



Aalto University  
Media Factory

# Digital\_Fabrication\_Studio.02

## Projects and Information - managing and retrieving information from databases and objects

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03.05.2012

Aalto Media Factory  
Helsinki



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# Today:

- \* Content Management Systems
- \* Version Control Systems
- \* QR Codes
- \* Blueprints

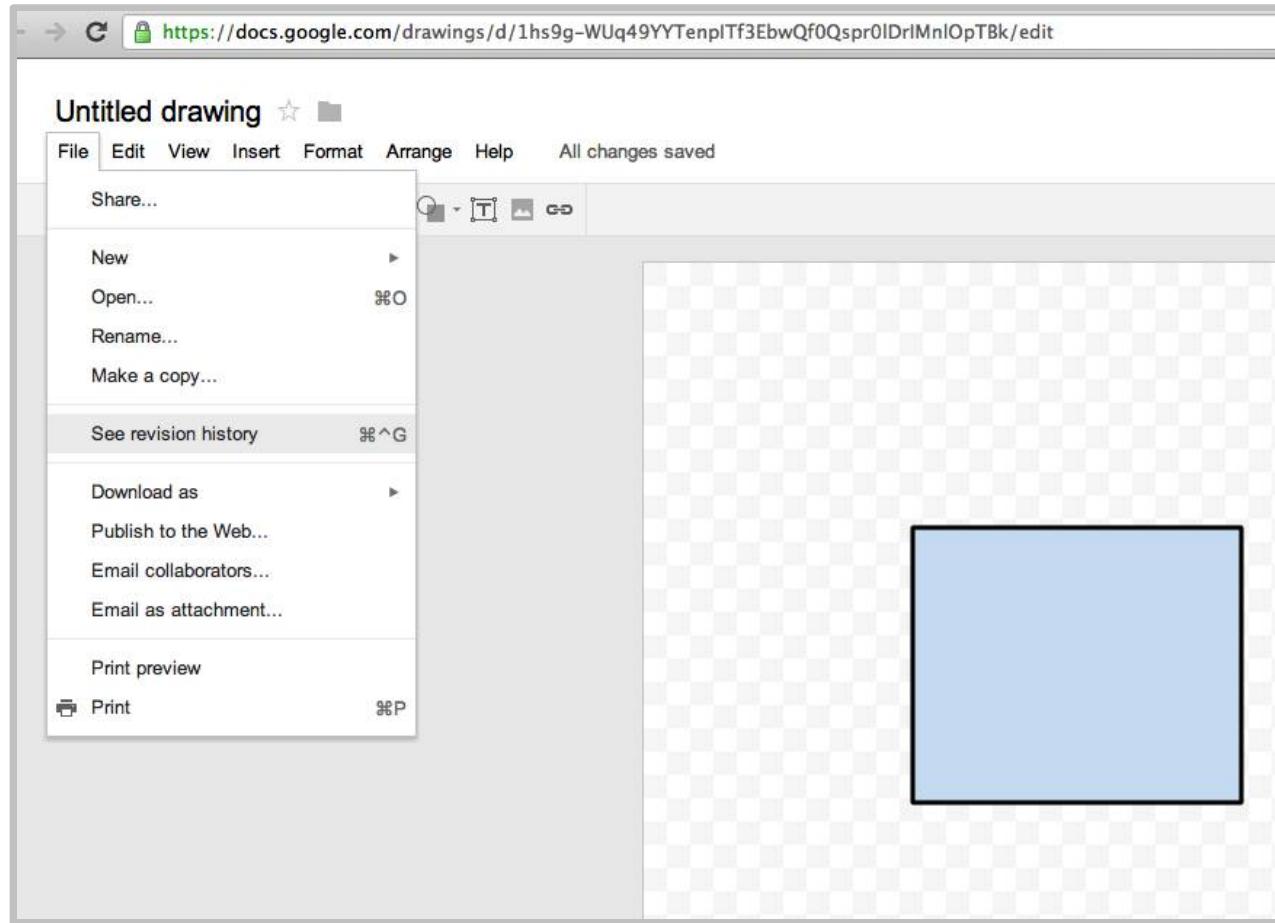


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01.

# Content Management Systems: web interfaces to databases

# Versioning: you've already seen it on Google Docs...



Even Google Docs has a very simple versioning system available. It is an important mechanism for keeping track of the history of a project.

# Blog: Wordpress.org

The screenshot shows the WordPress.org website. At the top, there's a navigation bar with links for Home, Showcase, Themes, Plugins, Mobile, About, Docs, Blog, Forums, Hosting, and a prominent red Download button. To the right of the navigation is a search bar with a 'Go' button. Below the navigation is the main content area. On the left, a sidebar displays a site menu with options like Home, Updates (3), Posts, Media, Links, Pages, and Comments (1). The main content area features a large image of the WordPress dashboard. The dashboard shows a summary of site activity: Right Now, Content, 2 Posts, 1 Page, 1 Category, and 0 Tags. To the right of the dashboard, text explains what WordPress is and how it can be used. It mentions community volunteers, available plugins and themes, and the over 60 million users. A 'Ready to get started?' button with a 'Download WordPress 3.3.2' link is also present. At the bottom of the main content area, a yellow banner states: 'WordPress is also available in [Suomi](#) and [Svenska](#)'.

WORDPRESS.ORG

Search WordPress.org Go

Home Showcase Themes Plugins Mobile About Docs Blog Forums Hosting Download

My Awesome Site

Dashboard

Home

Updates 3

Posts

Media

Links

Pages

Comments 1

Dashboard

Right Now

Content

2 Posts

1 Page

1 Category

0 Tags

WordPress is web software you can use to create a beautiful website or blog. We like to say that WordPress is both free and priceless at the same time.

The core software is built by hundreds of community volunteers, and when you're ready for more there are thousands of [plugins](#) and [themes](#) available to transform your site into almost [anything you can imagine](#). Over 60 million people have chosen WordPress to power the place on the web they call "home" — we'd love you to join the family.

Ready to get started? [Download WordPress 3.3.2](#)

WordPress is also available in [Suomi](#) and [Svenska](#).

The easiest way to manage content (and a bit of versioning).

Source: <http://wordpress.org/>

# Blog: Wordpress.org (+ plugin)

Plugin Directory

Username  Password  Log in (forgot?) or Register

Extend Home

Plugins ▾ [Developer Center](#)

Themes

Mobile

Ideas

Kvetch!

Search Plugins

[Search](#)

Popular Tags [More »](#)

- widget (3047)
- Post (2019)
- plugin (1897)
- admin (1542)
- posts (1484)

The Revisions Meta box

## Revision Control

Revision Control allows finer control over the Post Revision system included with WordPress

[Download Version 2.1](#)

Description Screenshots Other Notes Changelog Stats

Post Revisions		Author	Actions
<a href="#">Compare</a>	<a href="#">Delete</a>	Date Created	
<input checked="" type="radio"/>	<input type="radio"/>	9 January, 2010 @ 13:31 [Current Revision]	admin
<input type="radio"/>	<input checked="" type="radio"/>	9 January, 2010 @ 13:31	admin
<input type="radio"/>	<input checked="" type="radio"/>	9 January, 2010 @ 13:31	admin
<input type="radio"/>	<input checked="" type="radio"/>	9 January, 2010 @ 13:31	admin
<input type="radio"/>	<input checked="" type="radio"/>	9 January, 2010 @ 13:30	admin
<input type="radio"/>	<input checked="" type="radio"/>	9 January, 2010 @ 13:28	admin
<input type="radio"/>	<input checked="" type="radio"/>	9 January, 2010 @ 13:28	admin
<input checked="" type="radio"/>	<input type="radio"/>	9 January, 2010 @ 13:11 [Autosave]	admin

Requires: 3.2 or higher  
Last Updated: 2011-8-19  
Downloads: 107,773

Average Rating

 (95 ratings)

FYI

[Other Versions »](#)  
[Subversion Repository »](#)

 [Forums Posts](#)

Revision Control allows finer control over the Post Revision system included with WordPress.

Source: <http://wordpress.org/extend/plugins/revision-control/>

# Blog: Wordpress.org (+ plugin)

Plugin Directory

Username  Password  Log in (forgot?) or Register

Extend Home

Plugins

- Developer Center

Themes

Mobile

Ideas

Kvetch!

Search Plugins

Popular Tags

- widget (3047)
- Post (2016)
- plugin (1897)
- acm (1542)
- posts (1434)
- sidebar (1343)
- comments (1056)
- twitter (1024)
- google (1016)
- images (997)
- page (951)
- image (870)
- links (815)

WP Document Revisions

A document management and version control plugin that allows teams of any size to collaboratively edit files and manage their workflow.

[Download Version 1.8](#)

Description Installation FAQ Screenshots Other Notes Changelog Stats

**WP Document Revisions** is a document management and version control plugin. Built for time-sensitive and mission-critical projects, teams can collaboratively edit files of any format – text documents, spreadsheets, images, sheet music... anything – all the while, seamlessly tracking the document's progress as it moves through your organization's existing workflow.

**Requires:** 3.2 or higher  
**Compatible up to:** 3.4  
**Last Updated:** 2012-4-28  
**Downloads:** 12,309

**Average Rating**

★★★★★ (22 ratings)

**FYI**

[Other Versions »](#)  
[Savers on Repository »](#)  
[Donate to this plugin »](#)

A document management and version control plugin that allows teams of any size to collaboratively edit files and manage their workflow.

Source: <http://wordpress.org/extend/plugins/wp-document-revisions/>

# CMS: Drupal.org

Get Started   Community   Documentation   Support   Download & Extend   Marketplace   About

## Drupal™

Come for the software, stay for the community

Drupal is an open source content management platform powering millions of websites and applications. It's built, used, and supported by an active and diverse community of people around the world.

Drupal Homepage   Log In / Register

Search drupal.org

Refine your search

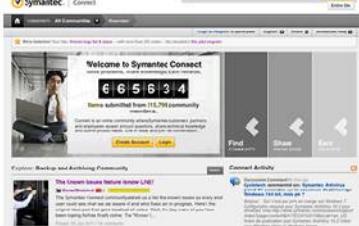
All    Documentation  
 Modules    Forums & Issues  
 Themes    Groups

Why Choose Drupal?

Use Drupal to build everything from personal blogs to enterprise applications. Thousands of add-on modules and designs let you build any site you can imagine. Join us!

Get Started with Drupal

Sites Made with Drupal



Drupal Distributions

Distributions are a collection of pre-configured themes and modules for feature-rich web sites giving you a head start on building your site. Build your own online communities, media portal, online store, and more!

Learn about Distributions

Develop with Drupal

15,814 Modules   1,359 Themes   407 Distributions   17,543 Developers   This week 3,743 Code commits   6,441 Issue comments

Drupal Core   Security Info   Developer Docs   API Docs

Symantec Connect Case Study

Drupal is used by some of the biggest sites on the Web, like [The Economist](#), [Examiner.com](#) and [The White House](#). Read more Drupal case studies.

Get Drupal Security Announcements  
Keep your site secure.

Drupal contains basic features common to a cms: user account registration and maintenance, menu management, RSS-feeds, page layout customization...

# CMS: Drupal.org (+modules)

You can extend the versioning system of Drupal with these modules:

- \* <http://drupal.org/project/revisioning>
  - \* [http://drupal.org/project/revision\\_fu](http://drupal.org/project/revision_fu)
  - \* <http://drupal.org/project/revisionreference>
  - \* [http://drupal.org/project/block\\_revisions](http://drupal.org/project/block_revisions)
  - \* [http://drupal.org/project/diff\\_revision](http://drupal.org/project/diff_revision)
  - \* [http://drupal.org/project/revision\\_all](http://drupal.org/project/revision_all)
  - \* [http://drupal.org/project/user\\_revision](http://drupal.org/project/user_revision)
  - \* [http://drupal.org/project/user\\_diff](http://drupal.org/project/user_diff)
-

# CMS: Drupal.org -> fablab.aalto.fi

The screenshot shows a blog post titled "Aalto Fablab – the first Finnish Fablab" by Arto on Mon, 13/06/2011 - 11:48. The post discusses the Aalto Fablab, a small-scale workshop for digital fabrication, and its philosophy of mutual support and community needs. It mentions plans for 50 Fablabs worldwide and the opening of the first one at Aalto Media Factory. The post includes a link to a presentation about Fabbing + Fablab.

**Aalto Fablab – the first Finnish Fablab**

Submitted by Arto on Mon, 13/06/2011 - 11:48

Fab Lab (fabrication laboratory) is a small-scale workshop for digital fabrication, started by MIT. Fablabs typically have a few digitally controlled manufacturing machines: larger CNC router for furniture and house-sized objects, smaller precision CNC milling machine for making cast moulds, engraving different materials or printed circuit boards, laser cutter for cutting and engraving wood, plastic, fabric and other materials, vinyl cutter for making signs, stickers and flexible circuits, video conferencing system to be in continuous touch with other Fablabs, and in many cases also a 3D printer and scanner. This basic set of manufacturing machines enables you to 'make just about anything' – this may be a prototype of a product, work of art, and can even contain electronics.

There are now about 50 Fablabs all around the world, with plans for many more on the way. Fablab blueprint dictates the commonalities between labs: standard inventory of machines, work processes, communication pathways and access policies, but each lab can and has interpreted the blueprints to suit the needs of their local community. As peer to peer learning in the way of mutual support in learning to work at the space is at the core of Fablab philosophy, community needs can really shape how an individual lab turns out.

We are currently putting all the pieces together to start the first Finnish Fablab here at Aalto Media Factory: finding local suppliers for the machines and raw materials, designing the space to fit our needs, building the website, educating ourselves about Fablab practices and mingling with other maker-minded groups in Helsinki region (there's quite a bit going on now that the World Design Capital year is almost at hand). Most of the machines should have arrived by early January, and the grand opening is planned to take place around the beginning of February 2012.

Aalto Fablab adds digital fabrication onto the service menu of the Aalto Media Factory. We aim to provide assistance with digital fabrication and will be offering online scheduling to book time on the Fablab machines (including assistance in machine usage). Part of the Fablab model is also to have the space open to everyone at least the part of the time – we will host open days weekly. Two courses are being organized at the Fablab sprint term 2012 as part of the Media Lab curriculum (but they are open to all Aalto students): Digital Workshop Basics (an intensive hands-on course to get acquainted with the Fablab machines) and Digital Fabrication Studio (offering more background and design context and completion of a more complex project realized using the Fablab machines).

Before we open our doors early next year, you're most welcome to visit the Fablab space and ask any questions you may have or [contact us](#), if you don't have time to stop by!

**Tags:**

3d printing   aalto fablab   arto mediafactory   digital fabrication   fablab

**Discussions on Twitter**

@AaltoFablab  
RT @openp2pdesign:  
About to start my #fabbing  
course at @ealtonmedia  
@AaltoFablab, here is the  
first presentation about  
#fabbing + #fablab  
<http://t.co/iajsMXccon>

@AaltoFablab  
RT @cmn777: Using Digital  
Manufacturing to Create a  
Condiment Mystery:  
<http://t.co/y6edwzYI>

@AaltoFablab  
Need any help for a free  
software for #3D modeling  
+ #3Dprinting ? Here's an  
introduction to Blender for  
you  
<https://t.co/PzQY5dXS>

@AaltoFablab  
RT @openp2pdesign:  
FABFUSE2012 is the first  
international Grassroots  
#fablab event, Amersfoort  
(NL) on 8-11 August.  
<http://t.co/RJAcruZX>

@AaltoFablab  
Manchester Mini Maker  
Faire 28th July - 29th July  
2012  
<http://t.co/3YNxeOks>  
#makers #makerfaireuk

We will soon have our website here ...

# Wiki: Mediawiki.org

MediaWiki.org logo featuring a sunflower and the word "MediaWiki".

Page Discussion Read View source View history Search

Our updated Terms of Use will become effective on May 25, 2012. Find out more.

## Welcome to MediaWiki.org

MediaWiki is a free software open source wiki package written in PHP, originally for use on Wikipedia. It is now used by several other projects of the non-profit Wikimedia Foundation and by many other wikis, including this website, the home of MediaWiki.

Use the links below to explore the site contents. You'll find some content translated into other languages, but the primary documentation language is English.

For general questions about MediaWiki see the communication page or ask at the support desk.

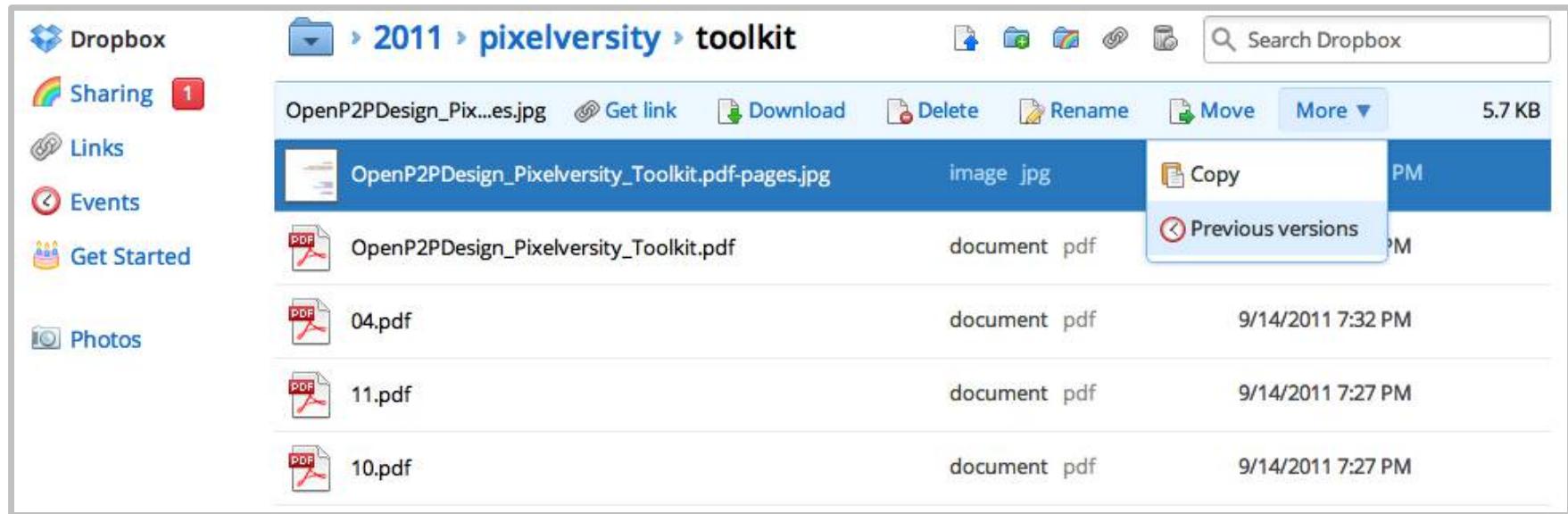
About this site | About MediaWiki | Download | Help and support

Users	System administrators	Developers
 What is a wiki? <ul style="list-style-type: none"><li>Learn how to navigate</li><li>Learn how to edit a page</li><li>Get more help</li></ul>	 Install & configure MediaWiki <ul style="list-style-type: none"><li>Upgrade an existing MediaWiki installation</li><li>Add features with third-party extensions</li><li>Get more sysadmin help</li></ul>	 Become a MediaWiki hacker <ul style="list-style-type: none"><li>Learn to use the API and write extensions</li><li>Browse the developer docs and class reference</li><li>Already a hacker? Visit the developer hub</li></ul>

MediaWiki is a free software open source wiki package written in PHP, originally for use on Wikipedia.

Source: <http://www.mediawiki.org/wiki/MediaWiki>

# Backup: DropBox



The screenshot shows a Dropbox interface with a sidebar on the left containing links for Dropbox, Sharing (1), Links, Events, Get Started, and Photos. The main area displays a folder structure: 2011 > pixelversity > toolkit. A file named "OpenP2PDesign\_Pix...es.jpg" is selected, and its context menu is open, showing options like Copy and Previous versions. Other files in the folder include "OpenP2PDesign\_Pixelversity\_Toolkit.pdf-pages.jpg", "OpenP2PDesign\_Pixelversity\_Toolkit.pdf", "04.pdf", "11.pdf", and "10.pdf". The "OpenP2PDesign\_Pixelversity\_Toolkit.pdf-pages.jpg" file has a size of 5.7 KB.

File Name	Type	Size
OpenP2PDesign_Pix...es.jpg	image jpg	5.7 KB
OpenP2PDesign_Pixelversity_Toolkit.pdf-pages.jpg	image jpg	5.7 KB
OpenP2PDesign_Pixelversity_Toolkit.pdf	document pdf	
04.pdf	document pdf	9/14/2011 7:32 PM
11.pdf	document pdf	9/14/2011 7:27 PM
10.pdf	document pdf	9/14/2011 7:27 PM

DropBox has a limited versioning system, that goes back to 30 days only.

