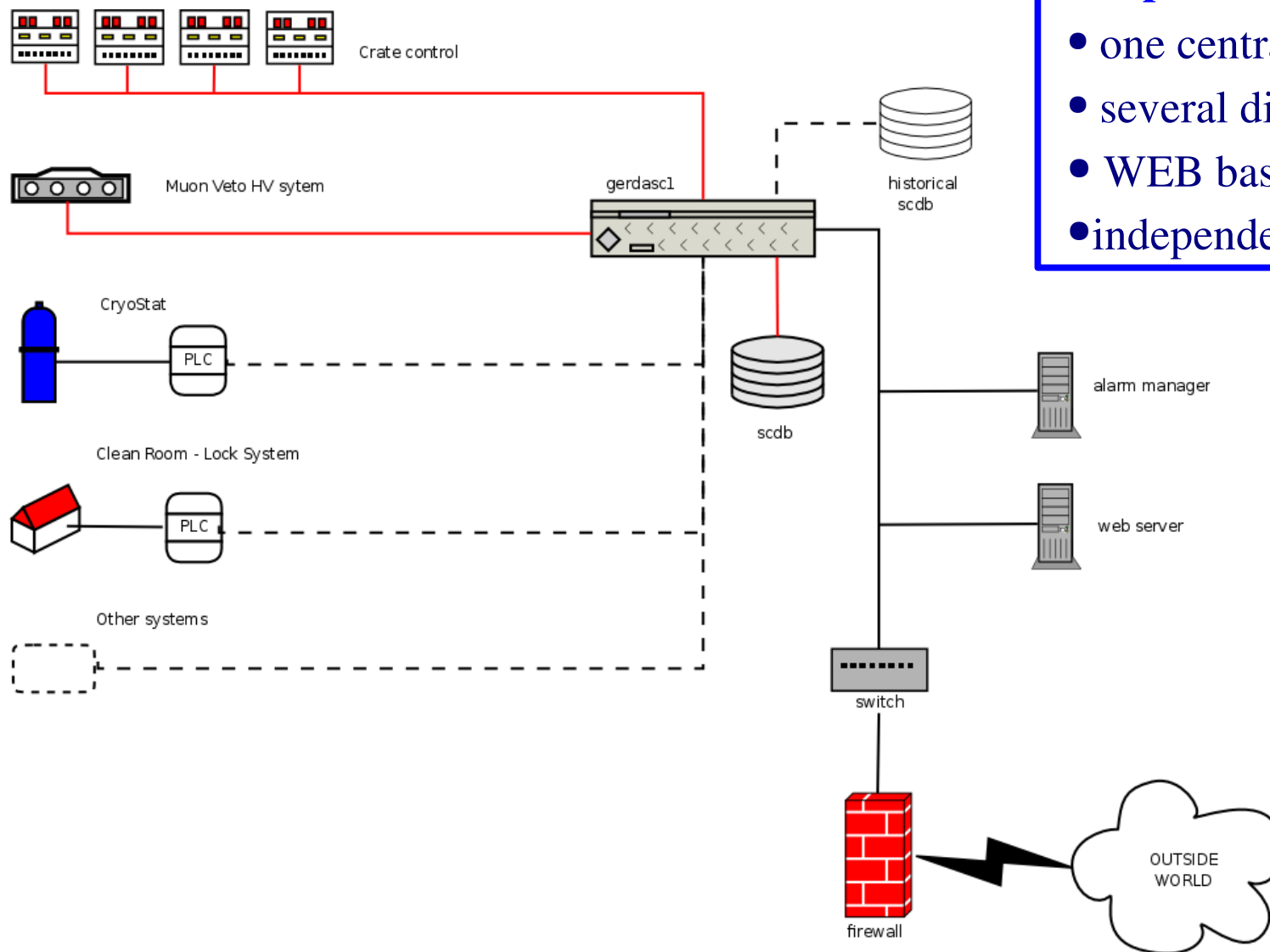

Status of the GERDA Slow Control

R. Brugnera, A. Garfagnini, I. Lippi, L. Stanco

Outline:

- *General layout*
- *Slow Control for the HV of the muon system*
- *Slow Control for the VME/NIM crates*
- *Alarm manager*
- *Network in the GERDA building*
- *Material*
- *Conclusions*

