MDA Reality/Implementation

OMG Model Driven Architecture in the Application Life Cycle

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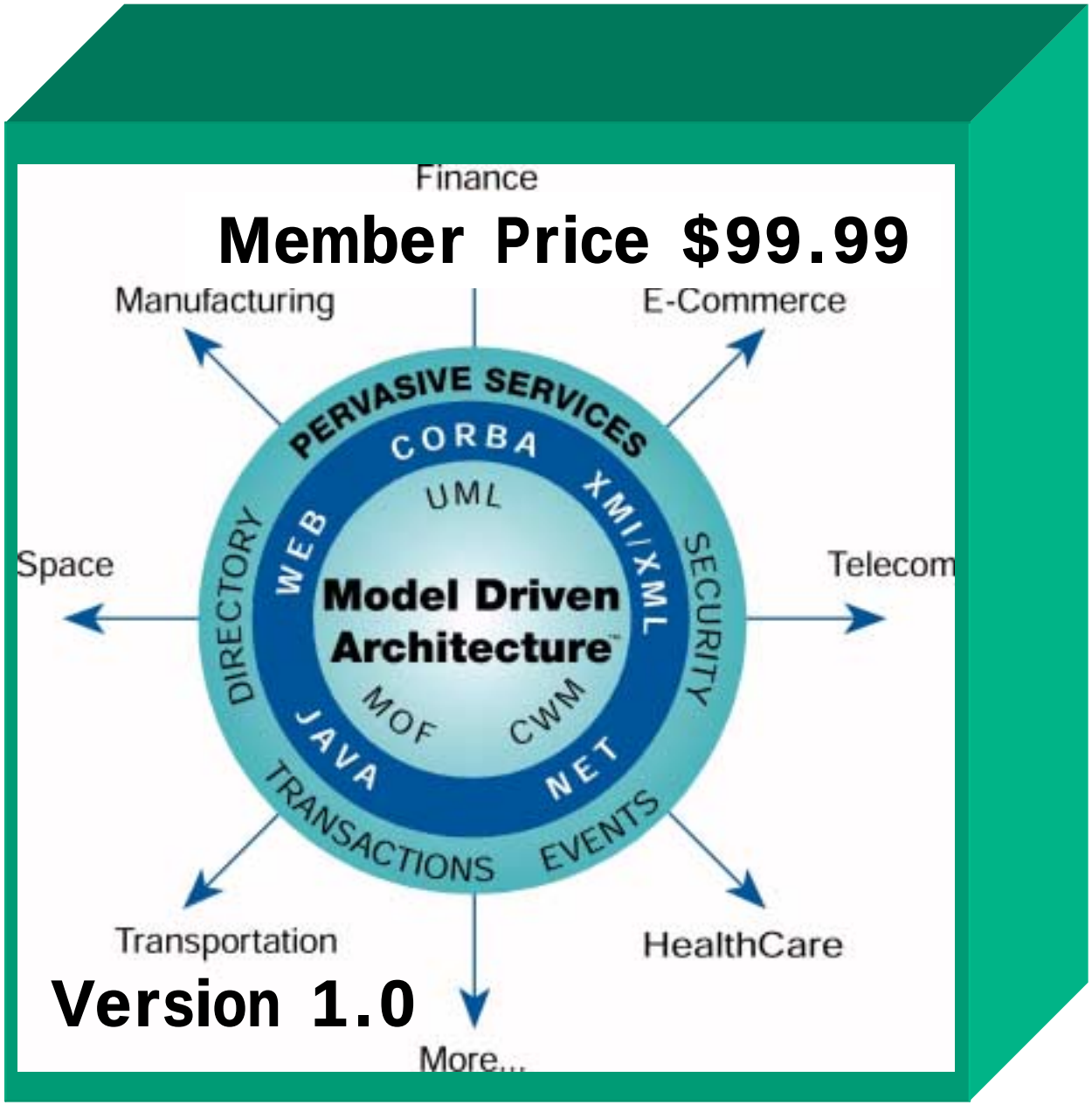
Background

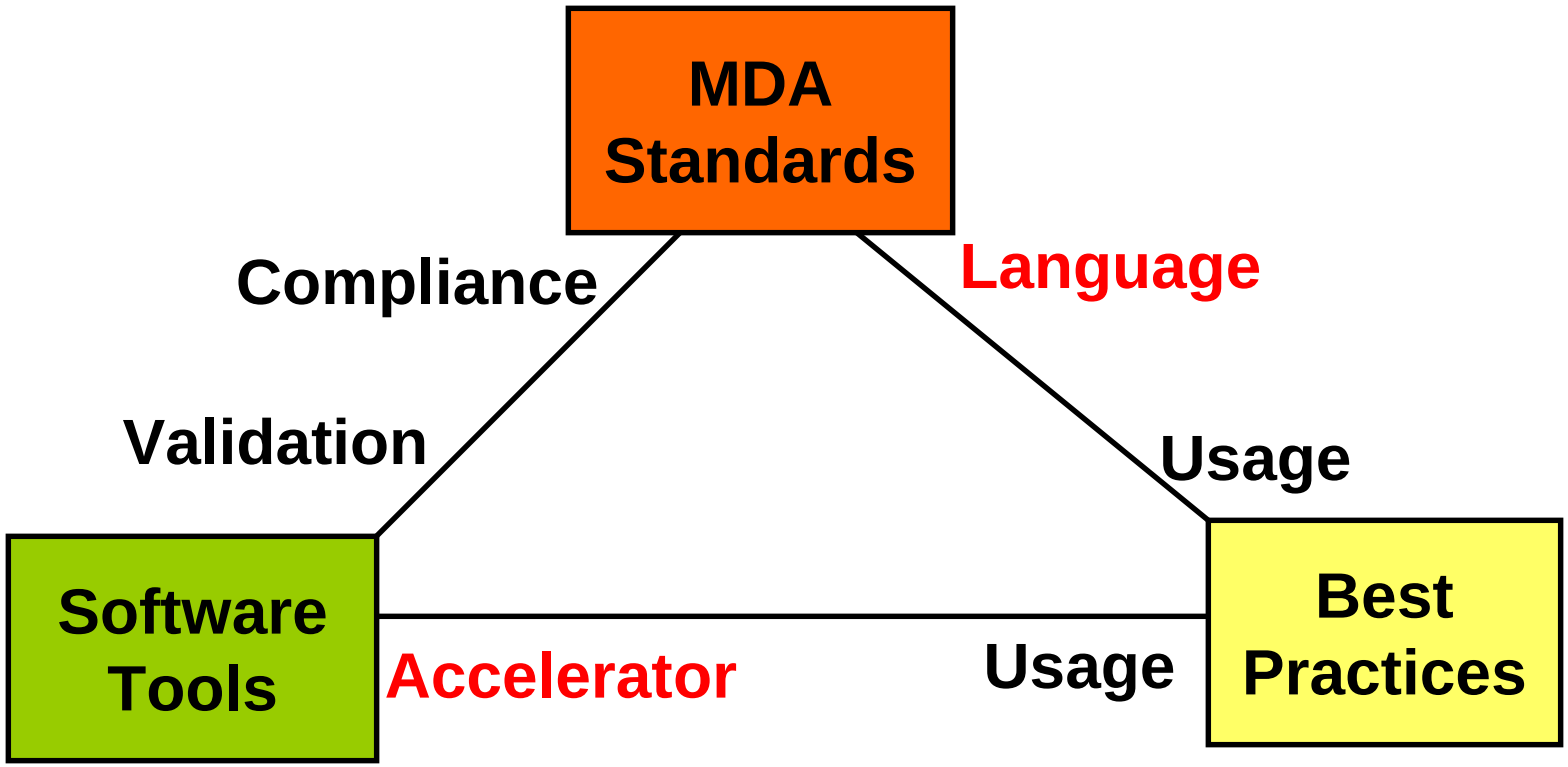
- Consultant for CIBER Inc. in Boston, MA
- Assist and advise IT organizations on Model Driven Development
- 25 projects in last 5 years over 11 organizations using CORBA, J2EE, Forté and messaging Nearly all were UML design based
- Developed communications protocols in the 70's with State Machines and Sequence Diagrams.

