

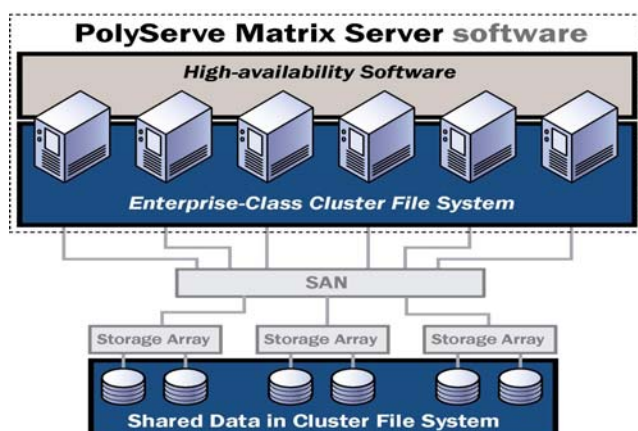
# PolyServe Matrix Server for Microsoft Windows

## Shared Data Clustering Software for Intel-architecture Servers

PolyServe Matrix Server™ is the leading shared data clustering software for Microsoft® Windows™ 2000 and Windows Server 2003, enabling multiple Windows-based servers to function as a single, easy-to-use, highly available system. It comprises a true symmetric cluster file system (CFS) that enables scalable data sharing, high availability services that increase system uptime, and cluster and storage management capabilities for managing servers and storage as one. Matrix Server delivers an unparalleled level of scalability, availability and manageability in support of database, file serving, e-mail, web and media serving applications.

### Benefit Highlights

- **Simplified Server Aggregation and Scalability** - Enables administrators to aggregate multiple Windows servers (up to 16 nodes) and manage them as a single coherent entity, reducing administrative steps and costs
- **Enables Shared Data** - Unlike “shared nothing” clustering, servers within the cluster concurrently read and write data across the SAN resulting in high bandwidth I/O throughput for demanding applications
- **Flexible Monitoring and Failover** - Monitors application, network, cluster and hardware health and provides automated failover and fail back, eliminating administrative burden and service downtime
- **Broad Application Support** - Supports databases (SQL Server, Oracle 9i RAC), applications (ERP, CRM, custom), Web servers (IIS) and CIFS file and print servers
- **Multi-Platform Support** - Supports all major Intel architecture-based server hardware platforms and the most common SAN implementations to ensure easy evaluation and seamless integration into existing infrastructures



### Product Highlights

- High-performance, symmetric cluster file system
- High-availability infrastructure
- Integrated cluster-wide management

### Key Benefits

- Replace expensive UNIX servers with scalable Windows clusters
- Increase system availability across applications, data, networks and servers
- Consolidate data and servers to improve productivity and reduce cost

Figure 1. All servers in the cluster have direct, simultaneous access to file systems in the SAN

## Matrix Server Functionality

PolyServe Matrix Server is based on several distributed computing breakthroughs. At the center of Matrix Server is a fully distributed, fully journaled CFS that supports online additions and deletions of nodes and concurrent multi-node access to shared data. It also includes a completely symmetric, distributed lock manager that eliminates master/slave relationships among servers, and innovative, distributed metadata management that prevents the single-server bottleneck on file operations. Matrix Server is not designed to be a bootable file system; instead it provides a shared file system across the cluster. The table below summarizes the key features and benefits of Matrix Server.

## Features and Benefits

<b>Cluster File System</b>	
16-node Scalability	Distributed lock and metadata management ensures there is no single point of failure or single system bottleneck in the cluster, avoiding the typical limitations of competing CFS or other clustering offerings
Shared Data File System	Enables concurrent, fast access for multiple servers to “shared data” as opposed to “shared nothing” clustering approaches
Journaled File System	Allows file system to quickly recover and maintain data coherency among all nodes in the cluster
Single System Semantics	An application running on top of Matrix Server does not need to be cluster aware. Matrix Server for Windows is fully compliant with all Win32 API calls and exhibits the same behavior as NTFS
<b>High Availability</b>	
Online Insertion or Deletion of Nodes	An administrator can add or delete a node from the cluster without pausing or halting the processing of other nodes in the system, preventing downtime
High Availability Monitoring	Integrated and customizable monitors assess health of applications, operating system, servers, network and storage throughout the cluster and will initiate and oversee failover and fail back
Flexible Failover Configurations	Supports N:1, N:N, and N:M failover models and allows fine-grained control over failover and fail back policies
Cascading NIC Failover Support	Multiple NICs can be configured as standby interfaces and will transparently handle network failover
Multi-Path I/O	Supports seamless failover and multiple data paths to shared storage through multiple HBAs and redundant switches while maintaining data integrity
Fabric Fencing	I/O fencing prevents rogue servers from outside the cluster or a malfunctioning server within the cluster from accessing the SAN
<b>Manageability</b>	
Ultra-fast Cluster Expansion	Simple and quick “import” and “start service” commands allow administrators to fully configure and add new nodes to the cluster
Integrated Fabric Management	Supports Brocade and McDATA fabrics and manages fabric load balancing within nodes and across the cluster. Supports recovery of failed components within fabric and automatically re-enables data paths when failures are corrected
Consistent Device Naming	Guarantees that each server in the cluster refers to cluster-wide accessible devices using the same name and prevents device slippage when new (or rebooted) servers join the cluster
LUN Discovery and Management	Allows administrator to discover LUNs that exist in the shared storage and easily map those LUNs to file systems
Central GUI Management Console and CLI	Powerful GUI and Command Line Interface (CLI) that allows administrator to configure and manage the cluster from a central management station
Supports Microsoft's .NET Framework	Facilitates the delivery of IT services and applications with improved reliability, scalability, performance, and security on high-volume, low-cost hardware

## Application and Solution Support

Matrix Server augments the scalability, availability and manageability of databases, application servers, Web servers and file servers. To an application, Matrix Server behaves like a single-node file system so applications run unchanged. On Matrix Server for Windows, Microsoft and third-party applications that use the Win32 APIs will run without recompilation or modification to their executables.

