



# ENTERPRISE VIRTUALIZATION

ONE PLATFORM FOR ALL DATA



 Hitachi Data Systems

**HITACHI**  
Inspire the Next

# ENTERPRISE VIRTUALIZATION

ONE PLATFORM FOR ALL DATA

# SUMMARY

ONE PLATFORM FOR ALL DATA

WOULD YOU LIKE TO SAVE 20% TO 30% ON YOUR STORAGE SPEND?

We can't slow down your data growth, but we sure can help you buy less disk to support that growth.

STORAGE ECONOMICS IS SIMPLE.

Buy less disk and put more data on lower cost storage.

REMEMBER?

It takes change, but change will be good.

## CONTENTS

- STORAGE VIRTUALIZATION
- DYNAMIC PROVISIONING
- SCALE UP AND SCALE OUT
- MOBILITY AND AVAILABILITY
- SUMMARY
- RESOURCES

In an era of explosive data growth, organizations must evaluate potential technology purchases not only on their technical merits but on their economic merits as well.

By addressing capital and operational expenses together, Hitachi Data Systems offers customers a comprehensive and sustainable approach to storage both today and for the future.

The following e-guide showcases how easy it can be to implement virtualization, tiered storage and software to deliver significant economic benefits to the organization.

**Homogenous management in a heterogeneous world.**

# STORAGE VIRTUALIZATION IS EASY

When someone virtualizes any storage, it inherits the characteristics, features and functionality of the USP-V and rejuvenates old technology

Virtualization helps organizations do three important things that help create an economically and ecologically superior data center:

▶ RECLAIM

▶ UTILIZE

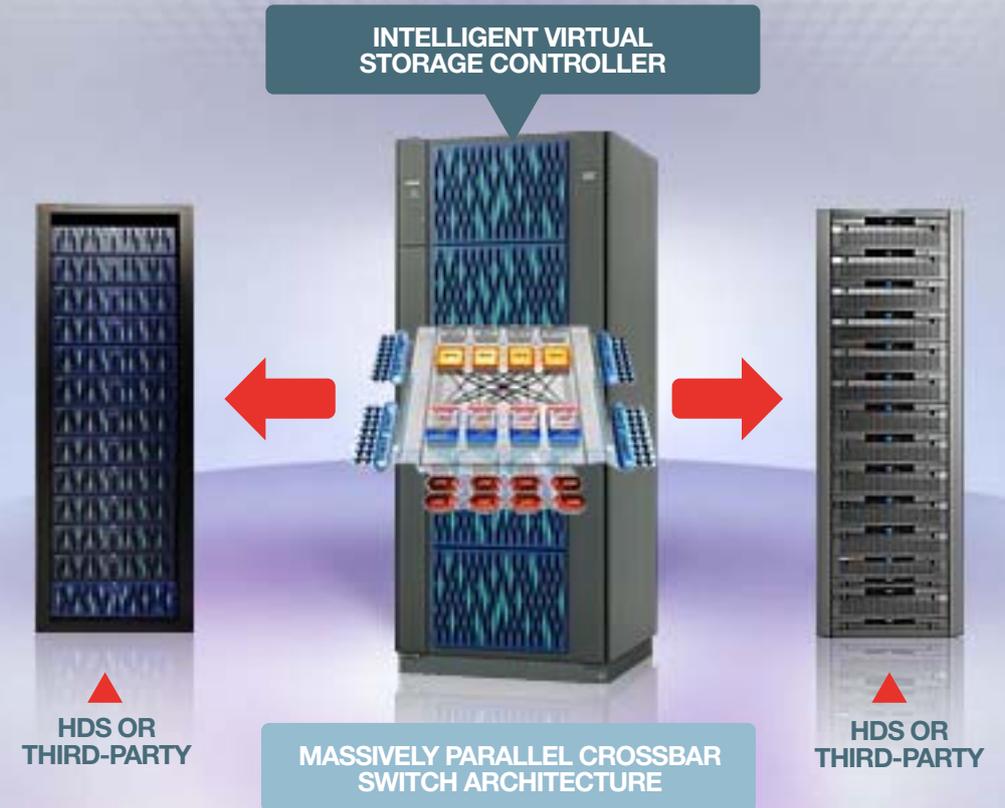
▶ OPTIMIZE

Hitachi Data Systems approaches storage virtualization by enabling it in the storage controller. Controller-based virtualization gives organizations the ability to manage their existing heterogeneous, multivendor storage assets as a single pool of storage.

