



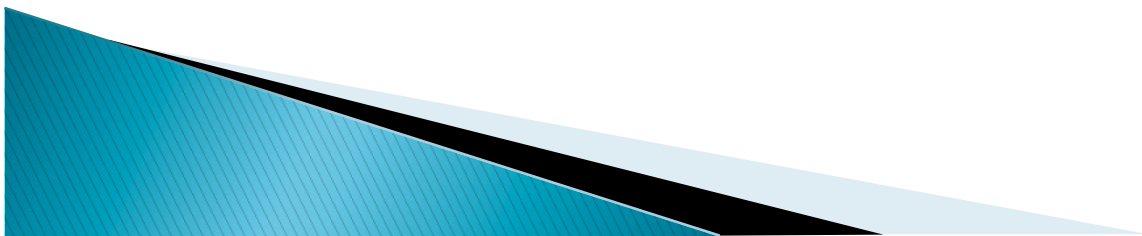
CYBERNET

IPv6: The Current Scenario in Pakistan

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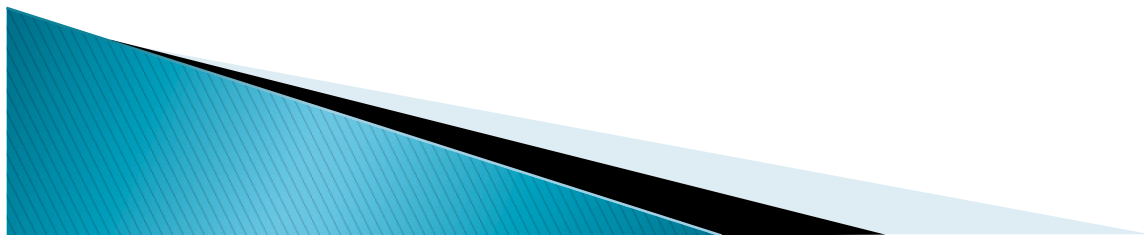
Agenda

- ▶ Introduction
- ▶ IPv6 delegation in Pakistan
- ▶ Pakistan's IPv6 prefixes visibility
- ▶ IPv6 Task Force Introduction
- ▶ Pakistan v6Core architecture
- ▶ v6Core Road Map
- ▶ IPv4 to IPv6 Transition



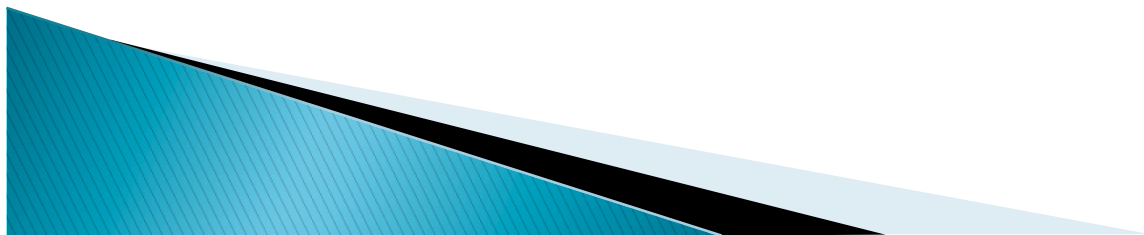
Introduction

- ▶ IPv6 is the new version of the Internet Layer Protocol (IP) in the TCP/IP suite.
- ▶ BUT, its not new....
- ▶ RFC 2460 (IPv6) was released in December 1998.
- ▶ It has been more than a decade now.
- ▶ So, NO MORE EXCUSES.....



IPv6 delegations in Pakistan

- ▶ As of 1st February 2011, there are 57 APNIC members in Pakistan.
- ▶ Every member is entitled to get an IPv6 allocation of /32 (and /48 in some cases).
- ▶ BUT Unfortunately.....
- ▶ According to APNIC routing database out of 57 only 19 Members have got their IPv6 address space. i.e. ~33%



IPv6 delegations in Pakistan

Member Name	Category	IPv6 Address Space
AMZ Technologies (Private) Limited	SMALL	2401:a200::/32
Connect Communication	MEDIUM	2401:ea00::/32
Cyber Internet Services Pakistan	MEDIUM	2001:4538::/32
Delta Networks	SMALL	2402:7c00::/32
Gerrys Information Technology (PVT) Ltd	MEDIUM	2406:ac00::/32
HEC	SMALL	2400:fc00::/32
IMZAK UK Limited	SMALL	2401:9e00::/32
	LARGE	2401::/32,
Linkdotnet Telecom Limited		2404:148::/32
Micronet Broadband (Pvt) Ltd.	MEDIUM	2407:d000::/32
Multinet Broadband	MEDIUM	2401:8e00::/32
National Institutional Facilitation Technologies.	VERY SMALL	2001:df0:84::/48
Pakistan Software Export Board	SMALL	2405:c00::/32
Pakistan Telecom company limited	VERY LARGE	2404:7000::/32
Supernet, PDS Limited	MEDIUM	2001:fe8::/32
Telenor Pakistan (Pvt) Ltd	SMALL	2402:e000::/32
TRANSWORLD ASSOCIATES (PVT) LIMITED	MEDIUM	2404:d400::/32
WARID TELECOM	SMALL	2407:9c00::/32
Wi-Tribe Pakistan Limited	LARGE	2404:f400::/32
Worldcall Multimedia Limited (WML)	LARGE	2406:7000::/32

