IBM XIV Storage System

Storage reinvented: Secure, cloud-optimized enterprise storage that scales with ease

Highlights

- Deliver consistent, tuning-free, high performance and remarkable ease of use via a grid-based architecture
- Provide linear scaling up to 325 TB per array and IBM Hyper-Scale for extreme operational agility over multiple systems
- Enable elasticity, open-standards support and mixed-workload affinity for optimized compute clouds and virtualized environments
- Offer high reliability and availability via full redundancy, self healing and unprecedented rebuild speed
- Provide compelling data economics through superb price-performance, low-touch and simplified management, footprint density, power efficiency and all-inclusive software licensing

As the planet becomes more instrumented, interconnected and intelligent, your business faces the challenge of managing huge quantities of data and extracting the most value from it—efficiently and flexibly—while meeting the needs of employees, partners and customers. Having the right storage is fundamental to survival and growth.

IBM® XIV® Storage System is high-end disk storage that supports the need for high performance, availability, operational flexibility and security while helping minimize costs and complexity. Built optimized to simplify storage, XIV Storage System is enabling thousands of organizations to take control of their storage and gain business insights from their data. Designed for consistent, enterprise-level performance and five-nines availability, XIV storage handles static and dynamic workloads with ease. Never compromising performance for reliability, the XIV grid architecture delivers massive parallelism—resulting in uniform allocation of system resources at all times. XIV storage secures your data through industry-standard data-at-rest encryption while keeping performance uninterrupted—with separate key management support by IBM Tivoli® Key Lifecycle Manager.

XIV storage sets a new standard for ease of use by automating most tasks and providing an extraordinarily intuitive user interface—and scaling its ease of management to a multi-system XIV environment. An equally rich and comprehensive command line interface (CLI) is provided for tailoring the system to user requirements. IBM XIV Mobile Dashboard enables anytime, anywhere XIV monitoring via iOS- and Android-based devices.

Exceptionally elastic, XIV storage delivers strengths that are an ideal match for the unique requirements of cloud computing. Through IBM Hyper-Scale, XIV offers a new paradigm in scalability for cloud and large deployments:

- IBM Hyper-Scale Mobility enables customers to move volumes between multiple XIV systems and without host application interruption, facilitating capacity management and optimal asset use.
- IBM Hyper-Scale Consistency enables customers to coordinate consistent snapshots of an application's volumes that span multiple XIV systems, enhancing data protection solutions.
- IBM Hyper-Scale Manager enables customers to manage multiple XIV systems with simplicity via a consolidated, integrated display and to customize their cloud with the XIV Representational State Transfer (REST) application programming interface (API).

XIV storage is deployed with success in diverse industries worldwide, including financial, healthcare, telecommunications, managed services, energy and manufacturing. It integrates easily with virtualization, email, database, analytics, data protection and other solutions from leading providers such as VMware, Microsoft, SAP, Oracle Solaris, SAS and Symantec. It plays a key role in IBM end-to-end dynamic infrastructure solutions, integrating with IBM ProtecTIER®, IBM Scale Out Network Attached Storage (SONAS), the IBM Storwize® family—including IBM System Storage® SAN Volume Controller (SVC)—IBM Tivoli products, IBM SmartCloud® Storage Access 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 CPU cores, 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 flash caching, available to all system data and based on optimally utilized commodity solid-state drives (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 scale-up from 28 to 325 TB by simply adding system modules and is available in configurations of 4 TB, 3 TB, 2 TB or 1 TB. For all configurations, XIV storage performs with autonomic redistribution of system data as modules are added.

Architecture matters

XIV storage is an ever-evolving, "no-excuses" answer to customer requirements for an easy-to-manage, flexible, powerful and highly available high-end system that meets multiple workload needs, including for cloud and analytics, and scales easily over time. The grid architecture is at the root of the system's far-reaching customer value.

Born optimized for consistent high performance

Driving XIV performance benefits is the massively parallel grid architecture, which delivers hotspot-free, consistent, predictable high performance to all applications at all times—tuning-free. This same service level is maintained even during peak load periods, management or maintenance activities, and disk recovery. 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 affecting application performance.

