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PUBLICATION

Application for Management and Monitoring of xTCA Hardware
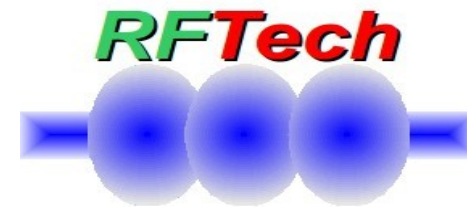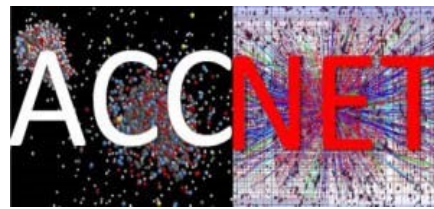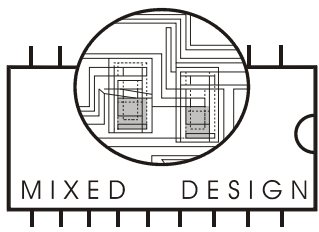
Wychowaniak, J (TUL) *et al*

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Application for Management and Monitoring of xTCA Hardware

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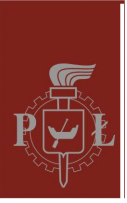
Agenda

- *ATCA crate management, vendor-provided tools*

- *The role of the application*

- *The capabilities*

- *Data exchange with ATCA Shelf Manager*

- *Internal application structure*

ATCA Crate Management

Application Aim

The application provides real-time monitoring capabilities and enables for supervision and management of the ATCA-based system being performed in more efficient and convenient manner.

System Manager link

Custom port SSH (22) System Manager link

Functionality (monitoring)

- *Graphical representation of the shelf front panel for real-time monitoring (remote virtual shelf)*

- *Determining FRUs and IPMCs presence and state*

Functionality (management)

- *FRU activation and deactivation*

- *FRU resetting*

- *Fan level monitoring and control*

- *SEL browsing*

- *Custom IPMI messaging (access to non-standard hardware functionality)*

Interfaces Compared

```
# clia getfanlevel fan_tray 2

Pigeon Point Shelf Manager Command Line Interpreter

5c: FRU # 0 Override Fan Level: 15, Local Fan Level: 1

# clia setfanlevel fan_tray 2 2

Pigeon Point Shelf Manager Command Line Interpreter

5c: FRU # 0 Set Fan Level to: 2

# clia getfanlevel -v fan_tray 2

Pigeon Point Shelf Manager Command Line Interpreter

5c: FRU # 0 Override Fan Level: 2, Local Fan Level: 1

# clia minfanlevel

Pigeon Point Shelf Manager Command Line Interpreter

Minimal Fan Level is 3
Dynamic Minimum Fan Level is 3

# clia minfanlevel 5

Pigeon Point Shelf Manager Command Line Interpreter

Minimal Fan Level is set to 5
```
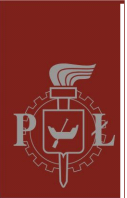
Cooperation with Shelf Manager

