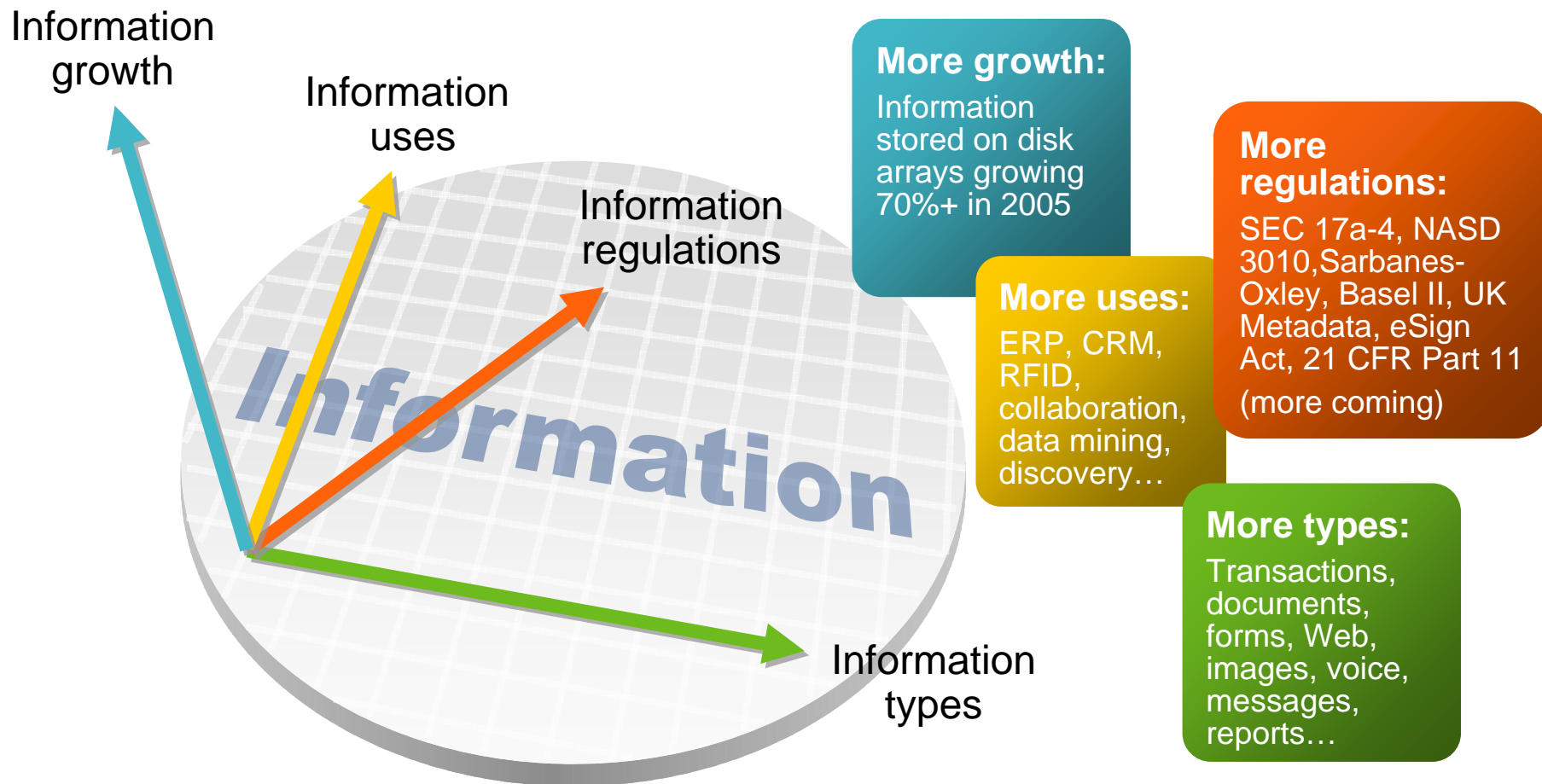


Storage Consolidation and Virtualization

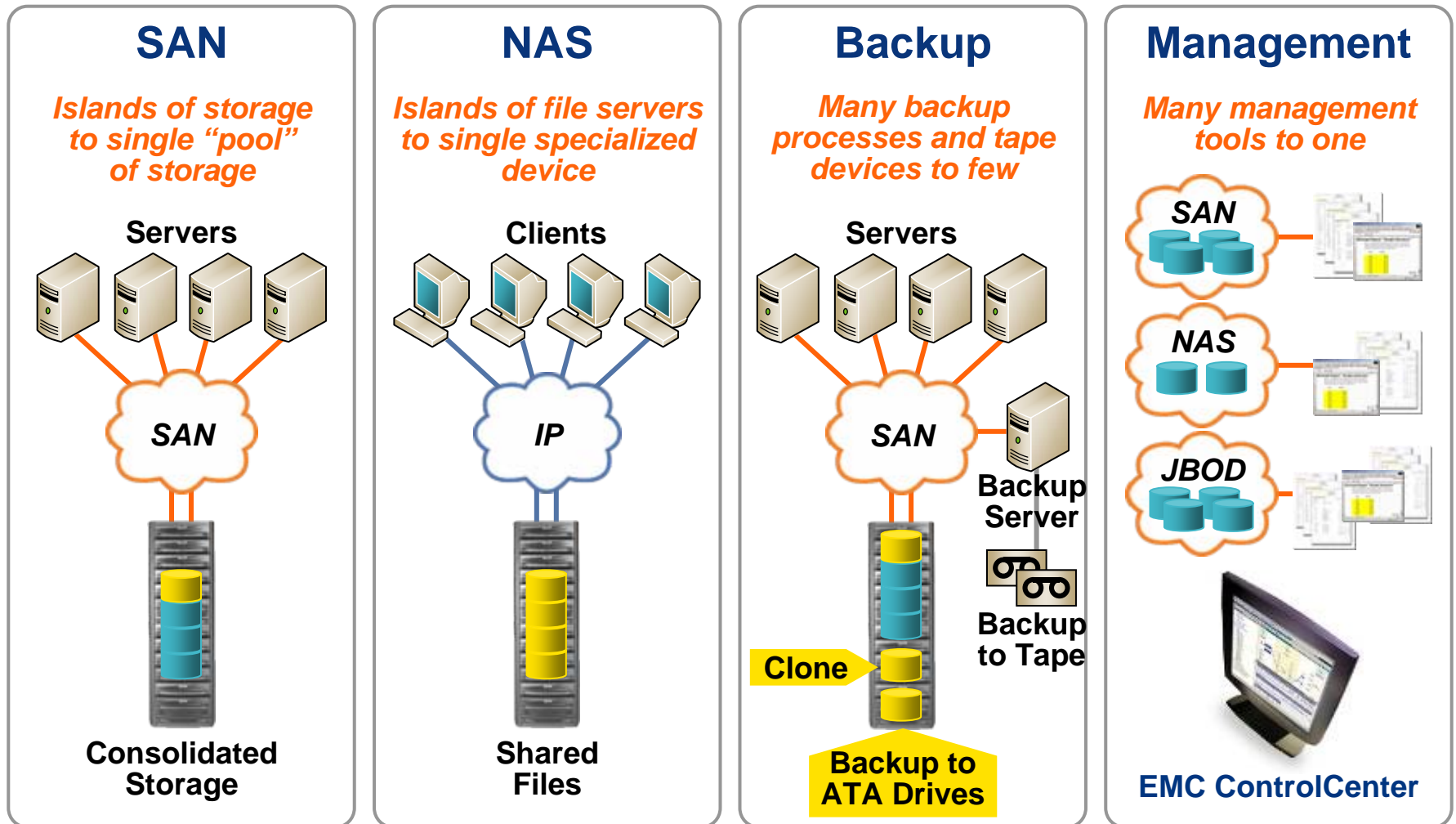
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NEW YORK | SEPTEMBER 18-22, 2006

