



## **Vicom Data Migration Engine**

An Indispensable Tool for Storage Vendors  
and Professional Services Organizations

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## Executive Summary

The biggest single point of resistance to adopting new technology is the painful process of moving away from an incumbent technology. Storage vendors know this well. Whether attempting to unseat a competitor, or helping customers upgrade, move, consolidate, and replace existing storage, the process of migrating data off an old storage array onto a new subsystem is an enormous challenge. Enterprise environments with a heterogeneous mix of application servers, and 24x7 service levels, make scheduling and executing data migration a complex and convoluted task.

Vicom Systems provides a solution for the complexity of data migration. And with this solution, a path for storage vendors into, otherwise closed, competitor accounts.

Supporting live, block-level transfers of data between heterogeneous storage subsystems, the portable Vicom Data Migration Engine (DME) appliance significantly reduces the pain of migration. Simple to introduce and remove from the network, the non-invasive Vicom DME does not use host-based software, requiring only dedicated Fibre Channel (FC) interconnects, between the appliance, host and storage devices. The DME employs synchronous mirroring to migrate data and updates, including those of live databases, between storage devices. The low-impact DME offers complete safe harbor for customer data. Should a problem arise, the appliance can be removed from the environment, swiftly returning to the original end-user configuration.

# The Data Migration Challenge

The complex and labor-intensive task of migrating data between storage arrays is a considerable headache for vendors of storage equipment. Whether migrating customers off older, legacy devices, consolidating around a new storage architecture, or displacing a competitor's product, the variables involved in transferring data between devices are mind-boggling. Enterprise accounts routinely contain a diverse array of application servers, operating systems (OSs), file systems, volume management methodologies, physical device characteristics, and network transport protocols and topologies. This catalog of variables equates to months of planning and hours, if not days, of manually executed data transfer.

## DOWNTIME

The "outage window" has virtually vanished from the vocabulary of enterprise computing operations staff. This period of downtime, traditionally used by administrators to apply maintenance and changes to production servers, has been shrinking as business applications increasingly adopt 24x7 service levels.

Vendors, who were once able to leverage the existence of scheduled outages to migrate data, when installing and upgrading storage equipment, are now placed in an awkward position. Absent a routine downtime window, a special outage must be planned, solely for the purpose of installing new storage. This can be a bitter pill for Information Technology (IT) management to swallow: taking business applications offline is costly. The unfortunate correlation between new equipment installs and loss of access to revenue generating business applications is something storage vendors try hard to avoid.

## INVASIVE MIGRATION SOFTWARE

Migration software, often used to avoid the downtime associated with data transfers, presents another set of challenges. IT administrators, responsible for the day-to-day availability and performance of enterprise application servers, are

understandably hesitant when asked to accommodate new software installs on production hosts.

By necessity, migration software runs deep within the operating environment of an application server, requiring careful installation and removal by the professional services team. The intrusive nature of the software, its potential to destabilize an environment, and its demand for resources from application hosts, each offer red flags to IT administrators.

## HETEROGENEOUS ENTERPRISE ENVIRONMENTS

Gone are the days when a storage vendor's professional services team could rely on data migration involving one big server and its associated storage. Today's enterprise computing environments contain a complex mix of application servers, OSs, storage devices, and networks.

Successfully migrating to a new storage platform requires professional services teams to maintain detailed knowledge of all available enterprise computing configurations, and the interaction among all components. The variety of possible platforms adds tremendous complexity to the data transfer process, increasing the elapse time of a project and introducing greater risk.

# Data Transfer Options

The demand for a safe data transfer mechanism has been around since the first disk drive received an upgrade. And, while choices for the professional services organizations have expanded, the process is still surprisingly manually intensive and complex.

## TAPE DUMP

The traditional path to migration, a tape dump involves manually taking a point-in-time copy of data, and storing it on a staging medium. After installing new storage equipment, the tape data is restored. Conceptually simple, this process has one significant flaw: downtime.

In order to maintain data consistency, application access to storage must be stopped throughout the dump and restore process. For business applications that can accommodate an outage, this procedure is still the simplest and the most straightforward means of populating a new storage device. However, for those applications with more demanding service levels, a flexible alternative must be sought.

