Continuous Integration

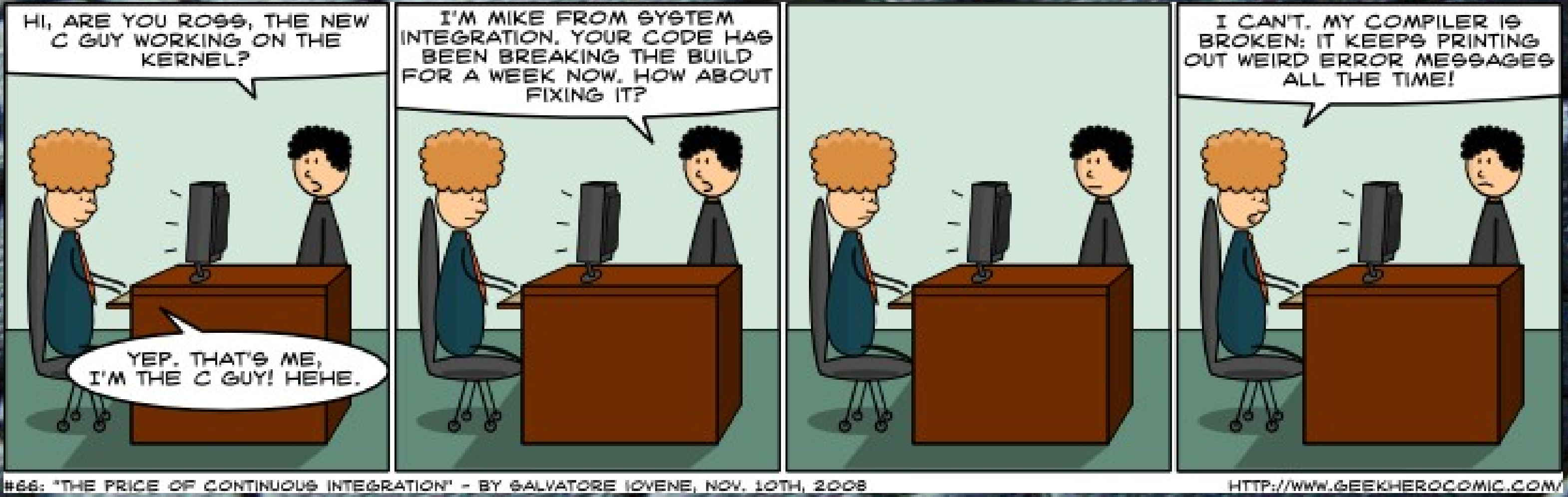
Continuous Integration

- What is Continuous Integration?
  - “In software engineering, continuous integration (CI) implements continuous processes of applying quality control — small pieces of effort, applied frequently.”
- What is Jenkins?
  - “Jenkins, previously known as Hudson, is an open source continuous integration tool written in Java.”

How It Used To Be

- Lack of automation
- Push me, pull you!

Getting Ready For Automated CI

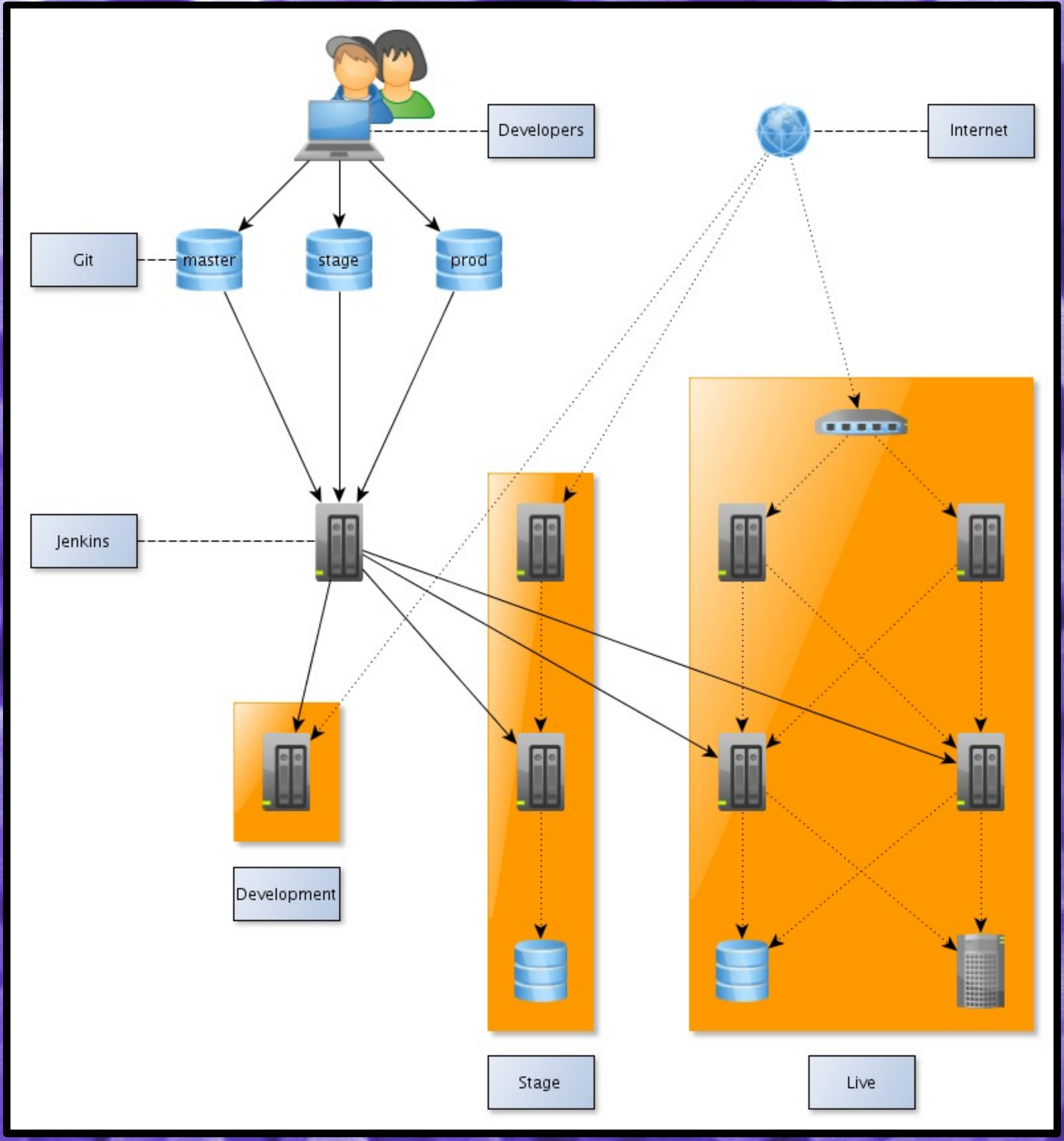

HI, ARE YOU ROSS, THE NEW C GUY WORKING ON THE KERNEL?
YEP. THAT'S ME, I'M THE C GUY! HEHE.
I'M MIKE FROM SYSTEM INTEGRATION. YOUR CODE HAS BEEN BREAKING THE BUILD FOR A WEEK NOW. HOW ABOUT FIXING IT?
I CAN'T. MY COMPILER IS BROKEN: IT KEEPS PRINTING OUT WEIRD ERROR MESSAGES ALL THE TIME!
#66: "THE PRICE OF CONTINUOUS INTEGRATION" - BY SALVATORE IOVENE, NOV. 10TH, 2008
HTTP://WWW.GEEKHEROCOMIC.COM/

Managing Change

- We want to keep revisions.
- But we also want to share.
- In fact, we want to share in complex ways.

