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## Media transmission in virtual meetings under poor network connectivity

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## **Media transmission in virtual meetings under poor network connectivity**

### **ABSTRACT**

This disclosure describes the transmission of recorded media such as audio and/or video in a virtual meeting when a participant device experiences conditions of poor network connectivity. Per techniques of this disclosure, the quality of service (QoS) of the network is monitored. If poor QoS is detected at a device, the meeting is switched to a receive-only mode for the device. The participant is provided with an option, e.g., similar to “tap-to-record” in messaging applications, to record and transmit their message(s) to other meeting participants. Other participants in the meeting are notified that the participant with poor network connectivity is recording a message. The recorded message can be transmitted by the user using a lossless network protocol. The lossless nature of the protocol enables the successful transmission of the message, even under poor network conditions. The recorded message relayed to all participants in the meeting and is played as soon as it is received, such that the participant with poor network connectivity can be active in the meeting.

### **KEYWORDS**

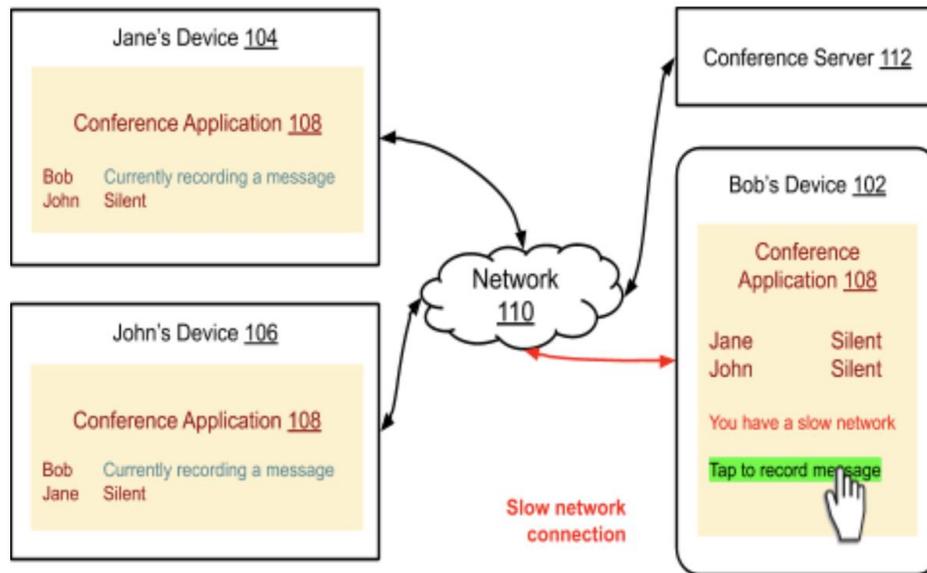
- Video conferencing
- Online meeting
- Quality of service (QoS)
- Network quality
- Recorded message
- Tap to record

## BACKGROUND

Users often participate in virtual meetings using their mobile devices and tablets. In many situations, a user joins an online meeting during a commute, from a remote location, or other context where the network connectivity is not always reliable. Poor network quality can lead to poor audio and video quality for the meeting, e.g., crackling audio, blurry images, etc. in the meeting. This can be particularly disruptive to the meeting if the user experiencing poor network connectivity is also the one who is speaking since other participants in the meeting may not be able to understand the speaker due to fragmented audio snippets transmitted over the network. In some applications, the video feed is disabled under conditions of poor network connectivity and the meeting is switched to audio-only mode. However, this can also be ineffective if the audio feed is also of poor quality and unintelligible, e.g., includes crackling audio.

## DESCRIPTION

This disclosure describes the transmission of recorded media such as audio and/or video in a virtual meeting when a participant device experiences conditions of poor network connectivity. Per techniques of this disclosure, the quality of service (QoS) of the network is monitored. For example, the monitoring can be performed continuously in the background. If poor QoS is detected at a device, the meeting is switched to a receive-only mode for the device. The participant is provided with an option, e.g., similar to “tap-to-record” in messaging applications, to record and transmit their message(s) to other meeting participants.



**Fig. 1: Users with slow network connections record and transmit a voice message**

Fig. 1 illustrates an example video conference in progress with three participant devices (102, 104, and 106) connected via a network (110). A conference application (108) executes on the devices and enables a virtual meeting amongst the participants. The meeting may be hosted by a conference server (112).

Per techniques of this disclosure, the QoS (Quality of Service) for the network connectivity is monitored for each of the devices. For example, the connectivity can be monitored by a background process. When the device includes a multicore processor, the background process can execute on a core or processor different from the core or processor utilized by the conference application. Activation of the monitoring process can be triggered, for example, when a device moves from a WiFi network to a cellular network, where the network connectivity can be of variable quality.

The conference application supports full interactivity (live audio/video) when the network connectivity QoS meets a threshold for quality. A low latency network protocol such

as user datagram protocol (UDP) is used for data transmission over the network between the devices. If the QoS degrades and falls below the threshold, the participant that is associated with the device experiencing poor network quality is provided with an option to switch to a receive-only mode for the virtual meeting. In this manner, the participant can be active in the meeting by recording and sending messages over a lossless protocol such as TCP.

In this mode, the participant device receives the conference feed from other participant devices. A selectable user interface option, e.g., that indicates “tap-to-record” provided to the participant to enable recording their response/message, e.g., a snippet of audio and/or video. Other participants in the meeting are notified that the participant with poor network connectivity is recording a message.

The recorded message can be transmitted using a lossless network protocol such as transmission control protocol (TCP). The lossless nature of the protocol enables the successful transmission of the message, even under poor network conditions. Upon receipt of the recorded message, e.g., by a conference server, the message is relayed to all other participant devices. The participants at these devices can respond over the live conference feed that is transmitted via UDP.

The network connectivity QoS of the participant with poor network connectivity is monitored during the receive-only mode. Upon detection that the network connectivity has improved to meet the QoS threshold, the virtual meeting is restored to full interactivity.

## CONCLUSION

This disclosure describes the transmission of recorded media such as audio and/or video in a virtual meeting when a participant device experiences conditions of poor network connectivity. Per techniques of this disclosure, the quality of service (QoS) of the network is

monitored. If poor QoS is detected at a device, the meeting is switched to a receive-only mode for the device. The participant is provided with an option, e.g., similar to “tap-to-record” in messaging applications, to record and transmit their message(s) to other meeting participants. Other participants in the meeting are notified that the participant with poor network connectivity is recording a message. The recorded message can be transmitted by the user using a lossless network protocol. The lossless nature of the protocol enables the successful transmission of the message, even under poor network conditions. The recorded message relayed to all participants in the meeting and is played as soon as it is received, such that the participant with poor network connectivity can be active in the meeting.