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The objective of this document is to provide a list of *Technical and Investment Management Improvements* as stated in Task Order 4.

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The technical improvement recommendations reflect our findings based on analysis of the current environments. The recommendations are specifically focused on the *development* and *operations* architectures. This section of the document will illustrate the importance of the relationships between the execution, operations, and development environment and the impact they have on deploying an integrated business capability. A detailed definition of the development and operations services for the internet, data warehouse, and integration architectures are found in Appendix A. The services identified are those necessary to develop and build the aforementioned architectures. The selected services were key in the identification of recommendations for the development and operations architectures. The execution architecture recommendations are defined / addressed within the Application Architecture Standards deliverable (4.1.2).

The investment management improvement recommendations are aimed to ensure that the SFA Modernization Blueprint will be favorably assessed during future General Accounting Office (GAO) audits. The current version of the Modernization Blueprint was assessed and reviewed based on current GAO evaluation criteria and standards. The findings in this section are the recommendations to address the identified gaps.

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In order to meet SFA's strategic objectives, three major environments (execution, development, and operations) must be integrated in order to support future business capabilities.

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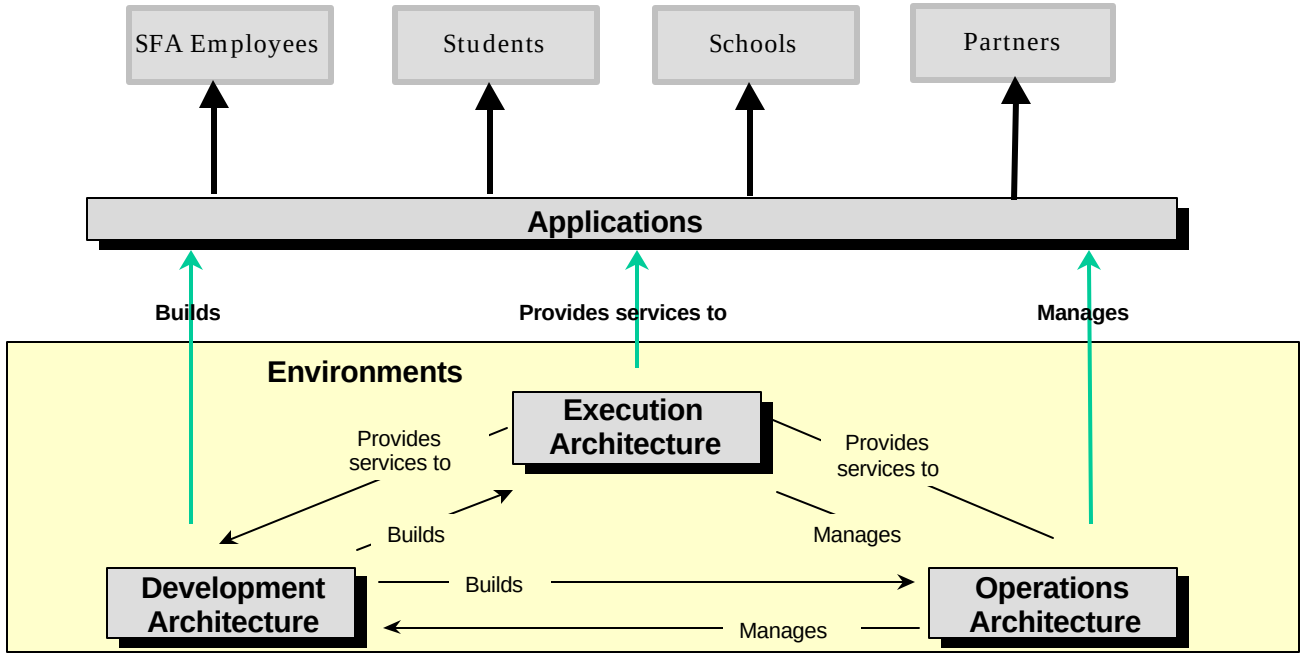
Our findings and recommendations are focused on the operations and development architectures which have been identified as the areas with the highest degree of potential improvement. The figure below illustrates the relationships and interactions between the three environments.

