

# ***Enterprise Architecture and Social Services: An Architect's Viewpoint***

Enterprise Architecture  
Practitioners Conference 2006

London, United Kingdom

Armstrong Process Group, Inc.  
[www.aprocessgroup.com](http://www.aprocessgroup.com)

# Objectives

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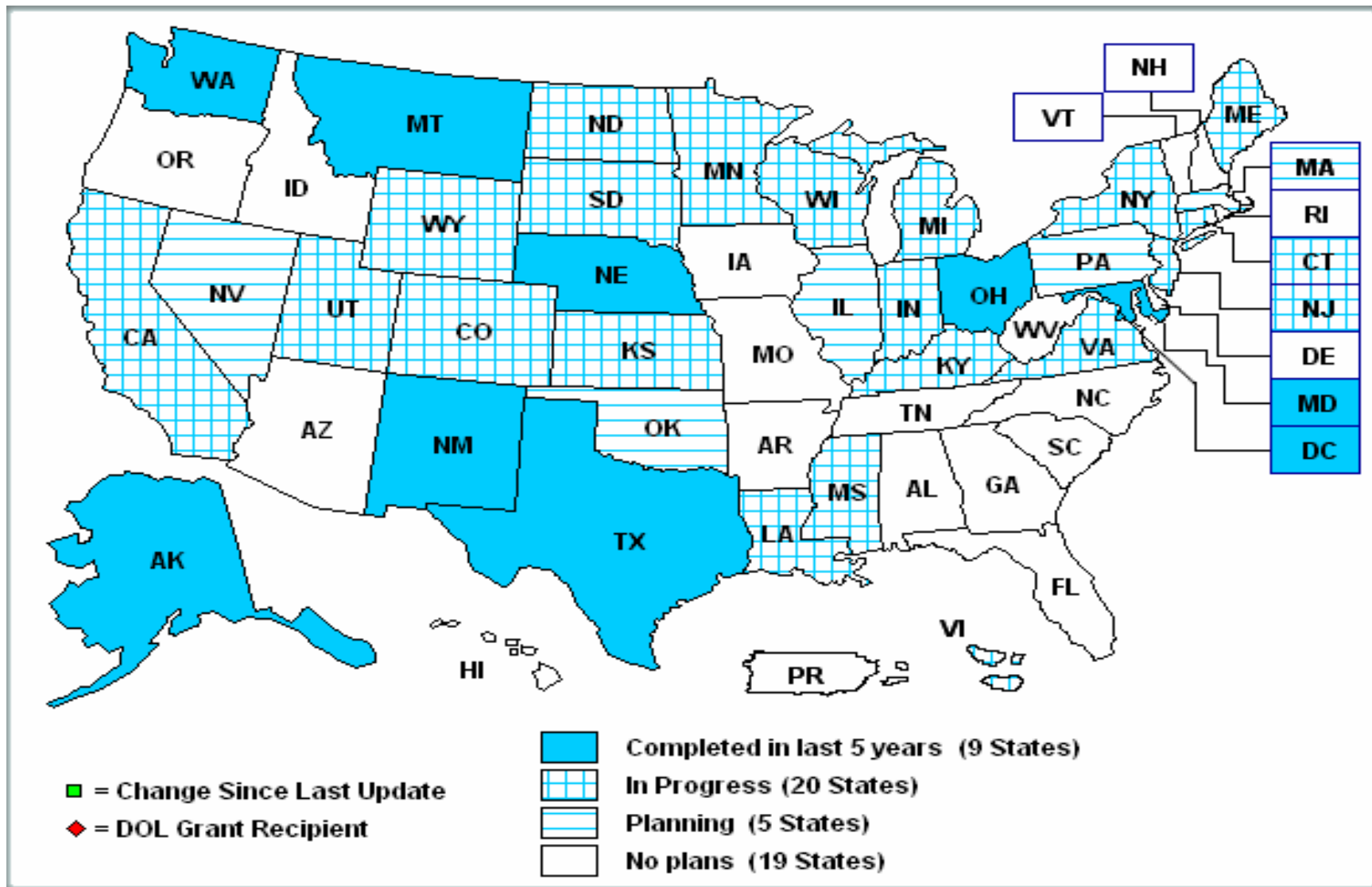
- Overview of social service agencies
  - Current and future state
- Model Driven Architecture and traceability
- Case study discussion based on ADM phases

# Social Service Agencies

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- Federal- and state-level agencies
- Variety of social services
  - Unemployment insurance and employment services
  - Medical and mental health benefits
  - Worker's compensation
  - Child support and welfare
  - Subsidized food programs
- Often services distributed among multiple agencies
- Provide both day-to-day support as well as meeting life-critical needs

