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IPv6 deployment including Mobile Platform

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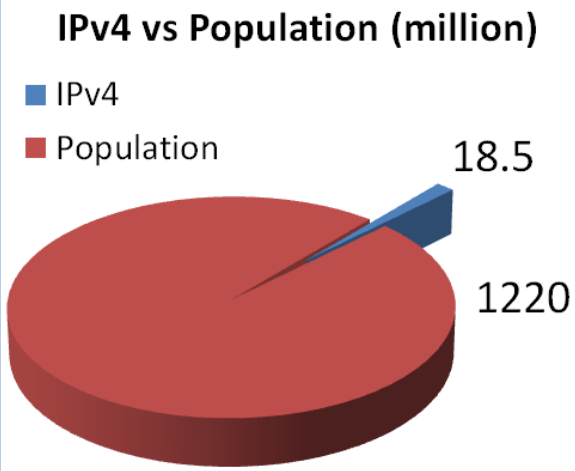
AGENDA

- IPv6 adoption is critical
- IPv6 Challenges
- IPv6 Drivers
- Mobile Platform Transition
- TCL IPv6 Readiness
- IPv6 World Day & Status

IPv6 adoption is critical

Only 18.5 million IPv4 addresses for a population of 1.2 billion in India.

- **Population of India – 1.22 Bn**
- **Indian telecom sector highlights:**
- **Total Telecom subscriber base of 926.53 Mn as of 31st Dec 2011;**
  - **Wireless base at 893.84Mn**
  - **Wire line base of 32.69 Mn**
- **Urban tele-density – 161%; Rural tele-density – 36.56%**
- **Internet users in India – 112 Mn – Sep 11, 13% growth over Sep-10**
- **Broadband Subscribers – 13.30 Mn – Dec 2011**
- **Only 8% internet users access internet on mobile**
- **Yearly growth in broadband subscribers is 21.88% during the last one year (Dec. 2010 to Dec. 2011)**



Key Objectives of Proposed National Telecom Policy –'11

*"achieve **175 million broadband connections by the year 2017 and 600 million by the year 2020** at minimum 2 Mbps download speed and making available higher speeds of atleast 100 Mbps on demand"*
"substantial transition to new Internet Protocol (IPv 6) 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."

Challenges

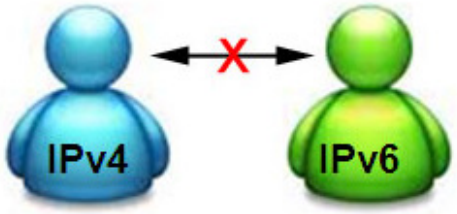
Exhaustion of IPv4 address space at the Regional Internet Registries (RIRs)

Transition Technologies like NAT44, NAT64, 6r, DS-Lite adds Network complexity and More Capex/Opex

Dual Stack will not solve IPv4 Exhaustion and still need more IPv4 address and handling two IP protocols.

NAT Solution creates Operational and User experience Issues

ISP / MNO – Current Problem on IPv6



v4 and v6 are not interoperable

IPv6 Readiness	
Function	Status
Network	
Servers Platforms	
IDC and CDN	
Client OS	
Games Console	
Browsers	
Application	
CPE	
Content	
Mobile Platform	

Less v6 Content available

Right v6 Strategy + Adoption ?

