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Reinventing Storage Virtualization

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Hitachi Storage Solutions

Hitachi Data Systems

Networked Storage - The First Wave

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- Modern storage technology has seen Disk prices declining about 30% every year for the last 50 years
  - **Why are your storage costs increasing?**
- Cache storage controllers were introduced 20 years ago, and some architectures have not changed since then!
  - **Can they meet current and future storage requirements?**
- Over 10 years ago SAN's were introduced to increase storage utilization.
  - **Why is the storage utilization still so low?**
- 7 years ago Storage Virtualization 1.0 was introduced to provide volume pooling in a storage network
  - **Why isn't it ubiquitous?**

Virtualization 1.0
What Happened to the Promise of SAN?

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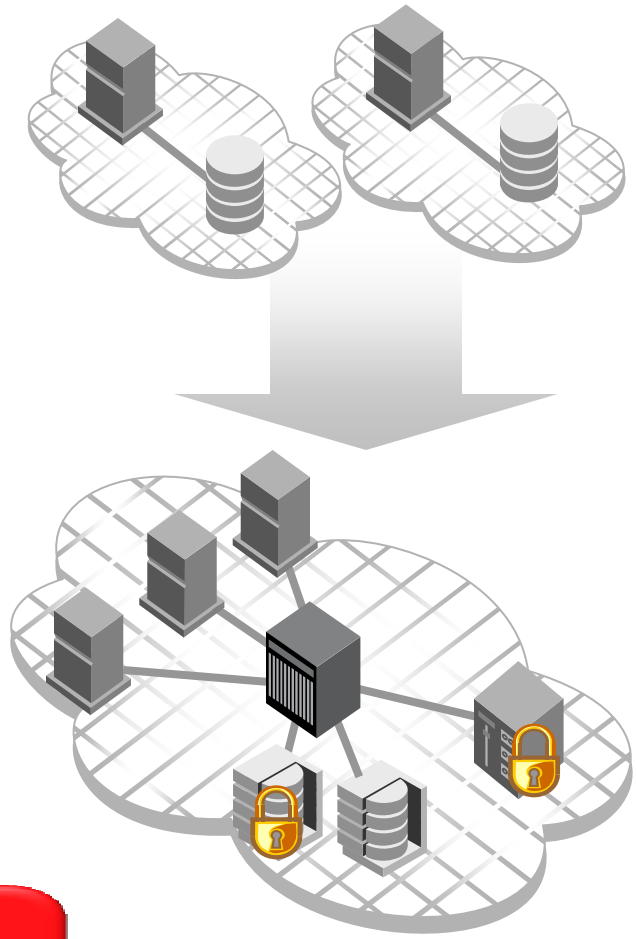
- **SAN promised…**
  - Consolidation through the elimination of islands of storage
  - Increase storage utilization and provide centralized management

What happened?

- **SAN's delivered…**
  - Networked servers to storage but left the islands of heterogeneous storage
  - Increased utilization but left separate points of management between storage systems
  - Created a unified pool of storage, but no data mobility between storage systems
  - Enhanced Business Continuity but not between heterogeneous storage systems



Storage Virtualization 1.0 did not solve all the problems!

Virtualization 2.0 Delivers…

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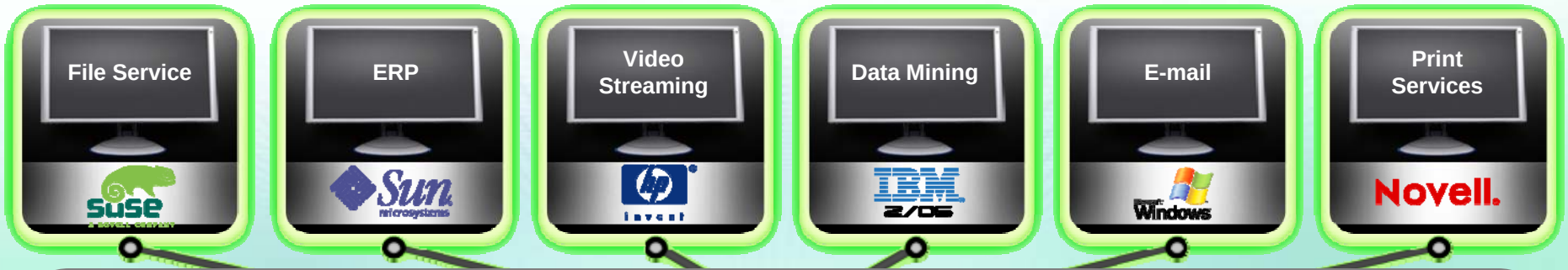
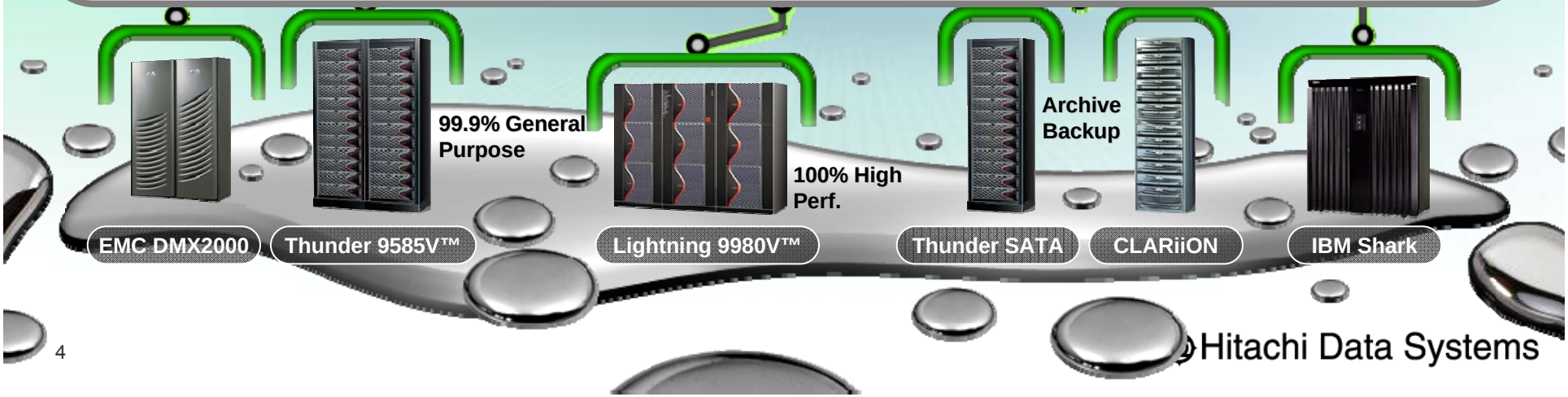


