

# Case Study:

## A Model Driven Architecture for Integrating Enterprise Wide Federal Web Applications

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# Federal IT Challenges

- Nationwide interconnected systems with little cohesion
- Heterogeneous platforms, environments, applications, standards, and people skills
- Pressure for greater intra-agency efficiency, productivity, responsiveness, and accountability
- Pressure for greater inter-agency collaboration (federation)

# Federal IT Challenges (cont'd)

- Integrate existing legacy systems and new web enabled systems in order to preserve HW/SW investments
- SW projects are still delivered late and over budget
- Need to do more with less
- Need better upfront analysis and a systematic development methodology
- Need to maintain synchronization between design and delivery

# Enterprise Model Objectives

- Federated Model
  - Keep models at the proper level
- Integrated Model
  - Both horizontal and vertical
- Standard Model
  - Decide the model consistency rules up front
- Synchronized Model
  - End to end, time based consistency

# CS Project Profile

- Civilian Federal agency with
  - 27 Inter agency Field Offices
  - 6 Inter agency Regional Offices
  - 2 Inter agency HQ Offices
  - 18 Inter agency interfaces
  - 8 Intra agency interfaces
- Distributed Users
  - 2000 agency users / 300 concurrent users
  - 200 contractor users
- Migrate 70 external databases into 1
- 5 application environments

# CS Project Profile (cont'd)

- 97 business use cases
- 5 major business areas
- Web Sitemap with ~ 60 pages in 5 layers
- Section 508 compliance
- Electronic Signature compliance

