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Simplify Data Management and Reduce Storage Costs with File Virtualization

Today's file storage environments comprise a complex collection of storage platforms, file systems, and operating systems that are rapidly growing. Frequent outages occur when data is moved or new storage is provisioned due to the dependencies between clients and storage resources. Low aggregate utilization rates are common. Burgeoning capacity demands increase the operational overhead associated with file storage management.

F5® ARX® devices enable you to break free from these constraints by introducing intelligent file virtualization into the file storage infrastructure—eliminating the disruption associated with storage administration and automating many storage management tasks. The result is a dramatic improvement in cost, agility, and business efficiency.

Key benefits

Reduce storage costs

Match the business value of your data to the cost of its storage; reduce costs with new technologies.

Optimize backups

Decrease the backup of redundant data to lower backup and recovery times, media consumption, and costs.

Maximize value of existing storage

Improve utilization, reclaim stranded capacity, and defer additional storage purchases.

Simplify management

Perform storage provisioning and decommissioning without disrupting users.

Improve flexibility and choice

Move your data wherever and whenever you want, even between heterogeneous devices.

Freedom from File Storage Constraints

F5's ARX intelligent file virtualization solutions enable enterprises to break free from the constraints of today's file storage infrastructures by performing two unique functions:

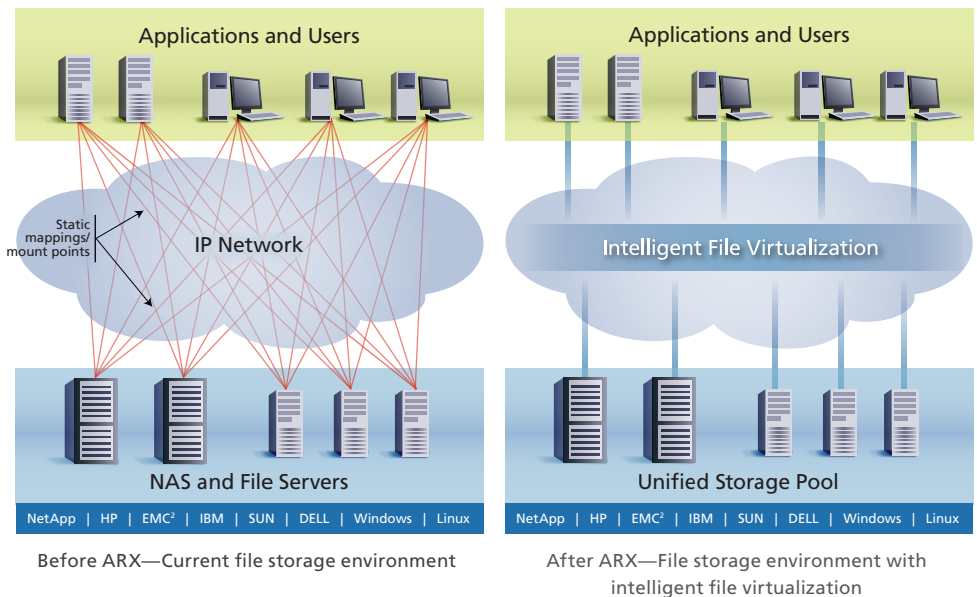
- Decoupling the logical access to data from the physical location of that data through file virtualization, which eliminates disruption and simplifies the way file data is accessed, moved, and managed.
- Enabling the enforcement of powerful, easy-to-use intelligent data management policies, automating many storage management tasks such as storage tiering, dynamic capacity balancing, and non-disruptive data migration.

In addition, ARX removes many inherent barriers to infrastructure change by eliminating vendor lock-in and giving businesses the freedom to choose file storage technologies that best meet their business and IT requirements.

Simplifying File Access with File Virtualization

At the heart of the ARX is a technology known as file virtualization. File virtualization creates a logical abstraction of the physical storage environment. This presentation layer, also referred to as a Global Namespace, enables simple, logical access to physical file systems and hides storage changes from clients. As a result, organizations can move their data at any time without disruption to users or applications.

ARX does not introduce a new file system into the storage environment, but acts as a proxy to federate file systems that are already in place in the underlying storage layer. It uses industry-standard file access protocols—CIFS and NFS—to communicate with both the clients accessing files and the storage servers providing them.