Virtualization 2.0 was defined by IDC as…

IDC
Analyse the Future

"Going beyond the consolidation of Virtualization 1.0… provides Data Mobility, Business Continuity, Disaster Recovery, non-disruptive technology refresh enhances external storage with the latest capabilities of a storage services platform"



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Why is Virtualization the answer?

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- **Increase Utilisation and Efficiency**
  - Reduce idle capacity in infrastructure (CPU, memory, network, storage)
  - Consolidate resources to reduce real estate in the data centre
- **Reduce Cost**
  - Reduce Capex infrastructure acquisition costs (servers, network, storage)
  - Reduce Opex costs (data centre floor space, power, maintenance)
- **Provide greater business agility**
  - Align infrastructure based on application requirements on demand
  - React to changing requirements to Service Level Agreements (SLA's)
  - Reduce Operational Risk by standardising and automating operational tasks such as provisioning & migration

Server Virtualisation - Is it for real?

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- *“About 5 percent of new operating systems were installed on virtual servers in 2005. The main reason is cost reduction… By 2009, Gartner estimates 40 percent of new operating systems will be deployed on virtual machines”* - Gartner
- *"We think there's value [in virtualization] that the market doesn't yet fully appreciate."* - Tom Bittman, VP at Gartner Research
- *“Virtualization is becoming commonplace in the data center arena, as companies seek to wring more out of their servers…VMware's software will be used to virtualize the blades, enabling businesses to host as many as 10 to 15 end users on a single blade”* said IBM “ – eWEEK
  - http://www.eweek.com/article2/0,1895,1926718,00.asp

Storage Virtualisation - Is it for real?

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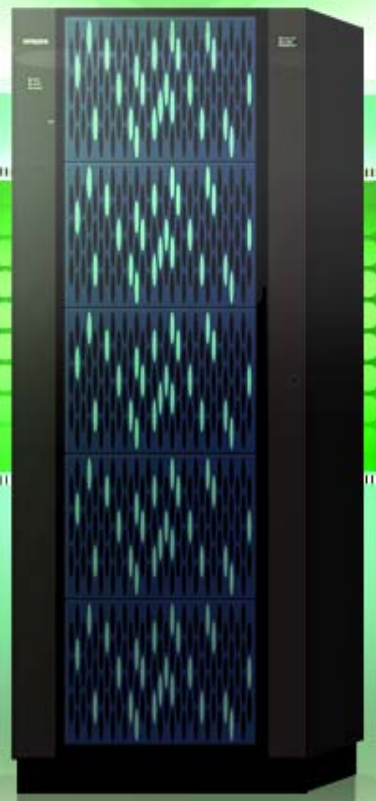
On Average 50% of Storage Production Environments at Fortune 1000 Organizations Are Targeted to Be Virtualized by 2009, According to New Research from TheInfoPro

- *35% of F1000 Storage organizations with block and file virtualization already in use increased their spending on block and file virtualization by 41% and 33%, respectively, in 2007. This trend is expected to continue in 2008. The number of Storage organizations that are users of block virtualization has almost doubled since Wave 6, to 21% in Wave 10 from 13%. Twenty-eight percent (28%) of F1000 Storage organizations that have storage virtualization deployed today anticipate that over 60% of their Storage production environments will be virtualized over the next 24 months.*

- *"**Hitachi has been named the number one provider of block-level virtualization according to TheInfoPro**, an independent research network created by alumni of Gartner, Giga and Bell Labs"*

- *"The results of our study show that the number of block-virtualization users are growing sizably, with deployments nearly doubling from 2006 to 2007," said Robert L. Stevenson, managing director, Storage Practice, TheInfoPro. "**Hitachi Data Systems has proven time and again that it is the vendor of choice when it comes to helping customers leverage the best virtualization technologies to manage burgeoning data growth and mitigate risk factors.**"*



THE INFOPRO

Source: *The InfoPro Wave 10 Storage Virtualization, January 28th 2008.*
http://www.theinfopro.net/public/home/document.php?dA=stor10pr3

How is Hitachi working with Virtual Server Vendors?

