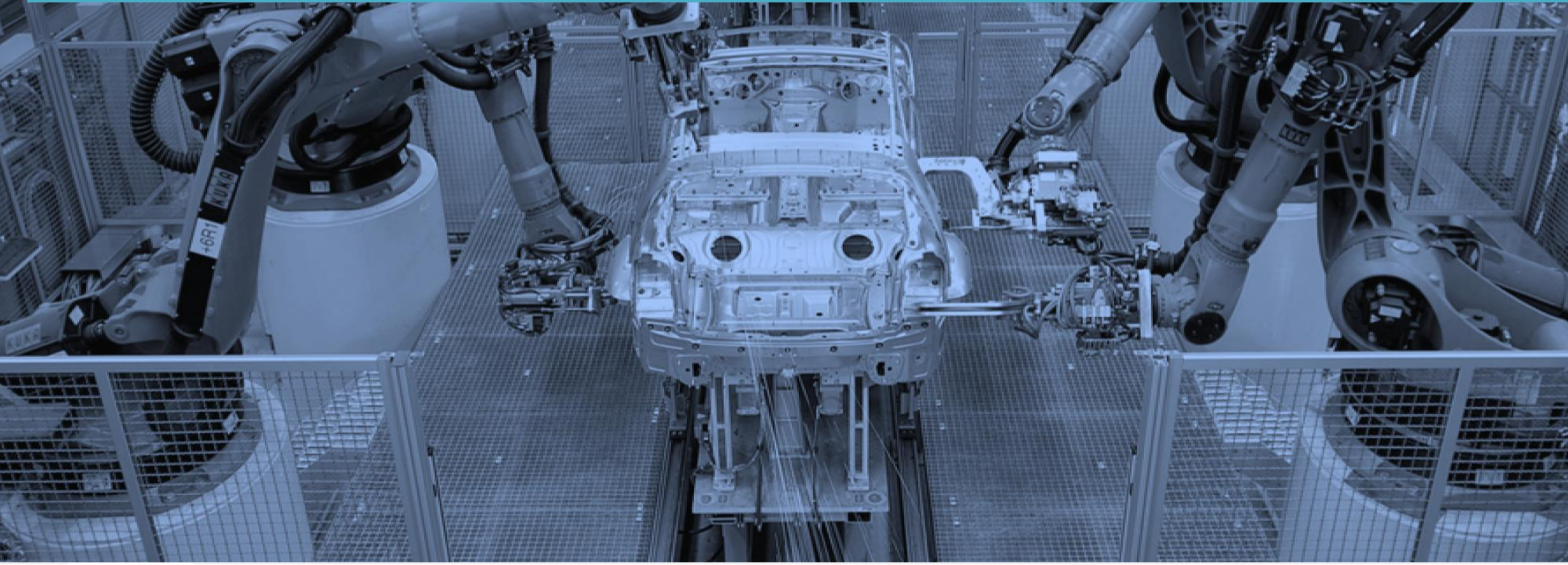
Stuxnet zum Frühstück
Industrielle Netzwerksicherheit 2.0

Stuttgart und München



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Choose certainty.
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TÜV SÜD Embedded Systems

Sicherheitsthemen für Ethernet basierte Systeme in der Industriellen Automatisierung

TÜV SÜD AG
Munich, June 30st, 2011

TÜV SÜD HIRSCHMANN A BELDEN BRAND secXTREME Information Security YELLO NETCOM

AGENDA

1 The Industrial Systems in the past

2 Ethernet as Communication Interface opened the door ...

3 Aspects of Attacks

4 The challenge for Industrial IT-Security

Encapsulated Embedded Systems as Stand-alone Systems

Industrial Systems in the past

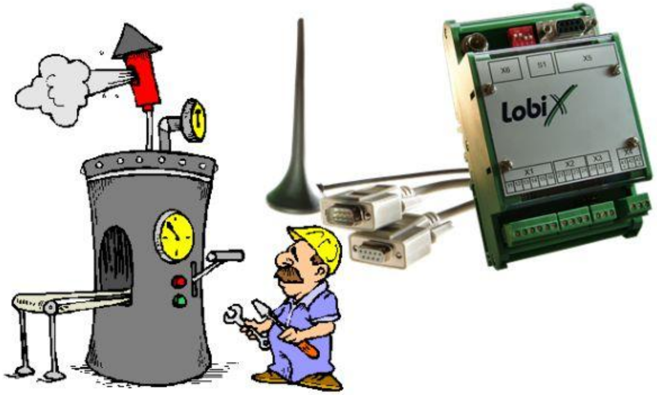
- Stand-alone systems, no access from the out-side

