IPMI developments at LAPP

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outline

- context
- motivations
- IPMI developments
- test board developments

context

- evolving demand concerning performances and versatility in physics instrumentation (dataflow up to 1.4Tbits/s per board)
- even more complex electronics, firmware, and software
- growing need for easier and faster upgrades either for electronics, firmware, and software
- ATCA is a promising standard with multiple high speed commuted serial links

motivations

- master ATCA standards
- have the best knowledge of the technologies we use
- long-term development with evolving components
- standardization of board management -> IPMI

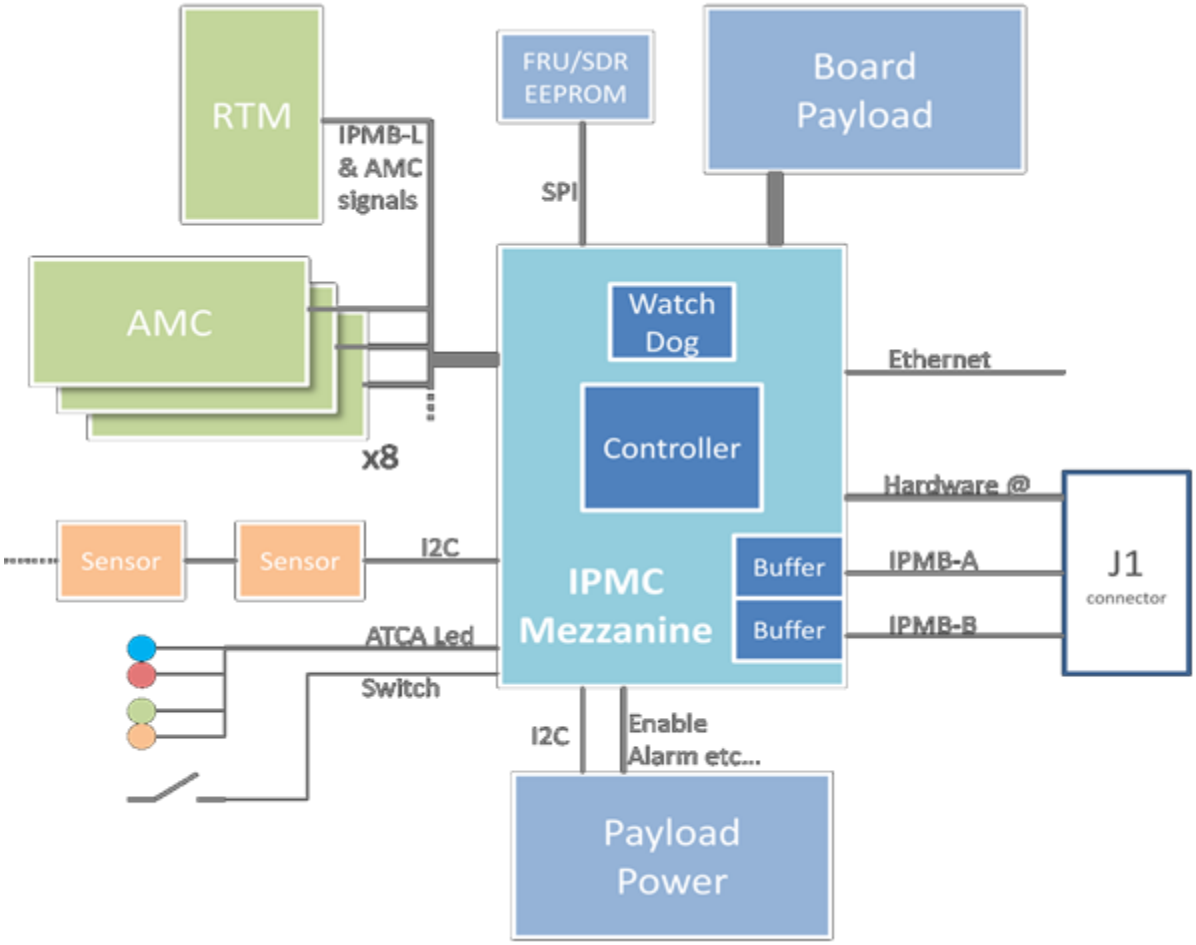
IPMI developments

- our needs :
  - ❑complete ATCA hardware management
    - power supplies
    - hot swap
    - diagnostics
    - firmware upgrade
    - sensor reading...
  - ❑+ JTAG access for debugging
  - ❑+ board configuration through ethernet
    - FPGA firmware upload
    - coefficient upload for signal processing
    - experiment monitoring/slow control

