IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

WSOU INVESTMENTS, LLC d/b/a BRAZOS LICENSING AND DEVELOPMENT, Plaintiff, v. DELL TECHNOLOGIES INC., DELL INC., EMC CORPORATION, AND VMWARE, INC. Defendants.	§ § § § § § § § § § § §	CIVIL ACTION NO. 6:20-cv-418 **JURY TRIAL DEMANDED**

ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff WSOU Investments, LLC d/b/a Brazos Licensing and Development ("Brazos" or "Plaintiff"), by and through its attorneys, files this Complaint for Patent Infringement against Dell Technologies Inc., Dell Inc., EMC Corporation, and VMWare, Inc. (collectively, "Defendants") and alleges:

NATURE OF THE ACTION

1. This is a civil action for patent infringement arising under the Patent Laws of the United States, 35 U.S.C. §§ 1, et seq., including §§ 271, 281, 284, and 285.

THE PARTIES

2. Brazos is a limited liability corporation organized and existing under the laws of Delaware, with its principal place of business at 605 Austin Avenue, Suite 6, Waco, Texas 76701.

3. On information and belief, defendant Dell Technologies Inc. ("Dell") is a Delaware corporation with a principal place of business at One Dell Way, Round Rock, Texas 78682.

4. On information and belief, defendant Dell Inc. is a Delaware corporation with a principal place of business at One Dell Way, Round Rock, Texas 78682. Dell Inc. is wholly owned by its corporate parent, Dell.

5. On information and belief, defendant EMC Corporation ("EMC") is a Massachusetts corporation with a principal place of business at One Dell Way, Round Rock, Texas 78682. EMC Corporation is wholly owned by its corporate parent, Dell Technologies Inc.

6. Upon information and belief, VMware, Inc. ("VMWare") is a Delaware corporation with two established places of business in this District, including two in Austin, Texas with over 700 employees.

7. Upon information and belief, VMWare was acquired by EMC in 2004 and conducted an initial public offering of Class A common stock in August 2007. On or around September 2016, Dell acquired by EMC. As a result, EMC became a wholly-owned subsidiary of Dell, and VMWare became an indirectly-held, majority-owned subsidiary of Dell. Under the rules of the New York Stock Exchange, VMWare is a controlled company. As of January 31, 2020, Dell controlled approximately 80.9% of VMWare's outstanding common stock, including 31 million shares of its Class A common stock and all of it Class B common stock.

COUNT ONE - INFRINGEMENT OF U.S. PATENT NO. 9,164,800

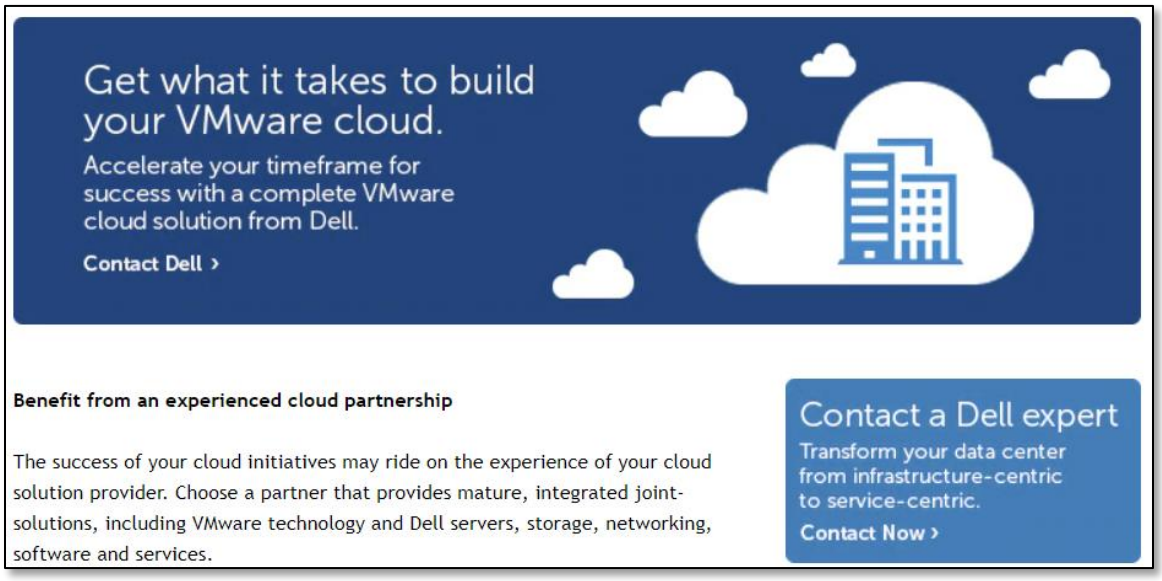
8. Brazos re-alleges and incorporates by reference the preceding paragraphs of this Complaint.

