



# What is Jenkins

Jenkins is one of the most popular automation tool used worldwide for continuous integration and continuous delivery.

Jenkins is a free and open-source automation server that enables developers to build, integrate, and test code automatically as soon as it is committed to the source repository.

# Why Jenkins?

## Challenges

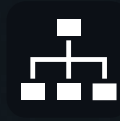
When working on a project with different teams, developers often face issues with different teams using different CI tools, version management, and other tools.

Setting up a CI/CD toolchain for each new project will lead to certain challenges like:

- Slower Releases
- Manual Builds
- Non-repeatable processes
- No Automations



Slower Releases



Manual Builds



Non-repeatable  
processes



No automations

# Why Jenkins?

## Solution

Jenkins is the solution to those challenges.  
It provides:

- Automated builds
- Automated Tests
- Automated CI/CD pipelines
- Automated deployments
- Ability to install Jenkins locally
- Jenkins support and Plugins



Automated builds



Automated Tests

CI

CD

Automated CI/CD  
pipelines



Automated  
deployments



Ability to install  
Jenkins locally



Jenkins support  
and Plugins



# KodeKloud

Check out our full course on Jenkins: <https://kode.wiki/3oQvNJn>

# Why Jenkins?



Open-source



1000+ plugins



Free



Paid, Enterprise

Free!

Jenkins is free and you don't have to pay for anything.  
Jenkins can be hosted on a Virtual Machine, a container. Or  
even locally for development purposes.



## Plugins

Jenkins is well tested and provide several integrations with 1800+ plugins to support build, deployment and automation for the project



The banner features the Jenkins logo on the left, a large 'Plugins Index' title in the center, and a search bar below it. The search bar has a 'Browse' button and a search icon. Below the banner, there are four columns of plugin categories: 'Browse categories', 'New Plugins', 'Recently updated', and 'Trending'.

# Plugins Index

Discover the 1800+ community contributed Jenkins plugins to support building, deploying and automating any project.

[Browse](#) Find plugins...

Browse categories	New Plugins	Recently updated	Trending
Platforms	CloudBees Feature Management	MSTestRunner	Localization: Chinese (Simplified)
User interface	Artifactz.io	Deployed On Column	Pipeline: GitHub Groovy Libraries
Administration	Jakarta Activation API	InfluxDB	Timestamper
Build management	Jakarta Mail API	MATLAB	Infrastructure for Publish Over X
Source Code Management	JavaMail API	Cloudify	Gradle
	JavaBeans Activation Framework (JAF) API	Allure	Role-based Authorization Strategy
	Jersey 2 API	InsightVM Container Image Scanner	GitLab
	Shutdown Queue	Build Monitor View	Build Timeout
	BMC DevOps for CFA	URLTrigger	NodeJS
	XTrigger API	XTrigger API	Workspace Cleanup

## Enterprise Options



Support



Managed  
Service

The screenshot displays the CloudBees website with a navigation bar containing links to Platform, Use Cases, Customer Stories, Resources, Developers, and Why CloudBees. A purple banner below the navigation bar states 'CloudBees Ranked #11 in G2 Top 50 Enterprise Software P'. The main content area has a blue background with colorful hexagonal shapes and features the heading 'Continuous Integration for the Enterprise'. Below the heading, a paragraph reads: 'Built on the most widely used automation server in the world Jenkins™ - CloudBees Continuous Integration provides flexible, scalable and governed CI/CD you can trust.' At the bottom of the section are two buttons: 'Schedule a Demo' and 'Contact Sales'.

CloudBees. Platform Use Cases Customer Stories Resources Developers Why CloudBees

CloudBees Ranked #11 in G2 Top 50 Enterprise Software P

# Continuous Integration for the Enterprise

Built on the most widely used automation server in the world Jenkins™ - CloudBees Continuous Integration provides flexible, scalable and governed CI/CD you can trust.

[Schedule a Demo](#) [Contact Sales](#)





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# Continuous Integration

Continuous Integration is a process in which the code is merged from multiple contributors and added to a single repository.

In simple words, CI is a process to take the code package it and send it to the CD for further processing.

