

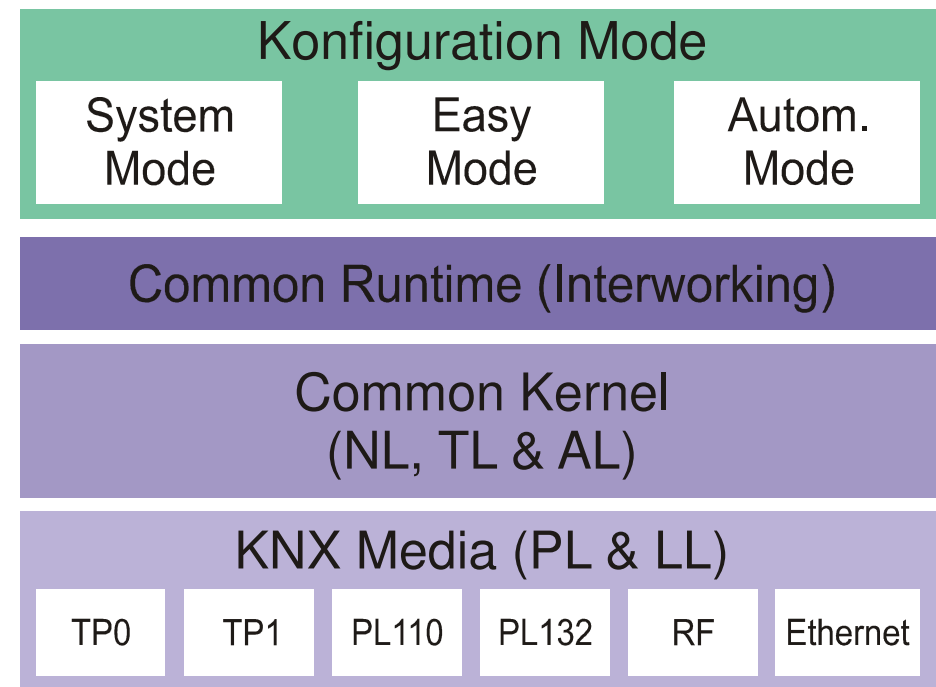
Implementing the KNX Landscape

- KNX Standard
- KNX Media
- KNX Network Management
- Reduction of System Costs
- Conclusion

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The KNX Standard

- Different configuration modes
 - System mode
 - Easy mode
 - Automatic mode
- One common kernel
- Different media
 - Twisted pair
 - Power line
 - Radio frequency
 - Ethernet



KNX Standardization

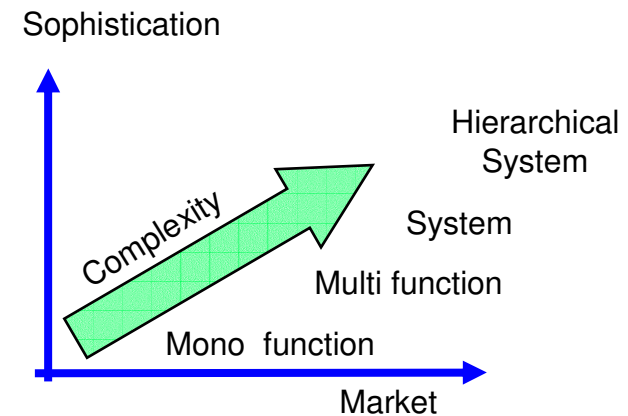
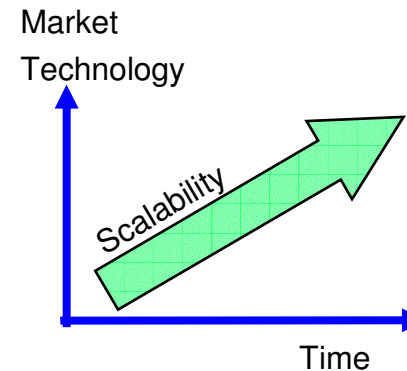
- KNX is the only system which complies to ISO/IEC, CEN and CENELEC!
 - ISO/IEC 14543
 - EN 50090
 - CEN 13321

➤ Patent free



Benefits of KNX Standard

- Sharing investments & costs
 - Specifications
 - Product & system development
 - Stacks and tools (ETS)
 - Marketing & selling channels
 - Presence in more than 50 countries
 - Training and support
 - More than 70 certified training centers
 - Partial offer
 - E.g. sensors or actuators
 - E.g. special devices
- Example: Ethernet