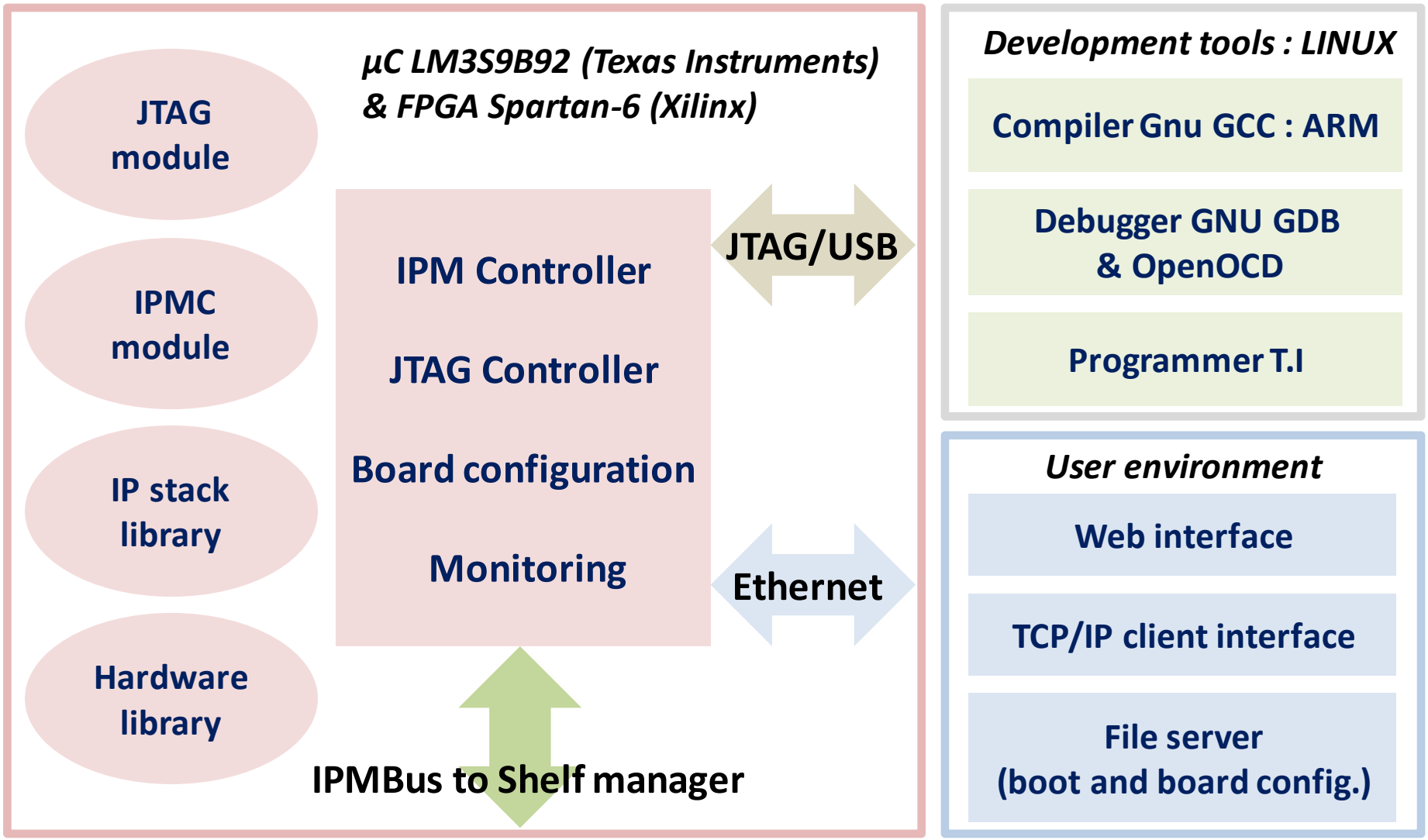
IPMI developments

- our IPMI solution
  - low cost microcontroller with a small FPGA
  - open source software (coreIPM), IPMI 1.5 compliant with relevant subset of IPMI 2.0
  - CMT + GNU development tools
- originally implemented for an AMC
- already extended to a standard ATCA board
  - heavily tested and compliance with PICMG 3.0 Revision 3.0 checked with a commercial shelf manager
  - software structure and core components remain the same

