



WU3
IPMI EPICS
Integration

Piotr Perek

MTCA
Management

WU3 Scope

Assumptions and
Ideas

Progress report



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WU3 - IPMI EPICS Integration

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Lodz University of Technology, Poland

Rzeszów, 26 June 2019



MTCA Management

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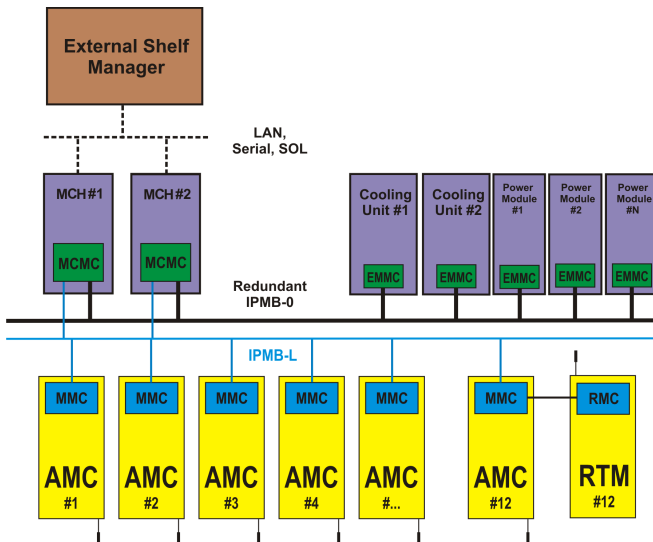
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- Interface to read/write and monitor the MTCA system using EPICS
- Develop this into a scalable module that can be used for any number of MTCA modules
- Design this module in accordance to the ESS guidelines and to other designers in order to keep some level of homogeneity



Functionality

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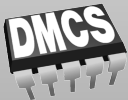
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- Getting field replaceable unit (MCH, PM, CU, AMCs, backplane) info and device ID (could also be used for inventory purposes)
- Getting activation (hot-swap) states
- Getting sensor data record, sensor reading (including reading factors and hot swap handle) and provide human readable values
- Getting sensor thresholds
- Getting link capability and link status
- Setting activation (hot-swap) states (shutdown/remove or activate) FRU
- Setting sensor thresholds
- Receiving events (to be defined)
- Firmware remote update



Assumptions

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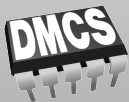
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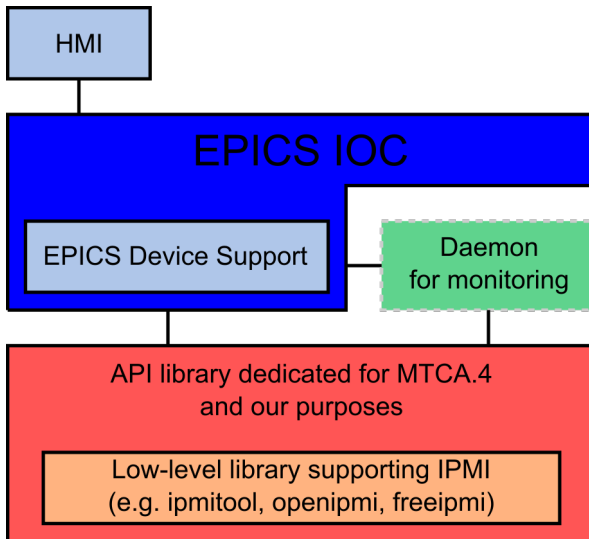


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- We are providing the monitoring/control system for single MTCA chassis
(1 chassis — 1 EPICS IOC)
- Complete EPICS monitoring system for the machine is out of scope of this contract
- Scalability — running separate EPICS IOC for every MTCA chassis in the accelerator
- Software should be fully compliant with NAT MCH — it will be used for development and tests
- Supported MicroTCA chassis types: 12 AMC (9U) and 6 AMC (3U)
- Supported modules: CCT AM 900/412, MRF EVR-300U, IFC14xx, SIS8300-KU, RTM Carrier AMC



Initial Idea



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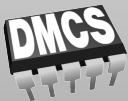
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Available Solutions

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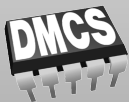
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- Low-level API:

- ipmitool
<https://github.com/ipmitool/ipmitool>
- ipmiutil
<http://ipmiutil.sourceforge.net>
<https://git.code.sf.net/p/ipmiutil/code-git>
- freeipmi
<https://www.gnu.org/software/freeipmi>
<https://git.savannah.gnu.org/git/freeipmi.git>
- OpenIPMI
<http://openipmi.sourceforge.net>
<https://git.code.sf.net/p/openipmi/code>
- OpenHPI
<http://openhpi.org>
<https://github.com/open-hpi>

