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Next Generation Networks (NGNS)

Harpreet Kaur[1] and Shivam Maini[2]

[1,2]Dept Of Computer Science S.R. Govt College (W), ASR
E-mail: [1]harpreetsethi.27@gmail.com, [2]sh_asr@yahoo.co.in

Abstract—*NGNs as a network based on packet transfer, enabling to provide services, including telecommunication services, and is capable of using several broadband transmission technologies allowing guaranteeing QoS . The functions related to services are at the same time independent of the basic transmission technologies. NGN provides unlimited user access to different service providers. It supports general mobility providing the users with consistency and availability of services.The next generation networks are a vision of a converged network, meeting all the requirements for a converged universal packet network of the future.*

Keywords*: Broadband,Converged, Mobility, Packet Network ,Telecommunication.*

1. INTRODUCTION

The Next Generation Network (NGN) is important for public network carriers as for them it could be an innovative and effective way to differentiate by offering a number of various value-added services at a lower cost, and consequently survive and even prosper in a highly competitive market. The NGN is a broad concept covering a variety of network types from wired to wireless, and from telecommunication to computer. It was designed to use a common network protocol to carry all data/service/ application which may be carried by different data/service/application-specified networks currently over a common and open network infrastructure. he NGN is also capable of generalizing mobility and converging services between mobile and stationary devices, retain compatibility with legacy systems, and allow users to select service providers unrestrictedly.

NGN network is the network of new generation, whose philosophical basis consists of unification of data, telephone and mobile networks including their services into one network concept .The concept of such network is not simple and is permanently development. It will bring wide range of possibilities to introduce new and existing technologies in field of information transmission and processing, but also many possibilities especially in the branch of network services.

Windows Filtering Platform (WFP) is a new architecture in the Next Generation TCP/IP stack that provides APIs so that non-Microsoft ISVs can filter at several layers in the TCP/IP protocol stack and throughout the operating system. WFP also integrates and provides support for next-generation firewall features such as authenticated communication and dynamic firewall configuration based on an application's use of the Windows Sockets API. ISVs can create firewalls, antivirus software, diagnostic software, and other types of applications and services. Windows Firewall and IPsec in Windows Server 2008 and Windows Vista use the WFP API.

2. ESSENTIALS FOR NGN

NGN required "broadband managed IP networks", includes next generation "core" networks, which evolve towards a converged IP infrastructure capable of carrying a multitude of services, such as voice, video and data services, and next generation "access" networks, i.e. the development of high-speed local loop networks that will guarantee the delivery of innovative services. It requires:

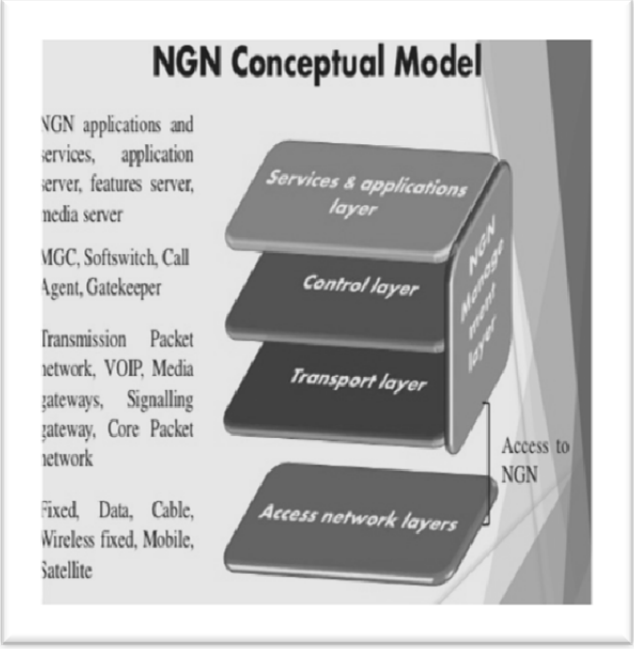
- High-capacity packet transfer within the transmission infrastructure, however, with a possibility to connect existing and future networks (be it the networks with packet switching, circuit switching, connection-oriented or connectionless, fixed or mobile).
- Separation of managing functions from transmission features. Separation of service provisioning from the network and ensuring the access via an open interface and thus a flexible, open and distributed architecture. Support for a wide range of services and applications by using the mechanisms based on the modular and flexible structure of elementary service building blocks
- Broadband capabilities, while complying with the requirements for **QoS** (Quality of Services) and transparency. Possibility of a complex network management should be available. Various types of mobility (users, terminals, services). Unlimited access to a variety of service providers.
- Various identification schemes and addressing which can be translated to the target IP address for the purposes of routing in the IP network
- Converged services between fixed and mobile networks (as well as voice, data and video convergence). Various

categories of services with the need of different QoS and classes of services (**CoS**).

