INTRANET INFORMATION AND COMMUNICATION SYSTEM USING NOSQL

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Abstract

The idea to make something useful for communication with own infrastructure has led us to development of "Intranet Information and Communication System using NoSQL" .The application focus on area where connectivity problems arises frequently or those organizations who requires their own communication facilities. In most of organizations they have their own intranet but still it doesn't provide them flexible communication. The word NoSQL specifies that instead of storing data in traditional format such as in tabular format, here it is stored in KEY-VALUE pair which makes us to efficiently handle and manage the data so that we can keep the record of historical data. The audio and video calling services are implemented with help of WebRTC. The development of such system makes the organization independent for communication services from third party service providers.

Keywords—*Intranet, NoSQL, KEY-VALUE pair, WebRTC*

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1. INTRODUCTION

In day-to-day use, internet is way of communication. Use of various technologies as well as applications such as WhatsApp, Facebook, Hike, etc., is at greater extent but the problem arises when there is no internet connectivity or the place like Colleges, Offices or any Organizations where use of social networks are prohibited. But in large organizations if there is any technologies or applications which allows the people to communicate who are working in organization is present with own network and infrastructure then it is beneficial as they need not to depend on the internet. So the idea of intranet communication comes into picture.

The system is based on client server model which makes the communication flexible as it depends on logical address instead of physical address. The system has Thick client. For storage purpose system uses a MongoDb as database server which is basically supports the concept of NoSQL which allows storing the data in semi-structured format. As such system is used in formal communication or information sharing in organization so to maintain history of such communication or information is easy using this system.

The system provides text messaging, group chatting ,file sharing, centralized storage, event notifications by admin, video as well as audio calling facilities which are nearly equal to all the facilities as that provided by the application which runs on internet. Moreover, the system uses separate node.jssignaling server for video as well as audio calling service and video as well as audio calling is implemented using WebRTC which totally avoids the burden on communication server.

2. RELATED WORK

The Working of system is as follows:
1. Thereistwo types of login accounts in system one is for administrator and other is for user.
2. When user logins and make search he'll get list of registered users in system .User will send request to other users and if intended user accepts the request then that user will automatically added into first user friend list. Now he will select required receiver from friend list and able to send message, file or is able to make video call or make an audio call with selected user.
3. Whenan administrator logins then he'll get list of all users and is able to grant and revoke privileges for video calling, audio calling, file sharing to particular user's .So he is able to control behavior of the users in the system. Administrator is also responsible to grant permission for user group formation. Administrator has special facility using which he can send the notice to all users.

The system Architecture is divided into two parts.

2.1 Messaging Architecture

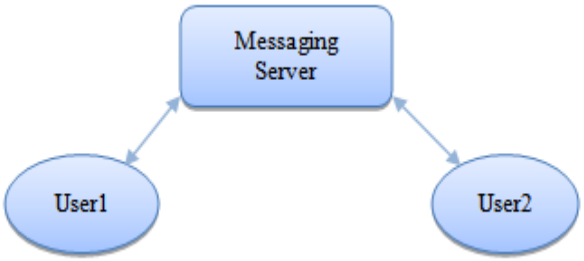

Fig Chatting Architecture.

i. Users willing to communicate with each other areservedby the messagingserver viz.MongoDb server.
ii. Messagingserver is responsible for receiveing the message from one user and delivers it to intended receiver.
iii. In same manner the Messaging server will also performs the group chatting and file sharing.

Following is the detailed working of Messaging server:

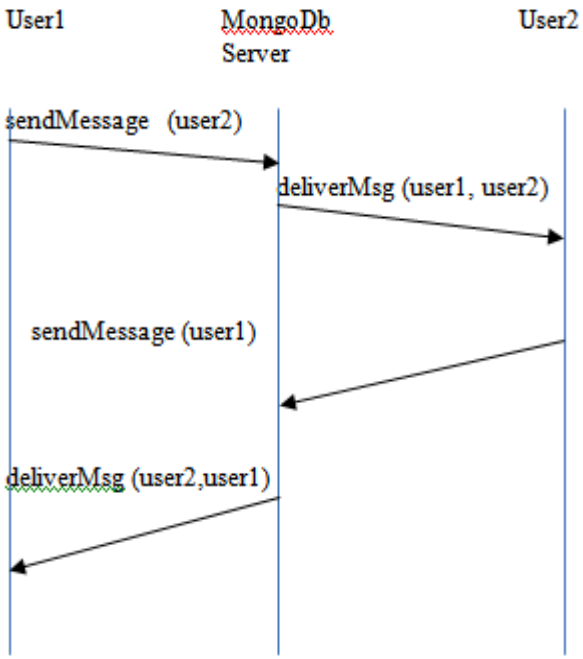

Fig. Messaging scenario

i. User 1 issues a sendMessage () requests to a Messaging server to deliver message for user 2.
ii. Messaging server stores the messageand delivers it to user 2 using deliverMsg ().
iii. When User 2 wants to replyto user 1 same operation will be performed as above.

