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# DHCP Protocol Modules for TTCN-3 Toolset with TITAN, User Guide

## Contents

# 1 Introduction

## 1.1 Revision history

| Date | Rev | Characteristics | Prepared |
|---|---|---|---|
| 2005-07-15 | PA1 | First draft version | ETHJGI |
| 2005-07-20 | PA2 | Updated after review | ETHJGI |
| 2006-12-01 | PB1 | RFC 3046 and 3442 addition | ETHGBH |
| 2006-12-15 | PB2 | Update after inspection | ETHGBH |
| 2007-03-07 | PC1 | Updated for TITAN R7 | ETHBAAT |
| 2012-05-09 | PD1 | Implemented CR_TR00019274 | ETHEKR |

## 1.2 About this Document

### 1.2.1 How to Read this Document

This is the User Guide for the DHCP protocol module. The DHCP protocol module is developed for the TTCN-3 Toolset with TITAN. This document should be read together with Product Revision Information [4] and Function Specification [5]

### 1.2.2 Presumed Knowledge

To use this protocol module the knowledge of the TTCN-3 language [1] is essential.

The DHCP protocol is specified in the RFC-s [6], [7], [8], [9] and [11].

### 1.2.3 References

[1] ETSI ES 201 873-1 v.2.2.1 (02/2003)
The Testing and Test Control Notation version 3. Part 1: Core Language

[2] 1/1531-CRL 113 200 Uen
Installation Guide for the TITAN TTCN-3 Test Executor

[3] 2/198 17-CRL 113 200 Uen
Programmer’s Technical Reference for the TITAN TTCN-3 Test Executor

[4] 109 21-CNL 113 461-3 Uen
DHCP Protocol Modules for TTCN-3 Toolset with TITAN, Product Revision Information

[5] 155 17-CNL 113 461
DHCP Protocol Modules for TTCN-3 Toolset with TITAN, Function Specification

[6] RFC 2131
Dynamic Host Configuration Protocol

[7] RFC 2132
DHCP Options and BOOTP Vendor Extensions

[8] RFC 3046
DHCP Relay Agent Information Option

[9] RFC 3442
The Classless Static Route Option for Dynamic Host Configuration Protocol (DHCP) version 4

[10] 10/155 19-FCP 111 348 Uen PA6
Interface Description - MASG – DHCP

[11] RFC 3011 The IPv4 Subnet Selection Option
for DHCP

### 1.2.4 Abbreviations

DHCP Dynamic Host Configuration Protocol

ES ETSI Standard

ETSI European Telecommunications Standards Institute

GUI Graphical User Interface

RFC Request for Comments

TTCN-3 Testing and Test Control Notation version 3

### 1.2.5 Terminology

No specific terminology is used.

## 1.3 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 [2]. Please note: This version of the protocol module is not compatible with TITAN releases earlier than R7A.

# 2 Protocol Modules

## 2.1 Overview

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 [1] and correctly encoding/decoding messages when executing test suites using the Titan TTCN-3 test environment.

Protocol modules are using Titan's RAW encoding attributes [3] and hence are usable with the Titan TTCN-3 toolset only.

The DHCP protocol module is defined in two TTCN-3 modules. DHCP_Types.ttcn defines the data structures given in [6] and DHCP_Options.ttcn implements [7][8][9][11].

The file DHCP_EncDec.cc implements the TTCN-3 external functions that can be used to encode/decode DHCP messages. Decoding of Option 82 is possible in different formats (See Appendix in [10]), therefore extra decoding function dec_PDU_DHCP_Opt82 is available, which decodes Option 82 according to its input parameter.

Note that the DHCP *Option Overload* option is not supported by the Enc/Dec functions. The *sname* and *file* fields are decoded as charstrings with the null characters removed from their end.

When erroneous PDU is received, the message is decoded as follows:

- If the decoder cannot decode one of the DHCP options the erroneous option will be decoded as a DHCP_General_Option
- If the data cannot be decoded it is put into the erroneousPDU field in PDU_DHCP as an octetstring.

Note, that the DHCP protocol module uses the types defined in the General_Types module (Available in Common Protocol Module CNL 113 368).

## 2.2 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 (e.g. nedit, xemacs). Since the DHCP 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 [2].

## 2.3 Configuration

None.

# 3 Example

The “demo” directory of the deliverable contains the files that show a simple example how to use the Enc/Dec functions to encode/decode a DHCP message.

To run the test case, follow these steps:

- Load the project definition file into the TITAN GUI
- Create the symbolic links
- Generate the Makefile
- Compile the executable
- Execute the test case(s)