

TEACHER'S LESSONS

COURSE NETB 341

**NEXT GENERATION
NETWORKS
(NGN)**

FULL ENGLISH VERSION

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1. 1. INTRODUCTION

The term "next" generation networks (NGN) refers to the future competitive marketplace for communications and information services.

It is generally accepted that Next Generation Networks do not represent specific technologies but rather a vision and a market concept enabled by different types of technologies.

NGN are implemented in such a way that the functions performed by the network are separated into different functional planes.

The functional planes are separated by open interfaces in order to facilitate the interconnections to other operators' networks and the integration of third-parties' services and applications.

NGN are multi-service networks that can be used to provide multiple services as opposed to legacy networks that are only used for specific services.

These all make the NGN very friendly for operator interconnection and technology convergence that will enable the emergence of the seamless service concepts, where users can access their "home" services from any type of access networks.

1.1.1. Market drivers

The world is becoming more and more personalized and information-centric with an always-anywhere-on-demand character.

- Deregulation is opening up the floodgates for competition.
- Incumbent operators are working to improve their business as carriers for many operators and service providers including value added services.
- For both purposes they need an improved network intelligence to do that efficiently and profitably.
- The new carriers would like to find the network intelligence that will provide their own carrier control and retail control over all the way to the edge of the network.
- Fixed networks operators who do not adapt their network intelligence on time will find that they will lose a huge part of their business.
- Telecommunications today are much more consumer-driven rather than technology/ product-driven.
- There is a strong demand for bandwidth and many services that are bundled together, often in a multimedia format.
- Customers want one-stop service, which means that operators have to change the service provision accordingly.
- They need also mobility, which means that fixed operators have to create virtual mobility through their networks.
- The trend is therefore towards fixed-mobile convergence, where all the operators are moving towards one type of network for all services.

1.1.2. The evolution of the industry

- In the well-developed European countries even the high number of users of fixed and mobile networks can not guarantee the healthy traffic revenues for Telecom operators in the increasingly competitive environment.
- To survive on the extension of the service layer and to deliver more and more applications, they have to focus their activities in order to maximize the potential revenues from the network infrastructure investments already made.
- Developing countries in the Central-European region are in the process of a similar network modernization procedure.
- At the same time the utilization of the networks is much lower in these countries. It means that the average traffic per subscriber is lower, which leads to considerably lower traffic revenues.
- Most of the incumbent Telecom operators are still the major telecommunications infrastructure and service providers in their countries. Their goal is to remain in the same leading position in the coming years by the network modernization.
- They need the introduction of centralized Telecommunication Management Network and effective Operation Support Systems, the required infrastructure modernization combined with the optimization of internal processes, existing network and human resources.
- The telecom industry will focus on IP-centric telecommunications world, where mobility is a fundamental and ubiquitous characteristic.
- Nevertheless, there are several primary considerations:
 - Protection of its customers' current revenue streams, both from classical voice services and from corporate data communication services and
 - Generating new revenue streams from innovative services and applications.
 - The emerging competition between network operators and service providers is fundamentally changing business behaviour.
 - It is more important to concentrate on serving that demand than to simply choose a particular technology. Service is a matter of time to market, quality and price rather than technological choices.
 - Most network operators and service providers face increasing risk coming from:
 - an unpredictable growth in both fixed and mobile applications and communication services.
 - new traffic demand dynamics, generated by competing operators, increasing interconnect traffic and mobility.
 - Vast range of technology choices offering a growing number of new solutions to satisfy end-user service needs.

1.1.3. Business processes

- Understanding of the total business process and the required technology change is more important for business success than the adoption of a particular network technology.
- Customer care, billing, service activation & control and network element management affect business results more fundamentally than the transport and switching techniques being used in the network.
- The effectiveness of the business processes and the requirements on the network itself are strongly supported by the development and implementation of layered network architecture.

