ctrl X AUTOMATION

BREAKING AWAY FROM TRADITIONAL INDUSTRIAL CONTROL SYSTEMS

ctrlX
AUTOMATION

Business Unit Automation & Electrification Solutions | November 2019

GERMAN INNOVATION AWARD '20 WINNER

Der Deutsche Innovationspreis 2021

Der Deutsche Innovationspreis 2021

reddot winner 2022 industrial design

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A Bosch Company

TRENDS IN AUTOMATION

In industrial automation, **willingness to embrace greater openness continues to grow** — both in terms of technology and **the** **cooperation between the various players.**

THE TECHNOLOGY

Performance   **CPUs & Memory**

Wireless   **5G**   **OPC UA**

Bandwidth   **TSN** Industrial Ethernet   **Uniform**

Data analytics   **Blockchain**

IoT   **Machine learning**

IT & Web technology   **Mobility**

Virtualization   **Smart end devices**

COMPUTING

Computing power doubles every 18 months

COMMUNICATION

Bandwidth doubles every 21 months

IOT & BIG DATA

14 billion networked devices in 2022*, Artificial neural networks double every 30 months

EVERYTHING DIGITAL & MOBILE

*Source: Bosch.IO

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THE USER

75 %

of the working population in 2025

DIGITAL NATIVES

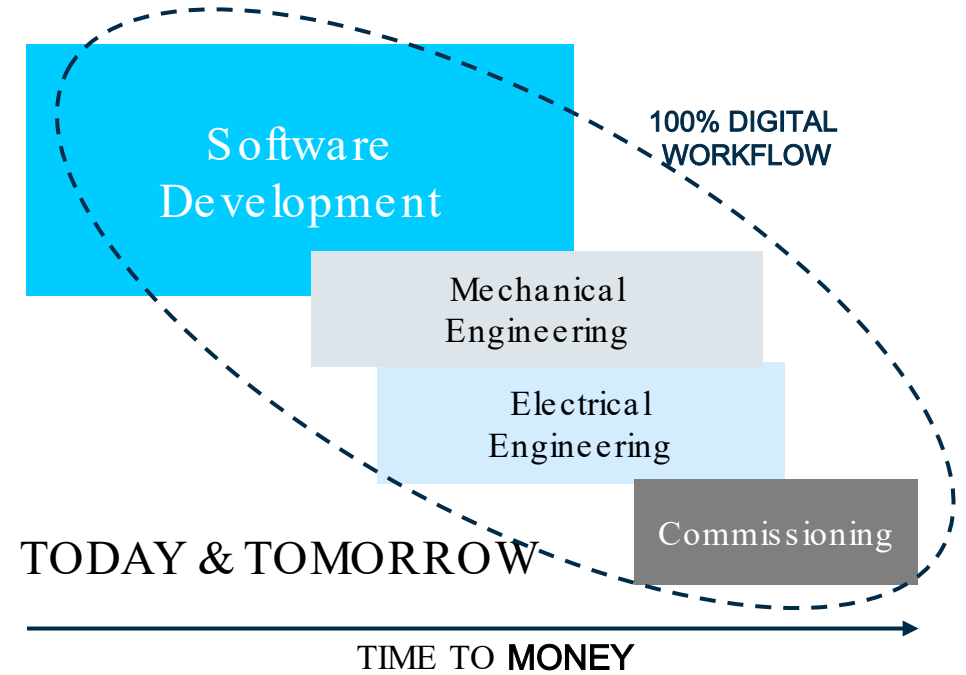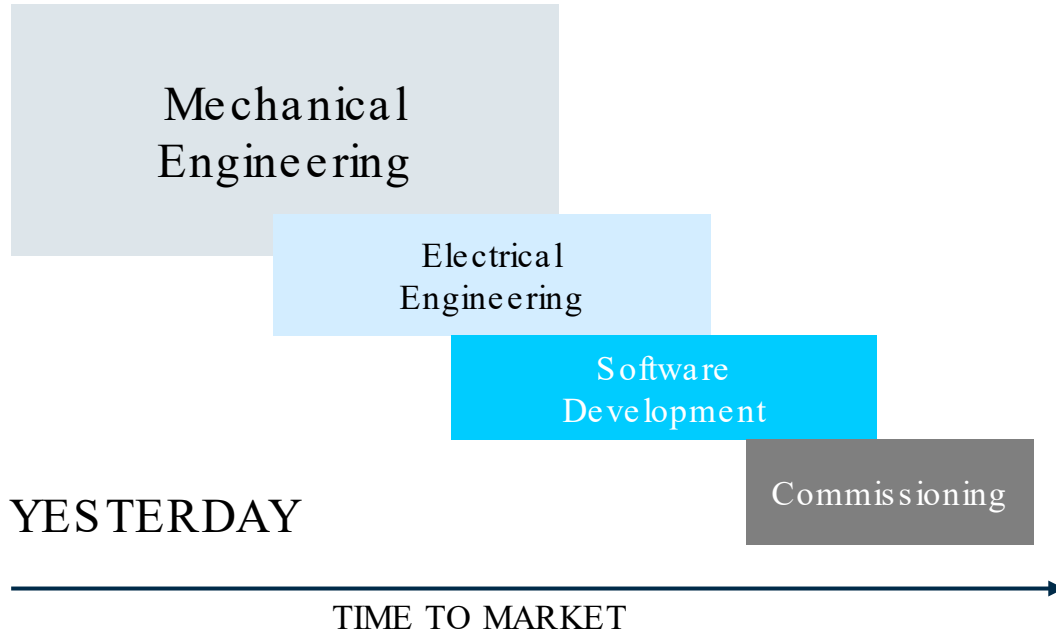Always online – mobile comes first

Always wanting things quickly – especially information

Work-life blending:
Professional and private life merge

IT-STUDENTS DO NOT LEARN G-CODE, IEC 61131, …

60% WORLD POPULATION IN ASIA

GENERATION Y.

