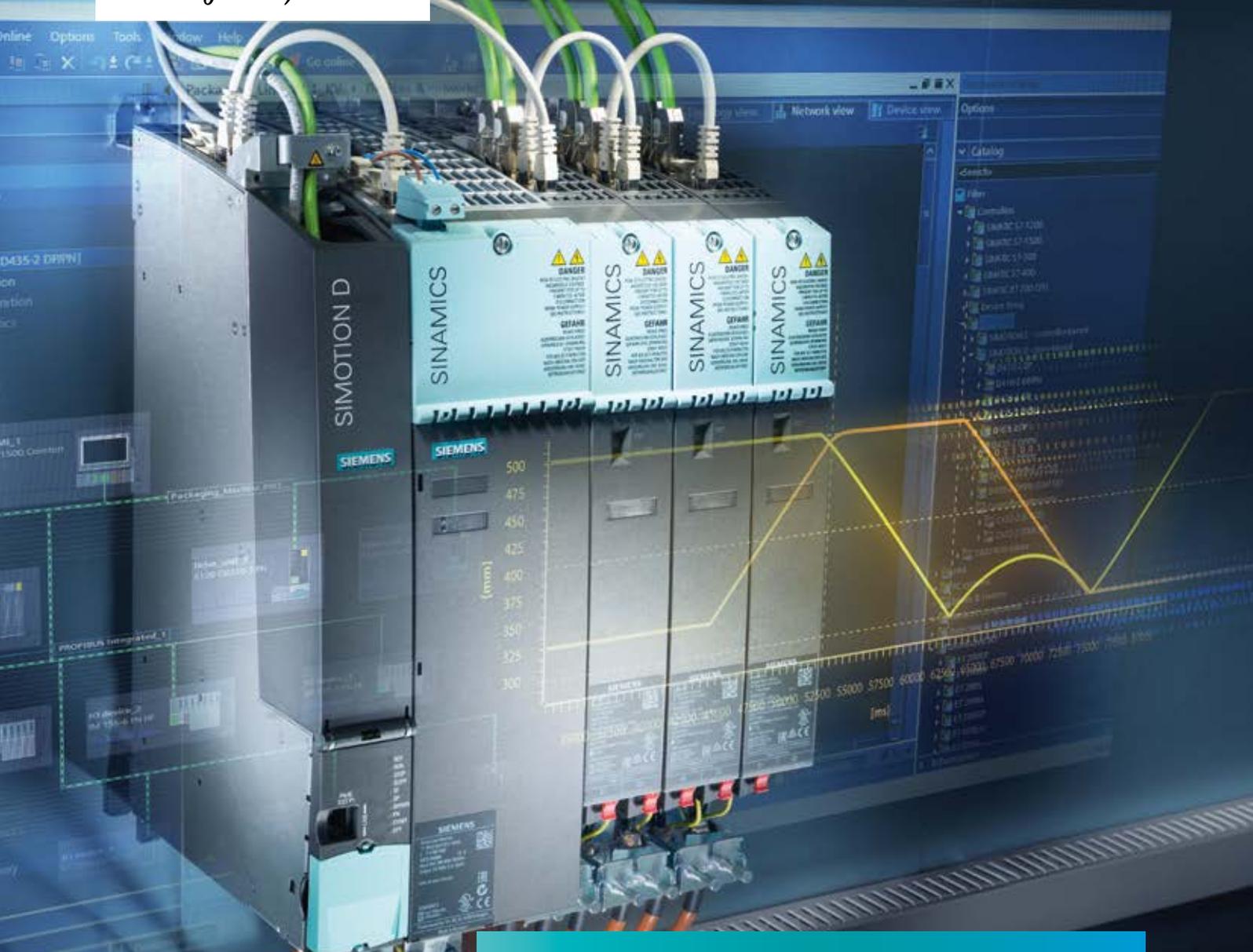


**SIEMENS**

*Ingenuity for life*



If it's high-end,  
it's SIMOTION

Merging performance  
and modularity

[siemens.com/simotion](https://www.siemens.com/simotion)

# The well-proven high-end motion control system

When modularity, maximum precision, and speed are required for applications in machine building, the modular and scalable SIMOTION motion control system featuring high-end functions is the optimal solution. Whether a cycle time of 125  $\mu$ s is needed or machine concepts with a central, decentral, or mixed topology are implemented, the scalable hardware covers a wide range of offerings.

