ETREL OCEAN

OCEAN CHARGING POINTS SIMULATOR GUIDE

Installation and configuration instructions

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2 | REVISION HISTORY

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Tracking documentation status (Incomplete or Draft status may be skipped by the author):

Incomplete - The document has the basic structure in place, but the authors have not yet written all the content. There may be some empty sections. Some content may be little more than notes from authors to themselves about what to write.

Draft - The authors have written all the content, but they still intend to clean up the language or markup. Reviews from developers for technical correctness are useful at this point.

Outdated - The document was once complete or nearly complete, but needs to be updated.

Under review - The authors consider the document complete. Editors should review the document at this point.

Final - A senior member of the documentation team has reviewed the document and approved it.

3 | OCEAN CHARGING POINT SIMULATORS

Ocean EV charging management solution offers a functionality that enables a simulation of real charging point devices.

This feature allows Ocean users/operators to perform various types of testing and demos to customers.

GOAL
Learn how to create and control charging point simulators

AUDIENCE
Ocean Intermediate and Advanced users

TIME
25 min read

4 | TERMS OF USE

Ocean charging point simulators can be used by Ocean partners on production environment or staging environment taking into account the following terms of use for each specific system environment:

PRODUCTION ENVIRONMENT

Ocean partner using Ocean production environment can connect and use any desired volume of simulators. Please do take into account that each connected simulator is also billed according to standard agreed EVSE pricing between Etrel & partner.

STAGING ENVIRONMENT

Ocean partner that is sourcing Ocean Staging environment from Etrel can connect and use up to 10 simulators within their existing Staging license package.

5 | INSTRUCTIONS FOR CREATING CHARGING POINT SIMULATORS

1. In Operator portal Assets module create a location.

2. Assign a charging point with one connector to that location. Configure such charging point as follows:
   a. *Friendly code* – created automatically upon creating the location and adding charging point to it
   b. *Charge point model* – always choose **Ocean charger OCPP 1.6J simulator (Etrel d.o.o.)**
   c. *Serial number* – put in the location's and charging station's friendly code with a prefix **SIMULATOR**. For example: SIMULATOR-00100107- 01
   d. *External code* – put in your desired flavour of the simulator. You can find codes and descriptions of all available flavours here. For standard charging you can choose STANDARD_CHARGING.
   e. *Station owner* – for successful adding of charging station it is necessary to select a station owner
   f. *Communication type* – choose Ethernet LAN
   g. *Communication provider contract* – here you can fill in the desired charging settings. This is an optional field. If you put in your own settings, they will overwrite the default ones. You can find the possible settings here.
   h. *Protocol charge point identity* – fill in the same information as for the serial number
   i. *EVSE and connector level* – set your desired configuration of EVSE (AC/DC) and type of connectors. Be sure to check the "Remote start enabled" box as simulators can only be started through remote start command (this means starting your charging session through web or native app)
   j. *Payment required checkbox* – if you want to simulate payments for the simulated sessions you should also check the payment required checkbox

Figure 1: Important data to be inserted for the set up of charging station simulator

Figure 2: Important data to be inserted for the set up of charging station simulator

Figure 3: Important data to be inserted for the set up of charging station simulator

3. Save the changes – as soon as changes are saved, the simulator will automatically be connected. If editing the charge point information and saving the changes the simulator will automatically apply new settings. Keep in mind that changes made during the charging session will force simulator to restart (and lose charging session).

