OBJECT MANAGEMENT GROUP

Model Driven Architecture

MODEL DRIVEN ARCHITECTURE™

Richard Mark Soley, Ph.D.
Chairman and CEO

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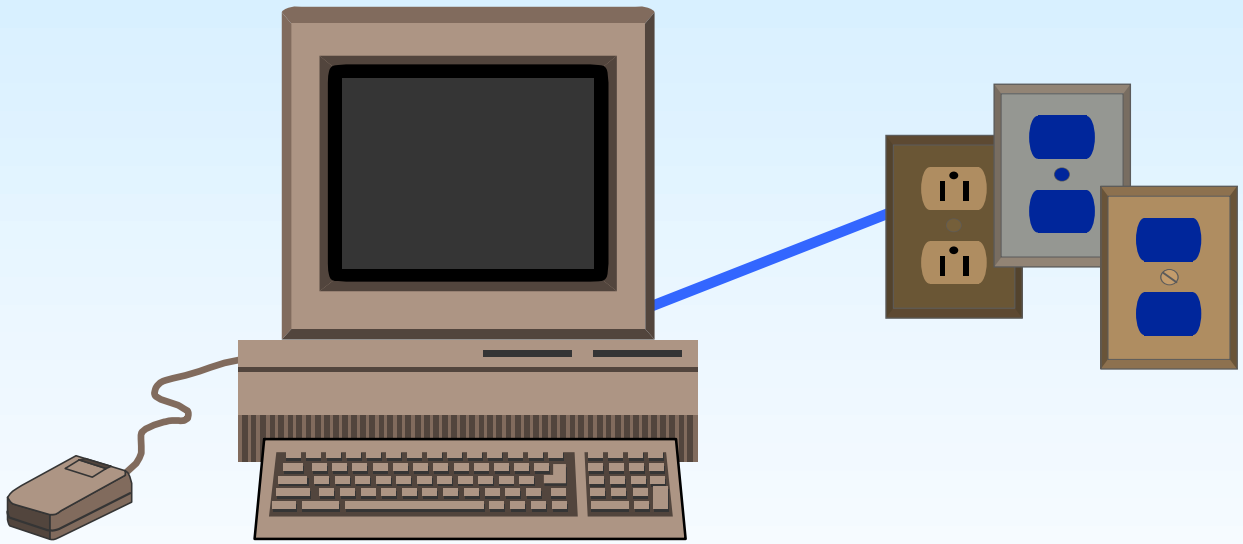
OMG's Vision



The Global Information Appliance

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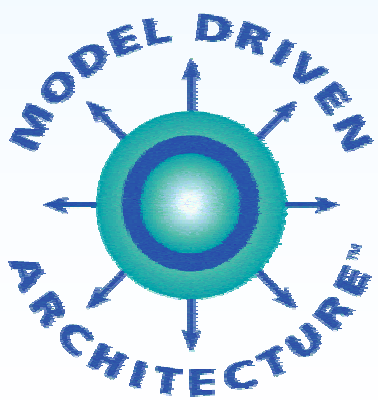
Heterogeneity is Permanent

- Programming languages
  - ~3 million COBOL programmers
  - ~1.6 million VB programmers
  - ~1.1 million C/C++ programmers
- Operating systems
  - Unix, MVS, VMS, MacOS, Windows (all 8!), PalmOS…
  - Windows 3.1: it's still out there!
  - Embedded devices (mobile, set-top, etc.)
- Networks
  - Ethernet, ATM, IP, SS7, Firewire, USB
  - Bluetooth, 802.11b, HomeRF



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Where Can We Agree?

