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Emerging Trends in Infrastructure Sharing for Faster BWA Deployment

Satya N Gupta
Chief Regulatory Advisor, BTGS, SAARC

AGENDA

- Infrastructure Sharing- What, Why, How
- Passive and Active Sharing- Elements
- Six Degrees of Sharing – What and What Not
- India case Study-Mobile revolution through Outsourcing
- Managed Services-Selective Outsourcing
- Functional Separation- Unlocking the Infrastructure Potential and Utilization
- Interconnect Exchange- Sharing common Interconnect resources

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What is Telecom Infrastructure?

- Passive: Non- Electronic (Civil and Electrical) Elements
- Towers, Masts, Posts, Power System, Land , Building, Duct, Dark Fiber, Trenches, Air- conditioning, Co-location space etc.
- Active: Electronic Elements
  - Switches/Routers : TDM and IP based
  - Transport network
    - OFC- Long Distance Carrier
    - Wireless: M/W, Satellite, Antenae
  - Access network
    - Copper: Local loop(Full, Partial, Bit-stream/ALA)
    - Fiber: Back Haul and FTTX
    - Wireless: BTS,BSC,MSC
  - Applications, Software, NMS
  - IN Platform, BSS, OSS, International Gateways, LIM
  - Radio Spectrum

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What to share?

- Any Element which has spare Capacity
- Any Element which can be Pooled
- Any Element which is a Bottleneck
- Passive & Active elements
  - *Passive Infrastructure*
  - Access Network
  - Carrier/Transport/Backhaul
  - Billing System, NMS,OSS, IN
  - Applications/Software
  - *Common interconnect points, Gateways, Radio Spectrum, LIMS(Lawful Interception and Monitoring System)*

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Why Share?

- Cost cutting- Single biggest reason to share.
- Developing countries seek to leverage mobile infrastructure boom into Broadband deployment.
- Developing countries seek to build IP-based backbone and backhaul networks (NGN), which has enormous extra capacity due to Packetisation.
- Developed countries seek to leverage fixed line investments and upgrade to Fibre to Home (FTTH), Building or Curb.
- Both share the same goal- To accelerate network deployment and growth by cutting costs and enhancing efficiency through network modernisation.

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Sharing-Time is Right, Now

- For many developing countries, end of exclusivity periods
- A second wave of regulatory reforms could be unleashed (Regulation V2.0)
- Sharing strategies could be central to the new wave of regulatory reform
- Phenomenal help in the Downturn times to become Recession-proof.
- Enabling technologies available (NGN)

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6 Degrees of Sharing- What it is?

- Using infrastructure sharing together with Universal Access strategies within a competitive framework
- Reducing costs through efficient usage
- Allowing new players to provide services faster
- Relying on time-tested Competition and Regulatory principles
- Allowing markets to function freely
- Enabling Consumers to get services faster and affordable

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6 Degrees of Sharing- What it is not?

- An attempt to put infrastructure back in the hands of monopoly providers or to stifle competition (Sharing not possible if there is only one player!)
- A strategy to lessen competition or to deploy less equipment
- About sharing for Free (Cost plus charging)
- Limiting consumer choices
- A limit on facilities-based competition
- Limiting Innovations

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How to facilitate Sharing?

- Share some infrastructure but still compete on end-user Services (Co-opetition)
- Requires political will and clear regulatory framework
- Many of the regulatory tools already exist in Interconnection regulations and Competition frameworks
- Can apply principles like Duct, Tower/Site sharing, Collocation, LLU, Bit-stream/Active Loop Access, Connection services to Mobile Infra, Fibre
- Equal-Ease of Access to International Gateway facilities and permitting Sharing of LIM
- And finally Functional Separation (The Nirvana)

