Iterative RFP
Process Management

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Adaptive Team Collaboration, Inc.
7402 Borman Avenue • St. Paul, MN 55076
651.554.1771 • www.atcprocess.com

Objectives

l Introduce an Adaptive Team Collaborative Process (ATCP)

l Review traditional request for proposal (RFP) process

l Government challenges with iterative development

l Introduce iterative RFP process management

l Review Architectural Tradeoff Analysis Method (ATAM)

l Describe case study at State of Wisconsin

- Iterative process

- Traceability strategy

- Automation within an MDA framework

Business Benefits

- Accelerated delivery through repeatable process
  - 6 months vs. 18 – 24 months
- New customer-centric viewpoint
  - Drive improved customer satisfaction
- In-house expertise
  - Reduce dependency on outside help
- Retain organization knowledge
  - Reduce risk related to less experienced workforce
- Impact analysis
  - Reduce risk of change
- Reference model
  - Used in implementation stage by selected vendor
  - Used by other states as basis for other RFPs

Adaptive Team Collaboration Process SM (ATCP™)

l **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

l **Customer-centric**

- Deliver continual visible value to customer
- Describe system capabilities with customer/user first, not system

l **Risk-driven**

- Something that might happen that may affect the project
- Minimize rework risk : business/requirements change and unknown technology
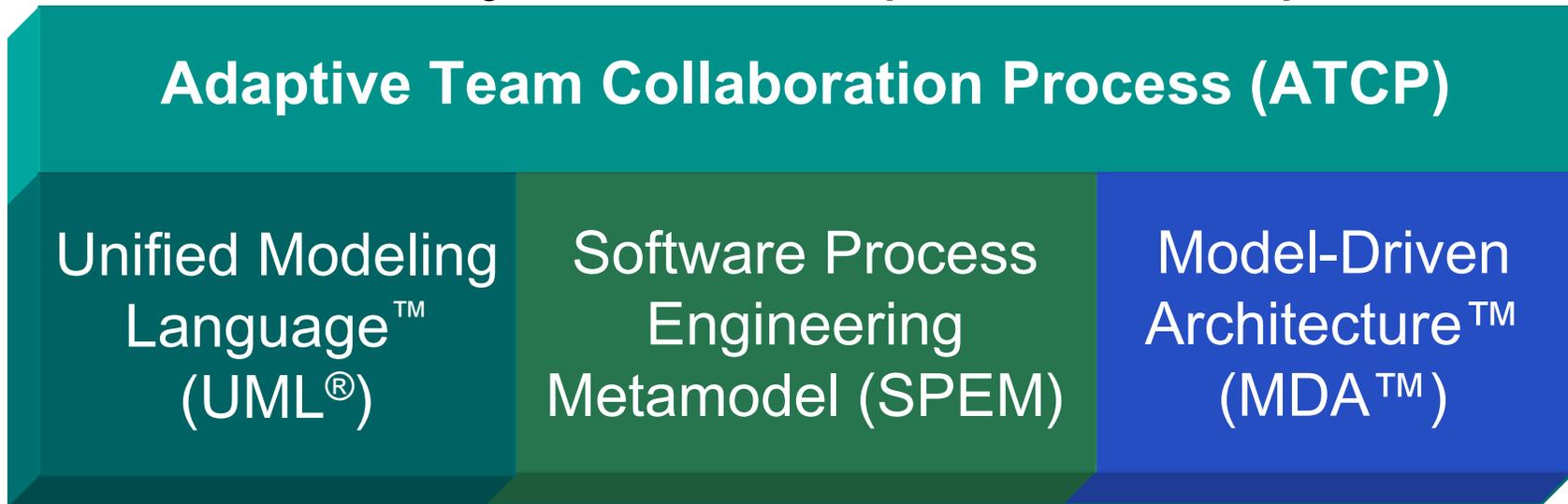- Identify and resolve potential risks

