

Alarms in relation to PM

Katarina Sigerud

LHC Post Mortem Workshop

16-17 January 2007

Content

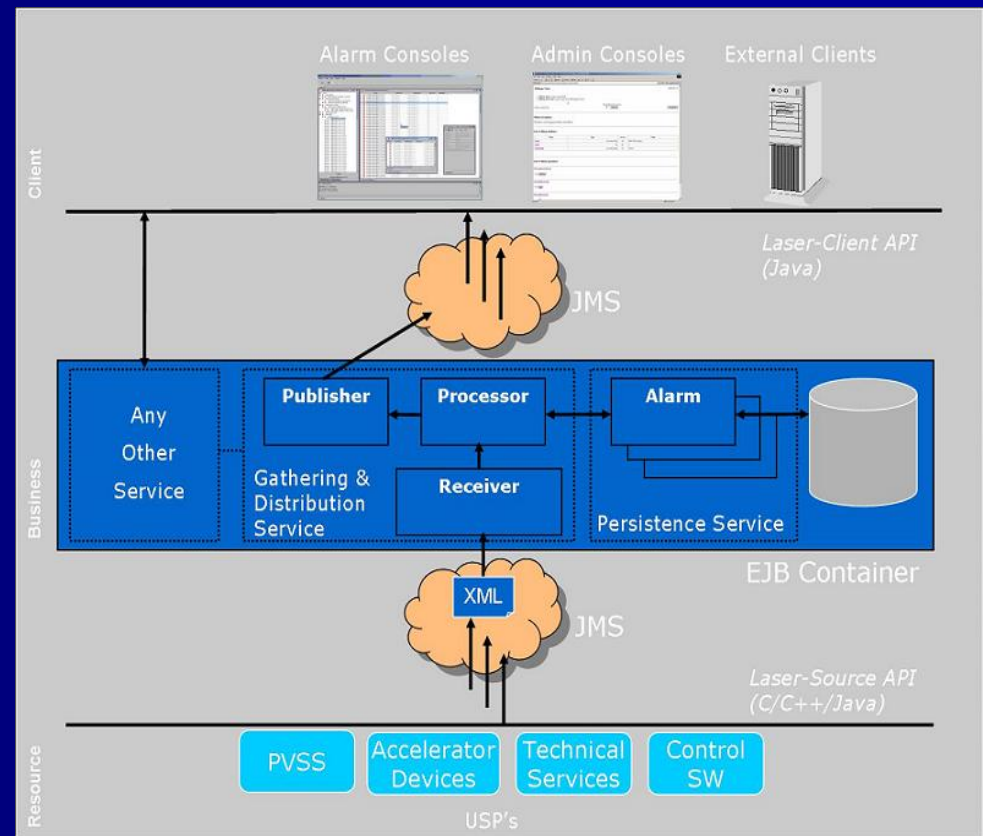
- What are alarms?
- What is LASER?
- LASER – PM integration
- Open issues

What are alarms?

- Abnormal situations
 - Range from severe alarms to warning states
- Reported by surveillance programs
 - Provided by application writers and equipment specialists
- Collected, distributed and archived by an alarm reporting tool
 - The LHC alarm service - LASER

