LabVIEW and the LHC

Sources, Targets and Interactions

Rapid Application Development Environment

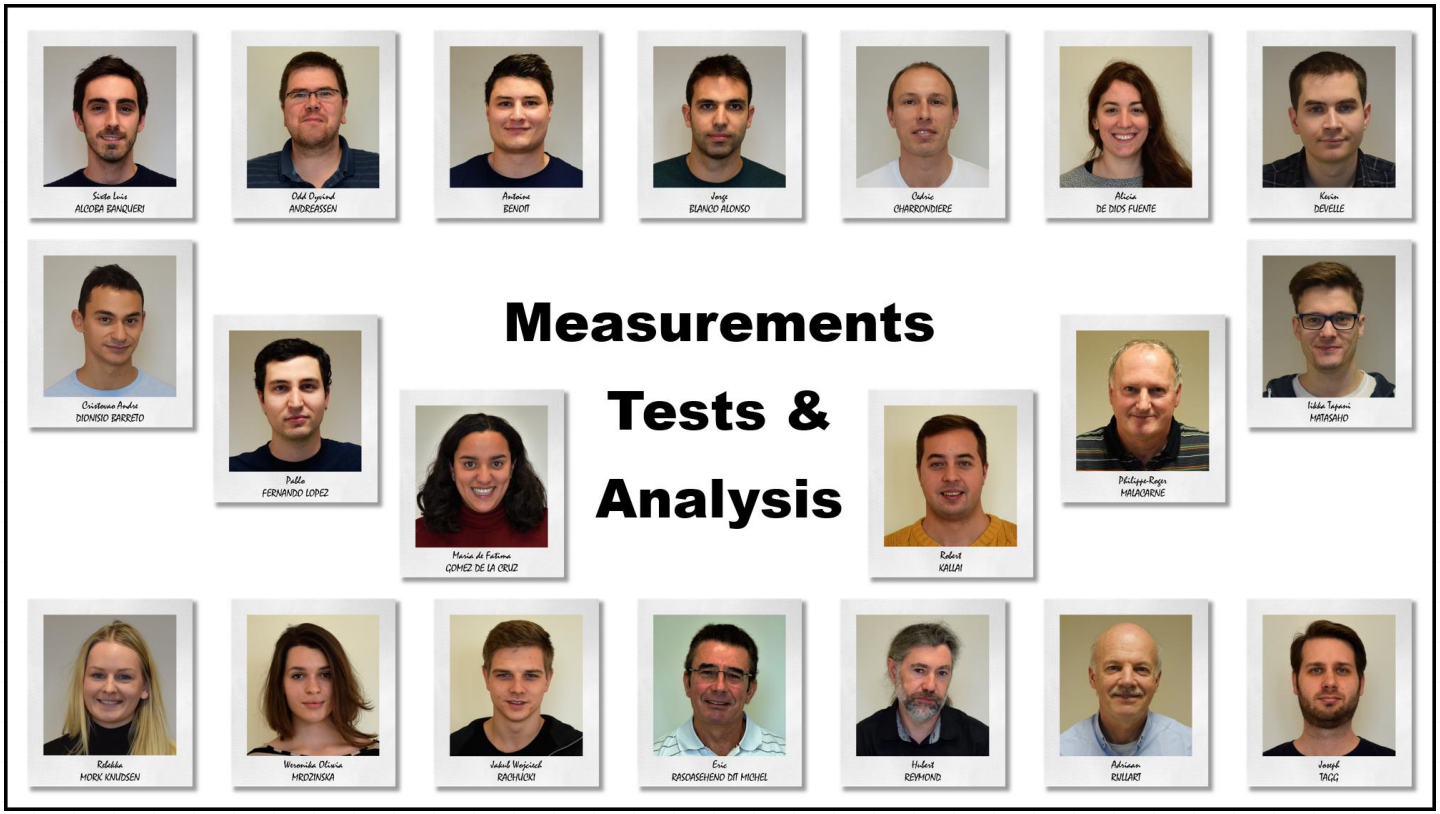
based on LabVIEW

Outline

- MTA
- Why RADE?
- The challenge
- The Scope
- Coping with large applications
- RADE today
- Future

EN-STI-ECE-MTA

Sources, Targets and Interactions



labview.support@cern.ch

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Why was RADE developed?

The Origin

- 10.000+ Magnets
- 1750 Circuits
- 13000+ Tests

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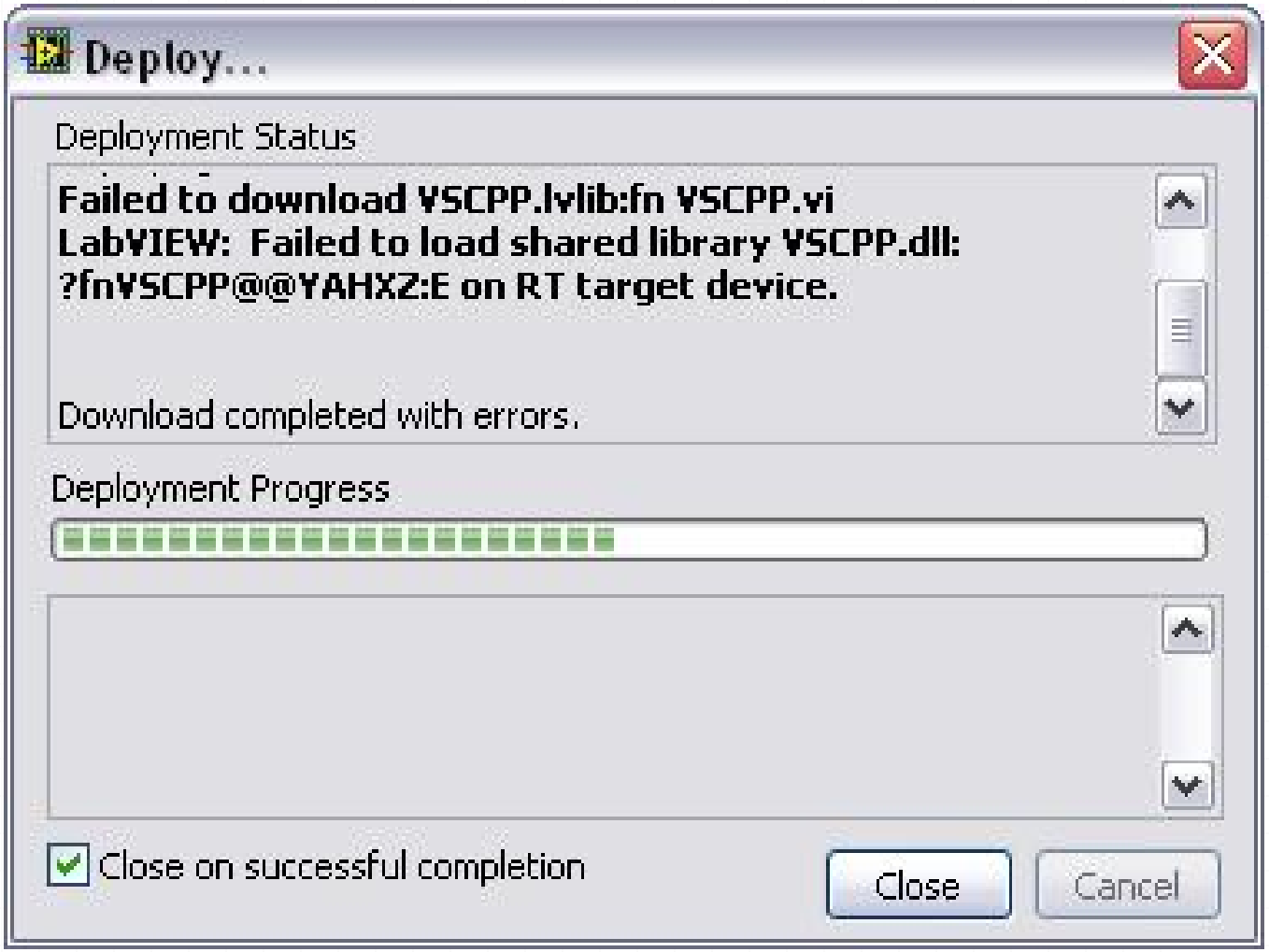
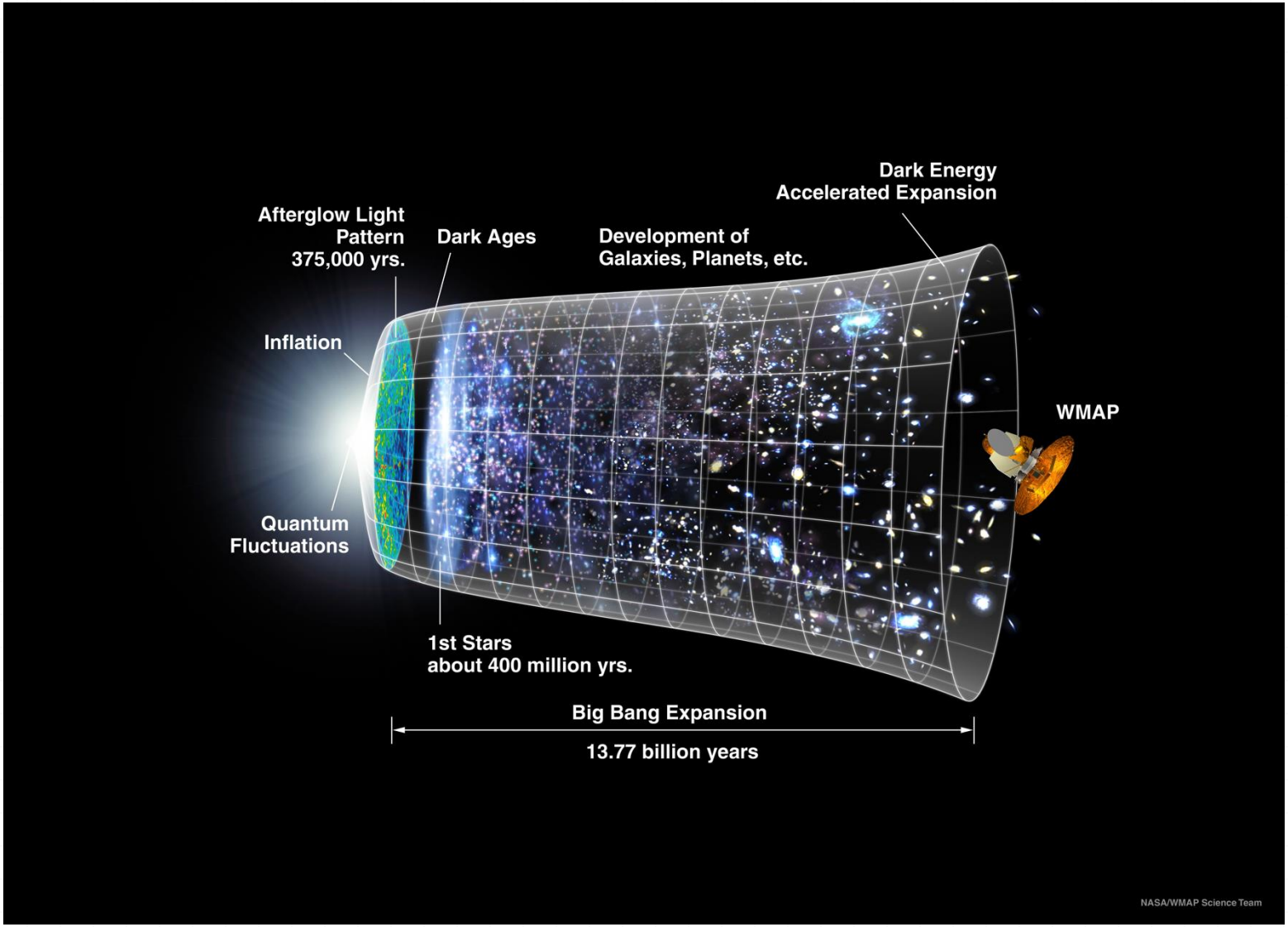
The Challenge

