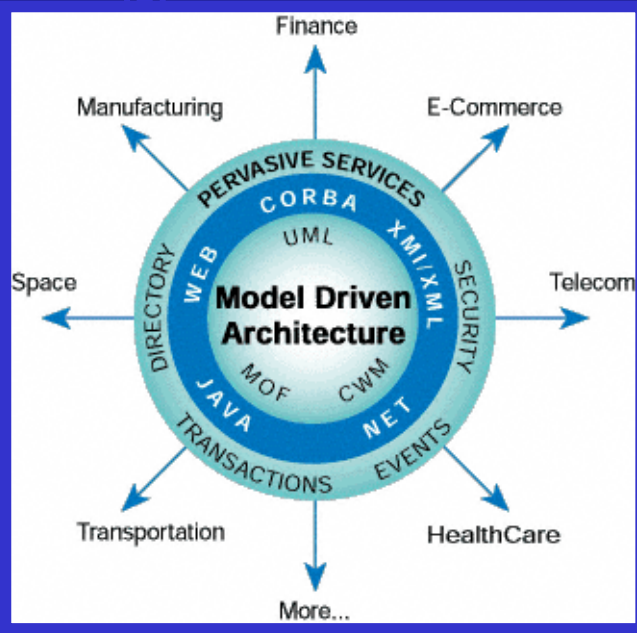




[Session M2] MDA PROCESSES

Dr Jon Siegel
Vice President of Technology Transfer, OMG

METRO TORONTO CONVENTION CENTRE
DECEMBER 6, 2004
TORONTO, ONTARIO



Introduction to OMG's Model Driven Architecture

Updated November 2004



Written and Presented by
Jon Siegel, Ph.D.

Vice President, Technology Transfer

Object Management Group

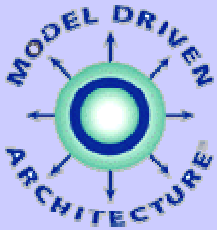
siegel@omg.org

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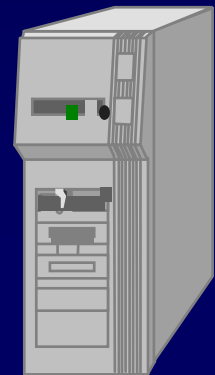
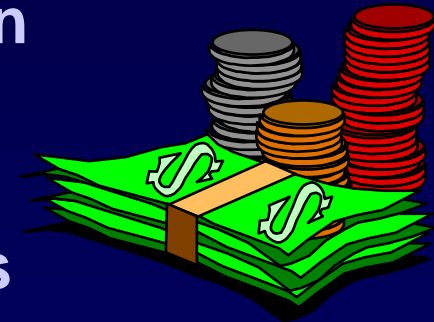
What is OMG?

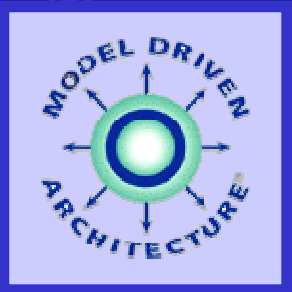
- **Object Management Group - 15-year-old not-for-profit Computer Industry Standards Consortium**
- **Home of UML, the Industry's Modeling Standard and the Model Driven Architecture (MDA)**
- **Open Membership and Adoption Process**
 - **One-member, One-vote**
- **Specifications Available Free on our Website**
- **Buy Implementing Products from Vendors**
 - **Vendors may be OMG members, or may not**
- **Over 500 members including Companies, Government Agencies, Universities**



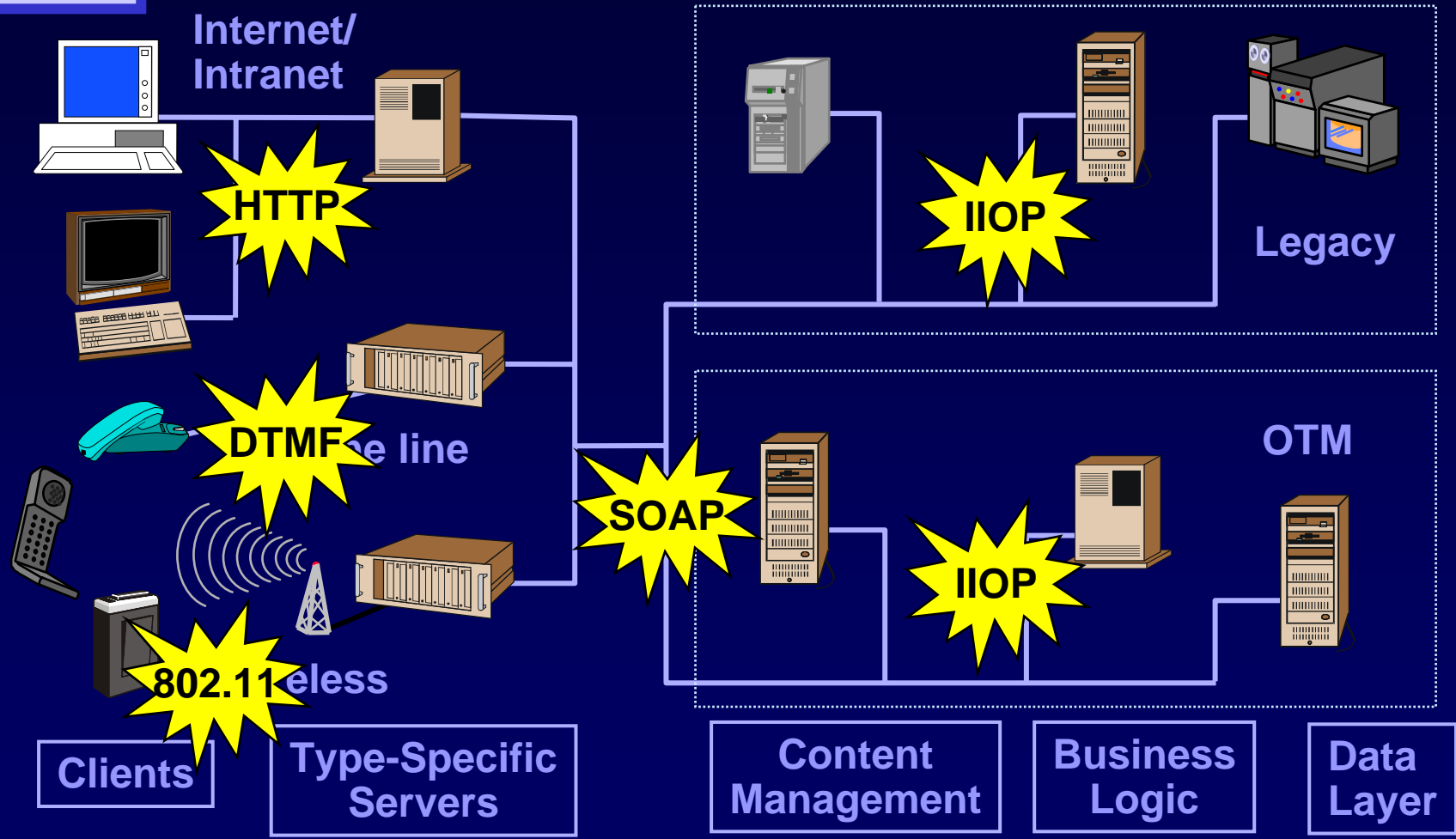
Enterprise IT Must Deal With

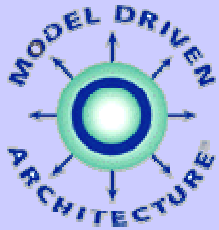
- Business Factors:
 - Defining/Meeting Business Requirements
 - Complex/Changing Business Processes
 - Shifting Enterprise/Application Boundaries
 - Semantic Integration with Customers/Suppliers/Partners
- Technological Factors:
 - Barriers to Interoperability/Integration
 - Development/Maintenance Obstacles
 - Evolving/Unstable Technology Suite



