

Subversion Tutorial

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CERN - LHCb

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Outline

Introduction

- Motivation

- Subversion

- Tools

Subversion in LHCb

- Repository Structure

- Common Operations

The Working Copy

- Getting Informations

- The Base Version

Migration

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Repository Structure

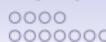
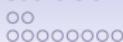
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Why migrate to Subversion?

What's wrong with CVS?

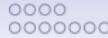
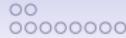
- General arguments
 - Subversion was developed to replace CVS overcoming its limitations (see [Subversion's History](#))
 - Stable and mature product (started in 2000)
- CERN IT arguments
 - Some HEP projects started to use it (ROOT)
 - Lot of requests to have a Subversion service
 - People working on CVS service about to retire
 - No manpower to maintain two services



Why migrate to Subversion?

What's wrong with CVS?

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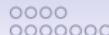
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Subversion Philosophy

From the Subversion F.A.Q.

Interface to the repository

[...] Subversion's repository interface [...] is a "**versioned filesystem**" in the sense that it stores a directory tree whose state is remembered from revision to revision. [...] this particular filesystem doesn't lose data when written to; **old tree states can be retrieved as easily the most recent state.**

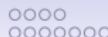
Tags and branches

[...] **branches and tags are conventions** built on top of copies, instead of being basic concepts built into Subversion itself [...]



Main Features

- Subversion remembers
 - files
 - directories
 - meta-data (properties)
 - copies
- Atomic commits (transactional)
 - no partial commits in case of failure
- Support for binary files
 - binary diffs
- Simplified conflicts resolution
- Quick diff/status (without network)
- Extreme flexibility
- No built-in concept of tag
- Constant-time *tagging* and *branching*



Revision Numbers and Commits

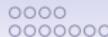
- The repository is a **versioned filesystem**
 - changes in the whole repository
 - copies and move/rename
 - meta-data/properties for files and directories
 - symbolic links
 - execution bit
 - ...
 - one revision number for the whole repository
- Each commit is an increment of the global revision number
 - it is a set of changes on a set of files and directories
 - the history of a file shows only the revision where it was modified
 - from a revision number you see all the files that changed at the same time (e.g. a .h and a .cpp)



Tags and Branches

Forget tags and branch tags: they do not exist.

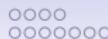
- No built-in concept of tag and branch
- How can we *tag* or *branch*?
 - we have a versioned filesystem that tracks copies
 - let's make copies
- Conventional structure to support tags
 - 3 main directories
 - trunk: main line of development
 - tags: copies that we want to keep stable
 - branches: copies that we want to modify
 - no restriction on names or structure
- Side effect
 - check out a *tag* is not equivalent to check out a revision along the main trunk: it is a different location in the repository.



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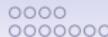
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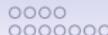
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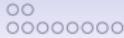
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Configuration

- See [CERN SVN How-To](#)
- Same as the configuration needed for CVS
 - ssh access without password (kerberos or ssh key)
 - have a client installed
 - minor changes in `$HOME/.ssh/config`



The command line client

svn

- Similar to the `cvs` command
 - accepts `actions`
 - same name for most common `actions`
- Different from the `cvs` command
 - no positional options
 - `no tag` actions
 - `copy`, `move` and `mkdir` actions
- Get help with `svn help <command>` or `svn -h`



Web interface

- Two web interfaces available:
 - WebSVN: <http://svnweb.cern.ch/world/wsvn/lhcb>
 - Trac: <https://svnweb.cern.ch/trac/lhcb/browser>
- Similar functionalities
 - History, changesets, RSS feeds
- Some differences
 - Trac shows properties, better browsing, integrated twiki and issue tracker

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Organization of the Repository

From Gaudi twiki: Rationale

Our development model requires the necessity to have [package level tags](#) and branches. At the same time, we need something that can be used as a [tag on the whole project](#). Moreover, LHCb unique CVS [repository](#) is hosting many CMT projects and a global tag is pointless, but we can profit from the possibility of check out a complete tagged project in one command.

