The IBM XIV Storage System is a high-end flash optimized, fully scalable enterprise disk storage system that is based on a grid of standard, off-the-shelf hardware components. The enterprise-class business enabler is wrapped around self-healing, data protected cloud centric foundation ideal for public, private, or hybrid clouds. XIV’s cloud economics provide world-class business continuity for applications requiring zero tolerance downtime. Its predictable, consistent, high performance design allow organizations to take control of their storage, and gain business insights from their data. The architecture of the system is designed to deliver performance, scalability, and ease of management while harnessing the high capacity and cost benefits of Serial attached SCSI (SAS) drives. Figure 1 shows the front view of the XIV Gen3 system.

Figure 1 - XIV Storage System Gen3
Did you know?

- IBM XIV has one of the fastest rebuild times in the storage industry.
- IBM XIV has all functions and features included and supporting software at no extra cost, such as remote mirroring, snapshots, encryption and VMware integration.
- IBM XIV Gen3 Model 214 offers industry-standard data at rest encryption while avoiding performance impact with self-encrypting drives (SED). Encryption can be turned on non-disruptively at any time.
- IBM XIV self-optimizes automatically upon changes in the hardware configuration, such as the addition of modules or replacement of modules upon failure.
- Capacity on Demand (CoD) configurations of XIV Storage Systems are available to provide a method to quickly provision new physical storage and can be ordered at any of the valid partially populated capacities.

Product highlights

IBM XIV Storage System is designed to be a scalable enterprise storage system based upon a grid array of hardware components.

- IBM XIV Storage System series is an innovative, high-end, open disk system series designed to support business requirements for a highly available information infrastructure. XIV architecture is a grid of standard Intel and Linux™ components connected in any-to-any topology. This architecture is designed to support enterprise-class reliability, performance, scalability, and energy efficiency.

Core features

Inherent to its design, XIV features:

- **Workload balancing** - The workload is evenly distributed over all hardware components at all times. All disks and modules are used equally, regardless of access patterns. Pseudo-random distribution ensures consistent load-balancing even after adding, deleting, or resizing volumes, as well as adding or removing hardware. This balancing of all data on all system components eliminates the possibility of a hotspot being created.

- **True virtualization** - Unlike other system architectures, storage virtualization is inherent to the basic principles of the XIV Storage System design. Physical drives and their locations are hidden from the user, which dramatically simplifies storage configuration. The automatic layout maximizes the system’s performance by using system resources for each volume, regardless of the user's access patterns. With the XIV, you no longer decide or plan which type of data protection to use for storing data or plan how many drives you need to dedicate for a specific application. Just allocate the needed storage capacity and the system does the rest. Storage administrators can to respond to growing storage needs in minutes instead of hours or days with traditional storage systems.

- **Ease of management** - Ease of management that goes below the surface, with a virtualized architecture, highly intuitive GUI, and clever implementation of role based management all add up to create a streamlined user experience with less administration.

- **Fast rebuild** - The XIV rebuild times are extremely fast due to the fact that it keeps track of what blocks contain data and only rebuilds these blocks. This approach results in rebuild times of less than an hour for a 6 TB drive failure, when the XIV is 100% utilized.

Storage efficiency

The following XIV characteristics contribute to storage efficiency

- **Efficient capacity usage** - Capacity utilization functionality, including space-reclamation for virtualized
environments, space-efficient snapshots, and advanced thin provisioning, helps support savings in capacity and cost with less administration requirements.

- **High-density storage** - Enterprise-class, high density SAS disk drives create increased physical space efficiencies. Using 6 TB drives, XIV Gen3 provides up to 485 TB usable capacity in a single rack. The ability to store so much data in one system using fewer, large capacity drives, as well as the use of multi-core processors, can help to reduce power and cooling expenses for a more energy efficient solution.

**Ready for the Cloud**

IBM XIV Cloud Storage for Service Providers, or client hosted cloud solutions require elastic, rapid response, and dynamic demand that is captured within XIV’s 485 TB linear scalability, and the immediate and automatic redistribution, without interruption, of added capacity. The grid design stripes data across all modules and disks, incorporating data redundancy for consistent and predictable I/O performance that is always load balanced.

