

ONTAP 9.0 Maximum Configurations Guide																
24 Node Clusters																
						Primary Platforms										
Category	Description	Scope	Code Enforced	Scales by Scope	Platform Agnostic	Cluster Maximum										
							Memory 48GB/node Platform Maximum	Memory 48GB/node Platform Maximum	Memory 72GB/node Platform Maximum	Memory 96GB/node Platform Maximum	Memory 96GB/node Platform Maximum	Memory 24GB/node Platform Maximum	Memory 32GB/node Platform Maximum	Memory 64GB/node Platform Maximum	Memory 128GB/node Platform Maximum	
Supported ONTAP 9.0 Versions >>>																
1	Core	Maximum number of nodes - 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	N/A	N/A
			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	
			HA Pair	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Cluster	No	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	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
			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	
			HA Pair	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Cluster	No	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	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
			Node	Yes	N/A	512	512	512	512	512	512	512	512	512	512	
			HA Pair	No	N/A	512	512	512	512	512	512	512	512	512	512	
			Cluster	No	Yes	N/A	N/A	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	N/A	N/A
			Node	Yes	N/A	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	
			HA Pair	No	N/A	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	
			Cluster	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Node	Yes	N/A	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	
			HA Pair	Yes	Yes	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	
			Cluster	Yes	Yes	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 (CIFS and NFS combined)	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
			Node	Yes	N/A	1,900,000	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	
			HA Pair	Yes	No	1,900,000	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	
			Cluster	Yes	No	N/A	N/A	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Node	No	N/A	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	
			HA Pair	No	Yes	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	
			Cluster	No	Yes	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	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
			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	
			HA Pair	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Cluster	No	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	ACL	Yes	N/A	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024
			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	
			HA Pair	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Cluster	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	N/A	N/A
			Node	Yes	N/A	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	
			HA Pair	Yes	No	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	
			Cluster	Yes	No	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Node	Yes	N/A	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	
			HA Pair	Yes	No	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	
			Cluster	Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
12	WAFL®	Maximum size of a 64-bit aggregate	Aggregate	Yes	N/A	No	324TiB	400TiB	400TiB	400TiB	400TiB	324TiB	324TiB	400TiB	400TiB	400TiB
			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	
			HA Pair	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Cluster	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	WAFL	Maximum size of a 64-bit volume	Volume	Yes	N/A	No	70TiB	100TiB	100TiB	100TiB	100TiB	70TiB	100TiB	100TiB	100TiB	100TiB
			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	
			HA Pair	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Cluster	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	WAFL	Maximum file size in a 64-bit volume	File	Yes	N/A	Yes	16TiB	16TiB	16TiB	16TiB	16TiB	16TiB	16TiB	16TiB	16TiB	16TiB
			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	
			HA Pair	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Cluster	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	WAFL	Maximum number of volume Snapshot™ copies	Volume	Yes	N/A	Yes	255	255	255	255	255	255	255	255	255	255
			Node	Yes	N/A	No	255,000	255,000	255,000	255,000	255,000	255,000	255,000	255,000	255,000	
			HA Pair	Yes	Yes	510,000	510,000	510,000	510,000	510,000	510,000	510,000	510,000	510,000	510,000	
			Cluster	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	WAFL	Maximum character length for Snapshot copy names	Snapshot	Yes	N/A	Yes	255	255	255	255	255	255	255	255	255	255
			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	
			HA Pair	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Cluster	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	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
			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	
			HA Pair	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Cluster	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	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
			Node	No	N/A	Yes	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000	
			HA Pair	No	No	Yes	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000	
			Cluster	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	WAFL	Maximum number of qtrees	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
			Node	No	N/A	Yes	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	
			HA Pair	No	No	Yes	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	
			Cluster	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
20	WAFL	Maximum number of concurrent DataMotion™ for Volumes (vol 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	N/A	N/A
			Node	Yes	N/A	8	8	8	8	8	8	8	8	8	8	
			HA Pair	Yes	No	16	16	16	16	16	16	16	16	16	16	
			Cluster	Yes	No	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	N/A	N/A	N/A	N/A
			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
			HA Pair	Yes	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Cluster	Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
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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.

