# CERN Safety Alarm Monitoring (CSAM)

## 4th LHC Controls Project Workshop

Luigi Scibile & CSAM project team



## Summary Overview

- Major User Requirements
- Proposed architecture
- Major technical choices, outstanding issues
- Infrastructure requirements (location, technical services, control system services, communications ...)
- Plans for installation and commissioning
- Milestones for the work



## Major User Requirements 1/2

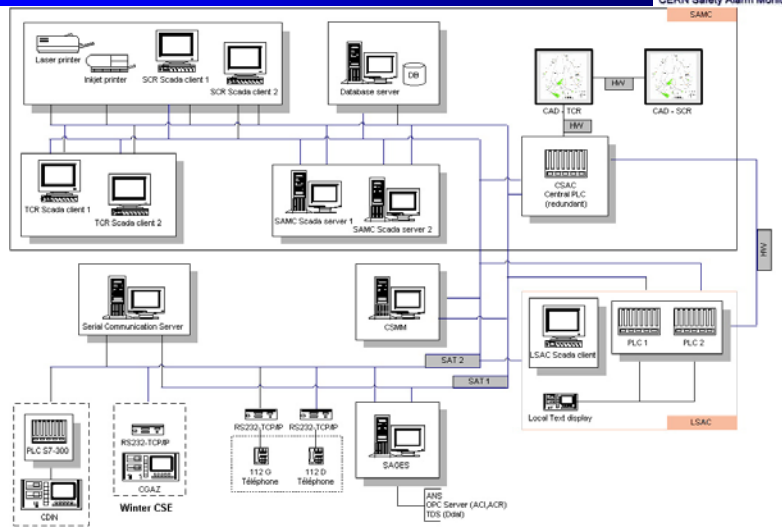
- For the Fire Brigade
  - Safety alarm acquisition from all CERN safety zones.
  - Local monitoring from each safety zone
  - Central monitoring, archiving, display, reporting and configuration
  - Non-interruptible 24h/365d system based on redundant communication networks
  - Specific Human Computer Interfaces and tools for the alarm handling
  - Real-time monitoring of the correct functioning of all safety sub-systems.



## Major User Requirements 2/2

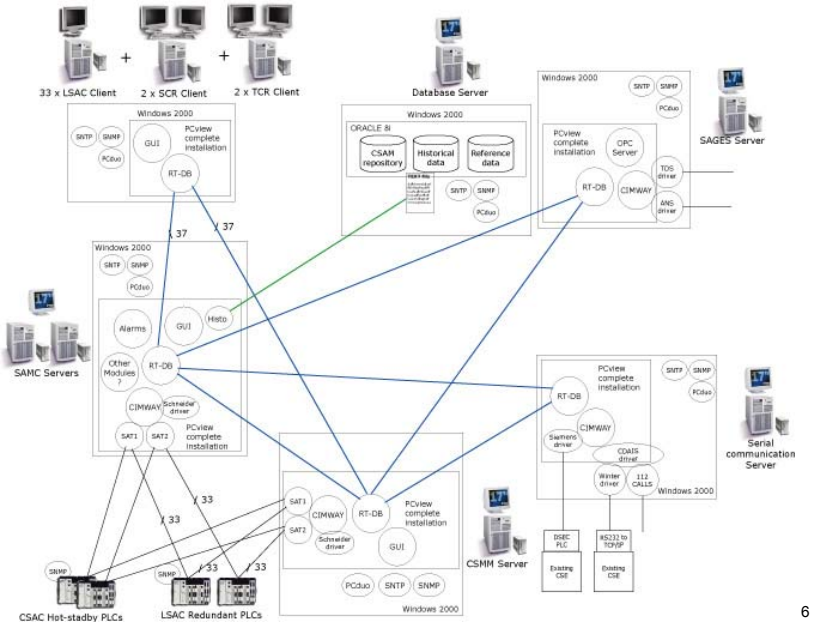
- For the Experiments and the other control rooms
  - A safety alarm gateway to external systems
  - A flexible system architecture for the integration of the LHC and LHC Experiments future alarms.
  - A modular acquisition and local monitoring system based on standard industrial equipment
- Availability requirements
  - In order to meet the availability requirements of ≈ 99.8% set by the AL3 Working Group, a Safety Integrity Level SIL 2 has been fixed.
  - A Supervision and monitors the availability of all sub-systems and generates performance reports.
- Maintainability requirements
  - integration in the Maintenance Manager System (MP5)