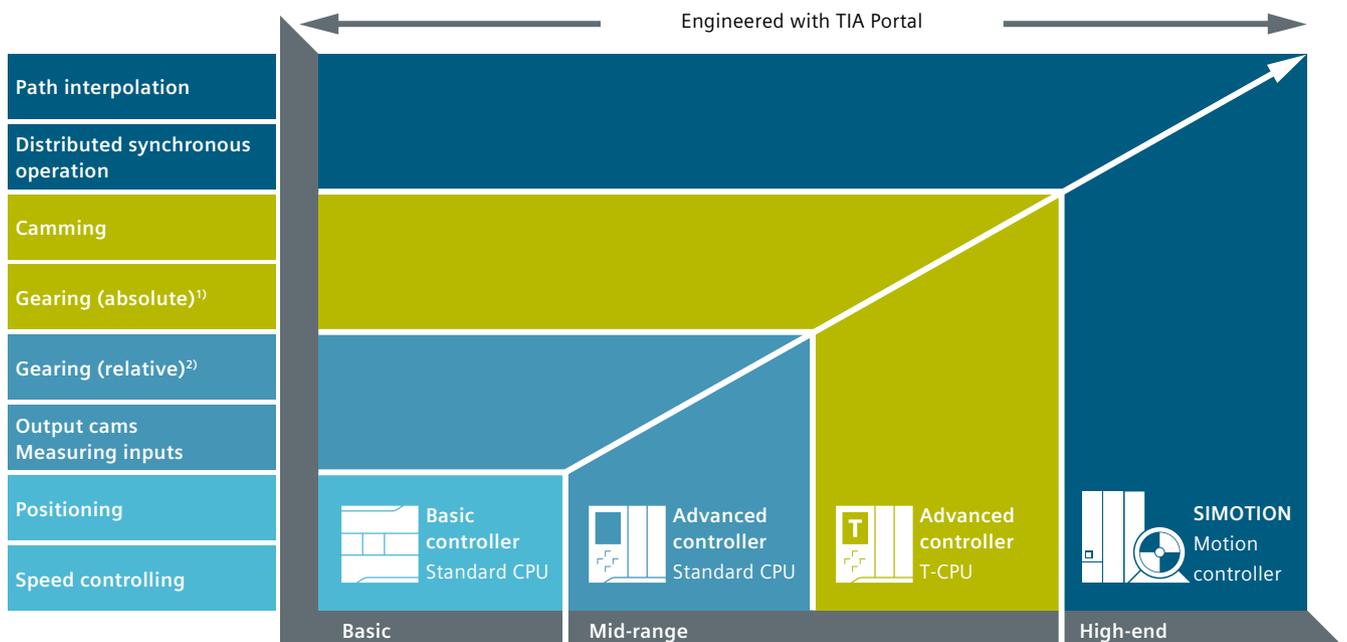
A particular highlight is the combination of several controllers, which makes it possible to synchronize hundreds of axes while ensuring optimal machine throughput.

With the modular technology object approach, SIMOTION offers a high degree of flexibility with little time and effort required for engineering.

Object-oriented programming and a programming model with units and libraries enable the creation of reusable software modules and the effective implementation of complex multi-axis machines.

Perfect integration throughout the digitalization process: With SIMOSIM, SIMOTION enables software tests during program development without hardware. The connection of simulation software such as SIMIT to SIMOTION facilitates the virtual commissioning of machines.

SIMOTION is cloud-ready with OPC UA and, for example, MindConnect IoT2040: the direct link to MindSphere for the implementation of condition monitoring and predictive maintenance.



1) Synchronization with specification of the synchronous position.

2) Synchronization without specification of the synchronous position.

