SuperB Accelrator computing infrastructure and controls system

G. Mazzitelli 3 Apr. 2012

The Scandale questions and Variola worries

- che cosa esiste (inclusa la proposta di Catani in risposta alla richiesta di aiuto di Petronzio)
- come si procede per il costing
Sarebbe possibile avere una prima stima al 50% dei canali di controllo e del numero di procedure da scrivere?
condivido pienamente la preoccupazione espressa ieri da Variola sulla questione strategica della tempistica.

- The !CHAOS idea
- Channels and cost estimation
- Efforts estimation
- Time schedule

work to carry out

		2011	2012	2013	2014	2015	2016	2017
WP7	**Computing & Controls**							
	• *Infrastructure design, test & development*							
	• *Controls library*							
	• *Frontend & drivers*							
	• *Users interface*							
	• *High Level Software*							
	• *Accelerator code vs controls interface*							
	• *Logbook & trouble ticket*							
	• *Identification & Security*							
	• *Web tools, data access, and experiment data correlation*							
	• *Electronic Management Data System*							
	• *Project Management Data System*							
	• *Remote Control Room*							
	• *Accelerator infrastructure subsystems interface*							

Presented to INFN directors meeting 20 Apr.2011

Deliverables

Work package number	7	Start date or starting event:			2010		
Work package title	Computing & Controls						
Participant	LNF	ROMA2	LAL				
Person-months per participant:	4	1.5	1				

Objectives: design, develop and maintenance of a computing infrastructure and a controls system for the superB project.

Description of work: SuperB Accelerator requires a large amount of computing tools, essentially dedicated to tree different purpose: implementation and maintenance of documentation and project management; beam simulation and controls; data monitors, presentation and correlation with the experiment. In the mean time those tools requires identification, security, accessibility for large and international community. Last but not list could be an opportunity to develop new concepts in accelerators controls and constitute a new computing infrastructure

D7.1) Computing infrastructure: design, develop and maintain a computing infrastructure with the following purpose: implementation and maintenance of an Electronics Management Data System (EMDS) dedicated to the storing and presentation of all (accelerators & experiment) project documents, cads, etc; implementation and maintenance of a Project Management Data System (PDS), for the accelerator and experiment, in order to efficiently allocate and monitors efforts and costs; develop a common infrastructure and tools with the experiment in order to share and correlate data; implementation and maintenance of accelerator simulation code FARM server sand services; implementation and maintenance of server and service needed for the beam controls.

D7.2) Software infrastructure, Control Systems: design, develop and maintain a control system for the accelerator device providing the possibility to integrate very fast data acquisition, interface with experiment data, electronic logbook, trouble ticket, high level software, simulation code interface. The work to be done can be divided in: design and implementation of the controls system libraries; development and implementation of the drivers, and interface with accelerators device; development and implementation of the user interface and high level accelerators software; development and implementation accelerator infrastructure interface to monitor and controls subsystems device like PLC, field bus, etc (electrical, fluid, etc installations); design and develop accelerator simulation code interface and controls systems in order to permit an easy and standardized data flow; implementation and development of an accelerator logbook and trouble ticketing system in order to monitors, store and allows statistics on accelerator devices and subsystems; design and develop web tools for public and private data presentation and correlation, online analysis, and monitoring.

D7.3) Users infrastructure, remote Control Room: D1 and D2 concourse to constitute the users infrastructure, where hardware and software tools are available for controlling, monitors accelerator's data and handle the SuperB project. All the above structure (hardware and software) requires a safe identification of participants to the projects and the study and implementation of collaborating tools for the large international community. In the mean time the implementation and maintenance of a Remote Control Room is needed in order to permit large collaboration and participation of the international SuperB accelerator community.

- design, develop and maintain the **computing infrastructure**
- design, develop and maintain the **software infrastructure** and **Controls System**
- design, develop and maintain the **user interface, identification** and **security** and **remote control room**

Presented to INFN directors meeting 2011

!CHAOS

Since the C. Bisegni idea, we started to create a group that that is now of 8 peoples and many collaboration institutions and industries

- Frascati and Tor Vergata group have a **long experience in design, develop and implementation** of innovative controls systems. in '90 for DAFNE the first PC and LABVIEW based controls systems has been successfully developed and operated making a braking trough in the concepts of controls
- experience and knowhow have continued on SPARC and contributed in others accelerators in the world and are **available for a new challenging business**
- the two Frascati running accelerators, DAFNE and SPARC, offer a *natural gym* to **study** a new and innovative control system, to develop the core, to test the critical parts and the software and hardware needs
- Frascati and Tor Vergata offers unique **infrastructures** and a large amount of computing **resources** interested in the projec

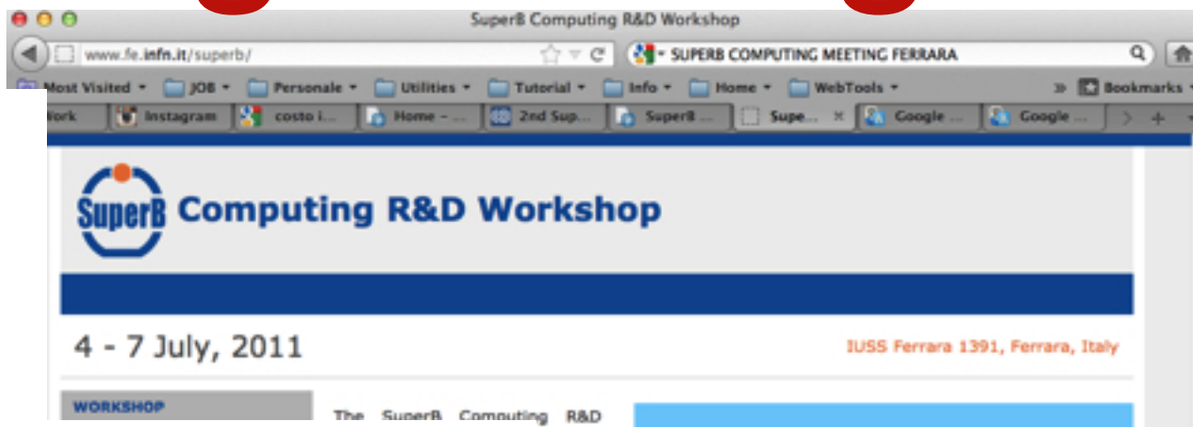
!CHAOS

A new SidC topology with the following futures:

- **redundancy** of all its parts; intrinsic **scalability**; **no point of failure**; hardware (device to be controlled) **hot-integration** and **auto configuration**
- integration in the SidC structure (library) of **triggered DAQ** operation mode
- based on a **distributed object caching** for real-time data access (Live Database)
- based on **no relational** database-oriented archiving data (History Database)
- abstraction of the structural components of the control to **reduce dependence on the particular HW and SW**, allowing for an extreme adaptability
- compatibility with **commercial standard** and custom components and any **future developments**

Presented in Bari Oct 2011

IPAC & ICALEPS 2011
SuperB computing meeting



HIGH PERFORMANCE WEB APPLICATIONS FOR PARTICLE ACCELERATOR CONTROL SYSTEMS

G. Mazzitelli, C. Bisegni, P. Ciuffetti, G. Di Pirro, A. Stecchi - INFN/LNF, Frascati (RM), Italy;
S. Calabrò, L. Foggetta - LAL-CNRS, Orsay, France & INFN/LNF, Frascati (RM), Italy;
L. Catani, F. Zani - INFN-Roma Tor Vergata, Roma, Italy

Abstract

The integration of web technologies and applications has been one of the major trends for the development of new services for Control Systems (CS) of particle accelerators and large experimental apparatuses. Nowadays, high performance web technologies exhibit some features that would allow their deeper integration in a CS and their employment in developing CS' core components. In this paper we discuss the results of preliminary investigations of a new paradigm for a particle accelerators CS and the associated machine data acquisition system based on a synergic combination of network distributed cache memory and a non-relational key/value database. Storage speed, network memory data retrieve throughput and database queries execution, as well as scalability and redundancy of the systems, are presented and critically reviewed.

INTRODUCTION

The Italian Ministry for Education, University and Research (MIUR) recently approved the construction of a new international research centre for fundamental and applied physics to be built in the campus of the University of Rome "Tor Vergata". It will consist of an innovative high-luminosity particle collider named **SuperB** [1] and

EXPLORING A NEW PARADIGM FOR ACCELERATORS AND LARGE EXPERIMENTAL APPARATUS CONTROL SYSTEMS

L. Catani, R. Ammendola, F. Zani, INFN-Roma Tor Vergata, Roma, Italy
C. Bisegni, P. Ciuffetti, G. Di Pirro, G. Mazzitelli, A. Stecchi, INFN-LNF, Frascati, Italy
S. Calabrò, L. Foggetta, LAL-CNRS, Orsay, France & INFN/LNF, Frascati (RM), Italy

Abstract

The integration of web technologies and web services has been, in the recent years, one of the major trends in upgrading and developing control systems for accelerators and large experimental apparatuses. Usually, web technologies have been introduced to complement the control systems with smart add-ons and user friendly services or, for instance, to safely allow access to the control system to users from remote sites.

Despite this still narrow spectrum of employment, some software technologies developed for high performance web services, although originally intended and optimized for these particular applications, deserve some features that would allow their deeper integration in a control system and, eventually, using them to develop some of the control system's core components. In this paper we present the conclusion of the preliminary investigations of a new design for an accelerator control system and associated machine data acquisition system (DAQ), based on a synergic combination of network distributed object caching (DOC) and a non-relational key/value database (KVDB). We investigated these technologies with particular interest on performances, namely speed of data storage and retrieve for the distributed caching, data throughput and queries ex-

The analysis of recent developments on high-performance software technologies suggests that the design of new accelerator CS may profit from solutions borrowed from cutting-edge Internet services. To fully profit from this new technologies the CS model has to be reconsidered, thus leading to the definition of a new paradigm.

The second strong motivation for this development follow the recent approval, by the Italian Ministry for Education, University and Research (MIUR) of the construction of a new international research centre for fundamental and applied physics to be built in the campus of the University of Rome "Tor Vergata".

It will consist of an innovative very high-luminosity particles collider named SuperB [1] and experimental apparatuses, built by an international collaboration of major scientific institutions under the supervision of Istituto Nazionale di Fisica Nucleare. Clearly, it will offer great opportunities not only for new discovering in particle and applied physics, but also for breakthrough innovation in particle accelerators technologies.

THE !CHAOS FRAMEWORK

google docs shared site: https://docs.google.com/?hl=it&tab=wo&authuser=0#folders/0BxLW8uyku7FfODJkNjVjNDgtNThjZi00YzQ1LTkxOTQtMTE5NzU4YTdjMjhj

December superB meeting

!CHAOS Mini Workshop (12 December 2011)

agenda.infn.it/conferenceOtherViews.py?view=standard

aida meeting desy 2012

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!CHAOS Mini Workshop

Monday 12 December 2011
from **15:00** to **18:00**
Europe/Rome
at **INFN-LNF** <!-- ID_UTENTE=483 --> (
Accelerator Division meeting room, Bldg 2)

Description: !CHAOS Mini Workshop, Frascati **12th Novembre 2011 / 15pm - 18pm**.

An half day mini workshop will be organized by the **!CHAOS** (Control system based on
the start of the Second SuperB Collaboration Meeting.
The **!CHAOS** project [1] [2] aiming at the development of an innovative concept of con
apparatus, but suited also for medium and small size distributed laboratory systems lo
archiving.
The mini-workshop will be particularly addressed to the italian community of developer
especially those interested in collaborating on the preparation of the proposal for Supe

!CHAOS

Material: live broadcast; live broadcast info

Monday 12 December 2011

15:00	Introduction (10')
15:10	!CHAOS Architecture (30') (Slides)
15:40	!CHAOS Developments (20') (Slides)
16:00	!CHAOS LabView integration (20') (Slides)
16:20	Archiving and querying historical data on key/value databases (20') (Slides)
16:40	System configuration and meta-data server (20') (Slides)
17:00	Discussion (40')

Find: | Next | Previous | Highlight all | Match case

2nd SuperB Collaboration Meeting @ INFN-LNF (13-16 December 2011)

agenda.infn.it/sessionDisplay.py?sessionId=35&slotId=(

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SuperB INFN Istituto Nazionale di Fisica Nucleare Laboratori Nazionali di Frascati

2nd SuperB Collaboration Meeting @ INFN-LNF

13-16 December 2011 | **INFN-LNF**

- Overview
- Organization
- Registration
- Registration Form
- Accommodation
- Travel Info
- BUS Service
- Internet Access @ LNF
- List of registrants
- Timetable
- Compact Agenda
- Physics Meeting Timetable
- !CHAOS Mini Workshop

support

Home > **Timetable** > Session details

Parallel III: Acc III - Controls

Phone number: +39 06 6228 8548
or **http://server10.infn.it/video/index.php?page=telephone_numbers**
Meeting ID: 1430

Place: *INFN-LNF <!-- ID_UTENTE=483 -->*
Via E. Fermi, 40
00044 Frascati (RM)
Italy

