

# Technical Specifications Guide

## Dell EMC Isilon OneFS and IsilonSD Edge

Version 8.0.0

### Technical Specifications Guide

October 2016

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## About this guide

This document presents guidelines and recommendations for configuring OneFS and IsilonSD Edge. Configuration guidelines are provided for protocols, file system features, software and hardware components, and network settings.

Your suggestions help us to improve the accuracy, organization, and overall quality of the documentation. Send your feedback to <https://www.research.net/s/isi-docfeedback>. If you cannot provide feedback through the URL, send an email message to [docfeedback@isilon.com](mailto:docfeedback@isilon.com).

## Planning to use IsilonSD Edge

IsilonSD Edge 8.0.0 is compatible with Management Server 1.0.0 and Management Server 1.0.1. To use IsilonSD Edge with EMC Secure Remote Services (ESRS) and ESX 6.0, Management Server 1.0.1 is required.

For information about IsilonSD Edge—including installation, administration, and troubleshooting guides—see the [IsilonSD Edge - Isilon Info Hub](#) web page.

## Isilon scale-out NAS overview

The Isilon scale-out NAS storage platform combines modular hardware with unified software to harness unstructured data. Powered by the OneFS operating system, a cluster delivers a scalable pool of storage with a global namespace.

The unified software platform provides centralized web-based and command-line administration to manage the following features:

- A cluster that runs a distributed file system
- Scale-out nodes that add capacity and performance
- Storage options that manage files and tiering
- Flexible data protection and high availability
- Software modules that control costs and optimize resources

## Where to go for support

If you have any questions about Isilon products, contact Isilon Technical Support.

Online Support	<ul style="list-style-type: none"> <li>• <a href="#">Live Chat</a></li> <li>• <a href="#">Create a Service Request</a></li> </ul>
Telephone Support	<ul style="list-style-type: none"> <li>• United States: 1-800-SVC-4EMC (1-800-782-4362)</li> <li>• Canada: 1-800-543-4782</li> <li>• Worldwide: 1-508-497-7901</li> <li>• Local phone numbers for a specific country are available at <a href="#">EMC Customer Support Centers</a>.</li> </ul>

Support registration or access	For questions about accessing <a href="#">Online Support</a> , email <a href="mailto:support@emc.com">support@emc.com</a> .
Isilon Info Hubs	For the list of Isilon info hubs, see the <a href="#">Isilon Info Hubs</a> page on the Isilon Community Network. Isilon info hubs organize Isilon documentation, videos, blogs, and user-contributed content into topic areas, making it easy to find content about subjects that interest you.

**Support for IsilonSD Edge**

If you are running a free version of IsilonSD Edge, support is available through the [Isilon Community Network](#). If you purchased one or more IsilonSD Edge licenses, support is available through Isilon Technical Support, provided you have a valid support contract for the product.

## Documentation resources

See the following Dell EMC Isilon info hubs for links to important OneFS documentation and resources:

- [Isilon Info Hubs](#) (complete list of Isilon info hubs)
- [OneFS 8.0.0 Documentation - Isilon Info Hub](#)
- [IsilonSD Edge - Isilon Info Hub](#)

You can also search for documentation and knowledge base articles on the [Online Support](#) website.

## Protocol guidelines for OneFS

This section presents guidelines for configuring protocols for OneFS.

Item	OneFS 8.0.0	IsilonSD Edge	Description
FTP connections per node	200	200	The recommended limit for FTP connections per node. This number is the tested limit. If the number of FTP connections to a node exceeds the recommended limit, FTP performance might be negatively affected. The limit for FTP connections per node assumes anonymous access that requires no authentication.
HDFS block size	64 MB - 512 MB	64 MB - 512 MB	The recommended range for HDFS block sizes. For best results, the block size should not be smaller than 4 KB or larger than 1 GB. The specific value varies by workflow. Smaller block sizes require

