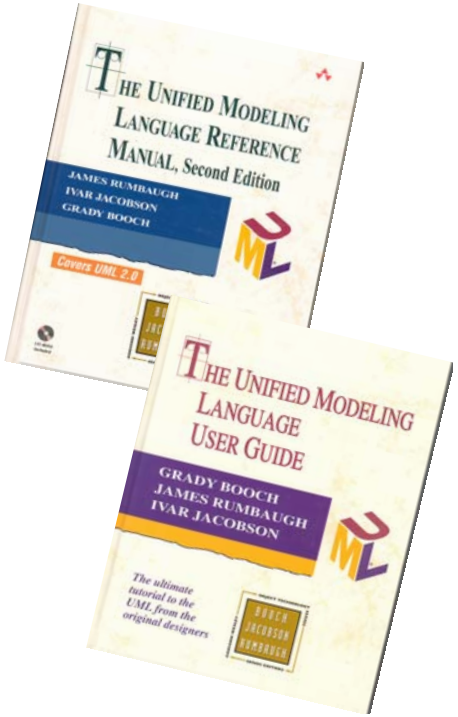
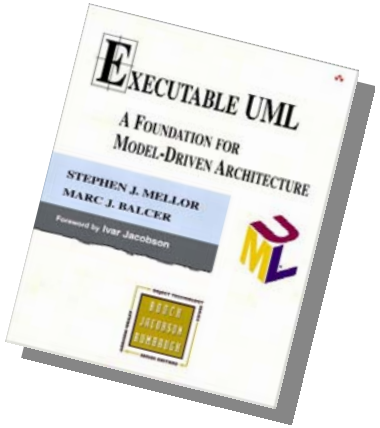
Model Driven Development with xtUML and BridgePoint®

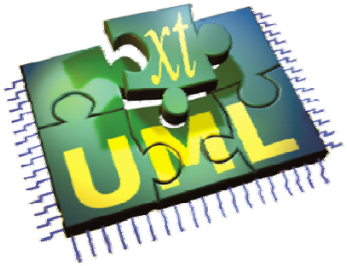
xtUML – Executable and Translatable UML

Unified Modeling Language

- Industry standard *notation*
- *Family* of languages





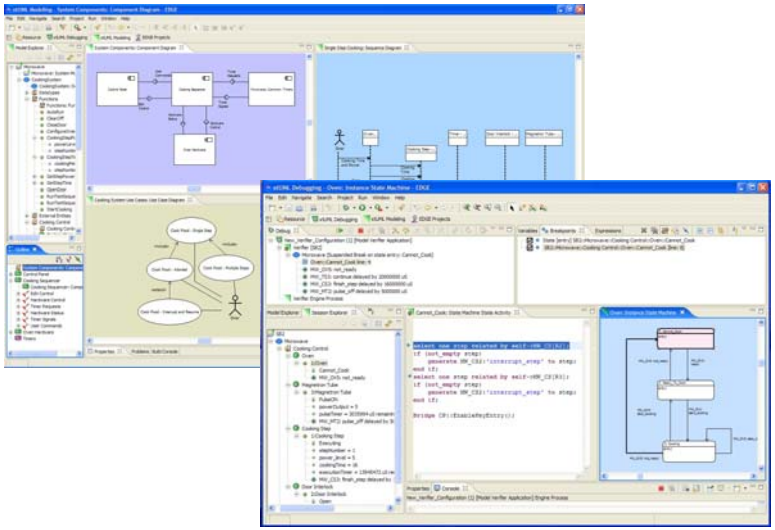


"Executable UML"

- Defines a method, including:
  - Semantics of diagrams
  - Relationship between diagrams
  - Execution rules
  - Order of construction
  - Path to implementation

Executable Models, Not Just Diagrams

- Test application design before coding it
- Result: Verified executable specification

