

CS 455 – Computer Security Fundamentals





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Computer Security Fundamentals

- A Quick Introduction to Kali Linux in AWS
 - We will use this example to do our introduction first
 - Install Kali Linux into AWS!
 - Then, I will show you getting around with AWS
 - SSH setup
 - RDP setup (GUI)(TBD)

A Quick Introduction to Kali Linux in AWS

- About the price!


**Kali Linux**
Kali 
★★★★☆ 13 AWS reviews  | 83 external reviews 
Free Tier | Standard Contract

Overview | Product details | **Pricing** | Usage | Support

Free Tier
EC2 charges for Micro instances are free for up to 750 hours a month if you qualify for the [AWS Free Tier](#).





▼ Kali Linux
EC2 - t2.micro

\$0/Hour
\$0.012/Hour

 The table shows current software and infrastructure pricing for services hosted in **US East (Ohio)**. Additional taxes or fees may apply.

	Instance type	Software/Hour	EC2/Hour	Total/Hour
<input type="radio"/>	t2.nano	\$0	\$0.006	\$0.006
<input checked="" type="radio"/>	t2.micro	\$0	\$0.012	\$0.012
<input type="radio"/>	t2.small	\$0	\$0.023	\$0.023
<input type="radio"/>	t2.medium <i>vendor recommended</i>	\$0	\$0.046	\$0.046
<input type="radio"/>	t2.large	\$0	\$0.093	\$0.093
<input type="radio"/>	t2.xlarge	\$0	\$0.186	\$0.186
<input type="radio"/>	t2.2xlarge	\$0	\$0.371	\$0.371

Continue


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▼ Kali Linux
EC2 - t2.nano


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Continue

A Quick Introduction to Kali Linux in AWS



Kali Linux

Kali [Kali](#)

★★★★☆ 13 AWS reviews [13 AWS reviews](#) | 77 external reviews [77 external reviews](#)

Free Tier | Standard Contract

- Overview
- Product details
- Pricing
- Usage
- Support

Kali Linux, The Most Advanced Penetration Testing Distribution. Ever.

Typical total price

\$0.046/Hr

Total pricing per instance for services hosted on t2.medium in us-east-1.

Latest version

Kali Linux 2022.4b

Delivery methods

Amazon Machine Image ⓘ

Operating systems

Other 2022.4b

Other 2022.4

Video

[Product Video](#) [Product Video](#)

Categories

Operating Systems

Security

Testing

[Continue](#)

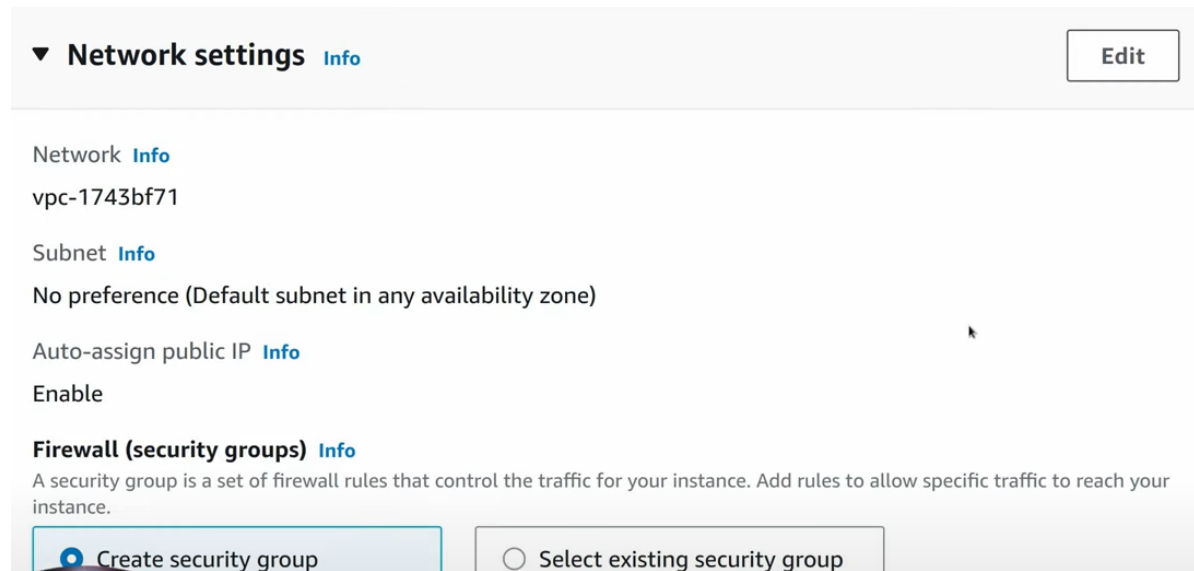
Remember this when we used to create an EC2 system instance previously?

