Charging Service Compositions in a Service-Oriented Peer-to-Peer Network

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1   Abstract

Today, peer-to-peer (P2P) networks, e.g., filesharing networks like Gnutella, are specialised towards specific purposes. This shortcoming is addressed by introducing a new middleware for P2P networks which is shown in Figure 1. The middleware supports the deployment and use of services inside a P2P network. It consists of six different modules, each encapsualating the functionality required for certain tasks. This modular approach makes it possible to adapt the middleware through plug-ins. The middleware includes service negotiation mechanisms which support the creation of legally enforceable service level agreements (SLAs) by using strong identities. This supports reliably composing services into new value-added services.
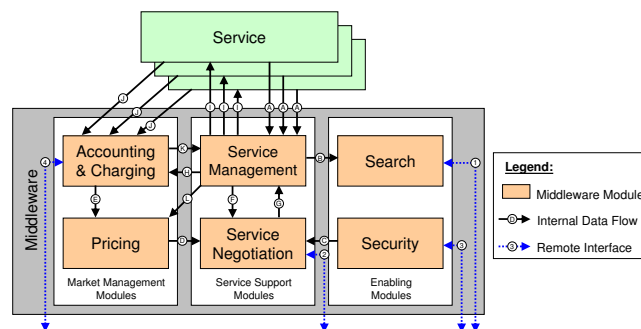
Fig. 1. The Modular Middleware

Therefore, in a second step, the business model of service composers has been investigated. Every composer has to pay fees to the service providers, which are calculated by applying tariffs to the QoS delivered by them. Similarly, the revenues he receives from a customer are calculated by applying a tariff to the QoS received by the customer. However, an objective measure of QoS is needed to apply this scheme. Therefore, service events have been introduced, which carry aggregated information about the progress of service primitives. This enables the definition of tariffs based on events. Since it is assumed that the customer's tariff corresponds to his utility function, the service composer is able to compose services, such as that his profit is maximised.