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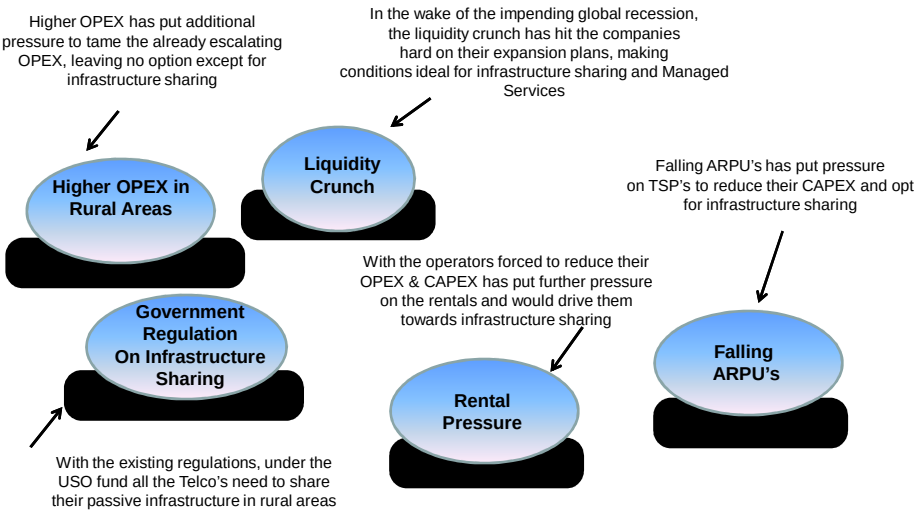
Current economic scenario creates new Challenges…and better case for infrastructure sharing



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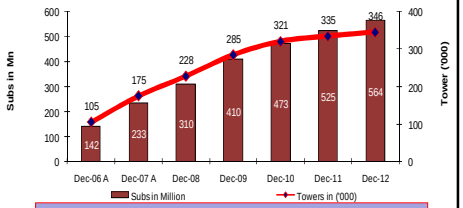
Growth Drivers

Factors driving Infrastructure Sharing

- Compelling economic value proposition
- Reduced time to market
- Plug and play offerings – connected network with backhaul
- Large geographical coverage requirements
- Heavy usage of voice services
- Allow the service provider to focus on their core competencies
- Pressure on strategic site's availability
- ***Infrastructure sharing likely to gain momentum with increasing competition and new entrants in market***
- Government support - Government's aim of narrowing the ***"digital divide"*** between rural and urban areas

Expected CAPEX savings between US$7 Bn to US$12 Bn and additional OPEX savings of US$1 Bn, over four years for telecom operators on account of Infrastructure Sharing

Industry Forecast



By 2012, approx no of towers-350,000 with tenancy ratio of 1.8-2.0 operators per tower

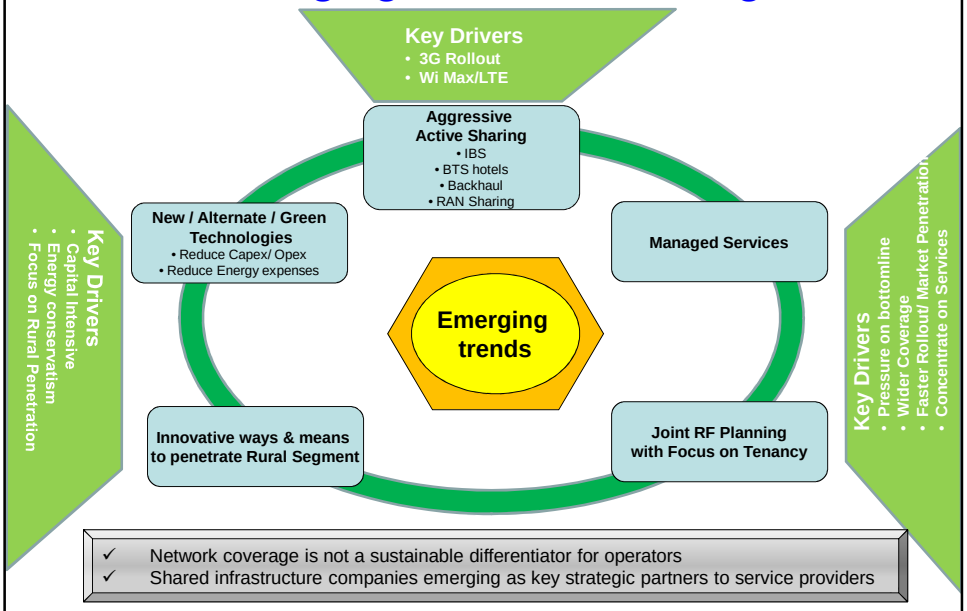
Demand for infrastructure sharing will rise due to:

- Worsening credit conditions and recent surge in cost of capital
- Demand on account of new technologies such as 3G, Wi Max and LTE, FTTH
- Operators need to prioritize capital allocation

A huge Industry in making- Minutes factories

Source: Broker research estimates; Ernst & Young analysis

Emerging trends in Sharing



✓ Network coverage is not a sustainable differentiator for operators
✓ Shared infrastructure companies emerging as key strategic partners to service providers

Evolution of Infrastructure sharing in India

Within a span of last 5 yrs the passive infrastructure sharing has observed significant progress

July 2005	Quippo Telecom, a Tower company pioneered the passive infrastructure model. Signs up with main mobile operators Bharati, Vodafone, Idea and Spice as its customers.
July 2007	Reliance Communication another operators hived off its tower unit and sold a 5% stake to investors in US, Europe and Asia valuing the business at about USD 6.75 bn
December 2007	Quippo Telecom acquired 988 towers from Spice in both its operating circles of Punjab and Karnataka
December 2007	Airtel, Vodafone & Idea cellular merged their tower assets in 16 telecom circles to form Indus.
January 2008	A group of overseas investors acquired a 9% stake for USD 1 bn in Bharti Infratel Limited (Airtel tower unit)
February 2008	US based private equity company Kohlberg Kravis Roberts (KKR) invested USD 250 mn for a 2% stake in BIL
January 2009	Quippo Telecom acquired 49% stake along with management control in Tata Teleservices tower arm - WTTIL
March 2009	American Tower Corporation(ATC) acquired Mumbai based Xcel Telecom established in 2006 with USD 500 mn funding commitment from Q investments
June 2010	GTL Attempts for Reliance Comm Tower Infrastructure in a M&A deal worth 11Bn US$ & also Aircel Towers.

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Service Providers' imperatives

Investment	Operating Margins	Go-To-Market
• Cater to low ROIC but high rural population • Spectrum scarcity vs. coverage; 3G rollout will require more towers • Huge capacity in high MoU areas • Increased share of passive in total capital expenditure	• Maintain operating margins despite falling tariffs • Keep rentals low despite high demand • Service rural population with high cost per subscriber	• Speed of deployment and time-to-market • Enhance market share by access to larger base of towers and investment in network and product innovations
Capex savings : US$7-12 b in 4 years	Opex savings: US1b per annum	Focus on core areas to enhance market share

Source : E & Y analysis

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Aggressive Active Sharing

- ✓ Next generation networks (3G+) likely to force greater sharing
- ✓ New Usage by Subscribers - email, text messaging, web access, & media applications such as picture sharing, video viewing
- ✓ 3G antennas need to be installed on each tower and data equipment needs to be added in the common shelter beneath the tower
- ✓ Greater cell-site density is required for data-centric networks.

- Intra-circle roaming
- In Building Solution (IBS)
- BTS Hotels
- Backhaul Sharing

Operators
- Opex savings on both Infrastructure and active equipment O&M
  - Opex savings per site (~30-35%)

Infra Provider
- Capex savings (25% ~40% per site) through leaner remote sites compared to full fledged tower sites
- Opportunity to attract incumbents to de-risk the tower business

Target customers
- Anchor customers on new sites
- Incumbents on existing and new sites

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Support Required from Government / Regulators

Telecom Industry
- *Concentrate on market*
- *More coverage*
- *Faster rollout*

Government/ Regulatory Authorities

Infrastructure **Partner of choice in creating prosperity** **Provider**

Society
- *Environment friendly &*
- *Better aesthetic*

Consumers
- *Wider Choice*
- *Better Tariffs*
- *Less call drops*

Support Required

- Support for effective and faster rural rollout
- Effective and efficient utilisation of USO funds
- Single Window Clearance for various permission/ approvals
- Support in generation of single invoice for electricity and subsidy for Green energy
- Facilitate access to passive and active infrastructure

