

# **MIGRATION to IPv6**

## **MTNL PLAN & PERSPECTIVE**



## **MTNL RESPONSE TO TRAI RECOMMENDATIONS ON IPv6 (JUNE, 2006)**

- (a) IPv6 migration is a complex issue and need joint effort.**
- (b) Deptt. of Telecom/Deptt. of IT/Govt. should initiate to set up IPv6 test bed.**
- (c) Set up National Internet Registry.**
- (d) Conduct training and awareness programme.**
- (e) Upgrade cost do not allow one time up gradation and life cycle upgrade is the feasible option.**

## **IP BASED NETWORK/SERVICES INFRASTRUCTURE IN MTNL**

- **ISP PoPs, Internet access.**
- **MPLS, L2/L3 VPNs, Multicast, QoS.**
- **Broadband access – XDSL, Metro Ethernet, 3G.**
- **Wireless – Network, 3G services, GPRS.**
- **NGN (C4)**
- **CPEs – DSL CPEs, STBs, IP phones, Soft Clients.**
- **OSS/BSS : DNS, DHCP, AAA (RADIUS), NMS, PMS, WSC, Billing & CRM.**
- **Services : IPTV, VOIP, VASs.**

# IPv6 MIGRATION CHALLENGES

- o **How to define IPv6 migration Timeframe/Roadmap.**
  - **IPv4 based equipment still being manufactured /supplied.**
- o **How to test / assess the equipment / services for**
  - \* **Conformance - to IPv6 features & protocols.**
  - \* **Performance - throughput, latency, packet loss / resources required for IPv6.**
  - \* **Security**
  - \* **Mobility**
  - \* **Interoperability**
- o **How to evaluate IPv6 effect in terms of costs involved / ROI and disruption etc.**

# IPv6 MIGRATION PLAN

- o IPv6 Procurement Plan.
- o IPv6 Deployment strategy.
- o Networks/Services component testing.
- o Network & Service Integration.

- Exceptional strategy.
- Integration Plan
- Security Plan finalization.
- Actual Implementation.

***IPv4 and IPv6 to co exist for some time and migration to happen only as life cycle upgrade of the products***

# IPv6 PROCUREMENT PLAN

**MTNL had decided (>3 years back) that all hardware, software, and Application being procured, shall be IPv6 compliant and accordingly adhering to it for all procurements:**

- o How to ensure?**
- o Requires mandate for the vendors.**
- o Requires incentive such as tax relief to vendors to manufacturer IPv6 compliant hardware/software/application.**

# IPv6 DEPLOYMENT STRATEGY

## Architectural Solutions:

- Native IPv6.
- Dual Stack.
- Tunnelling.
- Protocol translation
- 6PE, 6VPE.

***“MTNL to finalize after assessment/testing of the assessment of available features on Edge & Core routers and access NW components”***

# TESTING

## □ Testing for -

- Conformity – to IPv6 technology and protocols.
- Performance – i.e. throughput, latency, packet loss /processing and memory requirement etc.
- Security, Mobility, QoS requirements.
- Inter-operability.

## □ Components to be tested -

- Edge routers and core routers
- Components of access network and other NW islands.
- Application software and services.

***\*Test Bed Required.***

# IP ADDRESSING

- Obtain IPv6 Address Block/IPv6 suffix from the centralized (national/Regional) Internet Registry.

*Set up National Internet registry ?*

- Develop Addressing Plan and formulate Address Distribution mechanism to customers.

## NETWORK & SERVICES INTEGRATION

- Analyse various Network/Systems and services for IPv6 compliance and migration roadmap.
- IPv6 exception strategy – identification of components (HW/SW/Services) that will remain IPv4.
- Integrate progressively the existing/new IPv6 compliant network Island(s) with IPv6 compliant, Transport N/W

***High level analysis of N/Ws/services for IPv6 compliance and identification of components that will remain IPv4 is underway - migration to IPv6 only as the life cycle upgrade***

# SECURITY PLAN

➤ Access IPv6 security requirements & finalize Security Plan.

➤ Security requirements.

○ Does the NW support IPv6 based slated reference extended ACL.

○ Server connectivity e.g

- Support IP Sec.
- Protocol authentication for OSPF V.3
- IPv6 IP Sec terminal, router-to-router.
- IPv4/IPv6 Encryption Hardware adapter.
- Mobile IP authentication.

