



Hitachi Command Suite 7

Hitachi Data Systems

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SUMMARY

Catalyst

Hitachi Command Suite 7 (HCS7) is the latest generation of Hitachi Data Systems' storage management software. A single instance of the software can manage HDS's entire range of mid-range and high-end storage products and any third-party disk arrays virtualized by HDS's Virtual Storage Platform (VSP) disk array.

Key findings

Table 1: Key findings	
Strengths:	Scalable from mid-sized to very large installations. Business- and application-level monitoring of service levels. Single management interface for diverse storage systems.
Weaknesses:	Currently incomplete management of Hitachi NAS
Key facts:	HCS7 can be licensed on perpetual, fixed-term, or subscription basis.
Source: Ovum	

Ovum view

The rapid and continuing growth in the volume of data stored by organizations has driven competition among vendors to develop more efficient and scalable storage systems. IT departments need to store more data while containing their costs, and they will invest in the best systems available to do that. The reverse is equally true – if data storage technology had not developed as quickly as it has over the last half-century, and especially the last decade, businesses would not be able to store as much data as they do now. One way that the capacity of storage systems has been dramatically increased is through improvements to hardware, for example via Moore's Law for processors, and similarly rapid increases in the data density of disk drives. However, those developments alone would not have been sufficient to drive storage scalability to its current level. They have been matched by a much-needed increase in the sophistication and level of automation of storage management software.

HC7 is a good example of this trend. It provides a high-level, business- and application-oriented monitor of the service provided by an entire storage infrastructure, while also being able to complete the low-level analysis and configuration tasks needed to maximize storage efficiency. As HCS7 is a modular software suite, it can be tailored to suit both mid-sized storage deployments and very large environments encompassing hundreds of petabytes of capacity. Ovum believes that the effectiveness of HCS7 is a major contributor to the competitiveness of all of HDS's storage systems. The ability of Hitachi's VSP disk array – or the diskless controller version of the VSP – to virtualize third-party disk arrays gives HCS7 one more virtue, which is its ability to act as the single management interface for a range of cross-vendor systems.

FUNCTIONALITY

Solution overview

HCS7 is an integrated suite of optional modules that provides a wide range of management functions for HDS and third-party storage systems. The suite is the management interface for HDS's high-end VSP and mid-range Adaptable Modular Storage (AMS) disk arrays and the HDS Content System (HCP) object-oriented storage system.

Customers can select modules to suit their own needs. As it was designed to manage HDS's flagship VSP disk array, HCS7 in its full implementation is a very sophisticated tool. The principal aims of the software are to maximize the efficient use of the storage systems under its control, and simplify and automate their administration in order to lower costs and increase service levels. The suite manages and monitors storage resources at the level of business groups and applications,



and can manage up to 5 million logical objects, allowing a single instance of HCS7 on one server to manage the largest storage installations. The principal technical functions of HCS7 are:

- business-level monitoring of storage service
- device-level management of storage systems
- capacity and utilization monitoring
- performance reporting and analysis
- integration with virtual server platforms
- virtualization of third-party disk arrays
- thin provisioning of volumes
- automatic migration of data across storage tiers.

HCS7 is the latest version of software that was originally launched in 2001 as Hitachi HiCommand. HCS7 was launched late in 2010, as a major update that introduced a number of technical advances. Both the graphical user interface (GUI) and command line interface (CLI) for HCS7 have been improved. HCS7 also shares a single database of configuration data among all of its modules, and introduces agentless discovery of host servers for basic management services, and improved performance when completing both individual and batch commands.

Solution analysis

Administrative simplicity

Despite major advances in the automation and simplification of storage management systems during the last decade, the ease of use of such tools remains a major competitive arena for vendors. One reason for this is that despite the advances in storage management software, administrative labor costs continue to account for the majority of overall storage costs. Another reason is that while the volume of data stored by typical businesses is currently growing at around 50% per annum, IT budgets have either been pegged or grown only by low single-digit percentages during the last few years. This has put a premium on management tools that maximize administrators' productivity. The most basic measure of that productivity is the number of terabytes of data that can be managed by a single employee.

