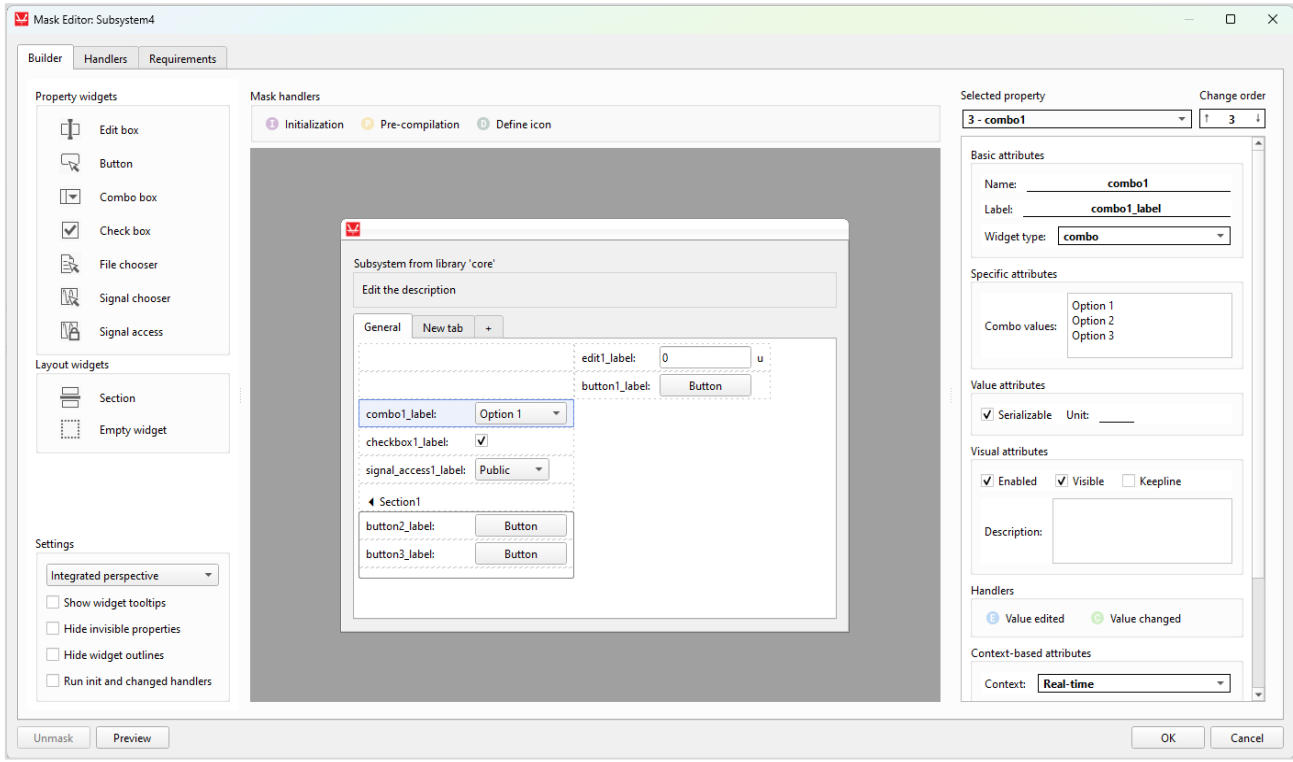
2025.1 Software Release Highlights

- ☐ **New Mask Editor**
- ☐ **Flexible Ethernet Communication**
- ☐ **Automotive Communication Extender (ACE) Updates**
- ☐ **New components**
  - Three Phase PMSM (Ansys ECE)
  - Phase Shifted Full Bridge converter
- ☐ **Communication interface updates**
- ☐ **Performance improvements**
- ☐ **TyphoonSim updates**

