**Introduction 4:52**

**What is Hypervisor 11:23**

Type 1 and Type 2 Hypervisor

Type 1 example is VMware ESXi also called bare metal Hypervisor, run directly on hardware

Type 2 example is VMware Workstation for window & Fusion for Mac (VMware Workstation, Oracle Virtual Box, GNS3 for network)

**What is vSphere 17:39**

The environment in which VMware is installed is called vSphere

Ingredient of Virtual Environment. It is call Software Define Data Center (SDDC)

ESXi Host

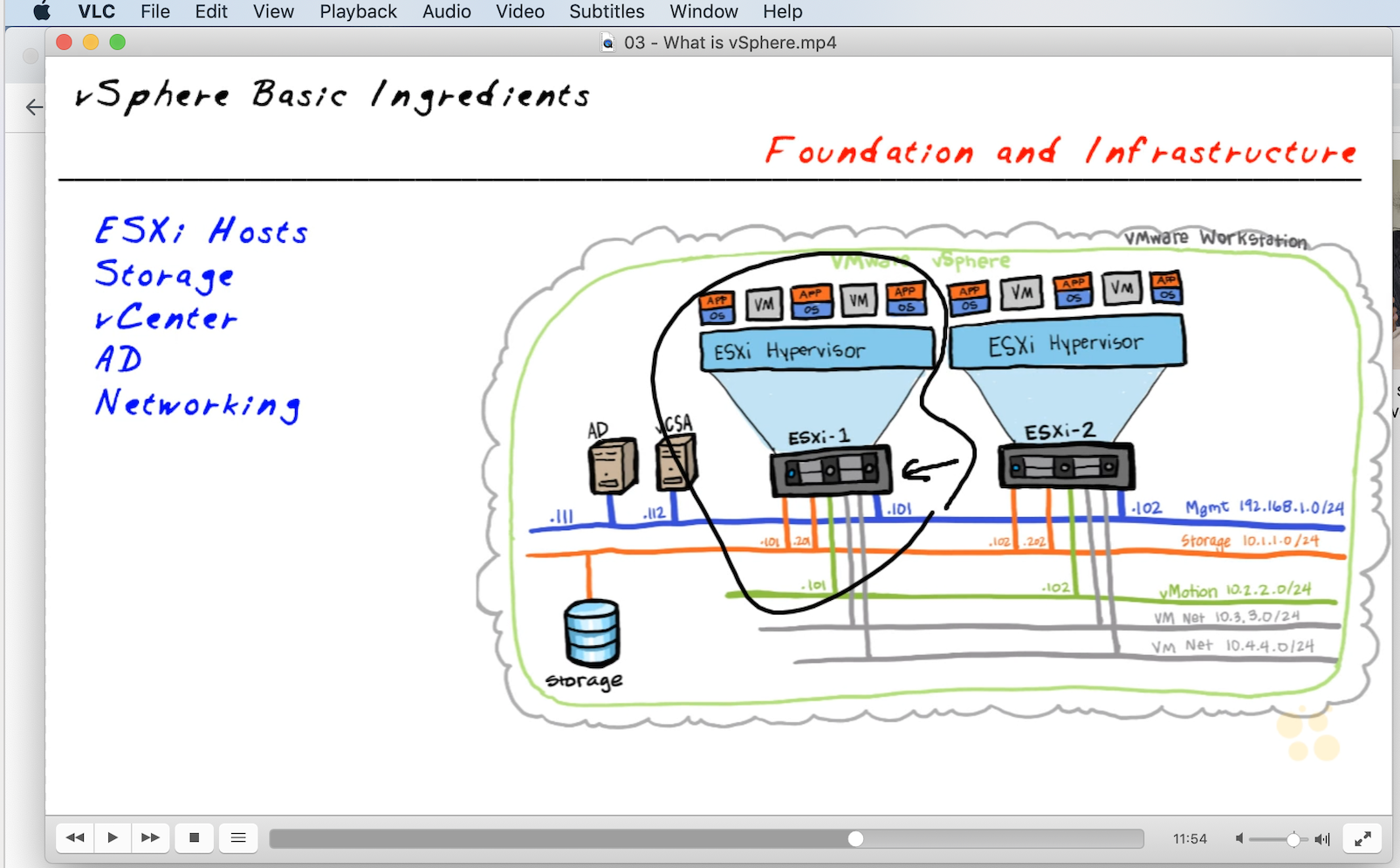
Storage ESXi host local storage or Network attached storage (iSCSI, NFS)

vCenter used to manage multiple ESXi hosts, it can be windows base or Linux base from VMware

