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Communications

Ad Hoc Selection for Voice Over Internet Streams

A method and apparatus for distributing audio streams, in the form of encrypted data packets, to the personal computers of authorized listeners in near real time

NASA seeks interested parties to license the Ad Hoc Selection for Voice Over Internet Streams technology developed by engineers at Johnson Space Center. This technology features the ability to select specific audio streams from one or more sources and then convert them into a multicast to the user's audio player. This selection ability benefits the user by allowing a wide range of information and/or data to be monitored from a remote location using existing network technologies in near real time.

BENEFITS

- Flexible and compatible with industry standards—uses proven, standard Voice over Internet Protocol (VoIP) technologies that are currently used in commercial Internet voice and video conferencing systems
- Private—features real-time encrypting of the multicast audio streams to ensure privacy and integrity
- High capacity—integrates multiple audio streams into a real-time, single-audible source without the need for a dedicated connection
- Individuality—allows users to receive audio at any location and individually control volume and muting for each of the audio streams
- High quality and efficient—provides a high-fidelity system with excellent reproduction of voice, using relatively small bandwidth at a low cost

technology solution



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THE TECHNOLOGY

In this patented system, the audio distribution process begins with feeding the audio signals to analog-to-digital converters. These converters create digital streams of MP3 VoIP audio packets. The resulting digital streams are sent through an audio Intranet, using a user datagram protocol (UDP), to a server that converts them to encrypted multicast data packets. These packets then are routed throughout the network to provide access to one or more audio streams concurrently on personal computers of authorized users. By using Internet Protocol (IP) multicast, the total data-processing load on the portion of the system downstream of and including the encryption server is the total load imposed by all of the audio streams being encoded, regardless of the number of listeners or the number of streams being monitored concurrently by listeners.

An authorized user's personal computer must be equipped with special purpose, audio player software. When a user launches the program, the system prompts the user to provide identification and a password. Once both access control checks are completed, the audio software presents a graphic display that includes audio stream and volume control buttons. The user can select up to 21 streams to monitor simultaneously and can mute or adjust the volume of each stream individually.

This innovation offers significant advantages over competing technologies because it allows multiple users to monitor the activities taking place at various locations by integrating multiple audio streams into a single source in real time. The technology is compatible with industry standards, offers excellent sound reproduction, and adds users automatically for networks supporting multicast traffic. The technology does not require dedicated connections, and the total data-processing load on the distribution system is relatively minimal, allowing for wide and secure distribution at low cost.



This flexible system is applicable in a wide variety of systems, including office communications and telemedicine.

APPLICATIONS

The technology has several potential applications:

Audio multicasting and monitoring – for air-traffic training applications, EMS communications, telemedicine, stock exchange, and other information and data sharing

PUBLICATIONS

U.S. Patent 7,415,005

U.S. Patent 8,767,714

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NP-2014-08-1129-HQ

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MSC-23349-1, MSC-23349-2

