

ONTAP 9.2 Maximum Configurations Guide														
24 Node Clusters														
Category	Description	Scope	Code Enforced	Scales by Scope	Platform Agnostic	Cluster Maximum	Supported Cluster Data ONTAP 9.2 Versions 444							
							FA58020	FA58040	FA58060	FA58080	AFF8080	FA58090	AFF A700	AFF A700s
							Memory 24GB/node Platform Maximum	Memory 32GB/node Platform Maximum	Memory 44GB/node Platform Maximum	Memory 128GB/node Platform Maximum	Memory 512GB/node Platform Maximum	Memory 512GB/node Platform Maximum	Memory 512GB/node Platform Maximum	
1	Core	Maximum number of nodes - NAS	N/A Node HA Pair Cluster	N/A Yes No No	N/A N/A N/A N/A	24	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	N/A N/A N/A N/A	
2	Core	Maximum number of storage virtual machines (SVMs) - NAS	N/A Node HA Pair Cluster	Yes No No No	N/A N/A N/A N/A	1,024	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	N/A N/A N/A N/A	
3	Core	Maximum number of LIFs - NAS	N/A Node HA Pair Cluster	N/A Yes No No	N/A N/A N/A N/A	3,072	N/A 512 512 512	N/A 512 512 512	N/A 512 512 512	N/A 512 512 512	N/A 512 512 512	N/A 512 512 512	N/A 512 512 512	
4	Core	Maximum number of connections - NAS	N/A Node HA Pair Cluster	Yes Yes No No	N/A N/A N/A N/A	N/A	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	100,000 100,000 100,000 100,000	100,000 100,000 100,000 100,000	100,000 100,000 100,000 100,000	
5	Core	Maximum number of flexible volumes - NAS	N/A Node HA Pair Cluster	Yes Yes Yes Yes	N/A N/A N/A N/A	12,000	1,000 1,000 2,000 2,000	1,000 1,000 2,000 2,000	1,000 1,000 2,000 2,000	1,000 1,000 2,000 2,000	1,000 1,000 2,000 2,000	1,000 1,000 2,000 2,000	1,000 1,000 2,000 2,000	
5	Core	Maximum number of FlexGroups - NAS	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	60	N/A 5 10 10	N/A 5 10 10	N/A 5 10 10	N/A 5 10 10	N/A 5 10 10	N/A 5 10 10	N/A 5 10 10	
6	Core	Maximum number of lock manager locked objects (CIFS and NFS combined)	N/A Node HA Pair Cluster	Yes Yes No No	N/A N/A N/A N/A	12,288,000	800,000 1,200,000 2,400,000 3,000,000	1,200,000 2,400,000 3,000,000 3,000,000	2,400,000 3,000,000 3,000,000 3,000,000	3,000,000 3,000,000 3,000,000 3,000,000	3,000,000 3,000,000 3,000,000 3,000,000	3,000,000 3,000,000 3,000,000 3,000,000	3,000,000 3,000,000 3,000,000 3,000,000	
7	NFS	Maximum number of export policies	N/A Node HA Pair Cluster	No No Yes No	N/A N/A N/A N/A	12,000	1,000 2,000 2,000 2,000	1,000 2,000 2,000 2,000	1,000 2,000 2,000 2,000	1,000 2,000 2,000 2,000	1,000 2,000 2,000 2,000	1,000 2,000 2,000 2,000	1,000 2,000 2,000 2,000	
8	NFS	Maximum number of export rules	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	140,000	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	N/A N/A N/A N/A	
9	NFS	Maximum NFSv4 access control entries	N/A Node HA Pair Cluster	No No No 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 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 Node HA Pair Cluster	No Yes No No	N/A N/A N/A N/A	N/A	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	100,000 100,000 100,000 100,000	100,000 100,000 100,000 100,000	100,000 100,000 100,000 100,000	
11	NFS	Maximum number of pNFS objects	N/A Node HA Pair Cluster	Yes Yes No No	N/A N/A N/A N/A	12,288,000	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 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 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	N/A Node HA Pair Cluster	Yes No No No	N/A N/A N/A N/A	N/A	32TB 32TB 40TB 40TB	32TB 32TB 40TB 40TB	40TB 40TB 60TB 60TB	40TB 40TB 60TB 60TB	60TB 60TB 60TB 60TB	60TB 60TB 60TB 60TB	60TB 60TB 60TB 60TB	
