

An IPMC for the PANDA Compute Node

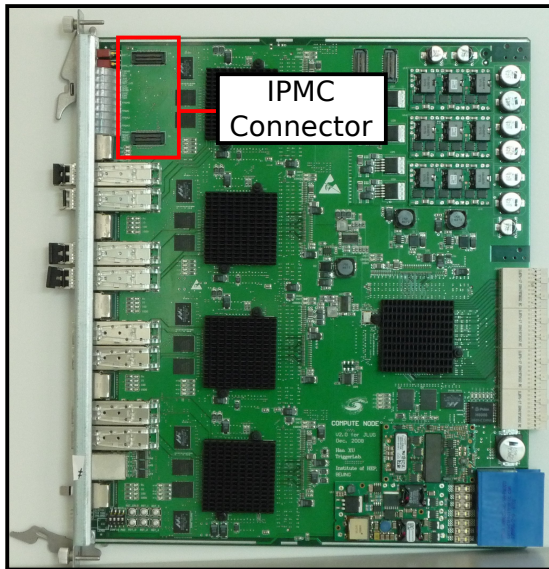
Development of an Intelligent Platform Management Controller

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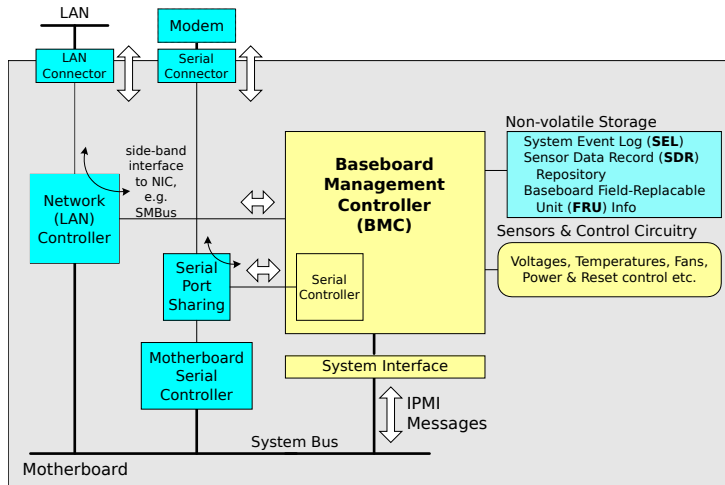
Motivation



- The Compute Nodes are hosted in an ATCA Shelf.
- The components of an ATCA Shelf are managed via IPMI (Intelligent Platform Management Interface).
- Each “Intelligent Field Replaceable Unit” (FRU) inside the Shelf needs an IPM Controller to manage sensors, power etc.

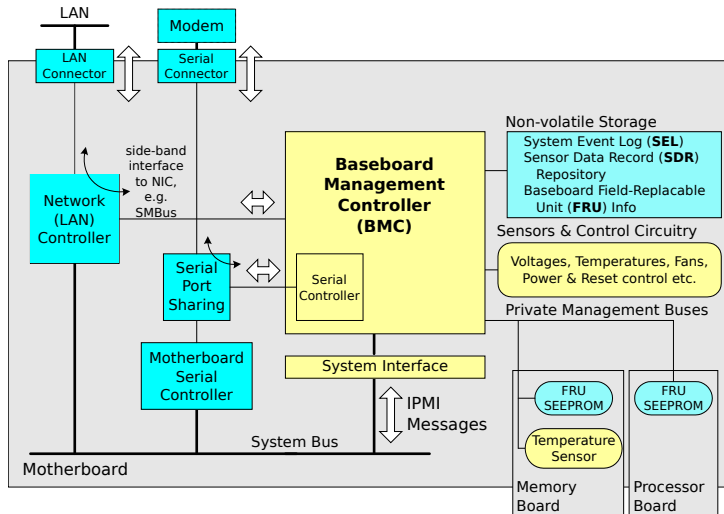
- 1 The IPMI Interface
- 2 The ATCA Architecture
- 3 The ATCA Shelf and the Compute Node
- 4 Development of the IPM Controller
 - Functions
 - Components
 - Prototype
 - Firmware Development
- 5 Outlook

