



GANMVL

Global Accelerator Network

Multipurpose Virtual Laboratory

Present Status and Future Developments

Roberto Pugliese

roberto.pugliese@elettra.trieste.it

on behalf of WP8

EUROTeV Scientific Workshop

26-28 August 2008 - Uppsala University



Outline

- The EUROTeV/GANMVL project
- The status of the GANMVL
- Features of the GANMVL
- The GANMVL @ ELETTRA
- Future developments



GANMVL motivation

- The most likely scenario of a linear collider is that it will be built by a collaboration of existing laboratories, which will remain involved during the operation of the accelerator.
 - Prototypes will be developed in one institution and tested with beam in another laboratory
 - Equipment will be built and delivered by one partner and needs to be integrated into the accelerator complex by another partner
 - Whole parts of the facility will be provided by a remote partner and need to be commissioned and possibly operated with the experts at their remote home institutions
 - In situ trouble shooting and repairs needs to be performed with the support of off-site experts
- Advanced means of communication will be necessary to support efficient collaboration.
- The GANMVL project will design and build a novel collaboration tool and test it in existing accelerator collaborations.



GANMVL tool

- The tool will be a mobile communication centre which provides immersive video and audio capture and reproduction of an accelerator control room, a laboratory workplace environment or an accelerator hardware installation
- The tool should be able to connect to standard measurement equipment (scopes, network analyzers etc.) and to elements of accelerator controls and make these connections available to a remote client
- The tool should be an integration platform, providing a secure unified access to all the related tools and services available at the laboratory
- The remote user should be enabled to participate in accelerator studies, assembly of accelerator components, trouble shooting of hardware or analysis of on-line data as if he or she would be present on site



EUROTeV/GANMVL

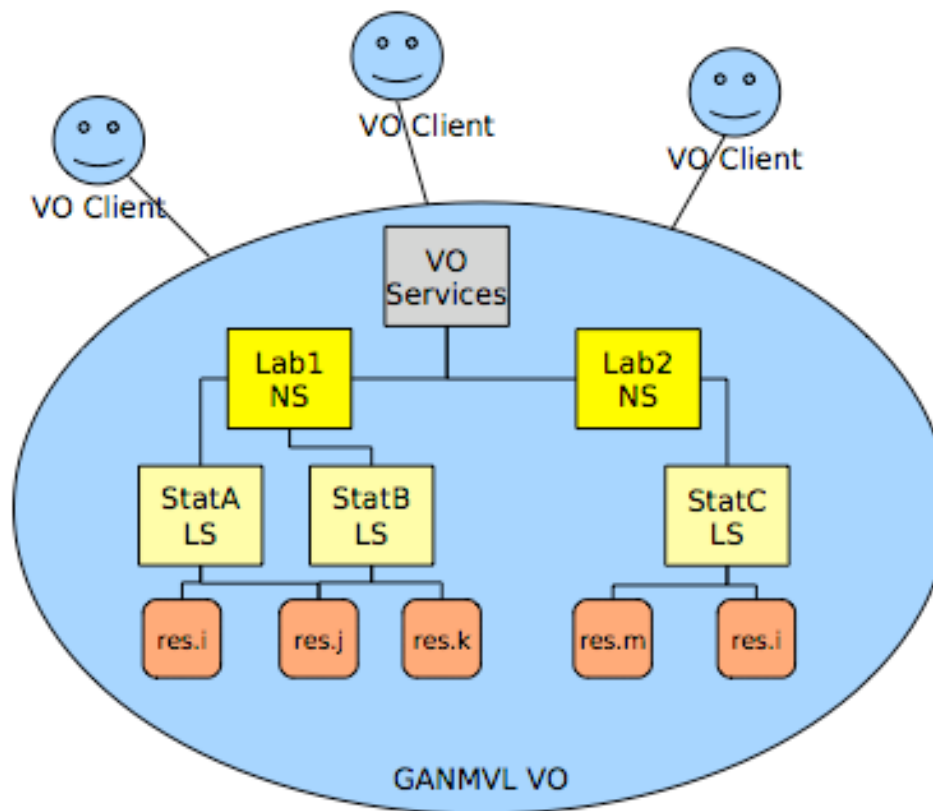
- The EUROTeV Work package 8 (GANMVL) been organized in four sub work packages. Each contains a number of subtasks
 - ODI: Overall Design and Integration
 - SC: System Components
 - ME: Mechanical and Electrical Design
 - DGF: Demonstration of GAN and far remote operating
- Shift from hardware to software solution deployable on different platforms