- But when we share, shit breaks. :-(

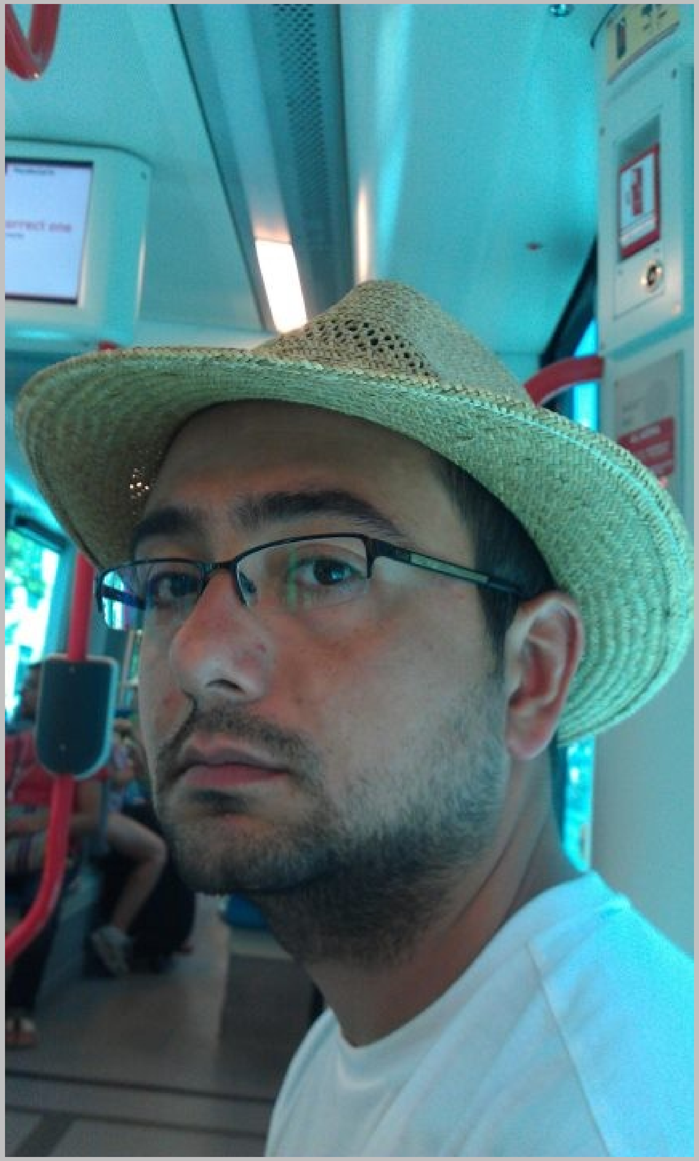
Managing Change



Vincenzo Russo

- Development Team Lead
- He likes hats...
- He hates it when shit breaks.

- He also likes process.
- A little too much.



VCS

- Vincenzo likes Scrum
- That changes the way you think...

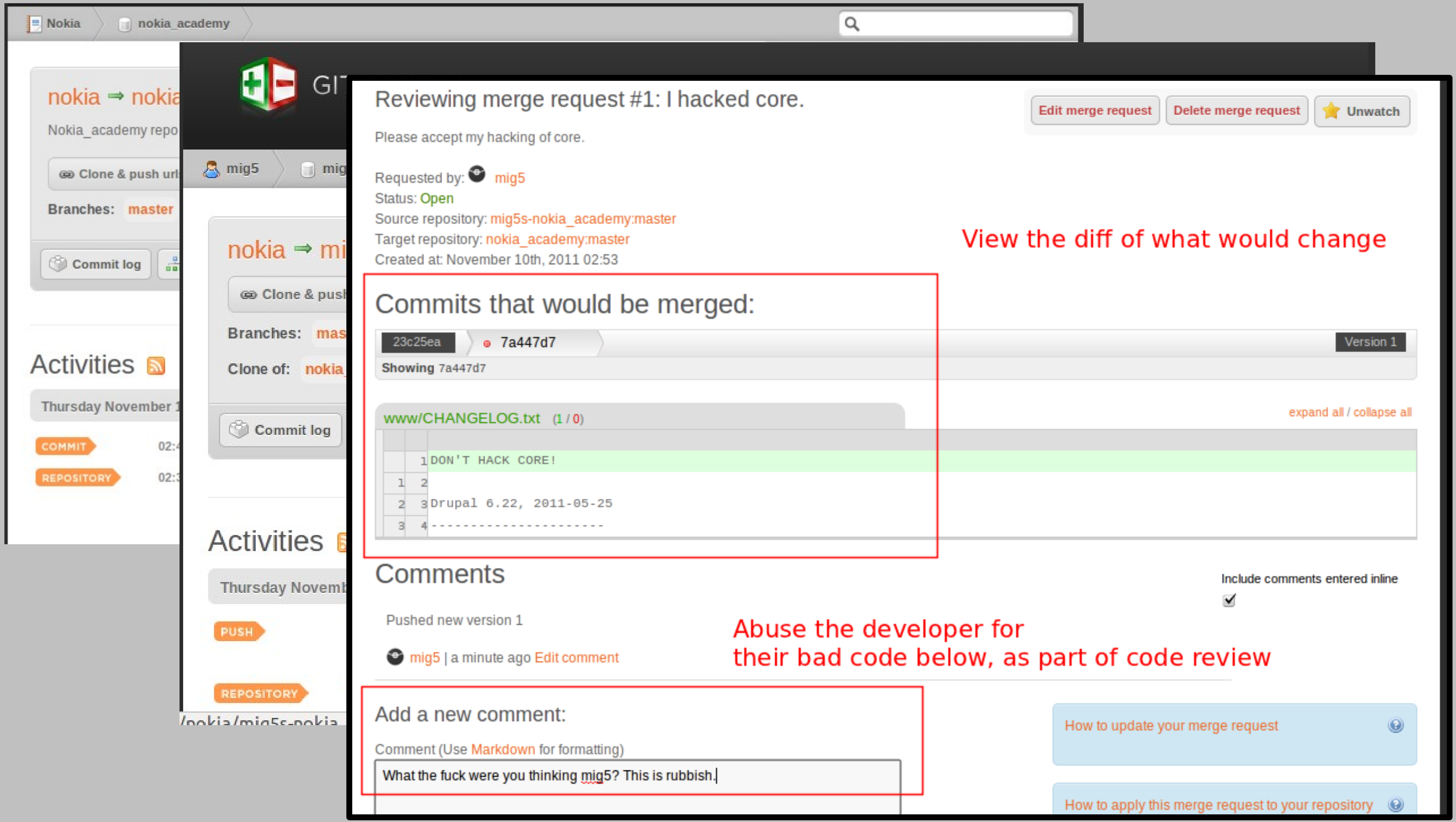
- What is “feature branching”?

- Um, we don't actually do that...

- We do feature **forking**!

VCS

- We use Gitorious instead of GitHub



Nokia · nokia_academy

nokia ⇒ nokia

Nokia_academy repo

Clone & push url

Branches: master

Commit log

Activities

Thursday November 1

COMMIT 02:4

REPOSITORY 02:3

mig5 · mig

nokia ⇒ mi

Clone & push

Branches: mas

Clone of: nokia

Commit log

Activities

Thursday Novemb

PUSH

REPOSITORY

/nokia/mig5s-nokia

Reviewing merge request #1: I hacked core.

Edit merge request · Delete merge request · Unwatch

Please accept my hacking of core.

Requested by: mig5
Status: Open
Source repository: mig5s-nokia_academy:master
Target repository: nokia_academy:master
Created at: November 10th, 2011 02:53

View the diff of what would change

Commits that would be merged:

23c25ea · 7a447d7 · Version 1

Showing 7a447d7

www/CHANGELOG.txt (1 / 0)

expand all / collapse all

```
DON'T HACK CORE!

Drupal 6.22, 2011-05-25
----------------------
```

Comments

Include comments entered inline ✓

Pushed new version 1

mig5 | a minute ago Edit comment

Abuse the developer for
their bad code below, as part of code review

Add a new comment:

Comment (Use Markdown for formatting)

What the fuck were you thinking mig5? This is rubbish.

How to update your merge request

How to apply this merge request to your repository

Hardware In The Cloud

- So we are managing change...
- Next we need a place to build!

Miguel Jacq

- Systems Engineer
- Likes France.
- Hates working.

- Hates working so much, he makes tools that can work for him!