# Status of Unemployment Insurance Systems

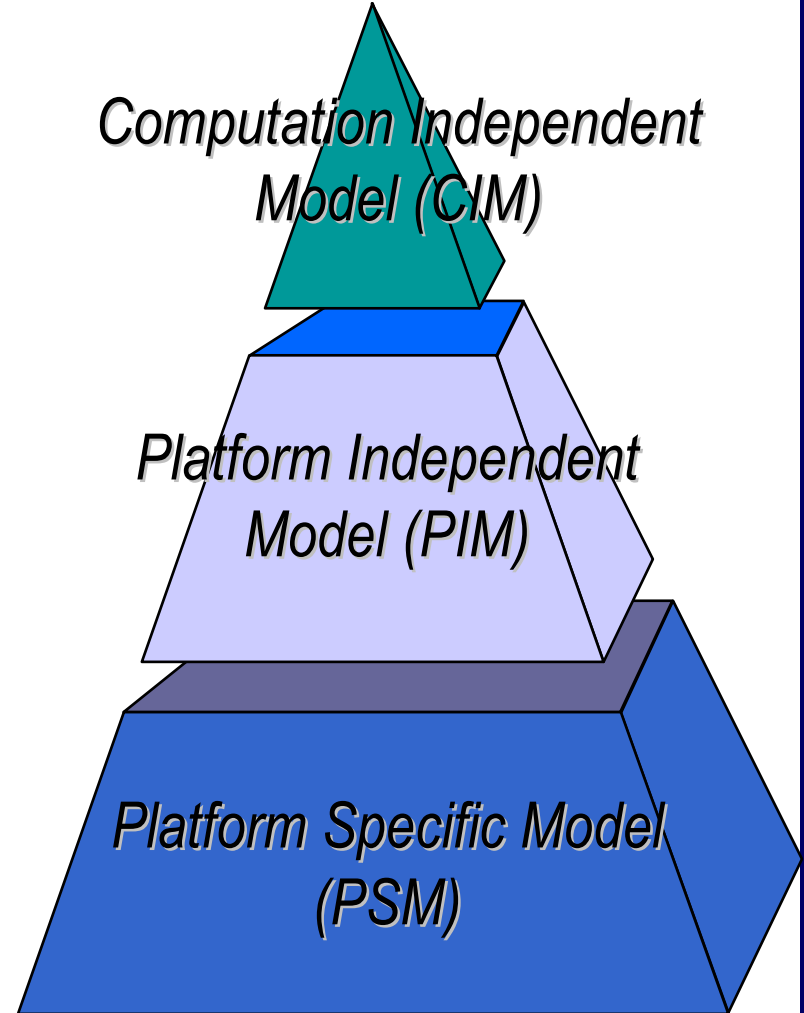
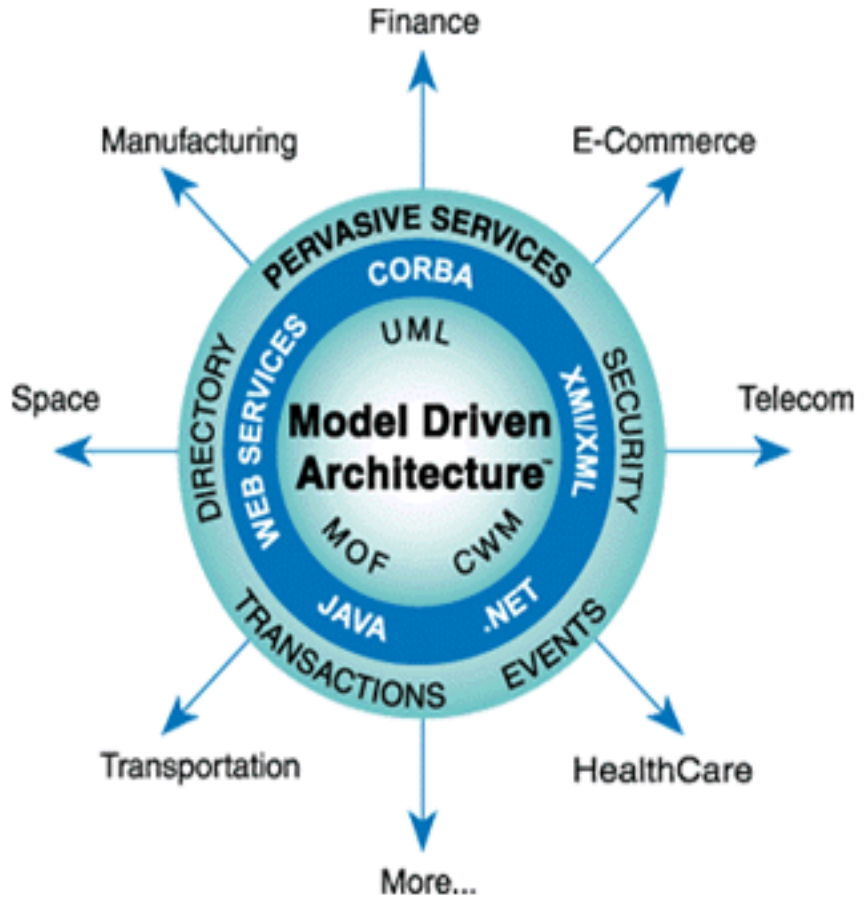