- Project/trunk/cmt
- Project/trunk/[Hat/]Package
- Project/tags/[Hat/]Package/version
- Project/tags/PROJECT/PROJECT_version/cmt
- Project/branches/[Hat/]Package/branch_id

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Check-out

Note: check out a *tag* is not equivalent to

- svn checkout URL[@REV] ... [PATH]
- URL = **svn+ssh://svn.cern.ch/repos/lhcb/...**
- e.g.

```
svn co $REPOS/Project/tags/Package/version \
          Package
```

```
svn co $REPOS/Proj/trunk/Package
```

Easier with `getpack`

- `getpack Package version`

```
REPOS=svn+ssh://svn.cern.ch/repos/lhcb
```

Comparison

`svn diff` is a complex command with several possibilities.

The simplest cases:

- Compare local changes with base version
 - `svn diff`
- Compare local copy with latest revision in repository
 - From a check out of the trunk:
`svn diff -r HEAD`

- Compare two tags

```
svn diff \
$REPOS/Project/tags/Package/version1 \
$REPOS/Project/tags/Package/version2
```

- Cannot compare local with with another remote path

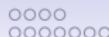
`REPOS=svn+ssh://svn.cern.ch/repos/lhcb`



Manipulate Working Copy

- Always use svn actions
 - svn rm
 - svn cp
 - svn mv
 - svn mkdir

More details about the working copy later



Commit

- Essentially identical to the commit in CVS

`svn help ci`

`commit (ci)`: Send changes from your working copy to the repository.

usage: `commit [PATH...]`

A log message must be provided, but it can be empty. If it is not given by a `--message` or `--file` option, an editor will be started.

...

- Executed in a transaction
 - either all the changes are applied or none of them

Commit messages

We may get rid of `release.notes` if we use the commit messages

```
lxplus5 > svn log svn+ssh://svn.cern.ch/repos/lhcbl/LHCb/trunk/Det/DetCond
```

```
-----  
r5730 | cattanem | 2010-01-20 15:46:11 +0100 (Wed, 20 Jan 2010) | 2 lines
```

```
v12r9 tag
```

```
-----  
r5716 | marcocle | 2010-01-19 14:13:20 +0100 (Tue, 19 Jan 2010) | 3 lines
```

```
Fixes to the first implementation of task #13270.
```

```
https://savannah.cern.ch/task/?13270
```

```
-----  
r5679 | marcocle | 2010-01-12 20:06:29 +0100 (Tue, 12 Jan 2010) | 3 lines
```

```
Completed task #13270: Block access to conditions in ONLINE partition if  
validity interval is not closed
```

```
https://savannah.cern.ch/task/?13270
```

```
-----  
r5650 | cattanem | 2009-12-11 14:39:28 +0100 (Fri, 11 Dec 2009) | 2 lines
```

```
v12r8
```

```
-----  
r5624 | dgolubko | 2009-12-05 15:39:20 +0100 (Sat, 05 Dec 2009) | 2 lines
```

```
add python interface to access histogram parameters of the Condition
```

Commit From Many Packages

- After a `getpack` of several packages, it is not possible to do a single commit on all of them
- There is a trick:

```
getpack Det/DetCond head  
getpack Tools/CondDBUI head  
svn co -N svn+ssh://svn/repos/lhcb Det  
svn co -N svn+ssh://svn/repos/lhcb Tools  
svn co -N svn+ssh://svn/repos/lhcb .  
svn ci Det/DetCond Tools/CondDBUI
```

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svn ci Det/DetCond Tools/CondDBUI
```

Tag

Tags are conventions

- Tag the head of a package

```
svn cp \
$REPOS/Project/trunk/Package \
$REPOS/Project/tags/Package/version
```

or

```
tag_package Package version
```

- Tag the head of a project

(cmt/project.cmt)

```
svn mkdir \
$REPOS/Project/tags/PROJECT/PROJECT_ver
```

```
svn cp \
$REPOS/Project/trunk/cmt \
$REPOS/Project/tags/PROJECT/PROJECT_ver
```

Introduction



Subversion in LHCb



The Working Copy



Migration



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Getting Informations

- svn info
(tag example)

```
Path: .
URL: svn+ssh://svn.cern.ch/repos/lhcbl/LHCb/tags/Det/DetCond/v12r9
Repository Root: svn+ssh://svn.cern.ch/repos/lhcbl
Repository UUID: 4525493e-7705-40b1-a816-d608a930855b
Revision: 5863
Node Kind: directory
Schedule: normal
Last Changed Author: cattanem
Last Changed Rev: 5731
Last Changed Date: 2010-01-20 15:50:36 +0100 (Wed, 20 Jan 2010)
```

Getting Informations

- `svn info`
(trunk example)