Active Directory mainly used for authentication

Networking

**Lab Design**

****

on PC install VMware Workstation 12 / VMware Fusion 10

PC requirement

1. i7 process

2. 32 GB RAM / 16 GB RAM

3. VT enable from BIOS

4. 1TB Hard Disk

5. VMware Workstation 12 installed / VMware Fusion 10 Installed

6. 64-bit OS Windows Operating System / MacBook Pro

7. assign IP address 192.168.X.11 to PC

create 5 virtual network in VMware workstation in virtual network editor by click on View ->

editor)

create 0 bridge network with IP 192.168.X.X (management network)

create 1 host only network with 1p 10.1.1.0 with 255.255.255.0 (Storage)

create 2 host only network with 1p 10.2.2.0 with 255.255.255.0 (vMotion)

create 3 host only network with 1p 10.3.3.0 with 255.255.255.0 (VM network 1)

create 4 host only network with 1p 10.4.4.0 with 255.255.255.0 (VM network 2)

**Creating Virtual Machine for ESXi host in VMWare Workstation 12**

Download VMware Workstation from filehipp.com and get license key from appnee.com

download VMware vSphere evaluation version from VMware website

Create new virtual virtual machine --> select ISO image --> give name ESXi-1 --> Specify

location where VM will save--> give Hard drive size 100 GB space --> Thin Provision believe

having 100 GB but used as needed --> Finish

--> RAM 3 GB

--> create total 10 Network adaptor in each host

--> associate the network adaptor to virtual Network adaptor created in VMware

workstation--> network adaptor 1, 2 will associate with vmnet0 (management)

--> network adaptor 3, 4 will associate with vmnet1 (Storage)

--> network adaptor 5, 6 will associate with vmnet2 (VMotion)

--> network adaptor 7, 8 will associate with vmnet3 (Normal Network 1)

--> network adaptor 9, 10 will associate with vmnet4 (Normal Network 2)

Repeat the above procedure for second Host (ESXi-2)

**Installing ESXi & Configuration on Host**

Power on the ESXi host VM and install the ESXi from ISO following the wizard

give the name **ESXi-1**

give root user password **m@g1t786**

assign static IP (192.168.x.101) add to host by pressing F2 from Direct User Console

Interface of ESXi

go to network management and set IP address

disable IPv-6

setup DNS IP address 192.168.x.111 (will install AD later and configure DNS later) 🡪

alternated DNS (8.8.8.8) 🡪 hostname (esxi-1) 🡪custom DNS suffix (nuglab.local) 🡪 this is optional 🡪 save configuration and reboot the HOST.

**Setting up Additional Services in Lab including (DNS)**

Installing Active Directory (AD) system

DNS

File Service iSCSI Network based Storage or NFS Storage

DHCP

Download Windows 2012 / 2016 server evaluation version from Microsoft website

Create new virtual virtual machine --> select ISO image --> give name AD --> Specify

location where VM will save

--> give 1 Hard drive size 100 GB space --> and create 2 additional hard disk each with 100 GB space --> will use one for **iSCSI base storage** and another for **NFS Storage later** -->Thin Provision believe having 100 GB but used as needed --> Finish

create total 4 Network adaptor in AD VM

associate the network adaptor to virtual Network adaptor created in Workstation

--> network adaptor 1 will associate with vmnet0 (management)

--> network adaptor 2 will associate with vmnet1 (Storage)

--> network adaptor 3 will associate with vmnet3 (Normal Network 1)

--> network adaptor 4 will associate with vmnet4 (Normal Network 2)

Installing Windows Server 2012 / 2016, AD, DNS, DHCP & File services

Power on the AD VM and install the windows server 2012 / 2016 from ISO.

give the name AD

give administrator password m@g1t786

assign static IP add to AD from server manager 🡪 click on local server option

management interface 192.168.x.111

storage interface 10.1.1.111

virtual network 10.3.3.111

virtual network 10.4.4.111

install the DNS, DHCP and file services from Server Manager window 🡪 click add role 🡪

select domain services, DNS DHCP and file services. 🡪 click next and finish the wizard

nuglab.local name used as domain while install active directory

access DNS server and enter HOST A records for ESXi-1 & ESXi-2 , AD, VCSA

change DNS setting for PC to 192.168.x.111

to verify DNS resolution is working use NSLOOKUP command from PC

nslookup esxi-1. nuglab.local

nslookup 192.168.x.101

check from ESXi-1 console --> that networking and DNS is working

**Installing VMware Windows Client (VSphere Client) to Administrate Individual ESXi Host**

On PC open browser and type host IP https://192.168.x.101 or (https://esxi-1.nuglab.local)and

press enter

click link download vSphere Client for Windows or we can also download from VMware website as well 🡪run the setup after installation finish

run VMware vSphere client

enter IP address 192.168.1.101 and user name (root) and password (m@g1t786)

click login

**Installing vCenter Server Appliance (vCSA)**

vCenter is used to administer vSphere environment include multiple HOST.