# Backup: ownCloud

The screenshot shows the ownCloud web interface. At the top, there's a navigation bar with links for News, Support, Developer, Contact, Commercial, and a green 'Try it out!' button. Below the navigation is a browser window displaying the demo.owncloud.org files index. The left sidebar has links for Files, New, Music, Contacts, Calendar, Gallery, and Bookmarks. The main content area shows a list of files with columns for Name, Size, and Modified. The files listed are:

Name	Size	Modified
Music	65.5	10 minutes ago
Shared	0	years ago
Demo Code - C++	< 0.1	10 minutes ago
Demo Code - PHP	< 0.1	10 minutes ago
Demo Image - Laser Towards Milky Ways Centre	0.3	10 minutes ago
Demo Movie MOV - Big Bug Bunny Trailer.mov	10.5	10 minutes ago
Music Etc - Black Swan.mp3	0.1	10 minutes ago

Below the file list is a banner that reads "ownCloud 3 Your files, music, calendars and more. Wherever you are." The bottom half of the page contains three sections: "Contribute" (with links to Write code, Report problems, Help others, and Translate), "Get started!" (with a sign-up form for OwnCloud or GetFreeCloud providers), and "Company support" (describing the use of ownCloud inside companies).

An open source version of DropBox, in case you have a server available.

Source: <http://owncloud.org/>

# Backup: ownCloud (with versioning)

Personal clone of ownCloud, containing an in-development versioning app (I would seriously advise against cloning and pulling from this repository at the moment) — [Read more](#)

<http://owncloud.org>

Clone in Mac ZIP HTTP Git Read-Only https://github.com/craig0990/ownCloud.git Read-Only access

branch: files\_versioning ▾ Files Commits Branches 1 Tags Downloads

Latest commit to the files\_versioning branch

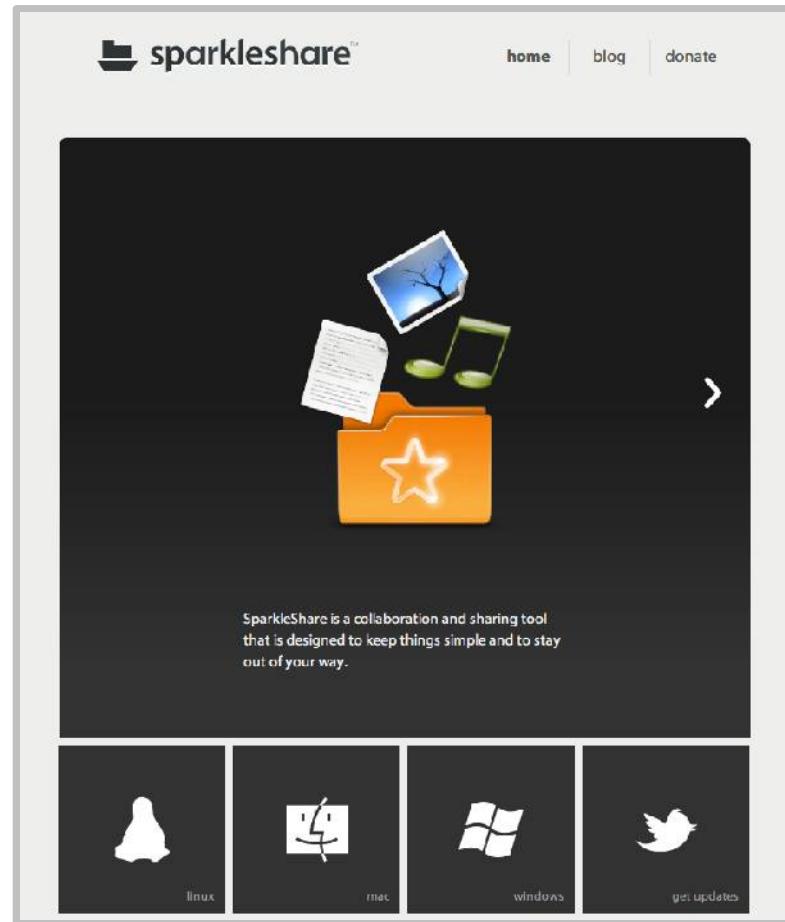
Fixed minor new folder bug

craig0990 authored 3 days ago commit b9d3a66d28

name	age	message	history
.tx	7 months ago	integrated and updated calendar translations [Jan-Christoph Borchardt]	
3rdparty	a month ago	Added Granite library v0.2.0 to '3rdparty/' [craig0990]	
apps	3 days ago	Fixed minor new folder bug [craig0990]	
config	a month ago	make it possible to connect to other ocs appstores and other ocs know... [Frank Karlitschek]	
core	a month ago	Merge commit 'refs/merge-requests/102' of git://gitorious.org/ownclou... [CBIx]	
files	a month ago	webdav needs to load authentication apps [Arthur Schiwon]	

“Personal clone of ownCloud, containing an in-development versioning app (I would seriously advise against cloning and pulling from this repository at the moment)”

# Backup: Sparkleshare



---

An open source version of DropBox, in case you have a server available (based on Git!).

Source: <http://sparkleshare.org/>

# Need a local server? XAMPP

The screenshot shows the Apache Friends XAMPP website. At the top, there's a navigation bar with links for Home, XAMPP, News, Team, Projects, Docs, Extras, Links, and Support, along with language options: deutsch, english, français, italiano, português (brasil), 日本語, 繁體中文, and 简体中文. Below the navigation is a banner for 'xeround' featuring a MySQL database icon and text: 'Free Cloud Database for Your MySQL Apps', 'Simple to use', 'Nothing to install', 'No code changes required', and a 'Create your FREE cloud database' button. The main content area has a large orange XAMPP logo with the word 'XAMPP' next to it. Below the logo, there's a paragraph about the difficulty of installing an Apache web server and the benefits of using XAMPP. To the right of the text is a photo of a woman sitting cross-legged. The page then lists four XAMPP distributions:

- XAMPP for Linux**: Contains Apache, MySQL, PHP & PEAR, Perl, ProFTPD, phpMyAdmin, OpenSSL, GD, Freetype2, libjpeg, libpng, gdbname, zlib, expat, Sablotron, libxml, Ming, Webalizer, pdf class, ncurses, mod\_perl, FreeTDS, gettext, mcrypt, mhash, eAccelerator, SQLite and IMAP C-Client.
- XAMPP for Windows**: Contains Apache, MySQL, PHP + PEAR, Perl, mod\_php, mod\_perl, mod\_ssl, OpenSSL, phpMyAdmin, Webalizer, Mercury Mail Transport System for Win32 and NetWare Systems v3.32, Ming, FileZilla FTP Server, mcrypt, eAccelerator, SQLite, and WEB-DAV + mod\_auth\_mysql.
- XAMPP for Mac OS X**: Contains Apache, MySQL, PHP & PEAR, SQLite, Perl, ProFTPD, phpMyAdmin, OpenSSL, GD, Freetype2, libjpeg, libpng, zlib, Ming, Webalizer, mod\_perl.

---

If you want to use Wordpress, Drupal, MediaWiki locally  
on your computer.

Source: <http://www.apachefriends.org/en/xampp.html>

# Your local server, `http://localhost/`



Look for the `htdocs` folder in your XAMPP application, all the files accessible through `http://localhost` should be there.

Source: <http://localhost/>

# Your local database, <http://localhost/phpmyadmin>

The screenshot shows the phpMyAdmin interface for MySQL localhost. The top navigation bar includes links for Databases, SQL, Status, Variables,Charsets, Engines, Privileges, and Processes. Below the navigation is a toolbar with Export and Import options. The left sidebar lists databases: cdccl (1), django, information\_schema (28), mysql (23), and test. A message "Please select a database" is displayed. The main area has sections for Actions, MySQL localhost, Interface, MySQL, Web server, and phpMyAdmin. The MySQL section shows the server is running via a UNIX socket, version 5.1.44, with protocol 10, user root@localhost, and UTF-8 Unicode charset. The Web server section lists Apache, PHP, and MySQL client versions. The phpMyAdmin section links to documentation, a wiki, and the official homepage. A yellow warning box at the bottom left states: "The additional features for working with linked tables have been deactivated. To find out why click [here](#)." Another red warning box at the bottom right states: "Your configuration file contains settings (root with no password) that correspond to the default MySQL privileged account. Your MySQL server is running with this default, is open to intrusion, and you really should fix this security hole by setting a password for user 'root'!"

You can easily create a database with PhpMyAdmin (but you will probably have to change the password for installing MediaWiki).



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Media Factory

02.

## Version Control Systems: managing the history of a project



Aalto University  
Media Factory

02.01

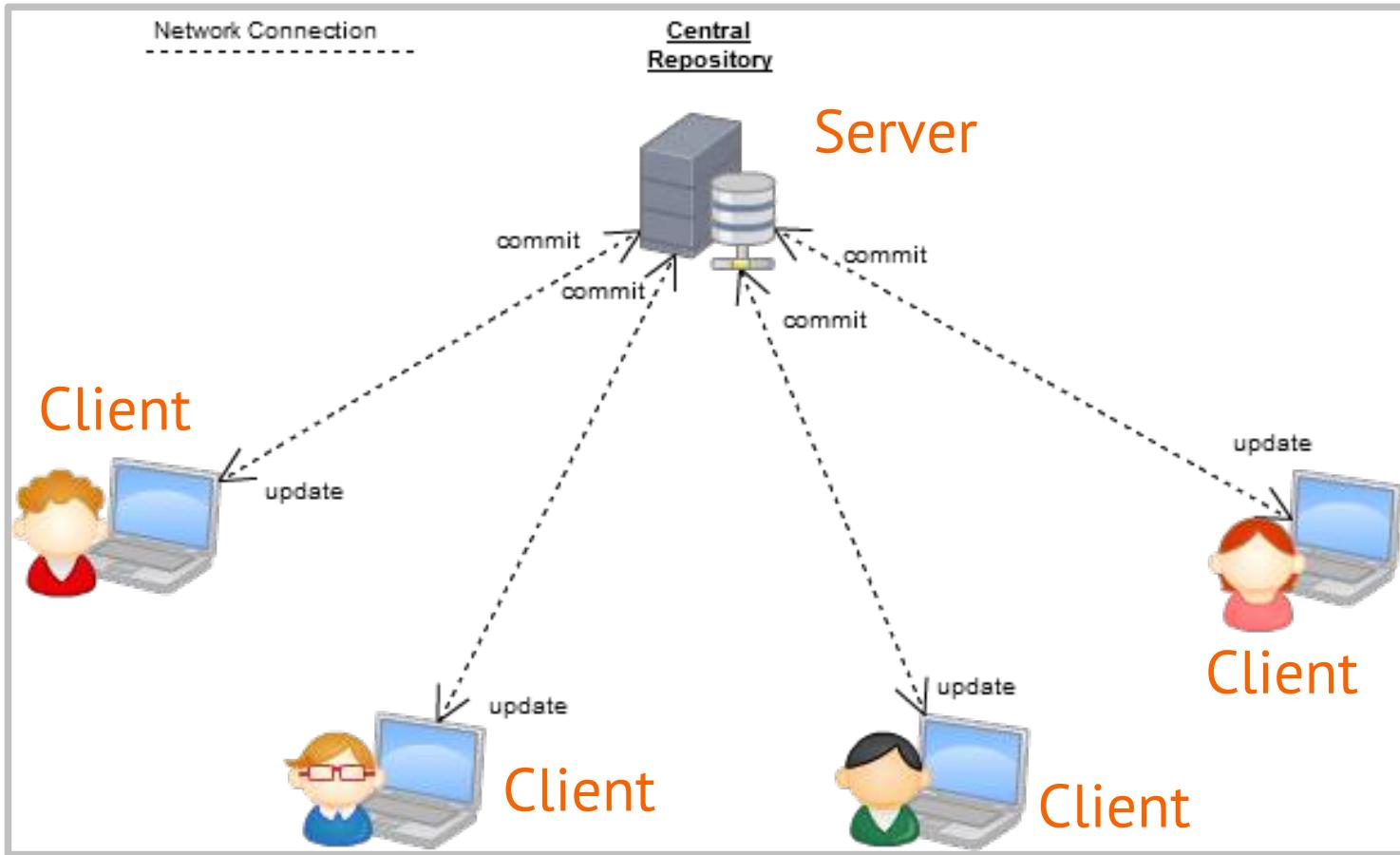
# Version Control Systems: Subversion (SVN)

# Version Control Systems

A version (or revision) control system is a system that **tracks incremental versions (or revisions)** of files and directories over time. It allows you to explore the changes which resulted in each of those versions and facilitates the arbitrary recall of the same.

- \* Backup and Restore
  - \* Synchronization
  - \* Short-term undo + Long-term undo
  - \* Track Changes
  - \* Track Ownership
  - \* Branching and merging
  - \* not in real time!
-

# Server/client-based Version Control System



The first architecture to appear, you need to be connected and you need a server (unless you want to work alone on your computer).

# Version Control System: Subversion (SVN)



## SUBVERSION®

<http://www.apache.org/> 

About Subversion  
[News](#)  
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[Documentation](#)  
[FAQ](#)  
[Roadmap](#)  
[Security](#)

Getting Subversion  
[Source Download](#)  
[Binary Packages](#)  
[Release Notes](#)

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## Apache™ Subversion®

*"Enterprise-class centralized version control for the masses"*

Welcome to **subversion.apache.org**, the online home of the Apache Subversion™ software project. Subversion is an open source version control system. Founded in 2000 by CollabNet, Inc., the Subversion project and software have seen incredible success over the past decade. Subversion has enjoyed and continues to enjoy widespread adoption in both the open source arena and the corporate world.

Subversion is developed as a project of the [Apache Software Foundation](#), and as such is part of a rich community of developers and users. We're always in need of individuals with a wide range of skills, and we invite you to participate in the development of Apache Subversion. Here's [how to get started](#).

For helpful hints about how to get the most out of your visit to this site, see the [About This Site](#) section below.

### Our Vision

Subversion exists to be universally recognized and adopted as an open-source, centralized version control system characterized by its reliability as a safe haven for valuable data; the simplicity of its model and usage; and its ability to support the needs of a wide variety of users and projects, from individuals to large-scale enterprise operations.

Subversion manages files and directories, and the changes made to them, over time. Think of it as a sort of “time machine” of changes.

# An introduction to SVN

*The Standard in Open Source Version Control*

*Version Control with*

# Subversion

## Introduction

This is the home of [Version Control with Subversion](#), a [free](#) book about the ubiquitous [Apache™ Subversion®](#) version control system and written by some of the developers of Subversion itself.

As you may have guessed from the layout of this page, we are quite pleased that some versions of this book have been [published](#) by O'Reilly Media. You can certainly [buy](#) a traditionally published print copy of the book if you'd like to, but you'll always find the most recent versions here on this site, available in both HTML and PDF formats.

## Online Versions of the Book

Versions of this book use a numbering system designed to match those used by the Subversion software itself—version 1.7 of [Version Control with Subversion](#) covers Subversion 1.7, for example. Here are the latest versions of the book which are available online:

### For Subversion 1.7

- View the [multiple-page HTML edition](#) of the book. [[tar.bz](#)]
- View the [single-page HTML edition](#) of the book. [[tar.bz](#)]
- View the [PDF edition](#) of the book.
- View the book's [DocBook XML sources](#).

An open source book about using SVN.

# Version Control System: the vocabulary (01)

- \* **Change**: A change (or diff) represents a specific modification to a document under version control.
  - \* **Checkout** : A check-out (or co) is the act of creating a local working copy from the repository. A user may specify a specific revision or obtain the latest. Also refers to the same files.
  - \* **Commit** : A commit (checkin, ci) is the action of writing or merging the changes made in the working copy back to the repository. Also refers to the same files.
  - \* **Head** : The most recent commit.
-

# Version Control System: the vocabulary (02)

## \* **Conflict**

A conflict occurs when different parties make changes to the same document. A user must resolve the conflict by combining the changes, or by selecting one change.

## \* **Merge**

A merge or integration is an operation in which two sets of changes are applied to a file or set of files.

## \* **Update**

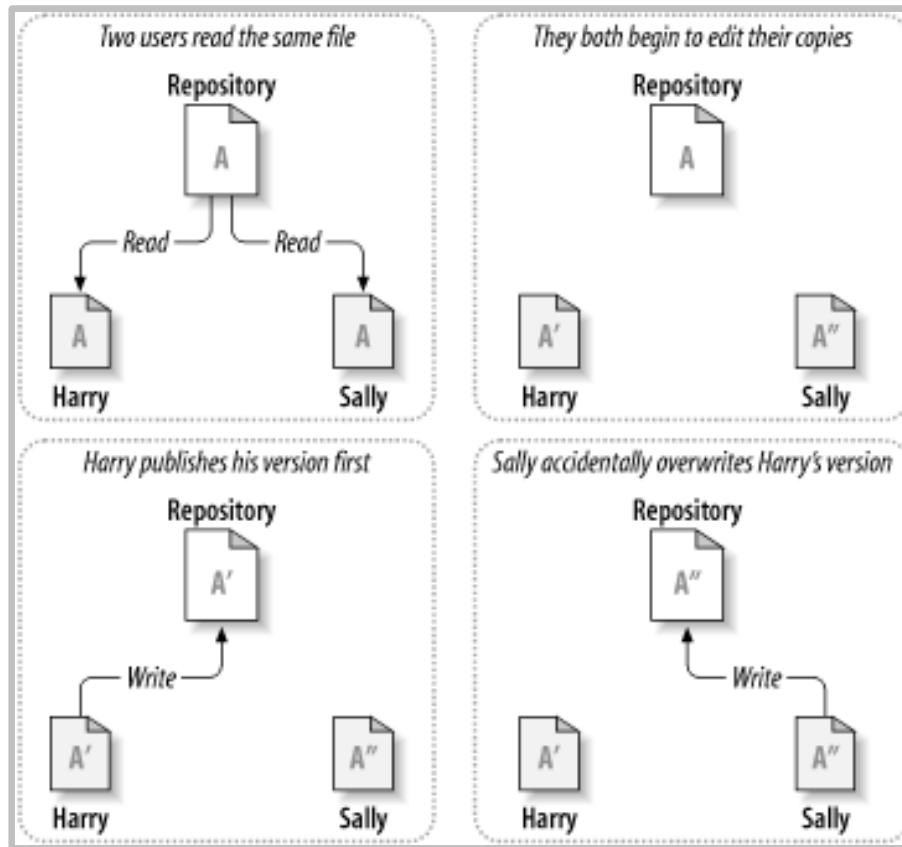
An update (or sync) merges changes made in the repository (by other people, for example) into the local working copy.

## \* **Working copy**

The working copy is the local copy of files from a repository, at a specific time or revision. Conceptually, it is a *sandbox*.

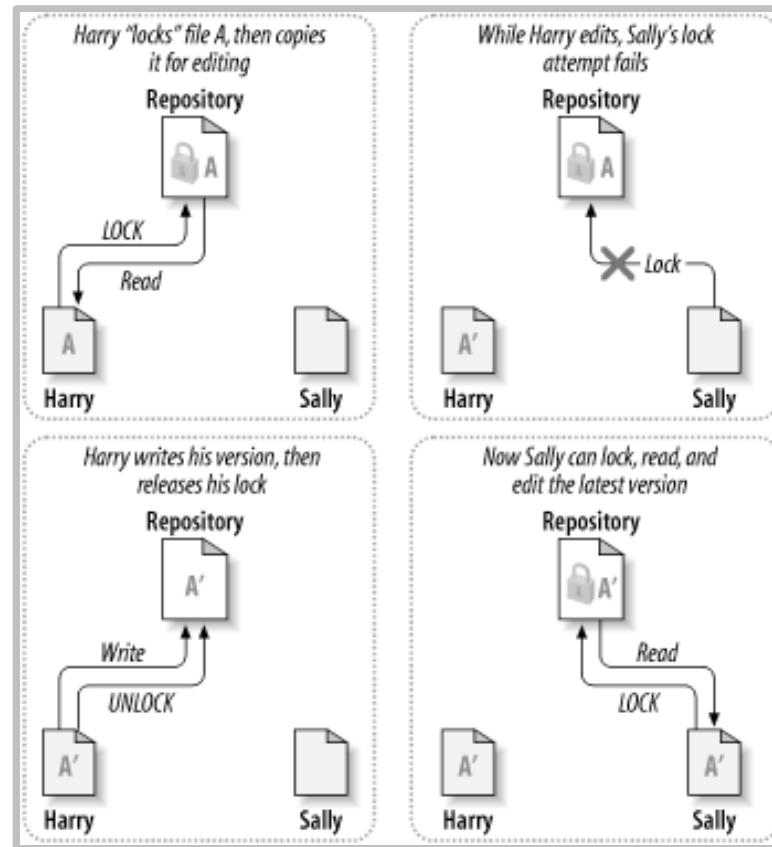
---

# Versioning: the problem



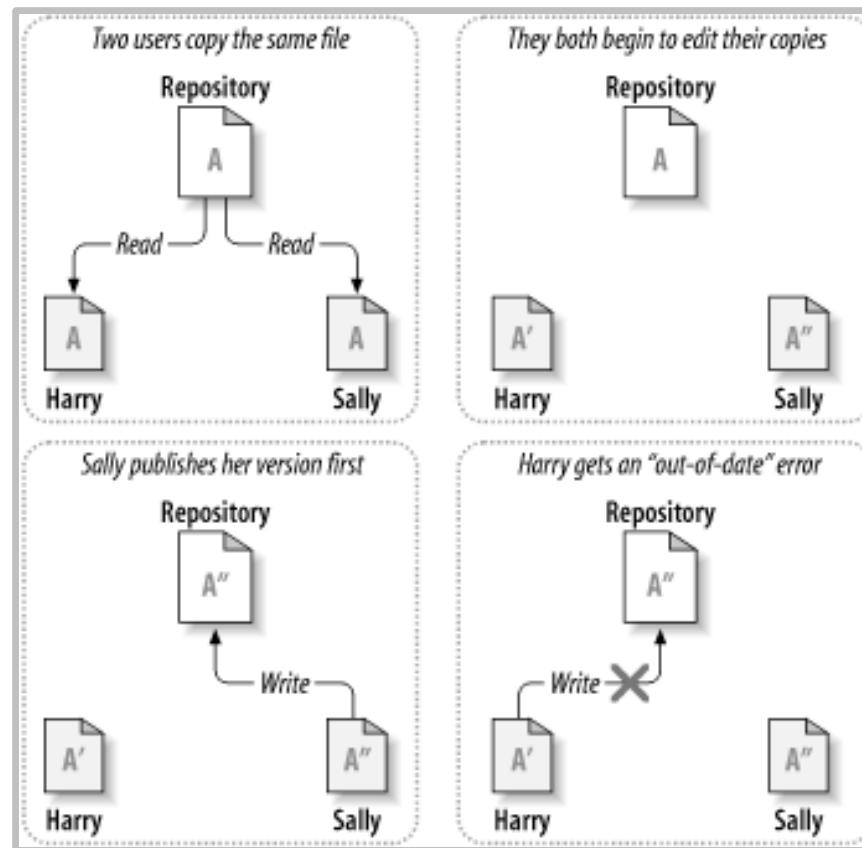
How will the system allow users to share information,  
but prevent them from accidentally overwriting?

