Continuous Integration

(Python, Django, Git Hooks, Jenkins, Fabric)

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Me, myself and I

Education:

- Technical University of Bialystok (Marketing Management - master's degree, IT - bachelor's degree)

Current position:

- Python/Django developer at TJ.Software
- Lead Developer at OpenTopic

Former position:

- instructor at Technical University of Bialystok
- PHP developer

Additional position:

- husband and father :)

TJ.Software opentopic

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OpenTopic

opentopic

Content Marketing Platform for Enterprise and Small Business companies

Technologies:

- Python/Django
- Nginx + uWSGI
- Varnish
- MySQL
- Memcached
- Celery + Amazon SQS + Supervisor
- ElasticSearch (News Storage)
- ElasticSearch + Logstash + Kibana (centralized logs platform)
- AWS: EC2 (17 servers) + Load Balancer, RDS, S3 + CloudFront (CDN), ElastiCache, CloudWatch, SES, Route 53
- boto - Python package that provides interfaces to Amazon Web Services
- and last but not least: **Git Hooks + Jenkins + Fabric**

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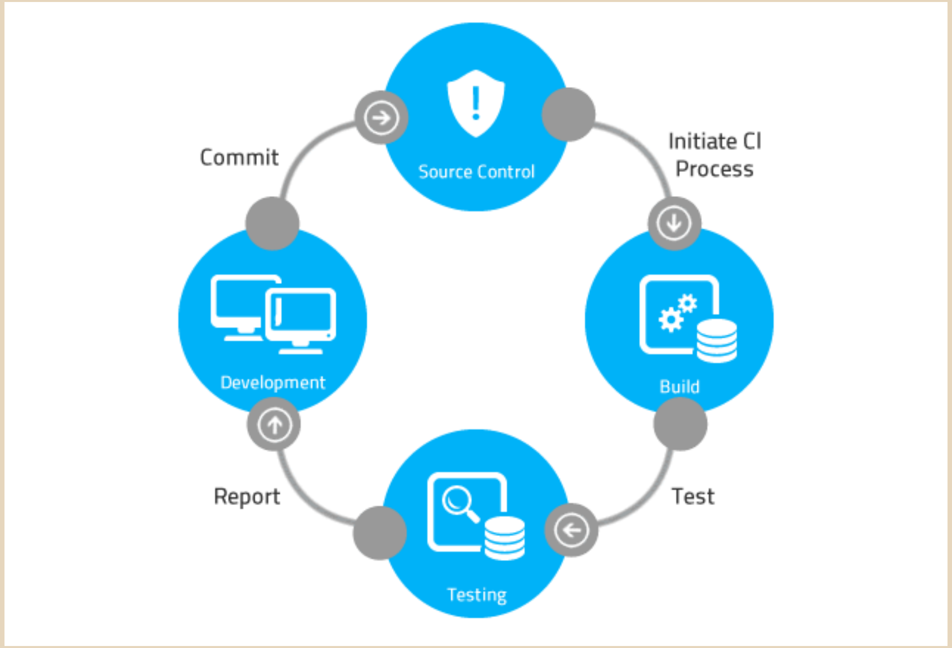
Continuous Integration



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Continuous Integration

Process of merging all developer working copies with a shared mainline several times a day

Basic requirements:

- Code repository
- Automate the build and make it self-testing
- Everyone commits to the baseline every day and each commit should be built
- Fast builds
- Easy to get the latest deliverables
- Everyone can review the results of the latest build
- Clone of the production environment (at least very similar env)
- Automated deployment

Tools:

- Jenkins/Hudson (Servlet container)
- Python - AutoDE, BuildBot, pyCI (light for i.e. Raspberry Pi)
- CruiseControl

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Git Hooks

Simple scripts that run before or after certain actions

2 types of hooks:

- Client-side – run on the developer's system
- Server-side – run on the server hosting the Git repository

ls -l .git/hooks/

```
-rwxr-xr-x 1 root root  452 Aug 11  2013 applypatch-msg.sample
-rwxr-xr-x 1 root root  896 Aug 11  2013 commit-msg.sample
-rwxr-xr-x 1 root root  189 Aug 11  2013 post-update.sample
-rwxr-xr-x 1 root root  398 Aug 11  2013 pre-applypatch.sample
-rwxr-xr-x 1 root root 1704 Aug 11  2013 pre-commit.sample
-rwxr-xr-x 1 root root 1239 Aug 11  2013 prepare-commit-msg.sample
-rwxr-xr-x 1 root root 4951 Aug 11  2013 pre-rebase.sample
-rwxr-xr-x 1 root root 3611 Aug 11  2013 update.sample
```

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Git Hooks

Git sets environmental variables when calling hooks (varies according to the hook)

Server-side hooks:

- pre-receive - if it exits non-zero, none of the references are accepted
- post-receive - include e-mailing a list, notifying a continuous integration server or updating a ticket-tracking system
- update - very similar to the pre-receive script, except that it’s run once for each branch the pusher is trying to update

curl http://jenkins.example.com/job/opentopic-develop/build?token=TOKEN_NAME

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Jenkins

Open source continuous integration tool written in Java, forked from Hudson

Developed by: Eclipse Foundation, **License:** MIT

IDE support: Eclipse, IntelliJ IDEA, NetBeans

Notifications: Android, E-mail, Google Calendar, IRC, XMPP (Jabber), RSS, Twitter

Plugin File System SCM: run cron-based repository checking

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Jenkins

Django-jenkins - allows an easy integration with Jenkins tools such as visualization of code coverage, pep8/pylint/pyflakes code violations.

- pip install django-jenkins
- add ‘django_jenkins’ to INSTALLED_APPS
- JENKINS_TASKS = (

  ```
      'django_jenkins.tasks.with_coverage',
      'django_jenkins.tasks.django_tests',
      'django_jenkins.tasks.run_pep8',
      'django_jenkins.tasks.run_pyflakes',
  )
  ```
- PROJECT_APPS = INSTALLED_APPS
- in **“Execute shell”** step (in jenkins):
  - pip install -r requirements.txt --exists-action=i
  - python manage.py jenkins

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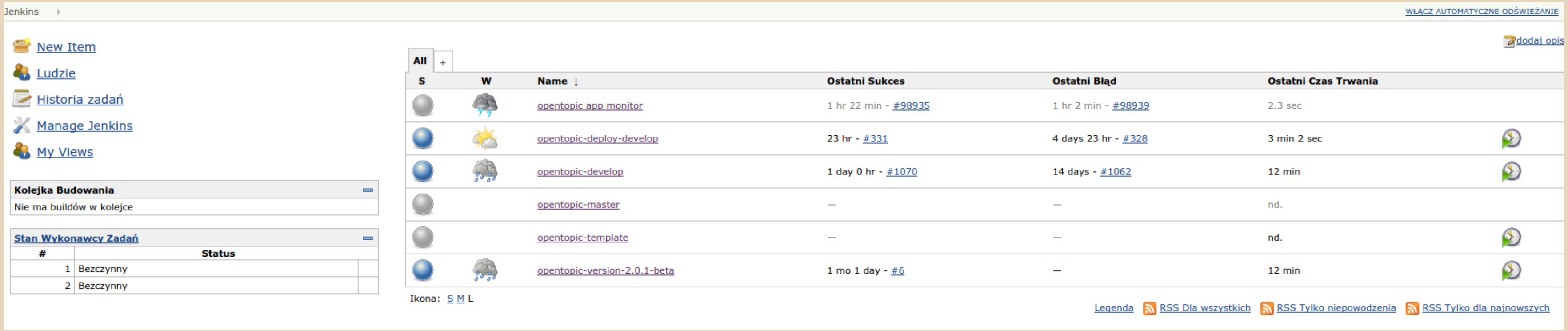
Jenkins



