

# HP EVA to 3PAR Online Import for EVA-to-3PAR StoreServ Migration

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## Introduction

There are many events that can trigger the need for a data migration. Some datacenters do migrations on a weekly basis. A technology refresh, server and/or storage consolidation, infrastructure relocation, data classifications are all events that could cause a need for a data migration.

The process of moving data to another location and then redirecting the I/O requests of that data to the new location can be a disruptive process to those using that data in production. This can therefore negatively impact a company financially with possible extended or unexpected downtime, performance issues, compatibility issues, and data corruption or loss. The best way to avoid these issues is to have a reliable, repeatable and consistent migration plan. Since a great number of storage systems today are purchased to store existing data, getting these new storage systems ready for production requires detailed planning to move data from its current location (source) to the new location (destination) to mitigate risk.

There are certain attributes to look for when searching for the right host based migration software. These include:

- The ability to rollback the migration
- Migrate unlike storage systems/devices
- A light weight process that can stay installed for future use
- A choice of thick or thin provisioning as part of the migration

HP EVA to 3PAR Online Import, orchestrated through HP EVA Command View and powered by HP 3PAR Peer Motion in HP 3PAR OS, meets the above attributes. HP Storage has come up with a way to do efficient migrations from EVA-to-3PAR StoreServ. Online Import Software coordinates a choice of an offline, online, or minimally disruptive movement of data from an EVA source system to a 3PAR StoreServ destination system. Thick or thin provisioning decisions can be made as part of the migration to the 3PAR StoreServ. In virtualized environments, VMware Storage vMotion or Microsoft Hyper-V Live migration are very convenient features to use when moving smaller amounts of data. If the purpose is to move large amounts of data, host based migration tools and features can negatively impact performance on the host. HP EVA to 3PAR Online Import is a direct data migration from the EVA to the 3PAR StorageServ storage system without the need of host resources in the actual migration of the data.

Evaluator Group assessed the HP EVA to 3PAR Online Import with HP in October 2012. This report outlines:

- The validation process used
- Documents an overview of the migration environment, and
- Discusses the two HP 3PAR Online Import migrations with HP 3PAR Online Import, a host migration and a virtual disk migration



**Figure 1:** EVA-to-3PAR StoreServ one way migration

## Considerations in planning and performing a migration

The key to a successful data migration is in the planning. In fact planning is the #1 factor in a successful data migration. Planning helps mitigate risk and can shorten the process by determining clear requirements for the data being migrated while staying focused on security, availability and recoverability. These requirements may include new service level agreements (SLAs), new expectations for the new storage infrastructure, or change in management costs. There are challenges to consider when planning a data migration. Planning helps define what, how, when and approximately how long it will take to move the data.

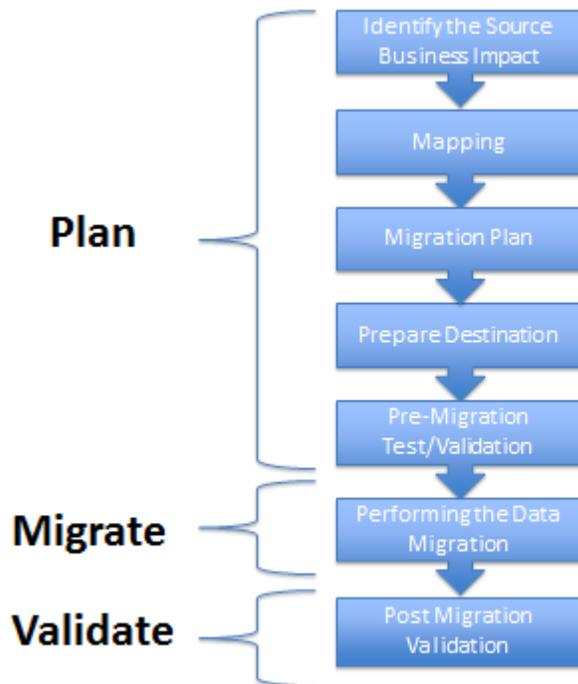
### Several items to consider for IT infrastructure

