

# Fiscal Year 2016-17 Information Technology Request

## Labor and Employment

### *Unemployment Insurance Mainframe Migration and Modernization*

#### PROGRAM PLAN STATUS and OIT BEST PRACTICES

2017-083

Approved Program Plan?  Date Approved:

The department will comply with the Governor's Office of Information Technology (OIT) best practices and policies.

#### PRIORITY NUMBERS

Prioritized By	Priority	
DeptInst	1 of 1	
OSPB	NP of 46	Recommended for funding from cash sources.

#### PRIOR APPROPRIATION AND REQUEST INFORMATION

Fund Source	Prior Approp.	FY 2016-17	FY 2017-18	Future Requests	Total Cost
CF	\$0	\$25,263,480	\$26,213,480	\$0	\$51,476,960
<b>Total</b>	<b>\$0</b>	<b>\$25,263,480</b>	<b>\$26,213,480</b>	<b>\$0</b>	<b>\$51,476,960</b>

#### ITEMIZED COST INFORMATION

Cost Item	Prior Approp.	FY 2016-17	FY 2017-18	Future Requests	Total Cost
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$4,463,480	\$4,213,480	\$0	\$8,676,960
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$800,000	\$0	\$0	\$800,000
Contingency	\$0	\$0	\$2,000,000	\$0	\$2,000,000
Software Acquisition	\$0	\$20,000,000	\$20,000,000	\$0	\$40,000,000
<b>Total</b>	<b>\$0</b>	<b>\$25,263,480</b>	<b>\$26,213,480</b>	<b>\$0</b>	<b>\$51,476,960</b>

#### PROJECT STATUS

This is a new, never-before requested project.

Although this is a new, never-before requested project, the department had previously entered into a consortium, named Wyoming Colorado Arizona North Dakota (WyCAN), for an upgraded unemployment insurance (UI) benefit system. The department is currently in mediation with the vendor originally selected for the WyCAN project. Once the mediation is complete, Colorado will no longer be a part of the consortium.

According to the department, WyCAN consortium had an initial budget \$62.2 million in federal funds. The consortium spent \$15.2 million and reverted the remaining funds to the U.S. Department of Labor. State funds were also appropriated for WyCAN. In FY 2013-14, \$3.8 million was appropriated from the Employment and Training Technology Fund (technology fund), of which \$2.6 million was spent on the WyCAN project, according to the department. In addition, the department received a \$2.6 million appropriation in FY 2014-15 from the technology fund and the department states \$2.3 million was spent on WyCAN. For FY 2015-16, the department received a \$9.9 million appropriation from the technology fund. The department states that these funds are being spent this fiscal year. The 2013, 2014, and 2015 Long Bills provided roll forward authority for all the technology fund requests listed above.

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#### PROJECT DESCRIPTION / SCOPE OF WORK

The Unemployment Insurance Division of the Colorado Department of Labor and Employment (CDLE), in cooperation with OIT, is requesting cash fund spending authority to migrate the current benefits and employer premium systems onto a modernized computer platform. The project will result in better compliance with federal technologies, minimize benefit overpayments, improve data security, and enhance, effective communication with claimants and employers.

During this project, the department will convert the mainframe COBOL code to Java and move the data stored in the mainframe to a relational database, such as a Microsoft SQL Server. The impacted mainframe systems will be the Colorado Unemployment Benefits System (CUBS) and the Colorado Automated Tax System (CATS).

#### PROJECT JUSTIFICATION

According to the department, CDLE's Unemployment Insurance (UI) mainframe system does not have the ability to meet claimant, employer, or departmental needs and reporting requirements. UI staff manually process some claims and the department cannot rapidly report financial information. The existing system is over 30 years old, unreliable and challenging to maintain. Making changes to the system, such as changes required by state or federal mandatory requirements, has become increasingly complex, and takes a noticeable amount of time and resources to implement.

The department says that migrating to a modern technology will provide additional functionality, including the ability to integrate with other department and state systems. A modern system will provide the foundation to integrate with systems that could verify legal residency and the internet self-service system. Thereby permitting customers to use more self-service options. The department believes this will reduce staff involvement with routine, housekeeping activities and enable staff to concentrate on more value-added activities.

