Enterprise Architecture and Social Services: An Architect's Viewpoint

Enterprise Architecture Practitioners Conference 2006

London, United Kingdom

Armstrong Process Group, Inc.
www.aprocessgroup.com
Objectives

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

- 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

- Completed in last 5 years (9 States)
- In Progress (20 States)
- Planning (5 States)
- No plans (19 States)

- Green square = Change Since Last Update
- Red square = DOL Grant Recipient

States colored blue represent the status of unemployment insurance systems.
Preliminary Phase: Framework and Principles

- 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®)

- Computation Independent Model (CIM)
- Platform Independent Model (PIM)
- Platform Specific Model (PSM)

MDA®

- Finance
- Manufacturing
- E-Commerce
- Telecom
- Space
- Transportation
- HealthCare

Pervasive Services
- CORBA
- UML
- MOF
- CWM
- JAVA
- .NET
- XML
- XMI
- Transactions
- Events

More...

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MDA Enterprise Traceability Strategy

Business Goal -> Business Use Case

Business Workflow

Business Worker
Business Entity
Business Responsibility

Supplemental Requirement
Architectural Subsystem
System Use Case

RFP Question
Vendor Response

ATAM
Phase A: Architecture Vision

• 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

- 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

- 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

- 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

- 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

- 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

- 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
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<tr>
<th>ID</th>
<th>Business Service Name</th>
<th>Functional Area</th>
<th>Rank</th>
<th>Definition Difficulty</th>
<th>Required Completeness</th>
<th>External Collaboration</th>
<th>Current Automation</th>
<th>Future Automation</th>
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<td>BUC32 Implement System Requirements for UI Policies and Procedures Business</td>
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</table>
However, claiming their weekly benefits (i.e. receiving temporary economic assistance – cash) is valuable!

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 the 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
Phase C-1: Data Architecture

- 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

- 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

Claimant

- Request Weekly Certification
- Complete Certification
- Receive Certification Confirmation
- View Alerts
- Verify Claimant Identity
- Identify Information Supplier

Policy Implementer

- Establish Certification Requirements

Information Analyzer

- Request Forced Payment

Tax Overpayment Manager

- Establish Payment Requirements
- Payment Processor
- Approve Forced Payment
- Send Forced Payment

Information Analyzer

- Receive Certification Confirmation

Certification Processor

- certifications

Claims Taker

- Approve Forced Payment

Forced Payment Manager
### Business-to-Application Architecture Traceability

![Diagram](image)

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

**Available Messages:**

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<thead>
<tr>
<th>Seq</th>
<th>Sending Object Name</th>
<th>Message Name</th>
<th>Receiving Object Name</th>
<th>Assign?</th>
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<td>add</td>
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<td>Claim Taker</td>
<td>determine questions</td>
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<td>Weekly Claim Processor</td>
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<td>certification questions</td>
<td>Claims Taker</td>
</tr>
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</table>

**System Use Cases:**
- Accept Certification
- Apply Charges
- Apply Disbursement
- Approve Pended Payment
- Calculate Disbursement
- Complete Certification
- Determine Payability
- Establish Certification Requirements
- Establish Payment Requirements
- GIC Certification
- Identify Weekly Income Employer

**Assigned Messages:**

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<th>Message Name</th>
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**Form View**

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## Application Service Gap Analysis

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<th>Innovation Return</th>
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<td>22</td>
<td>Adjust Wage Record</td>
<td>High</td>
<td>Reasonable</td>
<td>Barely (25%)</td>
<td>Significant</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Check Monetary Followup</td>
<td>High</td>
<td>Not Very Good</td>
<td>Mostly (75%)</td>
<td>Significant</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Determine Claimant Entitlement</td>
<td>High</td>
<td>Reasonable</td>
<td>Mostly (75%)</td>
<td>Significant</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Determine Employer Liability</td>
<td>High</td>
<td>Reasonable</td>
<td>Mostly (75%)</td>
<td>Significant</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Establish Monetary Requirements</td>
<td>High</td>
<td>Not Very Good</td>
<td>Partially (50%)</td>
<td>Significant</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Get Benefit Year and Base Period</td>
<td>Medium</td>
<td>Reasonable</td>
<td>Completely (100%)</td>
<td>Moderate</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Get Employment Information</td>
<td>Medium</td>
<td>Reasonable</td>
<td>Mostly (75%)</td>
<td>Moderate</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Manage Benefit Rate Escalation</td>
<td>Medium</td>
<td>Reasonable</td>
<td>Completely (100%)</td>
<td>Moderate</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Match Wage Record and Application Employers</td>
<td>Medium</td>
<td>Reasonable</td>
<td>Completely (100%)</td>
<td>Moderate</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Provide Employer Subjectivity Update Notification</td>
<td>Low</td>
<td>Reasonable</td>
<td>Barely (25%)</td>
<td>Moderate</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Provide Quarterly Wage Update Notification</td>
<td>Low</td>
<td>Reasonable</td>
<td>None (0%)</td>
<td>Significant</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
Phase D: Technology Architecture

• 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 engine
Sample Technology Architecture Goals

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

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

- 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

- 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

• 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

- 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
Thanks for your attention and participation!