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AUTOMATION IS SOFTWARE DEVELOPMENT

YESTERDAY

Mechanical Engineering

Electrical Engineering

Software Development

Commissioning

TIME TO MARKET

TODAY & TOMORROW

Software Development

100% DIGITAL WORKFLOW

Mechanical Engineering

Electrical Engineering

Commissioning

TIME TO **MONEY**

AUTOMATION IS
SOFTWARE DEVELOPMENT!

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A COMPLETE AUTOMATION HARDWARE SOLUTION …..IS THIS ENOUGH?

ctrl X AUTOMATION
A complete Automation Portfolio
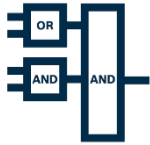
ctrlX PLC
IEC & non-IEC

ctrl X WORKS
Engineering &
Simulation

ctrlX MOTION
Motion, Robotics
& CNC

ctrlX SAFETY
SafeLogic & SafeMotion

ctrlX DRIVE
Drives & Motors

ctrlX I/O
EtherCAT & 30 others

ctrl X CORE
CPU & Apps

ctrlX IPC
Box & Panel

ctrlX HMI
Hard- & Software

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ctrl X AUTOMATION

EXPLORE THE WORLD OF AUTOMATION VIA APP
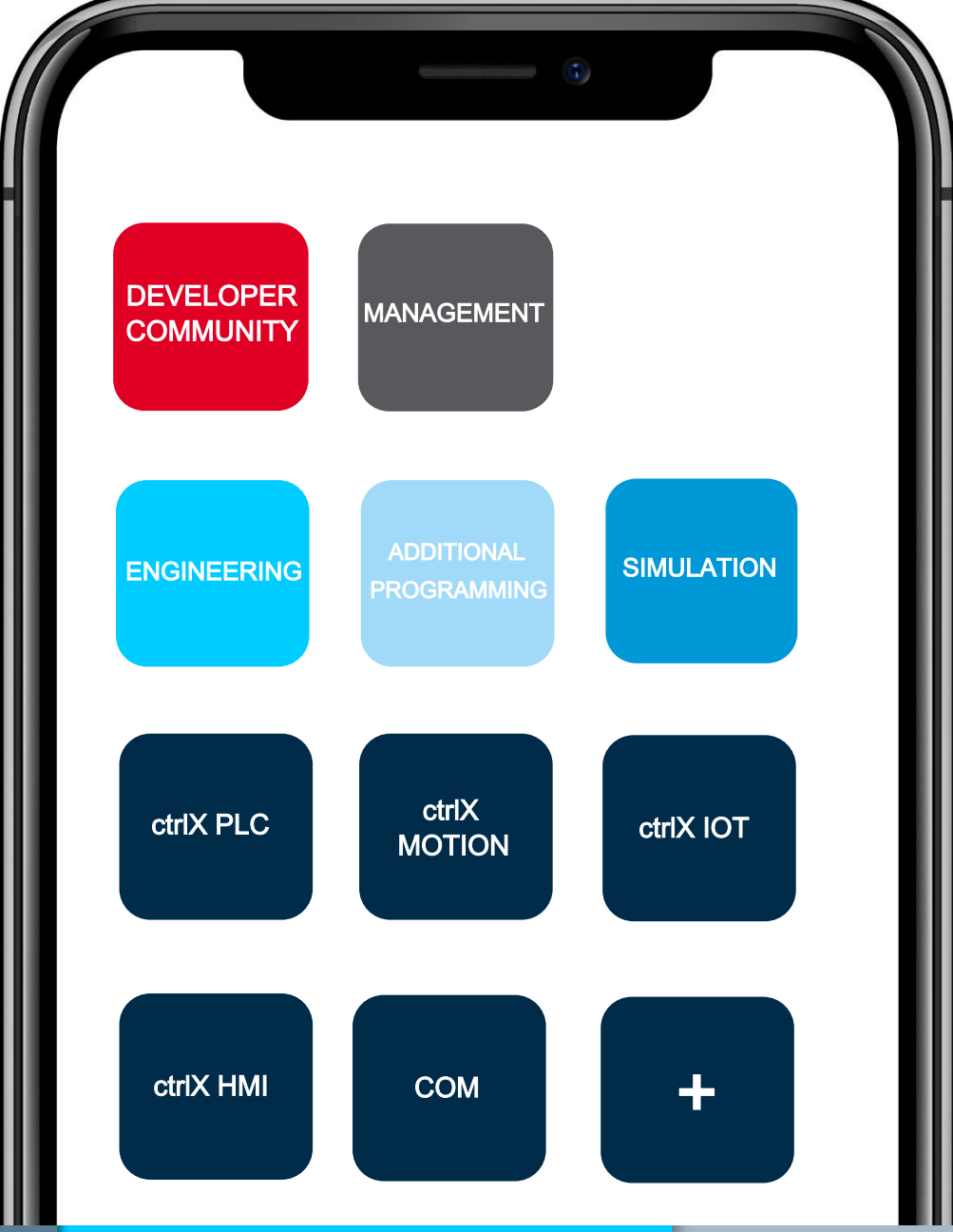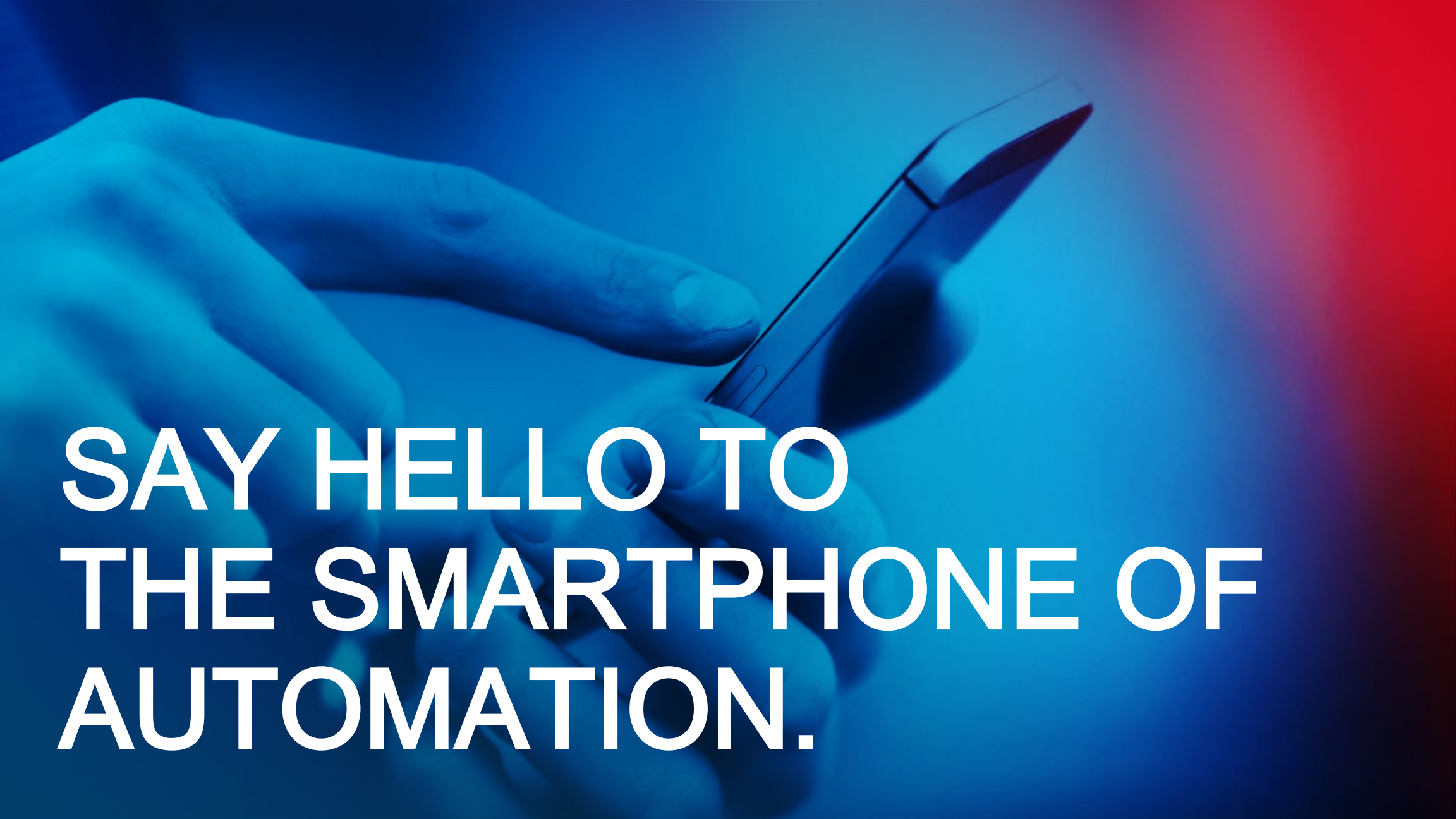
ctrlX AUTOMATION's
app-based system makes it
easy to add new automation and
control functions at any time

