



EMC Invista

Making virtual storage a reality for your enterprise

The Big Picture

- Simplify the movement of data across a multi-tiered heterogeneous environment enabling information lifecycle management
- Reduce unplanned or planned outages—increase availability while business applications remain online
- Leverage an open, standards-based approach to work with intelligent switch vendors
- Utilize your storage assets more efficiently, effectively, and economically
- Leverage your entire multi-vendor storage environment to meet today's—and tomorrow's—business demands

Virtualized storage addresses today's IT and business challenges

Enterprise computing environments are larger and more complex than ever. As organizations grow, the demand on IT to deliver on the information requirements of the business grows accordingly. For most organizations, that means constructing complex IT infrastructures that can deliver the right information to the right place at the right time, twenty-four hours a day, seven days a week. Businesses require continuous information availability and are unwilling to endure infrastructure downtime when delivering on the needs of the business.

In addition to unplanned events such as natural and man-made disasters, planned downtime is an IT reality today, accounting for 60 to 75 percent of all downtime. Some of the key reasons for planned downtime are scheduled maintenance, lease roll-overs, technology refreshes, data center migrations/additions, service-level optimizations, and reconfigurations. The cost of downtime to the enterprise can be staggering.

Enterprise-class infrastructures typically include multi-vendor server environments, diverse connectivity technologies, and multi-vendor tiered storage environments. Organizations require the ability to allocate any storage to any application based on the needs of the business, and to do so non-disruptively. Networked storage virtualization enables organizations to deliver the right information at the right performance level and the right functionality to the business at the lowest total cost.

EMC® Invista™ is a solution that enables the virtualization of storage in networked storage environments that dramatically reduces the amount of downtime associated with the movement of data across storage tiers in support of information lifecycle management (ILM) strategies.

Unlike other offerings, EMC Invista places the virtualization intelligence in the network—where that intelligence is applied—and where it does not impact server or application performance. The results: higher application availability, reduced administrative overhead, more effective and efficient use of storage resources, and reduced cost—all leading to greater business value from the advantages of a tiered storage ILM strategy.

EMC Invista overview

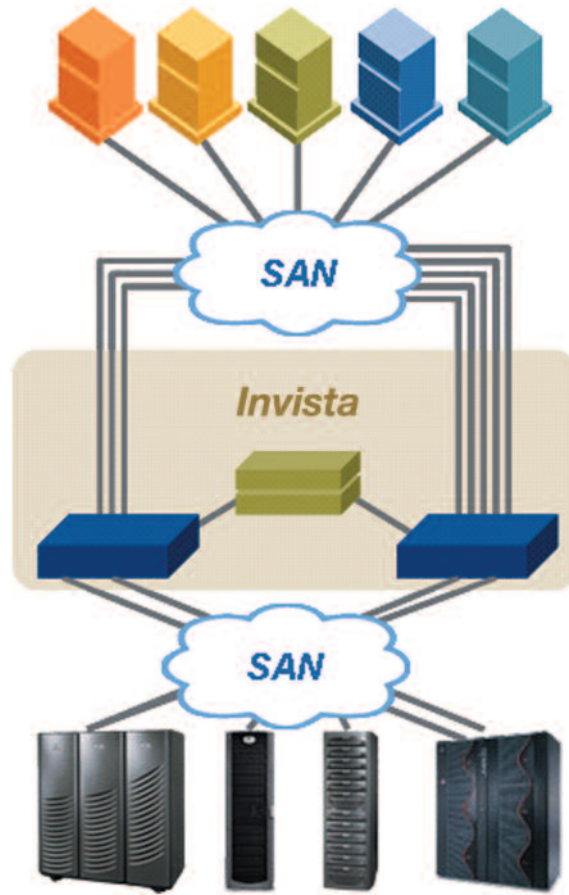
The industry believes it is critical to implement virtualization within an intelligent switch environment in an open, non-proprietary fashion.

EMC Invista leverages intelligent SAN switches for deployment of network-based storage virtualization. Invista takes advantage of additional specialized processing power in the switch to perform the basic operation of virtualization (I/O redirection) at wire speed. The intelligent switch is a high-performance platform that can be incorporated into existing SAN infrastructures.

EMC is an active participant in an industry-wide effort around network-based storage virtualization and has made a key architectural decision to leverage an open, standards-based approach that writes to vendor APIs rather than develop custom code for each supported switch platform. We are working together with our EMC Connectrix®-branded switch partners to give our customers the widest choice of intelligent switches. As a result, EMC customers can rapidly leverage updated hardware from our switch partners as it becomes available.