Managing The Servers

- Jenkins
- Madelon
- Libcloud / Linode API
- Puppet
- Nagios
- Munin

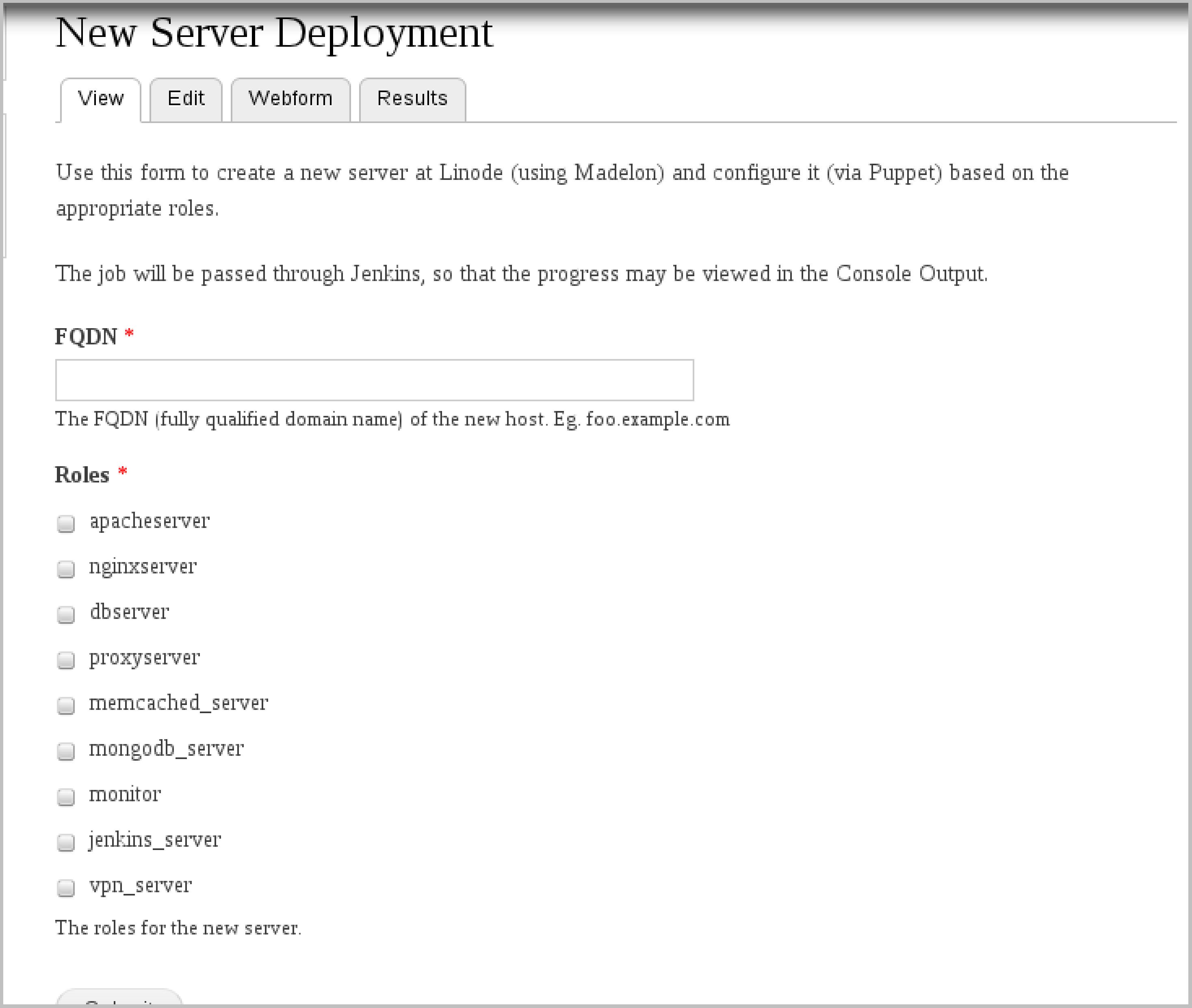
Why Jenkins for arbitrary tasks?

- Not just a CI tool
- Good for executing any remote script & monitoring result
- A useful audit trail
- Repeatable (useful for DR)
- Automatable
- Many notification options (iPhone, IRC, email)

Madelon?

- http://github.com/mig5/madelon
- Fabric-based implementation of Libcloud API
- Builds a new server, runs post 'hooks'
- Triggers the initial Puppetisation of a server
- Triggers automatic monitoring (Nagios/Munin)

Triggered from a Drupal webform!



New Server Deployment

View | Edit | Webform | Results

Use this form to create a new server at Linode (using Madelon) and configure it (via Puppet) based on the appropriate roles.

The job will be passed through Jenkins, so that the progress may be viewed in the Console Output.

FQDN *

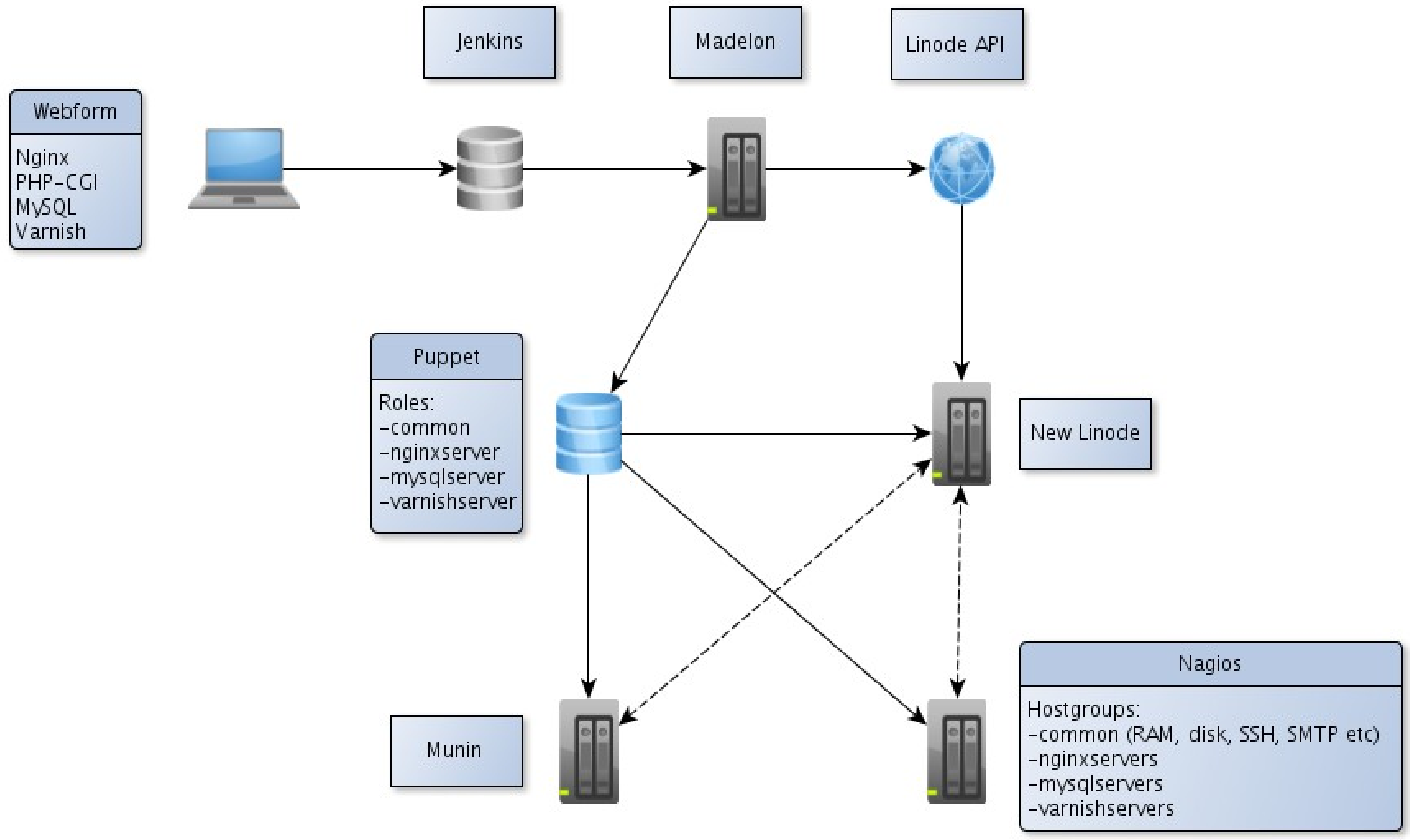
The FQDN (fully qualified domain name) of the new host. Eg. foo.example.com

Roles *

- [ ] apacheserver
- [ ] nginxserver
- [ ] dbserver
- [ ] proxyserver
- [ ] memcached_server
- [ ] mongodb_server
- [ ] monitor
- [ ] jenkins_server
- [ ] vpn_server

The roles for the new server.