SERVICES

ENGINEERING

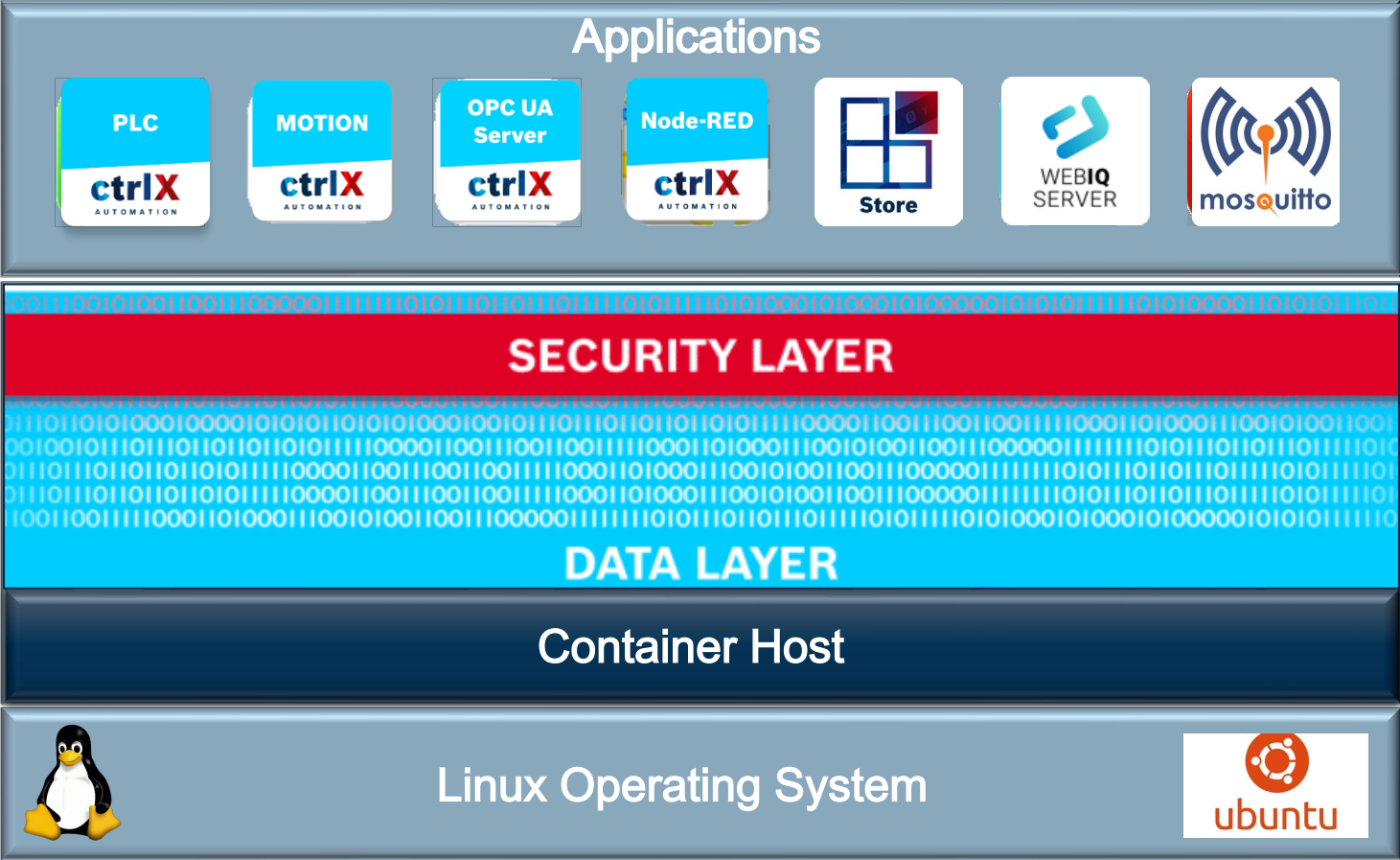**RUNTIME APPS**

DEVELOPER COMMUNITY

MANAGEMENT

ENGINEERING

ADDITIONAL PROGRAMMING

SIMULATION

ctrlX PLC

ctrlX MOTION

ctrlX IOT

ctrlX HMI

COM

+

SAY HELLO TO THE SMARTPHONE OF AUTOMATION.

ctrl X AUTOMATION
The USER TREND – APPS

ctrl X CORE X3

Applications

| PLC ctrlX AUTOMATION | MOTION ctrlX AUTOMATION | OPC UA Server ctrlX AUTOMATION | Node-RED ctrlX AUTOMATION | Store | WEBIQ SERVER | mosquitto |

SECURITY LAYER

DATA LAYER

Container Host

Linux Operating System

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UNIFORM ARCHITECTURE.

ctrl X World
Starts with an open and secure operating system

Device Admin
ctrlX AUTOMATION

Reserve Proxy
- Landing Page
- Apps
- Connectivity
- Users & Permissions
- Security
- Logbook
- About (OSS)

Automation Core
ctrlX AUTOMATION
User Interface
Solution
REST Adapter

MOTION
ctrlX AUTOMATION
User Interface
Runtime
Provider

IOT
ctrlX AUTOMATION
User Interface
Runtime
Provider

OPC UA Server
ctrlX AUTOMATION
OPC UA Stack
Provider

Any / User App
User Interface
Runtime
Provider

ctrl X Data Layer System Data, Communication, Fieldbus, EtherCAT, PLC, I/O, HMI, Motion, Drives, Safety …

CONTAINER HOST

LINUX – REAL-TIME OS (Ubuntu Core 20.04)

MULTICORE CPU – HIGH PERFORMANCE

LINUX
World's most stable and secure real-time operating system

APP Technology
for runtime and engineering software, and integration of 3rd party and/or user apps

ctrl X Data Layer
Central access to all real-time and non-real-time data

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THE MOST OPEN AUTOMATION SYSTEM ON THE MARKET.

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The we follow with "openness"

CREATE YOUR OWN APP

PLC	REAL-TIME	IoT	AI	HMI	Robotics
	e.g. with C/C++	e.g. with Java / JavaScript	e.g. with Python	e.g. with HTML5, Java Script	e.g. with ROS

USING ALMOST EVERY LANGUAGE

PLCopen   Python   C/C++   Java   Node.js   ROS   ROS 2   HTML5   ...