- Access only for trained employees

Added Communication Capabilities

Industrial Systems were extended with communication interfaces

- Connected Systems over field-busses (RS-232/-422/-485, CAN, …)
- Encapsulated control networks over Ethernet
- Proprietary Applications



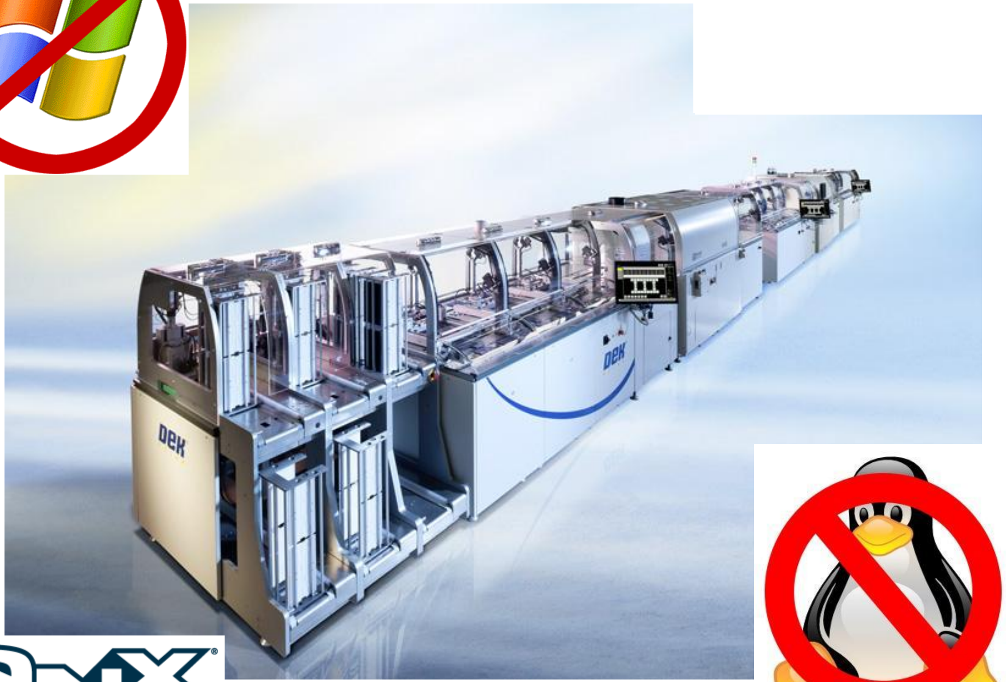
Special Embedded Systems

Industrial Systems were based on special designs

- Application runs directly on the Hardware without an Operating System

- Special, not common Operating Systems like VxWorks or QNX were used

VxWorks



QNX

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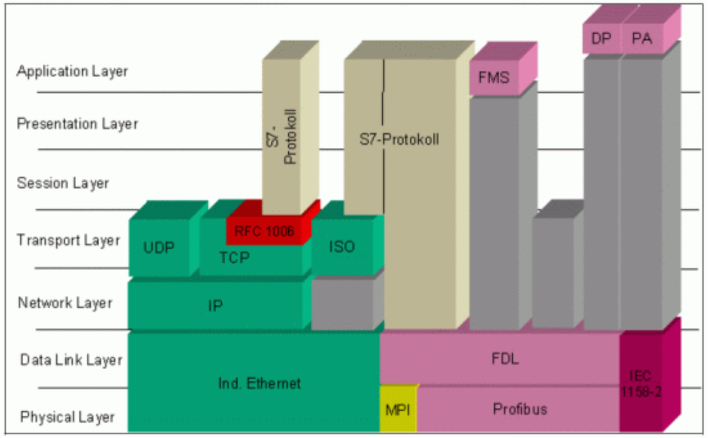
Ethernet – A standardized Communication Interface

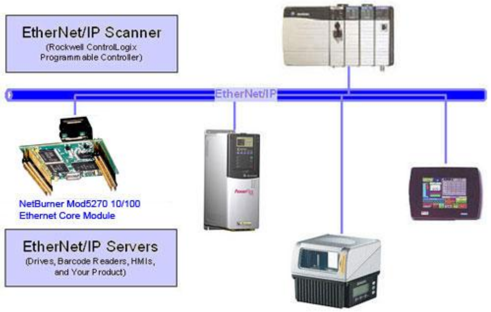
Ethernet is an open standard

- Ethernet is an open defined standard to connect several systems together
- The data is usually transferred over the network in clear text mode without any security
- Data is snoop-able during the transfer over the Ethernet