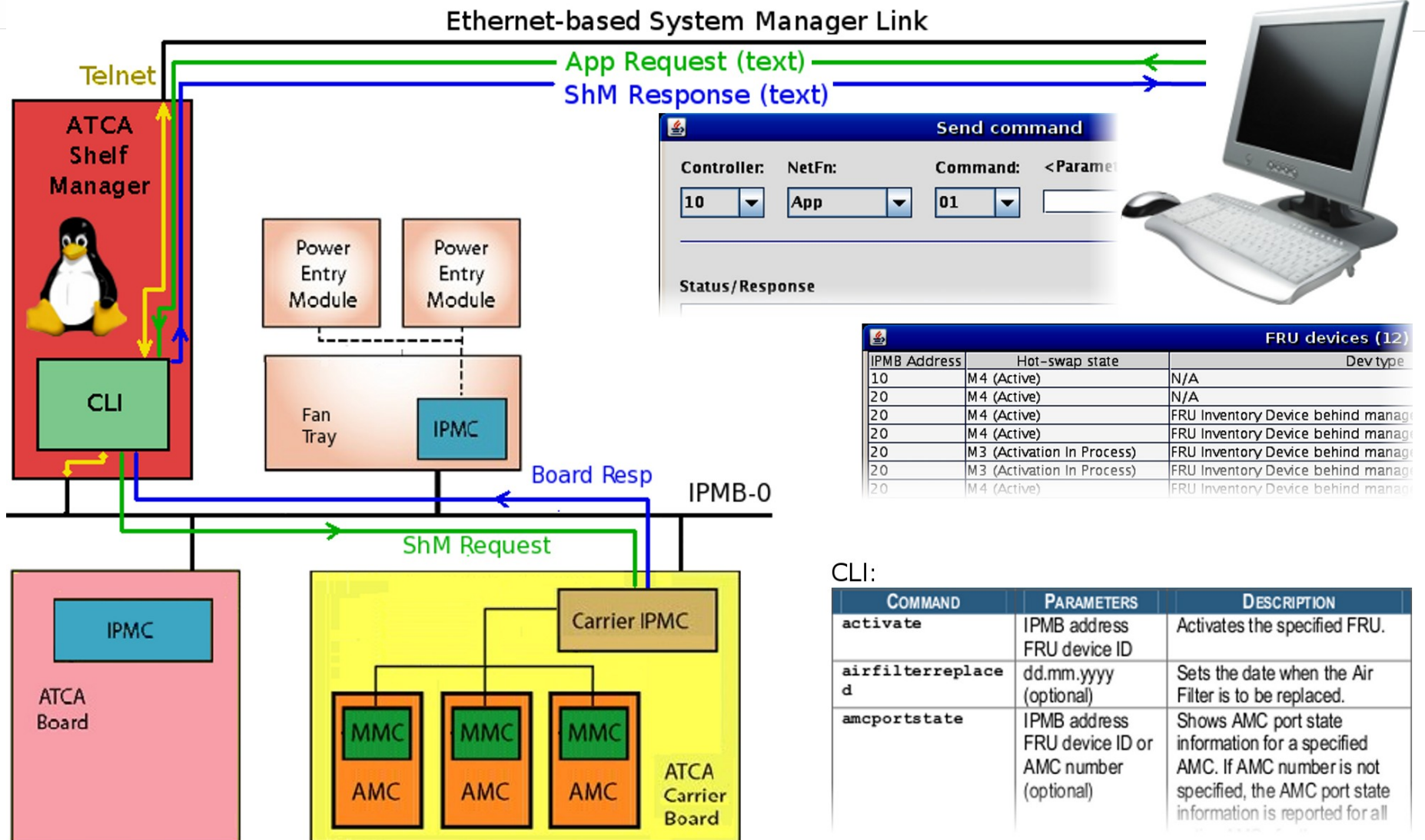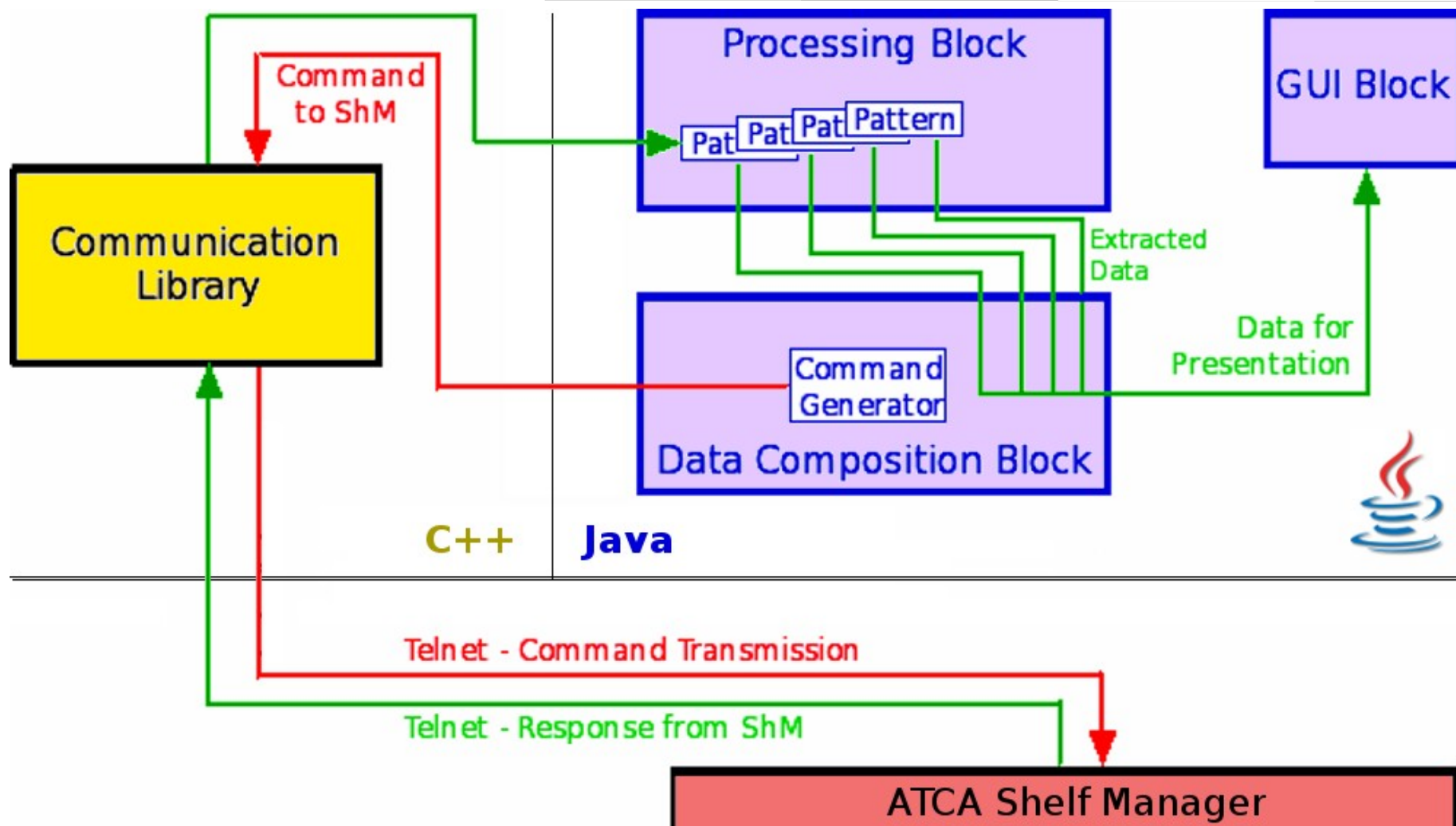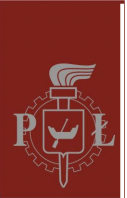# Internal Application Structure