General Layout

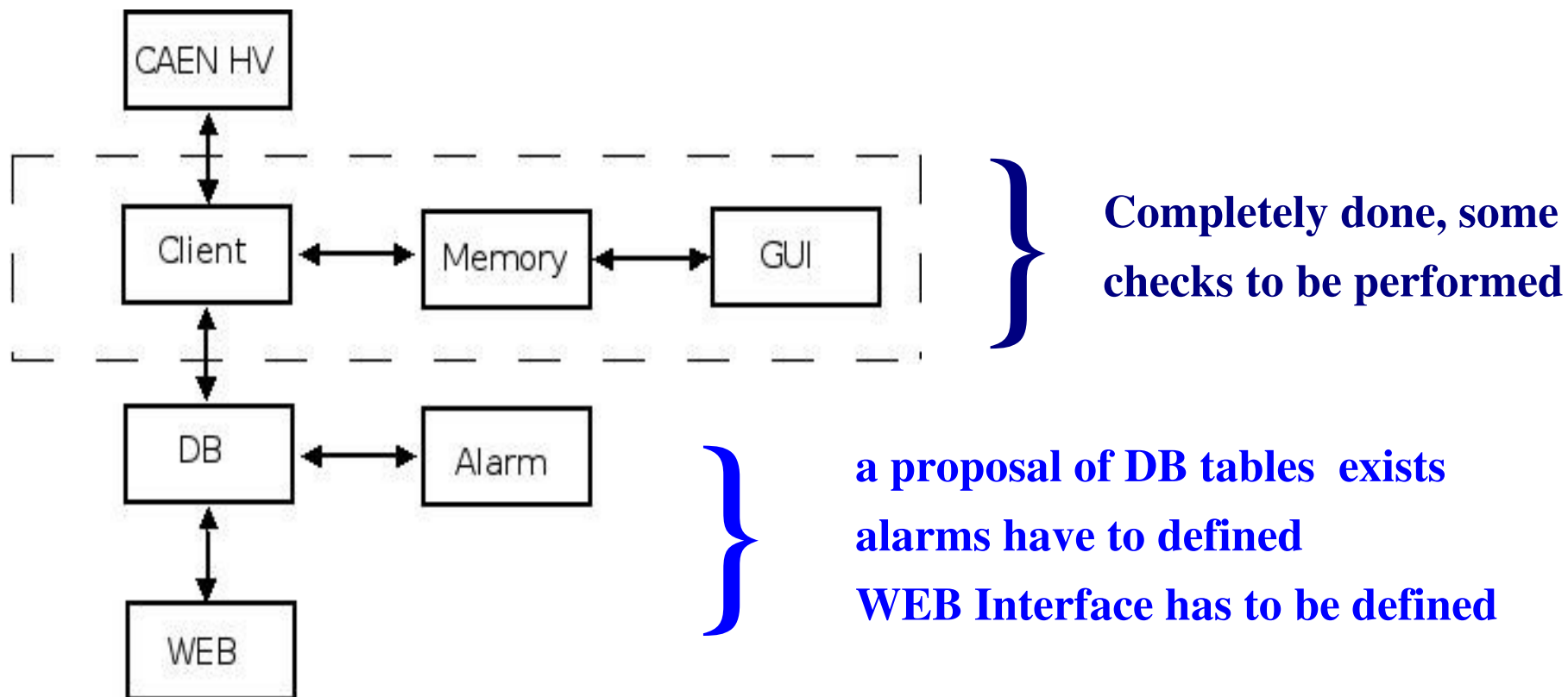


Simple structure

- one central database
- several distributed clients
- WEB based access to data
- independent alarm unit

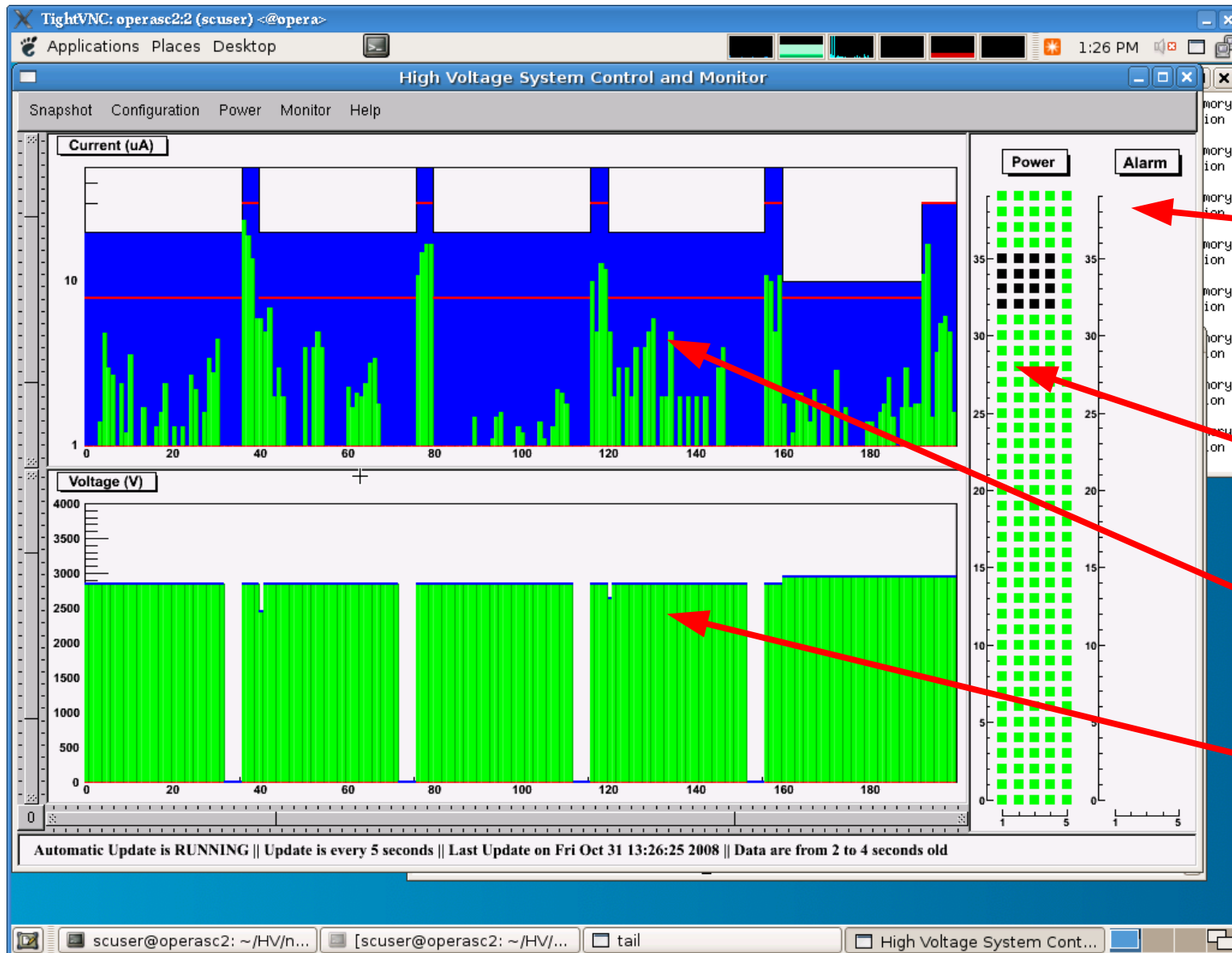
Slow Control for the HV of the Cherenkov muon Veto

