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Navigating Information Technology Horizons[SM]

Dot Hill's High-Performance Storage Solution — *RIO Xtreme*

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Management Summary

As we advance into the first decade of the 21st Century, the thirst for more and more information and the desire for ever-increasing stores of knowledge have become pervasive across all industries and all enterprise tiers. Enterprises are continually trying to improve their customer relationships, often by creating data warehouses that can be mined for cyclical trends, and identifying economic stimulators in order to respond better to changes in the business environment. In addition, publicly held enterprises have to ensure that they are compliant with all of the new financial regulations that have been put into effect, or shortly will become mandatory for these enterprises. Laws, such as Sarbanes-Oxley, require that these businesses retain all of their financial data, including email records and messages, which have proven useful in prosecuting those complicit in the Enron and Martha Stewart controversies.

As CIOs continue to seek to retain more information, Information Technology (IT) departments across the enterprise world are struggling with the dynamic growth of the enterprise storage base. They need to ensure that the arrays and devices installed are modular in scope in order to protect the investment that IT departments are making to solve the problems of today while preparing for the solutions that will be required tomorrow. **Nowhere is this more prevalent than in industries where the CIO is dealing with requirements for high-performance data transmissions while the CFO is insisting on low acquisition cost to avoid hurting the bottom lin**e. Many of these businesses fall into a tier that we call *MSE*, or mid-sized enterprise. Examples of enterprises demanding high performance and modular growth can be found in entertainment (video/media), broadcasting, oil and gas exploration, and life sciences where you find an assortment of applications simply ravenous for the collection or transmission of high volume data.

A large number of IT vendors have responded to this growing need, in support of these enterprises, with newer, more flexible storage devices. One of these companies is Dot Hill Systems Corp., founded in 1999. Based upon technology obtained in the February 2004, acquisition of Chaparral Network Storage, this quarter Dot Hill began shipping the *RIO Xtreme Storage* Solution, a high-performance integrated controller and array combination. In order to determine whether the RIO Xtreme can provide your enterprise with the performance capability it needs, please read on.

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Enterprise Storage Requirements

Have your storage requirements experienced significant growth over the past few years? Have your personnel been complaining about the response times for interactive transactions? Is your CFO displeased with the forecasted storage costs? If not, you may proceed to the next item on your action item list and ignore the remainder of this bulletin. If your enterprise, however, has contributed to the recent spike in the installed storage base of $12B, and your enterprise continues to exhibit the characteristics that demand even more growth in the years to come, then this bulletin may help your CIO save money on planned storage purchases. Many enterprises fall into a category referred to as SMB, for small and medium sized businesses. This could define a company as small as ten employees or as large as one thousand. It could refer to an enterprise with three servers and a single data center, or one with ten to twenty servers and multiple processing centers. As this definition tends to become too broad for an analytical assessment of requirements, The Clipper Group prefers to sub-divide it, with the larger businesses referred to as *MSEs,* or mid-sized enterprises[1]. Using installed storage as a metric, MSEs typically have 5-10 TBs of storage in their enterprise data center(s). The MSE is looking for a storage solution that starts at under $50,000.

In addition to the standard factors of increasing company growth, expanded customer lists, and increased vendor relationships, one of the most significant factors leading to the increase of storage is the requirement to be compliant with all of the new government mandates. For many enterprises, the data center must retain all communications dealing with financial matters in order to protect management from legal action. This includes official documents, such as balance sheets and income statements, and all of the supporting documentation, including email and instant

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[1] See *The Clipper Group Captain's Log* dated December 14, 2004, entitled *Why "SMB" is a Meaningless Acronym - Trying to Define the "Middle"* and available at http://www.clipper.com/research/TCG2004096.pdf.

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Exhibit 1 — Rio Xtreme's Storage Features

- High Performance
- Manageability
- Flexibility in connectivity
- Heterogeneous platform support

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messages.

