IPv6 – Frequently Asked Questions (FAQs)

GENERAL

1. What is IPv6?

IPv6 (Internet Protocol version 6) is the latest version of the Internet Protocol that has been designed to supplement and eventually be the successor of IPv4, which is the protocol predominantly in use today. IPv6 was developed by the Internet Engineering Task Force (IETF).

2. What is the main limitation of IPv4?

The biggest limitation of IPv4 is its 32-bit addressing space resulting in about 4.3 billion IP addresses only. The rapid growth of internet, wireless subscribers and deployment of NGN technology is leading to accelerated consumption of IP addresses with the result that IPv4 addresses are almost exhausted today.

3. What are the advantages of IPv6?

The IPv6 offers several advantages over IPv4 as below:
a) **Large Address Space** – There are 128 bits in IPv6 address compared to 32 bits in IPv4 address, thereby practically making available an almost infinite pool of IP addresses (340 trillion trillion trillion).
b) **Auto configuration** – This is a plug and play feature which simplifies network configuration especially when the number of devices / nodes is very large like in typical sensor networks. It helps networks to quickly respond to crisis situations and facilitate adhoc network reorganisations.
c) **Simplified Header format with better Quality of Service (QoS)** – The header format has been simplified in IPv6 which helps in faster routing and switching. There is also a traffic class and flow label field, improving streaming for several applications such as VoIP, interactive gaming, e-commerce, videos etc.
d) **IP Host Mobility –** This feature enables a mobile node to arbitrarily change its location on an IP network while still remaining reachable and maintaining existing connections. Some practical uses of Mobile IPv6 could be enterprise on the move (e.g. courier companies etc.), globally reachable home networks, and internet enabled transport (cars, buses, trucks etc.)
e) **Multicast –** The ability to send a single packet to multiple destinations (multicast) conserves bandwidth with efficient auto-configuration and service discovery.
f) **Security** – Internet Protocol Security (IPSec) is a part of the IPv6 base protocol suite. It supports end-to-end security, authentication and non-repudiation thereby simplifying end to end security into applications.
g) **Innovative Applications –** IPv6 has been designed with many new features which make it possible to develop innovative applications which are not easily possible in the current

IPv4 protocol e.g.Centralized Building Management System,Intelligent Transport Systems,Rural Emergency Health Care,Tele-education / Distance Education,Smart Grids etc.

4. Is IPv6 backward compatible with IPv4?

IPv6 is not backward compatible with IPv4. These two protocols cannot talk to each other directly.

5. What are the different transition techniques for IPv6 transition?

The main transition techniques are as under:
- ❖ Dual Stack – In this the network stack supports both IPv4 and IPv6 (recommended approach in Roadmap v-II).
- ❖ Tunneling – In this the IPv6 packets are encapsulated within IPv4 packets.
- ❖ Translation – Protocol translation between IPv4 and IPv6 is performed.

NATIONAL TELECOM POLICY (NTP)-2012

6. What does NTP-2012 say about IPv6?

The NTP-2012 also recognises futuristic roles of Internet Protocol Version 6 (IPv6) and its applications in different sectors of Indian economy. The relevant extracts of the NTP 2012 related to IPv6 are as under:

Preamble
- ❖ NTP-2012 recognises futuristic roles of Internet Protocol Version 6 (IPv6) and its applications in different sectors of Indian economy.

Objectives
- ❖ Achieve substantial transition to new Internet Protocol (IPv6) in the country in a phased and time bound manner by 2020 and encourage an ecosystem for provision of a significantly large bouquet of services on IP platform.

Telecom Enterprise Data Services, IPv6 Compliant Networks and Future Technologies
- ❖ To recognize the importance of the new Internet Protocol IPv6 to start offering new IP based services on the new protocol and to encourage new and innovative IPv6 based applications in different sectors of the economy by enabling participatory approach of all stake holders.

- ❖ To establish a dedicated centre of innovation to engage in R &D, specialized training, development of various applications in the field of IPv6. This will also be responsible for support to various policies and standards development processes in close coordination with different international bodies.

POLICY GUIDELINES

7. What is 'National IPv6 Deployment Roadmap (v-II)'?

It is a policy document for IPv6 transition whichwas released by DoT in March, 2013 for IPv6 transition in the country in a phased and time bound manner as per the NTP-2012.

8. What are the policy guidelines of 'National IPv6 Deployment Roadmap (v-II)' for Government Organisations?

The policy guidelines are:

❖ The Government organisations should prepare a detailed transition plan for complete transition to IPv6 (dual stack) by December 2017 based on the network complexity & equipment/ technological life cycles. The plan should be prepared latest by December 2013 and accordingly the required budgetary provisions should be made in their demand for grant. For this purpose, it is recommended that a dedicated transition unit in each organisation should be formed immediately to facilitate entire transition.

❖ All new IP based services (like cloud computing, data centres etc.) to be provisioned for / by the Government organisations should be on dual stack supporting IPv6 traffic with immediate effect.