Jenkins ▸ WŁĄCZ AUTOMATYCZNE ODŚWIEŻANIE

- New Item
- Ludzie
- Historia zadań
- Manage Jenkins
- My Views

Kolejka Budowania

Nie ma buildów w kolejce

Stan Wykonawcy Zadań

#	Status
1	Bezczynny
2	Bezczynny

dodaj opis

All +

S	W	Name ↓	Ostatni Sukces	Ostatni Błąd	Ostatni Czas Trwania	
⚪	⛈	opentopic app monitor	1 hr 22 min - #98935	1 hr 2 min - #98939	2.3 sec	
🔵	⛅	opentopic-deploy-develop	23 hr - #331	4 days 23 hr - #328	3 min 2 sec	⏱
🔵	🌧	opentopic-develop	1 day 0 hr - #1070	14 days - #1062	12 min	⏱
⚪		opentopic-master	—	—	nd.	
⚪		opentopic-template	—	—	nd.	⏱
🔵	🌧	opentopic-version-2.0.1-beta	1 mo 1 day - #6	—	12 min	⏱

Ikona: S M L

Legenda RSS Dla wszystkich RSS Tylko niepowodzenia RSS Tylko dla najnowszych

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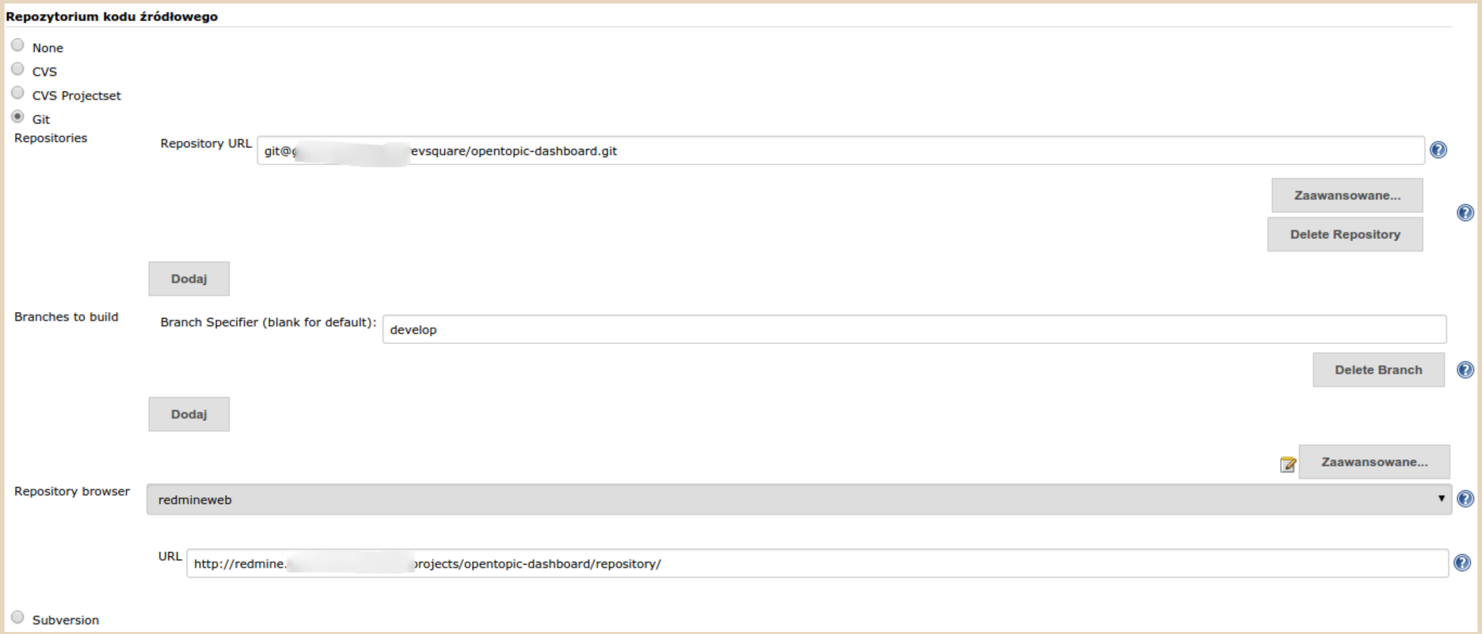

