

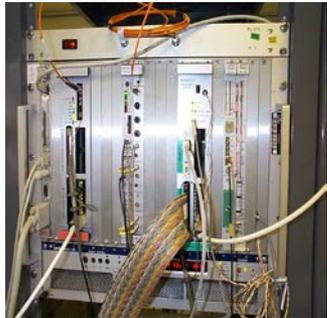
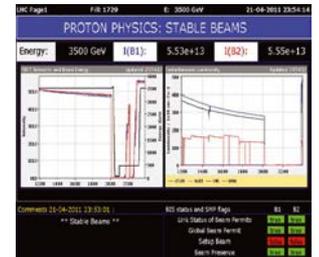
DIAMON2

Improved Monitoring of CERN's Accelerator Controls Infrastructure

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CERN's accelerators infrastructure



CERN Control & Monitoring: C²MON

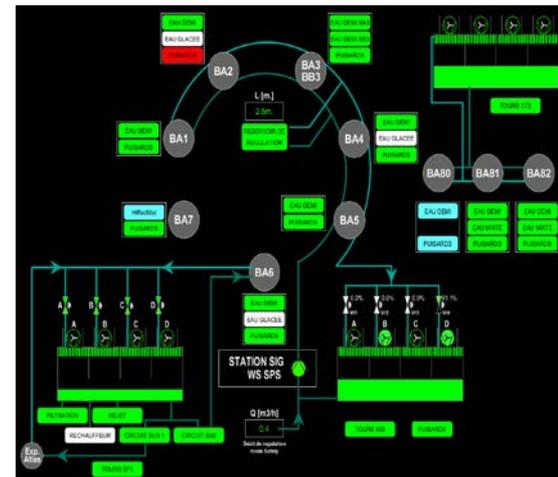
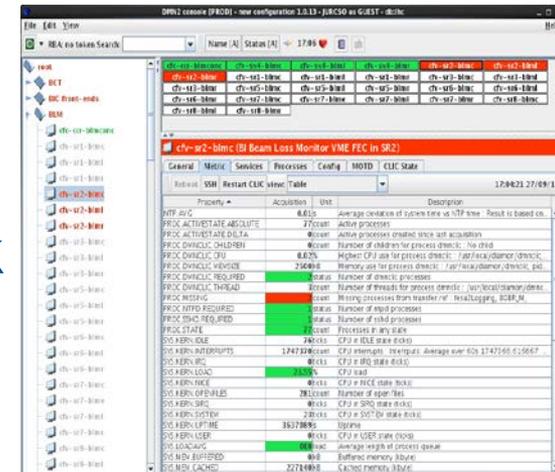
- Collaboration of two Departments to build a generic framework for building inter-operational monitoring solutions