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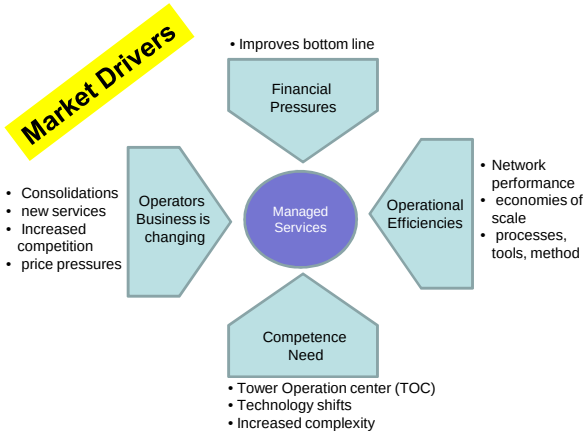
Managed Services- Selective Outsourcing

A Managed Service is provided by a service provider that takes on management responsibility for a function that has traditionally been carried out internally by a telecom operator

Managed Services **functions** typically include:

- **Design and Engg.** – N/W planning, optimization and development.
- **Build** – technology integration and implementation of networks, services and business support systems.
- **Operate** – day-to-day operations such as operation and maintenance of networks, services and business support systems, field services, customer problem management including helpdesk, and service and resource fulfillment



Massive deployment of high-speed wireless networks throughout has opened up a new market for telecom outsourcing and managed services

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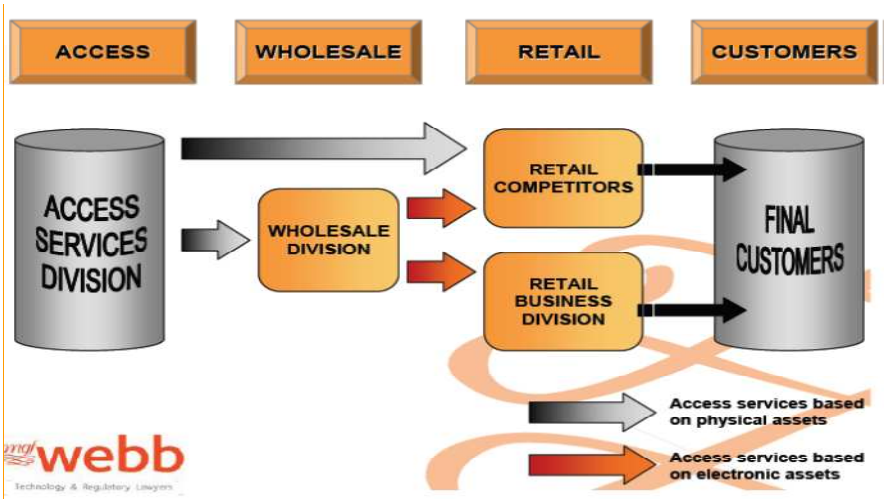
Functional Separation – A Win- Win Sharing Concept



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Functional Separation- What it is & What not?

1. It is carving out a separate logical entity (Virtual SPV) out of the sharable under-utilized Infrastructure to unlock the full potential without any Structural change. (eg. ARC in banking). It can offer Infrastructure-as-an-Interconnect-Service (I-a-a-s) on IRU (Indeafisible Right of Use) basis.
2. It is not any form of Divestment and involves no Ownership change .
3. It does not force any Retrenchment/VRS, but converts the staff Liability into Asset through sense of belongingness and Accountability.
4. It converts NPA(Non-Performing Assets) into Revenue Generating Asset (RGA) by unleashing the capacity through Modernization, upgradation through Managed Services & Efficient Utilization.
5. It leverages the Professional Management through empowerment & accountability along with staff participation (Best of both the Worlds)
6. It does not force a Free/ below cost leasing but enables cost++ returns
7. It converts the Competitors into the Wholesale dealers (Co-Opetition)
8. It is a Win-Win and maximizes the National (Societal) Welfare.
9. It is an implementable Idea whose time has come for India (Nirvana)
10. It is not a Rocket Science- It is all about timely Execution through Managed Services, Silly.