9. On October 20, 2015, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 9,164,800 ("the '800 Patent"), entitled "Optimizing Latencies in

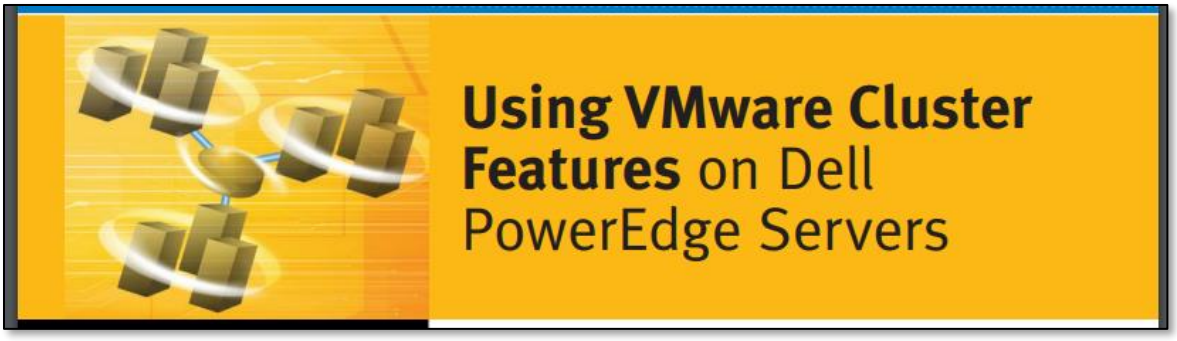
Cloud Systems by Intelligent Compute Node Placement." A true and correct copy of the '800 Patent is attached as Exhibit A to this Complaint.

10. Brazos is the owner of all rights, title, and interest in and to the '800 Patent, including the right to assert all causes of action arising under the '800 Patent and the right to any remedies for the infringement of the '800 Patent.

11. Defendants make, use, sell, offer for sale, import, and/or distribute in the United States, including within this judicial district, products such as, but not limited to, cloud-related solutions, including but not limited to, devices incorporating VMware's VeloCloud solutions and vSphere software, such as Dell's PowerEdge servers and VxRail appliances (collectively, the "Accused Products").



https://www.dell.com/learn/us/en/15/solutions/vmware-vcloud



https://www.dell.com/downloads/global/power/ps3q07-20070562-hanson.pdf

Simplify your journey to the hybrid cloud.

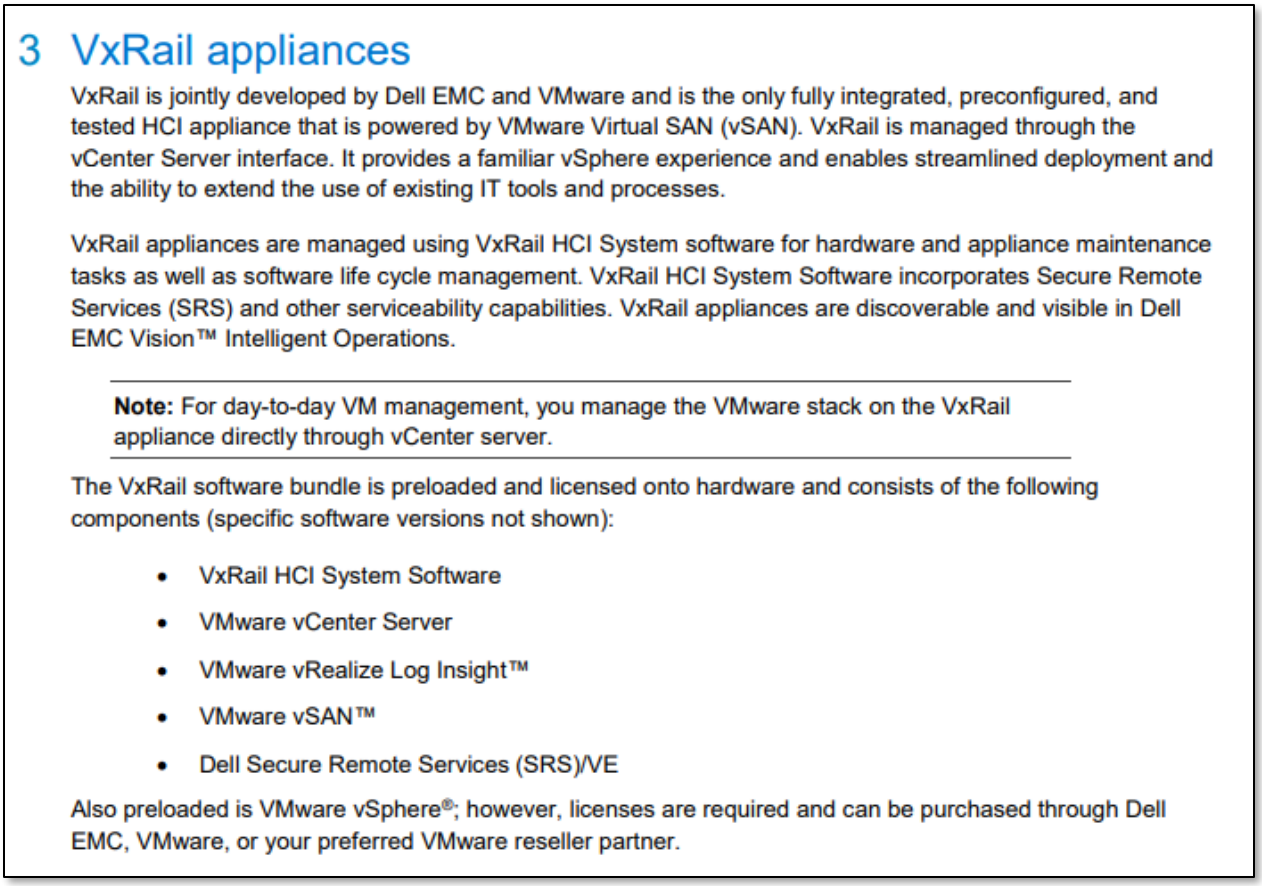
Together, Dell EMC and VMware accelerate digital business in a multi-cloud world. Building on our solid partnership, Dell EMC PowerEdge will offer the latest versions of VMware vSphere®, VMware vSAN™ and VMware Cloud Foundation once available. Learn more about VMware's recent announcements here.

