

July 8, 2014

Dear Interested Parties:

Federal Student Aid (FSA) (<http://federalstudentaid.ed.gov/>), a principal office of the Department of Education (DoED, <http://www.ed.gov/>), ensures that all eligible individuals can benefit from federally funded or federally guaranteed financial assistance for education beyond high school. FSA consistently champions the promise of postsecondary education and training to all Americans – and its value to our society.

FSA plays a central and essential role in the American community of postsecondary education. We partner with postsecondary schools and financial institutions to deliver programs and services that help students finance their education beyond high school.

Today, FSA is responsible for a range of critical functions that include, among others:

- Processing millions of student financial aid applications;
- Disbursing billions of dollars in aid funds to students through schools;
- Enforcing financial aid rules and regulations;
- Partnering with schools, financial institutions and guaranty agencies to prevent fraud, waste and abuse;
- Educating students and families about the process of obtaining aid;
- Servicing millions of student loan accounts;
- Informing borrowers of their repayment options and obligations and securing repayment from those who have defaulted on their loans; and
- Operating information technology systems and tools that manage billions of student aid dollars.

Designated as a Performance-Based Organization (PBO) by Congress in 1998, FSA emphasizes tangible results and efficient performance, as well as the continuous improvement of the processes and systems that support our mission.

This Request for Information (RFI) is for planning purposes only and shall not be construed as a Request of Proposal or as an obligation on the part of the U.S. Department of Education, Office of Federal Student Aid (FSA) to acquire any products or services.

FSA does not intend to award a contract on the basis of this RFI nor pay for the information provided. No entitlement to payment of direct or indirect costs or charges will arise as a result of submission of responses to the RFI and/or FSA's use of such information. The information provided shall be provided at no cost to the Government.

FSA is conducting market research to identify qualified and experienced firms that can provide a comprehensive, adaptable, and scalable solution and services to support FSA's requirements related to institutional data challenges as outlined in the attached Statement of Objectives (SOO).

This RFI is issued for information gathering purposes. Firms are highly encouraged to participate. It is the intent that input gathered during the RFI process will directly influence scope and requirements in any potential future solicitation.

FSA will review these responses and determine their relevance for its purpose. FSA intends to contact any respondent from which it desires to receive more information and arrange either in-person or by telephone appointments.

FSA will not pay any respondent for preparation of its response and assumes no liability for disclosure or use of unmarked data and may use or disclose such data for any purpose.

*Non-Obligation*

As noted above, this RFI shall not be construed to commit FSA to pay any costs incurred in connection with any information submitted. FSA does not authorize the interested parties to procure or contract for any materials or services.

Issuance of this RFI in no way obligates FSA to release an associated future competitive solicitation.

*Deadline Dates and Time:*

Any questions about the content of this RFI should be submitted to Ms. Dega Hussen at [dega.hussen@ed.gov](mailto:dega.hussen@ed.gov) by no later than 2:00PM (Eastern), July 18, 2014. FSA will make every effort to address those questions before RFI responses are due.

Please return completed RFI responses to Ms. Dega Hussen at [dega.hussen@ed.gov](mailto:dega.hussen@ed.gov) by **no later than 5:00PM (Eastern), July 25, 2014**.

Cordially,

/s/

Dega Hussen  
Executive Business Advisor/Contracting Officer  
FSA Acquisitions Office

Attachments:

1. FSA Data Challenges Statement of Objectives (SOO), version 1.2, dated June 30, 2014
2. Electronic Cohort Default Rate (eCDR) Upgrade Design Document, version 1.0.0, dated 1.30.2014
3. National Institute of Standards and Technology (NIST) Guides for the Security Portal
4. Proposed Solution ROM Worksheet

## **INSTRUCTIONS TO INTERESTED PARTIES**

### **I. Content**

- a. *Past Performance – No more than four (4) pages excluding cover letter and table of contents pages*

Two (2) recent or past (within the last three years) client references in which information provided includes client’s point of contact (name, phone number, and email address); brief description of work performed, total contract duration and value; and measurable achievements realized by the client organization.

In particular, references should sufficiently demonstrate knowledge and understanding of the following that are in descending order of importance:

1. Statutory and Regulatory Requirements for Title IV financial aid programs;
2. Overall FSA student aid delivery systems and data;
3. Cohort Default Rate; and
4. Executive mandates, guidance, and directives pertaining to and/or impacting post-secondary educational matters.

- b. *Response to Data Challenge Scenario (page 3 of SOO) – No More than ten (10) pages excluding cover letter and table of contents pages*

- i. Option #1: Modify eCDR System
- ii. Option #2: Service-based Solution
  - Existing workflow application/system
  - Or*
  - New COTS-based workflow application/system

- c. *Estimated Level of Effort (Rough Order of Magnitude) - No more than one (1) page*

Using MS Excel worksheet (Attachment 4), interested party may calculate its estimated duration, level of effort (hours), and total price to meet the government’s objectives as stated in the SOO (Attachment 1).

Proposed data challenges solution must meet the following high level objectives:

- Flexible and adaptable process and system that can quickly and easily process many data challenge types – including CDR challenges, all data challenges arising from the GE Regulations, and other student level data challenges arising from other ED produced metrics.
- Capable of allowing users to submit challenges, submit data and documentation supporting the challenge (may be multiple documents, document types to include PDFs,

Word, and more, and various sizes), submit questions and responses related to challenge data, and receive results of challenge outcomes.

- Ability to create customized inquiries and data sharing, and workflow processes that incorporate the business rules related to data challenges, routing, notifications and approvals.
- Capable of allowing for workflow processes to be triggered by calendar based events (related to Regulation timelines and items such as recalculation of final rates) and/or business rules.
- Offer interface with FSA's current systems to receive the underlying detailed calculation data from the calculation system for use in the challenge process, and the ability to send any data corrections back to the calculation system for Final rate calculation. This must be done in formats acceptable by the calculation system (National Student Loan Data System (NSLDS)).
- Adherence to technical and security requirements stated in the SOO as well as applicable reference and standards including NIST guides (Attachment 3).

## **II. Format**

The information provided for this RFI shall be double-spaced, size-12 font, and contain only substantive information, and not exceed fifteen (15) pages. All responses are to be in electronic form. Files are to be in MS Word 2010 or Adobe Acrobat XI.

# DATA CHALLENGES SOLUTION

# STATEMENT OF OBJECTIVES

**June 30, 2014**

**Version 1.2**

## Executive Summary

U.S. Department of Education (ED), Federal Student Aid (FSA) has a variety of program metrics that are or will be published on a frequent basis. Current and proposed regulations allow for institutions to challenge and appeal those metrics based on detailed data included in the metric calculation.

FSA currently publishes cohort default rates (CDR) annually. The CDR Regulations allow for multiple data challenge types.

On March 25, 2014, ED published a Notice of Proposed Rulemaking (NPRM) for Gainful Employment (GE) 79 FR 16426. It is expected that final GE regulations, resulting from this NPRM, will be published no later than November 1, 2014. The new GE Regulations may include provisions that will allow for multiple data challenge types. In addition, there may be additional data adjustment mechanisms that may be needed for institutions as a result of other metrics developed in response to the administration's transparency initiatives, such as the College Scorecard.

## Objective

To manage a high number of challenges, FSA is looking at solution alternatives that will include a system with workflow capabilities, interfaces with FSA systems and other partner data systems, analytical capabilities for basic checks in challenge data, and contracted staffing to resolve challenges within the timeframe indicated in the regulations.

At minimum, any potential service and/or system solutions shall include:

- Electronic intake process for institutions to submit data challenges, workflow for case resolution to include approvals by FSA staff (preferably by challenge types at an aggregate level);
- Regular management reporting to FSA management and staff on the number, status of challenge, and time to resolution statistics;
- Automated resolution techniques for simple data challenges allowing interfaces with FSA's systems to check for timing differences and data updates as part of the challenge resolution as well as additional automated processes that would make case processing more efficient;
- Routine customer support services for challenge entry and inquiry;
- Capability to transfer any changed data to the calculation system (National Student Loan Data System (NSLDS)) in order to revise, update, and distribute as final calculations.

## *I. Overview*

FSA currently conducts a challenge process in support of the cohort default rate regulations in Subpart N of the Student Assistance General Provisions regulations (34 CFR Part 668).

For the most recent cohort year, 2011, over 357 institutions submitted data challenges on the three year draft CDR. Of the 357 institutional challenges, each submission could range from data challenges on as few as 10 loans to more than 1,000 loans.

With the proposal of new regulations and new metrics for public use, FSA will be responsible for many more data challenges in coming years. The current NPRM for Gainful Employment was used as a basis to estimate over 300,000 loan level challenges during the first metric calculation year.

FSA has a current intake process that allows institutions to electronically submit data challenges in relation to CDR. Those data challenges are reviewed and resolved on a case-by-case basis by FSA staff. The volume of challenges continues to increase with new regulations and the possibility of additional metrics compounds the issue.

## *II. Background*

The Gainful Employment (GE) initiative is in support of the implementation of proposed new regulations that, if finalized will apply to all postsecondary institutions that have GE programs. The Higher Education Act of 1965 (as amended) states that in order to be eligible for funding under the Title IV programs, an educational program at a non-profit or public institution must lead to a degree (associate, bachelor's, graduate, or professional) or, at all types of institutions, must prepare students for "gainful employment in a recognized occupation". There are over 5,000 institutions with GE Programs that are currently participating in the Title IV programs for a total of over 64,000 GE programs.

The current Electronic Cohort Default Rate (e-CDR) Appeals System supports institution level Cohort Default Rate (CDR) Challenges. The platform needs to support large volumes, and interfaces with multiple sources. With the number of data challenges increasing each year and the addition of proposed GE metrics at the program level, the current e-CDR Appeals System cannot support the expected volume increase. The eCDR Appeals system maintains information throughout the case's life cycle about key dates and actions taken by the school and the data providers/managers.

College Scorecards in the U.S. Department of Education's College Affordability and Transparency Center (CATC) were designed by the U.S. Department of Education to meet requirements in the Higher Education Opportunity Act and to provide better information to student and parent consumers about college costs. It serves as a central point to several tools that allow users to compare colleges' tuition and fees, net price, and other



characteristics. The CATC is maintained by the Office of Postsecondary Education with support and technical assistance from the National Center of Education Statistics and Federal Student Aid.

Unlike GE and CDR, there are currently no data challenges in relation to the CATC; however, any proposed solution should be robust and adaptable in the event there are future requirements from other initiatives.

## **Data Challenge Scenario**

This section outlines a typical data challenge currently managed by FSA staff along with schools and data providers/data managers.

Data Provider is a generic term used to refer to a Guaranty Agency and Federal Loan Servicer users. Data Provider personnel who work with Cohort Default Rates commonly refer to themselves as “Data Managers”. The two terms should be considered synonymous.