4. In Ocean Operator portal, Infrastructure - Charge point dashboard screen, you can check this simulator CP if it is communicating properly.
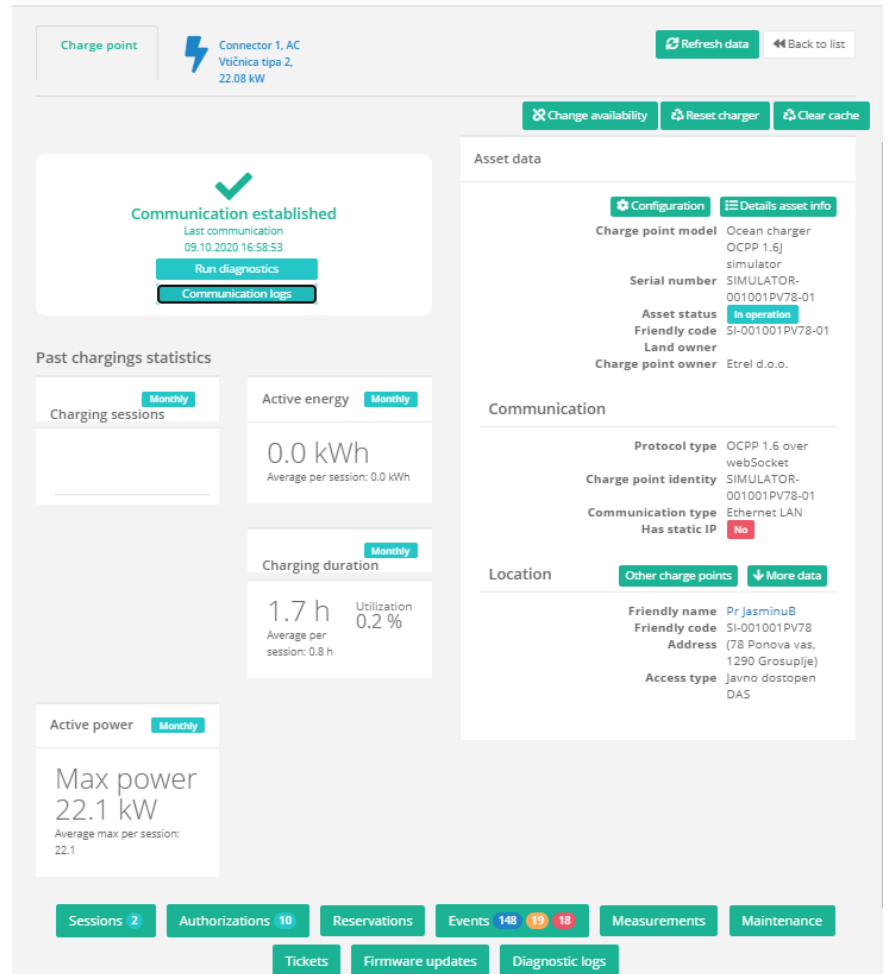
Figure 4: Check if the communication is successfully established by pressing on "Run diagnostics" button

5. If there is a need to reset the simulator (for example in the case of PeriodicLocalCharging flavour), "*Reset charger*" functionality returns simulator into its initial state. In the case of simulators. there is no difference between hard and soft reset.
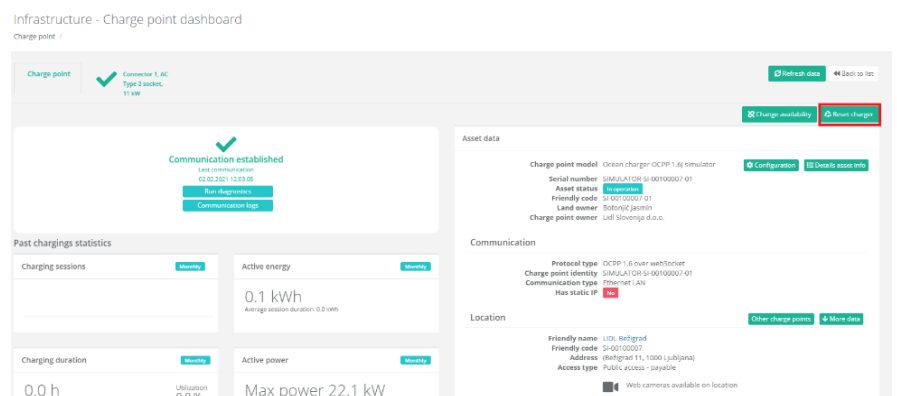
Figure 5: "Reset charger" functionality

