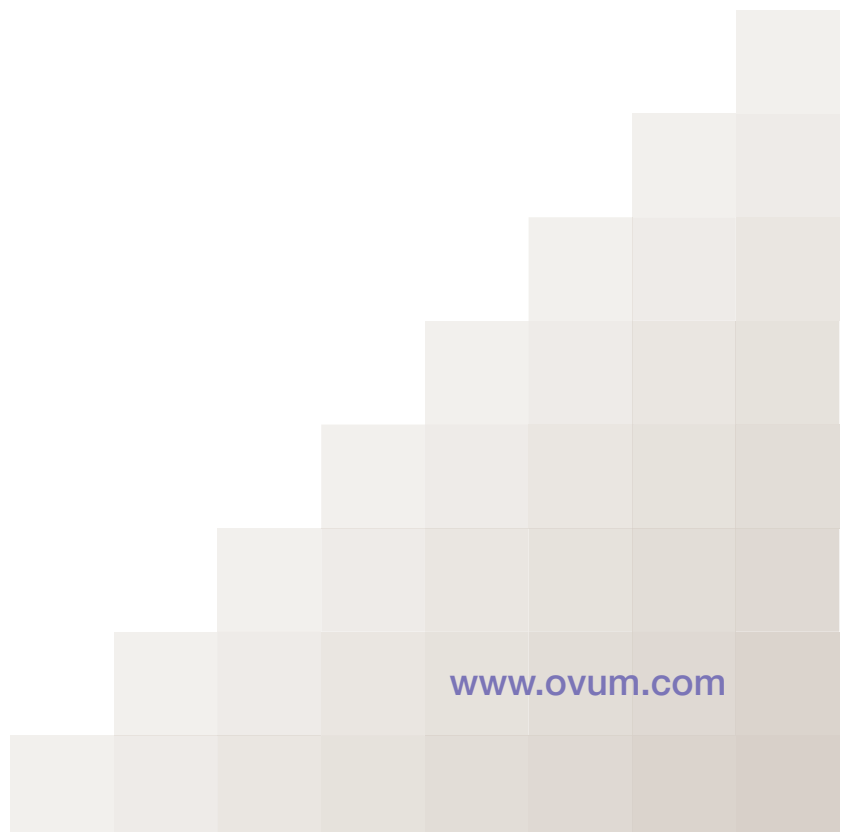




# Storage virtualization: enabling common storage services

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Table of Contents.....1  
Storage virtualization: enabling common storage services.....2  
    The intersection of SOA and virtualization.....2  
    The dilemma.....2  
    Focusing on storage.....3  
    Benefits of common storage services.....4  
    Storage virtualization – the enabler.....5



## Storage virtualization: enabling common storage services

***The marketing hype around virtualization, service-oriented architecture (SOA) and software/storage as a service (SaaS) continues to confound IT organizations (ITOs). All of these elements have merit, yet each organization and vendor has their own unique view as to what is actually being addressed with each solution. This report clarifies how these elements address/affect the storage infrastructure environment specifically and in context with the overall data center infrastructure provided to best position ITOs to separate fact from fiction – and to separate virtualization reality from virtualization mythology.***

### The intersection of SOA and virtualization

The confusion comes partly from the intersection of SOA and virtualization. SOA relates to abstracting business application functionality into sharable business service components and virtualization pertains to abstracting servers, storage and networks into more flexible supporting infrastructure services or functions (or to make matters worse a virtual/service-oriented infrastructure). Too many acronyms that sound similar yet address dramatically different issues.

Simplistically we view SOA as a much longer-term process than virtualization since it requires a rebuild of most current applications to embrace componentization. However, infrastructure virtualization is achievable today within domain-specific environments and with some cross-domain capability.

Yet key to SOA is a flexible virtualized infrastructure that can readily adjust itself to dynamic requirements and also coexist with traditional distributed/legacy applications.

Against this backdrop and realizing these are separate initiatives, we look at the role of storage virtualization, its benefits and the evolving common storage services model that is required to effectively manage and optimize this critical and rapidly growing infrastructure component.