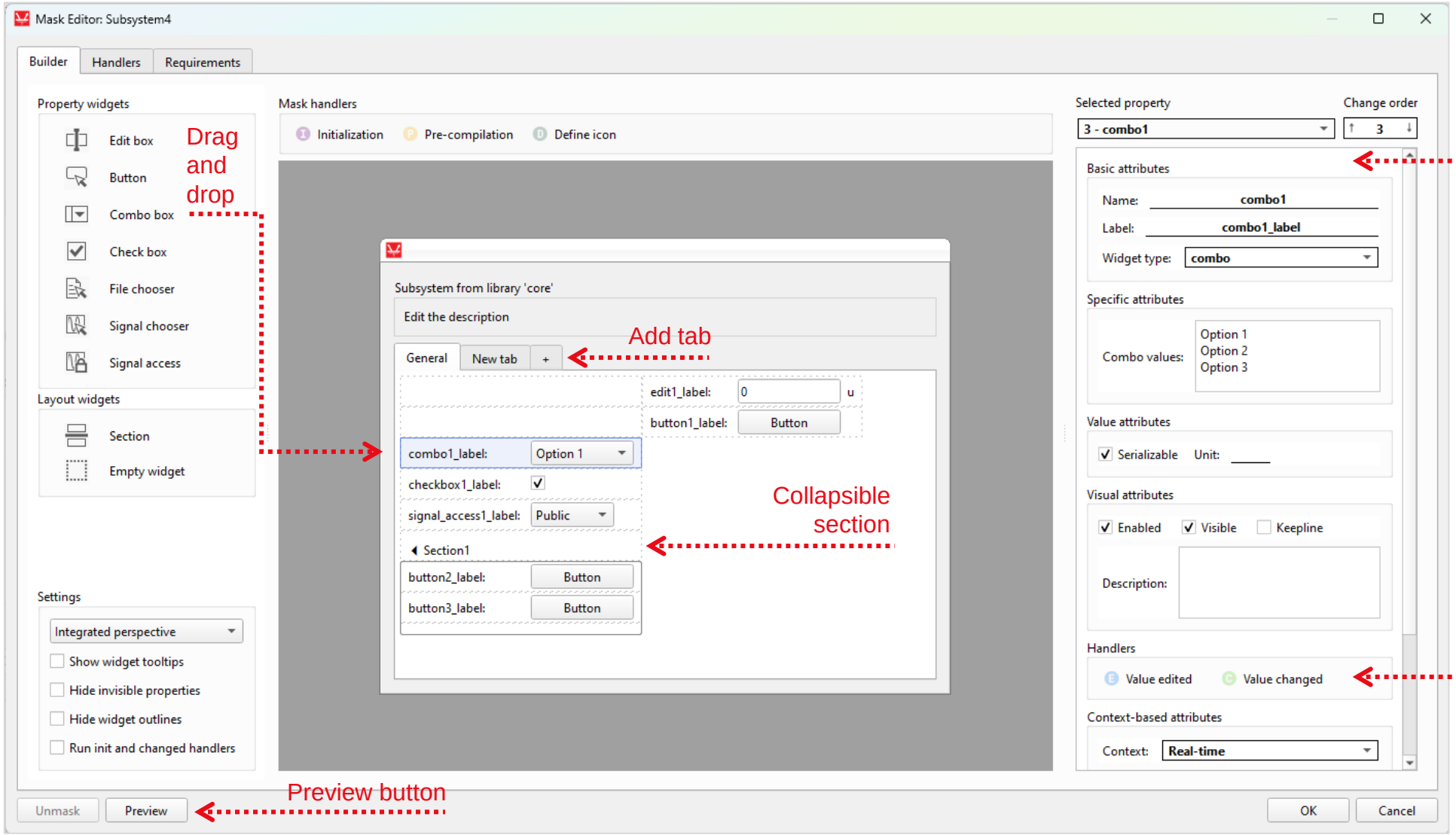
New Mask Editor

Interactive mask design

- Create Masks with a new "what you see is what you get" interface
- New actions:
  - Drag and drop to add / move widgets and tabs
  - Edit labels, units and tab names inline
- New layout widgets:
  - Section
  - Empty widget (skip)
- New features:
  - Added property description and context-based attributes to the GUI
  - Matrix Editor for vector properties



