Industrial PCs for the Digital Factory

Higher performance, quality and sustainability with SIMATIC IPCs

siemens.com/ipc

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Agenda

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- **Why use an Industrial PC? - Trends and requirements**
- SIMATIC IPC Portfolio
- SIMATIC IPC Software
- SIMATIC Open-/Software Controller

Set the pace for digitalization!
Factory Automation

Trends and Requirements – Digitalization, Industry 4.0 and Industrial Internet of Things (IIoT) as market driver

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1 The idea of the "Transparent Plant" creates "hunger for data".

2 To process this amount of data the performance, intelligence and the openness of a PC is needed.

3 Because of the large (often sensitive) amount of data, **data availability and security** are becoming more and more important.
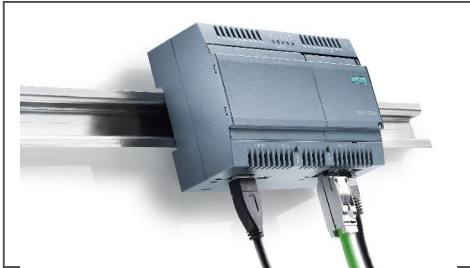
4 PCs are being used closer and closer to the machine, which is increasing the requirements for **ruggedness**.

Increased demand for **Industrial PCs**

Diverse application options with one hardware platform

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Data collector & converter

- Data recording directly at the machine
- Interface between machine and IT level
- Link to corporate information systems

Automation tasks

- Control and visualization with one device
- Complex SCADA applications
- Flexible integration of PC hardware and software

Industrial servers and workstations

- PC applications in production
- Machine-level server applications
- Data management in control rooms

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SIMATIC IPCs combine innovative technologies and maximum reliability in industrial use

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High quality in production and development +

Reliable continuous operation from the start

Latest PC technology +

Future-proof thanks to modern interfaces and processors with performance reserves

Long-term availability and compatibility +

Up to 11 years after start of delivery

90 million configurations from catalog +

Minimum order 1 unit, flexible choice of design thanks to platform concept

Integrated diagnostics +

Avoidance of standstills through preventive maintenance concepts

SIMATIC Industrial PC
Portfolio

		Rack PC	Box	Panel
Embedded industrial PCs Fanless design	**IPC2x7** Compact		IPC227E	IPC277E
	IPC4x7 Powerful		IPC427E	IPC477D/E
High-end industrial PCs High functionality	**IPC6x7** High performance	IPC647D	IPC627D	IPC677D
	IPC8x7 Maximum expandability	IPC847D	IPC827D	

Long-term availability: 4–6 years

plus 5 years repair and spare part service

		Rack PC	Box	Panel
Advanced industrial PCs Latest PC technology	**IPC5x7** Maximum performance	IPC547G		
Basic industrial PCs Attractive price	**IPC3x7** Ex stock	IPC347E	IPC327E	IPC377E

Long-term availability: 2–3 years

plus 3 years repair and spare part service

SIMATIC Industrial PC
Platform concept

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		Rack PC	Box	Panel
Embedded industrial PCs Fanless design	**IPC2x7** Compact		IPC227E	IPC277E
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Advanced industrial PCs Latest PC technology	**IPC5x7** Maximum performance	IPC547G		
Basic industrial PCs Attractive price	**IPC3x7** Ex stock	IPC347E	IPC327E	IPC377E

Platform strategy:

- Full compatibility in software and drivers
- Reduced evaluation effort
- High flexibility in choice of design
- Cost reductions thanks to reduced spare parts inventory

SIMATIC IPC – System performance
Great scalability for every industrial applications

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IPC2x7E | IPC327E IPC377E | IPC4x7E | IPC6x7D IPC8x7D | IPC347E | IPC547G

System Test Performance

| Celeron N2807 (1,58 GHz) | Celeron N2930 (1,83 GHz) | Celeron N3160 (1,6 GHz) | Intel Celeron G3902E | Intel Core i3-6102E (1.90GHz) | Intel Core i5-6442EQ (1.90GHz) | Intel XEON E3-1505L v5 (2.00GHz) | Celeron G1820TE (2,2 GHz) | Core i3-4330TE (2,4 GHz) | Core i5-4570TE (2,7 GHz) | Xeon E3-1268L v3 (2,3 GHz) | Xeon E3-1275 v3 (3,5GHz) * | Pentium G3420 (3,2 GHz) | Core i5-4570S (2,9 GHz) | Pentium G4400 (3,3 GHz) | Core i5-6500 (3,2 GHz) | Core i7-6700 (3,4 GHz) | Xeon E3-1275 v5 (3,6GHz) |

| Embedded | Basic | Embedded | High-End | Basic | Advanced |

12/14/2017

Future-proof thanks to the latest PC technology

Feature/function		Benefits
• The latest powerful Intel processors for industrial applications	▶	• Higher productivity and parallel operation of several applications on one device
• Modern interfaces	▶	• Connection of the latest PC I/O, and fast data transfer
• Early availability of the latest technology	▶	• Competitive advantages thanks to technological leadership

