

Building a disaster-proof data center with HP Integrity servers running Microsoft® Windows Server 2003 and HP StorageWorks Cluster Extension

Mission-critical capabilities in a flexible, standards-based solution



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High availability HP Integrity servers and Microsoft Windows Server 2003

Business continuity is essential to profitability and competitiveness. The harm caused by only a few seconds of system downtime can be gauged on a scale ranging from inconvenience to bankruptcy to the loss of human life. High availability (HA) and disaster tolerance (DT) are key IT elements that contribute to business continuity. In its most general definition, HA helps to ensure that the computing environment and data are available to those who need them and to the degree they are needed. From a technology perspective, HA helps to ensure that a system continues to provide service in the event of the failure of one or more components or to provide continuing service during planned downtime. DT helps to ensure that a computing environment and data can withstand a disaster (such as fire, loss of power, loss of communication components, or a natural disaster) and continue operating or return to operation in a short period of time.

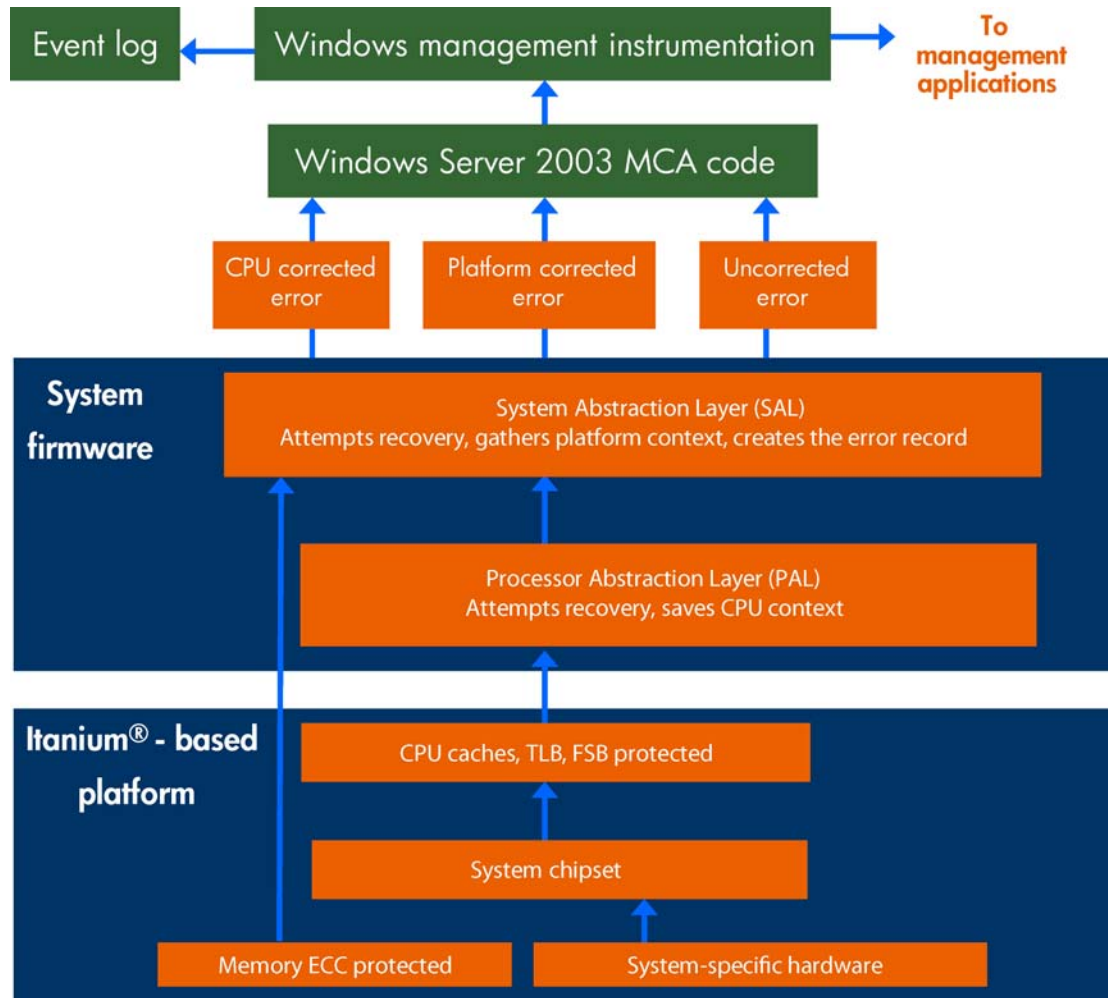
Building on their more than twenty-year partnership, HP and Microsoft continue to develop and deliver highly scalable solutions with the HA and DT capabilities that companies need to create and maintain a more productive, cost-effective, and secure enterprise. HP disaster-tolerant solutions for the Microsoft Windows environment include Microsoft Cluster Service clustering running on HP Integrity servers, HP StorageWorks Continuous Access Software for remote data replication, and HP StorageWorks Cluster Extension Software for geographically dispersed cluster support.

