Applying Model Driven Architecture to enterprise requirements using the OMG Enterprise Collaboration Architecture
Introductions

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Primary author of “CCA” in EDOC
What does MDA mean to the Enterprise?

- What is Enterprise-MDA going to do for me today?
- How can MDA achieve integration and collaboration between people, departments, systems and companies?
- How does Enterprise-MDA fit into my I.T. strategy and development life-cycle?
- How do we use UML for Enterprise-MDA?
MDA Enables the Agile Enterprise

The MDA message is meaningful to the entire enterprise; From the CEO to the Developer

The Agile Enterprise has a competitive advantage in its capability to embrace collaboration and change
Typical Problems

- Integration Nightmare
- Infrastructure, Version & Vendor lock-in
- Complex, divergent and manual development and deployment processes

Solutions typically require buy-in (Lock-in) to proprietary tools & infrastructure - your solution must be open
The dynamic reality

The information system must facilitate:

- Rapid realization of business goals
- Integration of independent processes and systems
- Multiple and Changing
  - business requirements
  - business processes
  - products and technologies
  - standards
  - enterprise boundaries
  - business partners
Technology Stew

- Web services
- .NET
- C'
- XML
- EAI
- Active Web pages
- EJB
- Java Beans
- Java
- Corba
- MQ-Series
- C++
- SQL
- Cobol
- IMS
- CICS
- ...

Technology is transient, but we must embrace and adapt to it to provide meet current requirements.
Goals

- A scalable and robust enterprise architecture
- Loosely coupled enterprise components
- Enable rapid provisioning of solutions
  - Simple, reproducible processes supporting reuse
- Technology & vendor independence
- Enable the integration and collaboration of multiple:
  - Agencies
  - Business units (internal and external)
  - Suppliers
  - Systems
  - Technologies
The OMG-Enterprise Collaboration Architecture

- ECA is a “profile of UML”, a way to use UML for a specific purpose - it is an OMG standard
  - That purpose is modeling enterprise systems.
- You can also think of this as a “modeling framework” for enterprise computing
- ECA is part of the “Model Driven Architecture” (MDA) initiative of the OMG
  - Using precise modeling techniques as part of the development lifecycle to speed development and provide technology independence
- ECA has been adopted by the OMG as part of the EDOC RFP.

Automated Model Driven Architecture

- Meta-Model
  - UML Profile (E.G. ECA)

- Domain Focused Model (UML)

- Infrastructure Mapping (E.G. ebXML)

- Tools
  - Produce & Integrate

- Enterprise Components

- Framework & Infrastructure (E.G. ebXML)

Mapping is tuned to the infrastructure

Minimize and structure manual implementation
Solution Triad

Development Process
Tooling & Infrastructure
Standards

Web Services
Corba

Service Based Architecture

Components

J2EE .NET

Model Driven Development

OMG ECA

Loose Coupling

Loose coupling is the ability for independent parts of systems to be built and evolve independently.

- Tightly coupled systems
  - Prevent change (the next legacy system)
  - Cause lock-in
  - Become unmanageable
  - Prevent reuse

- Quality architecture is essential for loose coupling
Enterprise Components

- Enterprise Components must be independent
- While being able to interoperate with each other
- Making the information system a lattice of cooperating components
Enterprise Architecture

Supply Chain

Web Browser

HTTP

EA1 Applications & B2B E-Commerce

Client Applications

Web Server Applications

Enterprise Components

XML
Corba
EJB
DCOM
MQ

Standard Middleware connects applications to components & components to components

Business and data rules go here

The data goes here

User interface and application logic go here

SQL DBMS, Client/Server & Legacy Applications

Collaboration is Key

- Collaboration is a key differentiation and key cost center (Healthcare Example)
  - Customer Collaboration
  - Claim processing
  - Disputes
  - Physician Collaboration
  - Payer Collaboration
  - Hospital Collaboration
  - Broker Collaboration
  - Government Collaboration
  - Employee Collaboration
  - Others...

The system integrates multiple collaborations
The Connected Enterprise
Content and Communication

Digital Map
Census Data
Police Records
House Drawings
Aerial Photos

Police Dispatcher Role
Multiple roles in a collaboration
Travel Expense Example

1: travelPermissionRequest
2: travelPermission
3: expenseReport
4: authorizedExpenseReport
5: paymentRequest
Diagram
Travel Expense Model

Objects --> ClassifierRoles
Collaboration Diagram

Traveler  Authorizer  Book Keeper

Paymaster
Roles to Systems

Component in Role

Interaction Path

Interaction (With Information)

Implementation

Framework, Middleware & Container

Operating System

Hardware

Net

Standards for Global Internet Computing

- EDOC
- ECA
- SOAP
- WSDL
- XML
- XML-Schema
- .NET
- BPML
- XLANG
- J2EE
- ebXML
- CORBA

Creating A Single Global Electronic Market
ECA as the normal form

MDA Mappings

The standard way to model and tool for multiple technologies
An ECA Methodology

A simple methodology for creating collaborative business processes
Basic Steps

- Identify roles and organize roles into collaborations
- Define collaboration documents
- Create basic business transactions
- Organize into protocols and events
- Use protocols to define ports on roles
- Drill-down into role detail
- Implement roles
- Configure implementations for deployment with technology specifics
- Deploy
Identifying roles and collaborations
Distinguish protocols and events
Create Business Transactions
Organize into protocols
Add ports to complete community process
Drill-down
Add implementation

- As component compositions
- In a programming language
- By using an external service
- By Wrapping legacy systems
Add technology specifics for deployment
Adding Entities

- Entities are added to manage entity data
- Entity Roles are managers that provides a view of the same identity in another context
- The Entities have ports for managing and accessing the entities
- Non-entities which are owned by (aggregate into) an entity are managed by the entity
Event Based Business Processes

Event Notification

Event Tied to Information
Mappings to technology

- Import external specifications
- Mappings (to and from)
  - Web Services
    - Standards in-progress (WSEC)
  - Distributed Objects (Corba, EJB, DCOM)
  - DBMS
  - Implementation languages (Java, C++, Cobol)
  - Client interface
  - Legacy interfaces
- Automation of >80% of an application
Complete process

- Middleware artifacts are generated
- Implemented roles are deployed
- Completing the process
Iterative Development

Business Model Design

Automation

Infrastructure Development

Build Build Build Build Build

Release Build

Deploy
High level tooling & infrastructure

- MUST BE SIMPLE!
  - We must be able to create better applications faster
  - We must separate the technology and business concerns, enable the user

- Tooling + Infrastructure
  - Executable models are source code
  - Tooling must be technology aware
  - Infrastructure must support tooling, not manual techniques

- Model based component architectures
High level tooling & infrastructure

- MUST BE SIMPLE!
  - We must be able to create better applications faster
  - We must separate the technology and business concerns

Executable Models
Put together the
- Best practices
- Expertise
- Enterprise Architecture
- Infrastructure
- Automated tooling

To produce and integrate robust business collaborations quickly & reliably
Net effect

Using these open standards and automated techniques we can:

- 80% Reduction in complexity (Conservative)
- Achieve the strategic advantage of an open and flexible enterprise
- Produce and/or integrate these systems FASTER and CHEAPER than could be done with legacy techniques
- Provide a lasting software asset that will outlive the technology of the day
Contact

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