ABSTRACT

A Contact Center is a central point in an organization from which a customer contact is being managed. Contact Center plays an important role in one-to-one customer interactions. Multichannel provides various channels for accepting and making contacts. A Multichannel Contact Center allow the organization to interact with the customers with multiple channels of communication providing quality of service which include voice calls, text or SMS, emails, fax, web chats etc. A MultiChannel Contact Center is an extension to the traditional Call Centers. The Call Centers that purely handle telephone calls are now converted to Contact Centers that offer communications that fall under a larger umbrella. The Contact Centers offer customers a variety of ways to communicate with the business and enable more personalized interactions that enhance customer relationships, improve business opportunities, reduce overall cost and optimize customer experience as compared to Call Centers. The paper presents a system to support Multichannel Contact Centers to business organizations.

Keywords: Contact Center, Unified Communications, multimedia, work items, agents, customers, Communication manager, media controller.

I Introduction

Unified Communications (UC) play an important role in customer reactions. It is important to communicate with the customer anytime and anywhere. Unified Communications is the integration of real-time communication services like instant messaging and chats with non real-time communication services like emails, SMS and voice calls. Unified Communications is not a single product, but a set of products that provide a consistent user-interface across multiple media types. Global leaders in Unified Communications are Avaya, Cisco, Interactive Intelligence, Genesys need to provide quality services to customers to stay ahead in the competitive market. Contact Centers are used as a solution of Unified Communications. The Multichannel Contact Centers allow the customers to contact through various multimedia options. The customers may contact through variety of options which include voice calls, text or SMS, emails, fax, web chats, etc. To go beyond traditional voices calls and allow customers to contact through several multimedia options can be done with a multichannel approach. The Multichannel Contact Centers is an evolving set of technology. It is useful for everyday communications. Multichannel Contact Centers allow customers to communicate easily to the organization via a wide range of integrated components. We present a system that supports Multichannel Contact Centers that allows the customers to communicate through traditional voice calls along with different multimedia options like emails, SMS, web chats supported through Facebook, Twitter, Yahoo messenger, MSN messenger etc.

The rest of the paper is organized as follows: The second section describes the related work. The third section presents the methodology that can be used to support Multichannel Contact Center system. The fourth section presents the parameters that must be concentrated to give a better performance. The following sections contain the Future Work and Conclusion of the paper.

II Related Work

This section presents a basic understanding of how a normal Multichannel Contact Center manages the customer contacts. The Multichannel Contact Centers can also be referred as an extension to the traditional Call Centers. The Call Centers allow customers to contact through voice calls whereas Multichannel Contact Centers allow customers to contact the organization through a variety of multimedia options in addition to the
traditional voice calls which include support to emails, text or SMS, web chats, fax, etc.

The users of the system would be a customer who makes a contact to the organization. The contact can take any form like a voice call, sms, email or web chat. The Contact Center agents will resolve the customer queries. Hence the customer contact must be managed from the customer till it reaches an agent and is resolved with the customer satisfaction.

The Multichannel Contact Center makes use of different components which can be used for handling customer contacts. The Communication Manager (CM) is an important component for the Multichannel Contact Center. Communication manager is responsible to organize and route voice, data, and image and video transmissions. Communication manager can connect to different private and public networks like Internet and Ethernet LANs. It delivers PBX features, high reliability, scalable and supports multiprotocol support. The Communication Manager has built in Contact Center application support. Communication Manager solves business challenges for voice communications and integrating with value-added applications. Communication Manager is open, scalable, and highly reliable and secures telephony applications. Communication Manager provides intelligent routing, user and system management functionalities, application integration and extensibility, and enterprise communication networking.

The Media Controller is another important component in the Multichannel Contact Center. It consist of the Media Director and different Media stores that can be used to store different multimedia work items. The Media director distributes the different non-voice work items from the customers to the Multichannel Contact Center agents. These work items may be email, web chats, sms, fax etc. The distribution of the work items is done with the help of the queuing algorithms built in to the Communication Manager. The non-voice work items originate from modules called the Media stores. The Media stores are connected to different sources like the email servers and the web servers using well defined protocols. The Multichannel Contact Center connects to different media stores for different work items. For example, the Email Media Store (EMS) is used for email work items and the Simple Messaging Media Store (SMMS) is used for sms or web chat work items.

