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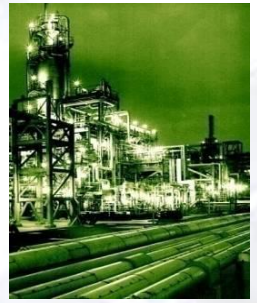


MTCA for Industrial applications

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Industry requirements

Industrial PC are used all over for de-centralized data processing/acquisition in factory automation

They need to be:

- simple to operate
- easy to manage
- robust
- reliable
- long-term availibility
- cost effective
- small

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Industry reality

Industrial PC lack of the following features

They are not easy to operate
They do not have any management
They are not easy to maintain or manage
They are very limited to expand beyond
- Max. 3 PCI slots (if any)
- Components are not easily exchangeable

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A simplified MTCA system

A simplified MTCA system is:
Simple to operate
Has got easy management
Support for 6 AMC modules
PCIe links to each AMC (x4 is enough)

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A simplified MCH
- eMCH
- backplane integrated
- as backplane add-on

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Cost reduction expected compared to a full feature MTCA system
- Microchip PM8532 (181,00 EUR; 26.9.2022)
- Broadcom PM40028B1-F3EI (190,01,00 EUR; 26.9.2022)
  - Supports up to 6 AMC Slots with PCIe x4

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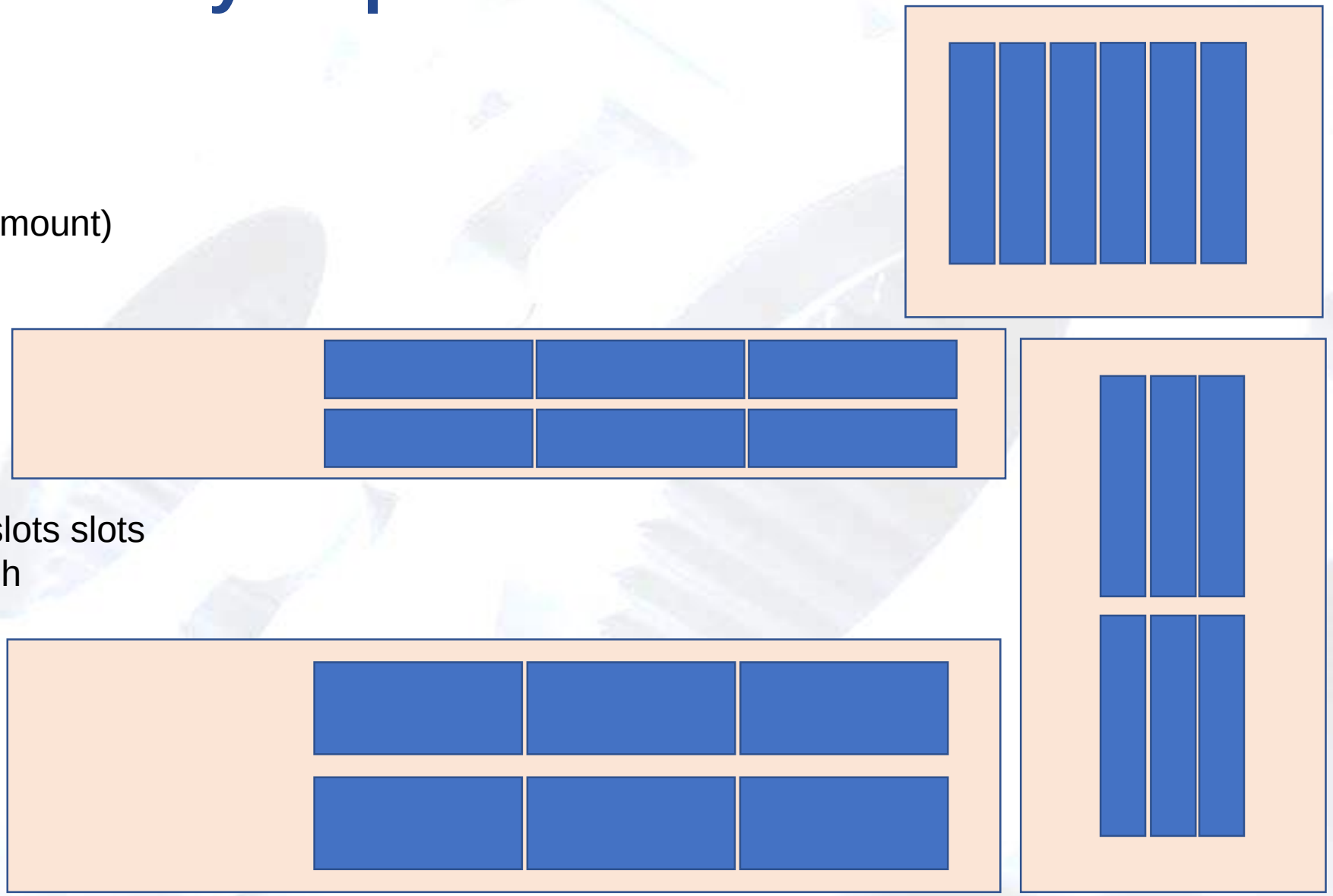
Industry requirements

