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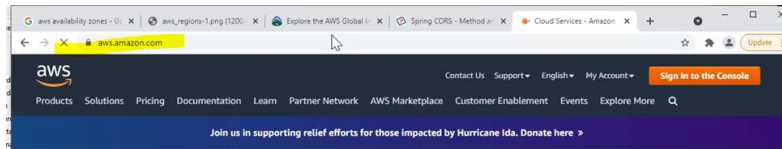
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This concludes the building of an EC2 instance and the deployment of a war file.	23

Build an AWS EC2 instance with a Tomcat Server

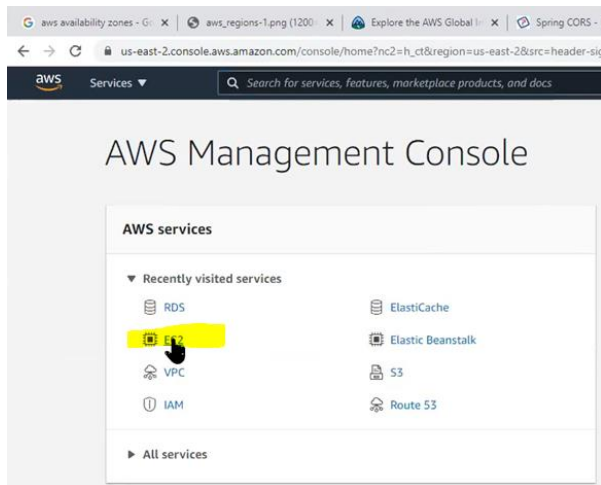
This document walks through the steps involved to build a working EC2 instance on AWS

- Build an EC2 instance
- Install Git, Java, Maven, and Tomcat
- Update the java and javac version
- Deploy war file on AWS



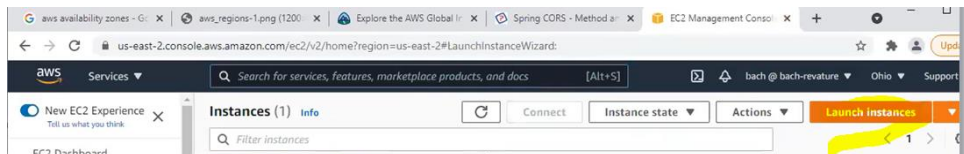
Log into you AWS account

Find and select the EC2 link



Launch instance

This button may be in a different location depending if you already have created an instance.



Step 1: Choose an Amazon Machine Image

Select a free tier 64-bit (x86)

Click "Select"

Step 1: Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Search for an AMI by entering a search term e.g. "Windows"

Quick Start

- My AMIs
- AWS Marketplace
- Community AMIs

☐ Free tier only

Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-00dfe2c7ce89a450b (64-bit x86) / ami-031dea1a744251b51 (64-bit Arm)

Free tier eligible

Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras. This AMI is the successor of the Amazon Linux AMI that is approaching end of life on December 31, 2020 and has been removed from this wizard.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

64-bit (x86) (selected)
64-bit (Arm)

Select

Step 2: Choose an Instance Type

Select "t2.micro" free tier

Click "Next: Configure Instance Details"

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. Learn more about instance types and how they can meet your computing needs.

Filter by: All instance families Current generation Show/Hide Columns

Currently selected: t2.micro (- ECUs, 1 vCPUs, 2.5 GHz, -, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
<input type="checkbox"/>	t2	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input checked="" type="checkbox"/>	t2	t2.micro	1	1	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	t2	t2.small	1	2	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	t2	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	t2	t2.large	2	8	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	t2	t2.xlarge	4	16	EBS only	-	Moderate	Yes
<input type="checkbox"/>	t2	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
<input type="checkbox"/>	t3	t3.nano	2	0.5	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	t3	t3.micro	2	1	EBS only	Yes	Up to 5 Gigabit	Yes

Cancel Previous Review and Launch Next: Configure Instance Details

Step 3: Configure Instance Details

Accept the default

Click "Next: Add Storage"

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances: 1 Launch into Auto Scaling Group

Purchasing option: ☐ Request Spot instances

Network: vpc-ac930c4 (default) Create new VPC

Subnet: No preference (default subnet in any Availability Zone) Create new subnet

Auto-assign Public IP: Use subnet setting (Enable)

Placement group: ☐ Add instance to placement group

Capacity Reservation: Open

Domain join directory: No directory Create new directory

IAM role: None Create new IAM role

Shutdown behavior: Stop

Stop - Hibernate behavior: ☐ Enable hibernation as an additional stop behavior

Enable termination protection: ☐ Protect against accidental termination

Monitoring: ☐ Enable CloudWatch detailed monitoring Additional charges apply.

Cancel Previous Review and Launch Next: Add Storage

Step 4: Add Storage

Change the storage amount if desired

Click “Next: Add Tags”

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more about storage options in Amazon EC2.](#)

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)
Root	/dev/xvda	snap-0350fa19a1ac7579d	8	General Purpose SSD (gp2)	100 / 3000	N/A

[Add New Volume](#)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more about free usage tier eligibility and usage restrictions.](#)

aws availability zones - G... x | aws_regions-1.png (1200... x | Explore the AWS Global In... x | Spring CORS - Method a... x | Launch instance wizard | x |

us-east-2.console.aws.amazon.com/ec2/v2/home?region=us-east-2#LaunchInstanceWizard

aws Services Search for services, features, marketplace products, and docs [Alt+S] bach @ bach-revature Ohio Support

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more about storage options in Amazon EC2.](#)

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encryption
Root	/dev/xvda	snap-0350fa19a1ac7579d	16	General Purpose SSD (gp2)	100 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted

[Add New Volume](#)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more about free usage tier eligibility and usage restrictions.](#)

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Add Tags](#)

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Step 5: Add Tags

Accept default

Click “Next: Configure Security Group”

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 5: Add Tags

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver. A copy of a tag can be applied to volumes, instances or both. Tags will be applied to all instances and volumes. [Learn more about tagging your Amazon EC2 resources.](#)

Key (128 characters maximum)	Value (256 characters maximum)	Instances	Volumes	Network Interfaces
This resource currently has no tags.				
Choose the Add tag button or click to add a Name tag. Make sure your IAM policy includes permissions to create tags.				

[Add Tag](#) (Up to 50 tags maximum)

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Configure Security Group](#)

Step 6: Configure Security Group

Configure security group making changes highlighted below.

Give some name and description.