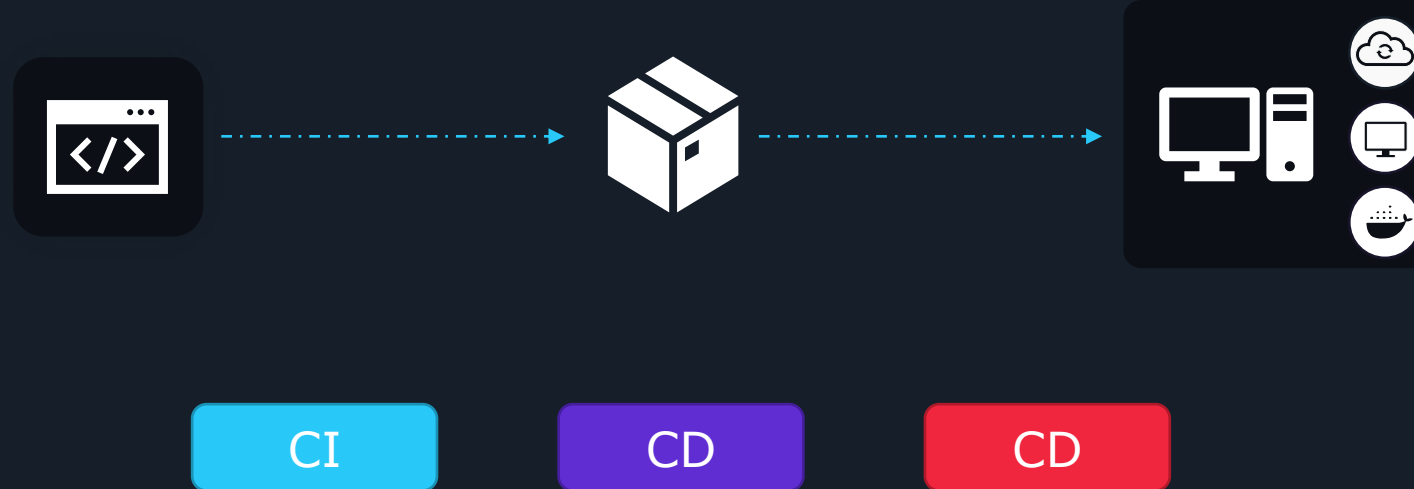
# Continuous Deployment

Continuous Deployment is an automated process in which the code is taken from the repository and deployed to the system.

## Continuous Integration and Continuous Delivery/Deployment (CI/CD)

CI/CD in simple words is a process to take a code, package it up and deploy it to a system that can be serverless, a VM, or a container. CI/CD can be broken down into 3 steps:

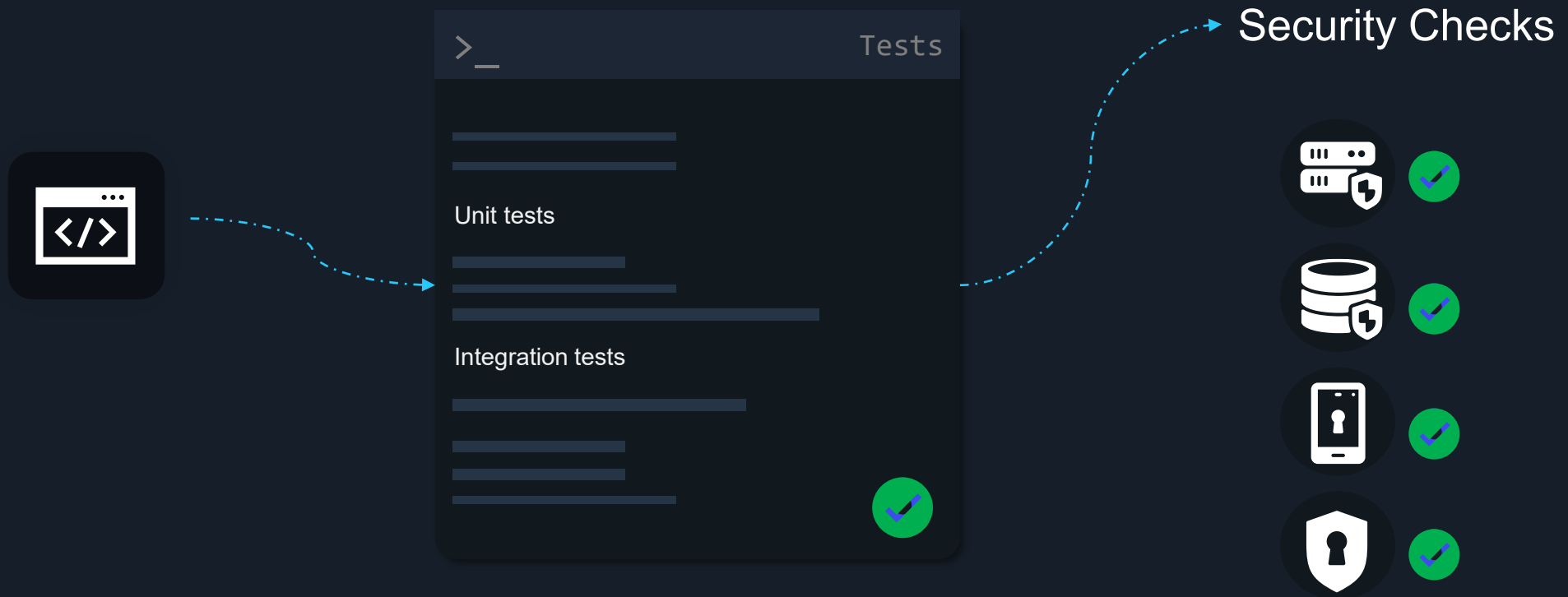
- CI – Continuous Integration
- CD – Continuous Delivery
- CD – Continuous Deployment



