Assignment-1   Configure Hypervisor and VM Management

1.) Create virtual machine.

2.) Take Snapshot.

3.) OVF [Open Virtual File] creation.

Step 1 :- Install windows 2016 with standard desktop experience.

* How to enable nested hyper-v in VM -

→ Open the virtual machine file (.vmx) and add the following commands at the bottom of it, and then save the file.

• hypervisor.cpuid.vo = FALSE
• mac.enable = TRUE

Step 2 :- Go to the hardware settings → processor → virtualization engine . ☑ virtualization Intel VT-x/EPT or EMD-V/RVI → OK.

Step 3 :- Now turn on the virtual machine and provide the username and password.

Step 4 :- Go to the SRV manager → manage → add roles and features → next → Roles based of features → next → ☑ check your hyper -v → next → add features → next → Install.

Step 5 :- Restart the virtual machine → Log -in the machine Successfully installed.

Assignment - 2   Installing vmware ESXi and accessing the management console

Create a new virtual machine → Typical → Next → I will install the operating later → Next → ⊙ vmware ESXi ⊙ vmware ESXi 7 → provide the name → provide the location → size → 190 GB and store virtual disk as a single file → Next → Finish

Edit virtual machine settings → Processor → ⊙ Virtualize Intel VT-x/EPT or AMD -V/RVI (if it shows any error then disable it).

Add the Iso file. → OK.

Now start the virtual machine → Enter to Continue → F11 to accept and Continue → Enter to Continue → Enter to continue → Enter the password → F11 to install. → Now press enter to reboot.

Then open the web browser at your main machine and then enter the Ip address that is shown at your ·ESXi interface

Then add the username and password.

Now you ESXi management console is available to use for further configuration.

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Assignment - 3   Build the private Data center using Vmware ESXi

Requirement

1) Create an ESXi with the storage of 200 GB.
2) Keep an OS ISO file in your physical system.
3) Linu ESXi with physical OS.

How to create virtual machine in vmware ESXi

Login to the ESXi → Create / Register VM → Create a new virtual machine → Provide the vmware → Check for Compatibility → Select Guest OS family (windows) → Guest OS version (Microsoft windows 7) → Next → Next → Finish.

How to connect with an ISO file

Go to ~~setting~~ → storage → Click on datastore browser → Create directory → Add the directory name → Select the newly created directory → Upload → Select the iso file → OPEN → After uploading the ISO click on close button.

Click on the newly created vm → Action → Edit Settings → CD/DVD Drive → Datastore ISO file → Navigate to the iso file → Select → Save.

Then power on the newly created virtual machine.

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Assignment - 4 Create EC2 Instance in AWS by WINDOWS AMI

How to create instance -
Login to AWS console → EC2 service → Launch Instance → Provide the server Name (ftp) → Click on browse on AMI → Check on Free tier only → Select the iso as per requirement → Create new key pair → Give the keypair name (myftp) → Create key pair → save the key pair properly → Launch Instance.

How to access the Instance -
Click on the Instance link from the EC2 dashboard → Select the Instance → Click on instance → Select on Action → Connect → RDP client → Get Password → Upload private key (select the downloaded key pair) → Then Decrypt password → Then copy the password → Download remote desutop file → Click on the downloaded file and connect.

Assignment - 5 Launch and Connect with Linux Instance
~ ~

Open your AWS account → Then search EC2 → Launch Instance → Add the name (Linux) → Brows more AMIs → Then on the left side check on "Free tier only" and "All Linux/Unix" → Then select "Red Hat" → Then click on "Create new key pair" → Enter the key name → Create key pair. Now open the downloaded file "linux.pem" Location → Right Click on it → Properties → Security Tab → Advanced → Disable Inheritance → Add → Select a Principal → Advanced → Find Now → Search the name or account that you want → OK → Full Control → Apply → OK → OK.

Now open the terminal / cmd → and add the following commands " ssh ⌴ -i ⌴ "C:\Users\Administrator\Downloads\Linux. pem" ⌴ ec2-user@ec2-44-201-117-168.compute-1.amazonaws.com"

Assignment - 6   Create Amazon S3 bucket and Manage the Object

Login into the AWS Account → Select S3 service under storage → Click on Create Bucket → Provide the Bucket Name → Click on Create Bucket → Click on the newly created bucket → Upload → Add files → Add the image to upload → Upload.

Click on the Bucket → Permission → Under Edit Block → Uncheck Block all public Access → Save Changes Confirm.

