



PICMG 3.x Specifications

“A new platform architecture for telecommunications equipment”

September 2001

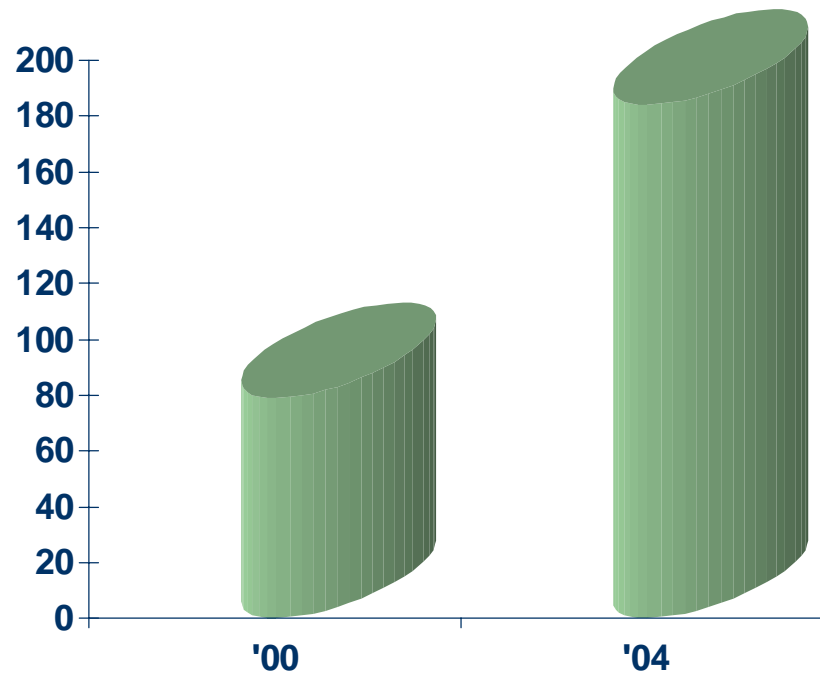
Contents

- Background
- Market Need
- Proposal Overview
 - Form Factor
 - Interconnect
 - RAS
- The Process

Background

- 1995 CompactPCI created from Eurocard, PCI and 2 mm connectors
- Aimed at general purpose modular solutions
- Adopted by communications industry in the midst of rapid change
- Rapid growth (and opposite) in line with comm. industry
- But.....

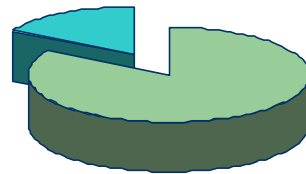
CompactPCI has a tiny share of the Communications equipment market



CompactPCI market share <1%
Most of the rest is proprietary

How to make the pie bigger?

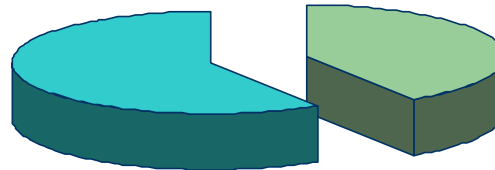
Now



■ Proprietary

■ Standard

2004



■ Proprietary

■ Standard

Market Changes - 1995

- Mainly top tier players + Cisco
 - Mainly in-house design and manufacturing
- Rapid change as deregulation kicked in
- Many upstarts
- Lots of money
- Time to Market more important than cost

Market Changes - 2001

- Frantic pace of change has slowed
 - Temporarily?
- Much consolidation
- Outsourcing strategies accepted
- Long term costs and supply stability increasingly important
 - More Need for Open standards
 - Interoperability more important

Technical Changes - 1995

- Modem Speeds were 14.4K
- A fast connection to comm. Equipment was a T1 a line (1.5Mbs)
- A fast LAN connection was 100Mbs
- A fast CPU was 200MHz and 128Mb was a LOT of memory
 - CPUs used 10 Watts
- At 132 M BYTES/Sec PCI was very fast!

Technical Changes - 2001

- Home connection speeds are up to 10Mbps
- Comm. equipment is pushing OC192
- LAN speeds are at 1Gbs with 10Gbs coming
- CPUs are over 2Ghz and 100Watts
- Computing is more distributed
 - Node based over bus based
- Computing and Communications Converging
- Even PCIX at 1024MBs is looking limited



2004 ?

Trends In High Performance Computing

- Increases in Data Transfer Rates are Limited by Basic Physics
- Parallel Data Buses are Near Their Limits
- Point-to-Point Architectures, Connected Via Switch Elements – “Switched Fabrics” - Emerging

Proposal Overview



Trends in High Performance Computing

- CompactPCI Community Moving Beyond Original CompactPCI Architecture:
 - PCI Bus Used More-and-More as a Control Plane
 - PCI Bus Increasingly No Longer Adequate as a Data Plane
- Interest in Switch Fabrics:
 - Ethernet
 - Starfabric
 - Infiniband
 - 3GIO
 - Rapid I/O
 - Other 2.5 Gbps LVDS Fabrics Announced
 - Etc.