Repozytorium kodu źródłowego

- ○ None
- ○ CVS
- ○ CVS Projectset
- ● Git

Repositories

Repository URL: git@[redacted]evsquare/opentopic-dashboard.git

Branches to build

Branch Specifier (blank for default): develop

Repository browser: redmineweb

URL: http://redmine.[redacted]projects/opentopic-dashboard/repository/

- ○ Subversion

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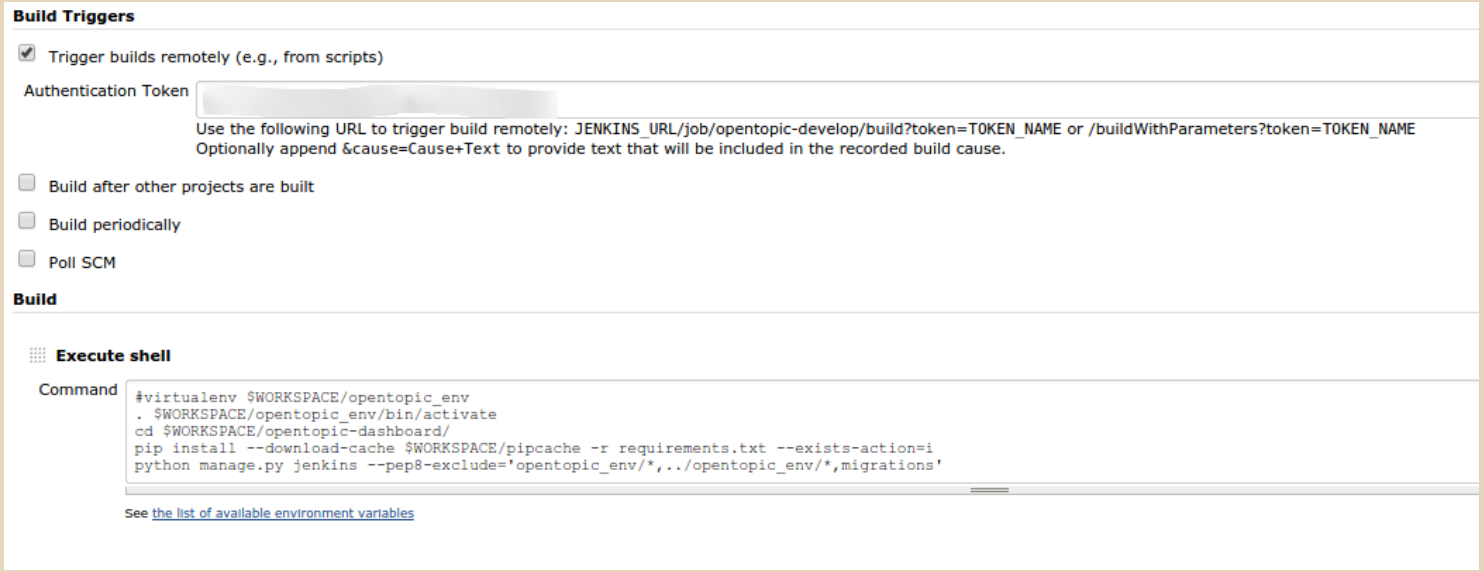

Build Triggers

[✓] Trigger builds remotely (e.g., from scripts)

Authentication Token [redacted]

Use the following URL to trigger build remotely: JENKINS_URL/job/opentopic-develop/build?token=TOKEN_NAME or /buildWithParameters?token=TOKEN_NAME
Optionally append &cause=Cause+Text to provide text that will be included in the recorded build cause.

[ ] Build after other projects are built

[ ] Build periodically

[ ] Poll SCM

Build

Execute shell

Command

```
#virtualenv $WORKSPACE/opentopic_env
. $WORKSPACE/opentopic_env/bin/activate
cd $WORKSPACE/opentopic-dashboard/
pip install --download-cache $WORKSPACE/pipcache -r requirements.txt --exists-action=i
python manage.py jenkins --pep8-exclude='opentopic_env/*,../opentopic_env/*,migrations'
```

