

Technical Track



Hitachi Data Systems

HITACHI
Inspire the Next



A partnership with
real potential

Making the most of our partner programme

Modular Solutions

Lee Goodwin, Technical Account Manager

Welcome

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Welcome



Agenda

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- Product overview
- Some customer feedback
- Recent product updates



Unique product overview

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- Launched in October 2008
- SPC1 tested March SPC1 price /performance best in class.
- Active - Active Dynamic load balancing controllers
- Multi path SAS backend up to 96GB/sec
- Unified tray architecture SAS and SATA HDD's in same tray at same interface speed
- Single or multiple disk raid expansion
- Lun shrink and grow
- 60TB max volume
- Up to 32 GB cache
- And up to 16x4Gb/s fibre channel ports
- iSCSI and FC replication for Async or Sync
- Backward compatible with AMS WMS for replication



Customer feedback

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- UK Local Government

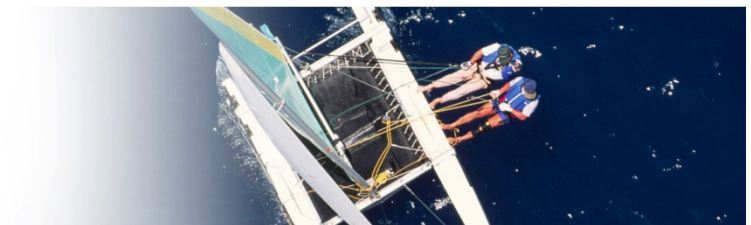
“We chose Hitachi because the capacity and performance it delivered made it far better value for us than other vendor’s products”

- UK Bank and pensions

“Yes thus far it has coped admirably with our diverse workload (Exchange / SQL / File serving / Oracle/ VMWare). We are already expanding our production array with another couple of shelves and hope this goes as smoothly as the original install. We also migrated our primary AMS2100 between sites using HDS staff and this too was painless”

- UK Health PCT

We have been using SAN technology for many years and we wanted a replacement system that was completely scalable to ensure that it meets our future growth. We also needed high availability so reliability was key in choosing a supplier and partnering with an organization that could provide this.



4 of most recent product updates

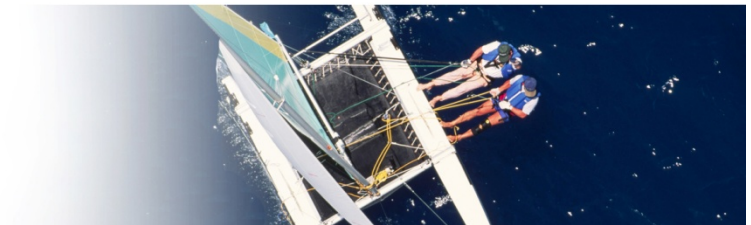
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- **AMS2000 – Dynamic Provisioning**
- GA 8th August

- **AMS 2500 NEBS compliant unit for Telco Networks**
- **ETSI (European Standard) Nebs is American**
- GA June

- **8Gbps Interfaces**
- GA August

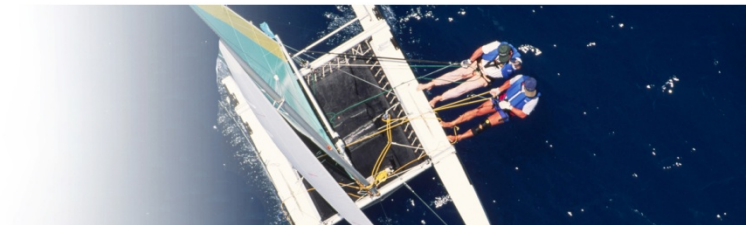
- **Dense SATA trays**
- GA now



What is Dynamic Provisioning

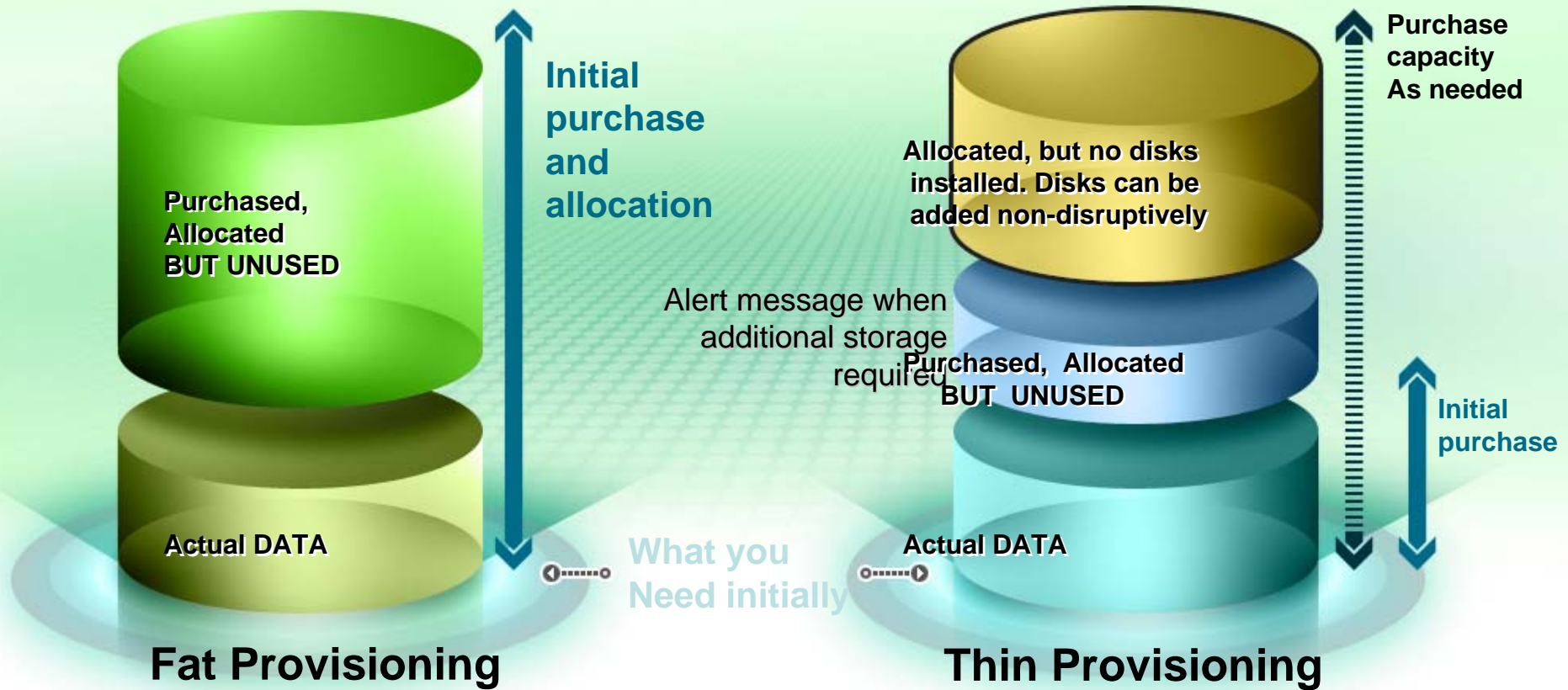
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- What is Dynamic Provisioning software
- It uses thin provisioning technology that allows customers to allocate virtual Storage capacity based on anticipated future capacity requirements and current use trends.
- Overall storage utilisation rate may improve because customers can potentially provide more virtual capacity to the application on a just in time manner, utilising fewer drives and of course limiting outages for capacity upgrades.



What is Dynamic Provisioning?

To avoid future service interruptions, today it is common to over-allocate storage by 75% or more. With dynamic provisioning, disk capacity can be added as needed, when needed.



Basic Specs of HDP

- All raid levels can be added
- All HDD types can be used
- Maximum of 64 HDP pools.
- Fixed page size upgrades 32MB
- Fixed size chunk size of 1GB (32 x 32MB) =1GB
- Two customer definable utilization levels may be set per pool to generate alerts
- Two customer definable over-provisioning ratio thresholds may be set to generate alerts
- Alerts via Hitrack, Email and SNMP
- Storing the DP Pool Trend information for the past one year
- Graphical Storage trending by pools and virtual LUNS
- Dynamic provision information kept in cache system area and in NV RAM on both controllers.



Hitachi Dynamic Provisioning

Example of Trend Information Reported

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The screenshot shows the Hitachi Dynamic Provisioning console interface. On the left is a navigation tree with categories like Components, Groups, Logical Units, Host Groups, Replication, Settings, Power Saving, Security, Performance, Monitoring, Tuning Parameters, and Alerts & Events. The main area displays 'DP Pool Trend' for 'AMS2300_85012345 > Performance > DP Pool Trend'. Below this is a table with columns for DP Pool, RAID Level, and Capacity (Total and Consumed). A table with 4 columns is visible: DP Pool, RAID Level, Total, and Consumed. The first row shows '000' under DP Pool, 'RAID6' under RAID Level, '1.0TB' under Total, and '0.0MB' under Consumed. At the top of the console, a 'Get CSV File' button is circled in red. At the bottom of the console, there are 'Show Trend', 'Filter', and 'Filter Off' buttons.