By providing a single management interface, virtualization enables cost lowering functions such as reduced hardware costs, SAN infrastructure costs and environmental costs.

# THE FUTURE HAS BEEN HERE FOR 6 YEARS

VIRTUALIZATION AND SEPARATION OF THE STORAGE CONTROLLER FROM THE DISK ARRAY



Virtualization is the box, the Hitachi Universal Storage Platform® V doesn't care whether its in the box or connected via a fibre channel cable. Hitachi has changed the playing field by separating the commodity media (disks) from the innovation (USP-V intelligent control unit) required to provide storage, data, and content services, providing TOTAL FLEXIBILITY.

# STORAGE VIRTUALIZATION IS EASY

VIRTUALIZATION IS IN THE DNA OF THE BOX,  
IT'S EASY AND IT COMES IN MANY FORMS

- ▶ INTERNAL VIRTUALIZATION  
Tiering inside the box
- ▶ EXTERNAL VIRTUALIZATION  
Tiering outside the box
- ▶ LUN VIRTUALIZATION  
“Thin provisioning and wide striping”
- ▶ ARRAY VIRTUAL PARTITIONING  
Enabling flexibility in quality of service

▶ LOWER COSTS

▶ REDUCE COMPLEXITY

▶ INCREASE UTILIZATION

▶ STORAGE SERVICE  
LEVEL MANAGEMENT

▶ ENHANCE BUSINESS  
CONTINUITY

▶ IMPROVE UPTIME

HITACHI  
Inspire The World

## Hitachi Storage Virtualization Pays Off

50% of IT organizations were paid back on their investment in their Hitachi Virtualization Solution in 12 months or less.



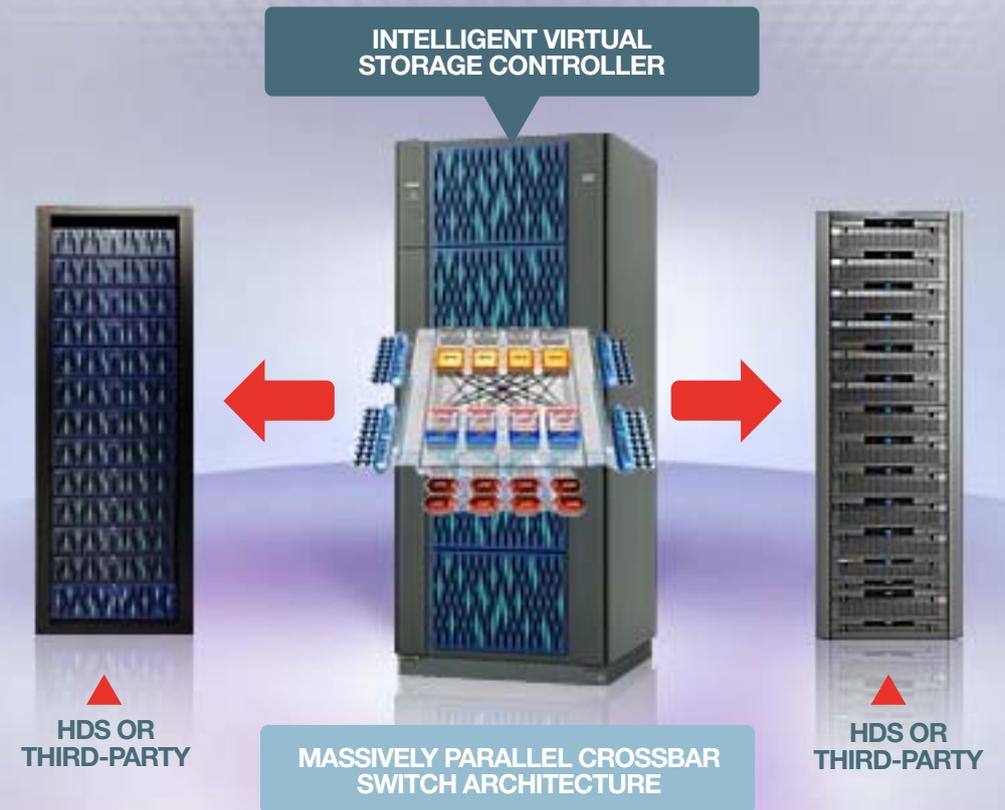
12 months or less

Source: Survey of 14 Hitachi Virtualization Solution users

TechValidate  
TVID: 6AF-2FS-75F

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VIRTUALIZATION AND SEPARATION OF THE STORAGE CONTROLLER  
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# INCREASE STORAGE UTILIZATION

