

Industrial Networks

Driving Digitalization for critical infrastructure

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Digitalization and big data address key industry trends



Industry trends

Time to market



- Fast innovation
- More complex products
- ...

Flexibility



- Individualized mass production
- Volatile markets
-

Quality



- Closed-loop quality
- Traceability
- ...

Efficiency



- Resource & energy efficiency
- Demanded product / quantity
- ...

Digitalization

Industrie 4.0



Industrial Internet of Things (IIoT)

Big Data

Digitalization will change the way you work...

Yesterday Non-digital industry

Manual processes

Intransparent processes

Separated islands of automation

Legacy systems

No central alarms

Tomorrow Digitalized manufacturing

Secured remote access

Industrial security

Full automation

Mobile applications

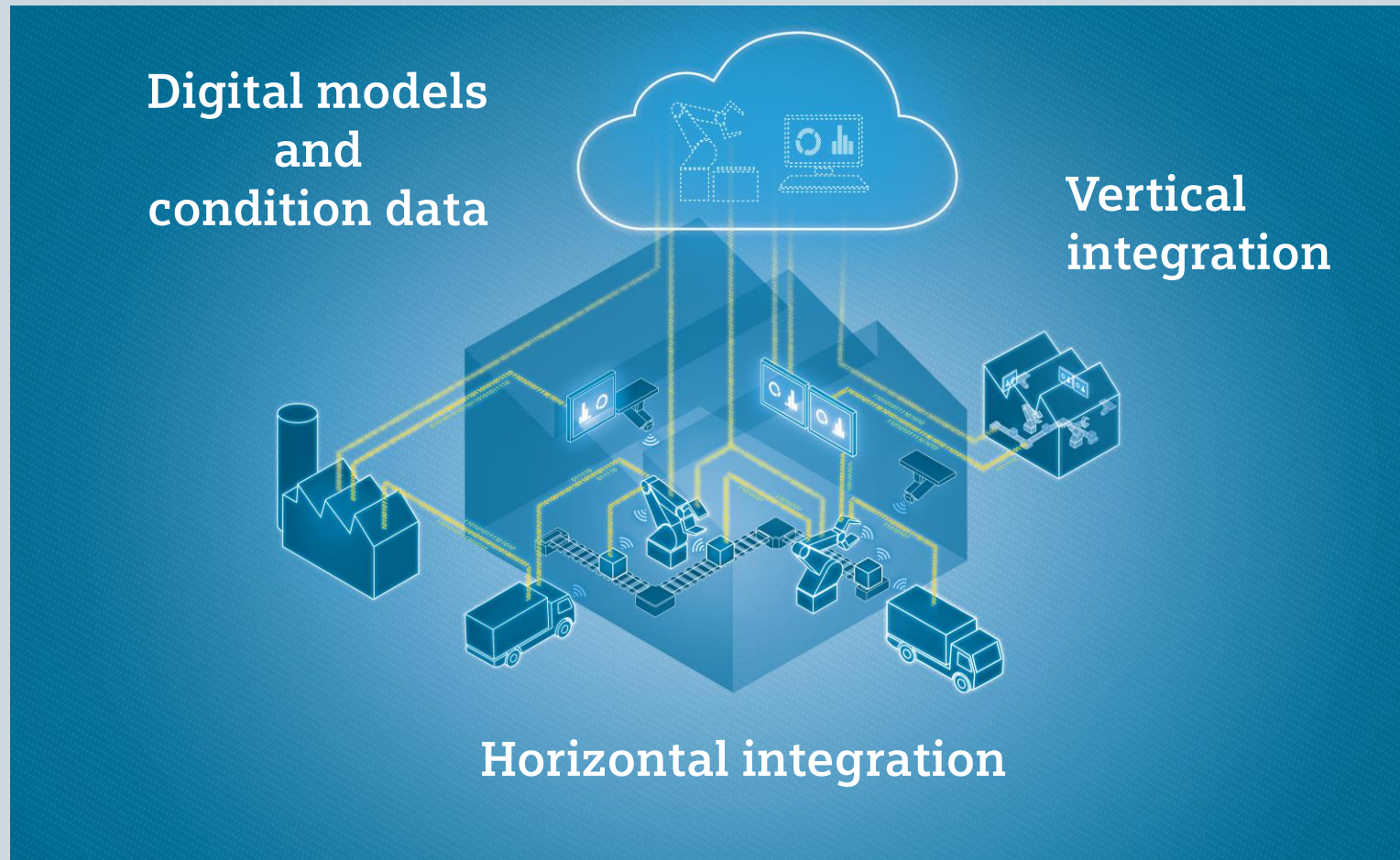
Full process transparency

Interoperability of processes

Vertical integration

Central alarm reporting

... and this requires powerful communication networks in the industrial space

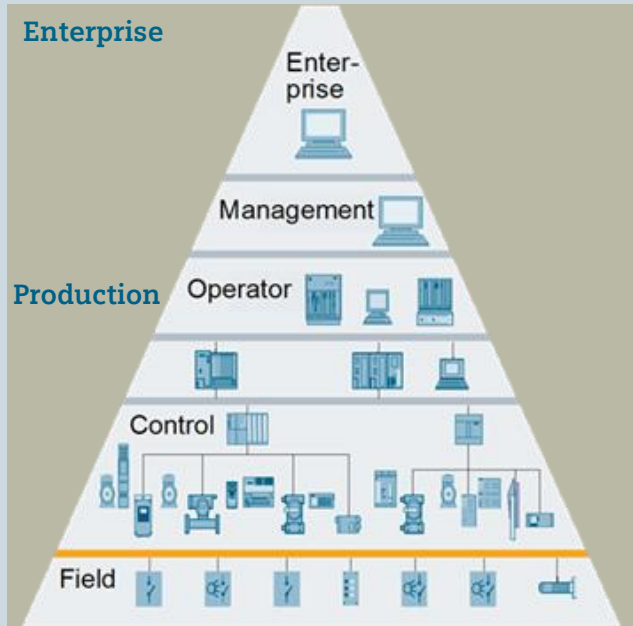


High performance communication networks to handle massive amounts of data required

- **High speed:** Real-time communication
- **High data volumes:** Large bandwidth
- **Protect against spying and attacks:** Secure communication
- **Ensured connectivity:** Robust and reliable components and networks
- **Flexibility:** Plug'n'play, on demand and easy (re-)configuration

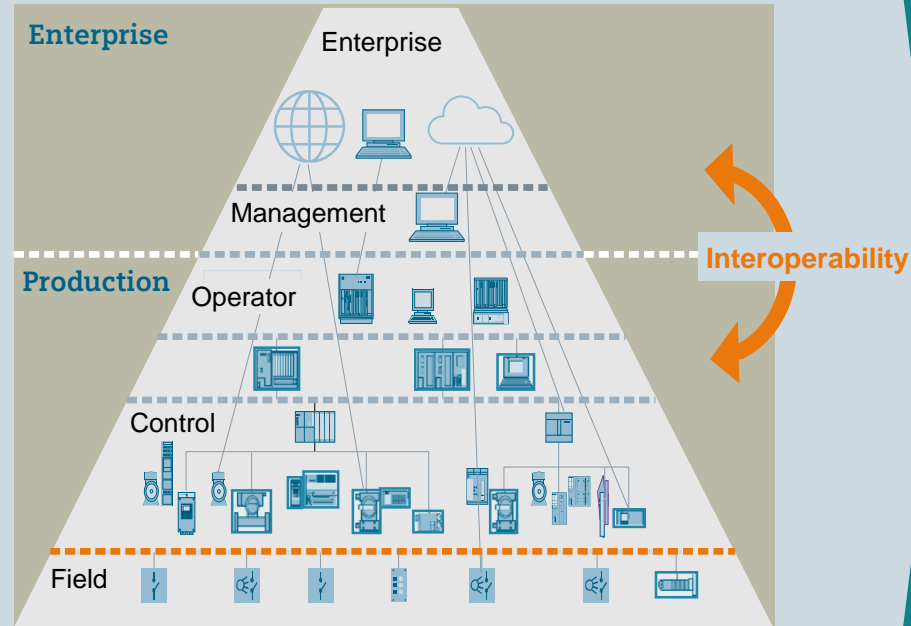
Digitalization results in a closed gap between enterprise and production layer

Yesterday:
Limited interoperability



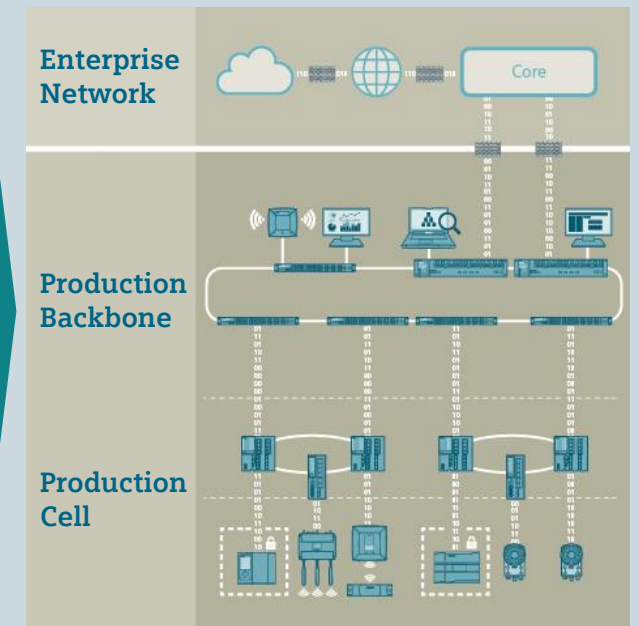
Limited communication between
enterprise and production layer

