

ONTAP 9.4 Maximum Configurations Guide 24 Node Clusters																	
Category	Description	Scope	Code Enforced	Scales by Scope	Platform Agnostic	Cluster Maximum											
							Memory 240B/node Platform Maximum	Memory 320B/node Platform Maximum	Memory 640B/node Platform Maximum	Memory 1280B/node Platform Maximum	Memory 1120B/node Platform Maximum	Memory 1120B/node Platform Maximum	Memory 1120B/node Platform Maximum				
1	Core	Maximum number of nodes - NAS	N/A	N/A	N/A	24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
2	Core	Maximum number of storage virtual machines (SVMs) - NAS	N/A	N/A	N/A	1,024	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
3	Core	Maximum number of LFS - NAS	N/A	N/A	N/A	3,072	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
4	Core	Maximum number of connections - NAS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
5	Core	Maximum number of flexible volumes - NAS	N/A	N/A	N/A	12,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
5	Core	Maximum number of FlexGroups - NAS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
6	Core	Maximum number of lock manager locked objects (CPL and NFS combined)	N/A	N/A	N/A	12,288,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
7	NFS	Maximum number of export policies	N/A	N/A	N/A	12,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
8	NFS	Maximum number of export rules	N/A	N/A	N/A	140,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
9	NFS	Maximum NFSv4 access control entries	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
10	NFS	Maximum number of client objects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
11	NFS	Maximum number of pNFS objects	N/A	N/A	N/A	12,288,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
12	WAPL	Maximum size of a 64-bit aggregate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
13	WAPL	Maximum size of a 64-bit volume	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
14	WAPL	Maximum file size in a 64-bit volume	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
15	WAPL	Maximum number of volume Snapshot™ copies	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
16	WAPL	Maximum character length for Snapshot copy names	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
17	WAPL	Maximum number of hard links	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
18	WAPL	Maximum number of inodes/files	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
19	WAPL	Maximum number of greps	N/A	N/A	N/A	2,400,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
20	WAPL	Maximum number of concurrent DataMotion™ for Volumes (not move) operations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
21	Quality of Service	Maximum number of policy groups	N/A	N/A	N/A	12,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
22	Quality of Service	Maximum number of QoS user workloads	N/A	N/A	N/A	40,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
23	Quality of Service	Maximum number of nodes participating in QoS	N/A	N/A	N/A	24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
24	Quality of Service	Maximum number of QoS autosave workloads	N/A	N/A	N/A	40,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
25	Quality of Service	Maximum number of QoS system workloads	N/A	N/A	N/A	5,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
26	SAN	Maximum number of nodes - SAN	N/A	N/A	N/A	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
27	SAN	Maximum number of storage virtual machines (SVMs) - SAN	N/A	N/A	N/A	1,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
28	SAN	Maximum number of flexible volumes - SAN	N/A	N/A	N/A	8,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
29	SAN	Maximum number of LUNs	N/A	N/A	N/A	98,304	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
30	SAN	Maximum number of LUN mappings	N/A	N/A	N/A	98,304	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
31	SAN	Maximum LUN size	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
32	SAN	Maximum FC queue depth available	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
33	SAN	Maximum I/Os	N/A	N/A	N/A	65,536	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
34	SAN	Maximum number of LFS - iSCSI	N/A	N/A	N/A	2,048	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
35	SAN	Maximum number of LFS - FCP	N/A	N/A	N/A	4,096	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
36	SAN	Maximum number of groups	N/A	N/A	N/A	32,768	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
37	SAN	Maximum number of initiators	N/A	N/A	N/A	32,768	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
38	SAN	Maximum number of ports	N/A	N/A	N/A	32,768	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
39	SAN	Maximum number of iSCSI sessions	N/A	N/A	N/A	65,536	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
40	NVMe-oF	Maximum number of nodes - NVMe-oF	N/A	N/A	N/A	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
41	NVMe-oF	Maximum number of storage virtual machines (SVMs) - NVMe-oF	N/A	N/A	N/A	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
42	NVMe-oF	Maximum number of flexible volumes - NVMe-oF	N/A	N/A	N/A	8,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
43	NVMe-oF	Maximum number of namespaces	N/A	N/A	N/A	1,024	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
44	NVMe-oF	Maximum number of subsystems	N/A	N/A	N/A	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
45	NVMe-oF	Maximum number of subsystem mappings	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
46	NVMe-oF	Maximum namespace size	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
47	NVMe-oF	Maximum I/O queue depth available	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
48	NVMe-oF	Maximum I/O queue count available	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
49	NVMe-oF	Maximum I/Os	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
50	NVMe-oF	Maximum number of hosts	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
51	NVMe-oF	Maximum number of LFS - NVMe-oF	N/A	N/A	N/A	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
52	NVMe-oF	Maximum number of NVMe-oF controllers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
53	CIFS	Maximum number of connected shares	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
54	CIFS	Maximum number of regular shares (does not apply to dynamic shares created using the home directory feature)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
55	CIFS	Maximum number of open files	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
56	CIFS	Maximum number of local users	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
57	CIFS	Maximum number of local groups	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
58	CIFS	Maximum number of local group members	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
59	Data Protection	Maximum number of NDMP sessions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
60	Data Protection	Maximum number of data protection (DP) mirrors and/or SnapVault® relationships for FlexPool	N/A	N/A	N/A	iDCT 9.0 = 6,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
61	Data Protection	Maximum number of data protection (DP) mirrors and/or SnapVault® relationships for FlexPool	N/A	N/A	N/A	iDCT 9.0 = 192	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
62	Data Protection	Maximum number of local backup (LS) mirrors	N/A	N/A	N/A	2 for each NAS SVM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
63	Data Protection	Maximum number of concurrent SnapMirror® or SnapVault transfers (additional transfers can be scheduled but will be queued)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
64	Data Protection	Maximum fan-out from source for DP mirror	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
65	Data Protection	Maximum fan-out from source for LS mirror	N/A	N/A	N/A	2 for each NAS SVM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
66	Data Protection	Maximum number of clusters that can be peered	N/A	N/A	N/A	255	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			