# Preliminary Phase: Framework and Principles

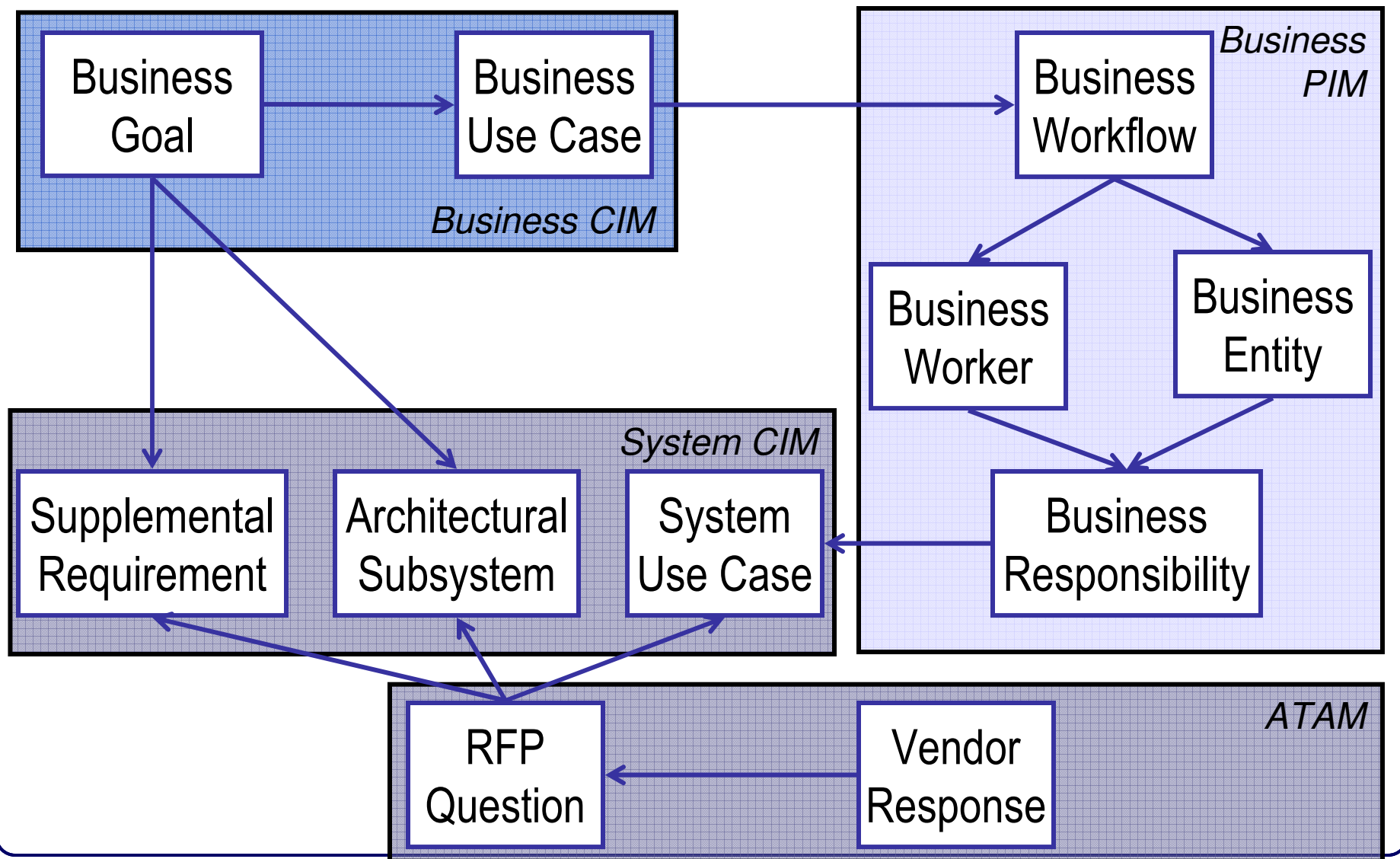
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- Agencies driven by federal legislation and funding
  - For example, the Reed Act in 2002 provided \$8 billion to states to improve unemployment insurance (UI) and employment services (ES)
- Many agencies are taking a modified approach using the Rational Unified Process (RUP)
  - Iterative
  - Use-case driven
  - Architecture-centric
- Very model-driven approaches (MDA-like)
  - Most UML-based
  - Added additional OMG specifications to handle business architecture
- Usually involves implementing tools
  - One or many modeling tools
  - Requirements management / traceability
  - Reporting

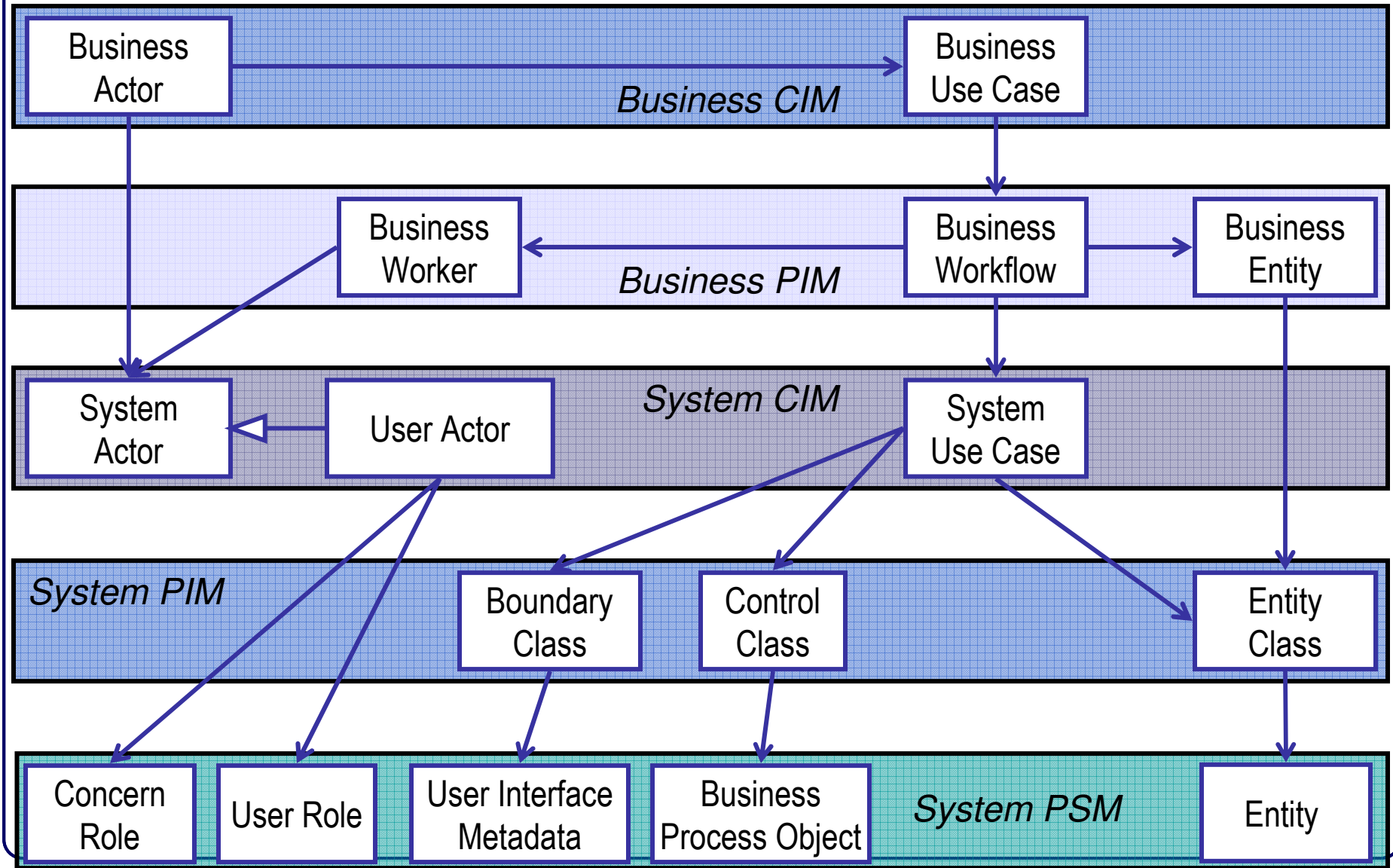
# Model Driven Architecture® (MDA®)