- The **Execution Architecture** is comprised of run-time services required when an application executes.
- The **Operations Architecture** is a combination of tools, support services, procedures, and controls required to keep a production system up and running efficiently.
- The **Development Architecture** is the environment for one or several systems development projects as well as for maintenance efforts.



Once the environment services were investigated, the recommendation along with its associated benefits and the addressed strategic objectives were summarized. An example of how to read the recommendation/benefits matrix is shown below.

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The benefits that will be achieved with the recommendation implementation

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
System / Server Consolidation	Reduction in overall amount of hardware to manage			√
	Decrease in operating cost… license fees			√
	Increase in capaci… performance…	√		√
	Facilitates …ta and application p… …o single platform			√
	Facilitates implementation of enterprise-wide scheduler			√

Sample

The proposed recommendation

The strategic objectives that would be addressed by the benefit

Technical Improvements - Operations Architecture

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RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
System / Server Consolidation	Reduction in overall amount of hardware to manage			√
	Decrease in operating costs and license fees			√
	Increase in capacity planning and performance metrics capability	√		√
	Facilitates migration of data and application portfolio to single platform			√
	Facilitates implementation of enterprise-wide scheduler			√

Technical Improvements - Operations Architecture

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Design and Implement an Operational eInfrastructure*	Increase in systems and application availability	√	√	
	Increase in application reliability	√	√	
	Facilitates well-defined service level agreements (SLAs)	√	√	
	Enables common, integrated security infrastructure	√	√	√

* An eInfrastructure is an infrastructure which supports eCommerce, i.e. the electronic capability to exchange value in the form of money, goods, services, and information.

Technical Improvements - Operations Architecture

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Implement a Centralized Infrastructure Management	Comprehensive event monitoring and handling strategy of systems environment	√		√
	Automation of event handling	√	√	
	Supports centralized display / view of system activity (performance, security, etc.) in distributed environment	√		√
	Optimization of infrastructure component monitoring	√		
	Centralization of configuration management		√	√

Technical Improvements - Operations Architecture

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Automate Current Manual Systems Interfaces at Virtual Data Center	Improve information throughput time			√
	Decrease cost of operations			√
	Decrease possibility of error, information loss		√	√

Technical Improvements - Operations Architecture

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Implement Enterprise Information Access Security	Enables common SFA information access security policy and procedures	√	√	√
	Provides consistency in information access security management			√
	Defines and maintains logical security profiles at the enterprise level		√	√

Technical Improvements - Operations Architecture

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Structure and Manage Distribution of IP Addresses	Enables logical implementation of IP addresses	√	√	
	Lessens the waste of unused addresses	√	√	√
	Enhances security	√	√	√

Technical Improvements - Operations Architecture

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Perform network LAN / WAN analysis	Identifies current hardware (routers, hubs, switches, etc.)		√	√
	Enables understanding of what needs to be replaced, reused, or refreshed	√	√	√

Technical Improvements - Development Architecture

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RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Implement Data Quality Policies	Prevents inconsistency of data	√	√	√
	Increase in data integrity	√	√	√
	Supports transition plan from legacy data structures to enterprise logical data model		√	√

Technical Improvements - Development Architecture

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Characterize and Define the Lowest Level of a Configuration Item	Enables comprehension of viewer		√	
	Provides boundaries for level of discussion		√	
	Supplies sufficient level of detail to map changes to requirements		√	

Technical Improvements - Development Architecture

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Implement environments at the program and/or functional level.	Provides assurance that production items will not be corrupted by development, testing, etc.	√	√	√
	Facilitates transition to the production system by transferring system objects		√	√
	Enables logical breakup of tasks		√	
	Enhances configuration management process by facilitating sharing across systems	√	√	
	Aids consistent configuration management policy, procedures and implementation		√	√

Technical Improvements - Development Architecture

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Establish baseline* environment in accordance with GAO criteria.	Provides a stable basis for continuing evolution of configuration items		√	√
	Enables basic controls on developers such as user permissions, disk quotas, etc.		√	√
	Enables monitoring of development ramp up and down between phases		√	√

* A baseline is composed of a configuration item and its associated entities. An example of a software baseline is a release of a software product that includes internally consistent versions of the requirements, design, code, and user documentation.

