



Continuous Integration with Jenkins

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Pusan-South Korea, 16.12.2014



The Previous Tasks for Continuous Integration with Jenkins

Overview of CWG 11

<https://indico.cern.ch/category/5051>

I have joined Computing Working Group (CWG) 11 : Software Lifecycle. CWG 11 is an important working group to contribute on ALICE O² upgrade. Currently, I am already going to be directly involved in CWG 11 on Continuous Integration (CI) with Jenkins. The previous tasks for Continuous Integration with Jenkins System have been done, such as CI with Jenkins study, Jenkins Installation and Jenkins Simulation.

Members of CWG 11 are Dario Berzano, Alina Grigoras, Peter Hristov, Barthélémy von Haller, Didi Rosiyadi.

Continuous Integration



Objectives

- Understand the motivation of Continuous Integration
- Become familiar with How to best integrate Continuous Integration to a project
- Well-know with Jenkins, a very famous open source Continuous Integration Technology.

Motivation

- There is an integration problem, which many people are working on a project in parallel.
- How to ascertain that the work done separately can be integrated successfully.

Level of Integration Problems

- Merge conflicts is people have modified the same file concurrently.
- Compile conflicts is people have modified files concurrently such that the resulting system does not compile (No merge conflicts).
- Test conflicts is people have modified files concurrently such that the system does not execute successfully (No merge conflicts, no compile conflicts)

Benefits of CI

- Reduced risk, which system always builds, or else you know it quickly.
- Bugs and problems discovered closer to the point in time that they were introduced.
- System is deployable more frequently, enabling more user feedback.

Jenkins



Jenkins

- Jenkins is a fork of hudson that occurred after oracle bought sun
- Jenkins – open source continuous integration server
- Jenkins (<http://jenkins-ci.org/>) are Easy to install, Easy to use, Multi-technology, Multi-platform, Widely used, Extensible, Free

IGN Desktop 9

- IGN : Indonesia Go Open Source
- IGN Based on Fedora 19
- About IGN at <http://igos-nusantara.or.id/about/> and <http://igos-nusantara.or.id/wiki/>

Jenkins Installation

- Download Jenkins

```
wget https://bitnami.com/redirect/to/40889/bitnami-jenkins-1.580-0-linux-x64-installer.run
```

- Install process of Jenkins

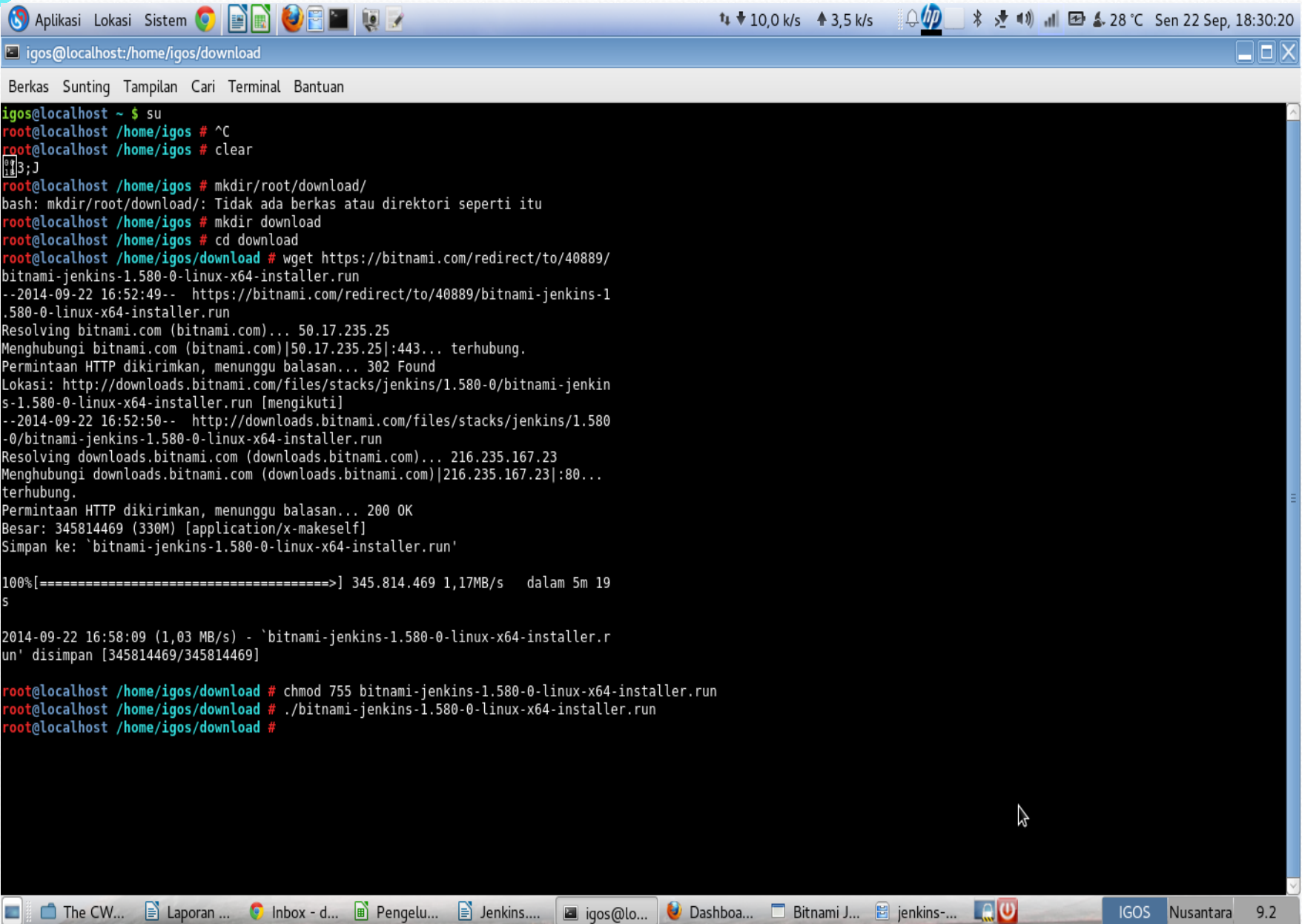
```
chmod 755 bitnami-jenkins-1.580-0-linux-x64-installer.run
```

```
./bitnami-jenkins-1.580-0-linux-x64-installer.run
```