# Proposed HW architecture






# Proposed SW architecture

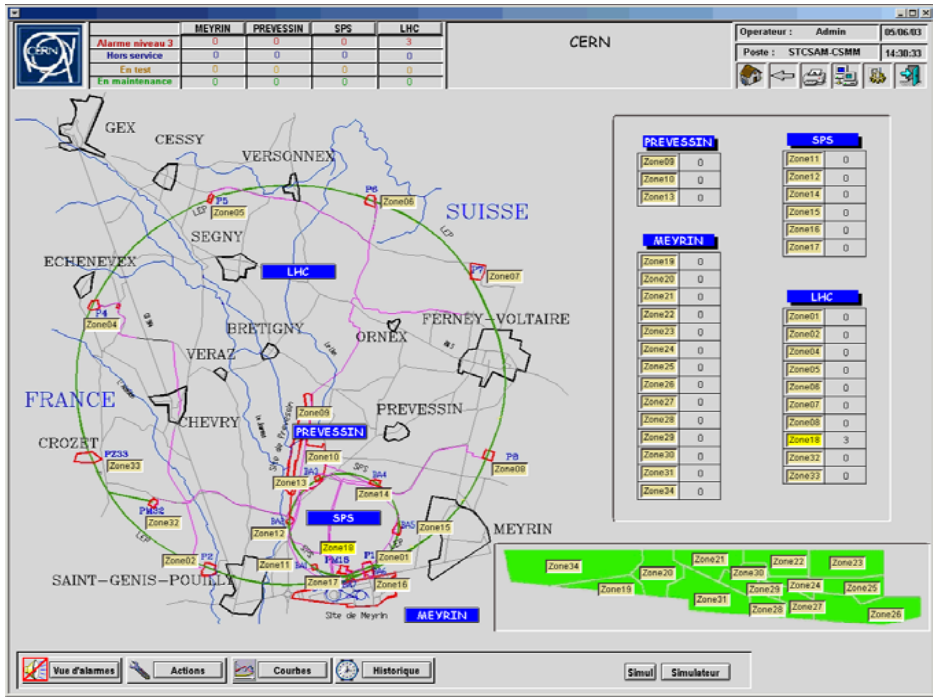


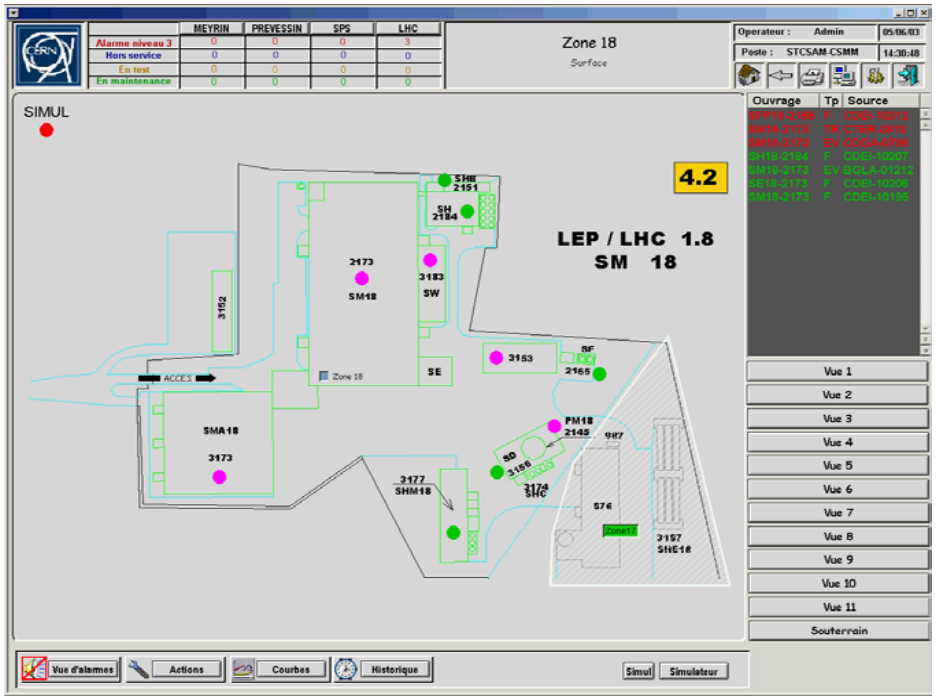


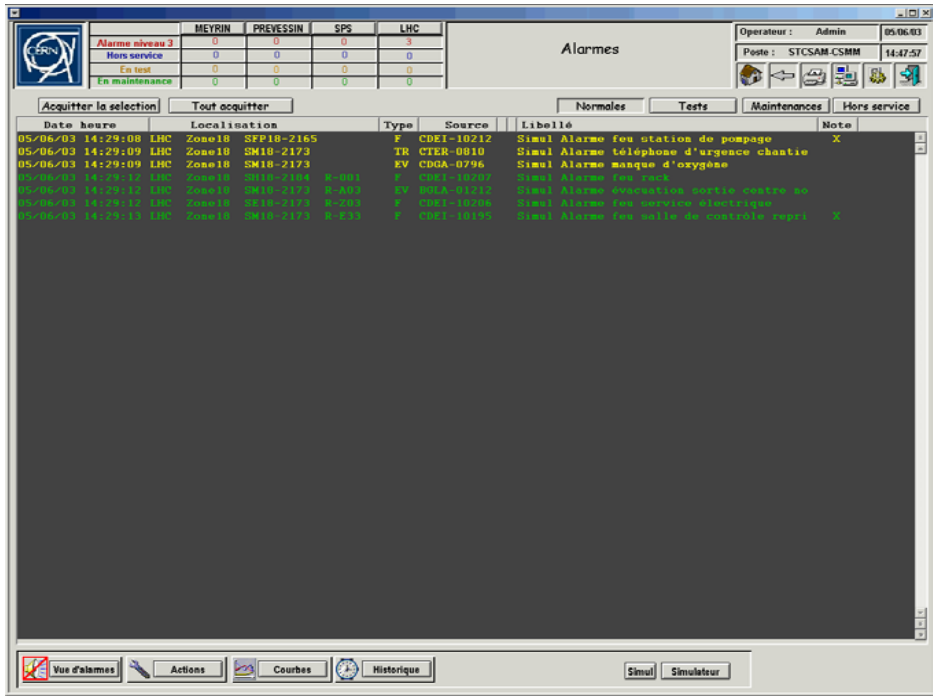

# Major technical choices

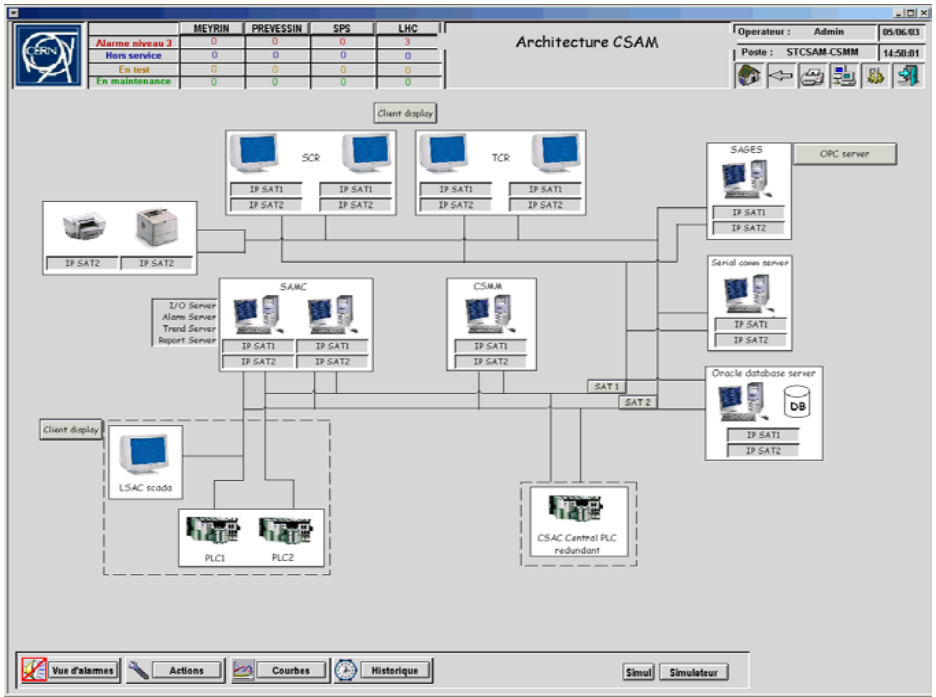
- **No common mode of failure**
  - Power supply, Location, server, display, acquisition module,etc.
- **INB compliant system based on redundant transmission paths**
  - The NEW Technical Service network
  - The General Service network
  - The existing hard-wired links.

