

SFA Modernization Partner
United States Department of Education
Student Financial Assistance



**Integration Application and Technical
Architecture Standards**

Task Order #4
Deliverable #4.1.5
Supplementary Materials

April 5, 2000

Introduction

Deliverable 4.1.2--Application Architecture Standards developed a technical architecture framework and identified the technology services required to enable migration to the new, modernized environment. This framework revolved around development of a Service-Oriented Architecture Vision. An attempt was made to align the Service-Oriented Architecture vision with the guiding principles previously identified through the EASI documentation, and with GAO criteria.

The Service-Oriented Architecture enables reuse and standardizes architecture design by leveraging shared libraries of logic and data among systems and users. The business rules, integrity checks and sequence of steps associated with a business function are implemented in a logical black box (a service) that can be invoked by any of the participating applications. New clients can reuse old services, and new business processes can reuse elements of old business processes.

Deliverable 4.1.5--Application and Technical Architecture Standards, identified standards associated with the Service-Oriented Architecture. Specifically, these standards were developed and documented within the Internet, Data Warehouse, and Integration Architecture domains.

Findings

The standards identified in Deliverable 4.1.5 were evaluated and rated based upon whether they were compliant, non-compliant, or did not address (N/A) specific GAO criteria through the guiding principles found in the EASI architecture and COE documentation. The findings are shown below.

	Vision/Architecture Framework Principles	Compliant	Non-Compliant	N/A
1.	The Architecture Must Support the Business: The enterprise architecture and standards will be designed to (1) support and optimize the mission of SFA, (2) be highly flexible to accommodate future business changes and (3) help ensure the overall success of the SFA business.	X		
2.	Periodic Architecture Review, Alignment, & Refreshment: The IT architecture will be periodically reviewed (at least annually) and updated according to a disciplined, structured maintenance and technology refreshment process. This structure will include a configuration management process and supporting tools.	X		
3.	Reengineer Business Processes and Supporting IT Together: New information systems will be implemented after work processes have been analyzed, simplified or otherwise redesigned as appropriate, in compliance with the Clinger-Cohen legislation and Raines rules.			X
4.	Architecture Enforcement: The information systems and	X		

	technology infrastructure implemented by SFA will be compliant with the SFA Enterprise Architecture and COE described within.			
5.	Use Industry Proven Technology: Information technology applications and technical infrastructure decisions must be based on industry proven and supported components, methods, standards, and tools consistent with industry technological and market direction and as defined by this architecture.	X		
6.	No vendor bias: Standards and technology choices will be based on vendor-neutral standards where they are available and realistically can be implemented. Products will be chosen from any vendor with strong business stability, who provides the best technology and service for a business need and whose products are compliant with its architecture standards.	X		
7.	Solutions Preference: Where most cost effective and beneficial, SFA solutions preference will be (1) outsourcing; (2) commercial-off-the-shelf (COTS) products; (3) reuse of existing applications; and (4) custom applications.	X		
8.	Access to Information: Timely access to information and the tools and applications required to access and manipulate that information will be available to all individuals unless there is a specific, compelling reason to restrict access.	X		
9.	Reduce Integration Complexity: Products, tools, designs, applications, and methods will be selected to reduce integration and infrastructure complexity	X		
	<u>Business Architecture Principles</u>	Compliant	Non-Compliant	N/A
	Deliverable 4.1.5 Identifies technical architecture standards. It does not attempt to address compliance with the Business Architecture Principles			X
	<u>Data Architecture Principles</u>	Compliant	Non-Compliant	N/A
10.	Data Stewardship: Data is an SFA asset and does not belong to a particular business, program or individual.	X		
11.	Data Capture and Replication: Data will be captured only once at the source. All data will be stored in a single master “authoritative source”. Replicated/aggregated copies (datamarts) will be created	X		

	where required for performance or other reasons. Replicated copies will be updated from the master source as often as required by the applications.			
12.	Manage data in its most appropriate form: SFA architecture and systems will address the storage and management of all forms of data (text, voice, video, etc.) needed to support the functional requirements of the business.	X		
13.	Operational Data Storage: Operational data (used for OLTP) shall be separated from analysis or decision support data by creating data warehouses from the operational databases as required.	X		
14.	Database Design: All databases will use the standard SFA entity relationship tool for database design and documentation of the data structures. The data models will be kept in a central repository and databases will share common data models and data definitions. A metadata dictionary (repository warehouse) defining fields and attributes will be maintained in a shared accessible area and used as the basis for the creation of data structures.	X		
15.	Business Logic: Where appropriate and cost effective, business logic will be separate from data structures in SFA future information systems.	X		
	<u>Application Architecture Principles</u>	Compliant	Non-Compliant	N/A
16.	Structure of Business Applications: Application design shall be based on an n-tier partitioned logical model (presentation, application logic, database) with firm logical boundaries established between the partitions.	X		
17.	Reuse and Components: Opportunities will be identified for cross-functional, integrated systems and these systems will be implemented to take advantage of standard components that can be shared and reused throughout SFA for similar business functions.	X		
18.	Modular implementation for upgrade: Technology components will be implemented in as modular a fashion as possible to allow the upgrade and exchange of vendor products with minimal disruption to the overall environment.	X		
19.	Presentation Consistency: All presentation user interfaces will	X		