CompactPCI Today

- Data Buses and Fabrics Already Being Added To CompactPCI:
 - H.110 TDM (PICMG 2.5)
 - Switched Ethernet (PICMG 2.16)
 - StarFabric (PICMG 2.17)

Limitations of CompactPCI for Telecom

- Not “Fabric Friendly”
- 2mm Connectors:
 - Pin Bending: Backplane an SPF
 - Limited High Frequency Characteristics
- 6U x 160mm Board Too Small for Many Applications
- Limited Power Input to Board
- Limited Cooling Possible with 0.8” pitch
- 0.8” Pitch not wide enough going forward:
 - Big, Tall CPU’s with Heat Sinks
 - DC-DC Converters
 - Limited Height for Back Side Components
- No Good Way to provide Optical Interconnects

Emerging Telecom Requirements

- Redundant Star and Full Mesh Backplanes
- 2.5 Gbps LVDS signaling
- Larger Board Area
- Wider Board Pitch
- More Power Input per Board/Blade (100-200W)
- Improved Scalability
- Telco Specific:
 - 600mm x 600mm Equipment Practice
 - Dual Redundant -48VDC Power
 - OC-x Fiber Interconnects Front and Back
 - Specific NEBS and ETSI Compliance

**Something “New” is
Needed**



Now is the Time for:

- **Something Timely (≤ 1 Year Development Cycle)**
- **Something That Is Suitable for More Telecom Applications than CompactPCI**
- **Something Fabric Agnostic**
- **Something Built From Existing Mechanical Packaging Technology – e.g., IEC60297 Equipment Practice**

The PICMG 3.X Specifications Initial Proposal

- Core Specification (PICMG 3.0) Defines Mechanicals, Power, System Management, Fabric Connectors
 - Supports A Variety of Fabrics (Specific Fabric Implementations Defined in PICMG 3.1, 3.2, etc.)
 - Uses Existing Eurocard Equipment Practice
 - Widely Available, Tooled, and Understood
 - Supports Hot Swap, Geographic Addressing, Robust System Management
 - No Direct PCI Bus Support



The PICMG 3.X Series

Current Working Group Thinking

- **Dual, Redundant -48VDC Power Distribution to Each Card w. High Current, Bladed Power Connector**
- **High Frequency Differential Data Connectors**
- **Robust Keying Block**
- **One or Two Alignment Pins**
- **Robust, Redundant System Management**
- **6U x Deeper Card Size**
- **1.2" (6HP) Pitch:**
 - Taller Components w. Heat Sinks, Better Cooling, More Backside Component Height
- **More Generic I/O Connector Area:**
 - General Purpose I/O, High Speed I/O, Blind Mate

