Migration from IPv4 to IPv6

Shri N. K. Srivastava, Sr. DDG, TEC welcoming Shri Chandra Prakash, Member (Technology) at the inauguration of Fourth TEC workshop on "IPv6 : New opportunities for the country" in Mumbai on 27th November 2009.

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TEC Organises Workshops on IPv6 Migration

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. Telecom Engineering Centre (TEC) has been given the mandate by the government for firming up the migration plan for the country. TEC has planned to organize a series of workshops to foster dialogue and cooperation between different stakeholders in the country to meet the common objective. The first such workshop was held in New Delhi on 21st July 2009, second in Bangalore on 15th September 2009, third in Chennai on 22nd Oct 2009 and fourth workshop in Mumbai on 27th Nov 2009.

Objectives

These workshops will provide a platform for dialogue where key players in the field like telecom and Internet service providers, industry associations, equipment manufacturers, policy makers as well as other interested entities will be able to discuss and address various migration issues as well as the economic aspects related to it. These workshops provide an opportunity for discussing the plans of service providers and equipment manufacturers for the IPv4 to IPv6 migration. Based on the feedback and outcomes, some of the key issues as given below could be addressed:

- What is the current state of deployment of IPv6 compliant networks by various telecom and Internet Service Providers? What are their migration plans and issues involved ?
- What is the current state of IPv6 compliant equipment manufacturing and applications developed in the country ?
- What kind of policies by the government can help in the migration strategy ?

Participants in TEC workshops include :

- Representatives from Industry associations like ISPAI, COAI, AUSPI, CMAI, TEMA
- Concerned service providers
- Senior Officers from Government, TRAI etc.
- Other concerned bodies

Other initiatives by TEC

1. TEC/DoT has written to all Ministries and Departments of the Government of India to procure only IPv6 based ICT (Information and Communication Technology) equipment in future. Replacement of ICT equipment with IPv6 compliant equipment during the normal procurement process is advised because it is cost effective and gives ample time to them to plan their strategy and train the employees.
2. The Government has also asked them to appoint nodal officers who will coordinate with TEC to sort out various migration issues. TEC has started receiving responses from various state and Central Government departments in this regard.
3. TEC is also involved in various standardization activities in the country. It coordinates with many international organizations for this purpose. Revised Test Schedule and Testing Procedure (TSTP) for IPv6 is under issue, after taking into account the feedback received from various stakeholders.
4. Deployment of IPv6 in the country would need investment in many "Greenfield Applications" and the Government plans to facilitate setting up of pilot projects in this area.

First Workshop was held in New Delhi on 21st July 2009 with the theme "Migration from IPv4 to IPv6 in India". The workshop was organized jointly by TEC and Communications and Manufacturing Association of India (CMAI). There were more than 250 participants from different Central Government

Departments, Industries, Service Providers, Educational Institutes (including IITs), Public Sector Undertakings etc. The workshop was inaugurated by Shri Siddhartha Behura, Secretary(Telecom). Other distinguished participants include Shri. K.Sridhara, former Member(Technology), DoT, Shri. R. N. Prabhakar, Member (TRAI), Shri. V. K. Shukla, Member (Services), Shri. D. K. Agrawal, Advisor (Technology), Shri. Latif Latid, President of Worldwide IPv6 Forum. Almost all Telecom Service providers presented their transition plan, status & strategy. It transpired that few SPs are in very good position while others are lagging.

Second Workshop was held on 15th September 2009 at the Indian Institute of Science, Bangalore on the theme "IPv6 Transition and Greenfield Applications in India".

There were more than 225 participants from various organisations and institutions. It was inaugurated by Shri D.K.Agrawal, Advisor (Technology), DoT. Various Greenfield applications and technologies, which need IPv6 protocol for their operation, like Intelligent Transport Management System, Sensor Networks to save energy in buildings, Cloud Computing & Internet Data centres, Scalable Cable TV networks were discussed.