Small system (either 19“ or wall mount)
Flexible
Expandable
Simple to operate
No redundancy needed
Easy management
Cost effective
Not neccessarily 12 expansion slots slots
    Maybe 6 slots will be enough



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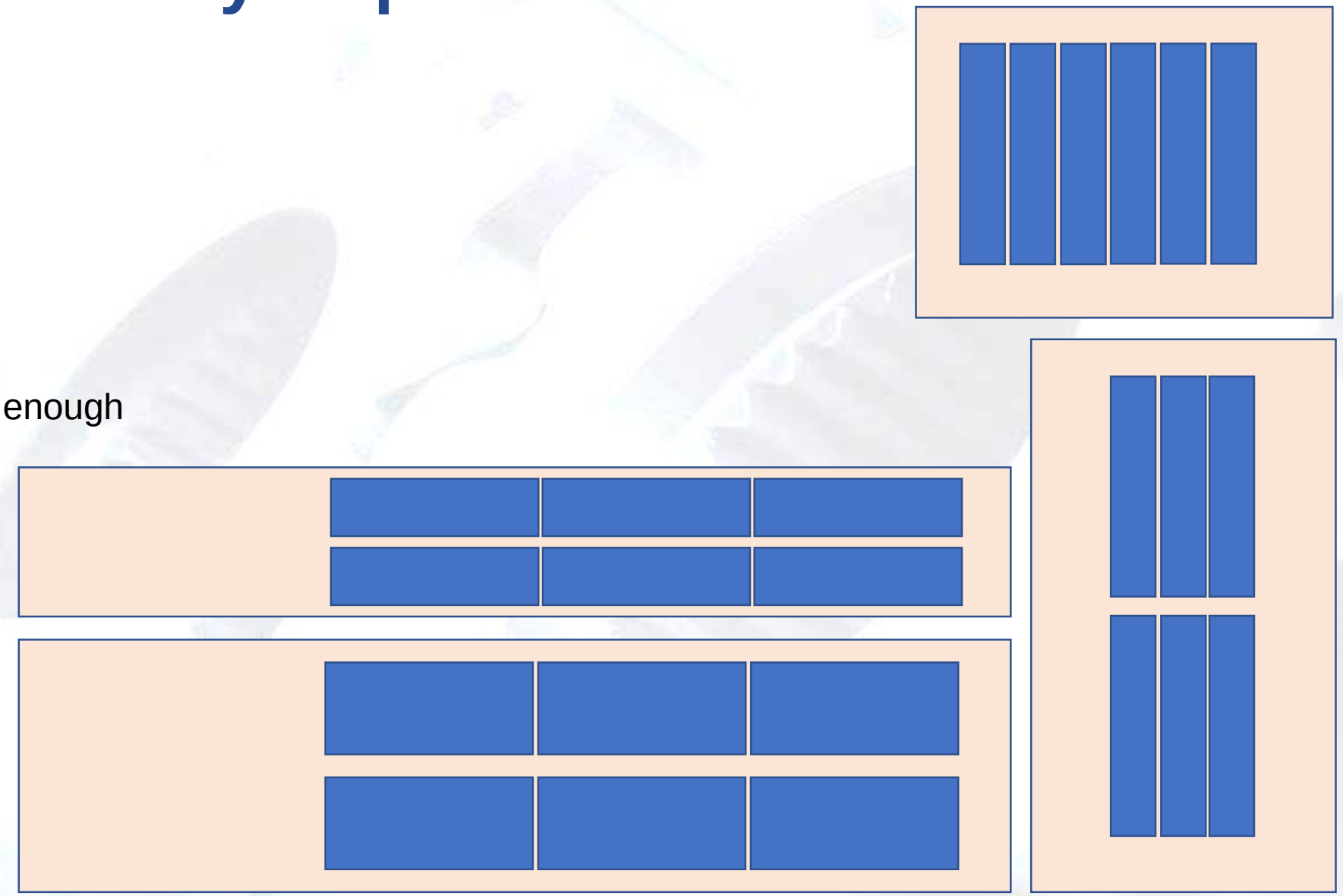
Industry requirements

