

AWS INTERN TASK 3

Team Members

1.Tanmay Nagepatil (C).

2.Siddarth Singravel.

3.Saleh Edhah.

4.Akhil Babu.

5.Vaibhav Tripathi.

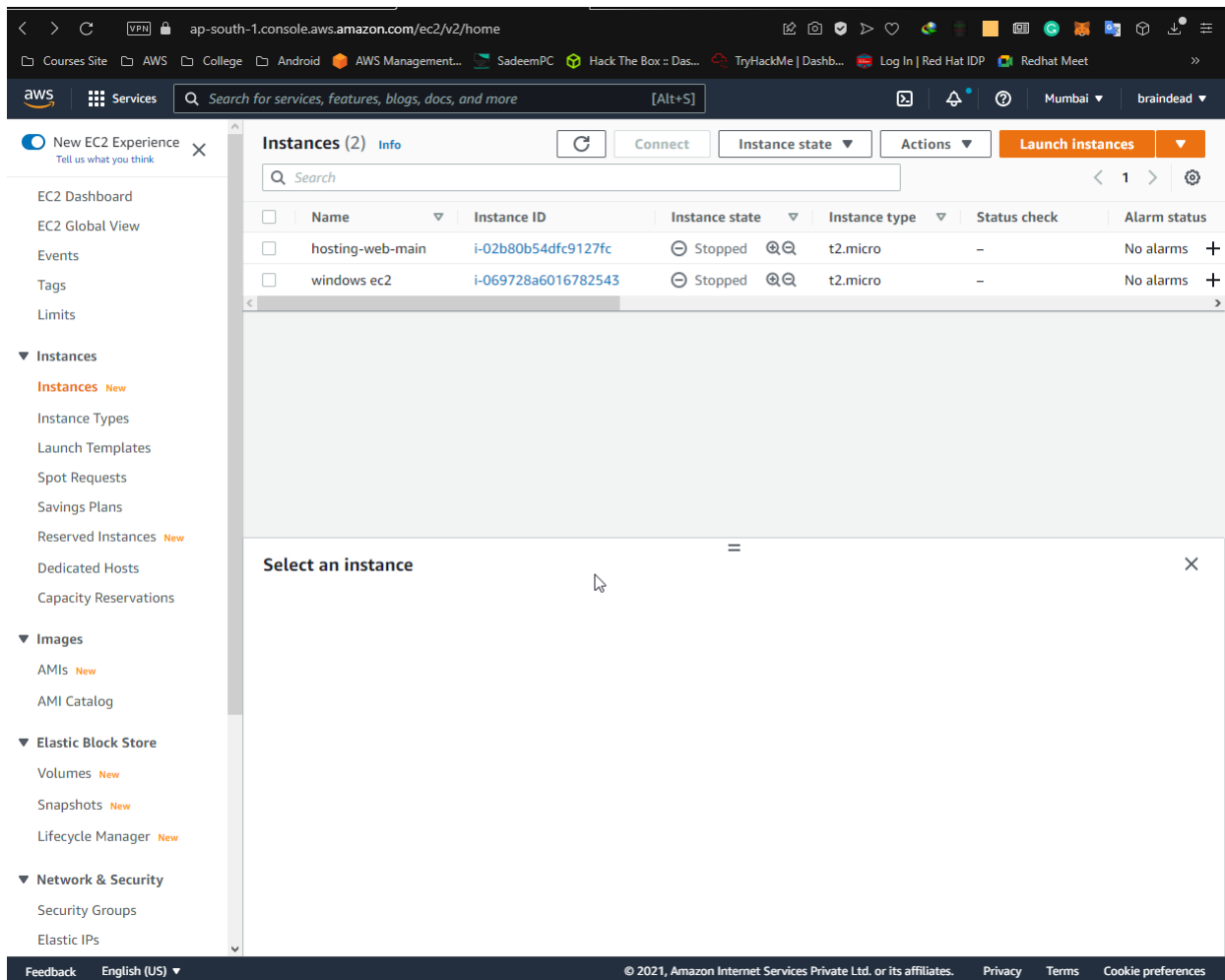
Windows Virtual Machine Deploy On AWS

Report

- Services Used:EC2

Steps to configure windows Virtual Machine on amazon AWS.

1. Go to EC2 section in AWS.
2. Select Windows Virtual Machine(Windows Server).



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
<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
<input type="checkbox"/>	t3	t3.small	2	2	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	t3	t3.medium	2	4	EBS only	Yes	Up to 5 Gigabit	Yes

3.Configuration Of Windows Machine

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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 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 ⓘ1Launch into Auto Scaling Group ⓘ

Purchasing option ⓘ☐ Request Spot instances

Network ⓘvpc-04093e80f537d3d2f (default)Create new VPC

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

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

Hostname type ⓘUse subnet setting (IP name)

DNS Hostname ⓘ☒ Enable IP name IPv4 (A record) DNS requests☒ Enable resource-based IPv4 (A record) DNS requests☐ Enable resource-based IPv6 (AAAA record) DNS requests

Placement group ⓘ☐ Add instance to placement group

Capacity Reservation ⓘOpen

Domain join directory ⓘNo directoryCreate new directory

IAM role ⓘNoneCreate 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

Cancel

Previous

Review and Launch

Next: Add Storage

4. Storage Configuration Of Windows Virtual Machine.

1. Choose AMI2. Choose Instance Type3. Configure Instance4. Add Storage5. Add Tags6. Configure Security Group7. 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-00e70074e94158b94	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.