Maximum quality in development and production for increased system availability from the start
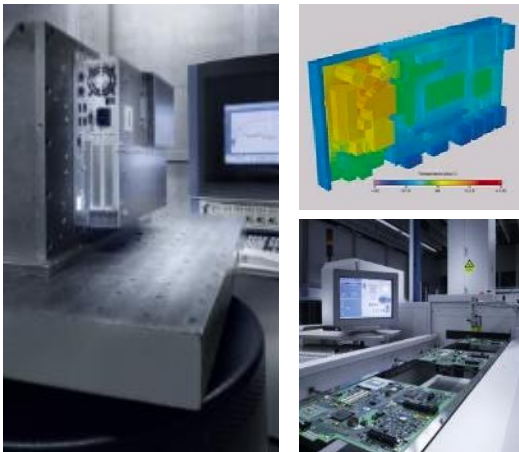
Feature/function	Benefits
High standards in development • In-house mainboard and BIOS development • Continuous test on vibration plate • Stress test for electronic components **Tested quality in production** • X-ray testing of all solder points and connections • 36-hour run-in test at maximum load and 40°	• Extended service life • Avoidance of early-failure effects • Reliable continuous operation from the start • No performance loss at high load

Long-term availability and compatibility create planning security

Microbox PC with identical dimensions for more than 10 years

SIMATIC IPC427E

SIMATIC PC 420

Feature/function	Benefits
Long life cycle of the SIMATIC IPCs • 4 – 6 years availability • At least a further 5 years repair and spare parts service • Extended marketing duration of Windows operating systems	• Planning security over the entire life cycle of the plant/machine • No software changeover over the entire life cycle
Simple migration to successor generation • Identical dimensions • "Old" interfaces still available • At least 1 year parallel marketing of two generations	• Flexibility when changing to successor generation • No mechanical adaptations in migration

SIMATIC IPC2x7E
Optimized performance in a compact design

Performance +

Optimized performance with dual & quad core processors

Great range of displays +

7" – 19" widescreen displays for modern visualization – also as Multitouch version in 15" and 19"

Maintenance-free & fanless +

Ideal for industrial use and continuous operation

Compact design +

Minimized housing for space-saving mountings

Modern interfaces +

Easy connection to automation and IT networks

SIMATIC IPC327E/377E
PC-Technology at an attractive price

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Latest PC technology +

with Intel Celeron Quad Core, up to 8 GB RAM and mini PCIe for easy expandability

SIMATIC Quality +

Designed for 24/7 operation with standard Run-in-Tests and certificates

Approved Standards +

with USB 3.0, DisplayPort, 6 Serial Ports and more for easy integration into existing systems

Attractive Pricing +

with great price-performance ratio for cost effective realization of diverse applications

Availabe ex stock +

with reduced complexity in preconfigured variants for shorter delivery time

SIMATIC IPC4x7E – High performance, zero maintenance and flexible configuration

Manifold configuration +
and flexible assembly options for optimum solutions

Powerful Intel processors +
scalable from Celeron, Core i to Xeon with up to 16 GB RAM

Panel PC version up to 22" +
for powerful HMI solutions
- also as Multitouch version

Numerous interfaces +
onboard (e.g. 3 x Ethernet) and expansion options with up to two PCIe cards

High ruggedness +
and zero-maintenance design without rotating parts for applications directly on the machine – also available with IP65

SIMATIC IPC627D / IPC827D / IPC677D - Best features the PC-Technology can offer the Automation Industry

High performance with Intel Core processors of the 4th generation. Now also with Intel Xeon processors for even more performance

Modern visualization with up to brilliant 22" Full HD Display as singletouch or multitouch

Maximum ruggedness and reliability for the installation direct at the machine

Secure data storage with RAID system for a long-term data availability

Great expandability with up to 5 PCIe cards for more flexibility

SIMATIC Rack PCs – High performance, functionality and expandability for versatile applications

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Maximum data and system availability with RAID system, integrated UPS or redundant power supply

High performance
With powerful Intel processors for demanding applications

Modern visualization with up to 5 displays without additional installation effort

Great expandability
with up to 11 PCIe cards for more flexibility

High ruggedness and reliability for the industrial use

SIMATIC Rack PCs – High performance, functionality and expandability for versatile applications

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High-end

IPC847
Maximum expandability and long-term availability

IPC647
Highly compact and long-term availability

Industrial

IPC547
Latest technology and maximum performance

IPC347
High performance and optimized price

Functionality/performance

IPC847

IPC647

IPC547

IPC347

System availability

On-stock – short delivery time	Build-to-order – high level of configuration freedom

