



Lesson 2 EC2

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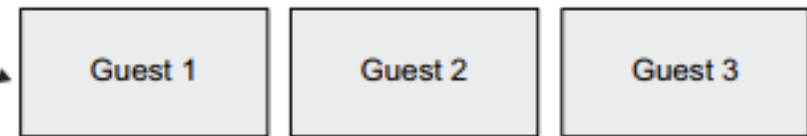
What is Virtual Machine(VM)

- ▶ With a virtual machine, you get access to a slice of a physical machine located in a data center.

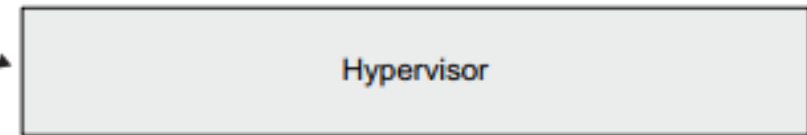
- ▶ Typical use cases for a virtual machine follow:

- ❓ Hosting a web application such as WordPress
- ❓ Operating an enterprise application, such as an ERP application
- ❓ Transforming or analyzing data, such as encoding video files

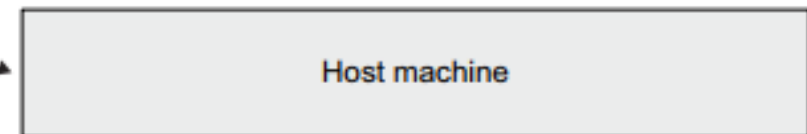
The virtual machine provides an isolated operating system.



The hypervisor schedules and isolates access to hardware.



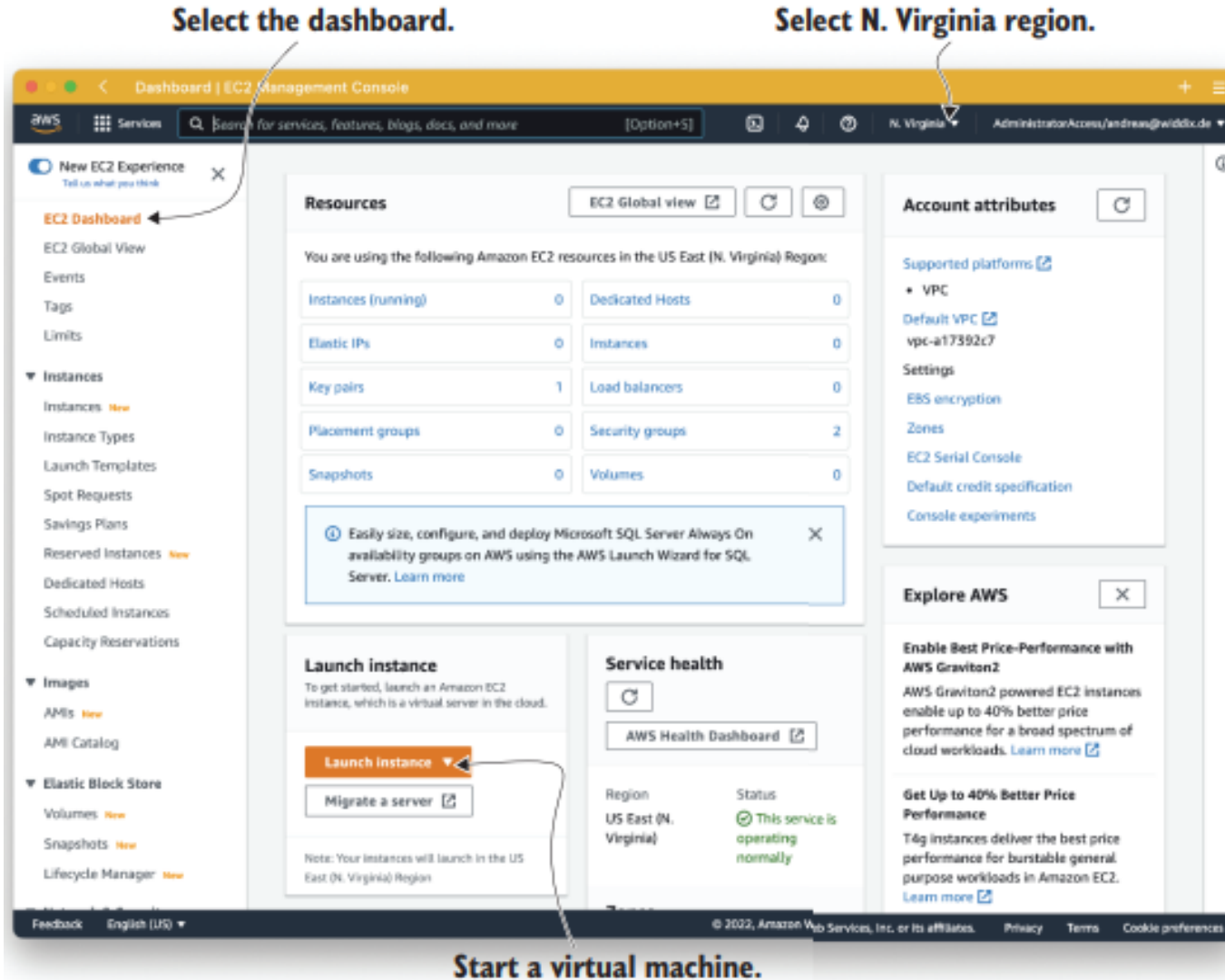
The host machine provides the hardware with the required compute, storage, and network resources.



