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Applications in Industry

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It is time ... to change your
Computing Platform!



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Agenda



- About N.A.T.
- How do we get to new standards?
- Views to the MTCA market
- Applications in industry

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Agenda



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About N.A.T. Network and Automation Technology



- Gesellschaft für Netzwerk- und Automatisierungstechnologie mit beschränkter Haftung => N.A.T.
- proud to provide quality "made in Germany"
 - since 29 years
 - by 25 highly professional employees
- privately owned and owner lead business
- own purpose-built building of more than 1,600m² (17,222ft²) with on-site centers for
 - hardware and software design
 - pre-manufacturing and test + repair
- ISO 9001:2015 certified
- fab-less due to qualified CMOs for PCBs + assembly



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About N.A.T. History of Standard Product Portfolio



- 1990: VME for LAN
- 1992: VME for WAN
- 1994: VME for ISDN
- 1996: M-Modules for telecom and industrial IO
- 1998: IP modules for telecom networks and industrial IO
- 1999: PMC modules and PCI cards for telecom networks and industrial IO
- 2002: cPCI products for telecom and GPIO
- 2006: AMC modules (ATCA) and PCIe cards for telecom, WAN and GPIO
- 2007: MCH for MicoTCA.0
- 2008: first MTCA system level product
- 2012: MTCA power modules for AC/DC and DC/DC
- 2013: MCH and RTM for MicoTCA.4
- 2015: AMC carrier for FMCs
- 2016: AMC modules for mobile networks and SDR
- 2017: AMC and PCIe carriers for XMCs
- 2018: XMCs and FMCs
- 2019: VPX

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About N.A.T. Product portfolio: www.nateurope.com



- Standard product line
 - based on common open standards following MOSA approach
- Board Level Products
 - network interfaces, communication and processing boards
 - intelligent switches and system controllers
 - carriers, converters, adapters and extenders, development kits
- Software
 - board support packages, drivers, IP-cores
 - signaling stacks and protocols
 - applications and APIs
 - development kits
- Systems
 - pre-validated platforms for development and rapid prototyping
 - turn-key solutions
- Supported standards
 - **industrial:** VME, cPCI, PCI/PCle, PMC, XMC, FMC, AMC, MTCA
 - **rugged:** XMC, FMC, AMC, MTCA, VPX

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About N.A.T. Markets and Applications



- Automation
- Communication
- Defense & Aerospace
- Energy
- Industrial Control
- Infotainment
- Medical
- Test & Measurement
- Transportation



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New Standards Time line

- Assumption:
"In every engineer's life there is one dominating hardware standard!"
- Examples:
 - Multibus (Intel 1974) 13 yrs
 - VME (VITA/IEEE 1987) 12 yrs
 - compactPCI (PICMG 1999) ???yrs
 - AdvancedTCA (PICMG 2002) 4 yrs
 - MicroTCA (PICMG 2006) 1 yr
 - VPX (VITA 2007)

New Standards Where does the demand come from?

- Market and customer needs
- Communication market has important momentum:
 - New standards in communication systems:
 - driven by big telecommunication and semiconductor companies
 - reflect the structure/challenges of next generation networks:

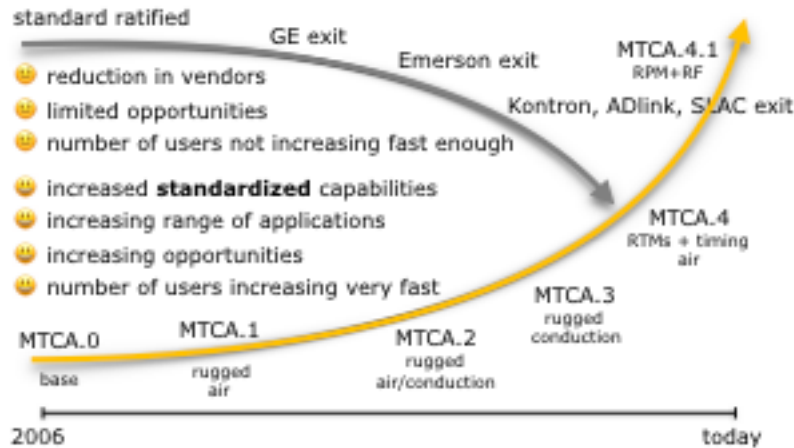


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MicroTCA situation view

From the outside and the inside



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MicroTCA Applications

> Coms: carrier grade multiplexer system

- Application
 - SDH front end for server processing farm
- Challenge
 - off-load servers by telecom PCIe cards
 - foot-print as small as possible
 - fully managed and remotely controllable
- Solution
 - redundant 2U MTCA system
 - 12 mid-size AMC's providing 4x STM-1 ea.



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MicroTCA Applications

> Coms: Satellite Ground Terminal

- Application
 - universal hub system for satellite link
- Challenge
 - replace existing cPCI/PMC system
 - front-to-rear cooling @ 3U
 - increase modularity and scalability by MOSA
- Solution
 - redundant 3U MTCA system
 - 12 AMC slots
 - 4 PMs for N+1 redundancy
 - 2 custom "AMCs" OXC0+PLL timing facility
 - front-to-rear cooling with excellent thermal performance

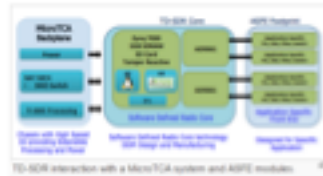


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MicroTCA Applications

> Coms: Vehicle Mounted SDR

- Application
 - vehicle mounted SDR platform
- Challenge
 - MOSA
 - COTS components only
- Solution
 - non-redundant 5U COTS MTCA system
 - custom enclosure for system



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MicroTCA Applications

> Coms: carrier grade conferencing system

- Application
 - carrier grade voice and video MGW and CS
- Challenge
 - limited rack space in cabinet
 - resource assignment based on traffic
 - integration of system management
- Solution
 - redundant 6U MTCA system
 - 10 FS AMCs
 - operates at DC and AC
 - "rear-to-front" design with panel PC connected to MCH

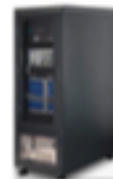


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MicroTCA Applications

> Coms: 3G+4G Test & Simulation

- Application
 - test and simulation system for mobile networks
- Challenge
 - replace existing cPCI/PMC based system
 - low latency (~90ns) between RF and DSP
 - upgradeable to future mobile standards
- Solution
 - 7U redundant MTCA system
 - double tier
 - SRIO



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MicroTCA Applications

> Automation: High Lift System Simulator

- Application
 - automated test system integrated into test bench
- Challenge
 - heterogeneous environments
 - hardware: VME, cPCI, custom
 - software: Windows, Linux, RTOS
 - modularity as test cases scale with time
 - COTS
- Solution
 - (non)-redundant 5U MTCA system
 - multicore PrAMC with RTOS and Linux
 - 6 AMCs with digital and analogue DAQ

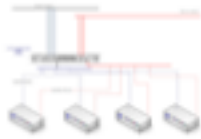


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MicroTCA Applications

> Traffic: Shaping and Control System

- **Application:**
 - traffic shaping and control for multi-lane roads
- **Challenge**
 - remote control and management of system
 - component change process as simple as possible
 - fail safe, limited space, low power consumption
 - existing system based on proprietary VME/cPCI
 - "make" or "buy" b/o modem cards
 - no single vendor lock-in
 - longevity support
- **Solution**
 - redundant 2U MTCA
 - 12 quad-core P2040 based AMCs
 - redundant external AC/DC

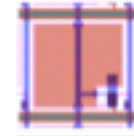


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MicroTCA Applications

> Medical: mammography glas tester

- **Application**
 - compute system for quality inspection
- **Challenge**
 - replace proprietary system b/o obsolescence
 - reduce effort needed for installation + bring-up
 - cost reduction
- **Solution**
 - redundant 3U MTCA system
 - read-out cards replaced by custom-made AMCs
 - off-site PC integrated into system by PrAMC



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Summary

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there is no doubt... it is time!



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Thank you very much!

Questions?

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