VMWARE VIRTUAL SAN INTEGRATION WITH EMC APPSYNC

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Satisfied Customers of Replication Manager and AppSync

Replication Manager® (RM) and AppSync® are two widely accepted or adapted copy management solutions which support almost all EMC arrays along with Enterprise Solutions or apps related to data management.

Targeting EMC's second generation storage platform, RM is more than 10 years old. Meanwhile, AppSync, which targets EMC's third generation storage platform, is just over 3 years old.

While RM has many satisfied customers, due to its robustness, functionality and Engineering support, EMC encourages customers to migrate from RM to AppSync due to the latter's simple user experience and ability to accept or adapt third generation Storage Platform, Computing, or Networking Stacks from EMC and others.

Gaps in RM and AppSync

RM and AppSync are Replication/Copy Management solutions that are Host, Storage, Application, and Infrastructure-centric and provide the capability of application protection, restore, and Mount of protected replica, to mount hosts with Application consistency.

Both products automate storage-level replication technologies provided by EMC arrays such as VNX®, VMAX®, RecoverPoint, and VPLEX® and support VMware and Microsoft Virtual infrastructures and Oracle, SQL, Exchange enterprise level applications.

AppSync is a next-generation Replication Manager. Unlike Replication Manager, it provides a lightweight agent to do application specific operations on production and mount host and collect the necessary information for server for proposed operation.

There are a few gaps in RM and AppSync, such as;

1. At this time, RM and AppSync only support EMC's storage arrays and VMware's and Microsoft's virtual infrastructures.
2. Both support second generation storage platforms.
3. Neither support commodity hardware [commonly used for third generation storage platform]
4. From a VMware perspective, RM and AppSync work at datastore level. It protects, mounts, and restores VMware datastores, i.e. VMFS and NFS and also provides VM level and File level restore functionalities.

Customers' ask of field

In this Cloud Computing and Big Data Era, most small customers prefer third platform for storage computing due to its ease and cost of operation.

Today, most big customers are willing to adapt third platform from high end, vendor- specific to commodity-based software centric.

Customers don't want to be tied to a specific vendor for any stacks, such as Storage, Computing, Network, Infrastructure, and so on.

Advantages of Technology

Most startup companies who target delivering a third generation storage platform as a service use their own software-defined storage stacks on top of commodity hardware.

A larger scale example is VMware Virtual SAN.

Over the past 8 years, EMC has targeted more and more integration of VMware stacks with all EMC arrays/products.

One of the gaps [gap number - 4 on page. 4] in RM and AppSync, we can easily fill [with affordable time and cost] by integrating VMware VSAN with next generation EMC copy management, aka AppSync.

EMC is rapidly coming with its own designed and defined Software Defined Storage Solution, ViPR®.

By integrating ViPR with AppSync we can resolve three of the major gaps [gap number – 1 to 3 on page 4] in RM and AppSync. [For more information on ViPR, refer to: https://community.emc.com/docs/DOC-35557]

In this article, I will focus on VMware VSAN integration with EMC AppSync.

How VMware VSAN fits in to EMC copy management

VMware VSAN introduction

VMware Virtual SAN is a software defined storage array that uses clusters of commodity server hardware. Virtual SAN is fully integrated with vSphere. It is an object based storage system and a platform for VM Storage policies that aims to simplify virtual machine storage replacement decisions for vSphere administrators.

It leverages the local storage from a number of ESXi hosts which are part of a cluster. A distributed vsanDatastore is then created leveraging the local storage from each of the ESXi hosts. This can then be used for VM placement, and of course supports a range of core vSphere technologies like vMotion, DRS,and vSphere HA.

In general, VSAN is a converged compute and storage hybrid solution using combination of SSD and HDD, policy-driven storage, and is a VMDK container.

Objective

AppSync provides datastore-level protection, mount, and restore functionalities. Even if we want to protect a single VM residing on VMFS or NFS datastore, we need to protect the whole datastore.

During datastore protection, for VM consistency AppSync uses VMware snapshot technology [that does not provide pRDM snapshot].

Can we concentrate on Virtual Machine Disk / VMDK for protection, mount, and restore? VMware VDDK/Virtual Disk Development Kit [open source] provides vDISK APIs to achieve VDK copy/clone, mount, and restore functionalities.

Here we can use VMware VSAN datastore as a VMDK container. This enables us to achieve Quality of Service by saving storage and network bandwidth and increasing performance.

We can migrate VM created on VMFS or NFS [on AppSync supported arrays] to vSAN Data store.

Approach

AppSync currently uses VI Java APIs [version 5.1/open source] for VMware-related operations.

VI Java APIs [Vesion 5.5 beta], VDDK 5.5.2 and ESXi 5.5 u1, and VC 5.5 support VMware VSAN features.

VDDK 5.5.2 – vDISK APIs: We can use all function calls written in c/c++ and using JNI [Java Native Interface] in our code.

Work flow

1. During VC registration in AppSyn we can discover and persist all required objects related to VSAN support in AppSync.
2. During bronze service plan run,
    - Application discovery phase will discover application as VMware data set.
    - Storage mapping phase will map storage as VMware VSAN data store.
    - Affinitization logic will be added to work VSAN data store.
    - Create copy phase will create all or mentioned VM's snapshot with the use of VI Java APIs.

      After that, VDDK – vDISK APIs will copy the mentioned or required VMDK files of VMs to mentioned VSAN Data stores. [Will be available in persistent, that we had discovered during VC registration]. Last, we will delete VMs' snapshot.
3. During mount copy phase, with the help of vDISK APIs, we can mount VMDK on requested host with VSAN datastore as under line storage array.
4. During restore phase, with the help of vDISK APIs, we can restore existing VM or create new VM with mentioned location by coping VMDKs residing under VSAN datastore.

Results

With integration of VMware VSAN to EMC AppSync we can support a software-defined storage array created on commodity server hardware for VMware VM-level copy management.

This will save Storage and Network bandwidth and increase performance.

VSAN supports its own Snapshot technology with VIRSTO

The upcoming release of VSAN will have its own Snapshot technology powered by VMware VIRSTO Software Defined Storage Solution which delivers virtual machine-centric I/O performance optimization and efficient and agile data services.

Leveraging this technology in EMC copy management will enable us to deeply integrate VMware VSAN to EMC copy management.

Appendix

http://cormachogan.com/vsan/

https://www.vmware.com/support/developer/vddk/VirtualDiskAPIprogramming.pdf

https://community.emc.com/docs/DOC-35557