SIEMENS

Ingenuity for life

PROFINET – the pulse of the digital enterprise

Empower your industrial communication network

siemens.com/profinet

PROFINET:
Fit for the digital future ...

Digitalization fundamentally changes industry, making it possible to meet unique customer demands as economically as mass-produced products. Through networking on all automation levels, it's possible to better organize and optimize innovation, production, and maintenance processes more quickly than ever before.
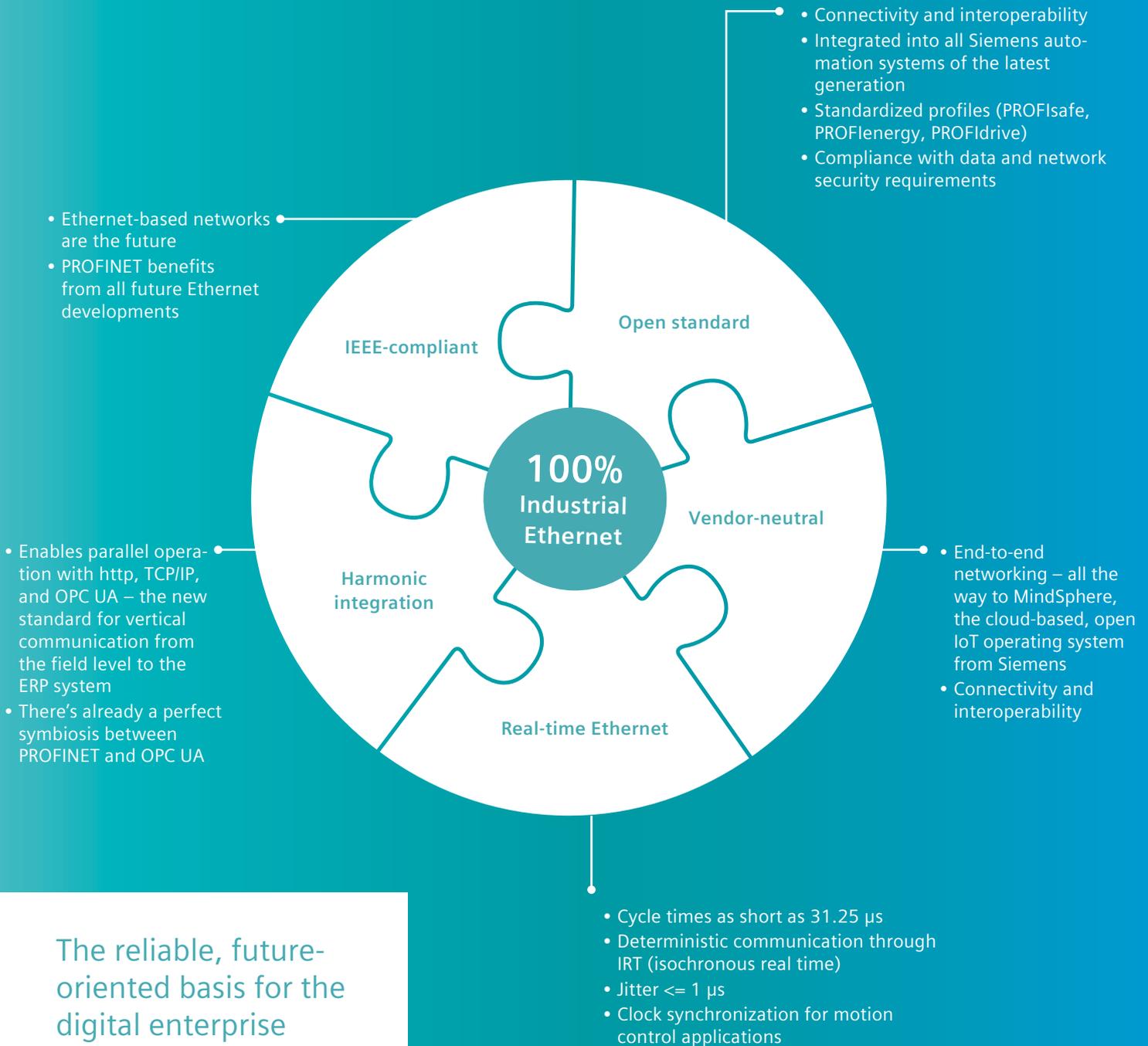
Digitalization: Networking is key
Industrial communication is the "nervous system" of this networked world. As the leading Industrial Ethernet standard for automation, PROFINET plays an essential role. Thanks to its properties – from openness and vendor neutrality to deterministic communication and hard

