Encouraging the deployment of IPv6 in the developing countries

ITU Regional Workshop for the CIS countries

**Recommendations on transition from IPv4 to IPv6 in the CIS region ,
16-18 April 2014**

Tashkent , Republic of Uzbekistan

Desire.karyabwite@itu.int

IEE/TND

International Telecommunication Union

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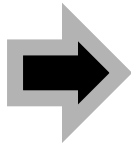
- Conclusion

Introduction

IPv6 infrastructure deployment

Resolution 180 of the Plenipotentiary Conference (Guadalajara, 2010), on facilitating the transition from IPv4 to IPv6.

RESOLUTION 101 (Rev. Guadalajara, 2010) Internet Protocol-based networks

RESOLUTION 63 (WTDC, Dubai 2014): IP address allocation and encouraging the deployment of IPv6 in the developing countries

OPINION 4: In support of IPv6 adoption and transition from IPv4 (the World Telecommunication Policy Forum (Geneva, 2013),
Invites

- *a)* Member States to take appropriate measures to encourage, facilitate and support the fastest possible adoption and migration to IPv6;
- *b)* Membership to promote affordable IPv6 compliant products and services as quickly as possible;
- Etc.
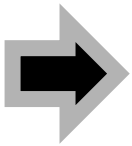
consider the questions of providing <u>trust and security</u> in the use of IPv6
Etc…

OPINION 3: Supporting Capacity Building for the deployment of IPv6, The fifth World Telecommunication/ICT Policy Forum (Geneva, 2013),

invites

- a)   Member States to consider policies and incentives to promote, facilitate and support the fastest possible adoption and migration to IPv6 within their jurisdictions;

- b)   Sector Members with web and Internet business to offer their services via IPv6 as quickly as possible.

The management of various currently used naming and addressing resources

|	Name	Address
Internet	Domain name	IP address
Fixed telephony	E.164 number	Q.708 ISPC
Mobile telephony	E.164 number	E.212 IMSI

- ITU regional workshop for the CIS countries on "Migration from IPv4 to IPv6: Regulatory and Technical aspects" was held in May 2012, Chisinau, Republic of Moldova.

- ASP COE Training was organized in Thailand in 2012 on "Certified IPV6 Network Engineer CNE6 L1 and L2. 13 persons from 5 countries were trained in the area of IPv6 deployment.

- In collaboration with APNIC and MICT in Thailand, a training was organized in 2012 on "IPv6 Network Migration Strategy for Telecom Service Providers". 37 participants from 9 countries attended the training on network migration strategy from IPv4 to IPv6. A workshop took place end 2013 on "IPv6 Infrastructure Security for Telecom Service Providers" in collaboration with APNIC and MICT in Thailand.

- A Symposium on IPv6 in the Americas was held in Suriname from 23-26 June 2013. Technical, Policy and Economic aspects of the introduction of IPv6 were discussed ;

- An Arab workshop on IPV6 took place in 2013, hosted by NTC in Sudan as part of the Centers of Excellence Activities for 2013.