The growth of centralized storage within an MSE has led to the implementation of storage area networks (SANs) to manage the expansion of data center resident servers and storage devices within these enterprises. The demand for storage and storage applications is widespread, with use in production environments as diverse as mission-critical applications, development, and archiving. With the continuing reduction in the cost of disk devices and the introduction of new technologies such as blades and SATA drives, more data centers are using a disk-to-disk backup strategy for faster performance and immediate recovery capabilities, creating even greater capacity requirements. In these implementations, tape is often relegated to long-term backups and archiving.

There is always a common set of storage features, however, that must be intrinsic to every SAN, before a client would consider acquisition of a new RAID array. High performance often leads that list. (See Exhibit 1 for a more complete list of the most desired storage features.) Although not a feature, low price is the most common characteristic that will be added to this list in any product evaluation. In this bulletin, we will look at the *RIO Xtreme Storage Solution* from Dot Hill Systems Corp.

Who is Dot Hill?

Dot Hill Systems Corp. is a publicly held company with 2003 revenue of almost $200M. It was founded in 1999 in Carlsbad, CA, through the merger of two players in the data storage innovation arena, Artecon and Box Hill, giving Dot Hill 20 years of expertise in designing and implementing

storage solutions. Although not always included in the short list by enterprises evaluating new products, Dot Hill has a commendable track record in developing reliable storage networking solutions, especially as a leader in scalable, rugged, highly-available solutions for mission-critical applications, where downtime is not an option. Since 2002, they have distributed their storage products mainly indirectly through OEM partners such as StorageTek and Sun. Dot Hill's *SANnet II* storage products are independently certified to the rugged telecommunications industry standard known as *NEBS Level 3*. The SANnet II is also certified for the rigorous military specifications required by the Department of Defense.

With 250 employees and an impressive reseller partner list, Dot Hill has been distributing storage products beneath the horizon through partner solutions such as Sun's *StorEdge3000 Series*. Dot Hill is now offering the SANnet II SATA systems in channel-friendly bundles where high capacity is paramount, while the RIO Xtreme is offered as an a la carte solution by resellers for end-users with higher performance requirements.[2]

The RIO Xtreme Storage Solution

Chaparral's technology allowed Dot Hill to introduce RIO Xtreme as a self-contained mid-range FC solution. It gives Dot Hill increased flexibility to be responsive to specific customer requirements and reduces the time necessary to bring a storage product to market. This technology also provides Dot Hill with the product set necessary to provide growth to SANnet II and to compete with EMC's *CX* arrays, among others.

RIO Xtreme is a storage solution with a modular design. It consists of a high bandwidth controller or storage processor with excellent price/performance in an active-active[3] architecture. Dot Hill's solu-

tion is available at up to half of the price of its competitors. It is very flexible, with four or eight integrated Fibre Channel host ports, depending upon configuration, eliminating the need for an external Fibre Channel switch in mid-sized installations. RIO Xtreme is capable of driving up to 1500 MB/second per system, with 1 GB of cache per controller that can be mirrored for fault tolerance or used independently for high-performance transactions.

The RIO Xtreme disk enclosure, based on the SANnet II FC, provides the actual disk storage. The SANnet II is a proven architecture with a modular design and a Fibre Channel interface. Up to 16 RIO Xtreme enclosures, with 12 drives in each, can be installed on a single controller, for up to 192 devices, with up to 28 TB of capacity, using 146 GB Fibre Channel drives. 36 and 73GB drives may also be installed. Higher capacity drives are planned. With all components in the environment hot swappable, the RIO Xtreme is a fault tolerant system. The RIO Xtreme solution is easy to control with a web-based management and monitoring capability.

RIO Xtreme is available in two basic configurations:

- The *RIO Xtreme C4200* – A cost-controlled implementation with four Fibre Channel host connections and four back-end Fibre Channel enclosure connections to support 14 TB of data; and

- The *RIO Xtreme C4400* – A high-performance implementation with full bandwidth for applications that require maximum throughput. This model comes with eight Fibre Channel host ports and eight back-end Fibre Channel enclosure connections for up to 16 SANnet II arrays and up to 28 TB of data.