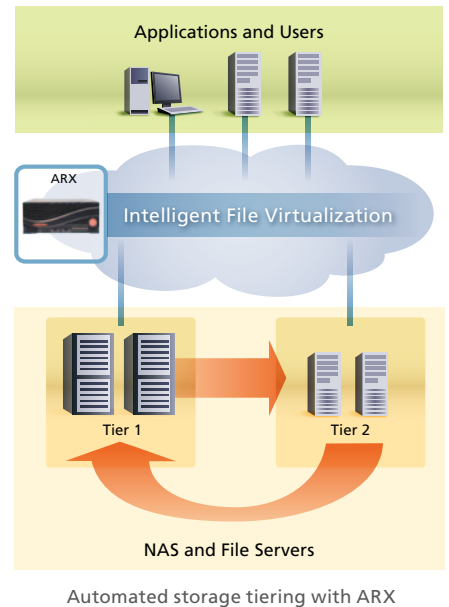
Simplifying Data Management with Automated Management Policies

ARX enables IT organizations to automate and enforce data management policies in real time. Operations that were once done manually can now be performed automatically, without visibility or disruption to users and applications. This significantly extends the value of existing storage investments and enhances business workflow in three key areas: automated storage tiering, non-disruptive data migration, and dynamic capacity balancing.

Automated storage tiering

ARX automates the placement and movement of data between different tiers (or classes) of storage, with each tier potentially comprising devices from multiple vendors. F5's storage tiering capability operates at the file level, enabling organizations to move files or projects based on certain criteria (age, type, and more) rather than entire file systems. No stubs or pointers are left behind, eliminating risks and complicated backup and recovery procedures. Real-time policy enforcement capabilities enable files to be placed on appropriate devices automatically. Benefits include:

- **Decreased Storage CapEx**—Automatically move older or less critical data to lower cost storage, while freeing up expensive tier 1 capacity and deferring additional storage purchases.
- **Lowered Operational Overhead**—Move older data to lower cost storage alternatives automatically and without impact to users or degrading service levels.
- **Decrease Backup Windows and Costs**—Reduce the amount of redundant data that is backed up regularly to reduce backup and recovery times and lower the amount of backup media consumed.
- **Use of the Best Technologies**—Match the business value of data with the cost and performance of storage by leveraging different technologies such as SATA or data deduplication.



Non-disruptive data migration

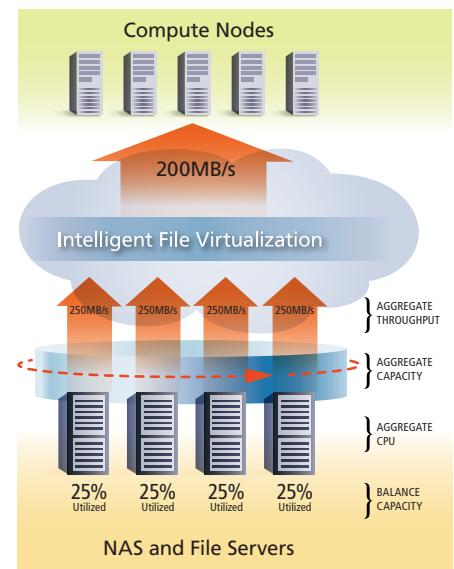
Administrators can use powerful policies for a range of data migration tasks—from moving entire file systems to individual files. Data migrations can take place between heterogeneous storage devices, for both NFS- and CIFS-oriented data, and can be scheduled to avoid peak traffic times or backup windows. In addition, migrations are performed without any changes to mount points or drive mappings to eliminate outages and business disruption previously associated with data migrations. Benefits include:

- Reduced Business Disruption—Migrate data without impacting users or applications.
- Enhanced Data Mobility—Perform migrations for any reason at any time.
- Faster Migration—Complete migrations in less time, with no need to schedule downtime with business groups or users.
- Use Fewer IT Resources—Dedicate fewer resources to migrations with automated policies and no need for client reconfiguration.
- Freedom from Lock-in—Consolidate file servers, rollover equipment leases, upgrade storage platforms, or swap vendors without disrupting users.

