

Insurance Giant Simplifies Infrastructure with Hitachi Data Systems Virtualization Solutions

Case Study

By Vijay Ramaswamy

June 2009



Executive Summary

The lifeblood of almost every organization is data and the requirements to groom, maintain and access the systems that store that data are absolutely necessary for supporting business operations. With the sheer amount and types of information that must be stored, complexity in the data center tends to grow as quickly as the amount of data itself. And with IT staff resources representing as much as 40 percent of the total cost of storage ownership, it is no wonder organizations are seeking solutions to dramatically simplify storage management.


German insurance company HUK-Coburg has been diligent in its determination to manage data growth as efficiently and cost effectively as possible. With expansion of the insurance services and products it provides to more than 8.8 million German households, and an accumulation of acquisitions and branch offices, HUK-Coburg has experienced several surges in the volume and complexity of its storage environment. As requirements for availability, performance and scalability increased so did the need to simplify administration and reduce both capital and operational expenses.

To adeptly meet new business conditions, HUK-Coburg implemented a wholly virtualized, multitiered storage solution based on a pair of Hitachi Universal Storage Platform™ V systems. HUK-Coburg makes extensive use of Hitachi data mobility and virtualization technologies to dramatically simplify its storage environment, improve storage utilization, and reduce operational costs and risks. The entire storage infrastructure is managed as a single pool of virtualized storage via a single, easy-to-use management interface. HUK-Coburg uses Hitachi Tiered Storage Manager software and Hitachi Tuning Manager software to further define the capabilities of the enterprise and simplify how data is migrated and monitored throughout the tiered architecture.

For best results use Acrobat Reader 8.0

Contents

Introduction	1
Evolution of IT Infrastructure at HUK-Coburg	1
Storage Goals to Support a Growing Business	2
Simplify the Storage Environment through Virtualization	2
Ensure Business Continuity	2
Align Storage Tiers to Business Needs	2
Simplify Data Migration	2
Reduce Operational Costs	3
Reduce CAPEX Costs	3
What's in the Data Center	3
Implementing a Hitachi Multitiered Storage Solution	4
Understanding Data Classification	4
A Look at Best Practices	5
The Design for Multiple Tiers	5
Virtualizing the HUK-Coburg Storage Environment	6
Hitachi Controller-based Virtualization	6
Configuring the Data Centers	6
Delivering Premium Storage Coverage with Hitachi Software	8
Meeting Provisioning Demands with Hitachi Dynamic Provisioning Software	8
Meeting Data Mobility Demands with Hitachi Tiered Storage Manager Software	9
Monitoring Data Performance with Hitachi Tuning Manager Software	11
Reducing Complexity, Costs and Barriers to Multitiered Storage	13
Realized Benefits at HUK-Coburg	13
Enhanced Functionality of Midrange Storage Systems	13
Alignment of Storage Tiers with Business Needs	13
Improved Performance and Managing Service Level Agreements	13
Improved Operational Efficiencies	14
Capacity Reclamation and CAPEX Deferral	14
Ease of Application Provisioning and Time to Market	14
Appendix A: HUK-Coburg Profile	15



Insurance Giant Simplifies Infrastructure with Hitachi Data Systems Virtualization Solutions

Case Study

by Vijay Ramaswamy

Introduction

HUK-Coburg is a mutual insurance company with a rich, long history that follows Germany's political changes and the country's history of motorization. The company was founded in 1933 in Erfurt, Germany, as the number of motor vehicles registered in Germany grew to half a million and automobiles were considered a status symbol. Several years later in the early 1950s, the company was re-established in Coburg, West Germany, and soon began to flourish again. The 1950s and 1960s brought massive motorization to private households in West Germany, and by 1970 more than one million vehicles were insured by HUK-Coburg. When the country was reunified in 1990, one quarter of HUK-Coburg's new auto insurance business developed in what had been East Germany.


Today, nearly one-sixth of German vehicles and 8.8 million households are insured by HUK-Coburg. The company significantly expanded its products and services with several strategic partnerships and acquisitions, new online insurance services and more than 400 customer service centers. In addition to automobile insurance, HUK-Coburg now provides property and casualty insurance, life and health insurance, plus financial products.

Evolution of IT Infrastructure at HUK-Coburg

Also growing at an aggressive rate is the volume of business data and customer records that HUK-Coburg generates and retains annually. In September 2005, the HUK-Coburg data storage infrastructure was upgraded from a multiplatform model to a multitiered storage solution supporting a heterogeneous environment, based on the Hitachi Universal Storage Platform™, for primary and secondary data centers that are each located within different headquarters buildings. Due to excessive data growth and the establishment of a new data center located in another facility several miles away, HUK-Coburg next wanted to upgrade storage capacity and replicate data to the remote site for business continuity purposes. HUK-Coburg refreshed the storage environment with two Hitachi Universal Storage Platforms, each with 18TB storage capacity, and Hitachi Thunder 9585V™ modular storage systems virtualized behind the Universal Storage Platforms.

To streamline storage efficiencies at HUK-Coburg, the secondary onsite data center was consolidated and shut down. Soon after the consolidation the Universal Storage Platforms were upgraded. At present, the primary onsite data center and the offsite disaster recovery facility manage and protect all the company's critical data.

Several factors have increased the organization's demand for availability, performance, scalability and simplification of the storage environment. With the increase in business operations and mandatory regulations for data protection and retention, HUK-Coburg data must be stored and retrievable for longer periods of time. Noncompliance can result in stiff legal and financial penalties, so ensuring the company's ability to meet future requirements is essential. To continue providing reliable and high-performance storage support for expanding production operations and application demands, HUK-Coburg also determined that the storage environment should be nearly limitless in its ability to expand with growth requirements. By optimizing data assets, promoting even greater efficiency and simplicity across the environment, and further defining storage class attributes,



the IT infrastructure will remain highly aligned with business goals. Consequently, HUK-Coburg will be able to drive company growth and profitability while effectively managing risk.