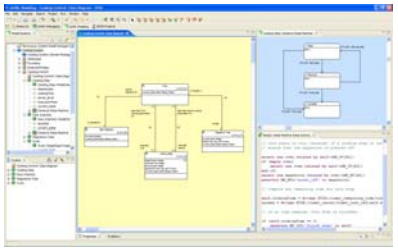


Drive existing design flows

Compile into optimized code…

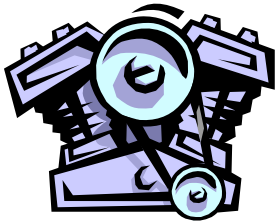
Compiling Models: It's not magic

Application Models



Marking Data

Rules & Templates



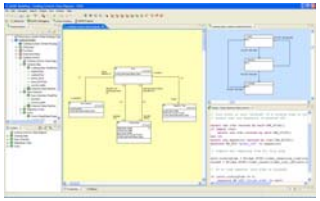
Translation Engine

Optimized Code

Separation of Application from Implementation

- Subject-matter experts focus on application
  - Features and capabilities
  - Intricacies of the application

Application Models

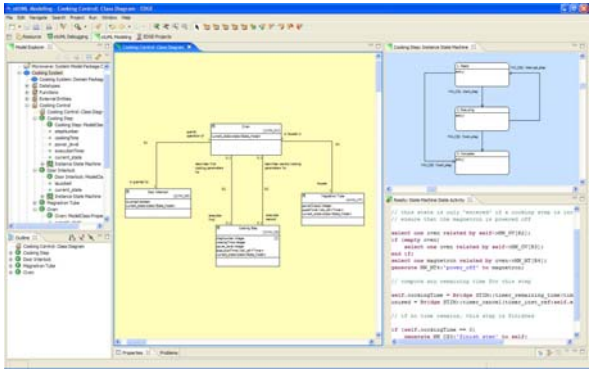


- Implementation experts focus on optimization
  - Faster, smaller
  - Less power
  - Lower cost

Model Compiler

Reusable IP(1): Application Models

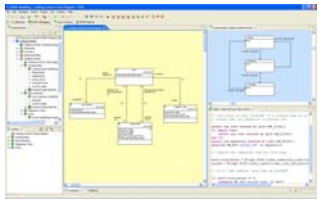
Platform-independent
Application Models



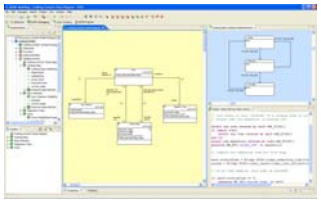
Reuse application models across platforms and product variants.

