



Recommended ESXi host and other ONTAP settings

NetApp Solutions

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Recommended ESXi host and other ONTAP settings

NetApp has developed a set of ESXi host multipathing and HBA timeout settings for proper behavior with ONTAP based on NetApp testing. These are easily set using ONTAP tools for VMware vSphere. From the Summary dashboard, click Edit Settings in the Host Systems portlet or right-click the host in vCenter, then navigate to ONTAP tools > Set Recommended Values. Here are the currently recommended host settings with the 9.8 release.

Host setting	NetApp recommended value
ESXi advanced configuration	
VMFS3.HardwareAcceleratedLocking	Leave as set (VMware default is 1).
VMFS3.EnableBlockDelete	Leave as set (VMware default is 0, but this is not needed for VMFS6). For more information, see VMware KB article .
NFS Settings	
Net.TcpipHeapSize	vSphere 6.0 or later, set to 32. All other NFS configurations, set to 30.
Net.TcpipHeapMax	Set to 1536 for vSphere 6.0 and later.
NFS.MaxVolumes	vSphere 6.0 or later, set to 256. All other NFS configurations, set to 64.
NFS41.MaxVolumes	vSphere 6.0 or later, set to 256.
NFS.MaxQueueDepth	vSphere 6.0 or later, set to 128.
NFS.HeartbeatMaxFailures	Set to 10 for all NFS configurations.
NFS.HeartbeatFrequency	Set to 12 for all NFS configurations.
NFS.HeartbeatTimeout	Set to 5 for all NFS configurations.
SunRPC.MaxConnPerIP	vSphere 7.0 or later, set to 128.
FC/FCoE Settings	
Path selection policy	Set to RR (round robin) when FC paths with ALUA are used. Set to FIXED for all other configurations. Setting this value to RR helps provide load balancing across all active/optimized paths. The value FIXED is for older, non-ALUA configurations and helps prevent proxy I/O. In other words, it helps keep I/O from going to the other node of a high-availability (HA) pair in an environment that has Data ONTAP operating in 7-Mode.
Disk.QFullSampleSize	Set to 32 for all configurations. Setting this value helps prevent I/O errors.
Disk.QFullThreshold	Set to 8 for all configurations. Setting this value helps prevent I/O errors.

Host setting	NetApp recommended value
Emulex FC HBA timeouts	Use the default value.
QLogic FC HBA timeouts	Use the default value.
iSCSI Settings	
Path selection policy	Set to RR (round robin) for all iSCSI paths. Setting this value to RR helps provide load balancing across all active/optimized paths.
Disk.QFullSampleSize	Set to 32 for all configurations. Setting this value helps prevent I/O errors.
Disk.QFullThreshold	Set to 8 for all configurations. Setting this value helps prevent I/O errors.

ONTAP tools also specify certain default settings when creating ONTAP FlexVol volumes and LUNs:

ONTAP tool	Default setting
Snapshot reserve (-percent-snapshot-space)	0
Fractional reserve (-fractional-reserve)	0
Access time update (-atime-update)	False
Minimum readahead (-min-readahead)	False
Scheduled Snapshot copies	None
Storage efficiency	Enabled
Volume guarantee	None (thin provisioned)
Volume Autosize	grow_shrink
LUN space reservation	Disabled
LUN space allocation	Enabled

Other host multipath configuration considerations

While not currently configured by available ONTAP tools, NetApp suggests considering these configuration options:

- In high-performance environments or when testing performance with a single LUN datastore, consider changing the load balance setting of the round-robin (VMW_PSP_RR) path selection policy (PSP) from the default IOPS setting of 1000 to a value of 1. See VMware KB [2069356](#) for more info.
- In vSphere 6.7 Update 1, VMware introduced a new latency load balance mechanism for the Round Robin PSP. The new option considers I/O bandwidth and path latency when selecting the optimal path for I/O. You might benefit from using it in environments with non-equivalent path connectivity, such as cases where there are more network hops on one path than another, or when using a NetApp All SAN Array system. See [Path Selection Plug-Ins and Policies](#) for more information.

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