▼ Shared file systems ⓘ

You currently don't have any file systems on this instance. Select "Add file system" button below to add a file system.

Add file system

CancelPreviousReview and LaunchNext: Add Tags

5. Security Group Configuration.

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Services

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Mumbai

braindead

1. Choose AMI

2. Choose Instance Type

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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.

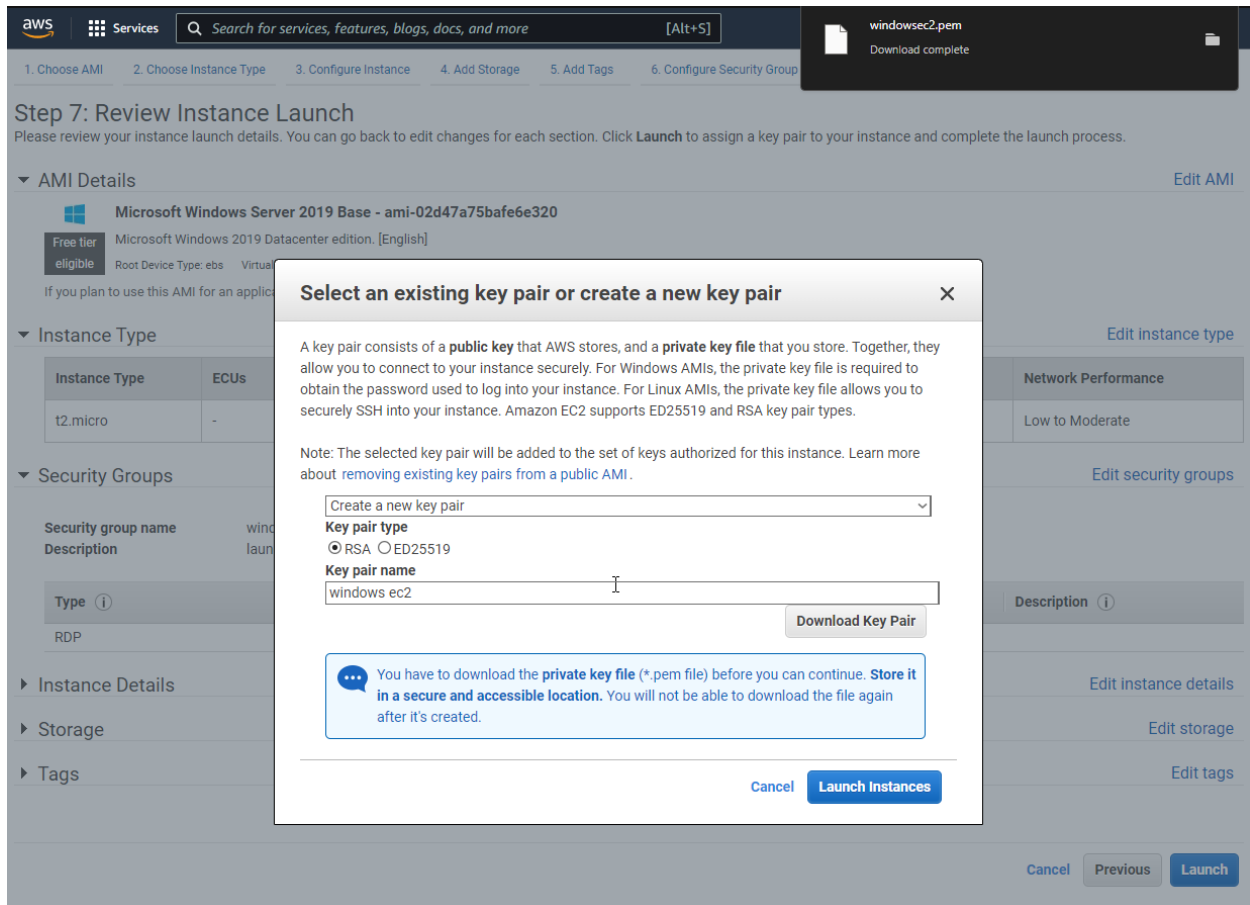
Assign a security group: ☒ Create a **new** security group
☐ Select an **existing** security group

Security group name:

Description:

Type <small>i</small>	Protocol <small>i</small>	Port Range <small>i</small>	Source <small>i</small>	Description <small>i</small>
RDP	TCP	3389	My IP 223.236.103.71/32	e.g. SSH for Admin Desktop

