

# EVSE Communications

OCPP, Modbus and OPC-UA



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<https://evauto.us/>

# I'm Fleet biased

## Technology:

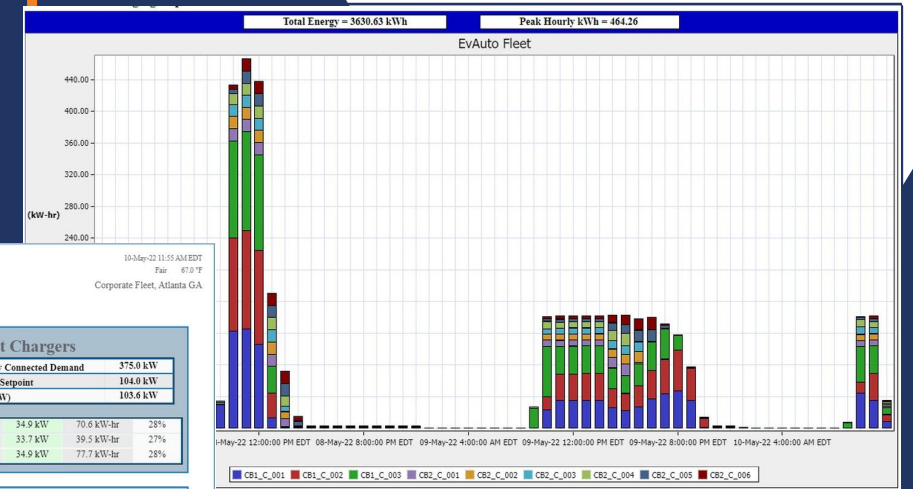
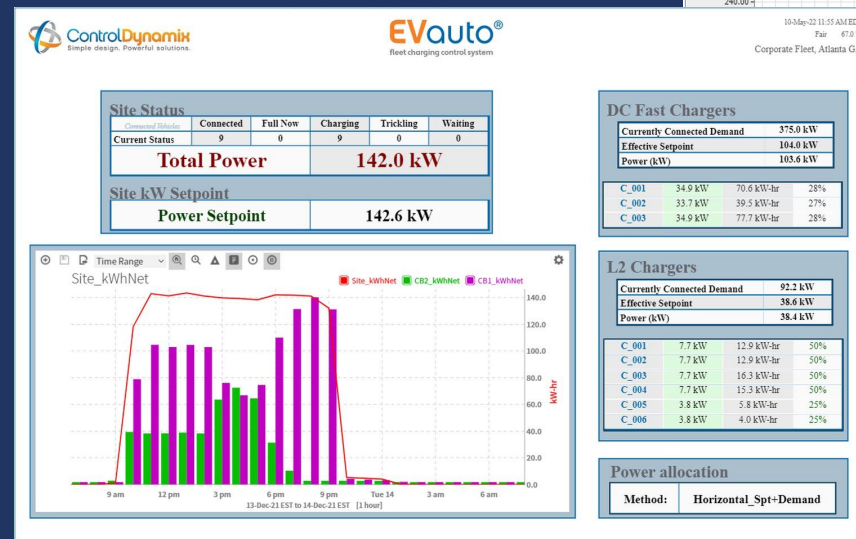
- Onsite IOT controllers
- Cloud hosted UI
- Any open charger
- Demand management algorithm
- Tridium Niagara Control Software

## Delivers:

- Onsite Reliability
- Monitoring and alerting
- Energy **cost savings**
- Interoperability

## Requires:

- Controllable Charger
- Accurate, fast metering - charger and mains
- Responsive, fast control signalling
- Connection to EMS, local generation or storage



## Security

Cloud-based, closed onsite, or blended control options



## Dependability

Keeps EVs charging when internet networks go down

## Flexibility

Supports all charger types and energy sources

# OCPP 1.6-j

## History :

- Started in 2009
- Greenlots, ESB, RWE, G2 mobility and ElaadNL - 2 techs, 2 utilities and a network provider

## Technology:

- JSON hosted by Charger
- Charger initiates connection

## Delivers:

- **Standard** communication protocol
- Comms commissioned in factory
  - Network / Authentication
- Charger status
- Electric Utility Cost Savings
- Charger flexibility

## My name is JSON

### Control:

- Authentication
- "Smart" Charging
- Set Output
- Set Default Output

### Charger Status:

- Available,
- Reserved,
- Charging,
- Suspended
- Finishing

### Firmware Update

### Meter Readings:

- Volts
- Amps
- Power (kW)
- **Session Energy (kWh)**
- SoC - DCFC

### Information:

- Charger ID
- Charger properties

### Configuration Variables

## Open Charge Point Protocol 1.6

### 3.3. General views of operation

This section is informative.

