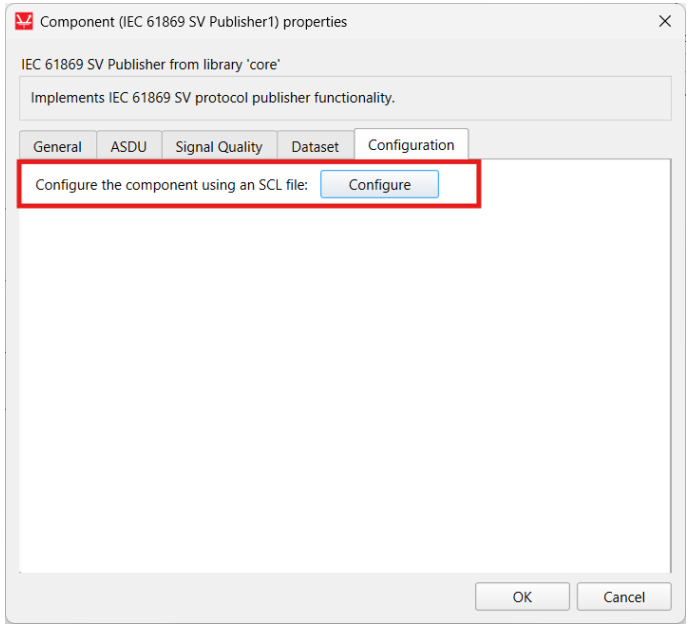
2025.3 Software Release Highlights

- ☐ **IEC 61869 Sampled Values protocol**
- ☐ **Communication interface updates**
- ☐ **Battery Cell Emulation HW support**
- ☐ **Additional features**
  - FMU Import updates
  - Code Editor autocompletion
- ☐ **TyphoonSim updates**

IEC 61869 Sampled Values protocol

New communication protocol in the Grid Modernization domain

- Standardization of IEC 61850 SV communication protocol for low power instrument transformers (LPIT)
- New communication protocol that improves digital substation testing capabilities
  - IEC 61869 SV Publisher
  - IEC 61869 SV Setup
  - IEC 61869 SV Subscriber
- Configuration of SV Publisher using standard IEC 61850 files (.icd, .ied, .scd, .scl, .cid)



IEC 61850 / 61869 SV Updates

New message monitoring options

- New ports added for monitoring of SV message fields on SV Subscribers
  - *smpCnt* - Index of the Sampled Values message
  - *smpSynch* - Defines the synchronization mechanism of the clock used for receiving the SV messages
  - *Simulate* – Flag which indicates that the SV message is sent by a test device

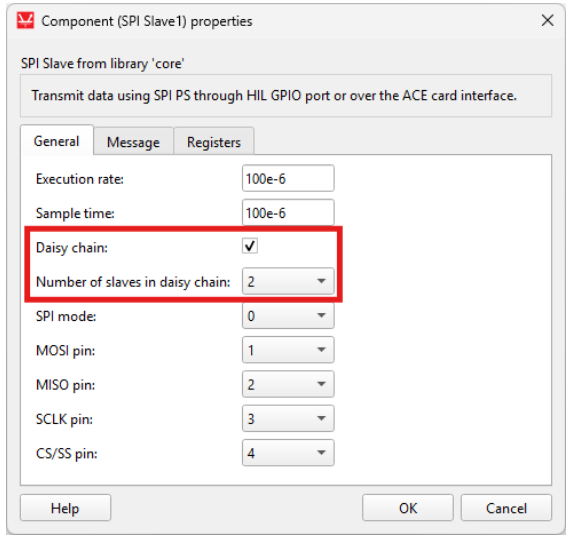
SV Subscriber

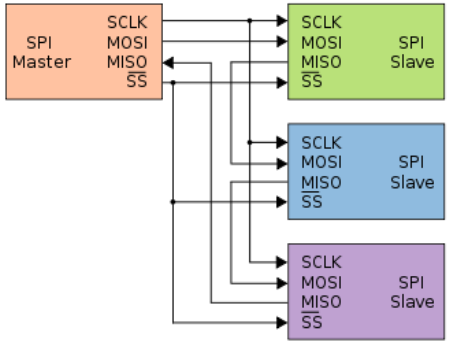
IEC 61869 SV Subscriber

Communication interface updates

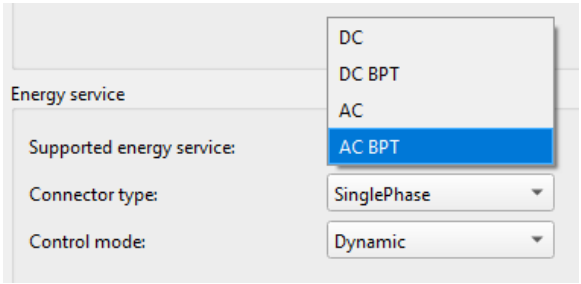
Extended functionality of various interface components