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- This is saying, if you choose t2.micro, you are eligible for AWS free tier
- It is free for the previous 750hrs
- $750/24 = 31$ days, 6 hrs
- After that, you will be charged \$0.012/hr
- You can delete the instance, move the data (or program) to a new instance
 - Technically, it is free to use forever.
- Or you can choose t2.nano in the beginning for \$0.006/hr for very limited amount RAM and hard drive. I wouldn't recommend it.

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- Previously, we talked about the “Network Settings” in AWS EC2.



▼ Network settings [Info](#) Edit

Network [Info](#)
vpc-1743bf71

Subnet [Info](#)
No preference (Default subnet in any availability zone)

Auto-assign public IP [Info](#)
Enable

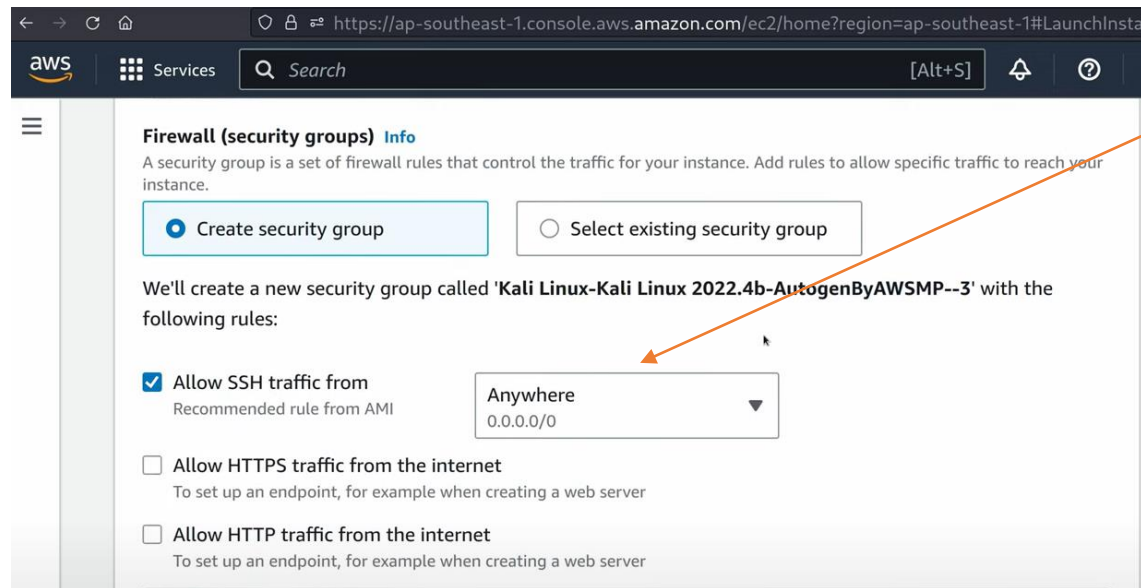
Firewall (security groups) [Info](#)
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

☒ Create security group ☐ Select existing security group

- For this part, we want to be able to create, for example, a new **security group** for “minimum protections”

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- Well, there is **default** setting which is very scary!