The following figures describe the general views of the operations between Charge Point and Central System for two cases:

1. a Charge Point requesting authentication of a card and sending charge transaction status,
2. Central System requesting a Charge Point to update its firmware.

<https://www.openchargealliance.org/>

See Diagram on page 25 of 130

# Gas Station Use case

## Steps:

- Waiting for vehicle  
= “Available”
- Lift handle - “Insert Credit Card”  
= “Reserved”
- Approved - “Select Grade”  
= “Charging”
- Full - “Click”  
= “SuspendedEV”  
= “Finishing”

## Fleet Control issues:

- Meter off between sessions
- Session energy usage
- Cellular isn't as reliable
  - Time delays too



# Modbus

## History :

- Modicon 1978 - **OPEN Source**
- Evolved
  - RS-232, RS-485, IP
  - Continues to grow

## Technology:

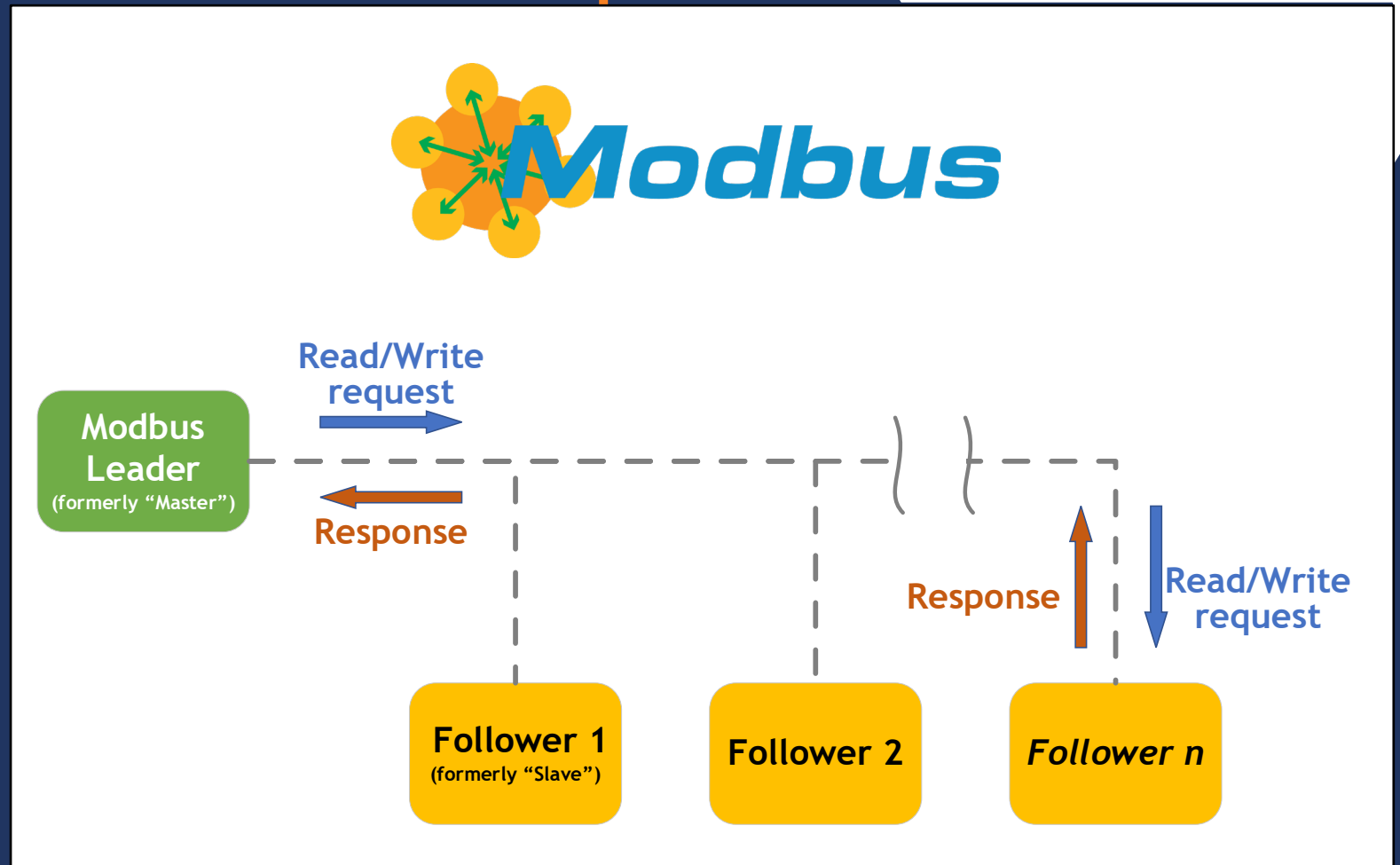
- Leader / Follower
- Controller initiates connection
- Boolean, Numeric, String