No Additional Revenue

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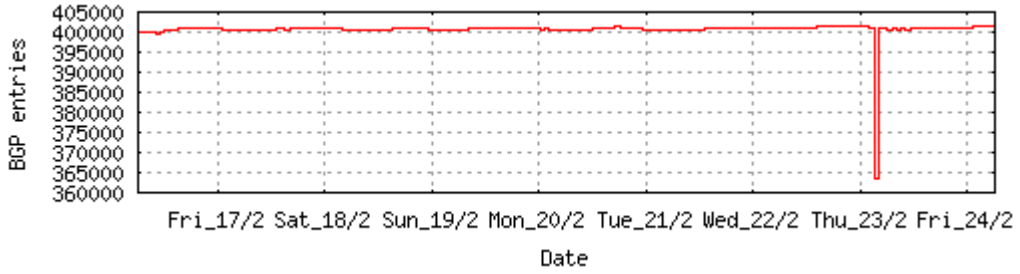
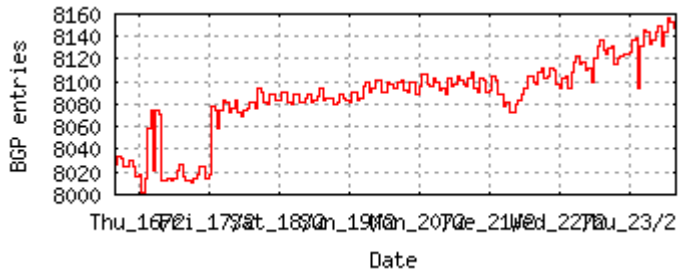
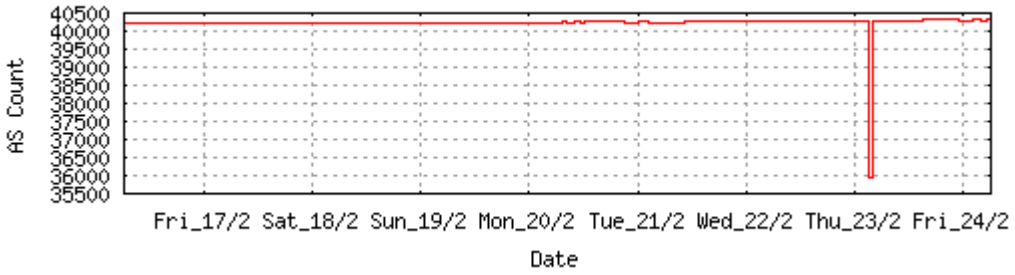
IPv4 / IPv6 Statistics