- Evaluate the connectivity between the source and destination locations for the data migration and determine what steps need to be done to perform the migration
- Understand the current capacity and growth requirements of the data
- Understand the current performance and throughput demands of the data making sure that the new location can handle the level of performance (IOPS) and throughput (MB/sec) and still meet SLAs

- Determine the importance of the data that is being migrated to make sure the appropriate security and availability measures are in place

## Other items to consider with HP EVA to 3PAR Online Import

- RAID level Flexibility – When choosing the destination LUN type in preparation for the data migration, a different RAID level can be chosen for the migration than what is currently used on the source (EVA). The user does not choose RAID level explicitly but can choose a Common Provisioning Group (CPG) that can have different RAID levels.
- Provisioning - There are provisioning options for choosing RAID level and the desired CPG. In addition there is an option to choose “Thin” or “Full” provisioning at the destination.
- Only FC hosts can be migrated.
- Just like most migration tools, there are limits on the number of active migrations going on concurrently before negatively impacting performance. HP recommends that a single host or cluster migrate at time so that the impact of the data migration time can be as short as possible. If all hosts are attempting to migrate their data concurrently, this may negatively impact migration times.
- Understanding the maximum migration size on each storage system is very important in planning what volumes are being migrated. The 3PAR StoreServ supports up to a 16TB volume vs. the EVA, which supports up to 32TB.
- Plan migrations during off-peak hours when possible. While EVA to 3PAR Online Import is designed to be non-intrusive it does take some resources on the source EVA. So picking a time when the source EVA has a lighter load will help minimal disrupting SLAs.
- Local replication sharing relationships on snapshots and mirrorclones will be lost during a migration. Snapshots can be migrated but they will be migrated as normal volumes rather than being associated with a migrated parent.
- There will be a disruption of remote replication. Since there is currently no interoperability between EVA remote replication and 3PAR remote copy replication, remote replication will need to be setup again once the data has been migrated.



**Figure 2:** Process to Plan, Migrate, and Validate a data migration

## Identifying the Source Data and the Business Impact

Sometimes identifying what data to migrate and its physical destination can be a difficult task, especially in large, complex and virtualized infrastructures. Once the data has been identified, an analysis of the business and operation impact of the data migration is crucial to minimizing risk. All parties affected by this data migration must be consulted and their requirements need to be factored into the process. This may entail other IT staff, such as, database, network and systems administrators. Additionally, compliance and security staff may need to define compliance requirements. Finally, the customers that actually use the data need to be consulted to ensure SLAs are minimally impacted.

## Mapping

Determining the location for destination data is important. This will impact the data path and how the data will be moved. This is also an opportunity to consider alternative layouts of the data to optimize performance, throughput, and growth rates.

## Migration Plan

The migration plan must spell out in detail the implementation of the data migration. There are seven main parts to a data migration plan:

1. Business and operational requirements
2. Design requirements
3. Migration checklist/dashboard - Details of the data to be migrated
4. Test plan (including all equipment required, project schedule)
5. Identification of migration tool, migration architecture, and strategy
6. Best practices for both the storage and application(s) being affected
7. Completion criteria, including verification for success

The migration plan should also include dependencies, contingencies and risk; and it should serve as an implementation guide for this data migration process.

## Prepare Destination

The new storage destination needs to be provisioned in preparation. LUNs, volumes, chunklets and so on can be created with the appropriate levels of security, data protection, performance, and throughput requirements.

## Pre-migration Test/Validation

Performing a test run of the data migration is important to surface any issues that may arise during the process so they can be solved BEFORE the actual migration of data. Testing and validating success will determine if this migration is ready to move production data from its source to its new destination. It will also expose whether agreed upon time expectations will or will not be met; if not, either the methodology or the agreed upon timeline will need to be revisited.