This technology has been around


Finance
Member Price $99.99
Manufacturing
E-Commerce
PERVASIVE SERVICES
CORBA
UML
XMI/XML
WEB
DIRECTORY
SECURITY
Space
Telecom
Model Driven Architecture
MOF
CWM
JAVA
.NET
TRANSACTIONS
EVENTS
Transportation
HealthCare
Version 1.0
More...

Model Driven Development

Application Life Cycle



Best Practices
How to articulate architecture

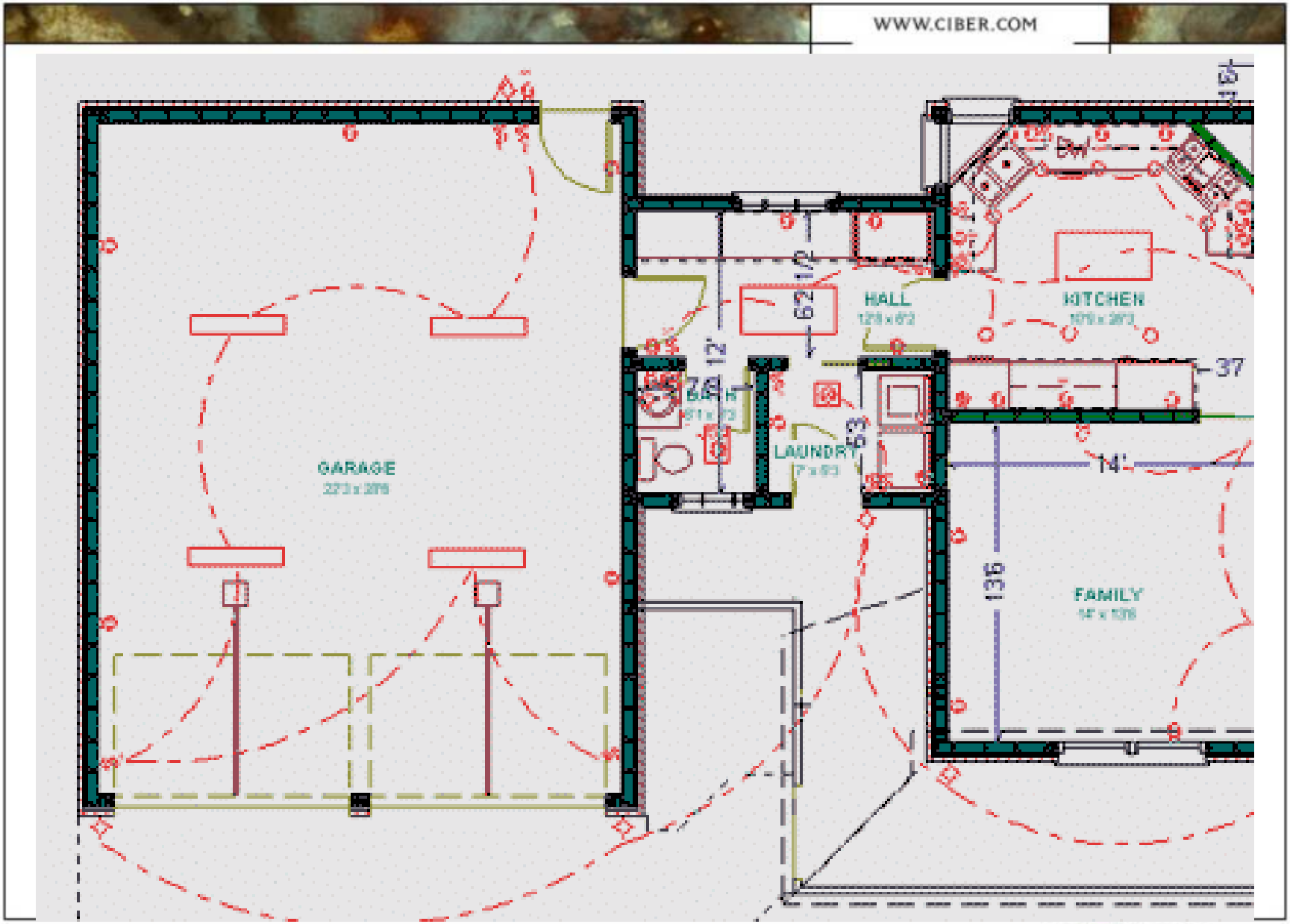
- Statement of Design Guidelines
- Integration Mechanism
- Design testability
  - Requirements satisfaction
  - Technical testing
- Technology constraints
  - Environment support

Integration Mechanism

- Common Partitioned Semantic Model
  - DataTypes
  - Profile
  - Packages
- Collaboration Environment selection
  - Shared Database
  - Asynchronous Messaging and Workflow
  - Service Based Communication
- Design Specification standards for each

