

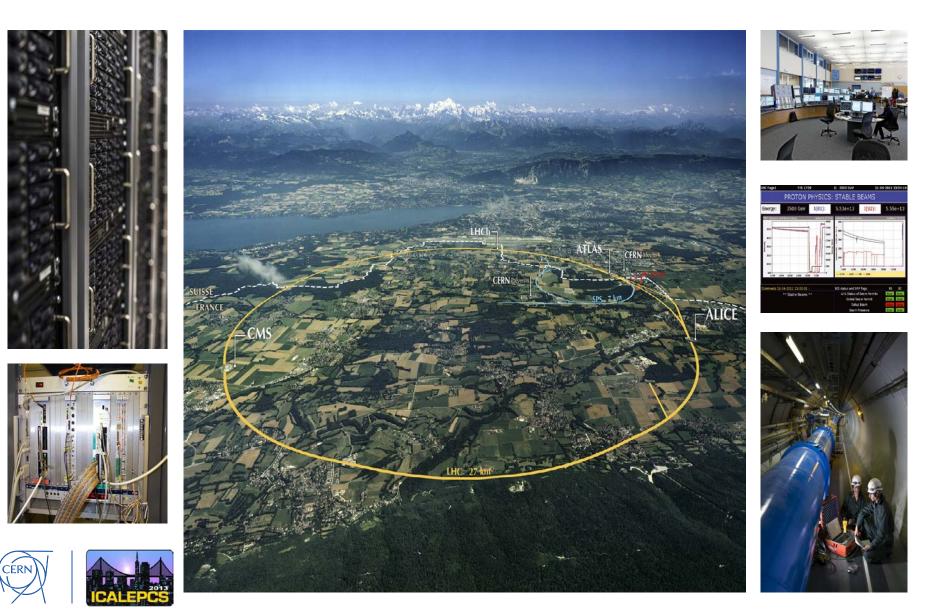
DIAMON2

Improved Monitoring of CERN's Accelerator Controls Infrastructure

Péter JURCSÓ - W. Buczak, M. Buttner, F. Ehm, M. Mitev



CERN's accelerators infrastructure



DIAgnostic and MONitoring version 2

- Provides tools for accelerator controls infrastructure monitoring
- Delivers easy to use first line diagnostics and means to
 - solve problems or help to decide about intervention
- Offers monitoring as well as on-demand enquiries
- Integrates with other systems including publishing, notification and alarms
- For operators and equipment groups

