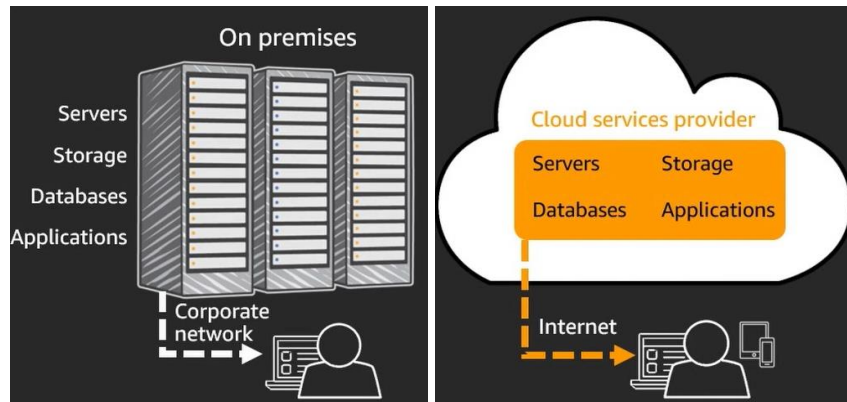


CLOUD COMPUTING

Cloud computing enables you to stop thinking of your infrastructure as hardware and instead think of it (and use it) as software. Getting the resources from internet. It is nothing but cloud computing.



Features of cloud:

1. Scalability
2. Pay as you use – Postpaid payment

Cloud providers:

1. AWS
2. Azzure
3. Google cloud
4. IBM soft layer
5. Rackspace

Cloud models:

1. Public cloud:
Anybody can request a VM anybody can request service.
Eg: AWS / AZZURE
2. Private cloud:
On premise data center. ie., we have a lab inside the organization and they are maintaining their own lab but they want to have a private cloud. So that anybody can request a VM and get it, anybody can request a service and they can work on it. So for that they create private cloud. ie, the hardware, the network switches, the storage everything is inside the organization. Thus using the software they manages the lab. So internal to organization ie, only people from that organization can use it.
Eg: Cisco quiker, openstack
3. Hybrid cloud:
Which is the combination of both public and private cloud.
Eg:
Company use

AWS => for testing/development

On premise => for production

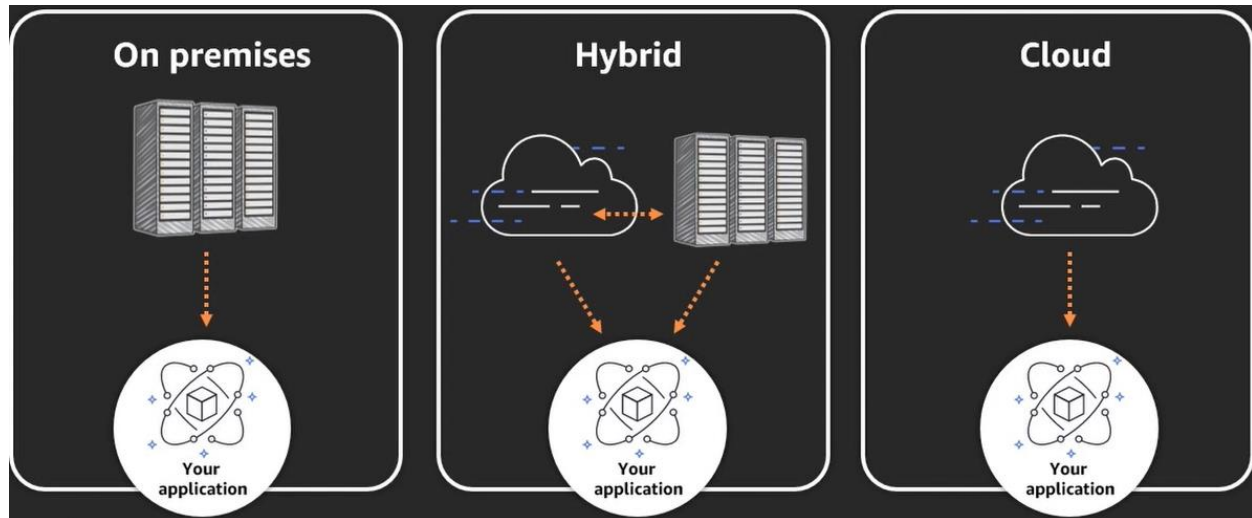
4. Community cloud:

A community using a services of cloud.

Eg:

Setup for the college people/student for their lab practices. Anybody with access ID, Password can login to that cloud and can use it.

Cloud deployment models:



Cloud services:

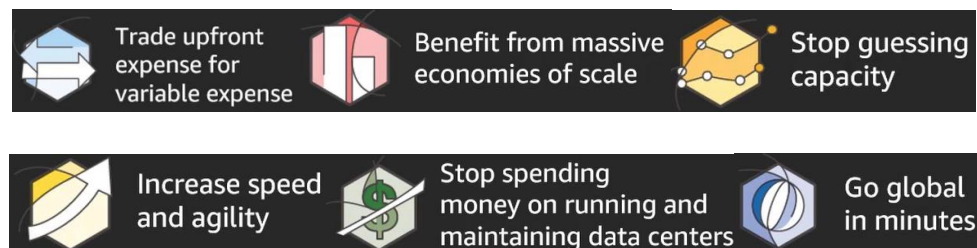
1. IaaS – Infrastructure as a service
2. PaaS – platform as a service
3. SaaS – Software as a service

IaaS: They provide the virtual machines. They provide the IP address, the username and the password. And we can login to the machine and we can maintain the software, you can built it, we can create our own website in the VM. So that is IaaS.

