Administering Jenkins

Plugin Management

Introduction

- To unleash Jenkins' full potential
- With all the new tools being released almost weekly, Jenkins will probably be the last CI/CD server you will think of.
- With plugins, Jenkins is able to become resourceful and efficient
  - Do you want to send a notification after every build? There's a plugin for that.

Principles of Plugin Usage

- Always read through a plugin's documentation and guide to understand whether it achieves your intended goals.
- Before installing, check the usage statistics and update frequency.
- Will it work with your Jenkins server version?
- Understanding how it works will have a great impact on how much help the tool provides, allowing you to maximize the potential.

Administration Plugins

- Service authentication
  - Introduction of new ways to access the host and its services, for example, LDAP.
- Audit trail and general security
  - Follow up on who did what; limit access to services and various operations
- Node and job-related management
  - Allows a variety of node-related operations, including the support of multiple operating system requirements.

User Interface (UI) Plugins

- UI plugins that help customize the Jenkins UI may provide the following:
  - Customizing the view tabs, menu, and dropdowns
  - Formatting text, and even images
  - Email templates

Source Code Management (SCM) Plugins

- SCM plugins are what help integrate version control services.
- They provide the following:
  - Allow Jenkins to run version control systems such as Git, Mercurial, and SCM.
  - Allow Jenkins to pull code from version control hosts, such as GitHub, Bitbucket, GitLab, and so on.
  - Authenticate Jenkins to pull from both private and public version control hosts.

Build Management Plugins

- Build Management are plugins that are involved in any build step.
  - Allow Jenkins to trigger notifications on build failure or pass
  - Manage build artifacts
  - Trigger deploys or other custom build steps

Assignment: Plugin Management

- You have been asked to prepare your Jenkins server for a simple Continuous Integration build by installing the following plugins:
  - Python
  - Pyenv
  - nodeJS
- Click on Manage Jenkins and select Manage Plugins

Updating and Upgrading Jenkins

Updating and Upgrading Jenkins

- New versions of the Jenkins server are constantly being released
- It is highly advisable to always keep the server up to date.
- However, the process doesn't really just involve upgrading the host, especially for production servers
- There are certain best practices that every administrator, DevOps engineer, and developer needs to follow, to maintain high availability

Maintenance Windows

- A period of time designated in advance by the technical staff, during which preventive maintenance that could cause disruption of the service may be performed.
- To enforce high availability, which aims to avoid downtime, every administrator needs to schedule a window
- This is usually on a weekend
- During this period, all stakeholders need to be notified, especially if the service under maintenance is an end-user product.

Maintenance Windows

- In any organization, Jenkins will be among the servers at the center of almost all operations.
- Downtime will have effects not limited to the following:
  - Potential feature delivery delays
  - Loss of data if any automated builds or processes are operated from Jenkins
  - Potential loss of revenue if any scheduled or automated revenue-related service was running
  - Potential impact on application services

Maintenance Windows

- We generally need to worry about the following:
  - The Jenkins host
  - Installed plugins

Maintenance Windows

- If you are going to upgrade the Jenkins host, ensure that upgrade plugins too
- To identify the current Jenkins version, you can check the bottom-right corner on your server page

Host Metrics

- Host metrics are another good starting point when planning a maintenance period
- Why is this?
- Well, the data collected helps identify problems with the host
- Where do we get these metrics from?

Retrieving Jenkins Logs and Metrics

- From dashboard, open Manage Jenkins and search for System Log. Take a look at this screenshot:

- Open the System Log file. At this point, we should have at least one log file. Take a look at this screenshot:

Retrieving Jenkins Logs and Metrics

- Open the log file and observe the output. Take a look at this screenshot:

```
Mar 22, 2018 6:29:04 PM INFO jenkins.InitReactorRunner$1 onAttained
Prepared all plugins
Mar 22, 2018 6:29:04 PM INFO jenkins.InitReactorRunner$1 onAttained
Started all plugins
Mar 22, 2018 6:29:06 PM INFO hudson.ExtensionFinder$GuiceFinder$FaultTolerantScope$1 error
Failed to instantiate optional component hudson.plugins.build_timeout.operations.AbortAndRestartOperation$DescriptorImpl; skipping
Mar 22, 2018 6:29:07 PM INFO jenkins.InitReactorRunner$1 onAttained
Augmented all extensions
Mar 22, 2018 6:29:07 PM INFO jenkins.InitReactorRunner$1 onAttained
Loaded all jobs
Mar 22, 2018 6:29:07 PM INFO hudson.model.AsyncPeriodicWork$1 run
Started Download metadata
Mar 22, 2018 6:29:07 PM INFO hudson.model.AsyncPeriodicWork$1 run
Finished Download metadata. 449 ms
Mar 22, 2018 6:29:07 PM INFO jenkins.util.groovy.GroovyHookScript execute
```

Retrieving Jenkins Logs and Metrics

- From the output in the file, we can tell that Jenkins keeps a record of all that happens on the host.
- If there is ever anything erroring out, Jenkins will capture this and, better yet, there are various ways to capture this and also get notified.

