

DEPLOY A WEBSITE ON A VIRTUAL SERVER (AWS CLOUD)

A project report

Submitted in Partial Fulfilment Of The Degree of

Master Of Computer Application

Session 2019-2021



Submitted To:
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D.A.V INSTITUTE OF MANAGEMENT
FARIDABAD

AFFILATED TO:

MAHARISHI DAYANAND UNIVERSITY, ROHTAK , HARYANA

PROJECT REPORT

ON

“ DEPLOY A WEBSITE ON A VIRTUAL SERVER (AWS CLOUD)”

At

“SRS Live Technologies Pvt Ltd “

Submitted to :

MAHARISHI DAYANAND UNIVERSITY ,ROHTAK

Submitted in Partial Fulfilment For The Award Of The Degree of

Master Of Computer Application

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Further, I also undertake that the matter embodied in this Project Report is my own work and has not been submitted by me or by any other candidate for the award of any other degree anywhere else.

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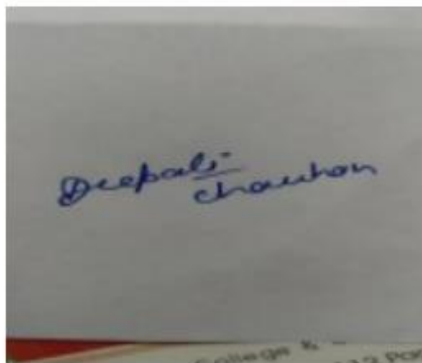
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TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms . Deepali Chauhan , MCA student of DAV Institute of Management , Faridabad Has completed the industrial training with us from february 3, 2021 to July 3 2021 on Devops . She worked on a project “ **Deploy a Website on a virtual server (AWS CLOUD)**”. During the training with us ,we found her very hard working, sincere & eager to learn more. We Wish her Success for future Projects.

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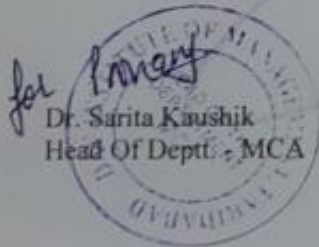
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He/She has submitted the requisite Project Report as per the University stipulations.

I wish him/her success in life.

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Abstract

“Deploy a website on a virtual server (AWS CLOUD)” is a project based on the latest technology I.e

Cloud & Virtualization in which we used the virtual machines as to reduces the cost of Infrastructure & issues related with maintenance.

In this project we are using the virtual server and access it from anywhere from the world Because it is totally deployed on cloud AWS by sharing the private ip helps to work on LAN Public ip help to work on WAN network. Moreover, we can run many virtual servers within Lan thereby reducing the cost by buying public ip for each machine & it work on Virtualization so we share more and more network, hardware etc Resources.

CHAPTER 1

INTRODUCTION

1.1 Life before cloud

Before There Was Cloud Computing, There Was SOA

Service-Oriented Architecture (SOA) is a style of software design where services are provided to the other components by application components, through a communication protocol over a network. Its principles are independent of vendors and other technologies.

In **service oriented architecture** a number of services communicate with each other, in one of two ways: through passing data or through two or more services coordinating an activity. This is just one definition of Service-Oriented Architecture

There are three roles in each of the Service-Oriented Architecture building blocks: service provider; service broker, service registry, service repository; and service requester/consumer.

The service provider works in conjunction with the service registry, debating the whys and hows of the services being offered, such as security, availability, what to charge, and more. This role also determines the service category and if there need to be any trading agreements.

The service broker makes information regarding the service available to those requesting it. The scope of the broker is determined by whoever implements it.

The service requester locates entries in the broker registry and then binds them to the service provider.

They may or may not be able to access multiple services; that depends on the capability of the service requester

When it comes to implementing service-oriented architecture (SOA), there is a wide range of technologies that can be used, depending on what your end goal is and what you're trying to accomplish. Typically, Service-Oriented Architecture is implemented with web services, which makes the "functional building blocks accessible over standard internet protocols." An example of a web service standard is [SOAP](#), which stands for Simple Object Access Protocol.

In a nutshell, SOAP "is a messaging protocol specification for exchanging structured information in the implementation of web services in computer networks. Although SOAP wasn't well-received at first, since 2003 it has gained more popularity and is becoming more widely used and accepted. Other options for implementing Service-Oriented Architecture include Jini, COBRA, or REST.

Disadvantages

- 1. High Bandwidth Server** – As therefore net service sends and receives messages and knowledge often times, so it simply reaches high requests per day. So it involves a high-speed server with plenty of information measure to run an internet service.
- 2. Extra Overload** – In SOA, all inputs square measures its validity before it's sent to the service. If you are victimization multiple services, then it'll overload your system with further computation.
- 3. High Cost** – It is expensive in terms of human resource, development, and technology.

AWS

Amazon Web Services (AWS) began offering IT infrastructure services to businesses in the form of web services -- now commonly known as cloud computing. One of the key benefits of cloud computing is the opportunity to replace up-front capital infrastructure expenses with low variable costs that scale with your business. With the Cloud, businesses no longer need to plan for and procure servers and other IT infrastructure weeks or months in advance. Instead, they can instantly spin up hundreds or thousands of servers in minutes and deliver results faster.

Today, Amazon Web Services provides a highly reliable, scalable, low-cost infrastructure platform in the cloud that powers hundreds of thousands of businesses in 190 countries around the world.

AWS offers low, pay-as-you-go pricing with no up-front expenses or long-term commitments. We are able to build and manage a global infrastructure at scale, and pass the cost saving benefits onto you in the form of lower prices. With the efficiencies of our scale and expertise, we have been able to lower our prices on 15 different occasions over the past four years.

Benefits of AWS

Easy to use

AWS is designed to allow application providers, ISVs, and vendors to quickly and securely host your applications – whether an existing application or a new SaaS-based application. You can use the AWS Management Console or well-documented web services APIs to access AWS's application hosting platform.

Flexible

AWS enables you to select the operating system, programming language, web application platform, database, and other services you need. With AWS, you receive a virtual environment that lets you load the software and services your application requires. This eases the migration process for existing applications while preserving options for building new solutions.

Cost-Effective

You pay only for the compute power, storage, and other resources you use, with no long-term contracts or up-front commitments. For more information on comparing the costs of other hosting alternatives with AWS, see the AWS Economics Center.

Reliable

With AWS, you take advantage of a scalable, reliable, and secure global computing infrastructure, the virtual backbone of Amazon. Com's multi-billion dollar online business that has been honed for over a decade.

Scalable and high-performance

Using AWS tools, Auto Scaling, and Elastic Load Balancing, your application can scale up or down based on demand. Backed by Amazon's massive infrastructure, you have access to compute and storage resources when you need them.

Secure.

AWS utilizes an end-to-end approach to secure and harden our infrastructure, including physical, operational, and software measures. For more information, see the AWS Security Center.



1.3 VIRTUALIZATION

Virtualization uses software to create an abstraction layer over computer hardware that allows the hardware elements of a single computer—processors, memory, storage and more—to be divided into multiple virtual computers, commonly called virtual machines (VMs). Each VM runs its own operating system (OS) and behaves like an independent computer, even though it is running on just a portion of the actual underlying computer hardware.

It follows that virtualization enables more efficient utilization of physical computer hardware and allows a greater return on an organization's hardware investment.

Today, virtualization is a standard practice in enterprise IT architecture. It is also the technology that drives cloud computing economics. Virtualization enables cloud providers to serve users with their existing physical computer hardware; it enables cloud users to purchase only the computing resources they need when they need it, and to scale those resources cost-effectively as their workloads grow.

Virtualization in Cloud Computing

Virtualization is the "creation of a virtual (rather than actual) version of something, such as a server, a desktop, a storage device, an operating system or network resources".

In other words, Virtualization is a technique, which allows to share a single physical instance of a resource or an application among multiple customers and organizations. It does by assigning a logical name to a physical storage and providing a pointer to that physical resource when demanded.

Concept behind the Virtualization

Creation of a virtual machine over existing operating system and hardware is known as Hardware Virtualization. A Virtual machine provides an environment that is logically separated from the underlying hardware.

The machine on which the virtual machine is going to create is known as **Host Machine** and that virtual machine is referred as a **Guest Machine**

1.4 Types of Virtualization:

1. Hardware Virtualization.
2. Operating system Virtualization.
3. Server Virtualization.
- 4.** Storage Virtualization.

Hardware Virtualization:

When the virtual machine software or virtual machine manager (VMM) *is directly installed on the hardware system* is known as hardware virtualization.

The main job of hypervisor is to control and monitoring the processor, memory and other hardware resources.

After virtualization of hardware system we can install different operating system on it and run different applications on those OS.

Usage:

Hardware virtualization is mainly done for the server platforms, because controlling virtual machines is much easier than controlling a physical server.

Operating System Virtualization:

When the virtual machine software or virtual machine manager (VMM) *is installed on the Host operating system* instead of directly on the hardware system is known as operating system virtualization.

Usage:

Operating System Virtualization is mainly used for testing the applications on different platforms of OS.

Server Virtualization:

When the virtual machine software or virtual machine manager (VMM) *is directly installed on the Server system* is known as server virtualization.

Usage:

Server virtualization is done because a single physical server can be divided into multiple servers on the demand basis and for balancing the load.

Storage Virtualization:

Storage virtualization is the *process of grouping the physical storage from multiple network storage devices so that it looks like a single storage device.*

Storage virtualization is also implemented by using software applications.



**Virtual
Machines**



**Type 1
Hypervisor**



**Physical Server
(Hardware)**

CHAPTER 2

2.1 FRONTEND & BACKEND USED

FRONTEND USED

Web Browser

A web browser takes you anywhere on the internet, letting you see text, images and video from anywhere in the world.

The web is a vast and powerful tool. Over the course of a few decades, the internet has changed the way we work, the way we play and the way we interact with one another.

Depending on how it's used, it bridges nations, drives commerce, nurtures relationships, drives the innovation engine of the future and is responsible for more memes than we know what to do with. It's important that everyone has access to the web, but it's also vital that we all understand the tools we use to access it.

We use web browsers like Mozilla Firefox, Google Chrome, Microsoft Edge and Apple Safari every day, but do we understand what they are and how they work? In a short period of time we've gone from being amazed by the ability to send an email to someone around the world, to a change in how we think of information

.

It's not a question of how much you know anymore, but simply a question of what browser or app can get you to that information fastest.

A web browser takes you anywhere on the internet. It retrieves information from other parts of the web and displays it on your desktop or mobile device.

The information is transferred using the Hypertext Transfer Protocol, which defines how text, images and video are transmitted on the web. This information needs to be shared and displayed in a consistent format so that people using any browser, anywhere in the world can see the information.

Websites save information about you in files called cookies. They are saved on your computer for the next time you visit that site. Upon your return, the website code will read that file to see that it's you. For example, when you go to a website, the page remembers your username and password – that's made possible by a cookie.

There are also cookies that remember more detailed information about you. Perhaps your interests, your web browsing patterns, etc. This means that a site can provide you more targeted content – often in the form of ads.

There are types of cookies, called *third-party* cookies, that come from sites you're not even visiting at the time and can track you from site to site to gather information about you, which is sometimes sold to other companies. Sometimes you can block these kinds of cookies, though not all browsers allow you to.

BACKEND USED

Virtual servers

A virtual server is a server that shares hardware and software resources with other operating systems (OS), versus dedicated servers. Because they are cost-effective and provide faster resource control, virtual servers are popular in Web hosting environments.

a virtual server mimics dedicated server functionalities. Rather than implement multiple dedicated servers, several virtual servers may be implemented on one server.

Each virtual server is designated a separate OS, software and independent reboot provisioning. In a virtual server environment for Web hosting, website administrators or Internet service providers (ISP) may have different domain names, IP addresses, email administration, file directories, logs and analytics.

Additionally, security systems and passwords are maintained as if they were in a dedicated server environment. To reduce Web hosting costs, server software installation provisioning is often available.

virtual server used for

1 . Remote access

Virtual dedicated servers can be readily configured to support secure access to business-critical data and files via the internet.

2. Web hosting

Different web services can be configured with virtual server hosting so multiple website owners can use the server as if they had complete control of it.

3. Software development and testing

Software developers can create, run, and test new software applications on a virtual server without taking processing power away from other users

Creating and Using Virtual Servers

A virtual server is a server that uses a unique combination of IP address, port number and host name to identify it. You might have several virtual servers, all of which use the same IP address and port number but are distinguished by their unique host names.

For instance, you might have one virtual server called hr.acme.com, and another called mis.acme.com, both of which reside on the same Web server instance, and listen for requests on the same port.

Using Virtual Server

Virtual servers have the following benefits:

- **Minimize memory and hardware utilization.** Each virtual server can, for example, have individual bandwidth or connection limits specified, ensuring that no one virtual server uses more than its share of system resources.
- **Provide differentiated services to different sets of users.** For example, you could set up one virtual server to run CGI programs and another to run web applications.

2.2 How to configure a virtual server

Start the Network Control Panel Applet (Start - Settings - Control Panel - Network)

Select the Protocols tab

Select TCP/IP and click Properties

On the "IP Address" tab click the Advanced button

In the IP Address section click Add

Enter the additional IP address and subnet mask you want the machine to respond to and click Add
Click OK until you leave the network control panel applet
Reboot the machine.

You now need to configure the DNS server to respond to the new name.com with the new IP address

Start the DNS Manager

(Start - Programs - Administrative Tools - DNS Manager)

From the DNS menu, select New Server and enter the IP address of the DNS Server, e.g.,

200.200.200.3, and click OK

The server will now be displayed with a CACHE sub part

Next, we want to add the domain, e.g. savilltech.com, from the DNS menu, select New Zone

Select Primary and click Next

Enter the name, e.g. savilltech.com, and then press tab, and it will fill in the Zone File Name and click Next

Click Finish

Next a zone for reverse lookups has to be created, so select New Zone from the DNS menu

Select Primary and click Next, enter the name of the first 3 parts of the domain IP + in-addr.arpa,

e.g.

if the domain was 158.234.26, the entry would be 26.234.158.in-addr.arpa, in my example it would be 200.200.200.in-addr.arpa,

click tab for the file name to be filled and

click Next, then click Finish

From the DNS menu select new Host, enter the machine name and IP address, also select the create associated PTR record. Click Add and then Done.

Next create the www.<domain>.com record. From the DNS menu select new record

Select record type of CNAME, enter a alias name of www, and the actual host name, e.g. server.shadow.com. Click OK

Exit the DNS server

Next update the IIS server to support the new domain

1.Start the Internet Service Manager (Start - Programs - Microsoft Internet Server)

2.Double click on the computer name of the web server which will display the properties

3.Click the Directories tab

4.Click the Add button

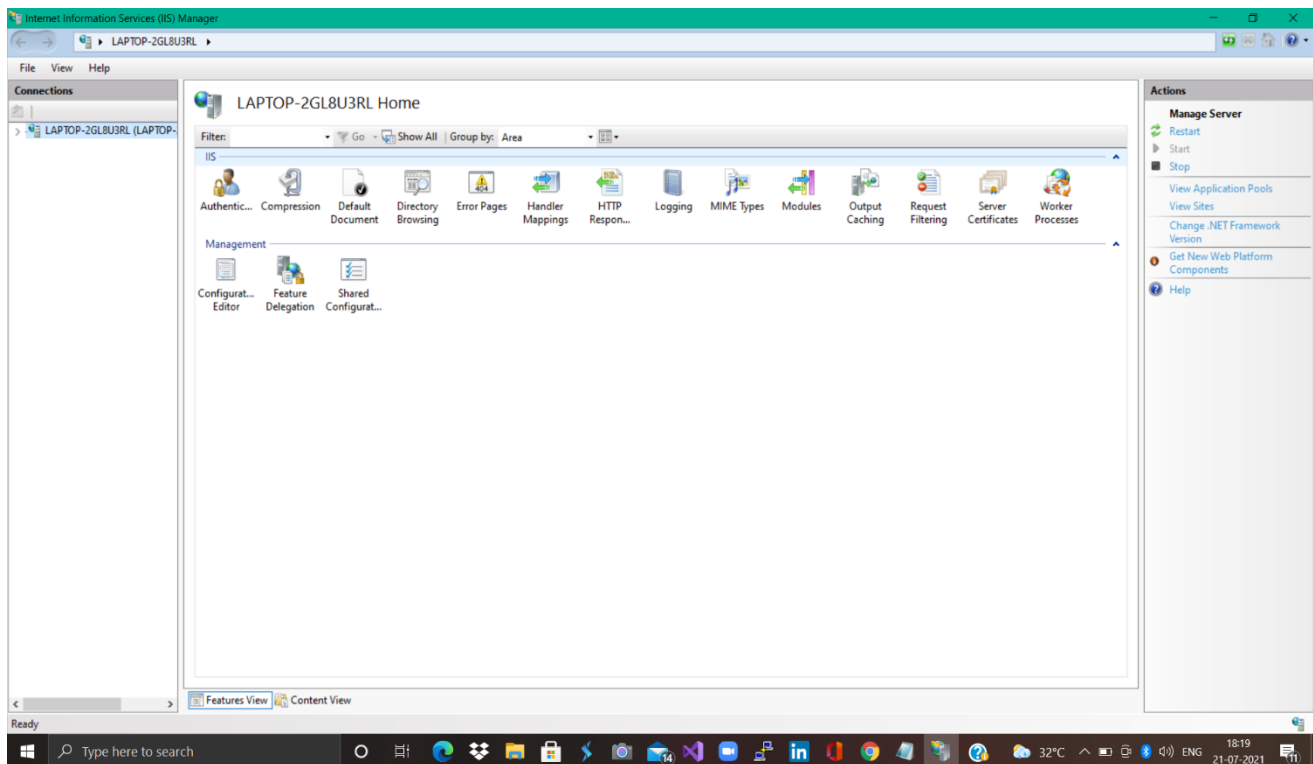
5.Enter the directory name and select the home directory check box.

