|  |  |
| --- | --- |
|  |  |

SUA Protocol Emulation for TTCN-3 Toolset with TITAN, User Guide

Contents

1 Introduction 2

1.1 Revision history 2

1.2 About this Document 2

1.2.1 How to Read this Document 2

1.2.2 Presumed Knowledge 2

1.2.3 References 2

1.2.4 Abbreviations 3

1.2.5 Terminology 3

1.3 System Requirements 3

2 The Protocol Emulation 4

2.1 Overview 4

2.2 The User Interface: the N-Service Primitives 5

2.3 Installation 5

2.3.1 Description of files implementing the SUA PE 5

2.4 Configuration 6

3 Error messages 7

4 Warning messages 8

5 Examples 8

# Introduction

## Revision history

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Rev | Characteristics | Prepared |
| 2006-12-01 | PA1 | First draft version | EJMTCSO |
| 2006-12-15 | PA2 | Updated after review | EJMTCSO |
|  |  |  |  |
|  |  |  |  |

## About this Document

### How to Read this Document

This is the User Guide for the SUA Protocol Emulation (SUA PE). The SUA PE is developed for the TTCN-3 Toolset with TITAN according to the Requirement Specification ‎[5]. This document should to be read together with Product Revision Information ‎[6] and Function Specification ‎[7].

### Presumed Knowledge

The knowledge of the TITAN TTCN-3 Test Executor‎[2] and the TTCN-3 language ‎[1] is essential.

### References

1. ETSI ES 201 873-1 V2.2.1   
   The Testing and Test Control Notation version 3. Part 1: Core Language
2. 1/198 17-CRL 113 200 Uen  
   User Guide for TITAN TTCN-3 Test Executor
3. 2/198 17-CRL 113 200 Uen  
   Programmer´s Technical Reference for TITAN TTCN-3 Test Executor
4. 1/1531-CRL 113 200 Uen  
   Installation Guide for TITAN TTCN-3 Test Executor
5. 6/0363-FCP 101 3665/P Uen Rev A  
   TTCNv3 Requirement Specification for MSC R13
6. 109 21-CNL 113 517-1 Uen  
   SUA Protocol Emulation for TTCN-3 Toolset, Product Revision Information
7. 155 17 CNL 113 517 Uen  
   SUA Protocol Emulation for TTCN-3 Toolset, Function Specification
8. RFC 3868 - Signalling Connection Control Part User Adaptation Layer (SUA)   
   <http://www.ietf.org/rfc/rfc3868.txt?number=3868>
9. 109 21-CNL 113 516-1 Uen  
   SUA Test Port for TTCN-3 Toolset with TITAN, Product Revision Information
10. 109 21-CNL 113 341-2 Uen  
    SCCP Protocol Emulation for TTCN-3 Toolset with TITAN, Product Revision Information

### Abbreviations

ASP Abstract Service Primitive

PE Protocol Emulation

SCCP Signalling Connection Control Part

SUA SCCP User Adaptation Layer

SUA PE SUA Protocol Emulation

SS7 Signalling System No 7

TTCN-3 Testing and Test Control Notation version 3.

### Terminology

SUA Protocol Emulation: Implementation of SUA as specified in ‎[7].

SCCP User: Protocol, which uses services of SCCP.

## System Requirements

In order to operate the SUA PE the following system requirements must be satisfied:

- The operation system shall be Sun Solaris 8.

# The Protocol Emulation

## Overview

The SUA PE is developed for testing implementations of SCCP Users using TTCN-3 and it uses the services of the underlying SUA layer (see *Figure 1*). It is assumed that the SCCP layer of the peer conforms to the same specifications as SUA PE does.

##### SUT

##### Test Suite

SCCP-User

Instance 2

SCCP-User

Instance 1

N-Service Primitives

SUA

Instance 2

###### SUA PE Instance 1

SUA Emulation

SUAasp\_PT

SUA-Service Primitives

IP layer

IP layer

**System**

*Figure 1 Service primitives in SS7*

Generally, SUA PE is designed to supply the same interfaces and services for the SCCP user layer as in the previous product SCCP PE ‎[10].