# Versioning: the lock-modify-unlock solution



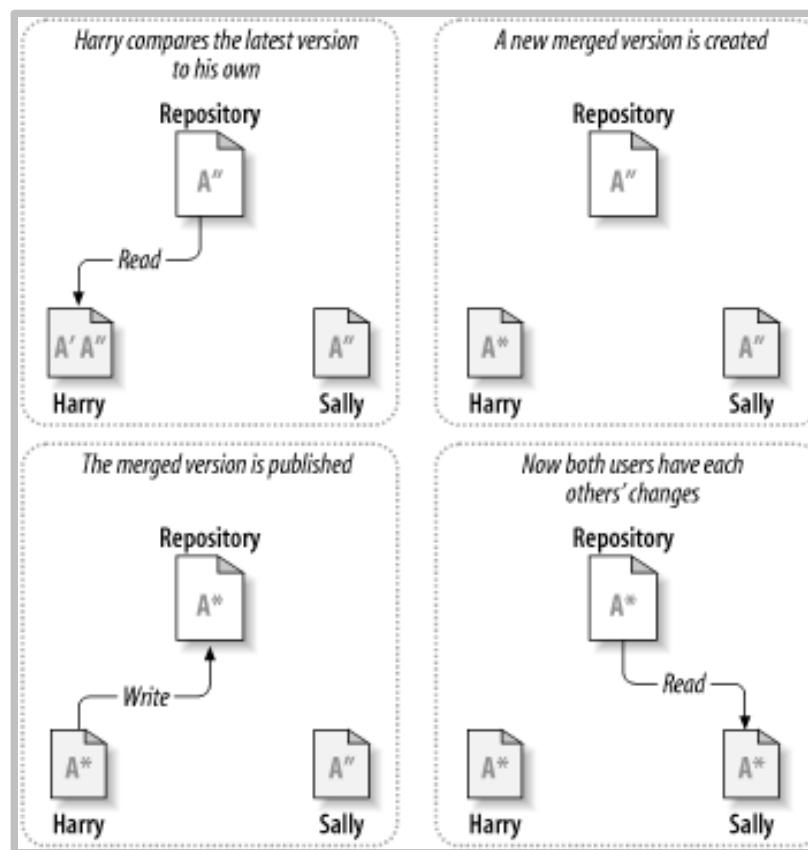
In this model, the repository allows only one person to change a file at a time, by locking it.

# Versioning: the copy-modify-merge solution (01)



In this model, each user's client contacts the project repository and creates a personal working copy. The private copies are merged together into a new version.

# Versioning: the copy-modify-merge solution (02)



In this model, each user's client contacts the project repository and creates a personal working copy. The private copies are merged together into a new version.

# Diff: how to understand the changes

The screenshot shows the Kompare application interface. At the top, there's a menu bar with File, Difference, Settings, and Help. Below the menu is a toolbar with various icons. The main window has four panes:

- Source Folder:** /home/robamler/Documents/
- Destination Folder:** /home/robamler/Documents/
- Source File:** hitchhiker-040624
- Destination File:** hitchhiker-current

Below these panes is a table titled "Difference" with columns: Source Line, Destination Line, and Difference. The table shows the following changes:

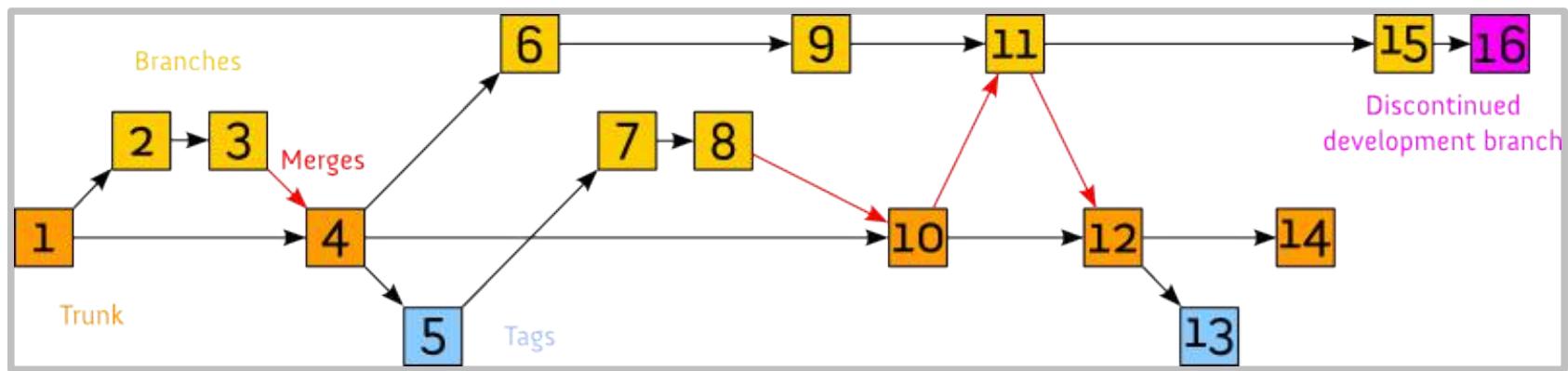
Source Line	Destination Line	Difference
32	48	Changed 1 line
38	56	Changed 1 line
51	69	Changed 1 line
57	75	Inserted 2 lines
59	79	Deleted 1 line

The bottom half of the window displays the content of both files side-by-side. The left pane (hitchhiker-040624) and right pane (hitchhiker-current) show identical text blocks, except for the differences highlighted by color and line numbers. The differences are:

- Line 32: Changed from 32 to 48.
- Line 38: Changed from 38 to 56.
- Line 51: Changed from 51 to 69.
- Line 57: Inserted two lines (75 and 79).
- Line 59: Deleted one line (79).

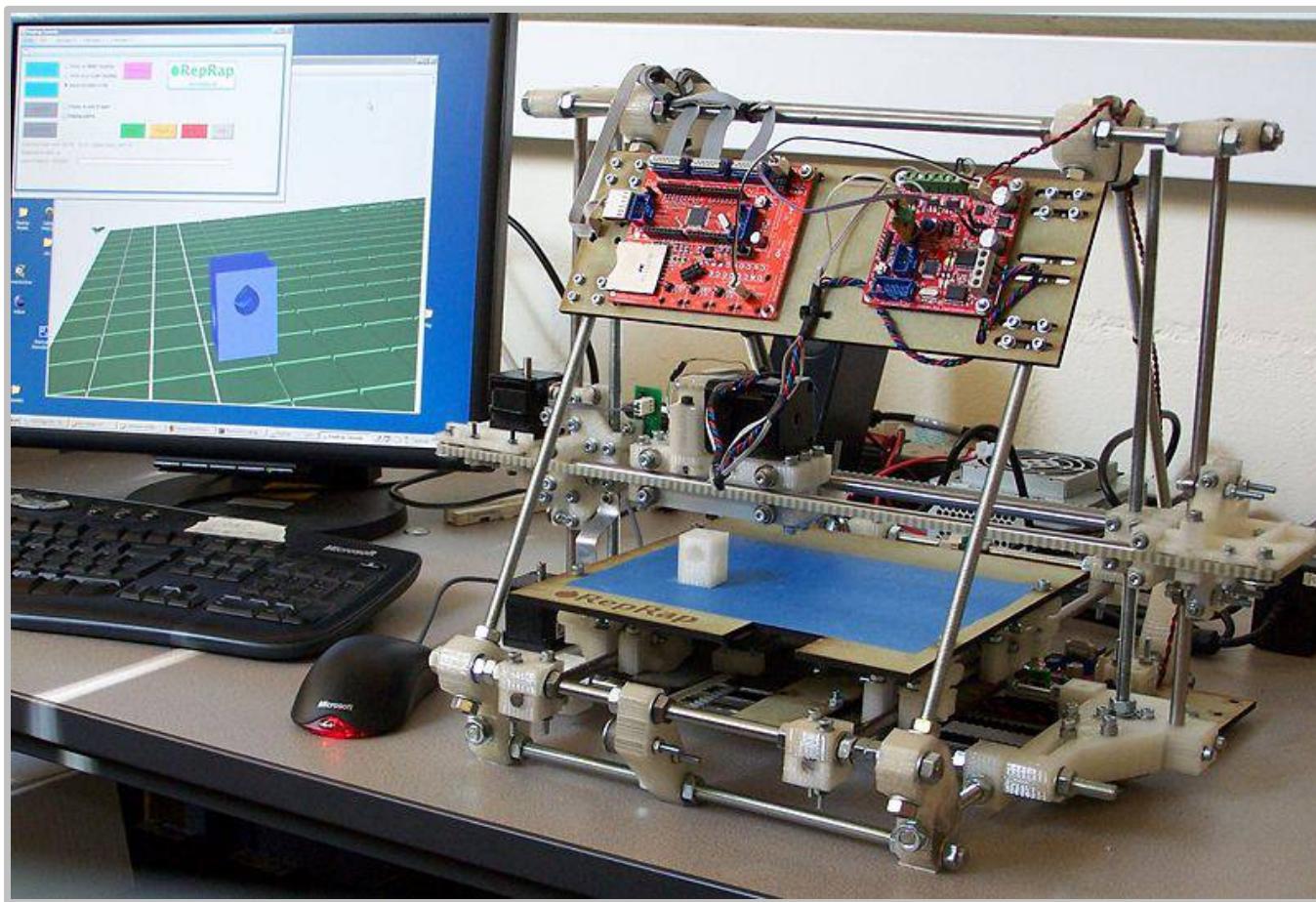
The best way of understanding what has changed is to compare different revisions with a diff software.

# A typical SVN project



Development happens in *trunk*, testing alternatives in *branches* and storing good versions (1.0, 1.1,...) in *tags*.

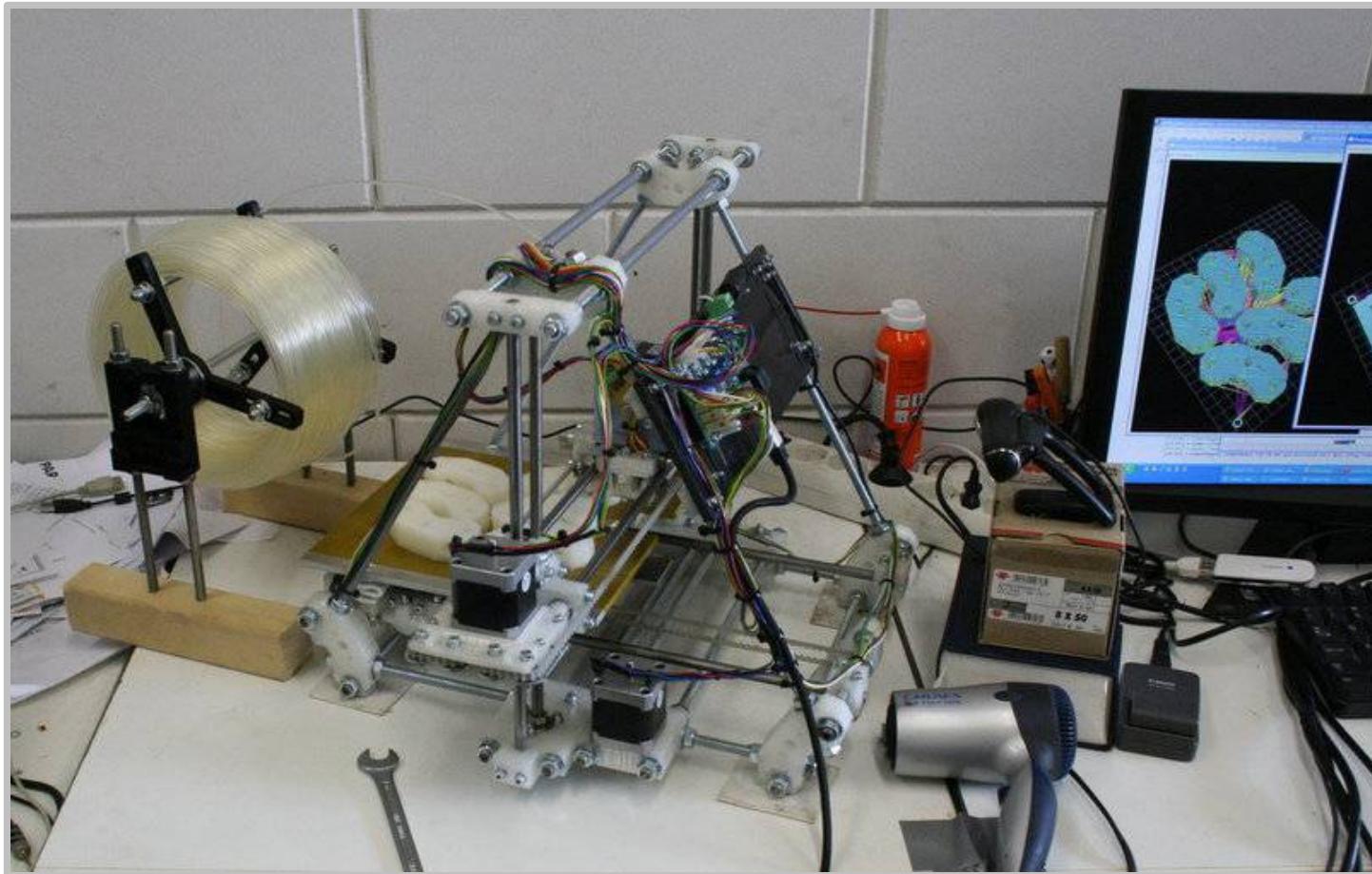
# Example: a spool for the RepRap Mendel



---

The second version of the RepRap, the first to be easier to build and calibrate.

# A spool for the RepRap Mendel: an improvement

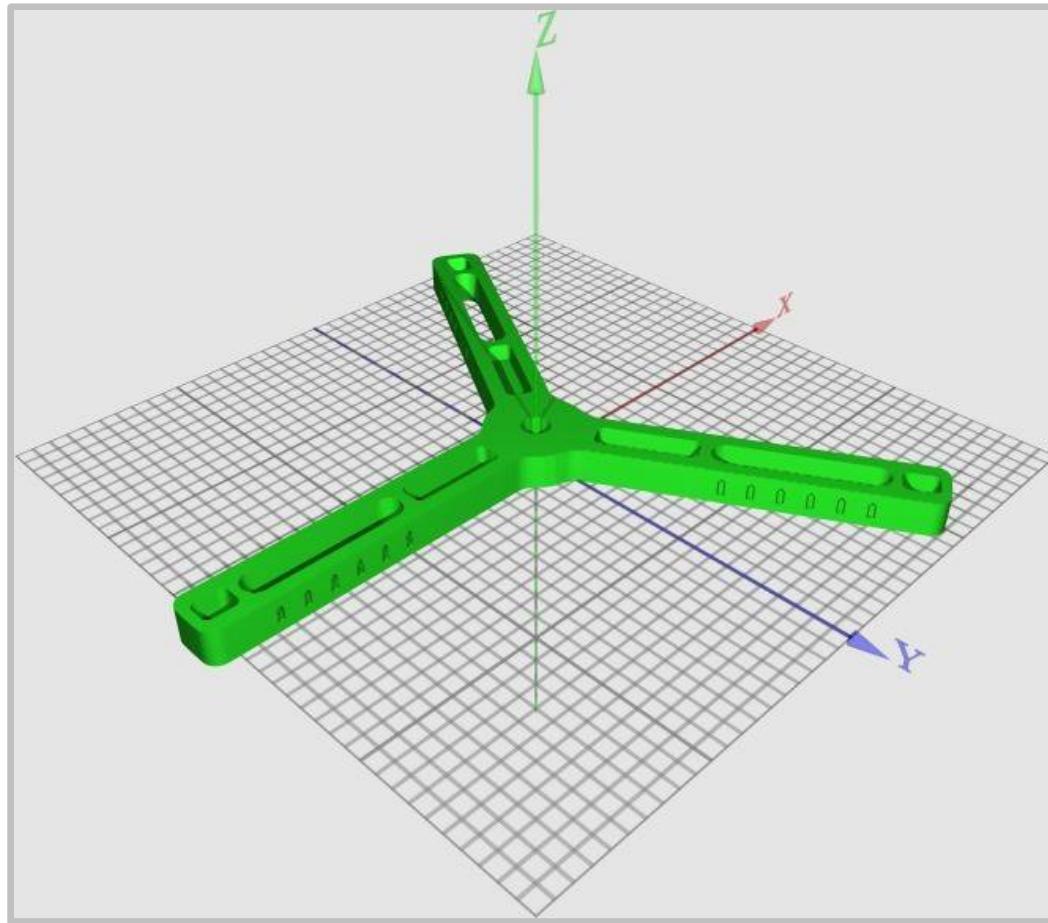


---

A spool added for handling the plastic wire and published on Thingiverse.

Source: <http://www.thingiverse.com/thing:3866>

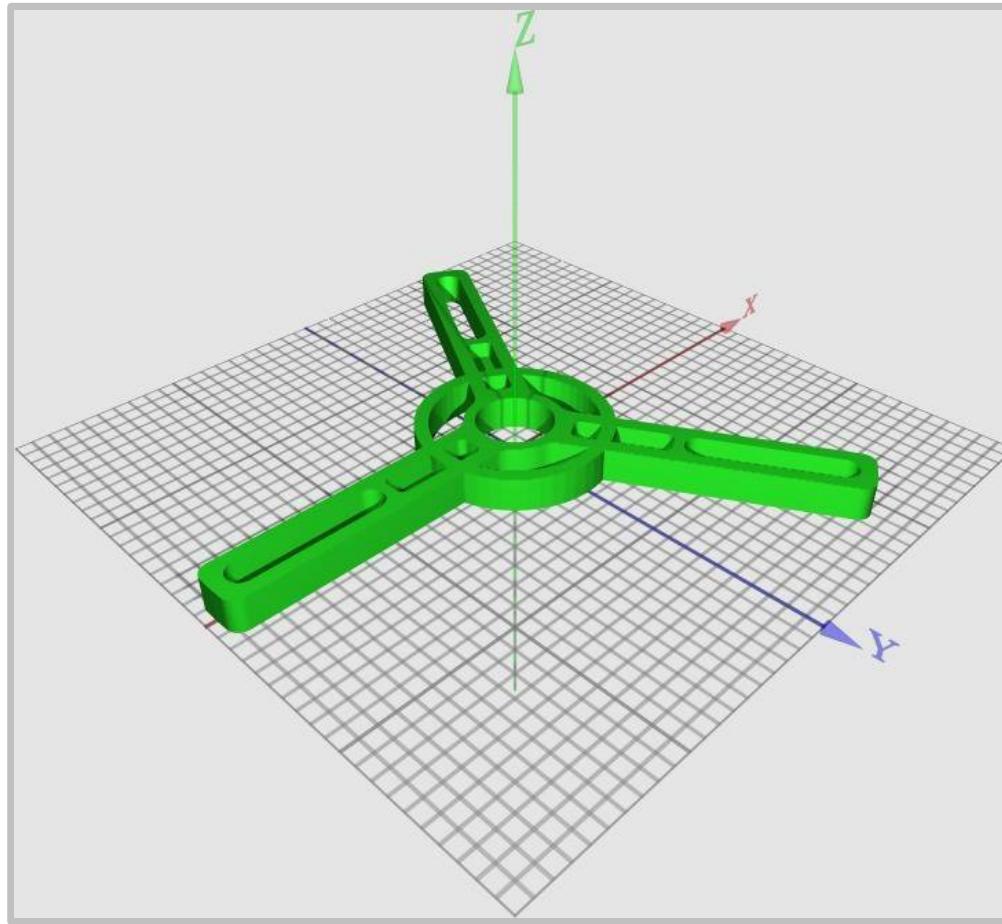
# A spool for the RepRap Mendel: an improvement (01)



