IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 8, Issue 11, November 2019

How a Storage System can be Built with Some Purpose to Take Benefit of Virtualization

Priyanka Kakasaheb Suryawanshi

M. Tech Student, Computer, Bharati Vidyapeeth College of Engineering, Pune, India

Abstract: Virtualization is its need to be modest and not influence the performance. . Virtualization is a rising innovation in the ongoing processing universes and has turned into a stage for the execution of utility registering (for example distributed computing) and the rising Virtual Private Networks. It incorporates and coordinate IT assets there by lessening expenses and vitality utilization. Virtualization has incredibly affected the utilization of IT as a way to helping organizations accomplish their business objectives. The intensity of programming characterized models liberates us from a considerable lot of the physical limitations of equipment and enables us to enhance every one of the assets we have available to us, utilizing IT significantly more prudent, versatile, and adaptable. The advantages managed through virtualization are incredible to such an extent that its ubiquity has now extended from its underlying server executions to capacity and systems administration frameworks. Frequently littler organizations are obliged by limited assets. They esteem arrangements that work to decrease costs and improve efficiency. Like the advantages offered through server virtualization, programming characterized capacity is intended to advance the utilization of assets; explicitly capacity assets. Virtualized stockpiling helps organizations incredibly decrease their equipment and asset costs, while improving unwavering quality, dexterity, and the capacity to scale their stockpiling. Respondents to the investigation announced that 35% of virtual stockpiling adopters diminished their general IT costs and 33% decreased their number of SAN (Storage Area Network) gadgets. Making unused space accessible for different applications enabled them to unite onto less assets. Capacity the board improved also, with 39% announcing that they had the option to decrease their time committed to SAN gadget the board. In a similar review, 49% of the associations announced a decrease in application vacation.

Keywords: Virtualization, SAN, Storage, Performance

I. INTRODUCTION

Virtualization has the impact at the various layers of storage stack. There is a rapid growth in the storage capacity, and hence the processing power in the respective enterprises storage appliances coupled with the requirements for high availability and it needs a Storage Area Network (SAN) architecture for providing the storage and performance elements here. The Storage Virtualization provides us with a combination and management of storage resources for Storage Area Network with multiple servers as well as the storage devices [1]. The main aim for storage Virtualization is known as the creation of a virtual version of a resource (device) like a server, a storage device, a network or an operating system where the framework is dividing the device into single or more executing environments [3]. The monetary supportability of future versatile systems will to a great extent rely upon the solid specialization of its offered administrations. System administrators should give increased the value of their occupants, by moving from the conventional one-size-fits-all methodology to a lot of virtual start to finish examples of a typical physical framework, named system cuts, which are particularly custom fitted to the necessities of every application. Actualizing system cutting has noteworthy results as far as asset the board: administration customization involves doling out to each cut completely committed assets, which may likewise be progressively reassigned and overbooked so as to expand the cost-proficiency of the framework [4]. In this paper, we embrace an information driven way to deal with evaluate the productivity of asset partaking in future cut systems. Expanding on metropolitan-scale true traffic estimations, we complete a broad parametric examination that features how assorted execution ensures, innovative settings, and cut arrangements sway the asset use at various degrees of the foundation in nearness of system cutting. Our outcomes give bits of knowledge on the feasible productivity of system cutting models, their dimensioning, and their transaction with asset the executives' calculations at various areas and reconfiguration timescales [10].

Benefits of Virtualization

1. Reduce hardware and resource costs Respondents to the study reported that 35% of virtual storage adopters reduced their overall IT expenses and 33% reduced their number of SAN (Storage Area Network) devices. Making unused space available for other applications allowed them to consolidate onto fewer resources. Storage management improved as well, with 39% reporting that they were able to reduce their time devoted to SAN device management[4].

IJARCCE
ISSN (Online) 2278-1021
ISSN (Print) 2319-5940
International Journal of Advanced Research in Computer and Communication Engineering
Vol. 8, Issue 11, November 2019

2. Improve reliability and performance
In the same survey, 49% of the organizations reported a reduction in application downtime. Storage virtualization optimized the use of their storage with tools that responded in real-time to workload changes [6]. It ensured constant access to business applications, providing load balancing and failover across systems and sites. It also featured unlimited snapshots for rapid, granular recovery in case of an unexpected failure.

