



# THE IT-ARCHITECTURE PROFESSIONALS

## Deutsche Bank Bauspar AG Uses ArcStyler to Embed Existing Cobol Mainframe Application into Modern Web-Based Systems

### Industry

Banking

### Application

- Web-based system for management of savings and loan association accounts
- Used by bank customers, internal staff and sales reps
- Fully integrated with existing Mainframe application

### Business Benefits

- Immediate development savings of 40%
- Web access to accounts for bank customers, improved customer service
- Optimized internal workflows
- Integration into existing Mainframe system protects investment
- Web-based system reduces administration costs for more than 30,000 client machines in all of the approx. 1,250 Deutsche Bank branch offices
- Short time-to-market
- Three different types of users served via a single application core

### Deutsche Bank Bauspar AG

Deutsche Bank Bauspar AG is a company of Deutsche Bank AG, the leading German bank. Deutsche Bank Bauspar AG provides special savings plans within the framework of savings and loan associations, designed to help its customers build capital to acquire real estate.

### The New Application

The new b-online system was designed to enhance customer service and improve organizational efficiency. The focus in the development project was on the implementation of new business functionality around a proven legacy system. The core system of the Deutsche Bank Bauspar AG runs on an IBM Mainframe and is based on CICS, COBOL and DB2. This legacy system was implemented in the eighties and has undergone continuous development ever since. The new application runs on more than 30,000 client machines in all of the approx. 1,250 Deutsche Bank branch offices and integrates the existing COBOL Mainframe system into a variety of new Web-based systems.

The new system serves three different types of users via a single application core. Customers use the Web application to view their contracts via the Internet, download



AWARDS 2002

Winner

**“Immediate savings in the development process due to the MDA-compliant approach and the usage of ArcStyler amounted to approx. 40% compared to the estimated figures for development without using this approach.”**

Deutsche Bank Bauspar AG

forms and get information on contract status and development as well as options on contract optimization. Sales partners and field staff work with the Customer Service application to access additional, comprehensive calculation and status information on contracts/customers. The Customer Service application can also run without contact to the server, for example, when salespersons work in the field. Back office staff work with the In-house application to verify and finalize the transactions and processes without having to enter redundant data.

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## Bringing the Mainframe to the Web

Just like numerous other corporations in the financial sector, Deutsche Bank Bauspar AG uses a Mainframe-based system for the operative processes. This system represents considerable investments as well as business and technological know-how. And just like many other corporations, Deutsche Bank Bauspar AG wanted to offer their internal users and customers additional services. While the demands and requirements of the users keep increasing, Deutsche Bank Bauspar AG cannot afford to sacrifice security and reliability to “new and modern” technologies that emerge at an ever-increasing rate.

The objective at Deutsche Bank Bauspar AG was to “migrate” the functionality of the monolithic Mainframe application to modern Internet/intranet technologies in an evolutionary way, i.e. make functionality of the COBOL components of the existing application available in a multi-tier environment.

## System Development with ArcStyler

### ArcStyler Enforces Coherent IT Architecture

Deutsche Bank Bauspar AG has developed its own corporate architectural style that is rigorously enforced across all levels of the enterprise. The company wanted a development platform that would do two things: first, help the IT department enforce its architectural style by automating the procedures. Second, allow the team to model the business logic of the application at a high level of abstraction independent of a specific technology in order to keep this asset separate from the technology-specific details. In addition, the department wanted automatic code generation capabilities to the maximum degree possible. Deutsche Bank Bauspar AG chose ArcStyler because it offers maximum flexibility and adaptability at all levels from such ‘high-level’ tasks as the enforcement of a cross-corporate architectural style all the way down to such ‘low-level’ aspects as automated code generation.