- Global IPv6 Symposium was held in Geneva in September 2013 to assist developing countries to understand the Policy, Technical and Economic Aspects of the Introduction of IPv6.
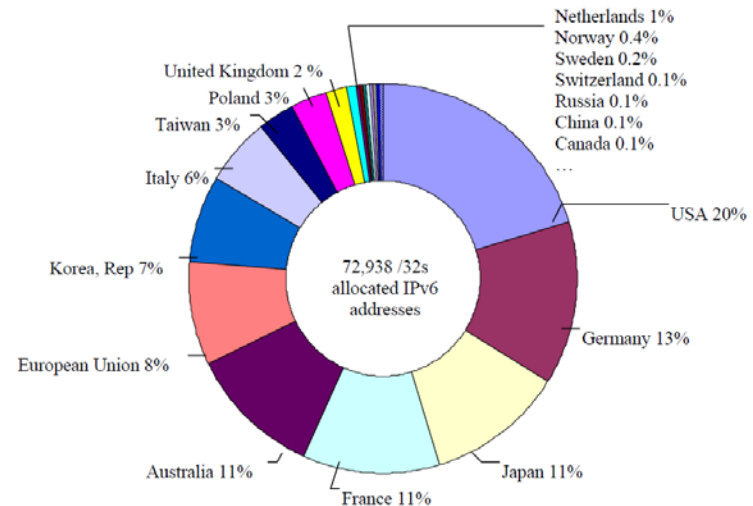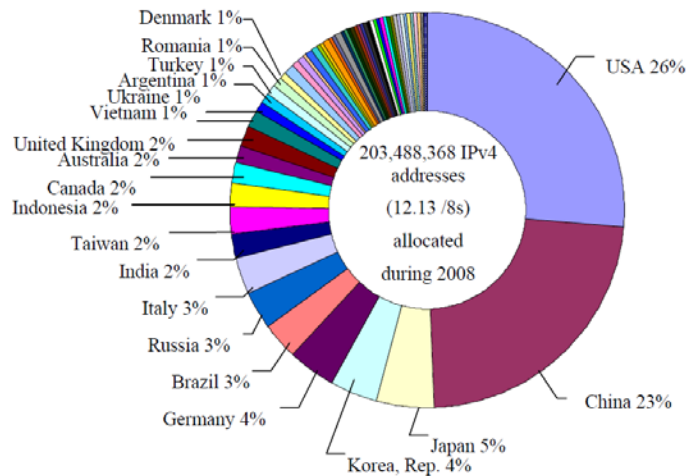
- Etc.

ITU IPv6 Group & Activities

Questionnaire on IPv6 address allocation and encouraging the deployment of IPv6.
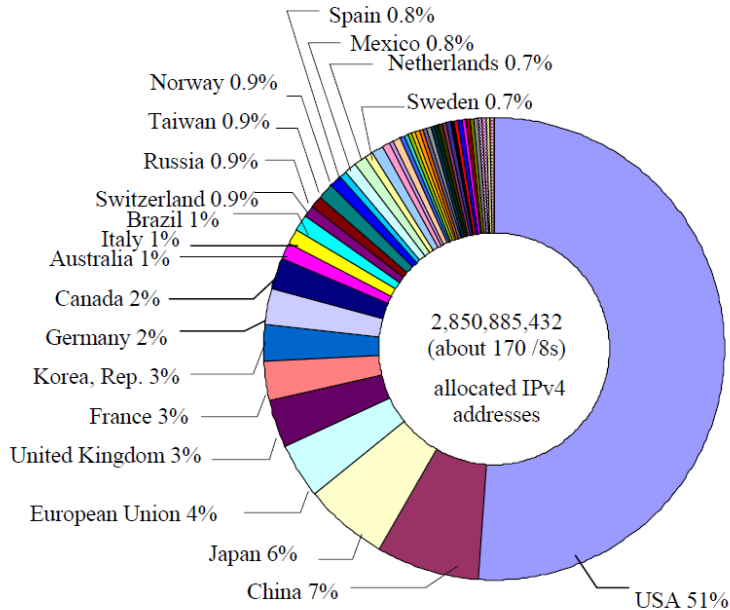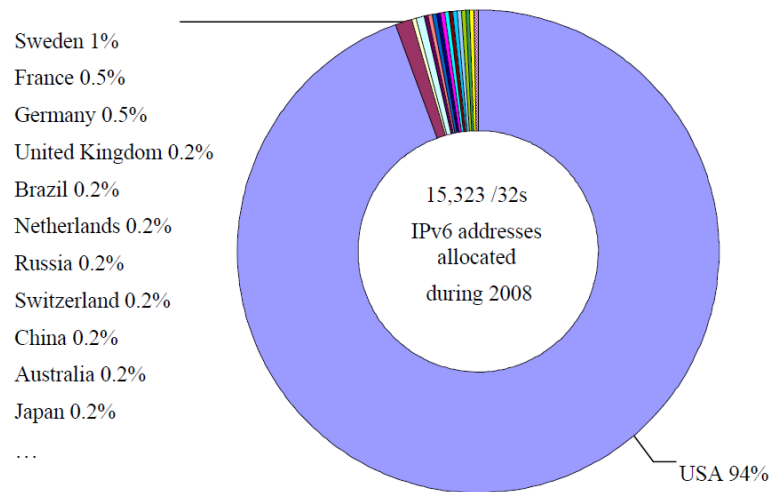