## HITACHI DYNAMIC PROVISIONING

Hitachi Dynamic Provisioning (HDP) is software that allows one or many pools of RAID groups to be managed as a common entity. This software enables two key functionalities. Automatic wide striping of data to improve performance and ease of management, as well as thin provisioning of individual LUNs to achieve greater storage utilization. This functionality is not limited to storage physically inside the Universal Storage Platform V (USP-V) frame, it can be delivered for any storage virtualized externally through the USP-V, whether it is HDS storage or third-party storage.

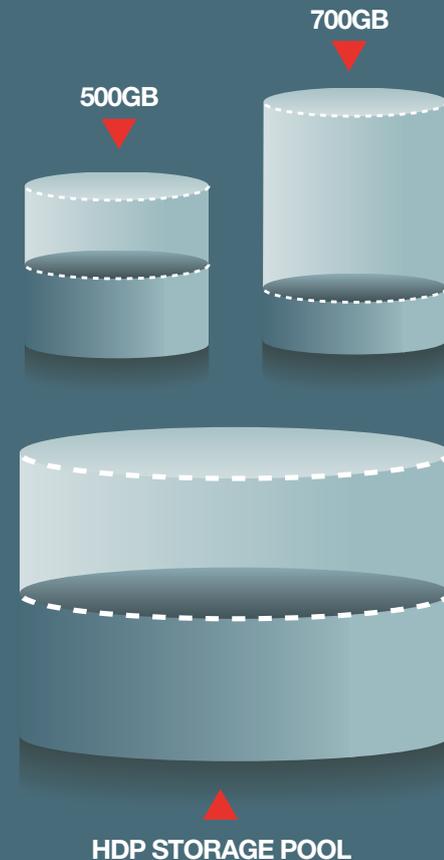
## HOW TO IMPROVE STORAGE UTILIZATION

- Provision only what is used – thin provisioning
- Simplify management by allocating virtual storage on demand
- Simplify performance tuning by spreading the I/O across all the RAID groups in the pool via wide striping
- And remember, the Hitachi Dynamic Provisioning storage pool is expandable, nondisruptively

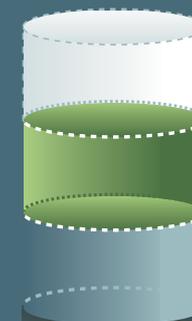
# HOW IT WORKS

TODAY – HITACHI DYNAMIC PROVISIONING (HDP)

## DATA DISPERSION TECHNOLOGY (HITACHI ADAPTABLE MODULAR STORAGE AND USP-V)



- Purchase actual storage capacity which gets put into the pool
- Allocate logical volumes to servers (dotted lines)  
42MB chunks or “pages” of the pool are assigned as applications write to the logical volumes
- Only need to purchase capacity for what is being used
- HDP storage pool is **expandable** AND **rebalances** data
- **RECLAIM** feature (10% + reclaim)



### ASSUMPTIONS

- Average industry utilization 25%-35%
- Target Hitachi utilization 65%+

# INCREASE STORAGE UTILIZATION

## DYNAMIC PROVISIONING CAPABILITIES

- > Simplify provisioning
- > Provision only what is used
- > Increase performance
- > Automate performance optimization
- > Automatic load balancing
- > Storage reclamation
- > Replication savings

## BENEFITS

- > **REDUCE STORAGE EXPENSE**
- > **REDUCED OPERATIONAL EXPENSE**
- > **IT AGILITY**

### Major Retail Chain Reduces Storage Costs While Improving Performance

A large enterprise retail company reported that improved performance and deferred storage purchases were the key benefits of implementing Hitachi Dynamic Provisioning.

