

ICMP 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 ICMP protocol module. The ICMP 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.

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 <i>ICMP_Types.ttcn</i>
Echo Reply	[5] p.13	ICMP_EchoReply
Destination Unreachable	[5] p.3	ICMP_DestinationUnreachable
Source Quench	[5] p.9	ICMP_SourceQuench
Redirect	[5] p.11	ICMP_Redirect
Echo	[5] p.13	ICMP_Echo
Time Exceeded	[5] p.5	ICMP_TimeExceeded

Message name	Reference	Corresponding type record in <i>ICMP_Types.ttcn</i>
Parameter Problem	[5] p.7	ICMP_ParameterProblem
Timestamp	[5] p.15	ICMP_Timestamp
Timestamp Reply	[5] p.15	ICMP_Timestamp Reply
Information Request	[5] p.17	ICMP_InformationRequest
Information Reply	[5] p.17	ICMP_InformationReply
Address Mask Request	[6] App.I	ICMP_AddressMaskRequest
Address Mask Reply	[6] App.I	ICMP_AddressMaskReply
Router Advertisement,	[7] p. 4	ICMP_RouterAdvertisement
Router Solicitation,	[7] p.4	ICMP_RouterSolicitation
Traceroute	[8] 2.3	ICMP_Traceroute
Conversion Failed	[9] 6.2.	ICMP_ConversionFailed
Domain Name Request	[10] 2.	ICMP_DomainNameRequest
Domain Name Reply	[10] 3.	ICMP_DomainNameReply
Security Failure	[11] 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 <i>ICMP_Types.ttcn</i>
Mobile Agent Advertisement	[12] 2.1.1.	ICMP_MIP_MobilityAgentAdvertisement_Extension
Prefix Length	[12] 2.1.2.	ICMP_MIP_PrefixLengths_Extension
One Byte Padding	[12] 2.1.3.	ICMP_MIP_OneBytePadding_Extension
Challenge	[13] 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 (for example, **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.

Terminology

TITAN TTCN-3 Test Executor.

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

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] Programmer's Technical Reference for the TITAN TTCN-3 Test Executor
- [3] Installation Guide for the TITAN TTCN-3 Test Executor
- [4] ICMP Protocol Modules for TTCN-3 Toolset with TITAN, Function Specification
- [5] IETF [RFC 792](#)
Internet Control Message Protocol
- [6] IETF [RFC 950](#)
Internet Standard Subnetting Procedure

- [7] IETF [RFC 1256](#)
ICMP Router Discovery Messages

- [8] IETF [RFC 1393](#)
Traceroute Using an IP Option

- [9] IETF [RFC 1475](#)
TP/IX: The Next Internet

- [10] IETF [RFC 1788](#)
ICMP Domain Name Messages

- [11] IETF [RFC 2521](#)
ICMP Security Failures Messages

- [12] IETF [RFC 3344](#)
IP Mobility Support for IPv4

- [13] IETF [RFC 3012](#)
Mobile IPv4 Challenge/Response Extensions