## HOST-BASED SOFTWARE

Host-based data transfer tools address some of the inadequacies of traditional tape dump migration by allowing a degree of application access to data during the copy process. These solutions require installation of software on each server accessing data to be migrated, and often additional host bus adapters (HBAs) to improve migration performance. The software resides on each host server, sitting between the file system and device driver. Application I/Os are captured before leaving the server, and replicated to the new storage array.

Host-based solutions require careful integration with existing production system hardware and software, if smooth operation during the copy process is to be maintained. Once completed, the items added for data migration must be thoroughly de-installed to return customers to the original server and network configuration.

The most significant problem with host-based migration solutions is that they are host-based. IT administrators are understandably cautious about the effects of new hardware and software components on

both production server stability and application performance. And if no direct network interconnects are to be added, the impact of migration traffic on local area networks (LAN) must be considered. Overcoming IT reticence to installing migration software and hardware on the host requires that professional services teams perform extensive planning and testing, and gain a thorough understanding of customer-specific change management procedures. All of this can add days and weeks to the project time line of a data migration.

Host-based migration solutions promise a no-application-outage data transfer process, but require navigation through a minefield of obstacles. Without intricate planning and testing, along with accurate forecasts of a migration's effect on servers and networks, host-based solutions can easily hit snags that sour customer perceptions and risk damaging vendor credibility.

## DEDICATED MIGRATION APPLIANCE

Addressing the shortcomings of host-based methods, the dedicated data migration appliance provides a standalone, off-host approach to the problem of transferring data between storage arrays. Appliance solutions eliminate the need for production server disruption during the data transfer process. As application I/Os pass across the network, they are mirrored to new storage devices. This block-level mirroring simplifies the support of heterogeneous storage subsystem migrations by eliminating the need for involvement in server file systems and OSs.

The low-impact nature of the dedicated migration appliance offers a simple solution to the complexities of fallback planning. In the event of a problem, the appliance can be removed from the environment to return customers to their original configuration.

For professional services teams, the dedicated migration appliance truly represents the holy grail of data migration. With no host components to deploy, the time consuming, costly, and politically sensitive task of installing and licensing hardware and software on customer servers can be avoided. Dedicated appliances can be rolled into a customer account when needed and rolled out when the migration is over.

# Vicom Data Migration Engine (DME)

Developed for use in demanding 24x7 environments, the Vicom DME appliance is a powerful tool for migrating live data between storage arrays. Supporting heterogeneous hosts and storage, the DME eliminates the need for server-based software, significantly reducing the complexity and risk of data migration.