3. Improve agility and ability to scale
One of the biggest challenges facing small and midsize companies today is centered on scaling storage for growing IT requirements. Happily, one of the greatest advantages offered by virtualized storage is the flexibility it provides for growth. By abstracting the physical and logical components of storage, you can single out a resource and make it available at different times for one application or another. This allows you to assign storage resources on-the-fly in accordance with your applications' needs from a single pane of glass. This way, the storage can scale with you as your needs change [5].

II. RELATED WORK

A. Virtualization aware storage system

Virtualization-aware storage (VM-aware storage) is a type of computer data storage designed to facilitate the management and monitoring of Virtual Machines (VMs) within a virtualized environment. It enables the storage to be managed at the same time as VMs rather than separately, as Logical Unit Numbers (LUNs) or volumes do [7]. The role of virtualization-aware storage is to serve as a facilitator between the disk array and the virtualization managers, or hypervisors. Although it's sometimes used interchangeably with Software-Defined Storage (SDS), VAS is actually a subset of SDS that specifies the enhancement of data migration and the performance of virtualized environments. This gives administrators and end users the ability to associate virtual machines with their storage performance, which can aid in troubleshooting. This improves automation efficiency, manageability, as well as storage performance, reliability and cost efficiency. VM-aware storage specifically focuses on the input and output patterns and sequences of virtual environments and is set up to automatically manage quality of service for each VM. Its drawback is that it's designed for virtualization, and not all end-users run virtual machines all the time. In that respect, VM-aware storage is not suited to the user's needs [2].

B. Storage Abstraction

In last few years, concept of storage abstraction has come in market. Storage abstraction is a virtual layer created using variety of storages configured in specific way so as to create impression of single storage for end users. It provides on demand storage and computing base to individuals, organizations in performing different tasks on pay and use basis. One can use storage abstraction system to store and process huge amount of data. One of the most popular storage abstraction came into form of AWS, Google cloud etc. Starting with Data servers and Data-ware houses to now AWS, Google storage, Storage abstraction allows end users to manipulate data without knowing where and how it has been stored [1]. When we talk about storage abstraction use at organization level, it came into picture a decade earlier than AWS or Google's storage for storage when IBM launched Data-ware houses platforms like Genesis/ Twinfin.

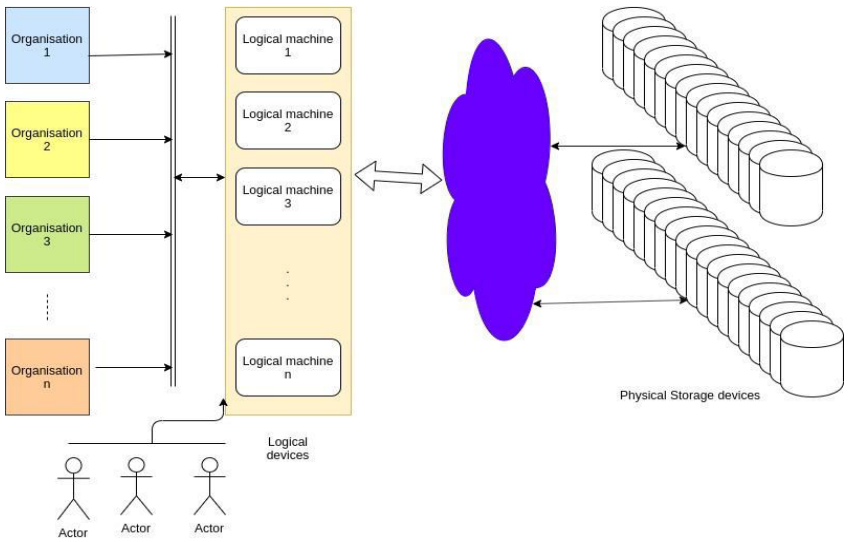

Figure: Storage Abstraction [7]

IJARCCE
ISSN (Online) 2278-1021
ISSN (Print) 2319-5940
International Journal of Advanced Research in Computer and Communication Engineering
Vol. 8, Issue 11, November 2019

Now with Google storage, It is used by almost every individual to store and maintain their confidential information li
Now with Google storage, It is used by almost every individual to store and maintain their confidential information like e-mails, design docs. At next level, storage abstraction system can be made available organizations to fill their development, storage and organization setup requirements so as to reduce maintenance cost in future.

