

Introduction to GitLab

Basics and Continuous Integration

Christian Stankowic

www.stankowic-development.net

Free and Open Source software
Conference

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Linux & vSphere administrator

Blogger & book author

AGENDA

Agenda

Motivation

Installation

Crash course

Continuous Integration

MOTIVATION

Why Git?

simple, distributed version control system

suitable even for non-developers

high security against code corruption by hashing

secure data transfers using SSH

Hello Git world!

```
1 $ git clone http://server/repo.git
2 $ cd repo ; vi myfile.c
3 $ git add *
4 $ git commit -m 'added feature'
5 $ git push
```

Listing 1: Clone repo and upload changes

Git variety

Standalone, local data

Web interface using **GitWeb**

Hosted (*extern and on-premise*):

GitHub

BitBucket

GitLab

etc...

What is GitLab?

web-based interface for version control with
`git`

includes additional management and
documentation functionality

free and paid models available

monthly release cycle

Features

Intuitive responsive web interface

file manager

integrated *'ticket tool'* and wiki

automatic code compilation (CI)





and much more...

Projects

Signed in successfully.

Your Projects Starred Projects Explore Projects

Filter by name... Last updated **New Project**

- 
monitoring-love / windows-plugins
 Nagios/Icinga monitoring plugins for Microsoft Windows
 🔄 ⭐ 0 🔒
- 
Christian Stankowic / homelab
 #justHomelabThings
 🔄 ⭐ 0 🔒
- 
Christian Stankowic / phpQuickshare
 Web-application for easy file sharing (legacy)
 ⭐ 0 🔒
- 
Christian Stankowic / ci-test
 ci-test
 🔄 ⭐ 0 🔒

Issues

Open Closed All

Author Christian Sta... Milestone Label Last created

Christian Stankowic / homelab New Issue

- Implement CMDB**
 #23 · opened about a month ago by Christian Stankowic documentation
👤 🗨️ 0
 updated about a month ago
- Document all passwords in KeePass/KyPass**
 #22 · opened 2 months ago by Christian Stankowic documentation network 3 tasks (0 completed, 3 remaining)
 👤 🗨️ 0
 updated 2 months ago
- Implement web-based IP management software**
 #20 · opened 2 months ago by Christian Stankowic documentation enhancement network
👤 🗨️ 1
 updated 2 months ago

Edition comparison

Feature	CE	EE
file manager, issues, wiki	✓	✓
Online code changes	✓	✓
GitHub import	✓	✓
LDAP/AD authentication	✓	✓
CI and Docker support	✓	✓
Support	×	✓
Kerberos authentication	×	✓
Merge Request Approvals	×	✓
Issues/Merge Requests templates	×	✓

Detailed comparison: about.gitlab.com/features

Git clients

git, command line

GitX-dev (*macOS*)

SourceTree Free (*Windows, macOS*)

GitG / qGit (*Linux*)

Git jargon variety

Description

Merge code

Code snippet

Project

Team/Group

GitLab

Merge Request

Snippet

Project

Group

GitHub

Pull Request

Gist

Repository

Organization

Source: **about.gitlab.com**

INSTALLATION

Installation

GitLab CE and EE can be downloaded as **Omnibus** package (*distro-specific, Chef*)

available for:

Debian 7 / 8

Raspbian

Ubuntu 12.04 / 14.04 / 16.04

Enterprise Linux (*RHEL, CentOS, SL*) 6 / 7

see also: **about.gitlab.com/downloads**

Requirements

at least 2 Cores

minimum 2 GB RAM

more than 500 users: graded by user amount

see also: **doc.gitlab.com/install**

Preparation

Required services and packages:

SSH server

Curl

Postfix

Ruby 2.1

Import software source, install `gitlab-ce` package

Configure using: `gitlabctl reconfigure`

CRASH COURSE

Projects, users,...

