Virtualization and Integration of Telecommunications Fortifies Utilization of Storage Infrastructures

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ABSTRACT
Managing and utilizing storage resources have resulted in complexity because of the heterogeneous nature of storage infrastructures. Paper elucidates that Virtual Private Network created in the Wireless Public Network would have implemented virtualization and would result in enhancement of productivity and efficient management of storage infrastructures. Proof is generated that Virtual environment results in optimum utilization of all the storage resources and reduces cost factor. Abstraction of physical resources for simplification in business and technological changes is done in the paper and resources are masked as logical resources with enhanced capabilities. Conclusion is drawn in the paper that virtualization in the Wireless Public Network would result in the increase of utilization of Servers, Networks and Storage Infrastructures.

General Terms
Public Network, Storage Infrastructure

Keywords
Wireless Medium, Virtual Private Network, Virtualization

1. INTRODUCTION
Virtualization is the technique of abstraction which simplifies the storage infrastructure. It masks the physical resources in order to accommodate the increasing pace of technological changes. Simplification is done by pooling and sharing resources. The physical resources which are masked would be made to appear as logical resources but with enhanced capabilities. Moreover in virtualization multiple operating systems and user applications could run on the same hardware platform. Both operating system run simultaneously but it is not dual boot, they are isolated from each other. IT industry is making use of virtualization in various forms: Memory Virtualization, Network Virtualization, Server Virtualization and Storage Virtualization.
In Memory Virtualization address space of memory is divided into fixed size contiguous block pages. Inactive memory pages are saved on the disk and are bought back to physical memory through paging. Virtual Memory Manager uses the space on the disk known as Swap file.

In Network Virtualization a virtual network is created independent of physical network and all applications see their own network independently. Virtual LAN is created which makes large networks more manageable. Central configuration is done in VLAN but the devices are at different physical locations.

In Server Virtualization multiple operating systems and applications run simultaneously. Machines are virtually different but server is physically same. When virtual machines are used it generates a layer of abstraction between operating system and hardware.

In Storage Virtualization a logical view of the physical storage resources is created. Behavior of this logical view is as same as the direct physical storage. When Logical Unit Numbers are created, it is the logical view but appears as a physical storage.

2. IMPLEMENTATION OF VIRTUALIZATION IN THE VIRTUAL PRIVATE NETWORK OF WIRELESS PUBLIC NETWORK

Communication at the public network when the medium is wireless is quiet complex. Remotely when systems are being accessed then a logical view of the resources is to be created. This is done with Storage Virtualization. Organizations create their virtual private network in the Wireless Public Network so that sessions could be created between host and remote server. Distributed applications can run on same hardware platform and complex applications with multiple operating systems can also run in virtualization [1].

Interconnection between the computers is not required physically but same server should be used in the virtual private network. Transport of data or communication process on the remote systems could be very efficiently done if Network and Server Virtualization is implemented in the VPN of Wireless Public Network. Figure 1 elucidates the implementation of virtualization in the VPN of Wireless Public Network. There are different levels of virtualization.

At first level type of virtualization is defined. Second level states where the virtualization has to take place either at Server, Storage or Network. When wireless public network is used even if there is path redirection or path failover the data to be accessed and distributed or load balanced, it should be moved to the network itself. At third level network

virtualization is done either in-band or out-of-band.

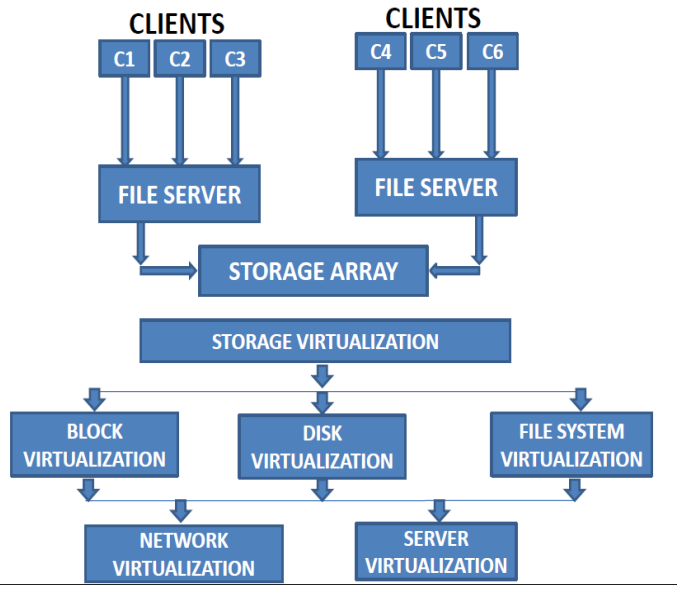

Figure 1: Implementation of virtualization in the VPN of Wireless Public Network

Zoning is done in the network virtualization in the virtual private network of the public network of the organization. So in-band and out-of-band can be easily implemented while virtual-zing the network [2].