There are two type of components of vCenter. We can configure vCenter with both components

for small environment and for large environment we can install these components on separate

servers, mean we can have one platform controller and multiple vCenter servers.

**vCenter Components**

Platform Controller

vCenter Server

**Platform Controller**

Sign Sign-On

License Server

Cert. Authority

**vCenter Server**

Inventory Service

PostgreSQL

Web Client

Dump Controller

Syslog Controller

Syslog Service

Auto Deploy

**vCenter Installation Options**

we can install vCenter in two types

1. vCSA Appliance (this will work VM running in ESXi Host)
2. vCenter on Windows (this will be working as a physical system)

make sure that HOST A (192.168.x.112) and PTR record for vCSA in DNS and confirm the name resolution using NSLOOKUP Command.

**Installing vCenter as a vCenter Virtual Appliance (vCSA) on ESXi Host**

first make sure HOST A and PTR record for vcsa.nuglab.local for IP address 192.168.1.112 is working on Admin PC

nslookup vcsa.nuglab.local

nslookup 192.168.1.112

download vCSA ISO from VMware website and open it as a Virtual Drive on admin PC

open the drive --> open vcsa folder for v6 or open vcsa-ui-installer --> run the VMware Integration

Client Plugin or installer.exe

once the plug-in install --> from the drive run the vcsa-setup.html file or wizard will start

click install --> license --> enter ESXi-1.nuglab.local address and username (root) and password

(m@g1t786)

give appliance name (vCSA) --> give password (M@g1t786) --> choose embedded platform service controller --> click next --> select create new SSO domain --> default user name is (Administrator) --->set password (m@g1t786) --> SSO domain name (vsphere.local) and site name (Site-1)

select size select (Tiny) --> select datastore and enable thin Disk mode --> select embedded

database PostgreSQL

enter IP address 192.168.1.112 --> system name (vcsa.nuglab.local) --> subnet mask

(255.255.255.0) and default (192.168.1.1)

select time sync --> enable SSH --> click finish

it will download and install vCenter appliance

login using **https://vcsa.nuglab.local/vsphere-client** with username administrator@vsphere.local

and password (m@g1t786)

**Installing vCenter as Appliance on VMware Fusion on admin PC (Like Physical Computer)**

this will be install in Workstation as like AD or ESXi-1)

download vCSA ISO from VMware website and open it as a Virtual Drive

open the drive --> open vcsa folder --> copy vmware-vcsa file and rename it to vmware-vcsa.ova

open vmware worksttion --> click file --> Click import --> select vmware-vcsa.ova file

specify the storage in location --> click accept and done

make sure the vcsa VM network adaptor is connected to VMNet0 or Bridge network

before power up --> edit the .vmx file located in storage location --> open in notepad --> paste the

below info to the end of vmware-vcsa.vmx file

guestinfo.cis.vmdir.password = "m@g1t786"

guestinfo.cis.appliance.net.addr.family = "ipv4"

guestinfo.cis.appliance.net.addr = "192.168.1.112"

guestinfo.cis.appliance.net.prefix = "24"

guestinfo.cis.appliance.net.mode = "static"

guestinfo.cis.appliance.net.dns.servers = "192.168.1.111"

guestinfo.cis.appliance.net.gateway = "192.168.1.1"

guestinfo.cis.appliance.root.passwd = "m@g1t786"

power on the vCSA VM

and then access from browser by https://vcsa.nuglab.local/vsphere-client or 192.168.1.112

with user name administrator@vsphere.local and password (m@g1t786)

<https://jorgedelacruz.uk/2017/11/24/vmware-how-to-deploy-vmware-vcsa-6-5-x-on-vmware-fusion-10/>

**Organizing vCenter and Adding Host in vCenter**

vCenter structure

folder represent the country --> then inside folder represent (regions) --> inside region -->

datacenter -->inside datacenter --> we have cluster --> inside cluster we have hosts

click host & cluster --> create folder (UAE) --> Inside UAE --> Create two datacenter

(Dubai & Abu Dhabi) -->inside Dubai datacenter--> create cluster (magrudy) -->

On cluster level we can enable many features like DRS, HA, Virtual SAN, we can enable

these features later as well 🡪 inside magrudy --> add ESXi-1 & ESXi-2

datastore for each Exsi will be with name datastore, rename it to some meaningful name by

select the Host and click the datastore tab --> right click and click rename -->

datastore is local or network based storage to esxi host

datastore for each Exsi will be with name datastore, rename it to some meaningful name by

select the Host and click the datastore tab --> right click and click rename -->

OR

click store --> select datastore --> click related objects --> click hosts --> right click

datastore and rename.

