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IBM's iSCSI Leadership Initiative - How To Grow A Market In A Maelstrom

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Management Summary

Storage networking is confusing on many levels, and some may think this maelstrom has gotten even worse with the addition of iSCSI. Isn't it enough that you have platform limitations or heterogeneity, either of which creates complications? Then there are a variety of storage media, from disk arrays to removable media, which must be considered. You have to deal with the geography of Web deployment. You have many component alternatives and architectures to build with, including switches, hubs and/or routers, appliances, gateways, fabric loops, meshes and fan-outs, and server host bus adapters and controller enhancements. We've discusses SAN versus NAS before[1], with its Fibre Channel and IP alternatives, but now there are even more protocols to consider. There is iSCSI (the topic of this issue), Infiniband (a future topic), and a host of other emerging protocols, which are lined up like planes circling an airport waiting to land. Why the vendors are pushing more protocols? Let's look at IBM's recent actions to find out why, and how.

These days, IBM's philosophy is to cover all of the bases, be they heterogeneous servers supporting all of the major operating systems (not new) or many of the ways of connecting storage (they have recently added NAS and iSCSI storage products). IBM's goal is to provide a full product and service line of what their customers will need, no matter which alternatives they choose. And while it may seem that IBM's storage product line is replete, particularly lately, IBM sees an emerging market opportunity with iSCSI. iSCSI is a protocol for sending SCSI commands, used for block-level access to data in storage, over IP instead of a Fibre Channel or traditional SCSI direct connection. Certain important applications require, and most are best optimized by, block-level access to data in storage. SCSI does this, but has distance limitations, which the use of iSCSI removes. NAS cannot do block access because it accesses disks at the file level. (NAS, which is optimized for file serving and data sharing, does not compete directly with iSCSI-networked storage where the two co-exist. Eventually the two technologies may converge.) **iSCSI can satisfy the needs of NAS customers for block-level access without requiring deployment of a Fibre Channel network.** Many mid-sized enterprises have postponed implementing a Fibre Channel SAN, for reasons of cost, complexity, or risk of failure. They need reassurance that an iSCSI solution offers real benefits, will become prevalent, and will be easy.

To fulfill those customer needs, IBM has set out to carve a path for iSCSI through the confusion surrounding storage networking. This path must not only instill confidence in customers; it must also provide IBM with a revenue stream robust enough to allow volume production and thus reasonable price points, for iSCSI is targeted as a value proposition. IBM has chosen to present a sincere and ongoing story of development instead of a tightly spun marketing blitz, taking care to gather support, not squander opportunities. Their comprehensive and pragmatic approach is another instance of covering the bases. Read on to see the steps that IBM has taken to bring this new technology to market.

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1 See *SAN versus NAS — The Holy War Not Worth Fighting* in The Clipper Group Explorer dated September 27, 2000, at www.clipper.com.

Seven Steps To Growing A Market In A Maelstrom

So how do you go about winning customers for a new technology? The applications best optimized by block level access are the transaction processing and database applications, which typically are most critical to the enterprise's existence. Customers always have several easy reasons to decide against a new technology for these applications. To overcome this, you must provide a compelling, multi-faceted rationale. IBM took several steps to succeed with iSCSI.

1. Put Articulation Before Hype

IBM feels iSCSI is complementary to its Fibre Channel products because together, in the market of block-level data access, they fill out the spectrums of affordability (FC for the high end, iSCSI below) and ease of use (iSCSI is easy to deploy, FC less so). As Paul Mattson, Business Line Manager of IP Storage in IBM's Storage Networking Division, put it, "We really think both Fibre Channel and IP will continue to dominate the transport of data … and both will be in IBM's portfolio for as long as the eye can see." IBM sees iSCSI as allowing many customers to leverage their present skills and vocabulary. **IBM sees its iSCSI offering as addressing the needs of the mid-market, a constituency whose needs have traditionally fallen between very expensive high-end solutions and solutions that are inadequately "lite".**

The industry is approaching iSCSI with two kinds of products. One is an iSCSI appliance, like the IBM *200i*, which is targeted at customers who have not previously implemented SANs. The other is a gateway to connect Fibre Channel SANs to iSCSI clients, targeted at customers with FC SANs who need the long distance capabilities of IP. Expect more iSCSI announcements by the end of the year.

IBM lends additional depth to its iSCSI initiative by describing its history – from the start at its research facilities several years ago, to the proposal of the iSCSI protocol to the IETF in February of 2000 by IBM and Cisco, to the launch of two iSCSI appliances in February of 2001 and the initiation of beta trials in March. The integration with Tivoli Storage Manager for backup and other management functionalities was announced at the end of June. Now IBM's iSCSI appliances are at beta's end, and IBM is sharing what they and customers have learned to build familiarity with the concept in a large audience.

IBM's *TotalStorage IP Storage 200i*

The *IP Storage 200i* is an appliance that provides a pooled-storage solution for small- to medium-sized organizations with multiple, likely heterogeneous, servers.

There are three models of the *IP Storage 200i*, the Model 100, 200 and EXP (expansion unit). Storage capacities range from 108 GB up to 1.74 TB. All three models use 36.4GB hard disk drives, RAID, and one or two 800 MHz *Pentium III* processors.

Preloaded microcode provides an operating environment designed for block I/O storage and includes a browser interface for straightforward configuration and management.

Software initiators, which wrap SCSI commands for transport over IP, are downloadable from IBM at no charge and support *Windows NT*, *Windows 2000* and *Linux*.