Get CSV File

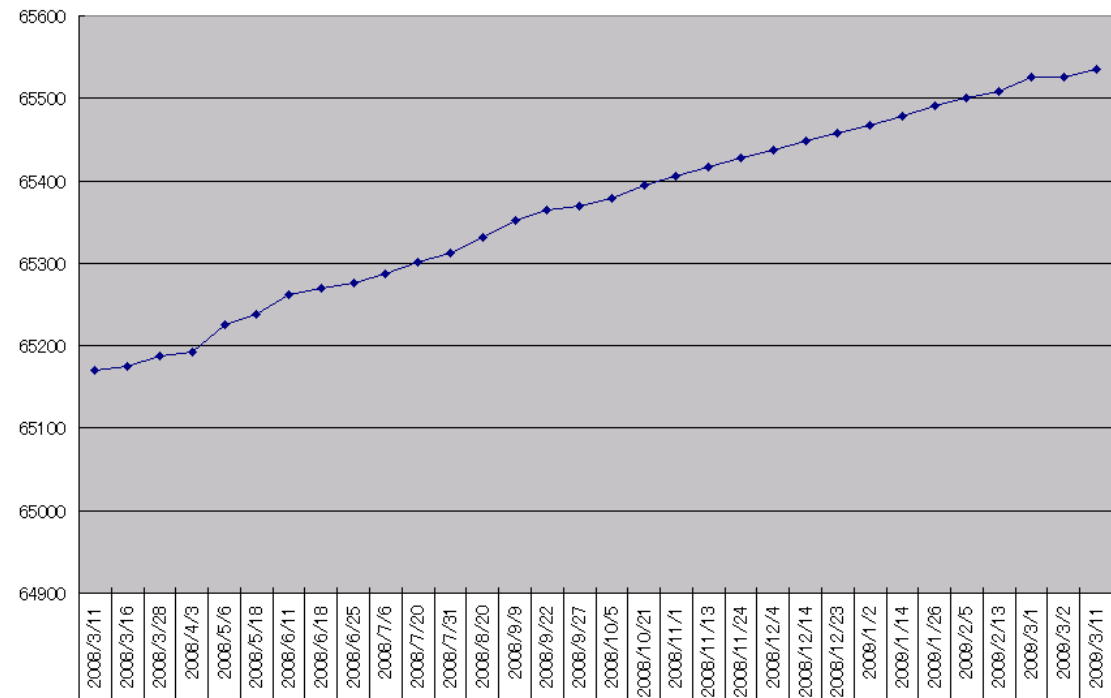


Trend data retrieved successfully.

Click Get CSV File to save.

Get CSV File

Close



HDP and wide stripping business value

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- **Summary of dynamic provisioning software**
- Available on all AMS 2000 models
- Just in time storage allocation.
- Easier and faster volume configuration/provisioning turnaround.
- Reduction in volume initial cost and increased storage utilisation.
- Simplified performance optimisation by spreading host I/O across many physical disks(spindles)
- Thin volume addition from multiple raid devices in that pool.
- Additional physical devices can purchased later and added without disruption to application
- Increases storage utilisation while reducing storage initial cost (TCO)



AMS 2500 DC(NEBS and ETSI)

- What is NEBS3 and ETSI
- NEBS is a industry, not legal requirement standard that covers hardware standards of equipment that are allowed in a dark site, Telco environment.
- NEBS Level 3 has strict specifications for fire suppression, thermal margin testing, vibration resistance (earthquakes), airflow patterns, acoustic limits, failover and partial operational requirements (such as chassis fan failures), failure severity levels, RF emissions and tolerances, and testing/certification requirements. NEBS-3 / ETSI
- European Telecommunications Standards Institute is the standardization organization for the European telecommunications industry (equipment makers and network operators).



AMS 2500 DC feature

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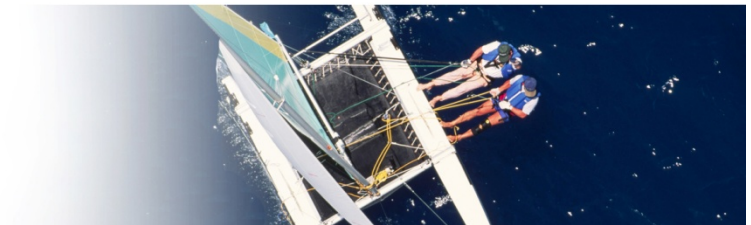
- **Adaptable Modular Storage 2500DC** – specifically designed to meet the most stringent requirements of a Telco central office (NEBS and ETSI) as well as direct current (DC) datacenters. With the Adaptable Modular Storage 2500DC, customers may realize energy and cost savings, as studies show that DC powered data centers use power more efficiently than alternating current (AC) powered data centers.
- **NEBS Level-3 Compliant Switch** – when combined with Adaptable Modular Storage 2500DC, Hitachi Data Systems delivers a complete NEBS-compliant SAN from one vendor and delivers value, flexibility and agility in infrastructure consolidation through Virtual SAN technology. The combination fully supports FC connectivity through 24 4Gb/sec dedicated FC ports. Additionally, the Cisco MDS 9124 SAN switch features integrated redundant power supplies to support either AC or DC power installations



AMS 2500 DC business value.

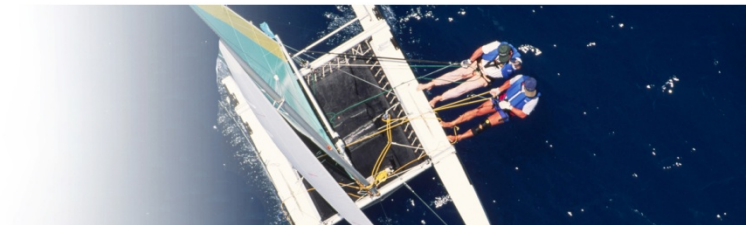
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- Will allow AMS 2500 equipment to be hosted in dark Telco 48V DC and remote managed computer rooms.
- ETSI and NEBS3 compliant for regulatory compliance
- Lower power usage for green credentials
- Lower infrastructure costs



8Gb interfaces key points

- AMS2100 is not supported due to processor (Celeron and DE4) QE4+ and QE8 AMS 2300/2500. They support 4 I/F port/ controller.
- 4Gb and 8Gb intermix supported in both models. FC and iSCSI intermix supported 2500.
- Now can support up to 6400GB/s for AMS 2300 or up to massive 128GB/s for the AMS 2500
- Interop tested on Cisco, Brocade and Qlogic.
- 2,4.8Gb/s (No 1GB/s)



8Gb interface Business values

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- Greater Virtual machine I/O utilisation of ports and bandwidth.
- Lower power usage, less servers for same throughput.
- Increased throughput per port
- Extra storage tier level if using AMS 2500 and 16 ports.



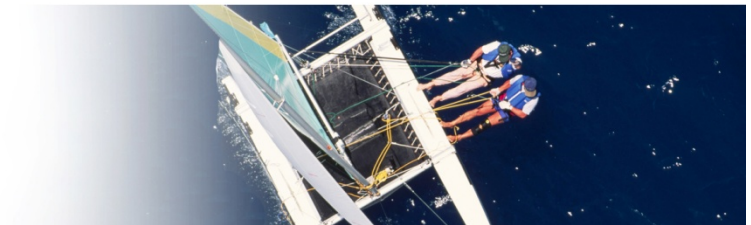
High Density Storage Expansion Trays

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- Dense bulk SATA storage
- Web 2.0
- Cost-effective data protection
- Video surveillance/Multimedia
- Data Warehouse
- Tier 2/3
- Open Archive, D2D2T

- **48 disks in a 4U high tray**
- **4 x 3GB/s SAS interfaces**
- **Each dense tray has four SAS ports. Each pair ports connects to the 24 drives on each side of the tray. Logically, the dense tray is like two standard trays with 24 drives per tray.**
- **Raid groups can be stripped across trays**



Competitive Value Proposition

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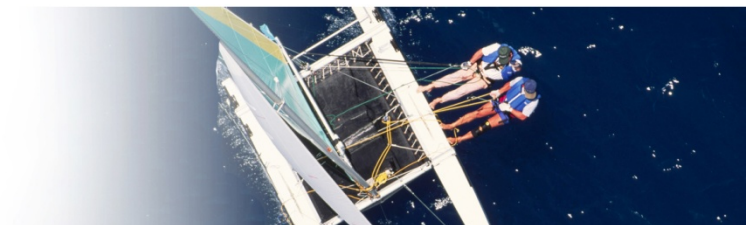
- Competitors:
 - Sun
 - Data Direct
 - Xyratex.
 - Nexsan.
- HDS competitive advantages:
 - Only dense tray that scales up to 480 drives with one dual controller module
 - Best performing dense storage system (££/IOPS)
 - Best reliability/availability from a dense storage system
 - Lightest dense tray
 - Only dense tray available for block storage from a tier 1 storage company
 - Only dense solution that scales for additional capacity



Dense Trays business benefits

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- Maximizes density in data centers:
 - 2.4x increase in storage density (GB/RU)
 - Install up to 480 disks in a single rack 10 units instead of 32
 - Reduces max AMS2300 and AMS2500 configs by one rack
- Financial benefits:
 - Increases GB/square foot; average cost of a data center floor tile is £££,000 per month
 - Reduces ££/GB for a system down to £2/GB (based on list price with 1TB SATA drives).
 - Reduces energy costs/GB, weight/GB and power/GB.
 - Maximum performance and utilization with HDP.



Dense Tray Rack Capacity vs Competition

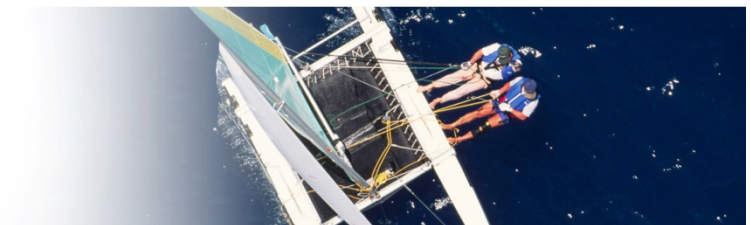
AMS2500 VS Competition in ONE Rack using 1TB Drives

	AMS2500	CLARiION CX	IBM DS5000	HP EVAx400	Netapp FAS xxxx
# of Disks per Tray	48	15	16	12	14
# of Trays per Rack	9*	12	12	12	12
# of Disks per Rack	432*	180	192	144	168
Capacity (TB) per Rack	432	180	192	144	168

*RKH +RKAK

Caution on weight for None

HDS Rack



Product Roadmap

AMS2000 Series



Timelines are subject to change.