**Datastorage**

Datastore can be two type

Local attached host storage,

Network based Storage (iSCSI, Fiber Channel, NFS)

Mixed Storage (Virtual Storage Area Network (vSAN)

Storage Location

Local

Network (iSCSI, Fiber Channel)

Virtual SAN (Local storage of hosts contribute to network based storage is vSAN)

vSAN is local storage but like as a network storage.

Storage Type

VMFS (Blocked based) VMware File System

NFS (File Based) Network File System

File System

VMFS in VMware file system is VMware File System (VMFS5). it's block

based

NFS Network File System (NFS). it's file based. used for Storage

VM Disk Provisioning

Thick Take whole hard drive space allocated regardless of usage

Thin Take only used space not the allocated space

Moving file like ISO images from Admin PC to Datastore

Click on Storage --> select the datastore --> create new folder --> click upload file

icon --> click browse --> select ISO🡪download Ubuntu ISO --> Upload to ESXi-1

datastore --> then install VM on ESXi-1 using that ISO

**Deploy Virtual Machine in vSphere**

login to vCenter --> click VM & Template --> right click on datacenter --> New VM &

Template Folder type --> give name --> right click new folder --> click new virtual machine

--> give name --> select ESXi-1 --> If DRS is enable then we can select

cluster and then vCenter will decide HOST for VM --> Select Storage --> Select Guest OS –

-> Give ISO location

VMware Tools advantage is to properly shutdown the Virtual Machine

VMware Tools is agent to work with VM

**Installing VMware Tools on Virtual Machine**

Installation in Windows based VM

power on VM --> click on install VMware tools link on VM in vCenter --> This will Mount CD drive in VM --> Open 🡪CD --> run the setup

Installation in Linux based VM

run command sudo apt-get install open-vm-tools

this will install tools and restart the VM

**Creating VM using Templates**

click VM & Template in vCenter --> first power off the VM --> right click VM --> Clone --> Clone to Template --> give name --> template cannot be run --> select host --> storage --> click finish

to create VM based on template --> right click the template --> click new VM using this template -> give name host name --> storage --> finish

**Open Virtualization Appliance / Format (OVA / OVF)**

this option we will use to share VM with other people (Export, Import)

Open Virtualization Format (OVF) - Set of files

Open Virtualization Appliance (OVA) - All in One

**To export VM in OVF or OVA format**

open vCenter --> select VM --> Shutdown VM --> right click VM --> Template --> Export

OVF template --> give name 🡪 select location --> select OVF or OVA option --> click OK

**Creating VM based on OVA format**

right click datacenter --> deploy OVF template --> Select file location --> select. ova file -->

give name -->host --> storage --> finish

**Creating VM based on OVF format**

right click datacenter --> deploy OVF template --> Select file location --> select. ova file -->

give name -->host --> storage --> finish

**Implementing Snapshots**

Snapshot is a process to take backup of a system before doing any modifications 🡪 if something goes wrong then we can go back to snapshot.

Take VM snapshot is working condition --> then apply update --> if something goes wrong --> we

can go back to working condition 🡪VM using snapshot

we can take snapshot is the VM is on but because of memory size will be large. so good option is to

power off the machine

concept

when snapshot is creating, VMware will create three additional files

1. .vmws file to keep track of all snapshot

2. .vmsn state of snapshots

3. 00001.vmdk delta disk

after the snapshot all change in VM is stored in delta disk. this is the reason if we delete or

merge the snapshot 🡪after long time, it's take long to merge original VM desk nad delta

desk

shutdown the VM --> right click VM --> click snapshot --> take snapshot --> give description

