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Simplified Management with Hitachi Command Suite

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Hitachi Data Systems

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Executive Summary

Today's data center has seen its responsibilities evolve from the storage of data to the management of information. As the requirements for more flexible, efficient information management have grown, Hitachi Data Systems has transformed its storage management products to meet those needs. Hitachi Command Suite is a critical component of the Hitachi Data Systems solution for integrated management of a unified data infrastructure for all data types. It provides a comprehensive set of tools for IT and storage administrators to manage their infrastructure, their storage, their applications and their information.

While data centers have become increasingly complex and IT has come under closer scrutiny to manage costs, Hitachi Command Suite provides advances in simplification and automation to improve storage management efficiency and productivity. Hitachi Command Suite has been redesigned with tighter integration between the products, a new graphical user interface (GUI), more database sharing to eliminate duplication, improved performance and increased scalability to support larger enterprise data centers.

Simplification helps administrators manage their storage more effectively. Best practice wizards with built-in intelligence streamline common management tasks to reduce the number of steps and time required to manage storage and reduce the potential for errors. This makes it easier for less experienced users to effectively manage their storage assets and take advantage of existing best practices.

Simplification isn't just for novice users. It also makes it easier and faster for experienced storage administrators to manage their systems. Intelligent defaults mean that, in most cases, even an experienced user will only need to accept the defaults, speeding up common management tasks. Only relevant, valid options are presented, thereby making it simpler to make administrative task decisions.

The advanced Hitachi Dynamic Tiering software may do the most toward simplifying tiered storage management. Within Dynamic Tiering, much of the underlying technologies for tiered storage management have been automated and hidden from the user. Creating Dynamic Tiering pools and allocating volumes is as simple as with standard, thin provisioned volumes. Hitachi Dynamic Tiering is self-optimizing and requires little ongoing administration, other than defining policies and monitoring pool status, to ensure adequate capacity is available in the pools.

Hitachi Command Suite is integral to transformation of the IT data center driven by Hitachi Data Systems. The suite provides significant advantages in flexibility, performance and simplification of IT storage management that complement the advanced capabilities of Hitachi storage systems. This helps to drive IT data center transformation, resulting in a software management framework that can manage the data center of today and tomorrow.

Data Center Transformation

Data drives our world. We send it, receive it, store it, manage it, process it, protect it and use it. While the words data and information might seem interchangeable, data is in essence the raw input that is processed or arranged to become meaningful output or information. In the modern data center, both input and output are critical to running the business. As expected, storage plays a critical role in data center transformation. How data is stored can either enable or inhibit data center transformation efforts. And, as the amount of data supporting mission-critical applications continues to exponentially grow and its underlying IT infrastructure ages, the need for a fundamental transformation of the data center becomes more vital.

Data center transformation is not just about adding more compute power, network and storage capacity. It is also about marrying a complete economic view of IT and the data center — from applications to servers to storage — with technology, people and processes to deliver a comprehensive solution for responding to the ever-changing business environment. At its core, the Hitachi Data Systems approach to IT data center transformation optimizes many types of virtualization methods to consolidate IT resources, reduce IT complexity and build-in future flexibility.

Hitachi Command Suite (HCS) is a comprehensive management framework that enables organizations to align business applications to the necessary IT resources according to business-related objectives. Such objectives may include quality of service, shared resource optimization and just-in-time delivery. HCS discovers the storage environment and provides visibility along the path from each application through the network to the storage system for end-to-end application to storage management. It effectively replaces manual procedures with unifying administrative tasks under a common management framework.

Hitachi Command Suite

Hitachi Command Suite is a centralized software management framework that incorporates multiple IT and storage management disciplines, including:

- Storage resource management
- Tiered storage management
- Service level management

HCS provides advanced data management that improves storage operations, provisioning, optimization and resilience for Hitachi storage environments. It complements Hitachi storage systems, creating the most reliable and easiest-to-manage enterprise storage solution available.

The latest release of HCS incorporates a number of key new enhancements, including:

- Agentless host discovery, which can be leveraged for basic storage management practices while only requiring host agent deployments for more advanced management functions
- Enhanced integration across HCS products with a new GUI, shared data repositories and task management, so tasks can either be executed immediately or scheduled for execution at a later time

- Improved usability with integrated use case wizards and best practices defaults for common administrative tasks
- Improved scalability to manage larger data centers with a single HCS management server and improved performance to reduce the time required to execute tasks
- Streamlining of common administrative practices, which can unify management across all Hitachi storage systems and data types

Hitachi Virtual Storage Platform

Hitachi Virtual Storage Platform (VSP) is the only 3D scaling storage platform designed for all data types. It is the only storage platform with the architecture that flexibly adapts to scale up for performance, scale out for capacity and scale deep for connectivity with external storage resources.

VSP takes storage virtualization to new levels; it goes beyond transforming storage into a large virtual pool of shared resources, by extending its storage virtualization with Hitachi Dynamic Tiering. This technology simplifies tiered storage management with automated storage tiering on a page basis (or subvolume level) for improved capacity utilization, dynamic load balancing, and improved performance and optimization of storage resources. By automating page-level placement of data across storage tiers, Dynamic Tiering can place the right data in the right place at the right time, with no performance degradation.

HCS is fully integrated with VSP for all of its configuration, reporting, optimization and administrative functions. VSP, when combined with HCS, takes the next steps toward an automated, self-optimizing storage system, making the enterprise storage infrastructure more manageable and IT more agile.

3D Management

Hitachi Command Suite enables rapid deployment of the latest storage technologies offered by Hitachi Virtual Storage Platform while continuing to advance efficient management across all Hitachi storage environments.