Launch a VM

Select the dashboard.

Select N. Virginia region.



The screenshot shows the AWS Management Console for the EC2 service. The left-hand navigation pane is visible, with the 'EC2 Dashboard' link highlighted. The main content area displays the 'Resources' section for the 'US East (N. Virginia)' region, showing counts for various EC2 resources. The 'Launch instance' button is highlighted in the 'Launch instance' section. The 'Service health' section shows that the service is operating normally. The 'Account attributes' section shows the default VPC and other account settings. The 'Explore AWS' section provides information about AWS Graviton2 and T4g instances.

Start a virtual machine.

Launch a VM Guideline

- 1 Naming the virtual machine
- 2 Selecting the operating system (OS)
- 3 Choosing the size of your virtual machine
- 4 Configuring details
- 5 Adding storage
- 6 Configuring a firewall
- 7 Granting the virtual machine permissions to access other AWS services

Choosing Amazon Machine Image - AMI

▼ Application and OS Images (Amazon Machine Image) [Info](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Search our full catalog including 1000s of application and OS images

Recents

Quick Start

Select Amazon Linux.



Ubuntu
ubuntu

Windows
Microsoft

Red Hat
Red Hat

SUSE Linux
SUSE



Browse more AMIs

Including AMIs from
AWS, Marketplace and
the Community

Amazon Machine Image (AMI)

Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type
ami-0c02fb55956c7d316 (64-bit (x86)) / ami-03190fe20ef6b1419 (64-bit (ARM))
Virtualization: hvm ENA enabled: true Root device type: ebs

Free tier eligible

Choose Amazon Linux 2.

Description

Amazon Linux 2 Kernel 5.10 AMI 2.0.20220316.0 x86_64 HVM gp2

Architecture

AMI ID

64-bit (x86)

ami-0c02fb55956c7d316

Use 64-bit (x86) architecture.

Choosing the size of VM

► <https://aws.amazon.com/ec2/instance-types/>

Instance type	Virtual CPUs	Memory	Description	Typical use case	Monthly cost (USD)
t2.nano	1	0.5 GiB	Small and cheap instance type, with moderate baseline performance and the ability to burst CPU performance above the baseline	Testing and development environments and applications with very low traffic	\$4
m6i.large	2	8 GiB	Has a balanced ratio of CPU, memory, and networking performance	All kinds of applications, such as medium databases, web servers, and enterprise applications	\$69
r6i.large	2	16 GiB	Optimized for memory-intensive applications with extra memory	In-memory caches and enterprise application servers	\$90

Configuring Key Pair

▼ **Key pair (login)** [Info](#)

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*

Proceed without a key pair (Not recommended) Default value ▼ [Create new key pair](#)

**Do not configure a key pair;
we will use a more advanced
approach to connect via SSH.**

Network and Firewall Setting

▼ Network settings [Info](#)

Edit

Network [Info](#)

vpc-a17392c7

Keep the default network.

