



# 2025.2 Software Release Highlights

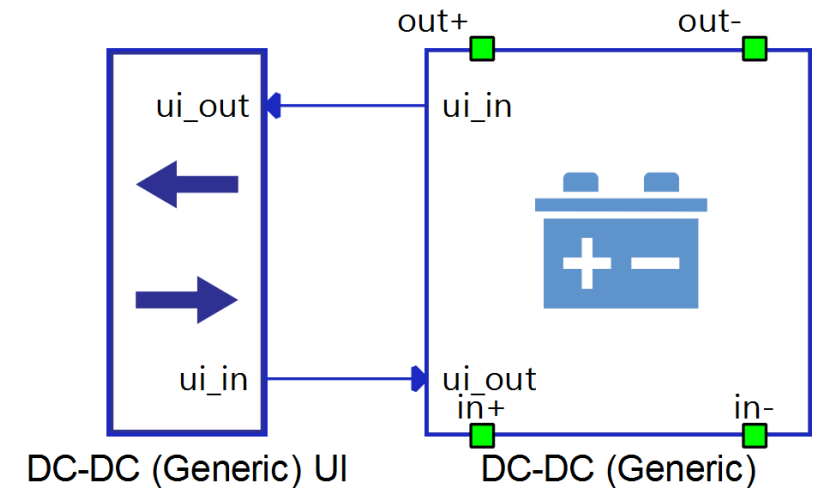
- ☐ **DC-DC Converter (Generic)**
- ☐ **Fuel Cell improvements**
- ☐ **Communication interface updates**
  - Parametrization of SFP Simulation Link
  - Zero-configuration networking on HIL
- ☐ **Signal Analyzer enhancements**
- ☐ **Toolbox-free Features Extended**
- ☐ **TyphoonSim updates**



# DC-DC Converter (Generic)

*New converter component in the Microgrid library category*

- ❑ Contains an averaged model based on a DAB (Dual Active Bridge), along with an output filter and circuit breaker
- ❑ Can operate in a wide output power range
- ❑ Isochronous, droop, and grid following operation modes available
- ❑ UI component allows easy access to inputs and outputs in SCADA
- ❑ State machine which handles circuit breaker control and fault logic implemented
- ❑ DC terminals for connecting external components to DC link



# Fuel Cell improvements

*Significantly simplified component parametrization process*

- ❑ Optimized for users with a power electronics background
- ❑ Includes presets for standard fuel cells available on the market
- ❑ Streamlined model transfer from other simulation tools (e.g. Simulink)
- ❑ Two fidelity levels available: Simplified and Detailed
- ❑ Runtime variation of selected component parameters now possible



Component (Fuel Cell1) properties

Fuel Cell from library 'core'

The hydrogen fuel cell component is implemented as a controlled voltage source. The proton exchange membrane fuel cell is known to have slower reaction kinetics at the cathode side (air) than at the anode side (hydrogen). Therefore, the cathode activation loss is an order of magnitude higher than the anode activation loss. In this PEM fuel cell model, the anode side activation loss effects are neglected for the sake of simplification purposes.

General Input Dynamics Polarization curve

Parameter definition: Detailed

Preset Fuel Cell: 1.26kW - 24Vdc

Nominal operating point: [24.23, 52] [V, A]

Maximum operating point: [20, 100] [V,A]

Voltage at 0A and 1A: [42, 35] [V, V]

Number of cells: 42

Nominal stack efficiency: 46 %

Operating temperature: 55 °C

Nominal air flow rate: 2400 lpm

Nominal supply pressure (fuel, air): [1.5, 1] [atm, atm]

Nominal composition (fuel, air, water): [99.95, 21, 1] [%, %, %]

Execution rate: 100e-6 s

OK Cancel

# Communication interface updates

## *Parametrization of SFP Simulation Link*

- ❑ Enables communication with different controllers and co-simulation with other vendors
- ❑ Xilinx Aurora protocol configurable via online configurator:
  - Adjustable link bandwidth (options: 0.5, 1, 2, 2.5, 4, and 5 Gbps)
  - Option to add hardware-generated CRC (Cyclic Redundancy Check) to SSL frames

### Interfaces

Paralleling support	NO <input checked="" type="checkbox"/> YES
SFP Simulation Link Type	Basic ▼
SFP Simulation Link Channels	0 <input type="text" value="1"/> 2
SFP simulation link Aurora line rate [Gbps]	5.0 ▼
SFP simulation link Aurora CRC	NO <input type="checkbox"/> YES
Egston SFP Link Channels	0 <input type="text" value="0"/> 2
ABB Proprietary protocols	NO <input type="checkbox"/> YES