## The Key Pieces of CI

### Key Processes of Continuous Integration

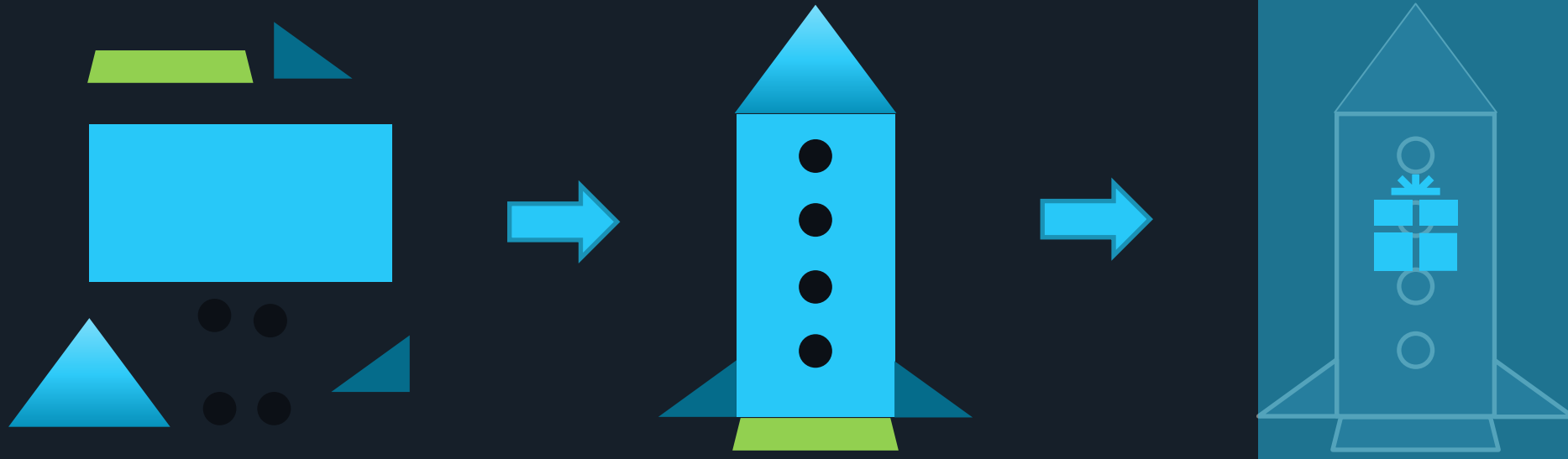
- Package up the code
- Test the code (run unit tests, integration tests, etc)
- Run security checks against the code



## Continuous Integration (CI)

Think of the Continuous Integration process like a gift you're wrapping

- The gift comes in pieces
- You put the gift together (maybe a toy chest/box)
- The gift gets wrapped in wrapping paper
- You put it in the car and deliver it to the person.