IBM XIV is prepared for the cloud with VMware and OpenStack.

- IBM XIV and VMware vCloud Suite Integration. This functionality is available to all XIV releases through the IBM Storage Integration Server v1.5. It is free of charge and enables VMware APIs for Storage Awareness (VASA), VMware vSphere Web Client, vCenter Orchestrator (vCO), vCenter Operations Manager (vCOPs), and VMware vCloud Automation Center (vCAC). VMware Virtual Volumes (VVol) which is designed to enable upcoming VMware vSphere environments to easily automate XIV provisioning, offload snapshots and cloning, and instantly reclaim space. The IBM Storage Integration Server delivers a range of IBM storage integration services in cloud based architectures providing provisioning, automation, and monitoring, see the IBM Redpaper, IBM XIV Storage System in a VMware Environment, REDP-4965.

- IBM XIV can automate storage discovery and provisioning in OpenStack environments using OpenStack Cinder integration, to manage the cloud in an easier way we recommend to deploy the IBM Cloud Manager, see the IBM Redpaper, Using the IBM XIV Storage System in OpenStack Cloud Environments, REDP-4971.

- IBM XIV can automate custom storage operation using the XIV RESTful API, see the IBM Redpaper, RESTful API Support in XIV, REDP-5064.

- IBM XIV multi-tenancy allows secure isolation into domains of XIV storage resources among numerous tenants, with the ability of setting different quality of service (QoS) levels per domain. It enables the division of storage system administration tasks into logical domains, using role-based permissions. It also enables rapid deployments while minimizing the need for extensive planning, tuning or field-upgrades.

- IBM XIV scales cloud storage capacity and performance linearly and can manage up to 144 frames using IBM Hyper-Scale

- The XIV Cloud Storage for Service Providers product further empowers users with the flexibility to combine a robust set of base functions with license-per-need features. The ability to pay for functionality when it is required enables cloud providers to tailor services to customer needs even more cost-effectively.

**Security and Encryption**

IBM XIV storage system addresses the data-at-rest encryption demands.

- **Self-encrypting drives** - IBM XIV Gen3 Model 214 offers industry-standard data at rest encryption at no extra cost, while avoiding performance impact with self-encrypting drives (SED). IBM Security Key
Lifecycle Manager (ISKLM) is used to manage the security keys. All SAS-SED drives can turn on encryption non-disruptively at any time. For details about encryption with XIV, see the IBM Redpaper, XIV Security with Data-at-Rest Encryption, REDP-5047.

- **Payment Card Industry Data Security Standard (PCI DSS)** - Security enhancements including auditing of user actions and user interface locking after a pre-defined period of idle time, allow XIV to meet requirements imposed by the Payment Card Industry Data Security Standards (PCI-DSS).

**Management**

The highly intuitive XIV GUI and built-in management tools make administrative tasks easy and efficient, with little training or expertise required, from provisioning volumes to monitoring multiple systems. Figure 2 on page 6 is an example of a System view with a module pullout in the XIV GUI.

![Figure 2 - XIV GUI System view](image)

- The IBM XIV Storage Management GUI acts as the management console for the storage system. A simple and intuitive GUI enables storage administrators to manage and monitor all system aspects easily, with almost no learning curve.
- The XIV TOP application allows the user to view and monitor performance information for defined volumes and hosts in real time. It can be launched independently or from within the XIV GUI.
- The XCLI is a comprehensive command-line interface that allows the user to configure and monitor the XIV Storage System. All the functions available in the XIV GUI are also available in the XCLI. It can be used in a shell environment for interactive commands or as part of a script to perform lengthy or complex tasks.
Performance statistics can be monitored through the XIV GUI and XCLI at any time. Monitoring through the XIV GUI is easily done by selecting specific filters. The XIV GUI will then display the requested data as shown in Figure 3.

![Figure 3 - Statistics monitor view in XIV GUI](image)

The XIV Mobile Dashboard, supported on Apple iOS and Android smart phones and tablets and is available free of charge from the specific application store. The mobile dashboard gives the user another way to monitor performance and capacity as well as receiving alert notifications from the XIV Storage System. Figure 4 shows an example of the XIV Mobile Dashboard screen.

