Instant messaging using xmpp

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Abstract—This paper discusses a web based instant messaging application based on XMPP protocol. This application can be used from any platform to send and receive texts and also be used for push notifications and broadcast news across the clients. The paper discusses the client server architecture in a single server system that can be used in smaller organization for secure message delivery. The clients can also use group chats or multi user chat rooms other than individual chats. The scope of the proposed application can be expanded to and not limited to file sharing system to share files(.pdf, .ppt, .docx) and multimedia files(.jpeg, .jpg). A daily task list or timesheet can also be added so that employees can use this application to add or remove daily work reminders.

Keywords: XMPP, messaging, broadcast, prosody IM

1. Introduction
In the present day scenario, an organization cannot exist without a proper channel of communication between the employees, staff and higher level authorities. To overcome this challenge most organizations use certain applications on a subscription basis to provide its employees a host of services. This method can generally be profitable for larger organizations but smaller organizations suffer due to high prices of such subscription services. Also many times companies and organizations come across the incidents of data theft and communication leaks that happen due to less secure communication with third party services. The proposed application aims to reduce such incidents as the account creation privileges would be with the admin only, admin would be notified every time an employee logs in or logs out. Another functionality of the XMPP is that it also gives out presence status of the client, i.e. if an employee is away from his workplace or is not working during the office hours then the message won’t be delivered if he/she is unavailable. It will instead notify the sender that the recipient is simply unavailable at the moment.

This application is developed by keeping the smaller organizations in mind that by the use of this application can save their revenue and utilize it someplace else. The application is particularly useful when the organization has to broadcast some information to all of the employees. As it is a web based application, it can be accessed by employees irrespective of the device category or the type of operating system.

2. Working with xmpp, prosody im, strophe.js
XMPP or Extensible Messaging and Presence Protocol is an open source technology for instant and real communication, XMPP or Extensible Messaging and Presence Protocol is an open source
technology for instant and real communication, which enables a wide variety of applications including instant chat applications, notification push, etc. This protocol is not dependent on any type of network architecture, yet it is mostly implemented on client server architecture. Application layer wise XMPP is similar to other protocols like SMTP, however main difference is that users are able to send messages in the chat, multi chat or notification headline, i.e. uni-cast, multicast and broadcast. To understand XMPP in detail, we’ll explain it in detail from X to P.

X- It is defined in an open standard and is using open approach i.e., it can be modified for individual use and application. It is extensible, which means it can be modified and take in changes very well.

M- It is very well designed to send all communication messages in real-time using an effective algorithm and mechanisms. The most important feature of this protocol is that it is secure and encrypted.

P- The presence protocol when transmitted by the server tells if the receiver is available to receive the messages.

P- As XMPP is a protocol, a bunch or set of rules and standard for various devices to communicate.

![Figure 1. Data flow for presence status of the user](image)

Prosody is latest and modern XMPP server software. It is very simple and easy to set up and configure, and does not take up much system resources. Moreover, it is very easy to modify and change, even test it with new protocols. It is one of the most efficient server software, as it can easily run on even a 1GB of RAM. Other benefit of prosody is that much of its components are modular that can be accessed to add or remove functionalities to the application. It can also be linked with other XMPP servers on a network and work as a multi server system. It is open-source software which can be categorized under the MIT/X11 license. It is highly efficient and secure; all the communication that takes place is encrypted. The most important of all the modules in the prosody is “BOSH” it allows communication over http, which is the most important for the proposed model Strophe.js is used to deal with website-based XMPP messaging applications that can run on any web-browser. It was originally developed for some chess based online community called chessspark which used XMPP for communication. It consists of several classes or functions that help to establish connections. It is basically a library that's used for XMPP BOSH. Since JavaScript doesn't provide much useful features to deal with TCP internet connections, this system uses Bidirectional-streams Over Synchronous HTTP or BOSH to make connections with XMPP server. Strophe.bosh is mostly used to establish a communication, which is helper class. It handles BOSH connections. It is a private class and thus cannot be manipulated or overridden by the
user. Strophe.webSocket is a private helper class that handles WebSocket connections. WebSocket protocol is used for communication. The web socket protocol helps in two-way communication, i.e., the sender and receiver can send messages to each other simultaneously. It follows full duplex communication. This helper classes provides us a way to establish server connections.