AND TOOLCHAIN

Visual Studio Code   Visual Studio   eclipse **+** Software Development Kit ctrlX CORE^{virtual}

SUPPORTED BY THE COMMUNITY

ctrlX AUTOMATION Community   GitHub

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Our Partners

ctrlX | AUTOMATION

COMMUNICATION
- BOSCH
- MB CONNECTLINE
- tetronik
- TOSIBOX

SECURITY
- Rhebo — a Landis+Gyr company

MECHATRONICS
- SCHUNK
- WITTENSTEIN

MOTION
- FuzzyLogic

HMI
- MGA
- SMARTHMI
- SpiderControl — ist eine Marke von Net ini
- Weidmüller GTI Software

ENGINEERING
- CORDIS SUITE
- EPLAN
- FANUC
- MathWorks
- machineering — THE TIMESAVER COMPANY
- NEXEED
- FACTORY I/O
- Selmo
- SOFTWARE DEFINED AUTOMATION
- wepall

IOT
- Appollo
- Bosch IoT Suite
- cedalo
- conductiv.ai
- Cybus
- dataprophet
- FUJITSU
- i-flow
- influxdata
- InUse
- IXON
- KATULU
- mirasoft
- mosquitto
- pragmatic INDUSTRIES
- PrescientDevices
- S.
- salesforce
- SQL4AUTOMATION
- timecho
- WORK-API

SERVICES
- ATINA
- HUCON shifting limits
- infoteam software
- iteratec
- Perfect Production — People, Lean & IT
- SIMON
- UID
- UNIVERSITY 4 INDUSTRY
- XITASO

SENSE & VISION
- 36ZEROVISION
- elunic
- HD VISION

PLC
- CODESYS
- neuron AUTOMATION

FACTORY IT
- FORCAM
- mpdv
- TechMass — a TeamSystem company
- TULIP
- oee.ai

DEVICE
- BALLUFF
- CoreTigo
- HAILO
- ARDUINO PRO
- ifm
- KEBA — Automation by innovation.
- Lanner
- maxon
- SICK Sensor Intelligence.
- synapticon
- TURCK — Your Global Automation Partner
- WAGO

