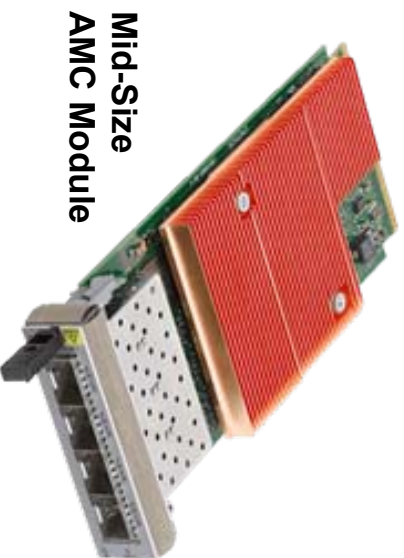


AMC Tutorial



AMC Module Form Factors

Module Type	Conventional ATCA Carrier	Cut-away ATCA Carrier	MicroTCA
Compact Module	1x per AMC bay	2x (stacked) per AMC bay	yes
Mid-Size Module	1x per AMC bay	1x per AMC bay	yes
Full-size Module	Not supported	1x per AMC bay	yes

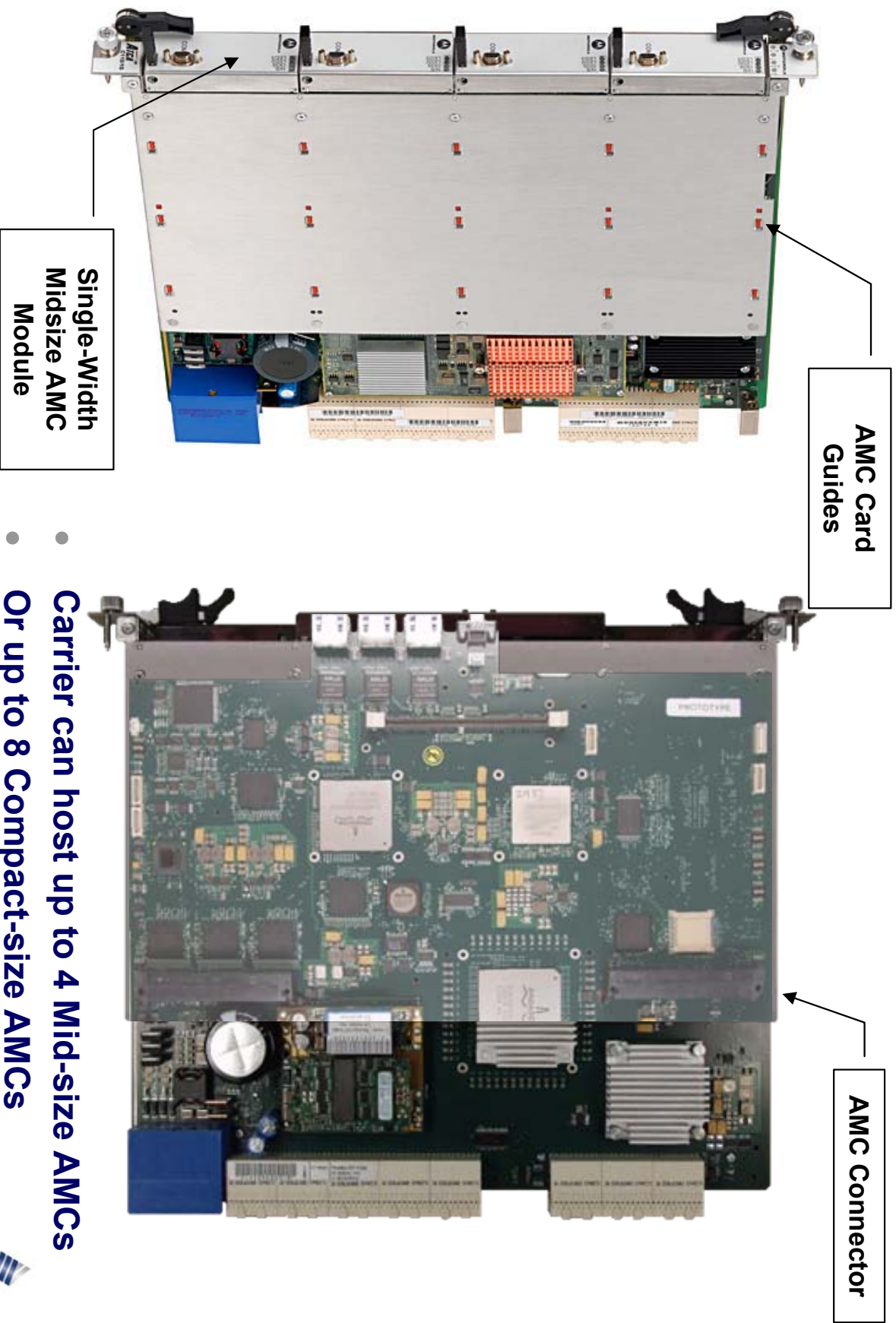


**Mid-Size
AMC Module**



**Full-Size
AMC Module**

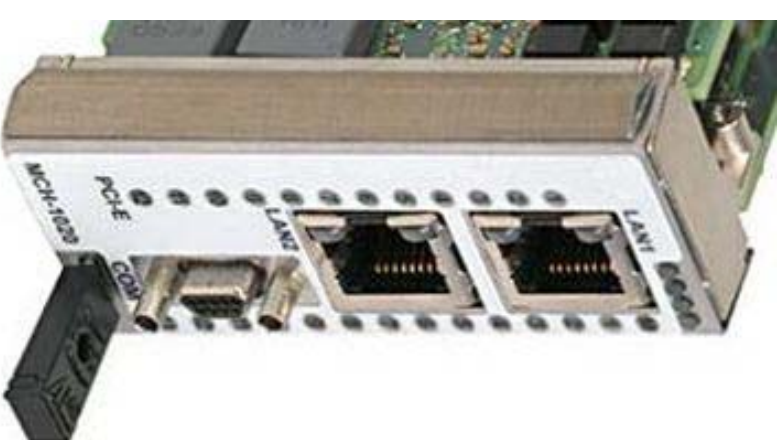