KNX Media

- Overview of media
- Usage today
- Future trend

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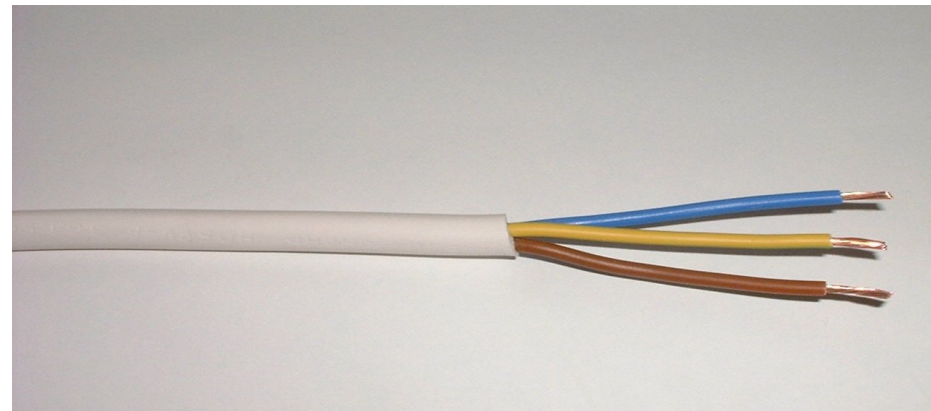
Twisted Pair

- Twisted Pair TP0
 - From Batibus
 - Mainly in France
- Twisted Pair TP1
 - From EIB
 - 90% of KNX business
 - High quality
 - Low cost medium
- Solutions from WzEng
 - KNX Stack for TP1
 - Microcontroller
 - MSP430 – ARM7
 - ATmega – 78K0
 - Bus access
 - TP-UART
 - Bit Transceiver



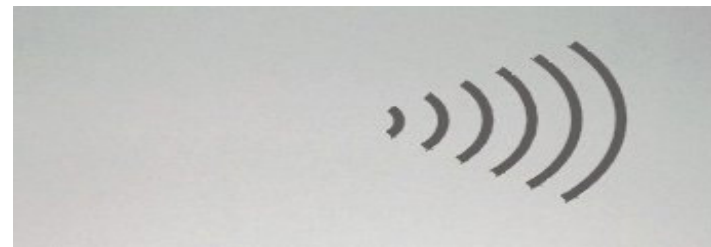
Powerline

- Powerline 110
 - From EIB
 - For renovation market
 - Mainly pushed by a few companies
 - Successful
- Powerline 132
 - From EHS
 - Used by white goods
 - Nearly no products
- Solutions from WzEng
 - KNX Stack for PL110
 - Microcontroller
 - ATmega
 - Bus access
 - ASIC



Media in KNX: Radio Frequency

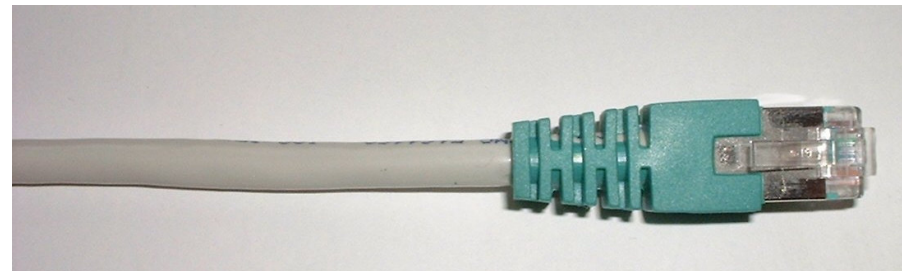
- KNX-RF
 - First KNX only medium
 - For renovation market
 - For mixed installations
 - Short range device
 - Low cost
- Solutions from WzEng
 - KNX Stack for RF
 - Microcontroller
 - MSP430
 - Low power
 - Transceiver
 - Chipcon
 - Analog Devices



Media in KNX: Ethernet

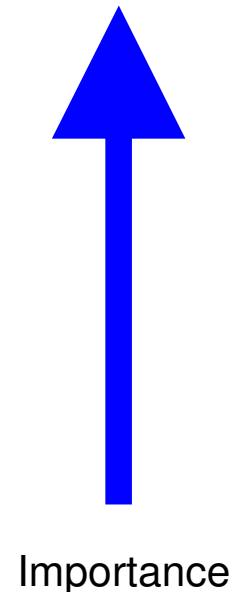
- KNXnet/IP
 - Standardized in KNX
 - For complex installations
 - Routing, tunneling
 - Linking KNX to multimedia, to telecommunication etc.
- Solutions from WzEng
 - KNX EtherGate
 - Optimized platform for
 - KNX TP1
 - Ethernet
 - IP Stack
 - KNX common kernel

