Adax SCTP/T

adax
Legacy to LTE

Run-time Security and Reliable Delivery of Valuable and Timely Data for LTE Networks, IoT and M2M

Overview

There is renewed urgency to address signaling-based threats to wireless communications networks. LTE is delivering on its promise of mobile broadband data services with VoLTE and LTE Broadcast not far behind. As the number of LTE subscribers grows so does the number of connected devices and associated Diameter-based transactions.

The Internet of Things (IoT) has continued to snowball and whilst the devices may only want to transmit a small amount of data the vast numbers of them could have a detrimental effect on the Quality of Experience (QoE). The underlying transmission protocols, such as SCTP need to be able to support the huge number of M2M and IoT connections trying to access the network simultaneously.

This exponential growth in signaling demands a secure, reliable, robust and high performing transport layer to maintain the high level of customer experience and protection networks must provide. Adax SCTP/T delivers this robust, reliable, and secure transport layer. Without SCPT/T network connections are vulnerable to fraudulent packet injection and hijacking and the delivery of valuable, time dependent, data is at risk. Adax SCTP for Telecom (SCTP/T) was designed specifically to meet the demands of signaling in LTE and IMS networks, IoT and M2M and ensure the constant and timely delivery of that valuable data. Thus securing the millions of simultaneous associations required by today's networks.

Steeped in the tradition of telecom reliability and robustness, with thousands of SIGTRAN installations, Adax SCTP/T is ready to meet the challenges in today's networks, enabling network growth, thwarting those with malicious intent, whilst maintaining service and data delivery.

Quality and Reliability of Service

Built to meet the demands of today's LTE, IMS, Diameter, SIGTRAN and IoT standards, Adax SCTP/T enables service providers to achieve signaling reliability and ensure the delivery of valuable and timely data by implementing signaling protocols and services that:

- Perform vigilant in-service quality monitoring of the signaling links
- Detect degradation of link quality at very short, programmable intervals and take action to move to alternative links before the primary goes out of service
- Provide redundancy via an enhanced version of multi-homing

These special considerations for using SCTP to meet the requirements of telephony signaling over IP infrastructure are as applicable for today's IP data mobile voice and data network traffic as they were when the standard was written. The Adax SCTP/T product constantly monitors the primary and alternative links to ensure the timely delivery of valuable data and provides the capabilities to address the issues necessary for reliable and effective signaling for IP voice and data.

Secure Authentication with Performance & Visibility

Security in the network is more important today than ever before. Networks are subject to attacks with greater frequency and potential damage unimaginable even 5 years ago. This can only increase as more devices are connected to the network. RFC 4895 for SCTP addresses this concern without compromising performance or network monitoring visibility like IPsec/VPNs do. Today's interconnected networks are vulnerable to hijacking via insecure links or rogue network nodes. Application vendors can unknowingly allow the network to be compromised when presumably 'secure VPNs' invisibly transport threats within packets. And even when they are secure, the heavy-weight solutions limit network scalability in a time of growth.

One of the most fundamental advantages of SCTP over TCP is avoiding the head-of-line blocking by the use of multiple streams. This is particularly important on the S1 interface in LTE where the number of outbound and inbound streams becomes an important factor for each SCTP association. For example the eNodeB could have up to 65,000 streams but the more streams the SCTP association end-point has the higher the overhead for managing those streams and that is why the use of Adax SCTP/T to reduce that overhead is so critical to good network performance.

Adax SCTP/T is the most robust, scalable, authenticated SCTP implementation available and will enable you to secure, optimise and grow your network.

The Adax Advantage

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

- Up to 10,000 simultaneous associations for maximum connectivity
- Secure authentication with performance & visibility
- Protocol implementation in the OS kernel for accurate timer control and quick recovery
- In-service monitoring detects degradation and anticipates the need to offload to secondary links
- Enhanced multi-homing provisioning options improve fail-over robustness and redundancy
- Improved levels of reliability, performance & capacity

Performance is in the Details

Capacity

Today's networks need reliable, high performance, high capacity signaling capabilities similar to that provided by STPs in SS7 networks. The flat architecture of the LTE network requires a very large number of signaling connections as well as signaling concentration for efficient routing. Diameter signaling can be the bottleneck in LTE signaling performance and while a convenient

and seemingly economical solution, the Linux-supplied SCTP for Diameter is simply not up to this task. Likewise the large number of IoT and M2M connections over the S1 interface cannot be handled effectively by the Linux supplied SCTP.