Room: Aula Div Acc

Dates: Wednesday 14 December 2011 09:00

Conveners: **Catani, Luciano**

Contribution List | **Time Table**

Wednesday, 14 December 2011

09:00

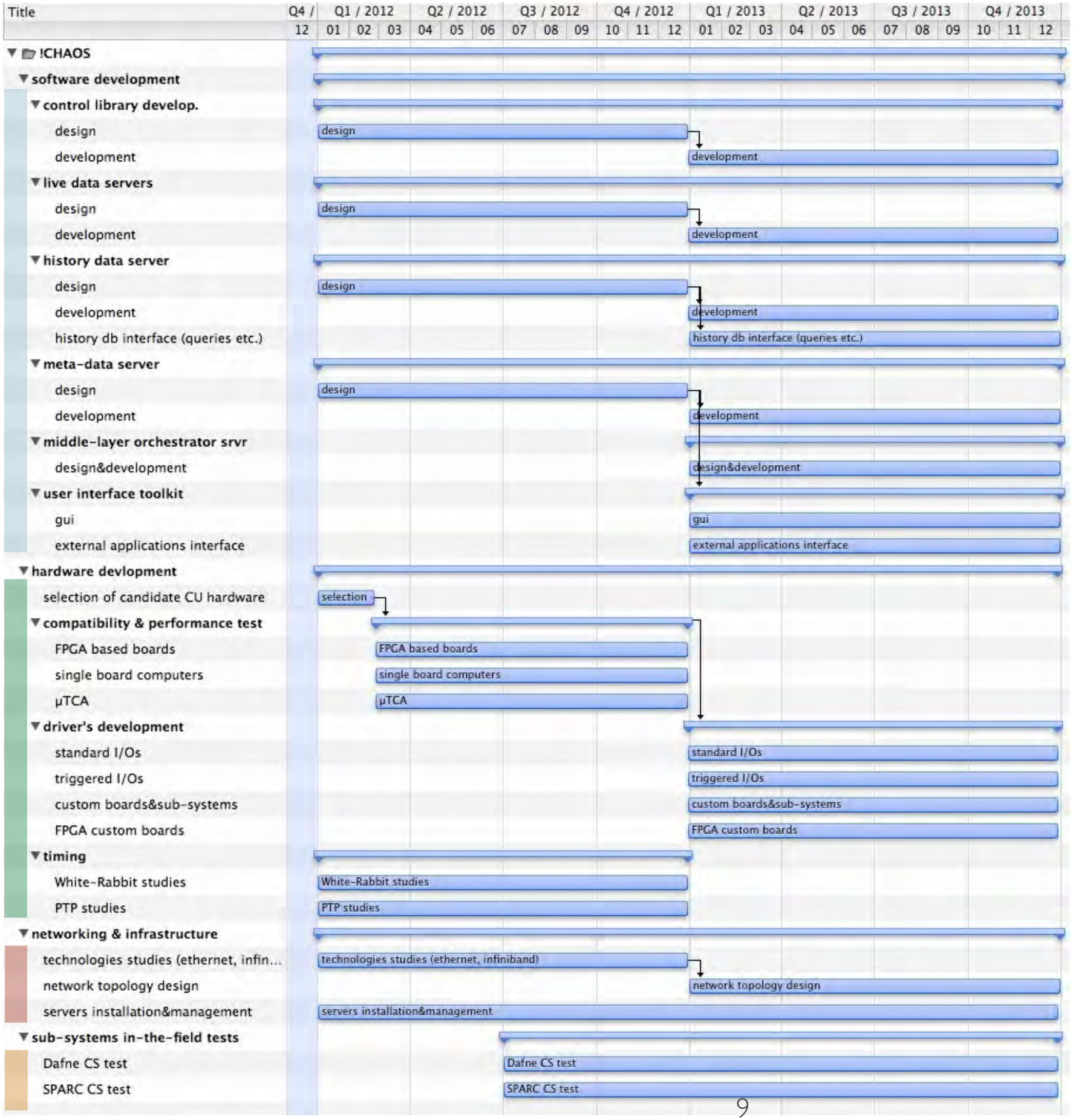
[36] **!CHAOS general introduction**
by Alessandro STECCHI (LNF)
(Aula Div Acc: 09:00 - 09:10)

[37] **!CHAOS general architecture** slides
by Mr. Claudio BISEGNI (LNF)
(Aula Div Acc: 09:10 - 09:35)

[38] **!CHAOS first implementation of the Control Unit**
by Luca Gennaro FOGGETTA (LNF)
(Aula Div Acc: 09:35 - 10:00)