https://www.delltechnologies.com/en-us/solutions/vmware/servers-for-vmware.htm

The two-socket server is an ideal base for building VI3 clusters as there are not as many "eggs in one basket". However, it would be best if there were a mechanism to restart the virtual machines from the failed hosts on remaining hosts in the VMware farm. Using VMware's HA (High Availabilility) and DRS (Distributed Resource Scheduler) it is possible to obtain this functionality.

VMware HA allows virtual machines on failed ESX server hosts to restart on surviving ESX hosts. The DRS solution uses system algorithms and user created rules to determine the optimal placement of the virtual machines.

https://www.dell.com/downloads/global/vectors/dell_and_vmware_drs_ha_solutions.pdf



3 VxRail appliances

VxRail is jointly developed by Dell EMC and VMware and is the only fully integrated, preconfigured, and tested HCI appliance that is powered by VMware Virtual SAN (vSAN). VxRail is managed through the vCenter Server interface. It provides a familiar vSphere experience and enables streamlined deployment and the ability to extend the use of existing IT tools and processes.

VxRail appliances are managed using VxRail HCI System software for hardware and appliance maintenance tasks as well as software life cycle management. VxRail HCI System Software incorporates Secure Remote Services (SRS) and other serviceability capabilities. VxRail appliances are discoverable and visible in Dell EMC Vision™ Intelligent Operations.

Note: For day-to-day VM management, you manage the VMware stack on the VxRail appliance directly through vCenter server.

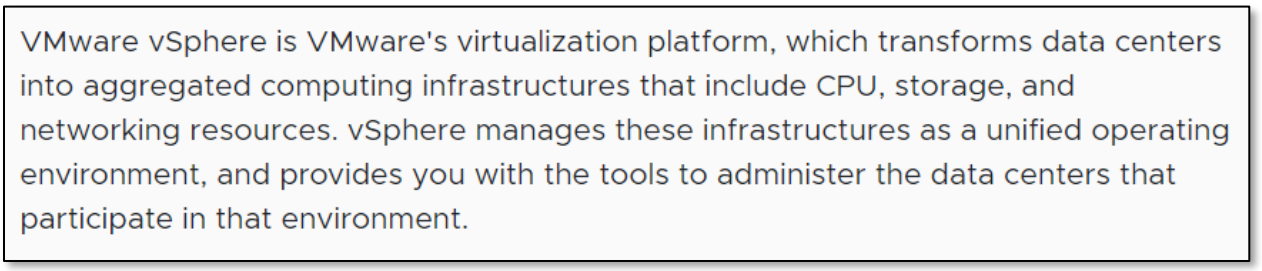
The VxRail software bundle is preloaded and licensed onto hardware and consists of the following components (specific software versions not shown):

- VxRail HCI System Software
- VMware vCenter Server
- VMware vRealize Log Insight™
- VMware vSAN™
- Dell Secure Remote Services (SRS)/VE

Also preloaded is VMware vSphere®; however, licenses are required and can be purchased through Dell EMC, VMware, or your preferred VMware reseller partner.

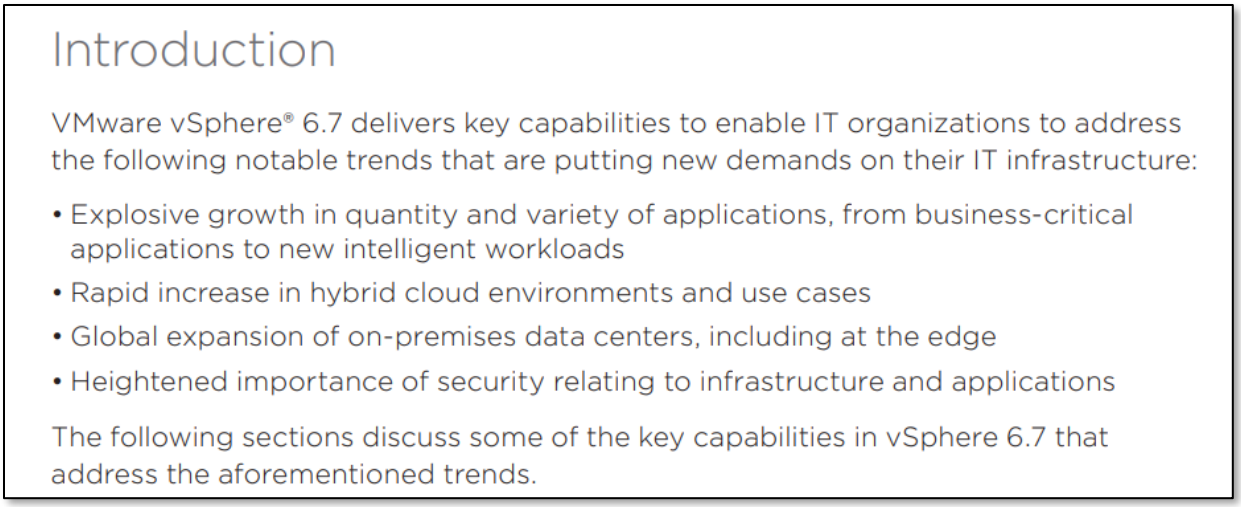
https://www.dellemc.com/resources/en-us/asset/technical-guides-support-information/products/converged-infrastructure/vxrail-vcenter-server-planning-guide.pdf