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

- **Massive parallelism in a fully distributed architecture:** XIV system uses a distributed architecture of interconnected modules, each with its own multi-core CPU, ample cache, flash 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—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.
- **Flash caching (optional):** XIV leverages its architecture to use flash for caching across all volumes, benefiting all applications without managing tiers. It uses the flash drives to deliver a huge amount of caching memory, read-caching the most frequently accessed data dynamically and adaptively—boosting performance by up to 4.5 times for database-like workloads.[1]
- **Distributed bandwidth within modules:** Aggressive prefetching 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, flash caching (optional) and connectivity to maintain a high performance level as the system scales.

Consolidated view of XIV storage metrics for in-depth analysis

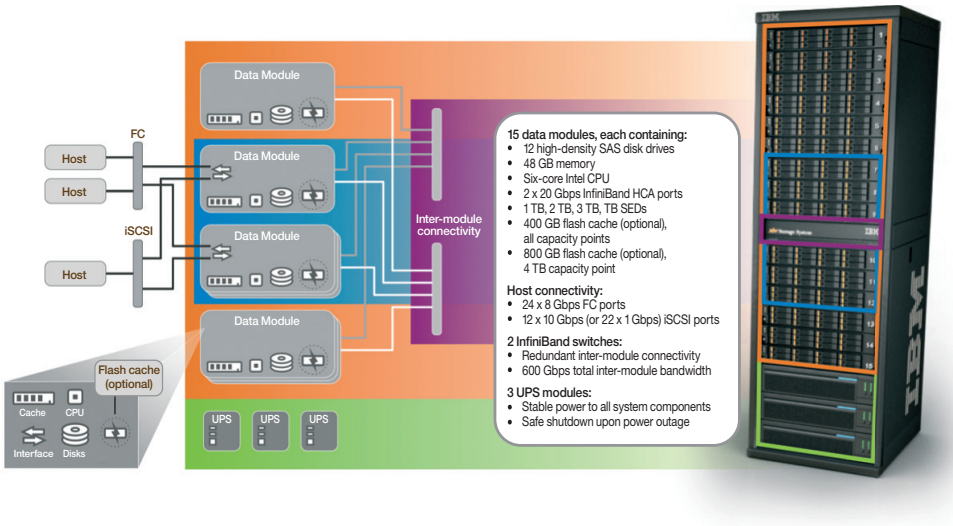
- **Load balancing:** The system automatically distributes the application load across all system modules uniformly, putting the aggregate power of all modules at the service of all requests concurrently. By doing so, it avoids many of the performance and reliability risks that can plague traditional 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.
- **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. 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.

Built for enterprise availability and security

XIV Storage System, with its grid architecture, is optimally designed for uncompromising five-nines availability—with continuous operation over its lifetime without interruption to data access—and industry-standard security:

- **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 4 TB drive in under an hour, even under heavy load, with minimal impact on system service. The exceptional speed results from performing the rebuild using all disks in the system simultaneously and rebuilding the written data only.
- **Preventive system healthcare, proactive self healing:** The system monitors its components continuously, activating self healing upon need and returning to full redundancy without human intervention through:
  - Disk-resident symptomatic monitoring for potential disk failure
  - Accessing of all disk drives and areas to assess health
  - Retiring of suspect disks before failure—and data rebuild 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.



XIV Storage System—components and connectivity

- **Reliable backup and recovery:** XIV storage uses host-based 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.
- **Engineered for business continuity:** XIV synchronous and asynchronous mirroring—including "quick-start" of synchronous mirroring through offline initialization, enabling switching between mirroring types to meet varied service level needs—as well as clustering and restoration capabilities, offer a highly resilient IT infrastructure that can survive the failure of an entire data center without jeopardizing data access.
- **Security:** XIV storage offers data-at-rest encryption, with key management support by Tivoli Key Lifecycle Manager. XIV systems are generally available with self-encrypting hard drives (SEDs) and software-based encryption of (optional) flash drives. Customers who own SED-based systems can hot-encrypt them nondisruptively, in minutes. XIV data-at-rest encryption, implemented with AES 256-bit keys, is Trusted Computing Group (TCG) storage specification-compliant. Tivoli Key Lifecycle Manager offers production-ready key management, including automated replication and Key Management Interoperability Protocol (KMIP) support.