ATCP Predecessors

l Extreme Programming (XP)

l Adaptive Software Development (ASD)

l Usage-Centered Design (U-CD)

- U-CD adopted ATCP Actor/Role concepts – Oct 2002

- http://www.foruse.com/newsletter/foruse26.htm

l Object-Oriented Analysis and Design (OOAD)

l Unified Modeling Language (UML)

l Rational Unified Process (RUP)

l Capability Maturity Model Integration (CMMI)

ATCP Foundation

- Built on industry standards to provide stable platform

Adaptive Team Collaboration Process (ATCP)

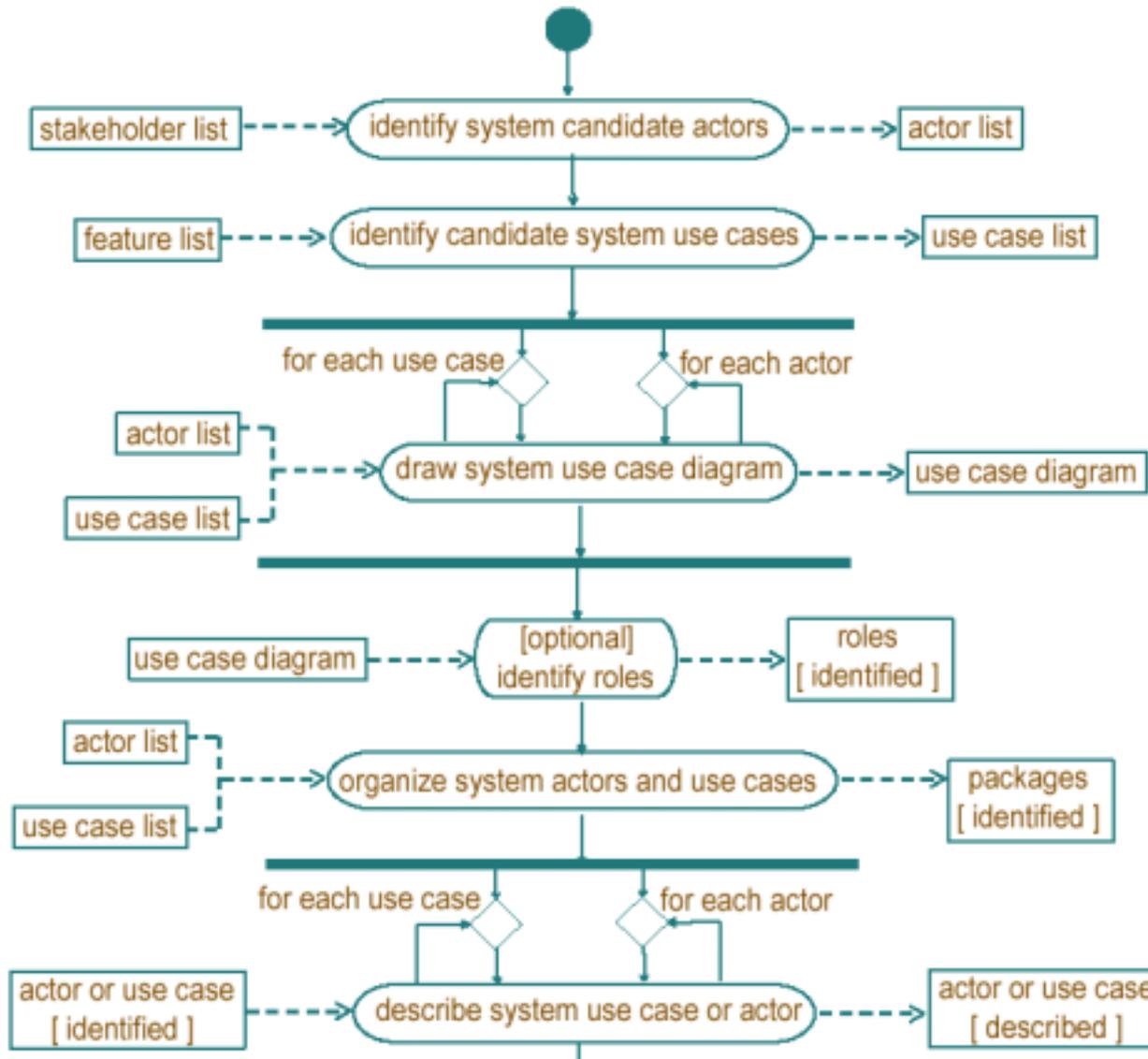| Unified Modeling Language™ (UML®)	Software Process Engineering Metamodel (SPEM)	Model-Driven Architecture™ (MDA™)

