2005 Version
IPv6 Deployment Guideline

About the IPv6 Deployment Guideline

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IPv6 Promotion Council of Japan

DP-WG

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Revision Highlights of the 2005 Version

The IPv6 Deployment Guideline is compiled by the IPv6 Promotion Council of Japan, Deployment Working Group (WG), which began its activities in 2003. The 2005 Version of the Guideline is a revision of the 2004 Version issued in May 2004.

In the preparation of the 2005 Version, the Deployment WG updated the previous version while the sub-working groups (SWGs) discussed the following:

- Security SWG and Data Center/IX-SWG (newly established)
  The Security SWG discussed security issues from a cross-cutting point of view.
- Large Enterprise SWG, SOHO-SWG, and ISP-SWG
  The SWGs carried out case studies and discussed the advantages of IPv6 deployment and introduction as well as cost factors.
- Home SWG
  The SWG discussed deployment and introduction scenarios from the viewpoints of various players.

Segmentation

The 2005 Version IPv6 Deployment Guideline examines IPv6 deployment divided into the following segments and provides guidelines for each segment.

- Home networks
- SOHO intranets
- Large enterprise and local government intranets
- Industrial application networks
- ISP
- Data center/IX

Assumed Target Readers and Description Scope

The assumed target readers vary with segments. In the home network segment, the target readers are service providers and equipment vendors for the household market. In the enterprise network segment, the target readers are network administrators in companies and system integrators.

This Guideline covers a time line from the near future to the propagation period (when the usage ratio between IPv4 and IPv6 becomes 50:50). The 2005 Version is described on the assumption that the near future means fiscal year 2005 and the propagation period is from 2006 to 2007. The Deployment Guideline will be revised in future as necessary.

The word “deployment” used in this Guideline needs to be defined here. The deployment of IPv6 networks is generally thought to involve two stages—“migration” (replacing IPv4 networks with IPv6 networks) and “introduction” (installing and using IPv6 networks); in this Guideline, the word “deployment” is used for both cases, so it refers to new installations of IPv6 networks as well.

Description Structure in Each Segment

Each segment is described in the basic structure shown above, but the actual structure varies according to the characteristics of the segment. The abbreviation BCP frequently used in this Guideline refers to “Best Current Practice,” which means the best course of action that can be taken at present.

2. IPv6 Deployment and Purpose of this Guideline

Three Concepts of IPv6

Before proceeding to the discussion of specific issues, let us clarify the characteristics of IPv6. The three main advantages of IPv6 are “almost infinite addresses,” “better IP” and “realization of flat networks without network address translation (NAT).”

First, IPv6 allows the use of a colossal number of addresses. Global addresses can be given not only to computers, as is the case now, but also to other terminals (called non-PCs in the following).

This leads to the second advantage of “better IP.” The realization of a direct communication environment between terminals and plug-and-play functions implemented by IPv6 will reduce design/operating costs and address management load.

Furthermore, IPv6 realizes an advantage of a flat network without NAT. Here, it is necessary to distinguish between two words “end to end (E2E)” and “peer to peer (P2P)” that often cause confusion. The term “E2E” indicates a range of communication and refers to “direct communication between network end nodes (no NAT or proxy)”. IPv6 enables E2E IPSec. On the other hand, “P2P” refers to a form of communication between equal terminals. That is, unlike in a client-server network, P2P end nodes have equal functions so that either can be the initiator of communication. IPv6 provides an environment for facilitating P2P communication and brings about a possibility of new application architecture.

