

NGN and Broadband

Policy and Regulatory Issues :
“NGN Interconnection and Pricing
Models

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Commissioner

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Key Point



NGN, The Concept

- ***Indonesia, ICT Profile***
- ***Indonesia, Initiative to NGN***
- ***NGN interconnection and Pricing Models***



What The NGN ?

A NGN is a packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service related functions are independent from underlying transport-related technologies.

It enables unfettered access for users to networks and to competing service providers and/or services of their choice. It supports generalized mobility which will allow consistent and ubiquitous provision of services to user

(ITU-T SG 13: Rec. Y.2001)

NGN, Basic Concept

- a packet-based network
- provide telecommunication services
- make use of multiple broadband, QoS-enabled transport technologies
- service-related functions are independent from underlying transport-related technologies.
- offers unrestricted access by users to different service providers
- supports generalized mobility
- allow consistent and ubiquitous provision of services to users

NGN, Objectives

- Promote fair competition
- Encourage private investment
- Define a framework for architecture and capabilities to be able to meet various regulatory requirements
- Provide open access to networks

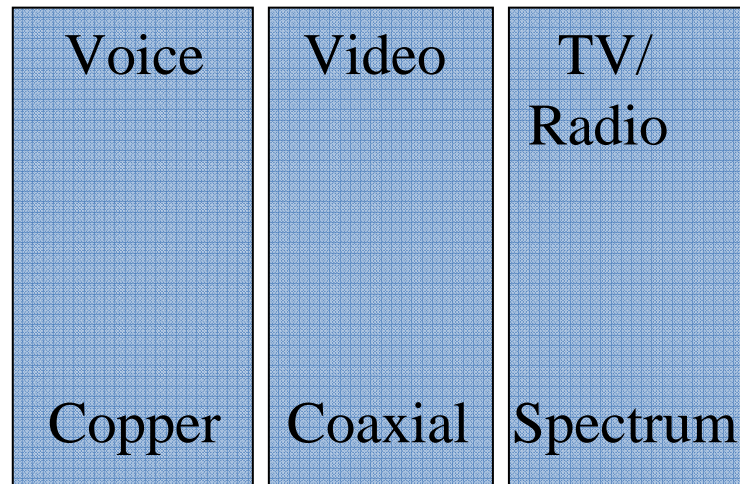
while:

- ensuring universal provision of and access to services
- promoting equality of opportunity to the citizen
- promoting diversity of content, including cultural and linguistic diversity
- recognizing the necessity of worldwide cooperation with particular attention to less developed countries.

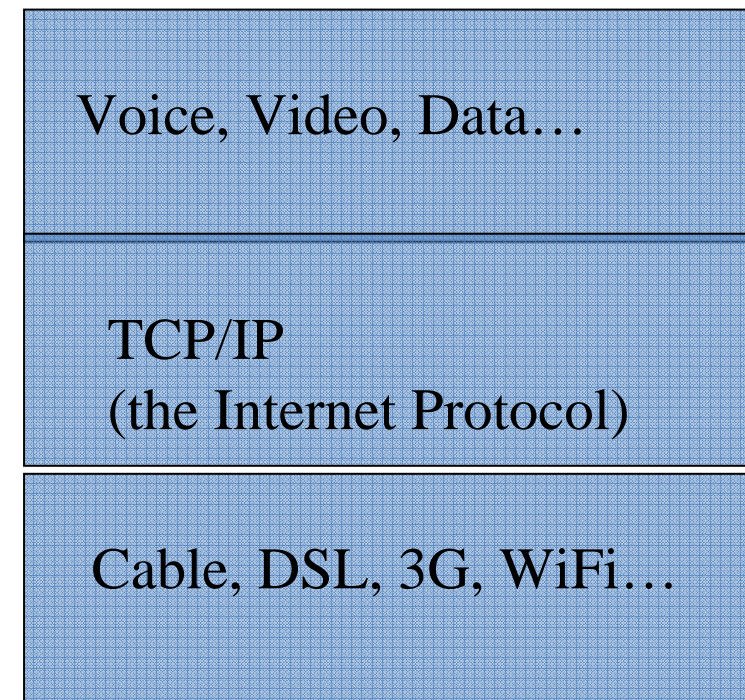
Converged Networks and Services

Multiple Networks with Multiple Services

Traditional “silos” of service



Converged services



Why NGN Needed ?