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Member of Technology Alliance Partner and Storage Virtualization Certification Program (Sep 2007), All Storage certified interoperability with ESX Server 2.5.x & 3.x, VMotion support, Integration with Site Recovery Manager, Hitachi Storage Command Suite™ interoperability with tighter integration committed

Gold Certified Partner since 2000, All Storage certified on WHQL, Currently working with Microsoft in Redmond to enhance our storage and Hyper-V integration (Systems Management, Business Continuity, Migration)

Worldwide OEM agreement for Enterprise Storage (9000 Series) since 2002, Enterprise & Modular storage platforms interoperability, Support for Solaris, Zones & Containers, Hitachi Storage Command Suite™ interoperable on Solaris

Interoperability with Modular Advanced Modular Storage Series qualified by Hardware Compatibility List

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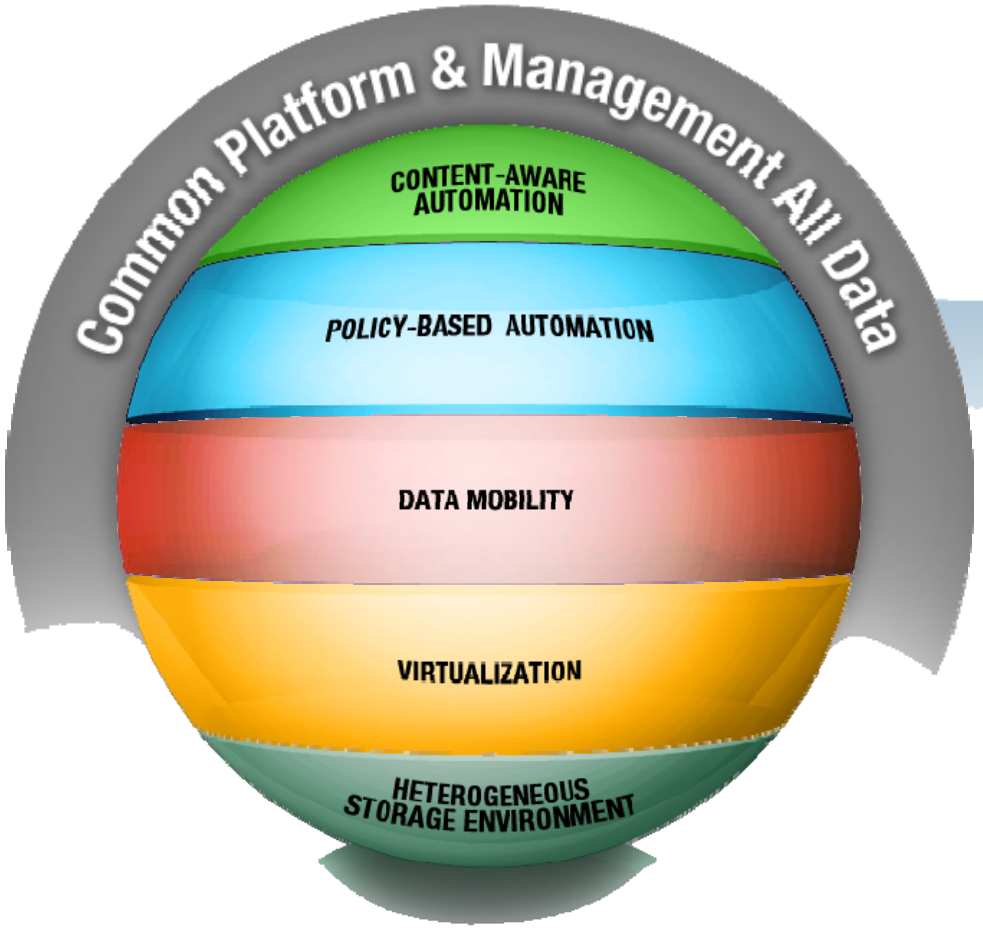
Services Oriented Storage Maturity Model



- Intelligent tiered storage
- Lowest TCO
- Optimize SLAs
- Reduce management
- Align tiers to business needs (manual)
- Integrate NAS, VTL, Archive tiers
- Optimize SLA (manual)
- Reduce TCO

- **Simplify Management**
- **Increase Utilization**
- **Consolidate assets**
- **Enhance business continuity**
- **Lower operational cost**
- **Reduce complexity**