Ethernet used for Communication

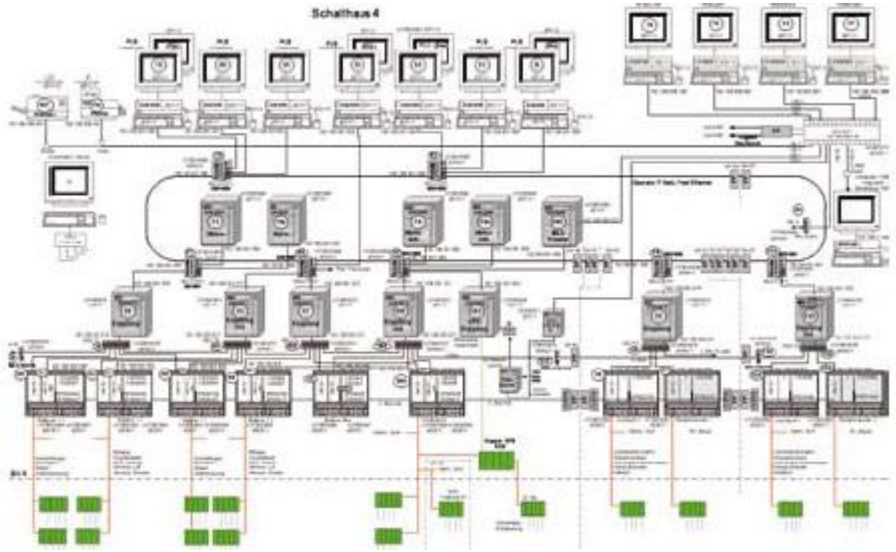
Ethernet for data, command and control



EtherNet/IP Scanner
(Rockwell ControlLogix Programmable Controller)

NetBurner Mod5270 10/100 Ethernet Core Module

EtherNet/IP Servers
(Drives, Barcode Readers, HMIs, and Your Product)

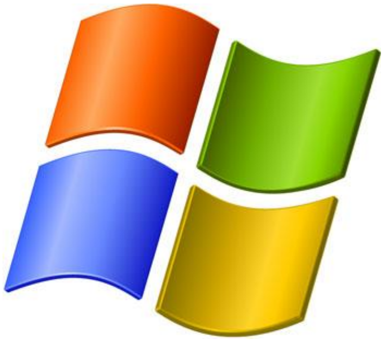


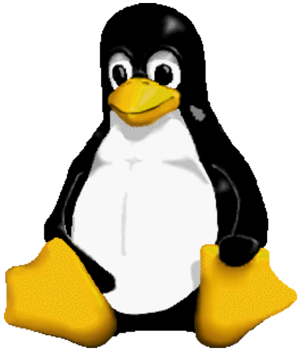
Ethernet is used for:

- Encapsulated networks
- Local networks
- World Wide Web

Common used Operating Systems and Ethernet Security Issues

Ethernet is not secure by itself





- Ethernet provides no security by itself
- Every Operating System have Security Lacks at the Ethernet Interface
- Common used Operating Systems have well known Security Holes and therefore easier targets for Security Attacks

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Differences between Office and Industrial IT Security Attacks

What are the intentions for IT Security Attacks

- Security Attacks on Office networks are usually target on knowledge
- Same applies for Industrial Systems, but …
- … espionage is not the only aspect
- Sabotage of Industrial Systems over the Ethernet can happen

Type of Industrial IT Security Attacks

How to get into a Industrial System

- Industrial Systems connected directly or indirectly to the World Wide Web can be a target of Attacks
- There are different kinds of attacks:
  - ➢ Security Lacks in Ethernet Services (like Telnet, FTP, DNS)
  - ➢ Viruses and Trojans can be implemented over emails or by infected USB Sticks
- The basis for an attack might have a commercial, but also a political background.

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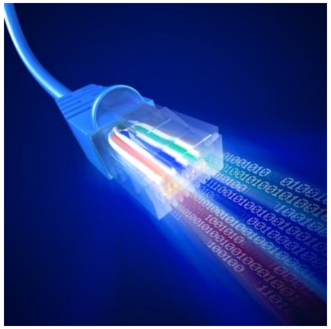
Requirements of Industrial Systems

Limits and limitations for Ethernet communication between Industrial Systems

- Industrial Systems communication requirements:
  - Performance requirements
  - Real Time requirements
  - Tested and Proven – no further changes are allowed
- These requirements are the limitations of Intrusion Prevention Systems and Firewalls



Solutions for Industrial Systems Security

Possibilities to protect Industrial Systems

- Usage of network topologies to prevent Industrial Systems from access or data exchange over the web
- Usage of encryption like TSL for all access and data transfer to the web if this is necessary
- Usage of special security enhancing tools like HoneyBox

Thank you for listening

Questions

Suggestions