

Welcome

Sistema de Control

PLCnext

Antonio Gordillo IMA Enero 2021

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Webinars

Agenda

- PLCnext Technology:
- PLCnext Control Controladores
- Configuración hacia nubes
- Aplicaciones
- Webinars



PLCnext Technology
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Webinar IMA Enero 2021

Sistema de Control PLCnext



Fecha	**8 Enero 2021**
Hora	9:00
Hora	
Duración	1 hora
Costo	gratuito

Logre mayor conocimiento sobre nuestro sistema de Control llamado PLCnext Control por medio de un amplio conocimiento de la oferta actual mostrada a finales de este año.

Durante esta sesión usted reconocerá la plataforma más reciente de controladores, así como descubrir en las herramientas, como los Sistemas de Control PLCnext Technology ayudan a realizar tareas diferentes y programaciones alternas para brindar mayor flexibilidad en los sistemas modernos de Control que requieren otro tipo de conectividad y se orientan a la digitalización y cómputo cognitivo de alta exigencia.

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PLCnext Control



PLCnext Engineer



PLCnext Store



PLCnext Community

Open Control Platform

Devices in various performance classes including PLCnext Runtime System and accessories

Engineering Software

Engineering tool for commissioning, configuring and programming PLCnext Control

Software Store

Apps for functional extension of PLCnext Control and PLCnext Engineer

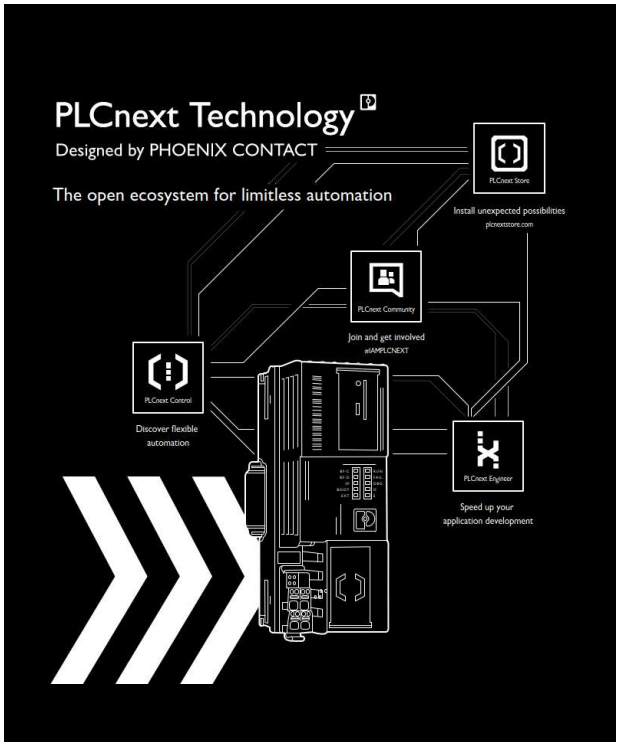
Collaboration & Resources

We offer our community Information, support and helpful resources, including FAQs, forums, tutorials, and a GitHub presence

PLCnext Technology Ecosystem

PLCnext Technology

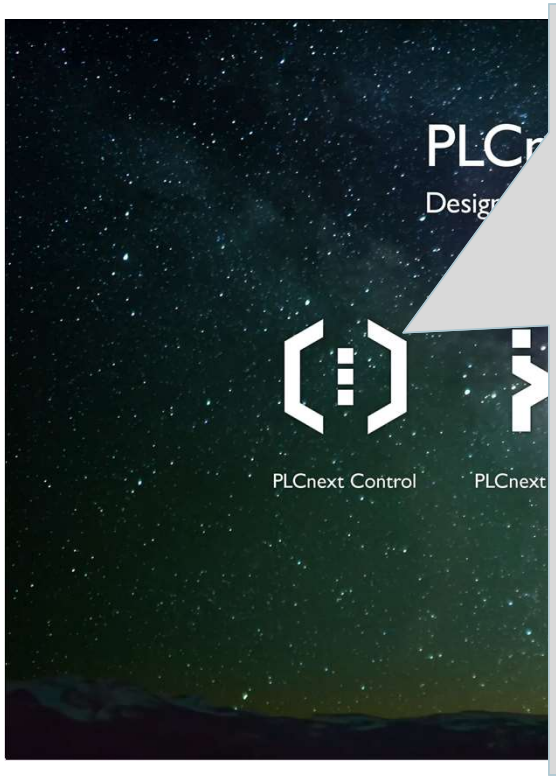


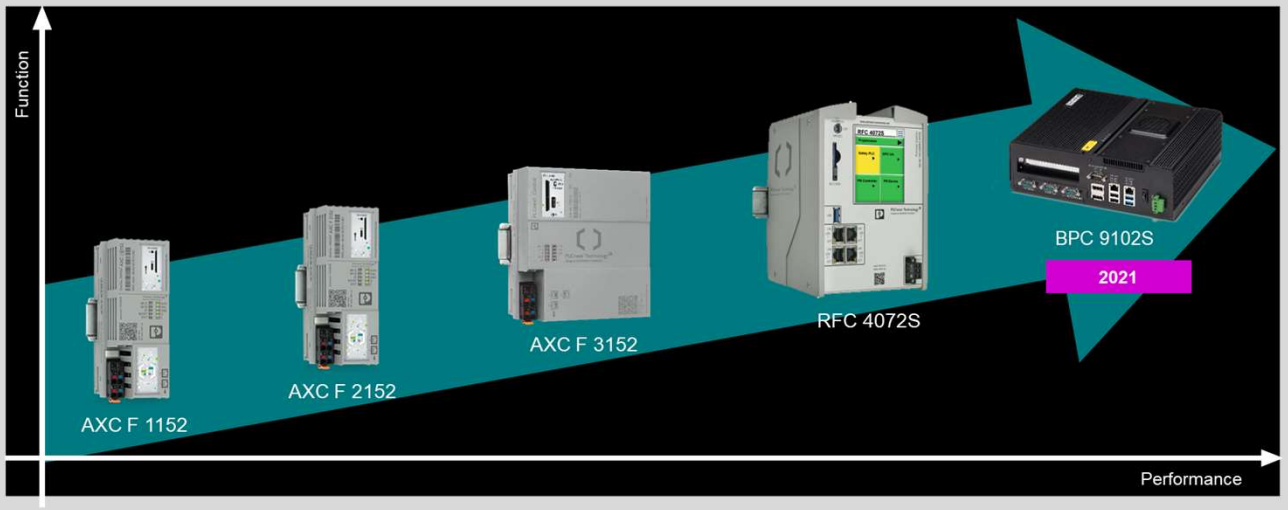


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PLCnext Ecosystem

PLCnext Technology





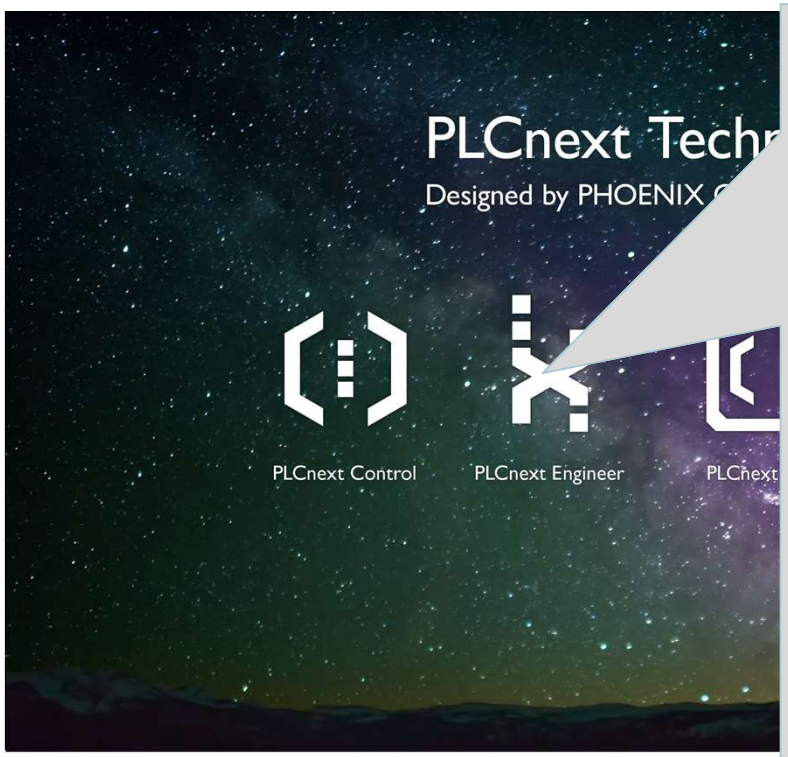
Open Control Platform

PLCs in various performance classes including
PLCnext Runtime System and accessories for PLCnext Technology

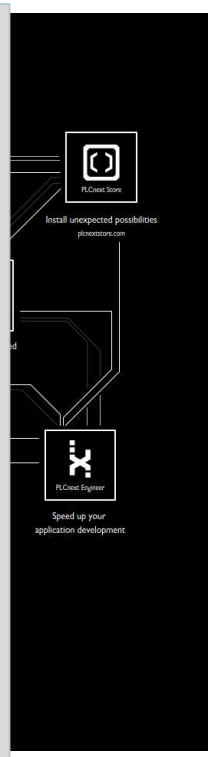
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PLCnext Ecosystem

PLCnext Technology







Engineering Software

Engineering tool for commissioning, configuring, and programming PLCnext Controls

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PLCnext Technology

The reliability and robustness
of the classical PLC world



enhances

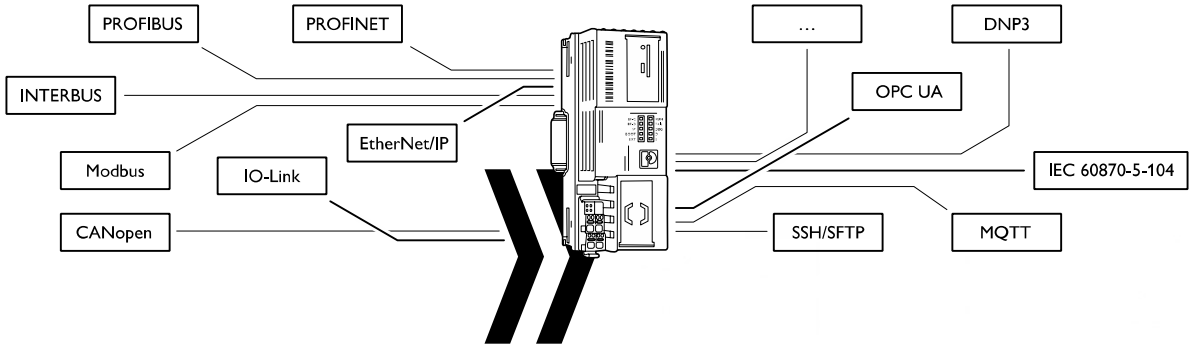
with the openness and flexibility
of Smart Devices.



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Future-proof Connectivity

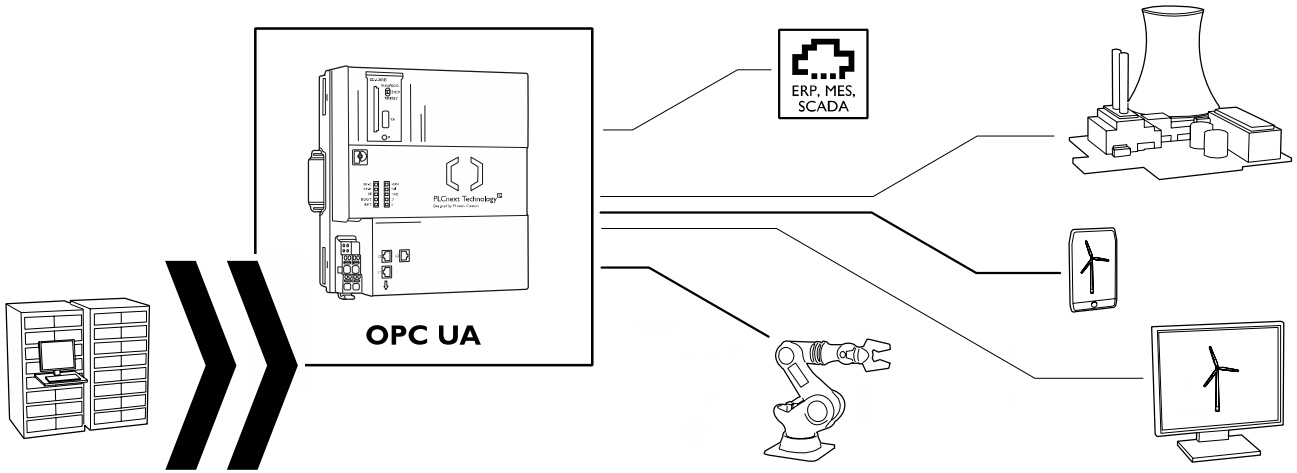


PLCnext Technology enables the integration of current and future interfaces and protocols for open communication in highly networked automation systems.

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Integrated OPC UA Server



Data Access, Alarms and Conditions, Programs, Historical Access, Global Discovery Server

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Cloud Strategy for Intelligent Networking

Proficloud, Public Cloud, Private Cloud, any Cloud

PROFICLOUD

Alibaba Cloud

Google Cloud

aws

MindSphere

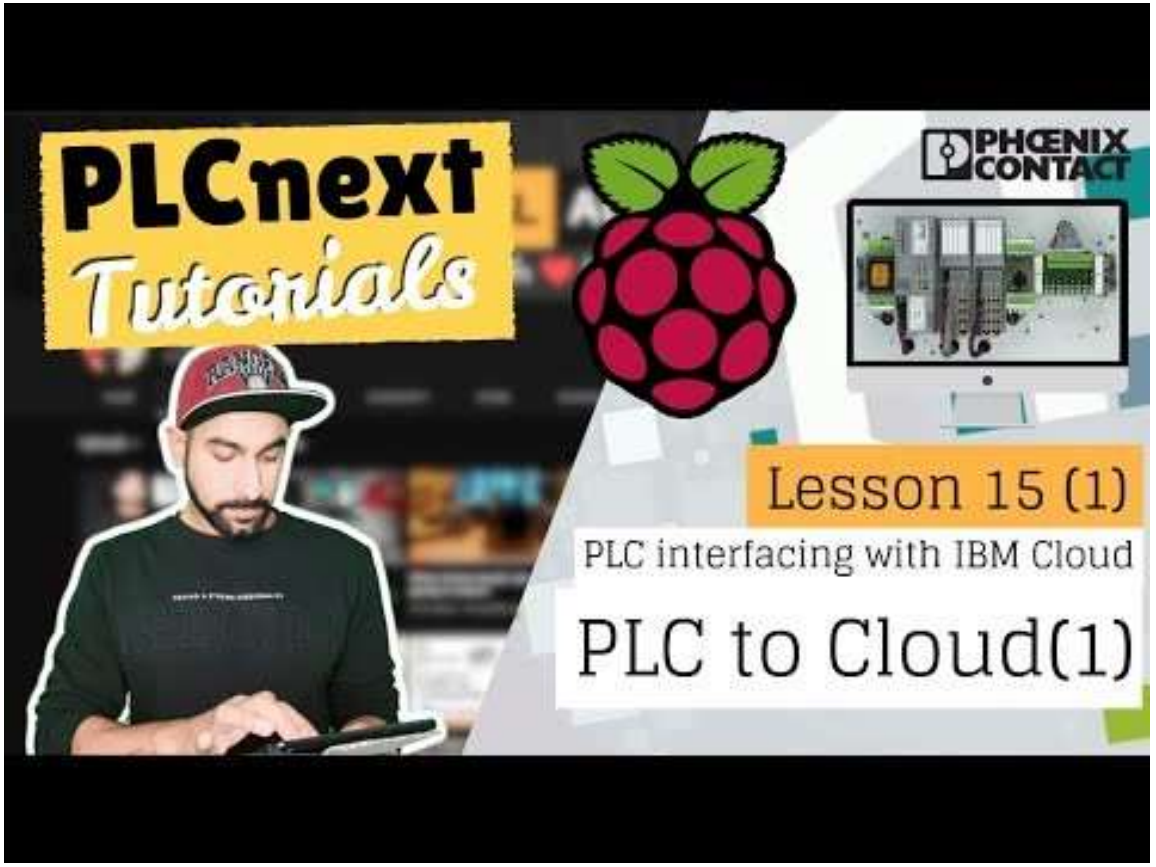
MQTT based on paho

Azure

IBM Cloud

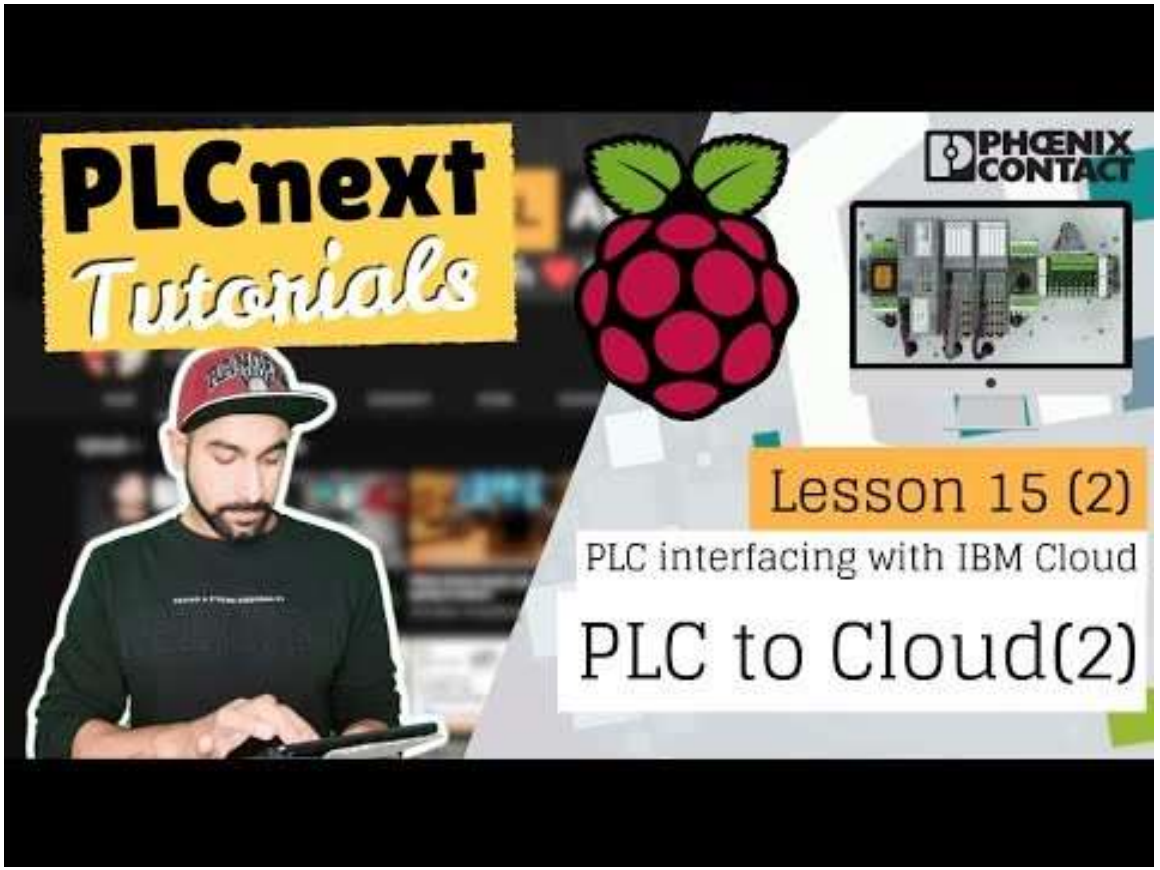
Implement new IoT-based business models through direct connection to cloud-based services and databases. With the cloud agnostic strategy, a cloud connector to any cloud can be downloaded via PLCnext Store and a fully integrated Proficloud connectivity, PLCnext Technology provides full support for any cloud strategy - public, private, hybrid - including AWS, IBM, Azure, Alibaba and MindSphere.