6. At this point you can use this simulator Charging Point as any other. Login to Drivers Web app, locate the simulator charging point and start a charging session. Alternatively, you can start the session remotely as an operator through Ocean back-end.
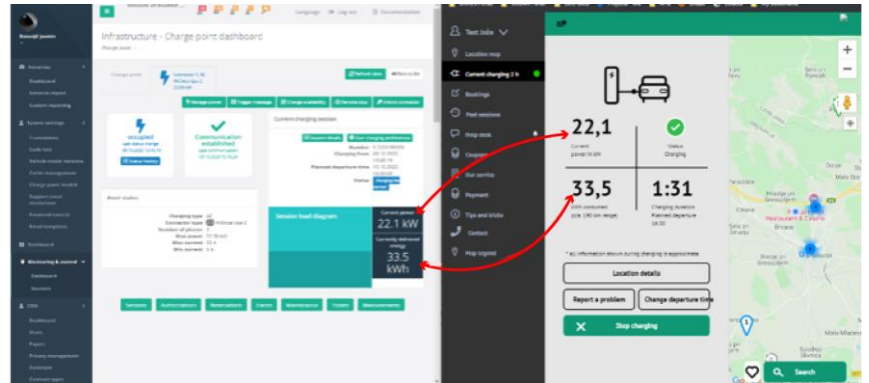
Figure 6: Charging data can also be seen in the Ocean back-end in operator view

Be aware that some limitations exist when using simulators:
1. Max one connector (on each charge point) could be remote started and charging station at a time
2. Change configuration accepts requests but does not do anything
3. Max one charging profile can be active at any given time on a specific simulator. If a new charging profile is set it will override the previous charging profile.

6 | OCEAN CHARGING POINT SIMULATOR MODES/FLAVOURS

In **Charge point general data** screen, the value of *External code* field defines the mode or flavour of your CP simulator. Below you can find the list of simulator flavours that are available.

STANDARD_CHARGING

Flavour description: Simulator's status is set to preparing (blue pin in the web app). User can start a charging session remotely through the web app. By default, EV's battery initial state of charge (SOC) is 10%. When SOC of 80% is reached, the current is decreased. Charging session is stopped when user decides to remotely stop the charging session through the web app.

Simulator's process:

1. Change status to Preparing

2. After 10s send StartTransaction message and start charging according to schedule (or MAX_CURRENT if no schedule are applied)

* MAX_CURRENT is calculated as min(evseMaxOut, maxEVCurrent)

3. Charge until you get RemoteStop (if battery is over 80% decrease current by 10% every meterValue and if battery is full go to pausedByEV)

AlwaysAvailable

Flavour description: Simulator's status is set to always-available (green pin in the web app). User cannot remotely start the charging session as the RemoteStart command is rejected by the simulator.

Simulator's process:

1. Connectors are initialized with available status.

2. RemoteStart is rejected. Status is always-available.

AlwaysInFault

Flavour description: Simulator's status is set to in-fault (red pin in web app) User cannot remotely start the charging session as the RemoteStart command is rejected by the simulator.

1. Connectors are initialized with fault status.

2. RemoteStart is rejected. Status is always fault.

AlwaysReserved

Flavour description: Simulator's status is set to always-reserved (yellow pin in web app) User cannot remotely start the charging session as the RemoteStart command is rejected by the simulator.

1. Connectors are initialized with reserved status.

2. RemoteStart is rejected. Status is always reserved.

PeriodicLocalCharging

Flavour description: This flavour allows for simulation of periodic charging. Simulator starts a charging session and then stops it after 2 minutes. After another 2 minutes the process is repeated. The only way to stop this flavour is to stop the charging session through the web app while charging is active.