---

*"Well i wanted to have a very simple, but bearing based spool system."* Camiel

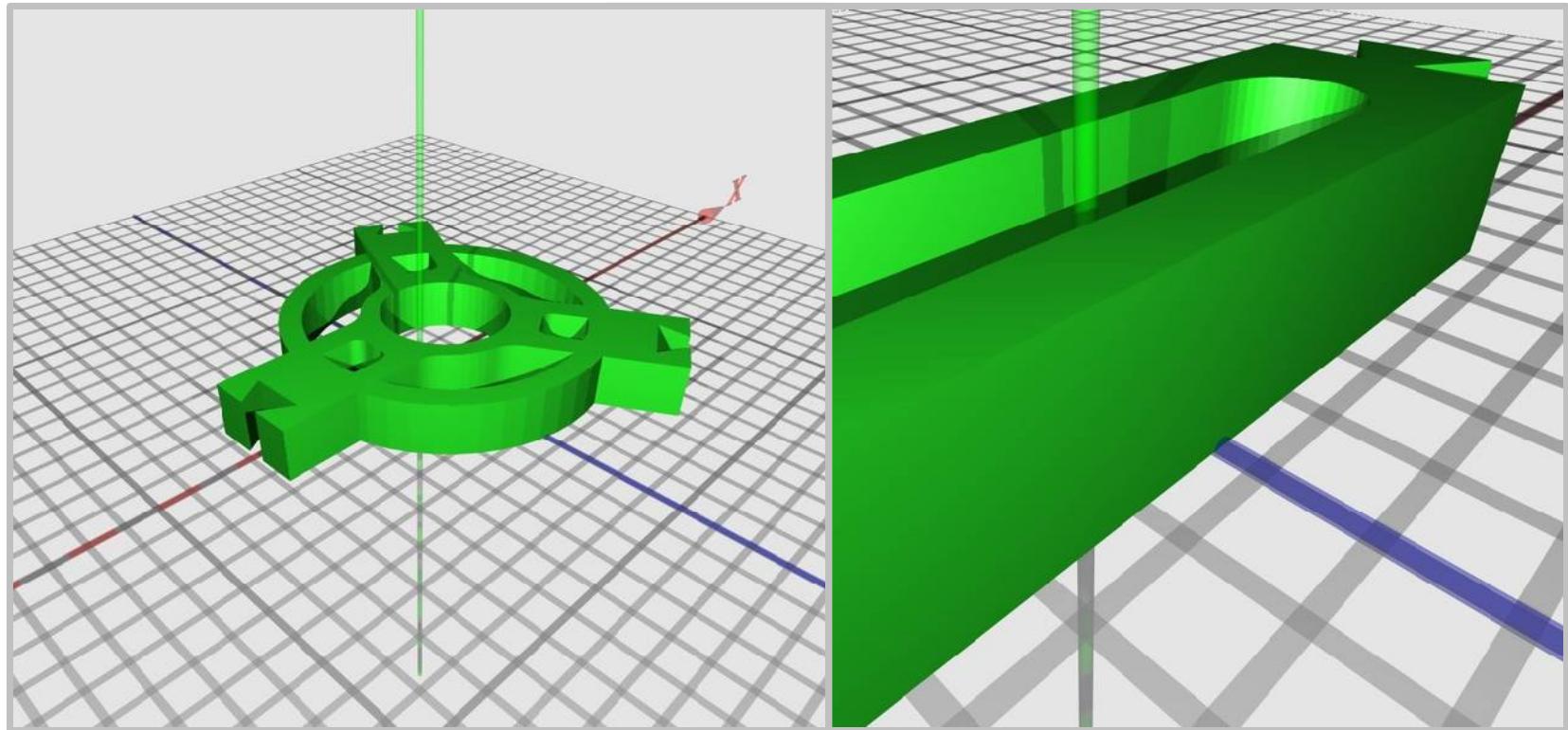
# A spool for the RepRap Mendel: an improvement (02)



---

*"I have changed the design to put the bearings in the spool itself. This way you can be more flexible in what you use to support the axle." Brokentoaster*

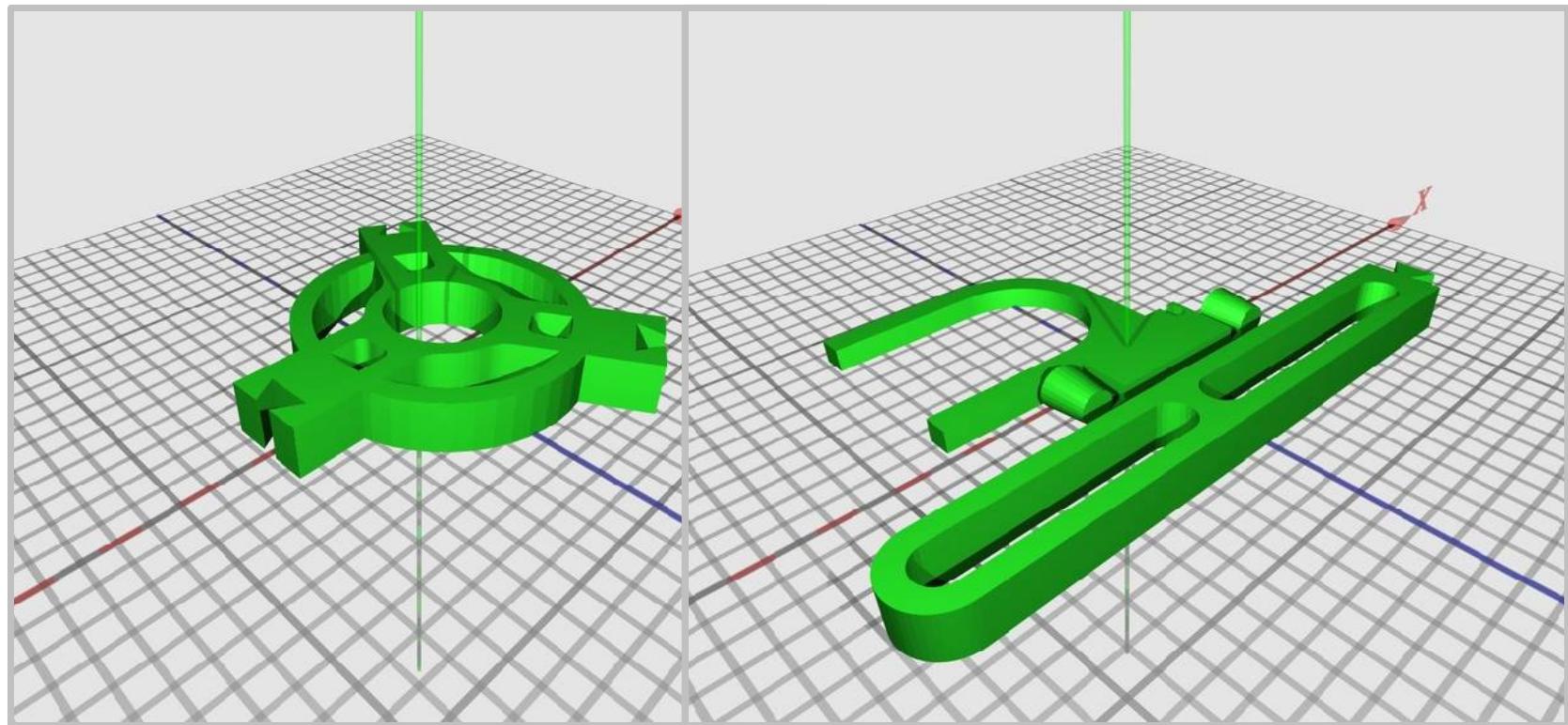
# A spool for the RepRap Mendel: an improvement (03)



---

*"I liked BrokenToaster's idea of a bearing-driven filament spool holder, but that version was too big to fit on a Makerbot print bed. [...]" Randyy*

# A spool for the RepRap Mendel: an improvement (04)



*“This takes advantage of the larger print area on RepRaps by printing the arm as one piece, [...] also saving material.”* Fil

# SVN Client + File comparison: TortoiseSVN (Win)

## TortoiseSVN *the coolest interface to (Sub)version control*

[Home](#) [Donate](#) [Downloads](#) [Translations](#) [Support/Docs](#) [Other tools](#)



# TortoiseSVN

**About TortoiseSVN**  
TortoiseSVN is an easy-to-use SCM / source control software for Microsoft Windows and possibly the best standalone Apache™ Subversion® client there is. It is implemented as a Windows shell extension, which makes it integrate seamlessly into the Windows explorer. Since it's not an integration for a specific IDE you can use it with whatever development tools you like.

**New version of grepWin**  
Posted on September 4, 2011

**Subversion Client Windows**  
Download Now! Windows, Linux, OSX Subversion Repository Browser  
[www.aquafold.com](http://www.aquafold.com)

AdChoices ▾

A new version of [GrepWin](#) is available. This new version contains a few bugfixes and enhancements.

List of completed [issues](#)  
Download from [here](#)

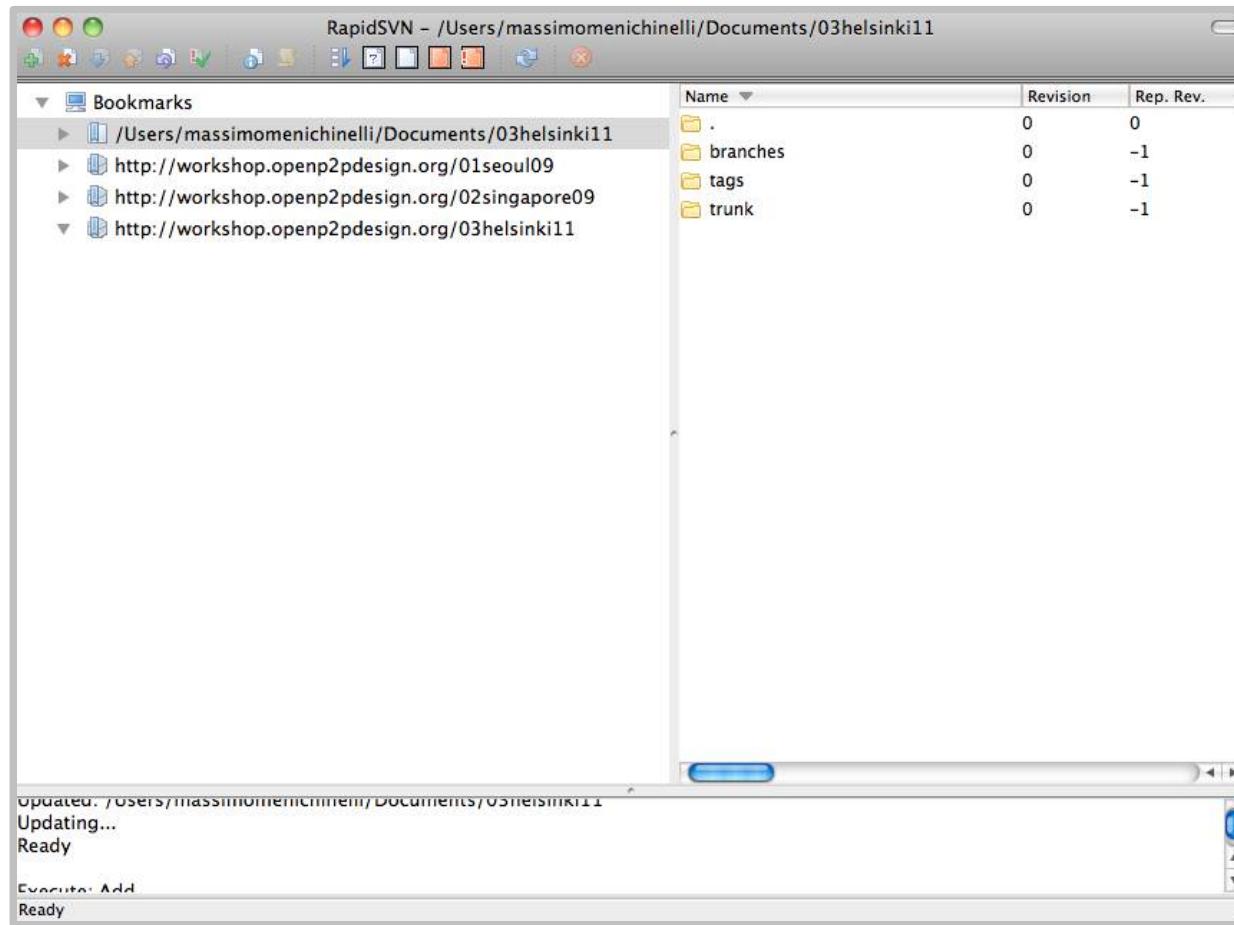
**Release candidate of TortoiseSVN 1.7**  
Posted on September 1, 2011

**Info**  
[News](#)  
[News archive](#)

The most popular SVN client on Windows, it can also compare images.

Source: <http://tortoisessvn.net/>

# SVN Client: RapidSVN (Windows, Mac, Linux)



---

Open Source and multi-platform, but without file comparison.

# SVN Client: Versions (Mac)

The screenshot shows the official website for Versions, a Subversion client for Mac. At the top, there's a navigation bar with links for SOFA, Home, Release Notes, Support, Buy, and Download. The main visual is a large green lotus flower growing out of a mound of grass against a dark background. Below the flower, the word "VERSIONS" is written in large white letters, with a small yellow badge containing "1.1" to its right. Underneath "VERSIONS" is the text "SUBVERSION CLIENT FOR MAC". To the left, there's a testimonial: "Versions offers the best way to work with Subversion on the Mac. Thanks to its clear-cut approach, you'll hit the ground running." To the right are two prominent buttons: a green one labeled "Download Now" and a blue one labeled "Buy for €39".

Free trial for one month...

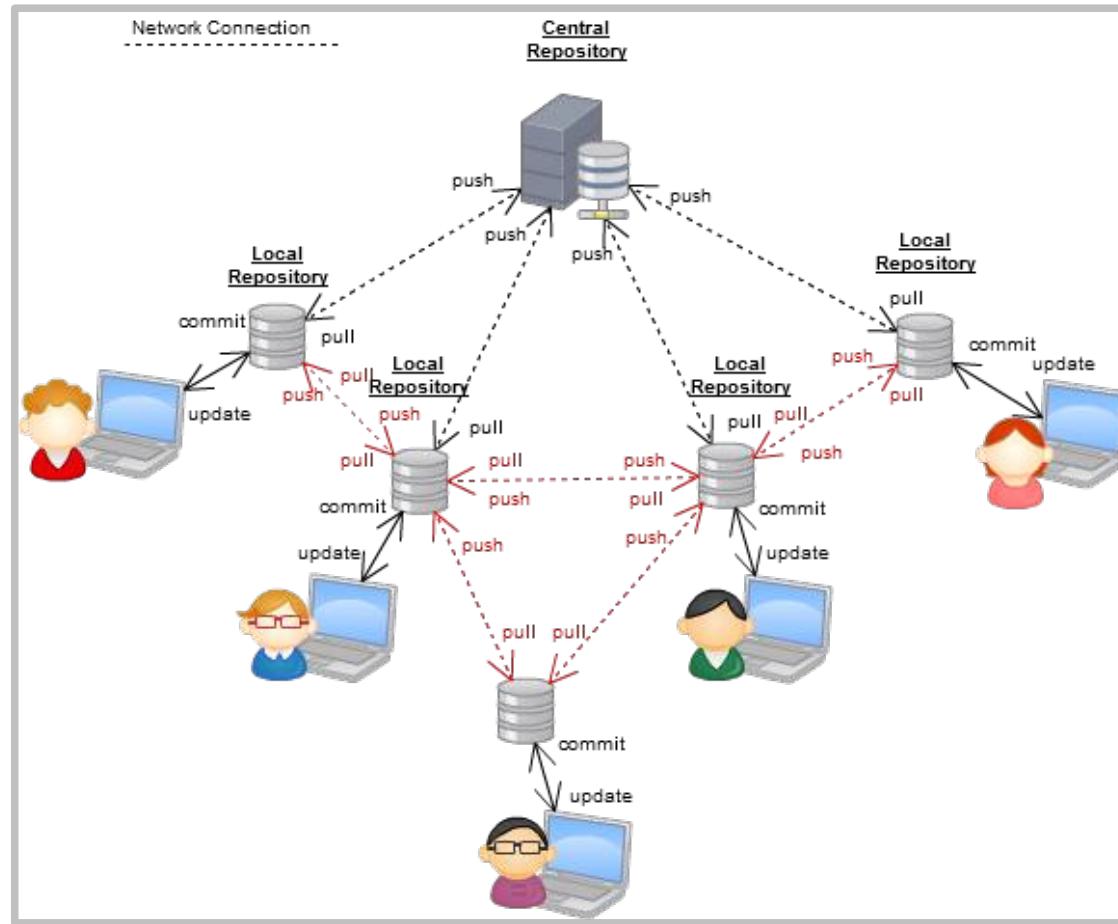


Aalto University  
Media Factory

02.02

# Version Control Systems: Git and Mercurial (Hg)

# Distributed Version Control System



A more recent architecture, more evolved and popular. It usually tracks the state of the files, not just the changes.

Source: <http://www.kalekold.net/index.php?post=13>

<http://betterexplained.com/articles/intro-to-distributed-version-control-illustrated/>

# Version Control System: the vocabulary (03)

**Distributed Version Control Systems** add new terms to the vocabulary:

- \* **Clone**: create a working copy on your computer from another repository.
  - \* **Push** : send a change to another repository (may require permission), even to your server.
  - \* **Pull** : download the latest changes from an online repository.
-

# Distributed Version Control System: Git



The screenshot shows the official Git website. At the top, there's a banner with the word "git" in large letters and "the fast version control system" below it, accompanied by a cartoon character of a brown root-like figure. Below the banner is a navigation bar with links for Home, About Git, Documentation, Download, Tools & Hosting, and Wiki. The main content area has three columns. The left column is titled "Git is..." and contains text about Git being a free & open source, distributed version control system, its full-fledged repository nature, branching and merging capabilities, and its use for version control of files. The middle column is titled "Projects using Git" and lists various projects that use Git, including Linux Kernel, Perl, Eclipse, Gnome, KDE, Qt, Ruby on Rails, Android, PostgreSQL, Debian, and X.org. The right column is titled "Download Git" and features the latest stable release (v1.7.6.1), release notes (2011-08-24), download links for Windows, Mac OS X, and Source, and links for Other Download Options and Git Source Repository. Each download link is accompanied by a small icon: a Windows logo, a Mac logo, and a penguin logo.

**git** the fast version control system

Home    About Git    Documentation    Download    Tools & Hosting    Wiki

**Git is...**

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

Every Git clone is a **full-fledged repository** with complete history and full revision tracking capabilities, not dependent on network access or a central server. Branching and merging are fast and easy to do.

Git is used for version control of files, much like tools such as Mercurial, Bazaar, Subversion, CVS, Perforce, and Team Foundation Server.

**Projects using Git**

- [Git](#)
- [Linux Kernel](#)
- [Perl](#)
- [Eclipse](#)
- [Gnome](#)
- [KDE](#)
- [Qt](#)
- [Ruby on Rails](#)
- [Android](#)
- [PostgreSQL](#)
- [Debian](#)
- [X.org](#)

**Download Git**

The latest stable Git release is  
**v1.7.6.1**

[release notes](#) (2011-08-24)

[Windows](#)    [Mac OS X](#)    [Source](#)

[Other Download Options](#)    [Git Source Repository](#)

Developed by Linus Torvalds, for improving the distributed development of the Linux Kernel.

# An introduction to Git

# Pro Git professional version control

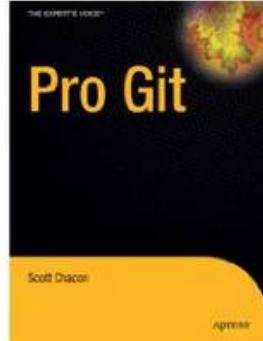
[Home](#) [Book](#) [Blog](#) [About](#) [Support Us](#) [GitHub](#) [Twitter](#)

## 1. Getting Started

- 1.1 - [About Version Control](#)
- 1.2 - [A Short History of Git](#)
- 1.3 - [Git Basics](#)
- 1.4 - [Installing Git](#)
- 1.5 - [First-Time Git Setup](#)
- 1.6 - [Getting Help](#)
- 1.7 - [Summary](#)

## 2. Git Basics

- 2.1 - [Getting a Git Repository](#)
- 2.2 - [Recording Changes to the Repository](#)



The cover of the book 'Pro Git' by Scott Chacon, published by Apress. The cover is black with yellow text and features a small illustration of gears.

Support this site by buying a print version of [Pro Git](#)

An open source book about using Git.

# Git project hosting: GitHub.com

The screenshot shows the GitHub homepage. At the top, it displays "github" in a logo, "Signup and Pricing", "Explore GitHub", "Features", "Blog", and "Login". A prominent banner states "1,568,188 people hosting over 2,693,380 repositories". Below the banner is a search bar with the placeholder "Find any repository" and a list of popular projects: jQuery, reddit, Sparkle, curl, Ruby on Rails, node.js, ClickToFlash, Erlang/OTP, CakePHP, Redis, and many more. Logos for various companies are displayed below the search bar, including Facebook, Twitter, Microsoft, VMware, Red Hat, LinkedIn, and Mozilla. Two boxes are shown side-by-side: one for "git" (version control system) and one for "git·hub" (collaboration platform). Both boxes include a "Plans, Pricing and Signup" button with the text "Unlimited public repositories are free!". Below these boxes, a list of features is provided: Team management, Code review, Reliable code hosting, and Open source collaboration.

github

Signup and Pricing Explore GitHub Features Blog Login

1,568,188 people hosting over 2,693,380 repositories

jQuery, reddit, Sparkle, curl, Ruby on Rails, node.js, ClickToFlash, Erlang/OTP, CakePHP, Redis, and many more Find any repository

facebook. twitter. Microsoft. vmware. redhat. LinkedIn. mozilla

git /'git/  
Git is an extremely fast, efficient, distributed version control system ideal for the collaborative development of software.

git·hub /'git,həb/  
GitHub is the best way to collaborate with others. Fork, send pull requests and manage all your **public** and **private** git repositories.