Dynamic capacity balancing

Real-time capacity balancing policies enable enterprises to create larger “virtual file servers” from existing file storage devices, aggregating the resources (capacity, throughput, processing power) of these physical devices and optimizing application performance. Benefits include:

- Maximized Utilization of Existing Assets—Aggregate capacity from multiple storage devices to improve utilization and defer additional storage purchases.
- Optimize Backups—Split a large virtual file system into multiple physical ones, enabling smaller backups to be performed in parallel to reduce backup time.
- Reduced Power and Cooling Costs—Boost storage utilization efficiency and reduce the number of powered storage devices.
- Fewer Outages from Data Management Tasks—Perform data management tasks such as provisioning and load balancing in real-time and without disrupting users or applications.
- Improved Application Performance—Eliminate performance hotspots by aggregating multiple devices onto a single virtual file server.



Dynamic capacity balancing with ARX

True Heterogeneity

File access protocols

ARX systems use industry-standard file access protocols to communicate with clients and servers—CIFS for Windows® devices and NFS for Unix® or Linux devices. ARX does not introduce a new file system, but acts as a proxy to the file systems that are already there.

Storage flexibility and choice

ARX is compatible with the vast majority of Network Attached Storage (NAS) devices and file servers, providing the benefits of virtualization across a heterogeneous infrastructure. With ARX, companies are not required to forklift-upgrade hardware, replace existing file systems, or install software agents across the enterprise to realize a benefit.

Data Protection

Historical file tracking

With automated storage tiering, companies can reduce backup and recovery times as well as backup media consumption. However, it can also make it more difficult to locate and restore individual files from backup media when needed. ARX makes file recovery easier by providing historical file tracking. Using file tracking, administrators can identify the physical locations of individual files at any point in time. This makes it easier to quickly locate and restore the right version of any file.

Virtual snapshots

ARX simplifies management of snapshots in heterogeneous environments, coordinating physical snapshots across multiple NAS devices and file systems—even those from different vendors—within the same virtual namespace. The virtual snapshot that results is navigable in the same manner as the virtual file system from which it was created, giving users the ability to recover their files in a virtual environment.

Hardware Platforms

The ARX family of intelligent file virtualization solutions is optimized to meet the needs of a wide range of IT organizations. Available in four different platforms, ARX systems are all based on F5's Data Management Operating System, differing by performance and scale. The ARX500 is the entry level switch that is targeted for departmental or regional office deployments. The ARX2000 is designed for medium to large enterprise data centers. The high performance ARX4000 switch is targeted at the largest enterprise data centers with very demanding performance and scale requirements. All ARX products offer global namespace, file virtualization features, and a broad set of data management capabilities.

Unmatched scalability

ARX was designed for a wide range of businesses and is the most scalable file virtualization solution available today. Scaling to more than two billion files with a single ARX4000 device, the ARX system brings virtualization benefits to file storage environments ranging in size from small- and mid-sized organizations to the largest and most demanding enterprises in the world.

High-performance for file access workloads

ARX provides industry-leading performance and is the only file virtualization solution with the ability to handle gigabytes of throughput. Its patented split-path architecture separates the data and control paths in the system. This enables it to sustain very high performance levels for file access workloads while simultaneously performing complex operations such as storage management policy. Data path functions are handled at wire-speed rates, and control path functions have their own dedicated processing and memory resources.

High availability and data integrity

ARX products have been designed with high reliability, availability, and data integrity in mind. ARX provides superior system availability through hardware and network redundancy, as well as through enhanced software resiliency mechanisms. All ARX systems support automatic service failover between ARX devices in a cluster upon failure, and data integrity is ensured throughout the entire process. ARX does not modify user data, store any data on the device itself, nor does it create proprietary stub files on file storage assets. This ensures the integrity and accessibility of data at all times.

Interface flexibility

ARX is the first file virtualization solution on the market that supports 10 Gigabit Ethernet (GbE) connectivity. This gives organizations that are planning to upgrade to 10 GbE the flexibility to realize the benefits of file virtualization today, while protecting their investment over time.

Manageability and Supportability

Easy-to-Use management interfaces

ARX provides easy-to-use management interfaces, including a command line interface (CLI) and graphical user interface (GUI). The GUI supports a wizard-driven configuration that makes even the most complex policies intuitive.

