

*MDA Legacy Modernization
Case Study: State of Wisconsin
Unemployment Insurance Division*

ADM Workshop 2004

Adaptive Team Collaboration, Inc.
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Objectives

- Introduce an Adaptive Team Collaborative Process (ATCP)
- Review traditional request for proposal (RFP) process
- Government challenges with iterative development
- Introduce iterative RFP process management
- Review Architectural Tradeoff Analysis Method (ATAM)
- Describe case study at State of Wisconsin
 - Iterative process
 - Traceability strategy
 - Automation within an MDA framework

Adaptive Team Collaboration Process™ (ATCP™)

- Adaptive
 - Plan in increments; get small things working (iterations)
 - Work together (collaborate) to get best results
 - Build team environment in which everyone learns and can contribute effectively
- Customer-centric
 - Deliver continual visible value to customer
 - Describe system capabilities with customer/user first, not system
- Risk-driven
 - Something that might happen that may affect the project
 - Minimize rework risk : business/requirements change and unknown technology
 - Identify and resolve potential risks

ATCP Predecessors

- Extreme Programming (XP)
- Adaptive Software Development (ASD)
- Usage-Centered Design (U-CD)
 - U-CD adopted ATCP Actor/Role concepts – Oct 2002
 - <http://www.foruse.com/newsletter/foruse26.htm>
- Object-Oriented Analysis and Design (OOAD)
- Unified Modeling Language (UML)
- Rational Unified Process (RUP)
- Capability Maturity Model Integration (CMMI)

ATCP Foundation

- Built on industry standards to provide stable platform

Adaptive Team Collaboration Process (ATCP)

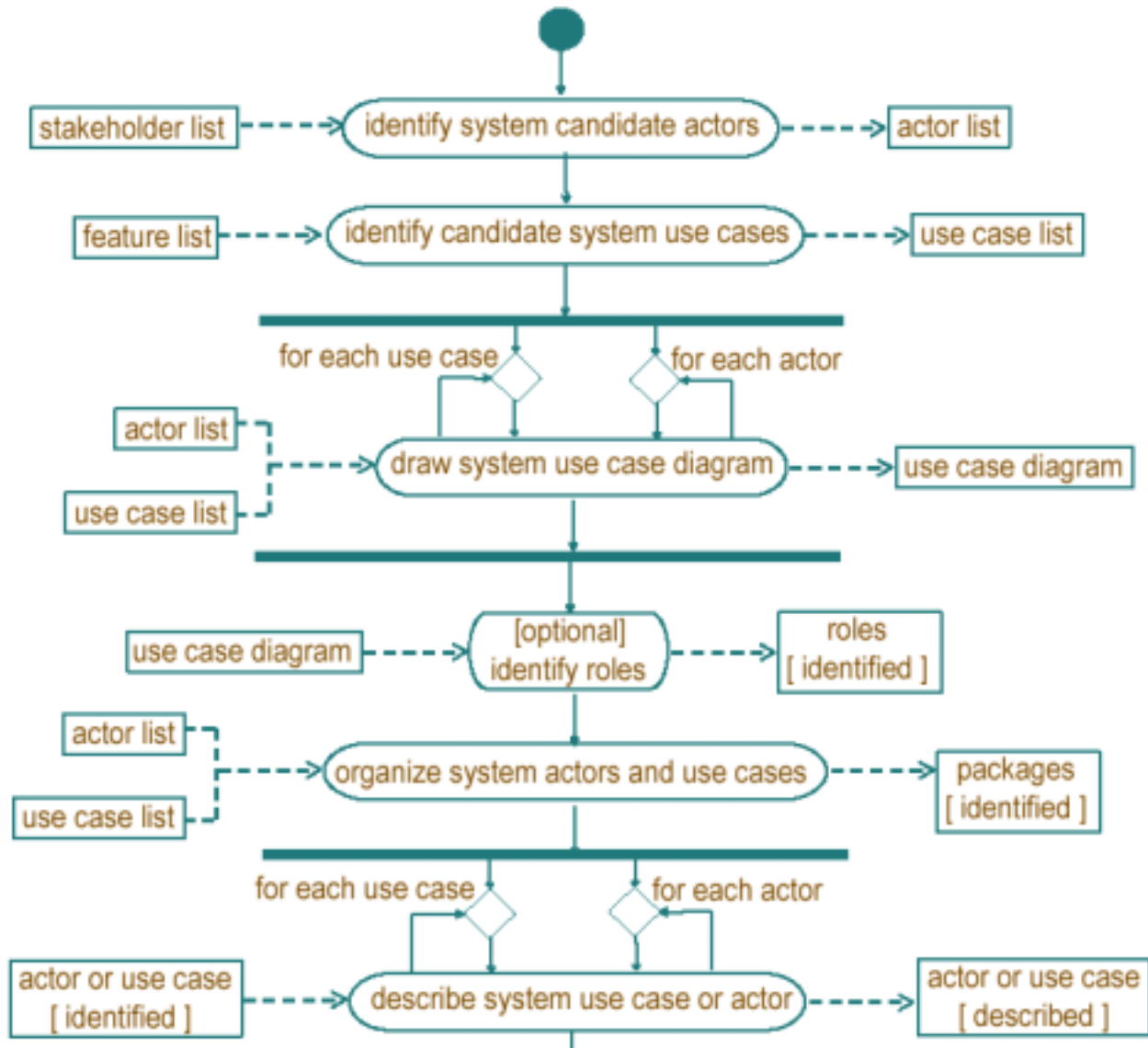
Unified Modeling
Language[®]
(UML[®])

Software Process
Engineering
Metamodel (SPEM)

Model-Driven
Architecture[®]
(MDA[®])

- Ensures sustainability and longevity
- Integrates with industry process frameworks
 - SEI Capability Maturity Model Integration (CMMI)
 - Project Management Institute (PMI)

Sample ATCP Workflow



Iterative RFP Process Management

- Adaptation of “pure” iterative development and “traditional” RFP procurement process
- Agile and adaptive collaborative development process
- Significantly leverage UML for modeling
- Comprehensive traceability strategy
- Complete automatic generation of RFP consumable work products
- Vendors held responsible for completely answering RFP
- Objective response grading captured in tool
- Simulation of multiple scoring algorithms

EnABLES Project

- Department of Workforce Development (DWD), Unemployment Insurance (UI) Division
- Enhanced Automated Benefits Legal Enterprise Services (EnABLES) project
- Completely replace legacy (Cobol/IDMS) application with new distributed web application
- Deploy new customer-centric business model
- Reduce call backs by increasing levels of customer self-service
- \$30 million, seven-year project; using off-the-shelf solution
- See RFP and supporting materials at <http://www.dwd.state.wi.us/asd/procurement>

