"Enabling NGN regulatory Ecosystem for a Developing Country– India"

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Broad ICT Statistics-India
(March 2007)

1) Population- 1.1 billion
2) Fixed Teledensity – 3.6 (40 million nos.)
3) Mobile Teledensity – 15 (165 million nos.)
4) Overall Teledensity- 18.6 (205 million nos.)
5) Internet Connections- 9 million (36 million users @ 4 users per connection)
6) No. of PCs- 20 million
7) No. of TVs- 100 million
8) No. of Cable TV Connections- 65 million
9) International Connectivity- 650 Gbps/18.6Tbps (Designed)
10) National connectivity- 10 Gbps (6.7 Lakh Kms)
11) Broadband Connection (>=256 Kbps) – 20 lakhs
12) International Gateways for Submarine cables - 8

Categories of Telecom Licenses-Service specific

i) Access Providers (APs) ----- (Access to Customer/ Local Service)
- Fixed Service Providers/ Basic Service Operators (BSO)
- Cellular Mobile Service Providers (CMSP)
- Internet Service Providers (ISP)
- Cable TV Operators (CaTVO)

} Combined as Unified Access Service (UAS) since Oct'03

ii) Long Distance Operators -----(Long Distance telecommunication)
- National Long Distance Operators (NLDO)
- International Long Distance Operators (ILDO)

iii) Infrastructure Providers ------(Infrastructure to the Licensed Telecom Service Providers)
- Infrastructure Provider Category –I (IP-I)
- Infrastructure Provider Category –II (IP-II)

} To migrate to NLDO

iv) Value Added Service Providers -(Other than Access & Long Distance Services)
- Public Mobile Radio Trunking Service Providers (PMRTS)
- Paging Service Providers (PgSP)
- VSAT Service Providers (VSATSP)
- Voice Mail/ Unified Messaging Service Providers (VMSP/ UMSP)

v) Other Service Providers (OSP) -----(Other than all above, Non-facility based Operators)
- ITES, Call Centres,BPO
- CUG (Closed User Group)
- Emergency Communication Services
- Tele-medicine, Tele-health, Tele-education etc.

vi) Broadcast Services
- Radio & TV Broadcast (FM, Terrestrial TV etc.)
- DTH
- Cable TV

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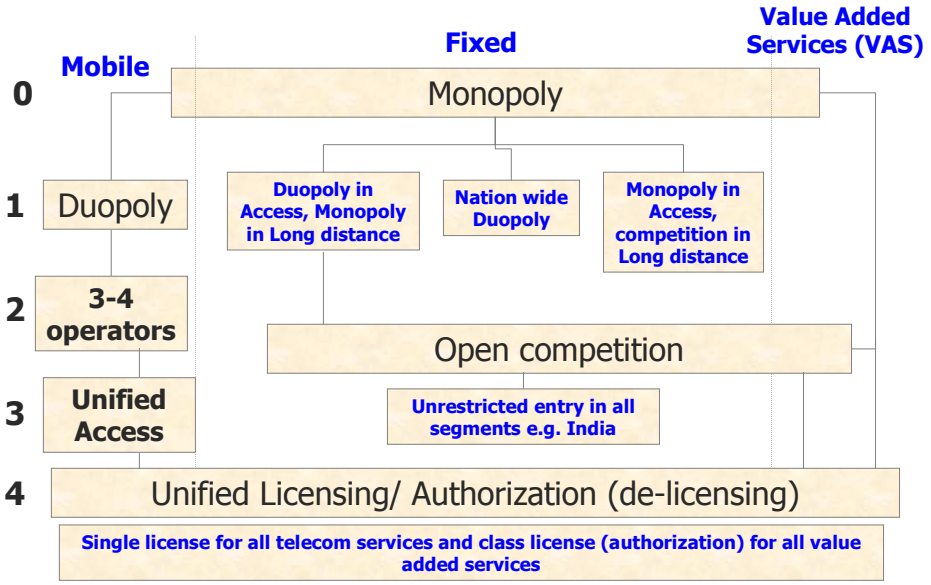
Promoting Competition in Phases



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NGN India – A SWOT Analysis

- Strength of present network and framework
- Weaknesses (Perceived)
- Opportunity/ Benefits
- Threats/ Risks

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Strength of present framework and network

- Open unrestricted competition in all segments (including mobile)
- Access service provision unified (broadband, triple play, internet telephony permitted in addition to voice, fixed/ mobile/ WLL)
- General technology-neutrality (technology option left to operators)
- General tariff forbearance (Except leased lines where competition is not considered enough)-lowest tariff in world
- Broadband policy in place (Govt's mission to accelerate access)
- Access network dominated by wireless (160 million out of 200 million)
- 6-7 million telephone additions per month
- 65 million cable TV homes and 40 million wireline
- Proactive regulator (initiatives on emerging issues like IP based networks, IPv6, unified licensing, convergence etc.)

