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# Session-1:

# Tips:

1. Destroy resources immediately after practice.
   1. Public IP
   2. VMs
   3. VPN Gateway
   4. Firewall
   5. Queue Vault
   6. Azure file resources
   7. Storage
2. No need to destroy Free resources
   1. RG (Resource group)
   2. NSG (Network Security group0
   3. vNet (virtual network)
3. Some resource we can not delete
   1. i.e Domain controller

For such cases we can create with least specs, HDD ets to reduce our billing

# Tenant, Subscription & Directory Services

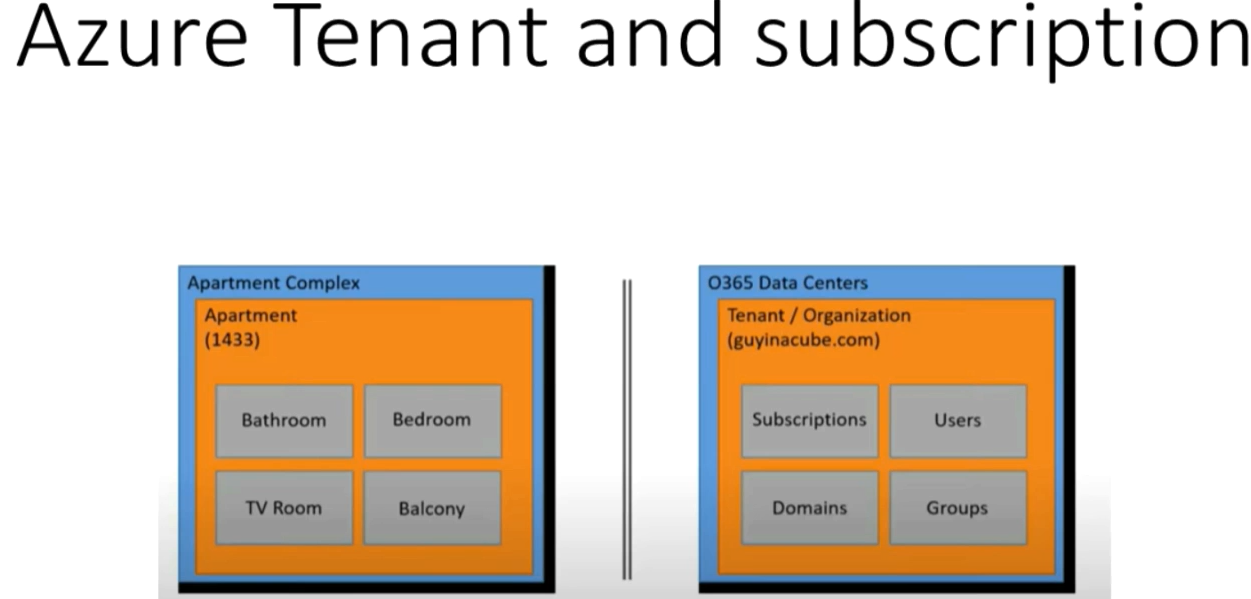
Tenant:

* It represents an organization
* It automatically created when you/Org signs up for MS cloud services - example below
  + Azure
  + Intune
  + M365

Subscription:

* It is a logical container used to provision resources in Azure – below are the example
  + Subscription 1 – For hosting the VMS (Separate billing)
  + Subscription 2 – for M365 Services (Separate billing)
* All Subscriptions will come under the single tenant

Example:

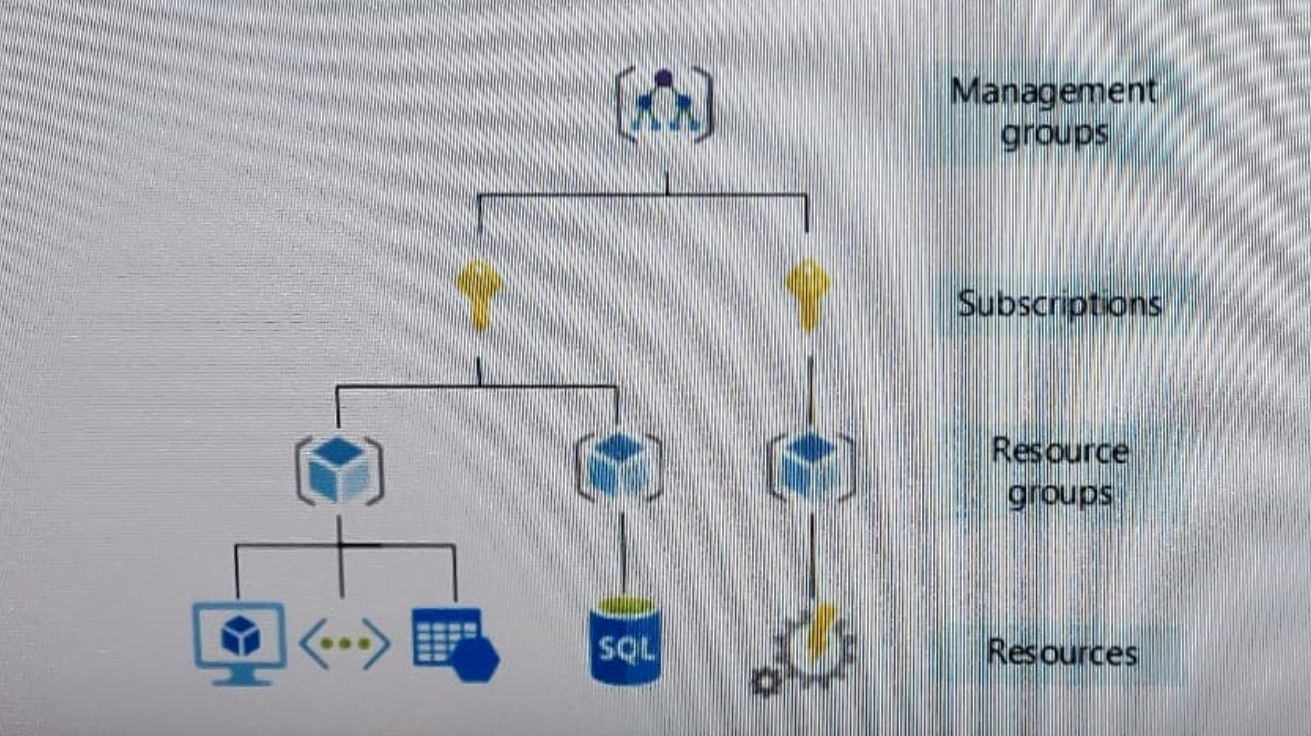


Directory Services:

* To manage the tenant there is a directory services which provides a Identity and Access management Service.
* By Default, tenant comes with Azure Active directory Service
  + Controls identity and access management to all our subscription which comes under the tenant
* When ever we subscribe any MS cloud services the tenant will have a default directory which will be linked to all the subscriptions.
* If we don’t want to use default directory then we can create our own Azure Active directory (AAD).
* Any Subscription only have relation with only one AAD and canot have linked with multiple AAD (Entra ID).

# Resource Hierarchy in Azure

1. Management Group
2. Subscription
3. Resource Group
4. Resources



**Policy Precedency: MG > Subs > RG > R**

1. **Management Group**: It is a Top level entity
   1. Manage access
   2. Policies
   3. Compliance for multiple subscription
   4. All subscriptions in MG automatically inherit the condition applied to the MG.
   5. Generally used for grouping subscriptions by internal department or geographical region.
   6. Any type of policy like access, restrictions etc… will applied hierarchically from top to bottom i.e. MG > Subscription > RG > recourses
2. **Subscription**: It is a billing Unit to use manage cost and recourses that created by Users, Teams and projects. In which we can deployed our all the recourses through RG.
   1. Billing
   2. Quota (Limits of each Recourse type)
3. **Resource Group:** Logical container in which azure resources be deployed and managed.
   1. VMs
   2. WebApp
   3. DBs
   4. Storage accounts
   5. Etc….!