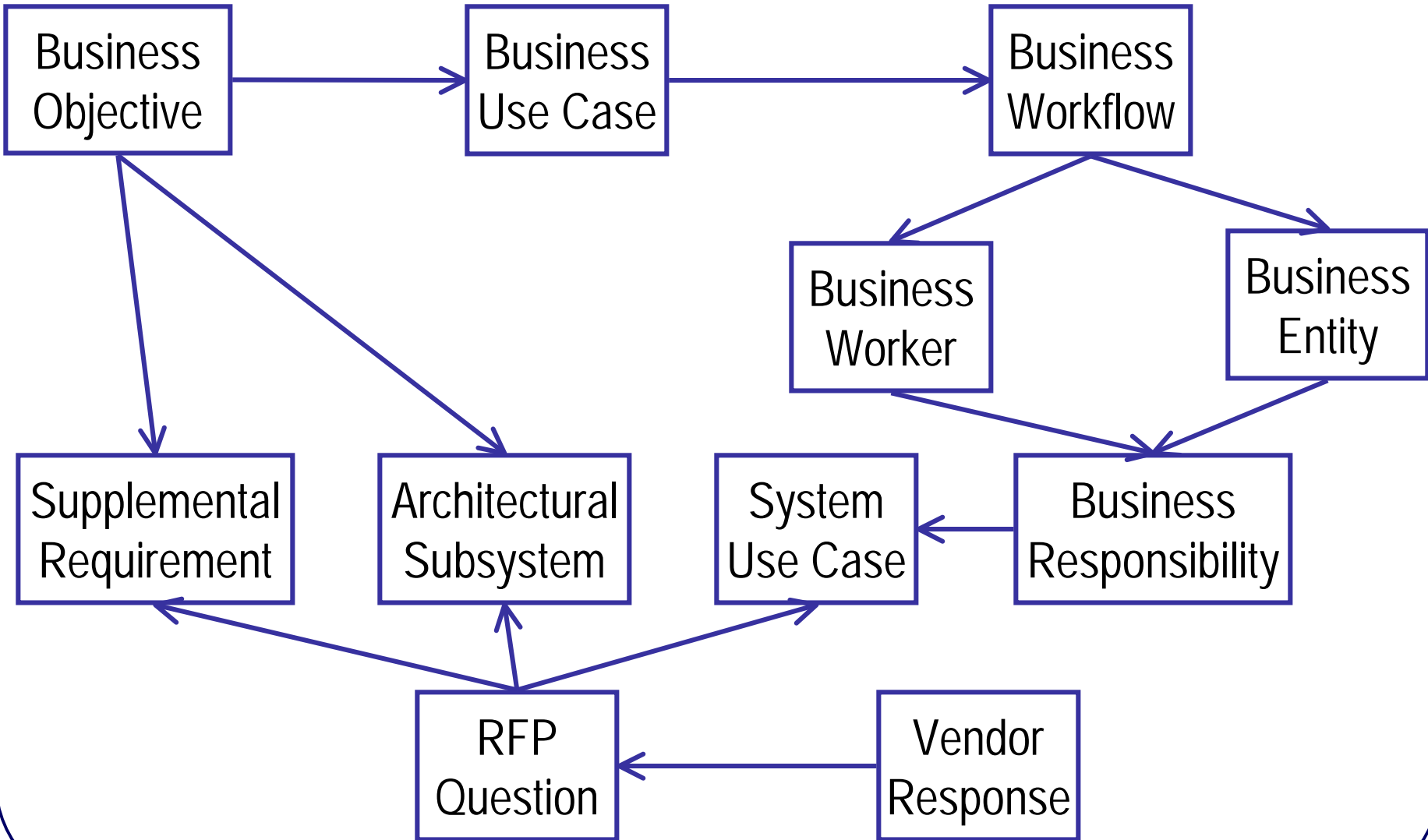
Project Inception

- Started at end of June 2002
- Began with no process and no tool environment, staff with incredible domain experience but no UML or tool experience
- Identified three iterations to finish RFP
 - Fourth iteration to review responses and award contract
- Issued RFP and all supporting materials November 6, 2002
 - Contract awarded in early May 2003
- ATC provided coaching, training, tool configuration
- ATCP provided software development process framework
- Applied Software Engineering Institute's (SEI) Architecture Tradeoff Analysis MethodSM (ATAM)
 - <http://www.sei.cmu.edu/atam>

Four Iterations

- Built UML business use case model
- Detailed use cases and built UML business object model
- Built transparent tool environment with real-time reporting
 - Team could use all their time to advance project
- Identified system use cases
- Established fine-grained traceability from messages on individual flow diagrams to system use cases
 - Required extending traceability capabilities of tool set
- Built business model data warehouse for reporting
- Identified RFP questions and expected responses
- Automatically generated all RFP content
- Scored responses in tool and issued award

RFP Traceability Strategy



Model Elements Identified

- 35 business use cases
- 75 business actors
- 500 external business services
 - Business use case flows
- 400 internal workflows
 - Business use case realizations
- 2,000 internal business services
 - Business object responsibilities
- 80 internal business worker roles
- 250 business entities
- 300 system use cases
- 500 RFP questions
- 20 report templates
- 50 consumables
- 2,000 pages of RFP content

Automated Development Environment

- Rational Rose for UML modeling
- Rational RequisitePro for requirements management and basic traceability
- Rational ClearQuest for change management
- Rational SoDA for reporting
- Extended light native traceability with custom traceability tool
- Transparent tool usage critical
- If something was not in the tool, it did not exist, and it did not appear in the RFP

MDA Features

- Ease transition from one platform to another version
- Integrate with existing legacy applications
- Apply domain-specific reference business models
- Use UML 2.0 for all models
- Provide framework for vendor-specific transformation mappings
- Extend useful lifetime of system models
- Support specialized computing environments

Moving Forward

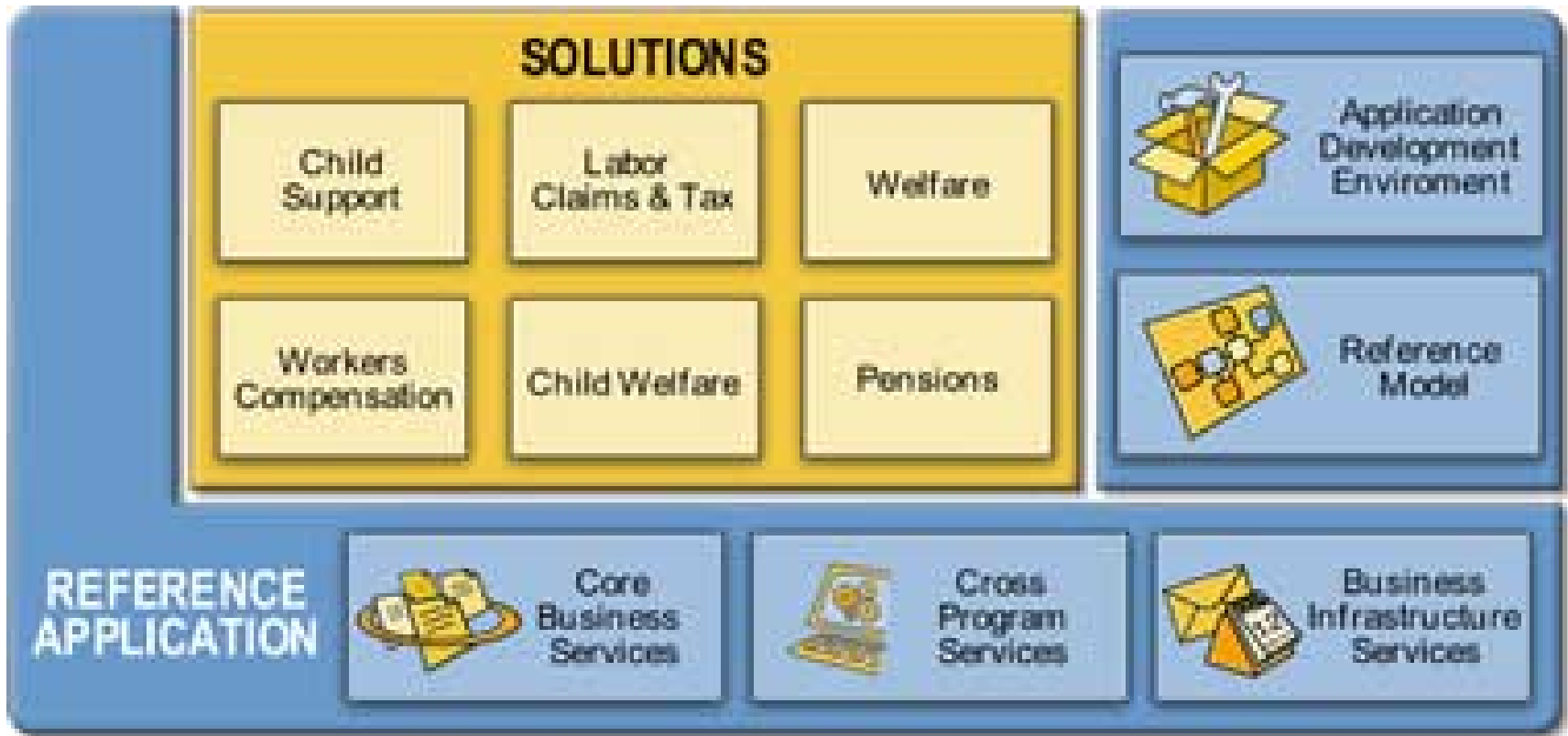
- Establish iterative project office inside automated development environment began July '03
- Base system installation began Sept '03
- Gap analysis began Oct '03
- Customization begins Feb '04
- Apply MDA principles to generating functional software from UML specifications
- Supports ITSC federal guidelines for unemployment insurance system modernization efforts