Change port 22 to anywhere

Add custom for port 8080

Click “Review and Launch”

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more about Amazon EC2 security groups.](#)

Assign a security group: ☒ Create a new security group ☐ Select an existing security group

Security group name:

Description:

A security group description is required.

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Anywhere	e.g. SSH for Admin Desktop
Custom TCP	TCP	8080	Anywhere	e.g. SSH for Admin Desktop

Add Rule

Warning

Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Cancel Previous **Review and Launch**

Step 7: Review Instance Launch

Review the instance information

Click “Launch”

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 7: Review Instance Launch

Please review your instance launch details. You can go back to edit changes for each section. Click **Launch** to assign a key pair to your instance and complete the launch process.

Warning

Improve your instances' security. Your security group, ship-manager-deployment-example, is open to the world. Your instances may be accessible from any IP address. We recommend that you update your security group rules to allow access from known IP addresses only. You can also open additional ports in your security group to facilitate access to the application or service you're running, e.g., HTTP (80) for web servers. [Edit security groups](#)

AMI Details [Edit AMI](#)

Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-00dfe2c7ce89a450b

Free tier eligible

Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras. This AMI is the successor of the Amazon Linux AMI that is a...

Root Device Type: ebs Virtualization type: hvm

Instance Type [Edit instance type](#)

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
t2.micro	-	1	1	EBS only	-	Low to Moderate

Security Groups [Edit security groups](#)

Security group name: ship-manager-deployment-example

Description: This is the security group for our EC2 deployment demo

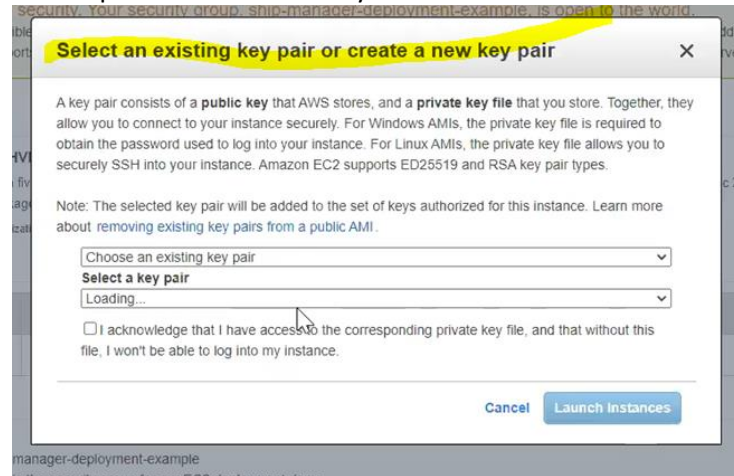
Cancel Previous **Launch**

Create a key pair to connect to the instance

You will need this file on your local machine to access the EC2 instance to install files and programs

This file is sensitive and should be kept in a secure location.

Do not push to Git Hub or any other non-secure location.



Select Create a new key pair

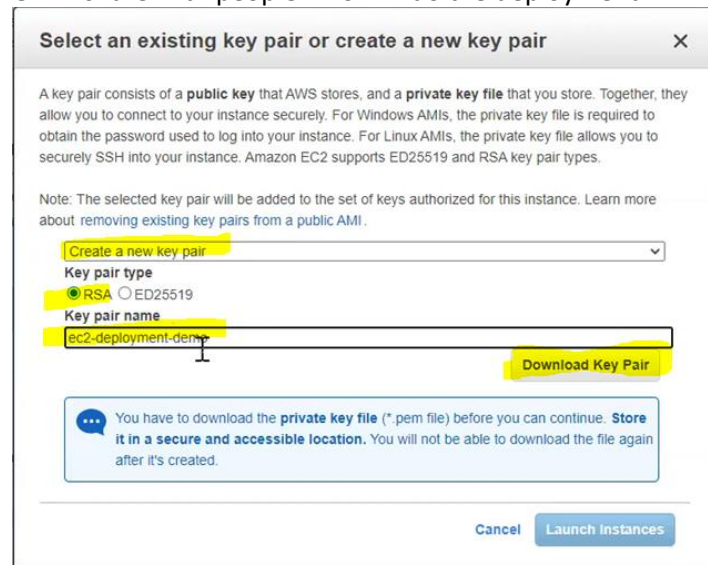
Keep RSA

Enter a Key pair name

Click "Download Key Pair"

Keep file in secure location

ONLY share with people who will do the deployment



Launch the Instance

After downloading the Key Pair

Click "Launch Instances"

Launch Status page

Click "View Instances"

Launch Status

Your instances are now launching
The following instance launches have been initiated: i-0a788d2fe24b21868 [View launch log](#)

Get notified of estimated charges
Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

How to connect to your instances

Your instances are launching, and it may take a few minutes until they are in the **running** state, when they will be ready for you to use. Usage hours on your new instances will start immediately and continue to accrue until you stop or terminate your instances.

Click **View Instances** to monitor your instances' status. Once your instances are in the **running** state, you can **connect** to them from the Instances screen. [Find out: how to connect to your instances.](#)

▼ Here are some helpful resources to get you started

- [How to connect to your Linux instance](#)
- [Amazon EC2: User Guide](#)
- [Learn about AWS Free Usage Tier](#)
- [Amazon EC2: Discussion Forum](#)

While your instances are launching you can also

- [Create status check alarms](#) to be notified when these instances fail status checks. (Additional charges may apply)
- [Create and attach additional EBS volumes](#) (Additional charges may apply)
- [Manage security groups](#)

[View Instances](#)

View Instances

Should look something like this after starting and passing the status check.

Click on the instance link

This will provide access for the HostName to add to a configuration file

Instances (5) [Info](#) [Refresh](#) [Connect](#) [Instance state ▼](#) [Actions](#)

<input type="checkbox"/>	Name ▼	Instance ID	Instance state ▼	Instance type ▼	Status check	Alarm status
<input type="checkbox"/>	-	i-0a57eb8bcf65c5d59	⏸ Stopped	t2.medium	-	No alarms
<input type="checkbox"/>	-	i-0ea1934c2998223d4	⏸ Stopped	t2.micro	-	No alarms
<input type="checkbox"/>	-	i-03fe8b711e54b3bf7	⏸ Stopped	t2.micro	-	No alarms
<input type="checkbox"/>	-	i-0a788d2fe24b21868	🟢 Running	t2.micro	🟢 2/2 checks passed	No alarms
<input type="checkbox"/>	-	i-03b1310074719b3eb	🟢 Running	t2.micro	🟢 2/2 checks passed	No alarms

Instance Summary

Copy the Public IPv4 DNS to the HostName to place in a configuration file.

