IBM XIV Storage System

Storage reinvented: Powerful, cloud-agile enterprise storage that is easy to manage and scale

Highlights

- A revolutionary, proven, high-end disk storage system designed for extreme ease of use and operational agility
- Consistent high performance without hotspots, along with massive parallelism, enabled by grid architecture
- Virtualized storage for optimized cloud and virtual environments
- High reliability and availability via full redundancy, self healing and unprecedented rebuild speed
- Low TCO due to aggregate benefits including high-density drives, simplified planning, low-touch management and cost-free features

As the planet becomes smarter—more instrumented, interconnected and intelligent—your business faces the dual challenges of managing a staggering amount of information, and extracting the most value from it, to meet the needs of employees, partners and customers. Having the right storage is fundamental to IT enabling growth.

The IBM® XIV® Storage System is high-end disk storage that supports the need for high performance, reliability and flexibility while helping keep costs and complexity to a minimum. Efficient by design and born optimized to simplify storage, the XIV Storage System exemplifies IBM Smarter Storage for Smarter Computing, empowering thousands of organizations worldwide to take control of their storage and gain business insights from their data. Designed for consistent Tier 1 performance and five-nines availability, XIV storage offers low total cost of ownership (TCO) and addresses even the most demanding and diverse workloads. Never compromising performance for reliability, the XIV grid architecture delivers massive parallelism—resulting in uniform allocation of system resources at all times. A recognized leader in storage manageability, XIV storage sets a new standard for ease of use by automating most tasks and providing an extraordinarily intuitive user interface. This interface is accompanied by an equally rich and comprehensive command line interface (CLI) for tailoring the system to user requirements.

Exceptionally elastic, XIV storage delivers strengths that are an ideal match for the unique requirements of cloud deployments and effective cloud computing—the system is hotspot-free, eliminates the need for

tuning of any kind, and is particularly adept at handling dynamic, heterogeneous workloads. Through IBM Hyper-Scale technologies, XIV storage enables customers to move volumes online between multiple XIV systems and without interruption to host applications (IBM Hyper-Scale Mobility) and to manage and monitor multiple XIV systems with simplicity via a consolidated, integrated display (IBM Hyper-Scale Manager). Volume mobility and consolidated management are key customer-empowering capabilities that support the IBM goal of enabling seamless management of multiple XIV systems.[1] Both capabilities drive operational agility and efficiency for large deployments.

Dedicated to maximizing ease of management and flexibility, IBM empowers IT staff with "anytime, anywhere" XIV storage monitoring through a handy mobile application. Supporting iOS and Android operating systems (Apple iPhone, Apple iPad, and leading Android devices), the XIV Mobile Dashboard enables storage administrators to monitor storage performance, capacity status and health across XIV systems quickly and easily.

The XIV Storage System has met with rapid market success in diverse industries worldwide, including financial services, healthcare, telecommunications and IT, energy, and manufacturing. XIV storage supports a wide range of workload needs, from capacity-hungry to ultra-high performance. It integrates easily with virtualization, email, database, analytics, data protection and other solutions from IBM and leading providers such as VMware, Microsoft, SAP, Oracle, SAS and Symantec. XIV storage plays a key role in IBM end-to-end dynamic infrastructure solutions, integrating with IBM ProtecTIER®, IBM Scale Out Network Attached Storage (SONAS), IBM System Storage® SAN Volume Controller (SVC), the IBM Storwize® family, IBM Tivoli® products and IBM PureFlex™ System.

XIV storage features advanced hardware components for outstanding performance. Its InfiniBand backplane offers massive throughput and low latency, while dozens of powerful CPUs, abundant RAM, 8 Gbps Fibre Channel and 10 Gbps iSCSI ports, and an advanced motherboard can address the highest, most-demanding application workload needs. Customers requiring ultra-high performance have the option of benefitting from management-free XIV solid-state drive (SSD) caching, available to all system data and based on optimally utilized commodity SSDs. Operating with advanced algorithms, XIV components help meet requirements for extremely high performance, such as ever-changing virtualized and cloud environments, and complex application scenarios involving business intelligence, archiving, data warehousing, streaming backup and large numbers of mailboxes, as well as demanding ProtecTIER deduplication installations and online transaction processing (OLTP).

