N.A.T. MicroTCA Carrier Hub Generation 4

Heiko Körte
VP, Director Sales & Marketing

N.A.T.

Agenda

- MicroTCA
  - History
  - Current status and future demands

- NAT-MCH Generation 4
  - Motivation
  - NAT-MCH-G4 in a nutshell
  - Main Differences between Gen3 and Gen4
  - How to transit from Gen3 to Gen4 and when

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Where MicroTCA came from and where it is being used 1/2

- 2002: **A**dvanced **T**elecom **C**omputing **A**rchitecure (ATCA)
  - Telecom carrier grade communication equipment
  - Switched MOSA using serial communication
  - New mezzanine standard: **A**dvanced **M**ezzanine **C**ard (AMC)
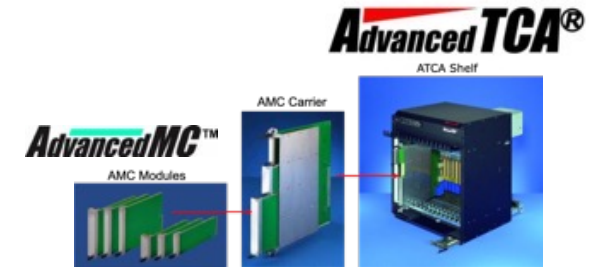
- 2006: **M**icro **T**elecom **C**omputing **A**rchitecure (MicroTCA, MTCA)
  - Derived from **A**dvance **T**elecom **C**omputing **A**rchitecture (ATCA)
    => common system managment and re-use of Advanced Mezzanine Cards (AMCs)
  - Targeting at any telecom application ATCA would be an overkill for
  - Switched MOSA using serial communication

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Where MicroTCA came from and where it is being used 2/2
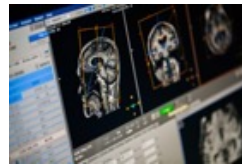
- Today **M**icro**TCA** (MTCA) is being used in almost any vertical market:

Quantum Computer

Vision and AI
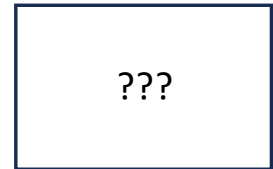

Medical

(Tele-) Communication

Military

Traffic

Research

Industrial Control

Test & Measurement

???

… any many more ….

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What MicroTCA needs to deliver tomorrow

- Fabrics

Challenges:
- X86/ RISC CPUs
- FPGAs
- Fast I/O

1GbE	**x1**	1Gbps	=> 1Gbps	=> 1Gbps	**?**	10Gbps	
PCIE	**x4**	16Gbps	=> 32Gbps	=> 32Gbps	**?**	63Gbps	
	x8		63Gbps	=> 63Gbps	**?**	252Gbps	
	x16				**?**	504Gbps	
ETH	**x4**	10Gbps	=> 10Gbps	=> 40Gbps	**?**	>100Gbps	

MTCA.0 r1
base

MTCA.1
rugged
air

MTCA.2
rugged
air/conduction

MTCA.3
rugged
conduction

MTCA.4
RTMs + timing
air

MTCA.4.1
RPM+RF

MTCA.0 r3
base

AMC.2 r2
base

2006

today

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NAT-MCH

Generation 4

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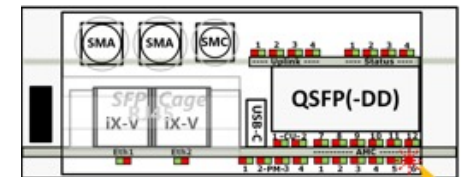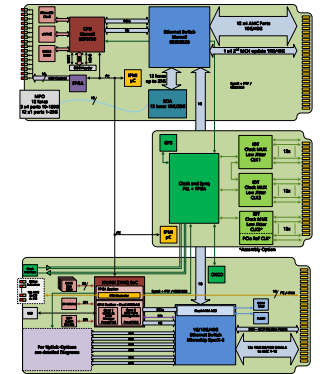
Why a next generation MCH