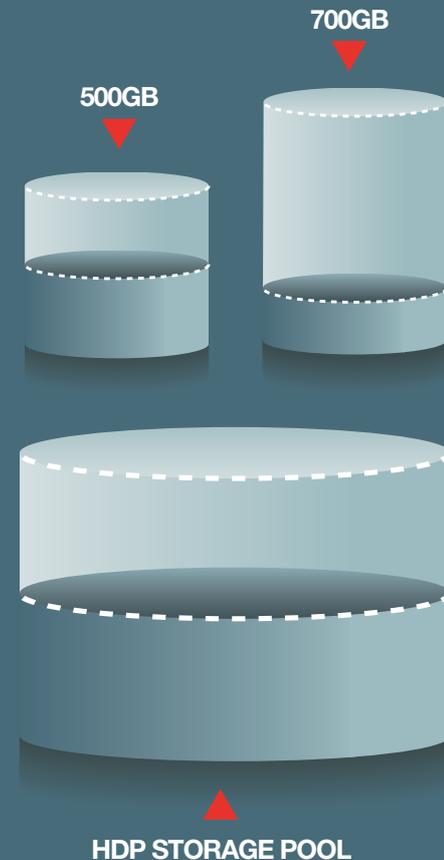
Source:  Senior IT Manager, Large Enterprise Retail Company

 TechValidate  
TVID: 37E-CB3-5B9

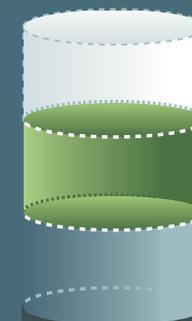
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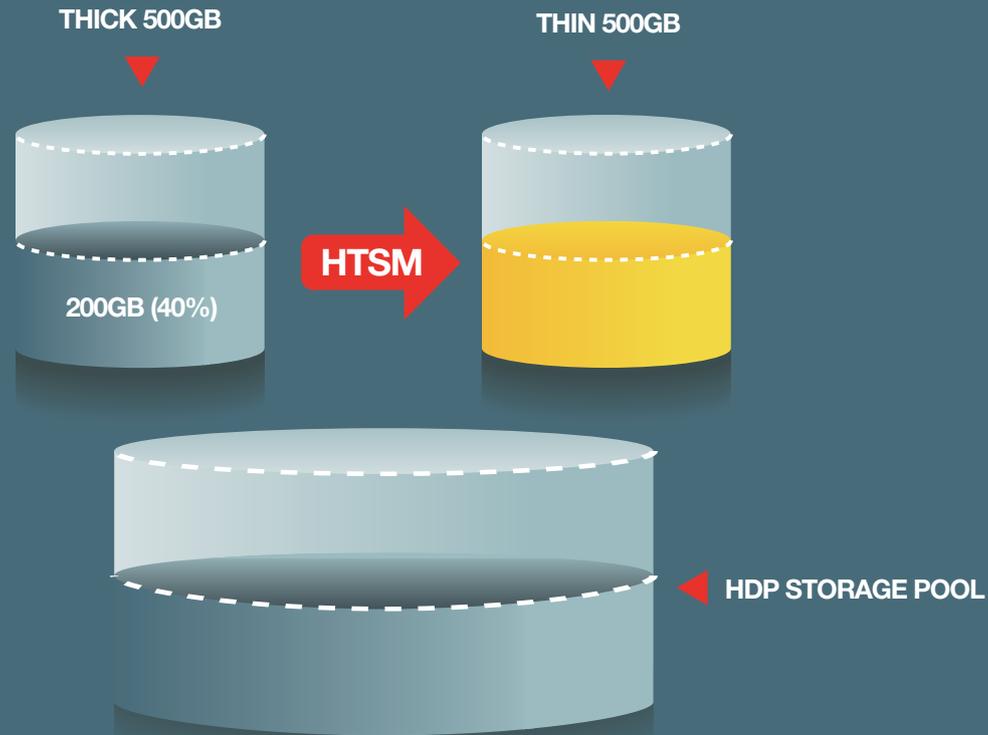