Also, any policy can be define and access control can also be defined at Resource group level as well. If we apply at RG level it will inherit toward the resources as well.

1. **Resources**: Instance of services that we create
   1. VMs
   2. Storage
   3. DBs
   4. Etc….

Also, any policy can be define and access control can also be defined at Resource level

## LAB-Management Group:

How to create Management group

1. Got Search box type <management group>
2. By default we will see a “Tenant Root Group” (It create automatically when we subscribe any AZ service) it is a default management group.
3. To create new MG group click on “Create”
4. Type the ID like <1> into the “management group ID”
5. Type the any name like <Prod MG Group> in to the “management group display name”
6. Click on “Submit”

How to move any subscription from one MG to another MG (i.e. from default MG to “Prod MG Group”)

1. Click on “Prod MG Group” > Click on “+ Add subscription”
2. In New window select the subscription from the dropdown list and then click on “Save”
3. Now check the subscription which will be moved from default MG to “Prod MG group’

## LAB-Subscription:

How to create subscription

1. Got Search box type <Subscription>
2. Click on “+ Add”
   1. Subscription Name < prod>
   2. No need to type in “Billing account & Billing profile”
   3. Click on “Review + Create”

View :

* Overview
* Activity Logs
* Access Control (IAM)
  + Can provide access at Subs level
    - Owner Role
    - Contributor role
    - Reader
    - …. Etc!
* Tags (Usefull for Billings and Policy applied… etc)
* Locks (very much important for accidental deletion of resources)
  + How to create/Add Locks
    - Click on “+ Add”
      * Lock Name\* <Donotdelete>
      * Lock type\* <D/D ‘Read only’ or **Delete’**>
      * Notes <\*Optional\*>
      * Click on “OK”
    - “OK”
  + Now check to delete “RG” for testing
* Cost
* Policy
* Usage + quota (default 4 CPU – top increase it need to raise request with MS)
* RG
* resources
* …. Etc… !

## LAB-Resource Group:

How to create subscription

1. Got Search box type <Resource Group>
2. Click on “+ Create”
   1. Type RG name in Recourse group\* <VDI>
   2. Region\* <Drop Down “central US”>
   3. Click “Review + Create” >> “Create”

View :

* Overview
* Activity Logs
* Access Control (IAM)
  + Can provide access at Subs level
    - Owner Role
    - Contributor role
    - Reader
    - …. Etc!
  + Check access
  + Role assignments
  + Roles
  + Deny Assignment
  + Classic Administrator
* Tags
* Cost
* Policy
* Usage + quota (default 4 CPU – top increase it need to raise request with MS)
* RG
* resources
* …. Etc… !

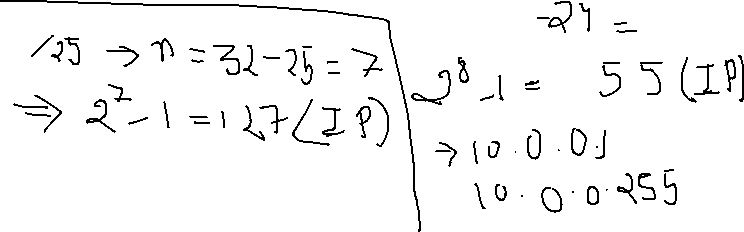
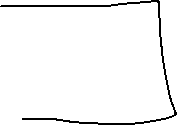
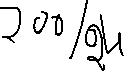
# Session-2:

# Azure Virtual Network “VNet”

It is representation of our own network into the cloud, logical isolation of Azure cloud dedicated to our subscription and it is a service from Azure which to our resource (VMs, Storage account, Key Vault, …etc) can communicate with internet, on-prem and internally.

* Generally, it has two type of IP Address
  + Private IP Address
    - Communication with in Azure and On-Prem
  + Public IP Address
    - Communicate with Internet
* Address space : IP Range of the entire network

Suppose we need 200 IP address of Address Space



* Subnet: It’s a range of IP addresses in the vNet.