6. Keypair For External Login or For Password Decryption.



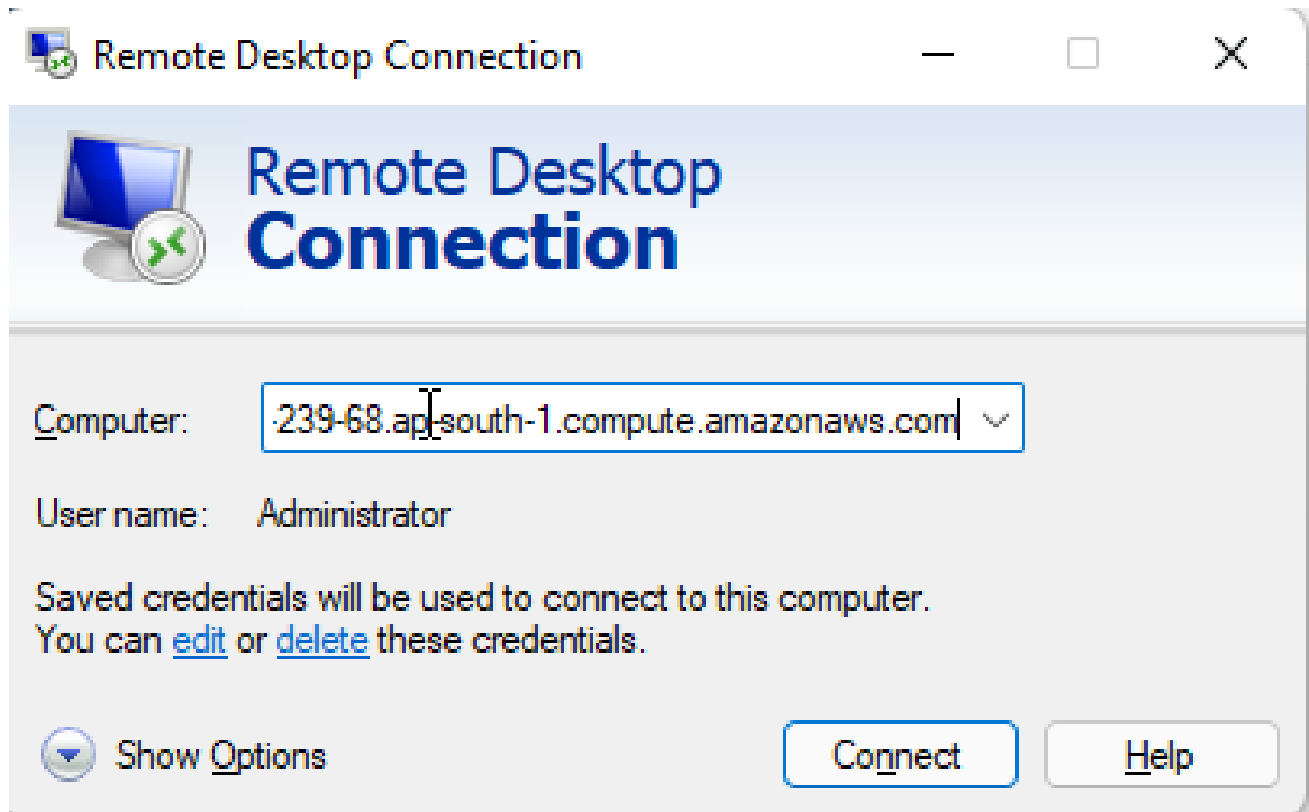
7. Launch Instance with given configuration.

The screenshot displays the AWS Management Console interface. On the left, the navigation menu includes sections like 'New EC2 Experience', 'EC2 Dashboard', 'Events', 'Tags', 'Limits', 'Instances', 'Images', 'Elastic Block Store', and 'Network & Security'. The main content area shows the 'Instances (1/2)' page with a table of instances. The instance 'windows ec2' with ID 'i-069728a6016782543' is highlighted. A modal window titled 'Instance: i-069728a6016782543 (windows ec2)' is open, showing the 'Details' tab. This tab contains an 'Instance summary' section with various attributes organized in a grid.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status
hosting-web-main	i-02b80b54dfc9127fc	Stopped	t2.micro	-	No alarms
windows ec2	i-069728a6016782543	Running	t2.micro	2/2 checks passed	No alarms