○ IPv6 Firewall

- Does the FW support IPv4/ IPv6.
- Does NIDS/NIPS support IPv4/ IPv6.
- Security Application.

***TEST BED REQUIRED***

## HIGH LEVEL NW/SERVICES ANALYSIS

### MPLS TRANSPORT (CORE & AGGREGATION)

<b>PE &amp; P routers</b>	<b>:</b>	<b>IPv6 compliant (to be verified).</b>
<b>Aggregation/CE routers</b>	<b>:</b>	<b>IPv6 compliant (to be verified)</b>
<b>eMS/NMS</b>	<b>:</b>	<b>To be tested for IPv6 compliance &amp; interoperability / to be upgraded required</b>

# ISP NETWORK

- Gateway Router : IPv6 compliant (to be verified)
  
- Web Server/Caching Server : To be verified/ upgraded.
  
- Messaging/ Security/ Firewall/ DNS : Under replacement by IPv6 compliant Hardware/ Software as part of planned upgrade.
- ISP/LL routers/ switches :
  
- Narrow band RAS : Shall remain IPv4 island

*ISP NW to evolve to support both IPv4 and IPv6 versions at the same time ( dual stack approach )*

## **BROADBAND ACCESS (xDSL & Metro Ethernet)**

- BRAS, Tier 1 & Tier 2 switches, MES, ME-CPEs** : **IPv6 compliant (to be verified)**
- DSLAM & DSLAM CPEs** : **To be verified for IPv6 compliance else shall remain IPv4 island and tunnelling used in access.**
- eMS & NMS system** : **IPv6 compliant (to be verified)**
- Policy Control (SSSC)** : **To be upgraded to IPv6.**

## WIRELESS BROADBAND

- (a) **Soft Switch (3G)** : To be tested for IPv6 compliance else upgraded to IPv6 / retained as IPv4 islands and replaced as life cycle upgrade of their networks/systems.
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- TMG/SGW  
GGSN (GPRS)** : To remain as IPv4 islands.  
GGSN to be replaced as life cycle upgrade
- (b) **CDMA (PDSN)** : To remain as IPv4 islands

## NGN (C.4)

**Soft-switch and other components.** : **To be tested for IPv6 compliance & upgraded to IPv6 if required.**

# VOICE OVER IP (VOIP)

## IPv6 Readiness for –

**SIP Server**

**To be ensured from  
Service Partner.**

**OSS – DHCP, DNS, NMS :**

**To be ensured from  
Service Partner.**

**BSS :**

**Convergent Billing to be  
used after due testing.**

**IP Phone / PC Soft client :**

**?**

# IPTV

## IPv6 readiness for –

- o Head End. Equipment : Service Partner to ensure.
- o Metro Ethernet, XDSL, access and CPE / STB : To be verified for IPv6 compliance else shall remain IPv4 island and tunnelling used in access.
- o OSS / BSS : Convergent Billing & CRM to be used after due testing and integration.

# OSS/BSS MIGRATION PLAN

- o AAA for dial-up & Broadband on IPv6. : Upgrade to IPv6 compliant system.
- o Mediation/ Billing/ Provisioning/ CRM/Web Selfcare,. : Migration to/use of Convergent Billing & CRM system test upgrade.
- o DNS (which understands IPv4 A record and IPv6 AAAA record) : To be Upgraded
- o Legal Interception. : To be assessed and upgraded.
- o Policy Control (SSSC) : To be upgraded.
- o NMS to be tested and evolution planned to cater for following :
  - Network Management evolution needs to be done before IPv6 deployment strategy.
  - System / Application / Protocol to be considered.
  - In a Dual Stack Network, both IPv4 & IPv6 environment must be managed with best optimization to decrease cost of operation.

# SUMMARY

- *Defining Migration Roadmap is a challenge - availability of IPv6 compliant equipment is still issue. Supply of IPv6 compliant equipment (from a given date) should be mandated.*
- *IPv6 Test bed - Deptt. of IT / DOT (TEC) / Govt. to take up challenges.*
- *Setting up of National Internet Registry – Govt / DoIT to decide*
- *IPv6 address allocation – Govt. / DOIT to take challenge.*
- *IPv6 Awareness & Training Programmes – need to be conducted.*
- *MTNL shall upgrade Network/system components only as life cycle upgrade.*



**THANK YOU**