AMC Modules on a Carrier ATCA Board



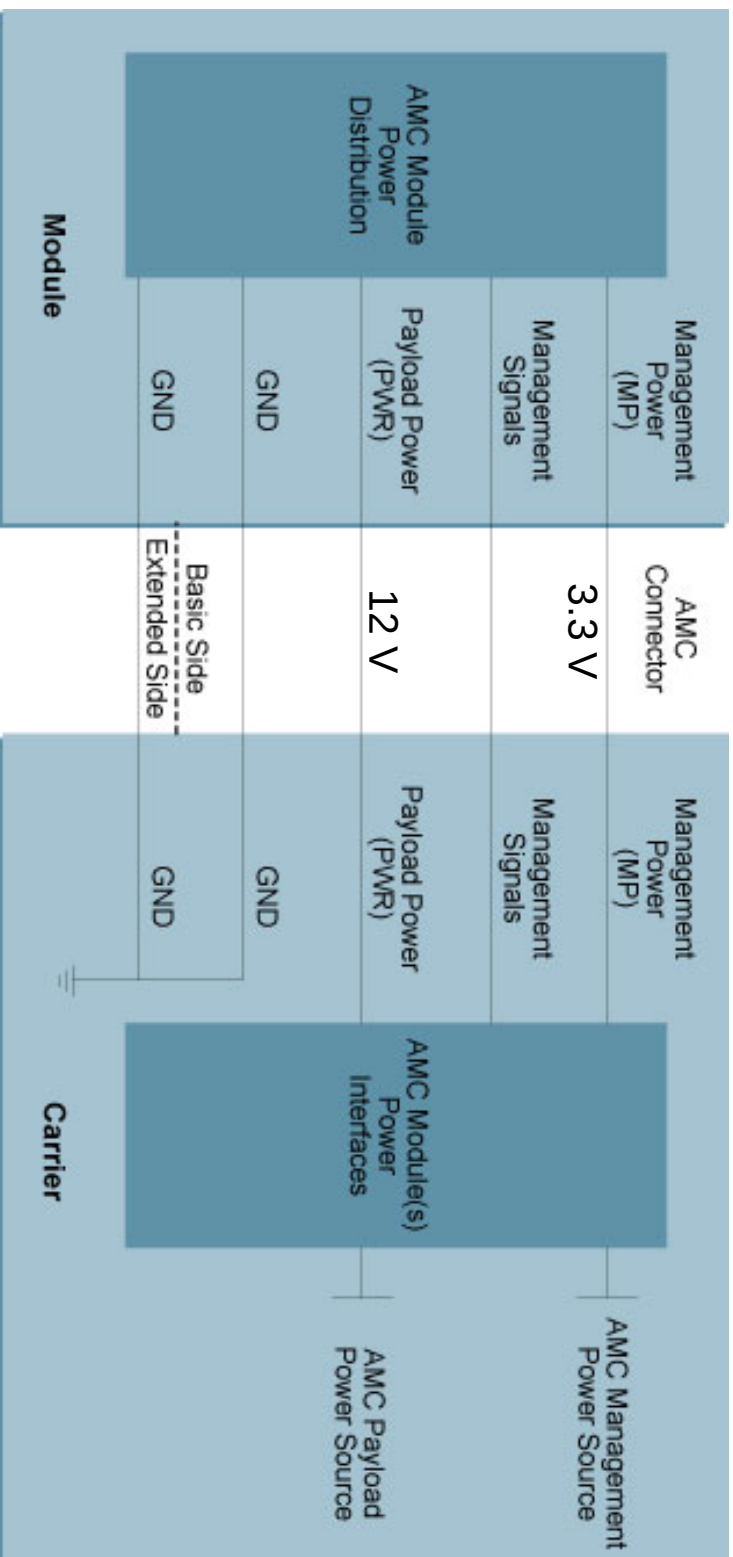
- Carrier can host up to 4 Mid-size AMCs
- Or up to 8 Compact-size AMCs

Face Plates and Handles

- Carries I/O connectors (incl. Dual row RJ-45 and SFP)
- Provides indicator LEDs
 - 4 standardized LEDs at fixed positions, incl. Blue LED
- Provides EMC closure
- ESD protection
- Provides a Handle for extraction support
- Hot Swap switch support (Handle activated)
- Sheet metal implementations preferred