Wrapping up


Jenkins
Madelon
Linode API
Webform
Nginx
PHP-CGI
MySQL
Varnish
Puppet
Roles:
-common
-nginxserver
-mysqlserver
-varnishserver
New Linode
Nagios
Hostgroups:
-common (RAM, disk, SSH, SMTP etc)
-nginxservers
-mysqlservers
-varnishservers
Munin

Alasdair Cowie-Fraser

- Junior Developer
- Likes music.
- Not very clever.
- We need to stop him from breaking shit...
- Because that upsets Vincenzo!

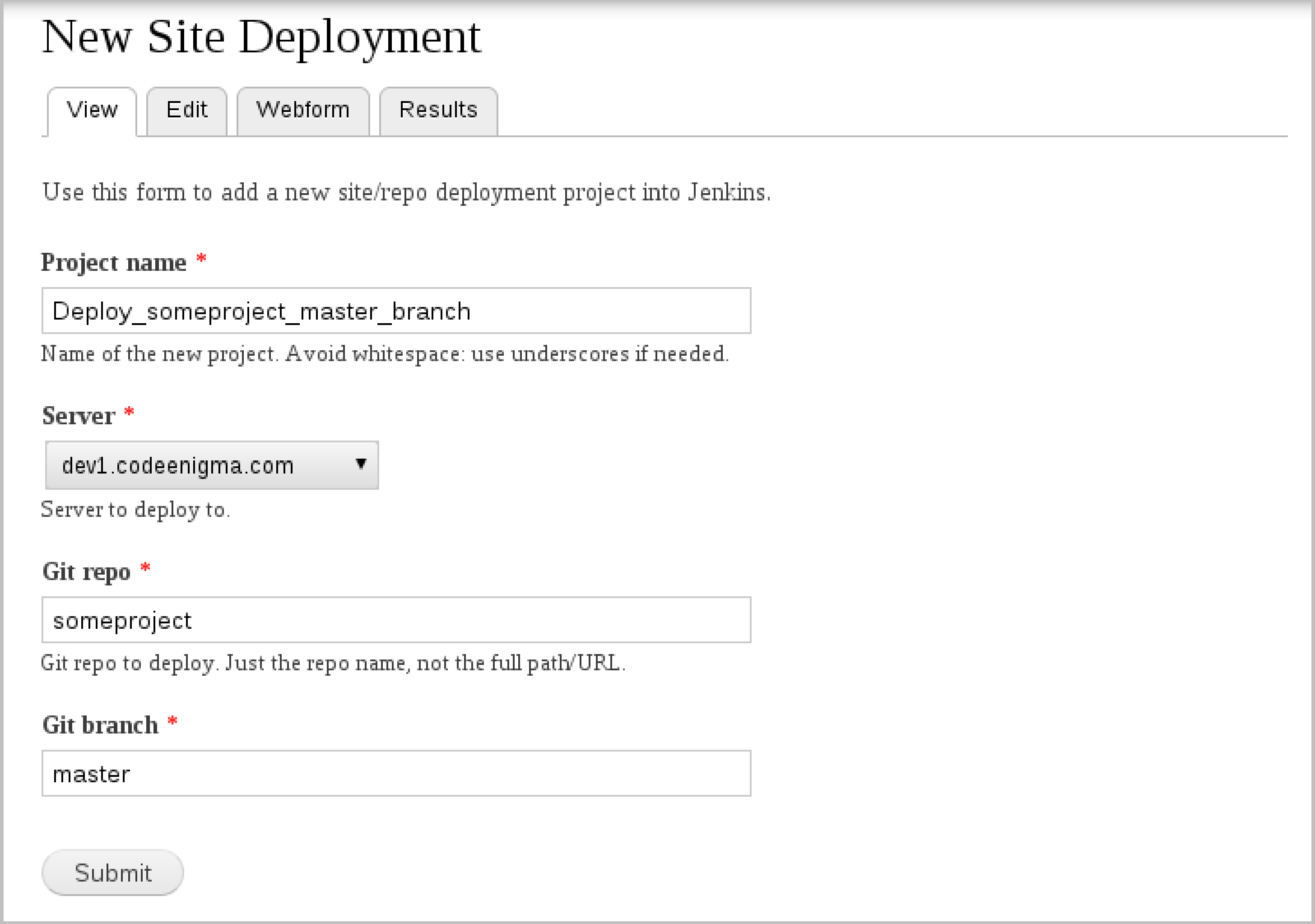
We can manage change
We have a place to build
But we also have an Alasdair
Now we need a safe pair of hands!

Jenkins

- Jenkins is already doing large chunks of Mig's job – maybe he can do Alasdair's job too?

Jenkins

- Webform once again, to make dev's life easier


New Site Deployment

Use this form to add a new site/repo deployment project into Jenkins.

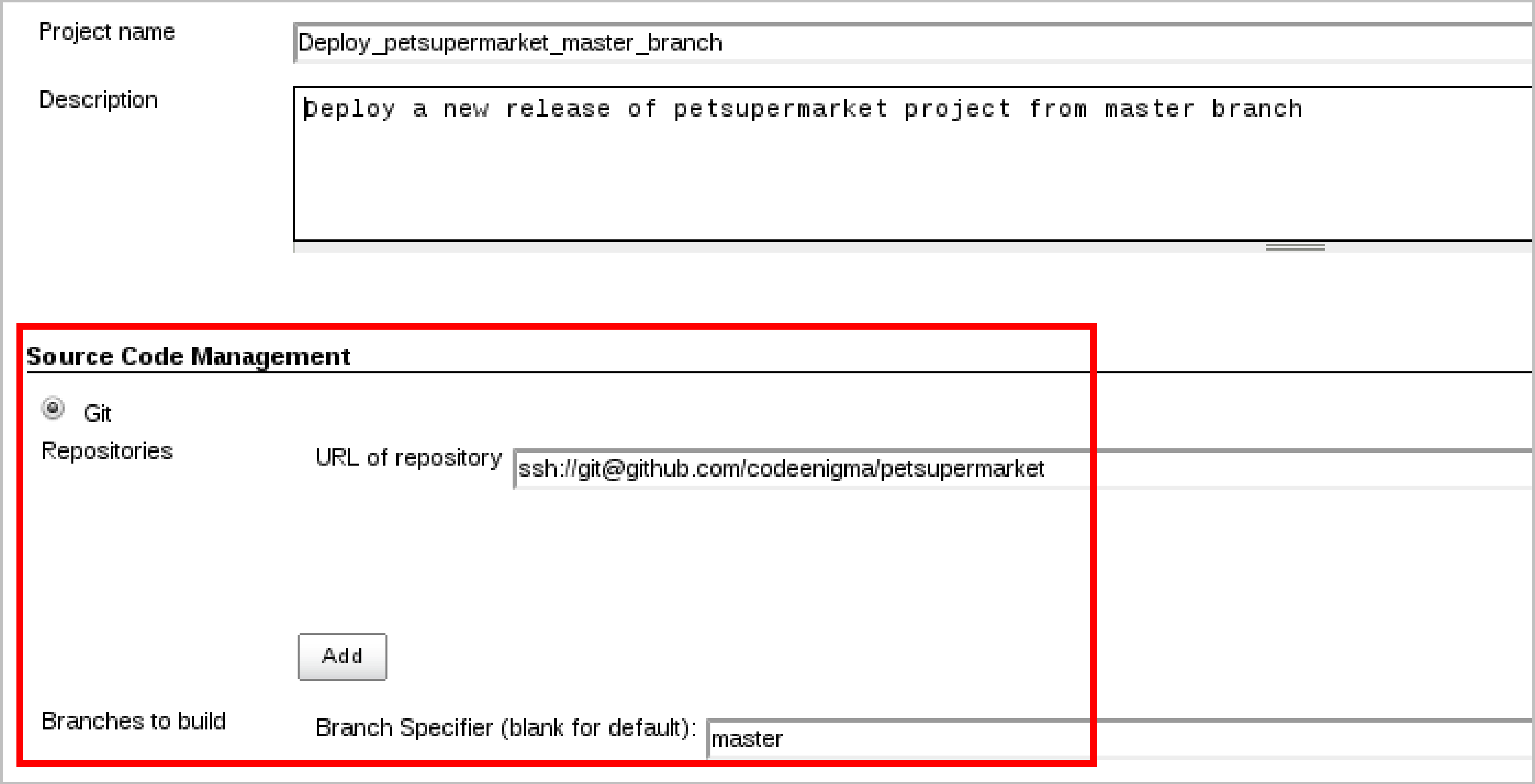
Project name *
Deploy_someproject_master_branch
Name of the new project. Avoid whitespace: use underscores if needed.