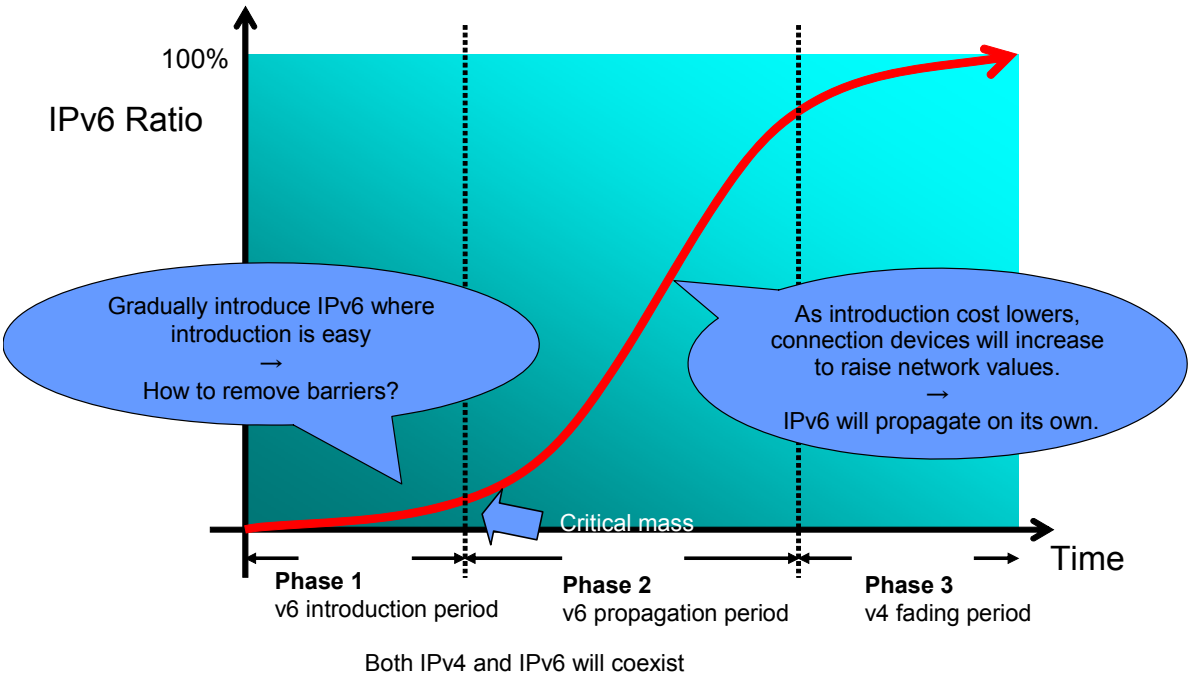
Three Phases of IPv6 Deployment

The deployment of IPv6 can be thought in the following three phases (stages):

Phase 1: IPv6 introduction period
Phase 2: IPv6 propagation period
Phase 3: IPv4 fading period

At present, we are about to leave Phase 1 and enter Phase 2. The spread of IPv6 has just begun because of its easy introduction and easy-to-understand advantages. The degree of propagation, however, varies greatly depending on areas. There are still a number of barriers to the deployment of IPv6, and promotion measures to solve this problem and remove the barriers are needed for some time. As we pull through this stage, IPv6 will propagate on its own.

Three Phases of IPv6 Deployment (continued)



Barriers to IPv6 Deployment

There are three primary obstacles to IPv6 deployment: People “don’t know how to implement it,” “still feel uncertain about its stability and quality,” and “find it difficult to quantify near-term advantages.”

To remove the first barrier that people “don’t know how to implement IPv6,” we can prepare deployment manuals for each user entity. Clarifying the deployment processes and security models and establishing a metric for deployment will certainly be useful in this regard.

To remove the second barrier that people “still feel uncertain about stability and quality,” we need to verify the reliability of IPv6. Identifying design and operation bugs through demonstration experiments and evaluations by quality metric and other tools can remove such concern. The IPv6 Promotion Council of Japan, Certification Working Group, and the TAHI project are engaged in various activities to verify mutual connectivity of diversified products. These programs will also contribute greatly to gaining people’s trust and confidence.

About the third issue of difficulty in quantifying the near-term advantages, we have to show the possibility of new applications through deployment demonstration experiments and prove the cost-saving effect of IPv6.

Of the above three issues, this Guideline primarily aims to address the first issue that people “don’t know how to implement IPv6” and clarify the specific method of its deployment. Secondarily, the Guideline spells out the advantages of IPv6 in response to the issue of “near-term advantages are difficult to quantity.”

Scenario for the IPv6 Introduction Period

In the IPv6 introduction period, we cannot expect to achieve many “things unique to IPv6” or “things only IPv6 can do.”

However, a promising deployment scenario is to introduce application-oriented, closed IPv6 networks. Here, the word “closed” means to install terminals and servers as a set. Fewer restrictions seem to be placed on the introduction of a closed network (e.g., facility network).

Another promising scenario is to install a new IPv6 system to overlay IPv4 so that it will not be affected by IPv4. IPv6 may be introduced also at the time of facility upgrading.

Deployment WG

In May 2003, the IPv6 Promotion Council of Japan established the Deployment WG comprising volunteer members. Divided into four sub-working groups by target segment, the members have been conducting studies to attain the following two goals:

- Study IPv6 introduction/deployment models (scenarios, costs, and architectures) and methods. Gather know-how in the Deployment Guideline.
- Study quality management, mutual connectivity, and advantages with deployment/introduction models, while making an attempt to reflect the achievements of other WG activities.

The core members of the Deployment WG include:

Chief: Takashi Arano (Intec NetCore, Inc., JPNIC Trustee)
Assistant Chief: Hiroaki Sadata (NTT Communications Corporation, IPv6 Promotion Council of Japan, Basic Strategy WG)
Akihiro Inomata (Fujitsu Limited, Internet Association Japan, IPv6 Operation Study Group Chair)

Home SWG Co-Chairs: Mitsuaki Oka (Toshiba Solutions Corporation) and Koji Kubota (Matsushita Electric Industrial Co., Ltd.)

SOHO SWG Chair: Akihiro Inomata (Fujitsu Limited)

Large Enterprise/Local Government SWG Co-Chairs: Yoichi Tsukioka (Hitachi Ltd.) and Hideki Sakauchi (NEC Corporation)

ISP SWG Chair: Kiyoteru Ishihara (KDDI Corporation)

Security SWG Chair: Tetsuya Nakai (NTT Communications Corporation)

Data Center SWG Chair: Tadashitsa Okimoto (NTT West Corporation)

Secretariat: Gaku Hashimoto (IPv6 Promotion Council of Japan Secretariat)
(The study members of each SWG are listed in the “Introduction” of each guideline.)

This Guideline is publicized as the result of the Deployment WG activities in fiscal year 2004. In future, the Guideline will be revised as necessary.

Inquiries

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