# IPv6 Transition and scenario in India

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**ABSTRACT: This paper reviews the government policy approaches regarding the transition from IPv4 to IPv6. IPv4 is limited to 4.2 billion possible addresses which is not sufficient so another version of internet protocol was developed with 128 bit addresses providing 340 trillion addresses. However the transition process between IPv4 and IPv6 is quite complex. As per the data available ,a centre of innovation for IPv6 is planned which refers to a substantial transition to IPv6 by 2020 with the vision to provide an environment of end to end IPv6 Services under a single umbrella with objectives like implementing IPv6 based pilot projects, to develop model Experimental IPv6 Network, Technical support to Central and State Government units Conducting certified training programs R& D in collaboration with premier institutes for new RFC/New applications, IPRs etc. Also Consultancy support at National / International level is to be provided. Auditing of the networks & its certification is another objective of this policy. The document also tracks the sites where this transition has already taken place successfully and different complex mechanisms that this transition has to deal with for its desired working.**

**Keywords:** Policy, Transition, Government, Objectives.

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## INTRODUCTION

The internet has experienced an astonishing increase of devices accessing the internet and the IPv4 addresses are running out. The solution to this problem is making use of IpV6 which can accommodate the increased demand by providing much large address space along with improved traffic routing. As we all are aware, there has been a massive deployment of internet-enabled resources worldwide during the last decade. In addition to the Internet and the World Wide Web all other Communication networks are also slowly migrating from circuit switched technology to IP based technologies and India is no exception. Newer and newer types of consumer devices and applications are coming up which will be IP-enabled. The current technology is IPv4 based having a 32-bit addressing space of only 4 billion devices. Despite the use of network address translation (NAT) as a strategy for reducing the use of public IPv4 addresses, several experts forecast depletion in the next few years. There is a wide recognition that this addressing space is insufficient for the future networks. Therefore IPV6 technology was developed which has a 128 bit address space and it will cater to the addressing requirements of future networks. India is expected to face a severe shortage of IPv4 addressing space in the near future if timely action is not taken to migrate from IPV4 to IPV6. It is expected that rapid growth of broadband and wireless technologies in telecom sector will push the demand for IP addresses in India. The Government of India has placed a high priority for making the country IPv6 ready to meet the rising demand for IP addresses in future.

1. **Need for IPv4-IPv6 Transition:**
    a) The depletion of addresses in ipv4
    b) Lack of ipv4 scalability
    c) New protocols ease network administration
2. **Problems associated with the IPv4-IPv6 transition:**
    a) Interoperability with software and hardware
    b) Equipment upgrades worthwhile?
    c) Massive leftover of legacy office equipments

  d) People resilient to change
  e) Experience with the new protocol is limited
  f) Difficulty of time scheduling
  g) Business return on investment is uncertain

**3. Transition tool from IPv4 to IPv6:**

For the transition to IPv6 to be successful, there must be compatibility with large installed base of IPv4 hosts and routers. The different tools applied to help in the transition are mentioned as under

  **A. Tunneling:** In this technique IPv6 packets are just tunneled through anIPv4 network.

  **B. Dual Stack***:* By adapting PCs and network equipment to be both IPv4 and IPv6-ready, IPv6 is used if the other end is IPv6-ready and IPv4 is used if the other end is IPv4-ready.

  **C. Translation:** A translator device converting IPv4 to IPv6 and vice versa is installed, and communications between IPv4 and IPv6 nodes are enabled via this translator, so to speak, it serves as an interpreter" between IPv4 and IPv6. It just translates IPv4 pockets to IPv6 Packets and vice versa.

**4. IPv6 deployment around the world:** One of the first questions asked by almost anyone considering IPv6 anywhere in the world is, "What is the rest of the world doing?" An examination of IPv6 activities in various regions is instructive of the motivations for deploying IPv6 and the progress that has been made in moving toward an IPv6 Internet.

**Table 1: Deployment of IPv6 in around the world.**

| Continent | Deployment Ratio |
|-----------|------------------|
| EUROPE | 8.8% |
| ASIA | 3.6% |
| AMERICA | 7.6% |
| AUSTRALIA | 6.3% |
| AFRICA | 3.4%. |

**5. Government of India's IPv6 deployment roadmap, its review and   update (policy decisions):**

  a) 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.
  b) All central and State  government ministries and departments, including its PSUs, shall start using IPv6 services by March-2012.
  c) Formation of the India IPv6 Task Force.

**6. Activity for 2012-13:**

  a) Substantial transition to IPv6 by 2020.
  b) Formulation of New Internet Protocol V6 (IPv6) Deployment Roadmap Version-2 in 2012
  c) Setting up of IPv6 innovation centre

Concept Paper & Approval of India IPv6 Innovation Center proposed in 2012:

  a) All the Government websites on dual stack in 2012 (proposed).
  b) Global IPv6 Summit in India.
  c) Adoption of IPv6 based Pilot Project in Government Sectors.
  d) To Pursue Content, Application and End User Equipment Providers.
  e) IPv6 Ready Logo Certification for TEC Test Bed.
  f) IPv6 implementation workshops for states and central Organizations.
  g) Target to have meeting with End User Equipments Vendors.