Find: | Next | Previous | Highlight all | Match case

SuperB



CSN5
Jun 2011

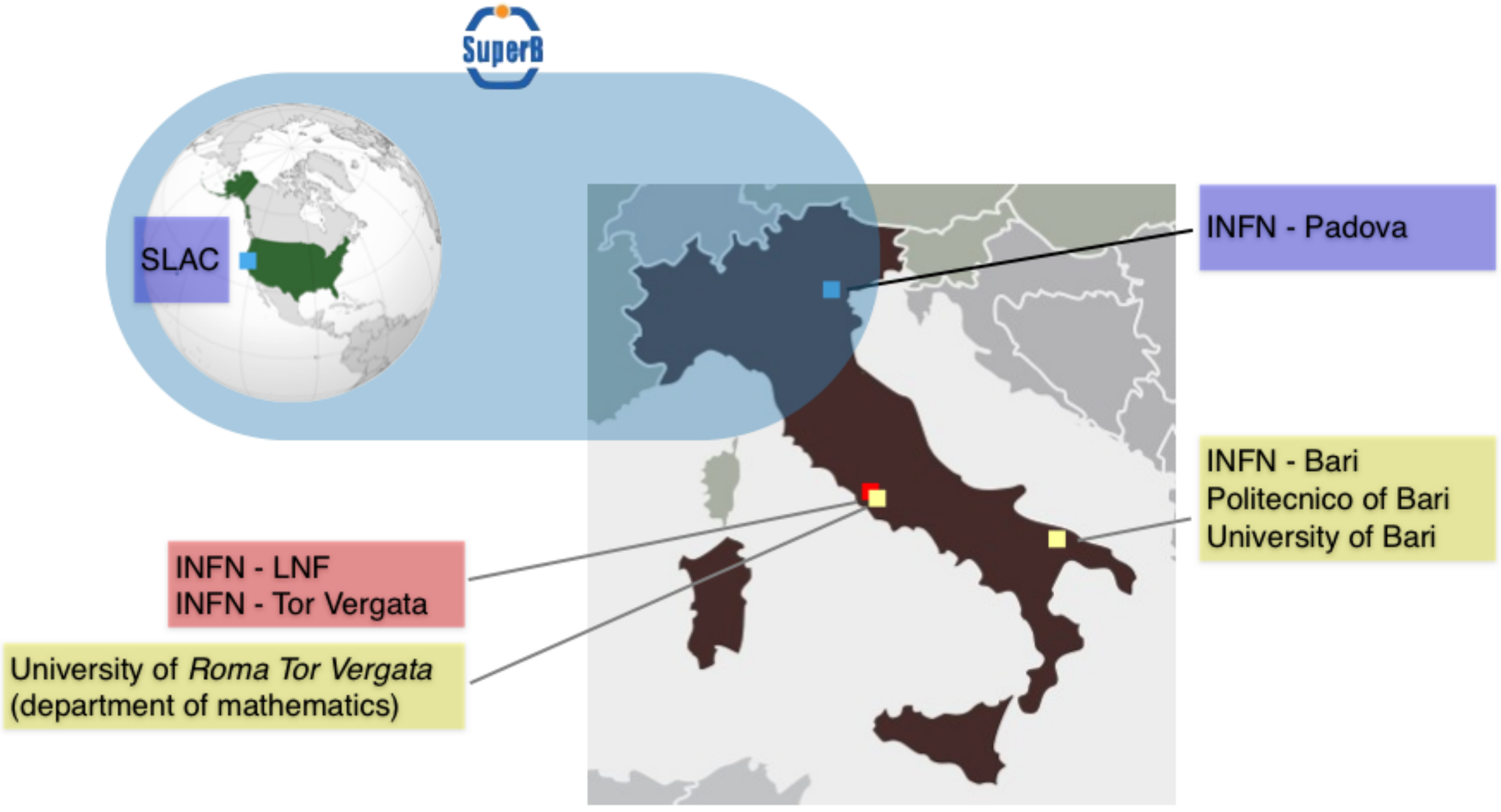
Academic review

- Tor Vergata "facolta' di matematica": studio ed ottimizzazione dei database

- Politecnico di Bari: studio dei processi di controllo di alto livello e loro generalizzazione (EU).

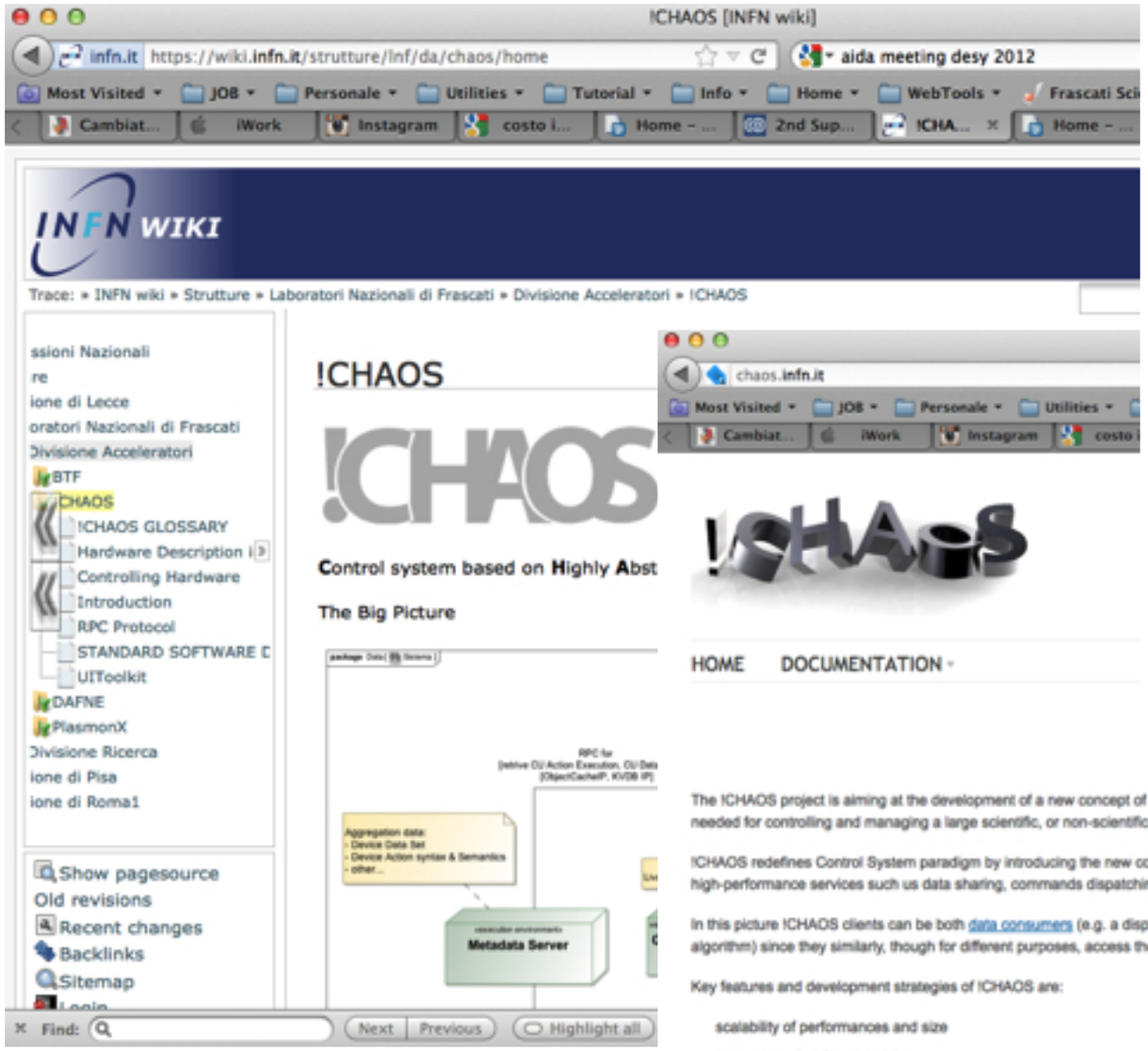
- Tesi di laurea Flaminio Antonucci di con prof. Tucci (TV): "Progettazione e sviluppo di una libreria software per la visualizzazione e l'elaborazione di grandi volumi di dati"