The 66 PMTs of the Cherenkov muon Veto are powered by a HV CAEN SY1527LC



We are writing the documentation

Slow Control for the HV of the Cherenkov muon Veto: the GUI



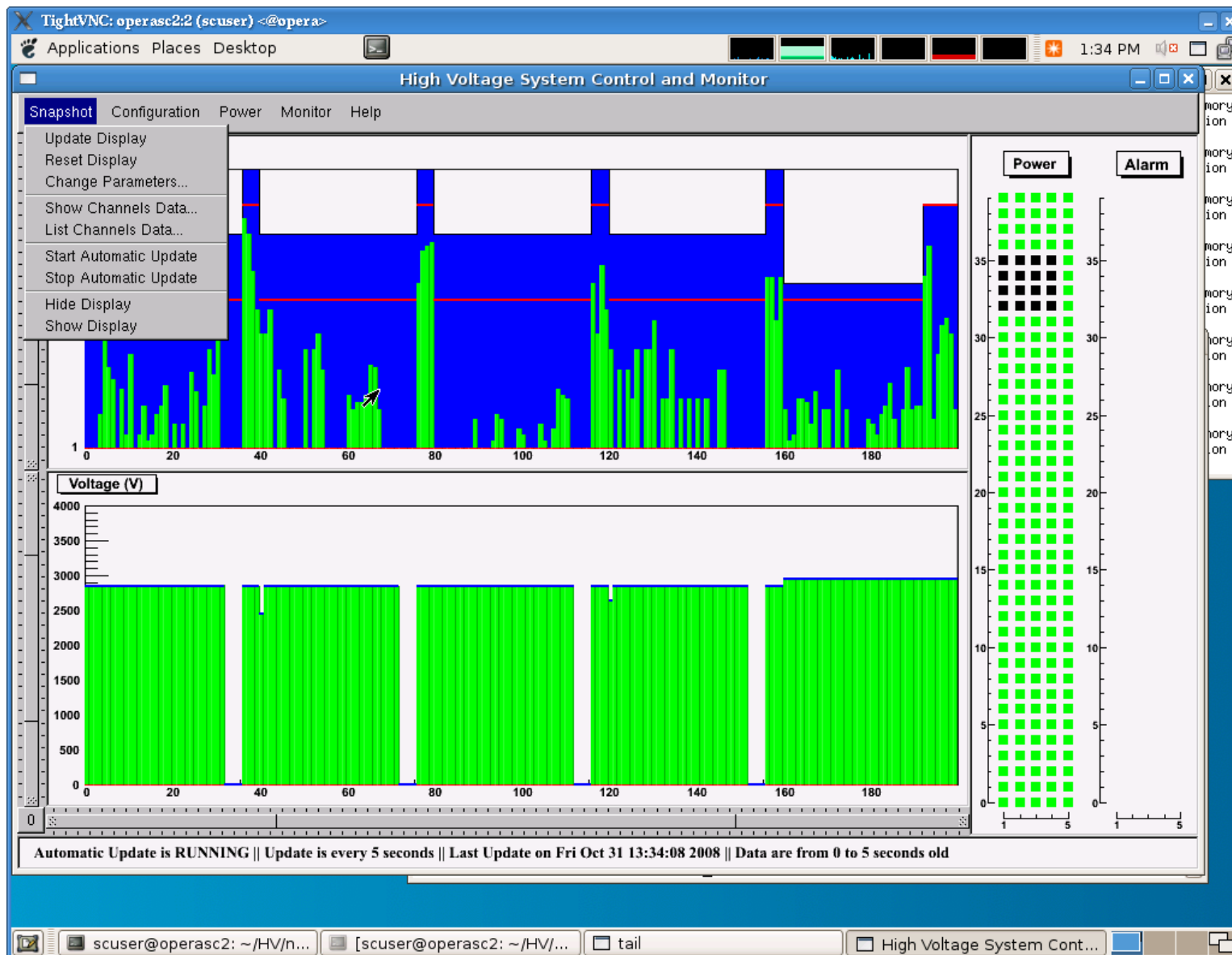
CAEN PS
alarms

status of the
channels

currents

voltages

Slow Control for the HV of the Cherenkov muon Veto: the GUI



The screenshot displays a TightVNC session of the High Voltage System Control and Monitor software. The main window shows two graphs: 'Current (uA)' and 'Voltage (V)'. The 'Current (uA)' graph shows a signal fluctuating around a red horizontal line at approximately 10 uA. The 'Voltage (V)' graph shows a signal fluctuating around a red horizontal line at approximately 2800 V. A 'Modify Configuration Parameters' dialog box is open, allowing for the adjustment of various parameters. The dialog box includes checkboxes for 'All Channels', 'All Positive', and 'All Negative', a grid for 'All Crate 1' through 'All Crate 5', and input fields for 'Voltage Set (V0)', 'Trip Current (I0)', 'Trip (seconds)', 'RampUp (volt/s)', and 'RampDown (volt/s)'. A table lists channel parameters for Cr, Ch, V0, I0, Trip, RUp, and RDw. Buttons for 'Update', 'Remove', 'ERASE ALL', 'Clear Input Form', 'Exit', and 'Load into H.V. System' are also visible.

Modify Configuration Parameters

All Channels All Positive All Negative

All Crate 1 All Crate 2 All Crate 3 All Crate 4 All Crate 5

Voltage Set (V0)

Trip Current (I0)

Trip (seconds)

RampUp (volt/s)

RampDown (volt/s)