This case study examines the latest storage architecture at HUK-Coburg, based on Hitachi Universal Storage Platform V systems, each with 80TB internal capacity and 45TB external capacity virtualized behind them on Hitachi and IBM platforms. Making extensive use of Hitachi data mobility and virtualization technologies, HUK-Coburg expects to dramatically simplify its storage environment and reduce operational costs and risks.

Storage Goals to Support a Growing Business

HUK-Coburg has always focused on providing excellent coverage and customer service, while emphasizing internal efficiencies. With an 80 percent growth rate forecasted in business operations and data volumes, HUK-Coburg developed several goals to help the company improve service levels and data access while reducing operational inefficiencies and related costs.

Simplify the Storage Environment through Virtualization

One way to effectively reduce operational costs is to reduce complexities within the storage environment by allowing data to be virtualized and managed as a single pool of storage. Through controller-based virtualization, internal and external storage systems can be brought together in a virtualized environment to increase utilization and share resources, enabling all storage to then be monitored, migrated and managed with one common interface.

Ensure Business Continuity


By implementing identical storage architectures in both the primary site and the disaster recovery facility and virtualizing all storage assets, HUK-Coburg is able to ensure business continuity in case of disaster. Specifically, HUK-Coburg implemented Hitachi Universal Replicator software to replicate data between the Hitachi Universal Storage Platform V systems across the two data centers.

Align Storage Tiers to Business Needs

All data is not equal in its importance to the organization, and the value of data changes throughout its lifecycle. By classifying data according to specific service level requirements and then matching data to corresponding storage tiers, organizations are better able to optimize IT infrastructures and costs. Prior to refreshing the IT environment with the Universal Storage Platform V systems, HUK-Coburg had implemented a three tiered storage environment to support high availability requirements and quality of service (QoS) needs. Now, HUK-Coburg will further define storage classifications and distinguish the quality characteristics and performance attributes for each storage tier. In this way, the company will be positioned for sustainable data growth and mobility and able to continuously support the ongoing alignment of data demands and resources.

Simplify Data Migration

Once data is classified, being able to move applications between the storage tiers is crucial to satisfying service requirements. Data mobility allows administrators to move non-critical or older records to lower tiers for cost effective storage, while keeping premium assets, such as production data, on higher performance tiers to optimize the entire storage environment. Data migration processes within the virtualized pool must therefore be easy to execute without hindering business operations. HUK-Coburg had been using host-based migration tools — which only move data locally between the application and the host system. That meant data movement was somewhat cumbersome and required applications to be brought down, causing slight disruptions to production operations. Being able to transparently move data was a top priority to avoid disruptions to produc-



tion operations. The company also wanted to standardize, automate and simplify migration procedures for all internal and external storage virtualized through the Hitachi Universal Storage Platform V systems.

Reduce Operational Costs

Minimizing the cost of doing business is always an asset to organizations seeking to be profitable. The IT department at HUK-Coburg is considered a cost center — which adds to the expense of running the company — and must operate as efficiently and cost effectively as possible. In examining ways to reduce its total cost of ownership within the IT department, HUK-Coburg learned that the virtualization and tiered storage management technologies offered by Hitachi Data Systems would significantly aid in lowering the time and expense of managing the storage environment.

Reduce CAPEX Costs

Managing a tight budget and supporting growing storage needs is always a challenge. HUK-Coburg is always looking at ways to reduce capital expenditure or at least defer them. With dynamic provisioning, HUK-Coburg is utilizing the existing disk storage more efficiently, which has delayed the need for additional capital outlay. Additionally, when they do need to go forward for approval to acquire additional storage, it will be easier to justify the request as they can show that the existing storage is actually being used, not just allocated.

What's in the Data Center

HUK-Coburg operates a primary data center and an offsite disaster recovery site located approximately four miles away. Each site has a Universal Storage Platform V that consolidates both NAS and SAN storage and supports multiple operating systems and applications, with both IBM and Hitachi storage virtualized behind it.

- **Primary Storage Platform for Virtualization, Simplification and Business Continuity**
 - Hitachi Universal Storage Platform V

- **Storage Systems Virtualized behind the Universal Storage Platform V**
 - (1) Hitachi Adaptable Modular Storage 1000
 - (1) Hitachi Thunder 9585V modular storage system
 - (1) IBM® System Storage™ DS4800™
 - (2) Brocade DCX Director switches

- **Native SAN-connected Storage Systems**
 - (1) Hitachi Thunder 9585V modular storage system
 - (1) IBM System Storage DS4800

- **Software Running on the Hitachi Universal Storage Platform V**
 - Hitachi Tiered Storage Manager
 - Hitachi Tuning Manager
 - Hitachi Universal Replicator
 - Hitachi Dynamic Provisioning



- **Servers, Operating Systems and File Servers supported by Universal Storage Platform V**

- IBM z/OS®
- IBM AIX®
- Microsoft® Windows® Server 2003/8
- Windows Powered NAS [based on Windows 2000 (Win2K) Server]
- VMware ESX 3.0
- HDS-NetApp® Enterprise NAS Gateway (GF940)

- **Key Applications supported by the Universal Storage Platform V**

- IBM DB2® for z/OS
- Oracle 10.2 RAC ASM
- Microsoft Exchange® Server 2007
- Microsoft SQL Server
- HUK Media Service document management and archival solution
- HUK Media Service Capture Flow document scanning solution

Implementing a Hitachi Multitiered Storage Solution


HUK-Coburg implemented an intelligent multitiered storage solution based on the Hitachi Universal Storage Platform V. The Hitachi intelligent tiered storage architecture classifies data according to the service level needs of business applications, then efficiently aggregates and moves that data to the correct storage tier. Tiering the storage architecture ensures that applications are always available and resources are appropriately managed.