HCS is designed to deliver a comprehensive, unified way of managing IT resources. It employs a 3D management approach to efficiently manage all data types to lower costs for the agile data center with the following 3 management dimensions:

- **Manage up** to scale for large data infrastructures and application deployments, increasing scalability to manage millions of logical objects with a single management server.
- **Manage out** with a unified management framework that has the breadth to manage storage, servers and the IT infrastructure, incorporating both virtualized storage and servers.
- **Manage deep** with HCS integration for the highest levels of operational efficiency that includes common management of multivendor storage assets.

Simplification

A focal point of Hitachi Command Suite is simplified and unified storage management. As enterprise storage systems become more complex and expand to incorporate larger capacities, it is even more important for the management framework to evolve to make it easier to manage. HCS provides a redesigned architecture with the required features and capabilities that enable storage administrators to manage more with less effort and resources.

One important aspect of HCS is that across-the-board operations have been made simpler, easier and quicker for administrators. This is true for administrators who have limited experience with Hitachi storage systems as well as those who have extensive experience and want to maintain thorough control and customization of their storage systems. Wizards to streamline management tasks have been extended for the most common tasks. They lead administrators through the required steps, requiring only the minimum amount of information (i.e. fewest "clicks"). Intelligent defaults are applied based on available options, experience and best practices procedures. At the same time, advanced options are available for experienced storage administrators to allow them to manage their systems with as much, or as little, control as they desire.

Agentless Discovery

Provisioning and managing storage involves host servers and SAN fabrics in addition to the respective storage systems. In the past, Hitachi Data Systems and other storage vendors have required users to either manually enter server information (e.g. World Wide Names or WWNs) for mapping of storage volumes, or to install software agents on their servers to collect and maintain this information. Hitachi Command Suite allows users to discover host servers and manage their respective storage resources with or without using host-based software agents.

When host agent software programs are installed, they can provide HCS with server identification, information required for provisioning storage, and host- and application-specific performance data for key business applications, such as Microsoft Exchange, Microsoft SQL Server and Oracle databases.

For administrators who would prefer not to install host agents, host servers connected to the storage systems can be discovered and host configuration information can be collected without agents. Using this agentless host discovery, storage administrators can do many storage management tasks, such as identify hosts (WWNs) and configure storage. The only administrative functions that cannot be done without agents are host provisioning, management of replication pairs and collection of host- and application-specific performance data.

With agentless host discovery, the HCS host data collector uses Windows Management Interface (WMI) for Microsoft Windows or SSH for UNIX (Linux, Solaris, HP-UX, IBM® AIX®) for login and collection of the necessary host and file system information to configure storage. System passwords are securely stored so server security is not compromised. The host data collector typically runs on the Hitachi Device Manager management server to minimize the impact to the data center servers or network. However, it can be installed on a separate server for scalability in very large data center environments.

Usability and Performance Improvements

The overall performance of task execution within Hitachi Command Suite has been dramatically improved. The integration of storage configuration, previously managed by Hitachi Device Manager and Hitachi Storage Navigator, has been consolidated within the HCS data repository. This integration of the storage configuration database allows changes to be executed much more efficiently, and the synchronization allows changes to be made in parallel rather than sequentially. Users can set up configuration tasks, submit them and immediately move on to the next task. This allows administrators to use their time more efficiently, as they do not have to wait for each step to complete before continuing. In addition, multiple storage administrators can work simultaneously and HCS will process the task requests in parallel. This parallel processing speeds up administrative tasks. Plus, because HCS supports multi threaded processing, it also makes the execution of the tasks much more efficient, and it can complete multiple tasks much faster.

Many of the usability enhancements in HCS also help improve management efficiency. The intelligent defaults and the reduction in the number of steps required for many common tasks help to improve administrator productivity. Many HCS wizards, such as the wizard for creating volumes, enable users to execute commands on multiple volumes in a single task. The wizards can speed execution up by an order of magnitude.

HCS allows users to execute tasks immediately or to schedule them to be run later. For example, it might be prudent to schedule a large-scale storage configuration to run at night rather than in the peak processing hours during the day.

Scripting and Batch Command Improvements

Advanced storage administrators have long had the capability to write scripts to do "batch" processing of tasks for the software products in Hitachi Command Suite using the command line interface (CLI). Commands could be executed by typing them in, individually, at a system command line or combining multiple commands contained within a script file. Commands could be executed immediately or scheduled to run later, such as during off-peak processing hours.

Hitachi Command Suite v7 provides 2 major enhancements for CLI processing:

1. **CLI performance improvements**. A re-design of the CLI architecture provides a reduction of up to 30% in processing time. In addition to the overall improvements in the management command processing performance, the system will dynamically determine whether it is more efficient for the management server and the storage system to communicate in band (over Fibre Channel) or out of band (over Ethernet), based on the task and workload.

2. **CLI batch processing improvement**. When multiple commands are submitted to the CLI via a script, the commands are now processed in parallel rather than sequentially. These efficiencies can dramatically reduce the total time to process multiple commands.

These performance improvements help speed up operations. However, perhaps more importantly, the improvements allow administrators to make the most out of increasingly narrow windows of opportunity, when configuration changes will have the least impact on users, applications and IT operations.