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Perceived Weaknesses

- Multiple regulatory agencies - licensor (DOT), spectrum management (WPC), technical regulation (TEC), interconnection, tariff & QOS regulation (TRAI), dispute settlement (TDSAT)
- Legacy interconnection regime (Usage and minutes based)
- Non-engineered, unidirectional CableTV infrastructure
- Value-added service providers/ Application Service providers (OSP)not treated as interconnection entity

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Opportunity/ Benefits

- **Large unmet demand for telecom services (telephony tele-density– 18%, Broadband penetration - 0.2%)**
- **Mobile coverage only 35% (semi-greenfield environment to expand)**
- **Rationalization of network resulting into simplicity and reduced OPEX**
- **Network expansion by using future proof technology (NGN)**
- **Establishing the ground rules for NGN in advance**
- **Involvement of industry in various issues fully in a pro-active manner**
- **Learn from the experiences of developed countries**
- **Be a part of NGN pioneers for the region (Asia-Pacific)**
- **Bring triple play services to rural area at affordable price (bridge digital divide)**

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Threats/ Risks

- **Standards and interoperability issues yet to be settled**
- **Technical challenges in Emergency access/ Security monitoring**
- **High CAPEX without corresponding increase in ARPU**
- **Project oriented risks due to huge scope and costs in migration**

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Driving forces for NGNs

Developing Countries including India

- **Operational cost savings, new services for increasing ARPU**
- **Predominantly mobile users, less investment in legacy infrastructure, new services**
- **Low tele-density and Broadband penetration**
- **Address space limitations,**
- **Government's / Regulator's NGN initiatives**
- **Increased roll-out of new networks in the countries in economic transition**

Source: ASTAP05-FR10-PL-30

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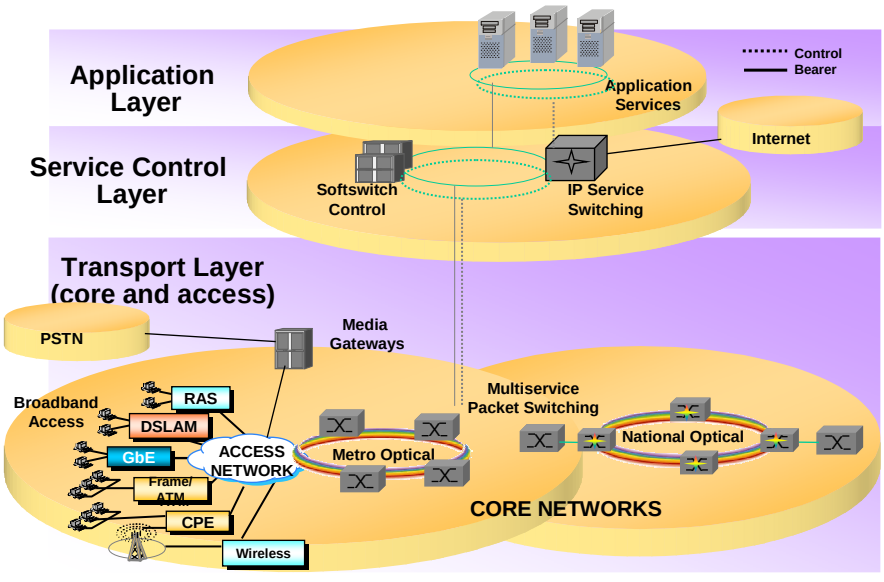
NGN – a layered architecture distributing intelligence at every layer



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NGN Regulatory Challenges

As per ITU:-

"The move to NGNs represents an opportunity to establish in advance ground rules for ensuring the continued passage to effective competition and minimise damage during transition".

