

e-Cat for Partner Profiling and Competency Management Tool

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INTRODUCTION

A modern industry environment requires very fast response to incoming business opportunities. Small and medium enterprises (SME) usually cannot satisfy complex customer needs on their own. Collaboration between enterprises is needed to cover all the business aspects and opportunities (Boughzala & Zacklad, 1999; Říha, Pěchouček, Vokřínek, & Mařík, 2002). To increase their competitiveness and to gain more business opportunities, SMEs form alliances. Such alliances may support their members by tools for effective partner search, social knowledge management, negotiation support, and others.

This article presents a concept and a prototype of a tool for profile and competency management for SME clusters—the e-Cat. The main goal of our work is to simplify and integrate cooperation between SMEs by sharing information about their abilities, competencies, and services that collaboratively cover new business opportunities. The e-Cat is based on a hybrid architecture consisting of peer-to-peer cooperating units supported by centralized components. The user interface to the system is provided by thin clients through ordinary Web-page browsers.

BACKGROUND

The concept of clustering individuals to cooperating groups is often used in the area of multi-agent systems (distributed artificial intelligence). Pěchouček, Mařík, and Bárta (2002) introduce clustering of agents that is based on the knowledge the agents are willing to provide in the domain of humanitarian aid operations.

Pěchouček et al. define the *alliance* as a collection of agents that share information about their resources and all agree to form possible coalitions. The alliance is regarded as a long-term cooperation agreement among the agents. A *coalition* is defined as a set of agents, which agreed to fulfill a single, well-specified goal. Coalition members committed themselves to collaborate on a common goal shared within the coalition. A coalition, unlike an alliance, is thus usually regarded as a short-term agreement between collaborative agents.

The concept of alliances and coalitions can be also applied in the domain of virtual organizations. In the context of agent technology, a virtual organization (VO) introduces a temporary coalition of organizations, which utilizes pre-prepared and pre-negotiated contract templates. A cluster of SMEs corresponds to alliance established in order to facilitate exploitation of possible and profitable collaborations by means of VOs creation and management.

VO Creation Oriented Alliances and Information Sharing

The VO lifecycle (defined, e.g., by Camarinha-Matos & Afsarmanesh, 1998) describes phases of VO; Camarinha-Matos et al. define four main phases: creation, operation, evolution (or adaptation), and dissolution. The e-Cat is applicable in the creation and adaptation (evolution) phases of a VO. The first phase (after discovering a business opportunity) is the VO creation. Fischer, Muller, Heimig, and Scheer (1996) define the following steps of VO creation: (1) identification of potential partners, (2) generation of possible VO configuration, (3) evaluation of possible VO configuration attributes, and (4) finalization of VO configuration.

For effective VO creation, SMEs (which intend to cooperate) may form business alliances. Such an alliance may be supported by specialized institutions (financed, e.g., from alliance membership fees) to help its members with communication, semi-private knowledge sharing and VO during its whole lifecycle. To provide its services effectively, an alliance needs to be supported by appropriate methodologies and technologies. Adesta (2005) explains that information and communication systems are crucial for effective cooperation. Referring to other work, Adesta calls information to be the blood of virtual organizations. Although existing tools (Web sites, emails, databases, etc.) work well, they are separate and do not offer a possibility to integrate knowledge from various sources, and to ensure common and consistent view for all partners.

Friese, Freisleben, Rusitschka, and Southall (2002) compare features of centralized (client-server architecture) and distributed technologies for information management. Without a central server, bottlenecks and single points of failure are avoided and individual peers keep their independence. On the other hand, network administration lacks any central control, which is required in some domains to ensure consistency and verity of data within the network.

An example of a distributed architecture is a peer-to-peer (P2P) network. It is a distributed technology consisting of mutually independent entities (peers) having respective physical and logical resources (Friese et al., 2002; Schmees, 2003). The only effort required for a peer to connect to a P2P network is to implement the corresponding network protocol (Schmees, 2003). To distinguish between different kinds of networks, Friese et al. define (beside the centralized architecture) a pure P2P network, consisting of “equal” peers, and a hybrid P2P network, which contains specialized nodes for certain functions. Friese, Müller, Smith, and Freisleben (2005) present a resource management framework used in a P2P business resource management framework for managing resources such as Web services and business process execution engines.

Competency Management

Since the terms “competency”, “competency class”, “competency instance”, and “profile” are used in several slightly different meanings, it is important to summarize the competency management terminology. In some cases, the term competency is used only for

a competency class (Biesalski, 2003; NASApeople, 2005). On the other hand, for example, HR-XML (2004) uses the term both for the competency class and the competency instance (HR-XML is primarily focused on human resources management but it is also applicable to another VO domains).

For the purpose of e-Cat the definitions presented in Hodík, Bečvář, Vokřínek, Bíba, and Semsch (2006) are used:

- *“Competency is an ability to perform business processes, which are supported by necessary available resources, practices and activities, allowing the organization to offer products/services.”* For larger sets of competencies, taxonomy structures are used to organize them and to comprehend the relations among them. Different sets of competency classes can use different description systems for the same competency. Thus, in different sets the same competency can be described with a different amount of detail and different relations to other competencies.
- *“Competency class defines an existence of the competency in the world; it distinguishes it from other existing competencies and defines relations to them. Competency class may be extended by a definition of means used to measure the level and robustness of the competency. If a class is not specific enough, specializing classes may exist. Thus, every competency class can have its generalizing and specializing class(es).”* Every competency may have its specifying attributes (called competency evidence according to the HR-XML), which are defined in the competency class. Since the competency class is never connected to a particular subject (person or company), the specifying attributes do not contain any particular value. There is only one competency class for each competency in one list of competencies—specifying and generalizing competencies have their own classes.
- *“Competency instance always refers exactly to one competency class and to one subject. If the competency class defines competency evidences, the competency instance can optionally assign values to them.”* One competency class can be instantiated multiple times by various subjects. Each subject instantiates as many competency classes as many competen-

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