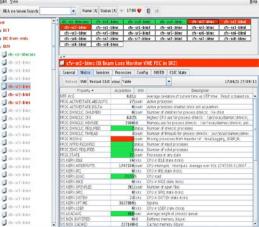
Edit View RBA: no token Search: blm	Vame [A]	Status (N) 🔸 13:45 💗			
REAC NO LOKEN SEATCHE DIM	Valle (A)				
ALL	acmmnr	alimcp001	alimcp003	atimcp100	atlmcp102
acmmnr 🗧	atimcp103	bco50s	bmu10s	bmu20s	bmu30s
	bmu40s	bmu50s	bmu60s	bws40s	dt-112-r1
alimcp001	cfc-150-rpow	cfc-152-cgsrc1	dc-152-dn4aos1	dfc-152-r1	dc-152-rln4pow1
alimcp003	dt-163-r1	dt-163-t2	cfc-170-arexplogw	cfc-170-r422	cfc-170-rpic
atimco100	d(-181-r1	cfc-193-alltf2	dc-193-asc1	cfc-193-rpow1	cfc-193-rpow2
	cfc-193-tadscrap	cfc-195-mkadhorn	cfc-197-bisobeam	cfc-197-rplcgps	dfc-197-rpichrs
📮 atlmcp102	cfc-197-rpiclin	dfc-197-rplarex	cfc-197-tislplcgw	cfc-2001-agw	cfc-2001-bmtv
atimco103	cfc-2001-rpow1	cfc-2010-bpm	cfc-2010-ccaos4	cfc-2010-rpow1	dc-2013-a12gts2
	cfc-233-rpow	cfc-250-rpow	cfc-251-rpseasthall	cfc-263-rpseastarea	cfc-269-cpaos13
💭 bco50s	cfc-269-cstep	cfc-269-rpsft16	dt-281-r1	cfc-351-cgen	cfc-351-rpow
bmu10s	cfc-353-bpmops	cfc-354-rpsft16	cfc-355-cpaos12	cfc-355-rpsecloud	cfc-355-rpspfw
bmu20s	cfc-355-rpsring	cfc-358-rpsa	cfc-359-cstep	cfc-359-rsepta	cfc-361-allcav
J Dmu20s	cfc-361-cbaos1	cfc-361-cbaos7	cfc-361-cbaos9	cfc-361-rinrg	cfc-361-rpsba
💭 bmu30s	cfc-361-rpsbb	cfc-361-rpsbc	cfc-361-rpsbd	cfc-361-rpsbe	cfc-361-rpsbej
bmu40s	cfc-361-rpsbmps	cfc-361-rpsbsep	cfc-362-mkkfa28	cfc-363-cgen	cfc-363-cgsrc
	cfc-363-csis	cfc-363-rlinac2	cfc-363-rin2transfer	cfc-365-cpaos11	cfc-365-rpseject
bmu50s	cfc-366-rpow1	cfc-367-rpops	cfc-368-rpsinject	cfc-370-rpow3	dc-375-r1
bmu60s	cfc-400-agplif	cfc-400-cgpIn4	cfc-400-cgsrc1	cfc-400-cln4aos2	cfc-400-mkprecho
bws40s	cfc-400-r14	cfc-400-rl4src	cfc-400-ri4tia	cfc-400-rpow1	cfc-6102-mtckick
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dr-150-rpow	cfc-866-reth2	cfc-866-reth3	cfc-866-rfip1	cfc-866-rfip2	cfc-866-rfip3
	cfc-866-rfip4	cfc-866-rfip5	cfc-866-rfip6	cfc-866-rfip7	cfc-867-mkacd
📮 cfc-152-cgsrc1	cfc-867-mkacdpm	cfc-867-mkbpm	cfc-867-mkdpm	cfc-867-mkdpm2	cfc-867-mkdspm
drc-152-cin4aos1	cfc-867-mkipm	cfc-867-mkitim	cfc-a7-reth1	cfc-a7-rfip1	cfc-ba1-cgptd
d(-152-r1	cfc-ba1-mkqhtim	cfc-bal-mkqvtim	cfc-bal-tscrap	cfc-ba2-cgptd	cfc-ba3-cgptd
🚽 dt-152-f1	cfc-ba4-cgptd	cfc-ba4-esyncdau	cfc-ba5-bifip	cfc-ba5-cgptd	cfc-ba5-tscrap
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	cfc-ccr-allgpsps	cfc-ccr-apsgw	dc-ca-bct	cfc-ccr-blmconc	cfc-ccr-bqbpmlhc
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	cfc-ccr-cgptbs	cfc-ccr-cgrilis	cfc-ccr-cgtasea	dc-ca-cgwtg	cfc-ccr-cpmcom
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dt-181-r1	cfc-ccr-tdump	cfc-ccr-tecephin	cfc-ccr-tgplc	dc-ca-tislits	cfc-ccr-tna
	efe-cer-zssps	cfc-hca4-bti8cd	cfc-hca4-dtsta	cfc-hca4-fiptsta	cfc-hca4-mkepm
📮 cfc-193-allrf2	cfc-hca4-qtsta	cfc-hca4-saos12	cfc-hca4-tccsti8	cfc-hca4-tpixdetec	cfc-phall-rcal1
drc-193-asc1	cfc-phall-reth1	cfc-phall-rfip1	cfc-sa6-ql6ce	cfc-sa6-ql6df	cfc-sa6-q17i