Subnet [Info](#)

No preference (Default subnet in any availability zone)

Auto-assign public IP [Info](#)

Enable

Ensure assigning a public IP is enabled.

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 'launch-wizard-1' with the following rules:

☐ Allow SSH traffic from
Helps you connect to your instance

☐ Allow HTTPs traffic from the internet
To set up an endpoint, for example when creating a web server

☐ Allow HTTP traffic from the internet
To set up an endpoint, for example when creating a web server

Deselect inbound SSH traffic, because we will use a more advanced approach to connect to the VM.

Creates a new firewall configuration named launch-wizard-1

Configure storage

▼ **Configure storage** [Info](#)

1x


GiB

▼

Root volume

Use volume type gp2, which means your volume will store data on SSDs.

Configure 8 GB of storage for the root volume.

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

×

Add new volume

The selected AMI contains more instance store volumes than the instance allows. Only the first 0 instance store volumes from the AMI will be accessible from the instance

Creating an IAM role

The screenshot shows the AWS IAM console 'Create role' page. The breadcrumb trail is 'IAM > Roles > Create role'. The left sidebar shows the progress: Step 1 'Select trusted entity' is active, followed by Step 2 'Add permissions' and Step 3 'Name, review, and create'. The main content area is titled 'Select trusted entity' and 'Select AWS service.' It contains five radio button options for 'Trusted entity type': 'AWS service' (selected), 'AWS account', 'Web identity', 'SAML 2.0 federation', and 'Custom trust policy'. Below this is the 'Use case' section, which includes 'Common use cases' with 'EC2' (selected) and 'Lambda', and a dropdown for 'Use cases for other AWS services'. At the bottom right, there are 'Cancel' and 'Next' buttons. Annotations with arrows point from the text 'Select AWS service.' to the 'AWS service' option, from 'Select EC2.' to the 'EC2' option, and from 'Proceed with next step.' to the 'Next' button.

aws Services Search for services, features, blogs, docs, and more [Option+S] Global AdministratorAccess/andreas@widdix.de

IAM > Roles > Create role

Step 1
Select trusted entity

Step 2
Add permissions

Step 3
Name, review, and create

Select trusted entity

Select AWS service.

Trusted entity type

- ☒ AWS service
Allow AWS services like EC2, Lambda, or others to perform actions in this account.
- ☐ AWS account
Allow entities in other AWS accounts belonging to you or a 3rd party to perform actions in this account.
- ☐ Web identity
Allows users federated by the specified external web identity provider to assume this role to perform actions in this account.
- ☐ SAML 2.0 federation
Allow users federated with SAML 2.0 from a corporate directory to perform actions in this account.
- ☐ Custom trust policy
Create a custom trust policy to enable others to perform actions in this account.

Use case
Allow an AWS service like EC2, Lambda, or others to perform actions in this account.

Common use cases

- ☒ EC2
Allows EC2 instances to call AWS services on your behalf.
- ☐ Lambda
Allows Lambda functions to call AWS services on your behalf.

Use cases for other AWS services:
Choose a service to view use case

Cancel Next

Proceed with next step.

Creating an IAM role

Add permissions

Search for predefined policy
AmazonSSMManagedInstanceCore.

Permissions policies (Selected 1/743)
Choose one or more policies to attach to your new role.

Q Filter policies by property or policy name and press enter 1 match < 1 > ⚙

"AmazonSSMManagedInstanceCore" X Clear filters

<input checked="" type="checkbox"/>	Policy name	Type	Description
<input checked="" type="checkbox"/>	AmazonSSMManagedInstanceCore	AWS m...	The policy for Amazon EC2 Role to

Set permissions boundary - optional

Set a permissions boundary to control the maximum permissions this role can have. This is not a common setting, but you can use it to delegate permission management to others.

Select the policy named
AmazonSSMManagedInstanceCore.

Proceed with next step.

Cancel

Previous

Next

Name, review, and create

Role details

Role name

Enter a meaningful name to identify this role.

ec2-ssm-core

Maximum 128 characters. Use alphanumeric and '+=, @-_' characters.

Type in **ec2-ssm-core** as the
name of the IAM role.

Description

Add a short explanation for this policy.

