IP-telephony and fixed networks trends

Regional seminar on costs and tariffs for the TAF group member countries
Yaounde, April 5-6, 2004

Xavier Voisin
ITU Expert
1- The operators’ challenge
A customer and service oriented view

- PART 1 - The operators’ challenge - A customer and service oriented view
- PART 2 - PSTN and IP convergence - The Next Generation Network (NGN)
- PART 3 - The CoE workshop on NGN economics
Operators’ Challenges: How to fill the gap between cost of access and revenues from services?

- Cost lays in the access

- Broadband access opens the limits compared to narrowband and provides for a wide potential for different usage rates

- Access to uncontrolled services is a facility with limited value and does not guarantee a profitable business case: see current profitability issues for Internet Access Providers

- Value and revenues are in the services. Question:
  - Which service?
  - How is it provisioned?
  - How is it delivered?
  - Is it effectively billable?
A customer & service oriented view

3 types of services may be offered by the network service providers

- **Basic packet transport and routing services**
  “Data best effort”

- **Managed data transport services**
  “Data QoS and security”

- **Communication services fitting with end user needs, as and when needed**
  “Communication Services”
3 types of revenues for Network Service Providers

- **Data best effort**
  - Internet today, IP networks of today, Information highways
  - Enhanced by higher transport bandwidth, proxies, caching, content based switching (webswitching)

- **Data QoS and security (end2end data transport with associated QoS)**
  - Frame relay and ATM service networks, MPLS
  - Internet access services
  - IP networks enhanced by tag switching, IPsec, IPv6, DiffServ, MPLS
  - To be further enhanced with evolution of Border nodes and BAS, the key to Data VPN services with associated QoS/SLA

- **Communication Services**
  - TDM telephony services, NB NGN, IN services offered to users and enterprises
  - User to user controlled and interoperable multimedia services
  - Multimedia controlled communication services needed by enterprises, content and service providers to develop B2C and B2B business
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slide 6
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**Type 1**
- ISPs
- Internet Backbone Providers

**Type 2**
- Data Carriers, Internet Access providers, Backbone wholesalers

**Type 3**
- Incumbent, Mobile, voice oriented CLECs, Data Carriers expanding to multiservice
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Borders are blurring (but not vanishing)

Value is in enabling services, not in data connectivity

Users are asking for services, Enterprises want to reach more people
2 - PSTN and IP convergence
- The Next Generation Network (NGN)

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IP and switched telephony convergence
The case of “Alice” and “Free” in France

- **2 competitive actors**
  - with a brand new offer (both launched Feb. 2004) of high speed Internet (ADSL 2048/256) and telephony services **when local loop unbundling is effective.**
  - both offering “free” national calls

- **Alice : € 46.95 / month**
  - full switched telephony service through local line narrowband access at a competitive price with same service and quality as France Telecom
  - **8 ct/min** for calls to Europe and large industrialized countries

- **Free : € 29.99 + € 13 (FT subscription) = 42.99 / month**
  - Low cost IP telephony through ADSL with a good quality for most of the calls : **3ct/min** for calls to Europe and large industrialized countries
  - User keeps using FT for some special services and shared revenue calls, fax and modem calls, and whenever best-effort IP telephony is not good enough.

- With **different technology, different QoS, different prices** they now compete on the same ground
Usage based revenues require QoS and simple service delivery

- **Voice telecom networks today:**
  - User only requests a communication service from the network
  - Network knows the service semantics and applies the appropriate QoS

- **Data networks today:**
  - User provides QoS constraints at transport level to its access network
  - QoS supported at engineering and network management level (SLA) moving to resource reservation (MPLS), traffic prioritization and policing (Tag switching, Diffserv).