Calendar	Q1 2009	Q2 2009	Q3 2009	Q4 2009	Q1 2010 AND BEYOND
Hardware	<ul style="list-style-type: none"> AMS 2500 1Gb iSCSI host ports Upgrades <ul style="list-style-type: none"> 2100/2300 to 2500 2100 to 2300 	<ul style="list-style-type: none"> Dense Expansion Unit Native DC AMS2500 Cisco 9124 DC Pwr Switch QLogic SB5802V 8Gb Switch 	<ul style="list-style-type: none"> Emulex CNA Cisco Nexus 5000 Switch 8Gb Fibre Channel host ports 	<ul style="list-style-type: none"> 600GB 15K SAS Brocade FCoE 	<ul style="list-style-type: none"> 10Gb iSCSI host ports FCoE host ports 2TB 7.2K SATA Solid State Disk
Firmware (Array based)	<ul style="list-style-type: none"> Raid Group Expansion LU Expand/Shrink IPv6 support for maintenance ports 		<ul style="list-style-type: none"> Hitachi Dynamic Provisioning 	<ul style="list-style-type: none"> TrueCopy Modular Distributed 	
Software (Server Based)	<ul style="list-style-type: none"> InMage (Remote Replication) 				
Services/Security		<ul style="list-style-type: none"> WDB and Standard "Lite" Self-Service (2100 & 2300) 	<ul style="list-style-type: none"> Centralized Authentication (Radius) 	<ul style="list-style-type: none"> Centralized Authorization (Active Directory) 	<ul style="list-style-type: none"> HDD Aligned Shredding Data at rest encryption
Solutions/3rd Party Qualification	<ul style="list-style-type: none"> Exchange 2007 Continuous Replication on AMS2000 Windows – HDPS / VSS Backup and DR Solutions 	<ul style="list-style-type: none"> FalconStor VTL Qualification VMware SRM Integration Symantec BUE Protection for Exchange Windows - BUE/ ADBO Backup and DR Windows – NBU / VSS Backup and DR Solutions 	<ul style="list-style-type: none"> Power Savings Integration w/ FalconStor 		
Certifications/ Inter-operability/ Benchmarking	<ul style="list-style-type: none"> AMS2000 SPC -1 	<ul style="list-style-type: none"> NEBS-3 Certification (2500) OS Synchronous Releases MS ESRP 			
EOL				<ul style="list-style-type: none"> 400GB 10K SAS HDD 	

RESTRICTED INFO ONLY UNDER NDA



Thank you

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- Thank you for partnering with Hitachi



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Making the most of our partner programme

File and Content Services

Ernest Ibe, EMEA Technical Consultant - Content Services

Why Hitachi Data Systems is the Best Choice

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Integrated

- Most integrated solution at the infrastructure layer
- Convergence of file, content and block services
- Search and migrate across boundaries



Content Aware

- Policy-based, content aware management in heterogeneous environment

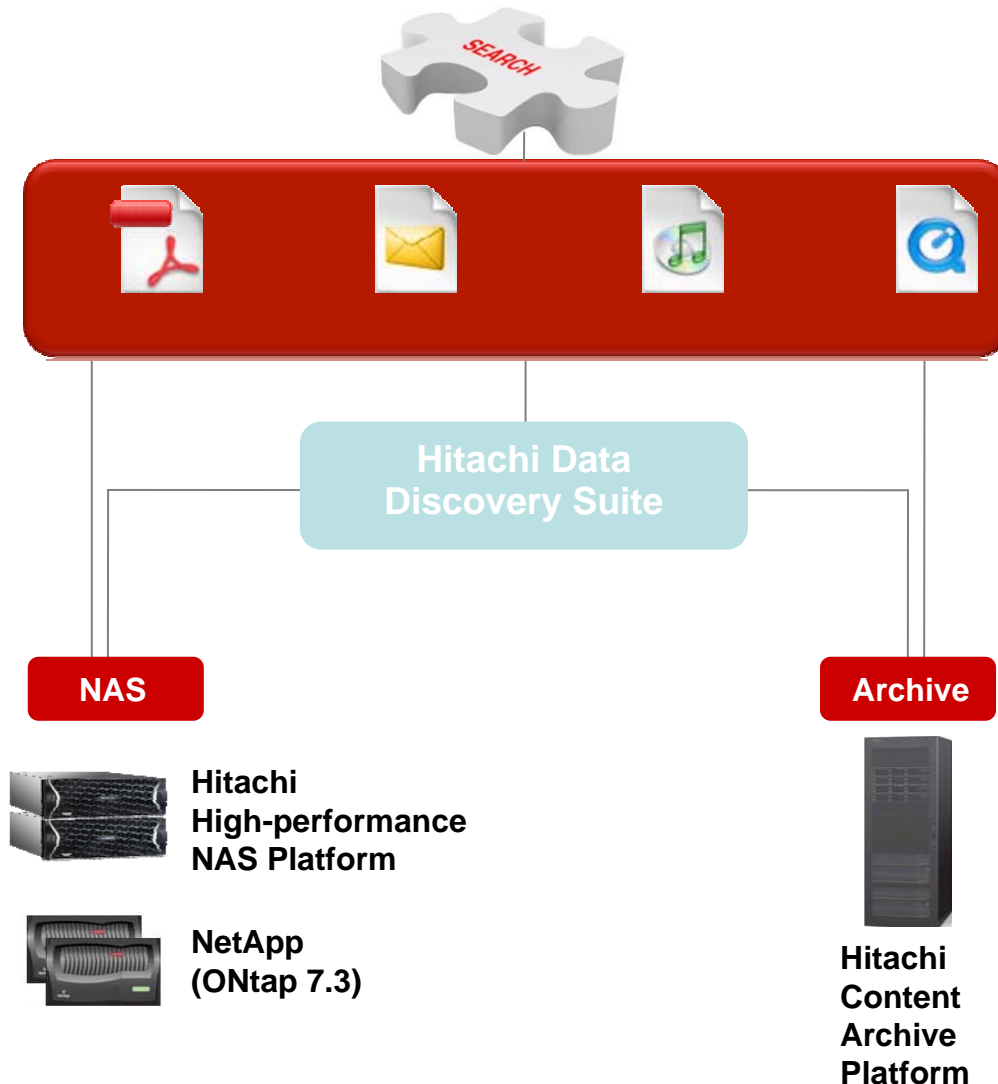
Scalable

- Scalability leadership in both NAS and Archive



Hitachi Data Discovery Suite – Effective and Efficient Search and Discovery

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Challenges:

- Lack of tools to find information across disparate storage islands
- Legal council search for patent content to review litigation risk

Solution Capabilities:

- Content aware search for Hitachi NAS, archive and NetApp
- Evaluate the risk of storage practices for selected data sets

Business Benefits:

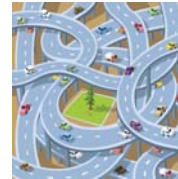
- Improve access to information and productivity
- Mitigate the risks and costs of regulatory compliance



Why Businesses Archive?

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📌 **Data Management
(Operational)**



