LHC-CP
Fourth Workshop

Alarm Services for the Approaching LHC Era

June 12th 2003

M.W.Tyrrell (AB/CO)

Talk Outline

- Where are we today ?
- Where are we going ?
- What will we have for TT40 /QRL ?
- Some remaining questions
- Conclusions

Where are we today ?

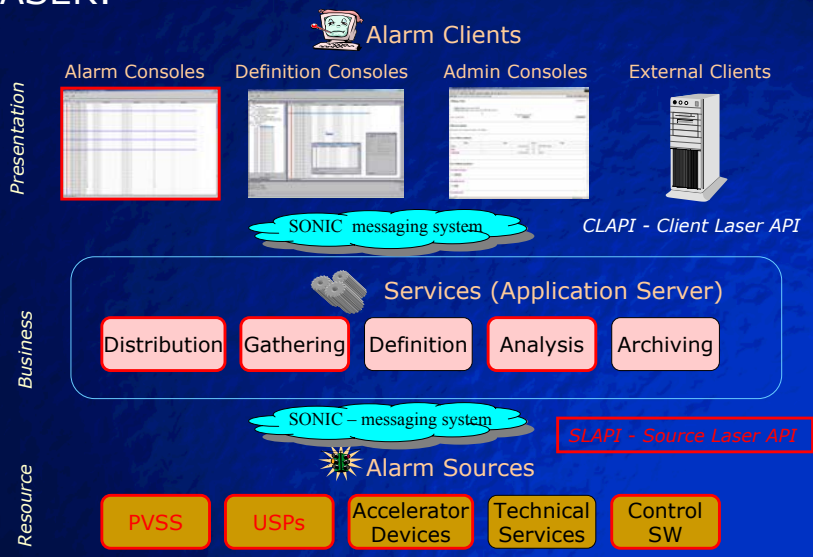
- 'CURRENT':
  - The PS alarm system:
    - Serves the MCR, control group and equipment groups
    - Alarm/display program polls the requested alarm working set(s)
    - Strongly coupled to the PS equipment module
    - Good interactive facilities back to the equipment module
    - One control database for alarm descriptions and configuration
  - The SPS, CERN technical services and safety alarm system:
    - Serves the PCR, TCR, SCR, controls group and equip. groups
    - Surveillance progs. and a central alarm server, run permanently
    - Alarm consoles connect to the server on demand
    - Source API lib, but no 'open' client API
    - Database used for alarm descriptions, configuration and archiving

Where are we today ?

- 'NEW' - in the pipeline:
  - Building the system called: LASER – Lhc Alarm SERvice – using 'new' technology:
    - Source API: 'C' or Java
    - J2EE Application Server – EJB's, JMS (SONIC messaging system)
    - Client API: Java
    - NetBeans / using the Gui Platform (GP) wrapper for alarm consoles

Where are we today ?

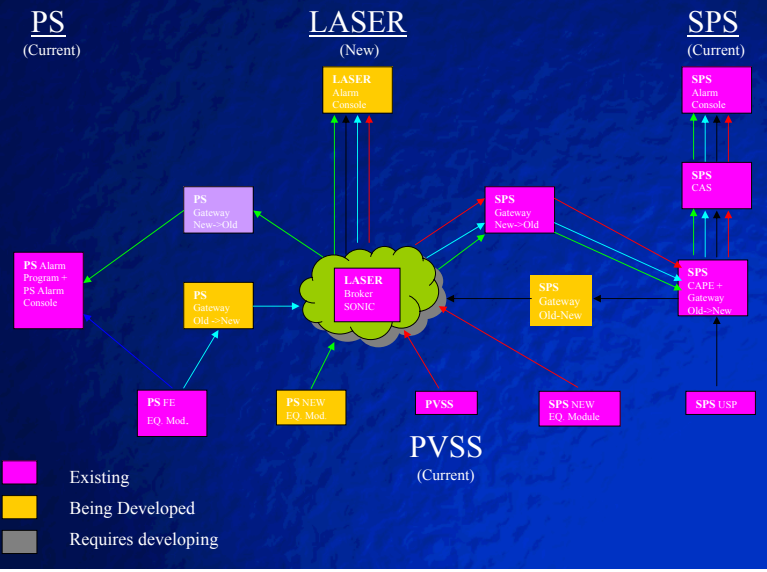
LASER:



Where are we going ?