Allows EC2 instances to interact with SSM.

Optionally, add a description
to explain the IAM role.

Configure IAM role for EC2 Instance

▼ **Advanced details** [Info](#)

Purchasing option [Info](#)

☐ Request Spot Instances

Request Spot Instances at the Spot price, capped at the On-Demand price

Deselect; you will learn more about this option later.

IAM instance profile [Info](#)

Select IAM role ec2-ssm-core to grant the virtual machine access to SSM.

ec2-ssm-core
arn:aws:iam::431832273228:instance-profile/ec2-ssm-core

Hostname type [Info](#)

IP name

[Create new IAM profile](#)

Reload after creating the IAM role.

Launch a EC2 Instance

▼ **Summary**

Number of instances [Info](#)

1

[Software Image \(AMI\)](#)
Amazon Linux 2 Kernel 5.10 AMI...[read more](#)
ami-0c02fb55956c7d316

[Virtual server type \(instance type\)](#)
t2.micro

[Firewall \(security group\)](#)
New security group

[Storage \(volumes\)](#)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet

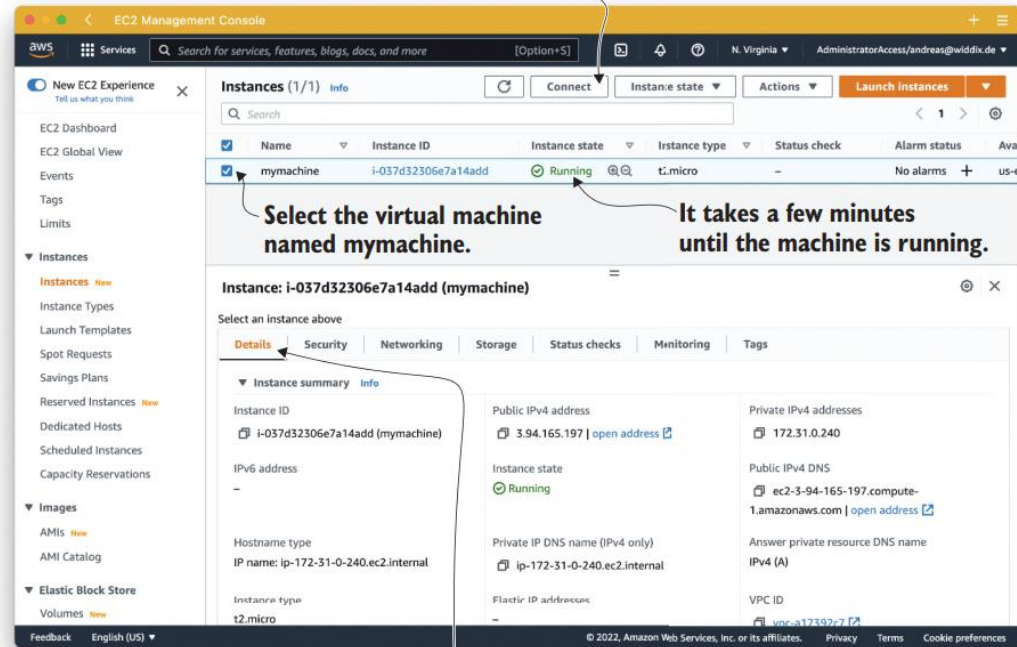
Cancel **Launch instance**

For now, we are launching only a single virtual machine.

Click here to create the virtual machine.