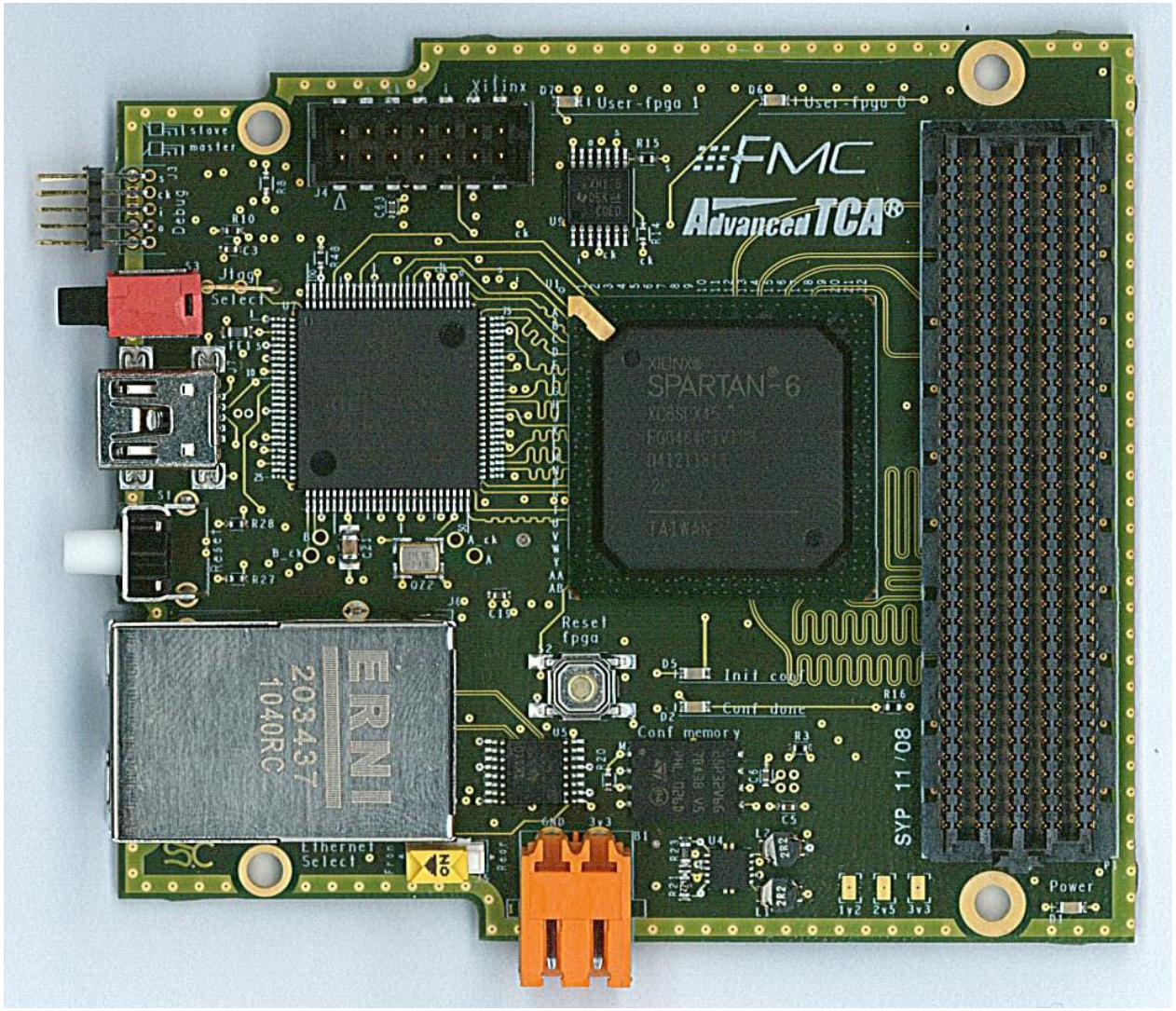
IPMC architecture



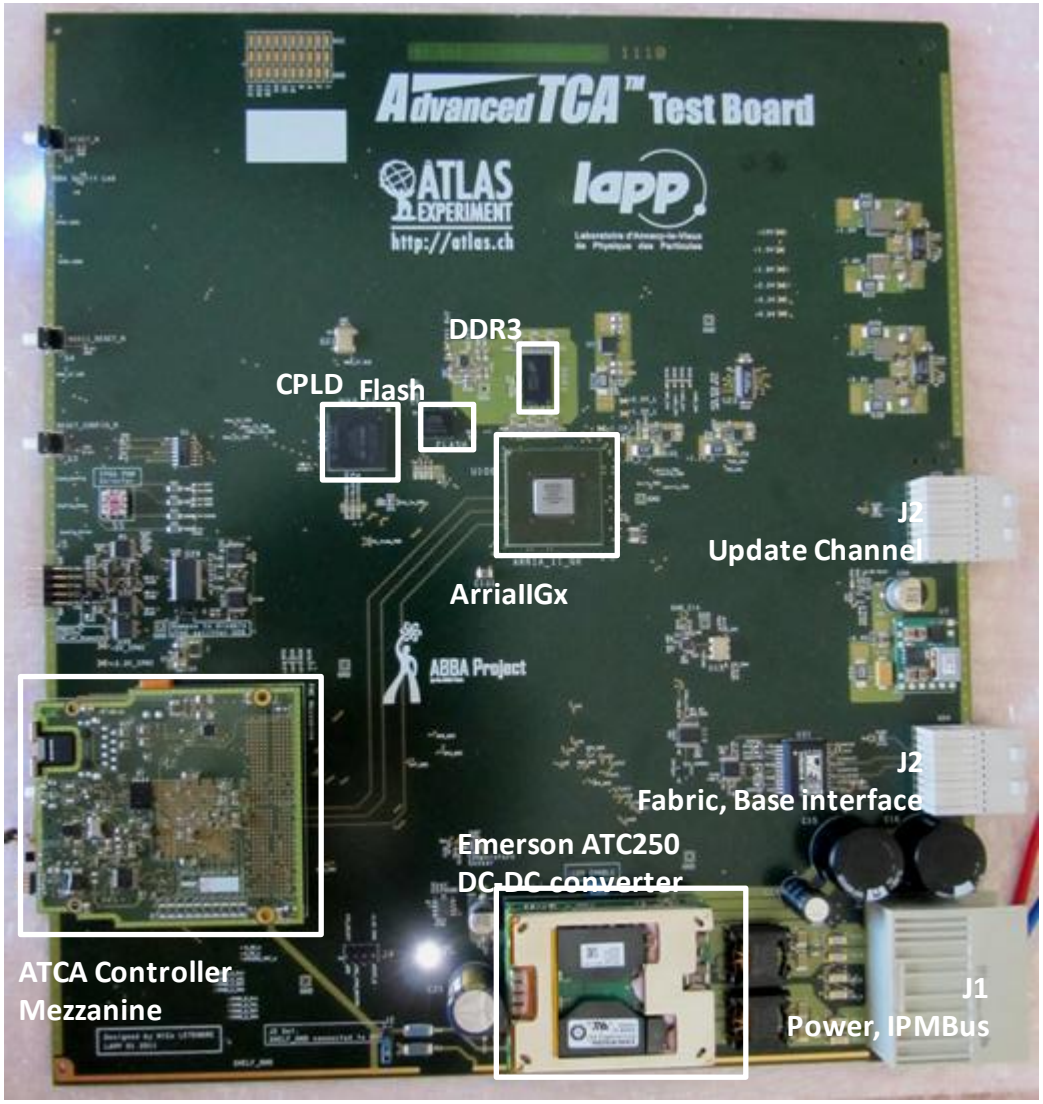
IPMC software



IPMC developments



ATCA test board



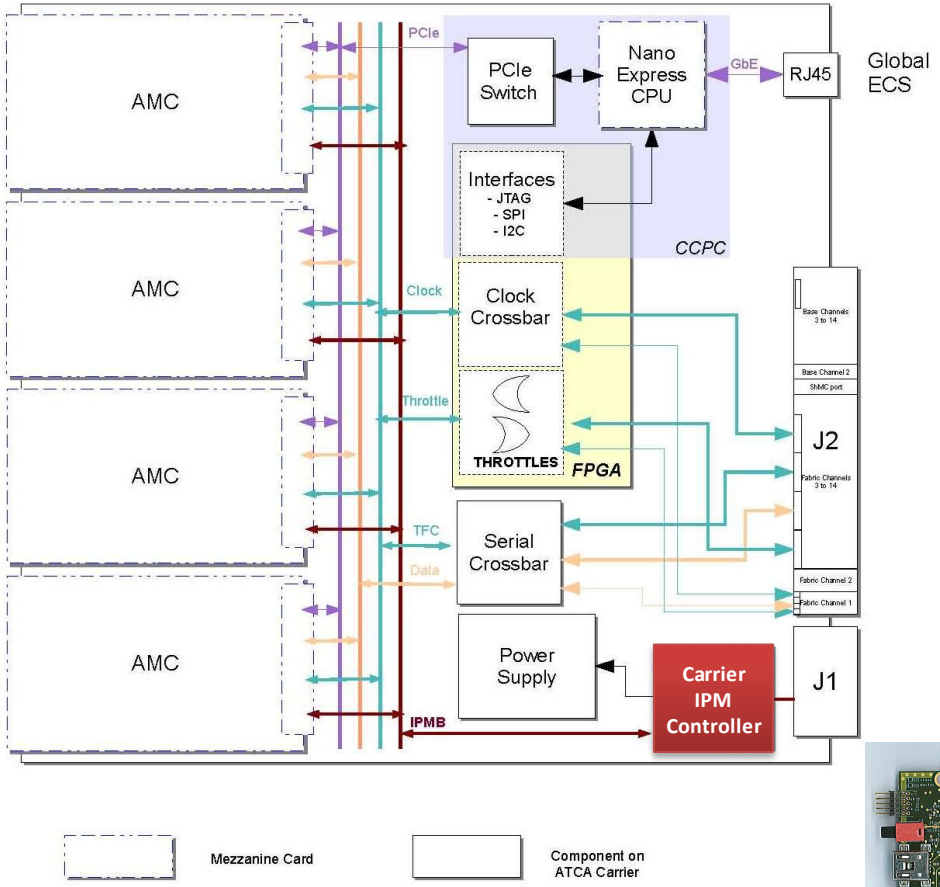
FPGA building block

- Boot from CPLD & parallel Flash
- Communications with DDR3 & Flash

ATCA CTRL Mezzanine :

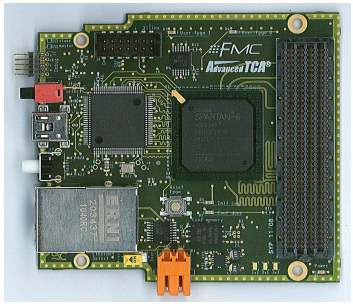
- IPM Control through IPM Bus
  - => Communication with Shelf Mgr
- ATCA power supplies management
  - => Hot swap (handle switch)
  - => Enable DC/DC
- Alarm/failure diagnostic
- Board configuration through Ethernet
  - => Firmware upload
  - => filtering coefficient upload
  - => Sensor reading...

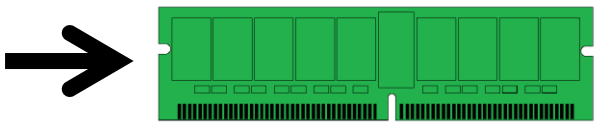
generic ATCA carrier board



courtesy : J-P. Cachemiche, CPPM

- PICMG AMC.0 implementation
- more compact electronics design
- IPMI separated from board slow control





summary

- IPMI spec is a huge quantity of information but is not that complicated to implement
- IPMI software is totally independent from slow control
- the core code is portable and easily tunable
- code is extensively tested for robustness
- a more compact version of the IPM Controller is being designed for common developments for LHCb with the CPPM