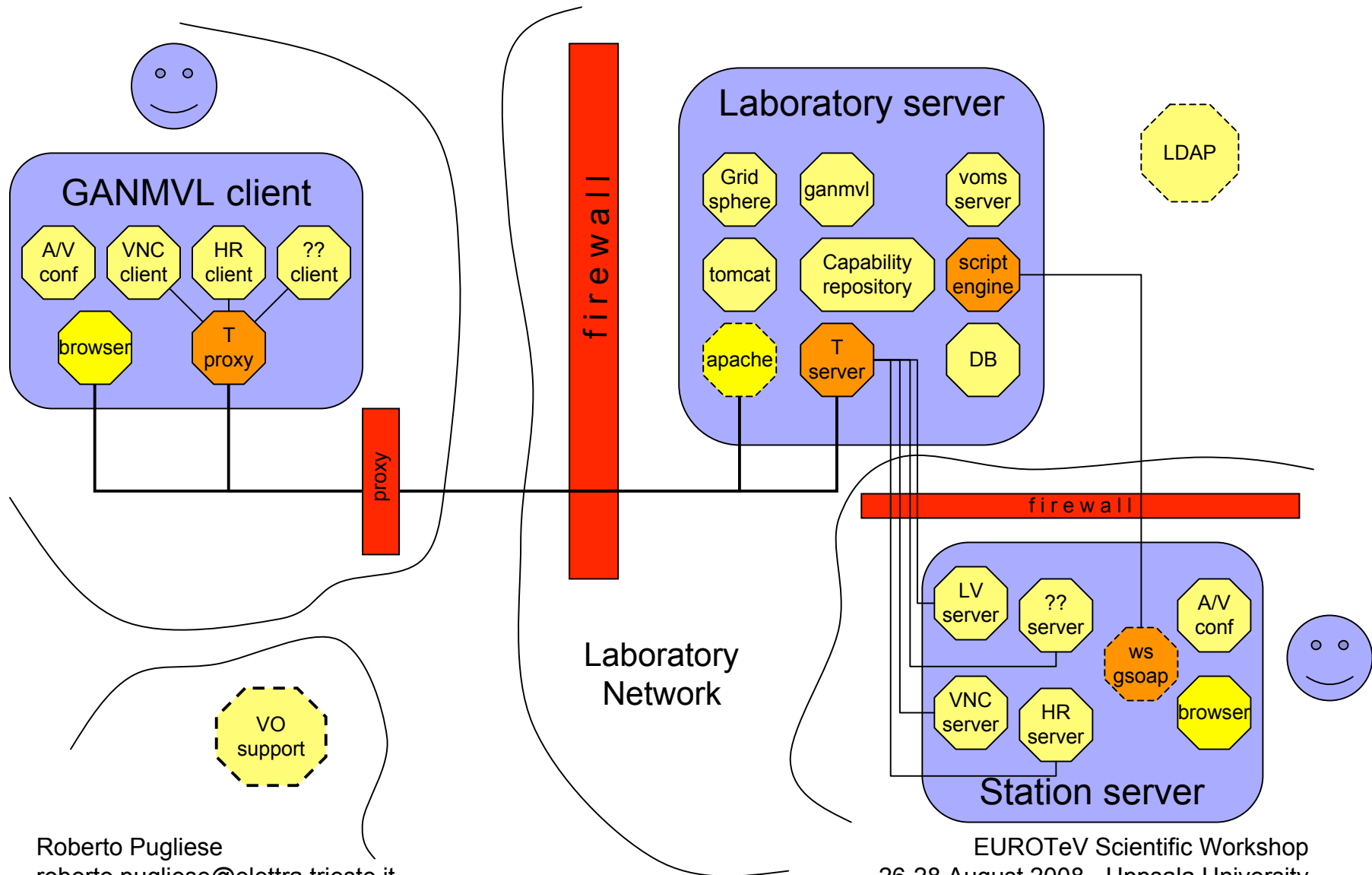
Development approach

- Focus on both technical and non-technical aspects
- Deep involvement of human computer interaction and psychology experts
- User surveys, interviews, feedbacks, heuristic evaluation
- Extensive use of prototypes
- Extreme programming

Global GANMVL Architecture



GANMVL internal architecture





Current GANMVL status

- Web portal interface for all the type of users (remote, laboratory admin, station admin) and all usage scenarios
- Fine grain control on authorization (VOMS): resource or capabilities can be associated to different levels
- Security and Awareness: tunnel, tunnel monitoring and control, resource enable and disable
- Knowledge management tab with e-log, help, download area
- GANMVL tab with an integrated resource and people browser
- By selecting a node in the browser associated and authorized capabilities are presented on a toolbox
- Different kind of capabilities: High resolution cameras, file manager, chat, audio and video conference (skype, VRVS), Web tools (IVI instrument integration), Remote desktop tools (VNC, NX), Wizards
- Open source, modular distribution, plug-in architecture (API)

Features: web based interface

The screenshot displays a complex web-based interface for a particle accelerator facility. The main window is titled "Global Accelerator Network" and features a "resource browser" on the left with a tree view of resources like "CollaboratoryRoom", "ControlRoom", and "MicroStation". A central panel shows various diagnostic tools such as "Big_SX", "DIAGNOSTIC_DCCT", "Logbook CR", "Remote Services", "RF Rob", "Tunnel Monitor", "VNC Wizard", and "VRVS". A "Calendario" (calendar) is visible at the bottom left, showing the date October 11, 2007. A "pc-gancr:0.0 idsupervisor" window displays a table of resource status:

Resource ID	Status	Mode	Value 1	Value 2	Value 3
ALOISA ID_7	NON PRONTO	DISABILITATO	0.000	0.000	0.000
ID_S8.1	NON PRONTO	DISABILITATO	0.000	0.000	0.000
ID_S8.2	NON PRONTO	DISABILITATO	0.000	0.000	0.000
ID_S9.1	NON PRONTO	DISABILITATO	0.000	0.000	0.000
ID_S9.2	NON PRONTO	DISABILITATO	0.000	0.000	0.000
IUVS ID_10	NON PRONTO	DISABILITATO	0.000	0.000	0.000
MiniID ID_12M	NON PRONTO	DISABILITATO	150.003	0.000	0.000