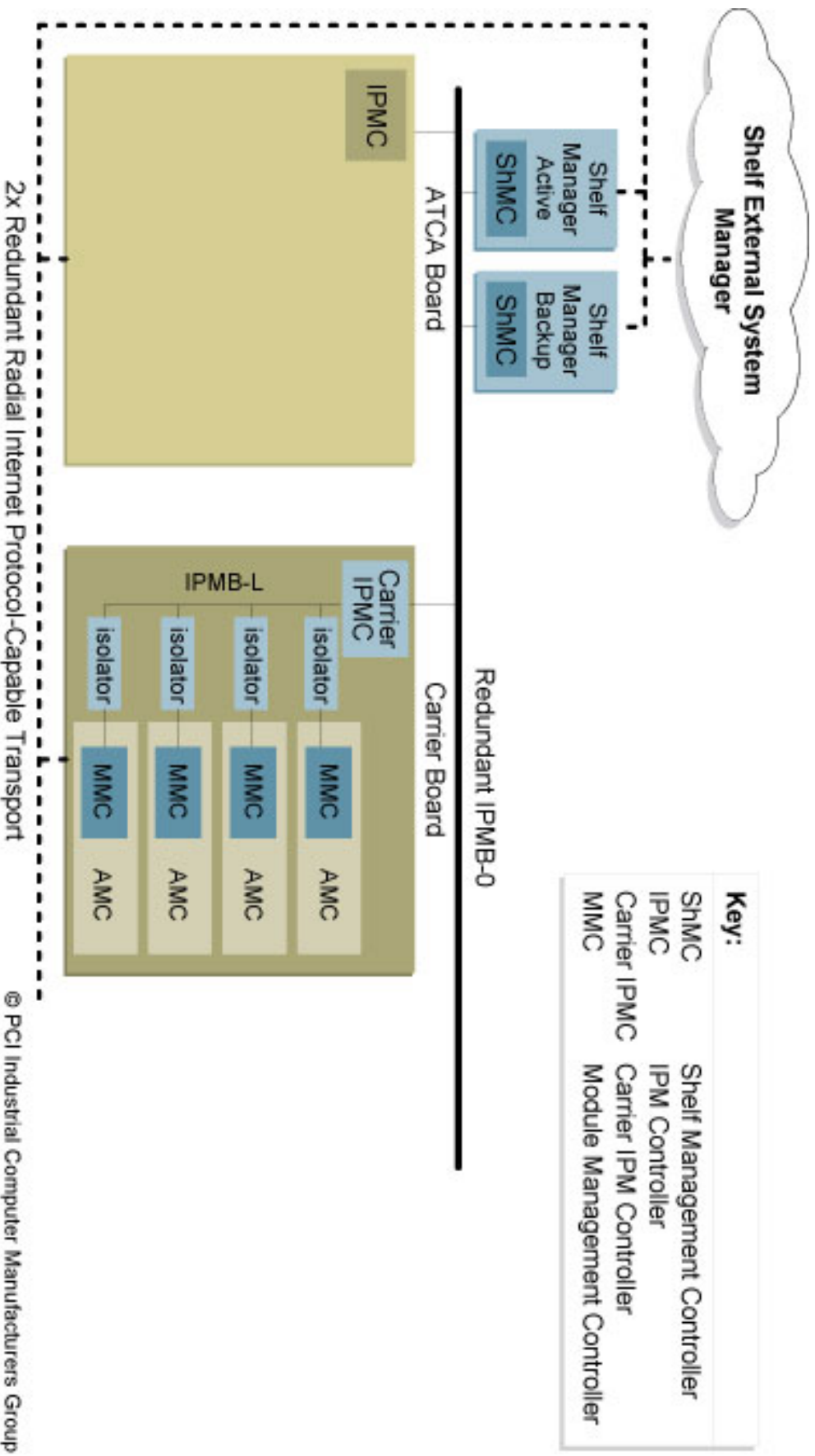


AMC Power

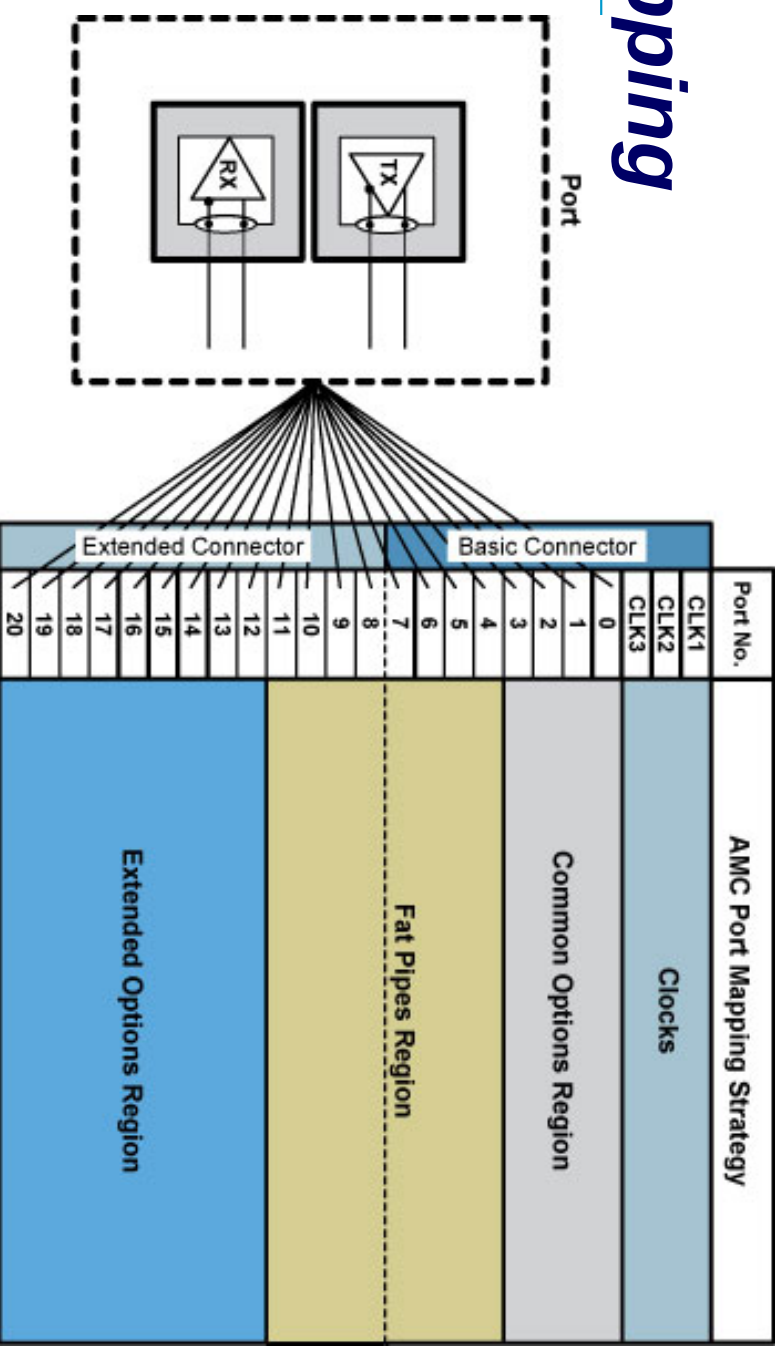


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Shelf and Module Management, Carrier ATCA



AMC Port Mapping



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- **LVDS signaling protocols are allowed unconditionally**
- **Non-LVDS signaling only if E-Keying identified a match**
- **Module to module connection needs the crossover between Tx and Rx pairs on the Carrier**
- **21 Ports for specific usages (defined by dot-specs)**