See the list of available environment variables

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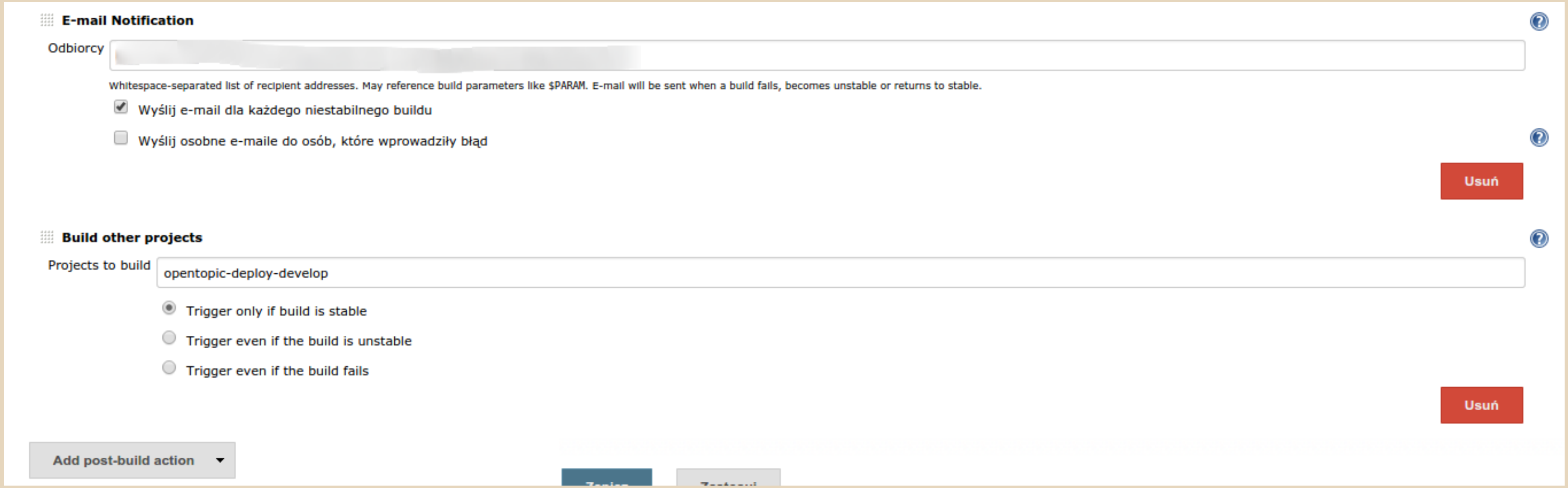
Jenkins



E-mail Notification

Odbiorcy [redacted]

Whitespace-separated list of recipient addresses. May reference build parameters like $PARAM. E-mail will be sent when a build fails, becomes unstable or returns to stable.

- [✓] Wyślij e-mail dla każdego niestabilnego buildu
- [ ] Wyślij osobne e-maile do osób, które wprowadziły błąd

Build other projects

Projects to build: opentopic-deploy-develop

- [✓ Trigger only if build is stable]
- Trigger even if the build is unstable
- Trigger even if the build fails

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Fabric

Python (2.5-2.7) library and command-line tool for streamlining the use of SSH for application deployment or systems administration tasks (uses Paramiko lib).

Basic functions:

local	# execute a local command
run	# execute a remote command on all specific hosts, user-level permissions
sudo	# sudo a command on the remote server
put	# copy over a local file to a remote destination
get	# download a file from the remote server
prompt	# prompt user with text and return the input (like raw_input)
reboot	# reboot the remote system, disconnect, and wait for wait seconds

Per default looks for ‘fabfile.py’ file (has to be stored only on your client)

Requirements:
Server: SSH server like OpenSSH
Client: SSH client needs

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Fabric

```
fab -H user1@server1,user2@server2 host_type
from fabric.api import *
def host_type():
    run('uname -s')

fab uptime
from fabric.api import *

# We can then specify host(s) and run the same commands across those systems
env.user = 'username'
env.hosts = ['server1']

def uptime():
    run("uptime")
```

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Fabric

fab -R webservers

```
from fabric.api import *

# Define sets of servers as roles
env.roledefs = {
    'webservers': ['www1', 'www2', 'www3', 'www4', 'www5'],
    'databases': ['db1', 'db2']
}

# Set the user to use for ssh
env.user = user1

# Restrict the function to the 'webservers' role
@roles('webservers')
def get_version():
    run('cat /etc/issue')
```

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Thank you for your attention! ;)

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