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PLCnext Lesson 15- Sending PLC values to IBM Cloud (1)

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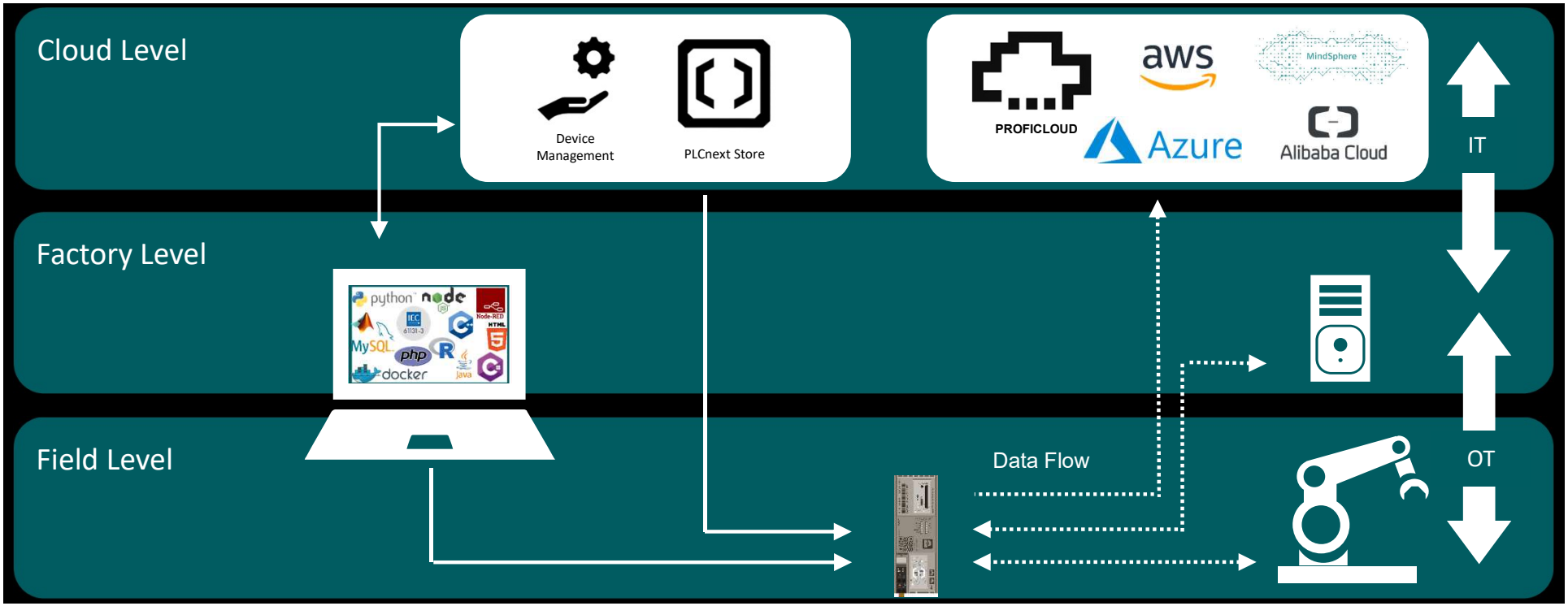


PLCnext Lesson 15 - Sending PLC values to IBM Cloud (2)

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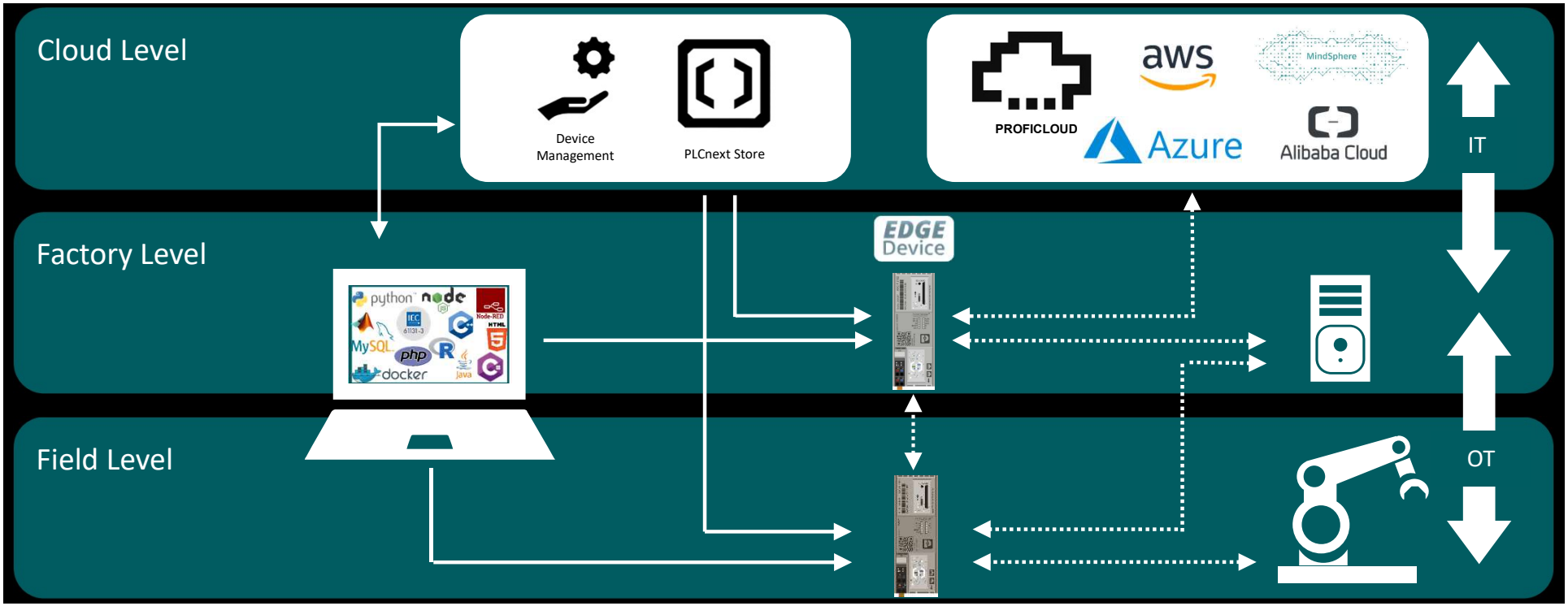
enhanced connectivity – Edge Device or PLC connecting all Levels

PLCnext Control as PLC



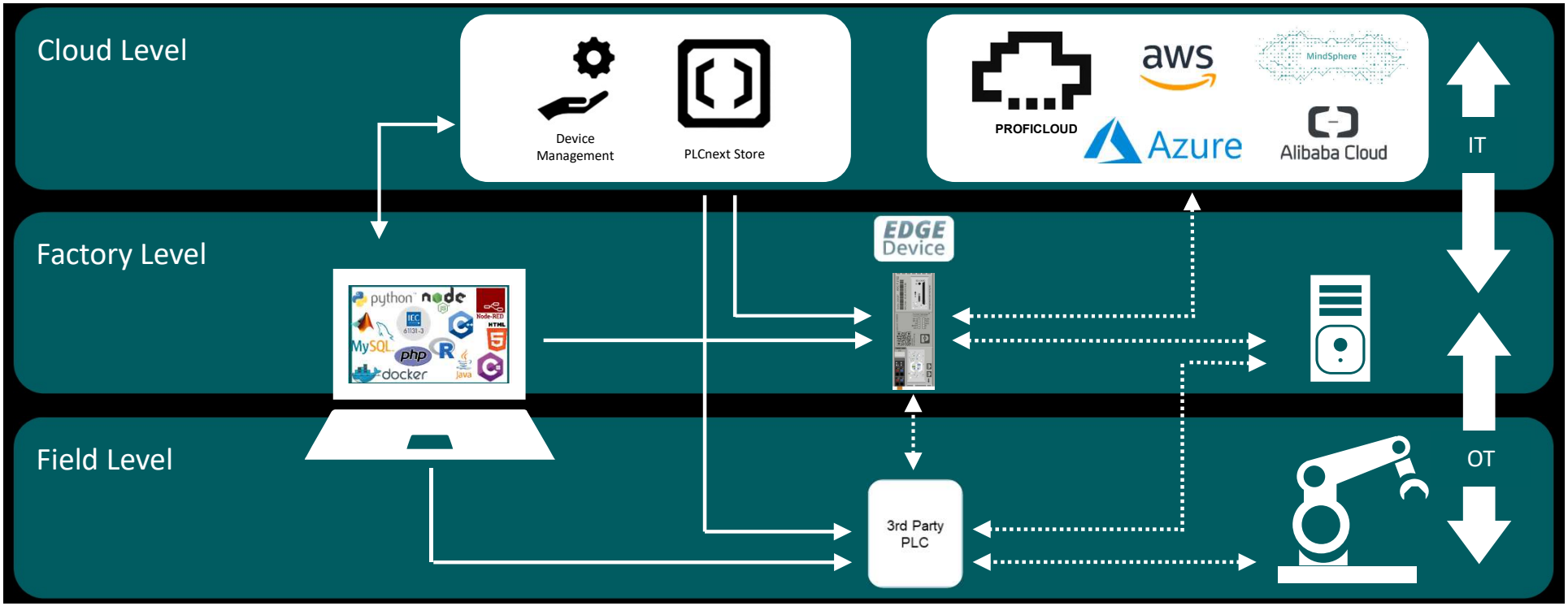
enhanced connectivity – Edge Device or PLC connecting all Levels

PLCnext Control as PLC and Edge Device



enhanced connectivity – Edge Device or PLC connecting all Levels

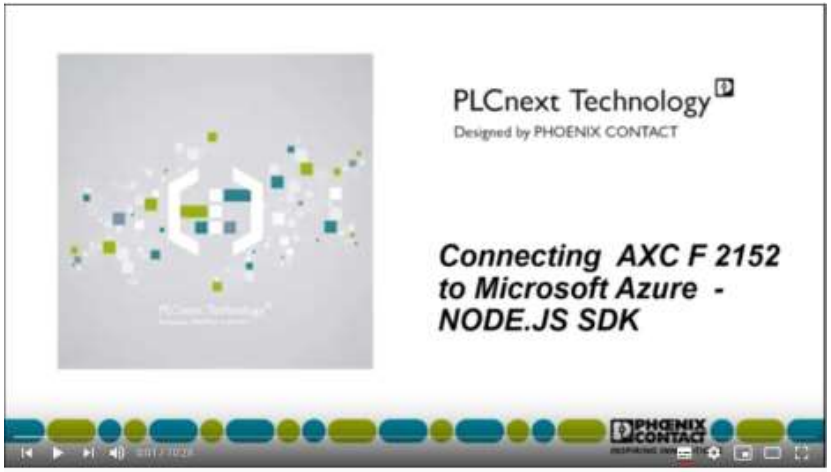
PLCnext Control as Edge Device



Confidential

Video Youtube

PLCnext Engineer Tutorial(s)



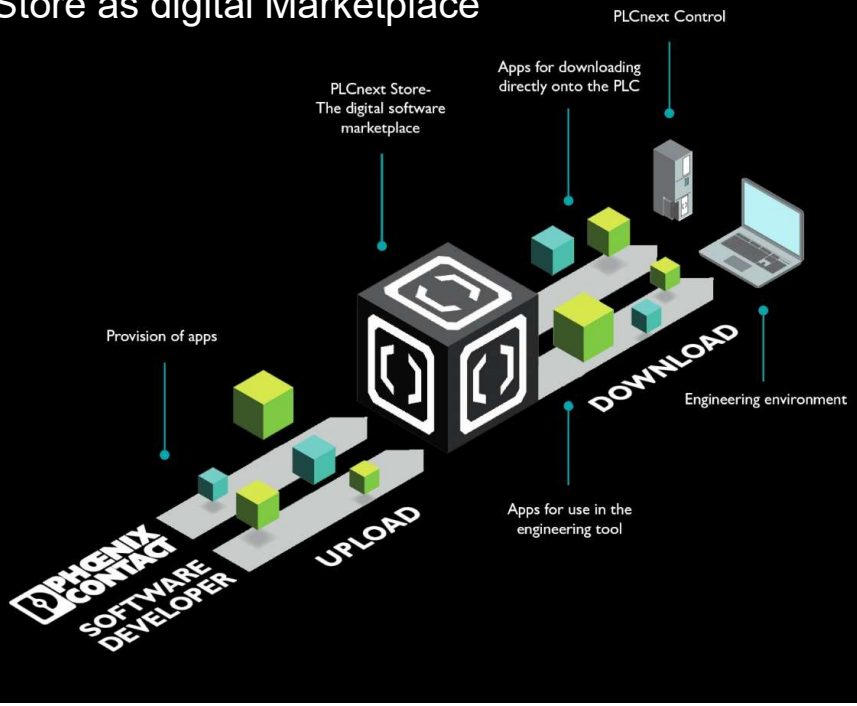
How to connect a PLCnext Control to Microsoft Azure via Node.js SDK | Makers Blog

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enhanced freedom

Limitless Adaption Capability

PLCnext Store as digital Marketplace



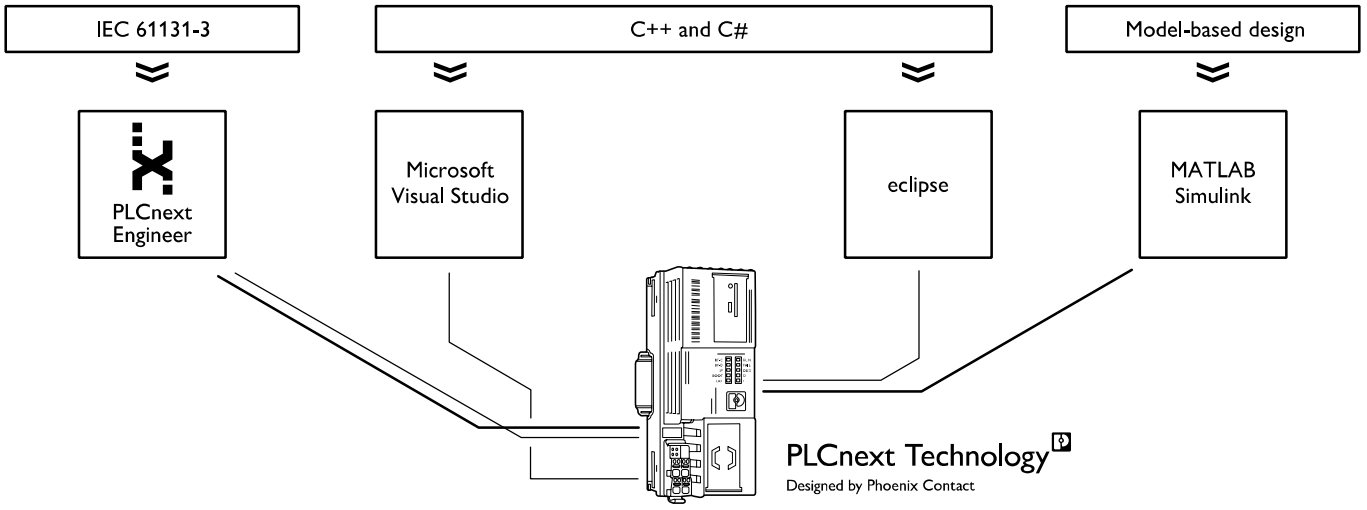
Open-Source Software



enhanced convenience

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Engineering and Application Development



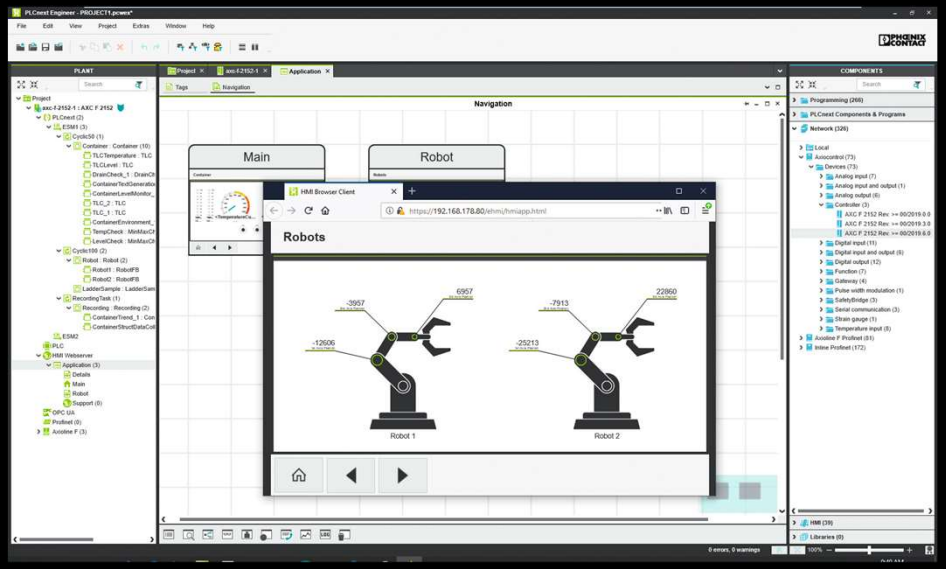
With PLCnext Technology, several developers from different generations, with different skill sets and expertise can work on one controller program, in parallel and yet independently, using different programming languages.

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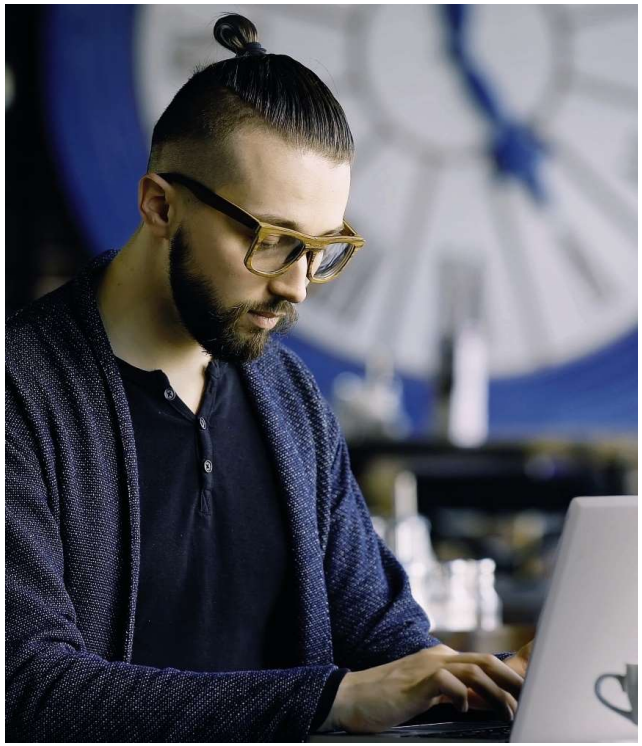
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IEC 61131-3 Programming with PLCnext Engineer



Use the innovative and easy to use features of PLCnext Engineer.

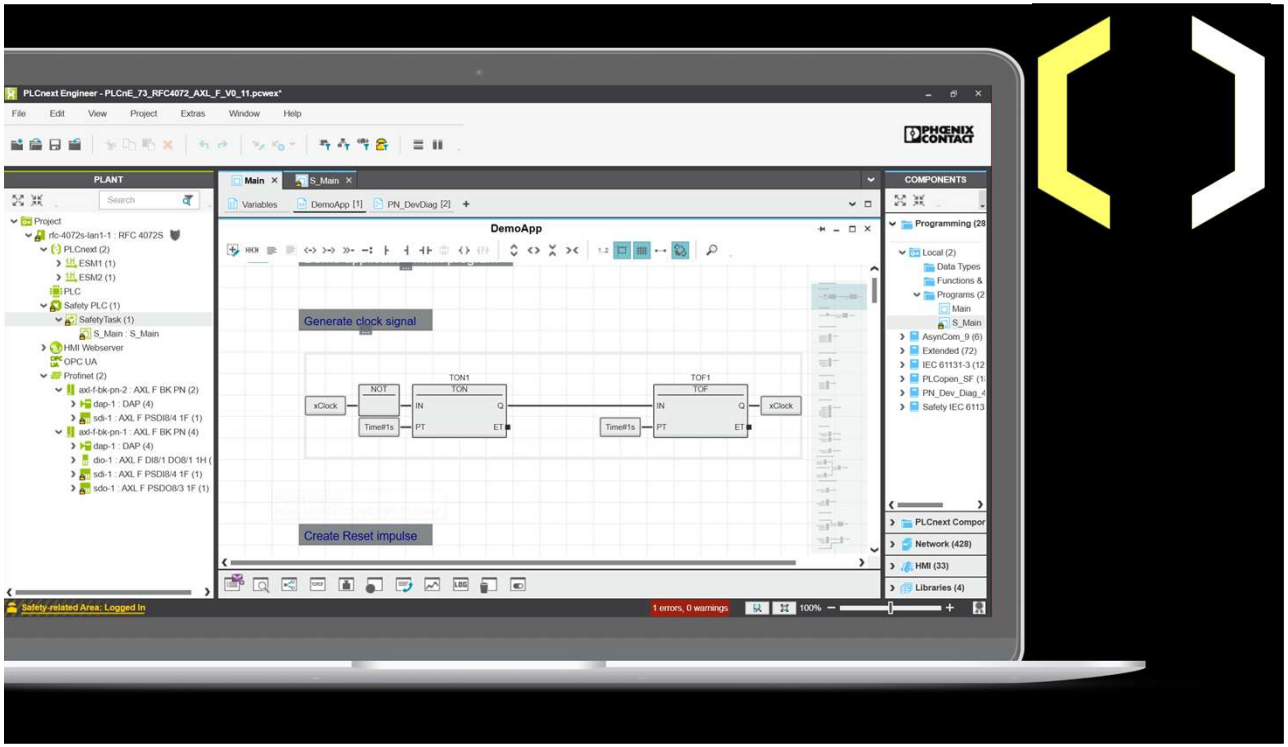


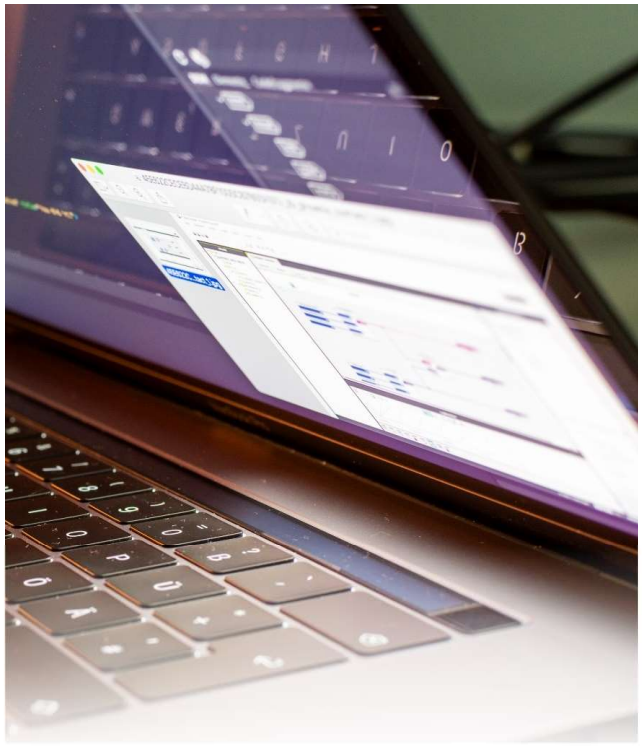
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Standard and safety programming in one engineering software

