



HIGHLIGHTS

- Massive computing parallelism delivers the performance to support multiple, varied applications
- Dynamic, policy-based data migration and caching simplify management of infrequently accessed data
- Cluster Namespace offers a single point of administration for file systems within a server and across a cluster
- An Advanced Virtualization Framework simplifies management
- File System Recover from Snapshot (FSRS) restores a file system in seconds
- A variety of replication options ensures the right protection for every environment

BlueArc Software

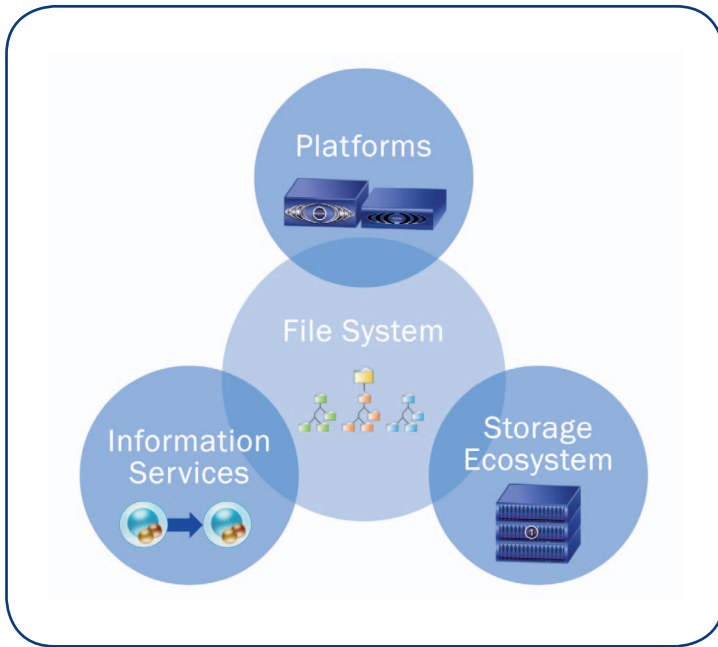
An Integrated File Services Environment

BlueArc offers a comprehensive suite of software to help customers optimize the functionality of Titan and Mercury storage solutions. The BlueArc software suite delivers a highly integrated operating environment that includes a powerful file system and extensive data and system management capabilities—all designed to accelerate data access while increasing productivity. Enterprises can quickly and cost-effectively add new features to existing platforms and benefit immediately from the functionality of advanced software.

BlueArc software integrates seamlessly and is deployed with BlueArc's powerful, hardware-accelerated Titan and Mercury servers, enabling massively parallel, concurrent processing and wire-speed performance for critical functions. The software suite uses a multi-tiered approach that provides different levels of data protection, data management, and virtualization to meet unique and evolving business needs. Also, BlueArc software works efficiently given that Mercury and Titan architectures separate data movement and management to prevent contention for system resources. Instead, users benefit from industry-leading performance, scalability, resiliency and security.

HARDWARE-ACCELERATED FILE SYSTEM

BlueArc's unique file system is the enabling foundation for BlueArc software. A virtualized and hardware accelerated file system, it overcomes the complexities of large-scale file system management and data availability. The file system integrates all elements of a Titan or Mercury storage solution—storage servers, information services and the Storage Ecosystem—and spans single servers, server clusters, virtual servers, and even external, third party storage devices. It supports multiple applications with various protocols and mixed mode-security, enabling simultaneous access to native CIFS and NFS based files from shared directories. The ability to consolidate disparate systems and applications extends even further with iSCSI for block based access. Also, BlueArc's hardware accelerated file system provides a comprehensive set of virtualization tools at multiple levels within the system to simplify the administration of file system functions and ensure high utilization of system resources.



BlueArc Software Architecture Framework

Virtual File Systems

BlueArc’s unique Cluster Namespace creates a global namespace across storage pools and physical servers. As a virtual file system, the Cluster Namespace unifies directories, providing global access to all data from any node in a server cluster, regardless of client operating system, disk technology, or file system location. The Cluster Namespace makes it easy to assign and reassign file systems to virtual servers and physical nodes as usage and performance requirements grow, shift, or change, without affecting user access to files and data.

In addition to presenting available storage as an entire file system, BlueArc delivers flexible partitioning called Virtual Volumes. Administrators may not wish to expose the entire file system to all end users, and with Virtual Volumes, they can present a subset of the file system to specific groups. Virtual Volumes can be grown and contracted with simple size controls. The sum of the space controlled by the Virtual Volumes may be greater than the size of the entire physical file system. This over-subscription approach, sometimes referred to as thin provisioning, provides additional flexibility for storage administrators when project growth rate is indeterminate.

Virtual Servers

A virtual server is a logical representation of a physical network storage server and has its own set of IP addresses, management policies, and file system protocols to meet the requirements of a particular department, project, application, or user group. Each physical Titan and Mercury server or cluster can be partitioned into 64 virtual servers. Virtual servers can be moved across the cluster at will for load balancing or to manage capacity and downtime. BlueArc also provides secure virtual servers, each with its own assigned domain, authentication scenario and the ability to host its own directory tree to consolidate multiple file systems. This makes Mercury a perfect solution for multitenant Internet service providers or for different departments within a business unit that require consolidation.