Today: Arising challenges through
increasing interoperability



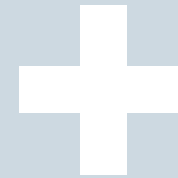
Challenge to handle complexity of
increasing communication

Future: Defined interface to
handle complexity



Two dedicated networks with
defined managed interface

Siemens enables you to meet your Digitalization needs



Siemens Industrial Networks

Together with our partner network we build
Industrial Networks that fit your future needs

Industrial Communication and Identification

Expertise in industrial networks and industrial identification

SIEMENS
Ingenuity for life

Process Industries



Industrial Networks



Discrete Industries



Industrial Communication

Industrial Ethernet



Rugged Communication



Security



Remote



Wireless



CPs, Profinet and Profibus



Software



Cabling Technology



Industrial Identification & Locating

Optical Identification



RFID



RTLS

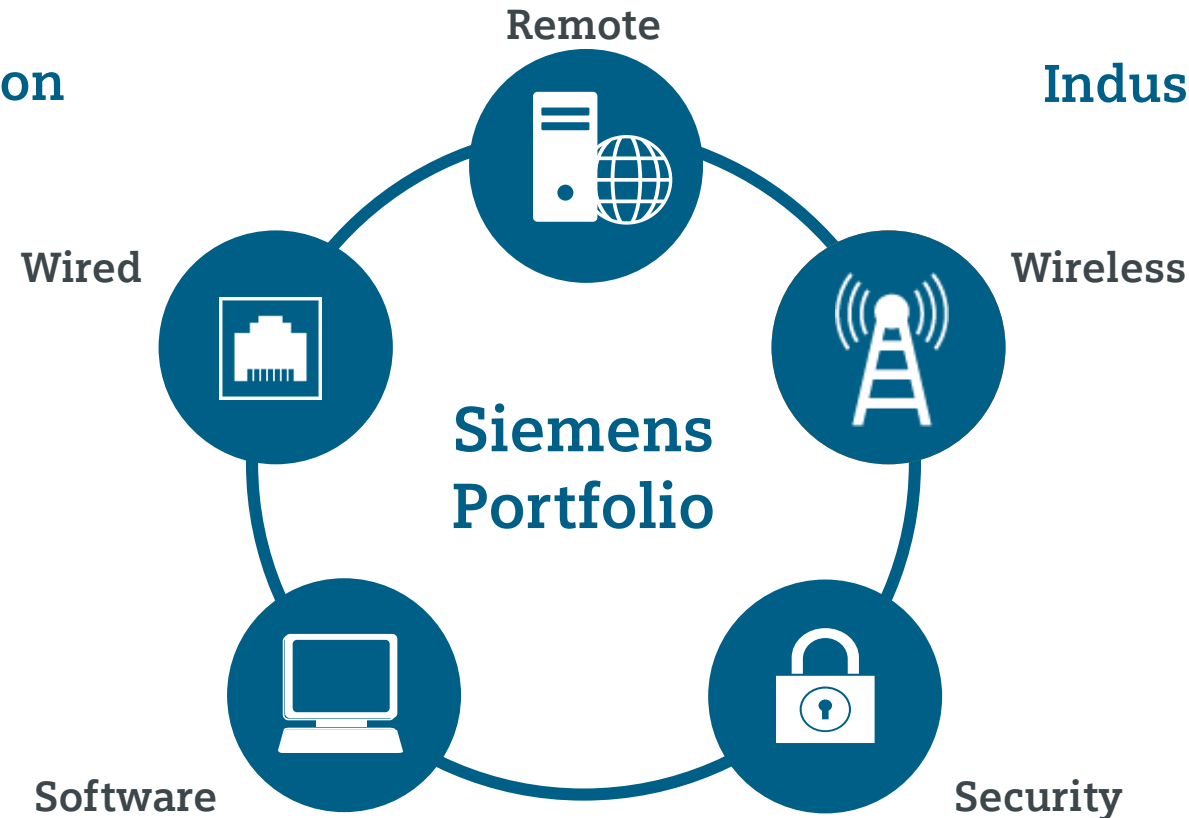


Siemens is your trusted partner for a broad range of reliable components for industrial communication



RUGGEDCOM
Rugged Communication

SCALANCE
Industrial Communication



Market leading portfolio based on more than 30 years of experience

Our products exceed industry specific requirements while building on existing standards



Industrial Features

- User friendly configuration via web based management and TIA Portal
- Ring / redundant topologies
- Fanless design
- Flexible and integrated diagnostics
- C-PLUG for easy device exchange
- iPCF for real-time WLAN incl. safety over WLAN
- Temperature range up to -40 °C to +85 °C
- 5 years warranty



→ Interoperability

All products are based on international standards, e.g. Ethernet, TCP/IP

→ Industry specifications

e.g. ATEX, IECEx, UL, IEEE 1613, IEC 61850, IEC 62443/ISA 99 guarantee a perfect fit for industrial usage