PLCnext Engineer

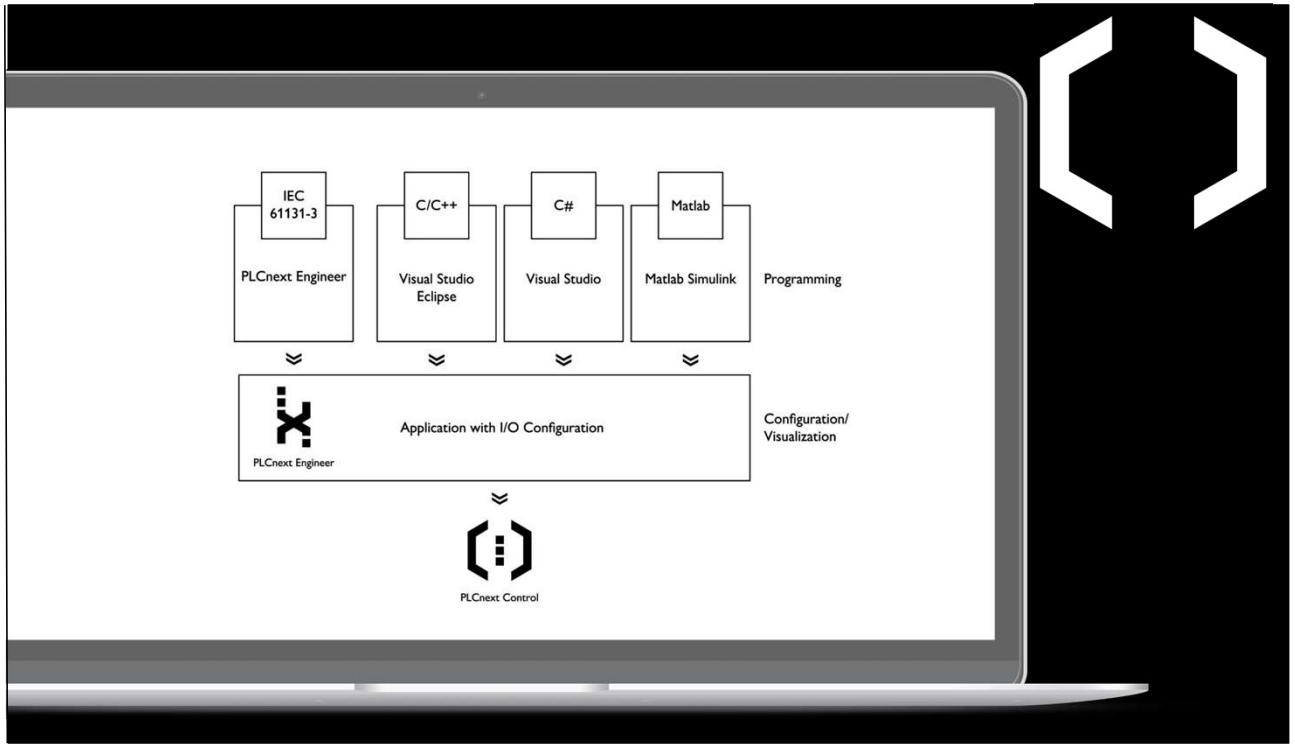




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PLCnext Engineer



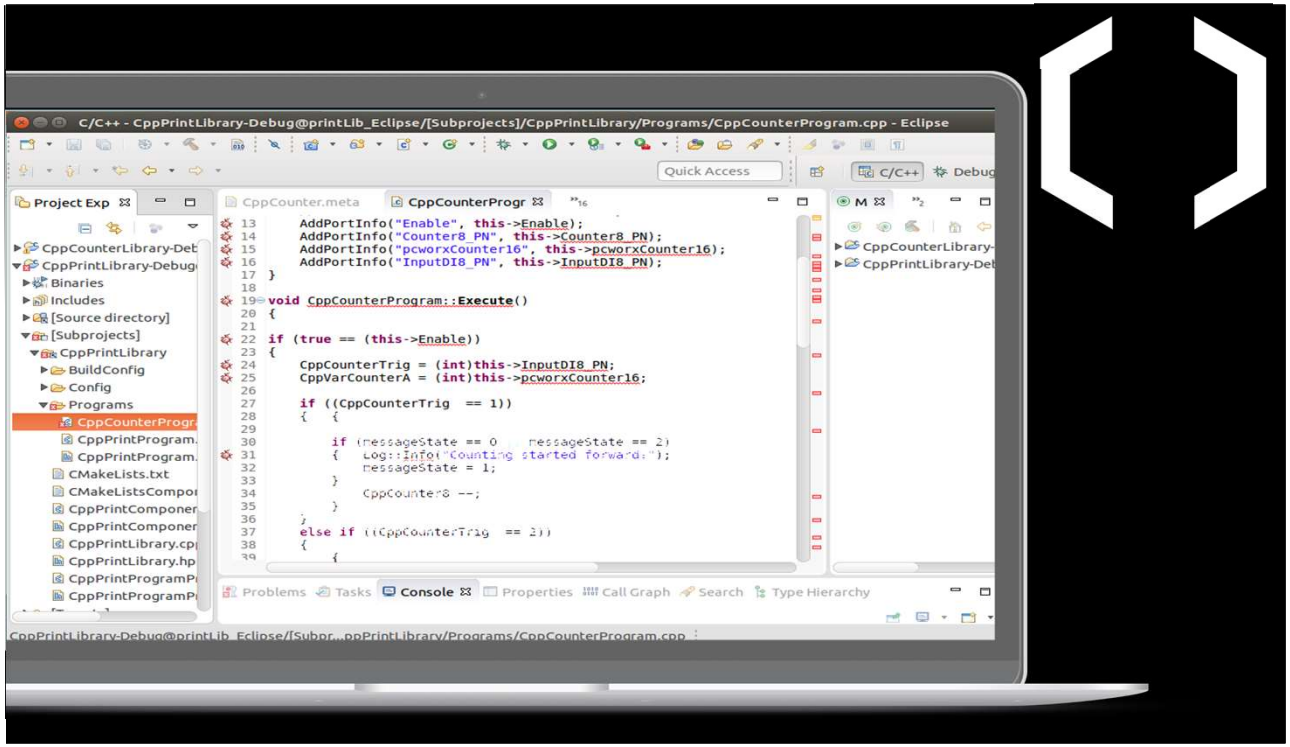


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Programming – C/C++



eclipse

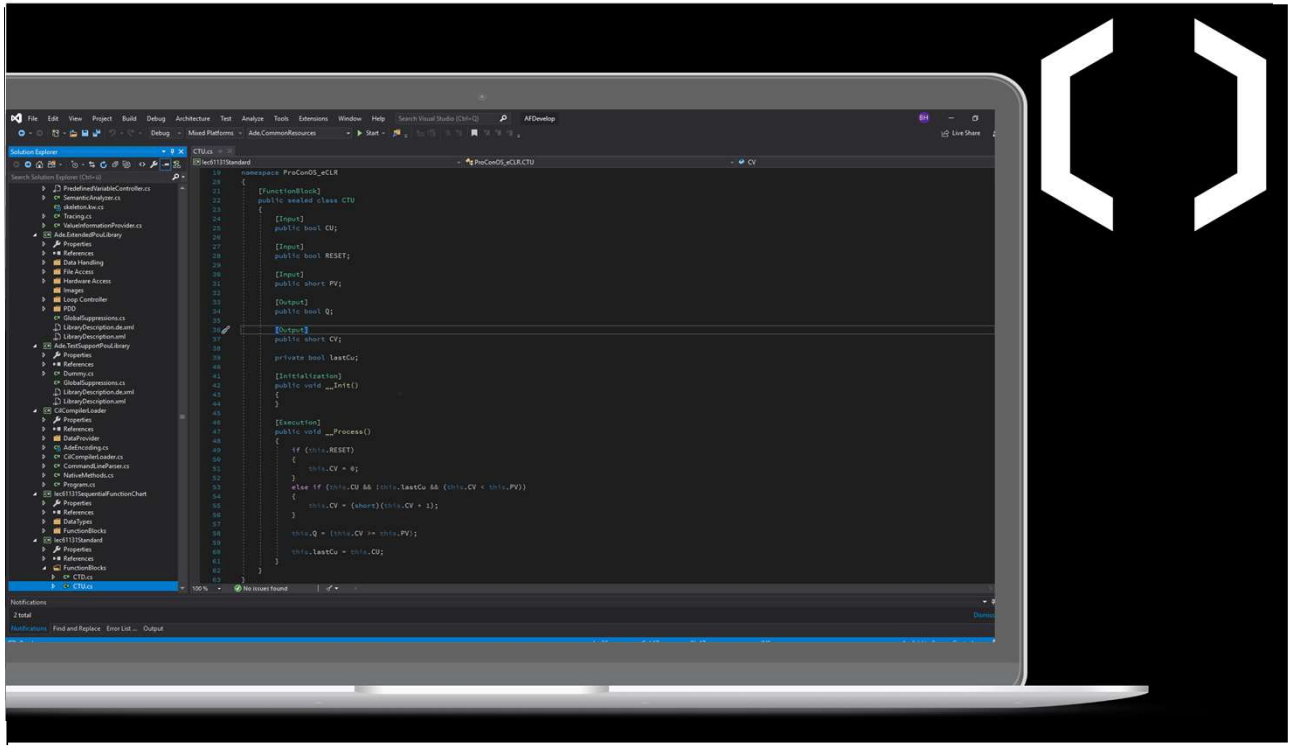
- C/C++ acc. to standard
- Easy interface to the PLCnext Runtime System
- Support of remote debugging
- Use the tool you are familiar with

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Programming – C/C++



Visual Studio

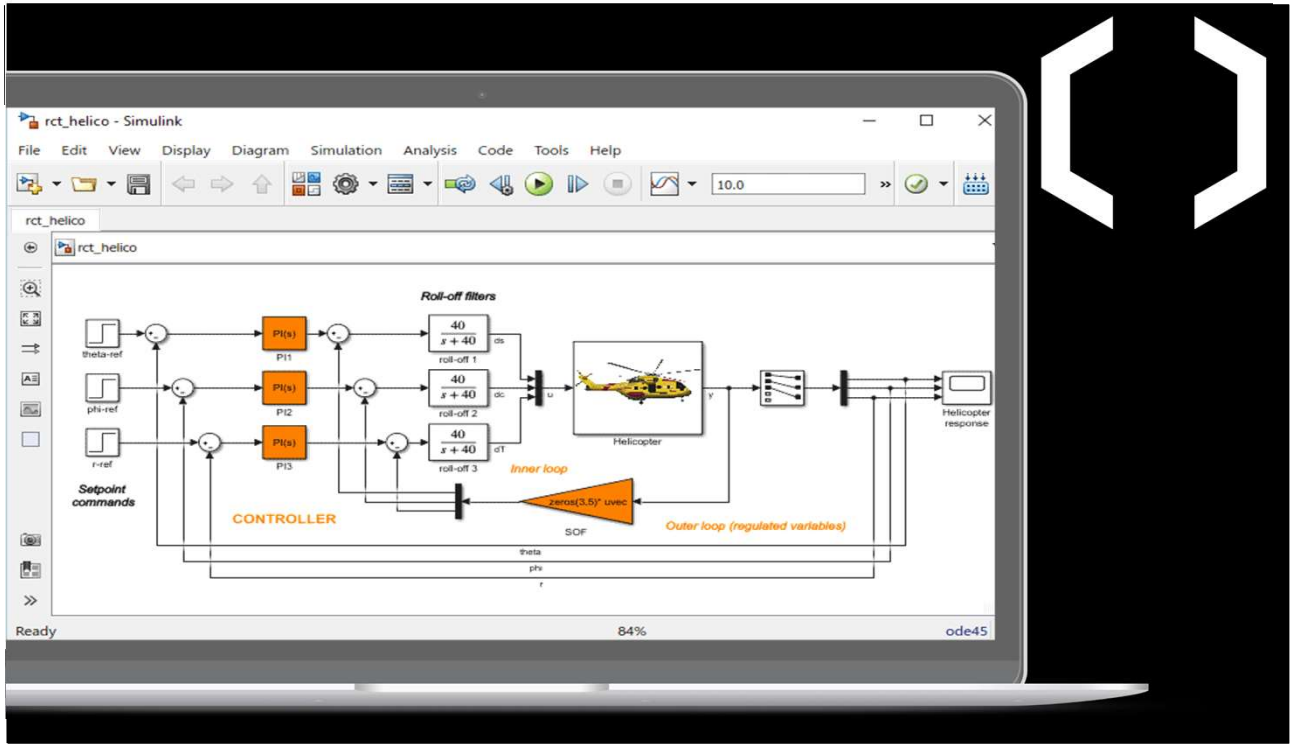
- Development and integration of function blocks with C#
- Dedicated plug-in for Visual Studio.
- Execute C# function blocks in real-time with the eCLR runtime system.

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MATLAB Simulink



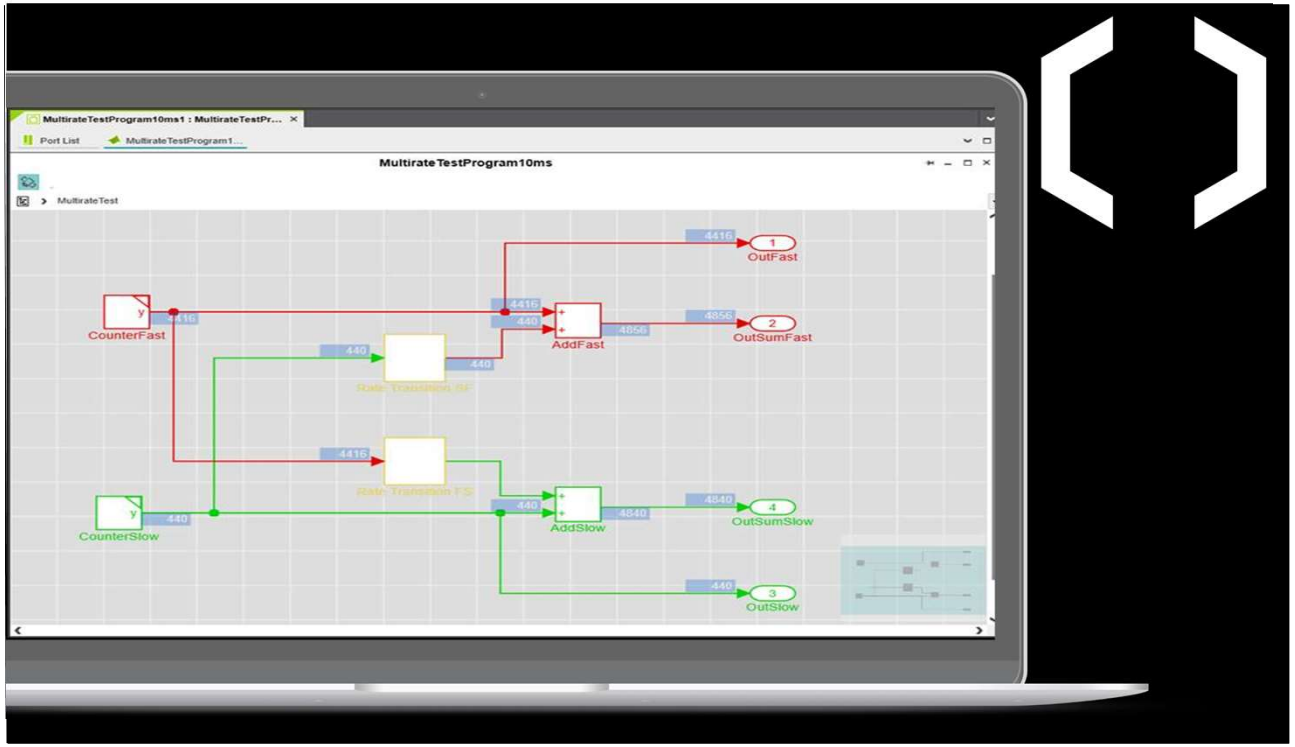
Seamless integration of model-based design & development with MATLAB Simulink.

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MATLAB Simulink & PLCnext Engineer



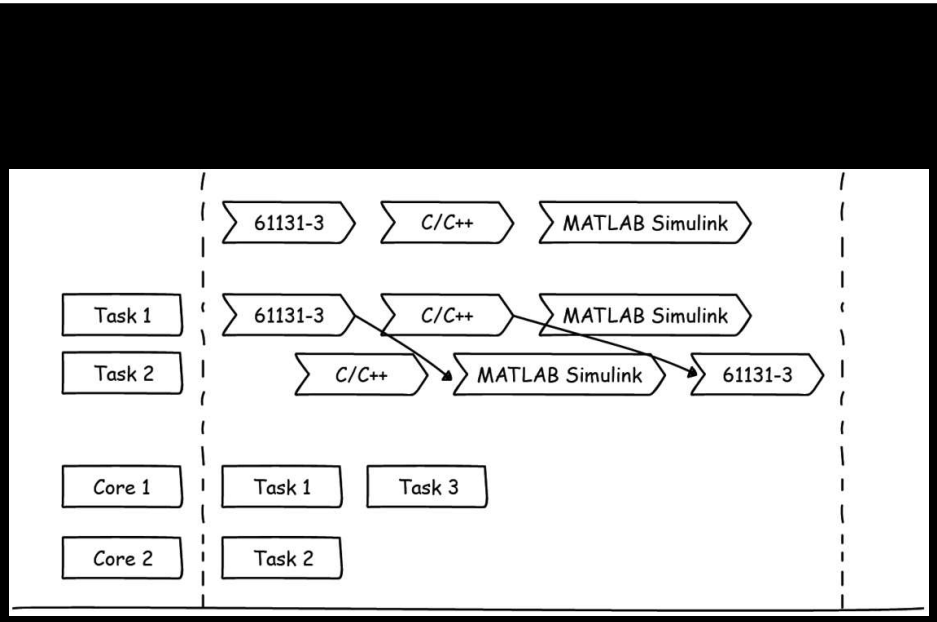
Seamless integration of model-based design & development with MATLAB Simulink and PLCnext Engineer.

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enhanced performance – PLC-typical Real-time Performance

Execution & Synchronization Manager



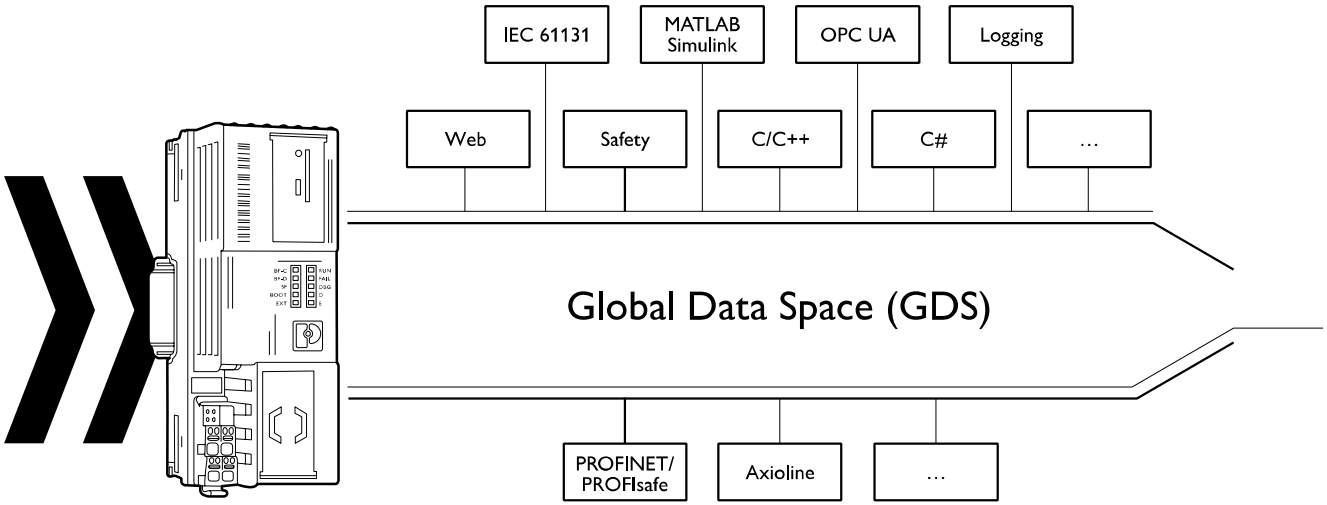
The patent-applied-for task handling of PLCnext Technology lets program routines of different origin run like classical IEC 61131 PLC code. Your high-level language programs become automatically deterministic.

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enhanced performance – Data Consistency

Global Data Space



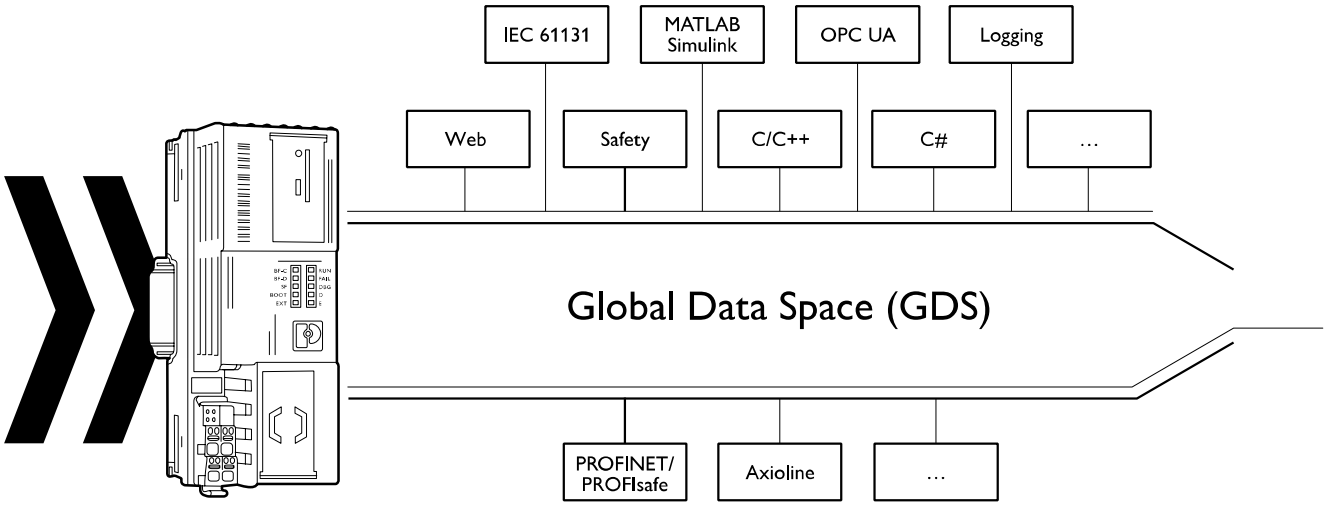
Fast and consistent data exchange between user programs, fieldbuses, and system programs. Access via Data Logger, HMI, and OPC UA. Security aspects for user management.