Now click on the object → Permission → Under ACL → Bucket Owner Enposed → ⊙ Acl enabled → I acknowledge that ACL will be restored → Save Changes → Click on Edit under ACL → check Object and Bucket ACL → I understand the effect of these changes on my object and bucket → Save changes → Now select the object → Action → Make public using ACL.

After creating the bucket and uploading the object. We can enable the bucket versioning → Click on the created Bucket → Go to properties → Click on enable bucket versioning we cannot disable it but we can suspend if required.

Assignment - 7   Host a Static website from AWS S3
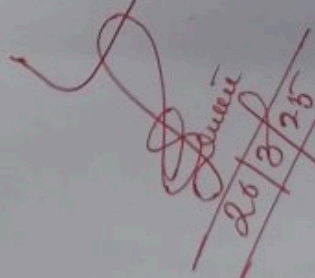
Create two HTML page for web listing.
Example - index.html and error.html.

Log in to the aws account → Go to S3 service → Create Bucket → Add the bucket name → Object ownership make it ACL enabled → Uncheck block all public access → I acknowledge that (Check it) → Enable Bucket Versioning → Create Bucket.

Click on the newly created bucket → Upload the both created HTML page → Upload → Click on the html page → permission → Edit → Every one → I understand... → Save change.

Now follow the same step for second page.

Now click on the bucket → Properties → Static web Page Hosting (Edit) → Enable → Give the actual name of the html pages and error page → Save changes.

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Assignment - 8   Create an EBS volume and Manage EBS

* Create EBS

Login to the AWS console → Go to EC2 service → Now to the left side of the screen → Expand Elastic Block store → Volume → Create volume → Select the volume type (gp2) → select the size (20G) → availability zone same as your EC2 → Then click on create volume.

* Attach EBS with EC2

Select the volume which we want to attach → Attach volume → Provide the instance id and provide the device name (nvdd) → Attach volume.

* How to Initialize Harddisk in EC2

Open EC2 instance (After attaching EBS) → Run → diskmgmt.msc → Right click on the unallocated disk → Online → Again Right click on the harddisk → Initialize Disk → Click on MBR → OK Now again Right click on the Harddisk → New Simple volume → Next → Next → Next → Next → Finish.

* Take snapshot of EBS

EC2 → Volume → Select the EBS for snapshot → Action → Create snapshot → Create snapshot.

* Detach EBS

Select the EBS → Action → Detach volume → Detach.

* Delete EBS

Select the EBS → Action → Delete volume → Delete.

* How to recover volume from snapshot -

Elastic Block store → snapshot → Select snapshot → Action → Create volume for snapshot → Then select the volume type → Then click on create volume.

To recover the data from the volume (disk) follow the steps to "Attach EBS with EC2".

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* Attach IGW route from Route Table

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Select the public Route Table → Route tab → Edit Routes →
Add Routes → Add default ip 0.0.0.0/0 → Then select Internet
Gateway → ID of IGW → Save Changes.
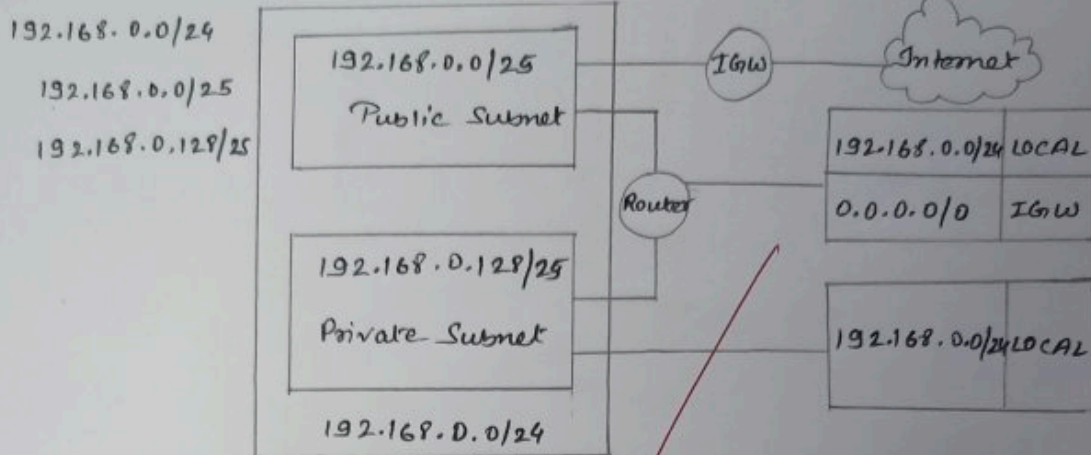
* How to create Subnet Association

~ ~

Select the private route table → Subnet association →
Edit Subnet Association → private Subnet → Save Association

Now follow the same steps for public.