SIMATIC Quality – 24/7 continuous operation in industrial environments
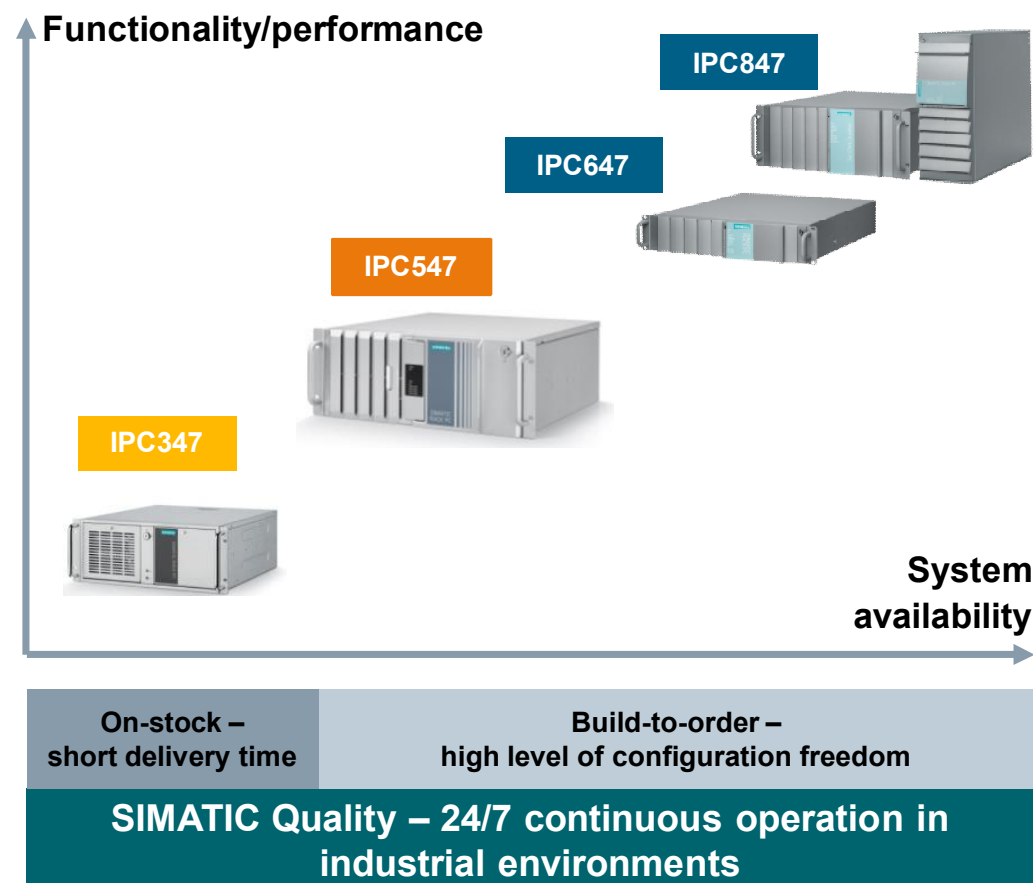
Range of systems for HMI solutions with all-round IP65 protection

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Our advantages stem from the **range of systems …**

… of all-round IP65 protection in the Advanced HMI area

+
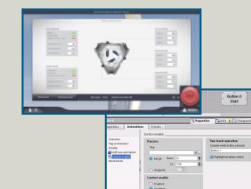
… and the HMI software in the TIA Portal

Comfort Panel PRO
12"- 22"

Industrial Flat Panel PRO
19"- 22"

Industrial PC PRO
15"- 22"

System components

iF DESIGN AWARD 2017

A uniform look & feel for all SIMATIC HMI devices with all-round IP65 protection

Configuring with the help of the SIMATIC HMI PRO system concept

Basic units

- Any selection and combination of basic units for maximum flexibility.
- Choice of Siemens design or neutral front (without Siemens logo)

Expansion components

- Expansion components with all-round IP65 protection matching your requirements in rough environments close at the machine-level

Mounting options

- Standardized fastening options for high degree of investment protection
- As required for your application: on pedestal or support arm

SIMATIC ITP1000
Development idea

Mobile devices in production

Rapid growth of number of mobile devices in production (+5.1% last year)

Specific functions

At least 70% of all industrial tablet users need special functions

Windows in production

Some have tried to switch over to iOS/Android and have returned to Windows

Paperless factory

No more printed documents in production

High performance

Demanding applications are now mobile

Main industrial requirements

Very rugged, long product availability for use in industrial environments

Long-term available, Windows based Industry Tablet PC with many interfaces and integrated functions

SIMATIC ITP1000
New fields of applications and applications

Mobile Panels

Mobile panels are designed for dedicated tasks in the field of **mobile (fail-safe) operator control and monitoring**

Differentiation from ITP1000:
- Wired (fail-safe) operator control and monitoring
- Direct keys
- Longer product availability

SIMATIC ITP1000

The SIMATIC ITP is used in a wide variety of applications in the fields of service, production, measurement/test engineering, and daily life.

