Set Up a Jenkins Build Server

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Introduction

Jenkins is an open-source automation server that integrates with a number of AWS Services, such as AWS CodeCommit, AWS CodeDeploy, Amazon EC2 Spot, and Amazon EC2 Fleet. You can use Amazon Elastic Compute Cloud (Amazon EC2) to deploy a Jenkins application on AWS in a matter of minutes.

This tutorial walks you through the process of deploying a Jenkins application. You will launch an EC2 instance, install Jenkins on that instance, and configure Jenkins to automatically spin up Jenkins build slave instances if build abilities need to be augmented on the instance.

In this tutorial, you will perform the following steps:

- Step 1: Set Up Prerequisites
- Step 2: Launch an EC2 Instance
- Step 3: Install and Configure Jenkins
- Step 4: Clean Up

This tutorial is not meant for production environments, and does not discuss options in depth. After you complete the steps in this tutorial, you can find more in-depth information to create your own Jenkins application in the Additional Resources section.

Step 1: Set Up Prerequisites

To prepare for this tutorial, you will need an AWS account, an AWS Identity and Access Management (IAM) user name and password, an Amazon EC2 key pair, and a configured Virtual Private Cloud (VPC). Detailed instructions can be found in Setting Up to Host a Web App on AWS.[1]

> **Important:**
>
> For this tutorial, be sure that you are using the Amazon EC2 console (and not, for example, the Amazon VPC console).[2] Otherwise, the directions will not match what you see.

Step 2: Launch an EC2 Instance

In this step you will launch a virtual server to host Jenkins. These virtual servers are called EC2 instances. Typically, you start from a base image called an Amazon Machine Image (AMI).

You will complete the following tasks:

- Create a Security Group for Your Amazon EC2 Instance
- Launch Your EC2 Instance

Create a Security Group for Your Amazon EC2 Instance

A security group acts as a firewall that controls the traffic allowed to reach one or more EC2 instances. When you launch an instance, you can assign it one or more security groups. You add rules to each security group that control the traffic allowed to reach the instances to which the security group is assigned. Note that you can modify the rules for a security group at any time; the new rules take effect immediately.

For this tutorial, you will create a security group and add the following rules:

- Allow inbound HTTP access from anywhere

- Allow inbound SSH traffic from your computer's public IP address so that you can connect to your instance

To create and configure your security group:

1. Decide who may access your instance, for example, a single computer or all trusted computers on a network. For this tutorial, you can use the public IP address of your computer. To find your IP address, use the checkip service from AWS[3] or search for the phrase "what is my IP address" in any Internet search engine.

   If you are connecting through an ISP or from behind your firewall without a static IP address, you will need to find the range of IP addresses used by client computers. If you don't know this address range, you can use `0.0.0.0/0` for this tutorial. However, this is unsafe for production environments because it allows everyone to access your instance using SSH.

2. Open the Amazon EC2 console at https://console.aws.amazon.com/ec2/.

3. In the navigation bar, verify that **US West (Oregon)** is the selected region.

4. In the left-hand navigation bar, choose **Security Groups**, and then click **Create Security Group**.

5. In **Security group name** enter `WebServerSG` and provide a description.

6. Choose your VPC from the list.

7. On the **Inbound** tab, add the rules as follows:

   a. Click **Add Rule**, and then choose **SSH** from the **Type** list. Under **Source**, select **Custom** and in the text box enter the public IP address range that you decided on in step 1.

   b. Click **Add Rule**, and then choose **HTTP** from the **Type** list.

   c. Click **Add Rule**, and then choose **Custom TCP Rule** from the **Type** list. Under Port Range enter `8080`.

