Version Control Systems

or: How to git better

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# What is a Version Control System?

A version control is also known as a revision control or source control management tool or SCM. It is a means to organize the production and modification of large bodies of text. Version Control offers several features like tracking of changes, collaboration of several authors, or restoration of previous versions.

Uses for SCM tools

What can you make using a source code management tool? You can for example write program code, legal documents or a company's technical documentation.

# Professional Use

What does this mean for me as a software developer?

# The Bad News: You must use SCM

If you collaborate with other developers, you absolutely must use an SCM tool. You would have to be a genius to organize a collaborative coding team without any kind of version control management.

The Good News: You already do

Whenever you use the Undo button in your favourite text processing software, you navigate between different versions of your document. Good job!

# No, seriously. Why should I use Source Control?

You see what others have changed

When someone contributes input to the project, it's carefully recorded and documented. This means that the project manager and the teammates can stay up to date with their peers' work.

You don't have the time to interview all your teammates on all their coding activity every day. You will lose track of changes and additions!

### You can roll back mistakes

Your own or your teammates' mistakes ;)

### Your code is saved often

At least once a day, when you check in, your code is copied to the SCM server. This is an easy and basic backup. Remember: each hard drive is going to fail eventually!

### It is easy to share project files

A new developer on the team can set up their IDE, copy the files from the repository and start working.

### +1 on your Joel Test score

The Joel Test is a quick quality test for development teams. It was invented by Joel Spolsky, the CEO of Stack Overflow. The first question in the test is whether you use source control. I'll link to it at the end of the talk.

# Interactive Example

We go spelunking in some repositories

# Jargon

In your career, as you cooperate with other developers, you are going to come across these terms. I'll explain some of the basic concepts of the SCM business.

Repository

The location where a project's data is stored, usually on one or more servers.

### Revision or Version

A single change in a file, usually with a timestamp of when the change happened.

### Clone

To download all the files and their revisions from a repository into a newly created repository.

### Commit or Check-In

To add the changes you made to your code repository.

### Push/Pull

To copy all the changes in one repository to another. Use this to synchronize your files with the files on the server.

### Branch or Fork

A copy of the files in a repository. Different branches can be changed independently from each other. Even completely new software can evolve from a branch of an existing project.

### Trunk or Master

The main branch of a project. This is usually the first branch in a newly created repository.

#### Feature Branch

Before you work on a new aspect of your program, you create a new branch. Then, when you are done, you integrate the changes you made into the master branch. This is called merging.

### Merge or Integration

When several developers make changes to the same file, these changes can overlap. The second developer to update a file then has to merge his or her changes into the file. Most of the time, merging can be done automatically, but if the changes overlap, you might have to sort in the code changes by hand.

A merge can also happen if development on a feature branch is complete and the results are added back to the main project.

### Switch

If you copy all the contents from one branch to another, it's called a switch.

### Tag

When a new feature has been merged, you can put a tag on the current version. It can be a version number, milestone name, or simply the name of the feature.

# Branching Strategy Example: Testing

For example, a company might develop their software on a dev branch. Once the desired features are finished, they switch to a testing branch. On the testing branch, they only fix bugs. They don't add new functionality. Once the testing version is stable and bug-free, they switch to a release branch. Should a customer note a critical bug that has to be fixed to work with the software, they might decide to do a hotfix.

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