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enhanced performance – Data Consistency

Global Data Space



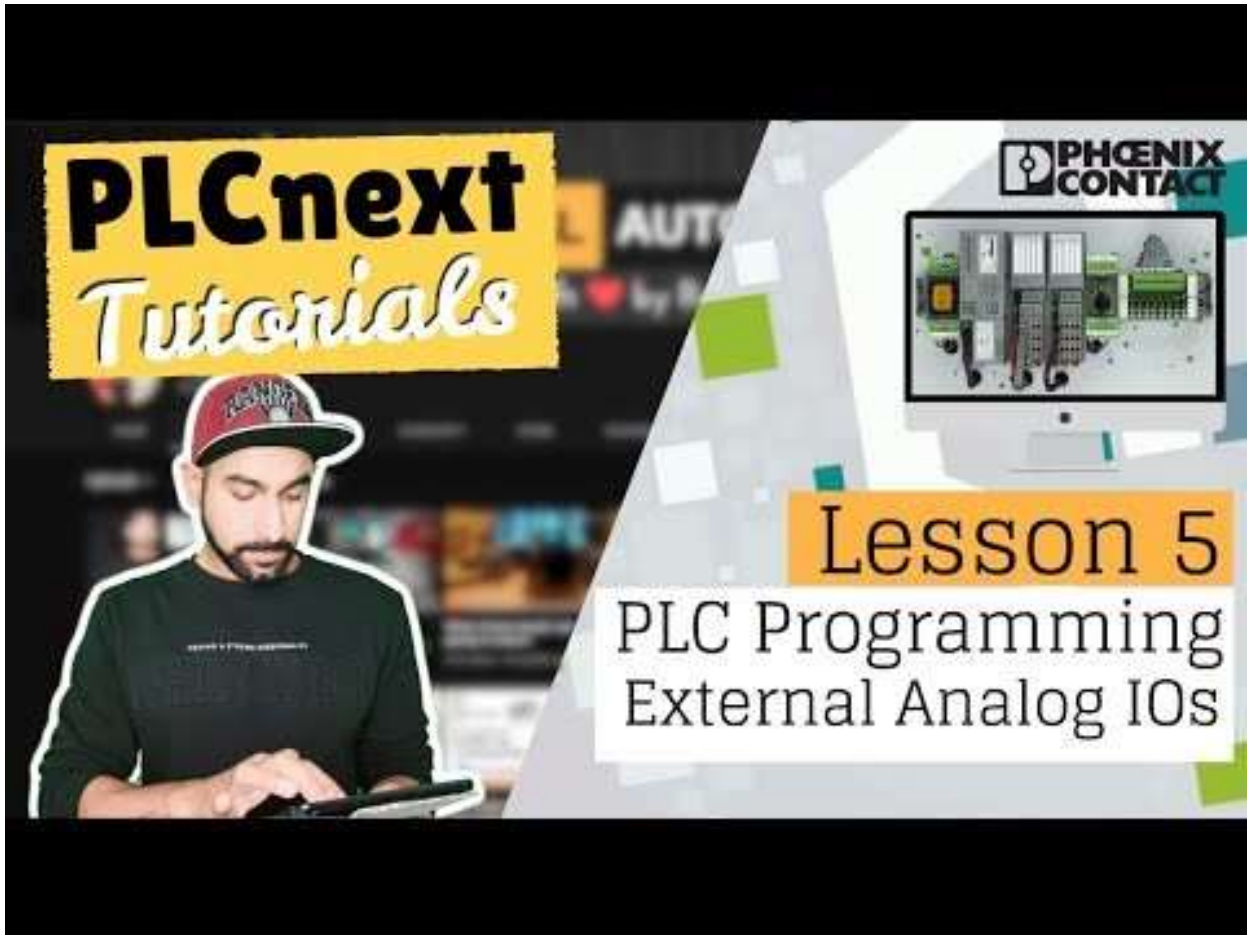
Fast and consistent data exchange between user programs, fieldbuses, and system programs. Access via Data Logger, HMI, and OPC UA. Security aspects for user management.

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PLCnext Lesson 4 - Programming the Controller's External Digital IOs

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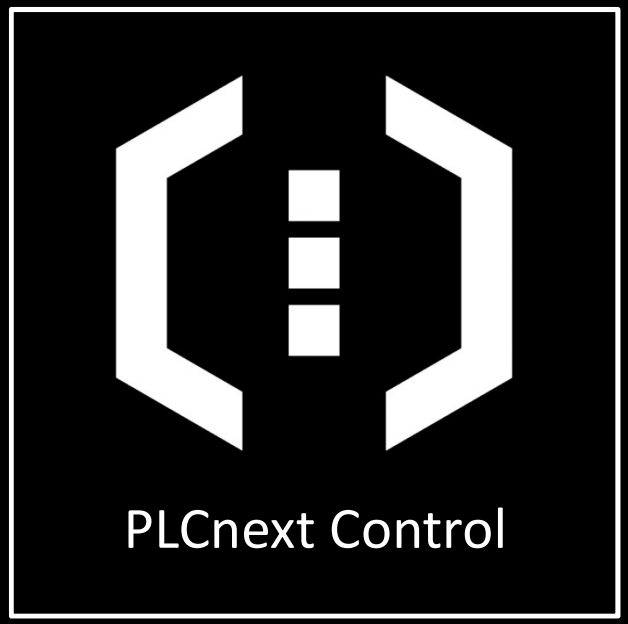
PLCnext Lesson 5 - Programming the Controller's External Analog IOs

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Open control platform for flexible automation

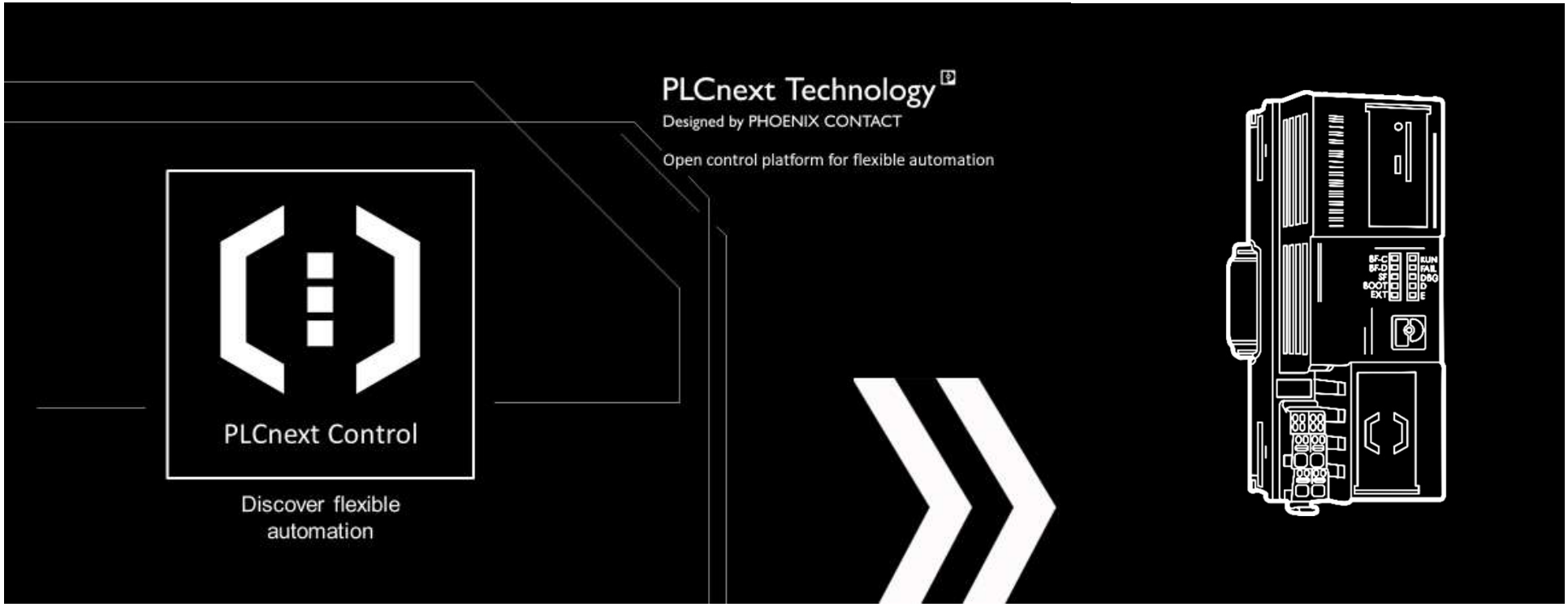


Discover flexible
automation

PLCnext Ecosystem – PLCnext Control

PLCnext Control

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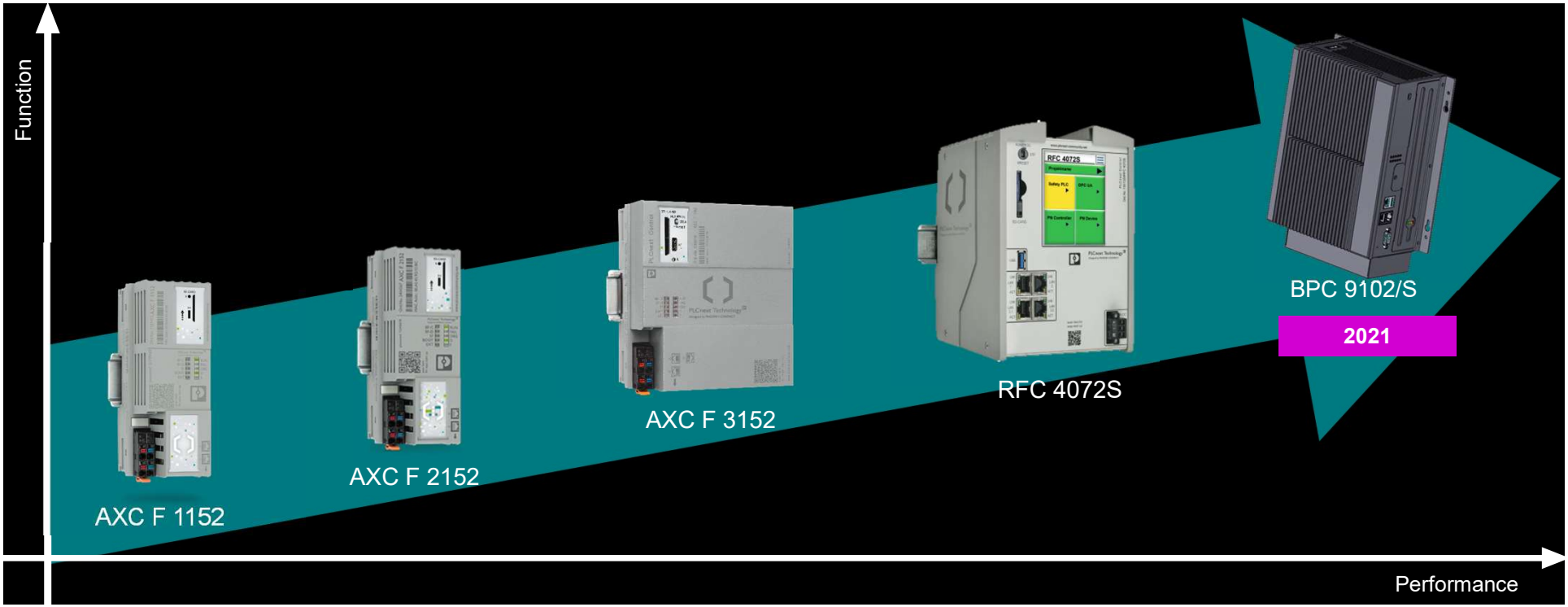


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PLCnext Ecosystem – PLCnext Control

PLCnext Control Portfolio Overview

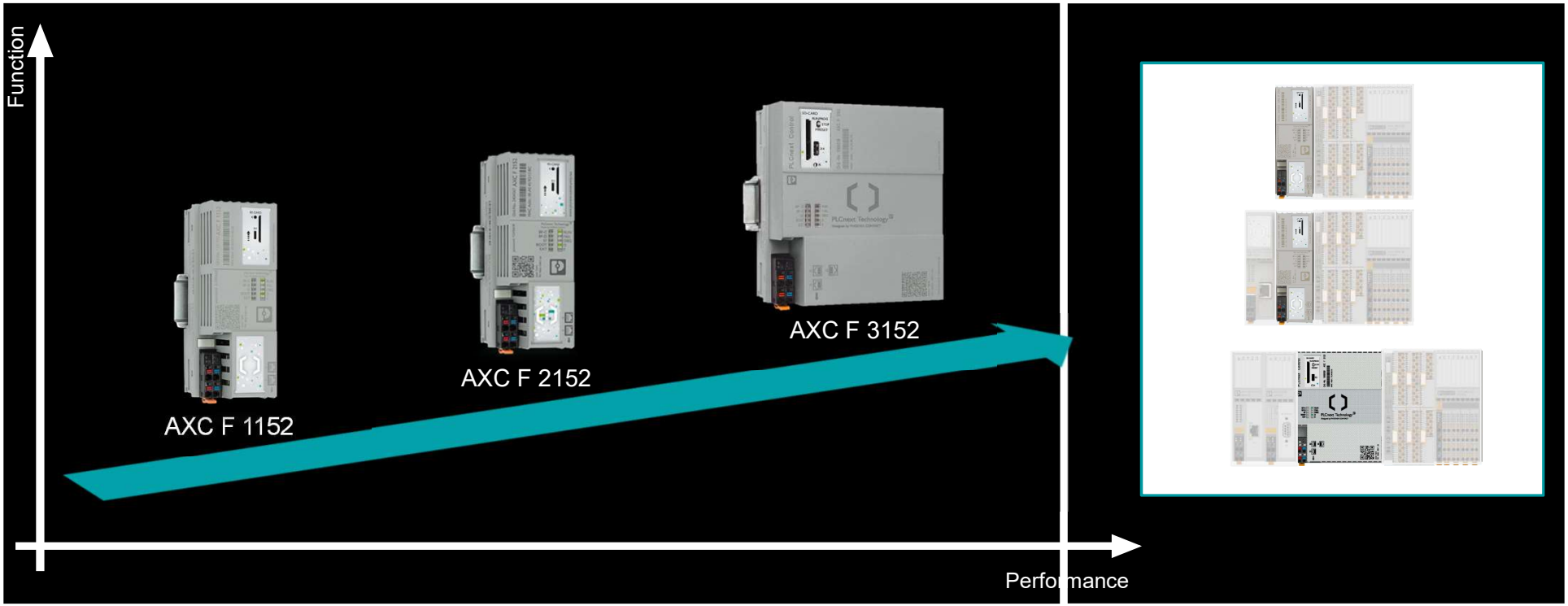
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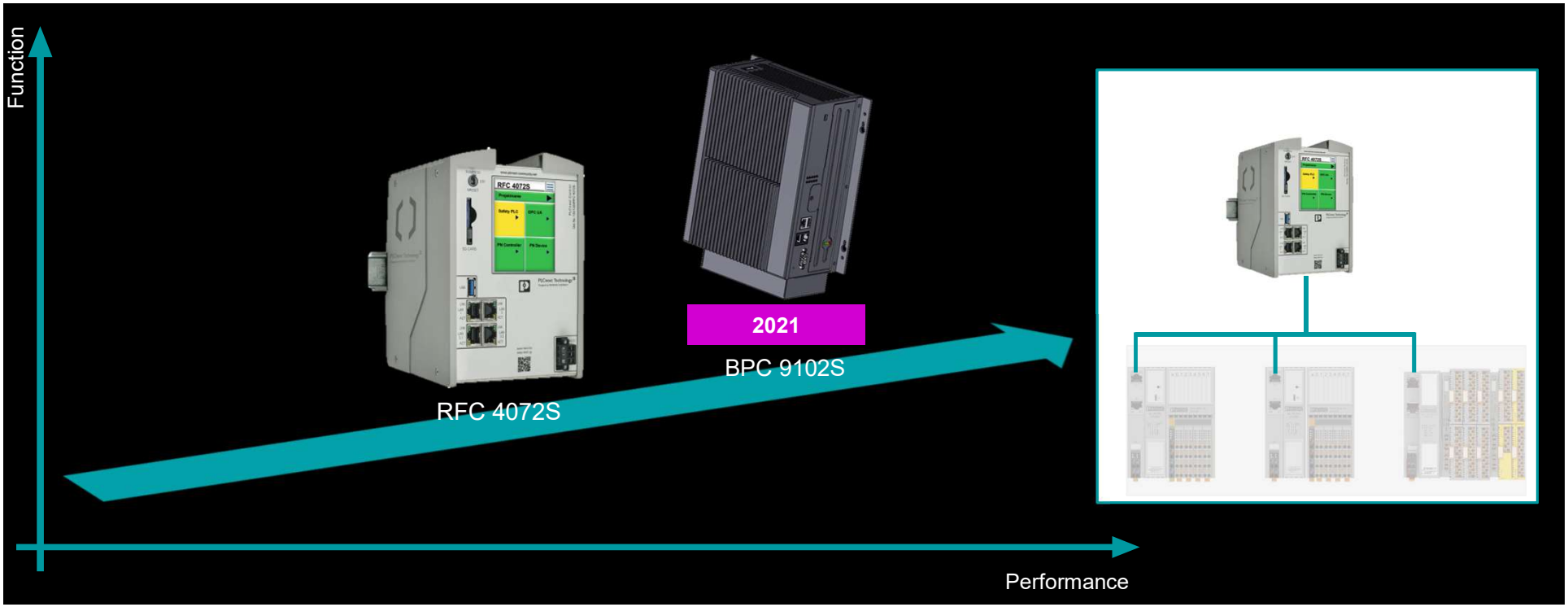
PLCnext Control for flexible automation with modular hardware platform



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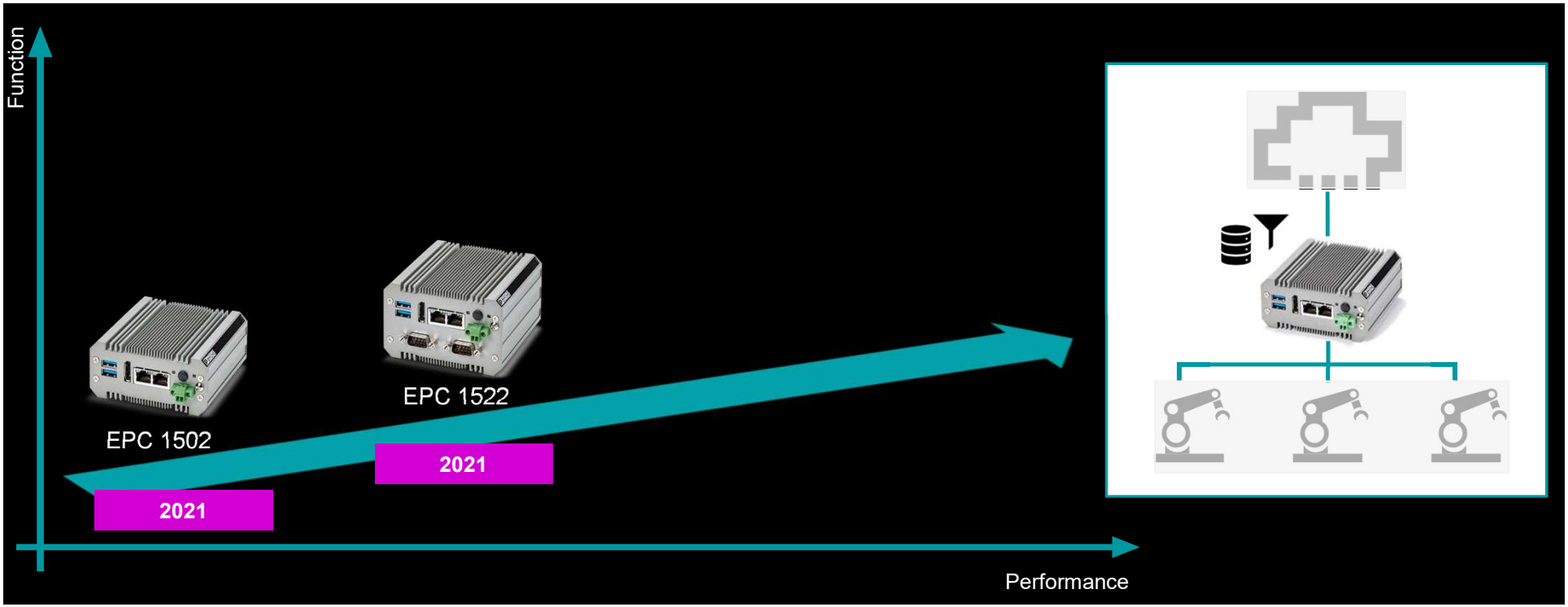
PLCnext Control for centralized applications with decentralized IOs