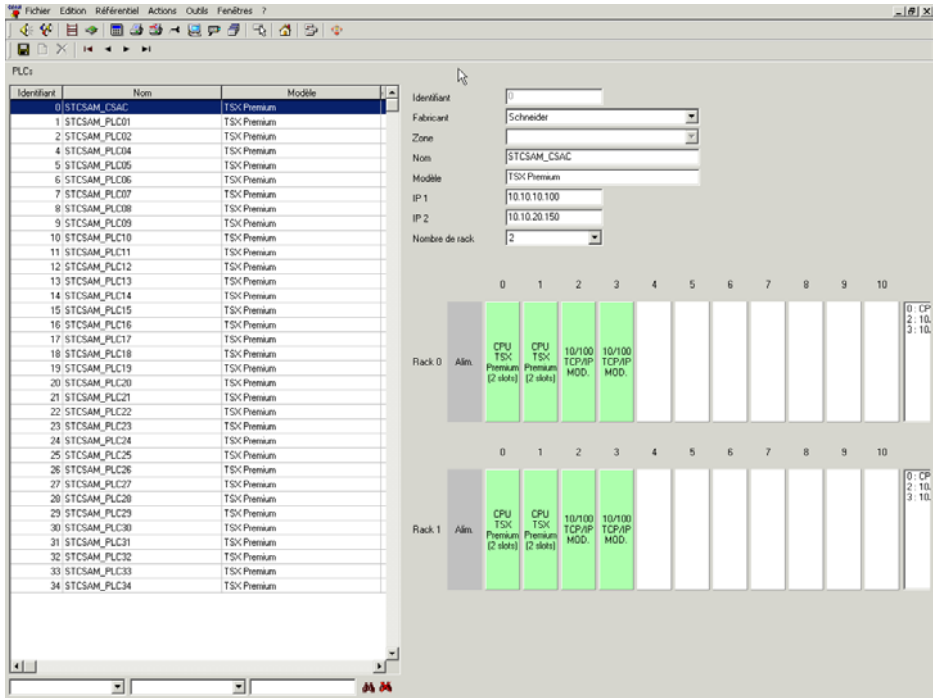


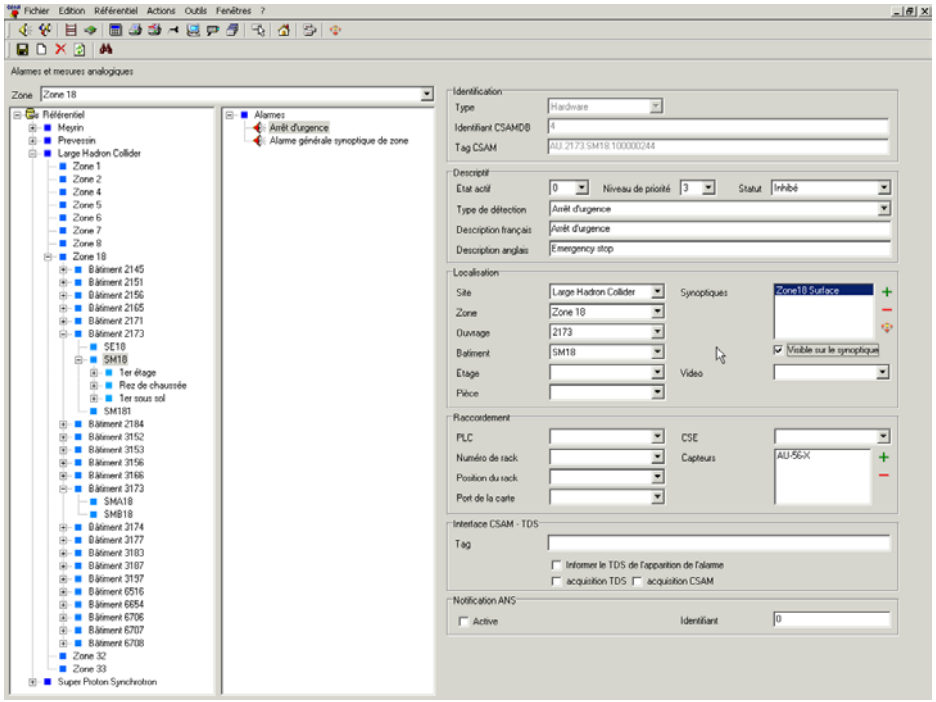


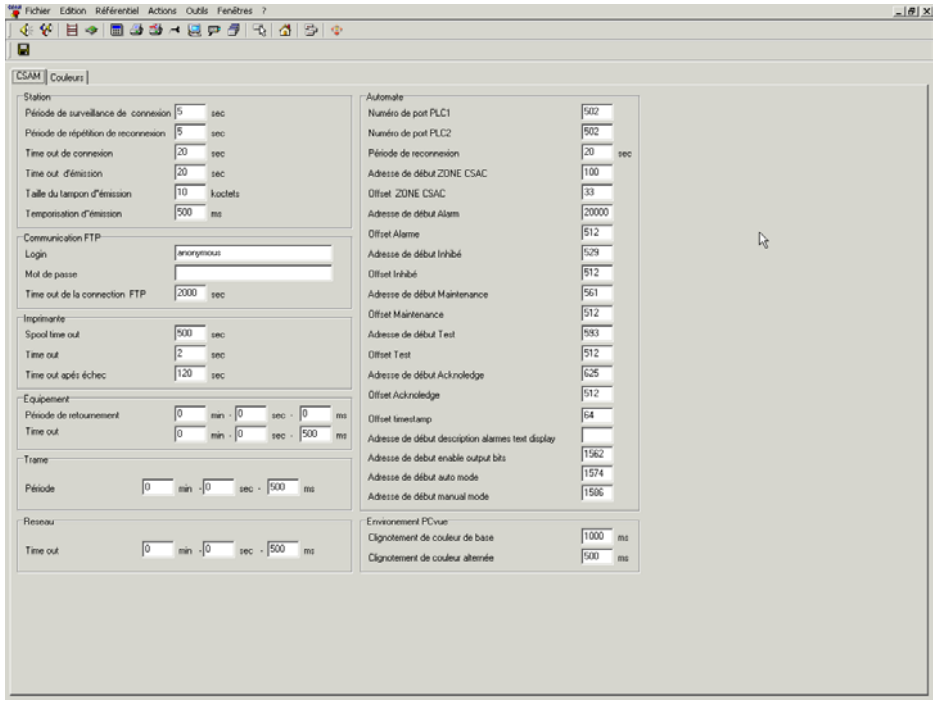

MEYRIN
PREVESSIN
SPS
LHC
Alarme niveau 3
Hors service
En test
En maintenance
Zone 18
Surface
Operateur : Admin
Poste : STCSAM-CSMM
SIMUL
4.2
LEP / LHC 1.8
SM 18
Ouvrage
Tp
Source
Vue 1
Vue 2
Vue 3
Vue 4
Vue 5
Vue 6
Vue 7
Vue 8
Vue 9
Vue 10
Vue 11
Souterrain
Vue d'alarmes
Actions
Courbes
Historique
Simul
Simulateur