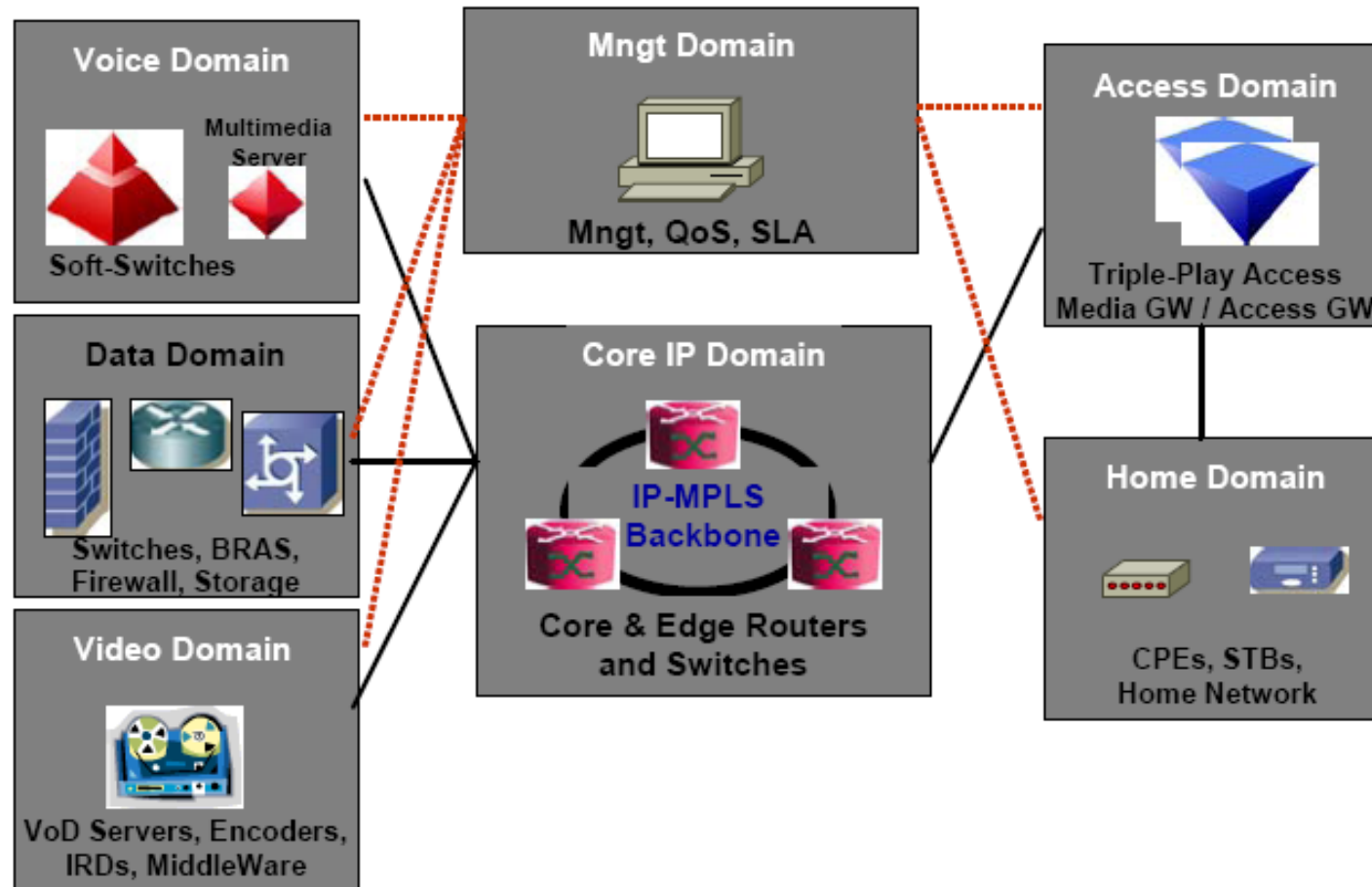
Operator

- Lower costs in having a single IP-based network to invest in and maintain, and fewer switching locations
- Single billing contact with the customer *and 3rd party content providers*
- Possibility to offer multiple play (voice, video, data etc) and faster time to market for new service roll-out
- Single network layer for management

Customer

- Possibility to use the same customized environment between different platforms and from different locations
- Possibility of lower prices through bundled service offerings
- Single connection and bill for voice, data, video, mobile (Quad play)
- Availability of BW on Demand

What Keys Domain in NGN Environment?



Key Point

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Indonesia ICT profile

(DGPT report on Dec, 2007)



Fixed Wireline

8,7 M

- TELKOM 99%
- BBT <1%

Penetrasi
4%



Fixed Wireless

5,75 M

- TELKOM 71%
- Indosat 5%
- Bakrie 24%

Penetrasi
2,6%



Cellular

63 M

- Telkomsel 56%
- Indosat 25%
- Excel 16%
- Others 3%

Penetrasi
28,6%



Internet

25 M

- Internet Kiosk 43%
- Campuses 3%
- Schools 1%
- Offices 41%
- Households 12%

Penetrasi
11,4%



Broadband

500 K

- Speedy 20%
- Wireless BB
- Others

Penetrasi
0,2%

Domestic Backbone (DGPT)

Fiber Optic



Sumatera, Jawa,
Bali, Kalimantan,
Sulawesi



TELKOM

Jawa, Sumatera,
Batam, Susel,
Kalsel



Jawa, Sumatera,
Batam, Babel, Bali,
NTB, Sulawesi,
Kalimantan



Jawa, Bali

Microwave Link



TELKOM

Trans Sumatera
Batam Babel Jawa
Bali NTB NTT
Kalimantan
Sulawesi

Satellite



Palapa C2,
24.transponder C-
Band dan 4 transpdr
Ku Band



TELKOM

TELKOM-1; kapasitas 24
trspdr C-Band dan 12
trspdr extended C-Band.
Palapa B4; kapasitas 24
trspdr C-Band
TELKOM-2 (sudah
diluncurkan th 2005)
menggantikan Palapa B4,
kapasitas 24 trspdr C Band
TELKOM-3 (rencana
peluncuran 2008),
kapasitas 48 trspdr C-Band



Palapa C2,
extended C-
Band

International Backbone (DGPT)