Virtual Storage Pools

Mercury and Titan logically virtualize RAID groups into unified Storage Pools. The architecture stripes data across storage sub-systems and then allocates storage from the pool to multiple file systems that can belong to different physical and virtual servers. File systems can expand by pulling unallocated free space from the pool on demand without downtime. Additionally, Dynamic Storage Balancing allows the data set to span the maximum number of drive spindles, ensuring optimal performance while eliminating hot spots. As new capacity is added, files can be easily re-distributed across the new spindles, providing the best possible performance-to-capacity ratios.

INFORMATION SERVICES

BlueArc’s Information Services provide the level of data management and data protection functionality you expect in a high-end storage system. Given that Titan and Mercury both leverage hardware accelerated architectures, data movement and management are separated to prevent contention of system resources. This means that the deployment of Information Services in addition to core file system functions have minimal impact on overall system performance.

DATA MANAGEMENT THROUGH INTELLIGENT TIERED STORAGE

BlueArc provides comprehensive data management functionality known as Intelligent Tiered Storage, which is comprised of Policy Based Data Migration and Dynamic Read Caching. These advanced features allow administrators to automatically migrate data to the appropriate tier of storage, optimizing cost and performance based on common file attributes or access patterns. Also, this functionality extends to third-party file systems and devices visible within the namespace.

BlueArc’s policy-based management applications use graphical, rule-based tools that simplify data management by minimizing the need for manual data migration, caching and replication. It provides “what if” analysis tools, policy templates, a scheduler for recurring policies, and integrated data protection safeguards. To formulate and schedule policies that automate Data Migration and Dynamic Read Caching, administrators create quotas and thresholds by selecting from variables that include last access, file name, path, and user identity.

Data Migration: Data Migration enables administrators to transparently migrate data between tiers of storage from a file system or volume using data management policies. For example, a policy based on the last time a file was accessed will transparently migrate older files to a slower tier. Should more recent access frequency trigger the need for higher performance, the data migrates back to a higher performance tier of storage. Also, for information with a very low probability of recall, archive files can be backed up via NDMP to external storage such as tape for long term retention. This allows organizations to consolidate multiple applications under a common storage system.

Dynamic Read Caching: In environments with large, dynamic unstructured data sets, administrators often have trouble predicting when a spike in demand for a particular file will occur. Read Caching instantly copies files to a high performance storage tier for use across physical or virtual servers when a file is requested from a slower tier of storage. While the file is being delivered to the requester, a background copy is made to a high-performance cache tier, ensuring

that subsequent accesses will be delivered at maximum speed. Files can be cached not only from integrated storage tiers, but also from external devices within the namespace, including de-duplication devices or stranded filers. Read caching eliminates the need for administrators to increase capacity on faster tiers as a performance buffer, reducing overall storage costs.

DATA PROTECTION

In addition to the hardware-based protection built into the Titan and Mercury architectures, BlueArc provides a comprehensive suite of Data Protection Services that include Clustering, Snapshot Rollback, and Replication to guard against all threats, including logical, physical and site outages.

Clustering: Clustering of up to 8 active/active servers increases system availability by reducing planned and un-planned recovery times. Should a server within the cluster cease to function, the remaining nodes seamlessly assume all functions of the failed server. Also, cluster failover times are minimized by performing data replay and file system recovery concurrently. Virtual servers and corresponding policy information are automatically migrated to a functional node while maintaining mapping to virtual machines. This means that all data is accessible from any node in the cluster—which can be up to 100 kilometers away for extended campuses.

During planned maintenance activities, clusters remain online through the use of rolling firmware upgrades for each node in the cluster. In this case, each node is able to perform sequential, minor firmware updates without cluster disruption or downtime.

Snapshots and File System Rollback: In order to increase granularity of recovery point objectives, administrators can automatically schedule snapshots as part of data migration, replication and backup policies. BlueArc allows up to 1,024 snapshots to be created per server. As a means to reduce recovery times, the File System Recover from Snapshot feature restores a file system from a snapshot in seconds. Also, if an administrator suspects corruption, “chkfs” can be run to validate the snapshot before using it to restore a file system.

As a standard feature, multiple checkpoints for File System Rollback increase recovery point granularity. Checkpoints are written to the file system every two to five seconds as the disk cache is flushed, creating a rollback window of approximately 10 minutes. If an error writing data or problem with the file system occurs, the administrator can roll back the file system, choosing any one of up to 128 checkpoints.

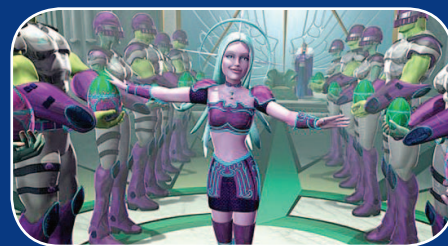
Replication: Synchronous and asynchronous replication provide the greatest protection against threats to the application, system, and data center. Synchronous replication copies data simultaneously between servers and storage arrays, with multiple acknowledgements, ensuring complete protection from corruption or data loss. To ensure high performance, BlueArc’s synchronous replication takes advantage of Mercury’s and Titan’s inherent ability to “parallelize” metadata and data access to create multiple concurrent streams during data transfers. These concurrent streams are particularly useful in environments that replicate numerous small files with significant metadata “overhead.”