![Figure 4 - XIV Mobile Dashboard](image)

SMI-S 1.6 latest protocol certification helps build dynamic, scalable, secure Microsoft-based cloud storage infrastructures with out-of-the-box integration with Microsoft System Center Virtual Machine Manager 2012.
IBM Hyper-Scale

IBM Hyper-Scale is a family of growing technologies around an innovative approach to storage scalability. IBM Hyper-Scale includes the following features:

- **Hyper-Scale Manager** - reduces operational complexity and enhances capacity planning through integrated management for large and multi-site XIV deployments. It enables the XIV GUI to access and operate on multiple XIV systems concurrently. It also provides support for the RESTful application programming interface (API). The Hyper-Scale Manager runs on a single instance of a virtual machine server or on several servers. Figure 5 illustrates how the Hyper-Scale Manager allows a storage administrator to work with volumes from multiple systems, in this case to create cross systems snapshots.

![Hyper-Scale Manager](image)

Figure 5 - Hyper-Scale Manager

- **Hyper-Scale Mobility** - a powerful function that allows the user to move volumes between storage systems transparently, with no disruption to host applications. It is only available with Gen3 systems.

- **Hyper-Scale Consistency** - Cross system consistency (or snapshot) groups enables a coordinated creation of snapshots for inter-dependent consistency groups on multiple systems. This feature is available only through the IBM Hyper-Scale Manager.

**Business Continuity**

The XIV Storage System provides a rich set of copy services functions suited for various data protection scenarios, and enables clients to enhance their business continuance and data migration capabilities.

- Synchronous mirroring is a data replication solution to use between two storage systems and which achieves a recovery point objective (RPO) of zero with a distance of less than 100 km. In synchronous mirroring, a host write operation is completed on both the local and remote sites before an acknowledgement is returned to the host. Synchronous mirroring ensures local and remote always have the same copy of data for a zero RPO.

- Asynchronous mirroring is designed for a non-zero RPO at greater distances. Consistent sets of data are copied to the remote location at predefined intervals while the host writes are acknowledged after they are written on the local site.

- Three-site (or 3-way) mirroring is a star topology multi-target disaster recovery solution. It utilizes proven, efficient XIV technology with synchronous and asynchronous mirroring. This is only available with Gen3 systems.
- XIV data migration is a seamless data transfer tool for migrating data from another source system by simulating host behavior. It synchronizes data between the two storage systems using transparent copying to the XIV Storage System as a background process. It requires only a short outage on the host side to switch LUN ownership to the XIV and begin the migration process.

**Scalability and Performance**

XIV Storage System is a scalable enterprise storage system based on a grid array of hardware components. The architecture offers the highest performance through maximized and balanced utilization of all disks, distributed cache implementation, and exceptional performance characteristics.

- Massive parallelism - With the grid architecture, the system ensures full usage of all system components. All volumes are spread across all spindles in the system. The system harnesses all storage capacity and all internal bandwidth, and it takes advantage of all available processing power for host-initiated I/O activity and system-initiated activity, such as rebuild processes and snapshot generation.

- Processing power - The XIV Storage System open architecture uses the latest processor technologies and is more scalable than solutions that are based on a closed architecture. The XIV Storage System avoids sacrificing the performance of one volume over another, and therefore requires little to no tuning.

- Innovative cache memory - Up to 720 GB of total system cache with flexible and powerful cache implementation allows the XIV system to leverage large slots for reads and pre-fetched data while enabling it to manage a smaller slot size for improved cache management and better performance.

- Flash Cache (optional) - For ultra-high performance needs, XIV Gen3 optionally offers up to 12 TB of management-free Flash Caching available to all system data. The flash caching option can be installed non-disruptively, and can provide up to a 90% reduction in I/O latency for random read workloads. Operating with advanced flash algorithms, the latest XIV Gen3 components help meet requirements for extremely high performance workloads.

- Enhanced connectivity - IBM XIV Gen3 offers multiple active/active IO interfaces with improved host connectivity with up to twenty-four 8 Gb FC ports and up to twelve 10 Gb Ethernet ports or twenty-two 1 Gb Ethernet ports for connecting to iSCSI-attached hosts.