8. Click **Create**.

For more information, see Security Groups in the *Amazon EC2 User Guide for Linux Instances.*[4]

Launch Your EC2 Instance

1. In the left-hand navigation bar of the Amazon EC2 console, choose **Instances**, and then click **Launch Instance**.
2. On the **Choose an Amazon Machine Image** page, select **Free tier only**, and then select an Amazon Linux AMI with the HVM virtualization type.
3. On the **Choose an Instance Type** page, the `t2.micro` instance is selected by default. Keep this instance type to stay within the free tier.
4. Click **Next: Configure Instance Details**.
5. On the **Configure Instance Details** page, do the following:
    a. T2 instances must be launched into a subnet. From **Network** choose your VPC, and from **Subnet** choose one of your **public** subnets.
    b. For **Auto-assign Public IP**, ensure that **Enable** is selected from the list. Otherwise, your instance will not get a public IP address or a public DNS name.
    c. Click **Review and Launch**. If you are prompted to specify the type of root volume, make your selection and then click **Next**.
6. On the **Review Instance Launch** page, click **Edit security groups**.
7. On the **Configure Security Group** page:
    d. Select **Select an existing security group**.
    e. Select the `WebServerSG` security group that you created.
    f. Click **Review and Launch**.
8. On the **Review Instance Launch** page, click **Launch**.
9. In the **Select an existing key pair or create a new key pair** dialog box, select **Choose an existing key pair**, and then select the key pair you created in Setting Up to Host Jenkins on AWS.
10. Click the acknowledgement check box, and then click **Launch Instances**.
11. In the left-hand navigation bar, choose **Instances** to see the status of your instance. Initially, the status of your instance is pending. After the status changes to running, your instance is ready for use.

Step 3: Install and Configure Jenkins

In this step you will deploy Jenkins on your EC2 instance by completing the following tasks:

- Connect to Your Linux Instance
- Download and Install Jenkins
- Configure Jenkins

Connect to Your Linux Instance

After you launch your instance, you can connect to it and use it the way that you would use a computer sitting in front of you.

Before you connect to your instance, get the public DNS name of the instance using the Amazon EC2 console. Select the instance and locate **Public DNS** on the **Description tab**.

> **Tip:**
>
> If your instance doesn't have a public DNS name, open the VPC console, select the VPC, and check the Summary tab. If either DNS resolution or DNS hostnames is **no**, click **Edit** and change the value to **yes**.