- Run Jenkins

```
http://localhost:8080/jenkins/
```

Jenkins Installation



```
igos@localhost:~/home/igos/download
Berkas Sunting Tampilan Cari Terminal Bantuan
igos@localhost ~ $ su
root@localhost /home/igos # ^C
root@localhost /home/igos # clear
[3;J
root@localhost /home/igos # mkdir/root/download/
bash: mkdir/root/download/: Tidak ada berkas atau direktori seperti itu
root@localhost /home/igos # mkdir download
root@localhost /home/igos # cd download
root@localhost /home/igos/download # wget https://bitnami.com/redirect/to/40889/bitnami-jenkins-1.580-0-linux-x64-installer.run
--2014-09-22 16:52:49-- https://bitnami.com/redirect/to/40889/bitnami-jenkins-1.580-0-linux-x64-installer.run
Resolving bitnami.com (bitnami.com)... 50.17.235.25
Menghubungi bitnami.com (bitnami.com)[50.17.235.25]:443... terhubung.
Permintaan HTTP dikirimkan, menunggu balasan... 302 Found
Lokasi: http://downloads.bitnami.com/files/stacks/jenkins/1.580-0/bitnami-jenkins-1.580-0-linux-x64-installer.run [mengikuti]
--2014-09-22 16:52:50-- http://downloads.bitnami.com/files/stacks/jenkins/1.580-0/bitnami-jenkins-1.580-0-linux-x64-installer.run
Resolving downloads.bitnami.com (downloads.bitnami.com)... 216.235.167.23
Menghubungi downloads.bitnami.com (downloads.bitnami.com)[216.235.167.23]:80... terhubung.
Permintaan HTTP dikirimkan, menunggu balasan... 200 OK
Besar: 345814469 (330M) [application/x-makeself]
Simpan ke: `bitnami-jenkins-1.580-0-linux-x64-installer.run'

100%[=====>] 345.814.469 1,17MB/s dalam 5m 19s
2014-09-22 16:58:09 (1,03 MB/s) - `bitnami-jenkins-1.580-0-linux-x64-installer.run' disimpan [345814469/345814469]

root@localhost /home/igos/download # chmod 755 bitnami-jenkins-1.580-0-linux-x64-installer.run
root@localhost /home/igos/download # ./bitnami-jenkins-1.580-0-linux-x64-installer.run
root@localhost /home/igos/download #
```