SATELLITE International



using INTELSAT



Access to INTELSAT
Using ground segment in
Cibinong

SUBMARINE CABLE NETWORK International



Sea-Me-We 3, Sea-Me-We 2,
APCN, TPC, JS
Total capacity: 1,73 TBps

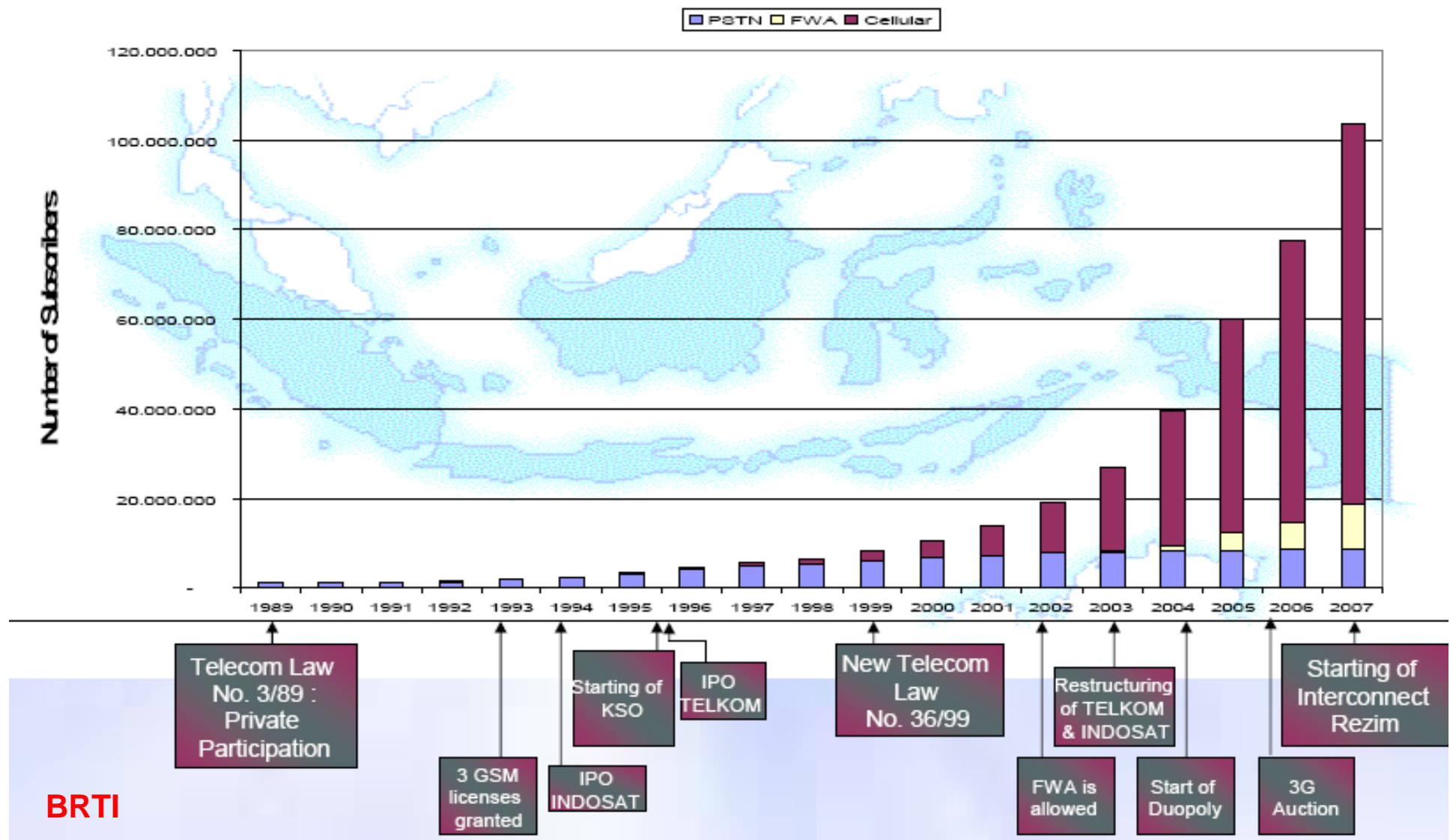


DMCS, TIS, Sea-Me-We 4
Total capacity: 320 GBps

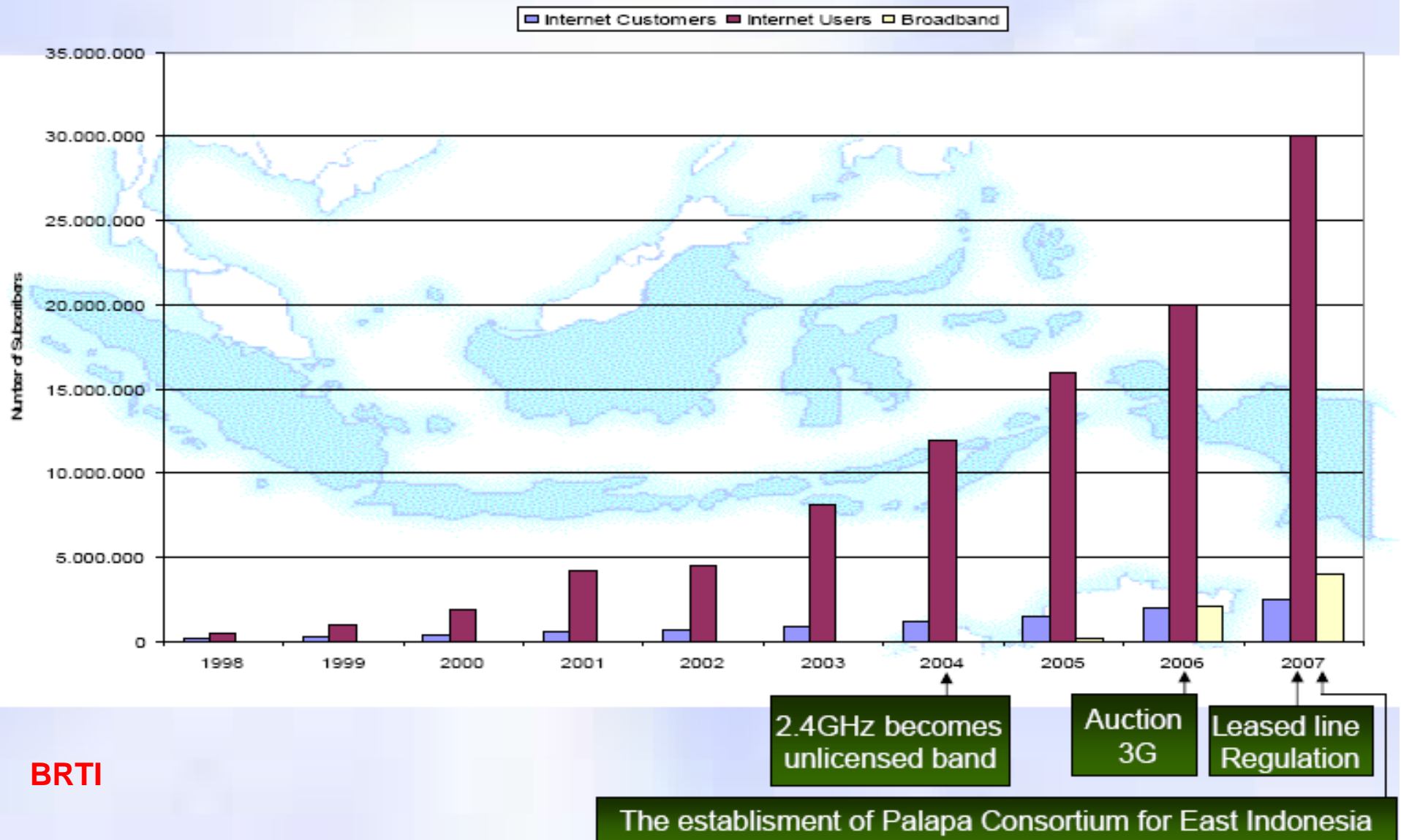
Access Network (DGPT)

	<i>Operators</i>	<i>Technology</i>	<i>Coverage</i>	<i>Total Subscriber (Dec. 2006)</i>
<i>PSTN</i>	Telkom, Indosat, BatamBintan	Copper	National, Regional	~ 8,7 millions
<i>Seluler</i>	Telkomsel; Indosat; Excelcomindo; Sampoerna Tel; Mobile8; Natrindo; HCI; Smart Telekom	GSM, CDMA450, cdma20001x, WCDMA	National; Regional (Bakrie)	~ 63 millions
<i>FWA</i>	Bakrie(Esia); Telkom (Flexy); Indosat (Starone)	cdma20001x	Per area code	~ 5.75 millions
<i>BWA</i>	Many operators (SME majority)	Freq hopping, spread spectrum	Regional	~ 500 millions
<i>Satelit</i>	-PSN (ACeS), Satelit Garuda-1 -Amalgam (Iridium)	- Digital - Digital	- Asia Pacific - Worldwide	

Regulation Impact to Telco



Regulation Impact to Internet User



Key Point

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Countries	Technology Neutral Licensing	Convergent Framework/ Convergence Regulator
Malaysia	✓	✓
Singapore	✓	✓*
Indonesia	X	X
Philippines	✓	✓**
Thailand	✓	✓**
Brunei	✓	✓*
Cambodia	X	X
Vietnam	X	X
Myanmar	X	X
Laos	X	X

