Computer Telephony Integration and QOS Implementation

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Abstract

Traditional telecommunications networks have been designed using a dedicated infrastructure with specialized equipment, to provide consistent quality. Companies and providers are moving to a shared data backbone utilizing Voice over Internet Protocol technologies. As these technologies converge to a collaborative environment, additional features become available, but the expectation of voice quality remains and should be included in the network design. This paper will discuss the implementation of network-based QOS when utilizing PC-based communications applications, providing a data stream to business process software for employee performance, and customer contact monitoring.

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Voice and data network throughout history have provided different types of service. In such a visit to a website can experience delay, or packet retransmission without notice to the user, unfortunately, in a congested network, a voice user will immediately notice a missing segment of a conversation (Cisco, 2001). In such on a high traffic network, quality of service should be implemented to provide the highest level of quality to users. Through the implementation of traffic marking, the Voice over Internet Protocol deployment can transport the call traffic ahead of the data traffic, providing customers consistent voice service quality comparable to traditional telecommunications networks (Cisco, 2001).

# Background for VoIP

For the last 100 years, telecommunications networks have evolved from rudimentary wiring and centralized operators to connect calls, into robust networks to provide a uniform level of service with instantaneous call connection. While this design was customer friendly, it was costly to implement and is becoming hard to continue operations. Network operators such as AT&T and Verizon utilize specialized Telephone Central Offices, using dedicated systems to provide service to their users. As this equipment continues to age, manufacturers have begun to distance themselves from support for these specialized equipment and software solutions (Avaya, 2017).

Existing telecommunications services are often limited in capabilities for business process improvement. To gain business advantages such as automatic contact logging, and customer account lookups for incoming calls required additional hardware and software systems that are cumbersome to operate to accomplish these simple office automation tasks. With the extension of VoIP technology, contact centers can integrate their systems into the PC-based communications application for automated processing.

With the user’s PC passing traffic to business systems and call traffic, large transactions can cause disruption and distortion in the voice portion of the call. Thus the need to apply a higher processing priority to the voice media becomes evident.

To connect systems with business process software, often a module such as Sugar CRM can be implemented to manage contact accounts and call registers. By adding a Customer Relationship Management solution, the business can track all customer interactions for the life of the account. One such addition is the ability to direct an incoming call to an agent, along with their account history automatically. This capability allows an agent to effectively and rapidly accommodate any requests to allow resolution, reducing contact time (Sugarcrm, 2017). Through the use of these platforms, business can record interactions and file them with the customer account for future dispute resolution. While these systems integrate into existing business software, the increased traffic on the network can degrade VoIP call quality.

# Possible Solutions

Solutions for implementing a Quality of Service solution are often network based and can be used to address other network concerns. Simple solutions can include shaping network traffic flows; an example provided in Figure 1.



Figure QOS Reservations (Cisco, 2001)

The use of shaping can allocate a set amount of the overall bandwidth for the voice services. This guaranteed pipe allows for the voice traffic to flow without interruption from other not critical services, which are categorized as Best Effort.

Another solution that is available to utilize is Software Defined Networking. In this solution, the network traffic is prioritized and routed by a centralized controller each network device categorizes the traffic; then the controller returns routing and transaction information on how to handle the packets (IETF, 2015). With SDN being a newer technology, and based on the size of the company would not be entirely feasible to implement.

To ensure that the traffic is properly controlled each packet has to be categorized at the sending devices. In the case of Charlie’s Manufacturing, this will include the software based phones in Sales and Support departments, along with the hardware instruments deployed in the management offices.

This marking is completed automatically at the network level and processed through the internal network before handing off to the Local Exchange Carrier. To support this requirement, the new business level switches will be configured utilizing this method.

## Conclusion

With a voice deployment on an IP network, you have to ensure the network is designed to prioritize traffic. With the increased traffic from an integrated business management solution, the network must be designed to handle the increased traffic load. Without taking this effort, you run the risk of degrading the quality of the voice which in proxy can deter customers from completing business transactions, or degrading the performance of employees.

# References

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**Remarks to Reviews**

 It was mentioned in the reviews about the lacking of content in my draft submission; I take responsibility for my sub-standard submission. Although, the weeks before the due date I encountered a family emergency that led to hospitalization over a thousand miles from home with three children. I attempted my best effort to create a submission before the AROPA deadline.