#### PROGRAM INFORMATION AND IMPLEMENTATION PLAN

The Colorado UI program provides temporary and partial wage replacement to workers who have become unemployed. The department administers the employer premium and unemployment benefits claim systems.

According to CDLE, the UI Mainframe Migration and Modernization project will be implemented using the following phases and corresponding high-level deliverables:

##### **Planning Phase (completed on month six of project):**

- develop project plan (vendor and state's project manager);
- install code conversion and management tools;
- conduct training for state developers on the new tools, and;
- set up test environment and test cases.

##### **Code Conversion, Testing, and Production Release Phase:**

- migrate CATS and CUBS applications mainframe to Java using automated tools,
- migrate all data to SQL;
- create web services from converting online and screen-scraping interfaces;
- create final acceptance criteria;
- test all online system maps and interfaces;
- set-up production environment, and;
- execute production release.

##### **Refactor Phase (will begin six months into the project):**

- define phase scope;
- deploy to production every three months with the first deployment being the target architecture, inventory, and the database access layer, and;

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- modernize new system for improved user interface between workflows using SOA (service oriented architecture).

#### **COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES**

The department calculates a savings of \$2.9 million per year through reductions in staff costs, network, and mainframe costs. The department estimates that these savings will pay for the cost of the project over a 20-year time frame. The savings are based on the assumption that the new system will be maintained and updated.

#### **SECURITY AND BACKUP / DISASTER RECOVERY**

According to the department, the new system will be on a modern virtual infrastructure that permits at least a daily backup of the entire system, virtualized redundancy of the database, and possibly a transaction log transmission between sites if the need is determined.

For security, the department will comply with OIT rules and policies.

#### **BUSINESS PROCESS ANALYSIS**

According to the department, CDLE is currently doing detailed business process modeling and will continue to do so throughout the project and beyond. This activity will help to define the initial test cases to use in verifying the success of the initial code migration to Java, as well as creating a basis for modernization planning. Continued improvements to the system will be designed, developed, and implemented based on analysis of the business process models to determine efficiencies and cost savings that can be accomplished.

#### **PROJECT SCHEDULE**

	Start Date	Completion Date
Contracting	July 2016	January 2017
Implementation		June 2019
Equipment		June 2019
Completion		June 2019

#### **OPERATING BUDGET**

This project has no projected impact on state operating costs.

#### **STAFF QUESTIONS AND ISSUES**

1. What is the current solvency and balance of the UI Revenue Fund? What are the sources of revenue for this fund?

*The year beginning fund balance for FY 2015-16 was \$19,752,292. The trust fund revenue is generated from interest collected on delinquent unemployment insurance taxes; penalties imposed on employers failing to pay UI taxes on a timely basis; and penalties on claimants for UI overpayments.*

2. What is the current balance of the Employment and Training Technology Fund? What are the sources of revenue for this fund?

*The year beginning fund balance for FY 2015-16 was \$25,935,347. The technology fund revenue is generated from the tax surcharge based on taxable wages. Taxable wages are the first \$10,000 earned by each employee annually.*

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*The technology fund receives 0.04 percent of taxable wages.*

3. The narrative states the project will require ongoing funding from the Employment and Training Technology Fund. Please quantify the annual ongoing expense.

*There will be ongoing operating costs that will need to be funded by the Employment and Training Technology Fund. The annual operating costs are listed below:*

- *innwake licensing - \$210,000;*
- *development environment - \$84,500;*
- *production environment infrastructure - \$1,194,300;*
- *near real time analytics (GPGPU) - \$8,125;*
- *miscellaneous software licenses (SQL, etc.) - \$193,500; and*
- *enterprise service bus - \$1,200,000 (estimated).*

4. Why are operational and support costs no longer shared by other state agencies for legacy systems? Why are all these costs now absorbed only by CDLE and DHS?