In a tiered storage environment, administrators gain the flexibility to establish guidelines for how and where the organization's information is stored. For example, in Germany, all insurance policy holders are required to renew their policies by the end of each November. For HUK-Coburg, that translates to very high application demands and production operations during the weeks that immediately precede and follow policy renewal periods. In a heterogeneous multiplatform environment, performance bottlenecks and storage utilization issues can emerge, slowing or even interrupting production. With a tiered storage architecture, HUK-Coburg is able to assign data according to the performance and availability needs required to meet these fluctuations, thereby eliminating barriers to sharing and improving capacity utilization.

Understanding Data Classification

Data classification is the mapping of business requirements to the storage infrastructure. The catalyst for storage data classification has traditionally been improved efficiencies in order to free up priority space by migrating aged data to less expensive tiers. But because business imperatives often depend on immediate access to company records, the modern storage environment seeks to classify beyond performance and cost to support the organization's data lifecycle with greater data mobility.

Architecting tiered storage should be based on an understanding that the value of data changes during its lifespan — this in turn affects where data resides at any given time and how best to manage it. Proper classification at the onset of assigning data to storage tiers can alleviate the painful reliance on “corporate memory”



to piece together historical records for governmental or legal summons while mitigating the potential loss of productivity and money to data retrieval.

A Look at Best Practices

HUK-Coburg implemented a data classification strategy to support its information lifecycle, based on several best practices, which would result in a more agile and economically shrewd organization.

Alignment of Data Classification with Business Operations

The assignment of data within a tiered storage infrastructure can directly impact the QoS levels, the working relationships with business units and the ability to reduce costs by storing data on appropriate classes. To best manage data assets and balance efficiencies, HUK-Coburg wanted tighter alignment between the company's priorities and how data was organized on the Universal Storage Platform V.

Understanding the Patterns of Data Lifecycles

Data classification is dynamic as data objects move from one class of storage to another. Categorizations tend to change as business strategies and requirements are modified. By framing a highly flexible tiered storage arrangement, HUK-Coburg will help to ensure its ability to adapt to future changes.

Manageability of the Tiered Storage Environment

Executing a well designed plan for storage assignment should include the ability to effectively manage the movement of data between tiers. Enabling the flow of data migration through the use of automation and management tools is essential to simplifying the storage infrastructure and meeting business expectations.

The Design for Multiple Tiers

The HUK-Coburg IT environment is now organized according to four classes of storage.

Higher Performance Storage without Availability

Data assigned to this tier is internal to the Universal Storage Platform V and does not require replication to the offsite data center. HUK-Coburg stores mission critical data such as production applications on this tier to achieve high performance, high availability and near zero downtime.

Higher Performance Storage with Availability

Data assigned to this tier is externalized to the Universal Storage Platform V and is replicated to the offsite data center.

Lower Performance Storage without Availability

Data assigned to this tier is internal to the Universal Storage Platform V and does not require replication to the offsite data center. HUK-Coburg stores business critical data on this tier with reasonable performance and availability, usually with recovery windows of less than eight hours.

Lower Performance Storage with Availability

Data assigned to this tier is externalized to the Universal Storage Platform V and is replicated to the offsite data center.

Virtualizing the HUK-Coburg Storage Environment

The tiered storage architecture relies on heterogeneous virtualization technology to seamlessly and quickly move storage allocations between tiers as dictated by business demands and changes. When insurance agents and customer representatives need urgent information, for example, the heterogeneous storage environment must be able to perform nondisruptive, cross vendor provisioning, copying and access to meet these service needs.

Storage virtualization technology consolidates multiple vendor storage systems into a single pool of storage through a unified management interface. While storage virtualization is a phrase common in the storage industry, several types of virtualization solutions exist, many of which require new layers of management complexity or vendor lock-in, and may not support all server types in the heterogeneous environment.

Hitachi Controller-based Virtualization

Unlike server-based virtualization or SAN-based virtualization, for example, Hitachi platforms offer fully featured, controller-based virtualization with pervasive support for heterogeneous storage, which allows the entire data center to be managed as one virtual disk drive from a single interface. That means virtualization and tiering are handled through the Hitachi storage controller for both internal and externally attached heterogeneous storage, including mainframe storage. The Hitachi Universal Storage Platform V consolidates both NAS and SAN, and uses one set of GUI-based tools to securely migrate, configure, automate, monitor and manage that storage. Hitachi platforms scale up to 32 petabytes of managed storage capacity in a virtualized environment.

The primary data center, situated in HUK-Coburg headquarters, is known as the R3 Data Center. The new off-site disaster recovery facility, the R7 Data Center, is located several miles away. The data centers are configured as mirror images and are designed to support a dual-vendor strategy for storage acquisition.

“While we depend heavily on Hitachi Data Systems to reliably run our business and scale as we grow, we also support a mainframe environment for relational database systems,” says Renar Grunenberg, manager of data administration at HUK-Coburg. “The Hitachi platform allows us to seamlessly virtualize and manage all the storage for both mainframes and open systems with a single integrated interface.”

Configuring the Data Centers

A Universal Storage Platform V forms the nucleus of each HUK-Coburg data center, configured with 80TB of internal storage capacity and 45TB of external capacity (see Figures 1 and 2). The platforms provide external storage virtualization, logical resource partitioning and universal replication — all from a single management interface — for flexible movement of data between tiers. Rather than requiring dedicated hardware such as management servers or application blades or separate management software for each application, the Universal Storage Platform V provides a centralized interface and intuitive software to unify the entire storage enterprise.