No need for high-end solutions
Open frame AC power supply
DC optional
Max. 6 slots
PCIe as fabric
x4 lanes to every AMC may be enough
Few variants



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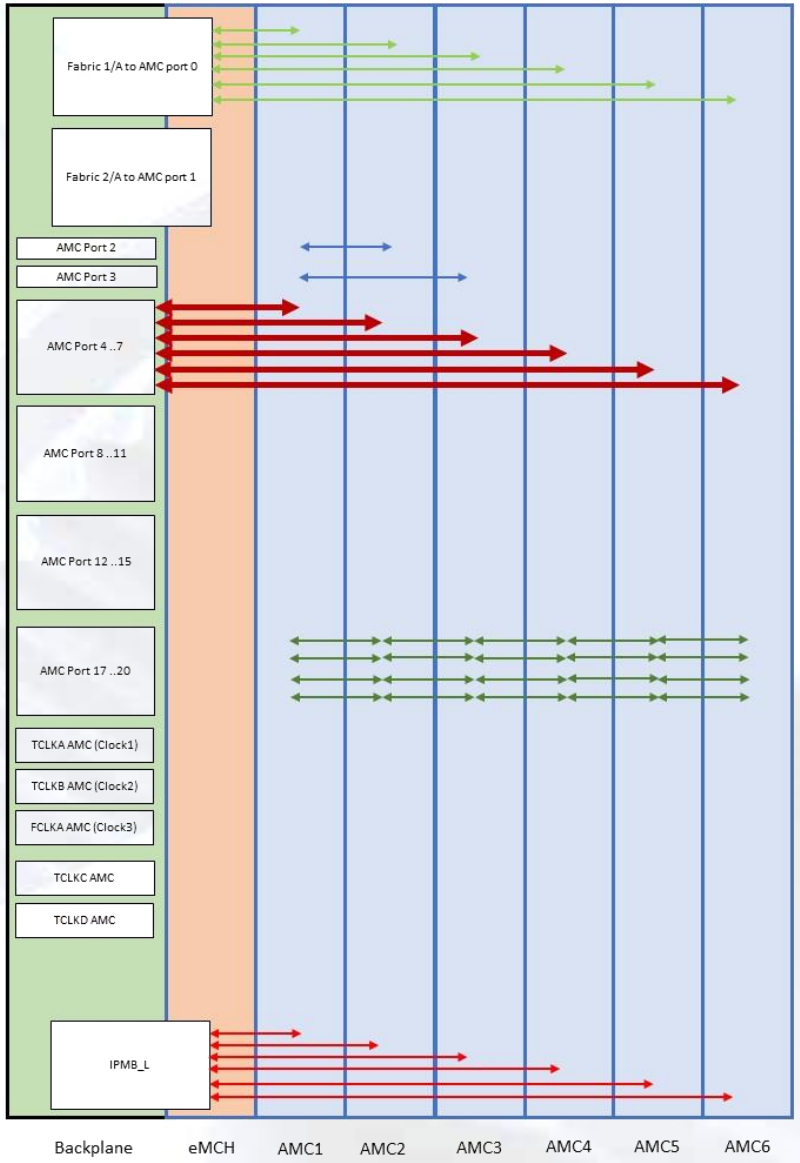
Requirement for a simple MTCA system

GbE to every AMC slot
Dedicated CPU Slot (AMC1)
PCIe x4 on AMC Ports 4..7
SATA links between AMC1 and AMC2/3
Daisy chain between AMC1 to AMC6
Clock 3 to all slots

