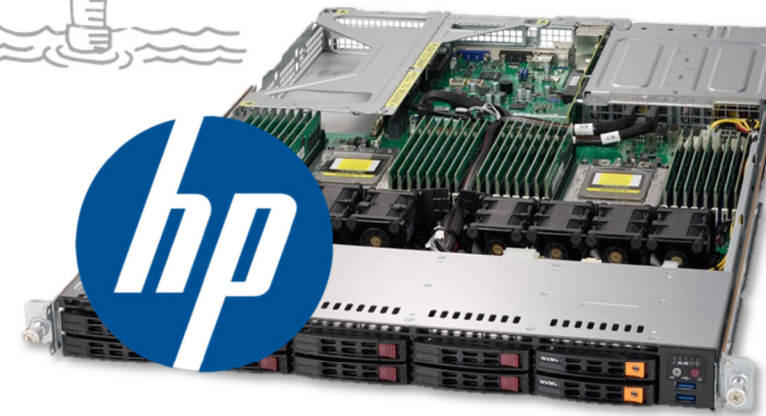
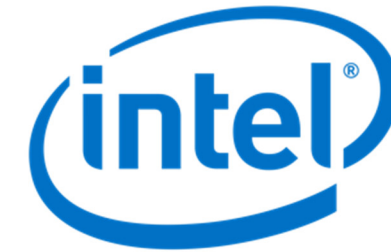
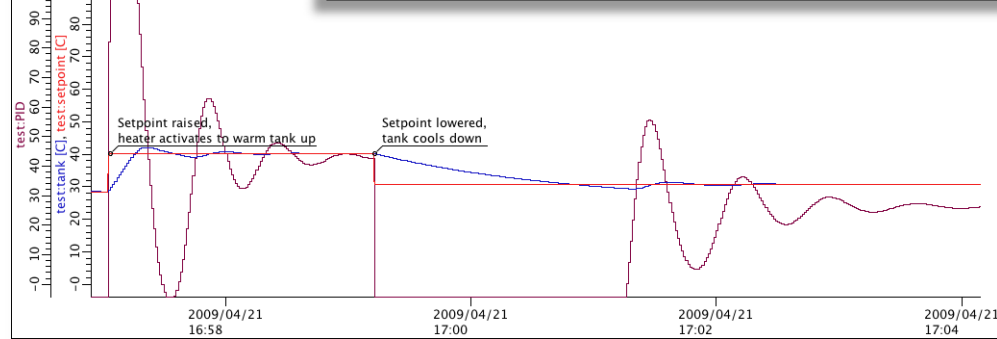
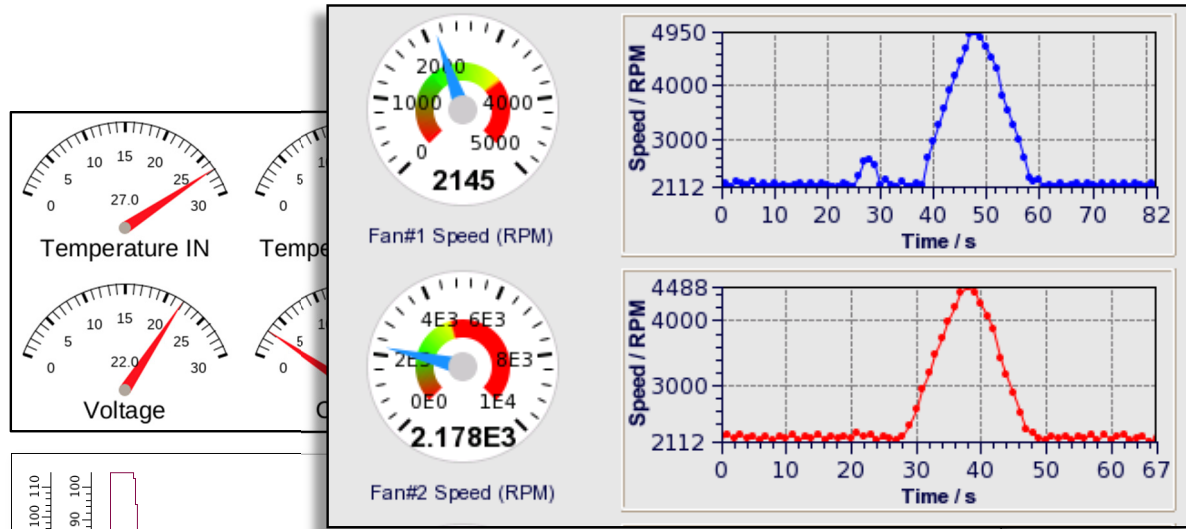