3. Proposed model

The proposed application is based on client server software and consists of various features that will help the employees in an organisation to be more productive and efficient. It will help the employees connect with other employees and staff, receive messages and information over text, create multi user chat rooms and view the presence status of other employees. The organisation will benefit from this application financially and make them independent on deciding what services they want to utilize without having to worry about the cost of the service. They can receive regular news about the organization through broadcast messages.

Nowadays with the onset of technology, more and more organizations are observing a decreasing trend in the productivity and efficiency with their employees constantly trying to avoid work and spend the time elsewhere, with this application the employee has to be logged in during the office hours moreover their presence status would change every time their computer gets into idle or standby state. The users can also change the presence status on their own while being online.

![System Architecture for proposed system](image)

**Figure 2.** System Architecture for proposed system

A. **Advantages**
1. Secure and encrypted transmission.
2. Real time and instant message delivery.
3. Reduction in cost due to third party services and application development is relatively cheap as most components are open source.
4. Services and modules can be modified to tailor the organization’s needs.
5. Visible presence status of the user.
6. Users (employees) get quick update or new from the company real-time.
7. XMPP consumes only one half of total resources as compared to other protocols like SIMPLE.

B. **Disadvantages**
1. The control of the session is not good as compared to SIMPLE as it is fairly simple in relation to SIMPLE.
2. XMPP suffers from some deficiencies in case of multimedia sessions which need to be improved.

C. **Login and Registration**

Every user for the communication system would have to be registered by the admin only who can then register with a new registration id (jabber id) on the server. The registration privileges are kept with
the admin. Every user must have to use their own jabber id to access messages and other information. Whenever a user logs in into the system, every time the admin will be notified of the action. Admin has certain other rights including to send out broadcast messages throughout the network.

4. Conclusion
In this paper the promising applications of XMPP for a secure and economically feasible application for communication other services is studied. The proposed web based application has all the services that a small organization might need and also provides a scope for growth and improvements if certain requirements aren’t met for an organization. The simplicity of the component used makes it easier to use and maintain. According to certain smaller organizations, they spend almost 15% of their revenues for 3rd party services and many times they end up spending for certain services that aren’t much useful but come with the subscription. The proposed system will be helpful for such organizations to replace those services or not have them at all, while saving their revenues for other useful things. The most important advantage of the proposed system is that the existing network architecture and hardware can be used and no further cost are involved as the prosody can be installed in any ubuntu system, even a desktop can work as a server for communication.

5. References
[1] Robert N. Lass, Joe Macker David Millar, William C. Regli and Ian Taylor , “XMPP Overlay Service for Distributed Chat”, Military Communications Conference, 2010.
[2] Adrian Hornsby , Rod Walsh, “ Instant Messaging and Cloud Computing, XMPP Overview”, IEEE 14th International Symposium on Consumer Electronics, 2010.
[3] Krishna Kumar J.N.G, Madasamy M, Malik Bathusha M, Sivakumar.V, “Efficient file sharing system using XMPP (Let’s Share)”, IEEE International Conference On Recent Trends In Electronics Information Communication Technology, May 20-21, 2016, India.
[4] Yizhi Zhang, Liang Hongxing , “A New Scheme for IM based on XMPP/SIMPLE”, International Conference of Information Technology, Computer Engineering and Management Sciences, 2011.
[5] Oral Gürel, Mehmet Ula Çakir, “IEEE 37th Annual Computer Software and Applications Conference”, 2013.
[6] MinXiou Chen and Fu-Ju Wang, ”Session Integration Service over Multiple Devices”, International Journal of Communication Systems, 2010, February.
[7] http://xmpp.org/extensions/
[8] P. Saint-Andre, K. Smith, and R. Tronçon, XMPP: The Definitive Guide, Building Real-Time Applications with Jabber Technologies, O’reilly, 2009
[9] Qingran-Wang, Junyan-Li, “Protocol application research of SIMPLE and XMPP in instant message products of telecom operators”, IEEE 3rd Advanced Information Technology, Electronic and Automation Control Conference (IAEAC 2018), 2018.
[10] P. Saint-Andre, XEP-0045: Multi-User Chat, http://xmpp.org/extensions/xep-0045.html
[11] https://prosody.im/doc/modules
[12] https://prosody.im/doc/configure
[13] http://xmpp.org/software/clients.shtml
[14] http://xmpp.org/software/servers.shtml
[15] http://xmpp.org/software/libraries.shtml