Plans, Pricing and Signup  
Unlimited public repositories are free!

Free public repositories, collaborator management, issue tracking, wikis, downloads, code review, graphs and much more...

**Team management**  
30 seconds to give people access to code. No SSH key required. Activity feeds keep you updated on progress.  
[More about collaboration](#)

**Code review**  
Comment on changes, track issues, compare branches, send pull requests and merge forks.  
[More about code review](#)

**Reliable code hosting**  
We spend all day and night making sure your repositories are **secure**, **backed up** and **always available**.  
[More about code hosting](#)

**Open source collaboration**  
Participate in the most important open source community in the world today—online or at one of our meetups.  
[More about our community](#)

The most popular (and refined) Git hosting available now, free plans for open source projects (you have to pay for private spaces).

Source: <https://github.com/>

# GitHub for Mac: a Git client (Mac)

The screenshot shows the official GitHub for Mac website. At the top, there's a download banner for "Mac OS X 10.6+ 64-bit" version 1.2.6 from April 13th, 2012. Below the banner, the main heading is "Introducing GitHub for Mac" with the subtext "The easiest way to share your code with GitHub". A large orange button says "Download GitHub for Mac" with the tagline "Free to download, free to use". Below the button are navigation links for "Overview", "Help", and "Release Notes". A list of features is shown with checkmarks: "Clone repositories", "Browse history", "Commit changes", "Branch code", and "Share code on github.com".

At GitHub, we think that sharing code should be as simple as possible.  
That's why we created GitHub for Mac.

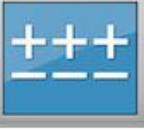
**Synchronize branches**  
The sync button pushes your changes to GitHub and pulls down other's changes in one operation. It notifies you when you have changes you haven't pushed or there are new changes on GitHub you haven't pulled down.

**Clone repositories in one click**  
When you add repositories to GitHub for Mac, we automatically match them up with any organizations you belong to. Want to pull down a repository from GitHub.com? Check out the "Clone in Mac" button on the website.

**Powerfully simple branching**  
Branching is one of Git's best features. We've made it easy to try out remote branches, create new local branches and publish branches to share with others.

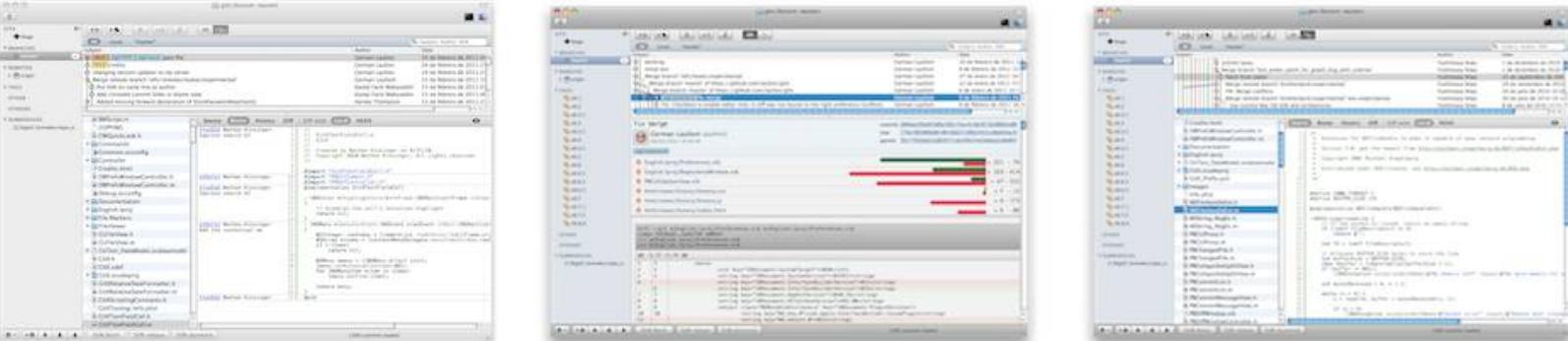
GitHub as its own freeware client (for Mac).

# Git Client: GitX (Mac)



**GitX (L)**  
Open Source Mac OS X Git client

[Download GitX \(L\) v0.8.4](#)  
[License GPL v2](#)



**Commit view**

- Commit/Parents/Tree SHA links
- File changes counts
- File Diffs
- Commit Tags and Refs

**File view**

- Source Code Highlight
- Blame
- File History (log)
- Diff with local and HEAD

**Sidebar**

- Branches
- Remotes
- Stashes
- Submodules

**Stage view**

- Unstaged/Staged files
- Stage/Discard by lines
- Amend
- File diff

Actually, more than one GitX can be found...

# Git project hosting: Gitorius.org

The screenshot shows the Gitorius.org website. At the top, there's a navigation bar with links for HOME, ABOUT, CONTACT, REGISTER, and LOG IN. The main heading "The best way to collaborate on distributed open source projects" is followed by a subtext: "Gitorious provides free open source infrastructure for open source projects that use Git." Below this is a button for "TRY IT — it's free!" and another for "LOG IN". A section titled "FEATURES — what we bring to the table." lists six features with icons: Project hosting, Activity monitoring, Public merge requests, Project Wikis, Team contributions, and Project centric. To the right, a project dashboard for "gitorious" is shown, featuring a commit log, source tree, and merge requests.

The main heading is "The best way to collaborate on distributed open source projects". Below it is the subtext: "Gitorious provides free open source infrastructure for open source projects that use Git." There are two buttons: "TRY IT — it's free!" and "LOG IN".

**FEATURES — what we bring to the table.**

- Project hosting** Host your open source projects and their repositories for free on Gitorious to enable community contributions.
- Activity monitoring** Keep track of project activity for both your personal projects and team projects.
- Public merge requests** Allow other developers to submit contributions to your project and merge them easily.
- Project Wikis** Document your project using Gitorious' built-in wiki.
- Team contributions** Create development teams to encourage and organize cooperative development.
- Project centric** Maintain all code repositories related to a single project under a single project area on Gitorious.

**gitorious ➔ gitorious**

Copy url GIT HTTP Your push git://gitorious.local/gitorious/gitorious.git

Branches: master

Commit log Source tree Merge requests (0)

Activities

Wednesday April 07 2010

PUSH 07:49 johan commented on gitorious/gitorious/22e03ac  
Ipsum decided to leave for the Far World of Grammar.

PUSH 07:49 johan commented on gitorious/gitorious/22e03ac  
place and supplies it with the necessary regelgio. It is a p

Free plans, and open source software itself.

# Distributed Version Control System: Mercurial (hg)

The screenshot shows the official Mercurial website at <http://mercurial.selenic.com/>. The header features the Mercurial logo and navigation links for about, guide, download, extensions, news/wiki, and sponsors, along with a search bar. The main heading "Work easier Work faster" is displayed above a brief description of Mercurial as a free, distributed source control management tool. To the right, a large blue button encourages users to "Download now" the "Mercurial 2.0.2" version for Mac OS X, with a smaller link for "Another OS?". Below this are links for Mac OS X, Windows, and other platforms. The left sidebar contains three icons with text: "It is fast and powerful", "It is easy to learn", and "And it just works". The right sidebar provides "Quick Start" examples with terminal commands.

Work easier  
Work faster

Mercurial is a free, distributed source control management tool. It efficiently handles projects of any size and offers an easy and intuitive interface.

How you can benefit from Mercurial

- It is **fast and powerful**  
Mercurial efficiently handles **projects of any size and kind**. Every clone contains the whole project history, so most actions are local, fast and convenient. Mercurial supports a multitude of **workflows** and you can easily enhance its functionality with **extensions**.
- It is **easy to learn**  
You can follow our simple **guide** to learn how to revision your documents with Mercurial, or just use the **quick start** to get going instantly. A short overview of Mercurial's decentralized model is also **available**.
- And it just works  
Mercurial strives to deliver on each of its promises. Most tasks simply work on the first try and without requiring arcane knowledge.

Quick Start

*Clone a project and push changes*

```
$ hg clone http://selenic.com/repo
$ cd hello
$ (edit files)
$ hg add (new files)
$ hg commit -m 'My changes'
$ hg push
```

*Create a project and commit*

```
$ hg init (project-directory)
$ cd (project-directory)
$ (add some files)
$ hg add
$ hg commit -m 'Initial commit'
```

Open Source and distributed as Git, usually the most used in FabLabs.

# An introduction to Mercurial

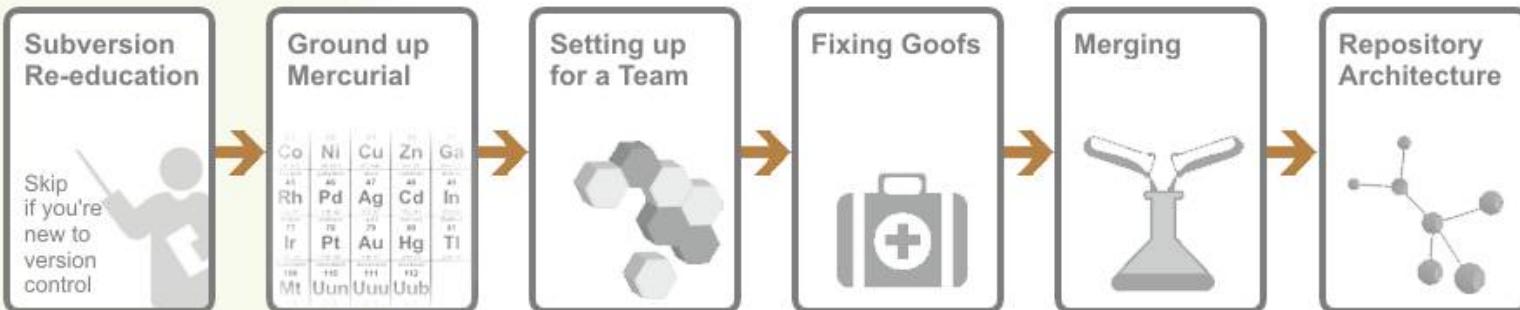
80

## Hg Init

200.59

## Hg Init: a Mercurial tutorial

Mercurial is a modern, open source, distributed version control system, and a compelling upgrade from older systems like Subversion. In this user-friendly, six-part tutorial, [Joel Spolsky](#) teaches you the key concepts.



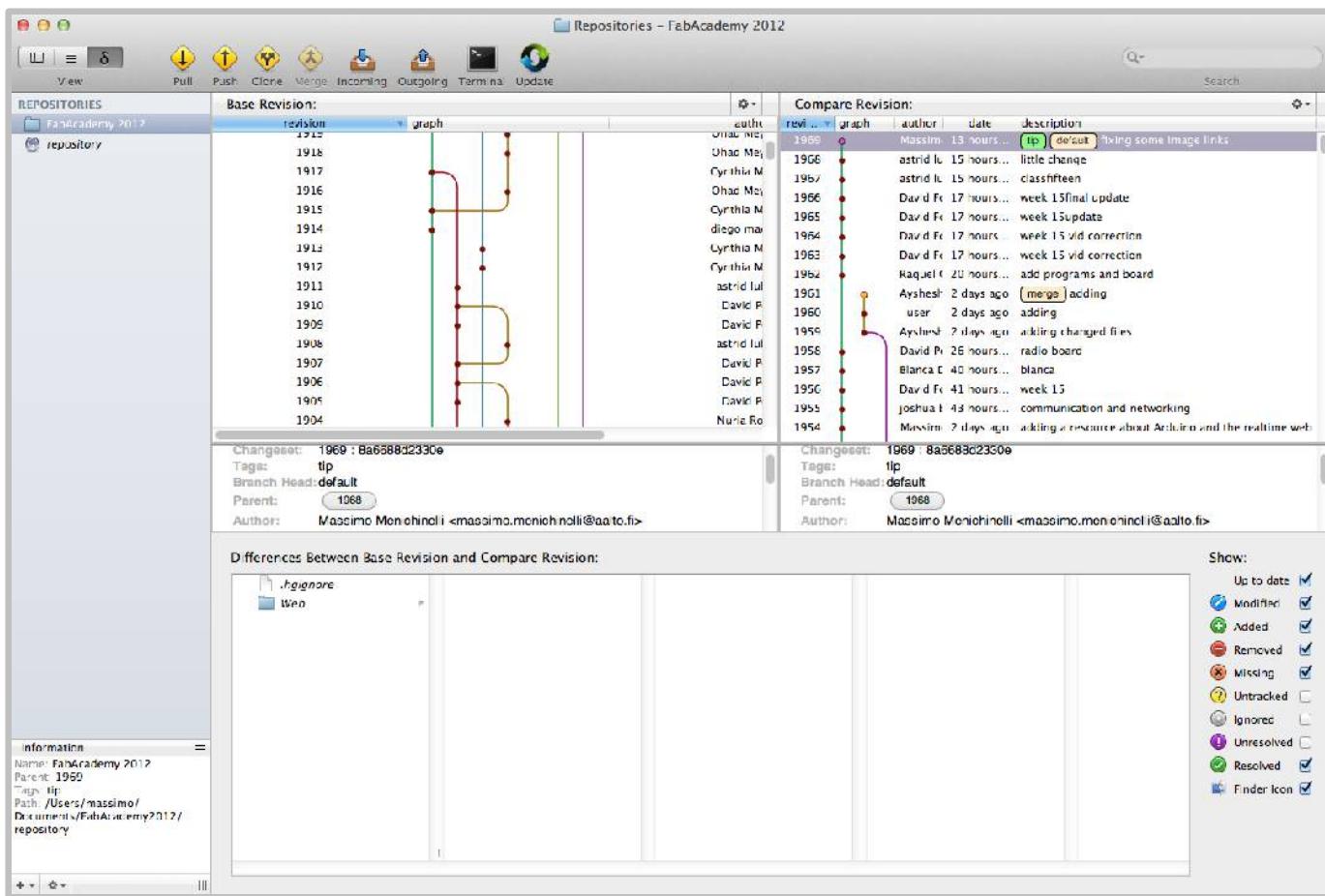
A complete and easy introduction to using Mercurial.

# Git / Hg project hosting: Bitbucket.org

The screenshot shows the Bitbucket homepage with a banner for 'Unlimited DVCS Code Hosting, Free'. It highlights features like unlimited repositories and integration with JIRA, Jenkins, Pivotal, and Cloud9 IDE. A yellow button says 'SIGN UP NOW, FREE UNLIMITED PRIVATE REPOS'. Below the banner, there's a section for 'Bitbucket Features' with cards for 'Fork, code, pull', 'Secure code hosting', 'Collaborate and get social', 'Unlimited repositories', 'Work as a team', and 'Integrate'. To the right, a code review interface for pull request #88-717 is shown, displaying commit details and a diff viewer.

For both Git and Hg, free plan also for private projects.

# Mercurial (hg) client: MacHg



Much better than the terminal for starting, and it has Mercurial packaged (no need to install it separately).

Source: <http://jasonfharris.com/machg/>

# File comparison: Kaleidoscope (Mac)

*Compare files with...*

# KALEIDOSCOPE

Use Kaleidoscope to **spot the differences** in text and image files. Review changes in seconds with the world's **most advanced** file comparison application.

[Download](#)  [Buy for €29](#) 

[30 Day Demo](#) [Introductory Price](#)

[Learn more...](#)

 **Text Scope**  
Compare text and source code

 **Image Scope**  
Review mockups and photos

 **Workflow**  
Integrate with just about anything

 **Details**  
Skim through the feature list



---

Free trial for one month...

# File comparison: Perforce P4Merge (Win, Mac, Linux)

 **PERFORCE**

Company Partners Resources

Products Downloads Documentation Customers Services Purchase Support

**Create. Develop. Version everything with Perforce.**

Only Perforce products have the Perforce Server – the fast version management platform that powers productive teamwork. Built from the ground up to be scalable and easy to manage, Perforce helps thousands of the world's leading organizations innovate and succeed.

 **NYSE Euronext**. uses Perforce throughout the entire technology lifecycle of the exchange.

***"We're really not even close to maxing out the scalability of the Perforce server."***

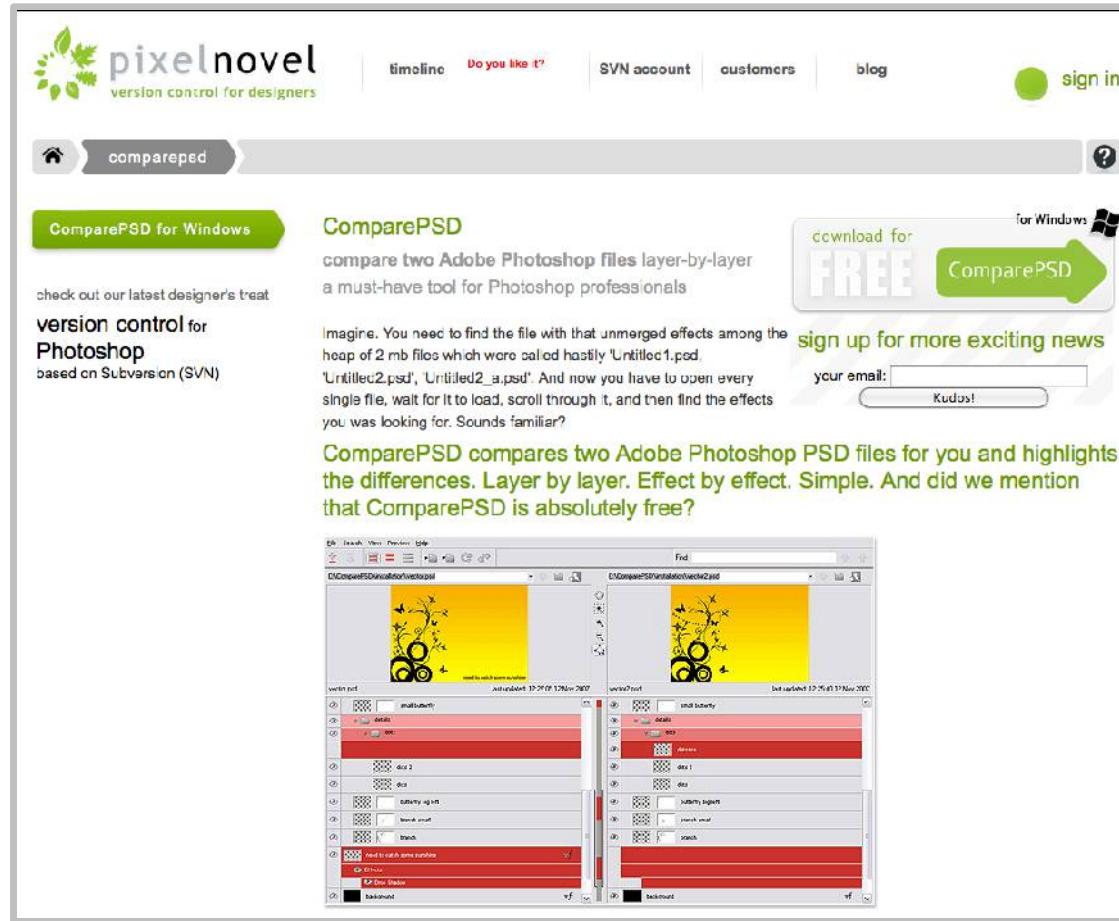


**Why Perforce** Get the fast track on better SCM... **Try Perforce** Free 2 user trial or multi-seat evaluation...  Get the Perforce 2011.1 Beta Release. Check out the [beta features](#) or [download the beta now](#).

Perforce is another version control system, but it is interesting for its visual diff applications (freeware).

Source: [http://www.perforce.com/product/components/perforce\\_visual\\_merge\\_and\\_diff\\_tools](http://www.perforce.com/product/components/perforce_visual_merge_and_diff_tools)

# File comparison: ComparePSD (Windows)



Freeware for Windows, can compare Photoshop .psd files.

Source: <http://pixelnovel.com/comparepsd/>

# Subversion hosting service: Pixelnovel

The screenshot shows the Pixelnovel website's account section. At the top, there's a navigation bar with links for 'timeline', 'Do you like it?', 'SVN account', 'customers', and 'blog'. On the right, there's a 'sign in' button. Below the navigation, a breadcrumb trail shows 'account'. The main heading is 'PIXELNOVEL ACCOUNT IS A SUBVERSION HOSTING FOR DESIGNERS'. On the left, there are two buttons: 'SVN account' (highlighted) and 'Pricing & plans'. The central content area lists several features:

- 3 plans for your convenience, a **free account** is available
- View all your files online along with **previews and history\***
- Is based on Subversion (SVN), a proved version control system
- Add more users to your account and manage their rights

\* only available if used along with Timeline, the Subversion client for Adobe Creative Suite

On the right, there are two buttons: 'SEE PLANS' and 'SIGN UP'.

A testimonial box contains the text: ““If you don't have your own SVN repository, a PixelNovel account will provide you with a hassle-free alternative, plus you get the extra features such as user management system and automatic back up””

Integrated with Photoshop: free plan (100 MB) and better paid plans.