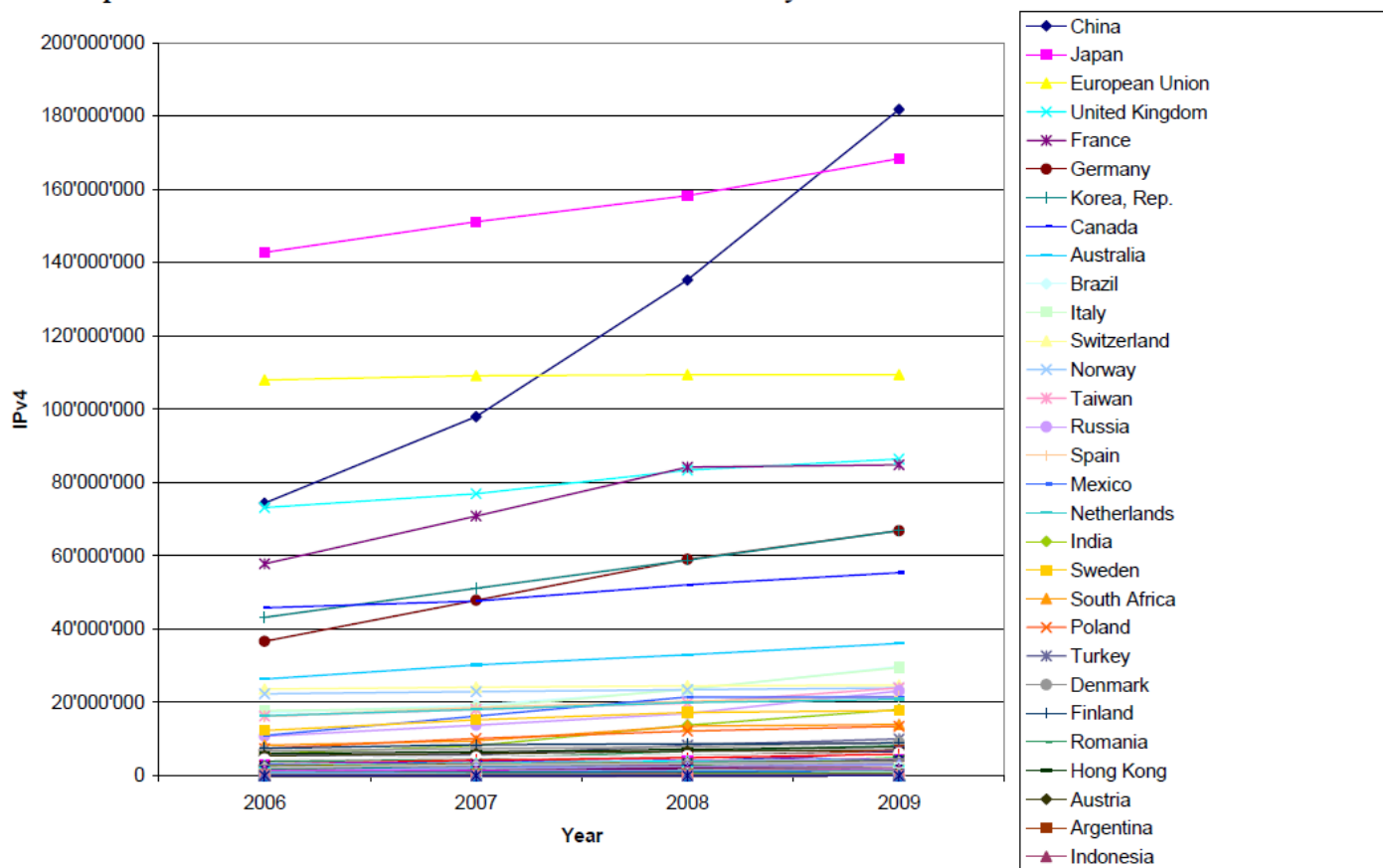**Proportion of allocated IPv4 addresses per economy (as of 15 May 2009)**