- There will not be consensus on hardware platforms
- There will not be consensus on operating systems
- There will not be consensus on network protocols
- There will not be consensus on programming languages

- ***There must be consensus on interfaces and interoperability: BASED ON MODELS***

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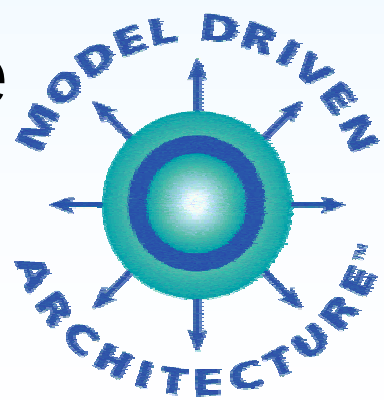
OMG Made its Name in Middleware

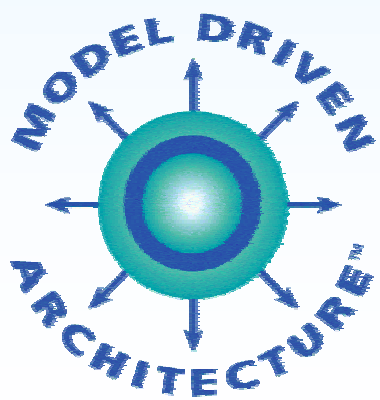
- But middleware *itself* has proliferated:
  - CORBA®: Vendor, OS & language independent middleware
  - COM/DCOM/MTS
  - Java/EJB
  - XML/SOAP
  - C#/.Net
  - What will be *Next Best Thing?*
- You must preserve your software investment as the infrastructure landscape changes around it



How Can We Protect Software Investment?

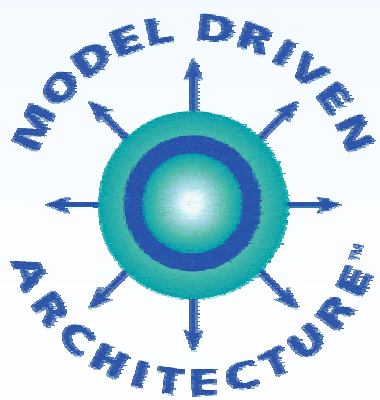
- The problem remains
  - Tracking the *next best thing*
  - Protecting your investment in existing software base
  - Retaining qualified staff
  - Maintaining existing code base

- Integrating what you've built
  - With what you're building, and
  - *With what you will build!*



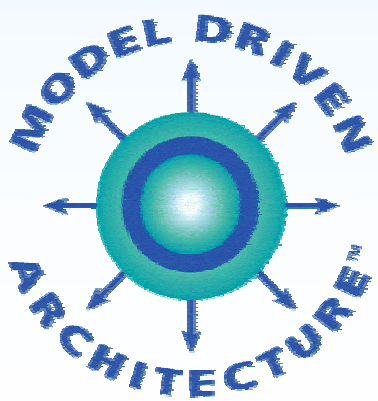
The Model Driven Architecture

- OMG's *Model Driven Architecture* (MDA™) initiative is aimed precisely at this problem
- You have an opportunity to increase your bottom line by *integrating your assets*
- Industry standards support that goal by future-proofing your application design
- The MDA will help you integrate the mix you have today, and give you an architecture to support the unexpected
- Focus on integrating legacy applications
- Ensure smooth integration of COTS applications
- Models are *testable* and *simulatable*
- The aim: *a 20-year software architecture*