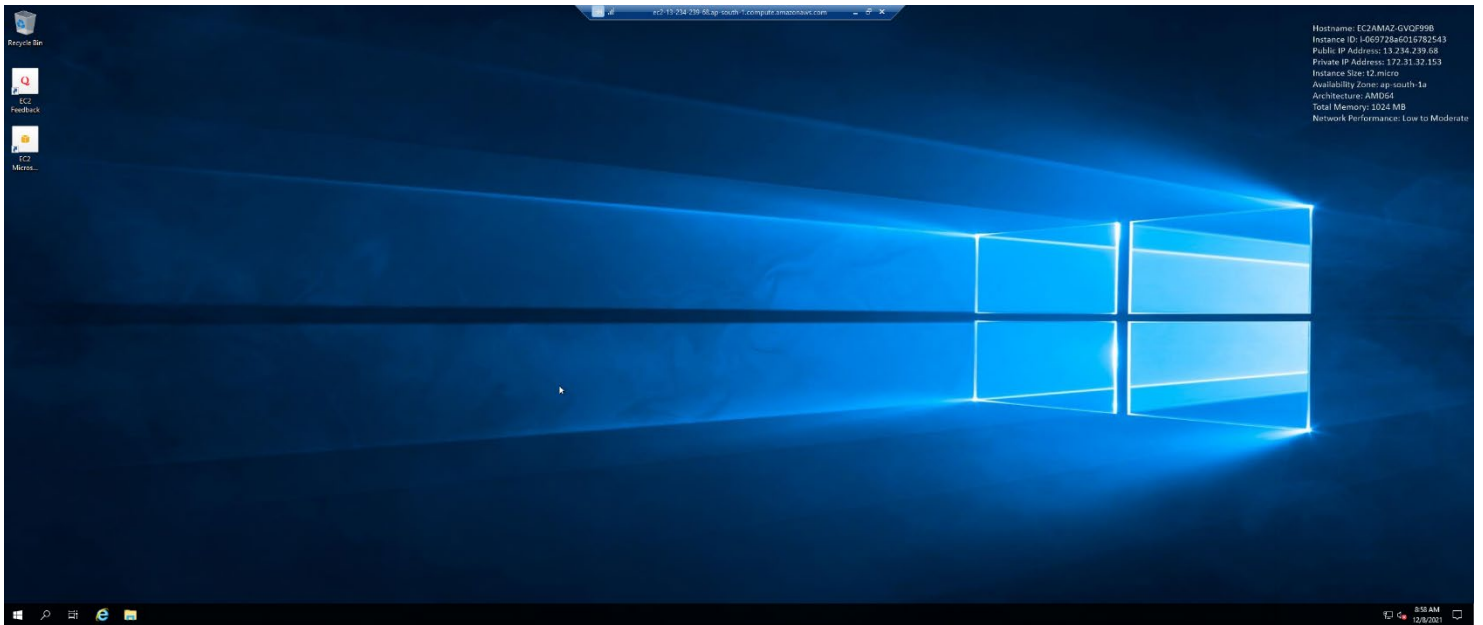
Instance summary Info		
Instance ID i-069728a6016782543 (windows ec2)	Public IPv4 address 13.234.239.68 open address	Private IPv4 addresses 172.31.32.153
IPv6 address -	Instance state Running	Public IPv4 DNS ec2-13-234-239-68.ap-south-1.compute.amazonaws.com open address
Hostname type IP name: ip-172-31-32-153.ap-south-1.compute.internal	Private IP DNS name (IPv4 only) ip-172-31-32-153.ap-south-1.compute.internal	Answer private resource DNS name IPv4 (A)
Instance type t2.micro	Elastic IP addresses -	VPC ID vpc-04093e80f537d3d2f
AWS Compute Optimizer finding Opt-in to AWS Compute Optimizer for recommendations. Learn more	IAM Role -	Subnet ID subnet-0845fab836bb3d64c

8. To view Windows Virtual Machine. We need Remote Desktop Connection on our PC. Or can connect via ssh also for command line.



We put computer public DNS in computer name.

9. After Successful Login. Windows Virtual Machine is ready to use.



Introduction To Virtual Machines

A virtual machine (VM) is an application computer that runs on top of another computer's operating system. It's commonly used for testing, data backup, and software development.

Applications that are delivered as a service (SaaS). Virtual machines feature a CPU, memory, and discs where you can store your data, files and, if necessary, connect to the internet, but the hardware is provided by the actual environment. Software-defined computers that only exist as code Virtual Machines are computer programmes that run on top of a specific operating system. Hypervisor is a term used to describe a virtual machine. A hypervisor is a piece of software that sits in the between of a virtual computer and its physical hardware. The hypervisor ensures that the VM receives the resources it need in a timely manner.

A Methodology in Cloud Computing, a Virtual System is a totally virtualized Virtual Machine Technology designed to replace a physical machine. It operates on a different host system by properly accessing the underlying machine's resources using a hypervisor such as VMware ESXi. In Cloud Computing, a virtual box is the remaining system. It means that the software running within a Virtual Machine in Cloud Computing has no way of escaping or being tampered with by the computer.

Features of Virtual Machines on AWS

Higher reliability and performance

With 77 Availability Zones (AZ) spread over 24 regions and 99.99 percent availability for each Amazon EC2 zone, AWS offers the most comprehensive worldwide infrastructure. According to IDC, migrating Windows workloads to AWS can result in a 98 percent reduction in unplanned downtime, a 71 percent faster deployment, and a 26 percent increase in developer productivity.

Greater security and identity services

AWS has 5x the number of security, compliance, and governance services and features as the next largest cloud provider. Virtualization functions are offloaded to dedicated hardware and software using the AWS Nitro System, the underlying platform for EC2 instances, resulting in a smaller attack surface. The Nitro Security chip monitors, protects, and checks the instance hardware and firmware on a constant basis. During migrations, AWS Managed Active Directory stores data securely in the cloud, removing the need to synchronise or replicate data from your existing Active Directory. You can also manage identities and permissions at scale using AWS Identity Services, while having a variety of options for where and how you manage your employee, partner, and customer information.

Broadest and deepest capabilities

Amazon EC2 instances are available in over 350 different configurations on AWS. With Amazon FSx for Windows File Server and Amazon EKS for Kubernetes on Windows, AWS offers the only fully managed services for native-Windows file systems and Kubernetes on Windows, allowing you to reduce management overhead and expenses. For your most demanding SQL Server deployments, Amazon Elastic Block Store provides 99.999 percent availability, 99.999 percent durability, and performant block storage. Customers also pick AWS because it provides the greatest and most consistent networking performance for Microsoft applications, with 3x higher throughput and 25% lower latency than the competition.

Lower TCO

Customers may use Windows on AWS to speed growth, improve efficiencies, and save money in the long run. According to IDC, customers may save 56 percent on 5-year operational expenditures and save 37 percent on infrastructure costs, resulting in a 442 percent ROI in just three years. Customers can save even more money using AWS's unique pricing structures, such as Savings Plans, which save you up to 72 percent on Amazon EC2 instances, and Amazon EC2 Spot, which saves you up to 90 percent on compute instances for fault tolerant workloads.