Use Case #1: Reduce Costs through Consolidation and Simplification

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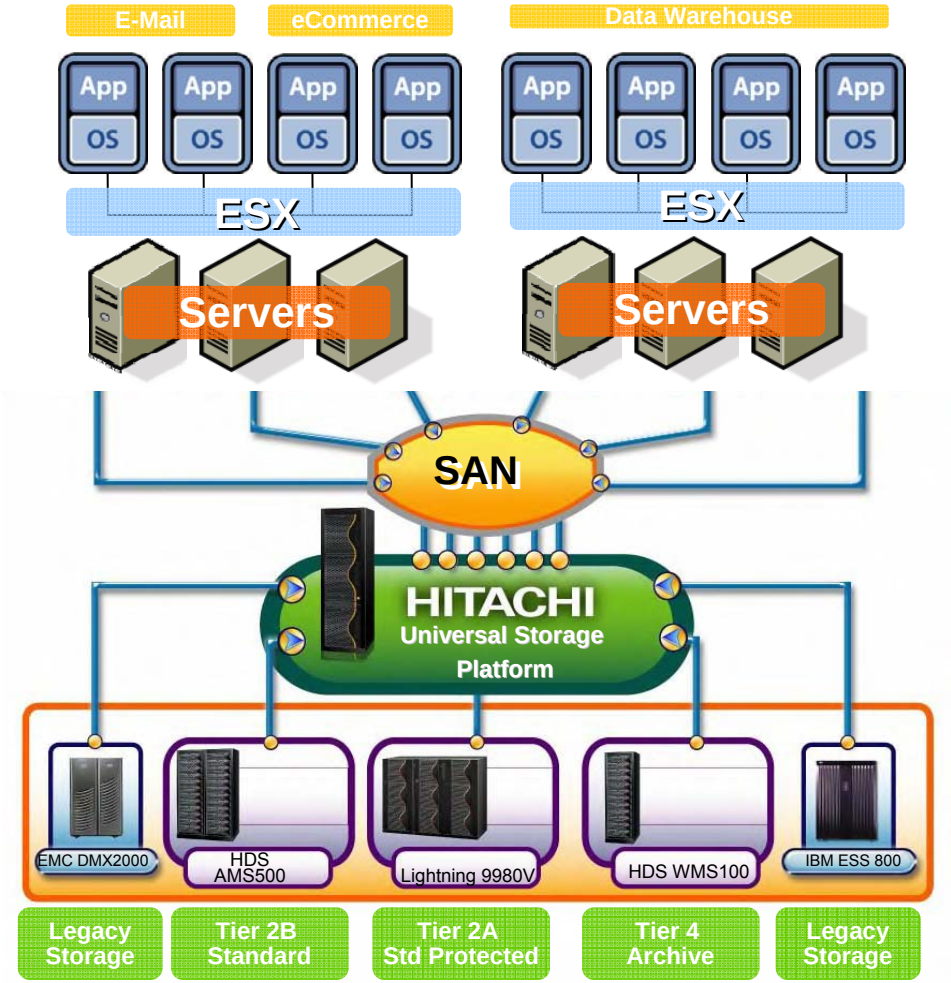
1 Virtualize all assets – server and storage managed as one common pool

Components:

- VMWare ESX Server
- Hitachi Universal Storage Platform
- Hitachi Universal Volume Manager



Key Benefits:

- Increase server & storage utilisation
- Reduce infrastructure & administration cost
- Simplified management

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Use Case #2: Maintain SLA's through Application & Data Mobility

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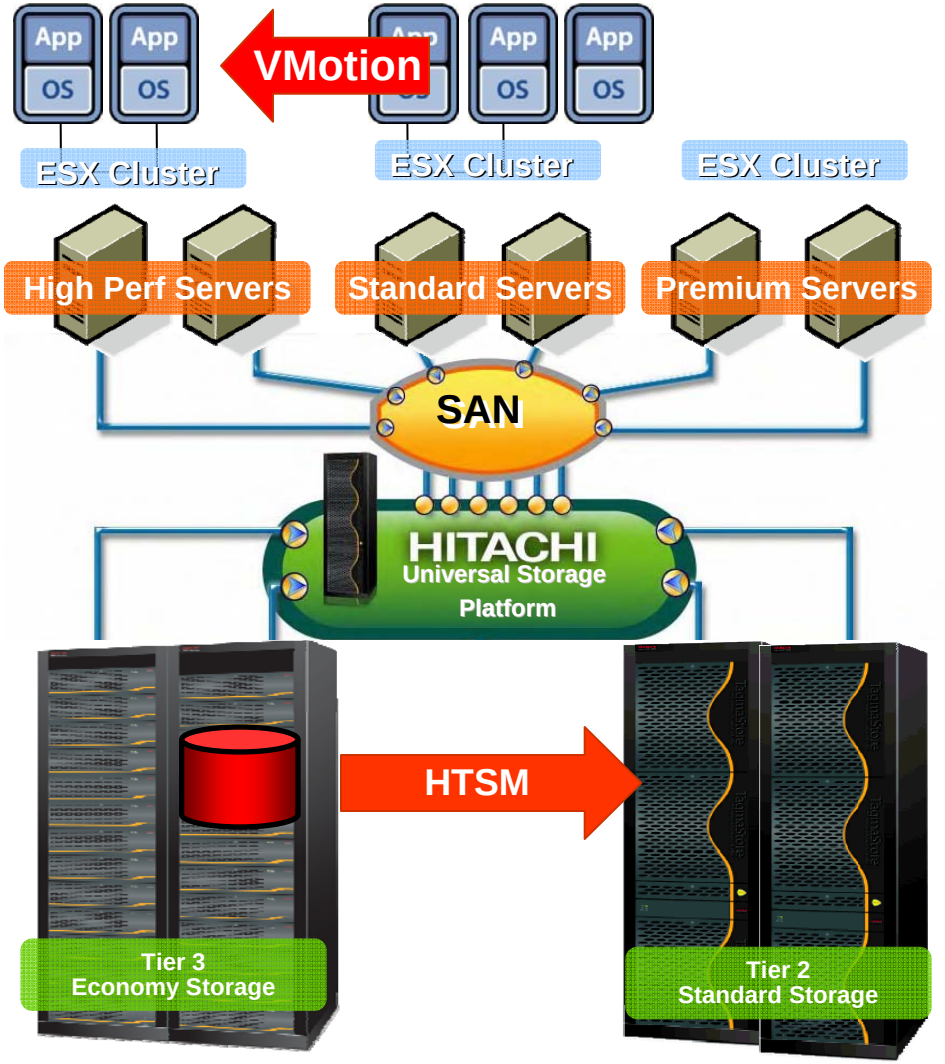
2 Migrate Server & Storage instances to increase performance when required