Storage abstraction can provides following benefits to organization(s):
- Provides support to heterogeneous, multi-vendor storage platforms
- Smoothen storage management and its maintenance.
- Provides flexibility in data migration
- Creates flexibility in storage utilization
- Offer no downtime for data manipulation

C. challenges with managing storage in a virtualized server environment

Managing storage in a virtual server environment comes with challenges in the areas of efficiency, deployment time and complexity. One has to navigate way through virtual server sprawl, end user expectations and storage networking choices.

There are three different challenges
1. Efficiency
2. Speed
3. Confusion and Complexity

1. Efficiency

We're seeing a lot of virtual server sprawl; you make it really easy for people to spin up virtual servers, and guess what they do? They ask for lots of them. And if you do your storage environment in the traditional way that you did pre-virtual, you end up burning up lots and lots of capacity. So, keeping the storage environment efficient is a real big challenge, to make sure that you get the benefits you were hoping for, from building the virtual server environment in the first place [8].

2. Speed

People's expectations are super high. We're in the cloud era. People want to get a virtual server right away, and they really don't want to wait for you to go buy storage and take six weeks, eight weeks, months, whatever it takes to build out storage the way you used to for big application development projects in the virtual server era. So, making sure that you can turn up those virtual servers very quickly and meet your internal customers' expectations is really, really important.

3. Complexity

There are lots of different ways to build storage for virtual server environments. Use of iSCSI, Fibre Channel, NFS is possible; even it is possible to do lots of different network designs and server designs and storage designs. It's just important to pick a best practice design and stick with it. Consistency, testing, understanding of the business continuity and disaster recovery aspects is important to keep it safe and reliable. Chargeback is a really important thing to make sure that the environment is really consistent and efficient. So, really just having the process to keep things from getting out of control is important.

D. storage management best practices to overcome these challenges

From an efficiency perspective, it's really critical to use both processes that can clean up and make sure you don't give out too much storage as well as technologies to be efficient. So, from a process perspective, really keeping an eye on what you're giving out; making sure you have a couple of different gradients -- like a gold, a silver and a bronze -- in terms of performance, reliability and redundancy; making sure you go back after the fact and audit the virtual servers you've given out and make sure they're still in use and have a process to disconnect them and put the storage capacity back in the free pool; keeping it absolutely consistent -- process like that is really going to help with efficiency[8]. From a technology perspective, tools like thin provisioning; deduplication; wide striping, which can allow you to use cheap disk rather than really high-performance storage capacity to satisfy those virtual server requests, are going to help you spend less. You know that you're going to start shifting capacity from disk on board the server to shared storage capacity, which is more expensive and more complicated. Thin provisioning is really critical because you're going to give out lots of gold images -- you don't want to have a custom storage allocation for every different virtual server. But the reality is that most of those virtual servers aren't going to consume all the storage capacity you give them. Thin provisioning allows those servers to pull from a common pool and to only use the actual amount of capacity that they're writing data to, rather than locking up physical storage for each of those. Another key tool for efficiency is snapshots and clones, where you can quickly copy those and give them out. The snapshots and the clones actually

help out with the second thing -- being quick, being fast. Finally, it's that process and complexity. It is possible to build one consistent virtual server infrastructure on one storage architecture, one network architecture, one server architecture and one version of the virtual server technology that you're using. Keep it consistent. It can get out of control so quickly if there are lots of different versions and lots of different hardware floating around the environment [9].