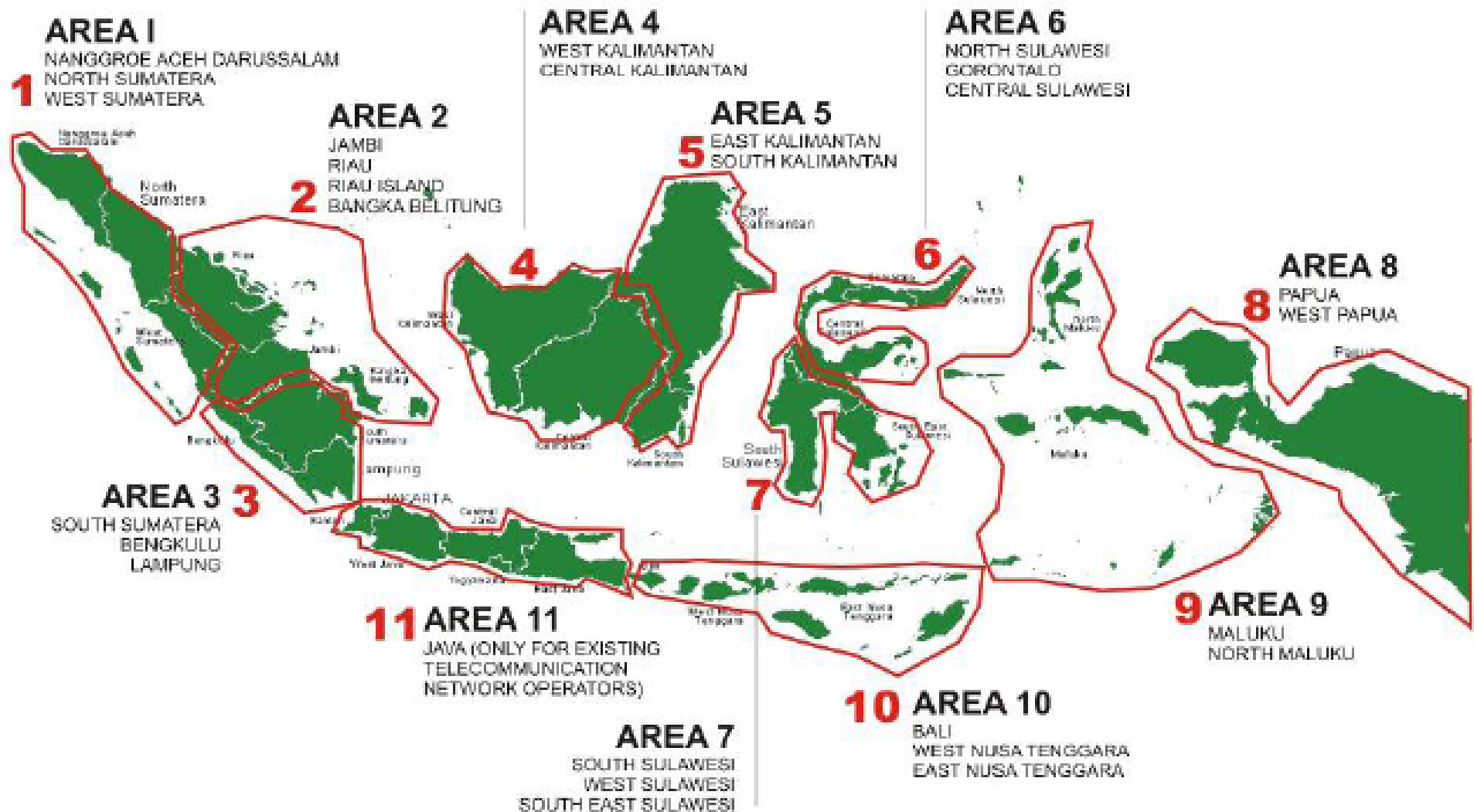
Note: (*) Convergence at Ministerial level

(**) Single Regulatory body

PALAPA Ring



USO



What The Driving of NGN developments ?

❑ **Operational issues**

- Obsolescence & modernization
- Reliability, resilience & quality
- Capacity & scalability
- Simpler and faster provision of new service roll-out

❑ **Financial Performance**

- Potential Revenue Growth
- Reduced OPEX & CAPEX

❑ **Convergence issues**

- Fixed/mobile convergence
- Voice/data convergence
- Telecoms/broadcasting convergence
- Shifting from narrowband to broadband

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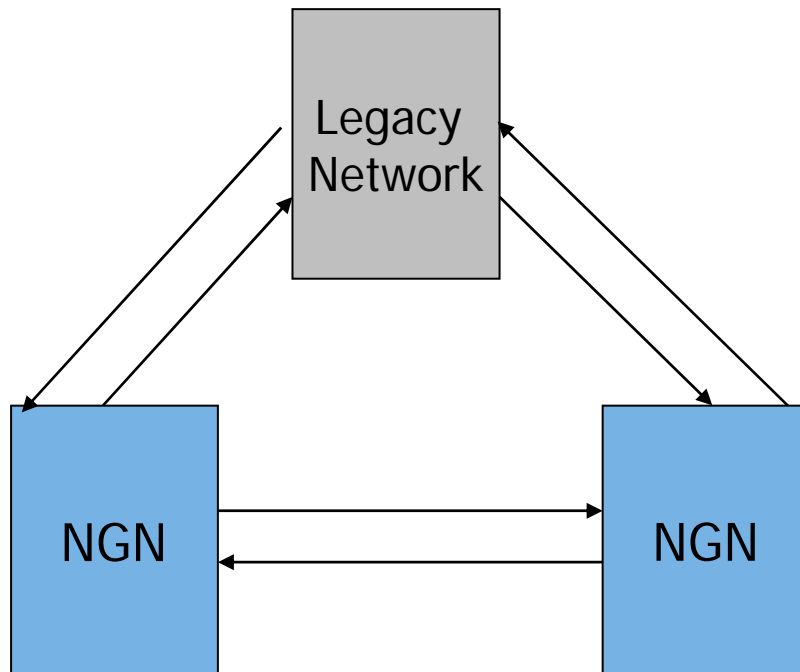


Regulatory Approach

- The objective of regulation is to facilitate competitive market environment, and to encourage investment, innovation and developed of new services, for greater end-user choices
- The approach should be to rely on market forces and introduce regulations where necessary

