IPLOOK STP/DRA PRODUCT DESCRIPTION

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IPLOOK STP/DRA Product Information

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Date (2020-02-01)

Document Version (V1.4)

Contents

1 Introduction

This document provides an overview description of IPLOOK's STP/DRA solution as well as the services and support offered by IPLOOK.

Overview

In this section, we would explain the basic idea and architecture of STP and DRA.

1.1 STP

A Signal Transfer Point is used in a SS7 or CC7 network. The STPs transfer SS7 messages between interconnected nodes (signaling end points) based on information contained in the SS7 address fields. Typical SEPs include service switching points (SSPs) and service control points (SCPs). The STP is connected to adjacent SEPs and STPs via signaling links.

STP's support any-to-any signaling connectivity between SS7 and IP SIGTRAN interfaces for maximum network integration flexibility. The STP offers all the standard features and functionality expected of an STP solution, including Gateway Screening and Global Title Translation, while also offering extended capabilities and features such as Signaling Gateway and Point Code Emulation.

1.2 DRA

A Diameter Routing Agent (DRA) is a functional element in a 3G or 4G (such as LTE) network which provides real-time routing capabilities to ensure that messages are routed among the correct elements in a network. The DRA was introduced by the 3GPP to address the increased Diameter signaling traffic and growing complexity of 4G LTE networks.

Some of this complexity comes from the enhanced services that communications service providers (CSPs) introduce in 3G and 4G LTE networks, such as tiered charging, converged billing, and policy enforcement

control. These services require other Diameter-based functionalities, including PCRFs, PCEFs, HSS, and more, to support complex user-service connections. A DRA controls and manages the Diameter signaling among these elements to ensure that the proper connections are made.

Networks with complex architectures and multiple Diameter nodes require an advanced Diameter contextual routing engine. Choosing a DRA that's capable of advanced contextual routing is essential to managing network complexity and capitalizing on all that 4G LTE has to offer.

2 Product Introduction

STP/DRA	SCCP routing	
	Geo redundancy	Standby Redundancy - Passive Standby Software instance
	Support for SIGTRAN standards M3UA	MTP3/SCCP/TCAP
	Support RFC 6733 Standard Routing	
	Routing Management	Routing rules based on: a)Peer Role b)Contents of AVP c)Application ID
	Operation and Management	Web Client
		Command Line Interface

Table 1: Product Introduction

IPLOOK STP/DRA products follow RFC, 3GPP, IFC and relevant protocol specifications, which could deliver all the standard features and functionality expected of STP/DRA solution while also offering extended capability and features.

3. Features

3.1 STP

Multi-Layer Routing Support

The IPLOOK STP has a highly flexible and high throughput routing engine for SCCP routing:

3.1.1 SCCP:

- Routing on incoming SCCP label
- Called and Calling
- GT, PC, SSN
- NOA, etc.
- Variant Translation ETSI to ANSI
- Outgoing SCCP label manipulation
- Translate routing variant (GT > PC+SN, etc.)

3.1.2 Redundancy:

- Standby Redundancy – Passive Standby Software instance
- Mated Pair Redundancy – 2 Independent STP's configured with a C Link
- Mated Pair and Standby redundancy – Combination of the above
- Architecture is designed around client requirements and overall dimensioning

3.1.3 Routing Management

- Peer Role

- Contents of AVP
- Application ID

3.2 DRA

3.2.1 Peer-to-peer management

The management of the peer end is mainly to realize how the DRA device manages Diameter devices with its direct link, including the configuration of peer reads, capacity negotiation, and functional requirements for link configuration within Diameter link groups between the two devices.

1. The DRA device supports static configuration of the peer, including the host name, IP address, port, etc. of the peer.
2. The DRA appliance supports redundant backup or load sharing of the signaling processing unit.
3. Multiple load-sharing and master Diameter links can be created between DRAs and between DRAs and other Diameter devices.
4. The connection to the peer fully complies with the RFC3588 standard.
5. Support peer link fault detection function, and support for failover and reversion.

3.2.2 Diameter signaling relay function

The Diameter signaling relay function mainly refers to the functional requirements of DRA on Diameter signaling relay capability, including the proxy method to relay Diameter signaling, the supported application types (such as S6a/S6d/S13/Gx), the addressing strategy to relay Diameter signaling messages, and the message processing mechanism of Diameter protocol layer during the relaying of Diameter messages.

3.2.2.1 Proxy Approach

Supports the Relay/proxy method as defined by RFC3588.

3.2.2.2 Type of application

For relay mode, it can support the routing of all Diameter applications.

For proxy mode, it supports the route of Diameter application of S6a, S6d, S13, Cx interface, and can support the route of other Diameter application through software upgrade according to the need.

The proxy mode for different Diameter applications is configurable, and the proxy mode for different nodes and the type of application supported are also configurable on a node-by-node basis.