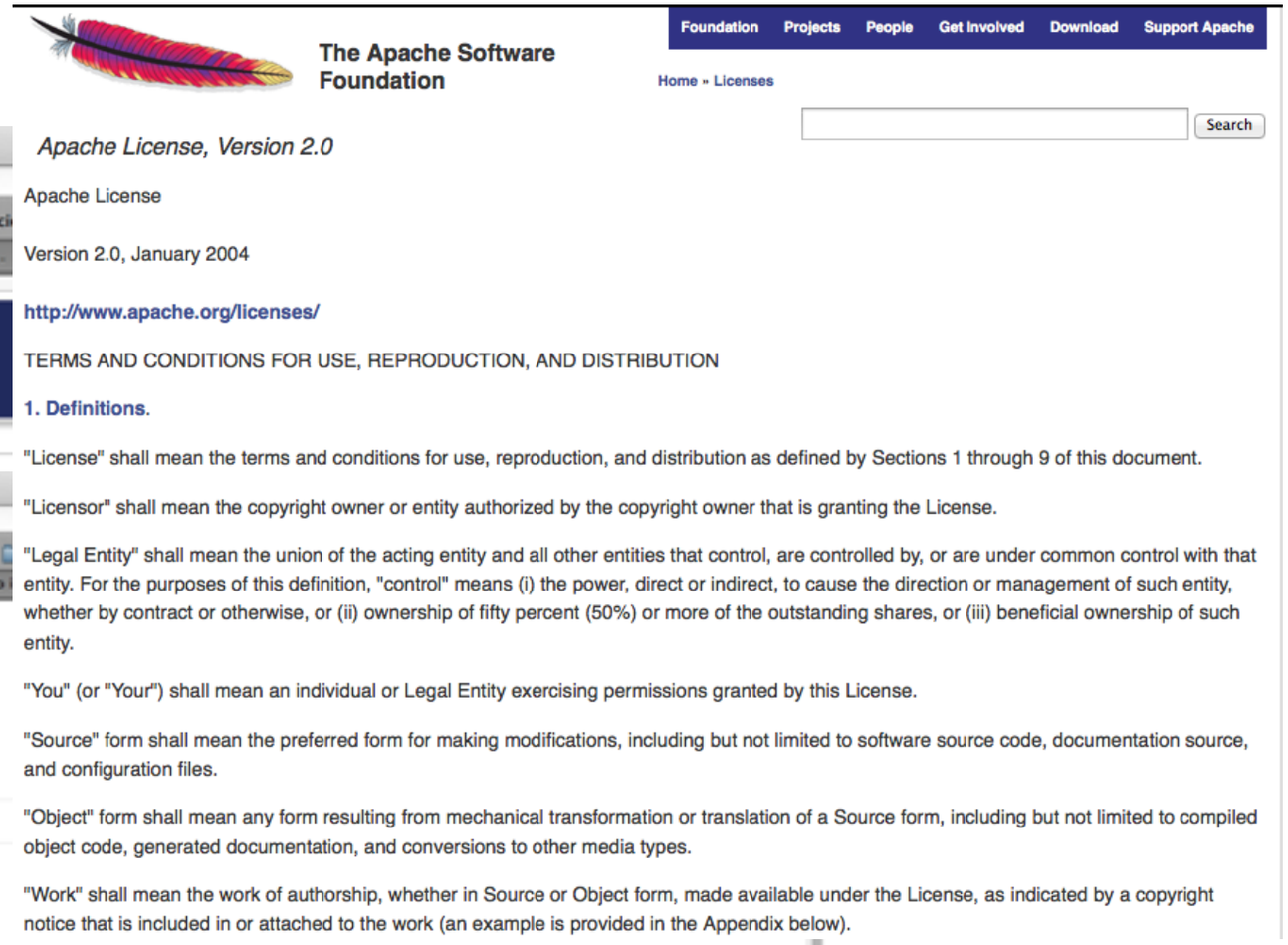
!CHAOS collaborations



We are conscious that the full development of !CHAOS will require a considerable effort and we are looking for a wide scientific community collaborating to this project

Web Site open source license APACHE 2





google docs shared site: https://docs.google.com/?hl=it&tab=wo&authuser=0#folders/0BxLW8uyku7FfODJkNjVjNDgtNThjZi00YzQ1LTkxOTQtMTE5NzU4YTdjMjhj

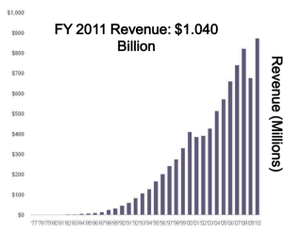
collaborations with industries

Relazione collaborazione National Instrumets (NI) - INFN/Cabibbo LAB

Nel quadro della **Big-Physics** (LHC, ITER, ESS, etc) la **SuperB** si colloca come un progetto di medio alto valore economico attirando fortemente le industrie del settore ad aprire delle collaborzioni. Se da un parte l'interesse dell'industria e' quello di partecipare alla progettazione per poter definire accordi e standard che la possano avvantaggiare rispetto ai concorrenti e/ o sviluppare future tecnologie, dall'altra, l'interesse della ricerca e' di realizzare nuove idee, dispositivi piu' performanti ed abbassare i costi di realizzazione e manutenzione.
Storicamente, i Laboratoratori Nazionali di Frascati e la sezione INFN di Tor Vergata, hanno acquisto grandi capacita' ed una lunga esperienza nella progettazione e realizzazione e messa in opera di sistemi di controllo distribuiti per macchine acceleratrici. A Frascati è stato realizzato il primo sistema di controllo basato su personal computer, interamente basato su LabVIEW®, e attualmente sono in operazone due acceleratori, DAFNE e SPARC, sedi di importante know-how e luogo ideale per test e sviluppo di nuove idee.

In questo contesto è nato nel 2011 **!CHAOS** (Control system based on Highly Abstracted Open Structure), **R&D INFN** finanziato dalla **CSN5** che si propone come candidato per il **controllo della SuperB** ed anche come un nuovo **standard di controlli** non solo per acceleratori di particelle. Il progetto !CHAOS si avvale della collabarozione e revisione di molti partenr scienfici (Università i Tor Vergata facoltà di fisica, matematica ed ingegneria, Politecnico di Bari, SLAC, CNR-IASI) coinvolgendo anche esperienze differenti nello sviluppo di sistemi complessi. Basato su un approccio astratto, e i più recenti concetti e strumenti provenieti dal mondo dell'informatica, !CHAOS si propone di:

- essere intrinsecamente ridondante e scalabile eliminando ogni point of failure;
- permettere l'inserzione e autoconfiguazione a caldo di nuovo hardware;
- integrare la modalità di funzionamento a eventi (trigger esterno);
- astrarre tutte le sue componenti in modo da essere indipendente dall'hardware e software;
- garantire la compatibilità con tutti gli standard commerciali e non in modo da garantire un facie integrazione di ogni tipo di hardware presente oggi e nel futuro sul mercato;



successo di !CHOAS, il suo sviluppo e distribuzione, sarà sicuramente molto maggiore se saremo in grado di gnerare una **ricaduta reale verso il mondo industriale**. Ovvero lavorare con le industrie per creazione di un nuovo standard di controlli che superi le limitazioni degli attuali standard principalmente usati (EPICS TANGO, etc). In questo contesto !CHAOS fin da subito ha visto l'interessamento della **National Instruments,** una delle principali industrie di sistemi per il controllo, l'automazione e la dignostica, con un fatturato di circa un miliardo di dollari annuo e semila dipendenti. National Instrument già collabora con importanti realtà scienfiche quali il **CERN** (i.e per lo sviluppo di White Rabbit), **ITER** e molte

We are working in order to starts collaboration with industries for two motivation:

- ➡ gain of the benefit of industrial development of some !CHAOS components
- ➡ study the possibility to have agreements for the software and hardware developments and maintenances on the superB project
- ➡ assert chaos as a new controls standard

National Instruments
AGILENT Technology
VITROCISET
etc.

!CHAOS R(done) & D(going on)

- The research study on !CHAOS is **done**, some components can be still optimize in the future if technicals demands will requires further performances improvement

- A **first release** is going to be published in open source license to be available for the scientific and industrial communities and test any further possible optimization

- The architecture is now in **developing phase** in order to implements new and auxiliry services and futures

- Time schedule and effort needed are **clear**

data load estimation

Elments	#@DAFNE	Data size [byte]	Frequency [Hz]	Throughput [Kb/s]	Frequancy S [Hz]
power supply	500	96	10	480	0.5
beam position monitors	80	32	50	128	50
BPM turn by turn	80	20000	2	3200	0
flags and screens	20	2000000	10	400000	0
sycrotron light monitors	3	2000000	30	180000	30
luminosity monitors	1	1000	1000	1000	1000
temperature monitors	100	32	1	3.2	1
beam loss monitors	50	32	50	80	1
current monitors	20	32	50	32	1
vacuum moniotrs	100	32	10	32	0.1
cryogenic system	1	1000	5	5	
RF system	3	1000	50	150	
injection system	1	1000	50	50	
scopes	10	10000	50	5000	
spectrum analyzer	2	10000	50	1000	
timing system	1	1000	50	50	
feedback system	6	10000	50	3000	
cleaning electrods, wire etc	20	64	1	1.28	
scrapers, slits, etc	20	64	1	1.28	
plc, termostick, flxmeter	2000	32	1	64	
Total [Mb/s]				**594.28**	**1.08**

Presented to INFN directors meeting 2011

just an exercise...

Efforts estimation

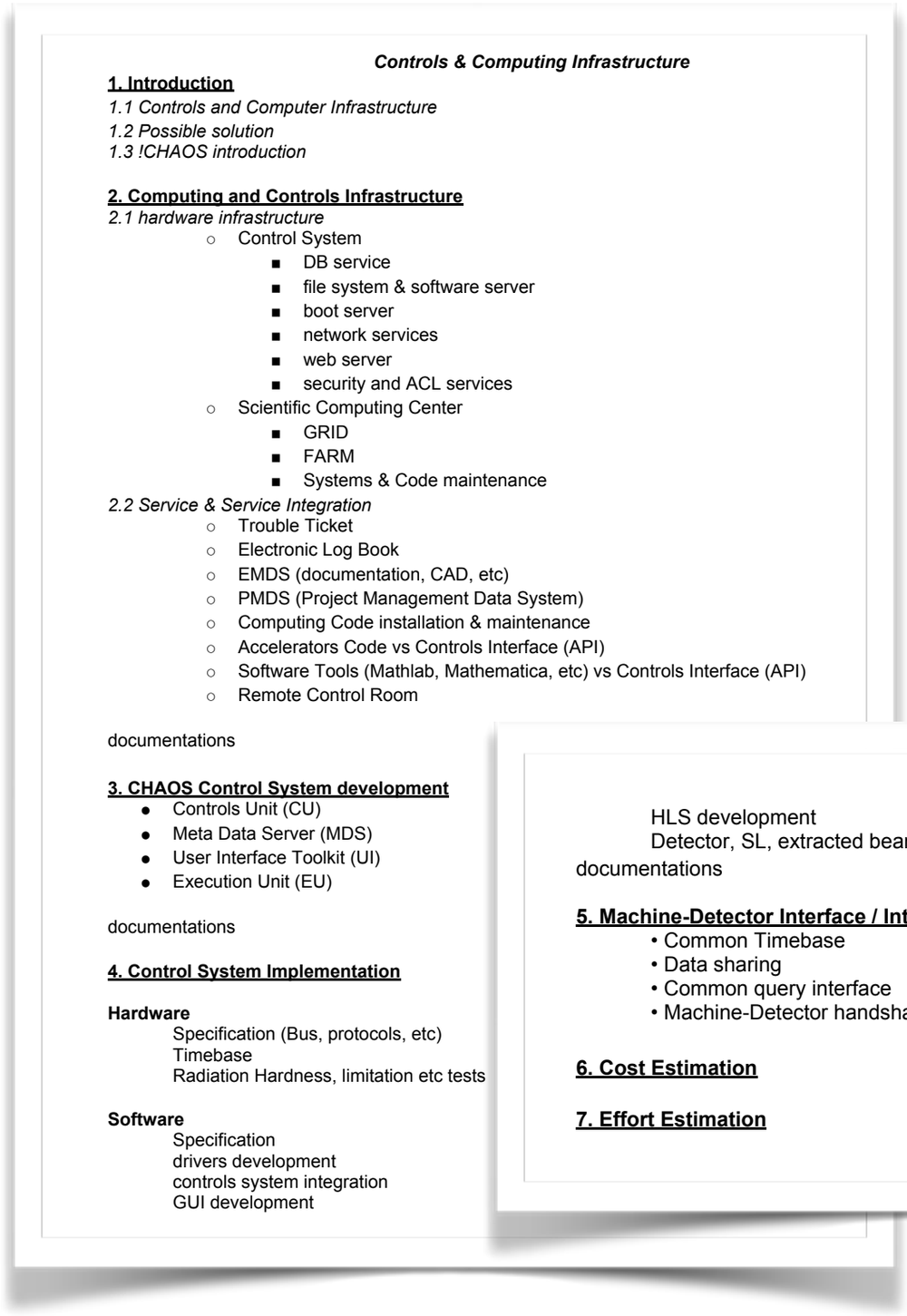
Task	2012	2013	2014	2015	2016	2017
						(maintenace)
System Administration						
Control System of !CHAOS	2	2	2	2	2	1
Collaborative Tools (documentation)	2	2	2	1	1	0.5
Computing FARM&GRID	1	1	1	0.5	0.5	0.5
CTR, Remote CTR, security etc	0.5	0.5	1	2	2	1
!CHAOS architecture development						
CU development	1	1	0.5	0.5	0.5	0.3
Meta Data Server	1.5	1.5	0.5	0.5	0.5	0.3
UI tool kit	1.5	1.5	0.5	0.5	0.5	0.3
EU and processing tool kit	0.5	1	1	1	1	0.5
Control Sysstem Implemantion						
Definition of devices Standards & Protocols	1	0.5	0.5	0	0	0
Hardware tests and protocols validation	1	1	2	2	1	0.6
Drivers Development & integration in !CHAOS	1	3.5	7	6	4	1.5
GUI Dvelopment	1	1	4	4	3	1.5
HLS Developmnt	0.5	0.5	1	3	3	2
Total FTE	**14.5**	**17**	**23**	**23**	**19**	**10**

