



## **iSCSI Questionnaire**

**Coming on the heels of the release of last year's SCSI over IP (iSCSI) standard from the Internet Engineering Task Force, 2004 is seeing a modest increase in the number of iSCSI products entering the market. Questions abound over the fit for this protocol and for storage topologies based on it.**

**The following questions are intended to identify your company's view of the market for iSCSI technology.**

### **QUESTION 1**

In its early development years, iSCSI had several prominent champions within the vendor community, including IBM and Cisco Systems. The early position of iSCSI advocates was that it would replace Fibre Channel as an interconnect for building storage area networks. With the delays in standards development, the party line seemed to change: FC would be used to build "core" fabrics, while iSCSI would be used to connect outlying servers to FC fabrics.

What is your position on the technical fit for the burgeoning technology?

Zoph—That depends on the definition of "core" fabric. If I'm an SME I may not have a SAN and the vast majority of my servers are DAS or internal disk running 1500 IOPs/ 5MBs. I would never buy an FC SAN as my core fabric. I can build an IP SAN with 20 servers on a subnet and have a workable solution. This supports my whole notion on "peasant revolt" In addition security and failover over services are natural benefits of IP networks anyway and users understand them – so why would I look at FC if I'm SME?

The reverse is true for servers chomping 40-60 MBs and driving 10k-15k IOPs – I would not recommend an iSCSI SAN until we start delivering 10GBs...

### **QUESTION 2**

As an IP-based protocol, iSCSI is limited in terms of speeds to available bandwidth less overhead, which is generally interpreted to mean that the

technology is capable of delivering roughly 75 percent of the rated speed of the TCP/IP network pipe in Mb/s or Gb/s. FC advocates have leveraged this as a major differentiator between FCP and iSCSI solutions.

How meaningful is this speed difference today? How meaningful will it be next year with the introduction of 10 GB/s IP nets?

Zoph-You know I can build an IP-SAN on 1GB Ethernet that will choke an FC PIPE because I'll aggregate IP Links into our product and funnel it to one FC storage system. We'll overload the FC storage system... The point in my mind is not so much "can I make IP go fast" but what is best for the customers. If they have a data center with 6 unix servers running at 60MBs each – probably be better served with an FC SAN ---If they have a data center with 40 MS or LX servers running 5-10 MBs...I would do an IP SAN

### **QUESTION 3**

Related to the above, how important is interconnect speed to applications? Haven't we made do with much slower storage interconnects in the recent past?

Zoph-this is my personal favorite.... We have this one customer with over 100 servers that thought they needed an FC SAN but could not afford it ....I told them to run a log file for a couple days on their server and let me look at the logs...We got the logs and thought originally that the machine was not running at all...we didn't even see 1MBs against the disk systems. We ran it again and the same result...I sat the customer down and told him that he could run his entire server farm very safely on qty 2, GB subnets with plenty of room to spare. On average – most servers drive about 5-7MBs and are very "bursty"...Remember that applications and OS's HATE disk IO because everything gets "dumb" while an IO is hanging on the page in memory.. so all apps and OS's make sure they limit disk IO – so they limit IP SAN I/O . Another example is UoM with 20 thousand email, VM, Fax clients on an IP SAN using 6 MS servers....NO TOEs and hardly any stress on the systems. So do they need 1GB or do they need 2GB.

Also iSCSI / GB can drive at 70MBs and FC drives at 140GB- per server if you are using any old non-blocking switch...The number of servers running at those speeds in the world is less than 5%- not exactly a TAM I'd want....ALSO last time I checked – the bottleneck in ANY SAN – IP or FC is the Storage not the network—Ping someone in China sometime and see how long a round trip takes over the internet....Than go load a file and time that...I think you'll find the numbers "interesting...."

### **QUESTION 4**

Both FC fabrics and iSCSI SANs utilize IP-based applications for management. In the case of iSCSI, management (or control path) is handled in the same network pipe as data and SCSI command traffic. In FCP, the control path and data path use different wires.

From the standpoint of scaling, simplified infrastructure, and design elegance, iSCSI would seem to have the advantage over Fibre Channel's "dual network" design. What do you think?

Zoph- I think you just gave me another sales tool.... :-0

## **QUESTION 5**

Both iSCSI and Fibre Channel use a serialization of SCSI, a channel protocol for storage I/O. The key technical difference is the transport used by each interconnect (TCP for iSCSI, FCP for FC fabrics).