EC2 > Instances > i-0a788d2fe24b21868

Instance summary for i-0a788d2fe24b21868 [Info](#) [Refresh](#) [Connect](#) [Instance state ▼](#) [Actions](#)

Updated less than a minute ago

Instance ID i-0a788d2fe24b21868	Public IPv4 address 18.225.36.88 open address	Private IPv4 addresses 172.31.28.96
IPv6 address -	Instance state 🟢 Running	Public IPv4 DNS ec2-18-225-36-88.us-east-2.compute.amazonaws.com open address

Local machine .ssh folder

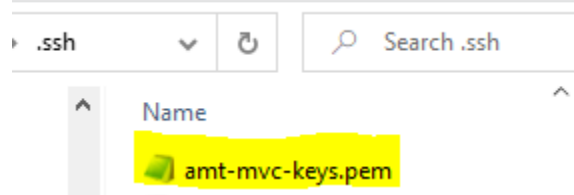
Check if there is a .ssh folder on your local machine.

If the folder does not exist, create it.

C:\Users\

Move the “key-Pair” file created in the “Download Key Pair” step

amt-mvc-keys.pem is the file I created for my EC2 instance.



Configuration file related to the Key Pair

Edit or Create a file named “config” with no extension

Use the Public IPv4 DNS host name copied in the [Instance Summary](#) step

Use VS Code or notepad create a file with:

Host <supply-a-hostname>

HostName <your-ec2... compute.amazonaws.com>

User **ec2-user** ← use this name

IdentityFile /c/Users/<your-username>/.ssh/your-keys.pem

Port 22 ← use port 22

The file I created:

Host amt-mvc-deploy

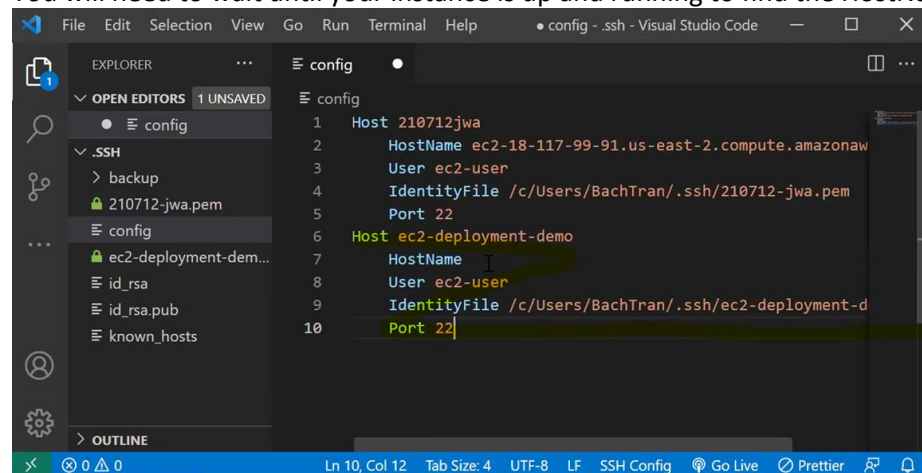
HostName ec2-18-117-158-53.us-east-2.compute.amazonaws.com

User **ec2-user**

IdentityFile /c/Users/tlw8748253/.ssh/amt-mvc-keys.pem

Port 22

You will need to wait until your instance is up and running to find the HostName for the config file.



Connect to the AWS EC2 Instance

Open a Git Bash window

This can be open anywhere

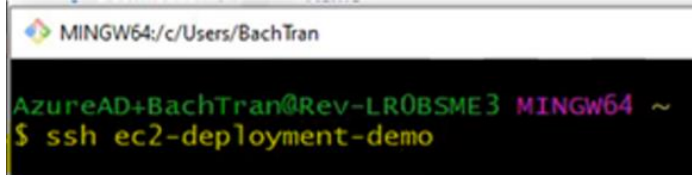
Enter the ssh command

Connect to the EC2 instance using Host *<supply-a-hostname>* defined in the config file

```
ssh <supply-a-hostname>
```

Example:

```
ssh amt-mvc-deploy
```



```
MINGW64/c/Users/BachTran
AzureAD+BachTran@Rev-LR0BSME3 MINGW64 ~
$ ssh ec2-deployment-demo
```

If you should see a prompt with (yes/no/[fingerprint])?

Type yes and press the Enter Key



```
MINGW64/c/Users/BachTran
AzureAD+BachTran@Rev-LR0BSME3 MINGW64 ~
$ ssh ec2-deployment-demo
The authenticity of host 'ec2-18-225-36-88.us-east-2.compute.amazonaws.com (18.225.36.88)' can't be established.
ECDSA key fingerprint is SHA256:H+mx21PsAmUKPyvYyRnwAka/emGR4gRBi0YS3LYPbAU.
Are you sure you want to continue connecting (yes/no/[fingerprint])?
```



```
ec2-user@ip-172-31-28-96:~
AzureAD+BachTran@Rev-LR0BSME3 MINGW64 ~
$ ssh ec2-deployment-demo
The authenticity of host 'ec2-18-225-36-88.us-east-2.compute.amazonaws.com (18.225.36.88)' can't be established.
ECDSA key fingerprint is SHA256:H+mx21PsAmUKPyvYyRnwAka/emGR4gRBi0YS3LYPbAU.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-18-225-36-88.us-east-2.compute.amazonaws.com,18.225.36.88' (ECDSA) to the list of known hosts.

 _ | _ | _ )
 _ | ( _ | /  Amazon Linux 2 AMI
 _ | \ _ | _ |

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-28-96 ~]$
```

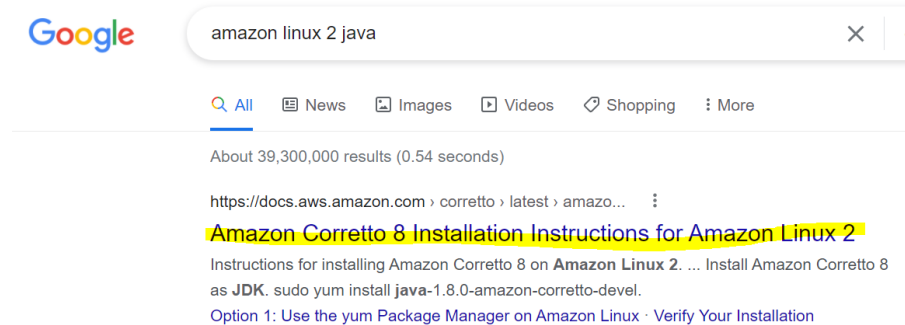
Program Installation on New EC2 Instance