real-time capability – you're optimally equipped for the digital transformation of industry. Regardless of whether you want to integrate new communications standards like OPC UA, combine IT and production networks, or adapt your production landscape to new requirements more quickly.

Continue writing your success story – with PROFINET, the pulse of the digital enterprise.

... with the number 1 Industrial Ethernet standard!

PROFINET gives you the certainty of a secure investment in the future, because PROFINET is 100 percent Industrial Ethernet – and already includes all the essentials for an increasingly digitalized production environment. An overview:
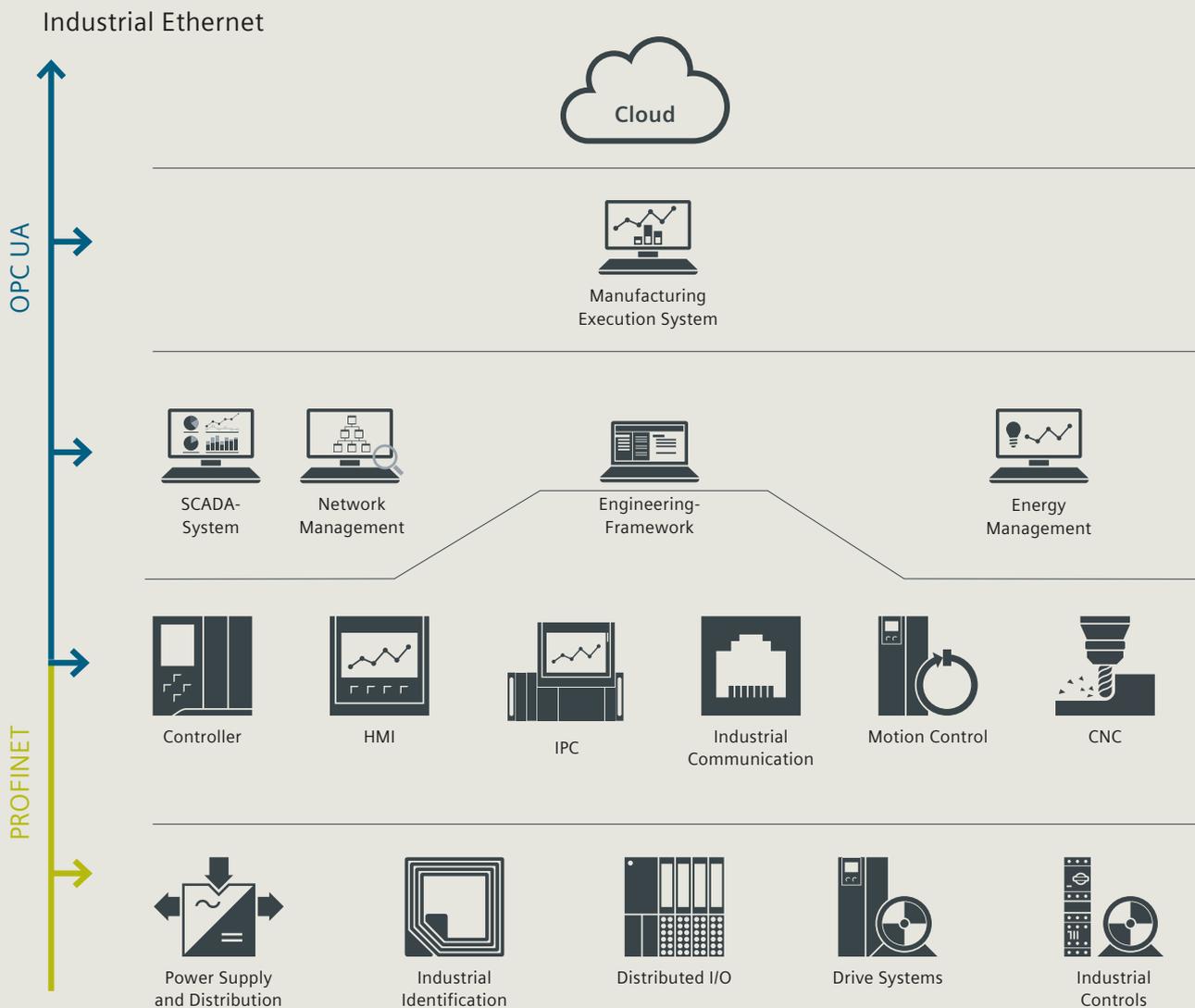
- Connectivity and interoperability
- Integrated into all Siemens automation systems of the latest generation
- Standardized profiles (PROFIsafe, PROFIenergy, PROFIdrive)
- Compliance with data and network security requirements