MEYRIN
PREVESSIN
SPS
LHC
Alarmes
Operateur : Admin
Poste : STCSAM-CSMM
Acquitter la selection
Tout acquitter
Normales
Tests
Maintenances
Hors service
Date heure
Localisation
Type
Source
Libellé
Note
05/06/03 14:29:08 LHC Zone18 SFP18-2165 F CDEI-10212 Simul Alarme feu station de pompage X
05/06/03 14:29:09 LHC Zone18 SM18-2173 TR CTER-0810 Simul Alarme téléphone d'urgence chantie
05/06/03 14:29:09 LHC Zone18 SM18-2173 EV CDGA-0796 Simul Alarme manque d'oxygène
Vue d'alarmes
Actions
Courbes
Historique
Simul
Simulateur


MEYRIN
PREVESSIN
SPS
LHC
Architecture CSAM
Operateur : Admin
Poste : STCSAM-CSMM
Client display
SCR
TCR
SAGES
OPC server
IP SAT1
IP SAT2
SAMC
CSMM
I/O Server
Alarm Server
Trend Server
Report Server
Serial comm server
Oracle database server
DB
SAT 1
SAT 2
LSAC scada
PLC1
PLC2
CSAC Control PLC redundant
Vue d'alarmes
Actions
Courbes
Historique
Simul
Simulateur

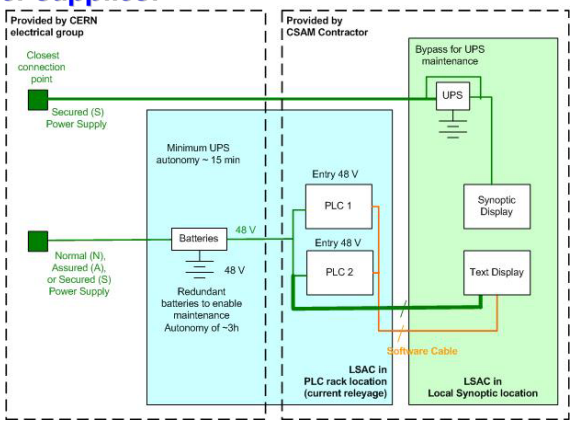

Fichier Edition Référentiel Actions Outils Fenêtres ?
PLCs
Identifiant
Nom
Modèle
0 STCSAM_CSAC TSX Premium
1 STCSAM_PLC01 TSX Premium
2 STCSAM_PLC02 TSX Premium
4 STCSAM_PLC04 TSX Premium
5 STCSAM_PLC05 TSX Premium
6 STCSAM_PLC06 TSX Premium
7 STCSAM_PLC07 TSX Premium
8 STCSAM_PLC08 TSX Premium
9 STCSAM_PLC09 TSX Premium
10 STCSAM_PLC10 TSX Premium
11 STCSAM_PLC11 TSX Premium
12 STCSAM_PLC12 TSX Premium
13 STCSAM_PLC13 TSX Premium
14 STCSAM_PLC14 TSX Premium
15 STCSAM_PLC15 TSX Premium
16 STCSAM_PLC16 TSX Premium
17 STCSAM_PLC17 TSX Premium
18 STCSAM_PLC18 TSX Premium
19 STCSAM_PLC19 TSX Premium
20 STCSAM_PLC20 TSX Premium
21 STCSAM_PLC21 TSX Premium
22 STCSAM_PLC22 TSX Premium
23 STCSAM_PLC23 TSX Premium
24 STCSAM_PLC24 TSX Premium
25 STCSAM_PLC25 TSX Premium
26 STCSAM_PLC26 TSX Premium
27 STCSAM_PLC27 TSX Premium
28 STCSAM_PLC28 TSX Premium
29 STCSAM_PLC29 TSX Premium
30 STCSAM_PLC30 TSX Premium
31 STCSAM_PLC31 TSX Premium
32 STCSAM_PLC32 TSX Premium
33 STCSAM_PLC33 TSX Premium
34 STCSAM_PLC34 TSX Premium
Identifiant
Fabricant Schneider
Zone
Nom STCSAM_CSAC
Modèle TSX Premium
IP 1 10.10.10.100
IP 2 10.10.20.150
Nombre de rack 2
Rack 0
Rack 1
Alim.
CPU TSX Premium (2 slots)
10/100 TCP/IP MOD.