New Mask Editor

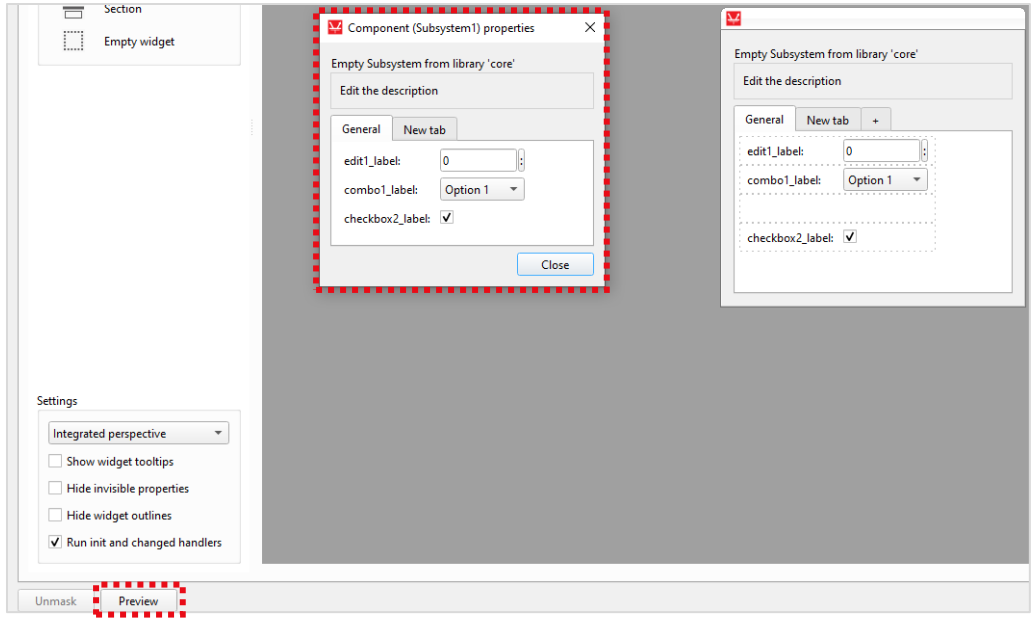


New Mask Editor

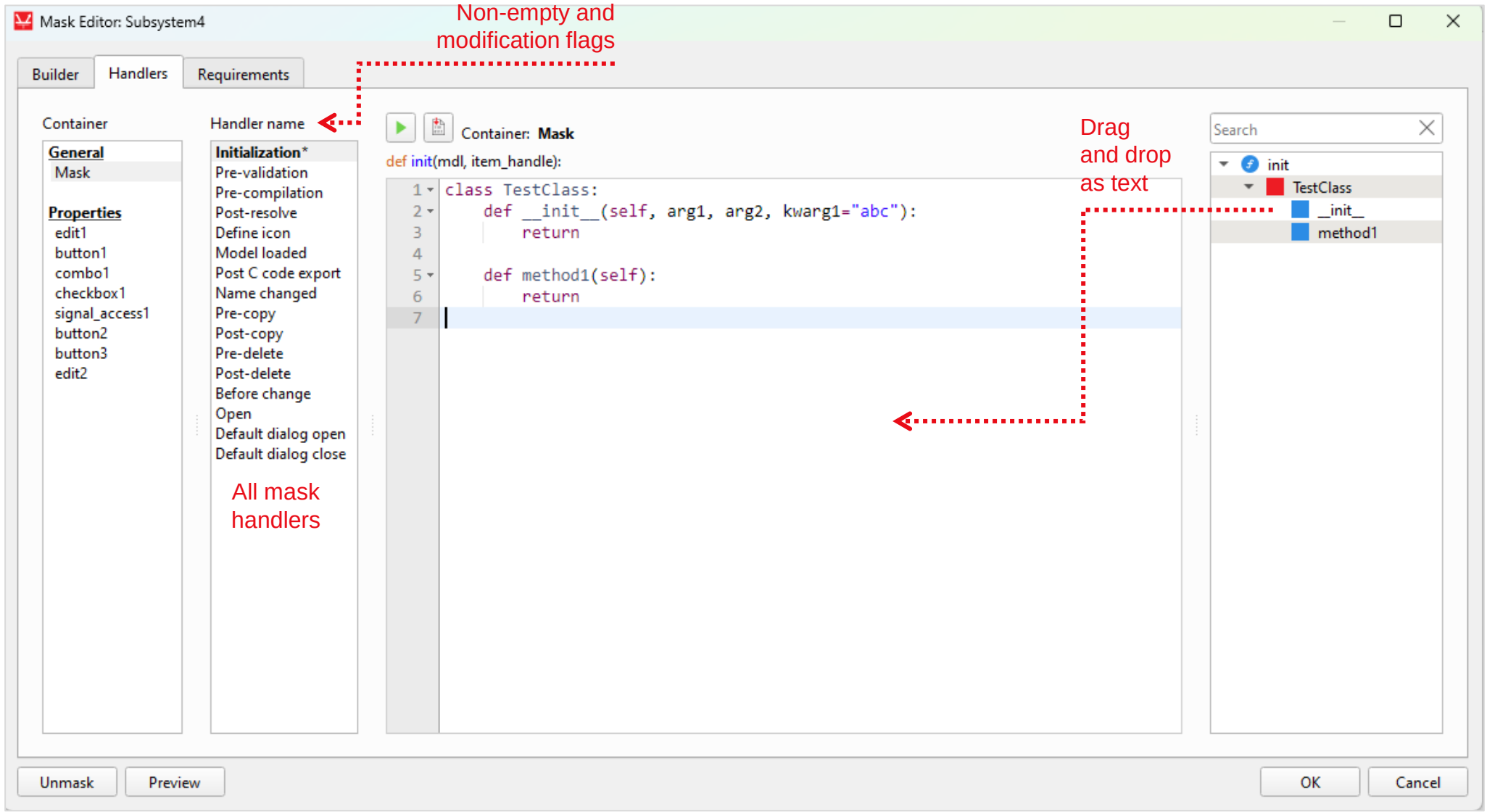
See your changes right away

- Preview button
  - Quickly test dialog dynamics handlers
  - See the changes to your Mask before deploying it to your component

- New Handlers tab
  - Supports all mask handlers
  - Drag and drop from the containers list and from the namespace list
  - Quickly transition between the Property Handler editor and the property on the Mask Editor



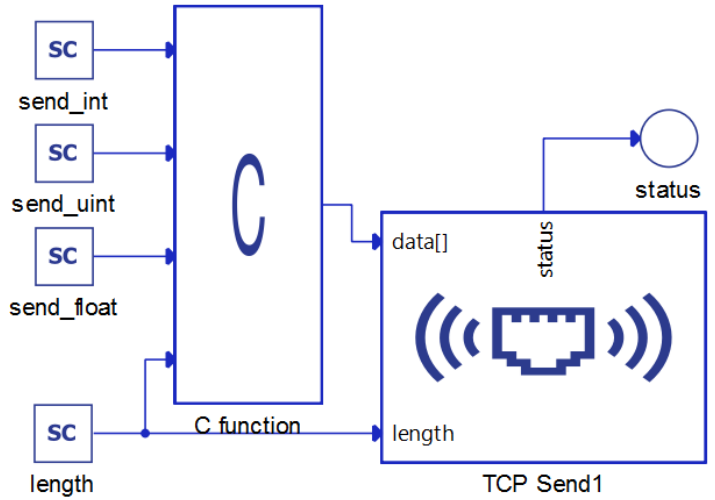
New Mask Editor

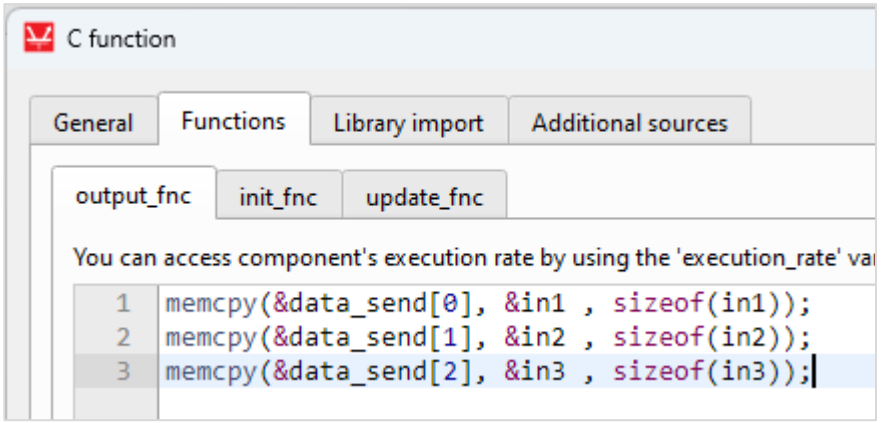


Flexible Ethernet Communication

New TCP and UDP protocols for improving control of data exchange

- You can now implement your own protocols on our platform
- Choose between connection-oriented (TCP) and connectionless (UDP) communication based on project needs
- Support for multiple send/receive components with independent configurations
- Integration with third-party systems now made easier