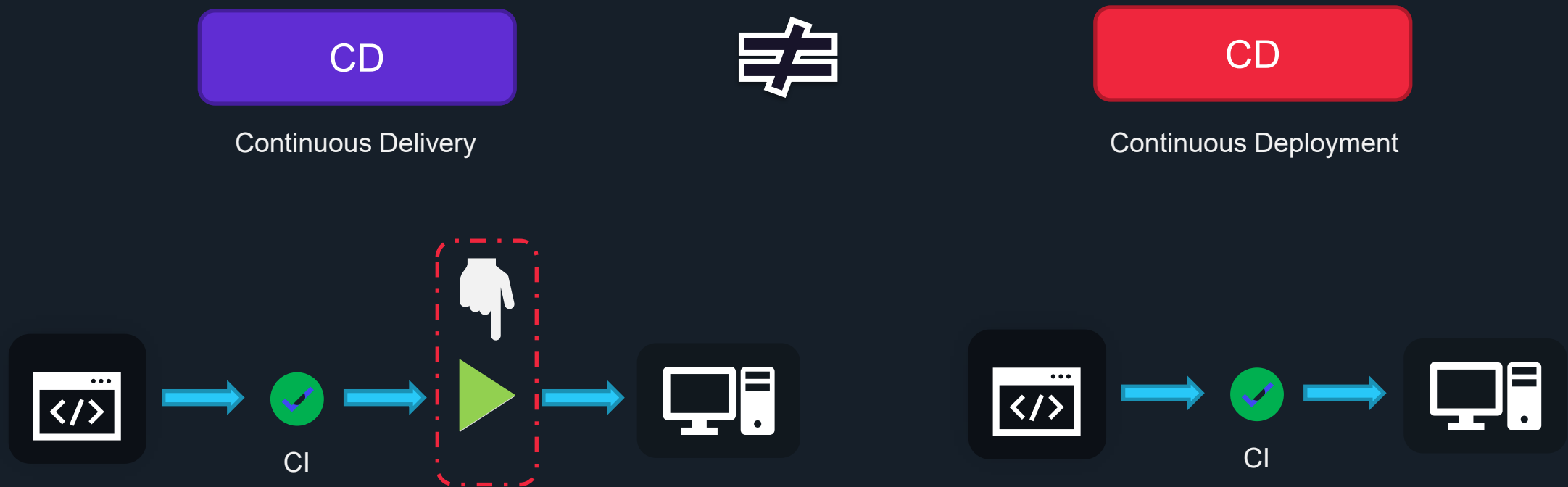


## Continuous Integration (CI)



## Continuous Deployment vs Continuous Delivery

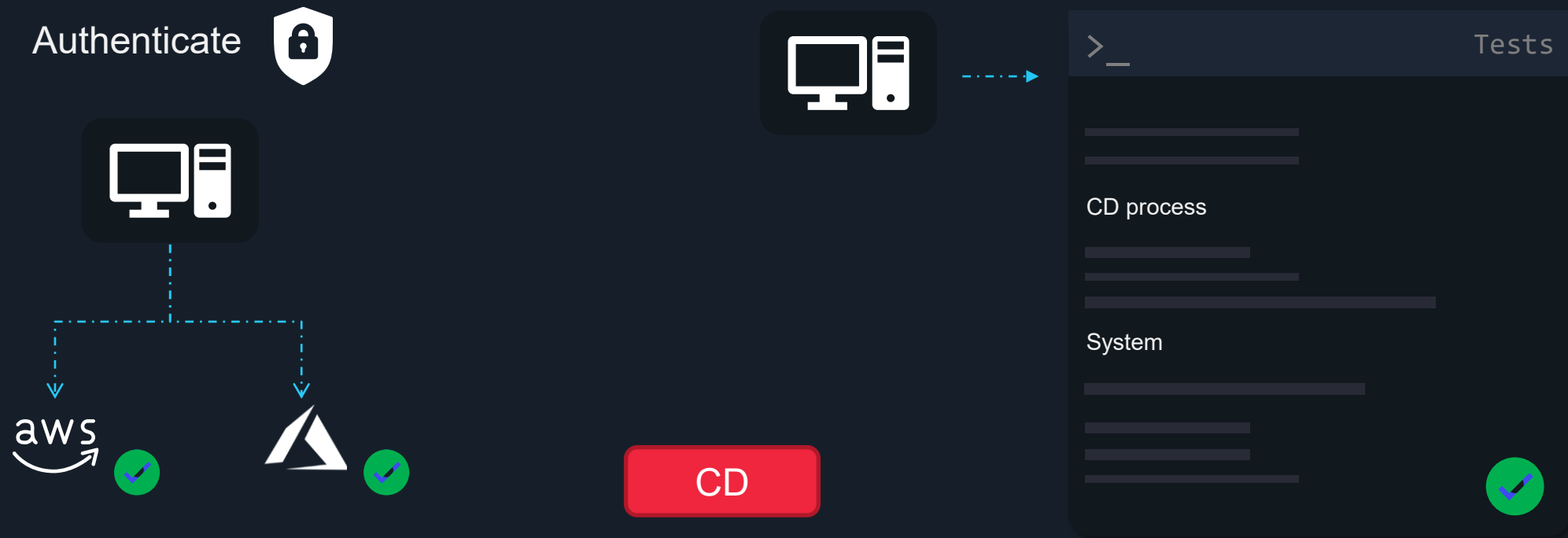
The basic difference between Continuous Delivery and Continuous Deployment is that in Continuous Delivery to deploy the code after the CI process you have to manually trigger it via some button to deploy on the system whereas in Continuous Deployment this process is automatic.