Next check the "Virtual Server" box and

enter the IP address you added in the first step.

Click OK

6.Click OK to close



Virtual Storage

Virtual storage means that each running program can assume it has access to all of the storage defined by the architecture's addressing scheme.

The only limit is the number of bits in a storage address.

This ability to use a large number of storage locations is important because a program may be long and complex, and both the program's code and the data it requires must be in central storage for the processor to access them.

Virtualized storage, or storage virtualization, is a technological concept developed within the past few decades.

It enables organizations to remove the traditional boundaries of physical storage devices, by abstracting the disks and drives, and presenting them as a single, centralized pool of storage capacity.

Storage virtualization software identifies the amount of storage capacity available across the physical storage components, compiles it, and provides it to the applications for use.

Data can be acted upon as short-term memory or archived as long-term memory.

The short-term memory is handled by random-access memory (RAM),

which is responsible for processing and remembering all requests and actions during the time a computer processes specific computation (known as tasks). Once all computations are complete, the data can be stored as long-term memory among different storage volumes, some of which may exist as clouds.

What is Cloud Storage

Cloud storage is a cloud computing model that stores data on the Internet through a cloud computing provider who manages and operates data storage as a service.

It's delivered on demand with just-in-time capacity and costs, and eliminates buying and managing your own data storage infrastructure.

This gives you agility, global scale and durability, with “anytime, anywhere” data access.

Cloud storage is purchased from a third party cloud vendor who owns and operates data storage capacity and delivers it over the Internet in a pay-as-you-go model. These cloud storage vendors manage capacity, security and durability to make data accessible to your applications all around the world.

Applications access cloud storage through traditional storage protocols or directly via an API.

Many vendors offer complementary services designed to help collect, manage, secure and analyze data at massive scale.

Benefits of Cloud Storage

Storing data in the cloud lets IT departments transform three areas:

Total Cost of Ownership. With cloud storage, there is no hardware to purchase, storage to provision, or capital being used for "someday" scenarios.

You can add or remove capacity on demand, quickly change performance and retention characteristics, and only pay for storage that you actually use.

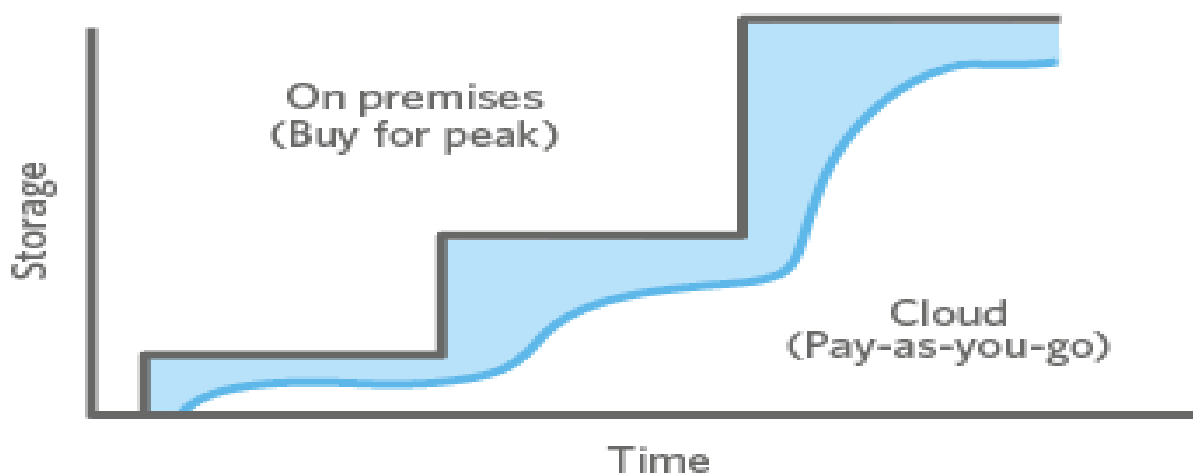
Less frequently accessed data can even be automatically moved to lower cost tiers in accordance with auditable rules, driving economies of scale.

Time to Deployment. When development teams are ready to execute, infrastructure should never slow them down. Cloud storage allows IT to quickly deliver the exact amount of storage needed, right when it's needed.

This allows IT to focus on solving complex application problems instead of having to manage storage systems.

Information Management. Centralizing storage in the cloud creates a tremendous leverage point for new use cases.

By using cloud storage lifecycle management policies, you can perform powerful information management tasks including automated tiering or locking down data in support of compliance requirements.



2.3 AWS Storage Services

- **Amazon Simple Storage Service (Amazon S3)**

Amazon Simple Storage Service (Amazon S3) is storage for the Internet. It is designed to make web-scale computing easier.

Amazon S3 has a simple web services interface that you can use to store and retrieve any amount of data, at any time, from anywhere on the web.

It gives any developer access to the same highly scalable, reliable, fast, and inexpensive data storage infrastructure that Amazon uses to run its own global network of web sites.

The service aims to maximize benefits of scale and to pass those benefits on to developers.

This introduction to Amazon Simple Storage Service (Amazon S3) provides a detailed summary of this web service. After reading this section, you should have a good idea of what it offers and how it can fit in with your business.

This guide describes how you send requests to create buckets, store and retrieve your objects, and manage permissions on your resources. The guide also describes access control and the authentication process.

Access control defines who can access objects and buckets within Amazon S3, and the type of access (for example, READ and WRITE). The authentication process verifies the identity of a user who is trying to access Amazon Web Services (AWS).

Advantages of using Amazon S3

Amazon S3 is intentionally built with a minimal feature set that focuses on simplicity and robustness. Following are some of the advantages of using Amazon S3:

- **Creating buckets** – Create and name a bucket that stores data. Buckets are the fundamental containers in Amazon S3 for data storage.

- **Storing data** – Store an infinite amount of data in a bucket. Upload as many objects as you like into an Amazon S3 bucket. Each object can contain up to 5 TB of data. Each object is stored and retrieved using a unique developer-assigned key.
- **Downloading data** – Download your data or enable others to do so. Download your data anytime you like, or allow others to do the same.
- **Permissions** – Grant or deny access to others who want to upload or download data into your Amazon S3 bucket. Grant upload and download permissions to three types of users. Authentication mechanisms can help keep data secure from unauthorized access.
- **Standard interfaces** – Use standards-based REST and SOAP interfaces designed to work with any internet-development toolkit.

Amazon S3 concepts

A bucket is a container for objects stored in Amazon S3. Every object is contained in a bucket. For example, if the object named photos/puppy.jpg is stored in the awsexamplebucket1 bucket in the US West (Oregon) Region, then it is addressable using the URL <https://awsexamplebucket1.s3.us-west-2.amazonaws.com/photos/puppy.jpg>.

Buckets serve several purposes:

- They organize the Amazon S3 namespace at the highest level.
- They identify the account responsible for storage and data transfer charges.
- They play a role in access control.
- They serve as the unit of aggregation for usage reporting.

You can configure buckets so that they are created in a specific AWS Region.

For more information, see [Accessing a Bucket](#)

You can also configure a bucket so that every time an object is added to it, Amazon S3 generates a unique version ID and assigns it to the object.

Amazon Glacier

Amazon S3 Glacier is an extremely low-cost storage service that provides secure, durable, and flexible storage for data backup and archival.

With Amazon S3 Glacier, customers can reliably store their data for as little as \$0.004 per gigabyte per month.

Amazon S3 Glacier enables customers to offload the administrative burdens of operating and scaling storage to AWS, so that they don't have to worry about capacity planning, hardware provisioning, data replication, hardware failure detection and repair, or time-consuming hardware migrations.

Amazon S3 Glacier enables any business or organization to easily and cost effectively retain data for months, years, or decades.

With Amazon S3 Glacier, customers can now cost effectively retain more of their data for future analysis or reference, and they can focus on their business rather than operating and maintaining their storage infrastructure.

Customers seeking compliance storage can deploy compliance controls using Vault Lock to meet regulatory and compliance archiving requirements.

Amazon S3 is a durable, secure, simple, and fast storage service designed to make web-scale computing easier for developers.

Use Amazon S3 if you need low latency or frequent access to your data. Use Amazon S3 Glacier if low storage cost is paramount, and you do not require millisecond access to your data.

- Amazon Elastic File System (Amazon EFS)

- Amazon Elastic Block Store (Amazon EBS)
- Amazon EC2 Instance Storage
- AWS Storage Gateway

AWS Storage Gateway is a set of hybrid cloud services that gives you on-premises access to virtually unlimited cloud storage.

Customers use Storage Gateway to integrate AWS Cloud storage with existing on-site workloads so they can simplify storage management and reduce costs for key hybrid cloud storage use cases.

These include moving backups to the cloud, using on-premises file shares backed by cloud storage, and providing low latency access to data in AWS for on-premises applications.

To support these use cases, Storage Gateway offers four different types of gateways – Amazon S3 File Gateway, Amazon FSx File Gateway , Tape Gateway , and Volume Gateway– that seamlessly connect on-premises applications with cloud storage.

Moving data to the cloud for advanced AWS Cloud storage capabilities and caching data locally for low-latency access gives you the best of cloud and on-premises.

Applications connect to the service through a virtual machine or gateway hardware appliance using standard storage protocols, such as NFS, SMB, and iSCSI.

The gateway connects to AWS storage services, such as Amazon S3, Amazon S3 Glacier, Amazon S3 Glacier Deep Archive, Amazon FSx for Windows File Server, Amazon EBS, and AWS Backup, providing storage and data management for files, volumes, snapshots, and virtual tapes in AWS.

The service includes an optimized and efficient data transfer mechanism, with bandwidth management and automated network resilience, and provides a consistent management experience using the AWS Console on-premises and in the AWS Cloud.

- AWS Snowball
- Amazon CloudFront

We are using EBS in our Project so we focus more on EBS Storage because it is attached to EC2 instances.

Amazon Elastic Block Store (Amazon EBS) provides block level storage volumes for use with EC2 instances. EBS volumes behave like raw, unformatted block devices. You can mount these volumes as devices on your instances.

EBS volumes that are attached to an instance are exposed as storage volumes that persist independently from the life of the instance.

You can create a file system on top of these volumes, or use them in any way you would use a block device (such as a hard drive). You can dynamically change the configuration of a volume attached to an instance.

AWS Elastic Block Store (EBS) is Amazon's block-level storage solution used with the EC2 cloud service to store persistent data. This means that the data is kept on the AWS EBS servers even when the EC2 instances are shut down.

EBS offers the same high availability and low-latency performance within the selected availability zone, allowing users to scale storage capacity at low subscription-based pricing model.

The data volumes can be dynamically attached, detached and scaled with any EC2 instance, just like a physical block storage drive. As a highly dependable cloud service, the EBS offering guarantees 99.999% availability.

AWS EBS is different from the standard EC2 Instance Store, which merely provides temporary storage available on the physical EC2 host servers.

The EC2 Instance Store is useful for temporary data content such as caches, buffers or files that are replicated across the hosted servers.

For data that needs to be available persistently, regardless of the operating life of an EC2 instance

The AWS EBS offers the following storage volume options:

General Purpose SSD (gp2): An optimum balance between cost and performance for a variety of IT workloads. Use cases include virtual desktops, apps, dev and test environments, among others.

Provisioned IOPS SSD (io1): The high-performance functionality serves particularly well for mission-critical IT workloads. Suitable use cases include large databases and business apps that require 16,000 IOPS or 250 MiB/s of throughput per volume.

Throughput Optimized HDD (st1): A low-cost alternative for large storage volume workloads with high performance throughput requirements. Examples include streaming workloads, big data applications, log processing and data warehousing.

Cold HDD (sc1): An inexpensive alternative for use cases with a requirement to maintain minimal cost for large volume data storage. Examples include workloads that are accessed less frequently.

Amazon EBS Snapshots

This feature allows point-in-time storage of data volumes incrementally, while only charging for the change in data volume. For instance, if 5GB of data was added to an existing 100GB of storage block with the snapshot, AWS will only charge for the additional 5GB of data.

Snapshots can be expanded, replicated, moved, shared, copied, modified, managed and organized within and across AWS Availability Zones using the Amazon Data Lifecycle Manager and the Tag feature. All EBS Snapshots are stored in AWS S3 that guarantee up to 11×9's of durability.

Snapshots are not stored as user accessible objects but accessed via the EBS API. The Snapshots are stored behind the Amazon Machine Images (AMI), providing all necessary information to recover data and launch EC2 instances in the cloud accordingly.

The Snapshot capability is key to business continuity plans for mission-critical apps and services. Users can define Recovery Time Objectives (RTO) and Recovery Point Objectives (RPO) and manage the snapshots to meet those objectives.

Amazon Data Lifecycle Manager

You can use Amazon Data Lifecycle Manager to automate the creation, retention, and deletion of EBS snapshots and EBS-backed AMIs. When you automate snapshot and AMI management, it helps you to:

- Protect valuable data by enforcing a regular backup schedule.
- Create standardized AMIs that can be refreshed at regular intervals.
- Retain backups as required by auditors or internal compliance.
- Reduce storage costs by deleting outdated backups.
- Create disaster recovery backup policies that back up data to isolated accounts.

When combined with the monitoring features of Amazon CloudWatch Events and AWS CloudTrail, Amazon Data Lifecycle Manager provides a complete backup solution for Amazon EC2 instances and individual EBS volumes at no additional cost.

Amazon EBS snapshots

You can back up the data on your Amazon EBS volumes to Amazon S3 by taking point-in-time snapshots. Snapshots are *incremental* backups, which means that only the blocks on the device that have changed after your most recent snapshot are saved

.

This minimizes the time required to create the snapshot and saves on storage costs by not duplicating data.

Each snapshot contains all of the information that is needed to restore your data (from the moment when the snapshot was taken) to a new EBS volume.

When you create an EBS volume based on a snapshot, the new volume begins as an exact replica of the original volume that was used to create the snapshot.

The replicated volume loads data in the background so that you can begin using it immediately. When you create an EBS volume based on a snapshot, the new volume begins as an exact replica of the original volume that was used to create the snapshot.

The replicated volume loads data in the background so that you can begin using it immediately. If you access data that hasn't been loaded yet, the volume immediately downloads the requested data from Amazon S3, and then continues loading the rest of the volume's data in the background.

When you delete a snapshot, only the data unique to that snapshot is removed.

Snapshot events

You can track the status of your EBS snapshots through CloudWatch Events.

Multi-volume snapshots

Snapshots can be used to create a backup of critical workloads, such as a large database or a file system that spans across multiple EBS volumes.

Multi-volume snapshots allow you to take exact point-in-time, data coordinated, and crash-consistent snapshots across multiple EBS volumes attached to an EC2 instance.

You are no longer required to stop your instance or to coordinate between volumes to ensure crash consistency, because snapshots are automatically taken across multiple EBS volumes.