- **Dedicated CLK signals (MLVDS) for synchronization purposes**
- **JTAG**

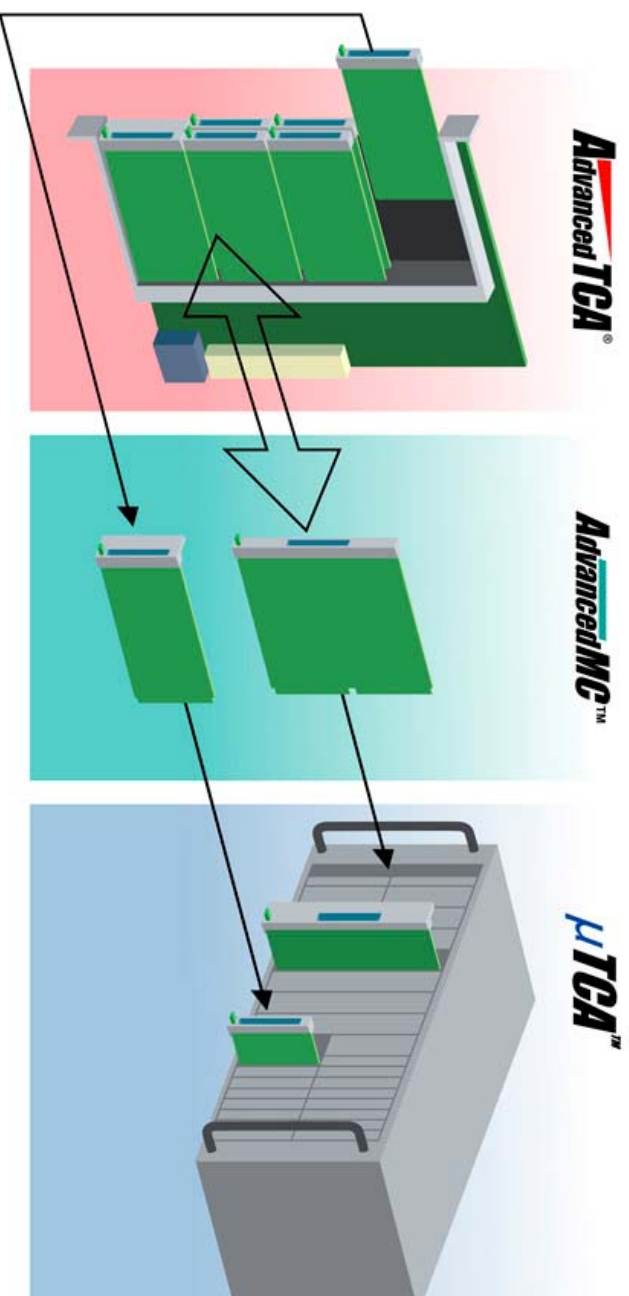
AMC Subsidiary Specifications

- The protocol layers for AdvancedMC are separated into Subsidiary Specifications
- What is specified?
 - References to the protocol specifications
 - Port assignments
 - E-Keying data set assignments
 - Routing requirements for Carrier and Module
- AMC.1 R1 PCI Express and AS
- AMC.2 R2 Ethernet
- AMC.3 R1 Storage
- AMC.4 RC Serial Rapid I/O