Administrators can also leveraging policy-based management and automated scheduling to employ asynchronous replication between file systems within the same array, storage pools or even tiers within the storage ecosystem—even if they are physically separated. Additionally, during the replication process, NFS and CIFS permissions are preserved for the replicated copy of data.

Anti Virus and Backup Support: In network data sharing environments, protection against potential virus attack is critical. BlueArc’s core software offers full integration and support for the most popular anti-virus infrastructure from Symantec, McAfee and Trend Micro. Files can be scanned directly upon open or close procedures. Administrators will benefit from report summary statistics and can configure per share scanning, or scanning via inclusion/exclusion lists.

CUSTOMER TESTIMONIALS

Media & Entertainment



“The big thing for us is throughput. Data is large, and turnaround is key. BlueArc is a great fit because of the high performance and scalability. It is at least 6x to 8x times faster.”

— Mainframe Entertainment Inc.

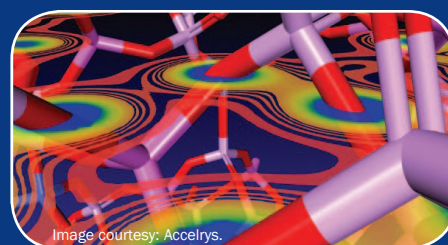
Internet Services



“For more than three years, BlueArc has delivered uncompromising server performance and capacity, enabling us to provide e-mail access and hosting for more than 100,000 broadband customers with a single Titan system.”

— Kology

Life Sciences



“Our storage needs grow from day to day, and the BlueArc solution really allows us to do more and store more data, which is critical for genome research. We chose BlueArc because it provided the scalability and reliability we needed.”

— Columbia University’s Center for Computational Biology and Biochemistry

SOFTWARE SPECIFICATIONS

Network File System Protocol Support	<ul style="list-style-type: none"> • Common Internet File System (CIFS) • Network Files System (NFS) – v2, v3, v4 • iSCSI
Network Transport Protocols	<ul style="list-style-type: none"> • NDMP v2, v3, and v4 • File Transfer Protocol (FTP) • Ethernet • TCP/IP • UDP
Management Protocols	HTTP, SSL, SSH, SNMP v1 and v2c, NIS, DNS, WINS, NTP, Email Alerts

SYSTEM MANAGEMENT SOFTWARE

Management Interfaces	<ul style="list-style-type: none"> • GUI based: web browser accessible • CLI-based: Telnet, Serial • Scripting for automated management
Hardware Management Includes:	<ul style="list-style-type: none"> • Mercury Storage Servers • RAID Controllers • Disk Subsystems • Fibre Channel Switches
Management Access Control	<ul style="list-style-type: none"> • User/Password authentication • Management port definition • Management access method • Access Control Lists (ACL's) • NIS, Active Directory, and LDAP

SOFTWARE FEATURES

Standard Features:	<ul style="list-style-type: none"> • BlueArc Hardware Accelerated File System • Network File System Protocol Support • Centralized Management • Snapshots & Quick Restore • Virtual Servers • Virtual Volumes • Virtual Storage Pools • Storage Balancing • Quotas - volume, group or user • NDMP (LAN-free backup) • Anti-Virus Support • RAID 1, 10, 5, 6 protection
Optional Features:	<ul style="list-style-type: none"> • Data Migrator • Dynamic Read Caching • Active-Active Clustering • Global Namespace • Replication • File System Rollback from Snapshot • Virtual Server Migration • Secure Virtual Servers

Through the Network Data Management Protocol (NDMP), BlueArc integrates with the data protection suites of all major backup and recovery partners with NDMP enabled devices. This provides an additional layer of data protection, including the ability to backup to tape archives, to provide the most comprehensive options for data recovery.

BlueArc – An Integrated, Unified Approach to Network Storage

BlueArc’s software suite uses a multi-tiered approach that provides different levels of data protection, data management or virtualization depending on the needs of the business. BlueArc combines the power of unique hardware accelerated file system with a comprehensive suite of value added features. The result is a unified, high performance network storage infrastructure that is easy to provision, economical to deploy, flexible to upgrade, and designed to integrate into a broader information environment.

ABOUT BLUEARC

BlueArc is a leading provider of high performance unified network storage systems to enterprise markets, as well as data intensive markets, such as electronic discovery, entertainment, federal government, higher education, Internet services, oil and gas and life sciences. Our products support both network attached storage, or NAS, and storage area network, or SAN, services on a converged network storage platform.

We enable companies to expand the ways they explore, discover, research, create, process and innovate in data-intensive environments. Our products replace complex and performance-limited products with high performance, scalable and easy to use systems capable of handling the most data intensive applications and environments. Further, we believe that our energy efficient design and our products’ ability to consolidate legacy storage infrastructures, dramatically increases storage utilization rates and reduces our customers’ total cost of ownership.



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