



## Mentor Graphics EDGE UML Suite

The EDGE UML Suite from Mentor Graphics is a leading model-driven architecture (MDA) tool providing UML design using platform-independent models (PIMs) with translation to platform-specific models (PSMs) to produce the desired implementation. PSMs are currently available in C, C++, and can be defined for any other language including proprietary languages. The EDGE UML Suite comprises the following tools:

- **BridgePoint Builder:** Captures PIMs in UML 2.0 with extensions for platform-independent actions.
- **BridgePoint Verifier:** Executes PIMs prior to translation for fast turnaround and verification of the design.
- **BridgePoint Model Compiler:** Generates optimized, complete, regular, and consistent real-time code.
- **BridgePoint Debugger.** Debugs the generated code on either the host or target, in terms of the original platform-independent UML models.

The figure below illustrates the EDGE UML Suite design flow:

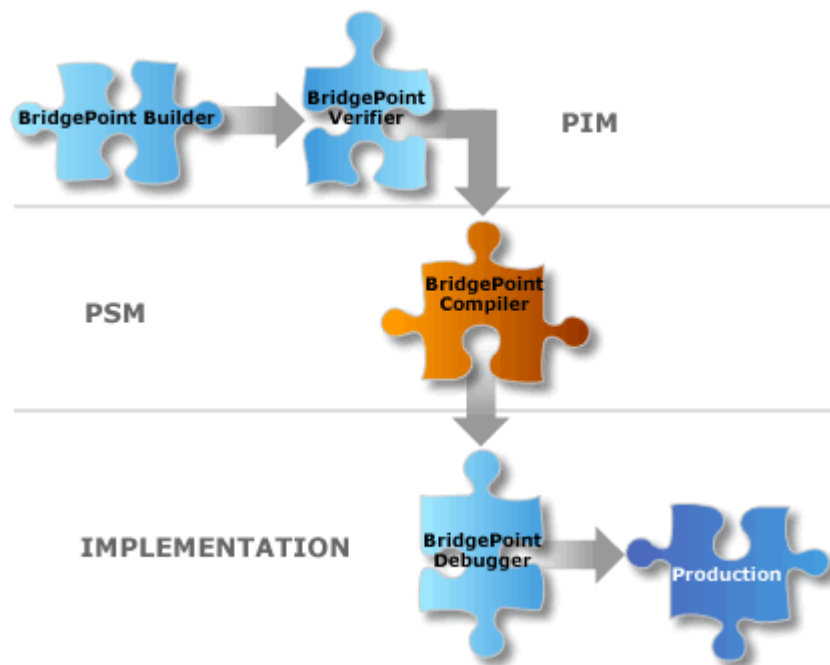
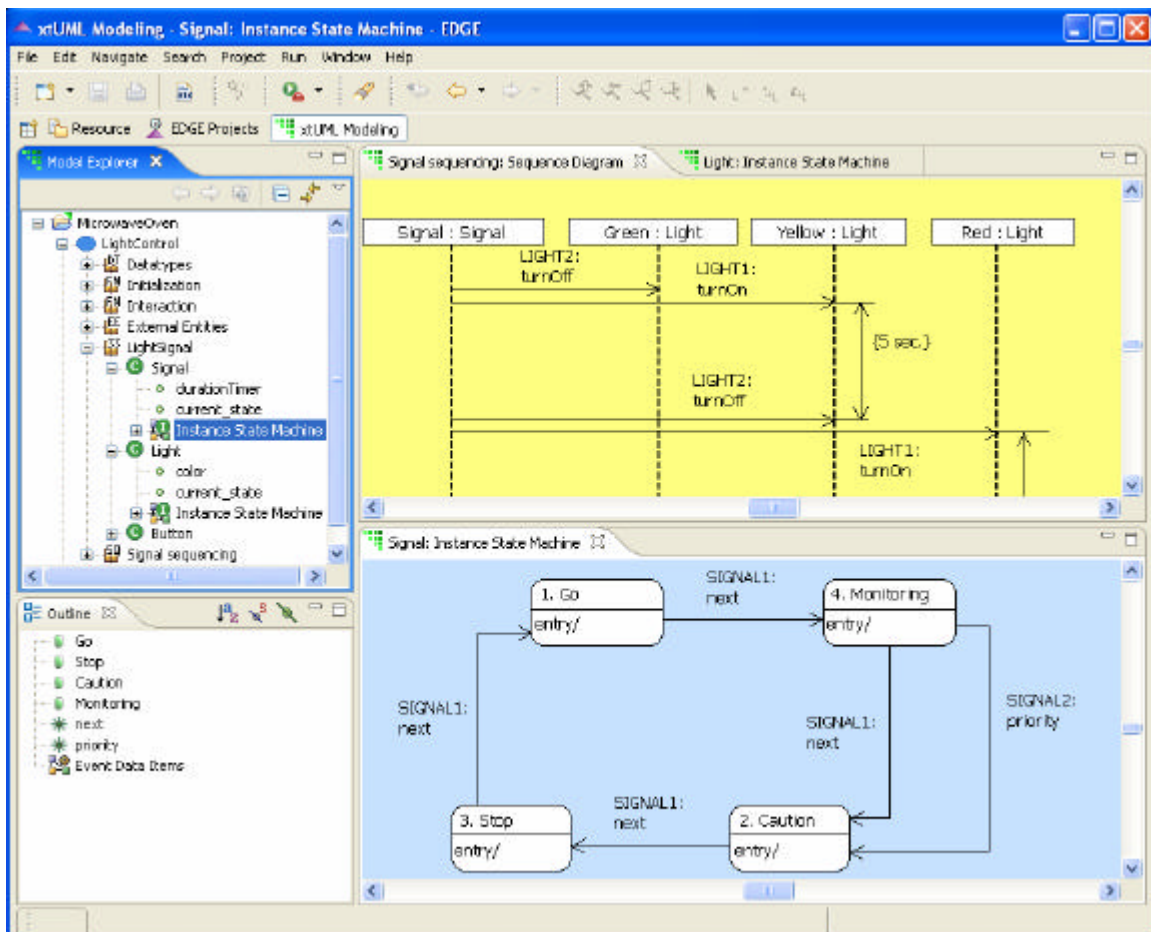