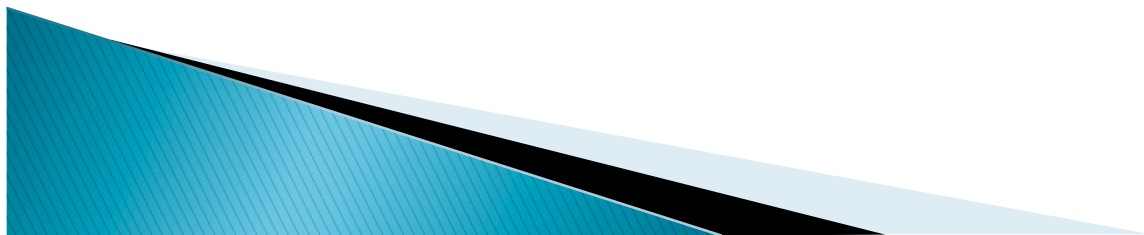
IPv6 Prefixes Visibility

- ▶ Out of 19 members having IPv6 address space only 6 are advertising their prefixes on the Internet. i.e. ~31%

Member Name	Category	IPv6 Address Space	v6 Route
Cyber Internet Services Pakistan	MEDIUM	2001:4538::/32	Advertised
Delta Networks	SMALL	2402:7c00::/32	Advertised
Linkdotnet Telecom Limited	LARGE	2401::/32, 2404:148::/32	Advertised
Pakistan Telecom PTCL	VERY LARGE	2404:7000::/32	Advertised
Supernet, PDS Limited	MEDIUM	2001:fe8::/32	Advertised
Worldcall Multimedia Limited	LARGE	2406:7000::/32	Advertised

IPv6 Task Force Pakistan

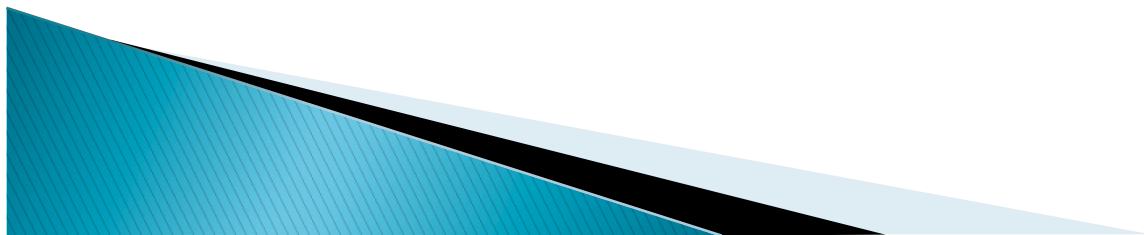
- ▶ IPv6 Task Force was created by few technology enthusiasts from Cybernet, Supernet and Dancom.
- ▶ It is accredited by IPv6 Forum, APNIC, SANOG and PTA.
- ▶ The main idea was to start working towards IPv6 deployment as early as possible.
- ▶ A working charter was established with consensus among the stakeholders.



IPv6 Task Force Pakistan

Task Force was formed with the following objectives:

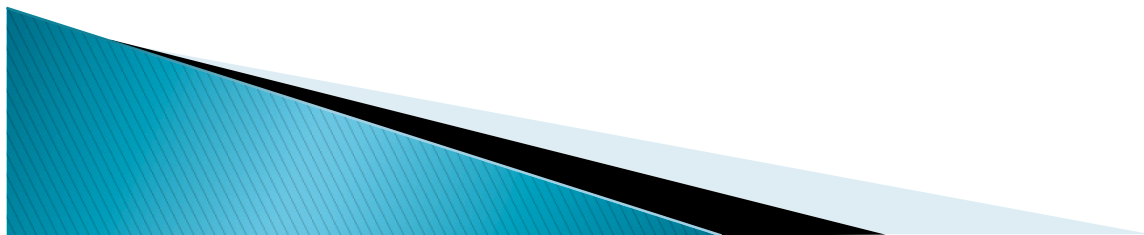
- ▶ Identify key application/product vendors and ISPs to promote IPv6 in Pakistan.
- ▶ Propose, discuss, implement and share regional and local IPv6 strategies
- ▶ Facilitate the means to promote IPv6 and its related technology through TF managed events and webportal.
- ▶ Work with academia to promote addition of IPv6 in their curriculum.
- ▶ Develop General Deployment and Transition Guidelines
- ▶ Investigate and publicize IPv6 deployment status;
- ▶ Establish and maintain Project 6Core (National IPv6 Core of Pakistan).



