Success Story

CREDIT SUISSE

Credit Suisse

Cost and Risk Reduction Achieved by Model Driven Architecture

Customer Benefits:

- ▶ Reduction of development expenses
- ▶ Formalization of facade design
- ▶ Compliance to concise modeling style
- ▶ Automatic transformation of architecture patterns
- ▶ Consistent quality for all facades
- ▶ Quality assurance through process and tools
- ▶ Project specific customization of ArcStyler and individual cartridges creation

MDA/ArcStyler Benefits:

- ▶ **Up to 55% reduction of expenses compared to manual development**
- ▶ **ROI achieved in less than 12 months**

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About Credit Suisse

Credit Suisse Group is a worldwide leading provider of financial services, offering advice for customers covering all financial questions, worldwide and around the globe. 360° finance.
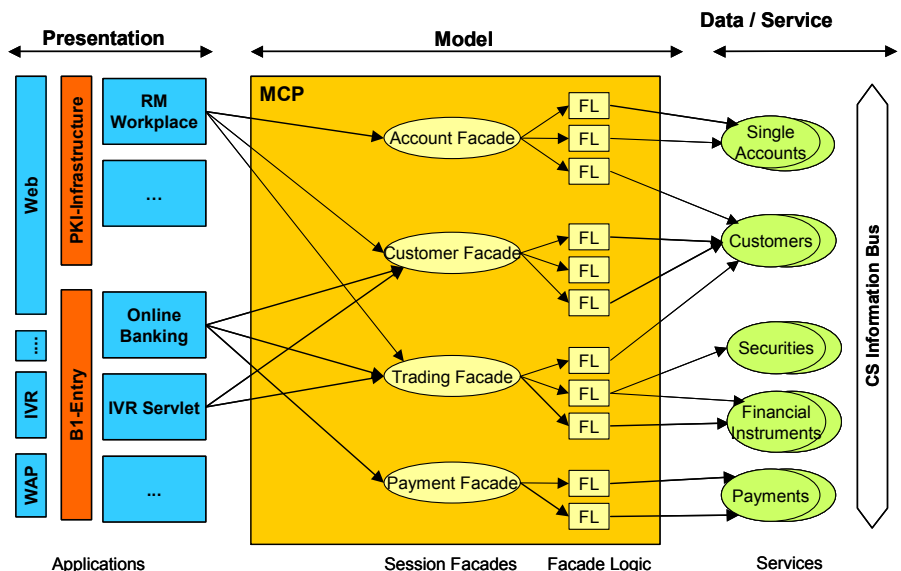
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Application Architecture at Credit Suisse

The innovative Multi Channel Platform (MCP) of Credit Suisse is an integration platform that increases the organization's IT efficiency by providing functionality, expertise and resources, by facilitating quality improvement and by supporting the entire lifecycle of applications.

This Multi Channel Platform is based on a concise architecture concept which differentiates application from business layers. MCP uses so-called facades. A facade provides functions which invoke one or more service functions (data aggregation). The facade is the interface to the applications within the business domains of Credit Suisse which are using specific services. It offers typical methods related to its scope of functions within a domain. Facades can be

The Multi Channel Platform at Credit Suisse

used as "services" for Java applications, facilitate reuse of business logic and enable improvement of quality standards.

High Expectations in MDA

The objective of this project was to examine the use of Model Driven Architecture and the development tool ArcStyler for creating facades at Credit Suisse and to explore the potential benefits this approach can be expected to deliver. Credit Suisse has high expectations regarding quality and standardization when it comes to development of MCP facades – consequently, maintaining a continually high quality level and compliance to defined facade design principles require significant efforts.

So far, MCP facades were developed manually at Credit Suisse, following a well defined process from the requirement, via an abstract and a technical model, to coding and testing. This project was set up to ascertain if deployment of a Model Driven Architecture (MDA) approach supported by appropriate tools can reduce the expenses involved with facade development while at the same time maintaining the high quality standards.

