

ONTAP 9.0 Maximum Configurations Guide			NetApp Confidential - Internal Use Only																					
8 Node Clusters																								
Category	Description	Scope	Code Enforced	Scales by Scope	Platform Agnostic	Cluster Maximum	Primary Platforms						Mobile Platforms (select one with FAS2010 or FAS2040 platform)											
							FAS252	FAS254	FAS320	FAS320	FAS320	FAS420	FAS420	FAS420	FAS420	FAS420	FAS420	FAS420	FAS420	FAS420	FAS420			
							Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	Memory 1GB/node Platform Maximum	
1	Core	Maximum number of nodes - NAS	Node	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	Node	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
3	Core	Maximum number of LIFs - NAS	Node	Yes	N/A	Yes	256	256	256	512	512	512	512	512	512	512	512	512	512	512	512	512	512	
4	Core	Maximum number of connections - NAS	Node	Yes	N/A	No	10,000	10,000	10,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	
5	Core	Maximum number of flexible volumes - NAS	Node	Yes	N/A	N/A	1,000	1,000	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	
6	Core	Maximum number of lock manager locked objects (CIFS and NFS combined)	Node	Yes	N/A	No	600,000	600,000	400,000	700,000	700,000	700,000	900,000	1,800,000	1,900,000	3,000,000	3,000,000	3,000,000	900,000	1,200,000	2,400,000	3,000,000	3,000,000	
7	NFS	Maximum number of export policies	Node	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
8	NFS	Maximum number of export rules	Node	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
9	NFS	Maximum NFSv4 access control entries	Node	Yes	N/A	Yes	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	
10	NFS	Maximum number of client objects	Node	Yes	N/A	No	10,000	10,000	10,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	
11	NFS	Maximum number of pNFS objects	Node	Yes	N/A	No	524,288	524,288	524,288	524,288	524,288	524,288	1,024,000	1,024,000	1,024,000	1,024,000	1,024,000	1,024,000	1,024,000	1,024,000	1,024,000	1,024,000	1,024,000	
12	WAFLB	Maximum size of a 64-bit aggregate	Aggregate	Yes	N/A	No	120TB	120TB	180TB	240TB	240TB	324TB	324TB	324TB	324TB	324TB	324TB	324TB	324TB	324TB	324TB	324TB	324TB	
13	WAFL	Maximum size of a 64-bit volume	Volume	Yes	N/A	No	60TB	60TB	60TB	70TB	70TB	70TB	70TB	70TB	70TB	70TB	70TB	70TB	70TB	70TB	70TB	70TB	70TB	
14	WAFL	Maximum file size in a 64-bit volume	File	Yes	N/A	No	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	
15	WAFL	Maximum number of volume Snapshot™ copies	Volume	Yes	N/A	Yes	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	
16	WAFL	Maximum character length for Snapshot copy names	Snapshot	Yes	N/A	Yes	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	
17	WAFL	Maximum number of hard links	File	Yes	N/A	Yes	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	
18	WAFL	Maximum number of inodes/files	Volume	Yes	N/A	Yes	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	2,000,000,000	
19	WAFL	Maximum number of qtree	Volume	Yes	N/A	Yes	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995		
20	WAFL	Maximum number of concurrent DataLock™ for Volumes (vol move) operations	Node	Yes	N/A	Yes	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	
21	Quality of Service	Maximum number of policy groups	Node	Yes	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	Node	Yes	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	Node	Yes	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
24	Quality of Service	Maximum number of QoS autonomous workloads	Node	Yes	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	Node	Yes	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
26	SAN	Maximum number of nodes - SAN	Node	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	Node	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
28	SAN	Maximum number of flexible volumes - SAN	Node	Yes	N/A	No	1,000	1,000	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		
29	SAN	Maximum number of LUNs	Node	Yes	N/A	Yes	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	
30	SAN	Maximum number of LUN mappings	Node	Yes	N/A	Yes	2,048	2,048	2,048	8,192	8,192	8,192	8,192	8,192	8,192	8,192	8,192	8,192	8,192	8,192	8,192	8,192		
31	SAN	Maximum LUN size	LUN	No	N/A	Yes	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	
32	SAN	Maximum FC queue depth available	Port	No	N/A	Yes	2,048	2,048	2,048	2,048	2,048	2,048	2,048	2,048	2,048	2,048	2,048	2,048	2,048	2,048	2,048	2,048	2,048	
33	SAN	Maximum ITNs	Node	Yes	N/A	No	2,048	2,048	2,048	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	
34	SAN	Maximum number of LIFs - iSCSI	Port	No	N/A	Yes	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32		
35	SAN	Maximum number of LIFs - FC	Port	No	N/A	No	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32		
36	SAN	Maximum number of igroups	Node	Yes	N/A	Yes	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	
37	SAN	Maximum number of initiators	Node	Yes	N/A	No	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	
38	SAN	Maximum number of portsets	Node	Yes	N/A	Yes	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	
39	SAN	Maximum number of iSCSI sessions	Node	Yes	N/A	No	2,048	2,048	2,048	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	4,096	
40	CIFS	Maximum number of connected shares	Node	Yes	N/A	Yes	400,000	400,000	250,000	500,000	500,000	500,000	650,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	650,000	800,000	1,200,000	1,000,000	1,000,000	
41	CIFS	Maximum number of regular shares (does not apply to dynamic shares created using the home directory feature)	Node	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
42	CIFS	Maximum number of open files	Node	Yes	N/A	Yes	300,000	300,000	200,000	350,000	350,000	350,000	450,000	950,000	950,000	1,500,000	1,500,000	1,500,000	600,000	1,200,000	1,500,000	1,500,000	1,500,000	
43	CIFS	Maximum number of local users	Node	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
44	CIFS	Maximum number of local groups	Node	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
45	CIFS	Maximum number of local group members	Node	N/A	N/A	N/A	N/A																	

