

Session 6



ITU Regional Seminar on Costs and Tariffs Regional Group for Asia and Oceania

Charging trends for NGN and Market Dynamics

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Oscar González Soto
ITU Consultant Expert
Spain

oscar.gonzalez-soto@ties.itu.int

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Agenda



- **Charging elements**
 - **Capacity and Traffic related units**
 - **IP traffic characterization**
- **Charging strategies and trends**
 - **Charging and accounting principles for NGN**
 - **Pricing and Market dynamics**

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Capacity, Costing and Charging units related questions



- What units to consider for dimensioning and engineering?
- What units to consider for interconnection and SLA?
- What units to consider for costing and charging
- How to monetize BW consumption increase?
- Impact of packaging and competition?
- Others.....?

Network Capacity Dimensioning



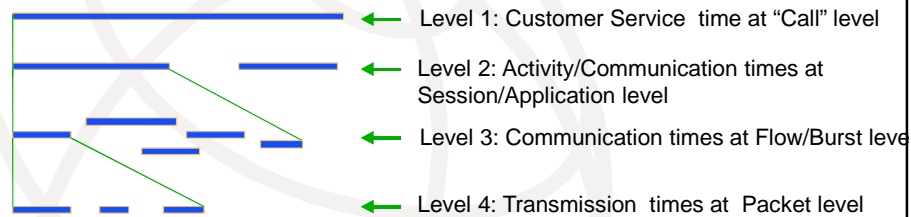
Service demand Characterization

- ◆ By a profile through days in a year/week
- ◆ **By a busy period within a day** → **Dimensioning**
- ◆ By superposition of non-coincidence of busy periods (for inter-country traffic in different time zone)
- ◆ By aggregation or convolution of flows for different services
- ◆ By interest factors between areas (adjusting matrices in the two dimensions ie: Kruithof, affinity, correlation)

Traffic Characterization for NGN



- Hierarchical modelling for call driven communications generating traffic flows in NGN



- Aggregated average traffic per level as a weighted average of the services categories (i) and customer classes (j) at that level.

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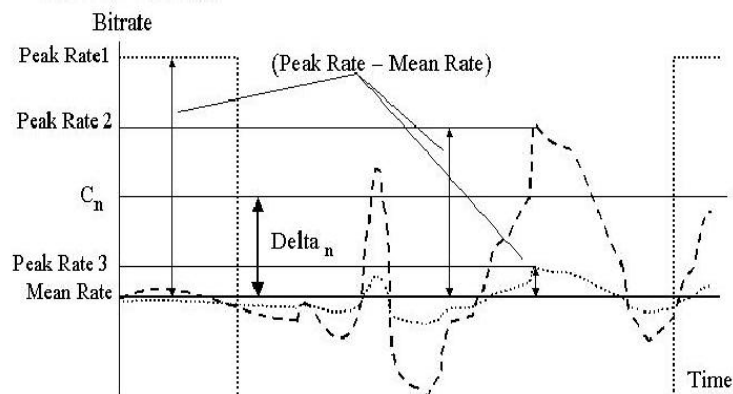
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Traffic Characterization for NGN



- Different relation between peak traffic and average traffic per service classes: CBR (1), VBR(2), VBR(3)



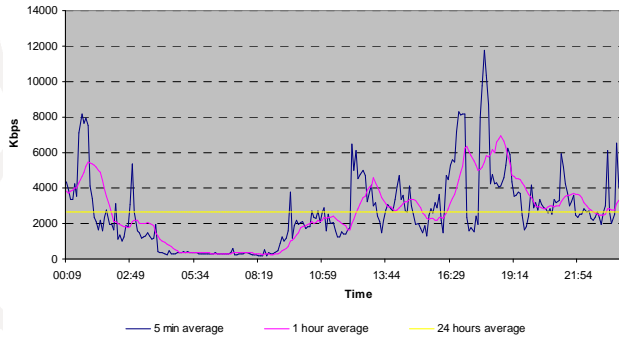
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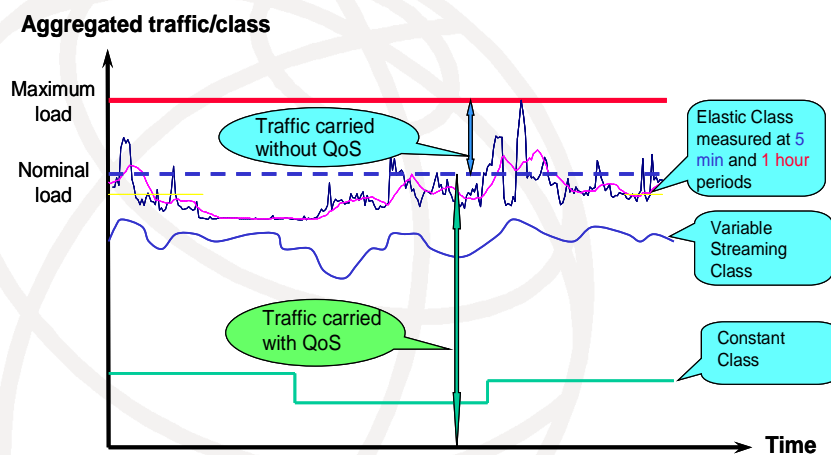
Example of time-scale influence on measurements