➤ Very important for the future



Media in KNX: Future Trend

- **KNX is the only Standard with the complete set of media**
 - TP1 for new buildings on field level
 - RF for renovation market and for mixed installations
 - Ethernet as powerful KNX backbone and link to high level systems (multimedia)
 - PL110 for renovation market especially for mains powered devices
 - PL132 may disappear
 - TP0 will disappear



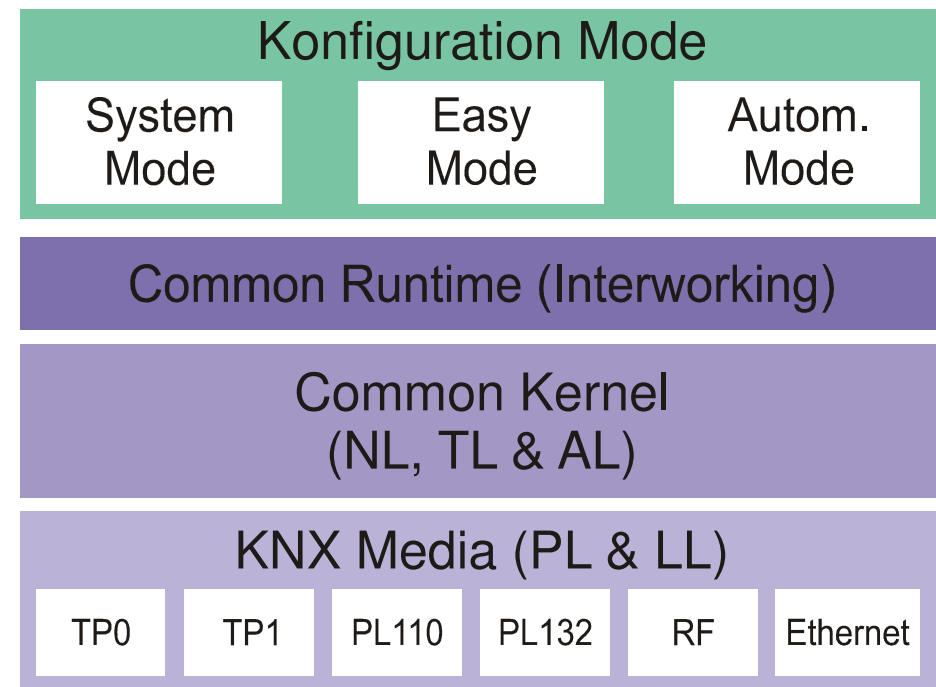
NW Management in KNX

- Overview of modes
- Usage today
- Future trend

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NW Management in KNX

- Medium independent configuration methods
 - System Mode (S-Mode)
 - For complex networks
 - Easy Mode (E-Mode)
 - For limited installations
 - Automatic Mode (A-Mode)
 - Plug & Play



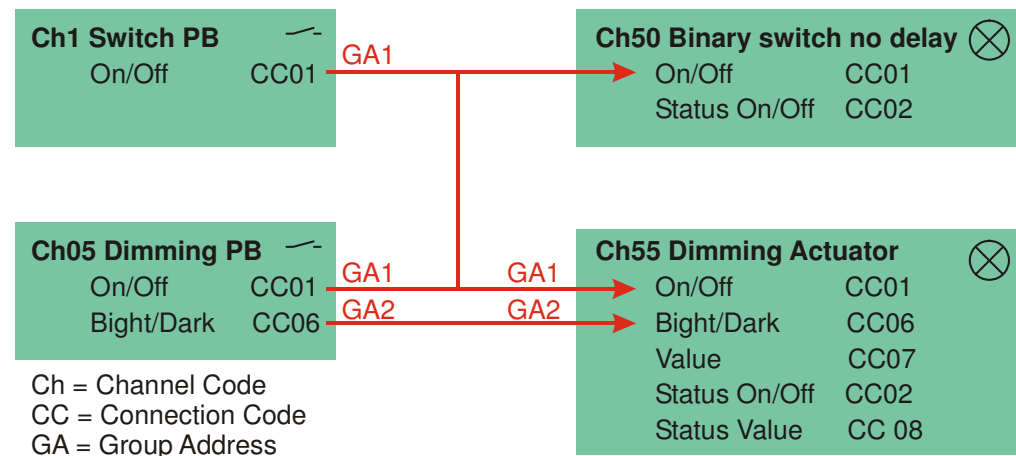
System Mode

- Configuration with PC
- For complex networks
- Training necessary
- For Twisted Pair TP1
 - ETS2 / ETS3
- For Powerline 110
 - ETS2 / ETS3
- For KNX-RF
 - Support in ETS planned
 - RF devices are ready for S-Mode
- Solutions from WzEng
 - S-Mode interface for TP1
 - Import / export tool
 - S-Mode interface for PL110
 - Import / export tool
 - S-Mode interface for RF
 - Prepared in RF stack