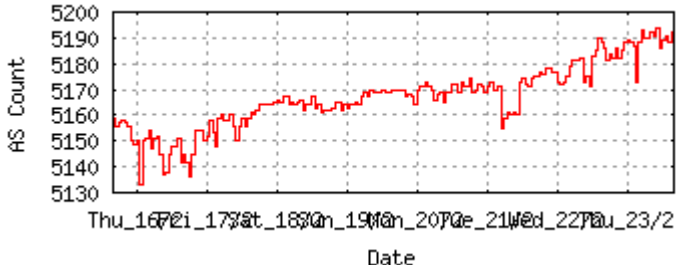
IPv4 Routes - 400000

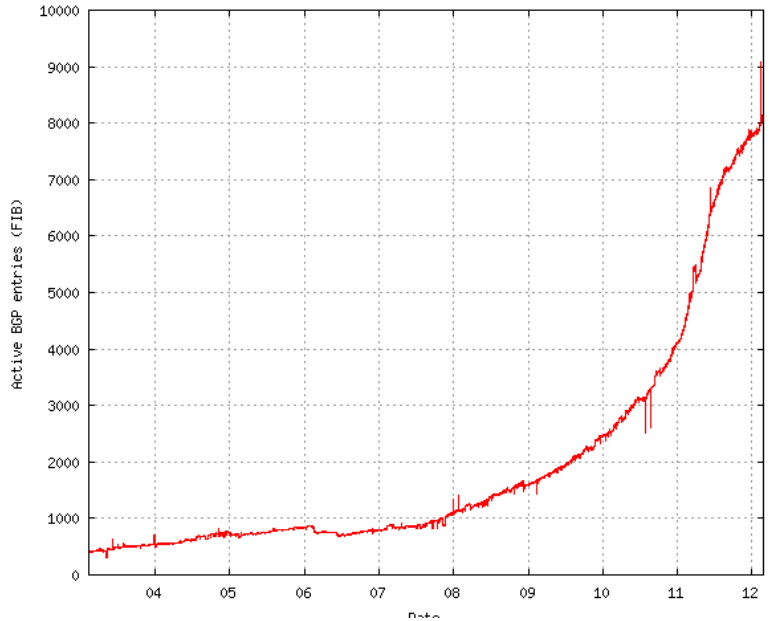


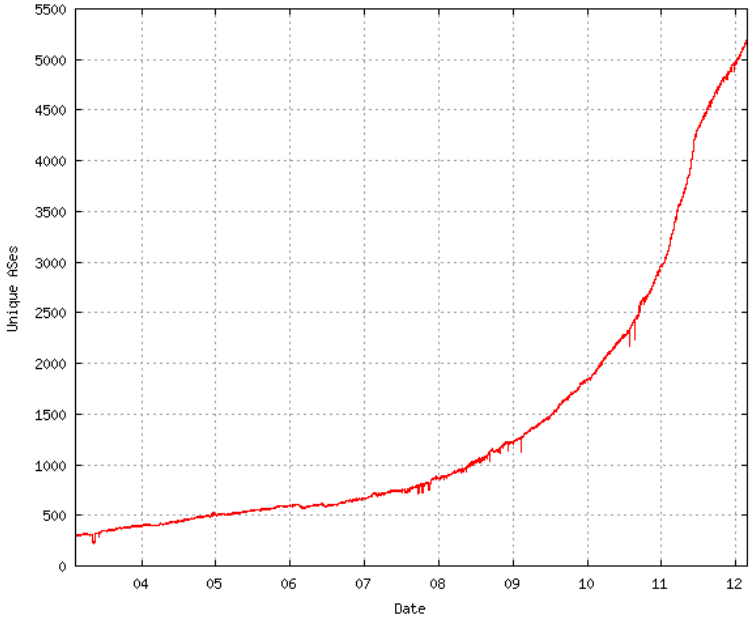
IPv6 Routes -8000











IPv6 Drivers and Extended Services

DRIVERS

- More Address Space
- Simpler Packet Header
- Flow-based QoS feature
- End to End Addressing
- Built in Security
- Enhanced Mobility
- Route Aggregation
- Auto Configuration
- Simplified Network Administration
- Built in Plug and Play
- Single Control Protocol – ICMPv6

