**Lab 09: VMware HA and VMware FT**

In this lab, we identified what High Availability (HA) and Fault Tolerance (FT) are, as well their key differences. We tested these by causing a host failure, observing what happened to the VMs.

**High Availability (HA)**

HA is a service that instructs the hosts to keep track of each other; virtual machines and resources, and restart or migrate the virtual machines assigned to failed hosts to available hosts in the cluster.

HA provides uniform, cost-effective failover protection against hardware and OS outages within the virtualised environments. HA allows you to monitor hosts and VMs to detect hardware and OS failures, to restart VMs on other hosts in the cluster without manual intervention when a server outage is detected, and to reduce application downtime by automatically restarting VMs upon detection of an OS failure.

Logging onto the vCenter Appliance and using the vSphere Web Client, we navigated to the Production Services Cluster. Under the Manage tab, we selected vSphere HA, clicked on Edit. Here, we turned on HA, enabled Host Monitoring, and disabled Admission Control. Powering on CentOS Server 01, we observed a reported IP Address in the Content area Summary tab. Opening a Terminal window on the client machine, we pinged this IP Address (192.168.1.130). We left the ping command running, minimising the Terminal window.

**Fault Tolerance (FT)**

FT provides continuous availability for VMs by creating and maintaining a Secondary VM that is identical to, and continuously available to replace, the Primary VM in the event of a failover situation. A duplicate VM, called the Secondary VM, is created and runs in virtual lockstep with the Primary VM. vLockstep captures inputs and events that occur on the Primary VM and sends them to the Secondary VM, which is running on another host. Using this information, the Secondary VM's execution is identical to that of the Primary VM. Because the Secondary VM is in virtual lockstep with the Primary VM, it can take over execution at any point without interruption, thereby providing fault tolerant protection.

In the Navigator area of CentOS\_6.4\_i386\_Min, we selected All vCenter Actions, then Fault Tolerance, clicking Turn On. When prompted, we confirmed by clicking Yes. We were able to view its progress under the Recent Tasks pane. Powering on CentOS\_6.4\_i386\_Min, we noted that it took longer to power up. This is because it had to boot a like instance on both hosts. Once powered up, we again observed a reported IP Address in the Content area Summary tab. Returning to the client machine, we opened a second instance of the Terminal, pinging the new IP Address (192.168.1.131). Again, we left the ping command running.

**Testing HA and FT**

In the NETLAB+ interface under the Action tab, we powered off ESXi01. Monitoring the host outage, we saw that the HA-protected machine was rebooting, but the FT machine continued to function. Opening the Terminals where we had previously pinged the two VMs, we saw Destination Host Unreachable for some of the pings, meaning the machine we were pinging was no longer available. The pings returned when FT restarted on the new host.

Stopping both ping commands, we noticed how mang pings failed for each of the VMs with HA having some downtime (30% packet loss), while FT was continuously running (0% packet loss). FT achieved this because the traffic was simply redirected to the second machine, whereas HA restarted the machine on a new host when it noticed the outage, meaning it was down for a short time.