Custom backplanes optional
for AMC port 8..11, AMC port 12..15



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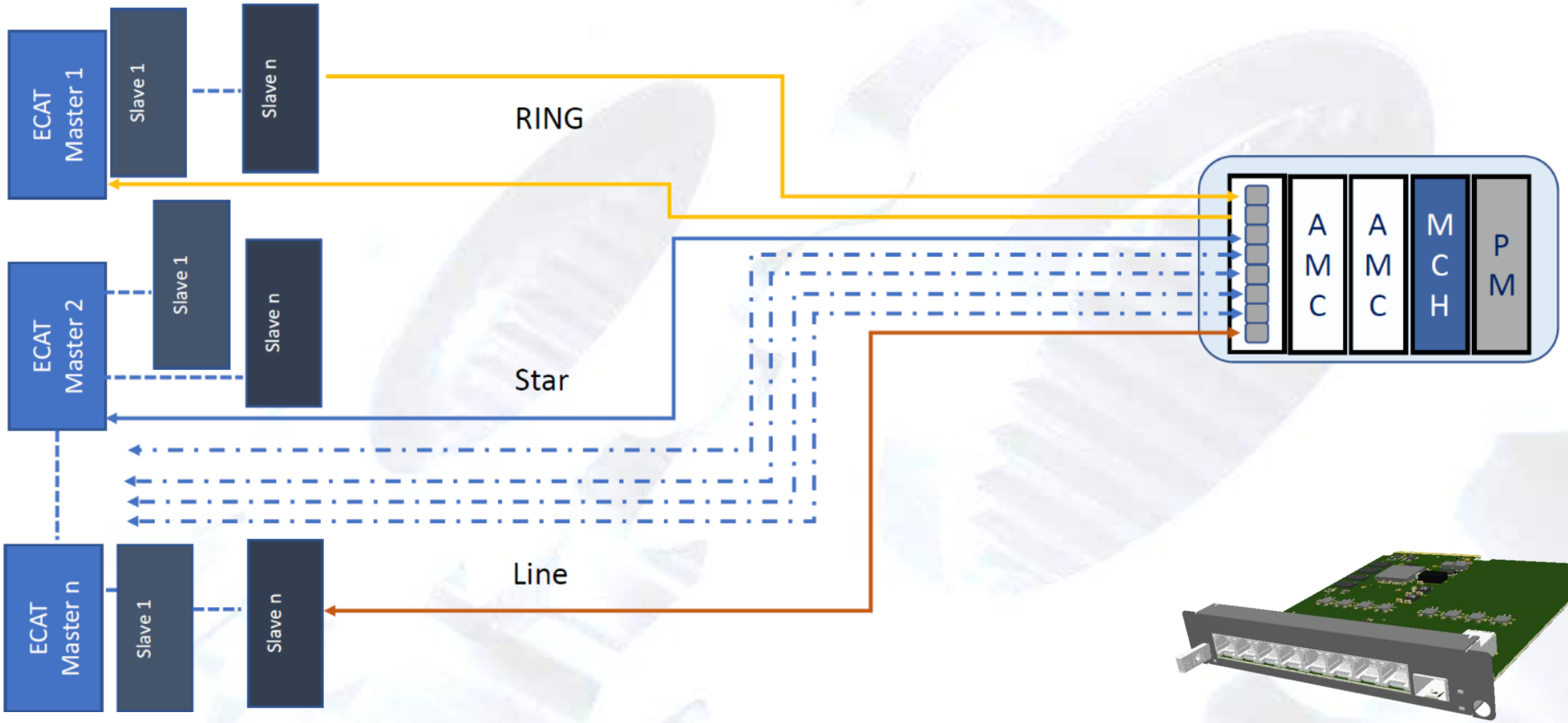
EtherCAT with NAT-AMC-ZYNQUP-ECAT



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Fieldbus EtherCAT

EtherCAT Slave modules

- EPS-9905 6-slot DIN rail mount with EPS-6000 EtherCAT bus coupler

- EPS-1132 digital input 32 channel with SPI interface (sinking type)
- EPS-2032 digital output 32 channel with SPI interface (sourcing type)
- EPS-2308 relay output 8 channel and 8 digital input with SPI interface
- EPS-3032 analogue input 32 channel (+/-10V) with SPI interface
- EPS-3216 analogue input 16 channel (0~20mA) with SPI interface
- EPS-3504 RTD input thermal 4 channel with SPI interface
- EPS-4008 analogue output 8 channel with SPI interface
- EPS-7002 pulse output motion controller 2 channel with SPI interface