1. Change status to Preparing

2. After 10s send StartTransaction message and start charging according to schedule (or MAX_CURRENT if no schedule are applied)

3. After 2 minutes StopTransaction is executed, connector goes to finishing state and immediately after that it goes to available state.

4. After 2 minutes flavour is repeated from step 1.

5. If remoteStart is sent in available state, flavour is started again and immediately goes to preparing state.

6. There are two ways to stop the periodic charging and returning it into initial state:
   - remoteStop while simulator is in charging state
   - resetting the simulator

StartRemotelyAfterUserPluggedHisEV

Flavour description: This flavour simulates user's remote start through te web app, after he plugged in his EV. The flavour itself is very similar to STANDARD_CHARGING flavour. The only difference is that with this flavour, the simulator gets status available 10 seconds after the charging has finished. After another 10 seconds the simulator goes back to preparing status and charging session can be started again.

1. Connectors are initialized with preparing status.

2. Remote start is received and accepted

3. After 2s send StartTransaction message and start charging according to schedule (or MAX_CURRENT if no schedule are applied)

4. Charge until you get RemoteStop (if battery is over 80% decrease current by 10% every meterValue and if battery is full go to pausedByEV)

5. After RemoteStop first go to Available (after 10 seconds)

6. Then after additional 10 seconds go to Preparing (initial state for this flavour)

StartRemotelyAndThenPlugVehicleChargingStartsAfter1MinEVPausedAfter2min

Flavour description: This flavour simulates the situation when user first remotely starts the charging session through the web app and then plugs in his EV. It is similar to StartRemotelyAfterUserPluggedHisEV flavour with the exception that the charging is paused by EV for 1 minute during charging session.

1. Remote start is received and accepted

2. After 30s connector goes to Preparing status

3. After 30s send StartTransaction message and start charging according to schedule (or MAX_CURRENT if no schedule are applied)

4. After 2 minutes of charging, connector goes to PausedByEV/SuspendedEV status.

5. After 1 minute connector starts charging again.

6. Charge until you get RemoteStop (if battery is over 80% decrease current by 10% every meterValue and if battery is full go to pausedByEV)

StartRemotelyAndThenPlugVehicleChargingStartsAfter1MinEVSEPausedAfter2min

Flavour description: This flavour simulates the situation when user first remotely starts the charging session through the web app and then plugs in his EV. It is similar to StartRemotelyAfterUserPluggedHisEV flavour with the exception that the charging is paused by EVSE for 1 minute during charging session.

1. Remote start is received and accepted

2. After 30s connector goes to Preparing status

3. After 30s send StartTransaction message and start charging according to schedule (or MAX_CURRENT if no schedule are applied)

4. After 2 minutes of charging, connector goes to PausedByEVSE/SuspendedEVSE status.

5. After 1 minute connector starts charging again.

6. Charge until you get RemoteStop (if battery is over 80% decrease current by 10% every meterValue and if battery is full go to pausedByEV)

StartRemotelyAndThenPlugVehicleBeforeChargingStartedGoesToFaultAfter1minFaultIsReseted

Flavour description: This flavour simulates the situation where a fault occurs before the charging session has started. The fault status of the simulator is then automatically reset.

1. Remote start is received and accepted

2. After 20s connector goes to Preparing state

3. After 20s connector goes to fault state

4. After 1 minute connector goes to available state

StartRemotelyAndThenPlugVehicleChargingStartedWhenStartedGoesToFaultAfter1minFaultIsReseted

Flavour description: This flavour simulates the situation where a fault occurs after the charging session has started. The fault status of the simulator is then automatically reset.

1. Remote start is received and accepted

2. After 20s connector goes to Preparing state

3. After 20s send StartTransaction message and start charging according to schedule (or MAX_CURRENT if no schedule are applied)

4. After 1 minute connector goes to faulted state

5. After 1 minute connector goes to available state

F1

Flavour description: This flavour simulates a situation where all charging schedules are delayed.