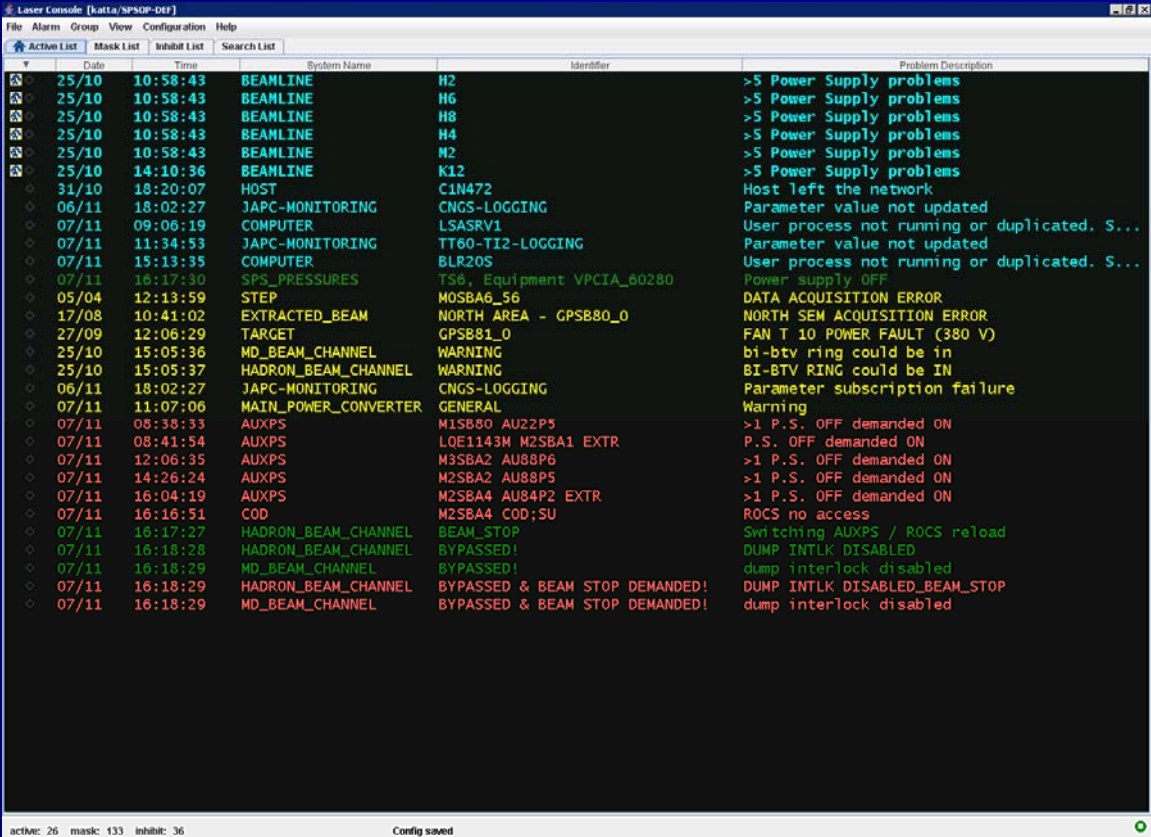
What is LASER?

- Delivers an alarm service for the operation of the CERN accelerator chain and technical services
- A distributed, 'layered' system
 - A dispersed set of surveillance programs detecting alarms
 - An alarm server that collects, analyses, distributes and archives alarms
 - Dedicated consoles and software clients displaying alarms



LASER alarm console

- Main tool for alarm display
- Provide facilities to
 - Configure and manage alarms displayed
 - Search archive and alarm definitions
 - Export alarm lists in different formats to email or file



The screenshot shows the LASER alarm console interface with a table of active alarms. The table has columns for Date, Time, System Name, Identifier, and Problem Description. The status bar at the bottom indicates 26 active, 133 masked, and 36 inhibited alarms.

Date	Time	System Name	Identifier	Problem Description
25/10	10:58:43	BEAMLINE	H2	>5 Power Supply problems
25/10	10:58:43	BEAMLINE	H6	>5 Power Supply problems
25/10	10:58:43	BEAMLINE	H8	>5 Power Supply problems
25/10	10:58:43	BEAMLINE	H4	>5 Power Supply problems
25/10	10:58:43	BEAMLINE	M2	>5 Power Supply problems
25/10	14:10:36	BEAMLINE	K12	>5 Power Supply problems
31/10	18:20:07	HOST	C1N472	Host left the network
06/11	18:02:27	JAPC-MONITORING	CNGS-LOGGING	Parameter value not updated
07/11	09:06:19	COMPUTER	LSASRV1	User process not running or duplicated. S...
07/11	11:34:53	JAPC-MONITORING	TT60-TI2-LOGGING	Parameter value not updated
07/11	15:13:35	COMPUTER	BLR20S	User process not running or duplicated. S...
07/11	16:17:30	SPS_PRESSURES	TS6, Equipment VPCIA_60280	Power supply OFF
05/04	12:13:59	STEP	MOSBA6_56	DATA ACQUISITION ERROR
17/08	10:41:02	EXTRACTED_BEAM	NORTH_AREA - GPS880_0	NORTH SEM ACQUISITION ERROR
27/09	12:06:29	TARGET	GPS881_0	FAN T 10 POWER FAULT (380 V)
25/10	15:05:36	MD_BEAM_CHANNEL	WARNING	bi-btv ring could be in
25/10	15:05:37	HADRON_BEAM_CHANNEL	WARNING	BI-BTV RING could be IN
06/11	18:02:27	JAPC-MONITORING	CNGS-LOGGING	Parameter subscription failure
07/11	11:07:06	MAIN_POWER_CONVERTER	GENERAL	Warning
07/11	08:38:33	AUXPS	M1S880 AU22P5	>1 P.S. OFF demanded ON
07/11	08:41:54	AUXPS	LOE1143M M2SBA1 EXTR	P.S. OFF demanded ON
07/11	12:06:35	AUXPS	M3SBA2 AU88P6	>1 P.S. OFF demanded ON
07/11	14:26:24	AUXPS	M2SBA2 AU88P5	>1 P.S. OFF demanded ON
07/11	16:04:19	AUXPS	M2SBA4 AU84P2 EXTR	>1 P.S. OFF demanded ON
07/11	16:16:51	COD	M2SBA4 COD;SU	ROCS no access
07/11	16:17:27	HADRON_BEAM_CHANNEL	BEAM_STOP	Switching AUXPS / ROCS reload
07/11	16:18:28	HADRON_BEAM_CHANNEL	BYPASSED!	DUMP INTLK DISABLED
07/11	16:18:29	MD_BEAM_CHANNEL	BYPASSED!	dump interlock disabled
07/11	16:18:29	HADRON_BEAM_CHANNEL	BYPASSED & BEAM STOP DEMANDED!	DUMP INTLK DISABLED_BEAM_STOP
07/11	16:18:29	MD_BEAM_CHANNEL	BYPASSED & BEAM STOP DEMANDED!	dump interlock disabled