Source code is located in projects

Users (*in groups*) have access

Code versions vary between branches (*e.g. master, nightly,...*)

Changes between branches are transferred using Merge Requests

Users and SSH keys

Users can be part of groups (*teams*)

Each user profile contains SSH client keys

Code changes are transferred securely using SSH

The first project

Creating a project

Creating a README, LICENSE

Adding your SSH key

Cloning the project

Changing the code

Uploading changes



Projects

Todos

0

Activity

Groups

Milestones

Issues

15

Merge Requests

0

Snippets

Help

Profile Settings

Projects



New project

Create or Import your project from popular Git services

Project path

cstan

Project name

Want to house several dependent projects under the same namespace? [Create a group](#)

Import project from



git Repo by URL

Project description (optional)

Visibility Level (?)

- Private
Project access must be granted explicitly to each user.
- Internal
The project can be cloned by any logged in user.
- Public
The project can be cloned without any authentication.

Create project

Cancel



Projects

Todos

0

Activity

Groups

Milestones

Issues

15

Merge Requests

0

Snippets

Help

Profile Settings

Christian Stankowic / hello-world ▾



This project Search



Project

Activity

Repository

Pipelines

Graphs

Issues 0

Merge Requests 0

Wiki



H

hello-world 📄

Hello GitLab world!

☆ Star

0

🍴 Fork

0

SSH ▾

git@st-deve102.stankowic.loc:csta



Files (130 KB)

Commit (1)

Branch (1)

Tags (0)

Add Changelog

Add License

Add Contribution guide

Set Up CI



Global ▾

262900bd Add new file · less than a minute ago by [Christian Stankowic](#)

Test



Issues: bug tracking and more

Documenting bugs, ideas, support requests,...

Grouped by tags (*e.g. bug, enhancement,...*)

Can be mapped to users and milestones



Open Closed All

📡 [New Issue](#)

Author ▼ Christian Sta... ▼ Milestone ▼ Label ▼

Last created ▼

Christian Stankowic / homelab

New issue

Implement CMDB

#23 · opened about a month ago by Christian Stankowic documentation

👤 0
updated about a month ago

Document all passwords in KeePass/KyPass

#22 · opened 2 months ago by Christian Stankowic documentation network 3 tasks (0 completed, 3 remaining)

👤 0
updated 2 months ago

Implement web-based IP management software

#20 · opened 2 months ago by Christian Stankowic documentation enhancement network

👤 1
updated 2 months ago

Pre-install Nagios packages

#19 · opened 3 months ago by Christian Stankowic linux

👤 0
updated 3 months ago

Implement SSL for public web server

#14 · opened 3 months ago by Christian Stankowic security web

👤 1
updated 3 months ago

Use SSL for Piwik

#13 · opened 3 months ago by Christian Stankowic security web

👤 0
updated 3 months ago

Freeze phpMyCMS web site

#12 · opened 3 months ago by Christian Stankowic web 3 tasks (0 completed, 3 remaining)

👤 0
updated 3 months ago

Freeze NETIO web site

#11 · opened 3 months ago by Christian Stankowic web 2 tasks (0 completed, 2 remaining)

👤 0
updated 3 months ago

Freeze IPCop web site

#10 · opened 3 months ago by Christian Stankowic web 3 tasks (0 completed, 3 remaining)

👤 0
updated 3 months ago

st-web04 is not able to shutdown gracefully

#5 · opened 3 months ago by Christian Stankowic bug linux vmware

👤 0
updated 3 months ago

Re-establish monitoring

#2 · opened 3 months ago by Christian Stankowic enhancement linux

👤 1
updated 3 months ago

Implement mail transport for vSphere environment

#1 · opened 3 months ago by Christian Stankowic enhancement linux vmware

👤 0
updated 3 months ago

Wiki

Full-featured wiki per project

Format using **Markdown**, **RDoc** or **AsciiDoc**

Good way to implement big documentations

Wiki is managed using a dedicated Git repository

Navigation menu (left): Projects, Todos (0), Activity, Groups, Milestones, Issues (15), Merge Requests (0), Snippets.