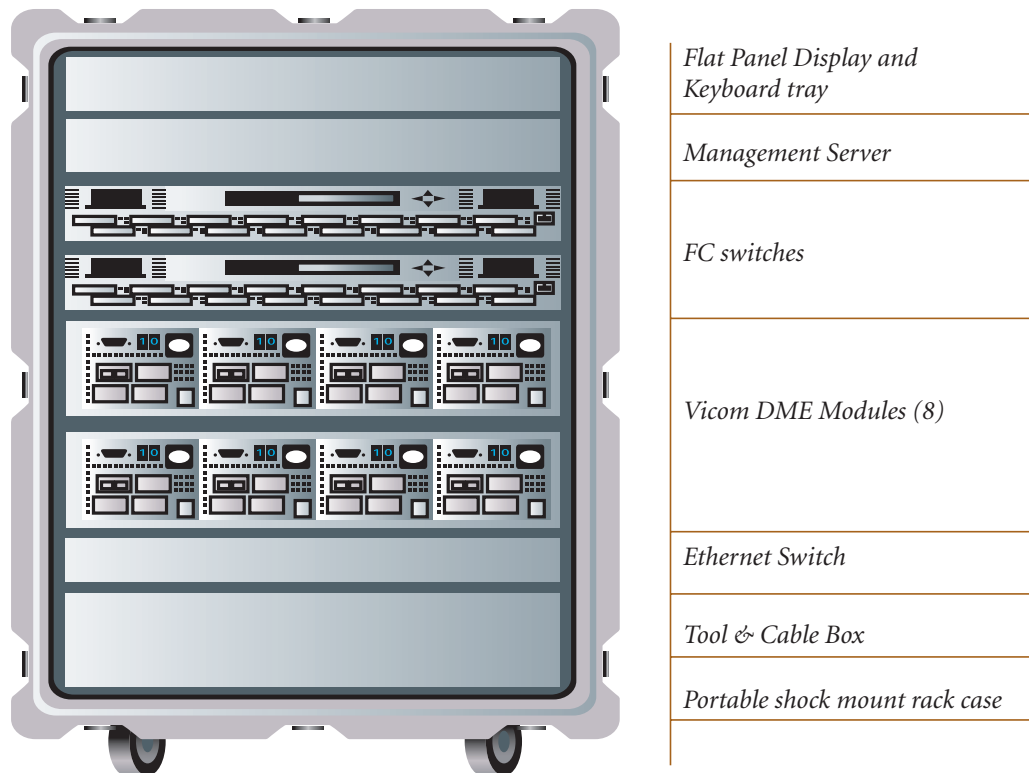


FIGURE 1. SAMPLE VICOM DME RACK CONFIGURATION

## VICOM DME ARCHITECTURE

The mobile, rack-mounted Vicom DME appliance, developed specifically for data migration, is powered by a special-purpose operating system. The appliance, built with expandable, replaceable, and upgradeable components, is configured to load balance across multiple channels, maximizing migration performance and throughput over a FC connection. The product is factory configured for migration, requiring no onsite tuning, and auto-senses host- and device-based LUNs on initial boot. Vicom DME can be tailored to the specific needs of a professional services organization with optional components that include: DME modules, supporting 1-channel per module; FC switches; FC patch panels; a Windows or Unix management host; and disk storage for staging.

Vicom DME supports simultaneous, parallel migrations between heterogeneous storage devices, dramatically reducing migration elapse time and increasing performance. Up to 128 target LUNs are supported by one DME.

Vicom DME provides a command line interface (CLI), for script-based control, and will be available with a graphical user interface (GUI). Both the CLI and GUI are initiated through direct IP connectivity to the management console. No actions on the customer host-server are necessary to configure, manage or monitor data migrations. Scripting support allows professional services organizations to develop fully automated data transfer processing.

Vicom DME migrates data between devices using block-level mirroring. No changes are made to host data and, in the event of a need to fallback to pre-migration configurations, the DME can simply be removed from the environment with no residual impact on either host servers or storage.

## LIVE DATA MIGRATION

Vicom DME eliminates the requirement for application downtime during data migration. Utilizing synchronous mirroring techniques, data and live updates are copied between storage devices without impacting host application I/O performance. Once complete, mirror copies are separated transparently, allowing all application I/Os to flow directly to the new storage device. At no point are end-users ever aware that data is being migrated.

Vicom DME supports multiple and simultaneous data transfers for increased copy performance and reduced migration elapse time. The simultaneous transfer facility can also create duplicate target copies, guaranteeing that high-availability configurations are maintained throughout the cutover to a new storage device.

## NO HOST FOOTPRINT

The standalone Vicom DME appliance dramatically simplifies the data migration process by eliminating the need for host-based software. Each Vicom DME appliance is capable of migrating data from many hosts, significantly reducing both the overhead of data transfers on application servers, and the software licensing costs.

No more invasive than an FC switch, Vicom DME requires only dedicated interconnects between the appliance, servers and storage to complete data transfers. Professional service teams configure, initiate and monitor migration tasks for multiple hosts from a single management interface at the DME.

### HETEROGENEOUS MIGRATION

Performing block-level transfers of data, Vicom DME offers support for heterogeneous host servers and storage devices. This liberates professional services teams from the complexity of cross-vendor migrations, and the time consuming intricacies of each individual host OS and file system.

### REDUCED COMPLEXITY AND RISK

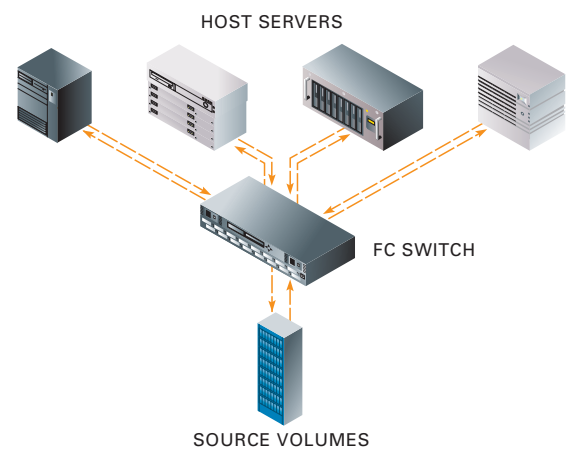
Migration of data using Vicom DME is a straightforward process. After connecting the appliance to hosts and storage, a direct, block-level copy is made between source and target LUNs over the dedicated FC network. Once the copy is complete, mirror pairs are split, and LUN maps are transferred between the source and target devices. As with any mirroring scenario, updates during the synchronization process are written to both sides of the mirror, allowing migration to continue with concurrent live access from business applications.