📌 **Preserve information
(Internal Governance)**



📌 **Meet regulatory requirements
(compliance)**



📌 **Discovery**



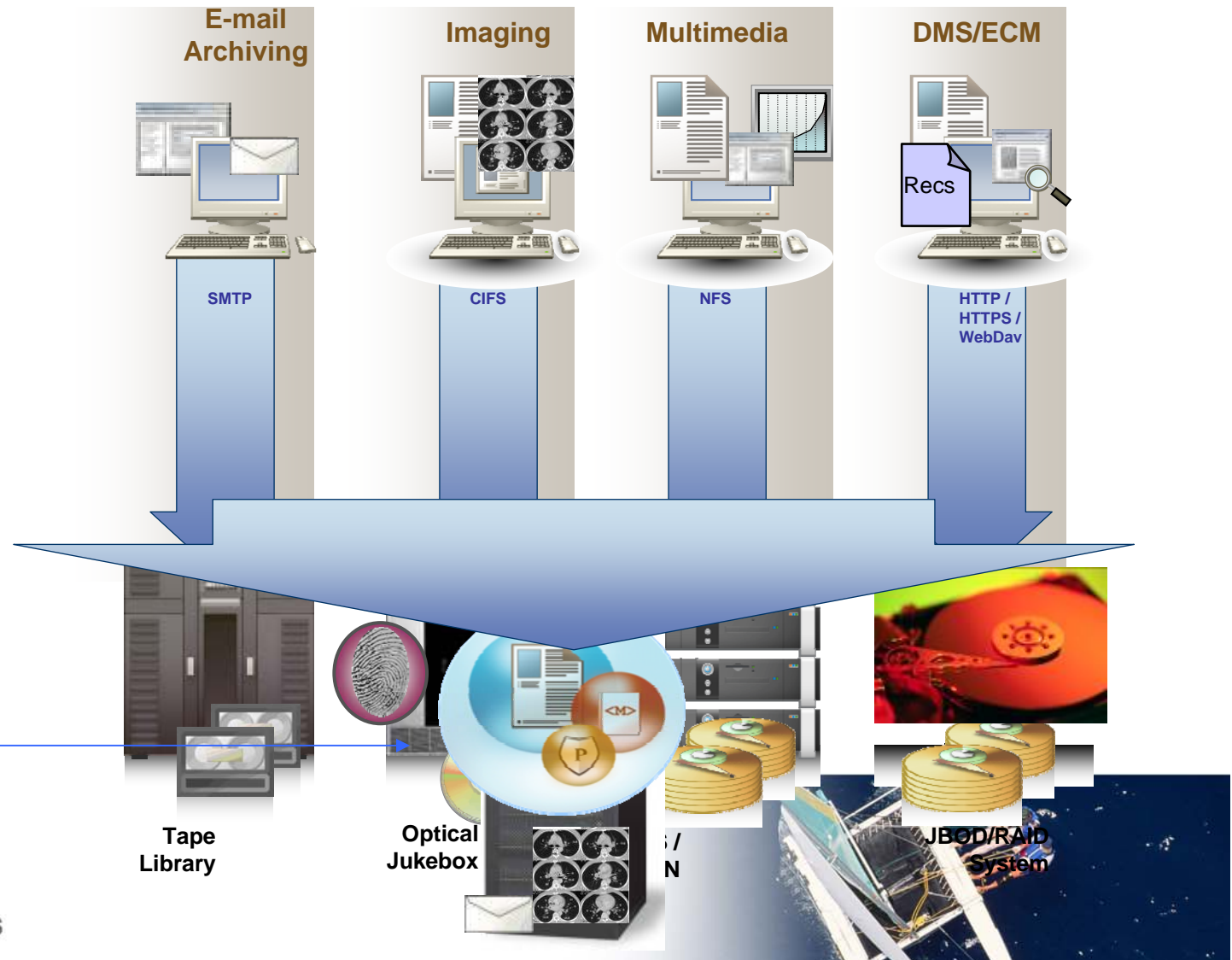
Hitachi Content Archive Platform

A Unified Approach to Active Archive Storage

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Hitachi Data Archive Platform

- Supports multiple applications and content types
- Embedded full text indexing and search
- High-performance, scalable, and secure storage



Customer/User View of the Archive

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Open Solution

- Supports Unix and Microsoft file systems, can store standard file formats such as XML and HTML, and can leverage other Hitachi SAN storage platforms



WORM, Immutability, and Retention

- Write once, read many file system where content is stored in an immutable format with the ability to set file-level retention



Single Archive Name Space

- All objects are stored in a single, archive-wide global name space, a well understood paradigm
- Open and easy to navigate with standard tools and applications



Simple Monitoring and Management

- Can be configured and monitored through a Web-based interface and through SNMP



Search and Indexing

- Simplifies requirement for timely discovery with an easy-to-use browser interface (search of files and metadata)



Scalability

- Content Archive Platform enterprise-class SAIN architecture (SAN + Array of Independent Nodes) allows for seamless scaling of capacity with unmatched availability



- Data
 - File contents stored in original, unaltered format
 - Write once read many (WORM) storage
 - Global file system and standard namespace
- Metadata
 - Self-describing attributes
 - User extensible in the future
 - Database for scalability and

The Hitachi Content Archive Platform 300 and 500 Archive Appliance

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Hitachi Content Archive Platform 300



- Fully integrated archive appliance with RAIN architecture
- Fully Integrated software and storage on each node
- RAID 5 Protection with DPL2 Availability
- Available in 2, 4, 8.5 and 17TB usable configurations - **Now up to 42.5TB**
- Standard file system interfaces and protocols for application integration – no proprietary API required:
 - File System Interfaces -NFS, CIFS
 - Supported Protocols - HTTP(S), WebDAV, SMTP, NDMP

OR

Hitachi Content Archive Platform 500



- SAIN Architecture – SAN-based Array of Independent Nodes
- Leverages world-class Hitachi storage systems to provide maximum scalability, high availability and performance
- Provides the highest-level of security
- Easily Scales from 9TB to 40 PetaBytes
- Standard file system interfaces and protocols for application integration – no proprietary API required:
 - File System Interfaces -NFS, CIFS
 - Supported Protocols - HTTP(S), WebDAV, SMTP, NDMP,

HCAP500 Diskless Model

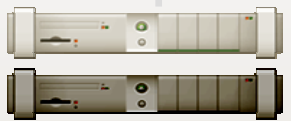
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FC Switch, 2 x Brocade 5000, in HA or Non HA



IP Switch (Archive "cluster" backend connectivity), as HA or Non HA



Archive node
Search node } HCAP Archive nodes (Scale from 4 to 80 nodes)



HDS storage (WMS / AMS, USP/USP-V), from 9TB to 40PB



HCAP Active Archiving Policies



Protection

The protection policy ensures the proper number of copies of each object are present in the archive. If a failure occurs, additional copies are created. If too many copies exist, extra copies are deleted.



Authentication

Keeps a digital signature for each object in the archive and periodically re-computes and compares results, repairing anomalies where possible.



Scavenging

The scavenging policy ensures the backup copies of metadata stored internally agree and repairs metadata problems where possible.



Shredding

Guarantees the contents of an object are permanently removed (scrubbed) from the system when it is deleted in accordance with the DOD 5220.22-M regulation.



Retention

The retention policy (multiple type variations) disallows deletion operations until a user defined date and time have been reached.



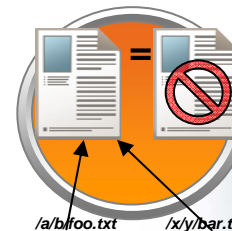
Cluster Balancing

As new nodes are added to the cluster, data is migrated from existing nodes in an attempt to balance the quantity of information each node is managing.



Garbage Collection

Keeps the archive clean of partially written files and other non-completed transactions. Incomplete artifacts are removed from the system.



Duplicate Elimination

Allows two or more byte for byte identical objects in the archive to have one data portion of the object stored, yet two or more namespace pointers



Additional Policies and Features

- Replication Policy – IP based, at Object level
 - Asynchronous across LAN or WAN
- Custom Metadata – Ability to augment object with searchable info
- Encryption – No external key management required
- Compression – Uses Zlib compression algorithm



Industry Leading Scalability

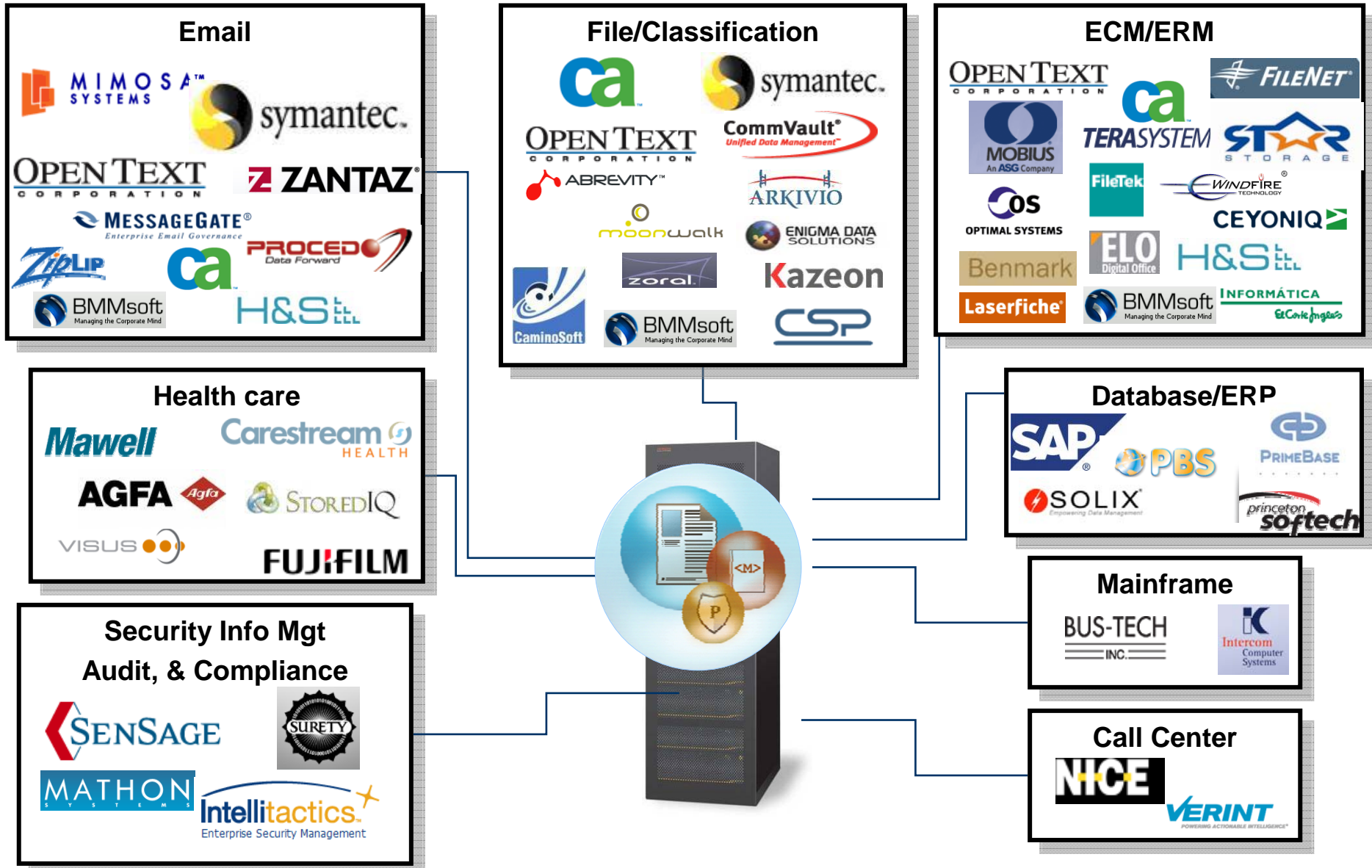
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- **HCAP metrics**
 - Support volumes up to 16TB
 - A single node will scale to 1024TB
 - An 80 node archive can scale to **40 PB**
 - A node will scale to 400 Million objects
 - An 80 node archive will scale to **32 B objects**