Cúram Software

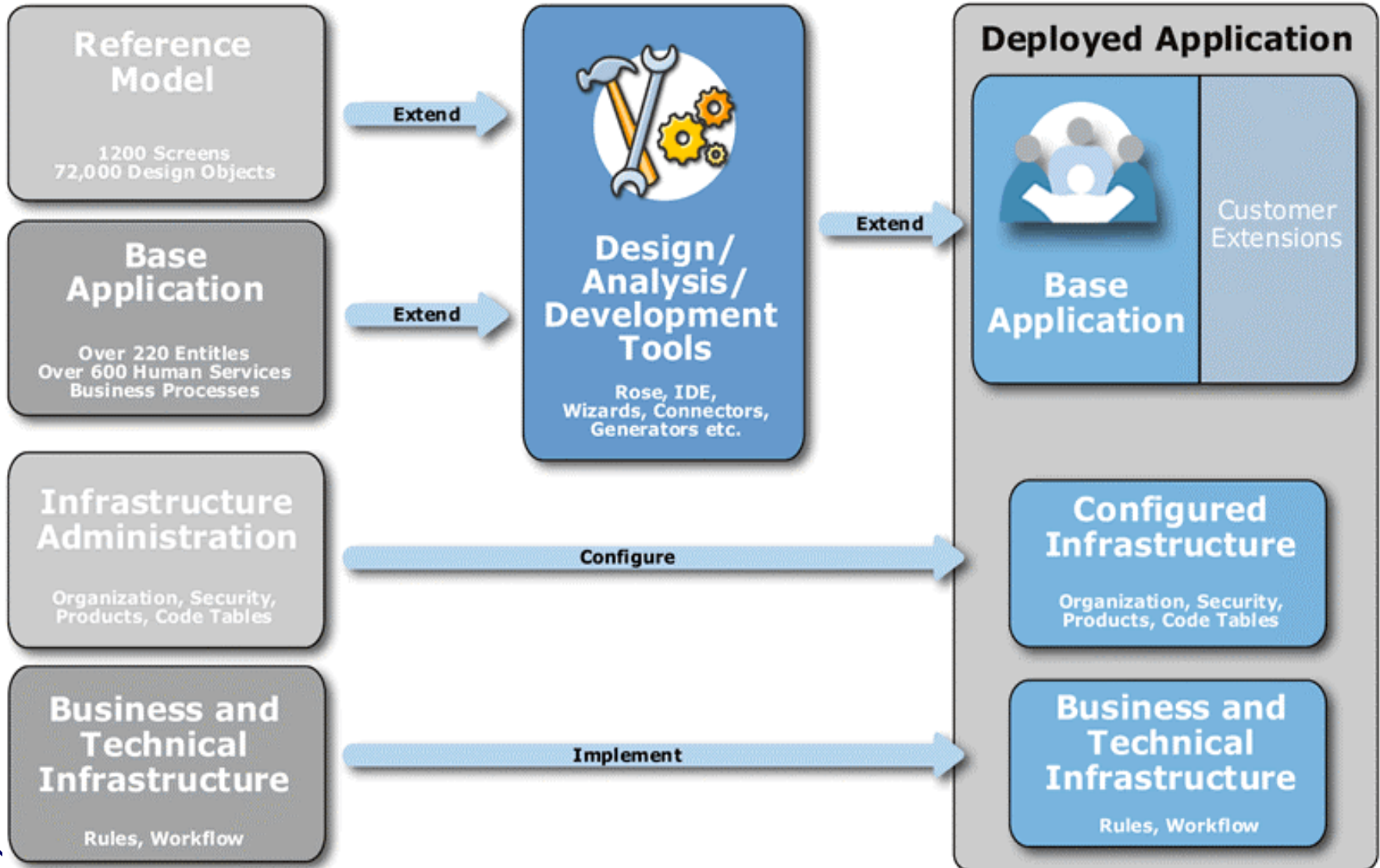
- “Enterprise framework for social and human services”
- Domain-specific reference models
 - Business and system requirements model in process flows
 - System design model in UML
- J2EE architecture framework
- Model-driven development
 - UML class diagrams with special stereotypes
 - Use Rational Rose for modeling
- Web user interface
 - XML-based user interface metadata (UIM)



Cúram Overview



Implementing Cúram

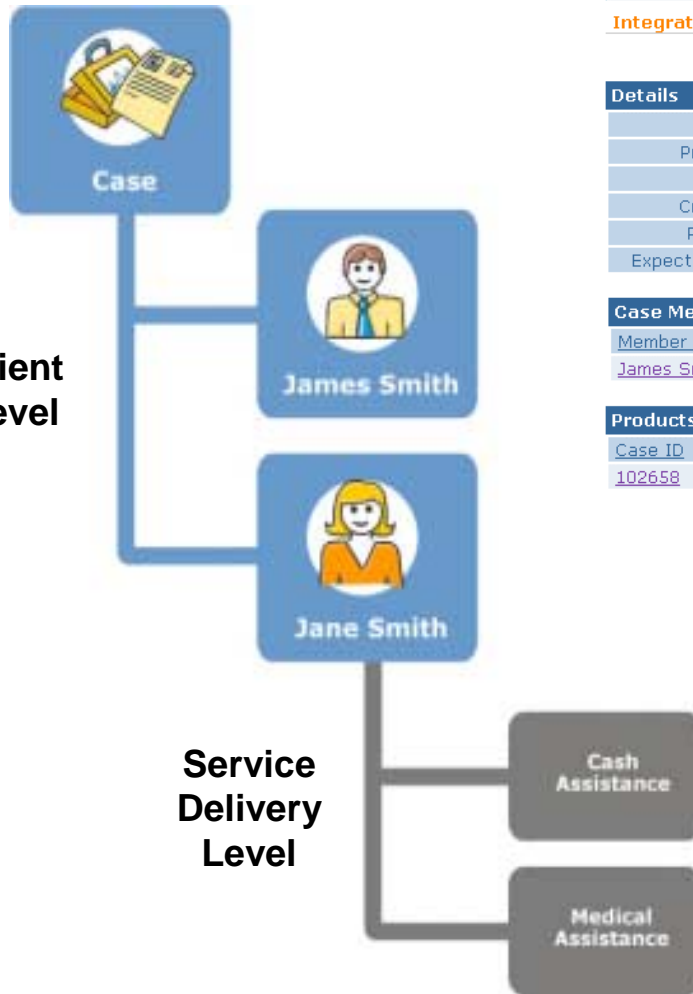


Integrated Case Management

Integrated Case Level

Client Level

Service Delivery Level



Assistance - 102657

Integrated Case Home: Assistance - 102657

[Edit](#) [Close Case](#)

Details

Case ID:	102657	Type:	Assistance
Primary Client:	James Smith	Status:	Open
Owner:	SUPER USER	Priority:	High

Created: Assistance - 102657 James Smith

Received: **Integrated Case Member Home:** James Smith

Expected End Date:

Case Member Details

First Name:	James	Other Name:	
Last Name:	Smith	Gender:	Male
Date Of Birth:	9/26/1964	Place Of Birth:	North Carolina
Preferred Language:	English	Nationality:	American
Registration Date:	1/1/2001		

Products

Case ID	Address	Phone Number
102658	1074 Park Terrace Fairfield Midway Illinois	1 3477455 555

Products

Case: Assistance - 102657 James Smith Benefit Sample

Sample Benefit Home: Benefit Sample - 102658 - James Smith

[Edit](#)

Manage

- [Submit for Approval](#) [Approve](#) [Suspend](#) [Close Case](#)
- [Activate Online](#) [Reject](#) [Un-suspend](#) [Change Closure Details](#)
- [Check Eligibility](#) [Reassess](#) [Re-activate](#)