HOW TO READ THE MAXIMUM VALUES TABLE

Platform maximum values
listed by platform model

Clustered Data ONTAP 8.2, 8.2.1 Maximum Configurations Guide													
Small-Sized Clusters (4 nodes)													
Category	Description	Scope	Code Enforced	Scales by Scope	7-Mode	Platform Agnostic	Cluster Maximum						
							Supported Data ONTAP® Versions 20.1	Platform Maximum	Platform Maximum	Platform Maximum	Platform Maximum	Platform Maximum	Platform Maximum
Core	Maximum number of nodes - N/A	N/A	N/A	N/A	N/A	N/A	4	8.2, 8.2.1	8.2, 8.2.1	8.2, 8.2.1	8.2, 8.2.1	8.2, 8.2.1	8.2, 8.2.1
		Node	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
		HA	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
		Of Yes	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A

Platform-specific maximum values as they relate to the scope column

HOW SCOPE APPLIES TO CLUSTER AND PLATFORM MAXIMUM VALUES

The HA pair, node, and any subnode row of scope, along with the code enforced, scales by scope, 7-Mode, and platform-agnostic columns in the same row, apply to the various platform maximum value column entries located to the right of the cluster column

Category	Description	Scope	Code Extension	File Scope	7-Mode	Platform Agnostic	Cluster Maximum	Platform Maximum
								FA 8600S
								Platform Maximum
								12, 21
WAF	Maximum number of FlexCache® volumes	Node	Yes	Yes	Yes	Yes	25	190
		HA_Par	Yes	Yes	Yes	Yes	25	200
		Cluster	Yes	Yes	No	Yes	25	190
WAF	Maximum number of concurrent Detach/reattach for Volumes (vol move) operations	Node	No	No	Yes	Yes	25	25
		HA_Par	No	No	Yes	Yes	25	25
		Cluster	No	No	No	Yes	25	25

"N/A" in the cluster maximum column indicates that the maximum value is not a cluster resource, whereas any number that is specified in this field indicates that the maximums/objects are tracked as a cluster resource

UNDERSTANDING SCALES BY SCOPE FOR AN HA PAIR

YES: If the HA pair row Scales by Scope column is "yes," the platform maximum value entry for the HA pair row is double that of the node row, indicating that the node maximum value is doubled in failover.