The CW... Laporan ... Inbox - d... Pengelu... Jenkins... igos@lo... Dashboa... Bitnami J... jenkins-... IGOS Nusantara 9.2

User Interface of Jenkins

Applications Places System 16.5 kb/s 1.0 kb/s 30 °C Mon Oct 6, 17:24:24
Inbox (1) - didi. x Inbox - Outlook x rosiyadi2005 - x Intra LIPI x LIPI x Informatika Wel x Facebook x Dashboard [Jen x

localhost:8080/jenkins/ search didi rosiyadi | log out

Konsultasi BEBAS, Real Madrid 3-2 M, Police Arrest Six Al, POLRI-Wadir Resk, Upaya Paksa Dalam, Perwira Ksatria - Yi, KlikBCA, BRAINWAVE A

Jenkins search didi rosiyadi | log out

Jenkins > [ENABLE AUTO REFRESH](#)

- New Item
- People
- Build History
- Manage Jenkins
- Credentials
- My Views

[add description](#)

Welcome to Jenkins!

Please **create new jobs** to get started.

Build Queue

No builds in the queue.

Build Executor Status

- 1 Idle
- 2 Idle

[Help us localize this page](#)

Page generated: Oct 6, 2014 5:16:15 PM [REST API](#) [Jenkins ver. 1.580](#)

Jenkins Simulation :

Create new job : the Jenkins Job DSL

The screenshot shows the Jenkins web interface in a browser window. The address bar indicates the URL is localhost:8080/jenkins/view/All/newJob. The page title is 'Jenkins' and the user is logged in as 'didi rosiyadi'. The main content area is titled 'New Item' and shows the configuration for a new job named 'Test-Job-DSL'. The 'Item name' field is filled with 'Test-Job-DSL'. The 'Freestyle project' option is selected, and its description is displayed: 'This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.' Other options include 'Build a maven project', 'Build multi-configuration project', and 'Monitor an external job'. The 'OK' button is visible at the bottom of the configuration area. On the left side, there are navigation links for 'New Item', 'People', 'Build History', 'Manage Jenkins', 'Credentials', and 'My Views'. Below these are sections for 'Build Queue' (showing 'No builds in the queue.') and 'Build Executor Status' (showing 1 Idle and 2 Idle executors). At the bottom of the page, there is a footer with 'Page generated: Oct 9, 2014 3:52:46 PM', 'REST API', and 'Jenkins ver. 1.580'. A download bar at the very bottom shows three files: '20141009-dbe....pdf', 'job-dsl.hpi', and 'job-dsl.hpi Failed - Insufficient per'.

Item name: Test-Job-DSL

- Freestyle project**
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.
- Build a maven project**
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.
- Build multi-configuration project**
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.
- Monitor an external job**
This type of job allows you to record the execution of a process run outside Jenkins, even on a remote machine. This is designed so that you can use Jenkins as a dashboard of your existing automation system. See [the documentation for more details](#).

OK

Page generated: Oct 9, 2014 3:52:46 PM [REST API](#) [Jenkins ver. 1.580](#)

20141009-dbe....pdf job-dsl.hpi job-dsl.hpi Failed - Insufficient per Show all downloads...

Jenkins Simulation : Process Job DSLs

The screenshot shows the Jenkins configuration page for a job named 'Test-Job-DSL'. The browser address bar indicates the URL is `localhost:8080/jenkins/job/Test-Job-DSL/configure`. The page is titled 'Jenkins > Test-Job-DSL > configuration'.

Configuration options include:

- Trigger builds remotely (e.g., from scripts)
- Build after other projects are built
- Build periodically
- Poll SCM

Build Environment

- SSH Agent

Build

Process Job DSLs

- Use the provided DSL script
- Look on Filesystem

DSL Script

```
job {
  name 'DSL-1-Test'
  scm {
    git('git://github.com/jgritman/aws-sdk-test.git')
  }
  triggers {
    scm('*/*25|****')
  }
}
```

Buttons: Save, Apply, Delete

Taskbar: 20141009-dbe....pdf, job-dsl.hpi, job-dsl.hpi Failed - Insufficient per, Show all downloads...

