WebRTC Enabled Call Centres

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Abstract: WebRTC is a free, open source project that enables web browsers with Real-Time Communications capabilities via simple JavaScript Application Program Interfaces. The concept of WebRTC enabled call centres comes from idea to improve over the traditional Call Centres by providing this facility to the customers, right into their web browsers. This system can provide a hassle free enquiry and troubleshooting option to the customers. Customers will be able to communicate with Company's Call Centre just by clicking and providing subsequent information on a link at Company's Website. This can facilitate an increase in customer loyalty for Company's business through new and user-friendly way to communicate. Also since this kind of On-Web Call Centre will cost comparatively lesser than conventional and Toll-Free one, it will be a huge business benefit.

This paper describes a new generation of call centres enabled with Web Real Time Communication technology based on Voice over Internet Protocol. It also compares this newer generation of On-Web Call Centres with earlier ones and discusses it from a business point of view.

Keywords: WebRTC, Call Centre, VoIP, Real-Time Communication

I. INTRODUCTION

Now-a-days, the need for alternative ways of communications is constantly increasing. This need is also faced by various customers to communicate with their service providing companies. A typical scenario would be a telecom company's customer is trying to register a complaint against activation of some unwanted value added service. So currently, he can communicate with company by either going to the company's office, or by dialing the customer care number which is toll-free. With the second option being a very obvious one, the advent of the Call centres over telephone network became an increasing trend. But with development of technology, alternatives are becoming available for such traditional call centres.

Today's world is completely occupied by the internet. It is everywhere. So the technologies based on internet are flourishing continuously. Voice over IP is one of them. VoIP is technology which is nothing but transmission of voice i.e. audio signals over IP network i.e. internet in real time. VoIP can be used for communication between any two ends of the vast internet.

The VoIP technology surely provides an alternative to the traditional call centres by giving them ability to make use of this vast internet so as to communicate to customers from anywhere with the least cost possible. Such 'On-Web' call centres will be the ways of customer troubleshooting for next generation. These call centres will provide simple and hassle-free enquiry and troubleshooting options for the customers. Also they will attract the companies more because of the less cost and more customer satisfaction.

WebRTC is an open framework for the web that enables Real Time Communications in the browser. The WebRTC effort is being standardized on an API level at the W3C and at the protocol level at the IETF. [1] [2]

The purpose of this paper is to compare the next generation of 'On-Web' call centres created using the WebRTC framework with earlier generation of call centres based on telephone network. It first describes about WebRTC and why it is useful for an online real-time application like a call centre followed by the support for WebRTC on various web browsers. Then the description of a WebRTC enabled call centre, how can it be built and its advantages are mentioned. Then it is compared with the traditional call centre. Finally, the WebRTC enabled call centre is analysed from business point of view.

II. WEBRTC

The WebRTC has its base in VoIP. WebRTC is a practical implementation of VoIP which is a technology competing with traditional PSTN. WebRTC is an open framework for the web that enables Real Time Communications in the browser. It includes the fundamental building blocks for high quality communications on the web such as network, audio and video components used in voice and video chat applications. These components, when implemented in a browser, can be accessed through a JavaScript API, enabling developers to easily implement their own RTC web app. [1]

There are three main JavaScript APIs of WebRTC:

» Navigator.getUserMedia: The API to capture media (video/audio). [3]

» RTCPeerConnection: The interface handling the streaming of data between two peers. [4]

» RTCDataChannel: The interface for sending arbitrary data across the peer connection. [5]

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a) Why WebRTC?

WebRTC is a technology that has evolved from VoIP. There are many advantages to the WebRTC that make it great to use for online Real-Time Applications. Here are some points that support WebRTC:

» A key factor in the success of the Internet is that its core technologies such as HTML, HTTP, and TCP/IP are open and freely implementable. Currently, there is no free, high quality, complete solution available that enables communication in the browser. WebRTC is a package that enables this.

» Already integrated with best-of-breed voice and video engines that have been deployed on millions of end points over the last 8+ years. Google is not charging royalties for this technology. [6]

» Includes and abstracts key NAT and firewall traversal technology using STUN, ICE, TURN, RTP-over-TCP and support for proxies. [1]

» Builds on the strength of the web browser: WebRTC abstracts signalling by offering a signalling state machine that maps directly to RTCPeerConnection API. [1] Web developers can therefore choose the protocol of choice for their usage scenario (for example, but not limited to: SIP, XMPP/Jingle, etc...).

b) Support for WebRTC

Since WebRTC is an API, it needs to be supported wherever it has to be implemented, and this is the major issue in WebRTC being popular. Given that WebRTC is a fairly new technology, it is not supported in many legacy systems. But WebRTC being a peer to peer technology, it is not very difficult to make it available everywhere by just adding support to web browsers. In fact, many of today's modern browsers like Google Chrome [7], Mozilla Firefox [8] [9] and Opera [10] support WebRTC.

