

FSA Integration Partner

United States Department of Education

Federal Student Aid



EAI Current State Report

Task Order #117

Deliverable # 117.3.3

Version 1.1

October 13, 2003



Table of Contents

1	INTRODUCTION.....	3
1.1	SUMMARY.....	3
2	CURRENT STATE.....	4
2.1	ARCHITECTURE SOFTWARE.....	4
2.2	SUPPORTED ENVIRONMENTS.....	6
2.3	FSA SUPPORTED BUSINESS SYSTEMS.....	8

APPENDIX A: *EAI ENVIRONMENT DIAGRAMS*
 APPENDIX B: *EAI SOFTWARE INSTALLATION REPORT*
 APPENDIX C: *EAI CONFIGURATION ITEM REPORT*



1 Introduction

1.1 Summary

The purpose of this report is to document the current state of FSA's EAI architecture as supported by the EAI team under Task Order 117, EAI Release 4.0.

The EAI Current State Report is summarized in the following sections:

- **Section 2: Current State** - Provides a brief overview of the current state of the EAI architecture with references to detailed appendices.
- **Appendix A: EAI Environment Diagrams** - Documents the current EAI Development, Test, and Production environments.
- **Appendix B: EAI Software Installation Report** - Documents the current status of all installed software for all EAI environments.
- **Appendix C: EAI Configuration Item Report** - Documents the list of custom software components of the EAI architecture.



2 Current State

Enterprise Application Integration (EAI) provides a messaging infrastructure and integration capability that standardizes interfaces to new and legacy systems in support of FSA modernization objectives. EAI does this by creating a central communication infrastructure commonly referred to as the “EAI Bus”. The EAI Bus consists of a scalable, extensible architecture based on IBM WebSphere MQ (formerly MQSeries) technology providing messaging capabilities for batch and real-time transaction processing. At the heart of the architecture are two clustered servers, which form a “hub” from which interfaces to the FSA business systems are extended.

2.1 Architecture Software

The EAI architecture is comprised of the following software components:

- WebSphere MQ – formerly known as MQSeries, WebSphere MQ provides the base messaging infrastructure.
- CommerceQuest Data Integrator (DI) – DI leverages the WebSphere MQ messaging platform to provide a high-speed, transport mechanism for transferring large, bulk files between systems for batch transactions.
- SupportPac MA0F: MQSeries Application Messaging Interface (AMI) - is a simple application programming interface, providing support for point-to-point and publish/subscribe messaging
- SupportPac MQSeries classes for Java and MQSeries classes for Java Message Service - Java development and application programming interface.
- WebSphere MQ Integrator (formerly MQSI) has been replaced as the message transformation engine by a custom java based engine. Although the MQSI infrastructure still exists and is operational, no message traffic flows to or through it.
- MQSoftware’s QPasa! is an application that will help to standardize and improve MQSeries configuration management, deployment and monitoring capabilities.
- Sun Java™ Java Development Kit (JDK) - The JDK contains the essential compiler, tools, runtimes, and APIs for writing, deploying, and running applets and applications in the Java programming language.
- Oracle Database, Enterprise Edition – Oracle provides the data repository for Data Integrator file transfer status information for the EAI Message Status Inquiry Tool.



-
- EAI custom developed code – custom code for message transformation, logging, transaction management, startup/shutdown, interface specific components, etc. The custom code is stored in Rational ClearCase in the following categories:
 - Custom Source Code: source code for custom adapters and other custom code
 - Scripts: UNIX shell scripts
 - Config: configuration and property text files
 - Utilities: prepackaged out-of-the-box utilities and helper software
 - Middleware: text file scripts for WebSphere MQ and MQSI
 - COD Test: files used to support COD testing
 - Admin: UNIX shell scripts and programs to assist in the administration of the custom source code

The EAI architecture is comprised of HP UNIX servers, Sun Solaris UNIX servers, OS/390 IBM mainframes, OpenVMS mainframes, and NT servers. WebSphere MQ objects are installed on each of these platforms; however, the EAI custom code is only installed on HP UNIX and Sun Solaris UNIX servers.

