

**PROTOCOL HEADER CONSTRUCTION AND/OR
REMOVAL FOR MESSAGES IN WIRELESS
COMMUNICATIONS**

**CROSS-REFERENCE TO RELATED
APPLICATION**

[0001] This claims the benefit under 35 U.S.C. §119(e) of U.S. Provisional Application No. 60/238,410, filed Oct. 6, 2000.

TECHNICAL FIELD

[0002] This invention is generally related to reconstruction and/or removal of protocol headers in messages in wireless communications.

BACKGROUND

[0003] Packet data networks are widely used to link various types of network elements, such as personal computers, servers, network telephones, Internet appliances, and so forth. Examples of data networks include private networks (such as local area networks or wide area networks) and public networks (such as the Internet). Common forms of communications between network elements across packet data networks include electronic mail, file transfer, web browsing, and other exchanges of data. More recently, with the increased capacity and reliability of packet data networks, audio communications (such as voice communications), video communications (such as video conferencing), and other forms of real-time interactive or streaming communications are becoming more common over packet data networks.

[0004] With advancements in wireless communications networks, efficient packet-switched communications over wireless networks have also become possible. Traditionally, wireless communications networks have been implemented as circuit-switched networks. In a circuit-switched network, a channel portion (such as a time slot) between two endpoints (e.g., two mobile stations) is occupied for the duration of the connection between the endpoints.

[0005] Several packet-switched wireless technologies have been proposed to provide more efficient connections between a mobile station and a packet data network, such as an Internet Protocol (IP) network. One such technology is the General Packet Radio Service (GPRS) technology, which provides for packet services in GSM (Global System for Mobile) networks, UMTS (Universal Mobile Telecommunications System) networks, or GERAN (GSM/EDGE radio access network) network. EDGE, which stands for Enhanced Data Rate for Global Evolution, is compatible with GSM and TIA/EIA-136 TDMA (time-division multiple access) wireless communications technologies. UMTS is based on the wideband code-division multiple access (W-CDMA) wireless communications technology.

[0006] Packet services that are provided by such packet-switched wireless technologies include traditional packet services such as web browsing, electronic mail, file transfer, and so forth. Additionally, real-time and interactive packet services, such as telephony services (e.g., voice-over-IP services) are also provided. In voice-over-IP communications, voice traffic is carried in packets (referred to as "packet-switched voice traffic").

[0007] One of the issues associated with carrying packet-switched voice traffic over a wireless link or air interface between the mobile station and radio network controller is that new channel coding and interleaving schemes may have to be developed. Typically, traffic channels that carry circuit-switched traffic have predetermined and standardized coding and interleaving schemes. As example coding and interleaving scheme is described in the GSM 05.03 Specification (Version 8.50 Release 1999). Developing and adopting new standards for packet-switched voice traffic (and other bearer traffic) can be a relatively long process requiring several rounds of negotiation between different parties. Also, equipment that has been manufactured to support old standards may not be able to support new, modified standards.

[0008] Packet-switched traffic (e.g., voice) is accompanied by overhead information in the form of protocol headers, e.g., Real-Time Protocol (RTP) headers, User Datagram Protocol (UDP) headers, and Internet Protocol (IP) headers. Such headers are rather large and can take up substantial amounts of bandwidth, especially since the protocol headers are communicated in each and every packet. As a result, communication of such headers over the air interface between a mobile station and radio equipment causes a reduction of the spectral efficiency of the air interface.

SUMMARY

[0009] In general, according to one embodiment, a method of communicating data over a wireless link between a mobile station and a wireless access system comprises communicating, over the wireless link, control signaling for setting up a packet-switched communications session between the mobile station and an endpoint. Packets containing real-time data are communicated over the wireless link, with at least one protocol header associated with the packet-switched communications being removed from each packet before communicating the packet over the wireless link.

[0010] Other or alternative features will become apparent from the following description, from the drawings and from the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a block diagram of an example of a wireless communications network.

[0012] FIG. 2 illustrates an Internet Protocol (IP) packet for carrying real-time bearer traffic.

[0013] FIG. 3 is a message flow diagram of a process of establishing communications between a mobile station and another endpoint in the wireless communications network of FIG. 1, in accordance with an embodiment.

[0014] FIGS. 4 and 5 are flow diagrams of processes for receiving and transmitting bearer data.

[0015] FIG. 6 is a block diagram of components in a mobile station and a radio network controller, in accordance with an example.

DETAILED DESCRIPTION

[0016] In the following description, numerous details are set forth to provide an understanding of the present invention. However, it will be understood by those skilled in the