## Delivers:

- Standard communication protocol
- Charger status
- Electric Utility Cost Savings
- Charger flexibility
- Same bus can read meters, etc.
- Flexibility for EVSE manufacturer

## Issues:

- Security / Commissioning



# OPC-UA

## History :

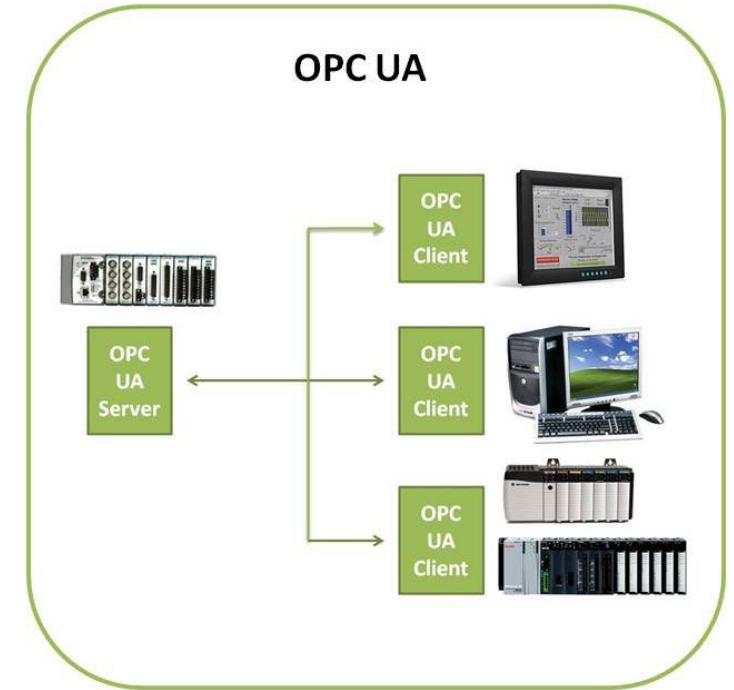
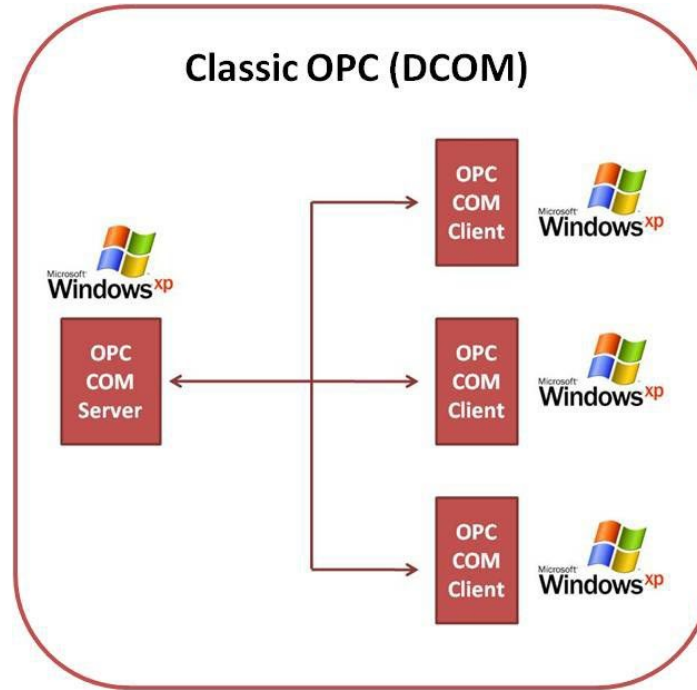
- Microsoft Office - OLE
- - **O**bject **L**inking & **E**mbedding
  - Embed excel, word, etc
- OPC - **O**LE for **P**rocess **C**ontrol
- OPC-UA

## Technology:

- Controller initiates connection
- Boolean, Numeric, String

## Delivers:

- Standard communication protocol
- **Security**
- Charger status
- Electric Utility Cost Savings
- Charger flexibility
- Flexibility for EVSE manufacturer



# Is one better?

## Public Charging: OCPP

- Any connection / phone home
- Credit Card Transaction
- Always ASAP
- Secure

## Captive Fleet (secure): Modbus RTU

- Flexible
- Reliable / Lower cost
  - Low cost cabling
  - No intermediate switching
  - No network switching
  - Flexible
- Open

## Captive Fleet (insecure): OPC-UA

- Flexible
- Reliable
- Secure







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