It is in contrast to the regulation of the legacy network, which came after the networks were actually in place. That is why, NGN is different.

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NGN Regulatory Challenges (Cont'd)

Regulatory concerns

(i) Death of distance and blurring of the traditional boundaries between Access (local) providers and long distance carriers.

(ii) VOIP as a "disruptive technology" putting a challenge for the regulators to perform a balancing act in maintaining level playing field.

(iii) On-going technological developments causing drastic impact on the telecom scenario forcing a re-look at the service based licensing and geographical area based regulatory regime including Numbering systems.

(iv) Level playing field issue between the licensed telecom operators and value added service providers.

(v) Need for new interconnect products based on capacity and quality (V&V) in place of those based on distance and duration (miles & minutes).

(vi) Access to emergency services like police control room, fire services, medical help etc. (PSAP, E 911 (US), 999 (UK), 100 (India))

(vii) Security monitoring like legal interception & monitoring (LIM), wiretap, CLI etc.

Requirements of Next Generation Licensing and Regulation

- **A converged regulator (single regulator for Telecom, IT & Broadcasting)**
- **A single technology-neutral, service-agnostic license (one license - one network – all services)**
- **A capacity based and open access Interconnect regime**

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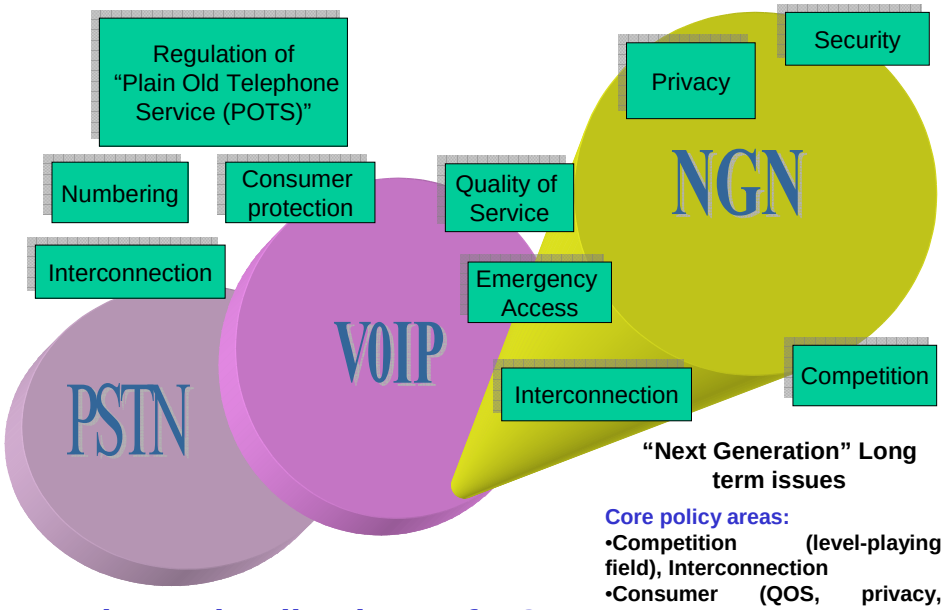

Regulatory implications of NGN

Source: ASTAP05_WS.IP&NGN-09

"Next Generation" Long term issues

Core policy areas:

- **Competition (level-playing field), Interconnection**
- **Consumer (QOS, privacy, emergency access)**
- **Security & legal interception**

Scope for light-touch regulation

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NGN Consultation Process – India

Findings from Public Consultation

- **Lack of awareness about NGN and need for training/ educational programmes**
- **Lack of enough infrastructure for considering any service based competition**
- **Need for a single license to provide all services (data, voice, broadcast through same network)**
- **Need for detailed consultation on interconnection issues and QOS regulation in NGN environment**
- **Need for accelerating the Broadband penetration for access migration**
- **Need for deliberations on technical and standardization issues with special reference to interoperability, emergency access and legal interception and security monitoring**
- **Need for cross-industry collaboration under the aegis of regulator to deliberate upon time table for NGN migration as well as interconnection issues**

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Major operator's approach towards NGN