NGN Interconnect

NGN Interconnect Transition



- Interconnection between NGN network use IP base platform within B2B scheme with multi convergence service (Voice, Video and multimedia)
- In Case Interconnect between NGN Network and legacy Network, NGN Network provider will provide Translator/converter or others IWF equipment to Non NGN Network to obtain the interconnection can applied

Traditional Interconnect Model

Voice

- **Charging Model** : Calling party's Network pays (CPNP) base on time used and distance / geographical as preferred Interconnection Regime, Some Case Receiving Party Network pay (RPNP) regime might be found
- **Revenue Stream** : Mostly Generated by The Call Initiating subscriber paying all carriers for transport capacities used, Not flat rate plan for call & Needed Settlement if traffic un-balanced
- **Traffic types** : symmetric services

Data

- **Charging Model** : Bill and Keep (BAK) as the preferred interconnection regime in the internet
- **Revenue Stream** : Mainly generated by subscriber access flat rate and advertisement, exchange of traffic among peers without settlement, when the traffic is balanced in each direction. If Un-balanced the Receiving Network Party Pay (RPNP)
- **Traffic types** : Asymmetric service

Interconnection Possibilities

❑ **Traditional international accounting rates**

- Symmetrical, negotiated bilateral arrangements for jointly provided, switched telecommunication service

❑ **Interconnection**

- Asymmetric rates for call termination/roaming
- F2F, F2M, M2F and M2M

❑ **Peering**

- A bilateral arrangement to accept and terminate traffic (usually IP-based), generally without financial compensation

❑ **Transit**

- An agreement to accept and terminate traffic on behalf of other carriers, for a price

❑ **Sender keeps all (Bill and Keep – BAK)**

- Sending and receiving traffic without payment and (usually) without requirement for prior arrangements

NGN Interconnection Model

- ❑ All Voice telephony in the NGN likely all traffic will be carried over the IP protocol (It will be VOIP)
- ❑ The Source & Destination location are not associated with a conventional E.164 Telephone Number, any IP interaction will be associated with a source & destination IP address which are linked to the network's topology not to the geographical location of the user
- ❑ Transaction cost represent a barrier to enhance the network, the IP base interconnection agreement ensure to explicitly address the ability to carry traffic at a committed level of QOS
- ❑ Verify QOS Compliance (average delay, variability delay and packet loss) were needed to measure IP Base Interconnection , often added with SLA between IP Based Operator/SP
- ❑ Charging Model : Bill And Keep (BAK), important to reduce complexity service in NGN

Impact NGN Interconnection Model to Indonesia Regulation

Indonesia Telco Industry

- ❑ Need Analysis the impact if The NGN Interconnect model will be applied, because the big gap between The NGN standard with the legacy std. The NGN build fully IP based and Flat Network whereas the legacy still use various standard such as E1, ATM, SDH, and IP and hierarchy.
- ❑ The Indonesia Interconnection until now still apply CPNP (calling party network pays) based on duration & Geographical for Voice system charge including Video Call, For Data Interconnection Currently still limited of SMS & MMS with Sender Keep All (SKA) model charge but for others content such as Internet, RBT, VoD still not Interconnected & provided by each Operator. NGN model not prefer with geographical area but concern based on volume, capacity, service & Content & emerge All multimedia services from different Content Provider. The big differential above should be consider if NGN will be implemented on Indonesia.
- ❑ Indonesian Government should be review readiness current IP backbone & IP Core and also determine NGN standardization including interconnection model to shield Current Industry.

Interconnection Regulation today

Role of Regulator :

- Not regulate retail arrangements except to the extent necessary to address market power distortions
- The implications of wholesale regulation for retail behavior are entirely relevant to the regulator

3 Main Reason to regulate at wholesale level :

1. Promote interconnection
Broader networks are more valuable, because of :
 - Expanded Connectivity – more option for calling (direct impact)
 - More Complementary Goods – more choice (Indirect impact)
 - Scale & Scope Economic – Lower Cost (Indirect impact)
3. Control market power
 - Promote competition - entry facilitation
 - Protect consumers from market power abuse - price regulation
4. Coordinate interoperability

Interconnection Regulation today

Historical Conditions has determined , that regulators have mainly focused on the control of market power :

- Monopolies on Fixed Telephony
- Limited number of market players in mobile telephony

Modes of Abuse

- ☐ Denial of access: foreclose competition
- ☐ Discriminatory access: inferior access to 3rd parties relative to affiliated subsidiary
- ☐ Monopoly pricing: price access significantly above cost

Regulatory Response

Common Principle - non-discriminatory access and interconnection obligation

- ☐ Mandatory unbundling and interconnection
- ☐ Business restrictions (preclude retail entry)
- ☐ Regulated prices and terms of interconnection

Approach to Price Regulation

- ❑ Regulator might use approaches as well :

- **Benchmark**

- The outcomes of such regulation heavily depend on adjustment made, the goal adjustment is basically to try to model interconnections cost without having enough detailed information on local cost input to carry out a full forward –looking cost analysis

- **Retail Minus**

- The outcome of this approach depend on the level of retail prices and usually used in case of sufficient competition in the downstream market

- ❑ Whole range of possible approaches to price regulation, the majority have chosen to adopt Cost orientation approach (generally FDC or LRAIC) to regulate Interconnection prices, The reason are :