Like, AWS ec2 => They provides VMs. So, we can login to the VMs, we can develop the software over there and then we can run a website inside the virtual machine.

Note: Based on the cloud provider, or based on the end client this definitions may change.

Advantages:

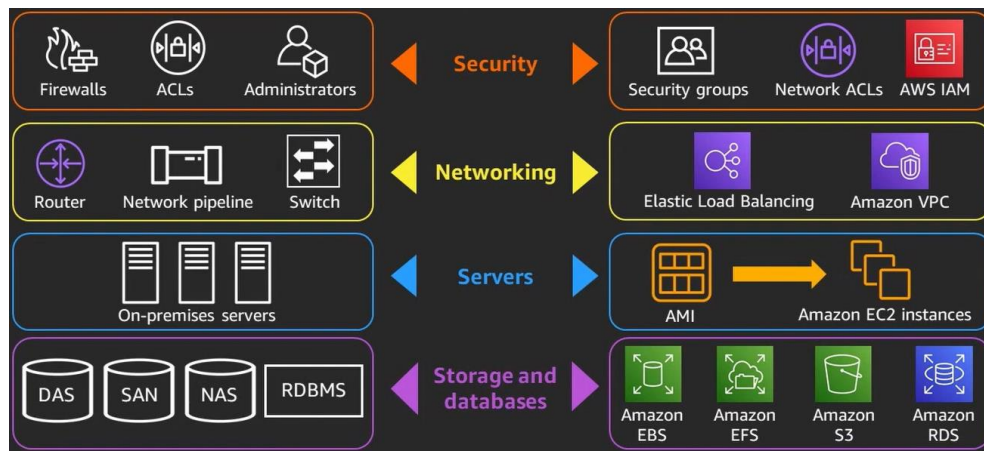


AWS CLOUD

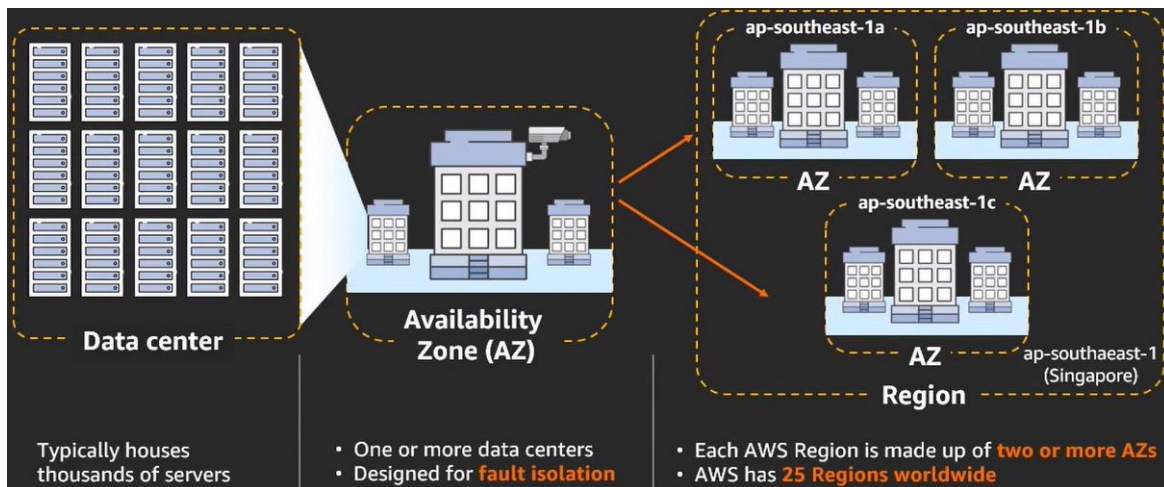
Essentially, it is a set of programmable resources. The use of IT assets as programmatic resources allows you to quickly tear down and setup infrastructure in the way that just isn't possible with a traditional approach.

The AWS cloud gives you access to many higher-level services and features, which lets you design and build applications in a completely new way. You can increase database throughput, or may be compute power, one of the biggest benefits of cloud computing is the ability to pay-as-you-go, letting you test and leverage the system without being fully committed. You can stop using these services at any time and change tactics to fit your needs.