Variation per measurement averaging period at ENST campus measurements for advanced internet applications



- Impact of averaging period
 - ▶ 1,8:1 ratio between "5 min" and "1 hour"
 - ▶ 2,3:1 ratio between "1 hour" and "24 hours"

Example of aggregated flows per category



Traffic units for aggregated flows

- Traffic Units definition for network dimensioning with Quality
 - ◆ Equivalent Sustained Bit Rate (ESBR) or aggregated equivalent rates for same QoS category flows in a common reference busy period (ie. 5 minutes)
 - ◆ Computed as weighted average of the services at QoS category (i) and customer classes (j) at each network element: $\sum_i \sum_j \text{ESBR}_{ij}$

Dimensioning Criteria

- ◆ **Stream traffics** need reserve capacity procedures like MPLS and Call Acceptance Control (CAC) in the access and may be modeled with equivalent bandwidth methods.
 - ➔ Available **multi-rate formulas** with different peakness factors for a given quality.
- ◆ **Elastic traffics** may be modeled with resource shared models.
 - ➔ Available **"processor-sharing"** one that provide a minimum capacity and a delivery speed as a function of simultaneous users
- ◆ **Constant rate** traffics need to be aggregated and reserved on top of the others with a given protection factor
- ◆ Overall dimensioning will be a combination of the previous procedures with different degrees of detail as a function of the model granularity

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 - Charging and accounting principles for NGN
 - Pricing and Market dynamics

Charging and accounting principles for NGN

Objective economic principles

- *Allocation efficiency* requires that resources, products, and services are allocated to the person or persons who value them the most. For this to happen, consumers of final products or services should pay prices that reflect the cost of the resources used to provide those products or services
- *Productive efficiency* requires that market participants use scarce resources as productively as possible. This means that the most efficient provider should not be precluded from serving customers
- *Dynamic efficiency* requires that all firms (entrants and incumbents) should have proper incentives to invest in technologies that reduce costs and/or expand product offerings

Charging and accounting principles for NGN



Cost allocation principles

- Several variants for calculating x-LRIC were used in the past as a function of the considered cost components and now it is recommended to have a complete consideration for all incurred costs in the planning life cycle of the involved resources **TSLRIC (Total Service Long Run Incremental Cost)**. **Standard revenue margins need to be considered** to guarantee business sustainability and neutrality for the different types of operators.
- Costing to be based on capacity in terms of resources utilized. When applying these generic economic procedures to the specific IP technologies it has to take into account that **packet mode switching uses resources as a function of the packet flows** through the network and not time.

Charging and accounting principles for NGN



Cost allocation principles

- The generic **Activity-Based Costing (ABC)** allocates direct and indirect costs to a service as a function of the cost drivers for any service on the network resources. Indirect costs are allocated according to an analysis of cost drivers. These activity-based costs constitute the directly and indirectly attributable costs
- Evaluation may be done with a gross model and only main cost factors or in more complete detail that implies a careful cost assignment to each service and the use of powerful tools like the Strategic Telecom Evaluation Model (STEM)