## Key Pieces of CD

## Key Pieces of CD:

- Ensure you're authenticated to the system or wherever you're deploying
- Ensure that the code that's being deployed is working as expected once it's deployed







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## Installing Jenkins



Ubuntu 20.04



<https://www.jenkins.io/doc/book/installing/linux/>

# Install Jenkins on Ubuntu

## Step 1: Install Java on Ubuntu

```
$ sudo apt update
$ sudo apt install openjdk-8-jdk
```

Alternatively, install version 11:

```
$ sudo apt install openjdk-11-jdk
```

Confirm the download by pressing Y and Enter

Step 2: Add the repository key to the system:

```
$ sudo apt wget -q -O -
https://pkg.jenkins.io/debian-
stable/jenkins.io.key | sudo apt-key add -
```

Step 3: Once the key is added with no errors, append the Debian package repository address

```
$ sudo sh -c 'echo deb
http://pkg.jenkins.io/debian-stable
binary/ >
/etc/apt/sources.list.d/jenkins.list'
```

Step 4: Run update to use new repository

```
$ sudo apt update
```

Step 5: Install Jenkins

```
$ sudo apt install jenkins
```

# Start Jenkins on Ubuntu

After successful installation let us start Jenkins

```
$ sudo systemctl start jenkins
```

The above command will not display any output

To check the running status of Jenkins use the below command which should show active status on run

```
$ sudo systemctl status jenkins
```



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# Jenkins Plugins

Plugins are used in Jenkins to enhance Jenkins functionality and cater to user-specific needs. Just like how Gmail, Facebook and LinkedIn help you connect your one service to another, plugins also work the same way and allow us to connect one service to other services and work with other products.



User



Login with Google



Login with Facebook



Login with LinkedIn



Website

## Plugins

For example, you want to connect to Azure from Jenkins you would need to download Azure Plugin which will allow you to connect to Azure at a programmatic level.

Similarly, we can have other integrations with AWS, GitHub, etc using plugins.



Azure Plugin



AWS Plugin



Github Actions Plugin



# Install Plugins

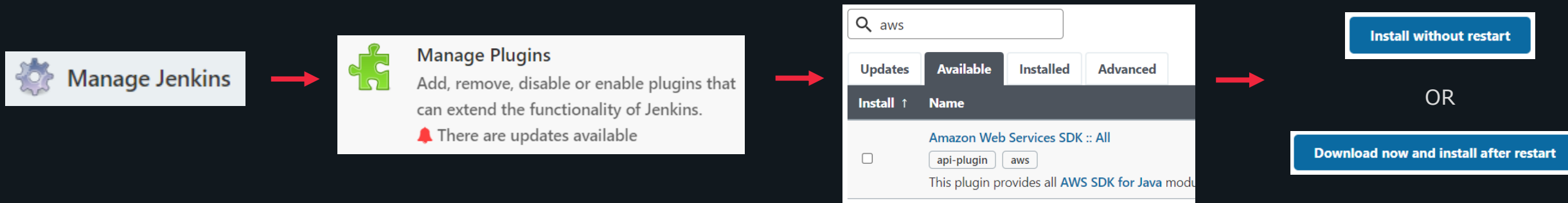
To install a new plugin in Jenkins

- 1) Go to Manage Jenkins -> Manager Plugins
- 2) Click Available and search for the desired plugin.
- 3) Select the desired plugin and Install.

Note: Few plugins may need a restart

To restart Jenkins

```
$ sudo systemctl restart jenkins
```





# Update Plugins

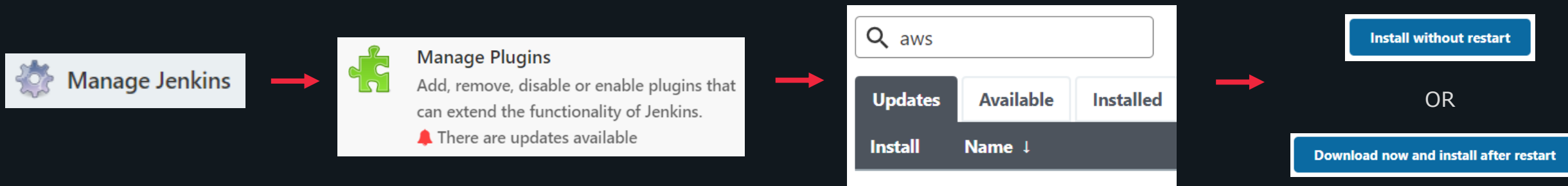
To update any existing plugin in Jenkins

- 1) Go to Manage Jenkins -> Manager Plugins
- 2) Click Updates and search for the desired plugin.
- 3) Select the desired plugin and Install.