### PROACTIVE MONITORING

Vicom DME eases the administrative burden on professional services teams with auto-detection of host- and device-side volume configurations, and proactive monitoring of migration progress. Event-based alerts, configured through the DME management interface, signal data transfer successes and problems to professional services teams.

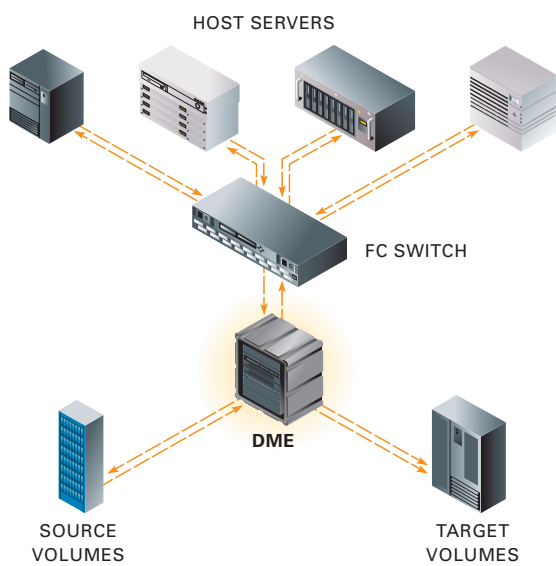
### STEP-BY-STEP SIMPLIFICATION OF DATA TRANSFERS

Migration of data using Vicom DME is performed independently of host systems. The migration process begins with the introduction of the new storage subsystem and DME rack into the environment.



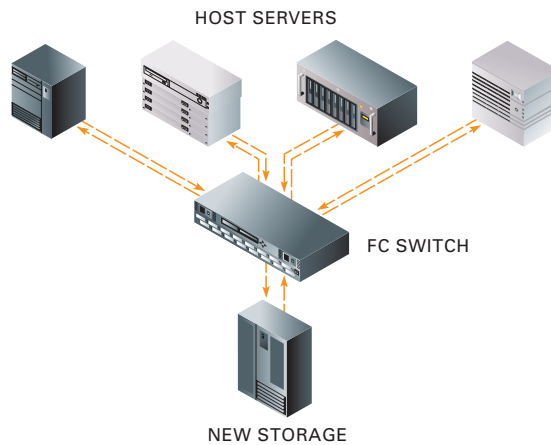
**FIGURE 2. PRE-DATA MIGRATION CONFIGURATION.**

With no host agents or licenses, the factory configured Vicom DME is easily installed and removed.



**FIGURE 3. VICOM DME MIGRATION CONFIGURATION.**

Once the DME and target storage are cabled into the stack, automated processes running on the DME discover existing host- and device-side LUN configurations. This information is then used as input to the DME mirroring process.



**FIGURE 4. POST-MIGRATION CONFIGURATION.**

Creating mirrored LUN copies on the target storage array is a simple, single step procedure. Once initiated, the DME begins synchronizing LUNs immediately. After the synchronization is complete, the mirrored LUN pairs can be split, leaving the LUNs on the target storage device mapped to the application host. The old storage subsystem and DME components can then be removed.

## Conclusion

Data migration remains a complex and problematic process, resisting attempts at total automation. Just as each enterprise computing environment is unique, each migration task is unique, presenting problems for storage vendor professional services organizations. A solid toolkit of tried and tested products and procedures that can be tailored to address the needs of any migration project, no matter how complicated, is imperative. The Vicom DME appliance is an essential component of the data migration toolkit.

Solving the problem of end-user downtime during the data transfer process, Vicom DME also offers the heterogeneous support to adapt to any situation that a professional service team could encounter. Offering safe-harbor guarantees, Vicom DME assures complete safety of customer data. Vicom DME has no host-footprint, eliminating the need for host licensed software, and can be quickly introduced into a customer environment for a migration project and then seamlessly removed once migration is complete.

Vicom Systems, Inc. is in a unique position to deliver on the promise of data migration solutions. With years of experience delivering OEM storage solutions to major systems vendors, Vicom has the domain expertise, support structures and track record to ensure success in managing business critical data migration.



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