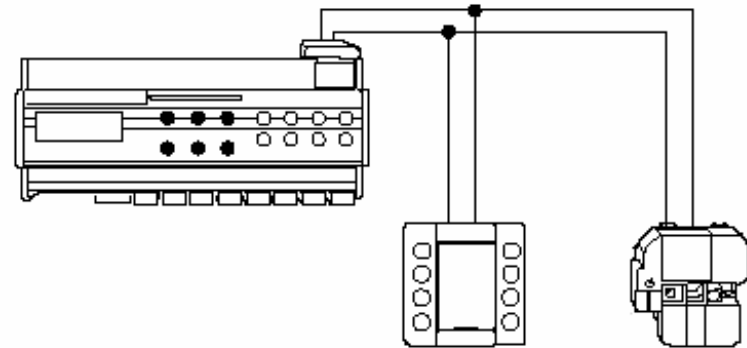
Easy Mode

- No PC required
- Automatic discovery
- Self description
 - No product database
 - Functional blocks
 - Channel codes
 - Connection rules
- Sub modes
 - Push button mode
 - Controller mode



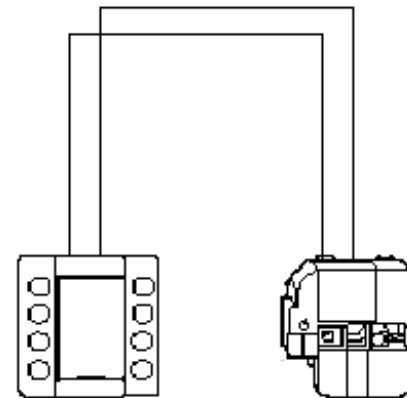
Easy Controller Mode

- Controller fulfills configuration according to connection rules
- Sub modes
 - Direct memory access (DMA)
 - Link services if used
- Solutions from WzEng
 - Easy controller mode for
 - TP1
 - RF



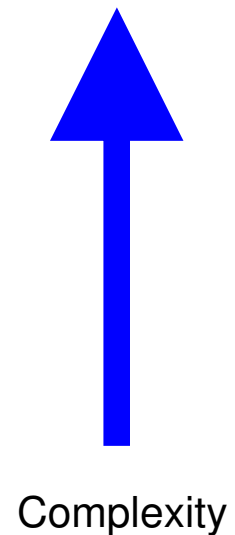
Easy Push Button Mode

- No configurator in system
 - Devices fulfill linking itself
 - HMI per device required
 - Set actuator into learning mode
 - Set sensor into learning mode
 - Sensor sends link commands
 - Actuator responds
- Solutions from WzEng
 - Easy push button mode for
 - TP1
 - RF



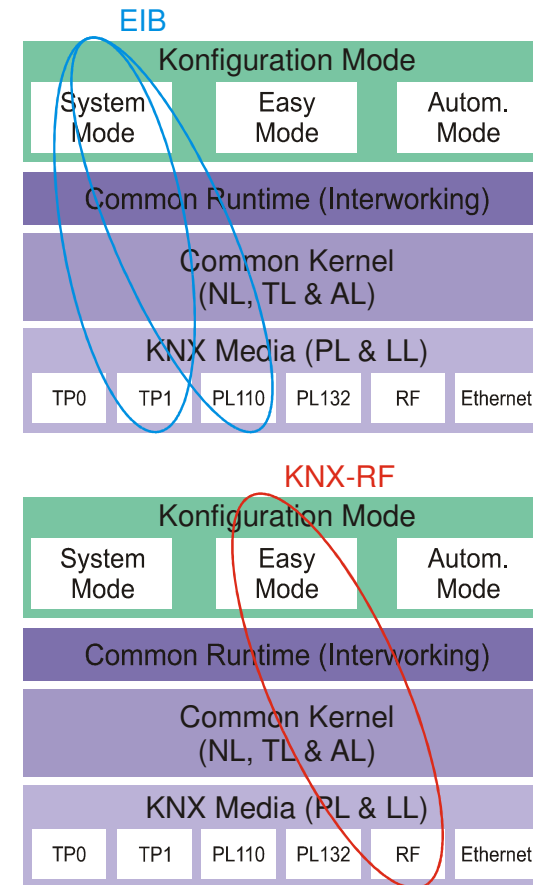
Modes in KNX: Future Trend

- **KNX is the only Standard with a complete set of scalable configuration modes**
 - S-Mode for complex installations
 - E-Mode for small and medium size installations and for emerging markets
 - Controller mode
 - Push button mode
 - A-Mode might be used for special applications
 - E.g. white goods
 - Combination of modes for scalable installations
Start easy, change later to s-mode