Smaller Chunks of IP Address of Address Space

* + Suppose we need 100 IP address from 200 Ips from the address Space
    - 100 IPs for Prod
    - 100 IPs for Non-Prod
    - Ex.
      * 10.0.0.0/24 (10.0.0.1 – 10.0.0.255) (255 IPs)
      * Break it in two portion
        + Subnet – 1

10.0.0.0/25 (Pool – 1)

10.0.0.1 – 10.0.0.127

* + - * + Subnet – 2

10.0.0.128/25 (pool – 2)

10.0.0.128 – 10.0.0.255

* + - * + Similarly, we can further divide these IPs into more subnet

Ex.

/26 – 64 IPs , /27 - 32 IPs, /28 – 16 IPS, . /29 – 8 IPs.

## LAB-Azure Virtual Network (VNet)

How to create VNET

1. Got Search box type <Virtual Network>
2. Click on “+ Create”
   1. Basic
      1. Select Subscription (Select from D/D)
         1. Resource Group (Select from D/D)
      2. Name\* <Give the Name of the Virtual Network>
      3. Region\* (Select from D/D)
   2. IP Addresses
      1. IPv4 address space (By Default Azure provide some IPs but in prod need to avoid default and provide our own IPs)
         1. Ex. 10.196.0.0/23 (512 IPs)
      2. Subnet
         1. “+ Add subnet”
            1. Subnet Name\* <ex. Prod-VDI-subnet>
            2. Subnet Address range\* <ex. 10.196.0.0/24> (256 IPs from the above address space) or for 128 IPs then take /25
            3. “+ Add”
   3. Security
      1. Keep Default

In prod infra it will be according to the Organization’s policies.

* 1. Tags
     1. If wanted to give tags then give else “next”
  2. “Review + Create”

1. “Create”

View:

Go to the Newly Created VNet

* Overview
* Activity Logs
* Access Control (IAM)
* Tags

**Settings**

* Address space
  + If we wated to increase the Range
    - Go to the “Address space” and change the “/24” range to desire one
    - Ex. 10.196.0.0/22 (now we have 1024 IP Addresses)
    - “Save”
  + Also, we can add another range of Address space
    - Ex.
      * Go to the Box “Add additional address space”
      * 10.125.0.0/22
      * “save”
      * Now we have another 1024 IP addresses
* Subnets
  + Prod-VDI-Subnet (251 IPs) (Some IPs reserved by Azure)
  + If we wanted to one more Subnet
    - “+ Subnet”
      * Name\* <ex. callcenter-vdi>
      * Subnet Address Range\* <10.196.1.0/25>
        + Range (10.196.1.0 – 10.196.1.127) (123+5 Azure reserve address)
      * “Save”
  + Now we can see two Subnets

# Azure Virtual Machine Service and Availability Options

Provide On-demand & Scalable computing resources with usage-based pricing.

* Type of Azure VMs
  + A Series VMs (Entry Level VMs)
  + B Series VMs (Economical VMs)

D Series VMs (General Purpose Compute – AVD, Citrix. etc)

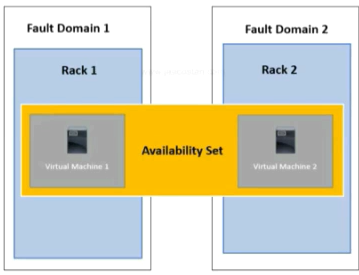
* + E Serise VMs (Optimized for in-memory “high” application – SAP, HANA workload, Multi session VDI… etc..!)
  + F Series VMs (Compute optimized “High CPU” machines – Gaming and analytics…etc)
  + G Series VMs (Memory and Storage optimized VMS – Large SQL, DBs, ERP, data warehousing. etc)
  + H Series VMs (High Performance computing – rendering, quantum simulation.. etc)
  + L Series VMs (Storage Optimized VMs – MongoDB, Large transactional DBs.. etc)
  + M Series VMs (Memory Optimized VMs – Large in-memory business workload and massive parallel computing)
  + N Series VMs (GPU enabled VMs- CAD or Graphics intensive application)
  + …..!

