Deployment of Web Application in LAN based 3 Tier Architecture

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ABSTRACT

In the Client-Server architecture, any of web and desktop application that can be deployed with the help of 3-tier application architecture. It is consisting of a presentation layer, an application layer and a data layer. All their layers do play vital role in the 3-tier architecture for performing variety of operations including business logic, storage of data and handling request. In this paper, we presented deployment process of any web application in the local area network where database and application are located on the remote or web server. Other clients only access the application via specific IP address and valid credentials. The entire request transmitted through the client application and send to the web server. Web server does provide resulted data to the requested client via the web application. We identified several loopholes from the 3-tier architecture adoption perspective and we highlighted the web application deployment interoperability issue that deserves substantial further research and development. In this paper, we investigate several tools and techniques including web server, database server and front-end tools for the successful deployment of the web application in the LAN based 3-tier architecture.

Keywords : LAN, 3 Tier, Middleware, Web Server, DB Server, Firewall, Web Client, HTTP,TCP/IP,DB Client, Policy, Roles and Server-Client Script, Xampp, HTML ,PHP.

I. INTRODUCTION

3 Tier Web Architecture is that unique system of developing web database application, which works around the 3-tier model, comprising of database tier at the bottom, the application tier in the middle and the client tier at the top. This comprehensive 3-tier architecture module is the framework for most Web Applications on the Internet [1]. This system helps to separate the business logic from the application, data storage and database. Our teams of experienced and highly efficient technical staff develop the most unique and exclusive web application development in the web 3-tier architecture to enhance our clients businesses.

The Three Tier Web Architecture is design to provide a greater degree of flexibility and increased security that can be design for each service at each level. This unique system of framework for web application development with the 3-tier web architecture also ensures that there is increased performance as the task is shared between servers. Web 3 Tier architecture is a connection and composition of the three links that facilitates the smooth functioning of the website.

II. TRADTIONAL ARCHITECTURE OF 3 TIER

3 Tier application architecture is characterized by the functional decomposition of applications, service components, and their distributed deployment, providing improved scalability, availability,

manageability, and resource utilization. During an application's life cycle, the three-tier approach provides benefits such as reusability, flexibility, manageability, maintainability, and scalability. Each tier is completely independent from all other tiers, except for those immediately above and below it. You can share and reuse the components and services you create, and you can distribute them across a network of computers as needed [3]. You can divide large and complex projects into simpler projects and assign them to different programmers or programming teams. You can also deploy components and services on a server to help keep up with changes, and you can redeploy them as growth of the application's user base, data, and transaction volume increases.

Logic layer is moved outside the presentation layer and into the business layer as it enhances reuse. As applications grow, applications often grow into other realms [2]. Applications may start out as a web application, but some of the functionality may later be moved to a smart client application. Portions of an application may be split between a web site and a web or windows service that runs on a server. In addition, keeping logic helps aid in developing a good design (sometimes code can get sloppier in the UI).
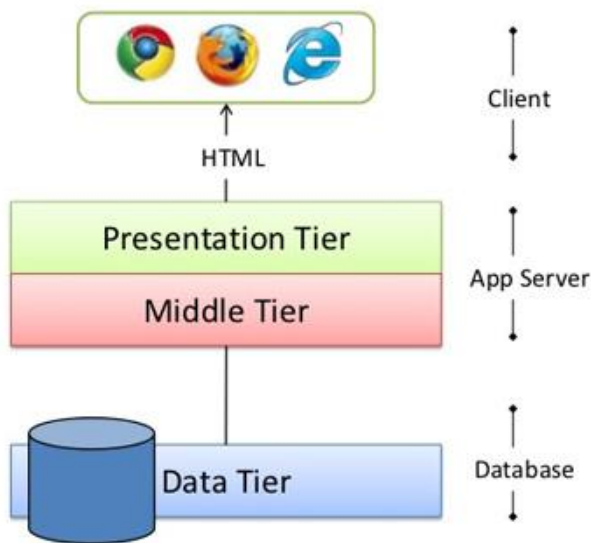
Although current web architectures use almost the same application protocol as first web servers did, their internals have changed considerably. Especially the rise of dynamic web content has had a reasonable impact on architectural concepts. As the web has been growing, tiered architectures appeared that separate different responsibilities of architectural components. Growing architectures also demanded for ways of scaling web applications, and load balancing has established itself as a decent mechanism [4]. We now have a look at the integration of dynamic content into web applications and consequences for servers by giving an overview of different technologies. Then we examine the concept of tiered architectures and load balancing.