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			more tasks; however, you want a large enough number of tasks to take advantage of all the slots on the cluster.
HDFS root directory	1 per access zone	1 per access zone	The number of HDFS root directories per access zone that OneFS supports. This limitation for access zones and authentication providers is the same for HDFS and other protocols.
HDFS threads per node	256	256	The maximum number of active HDFS threads per node. The threads are shared between NameNode and DataNode.
HTTP connections per node	500	500	<p>The limit for HTTP connections per node. OneFS runs version 2 of the Apache HTTP Server (httpd), which includes the Apache Multi-Processing Module (MPM) that implements a hybrid multi-process, multi-threaded server. The Apache MPM configuration limits the number of simultaneous connections that OneFS services.</p> <p>OneFS queues connections after the connection limit is reached and processes them as resources become available.</p> <p>Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.</p>
lwio per-process memory	1 GB for SMB container 1 GB for NFS container 512 MB for Swift container	1 GB for SMB container 1 GB for NFS container 512 MB for Swift container	In OneFS, three lwio process containers exist—one container for each SMB, NFS, and Swift process.

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			The SMB container can be as much as 25% of the total RAM, but it is at least 1 GB and at most 8 GB. The NFS container can be as much as 25% of the total RAM, but it is at least 1 GB and at most 8 GB. The Swift container is 512 MB.
lwio threads per node	4 * the number of CPU cores in the node	4 * the number of CPU cores in the node	The limit for lwio threads per node is a configuration limit in lwio. This limit represents the maximum number of simultaneous work items that the server can process. Simultaneous work items that are greater than this limit are queued and processed when resources become available.
NDMP block size	512 KB	512 KB	The size limit for tape blocks. If you back up tape blocks that are larger than the size limit, OneFS will back up 256 KB blocks.
NDMP connections per node	64	64	The limit for the number of NDMP connections that are allowed per node.
NFS exports per cluster	40,000	40,000	The recommended limit for NFS exports per cluster. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.
NFS max read size	1 MB	1 MB	The limit for NFS read size, or rsize, for NFS3 and NFS4. When you mount NFS exports from a cluster, a larger read size for remote procedure calls can improve throughput. The default read size in OneFS is 128 KB.

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			<p>An NFS client uses the largest supported size by default. As a result, avoid setting the size on your clients. Setting the value too low on a client overrides the default value and can undermine performance.</p>
NFS max write size	1 MB	1 MB	<p>The limit for NFS write size, or wsize, or NFS3 and NFS4. When you mount NFS exports from a cluster, a larger write size for remote procedure calls can improve throughput. The default write size in OneFS is 512 KB.</p> <p>An NFS client uses the largest supported size by default. As a result, avoid setting the size on your clients. Setting the value too low on a client overrides the default value and can undermine performance.</p>
NFS threads	Dynamic	Dynamic	<p>The limit for NFS threads is determined by the number of cores in the node.</p>
NFS3 connections per node	1,000 active connections	250 active connections	<p>The recommended limit for active NFS3 connections. The maximum has not been established; however, the number of available TCP sockets can limit the number of NFS connections.</p> <p>The number of connections that a node can process depends on the ratio of active-to-idle connections and on the resources that are available to process the sessions.</p> <p>Monitoring the number of NFS connections to each node helps prevent overloading a node with connections.</p>
NFS4 connections per node	1,000 active connections	250 active connections	<p>The recommended limit for active and passive NFS4 connections. The maximum</p>

Item	OneFS 8.0.0	IsilonSD Edge	Description
			<p>has not been established; however, the number of available TCP sockets can limit the number of NFS connections.</p> <p>The number of connections that a node can process depends on the ratio of active-to-idle connections and on the resources that are available to process the sessions.</p> <p>Monitoring the number of NFS connections to each node helps prevent overloading a node with connections.</p>
NFS4 state IDs	Unlimited	Unlimited	State IDs for NFS4 are limited by the amount of memory that is available in the nodes. If sufficient memory is available, state IDs should not run out. In the current implementation, the state ID is per target IP.
PAPI connections per node	10	10	The limit for the thread pool for the PAPI daemon.
RAN attribute key length	200 B	200 B	The limit of the key length for the OneFS extended user attribute ( <code>x-isi-ifs-attr-&lt;name&gt;</code> ).
RAN attribute value length	1 KB	1 KB	The limit of the value length for the OneFS extended user attribute ( <code>x-isi-ifs-attr-&lt;name&gt;</code> ).
Maximum RAN concurrent connections per node	50 (default) 300 (custom)	50 (default) 300 (custom)	<p>The limit of RAN concurrent connections per node using default parameters.</p> <p>You can obtain higher scalability for RAN by using non-default configuration parameters. The maximum limit depends on many parameters and can be specific to a clusters workflow. Contact your Isilon account team or Isilon Technical Support for help configuring the non-default</p>