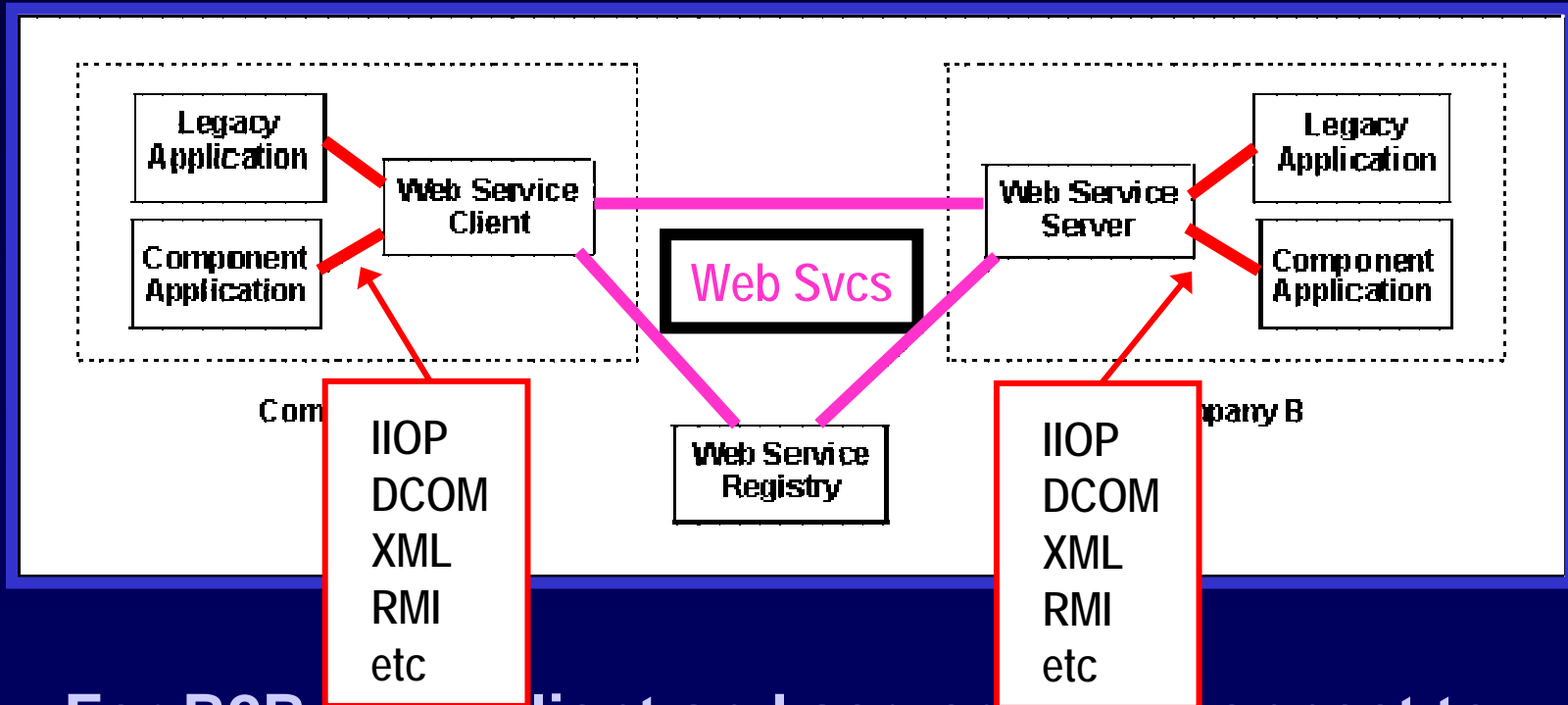


Today's Architecture

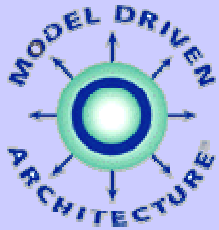




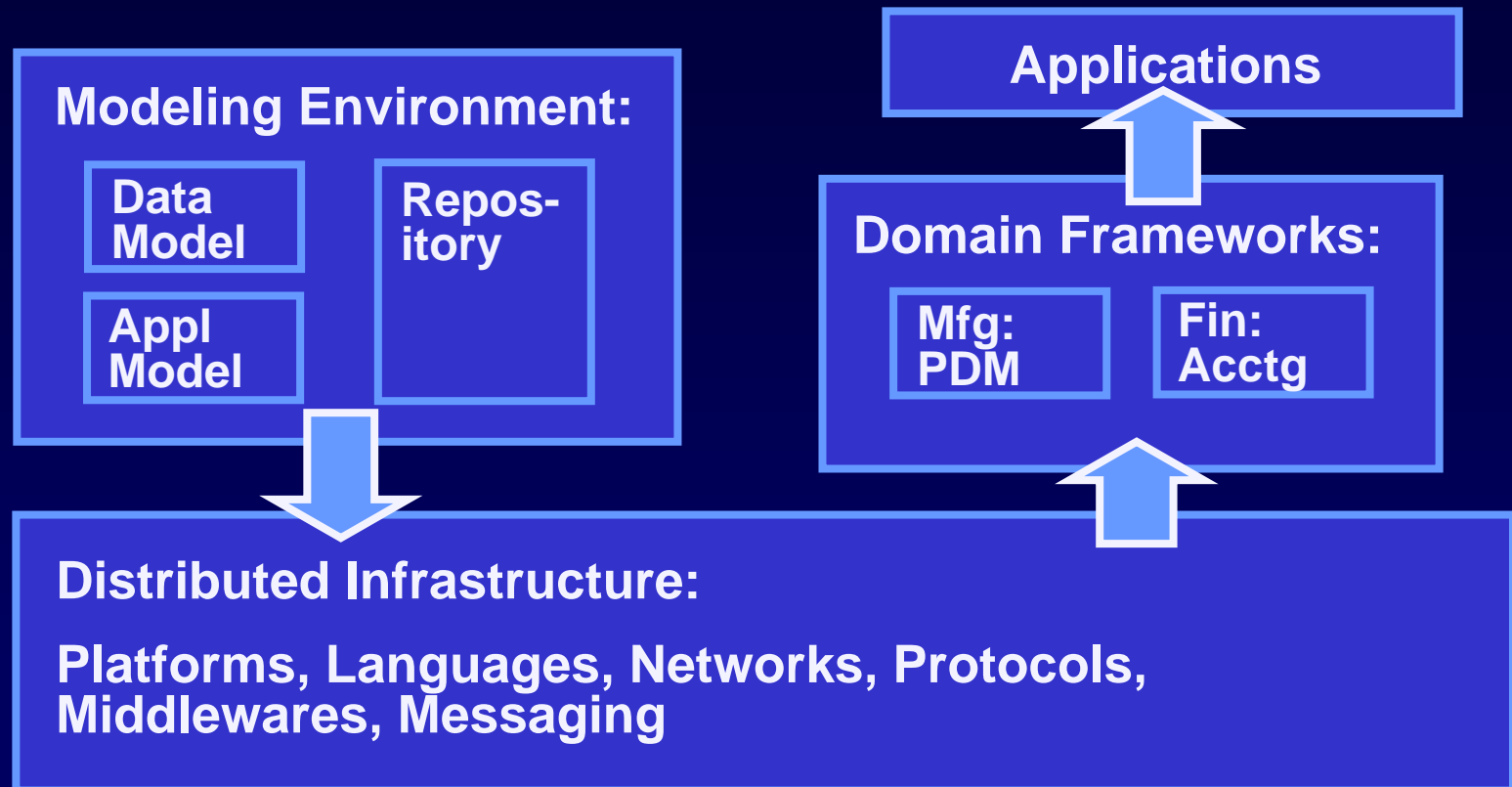
Behind the Scenes in WS



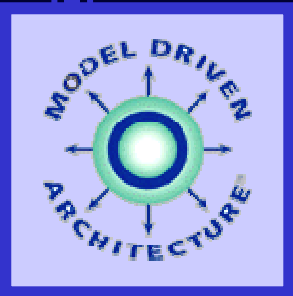
- For B2B, both client and server must connect to many legacy applications on many legacy middleware platforms