Five-fold Migration Approach

- Create nationwide IP-MPLS backbone network (fiber-based) (5,00,000 Km)
- Create access agnostic Metro Area Networks (MAN) (subscriber access capable of convergent voice, video and data services over DSL, Optical Ethernet and Wireless technologies)
- Implementation of VOIP based Class 4 services (packetize junction traffic of TAX)
- Implementation of Class 5 services over packet network (subscriber services)
- Offer Multimedia/ Triple play services including VOIP to Broadband subscribers

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Unified Licensing Regime- An Enabler for NGN

Three categories of licenses:

1. **Unified License** - All Public networks including switched networks, irrespective of media and technology, capable of offering voice and/or non-voice (data services) including internet telephony. Examples: Unified Access Service, NLDO, ILDO, Internet Telephony, Broadcast (eg. DTH, FM Radio, TV Broadcast).
2. **Class License**- All services including satellite services which do not have both way connectivity with Public network. This category excludes Radio Paging and PMRTS Services and includes Niche Operators. (The concept of niche operators is being included to promote growth of telecom services in rural/remote/backward areas from teledensity point of view). Examples: VSAT, Niche Operators.
3. **Licensing through Authorisation** - Services for provision of passive infrastructure and bandwidth services to service provider(s), Radio Paging, PMRTS and Internet including existing restricted Internet telephony (PC to PC, IP device to IP device using lease line only and PC to phones-phones outside India only).

Unified Licensing Regime (Cont'd)

1. Licensing Category: - "Unified License" (A master license)
2. Types of service: - All telecom services including Basic, Cellular, Unified Access Service, NLD, ILD, GMPCS, Broadcasting Services, Internet Telephony, etc. and all services covered under "Class License" and 'Licensing through Authorisation'.
3. Registration Charge (Entry Fee): - Registration charges - Rs. 5 crores plus a function of BSO's (entered in/ after 2001) entry fee depending on the Service area(s)/ Circle(s) where the Unified Licensee wishes to offer access services.

   Rs. 5 crores -combined value of NLD +ILD entry fee.

   The total registration charges shall be gradually reduced from the recommended level to Rs. 30 lakhs after 5 yrs.
4. License Fee: -Same as Class license
5. Bank Guarantees: - Performance Bank Guarantee (PBG) for Unified License will be as per UASL. For NLD/ ILD operators and UALs who do not migrate to Unified Licensing Regime, the existing PBG shall continue.
6. Service Area: - National level or circle level (same as in UAS regime).
7. Roll- out obligations: -For access services: UASL rollout obligations.

   For National long distance services, the licensee shall make an arrangement to pick up/ handover long distance traffic of his subscribers in all service areas. Inter- service area traffic could be handed over/ picked up at the choice of Unified Licensee/ NLDO either at a central location or LDCA. The traffic could also be handed over/ picked up at SDCA level with the mutual consent of interconnecting service providers. For ILD services existing roll- out obligations would continue.

Unified Licensing Regime (Cont'd)

1. Licensing Category:- "Class License"
2. Types of service: - Services covered under 'Licensing through Authorisation' , VSAT Services, Niche operators *
3. Registration Charge (Entry Fee): - Nil
4. License Fee: -6% of Adjusted Gross revenue (AGR) i. e. Contribution to USF (5%) + Administrative cost (1%).. As the sector revenues grow, the percentages will be reviewed for downward revision.
5. Bank Guarantees: - Nil
6. Service Area: - National level or circle level (same as in UAS regime). For niche operators service area would be at SDCA level.
7. Roll- out obligations: -Nil

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Interconnection in Conventional PSTN system

- Revenue Share based on “work done” principle
- Interoperate charging based on “minutes and miles”
- Determination of Usage Charges, Setup Costs, Access Deficit Charges. Port Charges based on “unbundled network elements” (UNE).Network element based interconnect costs are more accurate than distance based.
- Need for complex Interconnect Billing and settlement systems
- Concept of “seeker and provider”

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Interconnection in Internet (IP) Domain

- Done on Peering basis
- Bill and Keep or Sender Keep All (SKA) approach
- Death of Distance
- No concept of “Seeker and Provider”

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Interconnection Issues in NGN Domain

- **Interconnection Parties**
- **Types of Interconnection**
- **Interconnection Products**
- **Basis for Charging**
- **Interconnect Exchange**

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NGN Interconnection - Charging Schemes

- Technology neutral interconnection charging system based on capacity instead of traditional method of time and distance
- Capacity based interconnection is one where operator may request a specific capacity for interconnection and pay flat rate charge that reflects the fixed cost nature of interconnection capacity
- "Calling party network Pays" may still remain most practical option in NGN domain

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Interconnection in NGN- Issues

- Interconnection Architecture and location of Points of Interconnection (POIs)
- Technical Interface Functional Requirements
- Signalling used for interconnection,
- Traffic measurement and Routing Procedures

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Interconnection in NGN- Issues (Contd..)