Enterprise-class supportability

ARX offers comprehensive supportability and troubleshooting capabilities, including SNMP, extensive logging and reporting, automated “email home” support, port mirroring, and packet capture.

ARX Platforms

The ARX series is available in four different platforms that differ by performance and scale. All ARX platforms offer global namespace, file virtualization features, and a broad set of data management capabilities.



ARX4000 Series



ARX2000 Series

Physical Specifications	ARX4000	ARX2000
Protocols:	NFS, CIFS, Multi-protocol	NFS, CIFS, Multi-protocol
Maximum Gigabit Ethernet Ports:	12 - 10/100/1000 Mb RJ45	12 - 10/100/1000 Mb RJ45
Maximum 10 Gigabit Ethernet Ports:	2 - 10 Gb X2 (MM-SC)	n/a
Maximum Throughput:	12 Gbps*	4 Gbps*
Maximum Users:	12000*	6000*
Power Supplies:	Two dual, redundant, hot-swappable	Dual, redundant, hot-swappable
Dimensions:	7" H x 19" W x 24" D (per unit) 4U industry standard rack-mount chassis	3.5" H x 19" W x 28" D (per unit) 2U industry standard rack-mount chassis
Weight:	96 lbs.	40 lbs.
Operating Temperature:	41° to 95° F (5° to 35° C) 18° F change per hour	41° to 95° F (5° to 35° C) 18° F change per hour
Relative Humidity:	5-95%	5-95%
Safety Agency Approval:	UL 60950 ETL Listed IEC950 (EN60950) CE Marking	UL 60950 cUL listed to CSA C22.2 No. 950 IEC950 (EN60950) CE Marking
Certifications/Susceptibility Standards:	FCC Part 15 Class A CISPR22 Class A (EN55022) CE Marking EN 55024 VCCI Class A	FCC Part 15 Class A CISPR22 Class A (EN55022) CE Marking EN 55024 VCCI Class A
Typical Power Consumption:	517 W	280 W
Typical Heat Output:	1764 BTU/hr	956 BTU/hr
Input Voltage:	100-240 VAC, 50/60 Hz, 12.6/6.3 A	100-240 VAC, 50/60 Hz, 7.9/3.95 A

*Stated values are estimated guidelines - please consult with your F5 sales representative to determine which platform is right for your environment.



ARX500 Series

Physical Specifications ARX500

Protocols:	NFS, CIFS, Multi-protocol
Maximum Gigabit Ethernet Ports:	2 - 10/100/1000 Mb RJ45
Maximum 10 Gigabit Ethernet Ports:	n/a
Maximum Throughput:	800 Mbps*
Maximum Users:	600*
Power Supplies:	Single
Dimensions:	1.75" H x 19" W x 27" D (per unit) 1U industry standard rack-mount chassis
Weight:	31 lbs.
Operating Temperature:	50° to 95° F (10° to 35° C) 18° F change per hour
Relative Humidity:	5-95%
Safety Agency Approval:	UL 60950 cUL listed to CSA C22.2 No. 950 IEC950 (EN60950) CE Marking
Certifications/Susceptibility Standards:	FCC Part 15 Class A CISPR22 Class A (EN55022) CE Marking EN 55024 VCCI Class A
Typical Power Consumption:	157 W
Typical Heat Output:	536 BTU/hr
Input Voltage:	100-127/200-240 VAC, 50/60 Hz, 6.0/3.0 A

*Stated values are estimated guidelines - please consult with your F5 sales representative to determine which platform is right for your environment.

Professional Services and Support

F5 is dedicated to helping you get the most from your F5 products. To find out how F5 support services can help you improve your ROI, reduce administrative time and expense, and optimize the performance and reliability of your IT infrastructure, contact consulting@f5.com.

More Information

For more information about ARX solutions, use the search function on F5.com to find these resources.

Product overview

[ARX Series](#)

White papers

[Intelligent File Virtualization](#)

[ROI Analysis for Intelligent File Virtualization](#)

Case studies

[Foster and Partners Reduces Costs and Improves Operational Efficiencies](#)

[John Wiley & Sons Optimizes Backup, Effectively Manages Rapid Data Growth](#)

[Lulu.com Takes Control of Storage Environment and Improves Vendor Management](#)

Analyst report

[The Economic Impact of File Virtualization](#)

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