Server *
dev1.codeenigma.com
Server to deploy to.

Git repo *
someproject
Git repo to deploy. Just the repo name, not the full path/URL.

Git branch *
master

Becomes a Jenkins job



Project name	Deploy_petsupermarket_master_branch
Description	Deploy a new release of petsupermarket project from master branch

Source Code Management

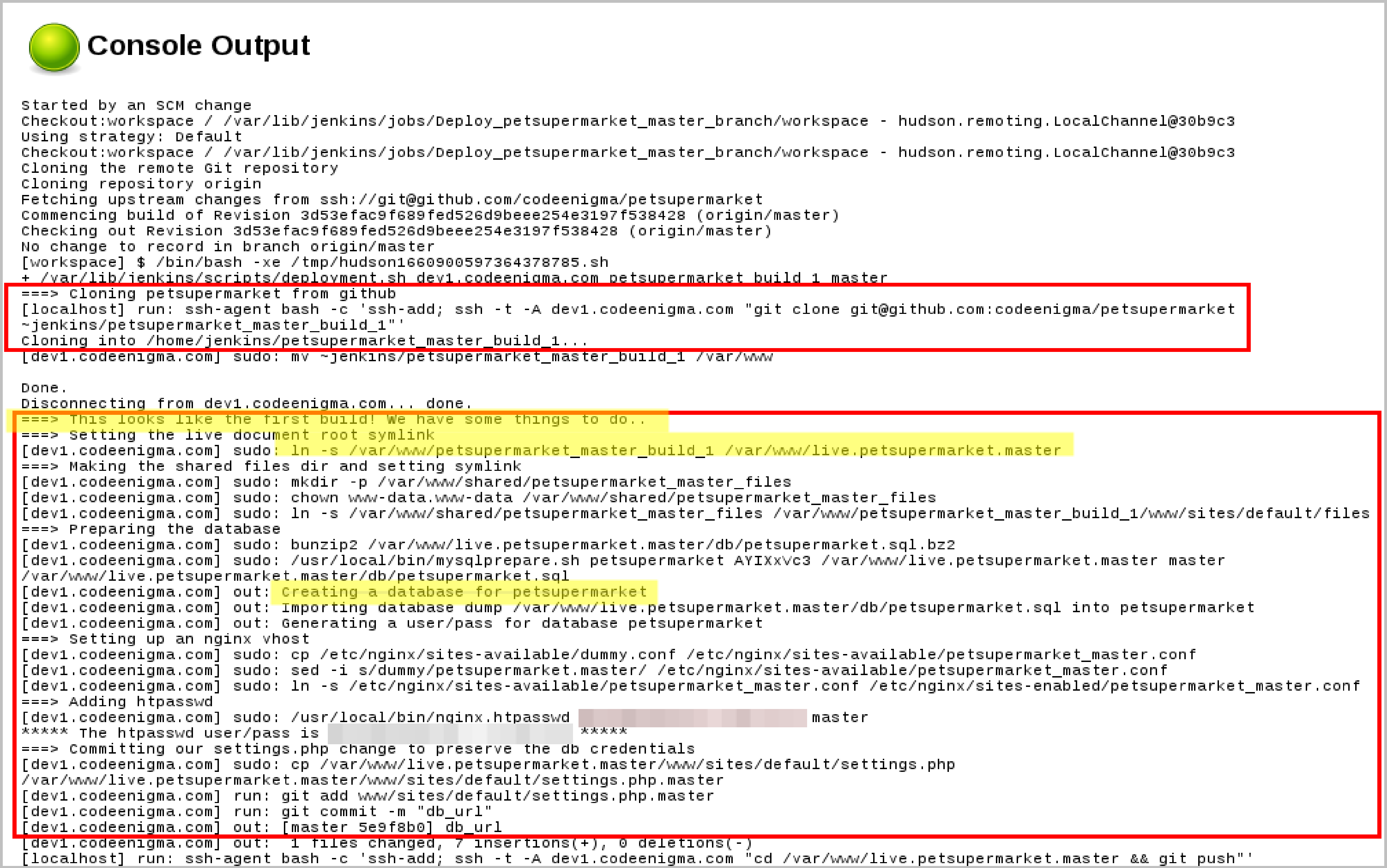
[✓ Git]

Repositories	URL of repository	ssh://git@github.com/codeenigma/petsupermarket
Branches to build	Branch Specifier (blank for default):	master

Triggers a Fabric deployment

- Clones repo
- Checks out requested branch
- Creates database, settings.php, files dir
- Sets up symlinks (files dir lives outside build)
- Creates Drush alias, Drush crontab
- Creates Nginx vhost, restarts services
- Points 'Document Root' symlink to new build
- Commits relevant bits back into git (updated settings.php with db credentials etc)