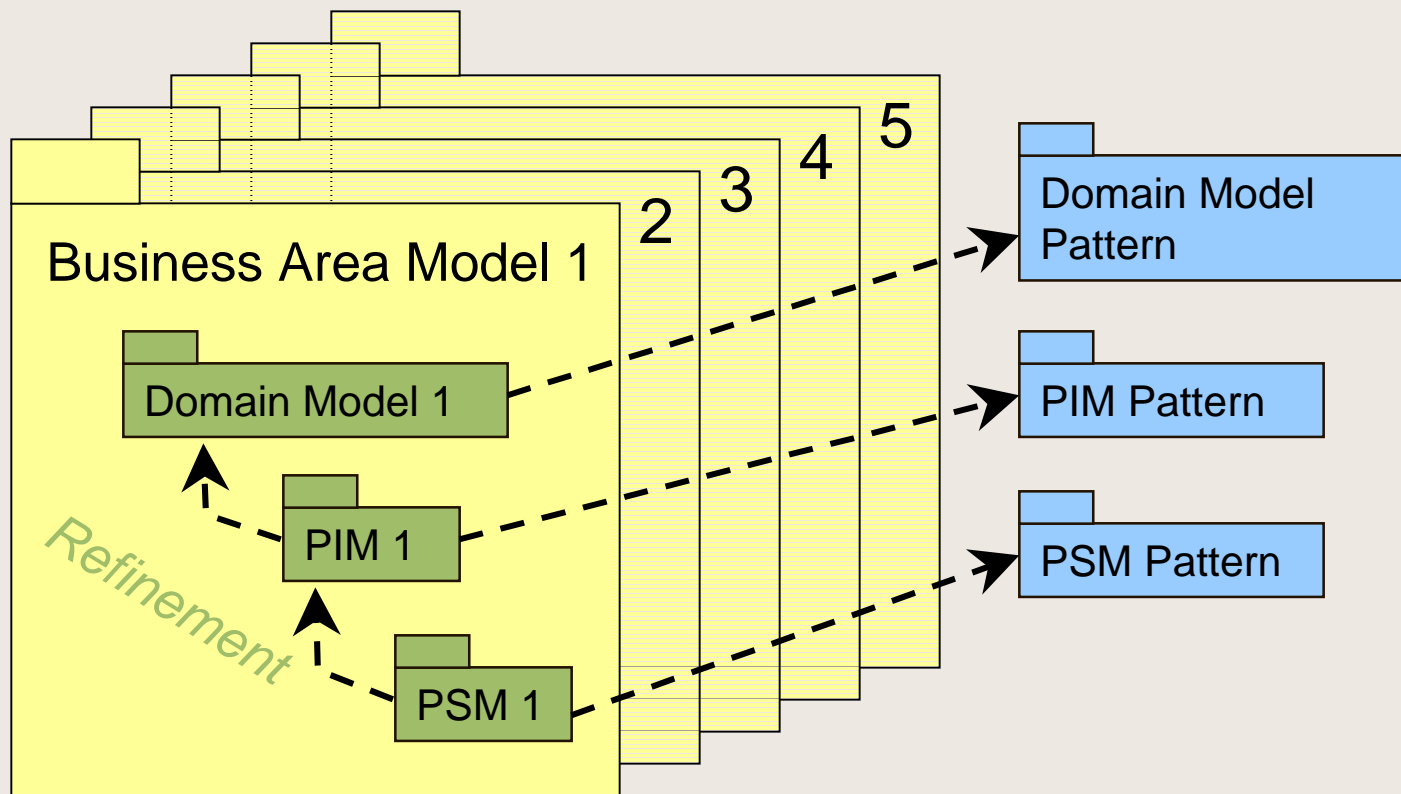
# MDA Meta Model Layers

- Domain model
  - abstract away algorithm details
- Platform Independent Model (PIM)
  - abstract away technology details
- Platform Specific Model (PSM)
  - abstract away underlying system interfaces, persistence details, etc.
- PSM like models predominant in Federal Gov IT projects

# CS MDA Tasks

- Model 5 intra agency business areas
- Refine Business Area Models into domain models
  - Look for business domain patterns : e.g. information portal, B2B, basic gov services, etc.
- Refine business domain into PIMs
  - Look for ways to create PIM patterns : e.g. Login, user profile, agency org, employment, etc.
- Refine PIMs into PSMs
  - Look for ways to create PSM patterns : e.g. clustering, transaction handling, db connection pools, exception handling, etc.

# CS Meta Model



# MDA Features to be Leveraged

- locality of model dependence
- horizontal and vertical integration
- shared standards mappings
  - platform specific
  - Business model design patterns
- portability
- pervasive Services

# CS MDA Guidelines

- Define scope of model
- Use UML to describe the model
- Use an MDA tool to generate code
  - CORBA IDL, XMI for XML, IDL links for EJBs
- Refine UML model
- Generate deployment elements
- But - Focus on enterprise application integration rather than code generation

# CS MDA Guidelines (cont'd)

- Integrate applications
  - But focus on metadata
- Define Middleware formats as metadata
  - mapping of metadata and models
- MDA permits this mapping to be automated
  - MOF does the job
- Need sophisticated staff of developers to do it right

