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

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How to Read This Document

This is the Function Specification for the set of DNS protocol modules. DNS protocol modules are developed for the TTCN-3 Toolset with TITAN.

Scope

The purpose of this document is to specify the content of the DNS Test Port and the additional modules containing TTCN-3 type definitions.

General

The Test Port and the included protocol modules implement message structures of the related protocol in a formalized way, using the standard specification language TTCN-3. Thus allowing definition of test data (using templates) in TTCN-3 core-language format [4]. The Test Port assures encoding/decoding of messages during test suite execution using the TITAN TTCN-3 test environment.

The DNS protocol modules use external encoding and decoding functions.

The DNS PDU in TTCN-3 is represented in an uncompressed format.

Functional Specification

Protocol Versions Implemented

This Protocol Module implements protocol messages and constants of the DNS protocol as decribed in [1], [2], [3], [6], [7] with the modifications specified in Modifications/Deviations Related to the Protocol Specification Also, valid NAPTR queries and responses needed by the ENUM protocol (specified in [5]) can be sent and received via the Test Port.

Modifications/Deviations Related to the Protocol Specification

Unimplemented Messages, Message Fields and Constants

Only the message fields related to Internet and IP are implemented. DNS resource records with class `CS` (CSNET), `CH` (CHAOS) and `HS` (Hesoid) are not supported but will be decoded into a TTCN-3 octetstring.

Protocol Modifications/Deviations

None.

Encoding/Decoding and Other Related Functions

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

Name	Type of formal parameters	Type of return value
`enc_PDU_DNS`	PDU_DNS, boolean, boolean	octetstring
`dec_PDU_DNS`	octetstring	PDU_DNS

The decoder function can handle both compressed and uncompressed format and the PDU will be visible in uncompressed format in TTCN-3.

The encoder function can be instructed by a boolean parameter to perform compression and by a second boolean parameter to automatically calculate length fields.

Terminology

No specific terminology is used.

Abbreviations

ASP
: Abstract Service Primitive

DNS
: Domain Name System

IP
: Internet Protocol

PDU
: Protocol Data Unit

TTCN-3
: Testing and Test Control Notation version 3

References

[1] RFC 1035
Domain names – Implementation and specification

[2] RFC 2782
A DNS RR for specifying the location of services (DNS SRV)

[3] RFC 3403
Dynamic Delegation Discovery System (DDDS), Part Three: The Domain Name System (DNS) Database

[4] ETSI ES 201 873-1 v3.1.1 (2005-06)
The Testing and Test Control Notation version 3; Part 1: Core Language

[5] RFC 3761
The E.164 to Uniform Resource Identifiers (URI) Dynamic Delegation Discovery System (DDDS) Application (ENUM)

[6] RFC 2136
Dynamic Updates in the Domain Name System (DNS UPDATE)

[7] RFC 1886
DNS Extensions to support IP version 6