

VMware Distributed Resource Scheduler (DRS)

Dynamic Load Balancing and Resource Allocation for Virtual Machines

AT A GLANCE

VMware® Distributed Resource Scheduler (DRS) aggregates computing capacity across a collection of servers into logical resource pools and intelligently allocates available resources among the virtual machines based on pre-defined rules that reflect business needs and changing priorities. VMware Distributed Power Management (DPM), included with VMware DRS, automates power management and minimizes power consumption across the collection of servers in a VMware DRS cluster.

BENEFITS

- Prioritize resources to the highest value applications in order to align resources with business goals, automatically.
- Increase operational efficiency of your datacenter by automatically optimizing hardware utilization and responding real time to changing conditions.
- Dedicate resources to business units while still profiting from higher hardware utilization through resource pooling.
- Conduct zero-downtime server maintenance.
- Lower power consumption costs by up to 20 percent.

What is VMware DRS?

VMware DRS dynamically balances computing capacity across a collection of hardware resources aggregated into logical resource pools, continuously monitoring utilization across resource pools and intelligently allocating available resources among the virtual machines based on pre-defined rules that reflect business needs and changing priorities. When a virtual machine experiences an increased load, VMware DRS automatically allocates additional resources by redistributing virtual machines among the physical servers in the resource pool. VMware DRS allows IT organizations to:

- Prioritize resources to the highest value applications in order to align resources with business goals
- Optimize hardware utilization automatically and continuously to respond to changing conditions
- Provide dedicated resources to business units while still profiting from higher hardware utilization through resource pooling
- Conduct zero-downtime server maintenance

What is VMware DPM?

VMware Distributed Power Management (DPM) is a pioneering new feature of VMware DRS that continuously monitors resource requirements in a VMware DRS cluster. When resource requirements of the cluster decrease during periods of low usage, VMware DPM consolidates workloads to reduce power consumption by the cluster. When resource requirements of workloads increase during periods of higher usage, VMware DPM brings powered-down hosts back online to ensure service levels are met.

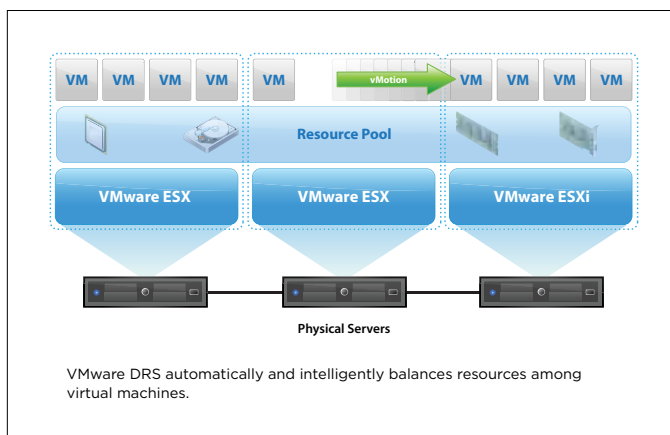
VMware DPM allows IT organizations to:

- Cut power and cooling costs in the datacenter
- Automate management of energy efficiency in the datacenter

How Does VMware DRS Work?

VMware® DRS aggregates computing capacity across a collection of servers into logical resource pools and intelligently allocates available resources among the virtual machines based on pre-defined rules that reflect business needs and changing priorities.

VMware DRS allows users to define the rules and policies that decide how virtual machines share resources and how these resources are prioritized among multiple virtual machines.



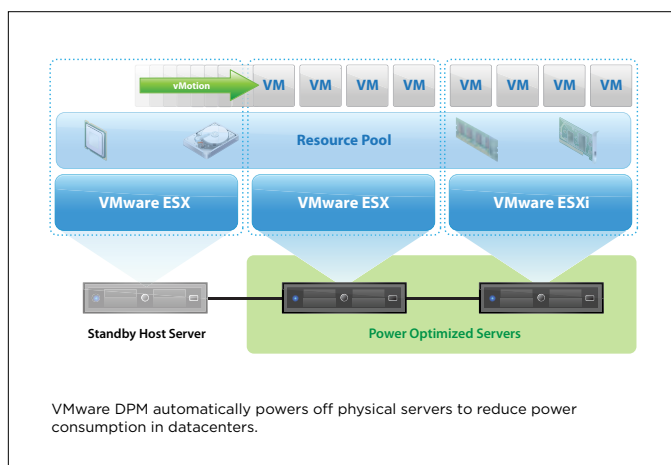
When a virtual machine experiences increased load, VMware DRS first evaluates its priority against the established resource allocation rules and policies, and if justified, allocates additional resources. Resources are allocated to the virtual machine by either migrating it to another server with more available resources or by making more “space” for it on the same server by migrating other virtual machines to different servers. The live migration of virtual machines to different physical servers is executed completely transparent to end-users through VMware vMotion™.

VMware DRS can be configured to operate in either automatic or manual mode. In automatic mode, VMware DRS determines the best possible distribution of virtual machines among different physical servers and automatically migrates virtual machines to the most appropriate physical servers. In manual mode, VMware DRS provides a recommendation for optimal placement of virtual machines, and leaves it to the system administrator to decide whether to make the change.