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- **Recommendations for Technical Improvements**
- **Recommendations for Investment Management Improvements**
- **Appendices**
  - Analysis of Integrate Technology Architecture Details
  - Detailed Evaluation of Modernization Blueprint and GAO standards

In order for SFA to pass future GAO audits, SFA business functions and architectural elements must be compliant with the GAO standards, outlined by the Chief Information Officers Council Federal Enterprise Architecture Framework.

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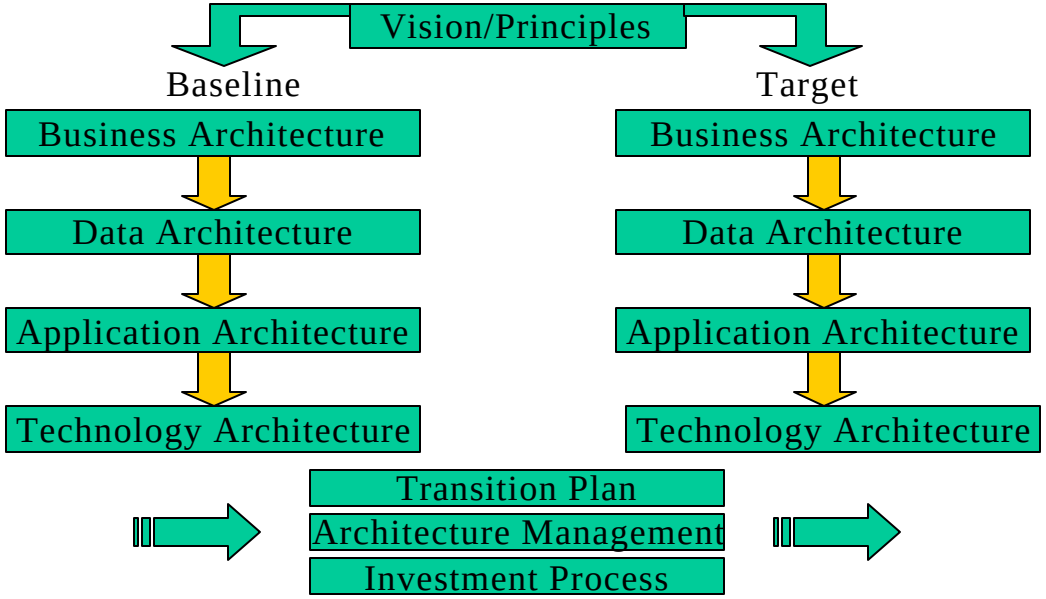
Our findings and recommendations are focused on the Chief Information Officers Council Federal Enterprise Architecture Framework. This framework identifies the evaluation areas for determining GAO compliance, i.e. evidence that key issues have been thought through, key architectural elements were analyzed, and linkages between architectural elements have been defined. For example, not only do the baseline vision / principles and baseline business architecture have specific GAO criteria, but so does the linkage between the business architecture to the vision / principles. The figure below illustrates the relationships between key business and architectural elements.

To identify the current gaps between the GAO standards and SFA, the business functions and architectural elements of the Modernization Blueprint and applicable project EASI deliverables were investigated. Each set of project deliverables was rated on its capability of meeting none, partial, or full GAO compliance. With the gaps identified, recommendations are proposed which would enable favorable future assessments from GAO audits. The summarization of the gap analysis and the recommendations are contained on the succeeding slides. The detailed evaluation of the Modernization Blueprint and the project EASI deliverables are contained in Appendix B.



Our evaluation of each architectural element was done by comparing the 9/30/99 SFA Modernization Blueprint (and project EASI architectural work) to GAO criteria.

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Key

- ○ – no evidence of compliance found
- ◍ – partial compliance
- ● – full compliance
- N/A$^{R\#}$ – Not Applicable; see corresponding reason

Note: Evaluation details for each architectural element can be found in the Appendix B.

