



ISE Media Affinity

Whitepaper

January 2015

Overview

This white paper provides a primer for the Media Affinity functionality that is new with the ISE G2 and G3 platforms and ISE Manager 4.0.4. This document covers the configuration of a Media Affinity volume and also reviews the setup within ISE Manager 4.0.4. A Media Affinity use case is also included in this white paper and covers a VMware Horizon View environment, leveraging pin to flash (media affinity) volumes for VMware Horizon View replica disks.

Media Affinity provides the administrator the ability to create volumes for specific purposes where All-Flash or All-HDD solutions may be preferred by an organization. Those volumes that are not setup with media affinity will still be managed by CADP (Continuous Adaptive Data Placement).

Key takeaway

The use of Media Affinity volumes in ISE should be carefully analyzed by an administrator. While there are good reasons to create All-Flash volumes please note that once allocated the flash will no longer be used for CADP volumes. Our example with VMware Horizon View demonstrates a small amount of flash yields a 20% performance increase in specific administrative tasks. At the same time, linked clones still are still benefiting from flash as they are being managed on CADP volumes.

Prerequisites

The following are prerequisites for leveraging the new Media Affinity features:

1. ISE G3 and firmware version 3.1 or greater
2. ISE G2 and firmware version 2.8 or greater
3. ISE Manager Suite 4.0.4 or greater

A Review of Media Affinity

Flash and HDD Media Affinity provide the administrator an ability to create ISE volumes of either all Flash disks or all HDD disks.

Until the release of ISE G2 2.8 firmware and ISE G3 3.1 firmware, the default configuration of a volume leveraged both Flash and HDD in the Hybrid ISE arrays. To provide the best possible performance for different types of workloads, X-IO technologies developed CADP (Continuous Adaptive Data Placement, <http://xiostorage.com/technology/intelligent-software/>). The ISE CADP software employs a patented cost analysis algorithm to ensure that the hottest data blocks are continuously and dynamically up-tiered to the DataPacs' Flash storage, where those data blocks remain for as long as they are "hot." Every five seconds, the CADP engine determines:

- which new blocks need to be promoted into Flash
- when the Flash space is at full capacity
- which Flash-resident blocks have cooled and can therefore be returned to HDD storage

CADP not only enables acceleration of data movement to Flash but also provides an even access pattern on the HDD, which in turn provides faster seek operations as there is less time spent on hotspots.

Media Affinity provides the administrator the ability to create volumes for specific purposes where all Flash or all HDD solutions may be preferred by an organization. For example, all Flash solutions are frequently leveraged for VDI environments. In linked clone VMware Horizon View deployments, VMware recommends pinning replica disks to Flash. This is a supported configuration proven to improve performance with specific administrative tasks that generate high read I/O, like refresh, recompose, boot storms, and anti-virus scans.

When all Flash Media Affinity is set up in an environment, objects pinned to the Flash will not use CADP. In the VMware Horizon View example above, the replica disks are pinned to Flash. The linked clones are set up on the default volume configuration, leveraging both Flash and HDD and having the workload managed by CADP. In a configuration like this, the replicas are guaranteed the resources needed for the high read I/O. At the same time, CADP is leveraged to manage the day-to-day activity on the linked clones, providing the best possible performance for the virtual desktops on the array.

That is the best in both worlds.

Media Affinity Setup and Configuration

Create and present an all flash volume from ISE Manager Suite 4.0.4

This set of instructions is used to create an All-Flash Media Affinity volume that will be used for VMware Horizon View replica disks. You never have to go the command line or the VMware Virtual Center client. ISE Manager is highly integrated with the VMware Ecosystem. The process from beginning to end is completed with just two wizards in ISE Manager.

Creating an All-Flash Pool

1. In ISE Manager Suite, navigate to the SAN group where the ISE array is located and click Storage Views
2. By default the Flash Quota is 0 GB and 100% is allocated for CADP. The Flash Quota is displayed and modified in GB. Three values will be presented in the Modify Pool screen.
3. To access this screen navigate to **Storage View**, right-click **Storage Pool**, and select **Modify Pool**.

