



The 27th INTERNATIONAL
ELECTRIC VEHICLE
SYMPOSIUM & EXHIBITION

BARCELONA
17th-20th November 2013

19. November 2013
Session 5C: Standardization

GLOBAL SERVICE PROVIDER FOR ELECTRIC VEHICLE ROAMING

Jure RATEJ
ETREL, Ljubljana, Slovenia



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Global Service Provider for
Electric Vehicle Roaming
DEFINITION OF ROAMING

What is roaming?

- the term originates from wireless telecommunications
- extension of connectivity service in a location that is different from the home location where the service was registered. Roaming enables to
- access services when travelling outside the geographical coverage area of the home network by means of using a visited network

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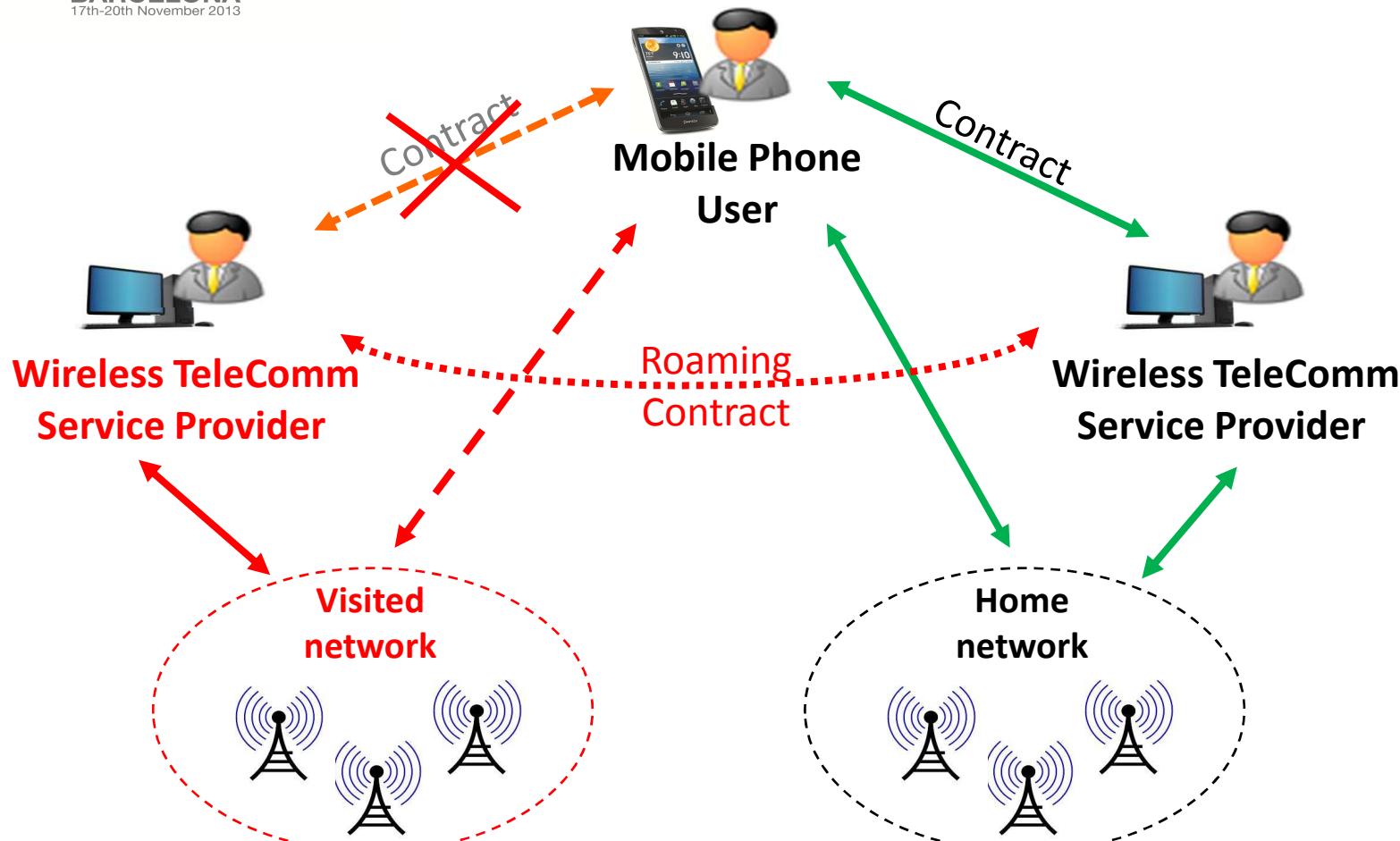
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Global Service Provider for EV Roaming ROAMING IN TELECOMMUNICATIONS



