



## **SOFTWARE ANALYSIS FOR SETTING UP A UNIFIED COMMUNICATION SYSTEM**

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### **ABSTRACT**

In the last few decades, the communication industry has seen a large development. With increasing technology, newer solutions have become available. Many companies have come up with a IP telephony platform of their own. These solutions can be purchased by organizations for carrying out their day to day communication needs. As a part of this Research paper, we are going to discuss the solutions of some of these vendors. We are also going to discuss solutions for Unified Communications and prepare the environment for running one of the solutions.

**Key words:** Unified Communication system, Skype for Business, Sametime, Unison, Elastix.

### **INTRODUCTION**

In traditional days, communication was much different from what we see today. Communication has evolved from sending messages using birds to sending messages with a click of a button. In earlier days, communication was possible only through limited sources. With time, technology came into play and we got the telegram, followed by the fax, telephone and now even the Internet. Communication has also evolved from one way communication to two way communication to multi- party video calls. Now, we can make a video call from any corner of the world to the remotest locations on the globe.

Initially, the only form of communication that existed in the organizations was telephone. Later, fax came into picture. The telephone network within the organization was handled using a Private branch Exchange (PBX). These private branch exchanges were provided by the local telephone service providers. The only option which the organizations had was to rent the private branch exchanges from these service providers. Later, the Internet came into picture and the communication started shifting from circuit switched networks to packet switched networks. The organizations started using Internet Protocol (IP)

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for sending voice messages. This is also termed as IP Telephony or Voice over IP (VoIP). Many organizations have come up with their own IP based solutions. These include Cisco, Mitel, Polycom, Microsoft, Avaya, IBM, Dell and the list goes on.

When we combine IP Telephony with other form of communications such as Instant Messaging (IM), Video conferencing, application sharing, presence, we come up with what is called as Unified Communications. The unified communications market has developed drastically from 2005 to 2015 and it is expected to grow by about 10.50% from 2015 to 2020. This is one of the developing field and constant research is going on in this field. This has been a great motivation for companies like Microsoft, Polycom and Logitech and so in 2010 they came up with the Unified communications Interoperability Forum<sup>3</sup>. In this paper, we will be discussing four solutions that help you to build a unified communication system. These include Sametime, Unison, Elsatix and Skype for Business.

The Second section is going to discuss all the four solutions, the third section gives a base for setting up Skype for Business servers, the fourth section discusses the future work and the final section is conclusion followed by acknowledge and references.

### **Unified communication platforms**

We have discussed all the four solutions stated above in this section and given a basic overview of how each platform works.

#### **A. IBM Sametime**

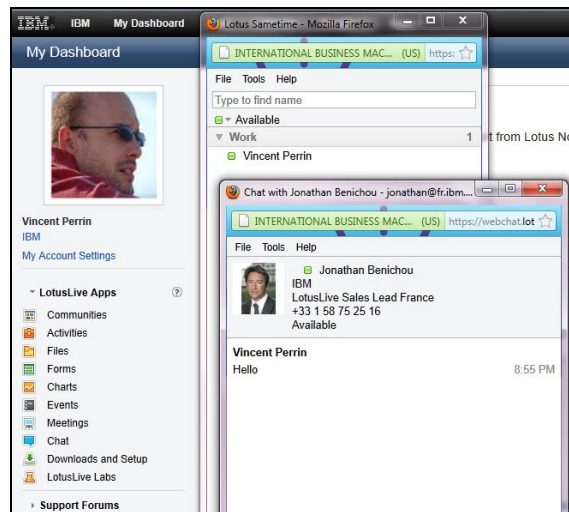
The first solution is the Sametime which is sold by IBM. The lotus software department of IBM, which is also known as Lotus development corporation before it was acquired by IBM, is responsible for selling the Sametime platform. The Sametime platform<sup>4</sup> provides the capability of developing a unified communication system. The type of solution that we have developed and the features included, depend on the instance of Sametime that we have installed. IBM Sametime is a client-server enterprise application<sup>3</sup>. From the users point of view, IBM has developed IBM system connect client and the users can make use of this for IM, video conferencing and other services. The system administrators on the other hand make use of the IBM Sametime server for controlling and administering the servers. The IBM Sametime consists of four functional levels.