Source: <http://pixelnovel.com svn-account/>

# SVN / Git / Hg hosting service: Beanstalk

The screenshot shows the Beanstalk website homepage. At the top, there is a dark navigation bar with links for Home, Feature Tour, Partners & Tools, API, Guides, Blog, Pricing & Sign Up. Below the navigation is the Beanstalk logo with the tagline "The easiest way to manage code, collaborate and deploy." The page is divided into three main sections: Version Control, Collaboration, and Deployments, each with a brief description and icon. A yellow banner features the HappyCog logo and a success story about HappyCog scaling with Beanstalk. At the bottom, there is a "View Plans & Pricing" button and a section for "Our customers" featuring logos for Wufoo, Philips, brightcove, blueflavor, and Hello Enjoy.

Home Feature Tour Partners & Tools API Guides Blog • Pricing & Sign Up

**beanstalk**

The easiest way to manage code, collaborate and deploy.

Version Control

Secure, private and reliable Git, Subversion and Mercurial hosting. View activity, browse files, compare revisions.

Collaboration

Review code and discuss changes. Easily integrate with your favorite ticketing, support and communication tools.

Deployments

Instantly deploy or rollback updates to multiple web servers for testing and production releases.

HAPPY COG EST. 1999

HappyCog easily scales for an MTV audience with Beanstalk

Find out how the award-winning team at Happy Cog was able to scale an application from four to twenty-two servers over a 3G hotspot thanks to Beanstalk Deployments.

Read the story

[View Plans & Pricing](#) — No contract and you'll be ready in seconds.

Our customers:

WUFOO PHILIPS brightcove blueflavor HELLO ENJOY

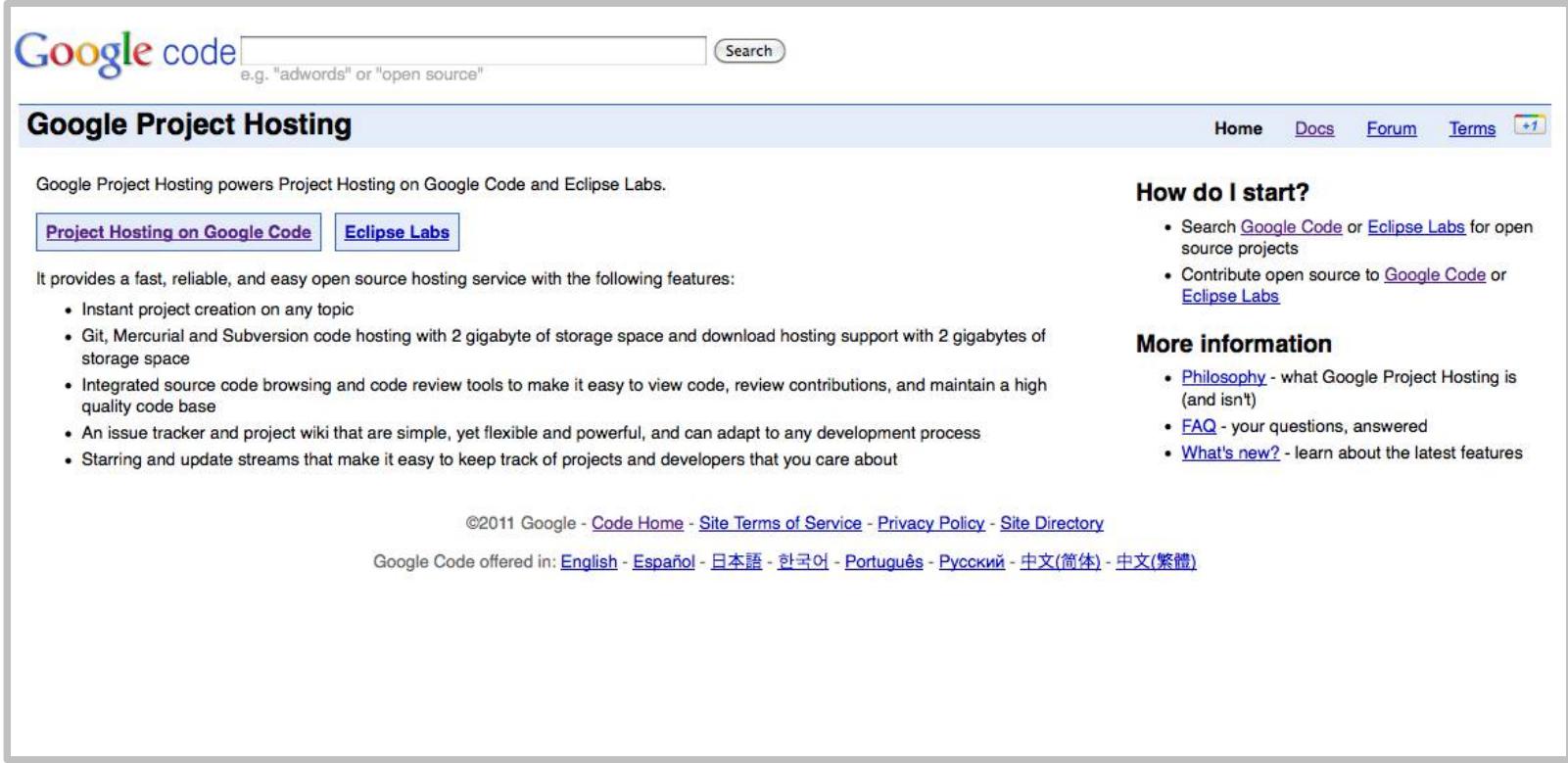
Paid plans (with free trial).

# SVN / Git hosting service: Codesion

The screenshot shows the homepage of the Codesion website. At the top, there's a navigation bar with links for 'Login', 'Status Site', 'Help', 'Get Free Hosting', 'SIGN UP', and several menu items: 'Tour', 'Partners', 'Buzz', 'Training', 'Blog', and 'Pricing & Signup'. The main header features a green frog logo and the text 'we're now COLLABNET.' Below the header, a large green banner reads 'GET G+ ON CODESION'. To the right of the banner are three call-to-action buttons: 'WATCH DEMO' (with a link to see how it works), 'FREE TRIAL' (with a link to try it for 30 days), and 'CONTACT US'. A central image shows a person working at a computer. Below the banner, a section states 'Serving 70,000 active users in 90 countries'. There are three main promotional boxes: 'EUROPEAN DATA CENTER NOW LIVE' (with a lock icon and a 'Request Access' button), 'INSTANT SUBVERSION AND GIT' (with a 'Check It Out' button), and 'PCI LEVEL 1 COMPLIANT SECURITY' (with a padlock icon and a 'More on Security' button). The bottom of the page has an orange footer bar.

Paid plans (with free trial).

# SVN / Git / Hg hosting service: Google Code



The screenshot shows the Google Project Hosting homepage. At the top, there's a search bar with placeholder text "e.g. 'adwords' or 'open source'" and a "Search" button. Below the search bar, the title "Google Project Hosting" is displayed. To the right of the title are links for "Home", "Docs", "Forum", "Terms", and a plus sign icon. A banner below the title states "Google Project Hosting powers Project Hosting on Google Code and Eclipse Labs." There are two blue buttons: "Project Hosting on Google Code" and "Eclipse Labs". A section titled "How do I start?" lists three items: "Search Google Code or Eclipse Labs for open source projects", "Contribute open source to Google Code or Eclipse Labs", and "Create a project on Google Code or Eclipse Labs". Another section titled "More information" lists three items: "Philosophy - what Google Project Hosting is (and isn't)", "FAQ - your questions, answered", and "What's new? - learn about the latest features". At the bottom, there's a copyright notice for 2011 Google and links to "Code Home", "Site Terms of Service", "Privacy Policy", and "Site Directory". It also mentions that Google Code is offered in multiple languages.

Google code  e.g. "adwords" or "open source"

## Google Project Hosting

Home Docs Forum Terms +1

Google Project Hosting powers Project Hosting on Google Code and Eclipse Labs.

[Project Hosting on Google Code](#) [Eclipse Labs](#)

It provides a fast, reliable, and easy open source hosting service with the following features:

- Instant project creation on any topic
- Git, Mercurial and Subversion code hosting with 2 gigabyte of storage space and download hosting support with 2 gigabytes of storage space
- Integrated source code browsing and code review tools to make it easy to view code, review contributions, and maintain a high quality code base
- An issue tracker and project wiki that are simple, yet flexible and powerful, and can adapt to any development process
- Starring and update streams that make it easy to keep track of projects and developers that you care about

©2011 Google - [Code Home](#) - [Site Terms of Service](#) - [Privacy Policy](#) - [Site Directory](#)  
Google Code offered in: [English](#) - [Español](#) - [日本語](#) - [한국어](#) - [Português](#) - [Русский](#) - [中文\(简体\)](#) - [中文\(繁體\)](#)

Free for open source projects.

Source: <http://code.google.com/projecthosting/>



Aalto University  
Media Factory

# 03. QR Code: bits about a project from its atoms

# Retrieving the source code of an object

15 MAR '12

## ARDUINO TOOL THAT CONNECTS EACH BOARD TO ITS OWN SOURCE

ARDUINO, OPEN SOURCE

BY DAVE VONDLE

Arduino File Edit Sketch Tools Help

Auto Format ⌘T

Archive Sketch

Fix Encoding & Reload

Serial Monitor ⌘M

Retrieve Source

Upload Source to Github

Board

Serial Port

Programmer

Burn Bootloader

If you create something with Arduino and put it out into the world, there is no well-established link to the source. If you personally made the device, the source can get lost over time. If you didn't create it, you could have a tough time tracking the source down. You have the physical device, why can't it tell you where its code lives?

I made a tool for Arduino called "Upload-And-Retrieve-Source" that for the most part solves this problem.

Github page [here](#), direct download link [here](#)

HOME ABOUT CONTACT

ABOUT IDEO LABS

IDEO Labs is a place where we can show bits of what we're working on, talk about prototyping, and share our excitement over the tools that help us create.

MORE

SUBSCRIBE TO RSS

CATEGORIES

3D

Arduino

flash

Hack

iPhone

multi-touch

open source

What about retrieving the information about a project, in order to be able to modify it? If we work with Arduino, there is this software from IDEO.

Source: <http://labs.ideo.com/2012/03/15/arduino-tool-that-connects-each-board-to-its-own-source/>

# Dead Drops: local (really!) information

The screenshot shows the official website for Dead Drops at [deaddrops.com](http://deaddrops.com). The main navigation bar includes links for About, Dead Drops, Blog, Forum, Media & Press, and Contact. The 'About' page features a photograph of a small USB drive embedded in a brick wall. Below the photo is a detailed description of the project:

'Dead Drops' is an anonymous, offline, peer to peer file-sharing network in public space. USB flash drives are embedded into walls, buildings and curbs accessible to anybody in public space. Everyone is invited to drop or find files on a dead drop. Plug your laptop to a wall, house or pole to share your favorite files and data. Each dead drop is installed empty except a readme.txt file explaining the project. 'Dead Drops' is open to participation. If you want to install a dead drop in your city/neighborhood follow the '[how to](#)' instructions and submit the location and pictures.

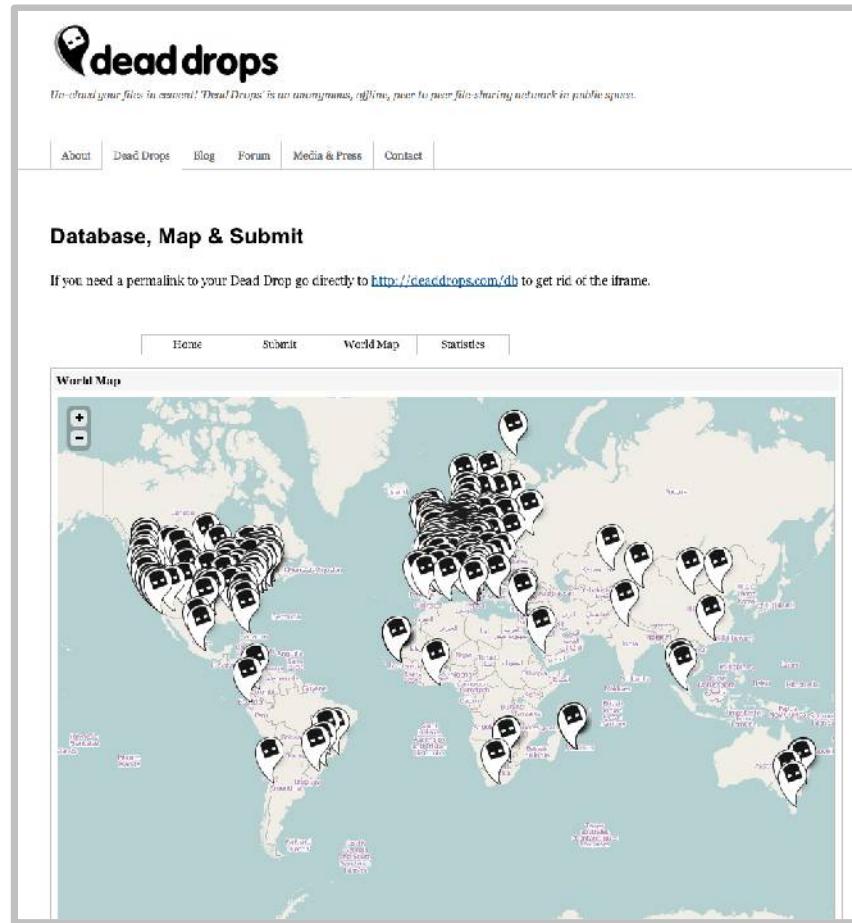
To the right of the website screenshot is a Facebook post from the 'Dead\_Drops' page. The post includes a profile picture of Aram Bartholl, a link to the page, and a message in German:

Dead\_Drops habe THX! RT @basisfmm  
Danke @arambartholl für den  
spannenden Vortrag! Die Doku legen wir  
auf unseren neuen @dead\_drops  
[Facebook](#)

'Dead Drops' is an anonymous, offline, peer to peer file-sharing network in public space. USB flash drives are embedded into walls accessible to anybody.

Source: <http://deaddrops.com/>

# Dead Drops: how to find them



‘Dead Drops’ is an anonymous, offline, peer to peer file-sharing network in public space. USB flash drives are embedded into walls accessible to anybody.

Source: <http://deaddrops.com/dead-drops/db-map/>

# Spime: sp(ace) + (ti)me of an object



September 2005  
5 1/2 x 7 1/2, 152 pp., 62 illus.  
\$20.95/£14.95 (PAPER)  
Trade

ISBN-10:  
0-262-69326-7  
ISBN-13:  
978-0-262-69326-4

**ADD TO CART**

#### Other Editions

Cloth (2005)

#### Series

Mediaworks Pamphlets

## Shaping Things

Bruce Sterling

Designed by Lorraine Wild

#### ► Table of Contents and Sample Chapters

"*Shaping Things* is about created objects and the environment, which is to say, it's about everything," writes Bruce Sterling in this addition to the Mediawork Pamphlet series. He adds, "Seen from sufficient distance, this is a small topic."

Sterling offers a brilliant, often hilarious history of shaped things. We have moved from an age of artifacts, made by hand, through complex machines, to the current era of "gizmos." New forms of design and manufacture are appearing that lack historical precedent, he writes; but the production methods, using archaic forms of energy and materials that are finite and toxic, are not sustainable. The future will see a new kind of object—we have the primitive forms of them now in our pockets and briefcases: user-alterable, baroquely multi-featured, and programmable—that will be sustainable, enhanceable, and uniquely identifiable. Sterling coins the term "spime" for them, these future manufactured objects with informational support so extensive and rich that they are regarded as material instantiations of an immaterial system. Spimes are designed on screens, fabricated by digital means, and precisely tracked through space and time. They are made of substances that can be folded back into the production stream of future spimes, challenging all of us to become involved in their production. Spimes are coming, says Sterling. We will need these objects in order to live; we won't be able to surrender their advantages without awful consequences.

The vision of *Shaping Things* is given material form by the intricate design of Lorraine Wild. *Shaping Things* is for designers and thinkers, engineers and scientists, entrepreneurs and financiers—and anyone who wants to understand and be part of the process of technosocial transformation.

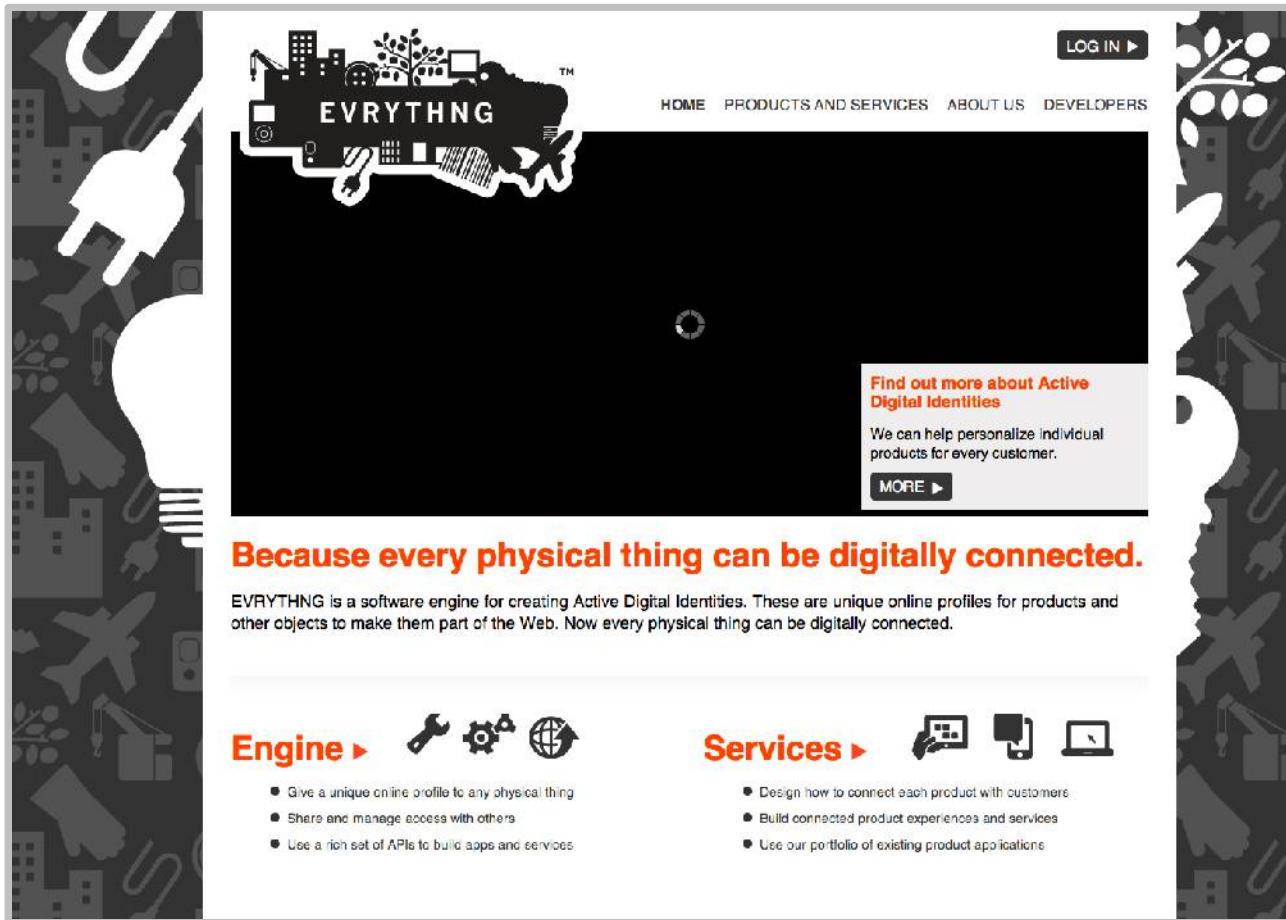
#### About the Author

Hugo Award-winning science fiction author and futurist Bruce Sterling has been called by *Time* "perhaps the sharpest observer of our media-choked culture working today in any genre." Three of his novels have been *New York Times* Notable Books of the Year, and he has been a contributing writer for *Wired* since its conception. In 2005 he is "Visionary-in-Residence" at Art Center College of Design, Pasadena. Bruce Sterling's blog *Beyond the Beyond* has been active since 2003.

*Spime* is a neologism for a currently theoretical object that can be tracked through space and time throughout the lifetime of the object.