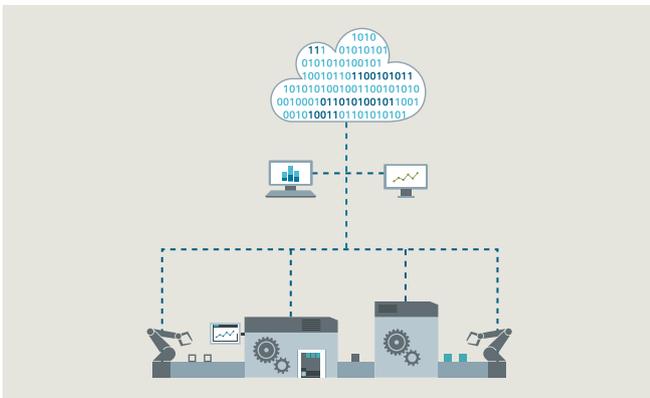
# Driving digitalization



## Object-oriented programming (OOP)

Until now, even minor function changes of machines have required the verification of the entire code. Object-oriented programming (OOP) makes this process more efficient: Machines consist of a combination of objects whose modular design is mapped in the software by OOP.

Objects can be combined as required and reused for new machines. This significantly reduces testing effort and additionally increases engineering efficiency thanks to the inheritance of the code.



## OPC UA

Steadily increasing volumes of data have to be exchanged between machines and across all automation levels. Inconsistent interfaces make this process complex and time-consuming. OPC UA changes this: As an internationally established communication standard, it enables the consistent exchange of data from the machine level to the cloud and is platform- and manufacturer-independent.

The OPC UA server is integrated into the SIMOTION software and can be integrated into any automation system.



## SIMOSIM

SIMOSIM is the simulation integrated in engineering. With SIMOSIM, a software test is possible during program development without additional hardware and including all axes and kinematics.

For you as a machine builder, this means essentially error-free software and significantly shorter commissioning times. Even adjustments that need to be made in the field can first be tested in the simulation, which results in significantly shorter downtimes.

# Flexibly designing high-performance solutions

## Simple engineering

The SCOUT engineering system makes it possible to solve motion control, PLC, and technology tasks in an integrated system and offers all the necessary tools – ranging from programming and configuration, testing and commissioning, to diagnostics.

Perfect component selection – from drive to controller: The SIZER configuration tool for Siemens Drives significantly simplifies the technical configuration. The tool supports every selection step with the description of the mechanical system as well as with the design of converters, motors, and gear units.

## Integration into TIA Portal

Integration into the Totally Integrated Automation Portal (TIA Portal) with SCOUT TIA enables seamless engineering from the controller to the HMI. This makes it possible to take advantage of the full motion control functionality of SIMOTION including its deep integration of drive technology in the TIA Portal.

## SIMOTION IT: technology accessible via the Internet

The extensive function package for diagnostics of the machine condition as well as for the maintenance and commissioning of a machine is based on the integrated Web server functions of SIMOTION. It offers numerous options to access the process data of the machine. This requires only an Ethernet cable and a computer with a Web browser installed.

## High-performance industry solutions with SIMOTION

With libraries for industry-specific applications and the SIMOTION easyProject project generator, SIMOTION simplifies the development and the integration of standard modules into an operational project. You can find preconfigured and industry-specific software modules organized in a toolbox. This enables you to implement solutions tailored to your applications within a very short period of time – ensuring high engineering efficiency at reduced costs.

Function	Description
<b>PLC</b>	Full PLC functionality (in accordance with IEC 61131-3)
<b>Motion control</b>	Extensive motion control functionality: <ul style="list-style-type: none"><li>• Output cams, cam tracks, measuring inputs, and external encoders</li><li>• Position control for electrical and hydraulic drives</li><li>• Positioning</li><li>• Synchronization and cams (even distributed across devices)</li><li>• 3D path interpolation (with a large number of kinematic transformations)</li></ul>
<b>Technology</b>	Technological functions such as PID-T1 controllers, multichannel temperature control, pressure and force control
<b>Safety Integrated</b>	SINAMICS basic and extended functions are available for your customized safety concepts. The SIMOTION D drive-based controllers additionally support the drive-integrated safety functions
<b>Task system</b>	The SIMOTION runtime system offers cyclical tasks (including synchronously with the control and interpolator cycles); sequential, time-controlled, and event-triggered tasks; as well as one task each for startup and shutdown. User programs can be appended to every task

# Optimally implementing industry applications



## SIMOTION Converting Toolbox

The SIMOTION Converting Toolbox provides typical, open standards for the configuration and programming of production machines to process continuous material webs. These application standards cover technological applications, such as for foil machines, coating systems, paper finishing systems, and cross-cutting systems.