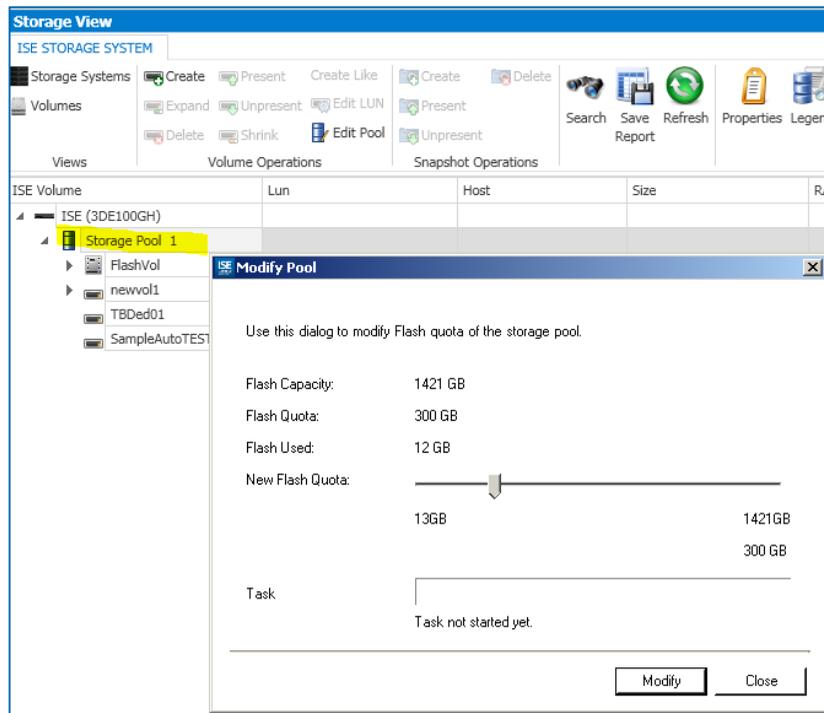


Figure 1 - Modifying the flash quota in ISE Manager

- Flash Capacity: This is the total Flash in the storage pool.
 - Flash Quota: This is the existing Flash Quota that can be pinned in GB. The default is 0.
 - Flash Used: This is the amount of the Flash Quota consumed.
 - New Flash Quota: This sets the Flash Quota. In the screen shot above, the new Flash Quota will extend the existing quota by 300 GB.
4. To make the change, click **Modify**.

Note: If CADP is using 100% of the Flash Capacity and you need to set the Flash Quota, “hot data” residing on Flash will be downgraded to HDD by CADP when the quota is reserved. Before the new Flash Quota is available for use, CADP must complete the downgrade. The amount of time it takes to become available depends on the size of the new quota and the system load.

Creating the Datastore

1. In ISE Manager navigate to **Server View** and select **VMware Ecosystem**.
2. Right-click on the cluster where you want to see the new Datastore created and select **Create Datastore**.
 - a. In the Create Datastore wizard, click **Next**.
 - b. In the *Formatting Options* screen, select the correct format for your environment. In this case, we are selecting VMFS 5.
 - c. Click **Next**.
 - d. In the *Choose Properties for the Datastore*, screen, complete the following fields.
 - Datastore Name: In this case we are naming it `Replica Datastore`.
 - Datastore Size: This is the size of the Datastore as you want it presented to ESXi. In this example, the Flash Quota was set to 300 GB. The actual free space for the Flash Datastore is 300 GB, less the amount consumed on Flash and less the RAID level. In this case we will have RAID 5. On Flash, 12 GB is currently consumed, which results in 229 GB free space for Media Affinity. We will set the Datastore size to 200 GB.
 - Select ISE: From the drop-down menu, select **Manual** and click **Browse**. In the popup screen, the Flash pool shows the quota that was set, used space, and free space. Highlight (by clicking) the Flash pool and then click **OK**.
 - DataPac Type: Select any
 - RAID level: From the drop-down list, RAID 1 and RAID 5 are available. RAID 1 will provide the best performance, though internal tests at X-IO found RAID 5 was not far off from the RAID 1 performance rating.
 - Affinity: Select Pinned to Flash
 - Multipath Policy: Select Round Robin