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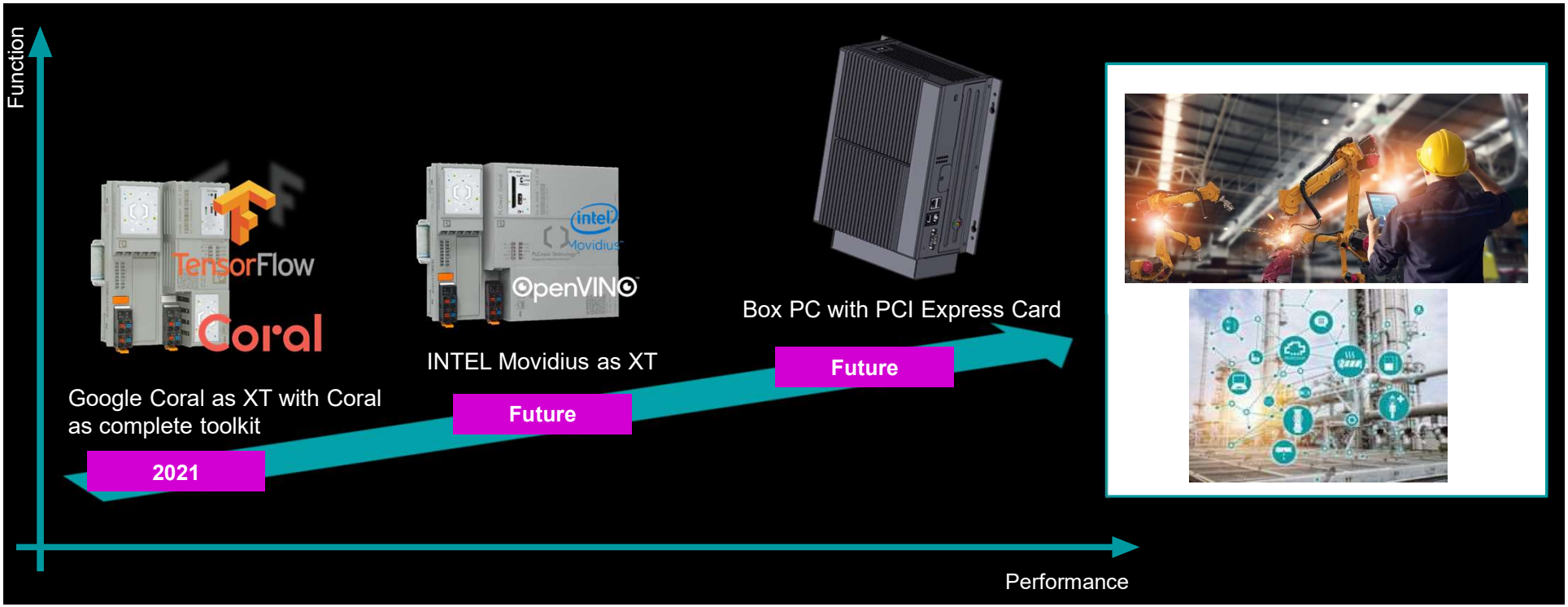
PLCnext Control for Edge Computing



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PLCnext Control for intelligent applications with Artificial Intelligence



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PLCnext Controls Performance Benchmark



RFC 4072S

4362

Intel i5 – 6300U dual core



AXC F 3152

811

Intel E3930 1,3GHz dual core
Basic list price ~ 1599 EUR

~ 2.7 times faster than AXC F 2152



AXC F 2152

300

Cyclone 5 Cortex-A9 800 MHz dual core (Comparable with AXC 3050)
Basic list price 599 EUR



AXC F 1152

150

Cyclone 5 Cortex-A9 800 MHz single core (Comparable with ILC 390)
Basic list price 399 EUR

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PLCnext Lesson 12 - Interfacing FACTORY IO via OPCUA

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PLCnext Control

PLCnext Control AXC F 1152



Core	Working memory	Temperature
ARM Cortex-A9 (800 MHz)	512 Mbytes RAM	-25°C-60°C

# control tasks (IEC 61131)	Min. cycle time (IEC 61131)	Security
8	5 ms	TPM integrated

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Entry Level – PLCnext Control AXC F 1152

- Cyclone 5 with ARM Cortex-A9 CPU 1 x 800 MHz
- Number Control-Tasks (IEC 61131): 8
- Min. cycle time (IEC 61131): 5 ms
- Profinet Controller & Device with 16 ARs
- 512 Mbytes RAM
- SD Flash card slot
- 1 x ETH-MAC interface (2 x 10/100 Mbit) switched
- Real-time clock
- Supports INLINE and AXIOLINE I/O modules
- Trusted platform module (TPM) for security
- Temperature range: -25°C up to +60°C



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Feature Set Differences – AXC F 1152 vs. AXC F 2152

Feature	AXC F 1152	AXC F 2152
CPU	Cyclone 5 with ARM Cortex-A9 1 x 800 MHz	Cyclone 5 with ARM Cortex-A9 2 x 800 MHz
Approvals	UL, CE	UL, CE, Marine, ATEX
Max. number of control tasks	8 (1 x 8)	32 (2 x 16)
PLCnext extension support (left-hand side)	No	Yes
PROFINET Features	Controller & Device with max. 16 ARs	Controller & Device with max. 64 ARs
Min. task cycle time	5 ms	1 ms

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PLCnext Control

PLCnext Control AXC F 2152



Core	Working memory	Temperature
ARM Cortex-A9 (2x 800 MHz)	512 Mbytes RAM	-25°C-60°C

# control tasks (IEC 61131)	Min. cycle time (IEC 61131)	Security
32	1 ms	TPM integrated

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Proven Standard – PLCnext Control AXC F 2152

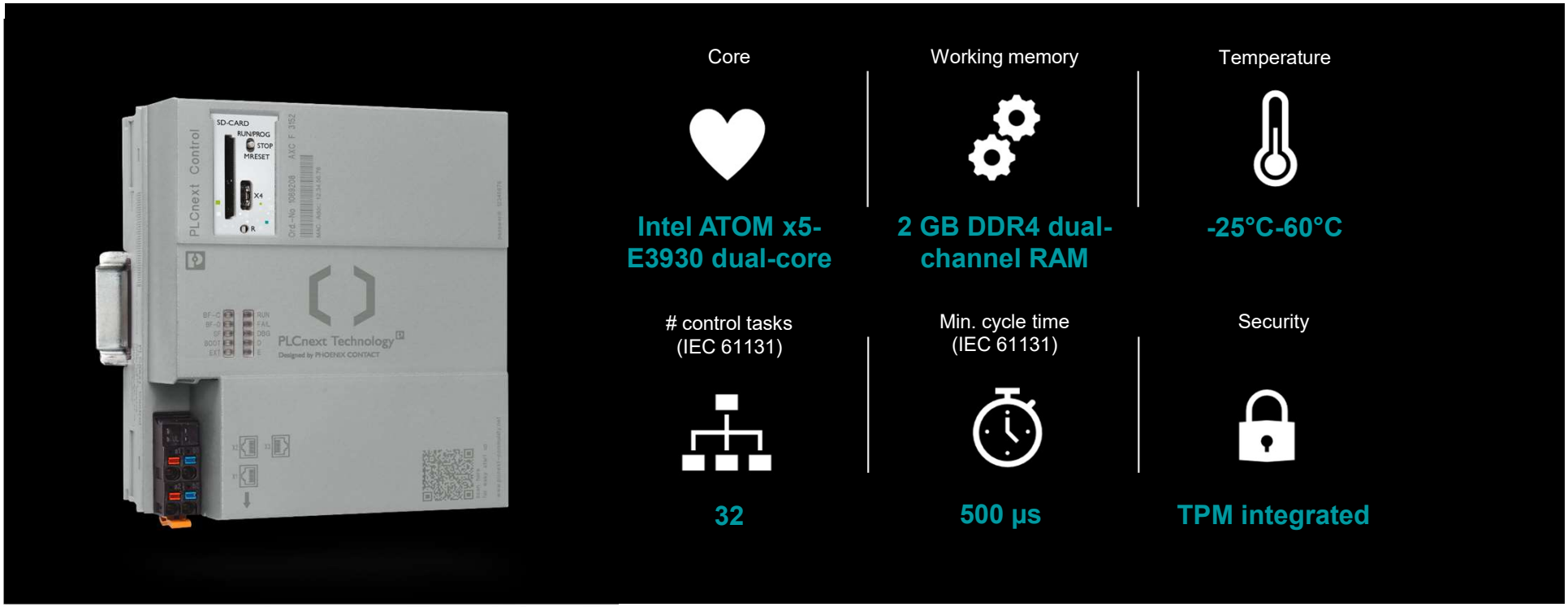
- Cyclone 5 with ARM Cortex-A9 CPU 2 x 800 MHz
- 512 Mbytes RAM
- SD Flash card slot
- 1 x ETH-MAC interface (2 x 10/100 Mbit) switched
- Micro-USB type C
- Real-time clock
- Supports INLINE and AXIOLINE I/O modules
- Left side extension capability
- Trusted platform module (TPM) for security
- Temperature range: -25°C up to +60°C



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PLCnext Control

PLCnext Control AXC F 3152



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More Performance – PLCnext Control AXC F 3152

- Intel ATOM x5-E3930 dual-core CPU (2 x 1,3 GHz)
- 2 GB DDR4 dual-channel RAM
- 3 independent ETH-MAC interfaces (3 x 1 Gbit)
- Supports 2 PLCnext Control extensions (internal PCIe bridge)
- Supports INLINE and AXIOLINE I/O modules
- Integrated uninterruptible power supply (UPS) for targeted application shutdown
- SD card slot
- Diagnostic LEDs
- Real-time clock
- Temperature range: -25°C up to 60°C
  - Optional fan to increase service life



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INSPIRING INNOVATIONS

PLCnext Technology
Designed by PHOENIX CONTACT

More Performance – PLCnext Control AXC F 3152

- Based on PLCnext Technology
  - Linux operating system
  - Supports high-level programming languages
  - PROFICLOUD Connection
- PROFINET Controller (up to 128 devices) + Device
- OPC UA
  - Easy integration of other fieldbus protocols (Linux OS)
- Prepared for TSN
- Trusted platform module (TPM) for security
- Approvals
  - UL (Hazloc), CUL, IEC Ex, ATEX
  - DNV/GL, LR, BV, ABS, …



PHOENIX CONTACT
INSPIRING INNOVATIONS

PLCnext Control

PLCnext Control RFC 4072S



Core

Intel i5 6300U 2 x 2,4 GHz processor

Working memory

4 GB DDR 4 dual channel RAM

Temperature

0°C up to 55°C with fan

control tasks (IEC 61131)

32

Min. cycle time (IEC 61131)

500 µs

Security

TPM integrated

PHOENIX CONTACT
INSPIRING INNOVATIONS

PLCnext Technology
Designed by PHOENIX CONTACT

PLCnext Control RFC 4072S

- Intel i5 6300U 2 x 2,4 GHz processor
- 4 GB DDR 4 dual channel RAM
- Profisafe integrated (up to 300 F-Devices)
- Operation Mode Switch
- Touch display
- SD Flash card slot
- 3 ETH-MAC interfaces
  (2 x 1 Gbit, 1 x 100 Mbit switched)
- Real-time clock
- Trusted platform module (TPM) for security
- Temperature range: 0°C up to 55°C with fan



PHOENIX CONTACT
INSPIRING INNOVATIONS

PLCnext Control BPC 9102S



Core

Intel i7 CPU
8 cores

Random access memory

2GB RAM (min),
int. UPS

Temperature

-20°C-60°C

Storage

Removable
mass storage

Connections

2x RJ45,
1x TSN, 1x USB

PCIe

Safety board,
AI acceleration

PHOENIX CONTACT
INSPIRING INNOVATIONS

PLCnext Technology
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PLCnext Control BPC 9102S

- CPU: i7-10700TE (10th Gen 8-Core)
- RAM: 16GB
- Interfaces:
- 3 separate and independent Ethernet interfaces with 1 RJ45 port each
  - LAN1: PN Controller (I225), 1GBit
  - LAN2: PN Device (I225), 1GBit
  - LAN3: RAW user ethernet communication (I225), 1GBit
- 1 Serial Interface RS232
- 1 USB for FW/SW Update
- Reset button and power switch
- SD Card
- Internal Super-cap UPS module
- Fan (only on between 50-60°C) to expand MTBF



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PLCnext Technology – New Starterkit

PLCnext Technology
Designed by PHOENIX CONTACT

Start now and become a part of PLCnext Technology



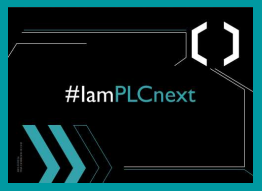
Getting started

Online

Hardware

PLCnext Control &
Axioline Smart Element

starterkit.plcnextcommunity.com









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INSPIRING INNOVATIONS

What else is worth mentioning …

New Starterkit, new sales channels







Hardware

PLCnext Control AXC F 2152 + Axioline Smart Elements

3rd Party Distribution/ Channel Partner

RS Components, RealPars

Getting started

Online

Extension

Additional space on DIN rail

Marketing Material

starterkit.plcnextcommunity.com



DESIGNSPARK

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Countless possibilities in hardware variance

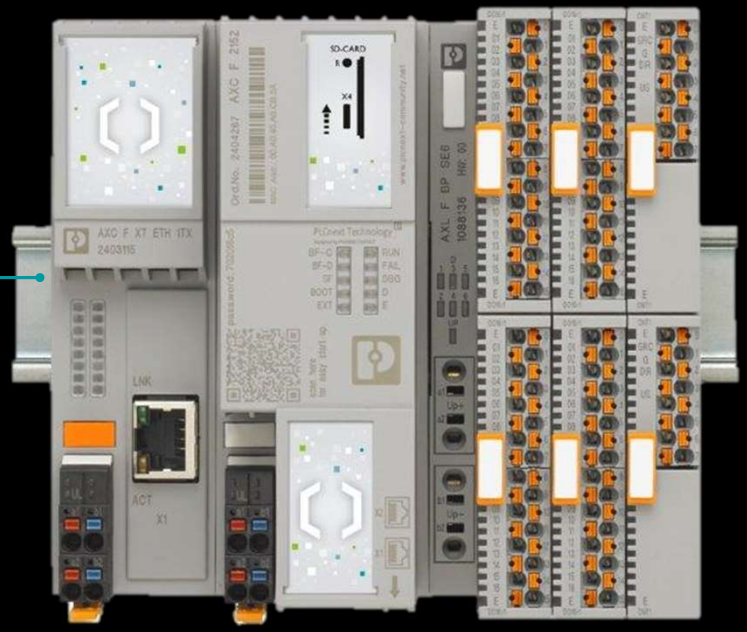
PLCnext Control

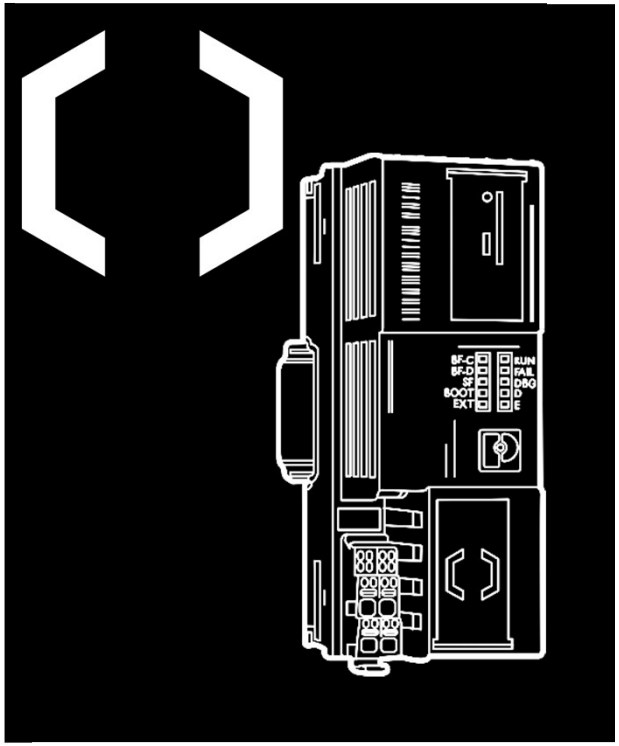
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new

PLCnext Control Extension

Control functionality can be easily extended with left-handed modules



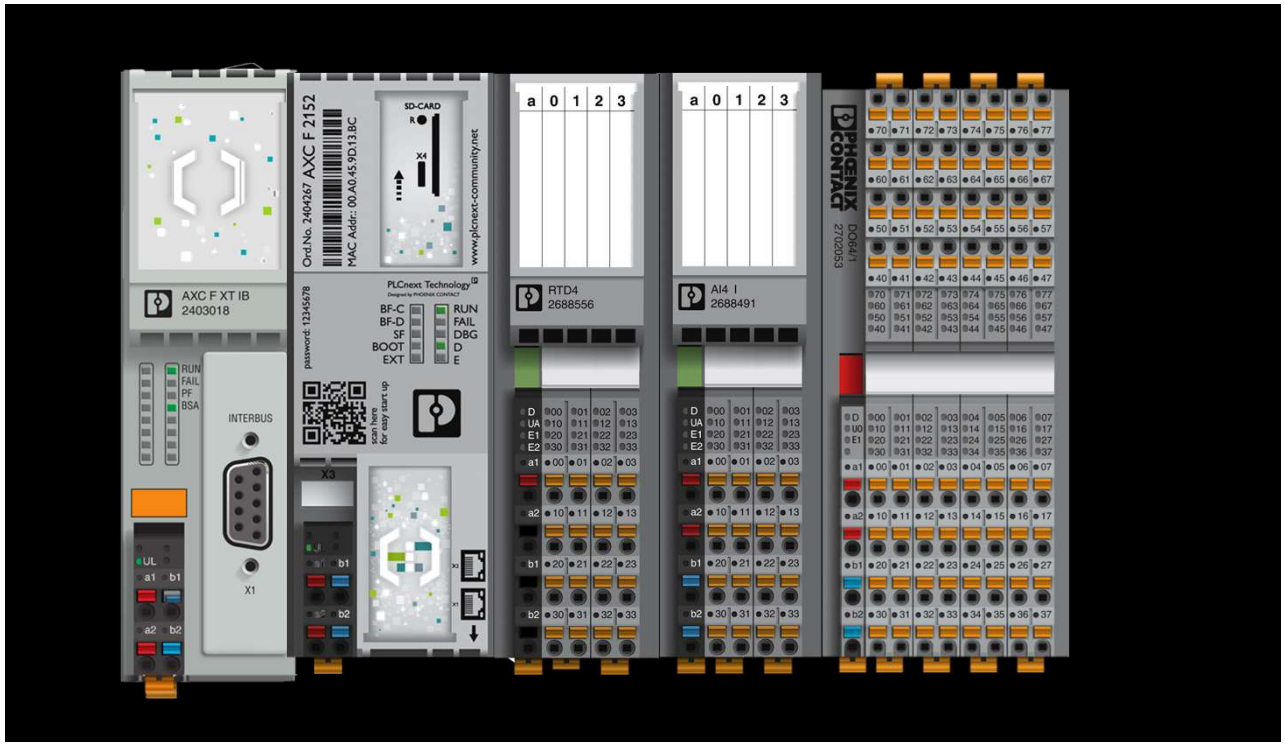


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PLCnext Ecosystem – PLCnext Control

PLCnext Technology
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Left-hand side extension possibilities

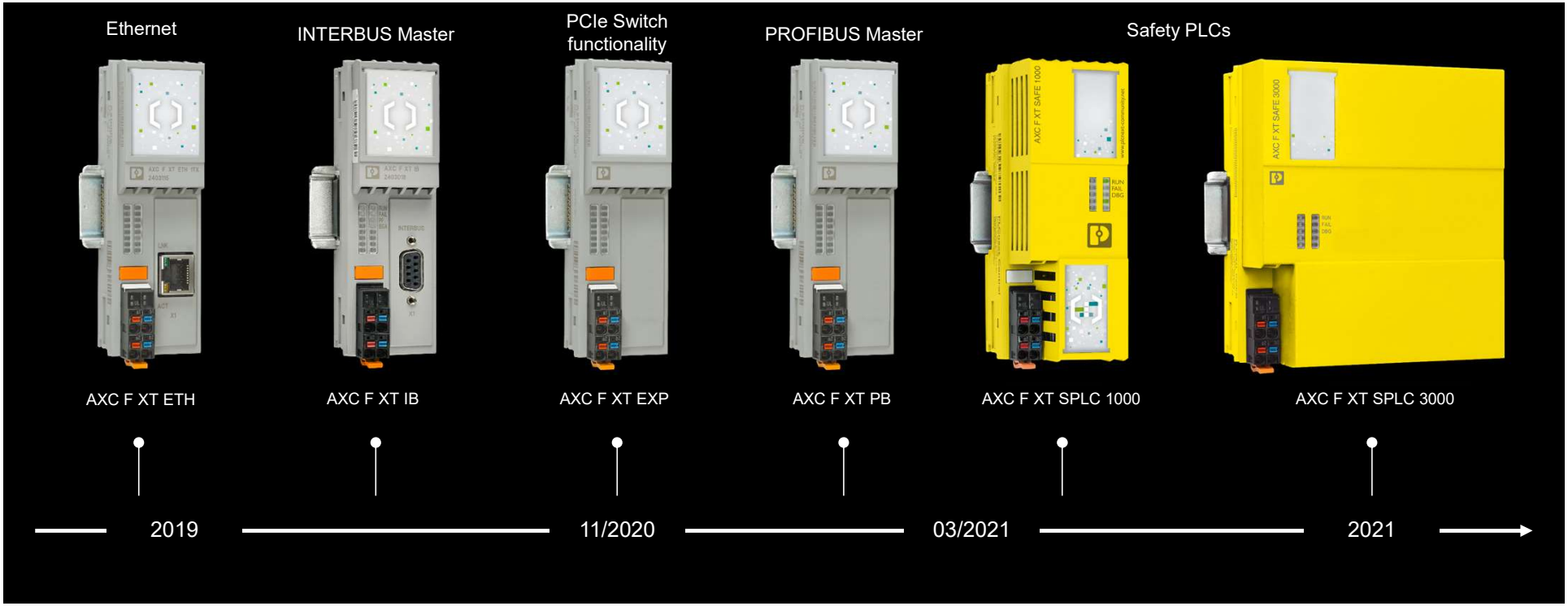


- Modular expandability of the controller through left-sided expansion modules on the PCI express interface via a corresponding bus socket
- Unlimited expansion possibilities

