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Optimizing Microsoft Windows Storage Server Environments with F5 ARX

Microsoft® Windows® file servers and storage solutions based on Windows Storage Server are ubiquitous in many enterprise data centers. Organizations have long deployed Windows file servers to present network file shares from existing capacity in their Storage Area Network (SAN) infrastructure. And today, several storage vendors offer turnkey solutions combining Windows Storage Server with attached storage capacity as a modular NAS appliance.

F5® ARX® intelligent file virtualization helps IT organizations to optimize and simplify management of Windows file server environments. ARX solutions eliminate the disruption associated with migrating data, while automated policies move file data between different storage tiers to reduce the cost of storage. In addition, ARX solutions federate and balance capacity utilization across multiple Windows file servers to increase aggregate storage utilization, enhance file system scale, and accelerate backup and recovery.

Key benefits

Non-disruptive Data Migration

Migrate data, re-provision shares, or balance capacity utilization without downtime or disruption

Maximize Storage Utilization

Make better use of existing storage assets by increasing aggregate utilization and balancing utilization across multiple resources.

Support Large File Systems

Get around volume size limitations by aggregating multiple physical volumes into a large virtual file system.

Lower Storage Costs

Increase utilization, automatically migrate files to lower-cost storage, and preserve existing investments in SAN infrastructures.

Reduce Backup, Restore, and Volume Recovery Times

Back up and restore smaller physical volumes in less time while presenting large virtual file systems to users and applications.

Increase File Server Performance

Balance capacity utilization across multiple physical volumes or storage resources to increase file server performance.

Seamless Data Migration

ARX solutions enable movement of file data for any reason without disruption to users and applications.

Automated policies reduce the IT overhead for even complex migration projects and can be scheduled to avoid peak traffic times or backup windows.

Challenges

For many organizations, Windows file server environments are simple to deploy and get running. Over time, however, rapid data growth increases the difficulty of managing these environments as the number of file servers and volumes grows. Scaling a Windows file server environment can be a costly and difficult proposition as IT strives to manage uneven utilization across file servers, troubleshoot performance issues, perform frequent re-provisioning events or manual capacity balancing, and face growing backup and restore times. As a result, organizations spend increasing amounts of time and IT resources managing their file storage environment.

Solution

F5 ARX solutions simplify management of Windows file server environments by virtualizing and aggregating existing file shares. ARX devices provide a virtualization layer that decouples logical access to files from users and applications from the physical location of those files. This layer presents virtual file shares to users and application clients that preserve the manner in which they logically access their data. With this layer in place, data is free to move and storage resources are free to change, without the disruption previously associated with these actions. ARX devices then provide a rich set of data management policies for data migration, automated storage tiering, and dynamic capacity balancing that help organizations get the most out of their existing Windows file server environment.

Benefits and F5 value

F5's Application Ready Solution for Microsoft Windows Storage Server provides the following benefits to organizations, and their end users.

Migrate Data Non-disruptively

Data migrations using traditional tools and processes can be both time-consuming and labor-intensive as organizations manage the impact of disruption and business downtime. Migrations projects typically require significant upfront planning and preparation, manual migration of data, and reconfiguration of client mount points and drive mappings. As a result, migration projects are typically performed after business hours and within small downtime windows either in the evenings or on the weekends.

ARX solutions enable movement of file data for any reason without disruption to users and applications. Automated policies reduce the IT overhead for even complex migration projects and can be scheduled to avoid peak traffic times or backup windows. In addition, migrations are performed without any changes to mount points or drive mappings to eliminate the need for client reconfiguration. The combination of automated policies and non-disruptive data movement can dramatically reduce not only the operational cost, but also the time required for data migrations.

Lower Storage Costs

The rate of data growth can far outstrip that of storage budget. Limited budgets can severely impact the ability to continue purchasing additional capacity in the same manner as done today – for example, by expanding a FC SAN or targeting 50% utilization levels when provisioning new storage. These organizations have to look for sustainable ways to lower their per-GB cost of capacity.

Simplify data growth management

ARX devices aggregate and automatically balance capacity across multiple storage resources to eliminate islands of storage and increase aggregate utilization. ARX also eliminates the disruption from re-provisioning events.

ARX solutions can help increase the aggregate storage utilization across a Windows file server environment. By making better use of existing assets, organizations can defer purchases of additional capacity or new storage systems as well as preserve the investments in their existing SAN infrastructure.

ARX can also seamlessly incorporate lower-cost storage technologies into the storage environment. ARX devices can automate the placement and movement of data between different tiers or types of storage. Automated storage tiering policies operate at the file level, providing the flexibility necessary for moving individual files or entire projects to lower-cost storage over time based on granular criteria (age, type, and more) without requiring the use of stubs or pointers.