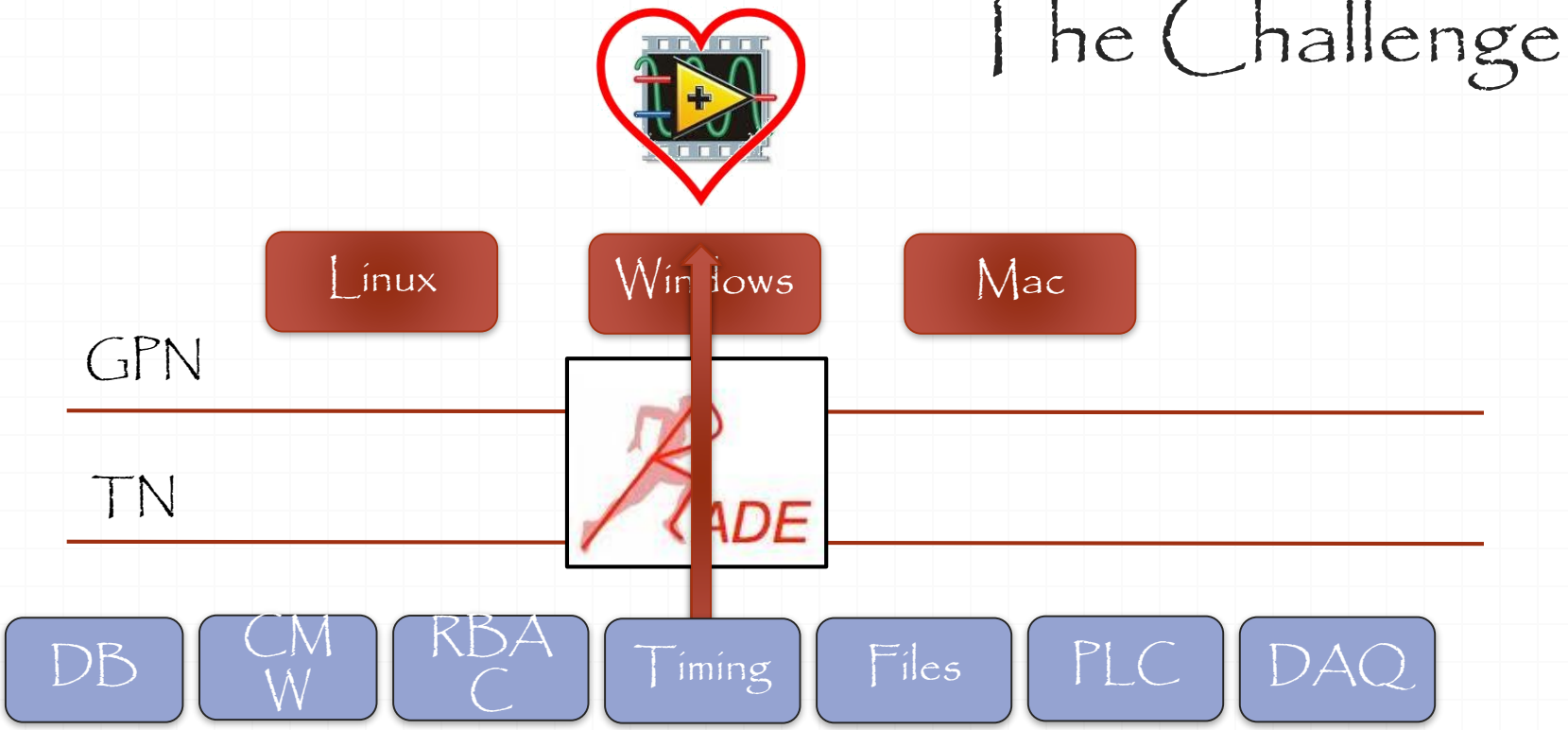


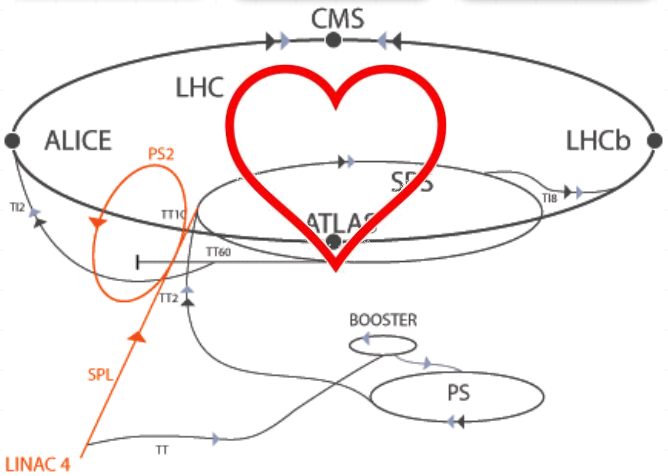
The Challenge



The Challenge

Sources, Targets and Interactions

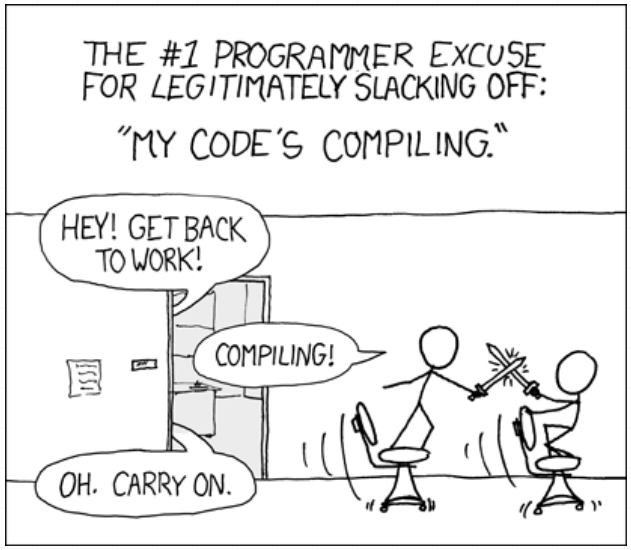




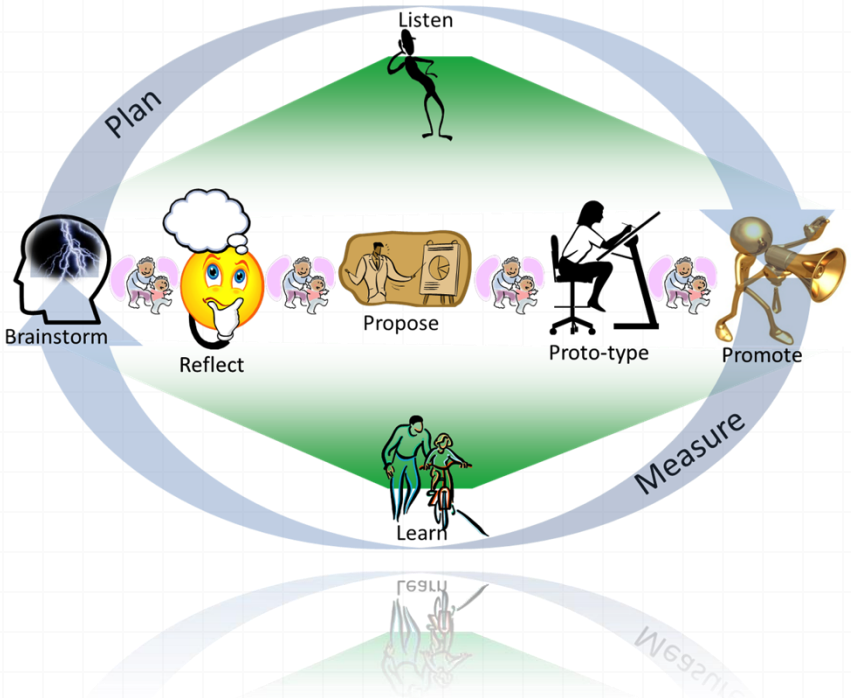
RAD(E)

RAD(E) (rapid application development) is a concept that products can be developed faster and of higher quality through:

- Gathering requirements
- Prototyping
- Defer design improvements to the next release
- Less formality in reviews and communication
- Re-use of software components



Development Methods



Extreme Programming methods

- Small increments
- Minimal planning
- Cross-functional team working on all aspects
- Demonstrated to the stakeholders frequently
- Minimizing risks
- Fast changes and adaptations.

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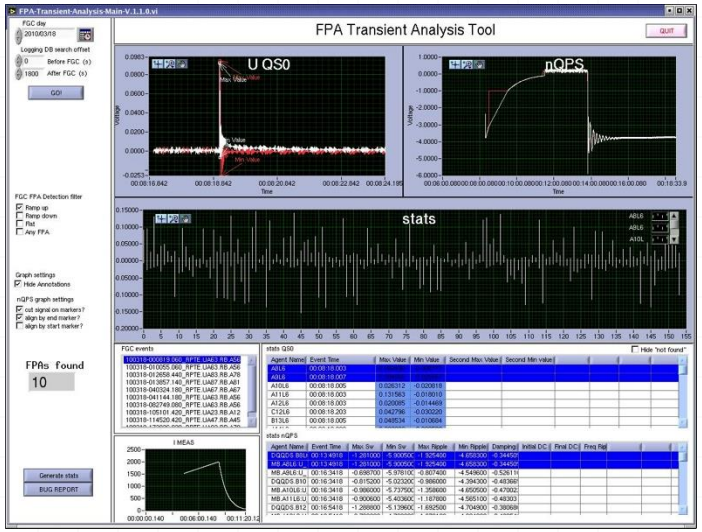
The Scope

Application characteristics:

- Short development time
- Rapidly evolving
- Light and independent



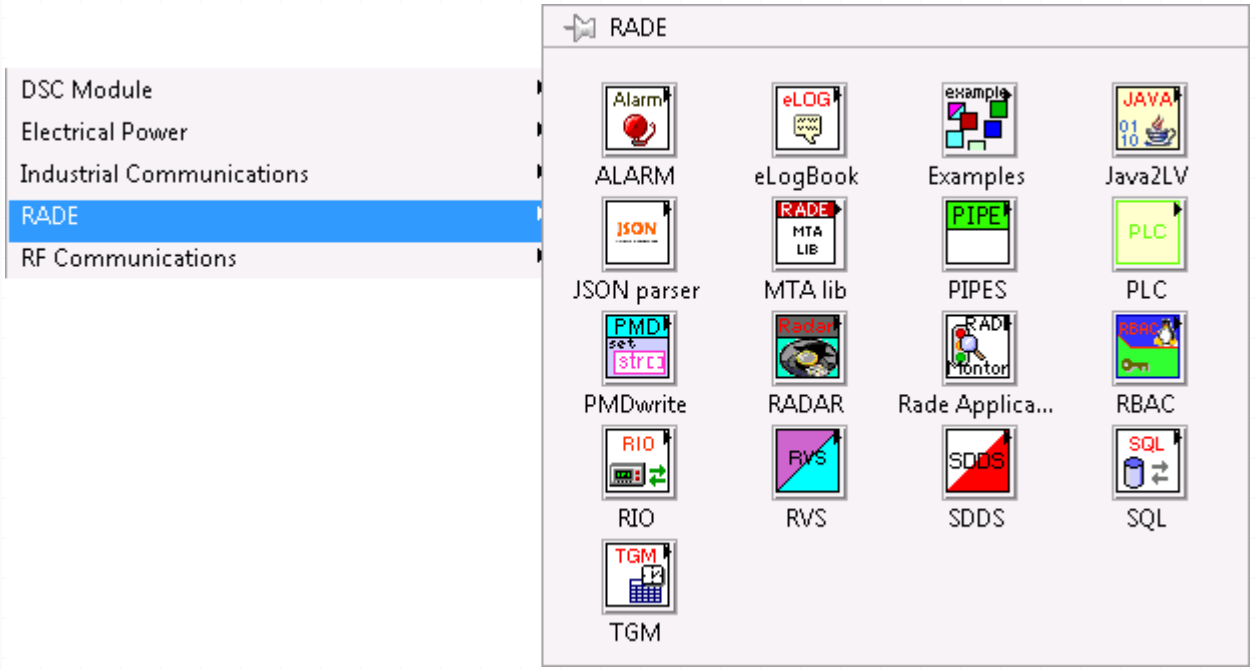
Initial Requirements

- Fast programming
- Rapid learning curve
- Drag and drop GUI development
- Wide range of analysis libraries
- Light/independent environment