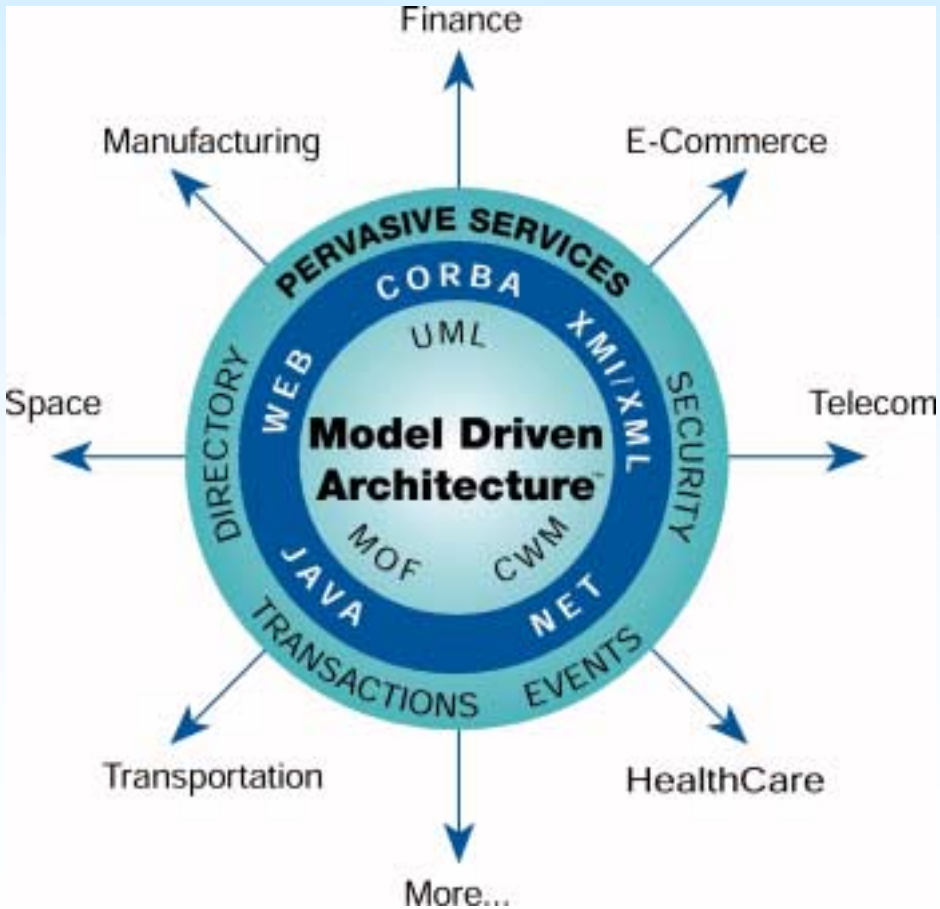


What is Model Driven Architecture?

- A New Way to Specify and Build Systems
  - ***Based on modeling with UML***
  - Supports full lifecycle: analysis, design, implementation, deployment, maintenance, evolution & integration with later systems
  - Builds in Interoperability and Portability
  - Lowers initial cost and maximizes ROI
  - Applies directly to the mix you face:
    - Programming language
    - Operating system
    - Network
    - Middleware

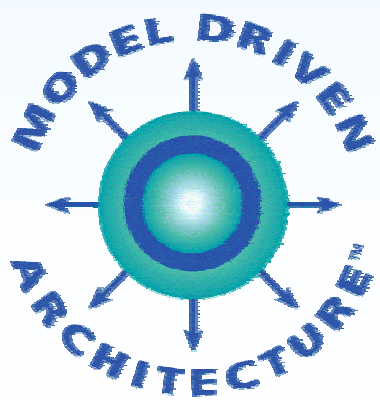


Model Driven Architecture

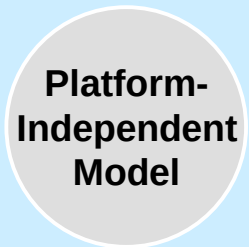


Leveraging UML is Critical

- The Unified Modeling Language is the successor to the dozens of OO A&D notations of the early ’90s.
- Result of an OMG adoption begun in ’96 and completed in ’97
- Complemented with repository (MOF) and XML Metadata specs (XMI)
- Standardization primed the market
  - Over 100 books
  - Dozens of commercial tools
  - Widely available training
- Supported by an open process
  - UML 2.0 process under way now

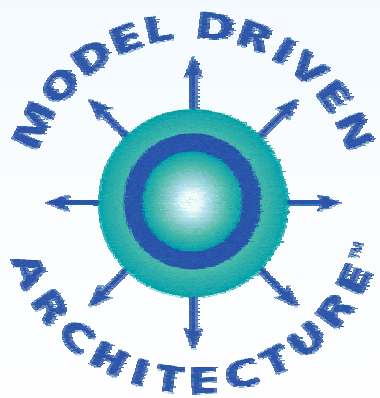


Building an MDA Application

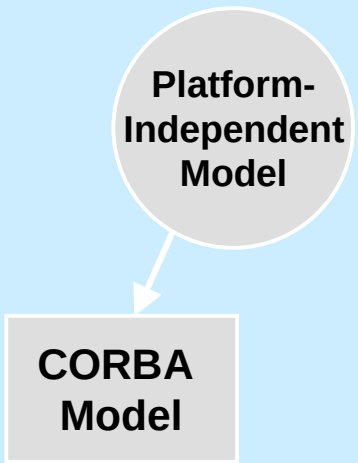


A Detailed Model, stating Pre- and Post-Conditions in OCL, and Semantics in Action Language

Start with a *Platform-Independent Model* (PIM) representing business functionality and behavior, undistorted by technology details.