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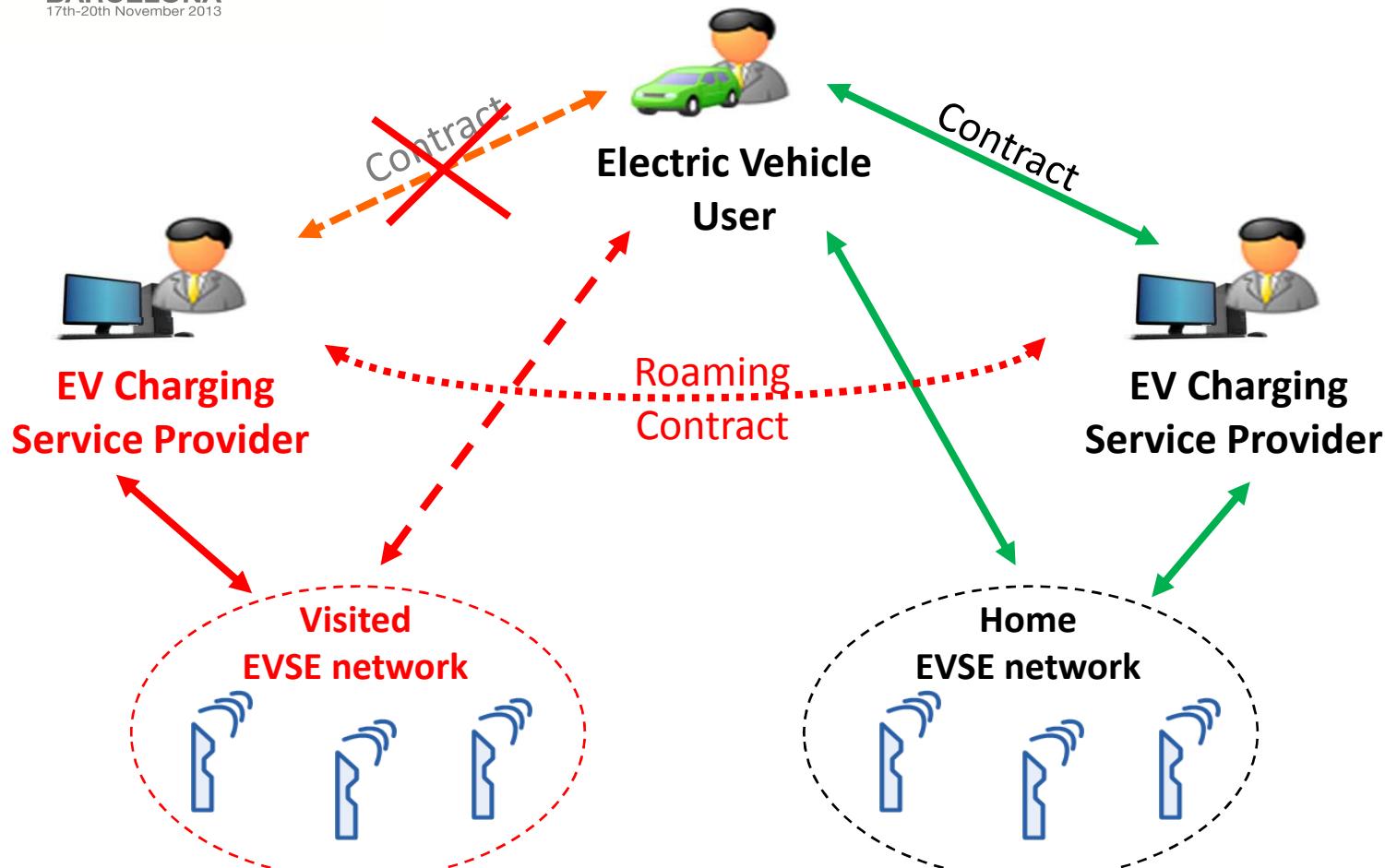
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Global Service Provider for EV Roaming ROAMING IN ELECTRIC VEHICLE CHARGING



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Global Service Provider for EV Roaming WHY ROAMING IN ELECTRIC MOBILITY?