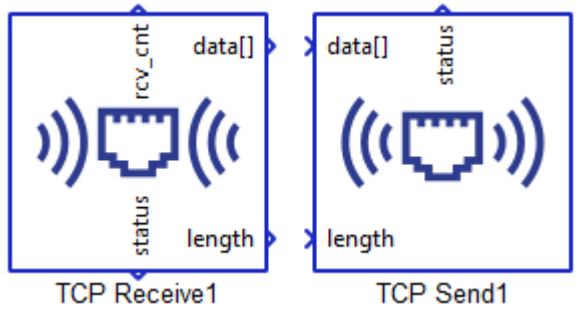


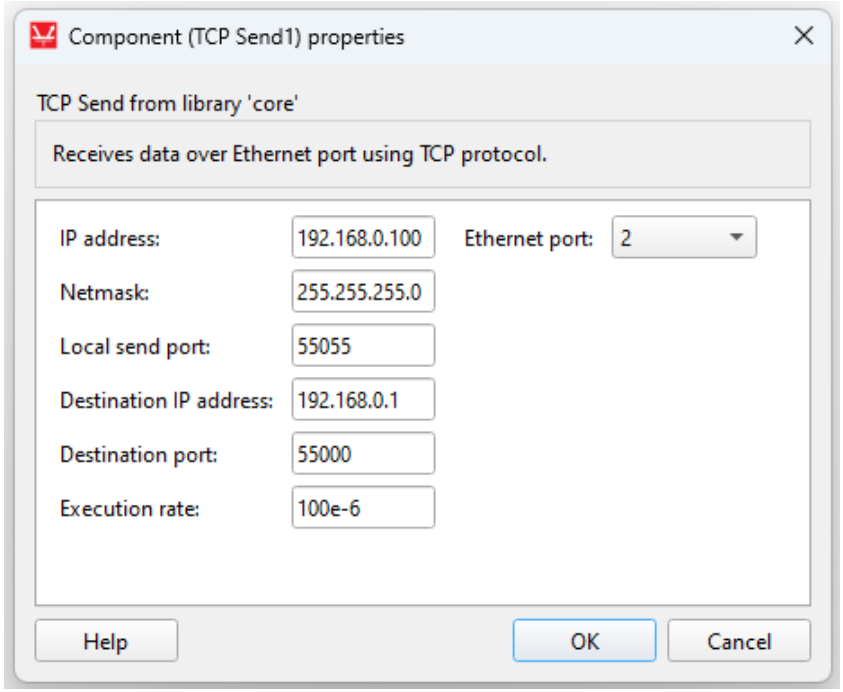


Flexible Ethernet Communication

Ethernet TCP Communication

- New components:
  - TCP Send: Initiates a connection and sends data (client role)
  - TCP Receive: Listens for connections and receives data (server role)
- Key Features:
  - Reliable, connection-oriented protocol with three-way handshake (SYN, SYN-ACK, ACK)
  - Provides guaranteed packet delivery and error handling
  - Multiple instances possible with unique ports
  - Deterministic execution rate for real-time simulations
  - Supported by all HIL devices

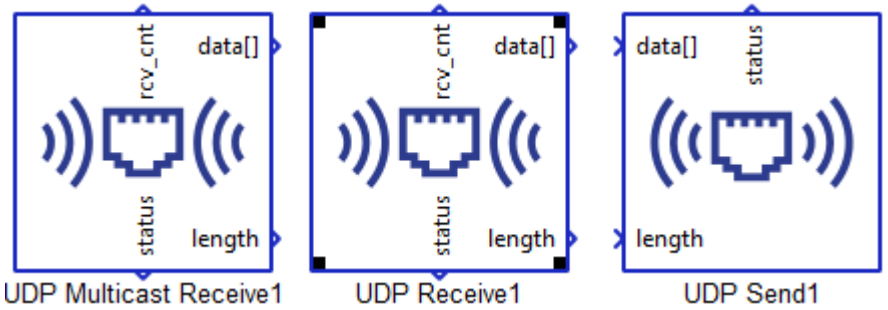


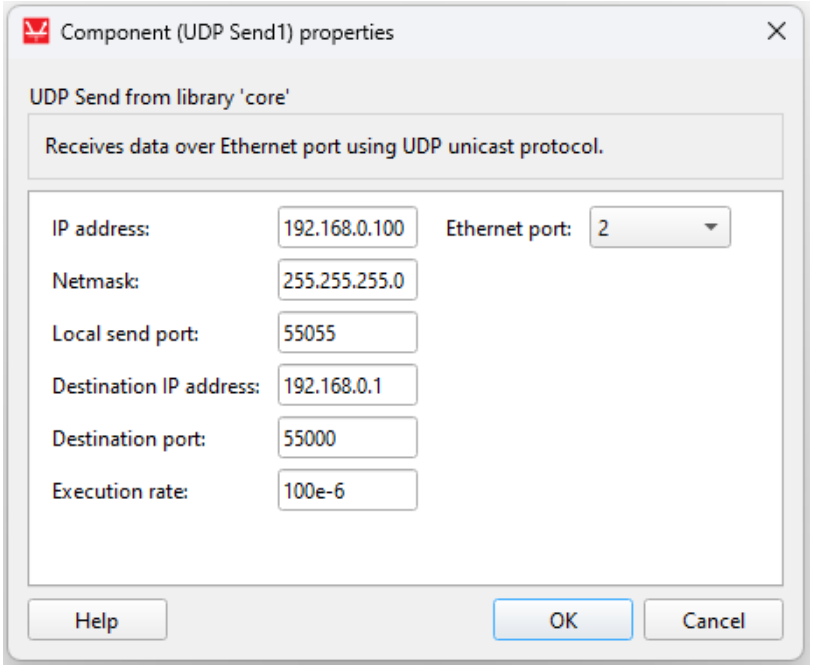


Flexible Ethernet Communication

Ethernet UDP Communication

- New components:
  - **UDP Send**: Sends data from the HIL device (client) to a remote server
  - **UDP Receive**: Receives data on the HIL device (server) from clients
  - **UDP Multicast Receive**: Listens for multicast messages from multiple senders.
- Key Features:
  - Simple, connectionless protocol using Lightweight IP (lwIP)
  - Supports multiple send/receive instances with different ports
  - Deterministic execution rate for real-time simulations
  - Supported by all HIL devices





Automotive Communication Extender (ACE) Updates

Expanded communication interface for e-mobility applications

- ACE is a modular HIL Connect card designed to support various automotive communication protocols
- Ideal for e-mobility and BMS applications requiring multiple communication ports
- Compatible with all 3rd and 4th generation HIL devices

