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# Introduction

## Revision history

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Rev | Characteristics | Prepared |
| 2013-05-02 | PA1 | First draft version | EZOLMED |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

## How to Read this Document

This is the Function Specification for the set of STUN protocol module. STUN protocol module is developed for the TTCN-3 Toolset with TITAN. This document should be read together with Product Revision Information [[3]](#PRI).

## Scope

The purpose of this document is to specify the content of the STUN protocol module. Basic knowledge of TTCN-3 [[2]](#TTCN3_CORE_LANGUAGE) and TITAN TTCN-3 Test Executor [5]is valuable when reading this document.

## References

1. RFC 5389  
   STUN - Session Traversal Utilities for NAT
2. ETSI ES 201 873-1 v4.5.1 (2013-02)  
   The Testing and Test Control Notation version 3; Part 1: Core Language
3. 109 21-CNL 113 778-2 Uen  
   STUN RFC5389 Protocol Modules for TTCN-3 Toolset with TITAN, Product Revision Information
4. 2/198 17-CRL 113 200/3 Uen  
   Programmer’s Technical Reference for the TITAN TTCN-3 Test Executor
5. 1/198 17-CRL 113 200/3 Uen  
   User Guide for the TITAN TTCN-3 Test Executor
6. RFC 5245  
   Interactive Connectivity Establishment (ICE):   
   A Protocol for Network Address Translator (NAT)  
   Traversal for Offer/Answer Protocols

## Abbreviations

STUN Session Traversal Utilities for NAT

UDP User Datagram Protocol

NAT Network Address Translators

TTCN-3 Testing and Test Control Notation version 3

## Terminology

No specific terminology is used.

## System Requirements

Protocol modules are a set of TTCN-3 source code files that can be used as part of TTCN-3 test suites only. Hence, protocol modules alone do not put specific requirements on the system used. However in order to compile and execute a TTCN-3 test suite using the set of protocol modules the following system requirements must be satisfied:

* TITAN TTCN-3 Test Executor version R7A (1.7.pl0) or higher installed. For installation guide see [5] Please note: This version of the protocol module is not compatible with TITAN releases earlier than R7A

## Overview

Protocol modules implement the messages structure of the related protocol in a formalized way, using the standard specification language TTCN-3. This allows defining of test data (templates) in the TTCN-3 language and correctly encoding/decoding messages when executing test suites using the TITAN TTCN-3 test environment [5].

Protocol modules are using TITAN’s RAW encoding attributes and hence are usable with the TITAN test toolset only [4].

There are useful functions in the file STUN\_Functions.ttcn to create messages easily, but templates can also be defined to send and receive a given message.

## Installation

The set of protocol modules can be used in developing TTCN-3 test suites using any text editor. However to make the work more efficient a TTCN-3-enabled text editor is recommended. Since the STUN protocol is used as a part of a TTCN-3 test suite, this requires TTCN-3 Test Executor be installed before the module can be compiled and executed together with other parts of the test suite. For more details on the installation of TTCN-3 Test Executor see the relevant section of.

# General

Protocol modules implement the message structures of the related protocol in a formalized way, using the standard specification language TTCN-3. This allows defining of test data (templates) in the TTCN-3 language [2] and correctly encoding/decoding messages when executing test suites using the TITAN TTCN-3 test environment [5].

Protocol modules are using TITAN’s RAW encoding attributes [4] and hence are usable with the TITAN test toolset only.

# Functional specification

## Protocol version implemented

This set of protocol modules implements protocol messages and constants of the STUN protocol. The module is based on RFC 5389 (see [1]). The following messages are implemented:

Binding Request  
Binding Indication  
Binding Success Response  
Binding Error Response

### Unimplemented Messages, Information Elements and Constants

N/A

### Protocol Modifications/Deviations

In addition to attributes in RFC 5389 [1] the attributes described in RFC 5245 [6] are also implemented. These additional attributes are:  
  
PRIORITY  
USE\_CANDIDATE  
ICE\_CONTROLLED  
ICE\_CONTROLLING

The error code ROLE\_CONFLICT is also implemented from RFC 5245 [6].

## Encoding/Decoding and Other Related Functions

This product also contains encoding/decoding functions, which assure correct RAW encoding of messages when sent from TITAN and correct RAW decoding of messages when received by TITAN. Implemented encoding/decoding functions:

|  |  |  |
| --- | --- | --- |
| Name | Type of formal parameters | Return |
| ef\_STUN\_enc | **in** PDU\_STUN pl\_pdu, in OCT16 pl\_key, in STUN\_Attribute\_Type pl\_last\_attribute\_type, **out** octetstring pl\_result in Boolean pl\_calculate\_HMAC\_CRC | **-** |
| ef\_STUN\_dec | in octetstring pl\_stream **out** PDU\_STUN pl\_result | - |
| ef\_STUN\_Check\_Message\_Integrity | in octetstring pl\_stream,  in OCT16 pl\_key, in STUN\_Attribute\_Type pl\_last\_attribute\_type | Boolean |
| ef\_STUN\_Generate\_Transaction\_Id | - | OCT12 |
| ef\_STUN\_get\_Message\_Length | in octetstring pl\_stream | Integer |

The message\_integrity and the fingerprint field will be calculated while encode (when pl\_calculate\_HMAC\_CRC encode parameter equals true) so dummy values are allowed.

## Makefile

The Makefile has to link crypto and z libraries.

-lttcn3-parallel **-lcrypto** **-lz** \

-lxml2 \

# Change information

## R2A

CR\_TR00019966has been implemented.