

Telecommunications and Network Convergence: Theory and Practice

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Abstract

Introduction of digital technologies, telecommunications deregulation and significant advances in broadband networking are fueling convergence of the Public Switched Telephone Network (PSTN), PC-based enterprise data networks and the Internet. Only a few years ago, computing, telecommunications, broadcasting and media were completely separate industries each following distinct business logic and building on technologies that had little overlap. Today the Internet Protocol (IP) is clearly becoming a common global packet-platform over which several new and exciting applications and services can be offered. The rapid emergence of “converged networks” is already having far reaching impact on business processes. As the Internet continues to evolve into a critical global infrastructure, there is a clear need to understand the technical, economic and regulatory issues posed by convergence, before it can be used effectively for competitive advantage.

The Telecommunications and Network Convergence minitrack address different aspects of the phenomenon of network convergence, including technology, strategy and policy. By network convergence we imply the integration of several media applications (data, voice, video, images) onto a common packet-based platform provided by IP (Internet Protocol) with the global Internet now becoming a true multi-service infrastructure. Theoretical and simulation models, case studies, or field experiences were all appropriate research methodologies.

This year, we received a total of twelve submissions dealing with various aspects of network convergence. In collaboration with the track chairs, we decided to organize two sessions devoted to the minitrack and accepted three papers in each session for a total of six papers that were finally accepted. The *first* paper, “The Architecture of a Mobile Internet,” by Dick Schefström, makes the case that a wired Internet supporting mobility, may drastically change the mobile market situation possibly to a level where special mobile operators are not needed. These approaches are examined in the Radiosphere project reported in the paper. The *second* paper, “Convergence Through Solution Interoperability: Case Study of Integrated Telecommunication Design and Incremental

Deployment,” by Thomas A. Horan and Benjamin Schooley, uses a case study approach to examine contemporary market and policy influences on achieving converged networks in a mixed commercial and residential environment. Based on proposed implementations in the Denver area, the paper analyzes the role of interoperability as a mediating condition and discusses public policy implications.” The *third* paper, “A Layered Model to Address the Voice Over IP Regulatory Dilemma,” by Douglas C. Sicker, describes the current model of convergent communication networks and explains why this current model is deficient. It goes on to propose a unified model of convergent communications that addresses some of these deficiencies. Given the fact that regulation often lags technology, this is a timely issue.

The *fourth* paper, “A First Person IP over HDSL Case Study,” by Wayne Smith presents a well organized case study of Residential IP that is of particular interest to the academic community. Its primary value is in the enumeration of the transactions involved in the establishment of the service as this lends insight into the overall process of provisioning residential IP. The *fifth* paper, “Simulation Analysis of QoS Enabled Internet Pricing Strategies: Flat-rate Vs. Two-Part Tariff” by SeungJae Shin and Martin B. H. Weiss analyzes two alternative pricing strategies for QoS Enabled Internet Access. The issue is timely and relevant given the recent move in the direction of standards like diffserv, intserv and other QoS mechanisms. The authors further model two competing ISPs as two sides of a game theoretical formulation yielding interesting results. The *sixth* and final paper, “Network Convergence and the NAT/Firewall Problems” by Victor Paulsamy and Samir Chatterjee looks at Voice over IP technology that is fueling the rapid growth on network convergence and the successful deployment of converged networks within enterprises. However, most enterprises today sit behind Firewalls and also use private IP addressing behind NATs. These NATs and Firewalls cause significant problems for multimedia over IP to work and function properly. In this paper the authors present the details of the problems and issues associated with NATs/Firewalls and then survey some ways to solve this problem for SIP protocol. There is no single best solution yet. However, this paper discusses how such a simple and elegant solution can be built.