(before modification) --> click finish

switch on the VM --> make some change like download some files --> and paste the download file

on desktop as well

to revert backup to snapshot --> right click VM --> snapshot --> revert to latest snapshot or manage snapshot 🡪 select snapshot & delete --> delete will merge both disk --> delete all will delete multiple snapshot and merge to primary

disk

revert to option will take back to snapshot and will lost all the changes

snapshot is not a backup

**Introduction to vSphere Networking (using standard virtual switch (vSwitch)**

vSphere networking is used that VM should be on separated network

Networking Components

Switch L2 device, forward the packes

vLAN divide switch into logical network is called vLAN

IP Address

VM Port Group(s)

VMKernel Port(s)

each Host by default have virtual switch and is called vswitch0

**Creating new Virtual Switch**

**Creating new switch**

vCenter--> host & cluster-->select ESXi-1 --> click manage tab --> click networking

tab --> click host networking 🡪 click add networking to host icon 🡪 select virtual

machine port group or standard switch option --> select new switch -->

click plus symbol (assign uplink) --> select vmnic6 --> give name VM Net 3 -->

VLAN None --> Finish

to assign VM machine to this switch, open VM property and change the network adaptor

**Creation Process**

Create a vSwitch

VM port group

Assign

vmnic (uplink)

Repeat

on other host

Connect VMs

via port group

try to give same name in all host the switch name

**Adding Freesco router to environment**

download freesco router as a .ova file from [www.freesco.org--](http://www.freesco.org--)> or <https://communities.vmware.com/thread/520168?start=0&tstart=0>

to import in VMware Workstation --> click file --> click open --> select the .ova

file --> give name (freesco) --> set location --> open freesco VM properly --> assign network with proper vmnic

Network adaptor0 = VMNet0

Network adaptor1 = VMNet1

Network adaptor2 = VMNet2

Network adaptor3 = VMNet3

Network adaptor4 = VMNet4

power on the freesco VM 🡪 login with username (root) & password (Welcome1) --> enter command setup --> then press c 🡪 then press l 🡪 then press c 🡪 press x 🡪

no need to setup on eth0 only enable client DHCP option, will take IP automatically

setup IP on eth1 to 10.1.1.2

setup IP on eth1 to 10.2.2.2

setup IP on eth1 to 10.3.3.2 enable DHCP press f and enter 10.3.3.10 10.3.3.200

setup IP on eth1 to 10.4.4.2 enable DHCP press f and enter 10.4.4.10 10.4.4.200

**iSCSI Datastore Concept**

Datastore Types VMFS blocked based storage (1M block size 🡪 sub block 8KB)

File System

**VMware File System (VMFS)**

Local Attached Storage or Direct Attached Storage to host

Network Based

iSCSI Target (server providing the storage) Logical Unit Numbers(LUN)

Storage Processor iSCSI Qualify Name (IQN) or Extended Unique

Identifier(EUI) Initiator (Client ESXi) Host Bus Adaptor (HBA)