Category	Description	Scope	Conf	Scales by Scope	7-Mode	Platform Agnostic	Change Maximum	Platform Maximum
WAF	Maximum number of FlexCache® volumes	N/A	Yes	Yes	Yes	Yes	3,400	100
WAF	Maximum number of concurrent Detach/Attach™ for Volumes (vol move) operations	N/A	Yes	Yes	No	Yes	25	25

NO: If the HA pair row Scales by Scope column is "no," the platform maximum value entry for the HA pair row is the same as that of the node row, indicating that the node maximum value is not doubled in failover.

UNDERSTANDING SCALES BY SCOPE FOR A CLUSTER

YES: If the cluster row Scales by Scope column is "yes," the cluster maximum value entry scales in relation to the maximum number of nodes supported for the cluster

Category	Description	number of nodes supported for the cluster						Cluster Maximum
		Scope	Concurrent	Scales by Scope	7-Mode	Platform Agnostic		
		N/A	N/A	N/A	N/A	N/A	Supported Data (GB) = Volume * 25	Platform Maximum
		N/A	N/A	N/A	N/A	N/A		1A 50000
WAPL	Maximum number of FlexCache® volumes	Node	Yes	N/A	Yes	Yes	2,400	N/A
		N/A Data	Yes	N/A	Yes	Yes		100
		Cluster	Yes	Yes	Yes	Yes		200
		N/A	No	N/A	Yes	Yes		N/A
WAPL	Maximum number of concurrent DataIotion™ for Volumes (vol move) operations	Node	No	N/A	Yes	Yes	25	25
		N/A Data	No	N/A	Yes	Yes		25
		Cluster	No	No	Yes	Yes		25

NO: If the cluster row Scales by Scope column is "no," the cluster maximum value entry does not scale based on the maximum number of nodes supported for the cluster

NOTES AND CAVEATS

Maximum values in this document represent the maximum value supported by NetApp in any configuration.

Consult additional technical documentation (technical reports and more) for operational guidance, best practices, and recommendations for specific application or performance-sensitive environments.

The primary resource affected by maximum values is system memory. As a result, all sizing and design considerations around maximum values must consider overall impact to available system memory.

Special attention must be paid to maximum values that are not code enforced, because in many cases there is no warning that a maximum value will be or has been exceeded.

Special consideration must be given to maximum values that have related or equivalent maximum values in 7-Mode, because the context of how the maximum values apply may have changed, or the maximum values may be lower (or higher) than it was in 7-Mode. For example, 7-Mode uses `qtree policies`, whereas clustered Data ONTAP uses both `qtree` policies and rules; although they are named the same in both ONTAP versions, the specific implementation is different.

For node maximum values that do not scale across HA failover (HA pair and node maximum values are the same), NetApp recommends operating at half of the defined maximum value (not required) on a per-node basis to make sure that maximum values are not exceeded in failover. It is possible to operate at any distribution between the two nodes in the HA pair, so long as in failover the remaining node does not exceed the defined maximum value.

Clustered Data ONTAP platform mixing rules (link below) take precedence in all cases. Each sized cluster now includes "primary platforms" and "mixable platforms" entries that define which platforms are able to be mixed together based on the defined platform mixing rules. When mixing platforms across different-sized clusters, the cluster maximum values for the specific size of cluster apply, while the individual subnode, node, and HA pair maximum values continue to apply based on the platform model being used.

Clustered Data ONTAP Platform Mixing Rules

<https://fieldportal.netapp.com/Core/DownloadDoc.aspx?documentID=93126&contentID=125939>

The maximum values listed in this document are valid only through the expiration date that is listed to the right of the main title bar. After expiration, visit the [NetApp Field Portal](#) to obtain the latest version of the maximum configurations document.

Future releases of this document will expand clustered Data ONTAP maximum values information into additional feature and functional areas. Additionally, existing maximum values will be revised and expanded.



Clustered Data ONTAP 8.3.x Maximum Configurations: Release 3.0

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