The Hitachi Content Archive Platform:

ISV Ecosystem Partners: 100+ partners, 85+ applications



Use Case: File System Archiving to the Hitachi Content Archive Platform

Business Challenges

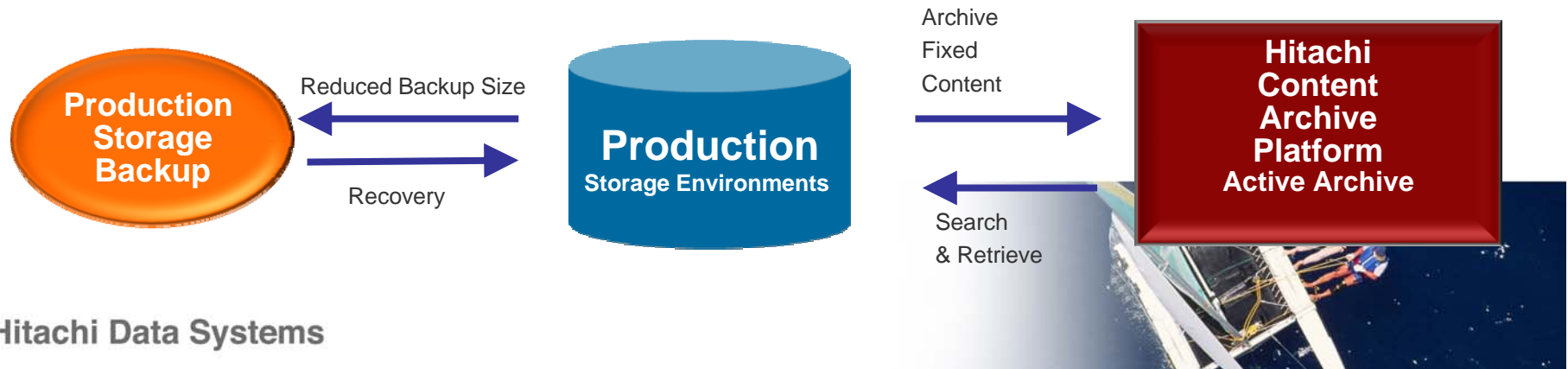
- Production Tiered Storage environments growth accelerates
- Backup environment is tied to production growth
- “Archive” environments are under utilized and ineffective
- Data is often “off line” - hindering e-discovery and retention management

Solution Capabilities

- Archive valuable content from tiered storage layers
- Search and Retrieve - “content aware” integrated archive
- Apply appropriate retention policies to all types of data

Business Benefits

- Relieve “storage bloat”
- Back up only “active” production information
- Meet SLAs and dependencies on backups



HCAP vs Centera: Active Archive Product Comparison

EMC	Hitachi Data Systems	Competitive Advantage
Centera	Hitachi Content Archive Platform 500/ Hitachi Universal Storage Platform™ V	<ul style="list-style-type: none"> • Industry Leading Reliability • Greater ROI • No Proprietary API Requirement • Extensive Direct Protocol Access • Secure Access and Active Search • No Proprietary Write Format • RAID-6 with configurable DPL levels for redundancy • External Storage Virtualization • Virtual Machines • Scalability • Performance • Long term future development of archive platform • Long term content access (ISV independence)



Real Centera Usable Space – Expensive Wasted Space

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CPM

OBJECT SIZE Usable disk Storage (12.5M CO/disk) Usable Disk Storage (25M CO/disk)

- 20KB 6.25% 12.5%
- 50KB 15.63% 31.25%
- 100KB 31.25% 44.25%
- 250KB+ 45% 45%

CPP

OBJECT SIZE Usable disk Storage (12.5M CO/disk) Usable Disk Storage (25M CO/disk)

- 20KB 2.78% 5.56%
- 50KB 6.94% 13.89%
- 100KB 13.89% 27.78%
- 250KB 34.72% 69.44%
- 1000KB+ 77.18% 77.18%



Skandia, Sweden – Leading Insurance provider

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Who?

Leading Swedish Insurance service provider

skandia :

What?

Financial services: Legacy data needed to be incorporated into digital archive

- o Email servers overloaded!
- o Data must be stored in compliant archive for 7 years

Migrate legacy data from old applications into Enterprise Vault and securely protect data in tamperproof archive.

Data MUST be archived seamless to the end user and access to archived data must be readily available.

Why?

Legal & internal governance obligations to adhere to.

Unable to store data using existing media due to cost & performance implications.

Best of breed technology on the market.

skandia :



| THANK YOU

Any Questions?



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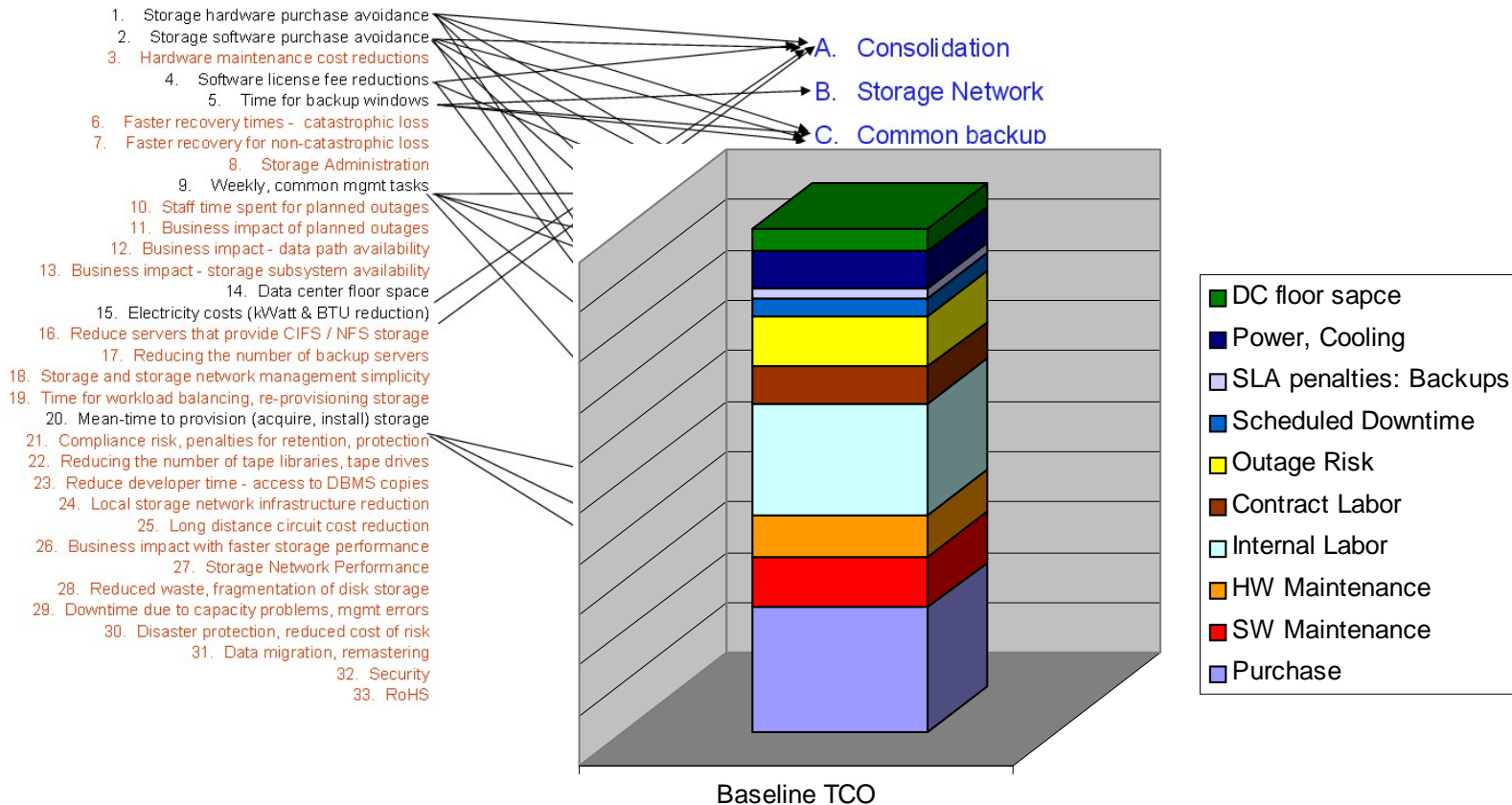
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Making the most of our partner programme

Storage Economics

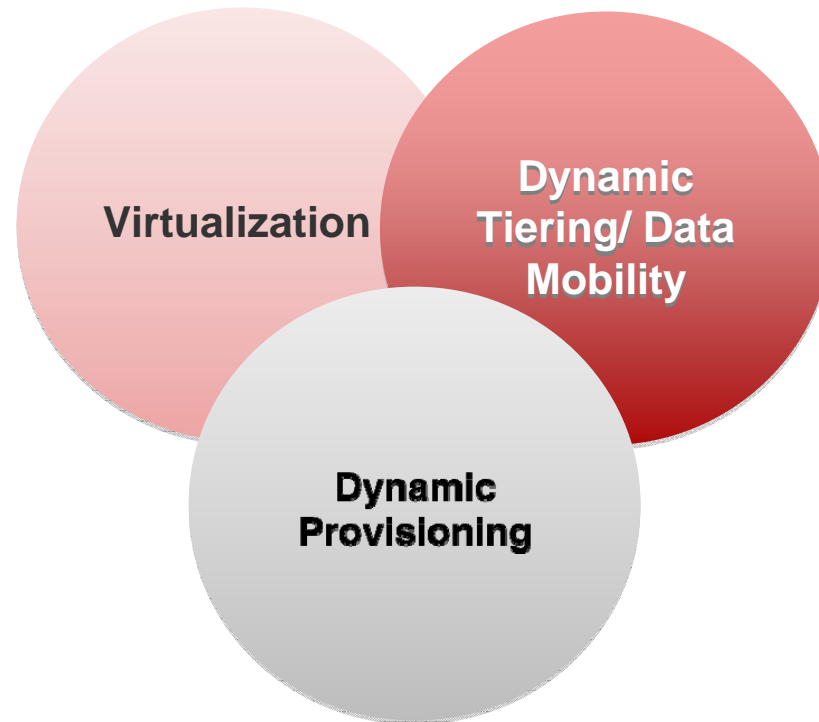
Jonathan Russell, Technical Account Manager

Storage Economics – What is it?