CLI Output Data Interpretation

```
# clia ipmc -v
Pigeon Point Shelf Manager Command Line Interpreter

10: Entity: (0xf0, 0x60) Maximum FRU device ID: 0x08
    PICMG Version 2.2
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process),
        Last State Change Cause: Normal State Change (0x0) String
    Device ID: 0x00, Revision: 0, Firmware: 2.51, IPMI ver 1.5
    Manufacturer ID: 00400a, Product ID: 0000, Auxiliary Rev: 99804662
    Device ID String: "ShMM-500"
    Global Initialization: 0x0, Power State Notification: 0x0, Device Capabilities: 0x29
    Supported features: 0x29
        "Sensor Device" "FRU Inventory Device" "IPMB Event Generator"
    10: Base Interface (0x00), Channel: 1


private final String entityRegex = "\\w\\w(: Entity:).*?";
private final String hotSwapRegex = "(Hot Swap State: ).+?,";
private final String devIDStrRegex = "(Device ID String: \").+?\"";
private final String suppFtrsRegex = "(Supported features: ).+?((\".+?\")[ ]?)+";
```

| IPM Controllers (5)			
IPMB Address:	Hot Swap State:	Device ID String:	Supported features:
10	M4 (Active)	ShMM-500	Sensor Device, FRU Inventory Device, IPMB Event Generator
20	M4 (Active)	PPS BMC	Sensor Device, SDR Repository Device, SEL Device, FRU Inventory [