- AWS, they are assuming all the EC2 instance builder are developers, or CS students.

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- Assuming we have in this case:
 - All links are running on port 22.
 - The SSH service is open
 - Of course an associated security group that ALSO has port 22 **open to the world**
- What? What is going to happen? Two things.
 - Hacker –(launch brute-force-attack)→ against port 22(if it is running on password based authentication)
 - If the service itself (SSH server) is vulnerable, for example, it uses some “defective library”, the hacker can take the advantage on it and gain access right into the EC2 instance (the Linux instance)
- You absolutely don't want this happen!

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- Choose this! Or, you need to “**Customize**” your co-worker’s IP

Firewall (security groups) [Info](#)

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

☒ Create security group ☐ Select existing security group

We'll create a new security group called 'Kali Linux-Kali Linux 2022.4b-AutogenByAWSMP--3' with the following rules:

☒ Allow SSH traffic from
Recommended rule from AMI



☐ Allow HTTPS traffic from the internet
To set up an endpoint, for example when you want to access your instance from the internet

☐ Allow HTTP traffic from the internet
To set up an endpoint, for example when you want to access your instance from the internet

Anywhere
0.0.0.0/0

Anywhere
0.0.0.0/0

Custom
My IP
119.74.76.81/32

 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. 

A Quick Introduction to Kali Linux in AWS

- Furthermore, if you noticed the HTTP(s) related setting. You can setup this as well. In our case (SSH), we just leave it alone.
- This instance is created along with a default “Security Group”

Firewall (security groups) [Info](#)

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

☒ Create security group ☐ Select existing security group

We'll create a new security group called '**Kali Linux-Kali Linux 2022.4b-AutogenByAWSMP--3**' with the following rules:

☒ Allow SSH traffic from Recommended rule from AMI

☐ Allow HTTPS traffic from the internet To set up an endpoint, for example when you want to access your instance via a web browser

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Anywhere 0.0.0.0/0

Anywhere 0.0.0.0/0 ✓

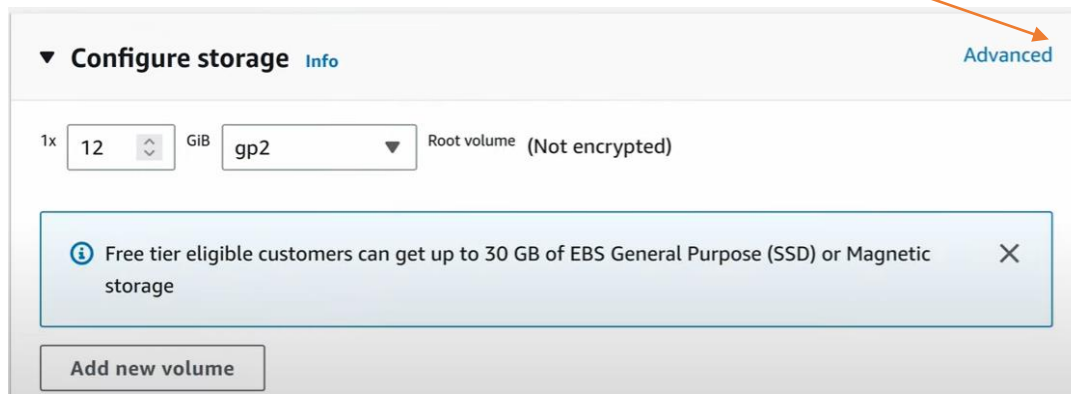
Custom

My IP 119.74.76.81/32

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. ✕

A Quick Introduction to Kali Linux in AWS

- Scroll all the way down to the storage settings
- You can click the “**advanced**” and see what are the options we have



- This is just saying, for a free user, you are allowed to use 30GB at most
 - For example, you can setup several instances {X, Y, Z}. X for 12GB, Y for 12 GB, Z for 6 GB. Once it is over 30GB, you will be charged with some money.