EXTENDED SERVICES

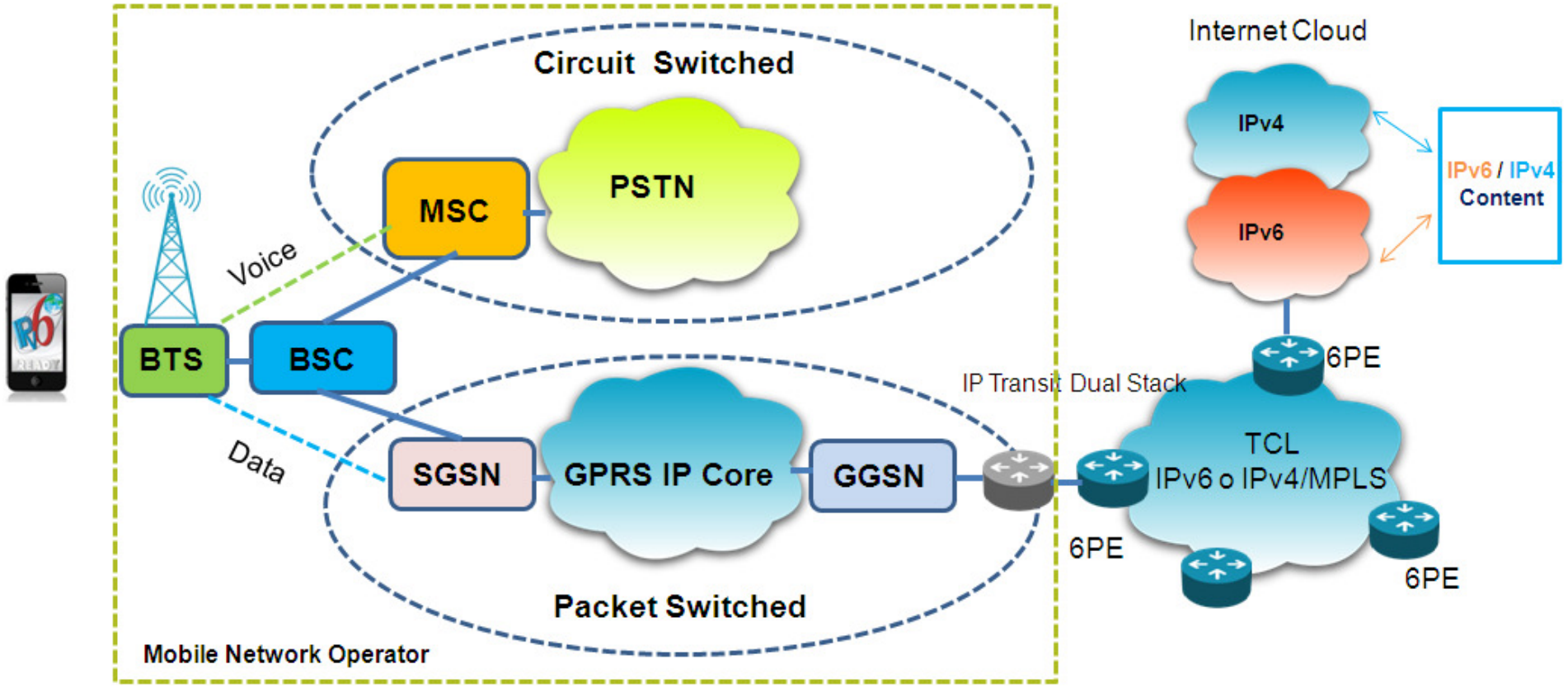
- Mobile Web/Data
- Mobile P2P
- Mobile VoIP
- Mobile Gaming
- Mobile Video
- Mobile M2M

IPv6 – Mobile M2M and Trends

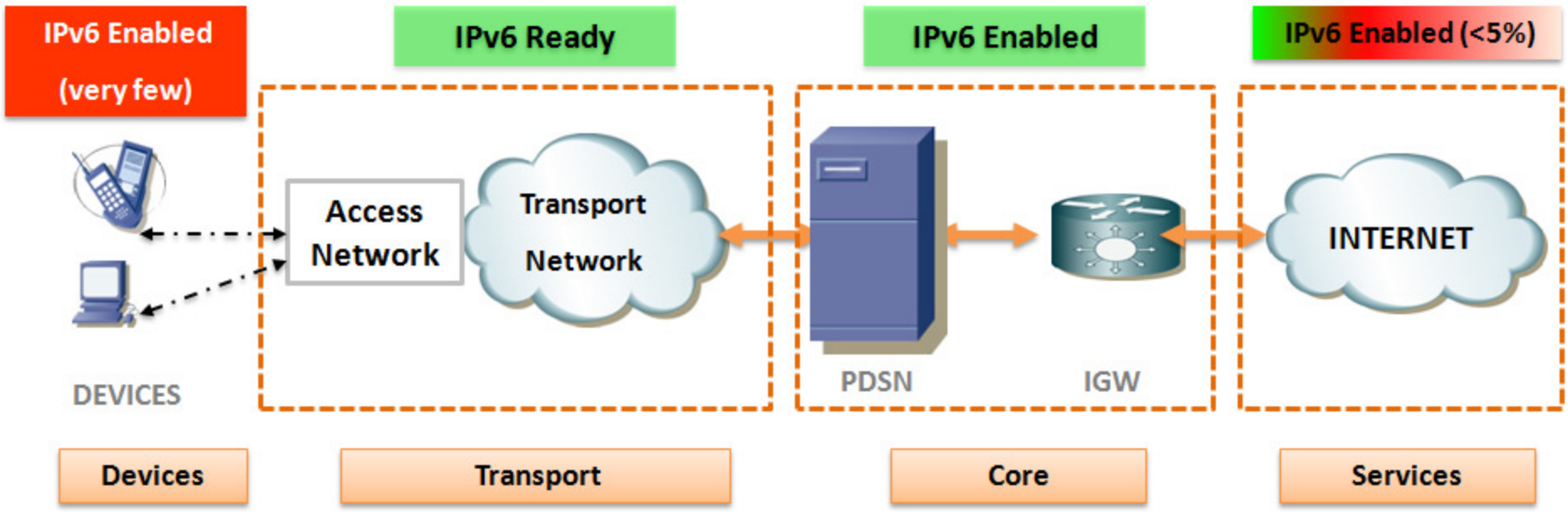
Mobile M2M - Wireless machine-to-machine communications
Machine to Mobile **e.g.** remote monitoring by the user
Mobile to Machine **e.g.** remote control by the user