12. The Accused Products allow administration of hybrid cloud environments and provide resource management.



VMware vSphere is VMware's virtualization platform, which transforms data centers into aggregated computing infrastructures that include CPU, storage, and networking resources. vSphere manages these infrastructures as a unified operating environment, and provides you with the tools to administer the data centers that participate in that environment.

https://docs.vmware.com/en/VMware-vSphere/index.html



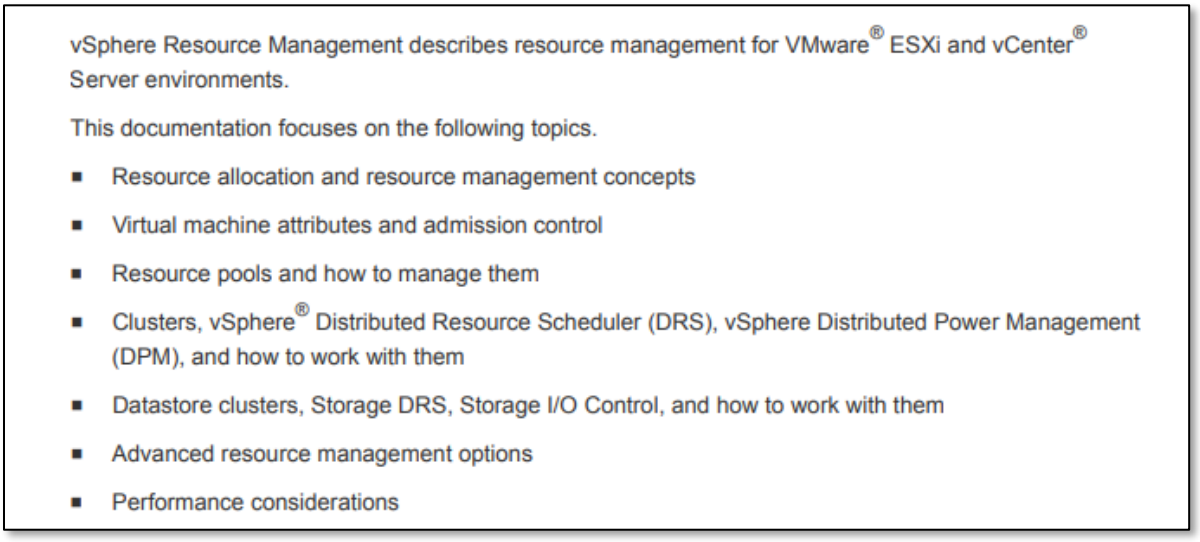
Introduction

VMware vSphere® 6.7 delivers key capabilities to enable IT organizations to address the following notable trends that are putting new demands on their IT infrastructure:

- Explosive growth in quantity and variety of applications, from business-critical applications to new intelligent workloads
- Rapid increase in hybrid cloud environments and use cases
- Global expansion of on-premises data centers, including at the edge
- Heightened importance of security relating to infrastructure and applications

The following sections discuss some of the key capabilities in vSphere 6.7 that address the aforementioned trends.

https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/products/vsphere/vmware-whats-new-in-vsphere-whitepaper.pdf



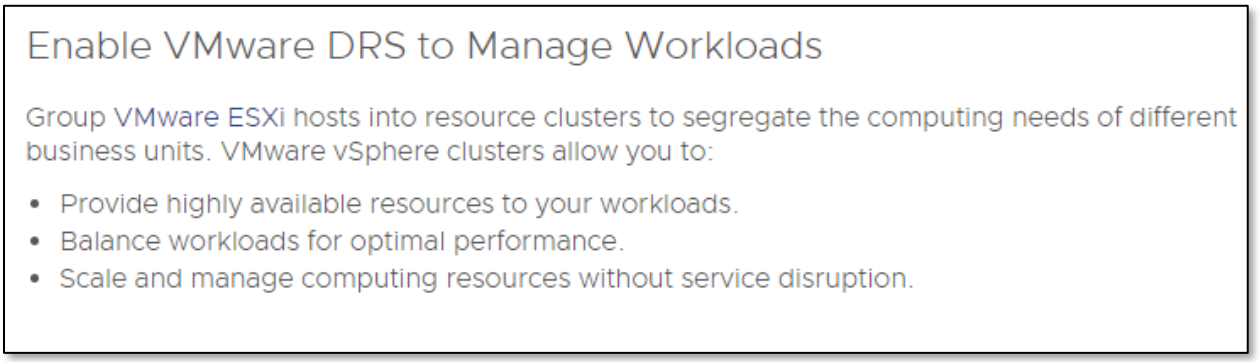
vSphere Resource Management describes resource management for VMware® ESXi and vCenter® Server environments.

This documentation focuses on the following topics.