Storage Economics – How we address it

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Individually these 3 provide economic benefit,
but there is a compounded impact when used together.



Economically Superior Storage Architectures

- In order to drive down unit costs, new storage architectures have to be employed
 - Current tiered island-SAN and DAS solutions are unsustainable
- HDS and an Economic Triumvirate
 - **Storage Virtualization** – in the controller
 - Reclaimed space, better aggregate utilization, better mgmt
 - Significant time and cost savings with data/array-based migration
 - Right storage for copied volumes (CoW, ShadowImage and Replicated)

– **Dynamic T**

- Data m
- Move ε

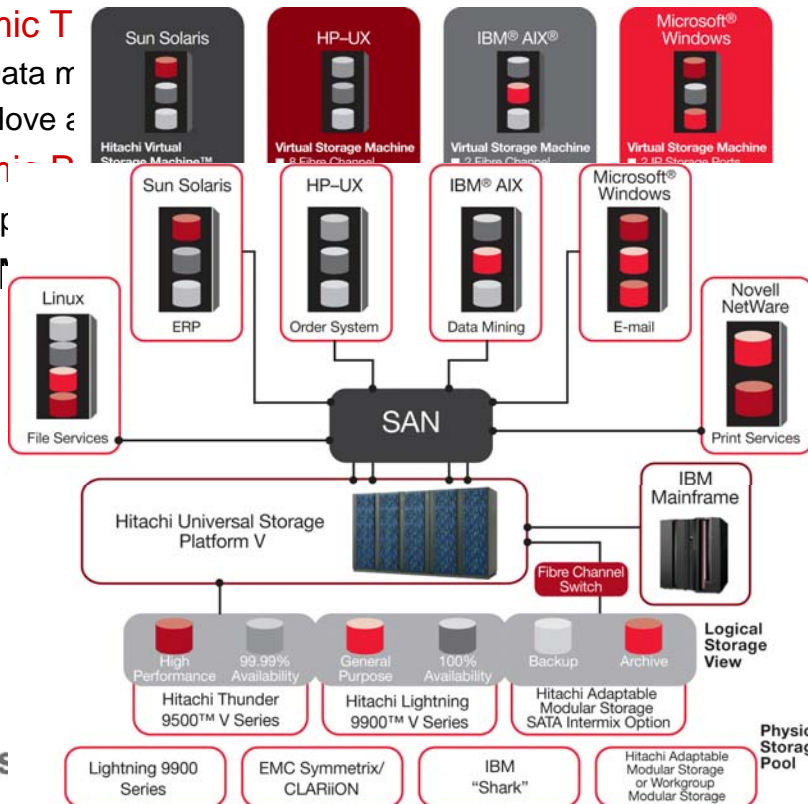
– **Dynamic P**

- Sp

- Virtualise f

- These 3 p

- Better
- Fewer



(thin volumes)
impact when bundled
our savings
of growth



Storage Virtualisation Calculation Methods

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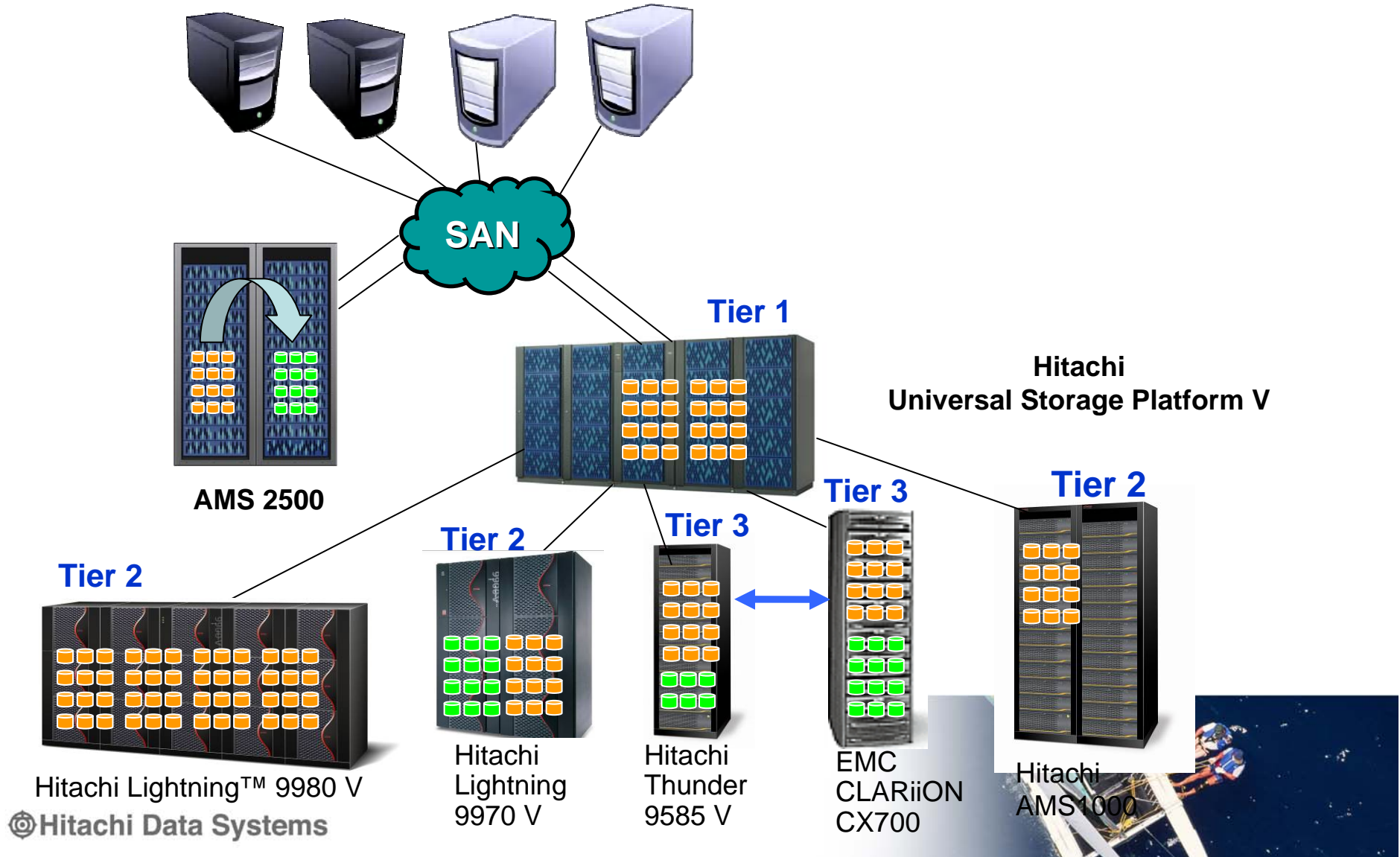
- Reclamation from un-allocated capacity
- Better utilization equals
 - Fewer frames
 - Better power, cooling and floor space per TB
 - Less total hardware on the floor
- Better storage management with one unified console
- Lower cost of migration, data remastering
- Consolidation and lowering of SW license requirements

- Available on USPV and AMS architecture



Dynamic Tiering & Data Mobility

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Dynamic Provisioning

- Dynamic Provisioning software provides thin provisioning for virtual storage capacity
 - Provisions storage from a virtual pool instead of traditional LUN provisioning
 - **Fat (Thick) Provisioning** occurs on traditional storage arrays where large pools of storage capacity are allocated to individual applications but remain unused with storage utilization often as low as 50 percent.
 - **Thin Provisioning** is a mechanism that applies to large scale centralized computer disk storage systems. Thin provisioning allows space to be easily allocated to servers on a *Just-enough* and *Just-in-Time* basis.
 - **Over Subscription** allows server applications to allocate more storage capacity than has been physically reserved on the storage array itself.
- External virtualization
 - Hitachi Data Systems can extend the thin provisioning function to externalized arrays
 - Eliminates a cap on thin provisioning pools



- Virtual storage capacity
 - Powerful form of storage virtualization for the Hitachi Universal Storage Platform® V and Universal Storage Platform VM
 - Available on AMS2000 in August 2009
 - Creates compelling alternative to traditional static provisioning
 - Uniquely addresses multiple storage management challenges
- Dynamic Provisioning software
 - Simplifies administration for the addition of new storage
 - Eliminates application service interruptions
 - Reduces costs associated with over provisioning
 - Evolves storage virtualization to incorporate virtual storage capacity for applications