LabVIEW

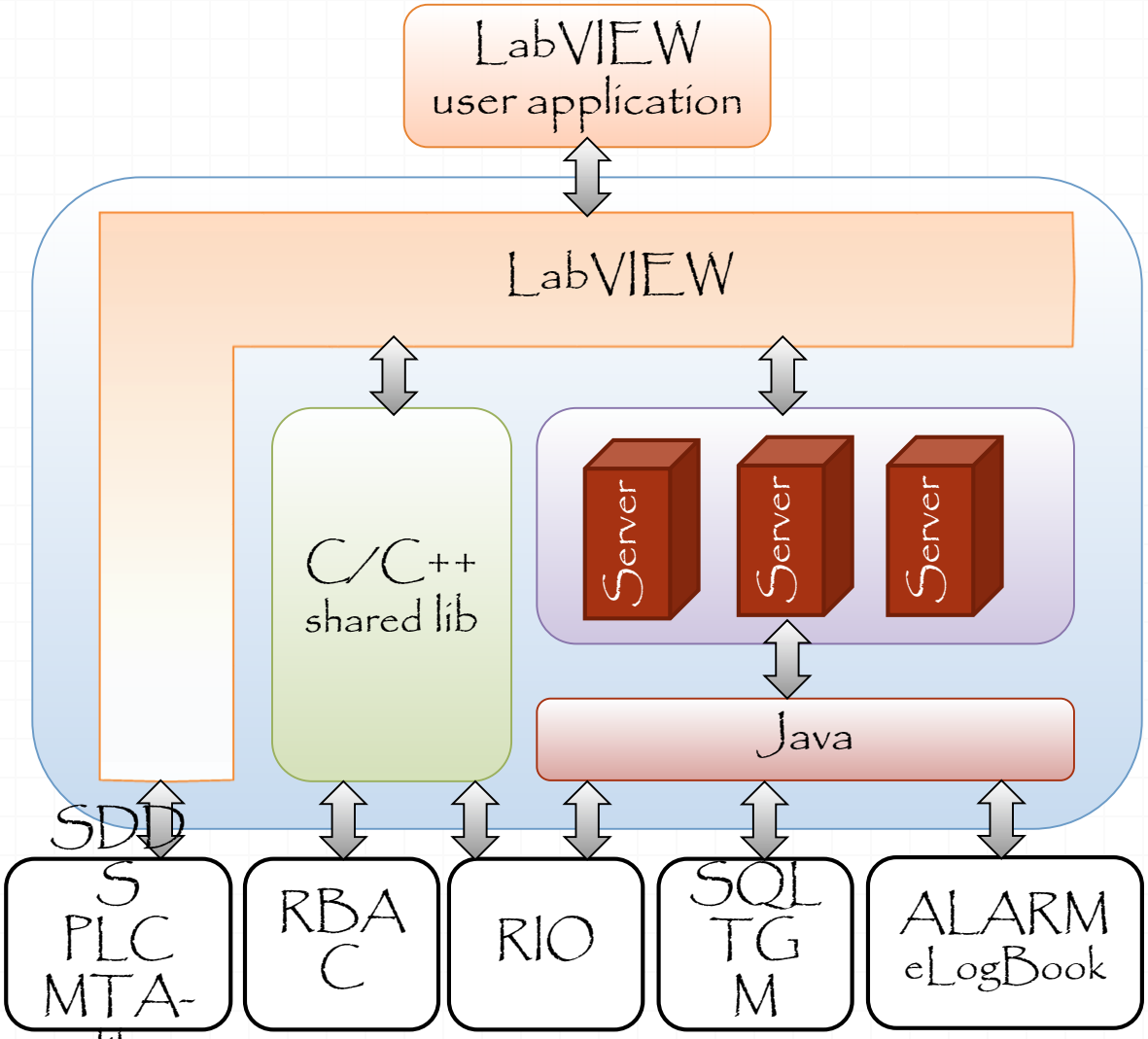
- Integration with CERN infrastructures

RADE Palette

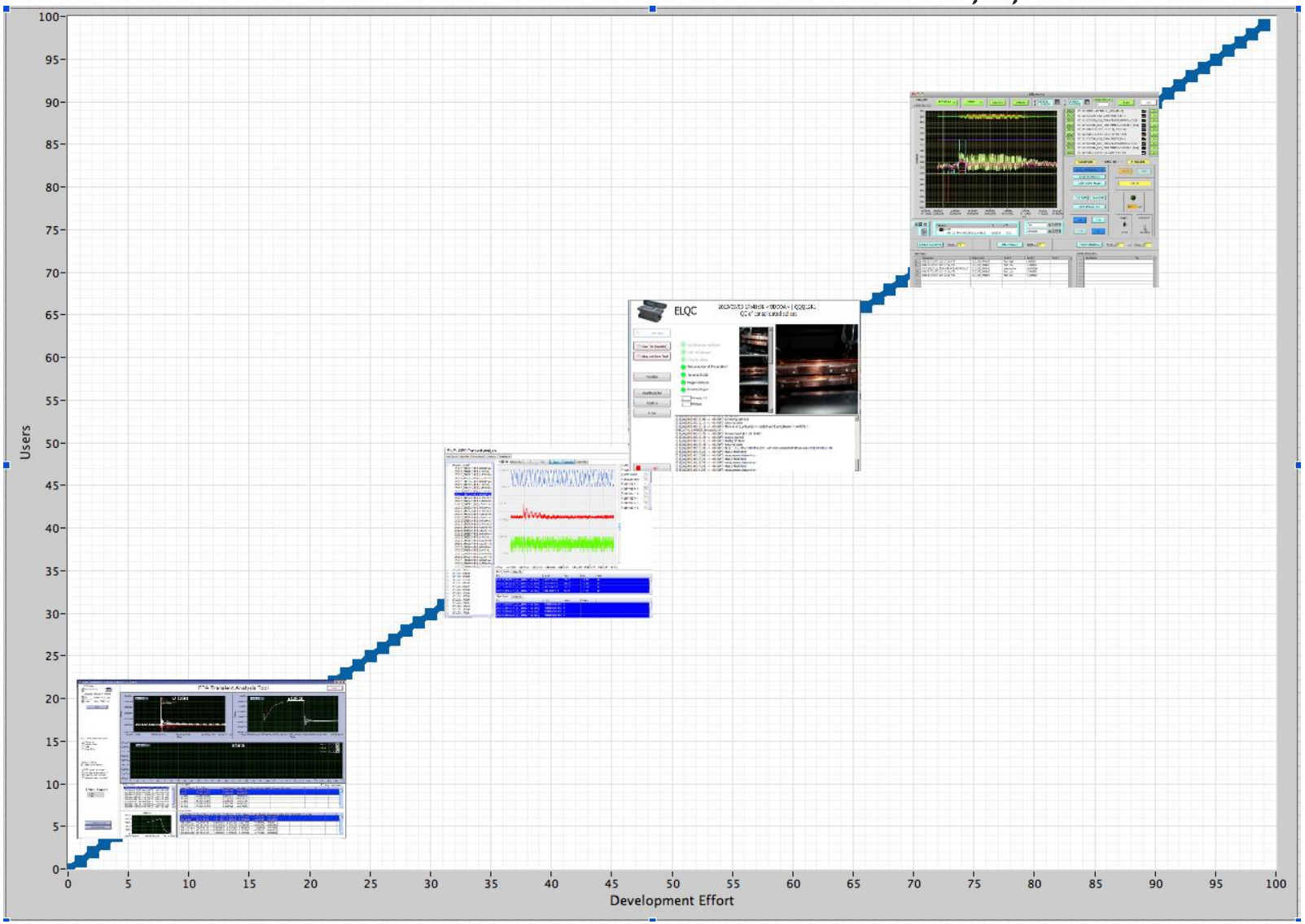


Sources, Targets and Interactions

RADE Core Technology



RADE Applications



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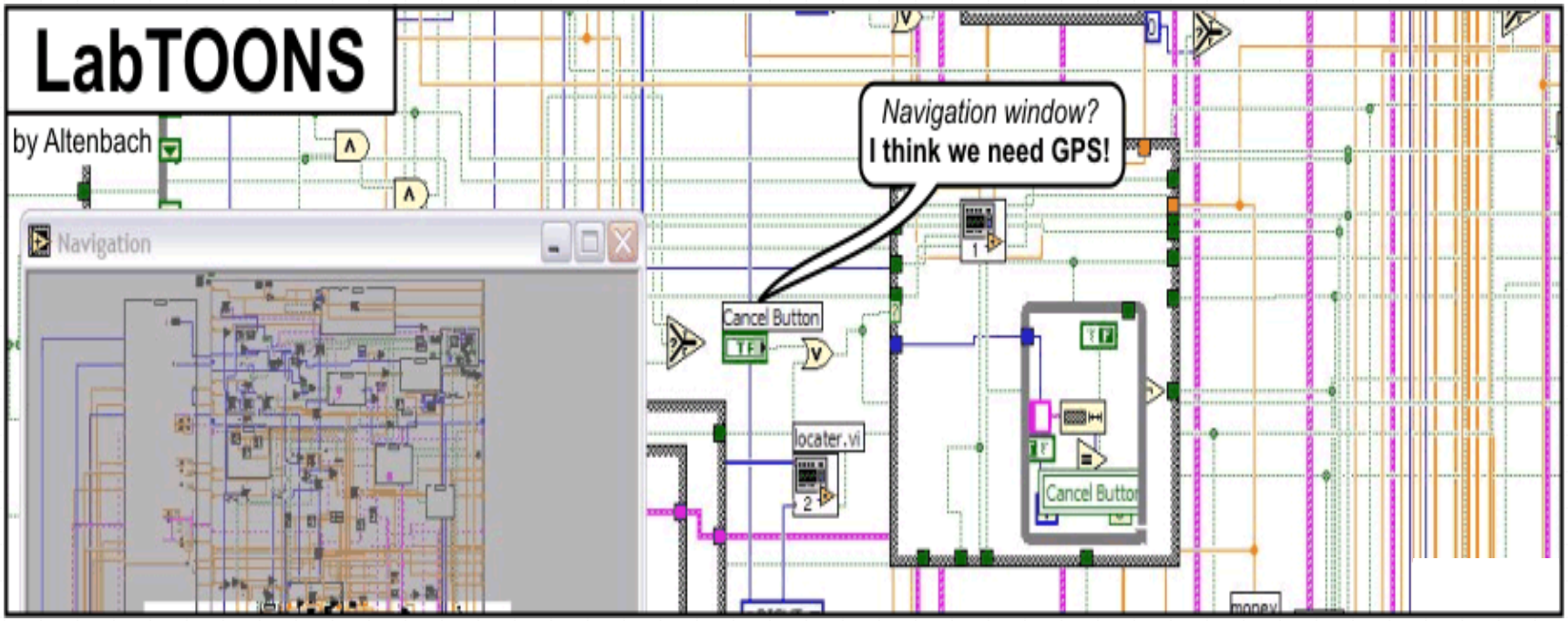
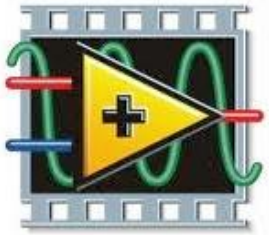
Coping With Large Applications



Large Application Requirements

- Fast programming
- Rapid learning curve
- Drag and drop GUI development
- Wide range of analysis libraries
- Light/independent environment

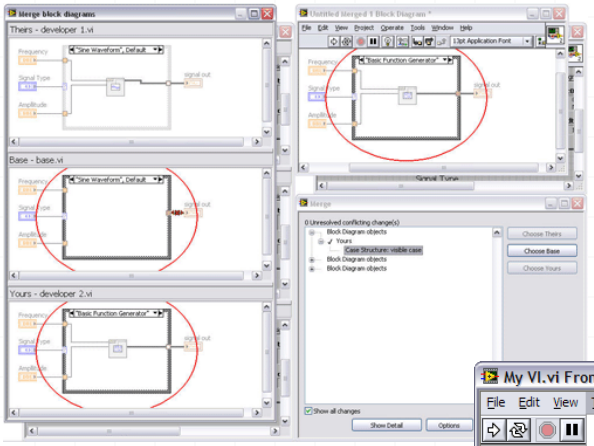


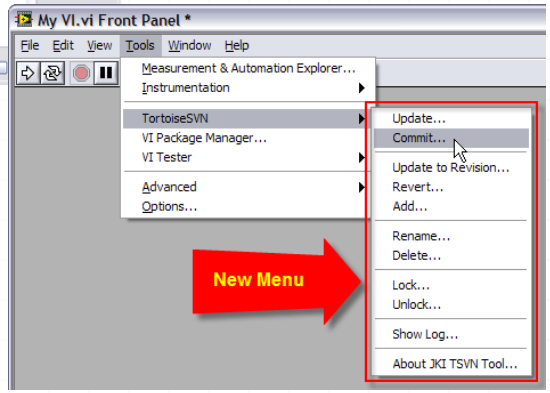
LabVIEW

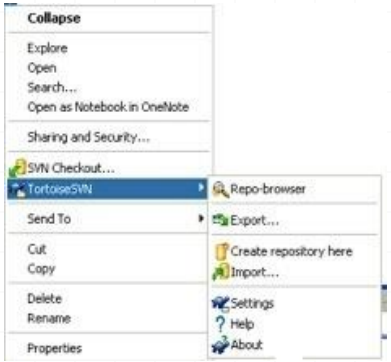
- Integration with CERN infrastructures
- Source control and distribution
- Instance generation
- Templates and documentation
- Automated tests and builds