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PLCnext Ecosystem – PLCnext Control

Portfolio PLCnext Control Extensions



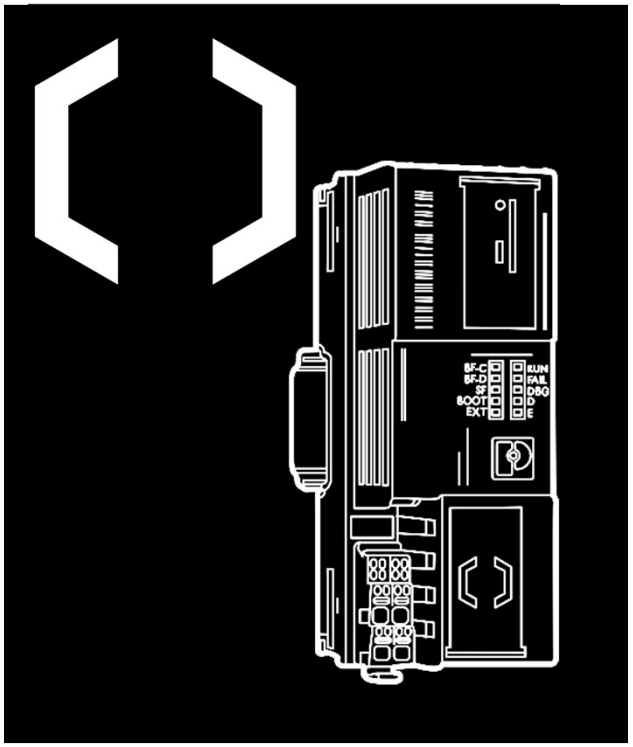
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PLCnext Technology
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PLCnext Extension AXC F XT ETH



- Additional 1Gbit MAC interface
- Temperature range: -25°C up to 60°C
- Profinet Control capability
- Security due to separated interfaces
- Modularity and Flexibility
- Approvals
- UL (Hazloc), CUL
- DNV/GL, LR, BV, ABS, …
- IEC Ex, ATEX



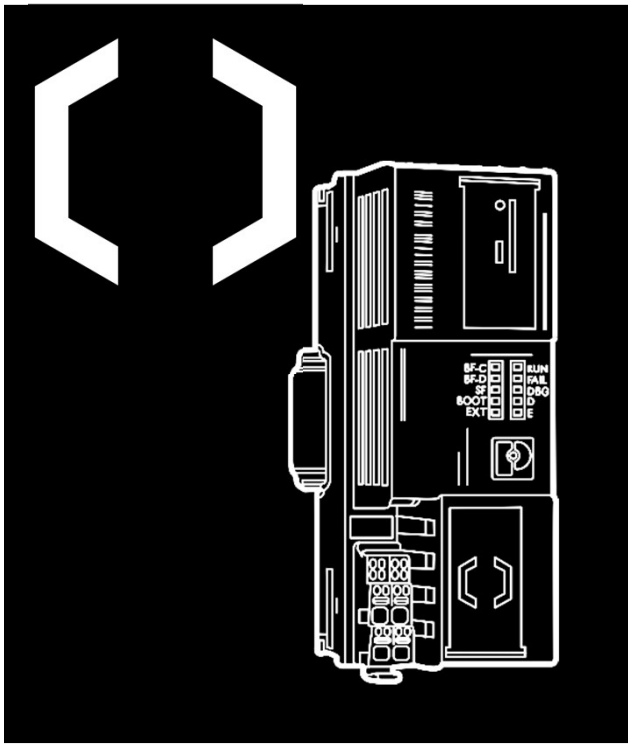
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PLCnext Extension AXC F XT IB



- Additional INTERBUS Master
- Up to 512 Devices, up to 255 Remote Devices
- Up to 126 PCP Devices
- Up to 16 Remote Bus Level
- 4096 Bit Process data
- 500kBit und 2 Mbit
- Ideal for Retrofit applications
- Approvals
  - UL (Hazloc), CUL, IEC Ex, ATEX
  - DNV/GL, LR, BV, ABS, …
- Temperature range: -25°C up to 60°C



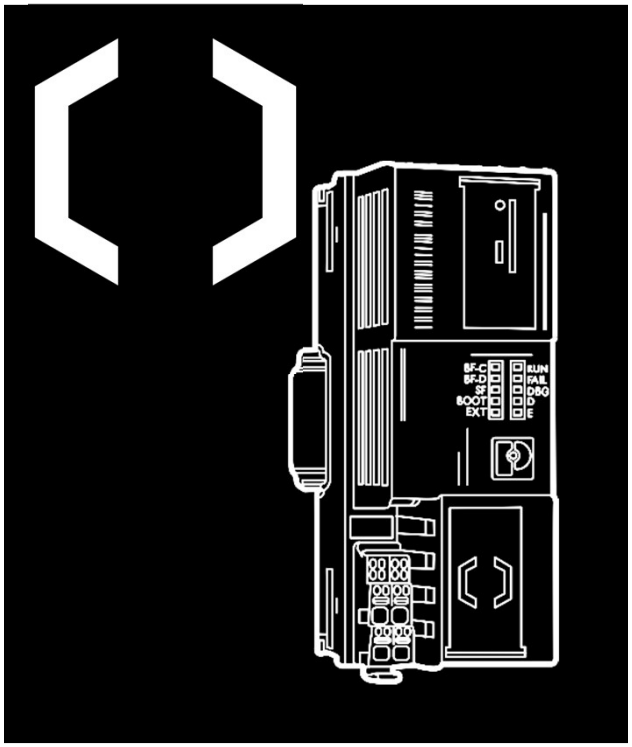
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PLCnext Technology
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PLCnext Extension AXC F XT SPLC 1000



- Profisafe Extension
  - Specification 2.6.1
- 54 mm width (AXC F 2152 housing)
- Supports up to 32 Profisafe devices
- Reloadable C-Functions
- Temperature range: -25°C up to 60°C
- Approvals
  - UL (Hazloc), CUL
  - DNV/GL, LR, BV, ABS, …
  - IEC Ex, ATEX



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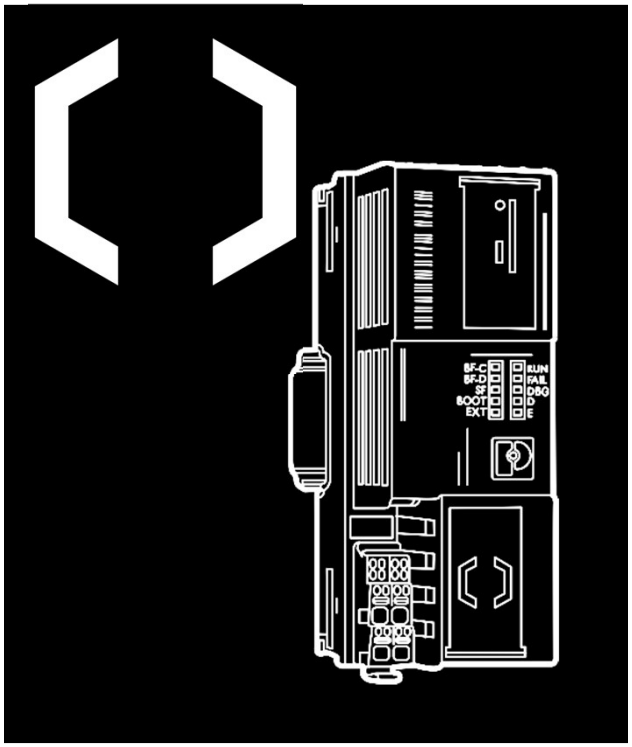
PLCnext Control

PLCnext Technology
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PLCnext Extension AXC F XT SPLC 3000



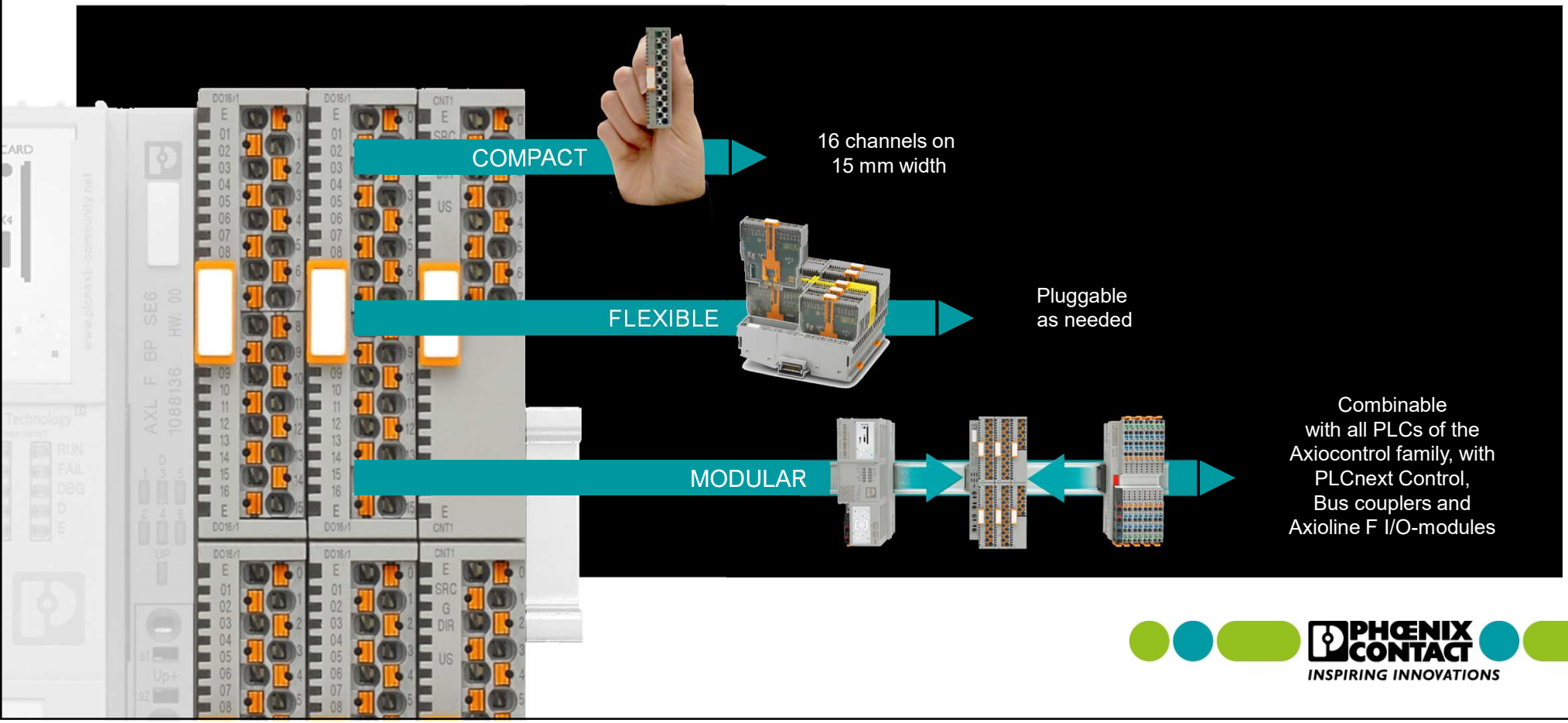
- Profisafe Extension
  - Specification 2.6.1
- 100 mm width (AXC F 3152 housing)
- Supports up to 300 Profisafe devices
- Reloadable C-Functions
- Temperature range: -25°C up to 60°C
- Approvals
  - UL (Hazloc), CUL
  - DNV/GL, LR, BV, ABS, …
  - IEC Ex, ATEX



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PLCnext Ecosystem – PLCnext Control - IO

Axioline Smart Elements



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Axioline Smart Elements

Automate smart and economically



Ready for automation

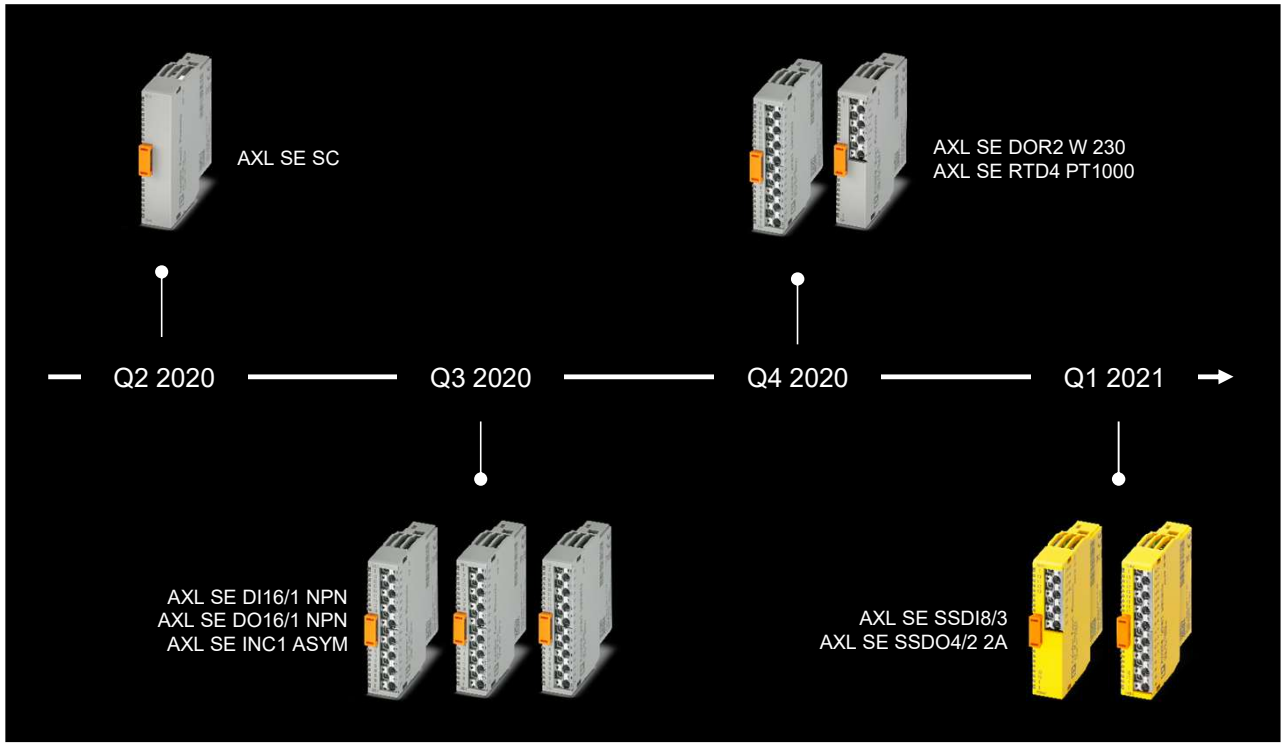
All necessary functionalities
incl. Safety and IO-Link

DI	SDI	AI	IO-Link	INC
DO	SDO	AO	RS485	CNT

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Axioline Smart Elements

More to come



Be always up to date with the
I/O systems & light community
at the PC World.

Check regularly for latest information on new products, marketing tools and management updates.

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PLCnext & Axioline Smart Elements

Modular automation system



- Scalable automation system for simple to complex assignments
- Large selection of modules according to the modular system principle
- Optimal complement to PLCnext Control
- All components are part of the COMPLETE line system

PLCnext Technology
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COMPLETE line

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I/O systems in the Process Industry | Product portfolio

Overview – Axioline IP20 I/O systems



Axioline Smart Elements

- Flexible, modular and space saving I/O concept
- Machine building
- Field-level communication IO-Link



Axioline F XC

- Wide temperature range, process-relevant approvals
- Hybrid applications, process applications
- Field-level communication HART COMMUNICATION PROTOCOL

General requirements
Factory automation

Specific requirements
Process industry

Axioline F

- Robust and fast I/O solution, wide I/O portfolio
- Ship building, energy applications
- Field-level communication IO-Link



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PLCnext Technology

Functional Safety Portfolio with PLCnext Technology



Limitless possibilities for functional safety applications with PLCnext Technology

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PLCnext Technology

Functional Safety



PLCnext Extension AXC F XT SPLC 3000

Core	# of Profisafe devices	Temperature
ARM A8 & A9	300	-25°C - 60°C

Width	Approvals	C Functions
100mm	UL, CUL, etc	Reloadable

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PLCnext Technology

Functional Safety



PLCnext Extension AXC F XT SPLC 1000

Core	# of Profisafe devices	Temperature
2 x Cortex M4	32	-25°C - 60°C

Width	Approvals	C Functions
45mm	UL, CUL, etc	Reloadable

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INSPIRING INNOVATIONS

PLCnext Technology

PLCnext Control Extension SPLC 1000



PLCnext Extension AXC F XT SPLC 1000

Core	# of Profisafe devices	Temperature
2 x Cortex M4	32	-25°C - 60°C

Width	Approvals	C Functions
45mm	UL, CUL, etc	Reloadable

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PLCnext Technology

PLCnext Control Extension SPLC 3000



PLCnext Extension AXC F XT SPLC 3000

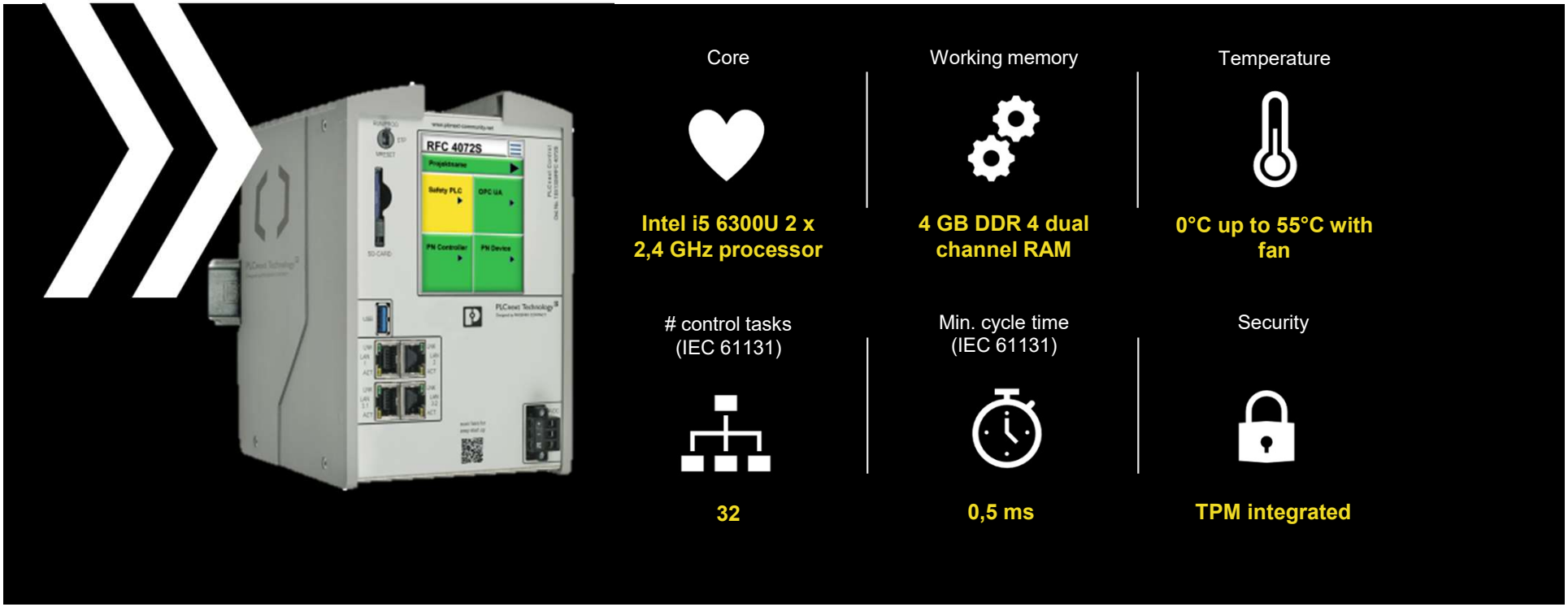
Core	# of Profisafe devices	Temperature
ARM A8 & A9	300	-25°C - 60°C

Width	Approvals	C Functions
100mm	UL, CUL, etc	Reloadable

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PLCnext Control

PLCnext Control RFC 4072S



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PCIe SPLC 3000

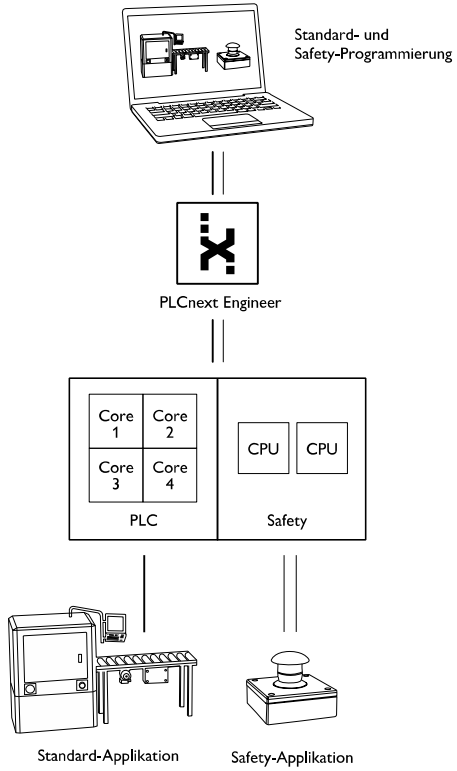


Highest performance for any automation application

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Functional Safety Integration