### ArcStyler Makes Different Worlds Talk to Each Other

The ‘Web extension’ to the existing Mainframe functionality required that the COBOL components be mapped to Java-enabled counterparts in the Web world in order to preserve the original functionality. In addition, a communication interface for the dynamic transfer of the data between these two worlds had to be implemented. Deutsche Bank Bauspar AG opted for an XML-based logic used to describe the COBOL components and Mainframe data structures for access by an application server. The XML4COBOL system is called by Enterprise Java Beans to access the COBOL components represented in the form of XML structures.

Deutsche Bank Bauspar AG chose BEA’s WebLogic application server. The server is not installed on the Mainframe, as this would imply unnecessary risks.

In addition to the Session Beans which provide the Mainframe functionality in the Java environment, Entity Beans are used by the system for persistent objects that need to be kept in the Java world before they are ‘committed’ to the Mainframe. The new Web access forced the team to reconsider quite a few aspects of the data management, such as the fact that all of a sudden

there are transactions that are triggered or controlled by customers. For example, customers can now apply for a savings plan via the Web. This data needs to be verified, of course, before it is committed to the Mainframe.

Deutsche Bank Bauspar AG uses an Oracle database for this ‘unverified’ data. Special functions are provided that notify the staff in charge. Only after verification is the Mainframe transaction triggered via the Internet or intranet.

### ArcStyler Generates the Entire Infrastructure

Deutsche Bank Bauspar AG used the ArcStyler to model the entire system and generate the executable infrastructure. Several UML models describe the complete

**“Interactive Objects’ ArcStyler is one of the first MDA-compliant products on the market. It is feature-rich and has been used to best effect in the Deutsche Bank Bauspar project, taking the ideas and approaches in MDA from theory to reality. It is an impressive project truly deserving of the OMG award.”**

Andrew Watson  
Vice President and Technical Director of the  
Object Management Group

application at various levels of abstraction, with added technology specific detail at each level of refinement. These models were used to automatically generate platform-optimized code with the Session Beans for the Mainframe functionality interface, the Entity Beans including all persistence aspects for the management of the 'unverified' data, the XML communication infrastructure, as well as build, test and deploy environments.

## ArcStyler MDA-Cartridges Serve as Flexible Automation Engines

ArcStyler uses so-called MDA-Cartridges as the automation engine for code generation. As opposed to previous CASE approaches, these MDA-Cartridges are completely open and can be adapted and extended as required. This way, the MDA-Cartridges provide an extra layer of flexibility between

the UML model and the low-level code. They enable the automated production of architecture-driven code by enforcing patterns and coding guidelines across all modules. The MDA-Cartridges also ensure a unique location for all changes: modifying a single generator template changes all files generated by that template, no matter how many projects are involved. Finally, the MDA-Cartridges assure architectural integrity by providing a single place and a powerful vehicle for the IT architect to express structures and patterns that define the system structure at all levels.

## Interactive Objects Provides Consulting

Within just a few weeks at the beginning of the project, Interactive Objects created a special MDA-Cartridge for the technology projection of the UML models to the specific

implementation platforms used by Deutsche Bank Bauspar AG. This Cartridge takes into account the bank-specific architectural style as well as all infrastructure-specific aspects to enable the comprehensive generation of the application.

## Summary of Benefits

### Enduser Benefits

Deutsche Bank Bauspar AG customers benefit from the new Bauspar System in a variety of ways. The Web client allows the customers to access their savings plan information at any time and from any computer equipped with a browser. On the other hand, customers benefit from the improved service quality the field staff can offer with the new Customer Service client. The added business logic of the new Bauspar System improves the workflow quality and performance of the back office staff.

### Investment Protection

One of the essential benefits of the ArcStyler-based development effort is the fact that this approach saved Deutsche Bank Bauspar AG from having to replace any of its existing systems. The entire logic of the Web extension to the Mainframe system is represented at an implementation-independent level of abstraction in the model. This liberates the company from technology cycles that it cannot control.