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Assignment - 9   Configure custom VPC with two subnets,
                  one is public and another is private.

192.168.0.0/24

192.168.0.0/25

192.168.0.128/25

```
192.168.0.0/24
┌─────────────────────────────────┐
│  ┌───────────────────┐          │         ┌─────┐      ╭────────╮
│  │  192.168.0.0/25   │──────────┼─────────│ IGW │──────│ Internet│
│  │   Public Subnet   │          │         └─────┘      ╰────────╯
│  └───────────────────┘          │
│                        ┌──────┐ │       ┌──────────────────────────┐
│                        │Router│ │       │ 192.168.0.0/24 │ LOCAL   │
│  ┌───────────────────┐ └──────┘ │       ├──────────────────────────┤
│  │ 192.168.0.128/25  │          │       │ 0.0.0.0/0      │ IGW     │
│  │   Private Subnet  │          │       └──────────────────────────┘
│  └───────────────────┘          │
│                                 │       ┌──────────────────────────┐
│         192.168.0.0/24          │       │ 192.168.0.0/24 │ LOCAL   │
└─────────────────────────────────┘       └──────────────────────────┘
```

* How to create VPC

Login to the AWS console → Open VPC service → Click on Your
VPC → Creat VPC → Add VPC Name (myVPC) → IPv4 manual
input → 192.168.0.0/24 → Create.

* How to create subnet

Select the subnet on the lef ~~panle~~ panel → Create subnet →
→ Select the VPC ID → Add subnet name (public) → IPv4 cidr
block (192.168.0.0/24) → IPv4 CIDR Block (192.168.0.0/25) → Add
the Availability zone → Create subnet.

Then similarly create a private subnet.

* How to create internet gateway

Click on internet gateway from the left panel → Create
internet gateway → Provide the internet gateway Name →
(Public) → Click on create internet gateway.

Then select the created internet gateway → Action →
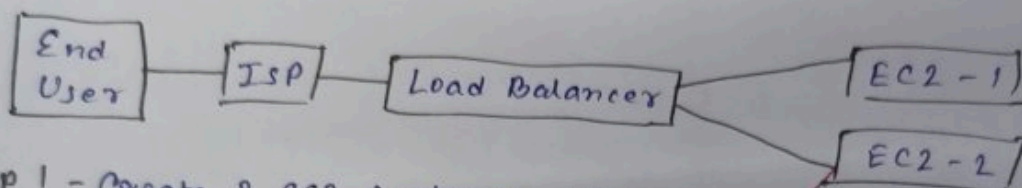Attach to VPC → Select the VPC ID → Attach internet
gateway.

* How to create Route Table

Click on Route Table from the left panel → Create Route
Table (private) → Add Route Table → Add VPC ID → Create.

Assignment - 10   Configuration of Load Balancing

1.) Create two EC2 Instances with different AZ and allow the HTTP.

2.) Configure two EC2 Instances as web servers.

3.) Configure the listner group from create Load balancer Tab.

4.) Register the Target.

5.) Create A Load Balancer.

6.) Copy the A Record.

7.) Open the browser and Run the URL.

```
┌───────┐     ┌─────┐     ┌───────────────┐          ┌─────────┐
│ End   │─────│ ISP │─────│ Load Balancer │────────  │ EC2 - 1 │
│ User  │     └─────┘     └───────────────┘  ╲       └─────────┘
└───────┘                                      ╲     ┌─────────┐
                                                ╲──  │ EC2 - 2 │
                                                     └─────────┘
```

Step 1 - Create 2 EC2 Instance. → Launch the Instance → Network settings → Add security groups → Type (HTTP) → source type (Anywhere) → Launch Instance,

Connect those server (webserver1), (webserver2) → Install IIS role from the server manager and configure the website.

Load Balancing

Click on EC2 service → Expand Load Balancing → Load Balancer → Create Load Balancer → Under Network Load Balancer → Create → Provide the name → Internet facing → IPv4 → Select the AZ and default VPC → Select security group → Create Target group → Instances → Target group Name → Port (TCP 80) → VPC → Next → select both the server → Include as Pending below → Create Target group.