- Conformance to the regulation requirements, such as emergency calls and security requirements in terms of personal data protection.
- Cheaper and more effective technologies if compared to the current technologies.

3. NGNS CONCEPTUAL MODEL

The conceptual model is to determine functional layers (covering similar functionalities), their entities, reference points (interfaces) and information flows between them. Such a model then can be mapped more easily into the physical reference architecture.



1. Access Network layer

The access layer provides the infrastructure, for example an access network between the end user and the transport network. The access network can be both wireless and fixed and it can be based on various transport media.

2. Transport Layer

The transport layer ensures the transport between the individual nodes (points) of the network, to which are connected access networks. It connects physical elements deployed in the individual layers It also enables the transport of different types of traffic, media (signaling, interactive data, real-time video, voice communication, etc.)

3. Control Layer

The control layer includes the control of services and network elements. This layer is responsible for set up/establishing, control and cancelling of the multimedia session. It ensures the control of sources as well, depending on the service requirements. One of the fundamental NGN principles is the separation of control logic from the switching hardware.

4. Service Layer

The service layer offers the basic service functions, which can be used to create more complex and sophisticated services and applications. It controls the progress of the service based on its logic.

In an NGN, there is a more defined separation between the transport (connectivity) portion of the network and the services that run on top of that transport. This means that whenever a provider wants to enable a new service, they can do so by defining it directly at the service layer without considering the transport layer – i.e. services are independent of transport details. Increasingly applications, including voice, tend to be independent of the access network (de-layering of network and applications) and will reside more on end-user devices (phone, PC).

4. THE NGNS INTERNET PROTOCOL

NGNs attempts to redefine the network infrastructure based on the current Internet and PSTN/ISDN networks, thus, as the dominant network protocol in the network world, the Internet Protocol is selected as the network protocol to carry data and deliver services/applications from the network edge to the core within an NGN infrastructure.

5.1 The Internet Protocol Suite

There are two basic methods used to transmit data: packet-switching and circuit-switching.

In a circuit-switching network, like PSTN/ISDN, the system decides and then establishes the path (circuit) for data transmission based on the system preloaded algorithms before data transfer begins, and during the entire data communication process the path is always-on, dedicated and exclusive, and will not be closed until the conversation ends. Thus, the entire message is transmitted between two nodes through a dedicated route in order and with a constant bit rate (Roberts, 1978).

In a packet-switching network, data is encapsulated into small segments called "packet" by the network protocol used. Each packet contains data payload and related control information, and travels through same or different routes. At the destination node the packets arrived are reassembled by the network protocol to make up the original data again.

5.2 IPv6: The NGN Network Protocol

Internet Protocol version 6, or IPv6 for short, is a later version of IP suite; it is selected as the primary network protocol for the NGN. The transition to IPv6 is usually considered important as the Internet will run out of its IPv4 addresses in the next decade, and IPv6 can provide many more potential addresses (2128 vs. 232). But the improved overall performance of the IPv6 Internet, including higher network throughput, enhanced QoS and etc, is also significant. (Bradner & Mankin, 1995) .

IPv6 has been developed for over a decade; its development was initiated in early 1990 by IETF (the Internet Engineering Task Force) to "address perceived scaling problems in the Internet's addressing and routing architectures" (Nightingale, 2007). Now it has been widely accepted and deployed in the telecommunication industry, its commercial implementations are emerging on a large scale to replace its previous version.

5. CONCLUSIONS

A next-generation network (NGN) is a packet-based network which can provide services including Telecommunication Services and is able to make use of multiple broadband, quality of Service-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It offers unrestricted access by users to different service providers. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users. And also usage of its conceptual model that is very helpful for network problems that is configured with different layers. NGN is a different concept from Future Internet, which is more focused on the evolution of Internet in terms of the variety and interactions of services offered.

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