

Performance and Scalability Guidelines

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Performance and Scalability guidelines

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Overview of performance and scalability guidelines

The guidelines described here are for planning, deploying, and configuring EMC Storage Resource Management Suite (SRM Suite) to help you maximize the performance and scalability and realize its full potential.

The performance and scalability guidelines outlined here are based on tests run on SRM Suite configured in a production-like environment. Both live and simulated configuration items were used to measure the performance and scalability of SRM Suite.

Usage guidelines

The guidelines for an optimized performance and scalability are related to planning the hardware and virtual environment, disk space, network latency, and deployment and configuration.

- ◆ Planning guidelines help determine the right ESX hardware and the number of virtual machines needed for a specific data center environment.
- ◆ Disk space guidelines help prepare and configure datastore capacity before SRM Suite deployment.
- ◆ Network latency guidelines help identify the proximity and placement of SRM Suite virtual machines with respect to the configuration items.
- ◆ Deployment and configuration guidelines assist with deployment and post-deployment.

SRM Suite is fully deployable on non-ESX hosts. *EMC Storage Resource Management Suite Performance and Scalability Guidelines* does not address non-ESX host deployment scenarios.

Note

EMC Storage Resource Management Suite Performance and Scalability Guidelines does not address all the SolutionPacks contained in SRM Suite.

Infrastructure planning guidelines

Use these guidelines to plan the infrastructure such as the right ESX hardware, number of virtual machines needed, and other details described in the tables to ensure an optimum performance and scalability.

Guideline P1- Assumptions to determine the configuration size

The size of a particular SRM Suite configuration depends on multiple factors such as count and size of various configuration items, arrival rate of alerts, and so on. Since these variations could be big in real-time datacenters, we have made certain assumptions to arrive at few examples of deployment configuration. The major assumptions are:

- ◆ The ratio between EMC VNX Block and EMC VMAX arrays is 60% to 40%
- ◆ The ratio between Brocade FC and Cisco MDS/Nexus switches is 50% to 50%
- ◆ All NAS arrays are of EMC VNX File array type only
- ◆ 50% of all the ESX and non-ESX hosts may contain EMC PowerPath, collecting default PowerPath metrics
- ◆ All these SRM Suite SolutionPacks are planned for the deployment:
 - SolutionPack for Brocade FC Switch
 - SolutionPack for Cisco MDS/Nexus
 - SolutionPack for EMC VMAX
 - SolutionPack for EMC VNX
 - SolutionPack for VMware vCenter
- ◆ Compliance rules are scheduled during period of low user activity
- ◆ Alerts processing at the rate of 33,000 alerts per day

The SRM Suite deployment can be scaled-out by deploying additional Backend and Collector VMs on top of the Standard deployment.

Deployment configuration based on inventory size and metric count

The recommended SRM Suite deployment configuration types at different scale levels, configuration item count, and metric count are described here.

Table 1 Recommended deployment type based on inventory size and metric count

Inventory				Deployment Configuration	
Scale Level	Configuration Items	Configuration Item Count	Estimated Metric Count (in Millions)	Deployment Type	VM Count ^a
Minimal	Storage Arrays/LUNs	3/32,300	1	All-in-one	1
	NAS/File Systems	3/3,460			
	Hosts/Host Devices	40/2,500			
	Switches/Ports	7/780			
	ESXs/VMs	26/520			

Table 1 Recommended deployment type based on inventory size and metric count (continued)

Inventory				Deployment Configuration	
Scale Level	Configuration Items	Configuration Item Count	Estimated Metric Count (in Millions)	Deployment Type	VM Count ^a
0	Storage Arrays/LUNs	14/132,000	4	Standard Deployment:	
	NAS/File Systems	14/14,643		SRM 4-VM vApp	4
	Hosts/Host Devices	330/21,120			
	Switches/Ports	29/3,300			
	ESXs/VMs	110/2,200		Additional Collectors	3
1	Storage Arrays/LUNs	29/264,000	8	Scale-out Deployment:	
	NAS/File Systems	29/29,286		SRM 4-VM vApp	4
	Hosts/Host Devices	660/42,240		Additional Backend	1
	Switches/Ports	57/6,600		Additional Collectors	4
	ESXs/VMs	220/4,400			
2	Storage Arrays/LUNs	43/396,000	12	Scale-out Deployment:	
	NAS/File Systems	43/43,930		SRM 4-VM vApp	4
	Hosts/Host Devices	990/63,360		Additional Backend	2
	Switches/Ports	86/9,900		Additional Collectors	8
	ESXs/VMs	330/6,600			
3	Storage Arrays/LUNs	57/528,000	16	Scale-out Deployment:	
	NAS/File Systems	57/58,573		SRM 4-VM vApp	4
	Hosts/Host Devices	1,320/84,480		Additional Backend	3
	Switches/Ports	114/13,200		Additional Collectors	10
	ESXs/VMs	440/8,800			
4	Storage Arrays/LUNs	72/660,000	20	Scale-out Deployment:	
	NAS/File Systems	72/73,216		SRM 4-VM vApp	4
	Hosts/Host Devices	1,650/105,600		Additional Backend	4
	Switches/Ports	143/16,500		Additional Collectors	13

