

## Course Description

This extensive course has become a very high demand need today, as it starts by introducing delegates to the concept of the next generation of AAA server (after the traditional RADIUS) called Diameter. This is described in depth within the context of the IETF Diameter Credit Control Application..

The course then fits the knowledge of Diameter and the Credit Control Application into the 3GPP UMTS and LTE Charging Management architecture.

An overview of the preferred Transport Layer (Layer 4) for Diameter, SCTP is also covered.

## Students Will Learn

- **Diameter and its Applications**
- **Support DIAMETER**
- **The Diameter Base Protocol**
- **Diameter Base Protocol Message Formats**
- **Diameter Operations and Extensibility**
- **Diameter Accounting Protocol**
- **Diameter Credit Control Application**
- **The LTE/UMTS Charging Management Architecture**
- **And More...**

## Target Audience

Attendees would be employed or contracted to operators, manufacturers, integrators or regulators. Anyone requiring the knowledge and skill-sets of the next generation of AAA server called Diameter as directed to the specific courses for these topics.

## Course Outline

## **Module I: Diameter and its Applications**

What an AAA Server Does

The Need for Diameter

Diameter Applications; Not Applications but Protocols

Overview of Diameter Applications

Diameter Credit Control Application

3GPP Use of Diameter for Charging

## **Module II: Supporting DIAMETER**

Diameter needs Network and Transport Layer Support

SCTP

Multi Homing and Multi Streaming

Security at Startup

SCTP Operation

## **Module III: The Diameter Base Protocol**

Terms and Acronyms

AVPs Attribute Value Pairs

Diameter Agents and Clients

Diameter Servers

NAI - Network Access Identifier

Application Identifier

Connections and Sessions

Peer Table

- Realms
- Agents
  - Relay
    - Proxy
  - Redirect
  - Translation
- End to End Security Support
- Facilities Provided

#### **Module IV: Diameter Base Protocol Message Formats**

- Header
- Command Codes
- AVPs
  - AVP Header
  - Grouped AVPs
- Base protocol AVPs

#### **Module V: Diameter Operations and Extensibility**

- Peer Connections
  - Discovery
  - Capability Exchange
  - Disconnection
- Failover and Fallback
- Diameter message processing
- Diameter Error Handling

User Sessions

Agent Support

Auditability

Extensibility of the protocol

Creating New AVPs

Creating New Applications

## **Module VI: Diameter Accounting Protocol**

Model

Accounting Records

Fault Resilience

## **Module VII: Diameter Credit Control Application**

Charging Trigger Function (CTF)

Charging Data Function (CDF)

Online Charging Function (OCF)

Event Based and Session Based Charging

Immediate Event Charging

Event charging with Reservation

Session charging with Reservation

Basic Principles for Diameter Online charging

Charging Application Message Sequence Examples

## **Module VIII: The LTE/UMTS Charging Management Architecture**

The Principle of Billing  
Overall Architecture  
Structure of Standards  
Charging mechanisms  
Flow Based Charging Principles  
Offline and Online charging  
..... Use of Diameter  
Policy Based Charging Interfaces (Gq/Go)  
Flow Based Charging (Rx/Gx/Gy)  
Policy and Charging Control - PCC (Rx/Gx/Gy)  
Offline Charging (Rf)  
Online Charging (Ro)

## **Delivery Method**

Instructor-Led with numerous case-studies and exercises.

## **Equipment Requirements**

**(This apply's to our hands-on courses only)**

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

## **Course Length**

2 Days