- Resource allocation and resource management concepts
- Virtual machine attributes and admission control
- Resource pools and how to manage them
- Clusters, vSphere® Distributed Resource Scheduler (DRS), vSphere Distributed Power Management (DPM), and how to work with them
- Datastore clusters, Storage DRS, Storage I/O Control, and how to work with them
- Advanced resource management options
- Performance considerations

https://docs.vmware.com/en/VMware-vSphere/6.7/vsphere-esxi-vcenter-server-67-resource-management-guide.pdf

13. The Accused Products employ Distributed Resources Scheduler (DRS) solutions to manage workloads and group hosts to resource clusters in order to segregate the computing needs of different business units and balance workloads.



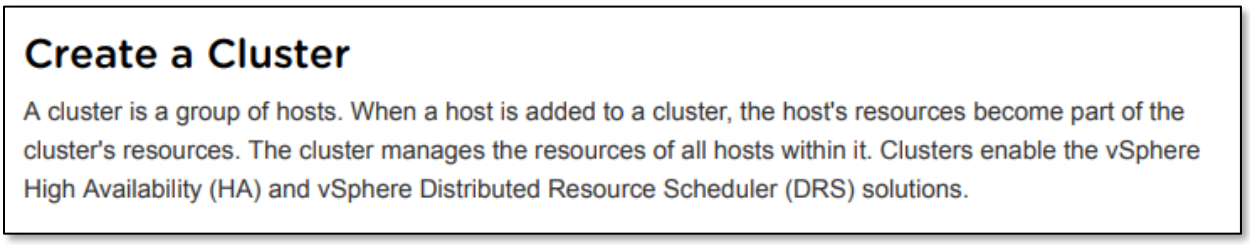
https://www.vmware.com/in/products/vsphere/drs-dpm.html

14. The Accused Products allocate I/O resources to virtual machines (VMs) performing computing based on importance by assigning a relative number of shares to the virtual machines. A storage DRS solution in the Accused Products can provide placement of VMs and VM disks (VMDKs) for data storage, for example.

https://docs.vmware.com/en/VMware-vSphere/6.7/vsphere-esxi-vcenter-server-67-resource-management-guide.pdf

15. The Accused Products uses clusters to manage the resources. In vSphere clusters, vSphere High Availability (HA) and vSphere Distributed Resources Scheduler (DRS) solutions

are also enabled.

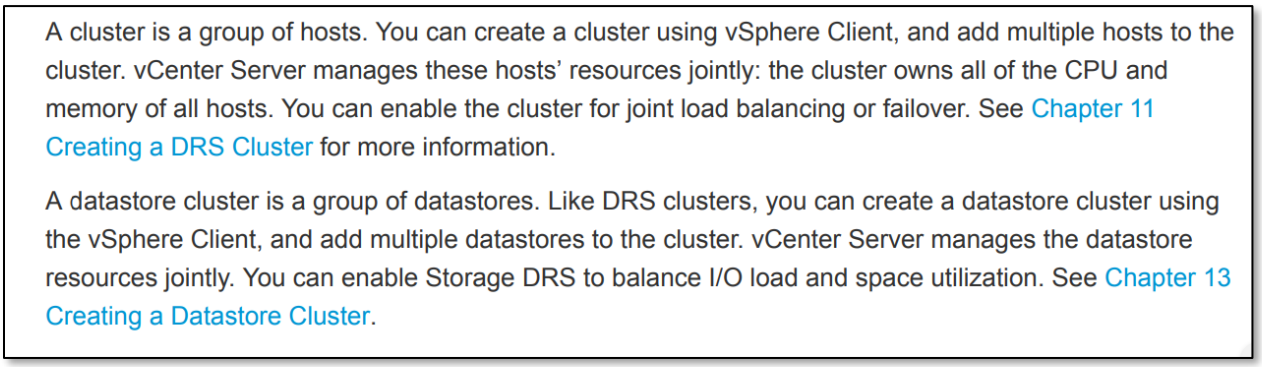


Create a Cluster

A cluster is a group of hosts. When a host is added to a cluster, the host's resources become part of the cluster's resources. The cluster manages the resources of all hosts within it. Clusters enable the vSphere High Availability (HA) and vSphere Distributed Resource Scheduler (DRS) solutions.

https://docs.vmware.com/en/VMware-vSphere/6.7/vsphere-esxi-vcenter-server-67-resource-management-guide.pdf

16. A DRS cluster created by a vSphere Client may be a collection of hosts and associated virtual machines with shared resources and a shared management interface. A vSphere Client can add multiple hosts to a cluster. A Datastore Cluster is a group of datastores. A vCenter server can manage all these resources.

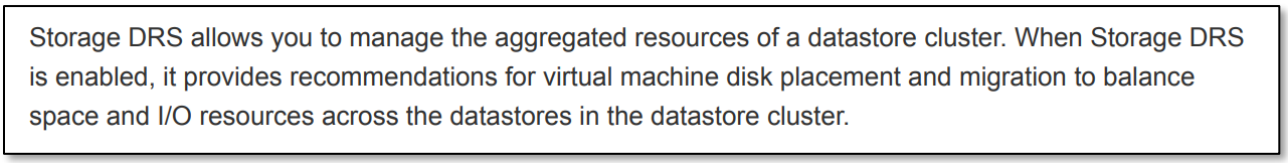


A cluster is a group of hosts. You can create a cluster using vSphere Client, and add multiple hosts to the cluster. vCenter Server manages these hosts' resources jointly: the cluster owns all of the CPU and memory of all hosts. You can enable the cluster for joint load balancing or failover. See Chapter 11 Creating a DRS Cluster for more information.