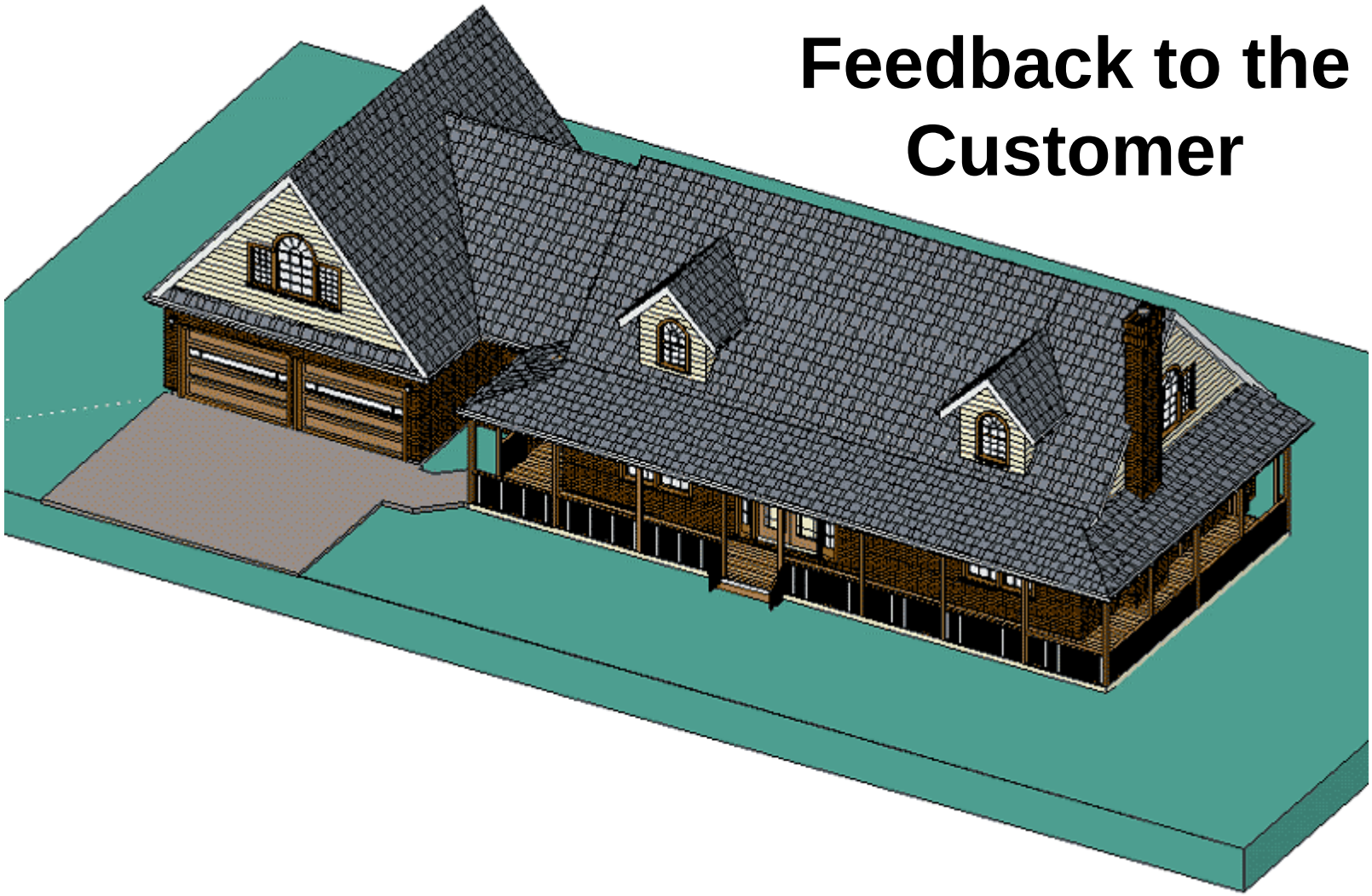
Design Specifications

- Pieces of Paper
- Electronic Documents in a File
- Metadata Repository



A mature industry has a common language

Feedback to the Customer



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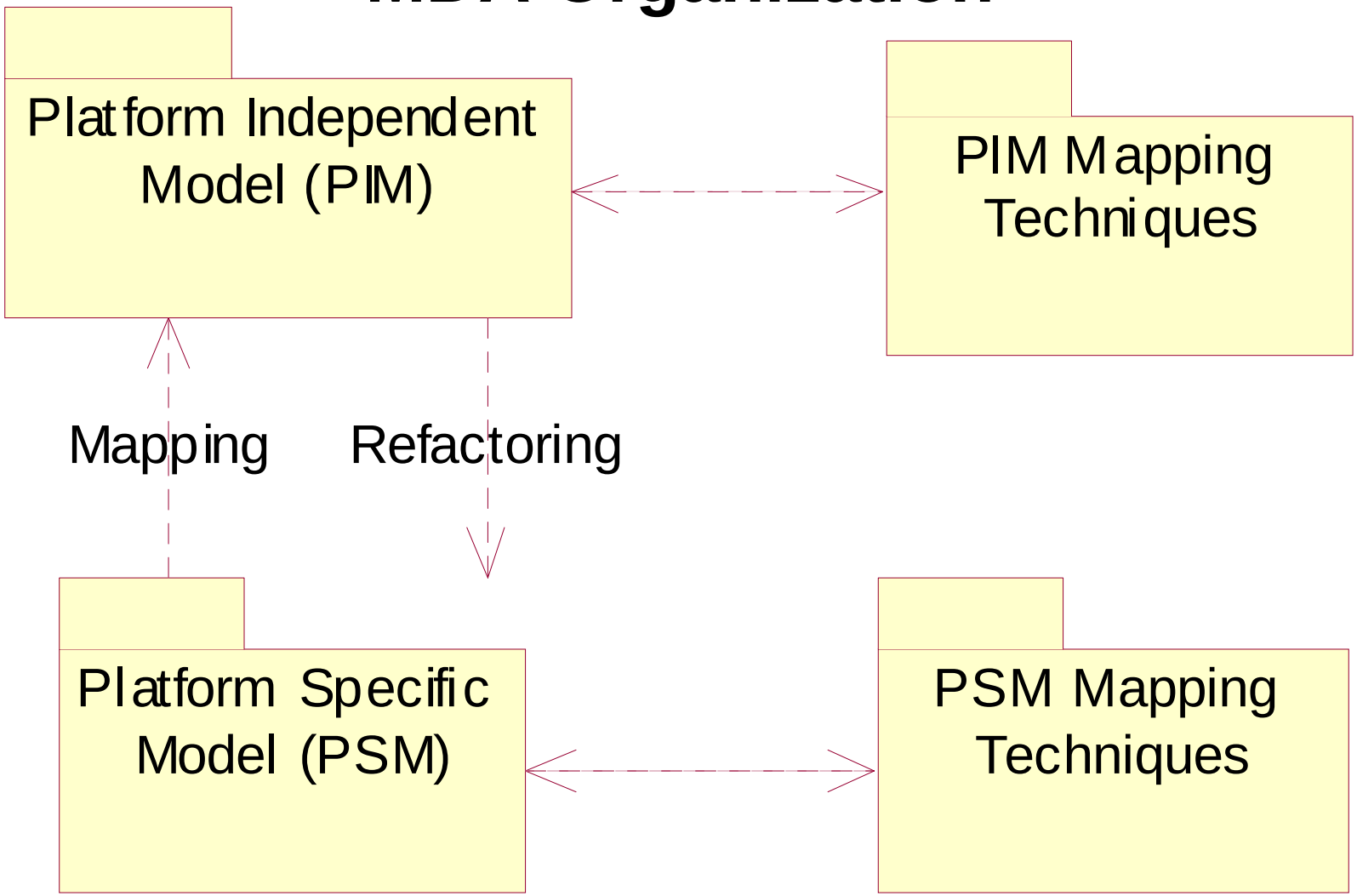
Illustrations from ChiefArchitect

What would happen if all your subcontractors appeared without an overall plan

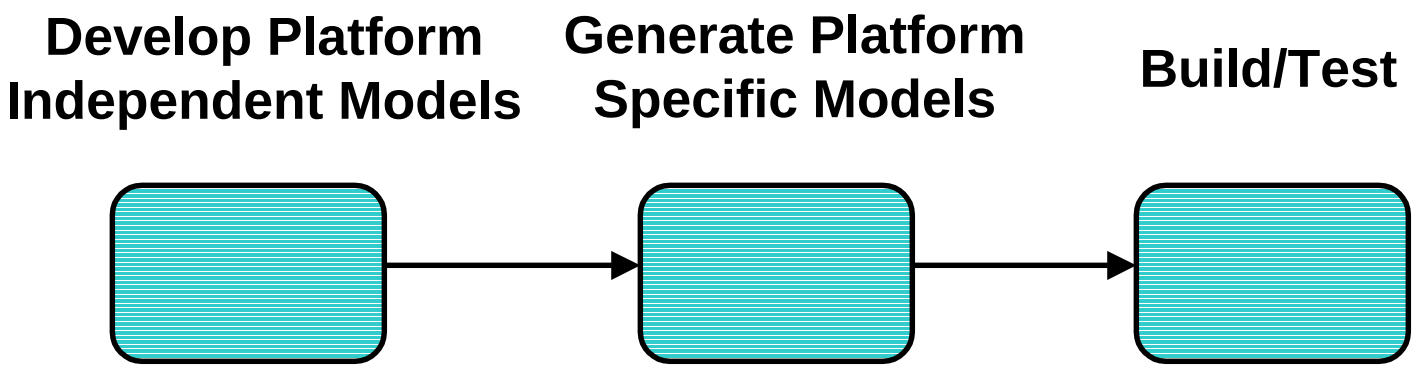
MDA Organization



Model Driven Development as Integration Best Practice

- Use the UML model as primary
- Generate all other schemas
- Wrap legacy subsystems with generated schemas
- Implement Architectural Control