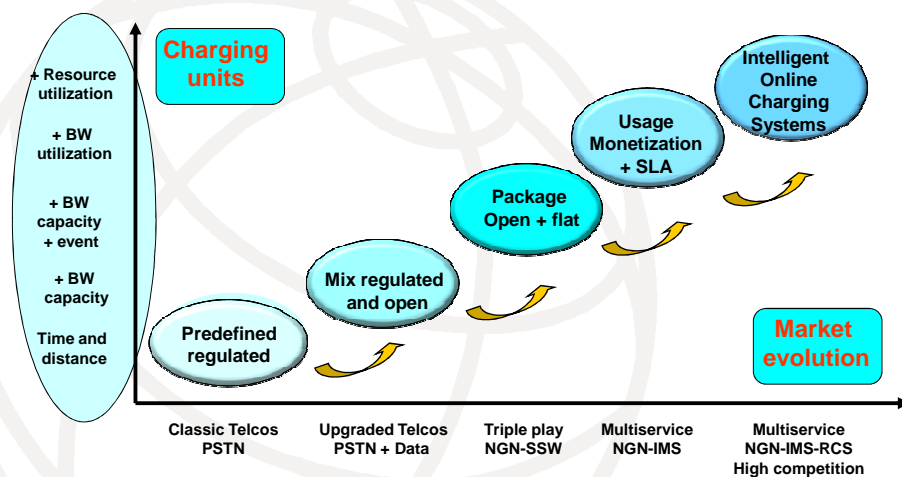
Charging and accounting principles for NGN:

Trends in charging

Taking into account the consumer side and from the initial most common charging on PSTN, a major evolution is taking place on two dimensions:

- **Migration from a static charging** per customer based on few parameters towards the aggregation of multiple parameters for multimedia services like bandwidth, content and QoS values in a **dynamic manner**.
- **Incorporation of market driven procedures** like the Online Charging Systems (OCS) that take into account competition influence with per call personalized offers as a function of service bundles, service buckets based on consumption volume, service priority, time of the day and week, negotiated SLA, etc.

Pricing and Market dynamics Charging evolution on Units and Market dimensions



Two dimensional view for charging systems: Units & Market Intelligence

Charging and accounting principles for NGN

- Which units used to evaluate traffic utilization ?

Traditional

- Ports associated to customers per class
- Calls generated at user interface
- Erlangs originated/terminated at user interface

New

- Sessions/Flows/Information/requests generated at user interface
- Packets handled at a given resource through the network
- Mbits transported through a given network link/path

Charging and accounting principles for NGN

- Requirements for service flow units:
 - Quantifiable with well defined engineering rules
 - Useful for interrelation between demand/dimensioning/costing for a given QoS and SLA
 - Reflecting service provisioning and market value across multiple networks
 - Applicable to multiservice/multimedia flows

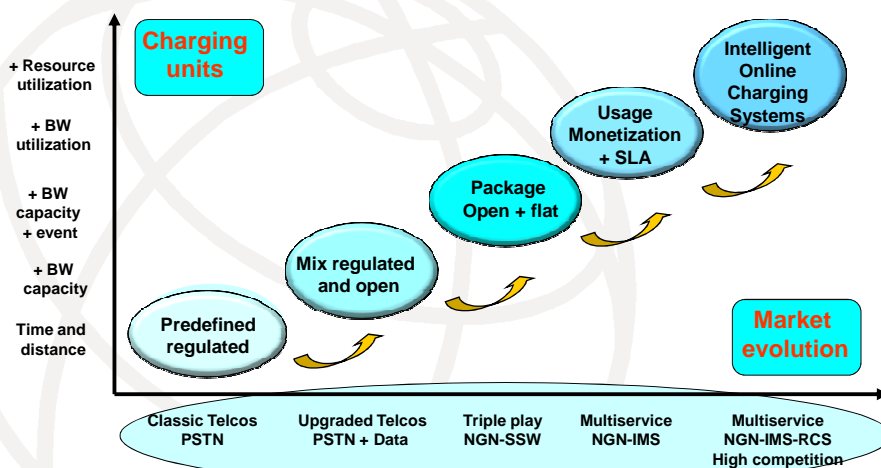
Charging and accounting principles for NGN

How to use dimensioning and costing units for charging?

- Interface or link gross capacity?
- Required Bandwidth at busy period?
- Consumed Information Volume. By linear function or stepwise. Related to QoS?
- Event driven. Individual or category?
- Resource Usage time. Cloud computing case?
- Content type. Premium service. Value added service?