1.1.4. Changing Scenario in the telecommunications market

- New industrial environment
- New professions (network operators, service providers, content providers, access providers, hardware suppliers, tool makers, distributors...)
- New multiform actors (system houses, manufactures of final products and systems...)
- New various marketing means, tools and prices (embedded software, role of Internet, price from "sold" to "free of charge"...)
- New user's expectations and possibilities
- Convergence means New Business Models and New Relationships among different actors are arising

The NGN architecture will provide Service Providers with:

- A service brokering function to enable a chargeable and controllable application ecosystem Generic capabilities.
- A set of multimedia conversational applications to be commercialized by the service provider himself
- Always-on broadband access
 - Convergence of fixed and mobile networks
 - Convergence of voice and data services (e.g. VoIP)
 - Evolution from voice to multimedia applications.
- Evolving terminals and advanced user interfaces
 - From PBX to IP-PBX and IP Centrex services
 - From e-mail and v-mail towards Unified Messaging
 - End-user empowerment through self management.
- Opening the business for competitive voice ft data services
 - Separation of Access, Transport, Control and Services layers
 - Changing models for network and service provisioning
 - Moving from Leased Lines to voice and data VPNs.

NGN is attractive for operators

- This type of network architecture is particularly attractive to operators entering the voice market.
- This is the case for cable operators that use the Docsis2 standard (with voice over IP), operators that make use of local loop unbundling, and long distance carriers that want to offer local services.
- Traditional operators who are equipped with the latest TDM phone switches are still less motivated. Although a single network is more economical to maintain and operate.
- This architecture is also well suited to the introduction of multimedia mobile services. However the uncertainty about the arrival of UMTS is still slowing down the architectural evolution of these networks.

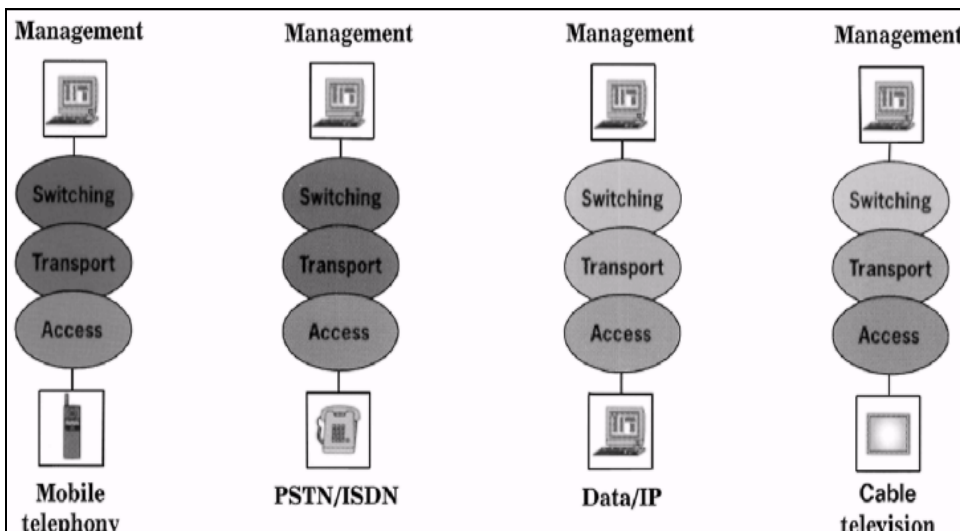
1.2. ARCHITECTURAL CONCEPTS

1.2.1. Telecommunications network development alternatives

- Migration and convergence are the key words for telecommunications at the start of the 21st Century.
- Infrastructure is converging - the existing telecommunications services such as voice are migrating to solutions based on packet technology.
- Operators realized the benefits of offering bundled services that allow their customers to obtain all their data, voice, fixed and mobile communication needs from one provider.
- Operators need a network solution that is optimized for delivering both telephony and data communications services efficiently.
- NGN - is the next challenge for fixed and mobile networks operators.

Main characteristics of the architecture in traditional telecommunication networks:

- The traditional network architecture implies separate, vertically integrated networks with its access, switching and transport infrastructure and technologies.
- Different sets of services are developed and implemented in each type of network.
- As an exception voice and data services are integrated into the particular networks using technologies for transporting and switching the services (ISDN).
- Network convergence, service convergence, transport and switching integration can not be achieved in an optimal way in the old architecture, it is therefore difficult to implement new services.
- Today's Vertical Network Infrastructure makes efficient Communication difficult



Source Ericsson