Advanced Controller SIMATIC S7-1500

Increased productivity with the ultimate power

siemens.com/s7-1500

Demands of the automation market are user-friendly products, high performance and a scalable product portfolio

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Globalization
- Global service network for automation suppliers
- Worldwide availability of products

Easy handling
- Easy installation, wiring and fast, efficient commissioning
- Efficient engineering

Protection of humans and machines
- Integrated safety and security functions

Digitalization
- Extensive simulation and standardization opportunities
- Cloud connectivity
- Optimization and transparency through data analyses
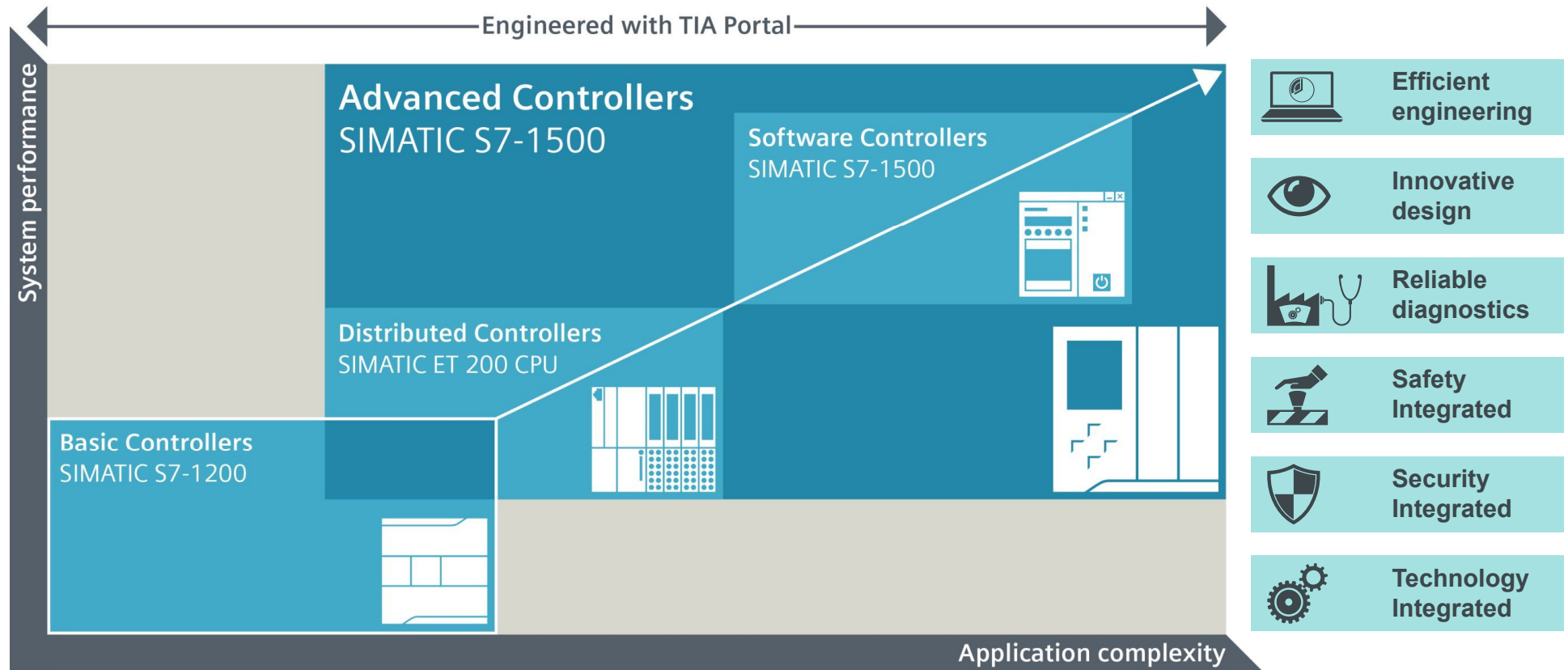
Plant availability
- Fast error localization and elimination to reduce downtime
- High spare part compatibility and availability

Increased production output
- High communication performance, fastest system response and efficient data processing

The SIMATIC Controllers portfolio offers always the right controller – plus integrated added value!

