

# Automation with Jenkins 2.0

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zudʒi:væŋ vidʒæjekumaræn

or: He, who can't be named.

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# Content

## 1 Jenkins CI (1.x)

- Master- & Slave-Nodes
- Plugins
- Jobs & Job-Definitions

## 2 Jenkins 2.0

- Pipeline as Code
- Multibranch Pipeline
- GitHub Organization Plugin

## 3 Jenkins Blue Ocean

# Jenkins CI

Consists of...

- Users/Committer
- Nodes (Master, Slaves)
- Plugins
- Job-Definitions (Bash-Skripte)

# General information about Jenkins

- two Versions
- LTS-Version: Updates every 3-4 months(recommended)
- non-LTS-Versions: Updates every week (not recommended)
- written in Java - loves your RAM
- configuration files saved in XML-Files

# Jenkins overview

The screenshot shows the Jenkins CI web interface. At the top, there's a navigation bar with the Jenkins logo, a search bar, and the user name 'Sujeewan Vijayakumaran'. Below the navigation bar, there's a sidebar with navigation links like 'Benutzer', 'Build-Verlauf', and 'Zugangsdaten'. The main content area displays a table of builds with columns for status, name, last success, last failure, and duration. The table lists several builds, including 'inyoka-deploy-oss-pipeline', 'inyoka-deploy-staging-pipeline', 'inyoka-deployment-package-build', 'inyoka-doc-build', 'inyokaproject-github', 'pipeline-test', and 'testing'. A legend at the bottom right explains the symbols used in the table.

S	W	Name ↓	Letzter Erfolg	Letzter Fehlschlag	Letzte Dauer	Fav
		<a href="#">inyoka-deploy-oss-pipeline</a>	1 Tag 19 Stunden - <a href="#">#30</a>	Unbekannt	34 Sekunden	
		<a href="#">inyoka-deploy-staging-pipeline</a>	1 Tag 19 Stunden - <a href="#">#4</a>	Unbekannt	26 Sekunden	
		<a href="#">inyoka-deployment-package-build</a>	1 Tag 19 Stunden - <a href="#">#34</a>	1 Tag 20 Stunden - <a href="#">#30</a>	58 Sekunden	
		<a href="#">inyoka-doc-build</a>	1 Tag 19 Stunden - <a href="#">#14</a>	Unbekannt	1 Minute 51 Sekunden	
		<a href="#">inyokaproject-github</a>	Nicht anwendbar	Unbekannt	Nicht anwendbar	
		<a href="#">pipeline-test</a>	4 Tage 15 Stunden - <a href="#">#15</a>	4 Tage 15 Stunden - <a href="#">#14</a>	30 Sekunden	
		<a href="#">testing</a>	Nicht anwendbar	Unbekannt	Nicht anwendbar	

Symbol: S M L

Legende RSS Alle Builds RSS Nur Fehlschläge RSS Nur Jeweils letzter Build

# Nodes

- Master:
  - where the Jenkins-Server runs
  - Configuration of every Nodes and Jobs
  - always online
  - optional use as a slave
- Slaves (Build-Executors):
  - where the jobs are running
  - optional online
  - have independent names
  - can have multiple labels

# Plugins

- Plugin-Manager allows central installation and updates of plugins
- many™ plugins available
- functions are layed off into plugins (VCS, Provisioning,...)
- revert to older plugin versions possible