2.2 Audio/Video Calling Architecture

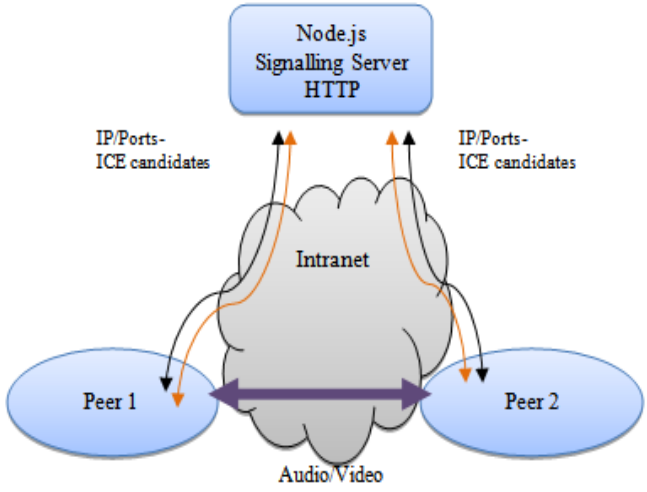

Fig: Video/Audio Calling Architecture.

HTTP
Socket.io
WebRTC

This system based on peer-to-peer model using WebRTC technology.

The client and the server communicate through a signaling protocol based on JSON messages over Web Socket ‘s. The normal sequence between client and application server logic is as follows:

i. Peer 1 is registered in the signaling server with its name
ii. Peer 2 is registered in the signaling server with its name
iii. Peer 1issues a call to Peer 2
iv. Signaling server check whether peer 2 in available if yes forward the request to peer 2.
v. Peer 2 accepts the incoming call request.
vi. The communicationlink is established between peer 1 and peer 2and media flows between Peer 1and Peer 2 and signaling server escapes from communication.

ICE stands for Interactive Connectivity Establishment is technique used for find ways so that two computer an communicate with each other directly. It provides IP address and port no from where the data is going to be exchanged, to achieve this functionality here RFC 5766 turn server is used.

Following is the detailed working of Audio/Video Calling:

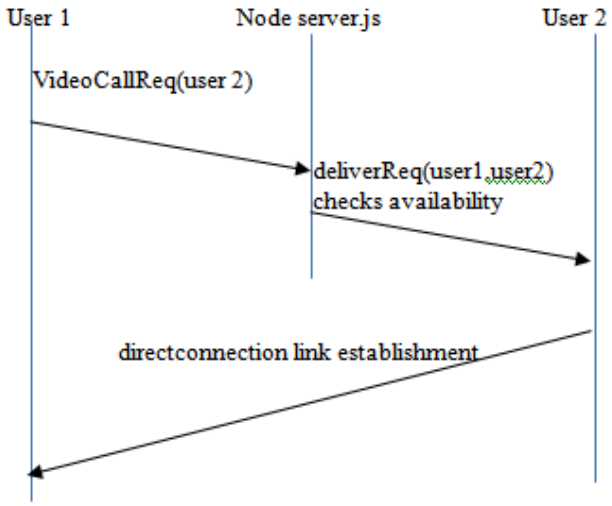

Fig. Video Calling scenario

Consider the scenario user1 wants to make video call to the user 2-

i. User1 issues a video call request to Node server.
ii. Node server checks if the User 2 is available or not.
iii. If User 2 is available direct link is established between User1 and User2 thereby escape of a Node server.

