

**Ford ID in IVI with DuerOS**

**Product Requirements Document (PRD)**

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**Author: Johnny Wang**

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**Project: DuerOS IVI Phase 4**

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# Background and Obejctives

Ford is introducing SYNC+ IVI system in China, to embrace the rapid changes in telematics market. SYNC+ is an IVI system, deeply customized DuerOS system, which is developed by Baidu.

On SYNC+, there are many features developed by Ford, Baidu and third party partners. Some of the featuers such as natural language recognition, Baidu Maps, iQiYi (an online video application), etc., are from Baidu ecosystem which require Baidu account support, some other features, such as online service booking, online mall, car wallet , etc…, require Ford account, and other 3 party apps such as QQ music requires Tencent QQ account login on IVI.

To satify the business requirements, both IVI and cloud solutions are needed for account login and binding.

To meet the program timeline, the account funtions on IVI are prioritized and implemented iterately through phase 1, 2, 3 and 4.

In phase 1, customers will need to download FordPass/Lincoln Way app, add the VIN, complete SIM card/s real name registeation(a separate process), complete Ford and account binding and scan the QR code on IVI to login. In this phase, Ford sends the combination of FordPass/Lincoln Way mobile phone number and VIN during FordPass/Lincoln Way account and Baidu account binding process to Baidu as OAuth 2.0 is not supported and only Baidu account is logged in on IVI, technically.

In phase 2, there is an enhancement that enables pulling Ford account profile, e.g. vehicle nickname onto IVI. In addition, add CX483/U611 Lincoln program support.

In phase 3, there will be multiple account support and improvements.

In phase 4, Ford account login and FaceID are added and also contains lots of improvements. (FaceID is only available on vehicles which equip in-vehicle camera).

The objectives of the SYNC+ account include:

* Enable Ford,Baidu and 3rd parties’ ecosystems current and future functions to work normally, such as cloud voice recognition, OSB, Ford credit,FaceID log in, membership system, etc…
* Build the account ID system to support as a basic function for data statictics, data report and data sharing between Ford and Baidu
* Basis for service customization
* Basis for service recommendation
* Used for big data personas and labeling
* Expansibility to bind with more 3rd party apps
* Meet high standart security requirements

While the login process onto IVI

* Shall be user friendly, seamlessly and effortlessly as possible
* Trustfully and securely

# General Assumptions

## User assumptions

* The customer has registered and setting up a FordPass/Lincoln Way account and Ford mini programs in Wechat if needed, e.g. account profile image, customer name, vehicle nickname, etc...
* The customer has completed vechile SIM card/s real name registration
* Customer has a valid phone number so a FordPass/Lincoln Way account can be created

The above features/processes have been defineds in separate documents, thus these are beyond the scope of this PRD.

## Vehicle assumptions

* The vehicle has valid internet access.
* Face ID is supported
* Classic memory/enhanced memory is supported so that seat positions, mirror positions, steering column can be memoried and recalled
* No physical memory seat button is mounted to recall seat positions, mirror positions
* Vehicle architecture support 4 pers signals

# Supported vehicle programs

* CD542
* CX727CBEV
* U554

To be updated from program team.

Face ID solution (Baidu or global supplier) needs to be confirmed by program.

# Related features and customer touch points

## Related features

* Rocket setup
* Account binding
* Account login on IVI
* Face ID
* Classic memory
* Enhanced memory
* PAAK(TBD)
* Terms and conditions (TBD)
* RNR (TBD)
* CCS (TBD)
* Authorization (TBD)

## Related customer touch points

* Owner’s app, i.d. FordPass, Lincoln Way app
* IVI
* Baidu app (TBD)
* Ford mini programs (TBD), i.e. 电动派

# Login flow on IVI

## User account login

### Multipe account login and Face ID association



After user logs in onto IVI,

* Account FA automatically links to Profile 1, which memorize personal settings. Account FB links to FB, etc…
* When seat position changes, it saves/prompts to save to account （FA to pers 1, FB to pers2）
* Ignition off, account not log out by default but locked
* Ignition on next time, account not log out by default but locked

## Login via Face ID



Please be noted at most 4 users + visitor/guest for personal profiles since only 4 personal profiles supported by vehicle architecture.

# General Requirements

## In-vehicle Face ID

In-vehicle Face ID (hereafter as Face ID in short) uses face recognition technology to identify the driver by scanning the face of the driver. Face ID provides an intuitive and secure authentication approach to login account or recall personal settings, such as seat and mirror positions.

To start using Face ID, customer needs to first enroll face. User may do this during the initial set up process, or at a later time by going to FaceID settings. And later customer can login the IVI or recall personal settings simply by glancing at the camera.

Please note Face ID is only available to vehicles equipped with designated camera and software. For details, please consulate specific vehicle programs. This documents is a general document which is not specified for each vehicle program.

For Face ID details, please refer to Face ID PRD.

## Set-up Face ID

The system shall have a configuration to indicate whether the IVI supports the FaceID function or not. The set-up Face ID process and related Face ID management shall only be available when Face ID is available. The HMI shall distinguish related design elements and user flow based on the availability of Face ID.

Customer will need to first set-up Face ID. Considering the user experience, the HMI user flow is suggested having at least 2 entries to initiate the Face ID set-up process in terms of IVI account login.

* When the account is logging into the IVI without Face ID created for this account, the Face ID set- up process shall be prompted so that the user can learn the feature and continue the set-up process. The user may skip the set-up process.
* In case the user skips the set-up process, the HMI shall provide the user another entry to set-up the Face ID, e.g. system settings, account settings depends on HMI and user flow design.

*Please note the Face ID set-up process alone will be clarified in the Face ID/Image Recognition PRD, hence it will not be elaborated in this document.*

## Face ID and account binding

To enable IVI accout login via face recognition, one account shall be only associated with one Face ID and one Face ID can only be associated with one account, hence the binding relatiship of Face ID and account is:



Face ID data is stored offline, hence so the binding relationship is only valid on the vehicle where it is created.

## Face recognition and account login verification

**Before face recognition**

When IVI system starts, system shall check whether there is any accout logged in. If yes, the system shall vefify the user identity before entering the home screen (The user can change the account login verification option is system settings, i.e. whether it requires identify verificaition during every ignition cycle).

* No account existing on IVI. The system shall ask user to login an account.
* There is/are existing account/s logged in (currently not active after system starts), but none of the accounts has associated with a Face ID. In the case,the system shall inform the user to verify the identity by alternative login methods, e.g. QR code scanning, password, which is the same as the scenario when the Face ID is not available on the vehicle.
* There is/are existing account/s logged in (currently not active after system starts), and some of these accounts are associated with Face IDs, and some don’t. For those accounts that have associated with Face ID, the system shall enable face recognition as user identity verification method. For those don’t, the system shall enable alternative login method.
* All of the existing account/s logggd in (currently not active after system starts) are associated with Face IDs. The system shall enable face recognition as user identity verification method for all these accounts.

Alternatively, the user can also login a new account rather than the existing ones.

**Initalize face recognition**

The face recogtion shall start as user requested from HMI soft button, voice commands or defined by system settings (e.g. initiate at every ignition cycle)

**During face recognition**

During face recognition, user shall be guided complete gestures required by the face recognition.

The system shall allow the user a defined number of retries,each limited to a defined amount of time, to prevent system lock-up.

In case the system cannot recognize the face, it shall responses accordingly:

* No valid face detected
* Valid face detected and cannot match local Face ID data
* Valid face detected and can match local Face ID data
* Time out

**After face recognition**

No matter whether the face recognition is successful or not, it shall output the recognition results to account module. The HMI shall provide the user an indication of the face recognition results.

* Face ID recognition is successful, the account login verification will pass and accept the login request. The HMI shall provide an loading animation/indicator matching the login process.
* Face ID recognition is not successful, the account login verification will not pass and reject the login request. The system shall allow the user a defined number of retries,each limited to a defined amount of time. If the number of retries reaches the number of maximum retries, the system shall prohibit the use of Face recognition for a limited time period. Once the user logins in via an alternative login method, or reaches the time limit, the system shall enable Face ID login again.

## Face ID management

User shall be able to create a Face ID after account login in case no Face ID is associated with this account on the vehicles that Face ID is supported.

The Face ID HMI shall provide the user an indication of the availability of Face ID on the vehicle, whether the FaceID is enabled/disabled and the interface to delete the Face ID.

The system shall not allow the user to associate an already associated FaceID to the account.

In short, the following functions are required:

* Create a Face ID
* Enable/Disable Face ID account login verification
* Delete Face ID

## Multiple accounts switch

There are two options for account login via face recognition.

**Assumption**

There are at least one valid user has logged in the IVI.

### Option 1- Detect face, identify which account the face is associated and then login (Preferred)

When system starts, Face ID camera starts to dectect whether there is a valid face entering and match whether the face match with the Face ID data stored in IVI.

* If the face match one of the Face ID stored in IVI, then return the account ID that associated with this Face ID and account starts to login.
* If the face does not match any of the Face ID stored in IVI，then
  + If the face recognition has not reached the maximum attempts, then ask the user to try again.
  + If the face recognition has reached the maximum attempts, then tell the user to login with other methods (i.e. QR code scanning).

### Option 2 – Select account first, validate face associated with the account, and then login

When system starts, IVI shall list all the user that has currently logged into the IVI but an account validation is required to access the system. The last used account is set as default account which is selected as current account automatically. And the Face ID is validation method by default. User shall be able to switch to another validation method such as QR code scanning or manually entering the account password.

### Accounts have separate settings

All the account profile data and settings are only for the access of the account of their own, except specific clarification.

One possible example of the exempt data is vehicle license plate number and enigine number in the personal center. These data can be input and modified by any user, in login or unlogin status.

## Remove an account from the sign-in

User shall be able to remove an account from the account login list. This will remove the linkage between the account and Pers signal (TBD).

## Account logout

The system shall not dissociate the Face ID and account when the account is logged out, so that the Face ID can be used to login the IVI next time.

## Master/Factory Reset

When a Master Reset operation is executed, system shall:

* Dissociate Face ID and account
* Delete the Face ID
* Log out the account
* Unbind profile index with account and release pers signal?
* All account log out and settings to default

### Account profile

The accounts, vehicle information and other necessary items shall be organized in the account profile (by UX).

#### Ford ID formation

* Phone number
* Email
* Account profile picture
* Customer name
* Home address
* Account creation time
* Last login time on IVI
* Third party account binding management

#### Baidu ID information

* Baidu ID phone number
* Baidu ID nickname

#### Vehicle information

* VIN
* Make/Model/Year
* Color
* License plate number
* License plate color
* Engine number
* Next annual inspection date
* Insurance expiration date

#### FaceID management

* Face ID setup
* Disable Face ID

#### Account login settings

* Verify password method

#### Others (per UX)

* Order center
* Third party services (authorization) management
* IoT devices management
* Payment management
* Invoice information management
* Data synchronization management
* Terms and conditions/privacy policy
* Location and privacy management

## Third party app binding management

TBD.

## Vistor mode

A mode in which IVI can be used temporarily without real customner account login.

TBD

# System and Architectural Design

## Related vehicle components EE architecture

TBD.

## IVI account SDK design

TBD.

## Backend and cloud services architecture

TBD.

# Non-functional requirements

## Performance requirements

The log in confirmation notification shall be available on FordPass in 2 seconds (TBD).

Once confirmed by the user, the FordPass account shall be logged in on IVI in 2 seconds (TBD).

## Service-level agreements (SLA)

Service availability: 99.99 %

## Data plan requirements

The data consumed by this feature shall be covered by the basic data plan (paid by Ford).

Data consumption assumption (TBD)

## Events tracking and statistics

TBD

## Operation requirements

* Inquiry and export Ford IVI account login status by VIN, vehicle make/model, nameplate, date, account,
* Inquriey and export Ford IVI account binding status with all parties by VIN, vehicle make/model, nameplate, parter name, date, account

TBD

## FaceID security and privacy requirements

For FaceID functional and unfunctional requirements, please refer to FaceID PRD.

For FaceID related security requirements, please refer to seratate requirements document from Ford Cybersecurity team.

For FaceID related privary requiements and how FaceID data is protected, please reter to Ford terms and conditions & privacy policy requirements.

# IVI app list that need work without login

To be updated, mostly vehicle control features.

# Classification Key

|  |  |
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| **Classification** | **Notes** |
| Proprietary | Information created or obtained in the normal course of business and not classified as Secret or Confidential |
| Confidential | Information that provides the Company with a competitive advantage, that supports its technical or financial position, and which, if disclosed without authorization, could cause damage to the Company. |
| Secret | Information of a strategic or highly sensitive nature that, if disclosed without authorization, would cause substantial, severe, or irreparable damage to the Company or its relationships. |

# Document Status Key

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| **Status** | **Notes** |
| DRAFT | Document currently being worked on. Shall not be used as a solid reference to information included in this document. |
| AFR | Available For Review. Document information is not eligible for changes. Approving manager will revise this document and if all the information is found to be completely valid, then the document will change to REL status. If the document is found to have errors, the document will change to DRAFT status. |
| REL | Released. Document is completely valid at time of review, and is now available to be used as a solid reference of information. |

# Terms, Acronyms and Definitions

|  |  |
| --- | --- |
| **Term or Acronym** | **Definition** |
| FordPass/Lincoln Way | Ford customer owner app installed on customer’s small phone |
| DuerOS | A set of functions and capabilities provided by Baidu, including Baidu navigation, voice recognition, Baidu online music, etc. |
| VIN | Vehicle Identification Number, which is the unique ID for a vehicle |
| POI | Point of interest |
| HMI | Human Machine Interface. The infotainment display and controls provided by the vehicle. |
| IVI | The in-vehicle infotainment unit. |
| VR | Voice recognition |
| OSB | Online service booking |

# Changes

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| --- | --- | --- | --- |
| **Author** | **Date (YYYY/MM/DD)** | **Status** | **Notes** |
| Johnny W. | 2018/10/19 | DRAFT | Version 1.0 - Initial draft at compiling all use cases, available information and existing requirements |
| Johnny W. | 2018/11/03 | DRAFT | Version 1.1 – Revise account log in process and update use cases, remove personalization (will have a separate PRD) |
| Johnny W. | 2018/11/11 | DRAFT | Version 1.2 – Revise log in wireframe and update use cases after internal discussion |
| Johnny W.  Fei Ya | 2018/11/13 | DRAFT | Version 1.3 – Architecture solution update |
| Johnny W | 2019/12/11 | DRAFT | Version 2.0 – Add FaceID and mutlple account login support for face ID equipped vehicles |

# Contacts

For assistance or correction, please contact any of the following:

Johnny Wang ([jwang308@ford.com](mailto:jwang308@ford.com)), Account Feature Owner

Elaine Jia ([tjia2@ford.com](mailto:tjia2@ford.com)) ，Face ID Feature Owner

Andy Xu ([xxu71@ford.com](mailto:xxu71@ford.com) ), Enhanced Memory Feature Owner

# Appendix.