

# EMC Celerra Multi-Path File System (MPFS)

## The Big Picture

- Delivers improved performance and scalability over traditional NAS deployments
- Facilitate shared file storage from a small number of compute servers to a large grid environment with hundreds to thousands of nodes
- Start with a cost-effective Celerra NS-120 unified storage platform and build to a large Celerra NS-G8 gateway to meet your most-demanding application requirements
- All applications work seamlessly with MPFS without changes
- Leverage your IP or Fibre Channel network: lower your cost of ownership and increase performance
- Enterprise NAS and SAN storage with high availability, reliability, and scalability

## Meeting the needs of the most-demanding applications with the world's best NAS performance

### Information where you need it, when you need it

EMC® Celerra® Multi-Path File System (MPFS) over iSCSI or Fibre Channel enables small-to-large enterprise applications to share files across thousands of clients while delivering the world's leading aggregate performance. MPFS is designed to work in a standard NAS file-sharing environment without any changes to applications and leverages the existing LAN and SAN infrastructures to reduce cost and management.

### Multi-Path File System: NAS file sharing with iSCSI or Fibre Channel SAN delivery

EMC Celerra MPFS is the answer to the question, "Should I choose NAS for file sharing or SAN for the best application performance?" With MPFS and EMC's industry-leading family of file servers, applications can now enjoy the benefits of both NAS file sharing and the performance of block access through iSCSI or Fibre Channel SAN. By leveraging your existing IP/FC network infrastructure, MPFS offers a cost-effective solution that reduces the complexity of managing multiple storage assets. Now fewer people can manage all your enterprise data.

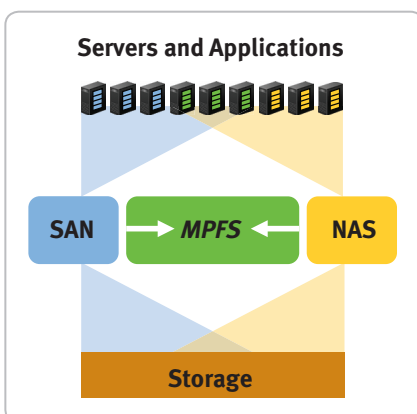
Whether your applications are designed for grid computing or a single server, MPFS meets the challenge. Its advanced software can accelerate NAS application bandwidth over that of traditional native NAS (NFS or CIFS) without application changes. Bandwidth can scale seamlessly as back-end storage arrays and disks are added. And non-MPFS-enabled applications can share the same files as MPFS-enabled applications. This allows administrators to manage a single enterprise storage infrastructure with the availability, reliability, and scalability that Celerra customers have come to expect from EMC.

### Flexible architecture for powerful configurations

MPFS is a topology made up of hardware and client/server software components supporting Celerra unified storage and Celerra gateway platforms.

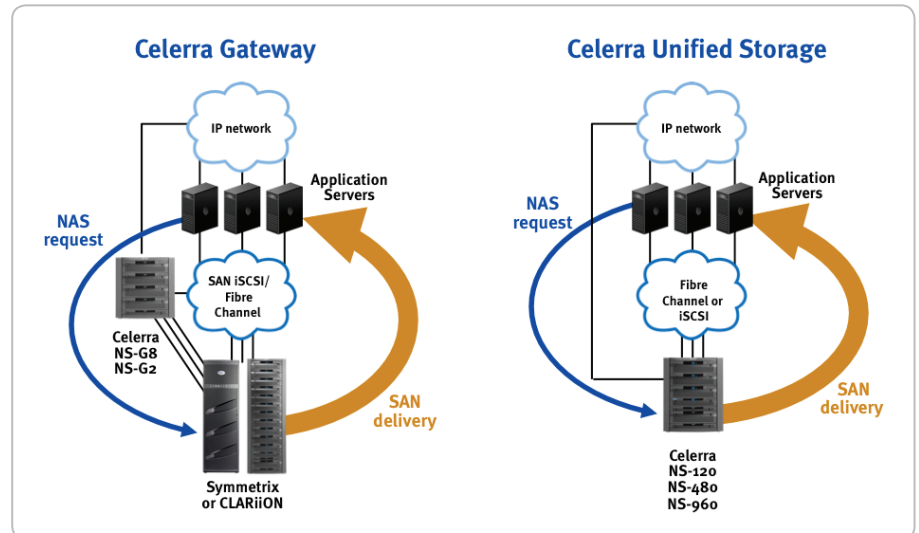
#### Celerra gateway platform for the maximum number of clients and high throughput:

- EMC Celerra NS-G2 and NS-G8 running DART NAS code
- Multiple EMC Symmetrix® or CLARiiON® back-end storage arrays
- Clients, application servers, or grid servers sharing files over the LAN to the Celerra
- MPFS driver and SAN initiator (iSCSI or FC) loaded on each client/grid node that wants accelerated performance (MPFS does not have to be loaded on clients that want standard NFS file access.)
- For iSCSI, CLARiiON CX4 series, CX3-20 or CX3-40 with FC/iSCSI option (up to 512 clients) or EMC Connectrix® MDS switch with Fibre Channel-to-iSCSI bridging (thousands of clients)



### Celerra unified storage platform for entry level (up to 120 clients):

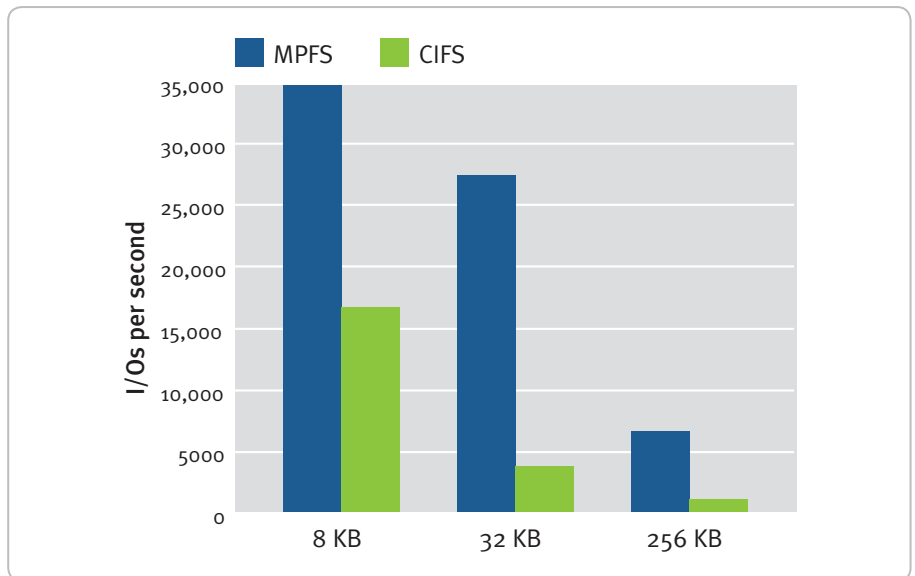
- Celerra NS-120, NS-480, and NS-960 with iSCSI or Fibre Channel options
- Clients, application servers, or grid servers sharing files over the LAN to the Celerra
- MPFS driver and iSCSI or FC initiator loaded on each client/grid node that wants accelerated performance (MPFS does not have to be loaded on clients that want standard CIFS/NFS file access.)



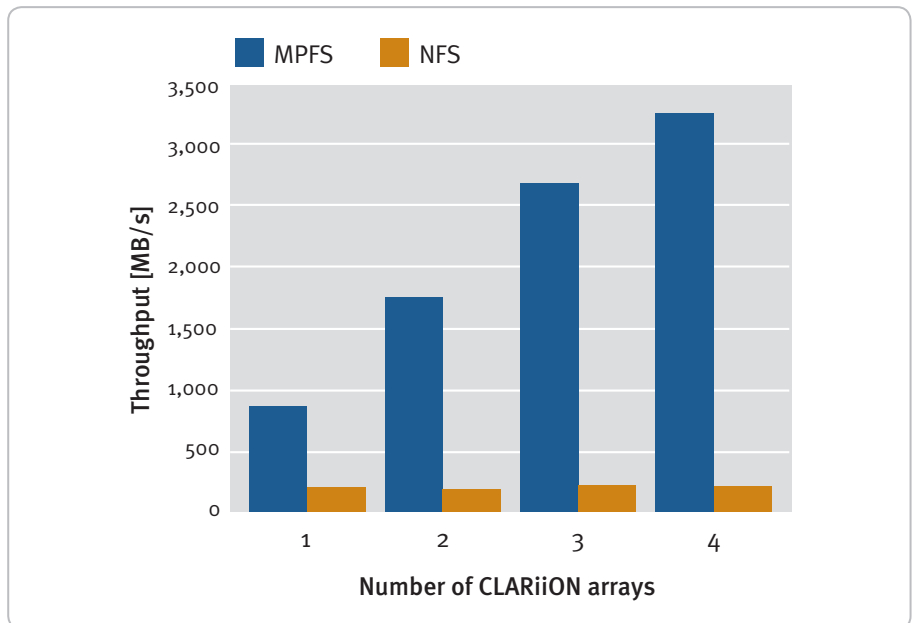
Celerra and MPFS clients communicate over the IP network to share metadata and control information using the NFS or CIFS protocols. When the MPFS client receives a data request from the application, it uses Celerra-provided metadata to access the storage array directly using low-latency and high-performance SAN. This architecture has many benefits.

