Summary of the 3rd meeting of the xTCA Interest Group

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Date / Location</th>
<th># of talks</th>
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<td>1</td>
<td>September 2010 / TWEPP Aachen</td>
<td>4</td>
<td>~20</td>
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<td>2</td>
<td>March 2011 / CERN (+ EVO)</td>
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<td>~25</td>
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<td>3</td>
<td>September 2011 / TWEPP Vienna</td>
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ATCA developments targeting ITER Fast Plant System Controllers

Bruno Soares Gonçalves / Instituto de Plasmas e Fusão Nuclear

• ITER decided to use PCIe for communication inside the ATCA shelf
• IPFN developments:
  • PCIe switch blade (no COTS product)
  • ATCA controller for PCIe (no COTS product)
  • Modular 24 (48) channel ADC/DAC ATCA board with PICMG 3.8 RTM
  • ATCA cutaway quad-AMC carrier with support for PICMG 3.8 RTMs and WhiteRabbit timing synchronization
• IPFN open for collaborations with other ATCA based projects
xTCA in CMS

Magnus Hansen / CERN

• AMC & uTCA selected a few years ago to replace VMEbus (and cPCI) based systems during upgrades
  • Considerable investment made in expertise
  • Some sub-systems may still continue with VMEbus
• Systems with upgrade plans
  • HCAL back end (~2016)
  • L1 trigger (~2016)
• H/W developments:
  • GCT Matrix card (AMC / 2008)
    • Lessons learnt: Preference for double width / full size AMCs
  • HCAL MiniCTR2, MiniT, AMC13, and more
• Desire to standardize (within CMS) on shelf, MMC functions, register access, etc.
• Special use of uTCA ports (AMC13)

Proposed CMS shelf
• 12 slot
• Vertical air flow
• Redundant PSU
• No RTMs (MTCA.4)
Simplified MCH providing clock/controls/DAQ functions

Eric Hazen / Boston University

AMC13
• Occupying the slot of MCH2 but not a MCH
• Standard interface to CMS sub-detectors
  • Distributes LCH clock / TTC timing / controls to AMCs
  • Collects DAQ data from AMCs
• 4 SFP+ cages for communication with other CMS sub-systems
• 10 complete boards available by end November
• AMC13 (clock distribution) not compatible with PCIe based AMCs
Introduction to MicroHAL / IPbus

Gregory Iles / Imperial College

A method (S/W & F/W) to communicate with FPGAs on modules (e.g. AMCs) over Ethernet
- Robust
- Scalable
- Reasonable bandwidth
- Portable

H/W access based on UDP protocol
- Simple to implement in FPGAs
- Re-gain some performance (wrt TCP/IP) e.g. by command grouping

Extensive reliability tests performed
- Test bench with ~20 IPbus clients
- 7 TB of data transferred
uTCA evaluation project

Markus Joos / CERN

• Investigating **interoperability** issues with a (small) number of commercial uTCA components
• Developing some “**tools**” for future H/W evaluations (e.g. shelves & PSUs)
  • MMC mezzanine (→ next slide) and test AMC
  • MTCA.4 load AMC & RTM
• Evaluation of **AMC tester** (commercial S/W) done
  • Opportunities for sharing it?

![MMC test AMC](image)
![Double wide load RTM (MTCA.4)](image)
![Double wide load AMC](image)
MMHC H/W & S/W

Vincent Bobillier / CERN

Based on work done by DESY @ CPPM:
• Development of a MMC mezzanine (now available)
• Development of MMC S/W (ongoing)
• H/W (and S/W) available to other projects

Example of implementation
Perspectives for xTCA in ATLAS

Philippe Farthouat / CERN

- ATLAS DAQ architecture based on separation of VMEbus based RODs and PCI based ROS
  - RODs use VMEbus mainly for control and monitoring
  - VMEbus has been a stable, well supported, easy-to-use platform for a long time (220 crates in ATLAS)
- ATCA (for its high speed backplane and large board size) could be useful especially for calorimeter upgrades
- No large scale deployment planned before Phase-2 (2022)
- ATCA prototype H/W
  - Tile calorimeter ROD
  - lAr ROD
- ATCA has to integrate well into the infrastructure and a clear support structure will be required
- No formal decisions taken so far
New xTCA Developments at SLAC

Presented by M. Joos on behalf of Ray Larsen / SLCA

MTCA.4 and PICMG 3.8 PICMG standards released

Committee still working on S/W recommendations

SLAC H/W developments:
- Linac Coherent Light Source (LCLS) experiments:
  - ATCA based MPP boards used
- Demonstrators for LCLS control systems:
  - Several RTMs (MTCA.4) developed for commercial AMCs
- Areas of application:
  - Klystron Interlocks
  - LLRF for main Linac S-Band 50 MW station
  - BPM system

SLAC RTM for FPGA AMC
Additional information

Next IG meeting
Tentatively scheduled for March 2012 (@CERN, with EVO)

xTCA IG web site
twiki.cern.ch/twiki/bin/view/XTCA/WebHome

Mailing list
xtca-news@cern.ch