- Ethernet-based networks are the future
- PROFINET benefits from all future Ethernet developments

IEEE-compliant

Open standard

100% Industrial Ethernet

Vendor-neutral

Harmonic integration

Real-time Ethernet

- Enables parallel operation with http, TCP/IP, and OPC UA – the new standard for vertical communication from the field level to the ERP system
- There's already a perfect symbiosis between PROFINET and OPC UA

- End-to-end networking – all the way to MindSphere, the cloud-based, open IoT operating system from Siemens
- Connectivity and interoperability

The reliable, future-oriented basis for the digital enterprise

- Cycle times as short as 31.25 µs
- Deterministic communication through IRT (isochronous real time)
- Jitter <= 1 µs
- Clock synchronization for motion control applications

PROFINET and OPC UA:
How the digital enterprise communicates

OPC UA has established itself as a communications standard in digitalized production. Symbiosis with PROFINET provides great advantages: On both the field and controller level, PROFINET scores with deterministics, a large bandwidth for more and more signals, and hard real-time capability for increasingly fast applications.

With its open interfaces, OPC UA is ideal for continuing the communications line to higher levels, from the controller to the ERP level and the cloud (MindSphere).

The symbiosis of PROFINET and OPC UA smoothes the way for end-to-end vertical communication in the automation and IT environment – future-oriented thanks to standard Ethernet, and all with just one cable.

Industrial Ethernet

Cloud

Manufacturing
Execution System

SCADA-
System

Network
Management

Engineering-
Framework

Energy
Management

Controller

HMI

IPC

Industrial
Communication

Motion Control

CNC

Power Supply
and Distribution

Industrial
Identification

Distributed I/O

Drive Systems

Industrial
Controls

OPC UA

PROFINET

As an open communications standard, OPC UA plays an important role in Siemens' entire Totally Integrated Automation (TIA) portfolio.

PROFINET – at home in every industry

As the basis for smooth production processes – whether it's the manufacturing or process industry – PROFINET guarantees fast, reliable communication in a variety of sectors.

PROFINET in the manufacturing industry

More and more field devices are communicating – and thanks to the open Ethernet standard, you can integrate them into your network. Connectivity and interoperability have always been among PROFINET's strengths. Where speed is of the essence, PROFINET supports applications with up to 31.25 µs – while fully meeting your demands for data and network security.

Thanks to its great flexibility, PROFINET enables innovative machine and plant concepts – including the integration of mobile devices, even where access is a challenge.

PROFINET in the process industry

PROFINET enables plant-wide consistent, safe, and fast communication. Achieve outstanding performance by meeting all process-industry specific requirements – from flexibility to availability and reliability, combined with easy handling.