The Intelligent Platform Management Interface



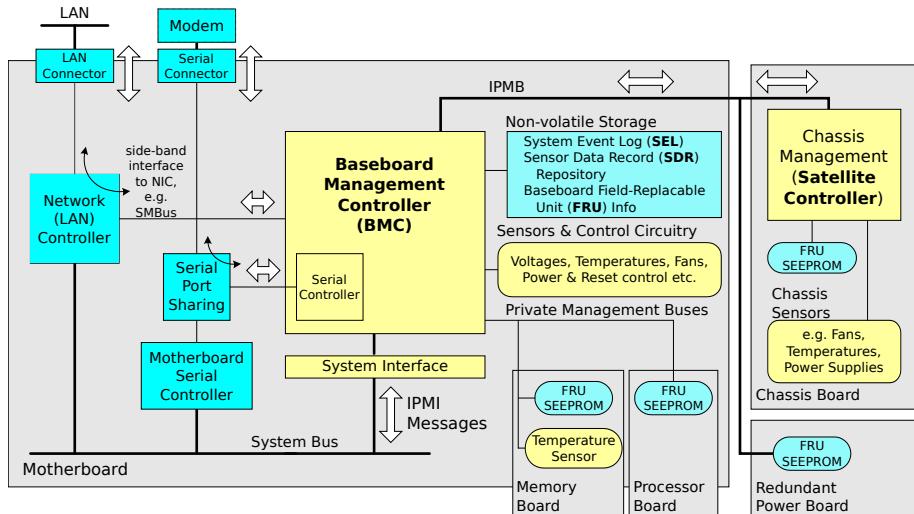
A System is monitored by a Baseboard Management Controller (BMC).

The Intelligent Platform Management Interface



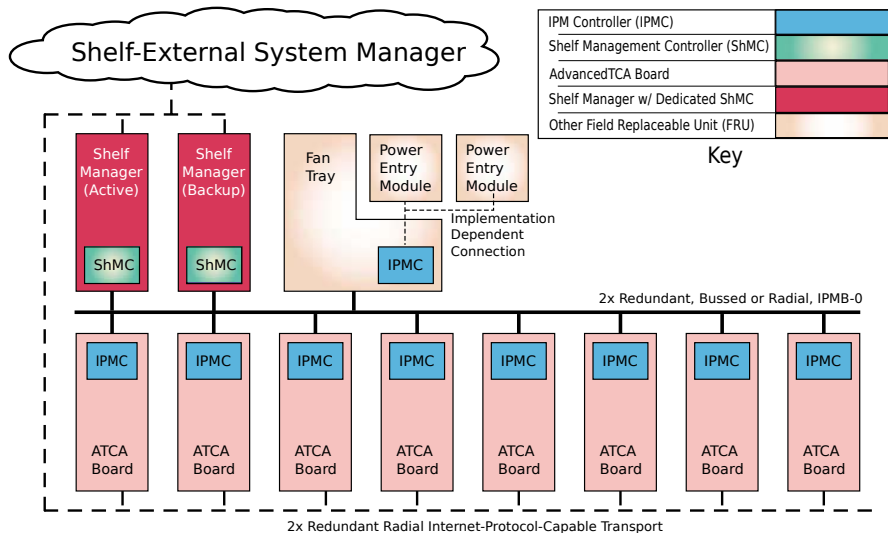
Extensible with Field Replaceable Units (FRUs).

The Intelligent Platform Management Interface

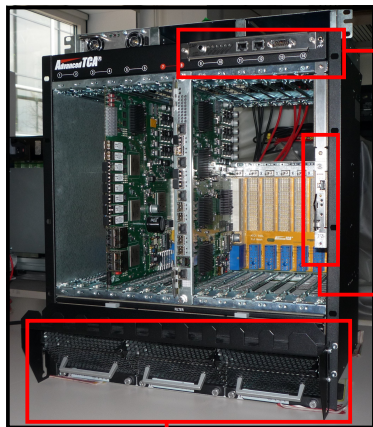


Subsystems are managed by a Satellite Controller (→ IPMC).

The Advanced Telecommunications Computing Architecture



The ATCA Shelf

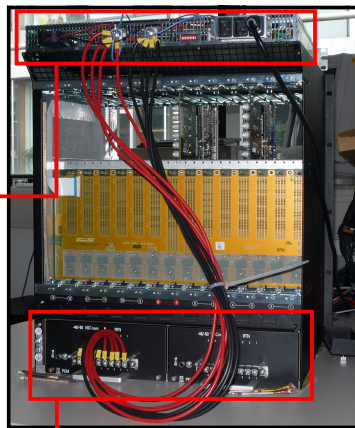


Shelf
Alarm
Panel

3000 W
Power
Supply

Shelf
Manager

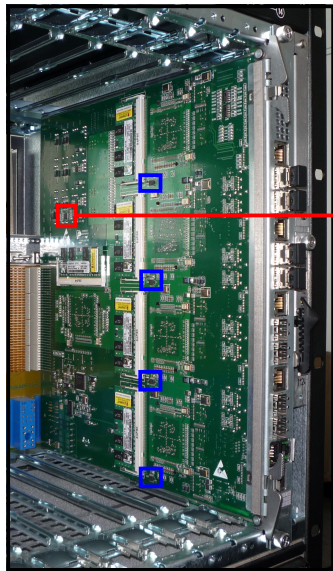
3 Fan Trays



2 Power Entry Modules

- Schroff 14-Slot AdvancedTCA Shelf with Full-Mesh Backplane Connectors.
- 3000 W power supply for up to 14 200 W Compute Nodes.