```
Path: .
URL: svn+ssh://svn.cern.ch/repos/lhcbl/LHCb/trunk/Det/DetCond
Repository Root: svn+ssh://svn.cern.ch/repos/lhcbl
Repository UUID: 4525493e-7705-40b1-a816-d608a930855b
Revision: 5863
Node Kind: directory
Schedule: normal
Last Changed Author: cattanem
Last Changed Rev: 5730
Last Changed Date: 2010-01-20 15:46:11 +0100 (Wed, 20 Jan 2010)
```

Getting Informations

- `svn status`
 - check the status of the working against the base version
 - no network connection required
- `svn status -u`
 - check the status of the working copy against the latest version in the repository
 - network connection required
 - limited to the path of the working version

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Re-basing the Working Copy

As with `cvs update`

- Move back and forth on the same path (`svn update`)

```
lxplus5 > svn help up
update (up): Bring changes from the repository into the working copy.
usage: update [PATH...]
...

```

- Change the path of the base (`svn switch`)

```
lxplus5 > svn help switch
switch (sw): Update the working copy to a different URL.
usage: 1. switch URL [PATH]
       2. switch --relocate FROM TO [PATH...]
```

1. Update the working copy to mirror a new URL within the repository.
This behaviour is similar to '`svn update`', and is the way to move a working copy to a branch or tag within the same repository.

...



Example of switch

```
lxplus5 > getpack Det/DetCond v12r8
...
Checked out revision 5863.
Processed packages:
    Det/DetCond      v12r8
lxplus5 > cd Det/DetCond
lxplus5 > svn info | grep URL
URL: svn+ssh://svn.cern.ch/repos/lhcb/LHCb/tags/Det/DetCond/v12r8
lxplus5 > svn switch \
?  svn+ssh://svn.cern.ch/repos/lhcb/LHCb/tags/Det/DetCond/v12r9
U      python/DetCond/Configuration.py
...
Updated to revision 5863.
lxplus5 > svn info | grep URL
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lxplus5 > svn switch \
?  svn+ssh://svn.cern.ch/repos/lhcb/LHCb/trunk/Det/DetCond
At revision 5863.
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URL: svn+ssh://svn.cern.ch/repos/lhcb/LHCb/trunk/Det/DetCond
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lxplus5 > svn info | grep URL
URL: svn+ssh://svn.cern.ch/repos/lhcb/LHCb/trunk/Det/DetCond
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lxplus5 > getpack Det/DetCond trunk
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Processed packages:
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getpack knows about switch

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Group Tagging (1)

Non-recursive check-outs are useful for global tagging

```
lxplus5 > svn co -N svn+ssh://svn.cern.ch/repos/lhcb
U    lhcb
Checked out revision 5863.
lxplus5 > cd lhcb
lxplus5 > svn up -N Erasmus Erasmus/trunk Erasmus/tags
A    Erasmus
Updated to revision 5863.
A    Erasmus/trunk
Updated to revision 5863.
A    Erasmus/tags
Updated to revision 5863.
lxplus5 > (cd Erasmus/trunk; svn up -N `svn ls`)
A    ErasmusSys
Updated to revision 5863.

...
A    cmt
A    cmt/project.cmt
Updated to revision 5863.
lxplus5 >
```

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lxplus5 > svn co -N svn+ssh://svn.cern.ch/repos/lhcb
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lxplus5 > cd lhcb
lxplus5 > svn up -N Erasmus Erasmus/trunk Erasmus/tags
A      Erasmus
Updated to revision 5863.
A      Erasmus/trunk
Updated to revision 5863.
A      Erasmus/tags
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...
A      cmt
A      cmt/project.cmt
Updated to revision 5863.
lxplus5 >
```

Group Tagging (1)

Non-recursive check-outs are useful for global tagging

```
lxplus5 > svn co -N svn+ssh://svn.cern.ch/repos/lhcb
      U    lhcb
Checked out revision 5863.
lxplus5 > cd lhcb
lxplus5 > svn up -N Erasmus Erasmus/trunk Erasmus/tags
A      Erasmus
Updated to revision 5863.
A      Erasmus/trunk
Updated to revision 5863.
A      Erasmus/tags
Updated to revision 5863.
lxplus5 > (cd Erasmus/trunk; svn up -N 'svn ls')
A      ErasmusSys
Updated to revision 5863.