# Communication interface updates

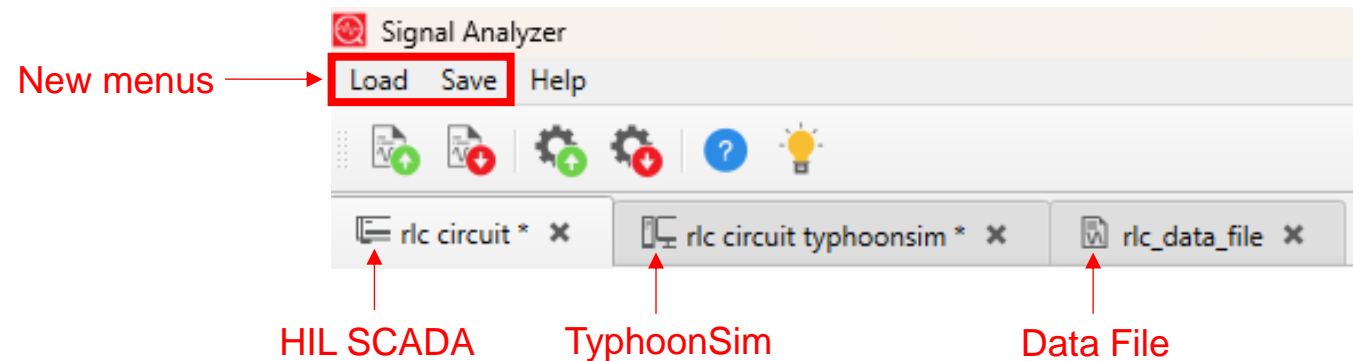
## *Zero-configuration networking of HIL*

- ❑ Enables direct one-to-one connection between the PC and HIL device without requiring static IP configuration
- ❑ Simplifies local communication within small network setups
- ❑ The default IP address of the HIL device (192.168.42.200) has been removed
- ❑ If the HIL device cannot obtain an IP address via DHCP, it will now use an address from the APIPA (Automatic Private IP Addressing) range
  - APIPA - Windows feature that automatically assigns an IP address when a DHCP server is unavailable
  - APIPA address range is from 169.254.0.1 to 169.254.255.254

# Signal Analyzer enhancements

*New UX improvements in the Signal analyzer tool*

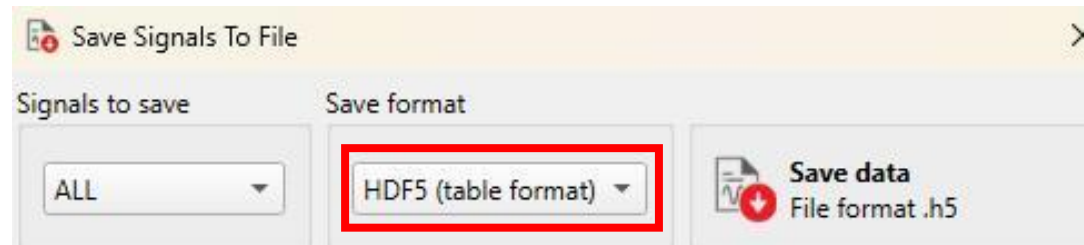
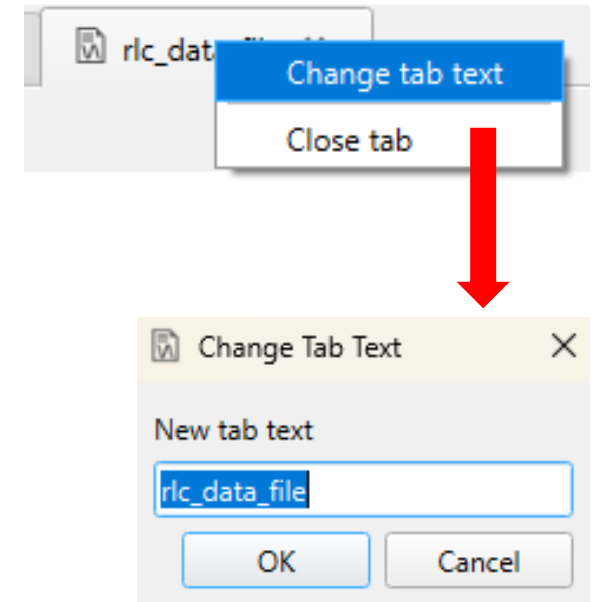
- ❑ Export/Import dialog windows redesigned
  - “Export” renamed to “Save”
  - “Import” renamed to “Load”
- ❑ Intuitive naming for imported data tabs
  - When data is imported from a file, file name is shown (without extension)
  - When data is imported from memory, model name is shown (without extension)
  - All additional data is moved into tooltips
- ❑ Added different tab icons for each data source (TyphoonSim, HIL SCADA, Data File)
- ❑ New menus added (Load menu, Save menu)



# Signal Analyzer enhancements

*New UX improvements in the Signal Analyzer tool*

- ☐ Each opened tab in Signal Analyzer can now be renamed
- ☐ Ctrl+S now opens the Save Data window
- ☐ Upon saving, the suggested file name is the same as the imported data tab
- ☐ Default Save format changed to HDF5 (table format)



# Toolbox-free Features Extended

*Extension of Starter Features for all HIL users*

- The following features are now available for real-time simulation for all HIL users:
  - TyphoonTest
  - Ethernet Variable Exchange
  - EtherCAT Protocol
  - SFP Simulation Link



# TyphoonSim updates

## *Extended library support*

- ☐ FMU Import component now supported
- ☐ Three Phase PMSM (Ansys ECE) now supported
- ☐ 9 converters supported
  - Buck-Boost
  - Three Level Buck
  - Cuk
  - SEPIC
  - Flyback
  - Forward
  - Active Clamp Forward-Flyback
  - 5L NE Type
  - Three Phase Asymmetric Inverter
- ☐ Added option to expose auxiliary winding on Single Phase Induction Machine





# Thank you for your attention!

