

MicroTCA hardware management integrated into the DOOCS.

Vahan Petrosyan

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IPMIlib for DOOCS

Documents:

IPMI(Intelligent Management Platform Interface) specifications

- IPMI v1.0 – The base specification, released in 1998 by major system vendors(Intel Hewlett-Packard NEC Dell ...) to define manageability across multiple platforms
- IPMI v1.5 - Released in 2001 to update/enhance IPMI,unify the specification with other management initiatives(like ATCA), and add functionality like LAN interface-to-BMC functionality
- IPMI v2.0 – Released in 2004 to further update/enhance IPMI with features like management link security, Serial Over LAN and Firmware Firewall support.
- IPMB(Intelligent Platform Management Bus) – the I2C-based bus definition for IPMI.
- IPMB v1.0 Address Allocation – Defines addressing on the IPMB.
- Platform Management FRU Information Storage Definition – FRU information.

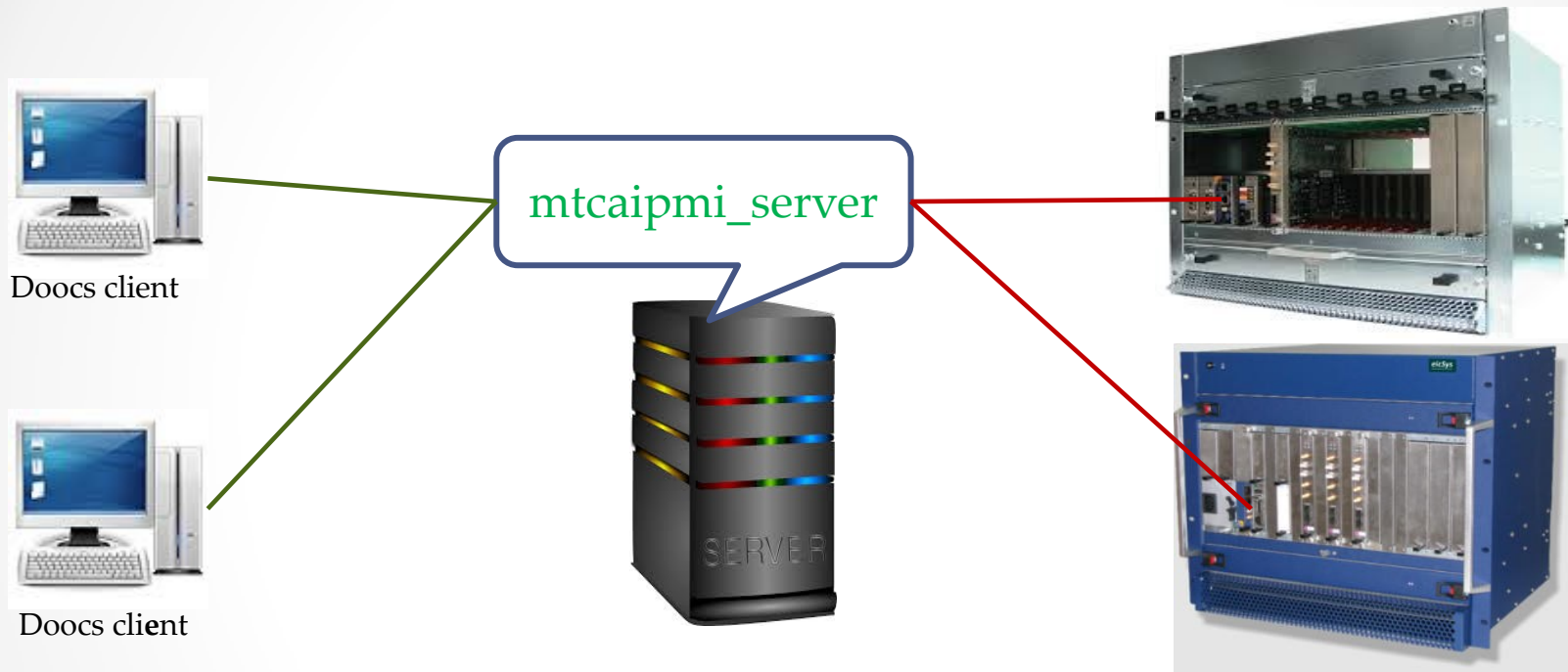
ATCA and MicroTCA specifications

- PICMG 3.0 – ATCA base specification that includes the definition and HW/SW implementation details of Shelf Management/Hot Swap Control for ATCA.
- PICMG AMC.0 – AdvancedMC base specification that includes the definition and HW/SW implementation details of carrier and module management for AMC.
- PICMG MicroTCA.0 – Base specification that includes the definition and HW/SW implementation details of management for MicroTCA and AMC.
- MTCA.4 xTCA for Physics Develops additional features and options for use in particle physics research including Rear Transmission Module(RTM) for signal conditioning, data collection and accelerator control systems.