EN STI

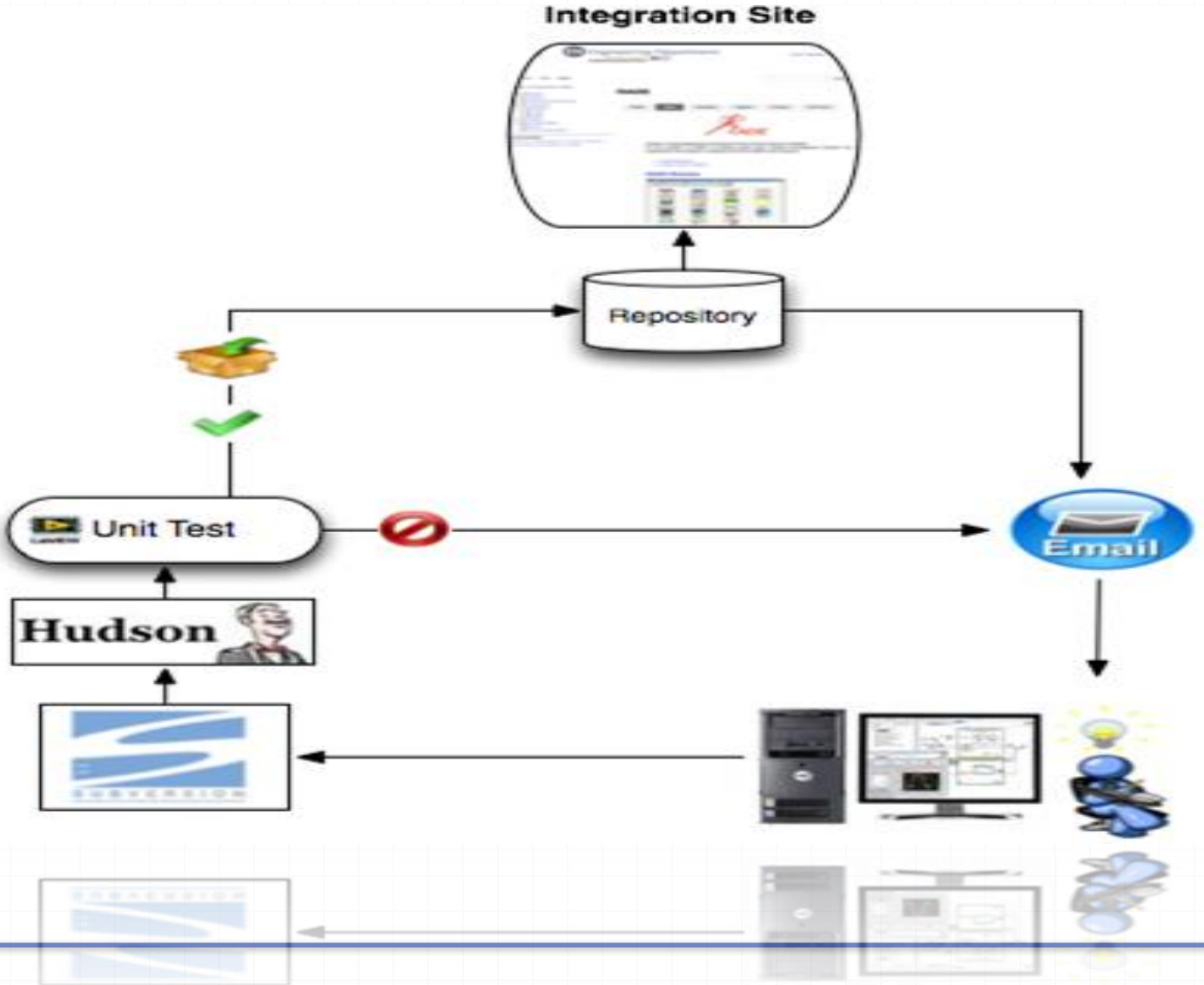
Source Control



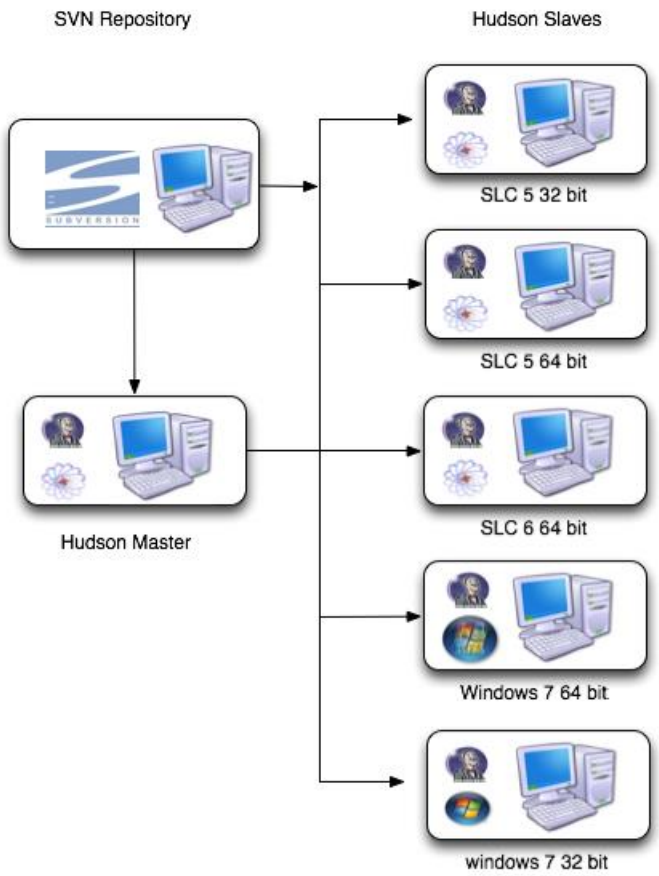




Continuous Integration



Continuous Integration



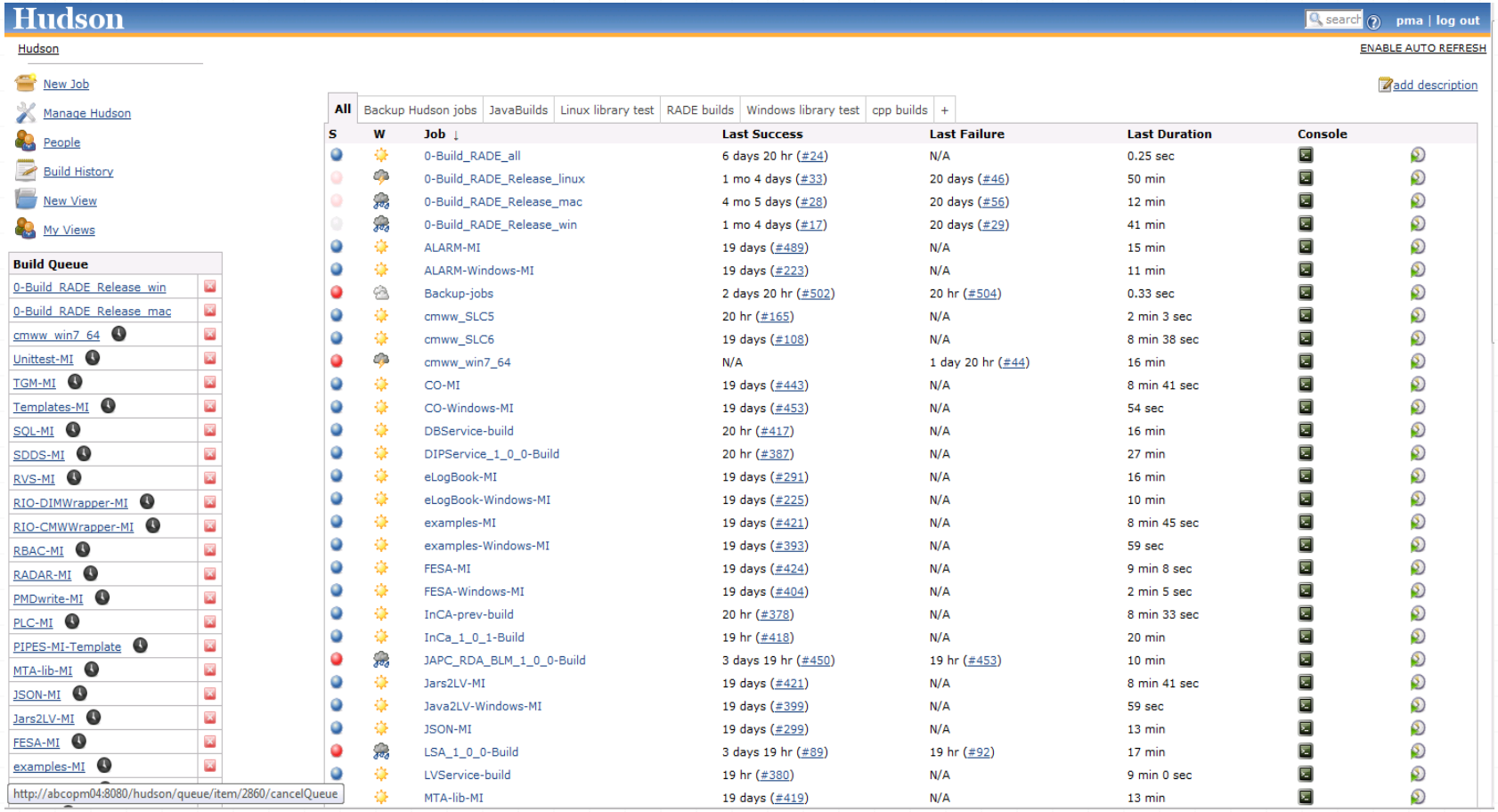
Linux Windows and Mac

Open stack and VPN

openstack™

Continuous Integration

Sources, Targets and Interactions



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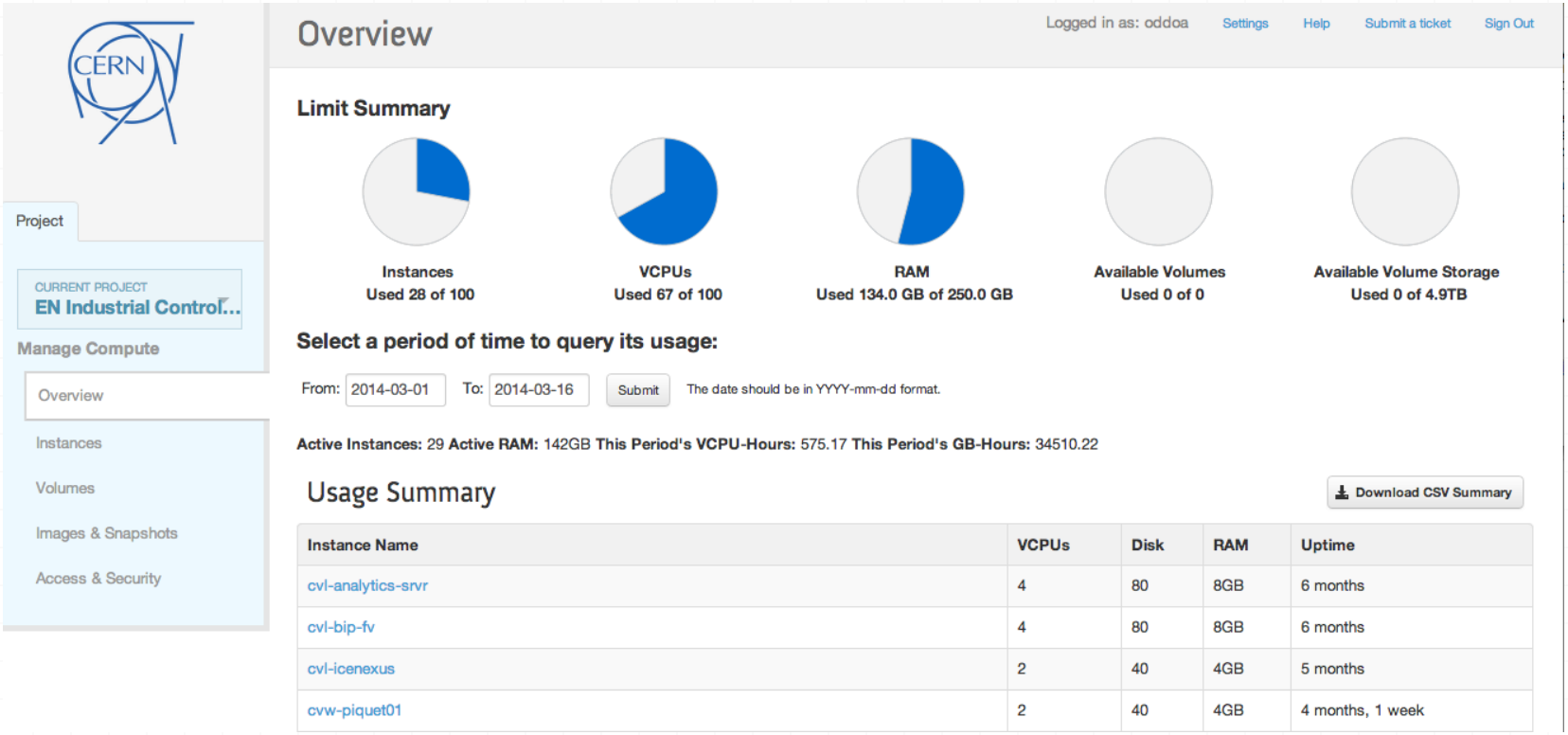