1. **Overloaded host:**
   automatic workload balancing
2. **Dynamically add resources:**
   DRS rebalances load
3. **Increase storage performance:**
   Promote volume to higher tier



Key Benefits:

- Align infrastructure to business needs
- End-to-End SLA Management – Server & Storage
- No application downtime

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Use Case #3: Business Continuity with OS images & Storage Array Replication

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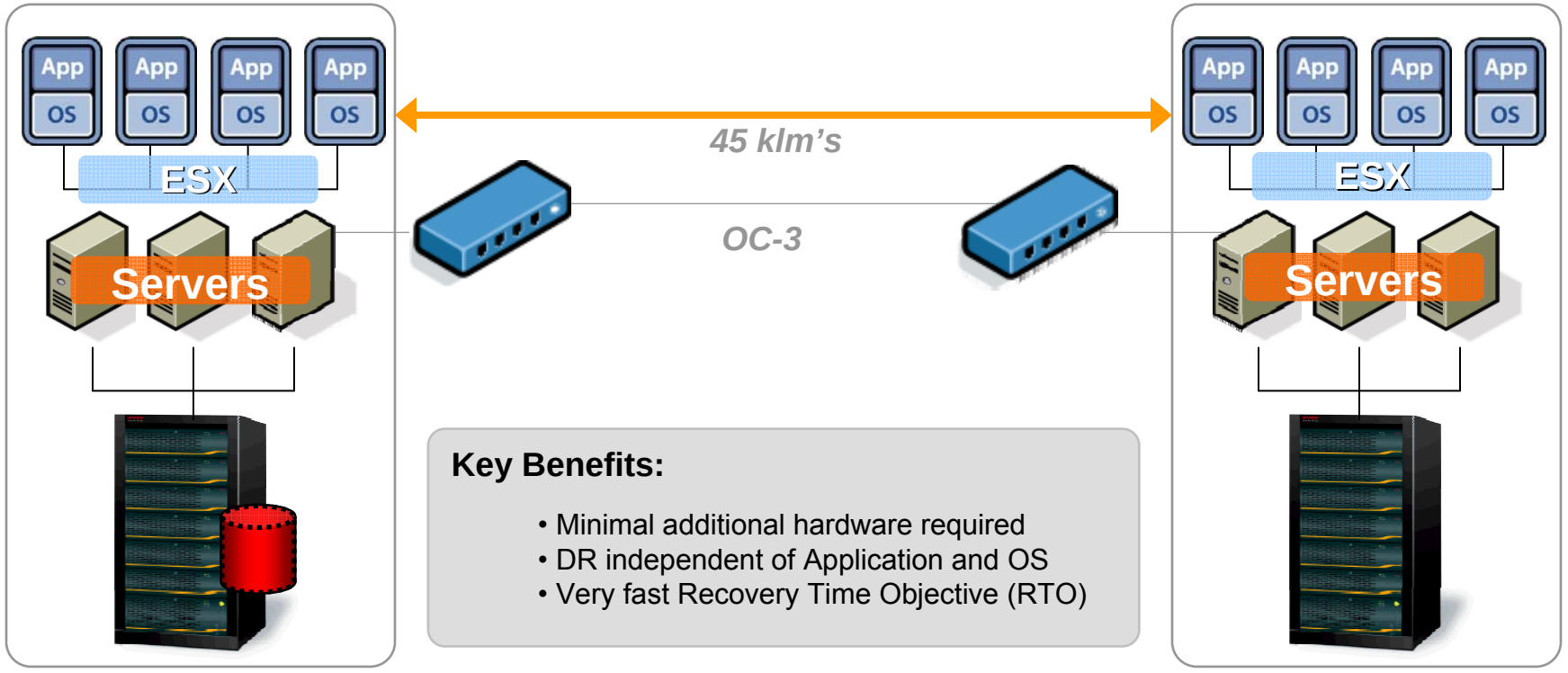
3 VMWare image snapshots with scheduled Array based snapshots (ShadowImage) and Remote Replication (TrueCopy or HUR)