Connect to your VM

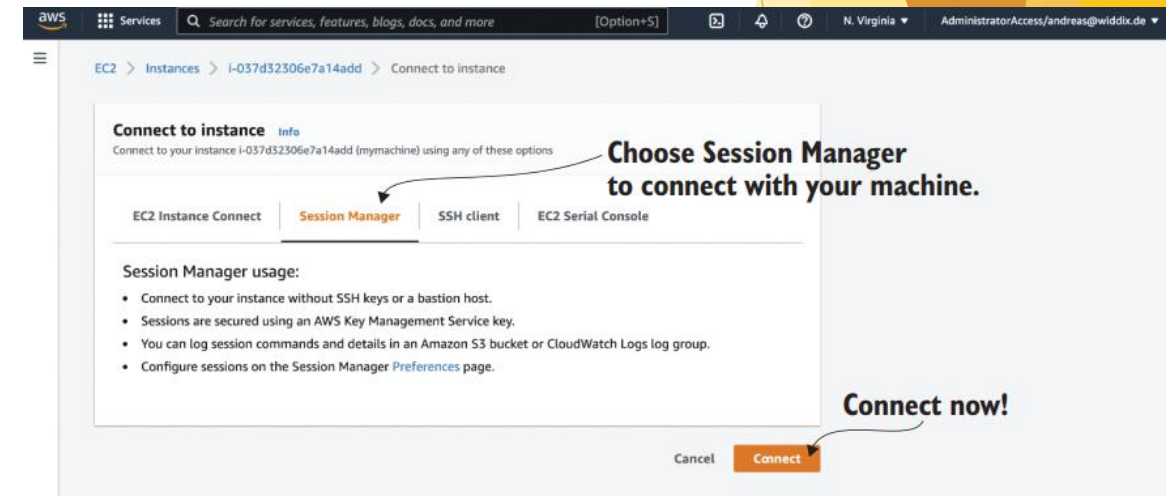
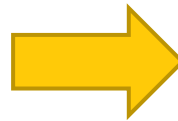
Log in to the virtual machine
as administrator user.



Select the virtual machine
named mymachine.

It takes a few minutes
until the machine is running.

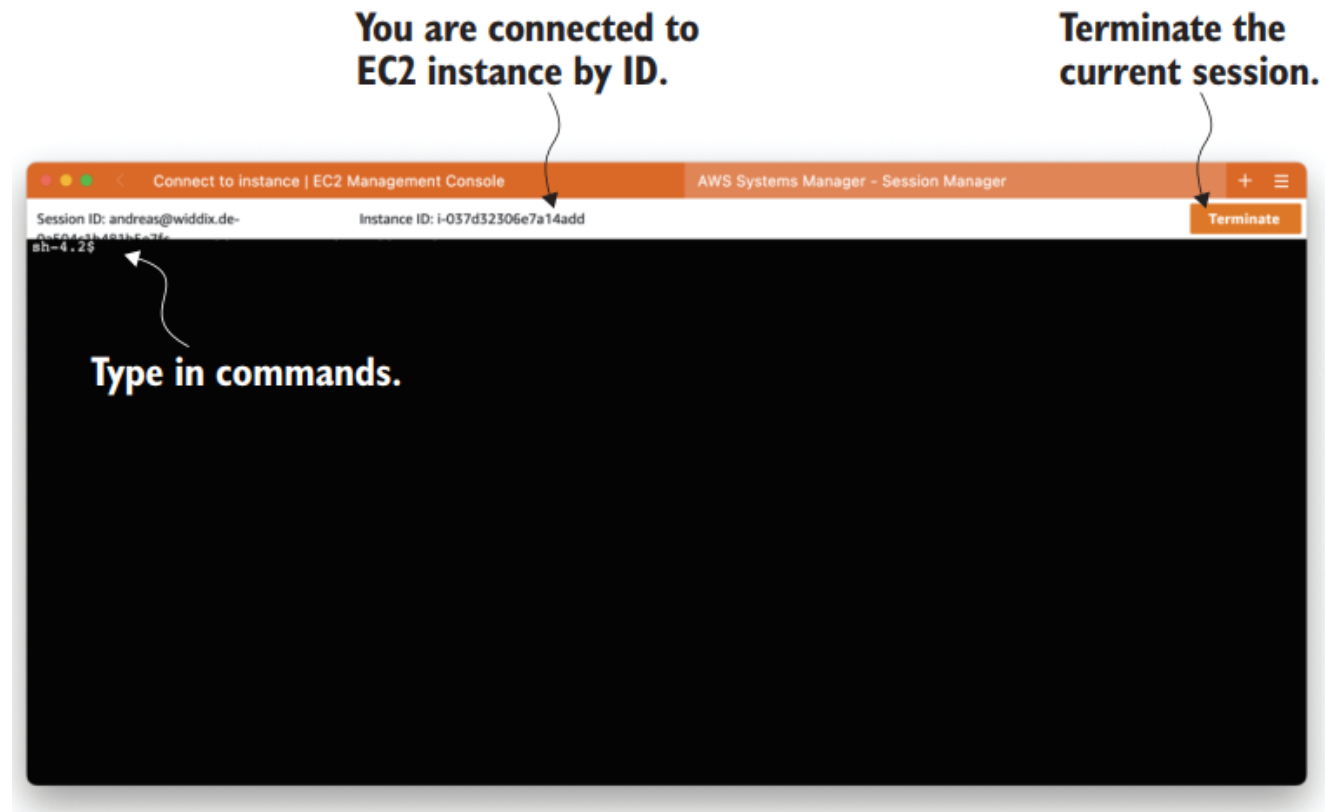
Shows details of the virtual machine,
for example, the private/public IPv4 address