Source: <http://mitpress.mit.edu/catalog/item/default.asp?id=10603&ttype=2>  
<http://en.wikipedia.org/wiki/Spime>

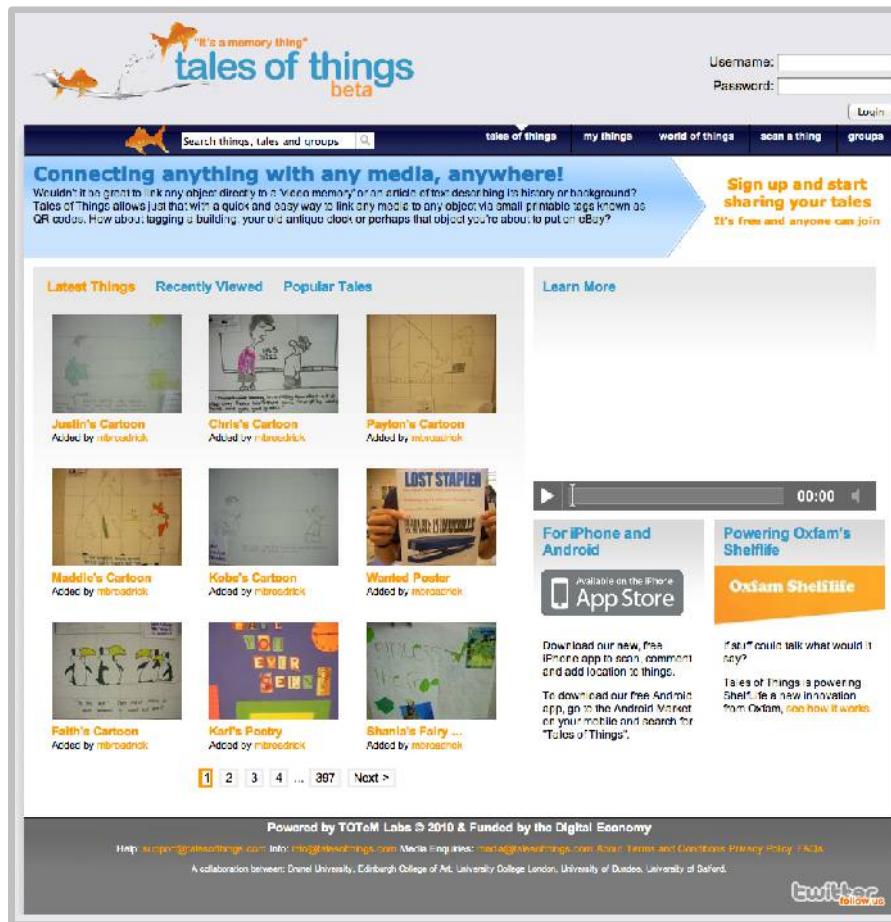
# Evrythng.com



EVRYTHNG is a software engine for creating Active Digital Identities, unique online profiles for objects to make them part of the Web and digitally connected.

Source: <http://evrythng.com/>

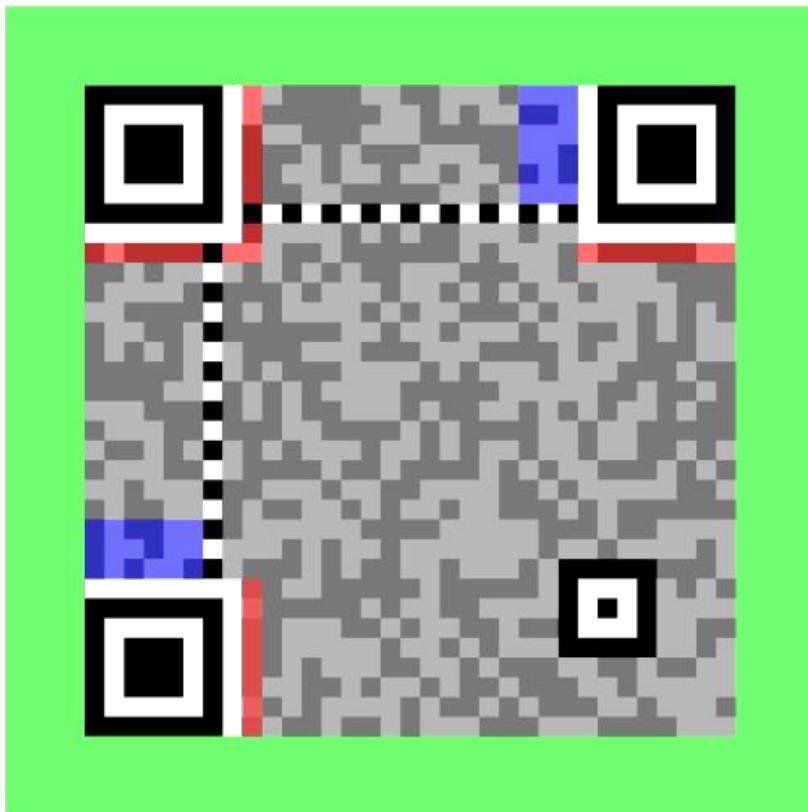
# Tales of things (.com)



Tales of Things allows just that with a quick and easy way to link any media to any object via small printable tags known as QR codes.

Source: <http://www.talesofthings.com/>

# Q(uick)R(esponse) Code



1. Version information
2. Format information
3. Data and error correction keys
4. Required patterns
  - 4.1. Position
  - 4.2. Alignment
  - 4.3. Timing
5. Quiet zone

QR Code is the trademark for a type of matrix / 2D barcode that can encode four standardized kinds of data (numeric, alphanumeric, byte/binary, Kanji).

Source: [http://en.wikipedia.org/wiki/Qr\\_code](http://en.wikipedia.org/wiki/Qr_code)

# QR Code: data storage

The amount of data that can be stored in the QR Code symbol depends on the **datatype** (mode, or input character set), **version** (1,...,40, indicating the overall dimensions of the symbol), and **error correction level** (L[ow], M[edium], Q[uality], H[igh]). The maximum storage capacities are:

- \* **Numeric only:** max. 7,089 characters (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)
  - \* **Alphanumeric:** max. 4,296 characters (0–9, A–Z [upper-case only], space, \$, %, \*, +, -, ., /, :)
  - \* **Binary/byte:** max. 2,953 characters (8-bit bytes) (23624 bits)
  - \* **Kanji/Kana:** max. 1,817 characters
-

# QR Code: data storage



The more information is encoded, the finer the details of the code.

Source: [http://en.wikipedia.org/wiki/Qr\\_code](http://en.wikipedia.org/wiki/Qr_code)

# QR Code: error tolerance and customization



---

You can “hack” a QR Code thanks to its tolerance to errors.

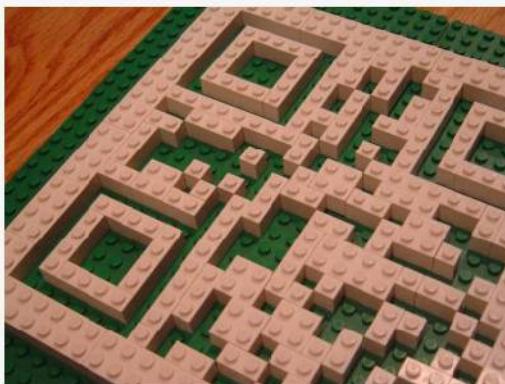
# QR Codes: not just printed paper

## QR codes in Lego

I've been experimenting with [QR codes](#) (2-d bar codes) with my mobile phone. While helping my daughter assemble a Lego® spaceship, I had the random thought that maybe I could build a QR code out of Lego. Would such a QR code be readable, or would the bumps and gaps mess it up?

To find out, I generated a QR code and started assembling it out of my daughter's spare Lego pieces. This would have been much easier if she had a lot of small white pieces, so I needed to really dig to find the necessary 1x1 blocks. (I'm pretty sure that determining if a code can be tiled with a specific set of blocks is a NP-complete problem, but my manual heuristics were sufficient to get it assembled.)

The moment of truth... would it scan? No, not at all. The problem was I needed a border around the code block and I'd put the pieces too close to the edge. So I laboriously shifted all the pieces over and added a white border.



LEGO Star Wars  
MagnaGuard Starfighter...  
LEGO

Buy from [amazon.com](#)

Privacy Information

With the border, the QR code scanned amazingly well. Here's a camera-eye view. If you have a barcode-enabled phone, you can probably scan this off the screen:



You can create QR codes with existing materials, objects and building blocks...

Source: <http://www.arcfn.com/2009/01/qr-codes-in-lego.html>

# QR Codes: not just printed paper

## A QR CODE BUILT FROM EVERYDAY OBJECTS

THURSDAY 12.15.2011 , POSTED BY BENJAMIN STARR

SHARE:

 Tweet 25

 Like 16

 +1 4

 Pin it

 Submit



QR codes seem to be cropping up everywhere you look, from tags in electronics stores to flyers stapled to telephone poles... so it's really nice to see this [completely original project](#) from David Sykes. To promote his newly launched website, Sykes created an 8 foot square model of a QR code using objects sourced directly from his studio. He then photographed the 'cityscape' of stuff from above and made 8x10 prints retaining the full frame of the shot. By including the studio floor and rebates in the image, he gave the whole piece a further sense of depth. Possibly my favorite aspect of the project was the mysterious way each print arrived at its recipient: in an anonymous photograph mailer with no mention of who it was from. Brilliant!

You can create QR codes with existing materials, objects and building blocks...

Source: <http://www.visualnews.com/2011/12/15/a-qr-code-built-from-everyday-objects/>

# QR Codes: not just printed paper



---

You can create QR codes with existing materials, objects and building blocks...

Source: <http://www.elenabelmann.blogspot.com/2011/02/objekt-als-informationstrager.html>

# QR Codes: an easy way to create them

The screenshot shows a web application for generating QR codes. At the top left is a QR code icon. To its right, text reads: "Create QR codes from different kinds of data, and download your code both in a **rasterized (PNG)** and **vector format (PDF, SVG, EPS)**. Feedback/suggestions? Leave your message."

## What do you want to turn into a QR code?

A vertical list of options on the left includes: Regular text (highlighted in teal), Hyperlink, Phone number, Email address, meCard, vCard, and WiFi settings.

To the right of the options, a large input field is labeled "Regular text will not be interpreted by most QR readers, so it will just be displayed as it is." Below this is a "more options" button with a gear icon. At the bottom right is a prominent "CREATE" button.

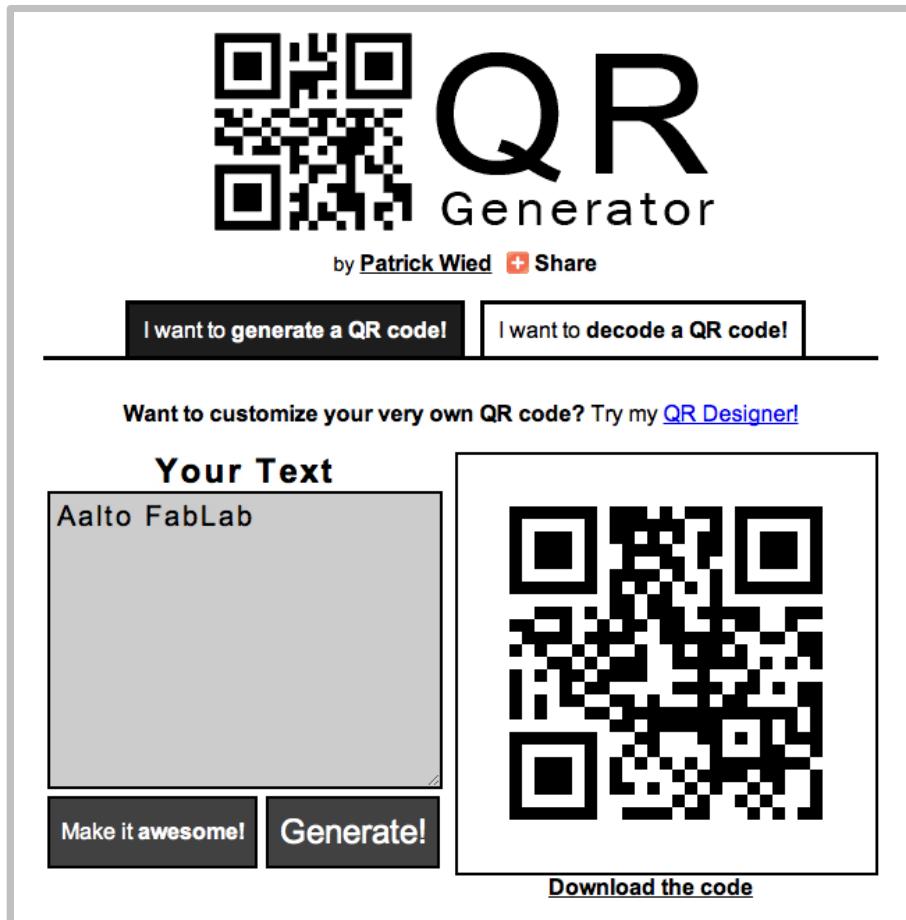
At the very bottom left of the main area are social sharing links for Facebook and Twitter.

---

Many online free services will create QR Codes for you starting from many different kinds of information.

Source: <http://qrcode.littleidiot.be/>

# QR Codes: an easy way to create (and decode) them



Many online free services will create QR Codes for you starting from many different kinds of information.

Source: <http://www.patrick-wied.at/static/qrgen/>

# QR Codes: an easy way to create them

The screenshot shows the homepage of QRStuff.com. At the top, there's a navigation bar with links for HOME, ABOUT THIS SITE, QR CODES, PHONE SOFTWARE, EXAMPLES, FAQS, and AFFILIATES. There are also social media links for Twitter, Facebook, and a BLOG. A login form for Email and Password is on the right, along with links for Register and Forgot Password?.

The main content area has a banner with links for Dynamic QR Codes, Vector Or Raster File Output, High Resolution Files, Analytics Reports, Error Correction Levels, Account History, and Batch Processing (up to 500 QR codes at a time). It also features a "SUBSCRIBE NOW FROM \$3.95" button.

The interface is divided into four main sections:

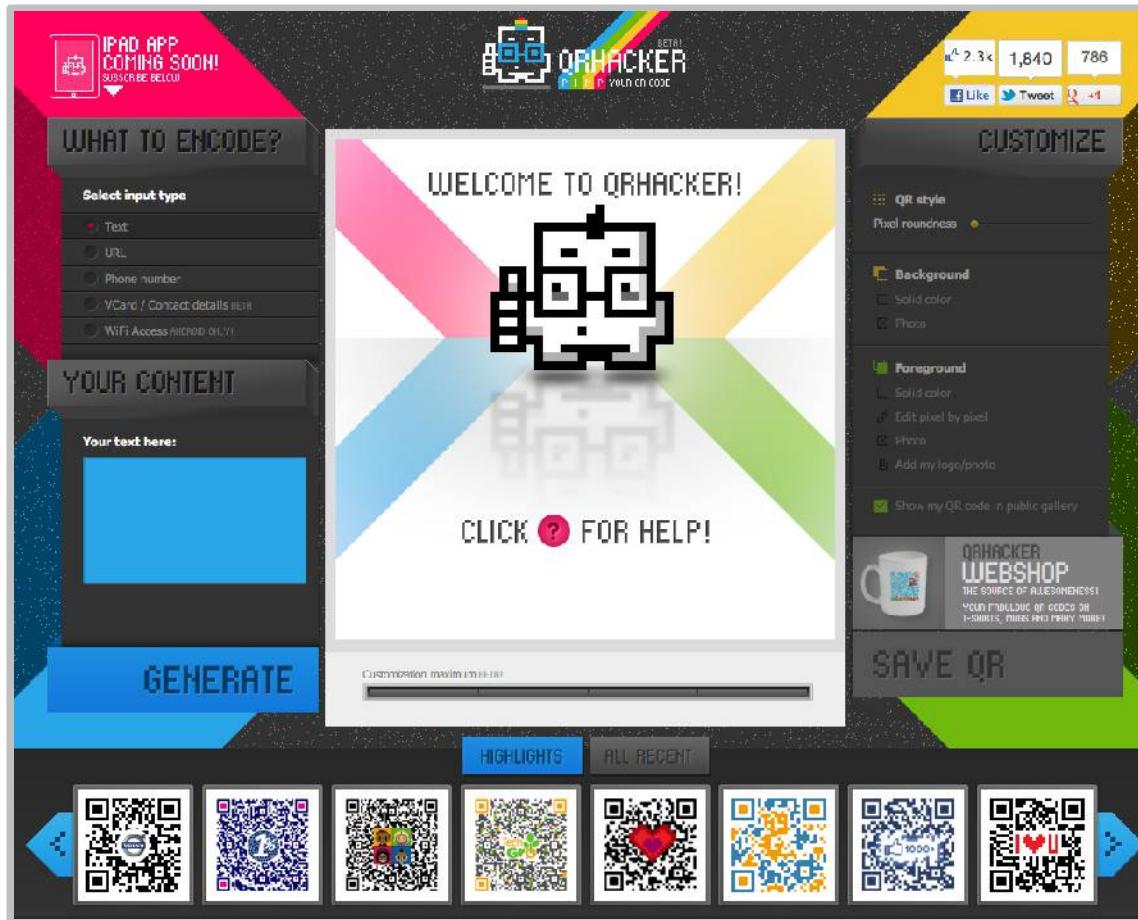
- 1 DATA TYPE:** A list of options including Website URL, YouTube Video, Google Maps Location, Twitter, Facebook, LinkedIn, Foursquare, iTunes Link, Plain Text, Telephone Number, Skype Call, SMS Message, Email Address, Email Message, Contact Details (VCARD), Event (VCALENDAR), Wifi Login (Android Only), and Paypal Buy Now Link. The "Website URL" option is selected.
- 2 CONTENT:** A field labeled "Website URL" containing "http://". Below it are two radio button options: "Embed URL into code as-is" (selected) and "Use our qrs.ly URL shortener". A note below says "Subscribers get analytics and dynamic QR code editing when using our URL shortener."
- 3 FOREGROUND COLOUR:** A color picker showing a gradient from purple to red. A color hex code "000000" is shown next to a black square. A note below says "Subscribers can also specify image size and resolution, and choose from 6 raster or vector output file types and 4 error correction levels."
- 4 OUTPUT TYPE:** Buttons for DOWNLOAD, PRINT, EMAIL, and BATCH FILE UPLOAD. To the right, there's a section titled "PUT YOUR CODE ON OTHER STUFF" showing various examples like a t-shirt, a mug, and a bag with QR codes.

On the right side of the preview area, there's a "DOWNLOAD QR CODE" button and a QR code itself.

Many online free services will create QR Codes for you starting from many different kinds of information.

Source: <http://www.qrstuff.com/>

# QR Codes: an easy way to create them



Many online free services will create QR Codes for you starting from many different kinds of information.

Source: <http://www.qrhacker.com/>

# QR Codes: an easy way to create a stencil

The screenshot shows a web page from the Make: magazine website. The header features the 'Make:' logo in red and blue, with the tagline 'technology on your time'. Below the header are four navigation tabs: 'Blog' (highlighted in green), 'MAKE Magazine', 'Videos/Podcasts', and 'Make: Projects'. A breadcrumb navigation bar indicates the current location: 'Home / Culture jamming / QR Stenciler'. The main title of the article is 'QR Stenciler'. To the left of the main content, there is a sidebar with text from Golan Levin at fffff.at, which reads: 'writes: Yep, it's a QR code stencil'. The main content area contains a photograph of a QR code stencil painted on a concrete surface. Below the image is a paragraph of text:

generator! We present **QR\_STENCILER**, a free, fully-automated utility which converts QR codes into vector-based stencil patterns suitable for laser-cutting. Additionally, we present **QR\_HOBO\_CODES**, a series of one hundred QR stencil designs which, covertly marked in urban spaces, may be used to warn people about danger or clue them into good situations. The QR\_STENCILER and the QR\_HOBO\_CODES join the *Adjustable Pie Chart Stencil* in our suite of homebrew "infoviz graffiti" tools for locative and situated information display.

... and there are even libraries for creating stencil of QR Codes that you can laser cut!

Source: <http://blog.makezine.com/2011/07/20/qr-stenciler/>

# QR Codes: you can track the position as well

**springwise.com**  
YOUR ESSENTIAL FIX OF ENTREPRENEURIAL IDEAS

## In Croatia, postage stamps made trackable via QR code

Croatia's Hrvatska Pošta has created postage stamps featuring QR codes that can be used to track mail and confirm delivery.

**1st November 2011 in Government.**

As postal services around the globe struggle to keep up with the online era, we've already seen [al-digital](#) stamps rolled out in Denmark. Now it looks like Croatia's own [Hrvatska Pošta](#) has come up with a different solution: postage stamps featuring QR codes that can be used to track the mail and confirm delivery.

As you can link an identity to an object with a QR Code, then we can track where this identity moves.

Source: <http://www.springwise.com/government/croatia-postage-stamps-trackable-qr-code/>

# QR Codes: you can add related information

**springwise.com**  
YOUR ESSENTIAL FIX OF ENTREPRENEURIAL IDEAS

## On cigarette packages, QR codes reveal a nearby place to smoke

Ronhill has begun to use QR codes on its cigarette packaging to help consumers find a nearby place to smoke.



Just as today's prevalent smoking bans can lead to a lot of cigarette butts on the doorsteps of public places, so the increasingly smoke-free world can make it difficult for smokers to find a place to enjoy their habit. Enter Croatian cigarette brand **Ronhill**, which has begun to use QR codes on its packaging to help consumers find a nearby place to smoke.

You can provide related information and build apps and services around an object!

Source: [http://www.springwise.com/lifestyle\\_leisure/cigarette-packages-qr-codes-reveal-nearby-place-smoke/](http://www.springwise.com/lifestyle_leisure/cigarette-packages-qr-codes-reveal-nearby-place-smoke/)

# QR Codes: you can add related information

Steelcase NO

PRODUCTS SERVICES RESOURCES SHOP COMPANY

## Leap: QR Codes

Overview Gallery Environmental Adjustability QR Codes

QR codes help users learn how to properly adjust the Leap chair.

To help users quickly find information on how to properly adjust their chairs to be more comfortable, Steelcase will be adding QR codes to the arms of its best selling ergonomic task chairs, such as Leap (available fall 2011).