### The dilemma

Business leaders are focused on business process results and tend to assume there is sufficient IT infrastructure and capabilities to meet their dynamic requirements. They view common and reusable business functions as a desired state with accountability and auditability a certainty in conjunction with timely deployments. True, these are in part the promised benefits of SOA-based application deployments, but the base assumption of adequate infrastructure and management are suspect. Today, most infrastructure deployments and support are



siloed, not only by technology (server, storage and network), but also by operating environment (zOS, proprietary Unix, Linux and Windows). The adoption of common management and process disciplines targeting the elimination of silos represents a tedious effort of unifying these multifaceted domains and, for most, the effort is nowhere near complete. As a result, concepts such as service-oriented data center, flexible data center and service-oriented infrastructure services all point to the desired end point, since ITOs are attempting to create a portfolio of heterogeneous infrastructure services that can be automatically provisioned, managed and measured for dynamic business results.

Given this dichotomy, most data centers are implementing strategies that attack each domain separately, attempting to achieve cost and operational effectiveness proof points. Normally projects focus on virtualization with common management and functional services within established domains. The overall lack of infrastructure standards continues to deter the achievement of our unified operational objective, yet progress continues to be made. One of the primary concerns with a virtual infrastructure remains how to holistically manage it and not let it result in unmanageable complexity.

### Focusing on storage

Given that storage remains a primary ITO pain point, and one that continues to see growth well in excess of 50% per year, managing this resource is challenging at best. Not attempting to minimize the issues associated with servers and network, which are ongoing, storage continues to achieve top billing as a priority item for attention. Storage solutions have been uniquely developed for distributed ('open') and mainframe environments addressing block, file, content, archive and virtual tape libraries, making consolidation and common management extremely difficult. Further complicating this situation is the fact that most solutions are proprietary and tied to specific vendor hardware, so lack the ability to create a unified or common storage environment. However, across all of these solutions there exists a common set of functions that would greatly simplify and optimize the storage infrastructure. Included are:

- data replication, mirroring or copy functions that could be local, synchronous or asynchronous, include both disk to disk and disk to tape, and address high availability and business continuity
- snapshots, point-in-time copies and continuous (or near) data protection for enhanced recovery capability from data corruption
- non-disruptive data migrations/placement to adjust for the dynamic performance requirements of tiered deployments and technology refreshes
- volume/file management (indexing) across heterogeneous storage devices
- data encryption and shredding/eraser
- alternative I/O path capability for load balancing and enhanced recovery
- data classification and automatic archival capabilities



- thin provisioning or 'allocate on write' capability to enhance storage utilization and support more concurrent application
- partitioning and security for multi-tenancy use of shared resources
- audit logs for compliance and security
- common management, including monitoring, reporting and alerting of the storage infrastructure.

Ideally, if these common functions or requirements could be provided through a common tool set and all of the one-off solutions and vendor-specific alternatives could be eliminated, data centers could begin to truly consolidate and optimize their storage infrastructure. Granted, this is the evolving promise of storage virtualization – the ability to provide common heterogeneous storage functions/solutions that are policy/model based with common management. Since virtualization and associated services/functions standards remain illusive, we believe the potential of a virtualized storage infrastructure will be delivered in an iterative fashion, and users should pick their solutions based on their vendor's vision, delivery, market presence and heterogeneous capability.

### Benefits of common storage services

The ability to simplify the storage infrastructure with common functions (or components similar to common business processes as applied to SOA) that are heterogeneous and can be evoked across a variety of storage solutions with common management would greatly simplify ITO storage infrastructures. More specifically, such a common function/component-based approach would provide the following business and operational benefits:

- greater efficiency – common functions/services greatly reduce redundancy (low utilization), integration complexity and cost
- incremental, repeatable and holistic deployments – common functions can be completely evaluated, tested and operational processes (including common change, configuration, asset, problem, measurement and management) with automation adapted prior to deployment, ensuring continued success with minimal risk
- predictable and timely deployments – common functions enable a rich portfolio of storage services to be deployed and managed, with each able to meet the required and varied business objectives
- lifecycle management – common functions allow for dynamic service definitions/solutions that adapt to changing requirements and governance, and compliance requirements with repeatable and auditable processes. Newer and more advanced technologies and functions can be introduced in a more incremental and proven manner with obsolete functions eliminated or minimized more quickly.



## Storage virtualization – the enabler

Beyond providing data migration, replication and storage aggregation, storage virtualization must enable common storage services so that dynamic business process requirements and their instantiated applications can use a common, managed heterogeneous storage infrastructure. The elimination of unique storage solutions and management to address each storage requirement will maximize leverage and lead to a truly optimized storage infrastructure. The realized benefit of storage virtualization will be the enablement of a common, consolidated, leveraged, dynamic, and managed portfolio of heterogeneous storage services/functions.

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