



## The leading platform for Model Driven Architecture (MDA)

### Content:

Models Made for Business .....	2
ArcStyler Overview .....	2
Main Benefits .....	3
ArcStyler Editions .....	4
ArcStyler Modules and Tool Architecture .....	5
Key Features and Modules .....	5
UML Engine for Application Modeling .....	5
MDA-Engine and MDA-Cartridges for Code Generation .....	6
Adaptation and Extension according to specific needs .....	7
MDA-enabling existing code (Harvesting) .....	8
Expanded support for XMI based model exchange .....	8
Model-to-model transformations .....	9
ArcStyler support for Teamwork .....	9



## ArcStyler Overview

### MODELS MADE FOR BUSINESS

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Business today is demanding shorter time-to-market, increased productivity and more cost-effective solutions; creating efficient well-run applications is vital for success. From the initial concept to the final release of an application, the ability to efficiently align the business needs with the software application is the key.

**ArcStyler** from Interactive Objects offers you the ability to create a dynamic link between business and technology. Application logic is captured in models which serve as the basis for automatic transformation to various technologies. This approach, which is fully compliant with the Model Driven Architecture concepts of the Object Management Group, enables companies to achieve significant productivity gains, greater flexibility to react to business change and reduced maintenance cost.

### ARCSTYLER OVERVIEW

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ArcStyler is one of the leading software development tools for Model Driven Architecture (MDA) It is a cross-platform, standards-compliant environment, fully implemented in Java, for the design, modeling, generation, deployment and management of high-quality, industrial strength applications of any size for architectures based on Java/J2EE and .NET as well as custom infrastructures and existing legacy platforms.

ArcStyler enables companies to build and integrate software applications in a highly automated and industrialized manner: It bridges the gap between business and technology by automatically transforming business models into working software applications.

ArcStyler offers a significant increase of productivity in the creation of business applications for J2EE/.NET, supporting the leading J2EE applications servers (BEA, IBM as well as open source products), is highly flexible and adaptive according to individual project needs, supports integration and modernization of existing system and leads to reductions in maintenance costs.



## MAIN BENEFITS

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With ArcStyler, IT organizations leverage application models for code generation, achieving the following main benefits which lead to **overall savings in software development by 35%** and more.

### **Achieve efficiency, quality and control in software development**

- Visual modeling allows for focus on business instead of technology
- Comprehensive code generation dramatically reduces need to deal with technology
- Less errors by avoiding repetitive and error-prone tasks
- High quality software by enforcing solid system architecture, guidelines and patterns results in maintainable systems: Readable, understandable, changeable, ready for integration

### **Independence of platforms and vendors: Pluggable Generation Cartridges**

- ArcStyler comes with extensive generation cartridges for standard architectures and platforms: J2EE/.NET, application frontend, backend
- ArcStyler features a complete cartridge development environment (editing, debugging, packaging) for developing cartridges for custom architectures and custom platforms

### **Leverages isolated tools and data by orchestrating them**

- Integrates best-of-breed commercial and open-source products, open for custom components
- Tight integration of different tools accelerates development cycles

### **Open and customizable to fit your environment**

- Built for being extended for custom IT infrastructures and architectures (e.g. SOA)
- Built-in mechanisms for customizing cartridges based on reuse and object-oriented principles
- Support of custom UML profiles: Automated generation and management eases handling of profiles

### **Investment protection for existing applications**

- Harvester technology for MDA-enabling legacy applications
- Key for application modernization and EAI



## ArcStyler Overview

### Investment protection for new applications

- Invest into models and transformations as long-lived, reusable assets instead of plain code
- Standards compliant: builds on OMG MDA standards such as UML 1.4, XMI 1.1, MOF 1.4, JMI 1.0
- Interactive Objects is one of the driving forces in the OMG MDA standardization process

### Security and innovation

- Interactive Objects brought the first MDA tool on the market the OMG has launched MDA
- In its fourth version now – reliable and mature
- Among the 2 top leading products worldwide, according to customers & industry analysts
- Several satisfied customers

### ARCSTYLER EDITIONS

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ArcStyler is available in two different editions, **ArcStyler Enterprise Edition** and **ArcStyler Architect Edition**.

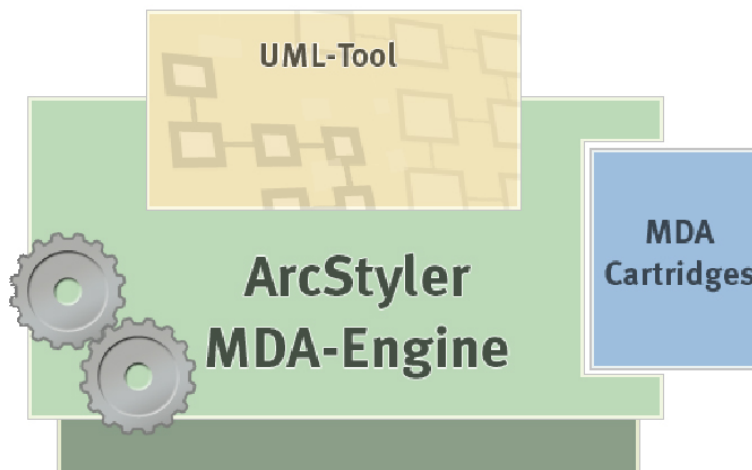
The ArcStyler Enterprise Edition supports MDA-compliant development of four-tier applications (J2EE,.NET and custom infrastructure).

