Highlights

- **Ready for the future with PROFINET**

- **PROFINET and OPC UA – the perfect duo in a shared network**

- **Powerful communication at field and control level**

- **From PROFIBUS to PROFINET – easy, step-by-step changeover**

- **Time-Sensitive Networking – turbo power for digitalization**

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SIEMENS
Ingenuity for life

PROFINET – the pulse of the digital enterprise.

Into the future together with OPC UA and TSN.

Intelligent networking for the digital factory...

Increasing digitalization of production processes require more and more openness, flexibility, efficiency and performance in industrial communication. In order to ensure fast, reliable manufacture of individual products while meeting tight delivery schedules, production must be able to communicate and respond with extreme agility.

A network for the future
Increasingly, the performance of industrial networks is key to the growing demands of the industry, and PROFINET plays an important role here as the leading Industrial Ethernet standard for automation.

Thanks to its characteristics – from its openness and vendor-neutrality to deterministic or hard real-time communication – you are well equipped for the digital transformation and the world of Industrie 4.0.
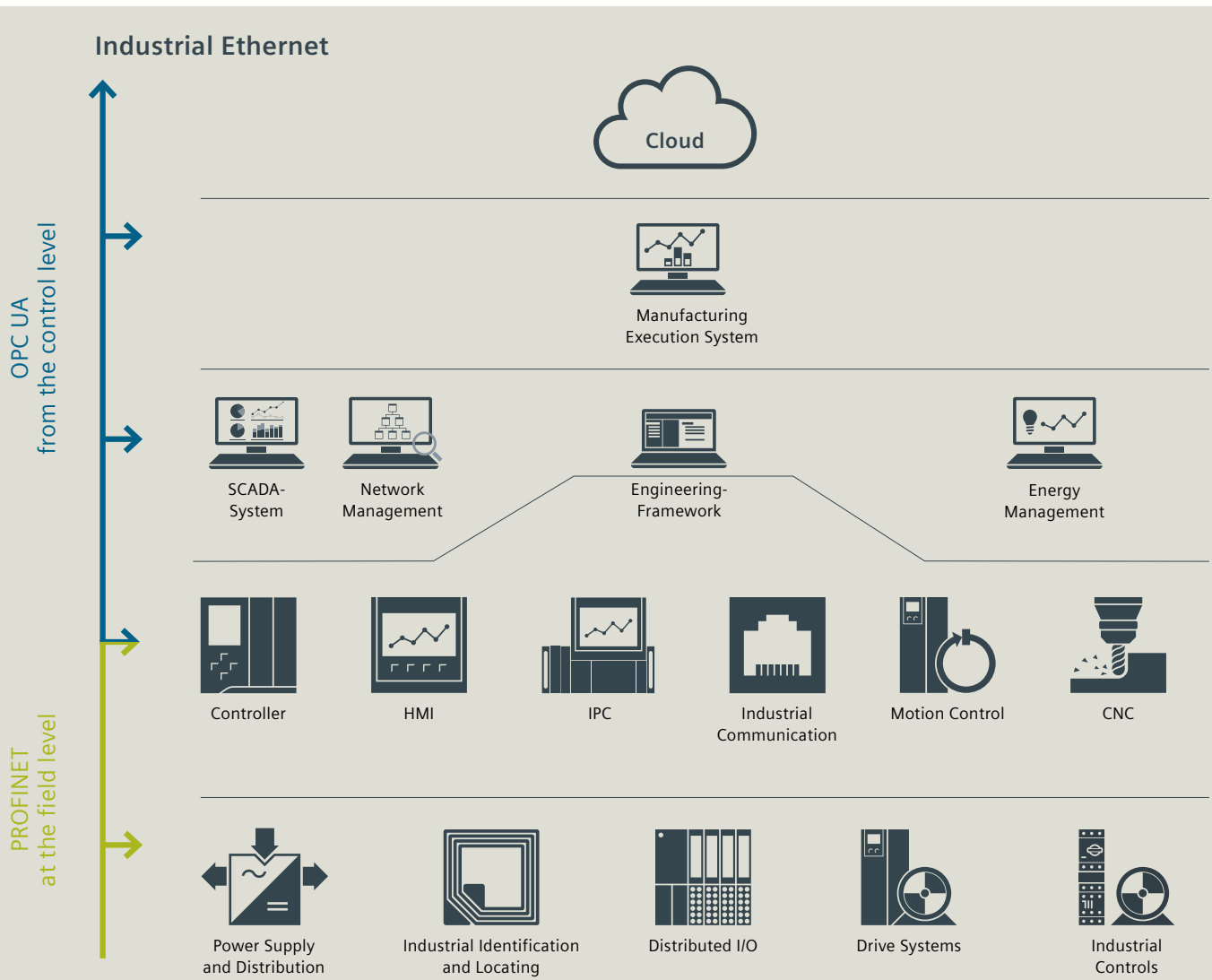
Regardless of whether you integrate new communication standards such as OPC UA, connect IT and production networks, or take the next big step with Time-Sensitive Networking (TSN) – the turbo for PROFINET and OPC UA.

The prospects for digital enterprises are excellent!

... with the dynamic duo: PROFINET and OPC UA

PROFINET is optimally complemented by OPC UA. The two standards work together to smooth the path to seamless communication in the world of automation and IT, and perfectly combine the advantages of both in a single Industrial Ethernet network.

PROFINET scores at the field level with deterministics, a large bandwidth for increasing numbers of signals, and strict real-time capability for faster and faster applications. The strengths of OPC UA, on the other hand, lie mainly in vertical integration and machine-to-machine (M2M) communication.