Scalability

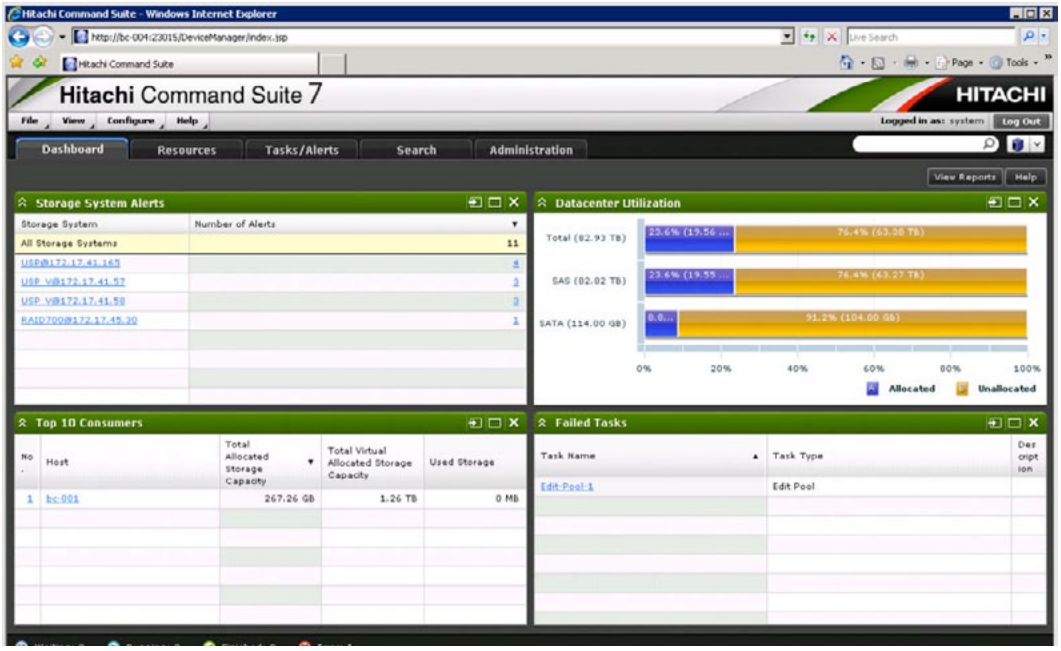
Hitachi Command Suite delivers significantly improved scalability to efficiently manage large data center environments. Today, a single large enterprise storage system, such as Hitachi Virtual Storage Platform, can support over 255PB of external storage. To meet these requirements, HCS has been enhanced to handle a significantly larger number of resources under management: scaling up to millions of logical objects. With this level of scalability, a single instance of HCS management server is capable of managing most enterprise data centers.

Improved Usability

Managing storage has never been simpler, and, at the same time, it is more flexible and powerful than ever. Usability enhancements have been added for both novice and expert users. All storage management tasks can be accessed through a common GUI based on Adobe Flex, making the user experience fully customizable. Console displays are quickly and easily modified: displays can be reformatted using "drag and drop"; reports can be sorted on any field simply by clicking on it; and columns can be added or removed quickly and easily.

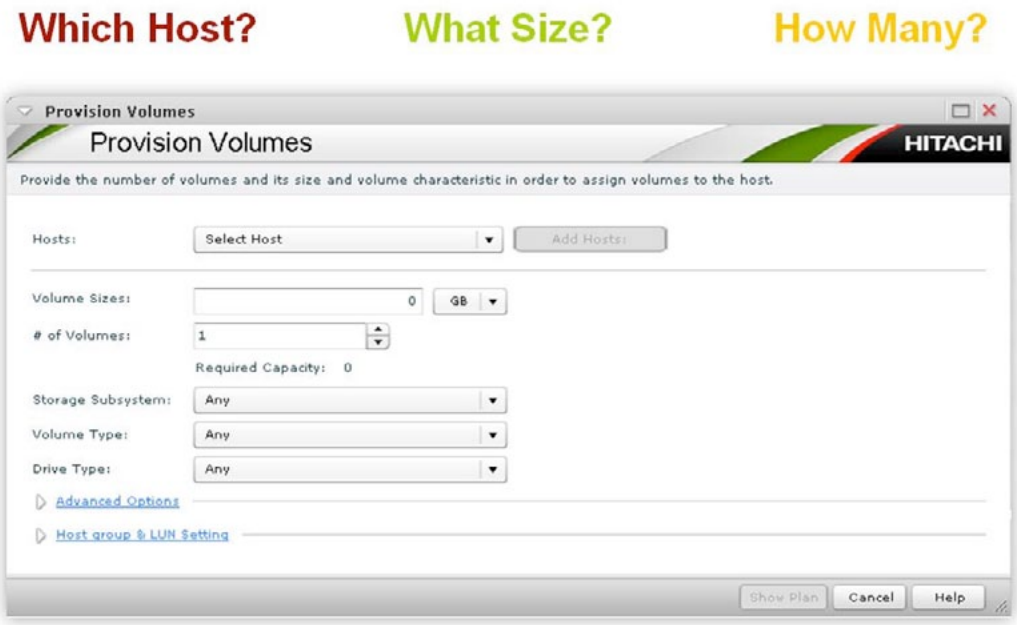
At startup Hitachi Command Suite takes the user to a dashboard that summarizes the state of all managed storage, along with any current alerts or errors (see Figure 1). Most common functions are available through integrated GUI tabs: Dashboard, Resources, Mobility, Analytics, Tasks/Alerts, Search, Administration, and common tasks such as creating volumes, virtualizing volumes or allocating storage.

Figure 1. Hitachi Command Suite Dashboard



HCS uses wizards and intelligent defaults, based on best practices, to minimize user input. Creating storage volumes can be as easy as specifying the required volume size and number of volumes. Allocating (provisioning) storage simply requires selecting the host, volume size and number of volumes (see Figure 2).

Figure 2. Provision Volumes



Options, such as specific storage systems, volume types or drive types, can be selected from pull-down lists (see Figure 3). HCS will automatically show only valid options that are available to the user.

Experienced storage administrators who want to override the defaults can select the advanced options, allowing them full control to customize their management task (see Figure 4). For example, to create new volumes, the user can select not only the storage system, but also volume type, drive type, drive speed, RAID level, and even down to the specific parity group.

Figure 3. Creating a Storage Volume: All that is required is specifying the volume size and the number of volumes.