Flexible licensing options

AWS provides the most options in the cloud for using both new and existing Microsoft software licences. AWS provides new, fully compliant SQL Server licences when you purchase Amazon Elastic Compute Cloud (Amazon EC2) or Amazon

Relational Database Service (Amazon RDS) license-included instances. Using Microsoft License Mobility through Software Assurance, you can migrate your existing licences to AWS using Amazon EC2 Dedicated Hosts, Amazon EC2 Dedicated Instances, or EC2 instances with default tenancy. AWS License Manager makes it easier to track software licence usage and lowers the risk of noncompliance.

Case study

Macmillan Learning

Macmillan Learning is an educational solutions provider that provides content, tools, and services to help with instruction and learning. The company facilitates teaching and learning opportunities that spark student engagement and improve outcomes by collaborating with the world's best researchers, educators, administrators, and developers. The company offers tailored solutions to educators in order to inspire student curiosity and track progress. LaunchPad, Macmillan Learning's flagship digital courseware, is an application that educators can use and customise to meet specific course objectives and facilitate student learning.

The Challenge:

One of the company's fastest growing digital-learning applications is Launchpad. Macmillan anticipates three times the number of Launchpad users it saw in the previous academic year for the 2016-2017 school year. "The application's demand grows year after year," says Dawit Lessanu, vice president of architecture and engineering at Macmillan Learning.

However, because Launchpad was hosted in a collocated data centre facility, accommodating that rapid growth had become difficult. "The traditional data centre model was no longer working for us," Lessanu says. "We needed more scalability and agility to quickly provision the capacity we needed to support our growth."

what is virtual machine?

A virtual machine (VM) is a virtual environment that functions as a virtual computer system with its own CPU, memory, network interface, and storage, created on a physical hardware system (located off- or on-premises). Software called a hypervisor separates the machine's resources from the hardware and provisions them appropriately so they can be used by the VM.

The physical machines, equipped with a hypervisor such as Kernel-based Virtual Machine (KVM), is called the host machine, host computer, host operating system, or simply *host*. The many VMs that use its resources are guest machines, guest computers, guest operating systems, or simply *guests*. The hypervisor treats compute resources—like CPU, memory, and storage—as a pool of resources that can easily be relocated between existing guests or to new virtual machines.

VMs are isolated from the rest of the system, and multiple VMs can exist on a single piece of hardware, like a server. They can be moved between host servers depending on demand or to use resources more efficiently.

VMs allow multiple different operating systems to run simultaneously on a single computer—like a Linux® distro on a MacOS laptop. Each operating system runs in the same way an operating system or application normally would on the host hardware, so the end user experience emulated within the VM is nearly identical to a real-time operating system experience running on a physical machine

.

How do VMs work

Virtualization technology allows you to share a system with many virtual environments. The hypervisor manages the hardware and separates the physical resources from the virtual environments. Resources are partitioned as needed from the physical environment to the VMs.

When the VM is running and a user or program issues an instruction that requires additional resources from the physical environment, the hypervisor schedules the request to the physical system's resources so that the virtual machine's operating system and applications can access the shared pool of physical resources

Use cases for VMs

VMs have several uses, both for enterprise IT administrators and users. Here are a few options

Cloud computing: For the last 10+ years, VMs have been the fundamental unit of compute in cloud, enabling dozens of different types of applications and workloads to run and scale successfully.

Support DevOps: VMs are a great way to support enterprise developers, who can configure VM templates with the settings for their software development and testing processes. They can create VMs for specific tasks such as static software tests, including these steps in an automated development workflow. This all helps streamline the DevOps toolchain.

Test a new operating system: A VM lets you test-drive a new operating system on your desktop without affecting your primary OS.

Investigate malware: VMs are useful for malware researchers that frequently need fresh machines on which to test malicious programs.

Run incompatible software: Some users may prefer one OS while still needing a program that is only available in another. One good example is the Dragon range of voice dictation software. Its vendor, Nuance, has discontinued the macOS version of its product. However, running a desktop-focused hypervisor—such as VMware Fusion or Parallels—enables you to run Windows in a VM, giving you access to that version of the software.

Browse securely: Using a virtual machine for browsing enables you to visit sites without worrying about infection. You can take a snapshot of your machine and then roll back to it after each browsing session. This is something that a user could set up themselves, using a Type 2 desktop hypervisor. Alternatively, an admin could provide a temporary virtual desktop located on the server

Types of VMs

This section goes through some of the different types of virtual machines:

Windows virtual machines

Android virtual machines

Mac virtual machines

iOS virtual machines

Java virtual machines

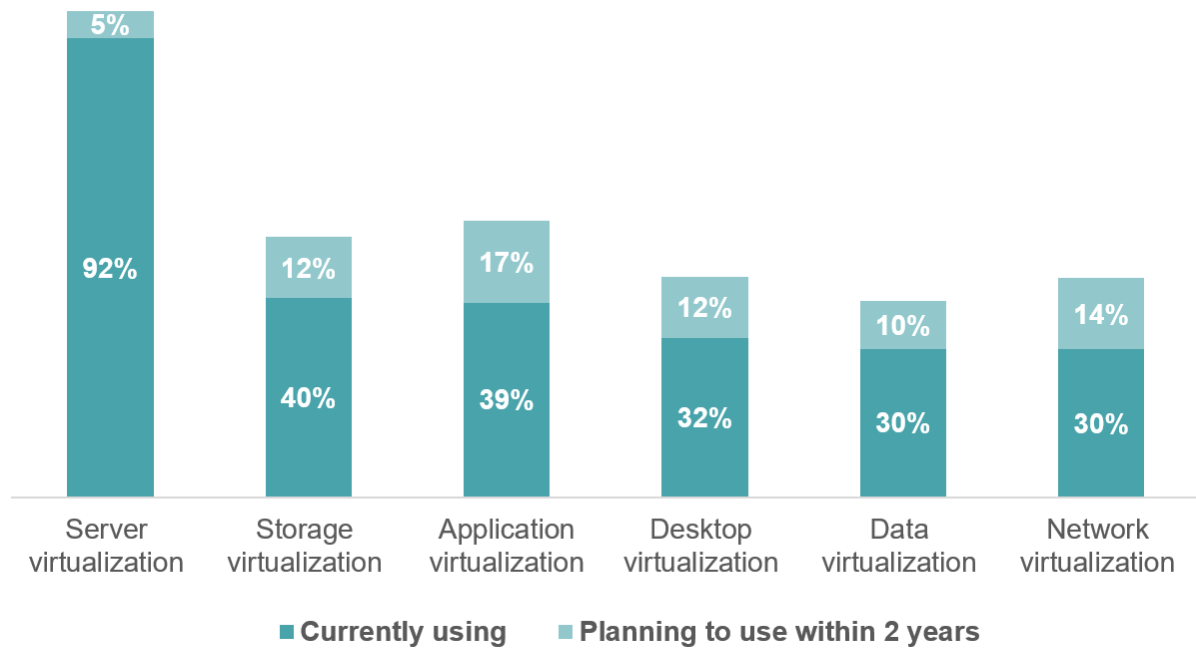
Python virtual machines

Linux virtual machines

VMware virtual machines

Ubuntu virtual machines

Business Adoption of Virtualization Technology



Business Benefits of Virtualization

Virtualization, the implementation of virtual machines within an organization, is not a new trend. Thankfully many small and medium businesses are realizing the many benefits to virtualization can offer, especially when coupled with a hosted cloud service provider (shameless plug – we're a Certified Microsoft Cloud Service Provider). Check out how desktop and server virtualization can help your growing business gain a competitive advantage:

Reduced Hardware Cost •

– In our experience most small business servers are only utilizing 40-60% of their hardware resources so instead of buying another server, your business can spin up a virtual server.

Faster Desktop and Server Provisioning and Deployment •

– Spend more time *on* driving your business forward instead of *in* your business. Deploying a new server takes several time-consuming steps – server installation, dependency resolution, securing and resource optimization, as well as, installing the actual software and services needed. With virtualized systems you're able to deploy a new virtual server in minutes using secure pre-configured server templates.

Small Footprint and Energy Saving •

– Kilowatts (KW) add up, virtualization reduces the office space needed to maintain and expand your IT capabilities while freeing up desk space for your growing business to support more employees.

Improved Data Security and Disaster Recovery •

– According to a University of Texas study, 94% of companies suffering from a catastrophic data loss do not survive – 43% never reopen and 51% close within two years. Virtualization streamlines the disaster recovery process by replicating your servers off-site in the cloud. Since VMs are independent of the underlying hardware, you don't need the same physical servers offsite to facilitate a secondary recovery site. In the event of a disaster, your team can be back online in a few minutes with an easy and cost-effective backup and disaster recovery solution.