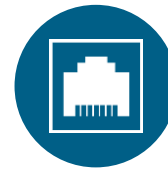
SCALANCE – Industrial Communication portfolio



SCALANCE: Industrial Communication proved to enable communication in production

- **High availability**
based on industrial features and industrial design
- **Fast & easy integration**
for new and existing networks based on TIA design
- **Easy to use**
with configuration via Web Based Management or TIA Portal
- **Easy device replacement**
with C-PLUG, also by untrained staff
- **For all Ethernet networks**
local, wireless and remote

Our Portfolio



Wired

- Industrial features
- Industrial design
- Fast & easy integration



Remote

- Different medias (DSL, UMTS, LTE)
- Transparent connectivity
- Easy enrollment with SINEMA RC



Wireless

- Indoor and outdoor applications
- Several country approvals
- Real-time capability



Security

- Firewall & VPN
- Remote access
- Fits to industrial security concepts

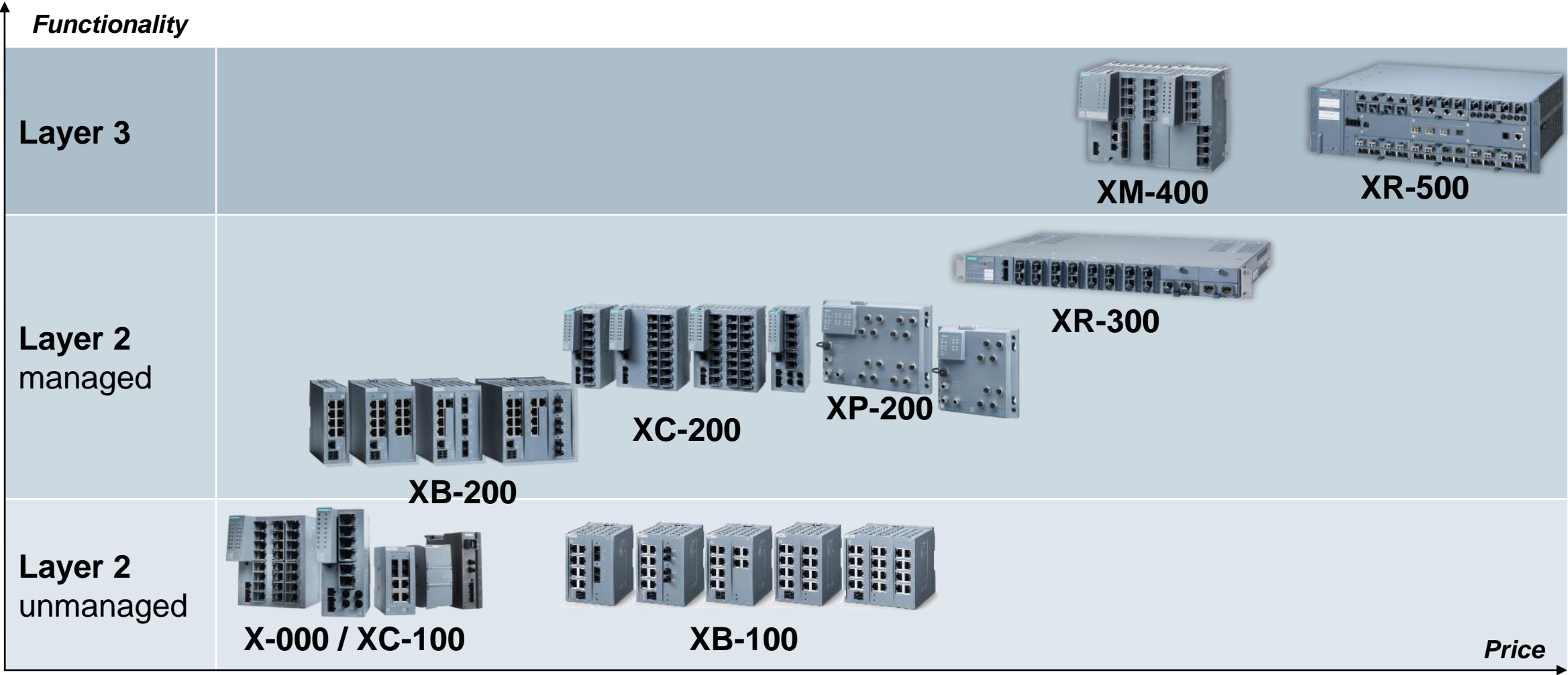


Software

- Transparency for the industrial network
- Integration into HMI / SCADA systems



SCALANCE X: The perfect switch for every application



RUGGEDCOM – Rugged Communication portfolio for harsh environments



RUGGEDCOM products have set the standard for communications networks deployed in harsh environments.