13	WAFL	Maximum size of a 64-bit volume	N/A Node HA Pair Cluster	No No No 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 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	N/A Node HA Pair Cluster	Yes No No No	N/A N/A N/A N/A	N/A	10TB 10TB 10TB 10TB	10TB 10TB 10TB 10TB	10TB 10TB 10TB 10TB	10TB 10TB 10TB 10TB	10TB 10TB 10TB 10TB	10TB 10TB 10TB 10TB	10TB 10TB 10TB 10TB	
15	WAFL	Maximum number of volume Snapshot™ copies	N/A Node HA Pair Cluster	Yes Yes Yes Yes	N/A N/A N/A N/A	N/A	255 255,000 510,000 510,000	255 255,000 510,000 510,000	255 255,000 510,000 510,000	255 255,000 510,000 510,000	255 255,000 510,000 510,000	255 255,000 510,000 510,000	255 255,000 510,000 510,000	
16	WAFL	Maximum character length for Snapshot copy names	N/A Node HA Pair Cluster	No No No 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 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	N/A Node HA Pair Cluster	No No No 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 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	N/A Node HA Pair Cluster	Yes No No No	N/A N/A N/A N/A	N/A	2,000,000,000 50,000,000,000 50,000,000,000 50,000,000,000	2,000,000,000 50,000,000,000 50,000,000,000 50,000,000,000	2,000,000,000 50,000,000,000 50,000,000,000 50,000,000,000	2,000,000,000 50,000,000,000 50,000,000,000 50,000,000,000	2,000,000,000 50,000,000,000 50,000,000,000 50,000,000,000	2,000,000,000 50,000,000,000 50,000,000,000 50,000,000,000	2,000,000,000 50,000,000,000 50,000,000,000 50,000,000,000	
19	WAFL	Maximum number of qrees	N/A Node HA Pair Cluster	Yes No No No	N/A N/A N/A N/A	2,400,000	4,995 100,000 200,000 200,000	4,995 100,000 200,000 200,000	4,995 100,000 200,000 200,000	4,995 100,000 200,000 200,000	4,995 100,000 200,000 200,000	4,995 100,000 200,000 200,000	4,995 100,000 200,000 200,000	
20	WAFL	Maximum number of concurrent DataMotion™ for Volumes (not moved) operations	N/A Node HA Pair Cluster	Yes No No No	N/A N/A N/A N/A	N/A	8 16 16 16	8 16 16 16	8 16 16 16	8 16 16 16	8 16 16 16	8 16 16 16	8 16 16 16	
21	Quality of Service	Maximum number of policy groups	N/A Node HA Pair Cluster	No Yes Yes Yes	N/A N/A N/A N/A	12,000	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	N/A N/A N/A N/A	
22	Quality of Service	Maximum number of QoS user workloads	N/A Node HA Pair Cluster	Yes Yes Yes Yes	N/A N/A N/A N/A	12,000	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	N/A N/A N/A N/A	
23	Quality of Service	Maximum number of nodes participating in QoS	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	24	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	N/A N/A N/A N/A	
24	Quality of Service	Maximum number of QoS autovolume workloads	N/A Node HA Pair Cluster	Yes Yes No No	N/A N/A N/A N/A	12,000	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	N/A N/A N/A N/A	
25	Quality of Service	Maximum number of QoS system workloads	N/A Node HA Pair Cluster	No Yes Yes Yes	N/A N/A N/A N/A	5,000	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	N/A N/A N/A N/A	
26	SAN	Maximum number of nodes - SAN	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	12	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	N/A N/A N/A N/A	