Simplifying administrative tasks by reducing the number of steps required to complete them not only speeds the completion of day-to-day activities such as the creation of new storage volumes,

but also reduces the chance of human error, which increases service levels and reduces the amount of non-productive time administrators spend diagnosing and correcting faults.

One way that HCS7 simplifies storage management is by introducing improvements to its GUI and CLI. The GUI is now based on Adobe's Flash graphics display platform, and allows drag-and-drop customization of screens, single-click changes of sorting parameters for tabular data, and simple creation of extra data columns. The GUI does not yet cover all of the functions of HCS7, but Hitachi says that it will do so within the near future. HCS7 will continue to feature a CLI, in order to allow customers to continue using existing command scripts.

The suite also incorporates wizards and default configurations that are based on best practices identified by HDS's professional services organization. As another simplification of administrative tasks, when HCS7 presents configuration choices to administrators, it presents only valid options.

Management system performance

Administrator productivity can also be boosted by reducing the time they spend waiting for a storage system itself to complete a management task. HDS claims that the use of multi-threading for management tasks in HCS7 allows tasks such as volume provisioning to be completed up to 10 times faster than previously. Processing of CLI commands has also been revised, with a claim of up to 30% better performance for single commands and a "dramatic" improvement for batch processing, delivered by parallel processing of commands.

Business-oriented service management

All of the monitoring and configuration functions within HCS7 can be applied at a customized level of individual business applications, host servers, or business units, by defining the groups of storage volumes and system elements that serve those applications, servers, or business units. This cuts costs considerably by boosting IT administrator productivity as well as significantly reducing the potential for human error when configuring or reconfiguring systems. As an example, snapshots or mirrors can be configured simultaneously for all of the data volumes associated with an application, simply by applying configuration actions to an entire resource group. Resource groups can be given meaningful names by IT staff, and the names and groups can then be used within all the modules that comprise HCS7.

However, at other times administrators also need to be able to identify individual storage volumes. For this purpose, HCS7 includes a search function, which allows volumes to be identified according to a range of parameters including free capacity, RAID level, and drive type. Filters applying a similar set of parameters can also be applied to all of the screens within HCS7.

Multi-tenancy

For storage, multi-tenancy means the sharing of a single storage system by multiple applications or application owners, often known as "consumers." Multi-tenancy has been a fact of life for service providers for many years. For enterprises, it is the consequence of storage consolidation, which reduces administrative overheads and boosts hardware utilization by eliminating resource silos or islands. The sharing of virtualized hardware resources is also the fundamental principal behind cloud computing, whether the cloud in question is private or public.

In the case of storage systems consolidated and managed by HCS7, those systems may include third-party disk arrays virtualized by a HDS VSP disk array. Clearly multi-tenancy of any IT resource must be accompanied by secure isolation of data, for a range of commercial and regulatory or compliance reasons that apply to organizations across a very wide range of industries. This isolation must extend beyond file-system or application-level permissions, into control of administrator access. HCS7 provides this level of isolation by controlling both application and administrator access to resources allocated to specific business applications or functions. However, this secure isolation of data is not sufficient to ensure successful multi-tenant sharing of storage resources. Multi-tenancy also requires a means of preventing individual applications over-consuming or monopolizing shared resources and therefore adversely affecting the performance of other applications.

HCS7 safeguards against the latter threat by allowing hardware resources under its command to be partitioned, with each partition then dedicated only to specific groups of applications. HCS7 allows a VSP disk array's front-end ports, cache, and disk drives to be split into up to 32 independent, separately managed partitions. HCS7 can prioritize server access to ports within those groups, which in turn allows applications to be prioritized in terms of I/O consumption.

Policy-based storage-as-a-service

The HCS7 suite includes a module called Command Director, which provides a customizable dashboard that displays the status of the most important storage resources and the service provided to key applications or business units. The capacity parameters displayed by Command Director include allocated and utilized overall storage capacity, and for virtual servers, available and used space within VMware datastores and Microsoft Hyper-V file systems. Application service levels are reported in terms of response times, I/O operations per second (IOPS), rates of data throughput, cache read hits, and write pending metrics.

Command Director compares the service levels achieved for individual applications with customer-defined service level objectives, and issues alerts whenever those objectives are not met.