Example Port Map

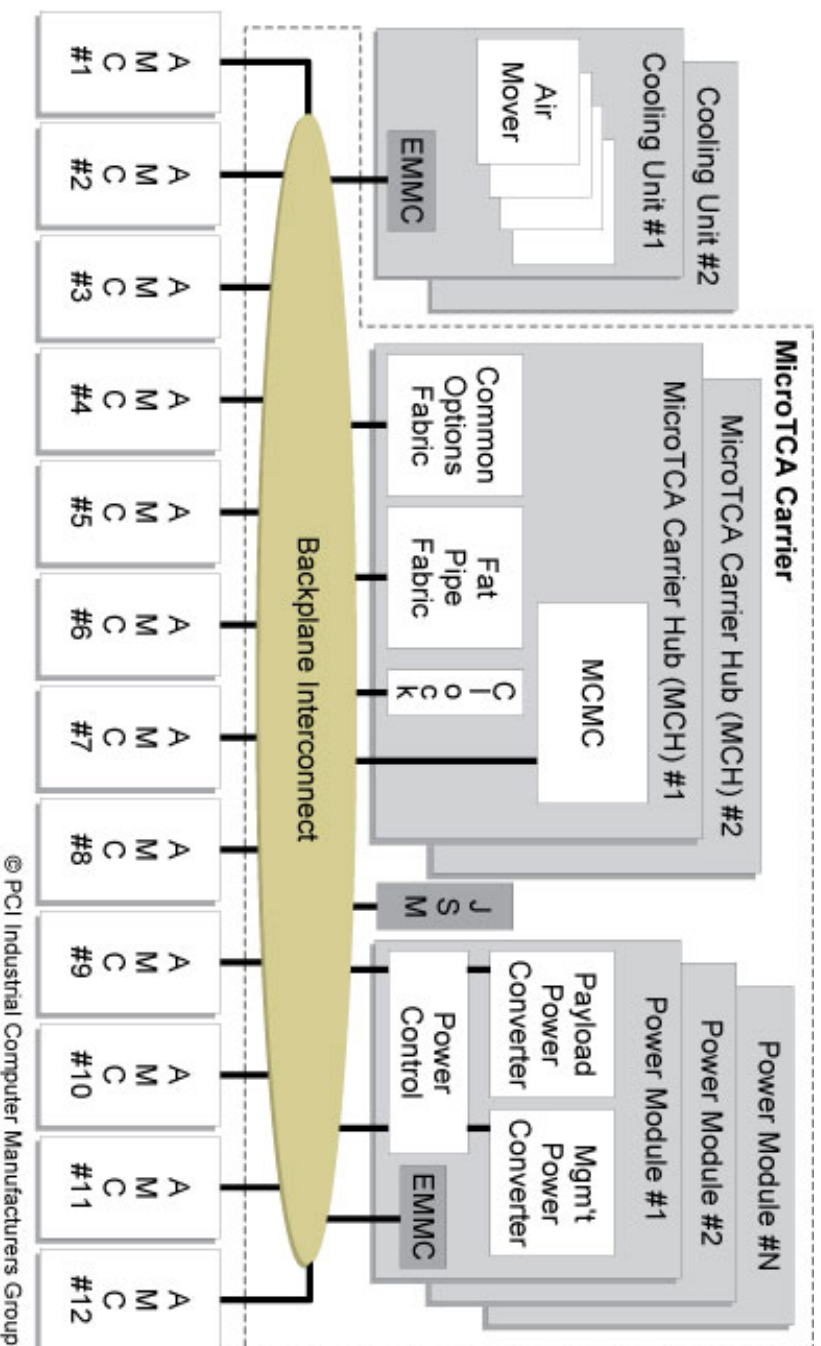
AMC.0 Specification		Each AMC
TCLKA	B s o c i e t y	Telecom Clock to/from AMC
TCLKB		Telecom Clock to/from AMC
FCLKA		100MHz fabric clock to AMC
0	C o m m o n O p t i o n s R e g i o n	1GbE
1		1GbE
2		SAS/SATA
3	F a t P i p e s R e g i o n	SAS/SATA
4		SAS/SATA
5		x4 PCI-EX
6		x4 PCI-EX
7	E x t e n d e d O p t i o n s R e g i o n	x4 PCI-EX
8		x4 PCI-EX
9		1GbE
10		1GbE
11	Z o n e 3 o r u p d a t e c h a n n e l	1GbE
12		1GbE
13		1GbE
14		1GbE
15	T C L K C / D t o /	Zone 3 or update channel
TCLKC/D		Zone 3
17		Zone 3
18		Zone 3
19		Zone 3
20		Zone 3

What is MicroTCA?



- Small form factor backplane based system for computing and communications
- Highly scalable range of systems from simplex, low cost systems to carrier grade, high availability systems
- Leverages use of industry-standard Advanced Mezzanine Cards
 - 12 volt power
 - Management
 - Switching