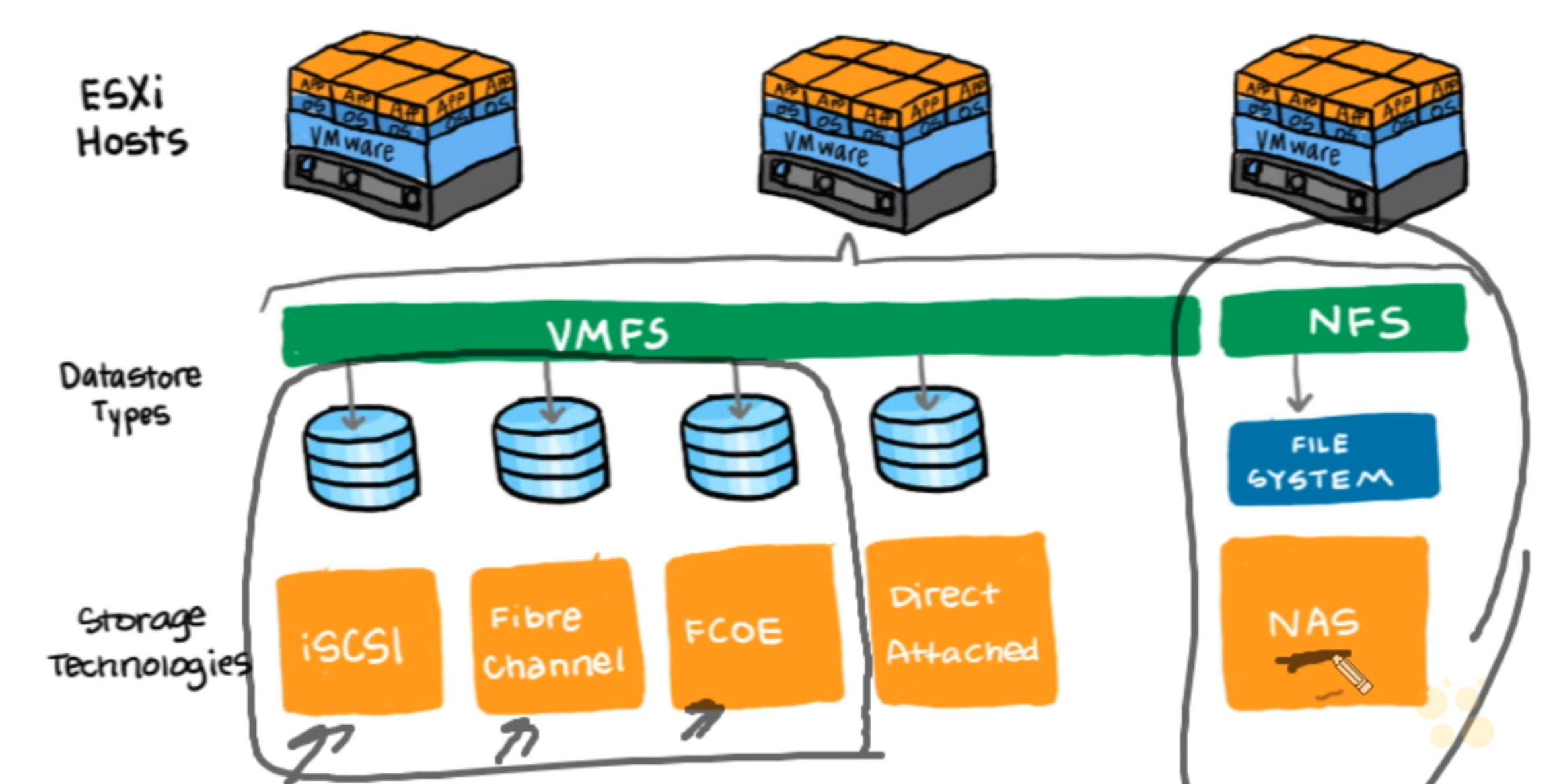
VMKernel

Fiber Channel (FC)

Fiber Channel over Ethernet (FCoE)

**Network File System (NFS)**

Network based Storage (NAS)



Target / Server

LUNs (Logical Unit Numbers (LUNs)

SPs (Storage Processors)

IQN or EUI (iSCSI qualify name, Extended Unique Identifier)

Initiator / Client (Host)

HBA (host Bus Adaptor)

VMkernel

**Setting up windows server 2012 as iSCSI target**

login to server --> click manage --> Add roles and feature --> select file and storage services -->expend the feature and select iSCSI Target Server 🡪 click Finish

click file & storage services --> select disk --> right click disk no. 1 bring online -->right click select new volume 🡪format NTFS --> Finish

now click file & storage services--> iSCSI --> create new iSCSI virtual disk--> select server --> select drive E 🡪 give name (iSCSI-vDisk--> size (65) 🡪 dynamically expend --> select new target --> specify initiator click add 🡪 select enter value for the selected type 🡪 type IP address (10.1.1.101) 🡪 repeat adding initiator for 10.1.1.102 , 10.1.1.201 and 10.1.1.202 and click next 🡪 click next 🡪 leave authentication --> finish

check for open filer setup as a iSCSI as a assignment

**Setting up ESXi host to use iSCSI storage**

create vswitch2 in ESXi-1 --> click manage --> network --> create new switch -->

select VMKernel option --> select new --> create uplink (vmnic2) --> give name storage-vmk --> give IP address --> 10.1.1.101 --> subnet (255.255.255.0)

finish

create HBA in HOST --> Select Esxi-1 --> click storage --> click plus + --> select iSCSI -->

click network port binding --> click + sign --> check the storage-vmk --> ok

--> click target --> enter IP address 10.1.1.111 --> rescan --> should show path in path tab

now create datastore based on iSCSI storage --> right click ESXi-1--> storage --> + sign to

create new datastore--> select VMFS --> give name --> iSCSI --> finish

create vSwitch2 and HBA adapter on Host2 as well to have access to storage

**iSCSI Multi path**

Create 2nd VMKernel port and bind to iSCSI storage

click host --> manage -> networking --> click new --> select new VMKernel network adaptor --> select existing 🡪switch --> select switch2 --> give name storage-vmk-B --> Next --> 10.1.1.201 --> finish

select switch2 --> click manage physical adaptor --> click add --> select vmnic3 --> ok

click storage-vmk --> edit --> click teaming & failover --> click override --> select vmnic3

and push down to unused adaptor 🡪ok

repeat same process for another HOST 2

now go to host --> storage --> select iSCSI --> network & port binding --> add --> add Switch-B->rescan