Table 1 Recommended deployment type based on inventory size and metric count (continued)

Inventory				Deployment Configuration	
Scale Level	Configuration Items	Configuration Item Count	Estimated Metric Count (in Millions)	Deployment Type	VM Count ^a
	ESXs/VMs	550/11,000			

- a. The number of Collectors represented is approximate requirement for the number of configuration items specified. To account for factors such as geographic distributions of data centers, your environment may require additional Collector Virtual Machines.

Table 2 Resource description and specification of deployment types

Deployment Type	Purpose of VM	vCPUs	Memory (GB)	Disk Space(GB)	VM Count
All-in-one	All components in a single VM	4	32	600	1
Standard Deployment (SRM 4-VM vApp)	Frontend	4	16	120	1
	Backend-Primary	4	24	600	1
	Backend-Secondary	4	24	1,200	1
	Collector	4	16	120	1
Scale-out Deployment (Requires Standard Deployment)	Additional Backend	4	24	1,200	1
	Additional Collector	4	16	120	1

Note

The disk space specification in this table assumes default retention policies.

Note

The CPU, disk space, and memory requirements do not change for the mode of installation, so binary and vApp installations require the same resources.

Guideline P2- Increase default disk space

After deploying SRM Suite standard deployment (SRM 4-VM vApp), the disk space must be increased for both primary and secondary backends. The default disk space on the primary and secondary backends is 117 GB. Use table 4 to estimate the disk space requirements for your environment.

Guideline P3- Deploy SRM Suite on ESX host with right SPEC score

All recommendations assume there is no resource contention with other VMs that reside on the same ESX server or data store. Do not over allocate virtual resources as to cause resource contention.

Use only ESX servers with the SPEC rate of SPECint_Rate_base2006 of 350 or higher to deploy SRM Suite.

Use [Finding the SPEC score on page 9](#) to determine the SPEC score for the ESX host.

Guideline P4- Plan datastore read/write latency for application deployment

To ensure the optimum performance of SRM Suite, the average read/write latency for datastores of Fibre Channel disks should be 10 ms or below and of SATA II disks should be 14 ms or below. The disk read/write latency exceeding the specified values degrades the end user response time. The read/write latency metrics can be viewed within the VMware vCenter **Performance** view or by using **ESXTOP**.

Guideline P5- Maintain network latency

While deploying SRM Suite, the network latency must stay within the limits for the specified components as mentioned in the table.

Table 3 Network latency tolerance of SRM Suite

Components	Maximum Network Latency
Between Frontend and Backend	5 ms
Between Backend and Collector	300 ms
Between VMAX Collector host and Solutions Enabler or UniVMAX host	20 ms ^a
Between VNX Collector host and VNX provider host	20 ms (a)
Between RSA (Host) Collector and Host	20 ms (a)
Between VMware Collector and VCenter	20 ms (a)
Between SNMP collector and Brocade Switch	100 ms

a. If latency between the provider and the collector is more than 20 ms, consider increasing the polling interval or decreasing the number of configuration items per collector.

Guideline P6- Plan for EMC VMAX providers

The maximum tested scalability for a SRM Suite VMAX Collector collecting performance and capacity statistics from a remote EMC Solutions Enabler provider and Unisphere for VMAX is 80,000 VMAX LUNs.

The following must be noted when deploying a VMAX Collector:

- ◆ Six gatekeepers are required for each VMAX array whether the provider is dedicated for Watch4net or shared with other management software.
- ◆ Do not exceed 5 ms of latency between VMAX Collector host and Solutions Enabler provider or Unisphere for VMAX host.
- ◆ A default 20 minute polling interval is assumed.