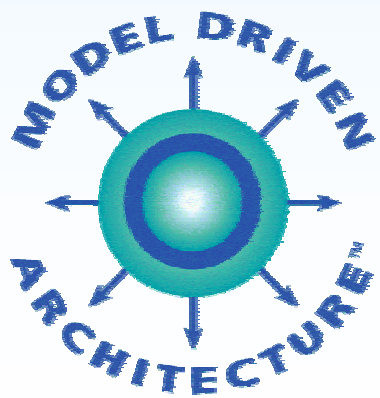


Generating Platform-Specific Model

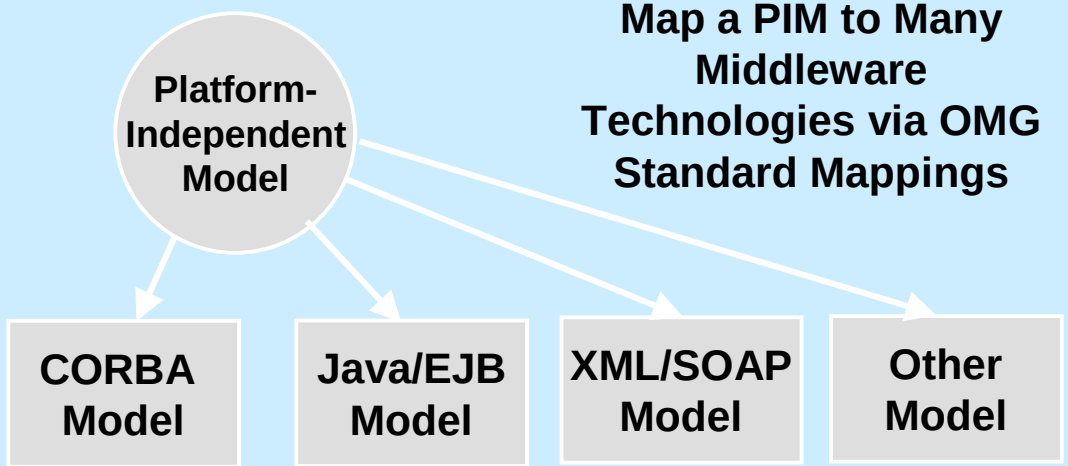


Map a PIM to Specific Middleware Technologies via OMG Standard Mappings

MDA tool applies a standard mapping to generate *Platform-Specific Model* (PSM) from the PIM. Code is partially automatic, partially hand-written.