Case Details

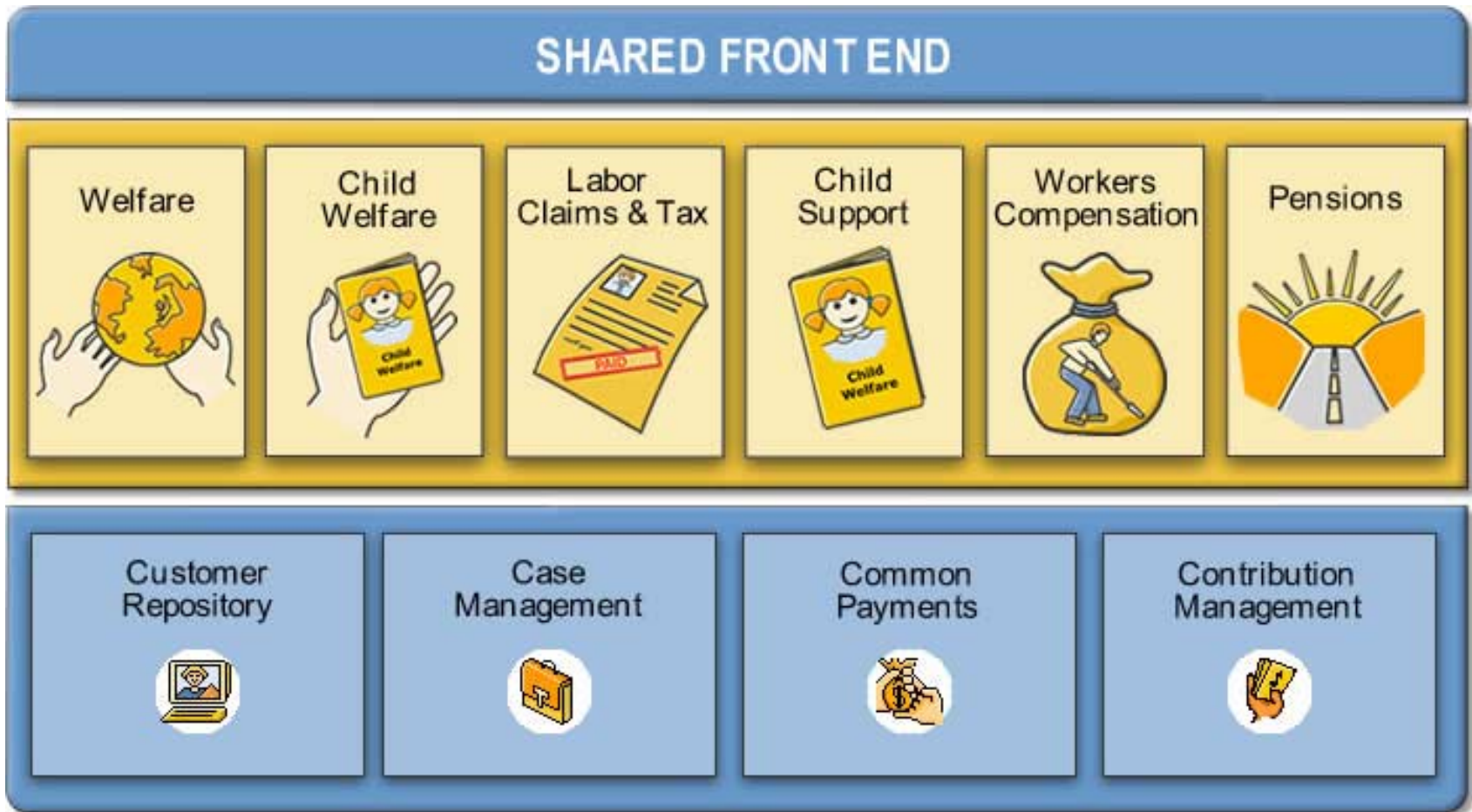
Product Name:	Integrated Case Benefit Sample	Case ID:	102658
Primary Client:	James Smith	Status:	Open
Start Date:	7/10/2003	Expected End Date:	7/10/2003
Priority:	High	Classification:	Medium Risk
Provider:	Midway Social Services	Location:	South Midway Office [Change]
Owner:	SUPER USER [Change]	Date Received:	7/10/2003
Objective:	Financial Support	Outcome:	
Certification Frequency:	[Change]	Delivery Pattern:	Daily by Check [Change]

Comments

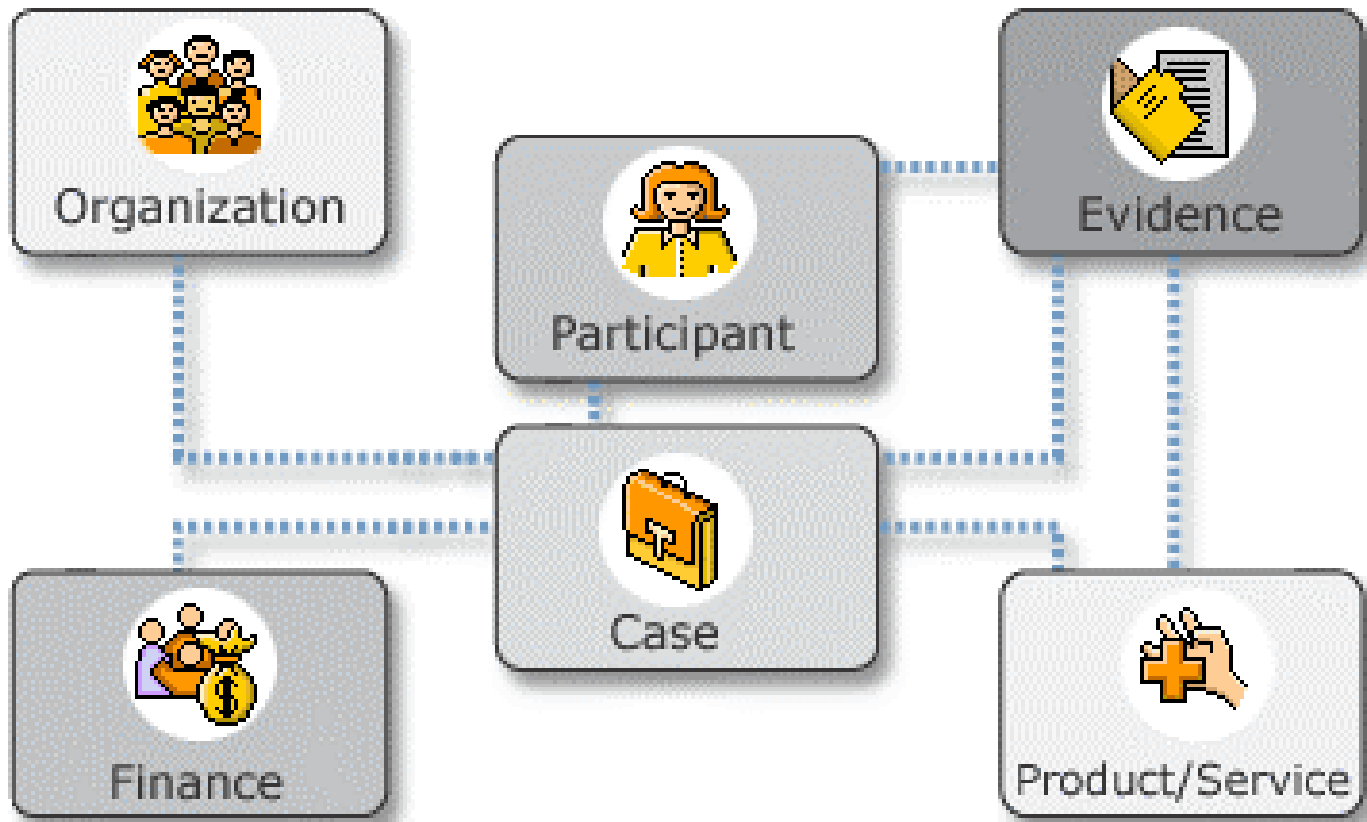
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Cúram Business Reference Model