Provided to superB managment Dec 2011

Technical Design Report

In December 2011 we have a meeting with S. Luitzs to investigate the opportunity to use !CHAOS for the detector **slow controls**. Stephen agree with the results shown and decide to adopt this system to develop the slow control. He presented his idea at last superB meting to the **detector computing community** and has been approved.

At the end of the meeting we write down the **TDR index**



Controls & Computing Infrastructure

1. Introduction

1.1 Controls and Computer Infrastructure
1.2 Possible solution
1.3 !CHAOS introduction

2. Computing and Controls Infrastructure

2.1 hardware infrastructure
- Control System
  - DB service
  - file system & software server
  - boot server
  - network services
  - web server
  - security and ACL services
- Scientific Computing Center
  - GRID
  - FARM
  - Systems & Code maintenance

2.2 Service & Service Integration
- Trouble Ticket
- Electronic Log Book
- EMDS (documentation, CAD, etc)
- PMDS (Project Management Data System)
- Computing Code installation & maintenance
- Accelerators Code vs Controls Interface (API)
- Software Tools (Mathlab, Mathematica, etc) vs Controls Interface (API)
- Remote Control Room

documentations

3. CHAOS Control System development
- Controls Unit (CU)
- Meta Data Server (MDS)
- User Interface Toolkit (UI)
- Execution Unit (EU)

documentations

4. Control System Implementation

Hardware
Specification (Bus, protocols, etc)
Timebase
Radiation Hardness, limitation etc tests

Software
Specification
drivers development
controls system integration
GUI development

HLS development
Detector, SL, extracted beam integration
documentations

5. Machine-Detector Interface / Integration (Accelerator Controls, MDI, Online)
- Common Timebase
- Data sharing
- Common query interface
- Machine-Detector handshake, interlocks, etc. “autopilot”, factory mode

6. Cost Estimation

7. Effort Estimation

Up to now some paragraph has by written by me and are available at the address: https://docs.google.com/document/d/1WO3QNwtd3r8x5PfGDRobz6B97O089h0mAIjAvIsrNmg

Technical Design Report

To complete a real evaluation of cost, spending plans, detailed time schedule a WBS of the accelerator is mandatory!

	Acc. Science/Engineering	Controls	Common Tools
Computation			
Storage			
Network			

computing infrastructure

	Acc. Science/Engineering	Controls	Common Tools
web servers			
databases			
EMDS			
EPDS			

services

	Inj e+	Dump. Rin	Inj e-	Main LINAC	e- ring	e+ ring	IP	SL	extracted beam
Diagnostics									
Magnets & PS									
Fluids									
Vacuum									
RF									
Safety									

Short WBS for control system components & throughput

Conclusions

- The !CHAOS milestones are in agreement with the SuperB time schedule

- While efforts needed are clear also including the remaining part of the !CHAOS development; to have a real estimation of costs **WBS is needed**! We are waiting since one year...

- The **long and unique experience** of the Frascati group in the controls system for a factory collider is asking for a technical an serious review of the status of the art

Meeting 3 Apr 2012

- introduction: G. Mazzitelli
- Computing infrastructure: G. Mazzitelli
- !CHAOS overview: C. Catani, A. Stecchi
- !CHOAS development: C. Bisegni
- !CHAOS integration: L. Foggetta

Roles

- Giovanni MAZZITELLI - SuperB Acc. Computing and Controls WP Manager
- Luciano CATANI - INFN !CHAOS R&D project head
- Alessadro STECCHI - Accelerator Division Control Group head
- Claudio BISEGNI - !CHAOS developer responsible
- Luca FOGGETTA - !CHAOS LabView development responsible
- F. Zani: meta data server developer
- D. Digiovenale: software developer
- S. Calabrò & P. Ciuffetti: System managers

TDR paragraph 1

- **1. Introduction**
  - 1.1 Controls and Computer Infrastructure
  - 1.2 Possible solution
  - 1.3 !CHAOS introduction

TDR paragraph 2

- **2. Computing and Controls Infrastructure**
  - *2.1 hardware infrastructure*
    - Control System
    - DB service
    - file system & software server
    - boot server
    - network services
    - web server
    - security and ACL services
    - Scientific Computing Center
    - GRID
    - FARM
    - Systems & Code maintenance
  - *2.2 Service & Service Integration*
    - Trouble Ticket
    - Electronic Log Book
    - EMDS (documentation, CAD, etc)
    - PMDS (Project Management Data System)
    - Computing Code installation & maintenance
    - Accelerators Code vs Controls Interface (API)
    - Software Tools (Mathlab, Mathematica, etc) vs Controls Interface (API)
    - Remote Control Roos

TDR paragraph 3

- **3. CHAOS Control System development**
  - Controls Unit (CU)
  - Meta Data Server (MDS)
  - User Interface Toolkit (UI)
  - Execution Unit (EU

TDR paragraph 4

- **4. Control System Implementation**
  - *Hardware*
    - Specification (Bus, protocols, etc)
    - Timebase
    - Radiation Hardness, limitation etc tests
  - *Software*
    - Specification
    - drivers development
    - controls system integration
    - GUI development
    - HLS development
    - Detector, SL, extracted beam integration

TDR paragraph ...