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

Model-Driven Architecture (MDA)

- Object Management Group (OMG) initiative
  - CORBA, UML, CWM, XMI
- 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

Sample ATCP Workflow

stakeholder list ---> identify system candidate actors ---> actor list

feature list ---> identify candidate system use cases ---> use case list

for each use case   for each actor

actor list
use case list ---> draw system use case diagram ---> use case diagram

use case diagram ---> [optional] identify roles ---> roles [identified]

actor list
use case list ---> organize system actors and use cases ---> packages [identified]

for each use case   for each actor

actor or use case [identified] ---> describe system use case or actor ---> actor or use case [described]

Traditional RFP Process

- Multi-year, phased approach; similar to waterfall
  - Business requirements phase
  - System requirements phases
  - Design phase
  - Implementation phase
- Control costs
- Open selection process
- No vendor favoritism

Challenges With Traditional RFP Approach

l Different awards for each phase (often to different vendors)

l Deliverables produced by one phase often disregarded by vendor in next phase

- Difficult to hold vendors accountable

- Degenerate into contract management issues

l Often result in massive change requests and overruns

- Agency often "held hostage" due to incomplete product

Iterative Development and Government Agencies

- Because of legislative statute, most agencies must follow established procurement process
  - Most agencies apply waterfall approach
  - Most activities are manual and not automated
  - Want to hold vendors accountable
- Just-in-time (JIT) iterative approach often inconsistent with "every 'i' dotted and 't' crossed" philosophy
  - Not planning each project detail out ahead
  - Don't collect every single requirements ahead of time
  - Don't wait until "the requirements are done"
- Reality requires a compromise

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; look for off-the-shelf solution

