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An Improved XenApp MultiFarm Architecture

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Abstract: *In Cloud computing, application and desktop delivery are the two emerging technologies that has reduced application and desktop computing costs and provided greater IT and user flexibility compared to traditional application and desktop management models. Among the various virtualization products that allow users to connect to their corporate applications from any device, XenApp is one that hosts applications on central servers and deliver them to users by streaming or remotely accessing. The existing architecture implementing XenApp restricts any organization use its services to a limited number of users due to its expensive license costs which includes in addition to a Terminal Server Client Access License (CAL) and a Windows Server CAL from Microsoft, there must exist a concurrent user Citrix license for each client connection. This paper proposes an improved architecture that can provide the efficient usage of this virtualization product and avails its services on demand to an increased number of users in a secured and cost effective way.*

Keywords: *Application virtualization, Web Interface*

1. INTRODUCTION

Cloud can be viewed as a new frontier of the IT services based on its abilities to deliver cost effective, enterprise class virtual desktop and application solutions as provided by Citrix XenDesktop. Increased challenges and changing business needs has presented a challenge for IT staff to satisfy their users with services that incorporate the fundamentals of access at anytime from anywhere, with any device and ensuring secure access to business-critical applications and information[8]. XenApp gives the ability to centrally manage heterogeneous applications and deliver Software as a Service (SaaS) to any workforce.

In classical computer architecture, applications are installed, managed and upgraded individually on every desktop. By the introduction of virtualization, an application need not to be managed individually as is done in centralized manner. With the increase in usage of variety of applications by an increased no. of users, has led to increase in no. of physical servers, need of high availability, load balancing, management of large amount of data and its reliability. Citrix XenApp server architecture has been succeeded to achieve this up to much extent. But there also complexity and cost are hinders the growth of organizations implementing this architecture. Citrix XenApp server hosts applications which are installed on servers in the data center and then accessed via any client device. And the shared desktop capability in XenApp gives IT the ability to provide a standardized, server OS desktop with installed applications to users, providing a consistent workspace from anywhere on demand. [1]Earlier XenApp was used to be installed on physical servers, then to accomplish present scenario needs like need to scale quickly to handle rapid growth employee numbers, to reproduce issues without adding new hardware and to reduce physical server counts etc. , it is installed now on Virtual machines.[2] Its centralized application management and session virtualization management makes it most secure technique for delivering and streaming applications to any client device as data remains in the data center whereas the input which are in form of keystrokes and mouse clicks and the output screenshots are transit through the network at fast speed in an encrypted manner. At all XenApp provides the ability for application deployment, remote office connectivity, workforce mobility, business continuity [3].

2. THE STANDARD XENAPP ARCHITECTURE

XenApp is an enhanced form of Windows terminal services and an application hosting technology that utilizes Citrix Systems' proprietary presentation layer protocol or thin client protocol called Independent Computing Architecture (ICA)as shown in fig.1[4].

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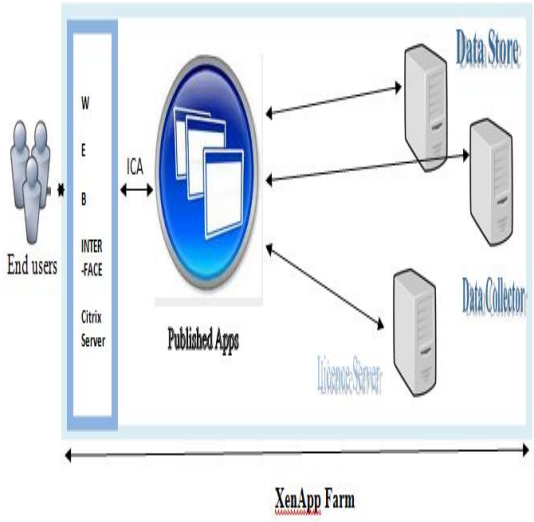

Figure 1: XenApp Server Architecture

The protocol lays down a specification for passing data between server and clients. A group of servers running XenApp shares common data store, known to be as Server farm. Servers are grouped into Zones which share common data store where applications can be load balanced across servers in farm. There can be multiple farms, where farms do not share data store and load balancing is done in individual farms [5]. Each Server farm consists of Farm servers, popularly known as citrix XenApp servers, IMA database, the web interface and the access management console.

2.1 The core components of citrix server include Multiwin, ICA and IMA. Multiwin is a kernel module that enables multiple concurrent users' login and access applications in separate secure session on a single server. This XenApp presentation server is hosted over Microsoft's Windows server which enables it to create multiple sessions on single instance of the operating system and by the help of its terminal services that makes it possible to connect to a session from any location and many devices [13]. ICA works to separate the application's logic from the user interface then transports it to the client over standard network protocols- TCP/IP, PPP, etc. At the client side, users see and work with the application's interface, but the whole application logic is executed on the server [6]. It can be used with slowest as 14.4kbps to fastest up to Gbps speedy connections. This protocol allows up to 32-bit applications run over multi platform clients and establishes communication through 32 virtual channels [10]. It is the only protocol used for client to server session secure communication run over basic network layer protocols. At the client side, a file with extension ".ica" is send by servers for application delivery services during a session. IMA known as Independent management architecture framework designed for server to server communication over data layer.