- Possibility significantly to decrease interconnection prices in a relatively short time (when using HCA)
 - Concern about price cap outcomes : X Factor depend on operator and CPI

Approach to Price Regulation

	RoR	Price-cap	Cost orientation
Prevent exercise of market power	Yes. The regulated firm can only earn a normal rate of return.	Yes. The CPI-X constraint prevents the firm from exercising market power (if chosen with care).	Yes. Cost + Reasonable rate of return only.
Productive efficiency	No. The firm will not reap the benefit from reducing costs and so has no incentive to do so.	Yes. Firms are automatically rewarded with higher earnings when they reduce costs (penalized when costs increase).	No. In the case of HCA. Yes. In the case of Forward-looking CA.
Allocative efficiency	No. Prices for individual services need not equal the costs of the service.	Yes. Firms have flexibility to set prices for individual services based on forward-looking costs. It is possible for individual prices to deviate from costs	Yes. Prices for individual services equal the costs of the service. No possibilities to deviate from costs.
Dynamic efficiency	No. No incentive to invest and introduce new technology or services	Yes. The firm has incentives to invest efficiently.	Yes. The firm has incentives to invest efficiently.
Promote competition	No. Does not generally permit pricing flexibility for the firm to set prices to reflect forward-looking costs in response to competition.	Yes. Baskets prevents cross-subsidization. The firm has sufficient pricing flexibility to respond to competitive pressures by setting prices that reflect underlying costs and demand conditions	Yes. The firm has to set prices that reflect underlying costs. No cross-subsidization.
Minimize regulatory costs	No. Rate proceedings are often lengthy and resource intensive.	Yes. Price cap proceedings are infrequent (once every 3 to 5 years).	No. Control proceedings are lengthy and resource intensive.

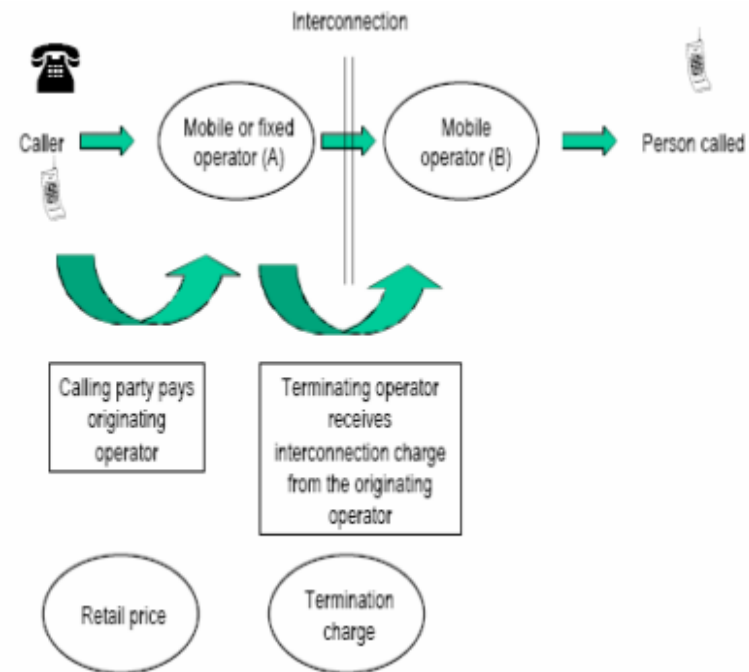
Consequences of price Regulation Today

Current principle

- ❑ Any to any interconnect for established E2E services (e.g : Voice telephony)
- ❑ Calling party pays

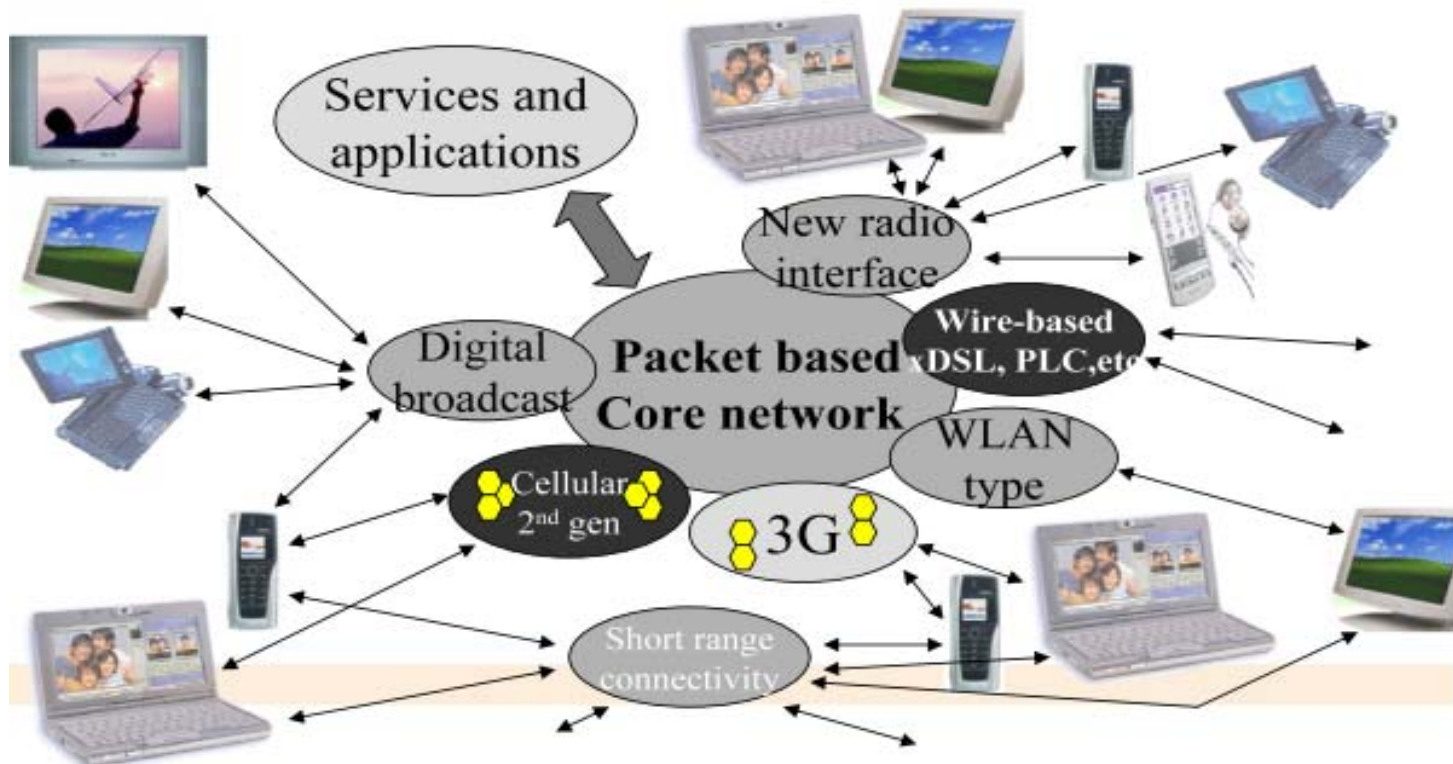
The principle will lead to terminating monopoly problem :