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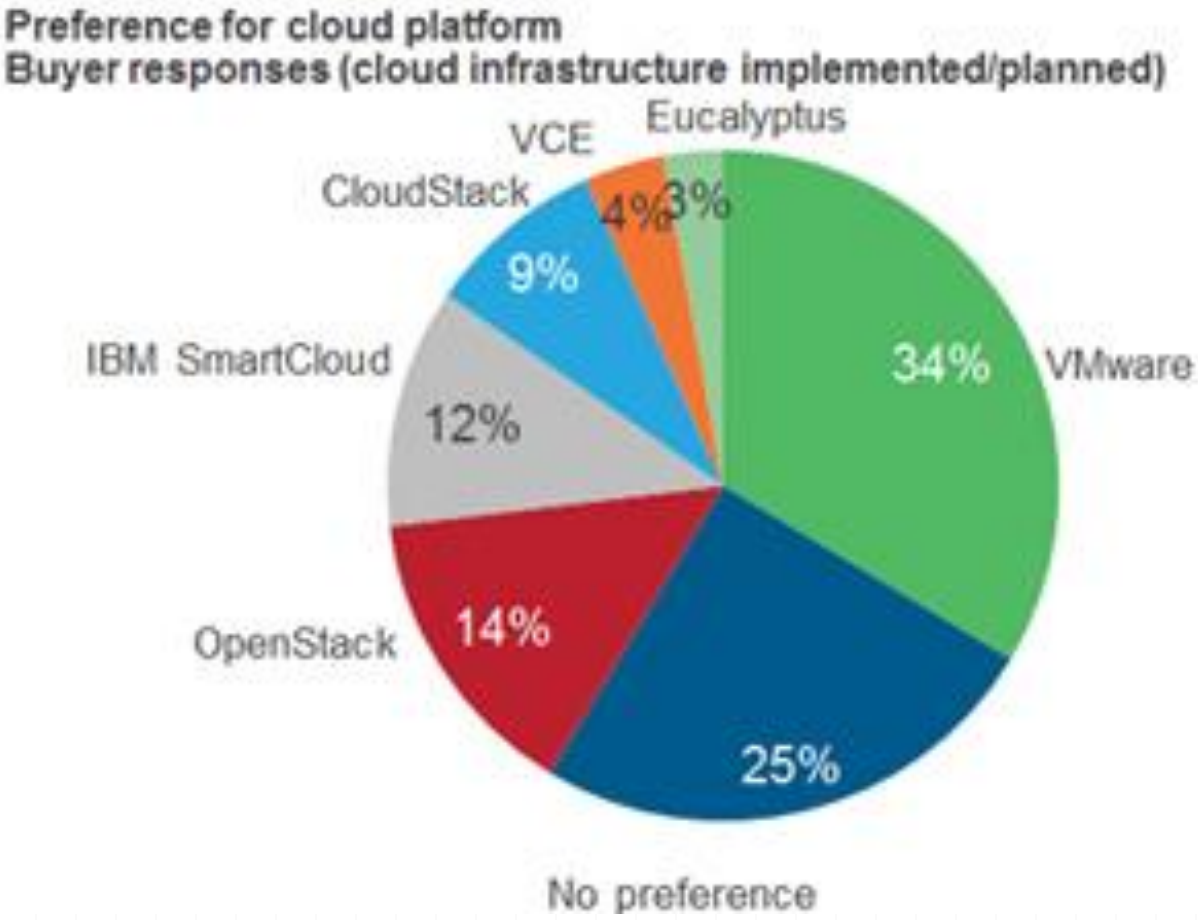
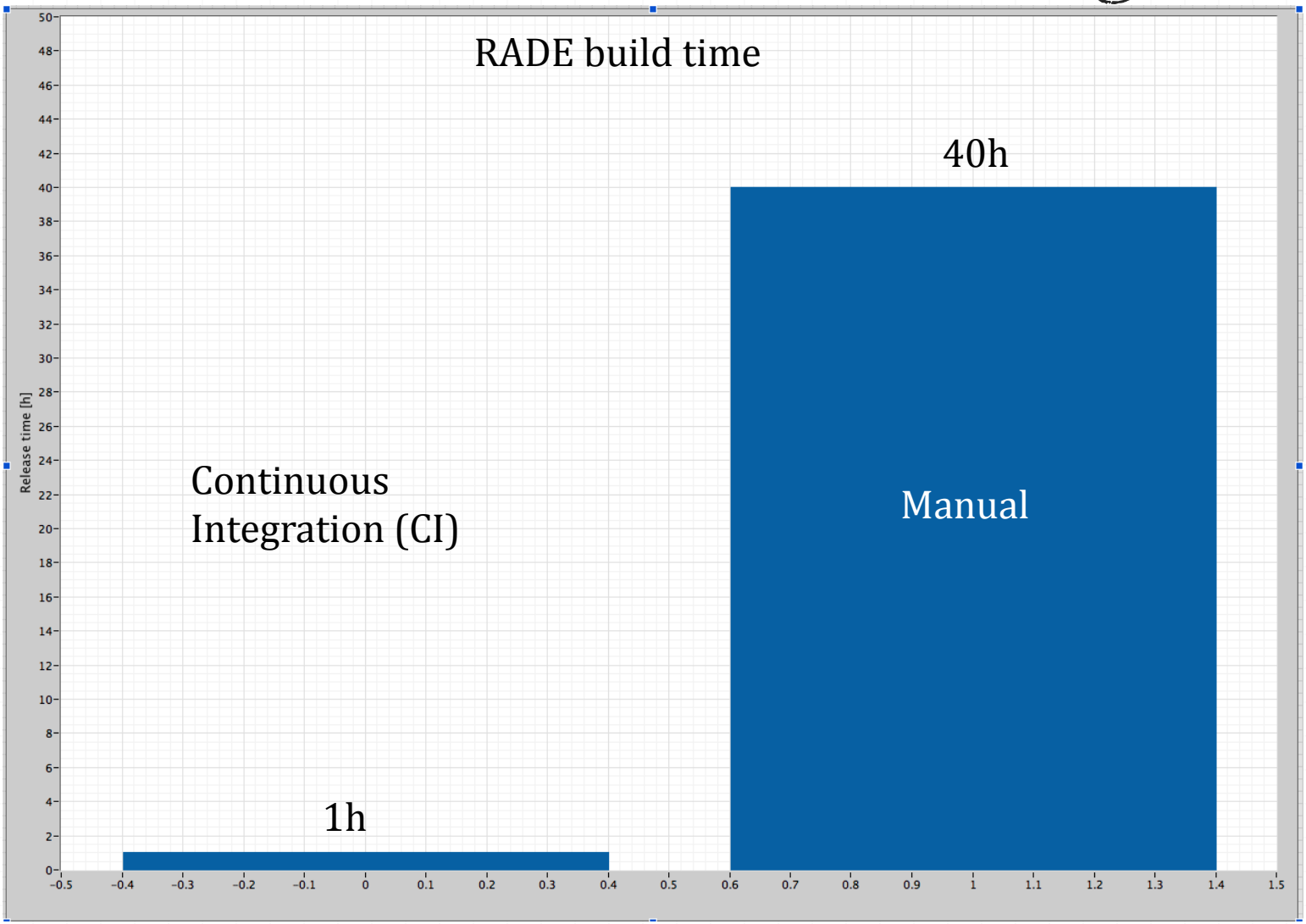
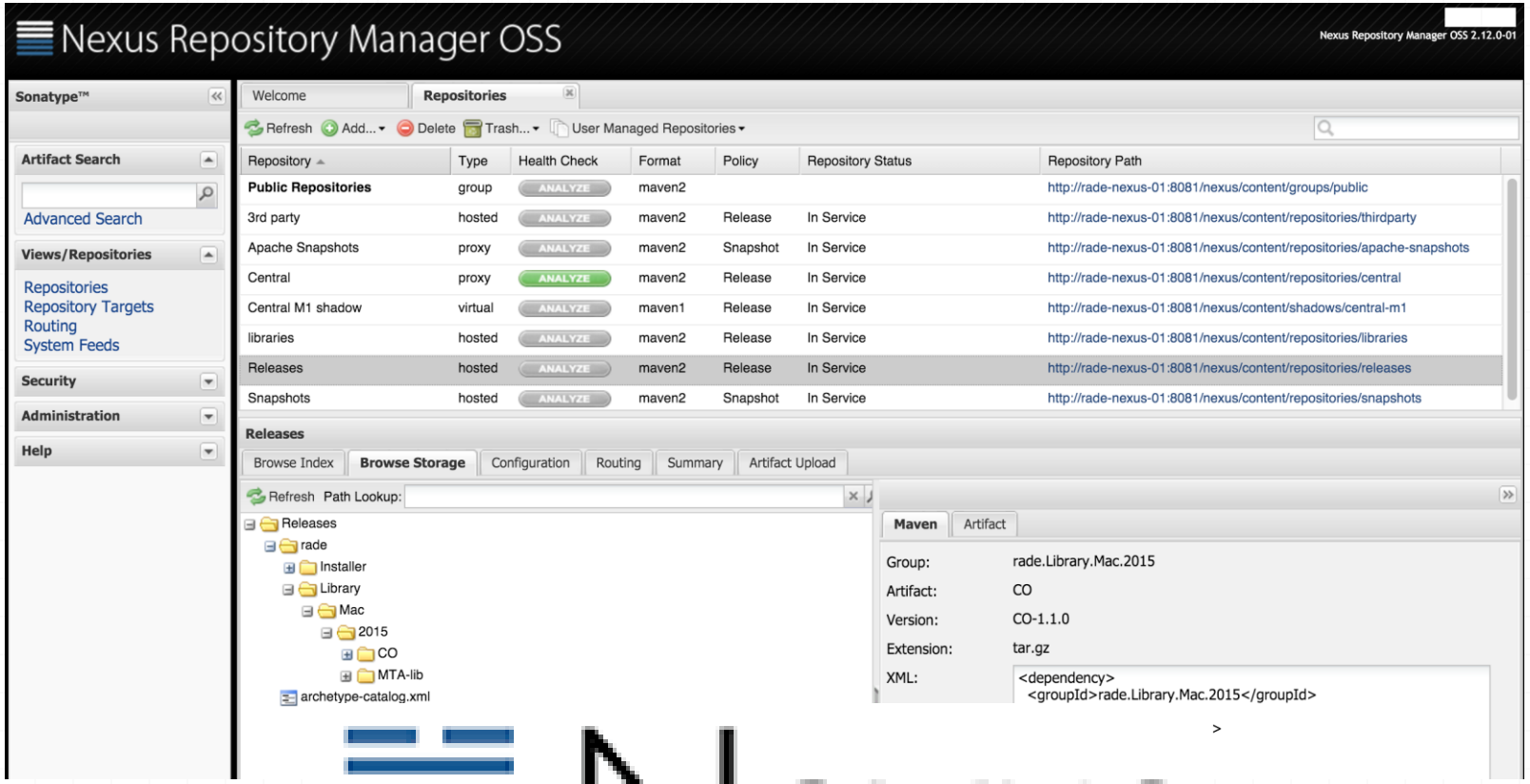


Continuous Integration



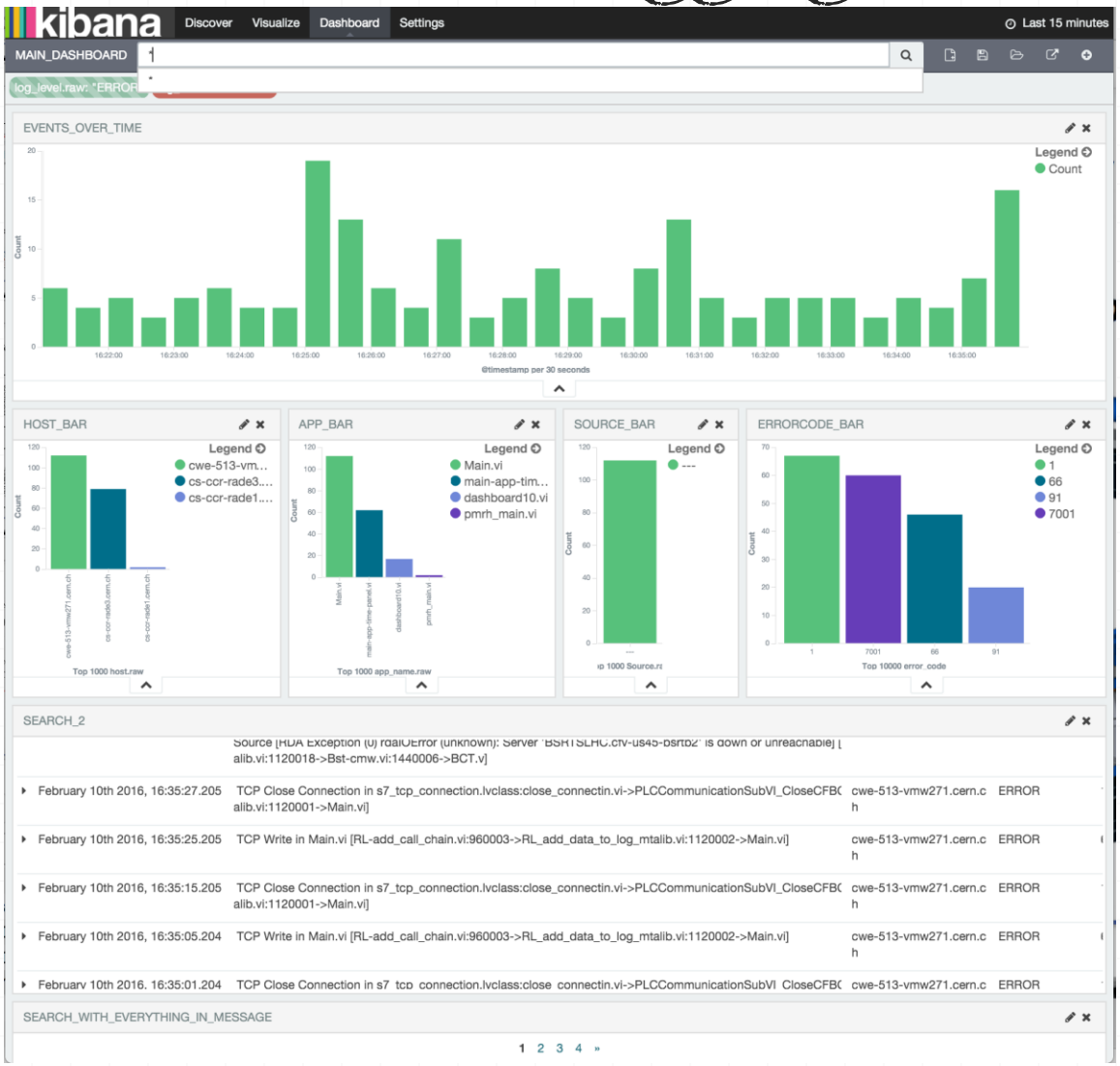
Software repository



Nexus

Logging and diagnostics

("ELK")



Distribution

Home / Frameworks / RADE / RADE-Getting-Started / RADE-install

Tools

RADE-install

Added by Unknown User (atarasen), last edited by Odd Oyvind Andreassen on Feb 10, 2014 (view change)

Home | Getting Started | Libraries | Download | Support | Glossary

RADE is available trough CMF.

If your computer doesn't have the CMF agent installed you can get RADE from the locations linked below.