### ***1. Roles and Responsibilities***

Within the current CDR workflow process, below is list of user roles and primary responsibilities:

- School Case Preparer – responsible for preparation of the data challenge case, including gathering of student loan level information and supporting documents for each data challenge.
- School Case Manager – same duties as School Case Preparer with additional responsibility for certification and submission of the data challenge case for the School.
- Data Provider (DP) Response Preparer - responsible for review of data challenge/corrections to determine validity of the request. Also responds to data challenge/correction inquiries and provides DP’s opinion.
- DP Manager – same duties as Data Provider Response Preparer with additional responsibility to submit the case formally for review by Case Response Preparer.
- Case Response Preparer/Manager – responsible for review of school’s data challenge requests and preparing final recommended decision on the case. Also, provides responses to inquiries or requests for additional information from both the School and Data Providers. It is expected that this role will be handled by the vendor providing the data challenge solution.
- Federal Student Aid (FSA) Case Reviewer/Manager – responsible for review of all case information, including responses/information provided by the Case Response

Preparer, Data Provider and School. Resolves the case and issues the final decision on the case outcome.

Data challenge system must restrict user access to case filings based on user role.

## **II. Process Steps**

### **a) School Submission of Data Challenge Case**

The school accesses the data challenge system for the purpose of creating a case.

To initiate the case, the institution must first request the back-up data file (loan level data) that supports the program level data for the challenge. This back-up data file is maintained by the calculation system (NSLDS).

Once the back-up data is available, the institution can begin to enter the data challenge information for each school/ Classification of Instructional Program (CIP) /GE program borrower loan level data being challenged. The type of information being entered into the challenge system will differ depending on the type of data challenge.

Using the challenge system, the following elements are examples of the type of data that may be entered by the institution:

- Institution Code (OPEID)
- GE Program Code/CIP Code
- Credential Level
- Student Identifier Information (SSN)
- Loan Type
- Loan Date
- Loan Period Begin Date
- Loan Period End Date
- Loan Amount
- Loan Status
- Type of Data Challenge (Debt-to-Earnings, pCDR, etc)
- Reason for Data Challenge
- Correct Data for Data Fields Being Challenged

The school inputs the data challenge information for the case and certifies and submits the information to the Case Response Preparers. The challenge system (NSLDS) tracks the timeliness of the case submission and determines if the case was submitted before the challenge deadline expired.

### **b) Case Preparation, Review and Decision Workflow**

Case Response Preparers and FSA are alerted that a new case has been submitted, which is then reviewed for completeness. Requests for additional information, clarification, or supporting documentation may be sent between the Case Response Preparers, Data Providers the Schools and FSA.

Case Response Preparers review the case to determine merit of the data challenge by ensuring appropriate supporting data and information have been received from the School and/or the Data Providers.

Case Response Preparers may request additional information, clarification or supporting documentation from the School and/or the Data Providers.

Once these requests for information/documentation are sent to the School or Data Providers, the challenge system notifies the appropriate party of an open work item that requires follow up and response.

Inquiries, information and responses are sent back and forth between the School, Data Providers, and Case Response Preparers using the workflow tools in the challenge system.

Once all data and information is collected, the Case Response Preparers input their final determination into the challenge system for each loan in the data challenge. Case Response Preparers submit case to FSA Case Managers for final decision.

c) FSA Review and Decision

FSA Case Managers are notified by the system of receipt of completed case for review.

FSA Case Managers review the case, including loan level information, case history and supporting documentation. FSA Case Managers determine if they agree or disagree with the final determination submitted by the Case Response Preparers.

If open questions remain, FSA Case Managers submit questions and requests for clarification back to the Case Response Preparers for resolution.

If FSA Case Managers agree with the final determination, FSA Case Managers finalize the case, send notifications to the School and Data Providers, and close the case.

Final detailed case outcomes are captured by the data challenge system as a data file to be sent to the calculation system (NSLDS) once all data challenges for the cycle have been completed.

### **III. Technical and Security Requirements**

Interested party shall comply with the FSA's Project Governance Model (Federal Student Aid Lifecycle Management Methodology (LMM)), which defines the control level activities

and a minimum set of documentation requirements to successfully oversee the development and implementation of a solution. Refer to the Lifecycle Management Methodology section of the Federal Student Aid Information Technology (IT) Standards Library for additional information.

Any solution shall comply with Federal Statutes, Standards and Guidelines for Security such as: Federal Information Security Act (FISMA) (2002), Computer Security Act (1987), Privacy Act (1974), FIPS Pub 199, FIPS Pub 200, FIPS Pub 140-2, NIST SP 800-34, NIST SP 800-18, NIST SP 800-30, NIST SP 800-37, NIST Pub 800-47, NIST SP 800-50, NIST SP 800-53, NIST SP 800-88, NIST SP 800-137, Office of Management and Budget (OMB) Circular A-130, OMB Circular A-123 and Department of Education and Federal Student Aid policies.

Interested party shall certify that the delivered solution complies or will comply with the security authorization processes as outlined in National Institute of Standards and Technology Special Publication NIST-SP-800-37 entitled Guide for Applying the Risk Management Framework to Federal Information Systems: A Security Life Cycle Approach, and supporting OCIO policies, standards, and procedures. In accordance with the identified risk rating, the solution shall satisfy the appropriate security controls as defined in Federal Information Processing Standards FIPS 200 and National Institute of Standards and Technology NIST-SP 800-53 entitled Recommended Security Controls for Federal Information Systems and Organizations.

## Applicable References and Standard

- a. [Subpart M](#) (2-year Cohort Default Rates) and Subpart N (Cohort Default Rates) of Section 668 of the Code of Federal Regulations.
- b. [Subpart A](#) (General) of section 668 of the Code of Federal Regulations for reporting and disclosure requirements.
- c. Additional default prevention and management information available on [ifap.ed.gov](http://ifap.ed.gov).
- d. Gainful Employment (GE) Information Resources [website](#).
- e. [NSLDS User Guide](#) for reporting GE data.
- f. [GE Operations Manual](#).
- g. White House [College Scorecard](#).
- h. FSA Information Technology [\(IT\) Standards Library](#).

**U.S. Department of Education  
Federal Student Aid**

**Electronic Cohort Default Rate Technology  
Upgrade Design Document**

**Version # 1.0.0**

**01/30/2014**

## Document Version Control

Ver	Date	Description

## Table of Contents

Document Version Control .....	ii
Table of Contents .....	iii
List of Figures .....	v
List of Tables .....	vi
Section 1 Introduction.....	1
1.1 Background.....	1
1.2 Purpose.....	1
1.3 Scope.....	1
1.4 Intended Audience .....	2
1.5 Document Organization.....	2
1.6 References and Related Documents .....	2
Section 2 Requirements Overview.....	4
Section 3 System Context Model.....	5
3.1 System Context Diagram .....	5
3.2 End Users .....	6
3.3 External Touch Point Systems .....	6
3.4 External Interfaces .....	6
Section 4 Architecture Overview .....	7
4.1 Architecture Overview Diagram.....	7
4.2 Architecture Overview Descriptions .....	7
4.2.1 Servers.....	7
4.2.2 Layers.....	8
Section 5 Functional Architecture .....	9
5.1 Component Model .....	9
5.1.1 Component Diagram(s).....	9
5.1.2 Component Descriptions.....	9
5.1.3 Component Interaction.....	10
Section 6 Architecture Decisions.....	2
Section 7 Operational Model .....	10
7.1 Locations.....	10

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7.2 Logical Operational Model.....	10
7.3 Node Descriptions.....	10
7.4 Connection Descriptions.....	10
7.5 Node Deployment and Deployment Unit Model.....	10
Section 8 User Interface Approach.....	11
Section 9 Logical Data Model.....	18
9.1 eCDRAppeals Data Model.....	18
9.2 Data Dictionary.....	22
Section 10 Integration Architecture.....	23
10.1 Data Migration Plan.....	23
10.2 Initial Load Data Migration Approach.....	23
10.3 On-Going Data Integration Approach.....	23
Section 11 System Modifications.....	24
11.1 Package Application Modifications.....	24
11.2 Legacy Application Modification.....	24
Section 12 Reporting Architecture.....	25
Section 13 Enterprise Service Model.....	26
Section 14 Non-Functional Requirements Design.....	27
14.1 Performance Model.....	27
14.2 Security and Privacy.....	27
14.3 Reliability and Availability.....	28
<b>Appendix A. Acronyms and Abbreviations.....</b>	<b>30</b>



## List of Figures

Figure 3-1: System Context Diagram .....	5
Figure 4-1: Architecture Overview Diagram .....	7
Figure 5-1: XSites Component Diagram .....	9
Figure 8-1: Basic UI Layout .....	12
Figure 8-2: Facelet and Backing Bean Interaction .....	<b>Error! Bookmark not defined.</b>
Figure 9-1: XSites Data Model .....	<b>Error! Bookmark not defined.</b>
Figure 14-1: Logical Architecture Diagram .....	29

## List of Tables

Table 1-A: Intended Audience and Document Uses.....	2
Table 3-A: XSites Context Model Users .....	6
Table 3-B: External Interface Details .....	<b>Error! Bookmark not defined.</b>
Table 6-A: Use A Flexible Application Design.....	<b>Error! Bookmark not defined.</b>
Table 9-A: XSites Entity Descriptions .....	21
Table 14-A: Acronyms .....	30

## Section 1 Introduction

*[This section, including all subsections except intended audience, is mandatory.]*

### 1.1 Background

*[This part of section one should capture background information on the project and this preliminary design to provide background and context to the reader.]*

The eCDRAppeals system was developed in 2007 and deployed in 2008. During the planning phase, the developers decided to use Inversion of Control to manage dependencies between the components of the application. This allowed for more flexible and more efficient development because developers could work on different components without having to know the implementation details of the components they were not working on. A dependency-injection framework was meant to take care of that.

At the time of development, the team determined that the most mature framework available was Spring 2.0. At the same time, the team selected Hibernate as the Object Relational Mapping (ORM) framework. The ORM framework simplified the code needed for interacting with the database. Java Server Pages (JSP) was the only choice for the web portion of the application so it was selected by default. The last upgrade to the technology stack took the framework version up to Spring 2.5. No further upgrades were done to the stack. The code has been reviewed and updated when necessary to maintain compatibility with the Java version used in the application servers as the servers were upgraded. This is the current state.

The application's technology stack will be upgraded to use EJB3, JPA2 and JSF2. This will accomplish several things. It will bring the application in line with the FSA technology vision. It will update the application to current industry standards. This will allow the use of application libraries that will make code maintenance easier and also provide new capabilities for improved user experience.

### 1.2 Purpose

*[This section defines the intended goals of this preliminary design document.]*

To provide developers with an overall structure for the upgrade to keep the application code consistent with existing design. It is also to keep the user interface consistent and in-line with user expectations.

### 1.3 Scope

*[This section provides a brief description of the boundaries of this design document, what this design document applies to, and what is affected or influenced by this design document.]*

This document applies to the whole application. User interface, business code, workflow, database, and security.