...
A      cmt
A      cmt/project.cmt
Updated to revision 5863.
lxplus5 >
```



Group Tagging (2)

```
lxplus5 > (cd Erasmus/tags; svn up -N 'svn ls')
A     ERASMUS
Updated to revision 5863.
A     ErasmusSys
Updated to revision 5863.

...
A     PhysFit
Updated to revision 5863.
lxplus5 > cd Erasmus
lxplus5 > svn mkdir tags/ERASMUS/ERASMUS_v2r0
A         tags/ERASMUS/ERASMUS_v2r0
lxplus5 > svn cp trunk/cmt tags/ERASMUS/ERASMUS_v2r0
A         tags/ERASMUS/ERASMUS_v2r0/cmt
lxplus5 > svn cp trunk/ErasmusSys tags/ErasmusSys/v2r0
A         tags/ErasmusSys/v2r0
lxplus5 > svn status
A         tags/ERASMUS/ERASMUS_v2r0
A +     tags/ERASMUS/ERASMUS_v2r0/cmt
A +     tags/ErasmusSys/v2r0
lxplus5 > svn ci
```

Group Tagging (2)

```
lxplus5 > (cd Erasmus/tags; svn up -N 'svn ls')
A     ERASMUS
Updated to revision 5863.
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A       tags/ErasmusSys/v2r0
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A         tags/ERASMUS/ERASMUS_v2r0/cmt
lxplus5 > svn cp trunk/ErasmusSys tags/ErasmusSys/v2r0
A         tags/ErasmusSys/v2r0
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A         tags/ERASMUS/ERASMUS_v2r0
A +     tags/ERASMUS/ERASMUS_v2r0/cmt
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A         tags/ERASMUS/ERASMUS_v2r0/cmt
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A         tags/ErasmusSys/v2r0
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A         tags/ErasmusSys/v2r0
lxplus5 > svn status
A         tags/ERASMUS/ERASMUS_v2r0
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A         tags/ERASMUS/ERASMUS_v2r0/cmt
lxplus5 > svn cp trunk/ErasmusSys tags/ErasmusSys/v2r0
A         tags/ErasmusSys/v2r0
lxplus5 > svn status
A         tags/ERASMUS/ERASMUS_v2r0
A +    tags/ERASMUS/ERASMUS_v2r0/cmt
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A +     tags/ERASMUS/ERASMUS_v2r0/cmt
A +     tags/ErasmusSys/v2r0
lxplus5 > svn ci
```

Group Tagging (3)

```
--This line, and those below, will be ignored--
```

```
A Erasmus/tags/ERASMUS/ERASMUS_v2r0
A Erasmus/tags/ERASMUS/ERASMUS_v2r0/cmt
A Erasmus/tags/ErasmusSys/v2r0
```

```
~  
~  
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~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~
```

```
"svn-commit.tmp"
```



Group Tagging (3)

Prepared tag v2r0.

--This line, and those below, will be ignored--

A Erasmus/tags/ERASMUS/ERASMUS_v2r0
A Erasmus/tags/ERASMUS/ERASMUS_v2r0/cmt
A Erasmus/tags/ErasmusSys/v2r0

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:wq

Migrate a Package from CVS to Subversion

- Request that your packages are migrated to Hubert (and/or me).
- The write access to the CVS copy will be blocked.
- `getpack` will not be able to see it for a while.
- The package will be visible again, but from Subversion.

Post-migration instructions on twiki:

[LHCb.HowToMigrateACvsCheckoutToSvn](#)

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Resources

- Subversion website
<http://subversion.apache.org>
- Subversion book
<http://svnbook.red-bean.com>
- CERN Central SVN Service
<http://svn.web.cern.ch/svn>
- Gaudi SVN Repository description
<https://twiki.cern.ch/twiki/bin/view/Gaudi/GaudiSVNRepository>
- Web interfaces to the LHCb repository
 - Trac: <https://svnweb.cern.ch/trac/lhcbs/browser>
 - WebSVN: <http://svnweb.cern.ch/world/wsxn/lhcbs>