- **High reliability for mission critical networks** required in utility environments
- **Fully IEC 61850-3 compliant** smooth operation in extreme environmental conditions
- **IEEE 1613 rated**
No data losses under EMI stress, shock and vibration
- **Easy to use**
via web-based management or NMS system
- **Highest performance for various network types**
LAN and WAN, wired, private and public wireless

Our Portfolio



Wired

- IEEE 1588 Time Sync
- IEC 62439 seamless redundancy
- Multi-Service Routing platform



Remote

- Different medias (EoVDSL, UMTS, LTE)
- Transparent connectivity
- High reliability, high bandwidth, low delays



Wireless

- Utility Grade, Wide Area Private Wireless Solution
- Low latency suitable for Distribution Automation
- Improved reach and “Non-Line of Sight” performance



Security

- Firewall & VPN / IPsec
- Remote access compliant with NERC-CIP
- Fits to industrial security concepts



Software

- Ability to manage the network with one tool
- Secure access, data management, visualization and analytics

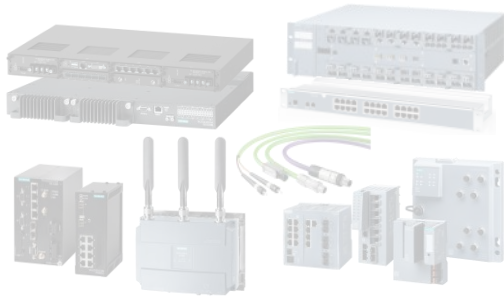


Siemens enables you to meet your Digitalization needs

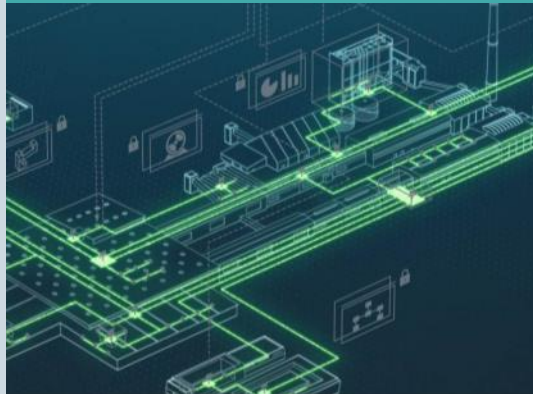


Best-in-class
Communication Portfolio

RUGGEDCOM & SCALANCE



Expertise in Industrial
Networks



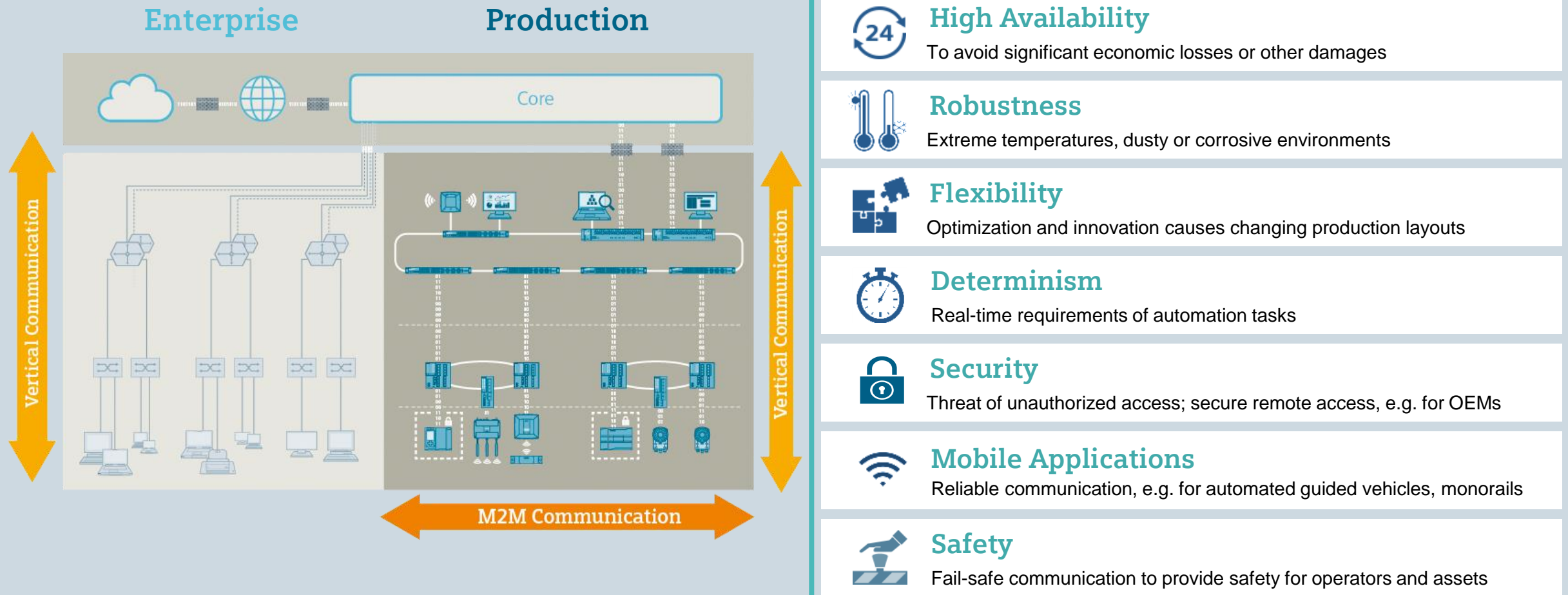
Services, Solutions &
Training



Siemens Industrial Networks

Together with our partner network we build
Industrial Networks that fit your future needs