AWS core infrastructure and services:



AWS global infrastructure:



AWS edge infrastructure:

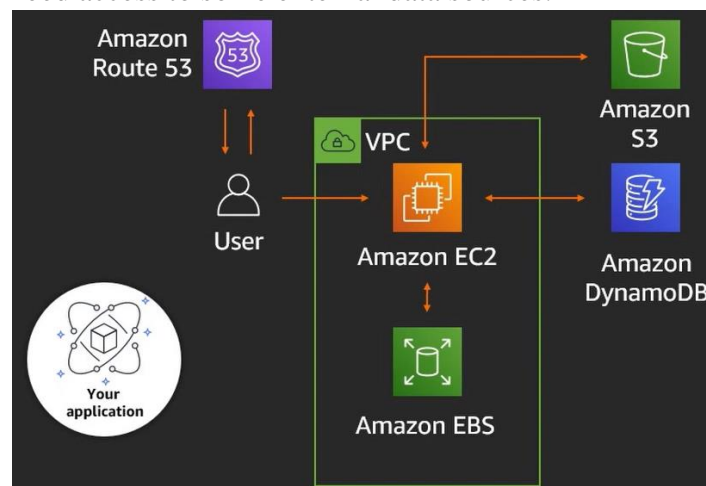
	AWS Outposts	AWS Local Zones	AWS Wavelength
			
Overview	AWS infrastructure and services on premises	AWS infrastructure and services in large metro centers	AWS infrastructure and services in CSP 5G networks
Use cases	Migration, local critical applications, data residency	Migration, low latency, local data processing	Ultra-low latency, local data processing
Service model	Expandable capacity in customer's data center, colocation, on-premises location	Scalable capacity in AWS-managed & operated facility	Scalable capacity in CSP data center managed and supported by AWS

Key service areas:

- Compute
- Storage
- Databases
- Networking
- Security

Example:

Let's say you have a web application which sits on a server that is accessed via the internet. The web application also need access to some external data sources.



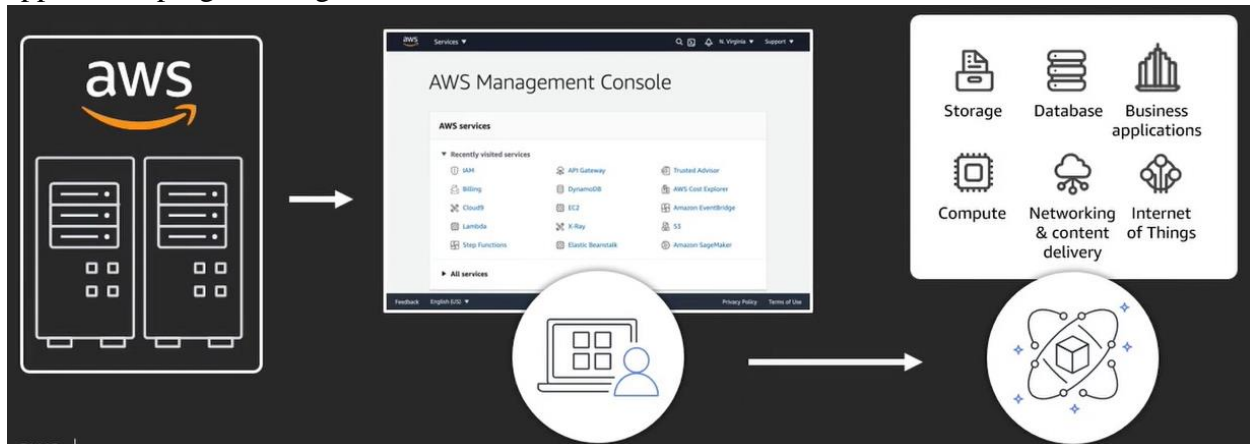
As you can see from above architecture diagram, we have different services connected together to create an environment. In the middle we have EC2, which being a virtual server hosts the actual web application.

The application is stored onto an EBS volume, which provides block storage to the EC2 instance. The EC2 instance is deployed into a VPC, which provides networking access. As for as data sources go, the EC2 instance can access data in S3, which is object storage or Dynamo DB, Which is non-relational database. External users can access this web application via route 53, which provides DNS resolution.

Note: you can see how by connecting different services together, you can come up with a huge variety of different solutions depending on what your requirements are.

How does it work?

AWS cloud is a set of programmable resources. There are ways to connect into AWS that allow direct connection between your environment and your AWS environment, enabling secure communications that bypass the internet. AWS achieves this by deploying robust physical resources around the globe. These resources are housed in data center, that are physically connected by AWS owned network hardware. You then access the services you need via the services application programming interface or API, which allows different methods of interaction.



Three ways to interact with AWS:



Basic services of AWS

Compute:

EC2

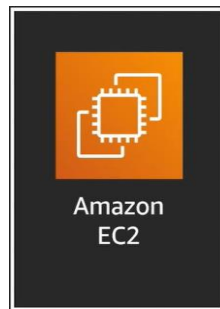
Lambda etc

So, these are the services from amazon wherein we can request the virtual machines, they are called instances, using the amazon website (aws.amazon.com).

[How to create an AWS account: https://github.com/Neema345/Dev-Ops_Internship_Tasks.git]

Once it is done. Then we can create VMs.

EC2:



EC2 is a virtual server which allows you to deploy or migrate workloads directly from your on premises infrastructure into cloud.

AWS support Linux, Windows and MacOS in select regions.

