



# **Management Of The FERMI Control System Infrastructure**

**L. Pivetta, A.I. Bogani, R. Passuello**

**Elettra – Sincrotrone Trieste, Italy**

**October 10 2013**



## Control system infrastructure in short

- Distributed control system based on a three-layer star-topology network
- 80 front-end computers, 20 servers (VM), 110 peripheral switches
- Based on the TANGO Control System Framework

## Requirements

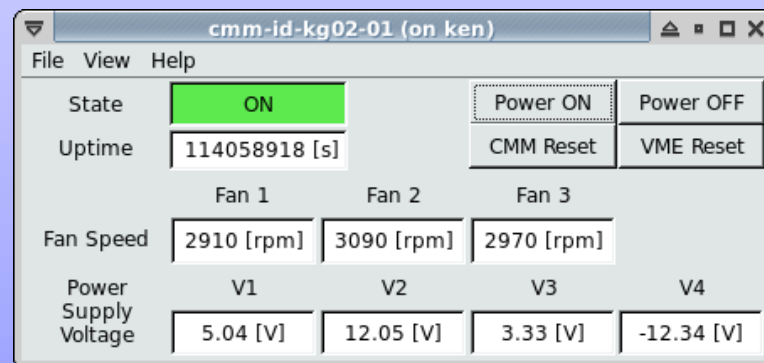
- Integrated system monitoring
- Remote system management
- Remote switching on/off of control system computers and controlled devices

## In-band system monitoring

- A TANGO device server to monitor selected OS parameters

## Out-of-band remote system management

- Chassis Monitor Module: an embedded micro to monitor and control the VME crates
- IPMI interfaces on Intel-based computers
- SNMP used for network switches management





## Power Distribution Units

- Controls, diagnostics, power supplies, vacuum, radio frequency modulators racks have been equipped with intelligent PDUs
- A large number of PDUs installed in the tunnel near the machine
- Three models from Raritan and APC selected
- TANGO device server based on SNMP and manufacturer MIB + GUI

## Nagios

- Open Source tool to monitor IT infrastructures
- Checks critical parameters such as disk space, system time synchronization, database replication
- Warnings and critical states are notified via mail to the system administrator, to the people on call and to the responsible of specific subsystems

pdu-rc-kg01-01				
File	View	Help		
Model	DPCR8A-16	State	ON	
Line Voltage	233.00 [V]	Cpu Temp	39.00 [°C]	
Line Current	1.50 [A]	Unit Apparent Power	355.00 [VA]	
Outlets	State	Current [A]	Commands	
socket strip	ON	0.00	Power ON	Power OFF
plc-mod-kg01-01	ON	0.13	Power ON	Power OFF
rack fan tray	ON	0.26	Power ON	Power OFF
sw-c-kg01-01	ON	0.31	Power ON	Power OFF
sds-vac-kg01-01	ON	0.58	Power ON	Power OFF
plc-int-kg01-01	ON	0.21	Power ON	Power OFF
rack lamp	ON	0.00	Power ON	Power OFF
ec-ps-kg01-01	ON	0.00	Power ON	Power OFF

The screenshot shows the Nagios web interface with the following sections:

- Monitoring Performance:**
  - Service Check Execution Time: 0.00 / 10.04 / 0.250 sec
  - Service Check Latency: 0.00 / 0.28 / 1.128 sec
  - Host Check Execution Time: 1.01 / 4.55 / 1.184 sec
  - Host Check Latency: 0.05 / 0.27 / 0.162 sec
  - # Active Host / Service Checks: 584 / 373
  - # Passive Host / Service Checks: 0 / 0
- Network Health:**
  - Host Health: ON
  - Service Health: ON
- Hosts:**
  - 24 Down, 0 Unreachable, 560 Up, 0 Pending
  - 1 Unhandled Problem, 21 Acknowledged
- Services:**
  - 19 Critical, 0 Warning, 0 Unknown, 354 OK, 0 Pending
  - 8 Unhandled Problems, 8 on Problem Hosts, 2 Acknowledged
- Monitoring Features:**
  - Flap Detection: ENABLED
  - Notifications: ENABLED
  - Event Handlers: ENABLED
  - Active Checks: ENABLED
  - Passive Checks: ENABLED