IPv6 Task Force Pakistan

Membership:

- ▶ Membership is open to any organization willing to contribute to IPv6 promotion and deployment in Pakistan.
- ▶ No membership fees.
- ▶ There shall be no limit as to the number of Members of the Task Force.
- ▶ All Members shall be entitled to participate in Task Force discussions.

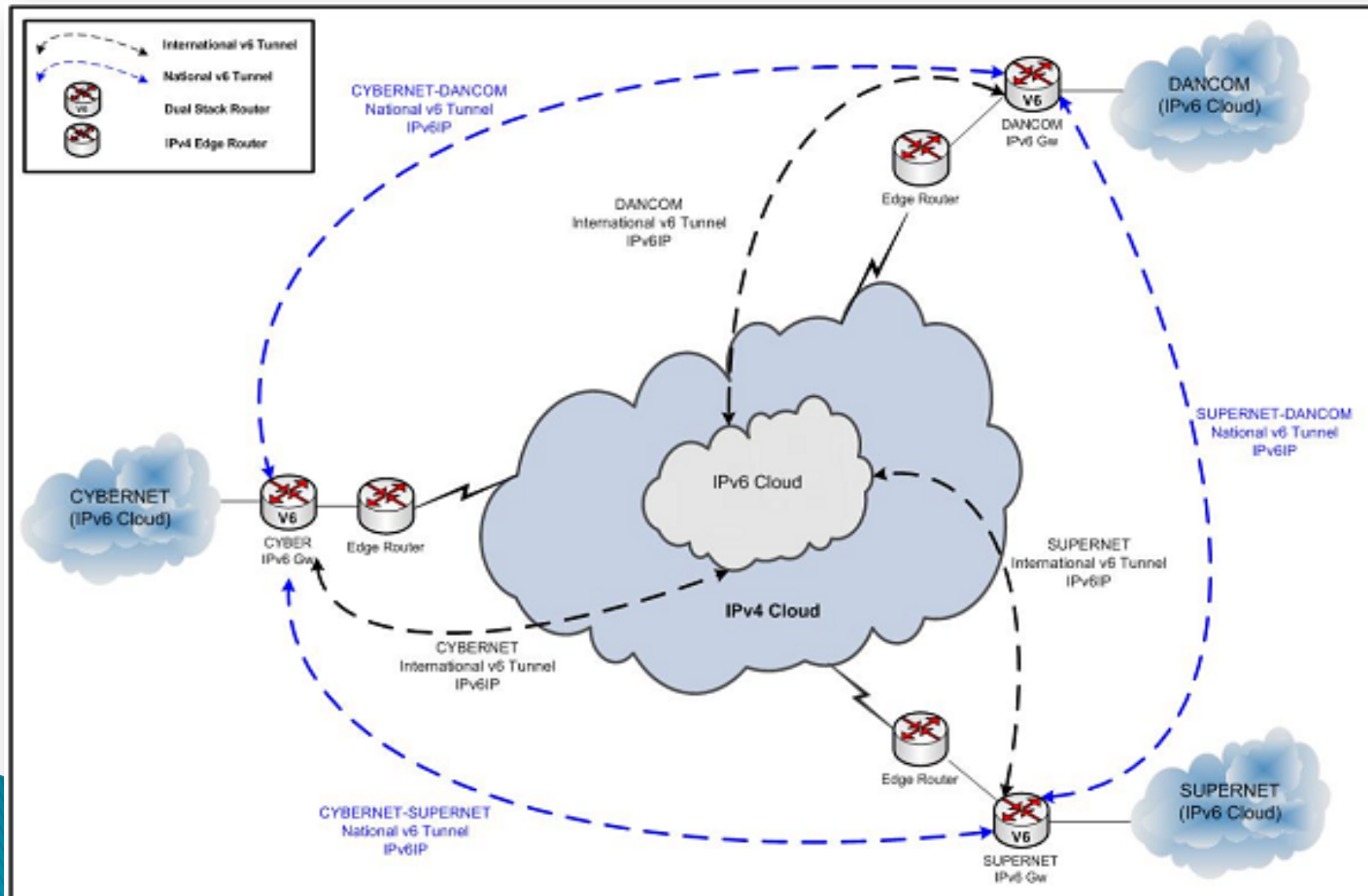


v6 Core Project

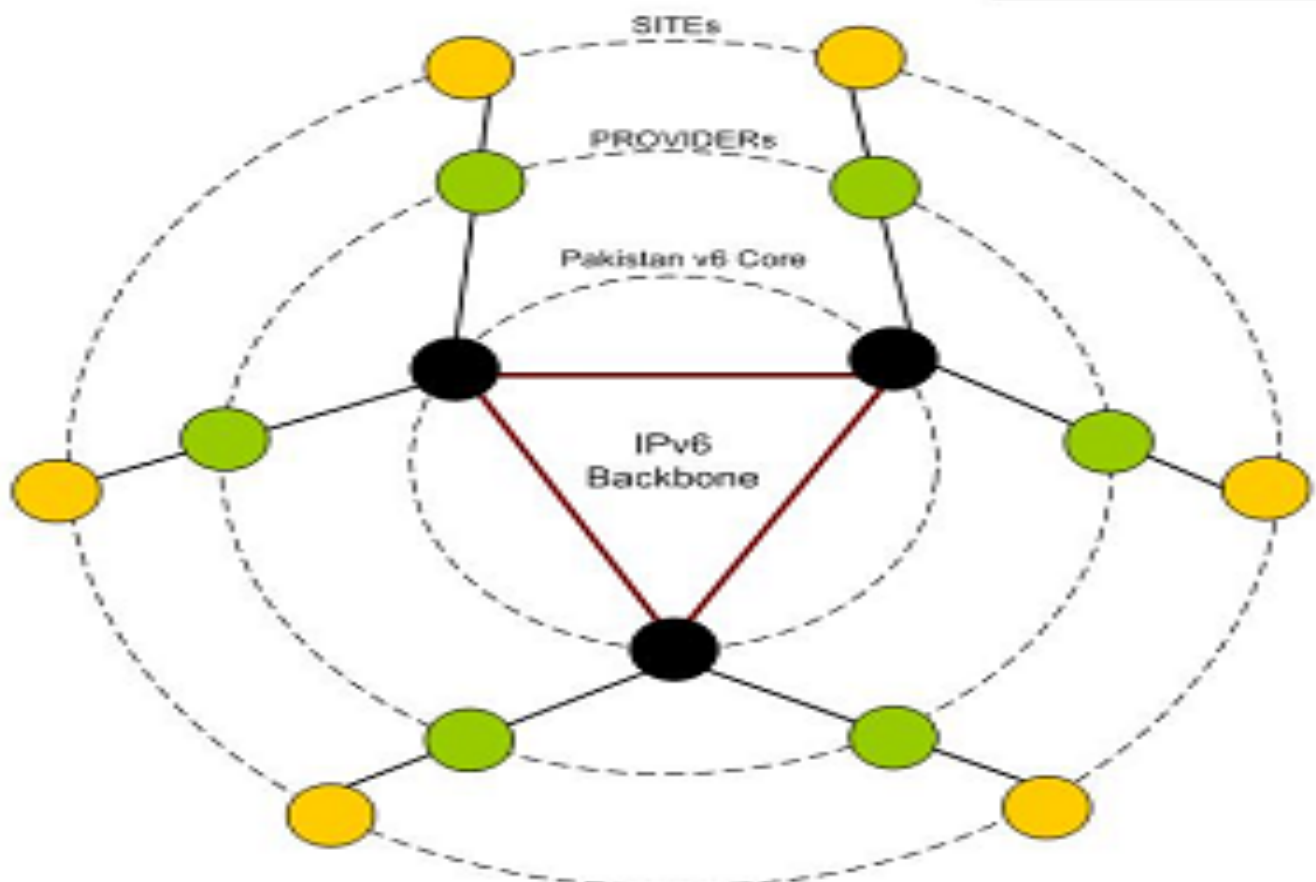
- ▶ 6Core stands for "IPv6 National Core." which is the First IPv6 based project initiated by ISPs of Pakistan under the common platform of Pakistan IPv6 Task Force. The 6Core is a test-bed network that was started by CYBERNET, SUPERNET, DANCOM towards transition from IPv4 to IPv6.
- ▶ The 6Core project was started to enable various IPv6 testing as well as to assist in the transitioning of Pakistan ISP/NSP and other Enterprises' IPv4 networks into IPv6 Internet.
- ▶ It is managed on a collaborative, best-effort basis by its Nationwide ISP/NSPs, Educational institutes etc.



