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Non-Disruptive Data Mitigation Through Storage Virtualization

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Abstract— Storage Area Network provides (SAN) matures larger and wide complexity to implement secure and robust communication between host and storage device in storage infrastructure to consolidate data and utilizing storage resources effectively. To adapt this virtualization in storage makes SAN to enhanced productivity, assets utilization and better management of storage infrastructure. Storage virtualization simplifies resource management by pooling and sharing resources for physical infrastructure to logical-view infrastructure by storage utilization and modifying storage without affecting an application's availability and non-disruptive Data mitigation to access and storage while migration of data-exchange in progress.

Index Term—Data Mining, Data Mitigation, RAID, SAN, NAS, Disruptive Data

I. INTRODUCTION

In the most technical sense of term, The Storage Virtualization is the process of presenting the logical-view of physical storage that abstract the resources to a host and behave like as a physical-view. A simple example can be found in file system that your hard-disk is formatted with, it perform a lookup in file system for file allocation table that resolves to logical block that is "Drive Name" to make up the file.

On the other hand SAN The Storage virtualization are host based volume management, LUN creation, RAID, tape storage virtualization and disk addressing and more as [Figure-1][10]

It involves abstraction of data where the aspects of system, desktop or hard-disk, server to a process that migrate data to host, network or array. [1] This allow for better visibility, controlled management of files, utilization, non-disruptive data mitigation.

Non-disruptive data mitigation for a instance that can forget you about where you have allocated data, because migration of data is somewhere else is much simpler that will migrate data based on utilization to optimize performance.

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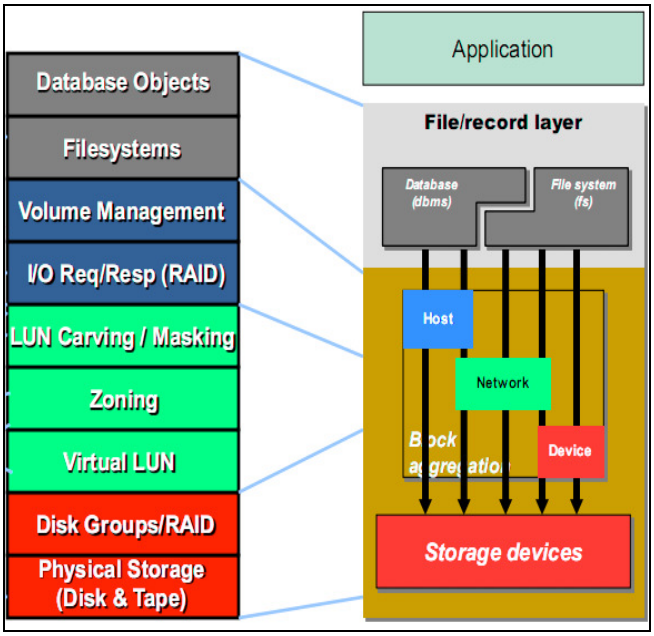

Figure1: SNIA Stack of Storage [10]

The rest of paper is organized as follows: In Section **II**, we discuss the taxonomy that is classification of storage virtualization specifying into various levels and multi-level approach. In Section **III** and **IV** , we describe the block-level virtualization and file-level virtualization that how they react as non-disruptive data mitigation while data exchange in progress and various aspects of these levels. Section **V,** we draw the conclusion for the paper and point out some potential to mitigate data and high performance by non-disruptive of data in storage.

II.TAXONOMY OF STORAGE VIRTUALIZATION

LEVEL 1: Specifying the taxonomy addressing that How storage-virtualization is created. Level specifying the type of virtualization.
LEVEL 2: Specifying the methods where the virtualization takes place. It's all about multi-level approach to an effective strategy that dispute the intelligence across the host based, network based, storage device/subsystem levels while centralizing the disputes to the management and control functions.
LEVEL 3: Specifying the configuration that how a host should control application area such as clustering and application failover and volume management of row disk.
However, Data access and distribution, path redirection or failover and Load balancing capabilities should be moved to network [2].

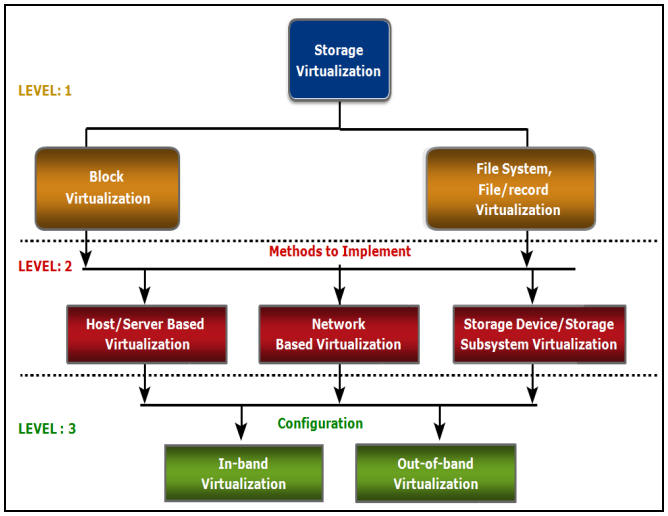

Figure 2: Taxonomy Storage Virtualization

As per configuration at Level 3: Out-of-band virtualization implementation configuration stored external to data pat that is based on hardware which enables the environment to process data at a network speed by adding translation of physical storage and minimum latency[17].

Host/Server based Virtualization	Storage Network based Virtualization	Storage Device based Virtualization
Replication	Load Balancing	Volume management (LUNs)
Disk-Volume management	Access Control Zoning	Access Control RAID
Data path management	ISL Trucking	Replication

Figure3: Multi-Level Approach

On the other hand In-band virtualization implementation that appliance is software based that only suitable for static environment with predictable workloads.