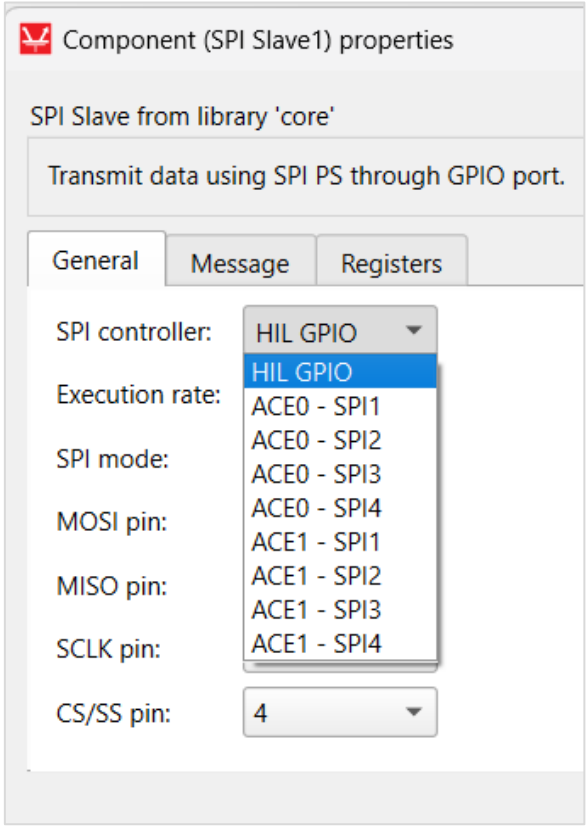
Interfaces
8x CAN/CAN FD
4x SPI
8x LIN
8x SENT
1x FlexRay

Automotive Communication Extender (ACE) Updates

Easily manage SPI communication via your ACE card

ACE SPI Setup1

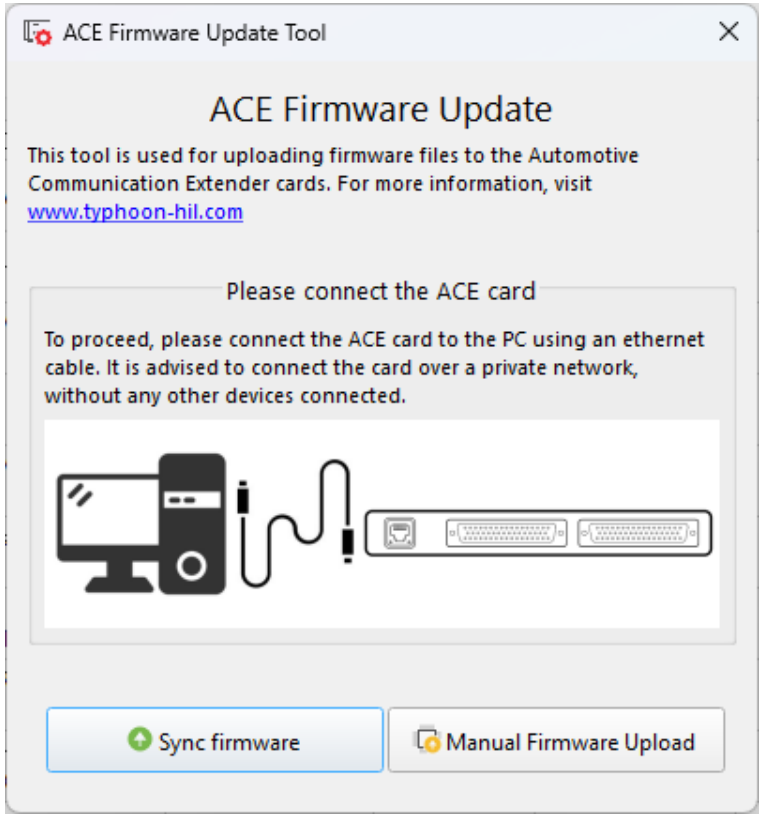
- ACE SPI Setup component added
- Defines the SPI controller settings for the chosen ACE card
- SPI Slave component modified to support both HIL device and ACE-based SPI controllers
- SPI daisy chain communication available



Automotive Communication Extender (ACE) Updates

Additional features

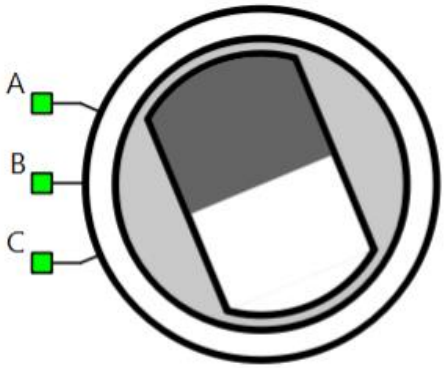
- ACE board firmware update from THCC
  - Direct Ethernet connection from PC to ACE board is mandatory
  - Flexible Ethernet port enabled for HIL506 and HIL606 devices – all ports except 1st are available
- Two firmware update options available
  - Update ACE firmware - software will find the appropriate firmware and start the update process automatically
  - Upload ACE firmware - software will ask you for the path to the desired firmware file that you want to upload to the card
- Additional button for accessing ACE documentation



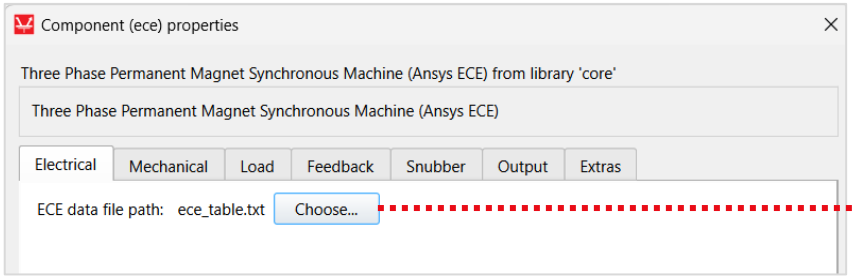
Three Phase PMSM (Ansys ECE)