V6 Core Architecture



- Top Level Aggregators (TLAs)
- Providers Level Aggregators (PLAs)
- Site Level Aggregators (SLAs)

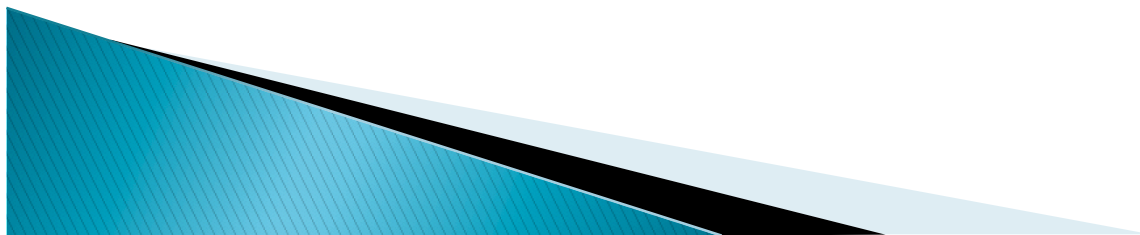


V6 Core Road Map

The proposed road map is in 5 phases initially.

Phase I:

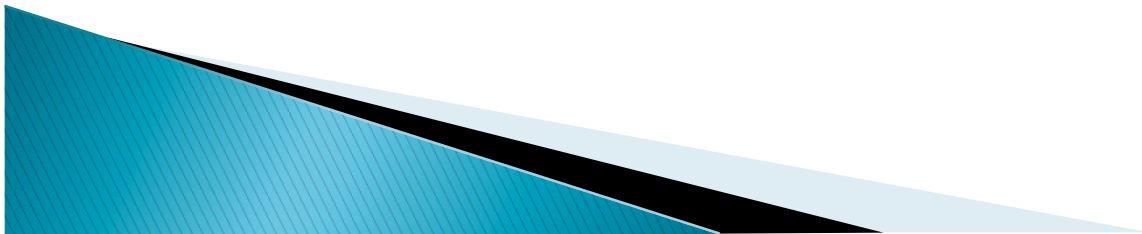
- ▶ Every ISP will initiate single IPv6 Tunnel with all other ISPs in Pakistan to establish IPv6 tunnel ring.
- ▶ Every ISP will advertise its /32 CIDR only (No v6 Transit services will be offered).
- ▶ IPv6 Tunnel will be used only for IPv6 traffic (unicast/multicast) only.
- ▶ BGP neighborhood will be created over National IPv6 tunnels.
- ▶ For international IPv6 traffic every ISP will forward it to their International IPv6 Tunnel provider.



V6 Core Road Map


Phase II:

- ▶ Every ISP will launch www6, DNS and FTP services over IPv6 in their Testbeds.
- ▶ Services like TFTP, Telnet and SSH, and DHCPv6 will be tested.
- ▶ ICMPv6 functions verification i.e. ICMPv6 Echo Request, Reply and Redirect, ICMP "hop limit exceeded," Neighbor Unreachability Detection, Path MTU Detection and Fragmentation/Reassembly, etc..



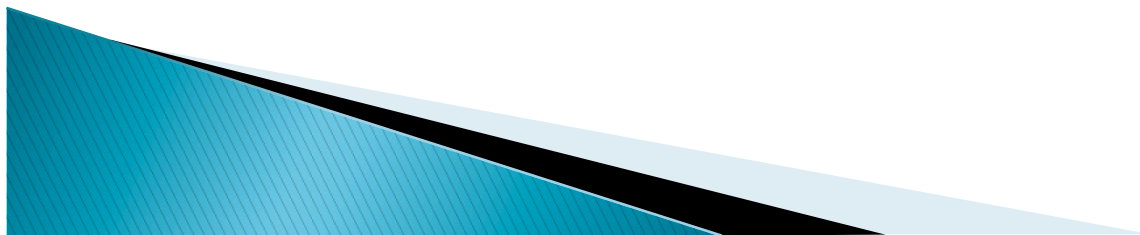
V6 Core Road Map

Phase III:

- ▶ Multiple v6 Tunnel between the ISP (base on major regions KHI/LHR/ISB only).
 - ▶ Every ISP will relax the prefix filter policy to /32 upto /48 to implement Multi-homed Traffic Engineering.
 - ▶ Routing Protocol performance “OSPFv3, ISIS and BGP4+” will be tested.
 - ▶ Different Tunnel scenarios i.e. static tunnels, 6to4, ISATAP, Teredo and Tunnel Broker will be tested.
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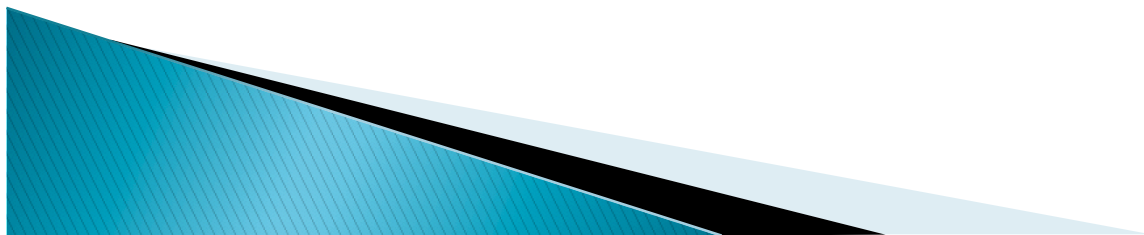
V6 Core Road Map