Jenkins Simulation : Project Job DSLs

The screenshot displays the Jenkins web interface at localhost:8080/jenkins/. The page features a navigation sidebar on the left with options like 'New Item', 'People', 'Build History', 'Manage Jenkins', 'Credentials', and 'My Views'. The main content area shows a table of job DSLs. The table has columns for status (S), weather icon (W), name, last success, last failure, and last duration. Two jobs are listed: 'DSL-1-Test' and 'Test-Job-DSL'. Below the table, there are links for 'Legend', 'RSS for all', 'RSS for failures', and 'RSS for just latest builds'. On the left, there are sections for 'Build Queue' (No builds in the queue) and 'Build Executor Status' (1 Idle, 2 Idle). The footer includes a localization link, page generation timestamp (Oct 9, 2014 4:06:30 PM), REST API link, Jenkins version (1.580), and a download bar with three items: '20141009-dbe....pdf', 'job-dsl.hpi', and 'job-dsl.hpi Failed - Insufficient per'.

localhost:8080/jenkins/

Jenkins

dididi rosiyadi | log out

ENABLE AUTO REFRESH

add description

S	W	Name ↓	Last Success	Last Failure	Last Duration
☐	☀	DSL-1-Test	N/A	N/A	N/A
🌐	☀	Test-Job-DSL	2 min 25 sec - #1	N/A	0.23 sec

Icon: [S](#) [M](#) [L](#)

[Legend](#) [RSS for all](#) [RSS for failures](#) [RSS for just latest builds](#)

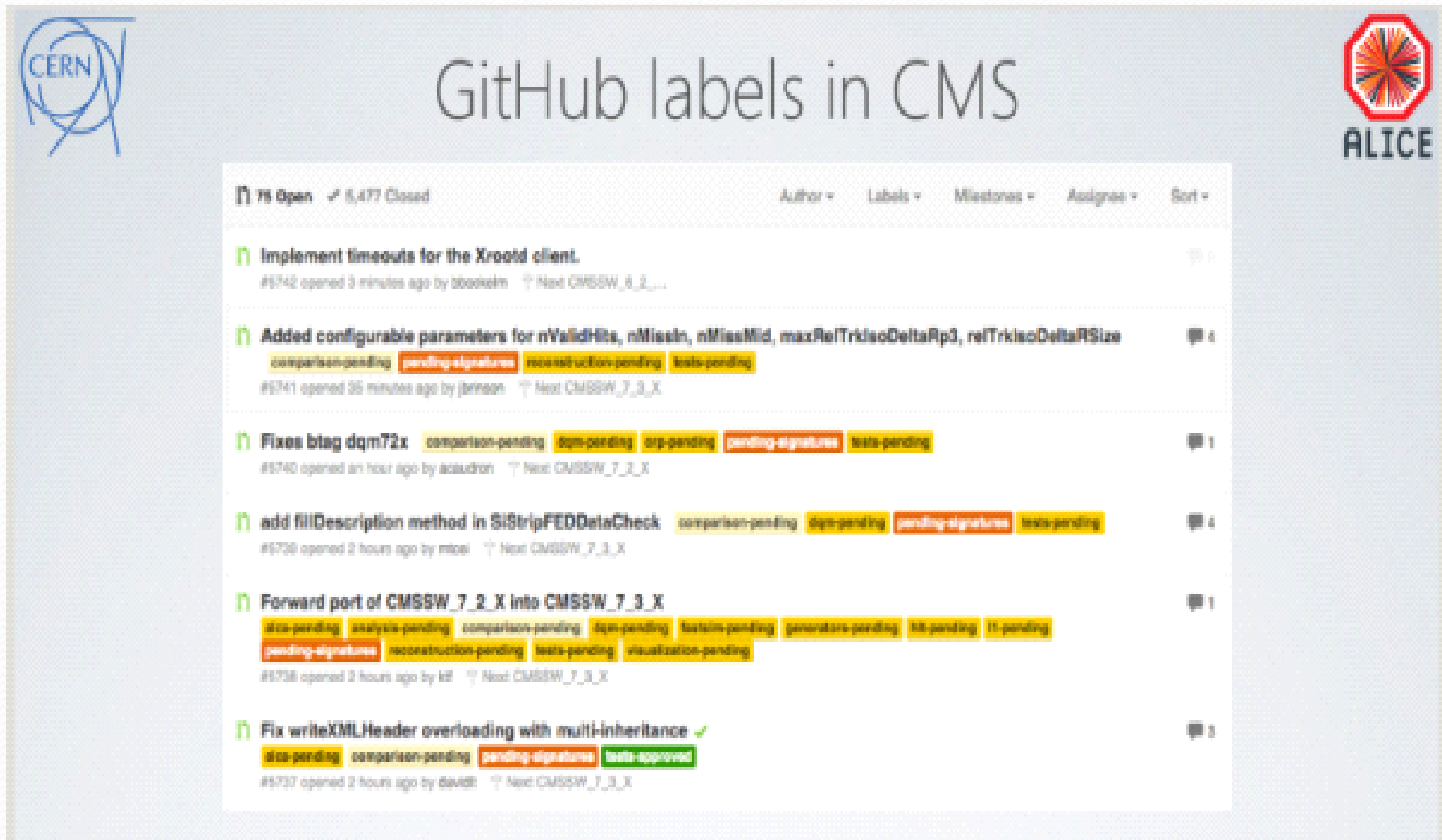
Build Queue —
No builds in the queue.