Differentiation ITP

SIMATIC Field PG

Field PGs are used as **programming and configuring devices** in service and engineering

Differentiation from ITP1000:
- Configuration with TIA Portal by means of 15" display possible
- S5 interface / EPROMMER
- Shorter product availability

Industry-standard operator terminals in modern design for flexible and innovative operator control concepts

Unlimited remote installation | **Compact** | **Remote installation up to 30 m**

Single-touch

Multi-touch

SIMATIC IFP1900 INOX PRO
(Ethernet monitor)

22"
19"
15"
12"

SIMATIC Industrial
Thin Client

Ethernet

22"
19"

SIMATIC Industrial Flat Panel
(Ethernet monitor)

SIMATIC Panel PCs

22"
19"
15" Key
15"
12"

SIMATIC Industrial Flat Panel

DVI / DisplayPort

22"
19"
15"

SIMATIC Industrial Flat Panel

19"

SIMATIC IFP1900 PRO
(with all-round IP65
protection)

SIMATIC IOT2000
Industrial ruggedness. Openness. Connectivity.

SIMATIC quality
Designed for 24/7 operation in industrial environment

Expandability & connectivity
With mPCIe, industrialized IO module and various standard interfaces & available protocol drivers

AutomatIon.ConnecTed
Easy connection to automation level with PROFINET*⁾ and openness to cloud based solutions

Performance & Deterministic
Intel Quark® CPU and 1 GB RAM as well as x86-deterministic and battery buffered real-time-clock

Openness
Free programmable in high-level languages (e.g. Java, C++) via various IDEs (e.g. Eclipse) and compilers for Yocto Linux
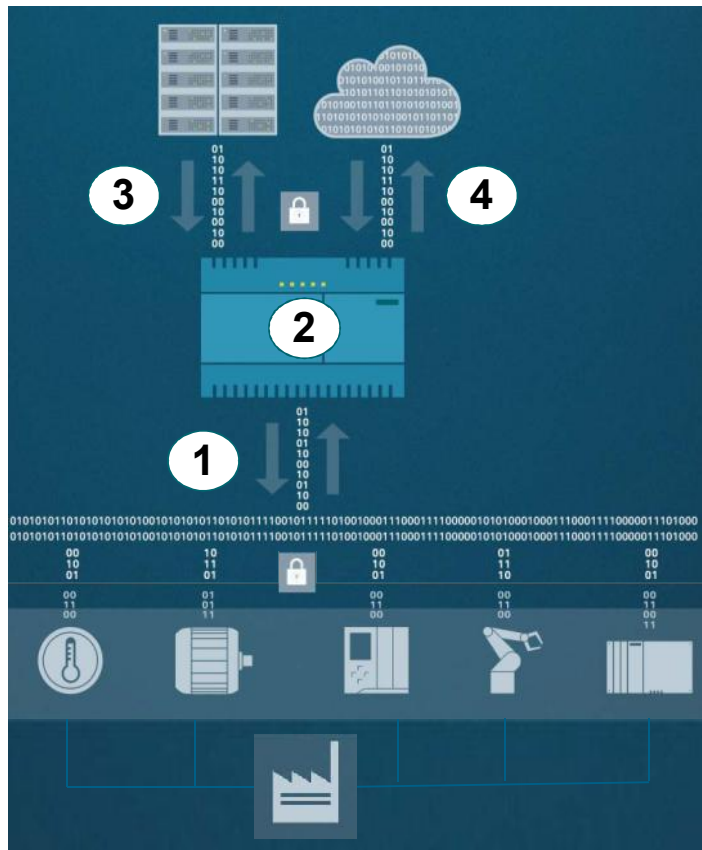
*⁾ planned

Application example SIMATIC IOT2040
The intelligent gateway to connect the field level to the IT level / cloud

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1 **Collecting and concentrating** relevant production **data** of several sources

Flexible Connection to sensors/actors via serial communication, Ethernet or Arduino shields. Communicating with PLCs, drives and motors with e.g. PROFINET[1] or OPC OA[2]

---

2 **Protocol conversion / customer programmed control**

Data aggregation, conversion of different communication protocols and pre-processing programmed in high-level language e.g. Java, C++

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3 **Secure transfer to** connected company **IT-systems or cloud applications**

Converted data can be transmitted to IT systems / cloud solutions using e.g. OPC UA, MQTT or AMQP [2]

**4** **Production monitoring, analysis and optimization**

Cloud based analytics to detect optimization potential

[1] planned   [2] application examples will be provided at IOT2000 forum

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Set the pace for digitalization!
Factory Automation

- Why use an Industrial PC? - Trends and requirements
- SIMATIC IPC Portfolio
- **SIMATIC IPC Software**
- SIMATIC Open-/Software Controller