The XIV system offers seamless scaling from 28 up to 325 terabytes (TB) by simply adding system modules and is available in configurations of 4 TB, 3 TB or 2 TB hard drives, or software-based 1 TB per drive raw capacity. For all configurations, XIV storage performs with autonomic redistribution of system data as modules are added.

Architecture matters

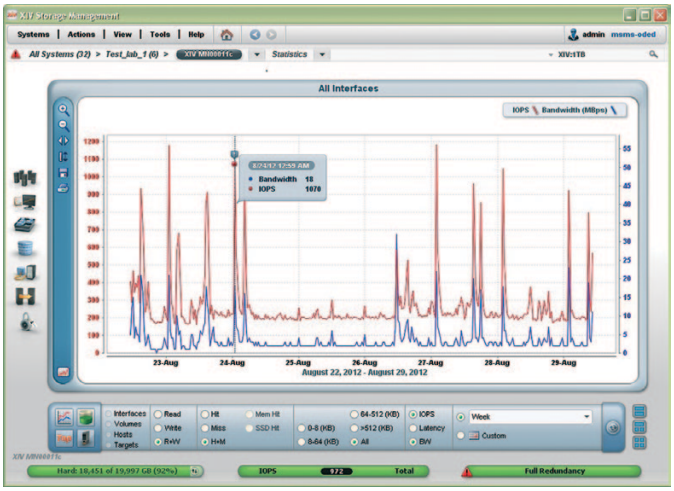
Most traditional high-end storage systems have complex and inflexible architectures that, even with incremental enhancements, compromise performance for reliability. An architecture that enables performance with reliability is a necessity for coping with unpredictable data growth. XIV storage was developed, and is evolving, in response to customer requirements for an easy-to-manage, flexible, powerful, highly available system that meets all application needs and scales easily over time.

Born optimized for consistent high performance

Driving the unique performance benefits of the XIV Storage System is its massively parallel grid architecture, which delivers hotspot-free, consistent, predictable high performance to all applications at all times—with no need for manual tuning. This same high level of service is maintained even during peak load periods, during management or maintenance activities, and upon recovery from disk failures. The XIV design provides performance optimization that enables ultimate use of system resources, uniform workload distribution across all system drives and the freedom to use advanced functions without adversely affecting application performance.

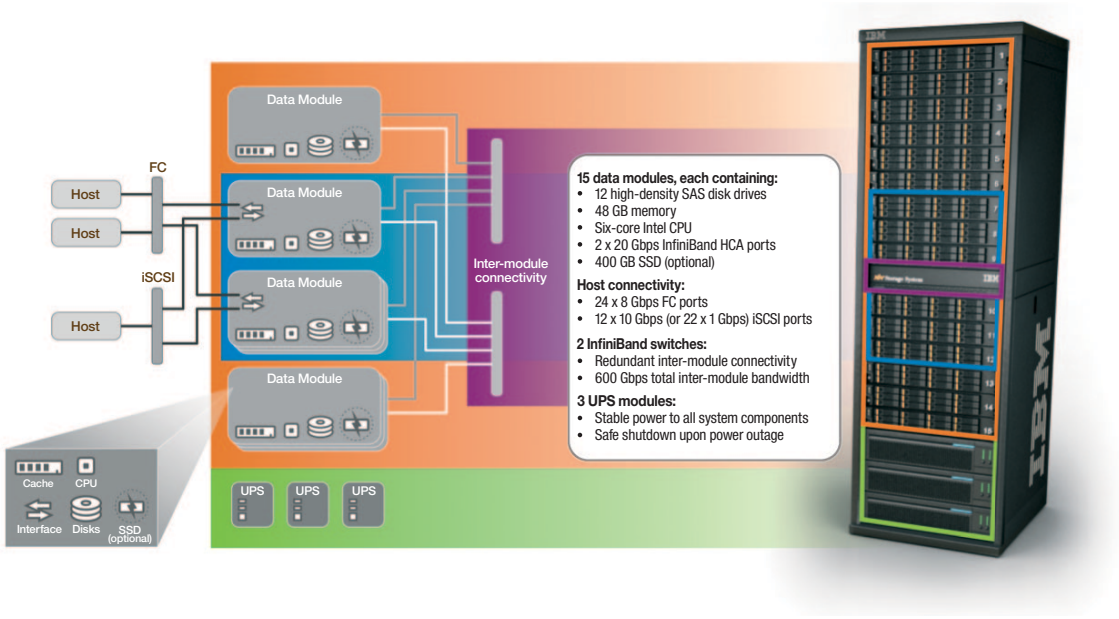
Several architectural features contribute to the XIV system's unique performance profile:

- **Massive parallelism in a fully distributed architecture:** The XIV Storage System uses a distributed architecture of interconnected modules, each with its own multi-core CPU, ample cache, SSD caching (optional) and high-density disk drives working in parallel to efficiently serve data to client applications. Every data volume is randomly spread across all modules and disks in the system, and the aggregate power of the entire system is continually available to every application. The XIV system presents this collection of disks as a single, large, elastic data store on the storage network.
- **Distributed data:** The system stores data by breaking it down into 1 MB chunks (partitions), each mirrored for redundancy to another module. The system distributes all the partitions automatically and uniformly across all the disks by means of a sophisticated pseudo-random distribution algorithm.
- **Distributed cache:** A flexible and powerful cache implementation allows the XIV system to leverage large slots for reads while managing a smaller slot size, resulting in a superior cache hit ratio and, consequently, better performance.
- **SSD caching (optional):** The XIV SSD caching implementation coupled with the XIV architecture enables XIV storage to exceed the benefits derived from typical SSD use. Many storage systems exploit SSDs as static tiers for the most critical data only. XIV storage uses SSDs for caching across all volumes for performance benefits to all applications without managing tiers. Using commodity SSD drives, the XIV system delivers a huge amount of caching memory to read-cache the most frequently accessed data dynamically and adaptively, boosting application performance by up to 4.5 times for database-like workloads.[2]
- **Distributed bandwidth within modules:** Aggressive pre-fetching is enabled by the large cache-to-disk bandwidth available within each module, together with the extremely large aggregate module interconnectivity bandwidth that is available on the XIV backplane.
- **Smart scaling:** Any increase in capacity—through the addition of disk modules—is accompanied by a corresponding increase in processing power, cache, SSD caching (optional) and connectivity to maintain a high performance level as the system scales.
- **Load balancing:** The system automatically distributes the application load across all system modules uniformly, putting the aggregate power of all modules at the service of all requests concurrently. By doing so, it avoids many of the performance and reliability risks that can plague traditional clustered controller designs.
- **Hotspot-free:** Changes to the application or its I/O pattern do not affect system performance; as workloads change and evolve, the system always remains hotspot-free.
- **Configuration change:** Each volume is evenly distributed across all modules and disk drives within the system. The data distribution is adjusted automatically whenever the number of functional disks or modules changes, ensuring optimal data layout and, consequently, optimal use of system resources at all times.



Consolidated view of XIV storage metrics for in-depth analysis

- **High bandwidth between and within modules:** Communication between modules takes place over an internal, redundant InfiniBand network equipped with massive bandwidth, which supports rapid rebuilding when necessary. Each module has its own extremely large CPU-to-memory and disk-to-memory bandwidth.
- **Huge processing resources:** Each module is equipped with its own multi-core processor, putting 90 CPU cores at the disposal of the rack. The XIV Storage System uses this vast processing power to execute advanced caching algorithms that support small cache slots, ensuring high performance through higher cache hit rates—even when using advanced features such as snapshots and mirroring.
- **High performance during disk rebuild and hardware failure:** XIV storage maintains consistent high performance at all times because it engages all the disks in the rebuild process simultaneously.



The XIV Storage System—components and connectivity

Built-in high reliability and availability

The XIV Storage System is designed to offer five-nines availability and to operate continuously over its installed lifetime without interruption to data access. The highly parallel grid architecture and distributed autonomic rebuild mechanism provide outstanding reliability, reducing failures and unplanned downtime. The system provides built-in system reliability at hardware and software levels, including uninterruptible power supply (UPS) protection for all disks, cache and electronics; redundant power supply and fans; partition mirroring; and proactive error detection and healing. Specific design features help further reduce risk:

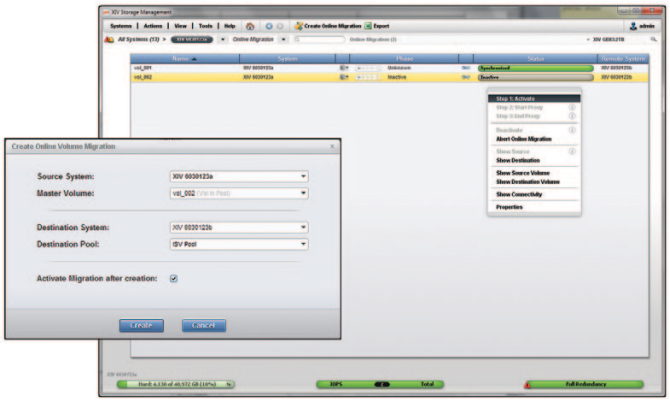
- **Active-active N+1 redundancy:** All key system components—disks, modules, switches, host connectivity and UPS units—are fully redundant and protected through active-active N+1 redundancy. Each component is hot-swappable—replaceable without system shutdown.
- **Exceptional rebuild speed:** The XIV system can rebuild a faulty drive in minutes, even under heavy load, with minimal impact on system service. Unlike other storage systems, which may require many hours to rebuild a disk, the XIV system performs a rebuild using all disks in the system simultaneously and rebuilds only the written data. This two-pronged approach serves to minimize the burden on any one disk and dramatically reduces rebuild time.
- **Proactive self healing and system health management:** The system monitors its components continuously, reacting to existing and potential issues by activating self healing as needed and returning to full redundancy rapidly and without human intervention. As part of this proactive approach, the system:
  - Uses disk-resident diagnostics to predict potential disk failure
  - Accesses all disk drives and all disk areas to assess health status
  - Increases protection levels by retiring suspect disks before they fail and rebuilding their data while a redundant version is still available
- **Smart maintenance and hot upgrades:** XIV storage supports live maintenance, avoiding the need for planned downtime. Maintenance of disks and modules is performed when data is at full redundancy, averting risk introduced by human error. The system also supports nondisruptive upgrades of the system software (microcode), allowing application services to continue uninterrupted.
- **Reliable backup and recovery:** XIV storage uses host-based application programming interfaces (APIs) to integrate with backup and recovery software. It supports Microsoft Windows Volume Shadow Copy Service (VSS) technology for seamless backup and recovery of Windows platforms. XIV snapshots used with the advanced snapshot management capabilities of IBM Tivoli Storage FlashCopy® Manager enable fast application-aware backups and restores. XIV storage combines with IBM Tivoli Storage Manager to enable near-instant, space-efficient snapshots with no perceivable impact on application performance.
- **Business continuity:** The system is specifically engineered for business continuity. The XIV synchronous and asynchronous replication, clustering and restoration capabilities facilitate the implementation of a highly resilient IT infrastructure that can survive the failure of an entire data center without jeopardizing data access.

Efficient by design for breakthrough ease of management

The XIV Storage System is crafted for an intuitive user experience. It provides fully virtualized storage designed to simplify the task of managing Tier 1 storage by eliminating the need for performance tuning, planning for capacity and performance growth, and numerous other activities. The XIV graphical user interface (GUI) and built-in management tools make administrative tasks easy and efficient, with little training or expertise required.

Through IBM Hyper-Scale Manager, XIV storage provides one-stop, centralized and integrated administration of XIV systems across the enterprise, driving down operational complexity with benefits such as consolidated alerts and reporting, minimal setup and troubleshooting, and minimal training. Through IBM Hyper-Scale Mobility, XIV storage facilitates capacity management by enabling movement of volumes between XIV systems without application disruption, enabling such benefits as aggressive thin provisioning, simplification of storage array rollover and retirement, and easier workload balancing across the data center.

On-the-go IT staff have the benefit of anywhere, anytime remote monitoring of system performance, capacity and health with the XIV Mobile Dashboard, which supports the Apple iPhone and iPad, and leading Android devices.



Volume mobility between XIV systems with no application disruption

XIV Mobile Dashboard for on-the-go monitoring via iOS and Android devices

Blue skies for your cloud

A smooth transition to cloud computing requires infrastructure components that tightly and seamlessly integrate with virtual architectures and the performance-heavy applications that run on them. XIV storage elicits the power of cloud computing with unique characteristics:

- **Elasticity and flexibility:** Delivers rapid provisioning and allows reclaiming of storage capacity along with the required quality-of-service levels; helps meet cloud requirements with volume mobility between systems
- **Predictable performance and easy scaling:** Supports constantly changing workloads and the sharing of resources across multiple customers with no impact on performance
- **Minimal management:** Provides ease of management with IBM Hyper-Scale Manager, consolidating management of multiple XIV systems for easy capacity planning; delivers consistent, tuning-free performance
- **Cloud management support:** Meshes closely with cloud management frameworks such as OpenStack (Grizzly release) for automated management and provisioning in large, dynamic cloud environments
- **Hypervisor integration:** Integrates with hypervisors such as VMware vSphere, Microsoft Hyper-V and IBM PowerVM® to yield more value from server virtualization and cloud management
- **Superb TCO:** Features 10 Gbps iSCSI, for cost-effective cloud deployments, and exceptionally low cost per TB enhanced by high-density drives, optimal capacity utilization, and power and cooling savings

Easy scalability

The XIV architecture scales in every aspect, enabling the seamless addition of capacity as well as easy mobility of data volumes between systems (IBM Hyper-Scale Mobility). These attributes simplify capacity planning and provide extreme operational flexibility and elasticity, making the system particularly well-suited for dynamic environments such as cloud.

The XIV redistribution mechanism integrates a new module automatically, allowing for perfect linear scalability with near-zero performance impact. Internal switching capacity is designed for any system size, ensuring that the system stays bottleneck-free even upon scaling. Each newly added module contains capacity, cache, SSD caching (optional), processing power, host interfaces and bandwidth; this design maintains the capacity-to-resources ratio, keeping performance in pace with application load and total throughput as the system scales.

IBM Hyper-Scale Mobility enables easy movement of a volume from one XIV system to another with no disruption to the application, providing highly flexible scalability solutions. The feature helps facilitate scenarios that typically challenge traditional systems, such as aggressive thin provisioning, workload balancing across the data center and machine repurposing.

Simplified management via a consolidated, integrated display across XIV systems

Low total cost of ownership

The XIV Storage System is designed to be cost-efficient in all aspects:

- **Simplicity helps save money:** Administrators can provision by simply sizing the desired volumes. Logical unit number (LUN) mapping is drag and drop. Snapshots and test environments are created in seconds. Data migration is dramatically fast; remote mirroring is easy and supported between generations of XIV storage, offering flexibility for meeting data protection goals. The reduced complexity frees up IT teams to perform other tasks.
- **High reliability helps avoid downtime costs:** In many traditional systems, storage outages are often caused by human error resulting from system complexity and the need for incessant fine tuning. Born optimized, XIV storage provides high performance without fine tuning, thereby reducing the risk of outages and human error.
- **All-included features at no extra charge:** All XIV functionality is provided with the system software, at no extra charge, and is available for use at any time.
- **Optimized capacity per floor tile helps reduce costs:** The system's use of ever larger, very high-density drives optimizes capacity per floor tile, helping reduce power, space and cooling costs, and contributing to lower cost per terabyte. Leveraging Windows Server 2012 or other space reclamation tools, users can eliminate orphaned space, lowering capital costs and power consumption.

Advanced features at no extra charge

The XIV Storage System empowers users with enterprise-class functions included with the system software, making pricing straightforward and giving anytime access to a rich set of features:

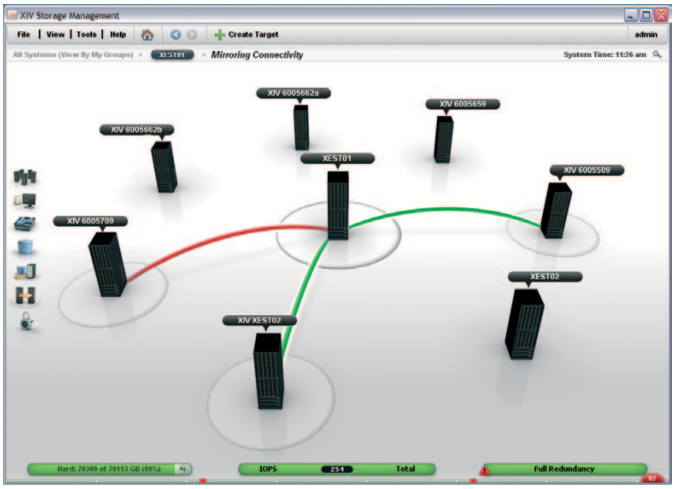
- **Snapshots:** Large numbers of space-efficient snapshots—create, restore, writable and "snap on snap"—are supported with virtually no performance impact. Multiple point-in-time copies of application data support development, prototyping, backup or other activities without the capacity penalty of full volume copies or performance penalty of copy-on-write.
- **Replication and disaster recovery:** The system provides ease of configuration and operation of synchronous and asynchronous mirroring and other business continuity capabilities. It allows mirroring of volumes to different systems, including between XIV models of different generations.
- **Consistency groups:** Volumes are logically grouped to facilitate application-centric operations, including snapshots and mirroring of all volumes in a consistency group.
- **Thin provisioning:** The system presents a fully sized LUN to the hosts while allocating needed capacity only. Thin-provisioned capacity can be managed via storage pools to minimize the risk of insufficient physical space.
- **Online volume mobility:** IBM Hyper-Scale Mobility enables nondisruptive movement of volumes between XIV systems, facilitating aggressive thin provisioning, array rollover and retirement, and easier workload balancing across the data center.
- **Data migration:** Rapid migration of data from any non-XIV system to the XIV system is supported. The migration is performed in the background while applications continue to operate.
- **Centralized administration:** Multiple XIV systems across the enterprise can be managed centrally through intuitive views of volumes, pools and resources, simplifying management of large-scale XIV deployments.