From Design to Deployment



Support for *All* your Business Computing



From Design to Deployment

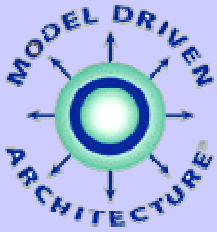
Modeling Environment:

Data
Model

Repos-
itory

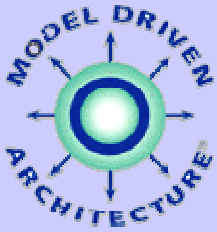
Appl
Model

Support for *All* your Business Computing



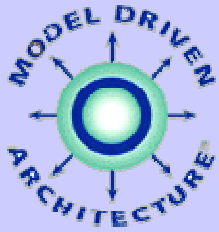
Why Focus on Modeling?

Because Modeling is the only way to ensure that enterprise IT systems deliver the functionality that a business requires, comprehensive and stable, yet able to evolve in a controlled manner as business needs change over time.



Why Focus on Modeling?

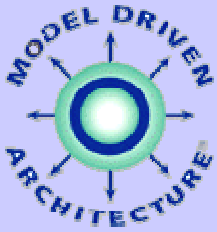
Models built in the Unified Modeling Language (UML) represent exactly what a business application - even a complex, multi-platform integrated application - can do, and record it with a clarity and stability that far exceeds that of the applications themselves.



Why Focus on Modeling?

Based on technology-independent representations of their business functionality and behavior, modeled applications last for decades and maximize IT return on investment.

Jon Siegel, OMG: www.sdtimes.com/news/064/special1.htm



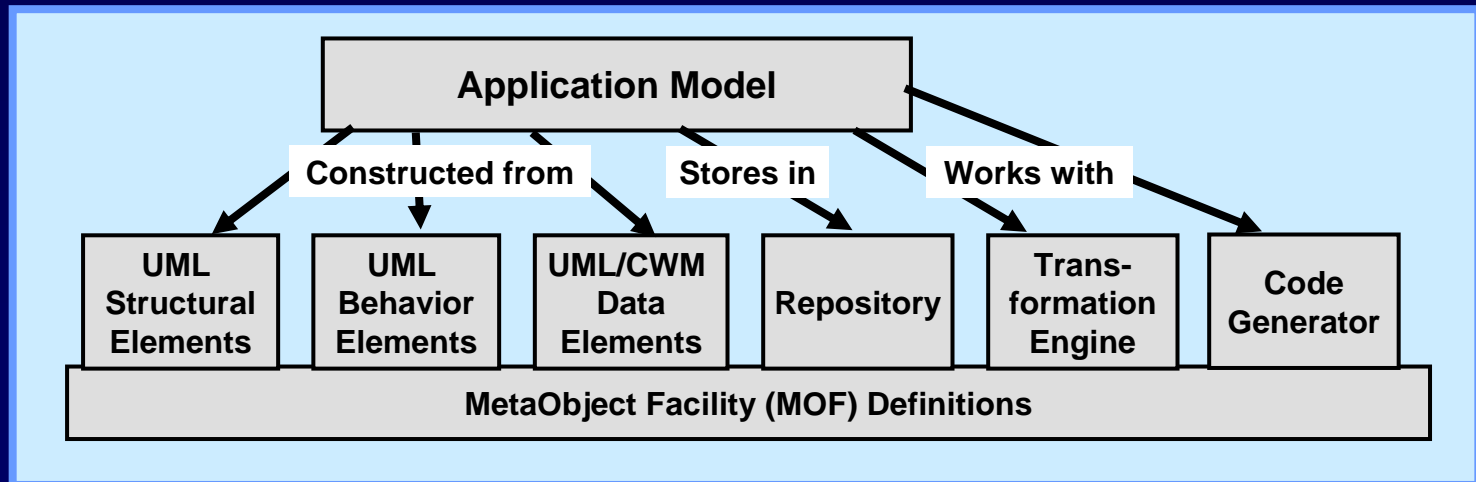
OMG Modeling Support

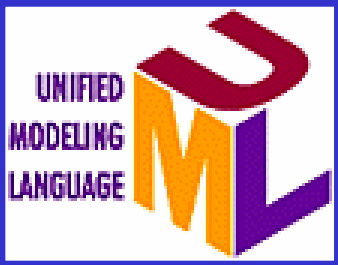
- **MOF: Meta-Object Facility 2.0**
 - Integrated Repository
 - Standard MetaModel
- **Unified Modeling Language UML 2.0**
 - World Standard for A&D
 - Representation for Structure, Dynamics, Deployment
- **XMI: XML Metadata Interchange**
 - Model & MetaModel Interchange
 - XML-Based Format, including DTDs
- **CWM: Common Warehouse Metamodel**
 - Data Warehousing Integration
 - Record, Table formats; Data Loading & Transformation



MOF - Foundation for Modeling

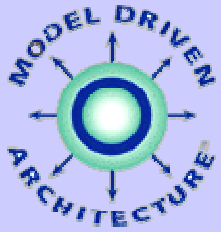
- MOF standardizes the basis for the elements that modeling languages define for you to model with
- Based on MOF, all of these diverse model elements can share repositories and interchange models among compliant tools:
 - Interchange of models and metamodels among toolsets
 - UML, MOF Itself, CWM, SPEM, XMI, UML Profiles
- And Especially, MOF supports the MDA!