Industrial Networks have critical requirements which need to be addressed



Industrial Networks have critical requirements which need to be addressed



High Availability

To avoid significant economic losses or other damages



Robustness

Extreme temperatures, dusty or corrosive environments



Flexibility

Optimization and innovation causes changing production layouts



Determinism

Real-time requirements of automation tasks



Security

Threat of unauthorized access; secure remote access, e.g. for OEMs



Mobile Applications

Reliable communication e.g. for automated guided vehicles, monorails

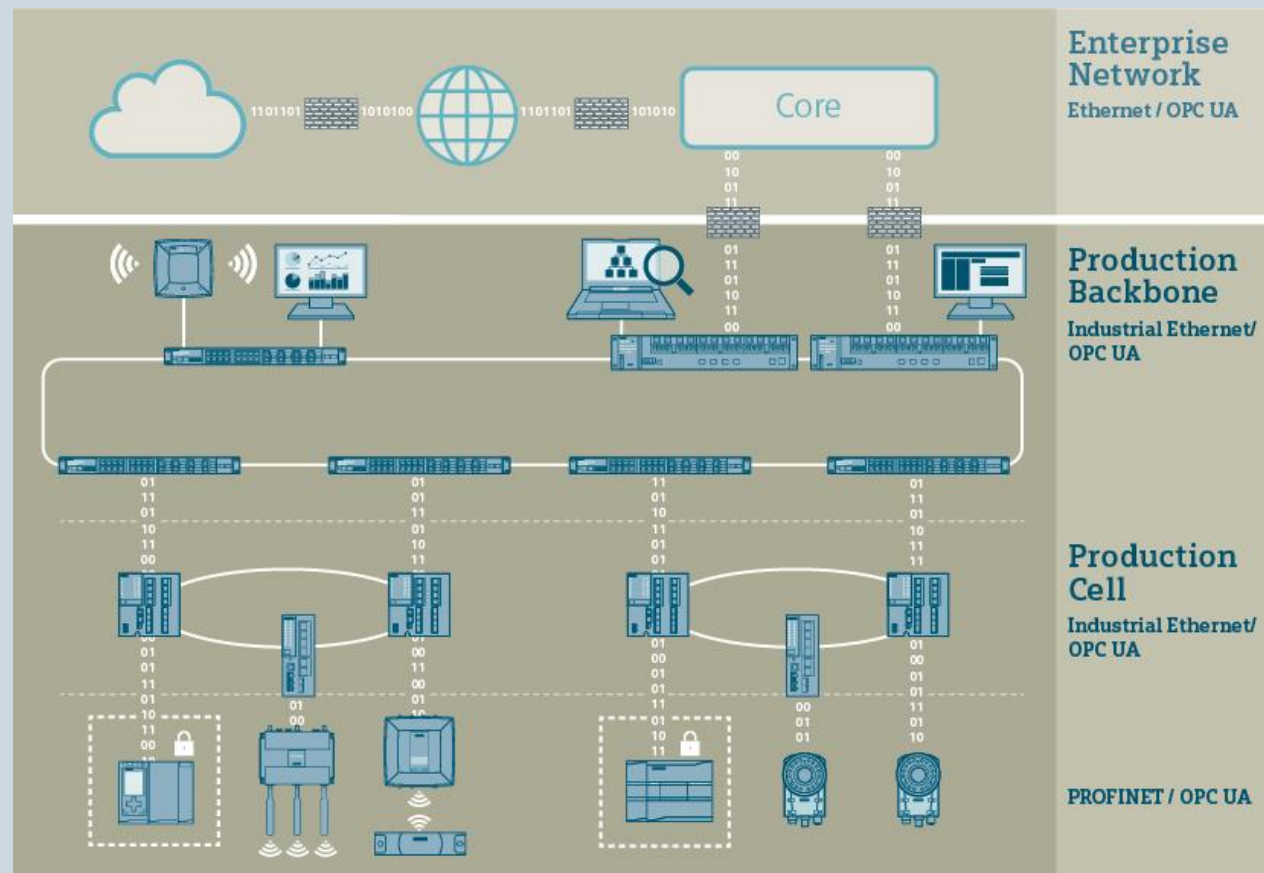


Safety

Fail-safe communication to provide safety for operators and assets

- **Ring redundancy** e.g. with MRP, HSR, PRP,...
- Quick and easy replacement with **C-PLUG**
- **Fanless design** to avoid downtimes
- **FastConnect** cables and plugs
- **Modularity**
- **Different interfaces** for electrical / optical connections
- **Guaranteed switchover** times in case of failures or **deterministic roaming** for wireless applications
- **Security modules** which fit to industrial security concepts
- **IWLAN RCoax Cable** for durable wireless connection during movement
- **Emergency shutdown over PROFINET** (wired as well as wireless)

