A Distributed EPC Discovery Service based on Peer-to-peer Technology

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Summary

Supply chain visibility and real-time awareness are two of the major drivers for the implementation of Auto-ID technologies in Supply Chain Management. A prerequisite for achieving real-time awareness and company overlapping visibility is an infrastructure to enable companies to share supply chain information in a reliable and secure way. EPCglobal proposes an application layer protocol called the EPC discovery service, which is supposed to provide services to gather supply chain information from a number of independent resources, across company borders. Our investigations on pharmaceutical and tobacco supply chains revealed tremendous data volumes and network traffic, generated from RFID-enabled supply chain networks. It is highly questionable if a single global discovery service is able to cope with such requirements.
In this paper, we address the question how distributed discovery services can deliver their service in a Peer-to-Peer (P2P) based manner. For this purpose, we analyzed the applicability of distinctive distribution schemes and present an approach, which enforces a distribution scheme that allows product managers to decide, which discovery service their data is stored at. Furthermore, we present a prototypical implementation that is based on the open source P2P protocol JXTA. Our architecture utilizes an unstructured P2P network coupled with cache optimizations for lowering response times concerning the processing of a query.