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

Next Generation Networks – Frameworks and functional
architecture models

General requirements for ID/locator separation in NGN

Recommendation ITU-T Y.2015

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Recommendation ITU-T Y.2015

General requirements for ID/locator separation in NGN

Summary

Recommendation ITU-T Y.2015 begins with showing the limitations of the conventional IP architecture, which uses IP addresses as both node identifiers (IDs) and locators, on supporting mobility, multi-homing, fast endpoint renumbering, traffic engineering, and scalable routing. It then shows that ID/locator separation, i.e., the use of distinct sets of values as node IDs and locators, helps to overcome these limitations. This Recommendation provides general requirements for introducing ID/locator separation in NGN.

Source

Recommendation ITU-T Y.2015 was approved on 23 January 2009 by ITU-T Study Group 13 (2009-2012) under Recommendation ITU-T A.8 procedure.

FOREWORD

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Recommendation ITU-T Y.2015

General requirements for ID/locator separation in NGN

1 Scope

This Recommendation begins by showing the limitations of the conventional IP architecture, which uses IP addresses as both node identifiers (IDs) and node locators, for supporting mobility and multi-homing and states how such limitations would be overcome by ID/locator separation, i.e., by using distinct sets of values for node IDs and locators.

It then defines general requirements for ID/locator separation to efficiently support mobility, multi-homing and host renumbering in NGN. Through the ID/locator separation, it is recommended to have network topology-independent node IDs and topology-dependent locators, and maintain a mapping between NGN identifiers, node IDs and locators.

It outlines a general architecture of ID/locator separation in NGN and provides general requirements of the architectural components. It also outlines security requirements of the architecture that are specific to ID/locator separation.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T E.164] Recommendation ITU-T E.164 (1997), *The international public telecommunication numbering plan*.
- [ITU-T H.323] Recommendation ITU-T H.323 (2003), *Packet-based multimedia communications systems*.
- [ITU-T Q.1706] Recommendation ITU-T Q.1706/Y.2801 (2006), *Mobility management requirements for NGN*.
- [ITU-T Y.1241] Recommendation ITU-T Y.1241 (2001), *Support of IP-based services using IP transfer capabilities*.
- [ITU-T Y.2001] Recommendation ITU-T Y.2001 (2004), *General overview of NGN*.
- [ITU-T Y.2011] Recommendation ITU-T Y.2011 (2004), *General principles and general reference model for next generation networks*.
- [ITU-T Y.2012] Recommendation ITU-T Y.2012 (2006), *Functional requirements and architecture of the NGN release 1*.
- [ITU-T Y.2052] Recommendation ITU-T Y.2052 (2008), *Framework of multi-homing in IPv6-based NGN*.
- [ITU-T Y.2201] Recommendation ITU-T Y.2201 (2007), *NGN release 1 requirements*.
- [IETF RFC 3261] IETF RFC 3261 (2002), *SIP: Session Initiation Protocol*.
<http://www.ietf.org/rfc/rfc3261.txt>

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 access border gateway [b-ITU-T Y.2091]: A packet gateway between an access network and a core network.

3.1.2 address [b-ITU-T Y.2091]: An address is the identifier for a specific termination point and is used for routing to this termination point.

NOTE – This Recommendation only uses the term "address" in the case where it does not specifically refer to a locator or an identifier.

3.1.3 identifier [b-ITU-T Y.2091]: An identifier is a series of digits, characters and symbols or any other form of data used to identify subscriber(s), user(s), network element(s), function(s), network entity(ies) providing services/applications, or other entities (e.g., physical or logical objects). Identifiers can be used for registration or authorization. They can be either public to all networks, shared between a limited number of networks or private to a specific network (private IDs are normally not disclosed to third parties).

NOTE – In this Recommendation, this identifier is referred to as "NGN identifier". We define a new term "Node ID" that would be used in transport and upper layers in the ID/locator separation architecture.

3.1.4 seamless service [ITU-T Q.1706]: A service that is implemented such that it will ensure that users will not experience any service disruptions while changing the point of attachment.

3.1.5 service continuity [ITU-T Q.1706]: The ability for a moving object to maintain ongoing service over including current states, such as user's network environment and session for a service.

3.1.6 session [b-ITU-T Y.2091]: A temporary telecommunications relationship among a group of objects in the service stratum that are assigned to collectively fulfil a task for a period of time. A session has a state that may change during its lifetime. Session-based telecommunications may, but need not be, assisted by intermediaries (see mediated services). Session-based telecommunications can be one-to-one, one-to-many, many-to-one, or many-to-many.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 ID/LOC mapping: ID/LOC mapping is an association between a node ID and one or more LOCs.

NOTE 1 – A single node ID or several node IDs can be associated with many LOCs associated with a single terminal. The node ID to LOC mapping can have the one-to-one, one-to-many, or many-to-one relationship.

NOTE 2 – ID/LOC mapping is also called ID/LOC binding.

3.2.2 ID/LOC mapping function: An ID/LOC mapping function gets mapping information from an ID/LOC mapping storage function and uses the corresponding node ID and/or LOC in packet headers. The ID/LOC mapping function works in a close correlation with the transport user profile associated with the transport control function.

NOTE – ID/LOC mapping functions can be physically located in an NGN terminal, an access border gateway, or any other NGN components.

3.2.3 ID/LOC mapping storage function: An ID/LOC mapping storage function stores the mapping of NGN identifiers, node IDs and LOCs. This function also updates mapping information, as well as provides mapping information to other functions on request. The mapping storage function can be physically located in an NGN terminal or with other NGN components.

3.2.4 ID/LOC separation: ID/LOC separation is decoupling the semantic of IP address into the semantics of node IDs and LOCs. Distinct namespaces are used for node IDs and LOCs so that they