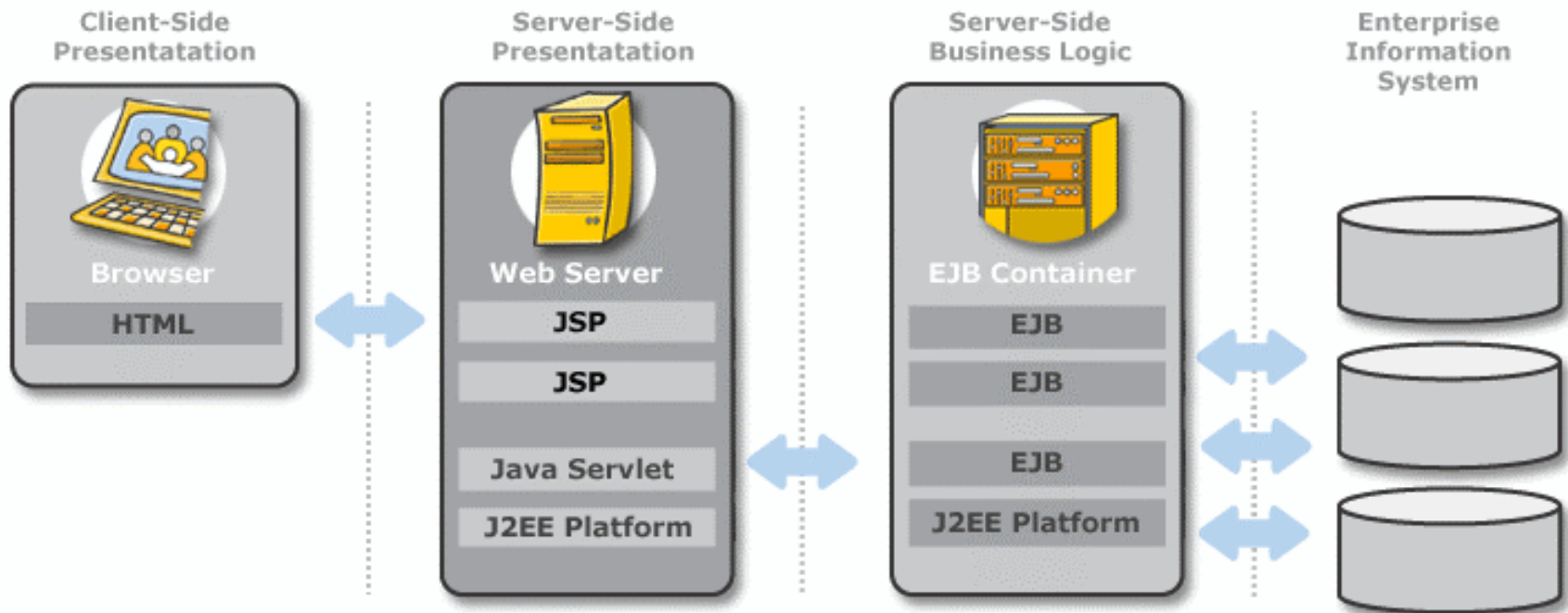


Cúram Business Entity Reference Model



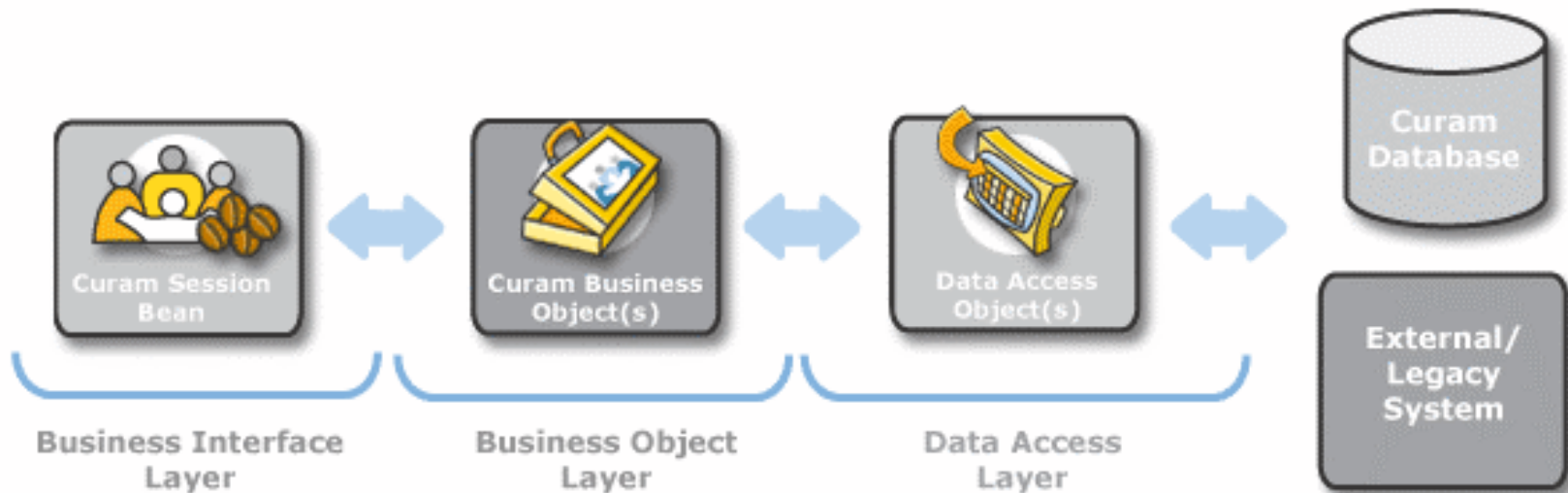
Cúram J2EE Architecture

- Web thin-client, MVC architecture
- Apache Struts (moving to Java Server Faces)
- JSP, servlet, EJB