Profiles

- Combination of mode and medium
- Profiles in use
 - S-Mode n TP1
 - S-Mode on PL110
 - E-Mode (Controller) on TP1
 - E-Mode (Controller and PB) on RF
- Upcoming profiles
 - S-Mode on RF (planned for ETS)
 - E-Mode (Push Button) on TP1
 - S-Mode on Ethernet
 - E-Mode on Ethernet

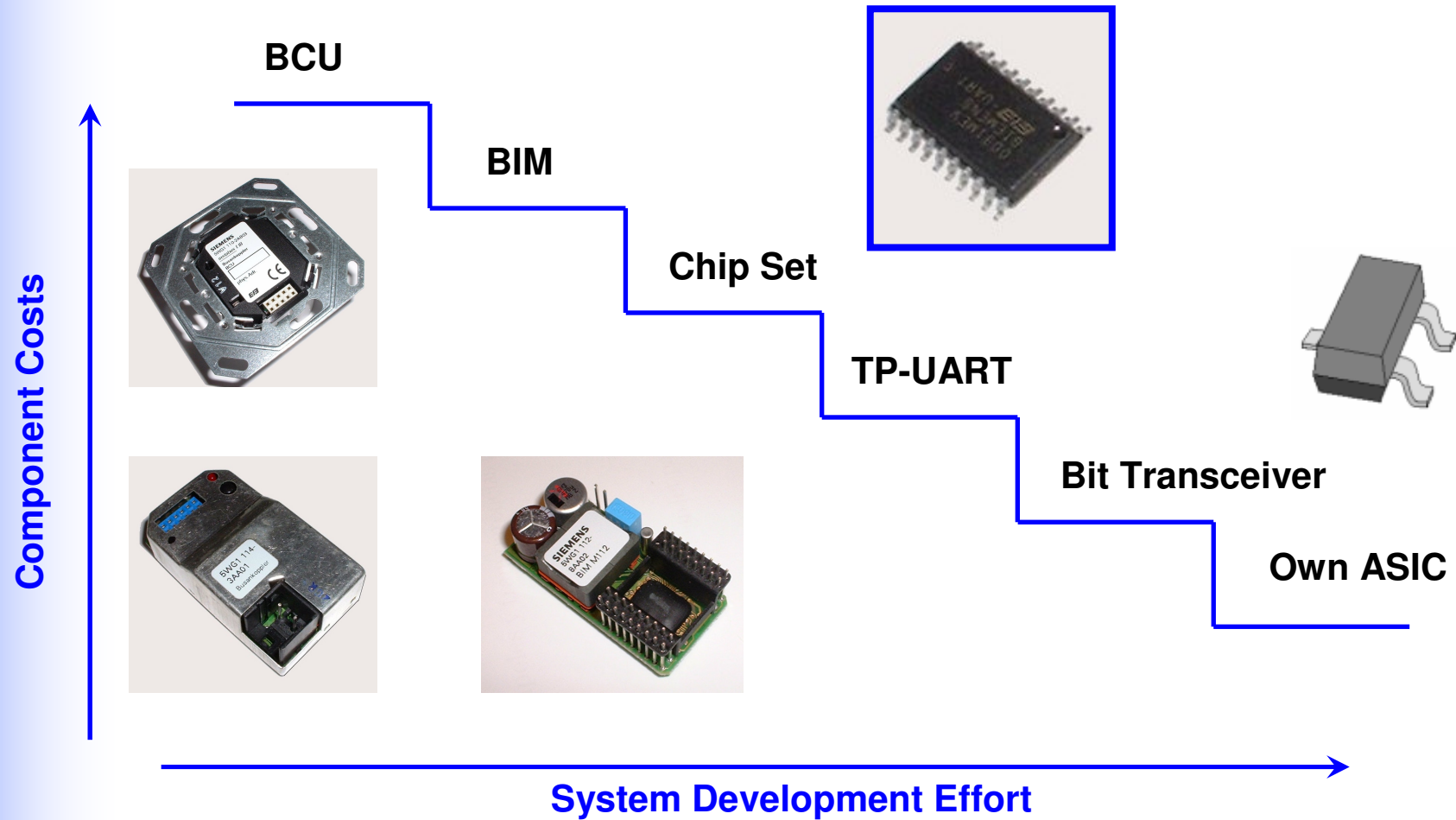


Market Aspekts

- Costs for KNX
- Highlights

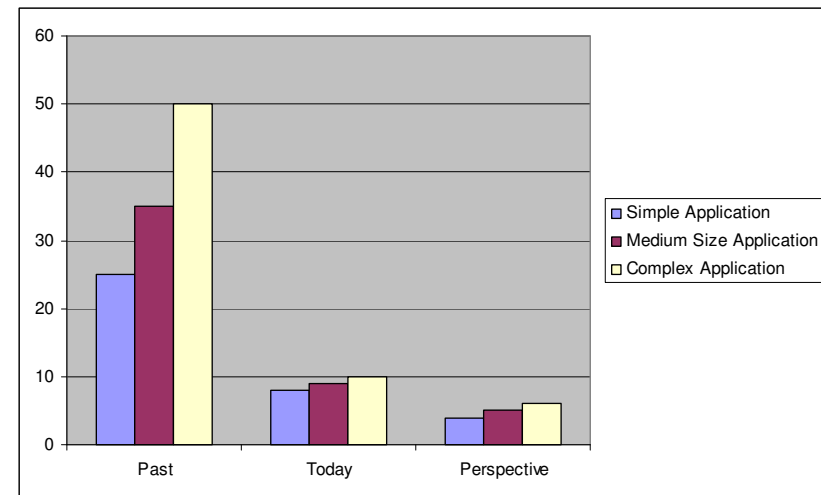
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Costs for components



Costs for KNX devices

- It is hard to develop a system with lower costs as KNX