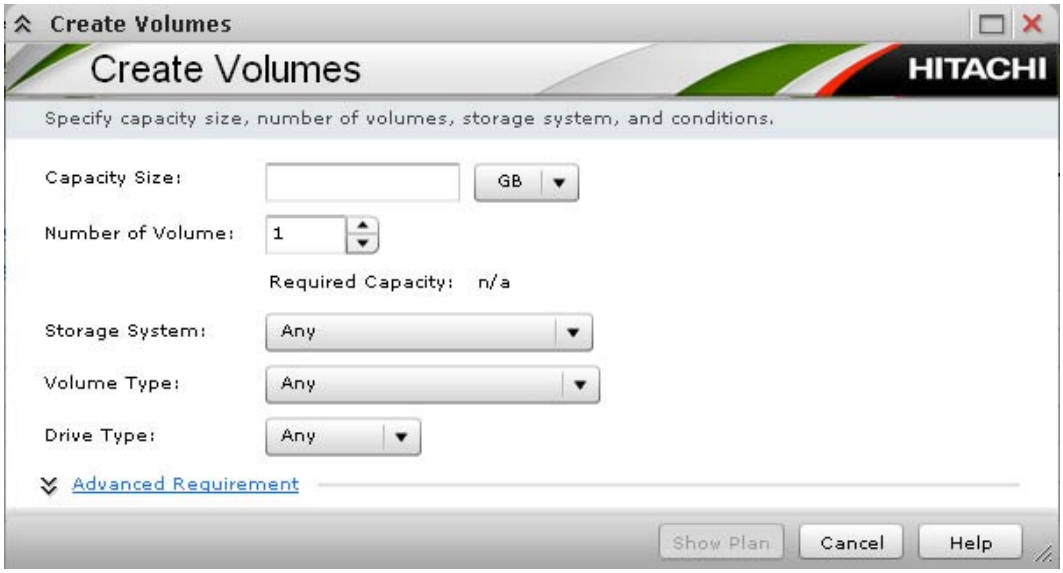
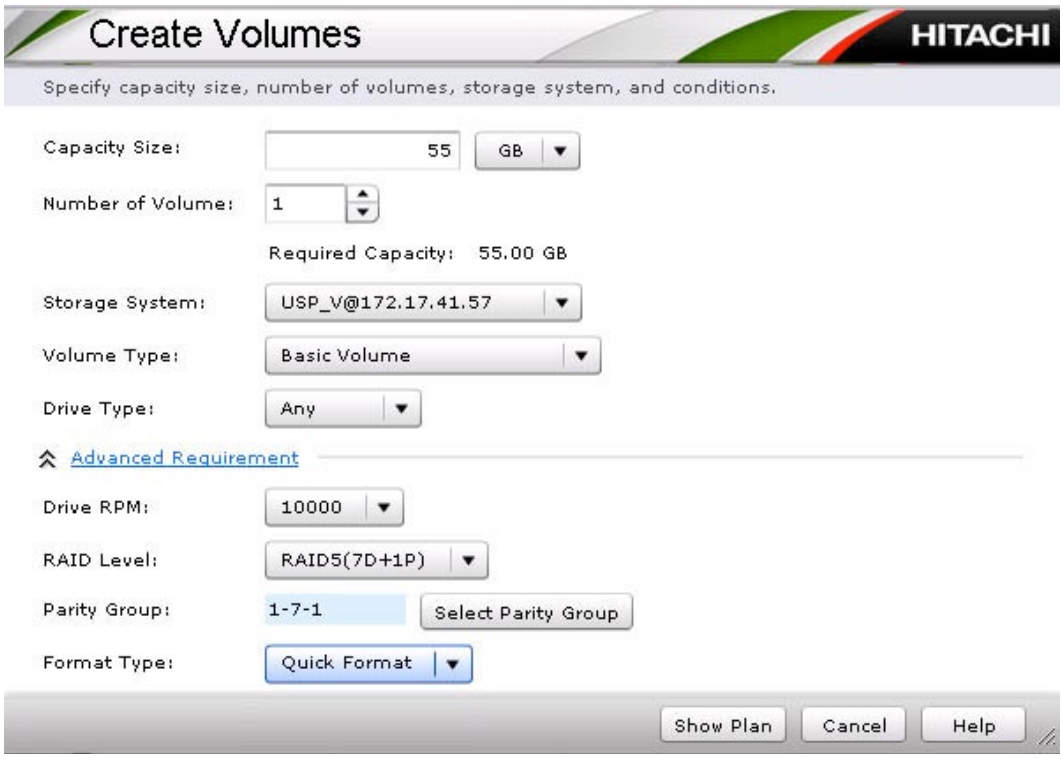


Figure 4. Additional Options: Advanced users can select further options to provide more fine-grained management control.