Model Driven Development as Integration Best Practice



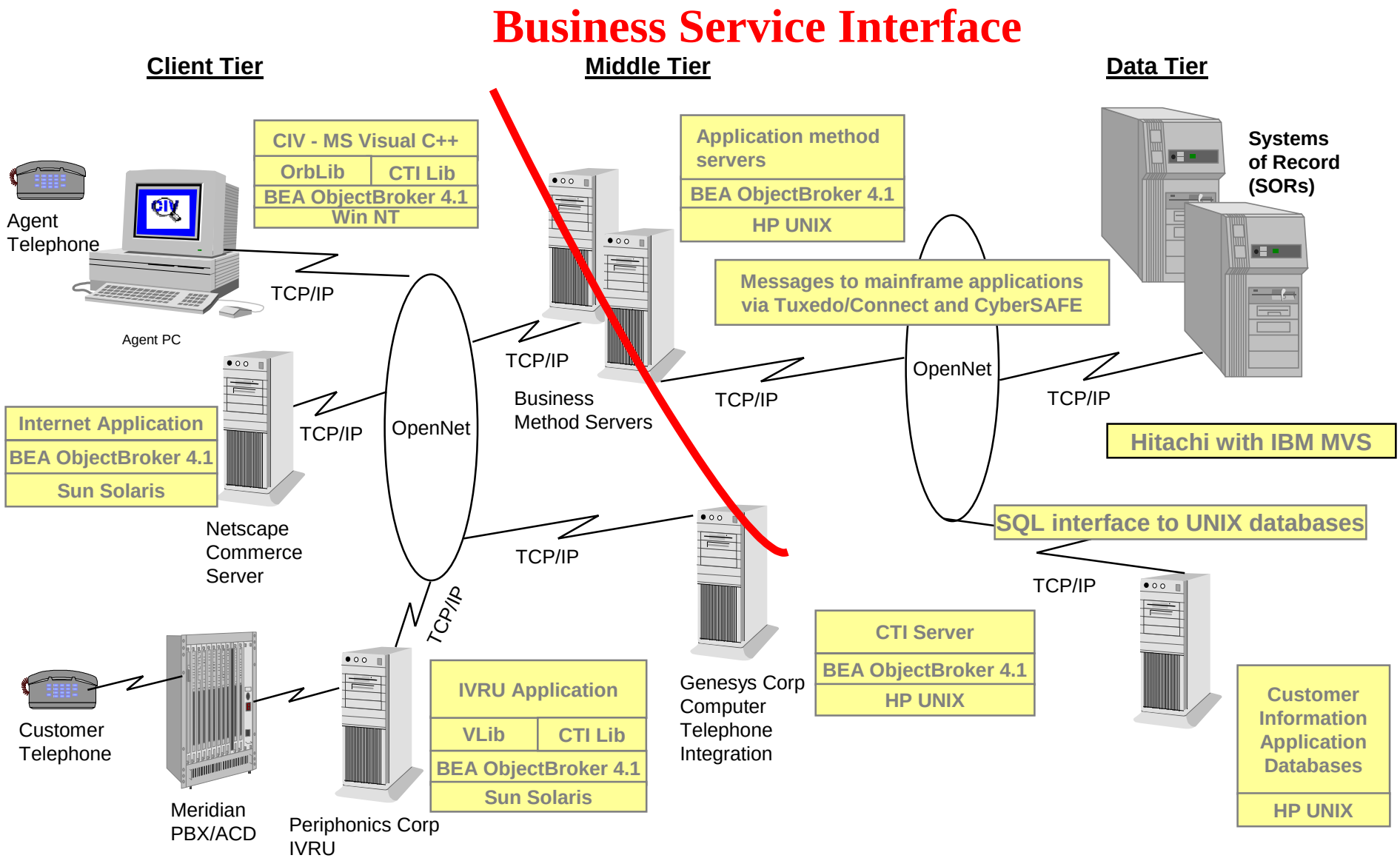
UML Tool Evolution

- UML Diagram Editors
- UML Model Document Generators
- UML to/from Code generators
  - UML to IDL
  - UML to C++/Java
- UML Model Programmatic Access
  - Custom tool development

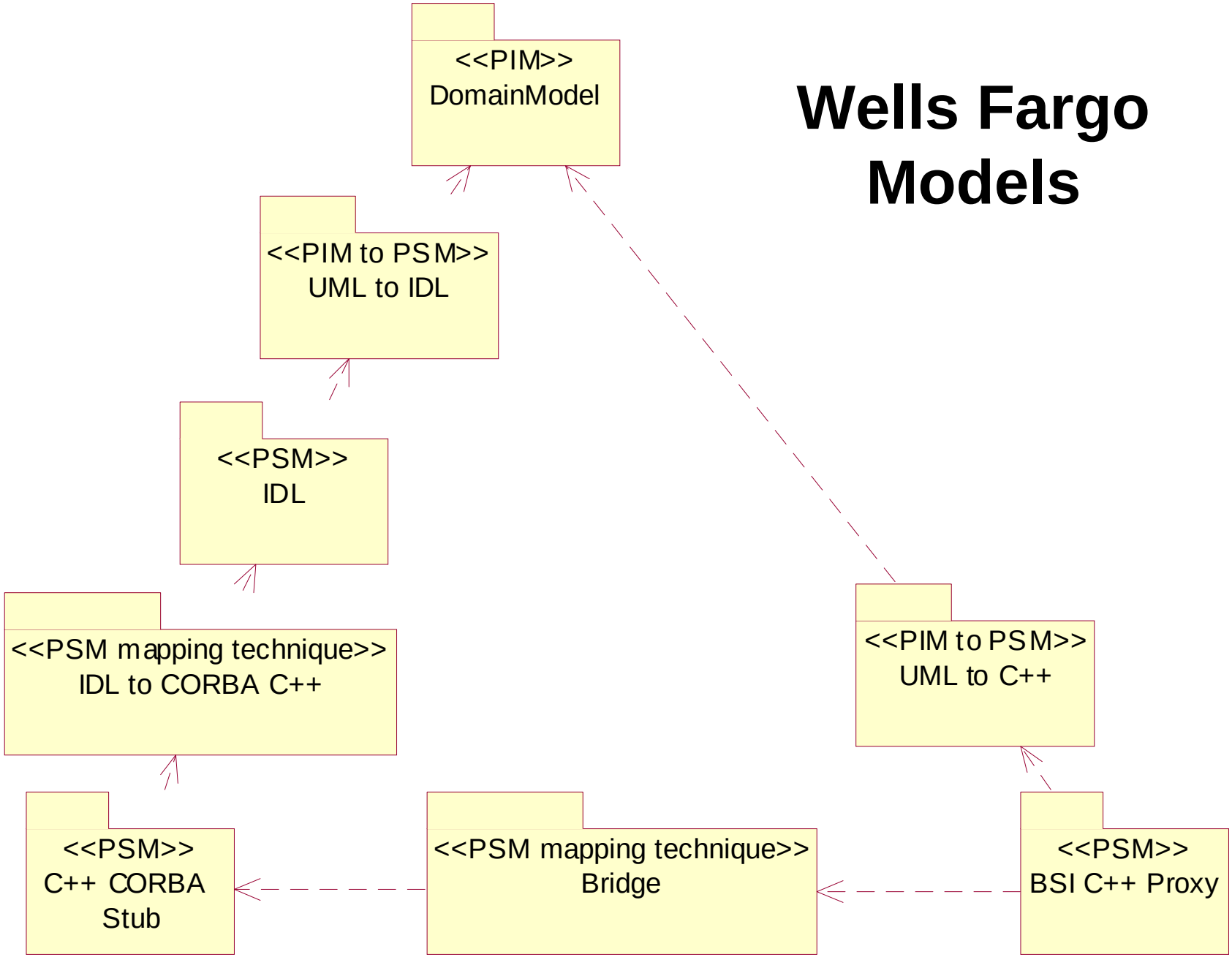
Practical Examples

- Wells Fargo
  - (Enterprise Application Integration) EAI
- Government Computer-Based Patient Record project (GCPR)
  - (Inter-Enterprise Integration) IEI