Update

Remove

ERASE ALL

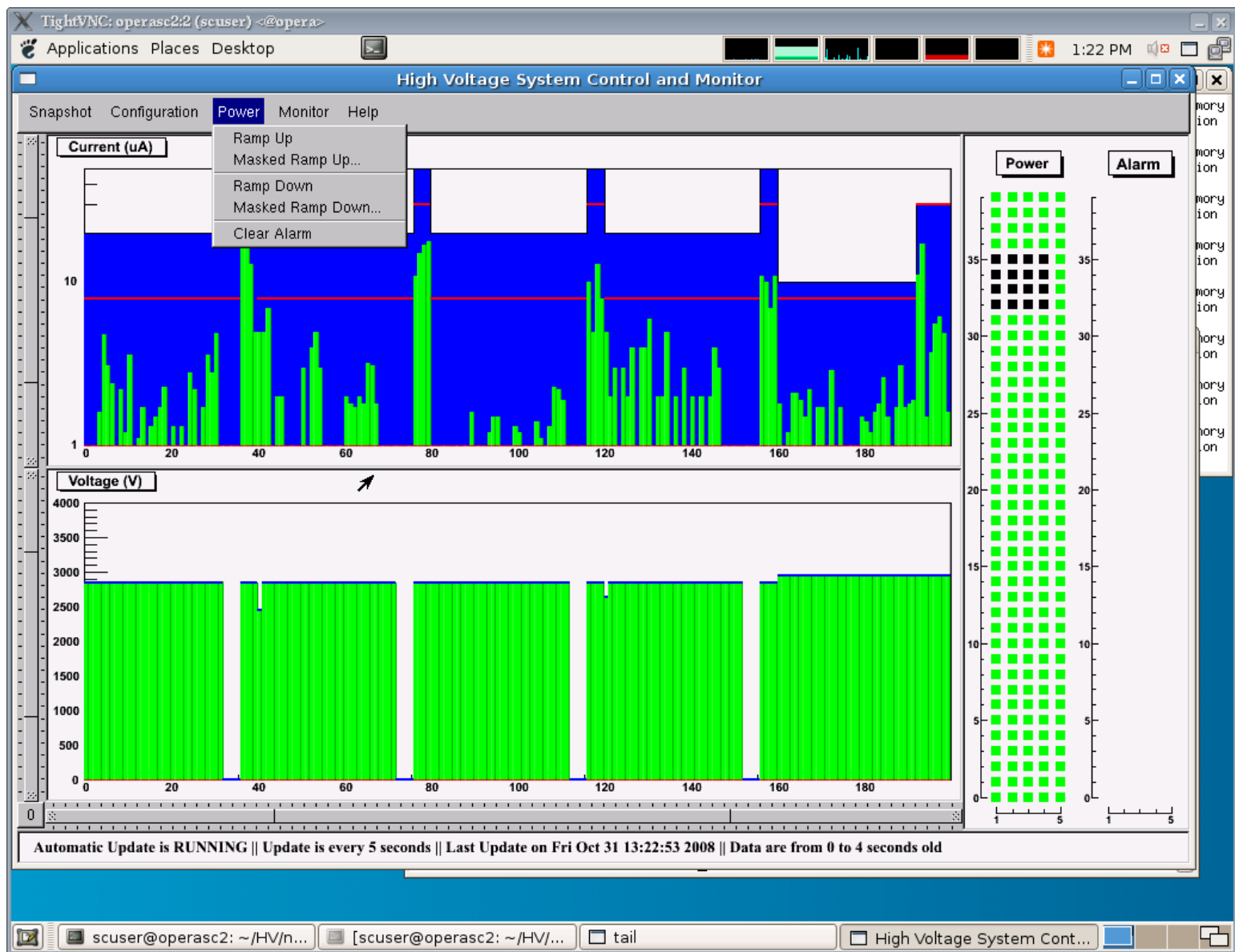
Clear Input Form

Exit

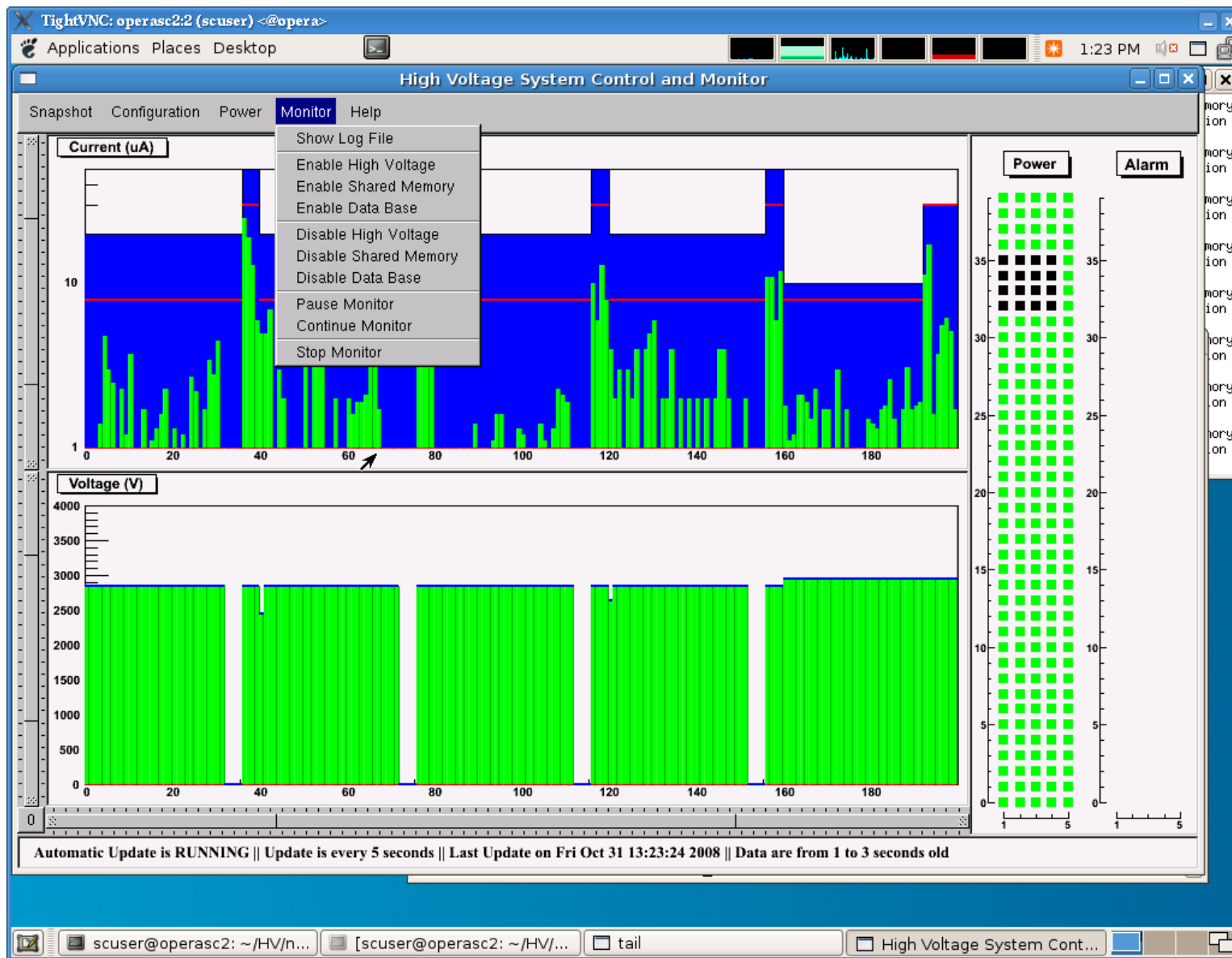
Load into H.V. System

Cr	Ch	V0	I0	Trip	RUp	RDw
1	0	2844.	20.0	10	5	10
1	1	2844.	20.0	10	5	10
1	2	2844.	20.0	10	5	10
1	3	2844.	20.0	10	5	10
1	4	2844.	20.0	10	5	10
1	5	2844.	20.0	10	5	10
1	6	2844.	20.0	10	5	10
1	7	2844.	20.0	10	5	10
1	8	2844.	20.0	10	5	10
1	9	2844.	20.0	10	5	10
1	10	2844.	20.0	20	5	10
1	11	2844.	20.0	20	5	10
1	12	2844.	20.0	10	5	10
1	13	2844.	20.0	10	5	10
1	14	2844.	20.0	10	5	10
1	15	2844.	20.0	10	5	10
1	16	2844.	20.0	10	5	10