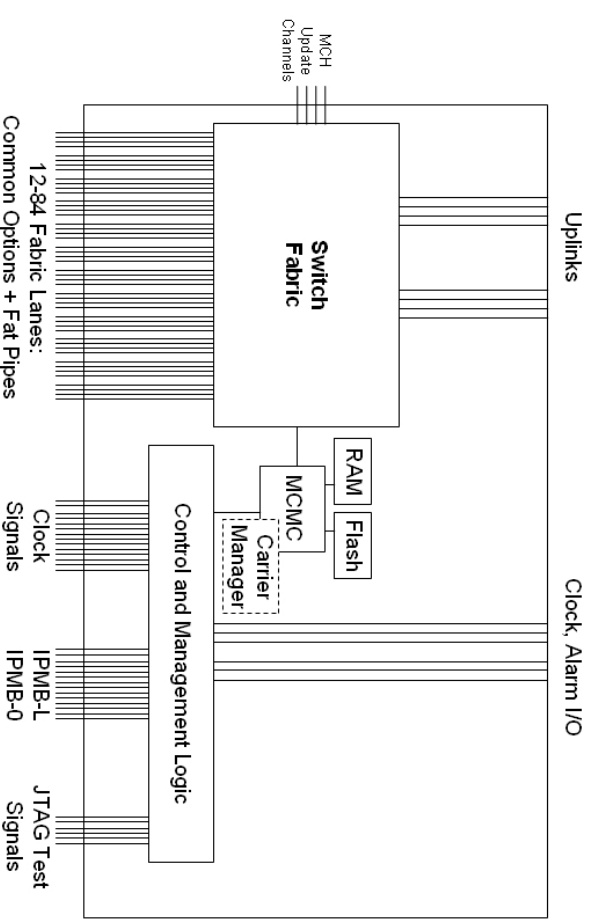
MicroTCA Block Diagram



- **MicroTCA Carrier refers to carrier functions needed to provide an infrastructure that supports nominally 12 AMCs.**
- **In other words, emulates a (very large) ATCA carrier board**
- **Primary element of this is MCH – MicroTCA Carrier Hub**
- **Carrier Functional Requirements are...**
 - **Power Delivery**
 - **Interconnects**
 - **IPMI Management**

MicroTCA Carrier Hub (MCH)

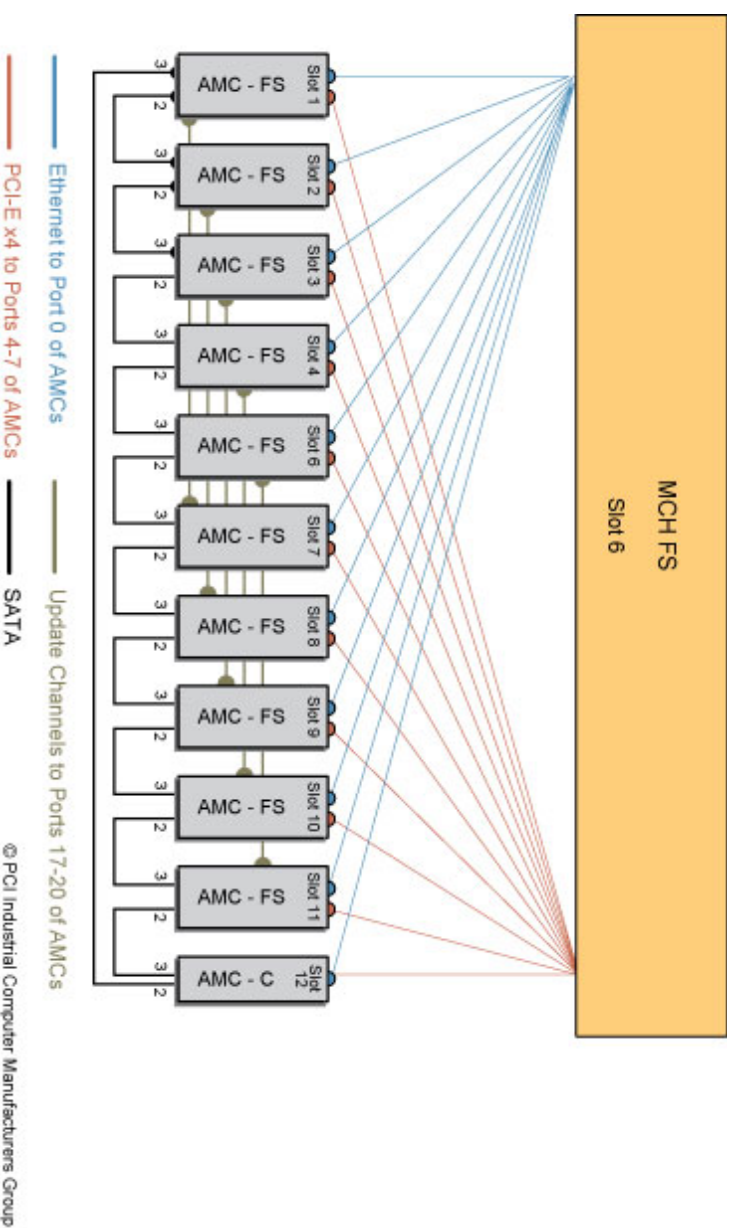
- Infrastructure elements shared by all the AMCs in a shelf
- MCH combines:
 - Control & management infrastructure
 - Fabric interconnect
 - Synchronization clocks
- Supports up to 12 AMCs
- MCH uses AMC form factor
- MCH includes MCMC – MicroTCA Carrier Management Controller
 - Central authority controlling and managing all AMCs in the carrier
 - Communicates via IPMI with FRUS
- Optionally redundant to provide highly reliable system