# MDA Enterprise Traceability Strategy



# MDA Development Traceability Strategy





## Phase A: Architecture Vision

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- Usually involves creating a Program Office that reports to the agency CIO
- Most agencies are doing a complete modernization of their legacy systems
  - And almost all of their existing systems are legacy systems
  - Most agencies see this as a 5-7 year effort
- Many agencies look to federally-funded consortia and national professional associations for guidance and reference models
  - Such as the National Association of State Workforce Agencies (NASWA) and the Unemployment Insurance Information Technology Service Center (ITSC)

## Current State

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- Aging social services work force
- Shrinking geographical presence
  - Expensive to maintain branch offices
- Increasing interest in customer self-service (via IVR and web)
- Increasing need for architecture compliance
  - Federal Enterprise Architecture (FEA)
  - Dept of Health & Human Services (HHS)
  - Dept of Labor (DOL)
- Need to protect individuals' data
- Aging legacy IT systems

## Future State

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- Many moving to package implementations
  - Tried “transfer systems” where one state “donates” the models and code for the system they built – did not work very well
- Increase seamless application integration between different agencies within the state government
- Formally capture organization knowledge
- Increase use of technology to “virtualize” customer service
  - Consolidated call centers
  - Interactive voice response (IVR)
  - Web-based

## Sample Business Drivers

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- Rapidly changing social services legislation and regulation
  - From both federal- and state-levels
- Greater efficiencies through more effective business integration between agencies
- Reduce licensing and maintenance costs due to legacy platforms
- Reduce time to implement changes

# Sample Business Goals

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- Creation of a business model that is customer-centric
- Make use of customer focused case management system
- Easy access to facilitate ability to answer inquiries by staff or automated systems
- Staff able to view issues from beginning to resolution
- Improved workflow
- Greater programming flexibility
- More support tools & resources available
- Efficient processing using advanced technologies
- System that is easily expandable

## Phase B: Business Architecture

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- Many agencies are using a use case based, UML approach
  - Many did this only at the system level
  - Some did a separate business use case model (such as State of Wisconsin, an APG client – became a national reference model)
- Many focused on detailed baseline business architectures
  - Challenge is to not exhaust resources describing the current state
  - With limited resources and time, does an agency want to spend its time describing how things have been done or focus more on how they will be done?

## Model Elements Identified

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- 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
- 2,000 pages of RFP content

# Business Service Gap Analysis

Microsoft Excel - BUC Attribute Matrix (summary).xls

Type a question for help

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B29 fx Request Statistics And Reports

	A	B	C	D	E	F	G	H	I
1	ID	Business Service Name	Functional Area	Rank	Definition Difficulty	Required Completeness	External Collaboration	Current Automation	Future Automation
2	BUC1	Apply for Benefits	Claims	13	Low	8 - Design Subsystem	Low	Partially (50%)	Mostly (75%)
3	BUC2	Claim Weekly Benefits	Claims	12	Low	8 - Design Subsystem	Low	Mostly (75%)	Completely (100%)
4	BUC3	Participate In Hearing	Appeals	7	Low	8 - Design Subsystem	Medium	Not At All (0%)	Barely (25%)
5	BUC4	Provide Check Information	Updates	16	Low	6 - Model Workflow	Low	Completely (100%)	Completely (100%)
6	BUC5	Provide Child Support Intercepts	Updates	17	Low	6 - Model Workflow	Low	Completely (100%)	Completely (100%)
7	BUC6	Provide Duplicate Claim Information	Updates	19	Low	6 - Model Workflow	Low	Mostly (75%)	Mostly (75%)
8	BUC7	Provide Claim Information	Adjudication	1	Medium	8 - Design Subsystem	Medium	Barely (25%)	Mostly (75%)
9	BUC8	Provide Claimant Employment Information	Adjudication	2	Medium	8 - Design Subsystem	Medium	Barely (25%)	Mostly (75%)
10	BUC9	Manage Claimant Personal Profile	Updates	14	Medium	8 - Design Subsystem	Medium	Barely (25%)	Mostly (75%)
11	BUC10	Manage Employer Benefit Profile	Updates	15	Medium	8 - Design Subsystem	Medium	Barely (25%)	Mostly (75%)
12	BUC11	Provide Information			Medium	1 - Identified			
13	BUC12	Provide Notice of Mass Layoff	Updates	18	Low	7 - Identify Subsystem	Low	Barely (25%)	Mostly (75%)
14	BUC13	Question Eligibility	Adjudication	4	Medium	6 - Model Workflow	Medium	Not At All (0%)	Partially (50%)
15	BUC14	Request Claimant Information	Inquiries	8	Medium	8 - Design Subsystem	High	Barely (25%)	Mostly (75%)
16	BUC15	Request Employer Claim Information	Inquiries	9	Medium	8 - Design Subsystem	High	Not At All (0%)	Mostly (75%)
17	BUC16	Request Hearing	Appeals	5	Medium	8 - Design Subsystem	Medium	Not At All (0%)	Partially (50%)
18	BUC17	Request Information			Medium	1 - Identified			
19	BUC18	Request Presentation	Inquiries	20	Medium	5 - Identify Workers/Entities	Medium	Not At All (0%)	Barely (25%)
20	BUC19	Request Confidential Claim Information	Inquiries	11	Medium	6 - Model Workflow	Low	Barely (25%)	Barely (25%)
21	BUC20	Request Review			Medium	1 - Identified			
22	BUC21	Request Review of Hearing Record	Appeals	6	Medium	8 - Design Subsystem	Medium	Not At All (0%)	Partially (50%)
23	BUC23	Request UI Program Information	Inquiries	10	Low	8 - Design Subsystem	Low	Barely (25%)	Partially (50%)
24	BUC24	Request Review of Notices	Adjudication	3	Medium	8 - Design Subsystem	Medium	Not At All (0%)	Partially (50%)
25	BUC29	Implement UI Policy and Procedures			Medium	8 - Design Subsystem			
26	BUC32	Implement System Requirements for UI Policies and Procedures Business			Medium	8 - Design Subsystem			
27	BUC38	Request Monetary Computation			Medium	8 - Design Subsystem			
28	BUC44	Request Audit And Quality Control Review			Medium	8 - Design Subsystem			

