

XCubeSAN Series Application Note

Setup Apple Xsan



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This XCubeSAN series white paper is applicable to the following XCubeSAN models:

Model Name	Controller Type	Form Factor, Bay Count, and Rack Unit
XS5224D	Dual Controller	LFF 24-disk 4U Chassis
XS3224D	Dual Controller	LFF 24-disk 4U Chassis
XS3224S	Single Controller	LFF 24-disk 4U Chassis
XS1224D	Dual Controller	LFF 24-disk 4U Chassis
XS1224S	Single Controller	LFF 24-disk 4U Chassis

XCubeSAN Storage System 4U 19" Rack Mount Models

XCubeSAN Storage System 3U 19" Rack Mount Models

Model Name	Controller Type	Form Factor, Bay Count, and Rack Unit
XS5216D	Dual Controller	LFF 16-disk 3U Chassis
XS3216D	Dual Controller	LFF 16-disk 3U Chassis
XS3216S	Single Controller	LFF 16-disk 3U Chassis
XS1216D	Dual Controller	LFF 16-disk 3U Chassis
XS1216S	Single Controller	LFF 16-disk 3U Chassis

XCubeSAN Storage System 2U 19" Rack Mount Models

Model Name	Controller Type	Form Factor, Bay Count, and Rack Unit
XS5212D	Dual Controller	LFF 12-disk 2U Chassis
XS5212S	Single Controller	LFF 12-disk 2U Chassis
XS3212D	Dual Controller	LFF 12-disk 2U Chassis
XS3212S	Single Controller	LFF 12-disk 2U Chassis
XS1212D	Dual Controller	LFF 12-disk 2U Chassis
XS1212S	Single Controller	LFF 12-disk 2U Chassis
XS5226D	Dual Controller	SFF 26-disk 2U Chassis
XS5226S	Single Controller	SFF 26-disk 2U Chassis
XS3226D	Dual Controller	SFF 26-disk 2U Chassis
XS3226S	Single Controller	SFF 26-disk 2U Chassis
XS1226D	Dual Controller	SFF 26-disk 2U Chassis



XS1226S	Single Controller	SFF 26-disk 2U Chassis

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Setup Apple Xsan

Executive Summary

Xsan is Apple Inc.'s SAN (Storage Area Network) or clustered file system for macOS. Xsan enables multiple Mac desktop and Xserve systems to access shared block storage over a Fibre Channel network. With the Xsan file system installed, these computers can read and write to the same storage volume at the same time. Xsan is a complete SAN solution that includes the metadata controller software, the file system client software, and integrated setup, management and monitoring tools. This application note provides technical guidance for setup Apple Xsan with QSAN XCubeSAN series product.

Audience

This document is applicable for QSAN customers and partners who are interested in learning about Apple Xsan software. It assumes the reader is familiar with QSAN products and has general IT experience, including knowledge as a system or network administrator. If there is any question, please refer to the user manuals of products, or contact QSAN support for further assistance.

Overview

Xsan has all the normal features to be expected in an enterprise shared disk file system, including support for large files and file systems, multiple mounted file systems, meta data controller failover for fault tolerance, and support for multiple operating systems.

This document is used for guiding user to setup Xsan topology step by step.



INFORMATION:

Xsan is a powerful and scalable solution for storage and consolidation, for more information, please refer to: <u>https://support.apple.com/xsan</u>



Prerequisites

Please check the Xsan version and macOS version. You can refer to the link below for compatibility.

- <u>https://support.apple.com/en-us/HT200135</u>
- <u>https://support.apple.com/en-us/HT200111</u>

Xsan Software

The following demonstration uses Xsan version 5 included in macOS Server 5.x, which you can purchase and install from the App Store.

• https://itunes.apple.com/us/app/os-x-server/id883878097

Environment

- MDC (MetaData Controller)
 - Model: Mac Pro (6-Core, 16GB)
 - FC (Fibre Channel) HBA: ATTO Celerity FC-84EN
 - OS: macOS Sierra version 10.12.2 and installed macOS server app
- Client
 - Model: Mac Pro (4-Core, 8GB)
 - FC HBA: ATTO Celerity FC-84EN
 - OS: X El Capitan version 10.11.6
- FC Switch
 - Model: Brocade 6505 (24 ports)
- Storage
 - Model: XCubeSAN XS3212D
 Memory: 8GB (2 x 4GB in bank 1 & 3) per controller
 Firmware 1.2.2
 - HDD: 12 x Seagate Constellation ES, ST500NM0001, 500GB, SAS 6Gb/s
 - \circ $\;$ HDD Pool: RAID 5 Pool with 12 x NL-SAS HDDs in Controller 1 $\;$
 - HDD Volume: 100GB in Pool



Topology

The following is a topology diagram. MDC and client with FC HBAs connect to the FC switch. XCubeSAN with FC host card also connect to the FC switch.