Library sources:

IPMITool - open source command-line interface <http://sourceforge.net/projects/ipmitool/>

DOOCS server for MicroTCA crate.



● — ● IPMI over LAN interface to MCH

● — ● Interface to DOOCS

Mtcaipmi_server

reads:

- Hostname/IP address of MCH from configuration file
- SDRs (Sensor Data Record) and FRU information of the crate and modules from the MCH
- SEL (System Event Logs) , sensor value and status LEDs in update routine

provides to **DOOCS**:

- Sensors (history, value, descriptions, states)
- Management controlled status LEDs
- FRU information (manufacture, board and product information, current consumption, link descriptions,...)
- System Event Logs (SEL)
- Remote control functions (reboot, shutdown, reset)

MicroTCA crates in system status panel

Overview of the crates in XFEL and AMTF

DOOCS System Status

Applications | Server Status | Network Status | FLASH Timing | FLASH VME | FLASH pTCA | MicroTCA FLASHLab | MicroTCA XFEL AMTF

XFEL MicroTCA Crates

Crates	show	Manufacturer	Count	Status
XFELMCHXHM1:	show	Schroff GmbH	12	●
XFELMCHTIME1:	show	Schroff GmbH	12	●
XFELMCHLLGUN1:	show	Schroff GmbH	6	●
XFELMCHLASER1:	show	Schroff GmbH	12	●
XFELMCHDI30I1:	show	Schroff GmbH	12	●
XFELMCHVAC1:	show	Schroff GmbH	6	●
XFELMCHMAG1:	show	Schroff GmbH	12	●
XFELMCHLLA2M:	show	Schroff GmbH	12	●
XFELMCHLLA2S:	show	Schroff GmbH	12	●
XFELMCHDI131L1:	show	Schroff GmbH	12	●
XFELMCHLASER2:	show	Schroff GmbH	12	●
XFELMCHTDS1:	show	Schroff GmbH	12	●
XFELMCHLLA6M:	show	Schroff GmbH	12	●
XFELMCHILA2M:	show	Schroff GmbH	12	●
XFELMCHILA2S:	show	Schroff GmbH	12	●

AMTF MicroTCA Crates

Crates	show	Manufacturer	Count	Status
MSKMCHAMTF1:	show	Schroff GmbH	12	●
MSKMCHAMTF2:	show	ELMA Electronic GmbH	12	●
MSKMCHAMTF3:	show	Schroff GmbH	12	●
AMTFMTS3MCH:	show	ELMA Electronic GmbH	12	●
AMTFMTS2MCH:	show	ELMA Electronic GmbH	12	●
AMTFMTS1MCH:	show	ELMA Electronic GmbH	12	●
MSKMCHAMTF39:	show	Schroff GmbH	12	●
AMTFMTS39-MCH:	off	Schroff GmbH	12	●