- SPI Slave - added daisy chain functionality
  - Enable SPI HIL controller to be connected in a daisy chain configuration

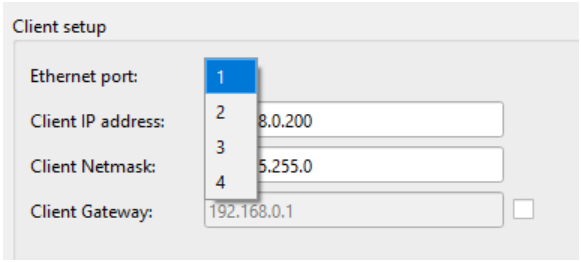




- ISO 15118-20 EVCC AC support
  - Added support for AC and AC BPT (Bidirectional Power Transfer) energy services



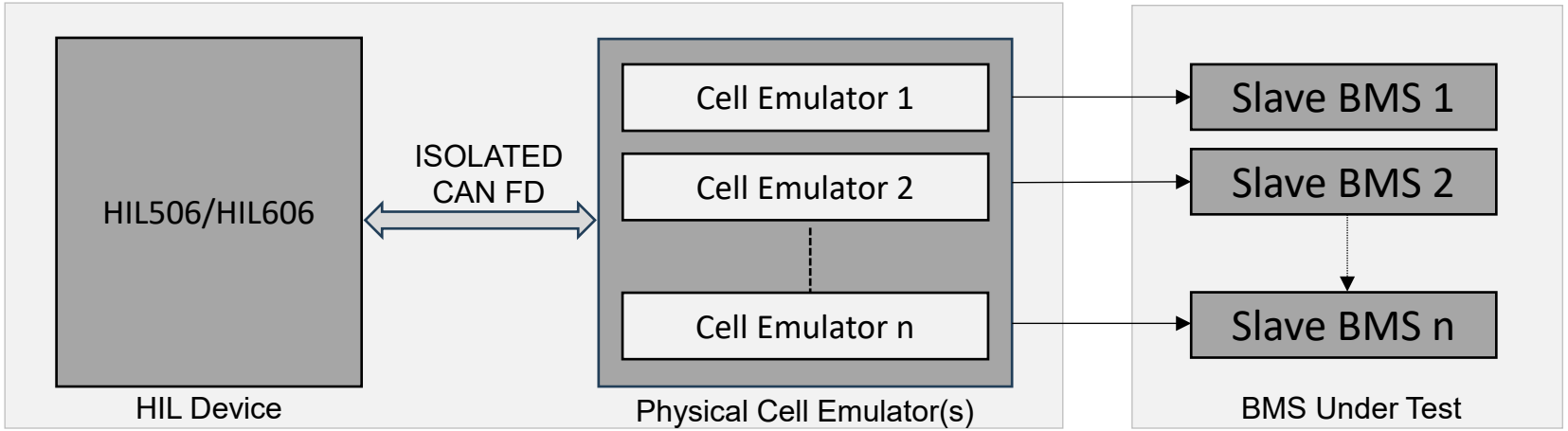
- Add ETH port selection for:
  - Modbus Client
  - ISO 15118-2 EVCC and SECC
  - ISO 15118-20 EVCC