Portability and Migration •

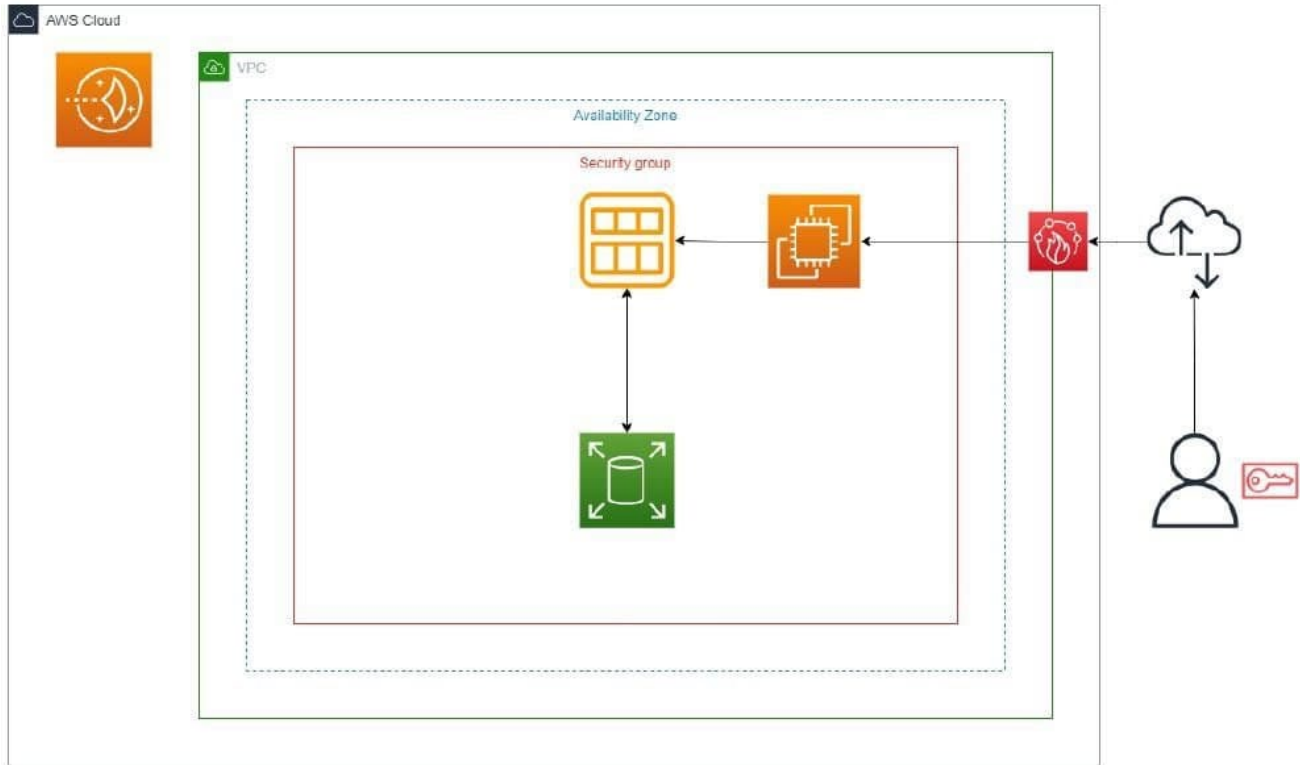
– One of the major physical server vs virtual server differences lies in portability. You can easily move VMs across the virtual environments and even from one physical server to another, with minimal input on your part. Since VMs are isolated from one another and have their own virtual hardware, this makes a VM hardware-independent. Moving your physical server environment to another location is a more resource-intensive task. You would need to copy all data stored on the server to a removable

media, transport the media as well as all hardware resources that you have to a new location, and then re-install all of the system components on a new server. Essentially, you will have to rebuild a server from scratch.

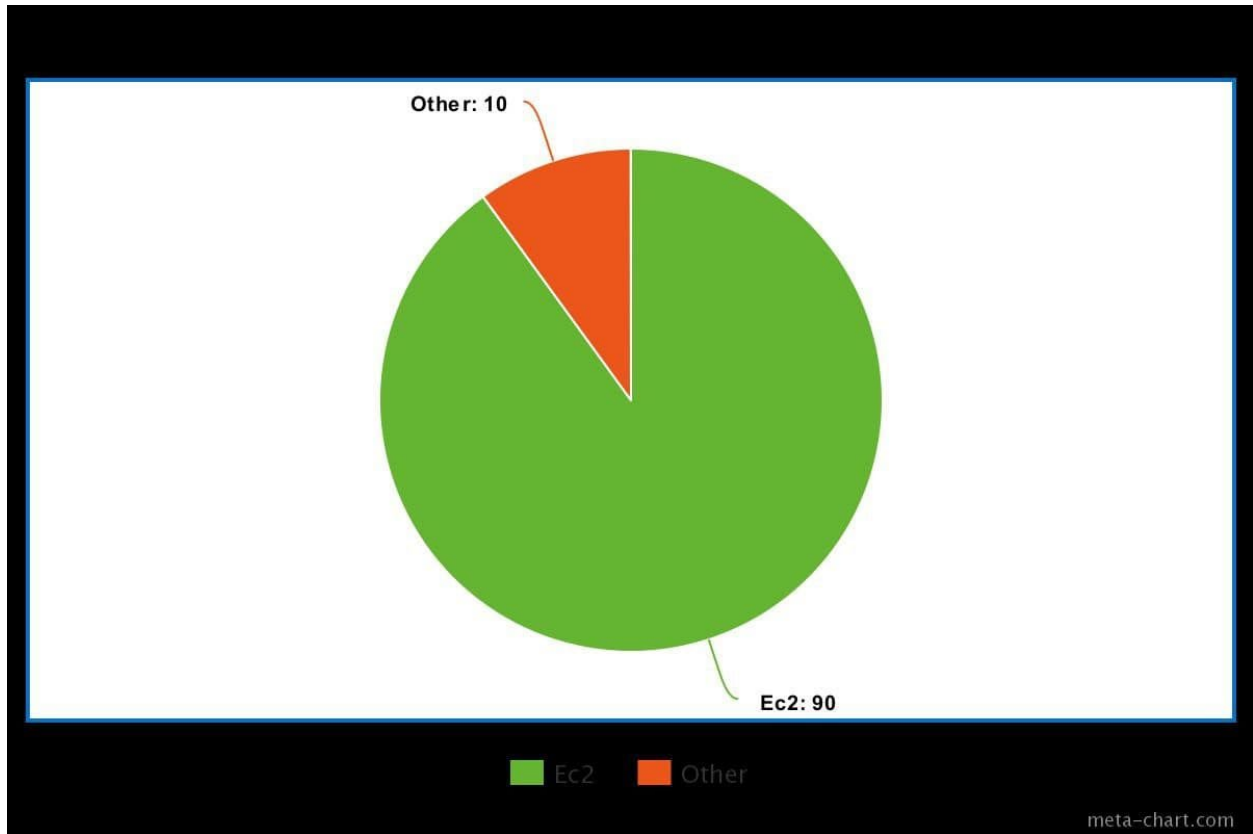
Increasing IT Operational Efficiency •

– In a recent survey of more than 300 senior business and IT managers for SMBs, VMware found 73% reported significant improvement on time spent managing routine admin tasks. Why? Simple – nine out of 10 IT departments spend at least half of their time managing routine administrative tasks. When you partition one physical server into several virtual machines, you can deploy, operate, and manage multiple operating systems at once from a single physical server. •