Third Workshop on the theme **"IPv6 as a New Platform for Innovation"** was held on

22nd October 2009 at the Hall of Inspiration, Anna Road Telephone Exchange, BSNL Chennai. The workshop was organized by TEC in association with CMAI.   There were around 200 delegates from various organisations and institutions. It was inaugurated by Shri Chandra Prakash, Member (Technology). It came out that the real demand of IPv6 will be through its innovative applications & Govt. should encourage such pilot projects & various other applications. Need for a check-list of IPv6 compliant hardware & software was stressed. It was announced that TEC has entered into an MOU with IPv6 forum for various services and technical standards.

Fourth Workshop was held in Mumbai on 27th November 2009 with the theme **"IPv6 : New opportunities for the country"** The workshop was inaugurated by Shri Chandra Prakash, Member (Technology). The workshop was well attended by more than 150 delegates from almost all segments including Cabinet Secretariat, Defence Ministry, Home Ministry, etc. In the workshop the advantages of using IPv6 in various possible pilot project for different government departments like emergency, rural health care, net centric warfare

for defence, smart grid for electricity sector, logistics for Indian Railways, etc. were discussed. Mr. German from APNIC mentioned that IPv4 addresses will be exhausted in nearly two years time and there is an urgent need to migrate. It was conveyed in the meeting that Asian countries especially India need not to follow the Western countries example in implementing IPv6. It also emerged out of the panel discussion that the Government should mandate the migration from IPv4 to IPv6 and ask all service providers to switch over in a time bound manner.
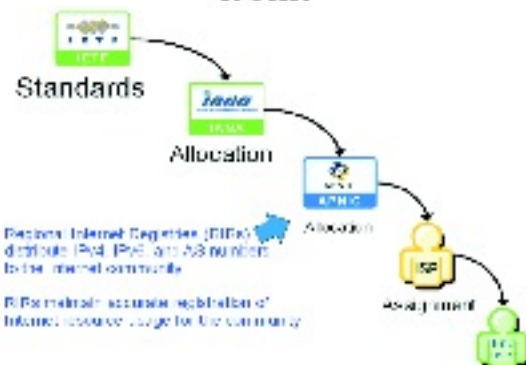

For more information on IPv6 :

http://www.ipv6.org
http://www.ipv6forum.com
http://www.6choice.eu
http://www.wide.ad.jp
http://www.bgpexpert.com
http://www.sixxs.net/main

Country wise IPv4 address distribution

Country	Addresses (Million)	Per Capita
United States	1474.319	5.297
China	194.425	0.152
Japan	153.327	1.210
European Union	114.103	-
Germany	85.300	1.038
Canada	76.197	2.446
South Korea	72.239	1.542
United Kingdom	70.795	1.187
France	68.385	1.155
Australia	37.378	1.979
Italy	32.344	0.561
Brazil	29.755	0.175
Russian Federation	24.919	0.170
Taiwan	24.681	1.109
Spain	22.065	0.559
Mexico	21.503	0.217
Netherlands	21.249	1.339
Sweden	18.998	2.144
India	18.312	0.018

Operating Systems : IPv6 Compliant Status

Vendor	Operating System	Reference
Apple	Mac OS 10.2 and later	http://developer.apple.com/macosx
BSD	Free BSD 4.0 and later Open BSD 2.7 and Later Net BSD 1.5 and Later BSD/OS 4.2 and Later	http://www.kame.net
HP	HP-UX11i and Later Tru64 UNIX V5.1 and Later Open VMS V5.1 and Later	http://h30097.www3.hp.com/unix/v51b.html http://h71000.www7.hp.com/doc/732final/6645/6645pro_index.html
IBM	AIX 4.3 and Later OS/390 V2R6 eNCS z/OS Rel 1.4 and Later	http://www-306.ibm.com/software/os/zseries/ipv6/
Linux	Rel 6.2 and Later Mandrake 8.0 and Later SuSE 7.1 and later Debian 2.2 and later	http://www.bieringer.de/linux/IPv6/status/IPv6+Linux-status-distributions.html
Novell	Netware 6.1 and Later	
SUN	Solaris 8 and Later	http://www.sun.com/software/solaris
Symbian	Symbian 7.0 and Later	http://www.symbian.com

Windows 2000 – IPv6 technology preview on Windows 2000, but did not provide support.
Window vista – IPv6 implementation is available. Parity between IPv4 and IPv6 at the application level.
Window XP- Got a supported IPv6 stack but with a limited subset of supported applications such as Internet Explorer 6.0, window Media Player 9.0 and 10.0 and Conference XP 3.2 but no IPv6 support for popular applications.
Reference- http://www.microsoft.com/ipv6

About IPv6

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 table on previous page shows the availability of IPv4 addresses for India as compared to other countries in the world.