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System performance ↑

Engineered with TIA Portal

Advanced Controllers
SIMATIC S7-1500

Software Controllers
SIMATIC S7-1500

Distributed Controllers
SIMATIC ET 200 CPU

Basic Controllers
SIMATIC S7-1200

Application complexity →

- **Efficient engineering**
- **Innovative design**
- **Reliable diagnostics**
- **Safety Integrated**
- **Security Integrated**
- **Technology Integrated**

Advanced Controller – SIMATIC S7-1500 CPU
Increased productivity through ultimate power

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Security Integrated +
- Integrated copy and know-how protection function secures intellectual property
- Improved protection against manipulation and cyber threats (authentication)

Safety Integrated +
- One controller for standard and fail-safe tasks, one network for standard and failsafe communication
- High-density channels of a failsafe IO module can be directly addressed from the engineering

High Performance +
- Higher productivity and product quality thanks to the backplane bus and shortest reaction times
- PROFINET with deterministic time response ensure reproducibility and precision within µs
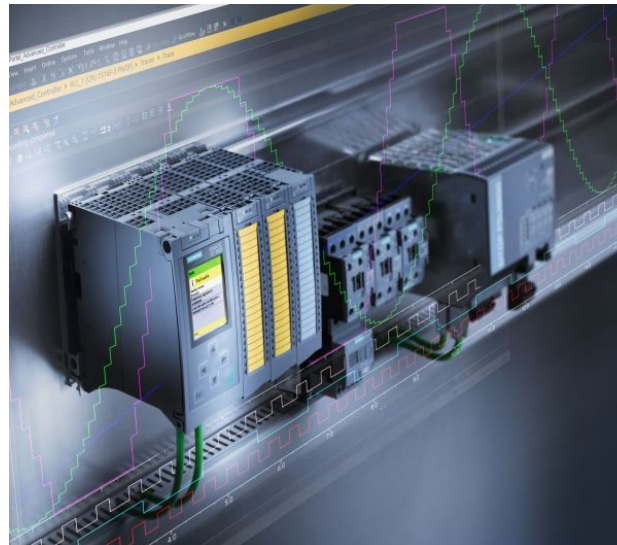
Efficient Engineering +
- Support of all IEC 61131-3 programming languages(LAD/FBD, STL, SCL and Graph)
- Integration of high-level language (C/C++) for Multifunctional Platform CPU 1518(F)-4 PN/DP MFP through SIMATIC ODK 1500S

Reliable Diagnostics +
- The automatic generation of system and user diagnostics enables quick error detection
- Any errors can be quickly localized on-site thanks to 1:1 LED channel assignment

Technology Integrated +
- Simple to complexe Motion Control task can be programmed directly in the controller (e.g. speed-controlled axes, camming, …)
- A variety of technology functions can be implemented with I/O modules (e.g. PWM)
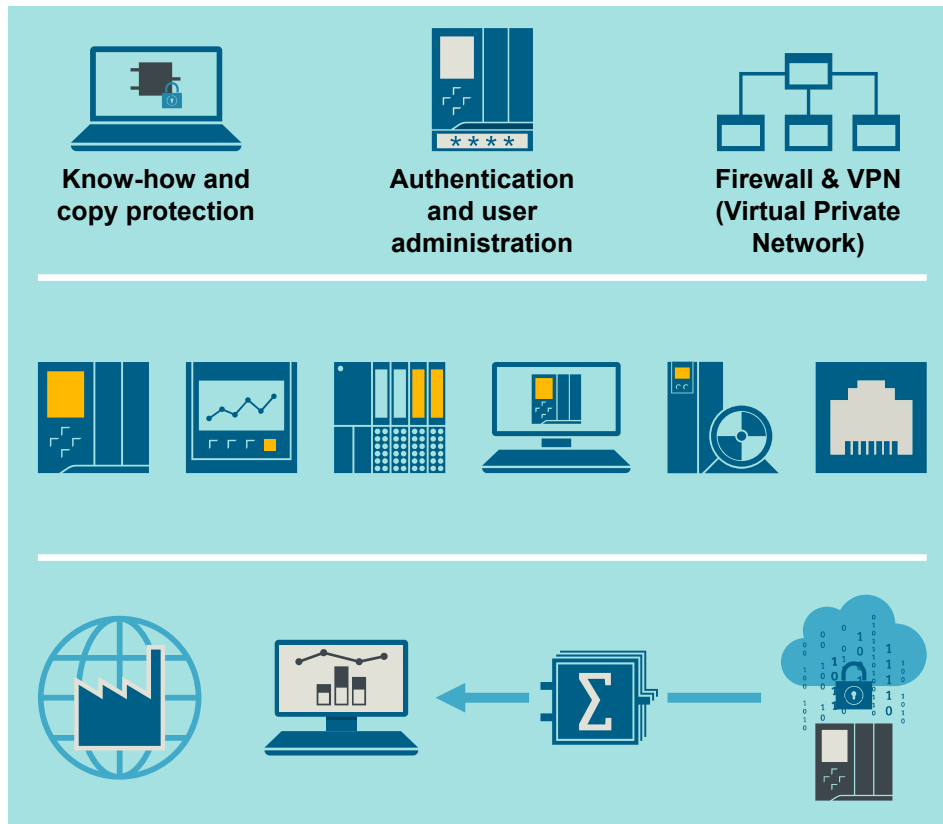
Innovative Design +
- CPU display supports diagnostics, initial commissioning and service (tag status, IP address assignment, backup, …)
- Convenient wiring thanks to pre-wiring position of the I/O modules and jumper links