Combined with the multi-tenancy features of HCS7, this provides the foundation for policy-based management of storage. To take this a step further and implement storage-as-a-service within a private cloud, some customers will want to create a chargeback system by which they can bill business units for the storage resources that they consume. HDS has incorporated an API into Command Director that allows it to pass data about storage resource consumption to chargeback systems. HDS says it has taken this approach because chargeback systems are not restricted to storage consumption alone, but also take account of network and server resource consumption. In addition, there is a wide range of approaches to chargeback taken by customers.

Management of multiple storage devices

As well as being the common management interface for HDS's VSP, AMS, and HCP storage systems, HCS7 is also the control point for any HDS or third-party disk arrays that are attached to and virtualized by a VSP disk array. In this situation, HCS7 replaces the multiple disparate management tools previously needed to manage those other storage systems. As well as simplifying operations and therefore lowering costs and improving service levels, this eliminates the need to maintain administrator skills in legacy management tools. In addition, advanced VSP functions such as thin provisioning are applied to the third-party storage. HCS7 is also able to report on capacity utilization for third-party disk arrays that have not been virtualized by a VSP, using a Storage Capacity Reporter module that is based on software licensed from Aptare.

Although HCS7 modules such as Command Director and Tuning Manager work with file-level HDS NAS (HNAS) disk arrays, those devices cannot yet be fully managed by HCS7. The HNAS arrays are OEMed from NAS specialist BlueArc, and tasks such as provisioning of storage space or the setting of file system user quotas currently require the use of BlueArc management software.

PRODUCT STRATEGY

Go-to-market strategy

Founded in 1989 and based in California, HDS is responsible for the sale and support of all of HDS's storage products outside of Japan. HCS7 was developed by HDS's parent company, Hitachi. The HDS customer base comprises more than 7,500 companies and includes 44 of the top 50 Fortune Global 500 companies. That presence among very large enterprises is the result of the popularity of HDS's VSP disk array, which has a significant share of the market for very large, scalable, and high-performing enterprise storage systems. As the management interface for the device, HCS7 has played a large part in the success of the VSP. The VSP's only two major competitors are EMC's Symmetrix and IBM's DS8000 disk arrays, and it is no coincidence that



HDS names EMC's ControlCenter and IBM's Total Productivity Center as two of the biggest competitors to HCS7.

Development plans

Ovum is confident that the strong market position of the VSP and HCS7 products will see HDS continuing to develop them in parallel for several years yet. We believe that the development priorities for HCS7 will include expansion of the suite's policy-based management functions, to provide a greater level of automation and delivery of storage-as-a-service. At present, HCS7 can monitor storage performance against objectives, but does not automatically protect quality of service (QoS) for entire volumes or applications. Ovum expects that HDS will achieve this by allowing volumes to be automatically moved – according to policy – from one storage tier to another when QoS falls below requirements. Elsewhere, HDS will continue its efforts to integrate HCS7 with third-party server virtualization platforms, focusing most of its efforts on VMware vSphere, and will improve the integration of the BlueArc-based NAS management software with HCS and extend the HCS7 GUI to cover all management tasks.


IMPLEMENTATION

Deployment and installation time

HCS7 is implemented alongside HDS storage hardware. The time taken for complete system implementation varies according to the complexity of the system itself and the server and storage network environment. For HDS's flagship VSP disk array, basic implementation of hardware and software is usually completed within a few days.

Web-based training is available for HCS7, alongside face-to-face instruction on customers' premises. HDS's professional certification scheme includes a Storage Manager certification designed to cover day-to-day storage systems operation and planning and architecture. HCS7 can be licensed on a permanent, subscription or fixed-term basis, and license costs usually account for around 25% of total implementation costs. Prices are based on the capacity of the associated HDS hardware. HDS's certified channel partners provide a range of assessment, design, implementation, and consulting services, as does HDS itself.

HCS7 modules mostly run on Windows and Red Hat Enterprise Linux and Suse Linux Enterprise Server, although some are also available for Sun Solaris.

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Source: Ovum	



APPENDIX

Further reading

- *2011 Trends to Watch: Storage*, December 2010, OI00043-008
- *Technology Audit: Hitachi – Virtual Storage Platform*, March 2011, OI00070-042

Methodology

Vendor analyst briefings.

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