OpenEyes - Version Control

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Target Audience

General Interest	
Healthcare managers	
Ophthalmologists	
Developers	✔

Amendment Record

Issue	Description	Author	Date
0.9	Draft	G W Aylward	4 Oct 2010
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0.92	Draft - added change control policy	G W Aylward	23 Oct 2010

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Introduction

OpenEyes uses Git for version control. Git is a Distributed Version Control Systems which has several benefits over more conventional Centralized Version Control Systems, including the ability to restore the full history of the project from any client, and the low overhead involved in branching. Git was developed in 2005 to provide version control for the Linux project, and is available free of charge for a wide range of platforms.

Currently all the OpenEyes source files, graphics, database files, and documentation are available on a remote repository accessible using HTTP (for cloning and updates) and over SSH for

Installation

Git is available free for a variety of platforms, and detailed instructions for installation are given in Appendix 1. The Git home page is at http://git-scm.com/.

Configuration

Git requires an initial configuration which includes information about the user. The email address is particularly important, as it is used to uniquely identify each developer.

Step 2 and 3 are only required for OEF developers, who need the SSH protocol to push changes to the server.

1. Set user information

```
git config --global user.name “your username"
git config --global user.email “your email address”
```

The default editor for git in Unix and Mac is Vi, but the following command will make it use your favourite editor.

```
git config --global core.editor "pico"
```

The configuration can be checked using the following command;

```
git config --list
```

This will produce an output something like the following;

```
user.name=Bill Aylward
user.email=bill.aylward@mac.com
core.editor=pico
```

2. Generate an SSH key pair

In order to allow secure access to the central OpenEyes server, it is necessary to generate a public and private key. If you have SSH installed (should be part of the Git installation) then the following commands will generate a key pair. SSH expects to find keys in a hidden subdirectory of your home folder called .ssh, and this can be generated using the initial three commands.

```
cd ~
mkdir .ssh
cd ~/.ssh
ssh-keygen -t dsa
```

Accept the default file name and location (by pressing the return key), and use a passphrase which you need to remember for later use (eg 'openeyes2010').

3. Transfer the public key to OpenEyes

The default filename for the public key is id_dsa.pub. Attach the key to an email and send it to the OpenEyes administrator. at this address.

Downloading the OpenEyes repository

Once access to the server has been granted, a copy of the software can be downloaded from the repository as follows;

1. Create a directory where you want to put the project, and move to it:

In order to make testing easier, It makes sense to have the working directory in a position where it can be served by Apache or IIS.

```
mkdir gitprojects
cd gitprojects
```

2. Now download a clone of the project from the server:

The first command will work for any user. The second requires submission of a public key (see previous section) and is intended for user by OEF developers.

Users:

```
git clone http://aylwards.co.uk/git/OpenEyes.git
```

Developers:

```
git clone ssh://git@aylwards.co.uk:XXXX/home/git/OpenEyes
```

(NB XXXX should be replaced with the number of the port used for SSH)

The first time you do this, you will get the following message:

```
Cloning into project...
The authenticity of host '[aylwards.co.uk]:XXXX ([217.35.82.38]:XXXX)' can't be established.
DSA key fingerprint is 7f:2a:72:d8:a4:3d:2f:5b:1b:83:11:c5:9d:57:cc:53.
Are you sure you want to continue connecting (yes/no)?
```

Type ‘yes’ and press the return key. This will store the host key and stop SSH generating the message on subsequent connections.

It will also ask for your passphrase for the key-pair that you generated earlier On a Mac this can be stored in your keychain so that you don’t have to enter it every time:

Now you should have a directory called ‘OpenEyes’ in your gitprojects folder. The directory consists of a complete copy of the working directory, plus a full history of the repository up to that point.