Additional information available at: [siemens.com/converting](http://siemens.com/converting)

## SIMOTION Handling Toolbox

The SIMOTION Handling Toolbox provides you with a modular kit for every handling task, and it can also be directly integrated into the line automation. You can use the G-Code Interpreter to efficiently map geometries with contour accuracy using a standardized interpreter language such as G-Code.

Additional information available at: [siemens.com/handling](http://siemens.com/handling)



## SIMOTION Printing Toolbox

The open SIMOTION Print Standard software package is perfectly tailored to the requirements in printing and print finishing machines. It offers axis-related and standardized operating mode management for motion control. Technology functions are simple and can be implemented individually via additional modules.

Additional information available at: [siemens.com/printing](http://siemens.com/printing)

## SIMOTION Packaging Toolbox

Thanks to software support, the SIMOTION Packaging Library LPac makes it possible to implement all central packaging functions. In addition, the toolbox contains modules that facilitate the easy implementation of international standards such as OMAC and Weihenstephan. This makes it easy to implement machine-to-machine communication as well as seamless line integration.

Additional information available at: [siemens.com/packaging](http://siemens.com/packaging)



You can find additional industry solutions at: [www.siemens.com/machine-building](http://www.siemens.com/machine-building)

# Hardware platforms for every application



## Compact and highly responsive

### SIMOTION D: drive-based motion control

- Drive control module with integrated SIMOTION functionality
- Available in five different performance levels
- Particularly well suited for compact or modular machines



## Open

### SIMOTION P: PC-based motion control

- PC with MS Windows and real-time extension for SIMOTION functionality
- Available with different panels
- Particularly well suited for applications with large data volumes, PC applications, IT communication

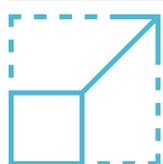


## Modular

### SIMOTION C: in controller design

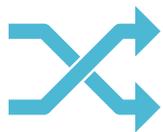
- CPU with digital inputs/outputs and interfaces for analog, stepper, and hydraulic drives
- Expandable with peripheral modules from the SIMATIC S7-300 range
- Particularly well suited for retrofitting production machines

# Exploiting all the benefits of modularity



## Scalable hardware

- Full performance range
  - Scalable in five performance classes: from a single axis with SIMOTION D410-2 to the high-performance SIMOTION D455-2 multi-axis system with 128 axes
  - With PC-based computing power up to 128 axes using SIMOTION P320-4
  - Hundreds of axes can be synchronized with distributed synchronous operation and PROFINET



## Flexible topologies

- Clock synchronicity of all components via PROFINET IO with IRT enables:
  - Central topologies: one controller with up to 128 axes
  - Decentral topologies: several controllers for multi-axis machines and modular machine concepts
- Separate engineering projects for different machine modules synchronous in the entire machine



## Modular software

- Technological objects: flexible connection, activation/deactivation of functions including distribution to individual controllers
- Deep drive integration: simple drive assignment and automatic comparison of technological data (drive/axis)
- Modular programming model with units and libraries for the development of independent, reusable software modules
- Object-oriented programming for efficient software development and reduced testing effort



## Modular machine

- Libraries for industry-specific applications and SIMOTION easyProject project generator for the simplified development and the integration of preconfigured standard modules into an operational project
- Adaptability of the modules including the drive configuration during machine commissioning – even via HMI and Internet

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information



## High-end performance meets modularity

- **Optimal performance range for all machine concepts and complex multi-axis machines**
- **High engineering efficiency thanks to modular software**
- **Strong industry focus with application-specific solutions**
- **Perfect integration throughout the entire digitalization process – from integrated engineering to predictive maintenance**

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