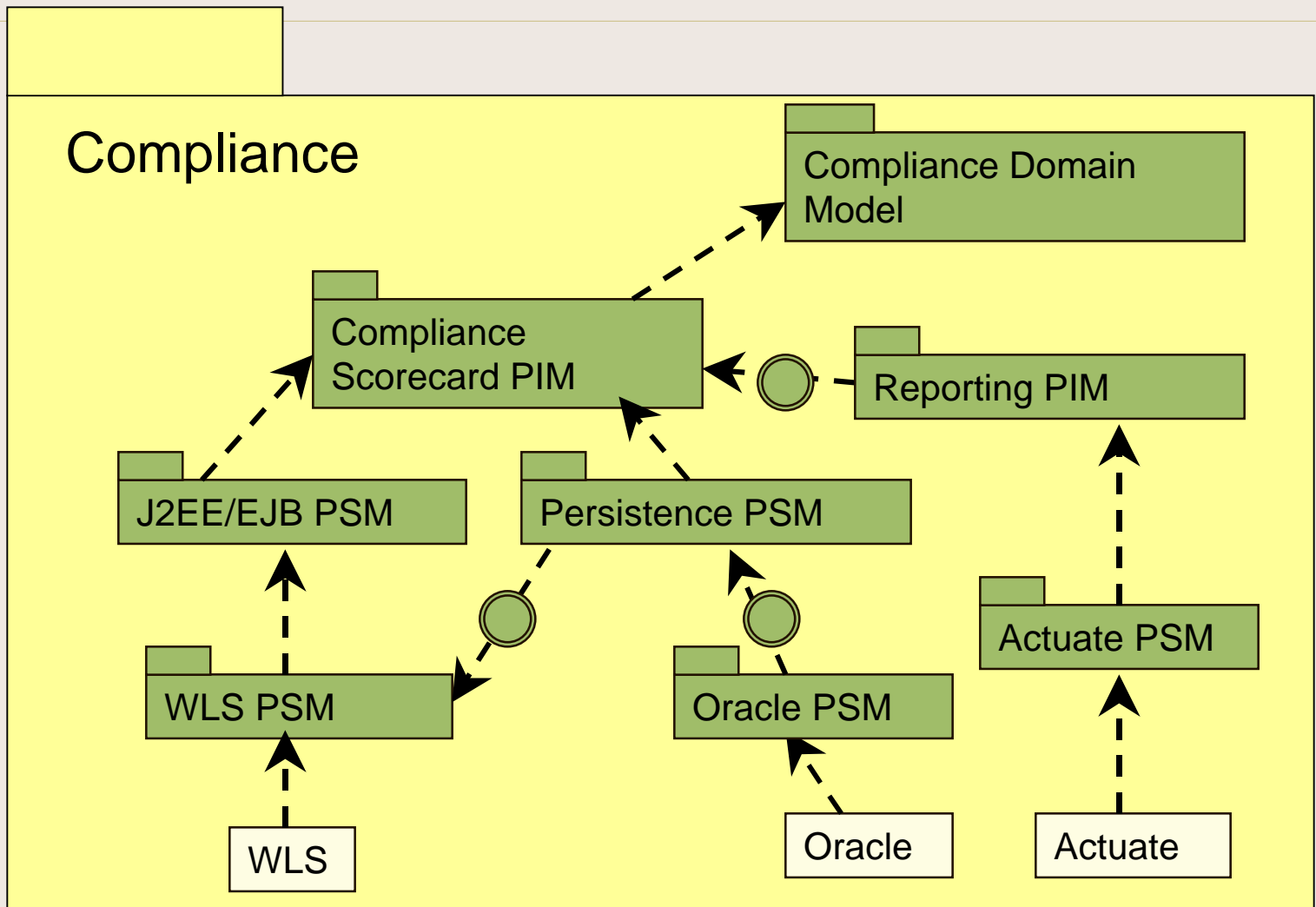
# CS MDA Guidelines (cont'd)

- Need to use Models not just for documentation but as more integral to the management of executable units.
- BEA WebLogic is using the J2EE Connection Architecture (JCA) and its XML based config files to change the personality of its execution units in near realtime.
- → MDA is an approach to engineer models and meta models.

# CS MDA Guidelines (cont'd)

- Use Model Refinement (vertical)
- Use Model refactoring
- Structure model in packages
- Models should include distribution and deployment constructs to keep models in sync
- → An architecture of interrelated models

# CS Compliance Metamodel



# CS MDA Tally

- 5 Domain Models
- 24 PIMs with 4 reusable PIM patterns
- 32 PSMs with 8 reusable PSM patterns
  - J2EE/EJB PSM → BEA WebLogic
  - Reporting PIM → Actuate
  - Persistence PSM → Oracle

# Project Lessons Learned

- Expose MDA early in the process
- Get agency buyin from the Business owner and the IT owner
- Include agency team members as stakeholders
- Involve the agency IT CM team because they will need to own the models
- Leverage existing PSM-like models to abstract up through PIM and Business Models layers
- Educate, educate, educate

# General MDA Project Benefits

- Leverages and reuses all Federal assets
- Reduces end to end costs
- Generates code automatically
- Integrates Intra agency and inter agency
- Maintains an architecture to support future technology, policy, legislative directions
- Promotes standards independent of deployment technologies

# Q & A ?

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