- ▶ There were many phases in the road map but somehow we never went ahead of Phase II and Phase III.
- ▶ So, what went wrong?
 - Gap in understanding between front line engineers and decision makers.
 - Lack of support/interest from Govt. functions and regulators.
 - Lack of support/interest from academia specially HEC-PERN
 - Failure to create a business case. No user is asking for IPv6.



V6 Core Road Map

- ▶ Crunch line to move forward:
 - IPv6 is the only technology available to serve the long term solution for Internet.
 - It is not perfect, its not backward compatible and it DOES NOT work with IPv4.
 - BUT, it does work ALONGSIDE IPv4 through co-existence and transition.



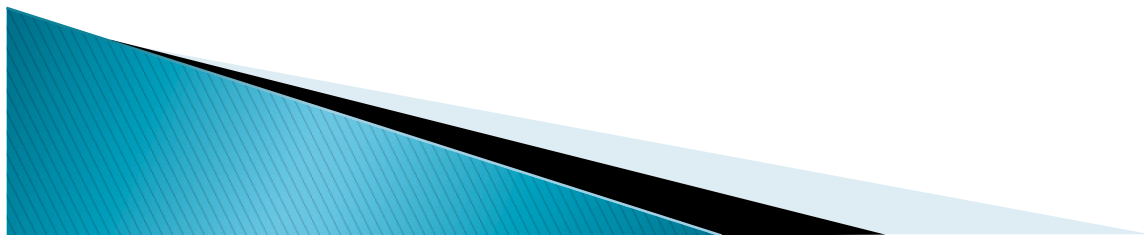
IPv4 to IPv6 Transition

- ▶ Since the IPv6 only networks are rare and working in isolation. Therefore, to reach IPv6 Internet from IPv6 host there should be certain transition methods
- ▶ Transition approaches:
 - IPv6 only i.e. Native v6 in Parallel
 - Dual Stack
 - Tunneling
 - Translation

