Prepared (also subject responsible if other)
ETH/RZX Gábor Bettesch +36 1 437 7918

No.
198 17-CNL 113 529 Uen

| Approved | Checked | Date | Rev | Reference |
|---|---|---|---|---|
| ETH/RZXC (Elemer Lelik) | | 2008-01-14 | A | GASK2 |

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

## Contents

Prepared (also subject responsible if other)
ETH/RZX Gábor Bettesch +36 1 437 7918
Approved
ETH/RZXC (Elemer Lelik)
Checked

No.
198 17-CNL 113 529 Uen
Date
2008-01-14
Rev
A
Reference
GASK2

# 1 Introduction

## 1.1 Revision history

| Date | Rev | Characteristics | Prepared |
|---|---|---|---|
| 2007-03-14 | PA1 | First draft version | ETHGBH |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## 1.2 About this Document

### 1.2.1 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].

### 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 113 529–1 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

### 1.2.4 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 |

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

# 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 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_TimestampReply |
| 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 |

## 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 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]

## 2.3 Encoding Feature

The encoder updates the checksum field with the correct value.