Deploying Invista involves both hardware and software. Invista software runs on an out-of-band Control Path Cluster (CPC)—a dual-node cluster, which configures and interacts with intelligent switch(es) of the customer's choosing. The intelligent switches may be new switches, or, depending on the switch and vendor, customers may be able to upgrade their existing switches (by adding an intelligent line card).

EMC Invista is managed either via a remote Web-based GUI, command-line interface, or through EMC ControlCenter® software. EMC ControlCenter is EMC's industry-leading family of storage resource and device management software that enables you to simplify and automate tasks such as reporting, planning, and provisioning through a single console, with a consistent information-centric approach.



The illustration presents a simplified look at how EMC Invista might be deployed in a SAN. A new, “intelligent core” is created for the network. In this core are the intelligent switches (which may be switches or directors with intelligent blades, depending on the vendor implementation), the Control Path Cluster (CPC), and metadata storage. The CPC is connected to the intelligent switches.

Hosts can connect directly to the intelligent switches or connect through a standard Layer 2 (non-intelligent) front-end fabric for fan-in (as depicted). Storage arrays can be connected to the intelligent switches directly and/or via a back-end fabric. This implementation is designed to require minimal changes to most standard SAN configurations, making EMC Invista easy to deploy.

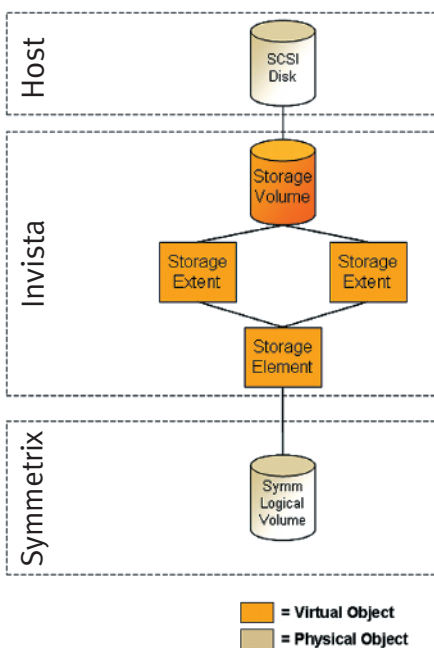
The EMC advantage

EMC’s vast experience in managing the data path and designing high-performance, highly reliable storage controllers makes us uniquely qualified to design, build, and deploy a network-based storage virtualization solution. Since our approach leverages port-level processing in intelligent switches, and is built on a highly scalable architecture, only EMC Invista has the performance and scalability that makes it suitable for deployment in enterprise data centers. Only EMC is developing Invista to run on intelligent switch platforms from all the major switch vendors.

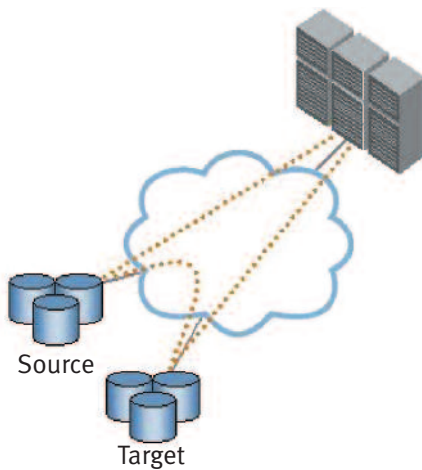
Network-based volume management offers storage management simplicity and efficiency

Network-based volume management is the ability to create and configure Invista storage volumes from a heterogeneous storage pool and present them back to hosts.

Networked storage virtualization solutions can aggregate capacity from many different types of storage arrays. Users choose which volumes from a given array they wish to virtualize and then dedicate that capacity to a storage pool. Individual volumes which then get created and presented to hosts are subsets of the virtualized capacity from these pools. Volume size and structure are completely independent of structural restrictions imposed by the arrays.



The EMC Invista object model is a layered model that abstracts physical objects.



Dynamic volume mobility allows storage administrators to move volumes from one location to another while the application remains online.

Once created, hosts are presented the storage volume (or virtual LUN) from the network. This storage volume appears to a host just like a standard SCSI volume from an array. The core function of network-based volume management is the mapping of the virtual LUN to the corresponding physical storage.

Invista-based volume management reduces the need to deal with individual hosts or to load host-based software. Today, administrators can spend 20 to 30 percent of their time on volume management-related tasks. By centralizing volume management in the network, IT organizations can significantly reduce the amount of time spent on these types of tasks, freeing up resources to focus on other areas that are more critical to the business.

Dynamic volume mobility

Once the foundation of a storage volume with a virtual address is in place, additional high-value services can be layered on top to take advantage of the flexibility that is offered. One such service is dynamic volume mobility. As shown in the figure, dynamic volume mobility allows storage administrators to move volumes from one location to another without application disruption.