- Security and surveillance for Business and Consumers
- Supply Chain , Inventory and fleet management
- Telematics - Trip assistance, navigation, and vehicle management
- Telemetry, Remote Monitoring/Control
- Sensing, Virtual Instrumentation
- e-Business and m-Business
- Mobile Learning, Education

Mobile Network – 2.5G + 3G Data Services



Mobile Network *(CDMA) - Status*



Network Readiness

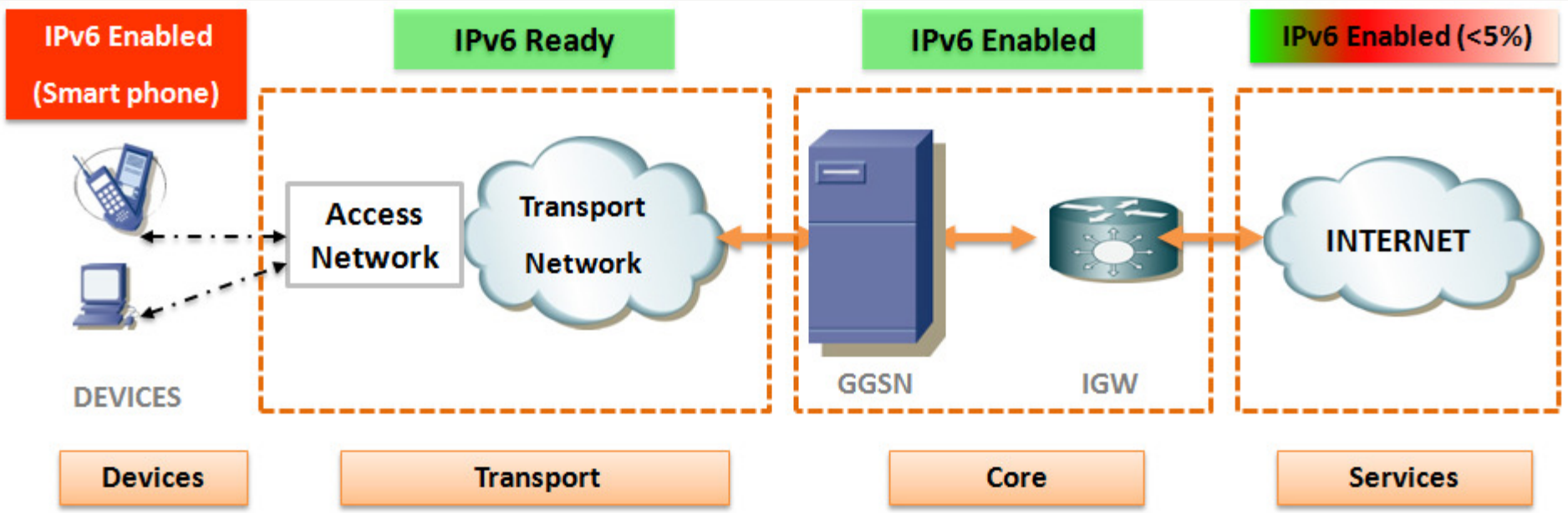
PDSN - Supports dual stack

Transport Network – IPv6 ready

IPv6 Service Testing

Successfully completed the testing of IPv6 content (internet access) using Dongle and windows 7 on Laptop.