- Applications based on C²MON framework

- Beams Department: DIAMON2
- General Services Department: TIM2

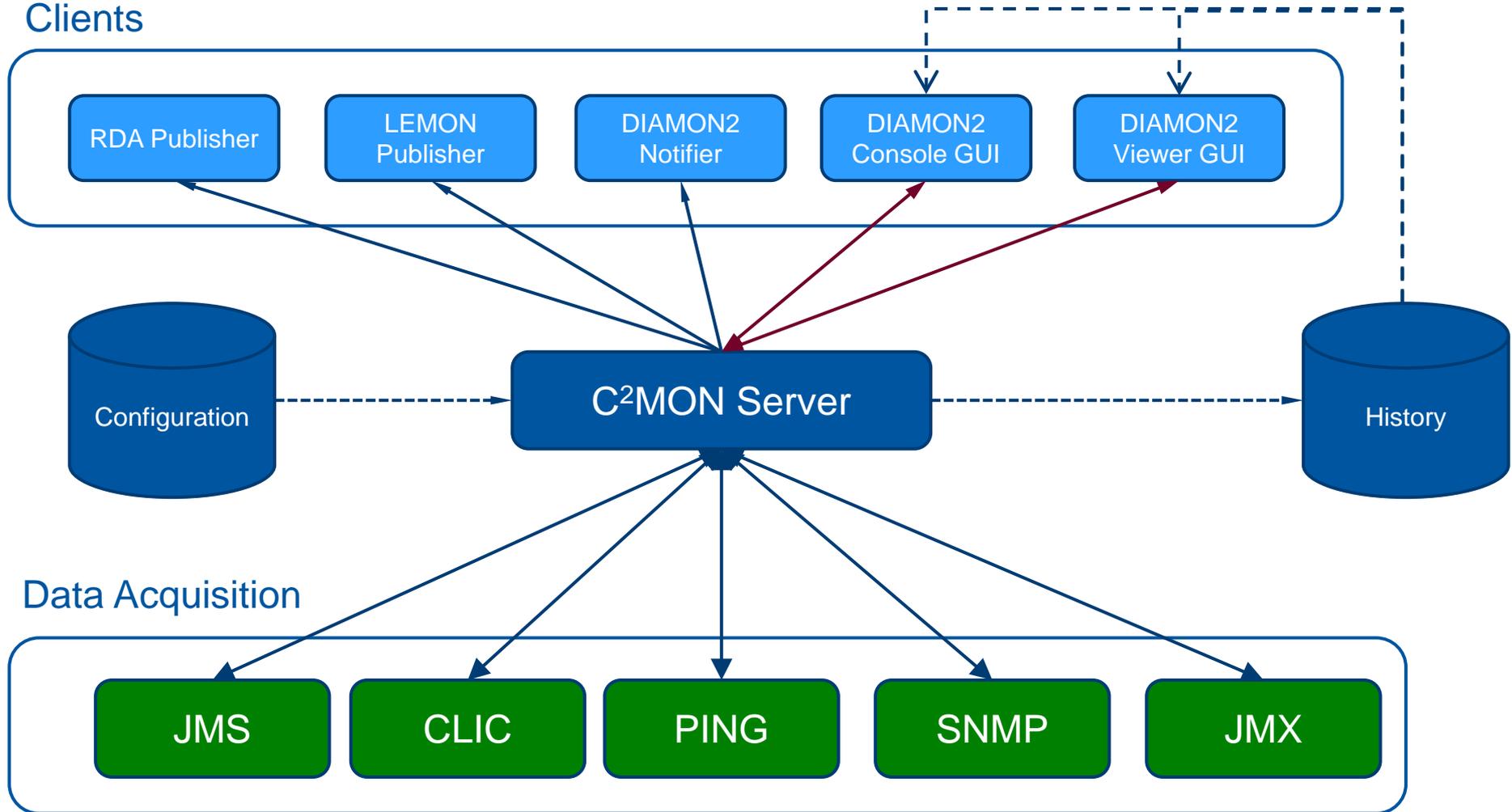
- Properties

- Ready-to-use solutions for the majority of required functionalities
- Robust, modular, extensible system