III. TIER ARCHITECTURE OF WEB APPLICATION

The first tier in this 3tier web architecture framework for efficient web application development is the client tier. This tier includes usually is a web hosting that includes the HTML recourses that has the necessary user interfaces to enhances the client's experience, as it is the computer that requests the resources, equipped with the most attractive user interface in adherence to the client's taste depending on the industry of this business website.

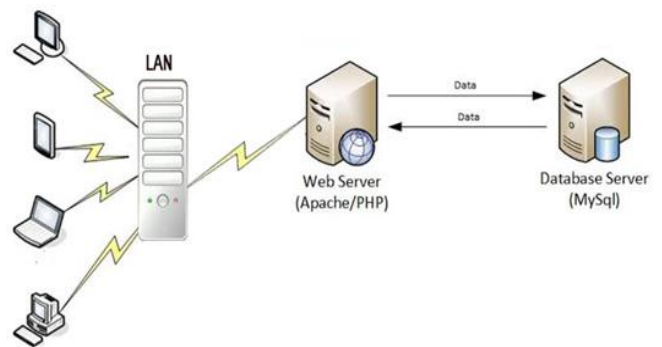
Figure 1 : Traditional 3 Tier Architecture

Figure 2 : Web Application in LAN based 3 Tier Architecture

The first tier in the three tier system of architecture comprises of web browsers for HTTP clients that efficiently interacts and co-ordinates with the Web

servers using the most convenient and standardised protocols. In this 3tier web architecture web application development module, the client is very often referred to as the tier since very little application logic resides in this particular tier. This tier also has the necessary built-in feature system, which efficiently has more rich-features than the essential display html page. This tier essentially interacts with the client by displaying data of various kinds. Only browser, nevertheless having limited feature and usage [5], essentially executes few of the application logic in form of java script. The sole feature benefit and technical advantage of the 3tier architecture is that it does not have to depend on any operating platform and neither on any added or additional software.

The second or the middle tier comprises of the most magnificent and the most important part of the application logic. It essentially plays the role of bringing together the three layers of the three tier web architecture. While technically processing the various inputs and selections received by the clients it plays the role of interaction with the vast database present in the third tier. The middle or the second tier in the three tier web architecture contains the web server, the web scripting language and the scripting language engine [7]. The Web server most often processes the HTTP requests and formulates reciprocation in the scripting language running on the scripting engine. This tier has the technical efficiency to deal and comprehend the dynamic content and built-in libraries that accentuates the faster access of the database to extract results.

The third tier of the database tier in the 3 tier system is made up of the DBMS in other words the database management system and the database. This complex application layer consists of the application logic while exchanging data in between tiers in the three tier Web Application, making the top tier mostly a thin client or a browser [8]. The first tier is therefore the data server, providing clients an application server with all

the necessary data that it may require in order to function.

In the web development field, three-tier is often used to refer to websites, commonly electronic commerce websites, which are built using three tiers:

❖ A front-end web server serving static content, and potentially some cached dynamic content. In web-based application, front end is the content rendered by the browser. The content may be static or generated dynamically.
❖ A middle dynamic content processing and generation level application server (e.g., PHP, Spring, ASP.NET, Django, Rails, Node.js).
❖ A back-end database or data store, comprising both data sets and the database management system software that manages and provides access to the data.

IV. DEVELOPMENT TECHNOLOGIES

We proposed a 3 Tier robust architecture for the deployment of Web Application in the Local Area Network (LAN) that gives developers to develop, test and deploy their web based application in one comprehensive environment. Distribution takes place on the same platform on which it is developed, avoiding additional software and hardware conflicts for clients [6]. Also, this single platform environment frees the developer from the need to tailor their applications to work on various OS and hardware.

We can easy to deploy Web Application along with 3 Tier architectural framework of the LAN. It does provide independent platform which has deployment capabilities and efficiency for running web application in the Lan based 3 Tier architecture [9]. For deployment, we need to use following tools and technologies :

❖ **Setting up Local Environment**

We need to set up and configure local area network with no. of clients which are interconnected with each other for sending and receiving data through the web application in the LAN.

❖ **Web Server (XAMPP Apache Server)**

We need to install and configure XAMPP Web Server on the server computer for deploying Web Application, which is based on the PHP server side scripting language.

❖ **Database Server (MySQL/PHPMyadmin)**

We need to setup Database Server (MySQL/PHPmyadmin) on the Web Server which is used to distributed data for all the clients via the Web Server and Database Server.

❖ **Setting Up Web Client with Unique IP in LAN**

Setting Up and configuring Web Client with an unique IP Address or Network ID that is used to interact with Web Server in the LAN in 3 Tier Architecture.

❖ **Roles and Privilege for each Web Client**

We need to assign Roles and Privileges for each web client to access application and database through the web server in the local area network(LAN).

