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

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# Introduction

## Revision history

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

## About this Document

### 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]

### 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].

### 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

### 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

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

# Protocol Modules

## 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).

## 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].

## Configuration

None.

# 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)