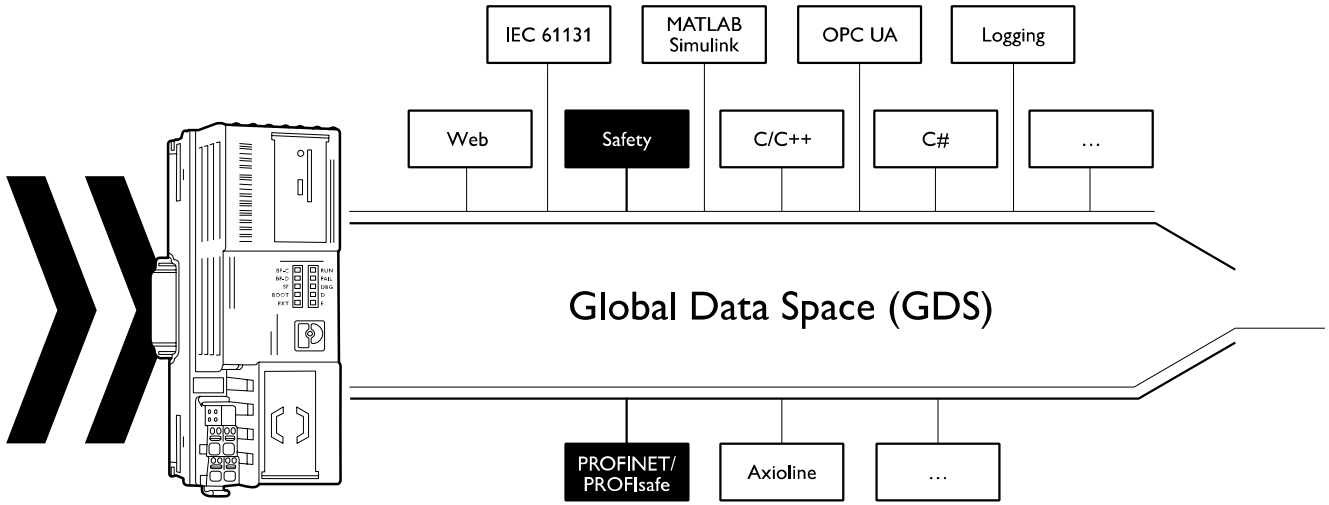




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Safety integrated

PROFIsafe



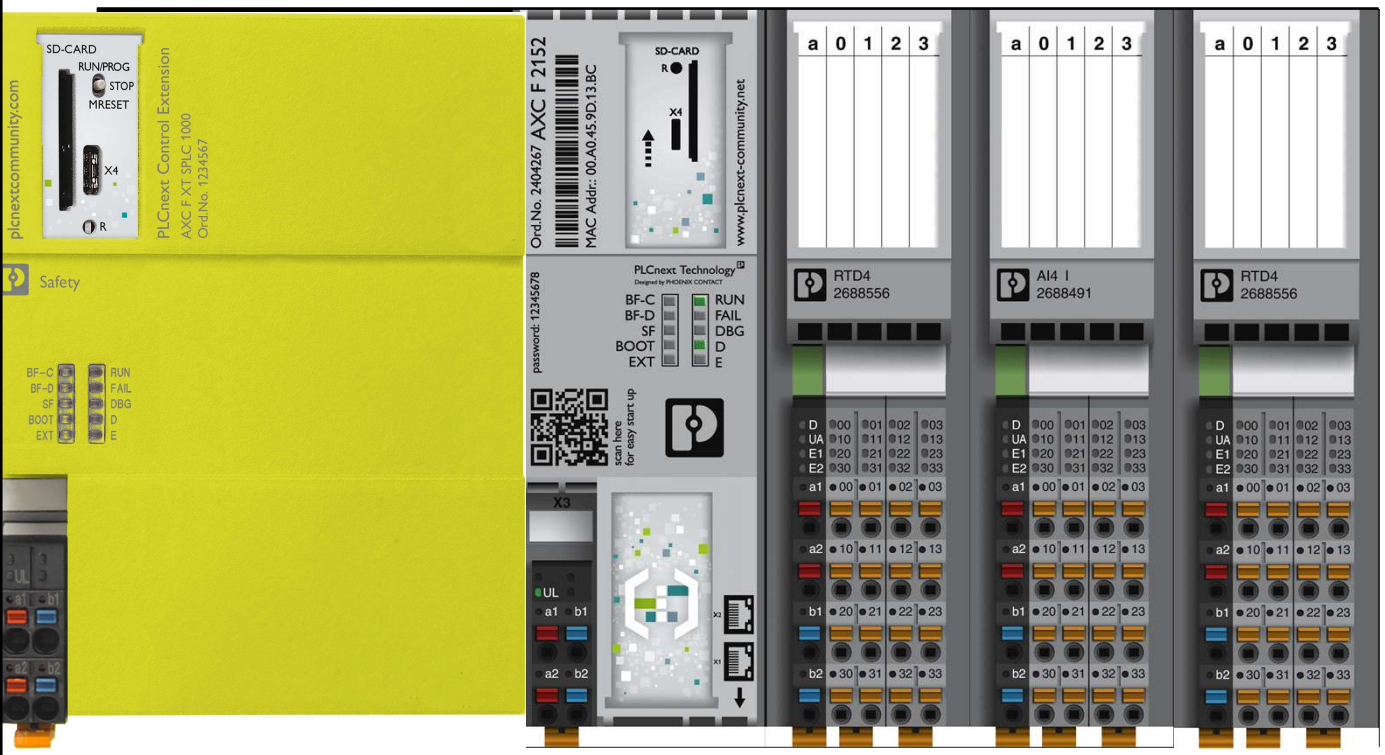
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Scalable Safe PLCs

PLCnext Technology
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AXC F XT SPLC 3000 – High-Scale Modular Safe PLC

Outlook: Mid 2021

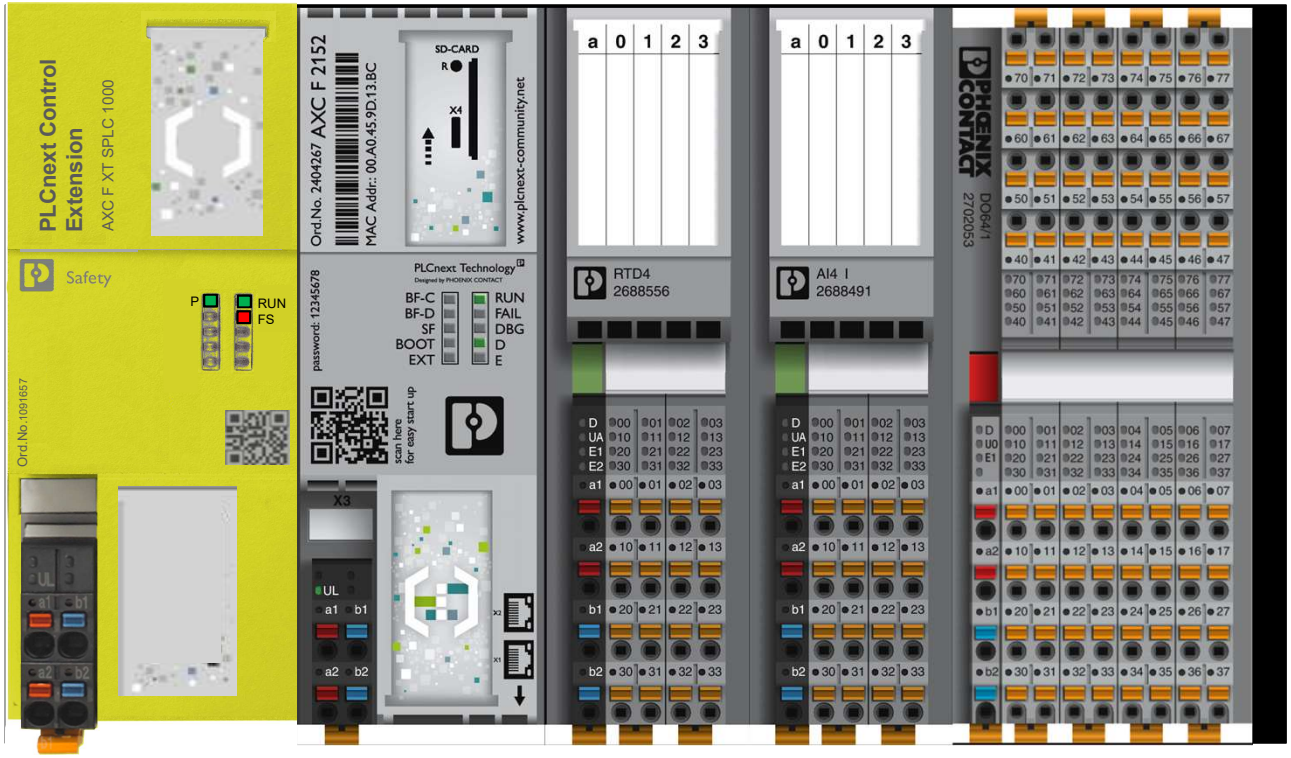


- Centralized Safe PLC
- Left-hand side connectable to PLCnext Controls
- Supported Safety Protocols:
  - PROFIsafe V2.61 (300 instances)
  - FSoE (future)
- Connectable to higher-layer SPLC
  - as PROFIsafe Slave
  - via new OPC UA Safety Protocol

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PLCnext Technology
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AXC F XT SPLC 1000 – Low-Scale Modular Safe PLC



- Decentralized Small Safe PLC
- Left-hand side connectable to PLCnext Controls
- Supported Safety Protocols:
  - PROFIsafe V2.61 (32 instances)
  - FSoE (future)
- Connectable to higher-layer SPLC
  - as PROFIsafe Slave
  - via new OPC UA Safety Protocol

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AXC F XT SPLC 1000 Categorization

Centralized Safe PLC

- e.g. SPLC 3000 @ AXC F 3152, alternatively RFC 480S / RFC 4072S
- Higher-layer plant control

Higher-layer network

- Step 1: PROFIsafe via PROFINET
- Step 2: Safety via OPC UA

Decentralized small-scale Safe PLC

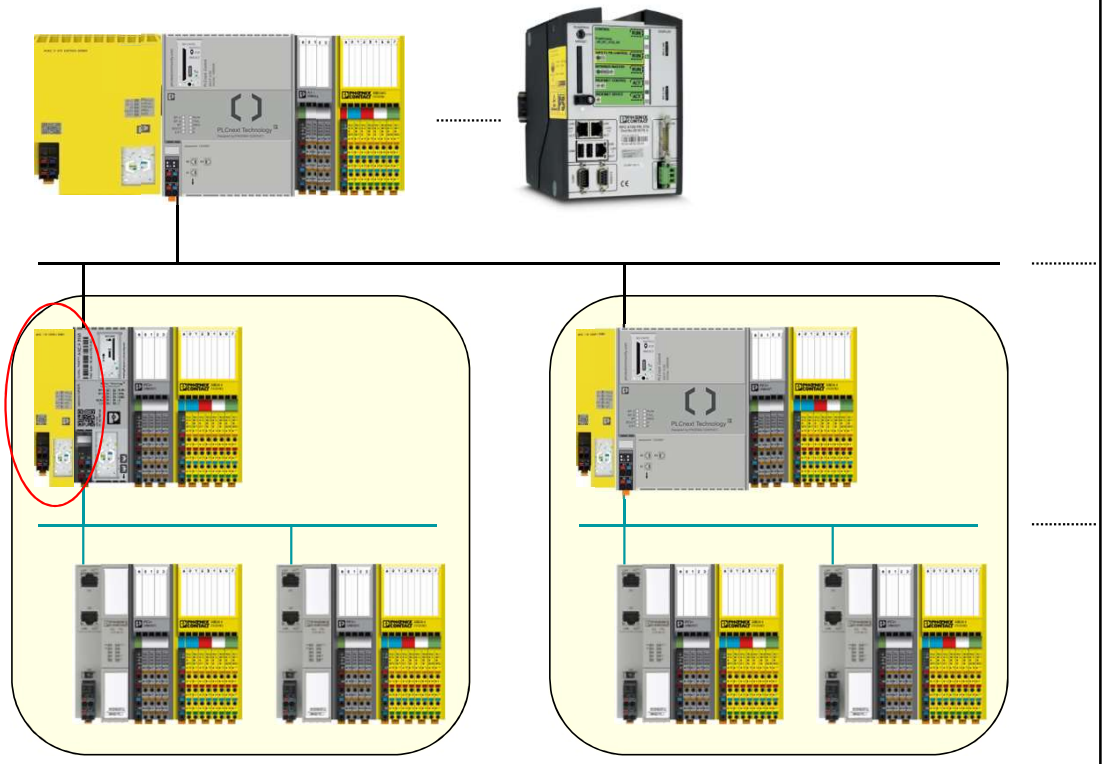
- **AXC F XT SPLC 1000** @ AXC F 2152 (or 3152)
- decentralized machine control incl. Safety

Machine network

- Step 1: PROFIsafe via PROFINET
- Step 2: FSoE via Ethercat

Field layer

- Step 1: PROFIsafe IO + intelligent field devices
- Step 2. FSoE IO + intelligent field devices

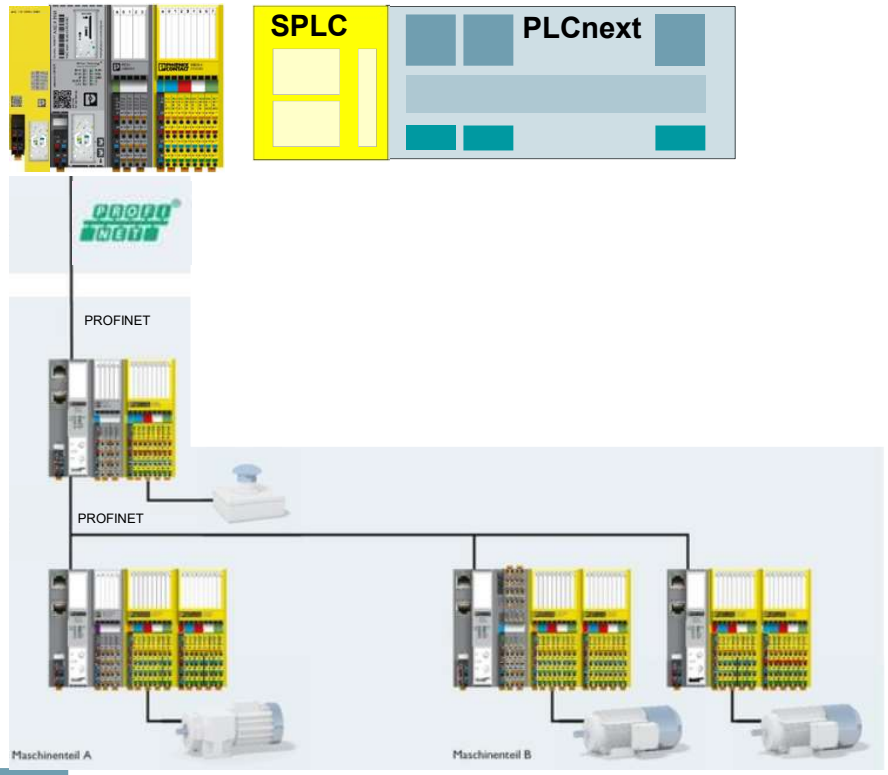


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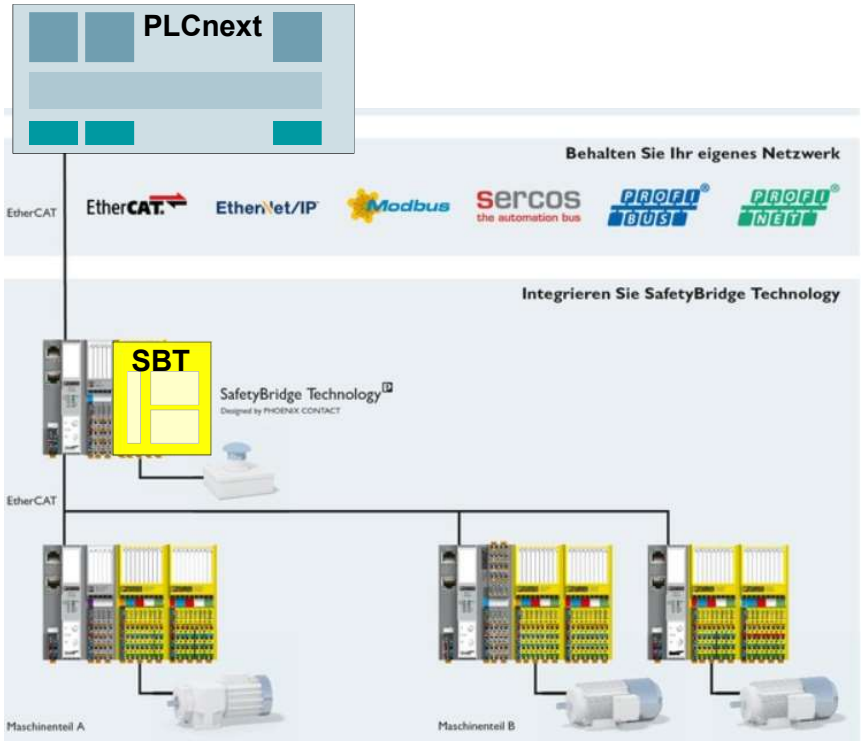
PLCnext Safety / SafetyBridge Categorization

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PLCnext Safety



SafetyBridge Technology



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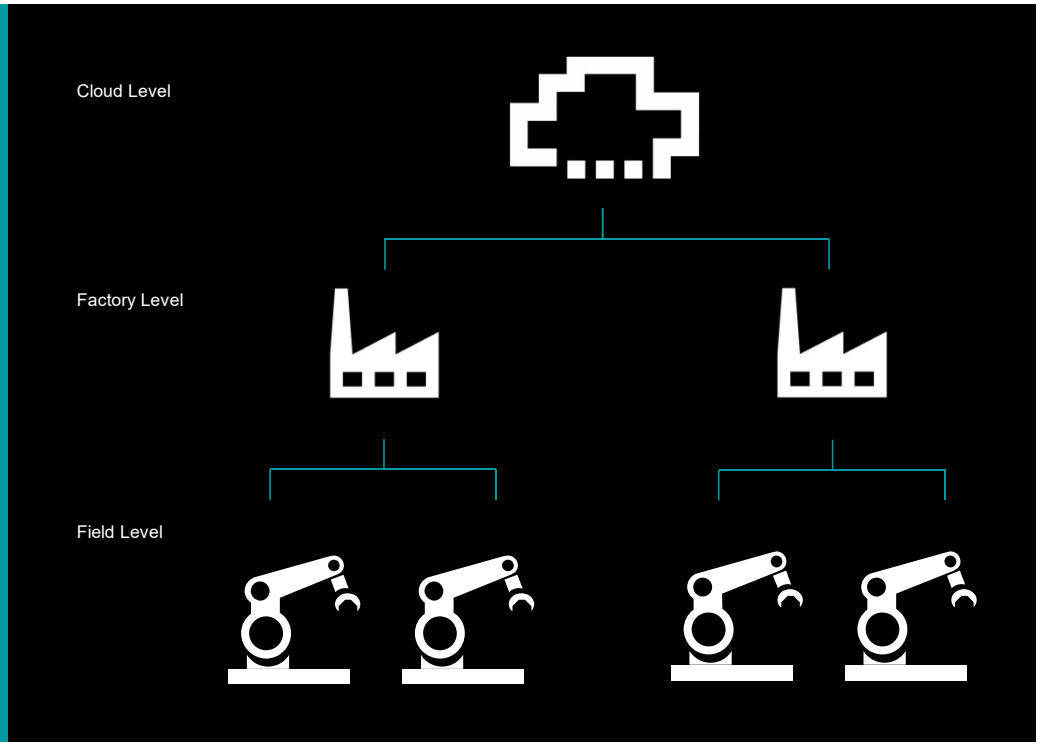


Confidential

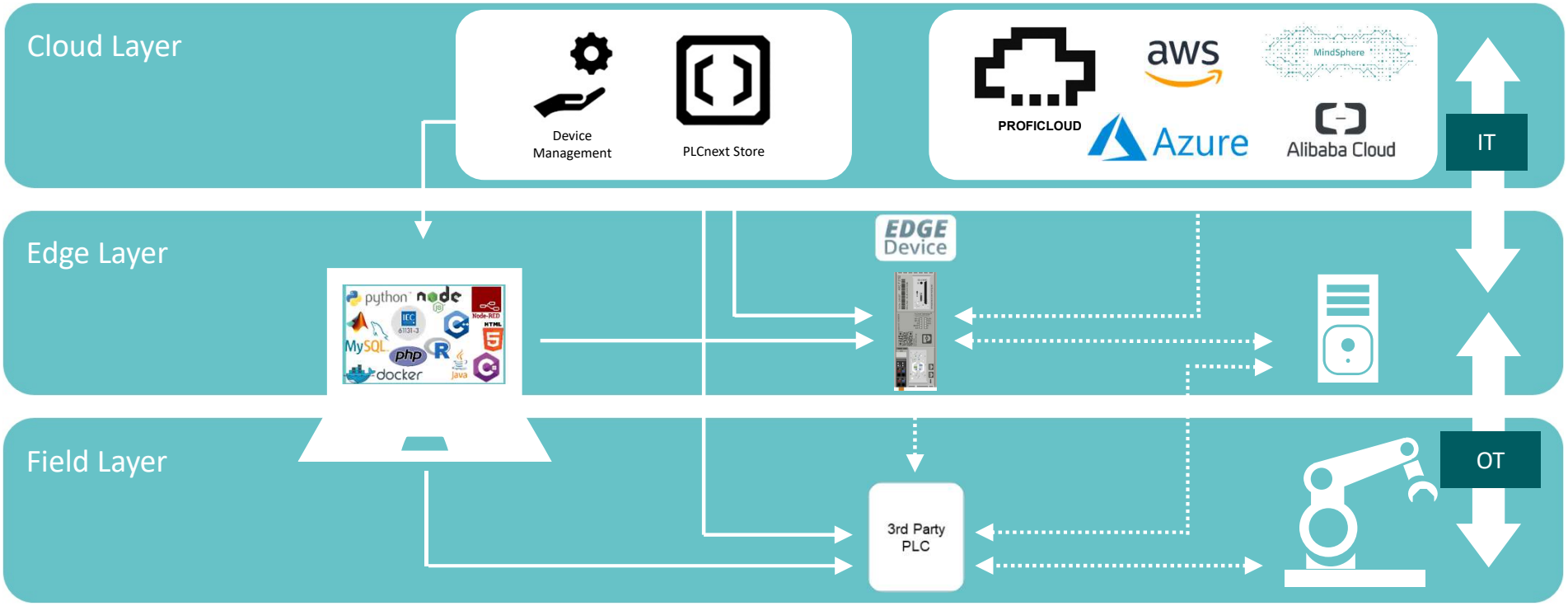
PLCnext Ecosystem – PLCnext Control

Edge Computing

- Cloud computing has revolutionized how people store and use their data, but…
- Latency, bandwidth, security or a lack of offline access can be problematic
- To solve this problem, users need robust, secure and intelligent on-premise infrastructure for edge computing
- When data is physically located closer to the user who connect to it, information can be shared quickly, securely and without latency