ALL STORAGE

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## TRANSITION PROCESS TO AN HDP ENVIRONMENT: AMS AND USP-V

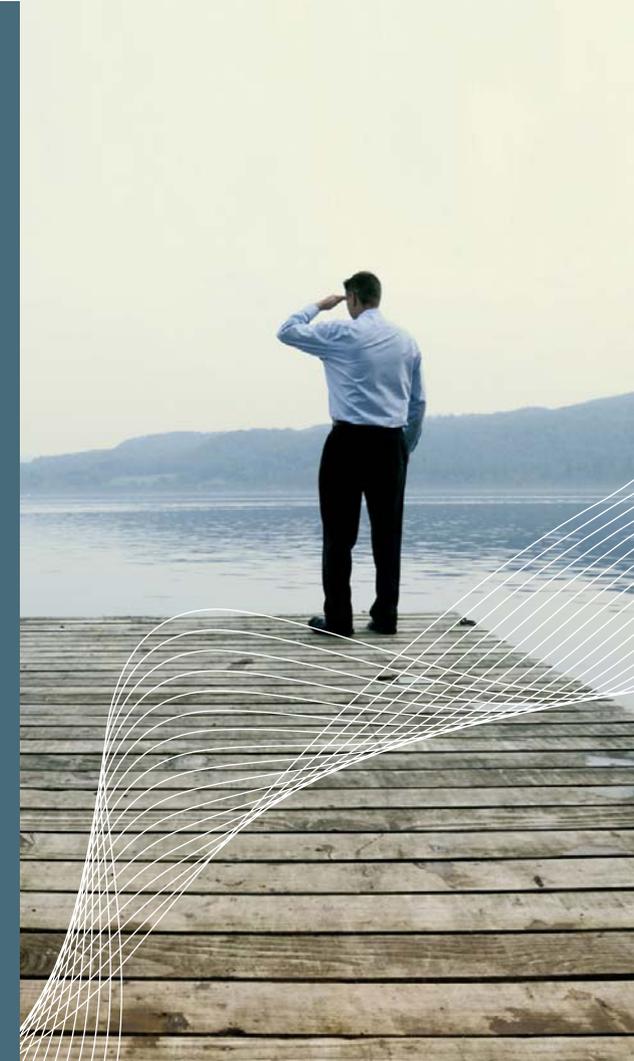


“CUSTOMERS ARE RECLAIMING BETWEEN 20 AND 50% OF THEIR PREVIOUSLY ALLOCATED, BUT UNUSED STORAGE.”

## TRANSITION PROCESS TO AN HDP ENVIRONMENT: AMS AND USP-V

- ▶ A “thick” volume has a “percent used” (file system view)
- ▶ A copy to an HDP volume (using Hitachi Tiered Storage Manager (HTSM) will copy the entire space
- ▶ As a post-process, we can reclaim “untouched” space
  - Zero page reclaim (ZPR)
  - Any 42MB page that is still zeroes is reclaimed back into the pool
- ▶ Reclaim totals will not equal original “unused” space
  - File system fragmentation strategies affect the number of “untouched” pages
  - New volumes and larger volumes have a better chance of reclaim
  - There will still be some “unused but assigned” space

**100% NONDISRUPTIVE  
TO THE APPLICATIONS**



# SCALE OUT OR SCALE UP

The choice of scale up or scale out needs to be dictated by the application environment and needs

## SCALE OUT IS LOOSE COUPLING

- Resources in one node can not be used to increase the resources in another node
- Additional management overhead to manage workload
- Availability comes from active/passive redundancy

## SCALE UP IS TIGHT COUPLING

- Resources can be pooled together to give maximum performance and capacity
- Pooled resources provide agility and ease of management
- Scale up can be partitioned to work like scale out
- Has higher availability with multiple resources is a common pool
- Scale up can be loosely coupled for disaster recovery and migration (Hitachi High Availability Manager, HAM)

# A BETTER SOLUTION

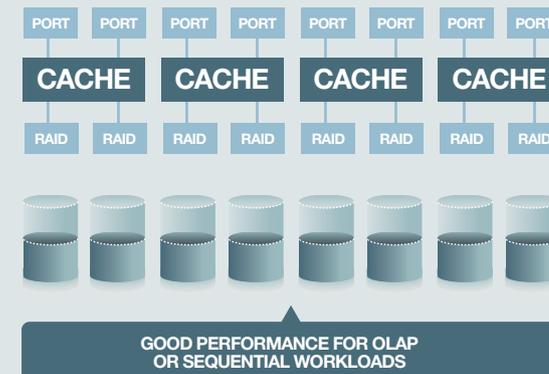
SCALE OUT, THEN UP

No compromise is needed between scale up and scale out. The Universal Storage Platform V integrates both architectures to provide performance scaling for any type of workload.