Advanced Controller – SIMATIC S7-1500 CPU
Innovative system functions for more productivity!

Know-how and copy protection

Authentication and user administration

Firewall & VPN (Virtual Private Network)

Protection of the intellectual property and investment spent

… thanks to security integrated function, like access, know-how and manipulations protection

Completely integrated safety features

… a single engineering environment for the standard and the safety-related automation

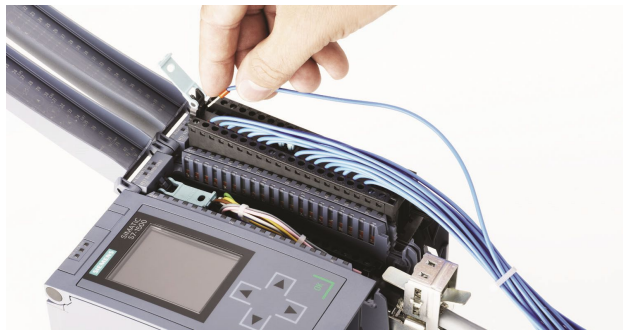## Predictive maintenance and digital services through data analysis with Mindsphere (Siemens Cloud for Industry)

… continuous monitoring of the machine performance and precise planning of the service assignment

Advanced Controller – SIMATIC S7-1500 CPU
Increased productivity through ultimate power

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SIMATIC S7-1500

Feature / Function		Benefit
Efficient Engineering • Support of various programming languages (LAD/FBD, STL, SCL and Graph and C/C++[1])	▶	• Efficient commissioning and service through innovative download behavior • Flexible and free program design
Simplified Maintenance • Thanks to standardized machine and plant diagnosis ProDiag • Integrated system diagnosis possible throughout all system components	▶	• Efficient diagnostics of process disruptions • Fast spotting of automation system failures
Integrated Trace Feature • Trace Editor integrated in the engineering • Trace View also part of the web server	▶	• Program and application diagnostics in real time to spot even sporadic failures • Error debugging without engineering
Highest user-friendliness • Common front connector • Pre-wiring position	▶	• Simple handling of wiring and easy commissioning directly at the device
High connectivity • OPC UA data access on the CPU	▶	• Vertical connection also to 3rd party devices and up to the ERP level

[1] C/C++ as library function or independent applications with the Multifunctional Platform CPU 1518(F)-4 PN/DP MFP

Advanced Controller – SIMATIC S7-1500 Compact CPU
The Advanced Controller in compact design and footprint

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SIMATIC S7-1500C:
CPU 1511C-1 PN and
CPU 1512C-1 PN

Feature / Function		Benefit
Two compact CPUs with integrated analogue and digital inputs and outputs • CPU 1511C-1PN • CPU 1512C-1PN	▶	• Well-priced entry level model of the S7-1500 system with periphery on board and a high number of integrated technological functions • Reduced variety of parts and types

• **Integrated counting measurement or frequency measurement with 100 kHz fast inputs**
• **Integrated 100 kHz fast outputs, usable for:**
  • PTO – stepping motor control
  • PWM – pulse width modulation
  • Frequency output
	▶	• Technological functionality integrated with on-board periphery
		• Integrated technological functions for an easy and direct device connection, e.g. step drives, valves, …