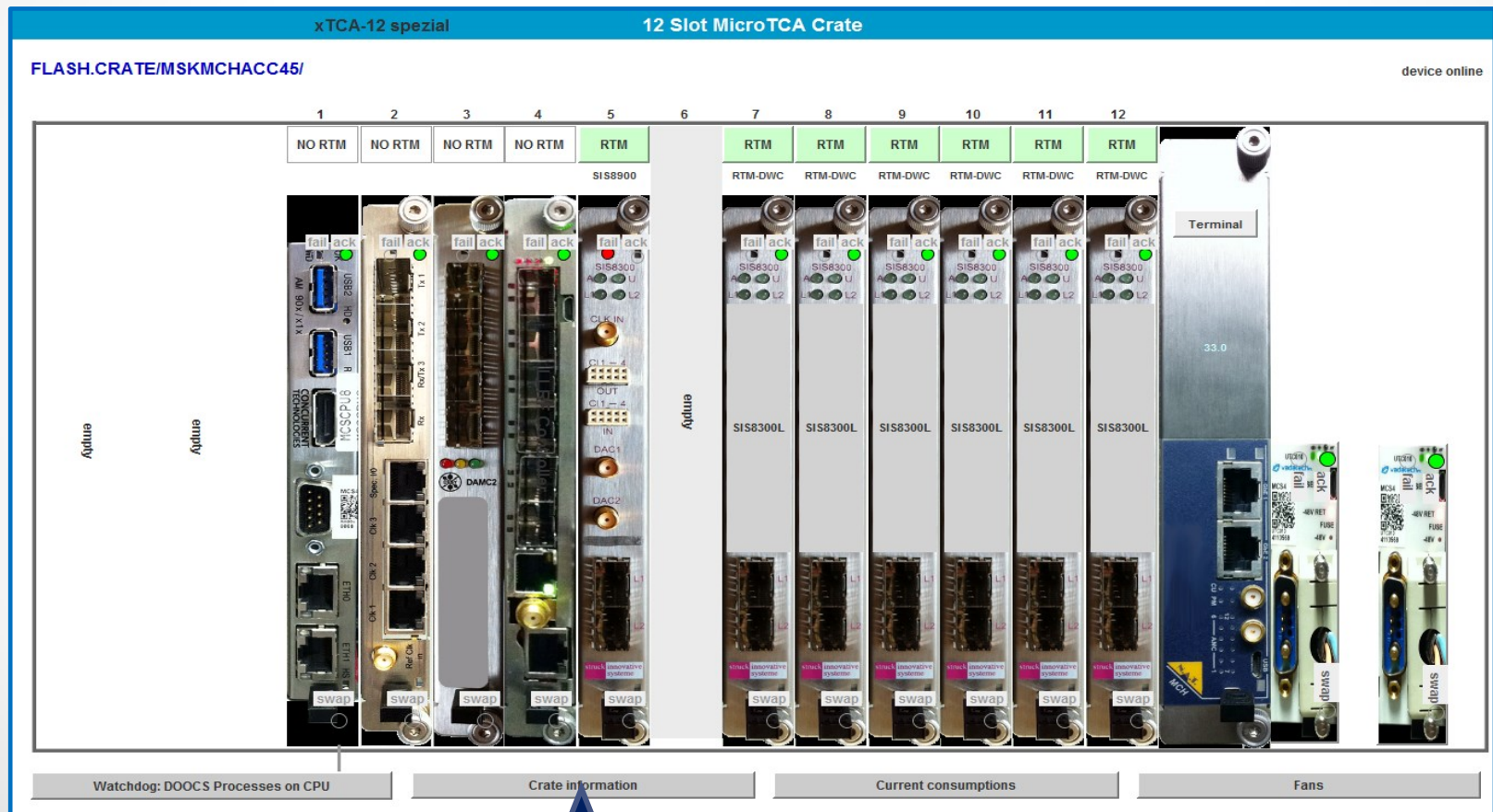
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Modules in selected crate: XFEL.CRATE/XFELMCHLLA2M/

Module	Manufacturer	U	Temp	Info	Serial	Version
RTM3:	MPS-RTM1	ATP		info	01-031	0
COOL_UNIT2:	Fan speed= 4680 4740 4680 4680	Temp= 0.0 0.0	info	1431400465AA	1	
COOL_UNIT1:	Fan speed= 2940 5460 11280 12300	Temp= 53.0 36.0	info	1431400467AA	1	
AMC3:	DAMC2 Deutsches Elektronen-Synchrotron	U= 0.0 Temp= 55.0	info	4055	2.03	
AMC9:	SIS8300L2 Struck Innovative Systeme GmbH	U= 1.5 Temp= 47.0	info	001	1.12	
AMC4:	DAMC-TCK7 Vadatech	U= 1.8 Temp= 33.0	info	See SDR	17.2	
AMC11:	SIS8300L2 Struck Innovative Systeme GmbH	U= 1.5 Temp= 48.0	info	001	1.12	
AMC8:	SIS8300L2 Struck Innovative Systeme GmbH	U= 1.5 Temp= 49.0	info	001	1.12	
AMC7:	SIS8300L2 Struck Innovative Systeme GmbH	U= 1.5 Temp= 51.0	info	001	1.12	
AMC12:	SIS8300L2 Struck Innovative Systeme GmbH	U= 1.5 Temp= 48.0	info	001	1.12	
AMC10:	SIS8300L2 Struck Innovative Systeme GmbH	U= 1.5 Temp= 46.0	info	001	1.12	
AMC2:	X2TIMER Stockholm University	U= 3.4 Temp= 28.0	info	0039	2.01	
AMC1:	AM 900/412 Concurrent Technologies	U= 0.9 Temp= 34.0	info	M22816/002	3.09	
MCH:	NAT-MCH V2.0, R141024	Current= 0.1 Temp= 29.0 33.0 30.0 0.0	info	206	2.22	
POWER_UNIT4:	MTCA Power Su...	Temp= 24.0 24.0	info	04586029	1.05	
POWER_UNIT2:	MTCA Power Su...	Temp= 36.0 42.0	info	04786078	1.05	