Flexible hierarchical organization of resource pools allows administrators to match available IT resources to the needs of the business organization. Individual business units can receive dedicated IT resources while still benefiting from the efficiency of resource pooling. Robust access privileges make it possible to delegate routine infrastructure tasks for a business unit resource pool to a business unit system administrator.

How Does VMware DPM Work?

VMware DPM is a component of VMware DRS that makes recommendations or decisions to power off or power on hosts to save energy. These recommendations are based on a comparison of the available capacity in a DRS cluster against resource requirements of virtual machines plus some administrator defined buffer capacity requirements. If DPM detects there are too many hosts powered on, it will consolidate virtual machines onto fewer hosts and power off the remaining. VMware DPM will



bring powered off hosts online once again to meet virtual machine requirements either at a pre-defined time or when it senses virtual machine requirements increasing.

How is VMware DRS Used in the Enterprise?

Customers use VMware DRS to:

- Align IT resources with business priorities.**
 Define rules and policies to decide how resources should be prioritized among virtual machines. VMware DRS dynamically and intelligently allocates IT resources to the highest priority virtual machines to ensure optimal alignment between business and IT.
- Guarantee autonomy and service levels to business organizations.**
 Provide dedicated resources to business units while still profiting from higher hardware utilization through resource pooling.
- Dramatically increase system administrator productivity.**
 Enable a single system administrator to monitor and effectively manage a large pool of infrastructure resources.
- Automate hardware maintenance.**
 Place a physical server in maintenance mode and VMware DRS will automatically migrate all virtual machines to other physical servers, allowing server maintenance with zero downtime.
- Easily add and deploy new capacity.**
 Add new physical servers to a resource pool and VMware DRS will automatically take advantage of the additional capacity by redistributing virtual machines among the servers.
- Reduce power consumption in the datacenter automatically.**
 Consolidate workloads during off-peak hours and power off hosts to make datacenters more energy efficient with VMware DPM.

Key Features of VMware DRS

- Intelligent resource allocation.**
 Aggregate disparate hardware resources into unified logical resource pools. With VMware DRS, resource pools are automatically and intelligently optimized to ensure that IT resource allocation matches business priorities while maximizing hardware utilization.
- Flexible hierarchical organization.**
 Organize resource pools hierarchically to match available IT resources to the business organization. VMware DRS ensures that resource utilization is maximized while business units retain control and autonomy of their infrastructure. Resource pools can be flexibly added, removed, or reorganized as business needs or organization change.

- **Isolation between resource pools.**

Make allocation changes within a resource pool without impacting other unrelated resource pools. For example, any allocation changes in the resource pool dedicated to a given business unit do not impact other resource pools.

- **Access control and delegation.**

Secure resource allocation at different levels in the company while eliminating bottlenecks. Virtual machine creation and maintenance for a business unit can be delegated to a business unit system administrator thus eliminating reliance on central IT for every routine operation. Management of sets of virtual machines running a distributed application. Optimize the service level of distributed applications by controlling the aggregate allocation of resources for the entire set of virtual machines running the distributed application.

- **Manual and automatic mode.**

VMware DRS collects resource usage information from servers and virtual machines, and then generates recommendations to optimize virtual machine allocation. These recommendations can be executed automatically or manually.

- **Initial placement.**

When a virtual machine is first powered on, VMware DRS either automatically places the virtual machine on the most appropriate physical server or makes a recommendation.

- **Continuous optimization.**

VMware DRS continuously optimizes resource allocations based on defined resource allocation rules and resource utilization. The resource allocation changes can be automatically executed by performing live migration of virtual machines through VMware VMotion. Alternatively, in manual mode, VMware DRS provides execution recommendations for system administrators.

- **Maintenance mode for servers.**

Perform maintenance on physical servers without disruption to virtual machines and end users. When a physical server is placed in maintenance mode, VMware DRS identifies alternative servers where the virtual machines can run. Based on automation mode settings, the virtual machines are either automatically moved to use the alternative servers, or the system administrator performs the move manually using the VMware DRS recommendations as a guideline.

- **Affinity rules.**

Create rules that govern the allocation of virtual machines to physical servers. For example, certain virtual machines can always run on the same server for performance reasons. Alternatively, specified virtual machines can always run on different servers for increased availability.

- **Power management.**

Reduce energy consumption in the datacenter by using VMware DPM to consolidate workloads and power off power consuming servers. VMware DPM can be configured to make recommendations for power on or power off based on user-defined period of resource load history. For example, power off decisions can be based on 1-2 hours worth of resource load history and power on decisions can be based on 5-15 minute resource load history.

Find Out More

How Can I Purchase VMware DRS?

VMware DRS is included with VMware vSphere™ Enterprise and VMware vSphere Enterprise Plus Editions. For more information on how to purchase, visit the VMware vSphere™ Web page at <http://www.vmware.com/go/vsphere/buy>.

Product Specifications and System Requirements

VMware vCenter™ Server is required for setup and control of VMware DRS and DPM.

For information or to purchase VMware products, call 1-877-4VMWARE (outside of North America dial +1-650-427-5000), visit www.vmware.com/products, or search online for an authorized reseller. For detailed product specifications and systems requirements, please refer to the VMware VMotion install and configure guide.