Configuration

MDC (MetaData Controller) Part

1. First, configure the network setting in the **System Preferences** -> **Network**. DNS Server adds itself as the IP address.



Ethernet 1 Connected Ethernet 2 Connected	Status:	Connected Ethernet 1 is currently active address 192.168.173.99.	e and has th <mark>e</mark> IP
 Wi-Fi On Bluetooth PAN Not Connected Thundet Bridge Not Connected 	Configure IPv4: IP Address: Subnet Mask: Router: DNS Server: Search Domains:	Manually 192.168.173.99 255.255.128.0 192.168.128.254 192.168.173.99.	
+ - &-		Assist Me	Advanced ? Revert Apply

Figure 2 Configure Network Settings

2. Configure the **DNS** server and add a **Host Name** in the **Server** -> **DNS**. This feature is included in the macOS server app.

😡 DNS				ON
Status:	 Set your network DN Learn about configuring 	S settings to 192.168.17: this service ©	3.99 to use this server	
Permissions:	All Networks			
Forwarding Servers:	2 forwarding servers sp	ecified		
	Edit Forwarding Servers			
Lookups:	\checkmark Perform lookups for	all clients 🗘		
	Edit Lookup Clients			
Host Names:	Host Name	IP Address	es	
	macpro.xsan	192.168.1	73.99	
	+ - *		Q Search	

Figure 3 Configure DNS Settings



Host Name:	macpro.xsan	
IP Addresses:	192.168.173.99	
	(+ -)	
Aliases:		
	+ -	
	Create an MX record for this host name	

Figure 4 Add a Host Name in DNS Setting



 Use the Network Utility in the Applications -> Utilities to check if the network settings are correct.



Figure 5 Ping the DNS Server

				Ne	etwork Utility				
	Info	Netstat	Ping	Lookup	Traceroute	Whois	Finger	Port Scan)
Entera	an interr	net addres:	s to look	Jp.					
		Ľ	192.168.1	173.99	(ex. 10.	.0.2.1 or ww	w.example.c	com)	
								Loc	kup
Looku	p has s	tarted							
192.1	68.173.	99 -> macı	oro.xsan						

Figure 6 Lookup the IP Address



4. Turn on the **Open Directory** service and follow the instructions to configure it in the **Server** -> **Open Directory**.

0	pen Directory	OF
	Turn on service to view settings	
	Open Directory is an easy-to-deploy directory and network authentication server that lets organizations benefit from centralized information.	
Figure 7	Turn on the Open Directory Service	
Configure	Network Users and Groups	
To conti importa	nue, you'll need to configure your server as a network directory. This directory will store nt information such as your user and group accounts.	
	 Create a new Open Directory domain Join an existing Open Directory domain as a replica Restore Open Directory domain from an archive 	
Cancel	Previous Next	
Figure 8	Configure Open Directory Step 1	



Directory Administrator

amo: dire desia	
ame: diradmin	
vord:	
erify: •••••	
\checkmark Remember this password in my	keychain
	vord: erify:

Figure 9 Configure Open Directory Step 2

Organization Information	is information will be shown to users to help them
	METT RAMACE RALIAN.
	Organization Name: Xsantest
ou. This will be used to verify your	Provide an email address that users can use to contact y
	server's authenticity as well as for support.
	Admin Email Address: qsantest@qsan.com
Previous Next	Cancel

Figure 10 Configure Open Directory Step 3



This server will become a director	y server with these settings:		
Administrator Name:	Directory Administrator		
Administrator Account Name:	diradmin		
Organization Name:	Xsantest		
Administrator Email:	qsantest@qsan.com		
Cancel		Previous	Set Up

Figure 11 Configure Open Directory Step 4

5. Continue to configure the Xsan service. Make sure you have connected the FC volumes to this MDC host and you will be able to enable the Xsan service. When connecting the FC volume, you will see a pop-up window as shown below, then just click the **Ignore** button and leave it blank.

computer.		
(Installant	Ignora	Fiect

Figure 12 Connect to the FC Volume



TIP:

Please do not use partitions and do not erase the FC volumes when connecting to the Mac server. If you do that, the volume will no longer be part of the Xsan LUN.



6. This is an option to configure the MPIO (MultiPath I/O) service, please check the FC HBA driver settings. Here is an example of ATTO Celerity FC-84EN. You can download its configuration tool from their website.