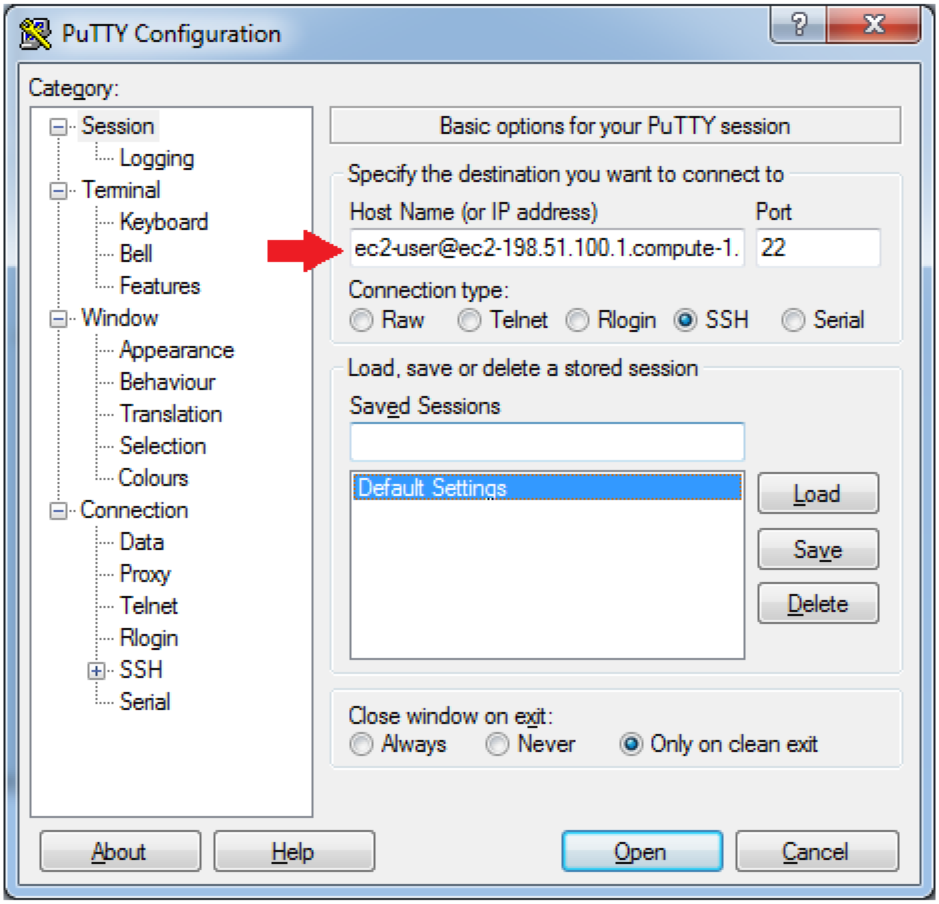
Prerequisites

The tool that you use to connect to your Linux instance depends on the operating system running on your computer. If your computer runs Windows, you will connect using PuTTY. If your computer runs Linux or Mac OS X, you will connect using the SSH client. These tools require the use of your key pair. Be sure that you created your key pair as described in Create a Key Pair.

To Connect to Your Linux Instance from Windows Using PuTTY

1. From the **Start** menu, choose **All Programs > PuTTY > PuTTY**.
2. In the Category pane, select **Session**, and complete the following fields:
   a. In **Host Name**, enter `ec2-user@public_dns_name`.

b. Ensure that **Port** is 22.



Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address): ec2-user@ec2-198.51.100.1.compute-1.

Port: 22

Connection type: ○ Raw ○ Telnet ○ Rlogin ● SSH ○ Serial

Load, save or delete a stored session

Saved Sessions

Default Settings

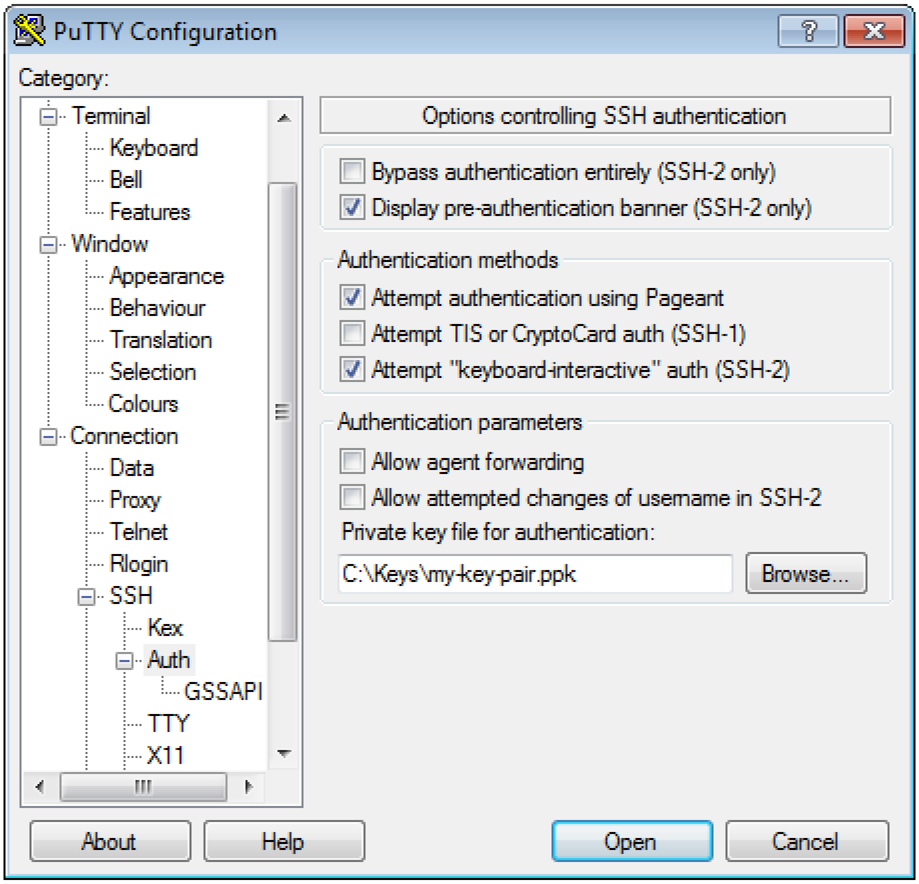
Close window on exit: ○ Always ○ Never ● Only on clean exit

3. In the **Category** pane, expand **Connection**, expand **SSH**, and then select **Auth**. Complete the following:

   a. Click **Browse**.

   b. Select the .ppk file that you generated for your key pair, as described in Create a Key Pair,[5] and then click **Open**.

   c. Click **Open** to start the PuTTY session.