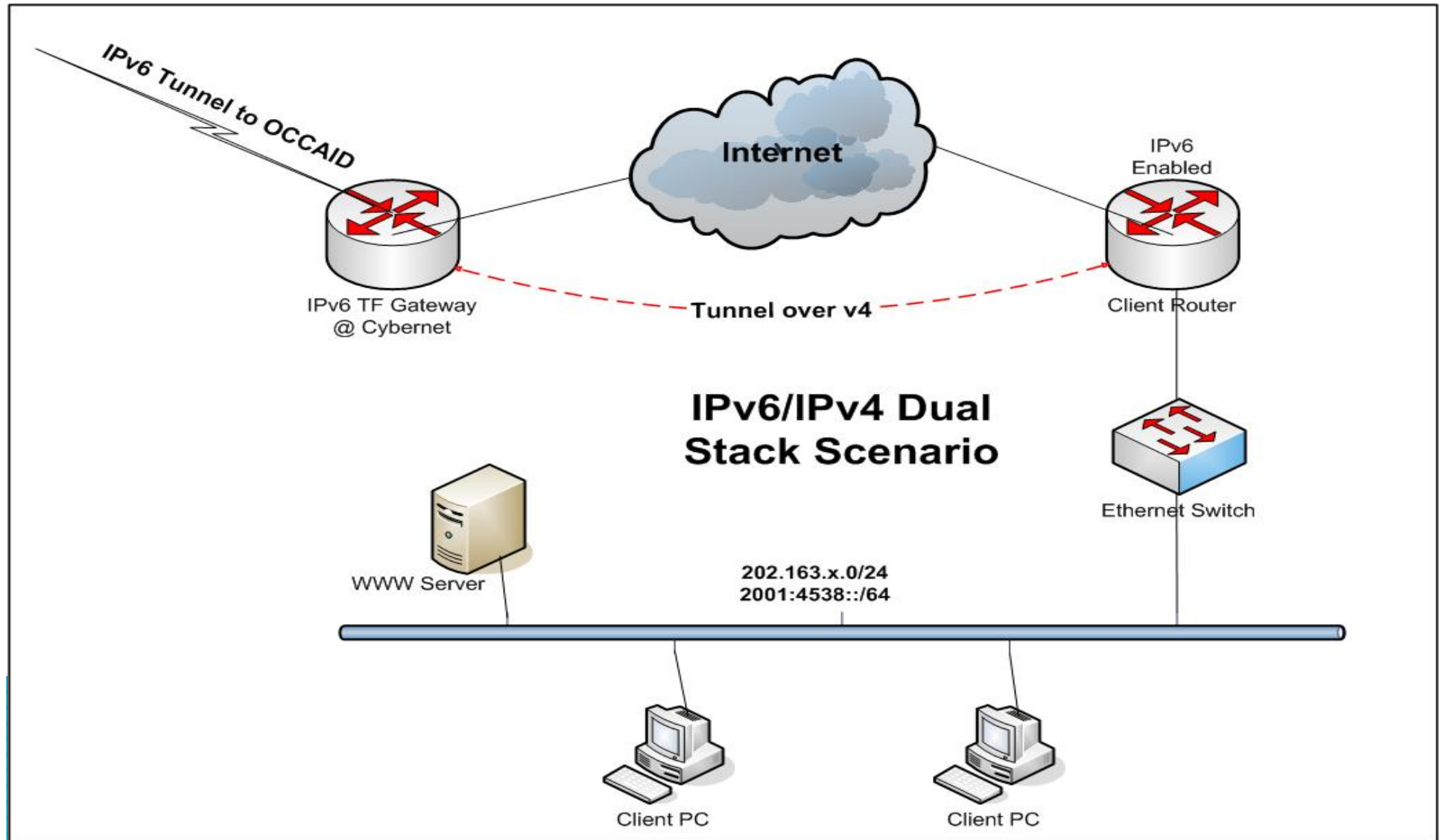


We are already late!

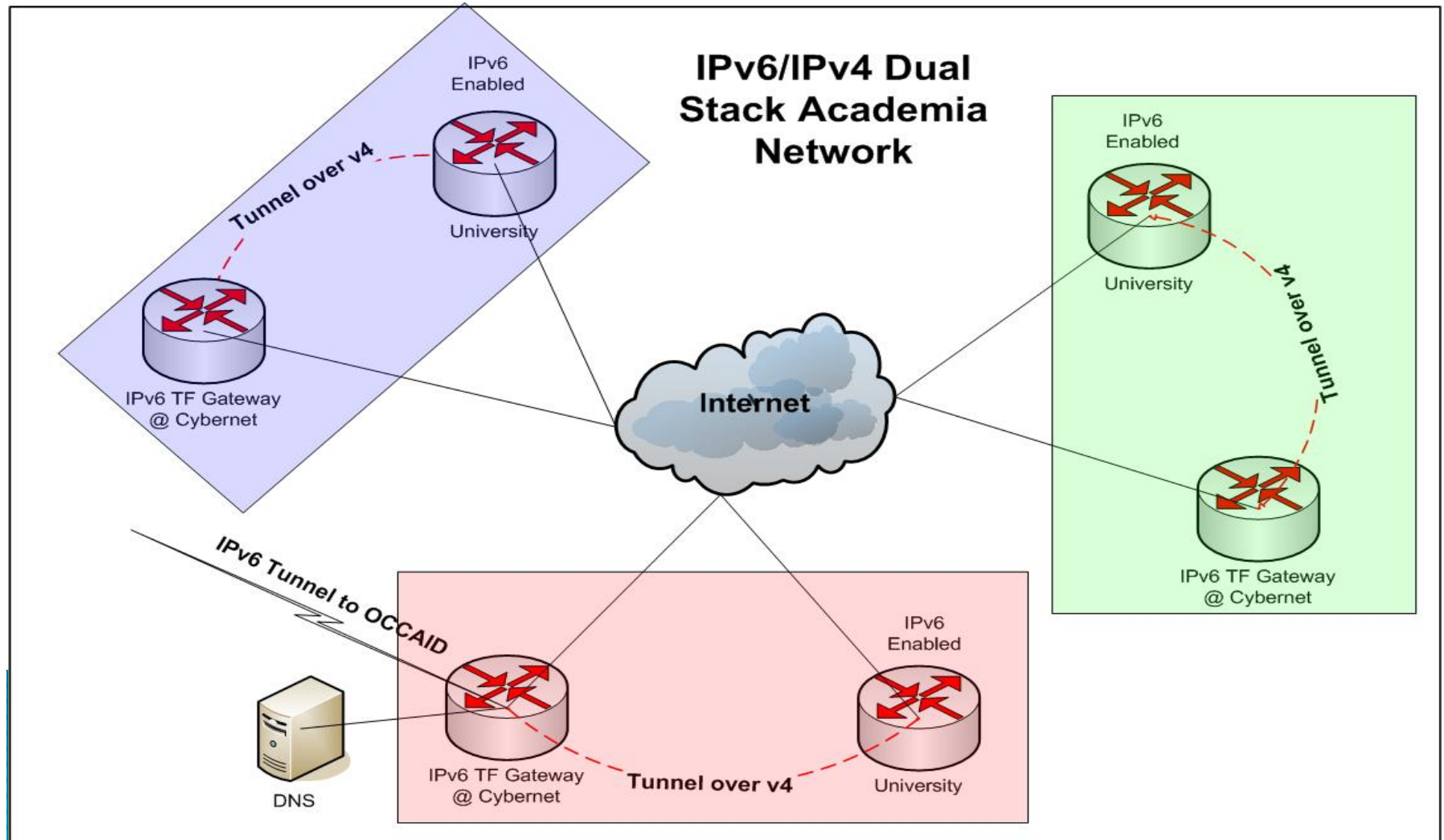
- ▶ A planned rollout in an average moderate network environment could take 2 years.
- ▶ If you are still looking for a business case than imagine Internet with NAT only.
- ▶ The sooner you start, the more time you have to test the network.
- ▶ Start conserving your IPv4 addresses for rainy days.