Primary Data Centre

Recovery Site

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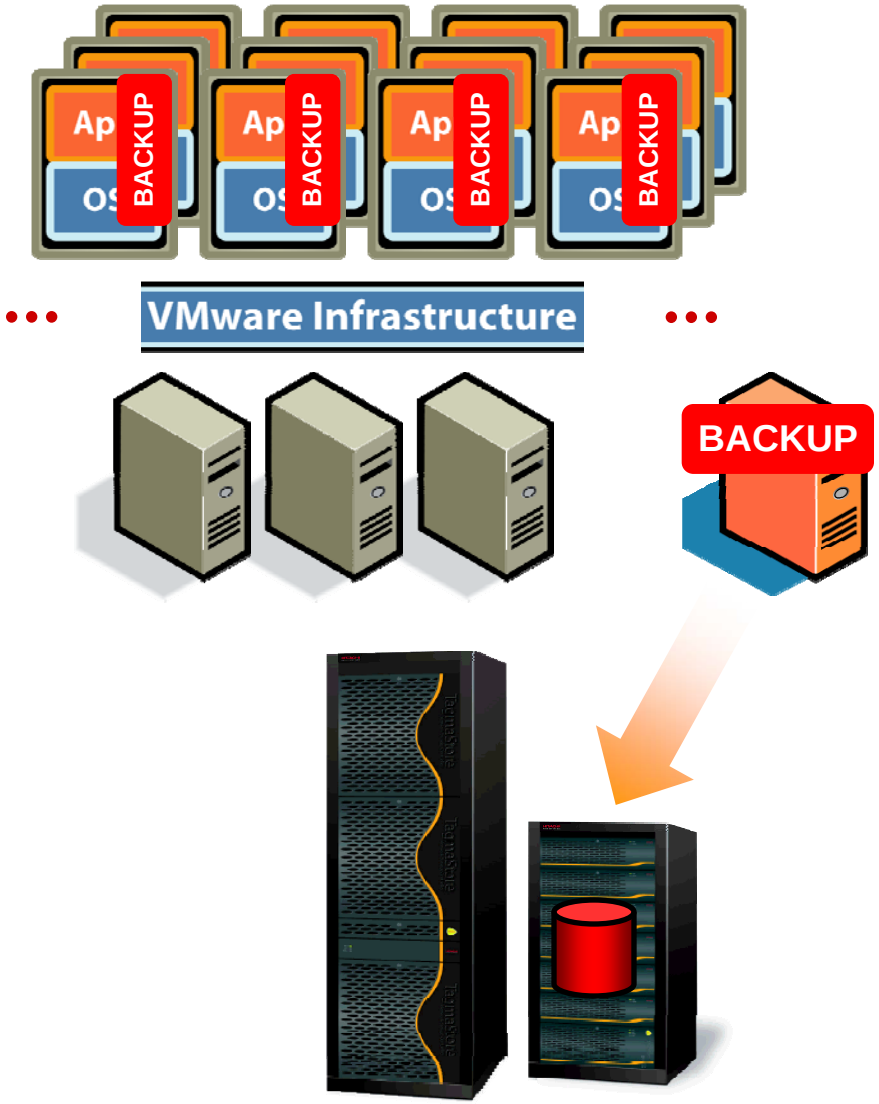
Use Case #4: Consolidated Backup & Recovery



4 Simplify backup by using HDPS and improve recovery with Direct-to-Disk technology

Hitachi Data Protection Suite

powered by CommVault

Key Benefits:

- Decouple backup from production VMs
- 20-40% better resource utilisation
- Pre-integrated with Hitachi Data Protection Suite

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Accelerating Utilization with Thin Provisioning

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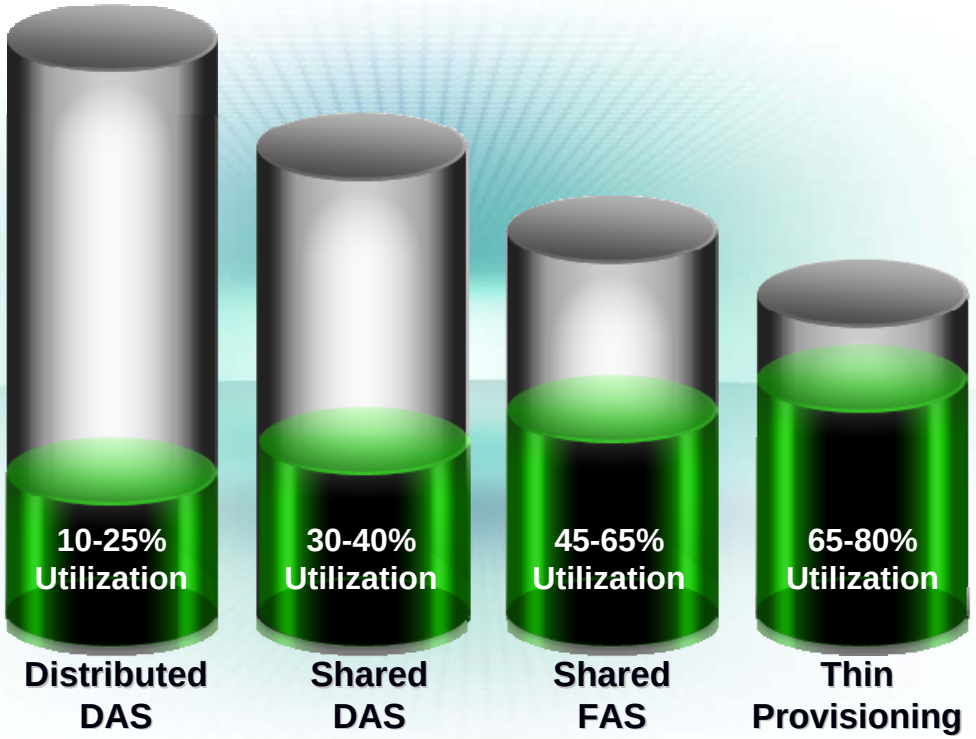
"Thin provisioning coupled with virtualized back-end disks improves staff productivity by simplifying storage provisioning and eliminating most tuning activities associated with solving performance problems."