Less width with combined integrated inputs and outputs as 25 mm wide Push-In contacts	▶	• Especially space-saving construction form by retaining the system characteristics of the S7-1500

Advanced Controller – SIMATIC S7-1500 Technology-CPU
Scalable motion control in the advanced controller portfolio

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SIMATIC S7-1500T:
CPU 1511T/TF,
CPU 1515 T/TF,
CPU 1516 T/TF,
CPU 1517T/TF,
TO Kinematics

Feature / Function	Benefits
Extended Motion Control functions: • Speed-, positioning axis • Gearing • Camming • Kinematics with up to 4 interpolating axis	**Simple programming of sophisticated Motion Control functions:** • in the well known SIMATIC environment • for a high machine flexibility • E.g. Pick & Place, assembly or handling tasks based on PLCopen
Kinematic configurator and trace with path recording and kinematic control panel	**Simple 3D visualization and diagnosis** of movements as well as **comminsioning** of the kinematics
Cam editor integrated in the TIA Portal • Simple definition of non-linear dependencies between leading and following axes	**High engineering efficiency** through • graphic-based and tabular configuration • optimization of cams
Consistent functionality and programming of S7-1500 throughout to S7-1500 T-CPU	**Seamless extension** of the Motion Control functionality of a standard CPU in TIA Portal
Failsafe PLC with extended Motion Control functions	Standard automation, Motion Control and safety functions **inside one CPU**

Advanced Controller – SIMATIC Multifunctional Platform
The S7-1500 Controller with flexible C/C++ Integration

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Multifunktionale Plattform:
CPU 1518(F)-4 PN/DP MFP

Feature / Function	Benefit
• Integration of high level language application and PLC program **into one hardware**	• **Reduced space** • **Robustness** of a SIMATIC S7
• **PLC independant applications** in C/C++ for any application (e.g. protocoll converter, database, …)	• **Simplified creation and reuse** of customer specific application in high level language
• Code generation with **model based development** tool, e.g. Matlab Simulink	• Direct integration of **complexe functions**
• Regular firmware updates stand for **highest security standards**	• Users solely care about the **implementation of the automation task**
• **Closed embedded operating systems**	• **Stability and long term availability**

Product overview – SIMATIC S7-1500
The right CPU for every application

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	Compact		Standard						Technology				MFP
Types of CPU	1511C-1 PN	1512C-1 PN	1511F-1 PN	1513F-1 PN	1515F-2 PN	1516F-3 PN/DP	1517F-3 PN/DP	1518F-4 PN/DP	1511TF-1 PN	1515TF-2 PN	1516TF-3 PN/DP	1517TF-3 PN/DP	1518F-4 PN/DP MFP
Interfaces	[1] [1]	[1] [1]	[1] [1]	[1] [1]	[1][2] [1]	[1][2] [1][3]	[1][2] [1][3]	[1][2][4] [1][3]	[1] [1]	[1][2] [1]	[1][2] [1][3]	[1][2] [1][3]	[1][2][4] [1][3]
Program memory (kB or MB)	175	250	150/225	300/450	500/750	1/1.5 MB	2/3 MB	4/6 MB	225/225	750/750	1.5/1.5 MB	3/3 MB	4/6 MB
Data memory (MB)	1	1	1	1,5	3	5	8	20	1	3	5	8	20
													50/500 MB *)
Bit performance (ns)	60	48	60	40	30	10	2	1	60	30	10	2	1
Connections, max.	96	128	96	128	192	256	320	384	96	192	256	320	384
Motion Control													
- Resources, max.	800	800	800	800	2400	2400	10240	10240	800 + 40	2400 + 120	6400 + 192	10240 + 256	10240
Width (mm)	85	110	35	35	70	70	175	175	35	70	175	175	175

■ PROFIBUS ■ PROFINET / IE

*) additional 50 MB memory for C/C++ functions (ODK) / 500 MB for applications (Runtime, API)

Dieffenbacher, wood industry
Particle board production with TIA Portal and S7-1500

Project information ⓘ

Realizing a new plant for a new particle board production for the company Pfleiderer.