1. Change status to Preparing

2. After 10s send StartTransaction message and start charging according to schedule (or MAX_CURRENT if no schedule are applied)

3. All charging schedules are delayed for 5 seconds - first meterValue is not correct (it includes old current)

3. Charge until battery capacity 50kWh is reached (will not gradually decrease current when reaching full battery). Apply set profiles if any.

4. When battery is full go to pausedByEV status and stay there until remoteStop is received

F2

Flavour description: This flavour simulates the situation when fault occurs during charging session. After 5 minutes the simulator's status is reset to available.

1. Change status to preparing

2. After 10s send StartTransaction message and start charging according to schedule (or MAX_CURRENT if no schedule are applied)

3. After 1 min of charging go to fault state (accept charging profiles if any)

4. After 5 min change status to available

F3

Flavour description: This flavour simualtes the situation where EV pauses charging during the charging session. This flavour also does not gradually decrease the current when reaching SOC of 80%. After the battery is full EV pauses charging. The session stays paused untill the user stops the session through the web app.

1. Change status to preparing

2. After 10s send StartTransaction message and start charging according to schedule (or MAX_CURRENT if no schedule are applied)

3. After 5 min vehicle pauses and does not charge for 5 min

4. After 5 min vehicle start charging again according to schedule (or MAX_CURRENT if no schedule are applied)

5. Charge until battery capacity 50kWh is reached (will not gradually decrease current when reaching full battery). Apply set profiles if any.

6. When battery is full go to pausedByEV status and stay there until remoteStop is received

F4

Flavour description: This flavour simulates gradual current decrease when baterry SOC reaches 80%. When the minimum specified current is reached, the charging is paused by EV. It stays paused until the user remotely stops it through the web app.

1. Change status to preparing

2. After 10s send StartTransaction message and start charging according to schedule (or MAX_CURRENT if no schedule are applied)

3. After 10 min of charging current starts to decrease by 10% every meterValue

4. When it reaches minEVCurrent, go to pausedByEV

5. Stay there until remoteStop is received

F5

Flavour description: This flavour simulates charging with max power. If there are any pre-set charging profiles, the simulator rejects them. Charging continues until the user stops session through the web app.

1. Change status to Preparing

2. After 10s send StartTransaction message and start charging with MAX_CURRENT

3. ChargePoint does not accept charging profiles - it rejects them.

4. Charge until you get RemoteStop (if battery is over 80% decrease current by 10% every meterValue and if battery is full go to pausedByEV)

F6

Flavour description: This flavour simulates charging with max power. If there are any pre-set charging profiles, the simulator accepts them but does not apply them as it is always charging with max current. Charging continues until the user stops session through the web app.

1. Change status to Preparing

2. After 10s send StartTransaction message and start charging with MAX_CURRENT

3. ChargePoint accepts charging profiles but it does not apply them - it always charges with evseMaxCurrent

4. Charge until you get RemoteStop (if battery is over 80% decrease current by 10% every meterValue and if battery is full go to pausedByEV)

7 | COMMUNICATION PROVIDER CONTRACT SETTINGS

In field *Communication provider contract* the following setting values are supported:

1. **sampleDataInterval**: in seconds, default 60s. Interval between 2 meter values
2. **batteryInitialSOC**: in percent, default 10%. Battery capacity is always 50kWh, this determines how quickly battery will be full
3. **minEVCurrent**: in ampere. Level under which pausedByEV will be triggered. Has precedence over MinEVPowerInW.
4. **maxEVCurrent**: in ampere. Has precedence over MaxEVPowerInW.
5. **MinEVPowerInW**: in watt, default 0. Level under which pausedByEV will be triggered.
6. **MaxEVPowerInW**: in watt, default values are 7360 for one phase AC, 22080 (230V * 32A * 3phases) for three phase AC and 50000 (400V * 125A * 1phase) for DC.