Refer to *Appendix A – EAI Environment Diagrams* for detailed diagrams of the current configuration of the above listed environments.

Refer to *Appendix B – EAI Software Installation Report* for a current list of the software versions installed for all servers in the above listed environments.

Refer to *Appendix C – EAI Configuration Item Report* for a current inventory of the custom code developed and maintained by the EAI team.



2.2 Supported Environments

The EAI team has built and maintains 13 environments to support application interface development, enhancements, and production fixes as they progress through the development lifecycle. The following is a list of all the environments:

- Development
- System Integration Test (SIT)
- Inter System Test (IST)
- Product Test (formerly called UAT)
- Staging*
- Production
- FAFSA EAI Development
- FAFSA Development
- FAFSA Demo Development
- FAFSA Test
- FAFSA Performance Test
- FAFSA Demo Production
- FAFSA Production

*EAI provides WebSphere MQ configuration support, but the Virtual Datacenter (VDC) owns and maintains the environment.

Refer to *Appendix A – EAI Environment Diagrams* for detailed diagrams of the current configuration of the above listed environments.

MQSeries objects and EAI source code are installed and configured on numerous servers and must be managed across each of the environments to ensure the integrity of the baseline. WebSphere MQ Objects are managed through Queue Managers. Each server can have one to many Queue Managers. The tables below illustrate the various WebSphere MQ environments.



2.2.1 Non-FAFSA WebSphere MQ Environments

Server \ Queue Manager	Environment				
System	DEV	SIT	UAT	IST	PROD
EAI 1	SU22E28 \ EAID1	SU22E28 \ EAIS1	SU22E28 \ EAIU1	SU22E28 \ EAI11	SU35E141 \ EAIP1
EAI 2	SU35E17 \ EAID2	SU35E17 \ EAIS2	SU35E17 \ EAIU2	SU35E17 \ EAI12	SU35E3 \ EAIP2
SAIG	HPL-15 \ SAIGD1	HPL-15 \ SAIGS1	HPL-15 \ SAIGU1	HPL-15 \ SAIGI1	HPL-16 \ SAIGP2
PEPS	N/A	N/A	N/A	N/A	HPK2 \ PEPSP1
CPS	CPSED \ CPD1	N/A	CPSED \ CPA1	CPSED \ CPT1	CPSED \ CPP1
NSLDS	NSLSYSP \ NPD1	N/A	NSLSYSP \ NPA1	N/A	NSLSYSP \ NPP1
COD	VD0Q	N/A	UCSV	UCSV	PD0Q
LOWeb	HPL12 \ LOWD1	HPL12 \ LOWS1	HPL12 \ LOWU1	HPL12 \ LOWI1	HPL13 \ LOWP1
FMS	HPL6 \ FMSD1	HPL6 \ FMSS1	HPL6 \ FMSU1	HPL6 \ FMSI1	HP-V2 \ FMSP1
eCB 1	SU35E5 \ ECBSD1	SU35E5 \ ECBS1	SU35E5 \ ECBSU1	SU35E5 \ ECBSI1	SU35E9 \ ECBS1
eCB 2	SU35E5 \ ECBSD2	SU35E5 \ ECBS2	SU35E5 \ ECBSU2	SU35E5 \ ECBSI2	SU35E13 \ ECBS2
DLSS	CRDEV2 \ DLSST1	N/A	N/A	N/A	CRPAS1 \ DLSS1
WAS 1	SU35E5 \ WASD1	SU35E5 \ WASS1	SU35E5 \ WASU1	SU35E5 \ WASI1	SU35E9 \ WASP1
WAS 2	SU35E5 \ WASD2	SU35E5 \ WASS2	SU35E5 \ WASU2	SU35E5 \ WASI2	SU35E13 \ WASP2
Informatica	SU35E5 \ INFD1	SU35E5 \ INFS1	SU35E5 \ INFU1	SU35E5 \ INF11	SU35E18 \ INFP1