3.2.2.3 Addressing strategies

DRA supports addressing based on the content of the following Diameter messages

- IMSI
    1. Support multiple configurable fixed-length IMSI number prefixes for maximum matching, with priority to match by maximum length, e.g., you can also support the prefixes 46006, 460061 for IMSI number segments in the IMSI routing table, with priority to match segment 460061.
    2. Full matching of IMSI numbers (the maximum length of the IMSI number should meet at least 15 bits)
- Application ID
- destination-realm, destination-host
    1. All matching for destination-realm (Realm naming convention in EPC network is: epc.mnc<MNC>.mcc<MCC>.3gppnetwork.org).
    2. Match all destination-hosts.
- Origin-Realm, Origin-Host
    1. Full matching of Origin-Realm
    2. Full matching of Origin-Host

- AVP-based diameter addressing

4 Capacity, performance requirements and reliability specifications

4.1 DRA capacity requirements

Capacity requirements are as follows:

- Maximum number of SCTP couplings: 200
- Maximum number of links: 200
- Maximum number of IMSI segments: 40000
- Maximum number of destination host routing table entries: 1000
- Number of routing table entries for the addressing policy: 40000

4.2 Performance requirements

4.2.1 Signaling Routing Capabilities of DRA Devices

Maximum number of packet-forwarded messages per second for DRA devices: (Note: MPS: Message per second, unidirectional messages, including both destination-host and IMSI-based routing) In the case of transaction-based signaling routing:

- S6a/S6d/S13 50000MPS
- Gx 50000MPS

4.3 Delay in signaling forwarding

The delivery delay of Diameter signaling is an important parameter of a network that affects the time it takes to establish a call and the response time to a business request. The delay of a message at the DRA is the delay of the DRA.

Business load	Deliver delay (ms)

CPU load: 60%	6
CPU load: 80%	10
CPU load: 100%	20

4.4 Availability

The availability of DRA equipment shall be greater than or equal to 99.9997%. That is, the unavailability time is less than or equal to 3 minutes/year.

5 Recommended Hardware Configuration

Hardware type	Universal X86 Machine
Hardware parameters	2 x Intel E5-2650 v3 10 cores，2.3GHz；32GB RAM； 64GB SSD； 6 x 1GbE NIC(Expandable on demand)
Appearance	

6 Operation and maintenance

6.1 Operation and maintenance subsystem structure

The operation and maintenance subsystem is based on Client/Server architecture, providing a GUI operation and maintenance subsystem and a Web UI performance measurement system, and supporting customized human-machine interfaces.

The operation and maintenance subsystem supports three operating modes.

Operate at the local maintenance terminal.

Access to the OMC maintenance center and centralized management by OMC.

Remote operation and maintenance, accessing the internal network via dial-up server to perform Web-based remote maintenance.

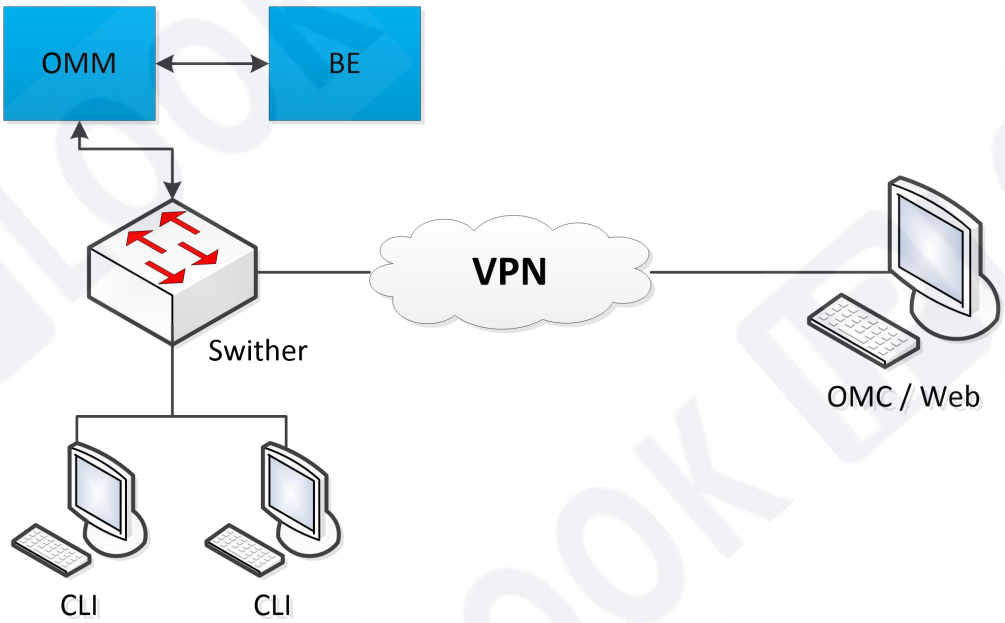

Figure 1: Architecture of Maintenance

6.2 Operation and maintenance of basic functions

6.2.1 Configuration Management

There are two approaches to configuration management, one is to use an SNMP-based configuration system. It provides users with a set of operation and query methods. The OMC allows for comprehensive monitoring and management of this product. The other is a local command-line system. It adopts a relational database to manage configuration data and provides database operation means such as adding, deleting, modifying, querying, storing, backing up, restoring, etc. It can effectively manage and maintain various configuration data (such as hardware data, signaling data, module data, etc.).

6.2.2 Fault Management

alarm management

Real-time detection and reporting of equipment failures or abnormalities and other alarm information.

Support the storage of alarm information, query the alarm history, set the alarm processing mode and other functions.

Display alarm processing suggestions in the alarm console, which is convenient for users to locate and deal with equipment failure quickly.

6.2.3 Performance measurement

The performance measurement system can be interrogated in a variety of ways to provide feedback on the various measurements of the system.

6.2.4 Safety Management

The operation and maintenance system is a multi-user system. In order to ensure that multiple users can use the system safely and conveniently, the system adopts permission management.

6.2.5 Remote maintenance

The following remote maintenance features are available.

The remote maintenance provided is secure and convenient, and the system software provides anti-virus, anti-hacker and anti-illegal attack measures.

Remote maintenance features are provided.