Gartner



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Use Case #5: Reduce waste by aligning storage utilisation with allocation

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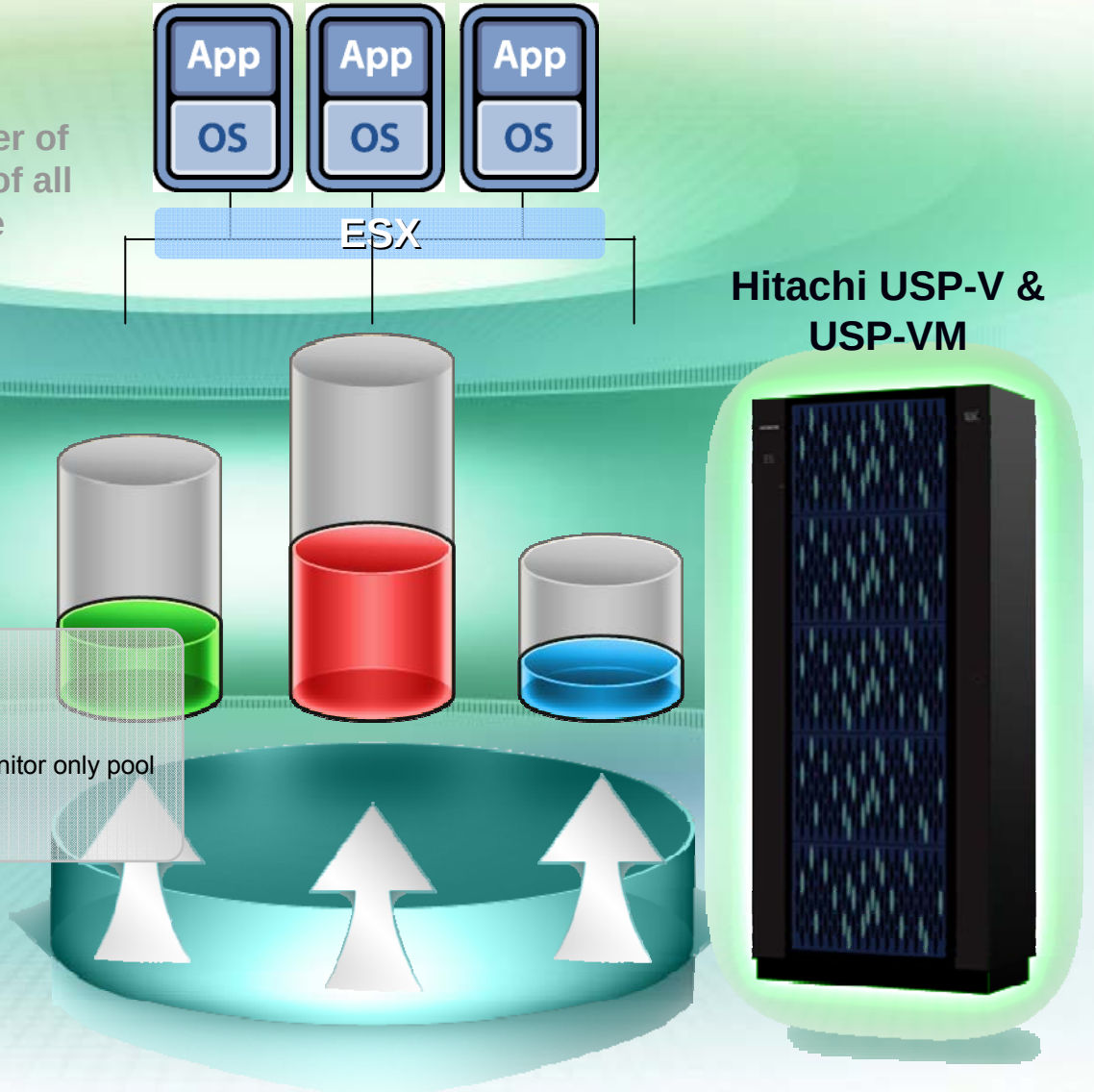
5

You can create a large number of Thinly Provisioned volumes of all sizes - each drawing from the same pool of capacity



Key Benefits:

- Reduce over subscription of storage to applications
- Easier storage management – less provisioning, monitor only pool
- Potentially increase performance with 'wide striping'