Snapshot pricing

Charges for your snapshots are based on the amount of data stored. Because snapshots are incremental, deleting a snapshot might not reduce your data storage costs.

Data referenced exclusively by a snapshot is removed when that snapshot is deleted, but data referenced by other snapshots is preserved.

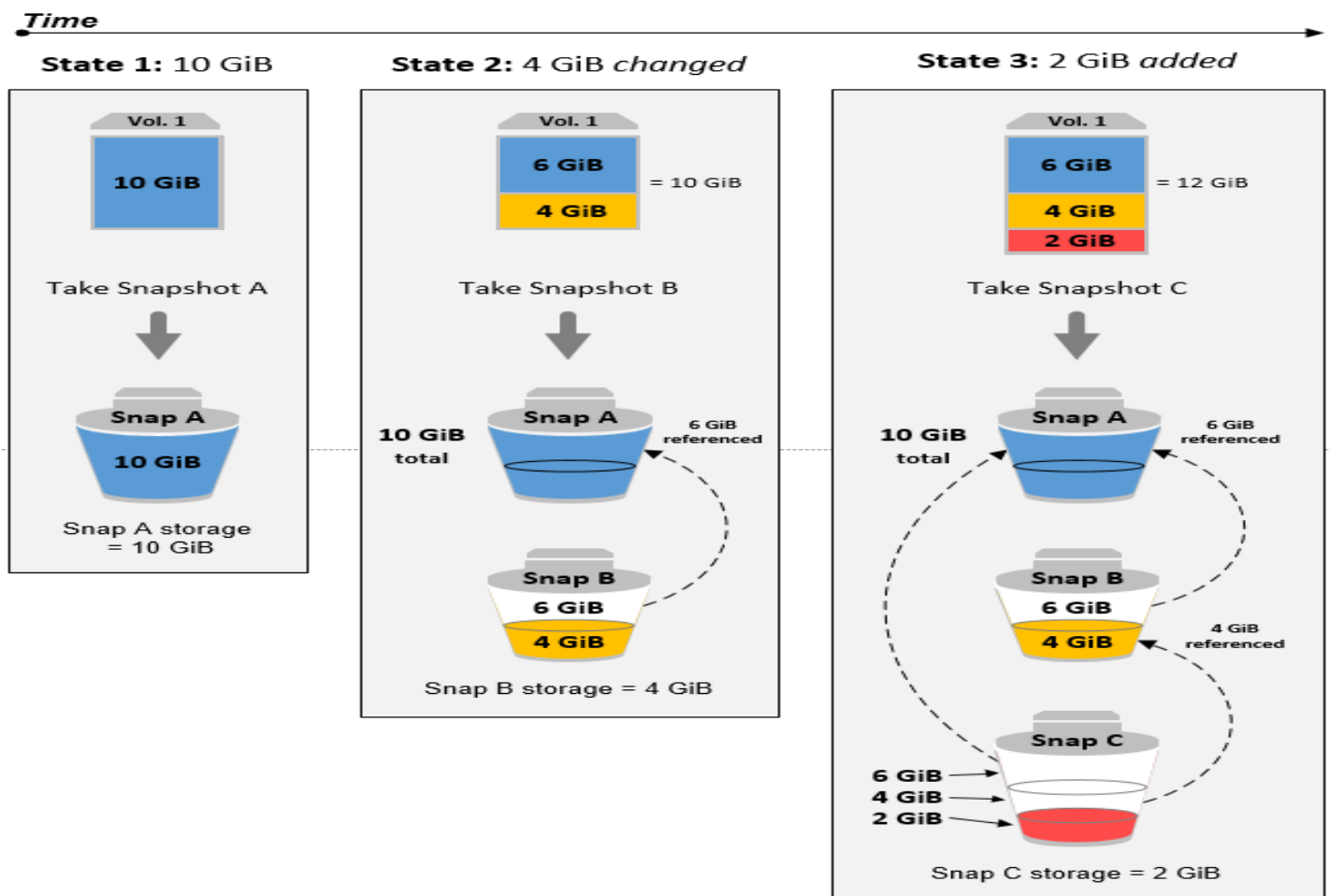
How incremental snapshots work

This section shows how an EBS snapshot captures the state of a volume at a point in time, and how successive snapshots of a changing volume create a history of those changes.

Relations among multiple snapshots of the same volume

The diagram in this section shows Volume 1 at three points in time. A snapshot is taken of each of these three volume states. The diagram specifically shows the following:

- In State 1, the volume has 10 GiB of data. Because **Snap A** is the first snapshot taken of the volume, the entire 10 GiB of data must be copied.
- In State 2, the volume still contains 10 GiB of data, but 4 GiB have changed. **Snap B** needs to copy and store only the 4 GiB that changed after **Snap A** was taken. The other 6 GiB of unchanged data, which are already copied and stored in **Snap A**, are *referenced* by **Snap B** rather than being copied again. This is indicated by the dashed arrow.
- In State 3, 2 GiB of data have been added to the volume, for a total of 12 GiB. **Snap C** needs to copy the 2 GiB that were added after **Snap B** was taken. As shown by the dashed arrows, **Snap C** also references 4 GiB of data stored in **Snap B**, and 6 GiB of data stored in **Snap A**.
- The total storage required for the three snapshots is 16 GiB.



Encryption support for snapshots

EBS snapshots fully support EBS encryption.

- Snapshots of encrypted volumes are automatically encrypted.
- Volumes that you create from encrypted snapshots are automatically encrypted
- Volumes that you create from an unencrypted snapshot that you own or have access to can be encrypted on-the-fly.
- When you copy an unencrypted snapshot that you own, you can encrypt it during the copy process.
- When you copy an encrypted snapshot that you own or have access to, you can reencrypt it with a different key during the copy process.
- The first snapshot you take of an encrypted volume that has been created from an unencrypted snapshot is always a full snapshot.
- The first snapshot you take of a reencrypted volume, which has a different CMK compared to the source snapshot, is always a full snapshot.

Copy and share snapshots

You can share a snapshot across AWS accounts by modifying its access permissions. You can make copies of your own snapshots as well as snapshots that have been shared with you.

A snapshot is constrained to the AWS Region where it was created.

After you create a snapshot of an EBS volume, you can use it to create new volumes in the same Region.

For more information,

You can also copy snapshots across Regions, making it possible to use multiple Regions for geographical expansion, data center migration, and disaster recovery. You can copy any accessible snapshot that has a completed status.

Amazon EBS–Optimized Instances

The EBS Optimized Instances offer burst of performance improvements for storage workloads that require short and intense periods of high device I/O operations.

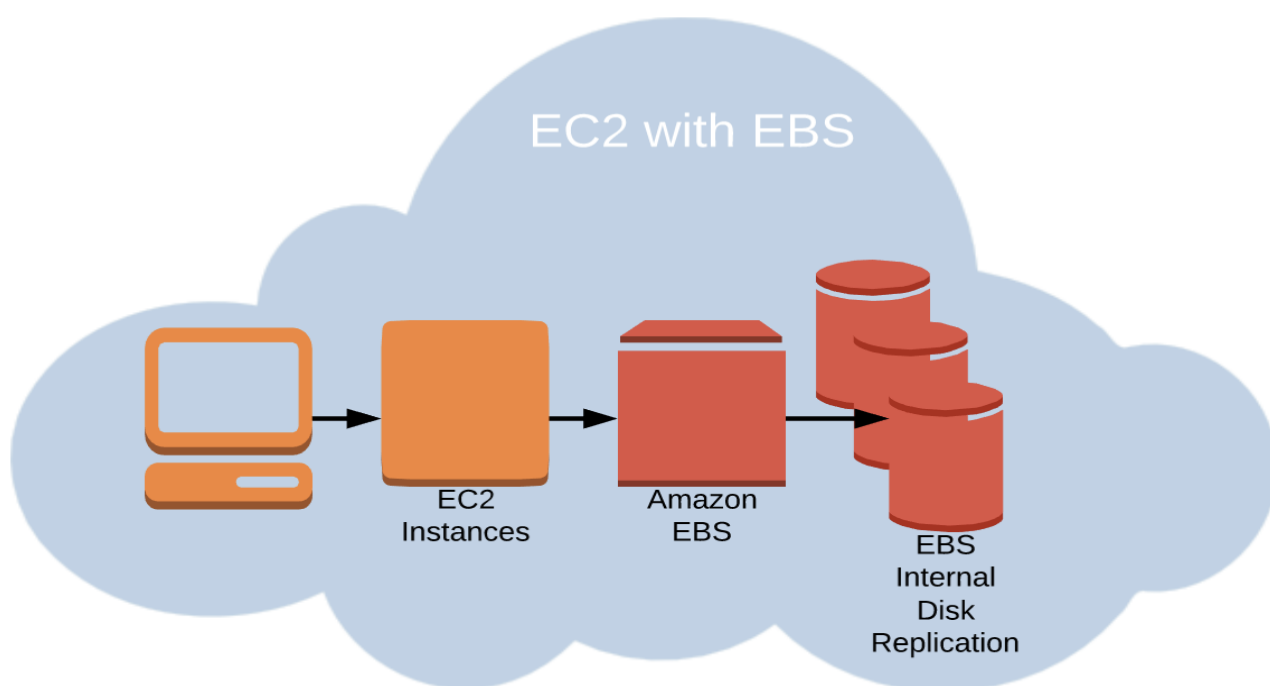
The throughput performance for EBS-optimized instances can vary between 4250 to 14,000 Mbps based on the instance type.

For instance, the SSD GP2 volume option is designed to operate within 10 percent of its baseline and burst performance, for 99 percent of the time that it's used as such.

This capability allows low spec instances to replicate the high performance of larger instances for a limited period of the day.

This feature allows users to right-size their instances while accommodating EBS demand spikes. As a result, the EBS volumes are optimized for a variety of storage use cases and the demand spikes do not impact end-user or customer experience.

The EBS solutions are optimized by default or available on a low hourly pricing.



2.4 STEPS TO CREATE AWS EC2 INSTANCES

1 Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance.

You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

The screenshot shows the AWS Management Console interface for the 'Launch Instance Wizard'. The browser address bar shows the URL: `us-west-1.console.aws.amazon.com/ec2/v2/home?region=us-west-1#LaunchInstanceWizard`. The console header includes the AWS logo, a search bar, and the user's name 'DeepaliCloudEngineer' with a dropdown menu for 'N. California' and a 'Support' link. The wizard progress bar shows seven steps: 1. Choose AMI (active), 2. Choose Instance Type, 3. Configure Instance, 4. Add Storage, 5. Add Tags, 6. Configure Security Group, and 7. Review.

Step 1: Choose an Amazon Machine Image (AMI)

The main content area displays a list of AMIs. The first AMI is 'Microsoft Windows Server 2019 Base - ami-0f6c23a2bf63bf1' with a 'Select' button. Below it is 'Deep Learning AMI (Ubuntu 18.04) Version 47.0 - ami-006a915cc6aeb0880' with a 'Select' button. This AMI is highlighted with a blue bar. Below it is 'Deep Learning AMI (Ubuntu 16.04) Version 47.0 - ami-0f6ac8db236b1e492' with a 'Select' button. Below that is 'Deep Learning AMI (Amazon Linux 2) Version 49.0 - ami-06a6258c3b5e21511' with a 'Select' button. At the bottom, a partially visible AMI 'Deep Learning Base AMI (Ubuntu 18.04) Version 40.0 - ami-0547b9cb597a6d4cd' is shown with a 'Select' button.

The footer of the console shows 'Feedback', 'English (US)', and copyright information: '© 2008 - 2021, Amazon Internet Services Private Ltd. or its affiliates. All rights reserved.' It also includes links for 'Privacy Policy', 'Terms of Use', and 'Cookie preferences'. At the bottom of the browser window, there are two tabs: 'ebs-ec2.png' and 'cloud12.png', and a 'Show all' button.

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.

← → ↻ us-west-1.console.aws.amazon.com/ec2/v2/home?region=us-west-1#LaunchInstanceWizard: Apps What is Microsoft A... Gmail YouTube Maps Reading list

aws Services Search for services, features, marketplace products, and docs [Alt+S] DeepaliCloudEngineer N. California 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
<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

Cancel Previous Review and Launch Next: Configure Instance Details

Feedback English (US)

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3. Instance description

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

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	<input type="checkbox"/> Request Spot instances	
Network	vpc-3dbd765b default (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	<input type="checkbox"/> Add instance to placement group	
Capacity Reservation	Open	
Domain join directory	No directory	Create new directory
IAM role	None	Create new IAM role
Shutdown behavior	Stop	
Stop - Hibernate behavior	<input type="checkbox"/> Enable hibernation as an additional stop behavior	
Enable termination protection	<input type="checkbox"/> Protect against accidental termination	

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

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4 . Adding 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.

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. Some limitations' about free usage tier eligibility and usage restrictions.

5 Step . Adding tag:

Tag is some what give unique identification to your ec2 instance so that you easliy ecognise it .

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, about tagging your Amazon EC2 resources.

Tags can be applied to all instances and volumes. Learn more about tagging your Amazon EC2 resources.

Key (128 characters maximum)	Value (256 characters maximum)	Instances ⓘ	Volumes ⓘ	Network Interfaces ⓘ
<input type="text" value="name"/>	<input type="text" value="server-1"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

[Add another tag](#) (Up to 50 tags maximum)

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

6 .STEP

Configure security group :

A security group is a set of firewall rules that control the traffic for your instance. 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.

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 ⁱ	Protocol ⁱ	Port Range ⁱ	Source ⁱ	Description ⁱ	
SSH ^v	TCP	22	Custom ^v 0.0.0.0/0	e.g. SSH for Admin Desktop	^x
All TCP ^v	TCP	0 - 65535	Custom ^v CIDR, IP or Security Group	e.g. SSH for Admin Desktop	^x
SMTP ^v	TCP	25	Custom ^v CIDR, IP or Security Group	e.g. SSH for Admin Desktop	^x




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.

Final steps review and launch your instance and check your intance is ready with in few mintues.

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.

▼ AMI Details

 Free tier eligible

Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-0ed05376b59b90e46
Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras. This AMI is the successor of the Amazon Linux AMI that is a...
Root Device Type: ebs Virtualization type: hvm

Edit AMI

▼ Instance Type

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

Edit instance type

▼ Security Groups

Security group name	launch-wizard-1
Description	launch-wizard-1 created 2021-07-22T10:55:11.088+05:30

Edit security groups

Cancel

Previous

Launch

CHAPTER 3

PROJECT ANALYSIS

Project analysis is the process of examining the aspects of a project in details. This is mainly to see to it that the project runs as expected and is also within the predefined budget.

THE BENEFITS OF PROJECT ANALYSIS

Determines Feasibility of a Project

Not all projects may serve the purpose intended. Some may be viable, but may still fall short in other areas. It is through the analysis of projects that their suitability is determined.

This can, therefore, determine whether the project is worthwhile or not.

Aids in Budgeting

As already stated, projects cost money. They must, therefore, operate within the predefined parameters and budgetary constraints. The analysis ensures that the projects run within the stipulated budgets.

This is because it identifies any inconsistencies and enables them to be dealt with timely.

Improves Project Planning and Scheduling

It is through the process of project analysis that any issues that may hinder the smooth implementation of projects are identified and dealt with. Once these issues are dealt with, the planning and scheduling of projects can now go on smoothly.

Detects and Mitigates Risks

All projects are subject to several risks such as poor design, poor implementation, pilferage of resources, and so on. Through analysis, these issues are identified and dealt with appropriately. This way, they are prevented from worsening and inflicting further

Expedites the Monitoring and Evaluation of Projects

At the end of a project, an assessment is often carried out to ascertain the efficacy of the project as well as whether it has indeed lived to its purpose.

By carrying out analysis from time to time, the process of assessing the project later becomes easier.

THE BASIC ELEMENTS OF PROJECT ANALYSIS

Aim

Each project analysis is initiated for a purpose. The aim of the project is to reduce cost and cloud technology the one that spells out this particular purpose. It basically stipulates the scope of the entire analysis as well as the finer objectives that are to be achieved in the process.

Methodology

This is basically the manner in which the analysis is going to be carried out. It is the sum total of the tools and strategies that are intended to be deployed for the sake of carrying out the analysis. It generally guides the researcher in executing the various tasks.

Timing and Duration

Timing refers to the exact moment in which the analysis is started and executed. The duration, on the other hand, refers to the total length of time that the analysis takes. Both are necessary as they give a rough indicator of just when the activity is to be performed.