**Availability and Serviceability**

The IBM XIV Storage System maximizes continuous operation and minimizes the performance degradation associated with none disruptive planned and unplanned events, while providing the capability to preserve the data in case of a disaster.

- Self-healing and self-tuning - Disk failure is taken care of by an efficient rebuild process that brings the system back to full redundancy in minutes. In addition, the IBM XIV Storage System extends the self-healing concept, resuming redundancy even after failures in components other than disks, or upon changes in the hardware configuration, such as the addition of modules.

- The rapid restoration of redundant data across all available drives and modules in the system during hardware failures, and the automatic redistribution of data across all newly installed hardware, are fundamental characteristics of the IBM XIV Storage System architecture.

- IBM XIV Storage System dynamically maintains the pseudo-random distribution of data across all modules and disks while ensuring that two copies of data exist at all times when the system reports Full Redundancy. When a disk drive or a module fails, the XIV data distribution algorithms automatically identify the non-redundant partitions and then begins to makes copies of just those non-redundant partitions and places this data in reserved areas of the disk drives that exist for just
this circumstance.

- Non-Disruptive Code Load (NDCL) enables upgrades to the XIV Storage System software from a current version to a later version without disrupting the application service.

- The provision within the XIV Storage System to efficiently and flexibly create snapshots, coupled with the ability to define consistency groups of volumes, constitutes integral elements of the data preservation strategy. In addition, the XIV Storage System data mirroring functionality facilitates excellent potential recovery point and recovery time objectives as a central element of the full disaster recovery plan.

**Architecture and key components**

The XIV Storage System is comprised of various physical components...

- IBM XIV storage system is delivered in a standard IBM T42 rack, fully cabled for 15 modules, even if a partially populated rack is ordered.

- The hardware of the Interface Modules [1] and Data Modules [2] in the IBM XIV Storage SystemGen3 is based on an Intel server platform optimized for data storage.

- A patch panel [3] at the rear of the rack is used for connecting the XIV Storage System to the customer’s network. The Fibre Channel ports on the Interface Modules are connected to the patch panel using 50-micron cables. All external connections must be made through the patch panel. In addition to the host connections and to the network connections, more ports are available on the patch panel for service connections.[4]

- An Automatic Transfer Switch (ATS) [5] allows the XIV Storage System to attach to two independent power sources, to protect against loss of customer utility power. If there is an external power failure, the ATS automatically transfers the load to the redundant power supply.

- The XIV Storage System has three internal Uninterruptible Power Supplies (UPSs) [6], these are used as cache batteries, so the data in cache always will be written down to disk, incase of a power outage. Two of these UPSs is enough to maintain cache battery power availability. This redundant design is n+1, because the XIV Storage System has one redundant UPS. The UPS complex has enough battery reserves to sustain two emergency power shutdowns.

- The 1U Maintenance Module [7] and the modem, which are installed in the middle of the rack, are used for XIV Storage System support and for the IBM personnel to maintain and repair the system. This device is only used to gain remote access to the XIV System through the modem for support personnel.

- The XIV Storage System utilizes redundant Infiniband switches [8] for communications between the interface and data modules. Each InfiniBand switch contains 36 ports that have 40-Gbps full bidirectional bandwidth per port. The switches are powered by redundant power supplies and fan modules to eliminate any single point of failure.
Figure 6 illustrates the physical components described above.

Figure 6 - The physical components of an XIV Storage System
Models

The rack specifications for capacity, connectivity, system resources and power usage can be found in Figure 7 on page 12. Note, the specifications differ based upon the number of modules in the system, as well as the size of the disk drives it contains.