Adax SCTP/T resolves all of these issues within the bounds of the host Linux operating system resources.

How does Adax SCPT/T meet the signaling demands in today's LTE networks?

The Adax SCTP/T advanced multi-core implementation allows the Linux host to provide thousands of Diameter associations and eNodeB connections, instantly ready to carry the traffic required by the host application. By supporting up to 10,000 simultaneous SCTP associations on the application's Linux host, while utilizing less than 20% of the CPU Adax SCTP/T leaves ample resources for any type of application. This efficiency is accomplished by taking advantage of the massive parallelism available in modern CPUs in general and Adax' long experience in telecom signaling in general and SCTP in particular.

Detection of Path Failures

Adax SCTP/T is a Linux kernel implementation that:

- Utilizes kernel high resolution timers, enabling large capacity and quick recovery
- Detects failures in the signaling fabric in 20mS, or less.

Heartbeat

More frequent heartbeats to detect and fix realtime failures and achieve service restoration through alternate destination addresses.

Multi-homing

- Adax SCTP/T multi-homing provides both redundancy and fault tolerance for signaling applications.
- Provides physical path and network route redundancy for SCTP associations thus avoiding single points of network failure between nodes.
- Paths are continually monitored by the rapid heartbeat feature. If the primary path fails SCTP transparently switches to the secondary path, without packet loss or upper layer intervention.

Responsive Retransmissions

- Reducing the timer intervals associated with Path.Max.Retrans and Association.Max.Retrans improves destination and peer path failure detection.
- Adax SCTP/T product implements smaller timer intervals for Path.Max.Retrans and Association.Max.Retrans. Consequently, SCTP/T provides a level of service comparable to those expected from SS7.

Other SCTP/T product features include:

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

Adax Protocol Acceleration Benefits

SCTP/T is just one of the many products in the Adax Protocol Acceleration suite that has been designed for both today's networks and legacy interworking. As well as a standalone transport for Diameter and the S1 interface, SCTP/T is also a part of the Adax SIGTRAN suite that includes M3UA, M2PA, and M2UA modules, complete signaling stacks and Signaling Gateways.

Other products in the Adax Protocol Acceleration suite include IPsec and GTP (see separate datasheets).

Fast Time to Market and Protection of Investment

Adax software provides the user with a set of common APIs that enables quick and easy integration of applications and upper protocol layers and delivers fast, efficient and reliable application performance. SCTP/T supports a comprehensive API designed to the ULP-to-SCTP interface primitives per RFC 4960.

- The user API for SCTP/T is similar to, and consistent with, the Adax API for Diameter, SIGTRAN and traditional SS7 signaling offerings.
- The API is common to all User Adaptation (UA) interfaces such as SUA, M3UA, IUA, M2PA, etc

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, portable and scalable 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 new network requirements and easy field upgrades to expand the capabilities of installed systems.

Standards

- IETF RFC 6733 SCTP as Transport for Diameter Base Protocol
- IETF RFC 5062 Security Attacks Against SCTP
- IETF RFC 5061 Dynamic Address Reconfiguration
- IETF RFC 4960 Stream Control Transport Protocol
- IEFT RFC 4895 Authenticated Chunks for SCTP
- IETF RFC 4460 Errata and Issues
- IETF RFC 4086 Random Number Generation
- IETF RFC 3873 SNMP MIB
- IETF RFC 3758 Partial Reliability Extension
- IETF RFC 2104 HMAC: Keyed-Hashing for Message Authentication
- IETF RFC 1321 The MD5 Message-Digest Algorithm

SCTP/T 1116/07

Adax is an industry leader in high performance packet processing, security and network infrastructure for Legacy to LTE networks. Modular, scalable and flexible, the Adax LTE-EPC solutions, SIGTRAN and SS7 Signaling platforms, as well as the DPI, IPsec Security, and GTP acceleration products enable customers to build the solutions they need, creating a smarter network infrastructure for all.

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Legacy to LTE

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