Single-system high availability with Windows-based HP Integrity servers

HP Integrity servers running Microsoft® Windows Server™ 2003 offer an extremely reliable, industry-standard solution for enterprise customers' most demanding needs. Reliability is built into every server with features such as enhanced Machine Check Architecture (MCA), single-bit error checking and correction (ECC) throughout the system, double-chip-spare memory, and Dynamic Memory Resiliency (DMR) providing such features as dynamic page deallocation.

Microsoft Windows Server 2003 for Itanium®-based systems is the only Windows operating environment enabling such high availability features as MCA. MCA enables the processor, chipset, firmware, and operating system to cooperate in providing advanced reliability and predictive analysis. In conjunction with the Itanium-based MCA, HP firmware provides the capability to shield the operating system from some failures that would otherwise cause the system to crash. The diagram in figure 1 shows an example of MCA error flow.

Figure 1 Windows Machine Check Architecture (MCA Error Flow)



Microsoft Windows Server 2003 configurations

Microsoft Cluster Service

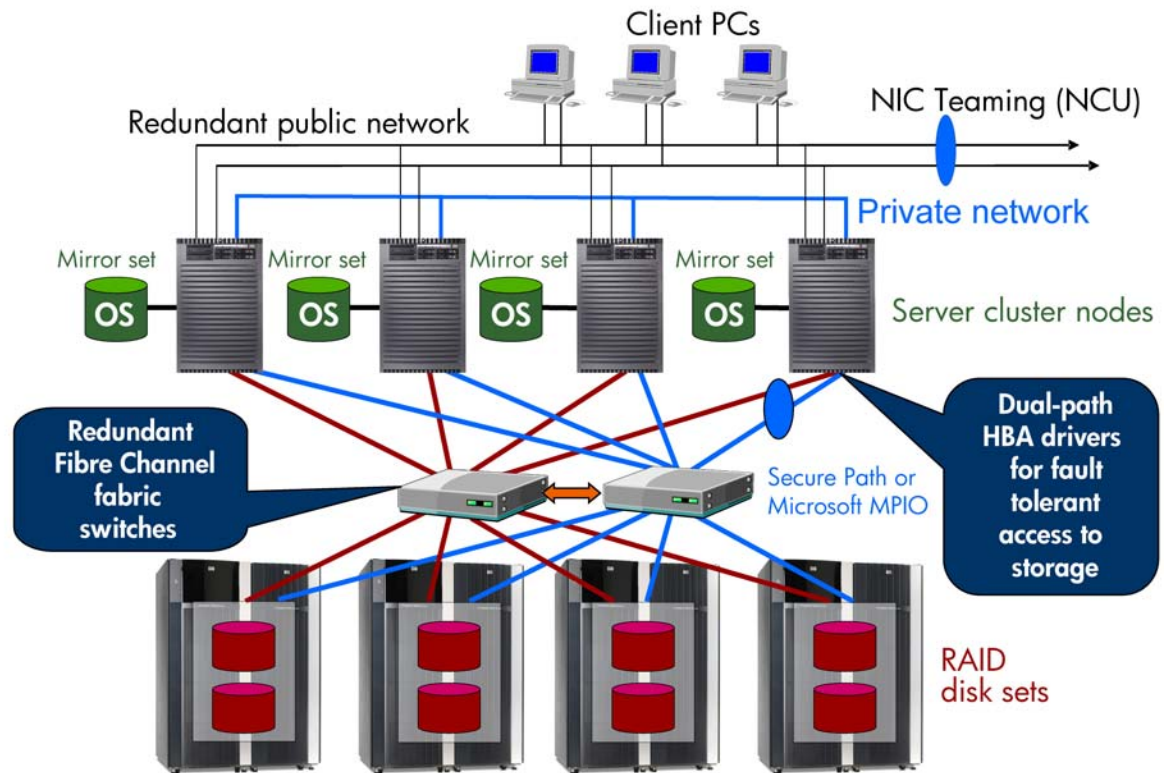
The Microsoft Cluster Service is an integrated component of Windows Server 2003 and installed by default on every system with Datacenter and Enterprise Editions of the operating system. Microsoft Cluster Manager, a simple, easy-to-use GUI-based interface, sets up and configures the system.