Hitachi Dynamic Provisioning – AMS2000

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- **Dynamic Provisioning Pool (DP-Pool)**
 - Real installed capacity
 - Cannot be directly referenced from any hosts
 - DP Pool is composed of 1GB Chunks (32 x 32MB pages) randomly assigned throughout the available DP Pool volumes
 - A 1GB Chunk is assigned to a Virtual-LU
 - DP Pool pages are assigned to Virtual-LUs Just-in-Time
 - DP Pool storage will be shared by all applications whose Virtual-LUs are associated with the DP Pool
 - DP Pool itself can not be replicated and it can not be migrated using the volume migration function



The DP Pool is comprised of RAID Groups built from physical HDDs



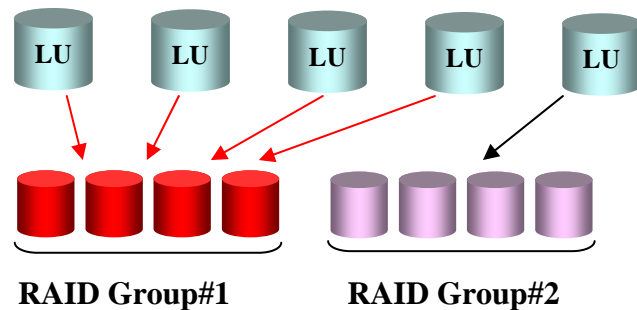
Hitachi Dynamic Provisioning Delivering Performance Improvements

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When allocating many Virtual LUs to a Dynamic Provisioning Pool that consists of multiple storage system groups, the total Host I/O load is evenly distributed across the pool's RAID Groups

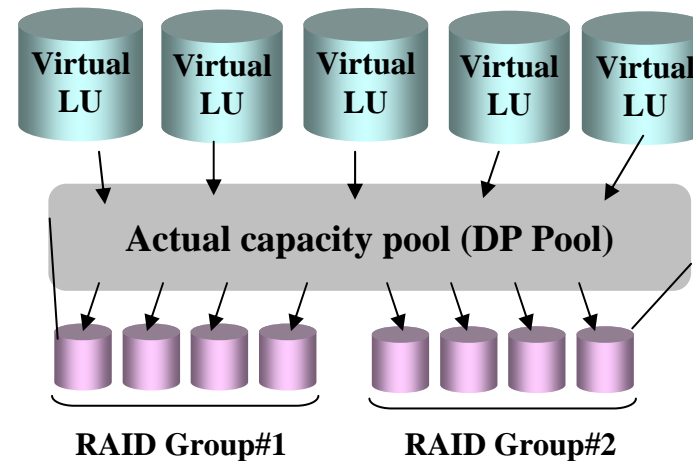
This "wide striping" implementation automatically levels the I/O load and avoids over utilizing a RAID Group resulting in a performance bottleneck

Without Dynamic Provisioning



RAID Group #1 becomes performance bottleneck

With Dynamic Provisioning



Host I/O load is distributed to both RAID Group #1 and RAID Group #2



Storage Reclamation Service – Value to Customers

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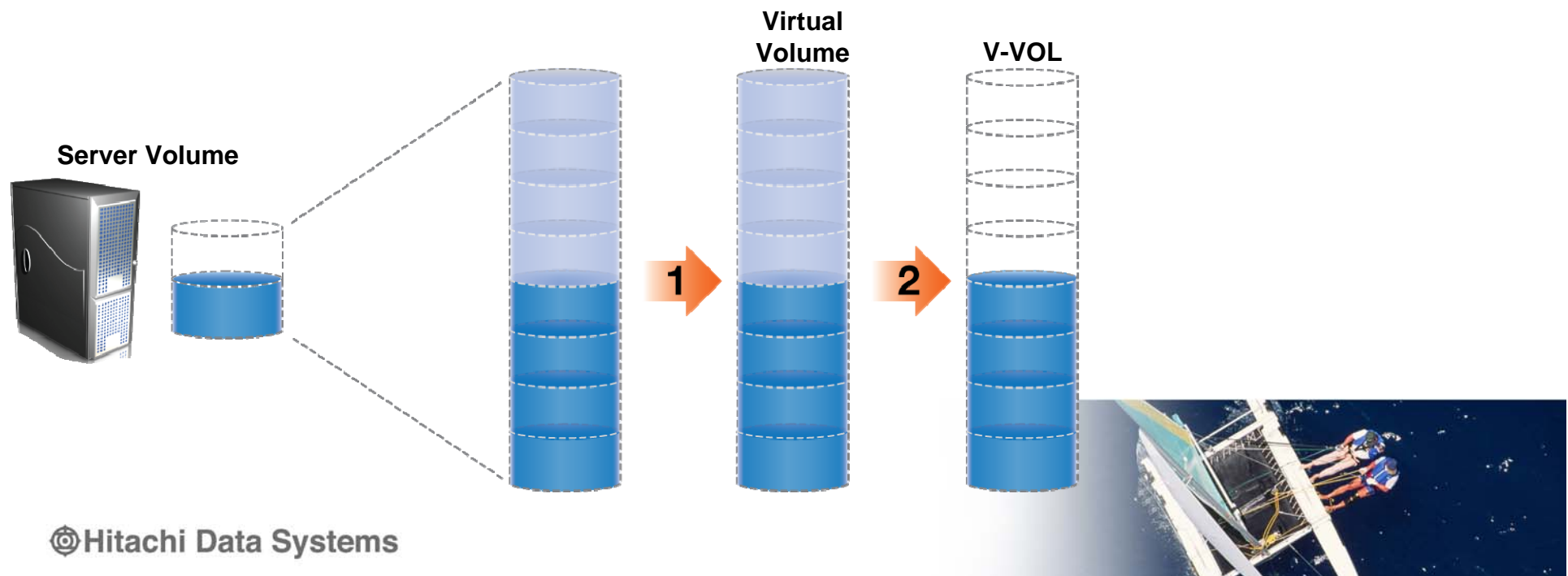
Hitachi Data Systems expertise and proven methodologies:

- Identify and plan optimal areas for storage reclamation
- Reduce risks in migrating your mission critical data with minimal business disruption
- Provide summary recommendations for managing a dynamically provisioned architecture
- Ensure predictable and successful results
- Accelerate your time to value



Zero Page Reclaim Software - Unique

- Zero Page Reclaim software examines the volumes of physical capacity on a Universal Storage Platform V or Universal Storage Platform VM and where the firmware determines that no data other than zeros is found on a Dynamic Provisioning software pool page, the physical storage is then unmapped and 'returned' to the pool's free capacity.
- Zero Page Reclaim is intended to be used after initial migration/restore
 - Migrate from the physical volume to the virtual volume (or restore volume from tape)
 - Zero Page Reclaim unused pages return physical storage to a dynamically provisioned pool



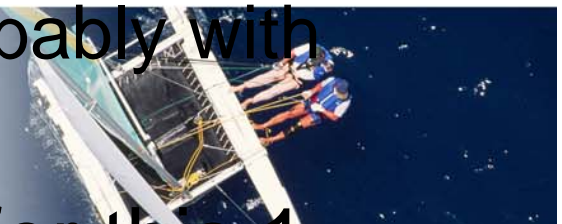
Example – Reclaiming the Copy Space

- SAP application, database for production use
 - When the volume was created, DBA asked for 200GB allocation
 - Actual application uses only 40GB of written-to data
- Primary volume has right level of protection, performance
 - RAID 1+0 on Tier 1 storage
- Development volumes evolve over the life of the application
 - At least 3 separate and distinct sets for Dev,



Example – 1 Application, 10 Copies of Data

- 1 production and 9 copies of the same 200GB volume
 - 3 for Test, DEV, QA
 - 4 for Data and disaster protection
 - 2 for Data marts and extractions
- All 10 of these volumes could now be on the same high-level tier
 - Under- provisioned (40 out of 200GB)
 - All 10 could be on Tier 1, but probably with different RAID levels



Case Study – The impact of new architecture elements

- Consider the same SAP production application
- Production version on tier 1 with RAID 1+0 protection
 - Apply a conservative level of thin provisioning to this volume (~20%)
- Test, DEV, & QA on a lower, thinned tier
 - Tier 2 - 4+1 or 7+1 RAID 5
 - Dynamic movement of volumes between tiers if/when needed
 - Possibly store on an externalized, virtualized lower cost array



Calculating Reclaimed Space

Minimal impact to Hosts – No need to re-layout data
 Virtualise Storage
 Migration Services using Tiered Storage Manager
 Into HDP Pools
 Apply Zero Page Reclaim

	Old way		
	Vol Usable	Raw	Tier
1. Prod Volume	200	400	1
2. Test	200	240	1
3. Dev	200	240	1
4. QA	200	400	1
5. PIT Local	200	240	2
6. Local Sync	200	240	1
7. Remote Async	200	240	1
8. Backup Copy	200	230	2
9. Data Mart	200	240	1
10. Data Extract	200	230	1
Totals	2000	2700	8/2/0

New Way			
Presented	Phys Alloc	Raw	Tier
200	100	200	1
200	60	72	2
200	46	54	2
200	100	120	1/2
200	50	58	3
200	50	58	2
200	50	58	2
200	46	54	3
200	60	72	2
200	46	54	2
2000	608	800	2/6/2

- In this simple example, 2.7TB Raw is converted to 800GB Raw for the same application,



Case Study – Other economic factors of reclaimed space

- Multiply the reclamation and cost savings of 1 application to dozens of applications residing in the storage infrastructure
- The 1.9 TB of reclaimed space for this one application has many other cost saving factors than just the reclaimed space
 - Power, cooling and floor space
 - HW purchase/lease costs (or cost avoidance for the next 1.9 TB)
 - HW and SW maintenance
 - License fees applied to this reclaimed space no longer needed



Savings Proof points

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- EDB improved operational headcount expense by more than 50% with HDS' virtualization solution.



