

MetroCluster (4 Node Cluster Per Site NAS, 2 Node Cluster Per Site SAN, 2 Sites)

Category		Description	Scope	Code Encoded	Scales by Scope	Platform Agnostic	Cluster Maximum	All Supported MCC Platforms																											
								FAS3220		FAS3250		FAS3210		FAS6220		FAS6240		FAS6250		FAS6260		FAS6290		FAS6820		FAS8040		FAS8060		FAS9080		FAS 8200 AFF A300		FAS9000	
								Memory 12GB/node	Platform Maximum	Memory 20GB/node	Platform Maximum	Memory 16GB/node	Platform 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 44GB/node	Platform Maximum	Memory 128GB/node	Platform Maximum	Memory 128GB/node	Platform Maximum	Memory 128GB/node	Platform Maximum
Supports Outlined Data ONTAP 8.5 Versions or Later																																			
1	Core	Maximum number of nodes - NAS	Node	N/A	N/A	N/A	N/A	4 (per site)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
			Chassis	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	No	No	N/A	No	Per Platform	32	32	32	64	64	64	64	64	64	32	32	32	64	64	64	64	64	64	64	64	64	64					
			HA Pair	No	No	N/A	No		Maximum	32	32	32	64	64	64	64	64	64	32	32	32	64	64	64	64	64	64	64	64	64					
			Chassis	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	No	No	N/A	Yes	Per Platform	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	No	No	N/A	Yes		Maximum	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128					
			Chassis	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	Node	No	No	N/A	No	N/A	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500						
			HA Pair	No	No	N/A	No		Maximum	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000					
			Chassis	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	Node	No	No	N/A	No	Per Platform	125	125	125	250	250	250	250	250	250	125	125	125	250	250	250	250	250	250	250	250	250						
			HA Pair	No	No	N/A	No		Maximum	250	250	250	500	500	500	500	500	500	250	250	250	500	500	500	500	500	500	500	500	500					
			Chassis	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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 FlexGroups - NAS	Node	N/A	N/A	N/A	N/A	Per Platform	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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		Maximum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
			Chassis	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
7	Core	Maximum number of lock manager locked objects (LMOs and NFS combined)	Node	Yes	No	N/A	N/A	Per Platform	250,000	250,000	250,000	500,000	500,000	500,000	500,000	500,000	500,000	250,000	250,000	250,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000							
			HA Pair	Yes	No	N/A	Yes		Maximum	350,000	350,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	350,000	350,000	350,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000						
			Chassis	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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 policies	Node	No	No	N/A	Yes	Per Platform	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500							
			HA Pair	No	Yes	N/A	Yes		Maximum	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	1,000	1,000	1,000	1,000	1,000	1,000						
			Chassis	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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 number of export rules	Node	N/A	N/A	N/A	N/A	Per Platform	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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		Maximum	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000						
			Chassis	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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 NFSv4 access control entries	Node	N/A	N/A	N/A	N/A	N/A	512	512	512	512	512	512	512	512	512	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024							
			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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A						
			Chassis	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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 client objects	Node	Yes	No	N/A	No	Per Platform	6,114	6,114	51,200	51,200	51,200	51,200	51,200	51,200	51,200	102,400	102,400	102,400	102,400	102,400	102,400	102,400	102,400	102,400	102,400								
			HA Pair	Yes	No	N/A	No		Maximum	6,114	6,114	51,200	51,200	51,200	51,200	51,200	51,200	51,200	102,400	102,400	102,400	102,400	102,400	102,400	102,400	102,400	102,400	102,400							
			Chassis	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A						
12	NFS	Maximum number of pNFS objects	Node	Yes	N/A	N/A	No	Per Platform	262,144	262,144	512,000	512,000	512,000	512,000	512,000	512,000	512,000	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	N/A	N/A	No		Maximum	262,144	262,144	512,000	512,000	512,000	512,000	512,000	512,000	512,000	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								
			Chassis	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	WAFB	Maximum size of a 64-bit aggregate	Aggregate	Yes	N/A	N/A	No	N/A	100TB	240TB	320TB	320TB	400TB	400TB	400TB	400TB	224TB	320TB	320TB	400TB	400TB	400TB	400TB	400TB	400TB	400TB	400TB								
			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	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	N/A	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	WAFB	Maximum size of a 64-bit volume	Volume	Yes	N/A	N/A	No	N/A	60TB	70TB	70TB	70TB	100TB	100TB	100TB	100TB	70TB	100TB	100TB	100TB	100TB	100TB	100TB	100TB	100TB	100TB	100TB								
			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	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	N/A	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	WAFB	Maximum file size in a 64-bit volume	File	Yes	N/A	N/A	Yes	N/A	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB	16TB								
			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	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	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	WAFB	Maximum number of volume Snapshots™ copies	Volume	No	N/A	N/A	Yes	N/A	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255								
			Node	Yes	No	N/A	No		Maximum	31,875	31,875	31,875	63,750	63,750	63,750	63,750	63,750	63,750	63,750	63,750	63,750	63,750	63,750	63,750	63,750	63,750	63,750	63,750							
			HA Pair	No	Yes	No	No		Maximum	63,750	63,750	127,500	127,500	127,500	127,500	127,500	127,500	127,500	127,500	127,500	127,500	127,500	127,500	127,500	127,500	127,500	127,500	127,500							
17	WAFB	Maximum character length for Snapshot copy names	Snapshot	Yes	N/A	N/A	Yes	N/A	255	255	255	255	255	255	255	255	255	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	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	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	WAFB	Maximum number of hard links	Link	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								
			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	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	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	WAFB	Maximum number of inodes/files	Volume	No	N/A	N/A	Yes	Per Platform	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	2,000,000,000									
			Node	Yes	No	N/A	Yes		Maximum	50,000,000,000	50,000,000,000	50,000,000,000	50,000,000,000																						

NetApp reserves the right to change any information or products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of information or products described herein, except as expressly agreed to in writing by NetApp. The use of this document, information, or the described products does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp. The products described in this document may be protected by one or more U.S. patents, foreign patents, or pending applications.

bioRxiv preprint doi: <https://doi.org/10.1101/2020.04.14.039101>; this version posted April 14, 2020. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under aCC-BY-NC-ND 4.0 International license.

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.