When nodes join a cluster, the process can be done remotely and does not require you to restart any system. Multiple nodes can join a cluster simultaneously, and the cluster automatically determines the quorum disk. In addition, a new analysis phase is incorporated into the Cluster Service that detects problems or potential problems with hardware and software configurations and suggests the best course of corrective action. Cluster diagnostics and verification tools are available as downloadable software components.

Figure 2 is an example of a Windows Server 2003 cluster configuration with HP Integrity servers, HP StorageWorks XP Disk Arrays, and multi-path software for redundancy.

Figure 2. HP Integrity server and Windows Server 2003 Cluster

HP Integrity reference architecture example (SPOF-less) Microsoft Windows Server 2003 Cluster Service



Scalable business-continuity solutions

HP business-continuity solutions build on and leverage the capabilities of other HP products. As organizations consider higher levels of data availability to meet their growing business needs, HP can offer the right solution through ease of deployment and provide investment protection through leveraged capabilities.

Scaling up to disaster tolerance solutions, StorageWorks disk arrays can be integrated into cluster solutions. HP StorageWorks Enterprise Virtual Array (EVA) and XP Disk Array families have been certified to work with the leading cluster software and have optional software called HP StorageWorks Cluster Extension.

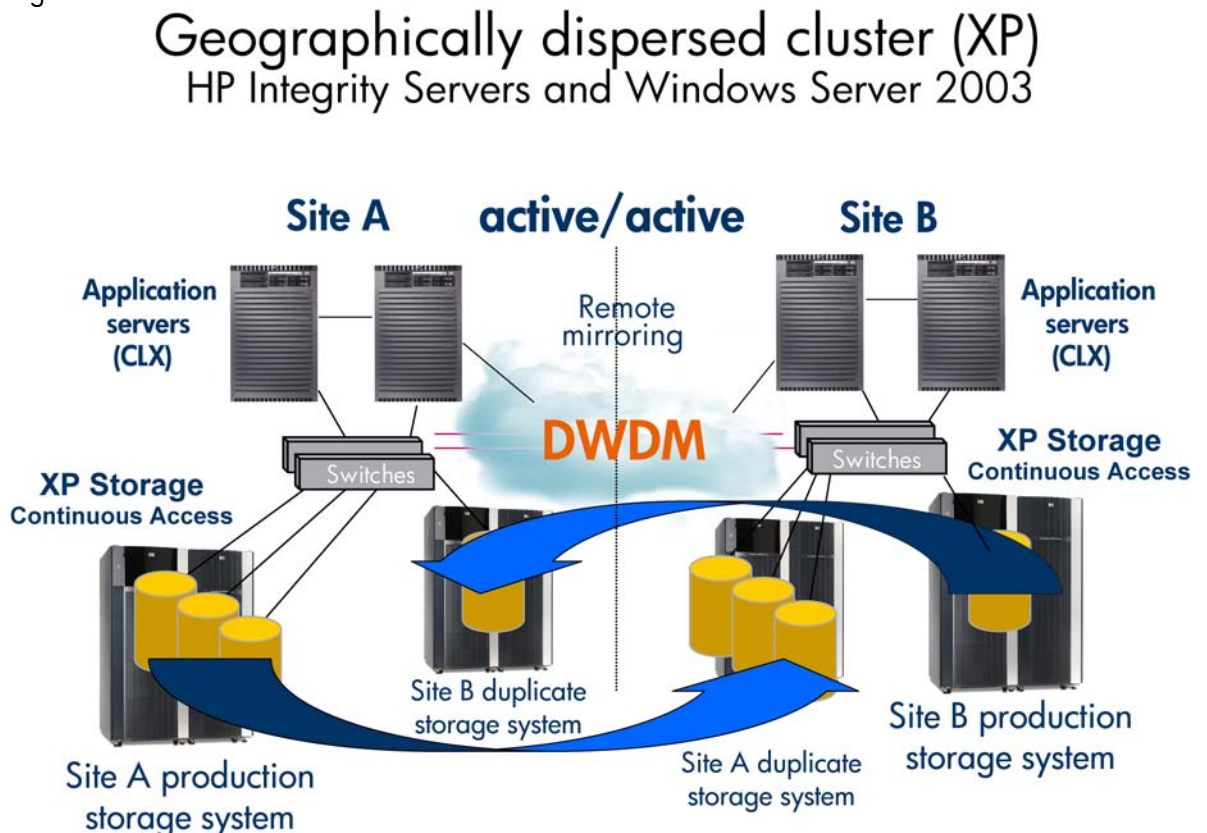
Elevating high availability to disaster tolerance with HP StorageWorks Cluster Extension

The need to extend high availability across distant locations has driven the demand for cluster solutions capable of recovering from even the most extensive disasters. With HP XP Cluster Extension, you have the confidence to extend your cluster solutions unlimited distances—beyond the limitations of a single data center. HP XP Cluster Extension leverages the power of XP remote mirroring, delivers uncompromised cluster performance, and elevates high availability to disaster tolerance.

HP XP Cluster Extension is designed to respond to the full range of maintenance or disaster scenarios. When an application becomes unavailable (during maintenance, server failure, or data center wide disaster), HP XP Cluster Extension directs the cluster software to failover the designated applications to another available server and checks the status of the storage mirror. HP XP Cluster Extension constantly confirms the integrity of the mirror and data availability so that it can give read/write access to the surviving servers. Then, HP XP Cluster Extension redirects mirroring operations. When the original server is restored, the cluster software acts to failback the application. Again, HP XP Cluster Extension checks and confirms the data integrity of the mirror volume (the original primary volume), returns read/write access to the primary volume, and redirects mirroring operations.

Figure 3 depicts scalable business continuity and cluster extension solutions with Windows.