Built-in Intelligence

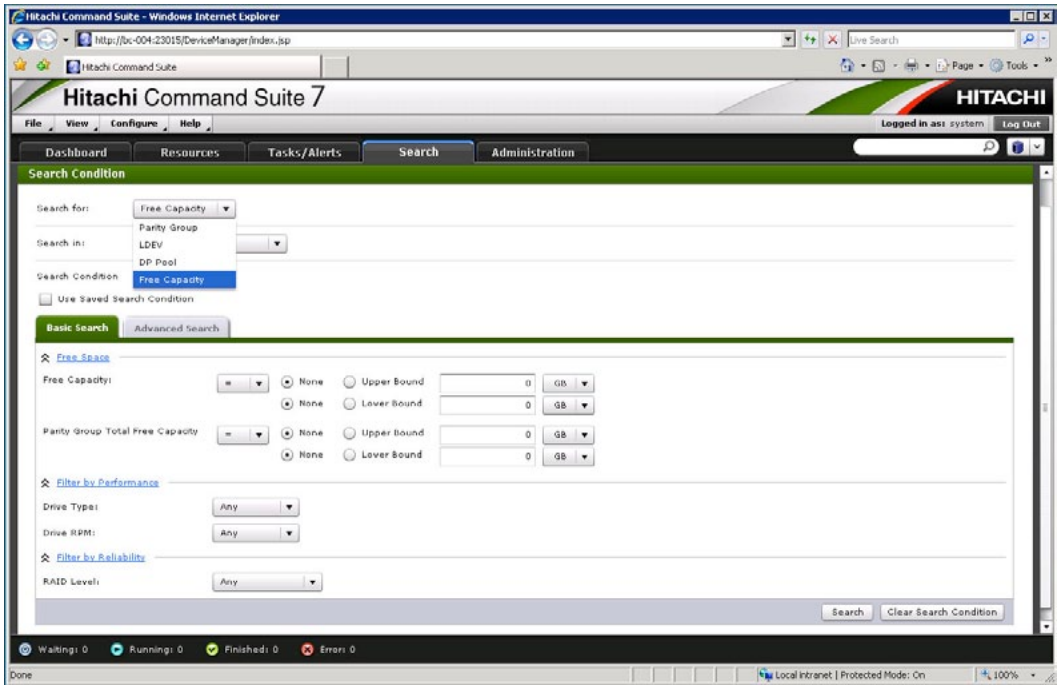
Hitachi Command Suite applies built-in intelligence when setting defaults and options. When menus are presented, only valid available options will be displayed. For example, when creating volumes, once a specific storage system is selected, the drive types and RAID levels available on that system will be displayed as valid options.

Built-in intelligence incorporates Hitachi best practices for storage management into HCS menus and wizards. For example, when creating a Hitachi Dynamic Provisioning pool, only entire parity groups with no allocated volumes are displayed. Hitachi Data Systems Global Solution Services (GSS) has determined that a recommended best practice is to use full parity groups for Hitachi Dynamic Provisioning pools. Also, when adding capacity to an existing pool, the menu will default to selected volumes with the same RAID level as in the existing pool volumes (another GSS recommended best practice). In this manner, HCS helps to guide administrators to use the most efficient and effective storage management practices. Of course, these are just guidelines. Storage administrators can override the defaults based on their experience or if they have specific requirements that run counter to the defaults presented.

Search and Reporting

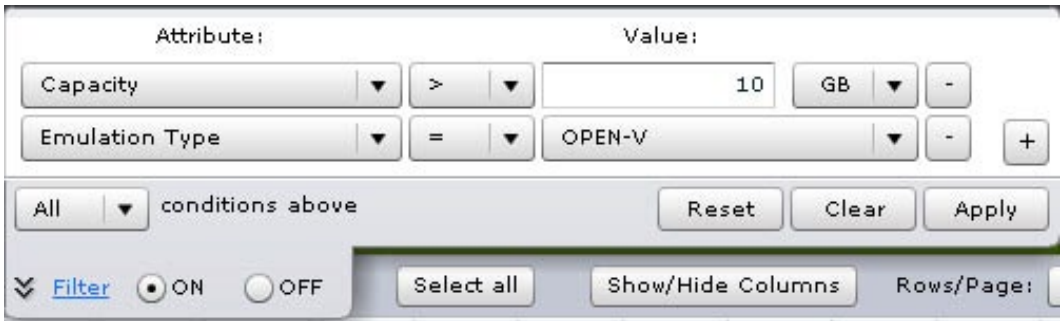
Hitachi Command Suite provides a powerful and flexible search tool to allow users to view volumes based on several criteria, such as free capacity, drive type or RAID level (see Figure 5). For managing large storage systems such as Hitachi Virtual Storage Platform, this can save administrators an inordinate amount of time trying to view available resources.

Figure 5. Hitachi Command Suite Search Tool



Similarly, each display in HCS can be filtered to help the storage administrator limit the view to just the relevant volumes, pools or hosts (see Figure 6). Each user can filter his or her views, tailoring the display to their needs.

Figure 6. Hitachi Command Suite Filter

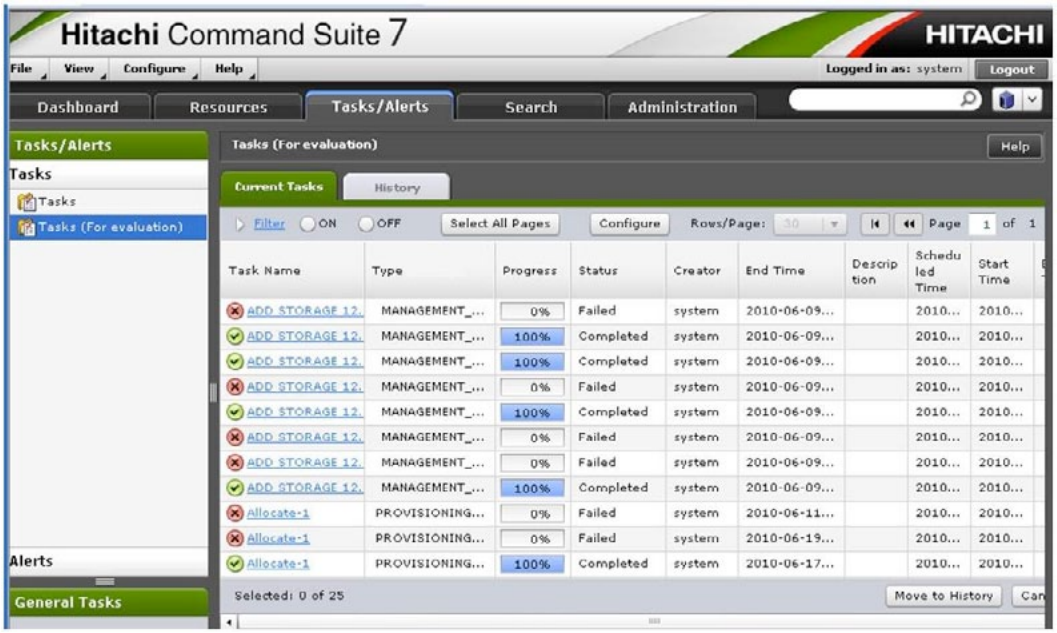


These tools help to provide customized reporting throughout HCS. For example, when trying to identify available capacity with certain characteristics within a storage system or a data center with thousands of volumes, this can reduce the report to a manageable view. Or, these methods can be used to view a report just for a specific server or application. Once a report is created, the results can be exported for further analysis or be forwarded to another tool, such as a data-center-wide management package.

