Alarms in relation to PM

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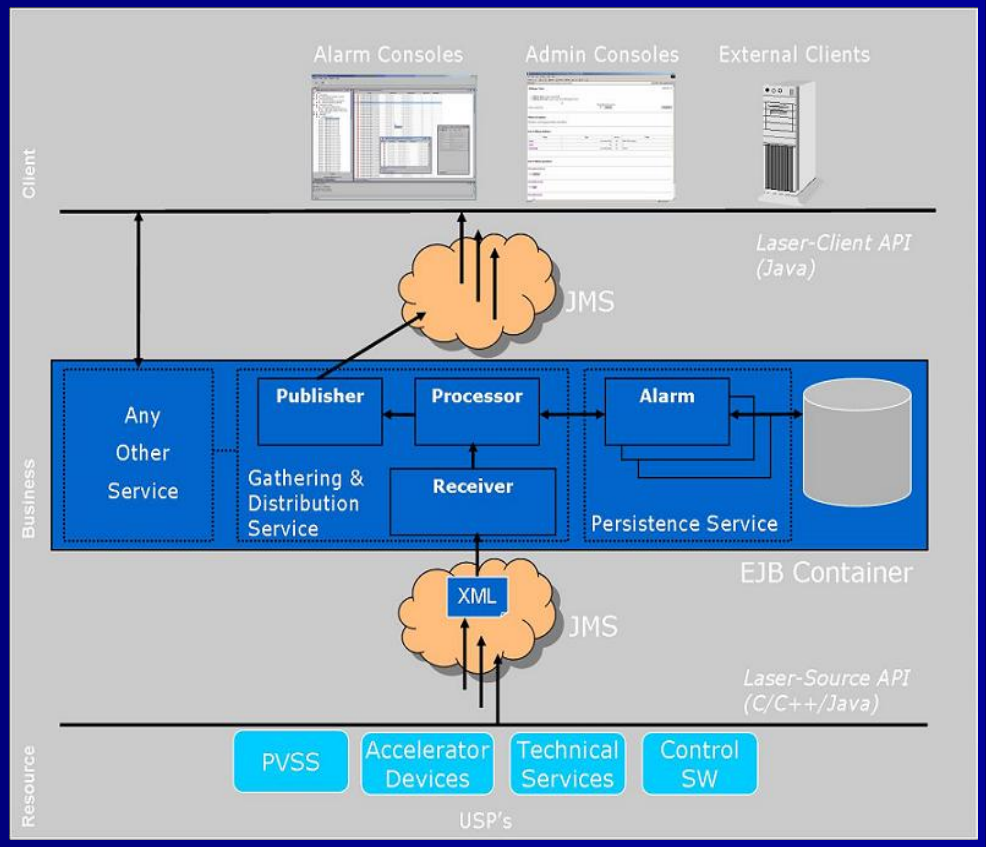
What are alarms?

- 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

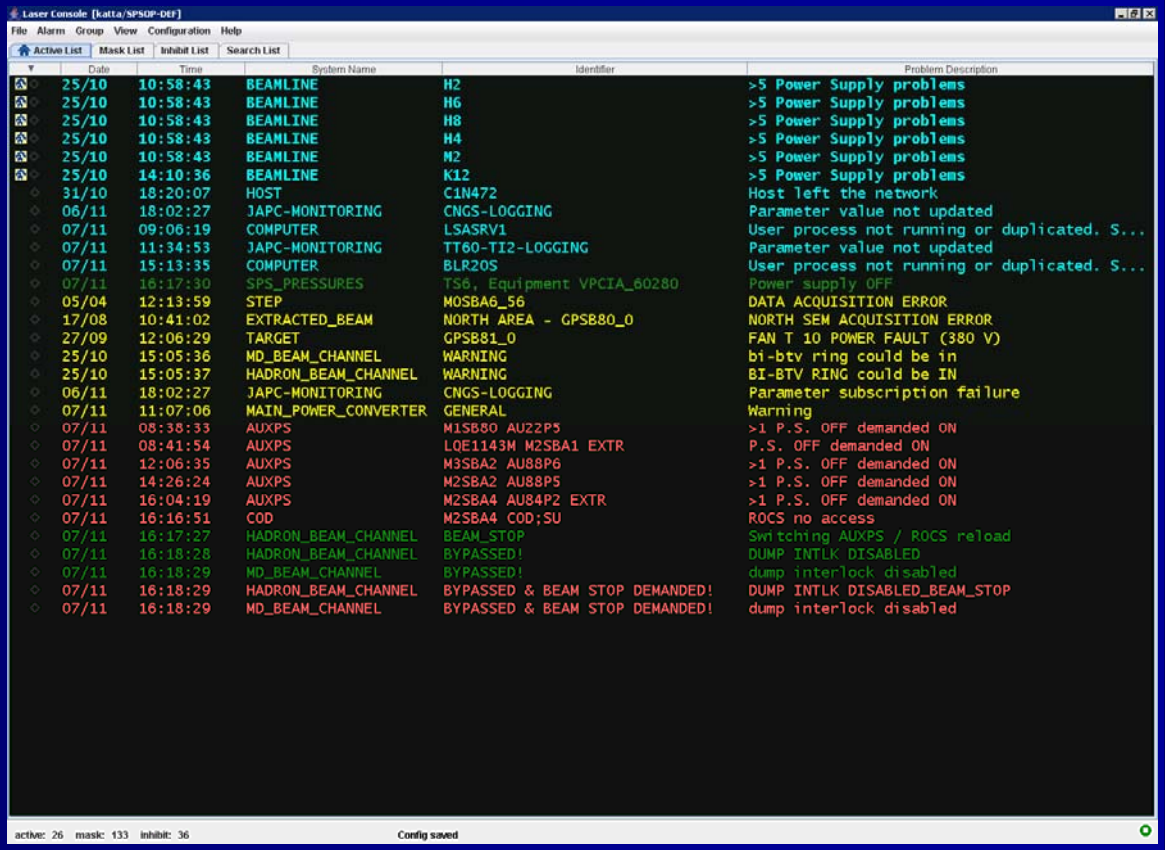
What is LASER?

- 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



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"
     "DEFAUT FONCTIONNEMENT EQUIPEMENT TIM"
1161609655 200000000 "EAU_DEMI_LHC:FDED-00101:20" "N" "EAU  DEMI       LHC" "UA67  2639-  -    FDED-00101" "DEFAUT 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] DEFAUT
     REFRIGERATEUR CMS"
1164807001 0 "EAU_BRUTE_LHC:CIRC_EP_SUX5:8264" "N" "EAU  BRUTE      LHC" "SF5   3565-SS-    CIRC_EP_SUX5" "DEFAUT 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?