If the two are more similar than dissimilar, why should a company field separate channel interconnect rather than use existing investments in networks to interconnect storage and servers?

Zoph-You would not – unless you plan to plead insanity. We find that customers who use FC want to continue to deploy FC and the same is true for folks that know IP –But when IP is explained to an FC person they get the common sense behind it (why because they understand networks- most SAN professional also understand IP networks) but if you explain FC to someone who understands IP- they ask WHY bother?- that is why the FC community should not look at IP as a pricing issue – it's a common sense issue for users who don't do FC today. On the other hand the IP community and the FC community shouldn't go around down playing each other. I have a deep respect for the IT person that wakes up in the morning to do their job – explain the facts and let them decide what's best. In the end – it's super speed vs. simplicity and flexibility....When IP goes 10GB – FC better have another value proposition.....

## **QUESTION 6**

FC SANs are increasingly seen behind NAS heads, which are said to act as gateways to SANs and provide hosting for SAN management utilities.

Taking this design choice to the next level, what is your opinion about using NAS gateways to support both NFS/CIFS and iSCSI on the front end in order to aggregate storage traffic?

Zoph...If you have it – do it. I'm not so sure folks will need NAS as much once as they do now once iSCSI takes off....My real feeling is build an iSCSI SAN and if you need NAS use a NAS head and backend the storage with an IP SAN. That way you can use the pure block power of a SAN without sharing CPU cycles with a CPU hungry NAS head. Stick the NAS off in a corner and use the iSCSI SAN for everything and use the NAS just for those client services that must have them.....NAS is slow and not really easy to scale AND wait until you're doing DR

from the IP Network layer – If you can do DR from the network layer – why would you think you can do it better from the NAS head????

## QUESTION 7

iSCSI standards do not seem to have been “held hostage” to proprietary vendor interests the way that FCP standards have been at ANSI (it is an established fact that vendors can develop FC switches that fully comply with ANSI standards, yet fail to be compatible with one another).

From the consumer’s perspective, do you feel it’s smarter to go with iSCSI-based technologies because of product interoperability?

Zoph...You bet.... You know we run on MS, Linux, Solaris, HP-UX, AIX- with MAC OSX in the wings....Every iSCSI vendor worth their salt should....We support practically any disk system on the planet...all popular FC switches and all Ethernet gear including IPSEC gateways – heck we even do data encryption with Decru. It all just worked--- Not all iSCSI vendors are that way – they want to sell you their disk systems or their agents- that’s not really “OPEN” but all is fair. Our position is the pure IP SAN play – your host, your network, your storage – we’ll glue it together for you....

## QUESTION 8

At one point, vendors touted iSCSI as the foundational technology for building “SANs for the rest of us” – that is, companies that are not necessarily Fortune 500 status.

Do you embrace this view? And if so:

- What do “the rest of us” require a SAN for? What is the killer application for iSCSI SANs?—
- - zoph-Simple – Unbounded storage sharing for ANY app, Any OS, anywhere.....
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- What is the advantage of iSCSI over burgeoning protocols for large-scale device interconnection like Serial Attached SCSI (SAS), which, with expanders, offers connectivity for up to 16,000 nodes?
- - zoph-iSCSI - It’s here, it’s done, it’s routable, it’s free on the host and people have the gear and know-how – why bother with other stuff unless it solves a problem in a much easier, better and cheaper way....

- With burgeoning drive capacity improvements, already at 200 GB for SATA and SCSI, can arrays be built with adequate capacity to meet the needs of SMBs without resorting to SANs?
- Zoph-But SANs are not about Cheap Storage – it's about sharing fast reliable storage. It's about being able to replace a server without having to mess with the data, it's about backup, it's about high availability, it's about adding capacity on the fly, it's about ILM - Every try to cluster servers without a SAN or do remote replication without the host.
- With removable/exchangeable disk/tape hybrids, such as Spectra Logic's RXT platforms, can SMBs achieve capacity scaling requirements without deploying SANs at all?

Zoph- See my last answer- by the way I'm not say NO-ONE will buy them- I'm saying why would they...?