Virtualized behind one of the Universal Storage Platform V systems as back end storage are one Hitachi Thunder 9585V modular storage system and a Hitachi Adaptable Modular Storage 1000. Also virtualized behind each of the Universal Storage Platform V systems is an IBM System Storage DS4800 disk storage system supporting VMware virtualization software.

Each data center contains a HDS-NetApp Enterprise NAS Gateway (GF940) solution that functions as a highly scalable diskless file server and connects to the SAN through Brocade DCX Director switches. These filer gateways allow data accessibility to a broad range of servers and applications and are used to consolidate data behind the Universal Storage Platform V systems.

“By virtualizing external storage assets — including the IBM System Storage DS4800 systems — behind the Universal Storage Platform V, HUK-Coburg is able to simplify the entire storage infrastructure from a common interface. Managing data as a single entity helps improve resource utilization while ensuring that availability and performance requirements are met,” Grunenberg explains.

Figure 1: Data Center Configuration

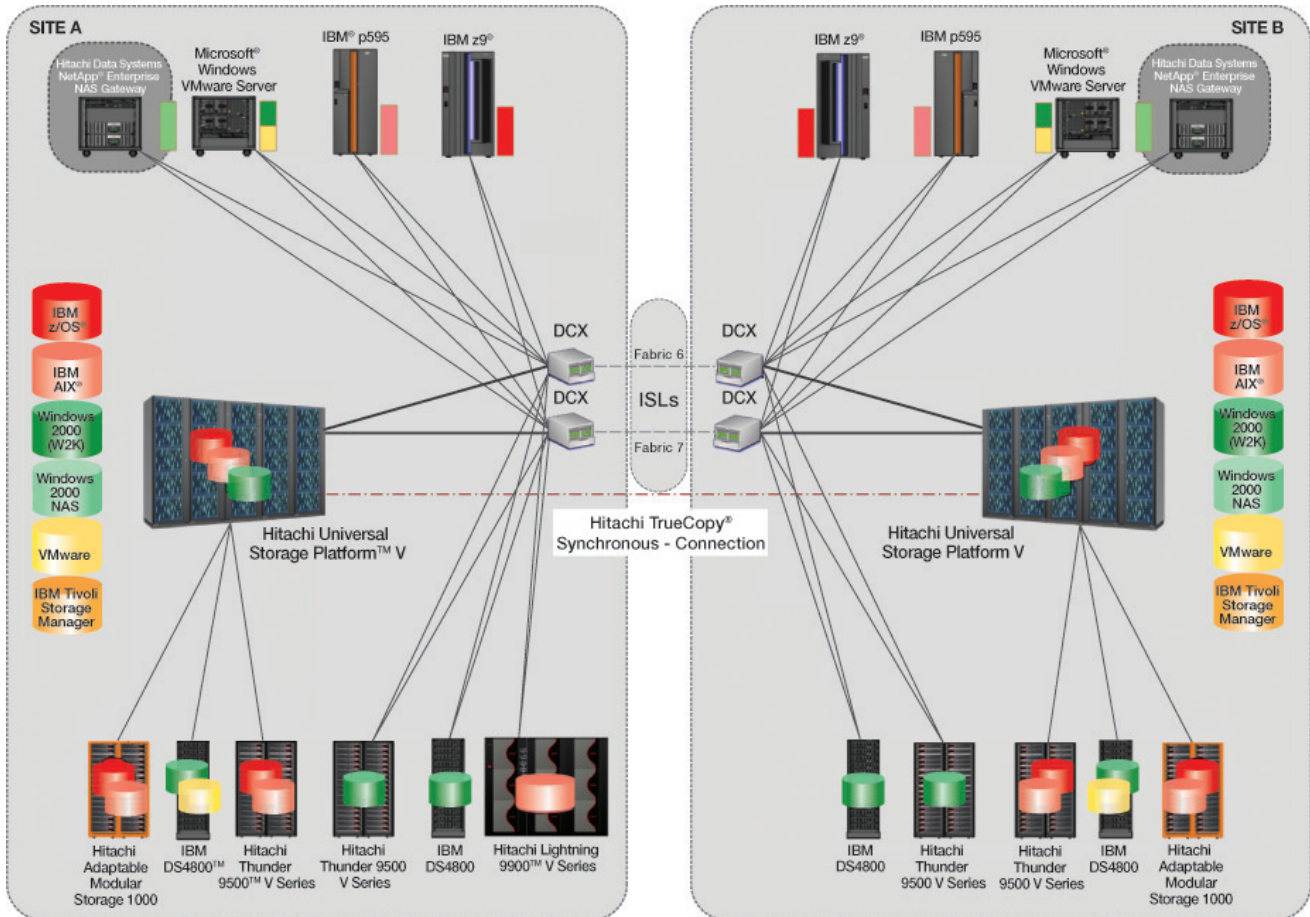
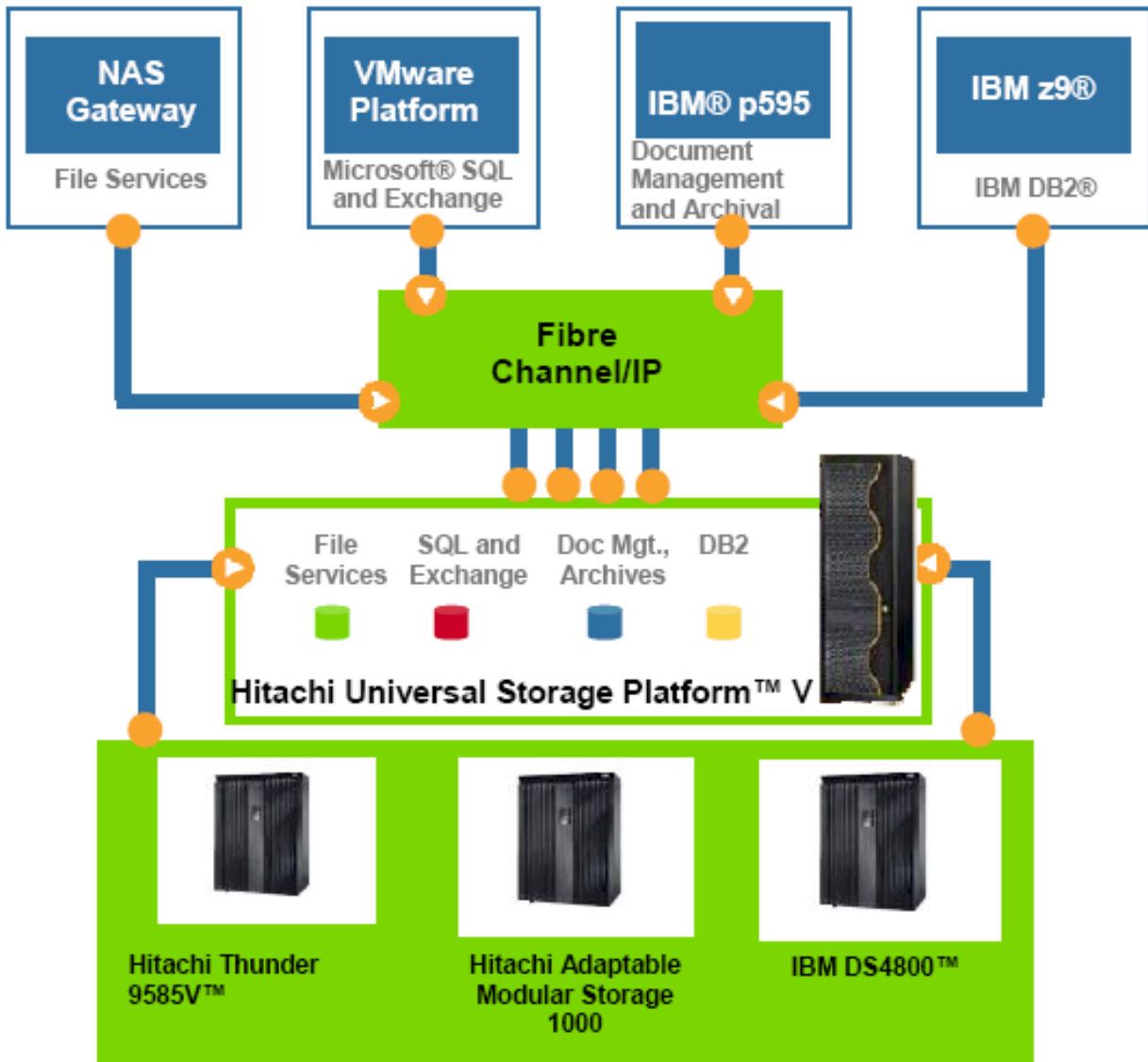