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INSPIRING INNOVATIONS

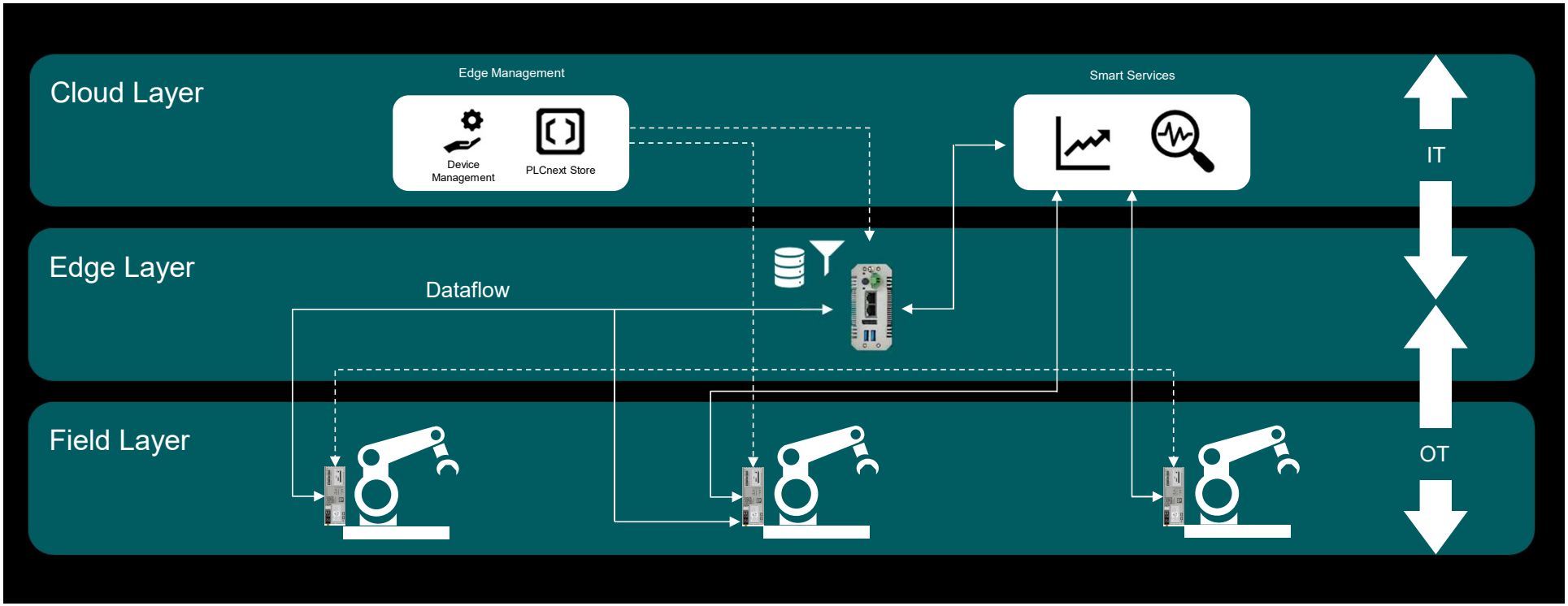


PLCnext Control

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PLCnext Ecosystem – PLCnext Control

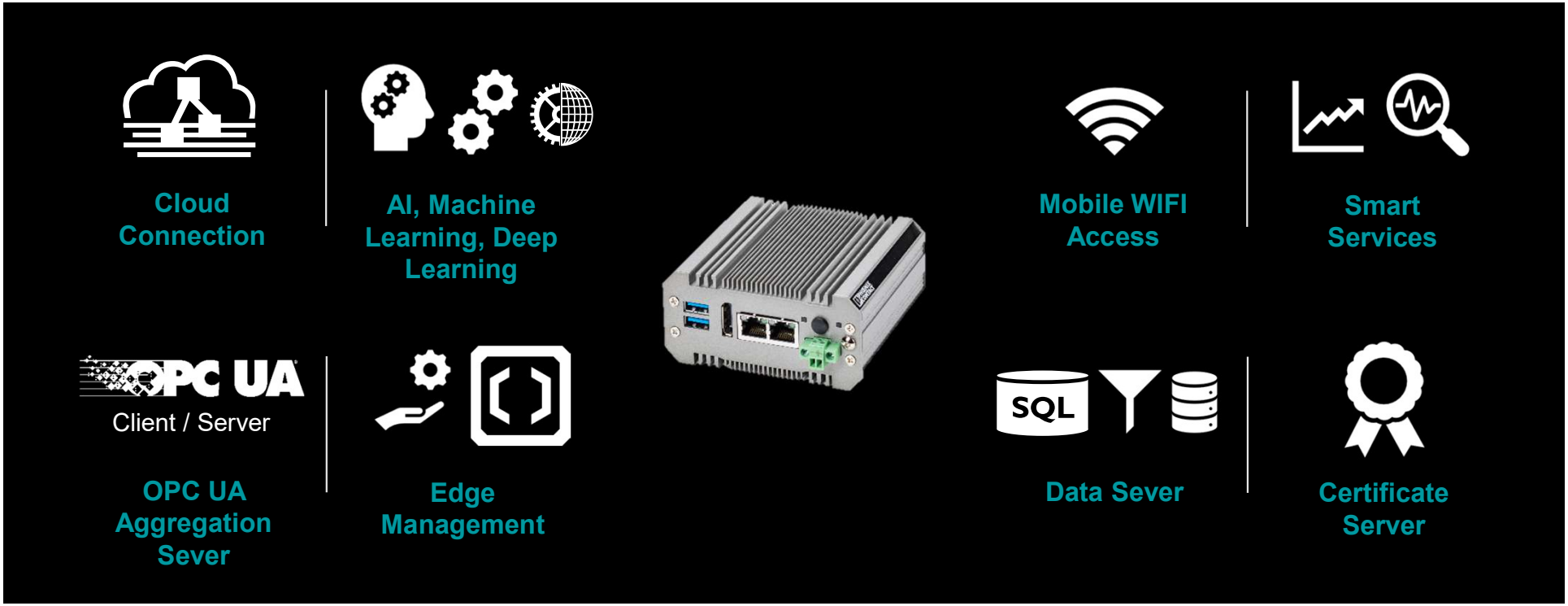
Definition



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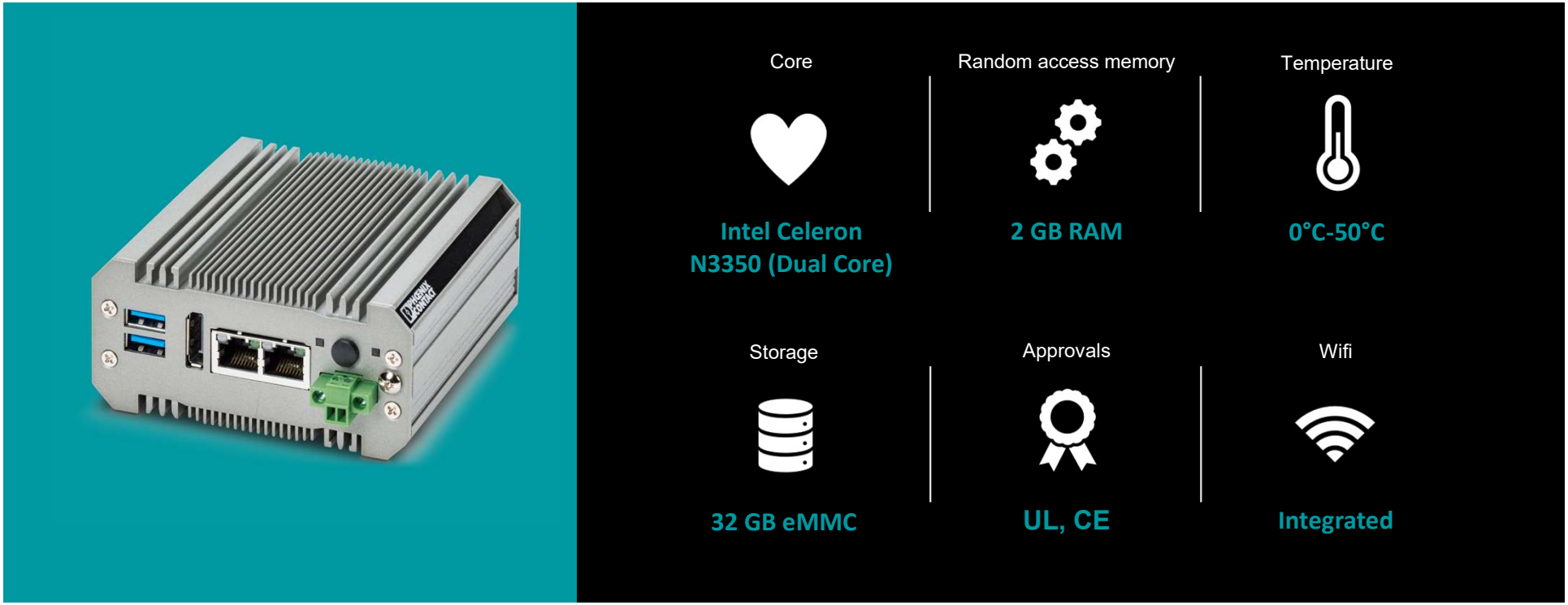
PLCnext Ecosystem – PLCnext Control

Edge functions within PLCnext Control



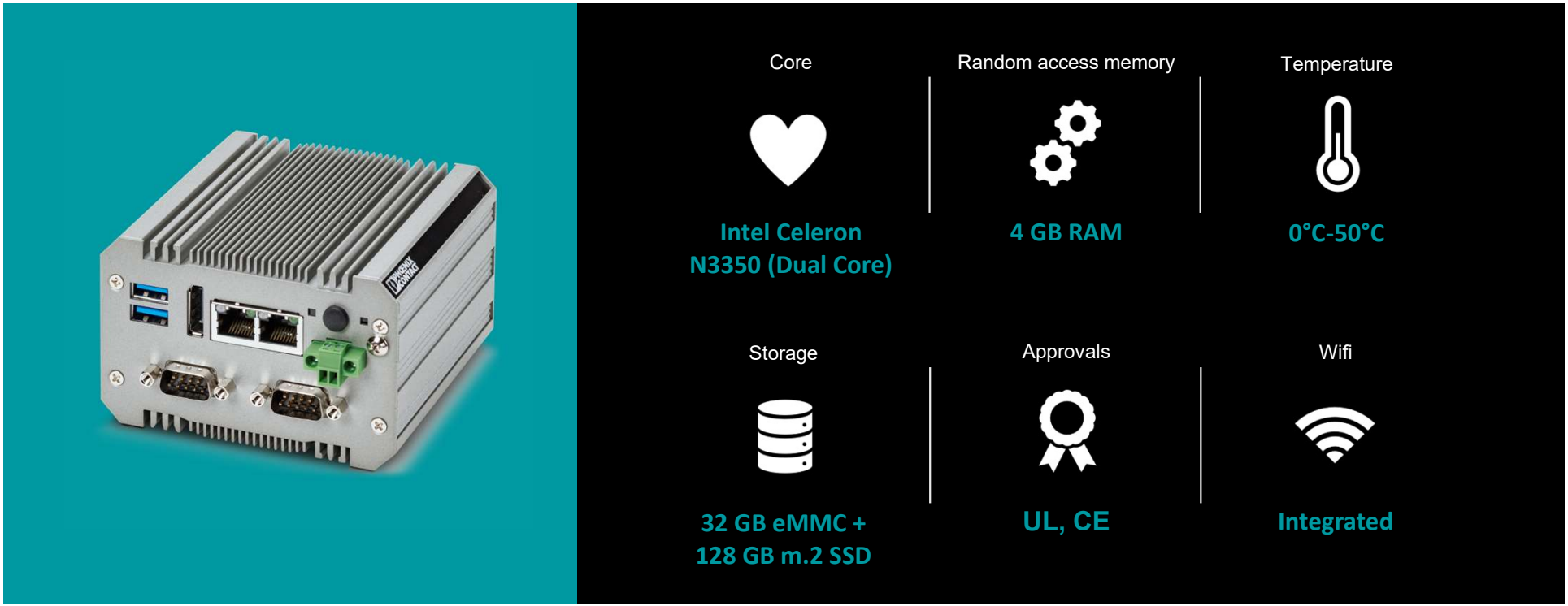
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PLCnext Control for Edge Computing EPC 1502



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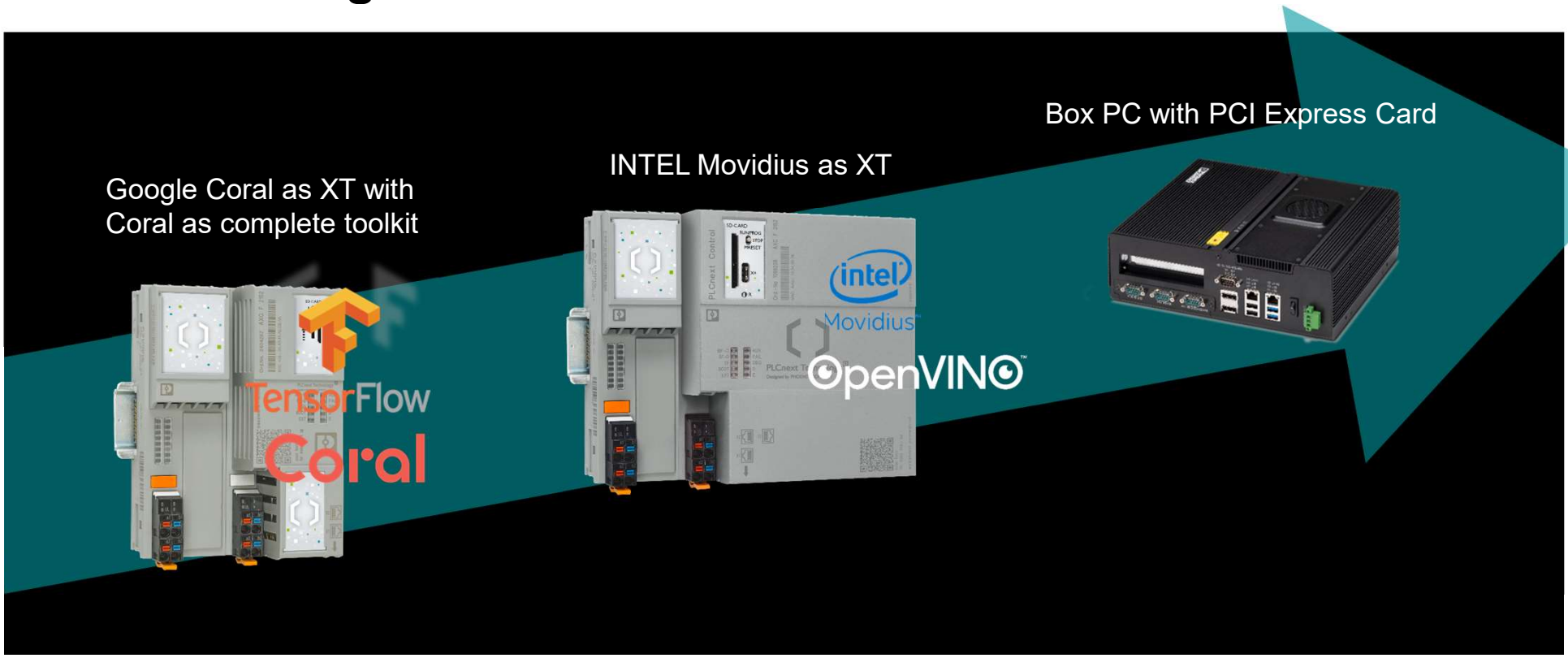
PLCnext Control for Edge Computing EPC 1522



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Edge Computing

Artificial intelligence



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Edge Computing

Artificial intelligence - AXC F XT ML 1000



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Join and get involved

PLCnext Community

More about PLCnext Technology

plcnextcommunity.com

Upload or download apps

plcnextstore.com

Ask a question in the forum

phoe.co/PLCnextForum

Use or share open source code

github.com/plcnext

Get in touch on LinkedIn

phoe.co/PLCnextLinkedin

#PLCnext
#IamPLCnext



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What else is worth mentioning …

PLCnext Technology
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Visitors can experience PLCnext: We live and think digitalization

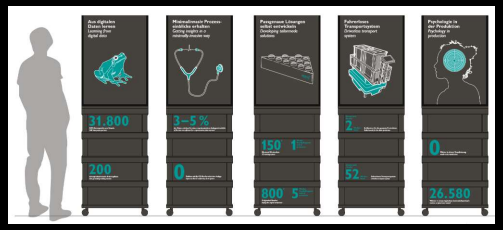
PLCnext Factory –
PLCnext Technology becomes a tangible experience

VISION:
In a rapidly changing world, we have to rethink our production processes every day. Digitalization is the key to this. Every day, we move borders, are flexible and open to new ways of working together. So are our products.



Tour for visitors with 5 stations on digitization topics





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EtherNet/IP™ | How to connect your PLCnext Control to controllers from other manufacturers using EIP



PLCnext Technology

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Connect an **AXC F 2152** to a **Rockwell** controller with **EtherNet/IP**

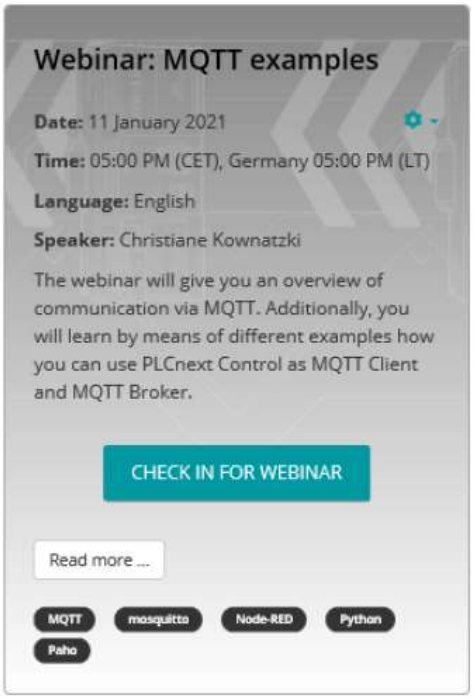
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INSPIRING INNOVATIONS

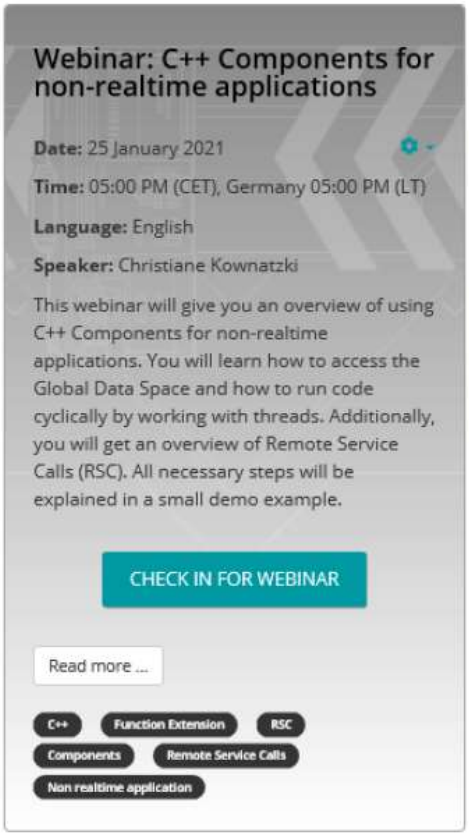
PLCnext Technology

Webinars

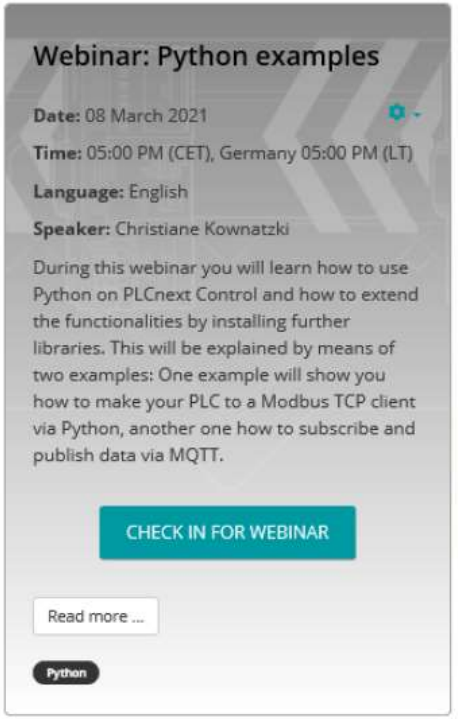
Enero 11 10:00



Enero 25 10:00



Marzo 8 10:00



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