to add the source of input file
 - a. To add “.inp” select standard_input type format
 - b. To add “.csv” select csv type format
 - c. “Generated” type will select for value generation

Input Fields

1. To add field, click on “Add Field”
2. To remove the field, click on “Remove field”
3. Click on Move up and move down to change the variables place.

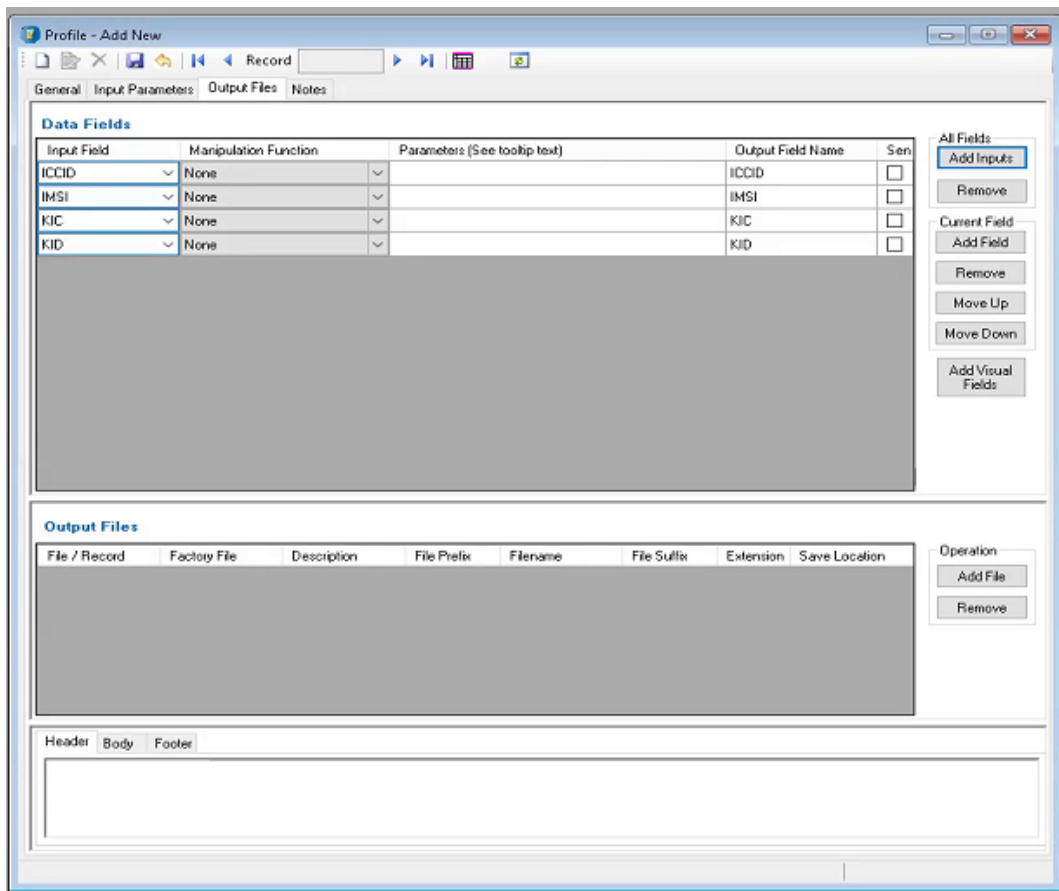
Predefined References

“0” – It means the variables will be picked from the “.inp” file.

“1” – It means the variables defined will be created during the data generation (it can be defined with the fix value as well).

“2” – It means the variables are defined will be picked from the “.csv” file.

