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Shared Storage That's Blazing Fast

Xsan for the Rest of Us

CV Rao

President, Senior Systems Engineer



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Agenda

- ▶ Xsan: Not just for Video Anymore
- ▶ Bits and Pieces of Xsan
- ▶ Xsan Best Practices
- ▶ Real World Case



About

- ▶ Mac I.T. Services since 1991
- ▶ Professional Services, Authorized Training & Certification, Authorized Repair Services, Authorized Reseller
- ▶ Apple Retail Centre in Downtown Houston, Texas
- ▶ SMB, Enterprise, Education, Government

Xsan: Why?

- ▶ **Need for Higher Performance for Shared Storage**
- ▶ **Traditional AFP File Sharing is Less Reliable**
- ▶ **Performance and Network Bottlenecks with Mac mini Servers**
- ▶ **No Support from Adobe for File Servers**

Xsan: Why Now?

- ▶ **Xsan Clients Free with OS X, Xsan Controllers for \$19 with Server.app**
- ▶ **Mac mini's, iMacs, SSD's (high performance at great value)**
- ▶ **Thunderbolt, Promise SanLINK (thunderbolt to fibre channel adapter)**
- ▶ **Bend Insensitive Fiber Cabling for Patch Cables**
- ▶ **Lower Premise Fiber Cabling and Switch Costs**
- ▶ **Lower Gigabit Ethernet Switch and Cabling Costs**

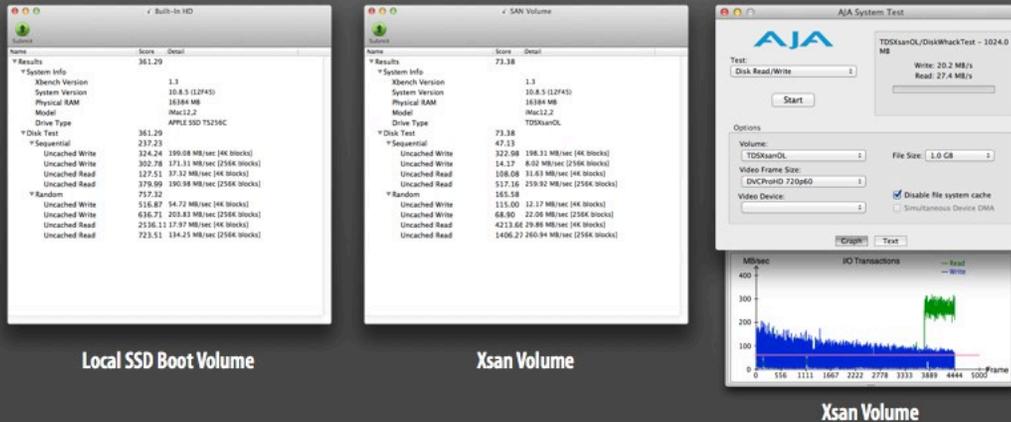
Xsan: Model Case Costs

Base Qty.	Xsan Qty.	Item Description	Base System	Xsan Add-On
10		27" iMac (i7, 16GB, 256GB SSD + 27" Thunderbolt Display)	35,000	
	10	Promise SANLink		8000
1		Promise X30 (32TB, 18TB Usable for Xsan)	15,000	
1	1	Promise SANLink	800	800
1	1	Mac mini Server (i7, 16GB, 256GB SSD)	1,500	1,500
1	1	ZyXEL L2 24-Port Gigabit Ethernet Switch	900	900
1		Q-Logic 5802V (20 Active Ports and SFP's)		10,000
1		Q-Logic 5802V-08A (8 Active Ports and SFP's)		5,200
		Fiber Cabling		3000
Totals			\$53,200	\$29,400
Cost Per User			\$5,320	\$2,940