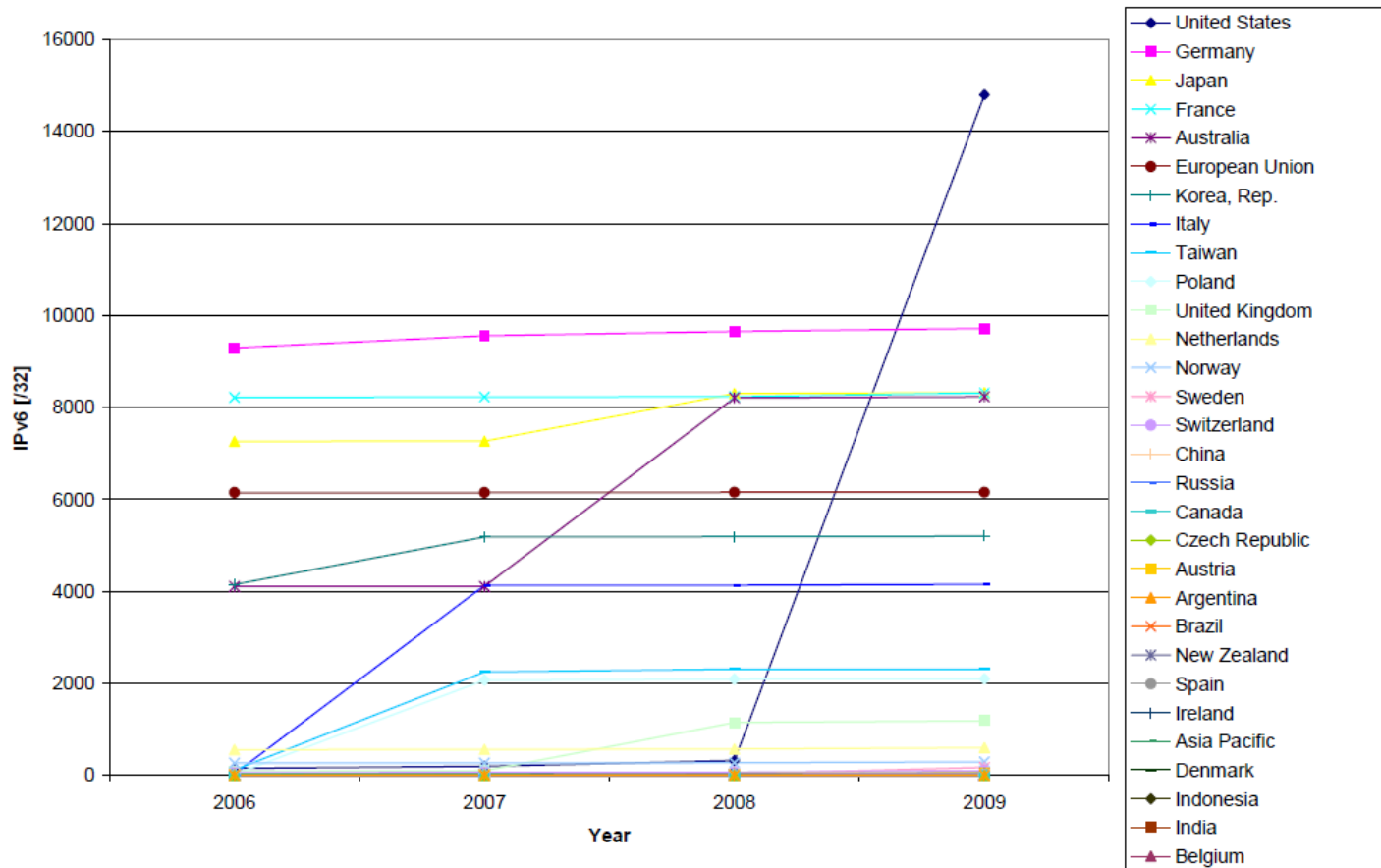**Proportion of allocated IPv6 addresses per economy (as of 15 May 2009)**

Share of IPv4 addresses allocated during 2008

Share of IPv6 addresses allocated during 2008

Trends in IPv4 allocations (without USA)

Trends in IPv6 allocations

The Value of IPv6

IPv6 expands the number of network address bits from 32 bits (in IPv4) to 128 bits, which provides more than enough globally unique IP addresses for every networked device on the planet.