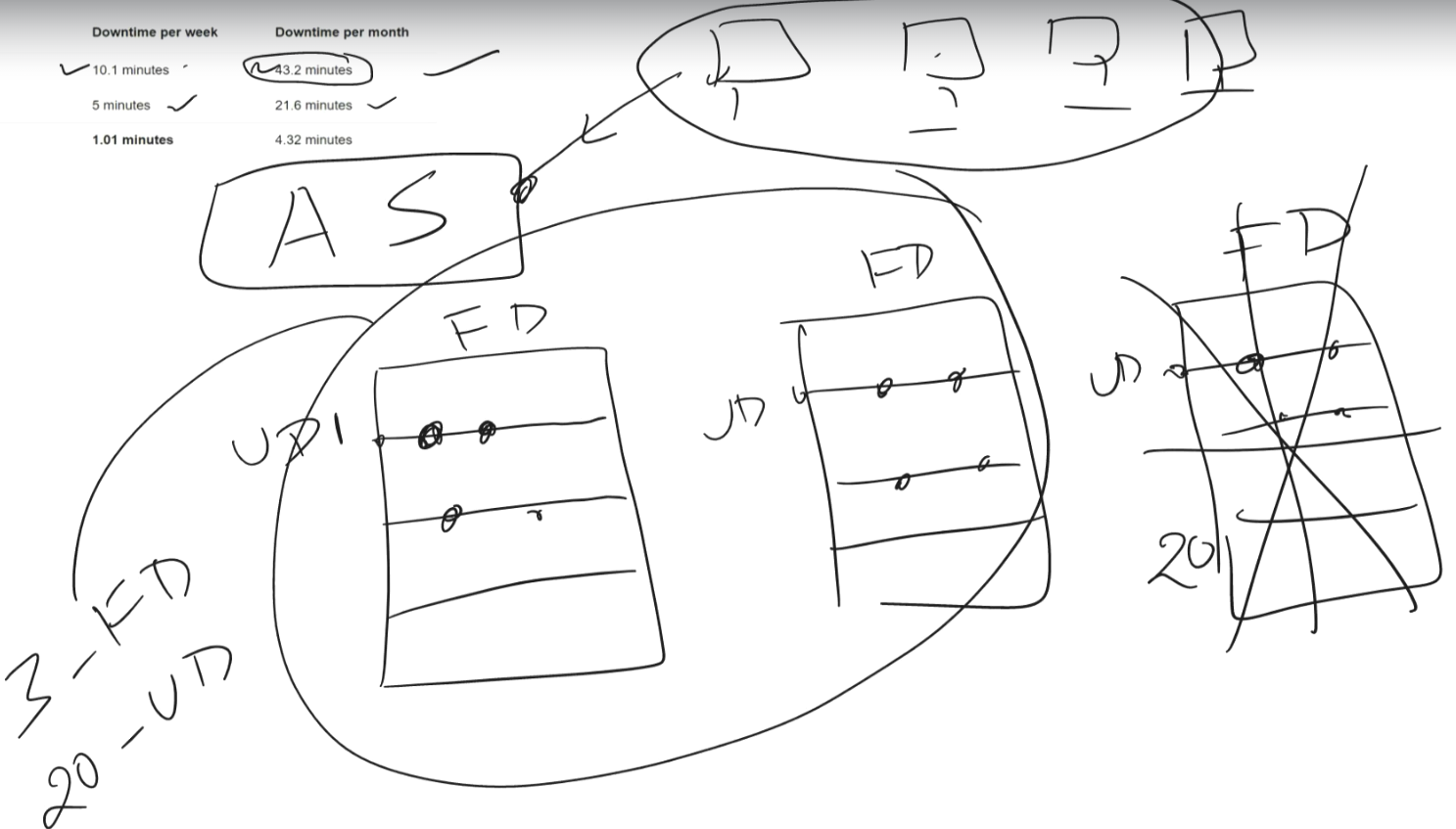
:- At Any time we change the VM type from one series to another series based on requirement.

