MicroTCA hardware management integrated into the DOOCS.

Vahan Petrosyan

4th MTCA Workshop @ DESY, 10.12.2015





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.

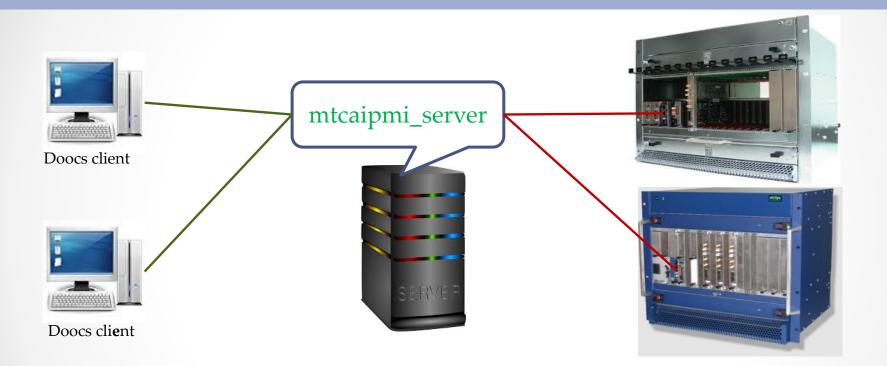
ATCA and MicroTCA specifications

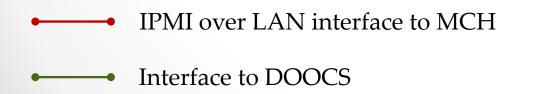
- PICMG 3.0 ATCA base specification that includes the definition and HW/SW implementation details of Shelf Management/Hot Swap Control for ATCA.
- PICMG AMC.0 AdvancedMC base specification that includes the definition and HW/SW implementation details of carrier and module management for AMC.
- PICMG 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.





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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)

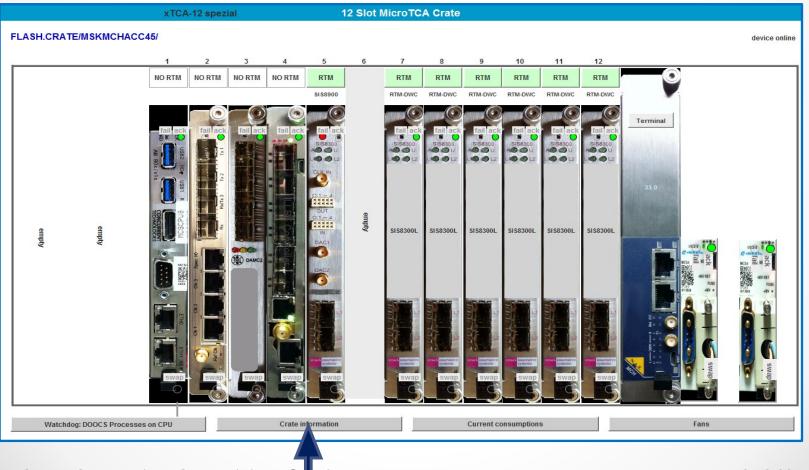
MicroTCA crates in system status panel

Overview of the crates in XFEL and AMTF

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Applications Se		Network Sta	atus	FLASH TI	ming	FLAS	H VME	FL/	ASH µTC		AMTE M		MicroT A Crate								
XFELMCHXHM1:	show	Schroff	GmbH				1	2 (МЅКМСНА	MTF1 :	s	how	Schroff G	SmbH			12	2	•
XFELMCHTIME1 :	show	Schroff (GmbH				1	2			мѕкмсна	MTF2:	s	how	ELMA Ele	ectronic G	GmbH		12	2	•
XFELMCHLLGUN1	: show	Schroff (GmbH				6	. (• =		мѕкмсна	MTF3:	s	how	Schroff G	SmbH			12	2	•
XFELMCHLASER1	: show	Schroff (GmbH				1	2			AMTFMT S3	MCH:	s	how	ELMA Ele	ectronic G	GmbH		12	2	•
XFELMCHDI30I1 :	show	Schroff (GmbH				1	2 (•		AMTFMT S2	MCH :	s	how	ELMA Ele	ectronic G	GmbH		12	2	•
XFELMCHVAC1 :	show	Schroff	GmbH				6	; (AMTFMT S1	MCH :	s	how	ELMA Ele	ectronic G	SmbH		12	2	•
XFELMCHMAG1 :	show	Schroff	GmbH				1	2 (мзкмсна	MTF39 :	s	how	Schroff G	SmbH			12	2	•
XFELMCHLLA2M :	show	Schroff (GmbH				1	2			AMTFMT S3	9-MCH :	off								
XFELMCHLLA2S:	show	Schroff (GmbH				1	2													
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XFELMCHLASER2	: show	Schroff (GmbH				1	2													
XFELMCHTDS1:	show	Schroff (GmbH				1	2													
XFELMCHLLA6M :	show	Schroff (GmbH				1	2													
XFELMCHILA2M :	show	Schroff (GmbH				1	2													
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View of the MicroTCA crate