A "pc-gancr:0.0 DIAGNOSTIC_DCCT" window shows diagnostic data for "Thu Oct 11 13:02:19":

- Current: NO BE
- Life Time: -----
- Energy: -0.077 [
- Int. Current: 11503.63

A "SONY Network Camera SNC-RZ30P" window displays a control interface with a camera feed of a "COMPRESSOR STATION" showing real-time data:

Pressure Point	Value	Unit	Percentage
HP: PT290	11.568	BAR	PCV289: 0.00 %
PT286	11.869	BAR	PCV280: 0.00 %
LP: PT275	1.478	BAR	PCV275: 0.00 %

The interface also includes a "Control" panel with buttons for "Control", "Capture", "Trigger", "Setting", and "Home", and a "Calendario" (calendar) showing the date October 11, 2007.



Features: wizards

- Instruments, control panels and other supported capabilities can be added by the web interface via a wizard. The wizard together with the help system will guide the administrator in the procedure.
- There are different integration issues and hence different wizards: http, VNC, VLC, HRC, Generic (NX)
 - The http is suitable when the instrument or control already has a web interface available or is a web resource
 - The VNC is suitable when the instrument or control is equipped with legacy software which was not designed for the web
 - The VLC and HRC wizards are used to integrate high resolution streams
 - Generic wizard can be used in all the other cases
- New capabilities can be developed via API
- Specific integration issues can be solved using the Scripting capabilities

Features: Web/Wizard based Administration

Global Accelerator Network Multipurpose Virtual Laboratory V2.2

Abmelden
Willkommen, ad

Knowledge Management GAN Portal

Welcome to GAN

resource browser

- Global Accelerator Network
- gsi
- fabio.bonaccorso@elettra.trieste.it
- h.tang@gsi.de
- hai.tang@gmx.de
- k.hoepfner@gsi.de
- p.schuett@gsi.de
- tang_hai@sina.com
- tang.hai.et@gmail.com

toolbar

- Capability Admin
- Global Acc. Node Admin
- Laboratory Admin
- Script Admin
- Tunnel Monitor (popup)
- User Manager
- User Profile

