



# ISE Mirroring

**Exceptional Reliability, Exceptional Availability  
and Continuous Data Access with  
Active-Active Mirroring**

## ISE Mirroring

Data replication comes in many forms: delivered through the application, the hypervisor, storage virtualizers, and the array. Replication provides a number of benefits, including fault-tolerance, high availability, redundancy, portability, and flexibility. When array-based replication is required, ISE Mirroring with ISE-1, ISE-2 or Hyper ISE, delivers.

ISE Mirroring includes options for:

- One of the industry's only active-active replication solutions when using Active-Active Mirroring
- Traditional disaster recovery measures, using active-passive replication with Basic Mirroring
- Volume Migration, enabling movement between different ISE performance tiers and RAID transformation
- Volume Copy, creating clones of production data in order to make test and development easier

ISE Mirroring enables a number of solutions with options to replicate within the same DataPac, between two DataPacs in the same ISE, and between two different ISE Storage Systems. Customers can take advantage of volume portability and maximum availability for their data when combined with the industry-leading resiliency and redundancy of the ISE and ISE Mirroring. ISE Mirroring is easy to use and is a simple way to build in-house, highly resilient IT environments, in a consolidated datacenter footprint, for a fraction of the cost of traditional replication solutions.

ISE Mirroring has been a part of the ISE design from early in the life of the first generation ISE, and it has been an integral part of the service repertoire for data migrations.

## Active-Active Mirroring

As a part of the ISE Mirroring framework, Active-Active Mirroring goes beyond replication technology. It provides the storage industry's only fully active-active replication, requiring no additional server-based software to implement.

Imagine a replication solution that allowed you to:

- Provide read and write access to both mirror copies simultaneously
- Maintain and, at times, improve performance
- Create a continuously available storage solution

Active-Active Mirroring provides all of these benefits and requires no additional software on the host or cluster. Traditional SAN replication solutions often require a coordinated multi-step process to fail operations over to the secondary copy of data, and these procedures must be done in the correct order. Active-Active Mirroring simply uses the system's multipathing drivers to manage load balancing and failover-failback. For example, if each ISE provided four paths to a particular volume, after that volume is set up using Active-Active Mirroring, it will look to the host or cluster as if there are eight paths to the same volume. In the event there is a loss of access to the ISE, it will appear to the host device, as if some of the paths are down, and it will continue to access the data without interruption. When the ISE access is re-established, ISE Mirroring simply resynchronizes the mirror and brings the paths back online.

Feature	Benefit
Active-Active Mirroring	Disaster Tolerance with Continuous Access and Availability
Basic Mirroring	Disaster Recovery
Migration	Portability, RAID Transformation
Copy	Test and Development, Flexibility

## Ease of Use and Enhanced Functionality

ISE Mirroring is easy to use and incorporates a number of value-added features. Based upon the open and RESTful web services called CorteX, ISE Mirror Manager facilitates the set-up and configuration of Active-Active Mirroring, Basic Mirroring, Copy and Migration for ISE-1, ISE-2, and Hyper ISE. When added to the Fibre Channel fabric and zoned together, the ISE Storage Systems will automatically discover each other and generate lists of all the other ISE targets, which will be visible through ISE Mirror Manager. In addition to setting up replication, ISE Mirror Manager fully automates the action of volume migration and copy, so that selecting the volume and the target destination are all that needs to be done. For ISE-2 and Hyper ISE, the initial synchronization of the mirror members will only require that written blocks are synchronized. After mirrors are established, the ISE Storage Systems will automatically resynchronize the mirror members if access between the two is interrupted for any reason. In some cases, the ISE Storage Systems will only need to perform a partial resynchronization. Error correction is also provided by ISE Mirroring and if for any reason the ISE cannot provide the data to be read, it will request the good data blocks from the other mirror member.

## Use Cases:

**Active-Active Mirroring:** Use Active-Active Mirroring and VMware vSphere 5 clusters to create a No-Single-Point-of-Failure shared storage configuration.

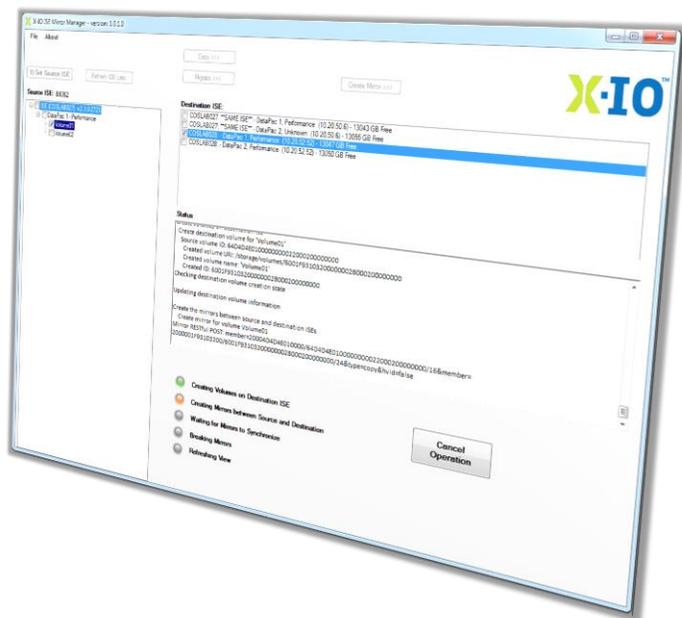
**Basic Mirroring:** Use Basic Mirroring to set up a multi-site disaster recovery solution by replicating all ISE volumes to a standby ISE.

**Migration:** Use Migration to move volumes needing more performance from ISE-2 to Hyper ISE.

**Copy:** Use Copy to create a clone of a SQL Server Database to perform quality tests against.

## Bringing It All Together

- For unparalleled reliability, choose the self-healing ISE
- For superior availability and continuous access to your data, choose ISE Mirroring
- For proactive support, enable Active-Watch



## Connectivity and Compatibility

NOTE: Dedicated Fibre Channel links between sites are required to support distance ISE Mirroring.	Maximum Distance	ISE-2 and Hyper ISE - Up to 40 kilometer for Basic Mirroring, Migration and Copy ISE-1 – Up to 40km
	Maximum Basic Mirrors	120
	Maximum Mirrors with Active-Active Mirroring	16
	Replication Type	Synchronous; Fibre Channel
	Basic Mirror, Migration, Copy Operating Systems Support*	All operating systems supported by ISE-1, ISE-2 and Hyper ISE
	Active-Active Mirroring Operating Systems Support	Supported on ISE-2 and Hyper ISE Clusters: VMware vSphere 5.1, Windows Server 2012 Single Node: Windows and Linux* Split-site: VMware vSphere 5.1 only
	Number of ISE	1 to 1 (both to be licensed); must be same generation of ISE (i.e., ISE-1 is Generation 1. ISE-2 and Hyper ISE are Generation 2)

\* Contact an X-IO sales associate to obtain a listing of the supported operating systems, hypervisors and their versions.



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