

APS-SCTP/T™

Telephony Transport for SS7 over IP

Overview

SCTP (Stream Control Transport Protocol) is defined by IETF RFC2960 as the transport layer to carry signaling messages over IP networks. SCTP/T is just one of the many products in the Adax Protocol Software (APS) SIGTRAN suite that has been designed for Convergence, Wireless and Intelligent Networks. Compliant with IETF RFC2960 and RFC3309, SCTP/T (SCTP for Telephony) is implemented in the OS kernel. SCTP/T provides a transport signaling framework for IP networks that enhances the speed and capability of SSCS/HSL and can be deployed over T1/E1, Ethernet and ATM OC3 physical media interfaces.

In addition to the services specified in IETF RFC2960, Adax SCTP/T also provides a transport framework with levels of service quality and reliability as those expected from a Public Switched Telephony Network (PSTN).

Quality and Reliability of Service

Traditional PSTN equipment and service providers achieve signaling reliability by implementing signaling protocols and services that:

- 1) perform in-service quality monitoring of the signaling link;
- 2) detect degradation of link quality in a very short time;
- 3) provide redundancy over an infrastructure independent of the traffic-bearing network.

There are 'special considerations for using SCTP to meet the requirements of telephony signaling over IP infrastructure' (see IETF "Telephony Signaling Transport over SCTP applicability statement"). The Adax SCTP/T product provides the capabilities to address those issues that are necessary for reliable and effective signaling for IP telephony networks.

Performance Benefits

Adax SCTP/T achieves levels of signaling performance that are unsurpassed in the industry. The attributes of the product that provide these levels of service are:

- SCTP/T is an integrated hardware and software solution.
- SCTP/T protocol is implemented in the OS kernel.
- SCTP/T offloads CPU intensive procedures and tasks such as Heartbeat, CRC Computation, Encryption, Authentication, etc. onto the HDC or ATM hardware.
- Adax SCTP/T has multi-homing provisioning options that implement link monitoring and fail-over robustness and redundancy for IP signaling that rival standard SS7 narrowband and broadband networks.

Performance is in the Details

Detection of Path Failures

- SCTP/T is implemented in the OS kernel utilizing kernel high resolution timers.
- SCTP/T detects failures in the signaling fabric in 1/10th, or less, of a second.

Heartbeat

More frequent heartbeat is required to detect real-time failures and service restoration of alternate destination addresses.

- SCTP/T offloads the heartbeat processing of SCTP/T to the HDC or ATM hardware where a high performance RISC processor manages heartbeat scheduling and computations.
- Offloading heartbeat computations from the application CPU dramatically improves performance and service reliability.

Multi-homing

Adax SCTP/T performs multi-homing providing both redundancy and fault tolerance for applications. Multi-homing is the transmission of SCTP/IP over an SCTP association that has more than one source IP address and/or more than one destination address. This feature provides physical path and network route redundancy for SCTP associations to avoid single points of network failure between devices. Paths are continually monitored by the heartbeat feature and if the primary path fails SCTP transparently switches to the secondary path, without packet loss or upper layer intervention.

Checksum Processing

The Checksum Processing of outbound and inbound SCTP PDUs is taxing on the application CPU.

- Adax SCTP/T provides hardware assist for both Adler-32 and 32-bit CRC checksum.
- In SCTP/T, the checksum computation is performed on each outbound and inbound PDU by the dedicated hardware on the HDC or ATM board.

Security Processing

SCTP/T utilizes an MD5 algorithm to validate the MAC (RFC2104) in the State Cookie during init exchange.

- Computation of the MAC (RFC2104) in the State Cookie during init exchange is taxing on the application CPU.



- The SCTP/T product utilizes the high performance RISC processor on the Adax HDC and ATM boards to compute the MAC in the State Cookie.

Other secure hash algorithm implementations can be considered for customer implementation.

Maximum Number of Retransmissions

Reducing the timer intervals associated with Path.Max.Retrans and Association.Max.Retrans improves destination and peer path failure detection. The SCTP/T product implements smaller timer intervals for Path.Max.Retrans and Association.Max.Retrans. Consequently, SCTP/T can provide a level of service comparable to those expected by, and from, a public telephony service.

Other SCTP/T product features include:

- Passive association initiation process
- Association reconnection and spoofing management
- Network measurement and engineering (BellCore GR-2878)

API

SCTP/T supports a comprehensive API designed to the ULP-to-SCTP interface primitives, per Section 10 of RFC2960.

- The user API for SCTP/T is implemented within the standard Unix DLPI.
- The user API for SCTP/T is similar to, and consistent with, the Adax API for traditional SS7 signaling offerings.
- The API is common to all User Adaptation (UA) interfaces such as SUA, M3UA, IUA, M2UA, etc.

Standards

- IETF RFC2960 Stream Control Transport Protocol
- IETF RFC3309 Stream Control Transport Protocol Checksum Change
- IETF RFC2104 HMAC: Keyed-Hashing for Message Authentication
- IETF RFC1321 The MD5 Message-Digest Algorithm

Operating System Support and Adax Protocol Controllers

SCTP/T is available for Linux and Solaris Operating Systems. VxWorks, HP-UX and IBM AIX can also be supported by special arrangement. All Adax hardware products are available for PCI, cPCI and PMC architectures. The cPCI products support PICMG 2.16 and HotSwap.

The SCTP/T software operates with the following Adax products:

- HDC High Density Channelized Controller for Multiple Protocols
- ATM Controller for Real Time Voice and Video over AAL2; Signaling and IP over AAL5

Adax Software

SCTP/T is just one of the many products in the Adax Protocol Software (APS) SIGTRAN suite that has been designed for Convergence, Wireless and Intelligent Networks.

Other Adax SIGTRAN products include M3UA, M2UA, M2PA, and Signaling Gateways. Adax Protocol Software (APS) is designed to provide the customer with the greatest benefit to their application and from each Adax hardware product.

The Adax software provides the user with a set of common APIs that enables integration of business applications and upper layers with Adax signaling infrastructure.

Fastest Time to Market

Adax provides extremely fast time to market through simplicity of design and a modular product range. The common software interface ensures a simple migration path and provides a flexible and portable solution. The consistent and common API across products provides preservation of the user's investment in the higher layer software and applications. The API commonality and compatibility enables quick upgrades to next generation requirements and easy field upgrades to expand the capabilities of installed systems.

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