Making Digitalization work – enabled by structured network solutions for connecting IT and Production



Enterprise Network:

Based on requirements from enterprise networks



Responsibility of IT

Production Backbone:

Defined interface between IT and production



Responsibility of production, but in agreement with IT

Production Cell:

Based on requirements from production and automation cells:

Reliable communication as critical factor



Responsibility of production

Recommended solution with two physically separated, but connected communication networks

Availability – Avoid stops in production that can result in large damages

Importance of Availability

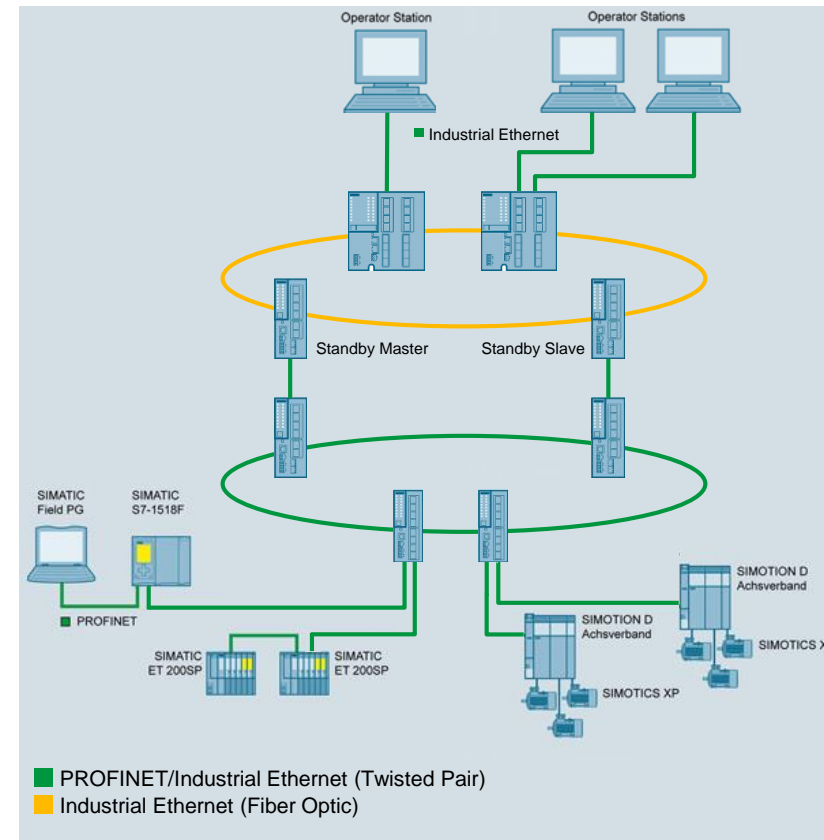
Enterprise

- Recovery times within seconds to minutes range are accepted
- Irregular downtimes because of SW roll-outs and security patches are common

Industrial

- 24/7 availability required
- Fast network recovery time
- Adapted redundancy concepts
- “Surviving” single point of errors
- “Bumpless” processes (no packet losses, no failover times)

Availability ensured by Siemens



Reliable topology based on redundancy, including e.g.

- **Redundant** network concepts
- **C-PLUG** for immediate device exchange by untrained staff
- **Fanless design** to avoid downtimes
- **Redundant** power supply

Robustness – Ensure functionality in industrial environments



Importance of Robustness

Enterprise

- Distribution rooms
- Air conditioned, 19" rack mounting
- Temperatures from 0 °C to +45 °C
- AC 115/230 V power supply

Industrial – Harsh environments in industrial and remote locations

- Temperatures from -40 °C to +85 °C
- Outdoor applications (IP65/67)
- Universal mounting (e.g. horizontal, vertical, at the ceiling)
- DC 24 V power supply

Robustness ensured by Siemens

Siemens products are built for industrial environments, e.g.