A datastore cluster is a group of datastores. Like DRS clusters, you can create a datastore cluster using the vSphere Client, and add multiple datastores to the cluster. vCenter Server manages the datastore resources jointly. You can enable Storage DRS to balance I/O load and space utilization. See Chapter 13 Creating a Datastore Cluster.

https://docs.vmware.com/en/VMware-vSphere/6.7/vsphere-esxi-vcenter-server-67-resource-management-guide.pdf

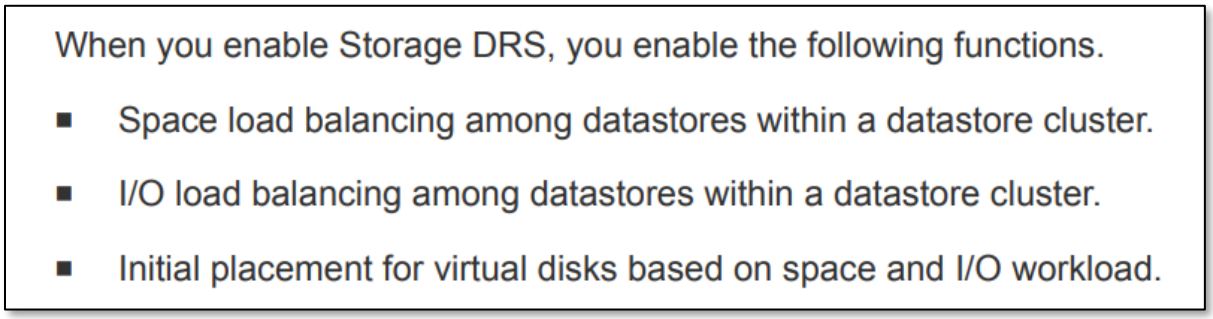
17. A vSphere cluster contains VMs, datastores, and links between them.



Storage DRS allows you to manage the aggregated resources of a datastore cluster. When Storage DRS is enabled, it provides recommendations for virtual machine disk placement and migration to balance space and I/O resources across the datastores in the datastore cluster.

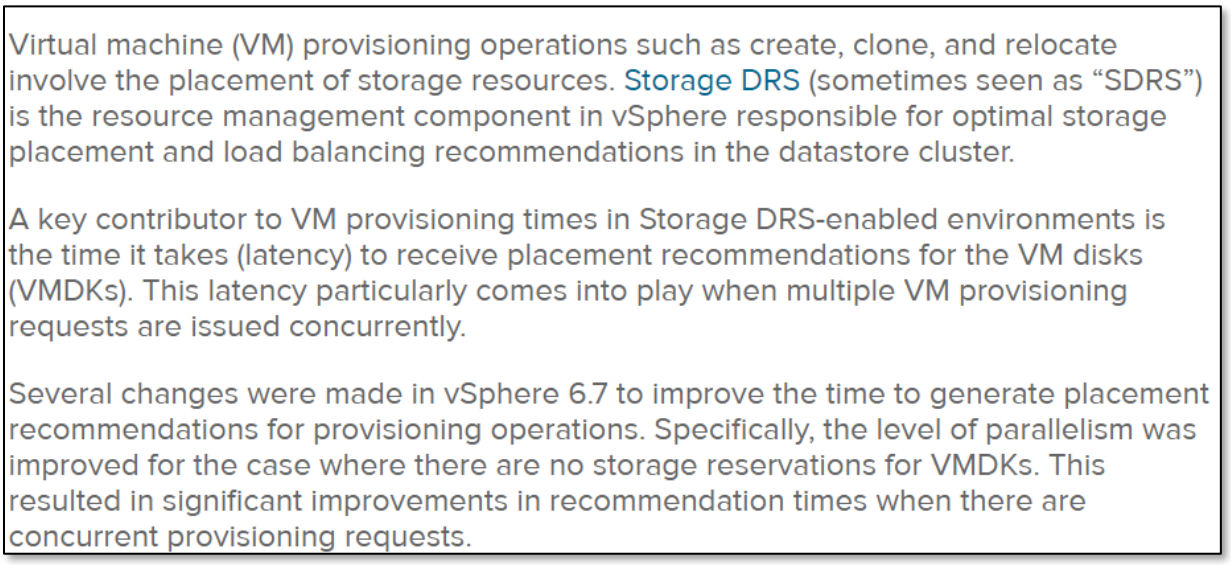
https://docs.vmware.com/en/VMware-vSphere/6.7/vsphere-esxi-vcenter-server-67-resource-management-guide.pdf

18. Storage DRS in the Accused Products allows users to manage the aggregated resources in a datastore cluster to achieve objectives, including space load balancing, I/O load balancing, and placement for virtual disks.


When you enable Storage DRS, you enable the following functions.