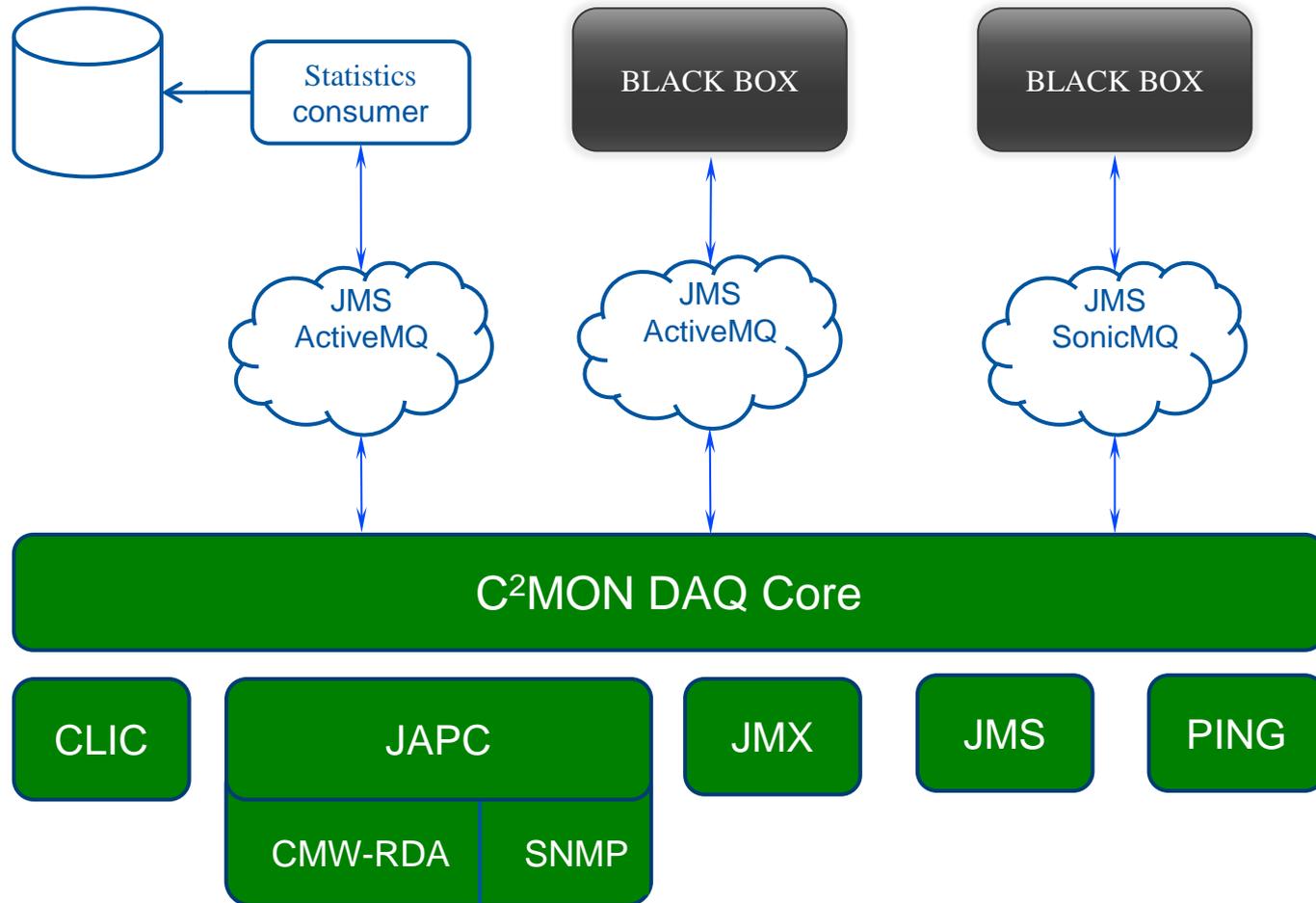


DIAMON2 architecture

Clients



DIAMON2 DAQ Components

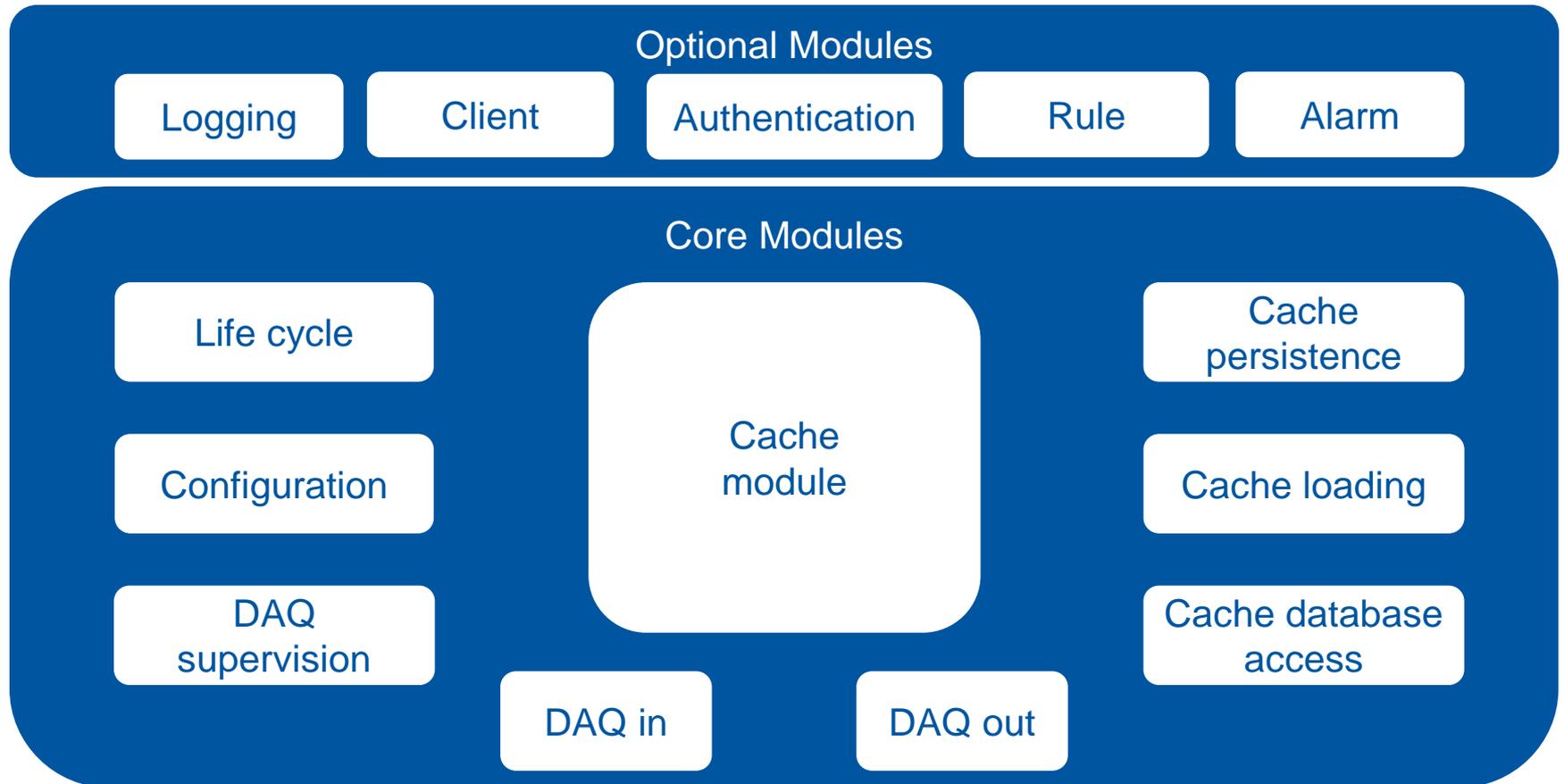


DIAMON2 CLIC

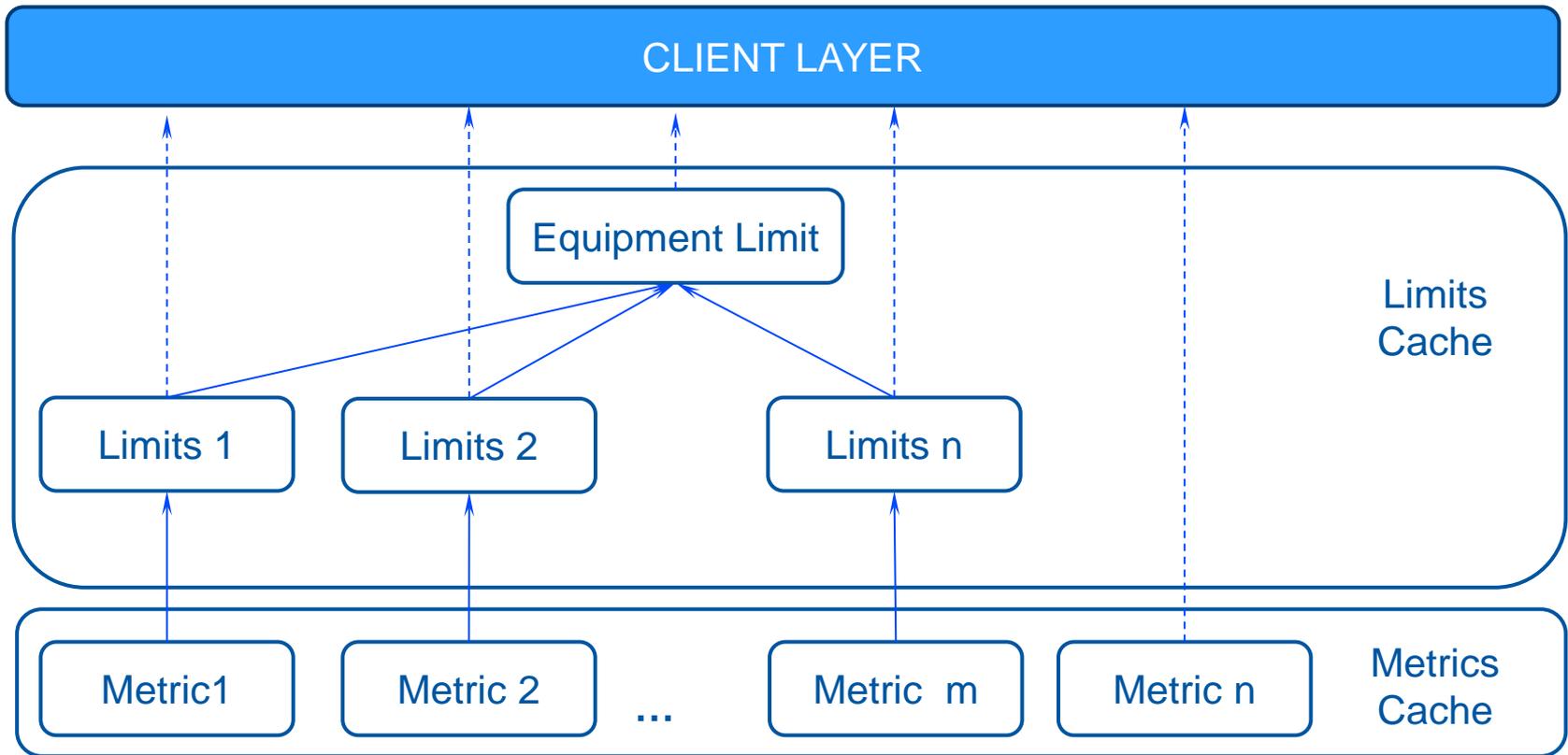
- The CLIC agent
 - Written in C++, small footprint
 - Deployed on over 2000 computers:
LynxOS, Linux & Windows
- The communication
 - STOMP / JMS protocol with text messages
 - Offering subscription and command – reply
- Modular approach is providing flexibility
 - Different modules are available on different platforms

DIAMON2 Server

- Modular approach based on C²MON



Metric, limits, equipment limits



RBA: no token Search: Name [A] Status [A] 17:06

- root
 - BCT
 - BIC front-ends
 - BLM
 - cfc-ccr-blmconc
 - cfv-sr1-blmc
 - cfv-sr1-blml
 - cfv-sr1-blmr
 - cfv-sr2-blmc**
 - cfv-sr2-blml
 - cfv-sr2-blmr
 - cfv-sr3-blmc
 - cfv-sr3-blml
 - cfv-sr3-blmr
 - cfv-sr5-blmc
 - cfv-sr5-blml
 - cfv-sr5-blmr
 - cfv-sr6-blmc
 - cfv-sr6-blml
 - cfv-sr6-blmr
 - cfv-sr7-blmc
 - cfv-sr7-blml
 - cfv-sr7-blmr
 - cfv-sr8-blmc
 - cfv-sr8-blml