3. PROOF OF REDUCTION IN COST WITH IMPLEMENTATION OF VIRTUALIZATION

Virtualization has several storage arrays that are used for independent storage of the contents. Input and Output is managed well by these storage arrays and is apple to meet the application requirements [2]. When virtualization is implemented these storage arrays are no longer independent but they become a single entity.

Traffic distribution, load balancing a processing etc all are adequately managed by the virtual environment application requirements. When virtualization is implemented these storage arrays are no longer independent but they become a single entity. Traffic distribution, load balancing an processing etc all are adequately managed by the virtual environment same as the physical environment do. This proves that virtual environment is scalable. When we implement virtualization Switches, Network, Storage Arrays etc all are required. Along with this some management tools are required to manage all this hardware which results in complexity [3]. Virtualization is manageable with the management tools which are of very less cost. As virtualization is not stand alone technology so these management tools provide support to it. Very less cost is associated with this support.

Now consider a situation in which organization has not implemented virtualization so they try to consolidate these physical components along with management tools from single vendor but with virtualization standardization is there as in very less cost these management tools support the hardware components required for virtualization. Products do not face any compatibility and coordination issues even if different manufacturers or vendors implement virtualization in an organization [3]. So overall if virtualization is implemented in the virtual private network of an organization would cost very less for the organization.

4. ABSTRACTION OF PHYSICAL RESOURCES, MASKED AS LOGICAL

Virtualization provides a layer in the SAN between the host and storage arrays if it is implemented at the block level only (Figure 2). Virtualized logical unit numbers are created and all resources are directed towards virtualized device instead of individual storage array [4]. This virtualized device creates translation between virtual logical unit number and the physical logical unit number. So this implementation helps all the vendors to work in synchronization.

All physical resources are gone through abstraction and a logical or virtual masking is done at the SAN Level so that data could be migrated in an non-disruptive manner between server and storage arrays.

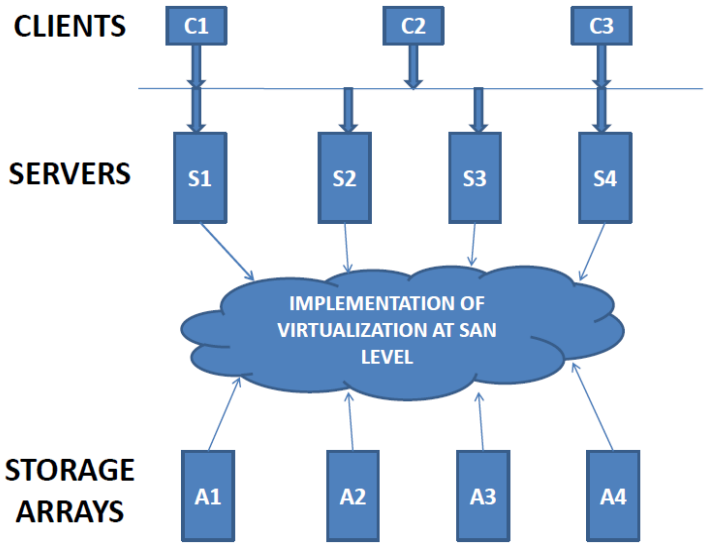

Figure 2: Implementation Of Virtualization At San Level

Sometimes there are several challenges with the network attached storage when data is to be accessed from the files which are physically stored at the storage arrays. It needs storage optimization, server consolidation and non-disruptive data migrations in the virtualization [5].

So file level virtualization is there which never keep the storage resources under-utilized because the files are bond to a specific file server.

When files are to be moved from one server to another it is quiet easy because virtualization is implemented at the SAN Level [6]. Only requirement is the reconfiguration of hosts and applications with the new path which is quiet difficult for storage administrators if virtualization is not implemented.

Virtualization improves the storage efficiency as the physical resources ate gone through abstraction and only virtual resources help in maintaining the efficiency. Clients can also read their files from old locations and those could be written at the new locations even if their physical location is changed or not. Multiple clients could be connected to multiple servers with help of virtualization.

5. CONCLUSION

Virtualization provides flexibility to the physical resources required to perform storage with different servers and storage arrays. Now a day's virtual SAN is implemented in which group of hosts or storage arrays communicate with each other through implemented virtual topology on the physical SAN. On single physical location administrators could create various virtual SAN's [6]. SAN could be scalable, available, and manageable and quiet secure if virtualization is implemented in it. Fibre Channel is to be configured if Virtual SAN is to be implemented. Traffic disruptions in one virtual SAN are not propagated to another virtual SAN. Virtualization allows addition and modification of the physical resources with the help of abstraction. Replacement of physical resources is also possible in virtualization when it is done at the SAN Level [6]. Performance degradation could never be there even if there are unplanned downtimes because hardware is virtually available everywhere. In virtualization storage would be uninterrupted. Resource conflict would never be there. So overall paper states that virtualization when implemented in the virtual private network of a wireless public network would result in uninterrupted storage and would increase the utilization of hardware such as servers, network and storage arrays.

6. REFERENCES

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