Fig. UI of Login Window

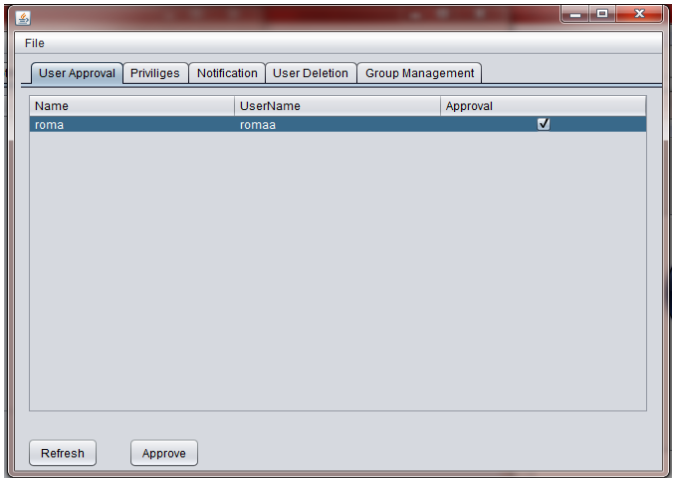

Fig.UI of Admin Window

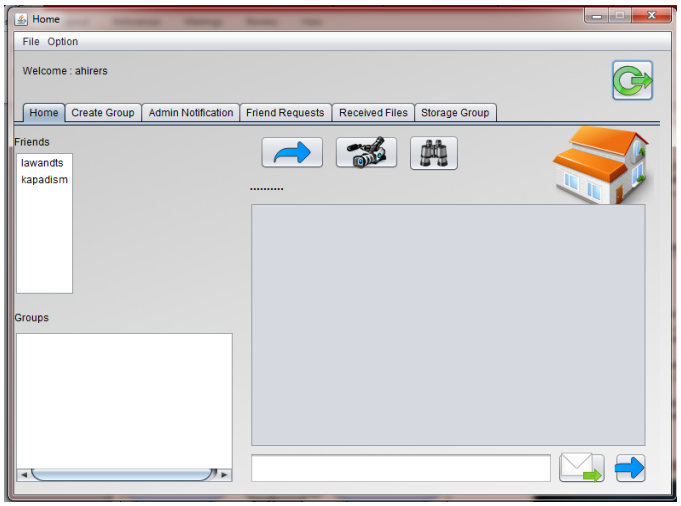

Fig. UI of Chatting Window

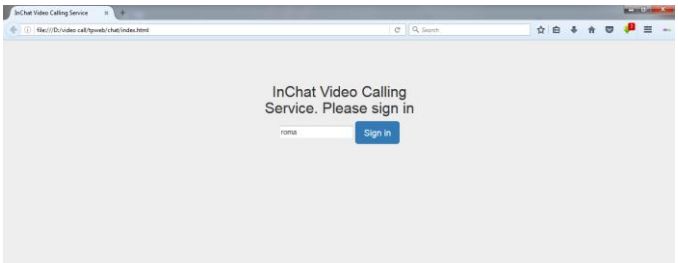

Fig. Video Calling Login Page

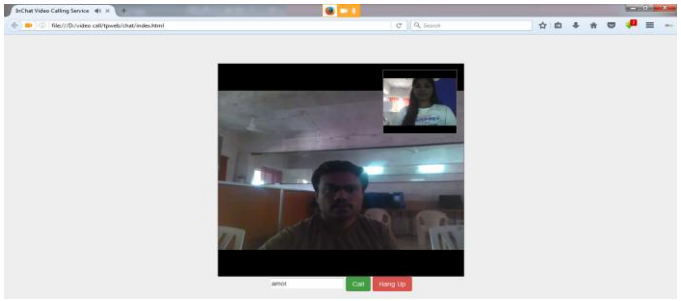

Fig. After call establishment

3. CONCLUSION

So we can conclude that application will provide the efficient way of communication within the organization. The system is fast, flexible as well as reliable. System keeps all data and information shared using it so easy to track the historical records. Instead of going through all the data from hardcopies i.e. files the data is available in digital format. The system is based on intranet hence the ongoing cost of internet is avoided. As system is based on intranet it is locally administrable and also makes maximum utilization of resources. The system uses MongoDb as a database server so efficient classification and fast retrieval of data is possible as data is maintained in the form of key-value pairs. Moreover as there's a separate node.js server for video and audio calling facility which escapes as soon as the link is established between the peers the performance of the system increases gradually hereby reducing the burden on the communication server itself.

REFERENCES

Paper

[1]. Yunhua Gu; Xing Wang; Shu Shen; Jin Wang; Jeong-Uk Kim," Analysis of Data Storage Mechanism in NoSQL Database MongoDB", Jiangsu Engineering Center of Network Monitoring, School of Computer & Software, Nanjing University of Information Science & Technology, Nanjing, 210044, China 2 Department of Energy Grid, Sangmyung University, Seoul, Korea,2015

[2]. Florian Rhinow, Pablo Porto Veloso, Carlos Puyelo, Stephen Barrett, 'P2P Live Video Streaming in WebRTC', Eamonn O Nuallain School of Computer Scienceand Statistics, Trinity College Dublin,2014

[3]. Wajdi Elleuch, 'Models for Multimedia Conference between Browsers based on WebRTC', Dep. Computer Science and Applied Mathematics National Engineering School of Sfax University of Sfax – Sfax – Tunisia ,2013

Website

[5]. https://www.mongodb.com/document-databases

[6]. https://docs.mongodb.com/manual/release-notes/2.6/