2.2.2 FAFSA WebSphere MQ Environments

Server \ Queue Manager	Environments				
System	Development	Test	Performance Test	Demo Production	Production
FAFSA	HPA2 \ FAFSAD1 (FAFSA) HPA2 \ FAFSAD2 (EAI) SU35E5 \ FAFSAD3 (Demo)	HPA2 \ FAFSAT1	HPN3 \ FAFSAI1 HPN8 \ FAFSAI2	SU35E9 \ FAFSAT2 SU35E13 \ FAFSAT3	HPN2 \ FAFSAP6 HPN4 \ FAFSAP7 HPN15 \ FAFSAP2 HPN16 \ FAFSAP3 HPN7 \ FAFSAP5



2.3 FSA Supported Business Systems

The EAI architecture supports the inter-system messaging for FSA’s business critical systems:

- Central Processing System (CPS)
- Financial Management System (FMS)
- Direct Loan Servicing System (DLSS)
- Student Aid Internet Gateway (SAIG)
- Postsecondary-Education Participant System PEPS)
- National Student Loan Data System (NSLDS)
- Credit Management Datamart (CMDM)
- Ombudsman
- Loan Origination Web (LOWeb)
- e-Campus-Based (eCB)
- Financial Partners Datamart (FPDM)
- Common Origination & Disbursement (COD)
- eZ-Audit
- Free Application For Federal Student Aid (FAFSA)*

*FAFSA is the only system that does not use the EAI Bus servers for messaging. There is a WebSphere MQ point-to-point interface between FAFSA and CPS.

2.3.1 System Interfaces

The EAI architecture allows FSA business systems communicate with one another by use of WebSphere MQ-based message transactions which are categorized as either batch or real-time.

Batch transactions are generally large, multi-record files transmitted on a defined or regular interval where the submitting system is not typically expecting an immediate response or acknowledgement. This type of transaction comprises the majority of inter-system communication at FSA.

Unlike batch, real-time transactions occur immediately based on a user submission or action and typically require an immediate or real-time response or acknowledgement. This type of transaction is often associated with FSA’s web-based applications such as LOWeb and FAFSA.

2.3.1.1 Batch Interfaces

The following table details the current batch interfaces:

Interface	Source System	Target System	Transaction
COD-CPS	COD	CPS	Recipient Record
COD-DLSS	COD	DLSS	Daily Batch File
COD-SAIG	COD	EAI	COD Response Record - Pre-XF
COD-SAIG	COD	SAIG	COD Reports
COD-CPS	CPS	COD	Abbreviated Applicant (AAR) File
CPS-NSLDS	CPS	NSLDS	CPS Match Data
CPS-NSLDS	CPS	NSLDS	CPS Post-Screening Errors
CPS-NSLDS	CPS	NSLDS	CPS Demographic Data
COD-DLSS	DLSS	COD	Daily Batch File Response
COD-DLSS	DLSS	COD	Disbursement Confirmation (RDC)
DLSS-CMDM	DLSS	CM Datamart	School Demographic File
DLSS-CMDM	DLSS	CM Datamart	Borrower Demographic File
DLSS-CMDM	DLSS	CM Datamart	Loan Information File



