Slow Control Kick-off meeting - concept for GERDA Slow Control

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Outline

- Slow Control specifications and GERDA environment
- news from PLC
- Slow Control diagram
- list of hardware
- summary

List of Specifications

Tasks: - switch ON/OFF low/high voltage
- read detector status (voltages, pressures, temperatures, ...) from the different hardware components
- store detector status in a data base for online/offline use
- generate warnings and alarms, also by SMS, email
- (Graphical) User Interface(s)
- **access and control with web browser**
- **no shift personal,**
  on-call expert(s) reachable at LNGS by mobile

Hardware: - HV and LV supplies, commercial and/or custom made
- sensors for voltage, current, temperature, pressure, ...
- communication hardware, e.g. TCP/IP - RS232/485 bridge
- PLC (programmable logic controller)
- insertion/removal of detector & calibration source
- special hardware: radon monitor, ...

List of Specifications (cont.)

What about O2 monitors and smoke alarms?
Go directly to LNGS monitoring and alarm system, we get alarm back?

Protocols: - TCP/IP
- RS232/485
- PLC specific bus system (Profibus)
(only internal to PLC)
- other bus systems: CAN, Fieldbus

} should be "hidden"

Graphical User Interface: HTML based

Operating Systems: Linux

Databases: - “ASCII” files:

very simple, very fast for time history, ...

- Table based data base based on Berkeley Data Base

open source data base

C interface

- mSQL or MySQL:

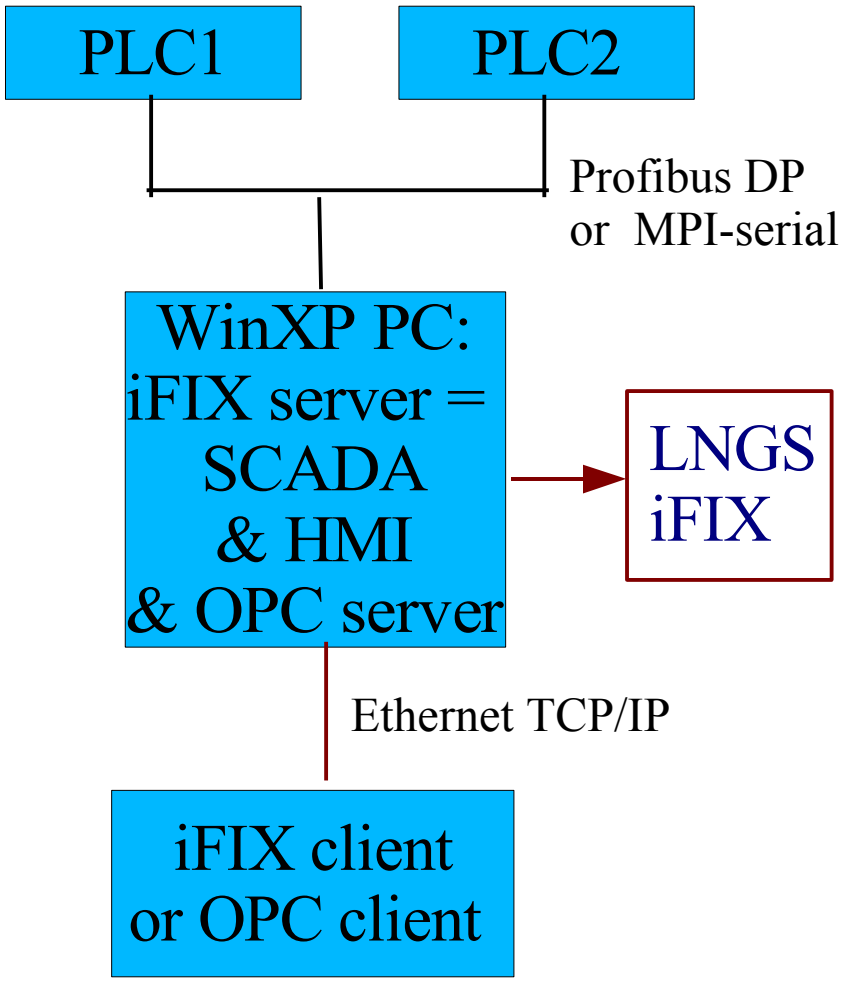
free software

C/C++, Perl, Java, CGI, ... interfaces

- Oracle data base:

commercial software

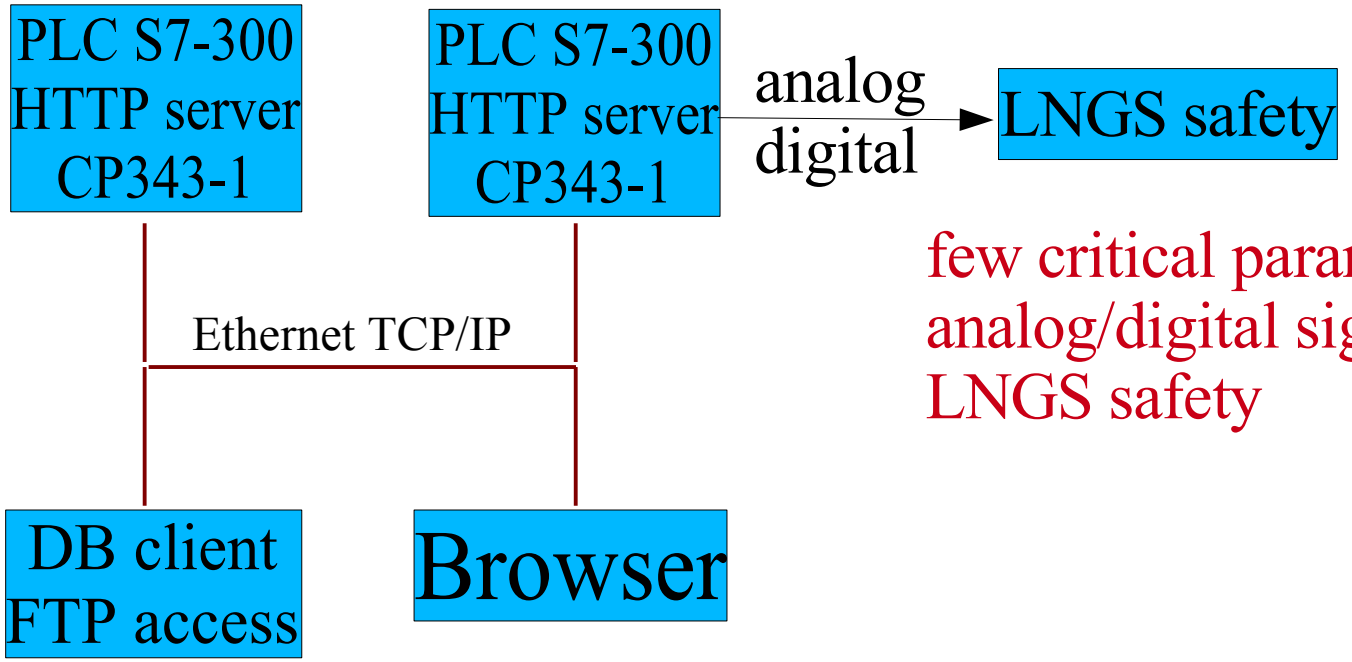
PLC connections (scheme so far)



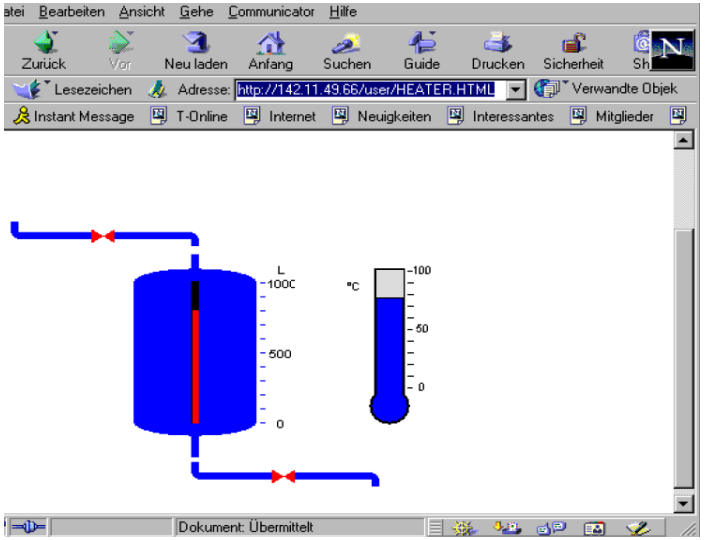
request of LNGS:
use iFIX for communication with
LNGS safety / alarms to guards

Glossary:
iFIX = product from GE Fanuc
SCADA = Supervisory Control
And Data Acquisition
HMI = Human Machine Interface
OPC = open connectivity/standard

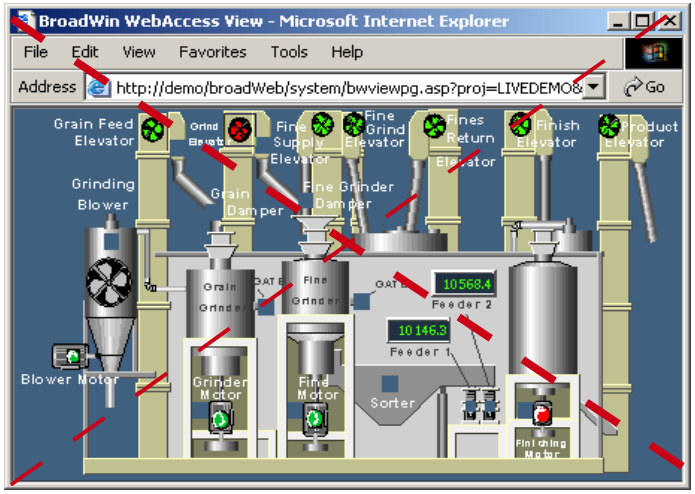
PLC connections (new idea)



few critical parameters via analog/digital signals to LNGS safety

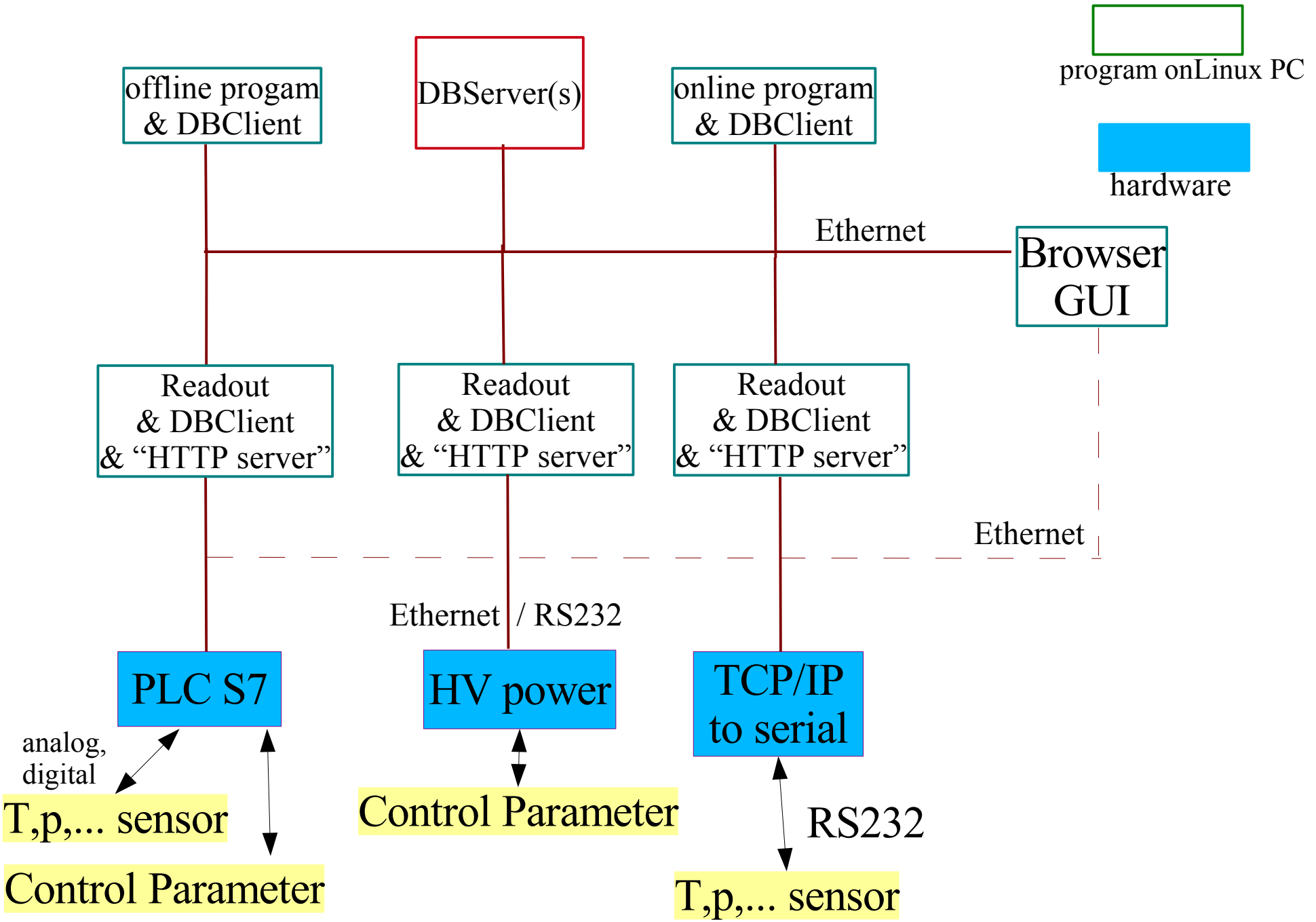


Simatic NET: S7Beans/Applets, display & parameter modification



alternatively: HTTP server on Windows PC, full SCADA/HMI

Slow Control Diagram



List of hardware

sensor	#chn	digitization by
temperature	25 Pt-100	PLC
	10 Pt-100	serial interface, e.g. ADAM
voltage	~150	power supplies
currents	??	??
pressure	10	PLC??
seismic	2	???
flow	6	PLC
valve positions	20	PLC
LAr fill level	2	PLC
radon monitor	1	???
scalars	?	???
lock motors	?	????

Other data: calibration constants
detector positions
detector geometry
cableing scheme

Summary

- GERDA should run without shift personal,
  only with expert(s) which can be reached by mobile phone (SMS from PLC)

- diagnostic/control from home with web browser

- number of channels is not so large in GERDA

- should limit the protocols used by Slow Control to TCP/IP and RS232/485

- open questions: what data base server?
  oxygen & smoke sensor go directly to LNGS safety?
  GERDA alarms as analog/digital signals to LNGS?
  does everyone agree to the presented concept?
  ...