## QUESTION 9

What has happened to TCP Offload Engine (TOE) technology, once touted as a prerequisite for iSCSI SANs? Was it simply hype intended to keep Host Bus Adapter vendors from losing market share to vendors of simple NIC cards in an iSCSI world? Or, has TOE development proved more daunting than originally thought? Why aren't we hearing more about TOE?

Zoph- it's too soon – as IP-SAN continue to deploy they'll hit more heavy IO aps. Other features like diskless boot with also drive TOE sales

## QUESTION 10

FC fabric advocates claim that FC fabrics are more secure than iSCSI SANs. What do you think?

- How is an FC fabric any more secure than an IP-based iSCSI SAN if it uses an out-of-band, IP-based, connection for fabric management?

Zoph-You're right – but the FC community thinks IP SAN's are built over public networks – New word VPN- second new word- air gap...Same Diff...

- How can FC advocates justify the claim that FCP remains a mystery to hackers, but also argue that the protocol is becoming more familiar and less of a training hurdle for customers?

- Why have no FC switch vendors implemented the FCP security standards from ANSI in their products?

Zoph – don't know – perhaps it's the same reason iSCSI vendors are not all over IPSEC – it's not needed in the target environments. AND for the few that need it, there are work arounds...

### **QUESTION 11**

Microsoft's iSCSI initiator seems to be winning mindshare among vendors (Cisco recently opted to use the Microsoft initiator in place of its own in Windows shops).

Do you support the Microsoft iSCSI initiator with your products? Does a target device also need to utilize Microsoft target definitions to work with a Microsoft initiator? (Microsoft says it does, some target vendors say it doesn't.)

Zoph- we do and we're proud of it. Microsoft has done more for iSCSI than any other vendor and we think they have done a great job. They have been really great to work with and why not support what they are doing. If you don't, one day they will use some of those features and suddenly your SAN dies...Customers in SME make their decisions based on what the OS vendor approves...to buck MS is not a good thing for your customer. Vendors have an obligation to make sure their customers are interoperable 100% with the OS. I doubt those "nah say vendors" mention that little bit of info to their customers.

### **QUESTION 12**

Some vendors seem to be suggesting that Fibre Channel is superior to iSCSI because of its end-to-end support of "native Fibre Channel drives."

Is there such a thing as a "native Fibre Channel drive" or are we really talking about SCSI drives with integral Fibre Channel to SCSI bridges in the electronics of the controller or disk?

Zoph- not sure....good question....but who cares.....

### **QUESTION 13**

Fibre Channel fabrics do not seem to respond to Metcalfe's Law of networks, which states that the value of a network should increase and cost per node should decrease as more nodes are deployed. Fibre Channel fabrics seem, in fact, to become more difficult to manage as they scale (in many cases eliminating many of the value gains promised by vendors) and, in general, remain the most expensive platform for data storage. FC fabric per port costs have been extremely slow to decline.

By contrast, per port costs of GigE switches and GigE NICs have fallen dramatically in only a two to three year time frame. 10GbE is expected to follow this pattern as well.

From a cost standpoint, does iSCSI have a better story to tell than Fibre Channel to price-sensitive consumers?

Zoph- I think it does if the customer is price sensitive – IP has the proof points...

#### **QUESTION 14**

The industry has given mixed messages about the fit for iSCSI: Is it a data center technology because that is where the big switches are located, or is it an “edge technology” because workgroups and departments do not require the speeds and feeds of data centers? What is your take?

Zoph -In my book- if you have a data center and a bunch of high-end unix boxes – go FC. If you have a bunch of average servers – go iSCSI. Right now few Data Centers use iSCSI but it is getting into the Enterprise companies but with applications that are less performance driven...It's not Data Center VS Department – it's number of servers and average server speeds.

#### **QUESTION 15**

With Simple Network Management Protocol (SNMP), Dynamic Host Communications Protocol (DHCP), and other established protocols in the IP world, it would seem that iSCSI will hit the ground running with services that were missing altogether from FCP. Is this an advantage in your opinion?

Zoph – If I'm worried about hacker - they'll hack or spoof the server before they even think about tapping the line...I see SAN wire hacking as a pretty remote issue-- Besides it's iSCSI or SCSI inside IP – ever look at an SCSI command – it looks like alphabet soup....either way it seems like a funny comment coming from FC (Every hear of a rouge server- that's a server on the FC fabric without VM agents-....)