- Only one path to terminate, terminating network only route to the called party
- Subscriber care more about what they pay than what those who call them pay
- Terminating operator has monopoly power
- Incentive for terminating network to set high fees
- The Impact that above termination fees have on retail prices



NGN Interconnect Regulation Option

- ❑ The Convergence and Technological developments lead to the “ network on network ”
 - Traffic passes between network owned / operated by different carriers , or across regulatory boundaries



NGN Interconnect Regulation Option

- ❑ The Migration to IP network break the historical linkage between the service and the network, enabling to emerge of independent service provider
- ❑ The Concept of Interconnection payment is likely to change as moving into an IP Environment
 - More fixed charge between operator base on capacity
 - Fewer variable charges base on The volume of traffic
 - Overall value of Interconnection payment between operator may reduced

NGN Interconnect Regulation Option

- ☐ Voice remain to be the main revenue source for operator
- ☐ Voice revenues continue to drive investment
- ☐ Customer Relationships :
 - Need for single billing relationship with a networkoperator
 - Ability to develop many billing relationship with SP
 - Ability to obtain the same service through different network operator in different location

NGN Interconnect Regulation Option

To move to NGN provide an opportunity to change Price / Charging Model

Volume Based	Event Based	Content/Value Based
<ul style="list-style-type: none">▪ User pays per Kbps or Mbps of data sent or received▪ No Charge if Link Not in used – not time related▪ Pay in additional for content e.g : Video, music▪ Charging Method : per Kbps or Bundle of X MB permonth	<ul style="list-style-type: none">▪ User pays per Event, current example are perSMS, MMS, Song▪ Off peak voice move to event charge, e.g : On net national Call▪ User have direct charging relationship with Content provider▪ Per event charging related to premium content, e.g : premiership Football match	<ul style="list-style-type: none">▪ Targeting Specific Customer▪ Based on demand, quality, customer loyalty▪ Not Necessarily linked to data volume or time on network▪ Could be applied to event base model

NGN Charging Option

☐ Usage Based Charging

- Charge based on combination of connected call duration (and sometimes a fixed charged per call) and the extent of NE used on each call
- Charge linked to the dimensioning of network for peak demands by varying them for different times of days (The tariff gradient, typically day/evening/weekend)

☐ Port Base Charging

- Wholesale customer charged per port or virtual port, which cover s all conveyance cost up to the capacity of the port (normally multiple 2 Mbps)

☐ Capacity Charging

- Charge model be driven by the peak demand it placed on the network within some time period (Month, year)
- The Unit price of the capacity will be set base on forecast capacity used.

SUMMARY

- ❑ Migration to NGN will not make concerns over SMP disappear at least in short medium term, therefore efficient regulation will still be an issue.
- ❑ The efficient regulatory model to wholesale pricing can generally be derived from 2 factors-the efficient retail price and the distribution of Cost
- ❑ Move to IP likely to affect wholesale cost accounting model
- ❑ Interconnection charging will be business to business (B2B) approach.
- ❑ Regulator, determine ceiling price as reference and floor price for retail.

SUMMARY

- ❑ NGN Will carry a wide range of services with diverse pricing model, wholesale pricing models must support diversities :
 - Trends toward bundling and flat rate pricing in retail market could be mirrored by capacity based pricing in wholesale market
 - Wholesale change will need to take traffic and quality into account in order to provision efficient network
 - Voice, which remain to be the main source of revenue and investments, has well accepted retail charging model
 - No single IP Interconnection model is superior in all circumstances



Thank You