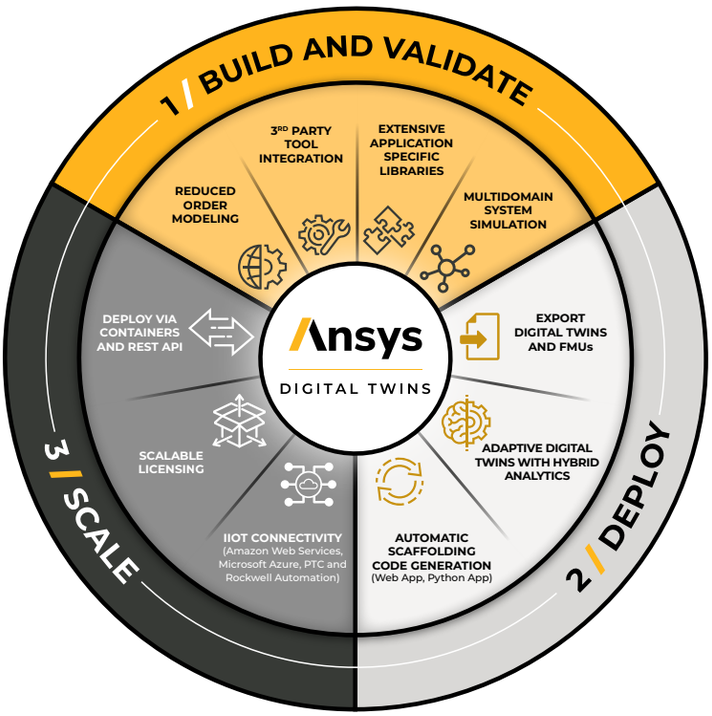
Ansys

DIGITAL TWIN

Ansys Digital Twins

Simulation Based with Hybrid Analytics



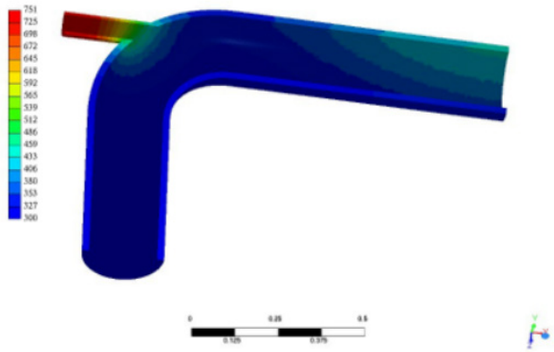
/ Build and Validate, Deploy and Scale Simulation-based Digital Twins

Ansys Digital Twins is a comprehensive multi-technology platform enabling engineers to develop analytics and simulation-based works, representing assets with real-world sensor inputs. These digital twins enhance predictive maintenance, leading to cost savings in warranty and insurance, while optimizing operational efficiency. The platform seamlessly integrates a multidomain system modeler, specialized 0D libraries, 3D physics solvers, and reduced-order model (ROM) capabilities for rapid system validation. Ansys Digital Twin products not only generate portable, cloud-deployable twins, but also create hybrid digital twins by combining data and physics using machine learning . Additionally, it automates the creation of scaffolding code for diverse deployments such as web apps, Python apps, and containers. Facilitating real-time data connection through industrial IoT platforms, Ansys Digital Twins offers scalable licensing options to support large-scale predictive maintenance for physical products. It is the only product that offers a packaged approach for your digital twin strategy.

/ Build and Validate System Models and Digital Twins

Reduced-order Model Creation and Integration

- Use ROM interfaces to generate accurate, compact models from detailed 2D and 3D physics simulations.
- Visualize 3D fields with the ROM viewer.
- Link to a variety of Ansys tools to create high-performing models for electromagnetic machines and actuators, circuit parasitics and cables, excitations for electromagnetic interference/electromagnetic compatibility (EMI/EMC), electronics thermal networks, signal integrity, general flow and heat transfer characteristics, and rigid-body dynamics.
- Multiple ROM generation techniques — including state-space, electrical circuit equivalent, singular value decomposition (SVD), and modal response — support a range of analysis requirements (linear or nonlinear, steady-state, or transient).

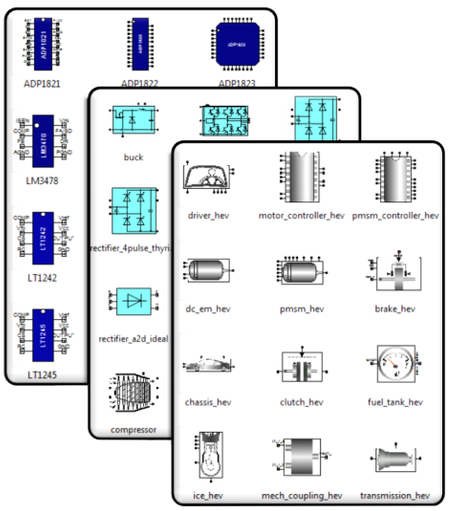


Model Exchange with External Tools

- Compatible with the FMI for model exchange to import models from all FMI-compliant tools and export Modelica models as functional mockup units (FMUs).
- Create or reuse C/C++ models with the C interface.
- Import MathWorks® Simulink® models using Simulink Coder™.