Jean Weintraub
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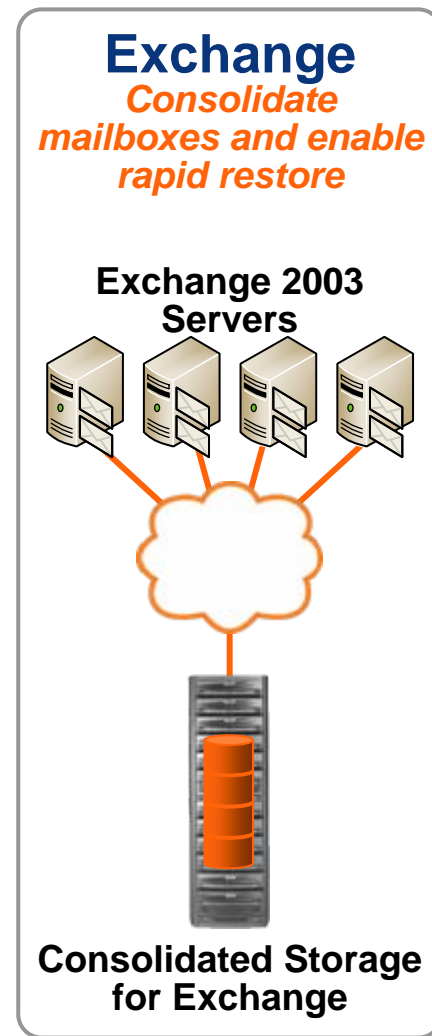
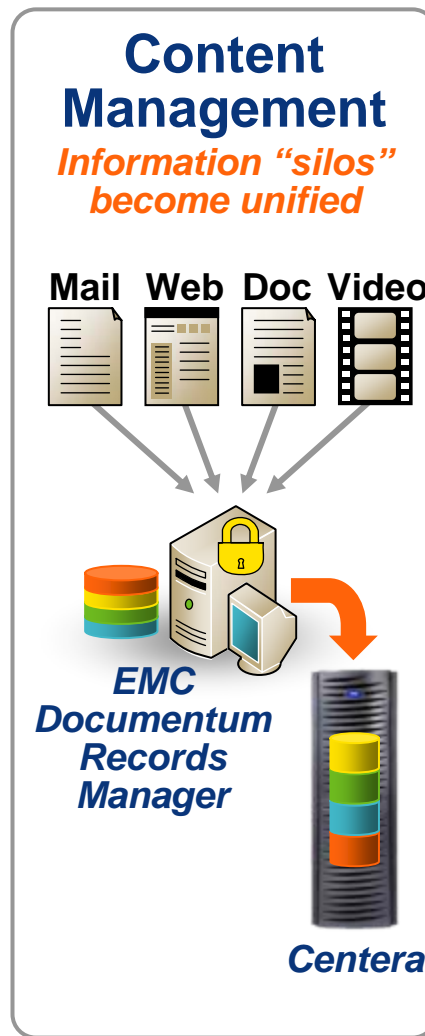
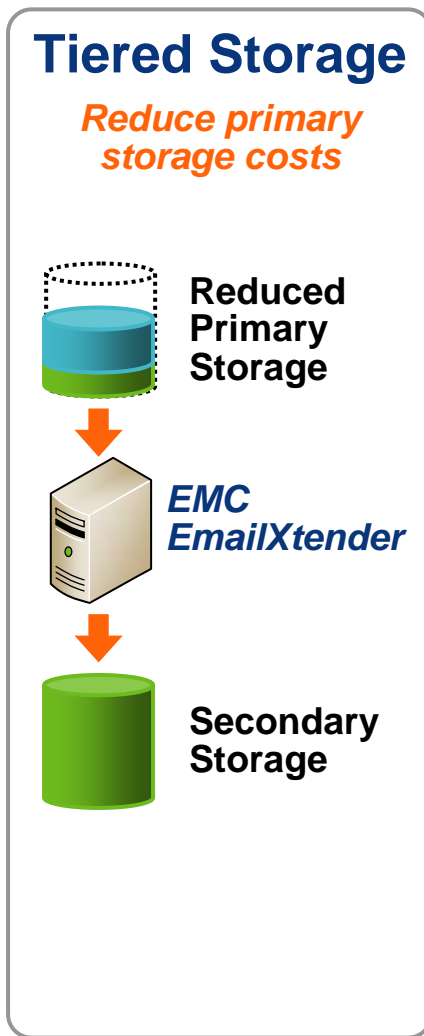
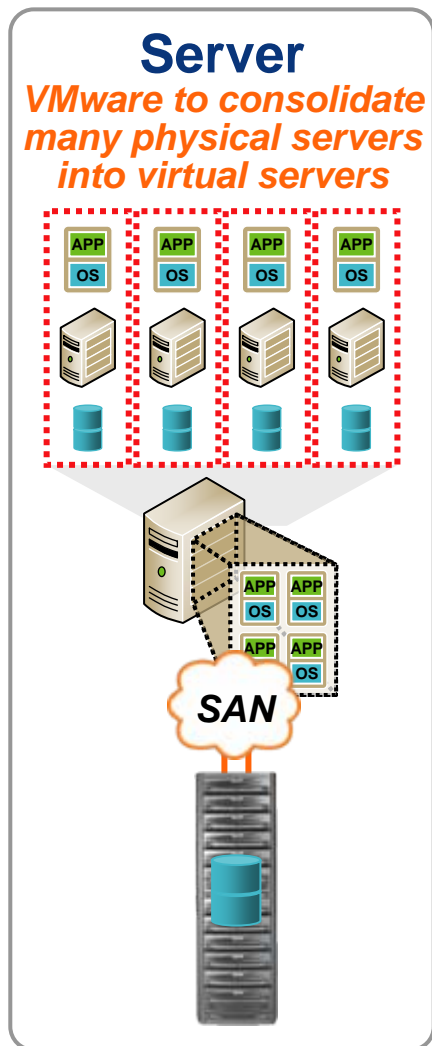
Information: Change in Multiple Dimensions