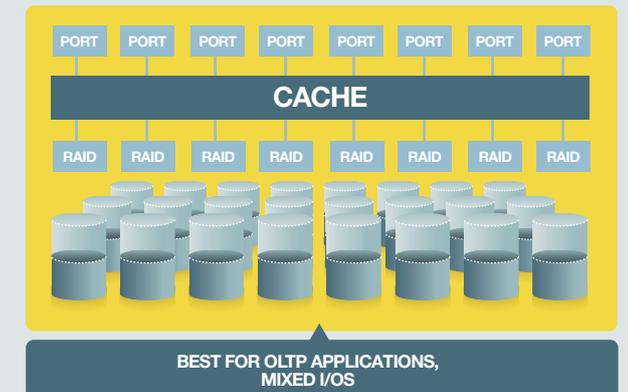
## BENEFITS

- Availability, scalability and reliability
- Flexible price points of storage T0 to T4 inside or outside the array
- Flexibility to put the right storage at the right place at the right price point.
- Ability to scale capacity inside the box or heterogeneously outside the box
- As we scale OUT we scale UP as the cache and processors act as one

## SCALE OUT



## SCALE UP



# DYNAMIC DATA MOVEMENT ENABLES DYNAMIC TIERS

## ENABLING FLEXIBILITY WHILE INCREASING SAVINGS

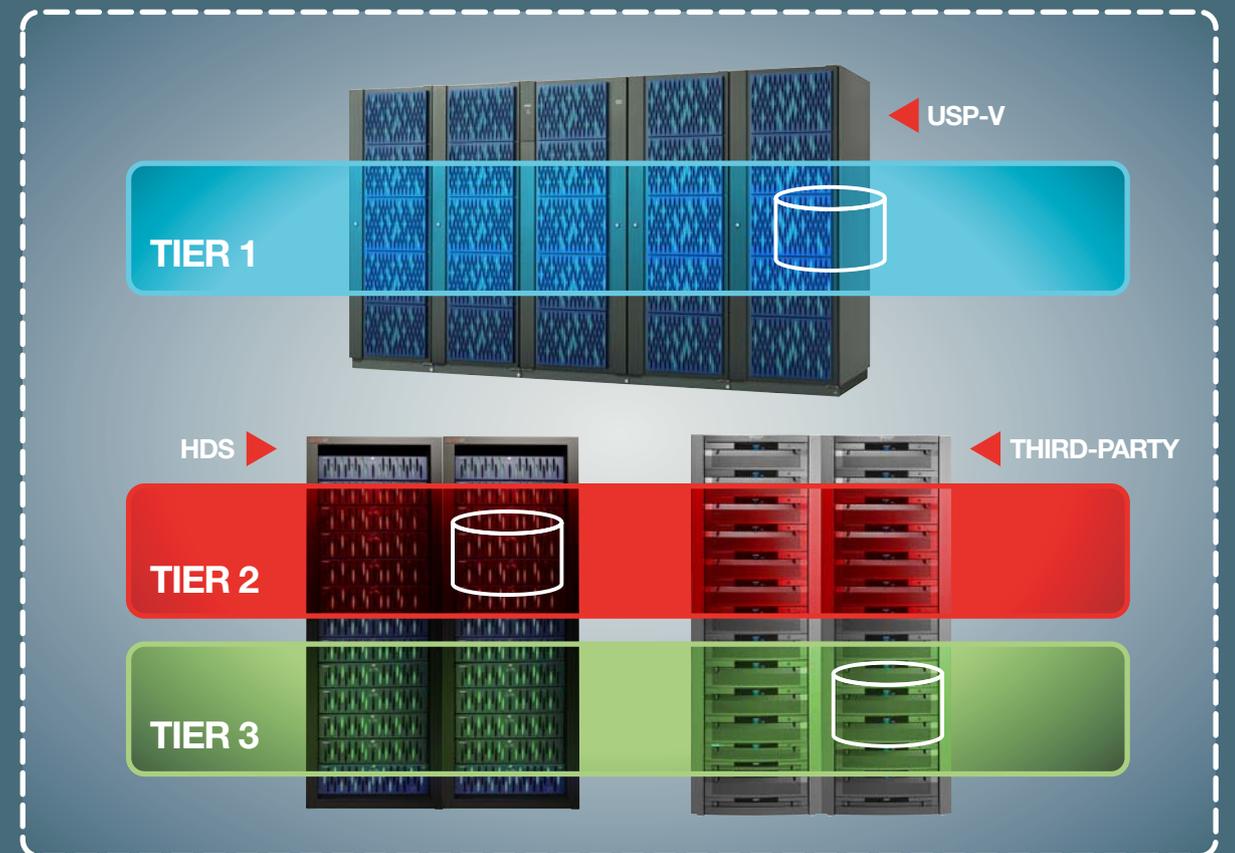
An approach to overcome these limitations is dynamic tiering of data which allows nondisruptive movement. The storage arrays are virtualized into a single pool of heterogeneous storage. One can then define tiers across the pool without physical limitations and move data nondisruptively at any time.