A Quick Introduction to Kali Linux in AWS

- We can just keep it by default and go ahead hit the [Launch instance] button

The screenshot shows the 'Configure storage' step of the AWS EC2 instance launch wizard. The 'Advanced' tab is selected. The storage configuration shows 1x 12 GiB gp2 Root volume (Not encrypted). A blue information box states: 'Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage'. Below this is an 'Add new volume' button. On the right side of the wizard, there are 'Cancel' and 'Launch instance' buttons, with a 'Review commands' link below the 'Launch instance' button.

▼ **Configure storage** [Info](#) [Advanced](#)

1x 12 GiB gp2 Root volume (Not encrypted)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage

[Add new volume](#)

[Cancel](#) [Launch instance](#) [Review commands](#)

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- Then you can see it is launching

EC2 > Instances > Launch an instance

Launching instance

Please wait while we launch your instance.
Do not close your browser while this is loading.

Subscribing to Marketplace AMI

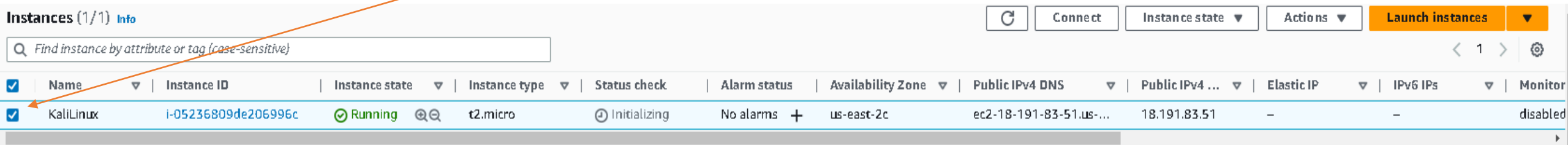
77%

▼ Details

Initializing requests	Succeeded
Creating security groups	Succeeded
Creating security group rules	Succeeded
Subscribing to Marketplace AMI	Loading

A Quick Introduction to Kali Linux in AWS

- Go to the instance detail page.
- Once we see the “Instance state” is running, we can now try to login to that using SSH
- All you need to do now is the check the instance and click the connect



Instances (1/1) [Info](#)

[Refresh](#) [Connect](#) [Instance state ▼](#) [Actions ▼](#) [Launch instances](#) [▼](#)

<input checked="" type="checkbox"/>	Name ▼	Instance ID	Instance state ▼	Instance type ▼	Status check	Alarm status	Availability Zone ▼	Public IPv4 DNS ▼	Public IPv4 ... ▼	Elastic IP ▼	IPv6 IPs ▼	Monitor
<input checked="" type="checkbox"/>	KaliLinux	i-05236809de206996c	Running	t2.micro	Initializing	No alarms +	us-east-2c	ec2-18-191-83-51.us-...	18.191.83.51	-	-	disabled

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- Click the SSH client tab. Still remember the way we create the key?

EC2 > Instances > i-05236809de206996c > Connect to instance

Connect to instance [Info](#)

Connect to your instance i-05236809de206996c (KaliLinux) using any of these options

EC2 Instance Connect

Session Manager

SSH client

EC2 serial console

Instance ID
i-05236809de206996c (KaliLinux)

Public IP address
18.191.83.51

User name
Enter the user name defined in the AMI used to launch the instance. If you didn't define a custom user name, use the default user name, root.