		ATTO ConfigTool
Device Listing		Basic Info Flash Advanced
▼ Network		
Iocalhost Colority EC- 84EN	Device Informati	on
▼ Qsan-supports-Mac-Pro	Name:	Celerity FC-84EN
No devices found	Device Type:	Fibre Channel Controller
WIN-BH9QRQAD8K9.K WIN-DLA9UAAAM3M.k WIN-DU0BJDPQN9P.lo	Bus Type:	PCI
 ► WIN-HEVB9U50PV9.lo ► WIN-KOSMUBH9CET.kc 	Location:	Slot 2
	Driver Informatio	n
0113/75 025 ET LY CONEAL	Driver Name	(hran (Stansions / ATTOCalarityE () () VEL Mainen / E VIELY LANGIN
]	Driver Version: 2.1.3

Figure 13 ATTO Configuration Tool

7. Then navigate to the **Advanced** function tab to check if it is **Enabled**.

Figure 14 Enable Multipath



8. After connecting two FC cables to the controller 1 and 2 of the storage system, the same LUN information will be seen on both Fibre Channel Domains. The system identifies the same LUNs as one automatically.

Hardware	Fibre Channel Device Tree
ATA	Fibre Channel Domain 0
Audio	Fibre Channel Domain 1
Bluetooth	▼ SCSI Target Device @ 0
Camera	SCSI Logical Unit @ 0
Card Reader	SCSI Logical Unit @ 1
Diagnostics	▼ Fibre Channel Domain 2
Disc Burning	▼ SCSI Target Device @ 0
Ethernet Cards	SCSI Logical Unit @ 0
Fibre Channel	SCSI Logical Unit @ 1
FireWire Graphics/Displays	Fibre Channel Domain 3

Figure 15 MPIO on Both Fibre Channel Domains

9. Next, turn on the **Xsan** service in the **Server** -> **Xsan**.



Figure 16 Turn on the **Xsan** Service



10. Select the Create a new SAN item and click the Next button.

	s server as an Xsan Storage Area Network (SAN) metadata controller.
• Create a new SAN		
This server will be the	first controller for a new SAN.	
◯ Join an existing SA	N as a controller	
This server will be an	additional controller for an existing SAN.	

Figure 17 Create a new SAN Step 1

11. Enter a name for this SAN environment and then click the **Next** button.

	at will be seen by clients and other controllers on t	he local network.
Name:	xsanqsan	
	The name cannot be changed once the SAN is created.	

Figure 18 Create a new SAN Step 2

CSAN

12. Click the **Next** button to continue.

To continue, you'll r important informatio	need to configure y on such as your us	our server as a er and group a	network direct	tory. This director	ry will store

Figure 19 Create a new SAN Step 3

13. Enter the password which you setup on the **Open Directory**, then click the **Next** button.

ave administrative priv	ion for the new directory administrator accoun vileges for managing network users and group:	t. This user account will s.
Name:	Directory Administrator	
Account Name:	diradmin	
Password:	•••••	
Verify:	•••••	
	\checkmark Remember this password in my keychain	

Figure 20 Create a new SAN Step 4



14. Save the SAN configuration file by clicking the **Save Configuration Profile** button. It will be used by the **Client** in the future.

	Save As: xsanqsan.mobileconfig
-2 3 34	Where: Documents
	Cancel Save Save
	SAN Name: xsanqsan
Figure 21	Create a new SAN Step 5

15. Next, configure the Xsan volume by clicking the + button.

	Charton				
N	Status:	 Available - Configured clic Learn about configuring device 	ces for this service O	y use volumes made availar	bie by this
	SAN Name:	xsanqsan			
		Save Configuration Profile			
	Volumes:	Volume	Size	Status	
		+ - *			
	Controllers:	Controller	Address	Status	
		macpro.xsan (this Mac)	192.168.173.99	Available	

Figure 22 Create a new SAN Step 6



Client Part

 Check the network setting that can communicate with the MDC in the System Preferences -> Network

Ethernet 2 Consumption Ethernet 2 is currently ac address 192,108,252,188.	Status: tive and has the IP	Connected Ethernet 1 Not Connected	<u></u>	-
Pv4: Using DHCP	\$	• Wi-Fi Off	ŝ	Configure
dress: 192.168.252.168		FireWire	<i>*</i> 6*	IP Ad
Mask: 255.255.128.0		Bluetooth PAN		Subnet
louter: 192.168.128.254		Not Connected	*	F
erver: 192.168.173.99 earch Domains macpro.xsa Assist mo	n Advanced e Revert A	VPN (PPTP)	L2TP)==.: henceded =	DNSS

Figure 26 Network Settings



2. Click the Advanced to set the DNS IP address. Please add it as the same DNS IP address as the MDC.

DNS Servers: Search Domains: 192.168.173.99 macpro.xsan		TCP/IP	DNS	WINS	802.1X	Proxies	Hardware	
192.168.173.99 macpro.xsan	NS Servers:				Sear	ch Domains	:	
	92.168.173	.99			mac	pro.xsan		

Figure 27 Set DSN IP Address

3. Join to the MDC Open Directory. Click the **System Preferences** -> **Users & Groups**, and then click the **Edit** button.