Example: Lease Rollover Process

- 1 – Select source array for removal
- 2 – Select target array to move the data to (Data is moved without host impact.)
- 3 – Source array can be safely disconnected (Application remains online.)

To move a storage volume, Invista performs a re-direction of I/O (copy is made in the background) from one physical location to another. Despite the fact that the I/O is physically redirected to a new location, the address of the virtual volume presented to the host never changes. This is accomplished through virtual LUN addressing. This allows the process to be transparent and non-disruptive to the host. Additionally, since Invista does the copy, no host processing cycles are required.

Dynamic volume mobility enables non-disruptive operations

There are a number of very valuable real-world uses for this dynamic volume mobility. These include:

- Lease rollovers or technology refreshes
- Data movement across multi-tiered heterogeneous environments to support the implementation of information lifecycle management strategies
- Data movement to respond to rapidly changing I/O performance needs

Lease rollovers or technology refreshes

One significant challenge organizations have today is getting new arrays deployed in their environments. Migration solutions are complex, manual, and disruptive, making the process labor intensive, complex, and inefficient. Dynamic volume mobility can significantly improve the process.

An organization can bring a new array into the environment and then set a mobility job in motion to copy the data from the source to the new array. All the copying occurs in the background, without host impact or application downtime. Once the copy is complete and consistent, the cutover occurs and I/O is redirected to the new array and the old array can be removed.

Enabling information lifecycle management

A key enabler for ILM, networked storage virtualization allows organizations to leverage the non-disruptive movement of data across different tiers of heterogeneous storage efficiently and quickly. For instance, a communications company has a business requirement to maintain their high-priority call records in the month they are generated on a tier-one storage platform. Once billing occurs, this rarely used data can now be moved non-disruptively to a tier-two platform.

This seamless, heterogeneous information mobility capability, based on dynamic business requirements, is key to support advanced information lifecycle management strategies.

Performance moves

Networked storage virtualization can also facilitate performance moves. A SAN can have both medium- and high-performance storage pools and those pools can be from a mixed variety of vendors. When a storage administrator observes that a volume in the medium-performance pool is not meeting a specified SLA, a job can be set in motion to migrate this volume into the high-performance pool non-disruptively.

Just as in the lease rollover example, a copy is performed in the background with no host impact and no application interruption. Once the copy is complete and consistent, I/O is redirected to the new volume in the high-performance pool. Policy-based automation capabilities delivered by EMC will transparently and automatically optimize the performance of the storage infrastructure in accordance with business requirements.

Network-based local replication increases flexibility across tiered storage infrastructures

Network-based local replication provides additional flexibility and choice. With EMC Invista, businesses can create heterogeneous local point-in-time copies of their production data.

For instance, a business could copy data from their tier-one to their tier-two storage to create an additional copy for backup, data warehousing, or other secondary uses. Since the data is replicated via the network, data can be copied to and from any supported array platform (for example, Hitachi to EMC CLARiiON®). Additionally, businesses can opt to virtualize their storage while still continuing to leverage (no rip and replace) their array-based replication technology such as Symmetrix® Remote Data Facility (SRDF®).

As the industry leader in the replication segment with four times greater market share than our nearest competitor, EMC will continue to innovate and provide a wide range of replication options (array-, network-, or host-based) to meet our customers' business requirements.

As your business requirements grow, EMC Invista will grow with you. Invista's scalability, reliability, and performance are unparalleled and EMC's globally acclaimed service and support ensure you will get the maximum value from your information at the lowest total cost, at every point in its lifecycle.

EMC Services for the IT lifecycle

EMC Services delivers results to our customers throughout the IT lifecycle: plan, build, manage. Strategic storage consulting services from Information Solutions Consulting help companies achieve the maximum value from their information, at the lowest total cost, at every point in the information lifecycle. EMC delivers product-specific point solutions in addition to comprehensive custom planning, design, implementation, and integration services for EMC technology—everything from consolidation of your current resources to a transformation of your environment to achieve information lifecycle management. EMC Customer Service—four-time winner of the SSPA STAR Award for outstanding mission-critical support—helps you keep your information available 24/7 to deliver competitive advantage and drive revenue. And EMC Global Education drives the value of your investment with a comprehensive portfolio of customer courses.

Ask your EMC sales representative about the full spectrum of services from EMC that can benefit your organization.

Take the Next Step

For more information on EMC Invista, the most advanced storage virtualization and dynamic volume mobility solution available today, contact your EMC sales representative. You can also visit our website at www.EMC.com or, in North America, call EMC directly at 1-866-464-7381.



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