Figure 2: Virtualization of Various Servers behind Universal Storage Platform V



Delivering Premium Storage Coverage with Hitachi Software

HUK-Coburg uses the elegant Hitachi Storage Command Suite of software to exploit virtualization of its tiered storage architecture with exceptional data mobility and performance monitoring tools, most specifically Hitachi Tiered Storage Manager and Hitachi Tuning Manager software.

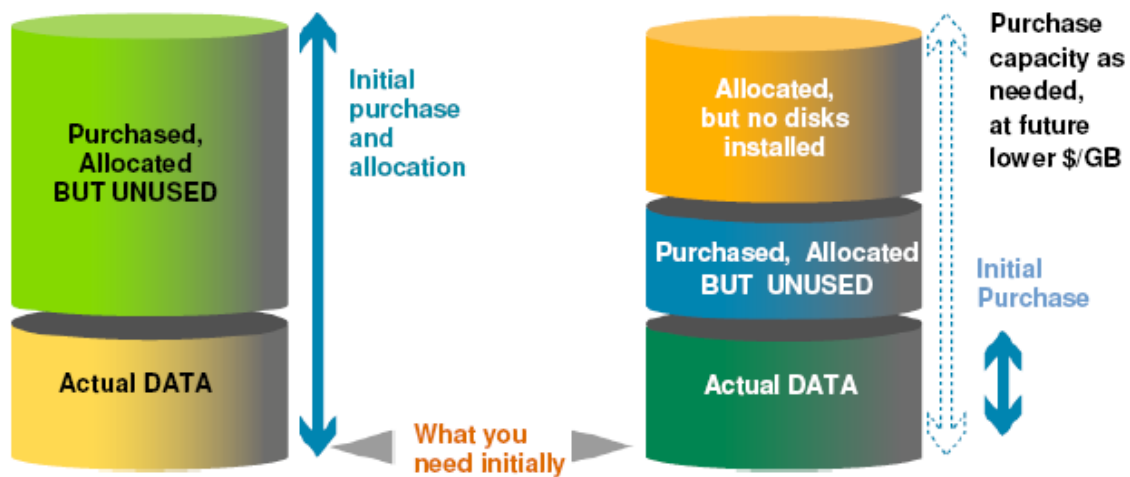
Meeting Provisioning Demands with Hitachi Dynamic Provisioning Software

Hitachi Dynamic Provisioning is a thin provisioning software product, which provides virtual storage capacity from a storage pool. It has no operational overhead and decreases the administration costs normally incurred with provisioning new storage. It also improves the availability of applications by reducing the downtime

needed for the storage provisioning process. Dynamic Provisioning enables the definition of large amounts of virtual disk storage, allowing overallocation to applications and providing for planned and/or unplanned growth. When an application actually requires additional physical capacity HUK-Coburg can allocate it from a storage pool nondisruptively.