Or a combination of the previous ones by a polynomial function based on driving costs

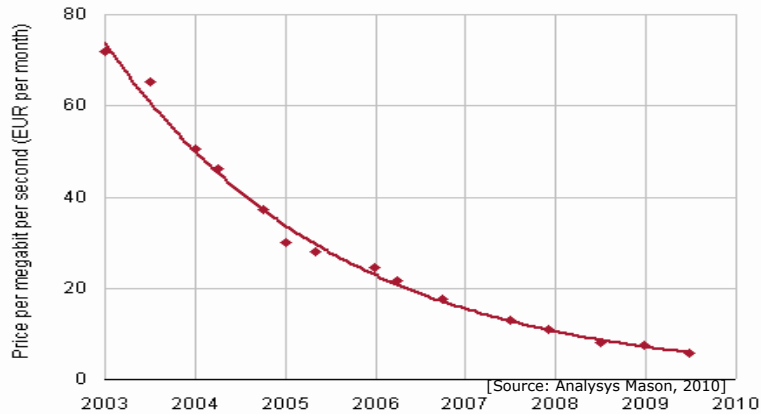
Pricing and Market dynamics Charging evolution on Units and Market dimensions



Two dimensional view for charging systems: Units & Market Intelligence

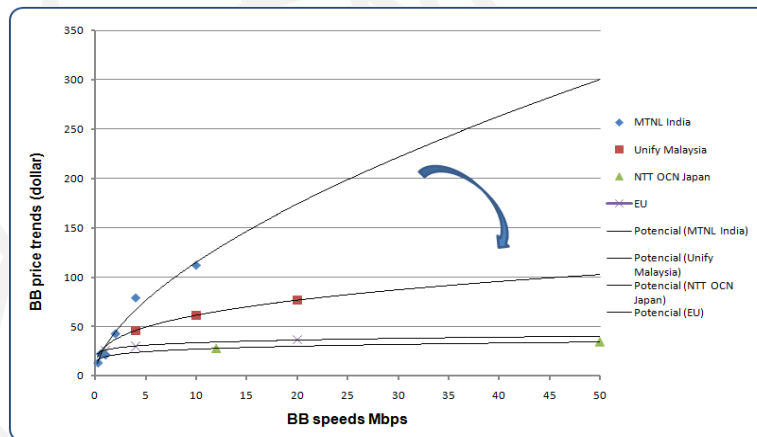
Pricing and Market dynamics

Example of price based on cost reduction for fixed BB residential access in EU



Pricing and Market dynamics

Example of trends in price per bandwidth at several APAC countries and EU



Pricing and Market dynamics



Evolution of market dimension towards a competitive market

- Mono service **fixed and regulated** or monopoly
- New services open to **market equilibrium**
- **Packages or bundles** by grouping set of services per consumer type
- Introduction of **flat tariffs** for simplification and consumption promotion
- Introduction of **mixed flat tariff and variable** based on QoS and higher volumes of consumption for very high BW especially on mobile
- Introduction of **dynamic based charging per customer type**
- Introduction of **dynamic based charging per call and customer type**

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Pricing and Market dynamics



Importance of **monetization of BW consumption** when coincidence of high speeds and high dispersion between consumers consumption

- Smart phones reach 50% of sales in 2010
- **High increase of video applications** on fixed and mobile applications (today is the dominant application)
- Smart mobile phones, Tablets and PCs increase the demand and in approximate **(x20)** in transport traffic and up to **(x10)** in signaling

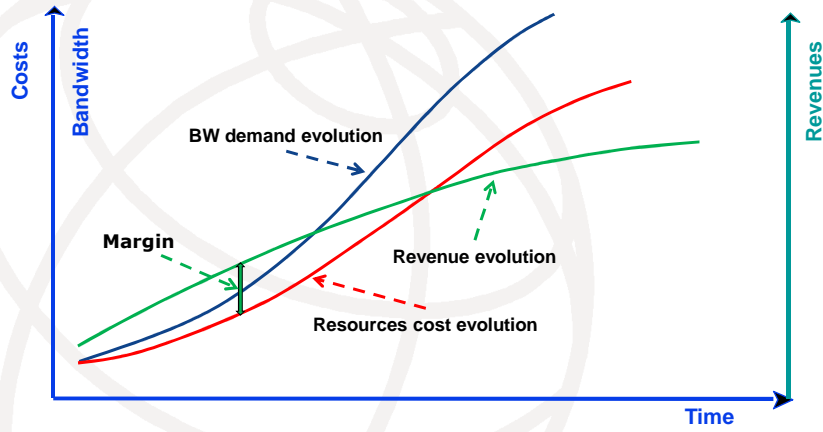
Need for **policy based services management** at network operation, attenuate busy periods and at charging procedures to avoid congestion and reach fairness