Battery Cell Emulation HW support

Expanded software support for BMS HIL testbeds

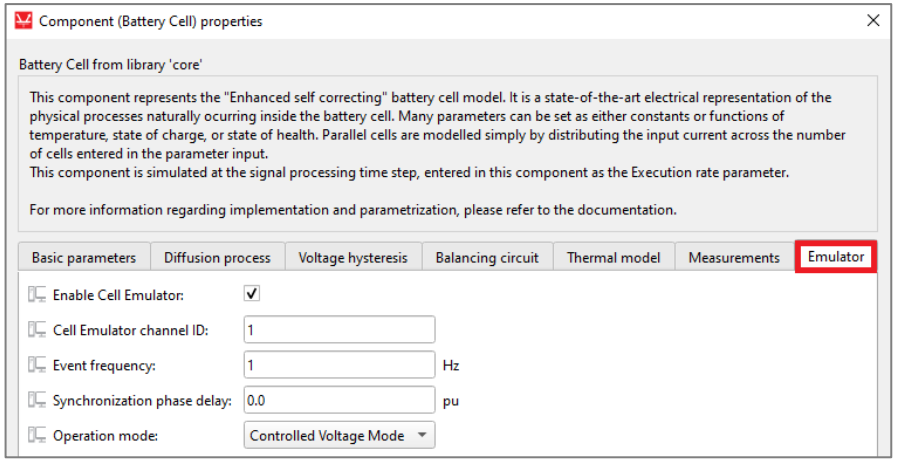
- Through battery cell emulation, the Typhoon HIL environment allows for HIL testing of Battery Management Systems
- Support for up to 256 emulated cells (systems up to 1000 V)
- Communication between the cell models and smart cell emulator channels realized through Isolated CAN FD
- Supported on HIL506 and HIL606

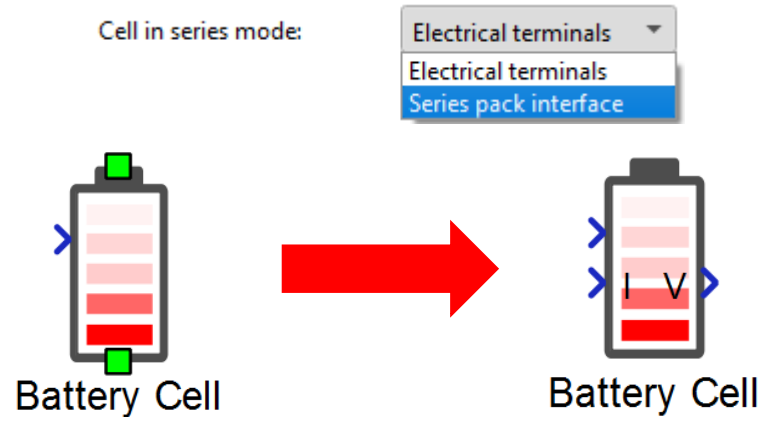


Battery Cell Emulation HW support

Battery Cell upgrades

- *Emulator* tab added for easy linking of Battery Cell components to physical Cell Emulator channels
  - Done through Cell Emulator channel IDs (CAN FD)
  - Choose between Controlled Voltage and Controlled Current mode
- Emulator measurements (voltage, current, temperature) now available in the *Measurements* tab
- Choose between an Electrical-based (Electrical) or a Signal Processing-based (Series pack) interface
  - Reduces utilization of Voltage sources in the model

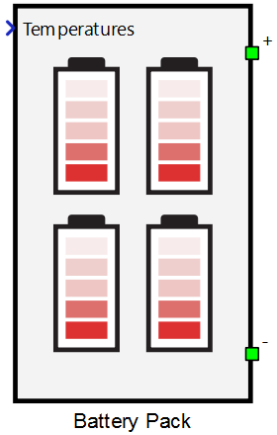


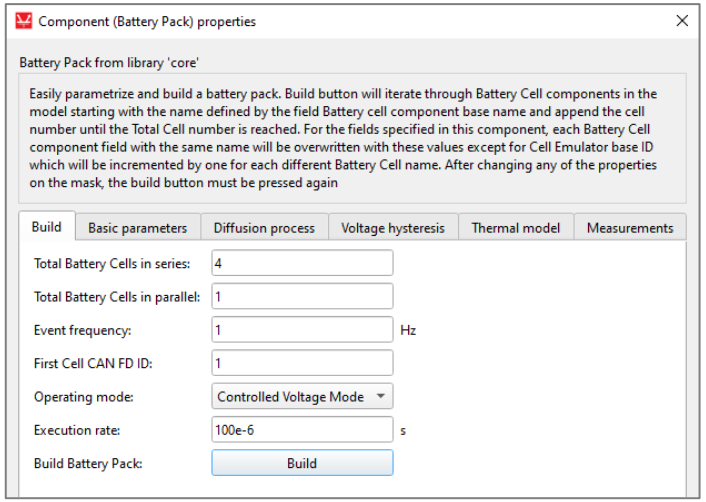


Battery Cell Emulation HW support

New Battery Pack component

- New Battery Pack component lets you easily build, parameterize, and interface with cell emulation channels
  - Specify pack configuration and generate hundreds of parametrized Battery Cells with the *Build* button
  - Parametrization kept the same as in the *Battery Cell* component, with parameters impacting all created cells
  - Interfacing with Cell Emulators done in the same manner as in the *Battery Cell* component