View of the MicroTCA crate

JDDD panel for MicroTCA crate



JDDD panel for MicroTCA crate



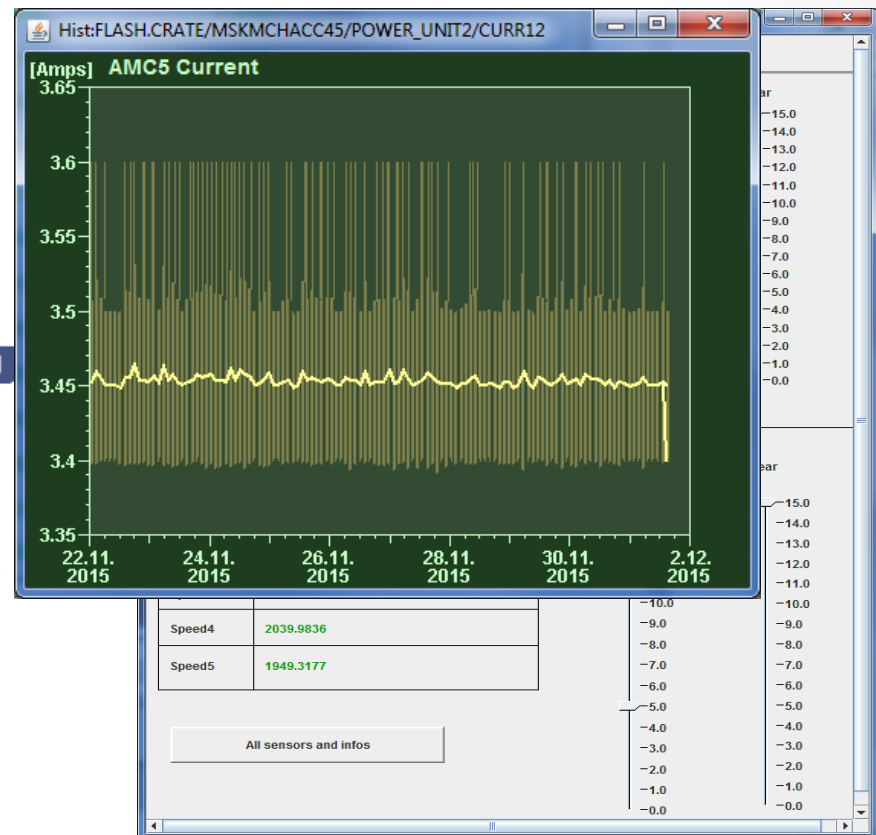
MicroTCA crate information

Current consumption of the modules

Current consumption monitor in the crate FLASH.CRATE/MSKMCHACC45/

Slot	Power Module 1	Power Module 2	Power Module 3	Power Module 4
MCH1		2.9000	0.3000	
MCH2		1.3000	0.3000	
FAN1		1.1000	0.2000	
FAN2	not installed	2.2000	0.1000	
AMC1		3.4000		
AMC2		0.2000		
AMC3		0.0000	3.9000	
AMC4		0.0000	4.0000	
AMC5		0.0000	4.2000	
AMC6		0.0000	4.1000	
AMC7		0.0000	4.1000	
AMC8		0.0000	4.0000	
AMC9		1.7000	0.4000	
AMC10		0.1000	0.1000	
AMC11		2.4000	0.1000	
AMC12		0.1000	2.2000	
Total		6.7500	12.5000	