- **Sufficient coverage with charging infrastructure operated by a single Charging Service Provider (CSP):**
 - not to be expected in large geographic areas
 - business approach of different CSPs
 - competition shall be enabled
- **Number of EVs and intensity of their use will increase**
- **Range of EVs will increase**

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- **EV User:** charges the EV at Electric Vehicle Supply Equipment (EVSE)
- **Charging Service Provider (CSP):** operates the “home” network of Electric Vehicle Supply Equipment (EVSE) and makes contracts with EV Users

Electric Mobility Service Provider (EMSP): makes contracts with EV Users and EVSE Operator(s)

EVSE Operator: operates the EVSE and makes contracts with EMSPs to enable their EV Users to charge the EVs at its EVSE

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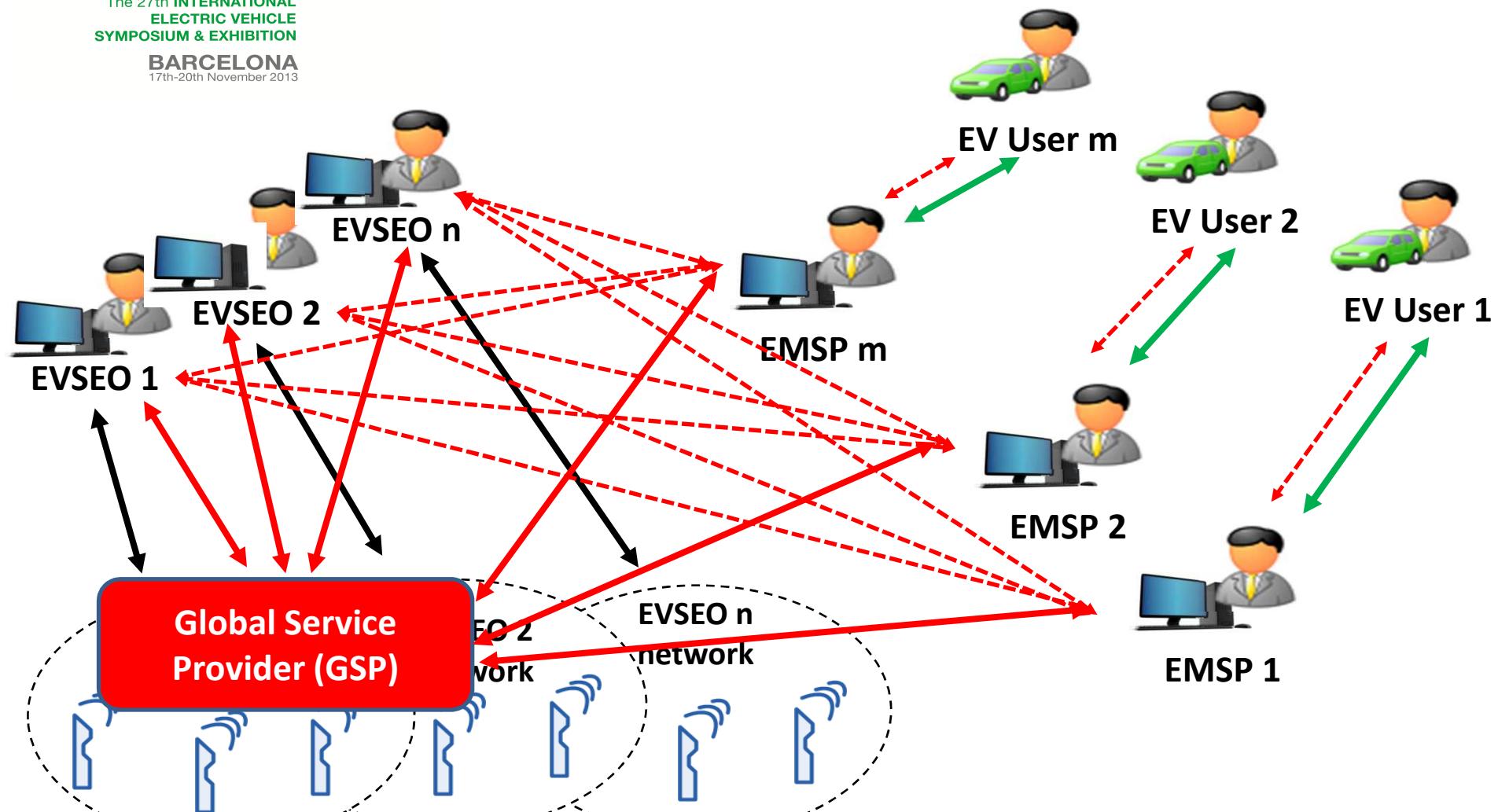
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Global Service Provider for EV Roaming MULTIPLE EVSEOs AND EMSPs