Hitachi Dynamic Provisioning™
Virtualizing the LUN can increase Performance

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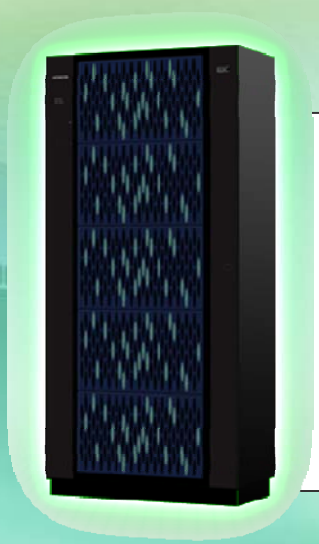
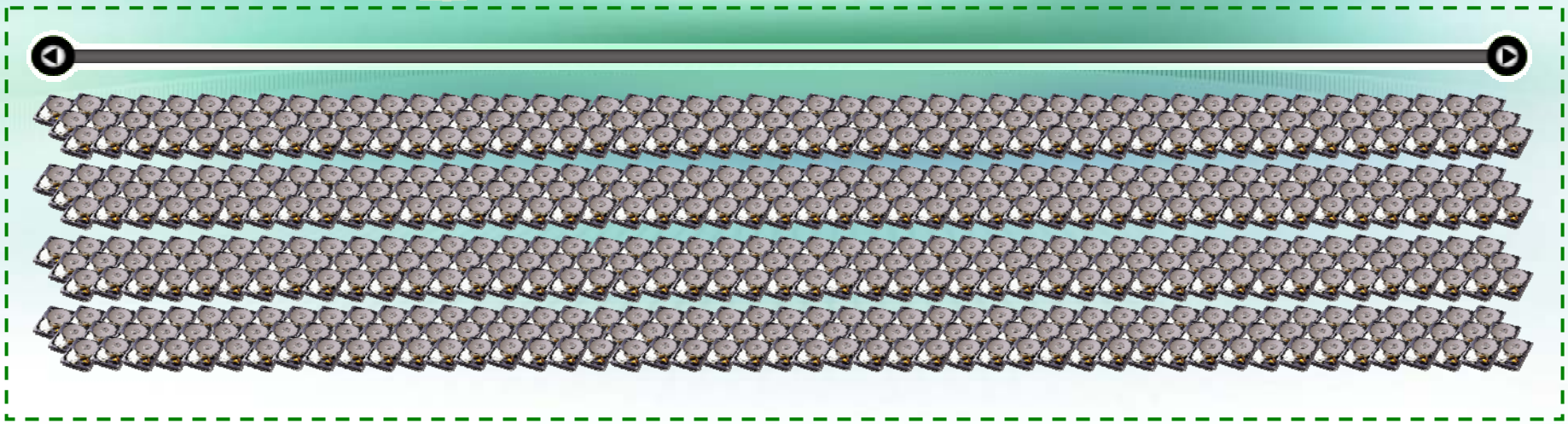
Hitachi USP V & VM



- Large Logical Pools of Storage provide ease-of-management and scalable performance
- Add Additional storage capacity non-disruptively - another powerful virtualization technology
- Optimized Performance with dozens or even hundreds of disk drives operating on I/O simultaneously



Case Study - PT. Indosat Tbk

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- **Background**
  - Indonesian telecommunication provider, established in 1969
  - Satelindo, Bimagraha and IM3 merged under Indosat in 2003
  - Cellular focused, full network provider with 12.87 million subscribers

- **Problems**
  - Merging storage infrastructures from 3 separate Telecommunication providers
  - Managing three sets of Customer Records, Financial, ERP and billing systems placing significant strain on operations and maintenance – consolidation required
  - Disaster Recovery facility required for critical applications
  - Sarbanes Oxley compliant solution required for Governance
  - Solution to be deployed and manged for less cost

- **Solution**
  - Universal Storage Platform, Network Storage Controller
  - Universal Volume Manager, Resource Manager, TrueCopy, ShadowImage,

- **Benefits**
  - By conolidating this way, able to proceed to integrate and streamline billing and customer care applications
  - Simplified management of entire storage pool & new flexibility to migrate data
  - **20%** saving in human resources
  - **40%** saving in hardware investments
  - Storage utilization up to **90%**

indosat

"We are now able to pool resources onto a single storage platform for billing, CRM, and account management. It's so much easier to manage costs when you're running a single management solution"

Joseph Chan
Director of IT
Indosat

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Summary

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- **Server + Storage Virtualisation have proven to deliver savings, if…..**
  - Understand existing server and storage utilisation
  - Create Service definitions for applications
  - Conduct an ROI
  - Plan to transform your infrastructure
- **Hitachi is the proven leader in storage Virtualisation 2.0**
  - Unified Storage Management, Non-disruptive data mobility, Heterogeneous Data Replication
  - 10,000+ footprint with 35% in virtualised environments
  - Verified by Industry Analysts
- **Dynamic Provisioning accelerates utilization & performance**
  - Virtualisation in USP V & USP VM is the enabler
  - Can be extended to hetrogeneous storage
- **Hitachi has is investing**
  - Deep relationships with market leaders (VMWare, Microsoft, Sun)
  - Interoperability, Integration, Best Practices & Whitepapers

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Thank You

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