#### **QUESTION 16**

Some vendors are “dumbing down” their Fibre Channel products to facilitate their deployment in SMBs. Is this your strategy and what do you see as the benefits and drawbacks of such an effort?

Great – We're “smartening up” the IP SANs. The value to IP is simple and cost effective – but the intelligence at the network layer is what people really dig...

#### **QUESTION 17**

Does iSCSI offer anything that FC fabrics do not to facilitate storage virtualization?

Zoph- Sure – ever try to route FC--- not easy...You can route IP at near wire speeds..We use this technique when we virtualize from the NW layer...Now you're starting to see how DR gets done from the network layer...Just to be clear – we virtualize at the block level....

## **QUESTION 18**

Describe the products that your company is developing that support iSCSI.

We are shipping these product since 2003.

SANRAD leads in IP/ iSCSI Storage Networking, enabling hundreds of organizations worldwide to effectively access, share and manage storage across Ethernet environments. SANRAD V-Switch™ products are network-centric storage management and virtualization solutions. They include the V-Switch and StoragePro onboard management software. The V-Switch family operates in the data-path of a storage network. V-Switches provide a single, easy-to-use storage connection and management platform which includes volume mgt., FC and SCSI protocol conversion, security, high-availability and DR.

The V-Switch supports the iSCSI storage protocol providing networked hosts with secure access to logical volumes residing across FC, iSCSI or SCSI storage systems. The V-Switch management and virtualization features gather all physical storage resources (SCSI, iSCSI and FC) into a single pool. From these pooled resources, network administrators can define new logical volumes that are independent of physical barriers such as enclosures, physical disks, protocols, or distance and define secure user access for each individual volume. The V-Switch provides multiple storage and host network ports and performs block level storage routing. Features include volume mirroring, striping, intraSAN synchronous mirroring, volume concatenation and precise LUN carving. The V-Switch ensures multi-pathing, failover and high-availability. Future features include remote replication and DR over IP.

SANRAD has relationships with key technology providers within the segment, including Microsoft, Intel, Novell, Qlogic, Adaptec, Alacritech, Agilent and Emulex.

### **SANRAD Product Configuration:**

SANRAD's V-Switch model 2000 and 3000 fully configured include StoragePro virtualization and failover packages. They provide protocol bridging, LUN mapping, volume management, virtualization, secure access control, high availability, clustering and a browser based management GUI.

## **QUESTION 19**

Compare key pricing and capability differences for your iSCSI solutions versus comparable FC solutions.

Zoph--



The following chart compares the overall costs of connecting FC servers and the license fees associated with host agents to enable volume management vs. the cost of delivering volume management from a central gateway that is host independent and does not require host agents.

Cost of Connecting a Server/Client to the SAN			Cost of Adding Multiple Servers and Clients with Volume Management					
Description	Fibre Channel	iSCSI	No. of Fibre-channel Servers - Charged per User / CPU Assumes \$2000 per			No of iSCSI / Ethernet Servers Flat Network Centric Charge Assumes Flat Fees		
Single Path- Standard Speed Application								
Driver Only - <15 MBs- (FC Needs 1 HBA)	\$750	\$0						
Standard Switch Port	\$750	\$50	5	10	20	5	10	20
Volume Management			\$10,000	\$20,000	\$40,000	\$5,000	\$10,000	\$10,000
Total	\$1,500	\$50	\$17,500	\$35,000	\$70,000	\$5,250	\$10,500	\$11,000
Multi Path- Standard Speed Application								
Driver Only - <15 MBs- (FC Needs 2 HBAs)	\$1,500	\$0						
Standard Switch Port (2X)	\$1,500	\$100	5	10	20	5	10	20
Volume Management			\$10,000	\$20,000	\$40,000	\$10,000	\$20,000	\$20,000
Total	\$3,000	\$100	\$25,000	\$50,000	\$100,000	\$10,500	\$21,000	\$22,000

## QUESTION 20

Does iSCSI contribute to data protection in a networked storage world? If so, what?

Zoph--

Remote Backup is now something any company can do with TCP/IP over the Ethernet. Because iSCSI is block based – it is compatible with any backup software and thus you can backup from California to Florida over the internet if you wanted....

With SANRAD IP-SANs you get SNAPshot so you don't need a backup window any longer, you get data mirroring to replicate data between different storage systems – and you get active/active multi-pathing and failover.