- See RFP and supporting materials at http://www.dwd.state.wi.us/asd/procurement
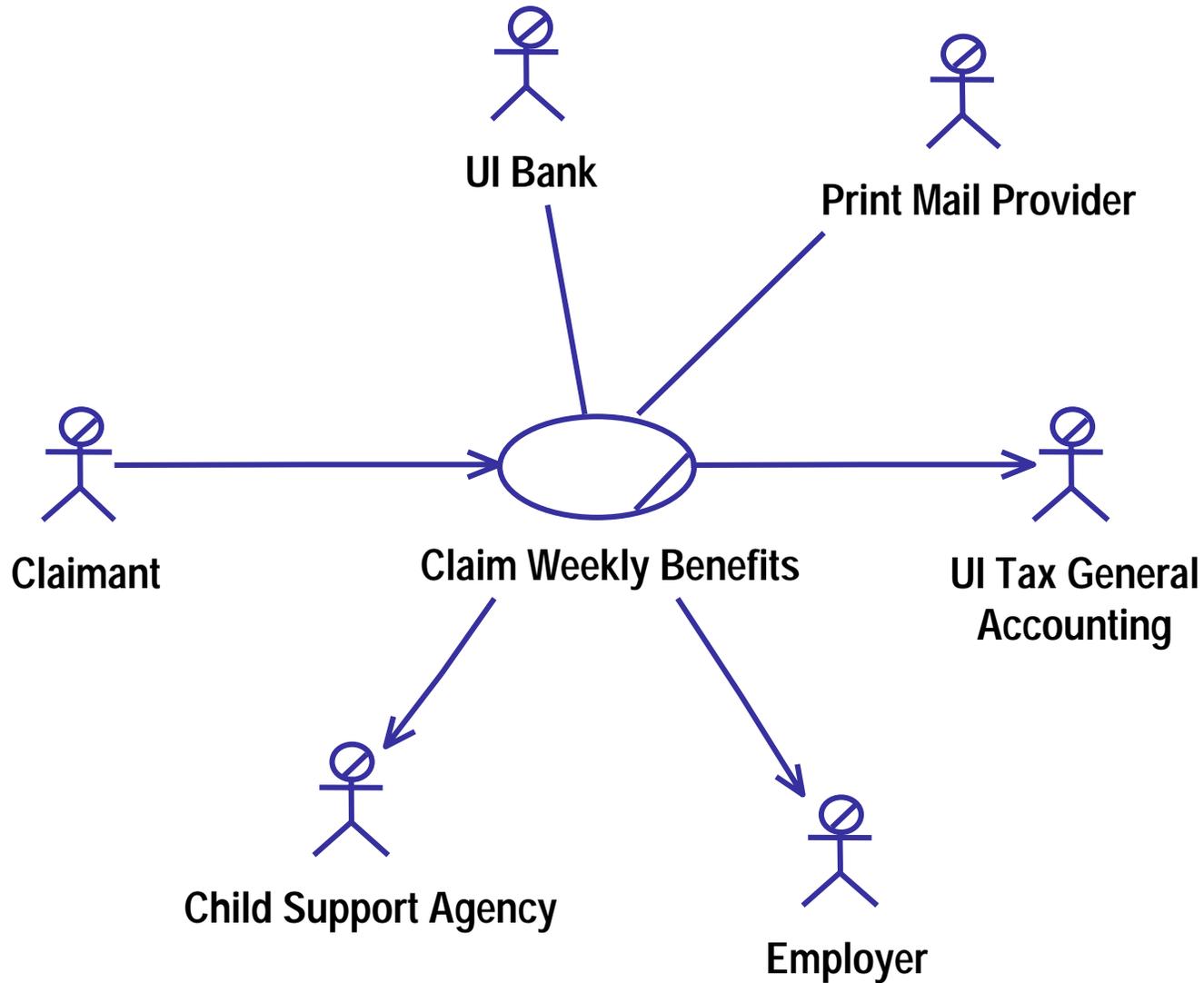
Project Inception: Four Iterations

l Started at end of June 2002

l Began with no process and no tool environment, staff with incredible domain experience but no UML or tool experience

l Identified three iterations to finish RFP

- Fourth iteration to review responses and award contract

l Issued RFP and all supporting materials November 6, 2002

- Contract awarded in early May 2003

l ATC provided coaching, training, tool configuration

l ATCP provided software development process framework

First Iteration: Establish Vision

- Generated extended business service survey
  - Also known as business use case model survey
  - Included coarse-grained business workflow diagrams (activity diagrams)
  - Included business use case outlines
  - Completely auto-generated with tool reporting capabilities
- Built transparent tool environment with real-time reporting
  - Team could use all their time to advance project
  - No team time required to produce reports
  - Focused on reviewing content