Keeping up to date

Changes that are made by other developers can be ‘pulled’ down to your working directory using the following commands;

```
git fetch origin
git merge origin/master
```

If you are certain that you want to accept all the updates, then the following command has the same effect as the previous two.

```
git pull origin master
```

Making changes

Git will keep automatically keep track of any changes made in the project directory, but will not do anything further without being told to do so. Imagine that you have added a file called 'test.php' to the project. Git will track the file, but will not consider it part of the project, as illustrated by running the following command;

```
git status
```

This will produce an output something like the following;

```
# On branch master
# Changed but not updated:
#   (use "git add <file>..." to update what will be committed)
#   (use "git checkout -- <file>..." to discard changes in working directory)
#
#    modified:   htdocs/test.php
#
no changes added to commit (use "git add" and/or "git commit -a")
```

If you want to commit the file to the project, it needs to be added, and then committed using the following commands;

```
git add .
git commit
```

The last command will launch and editor, and give you the opportunity to commend. It is helpful to add a single line which describes the added or modified file. After adding the comment, save and leave the editor.

All these steps can conveniently achieved with the single command;

```
git commit -am 'New file to display audit data'
```

3. Push the changes to the server:

When you are ready to distribute the changes to others, you can transfer them to the central server using the following command;

```
git push origin master
```

If changes involving the same files have been made by another developer and the push is rejected, then

```
git fetch origin
```

```
git merge origin/master
```

You will then have the opportunity to examine both versions of any files that have been changed, and to resolve the differences. Once you are happy with the result, you can then successfully push them to the server;

```
git push origin master
```

Change control policy

Certain files in OpenEyes are essential to the core functioning of the software. Therefore only OEF developers may push changes to the central repository. The 'master' branch represents the current working release, and changes to the this branch must be fully tested and agreed by the relevant project steering committee before uploading.

However, the excellent branching model of Git allows any number of experimental branches to be pushed, pulled, and tested.

Each OEF developer may push experimental branches to the server using the following naming convention; Initials, function, and number separated by underscore characters. Hence a branch with changes by Bill Aylward to test a family tree page might be called 'BA_TestFamilyTree_1'.

A new branch can be pushed to the server simple with;

```
git push origin BA_TestFamilyTree_1
```

Others can then track the branch with;

```
git branch --track BA_TestFamilTree_1 origin/BA_TestFamilTree_1
```

If it is no longer required, then it can be deleted from the server with;

```
git push origin :BA_TestFamilyTree_1
```

and then from the local repository with;

```
git branch -d BA_TestFamilyTree_1
```

SQL dump files are stored in the data subdirectory and are uploaded along with the other files in the repository. In order to facilitate testing, it is suggested that separate databases are created so that those on a developer's machine are not altered by the testing process. These would have a similar naming scheme with the initials of the developer and the lable of the database (eg BA_Test_Main, and BA_Test_RBAC). These settings would be entered into the configuration file (config.inc.php) which is also pushed to the repository.

Troubleshooting

1. Pushing fails

Attempting to push changes creates an error as in the following example

```
To ssh://git@aylwards.co.uk:XXXX/home/git/OpenEyes
 ! [rejected]        master -> master (non-fast-forward)
error: failed to push some refs to 'ssh://git@aylwards.co.uk:XXXX/home/git/OpenEyes'
To prevent you from losing history, non-fast-forward updates were rejected
Merge the remote changes before pushing again.  See the 'non-fast-forward'
section of 'git push --help' for details.
```

This arises when modifications have been made by another developer to files that are being pushed to the server. The solution is to fetch those changes, deal with any conflicts, then push them back.

Appendix 1 - Installation of Git

Macintosh

Git can be installed either with a package installer, or using Macports

1. Install

If using the package installer, download the iinstaller and follow the instructions. At the time of writing, the current version was git-1.7.1-intel-leopard.dmg.

If using MacPorts (assuming it is already installed), then type the following at the command line;

```
sudo port install git-core +svn +doc +bash_completion +gitweb
```

2. Check the path

The installer puts git in /usr/local/git/bin, so if git commands don't work, check the PATH environmental variable by typing;

```
env
```

If the path does not inlcude git, add it using the following command

```
export PATH=$PATH:/usr/local/git/bin
```

Unix Systems

There are multiple methods of installing Git according to the exact platform you are using. The following method should work with most installations.