The Compute Node in the ATCA Shelf



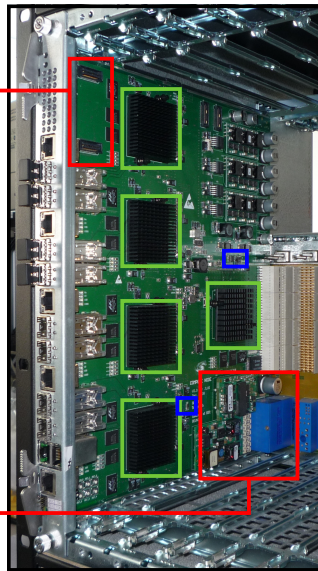
IPMC
Connector

Voltage
Sensor

FPGAs

Temperature
Sensors

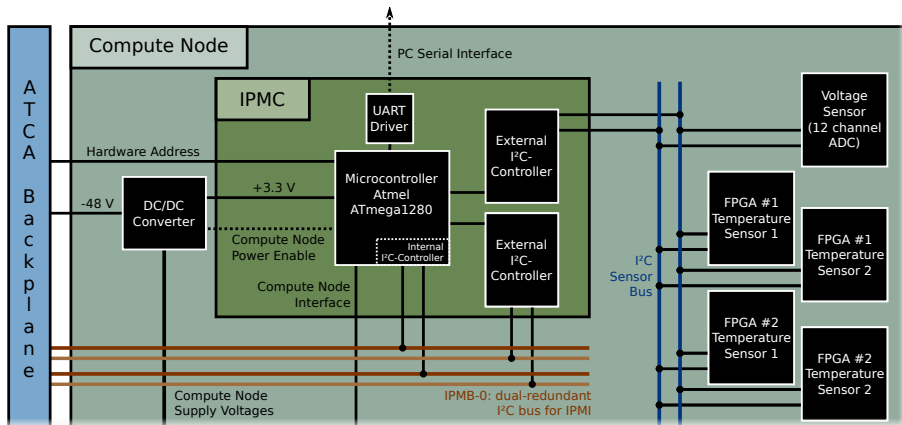
Power
Supply



Functions of the IPM Controller

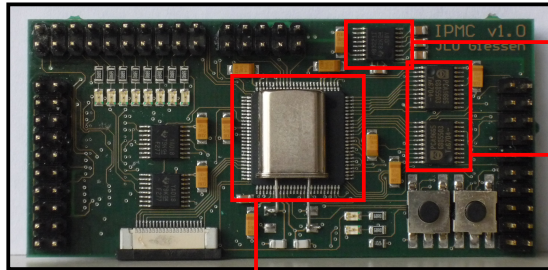
- Represent the Compute Node on the IPMB-0 (IPMB-address determined from Backplane hardware address).
- Receive and transmit mandatory IPMI commands.
- Perform Power Negotiations with the Shelf Manager and control the Compute Node's power supply.
- Manage Hot-Swap events.
- Provide an interface for sensors on the Compute Node (read-out and setting of thresholds).
- Relay sensor alerts to the Shelf Manager (create IPMI events).

Components of the IPM Controller



- Atmel ATmega1280 microcontroller.
- TI MAX3221 RS-232 Line Driver/Receiver.
- NXP PCA9665 Parallel bus to I²C-bus controller.

Assembled IPM Controller Prototype

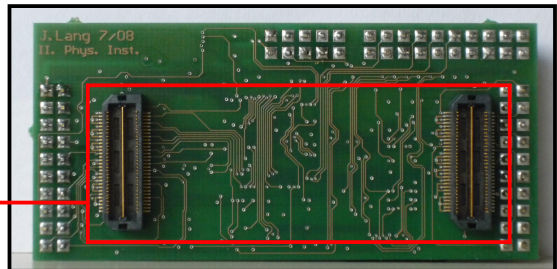


UART Driver

Parallel-to-I²C
Controller

Microcontroller
and
8MHz quartz

2 60-pin
connectors



Status of the Firmware Development

- Firmware is being developed in C++ for the avr-gcc compiler.
- The microcontroller is programmed via a JTAG interface.
- A “command shell” was written for the PC serial interface.
- The I²C interface controllers can be used.
- Temperature sensors on the Compute Node’s I²C bus can be read out and programmed.

IPMC 1.0

ipmc>

ipmc> tmptest

Temp Sensor 1: 25 oC

Temp Sensor 2: 22 oC

Temp Sensor 3: 24 oC

Temp Sensor 4: 22 oC

Temp Sensor 5: 21 oC

Temp Sensor 6: 24 oC

Temp Sensor 7: 24 oC

Temp Sensor 8: 23 oC

Temp Sensor 9: 24 oC

ipmc> █

- Firmware development will be continued. IPMI commands will be implemented to allow communication with the Shelf Manager via IPMB-0.
- Function of the managed components of the Compute Node and communication with the Shelf Manager will be tested.
- A new version of the IPMC will be designed and built, eliminating minor hardware bugs.