



**DATA CENTER**

## **Deploying Strategic Data Center Solutions for System z Environments**

The Brocade DCX Backbone provides industry-leading performance, scalability, and investment protection for mainframe data center environments.

**BROCADE**

**The Brocade® Data Center Fabric (DCF) architecture provides a flexible framework for designing, building, and transforming enterprise data centers into strategic business assets. Leveraging the new Brocade DCX™ Backbone, this architecture enables IT organizations to address their most pressing business challenges while preparing for emerging and future technologies. Today, System z users can benefit from the unique advantages of this forward-thinking solution built on field-proven technologies.**

#### **NEW SOLUTIONS FOR EVOLVING DATA CENTERS**

In today's ever-changing IT environment, organizations typically face more decisions than they would like to make. The most common challenges include finding the best ways to reduce costs, increase flexibility, deploy new applications, and protect data—without burdening overworked staff or disrupting business operations. All of these challenges revolve around the exponential growth in data processing requirements and storage capacity.

Emerging or future technologies can further complicate decision-making since new capabilities impact how IT organizations should invest today in order to grow their computing environments most efficiently. For instance, IBM System z users need to consider the latest advancements in performance and operating system integration as z/OS and open systems (such as zLinux) become more common. Building an infrastructure that solves today's urgent problems and creates a broader vision for the future goes a long way in establishing a "win-win" scenario for the entire organization.

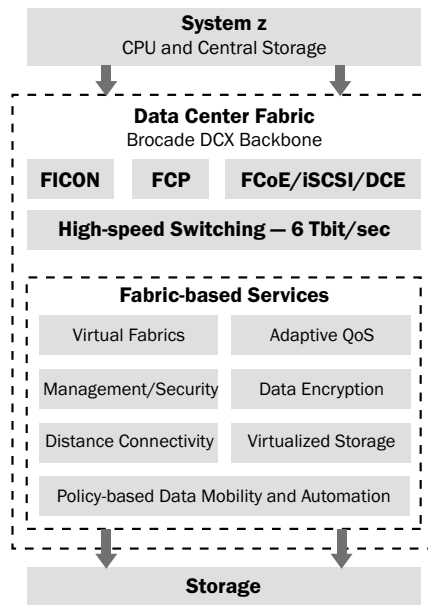
The Brocade Data Center Fabric (DCF) architecture is a strategic vision and framework for evolving data centers that enables continued growth. At the core of this framework is a new category of product: The Brocade DCX Backbone. This new platform meets the requirements of today's data centers while helping to ensure investment protection for tomorrow's key strategies and technologies. This paper describes how the Brocade DCF architecture and Brocade DCX support System z environments in the most effective manner.



The System z processor has emerged as a multiprotocol device that supports mixed I/O and traffic types, and today it can support both FICON® and Fibre Channel protocols for simultaneous storage connectivity. As the System z processor and technologies move into the future, organizations will need a storage infrastructure that can support higher performance and new I/O capabilities while protecting existing investments.

Figure 3 shows how Brocade is addressing near-term needs while enabling the transformation of a single-purpose fabric into a common backbone designed to meet a wide range of future objectives.

The Brocade DCF architecture enables the “plug-in” fabric-based services that applications can utilize today, as well as a scalable framework for protecting investments as new technologies emerge. The core of this framework is the Brocade DCX, a robust platform that provides high performance, scalability, and flexible services. By leveraging this unique solution, organizations are better able to meet their current requirements while building a next-generation data center.