- **Reporting:** The system can capture and store up to one year of performance and statistics data, specified by date and time, for visualization and reporting—including through mobile devices—facilitating troubleshooting and performance analysis.
- **Hot upgrades:** Hardware replacements and software upgrades can take place nondisruptively.
- **Host attachment kits (HAKs):** XIV HAKs configure platform-native, multipath solutions, simplifying connectivity setup while helping to ensure best-practice configuration, provide host-storage troubleshooting and support tools, and analyze host configuration and connectivity health for faster issue resolution. HAKs are provided for IBM AIX®, Microsoft Windows, Oracle Solaris, HP-UX, SUSE Linux Enterprise Server and Red Hat Enterprise Linux.
- **Quality of service (QoS):** The system allows users to control the priority of performance given to applications connected to the system to ensure resource allocations that address particular business needs.
- **USGv6, IPv6 and IPSec:** XIV storage is USGv6-certified and supports the IPv6 and IPSec protocols for management ports, allowing customers to address government requirements and enterprise needs and to enjoy the benefits of the standard's built-in security options.
- **Security:** XIV storage integrates with Active Directory and Lightweight Directory Access Protocol (LDAP) servers for centralized management of user identity and privileges. It supports role-based access management as well as auditing by capturing and transmitting events to monitoring systems such as IBM Systems Director and IBM Tivoli Storage Productivity Center Suite. It uses SSL for network channel encryption.
- **Automatic event notification:** The system sends alerts of imminent hardware failure via email, SMS or SNMP traps with filtering and distribution by severity or type.

Seamless integration with host platforms

The XIV Storage System offers seamless and cost-efficient integration with leading operating systems and host platforms—at no extra charge:

- **Operating systems:** The XIV system supports VMware ESX/ESXi, Microsoft Windows (including Hyper-V), AIX, SUSE Linux Enterprise Server, Oracle Solaris, HP-UX and IBM iSeries® (via VIOS).



Complete, intuitive XIV display of mirroring status

- **IBM platforms:** The system's multi-platform support includes Linux, VIOS for IBM Power Systems™ (IBM System i® and IBM System p®), PowerVM, IBM i5/OS® V6R1, IBM AIX (and AIX MPIO driver) and IBM PowerHA® (HACMP™).
- **Integrated storage solutions:** The XIV system supports solutions delivering network-attached storage (NAS) capabilities with N-series gateway or SONAS; highly scalable and reliable storage across multiple systems, including heterogeneous, with SVC; and deduplication archiving with ProtecTIER.
- **Concurrent multipath software support:** The XIV architecture provides optimized native concurrent multipath support as a function of its high bandwidth and resilient host connectivity. On the host side, XIV storage supports native OS multipathing solutions, as well as Symantec Veritas Storage Foundation dynamic multipathing (DMP)[3] and EMC PowerPath.[3]

Enterprise-proven application solutions

XIV storage supports a broad range of easily implemented, cost-efficient, enterprise-proven solutions. Working in close cooperation with Microsoft, VMware, SAP, Oracle, SAS, Symantec and others, IBM can offer outstanding customer value and the highest levels of partner support. Easy connectivity is provided through XIV HAKs.