 - You need always
 - A microcontroller
 - A medium access hardware
 - Application specific hardware
 - Enclosures etc.
 - A level of quality
- It is up to you to limit your costs for KNX
 - KNX is an open standard



Products from Weinzierl Eng.

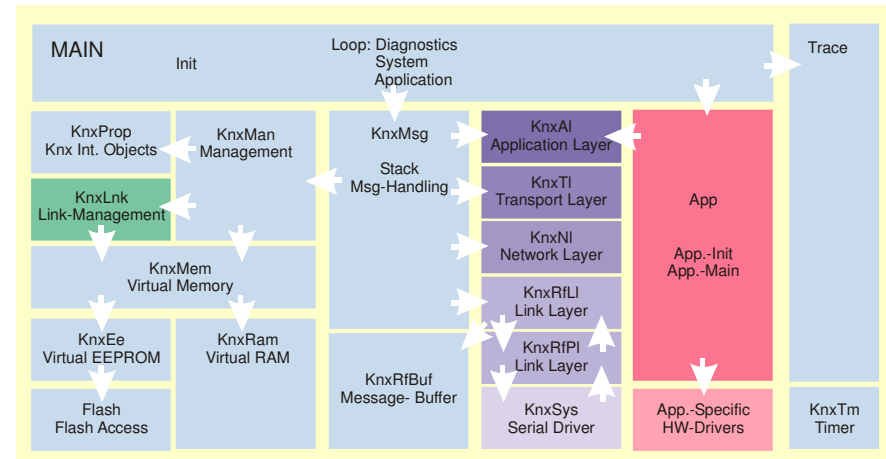
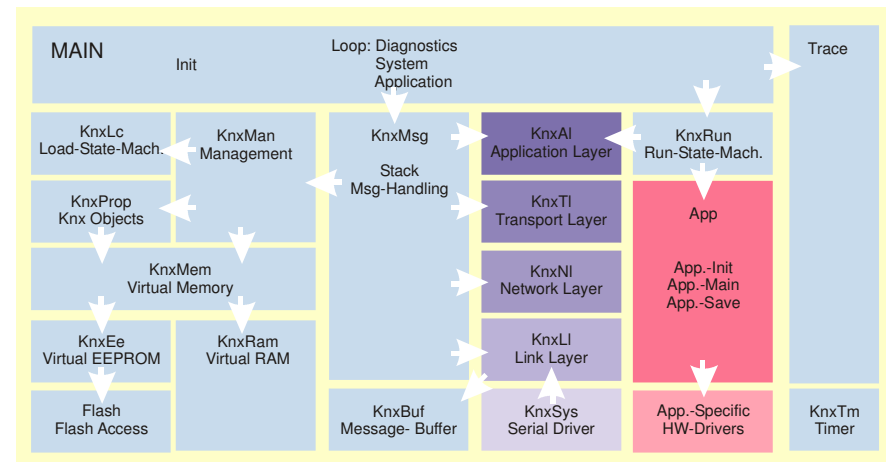
- Stack implementations
 - Twisted pair TP1
 - Power line PL110
 - Radio frequency
 - KNXnet/IP
- Development tools
 - Net'n Node
 - TraceMon
- KNX devices
 - KNX-IP router
 - KNX-IP interface
 - KNX-USB interface