- We need to provide:
  - a continuous service to our existing users:
    - generators of alarms
    - receivers of alarms
  - graceful transitions from 'current' to 'new'. This will need:
    - 'gateways' between: current / new, and new / current.
    - this is either done or being done for:
      - SPS, PS and LASER
- NOTE: PARTS OF THE CURRENT SYSTEM WILL REMAIN BEYOND 2004 !
  - But we will try to remove RPC and the 'X' protocol

Where are we going ?



Where are we going ?

LASER:

What will we have for TT40 / QRL ?

- Some deadlines:
  - TT40 tests, September this year
  - QRL soon after, before end of year
  - next year LHC hardware testing / commissioning
- What we will guarantee for the above:
  - alarm consoles to display alarms from any source:
    - current alarm consoles
    - current alarm archive
    - use the above to test and verify the LASER prototype
- Hope to provide a LASER vertical slice with new alarm consoles and integrated archive

What will we have for TT40 / QRL ?

- TT40:
  - Vacuum:
    - Pressure:
      - PVSS, Java source API or the 'C' source API
    - Sector valves:
      - current system
  - BI Equipment:
    - Beam Loss:
      - current system
    - Screens in beam:
      - existing SSIS system, 20 sec. poll frequency of equipment states

What will we have for TT40 / QRL ?

- TT40:
  - BT Equipment:
    - Extraction:
      - Michel's device server, new 'C' source API
    - TED, Stoppers:
      - existing SSIS system
  - Magnets:
    - Current measurement and status checks:
      - existing NODAL system
  - SPS2001 Business Layer:
    - Interlocks and associated surveillance:
      - existing SSIS system
- ?

What will we have for TT40 / QRL ?

- QRL:
  - Vacuum:
    - Pressure:
    - will use: PVSS, new 'C' API
  - Cryogenic systems:
    - Temperature, pressure, …:
    - PVSS, new 'C' API
  - ?

Some remaining Questions

- Front End COMmon Software Architecture:
  - PS ALARM type interface ?
    - Currently, the interface for an equipment can only expose 1 alarm state at a time via property ALARM
    - The alarm state cannot contain attributes / properties
    - Should the ALARM property be represented by a 'structure' ?
    - It will use CMW 'monitoring' with 'intermediate' property polling
  - Equipment alarms need to have a cycle dependency:
    - A beam loss monitor might detect losses in more than 1 'elementary' cycle, e.g. SPS main, P1 and MD, P2 cycles.
    - Some alarm states will be required to be tagged at source with a time stamp precision to within a microsecond
  - The LASER source API has been designed to be used directly by alarm generators.

Some remaining Questions

- Databases:
  - Alarm information is currently spread over:
    - Equipment Group DB's, SPS alarm DB, PS DB, LHC ref. DB, 'new' DB's
  - How do we feed the LASER DB with:
    - Alarm definitions
    - Alarm system configuration
  - Archiving:
    - Meta data
- DIWG, DIP: domain – domain connectivity:
  - What will it be ?
    - LASER covers all systems. Will we need another 'gateway' to the above ?

Some remaining Questions

- The Alarm Review Process:
  - What is an alarm, and what is not ?
  - How important is an alarm ?
  - Who is interested in the alarm ?
- There are 'formal' review procedures:
  - CERN and the LHC need to follow such procedures, but it requires experience and time

Conclusions

- The new technology has a very steep learning curve.
- My impression is that it is still in its infancy:
  - Important changes took place between the previous and current EJB versions
  - The selected Application Server from Oracle has only recently been available
  - Application Server 'clustering' is the hot topic for redundancy, but little practical experience exists – statement by an Oracle expert !
- BUT, we are building LASER using this technology and making progress - be it slower than I would like.
- We will have alarm facilities for TT40 and QRL.

Conclusions

- The new FECOMSA framework is an important element in the control system.
- Important database decisions have to be taken and supported.
- What is, and is not, an alarm, and its resulting priority must be given serious, and professional consideration.