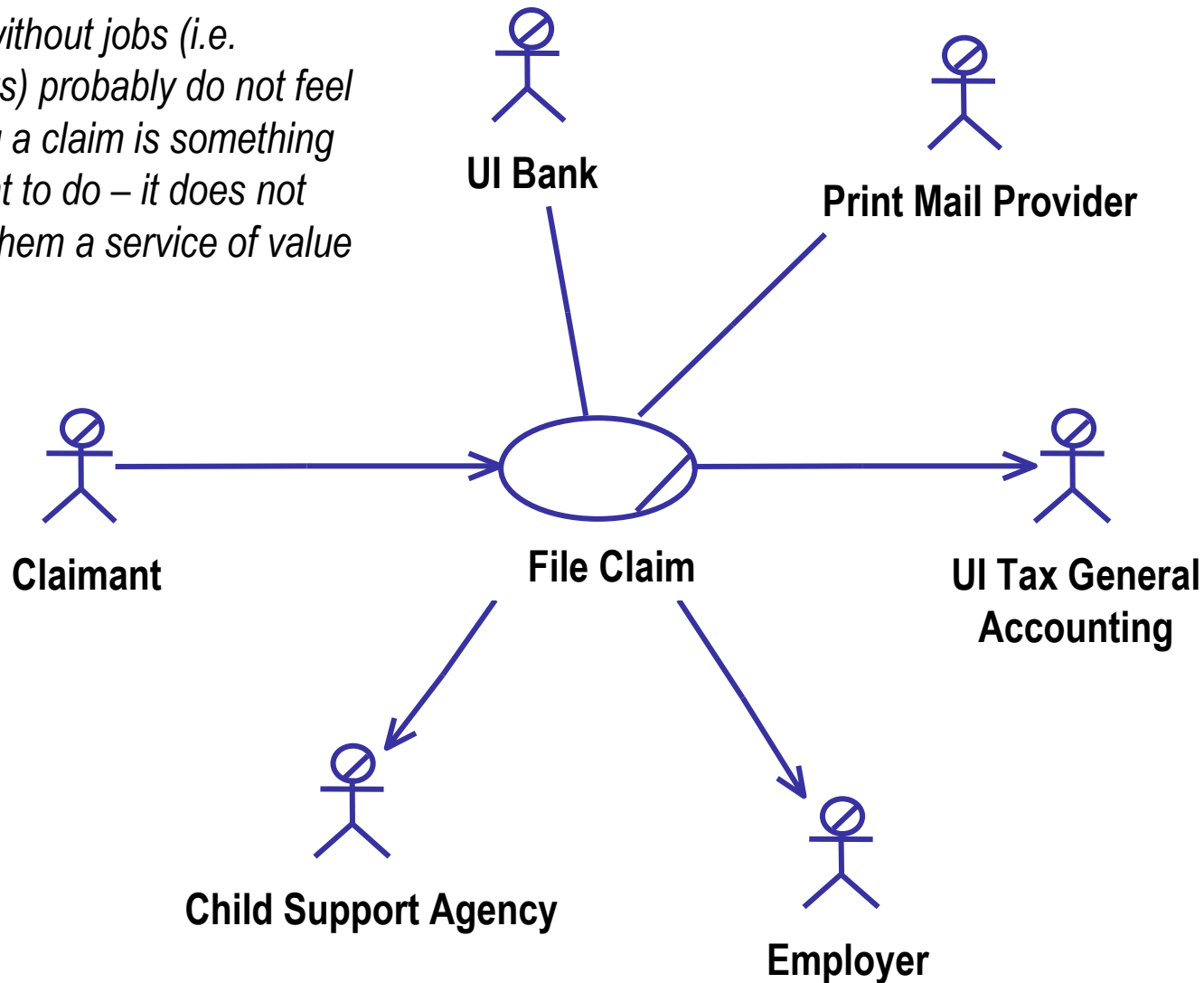
BUC Attribute Matrix (summary)

Ready



# Sample Business Service Diagram

*People without jobs (i.e. Claimants) probably do not feel that filing a claim is something they want to do – it does not provide them a service of value*