## 1.4 Intended Audience

*[OPTIONAL – The table below lists the intended users for this document, the document sections most relevant for each type of user, and the purpose for which the users may utilize the information in this document.]*

**Table 1-1: Intended Audience and Document Uses**

User(s)	Relevant Section(s)	Use(s)
FSA Technology Office Staff	All	Provide staff with information about the project.
FSA Business Owners, Analyst	User Interface, Workflow	Provides business owners with opportunity to validate design choices.
Developers	All	Basis for implementing the solution.
Tester	All	Designing test cases

## 1.5 Document Organization

*[This subsection summarizes how the preliminary design document is organized. The following verbiage may be used.*

*This document comprises the following sections:*

- *Section 1 – Introduction – The background, purpose, and scope for this document.*
- *<body sections of the document>*
- *Appendix A – Definitions of acronyms and abbreviations used in this document.*
- ***Error! Reference source not found.** – **Error! Reference source not found.** – Definitions of terms used in this document.*
- *<additional Appendices as needed>]*

## 1.6 References and Related Documents

*[This subsection should provide a complete list of all documents referenced elsewhere in the Preliminary Design Document. Each document should be identified by title, report number (if applicable), date, and publishing organization. Specify the sources from which the references can be obtained. This information may be provided by reference to an appendix or to another document.]*

*[References for the Preliminary Design Document template are:*

*Federal Student Aid, LCM Framework, the most recent version may be obtained from the Federal Student Aid CIO Library site.*

*Federal Student Aid, Enterprise Service Model, the most recent version may be obtained from the Technical Architecture Support Services team.*

*Federal Student Aid, Exemplar Preliminary Design, Version 2.1, September 2009.*

*Federal Student Aid, Exemplar Detailed Design, Version 2.2, August 2009.*

*Federal Student Aid, Exemplar User Interface Specifications, Version 1.3, September 2009.*

*Federal Student Aid, Exemplar Detailed Requirements Document, Version 1.0, September 2009.*

*Federal Student Aid, Exemplar Interface Control Document – Person Updates from CPS to PRMS, Version 1.1, October 1, 2008.]*

## Section 2 Requirements Overview

*[This section is intended to provide some background to the preliminary design with respect to the requirements driving the design. This would typically be in the form an overview and references to the approved requirements documents. Depending on what types of requirements documents were produced for the project, this may include a background narrative accompanied by a use case model, business process model overview, or a summarization of other requirements that may be available, as well as references to the approved requirements documents (which should have detailed references in the references subsection in section one). The requirements details should not be duplicated in this section. Refer to the exemplar preliminary design document for an example of a completed requirements overview.]*

All requirements implemented in the current version will also be implemented in the upgraded version. Defects will be considered for implementation with the upgrade on a case-by-case basis. Backlogged enhancements and feature requests will be implemented after the application has been upgraded.

## Section 3 System Context Model

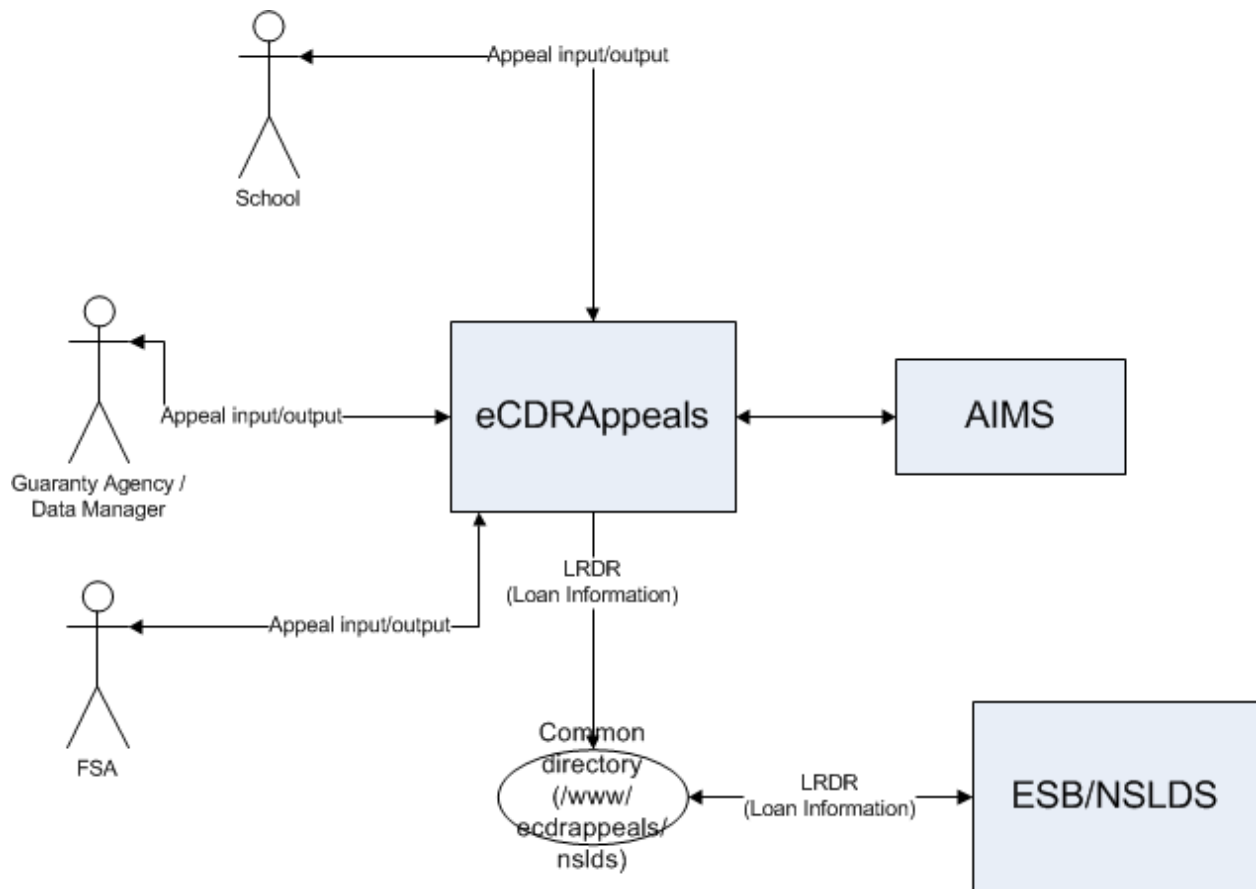
The purpose of the system context model is to outline the project scope with regard to external interface touch points. The system context model consists of three elements:

- System Context Diagram
- User and System Descriptions
- Interfaces Descriptions

The context diagram represents eCDRAppeals as a single object or process and identifies the interfaces between the system and external entities. The context diagram is followed by sections describing the users, systems, and interfaces identified in the diagram.

### 3.1 System Context Diagram

Figure 3-1: System Context Diagram defines eCDRAppeals as a single object and identifies the information flows that cross the system boundary. Each line represents a logical interface between eCDRAppeals and an external user.



**Figure 3-1: System Context Diagram**

### 3.2 End Users

Table 3-1: eCDRAppeals Context Model Users describes the end-users that interact with XSites as described in the system context diagram in Figure 3-1.

**Table 3-1: eCDRAppeals Context Model Users**

User	User Description
School	Schools Users – submits appeals to make corrections on their Cohort Default Rate (CDR)
Guaranty Agency/Data Manager	Loan Servicers – review allegations on appeals and determines if loan records support the allegations or not.
FSA	FSA Operations Performance Division (OPD) Staff - reviews appeals and make determination on effect of appeals on Cohort Default Rate (CDR)

### 3.3 External Touch Point Systems

eCDRAppeals uses FSA’s Authorization and Identity Management System (AIMS) for authentication and authorization information.

### 3.4 External Interfaces

There are two points where eCDRAppeals receive data from external systems. They are not interfaces in the technical sense as there are no direct interactions between eCDRAppeals and these other systems. The systems and their method of transferring data is as follows:

- AIMS - AIMS provides authentication and authorization to the application over the HTTP headers. This data is provided on every request to the application and the process is transparent to the application. The only thing that eCDRAppeals need to do is parse the headers for the data. It does not “care” where the data comes from, it only needs to know the format of the data.
- NSLDS/ESB (National Student Loan Data System/Enterprise Service Bus) – NSLDS provides loan records via a file sent over ESB and ESB downloads the files into a folder that eCDRAppeals has access to. eCDRAppeals checks this folder for any file and if one is found, the file is processed into the application.

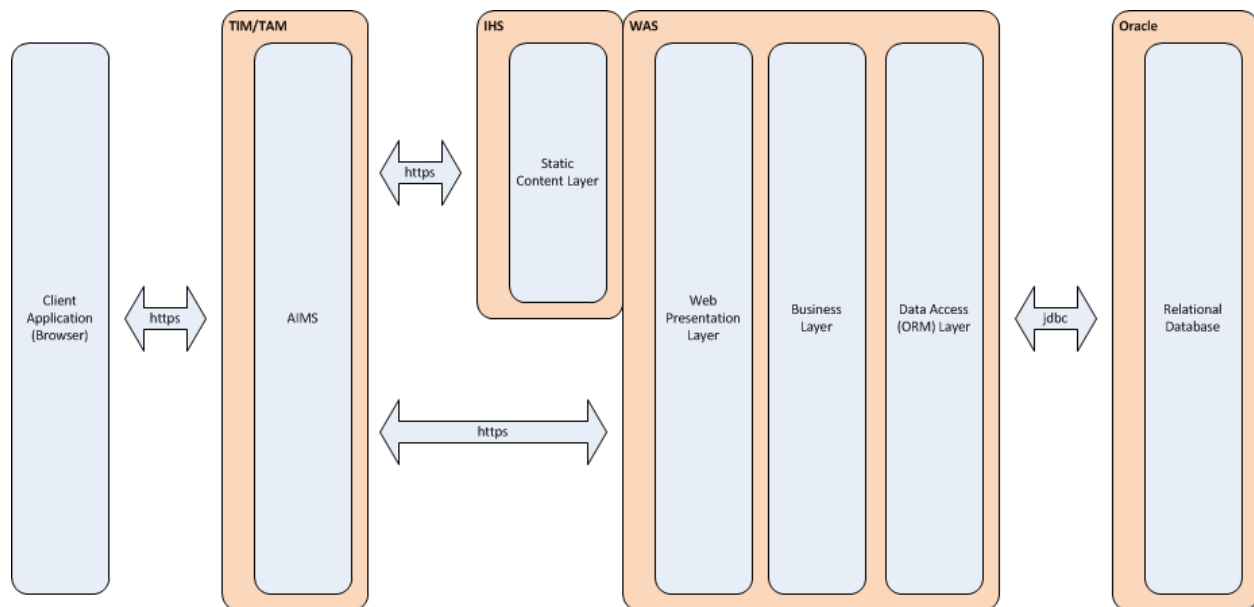


## Section 4 Architecture Overview

eCDRAppeals will be hosted in the Enterprise Integrated Technical Architecture environment, with the middleware components provided by EITA services. A virtualized EITA environment will host all eCDRAppeals environments: development, test, stage, and production.

eCDRAppeals will be hosted at the FSA Virtual Data Center (VDC). The VDC provides a highly available, redundant environment for hosting applications. The VDC provides backup, recovery, and monitoring services for all applications. The VDC's Service Level Agreements (SLAs) will be applicable to eCDRAppeals.

### 4.1 Architecture Overview Diagram



**Figure 4-1: Architecture Overview Diagram**

### 4.2 Architecture Overview Descriptions

eCDRAppeals employs a multi-layer architecture. Layers may be implemented in the same or on separate servers based on the functionalities provided by the servers.

#### 4.2.1 Servers

- **TIM/TAM (Tivoli Identity Manager/Tivoli Authorization Manager)** – TIM and TAM may actually be deployed on separate servers but they both support AIMS in coordination and normally treated as one.
- **IHS (IBM HTTP Server V8.5.0.1)** - Supports the Static Content Layer. This serves static content for the application including user guides, FAQs, and other documents.

