

the payload type (PT) field of the RTP header, which identifies the format of the RTP payload and determines its interpretation by a software application. An RTP Synchronization Source Identifier (SSRC) information element contains the SSRC field of the RTP header. The SSRC field identifies the synchronization source of a stream of packets. All packets from a synchronization source form part of the same timing and sequence number space, so a receiver groups packets by synchronization source for playback.

[0046] An RTP Sequence Number information element contains the sequence number of the RTP header. The sequence number for each RTP packet sent in a communications session increments according to calculations based upon (1) the RTP Clock Frequency information element (e.g., 8,000 Hz for the AMR-NB speech codec or 16,000 Hz for the AMR-WB speech codec) and (2) the speech codec frame duration (e.g., 20 milliseconds for both the AMR-NB and AMR-WB speech codecs). The sequence number is used to detect packet loss and to restore packet sequence.

[0047] An RTP Timestamp information element contains the timestamp field of the RTP header. The timestamp field reflects the sampling instant of the first octet or byte in the RTP data packet. The sampling instant is derived from a clock that increments monotonically and linearly in time to allow synchronization and jitter calculations. In the UPLINK PROTOCOL HEADER CONFIGURATION message, the frequency of the clock is specified in an RTP Clock Frequency information element.

[0048] The UPLINK PROTOCOL HEADER CONFIGURATION COMPLETE message is sent by the radio network controller to the mobile station to confirm the exchange of the header information (in response to receipt of the UPLINK PROTOCOL HEADER CONFIGURATION message). The message is shown below:

INFORMATION ELEMENT/GROUP NAME	NEED
Message Type	MP
<u>RB INFORMATION ELEMENTS</u>	
RB Identit	MP

[0049] The UPLINK HEADER CONFIGURATION COMPLETE message contains a Message Type information element to indicate the type of message (in this case UPLINK PROTOCOL HEADER CONFIGURATION COMPLETE), and an RB Identity information element to identify the radio bearer.

[0050] In one embodiment, the DOWNLINK PROTOCOL HEADER CONFIGURATION message is sent by the radio network controller to the mobile station to enable the mobile station to reconstruct the RTP, UDP, and IP header information. Note that the DOWNLINK PROTOCOL HEADER CONFIGURATION message is sent to mobile stations that are configured to reconstruct RTP/UDP/IP headers. For mobile stations that are not configured to reconstruct RTP/UDP/IP headers, communication of the DOWNLINK PROTOCOL HEADER CONFIGURATION message is not performed.

[0051] The DOWNLINK PROTOCOL HEADER CONFIGURATION contains the following:

INFORMATION ELEMENT/GROUP NAME	NEED
Message Type	MP
<u>RB INFORMATION ELEMENTS</u>	
RB Identity	MP
<u>RTP/UDP/IP HEADER INFORMATION ELEMENTS</u>	
DiffServ Code Point (DSCP)	OP
RTP CSRC Count (CC)	OP
RTP Synchronization Source Identifier (SSRC)	MP
RTP Contributing Source Identifier (CSRC)	OP
RTP Sequence Number	MP
RTP Timestamp	MP

[0052] The DOWNLINK PROTOCOL HEADER CONFIGURATION information element contains a Message Type information element and an RB Identity information element. In addition, the message contains various RTP-related information elements and a QoS-related information element. Note that the DOWNLINK PROTOCOL HEADER CONFIGURATION message does not include IP and UDP source and destination address and port information. Since the mobile station is UDP and IP-aware, the mobile station is able to determine the IP address and UDP port information from call control signaling used to establish a packet-switched communications session (e.g., SIP signaling).

[0053] A Diff-Serv Code Point (DSCP) information element (which contains QoS related information) contains the DSCP code for specifying a level of service for packets communicated in the communications session. An optional RTP CSRC Count (CC) information element contains the CSRC count value in an RTP header. The CSRC Count value contains the number of CSRC identifiers that are in a CSRC list (described below). The message also contains an RTP Synchronization Source Identifier (SSRC) information element as well as an RTP Contributing Source Identifier (CSRC) information element. The RTP CSRC information element contains a CSRC list (contained in an RTP header) that identifies the contributing sources for a payload contained in the packet. The number of CSRC identifiers in the CSRC list is specified in the RTP CSRC Count (CC) information element. Thus, in a multi-party call, the CSRC list identifies all parties that are involved in the call. In a multi-party call, such as a conference call, voice data from multiple persons may be mixed together. The CSRC list enables the identification of possible sources of the combined voice data. The CSRC identifiers are typically inserted by RTP mixers.

[0054] Other information elements in the DOWNLINK PROTOCOL HEADER CONFIGURATION message include an RTP Sequence Number information element and an RTP Timestamp information element.

[0055] A DOWNLINK PROTOCOL HEADER CONFIGURATION COMPLETE message is communicated in response to DOWNLINK PROTOCOL HEADER CONFIGURATION message, and contains the following elements.