To prep for the test run:

- Ensure the appropriate software licenses are installed
- Verify the test plan has been communicated to all parties involved in the data migration effort
- Be ready to customize the migration procedures if needed
- Install and configure the software
- Run the pre-migration test
- Monitor network metrics during the test to ensure other workloads are not being negatively affected, if an online migration is being performed

## Performing the Data Migration

Migration utilities can run either on the host, on the storage or, in some cases, on an appliance depending on the product. Data can be moved in two ways, out-of-band (create a baseline copy and then apply incremental changes) or inband (create a mirror and then break it).

After the pre-migration test has completed and success has been verified, it is time to migrate the targeted production data from its source to its destination and redirect all IO activity to the new destination. Make sure to verify the migration is complete before moving on to validation.

## Validating Success

After the data has been migrated, it is time to validate that the migration was successful and ensure that all data migrated has successfully moved to the new destination. Make sure that file permissions are preserved, directory structures are intact, and database and other applications have been validated. A post-validation test can be created to automate this process. Most IT organizations will create a migration report on the statistics to use as post mortem discussion, historical tracking, and/or a tool to improve the process.

## HP EVA to 3PAR Online Import Migration (EVA-to-3PAR StoreServ)

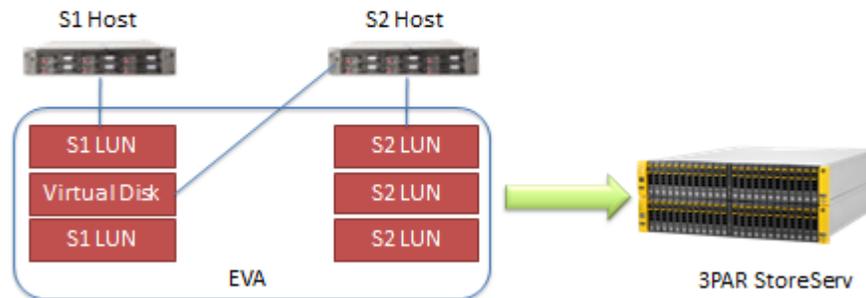
### HP EVA to 3PAR Online Import Migration Types

EVA to 3PAR Online Import operations are initiated by HP Command View to make it convenient to migrate data from an existing EVA to a 3PAR StoreServ array. Online Import supports three types of migration. The following migration types are auto-selected by 3PAR Online Import:

- **Online** – An online migration will be used when migrating all volumes associated with a host or a virtual disk presented to a host. All presentation relationships between hosts and virtual disk being migrated are maintained and are not disrupted during the migration.
- **Offline** – This is ONLY selected when virtual disks are migrated and have no presentations to any host. More migrations can be scheduled and additional migrations will start upon successful completion of current active migrations to minimize negative impacts on migration times.
- **Minimally Disruptive** – For the current release of the product, Command View 10.2 and 3PAR OS 3.1.2, a minimally disruptive migration will be chosen when a Windows host and its associated virtual disks are being migrated online. The host DSM communicating with the EVA must be reconfigured to communicate with the destination 3PAR storage system. The IO is interrupted during the time it takes to reconfigure the host to use Window's MPIO only. This type of migration is also chosen for non-Vmware clusters.

When a host(s) is selected, all FC virtual disk presentations are migrated from the EVA to the 3PAR StoreServ storage system. If a host is sharing a FC virtual disk presentation with another host, that FC virtual disk presentation and all of the other hosts FC virtual disk presentations will be migrated as well.