HOW TO READ THE MAXIMUM VALUES TABLE

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	FA S2220	FA S2240	FA S3160
Supported Data ONTAP® Versions >>>								8.2, 8.2.1	8.2, 8.2.1	8.2, 8.2.1
Core	Maximum number of nodes - NAS	N/A	N/A	N/A	N/A	N/A	4	N/A	N/A	N/A
		Node	N/A	N/A	N/A	N/A		N/A	N/A	N/A
		HA Pair	N/A	N/A	N/A	N/A		N/A	N/A	N/A
		Cluster	No	N/A	No	Yes		N/A	N/A	N/A

The feature or functional area of clustered Data ONTAP related to the maximum value

The level of scope in which the maximum value applies within the cluster

Applies to HA pair and cluster scope and indicates "yes" if the node maximum value doubles in failover (HA pair scope) or if the node limits scales by the maximum number of nodes in the cluster

Indicates which clustered Data ONTAP versions support the platform and maximum values indicated for the column

Platform maximum values listed by platform model

A generic description of the maximum value that, combined with each level of "scope," provides a complete context to the maximum value

Indicates if the maximum value is code enforced by clustered Data ONTAP

Indicates whether an equivalent or related maximum value is present in 7-Mode that should be considered when planning a transition to clustered Data ONTAP

The cluster maximum value for the indicated size of the cluster for this document (small - 4 nodes, medium - 8 nodes, or large - 24 nodes) that applies to both homogenous and heterogeneous clusters

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

HOW SCOPE APPLIES TO CLUSTER AND PLATFORM MAXIMUM VALUES

Category	Description	Scope	Code Enforced	Scales by Scope	7-Mode	Platform Agnostic	Cluster Maximum	FA S6080
Supported Data ONTAP® Versions >>>								Platform Maximum
		N/A	N/A	N/A	N/A	N/A	8.2, 8.2.1	N/A
WAFL	Maximum number of FlexCache® volumes	Node	Yes	N/A	Yes	Yes	100	N/A
		HA Pair	Yes	Yes	Yes	Yes	200	N/A
		Cluster	Yes	Yes	No	Yes	N/A	N/A
WAFL	Maximum number of concurrent DataMotion™ for Volumes (vol move) operations	Node	No	N/A	Yes	Yes	25	N/A
		HA Pair	No	No	Yes	Yes	25	N/A
		Cluster	No	No	No	Yes	25	N/A

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

The cluster row of scope, along with the code enforced, scales by scope, 7-Mode, and platform-agnostic columns in the same row, only apply to the cluster maximum column

"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

Category	Description	Scope	Code Enforced	Scales by Scope	7-Mode	Platform Agnostic	Cluster Maximum	FA S6080
Supported Data ONTAP® Versions >>>								Platform Maximum
		N/A	N/A	N/A	N/A	N/A	8.2, 8.2.1	N/A
WAFL	Maximum number of FlexCache® volumes	Node	Yes	N/A	Yes	Yes	100	N/A
		HA Pair	Yes	Yes	Yes	Yes	200	N/A
		Cluster	Yes	Yes	No	Yes	N/A	N/A
WAFL	Maximum number of concurrent DataMotion™ for Volumes (vol move) operations	Node	No	N/A	Yes	Yes	25	N/A
		HA Pair	No	No	Yes	Yes	25	N/A
		Cluster	No	No	No	Yes	25	N/A

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

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

Category	Description	Scope	Code Enforced	Scales by Scope	7-Mode	Platform Agnostic	Cluster Maximum	FA S6080
Supported Data ONTAP® Versions >>>								Platform Maximum
		N/A	N/A	N/A	N/A	N/A	8.2, 8.2.1	N/A
WAFL	Maximum number of FlexCache® volumes	Node	Yes	N/A	Yes	Yes	100	N/A
		HA Pair	Yes	Yes	Yes	Yes	200	N/A
		Cluster	Yes	Yes	No	Yes	N/A	N/A
WAFL	Maximum number of concurrent DataMotion™ for Volumes (vol move) operations	Node	No	N/A	Yes	Yes	25	N/A
		HA Pair	No	No	Yes	Yes	25	N/A
		Cluster	No	No	No	Yes	25	N/A

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

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 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.

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.

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.

ONTAP Platform Mixing Rules
https://library.netapp.com/ecm/ecm_get_file/ECMP1644424

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 ONTAP maximum values information into additional feature and functional areas. Additionally, existing maximum values will be revised and expanded.