The ArcStyler Architect Edition is the high-end ArcStyler offering. It enhances the Enterprise Edition with powerful extensibility tools enabling flexible extension, customization and exchange of MDA support within a well-defined, comprehensive Architectural IDE. With the ArcStyler Architect Edition and its MDA-Cartridge IDE, an organization can visually develop, test, and deploy MDA support to meet its specific requirements, whether these are extensions to existing MDA support or for completely new types of infrastructures and architectures.

### ARCSTYLER MODULES AND TOOL ARCHITECTURE

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The illustration below shows the ArcStyler tool architecture and its diverse modules for MDA system development according to the OMG concepts:



### KEY FEATURES AND MODULES

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#### ***UML Engine for Application Modeling***

A UML model normally serves as basis of a MDA based development approach. ArcStyler's UML engine is among the most powerful UML tools in the marketplace. In addition to the standard UML diagram and modeling support, it provides features such as UML Profile support, custom diagram types, sophisticated layout algorithms as well as extensive reporting and model documentation capabilities.

Of particular interest in the context of modelling are migration and interchange of models between tools and the reuse of models within other models:

- ❑ ***Model migration:*** Models in ArcStyler's UML engine are stored in standard compliant and interchangeable XMI format for UML 1.4. Import capabilities for Rational Rose XMI files (Unisys XMI export) allow for migrating existing Rose models to ArcStyler including diagram information. IO provides services to assist customers when migrating UML projects to ArcStyler.
- ❑ ***Model reuse:*** Models in ArcStyler's UML engine can be composed from other models thus facilitating the reuse of models. Changes to a submodel (which is referred to as a module) will be re-



## ArcStyler Overview

flected in the composing model. Alternatively, submodels can be imported into other models as a copy if decoupling the lifecycle of both models is a desired effect.

An additional unique feature of the ArcStyler is the concept of **MDA Marks**. These marks are light-weight annotations to model elements and hold platform-specific information. As marks can be attached to and detached from a model easily, they do not "pollute" the model with platform-dependent specifications. Instead, separate sets of marks can co-exist simultaneously for a single model, making it possible to map the same model to different platforms without having to change the model itself – which is, in other words, the basic idea of MDA.

### **MDA-Engine and MDA-Cartridges for Code Generation**

One of ArcStyler's unique features of ArcStyler is its **comprehensive and flexible MDA-Engine for code generation** along with the **pluggable and fully extensible MDA Cartridges**. These cartridges package all the necessary technology-specific items and mechanisms required for the automated and optimized transformation from models to the underlying infrastructure.

### **MDA-Cartridges for J2EE and .NET development**

ArcStyler offers a variety of ready to run transformations for the leading J2EE application servers and for the .NET infrastructure. The currently supported platforms include BEA Weblogic 8.1 as well as JBoss 3.2 and IBM WebSphere Application Server on request. The supported databases include Oracle and the built-in databases Cloudscape, Hypersonic and PointBase.

Based on the UML model, ArcStyler generates the structural application code, test support as well as the complete infrastructure for building, deploying and running the applications. ArcStyler supports the entire EJB 1.1 and EJB 2.0 standard. Modeling and generation is supported for concepts such as the different EJB types, J2EE modules, resources, applications, JDBC data sources, JMS connection factories etc. Furthermore, the ArcStyler MDA-Cartridges add unique and indispensable feature such as inheritance between EJBs, polymorphic associations and associations based on remote interfaces. All the different concepts are supported by a UML profile which in turn is supported by a number of custom diagram that allow for efficient modeling according to the profile.

ArcStyler support for the .NET Platform includes design and generation of distributed applications, using similar principles as those in J2EE. The .NET Cartridges leverage a Persistence Data Adapter, which enables automatic persistence of modeled entities. Supported databases include SQL Server and any accessible through OLEDB.NET. The .NET Cartridges provide a complete generation including integration with Visual Studio .NET, Internet Information Services, ANT, .NET Configuration files, etc. Also, the .NET Cartridges support through a "1-click" modeling style complete generation and registration of Windows Services and .NET Web Services. The underlying architecture and program-



## ArcStyler Overview

ming model leveraged by the .NET Cartridges reduces the learning curve for any kind of developer, whether with a Java or COM background.

### **MDA-Cartridges for Web Application Development**

Generate ready-to-run web applications based on UML models. ArcStyler supports the automatic generation of Web front-ends, Web application interfaces, Web Services and external EAI interfaces for various types of platforms. UML activity diagrams and class diagrams in conjunction with a specific UML profile are used for modelling the entire functionality of a Web-based application. Modeling is based on the MVC (model-view-controller) principle. The automatic model-to-model creation of user access models from basic, server-side component models is one unique and time-saving feature of the ArcStyler. This feature automatically creates the required infrastructure for re-occurring tasks like create, read, update, delete etc.