Sample Business Service Diagram

UI Bank

Print Mail Provider

Claimant

Claim Weekly Benefits

UI Tax General Accounting

Child Support Agency

Employer
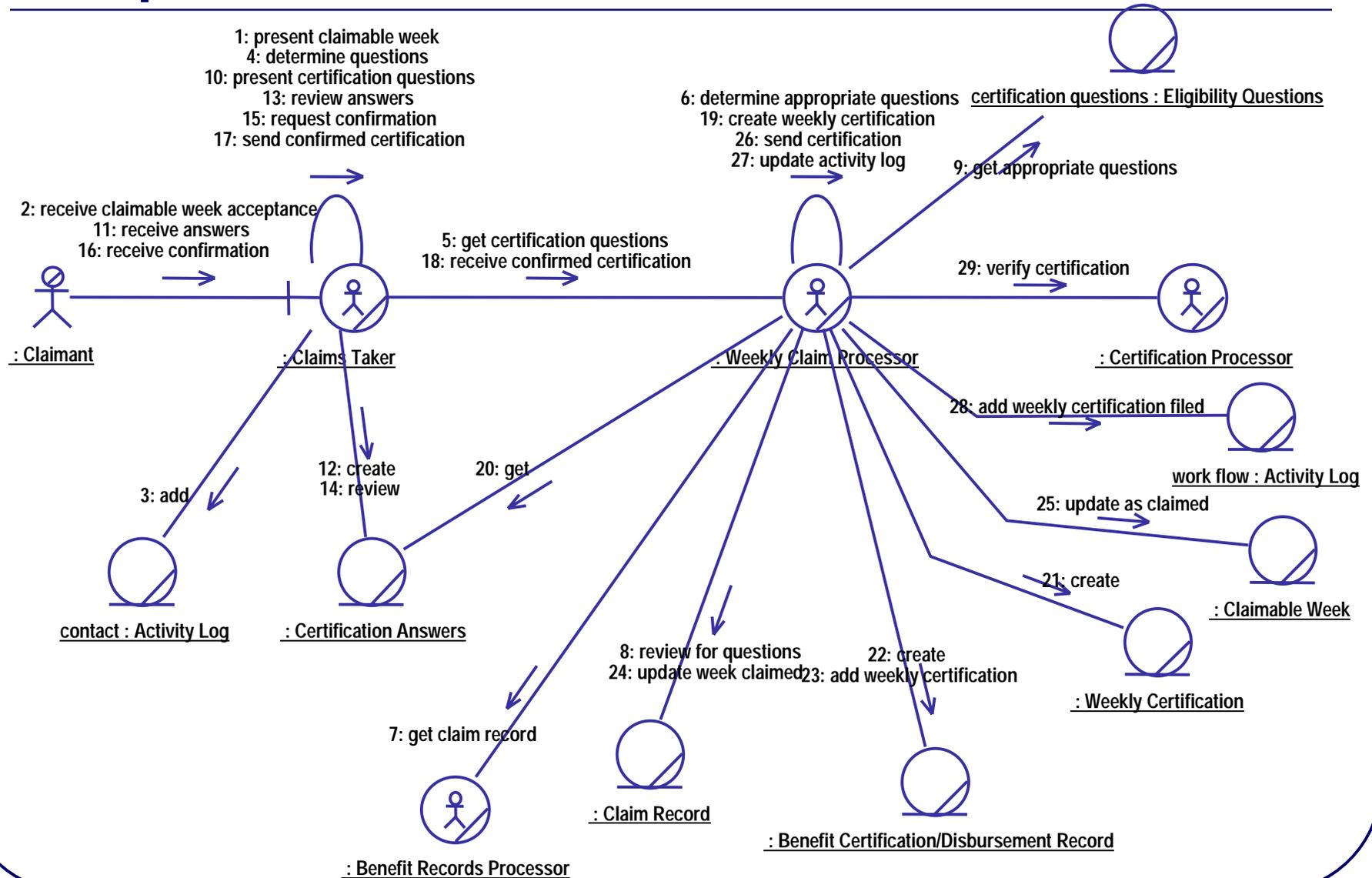
Second Iteration: Model Workflow

l Eight weeks long

l Launched with use case detailing and business workflow modeling with UML training

l Supported with facilitated workshops

l Captured detailed business use case specifications

l Applied ATCP universal design process pattern

l Banned the use of the word "Claim"

- Too general; too specific
- Meant too many things to too many people

Second Iteration: Model Workflow

- Modeled internal workflow of each business use case
  - Used collaboration diagrams for business use case event flows
  - Used class diagrams for business participant responsibilities
  - Applied UML collaborations
- Eight team members held over 50 meetings with 100 people to review detailed business use case specifications and internal workflow models
- Medium-grained traceability from each use case flow to each interaction diagram
- Generated business workflow realization surveys