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Xsan: Benchmarks



Local SSD Boot Volume

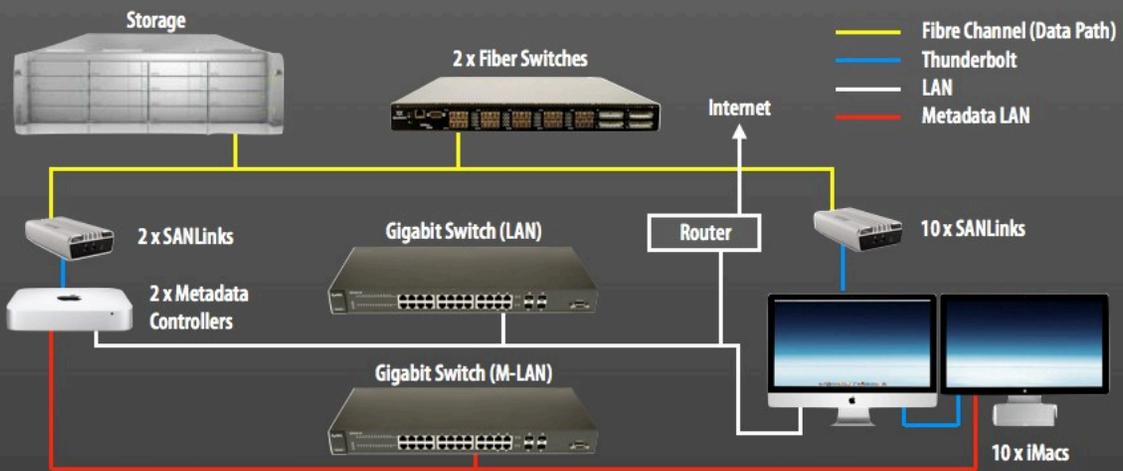
Xsan Volume

Xsan Volume



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Bits and Pieces of Xsan



Bits and Pieces of Xsan

- ▶ **Features & Benefits of SAN**
 - ▶ Shared Storage that Acts like Direct Attached Storage
 - ▶ Permission Management through Directory Services (OD or AD)
 - ▶ Fibre Channel Mesh that's Scalable in Every Direction (Bandwidth, Performance, Redundancy, Storage Capacity, Number of Users)
 - ▶ SAN is Channel based - Not Network Based (Data Path is not IP Encapsulated or AFP Protocolled—Similar to Direct Attached Storage)

Bits and Pieces of Xsan

▶ Storage Considerations

- ▶ Fibre Channel interface w/Lots of Drives
- ▶ Higher Number of Spindles = Greater Throughput
- ▶ Promise X30 or Promise Pegasus + Promise SanLINK are Good Options
- ▶ Easy Source for Apple Supported Products = store.apple.com

Bits and Pieces of Xsan

▶ Fibre Channel for Data Path

- ▶ Auto Scaling, Auto Redundant Mesh
- ▶ 2 x Dual Links to Each Xsan Client and Controller
Performance when all is well
Redundancy when all is not well
- ▶ Copper or Fiber depending on length
(Fibre Channel is not Fiber Cabling)
- ▶ Q-Logic Fibre Channel Switches

Bits and Pieces of Xsan

▶ Gigabit Ethernet for Metadata LAN

- ▶ Dedicated Metadata Network Required
- ▶ Use Primary Ethernet Interface (Gigabit) for Metadata LAN
- ▶ Dedicated Ethernet Switch Required
- ▶ Quality over Complexity Preferred
Layer 1 or 2 Recommended
- ▶ Static IPs for Metadata LAN Recommended



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Bits and Pieces of Xsan

▶ Xsan Metadata Controllers

- ▶ Mac mini Servers with SSD's Work Great!
- ▶ Use Built-In Gigabit Ethernet for Metadata LAN
- ▶ USB to Ethernet Adapter for LAN
- ▶ Promise SanLINK for Fibre Channel
via Thunderbolt
- ▶ Rack Mount with Sonnet RackMac mini



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Bits and Pieces of Xsan

▶ Xsan Client Workstations

- ▶ Quad-Core i7 iMacs with SSD's are Great!
- ▶ Built-In Gigabit Ethernet for Metadata LAN
- ▶ USB to Ethernet Adapter for LAN or Gigabit Ethernet on Secondary Cinema Display for LAN
- ▶ Promise SanLINK for Fibre Channel via Thunderbolt
- ▶ Secure SanLINK to Furniture—Not iMac

Xsan Best Practices

- ▶ Planning & Best Practices = Keys to Success
- ▶ Not Much Tolerance for Sloppiness
- ▶ Quality Components & Installation a Must
Cabling, Connectors, Configuration, Clean
- ▶ It's About the Infrastructure

Xsan Best Practices

▶ Storage

- ▶ Plan for Scaling
Xsan Volumes Expandable Dynamically without Data Migration
- ▶ Data LUNS of Matched Capacity & Performance Required
- ▶ Metadata LUN Required (RAID Mirror is Recommended)
- ▶ Setup Hot Spare Drive & Have a Cold Spare
- ▶ Check and Update Firmware



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Xsan Best Practices

▶ Storage - High Redundancy & Expandability LUN Scheme

HOT SPARE	HOT SPARE	2 x Drives - META DATA (RAID 1)
	4 x Drives DATA (RAID 5)	
	4 x Drives DATA (RAID 5)	
	4 x Drives DATA (RAID 5)	

Controller Chassis

	4 x Drives DATA (RAID 5)	
	4 x Drives DATA (RAID 5)	
	4 x Drives DATA (RAID 5)	
	4 x Drives DATA (RAID 5)	

Expansion Chassis

Promise VTrak: Configuring for optimal performance: <http://support.apple.com/kb/HT1200>