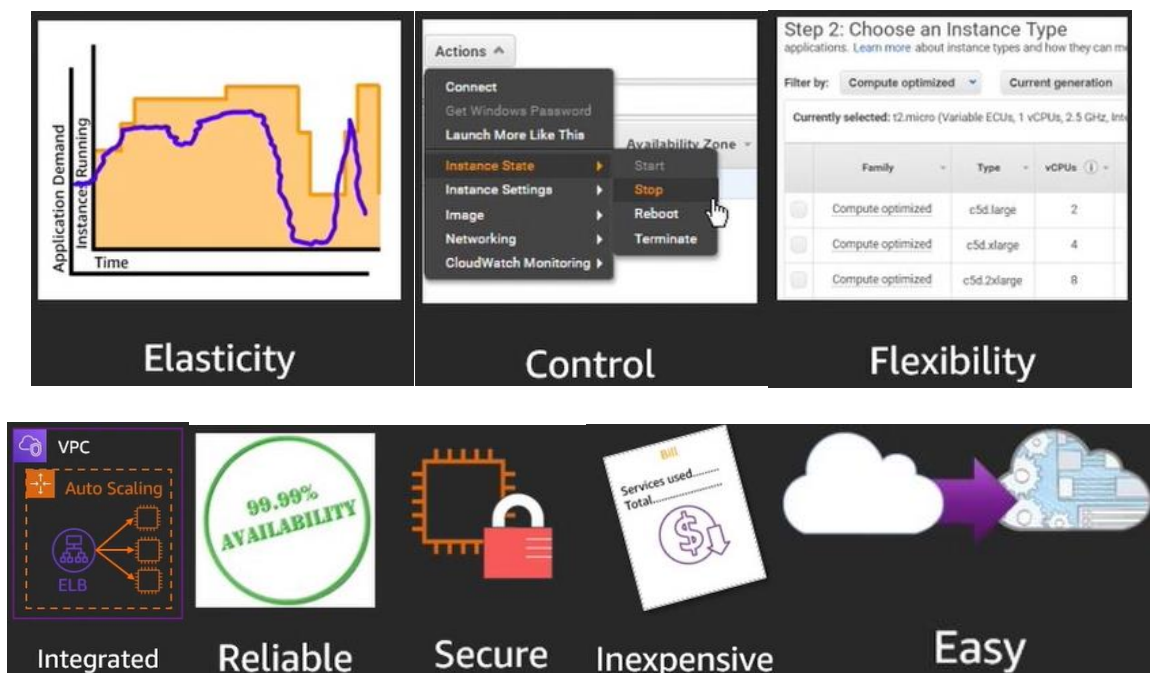
It is an extremely flexible service that gives you complete control over your servers.

“EC2 is a virtual server”, what this means is that, when you deploy an instance of EC2, you can deploy only the size you need and change it when you need it.

The key feature of EC2 is known as the Amazon machine image or AMI. This allows us to select the operating system of choice and even have customer applications pre-installed to speed up deployment time. Once the EC2 instance is deploys you can then run your application or workloads on them in a similar way to your existing environment.

Using EC2, we have the ability to add, remove, pause, resume, change, scale or manipulate your instances as you will.

Benefits of Amazon EC2:



Amazon EC2 instance families and its usecases:

Instance family	Use cases
General purpose <i>e.g., A1, T3, T3a, T2, M6g, M5</i>	<ul style="list-style-type: none">• Low-traffic websites and web applications• Small databases and midsize databases
Compute optimized <i>e.g., C5, C5n, C4</i>	<ul style="list-style-type: none">• High-performance web servers• Video encoding
Memory optimized <i>e.g., R5, R5n, X1e, X1, z1d</i>	<ul style="list-style-type: none">• High-performance databases• Distributed memory caches
Storage optimized <i>e.g., I3, I3en, D2, H1</i>	<ul style="list-style-type: none">• Data warehousing• Log or data processing applications
Accelerated computing <i>e.g., P3, P2, Inf1, G4, G3, F1</i>	<ul style="list-style-type: none">• 3D visualizations• Machine learning

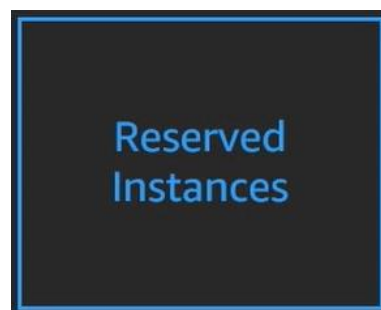
Choosing the correct type is very important for efficient use of your instances and cost reduction.

Amazon EC2 pricing:



On demand instances can be considered the list price. With on demand you have the greatest flexibility and control over when and how you configure and deploy your instances.

This is great for immediate scalability, workload changes, temporary workload or workloads that cannot be interrupted but only run for a short amount of time.



Reserved instance give a significant price reduction for workloads that run permanently.

Savings Plans

Savings plans are similar concept, you can commit to a certain amount of capacity that you are going to utilize overtime.

Spot Instances

Spot instances, which gives you up to 90% on the on demand price with one caveat. Spot instances are not guaranteed to permanently run.

*Per second billing => Amazon Linux and Ubuntu only

**Per hour billing => all other OS

How to create EC2 instance from windows:

Step by step procedure:

Step 1:

In aws.amazon.com → Sign in to the console.