Options controlling SSH authentication

□ Bypass authentication entirely (SSH-2 only)
☑ Display pre-authentication banner (SSH-2 only)

Authentication methods

☑ Attempt authentication using Pageant
□ Attempt TIS or CryptoCard auth (SSH-1)
☑ Attempt "keyboard-interactive" auth (SSH-2)

Authentication parameters

□ Allow agent forwarding
□ Allow attempted changes of username in SSH-2

Private key file for authentication: C:\Keys\my-key-pair.ppk Browse...

4. If this is the first time you have connected to this instance, PuTTY displays a security alert dialog box that asks whether you trust the host you are connecting to. Click **Yes**. A window opens and you are connected to your instance.

To Connect to Your Instance from Linux or Mac OS X Using SSH

1. Use the **ssh** command to connect to the instance. You will specify the private key (.pem) file and ec2-user@public_dns_name.

```
$ ssh -i /path/my-key-pair.pem ec2-user@ec2-198-51-
100-1.compute-1.amazonaws.com
```

You will see a response like the following:

```
The authenticity of host 'ec2-198-51-100-1.compute-
1.amazonaws.com (10.254.142.33)' can't be
established.
```

```
RSA key fingerprint is
1f:51:ae:28:bf:89:e9:d8:1f:25:5d:37:2d:7d:b8:ca:9f:f5
:f1:6f.

Are you sure you want to continue connecting
(yes/no)?
```

2. Enter yes.

   You will see a response like the following:

```
Warning: Permanently added 'ec2-198-51-100-1.compute-
1.amazonaws.com' (RSA) to the list of known hosts.
```

Download and Install Jenkins

To download and install Jenkins:

1. To ensure that your software packages are up to date on your instance, use the following command to perform a quick software update:

```
[ec2-user ~]$ sudo yum update –y
```

2. Add the Jenkins repo using the following command:

```
[ec2-user ~]$ sudo wget -O
/etc/yum.repos.d/jenkins.repo http://pkg.jenkins-
ci.org/redhat/jenkins.repo
```

3. Import a key file from Jenkins-CI to enable installation from the package:

```
 [ec2-user ~]$ sudo rpm --import
https://pkg.jenkins.io/redhat/jenkins.io.key
```

4. Install Jenkins:

```
[ec2-user ~]$ sudo yum install jenkins -y
```

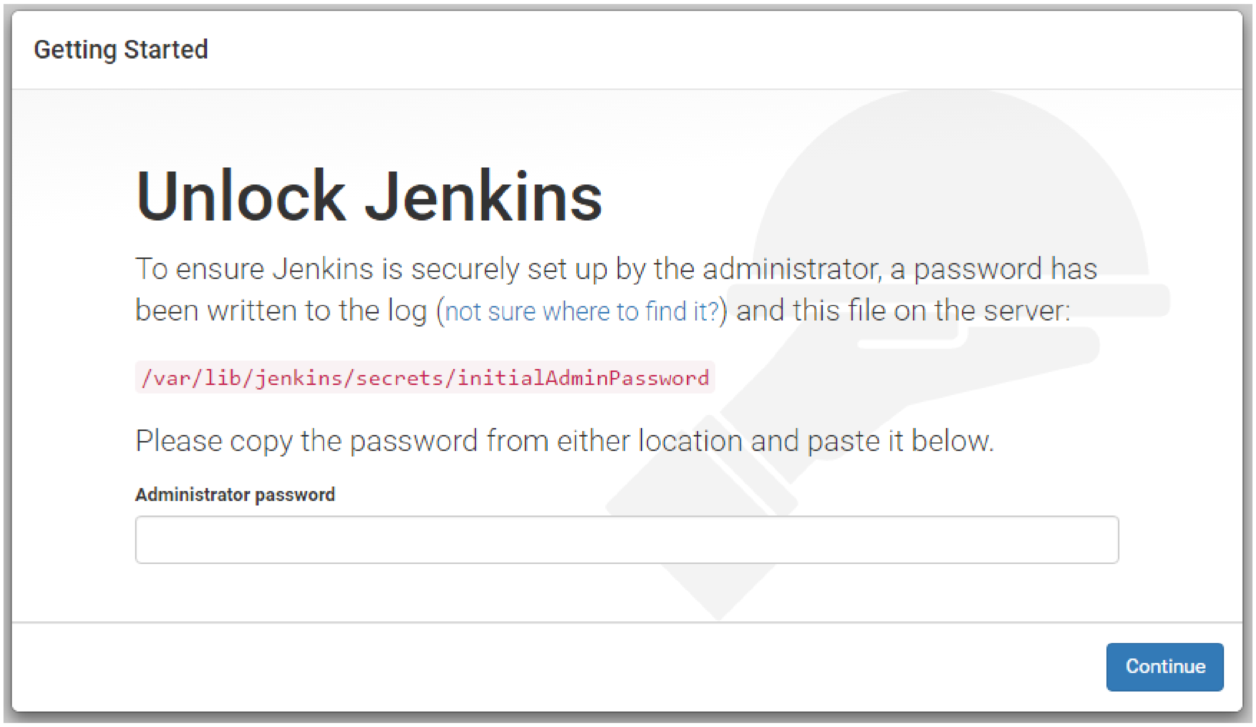
5. Start Jenkins as a service:

```
[ec2-user ~]$ sudo service jenkins start
```