Slow Control for the HV of the Cherenkov muon Veto: the GUI

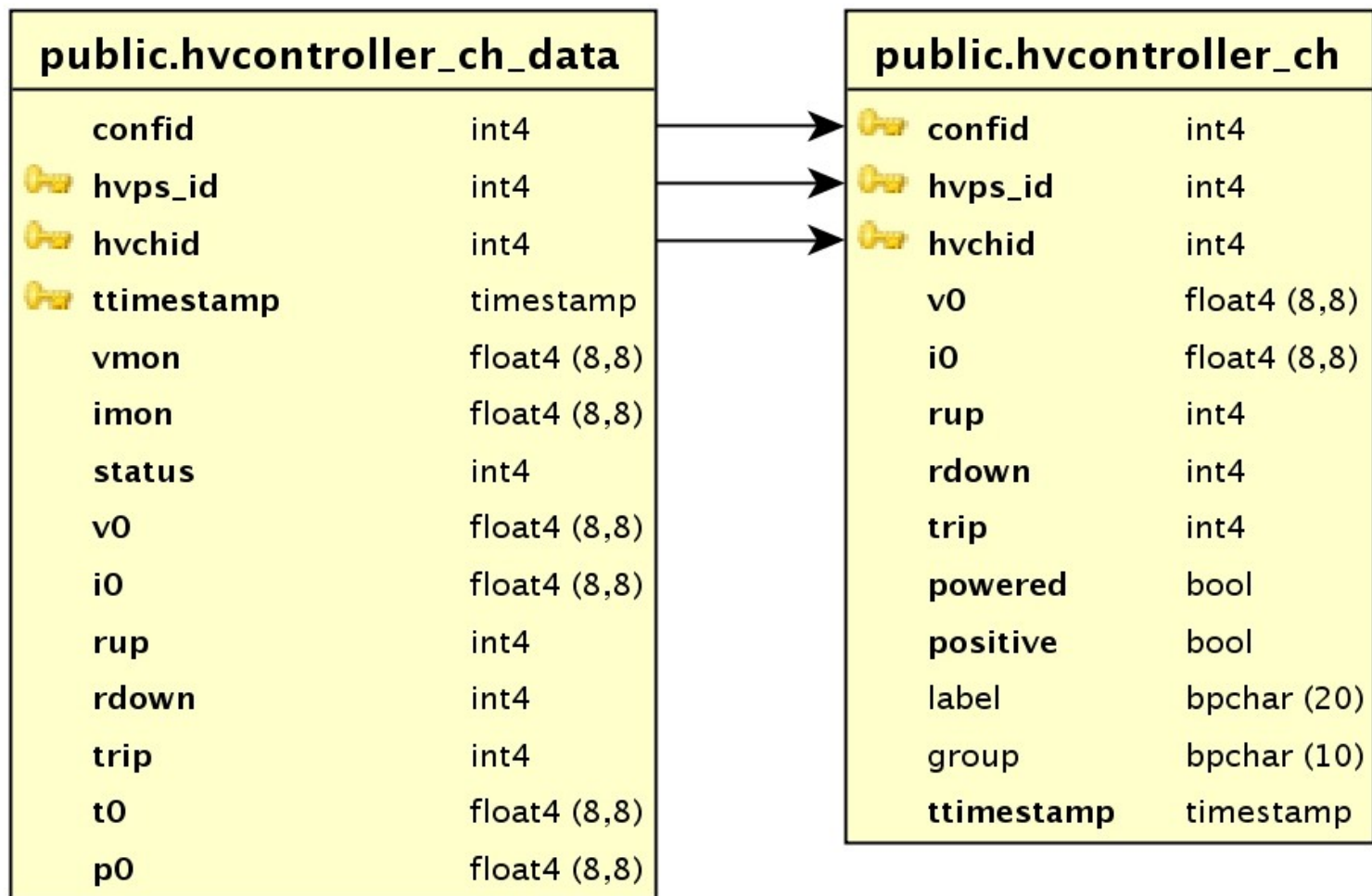


Slow Control for the HV of the Cherenkov muon Veto: the GUI



Slow Control for the HV of the Cherenkov muon Veto

DataBase structure for the HV system (a proposal)



Powered by yFiles

Slow Control for the VME/NIM crates

General enquire of the number/types of the crates in GERDA:

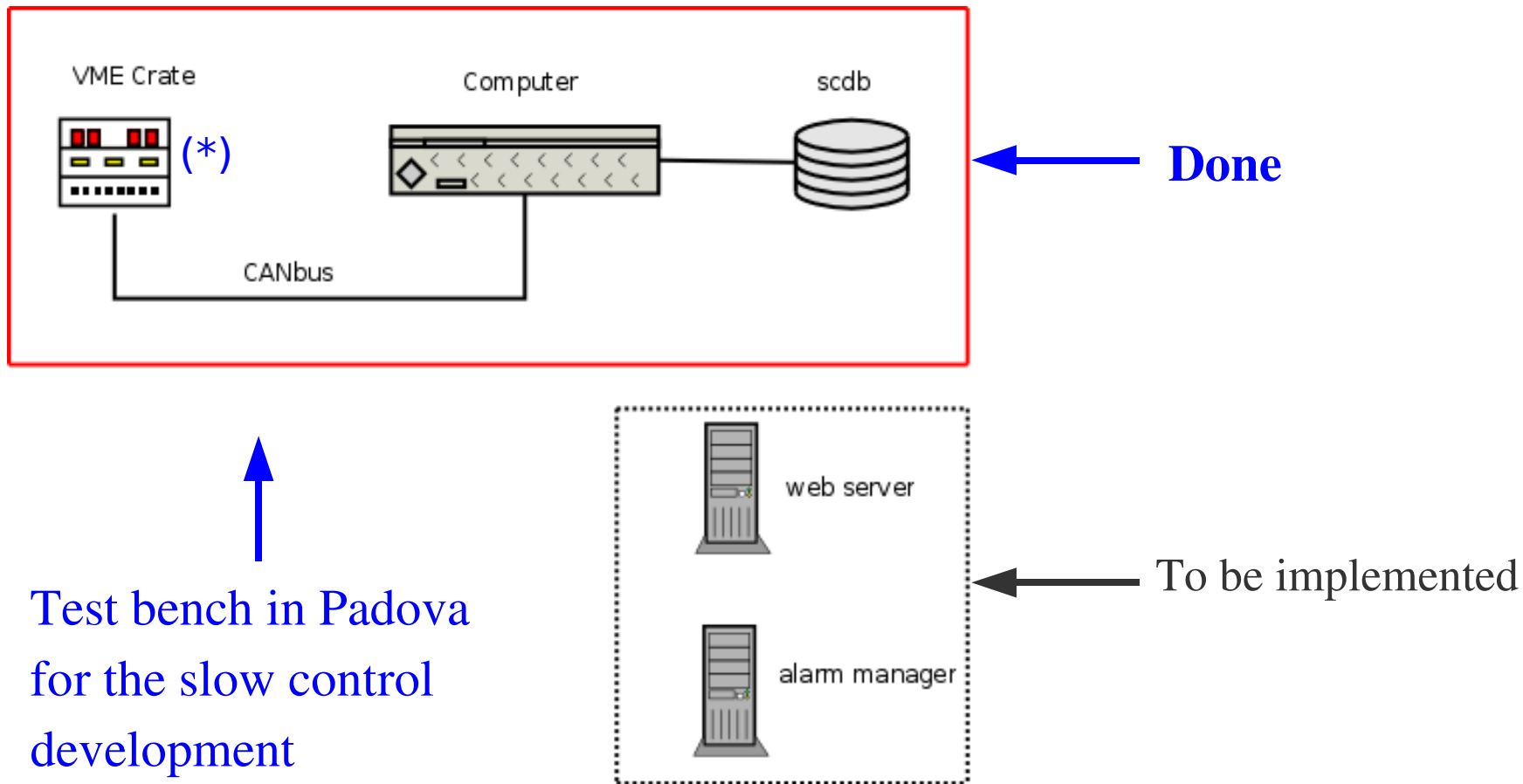
- ✓ *Front-End* : 2 NIM Crates from Wiener
- ✓ *DAQ-Phase-I* : 2 NIM Crates from Wiener
- ✓ *DAQ-Phase-II* : 3 VME Crates from Wiener
- ✓ *Muon Veto* : 3 VME Crates from Wiener