First build in action



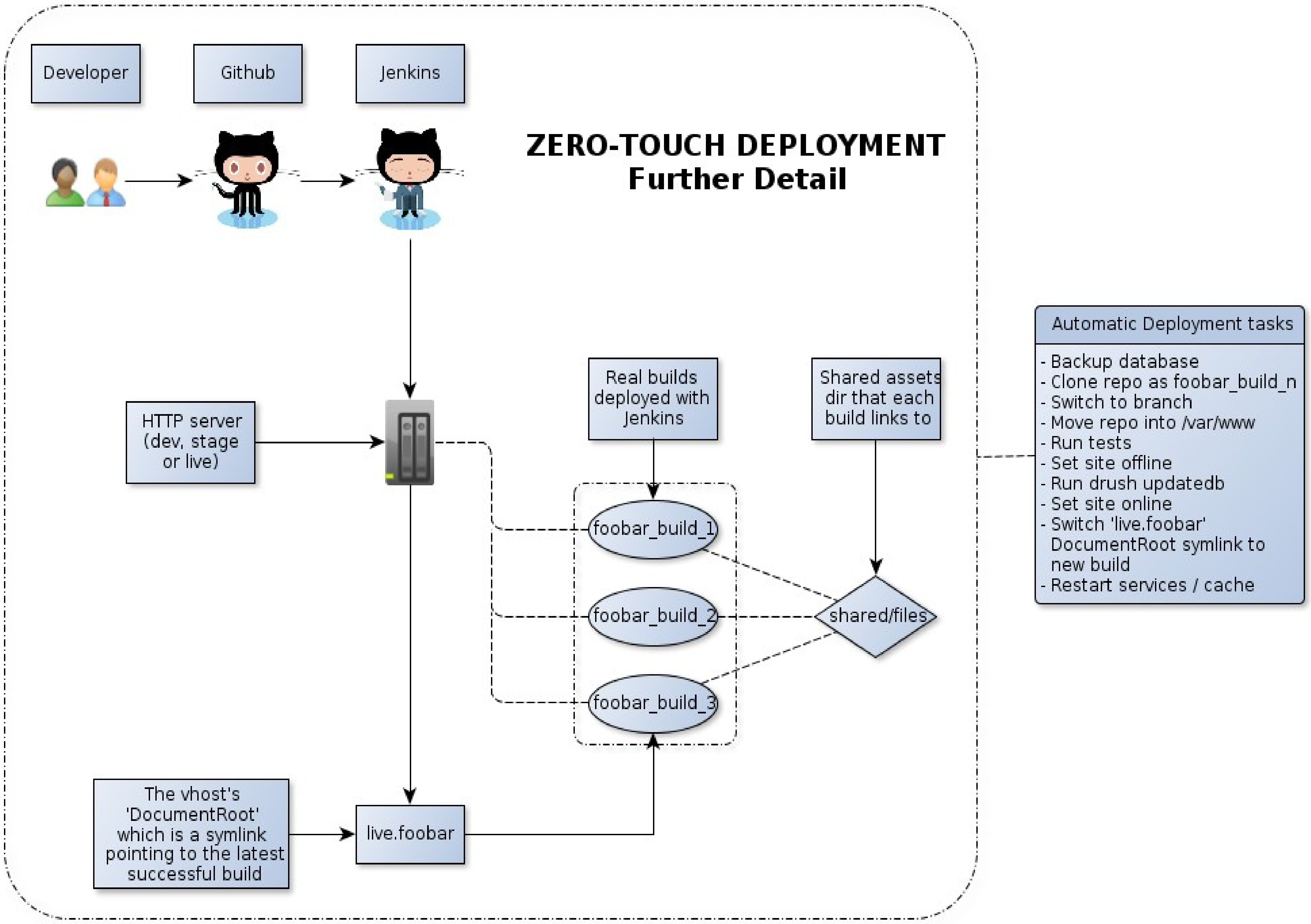
Console Output

```
Started by an SCM change
Checkout:workspace / /var/lib/jenkins/jobs/Deploy_petsupermarket_master_branch/workspace - hudson.remoting.LocalChannel@30b9c3
Using strategy: Default
Checkout:workspace / /var/lib/jenkins/jobs/Deploy_petsupermarket_master_branch/workspace - hudson.remoting.LocalChannel@30b9c3
Cloning the remote Git repository
Cloning repository origin
Fetching upstream changes from ssh://git@github.com/codeenigma/petsupermarket
Commencing build of Revision 3d53efac9f689fed526d9beee254e3197f538428 (origin/master)
Checking out Revision 3d53efac9f689fed526d9beee254e3197f538428 (origin/master)
No change to record in branch origin/master
[workspace] $ /bin/bash -xe /tmp/hudson1660900597364378785.sh
+ /var/lib/jenkins/scripts/deployment.sh dev1.codeenigma.com petsupermarket build 1 master
===> Cloning petsupermarket from github
[localhost] run: ssh-agent bash -c 'ssh-add; ssh -t -A dev1.codeenigma.com "git clone git@github.com:codeenigma/petsupermarket
~jenkins/petsupermarket_master_build_1"'
Cloning into /home/jenkins/petsupermarket_master_build_1...
[dev1.codeenigma.com] sudo: mv ~jenkins/petsupermarket_master_build_1 /var/www

Done.
Disconnecting from dev1.codeenigma.com... done.
===> This looks like the first build! We have some things to do..
===> Setting the live document root symlink
[dev1.codeenigma.com] sudo: ln -s /var/www/petsupermarket_master_build_1 /var/www/live.petsupermarket.master
===> Making the shared files dir and setting symlink
[dev1.codeenigma.com] sudo: mkdir -p /var/www/shared/petsupermarket_master_files
[dev1.codeenigma.com] sudo: chown www-data.www-data /var/www/shared/petsupermarket_master_files
[dev1.codeenigma.com] sudo: ln -s /var/www/shared/petsupermarket_master_files /var/www/petsupermarket_master_build_1/www/sites/default/files
===> Preparing the database
[dev1.codeenigma.com] sudo: bunzip2 /var/www/live.petsupermarket.master/db/petsupermarket.sql.bz2
[dev1.codeenigma.com] sudo: /usr/local/bin/mysqlprepare.sh petsupermarket AYIXxVc3 /var/www/live.petsupermarket.master master
/var/www/live.petsupermarket.master/db/petsupermarket.sql
[dev1.codeenigma.com] out: Creating a database for petsupermarket
[dev1.codeenigma.com] out: Importing database dump /var/www/live.petsupermarket.master/db/petsupermarket.sql into petsupermarket
[dev1.codeenigma.com] out: Generating a user/pass for database petsupermarket
===> Setting up an nginx vhost
[dev1.codeenigma.com] sudo: cp /etc/nginx/sites-available/dummy.conf /etc/nginx/sites-available/petsupermarket_master.conf
[dev1.codeenigma.com] sudo: sed -i s/dummy/petsupermarket.master/ /etc/nginx/sites-available/petsupermarket_master.conf
[dev1.codeenigma.com] sudo: ln -s /etc/nginx/sites-available/petsupermarket_master.conf /etc/nginx/sites-enabled/petsupermarket_master.conf
===> Adding htpasswd
[dev1.codeenigma.com] sudo: /usr/local/bin/nginx.htpasswd [redacted] master
***** The htpasswd user/pass is [redacted] *****
===> Committing our settings.php change to preserve the db credentials
[dev1.codeenigma.com] sudo: cp /var/www/live.petsupermarket.master/www/sites/default/settings.php
/var/www/live.petsupermarket.master/www/sites/default/settings.php.master
[dev1.codeenigma.com] run: git add www/sites/default/settings.php.master
[dev1.codeenigma.com] run: git commit -m "db_url"
[dev1.codeenigma.com] out: [master 5e9f8b0] db_url
[dev1.codeenigma.com] out:  1 files changed, 7 insertions(+), 0 deletions(-)
[localhost] run: ssh-agent bash -c 'ssh-add; ssh -t -A dev1.codeenigma.com "cd /var/www/live.petsupermarket.master && git push"'
```

What happens after the first build?

- Subsequent commits + push to that branch trigger new builds in Jenkins
- Fabric backs up site
- Clones a fresh build into /var/www
- Runs tests
- Runs drush updatedb
- Manipulates 'Document Root' symlink to point to new build
- Cleares caches


Developer
Github
Jenkins
ZERO-TOUCH DEPLOYMENT
Further Detail
HTTP server (dev, stage or live)
Real builds deployed with Jenkins
Shared assets dir that each build links to
foobar_build_1
foobar_build_2
foobar_build_3
shared/files
The vhost's 'DocumentRoot' which is a symlink pointing to the latest successful build
live.foobar
Automatic Deployment tasks

Automatic Deployment tasks

- Backup database
- Clone repo as foobar_build_n
- Switch to branch
- Move repo into /var/www
- Run tests
- Set site offline
- Run drush updatedb
- Set site online
- Switch 'live.foobar' DocumentRoot symlink to new build
- Restart services / cache

YOU BROKE THE BUILD!
This is Agnes and she's none too pleased with you, Bub. You broke the build. You should have known that you were making breaking changes, but you checked them in anyway.
If you start using continuous integration, Agnes won't have to come back.
www.YouBrokeTheBuild.com

Build failed? No problem!

- Usually happens early on in tests
- Existing site continues to function as it points to the last working build
- If it breaks too late in the process, simply set live symlink back to previous build
- Perhaps restore from the database backup taken prior to the broken build if it messed the data

Taking changes live?

- Merge or cherry-pick master branch to stage
- Triggers similar build on stage server
- Client approved? Cherry-pick/merge to prod
- Triggers similar build on prod server
- Takes database changes from dev > live because Jenkins build runs drush updatedb

How has this changed things?