Industrial Ethernet

OPC UA from the control level

Cloud

Manufacturing Execution System

SCADA-System

Network Management

Engineering-Framework

Energy Management

PROFINET at the field level

Controller

HMI

IPC

Industrial Communication

Motion Control

CNC

Power Supply and Distribution

Industrial Identification and Locating

Distributed I/O

Drive Systems

Industrial Controls

As open communication standards, PROFINET and OPC UA play an important role in the entire Totally Integrated Automation (TIA) portfolio from Siemens.

Your benefits at the field and control level …

… with OPC UA from the control level

OPC UA shows its strengths from the control level upwards – for example for communication from machine-to-machine and from machine to the MES and ERP levels, or to the cloud (such as MindSphere).

Openness means …

- Vendor and platform-neutrality: your preferred configuration for every control type
- Direct implementation in sensors, controllers, HMIs and ERP systems – for all operating systems
- Compatibility with other standards, e.g. unlimited operation in parallel with PROFINET

Flexibility means …

- Easy scalability – for future expansions
- Communication mechanisms for different demands – i.e. Client/Server or Publish/Subscribe (PubSub) communication

… with PROFINET at the field level

How do you benefit fourfold when you use PROFINET at field level? It's simple: because this standard is far better when it comes to openness, flexibility, efficiency, and performance.

Openness means …

- Vendor-neutrality – your preferred configuration for every control type
- Assured further development – thanks to IEEE conformity
- Use of web tools – access from any location, e.g. to the integrated web server in field devices

Flexibility means …

- "Perfect fit" topologies – networks possible in line, ring, star or tree form
- Functional safety with PROFIsafe – to protect humans, machines and the environment, including wirelessly via industrial WLAN
- Open standard – connectivity of standard Ethernet as well as automation devices

... with open and platform-neutral communication

Efficiency means ...

- Easy networking – Ethernet-based
- Easy integration – using the existing Industrial Ethernet and PROFINET infrastructure
- Unambiguous data interpretation – thanks to integrated semantic data description
- The ability to share information models, no matter how complex

Security means ...

- Proven security mechanisms – like combined methods for authentication, authorization, and encryption
- Secured communication – directly in the protocol with no additional hardware needed

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Efficiency means ...

- Reduced wiring overhead – a single cable covers machine and standard IT data
- Devices are easy to swap – the I/O controller will recognize and "baptize" the new device
- Easy cabling – thanks to FastConnect
- Device/network diagnostics – even from remote locations using remote access
- High energy efficiency – because consumers not currently needed are switched off using PROFIenergy

Performance means ...

- Large quantity structures:
  connect up to 1024 devices per network
- Large bandwidth: benefit from high data throughput
- Deterministics: achieve extremely accurate cycles of 125 µs and jitter of less than 1 µs – as the basis for high product quality
- Fast start-up: PROFINET identifies devices in under 500 ms and connects them with the I/O controller
- Higher plant availability: PROFINET makes redundant ring structures available with bumpless switchover

PROFINET – at home in every industry

PROFINET in the manufacturing industry

Innovative machine and plant concepts, easy machine integration, faster time-to-market, improved performance and reliability: PROFINET lets you generate end-to-end competitive advantages – from engineering to the operating phase and services.

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PROFINET in the process industry

Flexibility, availability and reliability, and ease of operation – PROFINET satisfies the demands of the process industry at a very high level, offering end-to-end, secure, and rapid communication at all points in your system.

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Haven't switched yet? Make the change from PROFIBUS to PROFINET now – it's quick and easy!

Upgrading from PROFIBUS to PROFINET offers a lot of chances and opportunities. PROFINET combines the benefits of both standards and is the system of the future. So give your investment the solid protection that PROFINET offers: migrate your existing PROFIBUS networks to PROFINET individually, step-by-step, and with no data loss. Then continue using your PROFIBUS networks with no problems!

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... and if it's a little more special

You can quickly and easily implement individual automation solutions using the supplementary PROFINET profiles PROFIdrive, PROFIsafe, and PROFIenergy.

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PROFIdrive:
The perfect interoperable interface for your drive technology

PROFIsafe:
Communication – including wireless – with a safety focus protects people, the environment, and your plants

PROFIenergy:
Communicate, switch off, save

Straight talk: TSN – our commitment to digitalization

From the automotive industry and machine-building to the food and beverage industry: the Ethernet-based technology of Time-Sensitive Networking (TSN) offers decisive advantages for industrial production, including reserved bandwidths, Quality of Service (QoS) mechanisms, low transmission latency, and parallel transmission of multiple protocols – including real-time ones.

TSN creates a standardized basic technology within the framework of IEEE 802.1. It comprises a series of individual standards that exclusively pertains to the OSI layer 2 of communication. This means that the user interface remains unchanged even with TSN. Both PROFINET and OPC UA can use TSN as a kind of "turbo power."

Straight talk: TSN – the answer to questions like …

- What makes PROFINET networks more robust in response to high network loads?

- What ensures that PROFINET-standard hardware can also be used for isochronous applications?

- What ensures scalable bandwidths in PROFINET networks (100/1.000 Mbit/s) and OPC UA networks (100/1.000/10.000 Mbit/s)?

- What makes it possible to transmit several protocols (including real-time capable protocols) simultaneously?

- What improves the Quality of Service (QoS) in OPC UA networks?

Stay up to date with TSN:
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