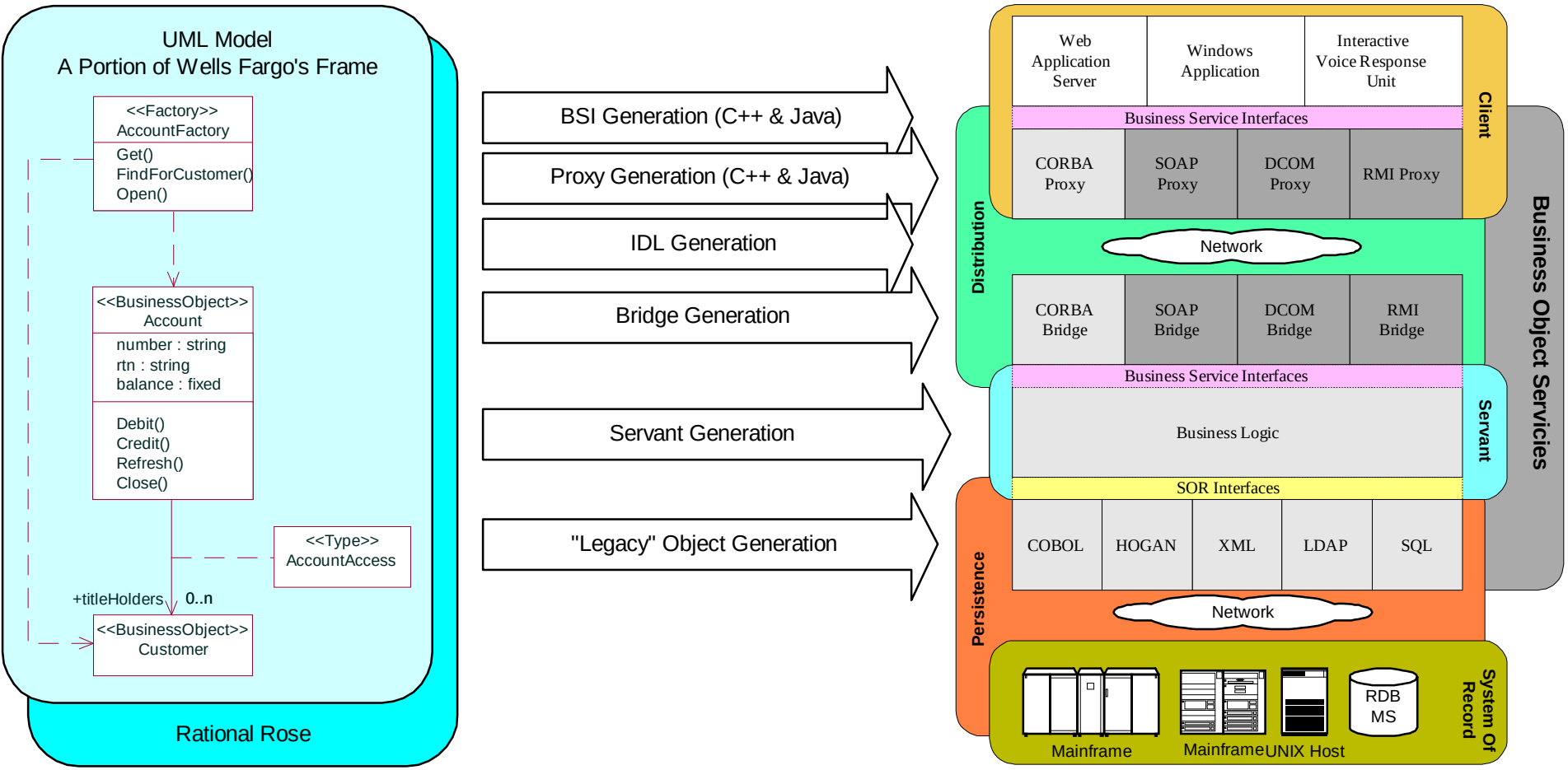
Wells Fargo Processing Environment



Wells Fargo Models



Wells Fargo Transformations

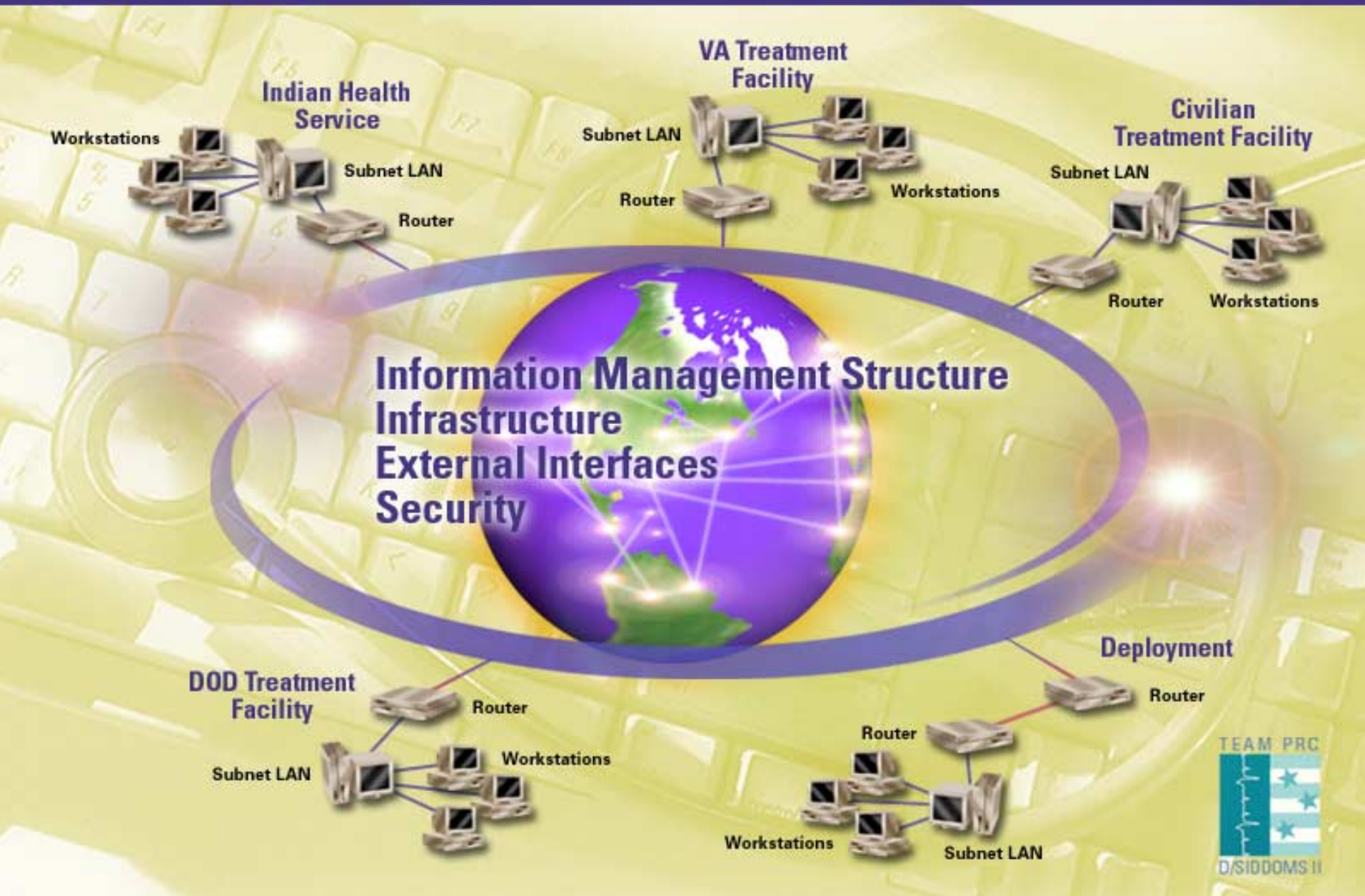


From Eric Castain - see www.omg.org/mda

Wells Fargo MDA benefits

- Acceleration
  - Production of Specifications
    - Originally IDL based
    - UML supported developers access to BSI
    - Mapping dictionary
  - Generation of IDL (and stubs)
  - Generation of C++ BSI Proxy
- Asset protection
  - BSI objects hide the transport