Suggested retail prices range from under $20,000 to just over $100,000.

2. Consider What Partners You Have And What Partners You Will Need

IBM's strategic partner Cisco will be a key factor in IBM's iSCSI plans. IBM is also partnering for storage management capabilities with Tivoli. It may partner externally for additional management capabilities. As the hardware falls into place, IBM is also seeking application software partnerships, looking for SMB[2] applications, both horizontal and industry-specific, which are often deployed across multiple servers.

[2] Small and medium business, typically with 100 or more employees.

They are looking as well for database-centric applications that benefit from block access capabilities, and applications that have a high peak-to-average (i.e., unpredictable) storage consumption demand. These are the applications that need what iSCSI can provide.

3. Jump-Start Community Formation On Multiple Fronts

Participate In Plugfests[3]

While many of these plugfest vendors will be future iSCSI competition, for now they are colleagues. IBM's participation in the plugfest recently sponsored by the University of New Hampshire, SNIA, and the IP Storage Forum brought it in contact with 30 companies who were in various stages of developing iSCSI products. The plugfest allowed a lot of companies to test out their products in a closed-door, supportive environment. It is reassuring to a potential customer that these folks are attacking interoperability problems early, building consensus and forming a development community. Mattson said all participants are acutely aware of the need for interoperability in order to grow an IP SAN market.

Craft Your Beta Strategy Carefully And Leverage The Beta Trials

Share what you have learned from beta test sites (including negatives that you have a firm plan for overcoming) in more than phrase-long sound bites. IBM was frank about discussing the performance variations that turned up in their beta tests and that throughput was occasionally less than optimal. Of course they stressed their beta customers' overall satisfaction. IBM also addressed iSCSI's server performance impairment, and proposed the remedy of off-loading the TCP/IP stack processing from the server onto a host bus adapter, a method that has been used for other communications and graphics accelerants.

Develop Certification Procedures

In emerging markets, particularly where arcane protocols are involved, such assessments clarify the landscape and benefit all who participate. The first software product to be certified with IBM's iSCSI solution is Tivoli Storage Manager, and they were quick to articulate how Tivoli *SANergy* could give file access capabilities to their iSCSI products. More certifications will follow.

Leverage Your Existing Channels And Assets

IBM will use some of its business partner-owned TotalStorage Solution Centers to provide local demonstration space for its iSCSI solutions, and will also extend the global reach of these solutions through IGS support and integration services. IBM will use its direct sales force to sell its iSCSI solutions into enterprises for pilot and departmental use. It will not, at this time, sell its iSCSI solutions over the Web. Having a robust and diverse channel structure is a great asset.

4. Select A Specific Target Market

IBM has targeted departmental, group and branch installations, as well as the mid-market tier and service providers who serve that mid-market. They are not looking to sell iSCSI into their existing data center customer base – though their existing customers might choose to implement iSCSI in branch offices for particular needy applications. **IBM is looking more specifically for customers, Mattson says, "whose storage requirements were complex enough that iSCSI was clearly useful but not so complex that Fibre Channel was clearly better."** Two academic beta sites cited, Luther College and Cornell University's Weill Medical College, had eclectic applications ranging from administrative systems to academic research needs.

5. Be First (Or Early) To Market With An Workable Solution, Priced Low

IBM came to market with an English-only implementation of the *200i* in order to get to market, and particularly to get the product into beta trials, as soon as possible. Partial solutions brought prematurely to market

[3] Testing among vendors, in a collegial environment.

just gather dust and obsolesce. Because of their extensive product lines, IBM's implementation includes initiator device drivers for Gigabit Ethernet Network Interface Cards (NICs), in addition to the *200i* iSCSI appliance, and is a complete solution. IBM has also demonstrated interoperability with Intel and Adaptec HBA[4] technology, neither of which has been fully launched.

6. Have A Clear Plan Of What Will Be Enhanced In The Next Revision

In the case of IBM's iSCSI solution, the conditions of the IETF's[5] acceptance of the iSCSI specifications will determine which capabilities will be added in the next revision of IBM's iSCSI products. There will be developments in the area of security. The next revision will also feature more automation of device discovery and configuration. There will be support for more languages. The initiators, presently available for Intel Windows 2000 and Linux, will be expanded and qualified with more storage targets. Presumably, partnerships with application vendors will spawn more specific solutions.

7. Have A Clearly Articulated Longer-Term Technology Roadmap

There is always a concern about technology stalling. It is better to address it specifically. IBM feels that iSCSI will continue to be a compelling proposition for a long time to come because server processors will continue to get faster and 10 gigabit Ethernet will become available during 2002. In the longer term, **once TCP/IP stack accelerators are developed in HBA hardware (probably starting 1Q 2002) and initiators are developed on platforms beyond Windows, Intel and Linux, a convergence of file (NAS) and block (SAN) capabilities will allow administrators to manage data access not by the network path but by the application need.**

Conclusion

The early days of an emerging market are a wonderful and terrifying place to be. There is the emotional gratification of doing something new and of community building. There is the complexity of introducing something that may disturb existing markets of value in the process of developing its own niche. There is the sharp tang of a ticking clock, and of financial risk. **To be a market maker, you must be able to marry all these things into a palatable direction and an adequate velocity. IBM has done this in its promotion of iSCSI.**

[4] Host Bus Adapter (in this case, a storage interface card).

[5] Internet Engineering Task Force, an open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet.

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