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			parameters. For more information, see the Isilon knowledge base article <a href="#">304701</a> , <i>How to update RAN scalability parameters</i> (restricted).
RAN URI length	8 KB	8 KB	The limit for the URI length that is used for the RAN HTTP operation.
RAN user attributes	126	126	The limit for extended user attributes that OneFS supports.
SMB share names	80 characters	80 characters	The limit for the length of SMB share names. Share names must include only alphanumeric characters, hyphens, and spaces.
SMB shares per cluster	80,000	20,000	The recommended limit for SMB shares per cluster. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.
SMB 1 connections per node	1,000	1,000	The number of SMB 1 connections that a node can process depends on the type of node and whether the connections are active or idle. The more CPUs and RAM that a node has, the more active connections the node can process.  The kernel imposes memory constraints on the OneFS protocol daemons, such as the input-output daemon (lwio), and these constraints limit the number of SMB 1 connections.



Item	OneFS 8.0.0	IsilonSD Edge	Description
SMB 1 request size	64 KB	64 KB	The request size limit is determined by the SMB 1 protocol.
SMB 2 connections per node	3,000 active connections 27,000 idle connections	350 active connections	<p>The number of active SMB 2 connections that a node can process depends on the type of node. The more CPUs and RAM that a node has, the more active connections the node can process.</p> <p>The kernel imposes memory constraints on the OneFS protocol daemons, such as the input-output daemon (Iwio), and these constraints limit the number of SMB 2 connections.</p> <p>To ensure that a node does not become overloaded with connections, you should monitor the number of SMB 2 connections to each node.</p>
SMB2 credits per client	1,024	1,024	<i>Per client means per node, per client.</i> The server provides this number of SMB 2 credits for any client that connects to a node.
SMB 2 credits per cluster	100,000	100,000	<p>The recommended limit for SMB 2 credits per cluster. The maximum number of SMB 2 credits per cluster has not to been established.</p> <p>Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.</p>
SMB 2 request size	1 MB	1 MB	OneFS supports the large 1 MB maximum transmission unit (MTU) that was introduced by SMB2.1. The MTU is the size of the largest data unit that the SMB

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			<p>protocol can transmit and receive. The large MTU can improve the overall throughput of SMB transmissions.</p> <p>Microsoft Windows 7 and Windows 2008 clients require a registry change to turn on large MTU support. Microsoft Windows 8 and Windows 2012 clients support the large MTU by default.</p>
SMB 3 connections per node	3,000 active connections 27,000 idle connections	350 active connections	<p>The number of active SMB 3 connections that a node can process depends on the type of node. The more CPUs and RAM that a node has, the more active connections the node can process.</p> <p>The kernel imposes memory constraints on the OneFS protocol daemons, such as the input-output daemon (lwio), and these constraints limit the number of SMB 3 connections.</p> <p>To ensure that a node does not become overloaded with connections, you should monitor the number of SMB 3 connections to each node.</p>
SSH connections per node	200	200	<p>The recommended limit for SSH connections per node. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support. The maximum number of SSH connections per node has not been established.</p>
SWIFT connections per node	150	150	<p>The SWIFT limit depends on the memory pattern of</p>

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			concurrent GET/PUT connections and is capped at 512 MB of memory. Because memory use varies by process, lower connection numbers are possible.
SWIFT objects per container	10,000	10,000	The number of objects that can be listed in a container GET or HEAD request.

## File system guidelines

This section presents guidelines for configuring the OneFS file system.