With Dynamic Provisioning, HUK-Coburg has eliminated the complexity and costs of provisioning storage volumes on a per application basis. Without Dynamic Provisioning, they typically overallocated storage for each application to avoid the impact associated with incrementally allocating just enough additional storage to meet the current need. With Dynamic Provisioning, they can still overallocate but only by provisioning storage from the storage pool, as it is needed (see Figure 3). This has reduced the need to request and justify additional investments in storage to be allocated to applications for future needs, not immediate use.

Figure 3. Storage Provisioning without (left) and with (right) Dynamic Provisioning




How It Works

With Hitachi Dynamic Provisioning software, administrators can allocate large amounts of virtual disk storage to an application but provision just enough physical storage to meet the short term requirements. When additional storage capacity is actually needed, it can be allocated from the Dynamic Provisioning storage pool with no impact to the availability of the application. Dynamic Provisioning eliminates the need to take the application down to change the storage configuration, a procedure that is typically required when adding physical disk capacity. This significantly reduces the planned outages required to increase physical storage capacity and change the application server and storage system configurations. Dynamic Provisioning significantly improves the efficiency of managing and using storage and increases the number of terabytes of storage that each storage administrator can manage. Physical disk requirements can be reduced due to more efficient utilization of the existing disk storage, resulting in environmental savings in floor space, power and cooling.

Dynamic Provisioning software can also return unused storage to the Dynamic Provisioning storage pool. It does this by examining a volume's physical capacity, and when it determines that no data other than zeros exist on a Dynamic Provisioning pool page, the physical storage page is unmapped and returned to the pool's free capacity and made available for re-use.

Meeting Data Mobility Demands with Hitachi Tiered Storage Manager Software

Data migration is a fundamental element of a total solution for tiered storage. Data mobility is determined by the freedom with which administrators can migrate data between objects — in this case, among virtualized



storage tiers. The ability to easily monitor, move and manage the data is key to simplifying HUK-Coburg's storage infrastructure and eliminating operational inefficiencies.

Tiered Storage Manager software capitalizes on the storage capabilities of the Universal Storage Platform V for better management and greater versatility across the entire storage environment. The software enables secure and transparent data migration between storage tiers or subsystems to reduce IT and business risks by providing:

- **Easy-to-use management automation** — replaces manual processes, guides migration and reduces human error
- **High application availability** — decreases or eliminates downtime required to conduct data migration
- **Tiered data mobility** — seamlessly adapts to changes in business and application needs and minimizes restrictive migration windows

Tiered Storage Manager software uses a single point of management, allowing administrators to best match application QoS levels to storage assets, including mainframes and open systems. Administrators are also able to provision storage on the fly to quickly meet requirements for new and existing applications without affecting application access or interrupting current operations. Independent analyst research concludes that by using Tiered Storage Manager, organizations are able to perform data migrations online, transparently and without user disruption to minimize downtime, risks and costs associated with staff time and data loss.

How It Works

To support HUK-Coburg's desire for simpler data migration, Tiered Storage Manager software delivers easy-to-perform volume movement and provisioning through the choice of a graphic user interface or command line interface. With only a few steps to migrate data, Grunenberg's team is able to rapidly respond to provisioning requests and storage reassignment tasks in a secure migration environment. Grunenberg standardized the storage volumes to abridge the complexities often associated with migration across tiers. He uses a one-to-one relationship for migration by defining two sizes of LUN capacities — 9GB and 25GB — so that migration within the tiers is accomplished by mapping between LUN volumes of the same size.

“We normally migrate data twice monthly. This standardization of LUN size significantly reduces migration complexities for us because we have eliminated the need to find similar capacity volumes on other systems in order to migrate data. As a result, we greatly lower risks and gain migration transparency,” Grunenberg says.

Tiered Storage Manager also supports HUK-Coburg's need for greater storage functionality. As with many organizations that must comply with stringent or long term data retention policies, HUK-Coburg needed an extraordinary amount of flexibility for choreographing the efficient travel and destinations of its data. Tiered Storage Manager steps up to that challenge by offering easy search capabilities and customizable storage pooling. There is no limit to the number of storage tiers that Tiered Storage Manager will allow, and storage volumes can reside on multiple tiers to eliminate common migration constraints. In addition, Tiered Storage Manager links to Hitachi Tuning Manager software to receive actual I/O performance metadata of particular LUNs for use in richer profiling.

Another advantage of employing Tiered Storage Manager software is HUK-Coburg's ability to better maneuver the storage management of its AIX and Windows applications. Tiered Storage Manager provides host level visibility to better control volume migration and view storage resources. Virtualized through the Universal Storage Platform V and guided by the Tiered Storage Manager, multiple IBM and Microsoft Windows systems are now easily and efficiently migrated and managed. The list includes IBM DB2 for z/OS running on an IBM mainframe; key financial databases running on the IBM AIX operating system; and Microsoft Exchange Server, Microsoft SQL Server, applications running on VMware software, and a large document management system running on Windows.

Monitoring Data Performance with Hitachi Tuning Manager Software

Optimizing storage is always desired but rarely achieved without the ability to monitor the performance of components within the environment. Organizations have long attempted to control the storage infrastructure by compiling metrics on performance and capacity in a variety of ways: reviewing command line scripts, building custom applications and employing vendor-supplied tools. Analyzing and reporting usually involve compiling data into spreadsheets. These partially manual operations for data gathering amount to a daunting undertaking, especially when each database, SAN switch, server and storage system has its own set of monitoring and reporting tools. Managing separate performance devices means managing a multitude of user interfaces, data repositories and skill sets. While measurement is an effective way to understand performance or capacity at a point in time, the timeliness and completeness of that information does not actually fix issues when they occur — or, more importantly, provide notification at critical thresholds before potential problems arise.