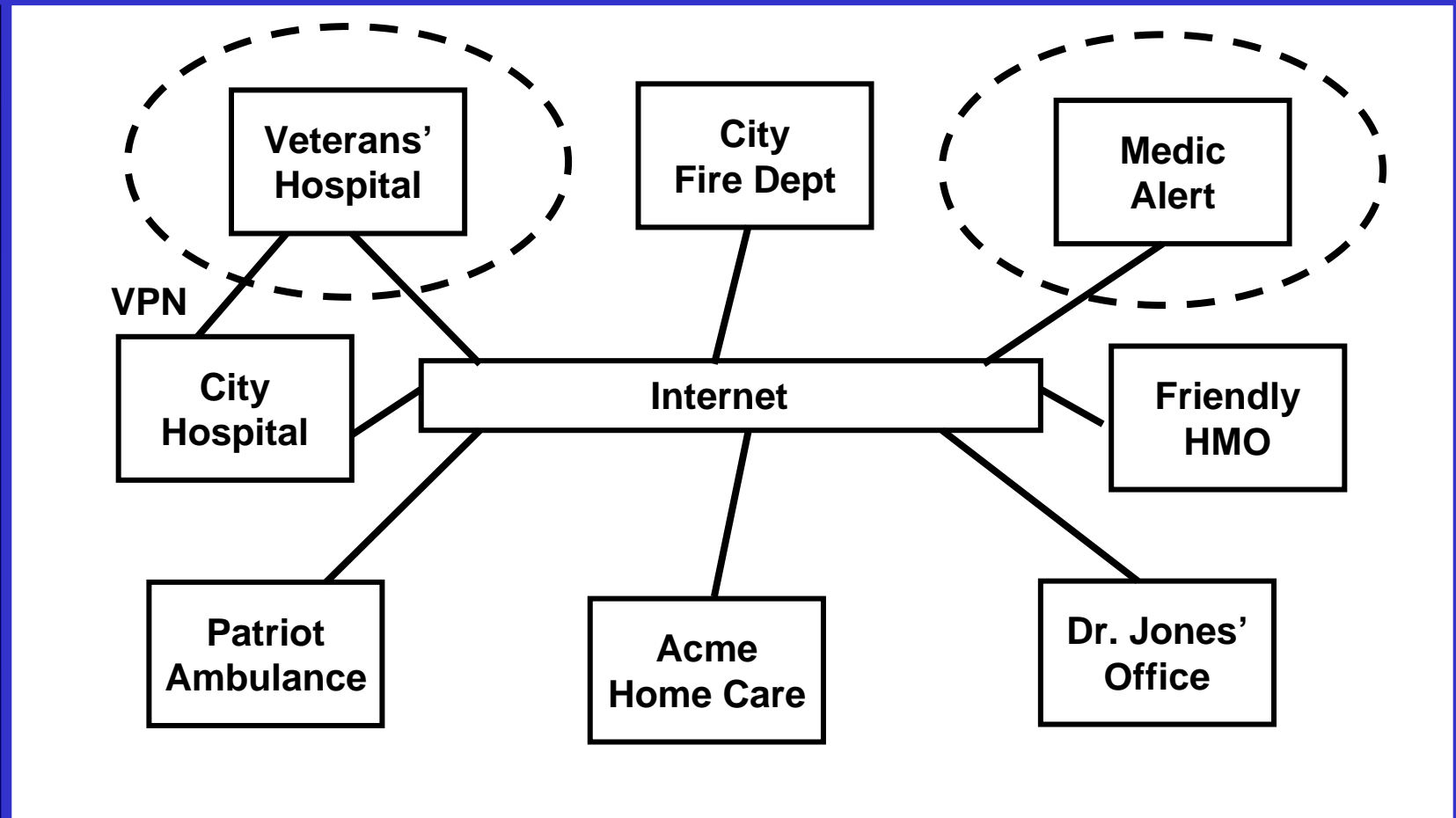


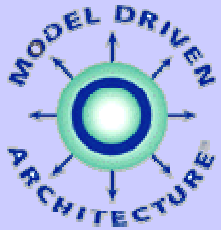
UML – The Modeling Standard

- **Integrates all the modeling you need to do**
 - **Business Modeling**
 - **Architectural/Deployment Modeling**
 - **Application Structure and Behavior**
 - **Component-Based Applications**
 - **Classes and Objects**
 - **Data Structures**
 - **Behavior, as State Machines, Data and Control Flow, Use Cases, more**
 - **The Industry Standard for Modeling**