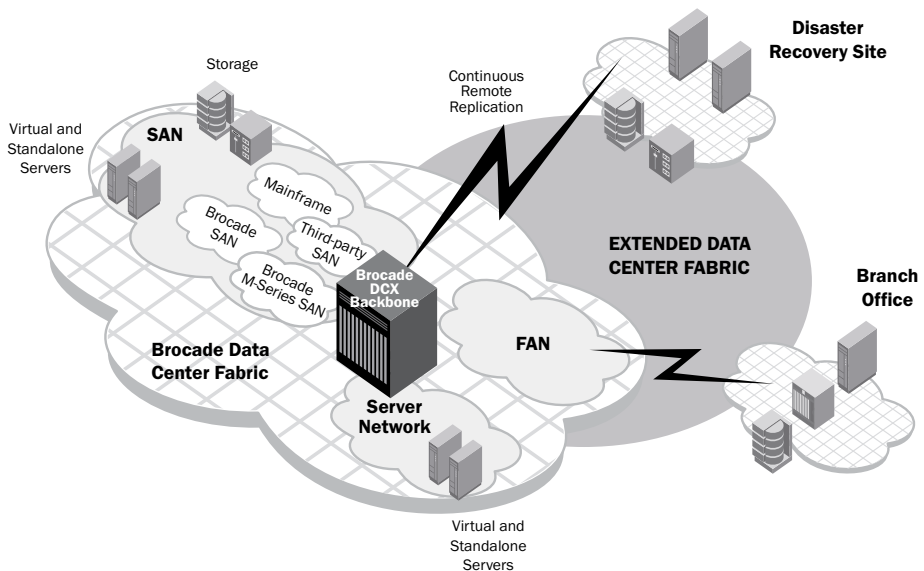
**Figure 3.**  
A highly flexible data center infrastructure built on the Brocade DCX Backbone.

### THE BROCADE DCF ARCHITECTURE AND BROCADE DCX BACKBONE

The Brocade DCF architecture is an intelligent, policy-based architecture designed for efficiency, cost-effectiveness, and long-term scalability (see Figure 4). This unique approach incorporates a shared resource model that leverages a decade of Brocade experience in building low-latency, high-performance, enterprise networks.

The Brocade DCF architecture encompasses the connectivity of applications and their data, including:

- File and block data
- Virtualized server and storage islands
- Multiprotocol connectivity
- Unified connectivity and management (server-to-server, server-to-storage, and storage-to-storage)



**Figure 4.**  
The Brocade data center fabric and beyond.

System z users can utilize the Brocade DCF architecture to solve key data management challenges, provide consistency across all types of applications, and reduce their overall operating costs. As a new class of platform that resides at the core of this infrastructure, the Brocade DCX can provide these capabilities for System z environments. Designed to meet the growing connectivity and cost-efficiency needs of enterprise data centers, the Brocade DCX is designed to:

- Complement existing Brocade switches and directors
- Provide breakthrough bandwidth performance
- Support multiple protocols and provide seamless interoperability across fabrics and networking protocols
- Interoperate with third-party SAN fabrics
- Utilize a wide range of Brocade Adaptive Networking services for maximum flexibility
- Deliver unmatched scalability for future requirements

**REAL-WORLD BUSINESS APPLICATIONS**

With its unprecedented functionality and performance, the Brocade DCX is ideal for use in a wide range of current and future enterprise-class solution areas, including:

- Resource optimization and consolidation
- Data protection for “always-on” operations
- Environments with System z and mixed operating systems

**Resource Optimization and Consolidation**

Optimization and consolidation pave the way for maximum efficiency and cost-effectiveness. With 4 and 8 Gbit/sec FICON or Fibre Channel capabilities, the Brocade DCX can reduce the number of host and storage channel adapters to simplify management without sacrificing performance. Moreover, the ability to provide 4 Gbit/sec performance without over-subscription and a simple upgrade path to 8 Gbit/sec helps protect existing and future investments.

For instance, consider an existing infrastructure built on mature technology. Processor or storage upgrades are being considered because leases are expiring and higher performance is required. Organizations could review several elements to help optimize and consolidate their current resources. If there is under-utilized I/O, organizations could consolidate channels to reduce the overall connectivity requirements.

In addition, organizations could consolidate director or switch ports into a single platform that is easier to manage and is not over-subscribed. Through these types of optimization efforts, System z users can simplify deployment and management—resulting in lower administration and power costs, not to mention capital expenses.