TECHNOLOGY
- NOKIA
- vmware

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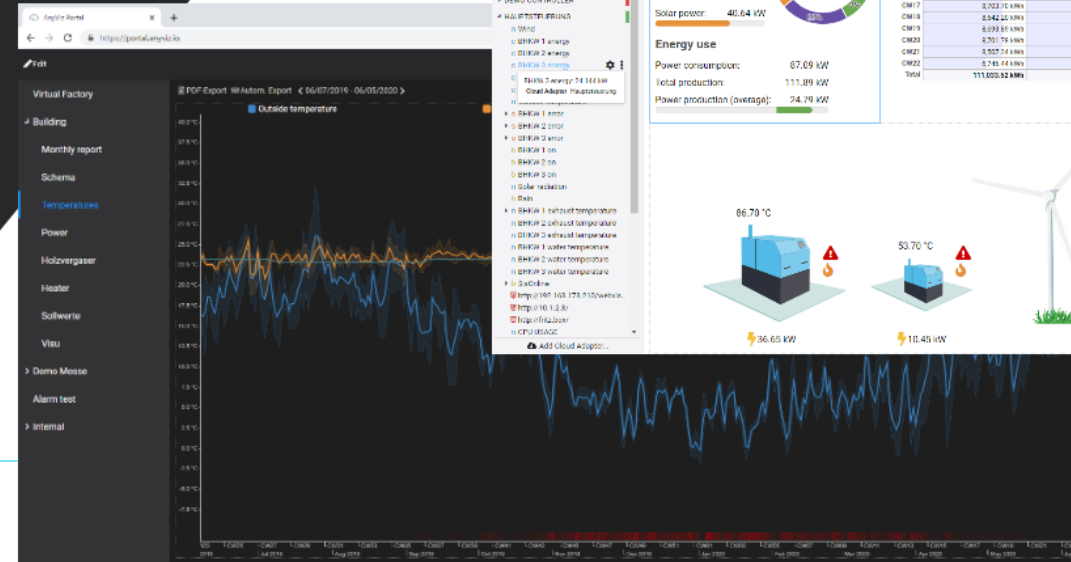# PARTNERS INTRODUCE THEIR OWN STRENGTHS AND SOLUTIONS VIA CO-CREATION
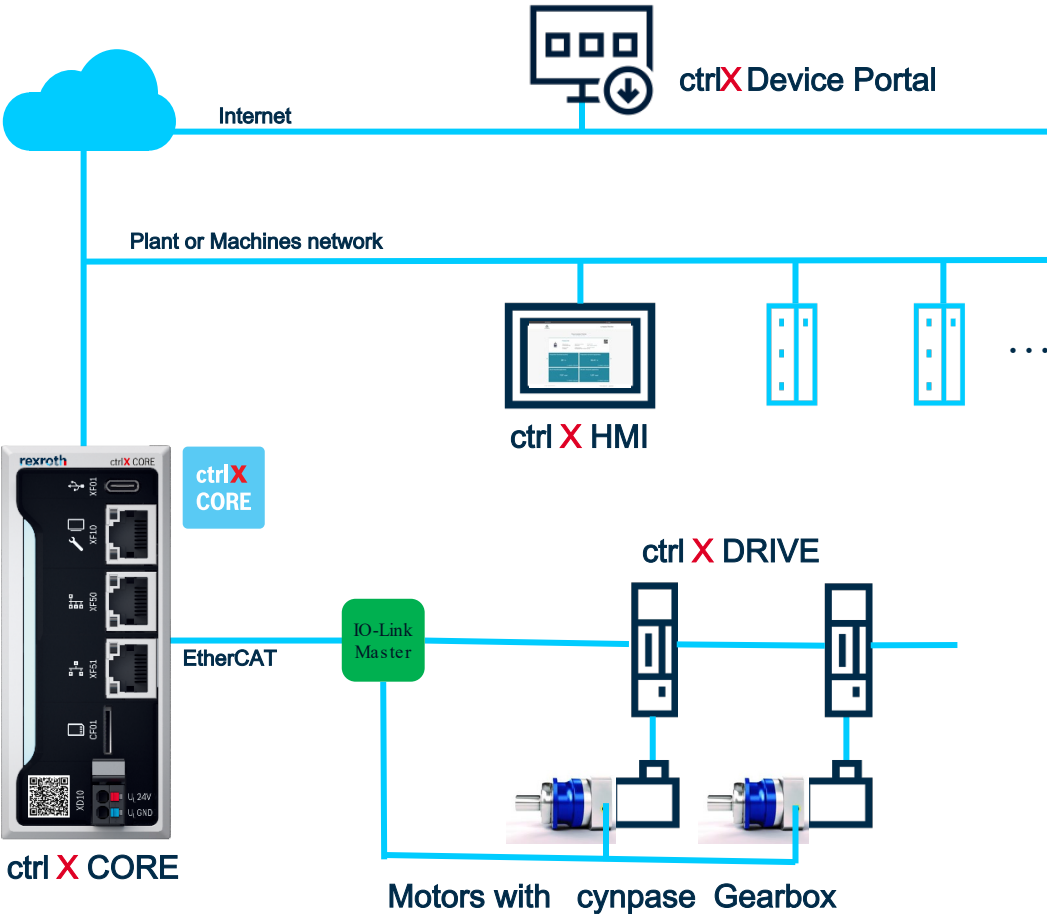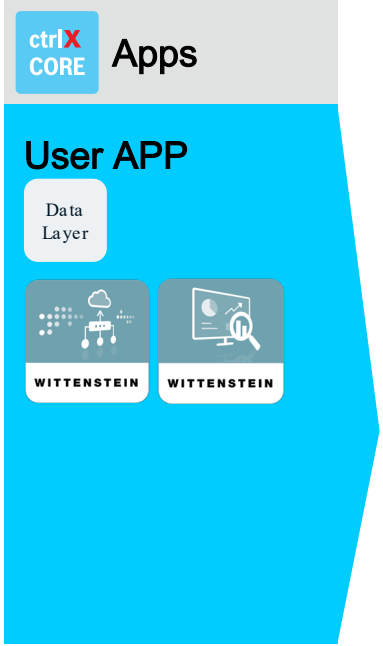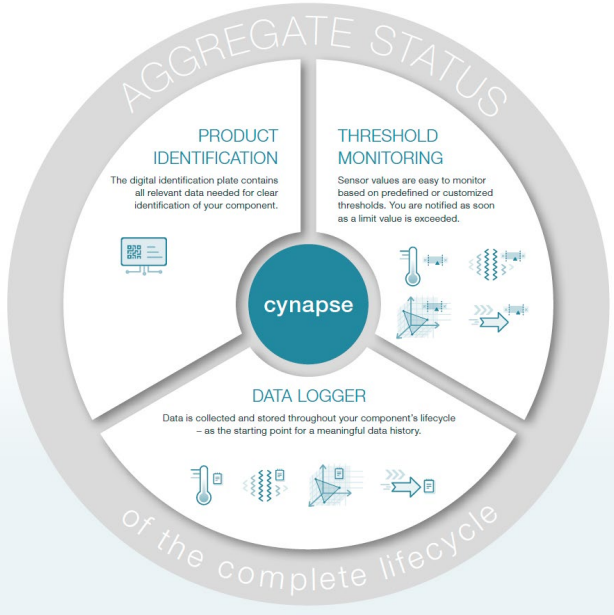
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Human machine interface

AnyViz Cloud for Automation Industry

- Real-time visualization of process data
- Record machine and operating data
- Targeted condition monitoring
- Remote control
- Automated reports
- Networking of machines and plants

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ctrl X World
Intelligent mechatronics

AGGREGATE STATUS

PRODUCT IDENTIFICATION
The digital identification plate contains all relevant data needed for clear identification of your component.

THRESHOLD MONITORING
Sensor values are easy to monitor based on predefined or customized thresholds. You are notified as soon as a limit value is exceeded.

cynapse

DATA LOGGER
Data is collected and stored throughout your component's lifecycle – as the starting point for a meaningful data history.

of the complete lifecycle

ctrlX CORE Apps

User APP

Data Layer

WITTENSTEIN WITTENSTEIN

Internet

ctrl**X** Device Portal

Plant or Machines network

ctrl **X** HMI

ctrl **X** DRIVE

rexroth ctrl**X** CORE

ctrl**X** CORE

IO-Link Master

EtherCAT

ctrl **X** CORE

Motors with cynpase Gearbox

WITTENSTEIN

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IIoT Platform / Factory IT

We are the experts in discrete manufacturing

Our solution is the shortest way to digitize your production.