Mobile Network *(GSM) – Status*



Network Readiness

GGSN - Supports dual stack

Transport Network – IPv6 ready

IPv6 Service Testing

Successfully completed the testing of IPv6 content (internet access)

- Using mobile phone.
- Using Dongle and windows 7

IPv6 deployment – *Challenges on Mobile Platform*

Device - GSM

- *Very few smart phone supports IPv6.*
- *For those devices also , forcing them to use IPv6 address is a challenge. By default IPv6 is not requested by device.*

Device - CDMA

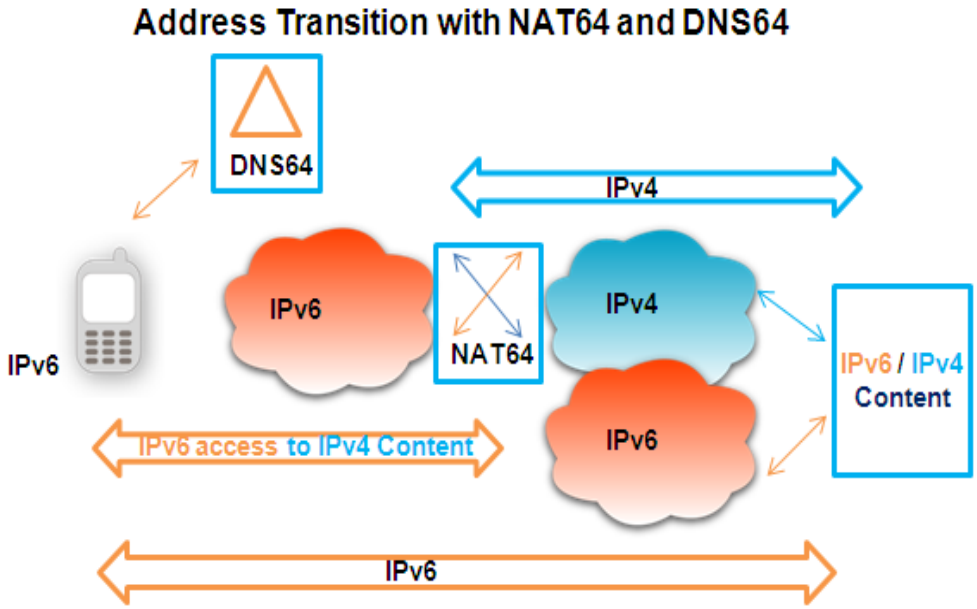
- *Most of the CDMA chipsets in the device do not support IPv6 stack*
- *Recently launched chipset support IPv6.*
- *By default this is not enabled. Need to work with vendor for enablement.*

Content

- *Very little content is available on the internet to for the subscriber.*

IPv6 Transition Solution for Mobile Network

IPv6 Address only User Equipment using NAT64/DNS64



Advantage

UE with IPv6 address only and no dependency on IPv4 addresses

NAT64/DNS64 is the most viable transition solution available moving to IPv6 and at same time access on IPv4 Content

Downside

NAT64 breaks some applications and these applications and contents are not IPv6 Ready.

Logging abilities to track port allocation and IP usage is must for compliance purpose.