Reusable IP(2): Model Compilers

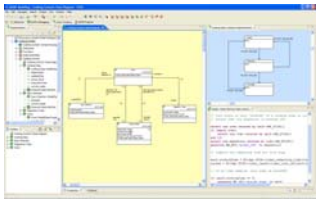
Site Link

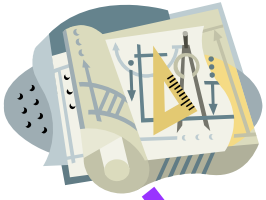


Channel Controller



MME

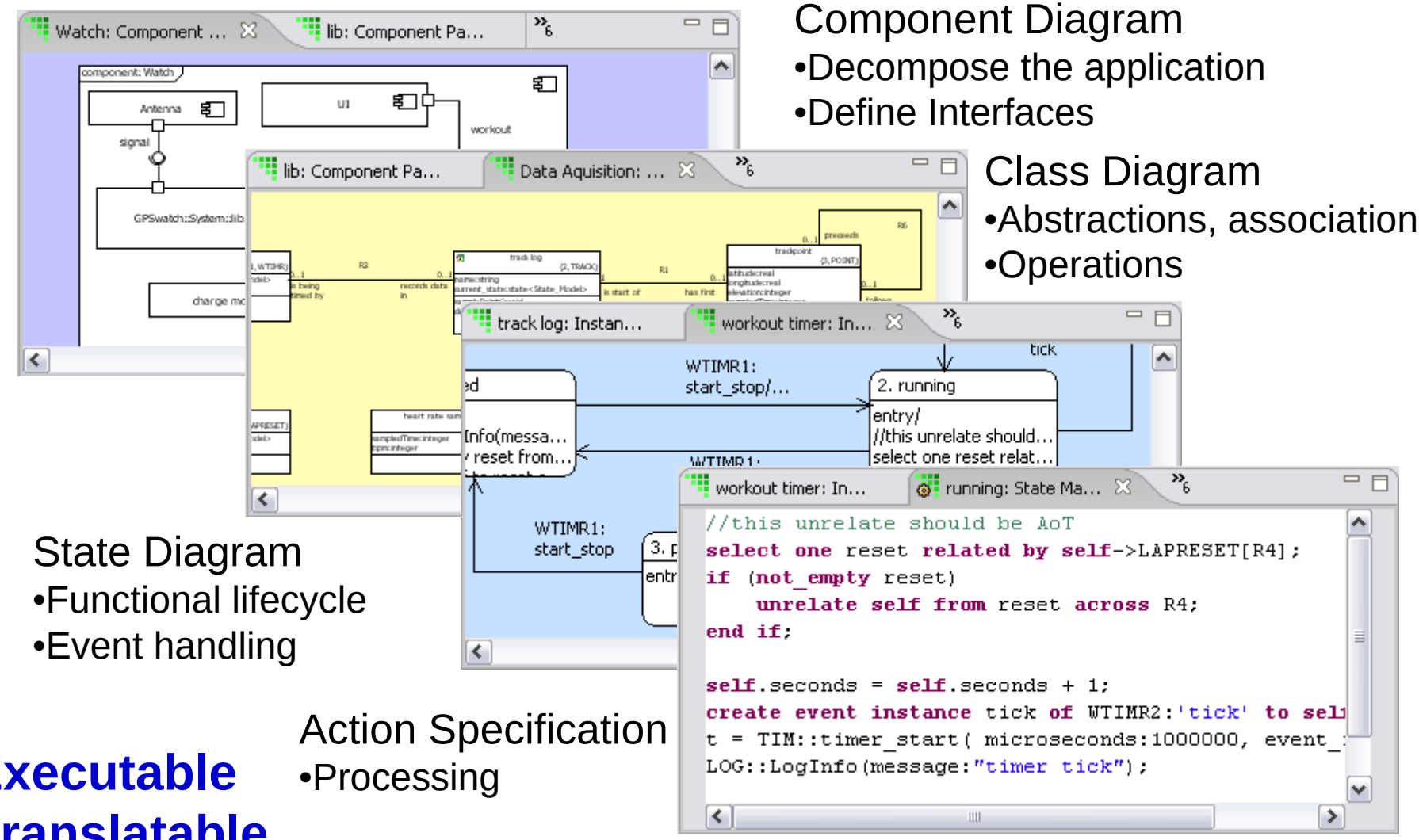




Application-independent
Model Compiler

Reuse one
model compiler
across many
applications.

xtUML Design flow



Component Diagram
- Decompose the application
- Define Interfaces

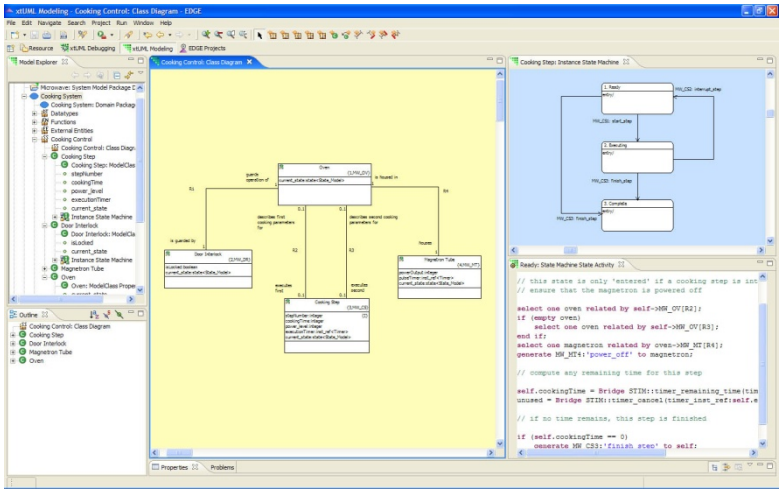
Class Diagram
- Abstractions, associations
- Operations