Continuous real time performance and capacity monitoring is vital to busy organizations managing multiple tiers of storage to meet service level needs for data and applications that run the business. Monitoring and reporting tools should provide organizations with immediate visibility across the entire virtualized environment. The ability to view the current state of IT resources such as hosts, filers, databases, SAN components and storage systems helps with forecasting as well as on-the-spot decision-making. The ability to quickly query and display comparative views of baseline performance and real time behavior removes guesswork and allows administrators to correlate changes in workloads, physical components and operations with an application's performance. In a recent survey conducted by independent storage analysts, more than 36 percent of storage administrators reported experiencing application performance issues during the course of normal data migration within tiered storage infrastructures.

Meeting the rigorous performance demands and continual capacity fluctuations of enterprise tiered storage requires intuitive, automated safeguards such as early detection and preventive notification. Hitachi Tuning Manager software is an advanced resource management solution that monitors, reports and forecasts storage performance and capacity in relation to the entire storage network. With the functionality to map, supervise, analyze and communicate the activities and characteristics of all tiers, Tuning Manager helps to deliver on the promise of optimization offered by a total tiered storage solution.

How It Works

Tuning Manager software begins by identifying all the storage, host, filer and other attached devices on the network. Next, Tuning Manager diagnoses and quantifies the performance, capacity and utilization levels of each system on the network. By continuously capturing hundreds of performance metrics, Tuning Manager gives administrators instant insight into performance and available capacity along the entire I/O infrastructure at any given time.

Tuning Manager displays performance and capacity summaries and provides drill-down functionality for more in-depth analyses. To understand how the whole IT environment is performing, HUK-Coburg is able to view the infrastructure hierarchy in a concatenated order. For example, the interface produces a new frame on the display panel to show detailed metrics from the perspective of the tiered storage platform out to the individual applications. When Grunenberg clicks to examine the next level down of detail, a new frame appears with the information on the individual systems out to their related ports, devices, disks and so on.

Administrators can select from a full spectrum of monitoring categories that provide metrics and thresholds, most of which are available for real time display, historical trending and troubleshooting. The categories and examples of what is typically monitored include:

- **Storage systems** — measures criticalities such as read I/O per second (IOPS) and write IOPS rates for each port, parity group and logical device, as well as the capacity and utilization percentages for cache

- **Servers** — examines allocations and capacity usage, such as I/O queuing and service intervals, paging operations, wait times, kernel and user modes and memory
- **File systems** — checks usage and capacity for read IOPS and write IOPS, growth rates, read MB/sec and write MB/sec
- **Device files** — monitors average service and wait times, the length of queuing times, read IOPS, write IOPS, read MB/sec transfers and write MB/sec transfers
- **SAN switches** — displays errors and failures related to inter-switch links, signal counts and transmission messages, the flow of buffer credits, and bytes and frames per second
- **Database instances** — shows the execution and memory used for Oracle and Microsoft SQL Server instances

Grunenberg monitors storage performance across the HUK-Coburg environment twice daily. “Having real time visibility of application performance and storage capacity has enabled us to rapidly respond to potential concerns. We have the flexibility to migrate the data related to those issues to another location within the virtualized pool until the issue is resolved — without curbing normal business activities,” he explains.


Tuning Manager software helps HUK-Coburg gain performance predictability by implementing alerts that set filters on performance behaviors. By setting alerts, storage administrators are able to control how and when an alert condition will be assessed. The first step is to specify how alerts will be managed. The administrator selects from a menu of options to designate monitoring intervals, such as during critical processing periods or continuously, and then determines the number of times a threshold must be reached before an alert is triggered — known as the Damping function. The next step is to define an alert, then set or “bind” that definition, which in turn applies the rule to the systems desired, such as all servers associated with a critical application or the storage ports or multiple disk array groups in one or more storage appliances. The third step is to verify the alert definition by testing it in advance of deployment. Verification is carried out through a simple point-and-click operation to open the alert activation window. Once alerts have been activated, Tuning Manager deploys its software agents to proactively detect when definitions are violated and produce a Current Alerts List to show outstanding alerts throughout the infrastructure.

Performance reports are easy to define and produce with mouse-click selections, and the user has a choice of formats in which to display information, including charts, lists and tables. Tuning Manager uses the Performance Reporter function to display standard or customized reports, and then allow administrators to conduct analysis on either real time or recently captured data held in the Tuning Manager database repository. The reports are derived from real time snapshots and historical information for a specified period of time.

The list of standard report products provided with Tuning Manager includes more than 150 possible reports, and each report offers the ability to make basic modifications. Standard capacity reports are available for all servers on the network or subnetworks, as well as individual servers, file systems, device files, and for Oracle and Microsoft SQL Server specifications. Standard performance reports include all storage on the network, select storage systems and servers displayed in a hierarchical structure and stratification of SAN components and Oracle and SQL Server applications.

Customization of Tuning Manager reports is important when administrators need to develop a comprehensive view of a specific object that is being monitored within the environment. Creation of customized performance and capacity reports is accomplished through wizard-based GUIs that prompt the user for particular information needed to tailor the data display.

Tuning Manager software equips HUK-Coburg with real time diagnostics and pinpoint precision of performance and capacity. In addition to instantaneous alerting and reporting capabilities, Tuning Manager helps administra-



tors to adeptly meet service levels dictated by the business applications on each storage tier and collectively across the enterprise.

Reducing Complexity, Costs and Barriers to Multitiered Storage

HUK-Coburg wanted to reduce operational IT expenses by minimizing the cost of doing business, and had determined that capitalizing on Hitachi virtualization and tiered storage technologies would accomplish the goal. While HUK-Coburg previously had a tiered storage environment, the company had been unable to take full advantage of the opportunities that virtualization offered. Its latest storage implementation taps the availability, performance, scalability and versatility of the Hitachi Universal Storage Platform V. With a plethora of robust functionality and intelligent software to take command of the storage enterprise, the Universal Storage Platform V paves the way for painless data growth.