Mapping to Multiple Deployment Technologies



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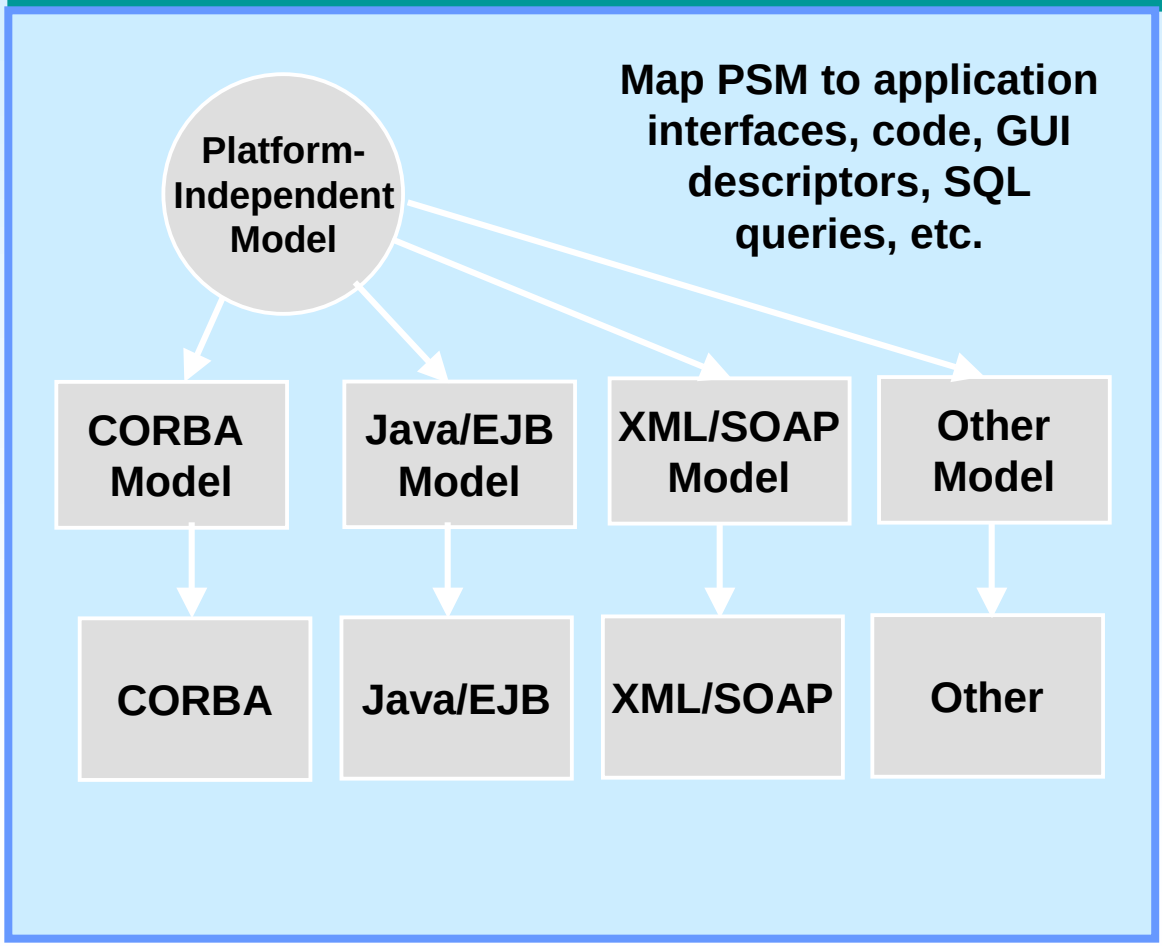
Generating Implementations



MDA Tool generates all or most of the implementation code for deployment technology selected by the developer.