The first one is the IBM Sametime Entry and it is used for basic IM and presence. Presence is a functionality using which we can know the present status of a person. This helps us in getting in touch with the person. If the presence status of a person is available, it means that the person can be contacted. On the other hand, if the person is unavailable, he or

she cannot be contacted and must be contacted at a later stage. The second is IBM Sametime Standard and it has a lot of additional functions as far as IBM Sametime entry is concerned. Sametime standard provides rich presence and also other features like media sharing, video chat, group chat, multi-way chat, web conferencing. It also allows us to integrate with other applications and also allows us to connect to public IM gateways like Yahoo!, AOL using IBM Gateways.

The third one is IBM Sametime advanced which is an upgraded version of IBM Sametime standard and provides social networking functionality<sup>3</sup>. It also consists of persistent chat rooms, instant screen sharing and geographical location sharing. The fourth one is IBM Sametime Unified telephony. It has many more features when compared to IBM Sametime advanced and standard such as telephone presence, incoming call management, click to call and many others. Thus, based on the requirement of the organization, the particular type of functional level can be implemented.

The Fig. 16 below shows the IBM Sametime client. The complete documentation of the IBM Sametime can be availed from the Lotus website<sup>5</sup>. Apart from this, the documentation required for programming the software for integration with other applications can also be obtained from this website.

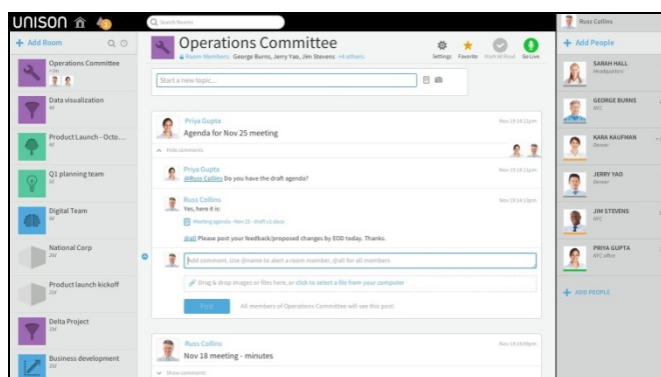


**Fig. 1: IBM Sametime interface**

## B. Unison

Unison is a freemium<sup>3</sup> software solution, which is developed by Unison

Technologies. It is very different as compared to IBM Sametime. In IBM samtime, we have different levels of functionalities, whereas in case of Unison there are fewer functions. Unison allows us to perform IM as well as video calling. Unison has different type of topics that it supports. You can create a number of topics and discussions related to that topic are carried out in the organization. The members of the group can share media and also involve in HD audio calling<sup>9</sup>. Apart from this, Unison also supports one to one HD Audio for team meeting and discussions. Organizations that are much more involved in working with projects will find Unison a good platform for carrying out their discussions. The Fig. 26 below shows the interface of Unison collaboration platform. On the left side we can see all the different groups for various topics and below the name of the group, the users that are currently engaged in discussion for that topic. On the left side panel, we can see all the users involved in the current discussion that the user is engaged into. We have options to start a HD Audio call at the top.



**Fig. 2: Unison collaboration software interface**

### C. Elastix

Elastix is another platform for developing Unified Communication systems. It is an open source software that runs on Linux operating system. The main goal of Elastix is to incorporate all the communication alternatives that are available at an enterprise level into a unique solution<sup>9</sup>. Elastix can also be developed on Arm as well as raspberry pi boards. Unlike Skype for Business 2015, Unison and IBM Sametime, Elastix does not support Presence. But, the other functionalities that Elastix provides include IM, Fax, Telephony, Video and Email. Elastix makes use of Asterisk<sup>1</sup> as a kernel for building Unified communication system. It makes use of Free PBX for implementing PBX to support telephony and Hyla FAX for implementing Fax servers. It also makes use of Open fire as an Instant Messaging and Group chat server and Postfix as an open source Mail transfer agent that routes and delivers messages using Email.