Schedule

This is the breakdown of the entire analysis. It basically provides the finer details of when each aspect or element of the analysis shall be carried out. It is intended to guide the researcher as well as make the assessment process easier.

Success Indicators

These are the various parameters that are used to gauge the efficacy of the analysis process. They include the time taken to analyze the project, the error identified and rectified, and any complaints addressed.

Feasibility Study

1. Describe the project.
2. Outline the potential solutions resulting from the project.
3. List the criteria for evaluating these solutions.
4. State which solution is most feasible for the project.
5. Make a conclusion statement.

Project Description:

This project is totally based on the AWS cloud in which we are going to use the virtual server (windows server) with the all-specified configuration of the server like storage, ram, hdd , CPU etc. in addition with this aws provide us with the secret key as to login to the server.

Potential Solution from Project:

This project is solution for those who do not want to spent expenditure on infrastructure of the company like buying the costly server & then spent too much on their maintenance & other issues. Also not want to hire network engineer for such roles because setup a new business with all such things is a major challenge so a better option come in the market as Cloud which give you server on rent basis and charge as per their policies.

3.1 List the criteria for evaluating these solutions

- Online storage
- Secure access
- Protocol restriction
- On demand hardware selection
- On demand Operation system selection
- Pay as you go model
- World wide access if user want
- Allocate public & private Ip
- Provide internet gateway (for chrome access)

Conclusion

In conclusion, Virtualization by itself allows an organization to utilize and effectively use its IT resources. However, cloud computing takes the use of those resources to another level by delivering access to those components on-demand as a service, thus reducing complexity for the end user, cost and burden.

Virtualization should be a logical action for any organization that is considering the adoption of a Private cloud computing strategy.

By now you have probably realized that cloud computing and virtualization is a match made in heaven. The benefits of virtualization can greatly be enhanced if it used as part of a Private Cloud solution.

Cloud computing is built on a virtualized infrastructure; if you have already invested in virtualization, the cloud can work on top of that to further maximize your computing efficiency in specific instances and assist in the delivery of your current network as a service.

There are several fundamental characteristics that define cloud computing, such as automation, scalability, agility and on-demand service delivery.

This means that the cloud allows you to always use what you need and its ability to rapidly, elastically, and in some cases automatically provision computing resources enables you to fully concentrate on core business without worrying about IT management.

Cloud computing and virtualization are both meant to maximize computing processes while streamlining them and increasing efficiencies to reduce costs.

To begin with, both of them are used to create a private cloud infrastructure, meaning one is a key component of the other. In most organizations, each technology is deployed separately.

Secondly, Cloud computing is the delivery of computing resources, data or software as service through the internet; as opposed to virtualization, which is part of the logical infrastructure. In essence, the Cloud treats computing as a utility rather than a specific technology or product.

Virtualization in itself does not offer the end user a self-service layer and without the layer, computing cannot be delivered as a service. Virtualization will allow the company to fully maximize all of its computing resources but a system admin (using a Hypervisor or VMM) will still be required to provision the VM for the end use

CHAPTER 4

Project Design

Reduce the cost of infrastructure

A good project is always designed in a way that ensures right understanding of the stated vision and identifies the problems that prevent from achievement of the vision.

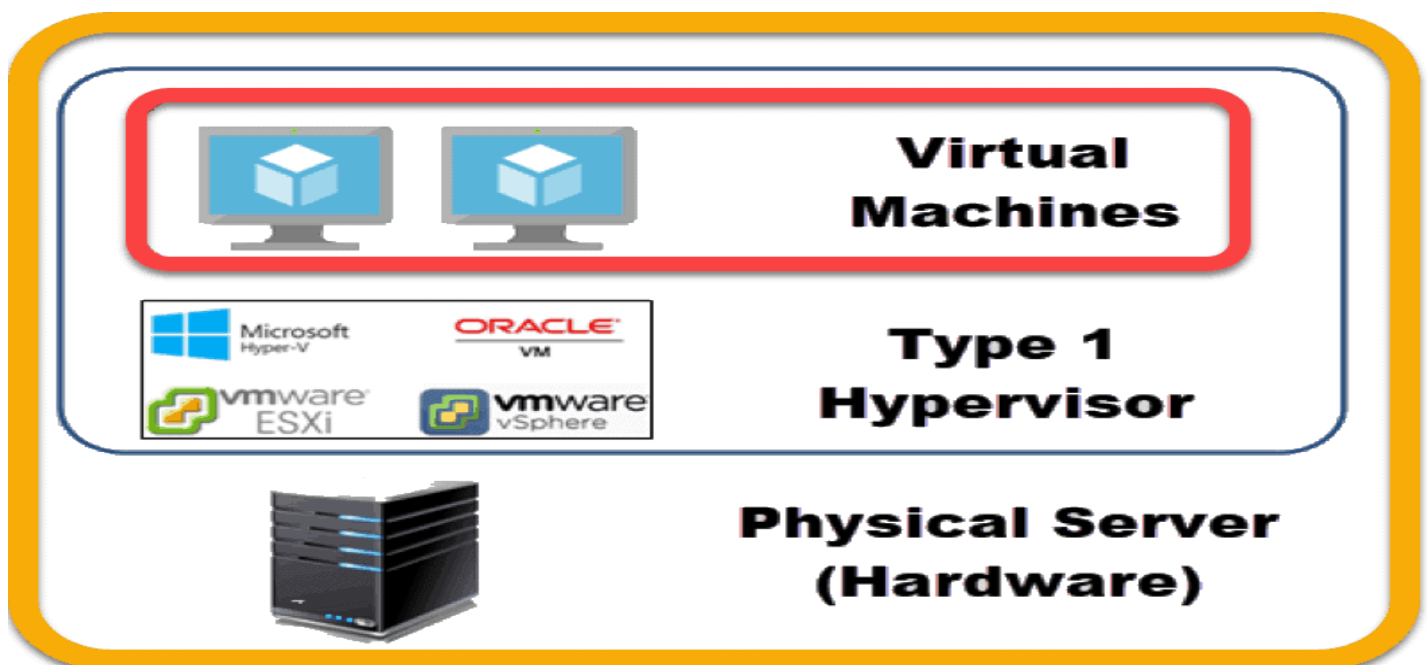
Thus, you need to perform a needs assessment to figure out what problems your business environment encounters and what needs your project will address.

The assessment will help you ensure that the problems do not block success of the envisioned scenario.

The assessment will also help gather valued information about the problems and let you better understand possible design of project solutions.

First, you decide what information is required for gathering. For example: if you run a website development project, you need such information as design, audience, SEO preferences, content requirements, others.

If you design a software project, you may require such info as functions, features, user requirements, target audience, dev platform, etc.



Determine Outcomes

Implementing more virtual servers on demand of customers & apply the as pay as you go model which is very much cost effective. Server operating system is available you can select and run your application .

The screenshot displays the AWS Management Console's 'Step 1: Choose an Amazon Machine Image (AMI)' wizard. The interface is divided into a left sidebar and a main content area. The sidebar includes 'My AMIs', 'AWS Marketplace', and 'Community AMIs'. The main content area lists several AMIs with their respective details and 'Select' buttons. The AMIs listed are:

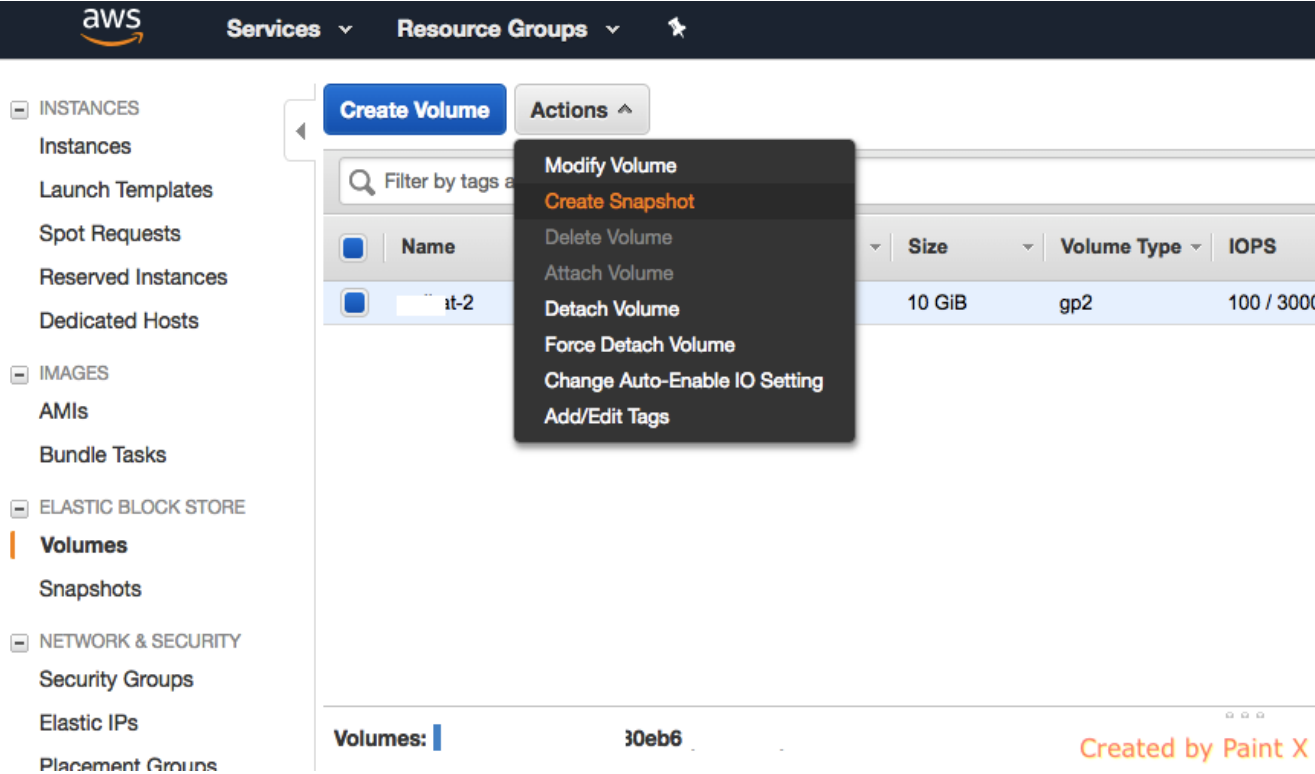
- Amazon Linux 2 AMI (HVM), SSD Volume Type** - ami-0ed053/6b59b90e46 (64-bit x86) / ami-0902/33800491eb5 (64-bit Arm). It includes a 'Free tier eligible' badge and a 'Select' button.
- Red Hat Enterprise Linux 8 (HVM), SSD Volume Type** - ami-054965c6cd7c6e462 (64-bit x86) / ami-05f88a4bcb91f4ea7 (64-bit Arm). It includes a 'Free tier eligible' badge and a 'Select' button.
- SUSE Linux Enterprise Server 15 SP2 (HVM), SSD Volume Type** - ami-05c558c169cfe8d99 (64-bit x86) / ami-05e206de142efa13a (64-bit Arm). It includes a 'Free tier eligible' badge and a 'Select' button.
- Ubuntu Server 20.04 LTS (HVM), SSD Volume Type** - ami-0d382e80be7ffdae5 (64-bit x86) / ami-0c58a45b4cecc02c (64-bit Arm). It includes a 'Free tier eligible' badge and a 'Select' button.
- Ubuntu Server 18.04 LTS (HVM), SSD Volume Type** - ami-07b068f843ec78e72 (64-bit x86) / ami-0437ad1b6a022fafe (64-bit Arm). It includes a 'Free tier eligible' badge and a 'Select' button.

Each AMI entry also displays its root device type, virtualization type, and whether ENA is enabled. A bottom banner promotes Amazon RDS with the text: 'Are you launching a database instance? Try Amazon RDS. Amazon Relational Database Service (RDS) makes it easy to set up, operate, and scale your database on AWS by automating time-consuming database management tasks. With RDS, you can easily deploy Amazon Aurora, MariaDB, MySQL, Oracle, PostgreSQL, and SQL Server databases on AWS. Aurora is a MySQL- and PostgreSQL-compatible, enterprise-class database at 1/10th the cost of commercial databases. Learn more about RDS'. A 'Launch a database using RDS' button is also present.

The browser's address bar shows the URL 'us-west-1.console.aws.amazon.com/ec2/v2/home?region=us-west-1#LaunchInstanceWizard:'. The Windows taskbar at the bottom shows various application icons and the system clock.

4.2 Identify Risks

Risk can be generated in any way so we must ready to cop-up with it . In virtual scenario For Risk management you must take backup in the form of AMI or SNAPSHOT ,look below in screenshots.



aws

Services

Resource Groups

Volumes > Create Snapshot

Create Snapshot

Volume

Description

mysnap-1

Encrypted

Not Encrypted

Key

(127 characters maximum)

Value

(255 characters maximum)

Name

mysnap-1

Add Tag

49 remaining

(Up to 50 tags maximum)

Created by Paint X

aws

Services

Resource Groups

INSTANCES

Instances

Launch Templates

Spot Requests

Reserved Instances

Dedicated Hosts

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

NETWORK & SECURITY

Security Groups

Elastic IPs

Create Snapshot

Owned By Me

Name

mysnap-1

Size

10 GiB

Description

mysnap-1

Actions

Delete

Create Volume

Create Image

Copy

Modify Permissions

Add/Edit Tags

Prepare a Visual Aid

Business Analytics & Data Visualization are two faces of the same coin. You need the ability to chart, graph, and plot your data.

Just as a picture is worth a thousand words, a visual is worth a thousand data points.

A key aspect of our ability to understand what's going on is to look for patterns, and these patterns are often not evident when we simply look at data in tables.

The right visualization will help you gain a deeper understanding in a much quicker timeframe.

Before you decide to create any chart or graph, you need to decide what you want to show or convey. Charts convey one of the following types of information: Key Performance Indicators (KPI), Relationships, Comparisons, Distributions, and Compositions.

A KPI is usually a single value that relates to a particular area or function and is a reflection of how well you are doing in that area or function.

This varies from business to business and function to function. Here are some popular KPIs that companies like to track:

Net Promoter Score (NPS): How likely is it for a customer to recommend your product or service to a friend?

Customer Profitability Score (CPS): How much profit does a customer bring to your business after deducting customer acquisition and customer retention costs

Conversion Rate: How many leads get converted to customers

Relative Market Share: How big is your slice of the pie compared to your competitors in the market?

Net Profit Margin: The percent of your revenue which is net profit.

Ballpark Your Budget

It's important to know the budget right from the start. Even if you don't have a complete picture of the costs and incomes your project will generate, create a budget in as much detail as you can.

The clearer you can be about your budget during the project design phase, the less likely you are to experience unexpected cost overruns later.

Estimating your budget will also help you determine the feasibility of the project. If the cost is more than your client, customer, funding source, or partnering entity can spare, the project can't realistically be undertaken.

Determine Approval and Monitoring Processes

Now that you have a picture of the project's goals, risks, and budget, decide how success will be determined. List the criteria you'll use to judge whether deliverables, outcomes, and the final product have been achieved.

You should also determine what processes must be followed in order for the project and its elements to be approved, and who is responsible for approval.

For projects that are quite technical or complex, you may also want to add a stage for "proof of concept." This allows the preliminary design of a product or service to be tested for viability before the project advances to the next phase.

Performing this stage can save a lot of time and money if the test isn't successful. If your proof of concept is feasible, this can reassure clients, stakeholders, and/or funding sources they have made a good investment.

Use Proper Project Design Documents

We create a proper documentation on how the client or customer use the product or software so that with proper ease they can handle all the task make project working.

DATA DICTIONARY

A Data Dictionary is a collection of names, definitions, and attributes about data elements that are being used or captured in a database, information system, or part of a research project.

It describes the meanings and purposes of data elements within the context of a project, and provides guidance on interpretation, accepted meanings and representation. A Data Dictionary also provides metadata about data elements.

The metadata included in a Data Dictionary can assist in defining the scope and characteristics of data elements, as well the rules for their usage and application.

Data Dictionaries are useful for a number of reasons. In short, they:

- Assist in avoiding data inconsistencies across a project
- Help define conventions that are to be used across a project
- Provide consistency in the collection and use of data across multiple members of a research team
- Make data easier to analyze
- Enforce the use of Data Standards

Data Standards are rules that govern the way data are collected, recorded, and represented. Standards provide a commonly understood reference for the interpretation and use of data sets.

