**IT 3300 : Virtualization**

**Pools, HA**

### Pools

- A resource pool comprises multiple XenServer host installations, bound together into a single managed entity which can host Virtual Machines.
- **Why?**
  - move hosts
  - minimize downtime
  - failover
- 16 hosts per pool

### Pools Requirements

A pool always has at least one physical node “master”.

- CPUs on server joining pool are same as CPUs in the pool
- same version of xenserver
- no shared storage configured
- no running or suspended vms on joining host
- no active operations on vms
- clock synchonized to master

### Pool Master

The master acts as the single management interface for all other hosts in the pool. Master will forward all commands to pool members ensuring consistency. If master fails, pool is unmanageable until a member is promoted to master or master regains stability. If HA is enabled, pool master will automatically be re-elected upon failure.

### Maintenance mode

Allows us to perform operations on a server. Running and suspended vms will be migrated to other server in the pool. We can also forcibly ‘migrate’ a vm to another host.

### XenMotion

XenMotion is a feature that allows VMs to migrate from one server to another without any downtime. This functionality can be used when performing maintenance on a particular server that needs to be taken offline in order to perform a hardware replacement or even replacing a server.

### XenMotion requirements

- VM’s hosted on shared storage
- VM’s can only be moved within pool
- XenServer Tools must be installed on the migrating VM
- DVD drive of VM must be empty
- Enough free memory on target server

Note: The target server must be the same or a newer version of XenServer. A VM that has migrated to a host running a newer version of XenServer cannot be migrated back to the older host.

**Storage XenMotion**

Allows you to migrate a VDI from one SR to another WHILE the machine is running. Can migrate from local storage to shared storage. Can also migrate a VDI from one server to another WITHOUT shared storage.

**Storage XenMotion Requirements**

- The migrating VM must have XenServer Tools installed
- If the CPUs on the source and target server are different, then the CPU on the target must support all the features of the source server
- The migrating VM can have no more than one snapshot
- The migrating VM can have no more than six attached VDIs
- The target SR must have enough free space to accommodate the migrating VMs
- There must be enough free memory on the target server to support the migrating VMs
- The target server must have the same version of XenServer or later as the source server

**High Availability**

HA is a set of automatic features designed to plan for, and safely recover from, issues which take down XenServer hosts or make them unreachable. For example physically disrupted networking or host hardware failures.

Should always be used with multipathed storage and bonded networking

**What is multipathed storage?**

Using more than one physical path to transfer data between host and storage device.

**What is bonded networking?**

Nic Bonding: configuring 2 or more nics to function as one. All bonded Nics share the same mac address. If one nic bond fails the traffic is automatically re-routed through the other.

**Nic bonding image**

![Nic bonding image]

**HA Heartbeats**

- Network heartbeats - management network is utilized. Bond it.
- Storage heartbeats - hosts in HA pool periodically write to a storage heartbeat SR as a keep-alive mechanism. This SR needs to be at min 356M.

**Server Fencing**

In the event a host is deemed unreachable, the host is powered off and restarted to prevent the host from
writing to the shared storage and potentially corrupting data.

---

**HA requirements reviewed**

- A shared storage SR is required to support the protected virtual machines
- An iSCSI, Fibre Channel, or NFS SR of 356 MB or greater is required for the heartbeat SR
- The virtual machine’s network must be a pool-wide network
- The protected virtual machine must not be connected to a local DVD drive

---

**HA VM settings**

See the start options sections of vm’s properties.

- Restart priority: used to define the order of precedence used when there is contention for capacity on the remaining hosts in the resource pool.
  - restart: host will restart if there is capacity in pool
  - restart if possible: will only restart on other host if there is capacity after hosts with HIGHER priority have been restarted.
  - Do not restart: the vm will not restart after a host failure.

---

**HA VM settings**

- The start order determines the order in which VMs are booted after a host failure. This functionality allows VMs that provide services to other VMs such as a database server to be started first.

---

**HA VM settings**

Delay interval: how long to wait before next set of vms starts. Makes sure that systems other vms rely on have adequate time to boot.