Sample Internal Business Workflow

1: present claimable week
4: determine questions
10: present certification questions
13: review answers
15: request confirmation
17: send confirmed certification

6: determine appropriate questions
19: create weekly certification
26: send certification
27: update activity log

certification questions : Eligibility Questions

9: get appropriate questions

2: receive claimable week acceptance
11: receive answers
16: receive confirmation

5: get certification questions
18: receive confirmed certification

29: verify certification

: Claimant

: Claims Taker

: Weekly Claim Processor

: Certification Processor

28: add weekly certification filed

work flow : Activity Log

12: create
14: review

20: get

25: update as claimed

3: add

21: create

contact : Activity Log

: Certification Answers

: Claimable Week

8: review for questions
24: update week claimed

22: create
23: add weekly certification

: Weekly Certification

7: get claim record

: Claim Record

: Benefit Certification/Disbursement Record
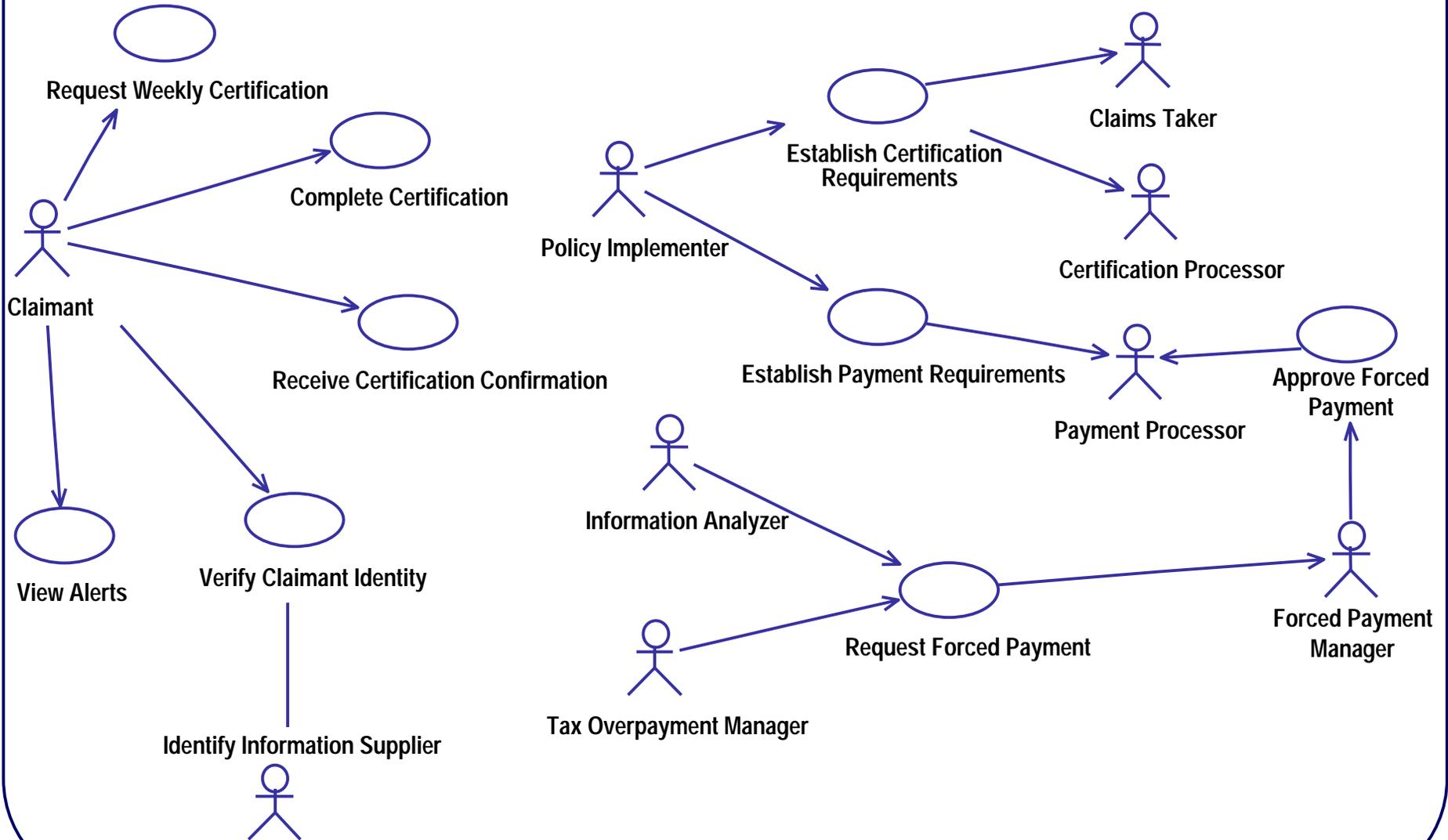
: Benefit Records Processor