## HP EVA to 3PAR Online Import



**Figure 3:** Migrate LUNs and all associated virtual Disks

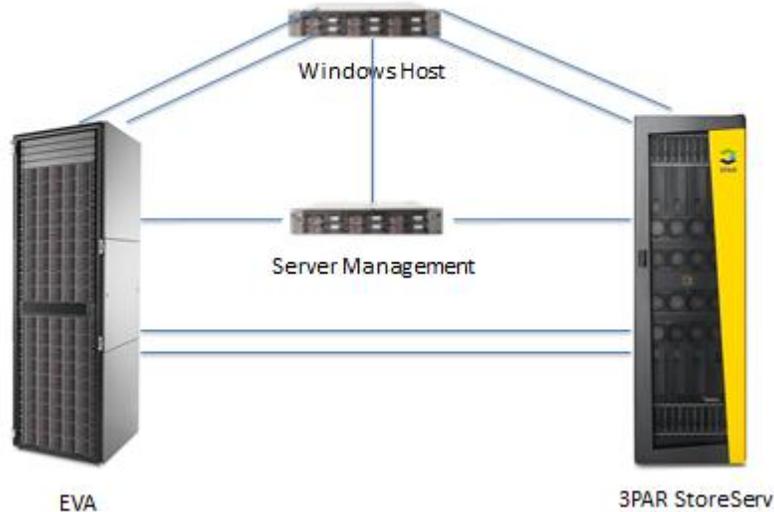
### Configuration

In preparation for the migration test validation we set up a host and its data on an EVA to migrate to a 3PAR StoreServ storage system. The migration was performed with the HP EVA P6000 Command View console. A host migration and a virtual disk migration were performed for this validation.

The following hardware was used:

- HP 3PAR StoreServ 7000 Storage system
- HP EVA
- HP Windows Host

## EVA-to-3PAR StoreServ Migration



**Figure 4:** EVA-to-3PAR StoreServ migration configuration

### Preparing for a minimal disruptive data migration

Following the “HP EVA-to-3PAR Data Migration Guide” there were several items to be completed before performing the migration:

- Upgraded the CV managing the source EVA to CV 10.2 and upgraded the EVA firmware to a supported version of firmware. The 3PAR Online Import showed up as a tab option in the HP P6000 Command View 10.2.
- Verified by all requirements, firmware levels, and restrictions.
- Network and Fabric - Two paths between the EVA and 3PAR StoreServ systems were created and made sure that both storage systems were seen by the host, as shown in Figure 4.
- Zoning – Two zones, with 2 ports each, were created for each EVA to 3PAR path created.
- Configure the Windows host DSM – In this case a Windows host was used for migration and therefore a minimally disruptive migration process was used. The Windows host DSM was changed from an EVA DSM to a 3PAR StoreServ DSM (Windows 2003) or Native DSM (Windows 2008 or 2012). The reason why this is considered minimally disruptive is because this action requires a reboot of the host. This ensures that the windows host is not multipathing between the EVA and 3PAR StoreServ storage systems.

- Identify the EVA source and 3PAR StoreServ destination – In Command View, **Settings** and then **Configuration** were selected all eligible source and destination systems in the management group were listed on the screen for selection. **Add Source** was chosen first and a P6000 EVA was chosen for the source. Then **Add Destination** was chosen and a 3PAR StoreServ storage system was chosen. Then the appropriate information (IP address, user name, password, secure data port, and evet port) was filled in and **Add Destination System** was chosen.

## Performing the Online Import Migration

Evaluator Group with HP personnel followed the “HP EVA-to-3PAR Data Migration Guide” to perform the validation. Once the migration has started it can’t be stopped. The actual migration does not go through the host but the copy begins directly from the EVA to the 3PAR StoreServ as a one-way migration. Even after the migration has been completed and the paths broken the EVA now has a “point-in-time copy” of the data. The reason why this point in time is important is because once writes and updates are performed both the source and destination are in sync. But once the 3PAR StoreServ storage system has completely taken over IO traffic, the EVA and 3PAR StoreServ copies are now out of sync.

### Migrating a host

In Command View under **Storage Systems** we started by choosing the **EVA to 3PAR Online Import** tab. A host was selected and then we selected **Add Migration** to add our migration. We were prompted to select migration source (EVA) and we had to verify our host and virtual disk selections were ready for migration. Then we verified and confirmed our migration destination (3PAR StoreServ).