Task Management

The ability to run multiple tasks in parallel and to schedule tasks requires that users be able to monitor their tasks and be alerted if there is an error. Management tasks in Hitachi Command Suite can be initiated or scheduled for virtually every management function: configuring or provisioning storage, setting up tiers or thin provisioned pools, etc. HCS manages all tasks from a centralized console (see Figure 7). A user can view the status of all their tasks, cancel tasks or re-schedule tasks from the "Tasks/Alerts" tab. This includes both completed tasks as well as those in process or scheduled to run in the future. As with other reports, or views, users can filter the report so that they view only the tasks that they want and then select or sort on any of the fields available. Particularly in large data centers, this helps users reduce the volume of data down to a manageable level, allowing them to find the information they need as quickly as possible.

Figure 7. Task Status Report



Once tasks are completed, HCS provides a consolidated view of events and alerts. Users can view the status and alerts for all management tasks in a single report. This view can be easily filtered based on criteria, such as severity, source and date to provide more manageable views. Any errors can be quickly identified and then rectified.

A status summary of tasks is displayed along the bottom of the HCS interface, so users will be alerted to any errors and completed tasks at all times. A single "click" on the summary display will bring up a report of any outstanding tasks and errors. This consolidated view helps administrators monitor the status of their environment more efficiently and be alerted and respond to errors more quickly.

Unified Storage Management Operations

Hitachi Command Suite Integration

Hitachi Command Suite leverages an architecture that integrates the products of the suite from the bottom up. Instead of separate products linked together, the software products in HCS use a common code base and a common database of shared information. HCS software products all use the same graphical user interface, based on Adobe Flex, and share a common user experience. The transition from product to product is virtually transparent to the user, who can simply click on a task function in a common menu instead of having to know which product within the suite is being accessed (i.e. Hitachi Device Manager or Hitachi Tiered Storage Manager software)[1]. All configuration and storage tier information is combined and synchronized in one database accessed by multiple products, rather than on separate databases requiring larger data repositories that could be subject to inconsistencies. The new design improves the efficiency and reliability of storage management information, as well as a consistent and more flexible user interface.

Unified Management

Hitachi Command Suite provides a unified management framework for advanced data and storage management across all Hitachi storage environments and data types. By unifying block and file management capabilities, HCS delivers efficient management practices for Hitachi Unified Storage Platform that cover key administrative functions of device configuration, system monitoring and service level management. Independent of file, block or unified storage configurations, HCS shares the same levels of consolidated operations, usability, task management and scalability to help IT organizations to take full advantage of leading Hitachi storage technologies and minimize operational costs.

Logical Group Constructs

Logical group and logical device (LDEV) labels provide the ability to logically group storage resources and apply meaningful labels to logical devices. The importance of this lies in the ability of logical groups and LDEV labels to be shared among many of the components of Hitachi Command Suite and, as a result, expose one of the key integration points of the suite as a whole. Use of logical groups and LDEV labels provides an enhanced organizational aspect to managing LDEVs that makes their reporting and provisioning easier.

For example, if an administrator defines logical groups according to how a company runs its business (by department and application), this simplifies "application" mobility as it relates to application in-system and remote replication and application migration between storage tiers. This is because the same logical group and LDEV label filters can be used as selection criterion by Hitachi Tiered Storage Manager to build migration groups or by Hitachi Replication Manager to build an application set of PVOLs in order to form a copy group. The combination of using logical groups and LDEV labels enables administrative scalability for users to manage more storage with existing IT staff resources.

[1] The full integration of Hitachi Device Manager and Hitachi Tiered Storage Manager data repositories is included in Hitachi Command Suite.

Integrated Performance Analytics

Hitachi Command Suite provides integrated performance analytics with Hitachi Tuning Manager that can quickly identify, isolate and find possible causes of performance bottlenecks. Within the HCS central management console, the integrated analytics capabilities provide the necessary 1st step to quickly address performance issues associated with Hitachi virtualized storage environments. If additional performance details or diagnosis is required, Hitachi Tuning Manager includes a web-based interface to provide deeper performance monitoring across a comprehensive range of performance and capacity metrics with historical trending and custom reporting capabilities.