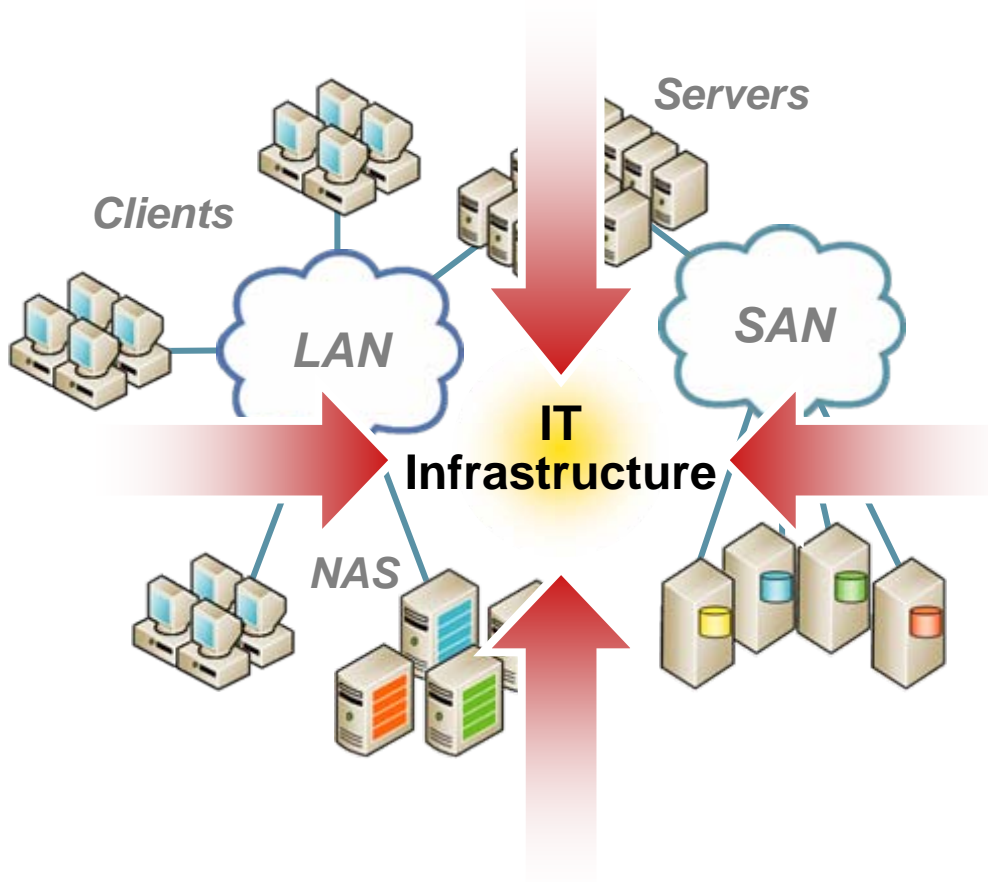
Ways to Consolidate



Ways to Consolidate

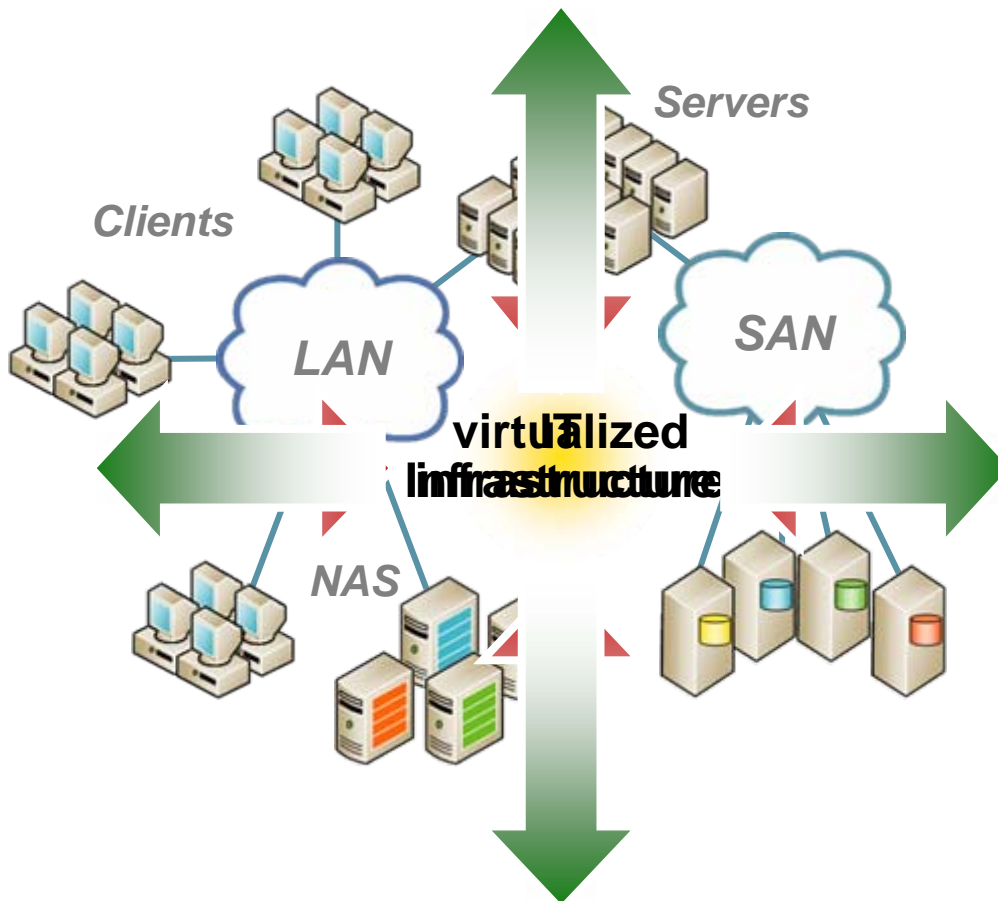


Today's IT Infrastructure Facing Many Challenges



- **Growth**
 - Resources and data proliferating
- **Cost**
 - Utilization rates remain low
 - Infrastructure changes are costly
- **Business alignment**
 - Lack of flexibility slows reaction time
 - Faster pace of change in IT demanded by the business
- **Availability**
 - Infrastructure changes create increased planned outages

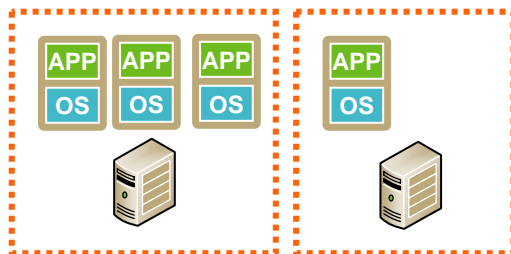
Virtualization Increases Flexibility and Availability



- Resources are not tied to a physical location.
- Resources can be pooled and dynamically allocated
- Changes to infrastructure can be made without impacting availability
- Virtualization:
 - lowers costs
 - simplifies management
 - increases service levels

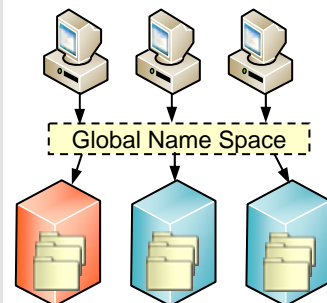
Virtualization Provides New Levels of Flexibility