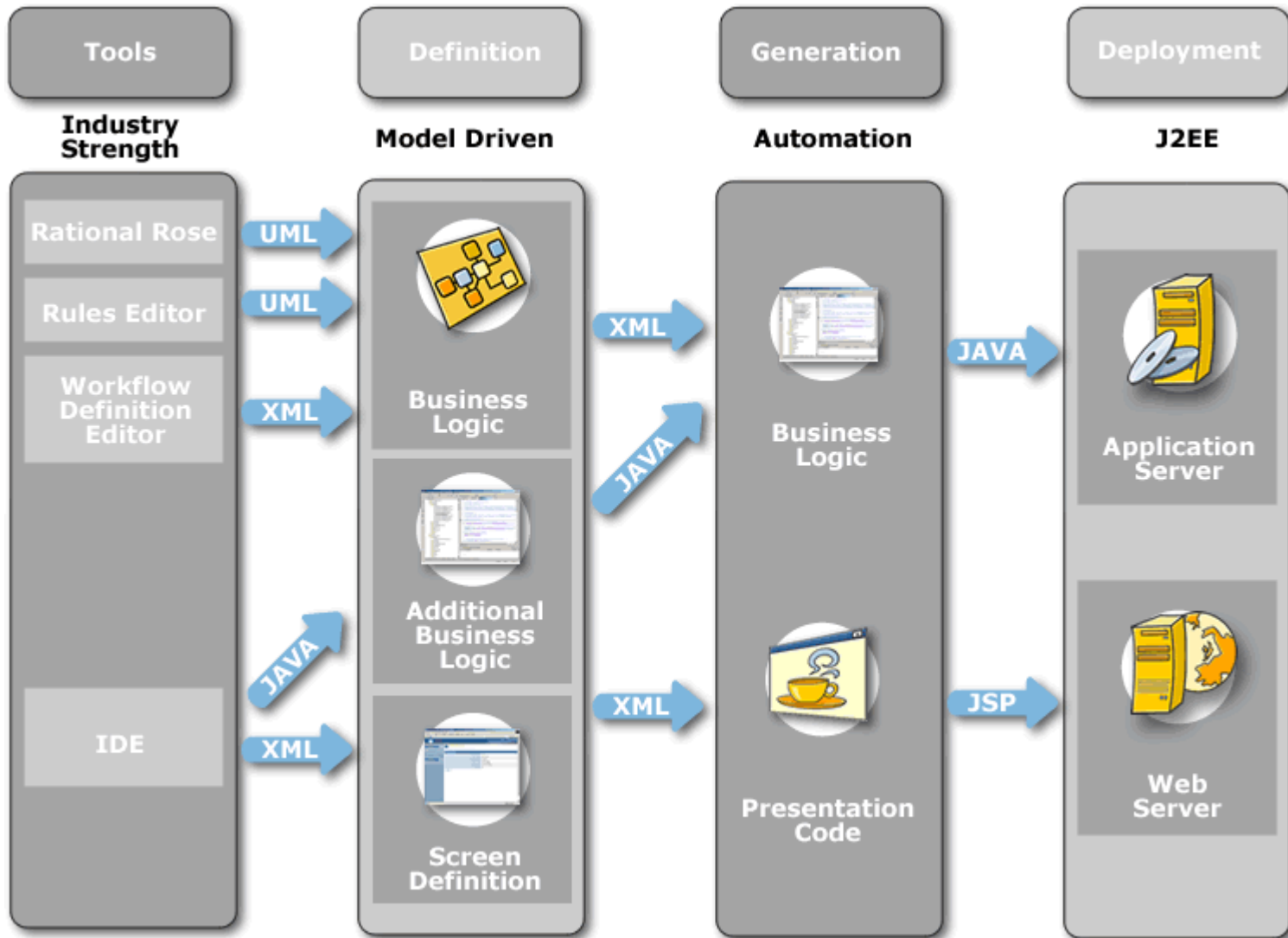


Cúram Server Runtime Architecture

- EJB session beans
- Java business objects
- Data access objects



Cúram Application Development Process



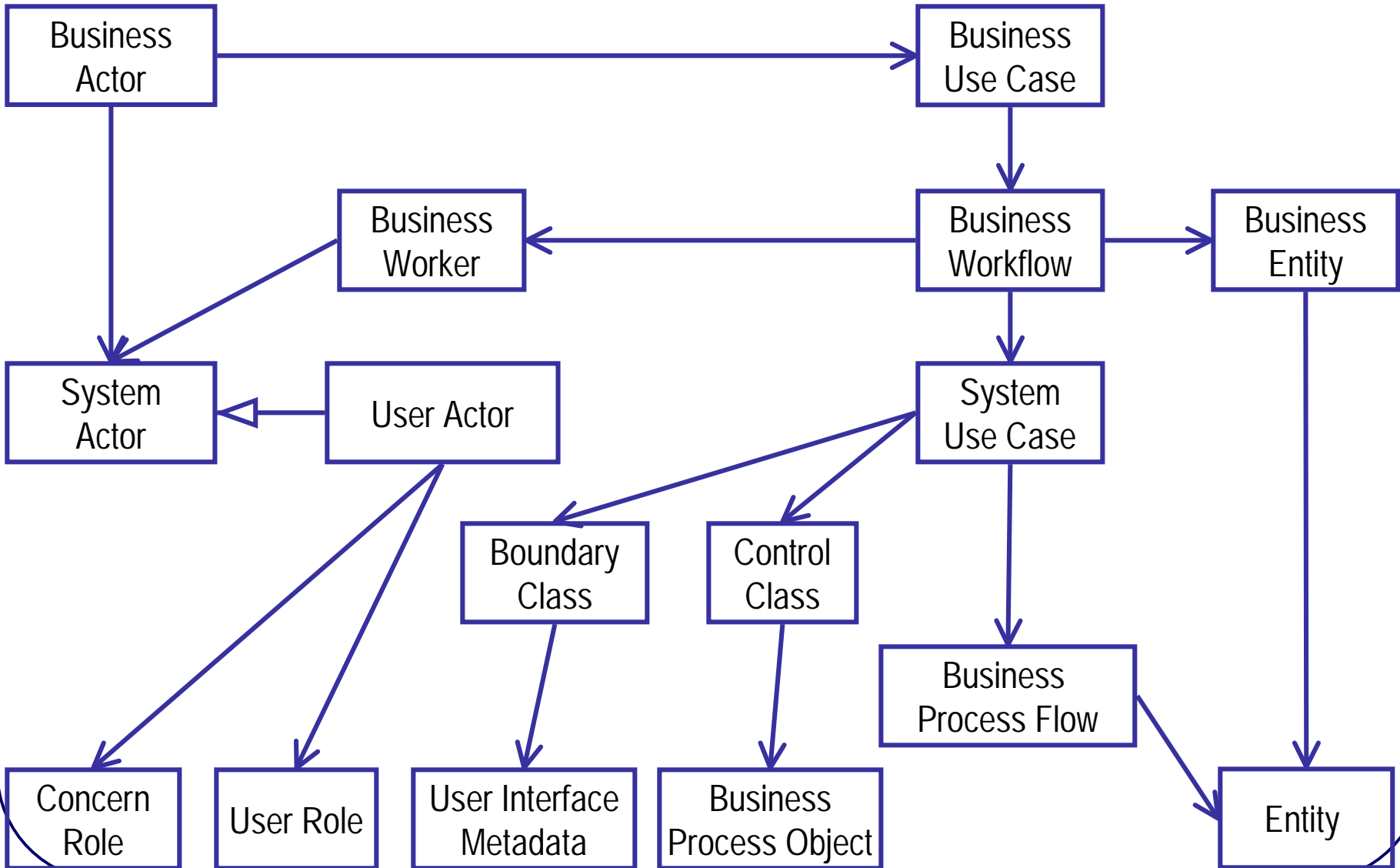
Base System Installation Stage

- Acquire Curam software through traditional process
- Install Curam software on development servers
- Team training (including many new team members)
 - Introduction to Object-Orientation
 - Curam Business Analyst Training
 - Curam Technical Training
 - Use Case Modeling Fundamentals
 - Introduction to Rational Suite AnalystStudio
- Apply development activities to three use cases to test process and software installation

Gap Analysis Stage

- Compare out-of-the-box features of Curam to DWD-UI needs
 - Done at high-level using existing work products
- Leverage UML models built during RFP process
 - Required customized gap analysis process and tools
- Extended RFP traceability strategy

Gap Analysis Traceability Strategy



Gap Analysis Process

The image shows a screenshot of a document window with a title bar and a scroll bar. The document content is as follows:

UI Business Entity to Cúram Entity Traceability Process

What
Look at business entity classes in EnABLES RFP and map them to entity classes in Cúram.

How

1. Select a package of UI business entities
2. Select one or many business entities from the list of business entities in the selected package
 - 2.1. Review what the business entities represent
 - 2.1.1. Examine its description (documentation)
 - 2.1.2. Examine any class diagrams on which the entity is shown
 - 2.1.3. Examine any collaboration diagrams on which objects for the entity are shown
 - 2.1.4. Examine the business object message survey for the messages sent to objects of the business entity across all collaboration diagrams
3. Select a package of Cúram entities
4. Select one or many Cúram entities from the list of Cúram entities in the selected package
 - 4.1. Review what the Cúram entities represent
 - 4.1.1. Examine its description (documentation)
 - 4.1.2. Examine the Cúram entity quick reference
 - 4.1.3. Examine the Cúram entity reference model diagram
 - 4.1.4. Examine any related Cúram process flows
5. Select to trace the selected UI business entities to the selected Cúram entities
6. Repeat steps 1-5 for additional UI business entities

Why

1. Show which UI business entities will be implemented as out-of-the-box Cúram entities
2. Show which UI business entities will be customized Cúram entities
3. Show which UI business entities do not relate to any Cúram entities
4. Show which Cúram entities do not relate to any UI business entities
5. Show ranked density of UI business entities to Cúram entities
 - 5.1. Show which UI business entities map to the most/fewest Cúram entities
6. Show ranked density of Cúram entities to UI business entities
 - 6.1. Show which Cúram entities map to the most/fewest UI business entities

Who
Business Analyst

When
Inception or Elaboration of Gap Analysis Stage

Gap Analysis Traceability Tool

UI to Curam Traceability Tool Main Menu

Trace Business Object Messages to System Use Cases

Trace Messages

Traceability Reports:

Business Object Messages Traced to System Use Case
System Use Case Traced From Business Object Messages
Business Object Messages Not Traced to System Use Case
System Use Case Not Traced From Business Object Messages

Open Report

Trace UI Business Entities to Curam Entities

Trace Entities

Traceability Reports:

UI Business Entities Traced to Curam Entities
Curam Entities Traced From UI Business Entities
UI Business Entities Not Traced to Curam Entities
Curam Entities Not Traced From UI Business Entities

Open Report

Trace UI System Actors to Curam User Roles

Trace Actors

Traceability Reports:

UI System Actors Traced to Curam User Roles
Curam User Roles Traced From UI System Actors
UI System Actors Not Traced to Curam User Roles
Curam User Roles Not Traced From UI System Actors

Open Report

Trace Business Workers to System Actors

Trace Business Workers

Traceability Reports:

Business Workers Traced to System Actors
System Actors Traced From Business Workers
Business Workers Not Traced to System Actors
System Actors Not Traced From Business Workers

Open Report

Trace UI System Use Cases to Curam Process Flows

Trace System Use Cases

Traceability Reports:

UI System Use Cases Traced to Curam Process Flows
Curam Process Flows Traced From UI System Use Cases
UI System Use Cases Not Traced to Curam Process Flows
Curam Process Flows Not Traced From UI System Use Cases

Open Report

Trace UI Arch Requirements to Curam Process Objects

Trace Arch Requirements

Traceability Reports:

UI Arch Requirements Traced to Curam Process Objects
Curam Process Objects Traced From UI Arch Requirements
UI Arch Requirements Not Traced to Curam Process Objects
Curam Process Objects Not Traced From UI Arch Requirements

Open Report

Workflow Traceability Reports

Business Object Message Survey
Business Object to Business Use Case Summary
Business Object to Business Use Case Interaction Diagram

Open Report



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Trace UI Boundary Classes to Curam UIMs/VIMs

Trace Boundary Classes

Traceability Reports:

UI Boundary Classes Traced to Curam UIMs/VIMs
Curam UIMs/VIMs Traced From UI Boundary Classes
UI Boundary Classes Not Traced to Curam UIMs/VIMs
Curam UIMs/VIMs Not Traced From UI Boundary Classes

Open Report

Logout

Business Entity to Cúram Entity Traceability

Microsoft Access - [frmTraceEntity : Form]

File Edit View Insert Format Records Tools Window Help

UI Packages:

Adjudication	4
Application Record Business Entities	12
Benefit Disbursement Record Business Entities	20
Bureau of Legal Affairs	51
Bureau of Tax and Accounting	10
Central Operations	10
Claim Inquiry Business Entities	30
Claim Record Business Entities	3
Claimant Business Entities	9
Claimant Child Support Business Entities	6
Combined Wage Claim Business Entities	6

UI Business Entities:

- Adjudicator Schedule
- Missing Information Notice
- Scheduling Notice
- Workload Distribution Report

Traced to Curam:

Activity	Adjudicator Schedule
Address	Missing Information Notice
Address	Scheduling Notice
AdminAssessment	Adjudicator Schedule
AdminIntegratedCase	Adjudicator Schedule
AdminIntegratedCase	Scheduling Notice

Trace

Untrace

Documentation: The Adjudicator Schedule shows the schedule of each individual adjudicator, to show when they have interviews scheduled, with which claimant, and the issue. It also shows vacation, meetings, and off line time. It is used to schedule eligibility issues.