However, it's not just about addressing. It's about business continuity and innovation.

The unlimited address space provided by IPv6 will allows to deliver more and newer applications and services with reliability, improved user experience and increased security. These might include:

- Multiple internet-enabled mobile devices for every person on the planet
- Billions of embedded sensors using technologies such as RFID, IEEE 802.15.4, and Personal Area Networks
- Home and industrial appliances
- Smart grids
- Etc.

Different reason to adopt IPv6

| IPv6 Adopter	Purpose	Typical Industry
Mandated	Meet regulations, compete in the global market, and ensure service availability	Government and Public Sector
Motivated	Serve customers needing IPv6 access; deal with address exhaustion, globalization, and device proliferation	Service Providers
Early Adopter	Deal with address exhaustion, establish competitive differentiation	Utilities (smart grid) and mobile service providers
Mainstream	Business continuity, maintain customer reach, protect investments	Large enterprises, smaller business

Migration Strategies and Technologies
Transition Scenarios

A variety of technologies are available to facilitate the migration to IPv6. These technologies are identified according to the following basic categories
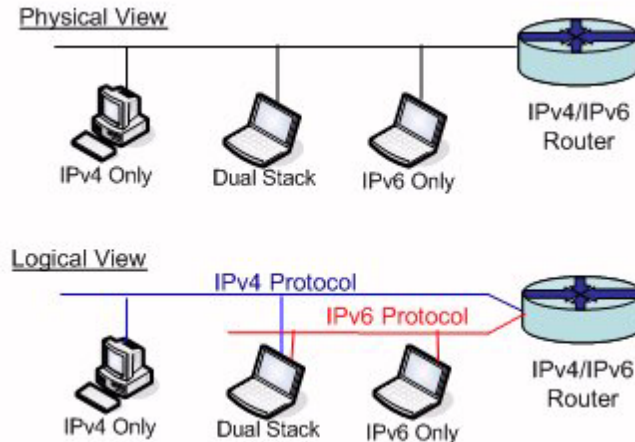

Dual-stacked Network Perspectives

a) ***Dual stack*** : support of both IPv4 and IPv6 on network devices. There will be a ***transition phase*** (expected to last for 10, 20 or even more years) when IPv4 and IPv6 will co-exist on the same machines (technically often referred to as "***dual stack***") and be transmitted over the same network links.
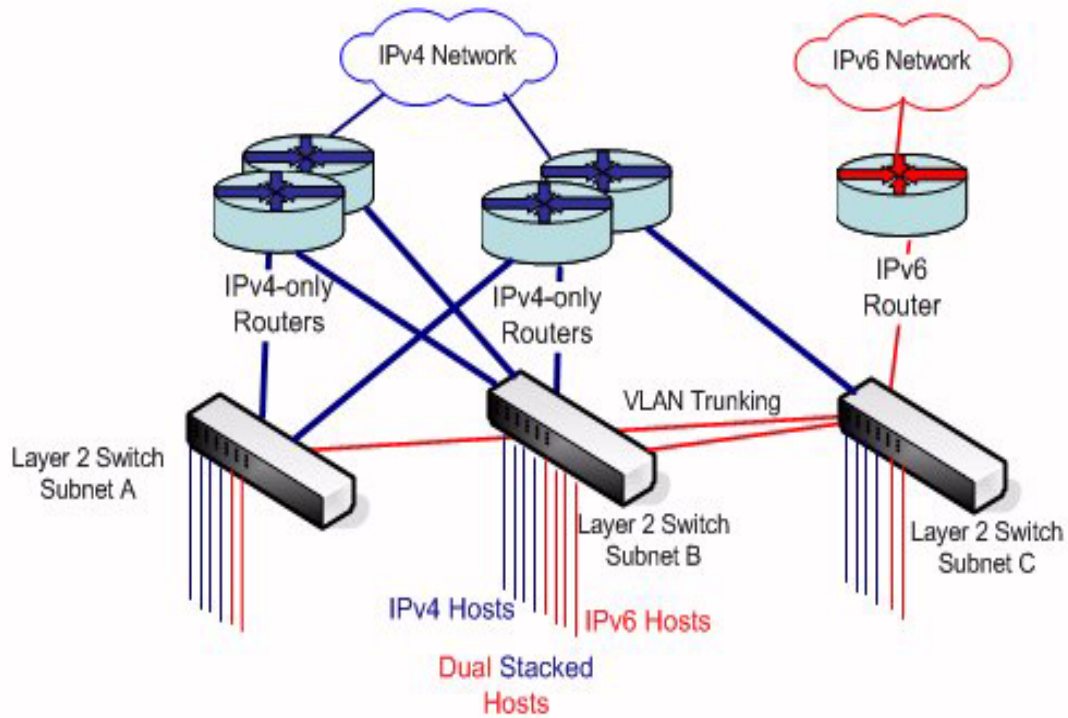
Dual-stacked VLAN Network