**Datastore that use NFS Share**

to enable NFS Share --> open AD server --> click manage --> add role and feature --> select

the Server for NFS option

Then click file & storage in local server --> click disk --> select 2nd disk --> right click bring online -->right click --> new volume --> finish -->

Now create new folder with name NSF-Mount in newly created drive --> then right click the

folder --> property -->click NFS sharing tab --> click manage NFS sharing --> share this

folder --> type of access (R&W) --> allow root access

now to create new datastore --> select host --> right click storage --> new datastore -->

select NFS --> select NSF version (all host should use same version) --> select 3 version –

> give name --> folder /NFS-Mount-->type server IP 10.1.1.111 --> finish

To make sure the NFS datastore is available to another HOST as well 🡪 then right click on datastore in HOST1 and click mount to additional HOST and select the desire HOST

**vMotion**

Migrating VM machine live from one Host to anther HOST without any down time

Difference between vMotion & Migration is

in vMotion VM is ON while in Migration VM is OFF. rest concept is same.

New

New VMKernel on each HOST

IP Network

Same:

VM Port Group

Caution:

Local CD /DVD

Create new switch (vSwitch3) --> on ESXi-1 --> New VMKernel Port --> new switch -->

add two adaptor vmnic4 & vmnic5 -->give name (vMotion-vmk) --> TCPIP Stack --> select

vMotion --> give IP 10.2.2.101 --> finish

do same above process on ESXi-2

click VM & Template --> Select VM --> Right click on VM --> Click migrate --> choose

both option --> select ESXi-2--> select storage --> select SCSI --> select network --> select

priority --> click finish -->

**Distributed Resource Scheduler (DRS)**

if resource utilization on host is higher then other host, then we use DRS to stabilize the

resource utilization for DRS to work properly, vMotion should be setup first between hosts

and hosts should be in same cluster

To enable DRS feature --> right click the cluster --> settings --> enable DRS --> make sure

method is manual and option is aggrasive.

now download DSL.ova VM --> it's a tiny VM --> import in to environment and create VM –-> POWER ON

create total 4 VM of DSL --> With name DSL-01, DSL-02, DSL-03 & DSL-04

**Distributed Switch**

To avoid creating individual vSwitch on each HOST, we will create distributed switch.

Because creating individual switch on each HOST is time consuming if number of HOSTs

are more.

Create one distributed switch and associate to multiple host.

Implementing Distributed Switch

to create distributed right click datacenter 🡪 select distributed switch 🡪 new distributed

switch --> give name D-Switch-01🡪 select version --> select 6 version --> next --> select

no. of uplink --> make it 2 –-> give port group name (DS VM Net 4) --> finish -->

click networking 🡪 select Distributed switch and click manage and click topology -->

change the uplink names (DSUPLINKS) --> DS VM NET 4 A & DS VM NET 4 B

Add host to distributed switch 🡪 click add host --> click new host --> select both host -->

Click OK 🡪 select Configure identical network setting on multiple hosts 🡪 click Next 🡪

select HOST1 🡪 Click next 🡪 select only first option (Manage Physical Option ) 🡪 click

next 🡪 select vmnic8 🡪 click Assign Uplink 🡪 Click OK 🡪 Repeat same process for

vmnic9 🡪 click Apply to all in next section as well, so setting will apply on HOST 2 as

well. 🡪 click next 🡪

**Network Policy for standard vSwitch**

VMware have product called VDI (Virtual Desktop infrastructure) to give direct remote

desktop connection to user to put limitation on user we will setup network policy for

network traffic & network teaming

select host --> manage 🡪network --> virtual switch --> select vSwitch2 --> add another

uplink vm net 7

edit switch setting on click top pencil icon 🡪

here we can setup

Security

Traffic shaping

Teaming and Failover

Click on security 🡪 set promiscuous mode means (for example three VM is connected to

port group and port group is connected to vSwitch, then if VM1 send packet to VM3, If

promiscuous mode is disable then packet will only go to VM3 otherwise will broadcast to

all VMs.

create another port group on vSwitch and then enable promiscuous is enable that port group.

Next two options are related to MAC address, by default Guest OS MAC address change is

allowed and also communication is also allowed with other VM. We can control this

behavior from these option.