The SIMATIC IPC DiagMonitor ...
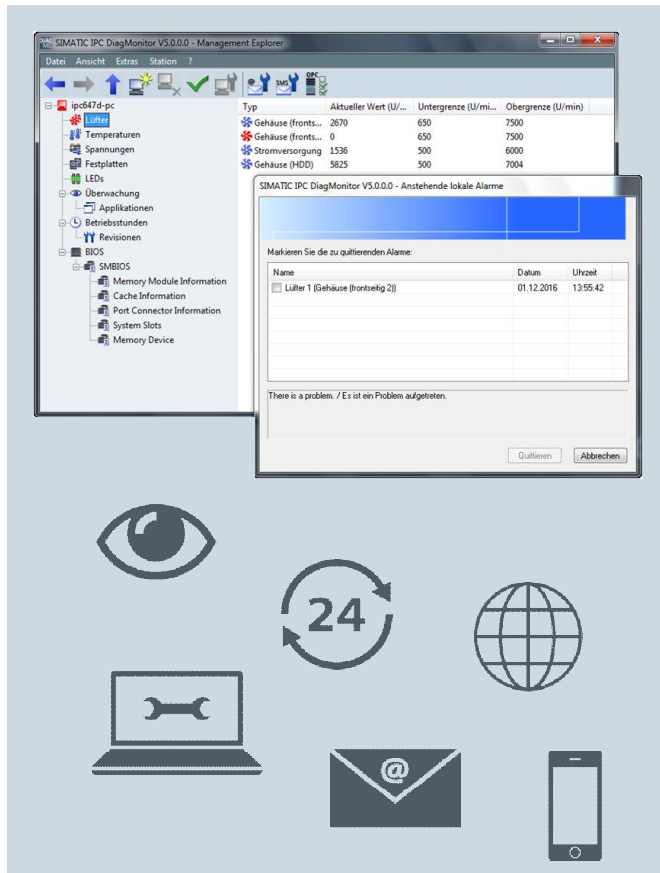
... monitors

- the status of drives, memory cards, fans, temperature, CMOS battery voltage, etc. on individual or networked SIMATIC Industrial PCs

... signals

- detected errors
- Service events in user-selectable time intervals

... communicates

- locally or via TCP/IP on the network
- via SNMP, OPC, LAN, e-mail and SMS

... operates

- through settable PC restart following watchdog interrupt
- through execution of batch programs and executable files

... logs

- all events in the Windows EventLog
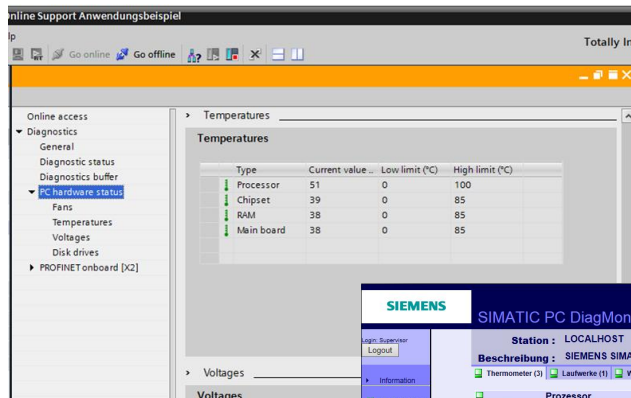- optionally the measured temperature/fan data in a measuring data file

... manages

- configuration data
- BIOS settings (including BIOS update)

SIMATIC IPC DiagMonitor
Customer benefits

✔ Downtimes or failures are avoided through timely detection of hardware faults and software errors

✔ The flexible and worldwide access to diagnostic data reduces travel costs and minimizes on-site service times.

✔ The data exchange with other systems and the automatic signaling and operation reduces manual effort.
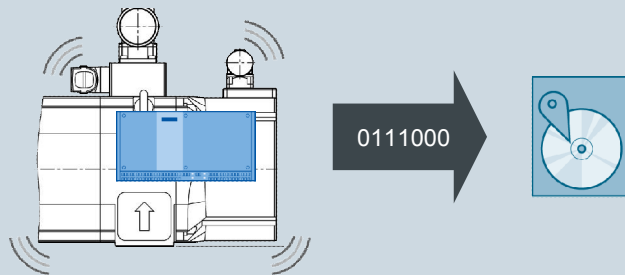
✔ Based on exact diagnostic data, long-term and cost-optimized service measures can be planned: "The right measures at the right time."
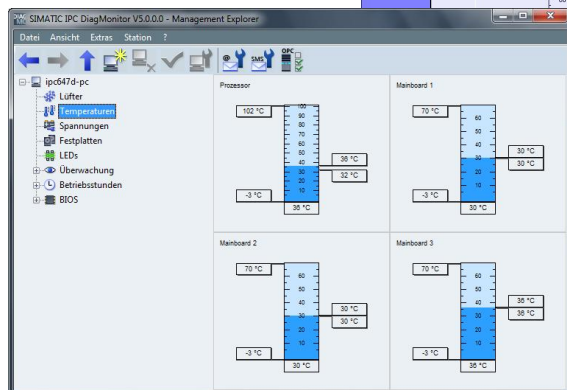
SIMATIC IPC Image & Partition Creator
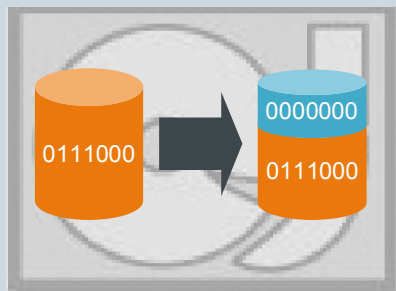## Highlights