There is nothing in the server directory so we need to install

- Java
- Git
- Maven
- Tomcat

Install Java on EC2 Instance

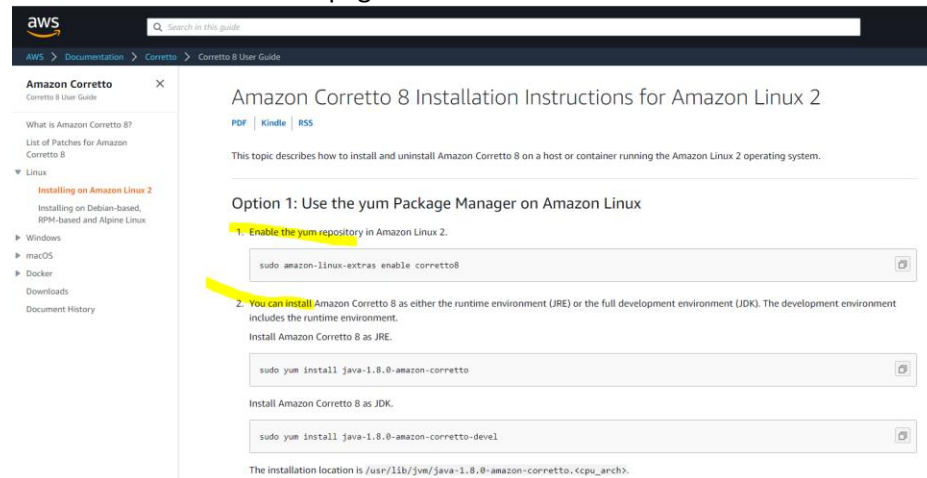
Perform a Google search for “amazon linux 2 java”



Navigate to page:

<https://docs.aws.amazon.com/corretto/latest/corretto-8-ug/amazon-linux-install.html>

Follow instructions on the page



Option 1: Use the yum Package Manager on Amazon Linux

1. Enable the yum repository in Amazon Linux 2.

sudo amazon-linux-extras enable corretto8

Don't install the JRE

~~sudo yum install java-1.8.0-amazon-corretto~~

2. Install Amazon Corretto 8 as JDK.

DO install the JDK

sudo yum install java-1.8.0-amazon-corretto-devel

Type y and press enter

```
Transaction Summary
-----
Install 1 Package (+56 Dependent packages)

Total download size: 116 M
Installed size: 261 M
Is this ok [y/d/N]: |

Complete!
[ec2-user@ip-172-31-10-221 ~]$ |
```

Install Git on EC2 Instance

Git needs to be installed as well.

Will need git in future to clone repositories like Jenkins

```
ec2-user@ip-172-31-10-221:~
[ec2-user@ip-172-31-10-221 ~]$ git status
-bash: git: command not found
[ec2-user@ip-172-31-10-221 ~]$ |
```

Type the command and press enter

sudo yum -y install git

```
ec2-user@ip-172-31-10-221:~
[ec2-user@ip-172-31-10-221 ~]$ sudo yum -y install git|
```

```
ec2-user@ip-172-31-10-221:~
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
Installing : git-core-2.32.0-1.amzn2.0.1.x86_64          1/7
Installing : git-core-doc-2.32.0-1.amzn2.0.1.noarch      2/7
Installing : 1:perl-Error-0.17020-2.amzn2.noarch         3/7
Installing : 1:emacsfilesystem-27.2-4.amzn2.0.1.noarch  4/7
Installing : perl-TermReadKey-2.30-20.amzn2.0.2.x86_64   5/7
Installing : perl-Git-2.32.0-1.amzn2.0.1.noarch          6/7
Installing : git-2.32.0-1.amzn2.0.1.x86_64              7/7
Verifying  : perl-TermReadKey-2.30-20.amzn2.0.2.x86_64   1/7
Verifying  : git-core-doc-2.32.0-1.amzn2.0.1.noarch     2/7
Verifying  : perl-Git-2.32.0-1.amzn2.0.1.noarch         3/7
Verifying  : 1:emacsfilesystem-27.2-4.amzn2.0.1.noarch  4/7
Verifying  : git-2.32.0-1.amzn2.0.1.x86_64             5/7
Verifying  : git-core-2.32.0-1.amzn2.0.1.x86_64        6/7
Verifying  : 1:perl-Error-0.17020-2.amzn2.noarch        7/7

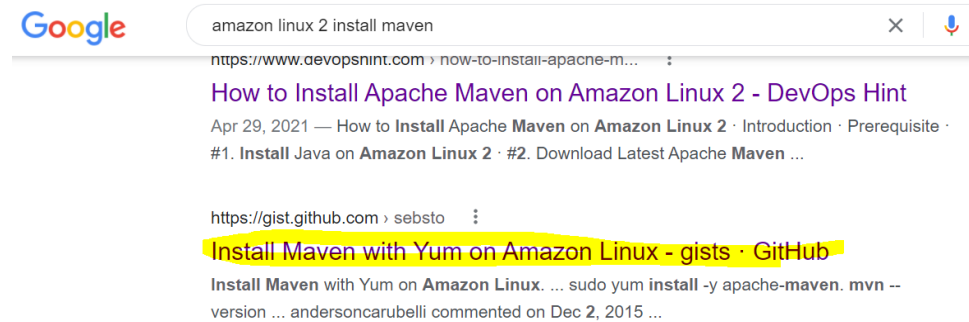
Installed:
git.x86_64 0:2.32.0-1.amzn2.0.1

Dependency Installed:
  emacsfilesystem.noarch 1:27.2-4.amzn2.0.1  git-core.x86_64 0:2.32.0-1.amzn2.0.1
  git-core-doc.noarch 0:2.32.0-1.amzn2.0.1  perl-Error.noarch 1:0.17020-2.amzn2
  perl-Git.noarch 0:2.32.0-1.amzn2.0.1      perl-TermReadKey.x86_64 0:2.30-20.amzn2.0.2

Complete!
[ec2-user@ip-172-31-10-221 ~]$ git status
fatal: not a git repository (or any of the parent directories): .git
[ec2-user@ip-172-31-10-221 ~]$ |
```