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MS Internet Explorer and Apple Safari still lack the native support for WebRTC, but can be added by some plugins. Upcoming new browser MS Project Spartan will be supporting WebRTC exclusively. [11]

III. A WEBRTC ENABLED CALL CENTRE

A WebRTC based call centre takes two different domains 'VoIP Systems' and 'Call Centre' together. Fig. 1 shows this with a Venn diagram. The intersection here contains the systems that can be implemented by many other ways. A WebRTC enabled call centre is one of them.
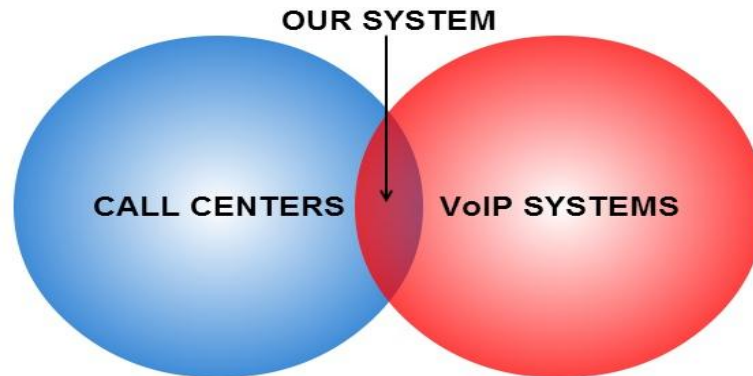

Fig. 1 Venn diagram showing WebRTC enabled call centre as intersection of two domains

This type of call centre is completely based on the IP network. Since the WebRTC allows us to establish a real time audio video communication between any two internet browsers, there is no need of any other application for the users to use it. Furthermore, the WebRTC gives users a freedom from installing any plugins in their browsers. Hence given that a user, either the customer or the agent of company, has a device (PC or mobile) with speaker, microphone, webcam (if video communication is required), internet connection and a web browser with WebRTC support enabled, he is ready to use such a call centre. The portability of WebRTC allows agents to work from anywhere just like customers, provided that they have fulfilled above mentioned requirements.

Building a server for such a call centre is not at all a tedious task. The server would need to handle the connection requests by customers and connect them to available agents. Once connection is set up, there is no need of server intervention. This provides us with faster communication. Before setting up a connection for a customer with an agent, the server will need to ask the customer for his identification and purpose of the call. Once customer provides information, the server will connect him with an agent who will get the customer information right on his screen. Since the server is not actually carrying the load of audio or video transmission, a server with considerably low cost can also be used. Fig. 2 shows a simple scheme of the system where a server serves different type of users. However it should be noted that when a call starts between customer and agent, there is no server required, and communication happens peer-to-peer.
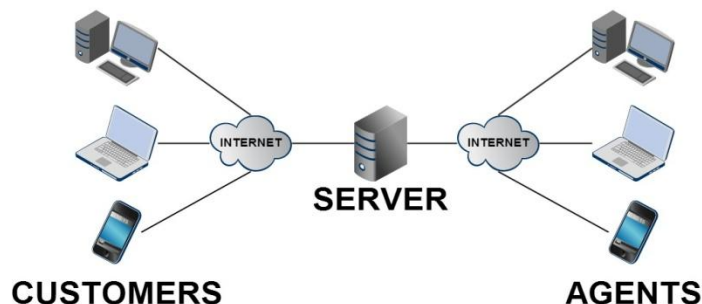

Fig. 2 Simple scheme of system

There are several advantages of using WebRTC for call centres and those are:

» No application required other than web browser on both customer and agent sides.

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» No browser plugin required. The WebRTC support is embedded in most modern browsers. (Except IE, Safari)

» Faster communication because of no server intervention once communication starts. Purely Peer-to-Peer.

» Secure because of mandatory encryption in WebRTC specification which is implemented by browser.

» Platform portable. WebRTC is browser dependent and hence doesn't worry about actual platform (OS).

» Open source technology, so zero cost of using it.

IV. COMPARING WebRTC ENABLED CALL CENTRE WITH OLDER GENERATION

In this section, we will compare the traditional call centres which were based on PSTN, with WebRTC enabled call centres. The Table I shows this comparison point by point in a tabulated form.

The comparison starts with the base technology which is PSTN for traditional call centres while the On-Web call centre uses WebRTC which is actually VoIP based. Although PSTN is at the base, for the conventional call centres, many other cellular technologies like GSM, WCDMA, LTE, etc. are also used. Now given that VoIP can also be used on these technologies, this newer generation of call centre can be implemented on this legacy. In fact it gives WebRTC a privilege to reach deeper in the worldwide internetwork by being independent of base technology for telecommunication. For example, consider a situation where a customer using his mobile device to call a WebRTC enabled call centre of some company. Here, he/she can use the data services provided by carrier network. The data services are nothing but IP based services which includes VoIP (in turn WebRTC) also. It is relevant to note here that a traditional call centre cannot be implemented on pure IP based network. One more point gets clear here that, a WebRTC based call centre can serve worldwide as compared to a traditional one, which is limited to carrier's network.