- EPICS:

- ipmiComm → e3-ipmiComm
<https://github.com/icshwi/e3-ipmiComm>



Available Solutions

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- Low-level API:

- ipmitool
<https://github.com/ipmitool/ipmitool>
- ipmiutil
<http://ipmiutil.sourceforge.net>
<https://git.code.sf.net/p/ipmiutil/code-git>
- freeipmi
<https://www.gnu.org/software/freeipmi>
<https://git.savannah.gnu.org/git/freeipmi.git>
- OpenIPMI
<http://openipmi.sourceforge.net>
<https://git.code.sf.net/p/openipmi/code>
- OpenHPI
<http://openhpi.org>
<https://github.com/open-hpi>

- EPICS:

- ipmiComm → e3-ipmiComm
<https://github.com/icshwi/e3-ipmiComm>



Proposed Software Architecture

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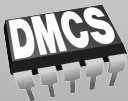
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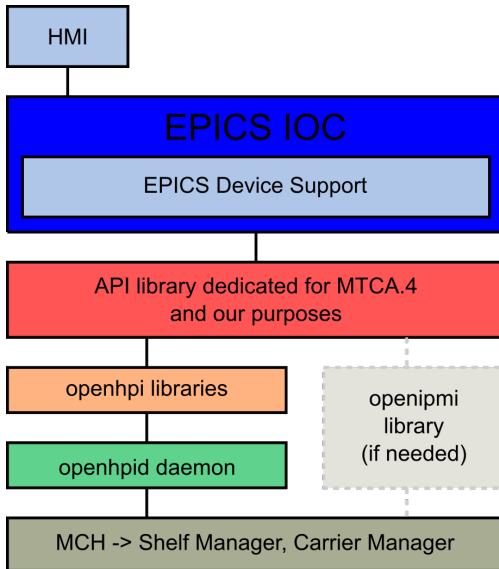
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MTCA Example based on OpenHPI

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```
nat> show fru
FRU Information:
-----
FRU Device State Name
=====
0 MCH M4 NMCH-CM
3 mcmc1 M4 NAT-MCH-MCMC
6 AMC2 M4 DMCS-PTPM
7 AMC3 M4 TAMC641
9 AMC5 M4 AIES-MFMC
13 AMC9 M4 AIES-MPTM-1588
40 CU1 M4 Schroff uTCA CU
41 CU2 M4 Schroff uTCA CU
51 PM2 M4 PM-AC1000
53 PM4 M4 PM-AC1000
60 Clk1 M4 MCH-Clock
61 Hub1 M4 MCH-PCIE
64 RTM1 M4 AIES-MPCIE16
=====
```



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==> RPT Entry ID: 0x3

Tag: DMCS-PTPM

Entity Path: {SYSTEM_CHASSIS,7}{SHELF_MANAGER,0}{AMC,2}

FRU ID: 6

==> RPT Entry ID: 0x1

Tag: Schroff uTCA CU

Entity Path: {SYSTEM_CHASSIS,7}{SHELF_MANAGER,0}{COOLING_UNIT,1}

FRU ID: 40

==> RPT Entry ID: 0x8

Tag: PM-AC1000

Entity Path: {SYSTEM_CHASSIS,7}{SHELF_MANAGER,0}{POWER_SUPPLY,4}

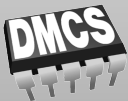
FRU ID: 53

==> RPT Entry ID: 0xC

Tag: NMCH-ShM

Entity Path: {SYSTEM_CHASSIS,7}{SHELF_MANAGER,0}{SWITCH_BLADE,0}

FRU ID: 0



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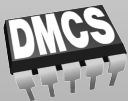
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- Migration to CentOS
- E3 - getting to know, playing with tutorial and examples
- Initial IOC corresponding to the console example and compliant with E3 - still in progress...



Last meeting - important questions

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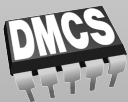
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- Do we really need separate daemon for chassis monitoring? Is it OK from the ESS IT point of view?
- IOC is a kind of daemon
- If we don't want to use external daemon we should not use OpenHPI and implement everything from scratch



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Future plans

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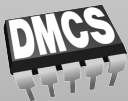
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- Finishing the E3-compliant IOC example
- Development of library dedicated for our purposes based on OpenHPI (and other libraries if really needed)
 - First step - support for all reading/monitoring features
 - Avoiding development of IPMI protocol from scratch
 - Providing some missing commands specific for MicroTCA.x
 - Check how to send configuration command using OpenHPI



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Thank you for your attention