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MTCA in Industry

- MTCA system (EtherCAT Master) controls Adlink EtherCAT slave (shown at DESY workshop in 2013)
- MTCA system can support multiple camera for visual inspection
  (shown at various DESY MTCA workshops since 2014)
- MTCA system can share data among different other systems (DDS) (MTCA workshop 2020 demo)
- MTCA system can support GPGPU (powerBridge table top exhibition)
- MTCA system acts as a dual rackmount PC for HIL testing (different root complexes)
- MTCA system acts as a data logger in automotive (different root complexes)
- MTCA system controls and monitors traffic crossing (monitors contact loops)
- MTCA system is used in particle therapy systems

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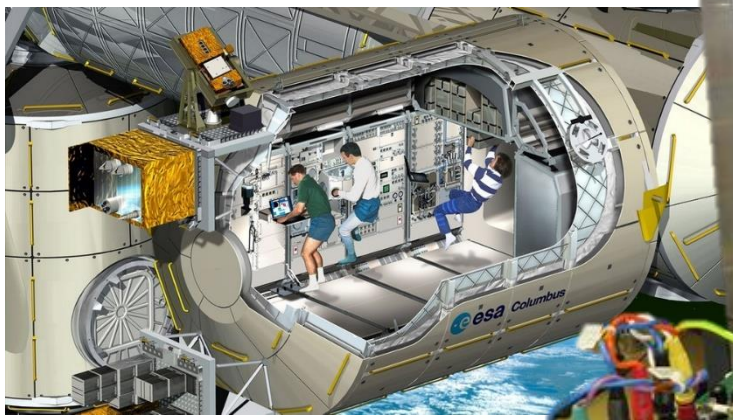
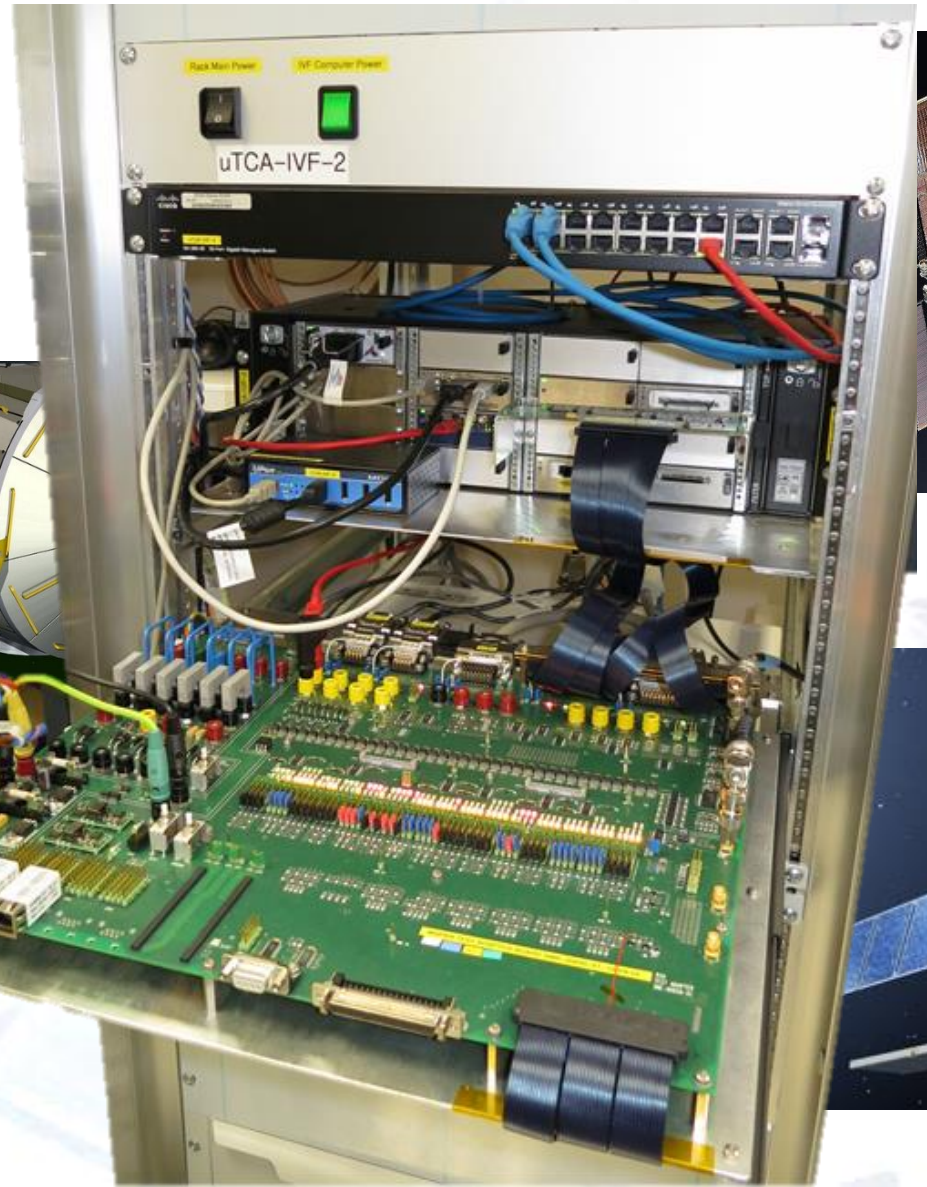
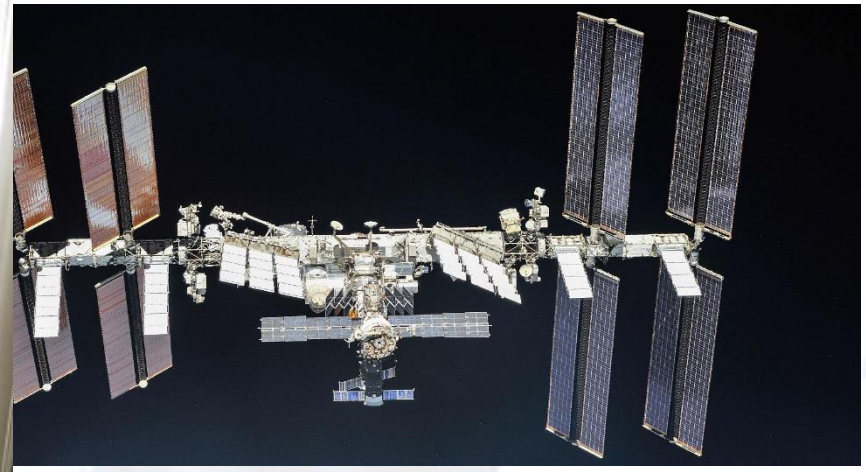
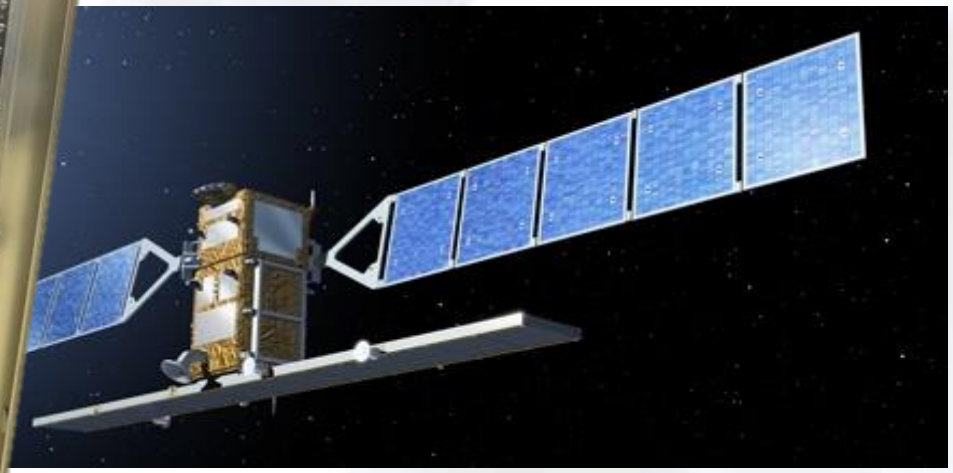
AeroSpace