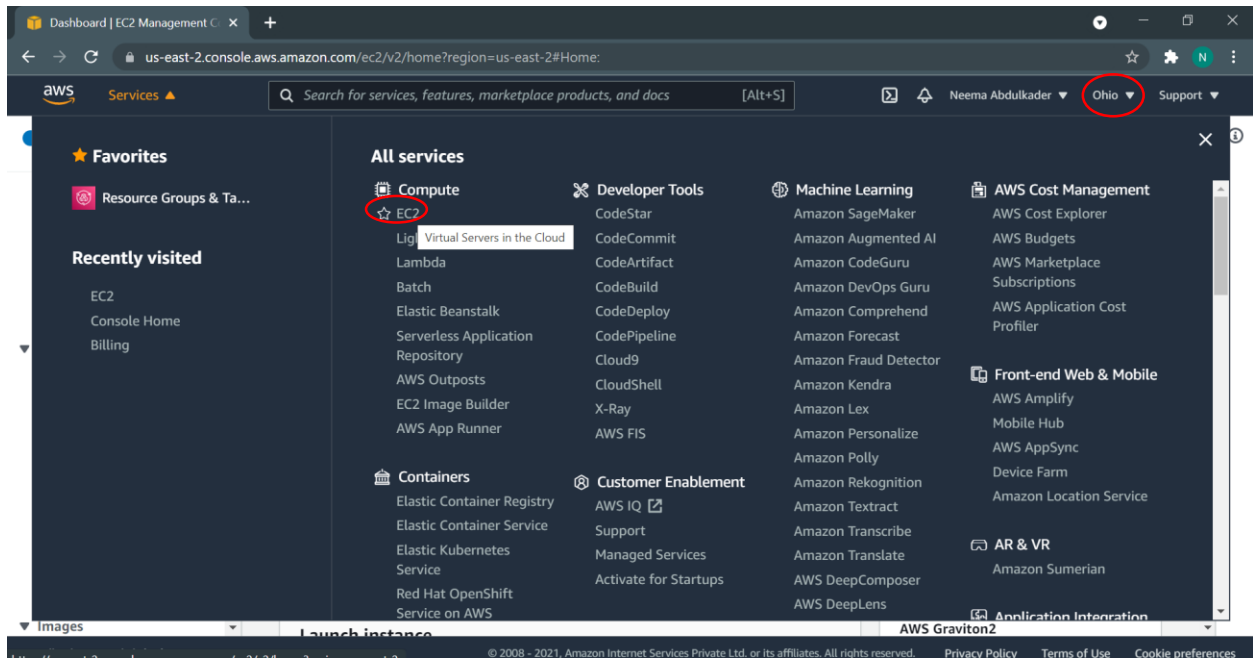
Step 2:

Click services

Step 3:

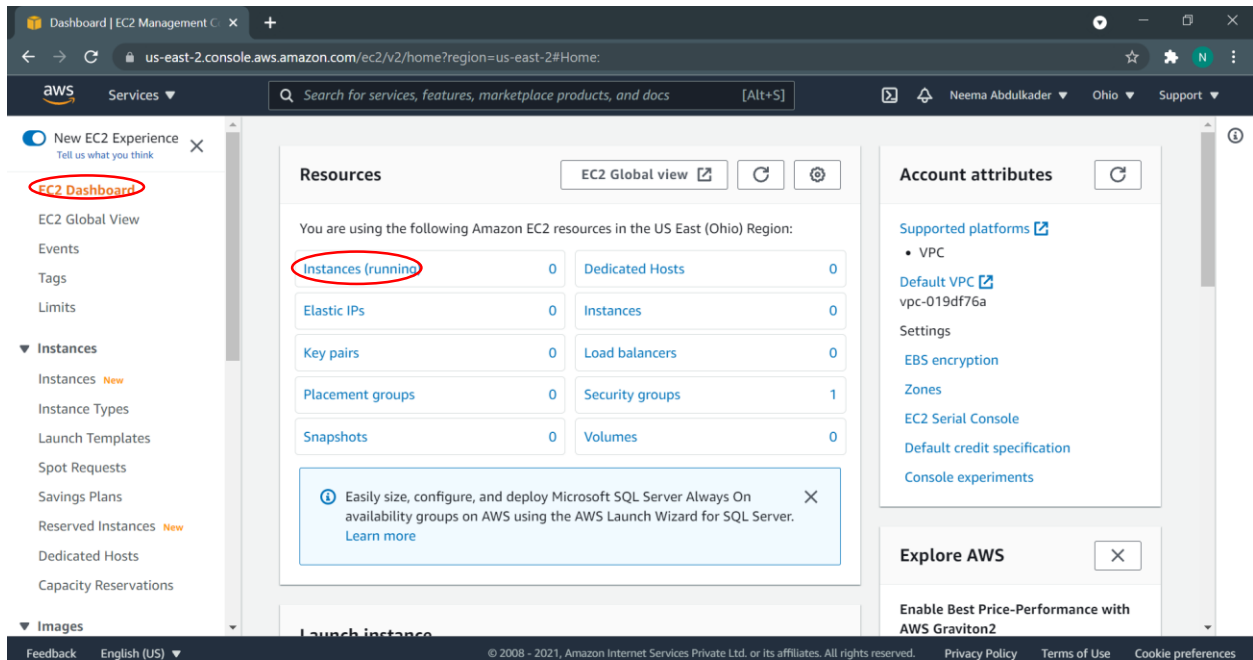
After login you have to select the region.