Item	OneFS 8.0.0	IsilonSD Edge	Description
Block size	8 KB	8 KB	The maximum block size limit. This limit cannot be changed.
Cluster name length	40 characters	40 characters	The maximum length for the cluster name.
Cluster size	144 nodes	6 nodes	The maximum number of nodes that a cluster can have.
Custom access pattern templates	5	5	The limit for custom file-system-tunable templates. This limit is in addition to the default templates of "random," "streaming," and "default."
Directories per directory	100,000	100,000	The recommended limit for the number of directories in a directory. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.
Directory depth	509	509	The recommended limit for directory depths. Directory depth is determined by the maximum path length. Exceeding this recommended limit might negatively affect the cluster performance and

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			<p>client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.</p>
Disk pools	40	40	<p>The recommended limit for the number of disk pools. The number of disk pools in the cluster is limited by the maximum number of node pools in the cluster and the type of nodes in those node pools. For information about disk pools, node pools, and tiers, see the white paper <a href="#">Next-Generation Storage Tiering with EMC Isilon SmartPools</a>. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.</p>
FEC protection	4	4	<p>The following FEC options are supported: +1n, +2n, +2d:1n, +3d:1n, +3d:1n1d, +3n, +4d:1n, +4d:2n, +4n.</p> <p>OneFS protection is defined at the node pool level. A cluster with multiple node pools can have multiple protection schemes simultaneously. For information about disk pools, node pools, and tiers, see the white paper <a href="#">Next-Generation Storage Tiering with EMC Isilon SmartPools</a>.</p>
Mirrored protection	8x (maximum)	8x (maximum)	<p>Mirroring options from 2x to 8x are supported. The</p>

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			recommended value depends on the cluster size.
File clones per file	32,766	32,766	The maximum number of references for a single block in a shadow store. When the limit for file clones per file is exceeded, a new shadow store is created .
File name length	255 bytes	255 bytes	Most Unicode character encodings, such as UTF-8, specify that a character can have multiple bytes. UTF-8 can have up to 4 bytes per character. As a result, the 255 bytes in a file name can range from 63 characters to 255 characters. The characters in some languages, such as Japanese, are likely to have multiple bytes per character. OneFS supports UTF-8 by default,
File size	4 TB	4 TB	The maximum size for a file. Files larger than 1 TB can negatively affect job engine performance .
File system size	66 PB	36 TB	The maximum capacity for the file system.  The capacity size does not include overhead for the OneFS operating system, the file system, or data protection.
Files per directory	1,000,000	1,000,000	The recommended limit for files per directory. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.  To improve performance when managing large numbers of files in a single

Item	OneFS 8.0.0	IsilonSD Edge	Description
			directory, use nodes that have solid-state drives (SSDs).
Hard links per file	1,000	1,000	The default and maximum number of hard links per file. You can set the maximum number of hard links per file with the <code>efs.ifm.max_links</code> system control. Setting the number higher than the default value can slow snapshot operations and file deletions. For more information, see the EMC Isilon knowledge base article <a href="#">447064</a> , <i>OneFS: Sysctl: efs.ifm.max_links</i> .
Inodes per cluster	Billions	Billions	OneFS dynamically allocates new inodes from free file system blocks. The maximum number of possible inodes depends on the number and density of nodes in the cluster, as expressed by the following formulas: <ul style="list-style-type: none"> <li>• 4Kn drives: <math>((\text{number of nodes in the cluster}) * (\text{node raw TB}) * 1000^4 * .99) / (8192 * (\text{number of inode mirrors}))</math></li> <li>• 512n drives: <math>((\text{number of nodes in the cluster}) * (\text{node raw TB}) * 1000^4 * .73) / (512 * (\text{number of inode mirrors}))</math></li> </ul> See the guideline for files per directory. The limit for files per directory can limit the number of files that the system can store.
Logical Node Numbers (LNNs)	144	144	The limit for logical node numbers.
Node pools per cluster	10	1	The recommended and maximum limits for node pools per cluster. The number of node pools that can be created is limited by the number of nodes in the cluster.