b) Tunneling : encapsulation of an IPv6 packet within an IPv4 packet for transmission over an IPv4 network. Technically referred to as "*tunnelling*", it allows IPv6 packets to be transmitted using IPv4 addressing and routing mechanisms and ultimately vice versa. This provides the technical basis for the step-by-step introduction of IPv6
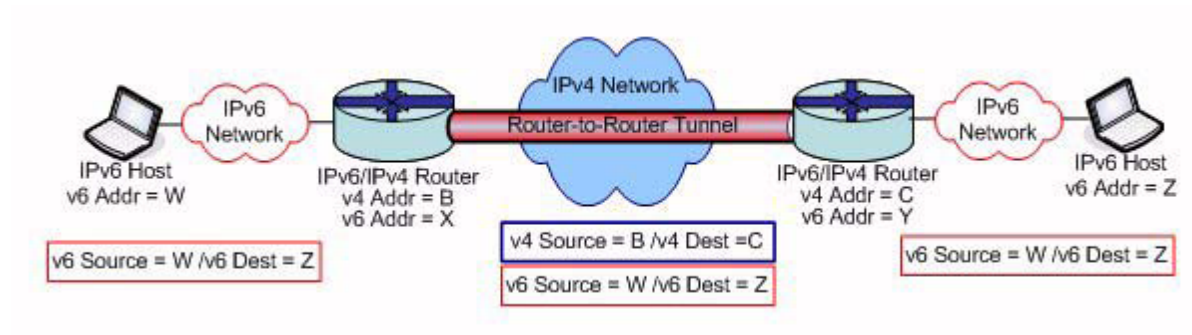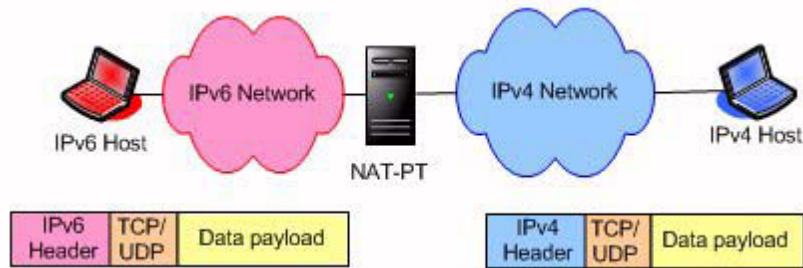

