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DISSERTATION TITLE: *Apply Modeling to Tool Integration: Integration Models, Industrial Applications, and Web Service Generation*

Short summary:

An important challenge in today's software development domain is to integrate diverse development tools in order to support software development processes. Software systems has an increasing number of requirements and their development involves a large amount of different tools that are not integrated. Deficiencies are most severe in the area of lifecycle data management.

Modeling technologies help to analyze design complexity and facilitate implementation. It is anticipated that applying modeling to tool integration will help in extracting and separating integration concepts from tools and data, thus facilitating the development and maintenance of tool integration. Meanwhile it also improves the productivity of development teams through semi-automatic code-generation.

This dissertation presents a model-based integration approach for establishing tool chains, by creating lightweight integration models, applying these integration models to various industrial scenarios, and generating web services that enable the integrations. The integration models mainly focus on data aspect and service aspect. Artifacts and Roles are the backbone of the proposed integration models. Through Artifact classes, it provides a mechanism of allocating other value-added integration properties. Artifacts act as representatives for the real models and model elements maintained by tools. The same Artifacts may be involved in multiple scenarios, which requires the integration support to be extended with Roles that may be dynamically generated and attached to Artifacts. Roles specify scenario-specific information and may dynamically be attached to Artifacts. Artifacts and Roles are choreographed by process models.

The dissertation also presents the workflow for establishing tool chains on the service cloud. The approach has been exemplified to industrial case studies that are based on diverse integration scenarios. By virtue of being based upon a modeling of tool integration, the approach is independent of the underlying realization platform. The dissertation has shown that class modeling of integration models can be used for generating OSLC specifications and implementation code for constructing tool adaptors with Web Services, which form as basis for tools to integrate with each other.