<table>
<thead>
<tr>
<th>Total number of modules (Configuration type)</th>
<th>6 partial</th>
<th>9 partial</th>
<th>10 partial</th>
<th>11 partial</th>
<th>12 partial</th>
<th>13 partial</th>
<th>14 partial</th>
<th>15 full</th>
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<tr>
<td>Total number of data modules</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Total number of interface modules</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Number of active interface modules</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Interface module 9 state</td>
<td>Disabled</td>
<td>Disabled</td>
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<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Interface module 8 state</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Interface module 7 state</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Interface module 6 state</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Interface module 5 state</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Interface module 4 state</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>FC ports</td>
<td>8</td>
<td>16</td>
<td>16</td>
<td>20</td>
<td>20</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>SCSI ports (1 Gbps - mod 114)</td>
<td>6</td>
<td>14</td>
<td>14</td>
<td>18</td>
<td>18</td>
<td>22</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>SCSI ports (10 Gbps - mod 214)</td>
<td>4</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Number of disks</td>
<td>72</td>
<td>108</td>
<td>120</td>
<td>132</td>
<td>144</td>
<td>156</td>
<td>168</td>
<td>180</td>
</tr>
<tr>
<td>Usable capacity (1 / 2 / 3 / 4 / 6 TB)</td>
<td>28 TB</td>
<td>44 TB</td>
<td>51 TB</td>
<td>56 TB</td>
<td>63 TB</td>
<td>67 TB</td>
<td>75 TB</td>
<td>81 TB</td>
</tr>
<tr>
<td></td>
<td>55 TB</td>
<td>88 TB</td>
<td>102 TB</td>
<td>111 TB</td>
<td>125 TB</td>
<td>134 TB</td>
<td>149 TB</td>
<td>161 TB</td>
</tr>
<tr>
<td></td>
<td>84 TB</td>
<td>132 TB</td>
<td>154 TB</td>
<td>168 TB</td>
<td>190 TB</td>
<td>203 TB</td>
<td>225 TB</td>
<td>243 TB</td>
</tr>
<tr>
<td></td>
<td>112 TB</td>
<td>177 TB</td>
<td>207 TB</td>
<td>225 TB</td>
<td>254 TB</td>
<td>272 TB</td>
<td>301 TB</td>
<td>325 TB</td>
</tr>
<tr>
<td></td>
<td>169 TB</td>
<td>267 TB</td>
<td>311 TB</td>
<td>338 TB</td>
<td>382 TB</td>
<td>409 TB</td>
<td>453 TB</td>
<td>485 TB</td>
</tr>
<tr>
<td># of CPUs (one per Module)</td>
<td>6</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Memory (24 GB per module w 1/2/3 TB)</td>
<td>144 GB</td>
<td>216 GB</td>
<td>240 GB</td>
<td>254 GB</td>
<td>264 GB</td>
<td>288 GB</td>
<td>312 GB</td>
<td>336 GB</td>
</tr>
<tr>
<td>Memory (48 GB per module w 4/6 TB)</td>
<td>288 GB</td>
<td>432 GB</td>
<td>480 GB</td>
<td>528 GB</td>
<td>576 GB</td>
<td>624 GB</td>
<td>672 GB</td>
<td>720 GB</td>
</tr>
<tr>
<td>Flash Cache (Optional for 1, 2, 3, 4, 6 TB XIVs)</td>
<td>400 GB</td>
<td>4.2 TB</td>
<td>4.4 TB</td>
<td>4.8 TB</td>
<td>5.2 TB</td>
<td>5.6 TB</td>
<td>6.0 TB</td>
<td></td>
</tr>
<tr>
<td>Flash Cache (Optional for 4, 6 TB XIVs)</td>
<td>800 GB</td>
<td>4.8 TB</td>
<td>7.2 TB</td>
<td>8.0 TB</td>
<td>8.8 TB</td>
<td>9.2 TB</td>
<td>10.4 TB</td>
<td>11.2 TB</td>
</tr>
<tr>
<td>Power (kVA) - Gen3.2 / SSD</td>
<td>2.4 / 2.6</td>
<td>3.5 / 3.8</td>
<td>3.9 / 4.2</td>
<td>4.2 / 4.5</td>
<td>4.6 / 4.9</td>
<td>4.9 / 5.3</td>
<td>5.3 / 5.7</td>
<td>5.6 / 6.1</td>
</tr>
</tbody>
</table>

Figure 7 - XIV Gen3 Rack Configuration

Some of the configurations shown above include:

- Partially populated configurations of 6, 9, 10, 11, 12, 13, or 14 modules, allowing for more granularity of capacity options. Modules can be added as capacity needs increase up to 15 modules. For these configurations some of the interface modules are not available. Those are indicated as *disabled* in Figure 7.