Integrated Data Mobility

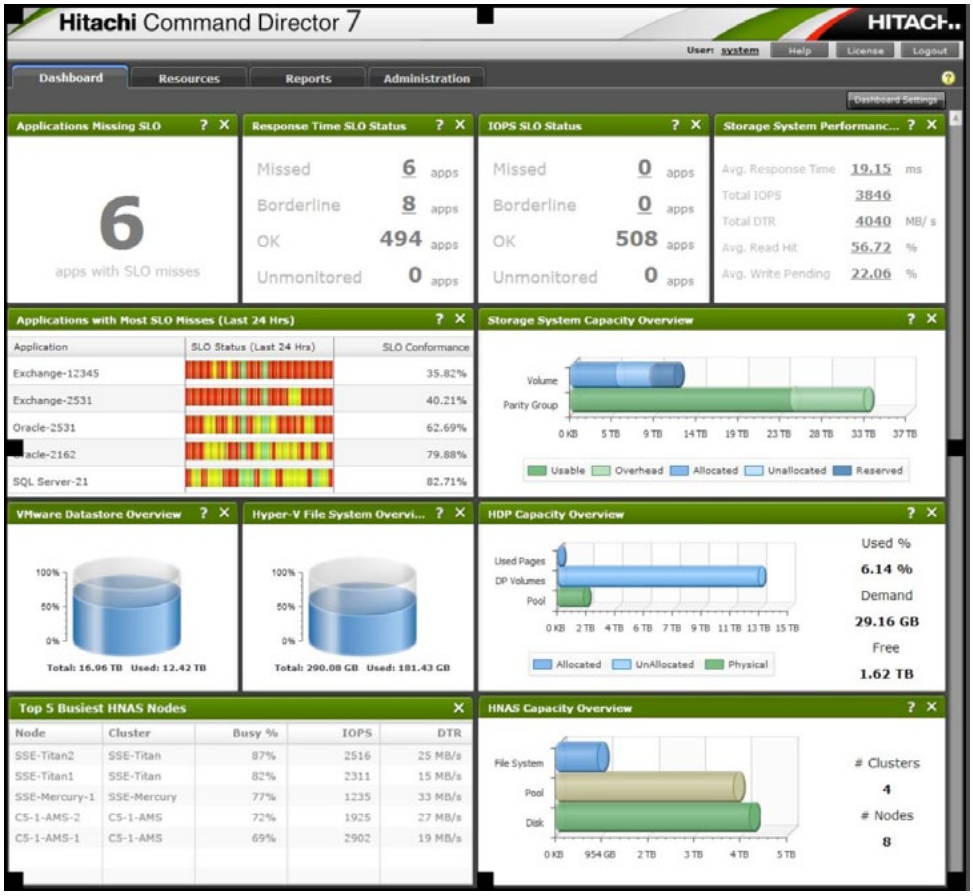
Hitachi Command Suite provides integrated data mobility within its centralized management console with Hitachi Tiered Storage Manager that simplifies the process of managing and moving data between storage tiers. As data storage requirements change over time, data migration tasks required for data lifecycle management must not interrupt business application operations. With its unique ability to move data volumes nondisruptively across storage pools and storage systems, Tiered Storage Manager provides an efficient data management solution, enabling administrators to get data when and where it is needed most. Tiered Storage Manager enables easy and interactive matching of application-driven cost, performance and availability requirements to storage system and tier characteristics.

Service-level Management

Hitachi Command Director software centralizes service-level management for Hitachi Command Suite by consolidating storage configuration, tier, policy, capacity and performance data to enable informed management decisions. By providing a business-oriented view into the storage environment, Hitachi Command Director simplifies application-to-storage capacity and performance reporting across block, file and unified storage environments, while enabling the implementation of application-based storage service levels.

From a global dashboard of the storage environment (see Figure 8), an administrator can quickly organize storage assets with specific service-level objectives by application and monitor service levels to ensure they are being met. By accurately monitoring key capacity and performance statistics provided to critical business applications and file servers, compliance to application service levels can be properly monitored and enforced.

Figure 8. Hitachi Command Director Global Dashboard



Virtual Server Management

Hitachi Command Suite also provides an ideal storage management framework to complement virtual server environments, such as VMware and Microsoft Hyper-V. HCS provides end-to-end visibility and correlation from application to virtual machine (VM) to the individual logical device on the Hitachi storage system.

For VMware, HCS uses a plug-in to VMware's vCenter management application to identify and associate virtual servers and VMs to logical storage devices on the Hitachi storage system. Using this information about the VMware ESX server and its data stores allows HCS to properly configure and manage storage for each VM. In addition, the correlation from VM and data store to storage allows Hitachi Tuning Manager to properly analyze capacity and performance information about each VM and identify the root cause of any storage performance issue. Similarly, advanced service-level reporting and management for business applications running on VMs is available from Hitachi Command Director.

NAS Performance Management

Performance reporting and management for Hitachi Unified Storage Platform file-based volumes is fully supported in Hitachi Command Suite. Managing those volumes is as simple and easy as any other block storage. File storage volumes can reap the benefits of advanced capabilities, such as external storage virtualization, Hitachi Dynamic Provisioning and Hitachi Dynamic Tiering to simplify management. In addition, advanced reporting in Hitachi Command Director provides storage

capacity performance reporting for Hitachi Unified Storage as well as file systems, clusters, storage pools and nodes. Only HCS offers this seamlessly integrated suite across all data types, whether block, file or unified, to simplify management, improve productivity and reduce costs.

Mobile Management

The Hitachi Command Suite for iPad App provides mobile access of global management dashboards to properly monitor a Hitachi storage environment from anywhere. By consolidating management operations across HCS, administrators can continuously monitor their storage infrastructure and mission-critical business applications from their iPads around the clock with increased flexibility and convenience, while still lowering operational costs.