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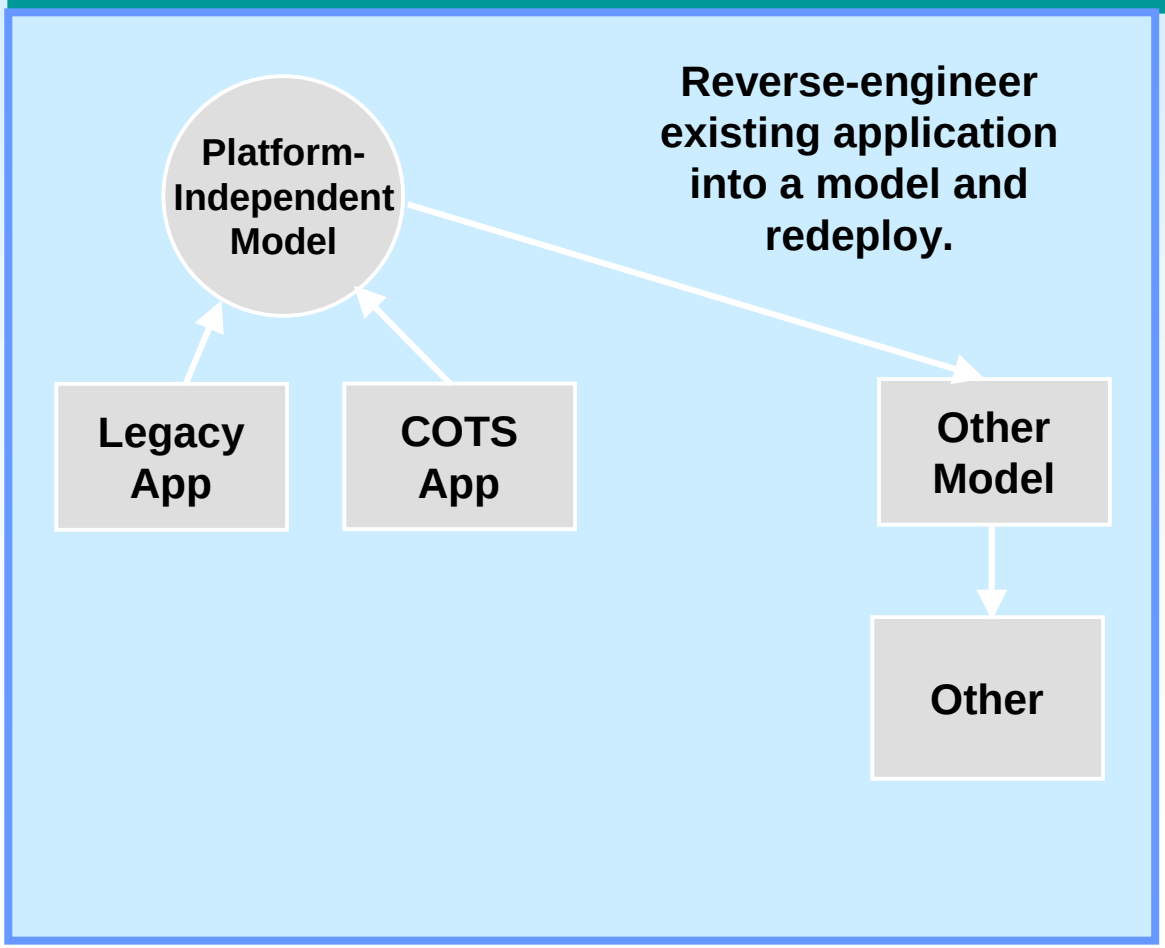
Integrating Legacy & COTS



MDA Tools for reverse engineering automate discovery of models for re-integration on new platforms.