## III Proposed Methodology

The basic flow of the customer contacts in the Multichannel Contact Center can be explained as follows. The Figure1 demonstrates the basic architecture of the system. The Multichannel Contact Center consists of three major components: The Communication Manager, The Media Controller and the agent-side application. The agent-side application is responsible to display the customer contacts.

The following section explains how voice and/or non-voice contacts are handled by the Multichannel Contact Center system. The customer makes a contact using either a voice call or a non-voice multimedia. The contact through the network which is PSTN in case of voice, IP or Internet in case of email, web chats or sms comes and falls on the gateway. The gateway is connected to the Communication Manager. The agents that are available to handle customer contacts must be logged on the Communication Manager. The Communication Manager performs routing functions and routes the call to the best skilled agent available to handle the contact at that instance of time. This method can also be used for the non-voice work items.
server. For any agent to handle customer contacts, the agent must first log on to the Server and the Communication Manager. Once the agent has logged on to the Server, the agent can connect to the Communication Manager. The Multichannel Contact Center Server and the Communication Manager both share different pair of protocols. To make them communicate efficiently we make use of the Application Enablement Services (AES). The AES forms a middle layer that allows Communication Manager and the Server to communicate to each other. They make use of the Telephony Server Application Programming Interface (TSAPI) which is defined by the Computer Supported Telecommunication Applications (CSTA) standards that are used with the purpose of achieving computer telephony integration (CTI) and the Adjunct/Switch Application Interface (ASAI). When the connections between all the components are made correctly, the customer contacts are received properly and the best skilled and appropriate agent manages the contacts in the Multichannel Contact Center system.

IV Results and Analysis

The performance of the system is a major parameter for any designed system. Hence, the aim of the paper is to design a system which would give a better performance when compared to other similar existing products in the market. The Multichannel Contact Center system must be designed in a way that supports different multimedia along with support to the traditional voice calls. Hence, we can perform an analysis by taking under consideration the following points:

- **CPU Usage:** CPU Usage is an important parameter. When the number of agents in the Multichannel Contact Center is increased, the CPU usage will also increase considerably. The aim is to make CPU usage stable and that with increase of agents the system must not crash.

- **Memory Usage:** The memory usage is another important factor that results to the performance of the system. The aim of the Multichannel Contact Center system is to design the system that reduces the memory usage.

- **IO read/write operations:** The Multichannel Contact Center system would be using multiple IO read/write operations that in turn affects the performance of the system. The aim of the system is to design a system where the read/write operation is less even with a large number of agents logged onto the system.

- **Scalability:** The system must be designed in a manner that it must support increased number of agents and give a considerable performance.

- **Processing Time:** The total time required to process a work item (voice or non-voice) must be minimum. It should be able to respond quickly to customer contacts.

- **Support to multimedia:** The Multichannel Contact Center system must be able to support different kind of multimedia work items. It must support traditional voice calls. In addition to the traditional voice calls, it must also support various multimedia options like text or SMS, emails, web chat, fax etc.

In addition to the improved performance, we also improve user experience and functionality through improved GUI.

V Future Work

The current design of the Multichannel Contact Center system does not support any security features. For instance, the current system supports POP3 and SMTP for email support. The POP3 and SMTP protocol are not secure. Hence, we plan to add security to the existing system by using secure POP3 and secure SMTP protocols. The current system is also designed in a way that can support a maximum of 1000 agents. Hence, we can also modify the system to support more number of agents. We can also support the reporting and localization features.

VI Conclusion

The Multichannel Contact Center helps the organization to be truly customer focused. The multichannel approach provides a quality service as we can support different multimedia like emails, sms or text, web chats, fax etc. in addition to traditional voice calls. The Multichannel Contact Center adapts to the ever-changing market opportunities and customer demands. Deploying a Multichannel Contact Center provides a single integrated view of the customers. It helps provide quality of service to the customers while reducing overall cost of the system.

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VII References