Elastix was the first distribution that included a call centre module with a predictive dialer which was released entirely as a free software<sup>3</sup>. This module for predictive dialer can be downloaded from the web based Elastix interface through a module loader<sup>3</sup>. Elastix has a very good for Telephony. Zaptel project or modified versions of it are used to support drivers of Telephony or Elastix. The drivers from companies like Digium, Xorcom, Yeastar, Rhino equipment Dinstar, Open Vox are supported by Elastix. Asterisk supports SIP and IAX protocol<sup>3</sup>. Hence, Elastix supports other phone brands that and Video calling<sup>9</sup>. Unison has a different type of Presence. In other platforms like IBM Sametime and Skype for Business, Presence indicates the current status of the user, whether available, busy or unavailable, Unison gives us information about which topic and group each user is focused on. This helps us in involving in a particular discussion. Unison is apt provide SIP phones. As far as licencing is concerned, Elastix is licensed using the GNU General public licence.

Elastix also provides an option for developers to develop add on software. The documentation for making an add on can be availed using the development documentation that can be obtained from the official website<sup>7</sup> of Elastix. The documentation also provides solutions for trunking between two Elastix servers using either the Internet or using VPN. The Fig. 38 below shows the dashboard for Elastix. As we can see, the dashboard gives the overall status of the Elastix servers. It also tells us about the status of the functions. We can switch between tabs for the various functions and modify permissions for the same. We can also monitor the status of each service for a particular user and for all the users combined. For instance, we can monitor the data used by each user for voice calling for a particular duration using this dashboard.



**Fig. 3: Elastix dashboard interface**

#### **D. Skype for business**

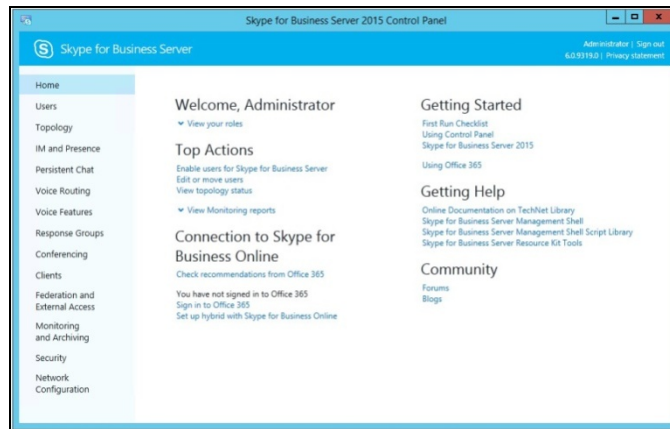
Skype for business 2015 is a platform introduced by Microsoft for developing a Unified Communication system. The earlier version of Skype for Business was known as Lync2010, which was later named Lync2013. In 2015, Microsoft came up with Skype for Business 2015 which had an improved user interface as compared to its previous versions. Like IBM Sametime and Unison, Skype for Business also supports Presence. In case of Skype for Business the presence provides information in a manner similar to IBM Sametime. Apart from this, Skype for Business also provides functionalities like IM, video conferencing, PSTN dial-in conferencing, Persistent chat, Call monitoring, high availability, application sharing and Mirroring. As far as PSTN dial-in and video conferencing is concerned, upto 25010 users can involve in a conference call. Skype for Business also provides functionality for Edge servers, which can be used for communicating with users that are outside the organization's boundary. For this, the Skype for Business servers make use of XMPP10 protocol. Skype for Business also provide support for mobile clients. Thus users with Nokia mobiles, android devices and even devices with iOS can connect with other users.

Microsoft has also provided the option for developers to develop advanced solutions using Skype for Business. For instance, users can make an audio call in a new window by just making use of certain keywords. The programming for such type of application needs to be done in either XAML coding or C# coding. The entire documentation for developing such applications can be found on the Microsoft Technet<sup>10</sup> and Microsoft MSDN<sup>11</sup> websites. The websites also provides the documentation for deploying the Skype for Business servers with any function that we want to implement.