# Sample Business Use Case Specification

## 3.1. Description

This use case allows the Claimant to file a weekly certification by answering a series of eligibility questions. UI reviews the answers to determine if payment can be made. UI either pays Claimant or notifies Claimant of the reason for non-payment. UI notifies Employers and General Accounting. [BUC2.1]

## 3.2. Basic Flow

### 2.1. Claimant requests to file a claim [BUC2.2]

This use case begins when the Claimant requests to file a weekly certification. [BUC2.2.1]

### 2.2. UI verifies Claimant identity [BUC2.3]

UI verifies the Claimant's identity by comparing information provided by the Claimant to UI information. [BUC2.3.1]

### 2.3. UI presents the week to be claimed [BUC2.4]

UI reviews claim record to determine the weeks for which the Claimant can complete a certification. UI specifies the dates of the claimable week. UI determines relevant questions for each week and offers the week to the Claimant. [BUC2.4.1]

### 2.4. Claimant answers eligibility questions [BUC2.5]

The claimant indicates they want to file a certification for a claimable week. The Claimant responds to a series of questions used to determine if benefits can be paid for the week. UI notifies the Claimant when the claim is complete and accepted. [BUC2.5.1]

### 2.5. UI updates claim record [BUC2.28]

UI records receipt of weekly certification. [BUC2.28.1]

### 2.6. UI attempts payment [BUC2.6]

UI reviews the Claimant's answers on the weekly certification along with the Claimant's existing claim record and determines the Claimant is eligible for payment. UI determines amount of benefits payable. UI determines the amount of any forfeitures, overpayments, child support intercepts or tax withholding to be applied against the payment. UI notifies the UI Bank to issue a benefit payment including any informational messages to the Claimant. UI annotates the payment on the claim record. [BUC2.6.1]

### 2.7. UI sends information to General Accounting [BUC2.10]

UI notifies General Accounting of Claimant payments, Employer charges, and reconciliations. [BUC2.10.1]

### 2.8. UI sends information to Employer [BUC2.8]

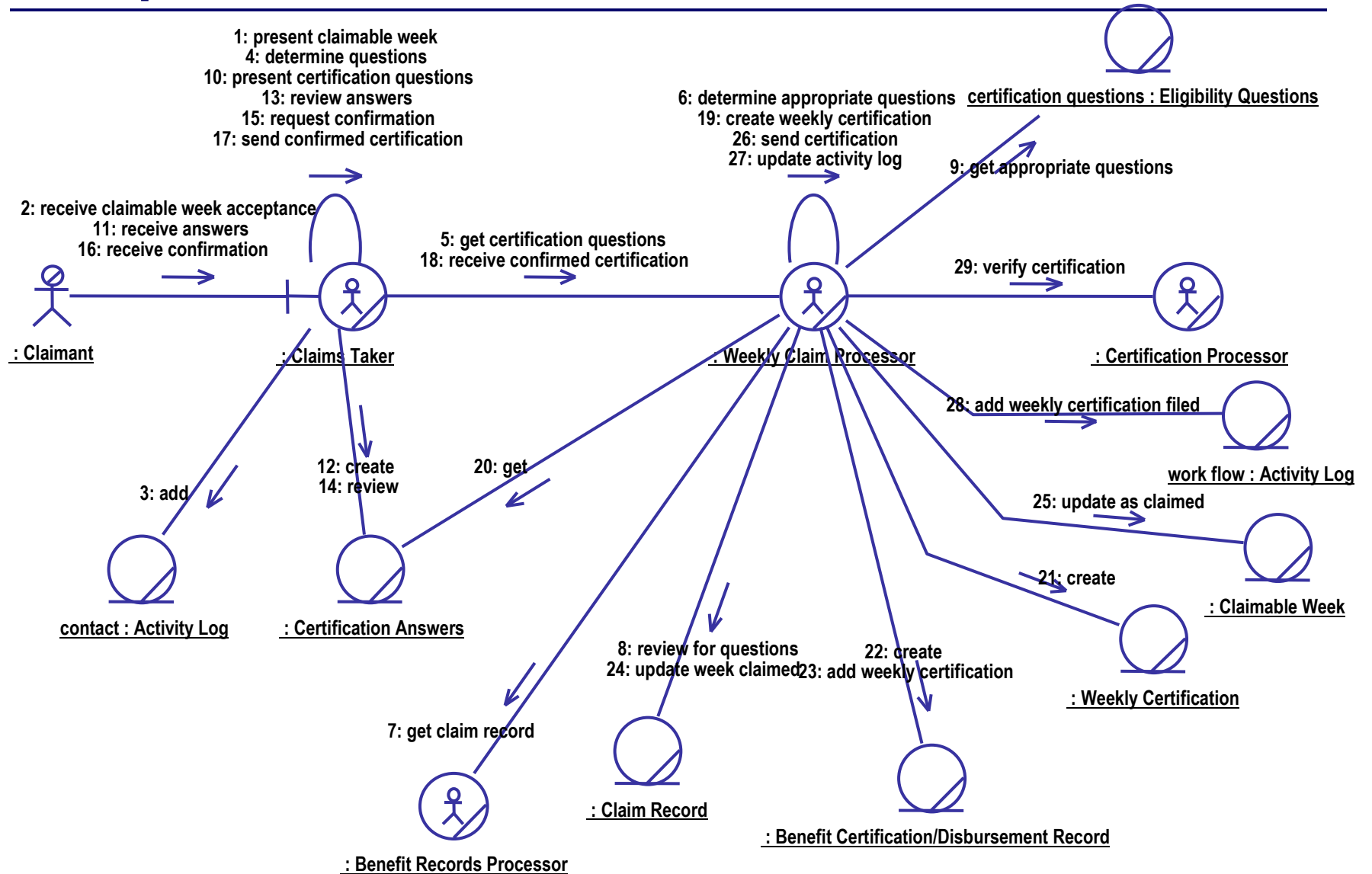
UI notifies all liable Employers of payments charged to their UI account. The use case ends. [BUC2.8.1]