*CDLE and DHS are the only agencies that use the legacy system.*

5. Has CDLE researched any other states besides New Mexico to compare the costs of upgrading the UI benefit systems?

*Yes. We looked at Missouri, Utah, and Idaho, in addition to New Mexico. We also received anecdotal costing for other consortiums. Specifically, CDLE conducted site visits to Idaho, Missouri and New Mexico. We also researched Utah as a possibility. However, Utah is about to undertake another system modernization so we chose not to explore that route further. Additionally, CDLE did some limited informal research on the system being developed for Massachusetts/West Virginia consortium. All these systems fall under the same scope of work and cost for the request by CDLE.*

6. The request includes a cost estimate for IT Professional Services. Are these professional services for temporary or fulltime OIT employees?

*The request is for both fulltime OIT employees for ongoing system work once implemented and then temporary OIT employees to help implement the system. CDLE will contract with OIT for the services using an inter-agency commitment document. The personnel who are already a part of OIT supporting UI will provide services. No new hiring is envisioned.*

See Attachment A for additional information.

**Colorado Department of Labor and Employment Responses to  
Joint Technology Committee Staff Questions  
Submitted to Legislative Council staff  
January 6, 2016**

**Project Scope, Schedule, and Cost**

**1. “Implementation Plan” section**

**a. A description of three major phases is provided in the request: (1) Planning Phase, (2) Code Conversion, Testing, Production Release Phase, and (3) Refactor Phase. Please detail each phase, including milestones for each phase and planned completion date.**

- (1) In the Planning Phase, the vendor together with the State’s project manager, develops an agreed upon detailed project plan. Code conversion and management tools are installed along with configuration of deployment scripting for automated code conversion and software configuration management. Training will also begin for State developers on the new toolsets being used. Test environments will be set up and test cases will be defined. These steps are completed within the first six months of the project.
- (2) The CATS and CUBS applications are migrated to Java and their data (Adabas, VSAM, and flat files) migrated to SQL. This process is highly automated. Online and screen-scraping interfaces will be converted to web services. The production environment is set up including databridge. All online system maps and interfaces are tested. Final Acceptance criteria for this phase after month 12 of the project include:
  - (a) CICS Conversion for CICS command execution
  - (b) Setup of batch software and configuration according to mainframe settings.
  - (c) Any FTP and file based interfaces are configured
  - (d) Testing of batch setup and batch jobs
  - (e) Configuration of new scheduler software
  - (f) Implementation of printing (including CA Dispatch replacement)
  - (g) Replacement of any remaining 3rd party mainframe tools (TRIM, Adastrip, N2O, IBM tools, SORT, etc.)
  - (h) Migration of Adabas, VSAM, and flat file data to new platform
  - (i) Rollout into production for entire State
  - (j) Training on new environment for State developers
  - (k) Burn-in of production system

(3) The CATS and CUBS system, now in Java and SQL, are modernized for improved user interface, between workflows, and service-oriented architecture. The database architecture is improved for more business oriented design. This phase will begin 6 months into the project, after the Online Pilot has started. The scope of this modernization is determined during the design phase. There will be 6 deployments to production, one every 3 months. The first deployment are Target Architecture, Inventory, and the database access layer.

**b. Scope and cost could be driven by the amount of manual intervention required to analyze code and test all the parts of the mainframe system, depending on how the mainframe system is architected and coded. Is this risk identified and part of the existing contingency in the budget request?**

Yes. This is a focal point of Innowake's Business model and expertise. They have already performed an initial analysis of the all of the program modules and the underlying data stores. Innowake's scope and quote was based on the results of this assessment.

**c. Will the planning phase include procuring a code conversion tool? If so, could any code conversion risks be mitigated or reduced during the planning phase?**

The vendor uses a proprietary code conversion tool which allows them to perform a detailed analysis of the code prior to migration which will allow them to identify and mitigate any risks involved in the conversion as part of the planning phase. The tool is their own, and they have successfully used it on three other programs with the State, and many times with other states, most recently for the DMV modernization effort in Texas.

**d. Will SOA be implemented during the Refactor Phase, or will this be determined after the *“financial feasibility of utilizing a middleware solution”* is determined?**

Yes, SOA will be implemented during the Refactor/Modernization phase.

**i. If the decision is not to proceed with SOA under this project, is a Refactor Phase still planned? If decided to proceed with SOA, please provide the SOA scope that will be implemented under this project.**

This project is predicated on SOA. Every module will communicate via standards-based web services interoperating through the Enterprise Service Bus and a standard Messaging queue. SOA will be used project wide.