- WAS (Websphere Application Server V8.5.0.1) – Supports the Web Presentation, Business, and Data Access Layers. WAS supports JEE6 which allows the application to use EJB3, JSF2, and JPA2.
- Oracle (Oracle 11g) – Supports the Relational Database Layer. Oracle 11g provides a high-availability (HA) data grid for the application to store its data in.

#### 4.2.2 Layers

- AIMS
  - As part of access management services, AIMS provides authentication and authorization services along with self-care utilities such as change password, forgot password, etc. Additionally, AIMS access management module enforces re-authentication during session timeouts and requires Secure Socket Layer (SSL) to access eCDRAppeals.
  - AIMS ensures that only properly authenticated and authorized users can access eCDRAppeals. After a user is authenticated and authorized, AIMS passes the user information to the application via HTTP headers.
- Static Content Layer
  - Serves static pages such as the landing page, FAQ page, and help pages. Also serves user guides and other documents.
- Web Presentation Layer
  - Will use JSF and component libraries to provide a web-based user interface.
- Business Layer
  - Will use EJB service classes to implement business logic needed by the application. Business logic includes workflow for managing the appeal business process.
- Data Access (ORM) Layer
  - Will use EJB entities and JPA functionality for database operations.

## Section 5 Functional Architecture

### 5.1 Component Model

The component model breaks the solution into manageable components, and specifies the relationships between those components.

#### 5.1.1 Component Diagram(s)

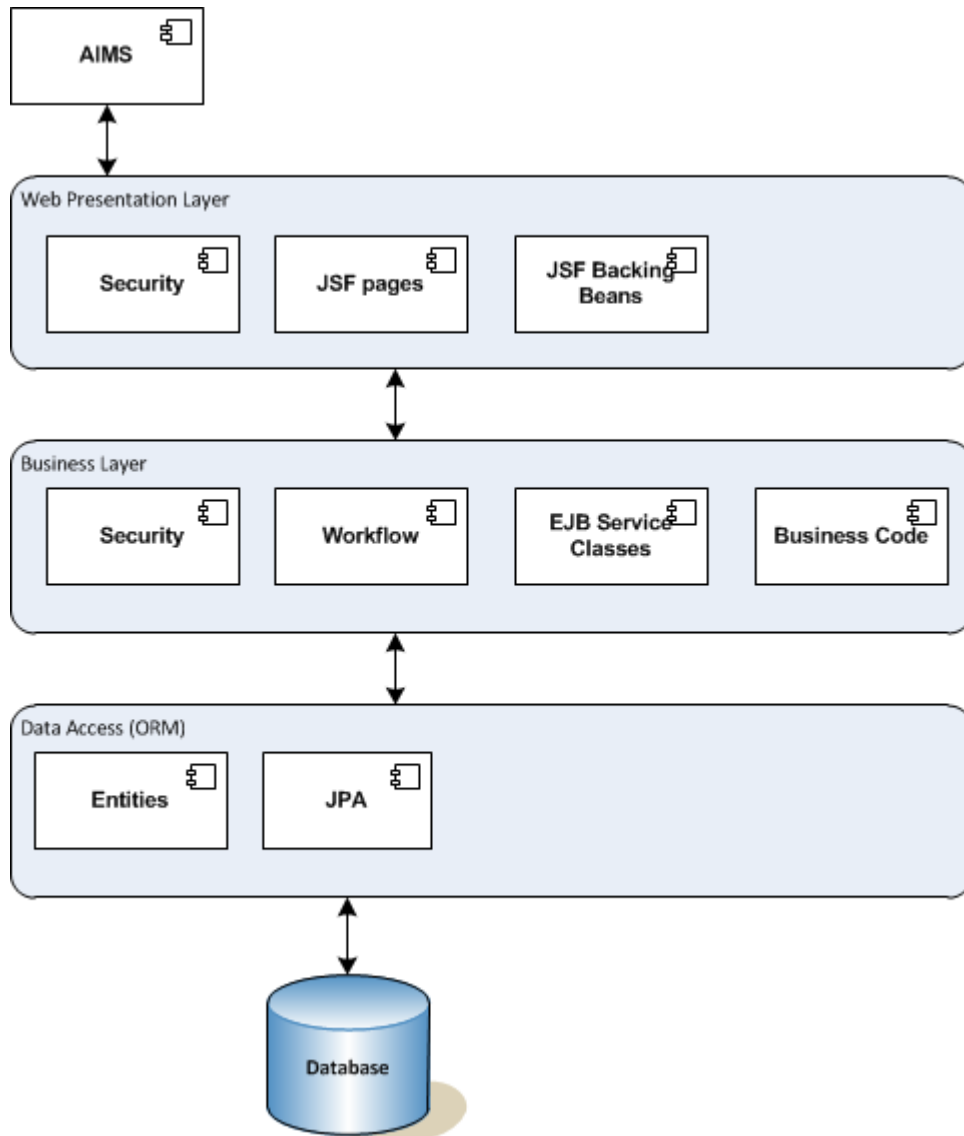


Figure 5-1: eCDRAppeals Component Diagram

#### 5.1.2 Component Descriptions

*[This section is mandatory.]*

*This section should capture descriptions and other relevant information for each item depicted in the component diagram(s). Please refer to the exemplar preliminary design document for an example of this section*

#### 5.1.2.1 Web Presentation Layer

- Security
  - Page level security ensures that only a particular user type can access certain pages. For example, only school users can access school reports, or only FSA admins can access system admin pages.
- JSF Pages
  - The interface that the users will interact with. More details will be provided in the User Interface Approach section.
- JSF Backing Beans
  - Calls the business layer services to provide data for presentation on the pages and also accepts input from the pages to save in the database through service calls.

#### 5.1.2.2 Business Layer

- Security
  - Instance level security ensures that users can only perform data related functions that they are authorized to do. For example, users without a read permission will not be able to view a record and users without a write permission cannot update records
- Workflow
  - Manages the processing of appeals through the business flow
- EJB Service Classes
  - Provides the interface for the presentation layer to access business logic.
- Business Code
  - Implementation of the business logic needed to process appeals.

#### 5.1.2.3 Data Access Layer

- Entities
  - Data classes that are mapped to the database tables.
- JPA
  - Provides functionality for database CRUD (Create-Read-Update-Delete) operations.

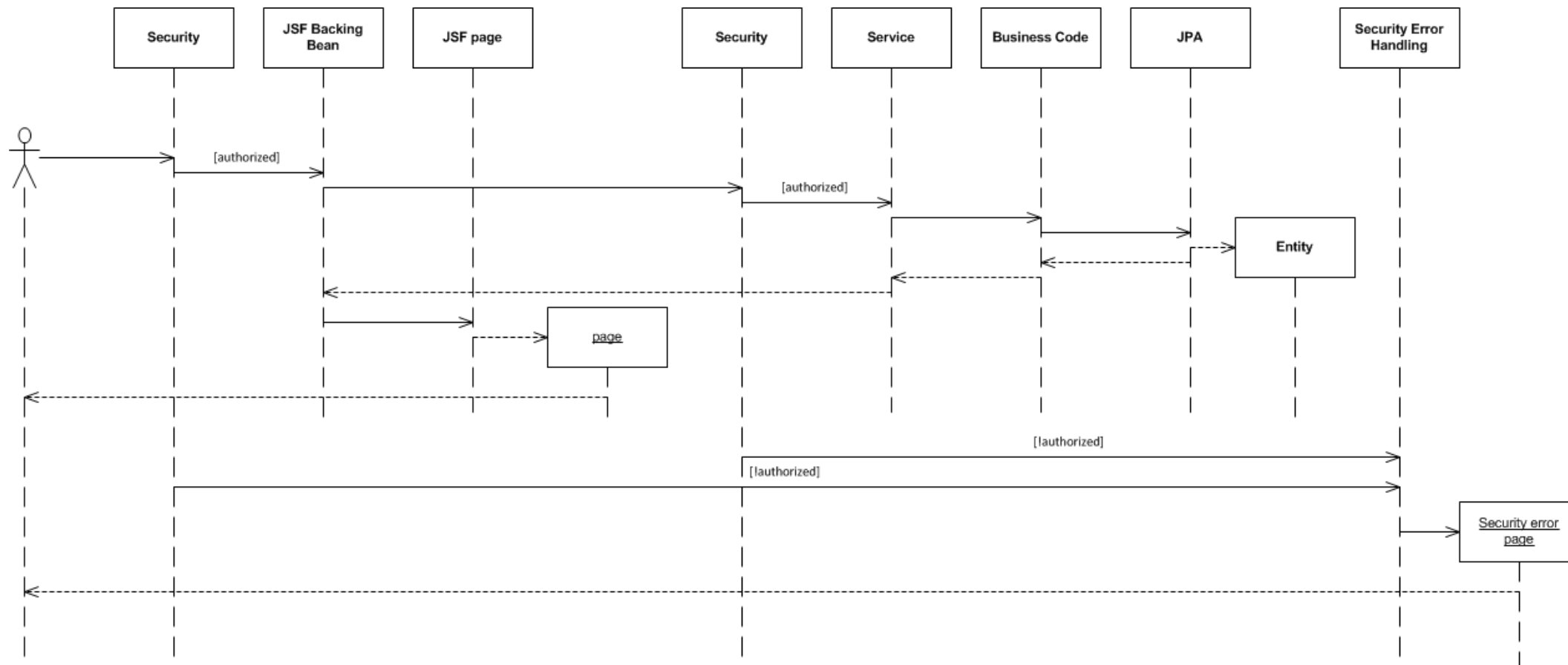
### 5.1.3 Component Interaction

*[This section is mandatory.]*

*This intent of this section is to communicate how components defined in the component model are intended to interact during the execution of key use cases or processes. This interaction is typically depicted using sequence diagrams and associated narratives. These sequence diagram interaction details should be at a high level, and often logical in nature. It is not appropriate to define interactions at the level required for the application developers to begin coding. That level of detail is to be captured in detailed design documents after general agreement on the high*