- **Ideal for virtualization and cloud:** XIV storage acts as the ideal storage component of virtualized and cloud environments due to its grid architecture, which provides consistent high performance for dynamic, heterogeneous workloads; delivers high, uninterrupted service levels through hotspot-free performance; and averts the need for complex, time-consuming tuning and configuration. The XIV system integrates with leading hypervisors—such as vSphere, Hyper-V and PowerVM, as well as Xen, IBM z/VM® and VIOS for IBM Power Systems (System i and System p)—enabling high quality of service for applications running in these environments. For enterprises using the OpenStack framework for cloud computing, the OpenStack Cinder volume-driver delivers automated storage provisioning and volume management, representing a unique combination of high-end storage with this open-source cloud platform.
- **Deeply integrated VMware solutions:** The longstanding partnership and tight cooperation between VMware and IBM bring powerful value to XIV customers, a large percentage of which use VMware. Benefits include enhanced performance through out-of-the-box support for vStorage APIs for Array Integration (VAAI); robust disaster-recovery options via VMware Site Recovery Manager (SRM) (XIV storage is certified with versions 4.1 and 5.0); and storage visibility and simplified provisioning via the IBM Storage Management Console (vCenter plug-in) and the IBM Storage Provider for vSphere APIs for Storage Awareness (VASA). Support for VMware vCenter Operations Management Suite (vCOPS) enables monitoring of XIV via the vCenter operations management console.
- **Tight support for Microsoft offerings:** Support for Windows Server 2012 enables XIV users to benefit from space reclamation and the newest attributes of Microsoft Windows VSS and Microsoft Clustering (MSCS) as well as SQL Server, Exchange, SharePoint and custom third-party applications. XIV storage also supports Microsoft cloud and virtualized environments by integrating with Hyper-V and Microsoft System Center Virtual Machine Manager (SCVMM) for simpler storage management.
- **Business and industry applications:** The XIV system delivers consistent high performance and exceptionally simple management across a range of applications with heterogeneous workloads such as IBM Lotus® Notes®, Microsoft Exchange, Oracle, SAP, SAS and healthcare applications such as EPIC and Siemens.
- **Extended storage management:** The XIV system integrates with leading products to enable storage management as part of global system resources management. It supports centralized, optimized and automated XIV management and SAN connectivity with IBM Tivoli Storage Productivity Center; monitoring of infrastructure and applications using Microsoft System Center Operations Manager (SCOM) or vCOPS; controlled storage provisioning and management by non-storage administrators with the IBM Storage Management Console for VMware vCenter (vCenter plug-in); and discovery, provisioning and rapid provisioning for Hyper-V through SCVMM. It also supports storage, server and application management in a heterogeneous environment with Symantec Veritas Storage Foundation.
- **Data protection and business continuity:** XIV storage can provide automated application-aware, near-instant snapshots with Tivoli Storage FlashCopy Manager and integrates with end-to-end backup solutions such as Tivoli Storage Manager and Symantec NetBackup. XIV supports clustering with MSCS, PowerHA on AIX and other OS solutions including Veritas Cluster Server (VCS). Additionally, XIV storage supports automated storage failover with VMware Site Recovery Manager (SRM), MSCS and VCS. It supports near-instant, application-aware hardware snapshots on any Windows server using the XIV Provider for Windows VSS.

IBM XIV Storage System (Model 2810/2812)—System specifications	
General properties	
Capacity per drive (7.2k rpm)	1 TB*, 2 TB, 3 TB or 4 TB
Number of disk drives (min/max)	72/180
Performance features	
Maximum number of CPUs	15 Intel Xeon Processor E5645
Maximum number of CPU cores	90 physical (180 logical cores with Intel Hyper-Threading technology)
Maximum memory	1 TB/2 TB/3 TB drive-based: up to 360 GB (24 GB of memory per module) 4 TB drive -based: up to 720 GB (48 GB of memory per module)
Maximum cache-to-disk bandwidth	480 Gbps
SSD caching	Up to 6.0 TB
Connectivity	
Maximum number of ports—Fibre Channel§	24 (8 Gbps ports)
Maximum number of ports—iSCSI over gigabit Ethernet	22 (1 Gbps ports) or 12 (10 Gbps ports)
Physical features	
Temperature	10°C – 35°C (50°F – 95°F)
Altitude (max)	2,134 m/7,000 ft
Humidity	25% – 80% noncondensing
Dimensions (height × width × depth)	202 cm × 66 cm × 120 cm (79.53 in. × 25.98 in. × 47.24 in.)
Maximum weight	1,041.5 kg (2,296 lb)
Clearance front/rear	120 cm/120 cm (47.24 in./47.24 in.)
Redundant power feed	√
Input voltage	180 – 264 V ac at 60 A or 30 A (±10%)
Power usage	See power usage table below
Host connectivity	
Fibre Channel rates	8 Gbps
iSCSI rates	1 Gbps or 10 Gbps
Capacity-on-demand configurations	√
Warranty	1 and 3 year limited warranty, onsite service, same day 24×7