- Numbering, Charging, Switching & Routing for interconnection among Multiple-Operator Multi-Service Networking scenario
- Technical/ Network up-gradation or modifications to facilitate Interconnection
- Interconnection Usage Charges(IUC)

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Interconnect Charging in NGN

- Charging based on call duration, bearer capability, time and type of day etc.
- Charging based QoS, bandwidth, application etc.
- Chargeable party (calling, called or third party).(Calling party network Pays may still remain appropriate).
- Charging of supplementary and value added services.
- Charging by Prepaid card.
- Charging of Centrex groups.

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Regulator's Recommendations and decisions – India

1. Awareness Building

The Govt. may consider arranging to organize some interactive workshops/ seminars through its various agencies like TEC, C-DOT, ALTTC etc. on various aspects of NGN to bring awareness among different stakeholders.

TRAI on its part could bring out more study papers to discuss various issues of NGN in detail and may also conduct some international seminars/ workshops on this.

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Regulator's Recommendations and decisions – India *(Cont'd)*

2. *Enabling Policy and Licensing Framework*

(i) **TRAI's recommendations for unified licensing regime dated 13th January 2005 should be considered expeditiously taking into account the revised entry fee *and annual license fee for different* services, so that various operators can make best use of NGN platform to provide all types of telecom, data, video and broadcast services through a single license.**

(ii) **In addition, the niche operators for rural areas, which could be permitted through lower entry barriers as per the above recommendations should also be created at the earliest so that benefits of NGN based services are also passed on to rural masses to improve the rural tele-density and to reduce the digital divide in rural areas.**

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Regulator's Recommendations and decisions – India *(Cont'd)*

4. *Regulatory Initiatives*

A comprehensive regulation pertaining to interconnection and QOS is required in the long term for the motivation of operators to invest in NGN and also to avoid any situation of disputes later on. For this purpose, there is a need to have a detailed consultation with stakeholders on the issues pertaining to interconnection entities, products, types and charging methodology for IUC in addition to specific requirements for QOS pertaining to NGN based networks.

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Regulator's Recommendations and decisions – India *(Cont'd)*

5. Cross Industry collaboration (NGN eCo)

(i) An expert committee named 'NGN eCo' i.e. 'NGN expert Committee' will be constituted by TRAI co-opting experts from DOT, TEC, C-DOT, service providers, vendors and academicia.

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Current Scenario-Multi stakeholders collaborations

1. **DOT and TEC (Licensor)**
   - **NGN Focus Group for effective standardization for inter-operability in NGN Domain.**
   - **NGN Test Lab for comprehensive testing.**
   - **Compendium of technical literature on NGN from International agencies.**
2. **TRAI (Regulator)**
   - **NGN e-CO(NGN Expert Committee – a cross industry body).**
   - **NGN interconnection consultation.**
   - **NGN QoS consultation.**

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ITU APT- RWG Salient Recommendations on NGN Issues

- **There is an urgent need for an enabling and conducive environment to promote migration to NGN. A coordination forum for knowledge sharing and capacity building needs to be established to resolve the regional issues and focus on regional needs like bringing awareness, conducting pilot projects, interconnection, interoperability, etc.**
- **It is desirable to have a unified National standardization agency that formulates standards within the framework of international standards for NGN of the ITU.**
- **Need for nationally centralized Lawful interception and security monitoring for all services offered by NGN should be considered.**

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ITU APT- RWG Salient Recommendations on NGN Issues- Contd.

- **Provision of emergency communication services in NGN environment must be studied and relevant proposals should be passed to the relevant ITU Study Groups.**
- **Appropriate QoS standards for end-to-end services should be established as well as monitored by the Regulator/ Licensor.**
- **Consumers should be made aware of the security issues and related QoS of NGN networks.**
- **Training related to NGN should be carried out under ITU HRD program and Asia Pac Centre of Excellence.**

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Thank You

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