Guideline P7- Plan for VNX Polling Interval

When monitoring more than 5000 Devices of VNX Block with one collectors increase polling cycle to 20 minutes. A maximum of 15,000 devices can be monitor per collector at a 20 minutes polling cycle.

Deployment and configuration guidelines

Follow these guidelines while deploying and configuring SRM Suite for an optimum performance and scalability of CPU utilization, JVM heap size, CPU, and memory resources.

Guideline D1- Consider CPU utilization of EMC Host Interface resources on production host

The EMC host interface resources on a production host is minimal. The CPU consumption is nearly 0% when the SolutionPack for EMC Host Interface Collector in not polling it.

The table shows the resource utilization of the EMC Host interface when SolutionPack for EMC Host Interface Collector is polling on a Windows host with 64 devices and 4 paths and the following specifications:

- ◆ 4x3.0 GHz processors with 2 GB of RAM
- ◆ Windows 2008 Enterprise Edition SP1

Table 4 Host interface footprint

Default Polling Type	Frequency	Duration (mm:ss)	Average CPU Utilization	Required Disk Space
Performance Collection	Every 5 minutes	< 1 second	9%	150 MB
Topology and Capacity Collection	Every 15 minutes	5:30	9%	150 MB

Guideline D2- Consider additional hardware requirements for enabling LUN and Path metrics of EMC PowerPath

The PowerPath LUN (device) and Path metrics are turned-off by default. Before enabling these collections, plan for additional backend hardware requirements. For each 1000 devices with 4 paths, the LUN and Path collections produce 81,000 metrics.

Guideline D3- Schedule compliance rule-validation during low user activity

Both the compliance rule-validation and database maintenance script execution take considerable CPU and memory resources. The nightly indexing of properties store starts at 8:00 P.M. (UTC) and takes a maximum of 4 hours.

It is best to schedule the compliance rule-validation during periods of low user activity and not during nightly database maintenance script execution. Also, do not schedule all compliance policies to start simultaneously, because some policy validation may consume considerable CPU and memory resources, which causes delay in user response times. Schedule the policies to run at least 30 minutes apart.

Example 1 Example: Scheduling policy run

Consider the nightly database maintenance is complete by midnight, then schedule

- ◆ Array configuration policy to run at 12:00 A.M.
- ◆ EMC Support Matrix policy to run at 12:30 A.M.
- ◆ Path Management policy to run at 1:00 A.M. and so on.

ESX/ESXi hardware specifications used for testing

The table describes the hardware specification of the ESX/ESXi servers used for testing.

Table 5 ESX/ESXi hardware specifications

Component	Specification
SPECint_Rate_base2006 score	640
Manufacturer	HP
Model	BL460c Gen8
Processor type	Intel® Xeon® CPU E5-2680 at 2.70 GHz
License	VMware vSphere 5 Enterprise
NIC type	1 Gigabit, Full Duplex NIC
Processor socket	2
Cores per socket	8
Total number of cores	16
Hyper threading	Active
Memory	128 GB
Number of NICs	6

The drive and RAID configurations were provisioned to the SRM Suite virtual appliance as specified in [Guideline P3- Allocate required virtual resources to the application](#).

Finding the SPEC score

If you are planning to compare your host performance with the equipment being used in the lab to measure the performance and scalability of SRM Suite, information provided on the SPEC website (www.spec.org) helps.

There are two distinct CPU benchmark results available on this web site. Hosts using old technology (for example, single-core hosts) are benchmarked using SPEC CPU2000. This benchmark was retired in February 2007 and a new benchmark (SPEC CPU2006) is used by most hardware vendors.

Procedure

1. Navigate to the SPEC website by typing **`www.spec.org`** in the web browser.
2. Select **Result › CPU2006 › Search CPU2006 Results** from the top navigation bar.
3. Select **SPECint2006 Rates for Available Configurations**.
4. Select **Advanced for Search Form Request** and click **Go!**.
5. Fill out the form with appropriate information.

For example, **Hardware Vendor, System, # Cores, # Chips, # Cores Per Chip**.

Note

In SPEC nomenclature, the term for *Processoris Chip*.

6. Click **Fetch Results** to submit the search.

The value listed in the **Baseline** column for the host is the value that is compared to the minimum specified in this document.

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