- Automatic triggered build from git to live site sounds risky? Doesn't have to be
- Encourages and inspires devs to commit early, commit often
- Building good tools for Dev takes away the pain for both Dev and Op
- Jenkins notifications to IRC of successful builds + commit message keeps everyone informed
- Emails and alerts about failed builds keeps everyone informed!

Fabric or Capistrano?

- Either tool is good
- Designed to solve same or similar problems
- (running remote tasks over SSH)
- Mig prefers Python to Ruby :P
- What Mig says goes (Mig wrote this slide..)

Peer Review

- Jenkins can build stuff.
- But Alasdair might still do something stupid. Who's keeping an eye on what he commits?

Steve Hunton

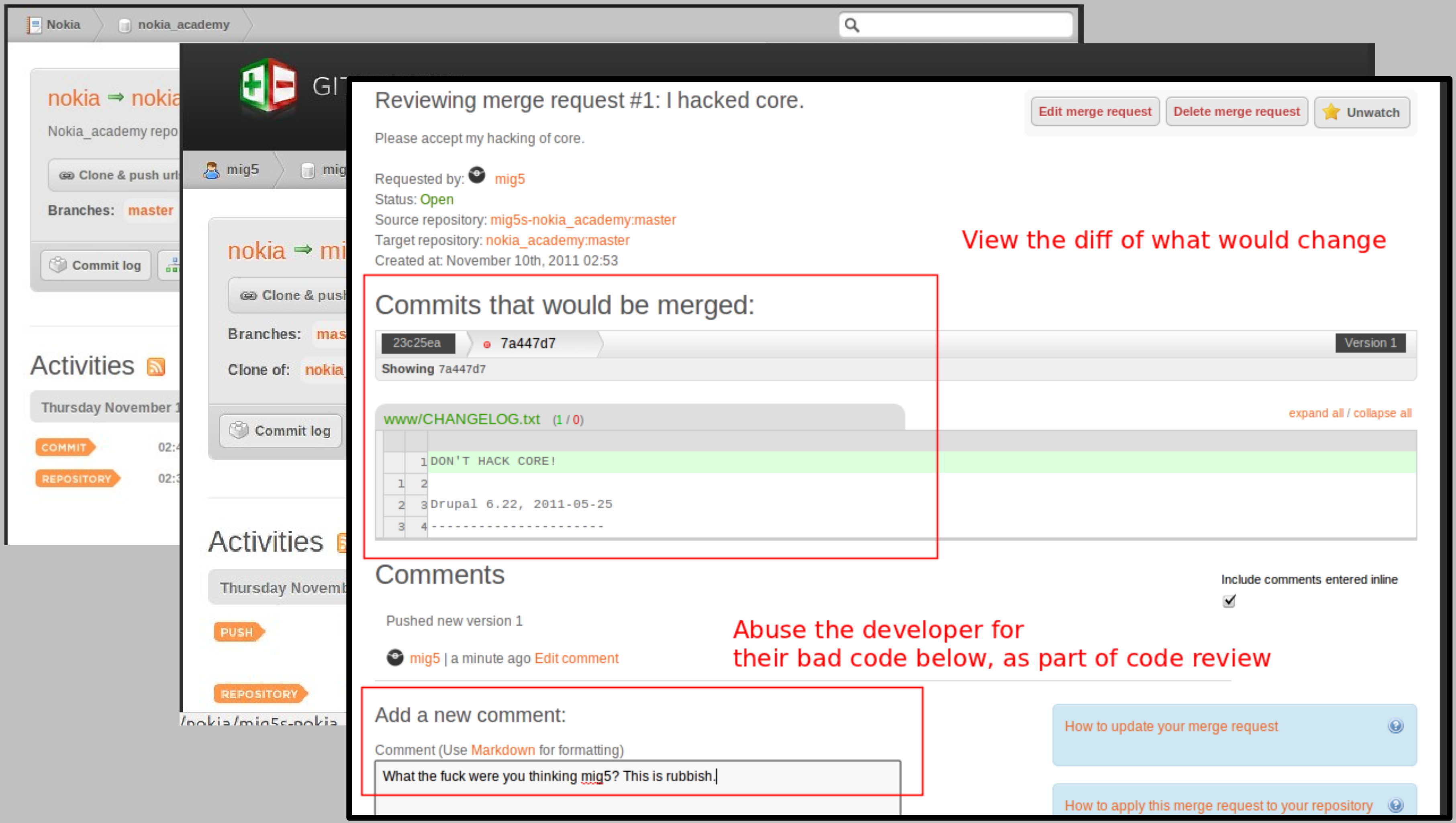
- Project Manager
- Likes order.
- Hates Scots.

- Which is unfortunate, since Alasdair is half-Scottish!

Peer Review

- Both Steve and Vincenzo like to keep an eye on poor Alasdair.
- They do so by:
  - Pull requests
  - Built feature branches

Peer Review



Nokia nokia_academy

nokia ⇒ nokia

Nokia_academy repo

Clone & push url

Branches: master

Commit log

Activities

Thursday November 1

COMMIT 02:4

REPOSITORY 02:3

GIT

mig5 mig

nokia ⇒ mi

Clone & push

Branches: mas

Clone of: nokia

Commit log

Activities

Thursday Novemb

PUSH

REPOSITORY

/nokia/mig5s-nokia

Reviewing merge request #1: I hacked core.

Edit merge request | Delete merge request | Unwatch

Please accept my hacking of core.

Requested by: mig5
Status: Open
Source repository: mig5s-nokia_academy:master
Target repository: nokia_academy:master
Created at: November 10th, 2011 02:53

View the diff of what would change

Commits that would be merged:

23c25ea | 7a447d7 | Version 1

Showing 7a447d7

www/CHANGELOG.txt (1 / 0)

expand all / collapse all

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DON'T HACK CORE!

Drupal 6.22, 2011-05-25
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Include comments entered inline ✓

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Abuse the developer for
their bad code below, as part of code review

Add a new comment:

Comment (Use Markdown for formatting)

What the fuck were you thinking mig5? This is rubbish.

