Voice over Computer Guide

Introduction

Ensuring that customers enjoy optimal call quality when speaking and listening during AT&T Connect® Events is of paramount importance to AT&T. This document will outline guidelines and best practices for maintaining a high quality voice experience when using Voice- over-Computer (VoC) during AT&T Connect Events.

An important note: Some countries or jurisdictions may place prohibitions or restrictions on the use of VoC capabilities. It is the customer's responsibility to ensure that all participants in an Event use VoC capability in compliance with all applicable laws.

Voice-over-Computer in AT&T Connect Events

Participants will have the ability to dial-in to Events by using either a conventional telephone or by utilizing their personal computer's ("PC") built-in audio capabilities (i.e., by utilizing a headset or microphone and speakers attached to their PC). Customers will have the option to enable the VoC capability on a corporate wide basis or limit its use to specific hosts. By default, the option to use VoC is turned off, unless requested explicitly by the customer.

Upon entering events with a PC, participants will be prompted with the option to dial-in by phone or to connect using VoC audio. Participants can switch the type of audio device they're using during an Event at their discretion.

Benefits of Voice over Computer

VoC is a powerful capability that offers three primary benefits:

1. **Cost Savings:** Using a PC as an audio device can be less expensive than dialing in via the conventional public switched telephone network. The amount of savings depends on the customer's service contract pricing and amount of conferencing usage.

2. **Keeps telephone free for other calls:** Using VoC audio keeps the participant's telephone free to pick up urgent incoming calls that might arrive during the Event.

3. **Flexibility**: Since participants can choose which audio device to work with, and can easily transition between audio devices during an Event, they can participate in events more conveniently. For example, a participant might participate in an Event on a cell phone while driving to work, and then easily switch to VoC when they arrive at their office. Or, a participant might begin an Event using VoC, and switch to a cell phone midway through the Event if they have to leave the office.

Factors Affecting Voice-over-Computer Call Quality

VoC can provide important benefits, *but it also has limitations and these must be carefully considered before deciding to utilize the VoC capability.* VoC can be a good choice for some customers but inappropriate for others, or may be appropriate for certain types of Events but not others.

When using a PC as an audio device (VoC), the voice packets traverse the user's IP network and over the Internet, until they reach the AT&T Connect conferencing servers. Traditionally, the term associated

with this type of communication is *Voice over IP (VoIP)*. As opposed to a circuit-switch telephone network where voice content is delivered "continuously" over an established circuit, with Voice over IP there is inherently more variability when it comes to call quality because voice packets are delivered on a 'best effort' basis and may be lost en route or arrive out-of-order. Latency, jitter and packet loss are more prevalent over an IP network and the Internet, which are more susceptible to congestion. These factors may impair the quality of voice transmission during an Event. For example, participants may experience brief intermittent delays in their conversation, or experience occasional short "cuts" in their audio. These are results of network latency and/or jitter. Extreme latency may also introduce acoustic echo. Furthermore, if one participant who is speaking happens to have an inferior network connection, this may cause all other participants in the conference to experience delays or cuts in the received speech. VoC quality "issues" may appear sporadically during an Event or not appear in one Event but surface in another.

In general, these audio irregularities are minor and can usually be ignored or tolerated by the participants, and may be worth accepting to obtain the cost savings and flexibility benefits mentioned earlier. But in some circumstances the audio irregularities can be disruptive and outweigh the benefits of using VoC.

Note that Voice-over-Computer requires end-users to have sufficient network bandwidth to deliver acceptable call quality. To conduct the data web conferencing *and* use VoC audio successfully, each participant using VoC should have a network connection with at least 56 kbps of average bandwidth, and support periodic brief bandwidth bursts up to 128kbps.

In summary: VoC involves a "trade-off": the customer has to be willing to accept the possibility of potential and occasional audio "issues" during an Event in order to obtain potential conferencing cost savings and usage flexibility. Whether VoC audio irregularities will occur depends on many factors, including network connection quality, available bandwidth, and location of the conference participants. A telephone connection will most often provide better overall call quality than VoC audio since it is less prone to the Internet's variability or bandwidth limitations. But there are exceptions to this rule: cellular phones and IP Telephones may also experience audio quality problems, and in some cases might actually deliver *worse* audio quality than VoC on a good network connection.

Guidelines for the Teleconferencing Manager

It is important that the Teleconferencing Manager weigh the pros and cons of enabling VoC in AT&T Connect Events. As stated, the option to allow use of VoC in events is configurable. Customers can decide whether to allow their participants to choose between audio devices across all events or allow their individual hosts to set their preferences independently.

Below are some factors to consider when making a decision about whether to use VoC capability in AT&T Connect Events:

1. State of customer's LAN/WAN quality and bandwidth capacity based on projected concurrent conferencing usage.

2. Geographical distribution of participants. If participants are internationally based, network latency can become more of a contributing factor to call quality than in cases where meetings are more regional.

3. Whether participants generally connect via VPN clients and/or wireless connections. VPNs route a participant's connection via a corporate network, adding latency and limiting available bandwidth. Wireless network quality differs by the proximity to an access point, signal strength and router congestion, all which may limit a participant's real-time connection.

4. Participant education and support: Some customers may feel that while giving a participant a choice is a good thing, the "cost" of educating participants and supporting them may be too high in their corporate environment.

5. Risk of irregular audio quality occurring during "high-profile" events.

6. Regulatory and legal restrictions may limit the use of VoC for some participants.

Host and Participant Best Practices

1. If in doubt regarding your network connection quality or bandwidth, a telephone should be used instead of VoC. If you have chosen to use your PC as an audio device, you may change your mind and dial-in via the phone at any time during an Event.

2. Hosts, presenters and participants who are expected to do most of the speaking during a conference may prefer to dial in to the Event by phone. Participants who will primarily be listening or speaking infrequently are the best candidates for utilizing the VoC option.

3. When using a PC as an audio device, ensure that the PC equipment and available network bandwidth meets the minimum requirements required for a VoC call.

4. When using a laptop, use *external* headsets, speakers or microphones as they provide higher quality than the laptop's built-in speakers and microphones.

5. Avoid using VoC when connected on a wireless network and/or while using a VPN connection as they tend to limit the quality of your real-time data connection and harm the VoC audio quality.

6. Place cell phones (even in silent/vibrate mode) away from your microphone as their signal may inject noise

7. If you are experiencing issues during an Event, try to isolate the "trouble speaker" by viewing the Participant List's active speaker indicator. If that participant is working with VoC, you may advise him/her to switch to telephone instead. As a presenter, you may advise your PC-audio users to switch to the phone or choose to mandate that the event be switched to use telephony audio only (via the 'Event' menu in the Participant Application).