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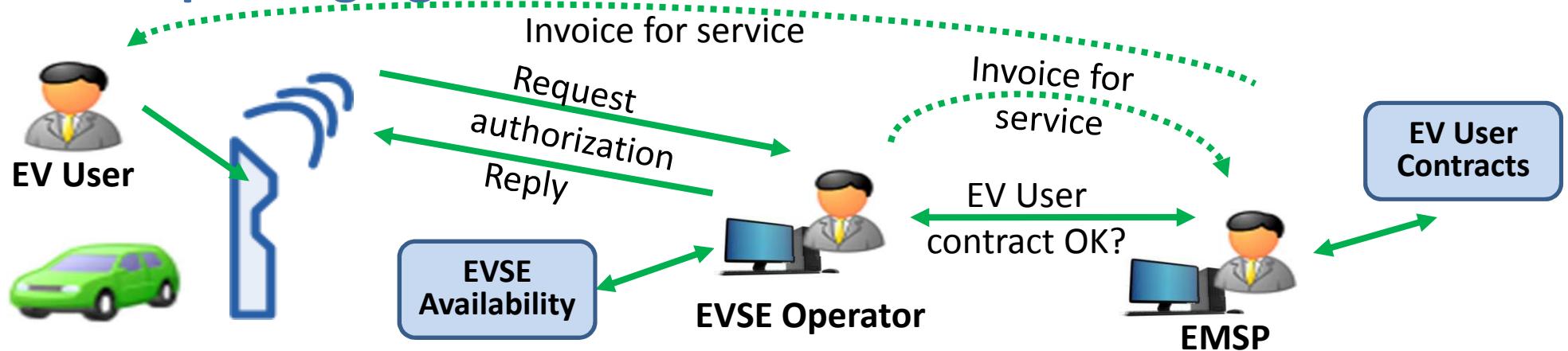


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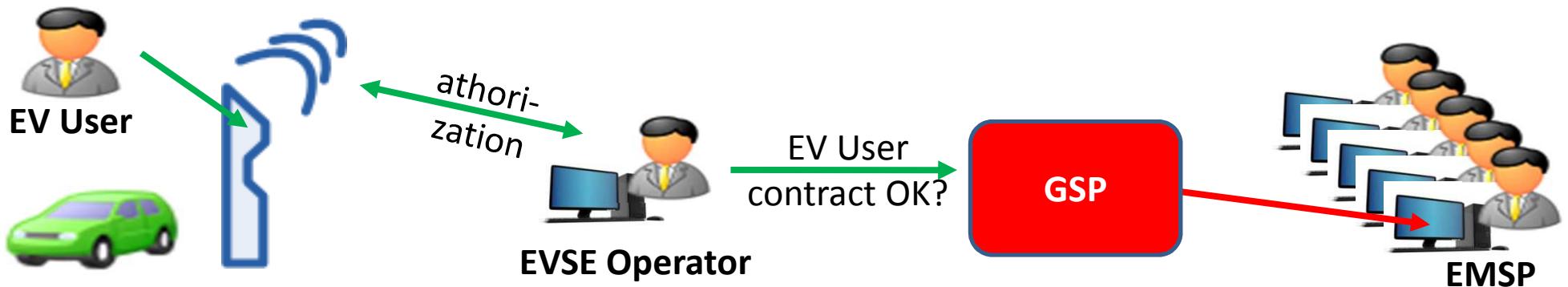


European
Commission

- EV User's identification at EVSE
- Request for charging authorization: charging allowed?
 - Verification of EVSE availability
 - Verification of EV User's contract (on the “white list”?)
- Reply to EVSE: start / deny charging
- Stop charging → send invoice for service to EMSP



- Verification of EV User's contract: who is the EV user?
 - The EV User and the EVSE Operator do not have a contract ! The EV User has a contract with EMSP
- Who is the EV User's EMSP?
 - The EVSEOs and the EMSPs do not have a direct contract ! They exercise the roaming services through the GSP



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- For identification of EV user several methods can be applied:

Method applied	EV User's identifier
RFID, NFC, communication EV-EVSE	EV User's ID determined by the EMSP
SMS, SmartPhone Apps	EV User's phone number
Credit, debit cards	Card's number
Pay-As-You-Go (on the spot payment)	No identification needed

- Only the first method enables the direct extraction of EMSP's identity from the EV User's identifier
- Other methods require introduction of “translation table” at the GSP to connect the EV Users' identifiers with their EMSPs

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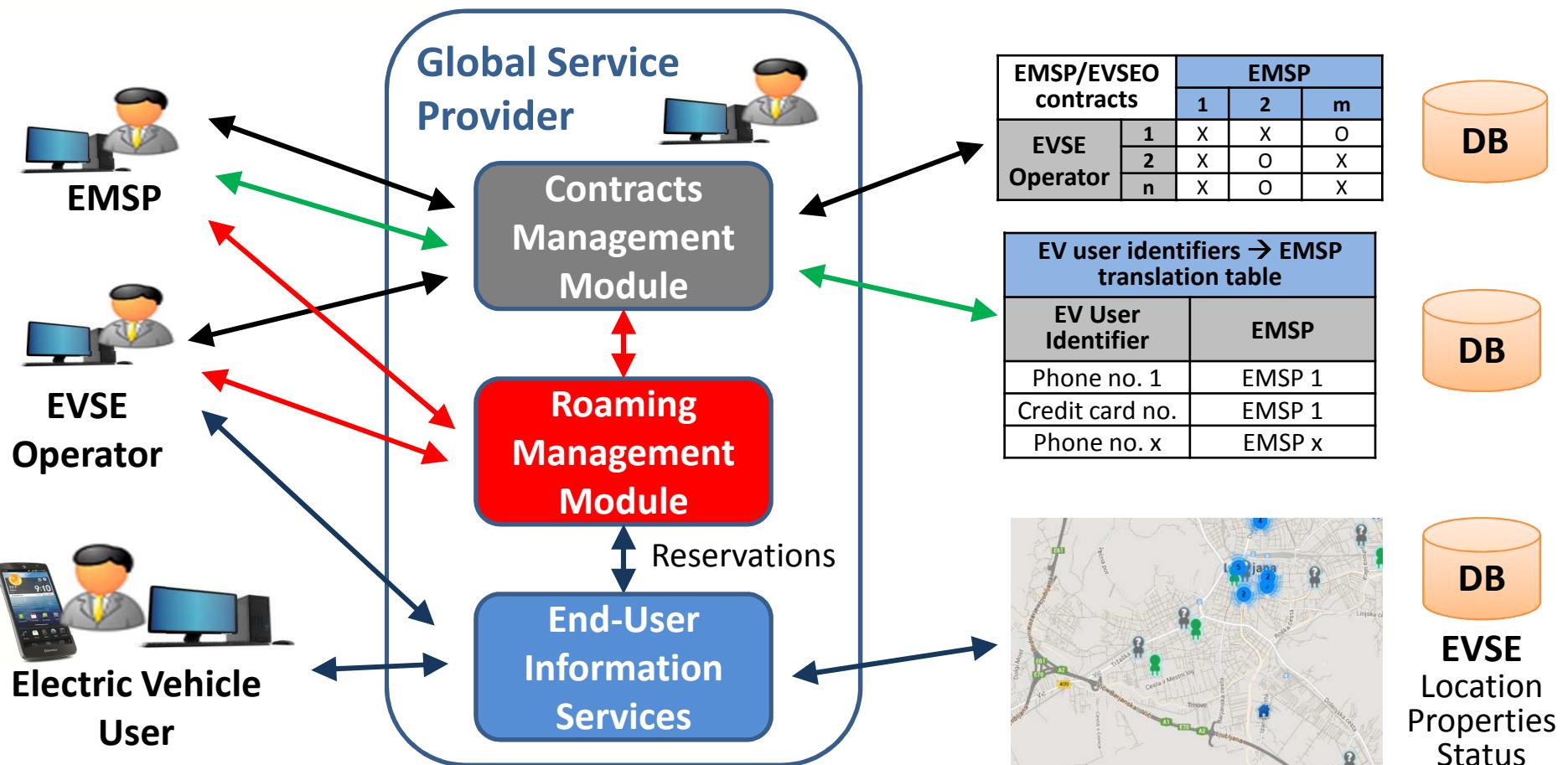


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Global Service Provider for EV Roaming STRUCTURE OF GSP's ICT SYSTEM

