

## **Signal traffic in a communication network based on the IMS system**

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### **Annotation**

IMS (IP Multimedia Subsystem) is the solution used when building multiservice networks in which services are implemented are based on the SIP session initiation protocol (Session Initiation Protocol). Initially, the IMS concept was developed consortium 3GPP (3rd Generation Partnership Project) for networks of strong third-generation 3G connection, but later it was proposed as a basis for fixed networks as well next generation (NGN, Next Generation Network). The following article is devoted to the study of characteristics of signal traffic in a communication network based on the IMS system.

**Key words:** IMS, protocol, signal, session management function, diameter protocol, network.

The IP Multimedia Subsystem (IMS) is a network architecture that consists of different network elements linked by standard interfaces. It facilitates the delivery of multimedia services based on Internet Protocol (IP) and makes the integration of services with the internet much easier. It is a method to achieve the convergence of fixed and mobile communication devices. Optimized transmission of voice, data and video communications among the users can be achieved using IMS architecture, independent of the user's location and devices. IMS enables the user to use different services in a more efficient way in terms of energy saving. Using this technology, it is possible to make the network distribution in a better way. It reduces the energy consumption because of the capability to switch network whenever possible. This paper focuses on establishment of end to end session between two IMS terminals and analysing the performance for different applications. The performance is measured on the basis of traffic parameters and call setup delay. We have compared Inter and Intra IMS network based on a model

that ensures the delivery of services without any data loss and with minimum delay.

One of the most important features of IMS, that of allowing for a SIP application to be dynamically and differentially (based on the user's profile) triggered, is implemented as a filter-and-redirect signalling mechanism in the S-CSCF.

The S-CSCF might apply filter criteria to determine the need to forward SIP requests to AS. It is important to note that services for the originating party will be applied in the originating network, while the services for the terminating party will be applied in the terminating network, all in the respective S-CSCFs.

Describing the functional elements of IMS, applied both in mobile and fixed networks, and therefore their special fika does not affect the generality of the results presented below. Just as for PSTN, GSM and ISS networks, the OX 7 system is the main stack of signaling protocols, for IMS subsystem, such a protocol is SIP, which is used

It is used to establish, manage and disconnect communication sessions. For authorization, authentication and accounting procedures in IMS, use The Diameter protocol is also used.

Let us give a brief description of the IMS subsystem in the amount sufficient for further presentation of the results. It is assumed that Entrant A makes a call to subscriber B, and both subscribers are on their home networks (Home Network). According to the standard subscriber A's network in this case is called the Origination Network, and subscriber B's network - Terminating Network.

The main functional elements of IMS are module that implements the CSCF session management function (Call Session Control Function) and Home Subscriber Server HSS (Home Subscriber Server), which is actually the user base body data.

The CSCF module includes three functions - the service function living (S-CSCF, Serving CSCF), request function (Interrogating CSCF, LCSCF) and proxy server function (PACSCF, Proxy CSCF).

The S-CSCF function is designed to register subscribers in the database HSS data, and also monitors and manages the session connection. The LCSCF function provides access to the home network and, in if necessary, can act as a firewall, hiding the internal network topology. The P-CSCF function provides is the first point of contact for the IMS terminal, and can also unencrypt and compress messages. We emphasize again that the objects defined above are subscriber to the Subscriber's Network are functional, i.e. for subsystem IMS is defined only to functional architecture, and physical implementation of data, functions depends on the solution of the con-SIP specific manufacturer. Important, P-CSCF, which, in the general case, under control communication sessions functional IMS nodes (hereinafter, for brevity IMS nodes) exchange signals direct messages and create signaling traffic, which should wives to be served with given subscriber in quality parameters that may be subject to requirements standards, as well as agreements about the level of service (SLA) Service Level Agreement). CSCF nodes exchange messages with each other SIP protocol communications, and to access the HSS server, the Diameter protocol is used. Subscriber terminals (UE, User Equipment) are connected through the PCSCF nodes of the networks in which they currently located and through these functions interact with other IMS nodes in their home networks. When registering subscriber in a certain network, the P-CSCF function of this network is to define the subscriber's home network and the corresponding S CSCF in which it is served. L Let us now introduce the definitions of the main characteristics of the signal traffic, which are the subject of research in this work. Under the signal load  $a(x, y)$  we mean the load created by SIP and Diameter protocol messages between nodes at the IMS subsystem.

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