Centralized System Management of IPMI Enabled Platforms using EPICS

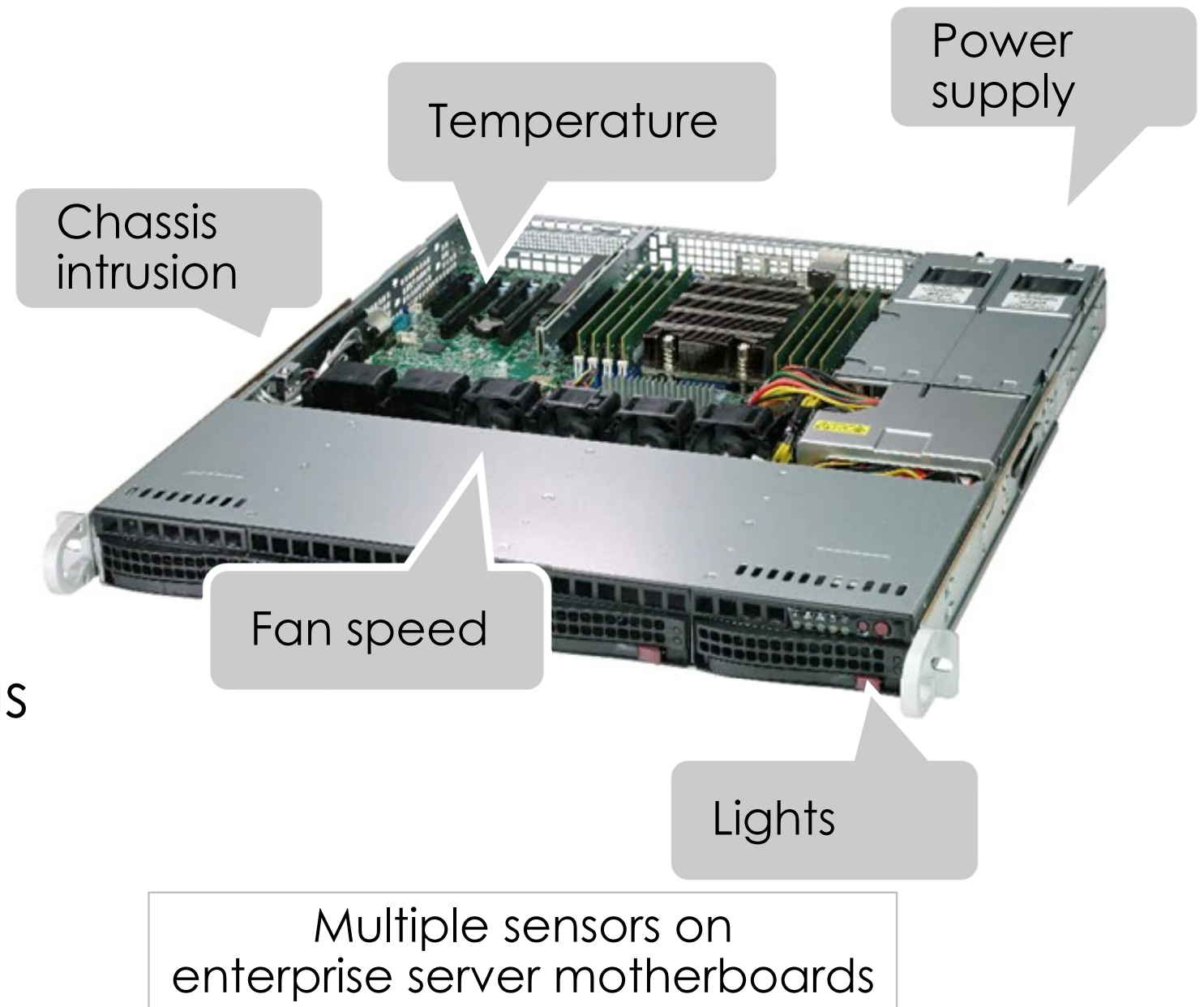
Klemen Vodopivec

ICALEPCS 2019 Oct 8th



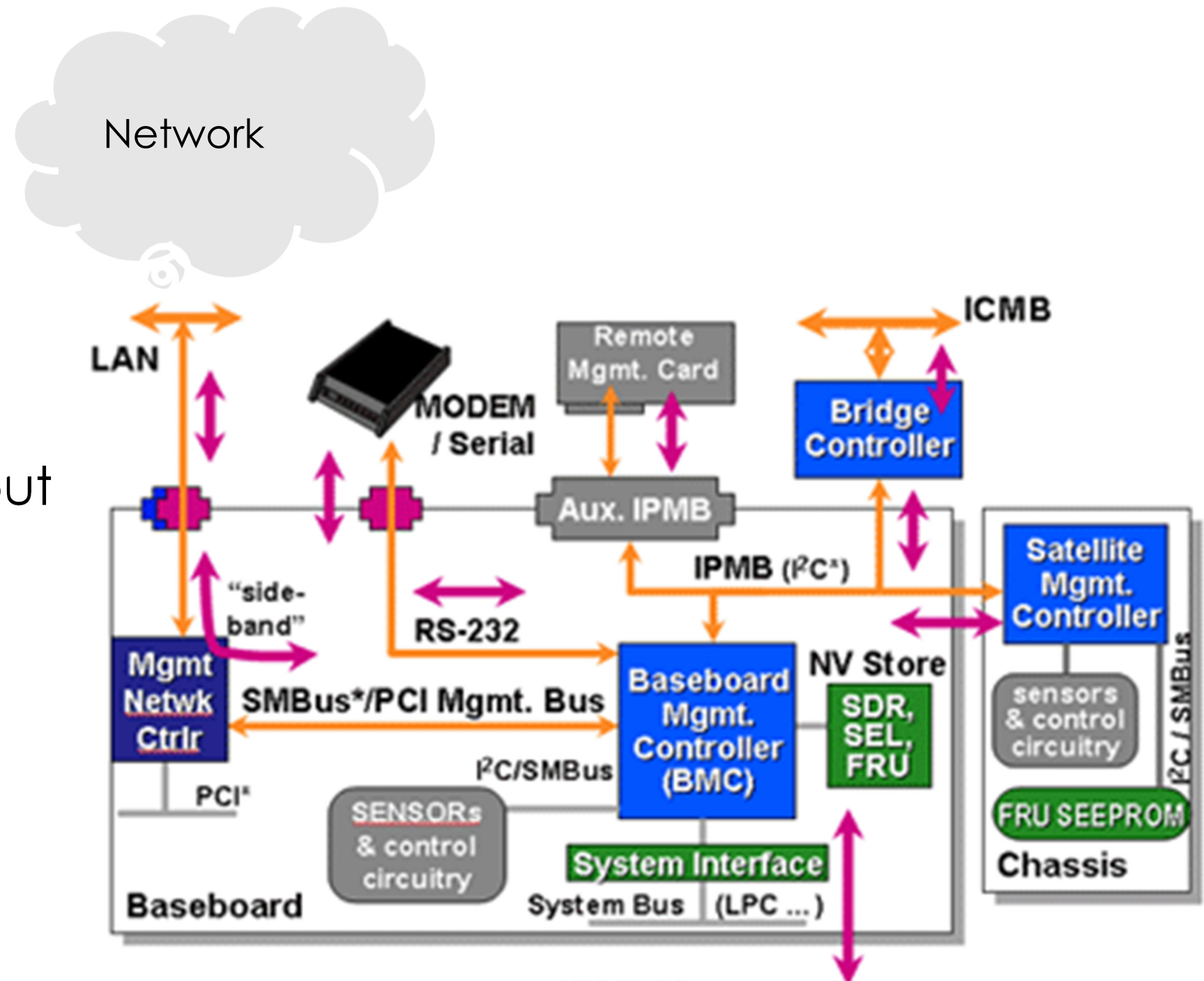
Externally available IPMI features

- Sensor Data Record (SDR)
- Field Replaceable Units (FRU)
 - Inventory cataloging
- System Event Log (SEL)
- Control functions
 - Power management
 - Change sensor threshold settings
 - Flashing EEPROM
 - Manage SEL