**ii. What “external programs via an API or external users via user interface” will be implemented under this project? What internal integration is planned? For example, is integration to verify legal residency within the project scope? Is integration with the “internet self-service” within the project scope?**

External interfaces with outside Federal, state, and third party systems will be implemented to maintain required functionality (including but not limited to: Interstate Connection Network (ICON), Unemployment Insurance State Information Data Exchange System (SIDES), Social Security Administration, Department of Motor Vehicles for verification of legal presence, etc.) Internal integration with platforms like Internet Self-Service, Appeals, Salesforce Timely Issue Notification System (TWINS), and vendor systems for Integrity cross-match processing will be implemented as part of the project scope.

**e. Does CDLE/OIT anticipate additional funding will be necessary to implement interoperability and/or SOA after the Mainframe Migration and Modernization project is complete?**

Based on the current budget and revenue from cash funds CDLE does not anticipate additional funding needed to implement the Mainframe Migration and Modernization project. There will be ongoing operating costs after the project is implemented and those are outlined in question 2. a.

**f. The request states that “all data in the legacy systems will be migrated to a Relational Database System.”**

**i. Does the legacy system contain data since 1985, and if so, does the scope include migrating all of this data?**

All legacy data present in the mainframe system will be migrated as part of the project scope.

**ii. Do opportunities exist to archive or purge any outdated records? What are the regulatory or contractual obligations for the data?**

CDLE last archived claim and wage data in August, 2013. The archive process at that time left any data that was linked to a claim with Emergency Unemployment Compensation as well as any claim data where an overpayment of Unemployment Insurance Benefits was present. At this time we do not anticipate any further need to include Emergency Unemployment Compensation

claim data so opportunities exist for further archiving of outdated records. Regulatory obligations require that CDLE keep outdated claim and wage data for claims with an active overpayment that may be collected.

**iii. ADABAS may not natively enforce referential integrity constraints or normalization. Older data may have data integrity issues. What are the plans for data cleansing or migration tools?**

This is a significant portion of Innowake's process. A majority of the effort surrounds building the Object Relational Management layer and encapsulating the relationships. This will include building the relationships in an iterative fashion as both the relational aspects of the data sets as well as the dependencies that are enforced through referential integrity are defined. Again, this is a known factor and is the part that will require about 80% of the conversion timeframe.

**2. "Consequences if not Funded" section**

**a. The request states that "*it is estimated that this project will be no longer than 36 months*", or 3 years. Will funding be necessary beyond FY 2018-19? If so, please explain.**

There will be ongoing operating costs that will need to be funded by the Employment and Training Technology Fund. The annual operating costs are listed below:

- Innowake Licensing - \$210,000
- Development Environment - \$84,500
- Production Environment Infrastructure - \$1,194,300
- Near Real- Time Analytics (GPGPU) - \$8,125
- Misc Software Licenses (SQL, etc.) - \$193,500
- Enterprise Service Bus - \$1,200,000 (estimated)

**3. IT system changes often require business process changes and executive/upper management support for impacted business units, especially with SOA (e.g., integration with external systems). Has CDLE/OIT conducted any business process analyses? If so, please provide them. If not, please explain why.**

CDLE is currently doing detailed business process modeling and will continue to do so throughout the project and beyond. This activity will help to define the initial test cases to use in verifying the success of the initial code migration to Java, as well as creating a basis for modernization planning. Continued improvements to the system will be designed, developed, and implemented based on analysis of the business process models to determine efficiencies and cost savings that can be accomplished through continuous improvements in the system.

## **System requirements**

**4. Is the current system considered high volume? Are there a high number of concurrent users during peak periods? Besides unit testing, system integration testing, and user acceptance testing, what are CDLE/OIT's plans for performance testing?**

The system would not be considered high volume by external, private sector standards as the primary user population would be employees in the Unemployment Insurance Division, our Workforce Centers and selected other public agencies. We would definitely build the new system to specifications to handle the anticipated concurrent user transaction load and thoroughly test its performance to handle the expected (i.e. load testing) and maximum potential usage (i.e. stress testing).