* SLA (Azure Service level agreement)

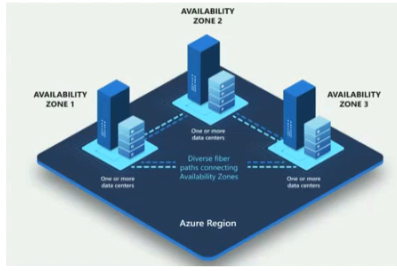


* + Azure VMs: 99.90% SLA Uptime (.10% Downtime)
  + Availability Set: 99.95% SLA Uptime (Only .05% downtime)
    - Logical grouping two or more VMs that helps to keep application hosted in Azure cloud during planned and unplanned outage.
    - There is concept of Fauth domain (Racks) and Update domain (where VMs are deployed in to the racks or we can say deployed VMs)
    - Each Azure Datacentre could have 3 fault domain and 20 Update domain.





* + Availability Zone: 99.99% SLA (Only .01% downtime)
    - Physically separated location within each Azure region to tolerant local failure.



Region



Zone 1

Zone 2

Zone 3



## LAB: Virtual Machine Creation, Resize & Deletion

### How to create Virtual Machine

1. Got Search box type <Virtual Machine>
2. Click on “+ Create” >> Select “Azure Virtual Machine”
   1. Basic
      1. Select Subscription (Select from D/D)
         1. Resource Group (Select from D/D)
      2. Name\* <Give the Name of the Virtual Machine>
      3. Region\* (Select from D/D)
      4. Availability option
         1. We can select (to place the VM)
            1. No infrastructure redundancy required
            2. Availability Zone
            3. Virtual machine scale set
            4. Availability Set
      5. Security Type
         1. Standard
         2. Trusted launched virtual machine

(It will have additional feature that it will protect our VM with threats … etc.)

* + - 1. … so on
    1. Image\*
       1. (Select from D/D)
       2. If we don’t identify our image then we can click on “See all image”, so it will take we on Azure market place there we can select required image (Windows, Linux …etc)
    2. Size\*
       1. Means how many CPU and RAM is required so accordingly we can select the size.
       2. If we go to ‘See all size” the here we can see all type of VMs and their size (A,B,C,D…. Series VMs0 accordingly we can select required size.

**Administrator Account**

* + 1. Username\* (Local user/Admin Name)
       1. Enter <User name>
    2. Password\* (Minimum 12 caratctor)
    3. Public inbound ports\*
       1. There are two options
          1. None (for secure infra depends on secure corporate policy)
          2. Allow selected ports (For practice purpose)

Select inbound ports\* : RDP 3389

* + 1. Licensing: As per the coporate policy but for practice purpose leave as it is.
    2. Click on “Next”
  1. Disk
     1. OS Disk type\*
        1. (Select from D/D)
           1. Premium SSD (Locally Redundant storage)
           2. Standard SSD
           3. Standard HDD
     2. Keep all other option as it is (Will learn about all other options later)
     3. Click on “Next”
  2. Networking
     1. Virtual network\*
        1. Select our virtual network which we have created (Select from D/D)
     2. Subnet\*
        1. Select our Subnet which we have created (Select from D/D)
     3. Public IP\*
        1. If we wanted to access our VM over the internet then keep this option else keep it as none (in corporate network)
     4. Network security group\*
        1. Keep “None”
     5. Click “review + Create”

1. Click “Create”
2. Once the VM is ready we will take the RDP of the machine over the internet with Public IP
   1. “Go to resource”
   2. Take public IP address from “overview > properties > networking” the take RDP and login
   3. Also with other way to connect the VM
      1. From the “Overview” tab
         1. Click on “Connect”
         2. Select the ‘RDP”
            1. Click on “Download RDP File”
            2. Open the downloaded file
            3. Provide local admin credential to login

### How to Resize Virtual Machine

According to the work load if we wanted to resize the VM the it can be resizing any time to follow below steps.