MDA with ArcStyler

Already with the first prototype Credit Suisse found that deployment of MDA for MCP was possible and feasible.
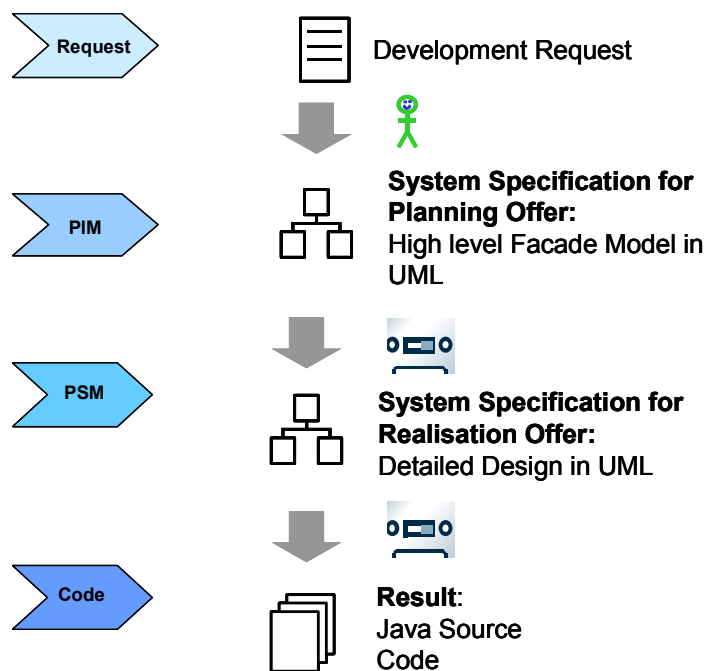
The MDA tool ArcStyler from Interactive Objects has proven its excellent suitability for this prototype. The fact that ArcStyler allows for modeling and flexible customization of the code generator itself was a key criterion during tool evaluation. For code generation ArcStyler from Interactive Objects uses cartridges comprising of templates used for generating the application code from UML models for specific technology platforms. These cartridges provide a high degree of flexibility for customization, thus ensuring that individual modeling styles are automatically

reflected and that the models consistently comply with the architecture guidelines.

Automating the Facade Development Process

Based on the positive results achieved with the prototype for automatic facade generation the next step was to explore MCP facade creation in a pilot project. The application "SecureMail" was selected for the pilot project. Creation of MCP facades for SecureMail was broken down into two essential tasks:

▶ Creation and adaptation of generators to support the model-based and generative development approach

▶ Facade model creation and

Request — Development Request

PIM — **System Specification for Planning Offer:** High level Facade Model in UML

PSM — **System Specification for Realisation Offer:** Detailed Design in UML

Code — **Result**: Java Source Code

Facade development with Model Driven Architecture

automatic java source code generation

At first two optimized ArcStyler cartridges were developed for the project: a model-to-model facade cartridge for transforming the model from a platform independent facade model (PIM) to a platform specific facade model (PSM); and a model2code Java cartridge for generating Java code for the facades. These individually created cartridges comprise modeling style and architecture patterns for facade development at Credit Suisse. Furthermore, an automatic verification of facade models was included. This ensured maintaining a high quality already during development, thus significantly reducing the project risk.

These cartridges were used for generating facades. In addition to detailed modeling of facades, generating as complete code as possible from these models is essential for a comprehensive deployment of Model Driven Architecture (MDA) concepts. In order to simplify the transformation logic the generation procedure was segmented into two steps: A model-to-model transformation (M2M) is used to convert the facade model into a detailed technical model including all classes, attributes, methods and interfaces. Using model-to-code transformation (M2C) this detailed design is converted into Java source code. The advantage is that this two stage procedure allows for simplified transformation logic. With this approach the previously manual process of facade development is now to a large extent supported by automated model transformations and code generation.

Uniqueness and Customer Benefits

▶ By defining a concise modeling style for facade modeling and by deriving the MDA generators from this definition, the quality is improved and full compliance to MCP architecture guidelines is ensured. Gaps in the transition from model to code are avoided.

▶ Greater transparency regarding implementation of requirements in the code enables significant reduction of project risk and an improved visibility of the project status.

▶ Thanks to design formalization new employees only have to get aquainted with the modeling style, resulting in reduced project risk and increased flexibility for allocation of resources to other projects.

▶ Comprehensive extension capabilities and maintenance facilitate concise modeling of the transformations as well as faster implementation of changes to the framework.

▶ Efforts during implementation were significantly reduced between 33% to 55%.

▶ Return on Investment (ROI): ROI studies exploring the use of MDA and ArcStyler for implementing facades have shown that the investment in Model Driven Architecture and ArcStyler pays off in less than 12 months.

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