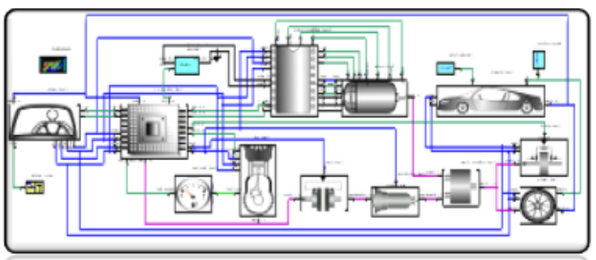
Access to Extensive Model Libraries

- Develop multidomain system models using built-in Modelica and specialized libraries.
- Model complete electronic systems with libraries of analog and power electronics components, digital and logic blocks, sensors, and transformers.
- Build battery cell models from hybrid pulse power characterization data with Modelica library, which includes several templates for equivalent circuit models (ECM) with state of charge (SOC), temperature, and current dependency.
- Select from broad collections of characterized manufacturer components, including power semiconductors, power management integrated circuits (ICs), magnetic devices, and ultracapacitors.
- Use add-on libraries, including the Twin Builder Heating and Cooling library, Twin Builder Fluid Power library, and EV Powertrain library.
- Use application-specific libraries for switch-mode power supplies, electric vehicle powertrains, and aircraft electrical power systems.
- Create and manage user and corporate model libraries with built-in graphical tools.
- Use wizard-driven graphical tools to create power MOSFET, insulated-gate bipolar transistors, and diode components from datasheet information.



Built-in Multi-Domain System Libraries

Language-Based Modeling



Multi-Domain Systems

Powerful Multidomain System Modeling

Create hierarchical schematics of complex power electronic circuits and multidomain systems. Model with standard languages and exchange formats, including:

- VHDL-AMS (IEEE 1076.1)
- Modelica
- SML (Simplorer modeling language)
- FMI (Functional Mock-up Interface)
- C/C++
- Python
- SPICE

You can also:

- Use wizard-driven code editors to create VHDL-AMS, Modelica®, SML, C/C++, and SPICE models.
- Combine conserved (acausal), signal-flow (causal), and discrete event system behaviors.
- Use on-the-fly design checking tools to assure consistency of connection types and physical domains.

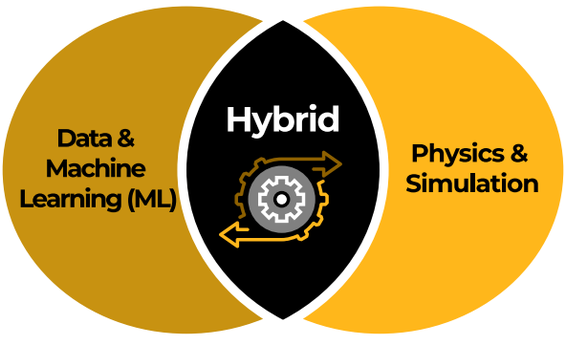
Deploy Digital Twins on IIoT Platforms

Export Digital Twins and FMUs

- Export to generate portable Twins that can be deployed on Cloud or Edge.
- Support for the FMI standard for simulation workflows. FMUs can be used in other software and simulation workflows.

