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INTEGRATED TELECOMMUNICATION TECHNOLOGY UA-ITT IMPLEMENTATION PERSPECTIVES

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Abstract

This paper focuses the Next Generation Networks (NGN) challenges along with implementation perspectives of advanced Integrated Telecommunication Technology made in Ukraine (UA-ITT). The UA-ITT introduces a sophisticated method of dynamic digital flow control to meet high QoS-demands and to benefit both packet- and circuit-switching techniques in a converged telecommunication network.

Анотація

Даний матеріал висвітлює проблеми мереж наступних поколінь (NGN) та перспективи впровадження новітньої інтегрованої технології телекомунікацій, яка розроблена в Україні (UA-ITT). Технологія UA-ITT запроваджує сучасний метод динамічного управління цифровими потоками для підтримки високих вимог якості обслуговування та об'єднує достоїнства техніки комутації пакетів і комутації каналів у конвергентній телекомунікаційній мережі.

Introduction

The new challenges in telecommunication market stimulate searching for enhanced technologies. In this respect, a new trend of network convergence emerged within the last decade. The ITU-T formulated in 2004 an abstract concept of network convergence in terms of the NGN directive network framework, [1]. One of the most commonly used motto for the NGN perspective is "All over IP and IP over all", fig.1. The reduced number of network layers aims to minimize the network overhead. However, there are some concerns of IP-based network convergence. Deploying enhanced broadband services over existing network infrastructure results in increase of network complexity. To overcome this, a broader understanding of NGN/ITU architecture provided in Y.2012 with decoupled service and application layers. The NGN concept implies a long-term evolution from the existing network infrastructure to the integrated NGN platform [2]. Therefore, the network and service convergence on the IP-basis could rather deem as an acceptable compromise towards the future and current interests of telecom companies. Therefore, more researches about this aspect toward NGN are required.

This paper aims to introduce made in Ukraine advanced Integrated Telecommunication Technology (UA-ITT) and outline the background perspectives of its implementation in NGN.

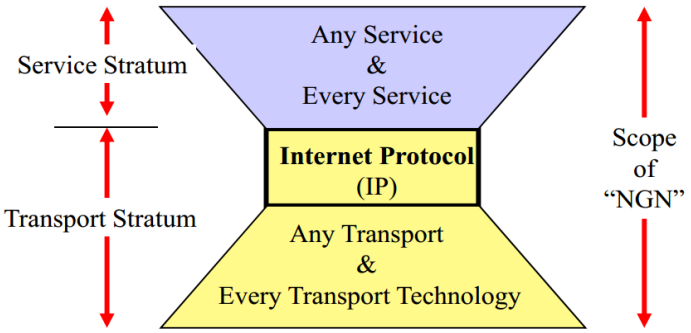

Figure 1 – ITU-T conceptual model of NGN

1. UA-ITT general architecture

The Ukraine Integrated Telecommunication Technology (UA-ITT) implies a completely new open system interconnection model (ITT-model) with three layers, [3]. Unlike the NGN/ITU model, the ITT-model provides connection oriented transport function within two in three lower layers: physical link layer (PLL) and network transport layer (NTL). The PLL and NTL layers embrace five OSI layers (from 1 to 5) and therefore, perform the telecommunication background for all network applications, fig.2. Each of the PLL and NTL layers are decoupled in two sub-layers (PLS, LLS, NPS and NLS).

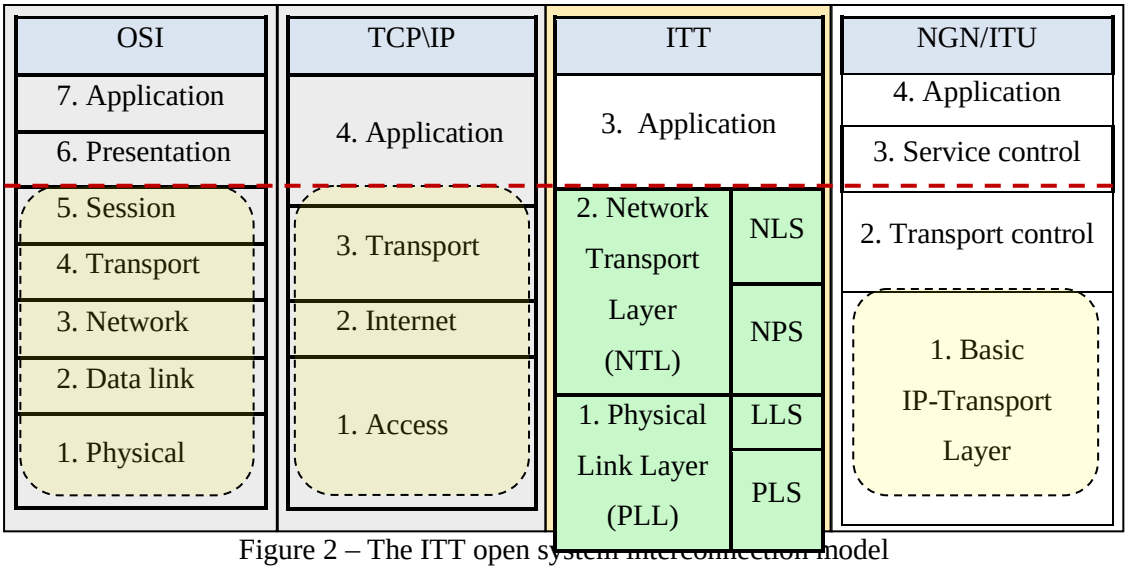

Figure 2 – The ITT open system interconnection model

The ITT-network infrastructure includes the global core network built on ITT switches (ITT-S), as well as local access networks built on terminal ITT switches (ITT-ST) and ITT-multiplexors (ITT-M) in subscriber premise, fig.3. The layer PLL specifies the behavior protocol for any couple of adjacent network interfaces. Any not neighboring network objects (switches and multiplexors) interact on the NTL layer (fig.3).