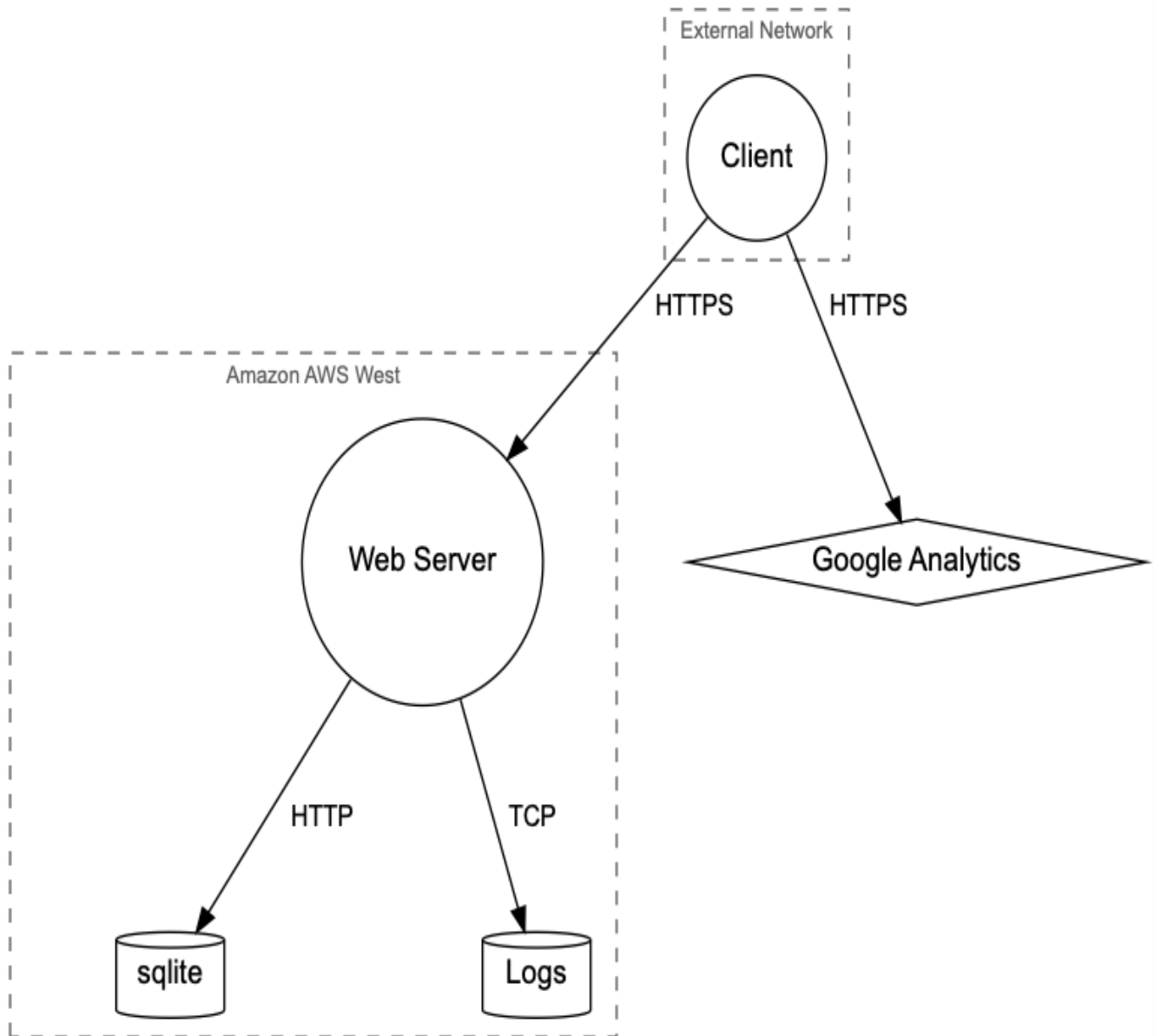
By using standards, researchers in the same disciplines will know that the way their data are being collected and described will be the same across different projects.

Using Data Standards as part of a well-crafted Data Dictionary can help increase the usability of your research data, and will ensure that data will be recognizable and usable beyond the immediate research team.

A data dictionary contains metadata i.e data about the database.

The data dictionary is very important as it contains information such as what is in the database, who is allowed to access it, where is the database physically stored etc. The users of the database normally don't interact with the data dictionary, it is only handled by the database administrators.

My WebApp



4.3 FIG

Active Data Dictionary

If the structure of the database or its specifications change at any point of time, it should be reflected in the data dictionary. This is the responsibility of the database management system in which the data dictionary resides.

So, the data dictionary is automatically updated by the database management system when any changes are made in the database. This is known as an active data dictionary as it is self updating

Passive Data Dictionary

This is not as useful or easy to handle as an active data dictionary. A passive data dictionary is maintained separately to the database whose contents are stored in the dictionary.

That means that if the database is modified the database dictionary is not automatically updated as in the case of Active Data Dictionary.

So, the passive data dictionary has to be manually updated to match the database. This needs careful handling or else the database and data dictionary are out of sync.

For groups of people working with similar data, having a shared data dictionary facilitates standardization by documenting common data structures and providing the precise vocabulary needed for discussing specific data elements.

Shared dictionaries ensure that the meaning, relevance, and quality of data elements are the same for all users. Data dictionaries also provide information needed by those who build systems and applications that support the data.

Lastly, if there is a common, vetted, and documented data resource, it is not necessary to produce separate documentation for each implementation.

4.3 DATA FLOW DIAGRAM OF EC2 INSTANCES

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination.

Data flowcharts can range from simple, even hand-drawn process overviews, to in-depth, multi-level DFDs that dig progressively deeper into how the data is handled.

They can be used to analyze an existing system or model a new one. Like all the best diagrams and charts, a DFD can often visually “say” things that would be hard to explain in words, and they work for both technical and nontechnical audiences, from developer to CEO.

That’s why DFDs remain so popular after all these years. While they work well for data flow software and systems, they are less applicable nowadays to visualizing interactive, real-time or database-oriented software or systems.

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It can be manual, automated, or a combination of both.

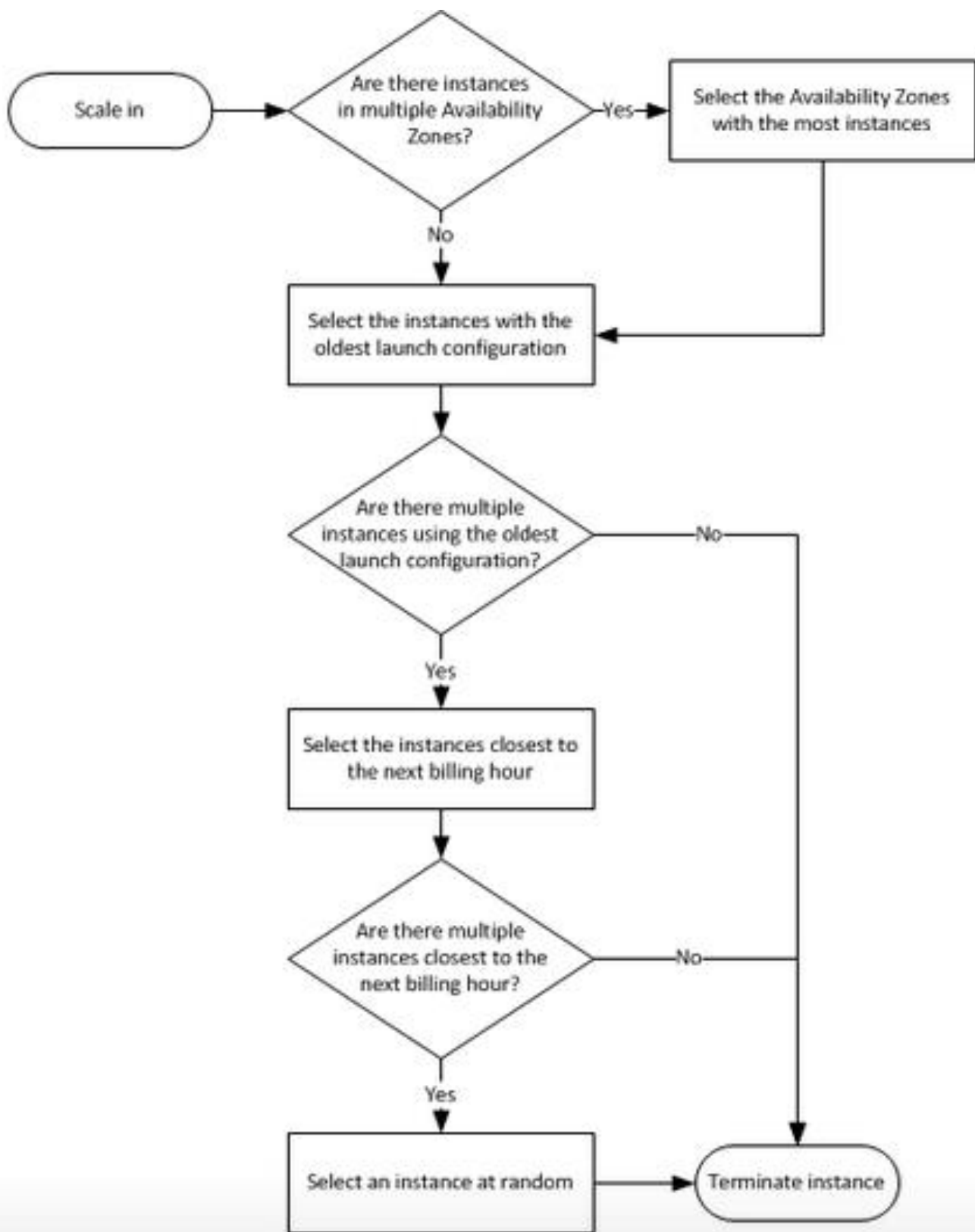
It shows how data enters and leaves the system, what changes the information, and where data is stored. The objective of a DFD is to show the scope and boundaries of a system as a whole. It may be used as a communication tool between a system analyst and any person who plays a part in the order that acts as a starting point for redesigning a system. The DFD is also called as a data flow graph or bubble chart.

All names should be unique. This makes it easier to refer to elements in the DFD.

Remember that DFD is not a flow chart. Arrows is a flow chart that represents the order of events; arrows in DFD represents flowing data. A DFD does not involve any order of events.

Suppress logical decisions. If we ever have the urge to draw a diamond-shaped box in a DFD, suppress that urge! A diamond-shaped box is used in flow charts to represent decision points with multiple existing paths of which the only one is taken. This implies an ordering of events, which makes no sense in a DFD.

Do not become bogged down with details. Defer error conditions and error handling until the end of the analysis.



CHAPTER 5

CODING & IMPLEMENTATION

Code for ec2 instances

```
aws ec2 run-instances --image-id ami-173d747e --count 1 --instance-type t1.micro --key-name MyKeyPair --security-groups my-sg
```

```
{
  "OwnerId": "123456789012",
  "ReservationId": "r-5875ca20", "Groups":
  [ {
    "GroupName": "my-sg", "GroupId": "sg-903004f8" } ],
  "Instances":
  [ { "Monitoring": { "State": "disabled" },

    "PublicDnsName": null, "Platform":

    "windows", "State": { "Code": 0, "Name": "pending"

    }, "EbsOptimized": false, "LaunchTime":

    "2013-07-19T02:42:39.000Z", "ProductCodes": [],

    "InstanceId": "i-5203422c",

    "ImageId": "ami-173d747e",

    "PrivateDnsName": null, "KeyName":

    "MyKeyPair", "SecurityGroups":

    [ { "GroupName": "my-sg", "GroupId": "sg-903004f8"

    }, "ClientToken": null, "InstanceType":

    "t1.micro", "NetworkInterfaces": [], "Placement":

    { "Tenancy": "default", "GroupName": null,

    "AvailabilityZone": "us-west-2b" },

    "Hypervisor": "xen", "BlockDeviceMappings": [ {
```



```

"DeviceName": "/dev/sda1",

"Ebs": { "Status": "attached", "DeleteOnTermination":

true, "VolumeId": "vol-877166c8", "AttachTime": "2013-07-19T02:42:39.000Z" }

}], "Architecture": "x86_64", "StateReason":

{ "Message": "pending", "Code": "pending" },

"RootDeviceName": "/dev/sda1", "VirtualizationType": "hvm",

"RootDeviceType": "ebs", "Tags": [ { "Value": "MyInstance", "Key": "Name"

"AmiLaunchIndex": 0
}
]
}

```

5.2 Coding for Terminate your instance

```

$ aws ec2 terminate-instances --instance-ids i-5203422c
{
  "TerminatingInstances":
  [
    { "InstanceId": "i-5203422c",
      "CurrentState":
      { "Code": 32, "Name": "shutting-down" },
      "PreviousState":
      { "Code": 16, "Name": "running" }
    }
  ]
}

```

Code for creating a keypair for ec2 instances

```
aws ec2 create-key-pair --key-name MyKeyPair --query 'KeyMaterial' --output text > MyKeyPair.pem
```

CHAPTER 6

TESTING MECHANISM USED

Testing is the process of evaluating a system or its component(s) with the intent to find whether it satisfies the specified requirements or not. In simple words, testing is executing a system in order to identify any gaps, errors, or missing requirements in contrary to the actual requirements

According to ANSI/IEEE 1059 standard, Testing can be defined as - A process of analyzing a software item to detect the differences between existing and required conditions (that is defects/errors/bugs) and to evaluate the features of the software item.

Who does Testing?

It depends on the process and the associated stakeholders of the project(s).

In the IT industry, large companies have a team with responsibilities to evaluate the developed software in context of the given requirements.

Moreover, developers also conduct testing which is called **Unit Testing**. In most cases, the following professionals are involved in testing a system within their respective capacities –

- Software Tester
- Software Developer
- Project Lead/Manager
- End User

Different companies have different designations for people who test the software on the basis of their experience and knowledge such as Software Tester, Software Quality Assurance Engineer, QA Analyst, etc.

It is not possible to test the software at any time during its cycle. The next two sections state when testing should be started and when to end it during the SDLC.

Software Testing is Important because if there are any bugs or errors in the software, it can be identified early and can be solved before delivery of the software product. Properly tested software product ensures reliability, security and high performance which further results in time saving, cost effectiveness and customer satisfaction.

6.1 Manual testing

The process of checking the functionality of an application as per the customer needs without taking any help of automation tools is known as manual testing

. While performing the manual testing on any application, we do not need any specific knowledge of any testing tool, rather than have a proper understanding of the product so we can easily prepare the test document.

Manual testing can be further divided into three types of testing, which are as follows:

- **White box testing**
- **Black box testing**
- **Gray box testing**

Automation testing

Automation testing is a process of converting any manual test cases into the test scripts with the help of automation tools, or any programming language is known as automation testing.

With the help of automation testing, we can enhance the speed of our test execution because here, we do not require any human efforts. We need to write a test script and execute those scripts.

Test Automation is the best way to increase the effectiveness, test coverage, and execution speed in software testing. Automated software testing is important due to the following reasons:

- Manual Testing of all workflows, all fields, all negative scenarios is time and money consuming
- It is difficult to test for multilingual sites manually

- Test Automation in software testing does not require Human intervention. You can run automated
- test unattended (overnight)
- Test Automation increases the speed of test execution
- Automation helps increase Test Coverage
- Manual Testing can become boring and hence error-prone.

Automated Testing Process:

Step 1) Test Tool Selection

Step 2) Define scope of Automation

Step 3) Planning, Design and Development

Step 4) Test Execution

Step 5) Maintenance

Benefits of Automation Testing

- 70% faster than the manual testing
- Wider test coverage of application features
- Reliable in results
- Ensure Consistency
- Saves Time and Cost
- Improves accuracy

- Human Intervention is not required while execution
 - Increases Efficiency
 - Better speed in executing tests
 - Re-usable test scripts
 - Test Frequently and thoroughly
-
- More cycle of execution can be achieved through automation
 - Early time to market

6.3 How to Choose an Automation Tool?

- Environment Support
- Ease of use
- Testing of Database
- Object identification
- Image Testing
- Error Recovery Testing
- Object Mapping
- Scripting Language Used
- Support for various types of test - including functional, test management, mobile, etc...
- Support for multiple testing frameworks

- Easy to debug the automation software scripts
- Ability to recognize objects in any environment
- Extensive test reports and results
- Minimize training cost of selected tools

Tool selection is one of the biggest challenges to be tackled before going for automation. First, identify the requirements, explore various tools and its capabilities, set the expectation from the tool and go for a Proof Of Concept.