R1: Documentation did not exist to perform comparison.

R2: Referring to slide 24, there is no forward linkage from technical architecture.

Architecture Element	Compliance Level		
	Baseline	Target	Linkage
Vision/Principles	N/A^{R1}	●	◍
Business Architecture	◍	●	●
Data Architecture	○	●	◍
Application Architecture	◍	◍	◍
Technology Architecture	○	●	N/A^{R2}
Transition Plan		◍	
Architecture Management		○	
Investment Process		●	

Once the GAO criteria was investigated, the recommendation along with its associated benefits and the addressed strategic objectives were summarized. An example of how to read the recommendation/benefits matrix is shown below.

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The benefits that will be achieved with the recommendation implementation

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Update architecture principles to reflect current architectural direction, developing traceable linkage to underlying architectures	Linkage of guidi… architectura…	√	√	√

Sample

The proposed recommendation

The strategic objectives that would be addressed by the benefit

Investment Management Improvements - Vision/Principles

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RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Update architecture principles to reflect current architectural direction, developing traceable linkage to underlying architectures	Enables understanding and synchronization of vision	√	√	
	Supports the development of metrics to evaluate performance targets	√	√	
	Provides SFA with immediate measuring of capability upon its first release rather than upon completion	√	√	
	Minimizes risk of a project progressing that does not have the potential of delivering measurable and meaningul business benefits	√	√	√

Investment Management Improvements - Business Architecture

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Update EASI baseline business architecture to reflect current architectural direction, enhancing linkage to data architecture	Enables identification and decomposition of all business functions	√	√	√
	Defines the full scope of the change journey, including changes to human performance, business process, and technology	√	√	√
	Accounts for all business capabilities and their relationships within the architecture.	√	√	√
	Decisions on the key changes for creating value (i.e. a clear mission) can be determined.	√	√	√
	Process of identifying gaps and their resolution will be enhanced.	√	√	√

Investment Management Improvements - Data Architecture

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Update EASI baseline data architecture and the logical data model to reflect current architectural direction, developing traceable linkage to application architecture	Provides consistent high-quality data across enterprise	√	√	√
	Provides enterprise-wide flexible and scalable data model	√	√	√

Investment Management Improvements - Application Architecture

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RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Update EASI baseline application architecture to reflect current architectural direction, enhance the detail of the application architecture to provide traceable linkage to the technology architecture	Helps determine which components should/could be reused		√	√
	Provides overview of the basic functions, design considerations, usage prerequisites, data flow, and input/output information		√	√

Investment Management Improvements - Technical Architecture

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Update EASI baseline technology architecture to reflect current architectural direction	Provides detailed listing of all the third party products and custom architecture components installed and integrated		√	√
	Helps in identification of integration gaps	√	√	√
	Provides the enterprise-wide technical services necessary to support the required business capabilities		√	

Investment Management Improvements - Transition Plan

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RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Develop an architectural transition plan identifying projects, dates, and project dependencies. Construct with respect to the capability release plan.	Helps in identifying all elements to transition, i.e. the workforce, business processes, and technology elements to establish a capability	√	√	√
	Enables logical separation of transition tasks by the organizational or geographic unit	√	√	√
	Influences the training of personnel to their new roles, as well as to define online help text, procedures, job aids, and other information		√	√
	Helps in the identification of the risks associated with the transition to the business capability			√

Investment Management Improvements - Architecture Management

Department of Education

RECOMMENDATION	BENEFITS	STRATEGIC OBJECTIVES		
		Customer Satisfaction	Employee Satisfaction	Cost Reduction
Develop an architecture management process of all architecture elements requiring maintenance, change control, and periodic refreshment. Utilize information in the EASI Target Architecture document. (i.e. Configuration Management for	Helps in identification / maintenance of technical details (operating system, protocol, etc.) of each architecture element	√	√	√
	Supports logical grouping of elements		√	√
	Helps in identifying the status of elements in development, release, and production.		√	√

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