# Plugin-Manager

Aktualisierungen		Verfügbar		Installiert		Erweiterte Einstellungen	
Aktiviert	Name ↓	Version	Vorher installierte Version	Gesperrt	Deinstallieren		
<input checked="" type="checkbox"/>	<a href="#">Ant Plugin</a> This plugin adds <a href="#">Apache Ant</a> support to Jenkins.	<a href="#">1.4</a>	1.3 wiederherstellen		<input type="button" value="Deinstallieren"/>		
<input checked="" type="checkbox"/>	<a href="#">Authentication Tokens API Plugin</a> This plugin provides an API for converting credentials into authentication tokens in Jenkins.	<a href="#">1.3</a>			<input type="button" value="Deinstallieren"/>		
<input checked="" type="checkbox"/>	<a href="#">BlueOcean beta</a> BlueOcean Aggregator	<a href="#">1.0.0-b08</a>	1.0.0-b07 wiederherstellen		<input type="button" value="Deinstallieren"/>		
<input checked="" type="checkbox"/>	<a href="#">bouncycastle API Plugin</a> Provides a stable API to Bouncy Castle related tasks. Plugins using Bouncy Castle should depend on this plugin and not directly on Bouncy Castle	<a href="#">2.16.0</a>	1.648 wiederherstellen		<input type="button" value="Deinstallieren"/>		
<input checked="" type="checkbox"/>	<a href="#">Branch API Plugin</a> This plugin provides an API for multiple branch based projects.	<a href="#">1.11</a>	1.10.2 wiederherstellen		<input type="button" value="Deinstallieren"/>		
<input checked="" type="checkbox"/>	<a href="#">Build Flow plugin</a> Manage jobs orchestration as a dedicated "build flow" top level item	<a href="#">0.20</a>	0.19 wiederherstellen		<input type="button" value="Deinstallieren"/>		
<input checked="" type="checkbox"/>	<a href="#">Build Pipeline Plugin</a> This plugin renders upstream and downstream connected jobs that typically form a build pipeline. In addition, it offers the ability to define manual triggers for jobs that require intervention prior to execution, e.g. an approval process outside of Jenkins.	<a href="#">1.5.4</a>	1.5.3.1 wiederherstellen		<input type="button" value="Deinstallieren"/>		
<input checked="" type="checkbox"/>	<a href="#">buildgraph-view</a> This plugin visualizes build relations as a graph.	<a href="#">1.4</a>	1.3.2 wiederherstellen		<input type="button" value="Deinstallieren"/>		
<input checked="" type="checkbox"/>	<a href="#">CloudBees Docker Pipeline</a> Build and use Docker containers from pipelines.	<a href="#">1.9</a>	1.8 wiederherstellen		<input type="button" value="Deinstallieren"/>		

# Job-Definitions

Jobs are mostly a queue of different actions and (shell) scripts.  
Configuration of a job is divided into...

- "General"
- Source Code Management
- Build-Triggers
- Build-Environment
- Build-procedure
- Post-Build-Actions

# Free Style Project

Freely configure your project with different scripts and plugins.








# Free Style Project

**General** Source-Code-Management Build-Auslöser Buildumgebung Buildverfahren Post-Build-Aktionen


Projektname

Beschreibung

[Safe HTML] [Vorschau](#)

- Alte Builds verwerfen 
- Dieser Build ist parametrisiert. 
- GitHub-Projekt
- Delivery Pipeline configuration
- Promote builds when... 
- Throttle builds 
- Projekt deaktivieren 
- Parallele Builds ausführen, wenn notwendig 
- Beschränke, wo dieses Projekt ausgeführt werden darf 

Label-Ausdruck



# Multiconfigurationproject

- Surprise: many configurations for the same job
- Example: Compiling the same software for different distributions
- Complex: Test the project with different configurations -> Configurationmatrix

# Multiconfigurationproject

## Projekt testing-multi

### Konfigurationen

 [ubuntu](#)

 [debian](#)

 [sles](#)

 [centos](#)

# Disadvantages

- initial configuration of Jenkins is hard
- default: completely 'open' to the world
- job configurations are not tied to a repository
- every branch needs an own job (or as an configurationmatrix)

# Jenkins 2.0!

Release in the weekly-release in spring, later as an LTS.

With Jenkins 2.0 many things got better:

- Setup Assistant
- Pipeline as Code
- GitHub Organization Plugin
- Multibranch Pipeline



# Setup-Assistant

Helps for the first setup...

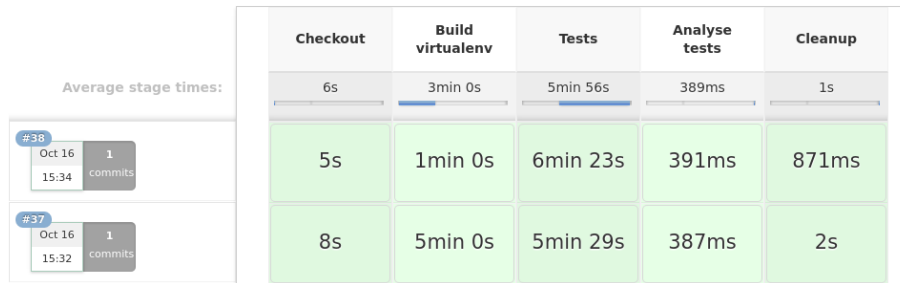
- Creates an user account
- basic protection of the Jenkins-Masters
- Installation of useful plugins

# Pipeline as Code

- complete configuration in a Jenkinsfile
- written in Groovy
- versioning in the repository
- can be used for Continuous Integration and Continuous Delivery
- pausable

# Pipeline as Code

## Stage View



[Letztes Testergebnis](#) (Kein Test fehlgeschlagen.)