IPMI Security

- Powerful features
 - Always available
 - Manage power functions
 - BIOS interaction
 - Console redirection
 - Front panel buttons lock-out
- IPMI v2.0
 - Enhanced authentication
 - AES based encryption
 - Extended privilege levels



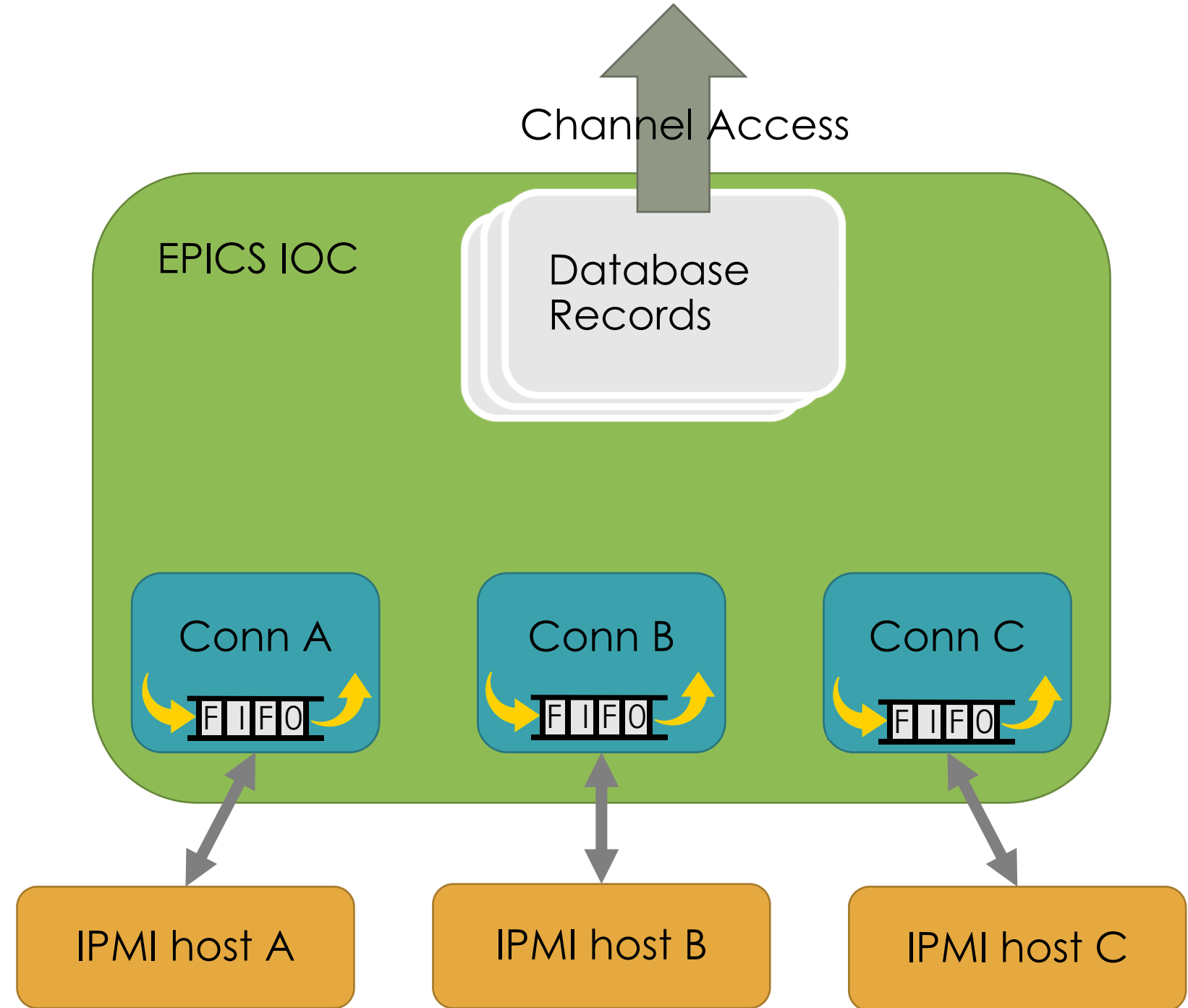
FreeIPMI library – leverage IPMI specification