Maximize Storage Utilization

Business data grows not only rapidly, but also unpredictably and unevenly. As a result, Windows file server environments typically experience uneven capacity utilization between different servers or volumes. Organizations often have to spend significant amounts of time re-provisioning capacity or manually balancing utilization with disruptive and labor-intensive data migrations.

ARX solutions help simplify the management of rapid and unpredictable data growth. ARX devices aggregate and automatically balance capacity across multiple storage resources to eliminate islands of storage and increase aggregate utilization. ARX also eliminates the disruption from re-provisioning events, allowing organizations to target higher levels of utilization when provisioning new or re-provisioning existing file shares.

Reduce Backup, Restore and Volume Recovery Times

As data continues to grow, the amount of time required to back up or restore that data also grows. In many cases, weekly backups can consume almost the entire backup window, leaving little room to respond to error or for future growth. ARX can significantly reduce the amount of time required to perform backup and restore operations, often by up to 80%.

Organizations often provision larger volumes to reduce the number of volumes that they have to manage. However, this strategy can create a data protection challenge as the amount time required to backup and restore a Windows volume increases with the size of that volume. ARX can present a large virtual file system to user and application clients that is comprised of multiple smaller physical volumes, each of which require less time to backup and restore. In addition, multiple volumes can be backed up or restored in parallel, further reducing the time required.

In addition, much of the time spent backing up data is consumed by inactive data that does not change between backups. This means that a sizeable percentage of every full backup is redundant. ARX devices can automatically migrate older or inactive files within a virtual volume to physical volumes dedicated to long-term archive where they can be backed up much less frequently. This automated tiering does not disrupt user access to those files, but enables organizations to apply different backup policies to different tiers based on the data classification of each tier.

The size of physical Windows volumes can also have a significant impact on the time required to recover a volume in the advent of a disk error. For example, the time required to verify file system integrity with CheckDisk increases exponentially with volume size, during which user and application access is disrupted. With ARX, organizations can present large virtual file systems to user and application clients while maintaining smaller and more manageable physical volumes for shorter Recovery Time Objectives (RTO).

Automated Policies

ARX offers automated policies that can distribute file placement across multiple physical volumes. This dynamic capacity balancing smooths the impact of uneven data growth and spreads utilization evenly across the environment to maximize file access performance.

Support Large File Systems

Many storage environments require volumes sizes beyond that which is supported natively by Windows Storage Server. For example, organizations may have home directory deployments with large numbers of users or a business application that requires a large workspace. In the case of the former, small volume size limitations may require management of a larger number of physical file systems, along with the associated utilization challenges. Applications requiring large workspaces can represent an even larger challenge. It is common practice to continuously migrate data in and out of the workspace to ensure that the application has all of the necessary data at any moment.

By virtualizing and aggregating multiple physical volumes, ARX devices can present a large virtual file system beyond the volume size limit imposed by Windows while maintaining smaller physical volumes for ease of management. This gives organizations more flexibility in how they provide file storage capacity to users and simplifies management for applications that require larger file systems.

Increase File Server Performance

Rapid data growth can degrade the performance of Windows file servers, resulting in slow applications and complaints from end users. Windows file server performance can be impacted by many factors, including having too many objects (files or directories) or too little free capacity within a volume. Frequently, IT will resort to manually migrating data from overburdened volumes in order to address performance issues. In addition to causing downtime, these migrations can consume IT resources without addressing the root cause – i.e., uneven data growth.

ARX offers automated policies that can distribute file placement across multiple physical volumes. This dynamic capacity balancing smooths the impact of uneven data growth and spreads utilization evenly across the environment to maximize file access performance.

More Information

To learn more about F5 and Windows Storage Server, use the search function on F5.com to find these and other resources.

Deployment Guides

[Deploying the ARX with Microsoft Windows Server 2008 VMware Virtual Machines](#)

Case Studies

[Clackamas County](#)

[RHWL Architects](#)

[Signal Iduna](#)

Whiteboard Conversations

[Simplify Data Management with File Virtualization](#)

[Reduce Storage Costs through Automated Storage Tiering](#)

[Optimize Backups to Reduce Backup Windows and Costs](#)

[Maximize the Value of Existing Storage Assets](#)

[Hassle-free NAS Consolidation and Data Migration](#)

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F5 Networks, Inc. 401 Elliott Avenue West, Seattle, WA 98119 888-882-4447 www.f5.com

F5 Networks, Inc.
Corporate Headquarters
info@f5.com

F5 Networks
Asia-Pacific
apacinfo@f5.com

F5 Networks Ltd.
Europe/Middle-East/Africa
emeainfo@f5.com

F5 Networks
Japan K.K.
f5j-info@f5.com