	Windows	Linux Local (64 bit)	Linux Local (32 bit)	Linux (NFS)	Mac OSX
LabVIEW 2010	RADE 10	RADE 10	RADE 10	RADE is installed centrally	RADE 10 OSX DMG
LabVIEW 2011	RADE 11	RADE 11	RADE 11	RADE is installed centrally	RADE 11 OSX DMG
LabVIEW 2012	RADE 12	RADE 12	RADE 12	RADE is installed centrally	RADE 12 OSX DMG
LabVIEW 2013	RADE 13	RADE 13	RADE 13	RADE is installed centrally	RADE 13 OSX DMG

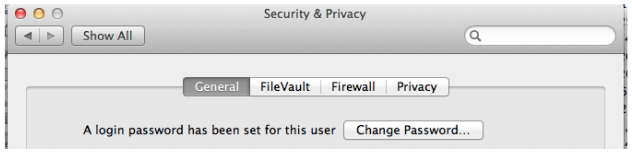
1. If the installation doesn't start automatically run RADE_13.exe from \\cern.ch\dfs\Services\PMA\rade\builds\RADE_13.exe

Beta-version of RADE for LabVIEW-2010

Windows	Linux
Windows version	RADE-10-beta.rpm

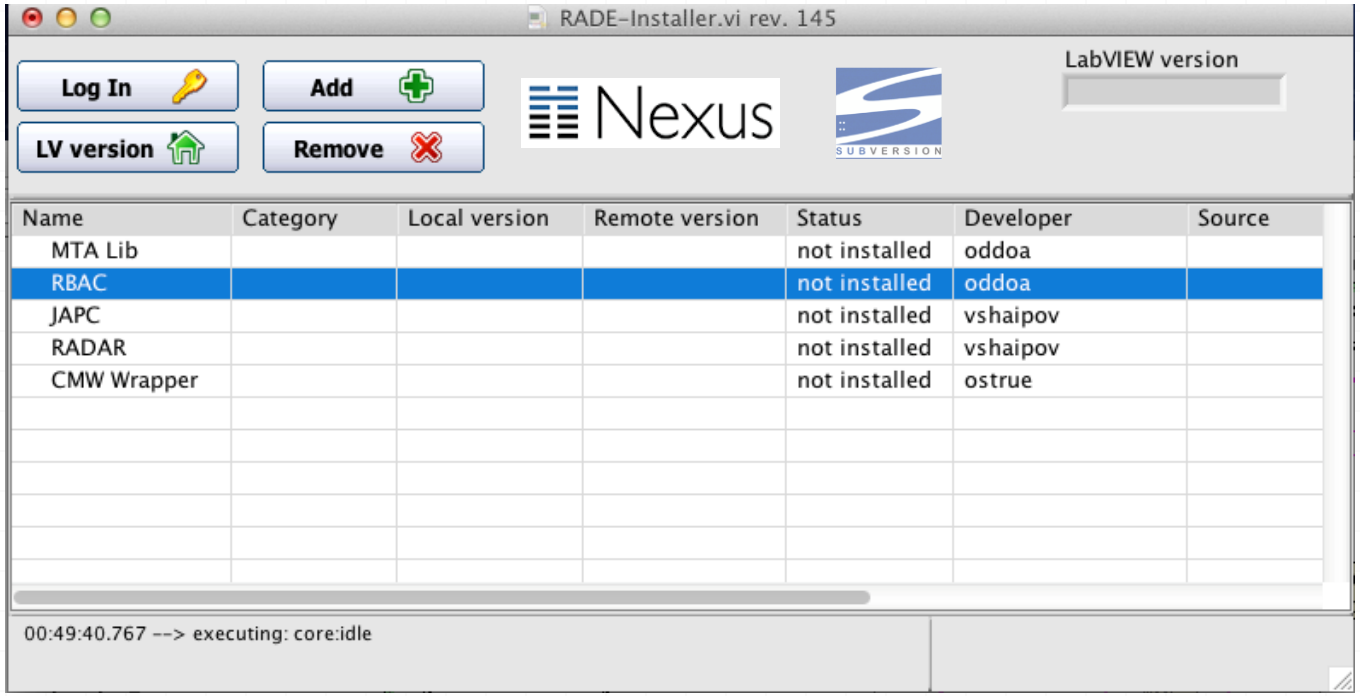
Installing on Mac

The mac package is not signed so in order to install the RADE framework on your machine you have to allow all applications in your security settings (Preferences >> Security & Privacy):