**5. A mainframe code conversion and data migration can often be expensive and come with risks. Have all options to modernize the mainframe been evaluated? If so, please list those options and the reason they were determined not to be optimal.**

CDLE evaluated several different options for mainframe modernization including the transfer another state's base code to use in refactoring for Colorado use. With this option, we would undoubtedly inherit the technical debt of another state and be heavily dependent on a vendor with resource and time constraints for development work on that code. We determined that migrating the Colorado mainframe code not only minimized the timeframe, risks and costs associated as compared to other options, but further allows for Colorado to retain ownership and control over the code base and subsequent enhancements that will be made to the system. This approach was successful for a similar project in the state of Idaho.

**6. Have any COTS systems been evaluated?**

Yes. We visited Idaho (a non- COTS system), New Mexico, and Missouri to view their systems and speak with their business and development staffs. We also spoke to Utah. The teams that researched these consisted of business and technical people from all three consortium states, and was led by Colorado. We concluded that none of these systems were mature enough, none were sufficiently similar to Colorado, and all would cost significantly more to implement compared to the migration option. Additional research on other COTS products showed that other Unemployment Insurance systems being developed in other states were not yet fully implemented and the availability of vendor resources for implementing a system being developed for use in multiple states carries a great risk to budget and time.

**7. Where will the new system and data reside? Have any offsite options been evaluated?**

Our assumption is the system and data will be hosted in the OIT Central Data Center but we are also considering external hosting options. Some data elements cannot be stored off-site, such as Treasury Offset Program (TOP) data but otherwise yes, we are looking at offsite storage for that data that can be stored offsite and making cost/benefits comparisons between on-premises and off-premises storage and compute.

**8. The new system's data retention and system availability requirements may impact the plan to deploy the project to production. Please provide a high-level deployment / release description. Will the old system be turned off and the new system turned on at the same time, or will the systems be running in parallel for a period of time? If a roll-back to the original mainframe is required after a substantial period, will the new records in the Java system need to be copied over to the original mainframe?**

The old system will be running in parallel with the new system for a period of time to ensure that the modernized system performs the critical mainframe functionality in the exact same way. The approach allows for a staged deployment of components as the business is ready and based on customer support prioritization. Once the converted code is mature and the new business oriented refactoring has been completed and tested, the new system will be in full production and all new modernization work will be developed on the new platform.

**9. Does CDLE/OIT have a plan for decommissioning the old system components, third-party tools, applicable vendor contracts, batch processing, external dependencies (e.g., file transmissions), and system user IDs (e.g., internal or external). If not, this could impact the cost, schedule, scope and risks of the project. Has an analysis been conducted yet or is this planned for the initial stages of the project?**

Those items will be decommissioned as they are no longer needed based on the deployment plan referenced in question 8. The estimated deployment plan will be developed in the planning phase of the project.

**10. Will the existing user account management procedure and repository need to be updated with the new system? If so, is this included in the planned cost and schedule? For example, does the data migration effort also include migrating existing user accounts stored in the mainframe to a new system (e.g., Active Directory)? Will the project implement Single-Sign-On (SSO) or Identity and Access Management (IdAM)?**

The project will follow the Standards being developed for the MyColorado initiative from a Identity Management and Single Sign On perspective. It is currently planned to migrate the users to Active Directory but if that proves to be more difficult than anticipated we will review the option to do a green field install of user accounts.

11. “Alignment with OIT Best Practices” section

- a. **The request states that “*the development language post-conversion will be Java, identified as one of OIT’s preferred programming languages*”. What are the other OIT preferred languages and why were these not chosen for the project? -**

The State also uses .Net but Java was preferred for this for a variety of reasons: resource availability, maturity of tool sets for the new architecture, lack of vendor lock-in, etc. In addition, there is currently not a .Net or Azure platform that is beyond the P-ATO for FedRAMP certification. Making Java the logical choice since FTI and TOP data will be used.

- b. **Has OIT CISO had an opportunity to provide a preliminary evaluation of the new system? If so, please forward the evaluation or provide highlights of the evaluation (e.g., Integrity, Availability, and Confidentiality).**

Not yet. As part of the OIT Enterprise Governance Process and Gate Reviews, OIT CISO will be integrally involved in the modernization design from a security perspective.