Server



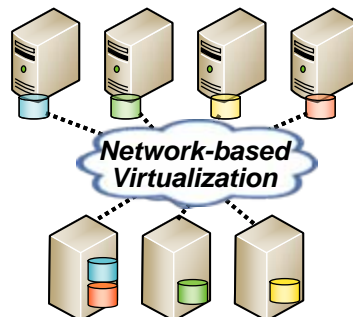
**Server
Virtualization**

File Storage



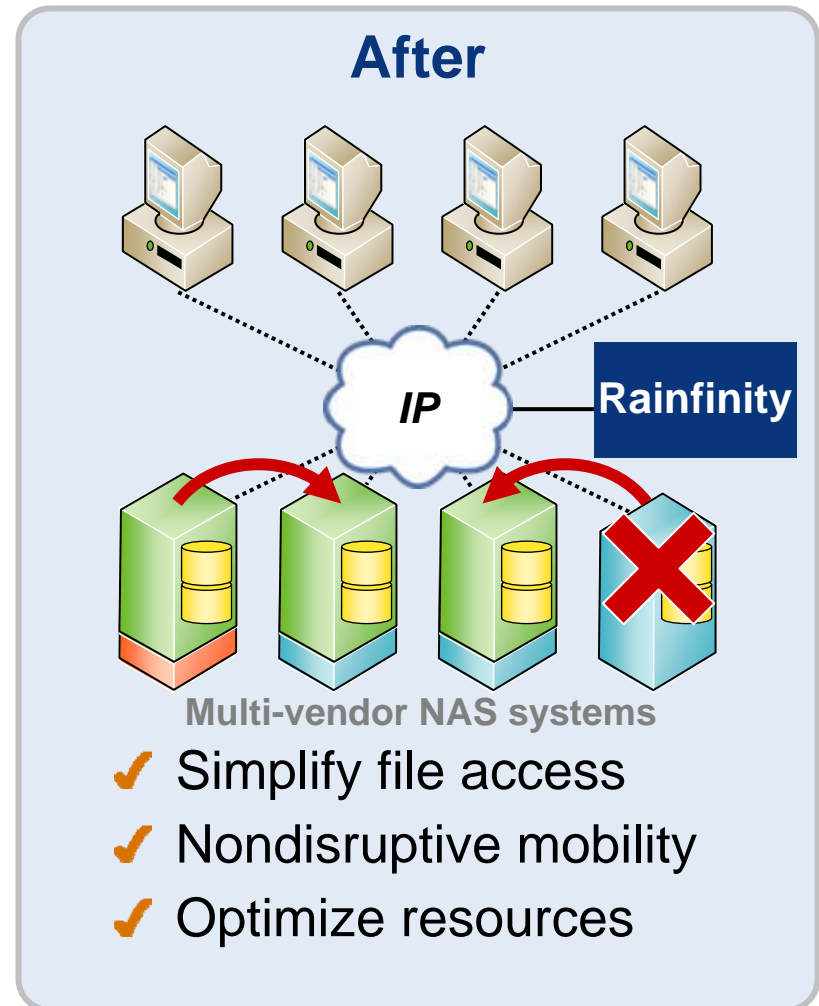
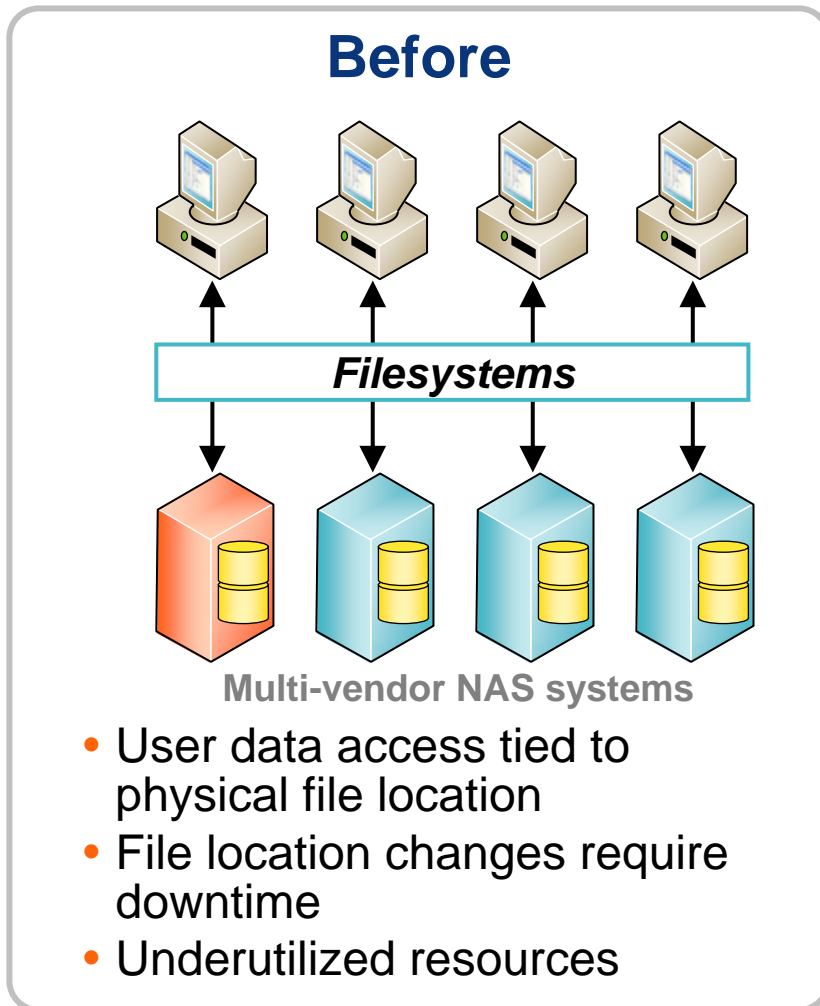
**Storage
Virtualization**

Block Storage



File Virtualization Example: EMC Rainfinity