VirtualOrganizations node administration

Modify all labs: VirtualOrganizations

Update

all labs Properties | all labs Users | all labs Resources

all labs name: VirtualOrganizations

Description: This is the main control p

Public

ADD property to group REMOVE selected properties from group

Property	Value
Identity Service	test
Storage Element	test
Computing Element	test

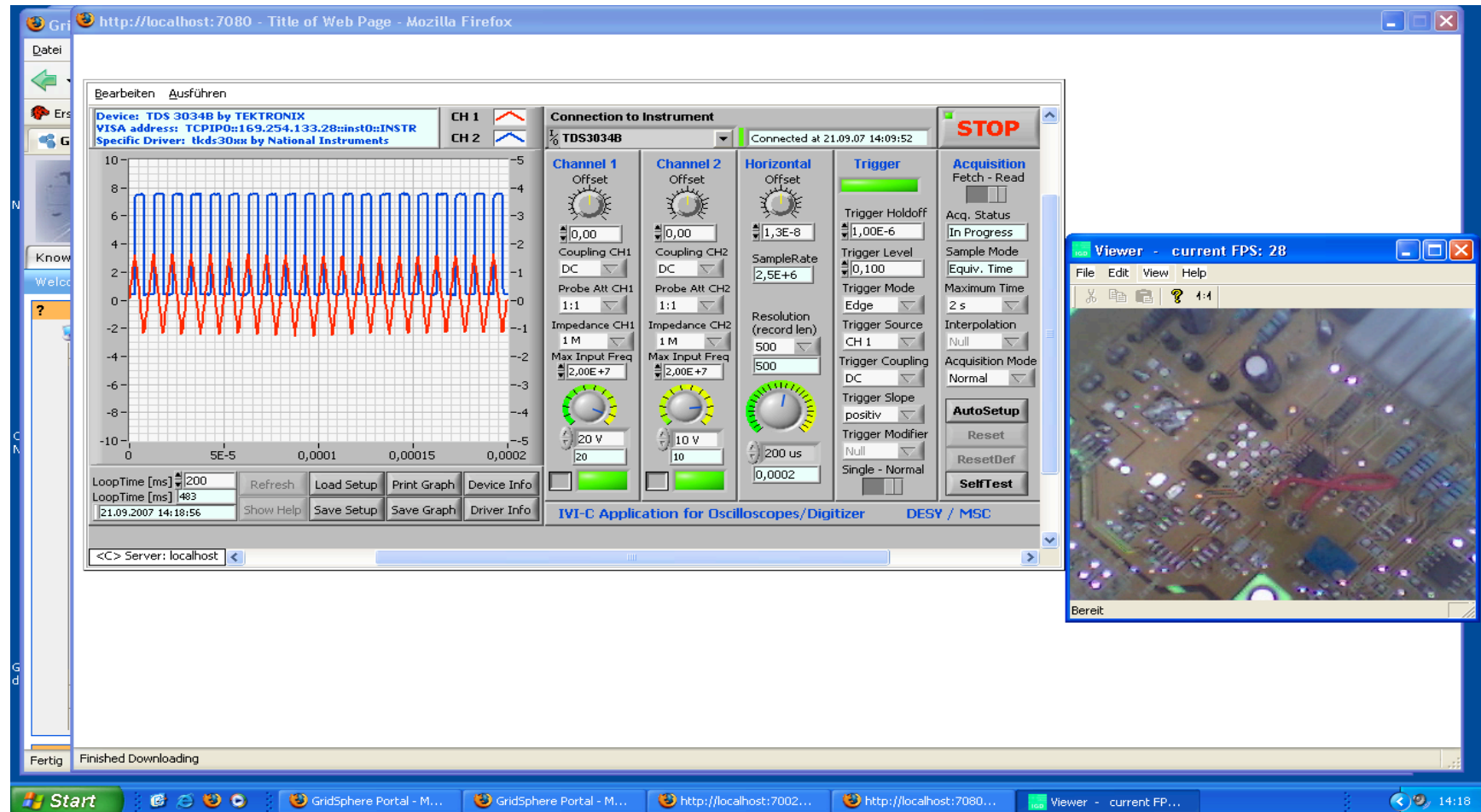
Calendario

<< September 2007 >>

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

VirtualOrganizations Events

Features: Troubleshooting via remote desktop and High Resolution Camera

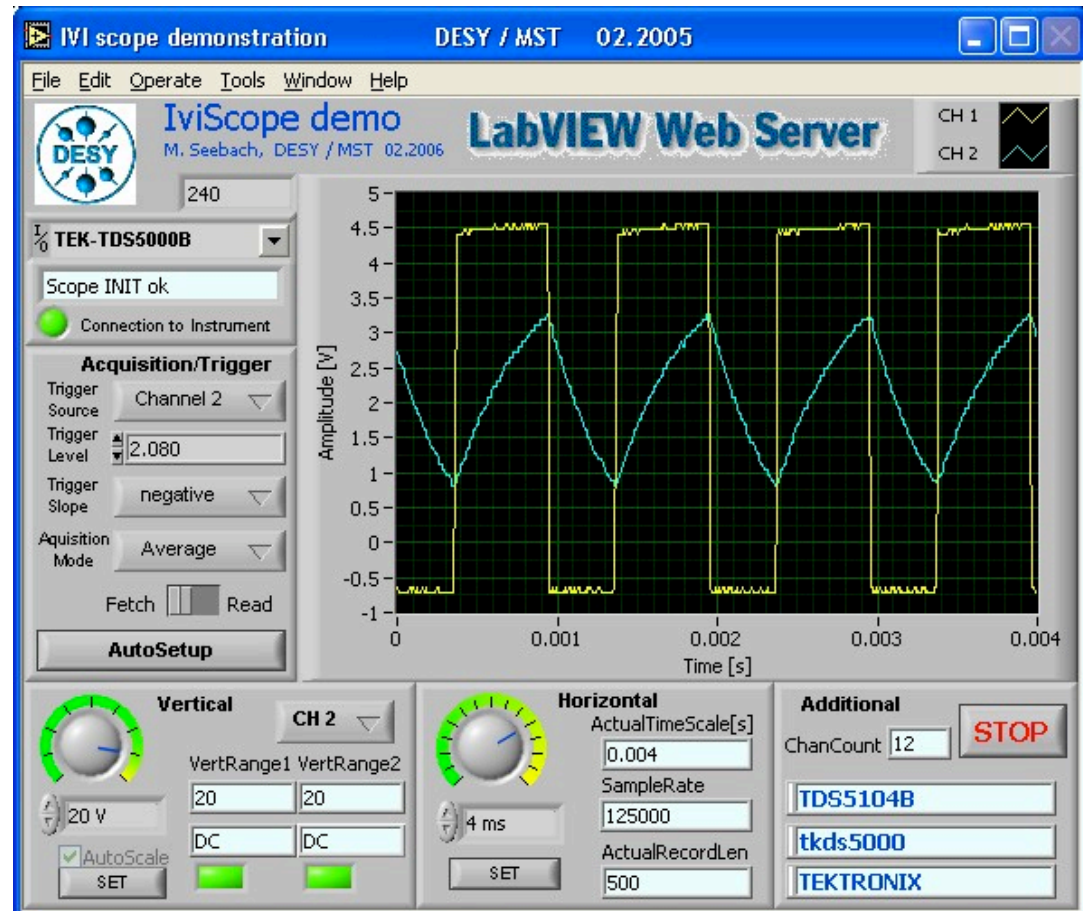


Roberto Pugliese
roberto.pugliese@elettra.trieste.it

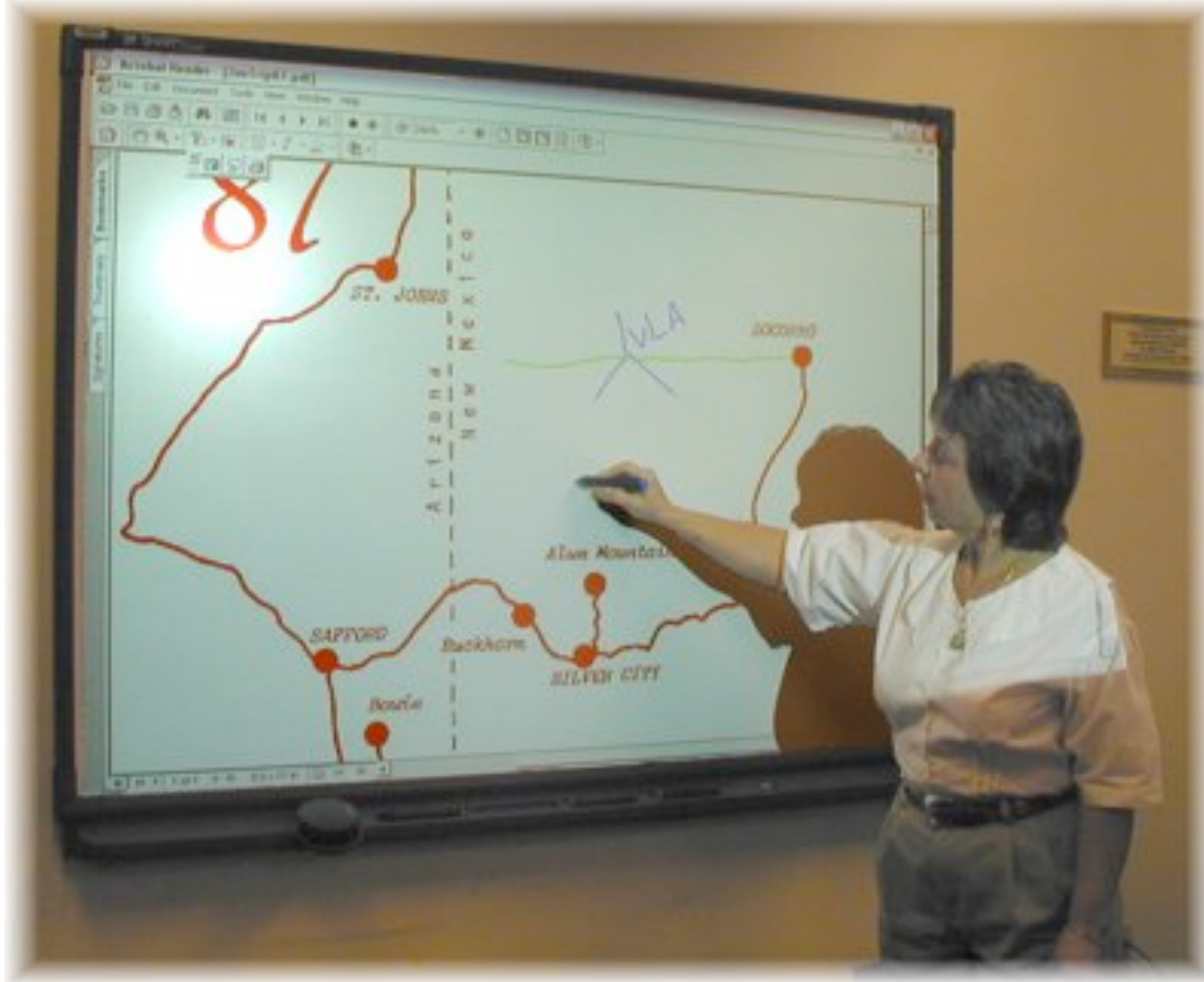
EUROTeV Scientific Workshop
26-28 August 2008 - Uppsala University

Features: IVI standard support

- Implemented with LabView
- Based on IVI scope class libraries
- Tested with:
 - [NI USB-5102](#)
 - [TEK TDS5104](#)
 - [TEK TDS3054](#)
 - [LC WR 6200](#)



Features: flexibility (smartboard support)



Features: Integrated Awareness via Tunnel Monitoring

GridSphere Portal - Mozilla Firefox
http://depc48.gsi.de:8080 - GridSphere Portal - Mozilla Firefox

Tunnel Monitor

STOP page refresh

CONNECTION AGE **more than a DAY** more than an HOUR 30 MINUTES 15 MINUTES less than a 15 MINUTES

Drop	Remote_client_host	Userinfo	Start_session	Remote_server_host	Remote_server_port	Application	Grp
DROP	140.181.66.116	p.schuett@gsi.de	2007-09-21 16:01:51.359	140.181.85.90	5010	on BENPC018	HRC Servers
DROP	140.181.85.47	p.schuett@gsi.de	2007-09-21 15:53:28.685	BENPC018.gsi.de	80	test	Instruments access per Web

Fertig

Fertig

Su Mo Tu We Th Fr Sa and

2 3 4 5 6 7 8

9 10 11 12 13 14 15

16 17 18 19 20 21 22

23 24 25 26 27 28 29

30

VirtualOrganizations Events

Private Event(s)