Cooling units monitor and control

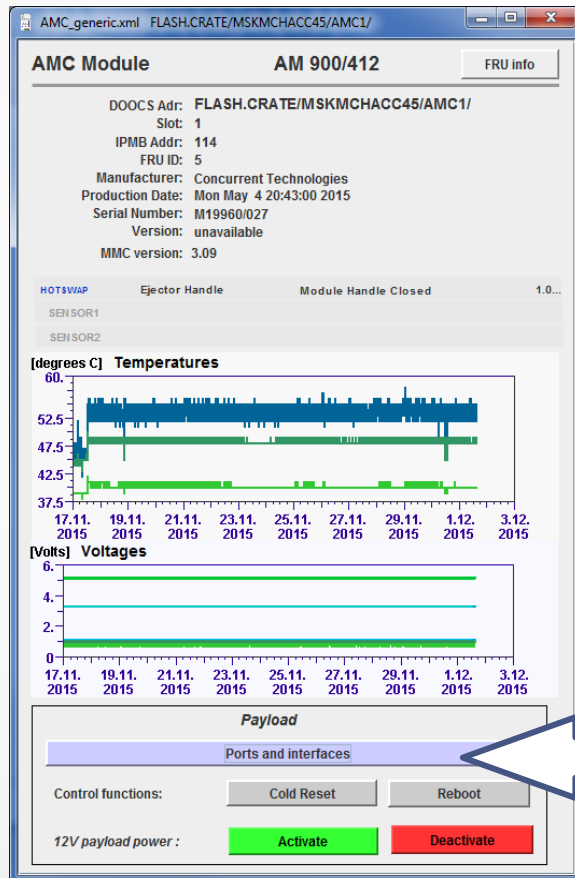


JDDD panel for MicroTCA crate



AMC module

AMC module main panel



AMC port types and statuses

The screenshot shows the 'AMC Ports' panel for 'AMC1'. It displays a table of port configurations. A large white arrow points from the 'Ports and interfaces' section of the 'Payload' panel in the left screenshot to this panel.

AMC Ports

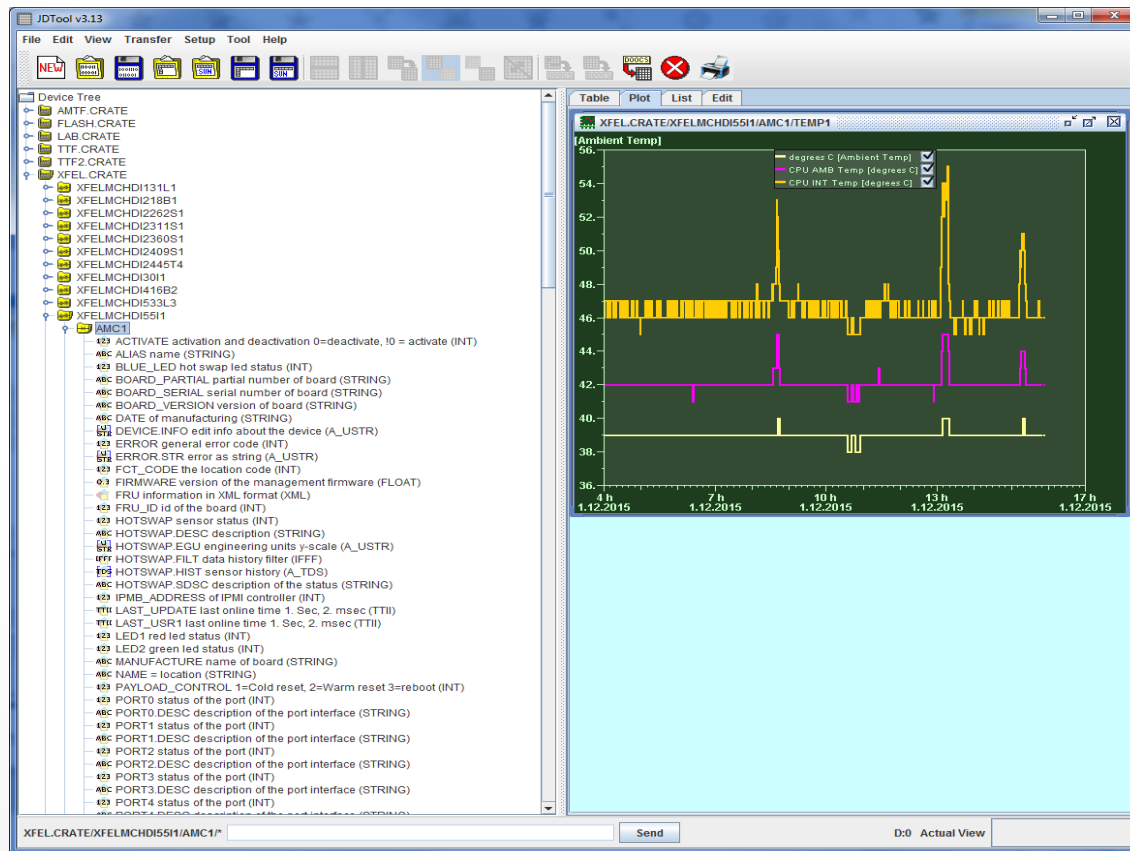
AMC1

Crate / MCH: mskmchacc45
Slot in crate: 1
Name: AM 900/412

Port N	Interface	Active
0	Ethernet	1
1	Unknown type interface	0
2	Unknown type interface	0
3	Unknown type interface	0
4	PClexpress x4 link	1
5	PClexpress x4 link	1
6	PClexpress x4 link	1
7	PClexpress x4 link	1