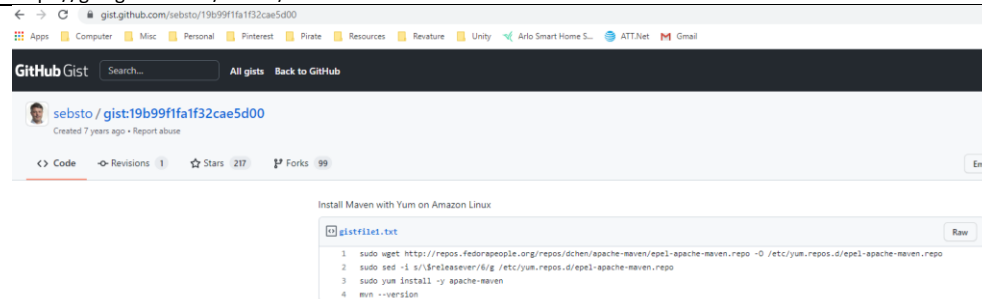
Install Maven on EC2 Instance

Perform a Google search for “amazon linux install maven”



Navigate to page:

<https://gist.github.com/sebsto/19b99f1fa1f32cae5d00>



Install Maven with Yum on Amazon Linux



Run the Maven install commands

Copy and paste the commands one at a time or all at once

```
sudo wget http://repos.fedorapeople.org/repos/dchen/apache-maven/epel-apache-maven.repo -O /etc/yum.repos.d/epel-apache-maven.repo
sudo sed -i s/$releasever/6/g /etc/yum.repos.d/epel-apache-maven.repo
sudo yum install -y apache-maven
mvn --version
```

```
Complete!
[ec2-user@ip-172-31-10-221 ~]$ mvn --version
mvn --version
Apache Maven 3.5.2 (138edd61fd100ec658bfa2d307c43b76940a5d7d; 2017-10-18T07:58:13Z)
Maven home: /usr/share/apache-maven
Java version: 1.7.0_261, vendor: Oracle Corporation
Java home: /usr/lib/jvm/java-1.7.0-openjdk-1.7.0.261-2.6.22.2.amzn2.0.1.x86_64/jre
Default locale: en_US, platform encoding: UTF-8
OS name: "linux", version: "4.14.243-185.433.amzn2.x86_64", arch: "amd64", family: "unix"
[ec2-user@ip-172-31-10-221 ~]$
```

Update installed software versions

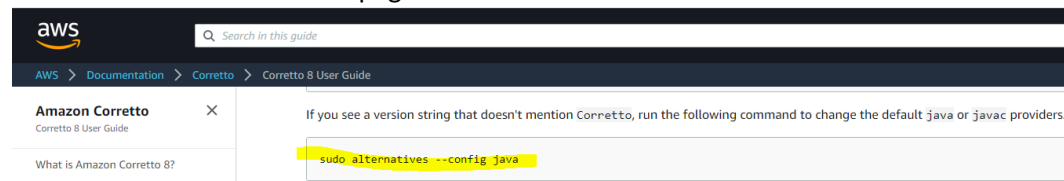
Check the Java JDK/JRE version

```
java -version
```

```
ec2-user@ip-172-31-10-221:~  
[ec2-user@ip-172-31-10-221 ~]$ java -version  
java version "1.7.0_261"  
OpenJDK Runtime Environment (rhel-2.6.22.2.amzn2.0.1-x86_64 u261-b02)  
OpenJDK 64-Bit Server VM (build 24.261-b02, mixed mode)  
[ec2-user@ip-172-31-10-221 ~]$ |
```

If Java JDK/JRE 1.8 was not installed

Scroll further down the AWS page are other sudo commands.



Type the sudo command and press enter

```
sudo alternatives --config java
```

Type 1 and press enter for java 1.8

```
ec2-user@ip-172-31-10-221:~  
[ec2-user@ip-172-31-10-221 ~]$ sudo alternatives --config java  
There are 2 programs which provide 'java'.  


| Selection | Command                                                                                                      |
|-----------|--------------------------------------------------------------------------------------------------------------|
| 1         | /usr/lib/jvm/java-1.8.0-amazon-corretto.x86_64/jre/bin/java                                                  |
| *+ 2      | java-1.7.0-openjdk.x86_64 (/usr/lib/jvm/java-1.7.0-openjdk-1.7.0.261-2.6.22.2.amzn2.0.1.x86_64/jre/bin/java) |

  
Enter to keep the current selection[+], or type selection number: 1|
```

Verify the version again:

```
ec2-user@ip-172-31-10-221:~  
[ec2-user@ip-172-31-10-221 ~]$ sudo alternatives --config java  
There are 2 programs which provide 'java'.  


| Selection | Command                                                                                                      |
|-----------|--------------------------------------------------------------------------------------------------------------|
| 1         | /usr/lib/jvm/java-1.8.0-amazon-corretto.x86_64/jre/bin/java                                                  |
| *+ 2      | java-1.7.0-openjdk.x86_64 (/usr/lib/jvm/java-1.7.0-openjdk-1.7.0.261-2.6.22.2.amzn2.0.1.x86_64/jre/bin/java) |

  
Enter to keep the current selection[+], or type selection number: 1  
[ec2-user@ip-172-31-10-221 ~]$ java -version  
openjdk version "1.8.0_302"  
OpenJDK Runtime Environment Corretto-8.302.08.1 (build 1.8.0_302-b08)  
OpenJDK 64-Bit Server VM Corretto-8.302.08.1 (build 25.302-b08, mixed mode)  
[ec2-user@ip-172-31-10-221 ~]$ |
```

Now it is java 1.8

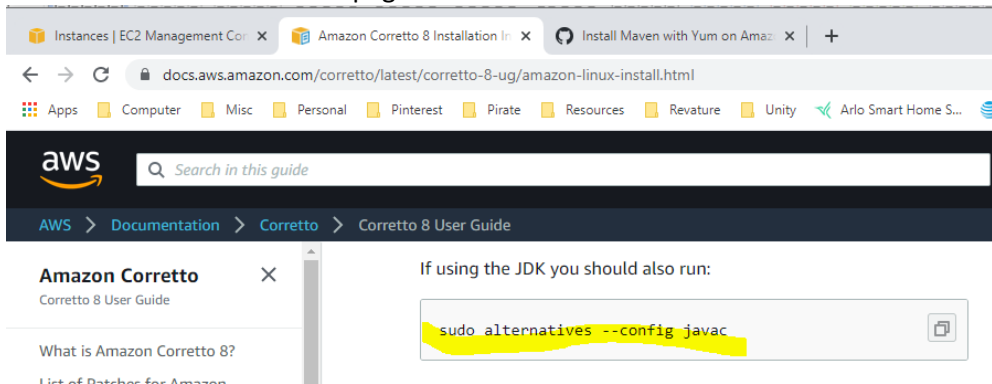
Check the Java Compiler version

```
javac -version
```

```
ec2-user@ip-172-31-10-221:~  
[ec2-user@ip-172-31-10-221 ~]$ javac -version  
javac 1.7.0_261  
[ec2-user@ip-172-31-10-221 ~]$ |
```

If Java Compiler 1.8 was not installed

Scroll further down the AWS page are other sudo commands.