	adhere to SFA’s standard graphical user interface to have a consistent look and feel. Presentation layer interfaces will be consistent across local and remote access. The preferred presentation interface will be based on Web browser technology capabilities.			
20.	Object-oriented Design and Structure: Where practical, applications shall be designed using objects, which encapsulate data structures and present a functional interface to application logic.			X
21.	Event Driven Processing: Where practical, application design shall be event driven, employing a real-time processing methodology versus batch processing.	X		
22.	Use of Automated Development and Testing Tools: Standardized information systems tools will be used across SFA for systems design, development, and configuration management. Application development and testing will maximize their reliance on automated tools.	X		
	<u>Technical Infrastructure Architecture Principles</u>	Compliant	Non-Compliant	N/A
23.	Common Security Access: The infrastructure will present a consistent, uniform, and adequate security mechanism across all applications, data access, and related components independent of physical location. Technologies such as a single logon with a database for profile definition and token-based authentication will be incorporated when applicable.	X		
24.	Network Design: All network components will adhere to the SFAP network standards for protocols, addressing, and firewall security. Any SFA desktop will be logically able to access any application and database within the SFA computing environment, within security and operational considerations	X		
	<u>IT Management Architecture Principles</u>	Compliant	Non-Compliant	N/A
26.	Common IT Infrastructure: SFA will implement a common IT infrastructure for its systems. Applications will operate on this infrastructure.	X		
27.	Migration Planning: Movement toward the target architecture			X

	implementation and replacement efforts will be planned and implemented in functional or technical infrastructure sub-elements (e.g., chunks, releases, plateaus) to minimize SFA risk.			
28.	Security Policy: Security policies and practices will be consistently implemented to ensure the confidentiality, integrity, and availability of SFA data and systems. Policy monitoring and coordination of system-wide security measures and contingency plans will be the responsibility of SFA -level management.	X		
29.	IT Project Evaluation and Review: A structured IT investment process consistent with the Clinger-Cohen legislation and OMB / GAO capital planning requirements will be used by SFA to manage its IT investments. This process should be implemented in a pragmatic way without sacrificing the key discipline elements.			X
30.	Security Conformance: All users of IT will conform to group and corporate security policies, protecting the integrity, reliability, and privacy of all SFA information assets. All users will conform to purchased product-licensing policies.	X		
31.	Systems Development Methodology: SFA will adopt and utilize a standard methodology for the implementation of IT solutions. The methodology will, at a minimum, address systems development -- design, development, and testing of IT solutions. Consistent with SFA priorities, the methodology should be a COTS product.	X		
32.	Acquisition Methodology: Software implementing the target architecture will be acquired by SFA using a structured process consistent with the Software Engineering Institute's Software Acquisition Capability Maturity Model, to mitigate risk. SFA will work to continuously improve this process over time.	X		
33.	Project Tracking: IT projects will use the standard SFA project management methodology and tool to track projects.			X
34.	Metrics Tracking: Applications and technical infrastructure will be implemented in a way that facilitates the capture of measurement data and metrics for analysis and for management of the information technology and business environments.			X

Constraints on Existing Systems

Based upon the GAO exception criteria identified above, each Legacy System within the SFA technical environment was reviewed to determine if the system would be able to support the standards identified in Deliverable 4.1.5.

Legacy System		Will Support Standards	Will Not Support Standards
CBS	Campus Based Systems	X	
ED CAPS	Central Automated Processing System	X	
CPS	Central Processing System	X	
FFELP	Federal Family Education Loan Program	X	
IFAP	Information for Financial Aid Professionals	X	
LCS	Loan Consolidation System	X	
LOS	Loan Origination System	X	
LSS	Loan Servicing System	X	
MDE	Multiple Data Entry	X	
NSLDS	National Student Loan Data System	X	
PEPS	Post-secondary Education Participants System	X	
RFMS	Recipient and Financial Management System	X	
TIVWAN	Title IV Wide Area Network		X

Note: Although the majority of systems will support the standards identified in Deliverable 4.1.5, some modification to those systems may be required. Examples of potential modifications are listed below:

- Enable existing systems to communicate through the MQSeries messaging architecture
- Re-platform existing systems (i.e., IFAP) to the compliant technical architecture
- Elimination of redundant functionality between existing systems and technical architecture