IPv6 Content Readiness across segments:

The following projects can be identified in the states*:*

  a) IPv6 based tele-medicine
  b) IPv6 based Birth and death certificate
  c) IPv6 cloud based citizen services

d) Intelligent traffic Management systems

| Segments | IPv6 Readiness |
|---|---|
| Banks | some banks have started ipv6 adoption are targeting their most critical content -    primarily their internet banking website |
| Travel(airlines) | some are undertaking a cost-benefit analysis need to plan and begin migration to ipv6 at the  earliest |
| Internet companies | key business services are being migrated some challenges are being faced – related to payment gateways, dns, auto assignment, etc. |
| Enterprises | many have internal systems and hence have not devised an ipv6 plan – dot is facilitating the  required wareness in psus and government enterprises need to identify public facing content and adopt |

**Proposed Indian road map for IPv6:**
a) Facilitate the efforts of stakeholders  regarding  the adoption and the deployment of IPv6, for instance through awareness-raising campaigns.
b) Undertaking detailed study for transition from IPv4 to IPv6 environments based on the experience gained through the networks within the country.
c) Involve Internet Service Providers to get connected to IPv6 based network and initiate the services within one year.
d) To facilitate, among other things by enabling IPv6, an integrated part of research & educational networks.
e) Making all major ISPs and major universities / research laboratories in India IPv6 aware: Implement a show case for awareness creation among all stakeholders: users, ISPs, industries, research institutes policy makers and politicians.
f) R&D test bed for identifying the issues that need to be addressed for a smooth transition.
g) Undertake research and development activities  for products, processes and systems for IPv6 environment. Success of such products, processes  and  system depends on the spread of commercialization, therefore, industry to be involved into it.
h) To participate actively in the establishment of a nationwide,  vendor  independent,  training and  education program on IPv6.
i) Making at least 2 large ISPs (both in public and private sectors) ERNET and BSNL, VSNL, Satyam etc. to provide select commerce.

 **Potential solutions:** Some of the potential solutions to improve IPv6 deployment rate and IPv6 research in India are as follows:

a) Keeping up-to-date on IPv6 activities around the world: The network operators should participate in world IPv6conventions such as the IPv6 Forum to gain more understanding on IPv6 market. Moreover, by keeping up-to al IPv6 services.  Should undergo attachment with industries or pursue postgraduate programs to improve their technical skills.
b) Create more awareness program: Local media should publish more IPv6 related materials. Local universities should conduct lecture series on IPv6 technology.   IT-related exhibitions should also include a section on IPv6 in their future road show.
c) Require government intervention: Policy makers should support and encourage IPv6 growth in India by proposing tax exemption on date with IPv6 community; they will gain knowledge on latest deployment strategy.
d) Produce more IPv6 developers among locals: Local universities should open up more courses on IPv6 technology and encourage application developments through competitions, grants and loans.

e) Develop technical competency among researchers:

## Structure of "India IPv6 Task Force"
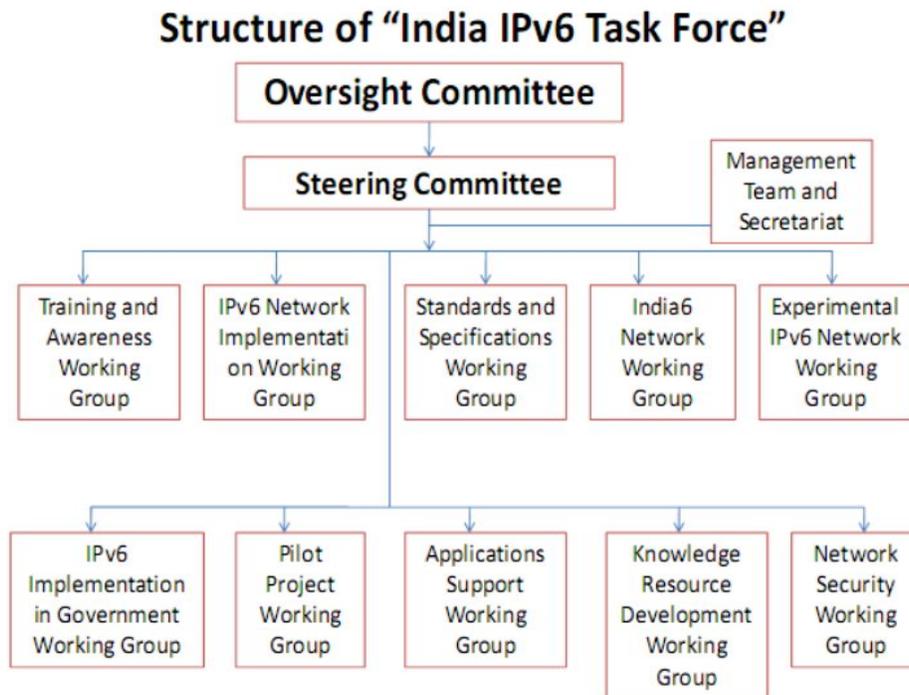


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