2EC801
MAJOR PROJECT REVIEW 1

Testing & Verification of Open Charge Point Protocol (O.C.P.P.) Modules

SUBMITTED TO

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OUTLINE

- Introduction
- Literature Survey on OCPP
- OCPP Architecture
- OCPP Modules
- OCPP Message Format
- Tools used for OCPP
- Conclusion
- References

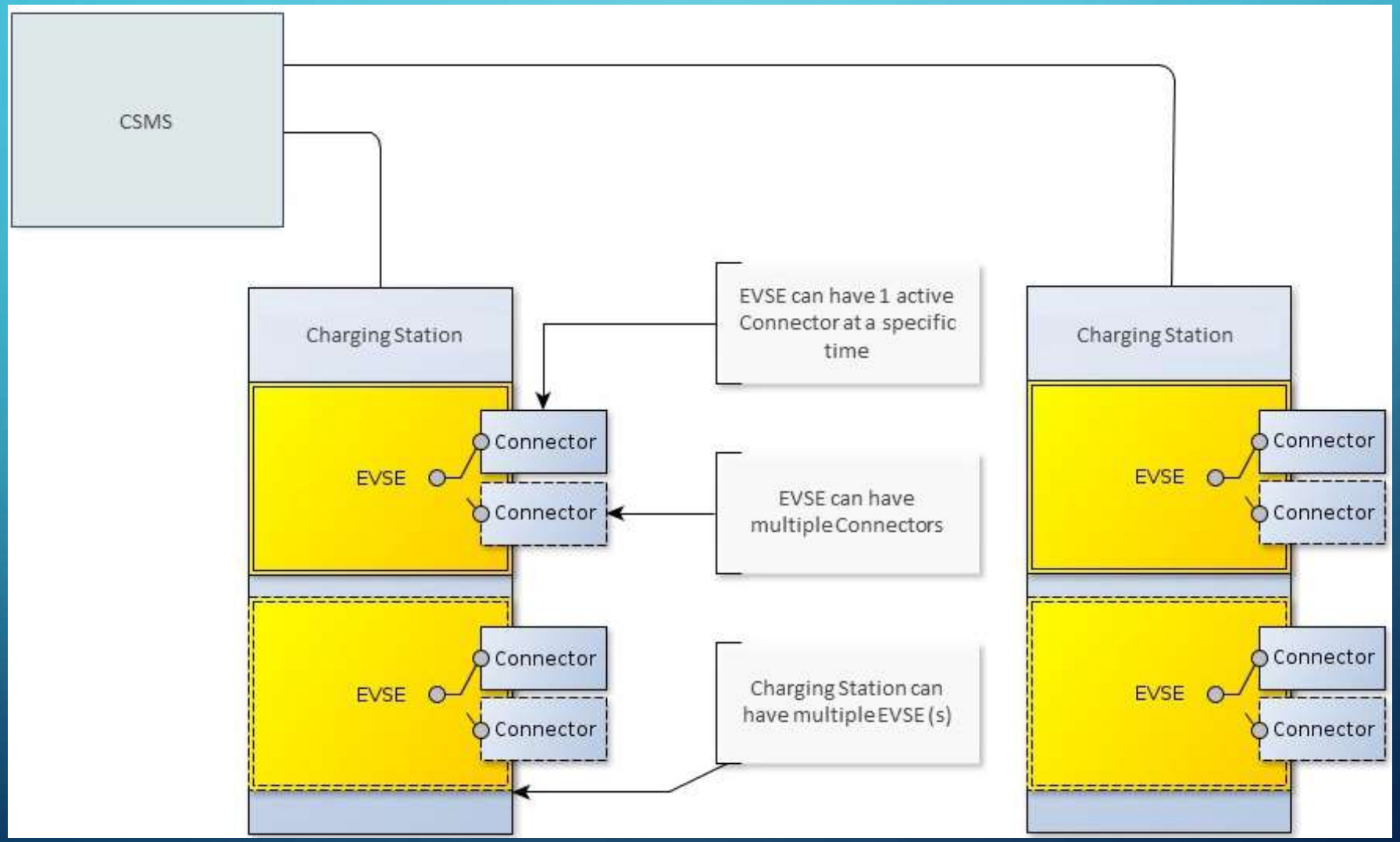
INTRODUCTION TO OCPP

- Open Charge Point Protocol
- Offers communication between charging station, charging station management system and electric vehicle (EV).
- Open standard where any EV can be charged at any charging station.
- Provides functionalities and features like smart charging, ISO-15118 certification, reservation, authorization, security, etc.
- Real-time communication

LITERATURE SURVEY ON OCPP

- Electric Vehicles are becoming a new mode for transportation, and it has only been possible with a good availability of charging station. Challenge that faced currently is the proprietorship of charging station network.
- To remedy this challenge of proprietorship, in 2009, ElaadNL, an organization of Dutch DSOs (Distribution System Operator) started an open standard communication protocol known as Open Charge Point Protocol (OCPP).
- Proprietary protocols have individual and distinct communication interfaces where flexibility and scalability issues were affecting the EV market growth.
- Unlike these proprietary protocols, OCPP lets EV to charge at any charging station.
- This enhanced growth of EV market to next level enabling vendors to apply openly.

OCPP ARCHITECTURE



OCPP 1.6 FEATURE PROFILES

- Core
- Firmware Management
- Local Auth List Management
- Reservation
- Smart Charging
- Remote Trigger

CORE PROFILE

- Authorize
- Boot Notification
- Clear Cache
- Change Availability
- Change Configuration
- Data Transfer
- Get Configuration
- Heartbeat
- Meter Values
- Remote Start Transaction
- Remote Stop Transaction
- Reset
- Start Transaction
- Stop Transaction
- Unlock Connector

FIRMWARE MANAGEMENT

- Get Diagnostics
- Diagnostics Status Notification
- Firmware Status Notification
- Update Firmware

Local Auth List Management

- Get Local List
- Send Local List

Reservation

- Reserve Now
- Cancel Reservation

Remote Trigger

- Trigger Message

SMART CHARGING

- Set Charging Profile
- Clear Charging Profile
- Get Composite Schedule

OCPP MESSAGE FORMAT

REQUEST

```
[
    "<MessageTypeID>",
    "<MessageID>",
    "<Action>",
    {"<Payload>":"Payload"}
]
```

RESPONSE

```
[
    "<MessageTypeID>",
    "<MessageID>",
    {"<Payload>":"Payload"}
]
```

SAMPLE MESSAGE FOR BOOT NOTIFICATION

REQUEST

```
[2,
 "19223201",
 "BootNotification",
 {"chargePointVendor": "VendorX", "chargePointModel": "SingleSocketCharger"}
]
```

RESPONSE

```
[3,
 "19223201",
 {"status":"Accepted", "currentTime":"2013-02-01T20:53:32.486Z", "heartbeatInterval":300}
]
```

TOOLS USED FOR OCPP

- Languages : C++ for developing and testing of client. JSON for configuration files and message formats.
- OS platform : Linux for developing testing and verification of OCPP client-side.
- Libraries : libocpp by EVrest, websocketpp, nlohmann for JSON parsing

CONCLUSION

- Learned about Open Charge Point Protocol
- Learned about working of OCPP and its implementation over web-sockets
- Learned about web-sockets and virtual machines
- OCPP solves issues of proprietorship charging station networks by providing compatibility of charging over any charging stations.
- OCPP increased scalability and flexibility of charging stations.

REFRENCES

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