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SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS
AND NEXT-GENERATION NETWORKS

ITU-T Y.2770-series – Supplement on DPI terminology

ITU-T Y-series Recommendations – Supplement 23

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Supplement 23 to ITU-T Y-series Recommendations

ITU-T Y.2770-series – Supplement on DPI terminology

Summary

Recommendation ITU-T Y.2770 introduced new terms in the area of deep packet inspection (DPI). Work on DPI terminology was an essential part during the development of this Recommendation. This Supplement 23 to the ITU-T Y-series provides complementary information on DPI terminology related to the flow and application descriptor, packet processing and layered protocol architectures, as defined by ITU-T Y.2770.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
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Supplement 23 to ITU-T Y-series Recommendations

ITU-T Y.2770-series – Supplement on DPI terminology

1 Scope

This Supplement provides complementary information to DPI terminology, defined in [ITU-T Y.2770]. This Supplement is structured as follows:

DPI terminology:

- *relationship* and formal specification aspect of key DPI terms (clause 6);
- from perspective of *packet processing* (clause 7); and
- from perspective of *layered protocol architectures* (clause 8).

The purpose of this Supplement is to provide readers of [ITU-T Y.2770] with background information.

2 References

- [ITU-T X.200] Recommendation ITU-T X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The basic model*.
- [ITU-T Y.2770] Recommendation ITU-T Y.2770 (2012), *Requirements for deep packet inspection in next generation networks*.
- [IETF RFC 791] IETF RFC 791 (1981), *Internet Protocol*.
- [IETF RFC 1122] IETF RFC 1122 (1989), *Requirements for Internet Hosts – Communication Layers*.
- [IETF RFC 1123] IETF RFC 1123 (1989), *Requirements for Internet Hosts – Application and Support*.
- [IETF RFC 1812] IETF RFC 1812 (1995), *Requirements for IP Version 4 Routers*.
- [IETF RFC 5101] IETF RFC 5101 (2008), *Specification of the IP Flow Information Export (IPFIX) Protocol for the Exchange of IP Traffic Flow Information*.

3 Definitions

3.1 Terms defined elsewhere

This Supplement uses the following terms defined elsewhere:

3.1.1 **application** [ITU-T Y.2770]: A designation of one of the following:

- an *application protocol type* (e.g., IP application protocols ITU-T H.264 video, or session initiation protocol (SIP));
- a *served user instance* (e.g., VoIP, VoLTE, VoIMS, VoNGN, and VoP2P) of an application type, e.g., "voice-over-packet application";
- a "*provider specific application*" for voice-over-Packet, (e.g., 3GPP provider VoIP, Skype VoIP);
- an application embedded in another application (e.g., application content in a body element of a SIP or an HTTP message).

An application is identifiable by a particular identifier (e.g., via a bit field, pattern, signature, or regular expression as "application level conditions", see also clause 3.2.2 of [ITU-T Y.2770]), as a common characteristic of all above listed levels of applications.

3.1.2 application descriptor (also known as application-level conditions) [ITU-T Y.2770]: A set of rule conditions that identifies the application (according to clause 3.2.1 of [ITU-T Y.2770]).

Recommendation [ITU-T Y.2770] addresses the application descriptor as an object in general, which is synonymous with application-level conditions. It does not deal with its detailed structure, e.g., syntax, encoding and data type.

3.1.3 deep packet inspection (DPI) [ITU-T Y.2770]: Analysis, according to the layered protocol architecture OSI-BRM [ITU-T X.200], of

- payload and/or packet properties (see list of potential properties in clause 3.2.11 of [ITU-T Y.2770] deeper than protocol layer 2, 3 or 4 (L2/L3/L4) header information; and
- other packet properties

in order to identify the application unambiguously.

NOTE – The output of the DPI function, along with some extra information such as the flow information, is typically used in subsequent functions such as reporting or actions on the packet.

3.1.4 DPI policy condition (also known as DPI signature) [ITU-T Y.2770]: A representation of the necessary state and/or prerequisites that identify an application and define whether policy rule actions should be performed. The set of DPI policy conditions associated with a policy rule specifies when the policy rule is applicable (see also [b-IETF RFC 3198]).

A DPI policy condition must contain application level conditions and may contain other options such as state conditions and/or flow level conditions:

- 1) State Condition (optional):
 - a) network grade of service conditions (e.g., experienced congestion in packet paths); or
 - b) network element status (e.g., local overload condition of the DPI-FE).
- 2) Flow descriptor/flow level conditions (optional):
 - a) packet content (header fields);
 - b) characteristics of a packet (e.g., number of MPLS labels);
 - c) packet treatment (e.g., output interface of the DPI-FE);
- 3) Application descriptor/application level conditions:
 - a) packet content (application header fields and application payload).

NOTE – The condition relates to the "simple condition" in the formal descriptions of flow level conditions and application level conditions.

3.1.5 flow descriptor (also known as flow level conditions) [ITU-T Y.2770]: A set of rule conditions that is used to identify a specific type of flow (according to clause 3.1.3 of [ITU-T Y.2770]) from inspected traffic.

NOTE 1 – This definition of flow descriptor extends the definition in [b-ITU-T Y.2121] with additional elements as described in clause 3 of [ITU-T Y.2770].

NOTE 2 – For further normative discussion of the flow descriptor as used in [ITU-T Y.2770], see Annex A of [ITU-T Y.2770].