OEM wood industry	Eppingen/Germany

Products used 📦

Previous system	Now
S7-400	S7-1500
ET 200S	ET 200SP
WinCC V7	WinCC Professional
Third party product	SINAMICS S120
Third party product	SITOP PSU100S
PROFIBUS	PROFINET
Trace: SPS Analyzer	Integrated trace function

Customer benefits ➕

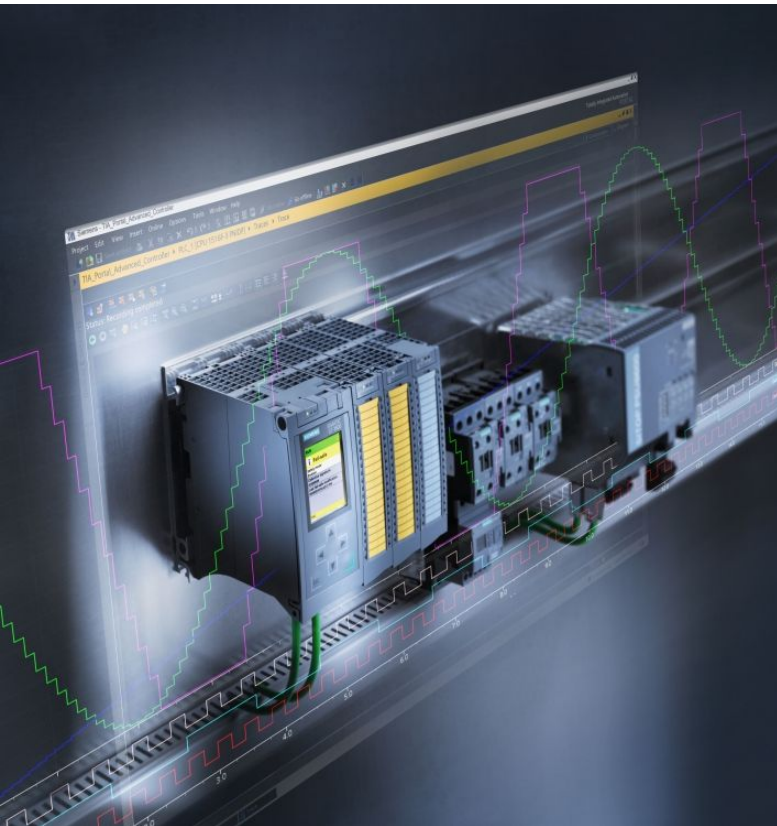| Reduced time of realization	**TIA Portal** Time savings at communication programming
Reduced efforts at start-up	**TIA Portal** Fast error identification
Reduced engineering efforts for scalable small and large projects	Scalability of **S7-1500 family**
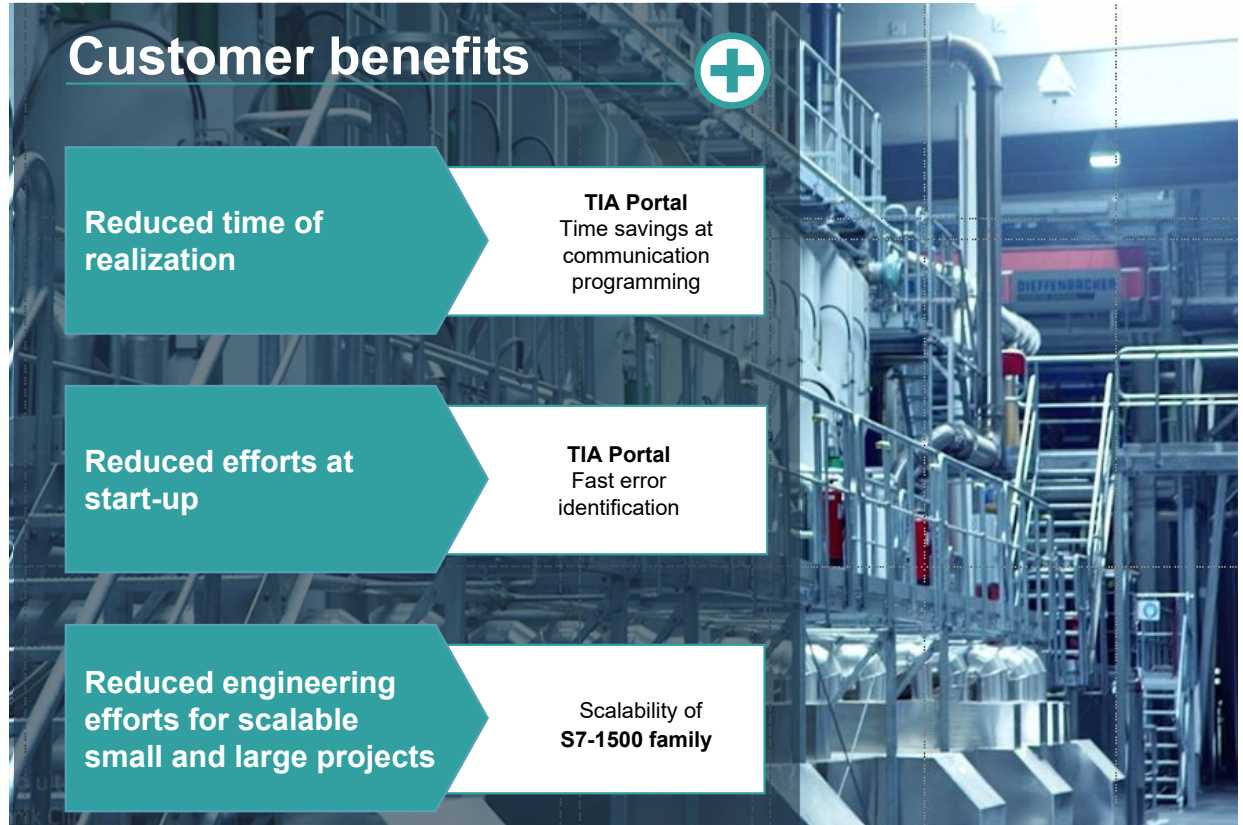
Advanced Controller SIMATIC S7-1500 CPU
… learn more!