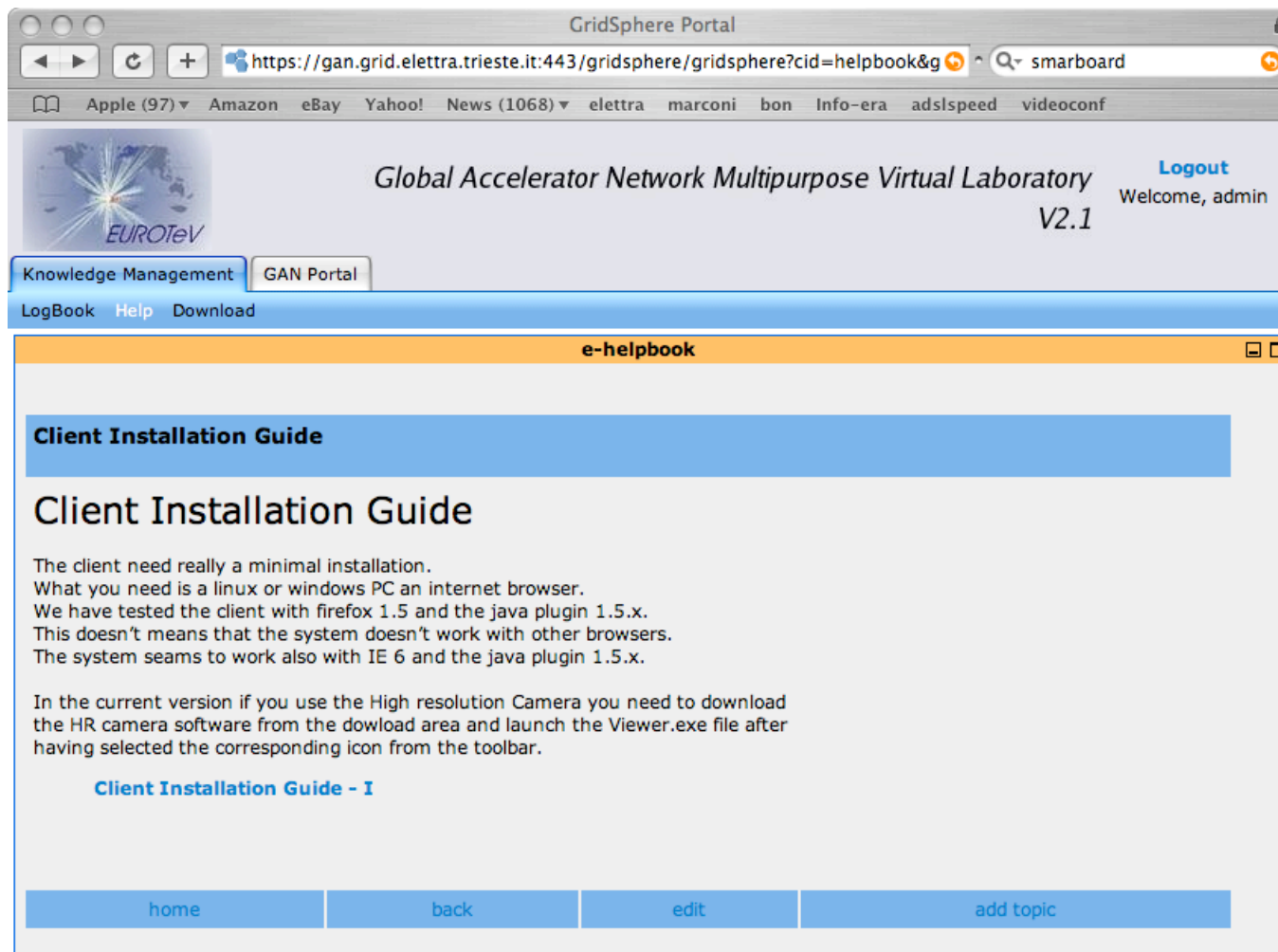
Fertig

Planung für das Internationale Beschleunigerzentrum
Plans for the International Accelerator Facility

Informationen
Information

© Impressum, Urheberrecht und Haftungsausschluss
Gesellschaft für Schwerionenforschung mbH | Planckstr. 1 | 64291 Darmstadt | Telefon: +49-6159-71-0

Features: Integrated Help System



The screenshot displays a web browser window titled "GridSphere Portal". The address bar shows the URL: <https://gan.grid.elettra.trieste.it:443/gridsphere/gridsphere?cid=helpbook&g>. The browser's toolbar includes navigation buttons and a search bar containing "smarboard". Below the browser window, the main content area of the portal is visible. It features a header with the "EUROTeV" logo and the text "Global Accelerator Network Multipurpose Virtual Laboratory V2.1". A "Logout" link and the text "Welcome, admin" are also present. A navigation bar includes "Knowledge Management" and "GAN Portal" tabs, along with "LogBook", "Help", and "Download" links. The main content area is titled "e-helpbook" and displays a "Client Installation Guide" page. The page content includes the following text:

Client Installation Guide

The client need really a minimal installation.
What you need is a linux or windows PC an internet browser.
We have tested the client with firefox 1.5 and the java plugin 1.5.x.
This doesn't means that the system doesn't work with other browsers.
The system seems to work also with IE 6 and the java plugin 1.5.x.

In the current version if you use the High resolution Camera you need to download the HR camera software from the dowload area and launch the Viewer.exe file after having selected the corresponding icon from the toolbar.

[Client Installation Guide - I](#)

At the bottom of the page, there are four navigation buttons: "home", "back", "edit", and "add topic".