- Space load balancing among datastores within a datastore cluster.
- I/O load balancing among datastores within a datastore cluster.
- Initial placement for virtual disks based on space and I/O workload.

https://docs.vmware.com/en/VMware-vSphere/6.7/vsphere-esxi-vcenter-server-67-resource-management-guide.pdf


Virtual machine (VM) provisioning operations such as create, clone, and relocate involve the placement of storage resources. Storage DRS (sometimes seen as "SDRS") is the resource management component in vSphere responsible for optimal storage placement and load balancing recommendations in the datastore cluster.

A key contributor to VM provisioning times in Storage DRS-enabled environments is the time it takes (latency) to receive placement recommendations for the VM disks (VMDKs). This latency particularly comes into play when multiple VM provisioning requests are issued concurrently.

Several changes were made in vSphere 6.7 to improve the time to generate placement recommendations for provisioning operations. Specifically, the level of parallelism was improved for the case where there are no storage reservations for VMDKs. This resulted in significant improvements in recommendation times when there are concurrent provisioning requests.

https://blogs.vmware.com/performance/2018/11/sdrs-performance-vsphere67.html

19. Storage DRS in the Accused Products place VMs and VMDKs with reduced latency.

> Virtual machine (VM) provisioning operations such as create, clone, and relocate involve the placement of storage resources. Storage DRS (sometimes seen as "SDRS") is the resource management component in vSphere responsible for optimal storage placement and load balancing recommendations in the datastore cluster.
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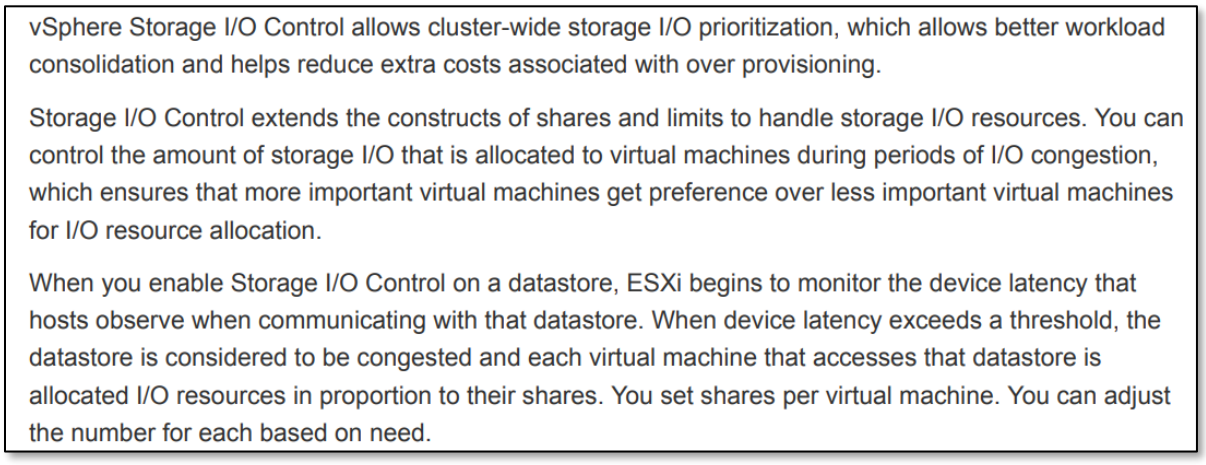
https://blogs.vmware.com/performance/2018/11/sdrs-performance-vsphere67.html

20. In the Accused Products, the Storage DRS works in conjunction with the cluster DRS based on a variety of metrics, including device latency and prioritizations to avoid over provisioning storage and other resources.

> Important VM Level Metrics
>
> - CPU active (run, ready and peak)
> - Memory overhead (growth rate)
> - Active, Consumed and Idle Memory
> - Shared memory pages, balloon, swapped
>
> The most important metric to determine a virtual machines' CPU demand is CPU active. CPU active is a collection of multiple stats all morphed into a single stat. One important statistic that is a part of CPU active is CPU ready time. DRS takes ready time into account to understand the demand of the virtual machine. On top of this, DRS considers both peak active as average active in the past five minutes.
>
> The most important metric to determine a virtual machines' memory demand is the active memory and the consumed memory. Another metric that is considered is the page sharing between multiple virtual machines running on the same host, whenever DRS makes a decision it knows about how pages are being shared between their respective virtual machines on that particular host. If a virtual machine is moved away from this host, DRS takes into account the loss of page sharing. This is one of the main reasons, why DRS prefers to move medium-sized workloads over larger sized workloads. Moving a virtual machine to a destination could force the ESXi host to reclaim memory to make room for the in-transit virtual machine. But there is one metric that supersedes all metrics listed above, and that is virtual machine happiness.

https://vspherecentral.vmware.com/t/resource-management-and-availability/vsphere-resources-and-availability/drs-decision-engine/



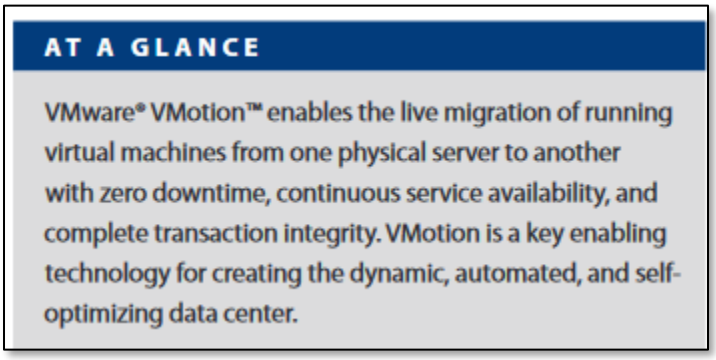
vSphere Storage I/O Control allows cluster-wide storage I/O prioritization, which allows better workload consolidation and helps reduce extra costs associated with over provisioning.