Choose Session Manager
to connect with your machine.

Connect now!

Connect to your VM



Monitoring and Debugging VM

The screenshot shows the AWS Management Console interface for an EC2 instance. The breadcrumb navigation indicates the path: EC2 > Instances > i-07f9230234cb135a0 > Get system log. The page title is 'Get system log' with an 'Info' link. Below the title, it says 'Review system log for instance i-07f9230234cb135a0 as of Mon Apr 04 2022 11:07:33 GMT+0200 (Central European Summer Time)'. There are three buttons: 'Copy log' and 'Download'. A callout box points to the 'Download' button with the text 'Download logs to archive or analyze in detail.' The main content area displays system logs for cloud-init and SSH host key fingerprints. A callout box points to the log content with the text 'Shows the system logs'. At the bottom, there is a 'Connect' button and a note: 'For boot or networking issues, use the EC2 serial console for troubleshooting. Choose the Connect button to start a session.'

Download logs to archive or analyze in detail.

Get system log [Info](#)

Review system log for instance i-07f9230234cb135a0 as of Mon Apr 04 2022 11:07:33 GMT+0200 (Central European Summer Time)

```
[ 20.530600] cloud-init[3082]: Started: Mon Apr 4 08:52:50 EEST - 00:00 ago
[ 18.567271] cloud-init[3082]: State : Running, pid: 3243
[ 21.485825] cloud-init[3082]: No packages needed for security; 0 packages available
[ 21.492918] cloud-init[3082]: No packages marked for update
[ 22.061500] cloud-init[3277]: Cloud-init v. 19.3-45.amzn2 running 'modules:final' at Mon, 04 Apr 2022 08:52:07 +0000. Up 22.00 seconds
[ 22.078824] cloud-init[3277]: ci-info: no authorized ssh keys fingerprints found for user ec2-user.
ci-info: no authorized ssh keys fingerprints found for user ec2-user.
<14>Apr 4 08:52:08 ec2: #####
<14>Apr 4 08:52:08 ec2: -----BEGIN SSH HOST KEY FINGERPRINTS-----
<14>Apr 4 08:52:08 ec2: 256 SHA256:Wm87wuvB31XLKvkX8i9onp0xzciwZzMlnNXuFKmPacA no comment (ECDSA)
<14>Apr 4 08:52:08 ec2: 256 SHA256:VCY4oHRwn8DP+ccyWfXJmkh5nBk0IPzTdjYWr+TQH4s no comment (ED25519)
<14>Apr 4 08:52:08 ec2: 2048 SHA256:3YiEzkNPS8coYU8y6HPZtzk4INlvAzaRlUvQJAvM9QQ no comment (RSA)
<14>Apr 4 08:52:08 ec2: -----END SSH HOST KEY FINGERPRINTS-----
<14>Apr 4 08:52:08 ec2: #####
-----BEGIN SSH HOST KEY KEYS-----
ecdsa-sha2-nistp256 AAAAE2VjZHNhLXNoYTItbmlzdHAyNTYAAAAIbmlzdHAyNTYAAABBBMhe6CeLGP3oF93GHb9hxmTj5oYWrVrxwNuMZ1cz7E/LPd67jfx4Lcv2kxPS
ssh-ed25519 AAAAC3NzaC1lZD01INTESAAAAIEsR2+deJUspVByCw6hmm0SNFKkYoKnhQNg94Zoi7Z1v
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQACxHwSCGCM2byB3Cc9h01Vf7w1y9mQxb3KBwGchtPfAR5JGFuiPapzB3J5Fb9v8QWZyWG3J51b61QVGs8AN0gp0sxZNzn+
-----END SSH HOST KEY KEYS-----
[ 22.198766] cloud-init[3277]: Cloud-init v. 19.3-45.amzn2 finished at Mon, 04 Apr 2022 08:52:08 +0000. Datasource DataSourceEc2.
```