1. Install required libraries

Ensure you have the following libraries installed: expat, curl, zlib, and openssl.

2. Download and compile

Download the source code from the Git home page *here*. Execute the following commands;

```
tar xjf git-1.6.x.x.tar.bz2
cd git-1.6.x.x
make prefix=/usr all
sudo make prefix=/usr install
```

If using the ports system for BSD, then use the following commands;

```
cd /usr/ports
porteasy -u /devel/git
cd devel/git
make install clean
```

While compiling, accept the option to enable building of GUI tools, install gitweb, and accept the default options for curl and other dependencies.

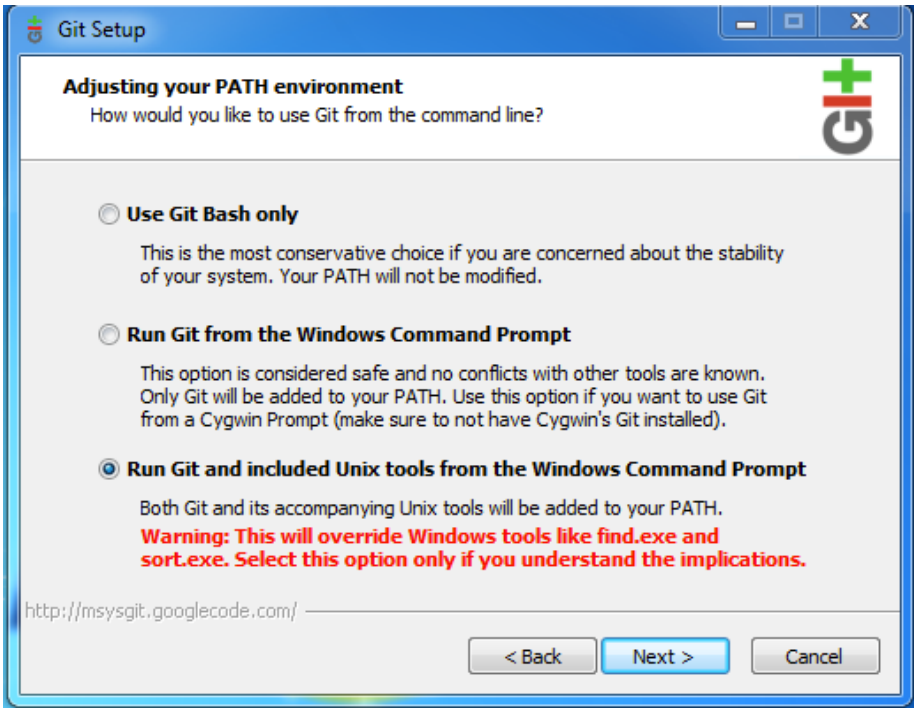
Windows

1. Download the installer

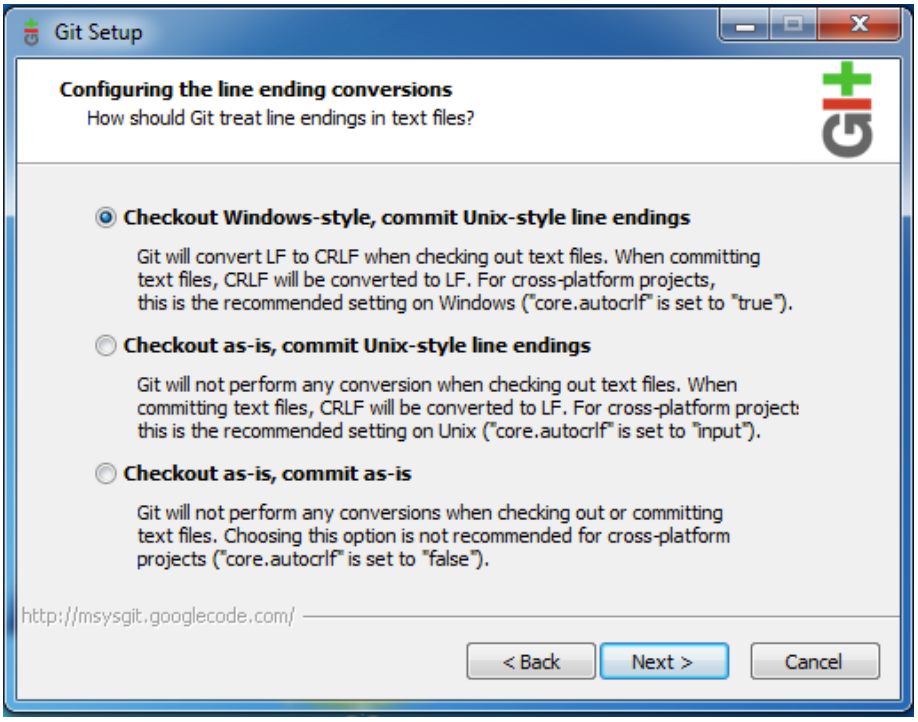
The latest version of Git can be found at the following URL: http://code.google.com/p/msysgit/downloads/list. Choose the “Full installer for official Git 1.7.3.1” (or whatever the latest version is).

2. Run the Installer

Run the installer which will launch a wizard. Accept all the defaults, up until the following screen;



It is recommended to choose the third option, as in the screen shot, but if you are concerned about the implications then choose one of the other two options. The following instructions assume you have chosen the third option. At the next screen accept the default option to including the option to checkout Windows-style,commit Unix-style line endings.



Complete the wizard, and you can now run Git from the command prompt by typing ‘git’ and return.

Appendix 2 - Server Management

The following notes are intended for the administrator of the central repository.

Adding developers

On receipt of a public key, you need to add it to the list of hosts that the ssh daemon will recognise. Drag the public key file to the desktop, then copy to the server with the following command;

```
scp -P XXXX -r Desktop/id_dsa.pub bill@aylwards.co.uk:/tmp
```