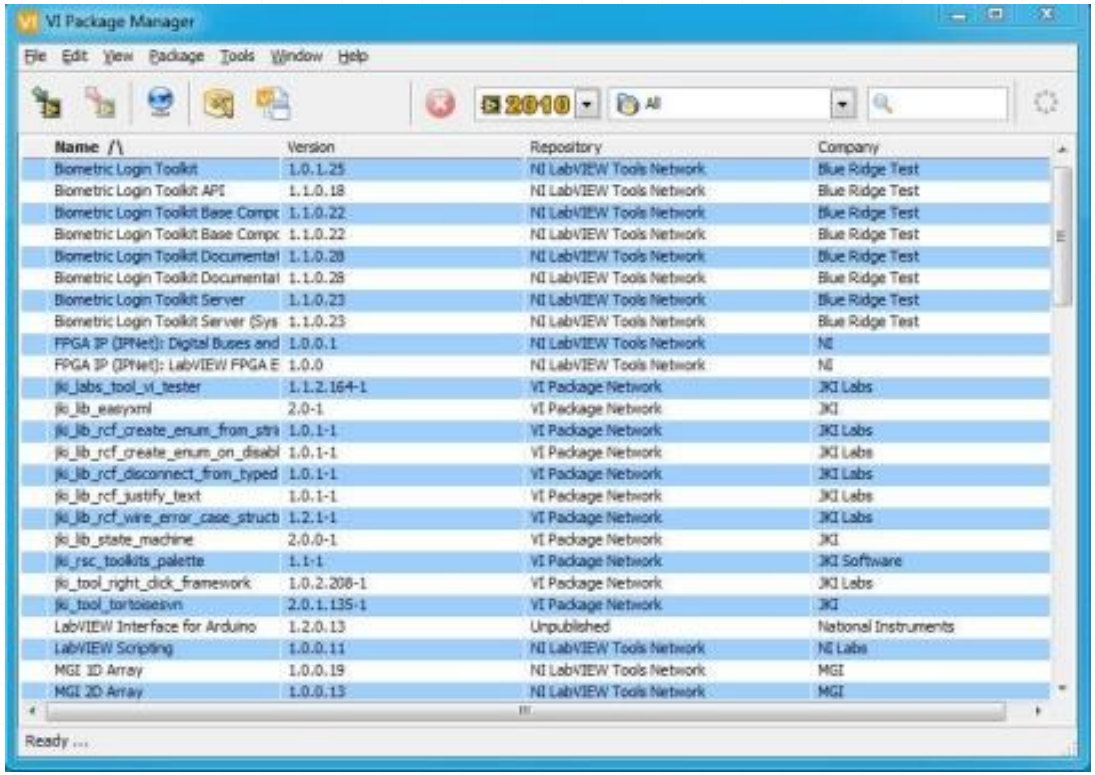
Online Installer

Distribution

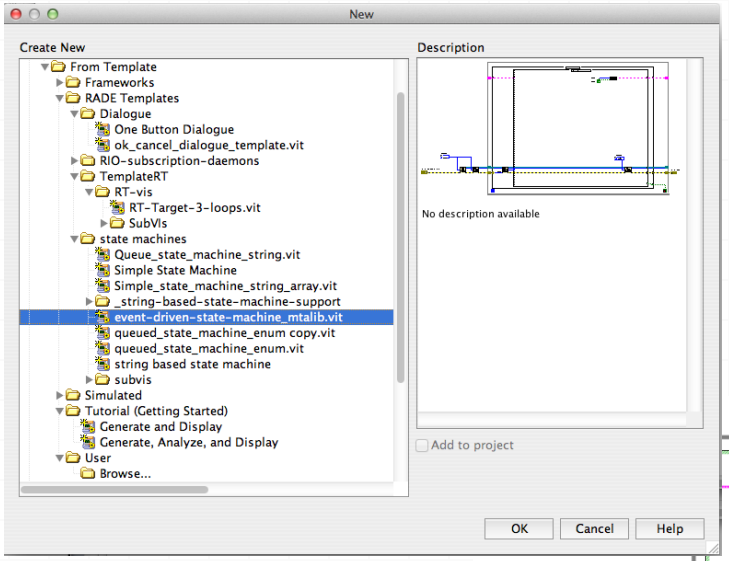


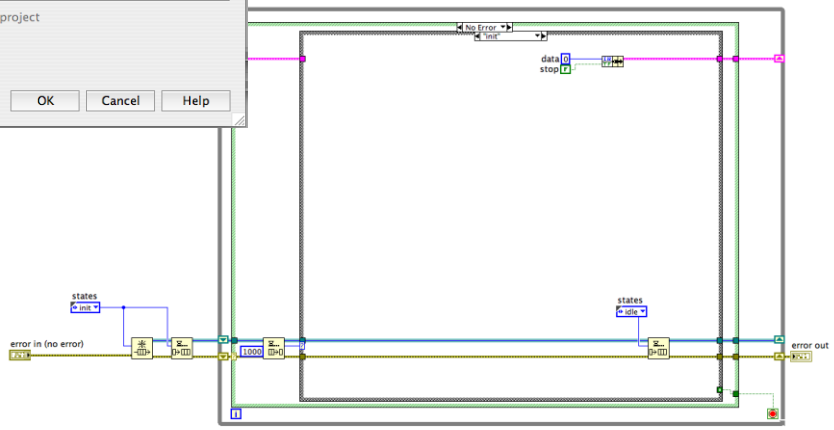
RADE Installer

Distribution

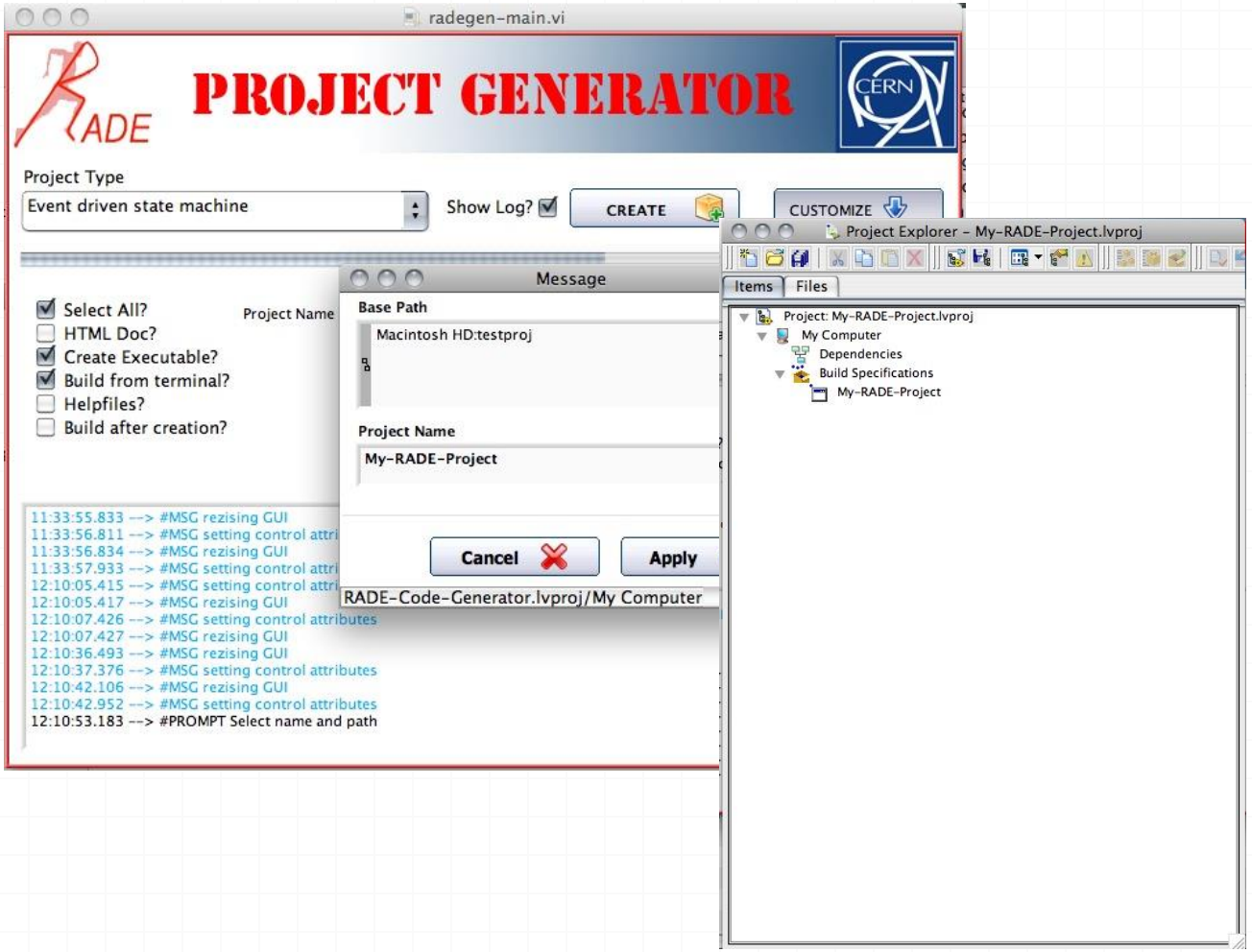


Dedicated Templates



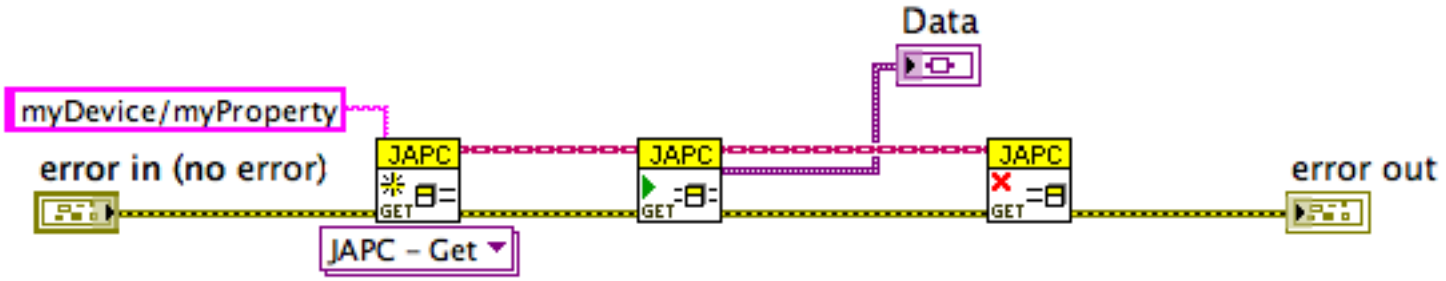


Project Generation



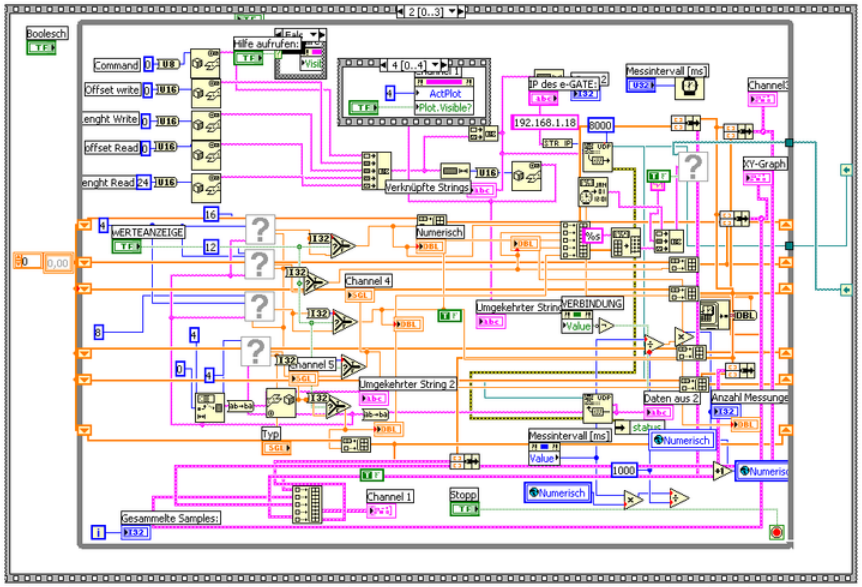
Typical design

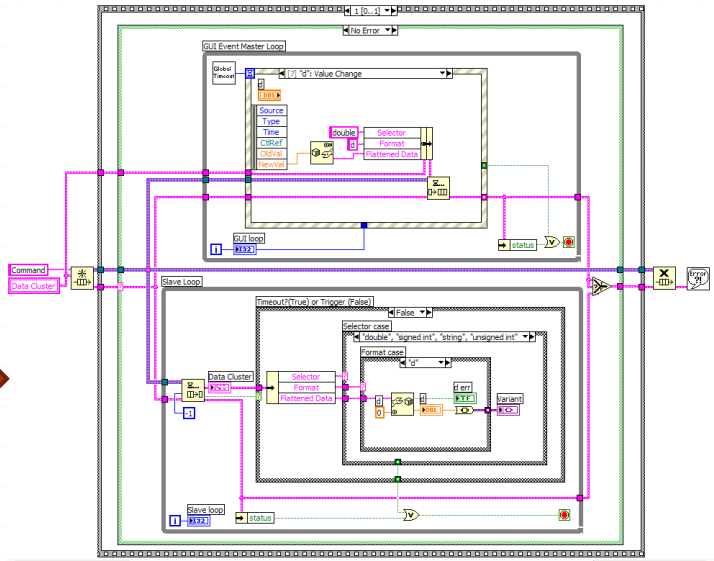
Create, Use & Destroy



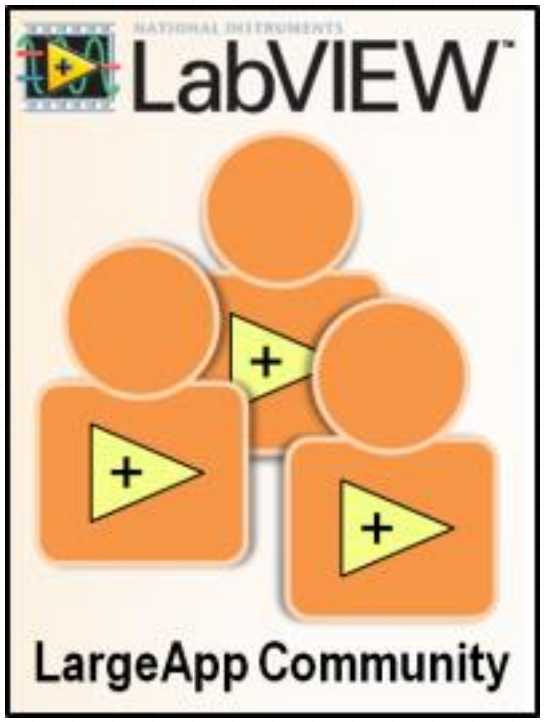
Development help

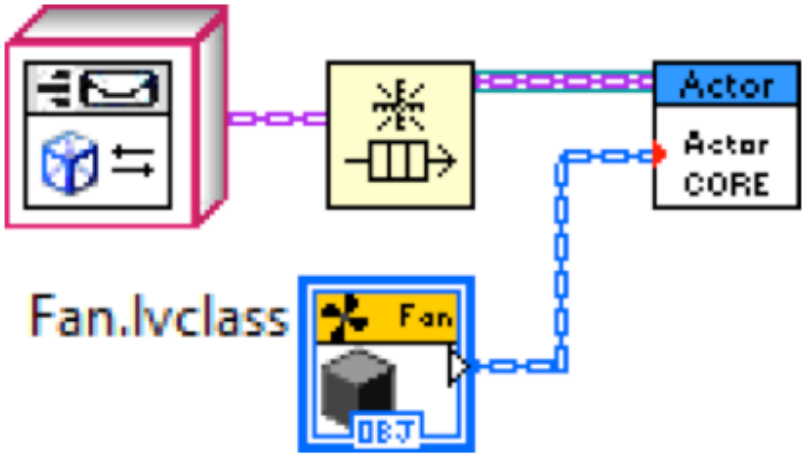
- Design patterns and templates in RADE
- LabVIEW Guides
  http://j2eeps.cern.ch/wikis/display/EN/LabVIEW+Guides
- Code review: make maintainable, and performant