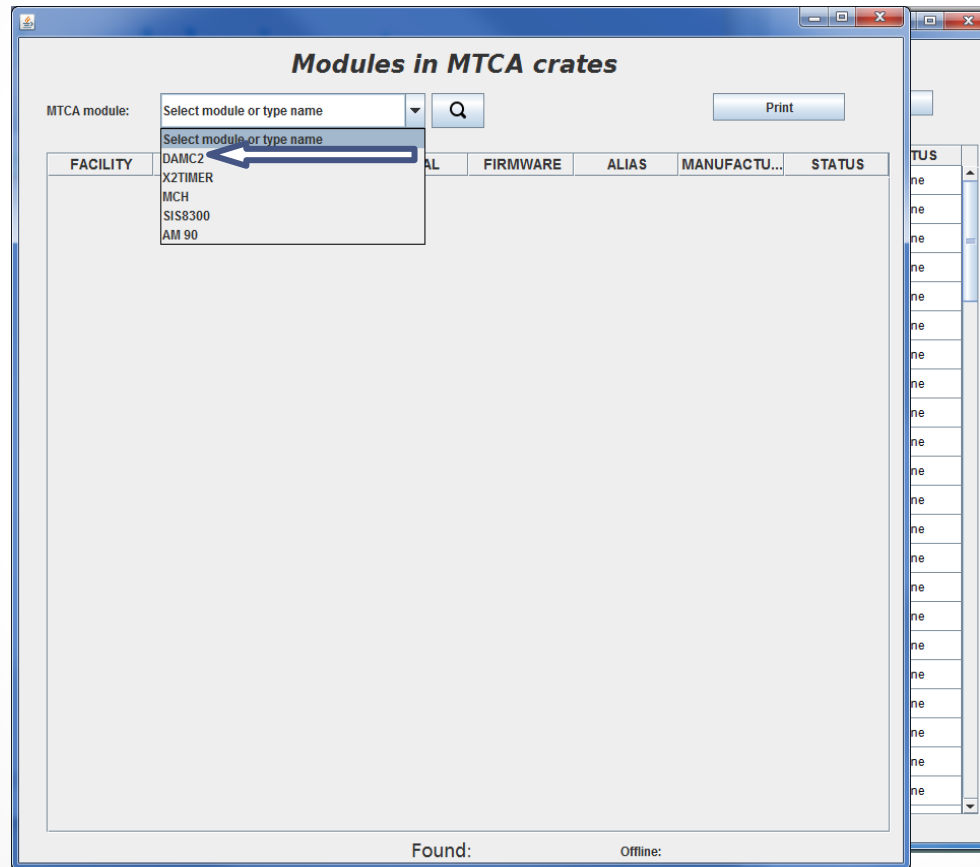
Crates and Modules in DOOCS hierarchy

JDTool application



Search MicroTCA modules in crates

JDTool application

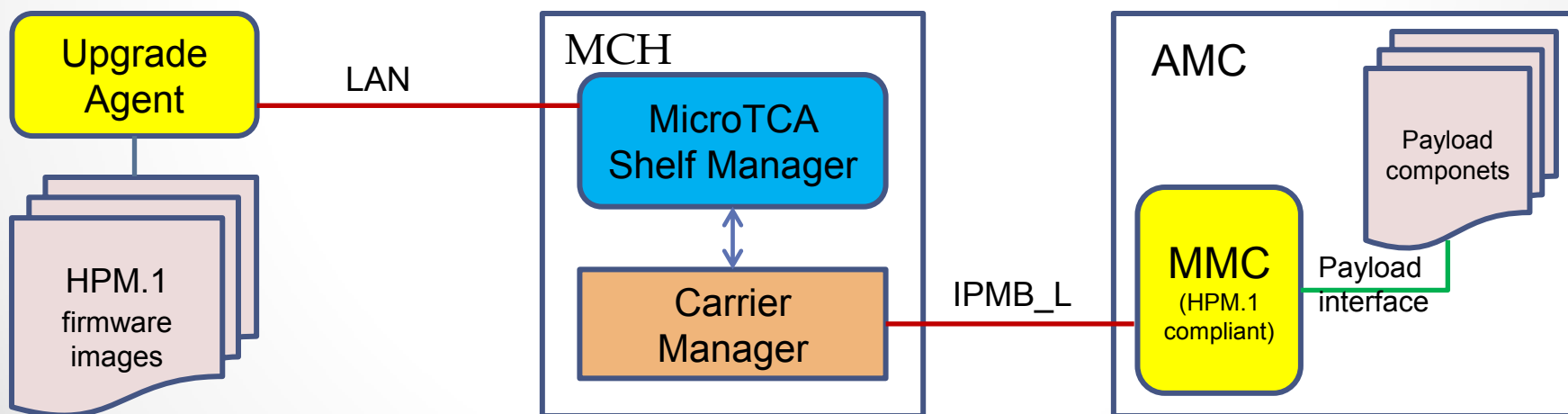


HPM (Hardware Platform Management)

HPM.1 is IPM Controller Firmware Upgrade specification, was adopted in 2007 and defines firmware file formats and IPMI command protocols for updating the firmware in ATCA, AMC, and MicroTCA management controllers.

