A Semantic Knowledge Model for Support of Network Management Tasks in Complex Heterogeneous Systems

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Network Management it is service which uses set of tools, applications and devices for assistance network administrator for monitoring and supporting networks. The traditional solutions of Network Management don't provide sufficient coverage of functional areas of a heterogeneous network that bringing to decrease level efficiency and reliability. These main questions demand an appropriate way of decision for effective Network Management [1].

As a rule, for management and support of network system, it is necessary to perform a row of operations, including state estimation of network condition, definition of network errors, selection /approved and application of counter-measures. The Internet, mobile communication, and portable computers allow today's users met new applications (for example, NGN – new generation networks) offered by developers of services, who are guided by popular tendencies of clients in technology.

Deployment of new multimedia services in telecommunications demand the support of quality of service (QoS), which defines a guarantee given by the network to satisfy a set of service performance constraints for the user in terms of end-to-end delay, jitter, available bandwidth, and packet loss probability; safety; mobility of users; and allocation of new services [2].

In the given work we consider a network as a collection of the various distributed resources. It is necessary to optimize distribution of these resources between users and services to maximize efficiency of network in general. Means of it is the increase in intellectuality of unit of management of network (IUMN) buy use of knowledge, application of multiagent technologies, metadata, ontologies and other Semantic Web means. Knowledge can be processed with the help of logic object - the interpreter of knowledge. Intelligent agents, working independently within the limits of logic object, continuously analyze the given management acting from/to each unit of a network, classify and keep them in information archive. Intelligent agents apply the mechanism of training that allows them to draw conclusions from messages of the mechanism of decision-making IUMN and to use them for the further data processing [3].

The main feature of proposed approach is automated generation of knowledge about network functioning by means of inductive generalization of the network raw data. Considered in this paper architecture of knowledge management in the NGN provides the storage and processing of such dynamically changed knowledge that represents rules of optimal network management with effective use of it's recourses. For knowledge interoperability we orient on standards and technologies of the Semantic Web project (OWL – for domain ontology representation, RDF – for metadata about network resources etc.) [4].

The architecture of IUMN shows how this node can take the information for support of QoS, mobility and security networks functions (for the base network levels according to reference model) and transforms them to required functionalities. All important aspects of each service are submitted by such abstract way that technical complexity of their realization is hidden from the user, the service provider and the network operator. The multilevel architecture of unit has to be designed so that it has been organized according to the semantic and contextual managing information that collects from the network. The term "semantics" concerns studying and change of value.

Use of the semantic approach in systems of intellectual management allows to raise in a complex efficiency of functioning of difficult heterogeneous systems at the expense of processing of the arriving statistical information from net nods and its transformation into ontologic knowledge.

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