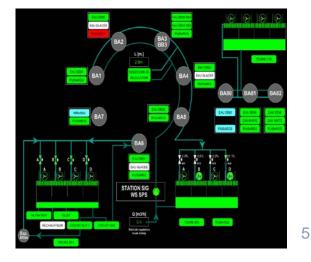


CERN Control & Monitoring: C²MON

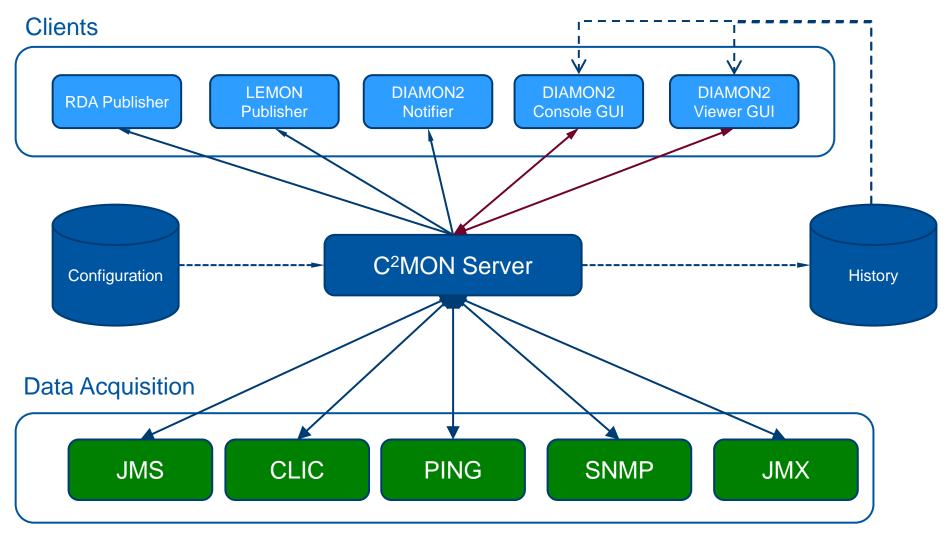
- Collaboration of two Departments to build a generic framework for building inter-operational monitoring solutions
- Applications based on C²MON framework
 - Beams Department: DIAMON2
 - General Services Department: TIM2
- Properties
 - Ready-to-use solutions for the majority of required functionalities
 - Robust, modular, extensible system





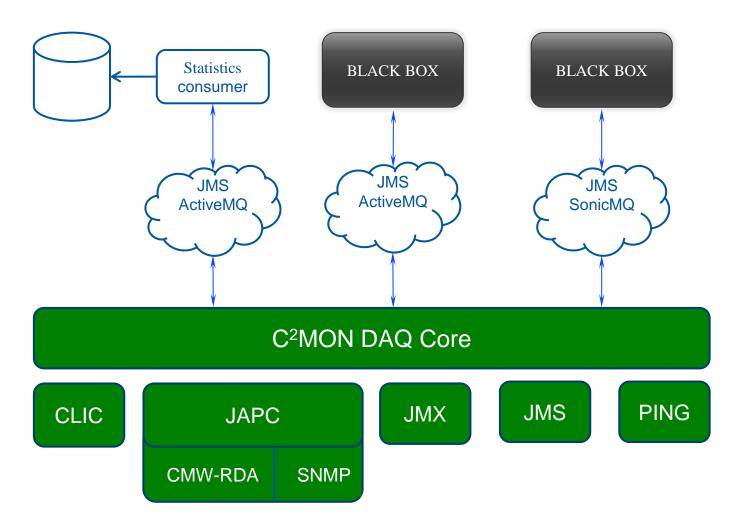


DIAMON2 architecture





DIAMON2 DAQ Components





DIAMON2 CLIC

- The CLIC agent
 - Written in C++, small footprint
 - Deployed on over 2000 computers:

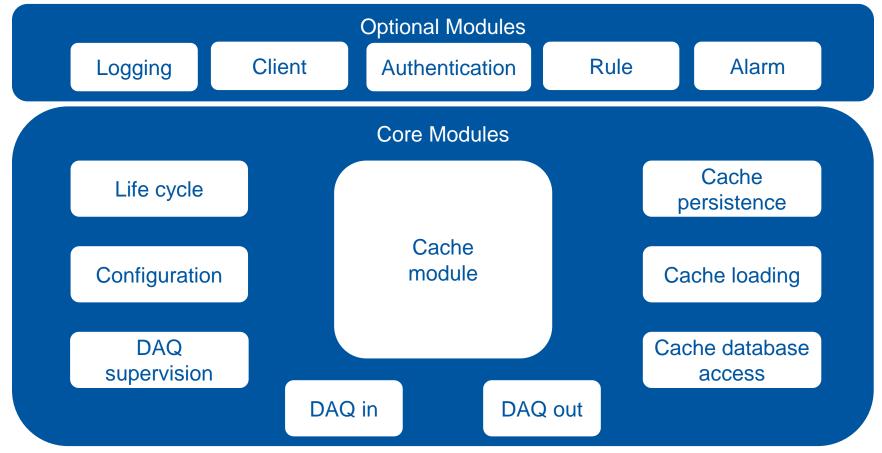
LynxOS, Linux & Windows

- 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



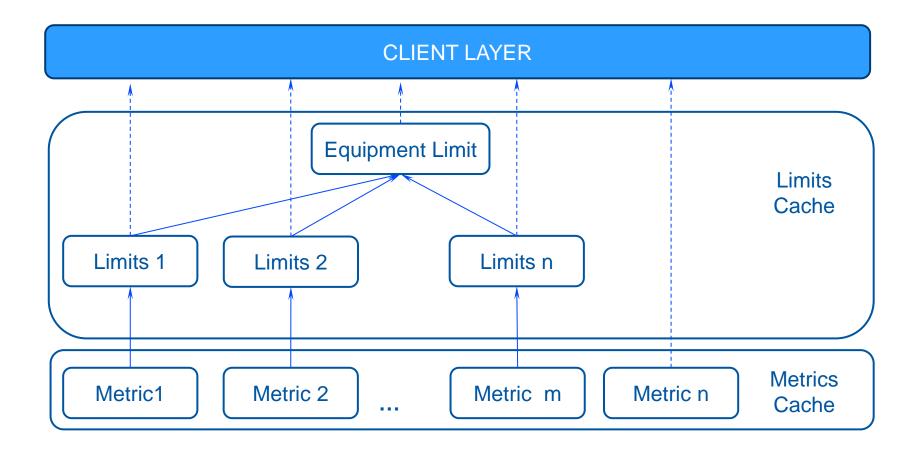
DIAMON2 Server

Modular approach based on C²MON





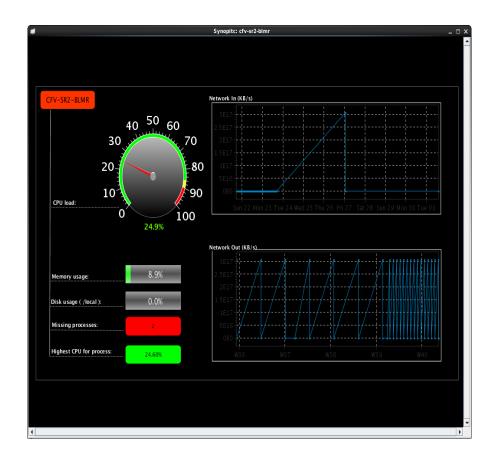
Metric, limits, equipment limits



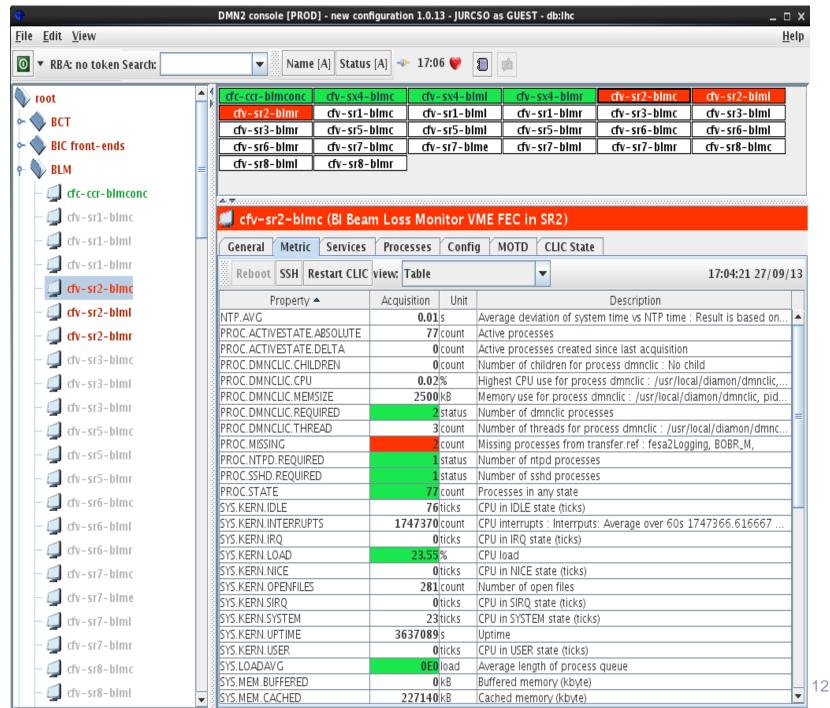


DIAMON2 Console

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				attern 100	atlanca 102
ALL	acmmnr atlmcp103	alimcp001 bco50s	alimcp003 bmu10s	atimcp100 bmu20s	attmcp102 bmu30s
🥥 acmmnr 👘 👘	bmu40s	bmu50s	bmu60s	bws40s	dfc-112-r1
alimco001	cfc-150-rpow	cfc-152-cgsrc1	cfc-152-cln4aos1	dc-152-r1	cfc-152-rin4pow1
	dc-163-r1	dc-163-r2	cfc-170-arexploqw	dfc-170-r422	cfc-170-rplc
alimcp003	dc-181-r1	cfc-193-alltf2	cfc-193-asc1	cfc-193-rpow1	cfc-193-rpow2
🗐 atimcp100	cfc-193-tadscrap	cfc-195-mkadhorn	cfc-197-bisobeam	cfc-197-rpicgps	dfc-197-rpichrs
atimcp102	cfc-197-rplclin	cfc-197-rplcrex	cfc-197-tislplcgw	cfc-2001-agw	cfc-2001-bmtv
	cfc-2001-rpow1	cfc-2010-bpm	dfc-2010-ccaos4	cfc-2010-rpow1	dfc-2013-a12gts2
📮 atimcp103	cfc-233-rpow	cfc-250-rpow	cfc-251-rpseasthall	cfc-263-rpseastarea	cfc-269-cpaos13
Dco50s	cfc-269-cstep	cfc-269-rpsft16	dfc-281-r1	crc-351-cgen	cfc-351-rpow
bmu10s	cfc-353-bpmops	cfc-354-rpsft16	cfc-355-cpaos12	cfc-355-rpsecloud	cfc-355-rpspfw
	cfc-355-rpsring	ctc-358-rpsa	cfc-359-cstep	cfc-359-rsepta	cfc-361-allcav
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🖾 bmu30s	cfc-361-rpsbb	cfc-361-rpsbc	cfc-361-rpsbd	cfc-361-rpsbe	ctc-361-rpsbej