Header: Christian Stankovic / sheasy

Top navigation: Project, Activity, Repository, Graphs, Issues (2), Merge Requests (0), Wiki

Sub-navigation: Home, Pages, Git Access

database design (markdown)	Last edited less than a minute ago
home (markdown)	Last edited about a minute ago
installation (markdown)	Last edited less than a minute ago
project ideas (markdown)	Last edited about a minute ago

Navigation menu (left): Groups, Milestones, Issues (15), Merge Requests (0), Snippets, Help, Profile Settings.

Page title: Project ideas · Edit Page

Buttons: New Page, Page History, Edit, Delete

Format: Markdown

Content area:

Write | Preview

B I

Content will follow very soon...

Click here for [database design information](database-design).

Styling with **Markdown** is supported

To link to a (new) page, simply type `[Link Title](page-slug)`.

Commit message: cstan created page: database design

Buttons: Save changes, Cancel

CONTINUOUS INTEGRATION

Why CI?

Automating development sub-steps, e.g.:

- Compiling sub-programs

- Compound the product

- Testing sub-programs with (*test units*)

Available since version 8.0

Functionality

Code changes are applied

GitLab CI selects systems for automation
(*Runner*)

Runners retrieve code changes

Pre-defined scripts are executed



Projects

Todos 0

Activity

Groups

Milestones

Issues 15

Merge Requests 0

Snippets

Help

Profile Settings

Project Activity Repository Pipelines Graphs Issues 0 Merge Requests 0 Wiki

passed Build #5 for commit 0f901338 from master by @cstan 8 months ago

```

gitlab-ci-multi-runner 0.7.2 (990cf5d)
Using SSH executor...
Running on st-devel02.stankowic.ioc via st-devel02.stankowic.ioc...
Fetching changes...
Removing BUILD/
Removing BUILDROOT/
Removing RPMS/
Removing SOURCES/helloworld-1.0.tar.gz
Removing SRPMS/
HEAD is now at abb7ae5 Updated configuration:

From http://st-devel02.stankowic.ioc/rpm-devel/rpm-specs
  abb7ae5..0f90133 master -> origin/master
Checking out 0f90133 as master...
Previous HEAD position was abb7ae5... Updated configuration: - only run on nodes with 'rpm' spec - only on
'master' branch
HEAD is now at 0f90133... Updated
$ cat /etc/redhat-release
CentOS Linux release 7.1.1503 (Core)
$ sh build.sh
*** INFO: this machine is:
CentOS Linux release 7.1.1503 (Core)
Linux st-devel02.stankowic.ioc 3.10.0-229.20.1.el7.x86_64 #1 SMP Tue Nov 3 19:10:07 UTC 2015 x86_64
x86_64 GNU/Linux

My SOURCES:
total 12
drwxrwxr-x. 2 svc-gitlab-ci svc-gitlab-ci 4096 Dec  8 11:04 .
drwxrwxr-x. 3 svc-gitlab-ci svc-gitlab-ci 4096 Dec  8 16:10 ..
-rw-rw-r--. 1 svc-gitlab-ci svc-gitlab-ci  17 Dec  8 11:04 helloworld
** Packing sauces...
tar cvFz helloworld-1.0.tar.gz helloworld-1.0
helloworld-1.0/
helloworld-1.0/helloworld

My new SOURCES:
/home/svc-gitlab-ci/builds/3c0b983c/0/rpm-devel/rpm-specs/SOURCES
-rw-rw-r--. 1 svc-gitlab-ci svc-gitlab-ci 182 Dec  8 16:10 helloworld-1.0.tar.gz

helloworld-1.0:
total 12

```

Build details

Retry

Duration: 1 second

Finished: 8 months ago

Runner: #2

Raw	Erase
-----	-------

Commit title

Updated

Tags

rpm

GitLab runner

Agent for Linux, Windows, macOS and BSD
written in **Go**

Supports Bash, Batch and PowerShell

Also available as Docker service

Encrypted communication between CI and
Runner

Builds can be seen within the GUI

CI configuration

Configuration using YAML file within the project (`.gitlab-ci.yml`)

Defines:

- Scripts pre/after/during compilation

- Branches and Runner (*e.g. custom Runner for **master***)

- Artefacts

Excursus: Executor types

Executor controls code compilation:

Shell - simple, local host/Windows system

Docker - for complex projects with dependencies (*e.g. databases*)

VirtualBox / Parallels - VMs can be cloned during life-time

SSH - *'letzte Wahl'*, remote commands

see also: gitlab.com/gitlab-org/...