JDDD panel for MicroTCA crate

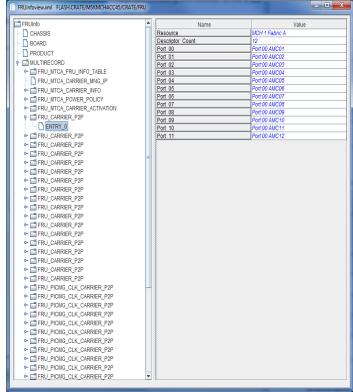


MicroTCA crate information

			MicroTCA Crat	e					
	Ту	per: x	TCA-12 spezial						
	Error M	sa.: d	evice online						
	Manufactu	· .	ELMA Electronic GmbH						
			ue Jul 17 11:28:00 2012						
Production Date:		ate.	Tue Jui 17 11:28:00 2012						
	Serial Num	ber.							
	Partial Num	ber: 04	42-500						
	Vers	ion: Ir	Id.A						
	Poweru	nits: 2							
	Cooling u	nits: 2							
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A 2 3 4 5 6 7 7 8 9 9 10 11 11 12 13 14 15 16 17 17 18 19	B 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	C 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	D 14. Aug. 2015 14:30:19.000 14. Aug. 2015 14:30:20.000 14. Aug. 2015 14:30:20.000	E IPMB3xc4 Sensor N:57 IPMB3xc4 Sensor N:52 IPMB3xc4 Sensor N:22 IPMB3xc4 Sensor N:22 IPMB3xc4 Sensor N:22	Type:FRU Hot Type:Unknown Type:Unknown Type:Unknown Type:Unknown Type:Unknown Type:Unknown Type:Unknown Type:Unknown Type:Unknown Type:Unknown Type:Unknown				
A 2 3 4 5 6 7 7 8 9 9 10 11 12 13 14 15 16 17 18	B 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	C 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	D 14. Aug. 2015 14:30:19.000 14. Aug. 2015 14:30:20.000 14. Aug. 2015 14:30:20.000	E IPMB:0xc4 Sensor Ik:27 IPMB:0xc4 Sensor Ik:37 IPMB:0xc4 Sensor Ik:37	TypeFRU Hot TypeUnknown TypeUnknown TypeUnknown TypeUnknown TypeUnknown TypeUnknown TypeUnknown TypeUnknown TypeUnknown TypeUnknown TypeUnknown TypeUnknown TypeUnknown TypeUnknown				