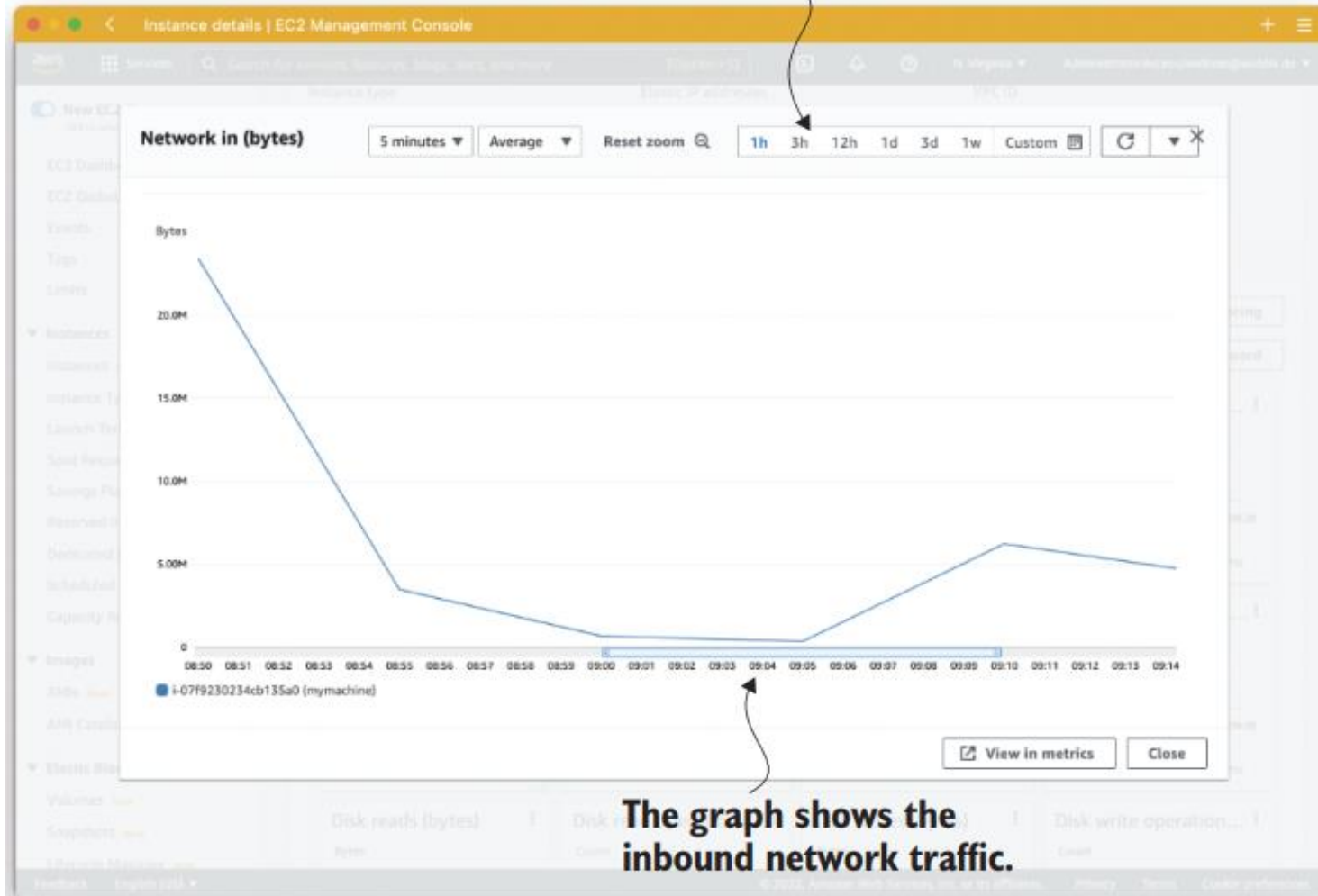
For boot or networking issues, use the EC2 serial console for troubleshooting. Choose the Connect button to start a session.