Now, let us discuss about what are the requirements for building call centres. For conventional call centres, one needs large infrastructure of communication devices (like telephones, or computers with telecom support) that are connected to some telecommunication network. These devices are to be bought by the company that is setting up call centre. Once that is done, the subscription of telecommunication services from carrier needs to be bought. A Toll-Free number is essential for setting up a call centre (otherwise customers won't call). It also needs to be bought. But considering a WebRTC enabled call centre, a lot of these issues are avoided. There are two approaches to set up one. One is that, Company can set up infrastructure (office with computers with internet connectivity) just like traditional one. Otherwise, it can hire agents who will work on their own computers or mobile devices from anywhere. This will avoid company from setting up large infrastructure. As far as the issue of buying internet services goes, it is definitely cheaper than buying a toll-free number. The factor of scalability comes into picture at this point. In traditional system, adding more agents comes at a cost of more devices. Also, these devices are to be connected using wires, and a proper configuration needs to be done, which is again extra cost. If we consider a second approach, we can easily say that scalability is not an issue because the system is completely independent of devices used by agents, or number of them, or how they connect to system.

Till now, we discussed some of the issues that are inherently addressed by the basic technology under the system. But when discussing about a call centre, we need to consider customers also. Customers do not care about what the technology is, or what the cost of setting up call centre is, etc. Rather they care about the user experience during the troubleshooting. A customer of traditional call centre faces a very general and monotonous Interactive Voice Response (IVR) interface which is audio only. But for a customer of on-web call centre, the rich user experience of targeted and attractive Graphical User Interface (GUI) is a way more advanced and useful than the traditional one. This makes customer more satisfied. The WebRTC will provide audio communication between agent and customer that is very similar to traditional system along with some other GUI based features like seeing call history. WebRTC holds the power to provide a rich multimedia call to the customer and agent. A

troubleshooting call can be more than just an audio call by adding video calling feature to it along with screen sharing and multiuser connectivity. WebRTC gives us privilege to create a system for any kind of use.

Table I. Traditional vs On-web Call Centres

	Traditional Call Centre	**On-Web Call Centre**
Technology	PSTN, GSM, WCDMA, LTE, etc.	VoIP, WebRTC Compatible with traditional technologies
Connectivity	Limited by carrier network Cannot work in pure IP network	Worldwide Can work in any network with IP support
Building Approach	Large infrastructure Set up office, buy devices, configure	Flexible infrastructure Agents with own devices at any location
Scalability	Not easy Involves much cost	Very Easy Involves less or no cost
Services To Be Bought	Telecommunication services Toll-Free number	Only internet services
Devices	Telephone Telecommunication Server	Computer, Mobile Web Server
Software	Proprietary	Web browser (Chrome, Firefox, Opera)
Requirements for user	Telephone, Mobile Telecommunication Network	Computer, Mobile Web Connectivity
Charges to Customers	Standard or Toll free	Always Toll free
Customer Experience	General, Monotonous IVR	Targeted, Attractive GUI
Customer Identity	Telephone/Mobile number	ID number given by company
Video and Other Rich Communication	Almost Impossible	Always Possible
Security	Defined by base technologies	Standard and mandatory security provided by WebRTC Custom security layer can be added

V. ANALYZING FROM BUSINESS POINT OF VIEW

A call centre is necessity for today's business. It provides efficient and fast way for company to connect with its customers. But it comes at dispense of money. The cost of setting a traditional call centre involves various expenses such as:

» Cost of office space

» Cost of toll free number

Not every company can always afford such a luxury. Many small businesses and start-ups do not have enough money to invest on such call centre. Hence the WebRTC based call centre becomes not only feasible but also an optimal option due to following:

» Open source technology ensures no cost or royalty for service

» No need to get a toll free number since call centre runs completely on internet

» No office is necessary since call centre agents can attend the calls from anywhere

» Flexibility in terms of agent procurement

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» Easy and cost effective to scale

» Addresses worldwide customers

» Appeals the customers more than traditional system because of rich user experience

The WebRTC holds power to support this and many more such business cases that make it a very versatile and cutting edge technology.

VI. CONCLUSION

The WebRTC has enabled a new era of internet based communications. This technology can be used in many versatile and innovative ways. And one of them is enabling call centres with WebRTC. Traditional call centres can be replaced by On Web call centres with use of WebRTC as they are efficient in terms of connectivity, scalability, security, cost, usefulness and support to rich media communications. This is beneficial for both the customer and the company.

ACKNOWLEDGMENT

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