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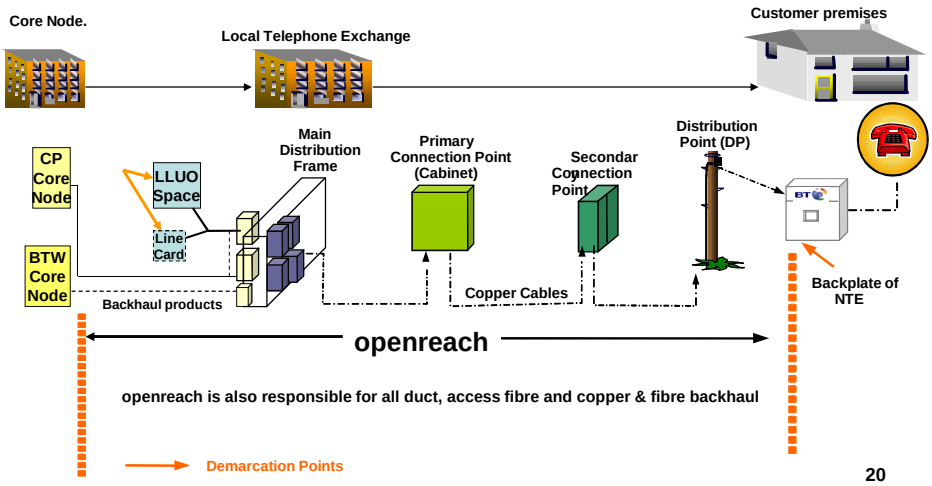
UK- Functional Separation (BT- Openreach)

PSTN Service

PSTN & ADSL Service



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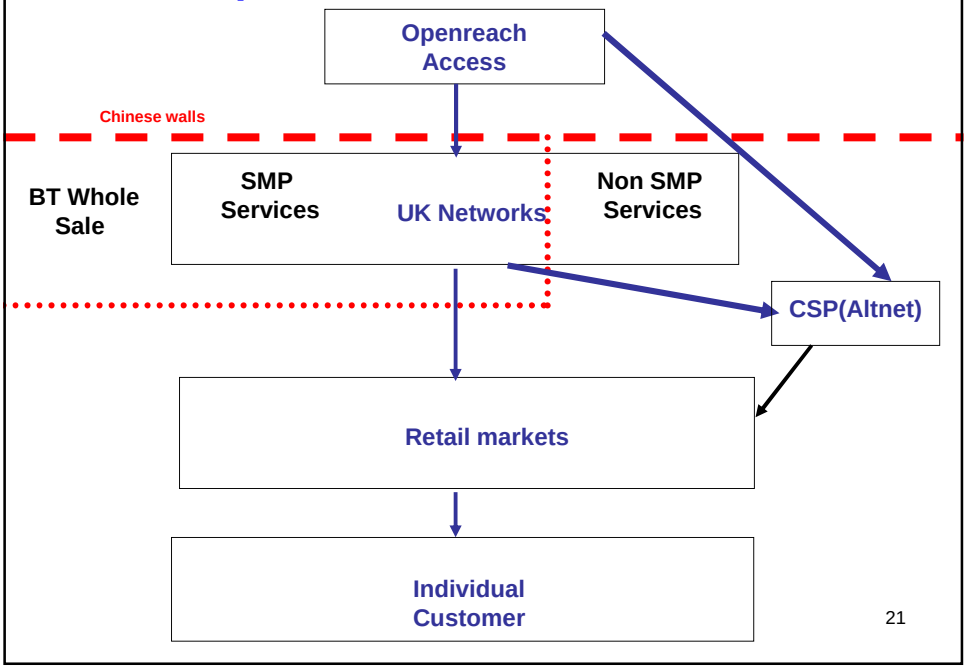
Upstream / Downstream Flows