Memory

- Memory is a crucial factor that needs to be considered
- Note that in this case, we are referring to disk space.
- Jenkins will collect data from builds, and if the required services are set up, even send out reports in a defined period
- This implies that the administrator needs to be aware of the server's memory consumption
- It is a very crucial factor to consider during maintenance periods.

Improving Memory Management

- Logs are known to be one of the main memory consumers, and if proper care is not enforced, they will take up the memory needed to store logs
- A lack of memory to operate causes lag in response and eventually downtime.
- To handle this better, on Unix servers, you can enable log rotation
- This is a process that manages log files either by compression or deletion in a defined period.

Upgrading our Jenkins Server

- Only upgrade your Jenkins server if there is a stable release for your current version
- Do not downgrade
- Head back to the main dashboard
- On the menu, you will see a red just before the search prompt on the right.
- This is where Jenkins will be sending notifications, so be sure to check any notifications to avoid missing out on critical messages.

Upgrading our Jenkins Server

- For now, we shall focus on the upgrade notification, which should be as follows:

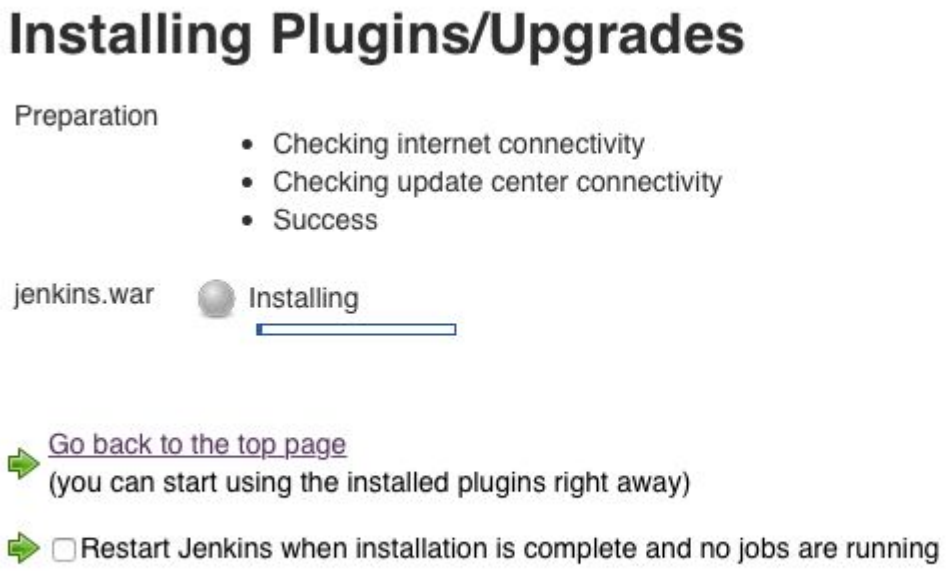
- It looks as if Jenkins needs an upgrade
- Before we even think about upgrading our host, here are a few questions we need to ask:
  - Is the recommended version stable?
  - Is there any particular reason for upgrading the server?
  - Does the recommended version list have any issues that may interfere with current operations and plugins?

Upgrading our Jenkins Server

- Head back to the main dashboard. If you don't have a notification to upgrade, your host should be fine and up to date
- Otherwise, we shall be running the automatic upgrade.
- Ensure that you have no jobs running currently.
- Select the Or Upgrade Automatically button, as follows:

Upgrading our Jenkins Server

- Jenkins will immediately start the download. Take a look at this screenshot:



Configuring Jenkins for Production

Configuring Jenkins for Production

- A few best practices for production environments:
  - Security
  - Access limited to the master node
  - Backup of Jenkins Home
  - Project naming conventions should be followed
  - Getting rid of jobs and resources that are not in use

Evaluating our Jenkins Server

- Since our server is currently for demonstration purposes, we will not be able to fully achieve a production environment.
- Without proper care, some of the implications would include the following:
  - Vulnerability to hackers
  - Data loss
  - Attacks such as man-in-the-middle attacks, where traffic is stolen through the imitation and replication of servers