Output Parameters-



Profile - Add New

General Input Parameters Output Files Notes

Data Fields

Input Field	Manipulation Function	Parameters (See tooltip text)	Output Field Name	Sen
ICCID	None		ICCID	<input type="checkbox"/>
IMSI	None		IMSI	<input type="checkbox"/>
KIC	None		KIC	<input type="checkbox"/>
KID	None		KID	<input type="checkbox"/>

Output Files

File / Record	Factory File	Description	File Prefix	Filename	File Suffix	Extension	Save Location

Header Body Footer

Operation

Add File Remove

All Fields

Add Inputs Remove

Current Field

Add Field Remove Move Up Move Down

Add Visual Fields

Once the variables are defined as per the input file, the next step will be declaration of variables in the Output file section.

- Click on “Add inputs” to get all variables that are defined in the input parameters section.
- To Remove click on “Remove”, it will remove all the input fields.
- To add one variable, click on “Add Field” – this option is used to re-define the variable in different format or for any manipulation if required to achieve the final value.
- “Move up” and “Move Down” options are used to move or to set the order of variables.
- To add the output file and factory input file, click on “Add file”
 - Header – Header of the output file will be defined in this part; Header is the static part of the output file.
 - Body – The dynamic part will be defined in this, like (IMSI, ICCID, PIN etc....)
Fix value also can be hardcoded in the body section.
 - Footer – Footer of the output file will be defined in this part; Footer is the static part of the output file.
- Workz factory files are also defined in the same section, as these files are considered as an output file. (Workz factory files are never shared with the customer; these files are used for internal purpose to produce the BAP or commercial cards)
- Workz Factory input file –
There are two factory file which gets generated during the data generation template creation-

Workz factory file for TSS –

- This file requires header part with the **quantity** field.
- This file does not contain any of the graphical variables.
- This file is used only for personalizing the card via desktop.
- Variables of this file and variables of actual factory input file must be same (except graphical variables)
Sample of factory input file attached in below.
- Extension will be .inp
- Below tools are used for personalizing the cards
 - Workz Perso Tool
 - TB2 Tool



ArgoNET_TestProfile_02_Input File.INP;

Workz factory file for SIM production –

- This file requires only header part of the variable.
- This file contains graphical variables along with the other variables.
- This file is used for personalizing the card via machine.
- Variables of this file and variables of actual factory input file must be same (except graphical variables)
Sample of factory input file attached in below.
- Extension will be “.inp”



P28032020_ArgoNE
T_TestProfile_02_Inp

Support –

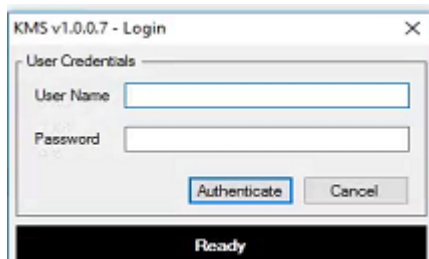
- ❖ For any enhancement or any bug related to the profile editor you can raise a ticket to the below email id –
Email Id – it.dev@workz.com

KMS tool

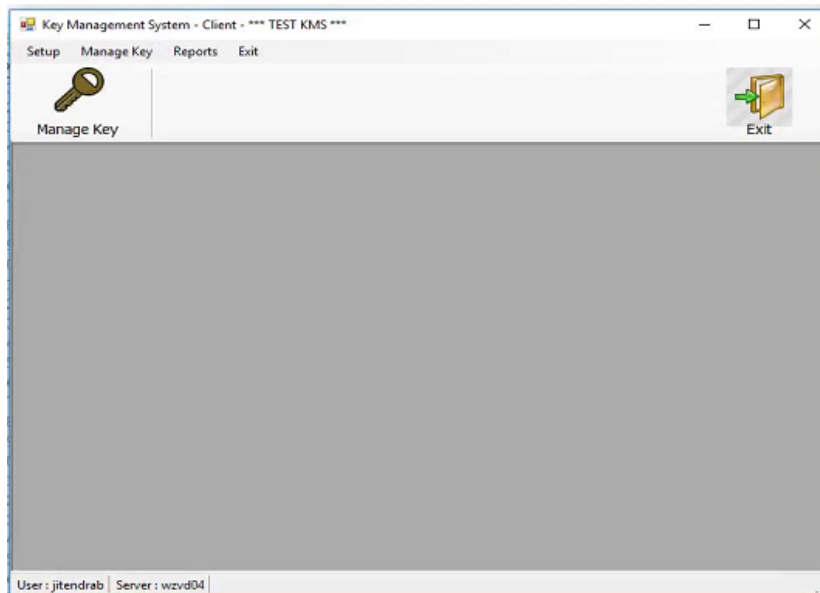
Customer code for new customer entry in KMS:

New customer entry

1. Login with user credentials to access the KMS



2. Login with user credentials to access the KMS- below window will appear-



3. Click on Setup → Customer

4. Login with user credentials to access the KMS- below window will appear-

IFS Customer ID	IFS Customer Name	Enabled	Created By	Global
1Connect_Vietnam	1Connect_Vietnam	<input checked="" type="checkbox"/>	arjunk	
CWC14102019	2SM_Senegal	<input checked="" type="checkbox"/>	jitendrab	
afg001	Afghan Wireless	<input type="checkbox"/>	tester	
CSC008	Al Madar Libya	<input checked="" type="checkbox"/>	arjunk	
CWC2803	ArgoNET Austria	<input checked="" type="checkbox"/>	jitendrab	
ARM Limited	ARM Limited	<input checked="" type="checkbox"/>	arjunk	
CIQ001	ASIACELL TELECOMMUNICAT...	<input checked="" type="checkbox"/>	JineshT	
C00021	Azerfon Uic	<input checked="" type="checkbox"/>	ArjunK	
CTJ001	Babilon Tajikistan	<input checked="" type="checkbox"/>	damanjeetc	

5. Below window will pop-up to enter the customer details –

Customer Master - Add New

IFS Customer ID:

IFS Customer Name:

Global Key Customer: ☐

Enabled: ☒

IFS Customer ID – Enter the same customer that was used during the customer entry creation of SDMS

IFS Customer Name – Enter the same customer's name that was used during the customer entry creation of SDMS

Global Key customer – In case this customer needs to be used for any of the sub-customer, check this box

Click on save option -

6. Below window will pop-up to enter the customer details –

How to enter the network keys into KMS:

1. Click on **Manage Key** after successfully created the customer entry, below option and below window will pop-up –

Key Management System - Client - *** TEST KMS ***

Setup Manage Key Reports Exit

Manage Key

Exit

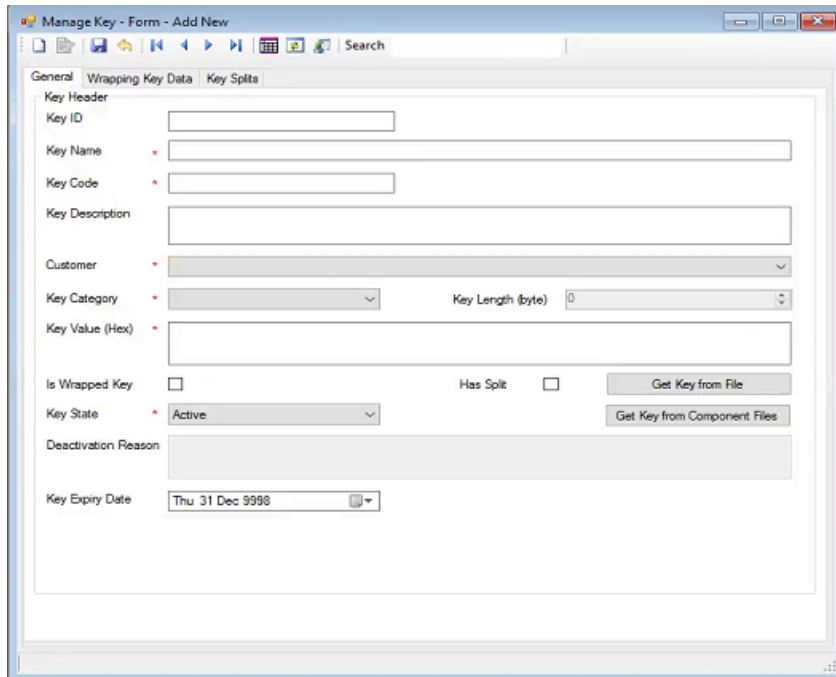
Manage Key - Form - View

Import Profiles

ID	Key Code	Key Name	Key Description	Customer Name	Category
465	465	INWI_MOROCCO...	INWI_MOROCCO_K4...	INWI_Maroc - C...	K4 Key(Trans...
464	464	INWI_MOROCCO...	INWI_MOROCCO_OP...	INWI_Maroc - C...	OP Key
461	461	EQUIPOS Y SIST...	IDEAYK4082720	IDEAY_Nicaragu...	K4 Key(Trans...
460	460	EQUIPOS Y SIST...	EIDEAY082720	IDEAY_Nicaragu...	OP Key
459	459	WORKZ ACH RS...	WORKZ ACH RSP TE...	WORKZ_RSP - ...	Other
458	458	TELECEL_CENT...	k4_004	Telecel RCA - C...	K4 Key(Trans...
456	456	TELECEL_CENT...	op_004	Telecel RCA - C...	OP Key
455	455	FLEXGROUP_MA...	FLEXGROUP_MAROC...	Flex_Canada - C...	K4 Key(Trans...
454	454	FLEXGROUP_MA...	FLEXGROUP_MAROC...	Flex_Canada - C...	OP Key
453	453	ARGONET_AUS...	ARGONET_AUSTRIA...	ArgoNET Austria ...	K4 Key(Trans...
452	452	ARGONET_AUS...	ARGONET_AUSTRIA...	ArgoNET Austria ...	OP Key
451	451	ARM_AUSTIN_M...	ArmAusMultitenant	ARM Limited - A...	Other
450	450	VECTONE_MOBI...	VECTONE_MOBILE_U...	Vectone_Mobile ...	OP Key
449	449	HALOTEL_TANZ...	HALOTEL_TANZANIA...	Halotel_Tanzania...	K4 Key(Trans...

User : jitendrab Server : wzvd04

2. Click on **new button**  to enter the key details –



3. Enter the key details from the “**KMS_Key_List.xls**” –

This sheet is managed by PDM team, after importing the keys into KMS the team enter every detail in this sheet with respect to the network keys.

Key ID – Enter the Key ID which is defined in the KMS_Key_List sheet.

Key Name – Enter the key name which is defined in the KMS_Key_List sheet.

Key Code – You can use the Key ID value here.

Key Description - you can use the key name here.

Customer – Choose the customer with respective to the keys.

Key Category – Choose the key type, example – OP Key or Transport key

Key Length – Select the key length that is shared by customer

Key value – Enter the key value of the key, you can use below dummy key values for the entry


8 Bytes – 1122334455667788

16 Bytes - 1122334455667788 1122334455667788

24 Bytes – 112233445566778811223344556677881122334455667788

Key State – By default it will be active.

Is wrapped key – This is used for eUICC projects.

4. Click on Save  to save the details.

Please follow the below checks –

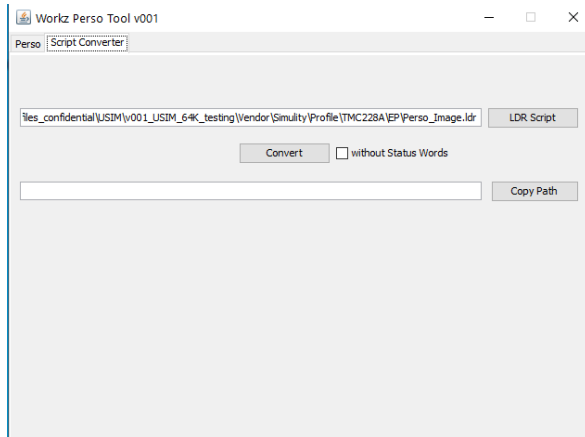
- ✓ Make sure the customer’s name in the SDMS and KMS must be the same.
- ✓ Make sure the details enter for the keys should be the correct.
- ✓ Make sure the KSM_Key_List details and KMS details must be the same.
- ✓ Network key type should be carefully chosen while entering.