## Solutions Scenarios Enabled by Matrix Server

Solution	Customer Needs	Description and Benefits
<b>Scalable File Serving (CIFS)</b>	<ul style="list-style-type: none"> <li>Obtain a higher throughput file serving environment with higher availability</li> <li>Utilize cost-effective industry-standard building blocks rather than expensive, slow-to-upgrade NAS filers</li> </ul>	<ul style="list-style-type: none"> <li>Aggregate file-serving performance of up to 16 nodes on industry-standard hardware while eliminating bottlenecks and single points of failure</li> <li>Adds failover infrastructure to Microsoft's Distributed File Systems (DFS) to achieve a highly available enterprise-wide namespace</li> <li>Simplifies data-intensive workflows, eliminates data copy steps and allows file operations within a common file system</li> </ul>
<b>Server Consolidation (SQL Server)</b>	<ul style="list-style-type: none"> <li>Consolidate large numbers of database servers to increase utilization on active servers and redeploy passive ones</li> <li>Achieve a more unified view of company's servers, storage and databases</li> </ul>	<ul style="list-style-type: none"> <li>Eliminates active-passive pairs, increasing utilization and reducing hardware, software and management costs</li> <li>Provides inherent high availability where every server node becomes a backup to others for all SQL Server instances</li> <li>Enables very fast application and SQL Server failover and recovery</li> </ul>
<b>Data Consolidation &amp; Web Content Serving (IIS)</b>	<ul style="list-style-type: none"> <li>Simplify application or Web site deployment, maintenance and change management</li> <li>Centralize data to increase storage utilization and intra-company data accessibility</li> </ul>	<ul style="list-style-type: none"> <li>Simplifies application or Web content publishing and maintenance by enabling multiple servers to concurrently share a single copy of data (or content), eliminating redundant server-to-server file replications and synchronization challenges</li> <li>Enables consolidation of isolated pools of direct attached storage (DAS) onto shared SAN infrastructure, resulting in reduced management costs and increased availability</li> <li>Enables data or log file consolidation for easy post-processing, backup or archiving for compliance audits</li> </ul>
<b>UNIX Migration with Scale-out Databases (Oracle9i RAC)</b>	<ul style="list-style-type: none"> <li>Offer a greater choice of Windows-based solutions to clients and business partners</li> <li>Lower TCO and spend less time developing, integrating and managing applications</li> </ul>	<ul style="list-style-type: none"> <li>Improves the manageability, availability and recoverability in Oracle9i RAC environments</li> <li>Improves performance of Oracle9i Data Warehousing functions such as ETL</li> <li>Enables migration of large UNIX systems to more easily managed and supported Windows servers via a truly scalable CFS for Windows</li> </ul>

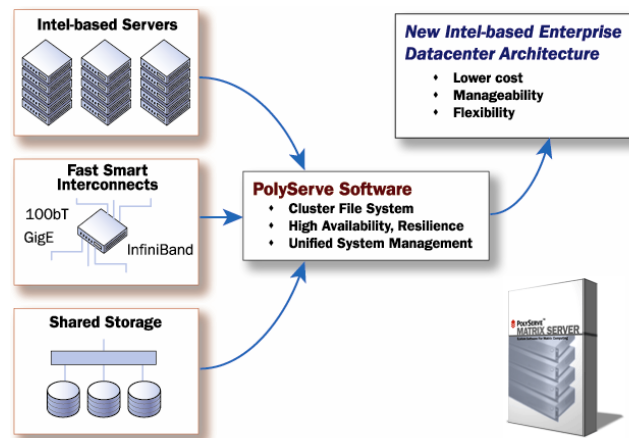
## Reduce Costs and Simplify Clustering

With Matrix Server, companies reduce costs and complexity associated with managing Windows-based server and blade clusters. Responding to enterprises' need for simplified cluster management and zero tolerance for downtime, Matrix Server uses simple and flexible failover and fail back policies for M:N clusters and supports multiple simultaneous failures of network, storage and servers. The result is a hands-off, self-healing cluster, lower administrative costs and increased freedom for IT personnel.

## Offers a New Alternative for Hardware Purchases

Enabling more than just enhanced availability, Matrix Server allows up to 16 server nodes to concurrently read and write data via a shared file system. This new level of concurrent access to business-critical data, along with the low-cost nature of blade or volume servers, makes Matrix Server clusters a superior choice over large expensive SMP UNIX or Windows servers. Specifically, the horizontal scalability of the product allows IT budget stakeholders to consider “scaling-out” using multiple 2-CPU servers as opposed to “scaling up” with single 8- or 16-CPU servers. This results in a hardware cost savings often exceeding 50% on industry-standard Windows servers and far exceeding that on proprietary SMP UNIX servers.

The diagram below illustrates the ability of Matrix Server to aggregate computing resources and simplify “scale-out” server clustering.



**Figure 2. Matrix Server simplifies and aggregates “scale-out” server clusters**

## Hardware and Platform Support

<b>Operating System</b>	Windows 2000 Server, Windows 2000 Advanced Server, Windows Server 2003 Standard Edition, and Windows Server 2003 Enterprise Edition
<b>Fibre Channel HBAs</b>	QLogic and Emulex HBAs
<b>Fibre Channel Switch</b>	Brocade and McDATA switches
<b>Server</b>	HP, Dell, IBM and other Intel IA32 or compatible servers

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