New machine with ANSYS equivalent-circuit extraction compatibility

- Direct import of look-up tables from ANSYS Maxwell
- Electrical parameters directly calculated through ANSYS ECE data
- Allows for more accurate modelling of three phase PMSM



3 ph PMSM (Ansys ECE)

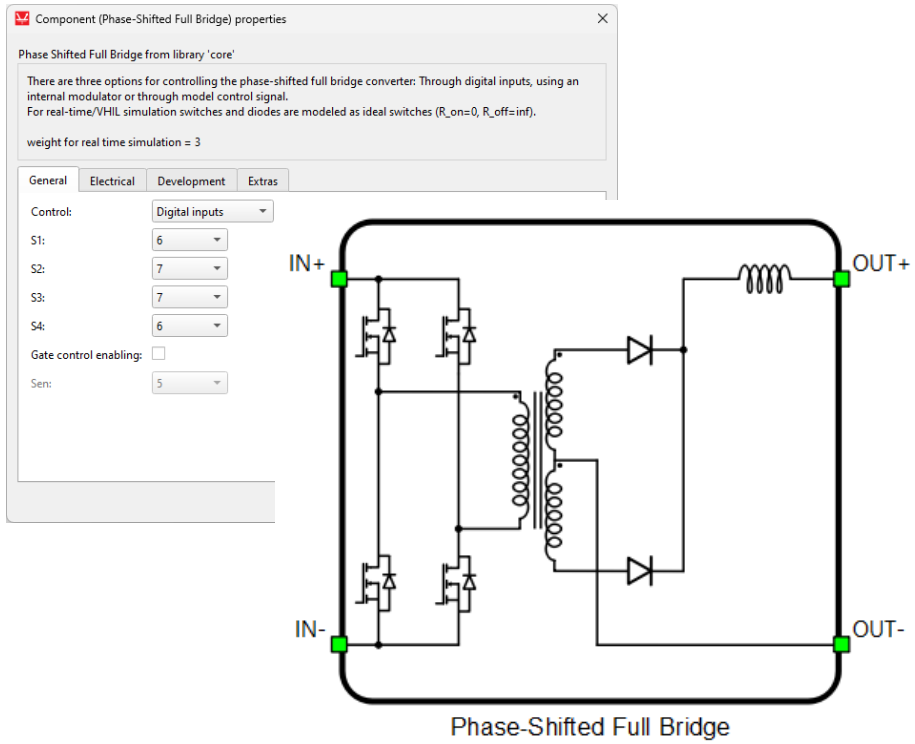



```
AB_BasicData
  Version   1.0
  Poles     8
E_BasicData

B_PhaseImp 3
    PhaseA    1.0000000000e-03    1.0000000000e-06
    PhaseB    1.0000000000e-03    1.0000000000e-06
    PhaseC    1.0000000000e-03    1.0000000000e-06
E_PhaseImp

B_Sweepings
  Id_Iq      (21:  -300 -270 -240 -210 -180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180 210
             (21:  -300 -270 -240 -210 -180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180 210
  Rotate     (31:  0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
E_Sweepings

B_OutputMatrix DQ0
          0   -9.2961203328e-02   -3.0285060261e-01    1.8236174235e-02   -4.5980482338e+02
          1   -1.0660580224e-01   -2.9968612885e-01    1.7454698709e-02   -4.0758122877e+02
          2   -1.1130882248e-01   -2.9674541106e-01    1.4688500792e-02   -3.7573410058e+02
```

Phase-Shifted Full Bridge Converter

New topology in our converter library

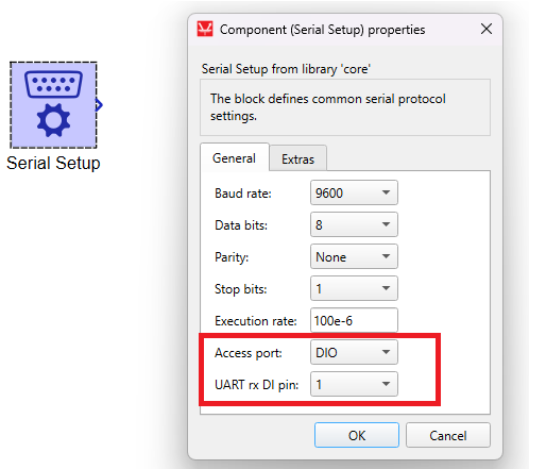
- A new ready-to-use block of a Phase-Shifted Full Bridge DC/DC Power Converter
- Relies on the switch-level oversampling mechanism
- Supports switching frequencies in the range of 100-150 kHz
- Reduced Output Voltage Ripple
  - Enables reduction of output capacitor
  - Lowers overall cost of the converter