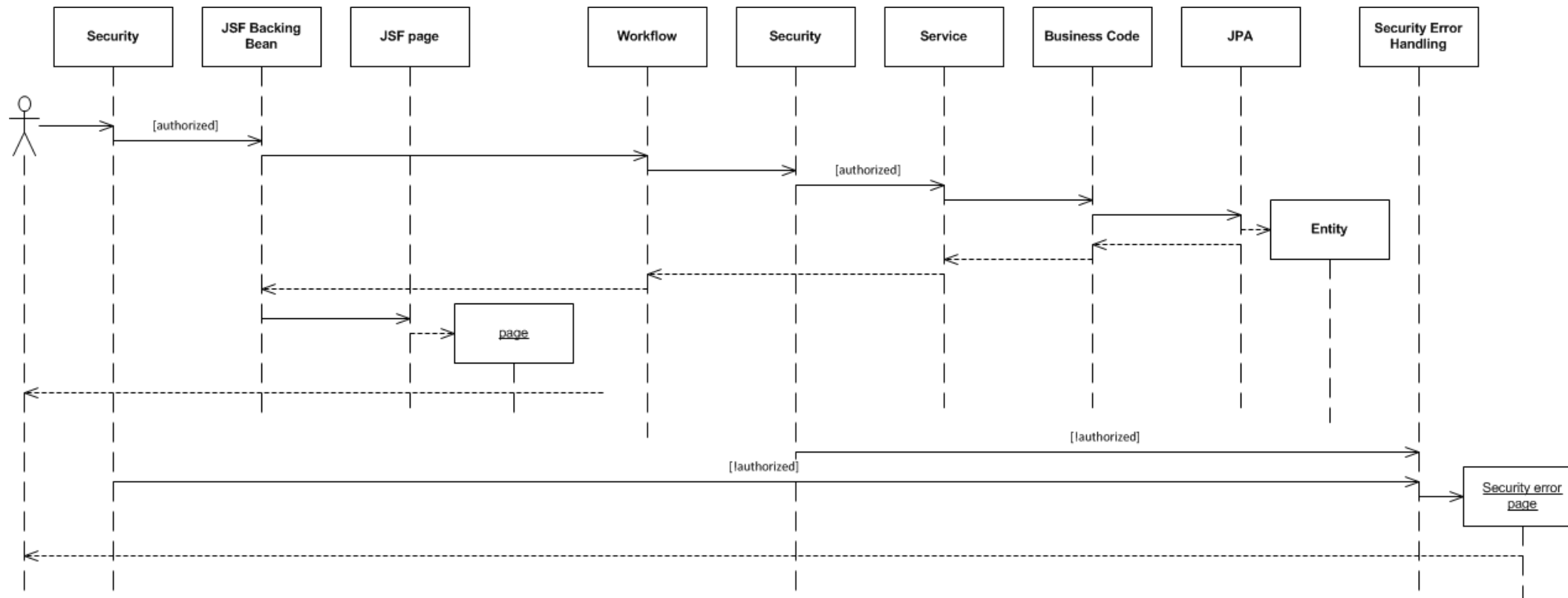
*level design has been achieved. Please refer to the exemplar preliminary design document for an example of the component interaction subsections.]*

Any description of interactions is under the assumption that the user has been authenticated and authorized through the AIMS component. A user not passed by AIMS will not be able to perform any actions on the application.



**Figure 5-2 Component interaction excluding the workflow**

Figure 5-2 shows the general component interaction for the system with the workflow excluded. This is the most common scenario where a user goes to a page and views or updates information from the database.



**Figure 5-3 Component Interaction with workflow**

Figure 5-3 shows the component interaction when the user is working with a workflow. This could be something like a school user submitting a case or a Data Manager user responding to a case.





## Section 6 Architecture Decisions

<b>Subject Area</b>	Information Architecture	<b>Topic</b>	Application Design
<b>Architectural Decision</b>	Use JEE Dependency Injection with EJB3	<b>AD ID</b>	ECDRA-001
<b>Issue or Problem</b>	There are several choices of frameworks for dependency injection. The primary options are those provided by JEE (EJB3) and Spring		
<b>Assumptions</b>	None		
<b>Motivation</b>	Choose a dependency framework that will facilitate development and will integrate well with the EITA environment.		
<b>Alternatives</b>	Use one of the two frameworks listed above.		
<b>Decision</b>	Use EJB3 with JEE dependency injection		
<b>Justification</b>	<p>The advantages with using EJB3:</p> <ul style="list-style-type: none"> <li>• they are consistent with Java Enterprise Edition (JEE) standards,</li> <li>• they are consistent with FSA's architecture standards,</li> </ul> <p>The disadvantage is it makes unit testing more complicated.</p> <p>In this case, maintaining consistency with FSA's architecture standards outweigh the aggravation of redesigning unit tests.</p>		
<b>Implications</b>	Most of the service classes will need updates, even if only to replace the injection annotations.		
<b>Derived requirements</b>	None		
<b>Related Decisions</b>	None		

<b>Subject Area</b>	Information Architecture	<b>Topic</b>	Application Design
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<b>Architectural Decision</b>	Use Java Persistence API (JPA) to provide Object-Relational Mapping (ORM)	<b>AD ID</b>	ECDRA-002
<b>Issue or Problem</b>	Keep Hibernate or replace with JPA		
<b>Assumptions</b>	None		
<b>Motivation</b>	Opportunity to reduce the number of libraries used by the application		
<b>Alternatives</b>	Hibernate or JPA		
<b>Decision</b>	Use JPA		
<b>Justification</b>	Hibernate and JPA provides fairly similar functionalities with neither one notably superior. Using JPA reduces the dependencies in the application without impacting performance.		
<b>Implications</b>	None		
<b>Derived requirements</b>	None		
<b>Related Decisions</b>	None		

<b>Subject Area</b>	Presentation	<b>Topic</b>	Application Design
<b>Architectural Decision</b>	Use JavaServer Faces (JSF) and Enterprise Java Beans (EJB), including Java Persistence API (JPA) entities, in the presentation layer	<b>AD ID</b>	ECDRA-003
<b>Issue or Problem</b>	There are several choices of MVC frameworks available. Two primary options are JSF and EJB or Spring MVC.		
<b>Assumptions</b>	None		
<b>Motivation</b>	Choose a MVC framework that will facilitate development and will integrate well with the EITA environment.		
<b>Alternatives</b>	Use one of the two frameworks listed above.		
<b>Decision</b>	Use JSF and EJB.		

<b>Justification</b>	There are several advantages with using JSF and EJB: <ul style="list-style-type: none"> <li>• they are consistent with Java Enterprise Edition (JEE) standards,</li> <li>• they are consistent with FSA’s architecture standards,</li> <li>• JSF component libraries allow for quick development of complex UIs</li> </ul>
<b>Implications</b>	All the current jsp pages and Spring controllers will be discarded and new pages and classes created.
<b>Derived requirements</b>	None
<b>Related Decisions</b>	None

<b>Subject Area</b>	Security Architecture	<b>Topic</b>	Application Design
<b>Architectural Decision</b>	Replace Spring Security with Shiro	<b>AD ID</b>	ECDRA-004
<b>Issue or Problem</b>	With upgrade, there is a choice between keeping Spring Security or replacing with a new security framework		
<b>Assumptions</b>	None		
<b>Motivation</b>	Review of other application frameworks in light of replacement of Spring with EJB and JSF		
<b>Alternatives</b>	Use shiro or configure Spring Security to work without the Spring framework		
<b>Decision</b>	Use Shiro		
<b>Justification</b>	Shiro is simpler to use with EJB than Spring Security.		
<b>Implications</b>			
<b>Derived requirements</b>	None		
<b>Related Decisions</b>	None		

<b>Subject Area</b>	Database Design	<b>Topic</b>	Application Design
<b>Architectural Decision</b>	Will not consolidate tables in this release	<b>AD ID</b>	ECDRA-005
<b>Issue or Problem</b>	The casefile, adjustment, and dm adjustment records had corresponding tables for status history and documents. When the LSA type case was implemented, there were enough new object types that creating individual status history and document tables for each one was not efficient. Particularly since one object may have multiple document types associated with it. So when LSA was implemented, only one status history table and one document table were created and a one-table-per-class-hierarchy mapping was created between those tables and the different status history and document types. These new tables were designed to allow the retroactive migration of the original case, adjustment, and dm adjustment status history and document records.		
<b>Assumptions</b>	None		
<b>Motivation</b>	Simplify the code base and the database by not having to deal with multiple tables for almost identical objects.		
<b>Alternatives</b>	Perform the consolidation during upgrade or at a later time (release)		
<b>Decision</b>	Perform consolidation at a later time.		
<b>Justification</b>	The limitations on time and resources makes adding the consolidation activity a high risk action.		
<b>Implications</b>			
<b>Derived requirements</b>	None		
<b>Related Decisions</b>	None		

<b>Subject Area</b>	Workflow Design	<b>Topic</b>	Application Design
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<b>Architectural Decision</b>	Use activiti 5 to replace OS Workflow	<b>AD ID</b>	ECDRA-006
<b>Issue or Problem</b>	<p>The workflow engine currently in use is old and no longer supported. This is not necessarily an issue but it also does not support BPMN2 notation and has no GUI for editing the workflow which makes updates difficult and error prone. Because the engine is no longer supported, it is not going to be upgraded with those capabilities.</p> <p>The state of workflow engines is mature enough that there are several choices available to replace the current engine.</p>		
<b>Assumptions</b>	Will not use proprietary and/or closed source solution.		
<b>Motivation</b>	Upgrade the application with a new workflow engine that supports BPMN2 and has a GUI. This will allow more efficient updating of workflows and more important, it will allow the generation of workflow diagrams that business users will be able to understand easily (being based on BPMN2).		
<b>Alternatives</b>	<p>The leading choices for replacement are activiti 5 and jbpm 5. There is also the option of staying with OS workflow.</p> <p>There is also the option of using one of the existing workflow services available in FSA, namely Sharepoint or Serena Business Manager (SBM). Using either one will require adding a web service layer to the application which unfortunately will require more resources than currently available to the development team in the release timeframe. Additionally, this will require additional integration testing, both for functionality as well as security since there will be an interface between systems. At this time, the development team does not have the resources, paradoxical as it may be, to use the enterprise workflow engines.</p>		
<b>Decision</b>	Use activiti 5 to replace OS Workflow		

<p><b>Justification</b></p>	<p>The decision is in two-parts. First is to decide which replacement workflow would be better suited for the upgrade. Second is whether to upgrade to the replacement workflow or not.</p> <p>The choices for replacement workflow are activity 5 and jbpm5.</p> <p>Databases:</p> <p>Activiti 5 is easier to configure for different databases. It comes with scripts for setting up the required tables for different databases (Oracle, MySQL, etc...) and can work with either JPA or Hibernate.</p> <p>Jbpm 5 is configured to automatically create databases using Hibernate. This means it needs schema account access to the database and this is not allowed for FSA applications. The alternative is to manually create the tables and this requires digging through the jbpm 5 source to create the SQL scripts.</p> <p>Configuration:</p> <p>Activiti 5 basic configuration is usable for most cases.</p> <p>Jbpm 5 basic configuration does not include human tasks (that is, where a user takes an action such as clicking on submit, etc...). To enable human tasks, additional configuration and coding is needed.</p> <p>Timer:</p> <p>Activiti 5 supports timer events based on duration, cycle, and specific date.</p> <p>Jbpm 5 supports timer events based on duration and cycle.</p> <p>GUI support:</p> <p>Both have a GUI tool for editing workflows.</p> <p>BPMN2 support:</p> <p>Both support BPMN2 notation.</p> <p>Activiti 5 is selected based on these criterias.</p> <p>Based on the new capabilities available in activiti 5, particularly the GUI tool, BPMN2 support and built-in timer, it is worthwhile to upgrade to it and replace OS Workflow.</p>
<p><b>Implications</b></p>	<p>Incorporating a new framework into the application requires some time to learn the basics and nuances of the new framework. This time needs to be allowed for in the project plans.</p>
<p><b>Derived requirements</b></p>	<p>None</p>

<b>Related Decisions</b>	None
--------------------------	------

<b>Subject Area</b>	Presentation	<b>Topic</b>	Application Design
<b>Architectural Decision</b>	Use resource bundle for messages and labels	<b>AD ID</b>	ECDRA-007
<b>Issue or Problem</b>	The labels and headings were “hard-coded” into the page files. This sometimes results in inconsistent names across pages when a label was changed in one page and not in another.		
<b>Assumptions</b>	None		
<b>Motivation</b>	Make updating labels across pages easier and more consistent. Make the application “i18n-ready”.		
<b>Alternatives</b>	Keep the labels and headings as “hard-coded” values.		
<b>Decision</b>	User resource bundles for labels as well as messages		
<b>Justification</b>	Messages are already configured for use with resource bundles. Adding labels is fairly simple.		
<b>Implications</b>	None		
<b>Derived requirements</b>	None		
<b>Related Decisions</b>	None		

<b>Subject Area</b>	Presentation	<b>Topic</b>	Application Design
<b>Architectural Decision</b>	Use primefaces for additional JSF components	<b>AD ID</b>	ECDRA-008
<b>Issue or Problem</b>	The components that are available natively for JSF 2 require customization to provide needed functions. For example data tables with pagination. Primefaces is one of several libraries that provide additional components to meet these needs.		