As per Multi-Level approach it makes storage virtualization solution must be scalable, capable of addressing issues, functionality and manageability [2][10].

III. BLOCK-LEVEL STORAGE VIRTUALIZATION

Block-level Storage Virtualization provides arrangement of storage capacity to as logical view to applications that provides a translation layer to the SAN. Data mitigation via virtualization devices translates between virtual LUNs and physical LUNs an array of disk block.

In this way Block-level Storage Virtualization enables administrators to provide the storage capacity when and where it's needed[13].It extends storage volume online, resolves application growth and enables transport volumes access to users from the potentially disruptive data protection, details of expansion and system maintenance.

Block-level storage virtualization having support individual formation of file system like NFS,NTFS or SMB(Windows) or VMFS(VMware) which are required by desired application that is this solution , engine handles the back-end migration of data, that remains LUNs to make online and accessible while data is being migrated.[3][5]

Non-disruptive data mitigation works flow by Block-level that data transportations can be used to store file and can work as special application like virtual machine file system.

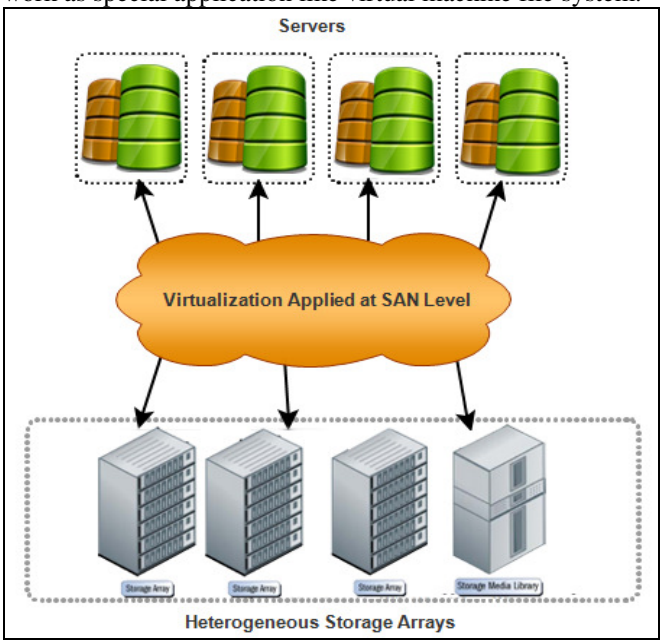

Figure 4: Block-Level Virtualization

IV: FILE-LEVEL VIRTUALIZATION

File-level virtualization is usually accessible using common file system protocols like NFS (Linux, VMware) and SMB (CIFS, Windows). In comparison to block-level , we need to create volume of array deploy an host and then attached to created volume. But in File-level virtualization the storage devices handles the files and folder on the devices. Network Attached Storage (NAS) needs to handle the user's permission and access control assignment[16]. This optimizes the storage utilization and server consolidation and to perform non-disruptive file migrations.

Non-disruptive file migration done by File-level virtualization that it creates the logical pool as per storage to enable the users to access the logical pool as storage to enable the user to access the logical path to accessing files.

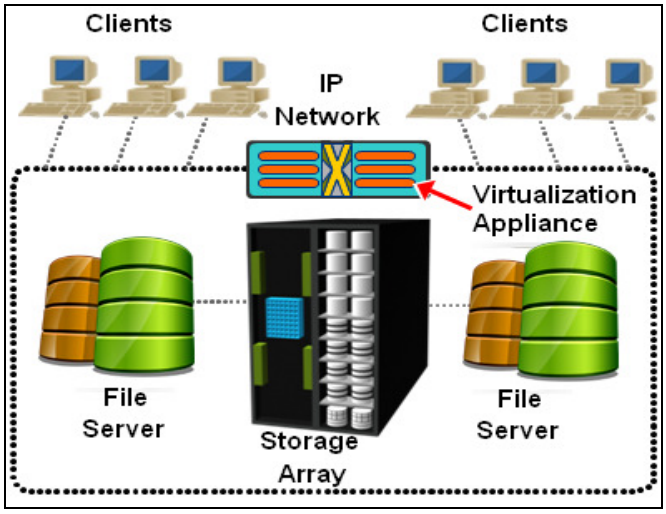

Figure 5: File-Level Virtualization

File-level virtualization is ideal in tired-storage infrastructure which is the assignment of different categories of data to different type of storage media that may be based upon level of protection needed, frequency of use, performance requirement or other consideration[7]. This serve as data migration that can be conducted file server transparently to end users and applications as service. This means client can access their files non-disruptively.

Non-disruptively data in file virtualization platform must also be interoperable with the current infrastructure so it can work with existing storage system and switches. Data mitigation may be deployed as off-the-shelf [1] server running file on virtualization software; the global namespace can be used to map this logical path of life.

File-level virtualization for non-disruptive data is at the highest level of virtualization. It has an advantage because data is shared , allocated and protected; not the volumes.

V. CONCLUSION

Non-disruptive data mitigation through storage virtualization is an elegant solution that reduces the disruption, operational overhead and risk inherent with any type of data migration. Storage virtualization is only the best solution to SAN that will provide the way to storage for management. Most important things that it will change the things the storage administration focus on.

Storage virtualization for data mitigation having advantage of automated resources balancing features for consideration to storage virtualization for non-disruptive data there must be hybrid policy at block-level and file-level virtualization to a reliable and high performance storage utilization and consolidation.

Instead of data migration to countless tasks to free up resources in various times, they can pay more attention to big picture: overall performance, scalability, manageability, data availability and mobility.

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