PROFINET also stands for consistent investment protection – meaning that you can migrate your existing PROFIBUS networks to PROFINET efficiently and with no loss of data. Choose your individual way, rely on step-by-step migration – and continue to operate PROFIBUS networks trouble-free!

Three specialists for specific tasks

PROFIdrive:
Implement drive concepts quickly and easily

Your benefits:
- Uniform application interface for motion control and drive-based safety
- Replaceability of devices
- Diagnostics via bus

PROFIsafe:
Safe is safe – open, integrated, and proven

Your benefits:
- Safe machines and plants
- Only one communications line via PROFINET
- Fail-safe wireless communication via Industrial Wireless LAN (IWLAN)

PROFIenergy:
Communicate, disconnect, save

Your benefits:
- Collecting measured energy data in a standardized way
- Coordinated disconnection and connection of complete plant parts
- Eliminates the need for permanently wired external systems

PROFINET: All the advantages are on your side ...

Why do you immediately quadruple your advantages with PROFINET? It's simple: Because this standard sets the benchmark not only for openness, flexibility, efficiency, and performance – but for much more.

Openness means ...

- Vendor-neutrality: Implement your dream configuration – for any controller type
- Assured ongoing development: Thanks to IEEE compliance, you benefit from all the innovations of the Ethernet standard
- Use of Web tools: For example, access the integrated Web server for your field devices – regardless of location
- Compatibility with other standards such as OPC UA

Flexibility means ...

- Perfectly tailored topologies: Implement your network as a line, ring, star, or tree network – according to your requirements
- Functional safety of your application for the reliable protection of people, machines, and the environment, including wirelessly via Industrial Wireless LAN
- Open standard: Connect both automation and other Ethernet devices – that's digitalization!

Efficiency means ...

- One cable: Integrate machine and standard IT data to reduce cabling and training outlay
- Easy device replacement: The I/O controller detects and "registers" the new device
- Simple wiring: Set up your network with FastConnect even with no specialized knowledge
- Device/network diagnostics even from remote locations via remote access
- High energy efficiency: PROFIenergy shuts down individual consumers or entire production units when their operation isn't needed

Performance means ...

- Large-quantity structures: Connect up to 1,024 devices per network
- High bandwidth: Benefit from high data throughput
- Deterministics: Achieve extremely precise cycles with a jitter of less than 1 μs – as the basis for high product quality
- Fast run-up: PROFINET identifies devices in as little as < 500 ms and connects them to the I/O controller
- Higher plant availability: PROFINET provides redundant ring structures with a bumpless switchover

… with a direct connection to the future

How can PROFINET give you a successful start on the future? With its forward-looking, state-of-the-art properties, openness to future developments – and far-reaching support as an established standard.

Digitalization in the production industry continues to spread at breakneck speed. More and more objects in the production environment will be feeding data into the Internet of Things (IoT). Product and production lifecycles, IT and automation networks are merging. Whole business models will be transformed because data is becoming the most important carrier of added value.

IEEE drives development – PROFINET is at the forefront
Because PROFINET is fully IEEE-compliant and participates in all related innovations, you're already perfectly prepared for these developments today – whether its enormous bandwidths accompanied by exploding numbers of network users, increasing wireless communications applications, or end-to-end networking from an individual sensor to MindSphere, the open, cloud-based IoT operating system from Siemens.

With PROFINET, you're fit for the digital future, which has long since begun.

Openness

Manufacturer and platform neutrality

Security Large networks Safety

Redundancy Big Data/Smart Data

Connectivity from the field to the cloud

Standardization

Deterministics Higher bandwidths

New with PROFINET:

- Equipped for the future with PROFINET
- PROFINET for process automation now universally available
- Openness and manufacturer neutrality – for future-oriented communication
- Flexibility – network topology based on requirements
- Efficiency – including extreme energy efficiency through selective disconnection
- Performance – up to 1,024 devices per network

Find out more:
siemens.com/profinet