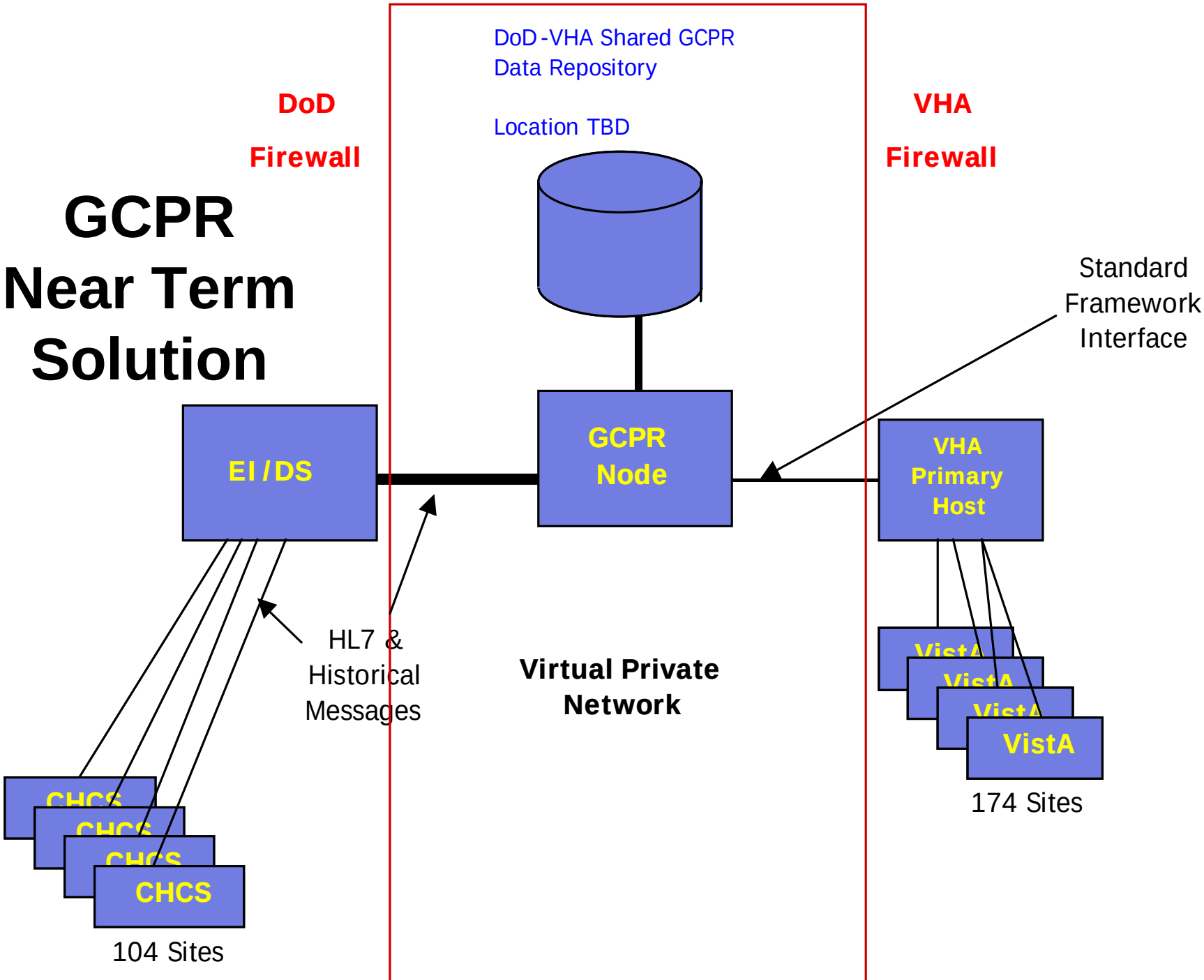
WHAT IS THE GCPR FRAMEWORK?