Figure 1: EDGE UML Suite Design Flow

The heart of the EDGE UML Suite is an executable semantics represented through UML diagrams and an action-semantics compliant action language. BridgePoint Builder captures PIMs in a repository based on the metamodel. BridgePoint Verifier is a platform-independent model interpreter. Developers can establish sets of initial conditions, step through the execution state by state or action by action, and modify the model, if needed, as the model executes.

Model compilers embody a set of translation rules that compile a PIM into a specific implementation. Some model compilers generate multi-tasking PSMs with persistence with a target of C++; others generate a single task sitting directly on the silicon into C without the necessity for an embedded operating system. Every model compiler is completely open, allowing developers the freedom to modify the PSM directly, or to build their own platform-specific model.

Each model compiler relies on the BridgePoint Data Access Package which accesses the PIM stored in a repository and applies the model compiler's rules to generate text-text that can be for any programming language, conforming to any API and any coding standards.



## **Figure 2: The EDGE UML Suite**

EDGE UML Suite customers benefit from the principles behind MDA. Some are generating more than two million lines of C++ from PIMs, while others are using optimized model compilers to produce small quantities of C code for highly constrained environments such as pacemakers. End-users of these products benefit from the ability to interpret the models to know they're correct before generating code for any target.

Stephen J. Mellor, Chief Scientist at Mentor Graphics and Chair of the UML Action Semantics Submission Consortium, states "The most exciting aspect of OMG's MDA initiative is the notion of design-time interoperability. We hope soon to see a standard for interchange of the semantics of models so that user can select between best-of-breed model builders, model verifiers, test-vector generators, state space provers, model compilers and so on. MDA enables the creation of a tool chain for executable modeling."

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