Designed for scalability with extreme ease of use

XIV Storage System is crafted for an intuitive user experience. It provides fully virtualized storage designed to simplify management of a Tier 1 storage environment. The underlying XIV architecture makes administrative tasks easy and efficient, with little training or expertise required. It is supported by an extremely easy to use graphical user interface (GUI), integrated seamlessly with Hyper-Scale Manager and built-in management tools. 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 Apple iOS and leading Android devices. Minimal personnel are required for its management due to minimal administration, tuning-free operation, and an optimized environment that minimizes performance planning.

Blue skies for your cloud

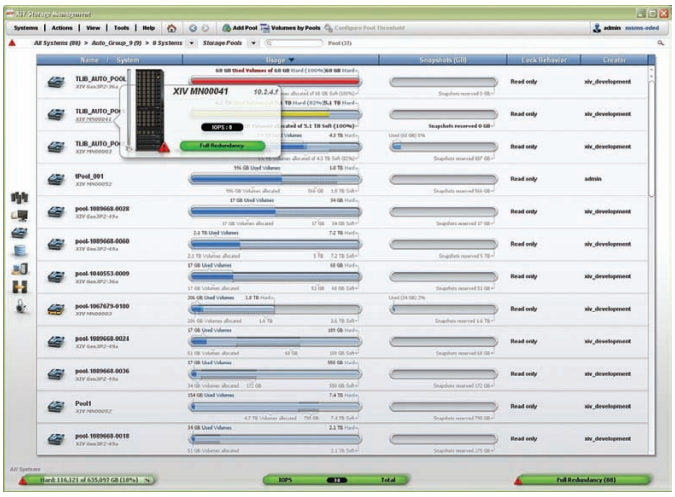
XIV storage attributes elicit compute cloud power:

- **Predictable high performance and grid-based linear scaling:** Handles heterogeneous workloads concurrently and resource sharing optimally, by design, without need for administrator involvement whatsoever
- **Elasticity:** Helps meet cloud requirements with exceptional agility and general scalability through Hyper-Scale
- **Security:** Offers industry-standard data-at-rest encryption, including for cloud, nondisruptively in minutes
- **Ease of use:** Consolidates administration with easy capacity planning and tuning-free performance
- **Open standards and automation:** Integrates easily with cloud frameworks including OpenStack, RESTful API, IBM SmartCloud Storage Access, and leading hypervisors
- **Exceptional data economics:** Features 10 Gbps iSCSI for low-latency, cost-effective cloud deployments made even more economical through low-touch management, high utilization and power savings

Hyper-Scale delivers seamless XIV scalability, through nondisruptive mobility of data volumes between XIV systems, concurrent snapshots of the volumes of an application that span multiple XIV systems and consolidated, integrated management of multiple XIV arrays. Through Hyper-Scale, XIV storage can drive down operational complexity dramatically and create new opportunities for efficient capacity management and data protection.

The XIV architecture is at the core of the system's seamless scaling-up capability. The system hardware scales in every aspect: each newly added module contains capacity, cache, flash caching (optional), processing power, host interfaces and bandwidth. This design is aimed at maintaining the capacity-to-resources ratio as the system scales up incrementally, keeping performance in pace with application load and total throughput. The XIV system software contains a redistribution mechanism that 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.

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



IBM Hyper-Scale: Consolidated management across XIV systems

Exceptional data economics

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

- **Simplicity helps save money:** Administrators provision by simply sizing the desired volumes. Logical unit number (LUN) mapping is drag and drop. Snapshots and test environments are created in seconds and are de facto differential—without duplication—for greatest efficiency. Data migration is dramatically fast; remote mirroring is easy and across generations, aiding data protection goals.
- **High availability helps avoid downtime costs:** The tuning-free architecture dramatically reduces the risk of human error that can result from complexity and the need for frequent tuning.