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Starter kits

Our starter kit is the perfect basis for a fast and easy start!

https://www.siemens.com/s7-1500-starter-kits

TIA Portal Tutorial Center

Various videos give you an overview of the general functions and tools of the TIA Portal and SIMATIC S7-1500.

http://www.siemens.com/tia-portal-tutorial-center

Getting Started

Easy insertion into the new controller family

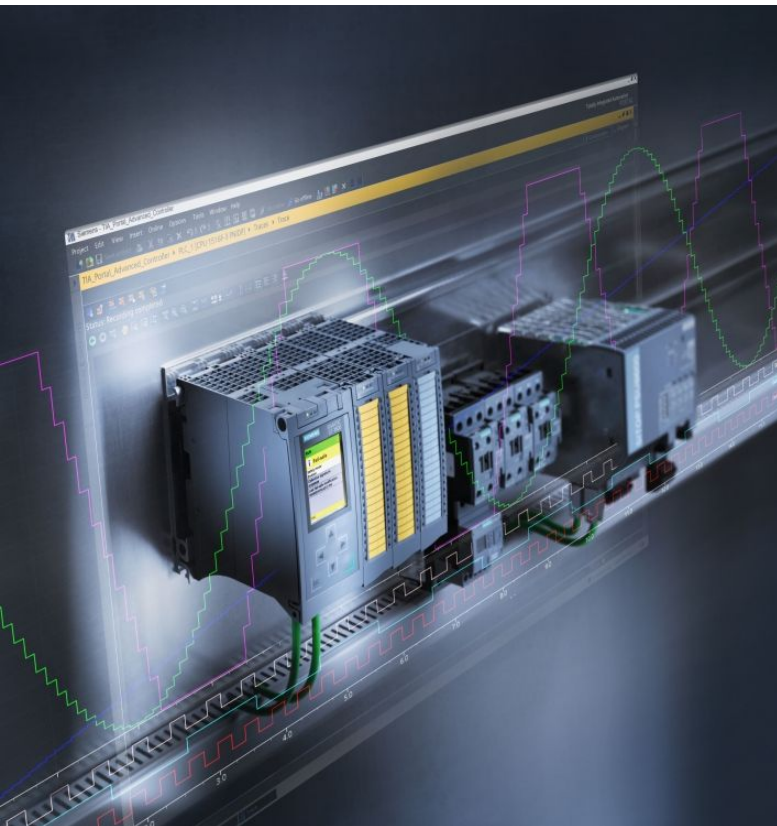• Explore the new possibilities and learn more about the new hardware

http://www.siemens.de/getting-started/s7-1500

Use cases

From customer to customer!

• Customer reporting about their experience with our products

https://webservices.siemens.com/referenzen/

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