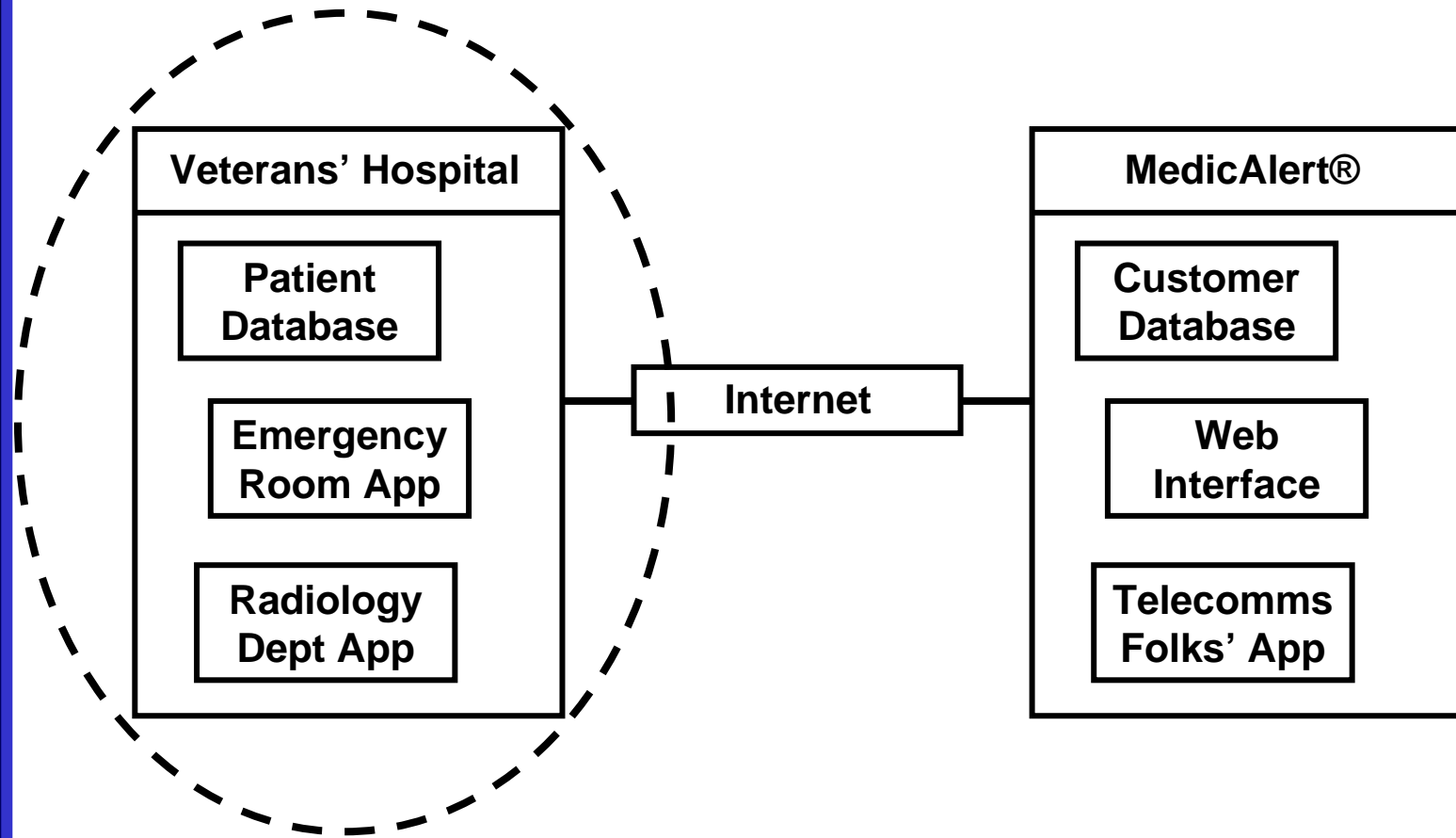


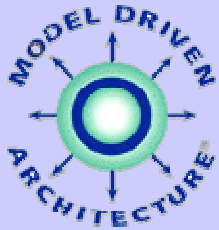
Architectural View



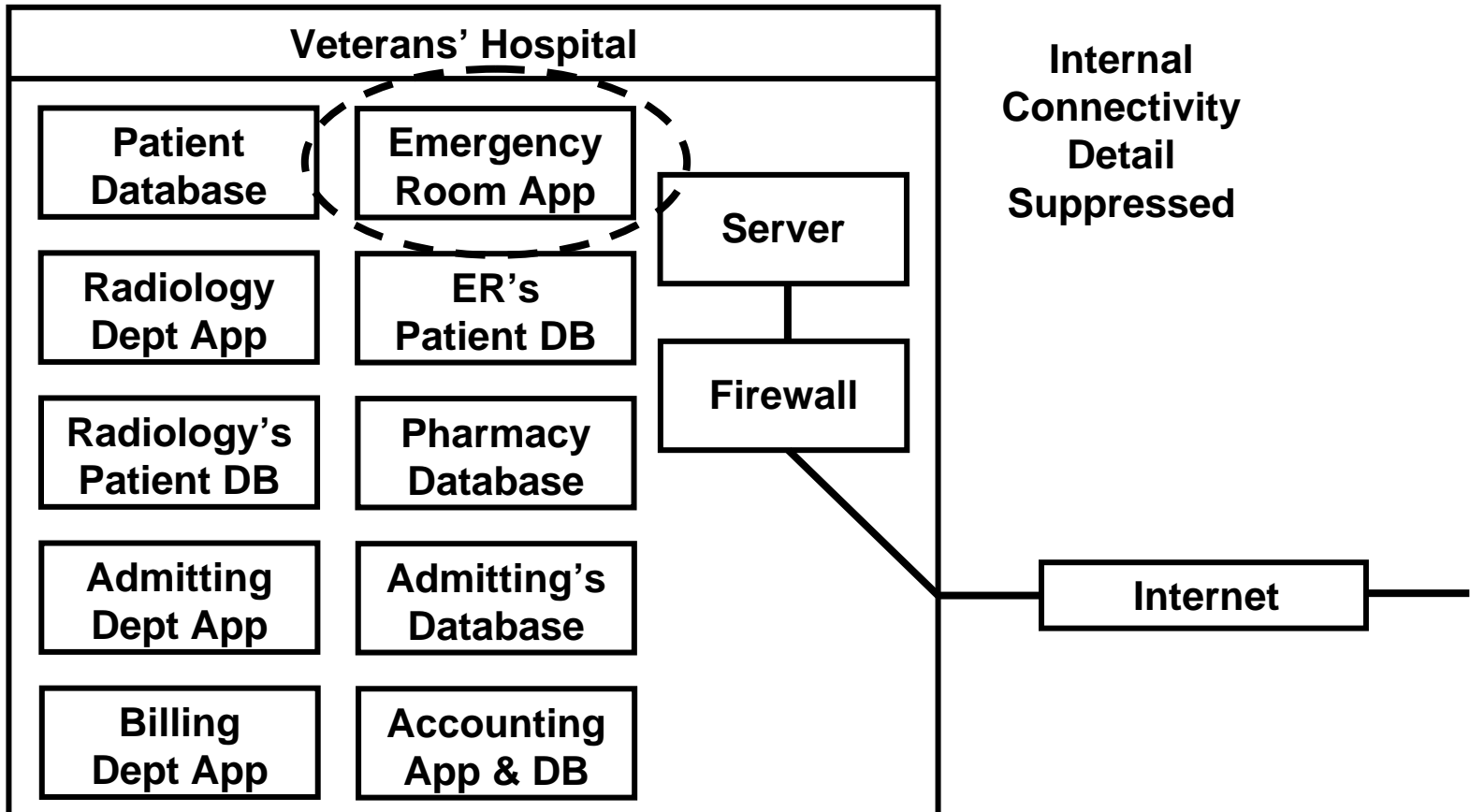


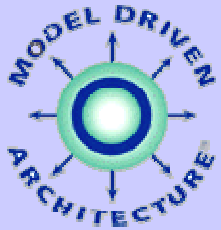
Zoomed In, Still Architectural



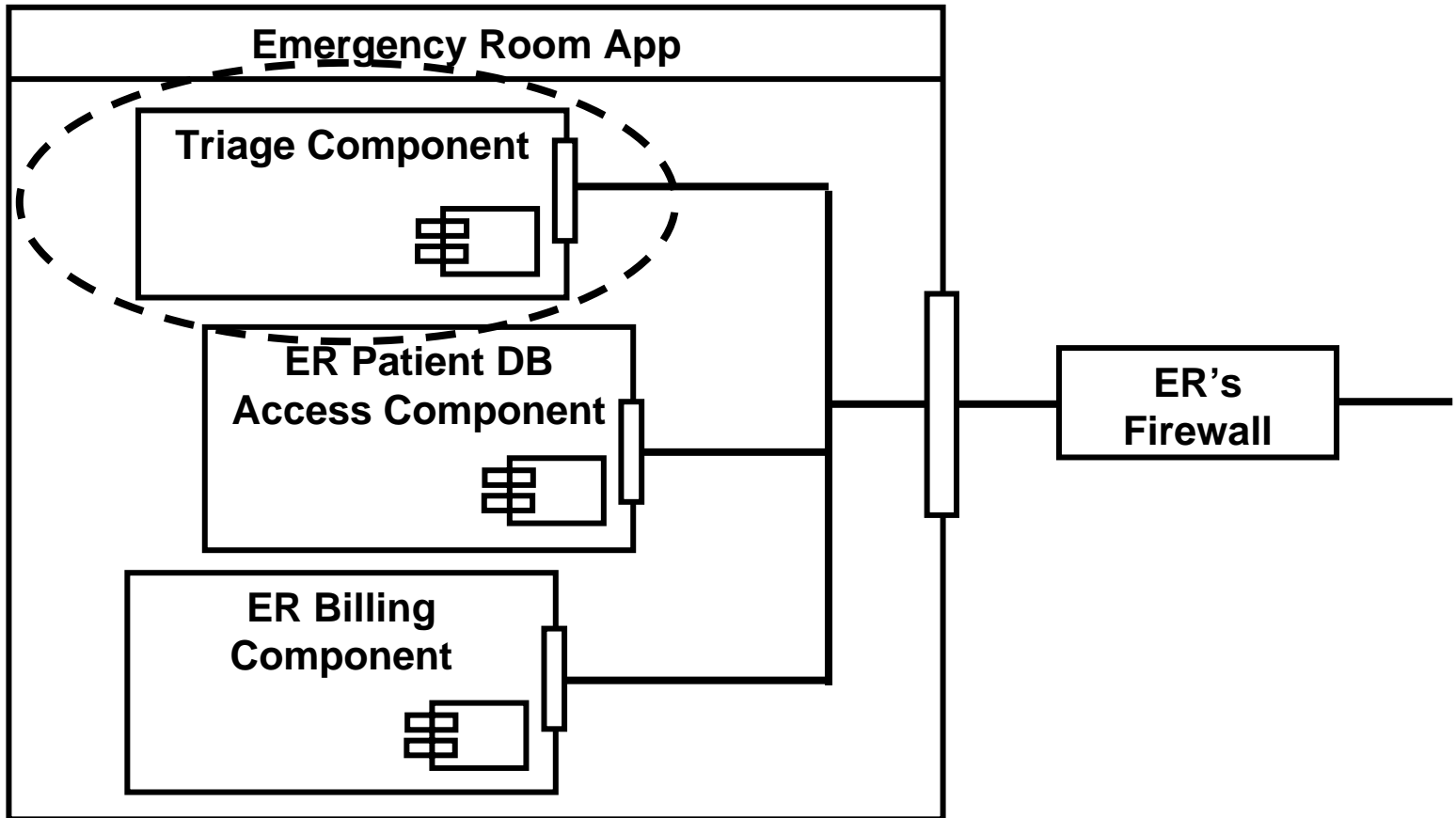


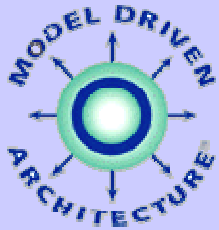
Enterprise Architecture View



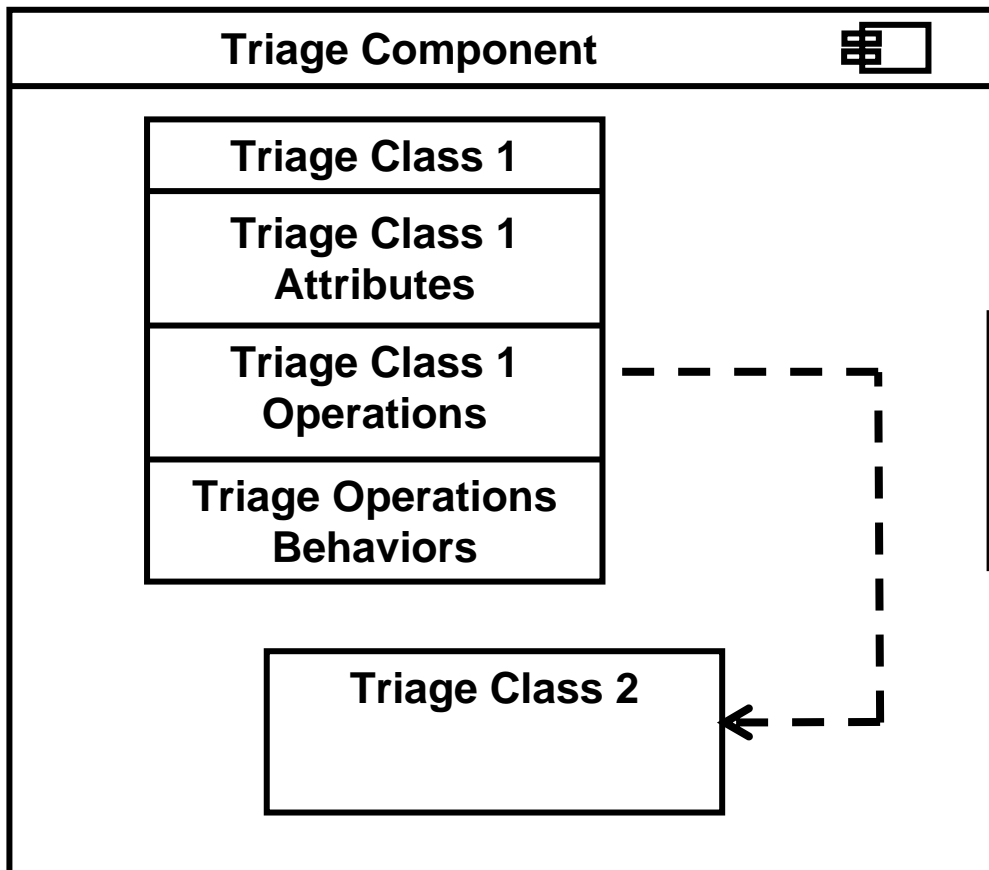


Application Model



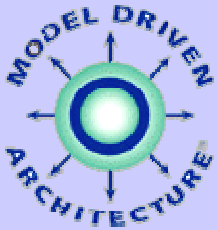


Component Model



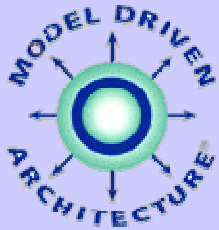
Then MDA
Generates
the application
and its connectivity
from this
detailed model

So you know
that the application
conforms to the
model,
connectivity works,
and changes to
any level model
work in the
real world



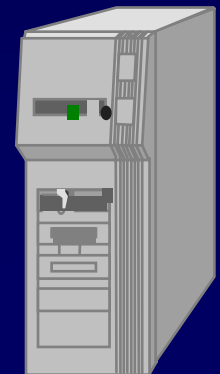
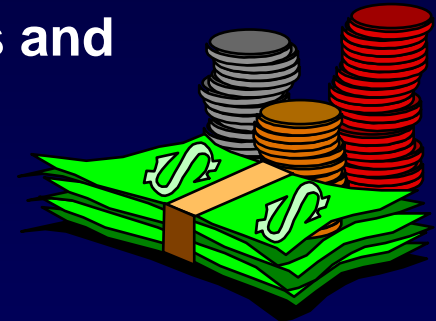
Work at Business Level

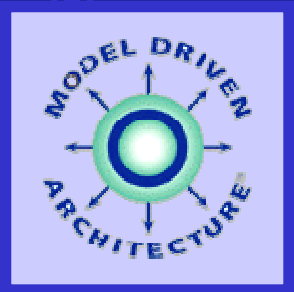
- **MDA *Raises the Level of Abstraction* with full connection from modeling to development**
- **Start with an Architectural Viewpoint of all your networked applications, and zoom in to a single application**