Alarms for PM analysis

- Where no internal PM buffer exists
 - E.g. machine protection (PIC), vacuum
- Provide information about the surrounding physical environment
 - E.g. radiation protection, electricity outages

LASER – PM integration

- Extract from alarm archive provided in SDDS format
 - All alarms for the time range (10 minutes before – 5 minutes after)
- Triggered by PM system

Alarm archive SDDS file

```
SDDS1
!generated by Laser Alarm Console
&description contents="Laser Console ACTIVE list report (Thu Jan 11 09:43:50 CET 2007)" &end
&column name=Timespec.seconds, type=long &end
&column name=Timespec.nanoseconds, type=long &end
&column name=AlarmId, type=string &end
&column name=Status, type=character &end
&column name=System, type=string &end
&column name=Identifier, type=string &end
&column name=Description, type=string &end
&data mode=ascii &end
40
1158044583 0 "COMM_TIMPROC_LHC:E_OPC_GTCCHILLSUX5:4163" "N" "COMM TIM          LHC" "SUX5  3582-R -    E_OPC_GTCCHILLSUX5"
    "DEFAULT FONCTIONNEMENT EQUIPEMENT TIM"
1161609655 200000000 "EAU_DEMI_LHC:FDED-00101:20" "N" "EAU  DEMI          LHC" "UA67  2639- -    FDED-00101" "DEFAULT GENERAL"
1163500884 380000000 "CNGSAUX:XG.REFL-CNGS:1" "N" "CNGS AUX" "XG.REFL-CNGS" "COOLING FAILURE"
1163513041 680000000 "CNGSAUX:XG.HORN-CNGS:1" "N" "CNGS AUX" "XG.HORN-CNGS" "COOLING FAILURE"
1164210543 110000000 "CMWALARMMONITOR:XG.HORN-CNGS:2" "N" "SURVEILLANCE" "XG.HORN-CNGS" "Disconnected from CMW Alarm Monitor
    due to connection breakdown or server failure"
1164210543 127000000 "CMWALARMMONITOR:XG.REFL-CNGS:2" "N" "SURVEILLANCE" "XG.REFL-CNGS" "Disconnected from CMW Alarm Monitor
    due to connection breakdown or server failure"
1164719349 982000000 "CRYO_EXPERIMENT_LHC:QUR1H:9841" "N" "CRYO EXPERIMENT LHC" "USC55 3524- -    QUR1H" "[A] DEFAULT
    REFRIGERATEUR CMS"
1164807001 0 "EAU_BRUTE_LHC:CIRC_EP_SUX5:8264" "N" "EAU  BRUTE          LHC" "SF5   3565-SS-    CIRC_EP_SUX5" "DEFAULT CIRCUIT EAU
    PRIMAIRE SUX5"
```


Open issues

- How will the triggering be done?
 - Via timing? Only? Should manual triggering be possible?
- Should the trigger be parameterized?
 - Different time ranges
 - Different alarm configuration

Open issues cont.

- What should be extracted from the alarm archive?
 - All alarms or a subset?
- Which timestamp to use?
 - Provided by surveillance program or LASER? Or both?
- Possibility to access alarm archive outside of PM trigger?
 - Available tools appropriate or different interface required?
 - Who will store the additional data? What are the lifetime requirements?