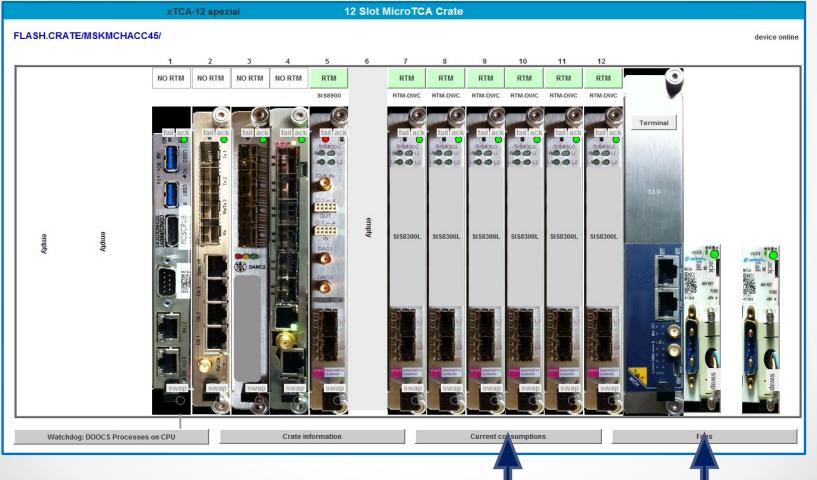
Crate main info and System Logs

FRU information of the crate



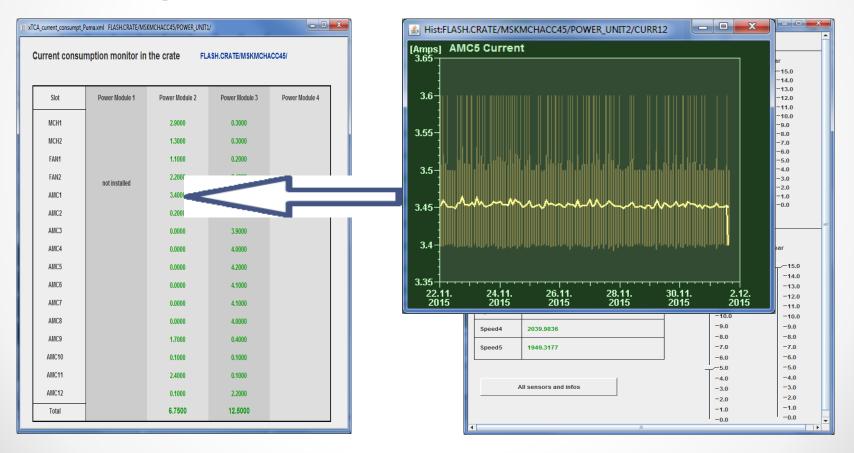
View of the MicroTCA crate

JDDD panel for MicroTCA crate



MicroTCA crate information

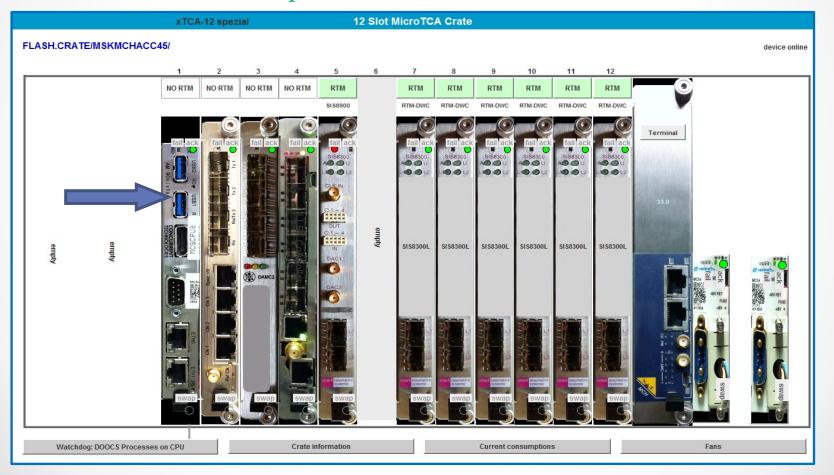
Current consumption of the modules



Cooling units monitor and control

View of the MicroTCA crate

JDDD panel for MicroTCA crate



AMC module

AMC module main panel



AMC port types and statuses

- - X

Active

1

0

0

0

1

1

1

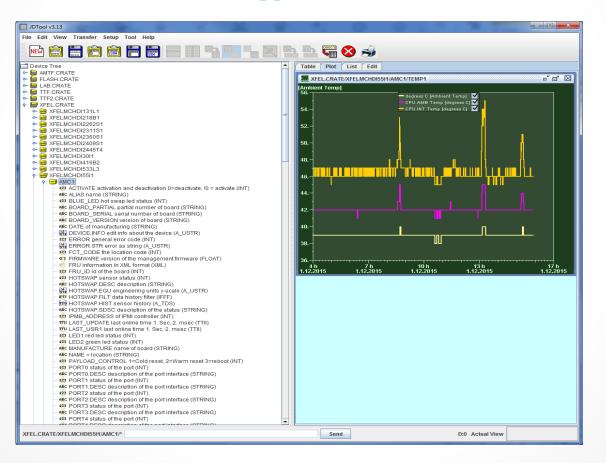
1

• Vahan Petrosyan | MTCA Workshop @ DESY

10.12.2015 • 11

Crates and Modules in DOOCS hierarchy

JDTool application



Search MicroTCA modules in crates

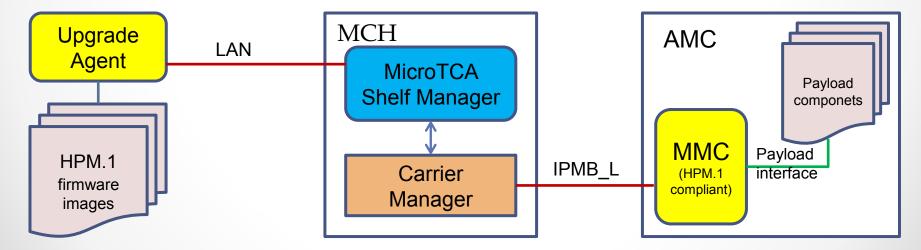
JDTool application

<u></u>		
	Modules in MTCA crates	
MTCA module:	Select module or type name	
FACILITY	Select module of type name AL FIRMWARE ALIAS MANUFACTU STATUS MCH SIS8300 AM 90	TUS ne ne
	Found: Offline:	