<b>Assumptions</b>	Prefer to use a component library that will meet with approval from the architecture group. They have identified two component libraries that may be used for FSA, Richfaces and Primefaces
<b>Motivation</b>	Make the web site as user-friendly as possible.
<b>Alternatives</b>	The other component library that the architecture group has identified for use in FSA is Richfaces.
<b>Decision</b>	Use Primefaces
<b>Justification</b>	Primefaces has a larger selection of components.
<b>Implications</b>	None
<b>Derived requirements</b>	None
<b>Related Decisions</b>	None



## **Section 7 Operational Model**

The Virtual Data Center (VDC) provides a standardized operational model to which the application is deployed. This model, including the nodes and how they are deployed, is under the control of the VDC and beyond the scope of this document. The eCDRAppeals application is designed to be deployed to the VDC and there is no requirement for custom configuration of any of the nodes. The only variable factor for operational support is the amount of resources (e.g. disk space, database space, etc...) made available to the eCDRAppeals application.

The resources needed by an application going to production are identified, reviewed, and approved at the Service Delivery Review (SDR) board. In the case of applications already in production, such as eCDRAppeals, the SDR is normally not conducted. Instead, the Application Specific Information (ASI) is reviewed to ensure that the correct resources are assigned.

### **7.1 Locations**

### **7.2 Logical Operational Model**

### **7.3 Node Descriptions**

### **7.4 Connection Descriptions**

### **7.5 Node Deployment and Deployment Unit Model**

## Section 8 User Interface (UI) Approach

The UI will be compliant with the Section 508 guidelines and will adhere to specifications mentioned in the FSA Style Guide. In addition, developers will incorporate applicable User Experience (UX) principles to improve user interaction.

The user experience is affected by the appearance/look-and-feel of the website and the expected behavior.

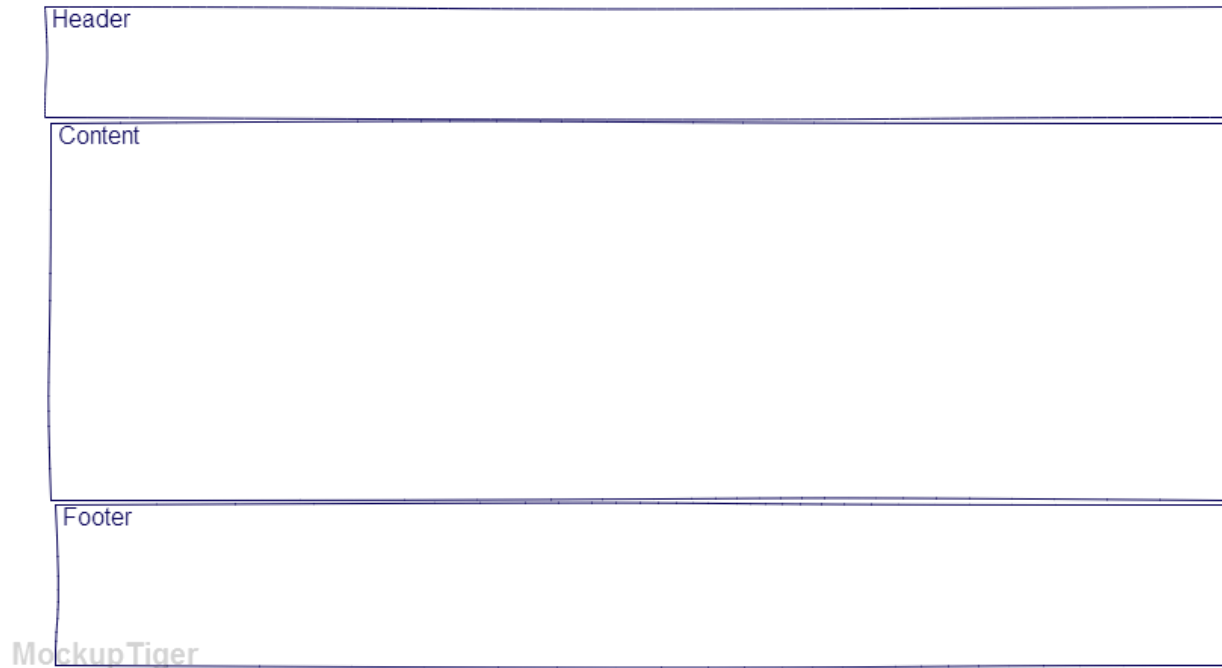
Look-and-feel

eCDRAppeals will use Java Server Faces (JSF), including facelets, technology to build its user interface. JSF provides a component based approach to building web applications. It also includes component libraries that facilitate the development of user interfaces.

Facelets use XML like tags and eCDRAppeals will use the file extension .XHTML for all UI files. Strong XML type and syntax checks are enforced, thus keeping the .XHTML files XML compliant. The URLs will use the .htm extension the way the current version does. JSF will be configured to make the appropriate mapping between htm URL and xhtml files.

Facelets allow for creation of templates of the screens to make the UI development faster and easier to maintain. The application layout will build on the default FSA layout which consists of a header region, a content region, and a footer region. The header and footer regions will use standard FSA elements. The content region will be configured to provide an effective user experience.

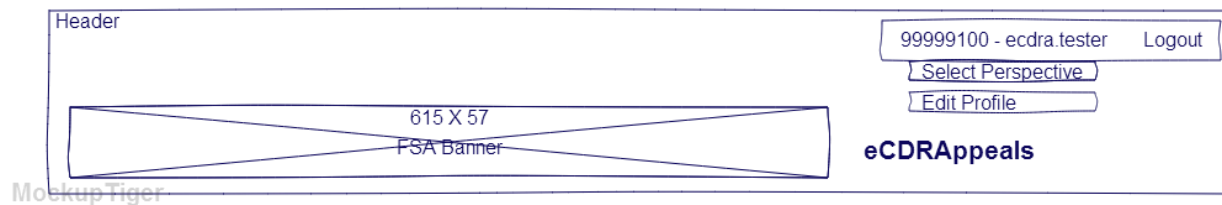
## Demo - unregistered



**Figure 8-1: Basic UI Layout**

The footer will be the standard footer used by other applications. The header will be based on the FSA look-and-feel design with customization for eCDRAppeals.

## Demo - unregistered

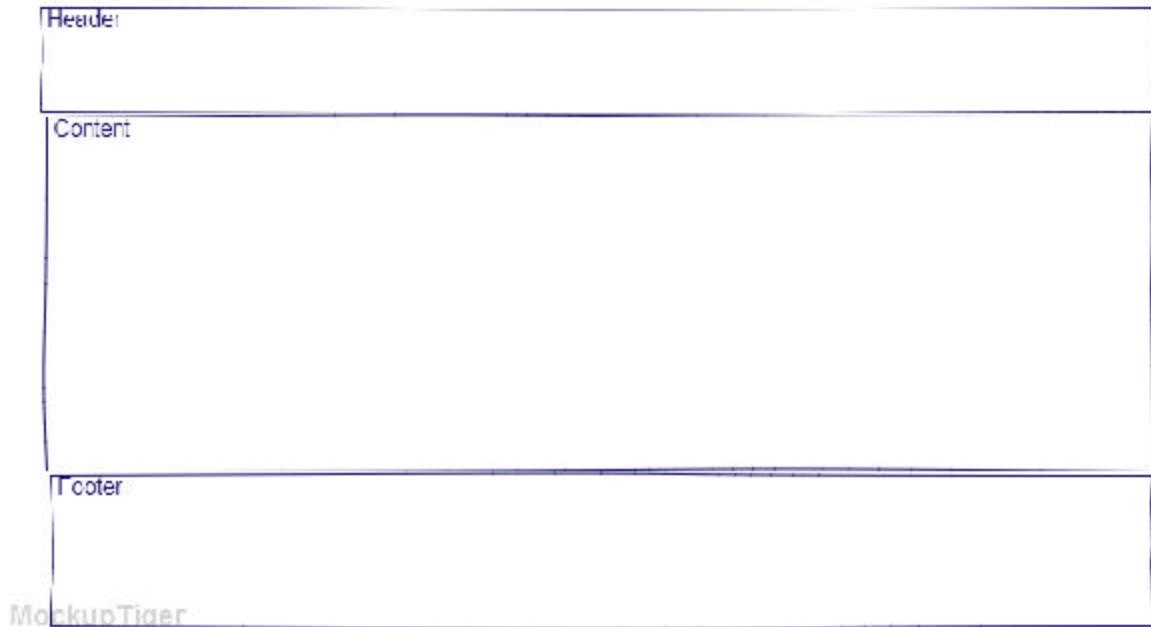


**Figure 8-2 Header section**

The menu on the top right corner will have the logout option and a user option with dropdown sub-menu. The user option will allow user to select a perspective, if there are multiple perspectives available, or edit profile. The option on the main menu will not be a link but only displays the information about the user. When clicked it will display the sub-menu.

The content section will follow the layout in Figure 8-3.

## Demo - unregistered



**Figure 8-1: Basic UI Layout**

The footer will be the standard footer used by other applications. The header will be based on the FSA look-and-feel design with customization for eCDRAppeals.

## Demo - unregistered



**Figure 8-2 Header section**

The menu on the top right corner will have the logout option and a user option with dropdown sub-menu. The user option will allow user to select a perspective, if there are multiple perspectives available, or edit profile. The option on the main menu will not be a link but only displays the information about the user. When clicked it will display the sub-menu.

The content section will follow the layout in Figure 8-3.

## Demo - unregistered

Page (maybe record also) label

Navigation section

Case Reports System Help

**Page (maybe record also) information** Back to parent

special function or link etc...

---

Workflow Actions

Certify Remove Stuff Do something else Being Prepared ▾

---

Item Information

Field  Field

These are basic information, entered during record creation and afterwards read-only

Field  Field

Comment

Status	Comment
Awaiting LRDR	This is the vulture waiting for prey to come
Being Prepared	You

Save Cancel

Attach file

Some file

Another file

---

Non-workflow actions

Add adjustment Change DM etc...

---

Children record listing

id	description	status	status date
1	Tea	created	Jan-11
2	Coffee	created	Jan-11
3	Milk	created	Jan-11
4	Cereal	created	Jan-11

MockupTiger

Figure 8-3 Content section

## Demo - unregistered

Page (maybe record also) label

Navigation section

Case Reports System Help

Page (maybe record also) information

Back to parent

special function or link etc...

Workflow Actions

Cancel Remove Stuff Do something else Using Prepared

Item information

Field Field

these are basic information, entered during record creation and afterwards read-only

Field Field

Comment

Status	Comment
Awaiting I RDR	This is the vulture waiting for prey to come
Being Document	Yes

Save Cancel

Attach file

Name file Remove

Another file Remove

Non workflow actions

Add adjustment Change DM etc...