- HUK Coburg reclaimed 30% capacity on IBM DS4800 using HDP.



- HDFC Bank saves 2100 man hours of labour/year using virtualization solution.



- Fidelity National reclaimed their entire investment in less than a year with a ROI of 188%.

- A global financial organization reclaimed 40-65% of its capacity through dynamic provisioning and Zero Page Reclaim saving in excess of 4M US\$.



Switch  On.

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Switch IT On

The Offer and Value Proposition



Economize your Storage.
Savings strategies for a sustainable future.



Switch it On – An Offer You Can't Refuse

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Switch It On is a unique offer enabling customers (for free) to seamlessly virtualize and manage all of their heterogeneous storage thereby reducing CAPEX and OPEX and increasing Return On Assets.



Switch it On

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The Offer:

Free Hitachi Basic Operating System V license when it is used to virtualize a newly attached existing 3rd party (non Hitachi) storage system behind a new or existing Hitachi Universal Storage Platform V system

Super size the Offer with options:

- Add for free: Hitachi Tiered Storage Manager license for capacity of newly attached third party storage system
- Add for free: Hitachi In-System Replication software bundle license for capacity of newly attached third party storage system
- Add for free: Hitachi Dynamic Provisioning license - 'First 10TB free option'

Promotion Period: May 6th, 2009 – December 31st, 2009



Switch it On – Terms and Conditions

- Customer pays maintenance on all software
- Free Licenses offered as part of this program are transferable if customers decides to migrate capacity virtualized for free to a Hitachi storage platform at any given point
- Customer can virtualize additional capacity for free until end of program date
- Business continuity software (ISR) free license is limited up to capacity already licensed or that of new capacity being virtualized
- Eligibility:
 - 1) Current Universal Storage Platform V install base
 - 2) New Universal Storage Platform V customers
- Program offered through Direct and Indirect including SUN.

****Conditions apply - see “Program Terms and Conditions” for additional details***

<http://www.hds.com/go/free-storage-virtualization/pdfs/limited-time-storage-virtualization-promotion.pdf>



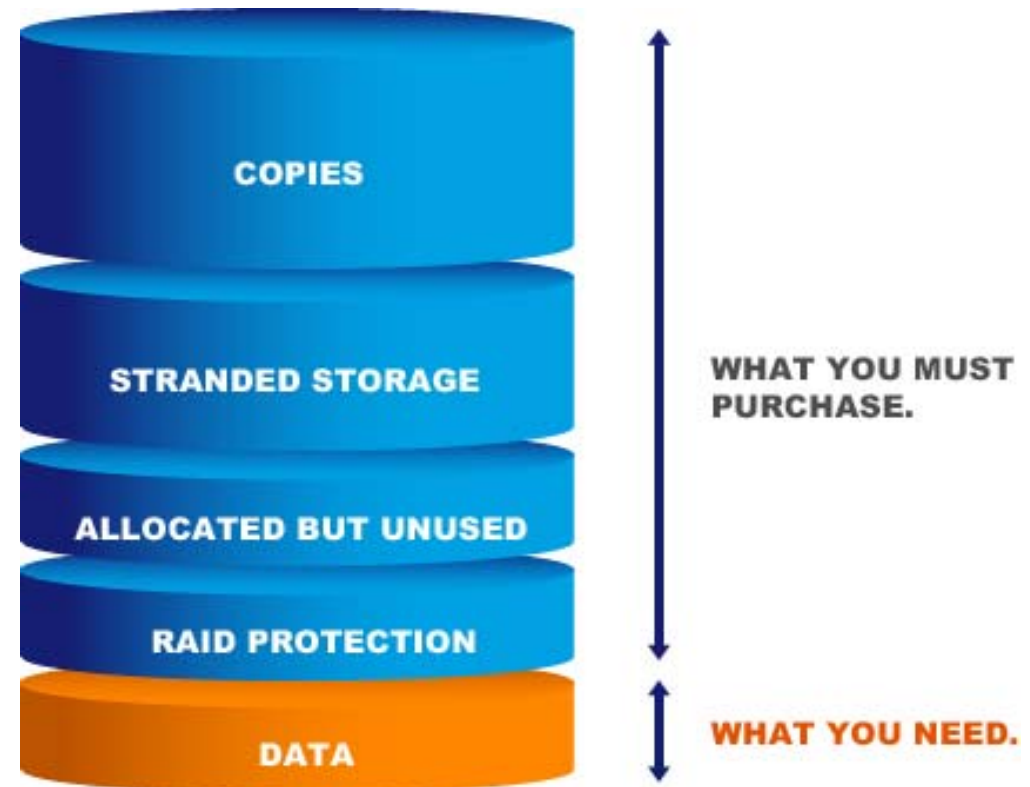
- Questions?



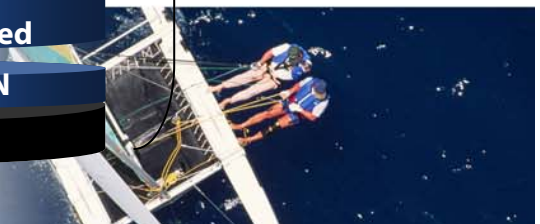
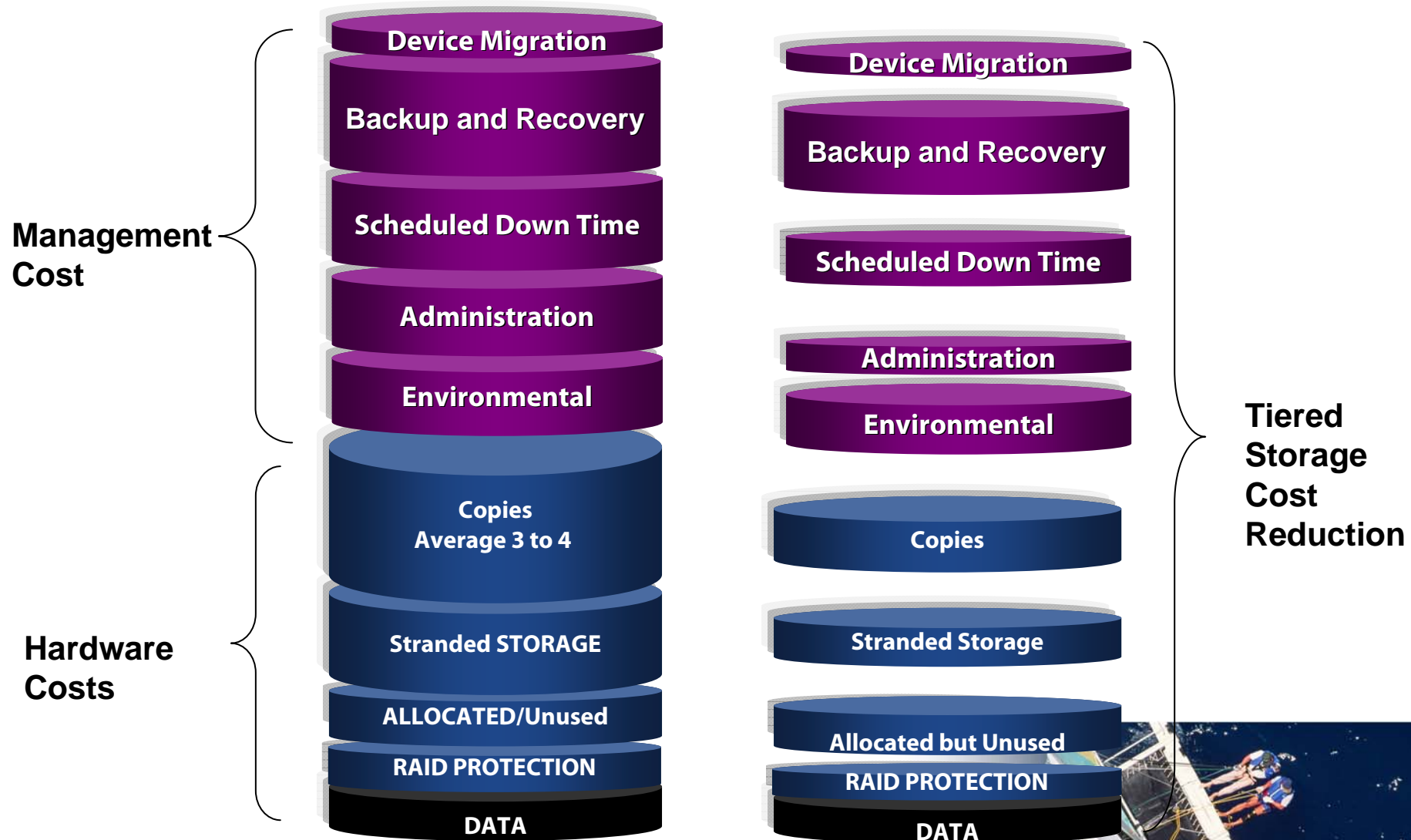
“Over subscription with under utilization”

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- Because of the way that storage is packaged, consumers must buy 75% more capacity than they actually need...



Customer Problems Solved By Tiered Storage



Thank you



Awards and Prizes (downstairs)

