

# Continuous Integration with Jenkins (plus Rake and SVN)

Mike Dillamore  
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# Topics



- Introduction to Continuous Integration
- Jenkins CI
- Rake (Ruby make)
- Case Study / Demo
- Resources

# Integration



- **integration:** a process in which separately produced components or subsystems are combined and problems in their interactions are addressed.
- It's often hard, time-consuming, distracting
- Gets harder with
  - number of bugs
  - number of components
  - time since last integration
- Ideally, we would like to avoid it!

# Continuous Integration



Martin Fowler:

*“Continuous Integration is a software development practice where members of a team integrate their work frequently, usually each person integrates at least daily - leading to multiple integrations per day. Each integration is verified by an automated build (including test) to detect integration errors as quickly as possible. Many teams find that this approach leads to significantly reduced integration problems and allows a team to develop cohesive software more rapidly.”*

# Continuous Integration



- Minimizes Integration effort
- Automates as much as possible
- Replaces long, infrequent integration phases with short, frequent ones
  - ideally instantaneous
- Allows developers to focus on what they're good at

# CI Benefits



- Developers get more coding done
- Bugs are found earlier
- No last-minute surprises
- Code is always ready to ship
- Supports Agile practices

# 10 Practices of Continuous Integration

## - Martin Fowler



- Maintain a Single Source Repository
- Automate the Build
- Make Your Build Self-Testing
- Everyone Commits To the Mainline Every Day
- Every Commit Should Build the Mainline on an Integration Machine
- Keep the Build Fast
- Test in a Clone of the Production Environment
- Make it Easy for Anyone to Get the Latest Executable
- Everyone can see what's happening
- Automate Deployment



# Jenkins CI

- Build server (originated as Hudson)
- Written in Java
  - not limited to building Java programs
- Easy to install
- Easy to configure
- Powerful, flexible
- Great community support
- <http://jenkins-ci.org/>



# Jenkins and the 10 practices



- “Maintain a Single Source Repository”
  - built-in support for SVN and CVS
  - plugin support for TFS, Mercurial, Git, ClearCase, ...
- “Automate the Build”
  - support for Ant, Rake, Maven, makefiles, scripting

# Jenkins and the 10 practices



- “Make Your Build Self-Testing”
  - build script runs xUnit family tests (or others)
  - Jenkins publishes test reports and success status
- “Every Commit Should Build the Mainline on an Integration Machine”
  - Jenkins supports multiple build triggers, including code commits, time of day, builds of other projects

# Jenkins and the 10 practices



- “Keep the Build Fast”
  - run build jobs in parallel, or chained
  - Jenkins support for building on remote slave machines
- “Test in a Clone of the Production Environment”
  - plugin support for deploying files to remote machines
  - plugin support for launching VMware instances

# Jenkins and the 10 practices








- “Make it Easy for Anyone to Get the Latest Executable”
  - artifacts of the build are published on the Jenkins dashboard
- “Everyone can see what's happening”
  - web dashboard
  - notifications via email, SMS, RSS, many others



# Jenkins


## Jenkins

[ENABLE AUTO REFRESH](#)

-  [New Job](#)
-  [People](#)
-  [Build History](#)
-  [Manage Jenkins](#)
-  [Status Monitor](#)

## Home

Eurotherm Product Tools: Continuous Integration (Linux)

 [edit description](#)

All Eurotherm Product Software +

S	W	Name ↓	Last Success	Last Failure	Last Duration	
		<a href="#">Build and test a C++ program</a>	5 mo 2 days (#82)	N/A	29 sec	
		<a href="#">Build and test a Python program</a>	7 mo 19 days (#60)	5 mo 8 days (#98)	16 sec	
		<a href="#">Delphi UhhLib Package</a>	6 mo 3 days (#154)	N/A	7 sec	
		<a href="#">EuroMerge</a>	1 day 14 hr (#261)	14 hr (#262)	3 min 10 sec	
		<a href="#">Google Test for Visual Studio 2008</a>	3 days 13 hr (#41)	N/A	2 min 16 sec	
		<a href="#">Google Test for Visual Studio 2010</a>	3 days 13 hr (#24)	N/A	4 min 16 sec	
		<a href="#">iTools</a>	7 hr 4 min (#173)	N/A	26 min	
		<a href="#">Product Tools DVD</a>	26 days (#28)	N/A	9 min 45 sec	
		<a href="#">Rails</a>	N/A	5 mo 8 days (#154)	47 sec	
		<a href="#">Review</a>	1 hr 10 min (#294)	N/A	23 min	
		<a href="#">Windows Navigator socket server</a>	1 hr 10 min (#460)	14 hr (#459)	1 hr 2 min	

**Build Queue**  
No builds in the queue.

**Build Executor Status**

#	Master
1	Idle
2	Idle
<b>swift.corp.com</b>	
1	Idle
2	Idle
<b>uk1208.corp.com</b>	
1	Building <a href="#">Windows Navigator socket server #461</a> 
2	Idle

Icon: [S](#) [M](#) [L](#)

# Jenkins

search ?