March 19, 2007



Features: Integrated Monitoring System

- Based on MonALISA (MonALISA, Monitorig Agent using a Large Integrated Services Architecture)
 - A MonALISA server on each GANMVL Laboratory Server
 - A LISA client on each Local station server sending data ti the server
 - A LISA client on the client itself to monitor the quality of the connection
 - A repository to collect all the data and make them geographically available to the users

Features: Integrated Monitoring System

The screenshot displays the GridSphere Portal web interface in Mozilla Firefox. The browser's address bar shows the URL: `https://gan.elettra.trieste.it/gridsphere/gridsphere.jsessionid=B8BBCF721619E431C4C35B58C2E9056E?cid=login#`. The page title is "Global Accelerator Network Multipurpose Virtual Laboratory V2.2". The user is logged in as "Benvenuto, admin@".

The interface features a "resource browser" on the left with a tree view of "Local Resources" including "elettra", "CollaboratoryRoom", "ControlRoom", "MobileStation", "NuoviBipolari", "RemoteBeamLines", "RemoteControlRoom", and "TrainingRoom". Below this are sections for "Remote Resources" and "Users". At the bottom left is a "Calendario" (calendar) for August 2008, showing "No appointments" from 00:00 to 24:00.



The main content area has a "toolbar" with several icons. The "Lisa Monitoring" icon, which depicts a computer monitor with a graph, is circled in red. Other icons include "Factotum Wizard", "gan", "HRC Wizard", "HTTP Wizard", "Station Admin", "test_nxserver", "test-pcgancr", "VideoLan Wizard", and "VNC Wizard".

Below the toolbar, the text reads "Most Information Service Agent". A paragraph describes LISA as a Java Web Start application that monitors parameters and sends them to the MonALISA service. A list of steps for starting monitoring is provided:

- Download and start the LISA client (JDK >= 1.5 required)
- Choose the parameters you want to monitor (CPU load, network, Free disk space etc.)
- Your system now is monitored both locally and on the MonALISA server on Gan
- Start the MonALISA client by using the MonALISA capability.
- Click on the Gan station near Trieste on the map.
- Click on the LISA folder on the new window, you should see the various hosts connected to the service, click on your host to see your parameters.

A small "Start LISA" button with a "Deadhost Information Service Agent" icon is located on the right side of the page. At the bottom of the browser window, the URL and the gan.elettra.trieste.it logo are visible.

Features: Possible station setups

		Video Conference Cameras	High Resolution Video & Cameras	3-D high resolution Video	Multiple Screens	Large Display	Lighting	Audio Support	Virtual Instruments	Stands	Control System Interface	Wireless Access Point
Stationary Setup	remotely assisted Accelerator Experiment	x	x	x	x	x		x				x
	Remotely assisted Accelerator Commissioning	x	x	x	x	x		x				x
Semi-mobile Setup	Remotely assisted Test preparation	x	x	x			x	x	x	x	x	x
	Remotely assisted Assembly	x	x	x			x	x	x	x	x	x
Mobile Setup	Remotely Assisted Maintenance	x	x					x	x		x	x
	Remotely Assisted Repair	x	x					x	x		x	x
	Remotely assisted Trouble Shooting	x	x					x	x		x	x
	...											



GANMVL @ ELETTRA

- Production use for remote operations of ELETTRA and commissioning of the booster
- Production use for remote operations of the beamlines and experimental stations
- Will be used for commissioning and remote operations of FERMI@ELETTRA