- A fully populated rack contains 9 data modules and 6 interface modules for a total of 15 modules. The
total usable capacity is 161 TB for a complete system when equipped with 2 TB drives, 243 TB of usable capacity when fully populated with 3 TB drives, 325TB of usable capacity when fully populated with 4 TB drives and 485 TB of usable capacity when fully populated with 6 TB.

- Fully and partially populated systems can be configured with either 1 or 10 Gbps iSCSI ports. The number of ports available for the 1 Gbps option ranges from 6-22. The number of 10 Gbps ports ranges from 4-12 per system.

- Memory options available for fully and partially populated systems in 24 GB per module for systems configured with 1, 2, or 3 TB drives and 48 GB per module for 4 or 6 TB drives.
Specifications

IBM XIV environment and specifications is made for an effective Total Cost of Ownership (TCO). Figure 8 on page 13 lists the detailed specifications for the XIV Storage System.

<table>
<thead>
<tr>
<th>IBM XIV Storage System (Model 2810/2812) – System specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General properties</strong></td>
</tr>
<tr>
<td>Capacity per drive (nearline SAS) 1 TB,* 2 TB, 3 TB, 4 TB or 6 TB self-encrypting hard drives (SEDs)</td>
</tr>
<tr>
<td>Number of disk drives (min/max) 72/180</td>
</tr>
<tr>
<td>Encryption All disk drives are SEDs. Encryption requires an external key management solution, such as IBM Security Key Lifecycle Manager</td>
</tr>
<tr>
<td><strong>Performance features</strong></td>
</tr>
<tr>
<td>Maximum number of CPUs 15 Intel Xeon Processor E5645</td>
</tr>
<tr>
<td>Maximum number of CPU cores 30 physical (180 logical cores with Intel Hyper-Threading technology)</td>
</tr>
<tr>
<td>Maximum memory Up to 360 GB (24 GB of memory per module) – 1 TB,* 2 TB or 3 TB capacity points</td>
</tr>
<tr>
<td>Maximum cache-to-disk bandwidth 480 Gbps</td>
</tr>
<tr>
<td>Flash caching (optional) Up to 6 TB (400 GB flash caching per module) – all capacity points</td>
</tr>
<tr>
<td>Note: When XIV encryption is enabled, the data on the flash drives is also encrypted.</td>
</tr>
<tr>
<td><strong>Connectivity</strong></td>
</tr>
<tr>
<td>Maximum number of ports – Fibre 24 (8 Gbps ports)</td>
</tr>
<tr>
<td><strong>Physical features</strong></td>
</tr>
<tr>
<td>Temperature 10°C - 35°C (50°F - 95°F)</td>
</tr>
<tr>
<td>Altitude (max) 2,134 m/7,000 ft</td>
</tr>
<tr>
<td>Humidity 25% - 80% noncondensing</td>
</tr>
<tr>
<td>Dimensions (height × width × depth) 202 cm × 66 cm × 120 cm (79.53 in. × 25.98 in. × 47.24 in.)</td>
</tr>
<tr>
<td>Maximum weight 1,041.5 kg (2,296 lb)</td>
</tr>
<tr>
<td>Clearance front/rear 120 cm/120 cm (47.24 in./47.24 in.)</td>
</tr>
<tr>
<td>Redundant power feed √</td>
</tr>
<tr>
<td>Input voltage 180 - 264 V ac at 60 A or 30 A (±10%)</td>
</tr>
<tr>
<td><strong>Host connectivity</strong></td>
</tr>
<tr>
<td>Fibre Channel rates 8 Gbps</td>
</tr>
<tr>
<td>SCSI rates 1 Gbps or 10 Gbps</td>
</tr>
<tr>
<td>Capacity-on-demand configurations √</td>
</tr>
<tr>
<td>Warranty 1 and 3 year limited warranty, onsite service, same day 24×7</td>
</tr>
</tbody>
</table>

Figure 8 - IBM XIV Specifications
Options

The XIV Storage System can be purchased with different options. The list below highlights some of these options.

- Flash Cache is an optional feature available for XIV Gen3 systems. The system can be equipped with 400 GB of flash cache for every module. In addition the XIV Gen3 systems with 4 TB or 6TB drives can be equipped with 400 GB or 800 GB flash cache for every module.