NAS Abstraction that Optimizes Resources and Improves Flexibility

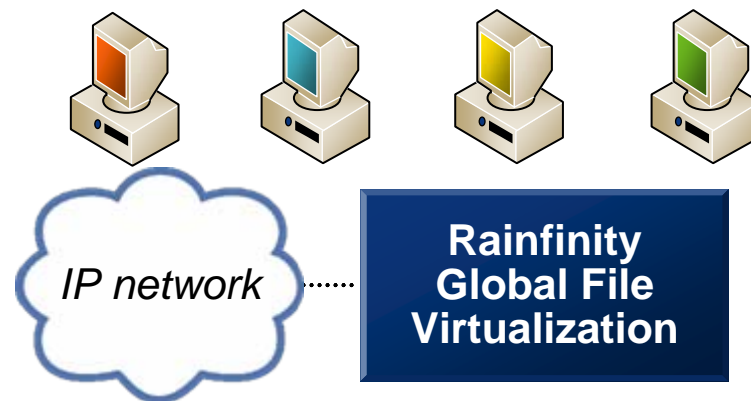


Optimizing File Storage Through Virtualization

NAS Virtualization Identifies and Rebalances Poor Utilization and Performance

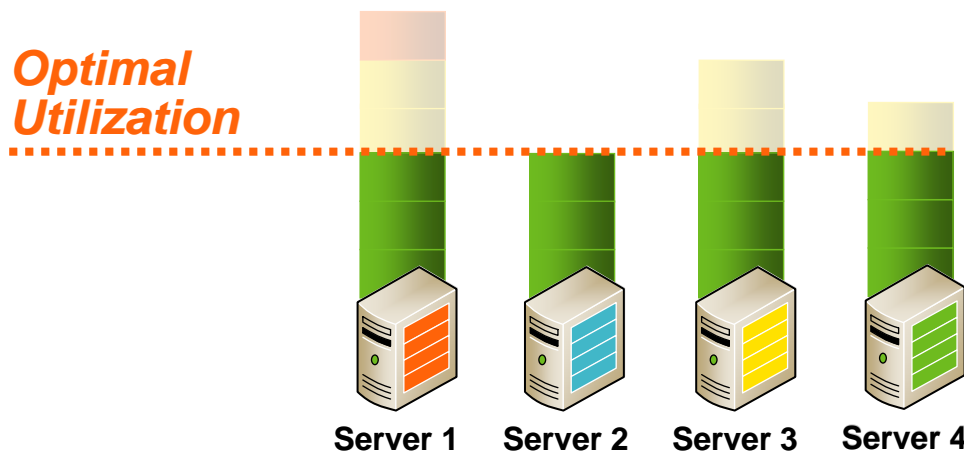
Before:

- Too many file servers
 - Buying more file servers for additional storage
- Poor resource utilization
 - Overutilization affects performance
 - Underutilization costs money



After:

- Identify areas of poor resource utilization
- Rebalance and increase performance
- Reduce server purchases for additional storage



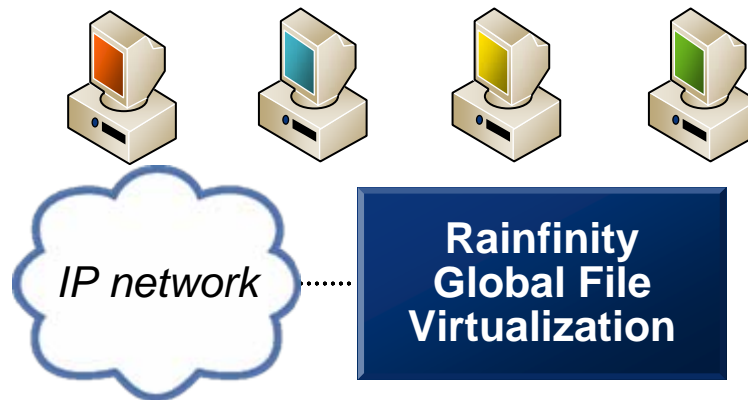
File Storage Virtualization Accelerates Consolidation

Move Files Non-disruptively – With Continuous Access to Data

Before:

Complex Migrations

Adding, changing, or removing file servers to consolidate was disruptive and time-consuming



After:

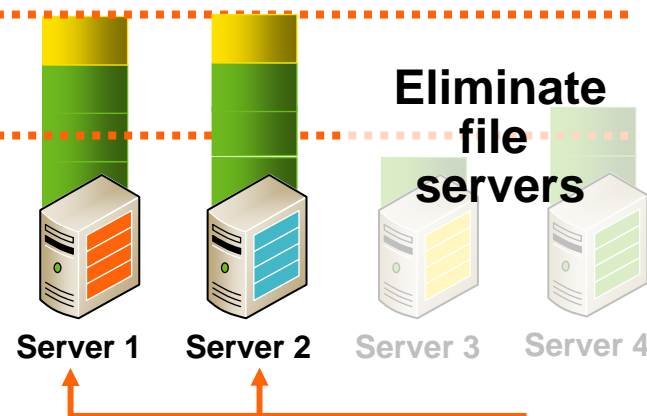
Eliminate servers through migration to underutilized servers

Maintain full read/write access during migration

Transparent to clients and applications

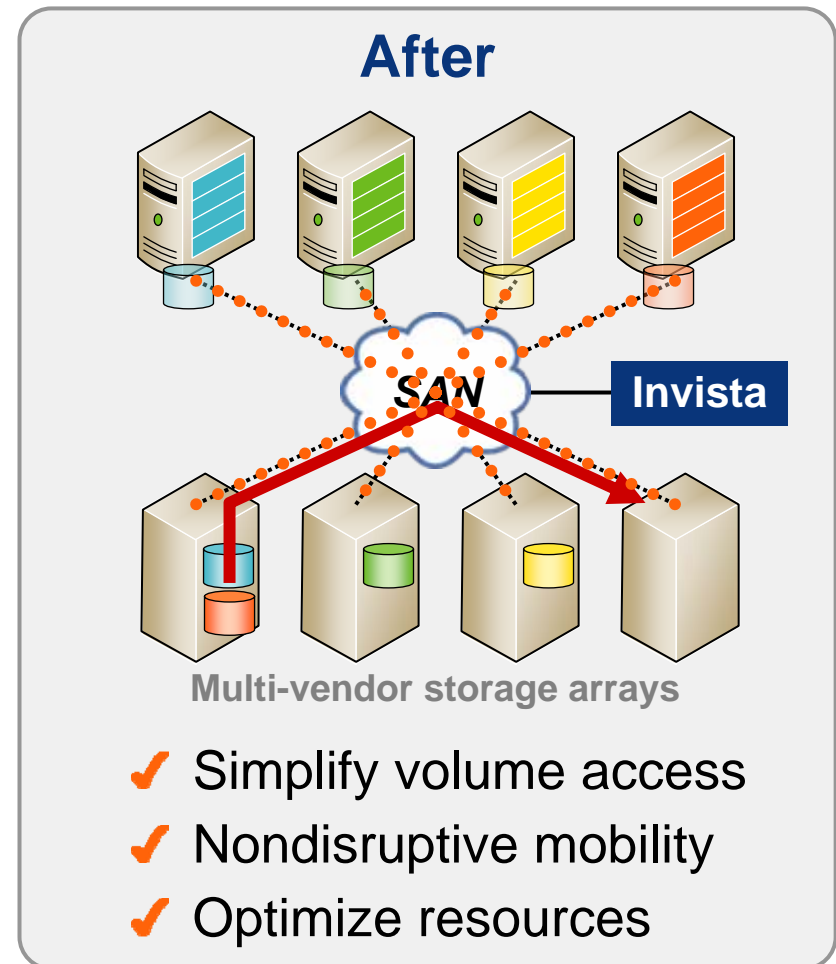
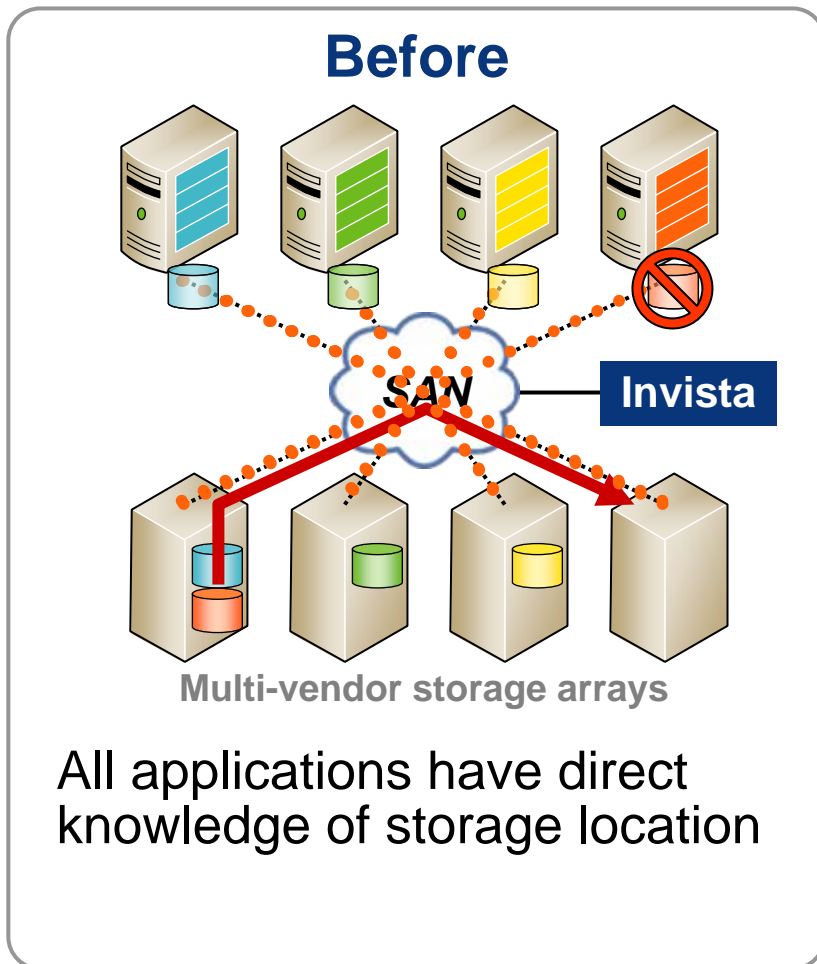
Increased Utilization