Build Executor Status —
1 Idle
2 Idle

[Help us localize this page](#) Page generated: Oct 9, 2014 4:06:30 PM [REST API](#) [Jenkins ver. 1.580](#)

20141009-dbe....pdf job-dsl.hpi job-dsl.hpi Failed - Insufficient per Show all downloads...

GitHub labels in CMS



The screenshot shows a GitHub repository page for 'CMS' with the title 'GitHub labels in CMS'. The repository has 75 Open pull requests and 5,477 Closed pull requests. The page displays a list of pull requests with various labels applied to them. The labels include 'comparison-pending', 'pending-signatures', 'reconstruction-pending', 'tests-pending', 'dqm-pending', 'org-pending', 'analysis-pending', 'generator-pending', 'fit-pending', 'it-pending', 'visualization-pending', and 'tests-approved'. The pull requests are sorted by author, labels, milestones, assignee, and sort order.

CERN **ALICE**

75 Open 5,477 Closed Author Labels Milestones Assignee Sort

- Implement timeouts for the Xrootd client. #5742 opened 3 minutes ago by sbokain. Labels: comparison-pending, pending-signatures, reconstruction-pending, tests-pending.
- Added configurable parameters for nValidHits, nMissIn, nMissMid, maxReTrkIsoDeltaRp3, reTrkIsoDeltaRSize. #5741 opened 35 minutes ago by jbrinn. Labels: comparison-pending, dqm-pending, org-pending, pending-signatures, tests-pending.
- Fixes btag dqm72x. #5740 opened an hour ago by acaudron. Labels: comparison-pending, dqm-pending, org-pending, pending-signatures, tests-pending.
- add fillDescription method in SiStripFEDDataCheck. #5739 opened 2 hours ago by mtoal. Labels: comparison-pending, dqm-pending, pending-signatures, tests-pending.
- Forward part of CMSSW_7_2_X into CMSSW_7_3_X. #5738 opened 2 hours ago by kf. Labels: analysis-pending, comparison-pending, dqm-pending, tests-pending, generator-pending, fit-pending, it-pending, pending-signatures, reconstruction-pending, tests-pending, visualization-pending.
- Fix writeXMLHeader overloading with multi-inheritance. #5737 opened 2 hours ago by davidb. Labels: analysis-pending, comparison-pending, pending-signatures, tests-approved.

Jenkins **simulates merging the pull request** and runs **build** and **tests** [Dario, 2014]

Resources

- <https://github.com/jenkinsci/job-dsl-plugin/wiki/Tutorial---Using-the-Jenkins-Job-DSL>
- Philip Johnson, Introduction to Continuous Integration, Collaborative Software Development Laboratory, Information and Computer Sciences, University of Hawaii
- Mark Waite, Jenkins :Continuous Integration after Hudson, CruiseControl, and Home Built, Mile High Agile 2011
- Dario Berzano, Git Development models, CWG 11 meeting, October 09, 2014



The current and next tasks for Continuous Integration with Jenkins



The current and next tasks for Continuous Integration with Jenkins System are shown as follows :

a. We need to understand how to manage with Jenkins:

- Parametric builds: e.g. Jenkins should prompt what version of AliRoot to build, and for which platforms!
- Job dependencies: e.g., if AliRoot depends on a certain version of ROOT, the latter should be triggered automatically!

b. We will take care of defining, as an example, a full working ROOT + Geant 3 + AliRoot build chain, using parameters for asking the software versions.