- Open-source, multi-platform
- Most suitable among considered alternatives
 - ipmitool, openipmi
- Secure TCP/IP connection management
 - Authentication and encryption
 - Automatic reconnect
- Benefit from larger pool of users
 - Verified to work with many IPMI vendors
 - Thoroughly tested



EPICS device support

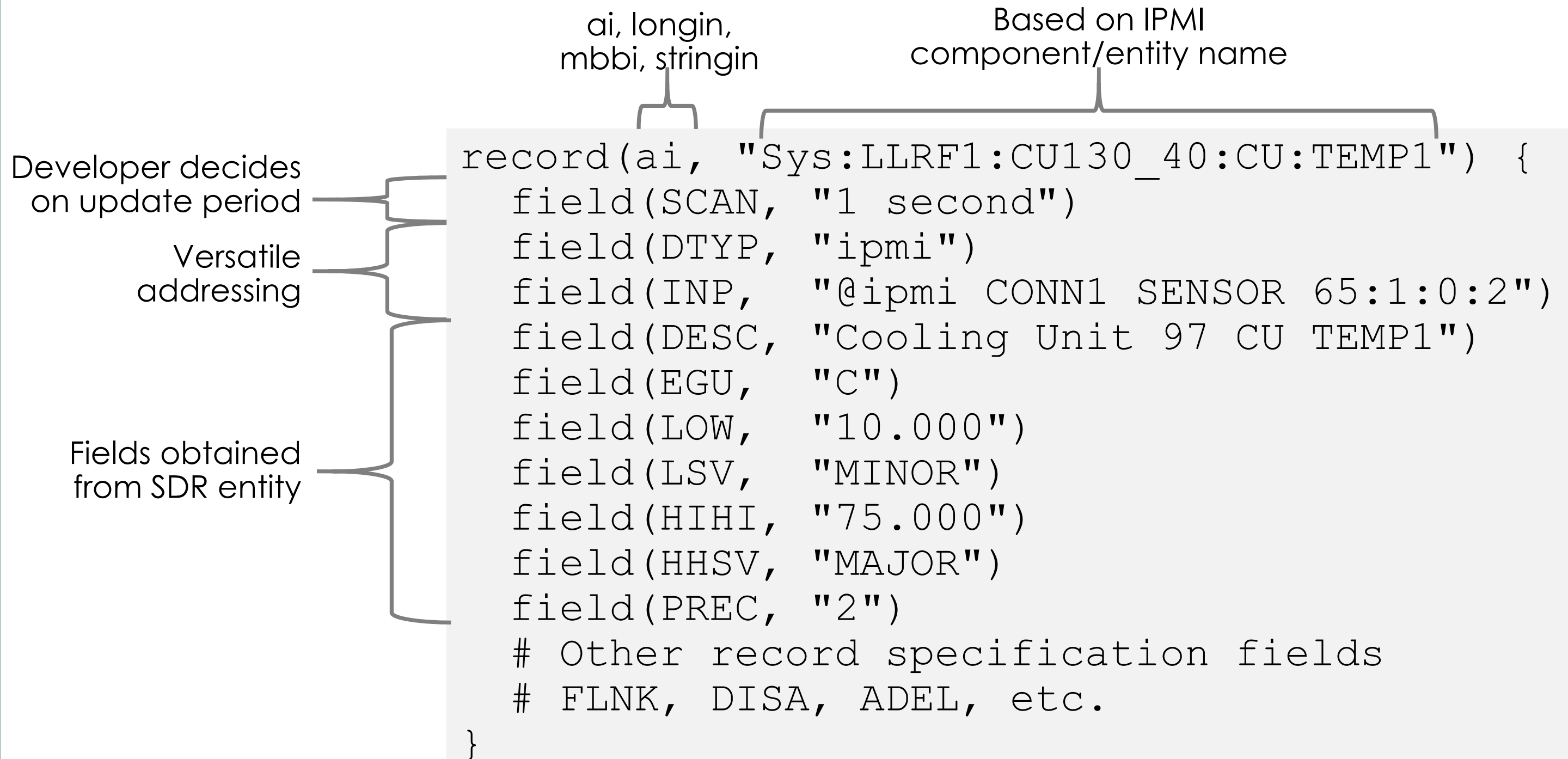
- New device driver
- Read-only monitoring
 - Sensors, FRU, lights
 - Supported records
ai, longin, stringin, mbbi
- Multiple IPMI connections
 - TCP/IP communication is
'blocking'
- Ready to use soft IOC