About IP Addresses

- A finite common resource
  - Managed in the common interest
  - Critical to maintenance of global internet

- Not "owned" by address users
  - Not property
  - Cannot be bought, sold, or traded...
  - Provided on a "license" basis
  - Returned to registry or provider when no longer required.
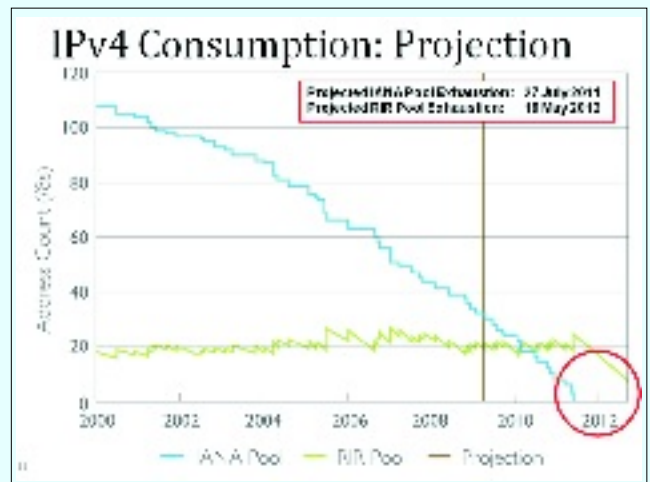
Important Activities of TEC during April 2009 to November 2009

New /Revised GRs/IRs

- GR on Raw Material for Manufacturing Optical Fibre Cable.
- GR on 50W/ 100W/200W/ 300W Solid State Power Amplifier (SSPA) 1+1 System operating in C-Band.
- GR for Synchronous Supply Unit (SSU).
- GR on 6 GHz High Performance Antenna
- GR on 30° K/45° K Low-Noise Amplifier system operating in C Band
- GR on 65° K/100° K Low-Noise Amplifier system operating in Ku Band
- IR on Mandatory Technical Interface Requirement for communication & Broadcast Network in FSS
- GR on Bandwidth Saving Satellite IF Modem for C band
- Test Procedure for Measurement of Electromagnetic Field for Base Station Antenna (for Telecommunication Sector)
- GR on Optical fibre Jumpers (Patch cord & Pigtail)and Adapters
- GR on Mechanical splice for Optical fibre
- GR on Digital microwave equipment for 4/8/16 E1 in 15 GHz frequency band
- GR on 15 GHz High Performance Antenna
- GR on Carrier Ethernet Network for Access Network application
- GR on Carrier Ethernet Network for Metro Network application
- GR on SIP application Server (SAS)
- GR on element Management System (EMS)
- GR on Session Border Controller (SBC)

DCC held for

- GR on Small Size Base Station Sub System
- GR on Subscriber Identity Module
- GR on Universal Subscriber Identity Module
- GR on Lawful Interception System (LIS)

Technical White Papers

- The Permanently Lubricated High Density Polyethylene telecom Ducts for use as underground Optical Fibre Cable Conduits.

Other Activities

- In principle approval accorded for TEC membership in WiMax Forum.
- TEC is in process of getting ISO Certification.
- Technical comments for 10 CMRTS and 2 PMRTS license cases sent to DoT.
- TEC has implemented latest recommendation on Electromagnetic compatibility standard for telecom equipments.
- Standing Finance Committee (SFC) approval received for NGN lab.

Approvals issued by TEC during the period April 2009 to Nov. 2009

Interface Approvals...................81
Type Approvals 08
Certificate of Approvals...........20