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Industrial Automation

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IT / Communication

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Transportation

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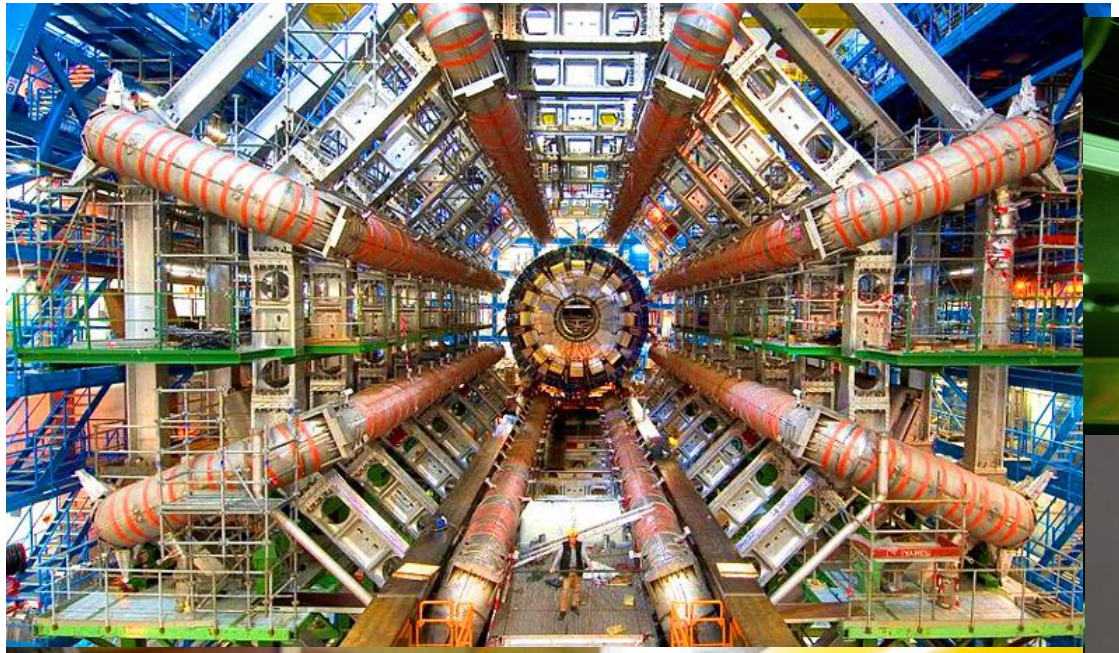
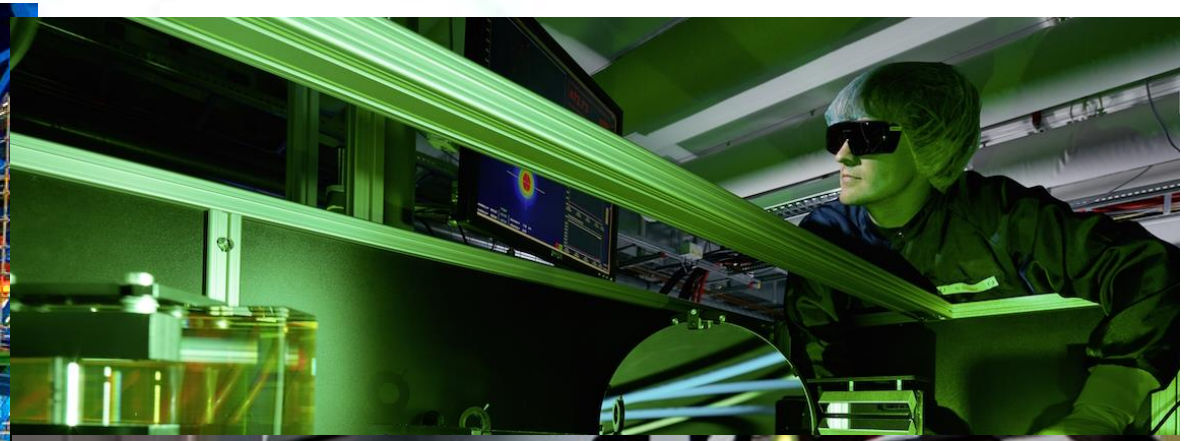
Research





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Missing AMC products

XMC carrier (single and double)
M.2 carrier (up to 2 M.2,
    2 x PCIe x4 oder 1 x PCIe x8, or maybe RAID?
Multiserial AMC module (RS232/422/485)
    4/8/16 ports
A/D converter AMC cards +/-10V; 0-10V, Isolated
    12-bit, 14-bit, 16-bit
Low cost FPGA AMC with adoption slot
Other fieldbusses?
USB?

Thank you

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