Third Iteration: Generate RFP

- Eight weeks long
- Launched with workshop to identify 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 business and technical architectural requirements

Third Iteration: Generate RFP

- Needed to make RFP contents navigable and useful to vendors

- Established enterprise governance process

- Applied ATAM framework for RFP response evaluation

- Identified RFP questions and expected responses

- Took two hours to completely generate all RFP materials

Sample System Use Cases

Request Weekly Certification

Complete Certification

Claimant

Receive Certification Confirmation

View Alerts

Verify Claimant Identity

Identify Information Supplier

Policy Implementer

Establish Certification Requirements

Claims Taker

Certification Processor

Establish Payment Requirements

Payment Processor

Approve Forced Payment

Information Analyzer

Request Forced Payment

Forced Payment Manager

Tax Overpayment Manager

Architecture Tradeoff Analysis Method ^{SM} (ATAM)

l Applied Software Engineering Institute's (SEI) Architecture Tradeoff Analysis Method (ATAM) by Kazman, Klein, and Clements

- http://www.sei.cmu.edu/atam

l Technique for assessing value of architecture for off-the-shelf applications during government procurement processes

l Uses quality attributes with focused questions to translate technical architecture concerns into business concerns

l "The purpose of the ATAM is to assess the consequences of architectural decisions in light of quality attribute requirements"

