Abstract—With the convergence of telecommunication and information services and infrastructures to the realization of Next Generation Network (NGN), there is need for this emerging network to accommodate existing multimedia technologies and applications and paving way for easy deployment of future services. Highly available and dependable signalling is a key requirement for the NGN. This paper reports on work in progress to define the Next Generation signalling network architecture. The signalling system must accommodate different multimedia applications which span over heterogeneous networks.

Index Terms—Next Generation Network, Network Performance, Quality of Service, Signalling Transport

I. INTRODUCTION

The Next Generation Network is a multiservice packet mode transport network capable of interworking with legacy networks. As the transport is a packet based network, control and management messages do not require a separate network as in the case of circuit switched networks where common channel signalling is transported by the separate Signalling System No. 7 (SS7) network. A further attempt to elaborate on the visions of the NGN is discussed in [1]. Amongst other features of the NGN is the ability of packet switched data networks to interwork with voice circuit switched network via signalling, trunking and media gateways.

In this work in progress paper, we seek to explore the various Next Generation Network initiatives leading to a signalling network architecture concept for supporting multimedia applications across heterogeneous networks.

The objective of this work is: -

(1) To build a typical model for the signaling transport layer capable of supporting multimedia application across distributed computing nodes in a packet mode network.

(2) To map typical upper layer implementation such as the application and service layer onto the NGN [2].

(3) To structure the core packet based transport network for performance, reliability and high availability in order to support real-time services and multimedia applications.

(4) To design and dimension the signalling transport layer for traffic engineering.

Section II reviews the signalling and transport networks relevant to this work. Section III outlines the steps required in the research.

II. SIGNALLING TRANSPORT TECHNOLOGIES

A. IP/MPLS Network Technology

The Internet is an IP-based multiservice network consisting of autonomous systems using best effort algorithm in the transmission of data packets between network element nodes. The Internet, partly due to its ubiquitous nature and flexible multiservice platform characteristics, is often proposed as a promising candidate for the Next Generation transport network. However, the IP packet transport network has little inherent structure, lacks QoS guarantees and is inherently unreliable. In the NGN, measures are taken to structure this packet mode network for performance [5]. The NGN-IP paradigm structures the Multiprotocol Label Switching (MPLS) enabled core network for performance, reliability and high availability in order to support real-time services and multimedia applications.

B. SS7 Network Architecture

In the Classical PSTN/IN implementation, the Intelligent Network (IN) architecture is an overlay network on the traditional circuit switched PSTN. This signalling network architecture is supported by the ITU-T Signalling System No 7 (SS7) network. The highly reliable and dependable SS7 network is made up of nodes and links to support signalling messages for call and connection control in switched circuit networks.

While there is no overlay signalling network in the NGN, SS7 is relevant because new network must interwork with legacy networks, SS7 application layer messages must be transported to nodes in the NGN, and signalling transport in the NGN must have similar performance to SS7.

C. The SIGTRAN Architecture

The SIGTRAN protocol suite – an initiative of the Internet Engineering Task Force (IETF) Signalling Transport (SIGTRAN) working group – is a development to structure the Internet IP-based multiservice network. A description of this generic architecture is detailed in [3]. The SIGTRAN protocol suite is shown in figure 1 with the network layer IP protocol supporting upper layer protocols. The stream control transmission protocol (SCTP) is defined...
SCTP is a connection-oriented protocol that is designed to be a reliable transport protocol for signalling messages supporting real-time, message oriented multimedia applications. An SCTP connection is called an association. An association is identified by the two SCTP endpoints. Amongst the features of SCTP is multi-homing and multi-streaming, these features provide high availability and reliability respectively to support the signalling performance requirements of SS7 networks in circuit switched networks.

The SIGTRAN adaptation layer consists of various adaptation modules to support upper layer protocols.

III. APPROACH

The design will be implemented on a generic Next Generation Network platform. The approach to this work will be based on the following steps. First, we identify the features and requirements of the NGN. Second, we review current and emerging standards, protocols and network technologies towards the realization of the Next Generation signalling transport. Third, we detail an analysis of a convergence scenario based on a distributed processing environment using Object Request Broker (ORB) concepts. Lastly, we define this Next Generation Network by constructing a generic signalling network.

IV. CONCLUSION

This paper describes ongoing work which aims to define the possible architecture for Next Generation Signalling Network. We review current and emerging standards and technologies focusing on the transport of control and management messages in a packet mode multiservice network. The formalization considers various initiatives and standards that focuses on various NGN features and recognises various signalling requirements across heterogeneous networks, such as across different administrative and technology domains [6]. The problem is essentially to define a logical network within the NGN transport network that transports signalling messages as dependably as Signalling System No 7.

REFERENCES