Connect

Shows the system logs

Monitoring and Debugging VM

Select the time period you want to look into.



Shutting down the VM

It is always possible to stop a running machine and to start a stopped machine.



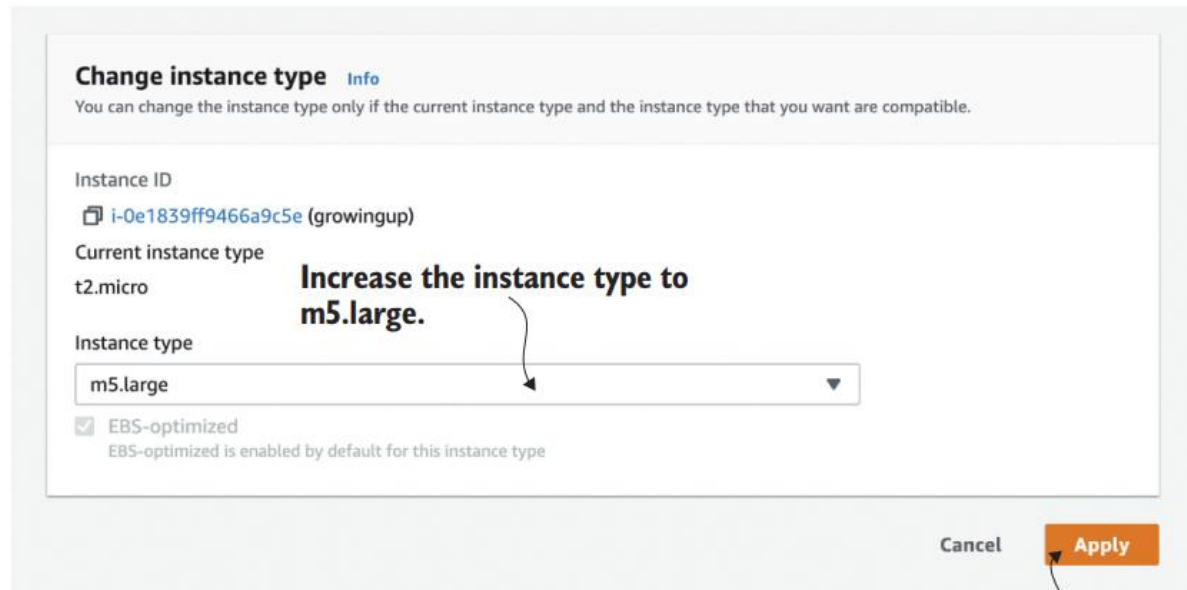
But terminating is deleting your virtual machine.



Stopping or terminating unused virtual machines saves costs and prevents you from being surprised by an unexpected bill from AWS.

Change Size of VM

- ▶ After waiting for the virtual machine to stop, you can change the instance type as follows:
 - 1 Click the Actions button and select Instance Settings.
 - 2 Click Change Instance Type.
 - 3 Select `m5.large` as the new instance type and click the Apply button



The screenshot shows the 'Change instance type' dialog box in the AWS Management Console. The title is 'Change instance type' with an 'Info' link. Below the title is a note: 'You can change the instance type only if the current instance type and the instance type that you want are compatible.' The dialog displays the 'Instance ID' as 'i-0e1839ff9466a9c5e (growingup)'. The 'Current instance type' is 't2.micro'. The 'Instance type' dropdown menu is set to 'm5.large'. Below the dropdown, there is a checked checkbox for 'EBS-optimized' with a note: 'EBS-optimized is enabled by default for this instance type'. At the bottom right, there are 'Cancel' and 'Apply' buttons. An arrow points from the 'Apply' button to the text 'Apply changes.' located below the dialog box.

Change instance type [Info](#)

You can change the instance type only if the current instance type and the instance type that you want are compatible.

Instance ID
i-0e1839ff9466a9c5e (growingup)

Current instance type
t2.micro

Instance type
m5.large

☒ EBS-optimized
EBS-optimized is enabled by default for this instance type

Cancel Apply

Apply changes.