Corrosion-resistant



EMC / shock resistant



Protection level up to IP65/67



Temperature resistant -40 °C to +85 °C

5 years warranty on functionality of RUGGEDCOM and SCALANCE

Flexibility – Ensure easy adaptability of communication to support ongoing optimizations and changes



Importance of Flexibility

Enterprise – No need for high flexibility in layout and cabling

- Structured star topologies at floor, building, site
- Raised floor for cabling

Industrial – Optimization and innovation cause changes in the production layout

- Flexible network topologies
- Modular components
- Ring- or Line Structures

Flexibility ensured by Siemens

Leading Portfolio



- **Comprehensive portfolio** with **KEY-PLUG** for additional functions
- **Various mounting options**

Modular devices



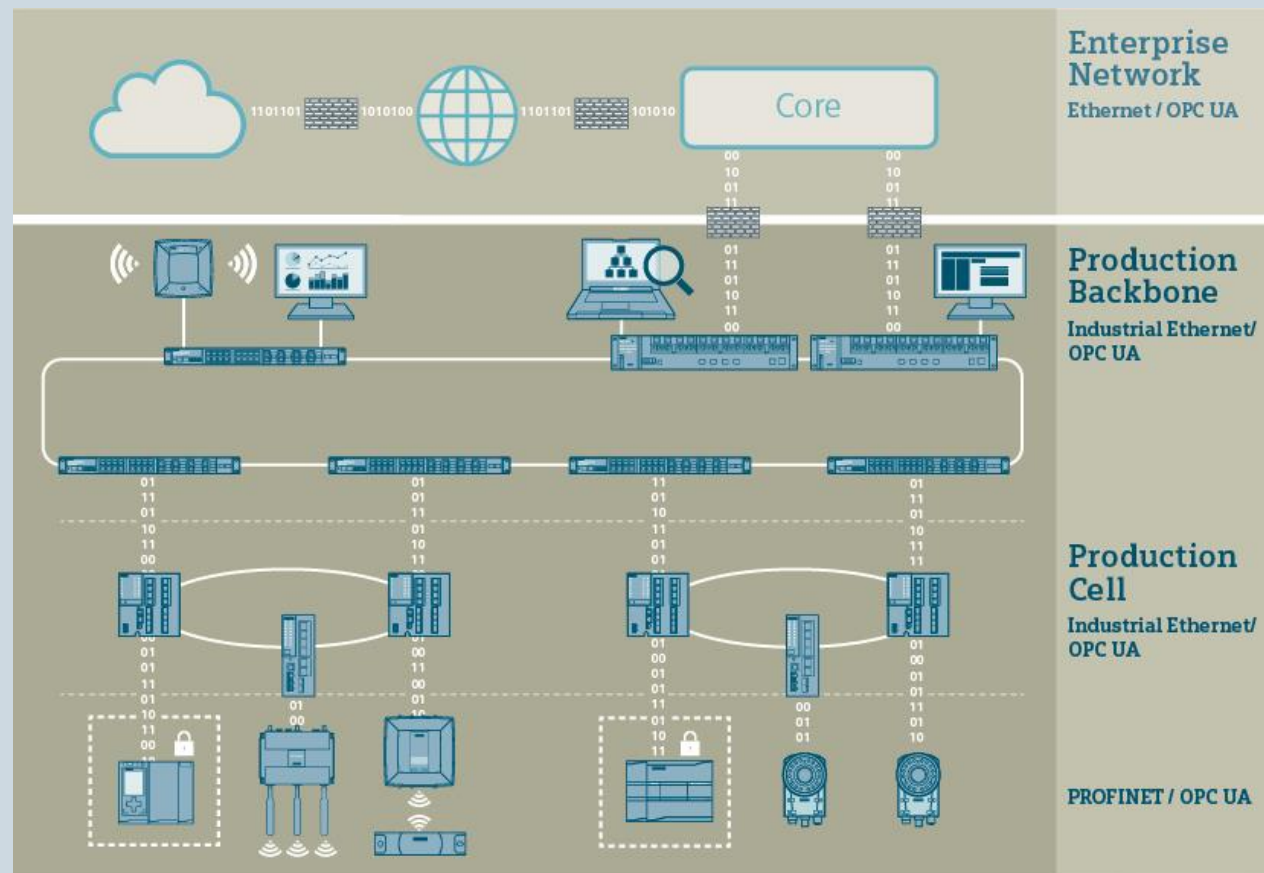
- **Full- or semi modular** (*“hot swap functionality”*)
- **Combo Ports** for port granular choice of different media

Accessories



- **Field assembly plugs** for easy connectivity
- Accessories made for **industrial use cases**

Industrial networks needs to address your key aspects



Cloud Connectivity

Easy and efficient integration of data points into the cloud infrastructure

Full TIA Conformity

All components are built and tested for TIA to achieve maximum of compatibility

Network Management

Highest transparency for industrial networks and all connected devices

Remote Communication

Enable secure and reliable remote access to service plants and machines

Network Security

Enabled by holistic security concept and security-integrated portfolio

Functional Safety

Safety-critical applications to protect personnel and machinery

Network Structure

Segmented and redundant architecture for reliable, communication networks

Mobile Applications

Easy and fast access to your data or applications from mobile devices

Main aspects to be considered in network design

Thank you for your attention!



Brad Wilson

System Architect

Email: bradleywilson@siemens.com

Mobile: 0419 828 329

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