1. Goto the VM and stopped it
   1. Check the status of the VM after Stopped it shows as “Stopped (deallocated)”
2. Once it is deallocated the go to the ‘Size” option
   1. Then select the size which we wanted (A,B,D,E… series) as per the requirement
   2. Click on “Resize”
   3. It will change from old to new series

### How to Delete Virtual Machine

1. Goto the VM
2. Middle pan of the ‘Overview” option
3. Select “Delete”
   1. Check mark “Apply force delete”

\*\*\*\*\* By default, when we delete VM the “Associated resources type” 🡪 OS Disk & network interface will not be deleted \*\*\*\*\*\*

* 1. If we wanted to delete “Associated resources type” as well during VM deletion the we will have select manually
     1. OS Disk
     2. Network interfaces
     3. Public IP addresses
  2. Click on “Delete”

## LAB: Availability Set Creation

### How to create Availability Set

1. Got Search box type < Availability Set >
2. Click on “+ Create” or on the middle pan bottom side selete “Create availability Set
   1. Basic
      1. Select Subscription (Select from D/D)
         1. Resource Group (Select from D/D)
      2. Name\* <Give the Name of the Availability Set> (Ex. VDI-Test-AS)
      3. Region\* (Select from D/D) {This should be same region as RG/VM have)
      4. Fault domains (Max 3)
         1. If we choose 2 then the VMs will be distributed across 2 Racks
         2. If we choose 3 then the VMs will be distributed across 3 Racks
      5. Update Domains (Max 20)
         1. If we choose 10 then the VMs will be distributed across 10 Update domain
         2. If we choose 20 then the VMs will be distributed across 2Update domain (Our VMs will be highly available)
      6. Use manged disk : (keep as it is)
      7. Click on “Review + Create”
   2. Keep default all other option as of now
3. Once validated passed then Click on “Create”

### How to Create VM using Availability Set

1. Got Search box type <Virtual Machine>
2. Click on “+ Create” >> Select “Azure Virtual Machine”
   1. Basic
      1. Select Subscription (Select from D/D)
         1. Resource Group (Select from D/D)
      2. Name\* <Give the Name of the Virtual Machine>
      3. Region\* (Select from D/D)
      4. Availability option
         1. We can select from D/D (to place the VM)
            1. No infrastructure redundancy required
            2. Availability Zone
            3. Virtual machine scale set
            4. Availability Set (Selected)
      5. Availability Set
         1. (Select from D/D)
            1. (Ex. VDI-Test-AS) {Created above}
      6. Security Type
         1. Standard
         2. Trusted launched virtual machine

(It will have additional feature that it will protect our VM with threats … etc.)

* + - 1. … so on
    1. Image\*
       1. (Select from D/D)
       2. If we don’t identify our image then we can click on “See all image”, so it will take we on Azure market place there we can select required image (Windows, Linux …etc)
    2. Size\*
       1. Means how many CPU and RAM is required so accordingly we can select the size.
       2. If we go to ‘See all size” the here we can see all type of VMs and their size (A,B,C,D…. Series VMs0 accordingly we can select required size.

**Administrator Account**

* + 1. Username\* (Local user/Admin Name)
       1. Enter <User name>
    2. Password\* (Minimum 12 caratctor)
    3. Public inbound ports\*
       1. There are two options
          1. None (for secure infra depends on secure corporate policy)
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Select inbound ports\* : RDP 3389

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  2. Networking
     1. Virtual network\*
        1. Select our virtual network which we have created (Select from D/D)
     2. Subnet\*
        1. Select our Subnet which we have created (Select from D/D)
     3. Public IP\*
        1. If we wanted to access our VM over the internet then keep this option else keep it as none (in corporate network)
     4. Network security group\*
        1. Keep “None”
     5. Click “review + Create”

1. Click “Create”