## 3.3. Alternate Flows

### 3.1. Claimant has filed a certification for the last week of the benefit year. [BUC2.49]

In Step 2.6, if UI determines the Claimant has filed a certification in the last week of their benefit year, a transitional benefit year is automatically established for

# Sample Internal Business Workflow



## Phase C-1: Data Architecture

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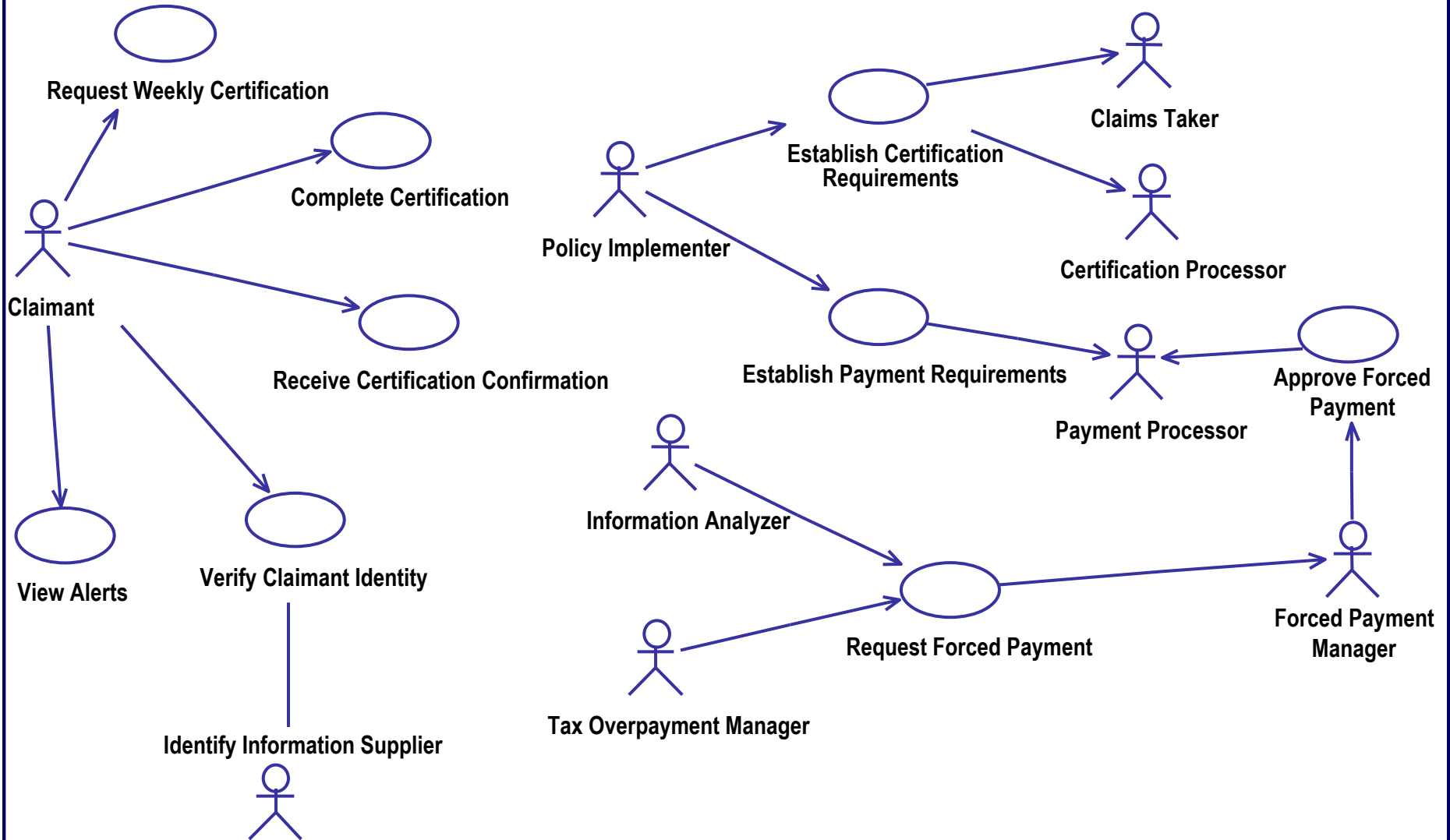
- Most critical data architecture principles
  - Data is shared
  - Data is accessible
  - Use common vocabulary
  - Data is secure
- Reverse-engineer existing data structures
- Look for redundancies and de-normalization across agencies
- Understand external data sharing requirements
- Many used reference models for target architecture

## Phase C-2: Applications Architecture

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- Derived application services from internal business workflow model
- Look at external and internal services provided by business workers
- Determine which ones should be automated
- Describe application capability using system use cases

# Sample System Use Cases



# Business-to-Application Architecture Traceability

Microsoft Access - [frmAssignInteractionDiagramSystemUseCase : Form]

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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 Cl	6	6	0
03Claim Weekly Benefits Business Use Case - Certification E	29	0	0
04Claim Weekly Benefits Business Use Case - Process Certi	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	0	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

