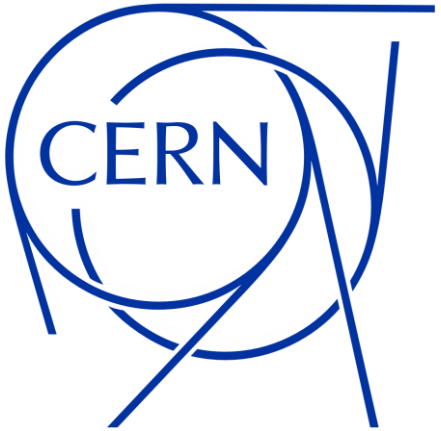


The Detector Safety System

a.k.a. the reason why the detectors in the biggest accelerator in the world don't set on fire.

Germinario Andrea (BE-ICS-SAS)

13/09/2024

What is DSS?

What is DSS?

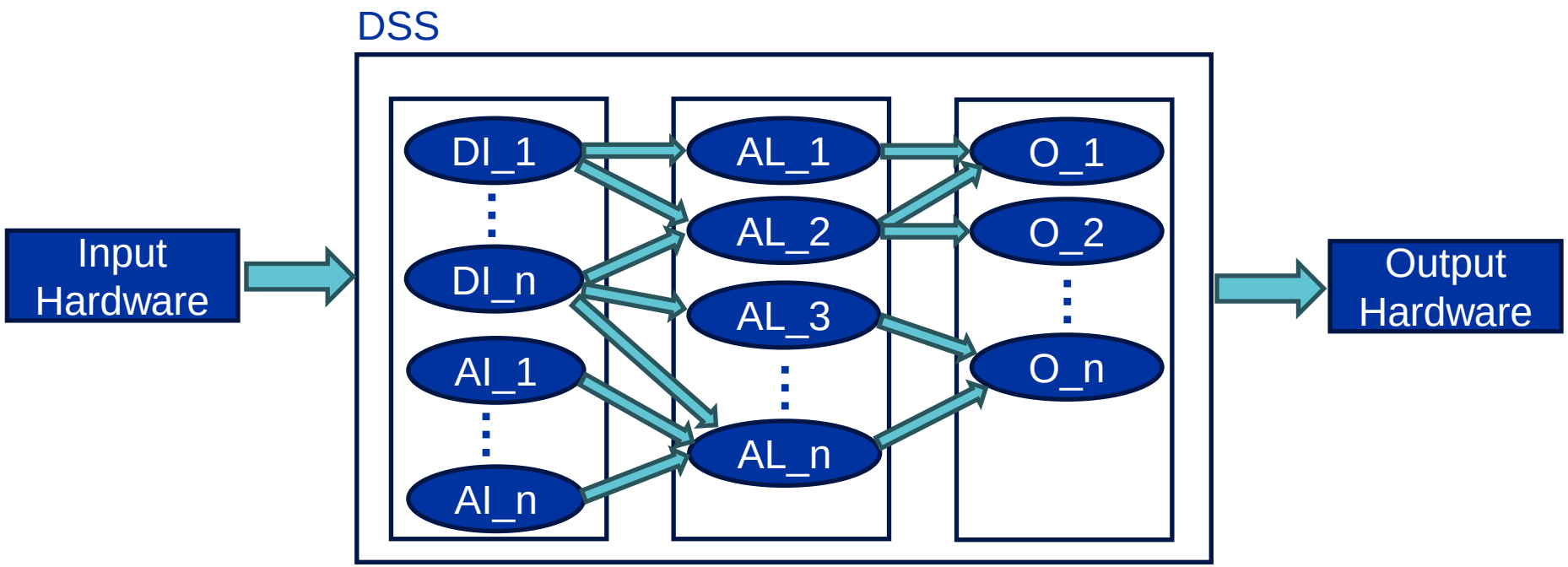
The **Detector Safety System** (DSS) is a control system that detects abnormal and potential harmful situations and minimizes the consequent damage to experiment's equipment by taking protective actions (equipment protection).

It complements but not duplicate other existing systems, such as the Detector Control System (DCS) and CERN Safety System (CSS).

It was first presented in ICALEPCS 2003

How does DSS work?

