

# A Simplified Approach to Application Layer Service Signalling

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**Abstract**—Current approaches to service provisioning require that signalling travels between terminals and the network using call/session signalling through the core network. This work-in-progress paper discusses future research on simplified, generic application layer signalling, where terminals communicate directly with applications in the network, minimizing the message passing required to invoke and exchange information with a service. This requires the consolidation of various approaches which use the Parlay interfaces to relocate service signalling from the call layer into the service layer.

**Index Terms**—signalling, services, call control, application layer

## I. INTRODUCTION

PROVIDING IT specialists with the ability to develop advanced services for telecommunications networks is an important step towards increasing the pool of programmers able to develop these services and hence reducing implementation, deployment and maintenance costs and times.

We can view a modern telecommunications network as consisting of three abstracted layers shown in figure 1. The lower two are the call/session layer and the generic services layer. The IT interfaces into telecommunications networks, which can be enabled with Application Programming Interface (API) and Service Oriented Architecture (SOA) approaches, provide service developers with the third layer – an application logic layer.

This layer, similar to the OSI-RM application layer, provides a decoupled programming environment which hides the complexities of the underlying network.

The creation of this environment is supported by various technologies being employed in networks which themselves are being enhanced by the Internet Protocol (IP). The Session Initiation Protocol (SIP) provides peer to peer call/session control of Voice over IP (VoIP) and multimedia calls and the IP Multimedia System (IMS) uses SIP and other technologies to add architectural elements, such as Quality of Service (QoS), to IP multimedia in the network

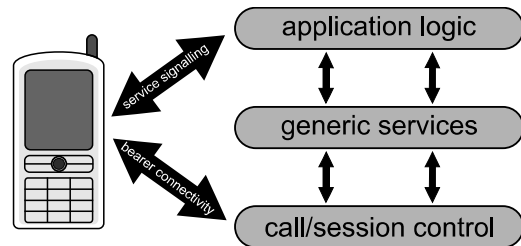


Fig. 1. Layered view for telecommunications services provisioning.

core by using technologies such as mobility management and GPRS already found in mobile networks.

IMS also provides Application Servers which offer value-added services, triggered using IN-like signalling either by the network or a 3<sup>rd</sup> party. However, this poses a limitation on the potential applications that can be developed, since applications in a terminal and in the network are limited to the capabilities of the call/session signalling with which they would communicate.

The research to be covered will propose an SOA or API for high-level interaction between applications, which will circumvent the complex IMS call/session signaling, to allow for richer and more efficient services to be developed by having terminals signal directly at the application layer to services in the network.

## II. SERVICE SIGNALLING BACKGROUND

The Intelligent Network (IN) standards formalised a service architecture based on ISUP signalling between various network elements, over which service logic was distributed. Signalling took place in the core network and implementation of services was the exclusive domain of telecommunications experts.

The Parlay and Parlay-X interfaces (referred to collectively here as “Parlay”) overcome these limitations by presenting a programming interface into the network which abstracts out complexities of the core network and hence call/session handling. With these interfaces it is possible, in a technology-neutral manner, to signal the network to perform advanced call handling, such as multiparty calls. Further, as discussed, 3<sup>rd</sup> party call initiation can be performed [1], allowing for bearer connectivity to be established if required by the application in the terminal.

## III. SIGNALLING IN THE APPLICATION LAYER

The research to be covered will centre on constructing a technology-independent architecture for application layer

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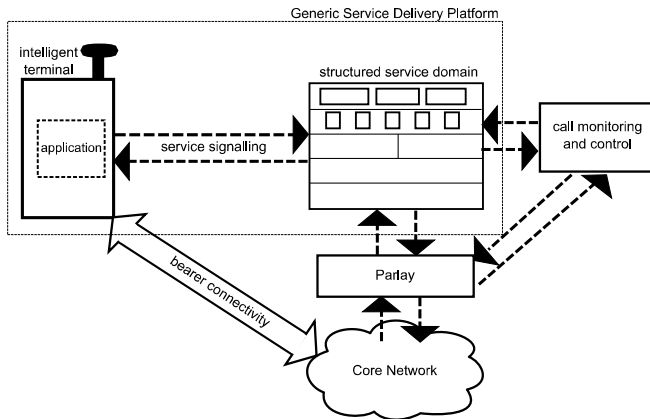


Fig. 2. Overview of environment in which application layer signalling will be designed, Showing the work which will be drawn on to provide a foundation.

signalling. This will involve the fleshing out of three central aspects (shown in figure 2) by defining a robust and simplified programming framework using the Unified Modelling Language (UML) to provide an interface into the architecture which will be designed.

#### A. Application Layer Signalling Methodology

The main idea behind application layer signalling involves allowing an intelligent terminal to directly communicate with the service domain, avoiding the need for signalling messages to be passed through the bearer network, which can often be unnecessarily complex as the bearer network is more focused on establishing voice and multimedia connections.

A substantial number of messages for this kind of messaging have been defined in [2], however with no generic infrastructure to support them. Thus the approach developed in [3] will be used to provide the required infrastructure to allow messages to be passed to and from the intelligent terminal using the generic Service Delivery Platform (SDP).

#### B. Call View and Control

Many services require that bearer connectivity be established between two terminals – in fact it has been shown that call setup can always be controlled from the service domain – which can be performed using 3<sup>rd</sup> party call invocation [1]. Also, to allow for bearer connectivity to be controlled by the service, the state of the calls established between the two terminals must be maintained and monitored in the service layer. Parlay enables this by providing a generic API for communicating between the application layer and the network. Extended Call Control (ECC), available in the Parlay interfaces, allows for a call view (or call state) to be maintained in the application layer [4]. Therefore the application layer can be used to perform call control (such as Call Leg Control) and monitor the state of calls, even whilst being decoupled from the call/session layer.

#### C. Structured Service Layer

A major aspect of the work covered in [2] was that of creating a “structured approach to service provisioning”; the research identified a lack of structure in the service domain and a reliance on proprietary solutions for service

development. Instead, a generic layered approach was developed allowing for services to be developed quickly. This proposed service provisioning environment will be used to further enhance the research to be covered.

#### IV. SIMPLIFICATION

As is indicated clearly in the title of this paper, simplification will be a major aspect of research. This will take place in 2 ways. Firstly, the number of messages required for the call layer signalling will be reduced. Secondly, since the work of others will be drawn on, it will have to be consolidated. This will require that some simplifications to the work are made to ensure that all the followed approaches will be compatible with each other, and that their details and complexities will enhance and not hinder the research discussed in this paper.

#### V. CONCLUSION

The research to be covered has been clearly outlined showing the various approaches developed by others which will be combined to create a simplified framework for service development and provisioning using application layer signalling.

The major practical aspects which will work together to allow for the desired functionality and architecture of the service environment have been indicated. Having these designed properly in the research will facilitate an accessible means for easily developing services which can provide end-users with desired information and call control when required.

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