KNX Device Model	Ready
0012 (KNX-TP BCU1)	√
0021 (KNX-TP BCU2)	√
0701 (KNX-TP BIM M 112)	√
1012 (KNX-PL BCU1)	√
2010 (KNX-RF bidirectional)	√
2110 (KNX-RF unidirectional)	√
091A (KNX-IP Router)	√

Reduction of system costs

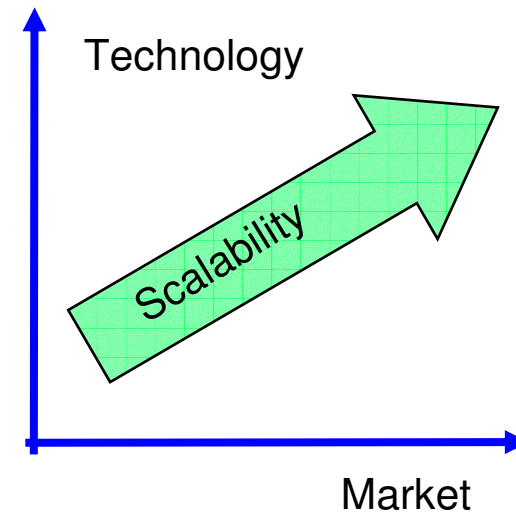
➤ Via a uniformed software architecture

- Modular system software
 - For different media
 - For different modes
- Simplified application development
- Same tools
- Reduced training of engineers



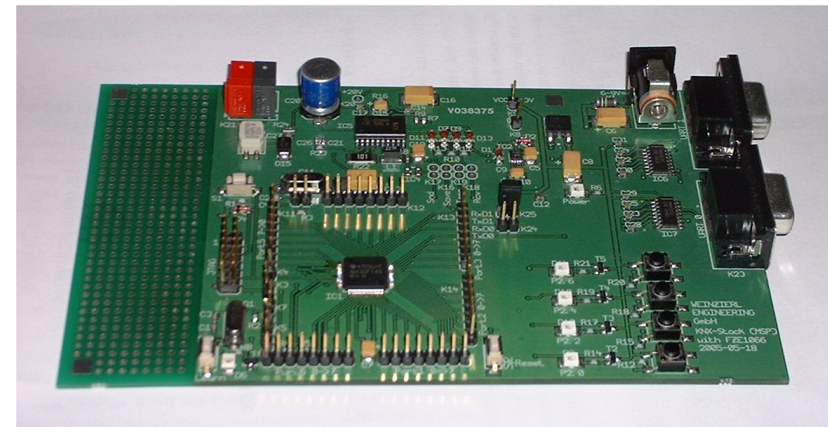
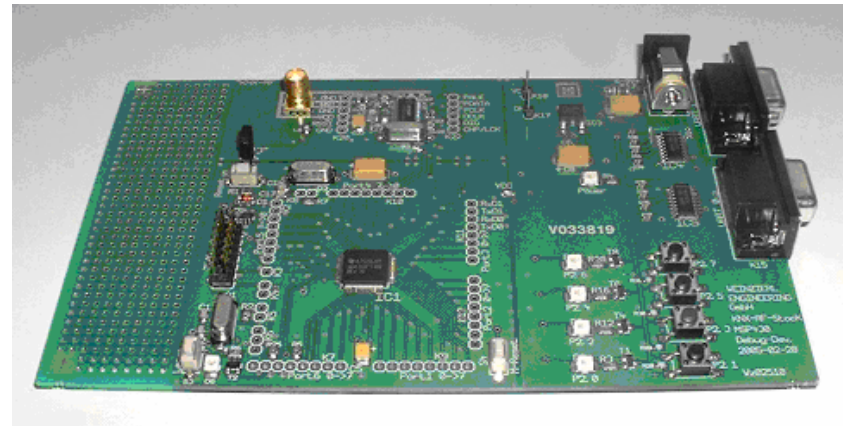
Reduction of system costs

- Different modes in one project / device
 - System mode
 - Easy controller mode
 - Easy push button mode
 - One device for different markets