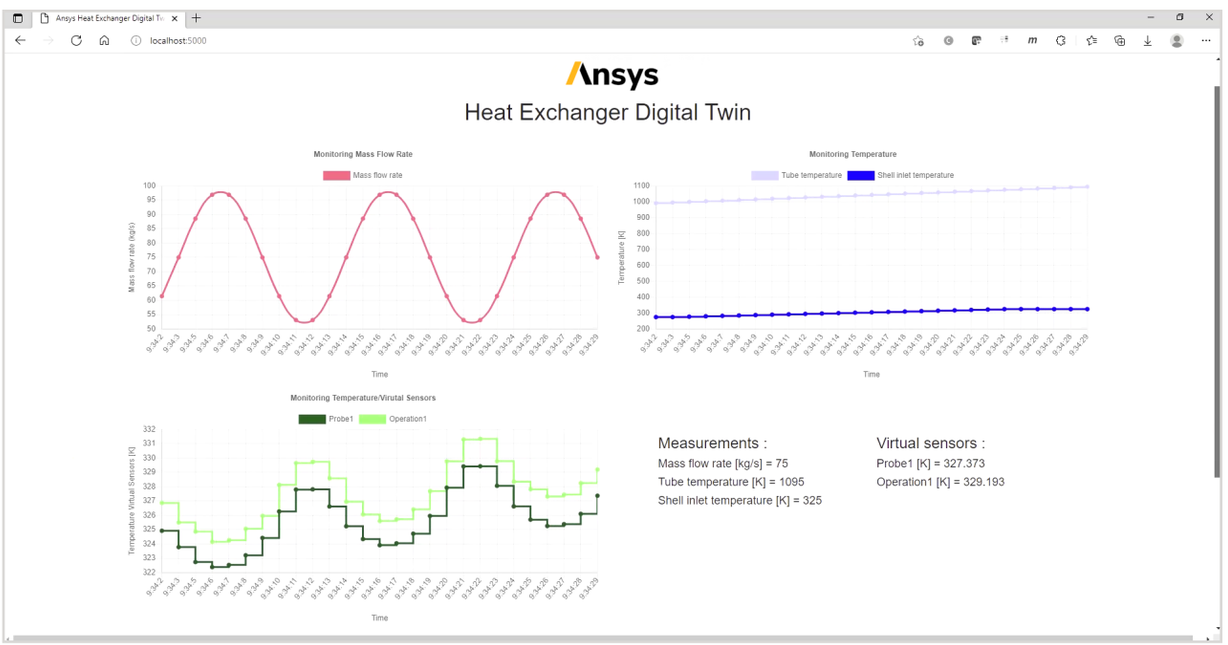
Hybrid Analytics

- Ability to calibrate/tune simulation model parameters so the simulation outputs match data.
- Uncertainty quantification on parameters and outputs with the help of stochastic methods and uncertainty propagation.
- Choice of multiple algorithms to accommodate difficult parameter spaces.
- Supports both offline (driven by Twin Deployer) and online (driven by IIoT platform) scenarios for parameter calibration.



Export Scaffolding Code

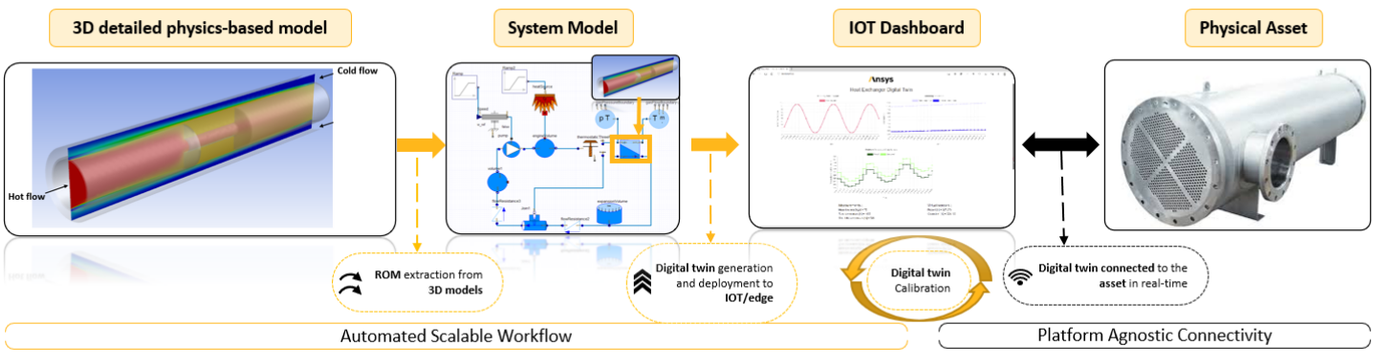
- Export sample code from Twin Deployer to easily deploy twins on the cloud, edge, or offline.
- Develop quick web application prototypes by exporting web apps from Twin Deployer to view and interact with, then run simulations in a browser.
- Easily export a deployable container from Twin Deployer that contains a sample Python client application, demonstrating the usage of all APIs.



Easily Scale Deployment with IIoT Platforms and Flexible Licensing

IIoT Connectivity

- Configure a connector to connect to an IIoT platform and send and receive operational data.
- Export to generate portable, cloud-deployable twins for Microsoft® Azure® IoT, Microsoft Azure Digital Twins, PTC ThingWorx®, Automation Emulate 3D, and Rockwell Studio 5000.
- Ansys DT SDK enables digital twin testing and deployment on nearly any platform (platform agnostic).



Scalable Licensing

- Scalable DT licensing offers flexible pricing and configuration options suitable for small and large projects.
- License-Free SDK helps seamlessly integrate with various software and platforms in production environments on cloud and edge.

Deploy via Containers and REST API

- The REST API and SDK allow for the smooth integration of other software components, third-party services, and IIoT platforms, ensuring scalability and interoperability.
- Containers with dependencies provide a uniform and portable environment that can be deployed across several platforms and operating systems, providing easy deployment and scalability.

ANSYS, Inc.
www.ansys.com
ansysinfo@ansys.com
866.267.9724