Workz Perso tool

Workz Perso Tool is used for –

- To convert the script into ldr to ipr format
 - To personalize the card
- Inputs – Perso script and factory input file (with the header format)

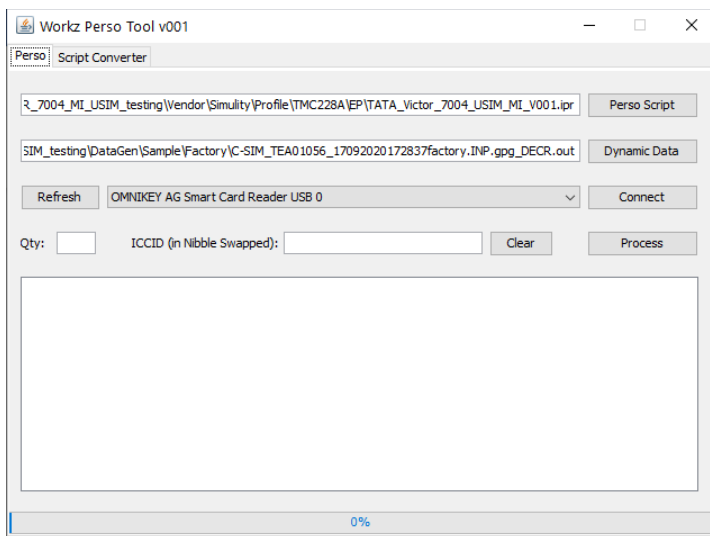
To convert the script into ldr to ipr format



1. Select the path of the ldr file
2. Click on the convert option for the ipr file

Please note without status word options is used for erase script to convert ldr to ipr format, as the required format doesn't require the response data.

To Personalize the card



1. Select the perso script (it should be in the ipr format)
2. Select the factory input file (it should be with the header format)
3. Click on Refresh
4. Select the card reader
5. Click on connect to connect the card reader
6. Click on process

UNIT Testing

Developer must do the UNIT testing before sharing the package to the validator –

- ✓ Profile must be validated by the auto-validation features of Profile Validator Tool
- ✓ Profile must be compliance to customer requirement
- ✓ Profile must be compliance to standard
- ✓ If there is any confirmation (regarding electrical profile or any document) received from the customer during the development phase that must be shared with validator or informed.
- ✓ Script must be prepared with perso Image and Perso scripts
- ✓ PINs test must be conducted via PIN management tool or Wojtek tool
- ✓ Authentication must be conducted via MilenageCalculator
- ✓ OTA test must be performed via OTA tool or Wojtek tool
- ✓ All technical elements must be kept into the respective folder.
- ✓ If there is any applet, the applet tests must be re-run to ensure the sanity of the Applet.

Output of the document

Below are the outputs of this documents-

1. Electrical profile in the .spe format
2. Perso script with perso image and postscript.
3. Factory input files
4. Output files

TITLE	SOP -UICC card Profile Development_v001.04
FILE NAME	SOP -UICC card Pr...pment_v001.04.pdf
DOCUMENT ID	c0ad989343d6d96f5eb338295590d7105b4c7300
AUDIT TRAIL DATE FORMAT	DD / MM / YYYY
STATUS	● Signed

Document history



SENT

14 / 06 / 2022
16:41:16 UTC+4

Sent for signature to Saji Krishnan
(saji.krishnan@workz.com) and Ajitav Mohanty
(ajitav.mohanty@workz.com) from tss@workz.com
IP: 94.200.229.6



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Viewed by Saji Krishnan (saji.krishnan@workz.com)
IP: 94.200.229.6



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14 / 06 / 2022
16:46:49 UTC+4

Signed by Saji Krishnan (saji.krishnan@workz.com)
IP: 94.200.229.6



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