Click on Traffic Shipping 🡪 by default traffic shipping is not enabled 🡪

Click on Teaming 🡪 check different options

we can do this on vm port group as well by over riding

**Implementing Networking policy & verifying on standard vSwitch**

to find out networking problem --> we will use protocol analyzer 🡪

select vSwitch1--> create port group with name special --> edit special port group --> under

security --> override promiscuous accept enable --> traffic shipping enable and 1000 value for all option --> remove teaming for vmnic 7, shift to unused area.

Switch on VM machine win 2012 🡪 download and install Wireshark on it then assign Special network to it 🡪 try to ping 8.8.8.8 from another VM located on same switch.

Analysis the traffic.

**Migrate VM Kernel Port from Standard Switch to Distributed Switch**

create new distributed vSwitch --> give name (DSwitch-Mgmnt) --> version 6🡪 create with 2 uplink --> port group name (DS-Mgmnt) 🡪 Finish

Select DSwitch-Mgmnt 🡪 Topology 🡪 change name of uplink group to (DSwitch-Mgmnt-Uplinks) 🡪 change uplink name to (Uplink A & Uplink B) 🡪

Click Add Host Icon 🡪 Add host 🡪 click add new host 🡪 select both host 🡪 make sure first two option selected 🡪 select vmnic0 🡪 select uplink A 🡪 repeat for vmnic2 as well 🡪 repeat same for host2 as well 🡪 next 🡪 Finish

**Distributed Switch Features**

Below are the features of Distributed Switch

**Link Aggregation Protocol**

Link Aggregation control protocol (LACP) --> combine two physical link into one

logical pipe

**Private vLAN**

IP subnetting on same switch

**NetFlow**

What is travel across the network . what is the most used protocol.

**Port Mirroring**

Replicate the traffic one part of network to another part of network. For anaylsis.

**Security**

Security option are same as on standard Switch

**Traffic Shaping**

Slow down the network traffic. Ingress (traffic coming from VM to switch and

Egress is opposite of Ingress)

**Trunking**

**CDP**

Cisco Discovery Protocol

**Link Layer Discovery Protocol**

**Increase Datastore iSCSI**

Click on storage 🡪 Select iSCSI 🡪 Right Click and select increase datastore capacity 🡪 select free

space from drop down list 🡪 enter 10 🡪 Finish

**Using vApps**

vApp is logical container, in which we will put VM. For example, to run an application require DB

server, web server and application server. We can put all these three VM in vApp container.

To create new vApps --> click vCenter inventory list --> on left side click on vApps --> create new

app --> select location --> give name 🡪 allocated resource 🡪 select defaults option 🡪 finish

go add VM to vApp --> click host & cluster --> right click vApp --> click new virtual machine -->

click clone existing virtual machine 🡪 select VM --> Give name Linux-vApp --> select vApp -->

select storage --> finish

edit vApp setting to setup booting sequence of VM -->

**CPU & Memory Utilization**

ESXi Memory Technique

Transparent Page sharing (TPS) (4KB pages) 🡪 identical pages are removed and only 1

page is used

Balloon driver (part of tools ) 🡪 in this technique balloon driver request memory from VM

not used and give back to HOST

Memory Compression 🡪 15% memory compression is happening in HOST in case of

storage memory

Swapping by ESXi host 🡪 this is not very good and for fast access.

**Implement Reservation & Limits**

open the VM setting and set up limit & reservation on CPU & Memory option

**Resource Pool**

**Using Resource Pool**

leave this topic

**Storage DRS**

Add couple of drives to use ad iSCSI storage --> add 500gb disk to AD VM in workstation -->

select disk in file & storage in server manager

bring volume online --> create volume --> finish

then click on iSCSI --> click task --> select new iSCSI disk --> select drive --> finish

now we have 3 LUN , LUN1 , LUN2 & LUN3

Click storage in vCenter --> click storage --> new storage --> select host1 🡪 select iSCSI-B 🡪

now create datastore cluster --> storage --> new data storage cluster --> select fully automated -->

High Availability

if ESXi-1 is gone then what will happen to VM --> If the Esxi-1 host network connectivity to

storage

then VM should move the ESXi-2 automatically

**High Availability**

In HA Cluster

Master Host

Heartbeat make sure that other host are available and working fine

Failure

Isolation mean VM working properly but the management connectivity is lost.

VMCP VM Component Protection 🡪 VM lost connect to storage but other

network are connected

right click the cluster --> setting and enable HA --> then shutdown the ESXi-2, VM running on ESXi-2 will automatically transfer to ESXi-1

**VM Fault Tolerance**

Primary VM and Secondary VM 🡪