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Hitachi's Tiered Storage Manager Optimizes Storage Provisioning

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Management Summary

Hitachi announced a host of improvements to its line of storage and data management software. The most significant is *HiCommand Tiered Storage Manager 4.0*, a new tool that allows users dynamic, non-disruptive management of storage service levels within the *TagmaStore Universal Storage Platform* (USP). Tiered storage is an effective way to meet the different storage requirements of an enterprise, and it works synergistically with the internal and external virtualization capabilities of TagmaStore. Hitachi also announced a new tool for centralized monitoring of data replication and several upgrades to existing software tools. Read on for details.

Application Optimized Storage

The context of this announcement is Hitachi's commitment to *Application Optimized Storage*. This vision reflects the fact that storage does not exist for its own sake. Its technical function is to store, protect, and provide access to information assets, but its purpose is to meet business requirements by servicing IT applications. Like a pillar under a roof, storage supports business processes and their associated applications.

Application Optimized Storage takes into account this broader context. Applications have different storage service level requirements, in terms of performance, availability, recoverability, capacity, and cost. Even the requirements for a single application can vary among its data sets. The requirements also change over the data lifecycle, from creation to active use to archiving and, eventually, to deletion. **Hitachi is developing its storage systems to meet these application requirements more precisely, dynamically, and cost-effectively.** Hitachi's latest announcement further delivers on its vision for Application Optimized Storage.

Tiered Storage Manager

Tiered storage is a means to provide storage as a service to the enterprise. It navigates between two common excesses:

(a) An assumption that the value of <u>all</u> data is high, with the enterprise now concerned that it is spending too much to store, protect, and manage it; or

(b) The enterprise is applying inadequate or inappropriate service levels, thus suffering performance bottlenecks, downtime, data loss, or penalties for failing regulatory compliance.

Tiered storage helps strike a balance by applying the right service level to the right data, and

maintain that balance as data service requirements change.

Hitachi's *Tiered Storage Manager* establishes tiers at the array level and migrates data non-disruptively between them. It thereby provides more specific service levels to applications and their data sets. Administrators specify the storage tier in which to place data by the tier's attributes. These include array type, drive type (Fibre Channel or ATA), RAID level, and eventually advanced descriptors like I/O profile and data protection measures. The attributes determine the service level. For example, a tier might offer high performance, low cost, or fast time to recovery.

From the perspective of the storage array, it categorizes LUNs or volumes[1] into specific tiers. It uses attribute-based profiles, as defined by each enterprise customer. These categorizations are not static, however. If a volume is reconfigured and its service level profile changes, Tiered Storage Manager can re-categorize it into a different tier. In addition, Hitachi plans to link it with *HiCommand Tuning Manager* and *HiCommand Device Manager*, so administrators will be able to use other, advanced metadata from these platforms for richer profiling. For instance, Tuning Manager could pass the actual I/O performance of a volume for use in profiling. Later, Hitachi will also add automated data migration; this version requires manual initiation.

From the perspective of the application, Tiered Storage Manager establishes groups of volumes[2] then can place and migrate them as a unit. These *migration groups* ensure that all volumes owned by an application are handled simultaneously and provided the same service level. If storage requirements change with time, if the current tier is no longer sufficient to the task, or if an upgrade or consolidation project is under way, Tiered Storage Manager can migrate data to other tiers without disrupting the application. This is an important characteristic for taking unfettered advantage of tiered storage.

This solution supports the *Hitachi*

TagmaStore Universal Storage Platform[3] plus any external storage connected to it. TagmaStore has the ability to incorporate external storage into its virtualization layer and present it as a unified pool of up to 32 PB in capacity. This includes the Hitachi *Thunder* and *Lightning* storage arrays and various arrays from Sun, HP, IBM, and EMC. The combination of Tiered Storage Manager and virtualization enables the data center to deliver a wide range of tiers. These might include high-performance volumes on a TagmaStore's internal Fibre Channel drives and low-cost, high-capacity volumes on an external array with ATA drives.