Evaluating our Jenkins Server

- Now we'll test the security of our Jenkins server.
  - Go to Manage Jenkins.
  - Select Configure System.
  - Under Jenkins Location, we have our server address.
- To enforce security, we would need to host Jenkins and a few recommended services including but not limited to the following:
  - Amazon EC2, Google's Compute Engine, and Digital Ocean Droplets.
- We would also need to get SSL certificates and a domain name.
- Above all that, we can also enforce our server in a VPC, where only people with access to the network can actually get to the Jenkins server

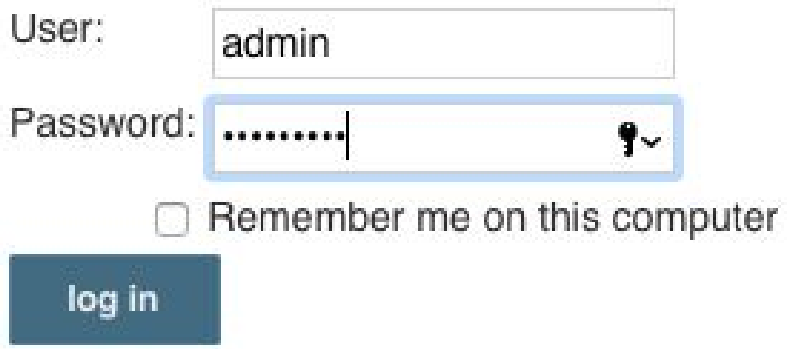
Access Points

- Access points are methods, channels, or ways users can open or access a specific service.
- These points are vital to what service is offered and can have implications if not properly managed.

- In a production environment, connections would be strictly limited to a specific port number and user interface.

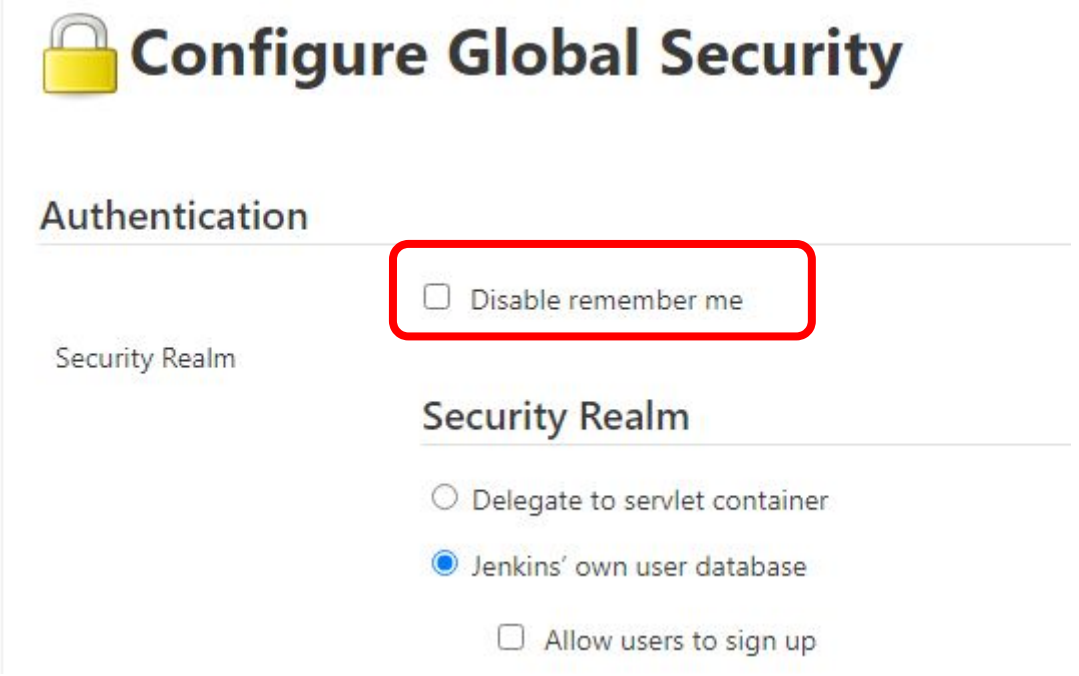
Access Control

- Access Control involves limiting privileges to a service and a number of people
- This means having measures set in place that restrict only certain people to a resource on a server, or the server itself.
- There is something wrong here. Can you identify the problem?



Access Control

- Here's a clue. Remember me on this computer is the issue we need to get rid of. Why is this?
- If at any time an unauthorized person gets access to your computer, they would have access to Jenkins and everything running on the server.
- This includes all keys, certificates, and data. This should never happen, and on that note, let's fix this issue.



Testing the Access Control

- Now we'll test the access control of Jenkins server.
- Go to Manage Jenkins.
- Under Configure Global Security, select the checkbox next to Disable remember me
- Click Apply then Save. Log out

Thanks