NetApp: Autonomic Network-Based Application Architecture for Creating New Value-Added Services

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ABSTRACT

The generalization of Internet continues to grow unabated, especially with the rapid adoption of mobile and fixed networks connecting a myriad of devices at home and in business. This allows the acquisition of more services at low costs. In the future, anyone with any kind of devices at any time will be able to access any type of service from anywhere. New rapid and profitable methods for service creation must be investigated. In traditional telecommunication networks, the intelligence of a service has been achieved for so long at the heart of the network. The Internet intermediation involves moving the intelligence toward the edge of the network. A fresh look is needed to design and develop self-organizing networks so human intervention is minimized as much as possible. In this regard, we propose the autonomic-network-based application concept: NetApp. This is an architecture in which the applications and services are not supported by a pre-existing network, but where the network itself grows out of the applications and services that end users require. The major objective of this article is to propose an architecture for the adaptive and self-organizing ambient-aware applications and services in networking.

Keywords: autonomic-network-based application; intermediation; IP telephony; value-added service; XML

INTRODUCTION

The development of the Internet paves the way for the introduction of more and more services such as e-newspapers, e-shopping, and so forth. People will be able to access any type of service from everywhere via any kind of devices (e.g., PDA, mobile phone, etc.) (Fasbender et al., 1999). This perspective will create not only better but also low cost services for consumers.
At the beginning stage of the Internet era, people believed that the development of the Internet would eliminate the need for an intermediary. In other words, producers and customers would be able to interact directly through the Internet.

Progressively, the amount of information transported through the Internet grew rapidly. This yielded to the fact that people are unable to identify which information is important or trusted and do not know how to find it easily. So in the model of net economy, the intermediary Internet reappears at a higher level compared to that of the past. Furthermore, it has new roles such as the provision of product information to buyers and marketing information to sellers, the aggregation and management of both physical deliveries and payments, providing trust-based relationships and ensuring the integrity of the markets. As a result, the consumer and the producer not only interact directly but also through mediation services. This creates value-added services and can aggregate service information directly between producers, thus generating more value (Barrett & Maglio, 1999). Figure 1 illustrates the intermediation concept in service creation.

To achieve the aforementioned perspective, autonomic network-based application service architecture (NetApp) is proposed. Its purpose is to easily create a plethora of better services. In the NetApp architecture, many protocols, such as LDAP databases, IP telephony, and Web services, are integrated into one protocol in the same IP infrastructure in order to reach its purpose without difficulty. The concept is that we can separate the service logic from the others; we only need to create new services but don’t care about the network structure. The intelligence of service, once achieved at the heart of the traditional telecommunication networks, is being moved, thanks to the advancement of the Internet intermediation toward the edge of the network. Figure 2 illustrates the evolution of the Intermediation in service creation.

The organization of the article is as follows. In the second section, we present an overview of the state of the art about service creation in networking. Then, in the third section, we present the NetApp architecture for value-added service creation. The analysis of the NetApp architecture is discussed. We provide in the
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