Curam Packages:

Assessment	1
Assessments	3
Case	42
Case Decision	1
Case Manager	1
CaseEvidenceAPI	3
CaseNominee	1
CaseNomineeDestination	1
CaseNomineeObjective	1
CaseNomineeProdDelPattern	1
CaseParticipantRole	1

Curam Entities:

- AdminIntegratedCase
- AdministrationCaseRole
- Assessment
- AssessmentComponent
- AssessmentEvidence
- AssessmentObjective
- AssessmentObjectiveTag
- AssessmentQuestions
- CaseAppeal
- CaseApproval
- CaseApprovalCheck

Traced from UI:

Adjudicator Schedule	AdminIntegratedCase
Scheduling Notice	AdminIntegratedCase
Workload Distribution Report	AdminIntegratedCase

Documentation: ALLOW_OPTIMISTIC_LOCKING=yes
COMMENTS=Entity to hold integrated case specific information.

Form View

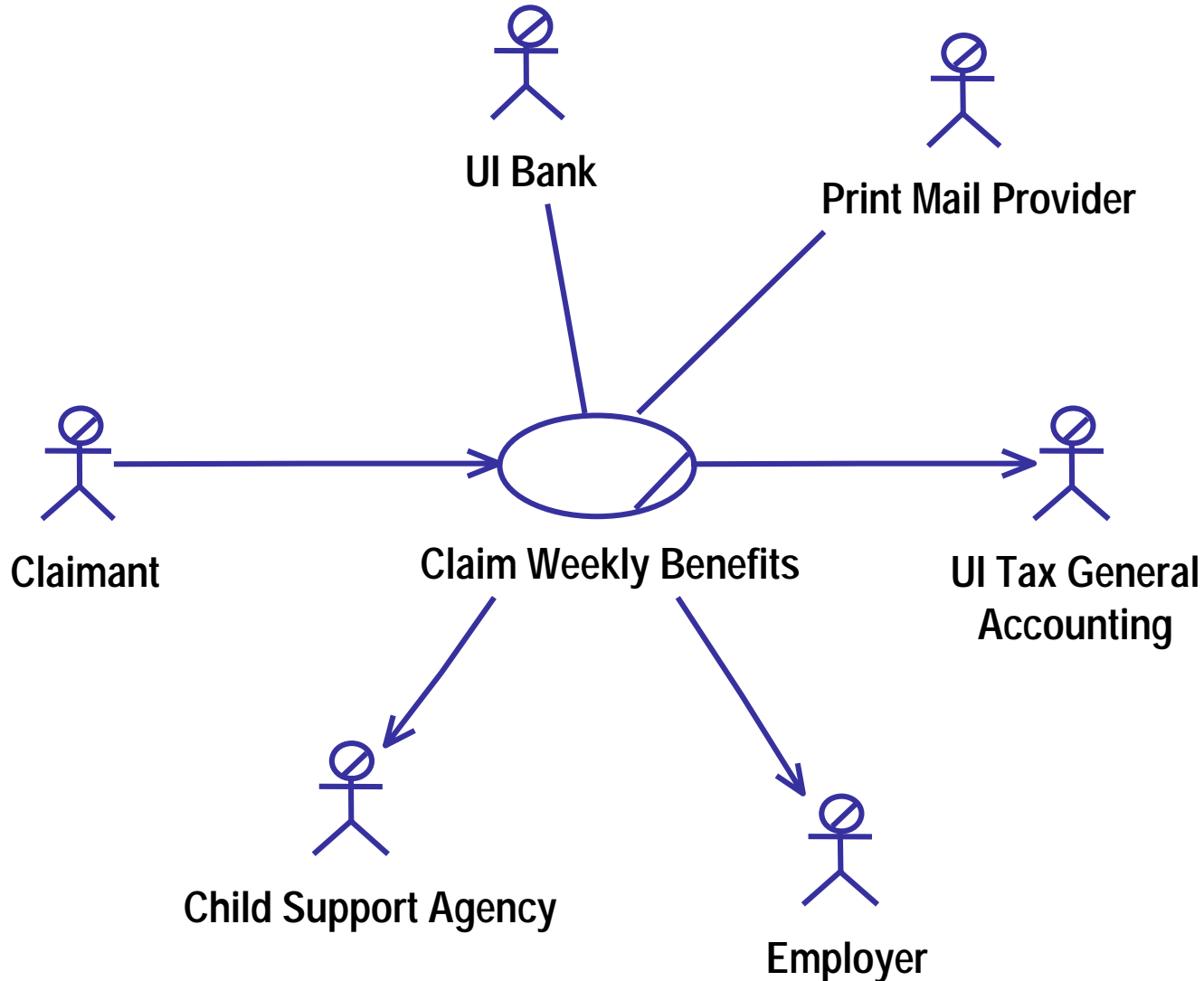
Conclusions

- EnABLES RFP process could not have been done and will not be sustainable without MDA principles
- Built a computational independent model
 - CIM has its own CIM, PIM, and PSM
- Now detailing PIM and generating PSM
- Transformations mostly done by hand
 - Enforced and captured by tools
 - Transformations more automated moving forward
- Provided framework for implementing custom-developed or off-the-shelf product on any technical platform

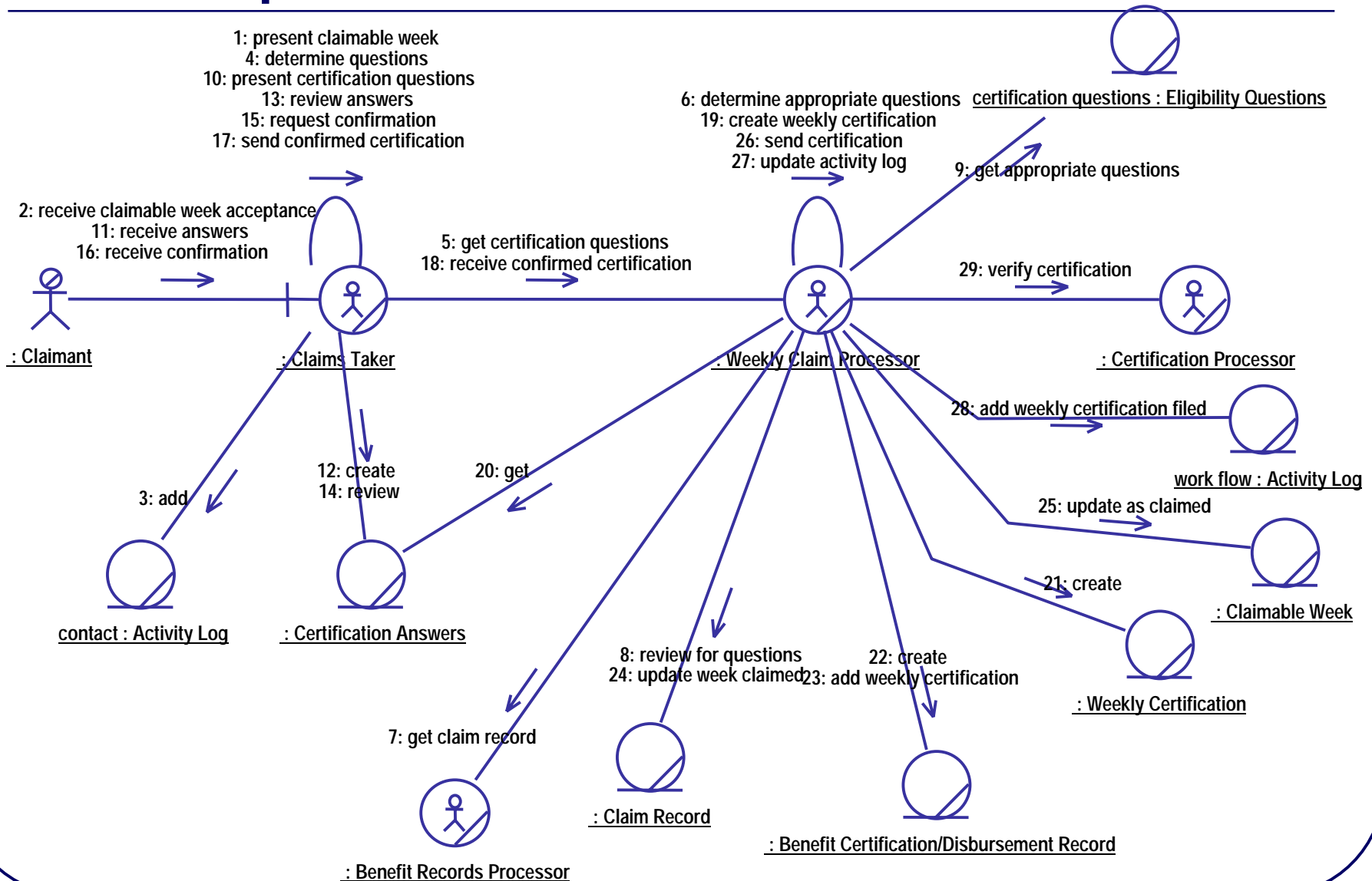
Questions?