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Open files per node	315,000	315,000	<p>The maximum number of open files per node depends on the maximum number of vnodes that are available on the node. The amount of available vnodes depends on how much RAM the node has. The maximum number of open files per node is 90% of the maximum number of vnodes on that node, as expressed in the following formula:</p> $\text{kern.maxfiles} = \text{kern.maxvnodes} * .9$ <p>The OneFS protocol daemons, such as the input-output daemon (lwio), might impose additional constraints on the number of files that a node can have open. The protocol daemons typically impose such constraints because the kernel places limits on per-process memory consumption.</p>
Path length	1,023 bytes	1,023 bytes	<p>The maximum length for a pathname. The length is the maximum length of a directory path that can be passed into a system call; it does not represent the absolute depth of nested directories.</p> <p>Shorter path and file names require fewer lookup operations. As a best practice, keep your path and file names as short as possible, especially in workflows that include many lookups. NDMP cannot back up files that have a path length greater than the maximum character limit.</p>
Device IDs	65,535	65,535	<p>Device IDs are unique identifiers for nodes. Device IDs are not reused when nodes are replaced. To reach the limit of Device IDs in a three-node cluster, you must replace nodes 65,532 times.</p>

Item	OneFS 8.0.0	IsilonSD Edge	Description
User attribute keys	16	16	The limit of attribute keys that can be created within any file system object.  The user attribute term refers to custom file system metadata that the FreeBSD extattr API creates. These extended attribute data types can be acted on by SmartPools, for example, by choosing the <code>File Attribute</code> file pool policy filter. Extended attributes exist as "name=value" pairs within a file system object.
User attribute key size	24 bytes	24 bytes	The limit size for the user attribute key.
User attribute value size	128 bytes	128 bytes	The limit size for the user attribute value.
User attribute total size	1 KB	1 KB	The limit for the size of the custom metadata that is associated with the file system object.

## Authentication, identity management, and access control guidelines

This section presents guidelines for configuring directory services and OneFS access zones.

Item	OneFS 8.0.0	IsilonSD Edge	Description
Access zones	50	50	The recommended limit for access zones. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support. The maximum limit has not been established.
ACEs per ACL	1,000	1,000	The limit for Access Control Entries (ACEs) per Access



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			Control List (ACL). ACEs are stored and evaluated linearly. Large numbers of ACEs per ACLs increase the number of authorization checks that must be performed, which might negatively affect system performance.
Kerberos token size	64 KB	64 KB	The size limit for the Kerberos token.
LDAP domains	50	50	The recommended limit for Lightweight Directory Access Protocol (LDAP) domains. This guideline represents unique LDAP domains. See the entry for access zones.
Local groups (per cluster)	25,000	25,000	The recommended limit for local groups per cluster. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.
Local users (per cluster)	25,000	25,000	The recommended limit for local users per cluster. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.
Microsoft Active Directory domains	50	50	The recommended limit for Active Directory domains. See the entry for access zones.
NIS domains	50	50	The recommended limit for Network Information Service (NIS) domains. The guideline

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			represents unique NIS domains. See the entry for access zones. Although you can specify multiple NIS domains in an access zone, NFS users benefit only from the NIS configuration that is defined in the system access zone.
RBAC roles	200	200	The recommended limit for role-based access control (RBAC) roles. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support. The maximum limit has not been established.
User mapper rules	1,000	1,000	The recommended limit for user mapper rules. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support. The maximum limit has not been established.

## OneFS software module guidelines

This section presents guidelines for configuring OneFS software modules.

Item	OneFS 8.0.0	IsilonSD Edge	Description
Antivirus: file size	2 GB	2 GB	The recommended file size limit for antivirus scans. Exceeding this recommended limit might negatively affect

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			the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.
Audit: CEE servers	1 (max) audit server per node 100 (max) audit servers per cluster	1 (max) audit server per node 100 (max) audit servers per cluster	OneFS must ping all the Common Event Enabler (CEE) servers within a single heartbeat window. The number of servers that can be contacted and that can respond during the window is estimated to be 100. The network topology and cluster bandwidth might require a lower limit.
Audit: log expiration	Never	Never	Log files are kept indefinitely. Monitor the size and quantity of the log files on the cluster. If space on the cluster is limited, delete or move the log files.
Audit: log file size	1 GB	1 GB	The size limit for a log file. When a log file reaches the maximum size, the log file is closed and a new log file is created. Monitor the size and quantity of the log files on the cluster. If space on the cluster is limited, delete or move the log files.
CloudPools: account name	768 characters	768 characters	The maximum length for a CloudPool account name.
CloudPools: account user name	Limit is set by service provider	Limit is set by service provider	The maximum length for a CloudPool account user name. This limit is set by the service provider. Check with your cloud provider for more information.
CloudPools: account password	255 characters	255 characters	The maximum length for a CloudPool account password.
CloudPools: pool name	768 characters	768 characters	The maximum length for a CloudPool name