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Xsan Best Practices

▶ Fibre Channel Cabling

- ▶ Apple Copper Cables for In-Rack Patching Recommended
- ▶ Professional Fiber Cabling for Site Recommended
- ▶ Gravity + Time is your Enemy
Secure Cables for Proper Support
- ▶ Patch Panels & Patch Cables Highly Recommended over Patch Cables Alone
Replacing Patch Cable is Better than Reinstalling New Cable

Xsan Best Practices

▶ Fibre Channel Switches

- ▶ Q-Logic Best Supported
- ▶ Pick Fiber Cable to Match Bandwidth and Distance Needs
- ▶ Match SFP's with Fiber Cabling
- ▶ Match SFP's on Both Ends of Fiber Cabling
- ▶ Check and Update Firmware

Xsan Best Practices

▶ Ethernet for Metadata LAN and LAN

- ▶ Separate Switches for M-LAN and LAN
VLANs Not Recommended
- ▶ Switches with Management over Packets NOT recommended for M-LAN
- ▶ CAT 6 Cabling—Installed to Perform at CAT 6 Specs
- ▶ Static IP's for M-LAN, DHCP fine for LAN
- ▶ LAN and then M-LAN in Network Interface Service Order
- ▶ Check and Update Firmware

Xsan Best Practices

▶ Xsan Controllers

- ▶ Two and Two ONLY
- ▶ Designate One as Xsan Admin Station
Configure and Manage from this Controller Only
- ▶ Xsan Admin GUI May Be Out of Sync with Reality
Use CLI Tools to Verify Status and Settings
- ▶ Make Changes One at a Time and
Allow Time for Changes to Take Effect and Settle

Xsan Best Practices

▶ Xsan Clients

- ▶ Clean Installs and/or Master Image Work Best
- ▶ Protect and Secure Fiber Cable in User Area
- ▶ Set Energy Saver to Never Sleep



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Real World Case

▶ Customer Challenge

- ▶ Manufacturer and Distributor of Consumer Products w/Major Customers
- ▶ High Performance and Reliability for In-House Design & Production Department
- ▶ Heavy-Use, Fast-Paced Deadline driven environment
- ▶ Permissions Issues with Adobe CS files over AFP
- ▶ Budget Conscious but Value Driven



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Real World Case

▶ Solution Developed

- ▶ Promise X30 (12 x 2TB for data, 2 x 2TB for metadata, 1 x 2TB for hot spare)
- ▶ Q-Logic 9600 (fiber cabling professionally installed)
- ▶ HP & Netgear Gigabit Ethernet Switches (cat 6 cabling professionally installed)
- ▶ APC Switched Rack PDU AP7900 (browser enabled power management)
- ▶ Promise SANLink (Fibre-Channel to Thunderbolt adapter)
- ▶ Mac mini Xsan Metadata Controllers (Quad i7, 16GB, SSD)
- ▶ iMac + Cinema Display Xsan Workstations (Quad i7, 16GB, SSD)

Real World Case



▶ Storage

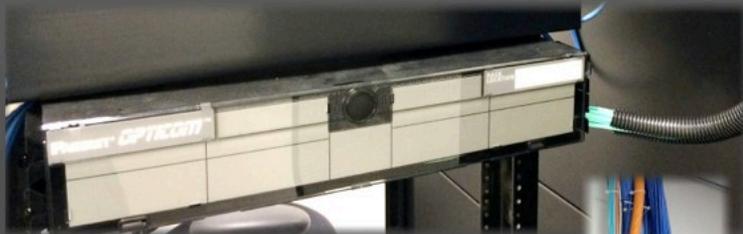
- ▶ Promise X30

Real World Case



- ▶ **Fibre Channel**
- ▶ Q-Logic 9600
- ▶ Anti-Gravity Cable Support

Real World Case



- ▶ **Fibre Channel**
- ▶ Professionally Installed Patch Panel & Termination at Workstations

Real World Case



- ▶ Gigabit Ethernet
 - ▶ ZyXEL (current choice)
 - ▶ HP for LAN (in this case)
 - ▶ Netgear for M-LAN (in this case)

Real World Case



- ▶ Metadata Controllers
 - ▶ Mac mini Servers
 - ▶ Promise SANLinks
- ▶ Sonnet Rackmac mini

Real World Case



- ▶ Workstations
 - ▶ iMac + Cinema Displays
 - ▶ Promise SANLinks
 - ▶ SANLink Attached to Desk

Discussion



- ▶ Xsan: Not just for Video Anymore
- ▶ Bits and Pieces of Xsan
- ▶ Xsan Best Practices
- ▶ Real World Case

- ▶ Apple Training Series: Xsan 2 Administration
Robert Kite
- ▶ www.xsanity.com

cvrao@techonecentre.com
www.TechOneCentre.com



