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

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# Introduction

## Revision history

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| --- | --- | --- | --- |
| Date | Rev | Characteristics | Prepared |
| 2005-07-15 | PA1 | First draft version | ETHJGI |
| 2006-12-01 | PB1 | RFC 3046 and 3442 addition | ETHGBH |
| 2012-05-09 | PC1 | Implemented CR\_TR00019274 | ETHEKR |
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## How to Read this Document

This is the Function Specification for the set of DHCP protocol modules. DHCP protocol modules are developed for the TTCN-3 Toolset with TITAN. This document should be read together with Product Revision Information ‎[4].

## Scope

The purpose of this document is to specify the content of the DHCP protocol modules.

## References

1. RFC 2131  
   Dynamic Host Configuration Protocol
2. RFC 2132  
   DHCP Options and BOOTP Vendor Extensions
3. ETSI ES 201 873-1 v.2.2.1 (02/2003)  
   The Testing and Test Control Notation version 3. Part 1: Core Language
4. 109 21-CNL 113 461-2  
   DHCP Protocol Modules for TTCN-3 Toolset with TITAN, Product Revision Information
5. 2/198 17-CRL 113 200 Uen  
   Programmer’s Technical Reference for the TITAN TTCN-3 Test Executor
6. RFC 3046  
   DHCP Relay Agent Information Option
7. RFC 3442  
   The Classless Static Route Option for Dynamic Host Configuration Protocol (DHCP) version 4
8. RFC 3011 The IPv4 Subnet Selection Option  
   for DHCP

## Abbreviations

DHCP Dynamic Host Configuration Protocol

TLV Type, Length, Value

TTCN-3 Testing and Test Control Notation version 3

## Terminology

No specific terminology is used.

# 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 ‎[3] 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 ‎[5] 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 DHCP protocol, (see ‎[1], ‎[2], ‎[6], ‎[7] and [8]) with the modifications specified in ‎3.2.

## Modifications/deviations related to the protocol specification

### Implemented Messages

The following messages are implemented from ‎[1]:

* BOOT REQUEST
* BOOT REPLY

The following options are implemented from ‎[2]:

* DHCP\_PADDING\_OPTION
* DHCP\_END\_OPTION
* DHCP\_Message\_Type\_OPTION
* DHCP\_Client\_Identifier\_OPTION
* DHCP\_Requested\_IP\_Address\_OPTION
* DHCP\_Host\_Name\_OPTION
* DHCP\_Vendor\_class\_identifier\_OPTION
* DHCP\_Parameter\_request\_list\_OPTION
* DHCP\_User\_Class\_Information\_OPTION
* DHCP\_Server\_Identifier\_OPTION
* DHCP\_IP\_Address\_Lease\_Time\_OPTION
* DHCP\_Subnet\_Mask\_OPTION
* DHCP\_Domain\_Name\_OPTION
* DHCP\_Router\_OPTION
* DHCP\_Domain\_Name\_Server\_OPTION
* DHCP\_NetBIOS\_over\_TCP\_IP\_Name\_Server\_OPTION
* DHCP\_NetBIOS\_over\_TCP\_IP\_Node\_Type\_OPTION
* DHCP\_NetBIOS\_over\_TCP\_IP\_Scope\_OPTION
* DHCP\_Perform\_Router\_Discovery\_OPTION
* DHCP\_Static\_Route\_OPTION
* DHCP\_Vendor\_Specific\_Information\_OPTION
* DHCP\_Maximum\_DHCP\_Message\_Size\_OPTION
* DHCP\_Time\_Offset\_OPTION
* DHCP\_Time\_Server\_OPTION
* DHCP\_Name\_Server\_OPTION
* DHCP\_Log\_Server\_OPTION
* DHCP\_Cookie\_Server\_OPTION
* DHCP\_LPR\_Server\_OPTION
* DHCP\_Impress\_Server\_OPTION
* DHCP\_Resource\_Location\_Server\_OPTION
* DHCP\_Boot\_File\_Size\_OPTION
* DHCP\_Merit\_Dump\_File\_OPTION
* DHCP\_Swap\_Server\_OPTION
* DHCP\_Root\_Path\_OPTION
* DHCP\_Extension\_Path\_OPTION
* DHCP\_IP\_Forwarding\_Enable\_Disable\_OPTION
* DHCP\_Non\_Local\_Source\_Routing\_Enable\_Disable\_OPTION
* DHCP\_Policy\_Filter\_OPTION
* DHCP\_Maximum\_Datagram\_Reassembly\_Size\_OPTION
* DHCP\_Default\_IP\_Time\_To\_Live\_OPTION
* DHCP\_Path\_MTU\_Aging\_Timeout\_OPTION
* DHCP\_Path\_MTU\_Plateau\_Table\_OPTION
* DHCP\_Interface\_MTU\_OPTION
* DHCP\_All\_Subnets\_Are\_Local\_OPTION
* DHCP\_Broadcast\_Address\_OPTION
* DHCP\_Perform\_Mask\_Discovery\_OPTION
* DHCP\_Mask\_Supplier\_OPTION
* DHCP\_Router\_Solicitation\_Address\_OPTION
* DHCP\_Trailer\_Encapsulation\_OPTION
* DHCP\_ARP\_Cache\_Timeout\_OPTION
* DHCP\_Ethernet\_Encapsulation\_OPTION
* DHCP\_TCP\_Default\_TTL\_OPTION
* DHCP\_TCP\_Keepalive\_Interval\_OPTION
* DHCP\_TCP\_Keepalive\_Garbage\_OPTION
* DHCP\_Network\_Information\_Service\_Domain\_OPTION
* DHCP\_Network\_Information\_Servers\_OPTION
* DHCP\_Network\_Time\_Protocol\_Servers\_OPTION
* DHCP\_NetBIOS\_Over\_TCP\_IP\_Datagram\_Distribution\_OPTION
* DHCP\_X\_Window\_System\_Font\_Server\_OPTION
* DHCP\_X\_Window\_System\_Display\_Manager\_OPTION
* DHCP\_Network\_Information\_Service\_and\_Domain\_OPTION
* DHCP\_Network\_Information\_Service\_and\_Servers\_OPTION
* DHCP\_Mobile\_IP\_Home\_Agent\_OPTION
* DHCP\_Simple\_Mail\_Transport\_Protocol\_OPTION
* DHCP\_Post\_Office\_Protocol\_OPTION
* DHCP\_Network\_News\_Transport\_Protocol\_OPTION
* DHCP\_Default\_World\_Wide\_Web\_OPTION
* DHCP\_Default\_Finger\_Service\_OPTION
* DHCP\_Default\_Internet\_Relay\_Chat\_OPTION
* DHCP\_Street\_Talk\_Server\_OPTION
* DHCP\_Street\_Talk\_Directory\_Assistance\_Server\_OPTION
* DHCP\_Option\_Overload\_OPTION
* DHCP\_TFTP\_Server\_Name\_OPTION
* DHCP\_Bootfile\_Name\_OPTION
* DHCP\_Message\_OPTION
* DHCP\_Renewal\_Time\_Value\_OPTION
* DHCP\_Rebinding\_Time\_Value\_OPTION

The following option is implemented from ‎[6]:

* DHCP\_Relay\_Agent\_Information\_OPTION

The following option is implemented from ‎[7]:

* DHCP\_Classless\_Route\_OPTION

The following option is implemented from [8]:

* DHCP\_Subnet\_Selection\_OPTION

### Protocol Modifications/Deviations

Protocol modules contain the following additions:

* DHCP\_GENERAL\_OPTION : This implements the general TLV format of the DHCP option
* The DHCP OPTION OVERLOAD option is not supported. Although this option is decoded correctly, the Enc/Dec functions do not interpret it, i.e. *sname* and *file* fields are decoded as charstrings.

## Encoding/Decoding and Other Related Functions

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

Name Type of formal parameters Type of return value  
enc\_PDU\_DHCP PDU\_DHCP octetstring  
dec\_PDU\_DHCP octetstring PDU\_DHCP

dec\_PDU\_DHCP\_Opt82 octetstring, DHCP\_Option82\_Format PDU\_DHCP