The Fig. 4 below<sup>6</sup>, shows the Skype for Business server control panel. This panel can only be accessed by a person holding administrative rights. The panel is accessed using the administrative URL that is developed while setting the server. As we can see on the left side of the panel we have options for selecting users, topology, IM and presence and soon. These are used for setting up the permissions and policies for the function that we choose. The users can be managed using the users tab, where as the topology information including the servers deployed can be seen using the Topology tab. The conferencing tab can be used for making the conference policies including the maximum number of users in a conference call.

As we can see by comparing the four solutions above that we have a variety of options available when it comes to developing a unified communication system. These are only four solutions in particular and they have been selected randomly. We have other

solutions available too. The type of solution that an organization wants to adopt, depends on the needs of that particular organization. Thus, if an organization is more project oriented, Unison is the preferred solution. For an organization having a large number of users and which has frequent video conferencing with a large number of users, Skype for Business is the apt solution. If any organization plans on deploying telephony on a large extent, Elastix is the way to go. In this research paper, we are going to discuss implementing Skype for Business servers in particular.



**Fig. 4: Skype for business server control panel interface**

## Setting up servers

As far as Skype for Business is concerned, Windows Servers are the best solution. The server that we must install depends on the platform that we plan to install. For instance, Skype for Business servers can be set up on Windows Server 2008, 2008 R2, 2012 and 2012 R2 standard as well as Data centre versions. Also, we need to fulfil the hard disk requirement for setting up the servers. Based on the functions that we plan to implement, the hard disk requirement of the deployment varies. We also need to prepare SQL Servers as they are going to act as the primary store as well as the central management store for the deployment.

Since a licenced copy of windows would cost a large amount, we are going to implement the servers on a virtual machine. We are going to make use of the virtual machine from VMW are which is a free version to work with. This particular installation for Skype for Business server is going to require two installations of windows servers. One of them is going to be required to control the domain, which is also known as a domain controller and the other one will be used to install the Skype for Business servers. The number of Windows

servers to be installed is going to depend on the number of Skype for Business servers that we plan to deploy. Since we plan to deploy a Standard edition server, we are just going to install a single server.

After the servers have been installed, we need to get the servers prepared for installing the Skype for Business servers. This is going to involve getting the necessary roles installed on the Windows server. The Microsoft Technetwebsite<sup>10</sup> can be referred for selecting the particular roles that need to be installed. After the roles are installed, the setup can be run. First, we need to run the Prepare active directory step. Once the step is completed, we need to run the “Prepare First Standard Edition Server” step. After this step is completed, we need to publish a topology and set the required URLs. The final step is installing the servers and starting the services. Once the servers are created and running, we need to create two users and enable them as discussed in the Skype for Business control panel. Finally, we can sign in to Skype for Business client using these users and have an IM conversation between the Users.

### **Future work**

So far, we have learnt about the various platforms that are available for setting up a Unified Communication system. We have also grabbed the idea of setting up the server for one of the platforms. As far as this paper is concerned, we have installed evaluation versions two Windows servers on a VMW are virtual machine. The future plan of this paper includes setting up the desired server roles that are required for running Skype for Business servers. Once these roles have been installed, we will move forward to installing Skype for Business servers. Once the servers are up and running, we will move forward to creating the users and sending IM between the two users using Skype for Business client. We will also look into developing applications using the Skype SDK.

## **CONCLUSION**

Communication when carried out in an efficient way has proven to be very effective. With the increasing technology, better means of communication need to be developed. Keeping this in mind, many companies have come up with their own solutions for providing a private branch exchange. Some of them have even come up with solutions for implementing a Unified Communication system. Depending on our needs, we can select the type of platform on which we want to set up our Unified Communication system. We have successfully installed two installations of Windows Server 2012 Data centre evaluation version. We are now going to install the server roles and set up Skype for Business Servers. WE are also going to test our solution by sending IM between two test users.



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