Instructions for Virtual Machine Compute Optimizer

Contents

Summary

Understanding Virtual Machine vCPU and vNUMA Rightsizing and Host Power Management Policies for Best Performance

Virtual Machine vNUMA configuration and Host Management Power Policies can have a dramatic effect on individual and overall VM performance on a host. The effects of a physical host's NUMA architecture on virtual machines' vNUMA configuration has been covered in-depth in Mark Achtemichuk's Blog Virtual Machine vCPU and vNUMA Rightsizing – Rules of Thumb. The Host Power Management in ESXi is covered in Performance Best Practices for VMware vSphere 6.7. These are applicable to any supported version of ESXi currently available.

What Is the Virtual Machine Compute Optimizer?

The VMCO is a Powershell script that uses the PowerCLI module to capture information about the hosts and VMS running in your vSphere environment, and reports back on whether the VMs are configured optimally based on the Host CPU and memory. It will flag a VM as "YES" if it is optimized and "NO" if it is not. For non-optimized VMs, a recommendation is made that will keep the same number of vCPUs currently configured, with the optimal number of virtual cores and sockets.

Note that the VMCO will not analyze whether your VMs are configured with the correct number of vCPUs based on the VM's workload. A more in-depth analysis tool such as VMware vRealize Operations Manager can make right-sizing determinations based on workload and actual performance.

Running the Virtual Machine Compute Optimizer

Requirements

In order to run the Virtual Machine Compute Optimizer, you will need the following:

- Windows 7/Server 2008 or above
- Powershell v5 or higher
- The PowerCLI Module installed, or access to the internet. The VMCO will attempt to install the module if it is not already, and give you an option to upgrade if it is out of date.
- A user account with Read-Only rights assigned at the vCenter level with 'Propogate to children' enabled. These rights will be needed on each vCenter that will be analyzed.

Running the VMCO

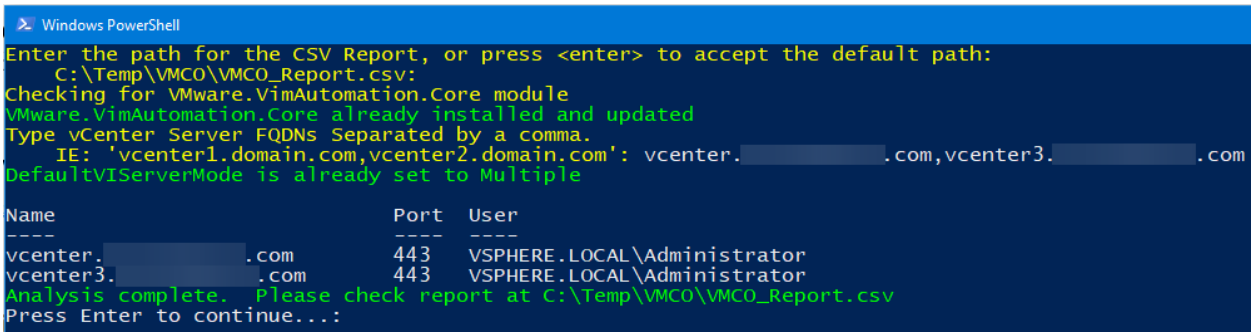
There are a few ways you can launch a Powershell script. We will use the simplest approach.

1. Right click the "Virtual_Machine_Compute_Optimizer.ps1" file and choose "Run with Powershell"
2. When prompted, type in the full path to a csv file where you would like to store the report results. By hitting enter, the path will default to "C:\temp\vNUMA_Report.csv". If the file already exists, it will attempt to merge the new report data into it. This could be helpful to combine other vCenter reports that might have been run separately.

3. The Core PowerCLI Module is needed to run this script. If it is not installed, you will be prompted to install it. If it is not the current version, you will be prompted to update. Although you don't have to choose to update the module, it does have to be installed. You will see 1 of 3 outputs on the screen:
    a. VMware.VimAutomation.Core already installed and updated
    b. VMware.VimAutomation.Core is not installed. Type 'Y' to install module, or 'N' to skip:
    c. A newer version of VMware.VimAutomation.Core is available. Type 'Y' to update module to x.y.z or 'N' to continue with current version a.b.c:

    *the computer you are running the script from has to have internet access in order to install or upgrade the module. You will have to manually install the module otherwise.

4. When prompted, enter the FQDN or the vCenter(s) you would like to analyze. Separate the names with a comma ",". IE, vcenter1.domain.com,vcenter2.domain.com,vcenter3.domain.com
5. You will be prompted to enter credentials to connect to the vCenter(s). The user account must have the rights defined under the Requirements section. You cannot specify different credentials per vCenter at this time.
6. Once authenticated, the progress will show on the screen. When the analysis is complete, it will indicate the location of the report file.