Use the sudo command

```
sudo alternatives --config javac
```

Type 1 and press enter for java 1.8

```
ec2-user@ip-172-31-10-221:~  
[ec2-user@ip-172-31-10-221 ~]$ javac -version  
javac 1.7.0_261  
[ec2-user@ip-172-31-10-221 ~]$ sudo alternatives --config javac  
There are 2 programs which provide 'javac'.  


| Selection | Command                                                                                                   |
|-----------|-----------------------------------------------------------------------------------------------------------|
| 1         | /usr/lib/jvm/java-1.8.0-amazon-corretto.x86_64/bin/javac                                                  |
| *+ 2      | java-1.7.0-openjdk.x86_64 (/usr/lib/jvm/java-1.7.0-openjdk-1.7.0.261-2.6.22.2.amzn2.0.1.x86_64/bin/javac) |

  
Enter to keep the current selection[+], or type selection number: 1|
```

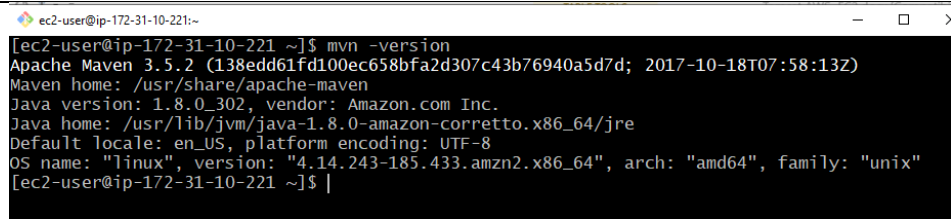
Check the java -version and javac -version again

```
ec2-user@ip-172-31-10-221:~  
[ec2-user@ip-172-31-10-221 ~]$ java -version  
openjdk version "1.8.0_302"  
OpenJDK Runtime Environment Corretto-8.302.08.1 (build 1.8.0_302-b08)  
OpenJDK 64-Bit Server VM Corretto-8.302.08.1 (build 25.302-b08, mixed mode)  
[ec2-user@ip-172-31-10-221 ~]$ javac -version  
javac 1.8.0_302  
[ec2-user@ip-172-31-10-221 ~]$ |
```

Check the Maven version

Type the command and press enter

```
mvn -version
```



```
ec2-user@ip-172-31-10-221:~  
[ec2-user@ip-172-31-10-221 ~]$ mvn -version  
Apache Maven 3.5.2 (138edd61fd100ec658bfa2d307c43b76940a5d7d; 2017-10-18T07:58:13Z)  
Maven home: /usr/share/apache-maven  
Java version: 1.8.0_302, vendor: Amazon.com Inc.  
Java home: /usr/lib/jvm/java-1.8.0-amazon-corretto.x86_64/jre  
Default locale: en_US, platform encoding: UTF-8  
OS name: "linux", version: "4.14.243-185.433.amzn2.x86_64", arch: "amd64", family: "unix"  
[ec2-user@ip-172-31-10-221 ~]$
```

The version should be correct. There was no alternative in the lecture.

Install Apache Tomcat on EC2 Instance

Download Tomcat

Enter the URL in a browser

<https://mirrors.gigenet.com/apache/tomcat/>

Select tomcat-9 link



../	
jakartae-migration/	08-May-2021 18:04
maven-plugin/	03-Jul-2020 04:17
taglibs/	03-Jul-2020 04:17
tomcat-10/	10-Sep-2021 06:18
tomcat-8/	09-Sep-2021 19:19
tomcat-9/	10-Sep-2021 07:18
tomcat-connectors/	03-Jul-2020 04:17

Select v9.0.52 link



../	
v9.0.52/	06-Aug-2021 05:51
v9.0.53/	10-Sep-2021 07:18

The instructor in the video installed v9.0.52 on Sept 8th 2021. A newer version was added on Sept 10th. I installed v9.0.52 to be consistent with the instructions in the video.

<https://mirrors.gigenet.com/apache/tomcat/tomcat-9/v9.0.52/>

Select bin link



../	
bin/	06-Aug-2021 05:51
src/	06-Aug-2021 05:51
README.html	31-Jul-2021 04:22
RELEASE-NOTES	31-Jul-2021 04:22

<https://mirrors.gigenet.com/apache/tomcat/tomcat-9/v9.0.52/bin/>

Need: the apache-tomcat-9.0.52.tar.gz file

<https://mirrors.gigenet.com/apache/tomcat/tomcat-9/v9.0.52/bin/apache-tomcat-9.0.52.tar.gz>

← → ↻ 🔒 mirrors.gigenet.com/apache/tomcat/tomcat-9/v9.0.52/bin/		
Apps Computer Misc Personal Pinterest Pirate Resources Revature		
Index of /apache/tomcat/tomcat-9/v9.0.52/bin/		
<hr/>		
../	06-Aug-2021 05:51	-
embed/	31-Jul-2021 04:22	3739
README.html	31-Jul-2021 04:22	2797663
apache-tomcat-9.0.52-deployer.tar.gz	31-Jul-2021 04:22	2811317
apache-tomcat-9.0.52-deployer.zip	31-Jul-2021 04:22	6558790
apache-tomcat-9.0.52-fulldocs.tar.gz	31-Jul-2021 04:22	12785607
apache-tomcat-9.0.52-windows-x64.zip	31-Jul-2021 04:22	12587985
apache-tomcat-9.0.52-windows-x86.zip	31-Jul-2021 04:22	12325744
apache-tomcat-9.0.52.exe	31-Jul-2021 04:22	11524133
apache-tomcat-9.0.52.tar.gz	31-Jul-2021 04:22	12064979
apache-tomcat-9.0.52.zip	31-Jul-2021 04:22	