The Brocade DCX provides a wide range of capabilities to help organizations save money through administration and power efficiency while protecting existing investments:

- The Brocade DCX blades can support 4 Gbit/sec and 8 Gbit/sec today. If they are starting with 4 Gbit/sec connections, organizations can upgrade their systems to 8 Gbit/sec through a simple SFP swap, protecting investments and simplifying migration.
- The Brocade DCX with 256 FICON 4 Gbit/sec ports and two control processors provides full system performance—even with the failure of a single control processor—reducing the need for capacity planning due to over-subscription concerns.
- The Brocade DCX with a fully loaded chassis at full rated speeds will likely be able to consolidate four to six mature directors with power consumption that is typically less than a smaller platform—saving three to five times the floor space and HVAC requirements.

### **Data Protection for “Always-On” Operations**

Most organizations follow two types of data protection planning: Disaster recovery and business continuity. Disaster recovery is a way to bring operations back online within a reasonable amount of time after some element has failed. In contrast, business continuity is a way to ensure “always-on” operation (or near-immediate recovery from a lost element). These two types of operations are not mutually exclusive and are often used as part of a tiered recovery plan that meets enterprise-class recovery point objectives and recovery time objectives.

System z users typically have used physical tape, virtualized tape, and disk replication to protect their data in offsite facilities. Distance requirements vary, and can span anywhere from metropolitan to transcontinental distances. The length of the distance creates specific characteristics for performance and reliability. The Brocade DCX is uniquely designed to provide maximum performance over any distance, providing organizations with the most flexible platform to meet their particular requirements.

In metro-distance (100 kilometers or less) deployments, organizations can leverage the following functions:

- **8 Gbit/sec Inter-Switch Link (ISL) Trunking:** Native E\_Port connectivity for cascading between sites
- **Advanced ISL Trunking:** Up to eight ports trunked for scalability
- **Adaptive Networking Services:** Port isolation for failover management

For extended-distance solutions (beyond 100 kilometers), organizations can utilize the following advanced capabilities over FCIP links:

- **FICON Disk Emulation:** Performance enhancements for disk read operations
- **FICON Tape Pipelining:** Performance enhancements for tape write and read operations
- **FCIP Fast Write:** For maximum disk mirroring performance over distance
- **Advanced Quality of Service (QoS):** For traffic prioritization, network failover, and resiliency

With over 25 years of long-distance experience and expertise engineered into the Brocade DCX, organizations have a robust, stable platform to support a variety of disaster recovery and business continuance operations.

### **Environments with System z and Mixed Operating Systems**

As described previously, System z can support multiple images (logical partitions) of operating systems such as z/OS and zLinux. Leveraging z/VM for virtualized processing and the I/O supervisor, organizations can share resources across processors and storage. For example, z/OS and its tool set can minimize the administration of how the fabric interacts in shared environments. However, having advanced capabilities within the fabric adds even more ways to maximize its effectiveness.

After several years of evaluating zLinux for the System z processor, many organizations are quickly moving forward with production applications. When considering moving standalone open system servers to zLinux partitions, organizations often find that the power efficiency and energy savings are well worth the effort. In addition to the energy cost savings, the resources available within System z processors provide a systematic way to manage storage access (ECKD- or FCP-based) and data backup.

The Brocade DCX is uniquely equipped to support mixed operating system environments, with the following functions providing high performance, scalability, and isolation of shared data center fabrics:

- **8 Gbit/sec FICON or FCP connectivity:** Enables consolidation and investment protection
- **N\_Port ID Virtualization (NPIV):** Reduces resource address administration
- **Adaptive Networking services:** Prioritize application flows in the fabric
- **Logical partitioning:** Segments and isolates traffic flows

Organizations that are considering sharing System z and open systems servers in the same fabric without integrating them into the System z processor can take full advantage of these advanced functions as well.

### **SUMMARY**

The Brocade DCF architecture and Brocade DCX Backbone are designed for all types of computing environments, but they provide unique capabilities for today's System z environments. By working with the industry leaders in processors and storage, Brocade provides a strategic platform that can fulfill the requirements of today and tomorrow. As a result, enterprise organizations now have a strategic framework for building their next-generation data center fabrics in a highly flexible and cost-effective manner.

To learn more, visit [www.brocade.com](http://www.brocade.com).

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