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

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# Introduction

## Revision history

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Rev | Characteristics | Prepared |
| 2007-03-14 | PA1 | First draft version | ETHGBH |
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## About this Document

### How to Read this Document

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

### 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 113 529–1 Uen  
   ICMP Protocol Modules for TTCN-3 Toolset with TITAN, Product Revision Information
5. 155 17-CNL 113 529  
   ICMP Protocol Modules for TTCN-3 Toolset with TITAN, Function Specification
6. IETF RFC 792  
   Internet Control Message Protocol
7. IETF RFC 950  
   Internet Standard Subnetting Procedure
8. IETF RFC 1256  
   ICMP Router Discovery Messages
9. IETF RFC 1393  
   Traceroute Using an IP Option
10. IETF RFC 1475  
    TP/IX: The Next Internet
11. IETF RFC 1788  
    ICMP Domain Name Messages
12. IETF RFC 2521  
    ICMP Security Failures Messages
13. IETF RFC 3344  
    IP Mobility Support for IPv4
14. IETF RFC 3012  
    Mobile IPv4 Challenge/Response Extensions

### Abbreviations

IETF Internet Engineering Task Force

IP Internet Protocol

ICMP Internet Control Message Protocol

MIP Mobile IP

RFC Request for Comments

TTCN-3 Testing and Test Control Notation version 3

### Terminology

TITAN TTCN-3 Test Executor

## 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 installed. For installation guide see [3].

# Protocol Modules

## 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 ICMP 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 **ICMP\_Types.ttcn** |
| Echo Reply | [6] p.13 | ICMP\_EchoReply |
| Destination Unreachable | [6] p.3 | ICMP\_DestinationUnreachable |
| Source Quench | [6] p.9 | ICMP\_SourceQuench |
| Redirect | [6] p.11 | ICMP\_Redirect |
| Echo | [6] p.13 | ICMP\_Echo |
| Time Exceeded | [6] p.5 | ICMP\_TimeExceeded |
| Parameter Problem | [6] p.7 | ICMP\_ParameterProblem |
| Timestamp | [6] p.15 | ICMP\_Timestamp |
| Timestamp Reply | [6] p.15 | ICMP\_Timestamp Reply |
| Information Request | [6] p.17 | ICMP\_InformationRequest |
| Information Reply | [6] p.17 | ICMP\_InformationReply |
| Address Mask Request | [7] App.I | ICMP\_AddressMaskRequest |
| Address Mask Reply | [7] App.I | ICMP\_AddressMaskReply |
| Router Advertisement,  MIP Agent Advertisement | [8] p. 4  [13] 2.1 | ICMP\_RouterAdvertisement |
| Router Solicitation,  MIP Agent Solicitation | [8] p.4  [13] 2.2. | ICMP\_RouterSolicitation |
| Traceroute | [9] 2.3 | ICMP\_Traceroute |
| Conversion Failed | [10] 6.2. | ICMP\_ConversionFailed |
| Domain Name Request | [11] 2. | ICMP\_DomainNameRequest |
| Domain Name Reply | [11] 3. | ICMP\_DomainNameReply |
| Security Failure | [12] 2. | ICMP\_SecurityFailure |

The table below contains the implemented MIP Agent Advertisement Extensions (‘extensions’ field in ICMP\_RouterAdvertisement) and the corresponding TTCN-3 type records

|  |  |  |
| --- | --- | --- |
| Extension name | Reference | Corresponding type record in **ICMP\_Types.ttcn** |
| Mobile Agent Advertisement | [13] 2.1.1. | ICMP\_MIP\_MobilityAgentAdvertisement\_Extension |
| Prefix Length | [13] 2.1.2. | ICMP\_MIP\_PrefixLengths\_Extension |
| One Byte Padding | [13] 2.1.3. | ICMP\_MIP\_OneBytePadding\_Extension |
| Challenge | [14] 2. | ICMP\_MIP\_Challenge\_Extension |

## 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 TRH 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]

## Encoding Feature

The encoder updates the checksum field with the correct value.