Adax D-M3UA

adax
Legacy to LTE

A distributed and more reliable M3UA

Introduction

The Adax D-M3UA product implements a Distributed M3UA library and API, permitting different computers to host individual Application Server Processes (ASPs) or IP signaling Points (IPSPs) in an Application Server (AS) cluster. This product does not implement distribution of Signaling Gateway Processes (SGPs) across multiple computers, but can implement multiple SGPs and Signaling Gateways (SGs) on a single system.

Adax D-M3UA includes the underlying Adax M3UA SIGTRAN protocol software (see separate datasheet) and a D-M3UA distribution wrapper that is used to co-ordinate multiple instances when provisioned as a cluster of inter-connected D-M3UA ASP or IPSP systems. The D-M3UA library uses a separate Adax SCTP/TTM communications library (included with the product) between the distributed cluster nodes. For full details of the SCTP product please refer to the Adax SCTP/T datasheet.

Design

Adax D-M3UA uses a set of distributed processes to achieve a distributed and more reliable M3UA. Each instance is an M3UA ASP or IPSP and these processes are also referred to as nodes. To remote users, the cluster of distributed ASP's form one M3UA Application Server (AS). Each ASP or IPSP can be configured to communicate with hundreds of remote SGP's or IPSP's and multiple SG's.

Up to 32 nodes can be created and the user application configures the node and assigns the node-id. The numbering is arbitrary as long as each node-id is unique in the cluster and is in the range of 0-31. For example, one can have a cluster of three nodes with node-ids 2, 5 and 9. M3UA designates each ASP with an asp-id and the asp-ids must also be unique in the entire cluster.

Reliable Inter ASP Communication

Each ASP node has an SCTP Association connection to every other ASP node. One node is designated the Master node and the other nodes are Clients. The Master maintains the table of point codes and ASP state but it has no special role in message transfer. All nodes update the Master Node with the list of destination point-codes available at each ASP and the current M3UA management state (ASP UP, ASP ACTIVE, etc.). The Master Node updates all the nodes with a list of available destination point-codes at each ASP and its M3UA management state. Every node therefore knows which nodes can reach a specific destination point code.

For High Availability the Inter-ASP HA communication is provided in the Adax D-M3UA library. This process provides status and remote point code availability for all nodes. In the event that a Destination Point Code (DPC) is not available at a given ASP, that ASP will route the messages for that DPC to another ASP where the DPC is reachable and the ASP is in the Active state. This is a key feature for redundancy in the Adax D-M3UA product. See Figure 1.

The user application software can dynamically select another node to be the Master at any time. This is useful if a system with the Master node is being removed from service for software upgrade.

Distributed High Availability Features

Adax D-M3UA ensures the reliable and distributed HA delivery of data through a range of unique features:

- Support for up to 32 systems (nodes)
- Availability of point codes across the ASP nodes of the cluster
- Ability to select a new Master node
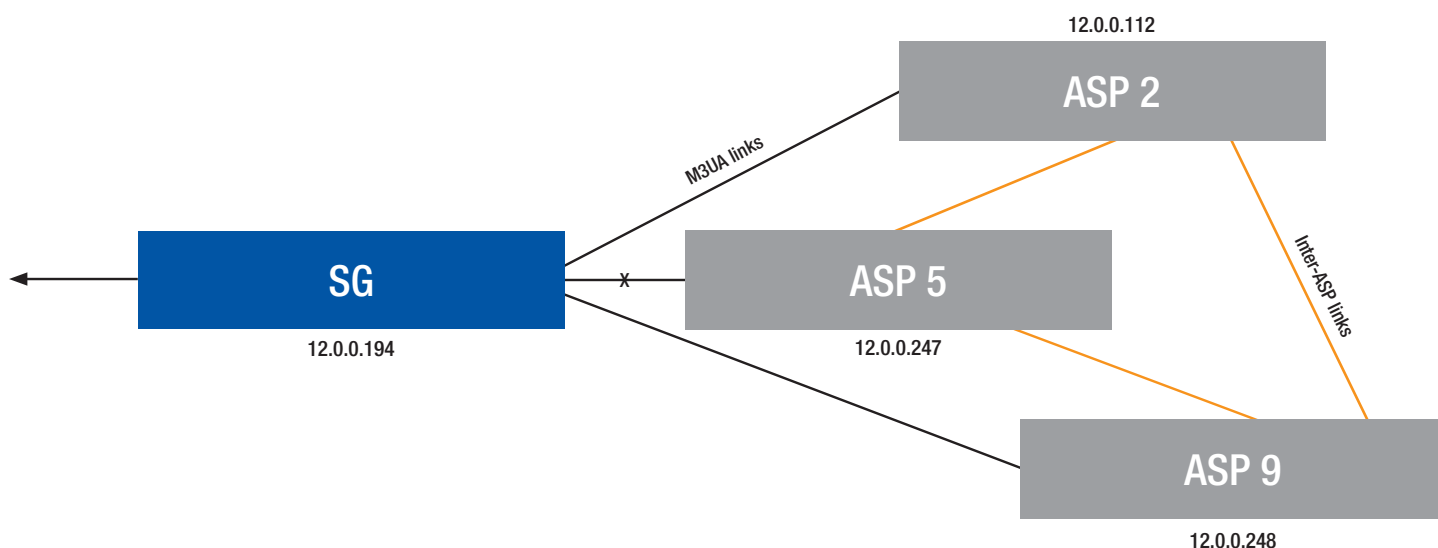- Routing via another node in the event of a network outage.

Figure 1 – Inter ASP Communication

API

The Adax D-M3UA API is designed to be consistent with the underlying M3UA API. As a result all of the D-M3UA wrapper functions use the same additional arguments to their corresponding M3UA functions and where additional arguments are not required the underlying M3UA functions are exactly as documented in the M3UA API manuals.

There are specific D-M3UA initialization function calls but the sequence, state applicability and usage of all other functions pertaining to the AS side of D-M3UA are the same as the underlying standard M3UA functions.

The distributed ASPs communicate via an Adax SCTP based message passing system provided in the library. Each ASP is configured with a node_id, a local primary IP address, a local source port and one to eight local alternate IP addresses. When each ASP connects to the other ASPs in the cluster it uses the other ASP's IP address and source port as the destination IP address and destination port in the SCTP association. Each SGP is similarly assigned an SGP id, a remote destination address and for SGPs, both a destination port and a source port must be assigned. If the INIT to an address is not responded to each ASP will attempt to connect to its peer ASPs at each alternate destination IP in a 'round robin' fashion until the initialization of the SCTP Association succeeds.

For the functionality, applicability and usage of Adax D-M3UA please refer to the Adax M3UA and SCTP/T datasheets.

For a complete Signaling Gateway solution please refer to the AdaxGW datasheet.

Adax SCTP/T (see separate datasheet)

The exponential growth in signalling 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 signalling 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.

Standards

- RFC4666 Signaling System 7 (SS7) Message Transfer Part 3 (MTP-3) - User Adaptation Layer (M3UA)

Operating System Support and Adax Protocol Controllers

D-M3UA is available for Linux and Solaris Operating Systems. Other OS support on request.

All Adax products are available for PCI, PCIe, Low Profile PCIe (LPe), PCIe EM, PMC and AMC architectures.

Adax Software

D-M3UA 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 SCTP, 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 API's between products remain the same preserving the investment in the higher layer software and applications. This compatibility enables quick upgrades to next generation requirements and easy field upgrades to expand the capabilities of installed systems.

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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