Few IPv6 Handset available in market

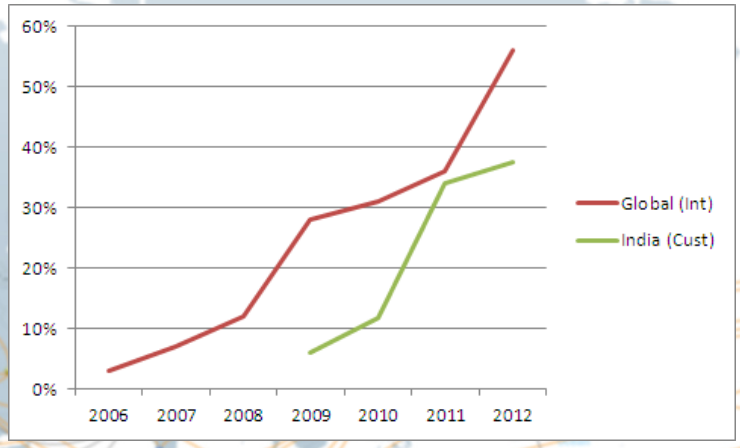
IPv6 Status Today in India

- Major ISPs in India are ready for IPv6 Services.
- IPv6 Penetration in India is less than 1%.
- Many ISPs lack the network infrastructure to handle IPv6.
- Access Infrastructure not IPv6 ready.
- IPv6 Penetration in Broadband /Mobile Internet is minimal.
- Minimal IPv6 Content available in India.
- IPv6 adoption in India is still very low however need to expedite the migration as IPv4 addresses are scares now.
- Most ISP still provides IPv4 Address
  - Customer not ready to upgrade infrastructure due to additional capex.
  - Lack of Training and Awareness
  - Need to remove legacy network and desktop assets
  - Lack of Low Cost IPv6 Compliant CPE Equipment.

TCL IPv6 Status

TCL Global IPv6 Service Overview

- Pioneer and world leader in IPV6 fully dual-stack
- Offering service since 2003
- 100% of PoPs are IPv6 ready
- 47% of customer interfaces are dual stack



TCL India IPv6 Service Overview

- Leading IPv4/v6 Service Provider with PE enabled with Dual Stack (6PE)
- Offering service since 2007
- 100% of PoPs are IPv6 ready
- IPv6 DNS Ready with Dual Stack in Nature
- v6 connectivity with NIXI.
- IPv6 connectivity with Top Customers

renesys | market intelligence IPv6

Dashboard | Registrations | Internet Index | Provid

India IPv6 Internet Index Ratings

IPv6 Customer Base

1		Tata Communications	6453
2		Tata Communications	4755
3		Hurricane Electric, Inc.	6939
4		Level 3 Communications, Inc.	3549
5	↑1	Tinet SpA	3257
6	↓1	TeliaNet Global Network	1299
7		BHARTI Airtel Ltd.	9498
8		PCCW Global	3491
9	↑1	Singapore Telecommunications Ltd	7473
10	↓1	DIRECT INTERNET LTD.	17820

TCL Participated in World IPv6 Day on 8th June 2011

World IPv6 Day

World IPv6 day, scheduled for 8 June 2011, is a global-scale test flight of IPv6 sponsored by the Internet Society. On World IPv6 Day, major web companies and other industry players will come together to enable IPv6 on their main websites for 24 hours. The goal is to motivate organizations across the industry -- Internet service providers, hardware makers, operating system vendors and web companies to prepare their services for IPv6 to ensure a successful transition as IPv4 address space runs out.

Tata Communication participated in this event as a Network Operator and provided all relevant Information to ISOC for getting listed in the ISOC's Website

PARTICIPATING WEBSITES

See below for other participating organisations

Show 100 entries Search: tata communications

Join Order	Participants	IPv6 Page	Participating Websites
113	Tata Communications		www.tatacommunications.com

Showing 1 to 1 of 1 entries (filtered from 434 total entries)

TCL role in pushing IPv6 in India (IPv6 Task Force of India)

- As per DOT Policy 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.

- TCL supported DOT to compile Questionnaire and responses on IPv6 Readiness and target dates for some network Infrastructure from various Service Providers (IT, CDN , Network Security, Broadband Network , OSS/BSS, Email Service) transition to IPv6.

- India IPv6 Task Force formed 9 Working Groups where India6 Network working group lead by Tata Communications Limited.

1. Training & Awareness
2. Standards & Specifications
3. India 6 Network (TCL is Leading this Task Force)
4. Experimental IPv6 Network
5. Pilot Project
6. Application Support
7. Knowledge Resource Development
8. IPv6 Implementation in the Government Network
9. Network Security Group

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