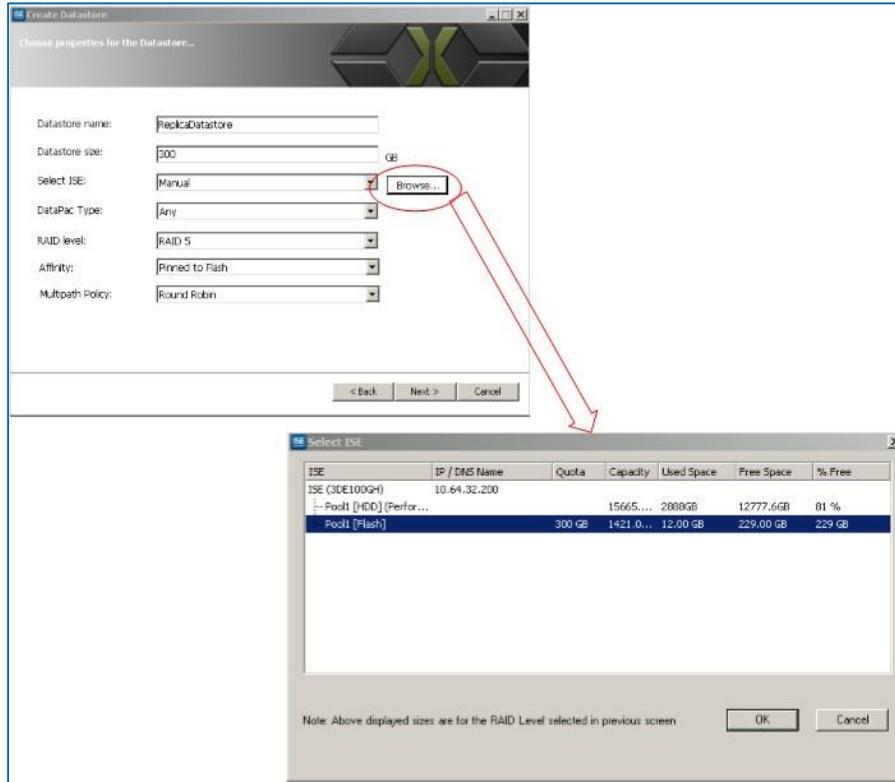


Figure 2 - Choosing Properties for the Datastore

- e. Click **Next**
- f. In the *Choose Host Initiators* screen, all of the ESXi hosts in the cluster are selected by default. You can either use the LUN number that is listed, or choose one that fits your configuration. Select a LUN number and click **Next**

The *Summary* screen confirms the properties of the new Datastore. Click **Next**. As the Create Datastore process proceeds, you will be able to see the activity in the *Recent Tasks* pane of the Virtual Center Client.

Confirming Media Affinity and Datastore creation

1. After the new Datastore is created, refresh the view in ISE Manager Suite in the *VMware Ecosystem* screen to see the Datastore in the list of that cluster.
2. In Storage View, click the properties of the new Datastore to view the Affinity setting in the right side of the screen.

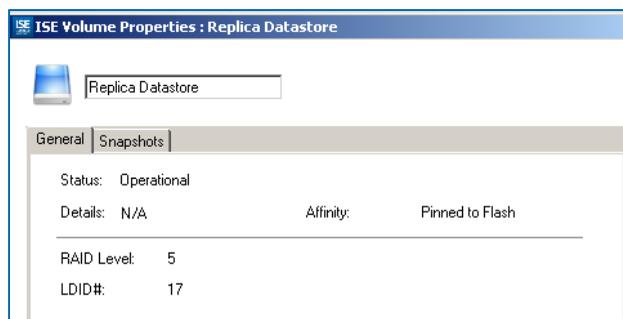


Figure 3 - Confirming Media Affinity

You will see that the new Datastore is ready to use. Next check the Datastore in the VMware Virtual Center Client.

1. Open the VMware Virtual Center Client and then navigate to **Home > Inventory > Datastores and Clusters**. Click on the Datastore and then select the Hosts tab.
2. All of the hosts selected in the *Choose Host Initiators* screen have visibility to the new Datastore as it was created in ISE Manager Suite.

The Datastore is now ready to be used for replica disks in VMware Horizon View.

Identification	Status	Device	Drive Type	Capacity	Free	Type	Last Update	Alarm Actions
Replica Datastore	Normal	naa.6001f93104058000023b000200000000:1	SSD	199.75 GB	198.80 GB	VMFS5	11/18/2014 8:39:00 AM	Enabled

Figure 4 - Viewing the new Datastore in Virtual Center Client

ISE Manager Suite Flash Dashboard

Administrators frequently want to have easy-to-access, real-time visibility into resource utilization on the storage array, especially after making changes to the configuration of the storage. Flash Utilization, accessible from the Flash Utilization tab on the right side of the SAN Group level, is a new feature added to ISE Manager 4.0.4.