- **All-inclusive functions without hidden costs:** All XIV software functionality is provided with the system software base license and available for use at any time (assuming supporting hardware is in place).
- **Optimized footprint utilization helps reduce costs:** Effective use of very high-density drives reduces operational and environmental costs; space reclamation through VMware, Windows Server 2012 R2 or other tools helps users eliminate orphaned space, lowering capital costs and power consumption.
- **Convergence of multiple workloads simplifies management:** The Hyper-Scale implementation streamlines administration and system use across the environment, reducing costs.

Advanced features at no extra software charge

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:

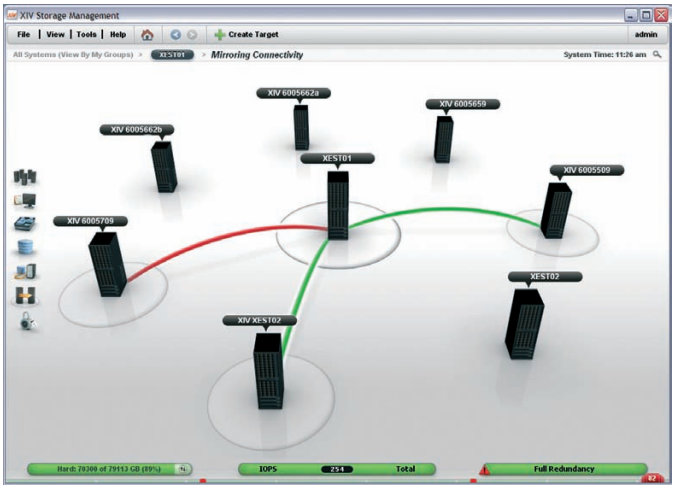
- **IBM Hyper-Scale:** Hyper-Scale Mobility enables nondisruptive movement of volumes between XIV systems, facilitating thin provisioning, machine repurposing, and easier workload balancing across arrays. Hyper-Scale Consistency offers a coordinated, concurrent snapshot of an application's volumes that are spread across multiple XIV systems—implemented via an enhanced command line that stops/resumes I/O operations of a full consistency group—for robust data protection. Hyper-Scale Manager enables consolidated management with integrated views of volumes, pools and resources, simplifying administration of large XIV deployments.
- **Snapshots:** Large numbers of space-efficient snapshots—create, restore, writable and "snap on snap"—are supported with near-zero 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. Hyper-Scale Consistency offers snapshot coordination across systems.
- **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.
- **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.
- **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.
- **Cloud integration and automation:** The system integrates easily with cloud frameworks and open-standards tools including OpenStack, IBM SmartCloud Storage Access, and key hypervisors, and via XIV RESTful API.
- **Host attachment kits (HAKs):** XIV HAKs configure platform-native, multipath solutions, simplifying connectivity setup while facilitating best-practice configuration; provide 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 offers data-at-rest encryption, with key management support by Tivoli Key Lifecycle Manager. It is USGv6-certified and supports the IPv6 and IPSec protocols for management ports, enabling customers to address government requirements and enterprise needs, and benefit from the standard's built-in security options. It 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

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

- **Operating systems:** The XIV system supports VMware ESXi, Microsoft Windows (including Hyper-V), AIX, SUSE Linux Enterprise Server, Oracle Solaris, HP-UX and IBM iSeries® (via VIOS).
- **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™). The XIV system supports IBM Storage Integration Server, which consolidates multiple integration-functions on a single host or virtual machine to deliver storage services from IBM storage arrays and serve target cloud environments.
- **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)[2] and EMC PowerPath.[2]