Then select EC2



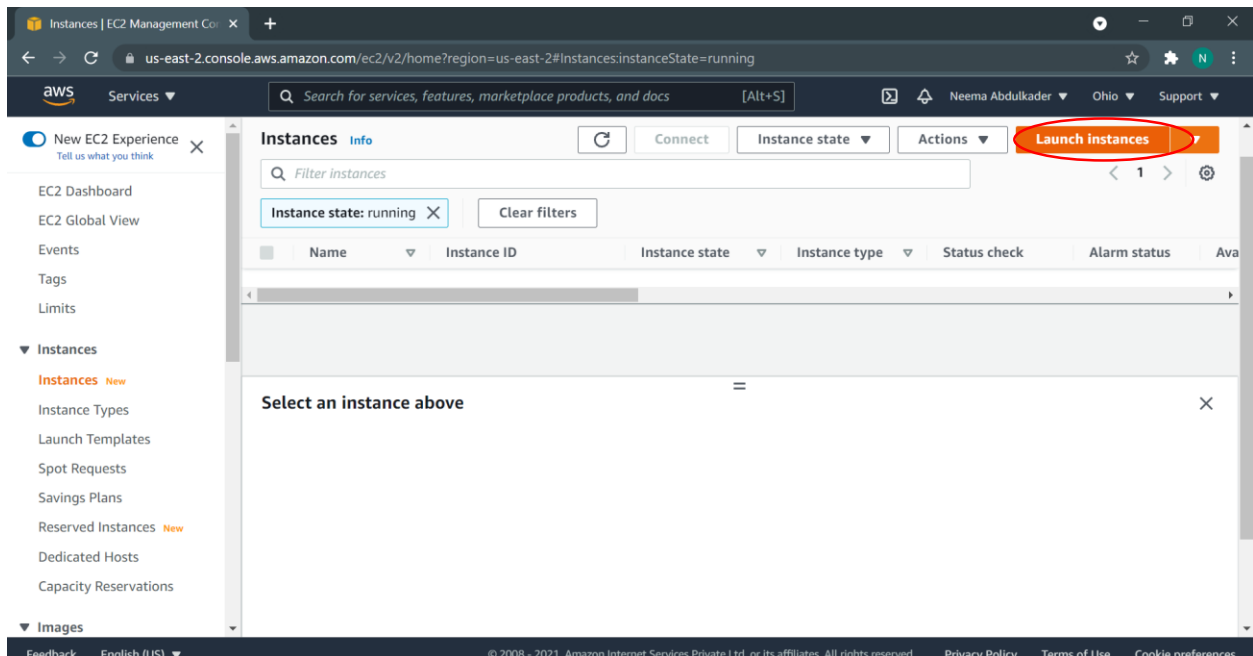
Step 4:

1. Select EC2 dashboard
2. Click instances (running)



Step 5:

Select launch instances.



Step 6: Select free tier option

Launch instance wizard | EC2 M... 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]

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

Step 1: Choose an Amazon Machine Image (AMI) Cancel and Exit

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"

Search by Systems Manager parameter

Quick Start

- My AMIs
- AWS Marketplace
- Community AMIs
- ☒ Free tier only

1 to 17 of 17 AMIs

Amazon Linux
Free tier eligible

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

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

Red Hat

Red Hat Enterprise Linux 8 (HVM), SSD Volume Type - ami-0ba62214afa52bec7 (64-bit x86) / ami-09f8674883d0ad6b8 (64-bit Arm)

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Step 7: Choose Microsoft Windows Server 2012 R2 Base

Launch instance wizard | EC2 M... 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]

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

Step 1: Choose an Amazon Machine Image (AMI) Cancel and Exit

Microsoft Windows Server 2016 Base with Containers - ami-0112a64ee2922121e

Windows Free tier eligible

Microsoft Windows 2016 Datacenter edition with Containers. [English]

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

64-bit (x86)

Microsoft Windows Server 2022 Base with Containers - ami-0d55df877a8eada89

Windows Free tier eligible

Microsoft Windows 2022 Datacenter edition with Containers. [English]

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

64-bit (x86)

Microsoft Windows Server 2012 R2 Base - ami-0d3be96538b868522

Windows Free tier eligible

Microsoft Windows 2012 R2 Standard edition with 64-bit architecture. [English]

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

64-bit (x86)

SUSE Linux

SUSE Linux Enterprise Server 12 SP5 (HVM), SSD Volume Type - ami-04aa88aebb9efd83

SUSE Linux Enterprise Server 12 Service Pack 5 (HVM) FRS General Purpose (SSD) Volume Type Public Cloud Advanced

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Step 8:

1. Select free tier eligible
2. Next: Configure Instance Details

The screenshot shows the AWS Launch Instance Wizard at Step 2: Choose an Instance Type. The breadcrumb trail at the top indicates the steps: 1. Choose AMI, 2. Choose Instance Type (current), 3. Configure Instance, 4. Add Storage, 5. Add Tags, 6. Configure Security Group, and 7. Review. The main heading is "Step 2: Choose an Instance Type". Below it, a paragraph explains that Amazon EC2 provides a wide selection of instance types optimized for different use cases. A filter bar shows "All instance families" and "Current generation" selected. The "Currently selected" instance is "t2.micro (- ECUs, 1 vCPUs, 2.5 GHz, -, 1 GiB memory, EBS only)". A table lists several instance types, with "t2.micro" highlighted as "Free tier eligible". The table columns are Family, Type, vCPUs, Memory (GiB), Instance Storage (GB), EBS-Optimized Available, Network Performance, and IPv6 Support. At the bottom, there are buttons for "Cancel", "Previous", "Review and Launch", and "Next: Configure Instance Details".