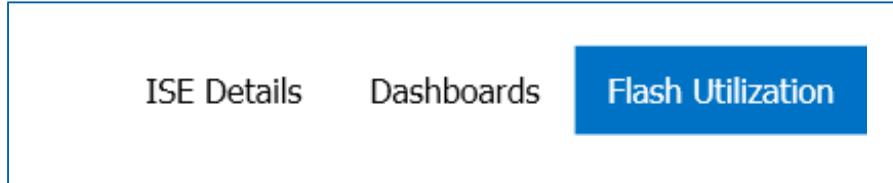


Figure 5 - Dashboard selection in ISE Manager

Flash Utilization Graphs show real-time Flash utilization, Flash Backend IOPS, HDD Backend IOPS, and Total Backend IOPS.

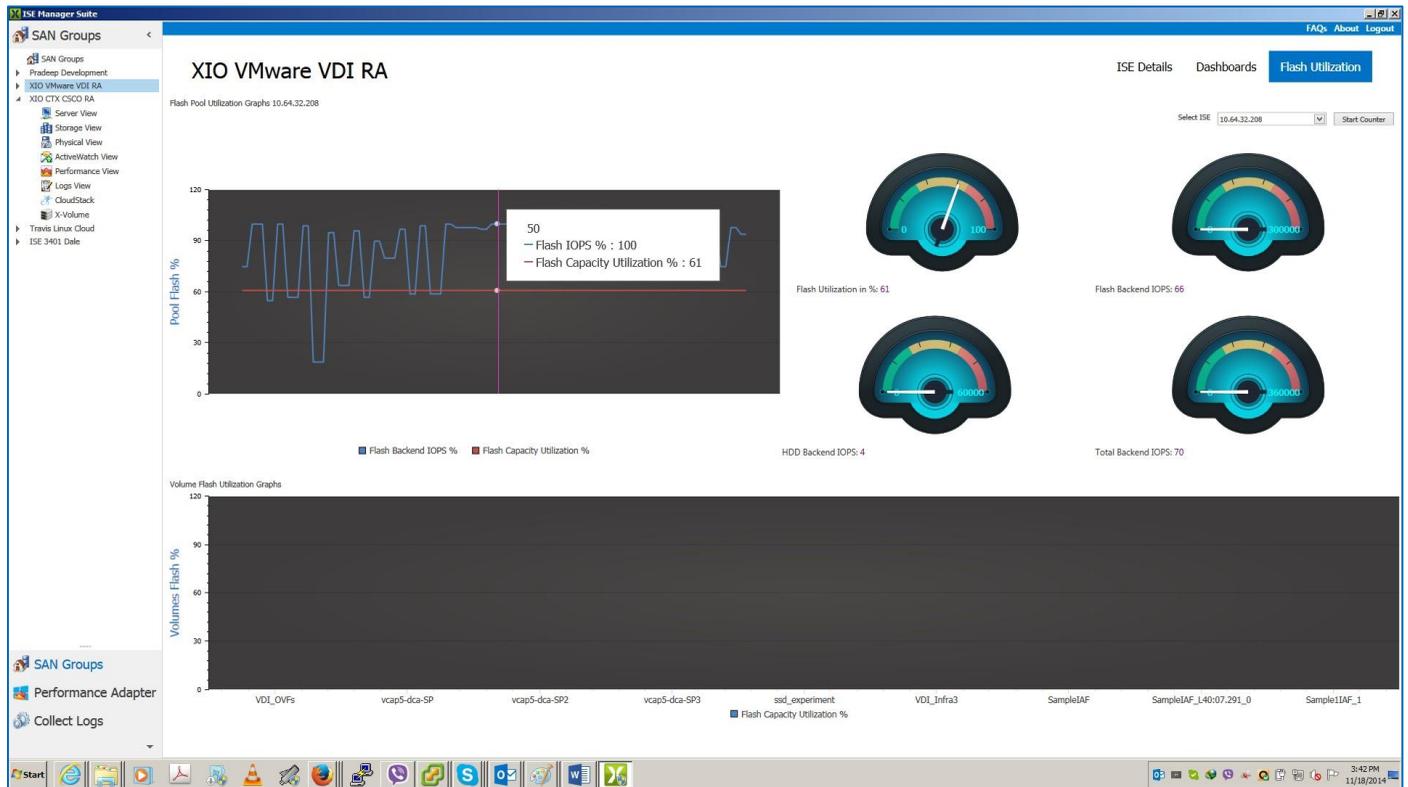


Figure 6 - Flash utilization graphs

Contact X-IO technologies

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