- **Also work from Business Rules and Process Viewpoint**
- **Then, model structure and behavior**
- **MDA tools *generate* your applications from your detailed application models**



MDA – Two Benefit Areas

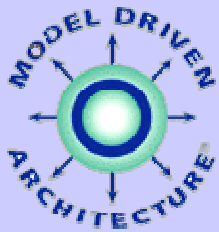
- **The Business Advantages:**
 - Architectural Viewpoint brings out how your applications work with each other, and with those on the outside
 - Model changing business requirements and shifting enterprise boundaries
 - Define the Business Functionality and Behavior of each application as a technology-independent model
 - Focus your IT investment in your core business
- **The Technological Advantages:**
 - Interoperability and Portability are built into the MDA
 - MDA speeds development as it concentrates investment on the business side
 - Move easily to the “next best thing”, or interoperate with it, quickly and easily





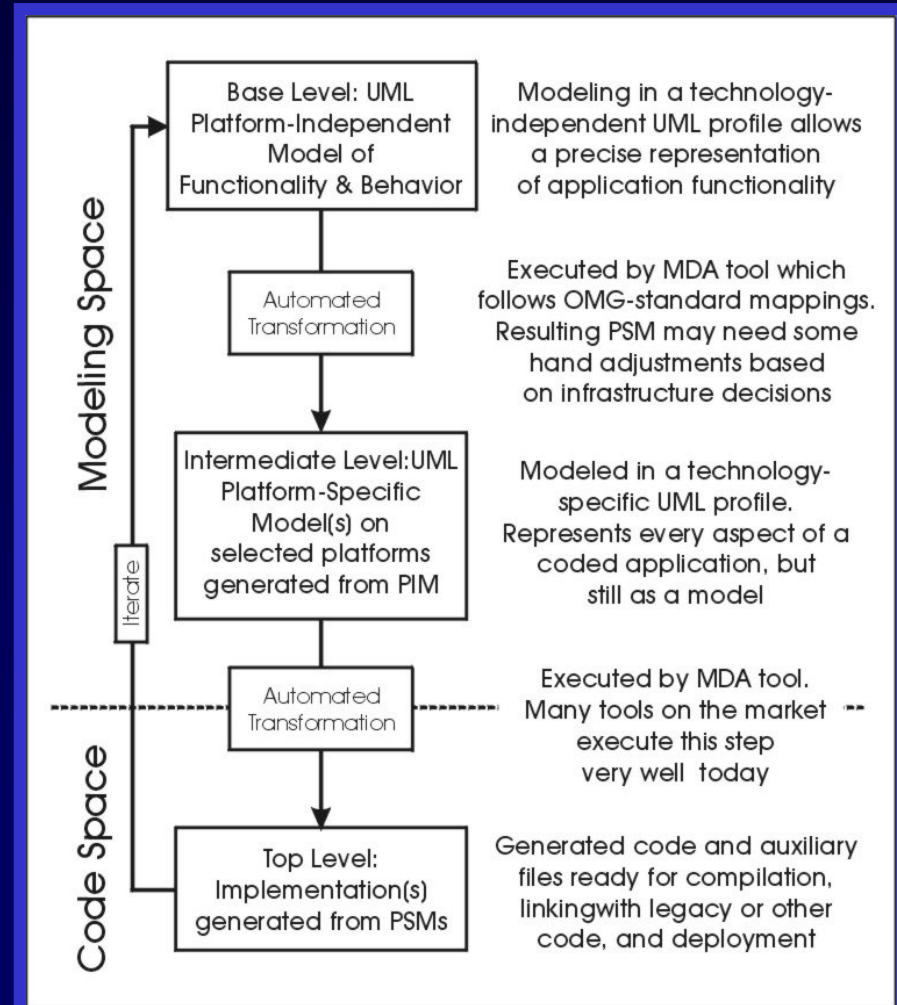
What is the Model Driven Architecture™?