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	cfc-363-csis	cfc-363-rlinac2	cfc-363-rin2transfer	cfc-365-cpaos11	cfc-365-rpseject
🗐 bmu50s	cfc-366-rpow4	cfc-367-rpops	cfc-368-rpsinject	cfc-370-rpow3	dfc-375-i1
bmu60s	ctc-400-agpirt	cfc-400-cgpin4	ctc-400-cgsrc1	ctc-400-cin4aos2	cfc-400-mkprecho
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	cfc-ba4-cgptd	cfc-ba4-esyncdau	cfc-ba5-bifip	cfc-ba5-cgptd	dic-ba5-tscrap
🗐 cfc-152-rin4pow1	cfc-ba6-cgptd	cfc-ba6-mkepm	cfc-ba7-bti2cd	cfc-ba7-cgptd	cfc-ba7-esyncdau
dc-163-r1	cfc-ba7-tccstl2	cfc-ba80-cgptd	cfc-ba81-bistep	cfc-ba81-cgptd	cfc-ba82-cgptd
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🥥 dtc-163-12	dt-ca-caksvy	cfc-ccr-cgabssea	d'c-ca-cgcps	cfc-ccr-cgpcngs	cfc-ccr-cgpgw
d cfc-170-arexplcgw	cfc-ccr-cgplbd	cfc-ccr-cgplrf	cfc-ccr-cgplrf2	cfc-ccr-cgpsbt	cfc-ccr-cgpsea
cfc-170-r422	dc-ca-captbs	dc-ca-cgrilis dc-ca-ab04	cfc-ccr-cgtasea	cfc-ccr-cgwtg	cfc-ccr-cpmcom
-	cfc-ccr-cpmcom2		dc-ca-db05	cfc-ccr-ctcngs	de car-etpps
🗐 efe-170-rple	cfc-ccr-ctxlhc cfc-ccr-tdump	cfc-ccr-cxps	dc-ca-axsps dc-ca-taple	cfc-ccr-cvsps cfc-ccr-tislits	cfc-ccr-cvsps1 cfc-ccr-tna
dr-181-r1		cfc-ccr-tecephin cfc-hca4-bti8cd	cfc-hca4-dtsta	dc-hca4-fiptsta	dc-hca4-mkepm
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🗐 cfc-193-allrf2	crc-nca4-qtsta cfc-phall-reth1	cfc-phall-rfip1	cfc-sa6-ql6ce	ctc-sa6-ql6df	cfc-sa6-ql7i
drc-193-asc1	Crephan reuni	uc pinali mpi	CIC Sab qibic	uc-sao-qibai	ut-sao-qi/i







CERN

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





www.cern.ch