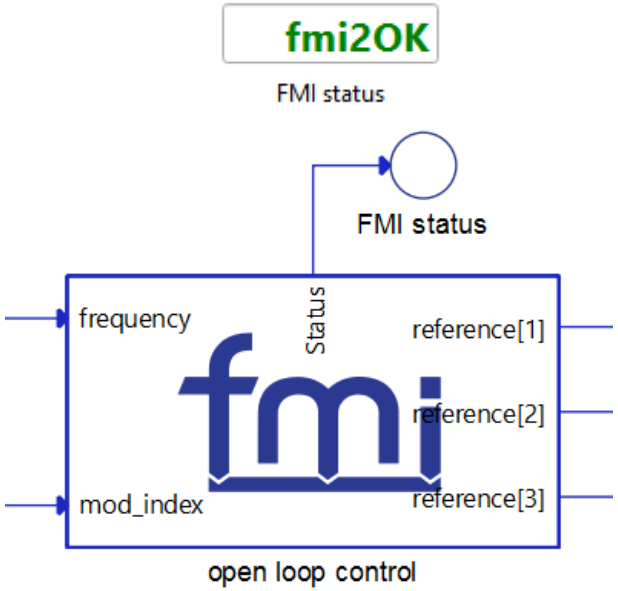


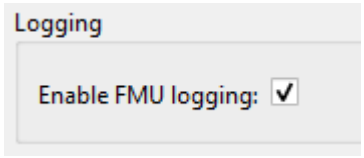


Additional features

FMU Import updates

- Status port added
  - Helps users detect potential FMU issues
  - Returns value from fmi2DoStep function
  - Status messages: Ok, Warning, Discard, Error…
- Logging option added
  - Record FMU log messages to a log file inside the Target Files folder
    - Includes: status messages, solver info, simulation time…
  - Logging can be enabled or disabled