- **NGN networks:**
  - Both models have to co-exist
  - Telecom way is needed to support the most revenue-generating person to person communication flows
NGN Architecture Principles (1)

Distributed Architecture

Traditional Circuit Switch

Service delivery & Connection Control

Line Cards

Trunk Cards

Switching Matrix

NGN

Softswitch

Access Gateways

Trunking Gateways

IP or ATM

+ IP Terminals
NGN Architecture Principles (2)
Common Transport Infrastructure

Today’s Public Networks

NGN

Service & control

IP or ATM

PSTN/ISDN
PLMN
Data
3G Mobile

PSTN/ISDN
PLMN
Fixed BB Access
UMTS Access
Layered Model

Service Layer

Control Layer

Media Layer

Access and Transport Layer

PSTN/PLMN

IMS UMTS Access

LAN

Fixed BB Access

3G mobile users

Residential users

Enterprise customers

Remote office / SOHO

Access and Transport Layer

Layered Model

NGN Architecture Principles (3)

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NGN Architecture Principles (4)

Standards-based Components

- Standards-based Components
- Enterprise customers
- Remote office / SOHO
- Residential users
- Access and Transport Layer
  - PSTN/PLMN
  - 3G mobile users
  - TGW
  - LAN
  - Fixed BB Access
  - RGW
  - AGW
- Media Layer
  - IPX
- Control Layer
- Applications Servers
- Media Server
- IMS UMTS Access
- 3G mobile users
- Residential users
- Enterprise customers

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Main Drivers for Network Evolution

- CAPEX/OPEX optimisation
- New revenue generation

Next Generation Network

- PSTN (TDM-based)
- Data (IP or ATM)
- SS7

Main Drivers for Network Evolution

- CAPEX/OPEX optimisation
- New revenue generation

Next Generation Network

- NB access
- BB access

- POTS/ISDN
- Dial-up
- POTS/ISDN
- H.323/SIP
- xDSL

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About “Alice” and “Free”

- **Needs NGN**
  - to reduce operating cost to be more competitive in price
  - extend to multimedia real time communication services

- **Needs NGN**
  - to control service delivery (e.g. resource reservation) and end to end QoS
  - extend telephone services to fax, modem and special services
  - grow its prices and revenues with a better quality service delivery scheme
PSTN Evolution Towards Voice over Packet

PSTN
(TDM-based)

Data
(IP or ATM)

Softswitch

IN

INAP

SS7
LEX/TEX

NB access

Dial-up

POTS/ISDN

VoDSL

Trunking GW

Access GW

H.248
Megaco

H.248
Megaco

H.248
Megaco

Residential GW

BB access

POTS/ISDN
IP-based Telephony & Multimedia Services

- PSTN (TDM-based)
- SS7
- POTS/ISDN
- Dial-up
- NB access

- Data (IP or ATM)
- BAS
- H.323/SIP
- xDSL

- Softswitch
  - SIP, Parlay
  - H.323, SIP

- Application Servers
  - IPDC
  - NAS
  - VoP GW

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Service related control of QoS
What about access and core?

- **Access**
  - Mono domain
  - ATM Multiservice EBR/CBR VCs
  - Admission Control is a must
  - Links with Security and NAT

- **Core**
  - IP Diffserv not enough
  - MPLS for guaranteed traffic flows
  - Is admission control needed?
  - Multi-domain is a must for public services

Still a number of questions - More for research & standardization
The convergence is in Next Generation Network

A public communication network with:

- A layered architecture
  - Clear separation of access/transport, media, control and services layers
  - Standards-based components
  - Open interfaces between the layers

- A common, packed-based infrastructure
  - Seamless control of multiple transport technologies (IP, ATM)
  - Interoperability with existing networks (circuit and packet, fixed and mobiles)

- New revenue-generating services
  - Leveraging broadband access
  - Leveraging mobile access as well
  - Voice, data and multimedia applications
  - Open Service Provisioning model
NGN generating value

Where is the value?

- in person-to-person real time communications
- in secured person-to-person or person-to-machine communications
- in ability to reach people, customers, consumers everywhere, anytime
- in delivering valuable services and applications
- in providing access to mass users
- in networks that enable the delivery and charging of profitable services with the appropriate level of quality
Services and Applications are the main drivers

NGN will not replace, but extend PSTN and Internet over time
  • Capitalise on the **installed base** to reduce CAPEX
  • Optimise **network operations** to reduce OPEX
  • Introduce **new applications** for new revenues

New advanced and MM services are key differentiators for network revenue generation
  • Allowing Network Operators to act as Application Service Provider and Retailer
  • Allowing Network Operators to offer advanced communication services to Enterprises helping them to better reach the consumer
  • NGN MM is a way to generate revenues from broadband accesses
3 - The CoE workshop on NGN economics

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Why NGN Economics?