Network Diagram And Architecture



Costing Details And Efficiency Chart



Services (1)		
<div>Amazon EC2</div> <div>Region: US East (Ohio)</div>		
<div>Quick estimate</div> <div>Operating system (Linux), Quantity (1), Pricing strategy (EC2 Instance Savings Plans 1 Year No UpFront), Storage amount (30 GB), Instance type (t4g.xlarge)</div>		
Monthly:		64.54 USD
Upfront:		0.00 USD
Acknowledgement		

Advantages of Virtual Machine

1. Security

Not all the applications available on the internet is genuine. Some of them could pose serious threats to the system. Virtual machines provide an option known as guest operating system which allows applications to run in guest mode. So whatever the damage that the application causes is only temporary.

2. Reliability

A virtual machine includes virtual resources as well. Everything is virtualized including the hard disk drive. Thus, even if the even if the machine crashes there will be no problem to the host computer.

3. ISA Structure

Instruction Set Architecture (ISA) is an abstract which differentiates hardware and software. Always the ISA provided by the virtual machine is different from that of a physical computer. Hence, the tasks that are to be executed by the hardware are separated primarily.

4. Multiple O/S

Every software on the virtual machines are virtually separated from the host computer. As a result, users will be able to run multiple operating system on a single computer all being isolated from each other. This overall leads to time management as well as cost savings for a company.

5. Malware identification

A separate sandbox environment is provided by a virtual machine to test applications. This helps to identify malware before it infects a computer. And also, since a virtual machine does not have any direct contacts with the host computer, the malware will not cause much damage.

Disadvantages of Virtual Machine

1. Cost

Running a virtual machine with a cloud computing service is generally considered to be expensive. The upfront costs involved in a virtual machine makes it costly. And depending on the need this cost varies. If there is more need more investments needs to be done.

2. Performance

Even though the machines are virtualized in a virtual machine, it still relies on the resources from the host machine. A computer needs to be powerful enough to run several virtual machines on a single host computer. If its power is not sufficient enough, it will cause stability issues in the performance.

3. Efficiency

In terms of hardware accessibility a virtual machine is less efficient. It cannot access the hardware directly. And also its speed is not sufficient for most IT firms. This makes them use a system that is balanced between virtual and physical.

4. Complexity

A virtual machine is a complex system. What makes it complex is the multiple local area networks it is equipped with.

Therefore, in case of any failure it will be difficult to figure out where the fault has occurred. Especially for the people who are familiar with the structure and hardware of the virtual machine.

5. Infections

A weak host system can easily be affected by infections. This usually happens when there is bugs in the operating system. If two or more virtual machines are connected with each other, the infections would spread to others as well.

How Virtualization is useful?

Virtualizing your environment can increase scalability while simultaneously reducing expenses, and the following details a just a few of the many benefits that virtualization can bring to your organization:

1. Slash your IT expenses

Utilizing a non-virtualized environment can be inefficient because when you are not consuming the application on the server, the compute is sitting idle and can't be used for other applications. When you virtualize an environment, that single physical server transforms into many virtual machines. These virtual machines can have different operating systems and run different applications while still all being hosted on the single physical server.

The consolidation of the applications onto virtualized environments is a more cost-effective approach because you'll be able to consume fewer physical customers, helping you spend significantly less money on servers and bring cost savings to your organization.

2. Reduce downtime and enhance resiliency in disaster recovery situations

When a disaster affects a physical server, someone is responsible for replacing or fixing it—this could take hours or even days. With a virtualized environment, it's easy to provision and deploy, allowing you to replicate or clone the virtual machine that's been affected. The recovery process would take mere minutes—as opposed to the hours it would take to provision and set up a new physical server—significantly enhancing the resiliency of the environment and improving business continuity.

3. Increase efficiency and productivity

With fewer servers, your IT teams will be able to spend less time maintaining the physical hardware and IT infrastructure. You'll be able to install, update, and maintain the environment across all the VMs in the virtual environment on the server instead of going through the laborious and tedious process of applying the updates server-by-server. Less time dedicated to maintaining the environment increases your team's efficiency and productivity.

4. Control independence and DevOps

Since the virtualized environment is segmented into virtual machines, your developers can quickly spin up a virtual machine without impacting a production environment. This is ideal for Dev/Test, as the developer can quickly clone the virtual machine and run a test on the environment.

For example, if a new software patch has been released, someone can clone the virtual machine and apply the latest software update, test the environment, and then pull it into their production application. This increases the speed and agility of an application.

5. Move to be more green-friendly

When you are able to cut down on the number of physical servers you're using, it'll lead to a reduction in the amount of power being consumed.