This approach changes the nature of tiering from a “must get it right the first time” approach when an app is first introduced, to an ongoing activity done at the client’s time of choice. Since tiering is easier and continual, data can be continually evaluated and optimized to lower, more cost effective tiers without the risk of disruption. So the need for over-engineering is eliminated.

- Create a single pool of heterogeneous storage
- Define tiers of storage across the pool with out physical array limitations
- Data can be moved between tiers using a consistent tool set - Hitachi Tiered Storage Manager (HTSM) ensures there is no server/application interruption
- Why?
  - Migration from older array to newer array
  - Extend the useful life of an array
  - Purchase a LOWER tier of storage and manage or leverage it in the common pool
- Capabilities of dynamic tiering:
  - Flexibility to make sure the application can find its correct tier to match its needs
  - Greater volume of data optimized to lower tiers as tiering is continual
  - Architecture is engineered to save money

# DYNAMIC DATA MOVEMENT ENABLES DYNAMIC TIERS

## MULTITIER POOL OF STORAGE



# MOBILITY AND AVAILABILITY

Data migration is part of an ongoing it operation that is especially intensive during technology refresh cycles because:

- Migration is highly prone to human errors and typically needs to be done in very small scheduling windows
- Data needs to be migrated across storage tiers and storage subsystems
- Operational costs can be prohibitive
- And application downtime is unacceptable

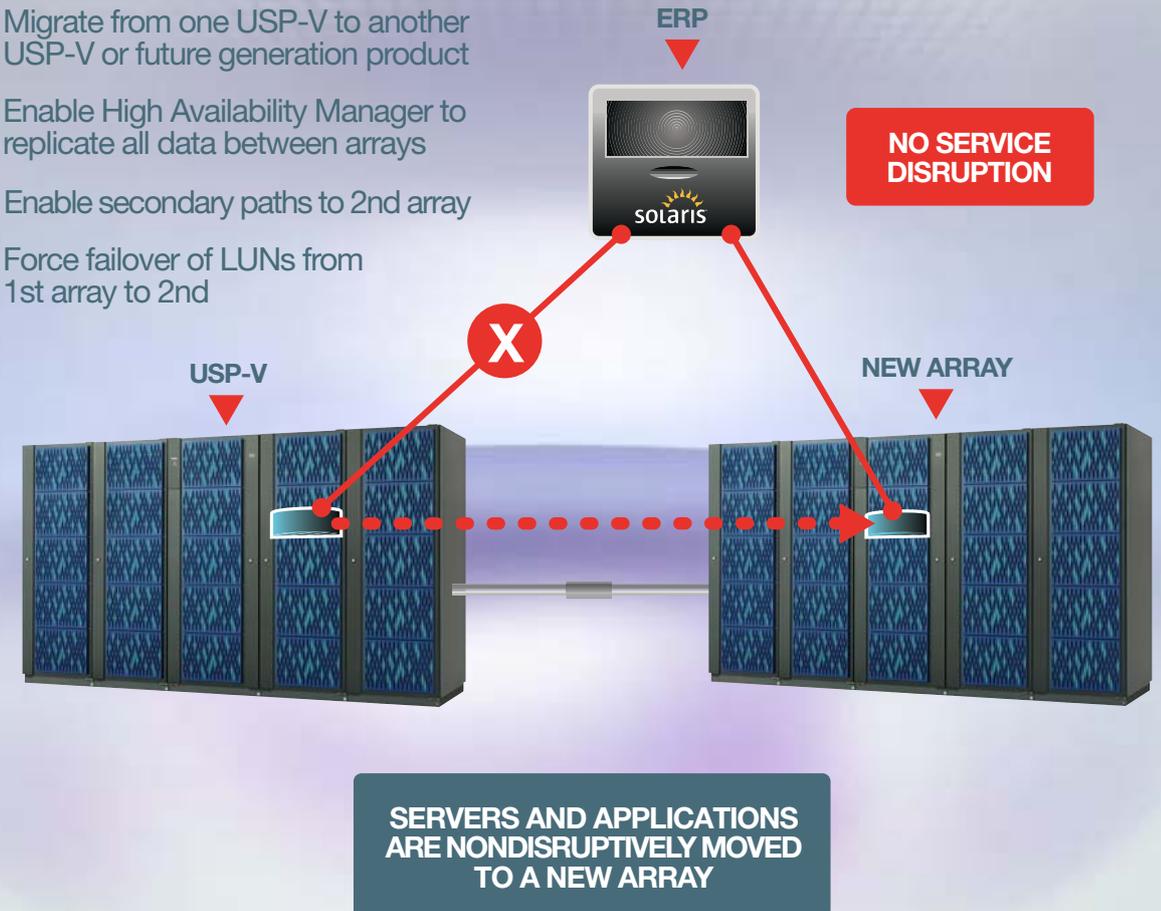
## YOU CAN ENJOY:

- Seamless data migration
- No application disruption
- Low cost storage tiers
- One single pool of heterogeneous storage

# NONDISRUPTIVE DATA MIGRATION BETWEEN ARRAYS

HOW ABOUT NO MORE MESSY DATA MIGRATIONS AND PAINFUL DOWNTIME?

- Migrate from one USP-V to another USP-V or future generation product
- Enable High Availability Manager to replicate all data between arrays
- Enable secondary paths to 2nd array
- Force failover of LUNs from 1st array to 2nd



# SUMMARY

## SAVE MONEY BY INCREASING EFFICIENCIES

Virtualization is now a mainstream technology and is used to increase hardware utilization as well as lower operational costs in the data center. Next, organizations need to begin to adopt and adapt to more efficient, cost effective and business friendly platforms and solutions to deliver more value to the business.

## HDS HAS THE TECHNOLOGY TODAY

- > Virtualization
- > Hitachi Dynamic Provisioning
- > Tiered Storage Manager
- > Hitachi Content Platform

The Hitachi Data Systems virtualized infrastructure provides one platform for all data and aligns customers for a smooth transition into cloud computing, the next big thing on the server side.

## HITACHI DATA SYSTEMS SOLUTIONS ARE DEPLOYED IN 44 OF THE TOP 50 FORTUNE GLOBAL 500® COMPANIES

- > Today, we are the leader in storage virtualization with more than 13,500 virtual controllers shipped worldwide, achieved through the use of common storage services throughout an entire heterogeneous storage infrastructure
- > It is innovation that makes us the **only** vendor with a single integrated platform to address the full range of storage requirements including virtualization, common management, tiered storage and common data protection

# ONE PLATFORM FOR ALL DATA



> SIMPLIFY MANAGEMENT

> INCREASE UTILIZATION

> CONSOLIDATE ASSETS

> ENHANCE BUSINESS CONTINUITY

> LOWER OPERATIONAL COST

> REDUCE COMPLEXITY

## THE ANALYST VIEWPOINT

### TAKE A LOOK AT OUR SOLUTIONS BRIEFS AND WHITE PAPERS

- ▶ Reducing Costs and Risks for Data Migrations White Paper by ESG
- ▶ Migration Solution Brief by IDC
- ▶ Assessing the Real Cost of Storage by IDC
- ▶ How HDS Enables Cloud Storage by ESG

## ADDITIONAL RESOURCES

### WHY NOT READ OUR OTHER E-GUIDES?

- ▶ 6 Essential Strategies for Economizing Your Storage
- ▶ Storage Virtualization for Dummies
- ▶ Big 5 Benefits of One Storage Platform

### FOLLOW US ON:

- ▶ Read our latest blogs

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