Easy entry into digital manufacturing

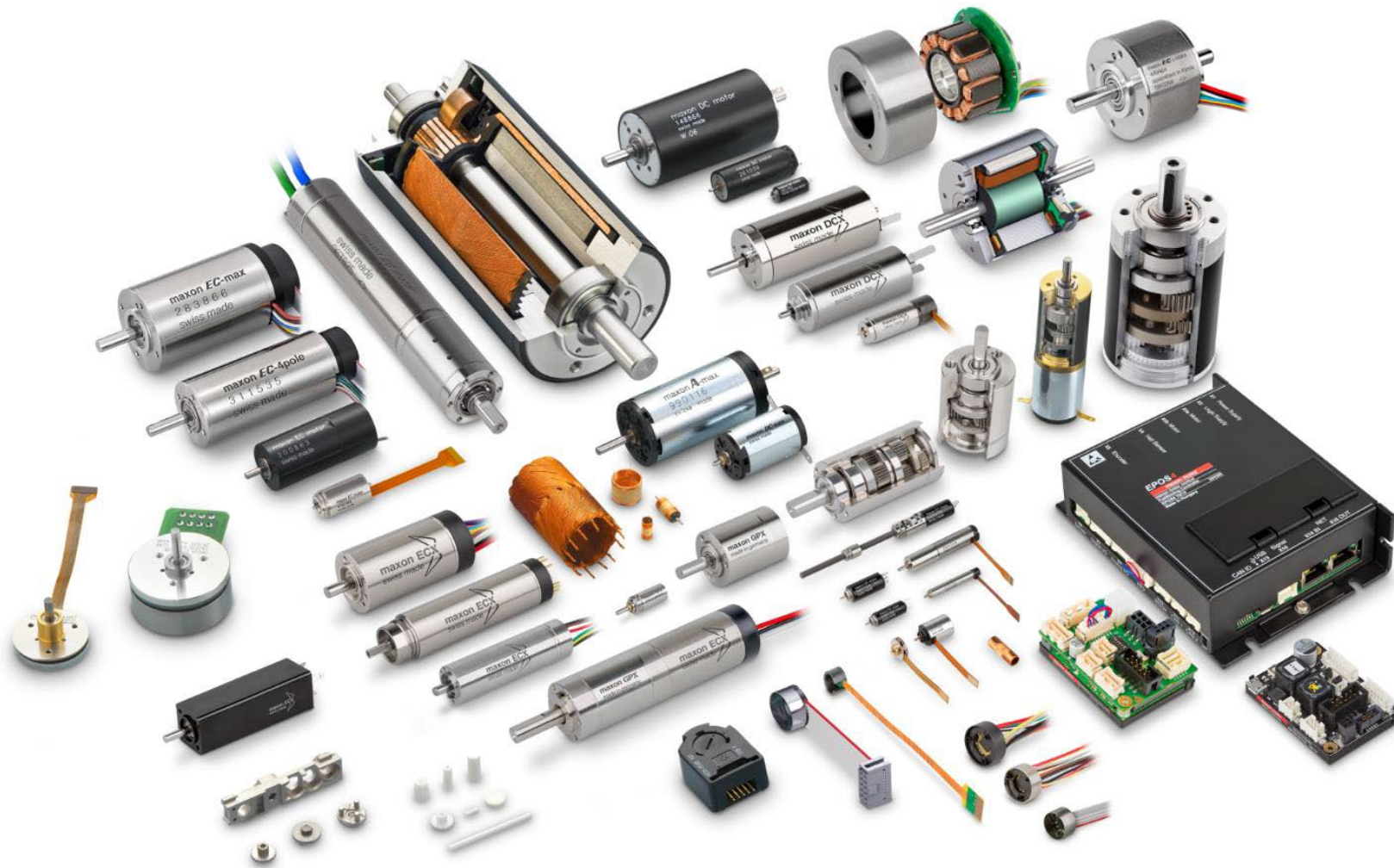We get you to the Smart Factory – quickly and easily.

Full transparency for more added value

We eliminate bottlenecks and increase the efficiency of your production.

Modular and Scalable

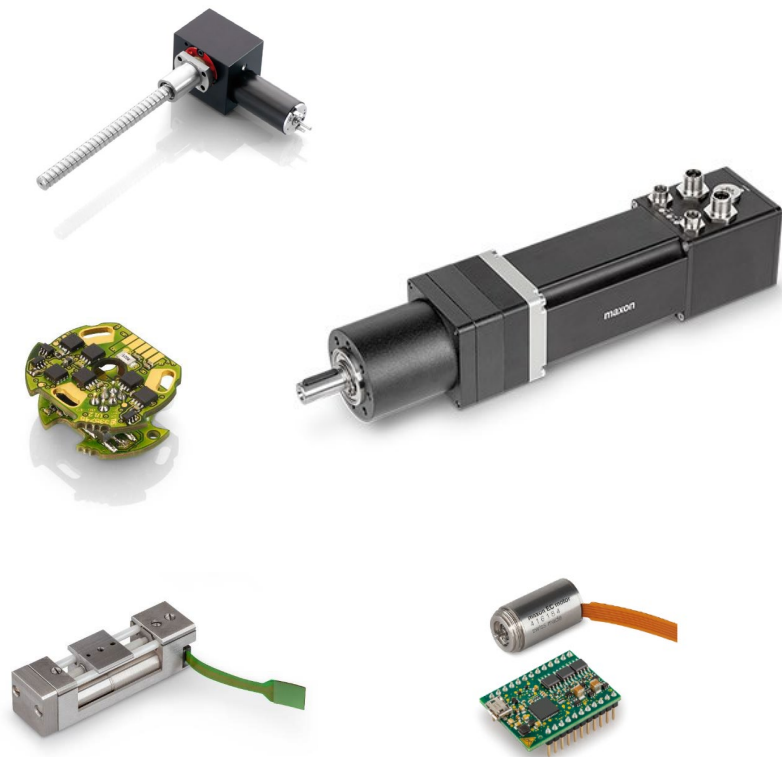From cloud architectures to applications – our solutions grow with your needs