❖ **Setting up Firewall for the Security in the LAN**

We Need to setup and configure Firewall for the security of Network to prevent any network attacks and secure the database and application.

V. DEPLOY A WEB APPLICATION ON LAN BASED 3 TIER ARCHITECTURE

When we complete all the tasks related to setup and configuration of LAN and Web Server. System starts acting like a web server to all the other computers in network with when offline and to all the systems of world when online that is web server not only accepts

local network requests, it can respond to the internet requests too [10]. Suppose there is a network of 4 systems has given configuration. So we can define each web client and server with the following configuration of network.

System-1 : IP : 192.168.1.50 (Web + Database Server)
System-2 : IP : 192.168.1.51
System-2 : IP : 192.168.1.52
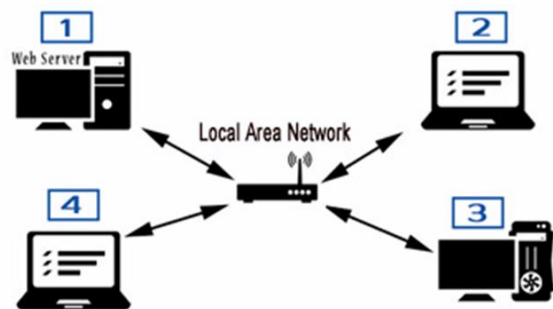**System-2 : IP : 192.168.1.53**

Figure 3 : Deployment of Web Application in LAN

Here in this configuration System-1 has Web server and database installed it can be any web server stack application out of available in market and as above mentioned WAMP and XAMPP are most popular ones and System 2 to 4 are in network with it using a LAN or Wi-Fi router [11].

Now the other systems connected to the same network are able to access the web root directory of server using web browser, when server is online.

Start the web server on system-1 and the put web app inside the server's recommended directory (mentioned in the installation posts given above).

Now it is accessible around the network using the IP address of the web server. Go to systems other then web server and inside web browser access the app using web server's IP as given.

URL:http://192.168.1.50/name-of-the-web-app

name-of-the-web-app is the name of the folder contains index file of web app inside server directory.

example : Web app folder name is: "myApp"
URL: http://192.168.1.50/myApp

Each web client of this network can access the application from the web server through server ip

Web Client IP : 192.168.1.51

Web Server URL : 192.168.1.50/myApp

The data submitted on the web app using forms or other way will be on network and stored on the web server database or file system. It completely depends upon the application script or code irrespective of the systems. so, here data submitted from web app will be stored on System-1(Web Server).

VI. CONCLUSION

Thus, the framework of Web Application is 3 Tier LAN based Architecture and an ideal solution to deploy any web application on the LAN so it's easy to access the data across the network through the web and database server. It will be beneficial for the business organization to execute web-based intranet application. In addition It does allow for easy and quick expansions in the local area network.

VII. REFERENCES

[1]. Ghetas, M., Yong, C., & Sumari, P. (2016). A survey of quality of service in multi-tier web applications. KSII Transactions on Internet and Information Systems, 238-256.

[2]. Mumtaz A. and Sarmad H., "Developing a Three-Tier Web Data Management Application for Higher Education Admission Environment", International Arab Journal of e-Technology, Vol. 2, No. 4, June 2012.

[3]. Wells L., Christensen S., L. Kristensen M., and Mortensen K. H., "Simulation Based Performance Analysis of Web Servers", 9th International Workshop on Petri Nets and Performance Models, 2001.

[4]. Diane C. and Sajal D., "Smart Environments: Technology, Protocols and Applications", Wiley Inc., ISBN: 0471544485, pp. 101-127, 2004.

[5]. Darleen Sadoski, Santiago Comella-Dorda, 2000. Three Tier Software Architectures [online]. http://www.sei.cmu.edu/str/descriptions/threetier_body.html [Accessed 21 March 2009].

[6]. Roy T. Fielding and Richard N. Taylor. "Principled design of the modern web architecture". In ICSE 2000 Limerick Ireland, 2000.

[7]. Zhang, H. (2013). Architecture of Network and Client-Server model. arXiv preprint arXiv:1307.6665.

[8]. The definitive guide to PHP's DocBook Rendering System Available: http://www.php.net/, accessed July 2016

[9]. "Downloading and installing XAMPP". Udemy. 2015-04-21. Archived from the original on 2015-06-19. Retrieved 2015-04-21.

[10]. Jeremy Petersen. "Benefits of using the n-tiered approach for web applications THURSDAY, SEPTEMBER 4, 2008

[11]. https://www.dotscreated.com/deploy-web-app-offline-on-local-network