Starting Point

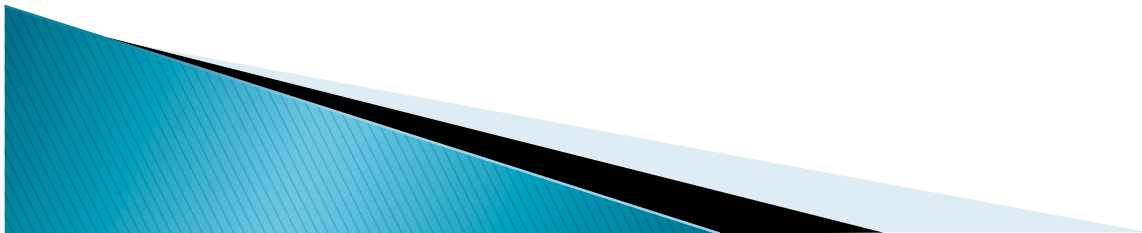


Academia Partnership

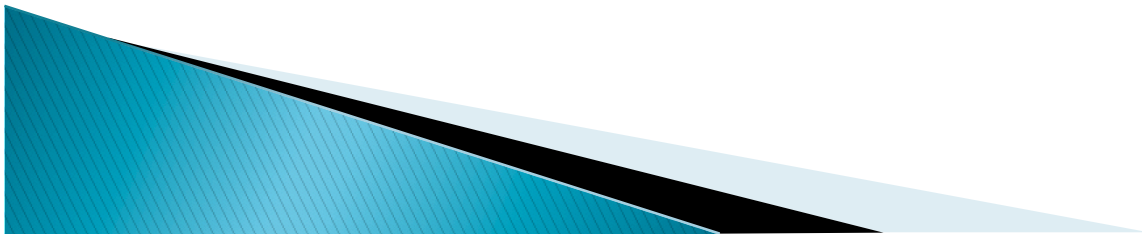


How we are helping?

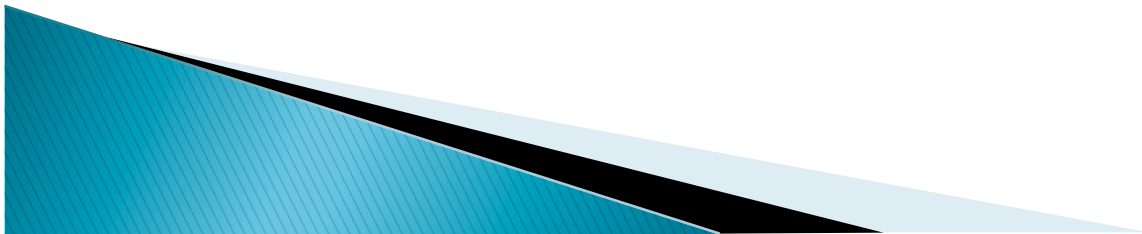
- ▶ IPv6 Task Force is doing IPv6 awareness seminars and lectures in universities.
- ▶ IPv6 Task Force is helping enterprises and academia to setup networks and labs.
- ▶ IPv6 Task Force provides IPv6 prefixes assigned by Cybernet.
- ▶ We are working on a complete IPv6 task force portal with all the desired resources
- ▶ Operational experience with transitional technologies is minimal. There are more questions than answers. We know few answers.....



We Need Your Support!



Any Questions.....



Thank you..

▶ Related Links

- IPv6 Task Force Pakistan www.ipv6tf.org.pk
- Tunnel Broker www.he.net
- APNIC IPv6 Program www.apnic.net/community/ipv6-program
- IPv6 Forum www.ipv6forum.org

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