Children record listing

id	description	status	status date
1	Tea	created	Jan-11
2	Coffee	created	Jan-11
3	Milk	created	Jan-11
4	Cocoa	created	Jan-11

MockupTiger

Figure 8-3 Content section

Components:

Date picker – provide whenever a date needs to be entered. Many of the dates entered for eCDRAppeals cases are usually not the current date, in fact most will be several years in the past and so the utility of this component may not be great.

Error messages:

System-related messages are displayed at the top of the page.

Validation error messages are displayed beside the field where the invalid values have been entered. In addition, focus will be placed on the first field that has an error.

Application behavior

The application will follow some standard behaviors to keep the user experience consistent throughout. The primary objective is to make the user interface transparent to the users so they can concentrate instead on getting their jobs done.

Record creation

Users will normally create records for the case. Cases, adjustments, loans, etc... have to be created for the appeals. A button will be provided for creating a record. Typically this button will be in the parent page or what can be considered the parent page of the record. For example, the button to create a case will be found in the current cases listing page. The button to create an adjustment will be in the case details page. And so on.



Figure 8-4 Create case button in current cases page

Behavior is as follows:

Click create <record> button

Detail page opens for creating record

Enter required information, optional information may be entered, optionally.

Click create button (discuss if it should be labelled save)

System validates input. If error reload page and display error message. If no error, save record.

Detail page loads/reloads (typically the detail page for creating a record contains fewer elements than the regular detail page for that record, ex. a page for creating a case may contain a list for selecting case type and a comment box while the case detail page will include a list of adjustments, documents, etc...)

A cancel button is provided. When clicked, any information entered is discarded and the “parent” page is loaded.

Saving record

The eCDRAppeals records have a small number of fields for editing and for the most part, once the users save information, they are done with the record.

Behavior

Enter information.

Click save button

System validates input. If error reload page and display error message. If no error, save record.

“Parent” page is loaded.

A cancel button is provided. When clicked, any information entered is discarded and the “parent” page is loaded.

Navigating out of page

There will normally be three ways provided to exit a page. Clicking save button, clicking cancel button, and clicking a back to <parent> button (ex. Back to Case). General navigation methods, menu selection, browser back button, etc... may also be used. Except when the save button is clicked, navigating away from a page causes any unsaved data to be discarded.

Sorting and searching

A site-wide search capability is not required and will not be implemented at this time. The sort and search capability available from Primefaces element library will be used. This allows searching values in individual table columns. The search can be combined (ANDed) for multiple columns. Sorting can only be done on one column at a time.



Cases for current cycles 2011 2-year, 2010 3-year					
ID	CASE TYPE	SCHOOL	STATUS	STATUS DATE	FSA ASSIGNEE
<a href="#">303262</a>	2011 - 2-YR LSA	880017 - Geographic Center Univers	Servicing records requested	09/21/2013	
<a href="#">303300</a>	2011 - 2-YR LSA	880016 - Geographic Center Univers	Perfected/Available for FSA	09/21/2013	
<a href="#">303295</a>	2011 - 2-YR LSA	880140 - Contiguous Geo Center Un	Perfected/Available for FSA	09/21/2013	
<a href="#">303276</a>	2011 - 2-YR LSA	880148 - Contiguous Geo Center Un	Caseworker review	09/21/2013	fsa.caseworker
<a href="#">303294</a>	2011 - 2-YR LSA	880146 - Contiguous Geo Center Un	Caseworker review	09/21/2013	fsa.caseworker
<a href="#">303292</a>	2011 - 2-YR LSA	880145 - Contiguous Geo Center Un	Perfected/Available for FSA	09/21/2013	
<a href="#">303274</a>	2011 - 2-YR LSA	880144 - Contiguous Geo Center Un	Perfected/Available for FSA	09/21/2013	
<a href="#">303290</a>	2011 - 2-YR LSA	999987 - Sturm Und Drang College c	Awaiting Required Files	09/21/2013	
<a href="#">303288</a>	2011 - 2-YR LSA	999907 - SALEM INSTITUTE OF WI	Perfected/Available for FSA	09/21/2013	
<a href="#">303286</a>	2011 - 2-YR LSA	999989 - Martian Rover Institute of T	Awaiting Required Files	09/21/2013	
<a href="#">303272</a>	2011 - 2-YR LSA	999988 - Venusian College of Psych	Perfected/Available for FSA	09/21/2013	
<a href="#">303270</a>	2011 - 2-YR LSA	333333 - CALLISTO COLLEGE	Perfected/Available for FSA	09/21/2013	
<a href="#">303268</a>	2011 - 2-YR LSA	111111 - UNIVERSITY OF IO	Closed	09/25/2013	fsa.casemanager
<a href="#">303284</a>	2011 - 2-YR LSA	041350 - Cozmo The School	Perfected/Available for FSA	09/21/2013	

Figure 8-5 Current cases unfiltered

Cases for current cycles 2011 2-year, 2010 3-year					
ID	CASE TYPE	SCHOOL	STATUS	STATUS DATE	FSA ASSIGNEE
3033		88			
<a href="#">303300</a>	2011 - 2-YR LSA	880016 - Geographic Center Univers	Perfected/Available for FSA	09/21/2013	
<a href="#">303301</a>	2010 - 3-YR LSA	880016 - Geographic Center Univers	Perfected/Available for FSA	09/21/2013	
<a href="#">303321</a>	2010 - 3-YR LSA	880148 - Contiguous Geo Center Un	Caseworker review	09/21/2013	fsa.caseworker
<a href="#">303320</a>	2010 - 3-YR LSA	880146 - Contiguous Geo Center Un	Caseworker review	09/21/2013	fsa.caseworker
<a href="#">303302</a>	2010 - 3-YR LSA	880140 - Contiguous Geo Center Un	Perfected/Available for FSA	09/21/2013	

Figure 8-6 Current cases filtered by id and openid

Multiple-selection and action:

Typically, records are updated one-at-a-time. Look for situations where it might make sense to allow the user to select multiple items and perform an action on all of them at the same time.

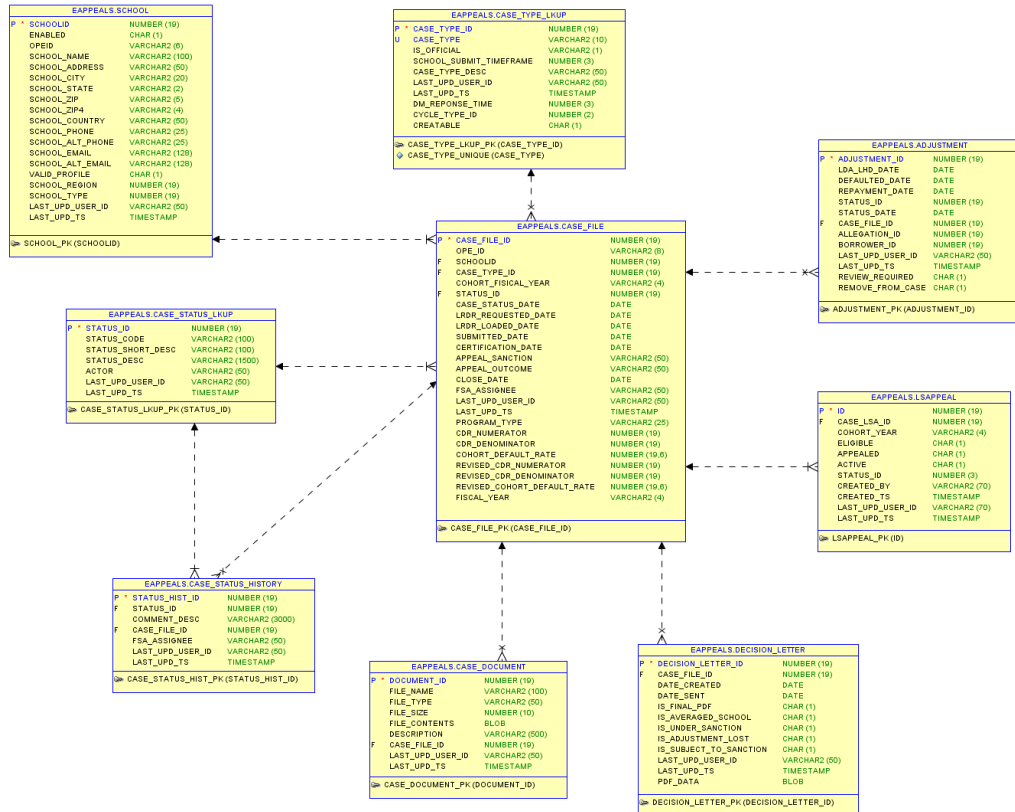
Many of the more user-friendly capabilities are provided through javascript so the design will for the most part assume that javascript is enabled. However, it is still a good idea to follow the progressive enhancement method whereby basic functionality is first implemented and then, as

time and resources allow, enhance the functions. For example, some pages may be designed as individual pages and later on converted to pop-up windows.

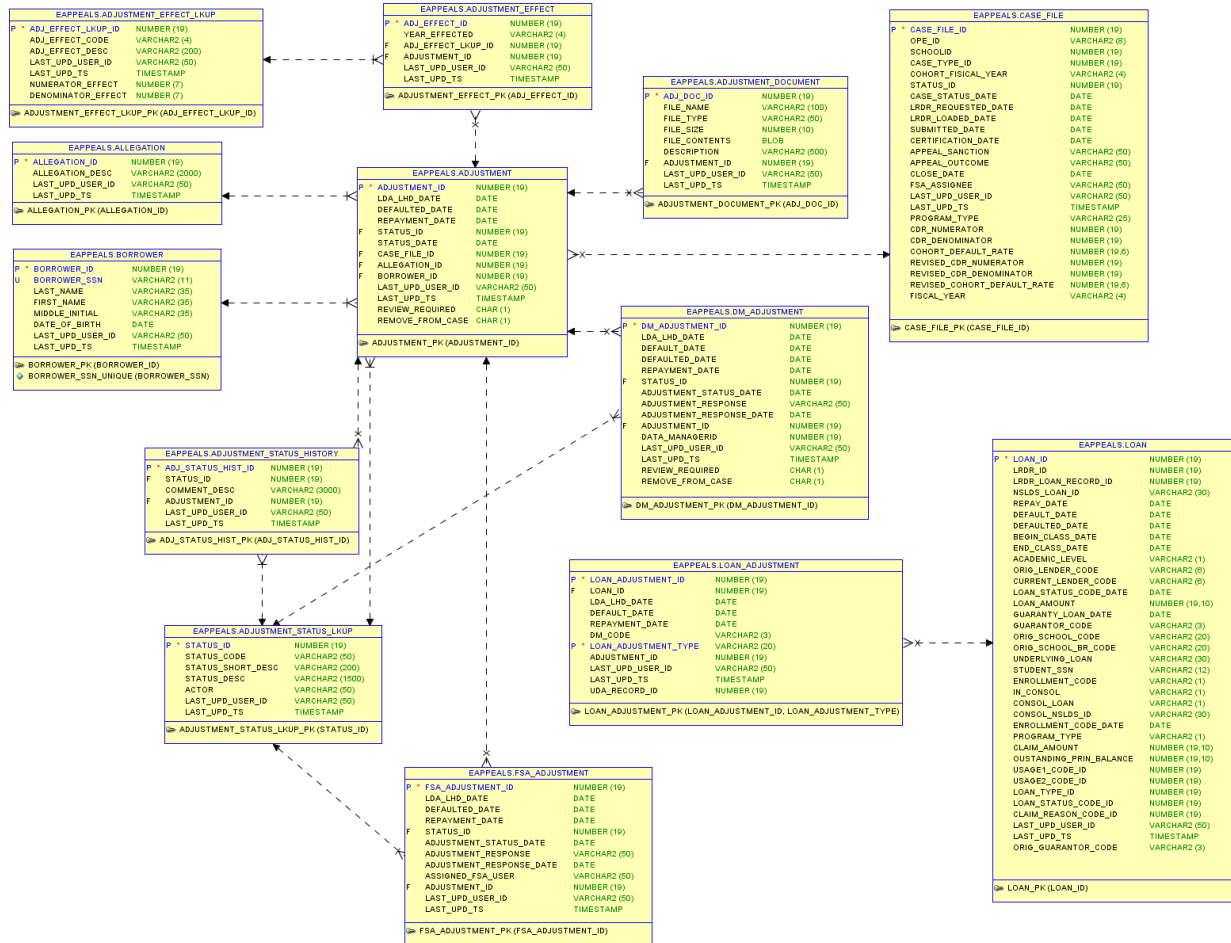
## Section 9 Logical Data Model

This section details the eCDRAppeals data model and data dictionary.