State Diagram
- Functional lifecycle
- Event handling

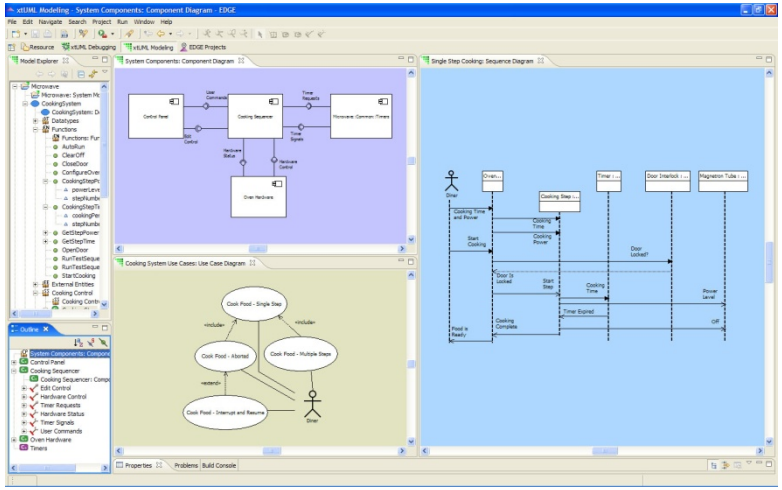
Action Specification
- Processing

Executable
Translatable

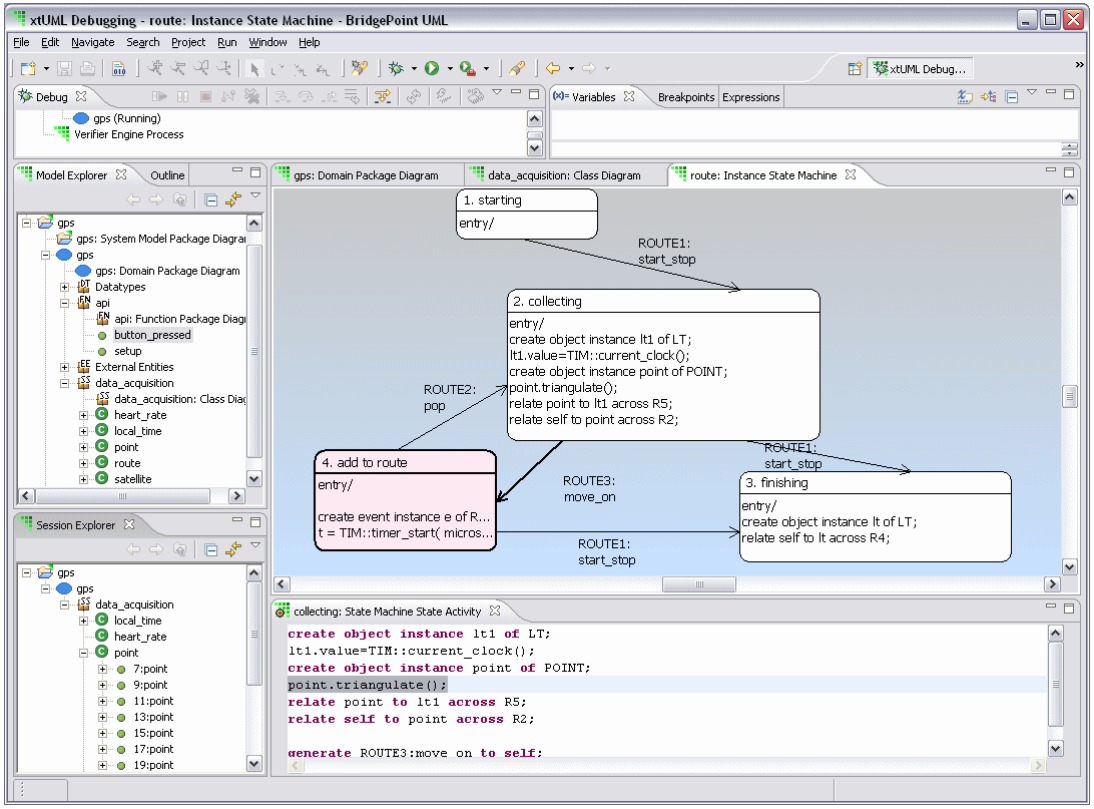
BridgePoint Model Builder



- Intelligent model entry
- Intuitive navigation
- Syntax-aware OAL editor
- Flexible CM
- Eclipse framework