* System utilizing 1 TB per disk capacity

§ Fibre Channel ports are capable of auto-negotiation

IBM XIV Storage System (Model 2810/2812-214)—capacity and connectivity

Number of modules	Number of disks	Usable capacity (TB, decimal) 1 TB*/2 TB/3 TB/4 TB	Fibre Channel ports 8 Gbps	iSCSI ports 1 or 10 Gbps
6	72	28/55/84/112	8	6 or 4
9	108	44/88/132/177	16	14 or 8
10	120	51/102/154/207	16	14 or 8
11	132	56/111/168/225	20	18 or 10
12	144	63/125/190/254	20	18 or 10
13	156	67/134/203/272	24	22 or 12
14	168	75/149/225/301	24	22 or 12
15	180	80/161/243/325	24	22 or 12

IBM XIV Storage System (Model 2810/2812-214)—number of CPUs and memory

Number of modules	Number of disks	Number of CPUs	XIV memory (GB) 24 GB per module/ 48 GB per module	SSD (TB) (optional)
6	72	6	144/288	2.4
9	108	9	216/432	3.6
10	120	10	240/480	4.0
11	132	11	264/528	4.4
12	144	12	288/576	4.8
13	156	13	312/624	5.2
14	168	14	336/672	5.6
15	180	15	360/720	6.0

IBM XIV Storage System (Model 2810/2812-214)—power usage (typical)

Number of modules	Number of disks	1 TB*/2 TB/3 TB/4 TB kVA	With optional SSD 1 TB*/2 TB/3 TB/4 TB kVA
6	72	2.4/2.4/2.5/2.5	2.5/2.5/2.6/2.6
9	108	3.5/3.5/3.7/3.7	3.6/3.6/3.8/3.8
10	120	3.9/3.9/4.1/4.1	4.0/4.0/4.2/4.2
11	132	4.2/4.2/4.4/4.4	4.3/4.3/4.5/4.5
12	144	4.6/4.6/4.8/4.8	4.7/4.7/4.9/4.9
13	156	4.9/4.9/5.2/5.2	5.0/5.0/5.3/5.3
14	168	5.3/5.3/5.5/5.5	5.5/5.5/5.7/5.7
15	180	5.6/5.6/5.9/5.9	5.8/5.8/6.1/6.1

* System utilizing 1 TB per disk capacity

For more information

To learn more about the IBM XIV Storage System, contact your IBM representative or IBM Business Partner, or visit: **ibm.com**/xiv

Additional online resources:

- SPC-1 benchmark results
- SPC-2/E benchmark results
- IBM XIV customer reference videos and case studies
- Redbook: XIV Storage System: Host Attachment and Interoperability
- Redbook: IBM XIV Storage System with the Virtual I/O Server and IBM i
- IBM System Storage Interoperation Center (SSIC)
- IBM ISV Solutions Resource Library
- Search for XIV on IBM Techdocs library

Additionally, IBM Global Financing can help you acquire the IT solutions that your business needs in the most cost-effective and strategic way possible. We'll partner with credit-qualified clients to customize an IT financing solution to suit your business goals, enable effective cash management, and improve your total cost of ownership. IBM Global Financing is your smartest choice to fund critical IT investments and propel your business forward. For more information, visit: **ibm.com**/financing

[1] All information to be released represents the current IBM intent, is subject to change or withdrawal, and represents only goals and objectives.

[2] All performance data contained in this publication was obtained in an IBM lab environment under simulated conditions and is presented as an illustration. Performance obtained in other operating environments may vary, and customers should conduct their own testing.

[3] For latest support details, check with the vendor.

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