✓ We build DC & BLDC motors, gears, electronics

✓ We customize drive systems to order in small and large quantities

✓ We develop customized mechatronic solutions

maxon

maxon & Bosch Rexroth – Plug and play

✓ High efficiency drive solutions

✓ From catalog products to fully customized solutions

✓ Seamless integration into ctrlX World

ctrl X World

Enablement data based decision making + business automation

▶ MANUFACTURERS CAN QUICKLY VISUALIZE AND ANALYZE
ALL DATA COMING FROM CTRLX AUTOMATION

▶ MANUFACTURERS CAN PREVENTATIVELY MAINTAIN
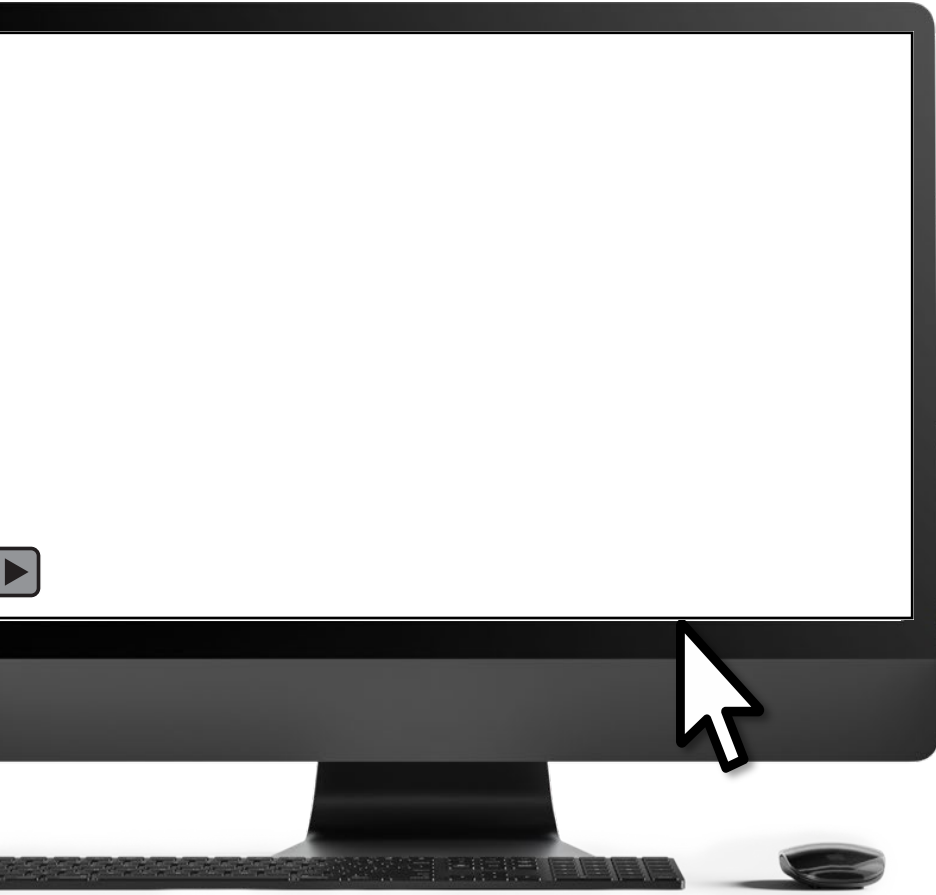MACHINES OR AUTOMATE SPARE PART ORDERS

Shop floor data gets interpreted and provides business intelligence

Salesforce Customer360 enables business and service automation
based on business intelligence

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ctrlX Store - Discover Apps and create your new business models

WebIQ
3D Viewer

| WebIQ Server | 3D Viewer ctrlX AUTOMATION | User App |

Security

| VPN Client ctrlX AUTOMATION | Firewall ctrlX AUTOMATION |

OPC UA, IOT

| OPC UA Server ctrlX AUTOMATION | Node-RED ctrlX AUTOMATION |

PLC, Motion

| EtherCAT Master ctrlX AUTOMATION | PLC ctrlX AUTOMATION | MOTION ctrlX AUTOMATION |

rexroth ctrlX CORE
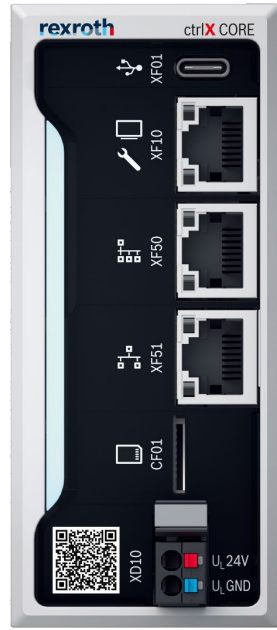
The all-in-one device

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LET'S BREAK AWAY FOR TRADITIONAL AUTOMATION

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