2.2 The non-core components included in architecture are License Server, Web Interface, Data Collector, data store. [12] License Server is associated with license management console. It stores the license file and vital information about the product edition and the number of concurrent users viable and the expiry dates etc. The license management console manages license server and maintains license files for XenApp servers. The licenses are not associated with particular clients but a particular client-server combination is viable for reservation of license. It is returned to license pool after a user logoff its session for other users' usage purpose. Web Interface provides users with access to content via internet explorer to XenApp applications and XenDesktop virtual desktops through a graphical presentation. The Web Interface interacts with a XenApp Server to deliver its resources to the client device by installing online plug-in and other necessary configurations to the client device [7]. Web interface also performs user authentication checks using RSA Secure ID and by other means. Data Store is the most important database that holds configurations data, persistent information about farm servers, farm management security, published applications and server administrators and printers. Each zone contains a data collector to keep dynamic data for servers in Zone. These data collectors also act as communication gateways between Zones. Data store used can be MySql Server Database over XenApp server.

2.3 Application Delivery Process The following figure shows how the XenApp architecture provides the ability to configure, manage, and enable application access from one centralized location, reducing the cost of provisioning offices individually and facilitating secured access from anywhere by any

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device.[9]

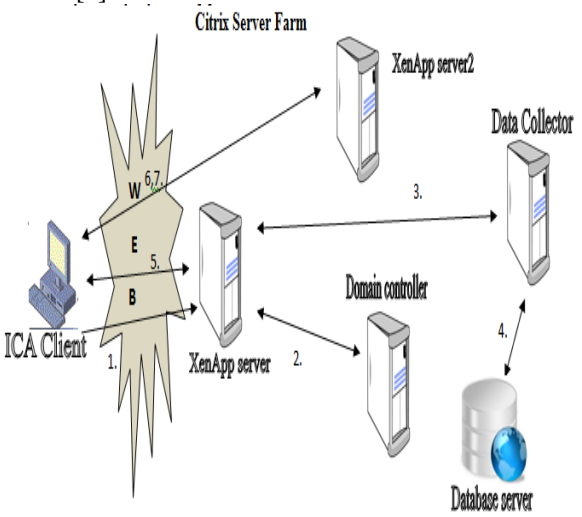

Figure 2: Steps in Application delivery process

This Application delivery process starts with the request from ICA client to XEN server for application access through Web interface by an ICA connection in 1st step. Then the user is authenticated and verified if it is authorized to access the application and any concurrent user license is free for use or not by license server and domain controller [11]. In the 3rd step, request is forwarded to data controller to check which server has the application requested and which server can now serve the application. Then the data store is checked for configuration data and access management console is accessed to deliver the application according to user profile and its privileges. Then the client is redirected to idle server or least loaded server. Then the client requests for IMA service to establish an application delivery session in step 6.Now session is established over ICA connection and all inputs and outputs are communicated over ICA virtual channel. It also gives option for streaming of application at client device to work in offline manner.

3. PROPOSED XENAPP ARCHITECTURE FOR MULTIPLE FARMS

In this proposed architecture, the requirement of Platinum license (Web-interface) for each server is removed by using centralized web-interface instead of separate web-interfaces. This is cost effective architecture. These severs can be used via web browser over (Virtual Private network)VPN/intranet. Here, the Citrix program neighborhood is published on intermediate server which is connected to other XenApp Servers via (Local Area Network)LAN. This architecture ensures high-end security due to multi-level architecture.

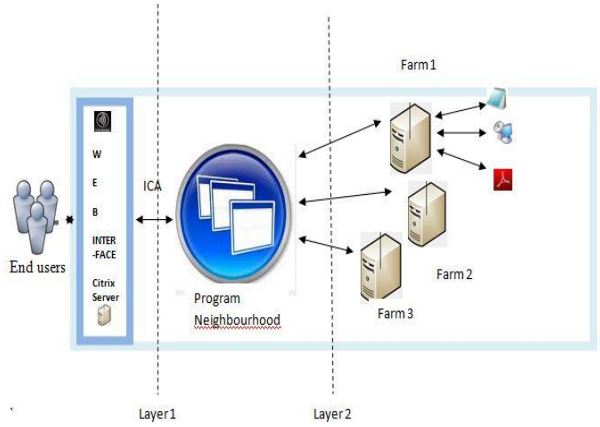

Figure 3: Proposed architecture of XenApp server

This can be done in very large scale organizations. Since in large scale organizations, there is need to purchase number of licenses which makes this architecture very costly to implement and become more expensive as number of employees concurrently using the published applications increases. In this architecture, in layer1, we are establishing a connection through citrix receiver by use of web browser to a middle/centralized server which can be placed anywhere. Layer 1 centralized servers are directly/indirectly (via NAT) connected to other XenApp servers (present on Layer2) having standard licenses. We are invoking citrix program neighborhood present on Layer 1 XenApp Server. Now, we can add new connection in citrix program neighborhood to layer 2 so that we can access applications/console of layer 2 servers. By this we can access Layer 2 servers via VPN/browsers which don't even have web-interfaces (Platinum Licenses). This helps serving the published applications on layer2 servers to be accessed by a number of employees concurrently without purchasing licenses and without increasing cost. Also, the middle layer can be used to act as a proxy server which monitors the requests of clients and can prevent any unauthorized access. In this way it is possible to reduce cost & increase security in XenApp servers without violating any terms.

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4. CONCLUSION

It is possible to reduce cost & increase security in XenApp servers. But this can only be implemented in very large scale organizations. This is of no use in small or middle level organizations. Citrix platinum licenses having web-interface feature is quite expensive so it can reduce excessive cost by introducing this new approach/architecture. Monitoring can be done on Level 1 centralized servers. Users can be asked for authentication at both levels and can be avoided via use of SSO. Aim of implementing this architecture is better security, flexibility and reducing cost.

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