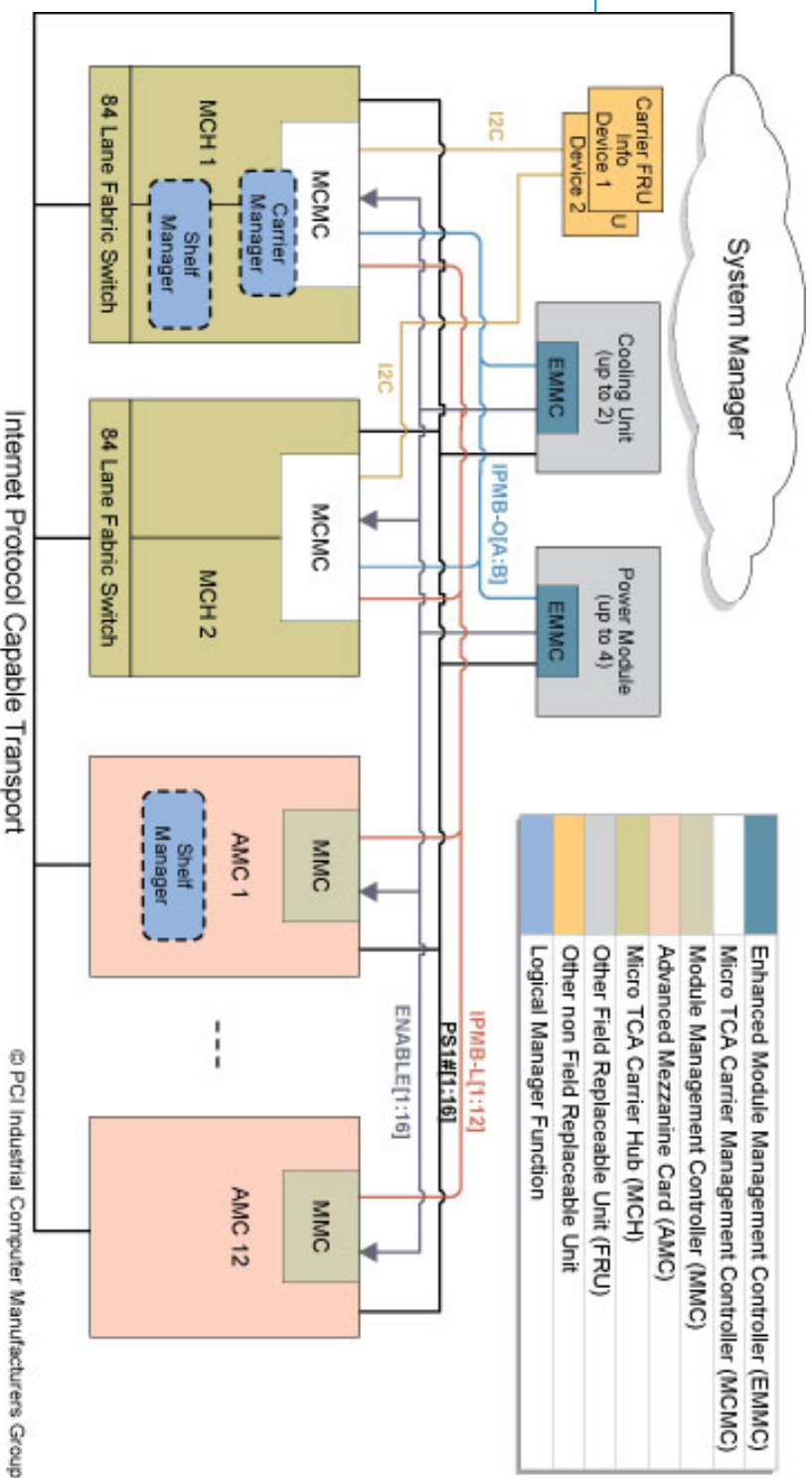
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MicroTCA Interconnect

- Provides main connectivity among AMCs in MicroTCA shelf
- Central switch on MCH
- Supported interconnect protocols defined by selected AMCs and MCH switch
- PCI-E, GIGE, SATA most commonly used
- E-Keying ensures that AMC ports comply with backplane routing and switch
- Only those compatible are enabled