After setting up the host, the source (EVA), and the destination (3PAR StoreServ), we were ready to set the attributes for the destination’s virtual volume. There are provisioning options that let the user choose any Common Provisioning Group (CPG), which includes a choice of RAID level and thin or full provisioning. For example CPG1(RAID6), CPG2(RAID1) or CPG3(RAID5) as CPG options that can be chosen by the user. There are provisioning options that let us choose the RAID level and Common Provisioning Group (CPG) we desire. At this point you can choose for all the virtual disks to carry the same attributes or not. We then reviewed our choices on in the Summary

In the Host Peer Motion Status Summary page, we observed the progress of the preparation status as it went through the necessary steps preparing for the migration. On completion, we manually unzoned the source EVA from the host. Since we were migrating a Windows host (Windows 2008) we first had to change the EVA DSM to a Native Microsoft DSM and shutdown the host. Once that was complete we chose the start button. A reminder/warning was received about making sure the source EVA had been unzoned from the host and all other conditions had been met before the migration started when we chose **Start Data Transfer**. A progress bar with minute-by-minute updates displayed and we brought the Windows host back online.

## Migrating a virtual disk

When choosing to migrate an individual virtual disk, all hosts and other virtual disks associated with that virtual disk are added implicitly for the migration. An individual virtual disk was chosen and added to the migration using **Add Migration**. The Virtual Disk Selection wizard started with a screen supplying the explicit migration source screen information. Then the source virtual disk was selected and we confirmed the explicit and implicit migration sources. The destination 3PAR storage system was reviewed and confirmed ready for migration.

The destination attributes were set. We chose the configuration **Set Individually** option, chose the **Common Provisioning Group (CPG)** and set the configuration to the same for all associated volumes being migrated. Once we review our migration selections, we added the migration and watched the preparation status until complete. The EVA was then unzoned from the host, the DSM was changed from EVA to the Microsoft native DSM, and then the host was shutdown. **Start** was selected and after reviewing the confirmation screen that appeared, and we confirmed we met all the conditions for a successful migration, we started the migration by clicking **Start Data Transfer**. The Windows host associated with the virtual disk was brought back online.

## Other Migration Tests Performed

**Creating and breaking Paths** – We conducted an experiment to see what happens to a file if the host connected to the source EVA connection is not unzoned and reconfiguring the host DSM is not done. We looked at the storage management window and it showed LUNS from both the EVA and 3PAR StoreServ. We looked at storage admin and it shows LUNs from both hosts. Because the disk signatures are the same we could not tell which LUNs belonged to the EVA and which ones belonged to the 3PAR. Therefore neither the host nor we knew which LUN on which storage system data is being written to.

**Management Locks** (eliminate unwanted changes) – These management locks on the EVA are to prevent volumes from being accessible by the host after they have been migrated to the 3PAR StoreServ. Once a virtual disk is locked, it is not unlocked automatically when the migration is complete. Virtual disks have to be manually unlocked for use once the migration is complete.

## Post Migration

There is a Post Migration Cleanup command in Peer Motion that removes the migration host once the migration is complete. Then unzone the network connections since they are no longer needed between the EVA and the 3PAR StoreServ.

## Summary

Even though data migrations are a common routine in the datacenter, they can cause major disruptions due to performance issues, extended or unexpected downtime that can severely impact time and

money. To minimize these issues, a good repeatable process that plans, designs, migrates, and validates the migration is crucial. Data migration solutions, like HP EVA to 3PAR Online Import, coupled with careful critical planning can help minimize costly issues when data is migrated. Migration products, like HP EVA to 3PAR Online Import that can maintain data availability during the migration without negatively impacting performance are very helpful and are a very efficient way to migrate EVA data to 3PAR StoreServ storage systems with no additional hardware required for the migration. For existing EVA customers looking for a well organized way to migrate their existing data to a new HP 3PAR StoreServ 7000 Storage system, the HP Online Import feature in the 3PAR OS meets the requirements to make data migrations with ease. Online import is included with the HP 3PAR 7000 Operating System Software Suite with rights to migrate data for 180 days. For the 3PAR StoreServ 10000 there is a separate Online Import license that provides the same 180 day migration rights license. With orchestration through EVA Command View, it offers the look and feel of familiar management tools to make data migrations easier. This process is transparent to the host and uses no host resources during migration operations making those resources available for other applications and operations. HP EVA to 3PAR Online Import is the most efficient way to migrate data from a HP EVA to a HP 3PAR StoreServ Storage system.

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