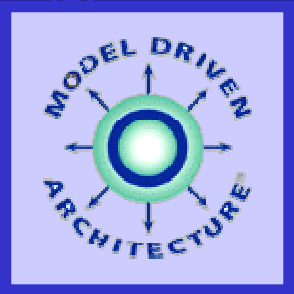
- **A New Way to Specify and Build Systems**
 - Focus on Business Needs First
 - Based on Modeling and UML
 - Supports full lifecycle: A&D, implementation, deployment, maintenance, and evolution
 - Builds in Interoperability and Portability
 - Lowers initial cost and maximizes ROI
 - Applies directly to the mix of hardware and software that you face:
 - Programming language
 - Operating system
 - Network
 - *Middleware*



MDA: Designed for Efficiency

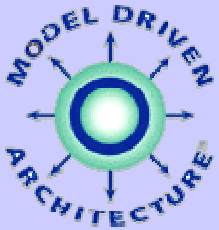
- Structure is a Spectrum progressing from Modeling at the Top to Code development at the bottom





A Sensible Structure:

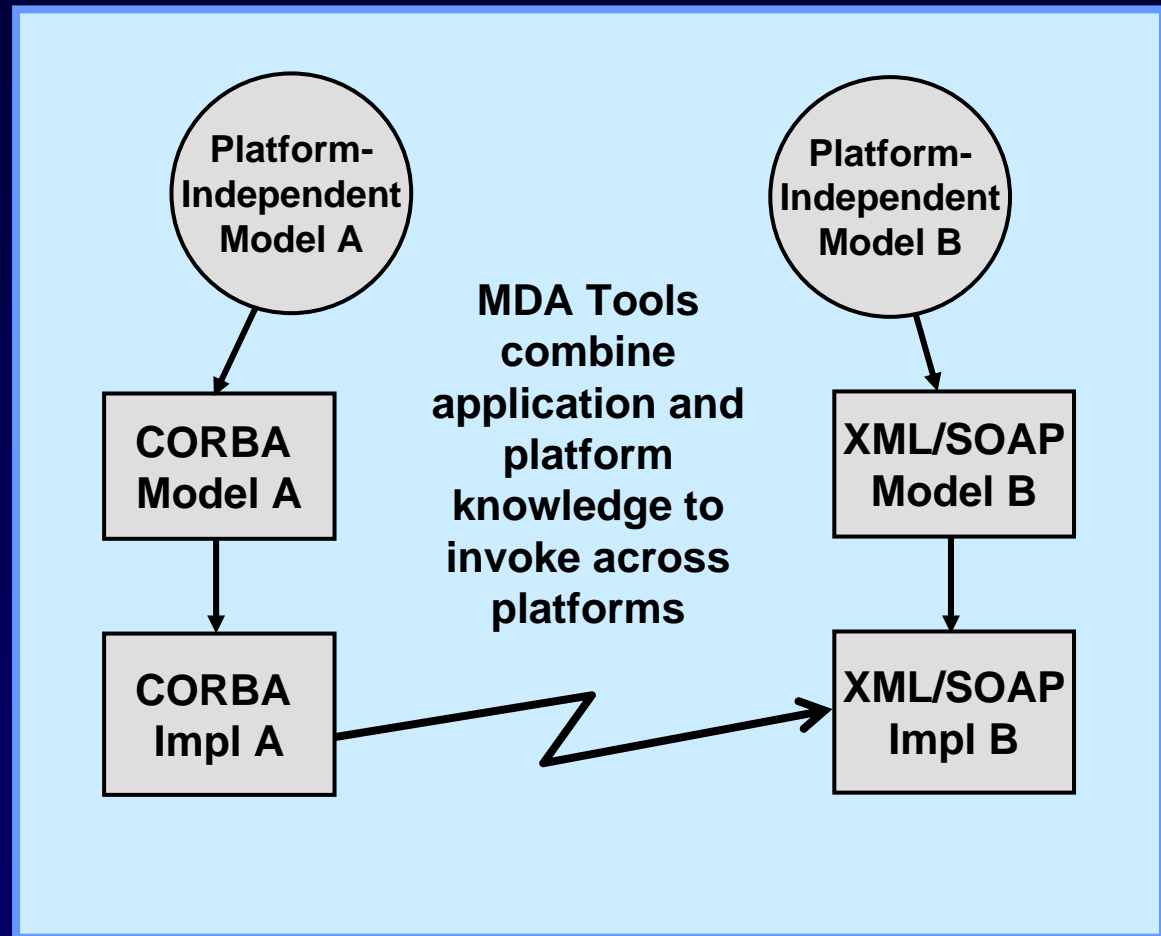
- **Input and Investment concentrate at the business zone at the top**
- **Automated tools take over coding IT infrastructure towards the bottom**
- **Code draws from libraries written and assembled by the industry's best minds**
- **Remote invocations, hard to program but hardly creative, are programmed by machines, not people**

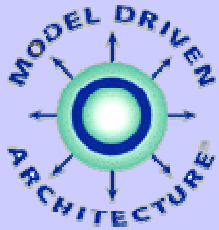


MDA Applications Interoperate

MDA Tools will generate cross-platform invocations connecting either instances of a single MDA application, or one application to another.

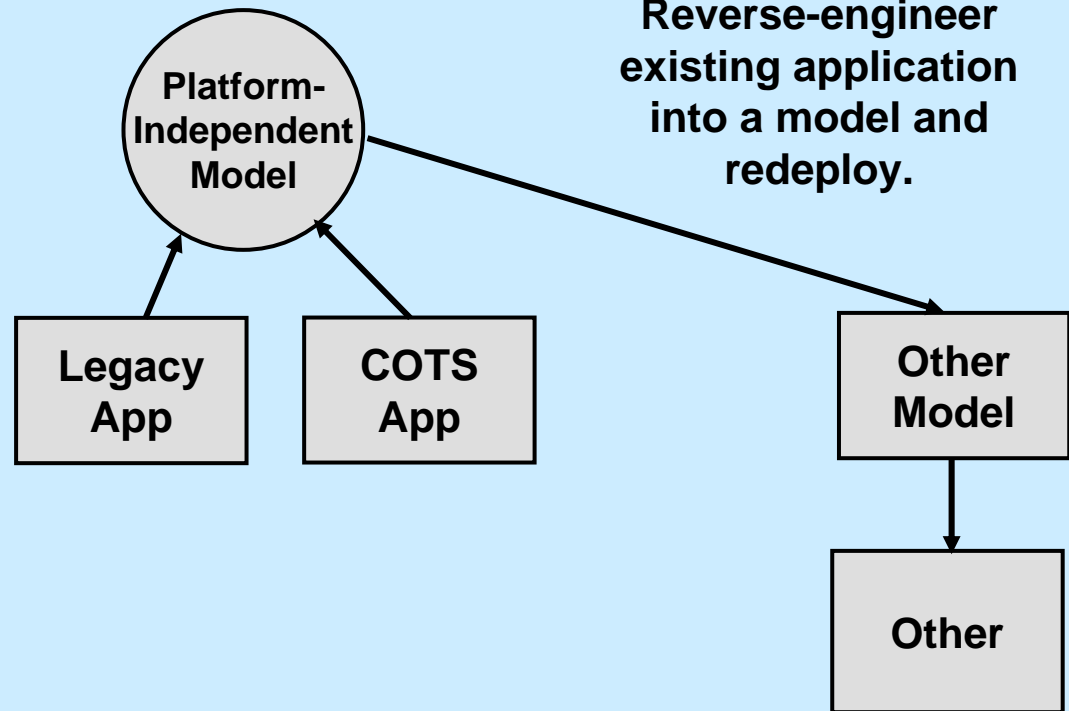
Standard *Pervasive Services* – directory, security, more – will also be accessed through cross-platform invocations where necessary.