Preventive data backup

0111000

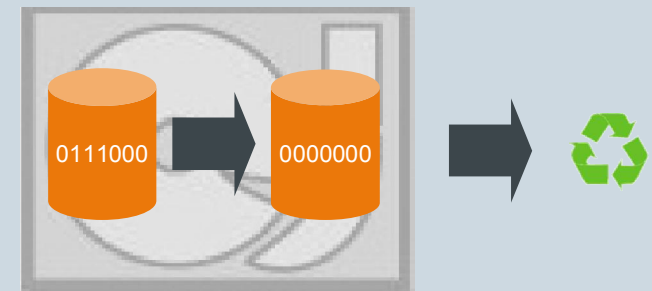**"1ClickImage" – Backup per mouse click**

0111000

1x Click

Efficient data backup and partition management

- Can be used with any SIMATIC IPC, all SIMATIC IPC drivers integrated

- No installation required

- Menu-driven creation of a bootable USB stick version

- Support of virtual machines

0000000
0111000

0111000   0000000

Partition changes without data loss

Final / secure deletion of data

SIMATIC IPC Image & Partition Creator
Customer benefits

Optimized for use on SIMATIC IPCs

✓ **Prevention of data loss and associated consequences.**

✓ **Efficient and customized adaptations of existing hard disks to your own needs with minimum effort.**
**Planning of actions at the optimal time via calendar.**

✓ **A fast and easy data backup and restoration and the migrating and cloning of hard disks saves time and reduces costs**

✓ **Data can be easily and reliably deleted, which prevents misuse and loss of know-how.**

SIMATIC IPC Remote Manager

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Remote service with SIMATIC IPC Remote Manager

Management PC

Internet / LAN

SIMATIC PC with Intel AMT
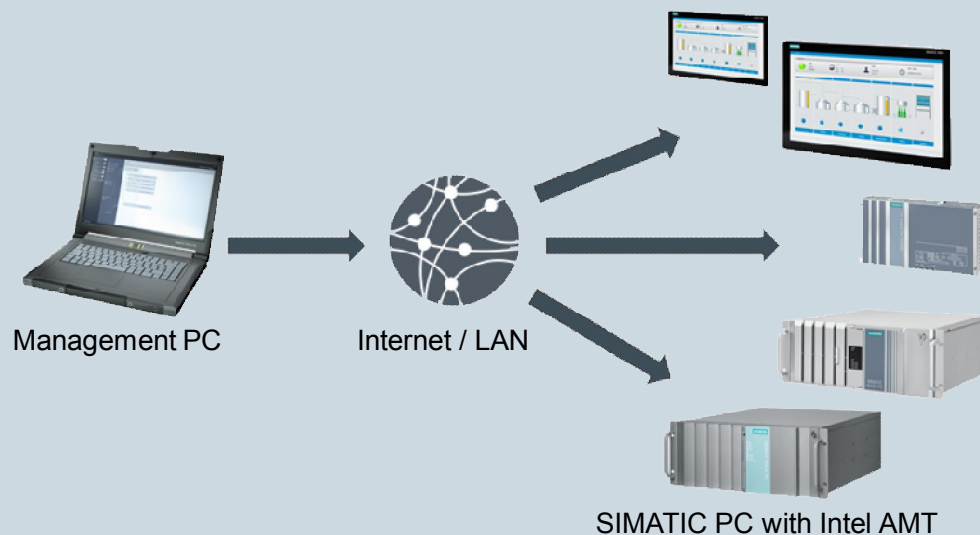
Remote diagnostics and access without on-site deployment