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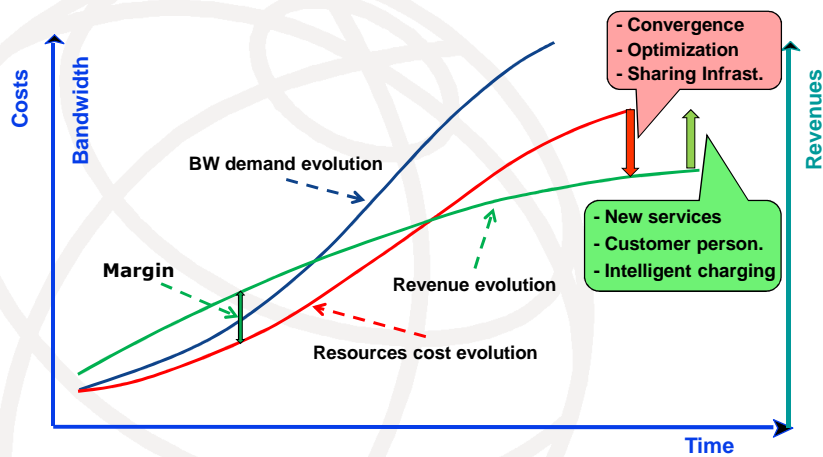
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Pricing and Market dynamics



- Evolution of Bandwidth demands, costs and revenues in a mature market

Pricing and Market dynamics



- Actions to ensure profitability in high consumption demands
- **Active role of intelligent charging**

Pricing and Market dynamics



Intelligent charging and services personalization is possible with IMS and NGOSS functions like:

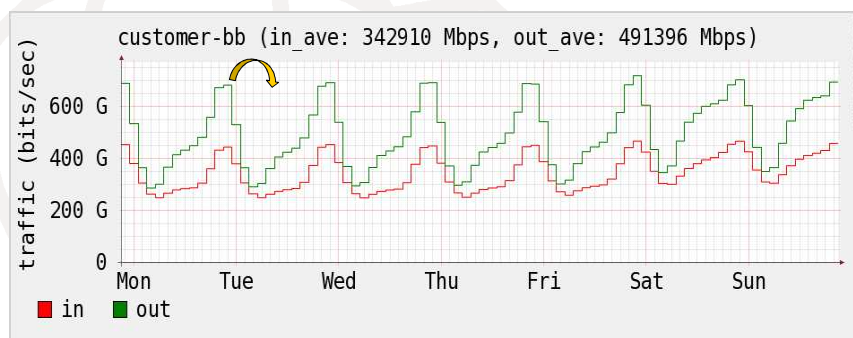
- Adaptation to customer profile needs and Intelligent Content Delivery (ICD) services
- Traffic shaping, QoS management and charging policy to optimize network utilization
- **Attenuation of busy periods**
- Volume discount for heavy users
- Premium content offers
- Increase loyalty and decrease churn

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Pricing and Market dynamics Attenuation of busy periods by intelligent charging



Kenjiro Cho (IJJ/WIDE), Nov 2009

- Traffic daily profile in Japan 2009: (daily periodicity, important peakness for busy period and asymmetry Down/Up due to video applications)

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Pricing and Market dynamics

Intelligent Charging as an active optimization for revenues and resources

- **Online Charging Systems (OCS)**
 - Real-time discounts or offers
 - Currency-based spend controls
 - Balance sharing policies
- **Subscriber Policy and Charging System (SPCS)**
 - Clear view of all usage costs
 - Apply policies and limits across all devices
 - Notifications & alerts and Advice-of-Charge
 - Sharing, discounting and usage based policies
 - Personalized, dynamic discounts and offers

Recommendations

- Migrate from time based charging towards a **multi-parameter based charging** considering IP traffic characterization
- Apply **ABC methodology** for evaluation of bottom business per service or service packages
- Introduce **market dynamics** to monetize BW and implement **intelligent subscriber policy and charging systems**