Intuitive display of mirroring status

Enterprise-proven application solutions

XIV storage supports a broad range of easily implemented, cost-efficient, enterprise solutions rich in 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 high-end storage component for virtualized and compute cloud environments due to its grid architecture, autonomic data placement, management scaleout and open-standards tools support. It handles general purpose workloads with elasticity and ease; delivers high, uninterrupted service levels with 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 Citrix XenServer, 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. XIV storage offers automated storage provisioning and volume management via the OpenStack Cinder volume-driver. XIV RESTful API helps organizations customize their cloud solutions with XIV-native monitoring and provisioning. XIV support for IBM SmartCloud Storage Access enables fully automated self-service storage provisioning and management through a web-based portal.
- **Robust VMware solutions:** A long-term VMware-IBM partnership benefits XIV customers with enhanced performance through out-of-the-box vStorage APIs for Array Integration (VAAI) support; robust disaster recovery via VMware Site Recovery Manager (SRM); and, with IBM Storage Integration Server, IBM-native storage visibility and self-service provisioning via a vSphere Web Client plugin and profile-based storage provisioning and automated storage placement via vSphere APIs for Storage Awareness (VASA). VMware ESXi 5.5 support enables space reclamation benefits.
- **Tight support for Microsoft offerings:** Windows Server 2012 R2 support and certified Windows Server 2012 support 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 management simplicity across applications with heterogeneous workloads such as IBM Lotus® Notes®, Microsoft Exchange, Oracle Solaris, 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); IBM-native storage visibility, self-service storage provisioning, and controlled management by VMware administrators through IBM Storage Integration Server; 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 self-encrypting hard drives (SEDs)
Number of disk drives (min/max)	72/180
Encryption	All disk drives are SEDs. Encryption requires an external key management solution, such as Tivoli Key Lifecycle Manager.
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	Up to 360 GB (24 GB of memory per module)—1 TB, 2 TB or 3 TB capacity points Up to 720 GB (48 GB of memory per module)—4 TB capacity point
Maximum cache-to-disk bandwidth	480 Gbps
Flash caching (optional)	Up to 6 TB (400 GB flash caching per module)—all capacity points Up to 12 TB (800 GB flash caching per module)—4 TB capacity point Note: When XIV encryption is enabled, the data on the flash drives is also encrypted.
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/48 GB per module	Flash caching per system (TB) (optional)	
				1 TB,* 2 TB, 3 TB capacity points (400 GB per module)	4 TB capacity point (400 GB or 800 GB per module)
6	72	6	144/288	2.4	2.4 or 4.8
9	108	9	216/432	3.6	3.6 or 7.2
10	120	10	240/480	4.0	4.0 or 8.0
11	132	11	264/528	4.4	4.4 or 8.8
12	144	12	288/576	4.8	4.8 or 9.6
13	156	13	312/624	5.2	5.2 or 10.4
14	168	14	336/672	5.6	5.6 or 11.2
15	180	15	360/720	6.0	6.0 or 12.0

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	
		Without flash caching	With flash caching
6	72	2.4/2.4/2.5/2.5	2.5/2.5/2.6/2.6
9	108	3.5/3.5/3.7/3.8	3.6/3.6/3.8/3.9
10	120	3.9/3.9/4.1/4.2	4.0/4.0/4.2/4.3
11	132	4.2/4.2/4.4/4.5	4.3/4.3/4.5/4.6
12	144	4.6/4.6/4.8/4.9	4.7/4.7/4.9/5.0
13	156	4.9/4.9/5.2/5.3	5.0/5.0/5.3/5.4
14	168	5.3/5.3/5.5/5.6	5.5/5.5/5.7/5.8
15	180	5.6/5.6/5.9/6.0	5.8/5.8/6.1/6.2

* System utilizing 1 TB per disk capacity

For more information

To learn more about 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
- 2013 Microsoft ESRP benchmark results
- IBM XIV customer reference videos and case studies
- IBM Redbooks: XIV Storage System: Architecture, Implementation, and Usage
- IBM Redbooks: XIV Storage System: IBM Hyper-Scale Mobility and Usage
- IBM Redbooks: XIV Storage System in a VMware Environment
- IBM Redbooks: XIV Storage System: Host Attachment and Interoperability
- IBM Redbooks: 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

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