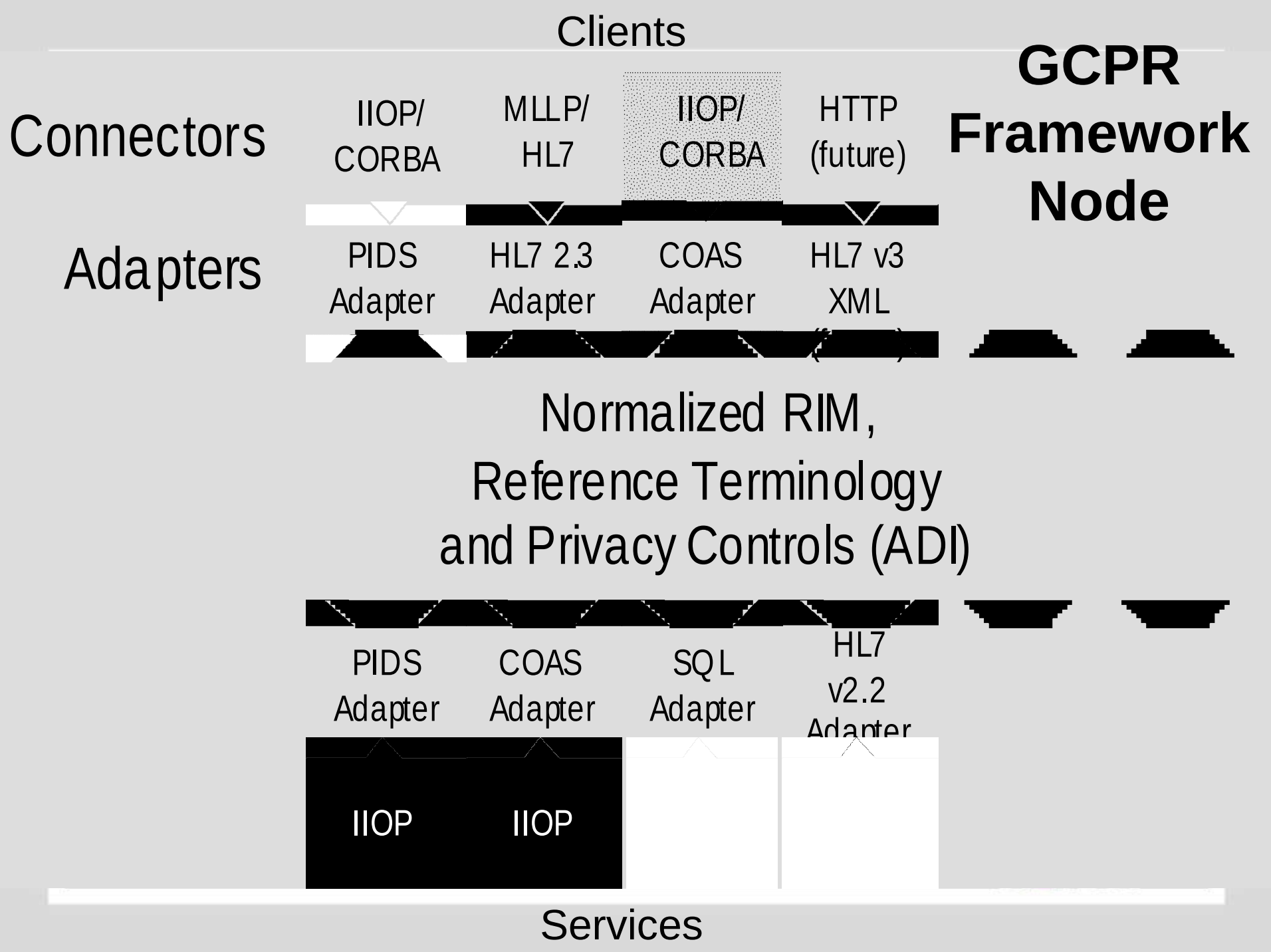


GCPR

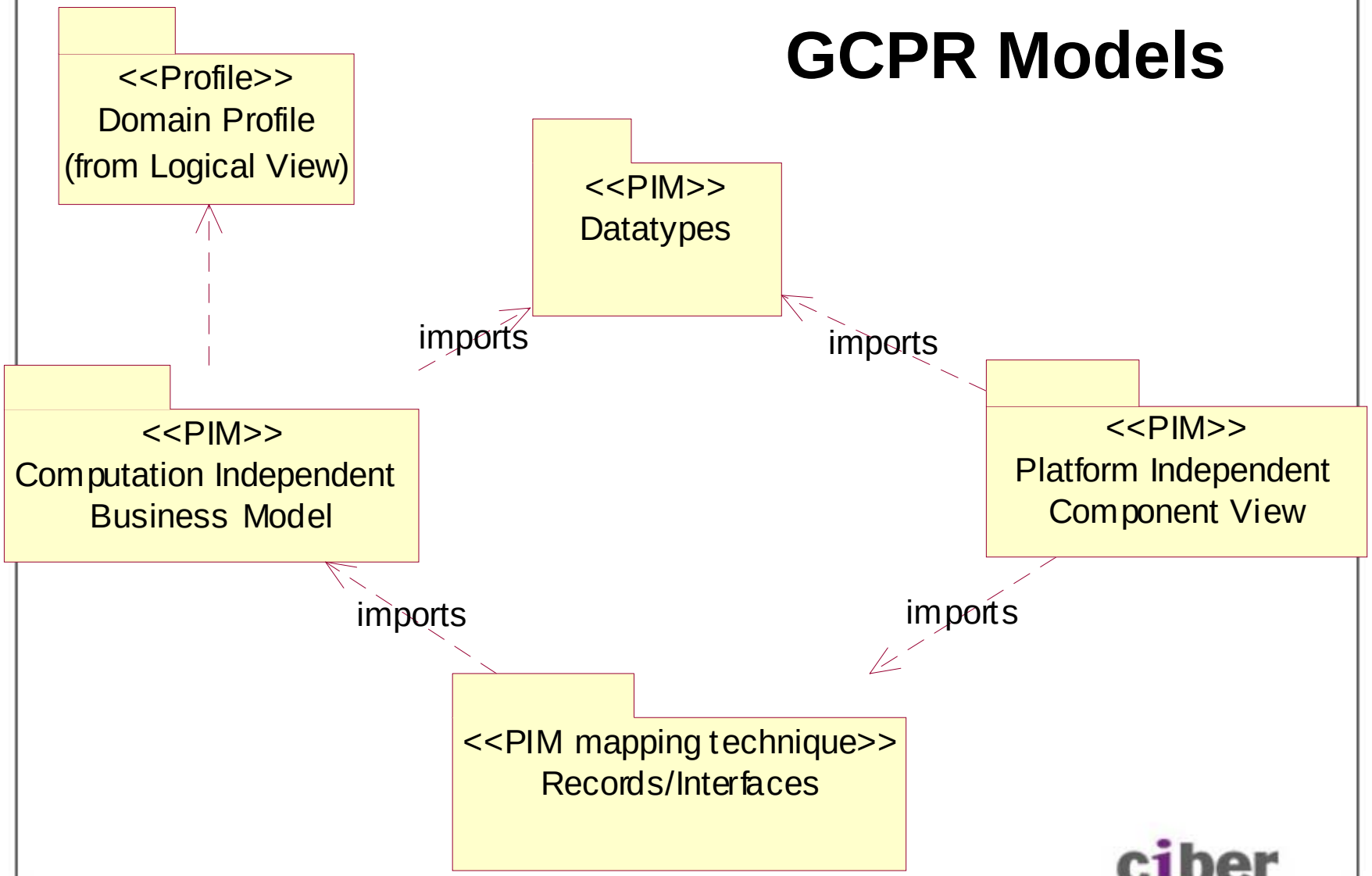
- 1997 PRD 5
- 1998 SOO issued to D/SIDDOMS Primes
- August 1998 Contract Award to Litton/PRC
- April 1999 First GCPR Delivery order
- January 2000 Complete Proof of Concept
- March 2000 Complete Prototype Acceptance Test
- February 2001 Complete Iteration 2 of Pilot/Core
- November 2001 Near Term Solution deployment