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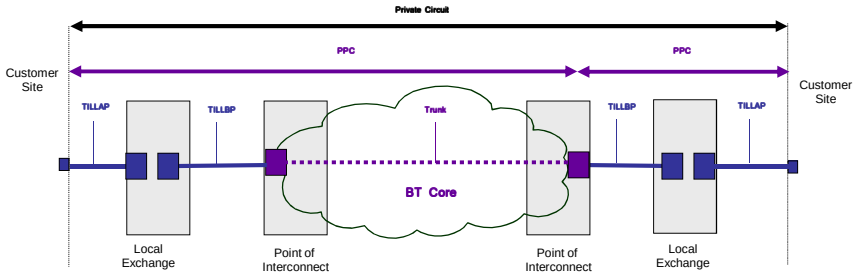
Partial Private Circuit (Built-up Leased Line)



- **Retail PC Product**
- **Wholesale Provide**
  - **PPC Partial Private Circuit**
- **Openreach Provide**
  - **TILLAP and TILLBP**

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UK-Equality of Access

- All services falling within the scope of Openreach will be offered to all on equal terms – *Equality of Input (*EoI). L2
- EoI is the key concept of Openreach
- EoI is more than *non discrimination*
  - EoI means: *same* ordering system, *same* ability to influence, *same* prices, terms & conditions, *same* services and same access to commercial information.
  - It will guarantee *equal* access to the 'economic bottleneck' and drive further downstream competition.
  - It will focus on the regulation where it is needed

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Sharing of Interconnect resources

- Separate Network for Basic/Mobile (Voice) and for Data
- Huge growth in Mobiles
- Increasing numbers of Application developers, Operators and Traffic
- Every Basic/Mobile operator to have interconnection with each other and with many NLD and ILD operators

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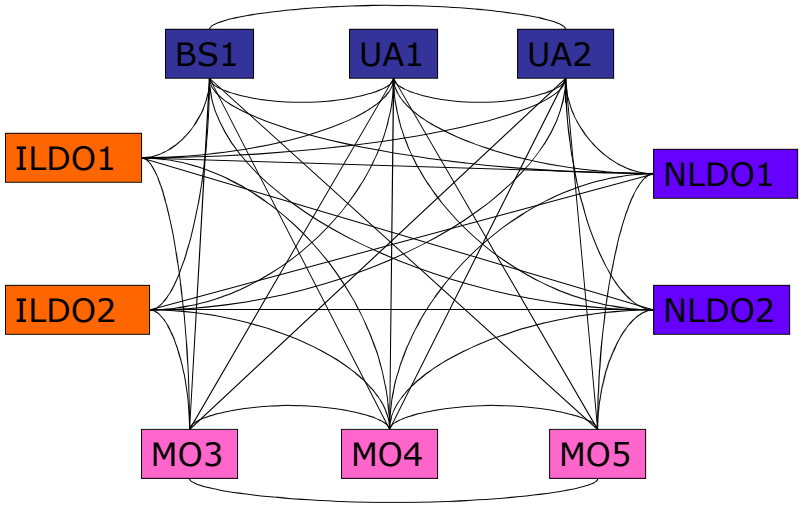
Slide 23

L2 I have discussed with Tim (earlier) concerning the discrimination aspect of Openreach ("equal treatment for equal situations and unequal treatment for unequal situations").

We need to elaborate on wording to cover that off...
LocalAdmin; 11.10.2005

Present Scenario (contd..)



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Results

- **Sub-optimal utilization of resources**
- **Inefficient handling of calls**
- **High operational cost for managing inter operator connections**
- **Inter carrier billing problems**
- **Complexity in settlement in Interconnect usage charges**
- **Increase in CAPEX and OPEX**

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Shortcomings

- High interconnection cost
- Connection at different levels and at many places Complex routing at every point
- Huge requirement of ports and their cost
- Physical provisions at different places causes delay and need more capacity

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Solution- IP based IX

- Open and Distributed Architecture
- Best breed of products
- Better Performance
- Required Quality of Service
- Efficiency in Inter- working

Thus NGN based interconnect Exchange (IP-IX) can be best solution for interconnection