- IBM XIV Cloud Storage for Service Providers offers an innovative pay-per-need scalability matrix. The offer empowers cloud providers to cater to tenant requirements with extreme ease, and efficiency through flexible software licensing.

- Advanced system placement is a pay-as-you-go program that lets an organization purchase the XIV Storage System for a fraction of the price upon installation. When the system reaches a predetermined capacity threshold, the client will be charged for the full balance of the system and will be able to acquire the next system for $1. This program is designed for rapidly growing environments.

- Capacity on demand is a program designed to help organizations with less aggressive growth projections. A Gen3 system can be ordered with a certain amount of authorized storage capacity along with extra capacity that is not intended for initial use. The extra capacity will be purchased as needed when allocated to a storage pool.

Warranty info and upgrades

IBM 2812 XIV Storage System Model 214 and IBM 2810 XIV Storage System Model 214 offer a flexible warranty choice for XIV storage. 2812 XIV Model 214 supports a 3-year warranty to complement the 1-year warranty offered by the functionally equivalent, 2810 Model 214.

- Technical Advisors (TA) are available with the initial warranty as well as for an additional fee once the warranty is up. The TA will support the initial install and updates of the XIV Storage System. The TA will also enhance end to end support by being a client advocate to proactively manage problem resolution through the support process for hardware.

- Call home and remote support
  
  - Call home is the capability of the system, when enabled, to send event notifications to the XIV Remote Support Center. This enables proactive and failure notifications to be sent directly to IBM for analysis.
  
  - Remote support enables trained IBM service personnel to connect to the XIV Storage System to analyze a problem, repair it remotely if possible, or assist the onsite IBM SSR.

Related publications and links

For more information, refer to the following resources

- IBM XIV Storage System Gen3 Architecture, Implementation, and Usage, SG24-7659-08
  
  http://www.redbooks.ibm.com/abstracts/sg247659.html

- IBM XIV storage System Business Continuity Functions, SG24-7759

  http://www.redbooks.ibm.com/abstracts/sg247759.html

- IBM XIV Knowledge Center

- IBM XIV Gen3 with IBM System Storage SAN Volume Controller and Storwize V7000, REDP-5063-00
  http://www.redbooks.ibm.com/abstracts/redp5063.html

- IBM XIV Storage System: Host Attachment and Interoperability, SG24-7904-02
  http://www.redbooks.ibm.com/abstracts/sg247904.html

- Solid-State Drive Caching in the IBM XIV Storage System, REDP-4842-00
  http://www.redbooks.ibm.com/abstracts/redp4842.html

- IBM XIV and VMware Synergy with the IBM Storage Integration Server, REDP-5131-00
  http://www.redbooks.ibm.com/redpieces/abstracts/redp5131.html

- XIV Storage System in a VMware Environment, REDP-4965-00

- IBM XIV Security with Data-at-Rest Encryption, REDP-5047-00
  http://www.redbooks.ibm.com/abstracts/redp5047.html

- IBM Hyper-Scale in XIV Storage, REDP-5053-01
  http://www.redbooks.ibm.com/abstracts/redp5053.html

- IBM XIV Storage System: IBM Hyper-Scale Mobility Overview and Usage, REDP-5007-00

- IBM XIV Storage System Thin Provisioning and Space Reclamation, REDP-5001-00
  http://www.redbooks.ibm.com/abstracts/redp5001.html

- Using the IBM XIV Storage System in OpenStack Cloud Environment, REDP-4971-00
  http://www.redbooks.ibm.com/abstracts/redp4971.html

- RESTful API Support in IBM XIV, REDP-5064-00
  http://www.redbooks.ibm.com/abstracts/redp5064.html

- IBM XIV Storage System Multi-Site Mirroring, REDP-5129-00
  http://www.redbooks.ibm.com/abstracts/redp5129.html

- Space Reclamation in IBM XIV with Windows 2012, TIPS1011
  http://www.redbooks.ibm.com/abstracts/tips1011.html

- IBM Hyper-Scale: A powerful new approach to scaling storage management (XIV)
SEN#loaded
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