Storage I/O Control extends the constructs of shares and limits to handle storage I/O resources. You can control the amount of storage I/O that is allocated to virtual machines during periods of I/O congestion, which ensures that more important virtual machines get preference over less important virtual machines for I/O resource allocation.

When you enable Storage I/O Control on a datastore, ESXi begins to monitor the device latency that hosts observe when communicating with that datastore. When device latency exceeds a threshold, the datastore is considered to be congested and each virtual machine that accesses that datastore is allocated I/O resources in proportion to their shares. You set shares per virtual machine. You can adjust the number for each based on need.

https://docs.vmware.com/en/VMware-vSphere/6.7/vsphere-esxi-vcenter-server-67-resource-management-guide.pdf

21. Based on the metrics and prioritizations, algorithms such as vMotion in the Accused Products can create assignments to migrate and optimize resources.



AT A GLANCE

VMware® VMotion™ enables the live migration of running virtual machines from one physical server to another with zero downtime, continuous service availability, and complete transaction integrity. VMotion is a key enabling technology for creating the dynamic, automated, and self-optimizing data center.

https://www.vmware.com/pdf/vmotion_datasheet.pdf

22. In view of preceding paragraphs, each and every element of at least claim 1 of the ‘800 Patent is found in the Accused Products.

23. Defendants continue to directly infringe at least one claim of the ‘800 Patent, literally or under the doctrine of equivalents, by making, using, selling, offering for sale, importing,

and/or distributing the Accused Products in the United States, including within this judicial district, without the authority of Brazos.

24. Defendants have received notice and actual or constructive knowledge of the '800 Patent since at least the date of service of this Complaint.

25. Since at least the date of service of this Complaint, through its actions, Defendants have actively induced product makers, distributors, retailers, and/or end users of the Accused Products to infringe the '800 Patent throughout the United States, including within this judicial district, by, among other things, advertising and promoting the use of the Accused Products in various websites, including providing and disseminating product descriptions, operating manuals, and other instructions on how to implement and configure the Accused Products. Examples of such advertising, promoting, and/or instructing include the documents at:

- https://www.dell.com/learn/us/en/15/solutions/vmware-vcloud
- https://www.dell.com/downloads/global/power/ps3q07-20070562-hanson.pdf
- https://www.delltechnologies.com/en-us/solutions/vmware/servers-for-vmware.htm
- https://www.dell.com/downloads/global/vectors/dell_and_vmware_drs_ha_solutions.pdf
- https://www.dell.com/support/article/en-uk/sln314727/dell-s-customization-of-vmware-esxi-and-its-advantages?lang=en
- https://www.dell.com/en-us/work/shop/povw/vmware-vsphere
- https://docs.vmware.com/en/VMware-vSphere/index.html
- https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/products/vsphere/vmware-whats-new-in-vsphere-whitepaper.pdf
- https://docs.vmware.com/en/VMware-vSphere/6.7/vsphere-esxi-vcenter-server-67-resource-management-guide.pdf
- https://www.vmware.com/in/products/vsphere/drs-dpm.html

- https://blogs.vmware.com/performance/2018/11/sdrs-performance-vsphere67.html
- https://www.vmware.com/pdf/vmotion_datasheet.pdf
- https://vspherecentral.vmware.com/t/vsphere-resources-and-availability/drs-decision-engine/

26. Since at least the date of service of this Complaint, through its actions, Defendants have contributed to the infringement of the '800 Patent by having others sell, offer for sale, or use the Accused Products throughout the United States, including within this judicial district, with knowledge that the Accused Products infringe the '800 Patent. The Accused Products are especially made or adapted for infringing the '800 Patent and have no substantial non-infringing use. For example, in view of the preceding paragraphs, the Accused Products contain functionality which is material to at least one claim of the '800 Patent.

JURY DEMAND

Brazos hereby demands a jury on all issues so triable.

REQUEST FOR RELIEF

WHEREFORE, Brazos respectfully requests that the Court:

(A) Enter judgment that Defendants infringe one or more claims of the '800 Patent literally and/or under the doctrine of equivalents;

(B) Enter judgment that Defendants have induced infringement and continue to induce infringement of one or more claims of the '800 Patent;

(C) Enter judgment that Defendants have contributed to and continue to contribute to the infringement of one or more claims of the '800 Patent;

(D) Award Brazos damages, to be paid by Defendants in an amount adequate to compensate Brazos for such damages, together with pre-judgment and post-judgment interest for

the infringement by Defendants of the '800 Patent through the date such judgment is entered in accordance with 35 U.S.C. § 284, and increase such award by up to three times the amount found or assessed in accordance with 35 U.S.C. § 284;

(E) Declare this case exceptional pursuant to 35 U.S.C. § 285; and

(F) Award Brazos its costs, disbursements, attorneys' fees, and such further and additional relief as is deemed appropriate by this Court.

Dated: May 21, 2020

Respectfully submitted,

/s/ James L. Etheridge

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Ryan S. Loveless
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Texas State Bar No. 24061296

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