●—● HPM.1 specified IPMI commands

●—● Local payload interface



HPM Upgrade Agents.

IPMItool command-line interface

```
Terminal
File Edit View Search Terminal Help
mcsvahan:~/ATCA/DESY_AMC/DAMC2v2> ipmitool -I lan -H mcsmhvahan -t 0x7c hpm upgrade damc2_bpm_firmware.hpm activate
Password:

PICMG HPM.1 Upgrade Agent 1.0.2:

Validating firmware image integrity...OK
Performing preparation stage...OK

Performing upgrade stage:

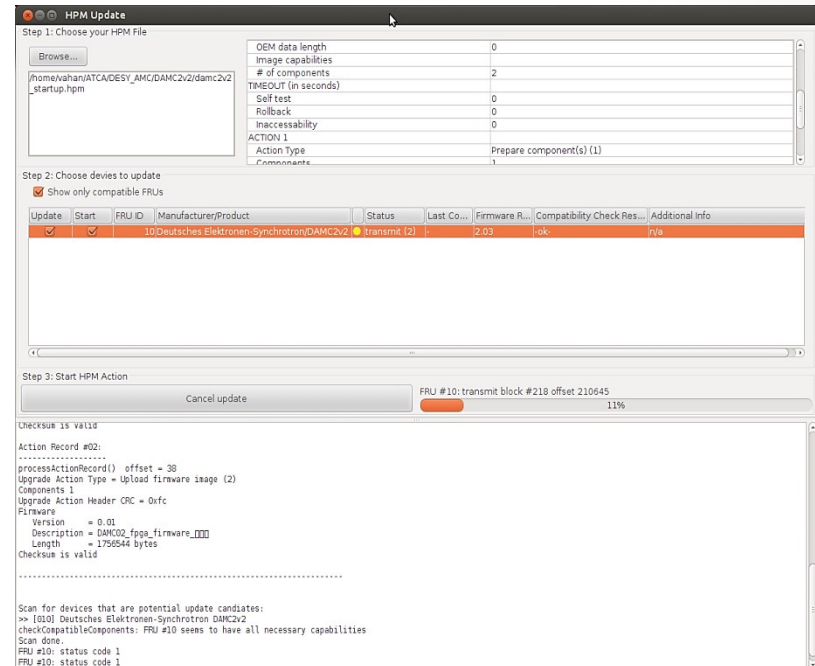
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| ID | Name | Versions | Upload Progress | Upload | Image |
|----|-----|-----|-----|-----|-----|
| 1 | FPGA-PCIE-4 | 0.05 | 0% 50% 100% | Time | Size |
|----|-----|-----|-----|-----|-----|
| *1 | FPGA-PCIE-4 | 0.05 | 0.01 | 10.49 | lacd80 |
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(*) Component requires Payload Cold Reset
Performing activation stage:

Firmware upgrade procedure successful

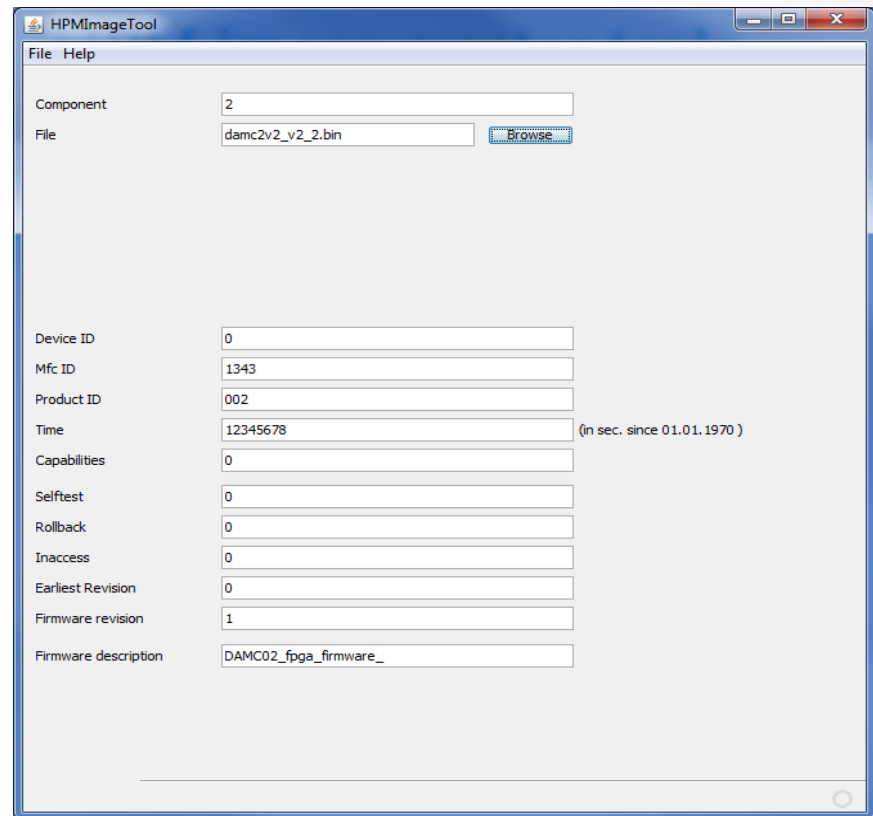
mcsvahan:~/ATCA/DESY_AMC/DAMC2v2>
```