Artefacts

Selection of files after running a build (*e.g. binary files*)

Can be downloaded from the GUI

Artefacts can be handed to web hooks (*content delivery*)

Only using **shell** and **Docker** executors!

Example: Python plugins

Icinga plugins for Linux and Windows

automatic packaging using pyInstaller for Windows

Result: EXE file containing Python interpreter + script

.gitlab-ci.yml

```
1  before_script:  
2    - hostname  
3  build:  
4    script:  
5      - "powershell.exe -File  
        build_binaries.ps1"  
6    artifacts:  
7      paths:  
8        - dist
```

Listing 2: CI configuration

master windows-plugins / + Find File Download zip

Name	Last Update	Last Commit > b8dc1f4f - Removed trash	History
check_backup_files	4 months ago	Added check_backup_files.py	
check_dir_files	about a month ago	Removed trash	
.gitlab-ci.yml	4 months ago	Added dist	
README.md	about a month ago	Removed trash	
build_binaries.ps1	4 months ago	Fixed error	

README.md

This project contains plugins developed for Microsoft Windows.

Plugin	Description	Python version	Notes
check_backup_files.py	Checks backup temp files	2.7	cross-compatible (also Linux)

master windows-plugins / check_backup_files / + Find File Download zip

Name	Last Update	Last Commit > b8dc1f4f - Removed trash	History
-			
check_backup_files.py	4 months ago	Added check_backup_files.py	

master windows-plugins / build_binaries.ps1

Fixed error
Christian Stankowic authored 4 months ago

77edfa5d Browse Files

build_binaries.ps1 287 Bytes Raw Blame History Permalink Edit Replace Delete

```

1 $folders=ls | where {$_.mode -match "d"}
2 mkdir dist
3 foreach($folder in $folders)
4 {
5     Write-Host "Moving to '$folder'"
6     cd $folder
7     Write-Host "Building binary by executing: pyinstaller.exe -F -y $folder.py"
8     pyinstaller.exe -F -y "$folder.py"
9     cd ..
10    move $folder/dist/$folder.exe dist
11 }

```

monitoring-love / windows-plugins ▾ · Builds This project Search 🔍

Project Activity Repository **Pipelines** Graphs Issues 0 Merge Requests 0 Wiki ⚙️

🟢 passed Build #84 for commit b8dc1dfd from master by @cstan about a month ago

```

gitlab-ci-multi-runner 1.1.2 (78b3f82)
Using Shell executor...
Running on ST-MIN02...

Fetching changes...

Removing check_backup_files/build/
Removing check_backup_files/check_backup_files.spec
Removing check_backup_files/dist/
Removing check_dir_files/build/
Removing check_dir_files/check_dir_files.spec
Removing check_dir_files/dist/
Removing dist/
Removing test1/build/
Removing test1/dist/
Removing test1/test1.spec
Removing test2/build/

```

Build artifacts

[Download](#) [Browse](#)

Build details Retry

Duration: 1 minute 24 seconds

Finished: about a month ago

Runner: #5

[Raw](#) [Erase](#)

Commit title

Removed trash

monitoring-love / windows-plugins ▾ · Builds This project Search 🔍

Project Activity Repository Pipelines **Graphs** Issues 0 Merge Requests 0 Wiki ⚙️

[Download artifacts archive](#)

Name	Size
..	
check_backup_files.exe	8.1 MB
check_dir_files.exe	8.1 MB

40

QUESTIONS?

Links

GitLab website: **gitlab.org**

Omnibus package downloads

GitLab documentation

GitLab CI documentation

GitLab Runner repository

GitLab CI tutorial on my blog

Thanks for your attention!

<http://www.stankowic-development.net>



@stankowic_devel



Christian Stankowic



stankowicdevel