Semantics-based software boosts company performance

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(PhysOrg.com) -- New semantics-based software tools that accelerate the speed companies can develop or adjust their processes - while slashing costs - have resulted from a major European research project.

Tools developed by SUPER, a European research project, greatly enhance the business usefulness of the service-oriented architecture (SOA) approach to software development. The new tools raise business process management (BPM) to the business level where it belongs, from the IT level where it mostly resides now.

In SOA, software solutions are built up from individual building blocks that can be reused where the same task is repeated in a range of situations. The advantages of this approach are obvious. But searching out and assessing the usefulness of software fragments can require many hours of work by IT professionals with high levels of analytical skills. As the popularity of SOA grows, the complexity of the search problem increases exponentially.

The EU-funded SUPER project applied semantics and semantic [web technology](#) to the problem.

"SUPER successfully brought three different research groups together," according to Agata Filipowska, from the Department of Information Systems at the University of Poznan in Poland, a member of the SUPER research consortium.

These groups comprise people working in the semantic web, BPM and information systems. The first group was interested in applying ontologies to describe enterprise models and business processes in general, to show the potential benefits of the application of ontologies for companies.

A second group was interested in the automation of the transition from business process models to execution. They also wanted to check the compliance of processes with existing business rules, monitor execution of those processes, and analyse anything that went wrong using the business vocabulary that could be delivered by ontologies.

Finally, there were information systems people who wanted to see how to automate processes using the SOA approach and semantic web services.

Ontologies are the backbone of the SUPER tools. Ontologies define 'meanings' through formal descriptions of concepts and relationships in an industry as well as carefully defined industry terms. For SUPER, that industry was telecommunications.

Using the SUPER ontologies, telecoms business managers can model new business processes, search for existing process fragments, automatically fill in the missing elements in the process model, search for semantic web services that will deliver the functionality, compose business processes out of available web services and execute implemented business process models.

Because SUPER tools can translate business language into machine-readable language - and vice versa - the business managers do not need expertise in the IT behind the tools. They need no help - or very little help - from IT professionals.

From modelling to execution and analysis

In the first phase of SUPER, a telecoms business analyst can use well-known flowchart-like graphics to model a new business process on his or her computer. SUPER matches the industry standard graphics in his/her business process model to concepts and relations from a SUPER ontology stack. Linking the terminology used to represent a process model to ontology entities means the process elements are specified in a machine-readable manner.

From the outputs of the semantic business process modelling phase, the executable description of the process is prepared. Semantic business process configuration involves composition (implementation of the process using web services), then translation from business process modelling ontology (BPMO) to semantically enhanced business process execution language (BPEL), which is then further serialised to an executable specification called BPEL4SWS. Finally, the executable process model is ready to be deployed to a process engine for execution.

Using semantic web services in the execution phase adds further flexibility. In conventional business process modelling, the web services used have to be specified at design time. If at runtime the specified web service is not available or the usage of another web service would be more appropriate, the process model has to be changed, which is a very time-consuming task. With SUPER that specification does not have to occur until runtime.

During execution, SUPER's tools monitor the performance of business processes. In the analysis phase, this information may be used to check the business processes against key performance indicators and provide feedback for continuous process improvement.

Cutting out the middlemen

The market for SUPER-style solutions is immense. Anyone dealing with software integration based on service-oriented architectures is a potential customer.

Global giant Telefónica sees SUPER tools as important in its drive into the ICT outsourcing market. SUPER will help it stay ahead of the game with leading-edge IT solutions. Members of the research consortium, such as Polish Telecom, part of France Telecom, are also looking to exploit the developments commercially. SAP, IBM and IDS Scheer are incorporating SUPER findings into their software offering. And SUPER's open source downloadable tools (at ip-super.org) are attracting a lot of traffic.

"The main innovation and benefit of SUPER is that it supports business analysts as the main people driving the business modelling, implementation and analysis," concludes Filipowska. In other words, SUPER cuts out the middlemen - and the dangers of mistranslation during vital business transactions.

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Provided by ICT Results

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