Run the wget command

`wget https://mirrors.gigenet.com/apache/tomcat/tomcat-9/v9.0.52/bin/apache-tomcat-9.0.52.tar.gz`

```
ec2-user@ip-172-31-10-221:~$ mvn -version
Apache Maven 3.5.2 (138ed61fd100ec658bfa2d307c43b76940a5d7d; 2017-10-18T07:58:13Z)
Maven home: /usr/share/apache-maven
Java version: 1.8.0_302, vendor: Amazon.com Inc.
Java home: /usr/lib/jvm/java-1.8.0-amazon-corretto.x86_64/jre
Default locale: en_US, platform encoding: UTF-8
OS name: "linux", version: "4.14.243-185.433.amzn2.x86_64", arch: "amd64", family: "unix"
ec2-user@ip-172-31-10-221 ~]$ wget https://mirrors.gigenet.com/apache/tomcat/tomcat-9/v9.0.52/bin/apache-tomcat-9.0.52.tar.gz
--2021-09-11 00:35:10-- https://mirrors.gigenet.com/apache/tomcat/tomcat-9/v9.0.52/bin/apache-tomcat-9.0.52.tar.gz
Resolving mirrors.gigenet.com (mirrors.gigenet.com)... 69.65.16.171, 2001:1850:f000:f000:f000:f000::
Connecting to mirrors.gigenet.com (mirrors.gigenet.com)|69.65.16.171|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 11524133 (11M) [application/octet-stream]
Saving to: 'apache-tomcat-9.0.52.tar.gz'

100%[=====] 11,524,133 29.1MB/s in 0.4s

2021-09-11 00:35:11 (29.1 MB/s) - 'apache-tomcat-9.0.52.tar.gz' saved [11524133/11524133]

ec2-user@ip-172-31-10-221 ~]$
```

Verify file was copied, do an ls command

```
ec2-user@ip-172-31-10-221:~$ ls
apache-tomcat-9.0.52.tar.gz
ec2-user@ip-172-31-10-221 ~]$
```

Extract the tar file

Type the command and press enter

`tar -zxvf apache-tomcat-9.0.52.tar.gz`

```
ec2-user@ip-172-31-10-221:~$ ls
apache-tomcat-9.0.52.tar.gz
ec2-user@ip-172-31-10-221 ~$ tar -zxvf apache-tomcat-9.0.52.tar.gz
```

Creates directory: `apache-tomcat-9.0.52`

```
ec2-user@ip-172-31-10-221:~  
[ec2-user@ip-172-31-10-221 ~]$ ls  
apache-tomcat-9.0.52  apache-tomcat-9.0.52.tar.gz  
[ec2-user@ip-172-31-10-221 ~]$ |
```

Look at the `apache-tomcat-9.0.52` directory

```
cd apache-tomcat-9.0.52  
ls
```

Has same directory structure as an installation on a local machine

```
ec2-user@ip-172-31-10-221:~/apache-tomcat-9.0.52  
[ec2-user@ip-172-31-10-221 ~]$ ls  
apache-tomcat-9.0.52  apache-tomcat-9.0.52.tar.gz  
[ec2-user@ip-172-31-10-221 ~]$ cd apache-tomcat-9.0.52  
[ec2-user@ip-172-31-10-221 apache-tomcat-9.0.52]$ ls  
bin  BUILDING.txt  conf  CONTRIBUTING.md  lib  LICENSE  logs  NOTICE  README.md  RELEASE-NOTES  RUNNING.txt  temp  webapps  work  
[ec2-user@ip-172-31-10-221 apache-tomcat-9.0.52]$ |
```

The installation of required software on the EC2 instance is completed.

Installing a war file on the EC2 instance

Copy a project war file from a local machine

Will be using scp commands for more info on scp visit:

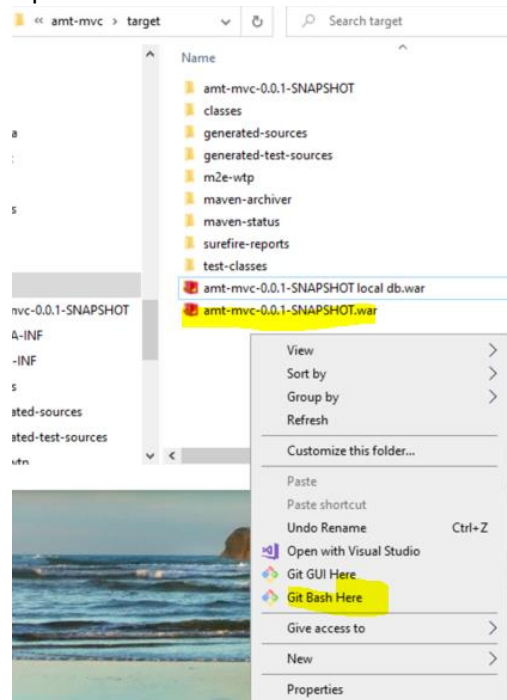
<https://linuxize.com/post/how-to-use-scp-command-to-securely-transfer-files/>

```
scp [OPTION] [user@]SRC_HOST:]file1 [user@]DEST_HOST:]file2
```

On the local machine

Use Windows explorer to navigate to the directory where the war file is located

Open a Git Bash window



Do an ls command to locate the war file

```
MINGW64: c:/Users/tlw8748253/Desktop/Projects/amt-mvc/target
t1w8748253@TLW8748253-DL13 MINGW64 ~/Desktop/Projects/amt-mvc/target (main)
$ ls
amt-mvc-0.0.1-SNAPSHOT/      m2e-wtp/
'amt-mvc-0.0.1-SNAPSHOT local db.war'  maven-archiver/
amt-mvc-0.0.1-SNAPSHOT.war  maven-status/
classes/                    surefire-reports/
generated-sources/          test-classes/
generated-test-sources/

t1w8748253@TLW8748253-DL13 MINGW64 ~/Desktop/Projects/amt-mvc/target (main)
```

Where: **amt-mvc-0.0.1-SNAPSHOT.war** is the name of your war file.

You might want to rename the file with Window explorer prior to pushing the file

Push the war file to the EC2 server

```
scp amt-mvc-0.0.1-SNAPSHOT.war amt-mvc-deploy:/home/ec2-user
```

```
scp amt-mvc.war amt-mvc-deploy:/home/ec2-user
```

The scp command will use the configuration information in the config file in the .ssh folder on the local machine.

```
Host amt-mvc-deploy
HostName ec2-18-216-251-223.us-east-2.compute.amazonaws.com
User ec2-user
IdentityFile /c/Users/tlw8748253/.ssh/amt-mvc-keys.pem
Port 22
```

In the EC2 window

Move to the /home/ec2-user directory

```
cd /home/ec2-user
```

```
ec2-user@ip-172-31-10-221:~
[ec2-user@ip-172-31-10-221 ~]$ pwd
/home/ec2-user
[ec2-user@ip-172-31-10-221 ~]$ |
```