**How does the QR code work?**

Once a user scans the QR code with a mobile device, they are taken to a mobile-friendly site that plays an interactive video showing chair adjustments.

The QR code connects users to information about their chair that is relevant to them:

- how to adjust the chair
- how to clean the chair
- how they can purchase a chair for their home office

Find a [dealer](#) near you.



You can provide the instruction manual of an object!

Source: <http://www.steelcase.com/en/products/category/seating/task/leap/pages/qr-codes.aspx>  
<http://www.fastcodesign.com/1665090/an-office-chair-with-built-in-video-instruction-manual>

# QR Codes: you can add the source code!

**SUPERMECHANICAL** objects that connect us

Objects Blog About



**REV->TABLE**

Products used to be less disposable; they came with repair manuals and a personal history. rev->table picks up where they left off.

This side table is built to last with quality components. And when those have outlived their useful life, the digital blueprint is a permanent part of rev->table. Use your smartphone to read the digital design file embedded in each part and create replacements. Modify the legs to make them longer or angled or art deco. This is furniture for the future of manufacturing.

Solid oak, powder-coated steel, laser-etched aluminum. Crafted in the United States using the best of traditional and digital construction.

21"H x 16"W x 16"L; 10.5 lbs.

 Tweet

... and finally you can even provide directly the source code of an object, not just a link to its source online!

Source: <http://supermechanical.com/rev/>

[http://www.springwise.com/style\\_design/future-repairs-tables-digital-blueprints-etched-surface/](http://www.springwise.com/style_design/future-repairs-tables-digital-blueprints-etched-surface/)

# QR Codes: you can add the source code!



... and finally you can even provide directly the source code of an object, not just a link to its source online!

Source: <http://supermechanical.com/rev/>

[http://www.springwise.com/style\\_design/future-repairs-tables-digital-blueprints-etched-surface/](http://www.springwise.com/style_design/future-repairs-tables-digital-blueprints-etched-surface/)

# QR Codes: which bits?

PCWorld » Security

Recommend: 0 Comments Print

## Beware of Malicious QR Codes

By Hamish Barwick, Computerworld-Australia

Cyber criminals have taken advantage of the proliferation of quick response (QR) codes on posters and marketing material by putting their own malicious stickers over the top of legitimate ones, warns security vendor AVG Australia and New Zealand.

QR codes can be read by scanning the sticker or typing in the code using a smartphone with a QR code reader.

In its latest report, entitled AVG Community Powered Threat Q4 2011, the company warns that cyber criminals are now producing their own QR codes which contain text and URLs with hidden malware. For example, one piece of malware called 'JimmRussia' sends costly SMS messages to premium numbers and also redirects to a URL which downloads a malicious file.

AVG Technologies chief technology officer, Yuval Ben-Itzhak, said in a statement that the smartphone user does not know what lurks behind the code until the malware is installed and running. "Putting a malicious QR code sticker onto existing marketing material or replacing a website's bona fide QR code with a malicious one could be enough to trick many unsuspecting people," he said.



We are embedding information on an object, and we use a device for retrieving it... but which kind of information?

Source: [http://www.pcworld.com/article/248843/beware\\_of\\_malicious\\_qr\\_codes.html](http://www.pcworld.com/article/248843/beware_of_malicious_qr_codes.html)

# Virus: a dangerous information



---

Some kind of information (like viruses) can modify, deform and damage an object...

Source: <http://www.platform21.nl/page/3915/en>  
<http://www.nextnature.net/2009/04/ikea-lamp-ca...>

# QR Code: you can even print it (in 3D)

The screenshot shows a Thingiverse page for a "Data Matrix Dualstrusionator". The main image is a photograph of a 3D-printed QR code being processed by a 3D printer. Below the image, the title "Data Matrix Dualstrusionator" is displayed, along with a brief description: "This script lets you create a positive/negative Data Matrix[1] Bar Code suitable for feeding into your experimental dual extruders. Or if you just want a negative space object barcode to cut into another model." The page includes social sharing buttons for Twitter, Facebook, and Pinterest, and a "Downloads" section with three files: "datamatrix dual...scad", "datamatrix duals...rb", and "number a.stl".

Welcome, friend.  
Please [REGISTER](#) or [LOGIN](#) to rock.

SEARCH

DIGITAL DESIGNS FOR REAL, PHYSICAL OBJECTS. A UNIVERSE OF THINGS! | [UPLOAD A THING](#)

## Data Matrix Dualstrusionator

Created by [tbuser](#)

Created on Oct 1, 2011

Derived from: [OpenSCAD Bitmap Fonts Module](#) by [tbuser](#)

This script lets you create a positive/negative Data Matrix[1] Bar Code suitable for feeding into your experimental dual extruders. Or if you just want a negative space object barcode to cut into another model.

You can encode the whole thingiverse url in your barcode, but the result will be pretty big. Probably too large to stamp into another model. However, you can just encode the Thingiverse thing number to get a pretty small code!

1: [on.wikidoc.org/wiki/Data\\_Matrix](#)

[Twitter](#) 4 | [Facebook](#) Like 0 | [Pinterest](#) | [Submit](#) | [Flattr](#) 2

### Downloads

Sort By: Date Popular File Type

- [datamatrix dual...scad](#)  
2 kb / 33 downloads / 7 months ago
- [datamatrix duals...rb](#)  
924 b / 34 downloads / 7 months ago
- [number a.stl](#)  
114 kb / 30 downloads / 7 months ago

### Instructions

Install OpenSCAD, download my OpenSCAD bitmap library, and make sure you have Ruby on your system. Then run gem install semacode. Now you can edit the variables in datamatrix\_dualstrusionator.scad and .rb and run the .rb script. It will shell out to OpenSCAD and generate an .stl and a .bst. You'll probably get the best results if you print it vertically. Note: the bigger the string, the painfully longer it takes. OpenSCAD is slow. ;)

### Comments

[Leave a comment](#)

### Latest From The Thingiverse Blog

[You Know You're Onto Something...](#)

...when you're having electron microscope take the fine photos of your 3D prints. This car is a little under 300 microns long, or just about the right size to sit inside the more fine-slash extruder nozzle. Just you can get these days for your thermoset printers. Atoms are the

If you have a 3D printer that can print at least two different materials....

Source: <http://www.thingiverse.com/thing:12104>

# QR Code: for real walls

## QR code stickers turn real-world objects into digital conversations

QRawr enables users to transform physical objects into Facebook-style walls, with QR code stickers containing text and photo messages.



19th January 2012 in Lifestyle & Leisure.

We've seen QR codes being used to convey playful messages before when we covered [Qklee](#) stickers. Now San Diego based [QRawr](#) is giving users the ability to transform any physical object into a Facebook-style digital wall, with QR code stickers linking to the users' own photos, videos or text.

QRawr hope their stickers, printed with unique QR codes, will turn real-world items into online conversations. Users must first download the QRawr iOS app to create their own message on the QR code stickers. QRawr encourage users to be creative, suggesting the stickers could be left in restaurants linking to photos of ordered meals, or at the end of a hiking trail with a message for others who complete the trek. Spotters of QRawr stickers can scan them — once they've downloaded the app — and post comments, pictures and videos in response. QRawr have built the initial version of the iPhone app and are seeking funding via [Kickstarter](#) to create an Android version and add features such as geolocation.

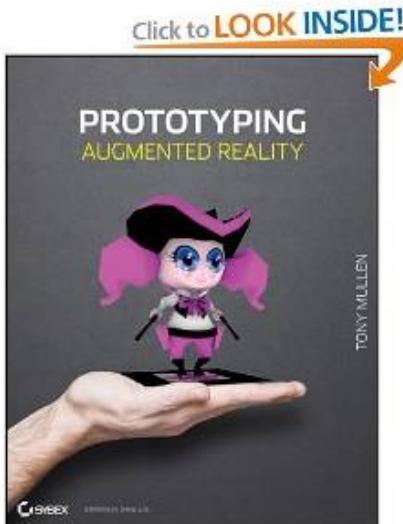
QRawr's founders believe the entertainment potential of QR codes has to-date been neglected. If you agree, this could this be an opportunity for you.

Website: [www.qrawr.com](http://www.qrawr.com)  
Contact: [team@qrawr.com](mailto:team@qrawr.com)

Not only Dead Drops can be used for embedding information on a wall!

Source: [http://www.springwise.com/lifestyle\\_leisure/qr-code-stickers-turn-real-world-objects-digital-conversations/](http://www.springwise.com/lifestyle_leisure/qr-code-stickers-turn-real-world-objects-digital-conversations/)  
<https://qrawr.com/>

# After QR Code, Augmented Reality?



## Prototyping Augmented Reality [Paperback]

Tony Mullen (Author)

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Paperback	<b>\$21.96</b>	\$17.97	\$17.95

AR can be useful for adding a layer of bits on a space or object, and we can possibly think about its source code...

Source: <http://amzn.to/KUwNk6>

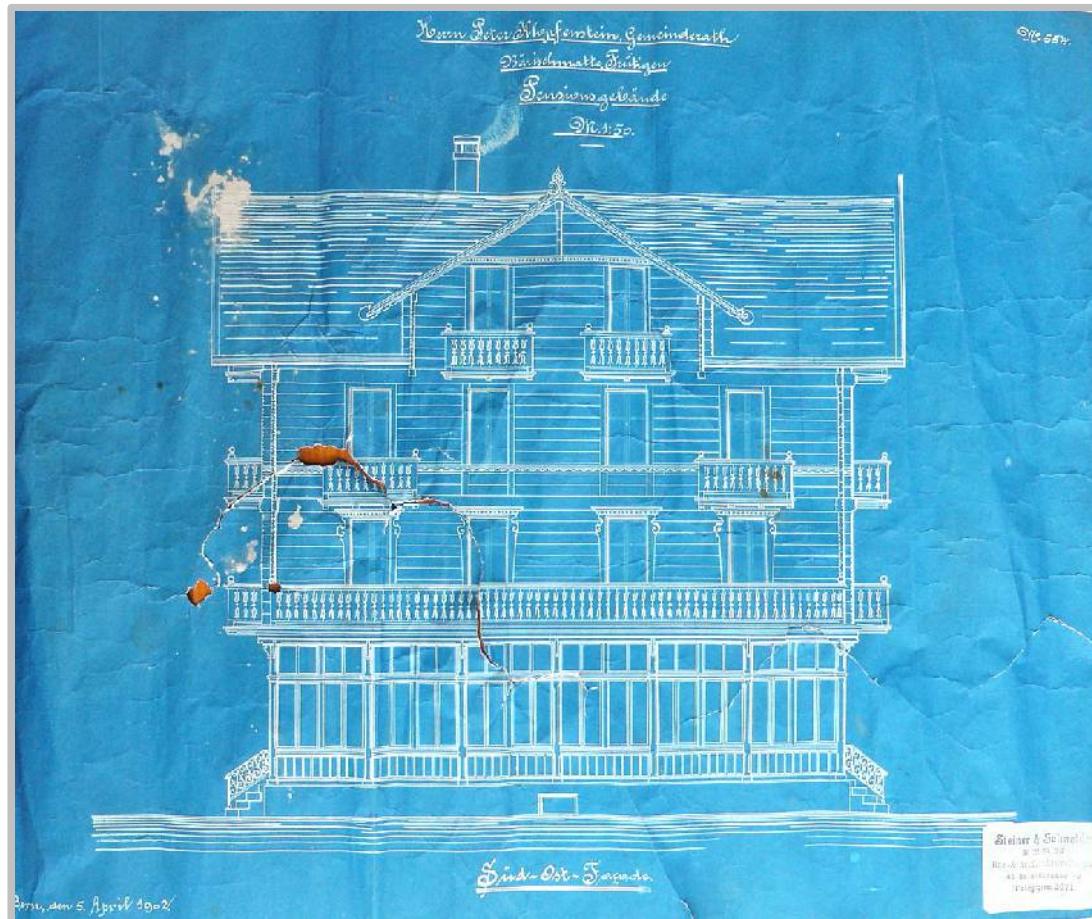


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04.

## Blueprints – suggestions for the documentation of the projects

# Ok, the blueprints...



We need all the possible documentation for being able to replicate the project in other FabLabs.

Source: <http://commons.wikimedia.org/wiki/Category:Blueprints>

# Patents (?)

Google 3d printing Messimo Menichinelli 1 + Share

Patents

Apparatus and methods for 3D printing David Russell et al.

Overview Abstract Drawings Description Claims Get it!

3d printing Go

Patent number: 7291002  
Filing date: April 2, 2004  
Issue date: Nov 6, 2007  
Application number: 10/817,169

Result 1 of 6 in this book for 3d printing < Previous Next > View all

(12) United States Patent Russell et al.

(43) Patent No.: US 7,291,002 B2  
(45) Date of Patent: Nov. 6, 2007

(54) APPARATUS AND METHODS FOR 3D PRINTING

(75) Inventor: David Russell, Burlington, MA (US); Andres Hernandez, Melkite, MA (US); Justin Kirby, Allston, MA (US); Andrew Berlin, Gloucester, MA (US)

(73) Assignee: Z Corporation, Burlington, MA (US)

(21) Appl. No.: 10817,169  
(22) Filed: Apr. 2, 2004

(60) Prior Publication Data  
US 2004/025413 A1 Dec. 30, 2004

Related U.S. Application Data  
(60) Provisional application No. 60/512,922, filed on May 23, 2004.

(31) Int. Cl.  
B29B 7/02 (2006.01)  
(10) U.S. CL... 252/47, 429/57, 471/374  
26/608, 700/11  
(58) Field of Classification Search  
425/144, 264/26, 401, 700/119, 120  
See application file for complete search history.

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(40) Subject matter disclosed, the year of this patent is considered as issued under 35 U.S.C. 151(e) by 122 days.

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US 299,212 \* 8,1999

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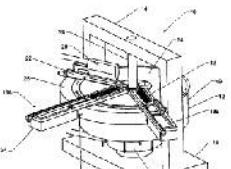
Evaluation of the Advanced Graphics Market for Year Applications of Three-Dimensional Printers, MS Thesis, MIT 1995  
(Continued)

Primary Examiner—Robert Davis  
Assistant Examiner—Maria Veronica Iacald  
(74) Attorney, Agent, or Firm—Acumen Design LLC

(57) ABSTRACT

The invention relates to apparatus and methods for producing three-dimensional objects and auxiliary systems used in conjunction with the above apparatus and methods. The apparatus and methods involve forming a three-dimensional object by selectively depositing a binder solution on a substrate to form multiple printheads. The apparatus and methods also include optical assembly for building tables, leveling systems relative to build material surfaces, cleaning diagnostic, and maintenance operation of the apparatus.

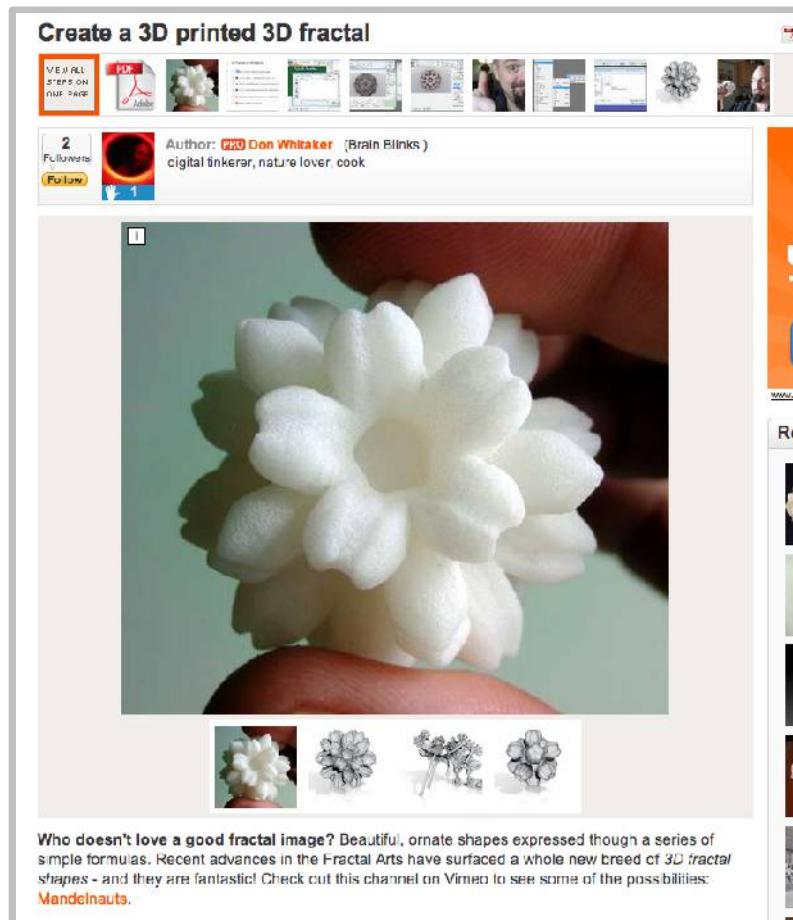
26 Claims, 19 Drawing Sheets



A very formal way of representing a project, but it could be useful.

Source: <http://bit.ly/K3YgxN>

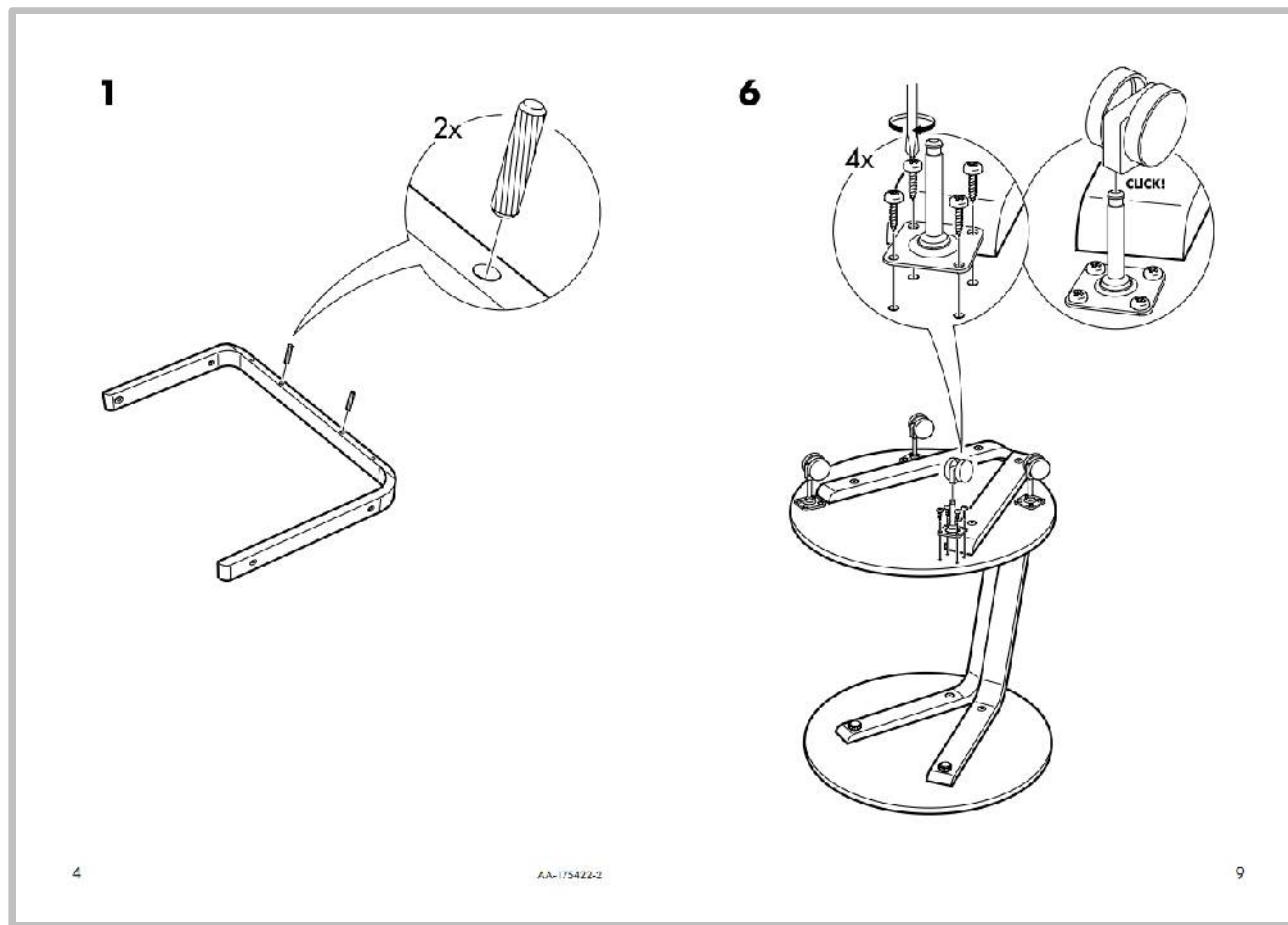
# Instructions (process): Instructables.com



You can explain in a simple way the whole process...

Source: <http://www.instructables.com/id/Create-a-3D-printed-3D-fractal/?ALLSTEPS>

# Instructions (process): IKEA



You can provide simple instructions...

# Instructions (process) for dummies: IKEA



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... simple intructions that can be understood by any culture!

## Even videos...



Nowadays it is almost impossible to find a tutorial that it is not made with a video! Even researchers present their papers with a video.

Source: <http://youtu.be/dfNByi-rr04>

# A”

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# Thank you!!

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