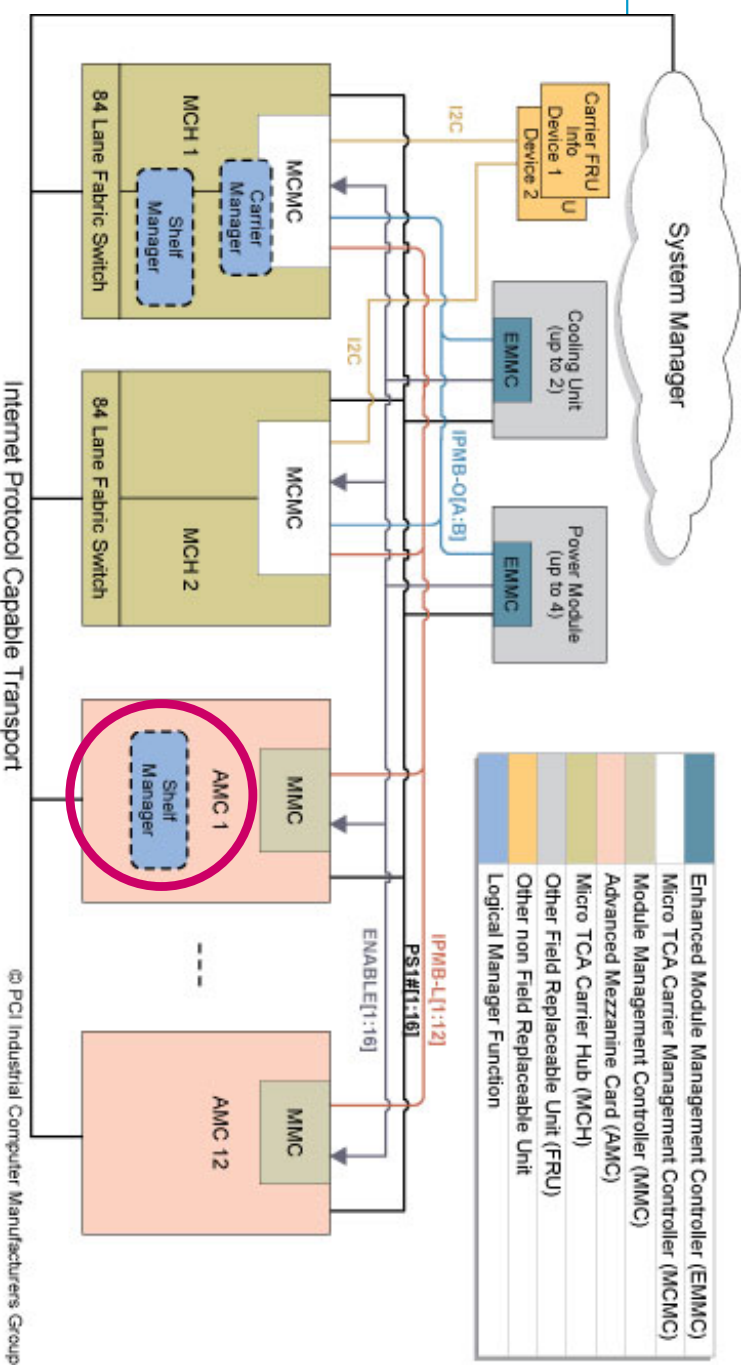


MicroTCA Management



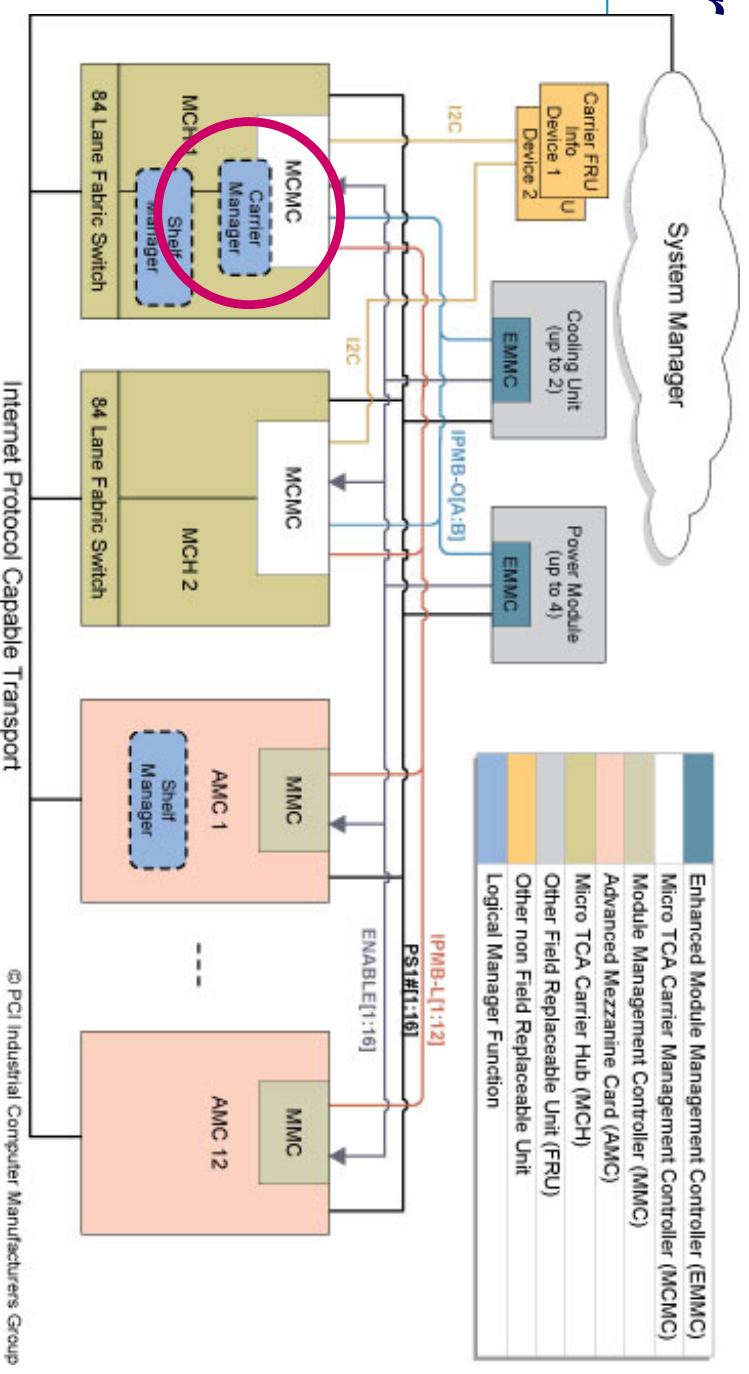
- **Low-level hardware management services, based on IPMI protocol**
- **High-speed management services, based on an Internet Protocol (IP) suite**
- **Leverages management architecture and requirements defined in AMC.0**
- **MicroTCA Carrier Management similar to management of ATCA carrier**
- **Shelf Management involves one or more uTCA carriers (up to 16 possible) within a single shelf**

MicroTCA Shelf Manager



- **Mandatory logical management function**
- **Can be implemented on any FRU – MCH or any AMCs**
- **Aggregation point for hardware management information from one or more MicroTCA carriers**
- **Watches over managed entities such as AMCs, PMs, CUs and reports any abnormal conditions and takes necessary actions**
- **Shelf Manager can be external to MicroTCA carrier (e.g. with more than one carrier managing the other carrier over IP interface)**
- **Manages cooling of shelf via CUs and FRU temperature sensors**

MicroTCA Carrier Manager



- Hosted by MCMC, which is similar to IPMC in ATCA
- Enables only compatible interfaces over MicroTCA backplane interconnects – E-Keying
- Shelf Manager accesses Sensor Data Records via carrier manager device SDR commands
- Negotiates power budgets with AMCs
- Controls payload power to the AMCs (Management power is directly connected). This provides the ability to shut off any module if required (ex: failing)
- All entities except the Carrier FRU information device are implemented as intelligent FRUs and are IPMI-capable