How do these configurations do in terms of meeting the MSE's storage market requirements regarding key features? The answer is *quite well*. In fact, the RIO Xtreme meets or exceeds all industry standards

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[2] In order to increase solution flexibility and modularity, Dot Hill acquired Chaparral in February 2004 and proceeded to introduce the RIO Xtreme Storage Solution, which is based on Chaparral's controller.

[3] *Active-Active* refers to the presence of dual controllers that can operate in parallel (thus doubling the potential

throughput), but can also continue to operate if one of the controllers becomes unavailable.

Exhibit 2 — RIO Xtreme Features

- **Performance** – Very high, wire speed sequential bandwidth. Able to support multiple concurrent video streams and simultaneous multi-seat editing of the same rich media data set;

- **Manageability** – RIO Xtreme may be installed, managed, and monitored from an intuitive web interface, with the management experience identical across all O/S platforms;

- **Connectivity** – RIO Xtreme may be deployed as direct attached storage, using up to eight ports to create a switch-less SAN, or add switches to create a larger SAN.

- **O/S Support** – RIO Xtreme provides heterogeneous support for Aix, HP-UX, Linux, Mac, Solaris, Windows, and other popular operating systems;

- **Support** – RIO Xtreme provides enterprise-class software support comparable to competitive products to insure constant availability across the storage network.

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regarding performance and storage server capabilities. (See Exhibit 2, above.)

These features, in which the RIO Xtreme excels, make these products ideal for industries that require high-bandwidth and superior price/performance such as entertainment and broadcasting which place a special emphasis on multi-user video production. RIO Xtreme is also popular for oil and gas exploration, life sciences, and, especially, government applications.
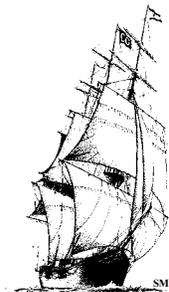
Conclusion

In an age of seemingly endless growth for data, the keys to success seem to be flexibility and manageability, with the ability to create a dynamic multi-tiered storage environment critical. With regard to the latter, the capability to create a storage architecture with Fibre Channel devices that can be integrated with arrays containing SATA

devices within the same cabinet is important for any enterprise dealing with information lifecycle management. High volume storage applications such as disk-to-disk backup and disaster recovery, and other near-line applications, are becoming standard in everyone's architecture. RIO Xtreme provides this customizable capability.

The flexibility to operate in a heterogeneous environment is another key ingredient. Today, we see data centers equipped with Windows and UNIX servers running mission-critical applications sitting alongside commodity appliances running applications to manage Internet services as well as email and other management functions. We also see significant growth in the implementation of Linux solutions within the enterprise. **All of these environments must be able to share a common storage architecture if the enterprise is going to achieve any kind of economy of scale in the data center.** RIO Xtreme provides this capability. Dot Hill also provides the reliability and serviceability required in any mission-critical storage solution through 24-hour response centers and service level agreements to match your specific environmental needs.

Finally, with the CFO looking over your decision-making shoulder, it is vital that your storage solution meet the financial objectives established within your enterprise. The RIO Xtreme has been designed to provide the price/performance always required but rarely achieved.

No one can guarantee that their solution fits your environment to a "T" with the absolute lowest costs. However, Dot Hill Systems Corp. has developed a storage solution worthy of your consideration. Take a look. You may find the storage solution that you seek.

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The Clipper Group, Inc., is an independent consulting firm specializing in acquisition decisions and strategic advice regarding complex, enterprise-class information technologies. Our team of industry professionals averages more than 25 years of real-world experience. A team of staff consultants augments our capabilities, with significant experience across a broad spectrum of applications and environments.

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About the Author

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