Note: Few plugins may need a restart

To restart Jenkins

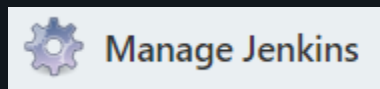
```
$ sudo systemctl restart jenkins
```




# Delete Plugins

To delete any plugin in Jenkins


- 1) Go to Manage Jenkins -> Manager Plugins
  - 2) Go to Installed and search for the desired plugin.
  - 3) Click on uninstall button for the plugin you want to delete.
- Click yes to proceed with the deletion.





### Manage Plugins

Add, remove, disable or enable plugins that can extend the functionality of Jenkins.

 There are updates available



filter					
Updates Available Installed Advanced					
Enabled	Name	Version	Previously installed version	Uninstall	
<input checked="" type="checkbox"/>	Git client plugin Utility plugin for Git support in Jenkins	3.11.0		Uninstall	
<input type="checkbox"/>	Git plugin This plugin integrates Git with Jenkins.	4.10.3		Uninstall	



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## Jenkins Visuals



Visuals

Jenkins  
Menu

Build

User  
account

Navigate

# Jenkins Jobs

Different types of jobs that can be created in Jenkins:

## 1) Freestyle project

This is a central feature of Jenkins. It will build the project, combine SCM with the build system. It can also be used for things other than building applications.

## 2) Pipeline

This is used to create a pipeline

## 3) Multi-configuration project

This is great if you need a large number of Jenkins configurations if you need multiple environments like Dev/ UAT.

## 4) Folder

This creates containers and stores nested items. It is useful in grouping, creating a namespace, etc.

## 5) Organisation folder

Creates a multibranch project for all different subfolders that are available.

## 6) Multibranch Pipeline

It sets up pipeline projects for different repositories.

## Administering Jenkins



Backup



Restore



Monitor



Scale



Manage

## Backup and Restore



Backup

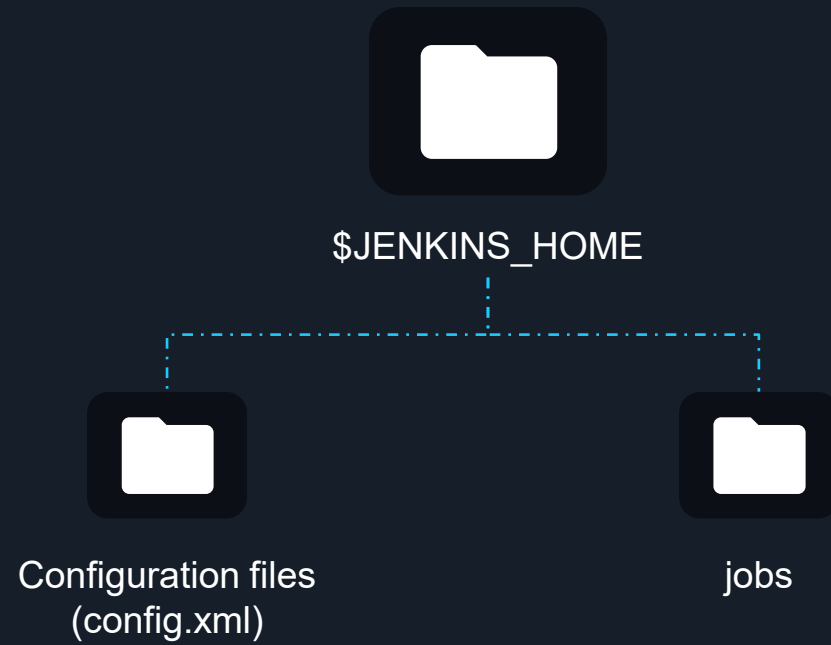


Full



Snapshots

## Which Files To Backup?





# Backup Jenkins

It is crucial to have adequate backups of your Jenkins instance. Backups are used to recover from accidental configuration changes. Recovering a file that has been mistakenly erased or has been corrupted. Or just to recover a previous setup.

There are two ways we can backup Jenkins:

- 1) Using Plugins
- 2) Using custom shell script

# Backup Jenkins

To backup Jenkins using a plugin, you will first need to install a backup plugin. Some of the most commonly used plugins are ThinBackup, Periodic Backup, Google cloud Backup.