Traceability Strategy
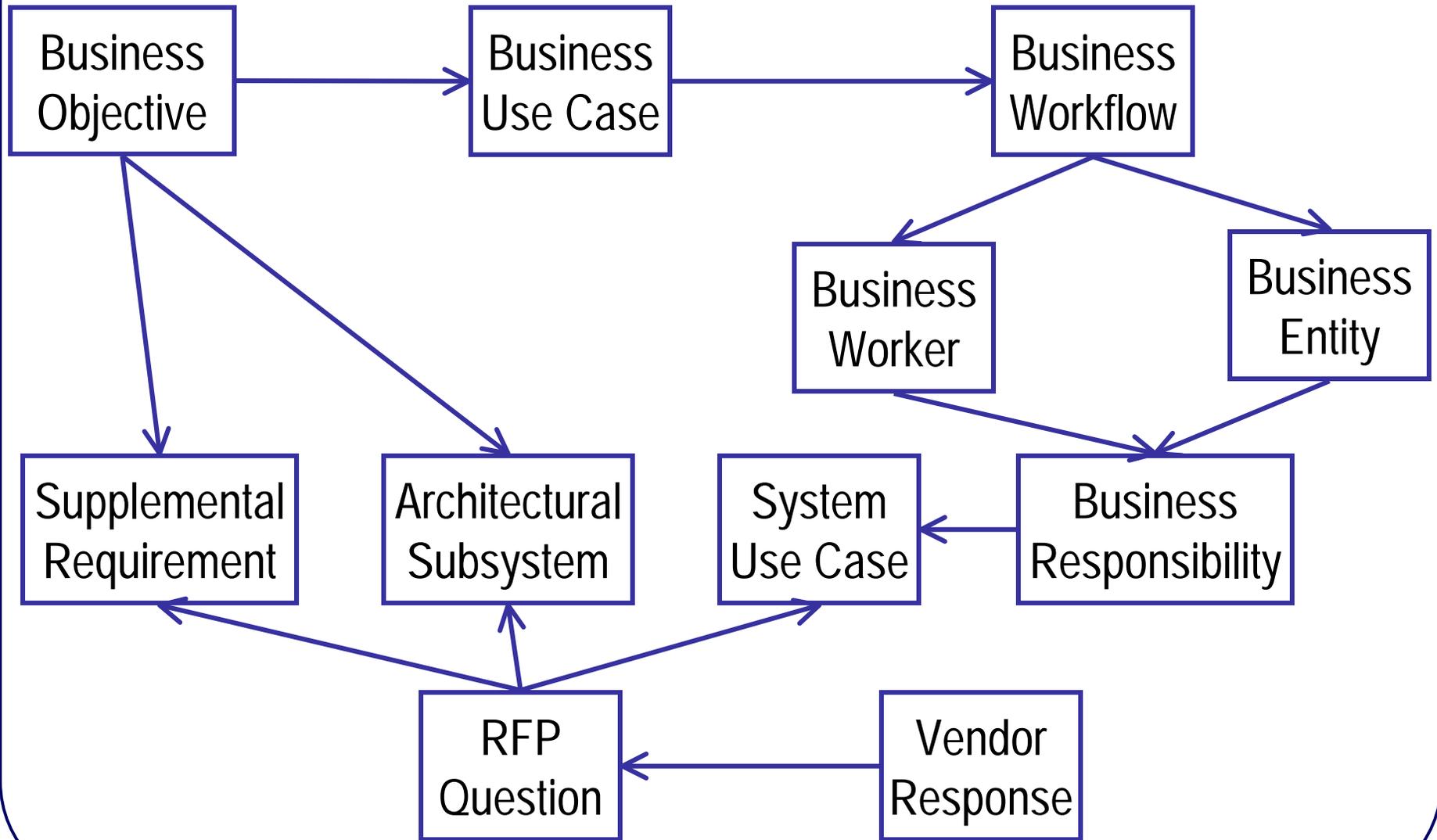
Model Elements Identified

- 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

RFP Extending Native Traceability

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 Basi	13	13	0
02Claim Weekly Benefits Business Use Case - Determine Cla	6	6	0
03Claim Weekly Benefits Business Use Case - Certification E	29	29	0
04Claim Weekly Benefits Business Use Case - Process Certil	15	15	0
05Claim Weekly benefits Business Use Case - Attempt Payn	32	32	0
06Claim Weekly Benefits Business Use Case - Attempt Payn	33	33	0
07Claim Weekly Benefits Business Use Case - Attempt Payn	24	24	0
08Claim Weekly Benefits Business Use Case - Attempt Payn	33	31	2
09Claim Weekly Benefits Business Use Case - Employer Cha	35	35	0
10Claim Weekly Benefits Business Use Case - Certification -	25	25	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 : Eligib	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

Show Use Cases?
- ○ All Use Cases
- ● Owned by Package
- ○ Appear on Diagram

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 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

Fourth Iteration: Scoring Responses & Issue Award

- Six months long
  - Two months to wait for vendor responses
- Built framework for capturing vendor responses
- Executed and evaluated multiple scoring algorithms
- Selected two finalists
- Performed two one-week long vendor demonstrations
- Evaluated vendor demo performance
- Issued award
- Finalized contract details

Moving Forward

- Establish iterative project office inside automated development environment begins July '03

- Base system installation begins Sept '03

- Gap analysis begins 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

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
- Will be detailing PIM and generating multiple PSMs
- 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!