Router-to-Router Tunnel
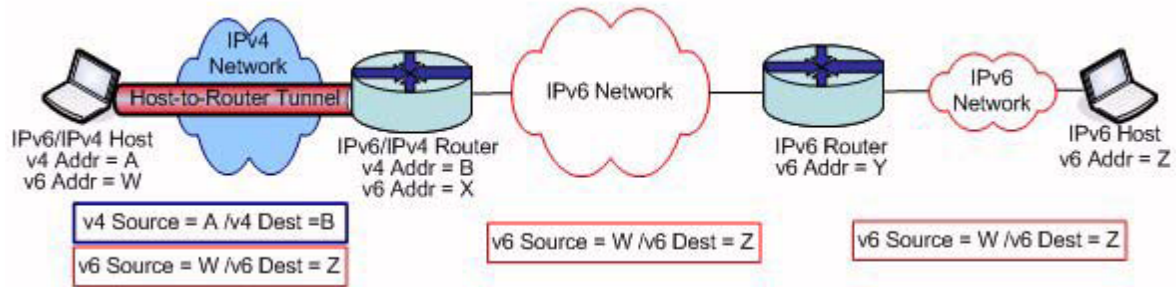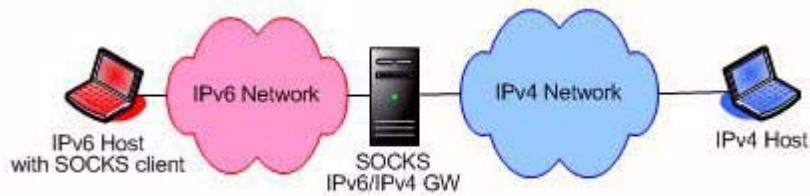
Router-to-Host Tunnel Configuration
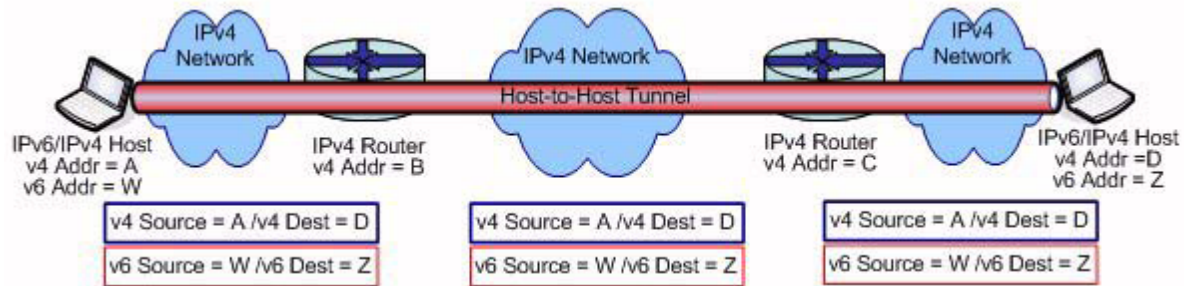
Host-to-Host Tunnel Configuration

c) Translation : address or port translation of addresses such as via a gateway device or translation code in the TCP/IP code of the host or router

NAT-Port Translation Deployment (NAT-PT Deployment)

Host-to-Host Tunnel Configuration

We should also note that the IPv6 migration goes with application migrations and we should consider some example migration scenarios and corresponding impact be considered. Implementation of the selected migration strategy(ies) will require effective coordination of the following:

- IPv4 and IPv6 network and subnet allocations, existing and planned
- Address assignment strategies for IPv4 and IPv6: static, autoconfiguration, DHCP for IPv4 and IPv6
- DNS resource record configuration corresponding to appropriate name resolution to address(es) for desired tunneling or translation
- Compatible client/host and router support of selected migration technologies, including translation and/or tunneling and application considerations
- Deployment of translation gateway(s) as appropriate

Conclusions

- IPv6 has been developed as an evolution of IPv4 to enable IPv6 to provide many new features while building on the foundational concepts that made IPv4 so successful.

- IPv6 Allocation: Many options are possible. E.g The Proposed Country based Internet Registries (CIR)

- Guidelines and best practices would be useful for Developing Countries for the IPv6 Implementation in Mobile and Fixed Networks taking into consideration, the Security and QoS issues.

- IPv6 security can be improved compared to IPv4 by the mandatory implementation of IPsec, adding the security measures at the IP layer
- As IPv6 security is actively discussed and new issues appear, it is necessary to keep your information updated

Thank you for your Attention