Literature Survey on Diameter

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I. INTRODUCTION

LTE is Long Term Evolution and it was started as a project in 2004 by telecommunication body known as third Generation Partnership Project (3GPP). LTE evolved from an earlier 3GPP system known as the Universal Mobile Telecommunications System (UTMS), which in turn evolved from the Global System for Mobile Communications (GSM). Even related specifications were formally known as the evolved UMTS terrestrial radio access E-UTRA and evolved UMTS terrestrial radio access network E-UTRAN. The main goal of LTE is to provide high data rate, low latency and packet optimized radio access technology supporting flexible bandwidth deployments.

II. MOBILE CONEX SCENARIO

Mobile data traffic continues to grow rapidly and the challenge wireless operators face is to support more subscribers with an increasing bandwidth demand. In order to meet these demands a new technology like ConEx (Congestion Exposure) mechanism is designed to be applied as key element of congestion management solutions for a variety of use cases. Thus, such a use case can be a mobile communication network like 3GPP EPS networks where UE (User Equipment), servers and caches, the access network, and possibly an operator's core network can be ConEx's enabled[6].

III. CONCEPT OF DIAMETER

Diameter is an Authentication, Authorization and Accounting (AAA) protocol. It works on Application Layer if we consider OSI Layered model. Diameter is a message-based protocol where AAA nodes exchange messages using TCP and SCTP protocols. It works on s6a interface which is an interface between the MME (Mobile Management Entity) and HSS (Home Subscriber server) in LTE architecture. It provides facilities like capabilities negotiation, error notification and basic services necessary for applications such as handling of user sessions. It has features like routing, relaying, proxying, redirecting,transporting of service-specific authorization information, transporting of user authentication information and exchanging resource usage information[1,5].

IV. DIAMETER PACKET

Each Diameter message consists of command codes which determines the action that is to be taken for a particular message, Application ID which is used to identify for which Diameter application the message is applicable, Hop-by-Hop ID that is used to match the requests with their answers as the same value in the request is used in the response, End-to-End ID that is used to detect duplicate messages along with the combination of the Origin-Host AVP and message length[3,4].

V. DIAMETER COMMAND CODES

Diameter works on s6a interface which is an interface between MME and HSS in LTE architecture. It has certain command codes to determine the action that is to be taken for a particular message. some common command codes are

- 3GPP-Update-Location-Request/Answer (ULR/ULA)
- 3GPP-Cancel-Location-Request/Answer (CLR/CLA)
- 3GPP-Authentication-Information-Request/ Answer (AIR/AIA)
- 3GPP-Insert-Subscriber-Data-Request/Answer (IDR/IDA)
- 3GPP-Delete-Subscriber-Data-Request/Answer (DSR/DSA)
- 3GPP-Purge-UE-Request/Answer (PUR/PUA)
- 3GPP-Reset-Request/Answer (RSR/RSA)
- 3GPP-Notify-Request/Answer (NOR/NOA)[1].

VI. STREAMCONTROL TRANSMISSION PROTOCOL

SCTP is a reliable transport protocol operating on top of a connectionless packet network such as IP. It offers data fragmentation, sequenced delivery of user messages within multiple streams, with an option for order-of-arrival delivery of individual user messages, bundling of multiple user messages into a single SCTP packet and network-level fault tolerance through supporting of multi-homing at either or both ends of an association[2].

VII. SCTP CHUNKS

Each SCTP packet consists of chunks in addition to the common header. Each chunk has a common

format, but the contents can vary. Some of major chunk types and their value are

VALUE	ABBREVATION	DESCRIPTION
0	DATA	Payload Data
1	INIT	Initiation
2	INIT ACK	Initiation Acknowledgement
3	SACK	Selective Acknowledgement
6	ABORT	Abort

Data chunk is used to send the payload data, INIT chunk initiates an SCTP association between two end-points. The INIT ACK chunk is used to acknowledge the initiation of an SCTP association. The ABORT chunk is sent to the peer of an association to close the association[8].

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