To answer operator requests about economics for NGN

Where I should go?
How shall my network evolve?

What are the impacts of an NGN solution?

When shall I invest?

TDM / NGN
Gateways
Broadband
Lex, Tex
Trunking VoIP
IP backbone

Revenues
CAPEX
OPEX
Break-even pt
Delta Cash Flow

R.O.I.
Operators may be facing several and not always exclusive issues concerning their market and their network:

- Network expansion
- Competition aspects, both for incumbents and new entrants
- Regulation
- New services introduction

Some important questions may arise:

- If I follow that strategy, will the business be profitable?
- Which from the available solutions is the best one for my business?

NGN Economics may answer them by showing the value of the business and the general solutions deployment trend to be followed.
The workshop has been built as part of a cooperation agreement between Alcatel and ITU-D for the Centers of Excellence CoE
- Already performed in several places (Bratislava, San Jose de Costa Rica and Damascus)
- Further workshop planned for Dakar and Tunis, under discussion for East Africa and Eastern Europe

Built in three major parts based on Alcatel business evaluation and network evolution modeling tools
- NGN economics for PSTN evolution
- NGN services and business modeling
- ADSL deployment
Purpose of the Economics for PSTN evolution

- identify the various cases encountered by operators
- describe the driving economic factors
- show and demonstrate an evaluation methodology
- evaluate some PSTN evolution cases

Based on a comprehensive input collection, network dimensioning, architecture, Capex and Opex modeling tool

Keeping in mind that cases and their conclusions might be quite different from one operator network to another
Model Architecture

DEMAND CHARACTERIZATION

- Number of lines per type of access
- Traffic per access line
- Network characteristics

network evolution strategy

Network Dimensioning

- Operational Cost drivers
- Investment Cost drivers

Opex Costs parameters

- Capex Unitary Costs

General methodology to evaluate OPEX and CAPEX

OpEx

CapEx

Operator data
Model calculation
Supplier input, influenced by technological solutions
Studied PSTN Evolution cases

- **NGN CLASS 4 (transit level)**
  - concerns only the evolution of the transit network to NGN
  - transit exchanges (TEX) are replaced/migrated to NGN
  - existing local exchanges (LEX) supporting subscribers remain untouched (kept in TDM technology)
  - can be understood as a partial evolution

- **NGN CLASS 5 (local level)**
  - local exchanges (LEX) are replaced/migrated to NGN
  - this case implies also a Class 4 NGN part
Examples of Outputs

**Capex**

**Personnel expenditures**

**Capex / year**

**NOTICE:** the data shown in this slide are not representative of any real Case
NGN services business modeling

- Purpose of NGN services business modeling
  - Mainly concern new services over broadband (DSL) access with the key business issues
  - finding ways to add value to the basic fast internet service of DSL accesses?

- Session include
  - in depth analysis of various IP based or NGN related services
    - which services ?
    - for which customers ?
    - which potential revenues?
    - Where are the costs, who are the other actors, is it impacting another profitable service ?
  - modeling the business generated by new services, using the Alcatel tool with scenarios built by the participants (work groups)
Service modeling and Value Chain

Bottom up services Analysis

Possibility to move up the value chain

Content
Application & Service
Network

Content
Application & Service
Network

Content
Application & Service
Network

Content
Application & Service
Network

Extended infrastructure

Existing Network

Macro-segments
Macro-economic analysis

Macro-economic analysis
Model Architecture

- Users Scenario
- Service model
- Revenues
- Cost allocation
- Cost drivers
- Cost
- Financial Results
- Financial data
- Sensitivity Analysis
- Impact of Services
Example of results

Services cost per year
(years pile up from 2003 to 2007)

Beware: Not same Scale!

Illustration Only
Merci à tous
Tous mes voeux de succès pour la suite du séminaire