Interface	Source System	Target System	Transaction
DLSS-CMDM	DLSS	CM Datamart	Record Count File
PEPS daily feed	PEPS	COD	PEPS Daily Delta File
PEPS daily feed	PEPS	eCB	PEPS Daily Participant Feed
PEPS daily feed	PEPS	eZ-Audit	PEPS Daily Participant Feed
COD-SAIG	EAI	SAIG	COD Response Record - Post-XF
FMS-CMDM	FMS	CM Datamart	IF010 File Transfer
FMS-CMDM	FMS	CM Datamart	IF020 File Transfer
FMS-CMDM	FMS	CM Datamart	GREC File Transfer
FMS-CMDM	FMS	CM Datamart	Manual File Transfer
FMS-FPDM	FMS	FP Datamart	Origination Fee Data
FMS-FPDM	FMS	FP Datamart	Interest Benefit Data
FMS-FPDM	FMS	FP Datamart	Special Allowance Data
FMS-FPDM	FMS	FP Datamart	Part 1V Data
FMS-FPDM	FMS	FP Datamart	Part V Data
FMS-FPDM	FMS	FP Datamart	Lender IDs and Addresses
FMS-FPDM	FMS	FP Datamart	Fee Tracking Data
FMS-FPDM	FMS	FP Datamart	Lender Fee Data
FMS-FPDM	FMS	FP Datamart	Service/Lender Relationship Data
CPS-NSLDS	NSLDS	CPS	Renewal Applicant File
CPS-NSLDS	NSLDS	CPS	NSLDS Match Data
CPS-NSLDS	NSLDS	CPS	NSLDS Post-Screening Data
NSLDS-FPDM	NSLDS	FP Datamart	GA NSLDS FFEL Claims payment data
NSLDS-FPDM	NSLDS	FP Datamart	FP Lender Default Rates Extract
NSLDS-FPDM	NSLDS	FP Datamart	FP GA Annual Reasonability Extract
NSLDS-FPDM	NSLDS	FP Datamart	Detail Level Open Portfolio data
NSLDS-FPDM	NSLDS	FP Datamart	Summary Level Open Portfolio data
PEPS-FPDM	PEPS	FP Datamart	Lender Audit File
PEPS-FPDM	PEPS	FP Datamart	Lender Audit Deficiency File
PEPS-FPDM	PEPS	FP Datamart	Lender Program Review File
PEPS-FPDM	PEPS	FP Datamart	Lender Program Review Deficiency File
PEPS-FPDM	PEPS	FP Datamart	Closed School File
PEPS-FPDM	PEPS	FP Datamart	Lender Association File with Parent Lenders
PEPS daily feed	PEPS	EAI	PEPS Daily Participant Feed
COD-SAIG	SAIG	COD	School to COD Input Record
Mellon-FMS	SAIG	FMS	Mellon Lockbox File
LARS-FMS	SAIG	FMS	LARS File
eCB-FMS	eCB	FMS	3G OB-Only File
eCB-FMS	eCB	FMS	1G OB-Only File
eCB-FMS	eCB	FMS	FISAP Expenses
eCB-FMS	eCB	FMS	Perkins Loan Balance Sheet
eCB-FMS	eCB	FMS	Unpaid Teacher Cancellation Liabilities
Ombudsman	EAI	NSLDS	Ombudsman File



2.3.1.2 Real-Time Interfaces

The following table details the current real-time interfaces:

Interface	Source System	Target System	Transaction
LOWeb-COD	LOWeb	COD	P-Note Record
LOWeb-COD	LOWeb	COD	PLUS Endorser Record
LOWeb-COD	LOWeb	COD	Credit Check Record - Request
COD-LOWeb	COD	LOWeb	Credit Check Record - Reply
LOWeb-COD	LOWeb	COD	Borrower Validation - Request
COD-LOWeb	COD	LOWeb	Borrower Validation - Reply
FAFSA	FAFSA	CPS	W11 - Get Status
FAFSA	FAFSA	CPS	O31 - Federal School Code Search
FAFSA	FAFSA	CPS	W12 - Perform Edits / Submit Data
FAFSA	FAFSA	CPS	O30 - Federal School Code Lookup
FAFSA	FAFSA	CPS	R44 - Get RAPP Data
FAFSA	FAFSA	CPS	E28 - Submit PIN Registration Request
FAFSA	FAFSA	CPS	V01 - Get Transaction Data
FAFSA	FAFSA	CPS	V02 - Process Control Batch Lookup
FAFSA	FAFSA	CPS	V03: Process Control Batch Search
FAFSA	FAFSA	CPS	R45: Submit FAA RAPP PIN Request
FAFSA	FAFSA	CPS	C18: Submit Signature Hold Request
FMS-COD	FMS	COD	Financial Data
FMS-COD	FMS	COD	Financial Data - Response/Confirmation
COD-FMS	COD	FMS	Financial Data
COD-FMS	COD	FMS	Financial Data - Response/Confirmation