Adaptive profiling framework and system for service provisioning in e-business solutions

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Abstract

Effective profiling of consumer and service information is critical to today's e-business solutions. Typically, each service has its individual profiling requirements in addition to the basic profiling requirements common to all services. The challenge is to build a flexible profiling system to dynamically collect relevant consumer data and accommodate a variety of profiling requirements of different services. To address this challenge, this paper introduces a two-phase profiling framework based on a service hub that provides the infrastructure for service hosting, aggregation, and provisioning. The profiling framework supports two profiling mechanisms, namely Delegated Profiling and Punchout Profiling. Using the proposed Data Driven Dynamic Form, the Delegated Profiling enables a cost-effective way to collect service specific information from a consumer beyond the basic profiling requirements. Punchout Profiling enables seamless integration between an individual service's profiling system and the service hub through the use of the Profiling Punchout Protocol.
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1. Introduction

Rapid growth of the Internet intensifies competition. Coupled with new technologies, several challenges in service provision area arise, and among them are:

- e-Commerce Web sites, B2B marketplaces or B2C portals need to integrate as many value-added services as possible and deliver them to consumers quickly;
- Mergers and acquisitions result in numerous islands of business processes, applications and IT infrastructure. These assets or services need to be integrated and delivered to consumers inside and outside the enterprise in a cost-effective way;

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When creating new services for consumers, service providers may need user information for personalization, service setup, configuration, user statistics, offline negotiation, and other business purposes. The process of collecting user information is termed user profiling or profiling for short in this paper. In addition, making a service accessible to a user is termed service provisioning or provisioning for short in the reminder of the paper. The authors observed that user profiling and service provisioning really go hand-in-hand. A centralized service hub [1] providing infrastructure for service hosting, aggregation, and provisioning [2,3], can provide solutions to these challenging problems. For such a hub environment, a centralized common profiling system is preferred as it helps to reduce the service development cost and promote profile information reusability and consistency. The challenge today is that this profiling system needs to be powerful enough to collect relevant information about consumers for diverse services to be provisioned.

One possible solution is to have a potentially large and universal set of information collected beforehand for all services. However, it is unfeasible as consumers tend to release their information only when they know how their information will be used as privacy is a major concern nowadays. Meanwhile, from the hub's perspective, this proposition also would not work because the number of services being hosted or aggregated can change frequently, and the information required by new services cannot always be predicted. Therefore, the hub's profiling system needs to be adaptive enough to accommodate the various requirements of individual services. Please see further discussion of "Service Profiling Requirement" in Section 2.3.

It is observed that the user information can be grossly categories into two types: (1) common or generic information such as relating to demographic data, which can be utilized by most services, (2) Information specific to a particular service that a user is subscribing to. In order to avoid repeatedly requesting generic information from consumers, a common profile for all consumers can be established for use with any service subscriptions. The information in the common profiles can be transferred to specific services when the consumer is subscribing to that service with consumers' consent.

In this paper, we propose a service based adaptive two-phase profiling framework to collect needed information from consumers. The rest of the paper provides further details of it, followed by a detailed discussion of Delegated Profiling and Punchout Profiling. The paper concludes with a comparison of related work and some future research topics in the field.

2. Adaptive two-phase profiling framework

A service based adaptive two-phase profiling framework is illustrated in Fig. 1 to collect needed information from consumers. The two phases are:

Phase I: Collect common information according to the pre-configurable common profiling requirement when consumers register with the service hub.

Phase II: Collect incremental information from consumers for each additional service when they subscribe to it.

For Phase II, there are two mechanisms to accomplish the information-collecting task: (1) services can delegate the task to the hub through the use of Delegated Profiling, (2) services can collaborate with the hub to perform the task through the use of Punchout Profiling. With the first mechanism, the proposed Data Driven Dynamic Form (D3Form) can be used to collect service specific information from consumers and dynamically generate different Web forms for different services according to the service profiling requirements. The collected data is propagated to services by the Profile Propagation Manager (PPM), which adopts the standard data format defined in Business Object Document (BOD) [4] and supports multiple network transport protocols for ease of integration. With the second mechanism, the proposed Profiling Punchout Protocol (PPP) is created to integrate the services' profiling systems with that of the hub's so as to meet some special requirements. Please see detailed discussion in Section 4.