

STREAM CONTROL TRANSMISSION PROTOCOL (SCTP)

The Stream Control Transmission Protocol (SCTP) provides a general-purpose transport protocol for message-oriented applications. It is a reliable transport protocol for transporting stream traffic, can operate on top of unreliable connectionless networks, and offers acknowledged and nonduplicated transmission data on connectionless networks (datagrams). SCTP has the following features.

- The protocol is error free. A retransmission scheme is applied to compensate for loss or corruption of the datagram, using checksums and sequence numbers.
- It has ordered and unordered delivery modes.
- SCTP has effective methods to avoid flooding congestion and masquerade attacks.
- This protocol is multipoint and allows several streams within a connection.

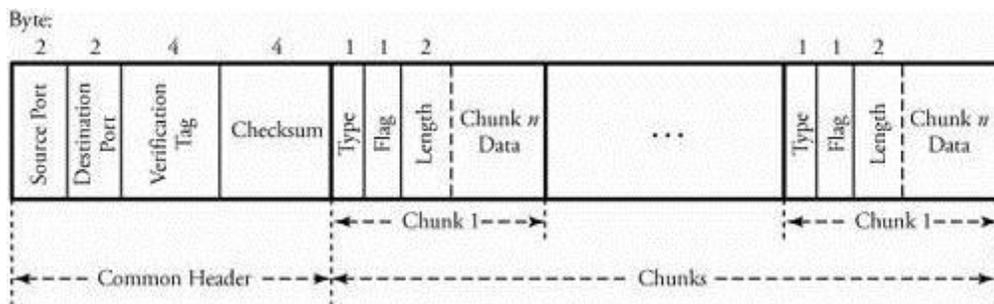
In TCP, a stream is a sequence of bytes; in SCTP, a sequence of variable-sized messages. SCTP services are placed at the same layer as TCP or UDP services. Streaming data is first encapsulated into packets, and each packet carries several correlated chunks of streaming details. If an MPEG movie is displayed live over the Internet, a careful assignment of data per packet is required. An MPEG video consists of frames, each consisting of $n \times m$ blocks of pixels, with each pixel normally an 8×8 matrix. In this case, each block of pixels can be encapsulated into a chunk, where each row of the block is formatted as a packet.

SCTP Packet Structure

[Figure 18.14](#) shows the structure of streaming packets used in SCTP. An SCTP packet is also called a protocol data unit (PDU). As soon as the streaming data is ready to be transmitted over IP, an SCTP packet forms the payload of an IP

packet. Each packet consists of a common header and chunks. The streaming data is distributed over packets, and each packet carries correlated "chunks" of streaming data. Multiple chunks representing multiple portions of streaming information are in fact multiplexed into one packet up to the path-maximum packet size.

Figure 7.14. The structure of packets in the stream control transmission protocol (SCTP). Streaming data is encapsulated into packets and each packet carries several correlated chunks of streaming details.



A chunk header starts with a chunk type field used to distinguish data chunks and any other types of control chunks. The type field is followed by a flag field and a chunk length field to indicate the chunk size. A chunk, and therefore a packet, may contain either control information or user data. The common header begins with the source port number followed by the destination port number. SCTP uses the same port concept as TCP or UDP does. A 32-bit verification tag field is exchanged between the end-point servers at startup to verify the two servers involved. Thus, two tag values are used in a connection. The common header consists of 12 bytes. SCTP packets are protected by a 32-bit checksum. The level of protection is more robust than the 16-bit checksum of TCP and UDP.

Each packet has n chunks, and each chunk is of two types: payload data chunk for transmitting actual streaming data and control chunks for signaling and control. Signaling and control chunks are of several different types, as follows:

- Initiation, to initiate an SCTP session between two end points
- Initiation acknowledgment, to acknowledge the initiation of an SCTP session
- Selective acknowledgment, to be transmitted to a peer end point to acknowledge received data chunks
- Heartbeat request, to probe the reachability of a particular destination transport address defined in the session
- Heartbeat acknowledgment, to respond to the heartbeat request chunk
- Abort, to close a session
- Shutdown, to initiate a graceful close of a session
- Shutdown acknowledgment, to acknowledge receipt of the shutdown chunk once the shutdown process is completed
- Operation error, to notify the other party of a certain error
- State cookie, sent by the source to its peer to complete the initialization process
- Cookie acknowledgment, to acknowledge receipt of a state cookie chunk
- Shutdown complete, to acknowledge receipt of the shutdown acknowledgment chunk at the completion of the shutdown process

SCTP can easily and effectively be used to broadcast live video clips or full-color video movies. The SCTP exercises at the end of this chapter explore SCTP further.

Source : <http://elearningatria.files.wordpress.com/2013/10/cse-vi-computer-networks-ii-10cs64-notes.pdf>