Figure 3. Cluster Extension for Windows



HP Cluster Extension and XP Disk Arrays

HP Cluster Extension Software works with XP Disk Arrays to offer disaster tolerance against application downtime from fault, failure, or site disaster by extending clusters between data centers. It resurrects critical applications at a remote site within minutes after an event. HP Cluster Extension is

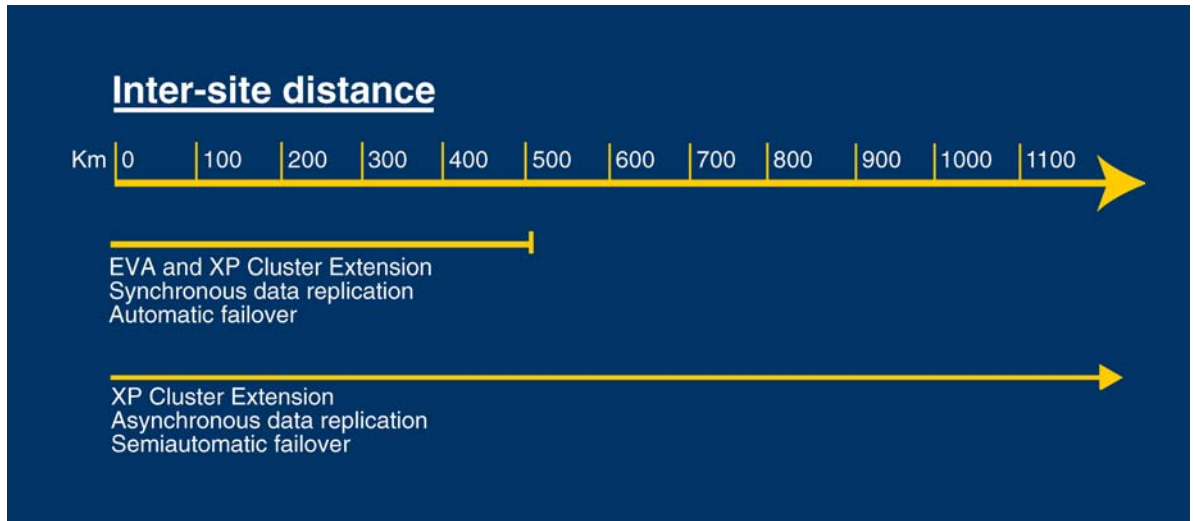
seamlessly integrated with Microsoft Cluster Service , HP StorageWorks XP Continuous Access Software and XP Disk Arrays to automate fail-over and fail-back between sites. The correct fail-over and fail-back decisions are made, minimizing downtime and accelerating recovery, without human intervention. With HP Cluster Extension, HP provides proven strategies, services, and technologies to reduce your exposure and vulnerability.

Table 1 summarizes the Cluster Extension configuration for Windows.

Table 1. Summary of Cluster Extension Windows configuration	
Cluster topology:	Cluster Extension supports up to eight nodes across two main data centers and a third location. Alternatively, the server could be utilized as File Share Witness (for MNS).
Geography	Metropolitan—Up to 500 km (20 ms round-trip delay) with XP and EVA storage Geographic—Unlimited distances with XP storage; dependent on synchronous or asynchronous communication
Network subnets:	Single IP subnet with Windows Server 2003
Network types:	Ethernet or FDDI
Cluster quorum:	For XP—Either majority node set with or without File Share Witness or CLX Quorum Filter Service with an optional server running the CLX Arbitrator Service. For EVA—Majority node set only, with or without File Share Witness.
Failover type:	Automatic
Failover direction:	Bi-directional
Data replication:	Physical data replication—EVA Continuous Access and XP Continuous Access

Figure 4 presents an overview of Windows inter-site distances.

Figure 4. Windows inter-site distance



Summary

Business continuity is essential to profitability and competitiveness. Organizations must be able to match high availability and disaster tolerance requirements to specific business processes. HP offers a range of Windows-based Integrity server solutions to ensure that customers can achieve the precise levels of availability and disaster tolerance that they need—from a basic high-availability environment to a wide-area disaster tolerant configuration.

For more information

www.hp.com/go/DisasterProof

www.hp.com/go/integrity/windows

www.hp.com/go/clxxp

<http://h18006.www1.hp.com/products/storage/software/continuousaccess/index.html>

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