Interpreting the Results

The report that is generated is a simple CSV file that will look like the following:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	vCenter	HostName	ESXi_Vers	HostSockets	HostCoresPerSocket	HostMemoryGB	HostPowerPolicy	VMName	VMNumSockets	VMCoresPerSocket	VMMemoryGB	VMCPUsOptimized	OptimalSockets	OptimalCores
2	vcenter.mydoma	flora.mydomain	6.7.0	1	4	32	Balanced	Mandor	1	1	0.5	YES	1	1
3	vcenter.mydoma	flora.mydomain	6.7.0	1	4	32	Balanced	vRep	2	1	8	NO	1	2
4	vcenter.mydoma	flora.mydomain	6.7.0	1	4	32	Balanced	nsx-ctrl	2	1	16	NO	1	2
5	vcenter.mydoma	dara.mydomain.	6.7.0	1	4	64	Balanced	k8worker	1	1	4	YES	1	1
6	vcenter.mydoma	llewella.mydom	6.7.0	1	4	32	HighPerformance	Rinaldo	2	2	8	NO	1	4
7	vcenter.mydoma	llewella.mydom	6.7.0	1	4	32	HighPerformance	Dworkin	1	1	0.5	YES	1	1
8	vcenter.mydoma	llewella.mydom	6.7.0	1	4	32	HighPerformance	Benedict	1	1	3	YES	1	1
9	vcenter.mydoma	llewella.mydom	6.7.0	1	4	32	HighPerformance	TDM219	1	1	2.5	YES	1	1
10	vcenter.mydoma	flora.mydomain	6.7.0	1	4	32	Balanced	nsx-edge1	2	1	4	NO	1	2
11	vcenter.mydoma	coral.mydomain	6.7.0	2	1	12	Balanced	vcenter	2	1	10	YES	2	1
12	vcenter.mydoma	flora.mydomain	6.7.0	1	4	32	Balanced	Random	1	1	3	YES	1	1
13	vcenter.mydoma	dara.mydomain.	6.7.0	1	4	64	Balanced	k8master	1	1	4	YES	1	1
14	vcenter.mydoma	dara.mydomain.	6.7.0	1	4	64	Balanced	CourtsOfChaos	2	1	4	NO	1	2
15	vcenter.mydoma	dara.mydomain.	6.7.0	1	4	64	Balanced	pksmaster	2	1	4	NO	1	2
16	vcenter.mydoma	dara.mydomain.	6.7.0	1	4	64	Balanced	Corwin	1	2	3	YES	1	2
17	vcenter.mydoma	dara.mydomain.	6.7.0	1	4	64	Balanced	NSX_Man	4	1	16	NO	1	4
18	vcenter.mydoma	dara.mydomain.	6.7.0	1	4	64	Balanced	Deirdre	2	1	4	NO	1	2
19	vcenter.mydoma	dara.mydomain.	6.7.0	1	4	64	Balanced	TDM217	1	1	2.5	YES	1	1
20	vcenter.mydoma	dara.mydomain.	6.7.0	1	4	64	Balanced	vROPs7	2	1	8	NO	1	2

In order to clarify the data, it is formatted below to highlight what is being presented.

vCenter	HostName	ESXi_Version	HostSockets	HostCoresPerSocket	HostMem	HostPowerPolicy	VMName	VMNumSockets	VMCoresPerSocket	VMMemoryGB	VMCPUsOptimized	OptimalSockets	OptimalCores
vcenter.mydo	flora.mydom	6.7.0	1	4	32	Balanced	Mandor	1	1	0.5	YES	1	1
vcenter.mydo	flora.mydom	6.7.0	1	4	32	Balanced	vRep	2	1	8	NO	1	2
vcenter.mydo	flora.mydom	6.7.0	1	4	32	Balanced	nsx-ctrl	2	1	16	NO	1	2
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vcenter.mydo	llewella.myd	6.7.0	1	4	32	HighPerformance	Rinaldo	2	2	8	NO	1	4
vcenter.mydo	llewella.myd	6.7.0	1	4	32	HighPerformance	Dworkin	1	1	0.5	YES	1	1
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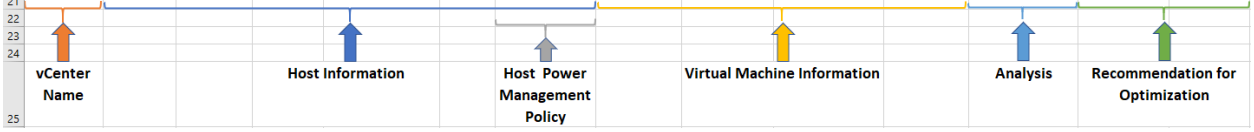

1. **vCenter Name:** Simply the FQDN of the vCenter that the Virtual Machine belongs to
2. **Host Information:** Reports the host's FQDN, ESXi Version, physical CPU sockets and cores, memory, and Host Power Management Policy.
    a. Host Power Management Policy: Shows current host setting. Note that the recommendation for best performance is to set this value to "High Performance"
3. **Virtual Machine Information:** Reports the VM's name, vCPU sockets and cores, and memory.
4. **Analysis:** Reports on whether or not the VM is optimized based on the host and VM information that was returned.
5. **Recommendation for Optimization:** If the Analysis returned "YES," then the recommendation will match the current VM configuration. If it returned "NO," then OptimalSockets and OptimalCores will show how you should configure this VM to optimize performance.