Family of Specifications

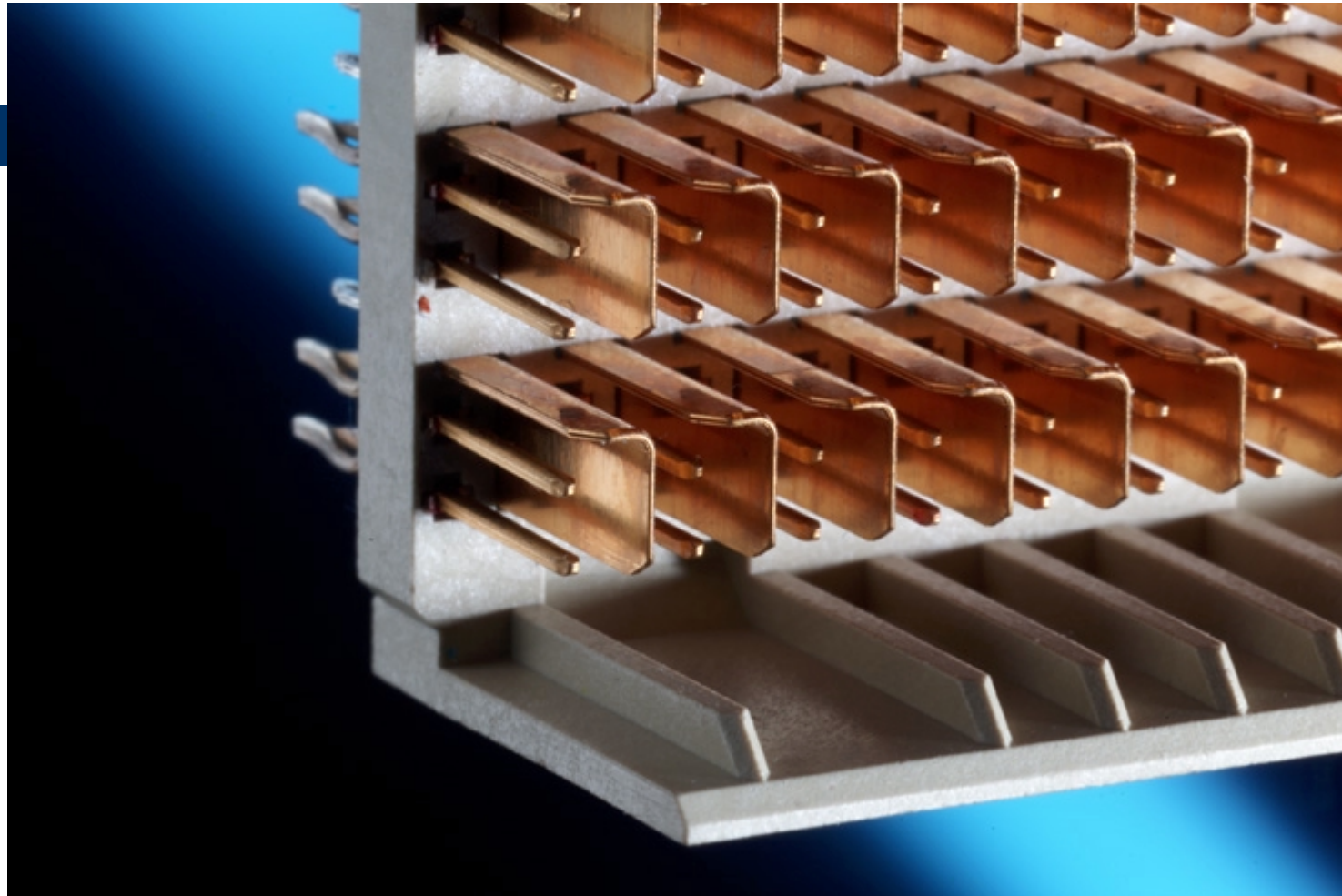
Initial Working Group Proposal

- Define the Following in PICMG 3.0:
 - Mechanicals
 - Power Distribution
 - Connector Zones for Fabric Interconnects
 - Fabric Connector Definitions
 - System Management
 - Connectors for Power, System Management
 - Keying, Alignment
 - Mezzanine Specifications (PMC and Next Gen)

Initial Proposal (cont.)

- The Following to be Detailed in Subsequent Specs (PICMG 3.1, PICMG 3.2, etc.):
 - Specific Fabric Electricals and Interconnects
 - Fabric Topologies
 - Software Requirements
 - etc.

2mm Differential “ZD” Connector





PICMG Specification Development Process





PICMG Structure

- Executive Members/Directors
 - Govern the corporate entity
 - Participate in spec development process
- Associate Members
 - Participate in spec development process
- Affiliate Members
 - Access to approved specifications

The Process

- Sponsorship
- Subcommittee organization
- Executive membership endorsement
- Subcommittee deliberation
- Final subcommittee ballot
- Adoption/Ratification

Sponsorship

- Three Executive Members required to launch a subcommittee.
- Technical Officer must be notified in writing by the three sponsors, with a preliminary scope of work.
- Technical Officer adds new subcommittee to the the Specification Directory with the notation that approval is pending



Working Group Cross-Coupling with PICMG

- Cypress Point - PICMG Executive Member
- Force - PICMG Executive Member
- Hewlett Packard - PICMG Executive Member
- IBM - PICMG Executive Member
- Intel - PICMG Executive Member
- Lucent - PICMG Executive Member
- Motorola - PICMG Executive Member
- NEC - Joining PICMG
- Nokia - PICMG Associate Member
- Radisys - PICMG Executive Member
- Rittal - PICMG Executive Member

Subcommittee Organization

- One of sponsors, serving as interim chairman, issues Call for Participation to all Executive and Associate Members
 - 5 Sept 2001
- All respondents meet to formulate a statement of work and to elect permanent officers
 - Mid Nov 2001
- Technical Officer is notified

Executive Membership Endorsement

- Technical officer presents Statement of Work to Executive Membership for endorsement
- Endorsement vote usually taken at conference call or face to face meeting, not usually by ballot.

Subcommittee Deliberation

- May proceed pending Executive Membership endorsement
- Membership controlled by subcommittee during this period
- Distribution of drafts controlled by subcommittee
- Draft and revise a specification which is satisfactory to all active participants

Special Considerations

- PICMG 3.0 will be a core specification
 - Establish architectural framework
 - Mechanical
 - EMC/ESD
 - Power/Thermal
 - Management
 - Identify obvious subsidiary specifications
 - Insure interoperability among family members
 - Provide headroom for faster links



Final Subcommittee Ballot

- Requires Executive Membership endorsement
- Must be open to all Execs and Associates
- Must be approved by 75% of active participants in the final ballot process
- Negative ballot review required, and a good faith effort to address issues
- Last chance to influence content of the specification

Adoption/Ratification

- Two alternate processes
 - Ballot
 - Roll Call vote at Executive Membership meeting/con call
- Ballot
 - Balloting body formed
 - 2/3 majority of those voting required
- Roll Call vote
 - 2/3 majority of a quorum at a meeting/con call



New from PICMG!