❖ The public interface of all Government projects for delivery of citizen centric services should be dual stack supporting IPv6 traffic latest by 01-01-2015. The readiness of Government projects in turn will act as a catalyst for private sector transition from IPv4 to IPv6.

❖ The Government organisations should procure equipments which are also IPv6 Ready (Dual Stack) and go for deployment of IPv6 ready (Dual Stack) networks with end to end IPv6 supported applications. The equipment should be either TEC certified or IPv6 Ready Logo certified.

❖ The Government organisations should go for IPv6 based innovative applications in their respective areas like smart metering, smart grid, smart building, smart city etc.

❖ The Government organisations should develop adequate skilled IPv6 trained human resources within the organisation through periodic trainings over a period of one to three years to have a seamless transition with minimum disruption.

❖ The IPv6 should be included in the curriculum of technical courses being offered by various institutes / colleges across the country.

9. What are the policy guidelines of 'National IPv6 Deployment Roadmap (v-II)' for Service Providers?

The policy guidelines are:

➡ Enterprise Customers

❖ All new enterprise customer connections (both wireless and wireline) provided by Service Providers on or after 01-01-2014 shall be capable of carrying IPv6 traffic either on dual stack or on native IPv6.

❖ Regarding the existing enterprise customers which are not IPv6 ready, the Service Providers shall educate and encourage their customers to switch over to IPv6.

→ Retail Customers (Wireline)

❖ All new retail wireline customer connections provided by Service Providers on or after 30-06-2014 shall be capable of carrying IPv6 traffic either on dual stack or on native IPv6.

❖ The Service Providers shall endeavor to progressively replace/ upgrade the Service Providers owned CPEs which are not IPv6 ready as per the following timelines:

  • Replacement / upgradation of 25% of CPEs by December 2014.

  • Replacement / upgradation of 50% of CPEs by December 2015.

  • Replacement / upgradation of 75% of CPEs by December 2016.

  • Replacement / upgradation of 100% of CPEs by December 2017.

❖ Regarding the customer owned CPEs which are not IPv6 ready, the Service Providers shall educate and encourage their customers to replace/ upgrade such CPEs to IPv6 ready ones.

→ Retail Customers (Wireless)

❖ All new LTE customer connections provided by Service Providers with effect from 30-06-2013 shall be capable of carrying IPv6 traffic either on dual stack or on native IPv6.

❖ All new GSM/ CDMA customer connections provided by Service Providers on or after 30-06-2014 shall be capable of carrying IPv6 traffic either on dual stack or on native IPv6.

10. What are the policy guidelines of 'National IPv6 Deployment Roadmap (v-II)' for Content & Application Providers?

The policy guidelines are:

❖ All contents (e.g. websites) and applications providers should target to adopt IPv6 (dual stack) for new contents & applications by 30-06-2014 and for existing ones latest by 01-01-2015.

❖ The complete financial ecosystem including payment gateways, financial institutions, banks, insurance companies, etc. should transit to IPv6 (dual stack) latest by 30-06-2013.

❖ The new registrations on '.in' domain to be compulsorily on dual stack with effect from 01st January 2014.The entire '.in' domain should migrate to IPv6 (dual stack) latest by June 2014.

11. What are the policy guidelines of 'National IPv6 Deployment Roadmap (v-II)' for Equipment Manufacturers?

The policy guidelines are:

❖ All mobile phone handsets/ data card dongles/ tablets and similar devices used for internet access supporting GSM / CDMA version 2.5G and above sold in India on or after 30-06-2014 shall be capable of carrying IPv6 traffic either on dual stack (IPv4v6) or on native IPv6.

❖ All wireline broadband CPEs sold in India on or after 01-01-2014 shall be capable of carrying IPv6 traffic either on dual stack or on native IPv6.

12. What are the policy guidelines of 'National IPv6 Deployment Roadmap (v-II)' for Cloud/ Data Centres Providers?

The policy guidelines are:

❖ All public cloud computing service / data centres providers should target to adopt IPv6 (dual stack) latest by 30-06-2014.

13. What are the various activities involved in the IPv4 to IPv6 transition for Government Organisations?

The National IPv6 Deployment Roadmap Version-II may kindly be referred for Government Organisations (chapter 4.1).

14. What is 'National IPv6 Deployment Roadmap (v-I)'?

It is a policy document for IPv6 transition which was released by DoT in July, 2010. It was the first initiative of its kind by a Government anywhere in the world. Its main focus was to educate/ sensitise the Indian ecosystem about the issues related to IPv6 and enable it to take the first step in the transition towards IPv6.

15. What were the key policy guidelines of 'National IPv6 Deployment Roadmap (v-I)'?

The key policy guidelines were:

❖ All major Service providers (having at least 10,000 internet customers or STM-1 bandwidth) will target to handle IPv6 traffic and offer IPv6 services by December-2011

❖ All Central and State Government Ministries and Departments, including its PSUs, shall start using IPv6 services by March-2012.

❖ Creation of IPv6 Task Force.

16. I need IPv6 addresses, where should I go?

You can get it from IRINN or APNIC or your service provider.