Jenkins » iTools

ENABLE AUTO REFRESH

- [Back to Dashboard](#)
- [Status](#)
- [Changes](#)
- [Workspace](#)
- [Build Now](#)
- [Delete Project](#)
- [Configure](#)
- [Subversion Polling Log](#)

## Project iTools

[add description](#)



[Workspace](#)



[Last Successful Artifacts](#)

- [itools\\_e8-41.exe](#)



[Recent Changes](#)

### Build History [\(trend\)](#)

- #173 [12-Jul-2011 06:00:31](#)
- #172 [11-Jul-2011 10:53:29](#)
- #171 [11-Jul-2011 06:00:58](#)
- #170 [10-Jul-2011 06:00:58](#)
- #169 [09-Jul-2011 06:00:58](#)
- #168 [08-Jul-2011 06:00:58](#)
- #167 [07-Jul-2011 06:00:43](#)
- #166 [06-Jul-2011 10:45:51](#)
- #165 [06-Jul-2011 06:00:43](#)
- #164 [05-Jul-2011 06:01:38](#)

[RSS for all](#) [RSS for failures](#)

## Permalinks

- [Last build \(#173\), 7 hr 6 min ago](#)
- [Last stable build \(#173\), 7 hr 6 min ago](#)
- [Last successful build \(#173\), 7 hr 6 min ago](#)



http://products-ci.e...

iTools #173 [Jenkins]



# Jenkins

search ?

Jenkins » iTools » #173

ENABLE AUTO REFRESH

- [Back to Project](#)
- [Status](#)
- [Changes](#)
- [Console Output \[raw\]](#)
- [Edit Build Information](#)
- [Tag this build](#)
- [Previous Build](#)

## Build #173 (12-Jul-2011 06:00:31)

Keep this build forever

Delete this build

Started 7 hr 8 min ago  
Took 26 min on [swift.corp.com](#)

[add description](#)



### Build Artifacts

- [itools\\_e8-41.exe](#)



Revision: 37612  
No changes.



Started by timer



http://products-ci.e...

iTools Config [Jenkins]



### Source Code Management

- CVS
- None
- Subversion

Repository URL  ?

Modules

Local module directory (optional)  ?

Add more locations...

Check-out Strategy

Delete everything first, then perform "svn checkout". While this takes time to execute, it ensures that the workspace is in the pristine state.

Repository browser

?

Advanced...

### Build Triggers

- Build after other projects are built ?
- Build periodically ?

Schedule

- Poll SCM ?

Schedule



Hudson Build Monitor


products-ci.eurotherm.co.uk:8080/monitor/?

**EuroMerge**  
#262 - 14 hr ago

**iTools**  
#173 - 7 hr 13 min ago

**Product Tools DVD**  
#28 - 26 days ago

**Review**  
#294 - 1 hr 19 min ago

 **Windows Navigator socket server**  
#460 - 1 hr 19 min ago

# Jenkins - summary



- An easy-to-use, powerful Continuous Integration server offering
  - interface to a range of SCM system
  - support for multiple make/build tools
  - project reporting and analysis
  - huge plugin ecosystem for extending Jenkins and integrating external tools
- An effective (and low cost) tool for introducing CI into your working practices

# A bit about Rake



- Rake = Ruby make
- A simple Ruby build program with capabilities similar to make
- A software task management tool
  - allows you to specify tasks and describe dependencies
- A Domain Specific Language (DSL) written in Ruby

# Rake by example (1)



*# Dependencies by file: a simple script to build a C HelloWorld program*

```
file 'hello.o' => ['hello.c'] do
```

```
  sh 'cc -c -o hello.o hello.c'
```

```
end
```

```
file 'hello' => ['hello.o'] do
```

```
  sh 'cc -o hello hello.o'
```

```
end
```

# Rake by example (2)



*# Dependencies by task: a simple Rake recipe*

```
task :pancake => [:flour, :milk, :egg, :baking_powder]
```

```
task :butter do
```

```
  puts "cut 3 tablespoons of butter into tiny squares"
```

```
end
```

```
task :flour => :butter do
```

```
  puts "use hands to knead butter squares into 1 1/2 cup flour"
```

```
end
```

```
task :milk do
```

```
  puts "add 1 1/4 cup milk"
```

```
end
```

# Rake – how we're using it (1)



- Build Visual Studio and Delphi projects
- Build HTML Help files
- Build MSI installers
- Code signing EXEs and installers
- Build ISO image for a DVD
- Run unit tests

# Rake – how we're using it (2)



- RegEx to update version resource in RC file
- Use COM automation to update MSI installer properties
- Page scrape all the PDF files from a website
- Create HTML documents 'on the fly'

# Getting it all going



- SVN: Subversion for Windows
  - <http://subversion.apache.org/packages.html>
  - <http://sourceforge.net/projects/win32svn/>
- Rake
  - RubyInstaller 1.8.7 from <http://rubyinstaller.org/>
  - **gem install --remote rake**
- Jenkins
  - Latest from <http://mirrors.jenkins-ci.org/windows/>
  - Set appropriate Logon account for Windows service



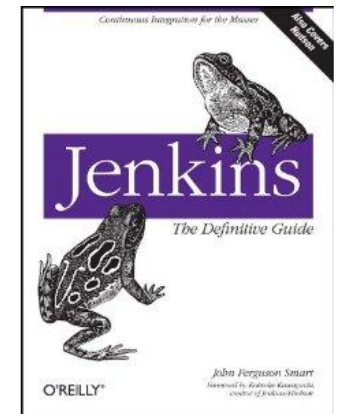
Demos...



# Resources



- Martin Fowler introductory article  
<http://www.martinfowler.com/articles/continuousIntegration.html>
- **Jenkins: The Definitive Guide**, John Ferguson Smart / O'Reilly  
(to be published July 2011)



- Parts of this presentation derived from  
<http://www.slideshare.net/carlo.bonamico/continuous-integration-with-hudson>  
with thanks to Carlo Bonamico