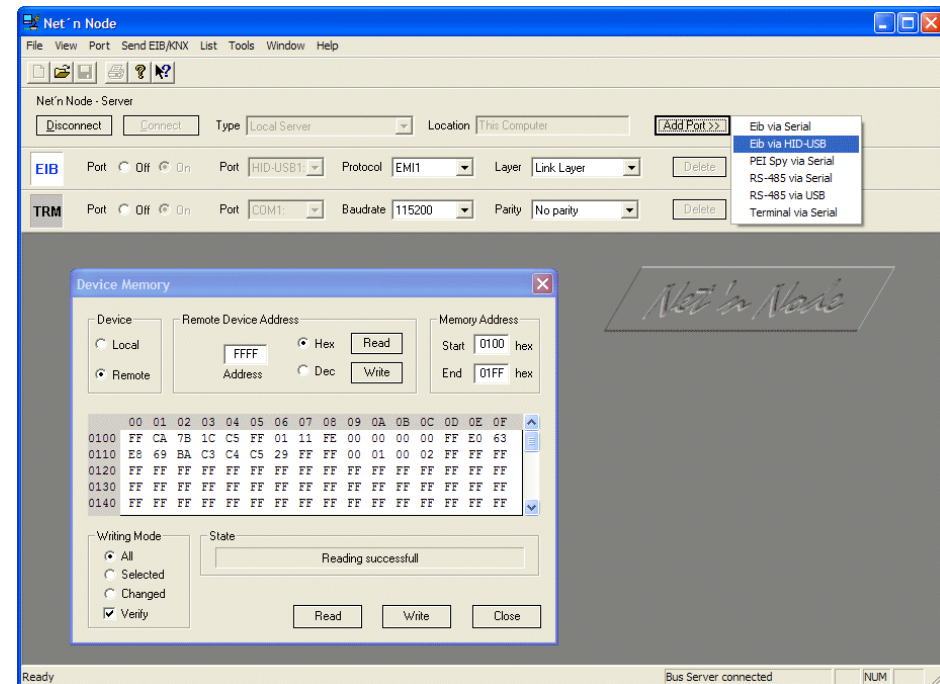
Reduction of system costs

- Via scalability in uC
 - Atmel ATmega (8 Bit)
 - TI MSP430 (16 Bit)
 - NEC 78K (8 Bit)
 - Atmel ARM7 (32 Bit)
- Via diversity in bus access
 - TP-UART
 - Bit transceiver FZE106x



Reduction of system costs

- Via a common analyzer
 - Net'n Node
 - Busmonitor program
 - Different media
 - TP1, PL110, RF, IP
 - Different interfaces
 - Serial, USB, IP
 - Via unified debug concept
 - TraceMon
- One tool concept for the complete KNX system



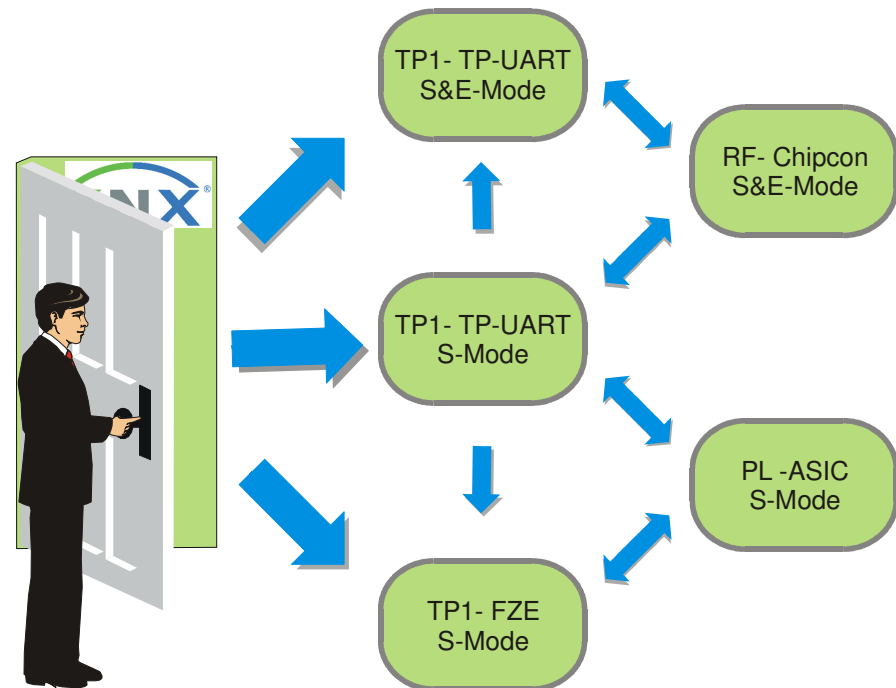
Highlights: New solutions

- Audio control via KNX
 - Audio actuator from WHD
- HVAC control
 - Driven by energy costs
- Interface to telecomm. systems
 - Interface to HighPath from Tetronik
 - Interface from Agfeo
- Installation with different KNX media
 - TP1 and RF
 - IP and TP1



Conclusions

- KNX is THE STANDARD for the complete world of building automation
 - For different modes
 - For different media
 - For different markets
- Weinzierl Engineering implementations cover the complete KNX landscape.



➤ ONE STANDARD – ONE SOLUTION