# Pipeline as Code II

- Steps
- Nodes
- Stages

# Pipeline as Code III - Example I



## Pipeline

Definition

Pipeline script

Script

```
1 node {  
2   echo 'Hello World!'  
3 }
```

try sample Pipeline...  Use Groovy Sandbox [Pipeline Syntax](#)

## Pipeline as Code III - Example II

Script

```
1 node("ubuntu1604") {  
2     echo 'Hello World!'  
3     sh 'lsb_release -a'  
4 }
```

try sample Pipeline... ▾



# Pipeline Snippet Generator

## Overview

This **Snippet Generator** will help you learn the Groovy code which can be used to define various steps. Pick a step you are interested in from the list, configure it, click **Generate Groovy**, and you will see a Groovy statement that would call the step with that configuration. You may copy and paste the whole statement into your script, or pick up just the options you care about. (Most parameters are optional and can be omitted in your script, leaving them at default values.)

## Steps

Sample Step **checkout: General SCM**

SCM **Git**

Repositories

Repository URL

Credentials **jenkins** Add

Erweitert...

Add Repository

Branches to build

Branch Specifier (blank for 'any')

Add Branch Delete Branch

Repository Browser **(Auto)**

Additional Behaviours **Hinzufügen**

Include in polling?

Include in changelog?

### Generate Groovy

```
checkout([${class: 'GitSCM', branches: [[name: '*/master']], doGenerateSubmoduleConfigurations: false, extensions: [], submoduleCfg: [], userRemoteConfigs: [[credentialsId: 'e081c9b5-6899-40b5-a895-7c2232be3430', url: 'git@github.com:inyokaproject/inyoka']]])
```

# Multibranch Pipeline

Solves the problem: create a job for every branch

- Configure the repository
- Jenkins scans repository for Jenkinsfile
- ... automagically creates jobs for branches with a Jenkinsfile

Another problem still exists: create a repository for every Multibranch-Pipeline Job...



# GitHub Organization Plugin

- Scans GitHub User/Organization
- Creates job for every Repository and Branch dynamically
- automatically configures Pull-Request setup

Not available for other Git-Servers...

# GitHub Organization Plugin



Branches

Pull Requests

S	W	Pull Request ↓	Letzter Erfolg	Letzter Fehlschlag	Letzte Dauer	Fav
		<a href="#">PR-441</a>	18 Stunden - <a href="#">#23</a>	Unbekannt	47 Minuten	
		<a href="#">PR-526</a>	18 Stunden - <a href="#">#24</a>	Unbekannt	39 Minuten	
		<a href="#">PR-584</a>	22 Stunden - <a href="#">#19</a>	18 Stunden - <a href="#">#24</a>	14 Minuten	
		<a href="#">PR-585</a>	1 Tag 12 Stunden - <a href="#">#8</a>	18 Stunden - <a href="#">#23</a>	12 Minuten	
		<a href="#">PR-597</a>	18 Stunden - <a href="#">#22</a>	Unbekannt	32 Minuten	

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

Legende [RSS Alle Builds](#) [RSS Nur Fehlschläge](#) [RSS Nur jeweils letzter Build](#)

## Conclusion Jenkins 2.0

- Configuration with a Jenkinsfile (finally!)
- easier initial setup
- writing pipelines are not that easy
- some functions are portable, some are not
- easy integration with GitHub

# Whats missing?

A new, clean UI!

# Blue Ocean

- Version 1.0 in Beta as a plugin
- will replace old Jenkins Web-UI eventually
- not that many features currently
- focused on pipelines

# Blue Ocean - Pipeline as Code

jenkins / inyokaproject-github / inyoka / PR-441 #23

Branch PR-441  
Commit ea85ebd  
Changes by Sujeevan Vijayakumaran

an hour  
17 hours ago

Pipeline Changes Tests Artifacts



Steps - Cleanup

✓ &gt; Shell Script



# Live-Demo Jenkins 2.0 & Blue Ocean

Live-Demo Jenkins 2.0 & Blue Ocean

# Done!

Questions?