Thank you for your attention and participation!

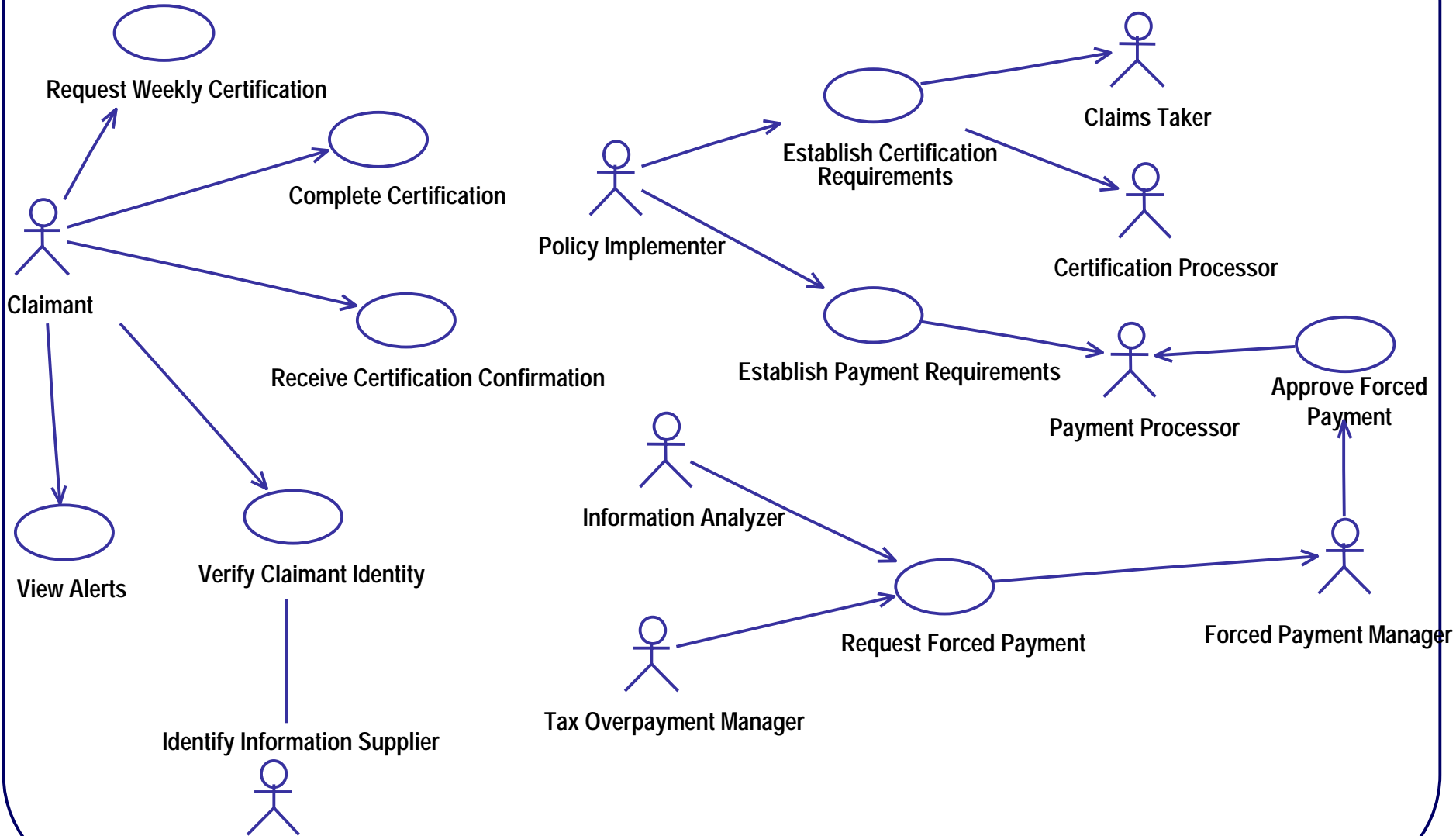
RFP Sample Business Service Diagram



RFP Sample Internal Business Workflow



RFP Sample System Use Cases



RFP Extending Native Traceability

Microsoft Access - [frmAssignInteractionDiagramSystemUseCase : Form]

File Edit View Insert Format Records Tools Window Help

Use Case Realization: Claim Weekly Benefits

Selected Diagram: 03Claim Weekly Benefits Business Use Case - Certification Basic Flow

Interaction Diagrams:

Name	Total	Assign	Left
01Claim Weekly Benefits Business Use Case - Verify ID Bas	13	13	0
02Claim Weekly Benefits Business Use Case - Determine Cl	6	6	0
03Claim Weekly Benefits Business Use Case - Certification	29	0	0
04Claim Weekly Benefits Business Use Case - Process Certi	15	0	0
05Claim Weekly benefits Business Use Case - Attempt Paym	32	0	0
06Claim Weekly Benefits Business Use Case - Attempt Paym	33	0	0
07Claim Weekly Benefits Business Use Case - Attempt Paym	24	0	0
08Claim Weekly Benefits Business Use Case - Attempt Paym	33	2	0
09Claim Weekly Benefits Business Use Case - Employer Cha	35	0	0
10Claim Weekly Benefits Business Use Case - Certification	25	0	0

Available Messages:

Seq	SendingObjectName	MessageName	ReceivingObjectName	Assign
1	: Claims Taker	present claimable week	: Claims Taker	Yes
2	: Claimant	receive claimable week acceptance	: Claims Taker	Yes
3	: Claims Taker	add	contact : Activity Log	Yes
4	: Claims Taker	determine questions	: Claims Taker	Yes
5	: Claims Taker	get certification questions	: Weekly Claim Processor	Yes
6	: Weekly Claim Processor	determine appropriate questions	: Weekly Claim Processor	Yes
7	: Weekly Claim Processor	get claim record	: Benefit Records Processor	Yes
8	: Weekly Claim Processor	review for questions	: Claim Record	Yes
9	: Weekly Claim Processor	get appropriate questions	certification questions : Elgib	Yes
10	: Claims Taker	present certification questions	: Claims Taker	Yes

Packages:

- Adjudication
- Application Record Business Entities
- Apply for Benefits System Use Cases
- Benefit Disbursement Record Business Entities
- Benefits Operations Bureau
- Central Operations
- Claim Inquiry Business Entities
- Claim Record Business Entities
- Claim Weekly Benefits System Use Cases**
- Claimant Business Entities
- Claimant Child Support Business Entities

System Use Cases:

- Accept Certification**
- Apply Charges
- Apply Disbursement
- Approve Forced Payment
- Calculate Disbursement
- Complete Certification
- Determine Payability
- Establish Certification Requirements
- Establish Payment Requirements
- Get Certification
- Identify Weekly Income Employer

Assign Messages

Unassign Messages

Show Use Cases?

- All Use Cases
- Owned by Package
- Appear on Diagram

Show Which Messages?

- All Realizations
- Use Case Realization
- Interaction Diagram

Assigned Messages:

Seq	UseCaseRealizationName	InteractionDiagramName	SendingObjectName	MessageName	ReceivingObjectName
19	Claim Weekly Benefits	03Claim Weekly Benefits Business Use Case - Cer	: Weekly Claim Processor	create weekly certification	: Weekly Claim Processor
20	Claim Weekly Benefits	03Claim Weekly Benefits Business Use Case - Cer	: Weekly Claim Processor	get	: Certification Answers
21	Claim Weekly Benefits	03Claim Weekly Benefits Business Use Case - Cer	: Weekly Claim Processor	create	: Weekly Certification
22	Claim Weekly Benefits	03Claim Weekly Benefits Business Use Case - Cer	: Weekly Claim Processor	create	: Benefit Certification/Disbursement Recor
23	Claim Weekly Benefits	03Claim Weekly Benefits Business Use Case - Cer	: Weekly Claim Processor	add weekly certification	: Benefit Certification/Disbursement Recor
24	Claim Weekly Benefits	03Claim Weekly Benefits Business Use Case - Cer	: Weekly Claim Processor	update week claimed	: Claim Record
25	Claim Weekly Benefits	03Claim Weekly Benefits Business Use Case - Cer	: Weekly Claim Processor	update as claimed	: Claimable Week
26	Claim Weekly Benefits	03Claim Weekly Benefits Business Use Case - Cer	: Weekly Claim Processor	send certification	: Weekly Claim Processor
9	Claim Weekly Benefits	10Claim Weekly Benefits Business Use Case - Cer	: Weekly Claim Processor	create weekly certification	: Weekly Claim Processor
10	Claim Weekly Benefits	10Claim Weekly Benefits Business Use Case - Cer	: Weekly Claim Processor	get	: Certification Answers

Form View