For backing up using any of these plugins there are a few general steps that must be followed:

- 1) Creating a backup directory with read and write access
- 2) Selecting files that need backup

Backing up using shell script

Please check out these popular repositories for your reference:

- 1) repository: <https://github.com/sue445/jenkins-backup-script>
- 2) gist: <https://gist.github.com/abayer/527063a4519f205efc74>



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# Jenkinsfile

Jenkinsfile is a text file that contains definitions. This could be templates or instructions. It tells pipelines what they should be doing and what services and plugins they should be interacting with.

## Components of Jenkinsfile:

- 1) Pipeline – The task you are trying to accomplish
- 2) Build Agent – The place where you run your pipeline
- 3) Stages – Staging/Production/UAT
- 4) Steps – Work done in the pipeline

## What Is A Jenkinsfile?

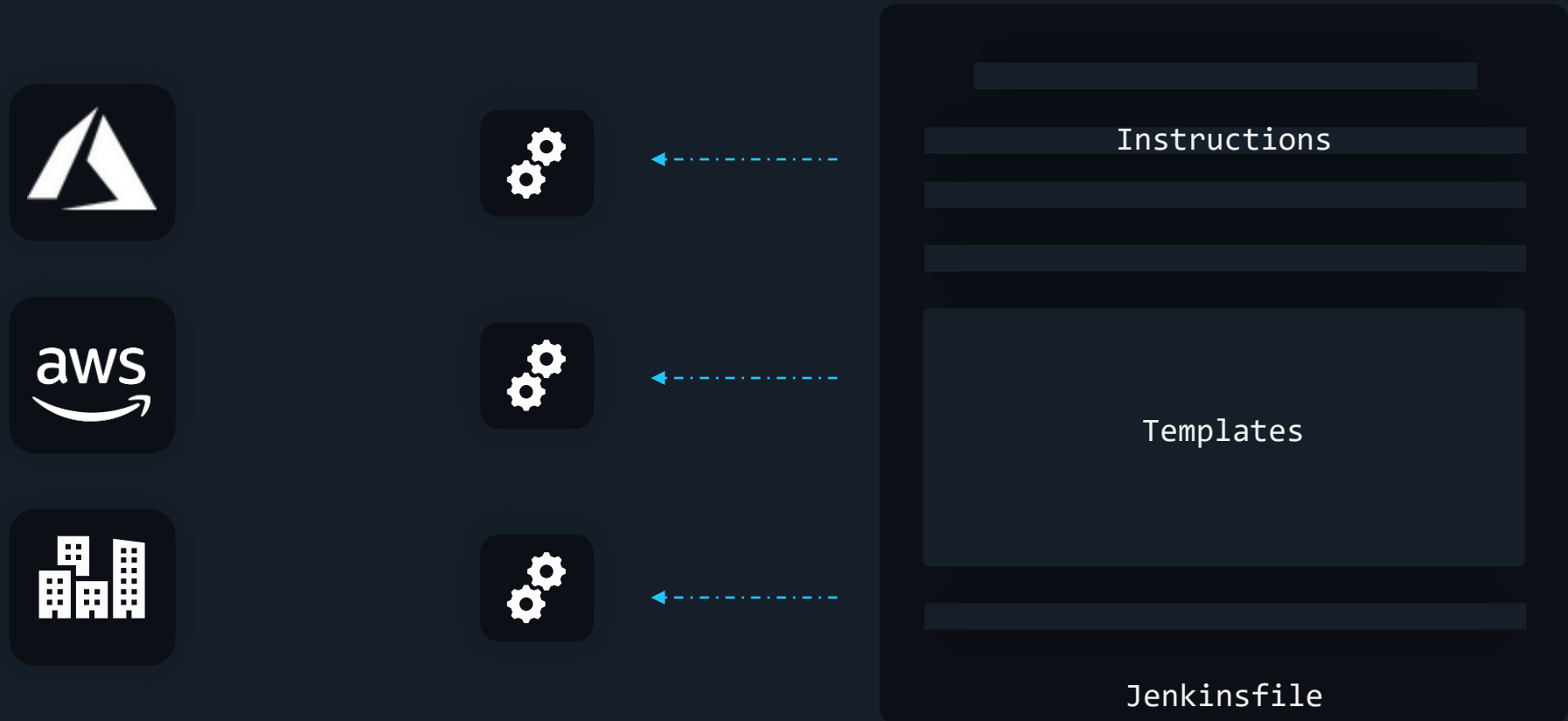


Instructions

Templates

Jenkinsfile

## What Is A Jenkinsfile?



# Components of Jenkinsfile

The task you are trying to accomplish

Build Agent

Stages

Steps



Dev

Jenkinsfile

Staging

Jenkinsfile

Prod

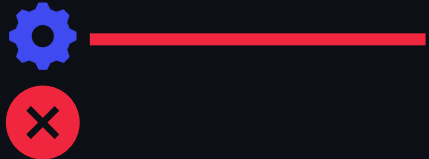
Jenkinsfile

Dev

Staging

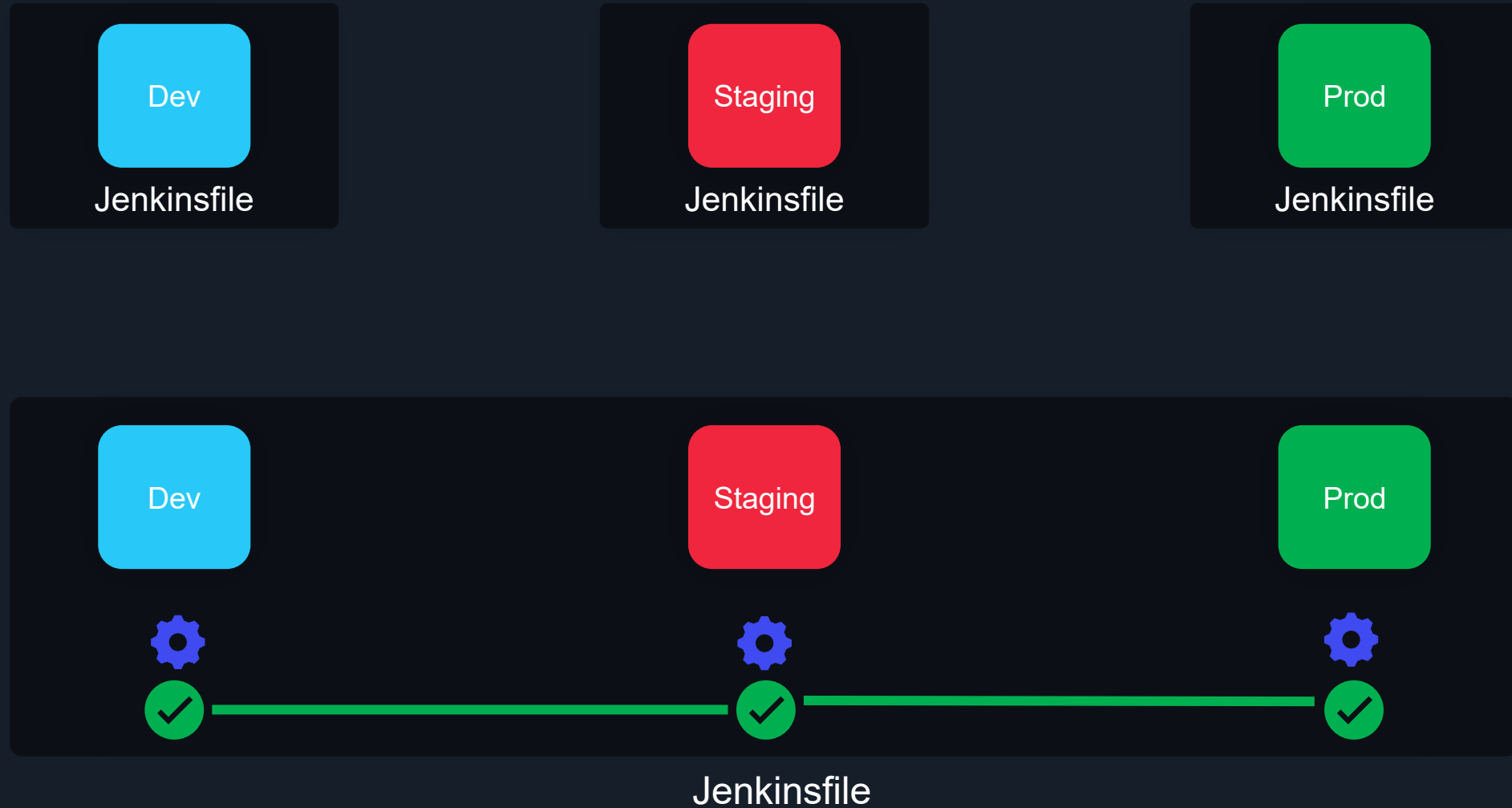
Prod

Jenkinsfile





## Multi-Stage Pipelines





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