Summary

- *Improvement of control and supervision efficiency as compared to vendor-provided tools*

- *Additional real-time monitoring capabilities*

- *Access to custom hardware functionality*

- *The archtecture of the application supports expandability*

- *Further development plans*
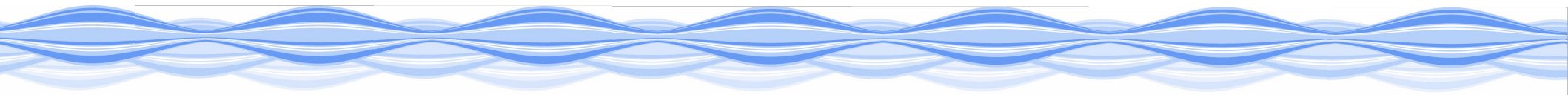
Thank You
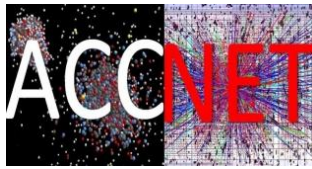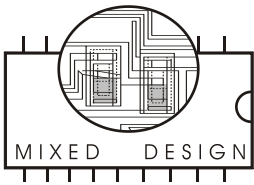
Report of RFTech presentation during Mixdes conference
(June 26-27, Wroclaw, Poland)

Title of presentation:

Application for Management and Monitoring of xTCA Hardware

Presenter:

Jan Wychowaniak

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Technical University of Lodz
Lodz, Poland
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17th International Conference Mixed Design of Integrated Circuits and Systems
Wrocław, 24-26 June 2010, Poland

J. Wychowaniak presented an application for performing management and monitoring of systems based on xTCA. For ensuring safe and uninterrupted operation of such hardware, the possibility to perform efficient diagnostic activities is essential. The presented software enables to remotely supervise the system in real-time, with the use of graphical user interface. Control over selected system sub-components is also supported.

Abstract: The Advanced Telecommunications Computing Architecture (ATCA) standard describes a powerful platform, implementation of which is considered to be adopted as a base for the control system of the X-ray Free Electron Laser (X-FEL), being built at Deutsches Electronen-Synchrotron (DESY) in Hamburg, Germany. The Low Level Radio Frequency (LLRF) control system is composed of a few ATCA Carrier Boards. Each Carrier Board hosts an Intelligent Platform Management Controller (IPMC), which is developed in compliance with the PICMG specifications. IPMC is responsible for management and monitoring of components installed on Carrier Boards and pluggable Advanced Mezzanine Card (AMC) modules.

The ATCA Shelf Manager is the main control unit of a single ATCA shelf, responsible for power management, fan modules and Carrier Boards installed in ATCA shelf. It provides a set of control and diagnostic capabilities regarding the shelf and its sub-modules. These capabilities are available for operators and can be used by higher level applications.

This paper presents a software component intended to support management and supervision of the ATCA shelf and its sub-modules, including Carrier Boards with AMC modules. The application provides enhanced mechanisms of control and allows to acquire detailed information regarding status and parameters of crucial devices (e.g. power supply voltages, temperatures, presence of reference clocks). The information supplied from Shelf Manager combined with graphical user interface of the application provides visual representation of selected system components and contributes towards efficient control and supervision of Carrier Boards and entire ATCA-based platform.

Index Term: Advanced Telecommunications Computing Architecture, Intelligent Platform Management Interface, Carrier Board, Shelf Manager, Telnet, Java, X-ray Free Electron Laser

Remarks:

During the conference the presenter learned about digital signal processing in LLRF and methods of GHz signal conversion with AMC-based hardware.