The Universal Storage Platform V delivered ubiquitous and simplified storage administration across the HUK-Coburg storage environment by virtualizing all storage assets into a single pool of storage that IT manages through a unified interface. Having interfaces for each storage system was only serving to complicate the process of managing company data.

Realized Benefits at HUK-Coburg

Enhanced Functionality of Midrange Storage Systems

HUK-Coburg has implemented Hitachi virtualization and replication capabilities, Hitachi Tiered Storage Manager, and Hitachi Dynamic Provisioning on the Hitachi Universal Storage Platform V systems. They have also extended these capabilities to their external storage through the capability of the Hitachi storage platform to virtualize external storage. The virtualization of the external IBM DS4800 and Hitachi Thunder 9585V systems has reduced the number of systems and applications that needed to be managed separately. They are now managed through the common interface of Hitachi storage platform.

Alignment of Storage Tiers with Business Needs

With the implementation of Tiered Storage Manager HUK-Coburg has been able to simplify their data migration procedures and enable higher system availability through nondisruptive data movement. They have improved the search capabilities and the ability to customize their storage pools, resulting in reduced staff time required to complete the semi-monthly data migrations.

Improved Performance and Managing Service Level Agreements

Tuning Manager software has helped HUK-Coburg gain real time visibility across the storage system through the use of Tuning Manager's software agents. These agents meticulously define, monitor, analyze and report on performance and capacity metrics. Storage administrators are now able to pinpoint changes in performance characteristics before they reach critical thresholds and quickly address concerns, avoiding time consuming and costly performance problems. As a result, HUK-Coburg's IT team has significantly reduced the risk of availability issues associated with storage performance bottlenecks, application demands and component failures and errors.

Performance improved by 200 percent after moving to Dynamic Provisioning. This was determined based on processor utilization dropping from 90 percent to 30 percent.

Improved Operational Efficiencies

Prior to implementing Dynamic Provisioning software, HUK-Coburg storage administrators spent time monitoring the performance of every application, watching for hot spots. These hot spots required the movement of data to another location. With the wide striping feature of Dynamic Provisioning, they have eliminated the hot spots, freeing up the administrators for other tasks. In the past, hot spots were discovered a few times each quarter with an estimated operation impact of 40 to 50 hours per quarter. This was eliminated through the use of Dynamic Provisioning. Also, managing all the storage assets as a single pool improves operational efficiencies.

Capacity Reclamation and CAPEX Deferral

HUK-Coburg has applied the thin provisioning capabilities of the Universal Storage Platform V on the IBM DS4800 virtualized behind the Universal Storage Platform to improve performance and reclaim storage capacity. Typically HUK-Coburg goes through two storage capacity upgrades each year with each representing at least a 20 percent capacity increase. Since implementing Dynamic Provisioning HUK-Coburg has reclaimed about 30 percent capacity and has saved an upgrade cycle.

Ease of Application Provisioning and Time to Market

Planning for and implementing new applications required extensive design and planning for the storage layout to ensure there was adequate storage with acceptable performance and availability. The planning included overallocation to avoid future outages due to both planned or unplanned application growth. With the implementation of Dynamic Provisioning, HUK-Coburg has been able to significantly reduce and in some cases eliminate this step, improving time to market for the new applications.

“Since implementing Hitachi Data Systems’ dynamic provisioning technologies, HUK-Coburg has reclaimed 30 percent of storage capacity. We capitalized on Hitachi virtualization and tiered storage technologies to reduce operational and capital IT expenses by minimizing the cost of doing business. We have reduced the number of systems and applications that needed to be managed separately and deferred storage purchases to the future for long term savings, resulting in a lower total cost of ownership. Now we are actually doing more with less — we’re managing more capacity more effectively with less effort and less cost to operate.”

Renar Grunenberg
Manager of Data Administration
HUK-Coburg



Appendix A: HUK-Coburg Profile

- Mutual insurance company established in 1933
- Headquartered in Coburg, Germany
- Serves more than 8.8 million households with automobile, property and casualty, life and health insurance, and financial services
- Has nearly 27.8 million insurance contracts
- Operates 400 customer service centers and 39 sales offices throughout Germany
- Employs 8,500 fulltime and part time representatives and agents
- Second largest motor vehicle insurer in Germany
- HUK business growing 400 percent faster than competition
- Web site: <http://www.huk-coburg.de>

 **Hitachi Data Systems Corporation**

Corporate Headquarters 750 Central Expressway, Santa Clara, California 95050-2627 USA

Contact Information: + 1 408 970 1000 www.hds.com / info@hds.com

Asia Pacific and Americas 750 Central Expressway, Santa Clara, California 95050-2627 USA

Contact Information: + 1 408 970 1000 www.hds.com / info@hds.com

Europe Headquarters Sefton Park, Stoke Poges, Buckinghamshire SL2 4HD United Kingdom

Contact Information: + 44 (0) 1753 618000 www.hds.com / info.emea@hds.com

Hitachi is a registered trademark of Hitachi, Ltd., in the United States and other countries. Hitachi Data Systems is a registered trademark and service mark of Hitachi, Ltd., in the United States and other countries.

IBM, z/OS, AIX and DB2 are registered trademarks and System Storage and DS4800 are trademarks of International Business Machines Corporation.

All other trademarks, service marks and company names mentioned in this document or Web site are properties of their respective owners.

Notice: This document is for informational purposes only, and does not set forth any warranty, expressed or implied, concerning any equipment or service offered or to be offered by Hitachi Data Systems. This document describes some capabilities that are conditioned on a maintenance contract with Hitachi Data Systems being in effect and that may be configuration dependent, and features that may not be currently available. Contact your local Hitachi Data Systems sales office for information on feature and product availability.