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Information technology — Future Network — Problem statement and requirements —

Part 2: Naming and addressing

Technologies de l'information — Réseaux du futur — Énoncé du problème et exigences —

Partie 2: Dénomination et adressage

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 6, *Telecommunication and information exchange between systems*.

ISO/IEC TR 29181 consists of the following parts, under the general title *Information technology — Future Network — Problem statement and requirements*:

— *Part 1: Overall aspects*

— *Part 2: Naming and addressing*

— *Part 3: Switching and routing*

— *Part 4: Mobility*

— *Part 5: Security*

— *Part 6: Media transport*

— *Part 7: Service composition*

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Introduction

This part of ISO/IEC TR 29181 is the second part of this Technical Report on Future Network — Problem statement and requirements developed by ISO/IEC JTC1 SC6. As ISO/IEC TR 29181-1 provides an overall perspective of the missions and requirements of the FN project, this part of ISO/IEC TR 29181 focuses on the issue of naming and addressing. The objective of this part of ISO/IEC TR 29181 is to discuss how to develop a clean slate designed new naming and addressing schemes (NAS) to help FN project achieve its lofty ambitions.

Naming and addressing schemes are the cornerstones of telecommunication networks and information systems. NAS designs not only provide fundamental building blocks for network designs, but can also influence network characteristics, performance, and capabilities. Therefore, NAS needs to be among the top priorities of network design projects.

NAS plays an even more important role in FN. As a project aimed at designing a totally new network with a clean slate design approach, FN has to produce a clean slate designed naming and addressing scheme. The need for new naming and addressing systems were based from the gaps between the existing NAS systems and the rising future demands of new applications which produces many technical challenges the existing NAS systems cannot provide satisfactory solutions. This Technical Report summarizes some of the challenges and also offers some new directions for future research on NAS standardization.

However, as the new network has to produce a network structure which would allow information to flow more smoothly, fast, and securely among various networks with various kinds of naming and addressing structures, designing a new NAS which would not only function within the new system, but also interoperate with other naming and addressing systems (such as old systems like DNS or telecom networks and new systems such as RFID and sensor networks) is a very challenging task.

Considering evolutionary approaches which seek to engage gradual improvement with available technologies while protecting the integrity of overall structure of old networks, a new scheme will produce a totally new naming and addressing scheme. A clean slate design needs thorough analysis, full understanding of the demand, careful planning, and collective work. In order to achieve the maximum benefits and find the best solution, a strategic planning document is needed before specific schemes are standardized.

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Information technology — Future Network — Problem statement and requirements —

Part 2: Naming and addressing

1 Scope

This part of ISO/IEC TR 29181 describes the general characteristics of Future Network naming and addressing schemes, including problem statements, requirements, design objectives, gap analysis, and development directions.

— Problem Statements: The characteristics and problems of existing NAS in existing network will be discussed.

— Technical Challenges: A list of major technical challenges to assure that the FN-NAS will be able to provide solid technical support from the base level to meet the objectives of FN.

— Requirements: The general characteristics of Future Network are discussed and their impact on NAS design.

— Gap analysis: Examines the gap between existing network NAS and future network performance expectations.

In Annex A, FN-NAS Standardization Plan, design objectives, gap analysis, development guidance, chronological scenarios for future network naming, and addressing guidance are described in detail.

Though this part of ISO/IEC TR 29181 mainly presents a list of up-to-date surveyed problems, requirements, and plausible techniques for Future Network, it does not mean that all of those would be applied to a single Future Network in common, since the naming and addressing scheme can be applied to the various networks, such as global networks, local networks, access networks, mobile networks, etc. If a specific Future Network is designed and implemented, some appropriate parts of ISO/IEC TR 29181 would be considered depending on its network usage and its characteristics.

2 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

2.1
Future Network naming and addressing schemes
system of mechanisms to provide identify and locate for information exchange in Future Network

Note 1 to entry: The system may design new naming schemes, new addressing schemes or an integrated scheme that combines identification and location.

2.2
naming
scheme which gives identity to every computer or object connected with the network or the party who is going to send or receive information from the network

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2.3
addressing
scheme which provides information on the point, where sender or receiver is located in the networks

Note 1 to entry: It contains two mechanisms, one is to define the location (address format) and another is to specify how to find the addresses.

2.4
naming authority pointer
NAPTR
type of DNS resource record, used in particular (but not only) which is used for E.164 telephone number to URI resolution

[SOURCE: IETF RFC 3403(NAPTR)]

2.5
routing locator
RLOC
sddress of an ETR

Note 1 to entry: Typically, RLOCs are numbered from topologically- aggregatable blocks that are assigned to a site at each point to which it attaches to the global Internet.

[SOURCE: IETF RFC 6830 (LISP)]

2.6
end point identification
EID
address used in the source and destination fields of the most inner LISP header of a packet

Note 1 to entry: The host obtains a destination EID the same way it obtains a destination address today. The source EID is obtained via existing mechanisms used to set a host's "local" IP address.

[SOURCE: IETF RFC 6830 (LISP)]

2.7
ingress tunnel router
ITR
router that resides in a LISP site

Note 1 to entry: Packets sent by sources inside of the LISP site to destinations outside of the site are candidates for encapsulation by the ITR. The ITR treats the IP destination address as an EID and performs an EID-to-RLOC mapping lookup.

[SOURCE: IETF RFC 6830 (LISP)]

2.8
egress tunnel router
ETR
router that accepts an IP packet where the destination address in the "outer" IP header is one of its own RLOCs

Note 1 to entry: In general, an ETR receives LISP-encapsulated IP packets from the Internet on one side and sends de-capsulated IP packets to site end-systems on the other side. ETR functionality does not have to be limited to a router device. A server host can be the endpoint of a LISP tunnel as well.

[SOURCE: IETF RFC 6830 (LISP)]

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