



Name: Shady Mohamed Abdel Gawad

ID: 20200246

Subject: Topics in Information

Technology-2 (Cloud Computing)

Under the supervision of: Dr/ Nour

Mahmoud

Group: S1

Part 1 - Investigate vSphere Main Services:

The screenshot displays the vSphere Client interface in a Firefox Web Browser. The browser's address bar shows the URL: <https://vcsa-01a.corp.vmbeans.com/ui/app/vm;nav=v/urn:vmomi:VirtualMachine:vm-12003:4c4f3e1>. The interface is titled "vSphere Client" and shows the user "Administrator@VSPHERE.LOCAL".

The main content area displays the configuration for the "TinyLinux2 Template". The left sidebar shows a tree view of the environment, including "vcsa-01a.corp.vmbeans.com", "RegionA01", and various virtual machines and templates. The "TinyLinux2 Template" is selected.

The right pane shows the configuration details for the "TinyLinux2 Template". The "Summary" tab is active, displaying the following information:

- Guest OS:** VMware Photon OS (64-bit)
- VMware Tools:** Not running, version:12352 (Guest Managed)
- DNS Name:**
- IP Addresses:**
- Encryption:** Not encrypted

Below the configuration details, there is a "Recent Tasks" section. It contains a table with the following data:

Task Name	Target	Status	Details	Initiator	Queued For	Start Time
Clone virtual machine	TinyLinux2 Template	Completed	Copying Virtual Machine files	VSPHERE.LOCAL\Administrator	3 ms	05/14/2024, 9:09:17 A...
Clone virtual machine	web-serv01	Completed	Deleting temporary snapshot	VSPHERE.LOCAL\Administrator	3 ms	05/14/2024, 9:07:55 ...
Reconfigure virtual mach...	web-serv01	Completed		VSPHERE.LOCAL\Administrator	4 ms	05/14/2024, 9:04:50 ...

Cloning Virtual Machines and Using Templates

Activities Firefox Web Browser May 14 9:24 AM

vSphere - RegionA01-COMP01

https://vcsa-01a.corp.vmbeans.com/ui/app/cluster;nav=h:urn:vmomi:ClusterComputeResource: 90%

HOL Admin Region A esx-03a Admin

vSphere Client

RegionA01-COMP01 ACTIONS

Summary Monitor Configure Permissions Hosts VMs Datastores Networks Updates

vSphere DRS

Cluster DRS Score 97%

VM DRS Score

DRS Recommendations: 0

DRS Faults: 0

VIEW DRS SETTINGS VIEW ALL VMS

Recent Tasks Alarms

Task Name	Target	Status	Details	Initiator	Queued For	Start Time	Completion Time
Reconfigure cluster	RegionA01-COMP01	Completed		VSPHERE.LOCAL\Administrator	2 ms	05/14/2024, 9:22:47 ...	05/14/2024, 9:22:47

Understanding vSphere High Availability and Distributed Resource

Activities Firefox Web Browser May 14 9:35 AM

vSphere - esx-02a.corp.vi

https://vcsa-01a.corp.vmbeans.com/ui/app/host;nav=h:urn:vmomi:HostSystem:host-1025:4< 90%

HOL Admin Region A esx-03a Admin

vSphere Client

esx-02a.corp.vmbeans.com ACTIONS

Summary Monitor Configure Permissions VMs Datastores Networks Updates

Virtual Machines VM Templates

Name	State	Status	Provisioned Space	Used Space	Host CPU	Host Mem
app-serv01	Powered On	Normal	18.08 GB	2.96 GB	0 Hz	364 MB
TinyLinux	Powered On	Normal	436.68 MB	371.68 MB	0 Hz	167 MB
TinyLinux2	Powered On	Normal	437.08 MB	372.08 MB	0 Hz	171 MB
web-serv01	Powered On	Normal	18.08 GB	2.95 GB	20 MHz	1.79 GB
Windows10	Powered On	Normal	32.08 GB	17.74 GB	104 MHz	2.04 GB