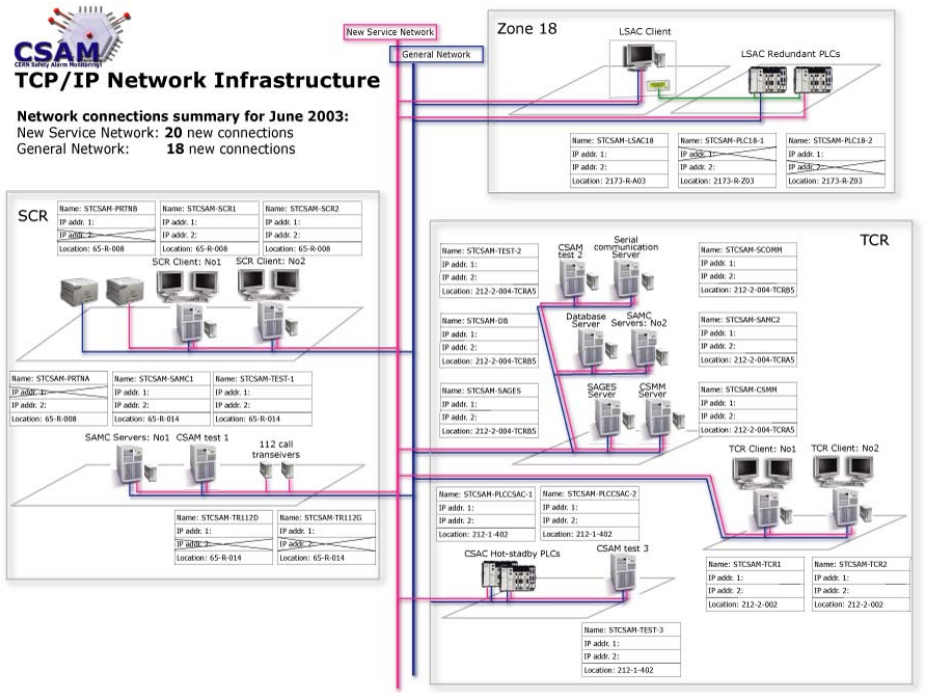



# Infrastructure requirements

- **Rack: re-use of old AL3 Racks**
- **Power supplies:**



## Plans for installation and commissioning

- SCR, TCR and Point 1.8-> Inst. 06/2003 - Comm. 10/2003
- Point 1 - Safety Zone 1 -> Inst. 12/2003 - Comm. 01/2004
- Point 2 - Safety Zone 2 -> Inst. 01/2004 - Comm. 02/2004
- Point 3.1 - Safety Zone 31 -> Inst. 02/2004 - Comm. 03/2004
- Point 3.2 - Safety Zone 32 -> Inst. 03/2004 - Comm. 04/2004
- Point 4 - Safety Zone 4 -> Inst. 04/2004 - Comm. 05/2004
- Point 5 - Safety Zone 5 -> Inst. 05/2004 - Comm. 06/2004
- Point 6 - Safety Zone 6 -> Inst. 06/2004 - Comm. 07/2004
- Point 7 - Safety Zone 7 -> Inst. 07/2004 - Comm. 08/2004
- Point 8 - Safety Zone 8 -> Inst. 08/2004 - Comm. 09/2004



## Milestones for the work

- Detailed design completed by September 2002
  - Safety validation of proposed architectures
- System realisation completed by January 2003
  - Practical integration of all the safety systems in CSAM
- Pilot installation in SM18 in June 2003
- CSAM running in background until October 2003
- Acceptance Testing by October 2003
- If acceptance successful

**CSAM OPERATIONAL in SCR and TCR**

- After First Acceptance - One LHC point per month



## Thank you for your attention!

http://st-proj-csam.web.cern.ch/st-proj-csam/