cfc-ccr-blmconc	cfv-sx4-blmc	cfv-sx4-blml	cfv-sx4-blmr	cfv-sr2-blmc	cfv-sr2-blml
cfv-sr2-blmr	cfv-sr1-blmc	cfv-sr1-blml	cfv-sr1-blmr	cfv-sr3-blmc	cfv-sr3-blml
cfv-sr3-blmr	cfv-sr5-blmc	cfv-sr5-blml	cfv-sr5-blmr	cfv-sr6-blmc	cfv-sr6-blml
cfv-sr6-blmr	cfv-sr7-blmc	cfv-sr7-blml	cfv-sr7-blmr	cfv-sr8-blmc	cfv-sr8-blml
cfv-sr8-blml	cfv-sr8-blmr				

cfv-sr2-blmc (BI Beam Loss Monitor VME FEC in SR2)

General Metric Services Processes Config MOTD CLIC State

Reboot SSH Restart CLIC view: Table 17:04:21 27/09/13

Property ^	Acquisition	Unit	Description
NTP.AVG	0.01	s	Average deviation of system time vs NTP time : Result is based on...
PROC.ACTIVESTATE.ABSOLUTE	77	count	Active processes
PROC.ACTIVESTATE.DELTA	0	count	Active processes created since last acquisition
PROC.DMNCLIC.CHILDREN	0	count	Number of children for process dmnclic : No child
PROC.DMNCLIC.CPU	0.02	%	Highest CPU use for process dmnclic : /usr/local/diamon/dmnclic,...
PROC.DMNCLIC.MEMSIZE	2500	kB	Memory use for process dmnclic : /usr/local/diamon/dmnclic, pid...
PROC.DMNCLIC.REQUIRED	2	status	Number of dmnclic processes
PROC.DMNCLIC.THREAD	3	count	Number of threads for process dmnclic : /usr/local/diamon/dmnc...
PROC.MISSING	2	count	Missing processes from transfer.ref : fesa2Logging, BOBR_M,
PROC.NTPD.REQUIRED	1	status	Number of ntpd processes
PROC.SSHD.REQUIRED	1	status	Number of sshd processes
PROC.STATE	77	count	Processes in any state
SYS.KERN.IDLE	76	ticks	CPU in IDLE state (ticks)
SYS.KERN.INTERRUPTS	1747370	count	CPU interrupts : Interrupts: Average over 60s 1747366.616667 ...
SYS.KERN.IRQ	0	ticks	CPU in IRQ state (ticks)
SYS.KERN.LOAD	23.55	%	CPU load
SYS.KERN.NICE	0	ticks	CPU in NICE state (ticks)
SYS.KERN.OPENFILES	281	count	Number of open files
SYS.KERN.SIRQ	0	ticks	CPU in SIRQ state (ticks)
SYS.KERN.SYSTEM	23	ticks	CPU in SYSTEM state (ticks)
SYS.KERN.UPTIME	3637089	s	Uptime
SYS.KERN.USER	0	ticks	CPU in USER state (ticks)
SYS.LOADAVG	0E0	load	Average length of process queue
SYS.MEM.BUFFERED	0	kB	Buffered memory (kbyte)
SYS.MEM.CACHED	227140	kB	Cached memory (kbyte)

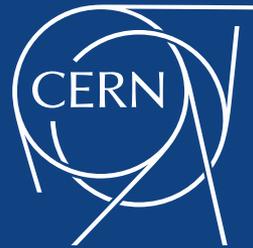


Operational experience since 2012

- Seamless transition to the new system
- Large scale deployment
 - 4820 equipment (including 2060 CLIC)
 - 67 500 metrics and 30 500 limits
 - Processing about 200 updates per second
- Positive user feedback
 - However configuration maintenance to be simplified

Future plans

- Simplification of configuration maintenance
- Integration of a new alarm system
- Web based user interfaces
 - Including functionality for mobile devices
- Making DIAMON2 Open Source



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