Average Utilization



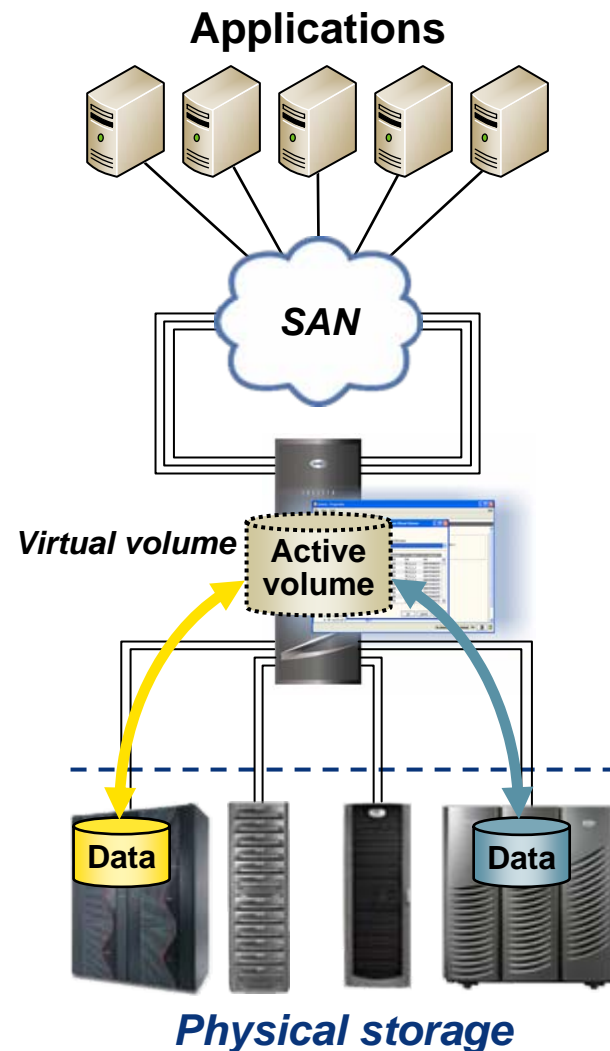
Block Storage Virtualization Example: EMC Invista

Optimizes Resources and Improves Flexibility



Dynamic Volume Mobility

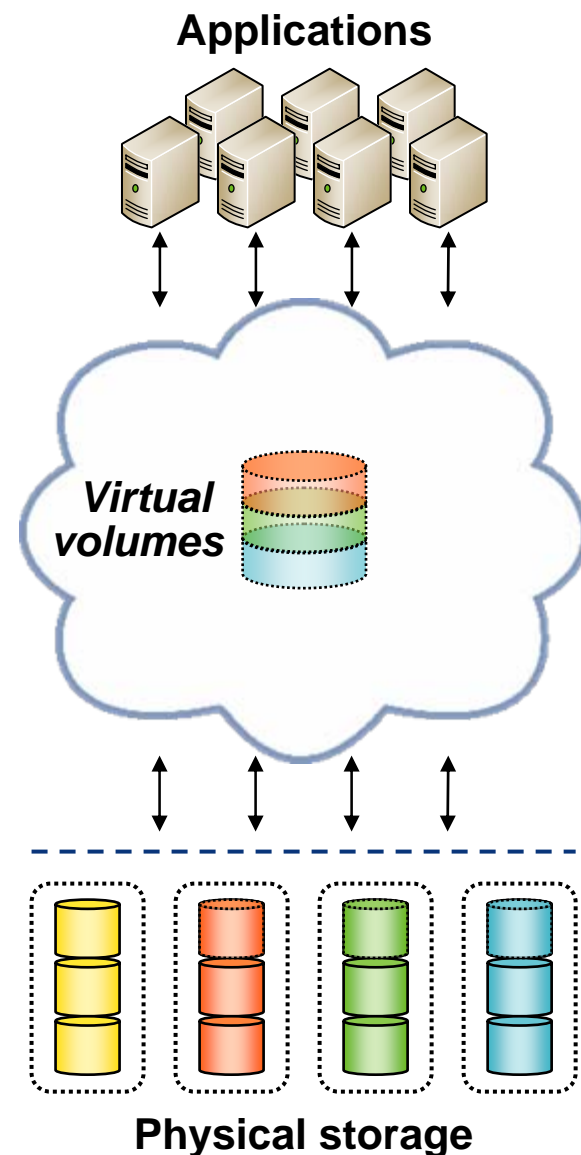
- Provide nondisruptive movement of volumes across heterogeneous storage
- Reduce migration costs
 - Does not use server resources
 - Enterprise Strategy Group research* shows migrations occur almost 50 times faster than with server based methods
 - Lowers license costs associated with host based volume managers
- Increase ability to meet service levels