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

NATView tool (N.A.T)

😣 🗇 🗈 Terminal	😣 😑 🕒 HPM Update	N N	
	Step 1: Choose your HPM File	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
File Edit View Search Terminal Help		OEM data length	0
nie bolt view Search lenninal neip	Browse	Image capabilities	
mcsvahan:~/ATCA/DESY AMC/DAMC2v2> ipmitool -I lan -H mcsmchvahan -t 0x7c hpm upgrade damc2 bpm firmware.hpm activate 🦷	/home/vahan/ATCA/DESY_AMC/DAMC2v2/damc2v2	# of components	2
	_startup.hpm	TIMEOUT (in seconds)	
Password:		Selftest	0
		Rollback	0
		Inaccessability	0
PICMG HPM.1 Upgrade Agent 1.0.2:		ACTION 1 Action Type	Prepare component(s) (1)
		Components	Prepare component(s) (1)
	Step 2: Choose devies to update		
Validating firmware image integrityOK	Show only compatible FRUs		
Performing preparation stageOK	Show only compatible PROS		
i chomizna propulatzon occagon tok	Update Start FRU ID Manufacturer/Produ	Ict Status	Last Co Firmware R Compatibility Check P
		en-Synchrotron/DAMC2v2 Otransmit	
Performing upgrade stage:			(L) L100 OK
renomizing degrade stage.			
ID Name Versions Upload Progress Upload Image			
Active Backup File 0% 50% 100% Time Size			
	(4)		
*1 FPGA-PCIE-4 0.05 0.01 10.49 1acd80	Step 3: Start HPM Action		
			FRU #10: transmit block #218 offset 210645
	Cancel updat	e	11%
(*) Component requires Payload Cold Reset			1170
Performing activation stage:	Checksum is valid		
Performing activation stage.	tradies Broad and		
	Action Record #02:		
Firmware upgrade procedure successful	processActionRecord() offset = 38		
rinimare upgrade procedure successifut	Upgrade Action Type = Upload firmware image (2)		
	Components 1		
	Upgrade Action Header CRC = Oxfc		
<u>mcsvahan</u> :~/ATCA/DESY_AHC/DAHC2v2>	Finware Version = 0.01		
	Description = DAMC02 fpga firmware DDD		
	Length = 1756544 bytes		
	Checksum is valid		
	Scan for devices that are potential update candi-	ates:	
	>> [010] Deutsches Elektronen-Synchrotron DAMC2v	2	
	checkCompatibleComponents: FRU #10 seems to have Scan done.	all necessary capabilities	
	FRU #10: status code 1		
	FFU #10: status code 1		

ility Check Res... Additional Info

HPM image tool.

• No available tool and program

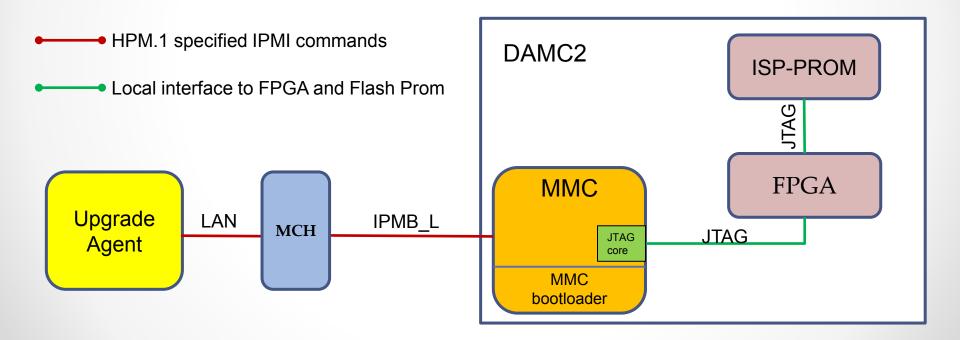
• A Java-based tool was developed in DESY to create HPM.1 compliant images.

🛃 HPMImageTool		
File Help		
Component File	2 damc2v2_v2_2.bin Browse	
Device ID	0	
Mfc ID	1343	
Product ID	002	
Time	12345678 (in sec. since 01.01.	1970)
Capabilities	0	
Selftest	0	
Rollback	0	
Inaccess	0	
Earliest Revision	0	
Firmware revision	1	
Firmware description	DAMC02_fpga_firmware_	
		0

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