Furthermore, Hitachi's Tiered Storage Manager is complementary to archiving and disk backup solutions. It provides appropriate tiers for primary storage and lower-cost archiving or backup tiers. It can move data around the infrastructure, if necessary. While archiving solutions also move data, it is on a different and complementary level. They operate on individual files and records, and so are specific to applications or file systems. For instance, e-mail archiving might handle just *Exchange* or *Lotus Notes*. It moves messages from a primary database to an archive for long-term storage, search, and retrieval. As such, the granularity of archiving is high but scope is limited. On the other hand, Tiered Storage Manager operates at the infrastructure level on all volumes for any application or file system. Its scope is universal.

Other New Products and Upgrades

Hitachi's *Replication Monitor 4.0* is a new centralized management tool for replication functions in Hitachi TagmaStore, Thunder, and Lightning storage arrays in open systems environments[4]. It supports the *TrueCopy* synchronous and asynchronous remote mirroring and *ShadowCopy* point-in-time copy features by providing visualization, status indication, and alerts. It also supports HDS' *Universal Replicator* (on USP) and *Copy on Write Snapshot* (on Thunder). Replication Monitor

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[1] LUNs and volumes here are allocations of capacity within a storage array.

[2] Volumes here are defined at the application server level, and may include multiple array-based LUNs or volumes.

[3] See *Hitachi Gives Enterprises* One Thing – *TagmaStore Universal Storage Platform* in **The Clipper Group Navigator** dated September 7, 2004, available at http://www.clipper.com/research/TCG2004073.pdf.

[4] Mainframe version is called *Copy Central*.

simplifies management in a distributed environment. It will be available in May.

Backup Services manager is a new addition to the HiCommand Suite, and is used for reporting status of backup – an important element for problem resolution. This product is the result of a partnership with Aptare.

Tuning Manager 4.0 is an upgrade to Hitachi's tool for performance and capacity management. A significant new feature is the ability to measure total and internal array response times per application. This helps administrators identify and correct performance bottlenecks in a SAN.

Device Manager 4.0 is an upgrade to Hitachi's centralized device manager. It has expanded support for Unix/Linux agents and TagmaStore features.

Protection Manager 4.0 is an upgrade to Hitachi's tool that integrates its copying technologies with Microsoft *Exchange* and *SQL Server* with for automated, online replication and rapid restore. It has expanded support for TrueCopy and added support for TagmaStore Universal Replicator, Veritas *Cluster*, *NTFS*, and *Dynamic Disk*.

Dynamic Link Manager 5.5 is an upgrade to Hitachi's path failover and load balancing capability. It now supports Microsoft's *MPIO*, *Plug 'n Play* facility, *Cluster Server*, and *Performance Monitor* for tighter integration with Windows. It supports iSCSI too.

Hitachi *Data Protection Suite* is another new offering, this a result of a partnership with CommVault. It includes the following products: Hitachi *Backup and Recovery*, Hitachi *Quick Recovery*, Hitachi *Data Migrator*, Hitachi *Data Archiver*, and Hitachi *Data Protection Monitor*.

Conclusion

Tiered Storage Manager is another solid reason to consider Hitachi's TagmaStore as the centerpiece of a virtualized storage infrastructure. Virtualization unifies a fractured, distributed storage environment. Its benefits are simpler management, better resource utilization, and lower storage total cost of ownership. By building a virtualization layer into its nth-generation high-end storage

platform, Hitachi is able to offer a very high performance solution with proven functionality right out of the chute. It was (and is) a clever approach. Tiered storage amplifies the benefits. More precise provisioning lowers costs and optimizes storage performance and availability for each application.[5] All of this fits into Hitachi's vision of Application Optimized Storage.

Hitachi's other software products and upgrades also expand the scope and functionality of its storage and data management solutions. **With this announcement, Hitachi demonstrates that it is still an innovative storage provider – and one that large enterprises should consider seriously.**

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[5] For more details, see *Tiered Storage Classes Save Money – Getting The Most Out Of Your Storage Infrastructure* in **The Clipper Group Explorer** dated August 29, 2002, at http://www.clipper.com/research/TCG2002030.pdf.

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