Item	OneFS 8.0.0	IsilonSD Edge	Description
CloudPools: vendor name	2048 characters	2048 characters	The maximum length for a CloudPool vendor name.
CloudPools: description	4096 characters	4096 characters	The maximum length for a CloudPool description.
CloudPools: accounts to tier to	256 accounts	256 accounts 30 active accounts	The maximum number of accounts that a CloudPool account can tier to. The number of accounts that can be active is limited by the maximum number of file pool policies.
CloudPools: Containers in cloud	Limit is set by service provider	Limit is set by service provider	The maximum number of containers in the cloud. This limit is set by the service provider. Check with your cloud provider for more information.
CloudPools: cloud container size	Limit is set by service provider	Limit is set by service provider	The size of the cloud container. This limit is set by the service provider. Check with your cloud provider for more information.
CloudPools: storage size per CloudPool account	Limit is set by service provider	Limit is set by service provider	The storage size for a CloudPool account. This limit is set by the service provider. Check with your cloud provider for more information.
CloudPools: file size tiered to cloud	4 TB	1 TB	The size of files that can be archived to the cloud and retrieved from the cloud. This limit is set by the service provider. Check with your cloud provider for more information.
File pool policies: AND and OR conditions	3 ORs and 5 ANDs	3 ORs and 5 ANDs	A file pool policy can have 3 OR disjunctions, and each term joined by the ORs can contain at most 5 ANDs. For example: (A and B and C and D and E) or (F and G and H and I and J) or (K and L and M and N and O).
File pool policies: number of file pool policies per cluster	30	30	The recommended limit for file policies per cluster. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads

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			for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.
InsightIQ: monitored clusters	8 clusters	8 clusters	The number of clusters that InsightIQ 3.0 and later can monitor. If you are running a different version of InsightIQ, see the release notes for the version of InsightIQ that you are running. For more information about InsightIQ, see the <a href="#">InsightIQ - Information Hub</a> .
InsightIQ: monitored nodes	80 nodes for one cluster; 150 nodes for multiple clusters	80 nodes for one cluster; 150 nodes for multiple clusters	The number of nodes for one cluster or multiple clusters that InsightIQ 3.0 and later can monitor. If you are running a different version of InsightIQ, see the release notes for the version of InsightIQ that you are running. For more information about InsightIQ, see the <a href="#">InsightIQ - Information Hub</a> .
Job Engine: concurrent jobs	3	3	The number of concurrent jobs that the Job Engine can run. The limit does not include jobs for striping or marking; one job from each of those categories can also run concurrently. For more information, see the <a href="#">EMC Isilon Job Engine</a> white paper.
SmartDedupe: block size	8 KB	8 KB	SmartDedupe works on file system blocks that are 8 KB.
SmartDedupe: maximum paths per policy	10	10	The recommended limit for paths per policy for SmartDedupe. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon

Item	OneFS 8.0.0	IsilonSD Edge	Description
			account representative or EMC Isilon Technical Support.
SmartDedupe: minimum file size	32 KB	32 KB	The minimum file size that SmartDedupe can process. SmartDedupe will not de-duplicate files that are smaller than 32 KB.
SmartDedupe: shadow stores	32,000	32,000	Each shadow store can have 32,000 pointers. This limit is imposed by the kernel. The OneFS shadow store is a metadata structure that references physical blocks to decrease the physical storage that is required to store data, which maximizes storage efficiency.
SmartPools: Tiers	5	5	The recommended limit for SmartPools tiers. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.
SmartQuotas: directory depth	509	509	The recommended limit for directory depths for SmartQuotas. Directory depth is determined by the maximum path length, which is 1,023 characters. Directory depths deeper than 275 directories might negatively affect system performance.
SmartQuotas: number of quotas per cluster	20,000	10,000	The recommended limit for quotas per cluster. If you have more than 20,000 quotas, you should use the command-line interface to administer them. The maximum number of quotas per cluster has not been established. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the