27	SAN	Maximum number of storage virtual machines (SVMs) - SAN	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	1,000	12 250 250 250	12 250 250 250	12 250 250 250	12 250 250 250	12 250 250 250	12 250 250 250	12 250 250 250	
28	SAN	Maximum number of flexible volumes - SAN	N/A Node HA Pair Cluster	Yes Yes Yes Yes	N/A N/A N/A N/A	8,000	1,000 2,000 2,000 2,000	1,000 2,000 2,000 2,000	1,000 2,000 2,000 2,000	1,000 2,000 2,000 2,000	1,000 2,000 2,000 2,000	1,000 2,000 2,000 2,000	1,000 2,000 2,000 2,000	
29	SAN	Maximum number of LUNs	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	98,304	8,192 16,384 16,384 16,384	8,192 16,384 16,384 16,384	12,288 24,576 24,576 24,576	12,288 24,576 24,576 24,576	12,288 24,576 24,576 24,576	12,288 24,576 24,576 24,576	12,288 24,576 24,576 24,576	
30	SAN	Maximum number of LUN mappings	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	98,304	16,384 16,384 16,384 16,384	16,384 16,384 16,384 16,384	24,576 24,576 24,576 24,576	24,576 24,576 24,576 24,576	24,576 24,576 24,576 24,576	24,576 24,576 24,576 24,576	24,576 24,576 24,576 24,576	
31	SAN	Maximum LUN size	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	N/A	10TB 10TB 10TB 10TB	10TB 10TB 10TB 10TB	10TB 10TB 10TB 10TB	10TB 10TB 10TB 10TB	10TB 10TB 10TB 10TB	10TB 10TB 10TB 10TB	10TB 10TB 10TB 10TB	
32	SAN	Maximum FC queue depth available	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	N/A	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 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	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	65,536	512 8,192 8,192 8,192	512 8,192 8,192 8,192	512 8,192 8,192 8,192	512 8,192 8,192 8,192	512 8,192 8,192 8,192	512 8,192 8,192 8,192	512 8,192 8,192 8,192	
34	SAN	Maximum number of LIFs - iSCSI	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	2,048	32 32 32 32	32 32 32 32	32 32 32 32	32 32 32 32	32 32 32 32	32 32 32 32	32 32 32 32	
35	SAN	Maximum number of LIFs - FCP	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	4,096	32 32 32 32	32 32 32 32	32 32 32 32	32 32 32 32	32 32 32 32	32 32 32 32	32 32 32 32	
36	SAN	Maximum number of igroups	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	32,768	2,048 4,096 4,096 4,096	2,048 4,096 4,096 4,096	4,096 8,192 8,192 8,192	4,096 8,192 8,192 8,192	4,096 8,192 8,192 8,192	4,096 8,192 8,192 8,192	4,096 8,192 8,192 8,192	
37	SAN	Maximum number of initiators	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	32,768	256 2,048 4,096 4,096	256 2,048 4,096 4,096	256 4,096 8,192 8,192	256 4,096 8,192 8,192	256 4,096 8,192 8,192	256 4,096 8,192 8,192	256 4,096 8,192 8,192	
38	SAN	Maximum number of portsets	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	32,768	2,048 4,096 4,096 4,096	2,048 4,096 4,096 4,096	4,096 8,192 8,192 8,192	4,096 8,192 8,192 8,192	4,096 8,192 8,192 8,192	4,096 8,192 8,192 8,192	4,096 8,192 8,192 8,192	
39	SAN	Maximum number of iSCSI sessions	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	65,536	4,096 8,192 8,192 8,192	4,096 8,192 8,192 8,192	8,192 16,384 16,384 16,384	8,192 16,384 16,384 16,384	8,192 16,384 16,384 16,384	8,192 16,384 16,384 16,384	8,192 16,384 16,384 16,384	
40	CIFS	Maximum number of connected shares	N/A Node HA Pair Cluster	No No No No	N/A N/A N/A N/A	N/A	650,000 800,000 1,000,000 1,000,000	800,000 1,000,000 1,000,000 1,000,000	1,000,000 1,000,000 1,000,000 1,000,000	1,000,000 1,00				

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/ECMP164424

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.