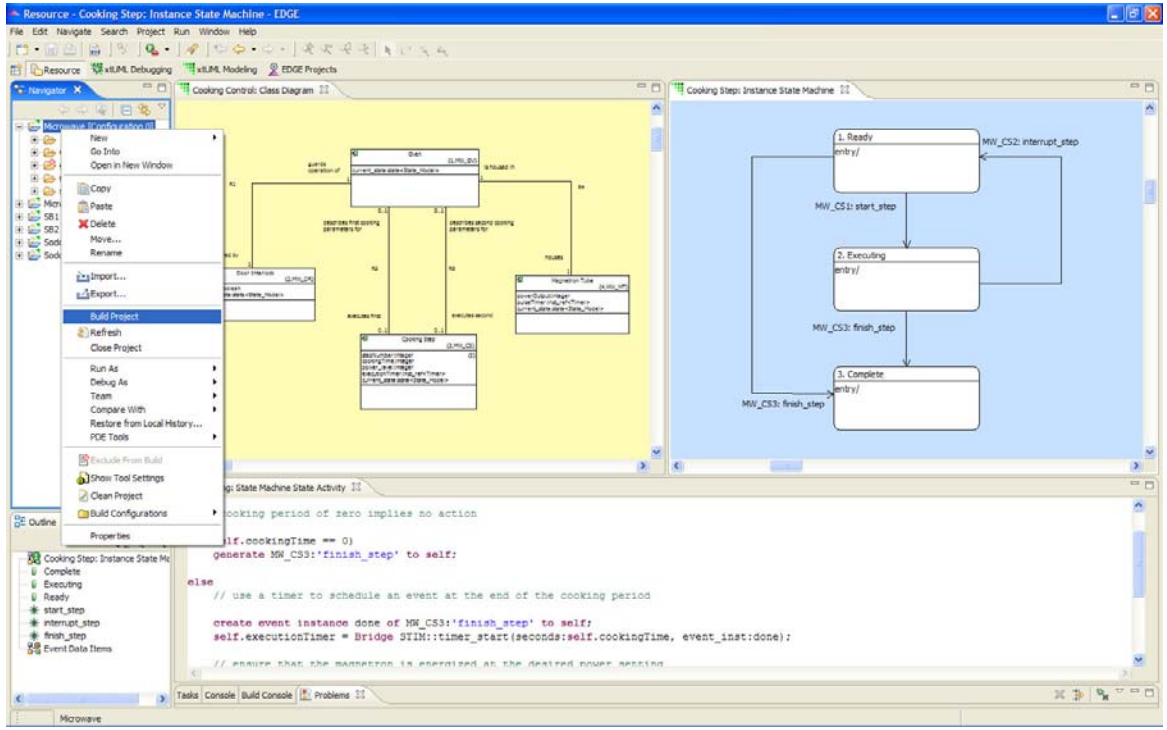
BridgePoint Model Verifier



- Interpretive execution
- Interactive debugging
- Animation of models
- Connect to legacy

- Execute models before you generate or write code
  - Run models immediately and incrementally
  - Remove defects early

BridgePoint Model Compilers



- Design patterns
  - Templates
- Translation rules
  - Query
  - Transform
  - Populate templates
- Marking
  - Like compiler flags
  - Determine which patterns are applied to each model element

- One-button build
  - Customize tool chain and build parameters
  - Generate build script for CM and batch
  - Buy or build model compiler

BridgePoint xtUML is Proven Technology

- Wireless network controllers, base stations
- Telecom multi-processor cross-connect switches
- PBX, call processing
- Office equipment – copier/printer/fax/scanner
- Surgical X-Ray, ultrasound imaging
- Automotive HVAC, Audio, Navigation, Instruments
- Satellite launch control, navigation control, avionics
- Railroad control system
- Manufacturing robots, data collection
- Training simulations, mission planning
- Implanted Medical Devices

Results

- 10x productivity increase over traditional approaches
  - Very large US defense contractor
  - Medium projects, 5-20 engineers
- 8x productivity increase over traditional approaches
  - Medium-sized Australian defense contractor
  - Small team, 3-5 engineers
- 30% productivity increase over traditional approaches
  - Very large US aerospace company
  - Large projects, 50-200 engineers
- European wireless telecom equipment maker
  - 40% reduction in code size
  - 9% increase in execution speed
  - Replacement of hand-written module with model-generated code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