All the crates can be readout remotely through CANbus connections.

Possible operations/features:

- switch on/ switch off
- monitor V, I, fan-speed
- crate status

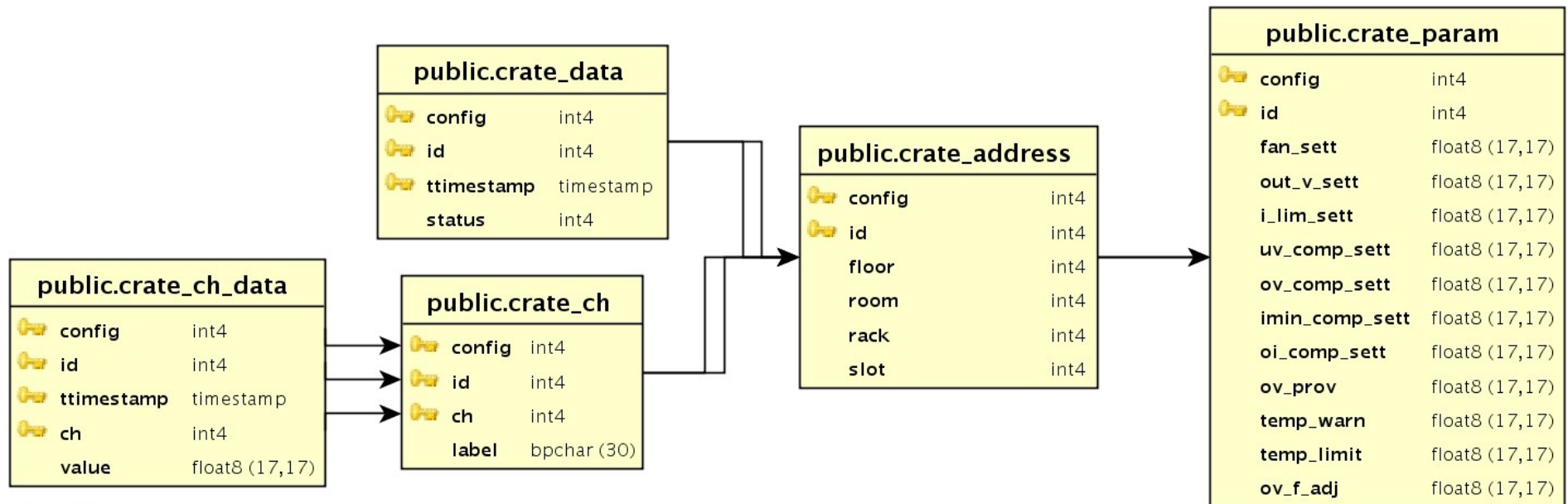
Slow Control for the VME/NIM crates



(*) the VME crate was gently lent by Bernhard

Slow Control for the VME/NIM crates

DataBase structure for the crates



Powered by yFiles

Alarm Manager

We can implement in GERDA a completely debugged and working **Alarm Manager**

System Requirements

- ✓ **Alarm Messages delivery** to all on-call users and sub-component experts
- ✓ Communicate via **SMS** and **EMAIL**
- ✓ Agile system configuration and alarm management (**WEB interface**)
- ✓ Security: **only authorized users** can interact with the system