Now move to the Load Balancer Page then Refresh it → Select the Target group that you created → Create Load Balancer.

Now under Load Balancer → DNS name → then copy the URL and paste it in the web server..

Assignment - 11 Create an EC2 and Launch Autoscaling Template with autoscaling Group

* Autoscaling

Autoscaling is a method where a fully configured instance can automatically generate when the large traffic reach in the existing configured servers. This is maintain by the Implimentation of Autoscaling policy.

We can scale up and scale down by the usage of CPU percentage, network configuration/traffic, process management.

Cloudwatch continious monitor the autoscaling server continously.

* We have to create the autoscaling. group when we define the OS, Autoscaling policy and load balander, minimum size of server, Maximum size of server.

• First we have to configure a server and all the services of that server, then we have to create an AMI of that server.

1.) Create an EC2 Instance with the name (web) select the A2 and Instance type, create key pair, Allow the HTTP in Sec group.

2.) Connect the EC2 instance and Install the 11S.

3.) Change the Administrator password from computer management.

4.) EC2 → Instances → Select the server → Actions → Image and Templates → Create Image → Provide the Image Name → Create image.

5.) EC2 → Expand Scaling → Auto-scaling Group → Create Auto scaling group → Provide name → Create a Launch Template → Provide (Ex. Asg1) template name (Ex Asg1 - Temp) → My AMI → Select the Image which we already created → Select Instance Type → Select Key Pair → Select the security group → Create Launch template → Refresh the Launch template and select the newly created template → Next → Select VPC and select AZ → Next → No Load Balancer → Next → Specify min desired capacity [1] → Specify max desired capacity [2] → Next → Next → Next → Create Autoscaling Group.

6.) Go to the Autoscaling Group → Select Auto Scaling Group (ASG1) → Automatic Scaling Tab → Create Dynamic Scaling Policy → Policy Type → [step scaling] → Scaling Policy Name →

`abc-policy-1`

Create a cloud watch alarm → Select a metric → Search
with (ASG1) → Select cpu utilization → Select metric.

7) Metric Name `CPU Utilization` →

Auto Scaling group `ASG1` →

Period `1 minute` → Next → Remove → Next → Provide

① greater/equal
    `70`
                  alarm name → (Scale up) → Next
                           → Create Alarm.

8) Select the Alarm in Dynamic Scaling Policy → when cpu
utilization `70` → capacity unit `2` → Create .and we
can add multiple scaling policy again create dynamic
scaling policy.

Assignment - 12 ~ Configure Cloud Watch Dashboard & Create Alarm

1) launch an EC2 Instance.

2) Open Cloud Watch Service. → On the left side click on dashboard. → Provide the Dashboard Name → Select the metric widget type of your choice (Eg-Number) → Next → Copy the EC2 Instance id and search it in the metric → Click on Pre-Instance metric → Select the metric name as per requirement. → Then. Create Widget. → Save.

3) Again Open Cloud Watch Service → Alarms → In Alarm → Create Alarm → Select metric → Copy the id of EC2 Instance → Click on Per-Instance metric → Select the metric as per requirement → Select Metric → Statistic - Average → Period -1 min → Threshold Type Static → Greater/Equal than.. 25 → Next → Notification → In alarm. → Create a new topic → Add the email address for mail notification. → Create Topic. → View in SNS Console → Confirm the subscription notification on the added mail id. → Add the Alarm Name → Next → Create Alarm

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Assignment - 13 Create an IAM user & create IAM group
& assign Permission & setup MFA

Step 1 :- Login into AWS account (Root account) → Then click on IAM Service → Users → Create users → ☑ Provide user username → → Provide user access to the AWS management console optional → ① I want to create an IAM user. ② Custom Password → Attach policies directly → (Search your policy) → ☑ S3 → Select the proper permission → next → Create user → Copy the signing URL → Past the URL in a new tab → Enter the username and the password → Open.

Step 2 :- Click on the IAM service → User group → Create group → Provide group name → Select the policy for the group (EC2 Read only) → Create user group.

Step 3 :- Click on the created IAM group → Add user → Select the user → Add user.

Step 4 :- Click on the newly created group → Go to the permission tab → Add permission → Attach policy (S3 full access) → Select the Permission → Attach Policies
  * Go to "URL" copy → Paste → Open → Login with created user.

Step 5 :- Click on the user tab → Select any user → Security Credentials → Assign MFA device → Authentication APP → Next → Scan the QR code (from phone) → Enter Code → Add MFA.