Launch instance wizard | EC2 M... 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] Neema Abdulkader 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 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 Free tier eligible	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

Cancel Previous Review and Launch Next: Configure Instance Details

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Step 9:

1. Give the details
2. Next: Add Storage

The screenshot shows the AWS Launch Instance Wizard at Step 3: Configure Instance Details. The breadcrumb trail at the top indicates the steps: 1. Choose AMI, 2. Choose Instance Type, 3. Configure Instance (current), 4. Add Storage, 5. Add Tags, 6. Configure Security Group, and 7. Review. The main heading is "Step 3: Configure Instance Details". Below it, a paragraph explains that the user can configure the instance to suit their requirements, such as launching multiple instances, requesting Spot instances, assigning an access management role, and more. The configuration options include: Number of instances (1), Purchasing option (Request Spot instances), Network (vpc-019df76a), Subnet (No preference), Auto-assign Public IP (Use subnet setting), Placement group (Add instance to placement group), Capacity Reservation (Open), and Domain join directory (No directory). At the bottom, there are buttons for "Cancel", "Previous", "Review and Launch", and "Next: Add Storage" (which is circled in red).

Launch instance wizard | EC2 M... 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] Neema Abdulkader 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 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-019df76a (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

Cancel Previous Review and Launch Next: Add Storage

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Step 10: Next: Add Tags

The screenshot shows the AWS Launch Instance Wizard at Step 4: Add Storage. The breadcrumb trail at the top indicates the steps: 1. Choose AMI, 2. Choose Instance Type, 3. Configure Instance, 4. Add Storage (highlighted), 5. Add Tags, 6. Configure Security Group, and 7. Review. The main heading is "Step 4: Add Storage". Below it, a paragraph explains that the instance will be launched with specific storage settings and that additional EBS volumes can be attached. A table lists the storage configuration for the root volume: Volume Type (Root), Device (/dev/sda1), Snapshot (snap-03ba951a0748b9dce), Size (30 GiB), Volume Type (General Purpose SSD (gp2)), IOPS (100 / 3000), Throughput (N/A), Delete on Termination (checked), and Encryption (Not Encrypt). Below the table is an "Add New Volume" button. A blue box contains information about free tier eligibility. At the bottom right, the "Next: Add Tags" button is circled in red. The footer includes a feedback link, language selection (English (US)), copyright notice, and links to Privacy Policy, Terms of Use, and Cookie preferences.

Launch instance wizard | EC2 M... 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]

Neema Abdulkader 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/sda1	snap-03ba951a0748b9dce	30	General Purpose SSD (gp2)	100 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypt

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 11: Add tag

The screenshot shows the AWS Launch Instance Wizard at Step 5: Add Tags. The breadcrumb trail at the top indicates the steps: 1. Choose AMI, 2. Choose Instance Type, 3. Configure Instance, 4. Add Storage, 5. Add Tags (highlighted), 6. Configure Security Group, and 7. Review. The main heading is "Step 5: Add Tags". Below it, a paragraph explains that a tag consists of a case-sensitive key-value pair and that tags will be applied to all instances and volumes. A table with columns "Key" and "Value" is shown, with a note that the resource currently has no tags. Below the table, there is a message to choose the "Add tag" button or to click to add a Name tag, and a note to ensure the IAM policy includes permissions to create tags. At the bottom left, the "Add Tag" button is circled in red. At the bottom right, the "Next: Configure Security Group" button is visible. The footer includes a feedback link, language selection (English (US)), copyright notice, and links to Privacy Policy, Terms of Use, and Cookie preferences.

Launch instance wizard | EC2 M... 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]

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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	Value
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**

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Step 12:

Launch instance wizard | EC2 M... 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]

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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 <i>i</i>	Volumes <i>i</i>	Network Interfaces <i>i</i>
<input type="text"/>	<input type="text"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

(Up to 50 tags maximum)

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1. Add – Name
2. Next: configure security group

Launch instance wizard | EC2 M... 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]

Neema Abdulkader 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 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 <i>i</i>	Volumes <i>i</i>	Network Interfaces <i>i</i>
Name	Windows2016r2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

(Up to 50 tags maximum)

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Step 13:

Click review and launch

Launch instance wizard | EC2 M... 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] Neema Abdulkader 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 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: launch-wizard-1

Description: launch-wizard-1 created 2021-09-28T11:54:52.530+05:30

Type	Protocol	Port Range	Source	Description
RDP	TCP	3389	Custom 0.0.0.0/0	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**

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Step 14:

Review it and then launch

Launch instance wizard | EC2 M... 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] Neema Abdulkader 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 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.

