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DHCPv6 Protocol Modules for TTCN-3 Toolset with TITAN, User Guide

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1 Introduction

1.1 Revision history

| Date | Rev | Characteristics | Prepared |
|------------|-----|---------------------|----------|
| 2012-12-04 | PA1 | First draft version | EZOLMED |
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1.2 About this Document

1.2.1 How to Read this Document

This is the User Guide for the DHCPv6 protocol module. The DHCPv6 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.

1.2.3 References

- [1] ETSI ES 201 873–1 v.3.1.1 (06/2005)
The Testing and Test Control Notation version 3. Part 1: Core Language
- [2] 2/198 17-CRL 113 200 Uen
Programmer's Technical Reference for the TITAN TTCN-3 Test Executor
- [3] 1/1531-CRL 113 200 Uen
Installation Guide for the TITAN TTCN-3 Test Executor
- [4] 109 21-CNL 113 763–1 Uen
DHCPv6 Protocol Modules for TTCN-3 Toolset with TITAN, Product Revision Information
- [5] 155 17-CNL 113 763
DHCPv6 Protocol Modules for TTCN-3 Toolset with TITAN, Function Specification
- [6] IETF RFC 3646
DNS Configuration options for Dynamic Host Configuration Protocol for IPv6 (DHCPv6)

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- [7] IETF RFC 3736
Stateless Dynamic Host Configuration Protocol (DHCP) Service for IPv6
- [8] IETF RFC 3315
Dynamic Host Configuration Protocol for IPv6 (DHCPv6)
- [9] IETF RFC 3319
Dynamic Host Configuration Protocol (DHCPv6) Options for Session Initiation Protocol (SIP) Servers
- [10] IETF RFC 1035
Domain names – implementation and specification
- [11] IETF RFC 3633
IPv6 Prefix Options for Dynamic Host Configuration Protocol (DHCP) version 6

1.2.4 Abbreviations

| | |
|--------|--|
| IETF | Internet Engineering Task Force |
| IP | Internet Protocol |
| DHCPv6 | Dynamic Host Configuration Protocol for IPv6 |
| IPv6 | Internet Protocol Version 6 |
| RFC | Request for Comments |
| TTCN-3 | Testing and Test Control Notation version 3 |

1.2.5 Terminology

| | |
|-------|----------------------|
| TITAN | TTCN-3 Test Executor |
|-------|----------------------|

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 1.8.pl0.pre2 or higher installed. For installation guide see [3]. Please note:
 1. This version of the protocol module can not be used for defining 32 bit unsigned or larger integers with TITAN versions earlier than 1.8.pl0.pre2.
 2. This version of the protocol module is not compatible with TITAN releases earlier than R7A.

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2 Protocol Modules

2.1 Overview

Protocol modules implement the message structures of the corresponding 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 [2] and hence are usable with the TITAN test toolset only.

The table below contains the implemented DHCPv6 messages and the corresponding TTCN-3 type records. Using those type records, templates can be defined to send and receive a given message.

| Message name | Reference | Corresponding type record in DHCPv6_Types.ttcn |
|-----------------------|-----------|---|
| Client-server message | [8] 6. | Client_Server_Message |
| Relay Message | [8] 7. | Relay_Message |

The list below contains the implemented DHCPv6 options from [6][7][9][11].

- DNS Recursive Name Server option
- Domain Search List option
- Client Identifier Option
- Server Identifier Option
- Identity Association for Non-temporary Addresses Option
- Identity Association for Temporary Addresses Option
- IA Address Option
- Option Request Option
- Preference Option
- Elapsed Time Option
- Relay Message Option
- Authentication Option
- Server Unicast Option
- Status Code Option
- Rapid Commit Option
- User Class Option
- Vendor Class Option
- Vendor-specific Information Option
- Interface-Id Option
- Reconfigure Message Option
- Reconfigure Accept Option
- SIP Server DHCPv6 Option
- Identity Association for Prefix Delegation Option
- IA_PD Prefix option

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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 DHCPv6 protocol module is used as a part of a TTCN-3 test suite, this requires TTCN-3 Test Executor and a C compiler 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 parts of [2]

2.3 Configuration

None.

2.4 Encoding, Decoding, Backtrack

Implemented encoding/decoding functions:

| <u>Name</u> | <u>Type of formal parameters</u> | <u>Type of return value</u> |
|------------------------------------|----------------------------------|-----------------------------|
| ef_enc_PDU_DHCPv6 | PDU_DHCPv6 | octetstring |
| ef_dec_PDU_DHCPv6 | octetstring | PDU_DHCPv6 |
| ef_dec_PDU_DHCPv6_backtrack | octetstring, PDU_DHCPv6 | integer |

The encoding function **ef_enc_PDU_DHCPv6** performs basic RAW encoding [2].