SW developed within the ICT4EVEU project



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- **Implementation of hierarchical structure of GSP:**
 - A single GSP covers the actors (and EV User's) on a certain geographical area (region)
 - Higher level GSPs (national, international) may be introduced to connect different GSPs and enable roaming in wider area
- **Financial clearing:**
 - In the presented solution the billing procedures between the EVSEOs and EMSPs are executed on a bilateral level (not via the GSP)
 - In the future, the GSP may assume also a function of financial clearing and settlement
 - Upgrade of GSP's legal status needed (permission to execute financial activities)
 - Implementation of rigid security and safety standards in communication

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- **EV User's identifiers:**

- The use of commonly agreed identification methods and structure of EV User's IDs would facilitate the interoperability between the different GSPs (regional, national, international)
- The EV User's ID should be “world wide unique”
- The EV User's ID should contain a unique EMSP code
- With implementation of such IDs the EV Users – EMSPs translation tables are not needed (and also a storage of large amount of data on EV Users at different GSP levels)

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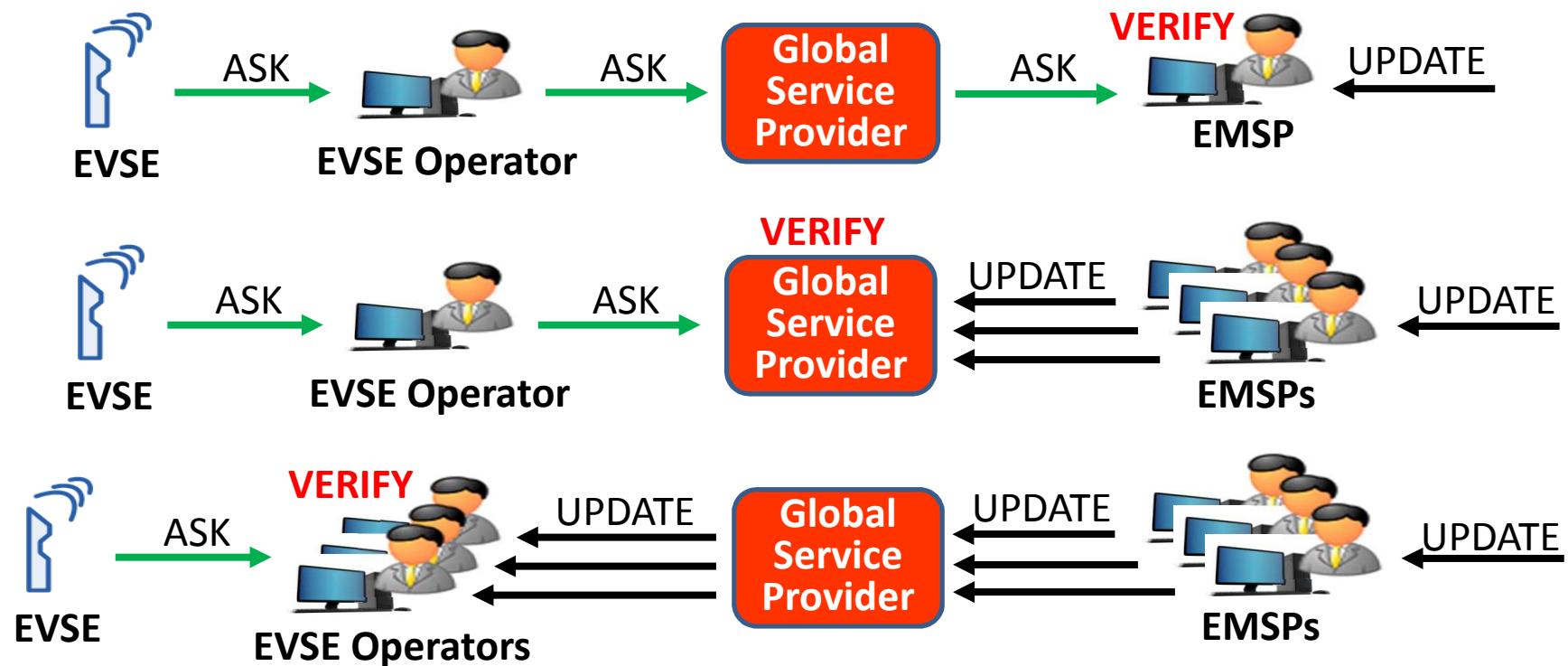
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- Verification of EV User's contract validity: where to store (and verify) the “contract status” data?



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