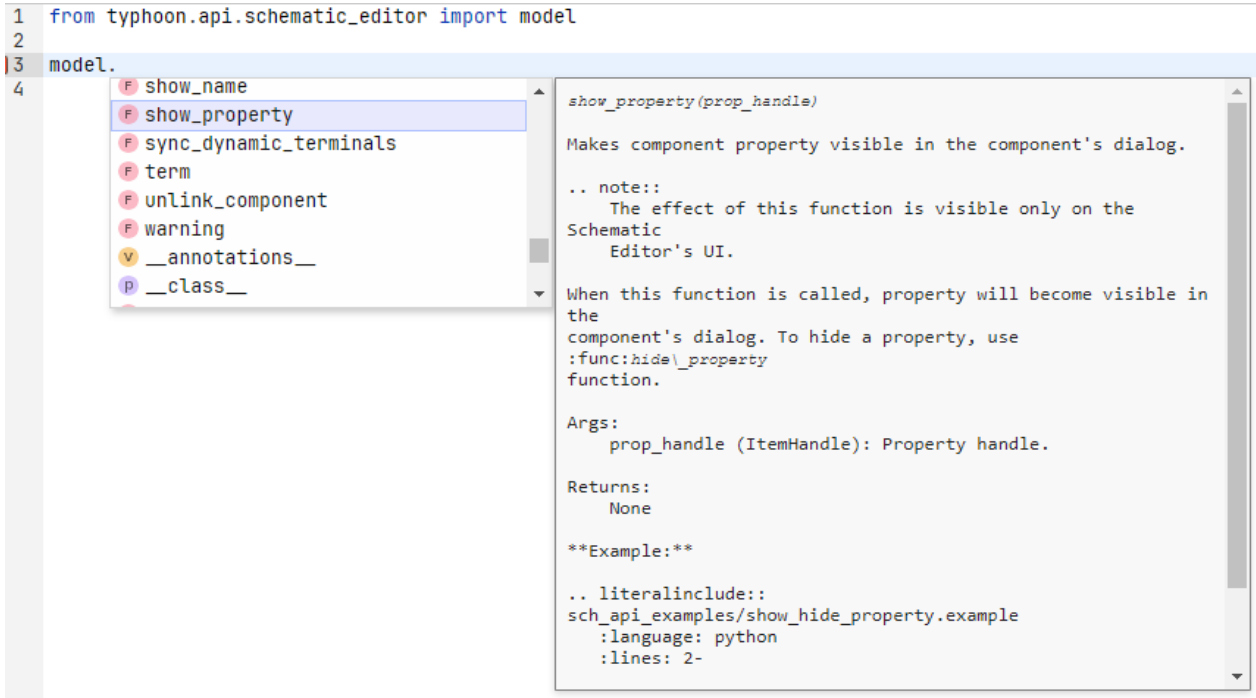




Additional features

Code Editor autocompletion

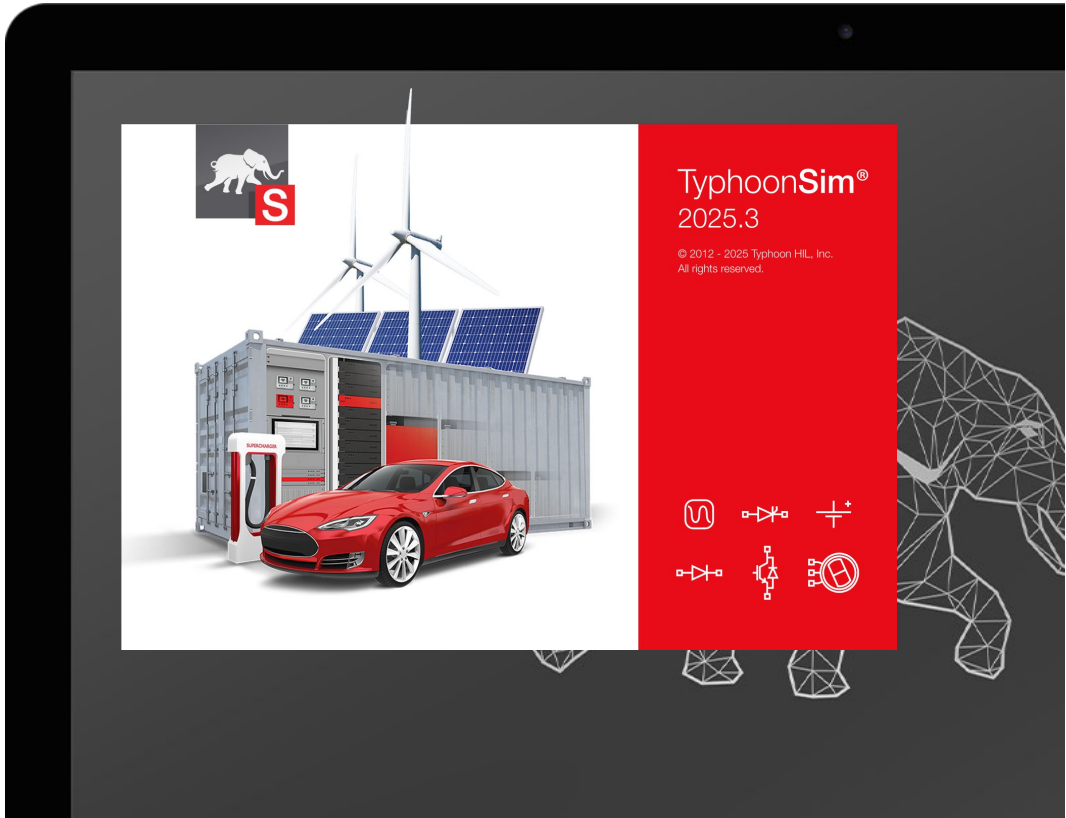
- Integrated Typhoon API autocompletion for Python code editors
- Available in Schematic Editor, HIL SCADA and TyphoonTest IDE
- Display function docstrings, documentation, and code examples while typing



TyphoonSim updates

Extended library support

- Semi-Ideal switches now supported
- 20 new converters supported
  - Quadratic Boost regular, Active Clamp Flyback, Bidirectional Cuk, Phase Shifted Full Bridge, Four/Five/Nine Level Flying Capacitor Inverter Leg…
- Star/delta stator windings connection support for all machines
- Full Saturation support for PMSM VBR type machine model
  - flux vs current;
  - incremental inductance vs current and
  - absolute inductance vs current saturation types
- Incremental inductance mode for PMSM now supported
- Saturable leakage inductance support for DFIM



Thank you for your attention!