## The User Interface: the N-Service Primitives

SUA PE communicates with its user by means of N-Service primitives.

These primitives are implemented as TTCN-3 records. Any SCCP User inserts its message in the field “User Data”. Their implementation can be found in file SCCPasp\_Types.ttcn.

## Installation

Since SUA PE is used as a part of the TTCN-3 test environment this requires TTCN-3 Test Executor to be installed before any operation of the implementation. For more details on the installation of TTCN-3 Test Executor see ‎[4].

An implementation of the SUA test port is also needed for execution ‎[9].

### Description of files implementing the SUA PE

The SUA PE is implemented in the file

SUA\_Emulation.ttcn

To build an executable test suite with TITAN ‎[2] that is using SUA PE the following files from other products shall be added to the related project (compilation is tested with revisions shown in ‎[6]):

General\_Types.ttcn

SCCPasp\_Types.ttcn

SUA\_EncDec.cc  
SUA\_Types.ttcn  
SUAasp\_EncDec.cc

SUAasp\_PortType.ttcn

SUAasp\_PT.cc

SUAasp\_PT.hh

SUAasp\_Types.ttcn

Their functionality is the following:

Abstract\_Socket.\* This is the implementation of the Abstract\_Socket (CNL 113 384).

General\_Types.ttcn General type definitions (CNL 113 368).

SCCPasp\_Types.ttcn This file contains the interface between the SUA PE and the SCCP User. It contains the abstract service primitives implemented as TTCN-3 messages, templates and it contains the port definitions between the SCCP User and SUA.

SUA\_Emulation.ttcn This file contains the dynamical part.

SUA\_EncDec.cc This file contains functions for RAW encoding-decoding. For details see [**Error! Bookmark not defined.**].

SUA\_Types.ttcn This file contains all other definitions used in SUA PE. It contains definitions of types, ports used between components SUA and SUA\_EncDec and between SUA\_EncDec and the IP layer.

SUAasp\_EncDec.cc, These files contain the implementation of the lower

SUAasp\_PT.cc, SUA layer of the PE. Including test port, type

SUAasp\_PT.hh, definitions and port type definition (CNL 113 516).

SUAasp\_Types.ttcn,

SUAasp\_PortType.ttcn

## Configuration

The SUA PE uses module parameters for runtime configuration that can be set in the [MODULE\_PARAMETERS]section of a TITAN RTE configuration file. On one hand side a few user configurable module parameters are defined, while on the other hand side there are a few timer settings that are not advised to be altered by the user.

A list of configurable parameters is provided below.

tsp\_maxLocalReference:

-type: float

-meaning: Max value of the field Local Reference .Local Reference = 0 .. (SUA.tsp\_maxLocalReference-1).

-possible values: 0-16777216

-default value: 16777216.0

-OPTIONAL

tsp\_maxConnectionId:

-type:float

-meaning: max value of ASP field Connection Identification.More exactly Connection Identification =0.. (SCCP.tsp\_maxConnectionId –1).

-possible values: 0-16777216

-default value: 16777216.0

-OPTIONAL

tsp\_SUA\_data\_maxlen:

-type: integer

-meaning: On one hand the data reassembler buffer’s size for each connection is determined as 16 times this value, and on the other hand buffered transmission of user layer data is performed taking this setting into account.

-possible values: any integer

-default value: 261

-OPTIONAL

tsp\_SSN :

-type: integer

-meaning: If present, it is used in the examination of SUA CLDT message payload content.

-possible values:= 8..1532

-default value: 0

-OPTIONAL

The additional parameters are used for the configuration of internal timers. Modification of their values is not recommended. The list of timer parameters follows:

tspc\_timer\_T\_conn\_est, tspc\_timer\_T\_ias, tspc\_timer\_T\_iar, tspc\_timer\_T\_rel, tspc\_timer\_T\_repeat\_rel, tspc\_timer\_T\_int, tspc\_timer\_T\_guard, tspc\_timer\_T\_reset, tspc\_timer\_T\_internal\_reset, tspc\_timer\_guard

# Error messages

**ERROR: Routing context was not received after map operation!**

The test port used by SUA PE should send the Routing Context associated with the instance and set in the runtime configuration file immediately after the map operation was issued. Check is the parameter is set correctly in the configuration file.