Automated Tiered Storage Management

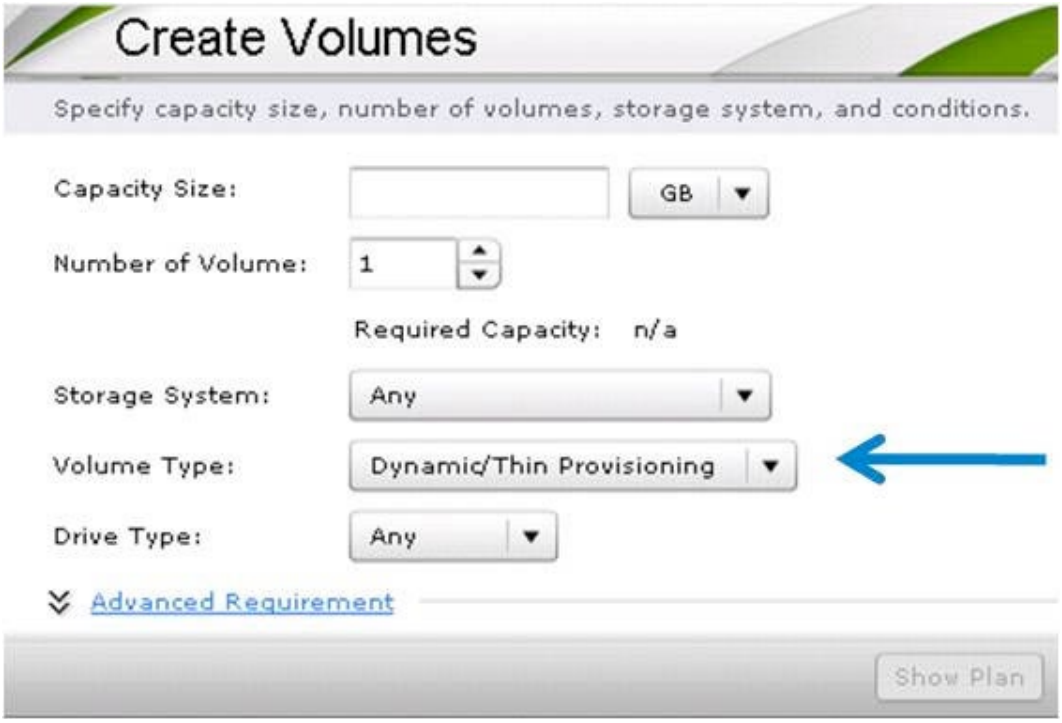
Dynamic Provisioning

Dynamic provisioning or thin provisioning has quickly evolved from "leading edge" to "must have" in networked storage. Hitachi Command Suite has integrated Hitachi Dynamic Provisioning software (Hitachi branded thin provisioning technology) into its storage configuration procedures. There is a link on the general task list to create a Dynamic Provisioning pool. This brings up a menu screen where the user selects the storage system, the pool name and then selects the parity groups to assign to the pool. Advanced options are available on the same menu, and, with other management commands, the pool creation can be executed immediately or scheduled for a later time.

HCS offers ease and flexibility in managing Dynamic Provisioning pools. Reporting on pools is provided within the suite similar to standard volumes. It provides the status of each pool, such as used or allocated capacity and percent full. Detailed reports are available on assigned parity groups and virtual volumes within the pool. Pool management is available via menus or a "right click" to expand the pool, create additional volumes, allocate storage or edit pool options, such as threshold alert levels.

Creating Dynamic Provisioning volumes is as simple as creating "standard" volumes. The same menu is used for both (see Figure 9). Simply specify the Volume Type as "Basic" or "Dynamic/Thin Provisioning."

Figure 9. Create Volumes Screen in Hitachi Command Suite



Under the advanced options, for basic volumes the user can select the specific parity group and for Dynamic Provisioning volumes the user can select from available pools.

HCS leverages the benefits of Dynamic Provisioning to use storage more efficiently. It eliminates the need for storage provisioning micro-management, while taking advantage of wide striping and dynamic load balancing to optimize performance, reduce waste and maximize storage utilization.

Dynamic Tiering

Hitachi Dynamic Tiering provides automated page-based tiered storage management. Data is dynamically moved to the appropriate tier based on its usage. The most frequently accessed data is moved to the top tier and less frequently accessed data is placed in a lower tier. Dynamic Tiering leverages the technology used in Dynamic Provisioning to create a pool consisting of multiple tiers.

The management of Dynamic Tiering pools and volumes is also integrated into Hitachi Command Suite. The same menus and commands can be used to create these as any other types of storage. When a user creates a pool, there is an option to create it as a Dynamic Tiering pool. Otherwise, it is created as a Dynamic Provisioning pool. The difference is that for a Dynamic Tiering pool, the user specifies up to 3 tiers and selects the parity groups for each tier.

HCS enables storage administrators to take full advantage of the capabilities and benefits of Dynamic Tiering without manual management of storage tiers, manual data classification or data migration. Data stored in a Dynamic Tiering volume is automatically moved to the most appropriate storage tier: the most critical, most frequently accessed data will be stored on the highest performing tier, such as flash or solid state disk (SSD); infrequently accessed data will be moved to a lower tier and reduce costs by taking advantage of less expensive disks, such as SATA. All

movement is accomplished without causing any performance degradation. Just as with Dynamic Provisioning, only pages with data written to them will take up physical disk space, improving capacity utilization and reducing waste. Data will be dynamically allocated across each tier, taking advantage of wide striping and load balancing for optimal performance.

Summary

Hitachi Command Suite helps to establish the unified management required for all Hitachi storage systems. This drives the Hitachi Data Systems vision of IT that is virtualized, automated, cloud-ready and sustainable: IT that transforms data centers into information centers. Hitachi Command Suite raises the bar in integration, simplification and unification of information management across all data types. The capabilities of each product in the suite have been enhanced to support the latest advanced Hitachi storage technologies, particularly in the area of storage virtualization.

The use of wizards and intelligent defaults saves storage administration time, reduces errors and improves productivity. The most commonly used management commands are displayed on the task list, by function, so they are always at your fingertips. Hitachi Command Suite simplifies management and minimizes wait times, allowing your administrators to focus on other, more strategic activities. The intelligence of the software reduces displays and menus to the available configuration options, saving time and eliminating errors.

The built-in intelligence in Hitachi Command Suite not only simplifies administrative tasks, but also helps users leverage existing Hitachi best practices in storage management. Combined with Hitachi Dynamic Provisioning and Hitachi Dynamic Tiering, these practices dramatically increase the level of automated management and self-optimization in Hitachi storage solutions. Administrators can focus on fine-tuning, monitoring and managing the exceptions in their storage environment.

With Hitachi Command Suite, you can leverage existing IT investments longer, reduce operational costs without added complexity, and increase storage asset utilization and efficiency. Hitachi Command Suite enables your organization to properly align the management practices needed today for your unique infrastructure environment while appropriately planning for future growth.

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