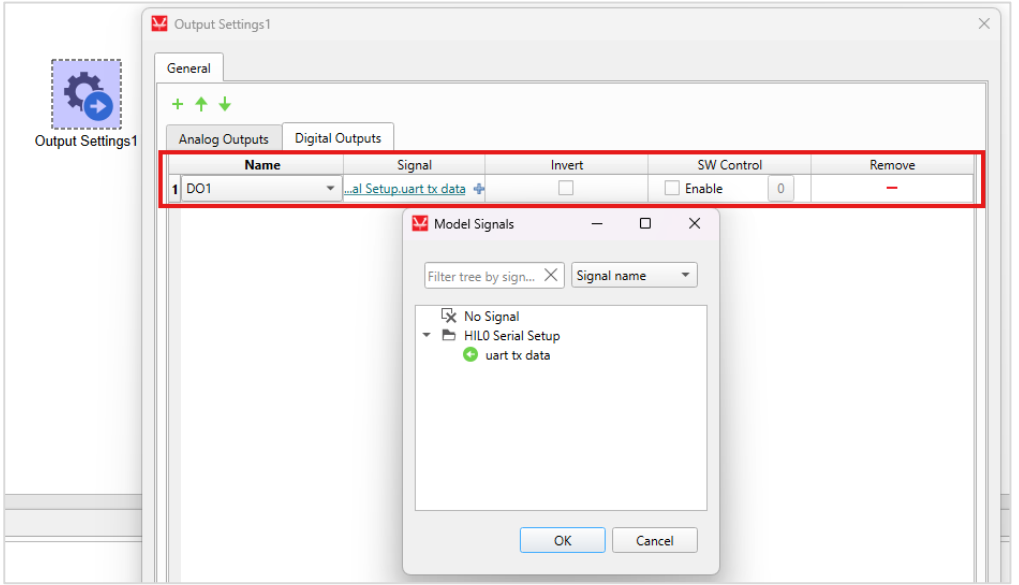


Communication interface updates

Serial communication over DIO on all active devices

- Allows more flexibility by utilizing DIO as an access port for Serial communication
- Serial controller RX port is configured as DI pin
- Serial controller TX port is configured as DO pin:
  - HIL SCADA -> Model Settings -> Digital Outputs
  - Schematic Editor -> Output Settings -> Digital Outputs

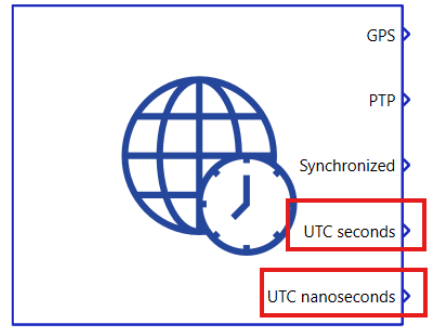




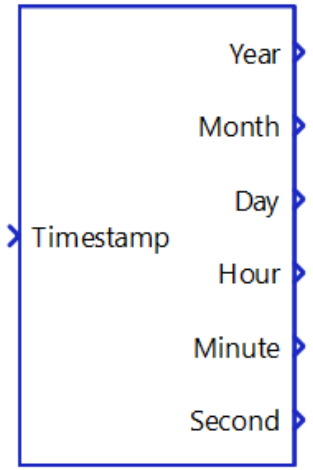
Communication interface updates

New UTC time synchronization components

- Current UTC time output from Time Synchronization component allows:
  - Time synchronization for testing time-sensitive systems and algorithms
  - Enables long-distance co-simulation
  - Provides a consistent time reference
  - Facilitates repeatable tests
  - Assists with accurately triggering and logging events
- UTC to date converter component added