* See ESG Labs report at <http://www.emc.com/analyst/analystview.jsp?id=366>

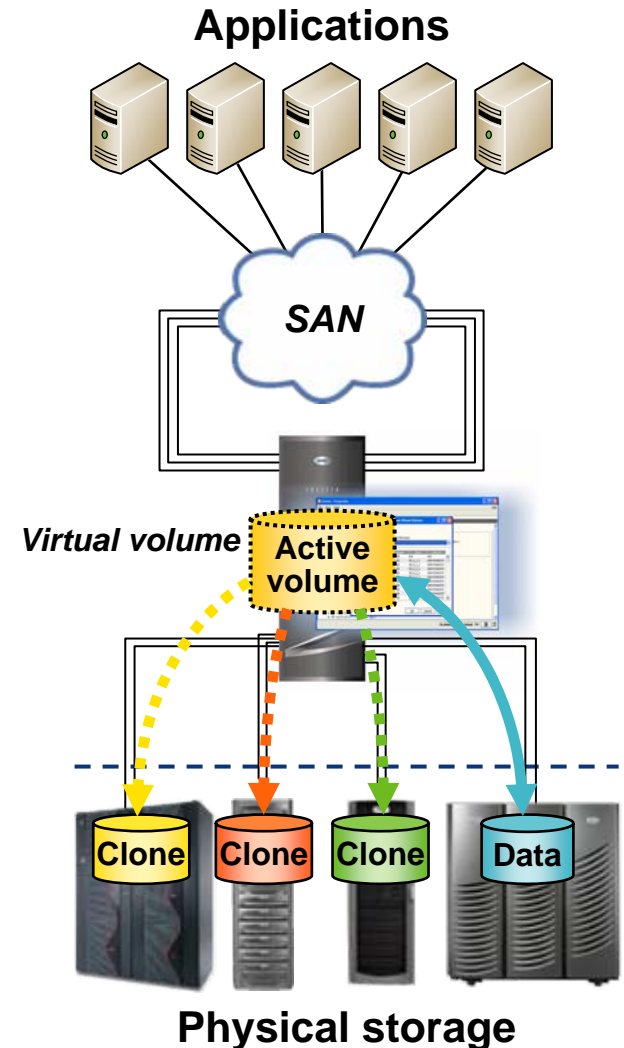
Network-based Volume Management

- Simplify volume presentation and management
- Centralize management and control
 - ESG research shows average administration savings of 19% and hardware savings of 24%
- Reduce management complexity of a heterogeneous storage

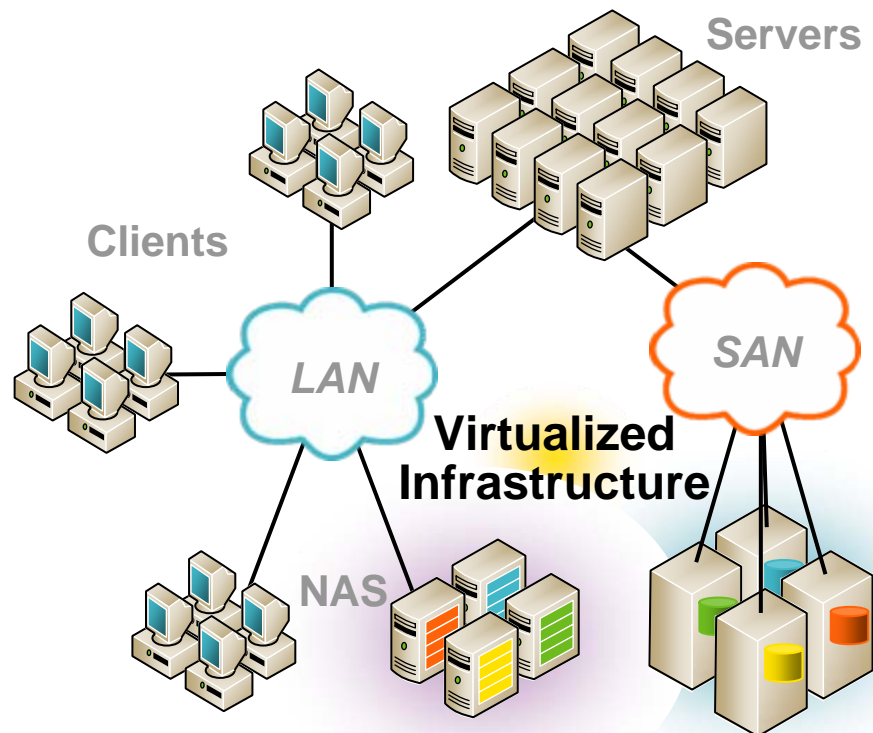


Heterogeneous Point-in-Time Copies

- Create point-in-time copies
- Enable replication across heterogeneous storage
- Maximize replication benefits to support service levels



Virtualization Reduces the Pain of Consolidations Across the Infrastructure



Server virtualization

Run multiple applications on a single server, move applications nondisruptively, increase server utilization

Block virtualization

Nondisruptive data migrations, increased utilization, nondisruptive data movement

File virtualization

Nondisruptive data migrations, increased utilization, nondisruptive data movement

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