- Fault correction
- No operating system required
- BIOS and program updates
- Remote filling (support of ISO image > 2 GB)
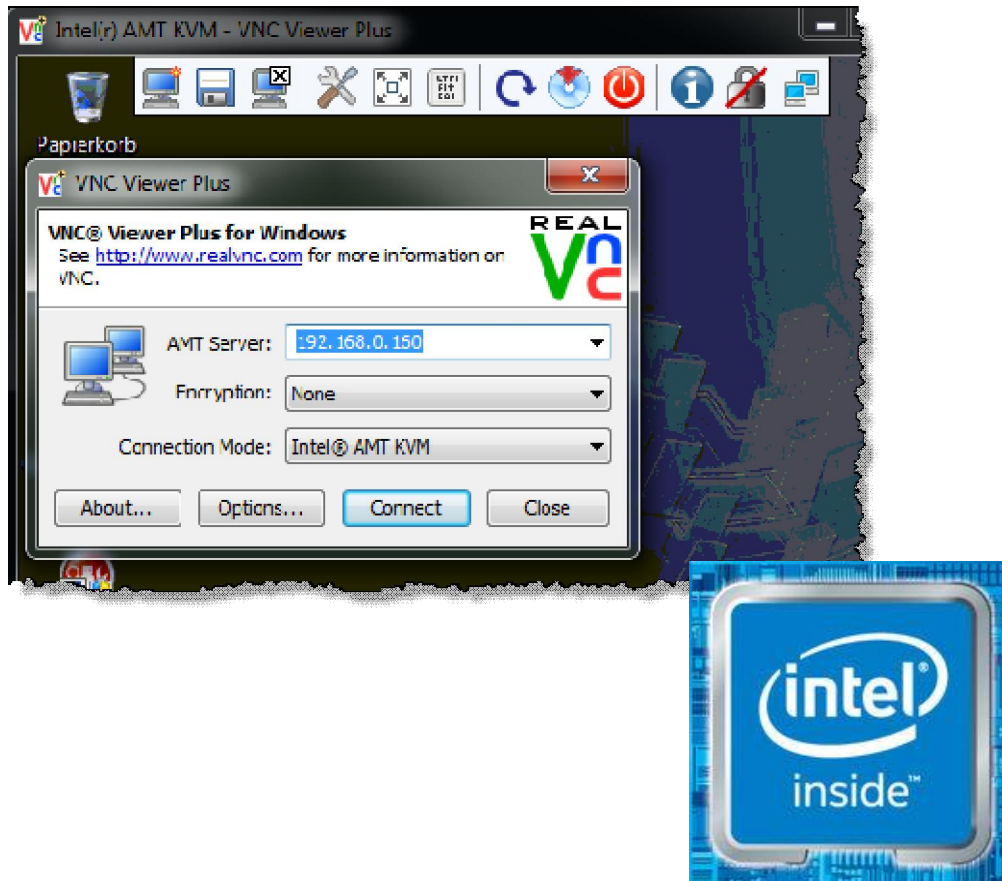- Configurable timeout

Central service

- Easy remote access to SIMATIC IPCs
- Remote access without additional hardware (e.g. KVM switch)
- Remote access via secure connections

Resource management

- Saving of electricity costs
- Efficient use of production time

SIMATIC IPC Remote Manager
Customer benefits

Most efficient remote service because a ready-to-run operating system is not needed. This reduces the need for on-site deployment.

Combines with the other SIMATIC IPC software products to enable completely new service concepts.

BIOS updates or program updates do not require personnel on-site.

"Remote Boot" and **Disk Redirection** permit booting from different boot media and even from ISO files on the management PC.