Improve your instances' security. Your security group, launch-wizard-1, 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](#)

Microsoft Windows Server 2012 R2 Base - ami-0d3be96538b868522
Free tier eligible
Microsoft Windows 2012 R2 Standard edition with 64-bit architecture. [English]
Root Device Type: ebs Virtualization type: hvm
If you plan to use this AMI for an application that benefits from Microsoft License Mobility, fill out the [License Mobility Form](#). Don't show me this again

Instance Type [Edit instance type](#)

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance

Cancel Previous **Launch**

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Step 15:

1. If you want to launch you need a password and that password is been created through this key pair=> create a new key pair.
2. Give key pair name
3. Then we have to download key pair
4. Launch instance

The screenshot shows the 'Launch instance wizard' in the AWS Management Console. The browser address bar indicates the URL: `us-east-2.console.aws.amazon.com/ec2/v2/home?region=us-east-2#LaunchInstanceWizard:`. The page title is 'Launch instance wizard | EC2 M...'. The AWS logo and 'Services' dropdown are visible in the top left. A search bar is present with the placeholder text 'Search for services, features, marketplace products, and docs'. The user's name 'Neema Abdulkader' and location 'Ohio' are shown in the top right, along with a 'Support' link. On the left sidebar, there's a notification 'Improve your instances' and a section for 'AMI Details' showing 'Microsoft Windows Serv' and 'Free tier eligible'. The main content area is titled 'Key pair' and contains the following text: 'A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance. Amazon EC2 supports ED25519 and RSA key pair types.' Below this is a note: 'Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).' The 'Create a new key pair' dropdown is set to 'Create a new key pair'. Under 'Key pair type', 'RSA' is selected with a radio button, and 'ED25519' is unselected. The 'Key pair name' field contains 'windows2016r2'. A 'Download Key Pair' button is visible. A blue information box states: 'You have to download the **private key file** (*.pem file) before you can continue. **Store it in a secure and accessible location.** You will not be able to download the file again after it's created.' At the bottom of the wizard are 'Cancel' and 'Launch Instances' buttons. The footer includes 'Feedback', 'English (US)', '© 2008 - 2021, Amazon Internet Services Private Ltd. or its affiliates. All rights reserved.', 'Privacy Policy', 'Terms of Use', and 'Cookie preferences'. A file explorer at the bottom shows 'windows2016r2.pem' with a 'Show all' button.

Step 16: View instances

The screenshot shows the 'Launch Status' page in the AWS Management Console. The page title is 'Launch Status'. Below the title, there is a paragraph: '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.'

Below this, there is a section titled 'Here are some helpful resources to get you started' with a list of links:

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

Below the resources, there is a paragraph: 'While your instances are launching you can also' followed by a list of links:

- [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](#)

At the bottom right of the main content area, there is a blue button labeled 'View Instances'.

The footer of the page includes 'Feedback', 'English (US)', '© 2008 - 2021, Amazon Internet Services Private Ltd. or its affiliates. All rights reserved.', 'Privacy Policy', 'Terms of Use', and 'Cookie preferences'. There is also a notification bar at the bottom left showing 'windows2016r2.pem' and a 'Show all' button.

Step 17: Instance running

The screenshot shows the 'Instances (1/1)' page in the AWS Management Console. The page title is 'Instances (1/1) Info'. Below the title, there is a search bar 'Filter instances' and a button 'Clear filters'. There is also a filter 'Instance state: running'.

Below the filter, there is a table with the following columns: Name, Instance ID, Instance state, Instance type, Status check, Alarm status, and Availability zone. The table contains one row:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability zone
Windows2016r2	i-0605347bfd167a098	Running	t2.micro	2/2 checks passed	No alarms	us-east-2a

Below the table, there is a section titled 'Instance: i-0605347bfd167a098 (Windows2016r2)' with a tabbed interface. The 'Details' tab is selected, showing the 'Instance summary' with the following information:

- Instance ID: i-0605347bfd167a098 (Windows2016r2)
- Public IPv4 address: 3.16.129.174 | [open address](#)
- Private IPv4 addresses: 172.31.30.55

The footer of the page includes 'Feedback', 'English (US)', '© 2008 - 2021, Amazon Internet Services Private Ltd. or its affiliates. All rights reserved.', 'Privacy Policy', 'Terms of Use', and 'Cookie preferences'. There is also a notification bar at the bottom left showing 'windows2016r2.pem' and a 'Show all' button.

Step 18:

1. Click EC2 Dashboard

There you can see

- Number of instance running
- The volumes
- Key pair given etc

The screenshot shows the AWS Management Console EC2 Dashboard for the us-east-2 region. The interface includes a left-hand navigation menu with options like 'EC2 Dashboard', 'EC2 Global View', 'Events', 'Tags', 'Limits', 'Instances', 'Instance Types', 'Launch Templates', 'Spot Requests', 'Savings Plans', 'Reserved Instances', and 'Dedicated Hosts'. The main content area displays 'Resources' for the US East (Ohio) Region, showing a summary of EC2 resources: 1 running instance, 0 Elastic IPs, 1 key pair, 0 placement groups, 0 snapshots, 0 dedicated hosts, 1 instance, 0 load balancers, 2 security groups, and 1 volume. A notification banner at the bottom of the resources section promotes the AWS Launch Wizard for SQL Server. On the right, the 'Account attributes' panel lists supported platforms (VPC), default VPC (vpc-019df76a), settings (EBS encryption, Zones, EC2 Serial Console, Default credit specification, Console experiments), and an 'Explore AWS' button. The footer contains the URL, copyright information, and links to Privacy Policy, Terms of Use, and Cookie preferences.

Resources	
Instances (running)	1
Elastic IPs	0
Key pairs	1
Placement groups	0
Snapshots	0
Dedicated Hosts	0
Instances	1
Load balancers	0
Security groups	2
Volumes	1

Windows taskbar at the bottom shows a file named 'windows2016r2.pem'.

Reference: