Charging and battery swap service data interactive for electric vehicle

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Background

- In 2015, the production and sales volume of NEVs in China reaches 379,000.
- The ownership of NEVs is reaching 500,000.
- Tens of EV charging service companies (more than half of them are newly opened) have started their business in different cities.
Background

- People need the services provided by different operators in a simple way

- In the beginning of 2016 CEC has established 4 expert groups to start the preparation of Chinese Roaming standards for EV charging service

- Main members is made up by below companies:
  - EVCSP: State Grid, Potevio, TGOOD, etc
  - EVIP: NARI Group, AUTO ELECTRIC POWER PLANT CO., LTD., etc
  - Research Institute: CEPRI
Background

■ EV charging and battery swap service information Exchange

✓ Part 1: General
✓ Part 2: Common Data Exchange
✓ Part 3: Business Service Data Exchange
✓ Part 4: Data Transfer and Security
Part 1: General

- Defines the Architecture of information exchange and control flow between EV charging service platforms

*Note: This standard includes two interfaces: Icomm and Iserv. Specification should refer to (Part 2 Public Information interchange standard) and (Part 3 Charging service interchange standard) and (Part 4 Protocols and Security).*
Part 1: General

- Section 1 Scope
- Section 2 Normative Reference
- Section 3 Terminology
- Section 4 Architecture of information exchange
- Section 5 Procedure of information exchange
- Section 6 Main functions of common information exchange
- Section 7 Security mechanism
- Section 8 Performance and availability
- Section 9 Information management mechanism
Part 2: **Common Data Exchange**

- This document defines Icomm Interface between operation service platforms
- Common data model include configuration profile data, real-time data and history data
- Two platforms can exchange data through this interface
- Common data exchange functions definitions and service flowcharts will be stated in this document

**Data Model Scope**

![Data Model Diagram]
Part2 : Common Data Exchange

• Section 1 Scope
• Section 2 Normative Reference
• Section 3 Terminology and Conventions
• Section 4 Common data model
  Profile Data: ChargeOperatorInfo/StationInfo/EquipmentInfo/ConnectorInfo
  Real time Working Data: ConnectorStatusInfo/StationStatusInfo
  History configuration Data: ConnectorStatsInfo / StationStatsInfo

• Section 5 data exchange flowchart of the Icomm interfaces
  Publish and Update Profile data
  Report Profile Data
  Collect History configuration Data
  Update Real time Working Data

• Section 6 Interface function definitions of the Icomm interfaces
  GET: get_operator_info /query_station_infos/ query_station_stats
  Notification: notification_station_status

QR Code is defined as one charging service credential in annex
Part 2: Common Data Exchange

- **GET: Request and Response**

  - **Client Request**
  - **Server Response**
  - Loop
  - Request for station list
  - Response stationlist
  - Query all stations (by timestamp)
  - Support for Page
  - Sleep (short term)
  - Request for station list (by timestamp)
  - Response stationlist
  - Sleep (short term)

- **Notification**

  - **Client**
  - **Server**
  - **EVI**
  - Notification for status
  - Notification for status
  - Status change
  - Reply for status changing
  - Push mode
QR Code Rules

- **Pattern**
  - Operator ID: 15 characters Filled by “0”
  - EVI ID: 23 characters Filled by “0”
  - Connector ID: 2 characters Filled by “0”
  - add-ons: add-ons message by operator

- QR Code should be generated by rules above.
- QR Code include information for EVI identification
- Refer to URI (Uniform Resource Identifier) standard, a resource identify can be searched and accessed through network.
- add-ons message can include encrypted information due to operators

```
hlht:// Connector ID . EVI ID . Operator ID / add-ons
```
This document defines Iserv Interface

Business data model include transaction data, control data and settlement data

Business data can be exchanged between two platforms through this interface

Business data exchange functions definitions and service flowcharts are stated in this document
Part 3: Business Data Exchange

There are 6 sections contained herein in Part 3

• Section 1 Scope
• Section 2 Normative Reference
• Section 3 Terminology and Conventions
• Section 4 Business data model
  - **authority data**: User ID /EVSE ID/Operator ID
  - **transaction data**: Start Time /End Time / duration/ charging electricity amount
  - **control data**: Start charging /Stop charging
  - **settlement data**: service ID / Add up

• Section 5 data exchange flowchart of the Iserv interfaces
• Section 6 Interface function definitions of the Icomm interfaces
  - **Request/Response**: authority_user_Info
    - authority_EVSE_Info
    - Start_charging
    - Stop_charging, etc.
  - **Notification**: transaction_notify, etc.
Exchange Data for roaming charging service:

a) **System authorization**: to get system authority before exchange
b) **User authorization**: to get user authority before providing service
c) **EVSE authorization**: to get EVSE access authority before exchange service
d) **Charging service rules**: to get service rules for different operator
e) **Charging service control**: to exchange control data between different operator platform for roaming service
f) **Accounting**: to exchange service transaction data between different operator platform for roaming service
g) **Settlement**: to interchange *settlement* data between different operator platform for roaming service
Part 4: Data Transfer and Security

- Data Transfer Object will be detailed in this document
- Data Transfer pattern will be stated in this document
  - Interface pattern
  - Transfer format and definitions
- Security pattern will be stated in this document
  - Network Security
  - Web Security
  - Encryption key
  - Digital Signature
Part 4: Data Transfer and Security

• Section 1 Scope
• Section 2 Normative Reference
• Section 3 Data Transfer Conventions
  ✓ Data Transfer Object
  ✓ Data Transfer Pattern
  ✓ Data Transfer methods
• Section 4 Security Conventions
  ✓ security common rules
  ✓ encryption rules and result
  ✓ digital signature conventions and exchange
Part 4: Data Transfer and Security

- **Data transfer protocol**: URL + Jason
  - http(s): //[domain name]/evcs/v[version number]/[type]_[operate]
  - **domain name**: stand for one operator service
  - **Version number**: for protocol version, upgrading
  - **Type**: data type: directory, operation
  - **Operation**: interface function, query, modify, etc.
  - Each URL work as one function, supporting one service

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<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
<th>Examples</th>
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<td>Timestamp</td>
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Schedule

- May of 2016, Complete the draft for four documents
- May to July, opening suggestion and feedback
- End of August, Complete modification and perfection
- End of 2016, will be released and tested by group members
- Beginning of 2017, will be released as Industrial standards

- At end of 2017, will be released as Nation Standards
谢谢！

Thanks