Now log into the server, su to root, and copy the key into the key file with the following command;

```
su root
cat /tmp/id_dsa.pub >> /home/git/.ssh/authorized_keys2
```

Now tidy up;

```
rm /tmp/id_dsa.pub
```

Setting up commit email

Go to the directory containing the supplied scripts;

```
cd /usr/local/share/git-core/contrib/hooks
```

Make the post-receive-email script executable (run this as root)

```
chmod a+x post-receive-email
```

Go to the hooks directory within the Git repository;

```
cd /home/git/OpenEyes/hooks
```

Make a soft link to the script

```
ln -sf /usr/local/share/git-core/contrib/hooks/post-receive-
email post-receive
```

Now configure git with the email address and prefix:

```
git config hooks.mailinglist "email@mailinglist.co.uk”
git config hooks.emailprefix "New OpenEyes commit: "
```

Appendix 3 - Setting up a server

These notes are intended to help the initial setup of a Git server.

1. Install Git on the server

See Appendix 1 for details

2. Create a user

Create a git user with password

```
sudo adduser git
```

Accept the defaults, and add a password.

3. Set up a directory for ssh

```
su git
cd /home/git
mkdir .ssh
```

4. Prevent shell login

Edit /etc/ssh/sshd_config and disable password access. Restart sshd with the following command;

```
sudo /etc/rc.d/sshd reload
```

In the passwd file, remove chsh for the git user and change the shell to /usr/local/libexec/git-core/git-shell.

5. Get public keys

For each user, add their public key to the authorized_keys2 file.

```
cat id_dsa.pub >> ~/.ssh/authorized_keys2
```

6. Clone the project

Move back to the client containing the master copy of the software

Initiate a git repository

```
git init
```

Create and edit a .gitignore file if required. Then add and commit all the remaining files.

```
git commit -am 'New file to display audit data'
```

Now clone the repository, and push the the server;

- `git remote add origin ssh://git@aylwards.co.uk:XXXX/home/git/project`
- `git push origin master`