With Remote Power Control, the SIMATIC IPC can be switched off and on via remote access for maintenance purposes or for energy saving.
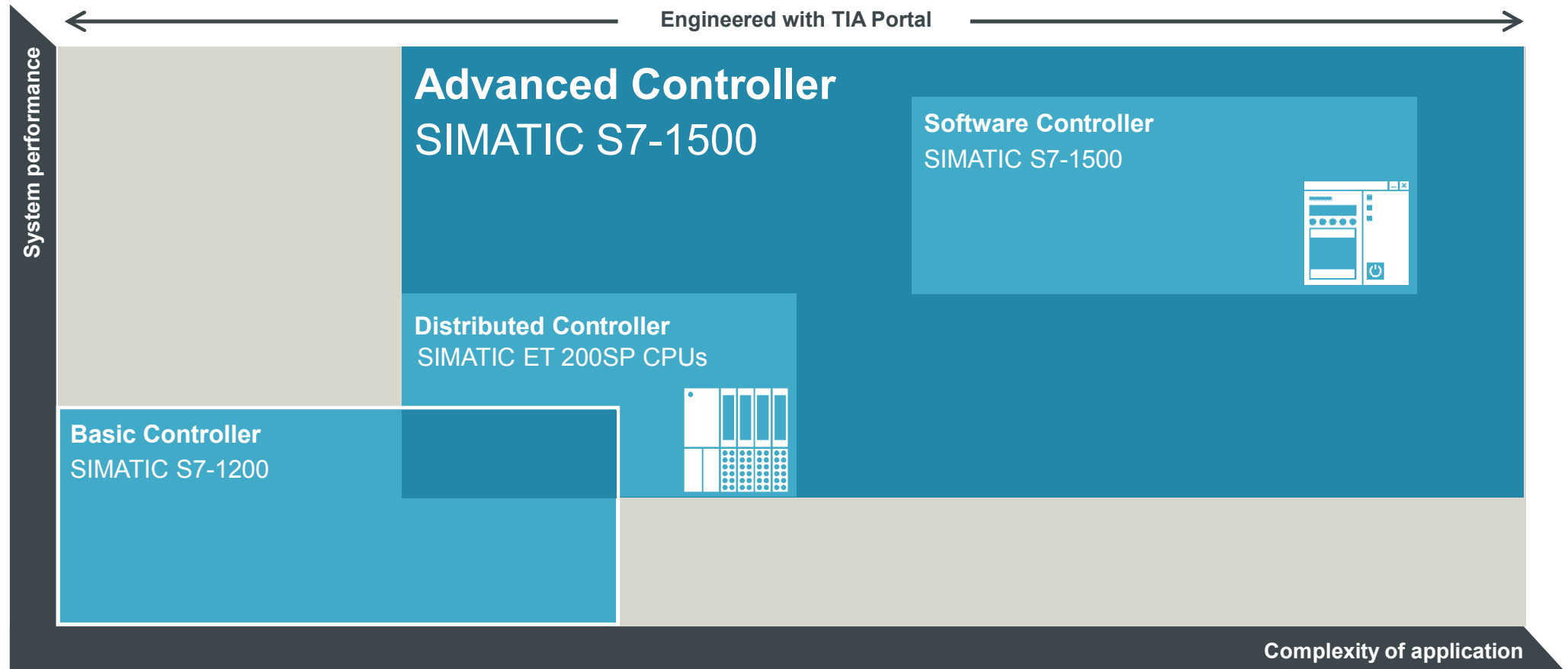
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SIMATIC ET 200SP Open Controller & Software Controller
The PC-based Controller within the S7-1500 Portfolio

Engineered with TIA Portal

System performance

Advanced Controller
SIMATIC S7-1500

Software Controller
SIMATIC S7-1500

Distributed Controller
SIMATIC ET 200SP CPUs

Basic Controller
SIMATIC S7-1200

Complexity of application

SIMATIC ET 200SP Open Controller & Software Controller
The PC-based Controller within the S7-1500 Portfolio

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Efficient engineering
Consistent engineering of control and visualization in the TIA portal – no Windows settings required for the software controller

Compact design
Over 30% space saving compared to comparable systems

Regardless of Windows
Unique architecture of the S7-1500 software controller – runs entirely independently of Windows

PC and fieldbus interfaces onboard
Easy connection to automation and IT networks

Easy integration of PC applications
No PC knowledge for the PLC programmer

Safety Integrated
A controller and engineering for standard and fail-safe tasks

Integrated security
Protection of intellectual property and tamper protection

Which SIMATIC IPC is right for your application?
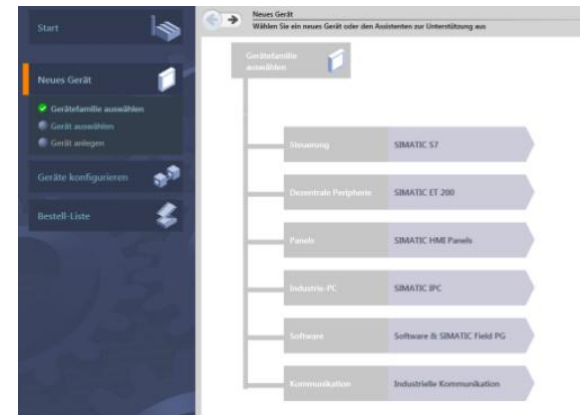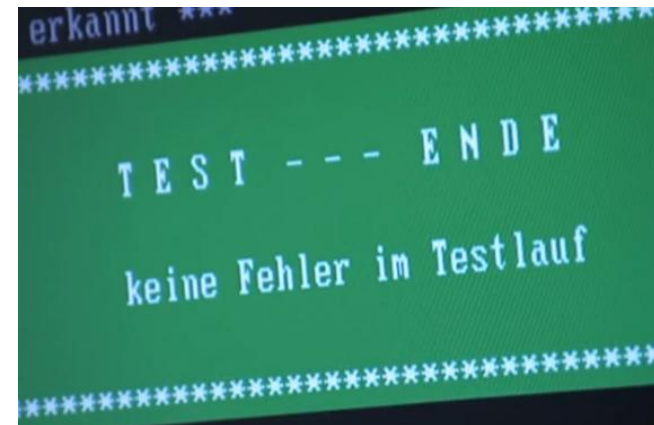# How does a PC become suitable for industry?

Configure your industrial PC
simply online!

Product
selection
with the TIA
Selection
Tool

Experience our quality claims "live"

SIMATIC IPCs
Quality in
production &
development

Thank you for your attention!

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Factory Automation

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