

23ITT204 - COMPUTER NETWORK

UNIT 2 - TRANSPORT LAYER

SCTP

Stream Control Transmission Protocol (SCTP) in the Transport Layer



What is SCTP? A Next-Gen Transport Protocol

Developed by the Internet Engineering Task Force (IETF) and standardized in RFC 9260 - SCTP represents a significant evolution in transport layer protocols. It uniquely combines TCP's reliability with UDP's message orientation, creating a powerful hybrid approach.

Originally designed for telecom signaling networks to carry SS7 over IP infrastructure, SCTP has evolved into a versatile protocol suitable for diverse applications requiring robust, message-based communication.

Enhanced Security

Uses a 4-way handshake for connection setup, providing stronger protection against attacks compared to TCP's traditional 3-way handshake

Hybrid Architecture

Seamlessly blends reliability mechanisms with message-oriented delivery for optimal performance

Key Features That Set SCTP Apart



Multi-homing

Supports multiple IP addresses per endpoint, enabling seamless automatic failover and ensuring high availability even during network disruptions



Multi streaming

Multiple independent streams within a single connection eliminate head-of-line blocking, dramatically improving latency and throughput



Message-Oriented Delivery

Preserves message boundaries unlike TCP's byte stream, making it ideal for applications requiring structured data units

01

Enhanced Security

Cookie-based association setup actively resists DoS attacks and masquerades, providing robust protection

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Efficient Packet Handling

Bundles multiple chunks into single packets with intelligent fragmentation and reassembly support for optimized bandwidth usage

Why Use SCTP? Applications & Advantages



Real-World Applications

- Telecom Signaling Networks**
 Powers 3G,4G,and 5G networks requiring reliable, ordered message delivery for critical signaling infrastructure
- VoIP & Real-Time Communication**
 Ensures high-quality voice transmission with reduced latency and automatic failover capabilities
- Critical Infrastructure**
 Provides transparent fail over ensuring uninterrupted communication in multihomed network environments

Performance Advantages

Reduces latency and improves throughput by eliminating TCP's head-of-line blocking problem, enabling true parallel stream processing

Enterprise-Ready Security

Robust security features including cookie mechanisms and enhanced handshake protocols protect critical mobile and infrastructure networks

Broad Platform Support

Supported by major operating systems, networking equipment, and modern firewalls, making deployment practical for contemporary networks