3 AWS Testing Tools for Testing your Amazon Infrastructure

Amid the increasing importance of cloud computing services, cloud testing is also gaining relevance. The main goal of cloud testing is to verify an application's performance and stability using cloud computing that provides more scalability and flexibility.

The cloud allows developers to test functional and non-functional features of the software in less time and with fewer resources.

Companies that work with AWS have two main options: native AWS testing tools or AWS certified third-party platforms. In this article, we will solely focus on AWS testing services and explore three tools for Quality Assurance.

AWS Inspector — Security testing tool

Amazon Inspector is at the top of the AWS automated testing tools list as it detects security loopholes in the deployment phase.

Evaluating and prioritizing the identified vulnerabilities, AWS Inspector generates automatic reports with explicit data about the findings and corresponding security measures.

This Amazon Web testing service offers an easy-to-understand overview of the potential bottlenecks and weaknesses that need to be addressed as early as possible.

- **Automate detection of security issues**

Amazon Web Services has a set of security standards and best practices that act as benchmarks for applications.

AWS Inspector tool checks the system for hidden vulnerabilities in both pre- and post-deployment phases and compiles all the findings in a concise report.

The earlier you detect a potential security issue, the less money would be spent on fixing it.

Adopt DevSecOps

To ensure the ultimate level of security, you need to integrate health checks into your workflow, and DevOps is the best method of achieving this goal.

Amazon Inspector is one of the AWS tools for testers that is delivered as a service that facilitates an easier adoption into the existing DevOps process.

DevSecOps extends DevOps with QA and entails continuous communication among operational teams, developers, and testers.

Besides ensuring ongoing collaboration between developers and operations, security DevOps delivers automated vulnerability assessments, making QA an integral part of the development and deployment processes.

Get access to the AWS security expertise

Amazon security and testing providers aim to deliver an extensive knowledge base and best practices to ensure a secure cloud.

By continuously assessing and updating their rules and guidelines and creating new AWS tools for testing, Amazon simplifies the adoption of security measures in the cloud. Amazon delivers its top-notch security expertise in the form of a service that is easy to employ and use.

Ensure security compliance

The costs of non-compliance, especially when it comes to security, can be devastatingly high. Amazon Inspector provides transparency and visibility to the security testing and gives easy access to auditors. AWS

guarantees a successful audit by creating transparent processes and thorough documentation that shows compliance with standards.

Furthermore, you can define and enforce your security standards that are crucial for your organization and industry.

AWS Device Farm — Automated testing tool

Device Farm is another automated AWS testing tool that allows mass testing across various devices.

Instead of creating a complex testing infrastructure with multiple browsers and devices, your company can use these AWS services for testers and set up automated test cases.

The service helps you execute your tests concurrently on numerous devices and browsers and immediately receive test results and logs to identify issues.

Why AWS Device Farm?

- **Test with real devices instead of emulators**

AWS testing tools and services enable testing with real devices instead of emulators that can be highly inaccurate. AWS Device Farm connects you to real devices, thus giving you a deeper understanding of the application performance. Amazon constantly extends the list of the available devices that allows you to incorporate devices' native features like memory, CPU usage, and other specifics into their test scenarios.

- **Approximate the real-world surroundings**

AWS Device Farm allows you to adjust various settings like location, network connection, language, etc., and even install other applications on the devices to simulate a realistic customer environment.

- **Customize your tests**

AWS environment offers customization tools from open-source frameworks like Appium and Espresso that unlock special test cases that are significant to your application.

- **Build your private device lab**

You can create your own device lab with iOS or Android devices that will be exclusive to your project. AWS Device Farm lets you set the needed configurations and leave them untouched between the testing sessions. This way, you will not be queued to gain access to the devices; on the contrary, they will be available to you at any time.

- **Run tests on desktop browsers**

AWS Device Farm also offers to execute tests on multiple desktop browsers like Chrome, Firefox, Internet Explorer to evaluate the performance across the browser environments. Moreover, you can run various tests simultaneously, thus saving money due to Amazon's pay-as-you-go pricing model.

6.4 AWS Fault Injection Simulator — Infrastructure testing tool

Our last tool is Fault Injection Simulator. Built for running fault injection experiments, this testing service helps you drive up the performance and stability of your application.

But what is fault injection? It is a technique commonly used in testing that checks how the system will behave in a stressful and out-of-the-ordinary situation.

Fault injections are achieved by creating and running a disrupting scenario that will put the application under stress, such as a rapid spike in user traffic or memory consumption.

The created real-world conditions help you uncover hidden bottlenecks that have gone unnoticed with other testing types.

Fault injection provides testers with ready-made templates that cause the desired disruptions and guarantee the results.

The automation that Amazon testing tools deliver allows QA teams to delegate some monitoring tasks as the service provides automatic rollbacks in case of failure.

On top of that, testers can generate overlapping scenarios when several disruptions occur simultaneously to simulate real-world messiness and make sure the application is bullet-proof.

Why AWS Fault Injection Simulator?

- **Identify performance bottlenecks**

Amazon Fault Injection service enables verifying your system's performance, resilience, and visibility through various methods of stressing an application via disruptive events.

What traditional test management tools could miss will be uncovered with fault injection scenarios and fixed before deployment takes place.

- **Define the conditions of the experiment**

Your cloud QA testers can define the breaking points that embody the conditions for experiment interruption.

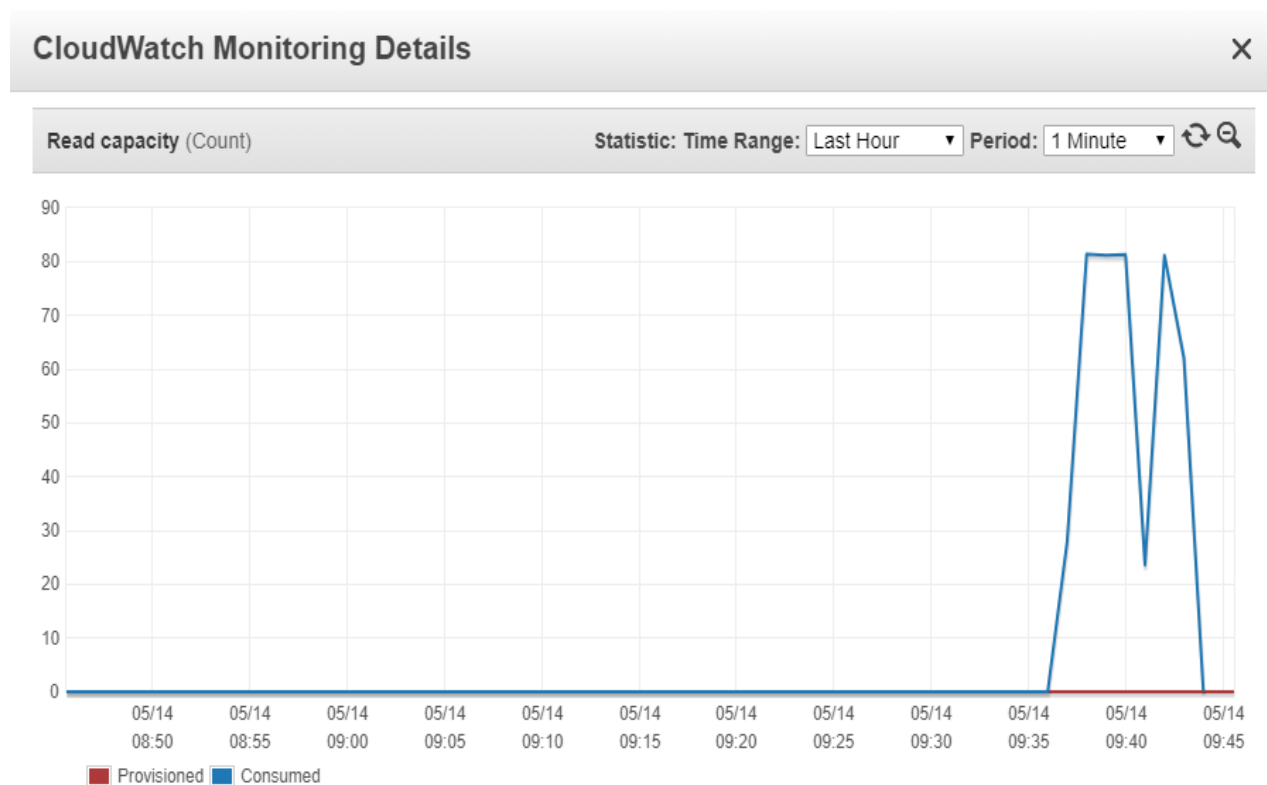
When the predefined conditions are met, the fault injection experiment stops, and the system rolls back to the pre-experiment state.

- **Start fast and easy with the short learning curve**

AWS tools and services for testers and QA specialists are easy to grasp as they come with predefined templates. Even if you are new to fault injection testing, you will be able to perform the tests by adopting the pre-written structure of the experiment process.

- **Simulate real-world conditions**

Typically, it is tough to generate close to reality conditions, but Fault Injection Simulator helps you approximate them. You can tweak the performance of several resources at the same time in the production environment to objectively assess the application behavior.



6.5 Amazon EC2 Testing Policy

Network Stress Test

This policy concerns customers who are planning on running high volume network tests directly from their Amazon EC2 instances to other locations such as other Amazon EC2 instances, AWS properties/services, or external endpoints. These tests are sometimes called stress tests, load tests, or gameday tests.

For the sake of this policy, we consider a "network stress test" to be when a test sends a large volume of legitimate or test traffic to a specific intended target application. The endpoint and infrastructure are expected to be able to handle this traffic.

This policy is not concerned with normal production traffic.

Network stress tests are different from normal production because network stress tests often target specific endpoints, have different traffic patterns including the concentration of sources and targets, maintain higher sustained volume than normal traffic, and can accidentally exceed expected limits

.

During network stress tests, these differences present potential risks for unintended impact to external endpoints, other customers, or AWS services.

Tests that purposefully attempt to overwhelm the target and/or infrastructure with packet or connection flooding attacks, reflection and complexity attacks, or other large volumes of traffic are not considered network stress tests but are considered distributed denial of service (DDoS) tests.

Volumetric network-based DDoS simulations are explicitly prohibited from the Amazon EC2 platform and are not covered by this policy.

Most customer testing will not fall under this policy. Normally, tasks like customer unit tests simulating large workloads for stress testing do not generate traffic that qualifies as network stress tests.

This policy only applies when a customer's network stress test generates traffic from their Amazon EC2 instances which meets one or more of the following criteria: sustains, in aggregate, for more than 1 minute, over 1 Gbps (1 billion bits per second) or 1 Gpps (1 billion packets per second); generates traffic that appears to be abusive or malicious;

or generates traffic that has the potential for impact to entities other than the anticipated target of the testing (such as routing or shared service infrastructure).

Customers will need to ensure the target endpoint has authorized the testing and understands the expected volumes. Some external endpoints or AWS services may have lower than expected thresholds for certain testing scenarios.

We understand that many of our large customers generate more than 1 Gbps or 1 Gpps of traffic in normal production mode regularly, which is completely normal and not under the purview of this policy, unless specifically done for the purpose of network stress testing.

Network stress tests that meet this policy's criteria have risks: the customer may be detected and/or reported as being abusive; the customer might be unintentionally abusive and/or impactful to other entities; and the customer might have mitigations applied to their instances, which can impact their tests as well as their production workloads.

If a customer is unsure if their tests meet these criteria, they should follow this policy, and have AWS evaluate the tests.

To improve the experience for the customer and other entities that might be impacted by such a test, before these stress tests are performed, the customer must fill out an Amazon EC2 Network Stress Test intake form, which can be obtained by [completing the form](#).

If a customer's network stress tests are performed via means other than directly from their EC2 instances, i.e., via external or other AWS services, they should send an email to determine if they need to submit a form.

AWS will generally respond to e-mail inquiries within 48 hours, please feel free to follow up if you have not received a response within that time frame.

Upon receiving the form, AWS will evaluate the test parameters and respond with what steps are needed to help prevent accidental impact.

If AWS determines there is not likely to be impact there will be no steps, but AWS will be ready to respond if needed.

For tests that might have impact steps may include running the network generating tests from a separate AWS account, adjusting the tests to minimize risk, or working with AWS Support closely to understand the scenarios and processes.

Even with approval from AWS, the customer is still responsible for any damages to AWS, other AWS customers, or external entities that are caused by testing activities.

JMeter cloud load testing

Running one instance of JMeter is easy. Running many instances of JMeter starts to get hard. When you don't have the time or the budget to manage your load generation infrastructure on-premise, you can take advantage of Flood's cloud-based load test infrastructure - configure load generators on demand within minutes.

If you are already a customer of popular cloud-based platforms such as AWS or Azure, you can also leverage Flood within your own hosted infrastructure for increased configuration and network security deployment options.

If you're new to load testing or have never thought about simulating load at the protocol level, writing your first load test script can be difficult.

Flood's online Test Builder helps you to get started generating load against any HTTP endpoint quickly. Enter the target URL and let Flood build your first load test plan for you.

The Test Builder has the added convenience of generating a JMeter compatible load test plan. You can download a copy of JMeter test plans from Flood and extend them further within JMeter itself, or you can continue to build, test, and run load tests direct from your browser instead. Flood makes it easy to get started with your first JMeter test.

If you already have a JMeter test plan, you can upload that along with any supporting data and let Flood run it for you, either on-premise or in the cloud.

Take advantage of Flood's advanced test management and reporting features, from the convenience of your browser.

No need to install additional software, no need to collate, and manually analyze results. Flood gives you a load testing dashboard to examine all of your results in real-time, whether it's from one load generator or many.

Take your scripting to the next level with Flood's Ruby-JMeter, an open source library that gives you an easy-to-use domain-specific language for fluent communication with JMeter.

It also includes API integration with Flood, so you can automate your load testing pipeline, from continuous integration to deployment, Flood makes it simple.

Distributed remote testing with JMeter

While JMeter on one machine is relatively straight forward, JMeter on many devices is not for the faint-hearted.

Combined with the use of cloud-based provisioning, this means Flood can scale from one to thousands of load generators within minutes, without significant overheads or bottlenecks within the load generation itself.

There's no need to plan or provision expensive load generation infrastructure in advance. Specify where in the world you want to load test from, and Flood will spare you the headache of configuring, building, and provisioning a load test platform yourself.

Leverage the cloud to obtain economy of scale from your load tests, or use your existing on-premise compute and network infrastructure to cater to your specific needs.
Flood is a flexible, and complete, distributed load test platform.

JMeter has many plugins to help you analyze the results of a single test. You might even be using spreadsheets to do your analysis of results. Widen your view from an individual load test perspective, to performance over time using Flood Insights.

With a balance between detailed real-time analysis for single load tests and historical analysis of many load tests over time, Flood gives you a single reporting platform to manage your performance results.

Watch and observe the real-time performance of your applications under load. Fine-tune your systems to eliminate performance bottlenecks.

Identify trends or regression in performance over time.

Flood's reporting is customizable to your needs, is easily shared with other members of your organization, and takes the pain out of collecting and analyzing load test results.

CHAPTER 7

Future Scope of the Project

Future Scope of AWS In Cloud Technology

Amazon Web Services are the topmost services trending now. The benefits are widespread, easily accessible and most prioritize customer satisfaction.

Amazon web services are mostly cloud computing provided by Amazon. Cloud computing is the future of today's generation, and anyone can access data globally from anywhere.

With just a click on the computer and sitting anywhere globally, the services can be accessed. Plenty of resources and data are available in cloud Amazon based web services.

You have to access it on the internet. For anyone interested and wants to lead their career in technology, Amazon web services are the best choice for today's scenario.

Amazon's web service is mainly a cloud service provided by Amazon. Amazon web services were introduced in 2006. Amazon web services are flourishing as it is the leading cloud service for any groups, companies, and international organizations.

The examples are Google cloud, IBM, Azure, and many more are present. The most trending, compelling future of Amazon web services and the advantages of using Amazon web services are the services' affordable pricing.

According to the user end, its security is too high and sensitive to any malicious data and has good flexibility and customizability

Amazon Web Services, popularly known as AWS in the market, is a secure cloud service platform. It offers various functions for a business to scale up and grow such as computing power, content delivery, database storage and many other functionalities.