- Current NAT-MCH Gen3
    - Deployed since early 2007 => almost 17 years
    - More than 17.000 deployed MCHs
    - Facing upcoming component obsolescence
    - Difficult to extend to new functions, both HW and SW

- Goals with NAT-MCH Gen4
    - Backward compatibility to ensure continuity for existing customer base
    - Update to state-of-the-art chipsets and technology
    - Comply with most recent version 3 of MTCA.0
    - Provide new features and functions
    - Meet future requirements of customers

NAT-MCH Gen4 – hardware in a nutshell

- New baseboard with improved HW and SW

- New clock module with improved functionality and optional features
  - OCXO
  - GPS

- New NAT-HUB-E for 40/100GbE

- New NAT-HUB-P for PCIe G4+5

- Ethernet switches and CLK module support IEEE 1588

- NG-MTCA has impact to our roadmap

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Main differences between Gen3 and Gen4 (excerpt)

	NAT-MCH Gen3	NAT-MCH Gen4 (Improvements)
CPU + O/S + memory	Single core NXP Coldfire + OK1 + 64Mb	Dual ARM core (A9, Xilinx Zynq) + FreeRTOS + 1GB
Base Switch	Broadcom 1GbE	Microchip 1/10/40GbE, dual ARM core (A53)
Base Fabric + Uplinks	12x 1GbE + 2x 1GbE (RJ45)	12x 1/2.5/10GbE + 2x 1/10GbE (RJ45/iX/SFP-DD)
Clock Module + ext. Input/output	CLK123, CLK12F, CLK-PHYS + dual input/output	CLK-G4 + dual input/output and GPS
IEEE1588/SyncE + TSN support + OXCO	Not supported+ Not supported + NAMC-PTM	Supported + Supported + OCXO
Fat pipe Ethernet switch	Marvell Amstrong-LP 40GbE	Marvell Amstrong-LP 40GbE
Fat Pipe + Uplinks	12x XAUI + MPO	12x XAUI/10/40G + SFP-DD
Fat pipe PCIe Switch + PCIe Gen	PLX + Gen3	MicroChip + Gen4
Fat Pipe + Uplinks	12x PCIe Gen3 + Finisar BOA (NAT-MCH-PHYS80)	12x PCIe Gen4 + SFP-DD
Fat pipe SRIO Switch + SRIO Gen	IDT + Gen2	?
Fat Pipe + Uplinks	12x SRIO Gen2 + Infiniband	?
User Interfaces	CLI, Web (GoAhead) => Update with 2.22.x	unified CLI, reworked Web (Mongoose) incl. CLI
NATView: HPM update + backplane viewer + FRU-Ed	JRE on external device	Integrated into Web interface (excl. FRU-Editor)

How to transit from Gen3 to Gen4 and when

	NAT-MCH Gen3	NAT-MCH Gen4
Compliance	MTCA.0 Rev 2	MTCA.0 Rev 3
General Availability single width	available	Q1/2024 (orders accepted)
double width	Available	scheduled for late Q2/2024, else use splitting kit
Lead Time	approx. 10-12 weeks	approx. 12-14 weeks
Firmware + updates	will be frozen at 2.22.x by Q1/2024 + major bugs only	> 3.1 and continued
EOL + LTB	~ 2025 + ~ 2024	n/a
Function/Form/Fit replacement	NAT-MCH Gen4	n/a

- NAT-MCH Gen4 is a full function + form + fit replacement for NAT-MCH-Gen3
- We expect users to start migrating from Gen3 to Gen4 during 2024.
- We expect to ship the last NAT-MCH Gen3 in 2025.

Thank you very much!

Heiko Körte
VP, Director Sales & Marketing
heiko.koerte@nateurope.com

N.A.T. GmbH
Konrad-Zuse-Platz 9
53227 Bonn
Germany

www.nateurope.com

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