Device discovery and enumeration

- ipmiDumpDb() generates database file
 - Generate .db file with all supported entities as EPICS records
 - Pre-populate meta fields
 - Record names based on IPMI entity names
 - With support for custom prefix, ie. \$(INSTRUMENT):DAQ:System:Fan0
 - Working database or template for customized applications
- ipmiScan() prints to IOC console
 - Same discovered entities as ipmiDumpDb()
 - Filtering based on entity type
 - Human readable format

EPICS database record



Benefits of TCA static addressing

- Permanent record names
 - Consistent record value archiving across replacements
 - Modular build-up of record database and screens
- Component location information
 - Inventory traceability
 - Assisted identification of components

slot 2



Phoebus

File Applications Window Help

AMC502 details x VT816

100 %

Board info

Manufacturer	VadaTech
Product	AMC
Model	AMC502
Version	04.10
Date/time	unspecified
Part number	AMC502
Serial number	40170476
File ID	MgtCtrl.bin
Slot	2

Front panel lights

Eye icon, Plus icon, Cross icon, Diagonal lines icon

Green light, Red light, Blue light

Sensors

	Reading	Warning		Alarm		Critical	
		Low	High	Low	High	Low	High
FPGA Die Temperature	42 C	10 C	65 C	5 C	75 C		
Board Temperature	38 C	10 C	65 C	5 C	75 C		
Intake Air Temperature	33 C	10 C	65 C	5 C	75 C		
Outtake Air Temperature	38 C	10 C	65 C	5 C	75 C		
12V Input Power	12 V	11 V	13 V	10 V	14 V		
1.0V Voltage Rail	1 V	1 V	1 V	1 V	1 V		

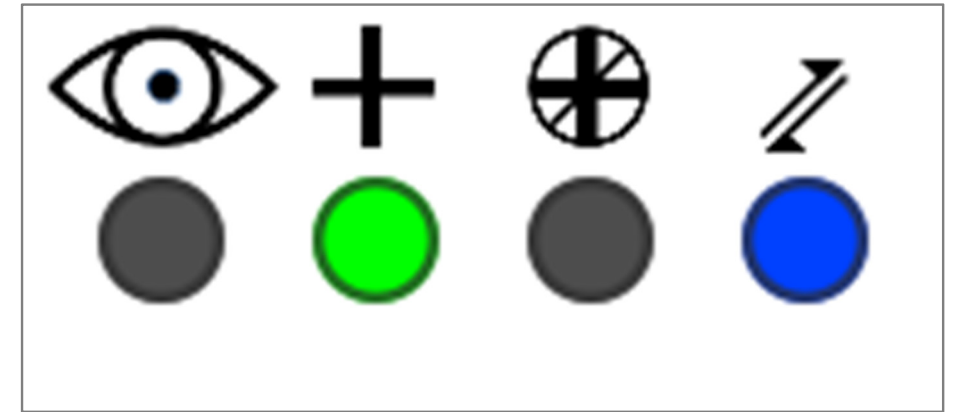
FPGA temperature (Gauge: 0 to 100, reading 42 C)

Board temperature (Gauge: 0 to 100, reading 38 C)

Input power 12V (Gauge: 10 to 14, reading 12 V)

PICMG Support (ATCA, MicroTCA)

- Monitoring of lights (PICMG allows changing lights from SW)
 - Multi-state represented as different colors
 - Solid, blinking (short/long/interval)
 - Extract colors into mbbi
- Extended FreeIPMI with custom messages
 - PICMG specific message using “FreeIPMI Interface Definition” (fiid)
 - Use of generic FreeIPMI send/receive with fiid



Conclusion