GCPR Near Term Solution

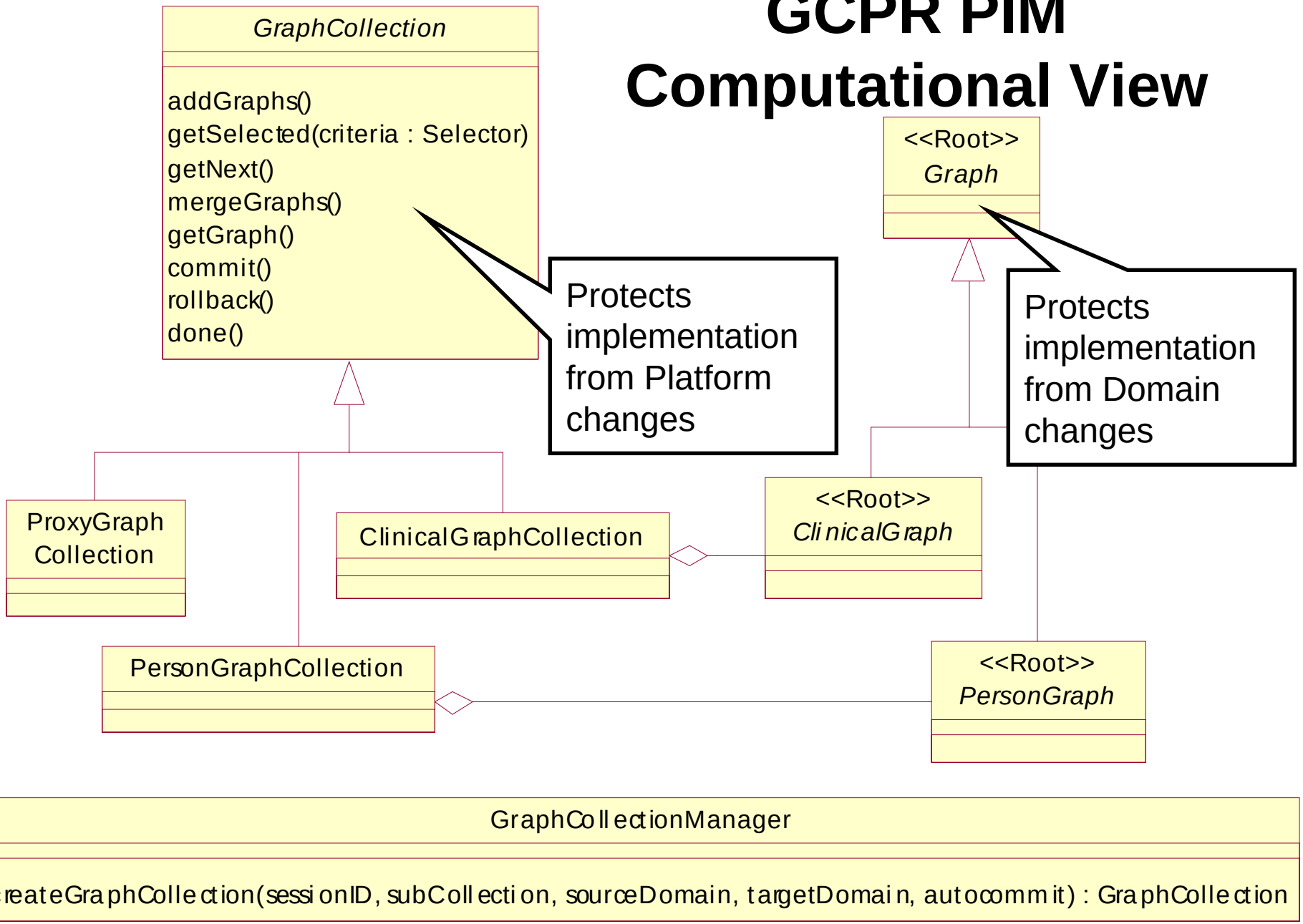



Clients
GCPR Framework Node
Connectors
IIOP/ CORBA
MLLP/ HL7
IIOP/ CORBA
HTTP (future)
Adapters
PIDS Adapter
HL7 2.3 Adapter
COAS Adapter
HL7 v3 XML
Normalized RIM, Reference Terminology and Privacy Controls (ADI)
PIDS Adapter
COAS Adapter
SQL Adapter
HL7 v2.2 Adapter
IIOP
IIOP
Services

GCPR Models


<<Profile>>
Domain Profile
(from Logical View)
<<PIM>>
Datatypes
imports
imports
<<PIM>>
Computation Independent
Business Model
<<PIM>>
Platform Independent
Component View
imports
imports
<<PIM mapping technique>>
Records/Interfaces

GCPR PIM Computational View



Adapters and Transformation

- Normalized Representation
  - Graph to Java objects
- Implicit transformation
  - Graph to OMG COAS IDL Structures
- Explicit transformation
  - HL7 2.2 message to Graph
  - Graph to/from OMG PIDS

Legacy HL7 2.2 message to Graph

Explicit mapping

PID HL DG PATIENT IDENTIFICATION

7 HL DG DATE OF BIRTH

TS	1	Date/Time	patien… DateT…	…teTime	value
TS	2	degree of precision	patientData.player.birth DateTime	DateTime	accuracyUnit.coding_scheme_id.authority
TS	2	degree of precision	patientData.player.birth DateTime	DateTime	accuracyUnit.coding_scheme_id.naming_entity
TS	2	degree of precision	patientData.player.birth DateTime	DateTime	accuracyUnit.a_code

Element Type

Message Segment

Element

Semantic Path

Primitive

Component

DataType

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GCPR MDA Benefits

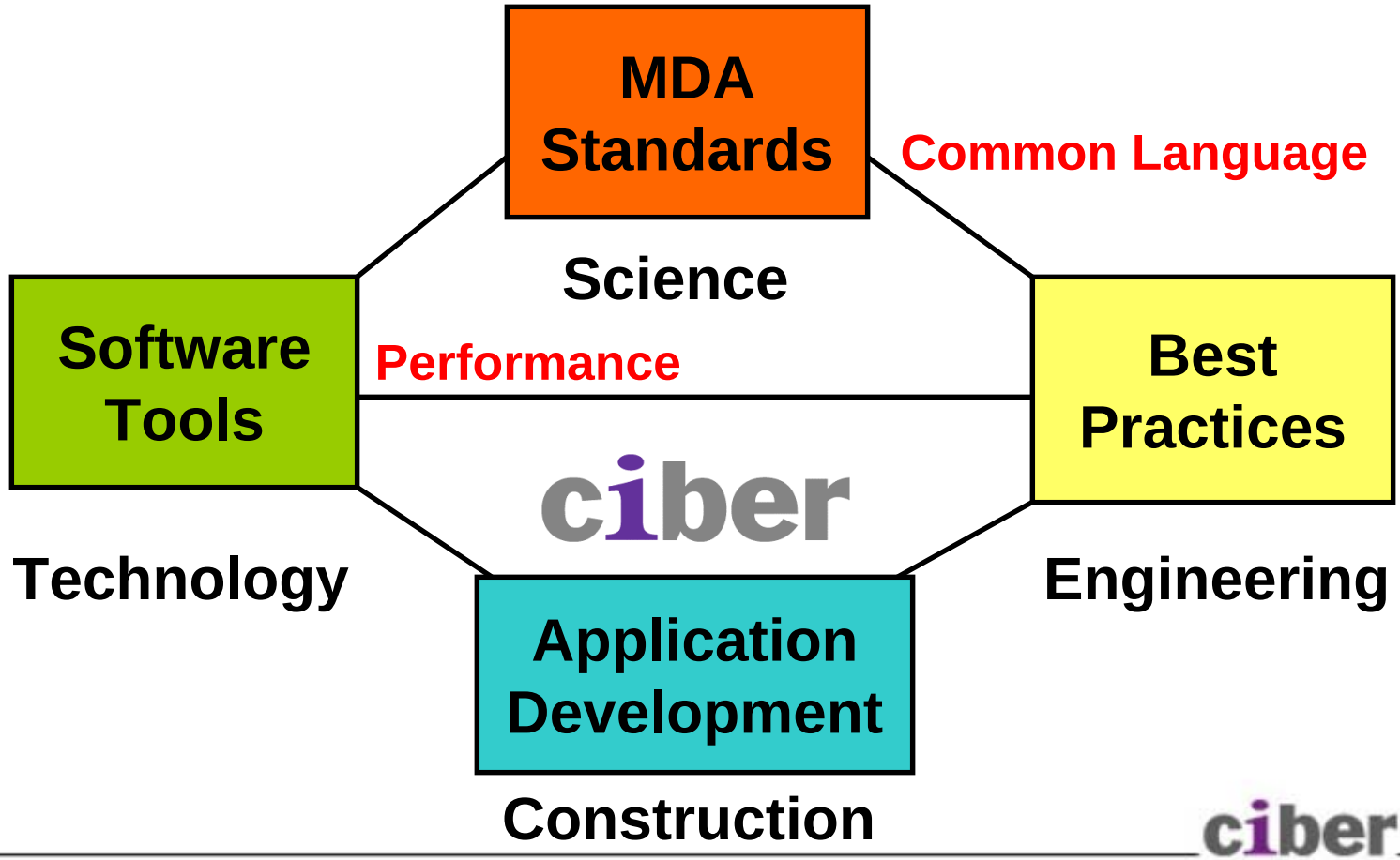
- Accelerators
  - Design Document Generation
  - Data Dictionary generation for mapping
  - Adaptor metadata loading
- Asset protection
  - Platform Independent models
    - Domain independent of Computational
    - Computational independent of Domain
  - Proxy objects hide protocol

Recommendations

- Use today's tools for UML - Do not wait!
- UML Mapping techniques exist to
  - J2EE/RMI
  - CORBA IDL with ValueType
  - XML DTD/Schema
- Develop custom generators
- Work with your vendor
- Participate in the evolving standards
- It has been done - converging techniques

Model Driven Development

Software Discipline



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