Note: In most cases, the default user name, root, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

Cancel Connect

EC2 > Instances > i-05236809de206996c > Connect to instance

Connect to instance [Info](#)

Connect to your instance i-05236809de206996c (KaliLinux) using any of these options

EC2 Instance Connect

Session Manager

SSH client

EC2 serial console

Instance ID
i-05236809de206996c (KaliLinux)

1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is KaliLinuxCharles.pem
3. Run this command, if necessary, to ensure your key is not publicly viewable.
chmod 400 KaliLinuxCharles.pem
4. Connect to your instance using its Public DNS:
ec2-18-191-83-51.us-east-2.compute.amazonaws.com

Example:
ssh -i "KaliLinuxCharles.pem" root@ec2-18-191-83-51.us-east-2.compute.amazonaws.com

Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

Cancel

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- SSH setup
 - pem is the key's format for OpenSSH
 - So you can directly connect that from your local Mac or local Linux

Example:

```
ssh -i "KaliLinuxCharles.pem" root@ec2-18-191-83-51.us-east-2.compute.amazonaws.com
```


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- However, in my case, because I'm using the Windows with Putty SSH client, I changed that to .ppk format ← This is supported by Putty

Create key pair

×

Key pairs allow you to connect to your instance securely.

Enter the name of the key pair below. When prompted, store the private key in a secure and accessible location on your computer. **You will need it later to connect to your instance.** [Learn more](#)

Key pair name

KaliLinuxCharles

The name can include upto 255 ASCII characters. It can't include leading or trailing spaces.

Key pair type

☒ RSA
RSA encrypted private and public key pair

☐ ED25519
ED25519 encrypted private and public key pair (Not supported for Windows instances)