- **5. Machine-Detector Interface / Integration (Accelerator Controls, MDI, Online)**
  - Common Timebase
  - Data sharing
  - Common query interface
  - Machine-Detector handshake, interlocks, etc. “autopilot”, factory mode
- **6. Cost Estimation**
- **7. Effort Estimation**

ACCELERATOR COMPUTING INFRASTRUCTURE

design, develop and maintain a computing infrastructure with the following purpose: implementation and maintenance of an **Electronics Management Data System** (EMDS) dedicated to the storing and presentation of all project documents, cads, etc; implementation and maintenance of a **Project Management Data System** (PDS) in order to efficiently allocate and monitors efforts and costs; develop a common infrastructure and **tools with the experiment** in order to share and correlate data; implementation and maintenance of **accelerator simulation code** FARM/TIER2 share; implementation and maintenance of **servers and services** needed for the **accelerator controls**

SOFTWARE INFRASTRUCTURE, CONTROL SYSTEMS

design and implementation of the **controls system**; development and implementation of the **drivers**, and interface with accelerators device; development and implementation of the **user interface** and **high level** accelerator softwares; development and implementation accelerator infrastructure interface to **monitor and control subsystems** device like PLC, field bus, etc (electrical, fluid, etc installations); design and develop accelerator **simulation code interface** and controls systems in order to permit an easy and standardized data flow; implementation and development of an accelerator **logbook and trouble ticketing** system in order to monitors, store and allows statistics on accelerator devices and subsystems; design and develop **web tools for public** and private data presentation and correlation, **online analysis, and monitoring**.

USERS INFRASTRUCTURE, REMOTE CONTROL ROOM

The infrastructure previously introduced (hardware and software) requires to develop **identification and security** tools and the implementation of **collaborating tools** for the community participating to the project.

In the mean time, the international community interested in the development of the accelerator, push also to foreseen a **Remote Control Room** in order to permit and guarantee participation in the operation and high efficiency in diagnostics and fault solution

ACCELERATOR COMPUTING FARM

- has been installed a computer **FARM** dedicated to accelerators simulation & calculation code

- 5/16 slot rack equipped with blede 2 processor Intel Xeon X5660, 64 bit esa-core,2,80 GHz, 48 GB RAM, FiberChannel, GigabitEthernet dual.

  - simulation and calculation code: HFSS, GdFidL, MatLab, Mathematica, OPERA, ORCAD, inventor, FLUKA, GEANT, MCNPX, ANSYS

  - Controls R&D: Labview, memcache, mongoDB, etc

- hardware has been installed in April 2011. FARM configuration under the LNF computing infrastructure is going on. Software installation and configuration are also started.

SuperB Tier2 startup@LNF

- a VO for **SuperB** is starting at LNF thanks to a collaboration with **ATLAS@LNF TIER2** resources and personnels and LNF computing service and infrastructure
- the share will be addressed to **accelerator and experiment** purposes: MDI and backgrounds, CMAD for e-cloud and IBS simulation, dynamic aperture calculation, etc as well as fast, full and GARFIELD simulation

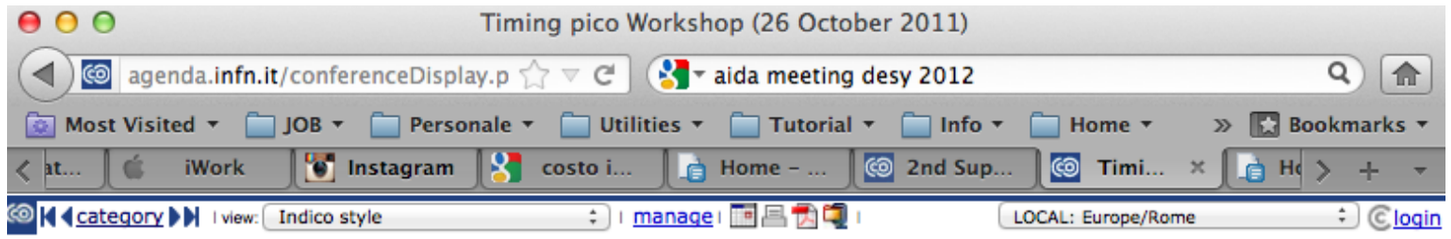
New Computing Nodes in Frascati Tier2

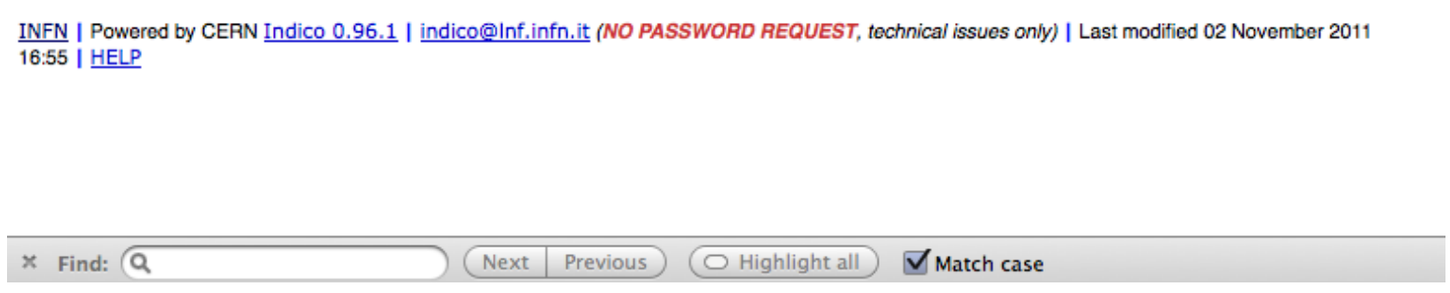
- 8 computing nodes were recently purchased in collaboration with ATLAS group, in order to add them to the Tier2 cluster.
- 2 Dell Power Edge C6100: 4 nodes in 2U, where any unit support:
  - 4 x CPU dual-esa core (Intel Xeon E5645, 2,40GHz, 6 core, cache 12MB)
  - 4 x 36GB memory (for 2 CPU)
  - 4 x 2 disks of 1TB
- Whit new nodes SuperB VO will use: 176 (/704) computing slots

SuperB VO in Frascati Tier2

- Support to superbvo.org VO was recently added to Frascati Tier2.
  - Whit the last purchase the site will be made of: 704 computing slots, i.e. almost 4544 HEP SPEC, where SuperB share will be ~1112 HEP SPEC (~25% of total share)
    - Tier2 services: lcg-CE and CREAM CE, batch server Torque, scheduler Maui, “superb” queue in Grid and “local” for local submission
    - 240TB of net disk space, managed from DPM (Disk Pool Manager) srm for ATLAS VO, few TB available for superb (only 1/2TB VO present request)
  - VO manager is installing the simulation software in a NFS area exported to WNs and UI, in the future will be migrated to cvmfs (like ATLAS)
  - SuperB Frascati group…..

Timing Pico Workshop





Infn Padova (timing)
Infn Milano (fulsim)
Infn Bari & Politecnico Bari
(RF/magnets/controls)