III. CONCLUSION

Virtualization itself is not inherently unsecure, it is a technology that has new vulnerabilities and requires restructuring of manual security processes. One of the biggest challenges is to maintain and secure all of the VMs, since many instances and configurations can be rapidly created. The contents of each guest OS is a virtual disk, stored as a file. If this file is accessed, copied, or modified on the host by an unauthorized party, then the privacy and integrity of the VM is compromised. Likewise, if an attacker accesses the host and directly modifies the hypervisor, then he or she will be able to run arbitrary code, but the hypervisor has additional layer of abstraction from physical hardware and further restricts malicious attempts to control the machine from the hardware. This abstraction encapsulates malicious attacks and allows external monitoring for malicious attacks on a VM. Since the hypervisor monitors each VM, it can record the states and allow the VM to return to a previous state, which has many backup and malware removal advantages. The hypervisor should strictly control communication between VMs and limit resource consumption of each VM to a finite bound to prevent DoS attacks. All known vulnerabilities of VMs can be prevented, but it is absolutely essential to secure the host and each guest OS in order to create a secure virtual environment.

REFERENCES

[1]. Desai, P. and Jayakumar, N., An Extensible Framework Using Mobilityrpc for Possible Deployment of Active Storage on Traditional Storage Architecture.
[2]. Desai, P.R. and Jayakumar, N.K., A Survey on Mobile Agents.
[3]. Jayakumar, N. and Kulkarni, A., 2017. A Simple Measuring Model for Evaluating the Performance of Small Block Size Accesses in Lustre File System. Engineering, Technology & Applied Science Research, 7(6), pp.2313-2318.
[4]. Rishikesh Salunkhe, N.J., 2016. Query Bound Application Offloading: Approach Towards Increase Performance of Big Data Computing. Journal of Emerging Technologies and Innovative Research, 3(6), pp.188-191.
[5]. Salunkhe, R., Kadam, A.D., Jayakumar, N. and Joshi, S., 2016, March. Luster a scalable architecture file system: A research implementation on active storage array framework with Luster file system. In 2016 International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) (pp. 1073-1081). IEEE.
[6]. Jayakumar, N., Iyer, M.S., Joshi, S.D. and Patil, S.H., A Mathematical Model in Support of Efficient offloading for Active Storage Architectures.
[7]. Naveenkumar, J. and Joshi, S.D., 2015. Evaluation of Active Storage System Realized through MobilityRPC.
[8]. Jayakumar, N., Bhardwaj, T., Pant, K., Joshi, S.D. and Patil, S.H., A Holistic Approach for Performance Analysis of Embedded Storage Array.
[9]. Naveenkumar, J., Makwana, R., Joshi, S.D. and Thakore, D.M., 2015. Performance Impact Analysis of Application Implemented on Active Storage Framework. International Journal, 5(2).
[10]. Naveenkumar, J. and Joshi, S.D., 2015. Evaluation of Active Storage System Realized Through Hadoop.
[11]. Zaeimfar, S.N.J.F., 2014. Workload Characteristics Impacts on file System Benchmarking. Int. J. Adv, pp.39-44.
[12]. Jayakumar, D.T. and Naveenkumar, R., 2012. SDjoshi,". International Journal of Advanced Research in Computer Science and Software Engineering," Int. J, 2(9), pp.62-70.
[13]. Suryawanshi, A.U. and Naveenkumar, J., PRIVACY-PRESERVING FOR A SECURE DATA STORAGE ON CLOUD USING PUBLIC AUDITING TECHNIQUE.
[14]. Suryawanshi, A.U. and Kumar, J.N., A Multiuser Model of Privacy-Preserving Auditing for Storing Data Security in Cloud Computing.
[15]. Naveenkumar J and Raval K.S, Clouds Explained Using Use-Case Scenarios.
[16]. Sagar S Lad, S.D Joshi, N.J, Comparison study on Hadoop's HDFS with Lustre File System. International Journal of Scientific Engineering and Applied Science, 1(8), pp.491–494, 2015.
[17]. Jayakumar, N., Bhardwaj, T., Pant, K., Joshi, S.D. and Patil, S.H., 2015. A Holistic Approach for Performance Analysis of Embedded Storage Array. Int. J. Sci. Technol. Eng, 1(12), pp.247-250.
[18]. Kumar, N., Kumar, J., Salunkhe, R.B. and Kadam, A.D., 2016, March. A Scalable Record Retrieval Methodology Using Relational Keyword Search System. In Proceedings of the Second International Conference on Information and Communication Technology for Competitive Strategies (p. 32). ACM.

BIOGRAPHY

Priyanka Kakasaheb Suryawanshi, M. Tech Student, Computer, Bharati Vidyapeeth College of Engineering, Pune, India