# Warning messages

**WARNING: maximum allowed buffer length exceeded!**

The maximum allowed reassembly buffer length has been exceeded during the assembly of a SUA CODT message. Try setting the parameter tsp\_SUA\_data\_maxlen.

**WARNING: N-CONNECTres ASP received without a connection Id param.!**

For successful connection establishment in SUA PE the N-CONNECTresp primitive must convey a connection Id field.

**WARNING: N-DISCONNECT\_req ASP received without a connection Id param.!**

For successful disconnection in SUA PE the N-CONNECTresp primitive must convey a connection Id field.

# Examples

This is a simple example configuration file for testing. The relevant information can be found under the sections TESTPORT\_PARAMETERS and MODULE\_PARAMETERS. Additional information on the configuration of the underlying SUA test port can be found in ‎[9].

[LOGGING]

FileMask := LOG\_ALL | TTCN\_DEBUG | TTCN\_MATCHING

ConsoleMask := TTCN\_WARNING | TTCN\_ERROR | TTCN\_TESTCASE | TTCN\_PORTEVENT

LogSourceInfo := Yes

[TESTPORT\_PARAMETERS]

system.\*.Hostname := "rhea.eth.ericsson.se" // SEA server name

system.\*.DestinationName := "testtest"

system.\*.HttpPort := "5000" // SEA http port

system.\*.SUAServiceType := "TargetSUA"

system.\*.TesterAPC := "1"

system.\*.EntityName := "SCTP-10.2.112.34:14001-10.2.112.32:14001" // SEA Entity

system.\*.RoutingContext0 := "1111"

system.\*.RoutingContext1 := "2222"

system.\*.RoutingContext2 := "3333"

system.\*.RoutingContext3 := "4444"

// required for Target testing

// location of SUA Server component

system.\*.socket\_debugging := "yes"

system.\*.SUAtarget\_TCP\_IPAddr := "159.107.197.130"

system.\*.SUAtarget\_TCP\_Port := "17705"

[MODULE\_PARAMETERS]

tsp\_maxLocalReference := 16777216.0; //loc ref= 0...tsp\_maxLocalReference-1

tsp\_max\_ConnectionId := 16777216.0; //max connection id = 0..tsp\_max\_ConnectionId -1

tsp\_SUA\_data\_maxlen := 261;

tsp\_SSN := 0;

tspc\_timer\_T\_conn\_est:=120.0;

//Delay to send a message on a conn IT on a

//connection section when there are no

//messages to send

//5 to 10 minutes

tspc\_timer\_T\_ias:=600.0;

//Waiting to receive a message on a connection

//section

//11 to 21 minutes

tspc\_timer\_T\_iar:=1260.0; //Waiting for release complete message -10 to 20 seconds

tspc\_timer\_T\_rel:=20.0;

//Waiting for release complete message; or to

//repeat sending released message after the

//initial T(rel) expiry

//10 to 20 seconds

tspc\_timer\_T\_repeat\_rel:=20.0;

//Waiting for release complete message; or to

//release connection resources, freeze the LRN

//and alert a maintenance function after the

//initial T(rel) expiry

//extending to 1 minute

tspc\_timer\_T\_int:=60.0;

//Waiting to resume normal procedure for

//temporary connection sections during the

//restart procedure

//23 to 25 minutes

tspc\_timer\_T\_guard:=1500.0;

//Waiting to release temporary connection

//section or alert maintenance function after

//reset request message is sent

//10 to 20 seconds

tspc\_timer\_T\_reset:=20.0;

//Waiting to receive all the segments of the

//remaining segments single segmented

//message after receiving the first segment

//10 to 20 seconds

tspc\_timer\_T\_internal\_reset:=0.0; //zero-only for sending internal signals!!

tspc\_timer\_guard :=120.0 //the same as tspc\_timer\_T\_conn\_est:1 or 2 minutes

[MAIN\_CONTROLLER]

TCPPort := 7000

NumHCs := 1