Real-time Billing as a Service – A standard-based proof-of-concept implementation

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Abstract
Looking at today’s services and applications offered in an increasingly interconnected world, there is a trend towards a variety of services and applications developed for very specific tasks. But instead of providing large, monolithic applications, complex applications are now stitched together based on interoperable services, which is known as service composition in the Service Oriented Architecture (SOA). Several electronic services marketplaces now offer customers the possibility to build their own, tailored applications in this way.

This trend is supported by the proliferation of cloud computing, which allows – on the basis of scalable infrastructures (Infrastructure as a Service, IaaS) and well equipped platforms (Platform as a Service, PaaS) – to provide specific services and applications as Software as a Service (SaaS). Together with a vast number of specific services and applications also a large number of payment models emerge, similar as already known in the mobile telecommunications market. Especially usage-based payment models are suitable for SaaS. They allow charging each individual service usage, even depending on the amount of data transferred or the desired and provided quality of a result. Because cloud services are often used ad hoc, it is more than helpful when the anticipated costs can be determined before the service is actually used and the incurred costs are directly visible after or even already during service usage. Such functionalities can usually be provided by a real-time billing system.

Real-time billing systems are usually large, sophisticated commercial systems that require a high capital expenditure and a lot of installation and maintenance effort. Providers of specific services and applications, however, are usually small and medium-sized supplier companies which cannot afford to purchase and operate their own real-time billing system. To overcome this problem, this article presents an approach to offer real-time billing functionality based on the SaaS principle. As a proof-of-concept, real-time billing services have been prototypically developed as part of the ITEA research project EASI-CLOUDS. These billing services allow...
flexible usage-based rating, charging and billing in real-time without the need of huge investments in an own powerful billing system. The article describes how these services can be offered as SaaS – this is also referred to as “Billing as a Service” (BaaS). By using open standards from the telecommunications domain and the Internet of Services, interoperability of our approach for utilization in different operational environments and with legacy billing systems is supported. An end-to-end use case from the domain of medical image processing is outlined to illustrate the ease of integration of our BaaS approach into existing IT services.