### Evolutionary Development

Model Driven Architecture and the ArcStyler explicitly promote the coexistence of diverse technologies, thus allowing for evolutionary development instead of causing successions of high-risk "revolutions". This was particularly important in view of the heterogeneous IT landscape of Deutsche Bank Bauspar AG.

### Independence of Implementation Technologies

MDA and the ArcStyler tool support enabled Deutsche Bank Bauspar AG to decouple the business logic of the systems from specific technological details of the implementation. This allows Deutsche Bank Bauspar AG to flexibly respond to further developments and changes in the technology landscape. For example, the company is now able to migrate the application to a different application server without incurring major costs.

## Technical Benefits

- Evolutionary development for risk management
- Business logic model fully independent of implementation technologies
- High development productivity and system quality due to automation
- Consistent implementation and enforcement of a cross-corporate architectural style
- Excellent communication and collaboration in the development process

## High Development Productivity and System Quality

Since the development team could concentrate on the design of the business logic and leave the implementation-specific technological details to the ArcStyler, Deutsche Bank Bauspar AG achieved high productivity which, by orders of magnitude, made up for the extra effort caused by the administration of the relatively complex development process. The integration of the heterogeneous system environments by means of automatic code generation from a common model turned out to be a particularly valuable benefit. Not only did this ensure the consistency of the J2EE and COBOL developments, but it also contributed to automated quality assurance.

## Excellent Communication and Collaboration

The MDA approach and ArcStyler significantly improved the collaboration of different developer teams with diverse background (Java, COBOL). The common UML model optimized the understanding of the architecture among the groups, served as a common language for everybody and provided easy-to-understand documentation.

## Flexibility

The flexibility of the ArcStyler's approach is also evidenced by the fact that after the successful completion of this project Deutsche Bank Bauspar AG is now further customizing its MDA-Cartridges to generate Cobol functionality for the Mainframe.

Architectural unit	Percentage of generated code lines
XML interface	100%
Fronted layer	40%
Business layer server	60%
Business layer Mainframe	70%
Logical layer server	70%
Logical layer Mainframe	60%
Physical layer server	90%
Physical layer Mainframe	90%

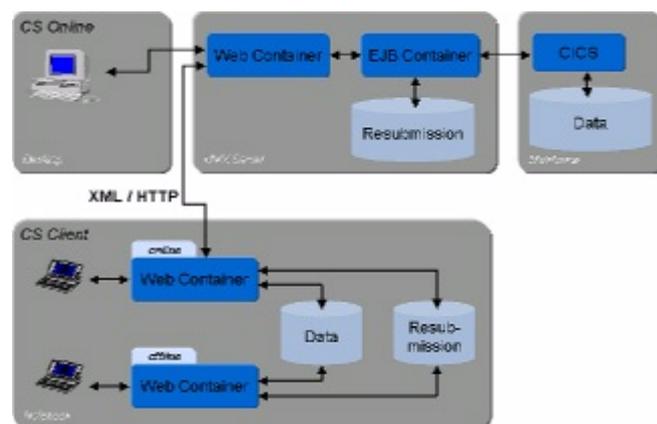
*The relative proportion of generated lines, including comments, for the application dependent code parts of the individual architectural layers and the artifacts of the interface classes.*

## High Savings

According to Deutsche Bank Bauspar AG, immediate savings in the development process due to the MDA-compliant approach and the usage of ArcStyler amounted to approx. 40% compared to the estimated figures for development without using this approach. Factors contributing to the savings comprise faster development of the business logic, more efficient application of manpower, a high degree of automation in code and infrastructure generation and automated quality management.

At the same time, the new system considerably reduces the costs involved in maintaining the desktop-based software in the approx. 1,250 Deutsche Bank AG branch offices and on the machines of the sales reps in the field (more than 30,000 clients).

The MDA/UML model will result in additional long-term savings due to easier maintainability of the Deutsche Bank Bauspar system. This affects issues such as migration, adaptation, extensions and documentation.



*Overview of the different versions, modes and types of data management of the Customer Service application.*