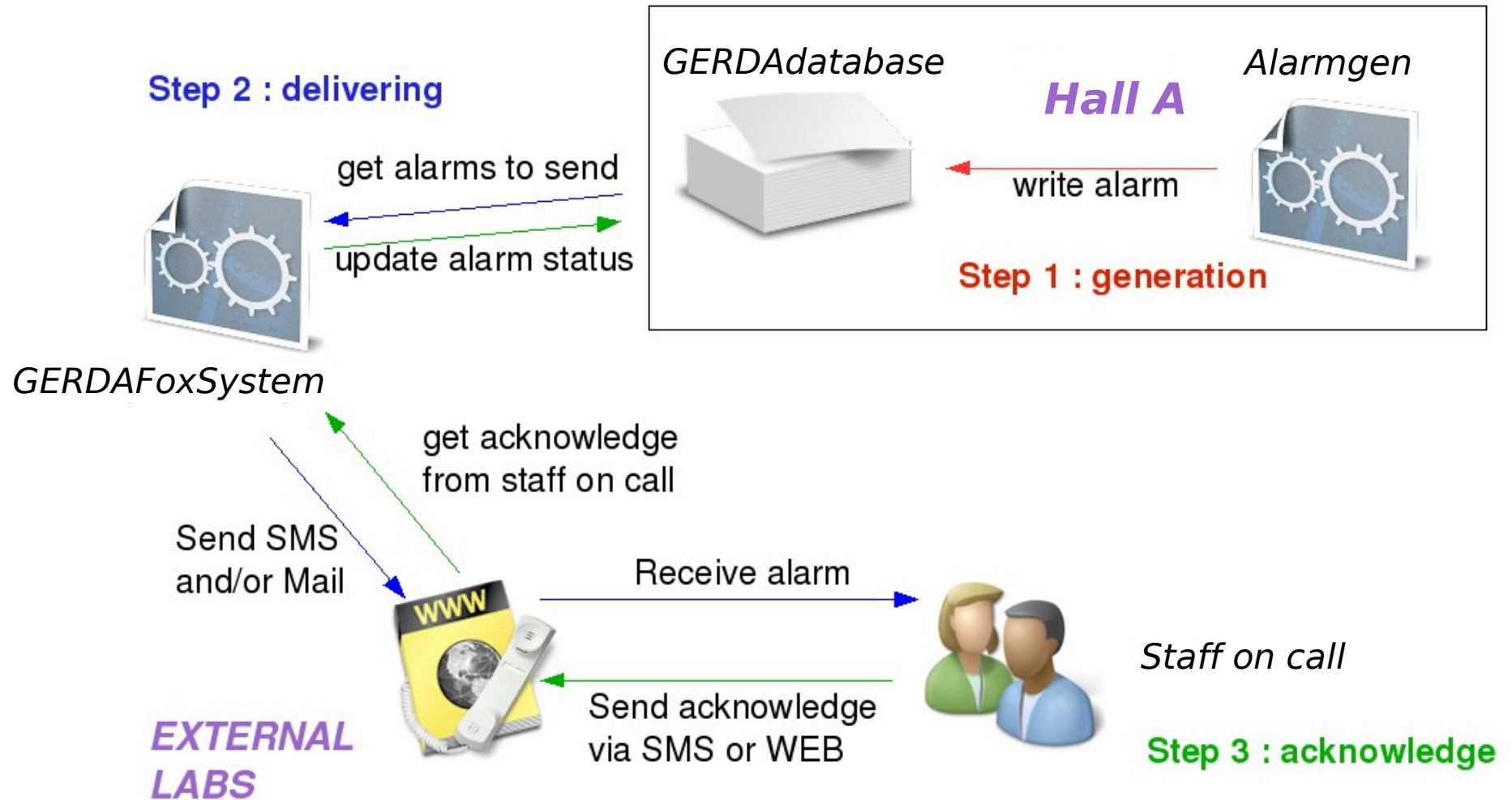
Hardware

- ✓ **Axis ETRAX LX100** CPU (32 bit, RISC)
- ✓ 32 MB RAM, 8 MB FLASH ROM
- ✓ **Linux Kernel 2.6.19**
- ✓ I/O : **Ethernet 10/100 Mb**, 2 1.1. **USB** port
48 I/O lines, I2C BUS, SPI,
serial and parallel port
Telit GM862-QUAD GSM Modem



Alarm System Workflow

- ✓ Alarm Generation in the Underground Labs (Hall A)
- ✓ Alarm Delivery in the External Labs



Alarm Administration

Web Interface for

✓ view/knowledge slow control alarms

27	Started	retry	2008-05-23 11:46:45	2008-06-06 14:34:46.097987	Info	1000	ACK THIS!
28	Stopped	retry	2008-05-23 11:46:55	2008-06-06 14:35:42.937009	Info	1000	ACK THIS!
372	Started	alive	2008-06-06 14:48:22	2008-06-06 14:48:22	Info	1000	TO MANAGE!
373	nodeid = 32 AND tid = 2 did not get data from DataBase last 5min	alive	2008-06-06 14:47:42	2008-06-06 14:47:42	Warning	4001	TO MANAGE!
374	nodeid = 33 AND tid = 1 did not get data from DataBase last 5min	alive	2008-06-06 14:47:42	2008-06-06 14:47:42	Warning	4160	TO MANAGE!
375	nodeid = 33 AND tid = 2 did not get data from DataBase last 5min	alive	2008-06-06 14:47:42	2008-06-06 14:47:42	Warning	4161	TO MANAGE!
376	nodeid = 34 AND tid = 1 did not get data from DataBase last 5min	alive	2008-06-06 14:47:42	2008-06-06 14:47:42	Warning	4320	TO MANAGE!
377	nodeid = 34 AND tid = 2 did not get data from DataBase last 5min	alive	2008-06-06 14:47:42	2008-06-06 14:47:42	Warning	4321	TO MANAGE!
378	nodeid = 32 AND tid = 2 did not get data from DataBase last 5min	alive	2008-06-06 14:48:22	2008-06-06 14:48:22	Warning	4001	TO MANAGE!
379	nodeid = 33 AND tid = 1 did not get data from DataBase last 5min	alive	2008-06-06 14:48:22	2008-06-06 14:48:22	Warning	4160	TO MANAGE!
380	nodeid = 33 AND tid = 2 did not get data from DataBase last 5min	alive	2008-06-06 14:48:22	2008-06-06 14:48:22	Warning	4161	TO MANAGE!
381	nodeid = 34 AND tid = 1 did not get data from DataBase last 5min	alive	2008-06-06 14:48:22	2008-06-06 14:48:22	Warning	4320	TO MANAGE!
382	nodeid = 34 AND tid = 2 did not get data from DataBase last 5min	alive	2008-06-06 14:48:22	2008-06-06 14:48:22	Warning	4321	TO MANAGE!
383	Stopped	alive	2008-06-06 14:48:35	2008-06-06 14:48:35	Info	1000	TO MANAGE!
384	Started	OK	2008-06-06 14:55:47	2008-06-06 14:55:47	Info	1000	See ack history
385	nodeid = 32 AND tid = 2 did not get data from DataBase last 5min	OK	2008-06-06 14:55:07	2008-06-06 14:55:07	Warning	4001	See ack history
386	nodeid = 33 AND tid = 1 did not get data from DataBase last 5min	OK	2008-06-06 14:55:07	2008-06-06 14:55:07	Warning	4160	See ack history

User Administration

Web Interface for

- ✓ administer the on-call users and settings

OPERA Fox Alarm System

Please, wait...

Loading Staff on call list...

List loaded

ID	Name	Phone	Email	Sms enable	Mail enable	Able to ack	Alarm type managed	Minimum alarm level	Web access level	Delete this profile	Update this profile
1	OPERA Alarm Administrator	3381032818	dario.zinato@pd.infn.it	YES	YES	YES	255	FATAL	admin	Delete this!	Modify this!
2	Staff on call	-	dario.zinato@gmail.com	NO	YES	YES	255	ERROR	staff	Delete this!	Modify this!
3	Simple user	-	zinatoda@dei.unipd.it	NO	YES	NO	255	INFO	user	Delete this!	Modify this!
4	Alberto Garfagnini	3406177876	alberto.garfagnini@pd.infn.it	YES	YES	YES	255	INFO	staff	Delete this!	Modify this!

[Clean](#)

User Administration

Web Interface for

- ✓ administer the on-call users and settings

calling python script for form generation...