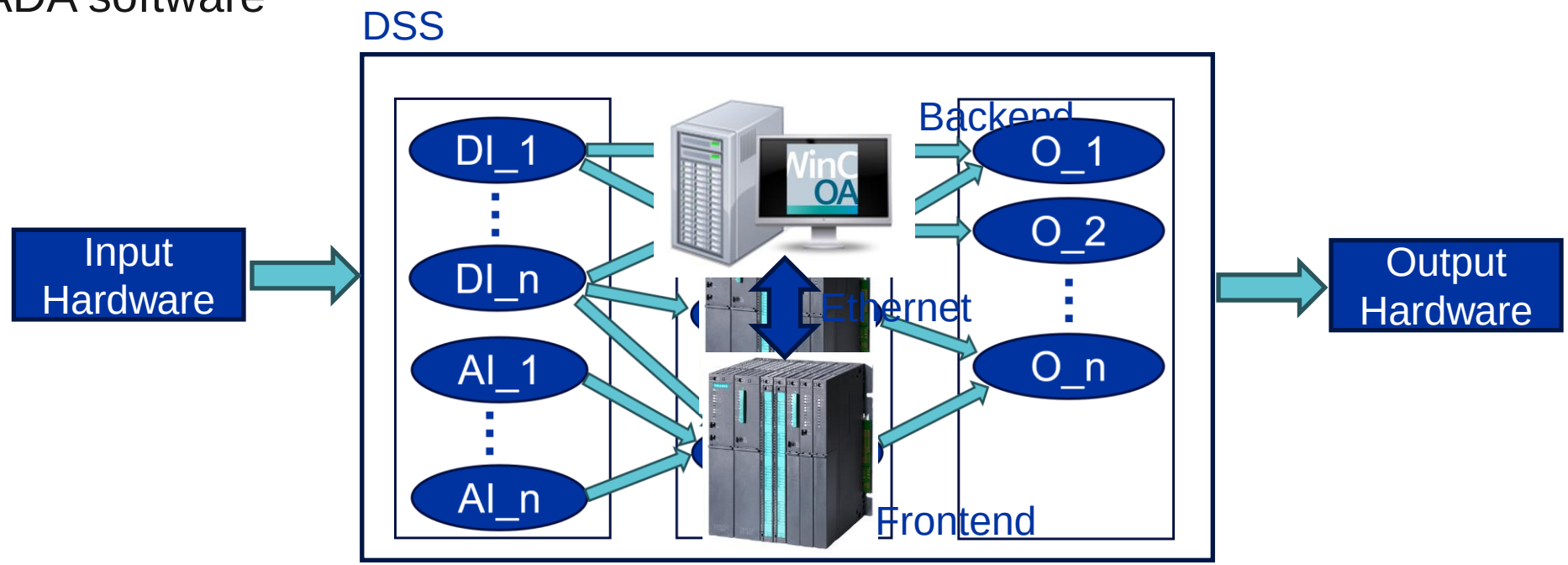
1. Declare and configure **sensors** to check the status of the Detector
2. Define **alarms** that trigger when specific conditions based on the sensors verify
3. Declare and configure **actuators** that activates when an alarm triggers



How does DSS work?

The DSS comprises two main components:

- **Frontend** : PLC application, running on a set of redundant Siemens PLCs
- **Backend**: SCADA Application, based on the Siemens/ETM WinCC Open Architecture SCADA software



Challenges

Challenges

My goal is to maintain and refactor the SCADA (Supervisory Control and Data Acquisition) layer of DSS. However, the system makes us face some challenges:

- Critical system (Users expect 24/7 uptime)
- Users are very reluctant to change, but upgrades are required
- Hardware is physically close to application
- Deployment possible in small time windows (end of year shutdown, etc..)

Common problems in the industrial control world!

Solutions

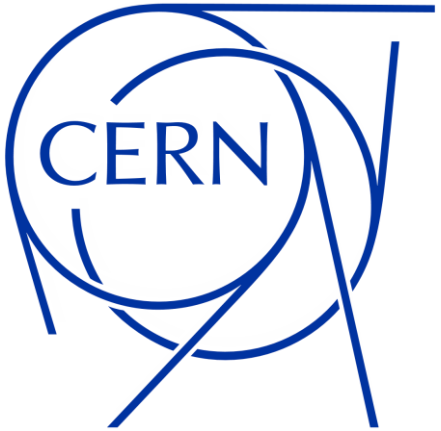
- Critical system (Users expect 24/7 uptime)
  - Test every change in a perfect physical copy of the system before deploying
  - Be ready to roll-back quickly
- Users are very reluctant to change, but upgrades are required
  - Put nice-for-developer changes with nice-for-users ones
  - Make the new feature look more appealing
- Hardware is physically close to application
  - Perform remote operations as much as possible
- Deployment possible in small time windows (end of year shutdown, etc..)
  - Book these slots well in advance and be flexible with dates
  - Make the users desire the upgrade

Conclusions

Engineers like to work on latest technologies

Real world projects are legacy and have constraints

It is possible to reduce the gap between industry and modern software development!



Thank you!