6. Input the Open Directory account and password, then click the OK button

Server:	192.168.173	.99	×
You can e Domain.	nter the addre	ss of an Open Directory Server or Active Directo	ory
Client C	omputer ID:	xsan	
1	User Name:	diradmin	
	Password:	•••••	
This serve and pass	er allows authe word. You may	nticated binding. You may choose to enter a na also leave them blank to bind anonymously.	me
		Cancel OK	
			_

Figure 31 Join to the MDC Open Directory Step 4

7. A Open Directory Server is added.

Local Server Open Directory Server	The status of this server is unknown. This server is not in your authentication search policy.
 192.168.173.99 Open Directory Server 	
+ -	
Open Directory Utility	Done

Figure 32 Join to the MDC Open Directory Step 5

 Copy the SAN configuration file to client which is from the MDC. You can refer to the step 14 of MDC part. Double click to execute it and follow the default setting to install the profile.

	Install "Xsan Configuration Profile"? This device profile will configure your Mac for the following: Xsan Configuration.						
	Show Profile	Cancel Continue					
Figure 33	Install the Xsan Configuration Profil	le Step 1					

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9. Enter the **MDC** server administrator account and password, and then click the **Install** button.

Enter s	settings for "Xsa	an Configuration P	rofile": n Configurat	ion	
A se	rver administrator	username and passy	wor <u>d are required to</u>	ioin SAN "xsanasan	". Use
word:					Pas
			Previo	ous Install	Cancel

Figure 34 Install the Xsan Configuration Profile Step 2

10. Done. There is a Xsan Configuration Profile.

Figure 35 Install the Xsan Configuration Profile Step 3



11. An Xsan volume named vol1 appears on the Client.

	E	vol1		
$\langle \rangle$			Q Search	
Favorites	Name	Date Modified	Size	Kind
All My Files				
🛆 iCloud Dr				
AirDrop				
\land Applicati				
Desktop				
Documents				
Downloads				
Devices				
Macintos				
🗐 vol1				

Figure 36 An Xsan Volume Appears on the Client

Verification

Now we will verify the data integrity in Xsan. We will copy zipped files in Xsan volume simultaneously on both MDC and Client. Next, try to unzip it at the same time to check if the data is affected.

1. Copy a 15GB zipped file to the Xsan volume (vol1) on MDC. Copy another 2.9GB zipped file to the same Xsan volume (vol1) on the Client at the same time.



Copying 27 items to "vol1"		
1.60 GB of 14.18 GB - About 2 minutes	Q Search	
vol1	vol1 -	+
		Favorites () AirDrop () All My Files
2016,01 2.91G.rar		iCloud Drive
		Applications
		Desktop
		Documents

Figure 37 Verification Step 1

2. Wait for the copy process to complete. Then, try to unzip the 15GB zipped file on both MDC and Client at the same time.

		Archive	e Utility				
<>	Expanding "2016,01.zip" Cancel			Q Search			
	2016,01.zi	p			vo	1	+
Favorites							
AirDrop		i					
🗐 All My Files	5	ZIP					
iCloud Driv	е	2016,01.zip	2.91G.rar				
A Application	IS						
	and the second s						
🖻 р	ocuments						
🦳 💽 D	ownloads						
Devices							
(🔘 R	emote Disc						
	ol1						

Figure 38 Verification Step 2



Reference

Apple Xsan

• <u>https://support.apple.com/xsan</u>

XCubeSAN SANOS 4.0 User's Manual

• XCubeSAN SANOS 4.0 User's Manual



Appendix

Related Documents

There are related documents which can be downloaded from the website.

- All XCubeSAN Documents
- XCubeSAN QIG (Quick Installation Guide)
- <u>XCubeSAN Hardware Owner's Manual</u>
- <u>XCubeSAN Configuration Worksheet</u>
- <u>XCubeSAN SANOS 4.0 User's Manual</u>
- <u>Compatibility Matrix</u>
- White Papers
- <u>Application Notes</u>

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Do you have any questions or need help trouble-shooting a problem? Please contact QSAN Support, we will reply to you as soon as possible.

- Via the Web: https://qsan.com/support
- Via Telephone: +886-2-7720-2118 extension 136 (Service hours: 09:30 - 18:00, Monday - Friday, UTC+8)
- Via Skype Chat, Skype ID: qsan.support (Service hours: 09:30 - 02:00, Monday - Friday, UTC+8, Summer time: 09:30 - 01:00)
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