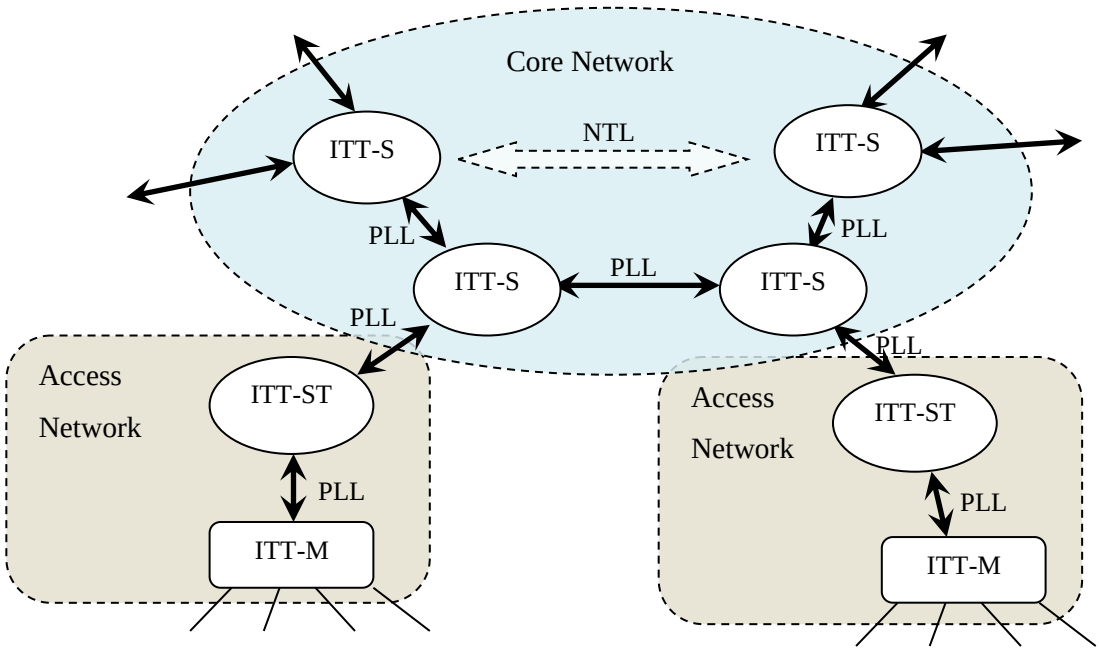

Figure 3 – The ITT-network infrastructure

2. UA-ITT implementation perspectives

The smooth transition from existing "all over IP" telecommunication infrastructure to the converged ITT-based transport network implies three typical cases to be implemented: a) to interact remote ITT-entities (clients and servers) over IP-network; b) to interact remote IP-entities over ITT-network; c) to interact ITT- with IP-entities. The first two cases may be provided via IP or ITT transit tunnels terminated by specific gateways GW1, GW2, fig.4. In case 'a', there takes place a limited ITT-functionality – solely datagram delivery (as IP is not connection-oriented protocol). In case 'b', the IP-entities will be provided with full IP-functionality (as ITT transport is invariant to all the traffic carried above). Moreover, the ITT-transport offers new opportunities to enhance any IP based service. The most disputable interaction case is 'c'. Apparently, for any couple of interacting objects, at least one of them must support both – IP and ITT – protocols.

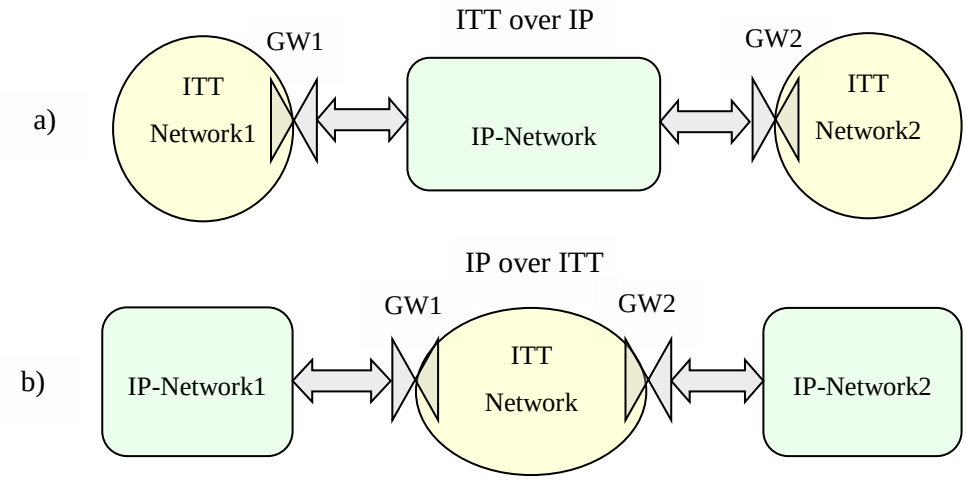

Figure 4 – The ITT to IP interaction cases

Conclusion

The researches on UA-ITT technology made in A.S. Popov Odessa National Academy of Telecommunication during last 7 years show that after being approved the ITT reference model could challenge the IPv6 NGN perspective and might be introduced in telecom market within next 10–15 years. The implementation of the UA-ITT technology promises a noticeable impact on network convergence process and quality of service improvement.

References:

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