Time Synchronization

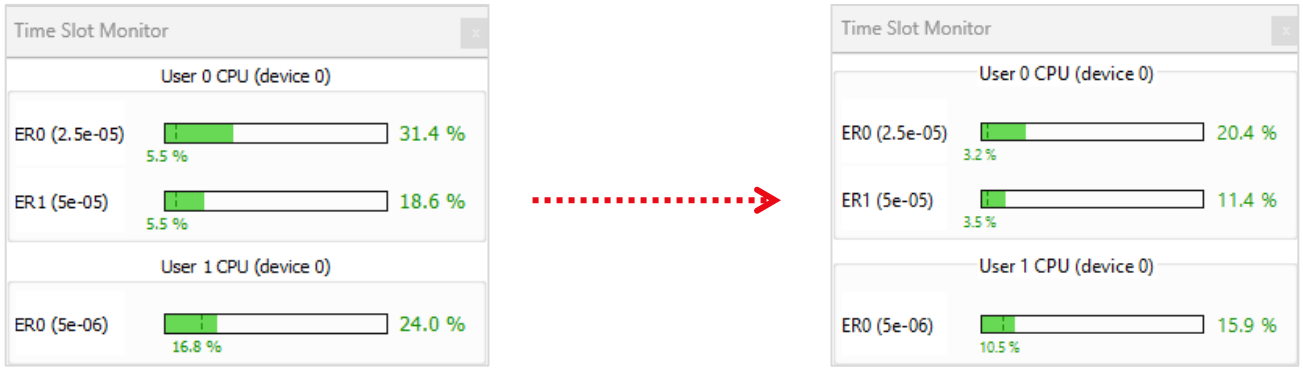


Timestamp To Datetime

Performance improvements

Faster CPU-CPU data exchange

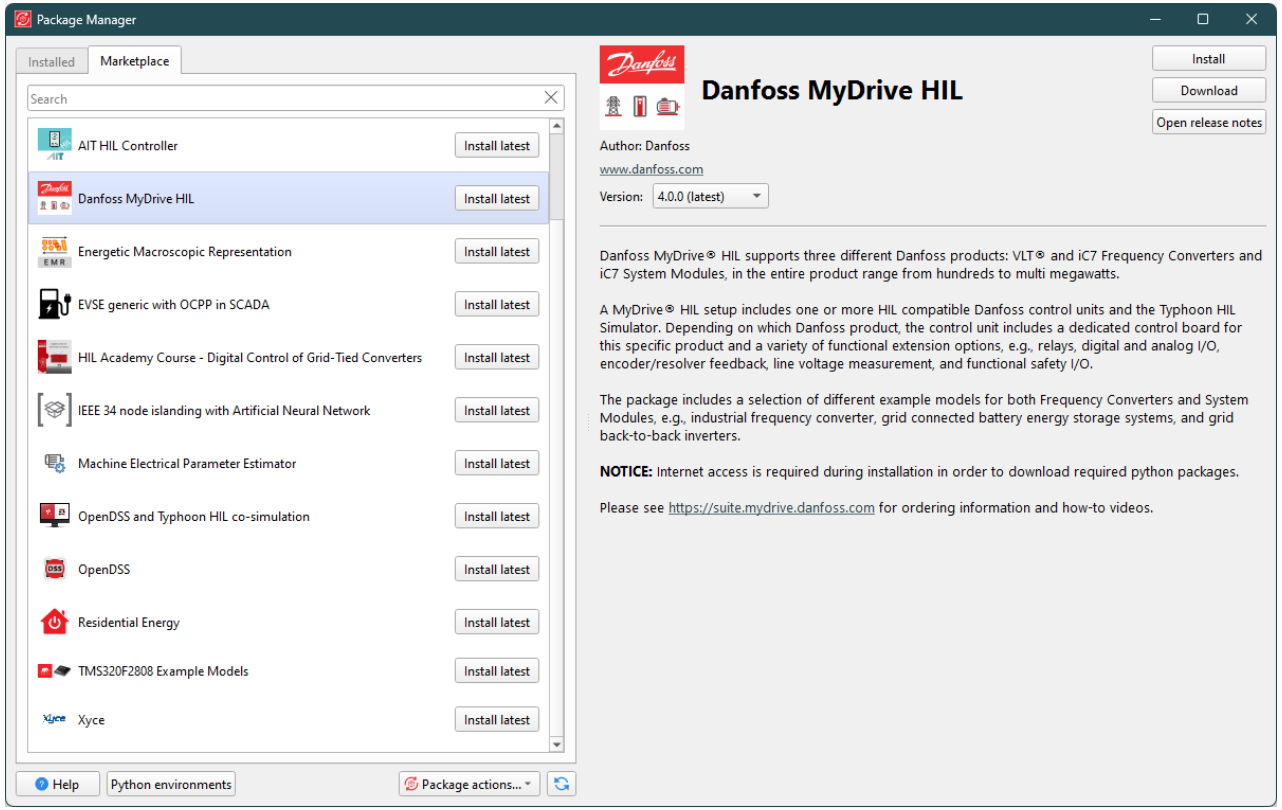
- Implemented Cache coherent data transfers between CPU cores
  - Data between CPU cores is exchanged via cache memory (cache-to-cache communication)
  - CPU cores are less burdened and inter CPU communication latency is reduced
- Result
  - Lower time slot utilization (typically 3% to 40% speed-up)
  - Especially affects models:
    - running on multiple User CPU cores
    - with a lot of SCADA Inputs and Probes



Performance improvements

Faster loading of user libraries

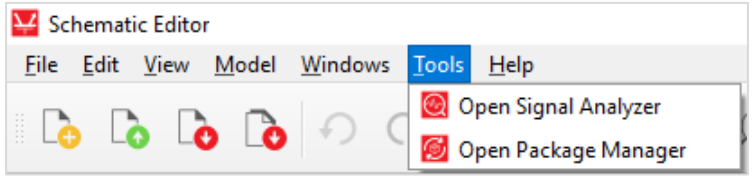
- Implemented per-file caching of Schematic Editor libraries
- Speeds-up loading of user libraries
  - Especially important during development of complex user libraries

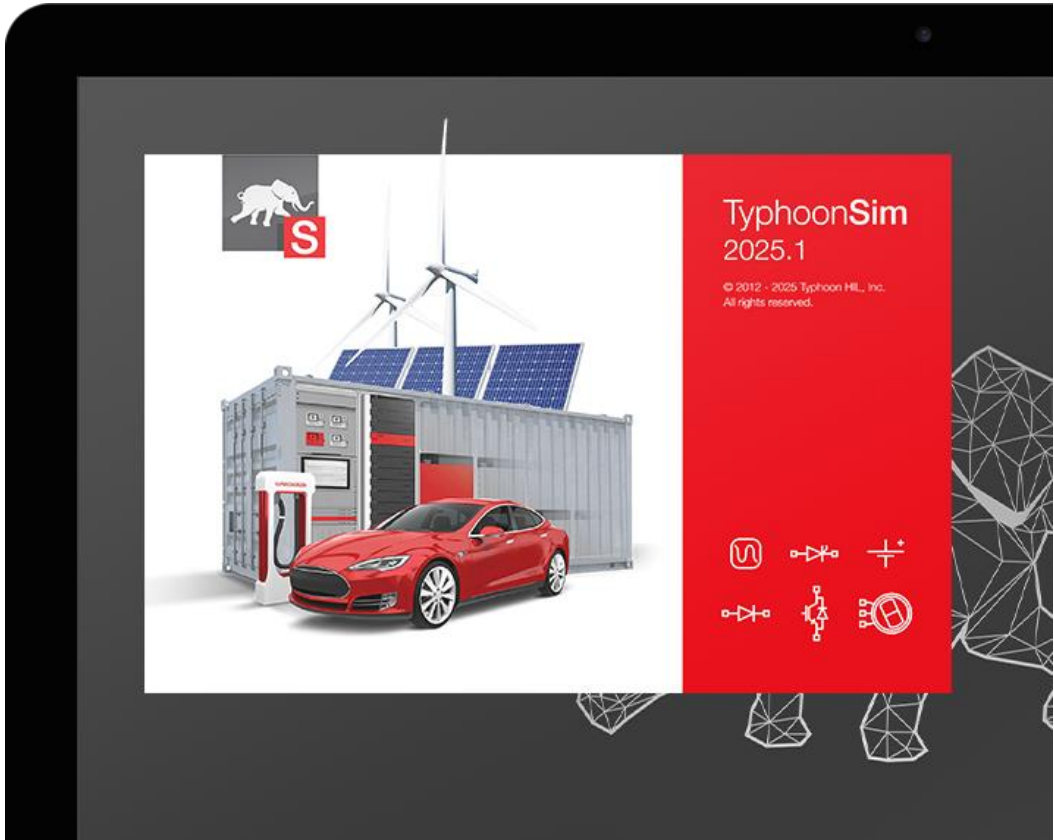


TyphoonSim updates

Greatly expanded tool and library support

- Package Manager and Signal Analyzer now available in TyphoonSim Standalone
  - Ability to install packages (including upcoming TI Coder)
  - Ability to do post-inspection of captured signals
- Extended library support
  - All machines now supported
  - 4 new converters supported
  - Fuel Cell component supported
  - Support for losses calculation for MOSFET switches
- Relaxed Signal Processing validation
  - Execution rates no longer need be a multiple of the fastest rate
  - No limit on the number of different execution rates





Thank you for your attention!