By using AWS cloud products and services you can leverage your organization by building sophisticated applications which are more scalable, flexible and reliable.

AWS provides a broad set of IT infrastructure platform to its customers with services which are available to the business owners within seconds and delivered on demand with a flexible pay-as-you-go price scheme. Some of the technologies which are on high demand are:

- Wide storage options
- Networking and database
- Computing power
- Block chain
- AWS cost management
- Machine Learning
- Migration and transfer
- Security, identity and compliance

In the current market place, where every process is becoming more technological and every organization is turning to cloud services, being trained in AWS is an added advantage for you.

Several large organizations require individuals who are skilled in cloud computing services in order to transform and scale up their businesses.

Being trained and certified in AWS will not only help the individual to validate their cloud skills and advance further in the organization, but also benefits the organization by having someone adept in cloud services knowledge rather than by someone who is not trained in it.

With technology developing constantly, it is important to be constantly up-to-date with your knowledge and practice on AWS. For this, it is important that you pick a training course that is not fixed with a particular time, and is rather constantly evolving over time. You can find some of the best certifications for AWS training in Bangalore.

A certification in AWS will help benefit you to choose from a wide range of career options such as AWS solutions architect, AWS engineer, cloud architect, DevOps Engineer, and many more. A good AWS course teaches you how to design, and scale AWS Cloud implementations, in addition to the best practices recommended by Amazon

A majority of the world market share is moving towards cloud computing and their first choice is AWS. Some popular MNCs who have turned to AWS are Netflix, Kelloggs, General Electric and Adobe.

❏ FUTURE SCOPE OF SERVER VIRTUALIZATION

Server virtualization is one of those technologies that's simple in concept and profound in its impact on enterprise data centers.

What if, instead of running one operating system instance and one application per server, you could add a layer of software, known as a hypervisor, that enables you to run multiple operating system instances and associated workloads on a single physical server?

That's the idea behind server virtualization, and the idea dates back to IBM mainframes in the 1960s and was popularized by VMware, which introduced virtualization software for x86 servers in the early 2000s.

Since then, other vendors have developed their own server-virtualization platforms and the industry as a whole has created advanced management, automation and orchestration tools that make deploying, moving and managing virtual machine (VM) workloads a breeze.

Prior to server virtualization, enterprises dealt with server sprawl, with underutilized compute power, with soaring energy bills, with manual processes and with general inefficiency and inflexibility in their data-center environments.

Server virtualization changed all that and has been widely adopted. In fact, it's hard to find an enterprise today that isn't already running most of its workloads in a VM environment.

But, as we know, no technology is immune to being knocked off its perch by the next big thing. In the case of server virtualization, the next big thing is going small.

Server virtualization took a physical device and sliced it up, allowing multiple operating systems and multiple full-blown applications to draw on the underlying compute power.

The benefits of server virtualization are many, starting with basic server consolidation.

You can combine multiple applications on a single piece of hardware, thereby reducing the total number of servers required in the data center.

Fewer servers, fewer racks, less networking gear; it all translates into money savings on everything from physical space to maintenance costs to air conditioning.

Server virtualization reduces the need for capital expenditures on new hardware, getting you off that hardware refresh merry-go-round. And you can re-deploy those suddenly freed-up servers.

Remember when data-center admins had to provision servers by hand?

With server virtualization comes advances in automation that allow you to spin up a VM in seconds and to move multiple workloads at the touch of a button in response to changing business needs.

Server virtualization also delivers the high availability, failover, speed, scalability, agility, performance and flexibility that today's web-based, highly connected businesses require.

And server virtualization is the underlying technology that enables cloud computing vendors to offer their services.

When a customer orders up infrastructure-as-a-service (IaaS) from a cloud service provider, they start with VMs and add on the associated storage, management and security features required to accomplish the task at hand.

In the server virtualization world, the physical server is referred to as the host and runs a host operating system. Each VM is a guest and runs a guest operating system

In a traditional IaaS cloud environment, customers first provision VMs, storage, databases and associated security and management tools, then they load applications onto the VMs.

With serverless computing, developers write code and the cloud service provider handles everything else.

The developer never has to think about servers, operating systems, provisioning or managing. Of course, there is a physical server that runs the code, but that's the cloud service provider's responsibility.

Instead of a monolithic application, code is broken down into specific functions. When an event happens that triggers that function, the serverless service – for example Amazon's Lambda – runs it. Serverless providers charge customers by the function.

As with the microservice/container scenario, serverless computing bypasses the virtual machine layer and functions run on bare metal. At this point, serverless computing is relatively immature and use cases are limited.

While containers are hot and interest in serverless computing is growing, the reality is that server virtualization is a rock-solid technology that powers the vast majority of enterprise applications – some estimates put VM saturation as high as 90 percent.

It's difficult to envision an enterprise moving mission critical applications running smoothly on VMs to either containers or a serverless platform.

Users with heterogeneous environments will likely still use VMs because containers need to run all on the same OS and can't be mixed between Linux and Windows.

But for new applications that are being built with the latest DevOps and agile methodologies, developers now have options. Going forward, developers will make case-by-case decisions on whether to run new workloads in a traditional VM, a container or a serverless environment.

The data center industry has moved way beyond simple server virtualization, and is exploring new avenues to make virtualization an even more powerful platform.

Let's take a look at some of these newer approaches to virtualization.

Several years ago, we began using virtualization technologies as means to test servers and use resources more effectively. When VMware became a hypervisor, very few vendors actually supported a virtual infrastructure. So, virtualization was left behind in the classroom, and the development environment within numerous organizations

With the awareness quickly rising, administrators saw that server resources were being wasted dramatically and that virtualization was a way to curtail that. And with that, the pressure rose on vendors to support a virtual state. From there, server virtualization made its way into almost all data center environments as more organizations adopted the technology to help align their business needs.

If we can virtualize a server, why not apps? Popularity with products like XenApp, ThinApp, and now Cloud Volumes continues to increase. Administrators are able to stream or delivery applications to the end-user without actually deploying them at the end-point.

This sort of control and manageability makes app virtualization very plausible. In fact, many of the big Fortune 500 organizations have some type of application virtualization deployed already. The next iteration of application and virtualization will absolutely revolve around secure clientless delivery. HTML5 allows you to stream entire applications directly to a web browser.

This can helped revolutionize how end-points are being deployed and how organizations control resources.

People very realized that VDI isn't as easy as it may seem. Numerous underlying components can make this technology a bit cumbersome.

Today, there has been a resurgence behind VDI and the delivery of complete virtual desktops. Similar to applications, HTML5 can also steam *entire* desktops directly to a browser. The other big aspect is how far the data center has come as well. Converged infrastructure, better resource controls and more use-cases are actually resulting in more VDI deployments today.

The future, however, might be a bit different. The concept of a "desktop" as we know it might be going away as the focus shifts even more towards the delivery of applications and data.

Network virtualization has allowed the administrator much greater control over a network infrastructure. Where one physical NIC had its limitations, new technologies allow for numerous virtual networking designations on a corporate network.

Another big network virtualization push revolves around network functions virtualization (NFV). You can now virtualize specific network functions and allow them to run as individual nodes connecting with other communication and networking services.

For example, you can have virtual machines or appliances running as virtual load balancers, firewalls, and even WAN optimizers.

Security Abstraction: There will always be room in the IT world for more traditional unified threat management devices. However, hardened physical appliances aside, more organizations have deployed security platforms on top of a VM.

The flexibility to clone security appliances, place them at various points within the organization and assign specific functions to them makes security virtualization very appealing. Imagine having a security appliance VM only doing DLP, IPS/IDS.

This type of deployment can be very strategic and beneficial. Furthermore, you're going to see a lot more virtual services specifically designed to protect your cloud.

Inter-cloud connectivity needs a good security practice. This is where more virtual appliances helping bind security services spanning multiple cloud services are really going to help.

User Virtualization, With IT consumerization and mobility making a presence, more organizations have been looking for ways to abstract the user layer from devices, applications and end-points. And so, user virtualization was born.

Solutions from technologies like AppSense provide a way for a user to transfer their personalized settings from application to application and from platform to platform. Basically, users are able to carry their settings with them as they migrate from various systems and applications. Furthermore, you can tie the user's compute profile between various end-points and even cloud resources.

Storage Virtualization: A single storage controller can be logically carved up so well, that they appear to be their own standalone units to the administrator.

Using storage more efficiently is on the front page of many project lists. Controller multi-tenancy is just one example of how storage virtualization plays a role in today's IT world. Another big example is what's happening around software-defined storage.

An organization's ability to completely abstract every storage resource and point it to a virtual layer for management is absolutely a reality. Today's heterogeneous storage architecture is asking for a better way to manage silo'd disks, storage arrays, and cloud resources.

The list will most likely grow as more environments seek ways to be even more efficient. Already, virtualization technologies are helping many businesses cut costs, regain control, and allow for greater growth with their infrastructure. The most important point to remember here is that the logical (virtual) layer will be critical to help connect your data center to your users – and to the cloud.

VIRTUALIZATION SOFTWARE MARKET - GROWTH, TRENDS, COVID-19 IMPACT, AND FORECASTS (2021 - 2026)

ABOUT THIS REPORT

Market Snapshot

Market Overview

Scope of the Report

Key Market Trends

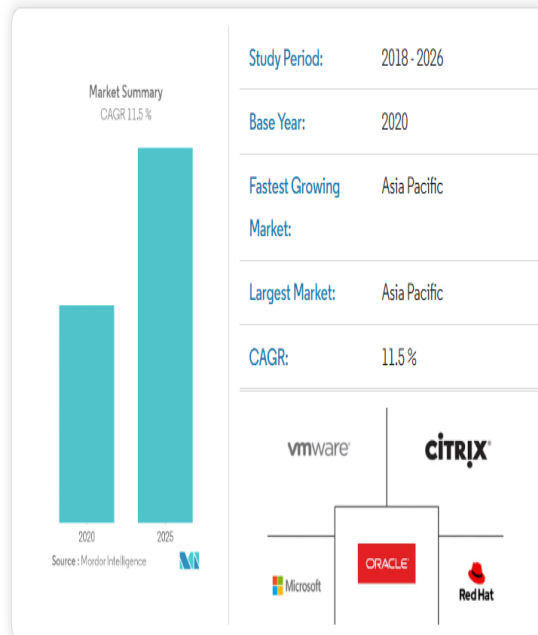
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Need a report that reflects
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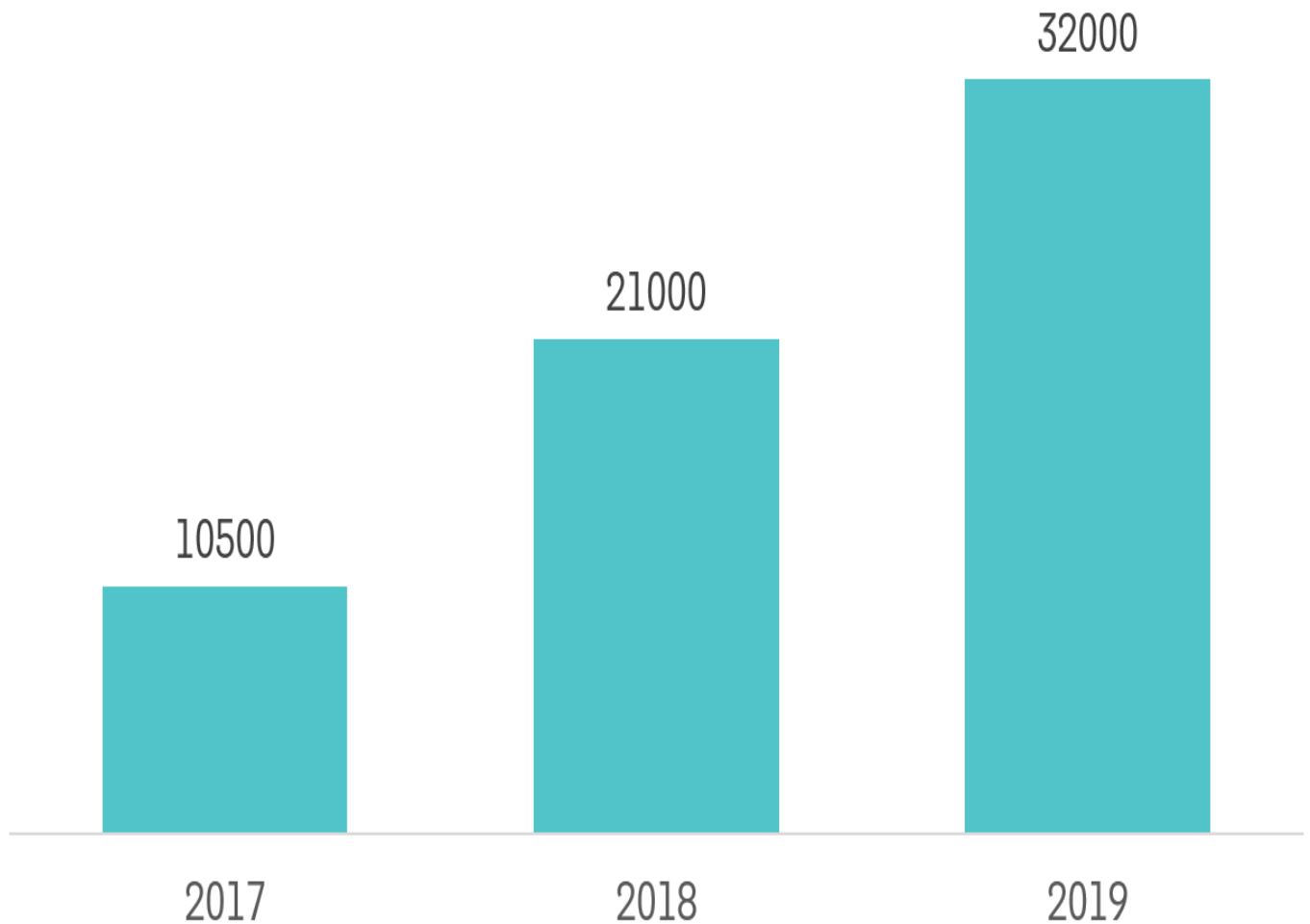
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Data Storage Needs, in Exebytes, Global , 2017-2019*



*Forecast

Source: Enterprise Data Storage 2018



The 2020 State of Virtualization Technology

From VMs to VSANs and VLANs to VDI, Spiceworks examines current and future adoption plans of the various types of virtualization used by businesses.

Not that long ago, running applications directly on physical servers — which often sat mostly idle — was typical in server rooms around the world.

But within the span of a decade, use of server virtualization, which can drastically improve IT efficiency, became a standard industry practice.

Server virtualization adoption also grew thanks to additional benefits such as application isolation, greater workload portability, improved scalability, and high availability options. These advances ultimately helped businesses get more out of their hardware and “do more with less.”

Although in smaller numbers, many organizations seek similar gains by virtualizing other elements of IT, including storage, networks, desktops, applications, and more

. But which forms of virtualization are most commonly used, which solutions and vendors are gaining popularity, and how will adoption grow in the future?

According to Spiceworks research, server virtualization is ubiquitous, used by 92% of businesses. However, other forms of virtualization have some catching up to do.