### ***Adaptation and Extension according to specific needs***

#### **Adaptation of existing MDA-Cartridges**

The ArcStyler MDA-Cartridges are composed of many man-years of practitioners in the field of system development and software architecture of large-scale, distributed systems. However, it turns out that in typical situations, each environment may have its own flavor that needs to be supported in a specific way that goes beyond the comprehensive functionality provided by the available ArcStyler MDA-Cartridges. That flavour may come from existing systems the new system needs to integrate with, from specific middleware that needs to be used or custom architectures and patterns that need to be applied. In order to meet these requirements of a specific environment, ArcStyler cartridges are built for extension and customisation. As a solid architecture, ArcStyler CARAT leverages object-oriented principles such as inheritance and polymorphism to the cartridge level allows for non-intrusive extension of existing cartridges. Based on existing extension points of these cartridges, the behaviour of a cartridge can be customized for a specific purpose without having to re-invent the wheel. In addition to that, cartridges in ArcStyler are developed based on MDA: A transformation is modelled visually using a specific UML profile. Then, the CARAT cartridge (which is part of the Architect Edition) is used for generating >90% of the implementation code of the adapted cartridge.

#### **Development of new MDA-Cartridges**

In the same way as packaged transformation can be extended and customized, ArcStyler CARAT supports the development of entirely new cartridges. These cartridges are usually developed to support a custom architecture (e.g. a SOA platform) in order to increase efficiency of application development for that architecture and at the same time improve the quality of the application code.



## ArcStyler Overview

In these situations, ArcStyler's approach to model-driven cartridge development can be applied in a similar way as when extending cartridges. Based on a model of the transformation, a large portion of the code that makes up the transformation is generated automatically. A complete cartridge development IDE inside ArcStyler supports manual refinement of the generated code. A debugger within the cartridge development IDE allows for debugging transformations. Debugging even includes the ability to trace-back the transformation rules where a particular fragment of generated text originated from.

### ***MDA-enabling existing code (Harvesting)***

The ArcStyler's MDA approach, with its top-down path from a high level of abstraction in terms of models to a lower one in terms of code, is one of its main features, providing the richest source of benefits. However the opposite way is attractive if a system has been developed "conventionally", i.e., without the support of modeling and ArcStyler. By using what is referred to as the ArcStyler Harvester, existing applications may be turned into models either for the purpose of forward-engineering them using the MDA benefits or for translating them to another platform or programming language. There are two Harvesters packaged with the ArcStyler:

- Reverse engineering of J2SE applications with optional abstraction heuristics
- Abstraction from J2EE applications based on the EJB deployment descriptors

Due to the flexibility of ArcStyler Harvesters for other languages may be implemented by customers with support of Interactive Objects. In particular in the domain of application modernization, customer projects have shown how to harvest existing 3GL/4GL applications and transform them to e.g. J2EE applications in a highly automated way.

### ***Expanded support for XMI based model exchange***

The comprehensive support for XMI based model exchange within ArcStyler allows companies to leverage existing UML models from other modeling tools and benefit from the comprehensive and flexible code generation features of ArcStyler. UML models from diverse UML 1.4 compliant modeling tools can automatically be imported into the ArcStyler tool environment via a specific import dialogue. These imported models can be extended with MDA-specific model annotations and serve as basis for comprehensive code generation for diverse technology platforms.

Using standard XMI technology, you can easily bring your existing UML models to the level of MDA development and generate comprehensive, high-quality code for the leading technologies.





## ArcStyler Overview

### ***Model-to-model transformations***

One of the key elements of Model Driven Architecture is the transformation of models and the definition of such models – an area heavily discussed within the OMG MDA standardization process, to which Interactive Objects actively contributes.

ArcStyler comes with a module which shows an example of an implementation of such an environment for definition and execution of models. This model-transformation module supports the definition of specific model transformations (e.g. business process models to UML) and even enables model transformation chains. With the ArcStyler model-transformation module architects can create and extend transformations according to their specific needs – based on standard, state-of-the-art technology.

### ***ArcStyler support for Teamwork***

ArcStyler adds comprehensive teamwork support capabilities to the MDA-level – in addition to the regular CVS support for team development, ArcStyler offers unique features for teamwork due to the tight integration with the MagicDraw teamwork server:

**Faster team collaboration.** Every developer may instantly obtain the newest version of the model; everybody is allowed to work in parallel on its own part. No need to merge separate XMI files by hand.

**Easy usability.** All functionality of the MagicDraw Teamwork Server is tightly integrated into the ArcStyler user interface.

**Simpler configuration management.** All designs are stored in a single place, there are no more files that are scattered around in the network; changes can be introduced orderly and without conflicts.

**Controlled access to your artifacts.** Different people in the project may have different access levels to the projects stored in the teamwork server repository.

**Remote access.** No matter where you are, if you are connected to the Internet you may work with the model that is stored in the repository. A project manager may provide read only or full access to the repository for the overseas developers, customers, subcontractors, management, and other interested parties.



## ArcStyler Overview

For more information, downloads and contact details please visit our website at

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