GANMVL: Stationary Station Set-up



Roberto Pugliese
roberto.pugliese@elettra.trieste.it

EUROTeV Scientific Workshop
26-28 August 2008 - Uppsala University



Mobile Station

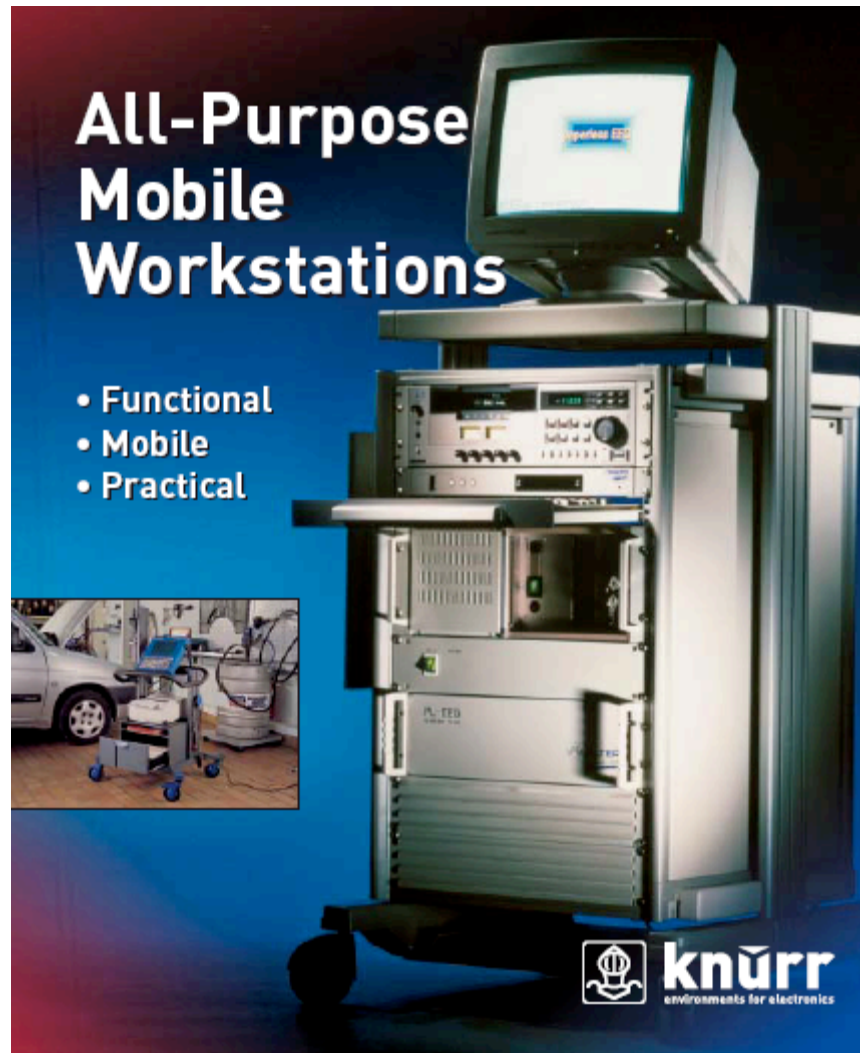


Tablet PC



Micro PC

Semi-Mobile Station





GANMVL @ ELETTRA Video Storyboard

- GANMVL in the ELETTRA Control Room (Large Displays)
- Using the client
 - Control Panel via HTTP tunnel
 - External Logbook via HTTP tunnel
 - Mobile camera via HTTP tunnel
 - Local Tunnel monitor
 - MOXA camera server via HTTP tunnel
 - Skype integration
 - EVO integration
 - Labview integration via HTTP tunnel
 - High Resolution Camera integration via HRC tunnel



GANMVL @ ELETTRA Video Storyboard (2)

■ Administrator access

- Using the HTTP wizard
- Tunnel monitor and Operator Remote Connection Awareness
- Controlling the large displays via remote script execution
- Generic Tunnel Wizard
- Telnet and ssh integration
- Plugin architecture
- Scripting
- Internal Logbook
- Help system
- Tablet PC

■ Collaboration via Smart board, VNC and skype

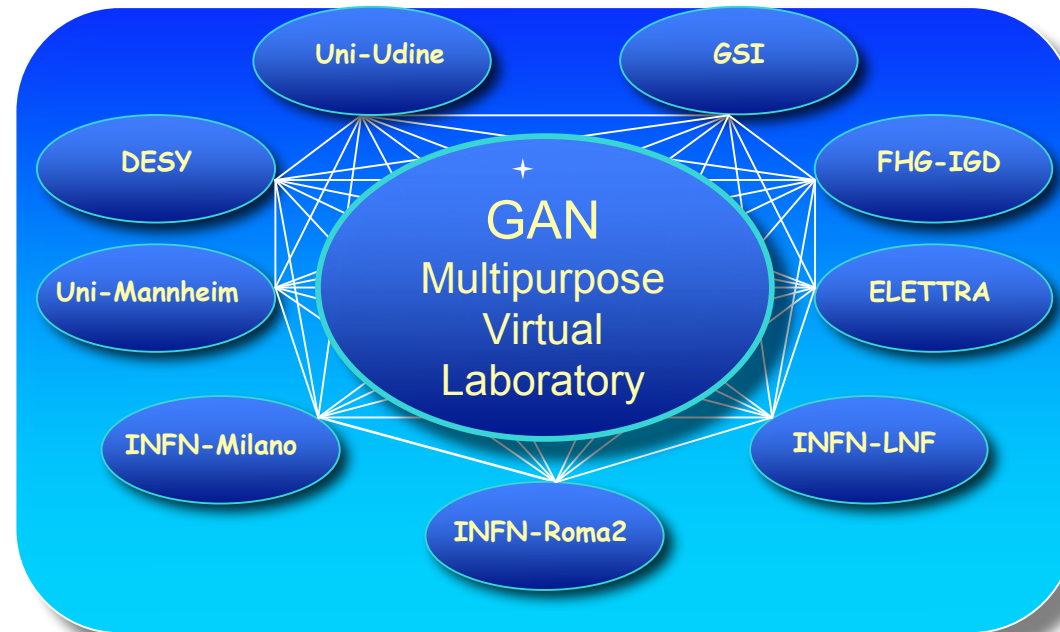


GANMVL Future

- Production use at ELETTRA, DESY, GSI, INFN
- Integration of MCE/VCR technology and the “Grid” world with the GANMVL approach “Not-Grid” world
 - Virtual Control Room
(<http://www.youtube.com/watch?v=vcSAIp9qps0>)
 - Instrument Element
 - More info on EGEE RESPECT program
(<http://technical.eu-egee.org/index.php?id=290>)
- Funding
 - DORII project started Feb 2008
 - EUROTeV, then ILC ?
- Interest by ITER, FERMILAB, XFEL, OGF, ...

Many Thanks to ...

- All the members of the collaboration



- The developers of the tools we integrated in the GANMVL (VRVS, EVO, ...)