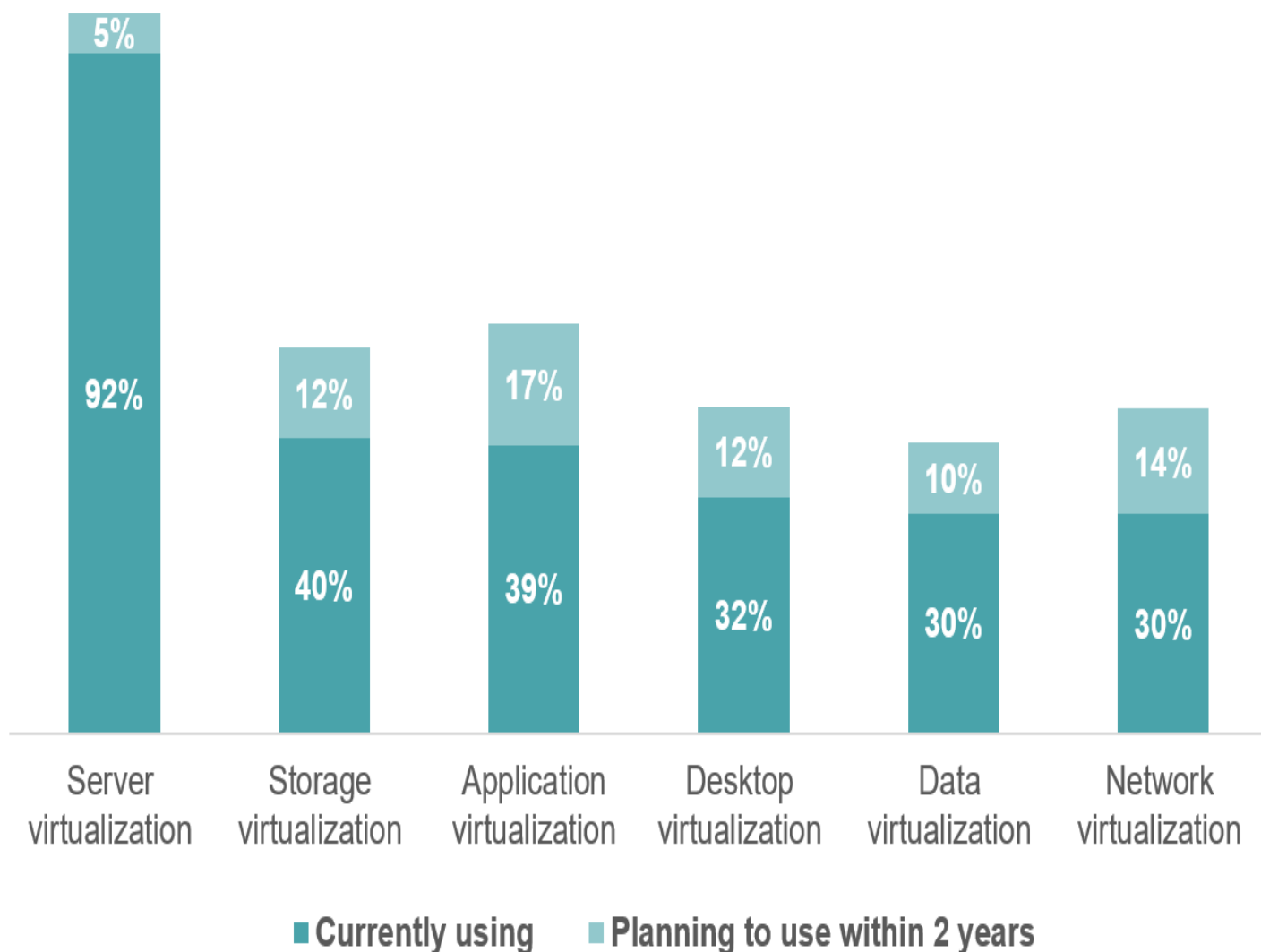
Among emerging virtualization technologies, the most common is storage virtualization (also called software-defined storage) with a 40% adoption rate, followed by application virtualization at 39% and virtual desktop infrastructure (VDI) technology at 32%.

Additionally, network virtualization (also called software-defined networking) and data virtualization each enjoy a 30% adoption rate.

Looking forward, Spiceworks research indicates more than half of businesses plan to use storage virtualization and application virtualization by 2021.

In fact, application virtualization is expected to experience the most growth among virtualization technologies with adoption expected to grow from 39% today to 56% by 2021. We also expect double digit growth in the use of desktop, data, and network virtualization technologies within the next two years.

Business Adoption of Virtualization Technology



When comparing responses by company size, the data shows enterprises with more than 1,000 employees are adopting virtualization technologies at higher rates across the board.

For example, compared to small businesses, twice as many enterprises have adopted application virtualization (60% of enterprises vs. 29% of small businesses) and desktop virtualization (50% of enterprises vs. 24% of small businesses).

Storage virtualization allows for greater control and flexibility with physical storage, helping companies do more with the resources they have.

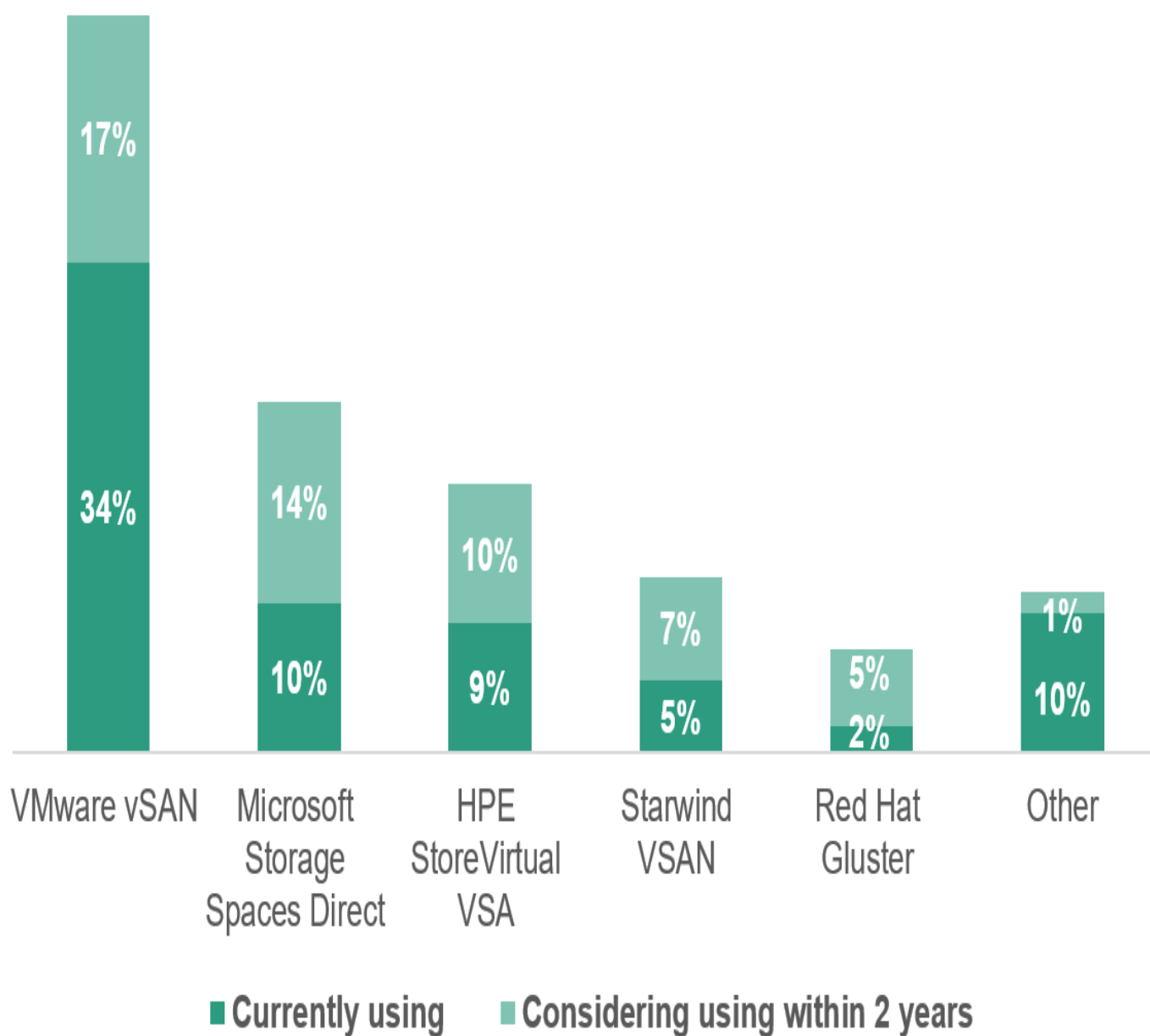
For these reasons and more, storage virtualization adoption is already relatively common, and it will soon become mainstream.

According to our findings, 40% of organizations currently use storage virtualization technology, and an additional 12% plan to within the next two years.

Additionally, a quarter of businesses said they'll use software-defined storage as a replacement for traditional SAN and NAS devices.

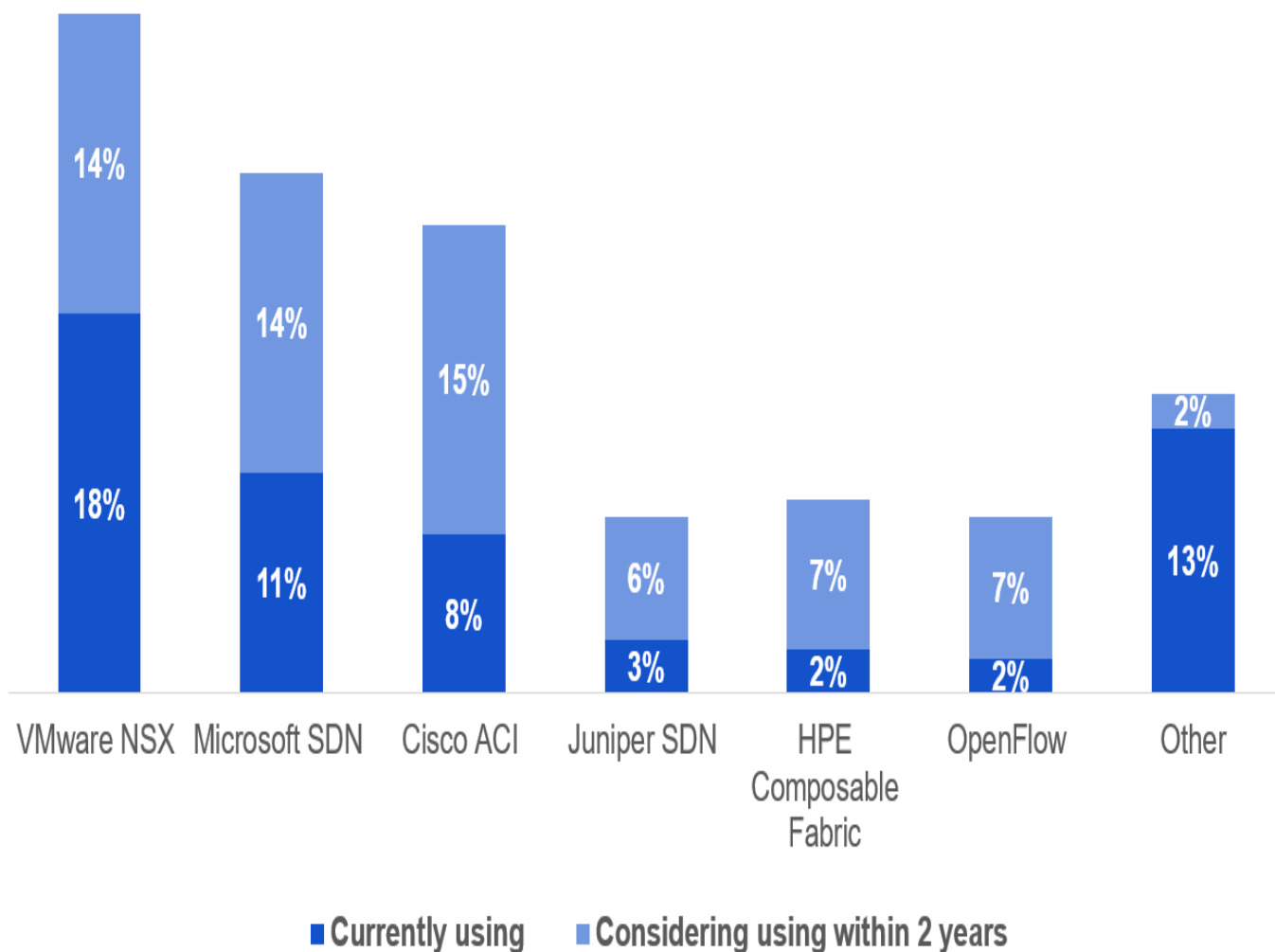
But while many businesses agree that using software-defined-storage technology is a cost-effective way to achieve benefits similar to those provided by storage arrays, monetary savings aren't the primary reason driving the shift.

Business Adoption of Storage Virtualization Solutions



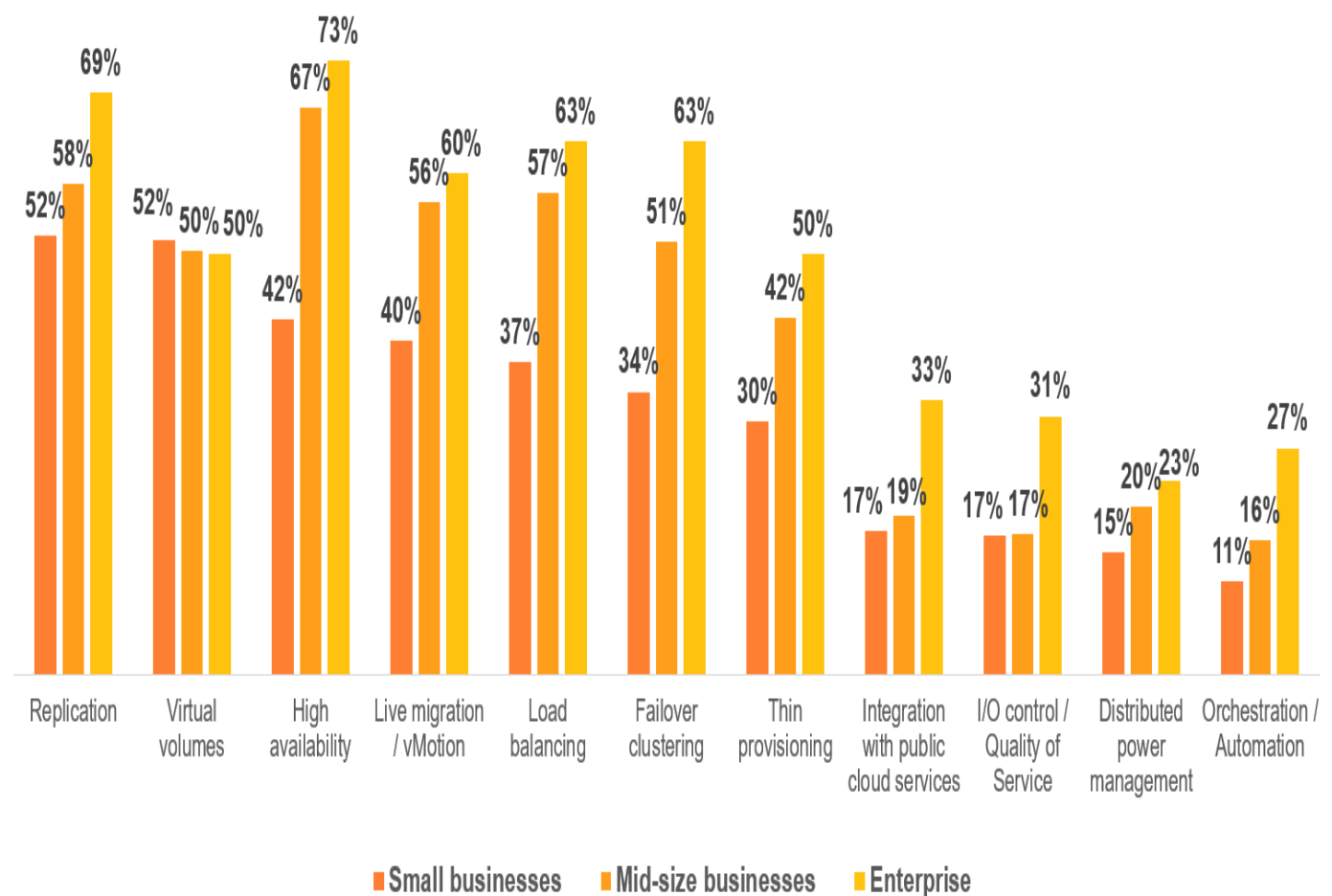
Network Virtualization

According to our research, 30% of businesses currently use network virtualization technology — also referred to as software-defined networking (SDN) — and an additional 14% plan to adopt it by 2025.



Server Virtualization Capabilities Businesses Utilize

Among businesses currently using server virtualization technology



NOTE :

We can further improve more in this project as technologies rises day-by-day, so not limiting upto this we continuous to find more better solutions to remain best use of technology

BIG COMPANIES USING AMAZON WEB SERVICES

ADOBE



AIRBNB

DISNEY

ITV

MCDONALD'S



NASA



NETFLIX



PINTEREST



SAMSUNG
UNILEVER

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- 11 Guidance from Dr Sarita Kaushik (HOD ,DAVIM)