ID :	<input type="text" value="4"/>
Username :	<input type="text" value="scgarfa"/>
Pwd :	<input type="password" value="●●●●●●"/>
Phone :	<input type="text" value="3406177876"/>
E-Mail :	<input type="text" value="alberto.garfagnini@pd.infn.it"/>
Name :	<input type="text" value="Alberto Garfagnini"/>
OnSms :	<input checked="" type="checkbox"/>
OnMail :	<input checked="" type="checkbox"/>
CanSilence :	<input checked="" type="checkbox"/>
AlarmType :	<input type="text" value="255"/>
AlarmLevel :	<input type="text" value="INFO"/>
WebAccess :	<input type="text" value="staff"/>
	<input type="button" value="Update!"/>

(Valid alarm level : INFO, WARNING, ERROR, FATAL)

(Valid web level : user, staff, admin)

Network in the GERDA building

The GERDA building will be connected to the external world through a LSZH multi-mode optical fiber (a bundle with 6 fibers).

Inside the GERDA building the data lines will be made by simple electrical cables.

In May 2008, Alberto, Bernhard and I sent a mail to the **pmg-members** in order to collect information about:

- ◆ *number of ethernet points foreseen for each subcomponents*
- ◆ *types of computers (LINUX, UNIX, WINDOWS, ...)*
- ◆ *special requirements for the connection with the external world*
- ◆ *foreseen amount of data transfer (mean value and/or maximum value)*
- ◆ *data transfer between computers in the same rack, or between computers placed in different floors of the GERDA building*

Network in the GERDA building

We received only few answers.

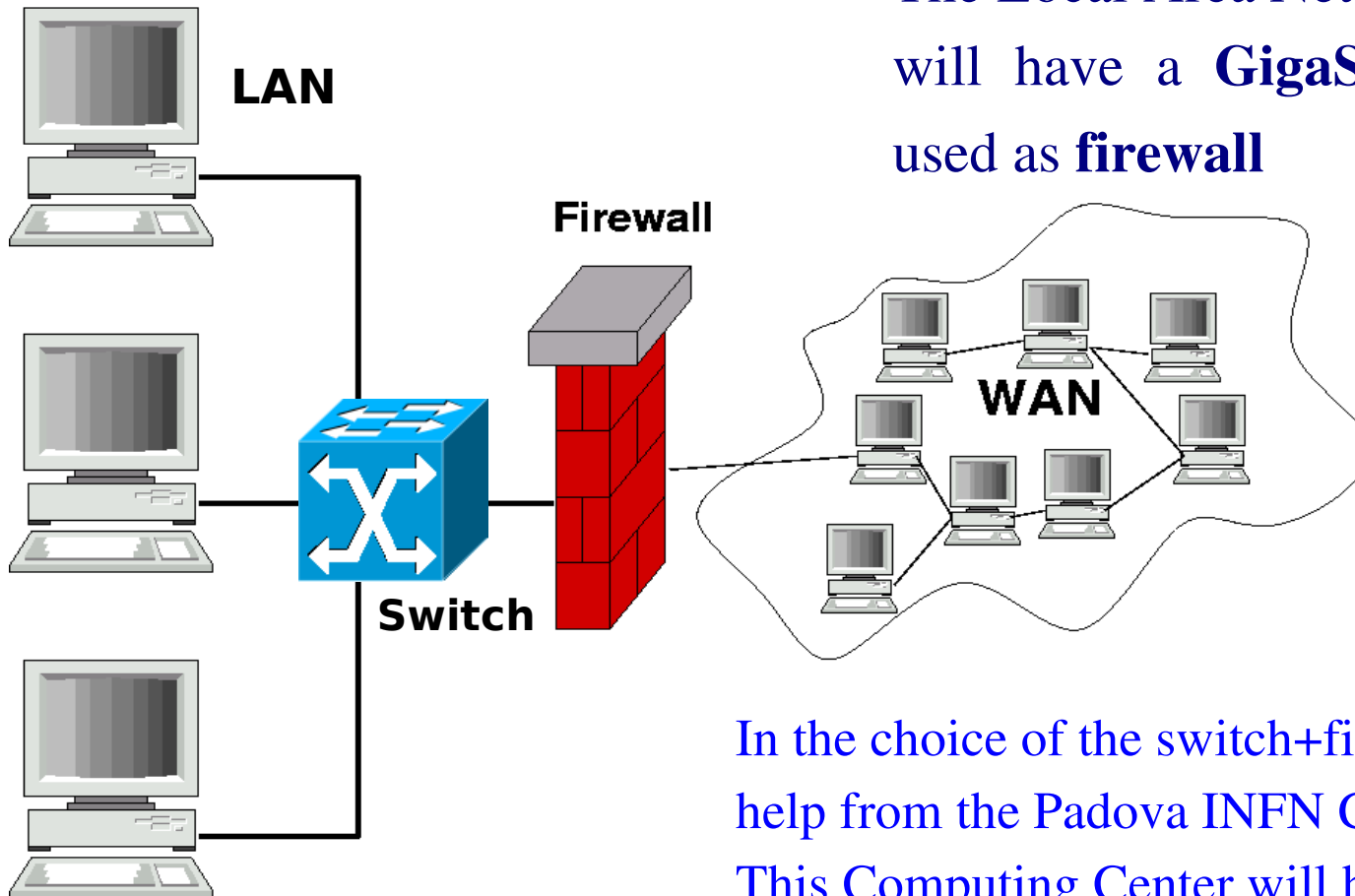
Necessity of ~30 ethernet points

2/3 WINDOWS, 1/3 LINUX

Amount of data \lesssim 1Mb/s (calibration?)

So no special requirements.

Network in the GERDA building



The Local Area Network for GERDA will have a **GigaSwitch** and a server used as **firewall**

In the choice of the switch+firewall we have received help from the Padova INFN Computing Center. This Computing Center will help us in the installation, maintenance of the networking software.

Material

We are buying the following material:

- 1 switch ProCurve 2810 48G (J9022A), 48 ports, stackable
- 1 computer for database and clients
- 1 server (firewall)
- 2 Axis ETRAX LX100

Conclusions

- ✓ **The building of the GERDA Slow Control is already started:**
 - ◆ the essential part of the HV control for the Cherenkov Muon Veto is done
 - ◆ the crate control can be finished for the end of the year
 - ◆ the Alarm Manager is now ready to be implemented in the GERDA Slow Control
 - ◆ we are buying some important pieces of hardware
- ✓ **with the 2009 new components will be integrated** (cryostat, clean-room,...)
 - ◆ the integration plan has to be discussed with the experts/project-managers
- ✓ **Network in the Hall A**
 - ◆ hardware chosen and to be bought
 - ◆ help from experts available