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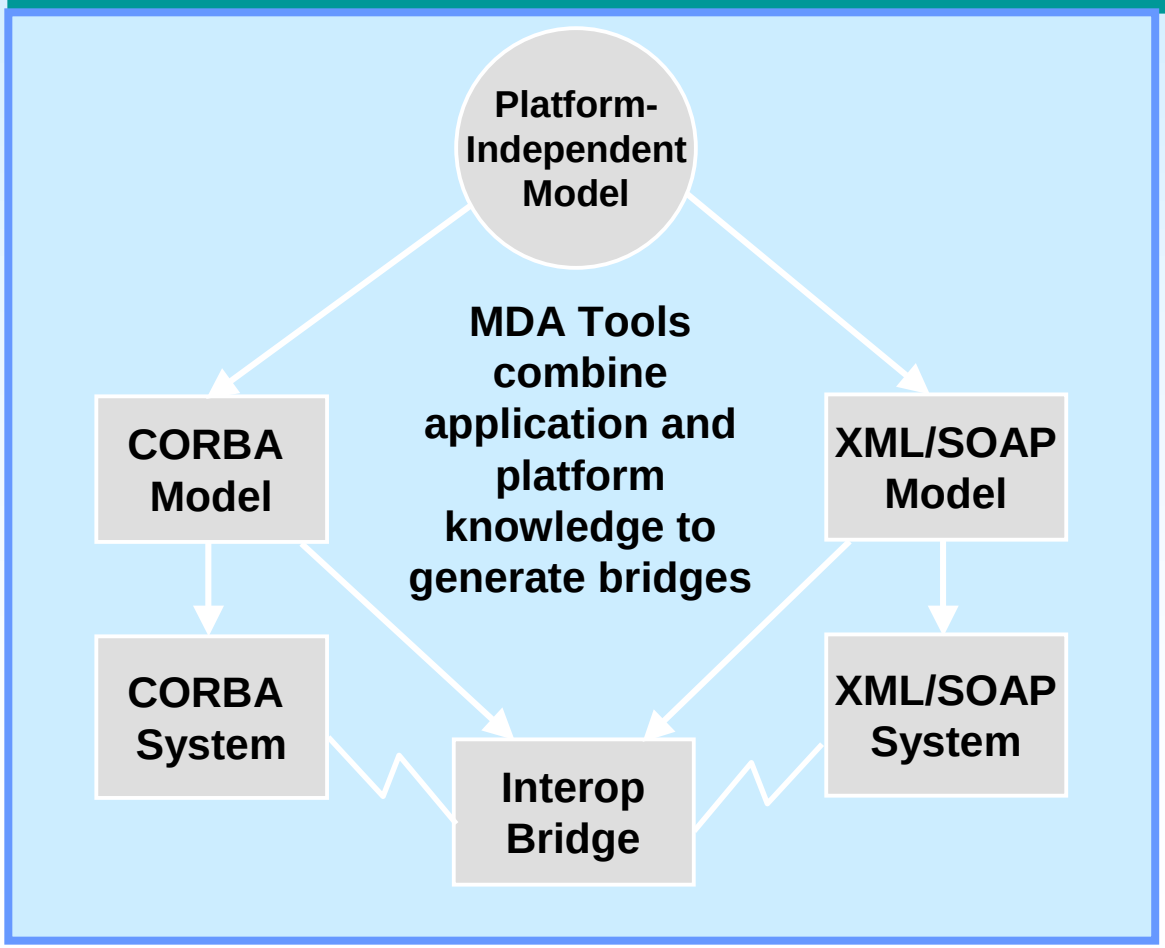
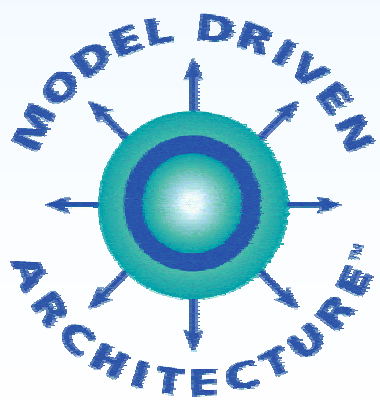
Automating Bridges



Bridge generation is simplified by common application models, simplifying creation of integrated applications both within and across enterprises.

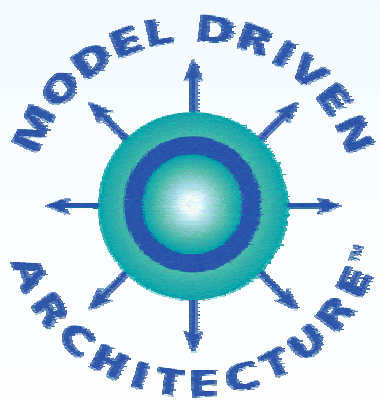
MDA in Industry Standards

- The MDA promotes standards that are valuable *across deployment technologies*
  - Applicable to large & small deployments, new applications, legacy and COTS
  - Applicable to CORBA, DCOM, .Net, etc.
  - Allows knowledge leverage for the long-term, standards that persist
- MDA has been quickly adopted by OMG's standardization groups
  - Both PIM and PSM(s) adopted by process
  - Standard model lasts decades



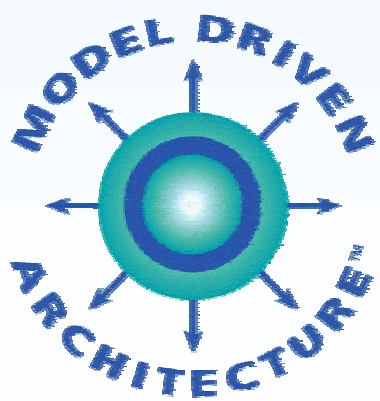
MDA in Practice

- Several excellent proofs-of-concept:
  - Wells Fargo (an architecture that has already been resilient through a decade of change)
  - Lockheed Martin Aeronautics
  - GCPR in US government
- These are “MDA-like”
  - Standards make it portable



