

**PGPI**

*Tools*

Práctica 9

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Granada, December de 2019

1. Version Control Tools:
   1. **Git**

Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

Git is easy to learn and has a tiny footprint with lightning fast performance. It outclasses SCM tools like Subversion, CVS, Perforce, and ClearCase with features like cheap local branching, convenient staging areas, and multiple workflows.

**characteristics of Git**

* Provides strong support for non-linear development.
* Distributed repository model.
* Compatible with existing systems and protocols like HTTP, FTP, ssh.
* Capable of efficiently handling small to large sized projects.
* Cryptographic authentication of history.
* Pluggable merge strategies.
* Toolkit-based design.
* Periodic explicit object packing.
* Garbage accumulates until collected.
  1. CVS

also known as the Concurrent Versioning System, is a free client-server revision control system in the field of software development. A version control system keeps track of all work and all changes in a set of files, and allows several developers (potentially widely separated in space and time) to collaborate. Dick Grune developed CVS as a series of shell scripts in July 1986.

**Features**

* Client-server repository model.
* Multiple developers might work on the same project parallelly.
* CVS client will keep the working copy of the file up-to-date and requires manual intervention only when an edit conflict occurs
* Keeps a historical snapshot of the project.
* Anonymous read access.
* ‘Update’ command to keep local copies up to date.
* Can uphold different branches of a project.
* Excludes symbolic links to avoid a security risk.
* Uses delta compression technique for efficient storage.
  1. **Monotone** is an open source software tool for distributed revision control

Monotone tracks revisions to files, groups sets of revisions into changesets, and tracks history across renames. The focus of the project is on integrity over performance Monotone is designed for distributed operation, and makes heavy use of cryptographic primitives to track file revisions (via the SHA-1 secure hash) and to authenticate user actions (via RSA cryptographic signatures).

**Features**

* Provides good support for internationalization and localization.
* Focuses on integrity over performance.
* Intended for distributed operations.
* Employs cryptographic primitives to track file revisions and authentications.
* Can import CVS projects.
* Uses a very efficient and robust custom protocol called netsync.

1. **Compilation tools**
   1. **Microsoft Build Engine**, better known as MSBuild is a free and open-source build tool set for managed code as well as native C++ code and was part of .NET Framework. Visual Studio depends on MSBuild, but not the vice versa.

Visual Studio Application Lifecycle Management depends on MSBuild to perform team builds via the Team Foundation Server.

* 1. **Apache Ant** is a software tool for automating software build processes which originated from the Apache Tomcat project in early 2000. It was a replacement for the Make build tool of Unix, and was created due to a number of problems with Unix's make. It is similar to Make but is implemented using the Java language, requires the Java platform, and is best suited to building Java projects.
  2. **Maven** is a build automation tool used primarily for Java projects. Maven can also be used to build and manage projects written in C#, Ruby, Scala, Maven addresses two aspects of building software: how software is built, and its dependencies. Unlike earlier tools like Apache Ant, it uses conventions for the build procedure, and only exceptions need to be written down. and other languages. The Maven project is hosted by the Apache Software Foundation, where it was formerly part of the Jakarta Project.

1. **Test Automation Tools**
   1. **TestingWhiz** is a test automation tool with the code-less scripting by Cygnet Infotech, a CMMi Level 3 IT solutions provider. TestingWhiz tool’s Enterprise edition offers a complete package of various automated testing solutions like web testing, software testing, database testing, API testing, mobile app testing, regression test suite maintenance, optimization, and automation, and cross-browser testing.

TestingWhiz offers various important features like:

* Keyword-driven, data-driven testing, and distributed testing
* Browser Extension Testing
* Object Eye Internal Recorder
* SMTP Integration
* Integration with bug tracking tools like Jira, Mantis, TFS and FogBugz
* Integration with test management tools like HP Quality Center, Zephyr, TestRail, and Microsoft VSTS
* Centralized Object Repository
* Version Control System Integration
* Customized Recording Rule
  1. **HPE Unified Functional Testing (HP – UFT formerly QTP)** HP QuickTest Professional was renamed to HPE Unified Functional Testing. HPE UFT offers testing automation for functional and regression testing for software applications.

Visual Basic Scripting Edition scripting language is used by this tool to register the test processes and operates the various objects and controls in testing the applications.

QTP offers various features like:

* Integration with Mercury Business Process Testing and Mercury Quality Center
* Unique Smart Object Recognition
* Error handling mechanism
* Creation of parameters for objects, checkpoints, and data-driven tables
* Automated documentation
  1. **TestComplete** TestComplete is a functional testing platform that offers various solutions to automate testing for desktop, web, and mobile applications by SmartBear Software.

TestComplete offers the following features:

* GUI testing
* Scripting Language Support – JavaScript, Python, VBScript, JScript, DelphiScript, C++Script & C#Script
* Test visualizer
* Scripted testing
* Test recording and playback

1. **Continuous integration tools**
   1. **Travis CI**

Travis CI is one of the oldest hosted solutions out there and it has won the trust of many people. Although it’s mostly known for the hosted solution, it offers the on-premise version too in a form of enterprise package.

Travis CI is free for all open source projects hosted on the GitHub and for the first 100 builds otherwise. There are a few pricing plans you can choose from, the main difference being the number of concurrent builds you can run.

Builds are configured using .travis.yml file which contains the build tasks that will be executed on running the build. It supports a variety of different languages and a good documentation to back them up.

**Verdict:** A Mature solution that offers both hosted and On-premises variants, loved and used by many teams, very well documented.

**Official website:** Travis CI

**Availability:** Free for open source plans and first 100 builds, paid plans for everything else

**Platform:** Hosted and On-premises

* 1. **Bamboo**

Atlassian is the company focused on providing tools for software development teams and you might know them by their tools like JIRA and Bitbucket. Bamboo originally offered both cloud and On-premises solutions, but in the May 2016 the cloud version was discontinued in the favor of the Bitbucket pipelines (accessible through the left panel of your Bitbucket account).

By utilizing the power of Docker, Bitbucket Pipelines is offering very efficient and fast builds that and is rapidly growing and becoming a worthy successor to the Bamboo Cloud.

**Verdict**: Great On-premises CI tool that originally offered Cloud solution too. Bitbucket Pipelines replaced the cloud solution. Pipelines is a modern and fast cloud CI tool integrated into Bitbucket. Has a free trial for 30 days, and paid plans after that.

**Official** **website**: Bamboo

**Availability**: Paid with a free trial

**Platform**: On-premises

* 1. **Jenkins** is an open-source CI tool written in Java. It originated as the fork of Hudson when the Oracle bought the Sun Microsystems. Jenkins is a cross-platform CI tool and it offers configuration both through GUI interface and console commands.

What makes Jenkins very flexible is the feature extension through plugins. Jenkins plugin list is very comprehensive and you can easily add your own. Besides extensibility, Jenkins prides itself on distributing builds and test loads on multiple machines. It is published under MIT license so it is free to use and distribute.

Cloudbees also offers hosted solution in the form of the Jenkins in the Cloud.

**Verdict**: One of the best solutions out there, both powerful and flexible at the same time. The learning curve could be a bit steep, but if you need flexibility it very well pays off to learn how to use it.

**Official website**: Jenkins

**Availability**: Free

**Platform**: Cross-platform