Verify file is on server with ls command

```
[ec2-user@ip-172-31-10-221 ~]$
[ec2-user@ip-172-31-10-221 ~]$
[ec2-user@ip-172-31-10-221 ~]$ ls
amt-mvc-0.0.1-SNAPSHOT.war  apache-tomcat-9.0.52  apache-tomcat-9.0.52.tar.gz
[ec2-user@ip-172-31-10-221 ~]$ |
```

Rename file with mv command:

```
mv amt-mvc-0.0.1-SNAPSHOT.war amt-mvc.war
```

```
ec2-user@ip-172-31-10-221:~
[ec2-user@ip-172-31-10-221 ~]$ ls
amt-mvc.war  apache-tomcat-9.0.52  apache-tomcat-9.0.52.tar.gz
[ec2-user@ip-172-31-10-221 ~]$ |
```

Move the file to the apache directory

```
mv amt-mvc.war apache-tomcat-9.0.52/webapps/
```

```
ls apache-tomcat-9.0.52/webapps/
```

```
[ec2-user@ip-172-31-10-221 ~]$ ls
apache-tomcat-9.0.52  apache-tomcat-9.0.52.tar.gz
[ec2-user@ip-172-31-10-221 ~]$ ls apache-tomcat-9.0.52/webapps/
amt-mvc.war  docs  examples  host-manager  manager  ROOT
[ec2-user@ip-172-31-10-221 ~]$ |
```

Start the EC2 Tomcat Server

Go to apache bin directory

```
cd apache-tomcat-9.0.52/bin  
ls
```

```
[ec2-user@ip-172-31-10-221 bin]$ ls  
bootstrap.jar          configtest.sh          shutdown.sh  
catalina.bat           daemon.sh              startup.bat  
catalina.sh            digest.bat             startup.sh  
catalina-tasks.xml     digest.sh              tomcat-juli.jar  
ciphers.bat            makebase.bat           tomcat-native.tar.gz  
ciphers.sh             makebase.sh            tool-wrapper.bat  
commons-daemon.jar     setclasspath.bat       tool-wrapper.sh  
commons-daemon-native.tar.gz setclasspath.sh         version.bat  
configtest.bat         shutdown.bat           version.sh  
[ec2-user@ip-172-31-10-221 bin]$ ^C  
[ec2-user@ip-172-31-10-221 bin]$ |
```

Run the startup script

```
./startup.sh
```

```
[ec2-user@ip-172-31-10-221 bin]$ ./startup.sh  
Using CATALINA_BASE:   /home/ec2-user/apache-tomcat-9.0.52  
Using CATALINA_HOME:   /home/ec2-user/apache-tomcat-9.0.52  
Using CATALINA_TMPDIR: /home/ec2-user/apache-tomcat-9.0.52/temp  
Using JRE_HOME:        /usr  
Using CLASSPATH:        /home/ec2-user/apache-tomcat-9.0.52/bin/bootstrap.jar:/home/ec2-user/apache-tomcat-9.0.52/bin/tomcat-juli.jar  
Using CATALINA_OPTS:  
Tomcat started.  
[ec2-user@ip-172-31-10-221 bin]$ |
```

Shutdown Script

Do not stop it at this time

In the bin directory

To stop the Tomcat use:

```
./shutdown.sh
```


Test the Project Deployed on the EC2 Instance

Now try and send in a request.

You will need your instance's public IPv4

This should have been copied prior to setting up the config file in the .ssh folder

Public IPv4 DNS

 `ec2-18-216-251-223.us-east-2.compute.amazonaws.com`

This is used in place of localhost in the connection URL for your program

For my program deployed on the EC2 instance the configuration was:

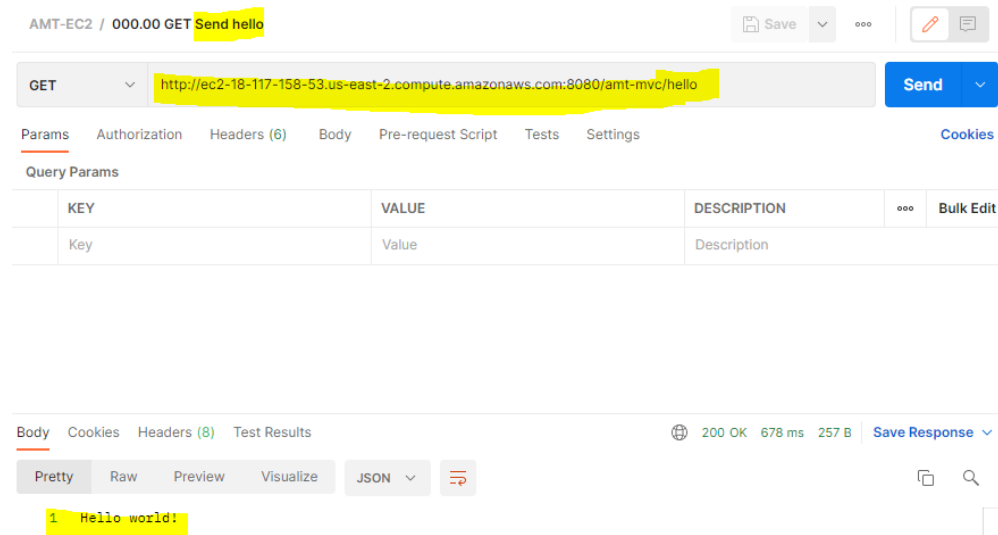
Went from:

`http://localhost:8080/amt-mvc/hello`

To:

`http://ec2-18-117-158-53.us-east-2.compute.amazonaws.com:8080/amt-mvc/hello`

My program has a very simple end point to perform initial test of the MVC application



The screenshot shows a REST client interface. At the top, it says "AMT-EC2 / 000.00 GET Send hello". Below this, the method is set to "GET" and the URL is `http://ec2-18-117-158-53.us-east-2.compute.amazonaws.com:8080/amt-mvc/hello`. The "Send" button is visible. Below the URL bar, there are tabs for "Params", "Authorization", "Headers (6)", "Body", "Pre-request Script", "Tests", and "Settings". The "Query Params" section is expanded, showing a table with columns "KEY", "VALUE", and "DESCRIPTION". The table has one row with "Key" and "Value". Below this, there are tabs for "Body", "Cookies", "Headers (8)", and "Test Results". The "Test Results" tab is selected, showing a status of "200 OK", a response time of "678 ms", and a response size of "257 B". The response body is displayed as "1 Hello world!".

At the time of writing this document the above URL is working and EC2 instance is up and running if you want to try it from a browser.

NOTE: the AWS endpoint will change any time you restart the EC2 instance.

This concludes the building of an EC2 instance and the deployment of a war file.