NATView tool (N.A.T)



HPM image tool.

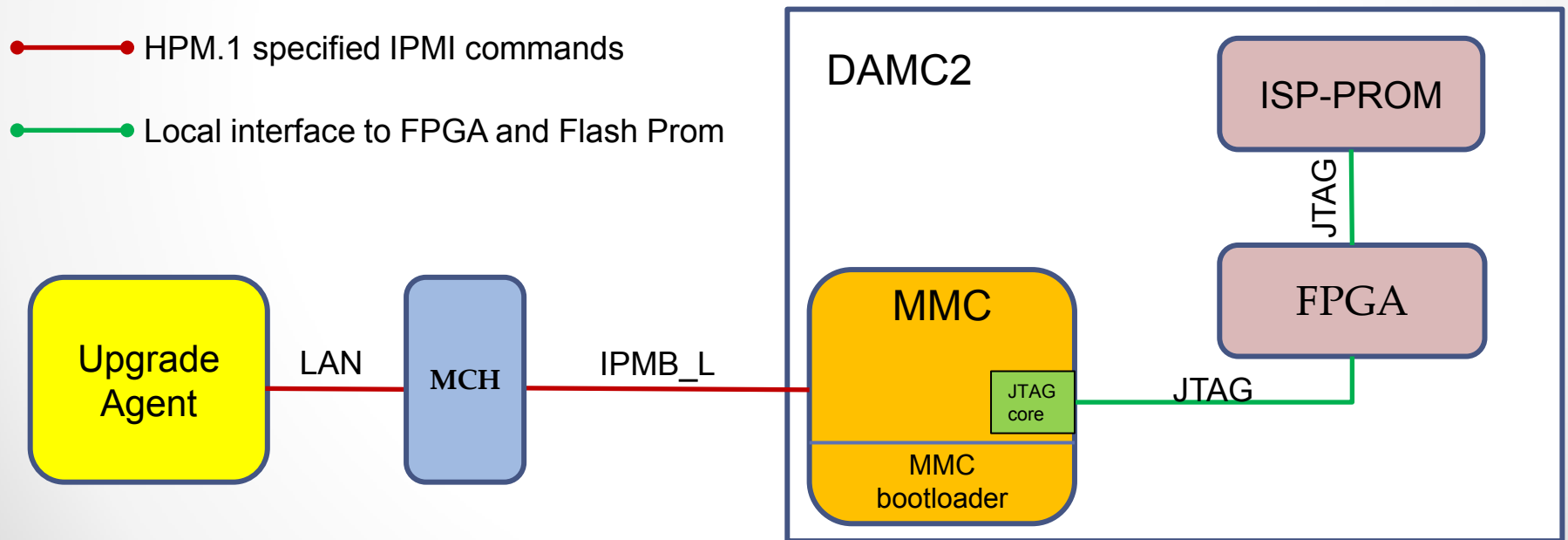
- No available tool and program
- A Java-based tool was developed in DESY to create HPM.1 compliant images.



HPM capability of DAMC2

2 Components are available for firmware upgrade:

- ✓ MMC firmware for ATXMEGA128 microcontroller
- ✓ Flash Prom for FPGA configuration



HPM capability of X2TIMER

3 Components are available for firmware upgrade:

- ✓ MMC firmware for ATXMEGA128 microcontroller
- ✓ SPI Flash Prom for FPGA configuration
- ✓ Firmware for up to 12 ATXmega32 microcontroller on Piggyback boards

- HPM.1 specified IPMI commands
- SPI interface to FPGA and Flash Prom
- PDI (Atmel® proprietary interface) to programm ATXmega devices on piggybacks on AMC and RTM
- I2C EEPROM to store Firmware for piggyback