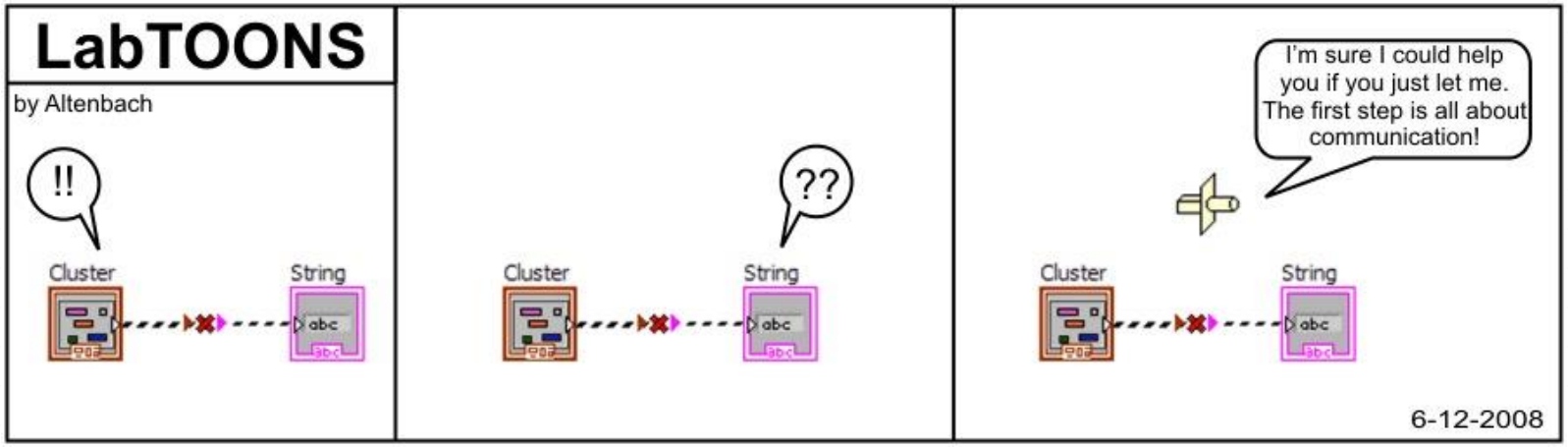


Peer Programming





The missing link



Middleware integragion

Operators

Clients

- RIO palette (Rade Input/Output)
  - Get, Set and Subscribe

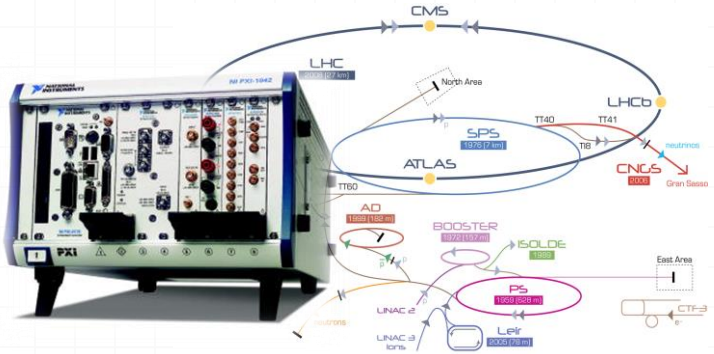
User Application

CERN Middleware

CMW Server

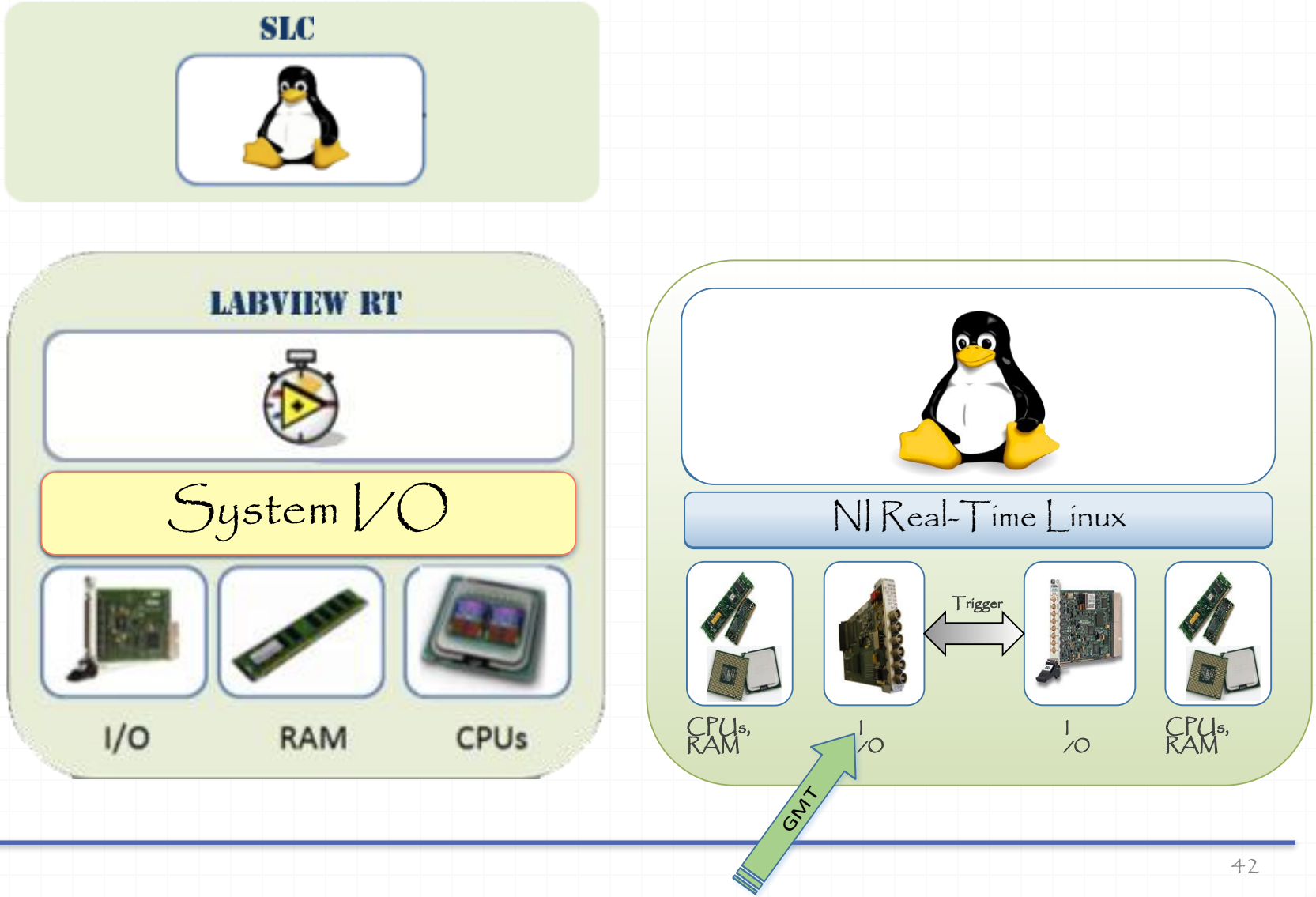
Server

- Device/property/field definitions



PXI on the accelerator complex

Distributed Architecture



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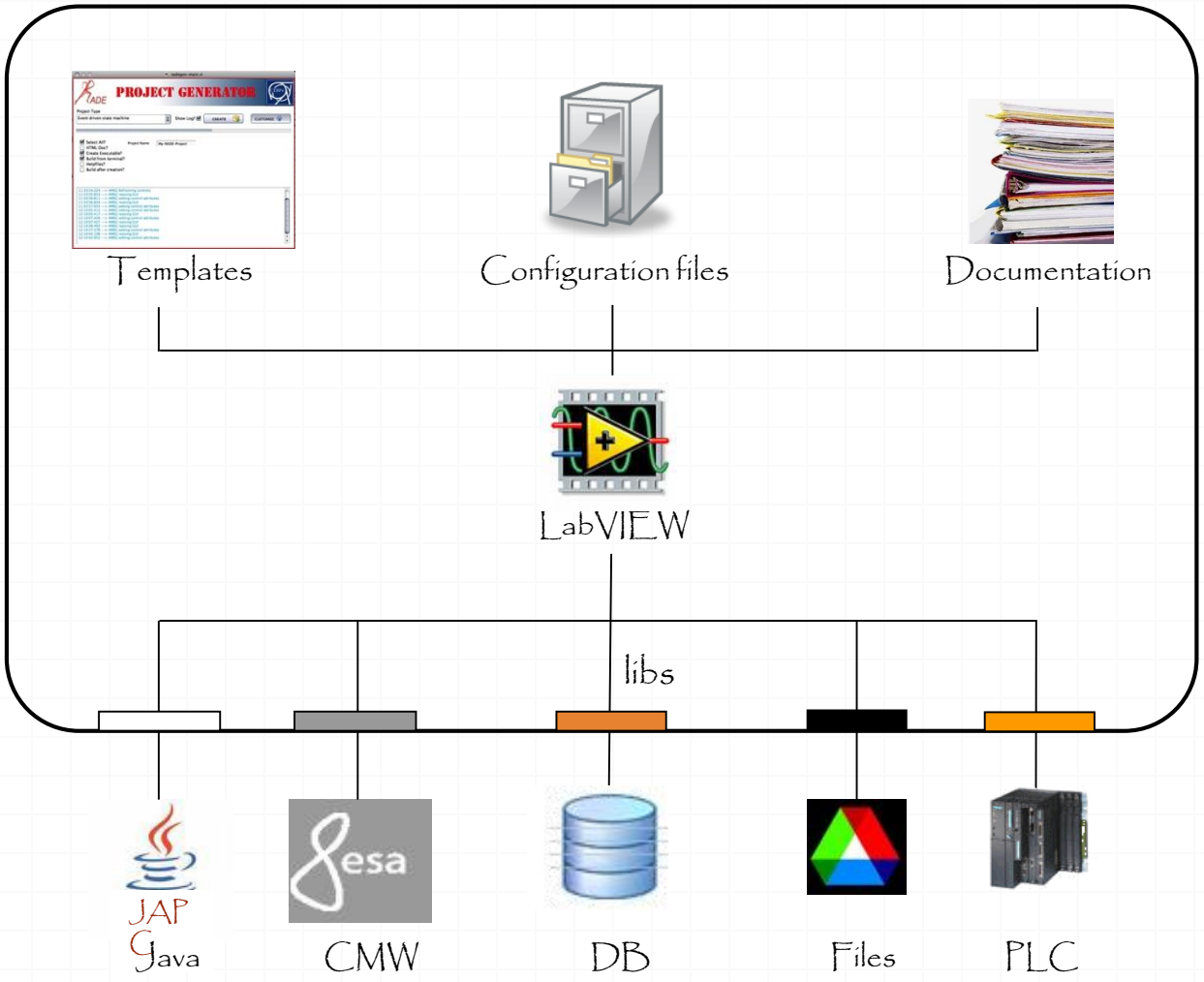
RADE today

- RADE has become adult
- LabVIEW has started getting out of the Lab
- Copes with the classical software development challenges
- Enables LabVIEW to be used for accelerator applications

The Framework

Sources, Targets and Interactions



Training

Support

Hardware Support

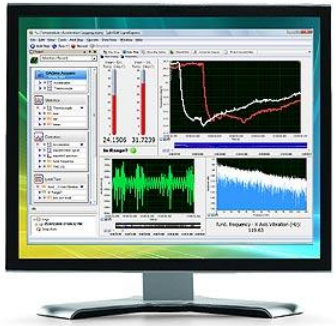
NATIONAL INSTRUMENTS

Hardware

- PXI
- CompactRIO
- DAQ

&

Software



- LabVIEW
- TestStand
- DIAdem
- and other NI products

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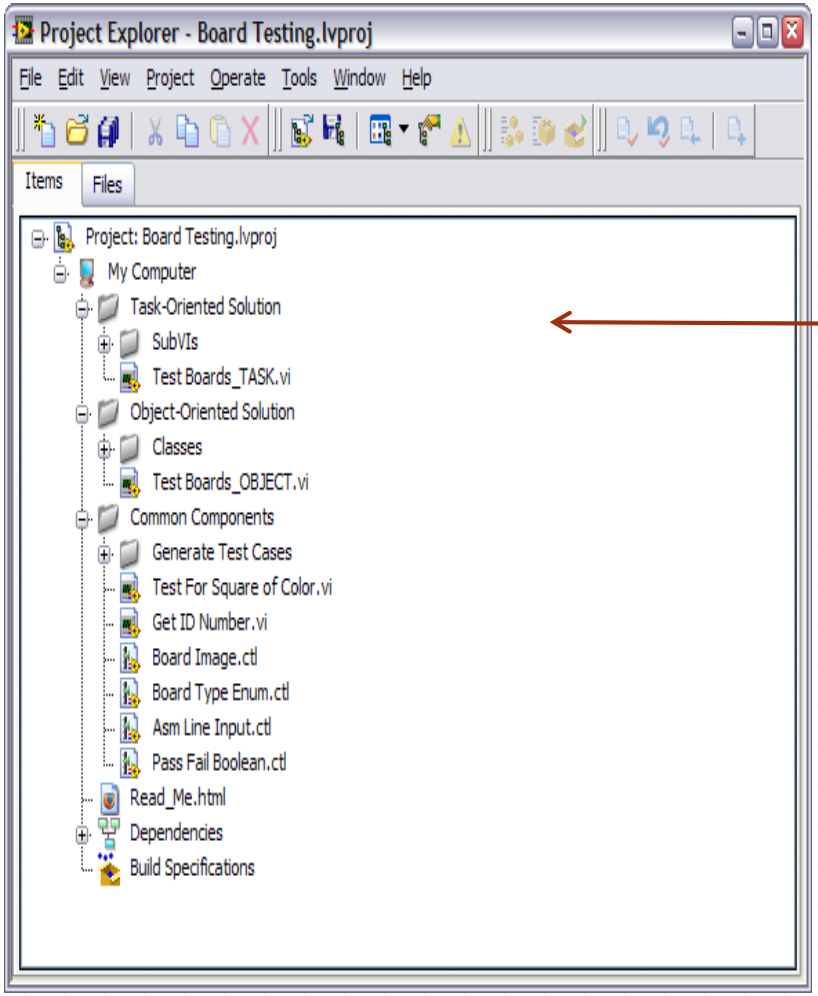
Future Challenges



SUBVERSION

git

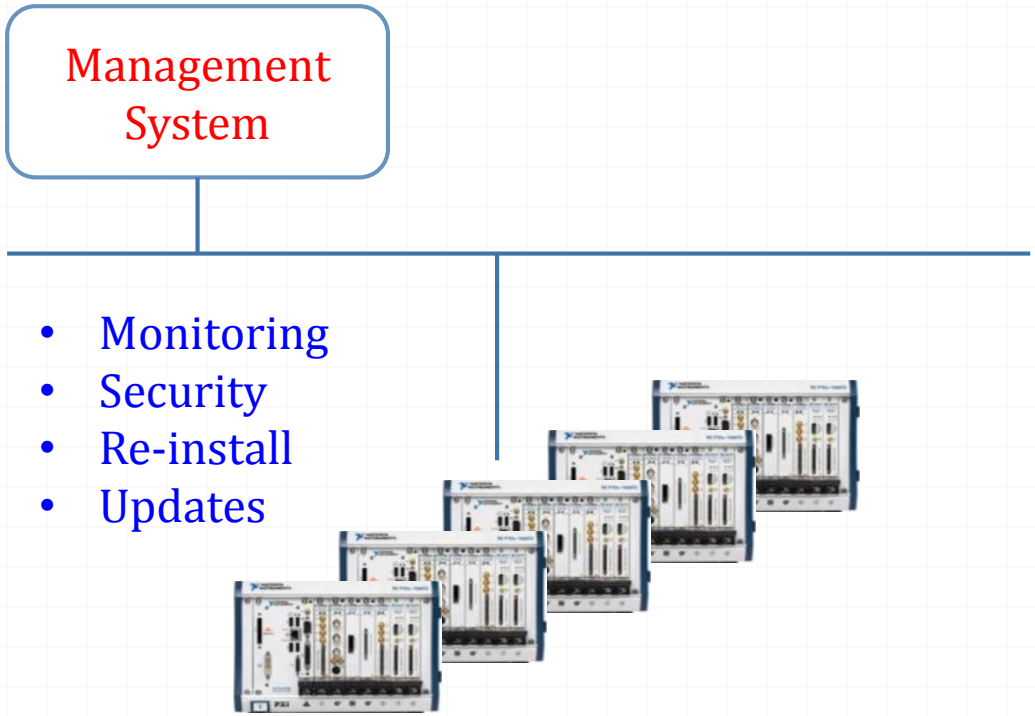
mercurial

PERFORCE
Version everything.

Future Challenges

Large system management

- How to manage a large installation?

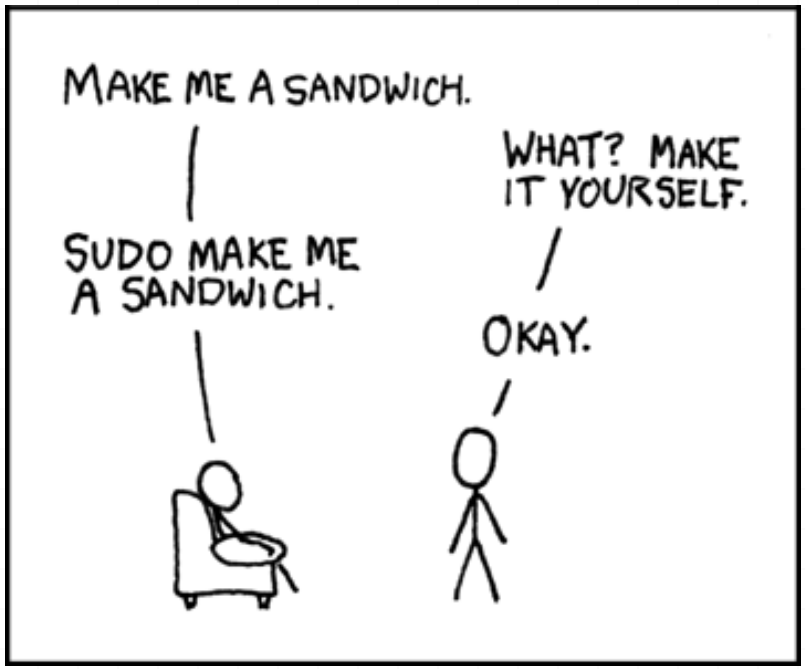


Watch these!

- The LHC by Brian Cox
- Extreme programming by Elisabeth Hendrickson
- What the agile manifesto left out by Brian Marick
- Practicing Continuous Integration by David Cramer
- The Actor Framework by Stephen Mercer
- ZMQ is the answer by Ian Barber

Questions


RADE


MAKE ME A SANDWICH.
SUDO MAKE ME A SANDWICH.
WHAT? MAKE IT YOURSELF.
OKAY.

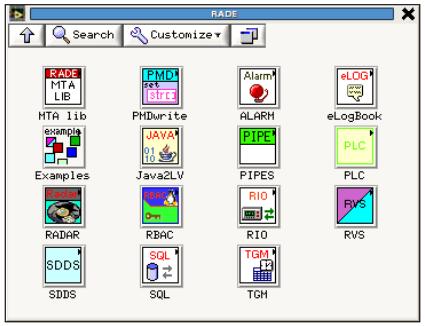
www.cern.ch/RADE

RADE | About | Download | Support | Training

RADE is a Rapid Application Development Environment based on LabVIEW.
It's the solution at CERN to develop expert tools, machine development analysis and independent test facilities in integration with the CERN control systems.

- RADE Modules
- What is new in RADE?

RADE Modules



Library	Icon	Description
MTALib		MTA library. Contains extensions of standard LabVIEW functions for Array, Boolean, Comparison and other palettes.
ALARM		Activating and terminating alarms for the LHC ALARM System.
eLogBook		Adding events and file-attachment to events into eLogBook.
RIO		**RADE Input/Output** provides an access to a live data from the front-ends. Provides GET, SET and Subscription possibilities for any RDA supported device. RIO is the combination of JAPC and FESA palettes of RADE's previous versions.
PIPES		Using **pipes** for Read and Write operations.

Sources, Targets and Interactions

EN STI