- With MPFS, Celerra can support more clients for demanding applications because Celerra does not have to process data transfers.
- Because Celerra is not in the data path, scalable bandwidth to applications can be achieved by simply adding Symmetrix or CLARiON storage arrays to the MPFS environment.
- MPFS leverages existing pre-fetch and caching algorithms in the storage array and introduces enhanced caching in the clients. Multiple levels of parallelism can be achieved throughout the data path for maximum performance.
- Single files can be read/written by clients simultaneously because of a sophisticated MPFS range lock manager.
- Applications can scale with your IP network infrastructures. As standards evolve and bandwidth grows as cost declines, immediate gains are realized. Also, customers can leverage current network administration staff, further reducing cost.
- A single client can use MPFS to access multiple Celerra systems, file systems, and back-end arrays.
- All NAS standards are met and data integrity is maintained.

MPFS vs. CIFS Scaling for Windows Clients



MPFS vs. NFS Scaling for Linux Clients

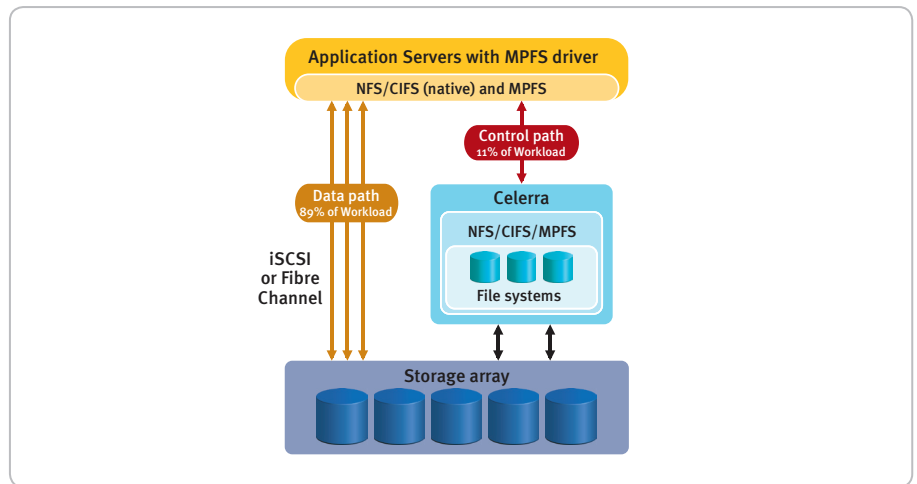


### Boost application performance

MPFS is especially appropriate for applications that require realtime data access, for media applications that require content digitization or encoding for archival, for distributing realtime content to thousands of users or for accelerating and simplifying Celerra based backups. Applications that benefit from MPFS include business intelligence, data warehousing, simulation and modeling, electronic design automation, chip simulations, financial modeling, movie creation, oil and gas, and many other interactive or batch HPC applications. These applications can take advantage of the storage arrays' pre-fetching and caching algorithms as well as the clients' caching.

MPFS is especially effective in grid file-sharing environments where multiple nodes share the same files. Content cached in the arrays can be served to multiple nodes via iSCSI without accessing disks, ultimately improving performance to the entire grid. Array configurations can have further performance optimizations like striping and large block sizes that leverage the iSCSI protocol and bandwidth.

## MPFS Enables Scaling by Data-path Offload



## Leverage EMC Global Services

EMC Global Services offers the capabilities and expertise to deliver comprehensive solutions to help customers realize the performance enhancements and savings associated with Celerra Multi-Path File System. We are uniquely positioned to assist customers with the assessment, design, and implementation of their MPFS solutions.

To assist with the definition of requirements, EMC offers the High-Performance File System Assessment service. The resulting recommendations will contribute to the development of the appropriate solution. For larger, more complex environments or smaller deployments, EMC offers service engagements, including project management and full implementation of MPFS across your IP and Fibre Channel storage systems.

EMC's service professionals have the training and certification to help you maximize your investment, get up and running quickly, and provide the necessary support for your ongoing operations.



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### Take the next step

Discover the most advanced high-performance file-sharing NAS environment in the industry with Celerra MPFS and how it enables a single, efficient, IT infrastructure. For more information on Celerra MPFS, contact your EMC sales representative or authorized EMC value-added systems integrator. Or visit our website at [www.EMC.com](http://www.EMC.com).