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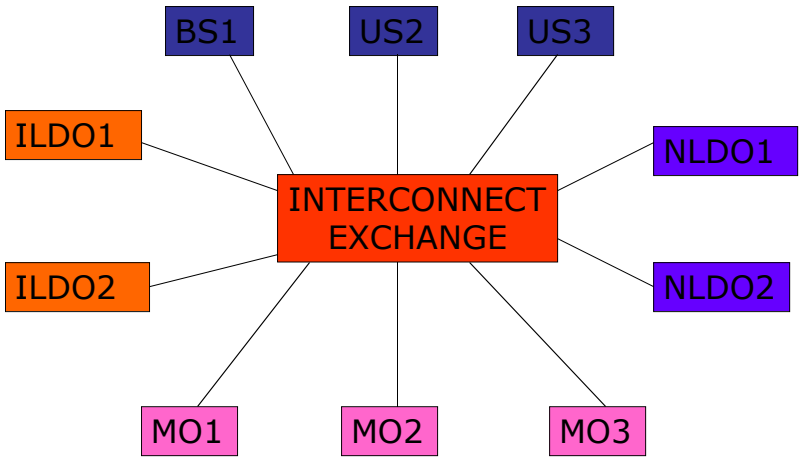
Interconnect Exchange-The Concept



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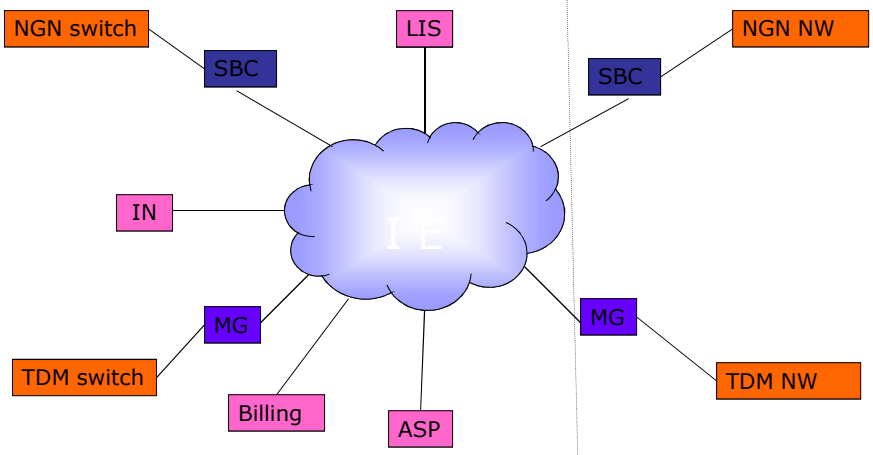
Domestic

International



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Advantages

- Network simplicity leads to reduction in interconnection cost and port charges
  - Simple network interconnection using GE or OFC as per ITU-T G.653
  - Reduction in number of links
  - Simplifies digit analysis for all inter operator and long distance calls from the switches connected to it
- Help in quadruple (Voice, Video, Mobile TV and data) play
- Less time consumption in provision/augmentation of PoIs
- Help in convergence of services, application and provisioning

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Advantages (Contd..)

- Simplification in carrier selection function and Number Portability
- Integration of different service providers at one point
- FMC and Femto cell concept in multi operator environment in case of intra roaming, thus saving in spectrum
- Low latency
- Reduction in Capex and Opex

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Advantages (contd..)

- **Integrated and Inter carrier billing**
  - Less connection: less disputes
  - Clearing house function
  - Inter operator charging, based on GOS, Content and network elements used in interconnection
- **Intelligent network services**
  - Easy provision in a multi operator and multi-service scenario
  - Content can be integrated at ICE and can be pooled to all the operators connected to it

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Who will do it?

- Regulator and Licensor: Terms to be redefined with light touch approach
- All stake holders to come to-gather
- By incumbent operator or by other or separate independent operator
- Management : To be decided by all stake holders

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Future- back to Core- Competency Towards Bandwidth Factory

- Separate access providers: DSL, Wi-Fi, WiMAX, FTTX, GSM, CDMA etc
- Separate network providers
- Separate long/short distance connectivity providers
- Separate Infra: Tower, Power, BTS providers
- Separate Operation/ Billing system providers
- MVNO/ Virtual Operator concept
- 3rd party VAS providers

Specialized entities will handle different segments, efficiently and in a cost effective expert manner

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THANK YOU

Satya N. Gupta

sngupta57@yahoo.com