EXPORT

Recent Tasks Alarms

Task Name	Target	Status	Details	Initiator	Queued For	Start Time	Completion Time
Relocate virtual machine	app-serv01	Completed	Migrating Virtual Machine ac...	VSPHERE.LOCAL\Administrator	6 ms	05/14/2024, 9:34:59 ...	05/14/2024, 9:35:04

Migrating Virtual Machines with VMware vMotion

Answer the following questions:

1. What is the difference between VMware vSphere High Availability (HA) and DRS?

VMware vSphere offers two key functionalities for managing virtual machines (VMs) in a cluster environment: High Availability (HA) and Distributed Resource Scheduler (DRS). While both are essential for maintaining a healthy virtualized environment, they address different aspects:

vSphere HA focuses on availability. In case of a host failure, HA ensures automatic restart of affected VMs on remaining cluster hosts. This minimizes downtime for critical applications running on those VMs.

vSphere DRS concentrates on resource optimization. It dynamically migrates VMs across cluster hosts based on resource utilization. This helps balance workloads, prevent resource bottlenecks, and improve overall cluster efficiency.

Here's an analogy: Imagine a hospital with multiple operating rooms (cluster hosts).

HA acts like a backup surgical team. If the primary surgeon (host) becomes unavailable, the backup team (HA) ensures the surgery (VM operation) continues on another operating table (different host) with minimal disruption.

DRS functions like an OR manager. It distributes patients (VMs) across operating rooms (hosts) based on their needs and the surgeons' (hosts') capacity. This ensures efficient utilization of all available operating rooms.

In essence, HA safeguards VM uptime during host failures, while DRS optimizes resource allocation for smooth VM operation. They work together seamlessly to provide a robust and efficient virtualized environment.

2. What is FDM and what is its role in vSphere HA?

FDM stands for Fault Domain Manager. It's a critical component within vSphere HA, playing a key role in ensuring VM availability during host failures. Here's how FDM functions:

Agent on Every Host: FDM operates as a software agent. It runs on each ESXi host participating in the vSphere HA cluster.

Communication Hub: FDM acts as a communication hub between ESXi hosts. It facilitates the exchange of information regarding:

- Available resources on each host (CPU, memory, storage)

- Status of running VMs (powered on, powered off, suspended)

- vSphere HA configuration details

Master Election: The FDM agents elect a single host as the "master" within the cluster. This master plays a crucial role in coordinating HA activities.

Heartbeat Monitoring: FDMs on all hosts constantly exchange heartbeats. This allows them to detect host failures promptly.

VM Restart Decisions: Upon detecting a host failure, the FDM master leverages the collected information to determine which VMs need restarting and where to restart them on remaining healthy hosts.

vCenter Server Interaction: While FDM agents handle communication and coordination within the cluster, they also interact with vCenter Server. vCenter Server provides overall management and configuration of vSphere HA, including FDM settings.

In simpler terms, FDM acts as the nervous system of vSphere HA. It constantly monitors the health of ESXi hosts, detects failures, and coordinates the automatic restart of VMs on surviving hosts. This ensures minimal downtime for your virtual machines during host-related issues.

3. What are the automation levels in DRS and what is their function?

DRS, or Distributed Resource Scheduler, in vSphere offers three automation levels for managing VM migrations within a cluster:

1. Manual:

In this mode, DRS acts purely as an advisor.

It analyzes resource utilization across cluster hosts and identifies potential imbalances.

DRS recommends VM migrations to optimize resource allocation but doesn't execute them automatically.

The administrator has to manually review these recommendations and decide whether to initiate migrations.

2. Partially Automated:

This mode offers a balance between automation and control.

DRS can automatically perform initial placement of VMs during deployment based on predefined rules and cluster configuration.

However, for existing VMs, DRS still recommends migrations for load balancing but requires manual approval before execution.

This allows administrators to maintain some oversight while benefiting from DRS's automated analysis and placement for new VMs.

3. Fully Automated:

This mode provides the most hands-off approach.

DRS takes complete control over VM migrations for both initial placement and load balancing.

Based on configured thresholds and DRS rules, it can automatically migrate VMs across cluster hosts to optimize resource utilization without requiring manual intervention.

This offers the highest level of automation but requires careful configuration of DRS thresholds and rules to ensure migrations align with your cluster's performance and resource requirements.