Private key file format

☐ .pem
For use with OpenSSH

☒ .ppk
For use with PuTTY

Cancel

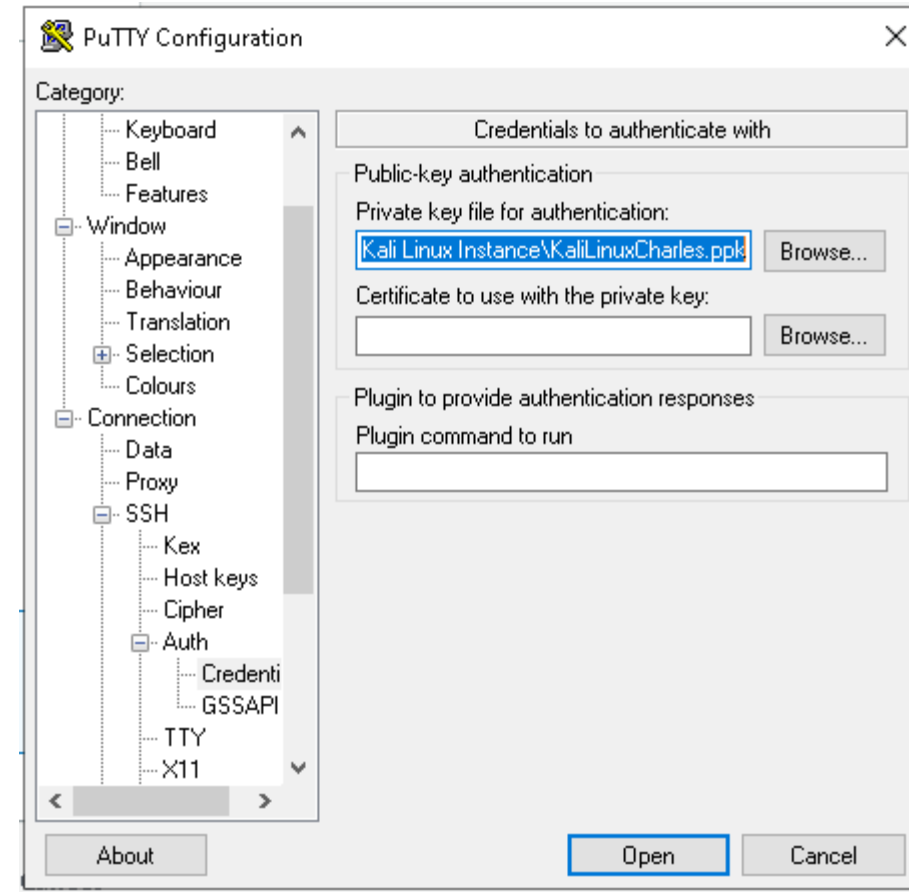
Create key pair

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- Now! You know the idea
 - During the process of key creation, it asked you to store a copy of the key locally! (to your hard drive)
 - It is the “private key”!
 - There is actually a copy of “public key” in the cloud
 - AWS will do a check by a match with the copy of public key stored in AWS and a copy from your hard drive
- One more thing I need to remind you, the default user name for Kali is “Kali”. If you use “root”, you will be denied for SSH login

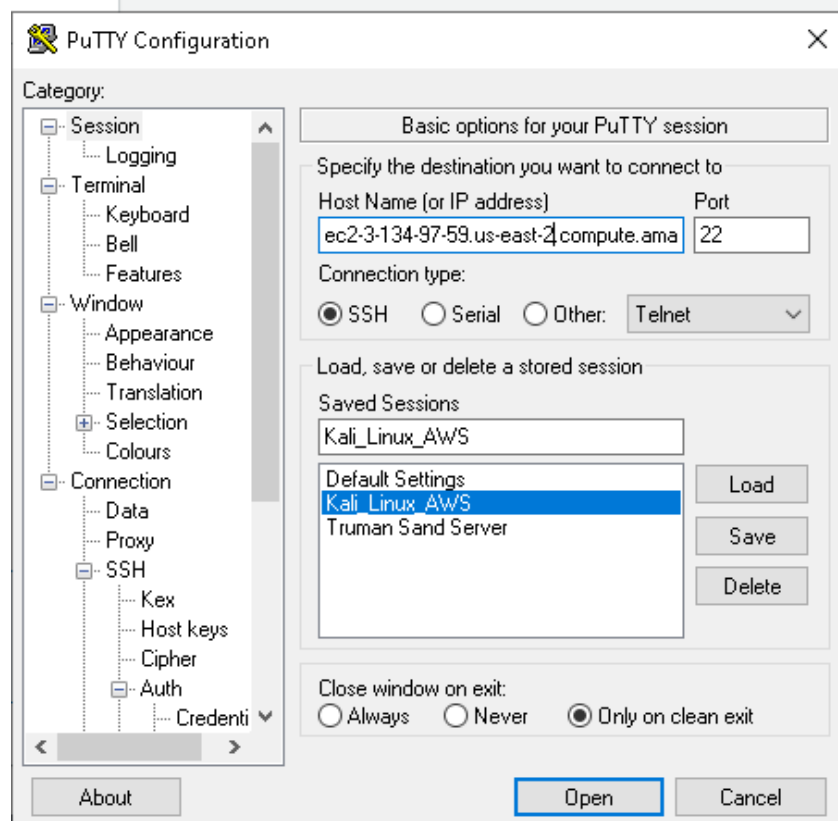
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- The way I provide the private key file from hard drive in the PuTTY.
- This is used in the SSH connection



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- Hit the [Open] (connection)
- Yes! We're in!



```
kali@kali: ~  
login as: kali  
Authenticating with public key "KaliLinuxCharles"  
Linux kali 6.1.0-kali5-cloud-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.12-1kali2 (2023-02-23) x86_64  
  
The programs included with the Kali GNU/Linux system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
  
Kali GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent  
permitted by applicable law.  
-- (Message from Kali developers)  
  
This is a minimal installation of Kali Linux, you likely  
want to install supplementary tools. Learn how:  
= https://www.kali.org/docs/troubleshooting/common-minimum-setup/  
  
This is a cloud installation of Kali Linux. Learn more about  
the specificities of the various cloud images:  
= https://www.kali.org/docs/troubleshooting/common-cloud-setup/  
  
-- (Run: "touch ~/.hushlogin" to hide this message)  
(kali@kali) ~  
$
```

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- RDP setup (GUI) (TBD)