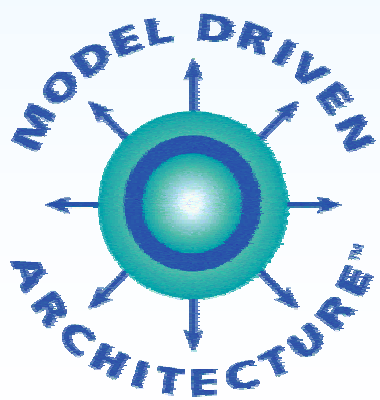
OMG MDA Adoption Status

- Major direction agreed March ’01; overall architecture adopted September ’01.
- UML 1.4 complete; 2.0 in process.
- Mappings (“*profiles*”) underway:
  - EDOC (adopted)
  - CORBA (adopted)
  - EAI (in process)
  - EJB (adopted by JCP)
  - SOAP/XML (in process)
  - .Net (to be started)



OMG MDA Adoption Status

- More importantly, *vertical market groups* are thriving on MDA approach:
  - Electronic Commerce
  - Financial Services
  - Healthcare
  - Life Sciences Research
  - Manufacturing
  - Space & Ground Systems
  - Telecommunications



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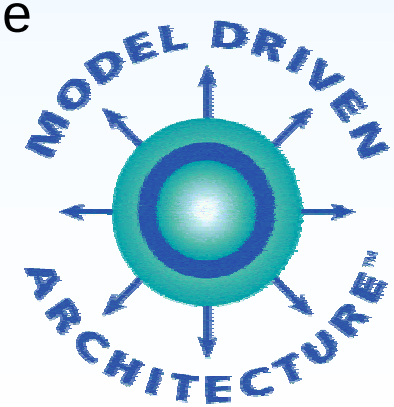
MDA Benefits

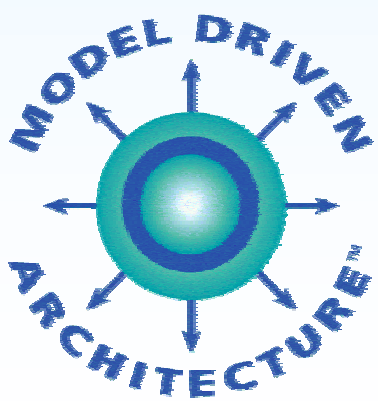
- Full support for your “20 year architecture” across the application lifecycle
- Smooth integration across intra- and inter-business boundaries (across deployment technologies)
- Reduced costs from beginning to end
- Reuse of applications, code, training and people
- Technology-independent representation of the *business*
- Scalability, robustness & security via generated code
- Stable model-based approach maximizes ROI
- Rapid inclusion of the *next best thing*

The CIO Problem Solver



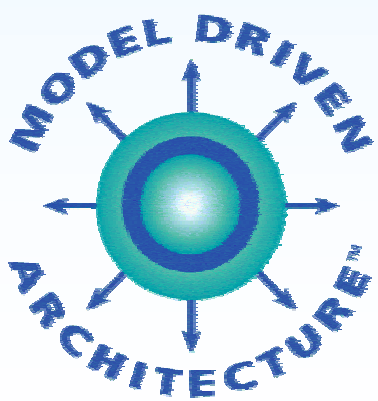
Market Forecast

- Analysis by Paul Harmon, Cutter Consortium
- Assumes:
  - Driven by e-business integration
  - UML tools will become MDA tools
- UML growth was very rapid
  - Changed tool market in 3 years



Cutter Consortium Summary

- “Most exciting enterprise software initiative since UML”
- “Could take off very fast after the current economic slowdown is over”
- At least US$500 million market
  - Assumes 33% penetration



To Get More Information

- MDA Information Page
  - http://www.omg.org/mda/
- OMG General Information
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- Contact the Author
  - soley@omg.org