

LHCb Software Distribution & Installation

ABSTRACT

The installation of the LHCb software is handled by a single python script: `install_project.py`. This bootstrap script is unique by allowing the installation of software projects on various operating system (Linux, Windows, MacOSX). It is designed for the LHCb software deployment for a single user or for multiple users, in a shared area or on the Grid. It retrieves the software packages and deduces the dependencies using a remote web repository and thus takes care of the consistency of the installation.

Among the various features which have been implemented one can list: the fix of the access permission settings for the installed packages, the incremental installation using multiple deployment areas and the consistency check of the retrieved files.

The only prerequisite for the use of this tool is to have a recent enough version of the python language installed (2.3 and above) and a reasonable network access.

This page present the new development version which will replace the current distribution tool.

SELFINSTALLSCRIPT

This is an auto-extract script which embeds the LbScript project. It is also part of this project as well.

This scripts has a bootstrap phase where it extract from itself the compressed LbScript project and run the `InstallScript` located in it.

The script is inspired by the bash shell script `makeself`. Since it has to run on windows as well, it has been transformed into a python script

It takes advantages of the Unix system tools (tar, gzip, bzip2) if they are present or falls back on python "battery included" libraries.

THE LBSERPTS PROJECT

This is a CMT project that contains the LHCb management scripts

- It is a pure python project
- It contains the `SelfInstallScript` and the `InstallScript`
- The `InstallScript` is using the python libraries provided by the LbScripts project

THE PACKAGE FORMAT

The external format of the distributed package is a ZIP file. It contains 2 parts: a header file in XML and the payload which can be of different format: tar.gz, tar.bz2, ZIP.

The XML header file contains the name, version and type (binary, share, src) of the project. It contains also the dependencies of the project

The package is either a full CMT project or a simple package for the external tools (ROOT, python, etc)

CONSTRAINTS

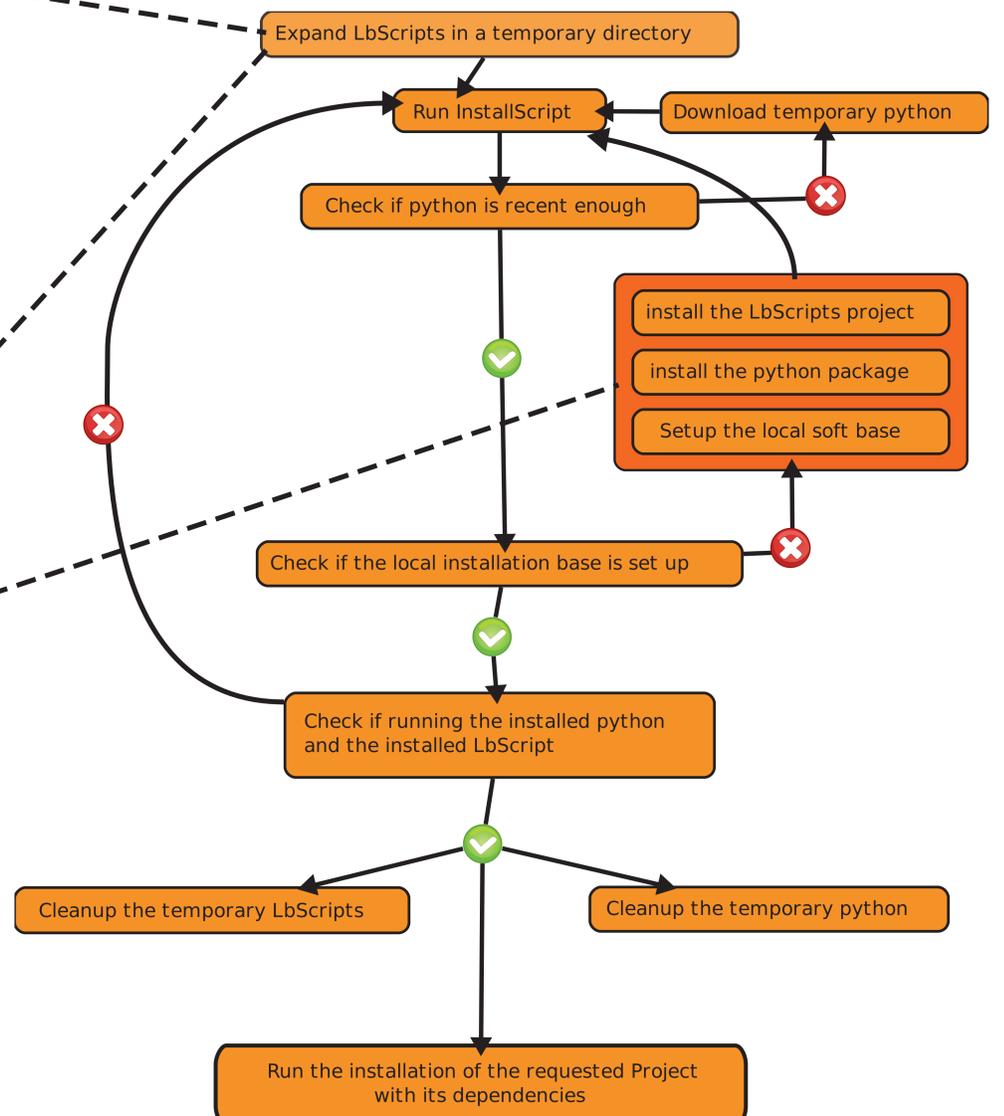
Several constraints have to be considered for the choice of technology used for the installation of the LHCb software

- The installation has to be performed on different architecture, on Linux and MacOS but also on windows. This is the reason why python has been chosen for this task. It is installable on many platform and it is bundled with many useful libraries.
- The installation bases on the local target machine can be chained. One can have a shared installation with the common software installed and a local installation which will only add packages which are not present in the shared area.
- The repositories can live either on an HTTP server or a Grid storage device.
- The installation procedure is also used on the Grid worker nodes which are difficult to control. Thus the installation script has to be resilient to race conditions, disk or network failure. To cope with this kind of incidents, it implements a locked journal in order to be able to roll back any broken operation.

CMT

CMT is the mangement tool used for the LHCb software organisation. The different software pieces are organised as CMT projects located at different places and CMT is binding them together.

- CMT is deducing the build time and runtime parameters for the software
- It manages the projects (DaVinci, Panoramix, Analysis, Phys etc) as well as the interace to external tools (Root, boost, python, etc)
- It allows a local override of deployed projects
- CMT is also used to compute the dependencies between the distributed packages



THE REPOSITORY

This is a directory exposed by either an HTTP server or a Grid storage service. It contains all the needed packages and a small XML database in order to speed up the package lookup by the client. The XML database contains:

- the full list of packages and their dependencies
- the compressed list of files per package
- the list of available mirrors
- the md5 checksum for every package file

LHCb SOFTWARE