Item	OneFS 8.0.0	IsilonSD Edge	Description
			workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.
SnapshotIQ: directory depth	509	509	The recommended limit for directory depths for SnapshotIQ. Directory depth is determined by the maximum path length, which is 1,023 characters. Depths deeper than 275 directories might negatively affect the cluster performance.
SnapshotIQ: number of snapshots	20,000	20,000	The limit for snapshots per cluster.
SyncIQ: defined policies	1,000	1,000	<p>The recommended limit for defined SyncIQ policies. The maximum limit of defined policies has not been established. If the number of policies exceeds the recommended limit, you should keep in mind the following effects:</p> <ul style="list-style-type: none"> <li>• SyncIQ is bound by the limit on the number of concurrently running policies. If many policies are running on schedules, the queue to run the jobs might become so large that OneFS can never complete all the jobs in the queue.</li> <li>• Each policy represents a set of snapshots on the source and the destination clusters. More snapshots mean that more jobs must run to delete the snapshots, and the increase in the number of jobs can negatively affect the cluster performance.</li> </ul>
SyncIQ: running policies	50 - for clusters with 4 or more nodes OR 4 * number of	50 - for clusters with 4 or more nodes OR 4 * number of	The recommended limit of running SyncIQ policies. For

Item	OneFS 8.0.0	IsilonSD Edge	Description
	CPU cores per cluster - for clusters with 3 or fewer nodes	CPU cores per cluster - for clusters with 3 or fewer nodes	clusters with 3 or fewer nodes, the limit depends on the number of CPU cores per node. There can be one worker per CPU core, with each worker running 4 policies. The recommended limit for smaller clusters is: 4 * number of CPU cores per cluster. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.
SyncIQ: workers per node (policy setting)	3	3	The recommended limit for workers per node. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.
SyncIQ: workers per policy	40	40	The recommended limit for workers per policy. Exceeding this recommended limit might negatively affect the cluster performance and client connections. Evaluate the workflow and workloads for your cluster to determine the value that works best for your environment. For assistance, contact your EMC Isilon account representative or EMC Isilon Technical Support.



## Networking guidelines

This section presents guidelines for OneFS networking configurations.

Item	OneFS 8.0.0	IsilonSD Edge	Description
Default routes per node	1	1	The limit for default routes per node. OneFS does not support default routes per interface.
DNS configurations per cluster	1 per groupnet	1 per groupnet	The recommended limit for DNS configurations per cluster. In OneFS, you can specify multiple DNS resolver configurations with a limit of one DNS resolver configuration per groupnet. You can have as many groupnets as there are access zones.
DNS name servers per configuration	3	3	The limit for DNS name servers per configuration.
Groupnets	1 per access zone	1 per access zone	The limit for groupnets per access zone. Groupnets are optional and should be used only if the access zone requires an alternate DNS server. The number of access zones should not exceed 50.
DNS search suffixes per configuration	6	6	The limit for DNS search suffixes per configuration.
Network pools per cluster	100	100	The recommended limit for network pools per cluster. The maximum limit has not been established. The number of network pools should be kept under 100 pools across all subnets and groupnets in the cluster
SmartConnect DNS zone names	100	100	The limit for SmartConnect DNS zone names per network pool. See the <i>Network pools per cluster</i> entry for more information.
SmartConnect DNS zone name aliases	100	100	The recommended limit for SmartConnect DNS zone name aliases. The maximum limit has not been established. The number of DNS zone

Item	OneFS 8.0.0	IsilonSD Edge	Description
			name aliases should be kept under 100 in the cluster.
Subnets per cluster	100	100	The limit for subnets per cluster.
VLANs per cluster	100	100	The limit for VLANs per cluster.

## Hardware guidelines

This section presents guidelines for hardware configurations

Item	OneFS 8.0.0	IsilonSD Edge	Description
Backup accelerator: tape device paths	4	4	The limit for device paths per backup accelerator node.
InfiniBand cable length	Varies by node type	Not supported	Older nodes (S200, X200, X400, and NL400) use DDR IB cables and support lengths up to 10 meters. Newer nodes (S210, X210, NL410, and HD400) use QDR IB cables and support lengths up to 100 meters.

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Published October 2016

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