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

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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 Function Specification [4].

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 2131 ([5]), 2132 ([6]), 3046 ([7]), 3442 ([8]) and 3011 ([10]).

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].

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 [5]
- *DHCP_Options.ttcn* - implements [6], [7], [8], [10].

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 [9]), therefore extra decoding function `dec_PDU_DHCP_Opt82` is available, which decodes Option 82 according to its input parameter.

NOTE	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	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:

1. Load the project definition file into the TITAN GUI
2. Create the symbolic links
3. Generate the *Makefile*
4. Compile the executable
5. Execute the test case(s)

Terminology

No specific terminology is used.

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

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] Installation Guide for the TITAN TTCN-3 Test Executor

[3] Programmer’s Technical Reference for the TITAN TTCN-3 Test Executor

[4] DHCP Protocol Modules for TTCN-3 Toolset with TITAN, Function Specification

[5] RFC 2131
Dynamic Host Configuration Protocol

[6] RFC 2132
DHCP Options and BOOTP Vendor Extensions

[7] RFC 3046
DHCP Relay Agent Information Option

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

[9] Interface Description - MASG – DHCP

[10] RFC 3011
The IPv4 Subnet Selection Optionfor DHCP