Configure Jenkins

Jenkins is now installed and running on your EC2 instance. To configure Jenkins:

1. Connect to http://<your_server_public_DNS>:8080 from your favorite browser. You will be able to access Jenkins through its management interface:



Getting Started

Unlock Jenkins

To ensure Jenkins is securely set up by the administrator, a password has been written to the log (not sure where to find it?) and this file on the server:

`/var/lib/jenkins/secrets/initialAdminPassword`

Please copy the password from either location and paste it below.

2. As prompted, enter the password found in **/var/lib/jenkins/secrets/initialAdminPassword**. Use the following command to display this password:

```
[ec2-user ~]$ sudo cat
/var/lib/jenkins/secrets/initialAdminPassword
```

3. The Jenkins installation script directs you to the **Customize Jenkins** page. Click **Install suggested plugins**.

4. Once the installation is complete, enter Administrator Credentials, click **Save Credentials**, and then click **Start Using Jenkins**.

5. On the left-hand side, click **Manage Jenkins**, and then click **Manage Plugins**.
6. Click on the **Available** tab, and then enter `Amazon EC2 plugin` at the top right.
7. Select the checkbox next to **Amazon EC2 plugin**, and then click **Install without restart**.
8. Once the installation is done, click **Go back to the top page**.
9. Click on **Manage Jenkins**, and then **Configure System**.
10. Scroll all the way down to the section that says **Cloud**.
11. Click **Add a new cloud**, and select **Amazon EC2**. A collection of new fields appears.
12. Fill out all the fields. (Note: You will have to Add Credentials of the kind **AWS Credentials**.)

You are now ready to use EC2 instances as Jenkins build slaves.

Step 4: Clean Up

After completing this tutorial, be sure to delete the AWS resources that you created so that you do not continue to accrue charges.

Delete Your EC2 Instance

1. In the left-hand navigation bar of the Amazon EC2 console, choose **Instances**.
2. Right-click on the instance you created earlier and select **Instance State > Terminate**.

Additional Resources

We recommend that you continue to learn more about the concepts introduced in this guide with the following resources:

- Jenkins on AWS (whitepaper): https://d0.awsstatic.com/whitepapers/DevOps/Jenkins_on_AWS.pdf
- DevOps and AWS: https://aws.amazon.com/devops/

Notes

[1] https://docs.aws.amazon.com/gettingstarted/latest/wah-linux/getting-started-prereq.html

[2] https://console.aws.amazon.com/ec2/

[3] http://checkip.amazonaws.com

[4] http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/using-network-security.html

[5] https://docs.aws.amazon.com/gettingstarted/latest/wah-linux/getting-started-prereq.html#create-a-key-pair