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

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



# Application Service Gap Analysis

Microsoft Excel - SUC Attribute Matrix.CSV

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A1 ID

A	B	C	D	E	F	G	H
ID	Use Case Name	Priority	Understanding	Current Automation	Innovation Return	Critical	Order
2 SUC1	Accept Benefit Application	Medium	Very Good	Completely (100%)	Moderate	Yes	
3 SUC2	Complete Benefit Application	Medium	Very Good	Mostly (75%)	Significant	Yes	
4 SUC3	Create Eligibility Issue	High	Reasonable	Mostly (75%)	Significant	Yes	High
5 SUC4	Create Weekly Certification Initiated Application	Medium	Reasonable	Completely (100%)	Significant	No	
6 SUC5	Determine Monetary Eligibility	High	Not Very Good	Mostly (75%)	Significant	Yes	
7 SUC6	Forward Interstate Benefit Application	Medium	Very Good	Mostly (75%)	Moderate	Yes	
8 SUC7	Get Benefit Application	High	Very Good	Completely (100%)	Significant	Yes	High
9 SUC8	Identify New Employer	High	Not Very Good	Partially (50%)	Significant	Yes	High
10 SUC9	Manage Activity Log	High	Not Very Good	None (0%)	Significant	No	High
11 SUC10	Receive Application Confirmation	Medium	Very Good	Mostly (75%)	Moderate	Yes	
12 SUC11	Receive Benefit Rights and Responsibilities	Medium	Very Good	Mostly (75%)	Significant	Yes	
13 SUC12	Request Federal Employment Information	Medium	Very Good	Mostly (75%)	Moderate	Yes	
14 SUC13	Request Military Employment Information	Medium	Very Good	Completely (100%)	Moderate		
15 SUC14	Request Missing Wages	Medium	Very Good	Mostly (75%)	Significant	Yes	
16 SUC15	Request Other State Employment Information	Medium	Reasonable	Mostly (75%)	Moderate	Yes	
17 SUC16	Request Separation Verification	High	Very Good	Partially (50%)	Significant	Yes	High
18 SUC17	Request Worker's Compensation Information	Low	Reasonable	Partially (50%)	Moderate	Yes	
19 SUC18	Verify Alien Employment Authorization	Medium	Reasonable	Partially (50%)	Moderate	Yes	
20 SUC19	Verify Benefit Application	High	Very Good	Mostly (75%)	Significant	Yes	
21 SUC20	Verify Claimant Identity	High	Reasonable	Partially (50%)	Significant	Yes	High
22 SUC21	Adjust Wage Record	High	Reasonable	Barely (25%)	Significant	Yes	High
23 SUC22	Check Monetary Followup	High	Not Very Good	Mostly (75%)	Significant	Yes	
24 SUC23	Determine Claimant Entitlement	High	Reasonable	Mostly (75%)	Significant	Yes	High
25 SUC24	Determine Employer Liability	High	Reasonable	Mostly (75%)	Significant	Yes	High
26 SUC25	Establish Monetary Requirements	High	Not Very Good	Partially (50%)	Significant	Yes	
27 SUC26	Get Benefit Year and Base Period	Medium	Reasonable	Completely (100%)	Moderate	Yes	
28 SUC27	Get Employment Information	Medium	Reasonable	Mostly (75%)	Moderate	Yes	
29 SUC28	Manage Benefit Rate Escalation	Medium	Reasonable	Completely (100%)	Moderate	Yes	
30 SUC29	Match Wage Record and Application Employers	Medium	Reasonable	Mostly (75%)	Moderate	Yes	
31 SUC30	Provide Employer Subjectivity Update Notification	Low	Reasonable	Barely (25%)	Moderate	No	
32 SUC31	Provide Quarterly Wage Update Notification	Low	Reasonable	None (0%)	Slight	No	

SUC Attribute Matrix

Ready



## Phase D: Technology Architecture

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- Most critical technology architecture principles
  - Reduce reliance on batch processing
  - Reduce technical complexity of environment
  - Quick implementation of changes
  - Better disaster recovery
- Sample reusable architectural building blocks
  - Correspondence and document management
  - Customer relationship management (CRM)
  - Scheduling, workflow, and task management
  - Business rules enging

# Sample Technology Architecture Goals

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## Reduction in batch processing

- Improved timeliness, quicker completion of work
- Greater ability to provide information to customers without waiting for batch, thereby reducing subsequent inquiries
- Consistency of processing – reduction in duplication of processes
- Reduction in conflicts that occur between online and batch processing
- Reduction in overall technical complexity of system
- Reduction in total cost of system support and maintenance

# Sample Technology Architecture Goals

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## Reduce technical complexity

- Use of one relational database
- Fewer development languages
- Code running on fewer platforms, consolidation of processes
- Unified and consistent approach to interaction with other systems/technologies
- Quicker implementation of changes:
- Outcome of proposed changes more readily apparent (traceability between system components)
- More targeted testing
- End user customization (business rules engine, expert systems)
- More accurate estimates/better planning

## Phases E & F: Opps and Solutions & Migration Planning

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- Biggest decision facing these large modernization projects is whether to
  - Implement entire system at once – or –
  - Implement chunks of the system in a phased approach
- Need to apply trade-off analysis to determine
  - Opportunities gained by earlier deployment – versus –
  - Risks and costs for creating and maintaining “bridges” to legacy platform
- Some opted for a phased approach with a new release of capability each year
  - At the end, the legacy platform can be retired

## Phase G: Implementation Governance

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- Often, the first release is the “easiest” with respect to governance
- This is when the new architecture is first implemented – not very much to govern, yet
- However, need to ensure that temporary bridges do not disrupt existing legacy applications
- Often establishing architecture governance is a very new thing to these agencies
  - Represents significant organizational change from past behavior

## Phase H: Architecture Change Management

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- In subsequent releases, things get more interesting as the real capabilities of the target architecture are better understood
  - Target architecture may need to be changed
  - New requirements and technology may need to be accommodated
- Tendency to move towards enterprise applications may put agencies in the same place they started with unwieldy legacy applications
  - Will agencies be faced with today's problems again in 10 years?

# Business Benefits of a Model-Driven Approach

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- 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

# Q&A

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Thanks for your attention and participation!