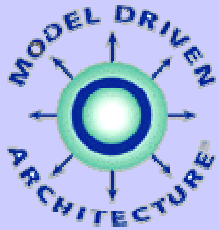




Integrating Legacy & COTS

Tools for Reverse Engineering automate creation of models for re-integration on new platforms





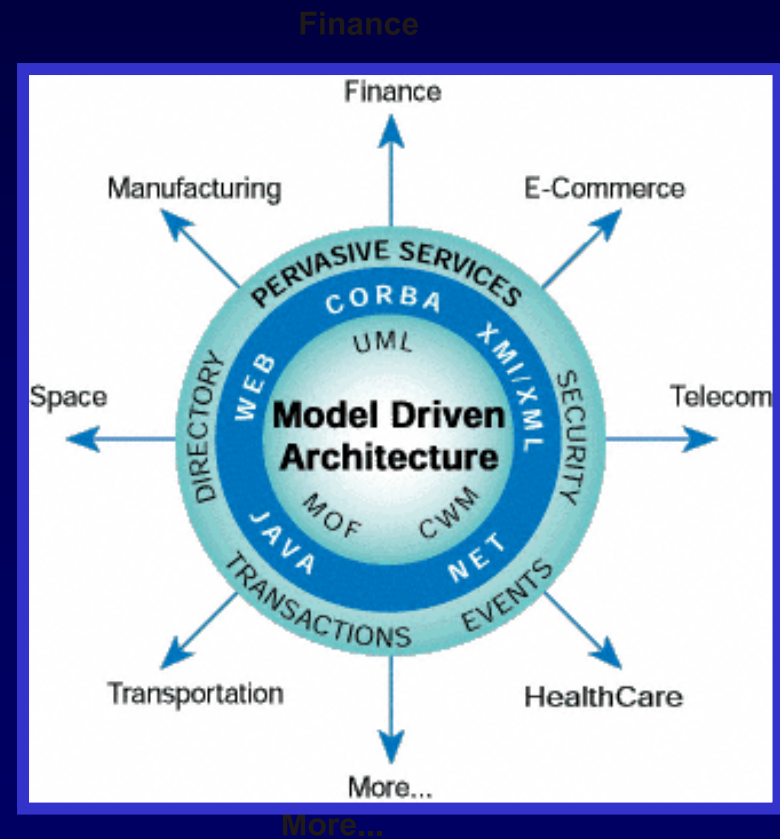
MDA in Industry Standards

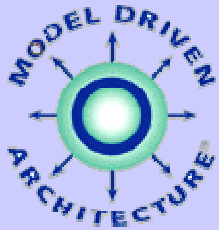
OMG (and other) Task Forces standardize Domain (Industry-Specific) Facilities as PIMs.

With implementations on multiple platforms, no technology or platform barriers prevent widespread adoption and use.

Interoperate cross-platform with other standard applications.

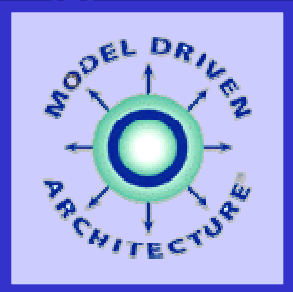
Both PIM and set of PSMs and interface code – on every mapped platform – become OMG standards.





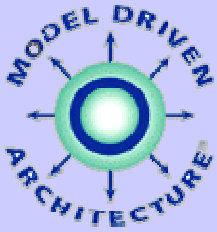
MDA Success Stories

- 20 MDA Success Stories on OMG's Website – www.omg.org/mda
- Lockheed-Martin: F-16 Modular Mission Computer Application Software
- Deutsche Bank: Integrate COBOL back office with customer web access
- Austrian Railways: Per-usage billing of all track segments
- Research studies prove 35% cost savings on development:
www.middleware-company.com/casestudy/mda.pdf
www.eds.com/thought/thought_leadership_agility_model_arch.pdf



MDA Specifications

- **MDA Architecture (September 2001)**
- **UML 1.5 (complete) and 2.0 (finalization)**
- **UML Profiles (all complete):**
 - Profile for EDOC
 - Profile for EAI
 - Profile for CORBA
 - More...
- **Support from XMI, CWM (complete)**
- **Pervasive Services (coming)**
- **Domain Specifications**



MDA Benefits

- **Comprehensive architecture maximizes both business and technical advantages**
- **Technology-independent representation of business functionality and behavior**
- **Stable, model-based approach maximizes SW ROI**
- **Full support throughout the application life-cycle**
- **Reduced costs from beginning to end**
- **Reduced development time for new applications**
- **Optimized technical behavior - scalability, robustness, security – via generated code**
- **Smooth integration across middleware platform boundaries**
- **Rapid inclusion of emerging technologies into existing systems**



OMG: Background

- **About 500 member companies, world's largest software consortium.**
- **Founded April 1989 - Twelve Years Old**
- **Small staff (22 full time); no internal development. Representatives in Germany, Japan, U.K, Australia, India.**
- **Dedicated to creating and popularizing object-oriented standards for application integration based on existing technology.**



Worldwide Scope

Alcatel	Computer Assocs	Fraunhofer Fokus	NEC	Siemens
Artisan	Compuware	HP	NIST	Software AG
BEA Systems	Daimler-Benz AG	Hitachi	Nokia	Sony
Bank of America	Deere & Co.	IBM	Northrup	Sun
Boeing Corp.	EDS	IONA	Osellus	Telelogic
Borland	Ericsson	Lockheed	PrismTech	Thales
BAE Systems	Fair Isaac	MetaMatrix	Raytheon	Unisys
CBOE	Fujitsu	Mitre	Sandia	W3C
Charles Schwab	GCHQ	Motorola	SAP AG	Workflow Mgmt





Meetings, Meetings!

- **OMG Specifications are adopted at our meetings**
- **Held Five times a year, at member companies' sites around the world**
- **Lasts a week and attracts over 250 people**
- **Every subgroup meets; up to 30 simultaneous sessions on some days**
- **Dates, locations on the web at www.omg.org/news/schedule/upcoming.htm**
- **You're invited to come as an observer! Just let me know (email: info@omg.org)**



Adoption Process

- RFI (Request for Information) to establish range of commercially available software.
- RFP (Request for Proposals) to gather explicit descriptions of available software.
- Letters of Intent to establish corporate direction.
- Submissions entered and revised.
- Task Force evaluation & recommendation; simultaneous Business Committee examination.
- Board decision based on TC and BC recommendations.



Availability

Innovative approach for selection of standard interfaces to adopt:

- 1. OMG adopts & publishes MDA PIMs and PSMs, and Implementation Interface Specifications.**
- 2. Implementations of the Interface Specifications must be available commercially from OMG Platform, Domain, or Contributing member.**
- 3. MDA PIMs and PSMs, and Interface Specifications, are freely available to members and non-members alike.**
- 4. MDA PIMs and PSMs, and Interface Specifications chosen from existing products or prototypes in a competitive selection process.**



OMG Links & Contacts

- **OMG Homepage:**
 - <http://www.omg.org>
- **Download our specifications:**
 - <http://www.omg.org/specifications>
- **MDA Central:**
 - <http://www.omg.org/mda>
- **MDA Executive overview:**
 - http://www.omg.org/mda/executive_overview.htm
- **Find out about UML:**
 - <http://www.omg.org/uml>
- **Find out about CWM:**
 - <http://www.omg.org/cwm>
- **Contact OMG:**
 - Email info@omg.org or siegel@omg.org