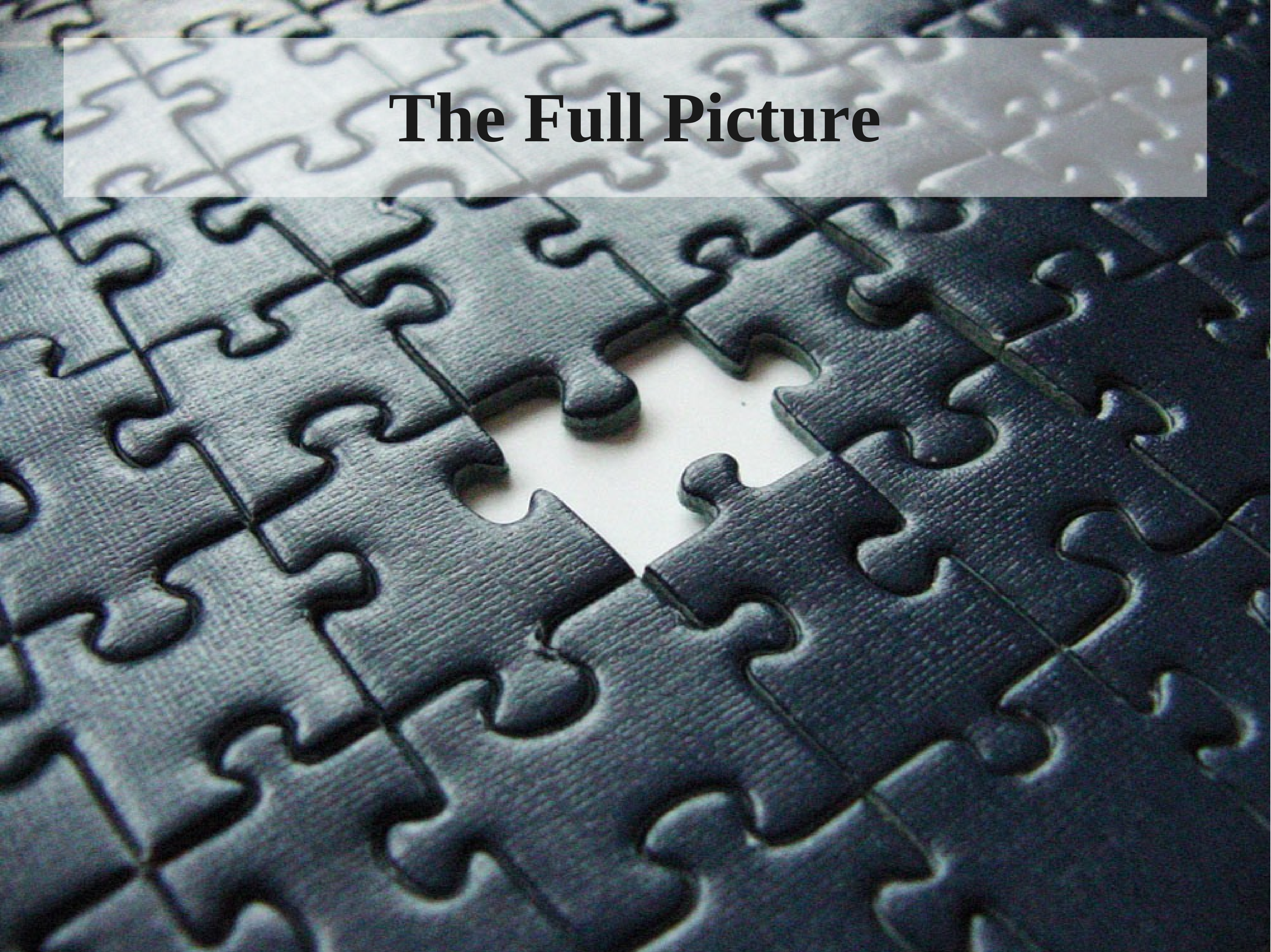
How to update your merge request

How to apply this merge request to your repository

Customers

- Lovely people
- Like it when things just work.

- Customers sign off on Stage
- We cherry-pick the changes to Production
- Tag and release (Jenkins again)



The Full Picture

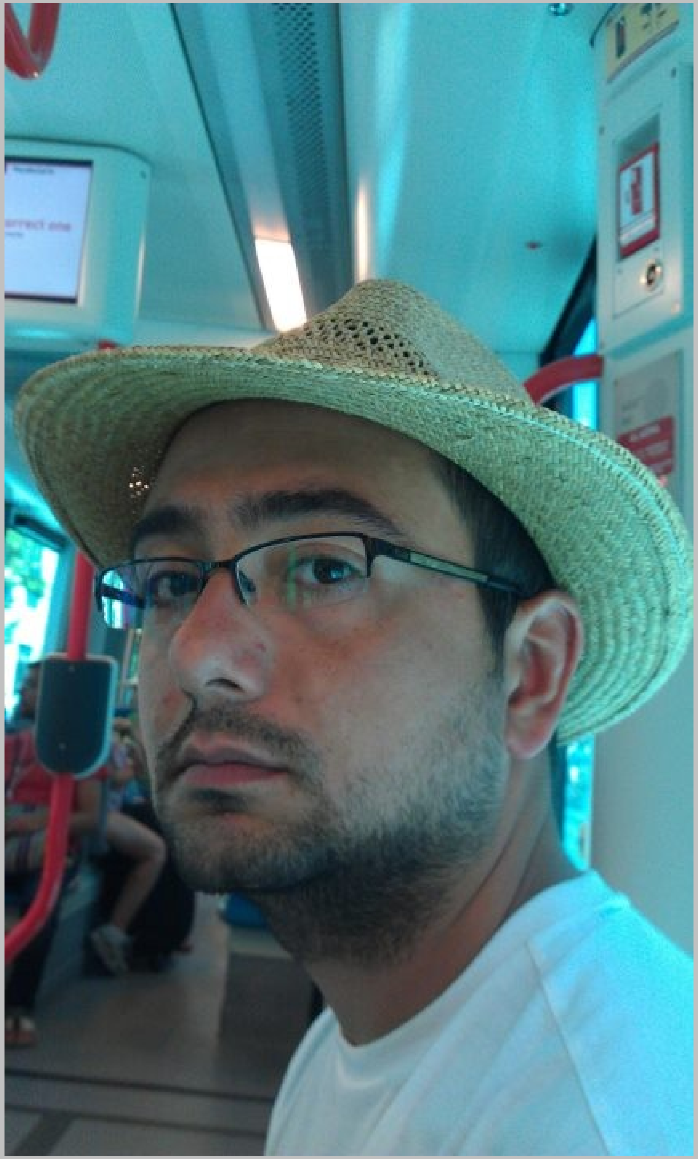
The Full Picture

The Full Picture

The Full Picture

Jenkins

The Full Picture

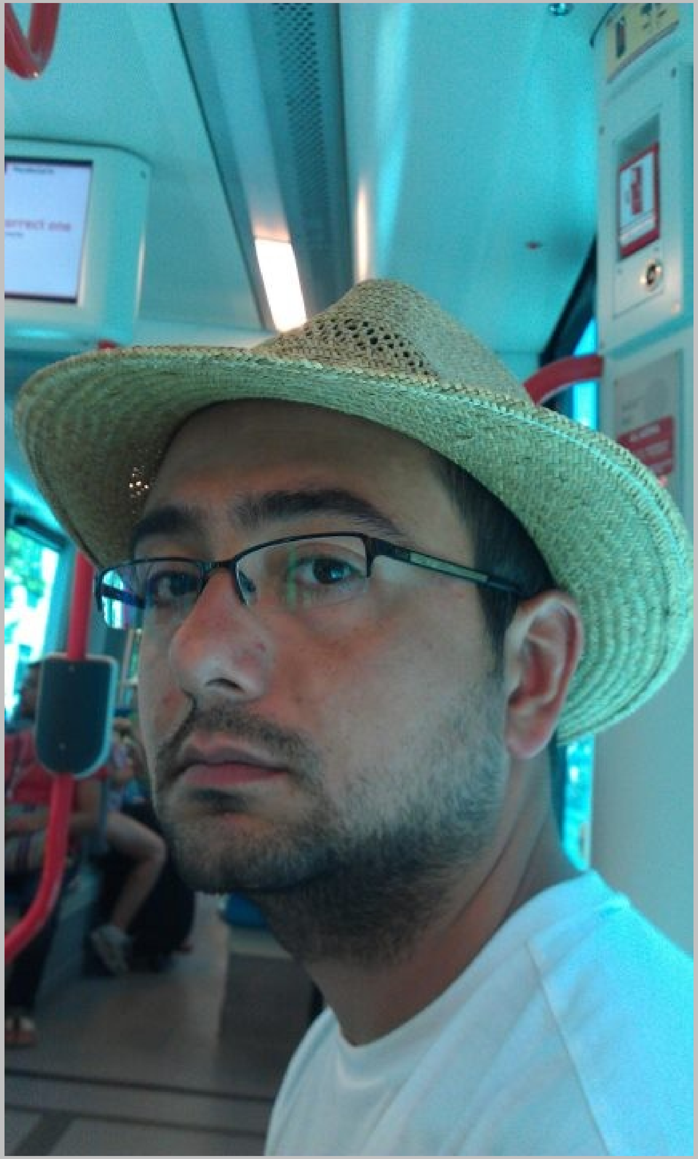


The Full Picture

The Full Picture

Jenkins

The Full Picture



The Full Picture

ETC. ETC.

The Full Picture

The Full Picture

The Full Picture

The Full Picture

The Full Picture

Jenkins

Steve Cowie

- Director of Operations
- Lacks empathy.
- Likes money. (He's a Scot.)

- Sends the bill!

Get Paid!

The Plug!

- Like what you see?
- Buy it from Code Enigma.
- Ask Mig to come and manage your servers – he'll find a way to avoid doing it!

Thanks for listening!

code enigma

mig5