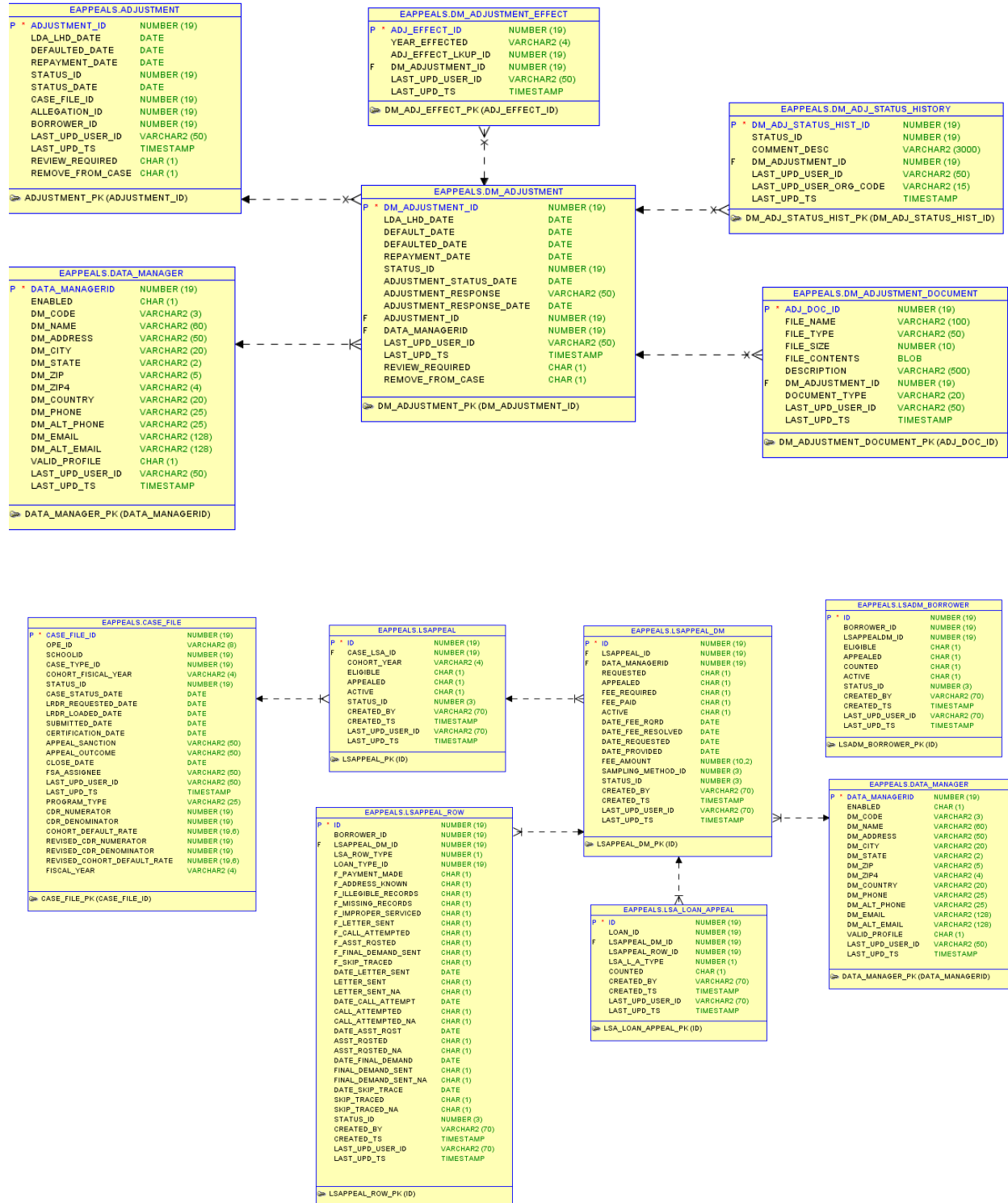
### 9.1 eCDRAppeals Data Model



# Electronic Cohort Default Rate Technology Upgrade Design Document Acronyms and Abbreviations



# Electronic Cohort Default Rate Technology Upgrade Design Document Acronyms and Abbreviations



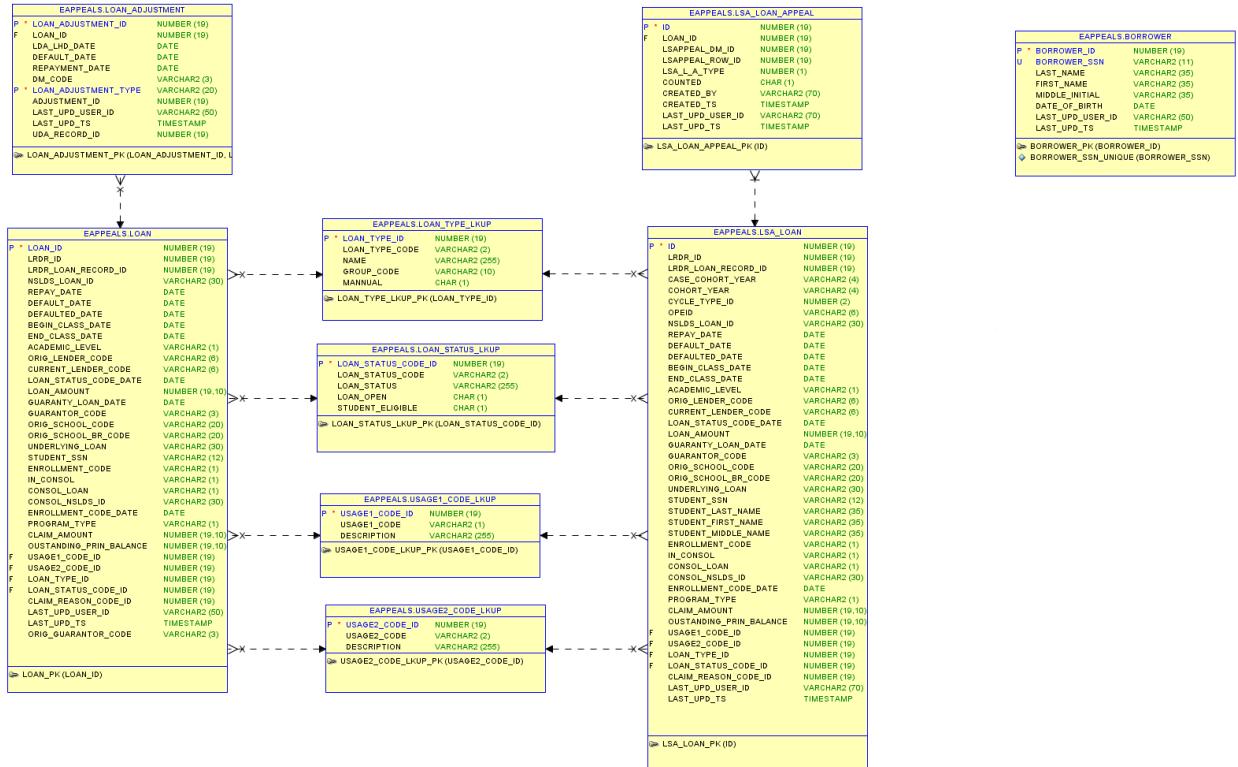


Table 9-1 lists the primary entities (i.e. directly referenced in the appeals) in eCDRAppeals. For each entity, a short description is provided.

**Table 9-1: eCDRAppeals Entity Descriptions**

Data Entity	Description
CaseFile	The parent object for adjustments or appeals. A school may submit only one type of case (e.g. IDC, NDA, UDA, LSA) in each cycle.
Adjustment	This conveys the information about the borrower and the adjustment that the school believes should be made (-B, -N, -D, +B, +N, +D) to the borrower’s usage code (i.e. code that indicates how the borrower is counted in the school’s cohort default rate).
DmAdjustment	This conveys the information about the borrower and the adjustment that the school believes the DM should make to the borrower’s usage code.
LSAppeal	Identifies the year for which the school alleges that loans were not properly serviced.

LSAppealDM	Identifies the DM for a particular year for which the school alleges that loans were not properly serviced.
Borrower	The individual responsible for loans that are in repayment or default and are counted in the school's default rate

While the logical data model may describe entities as containing collections of other entities, the implementation will be much simpler. Unless actually needed, Java entity classes will not contain collections. For example, logically, an Incorrect Data Challenge case will have a list of borrowers that a school claims have incorrect data. Each borrower will have a list of loans divided among several Guaranty Agencies. Each case may also contain a set of documents that will substantiate the incorrect data allegations. However, when a user views the case, not all the contained information is used and when the case is updated, it is actually just the actual case information or comments that are updated. The case is not processed as a whole, i.e. when the case is processed, the borrowers, allegations, documents, etc... are not processed. So it makes sense to keep the entity simple. This makes data operations more simple and avoids JPA “quirks” that sometimes manifest when dealing with mapped collections.

## 9.2 Data Dictionary

For the most up-to-date data dictionary, refer to database scripts stored within the eCDRAppeals project source control repository.

## **Section 10 Integration Architecture**

eCDRAppeals does not integrate with other information systems.

### **10.1 Data Migration Plan**

The application will maintain the current database and no data migration is required.

### **10.2 Initial Load Data Migration Approach**

Additional lookup values for security permissions will be loaded into the database prior to deployment of upgraded code. The SQL scripts to perform this load will be written and tested during development.

### **10.3 On-Going Data Integration Approach**

There are no on-going data integration requirements.



## **Section 11 System Modifications**

This release of eCDRAppeals updates the entire technology stack used by eCDRAppeals. Refer to upgrade plan for details.

### **11.1 Package Application Modifications**

N/A

### **11.2 Legacy Application Modification**

This version of eCDRAppeals replaces previous versions. Since it is a total replacement, no changes to the legacy versions are required.

## **Section 12 Reporting Architecture**

eCDRAppeals reports will be displayed online and will use the same architecture as the rest of the application. has basic reporting requirements.

## **Section 13 Enterprise Service Model**

eCDRAppeals does not expose or consume enterprise services.

## Section 14 Non-Functional Requirements Design

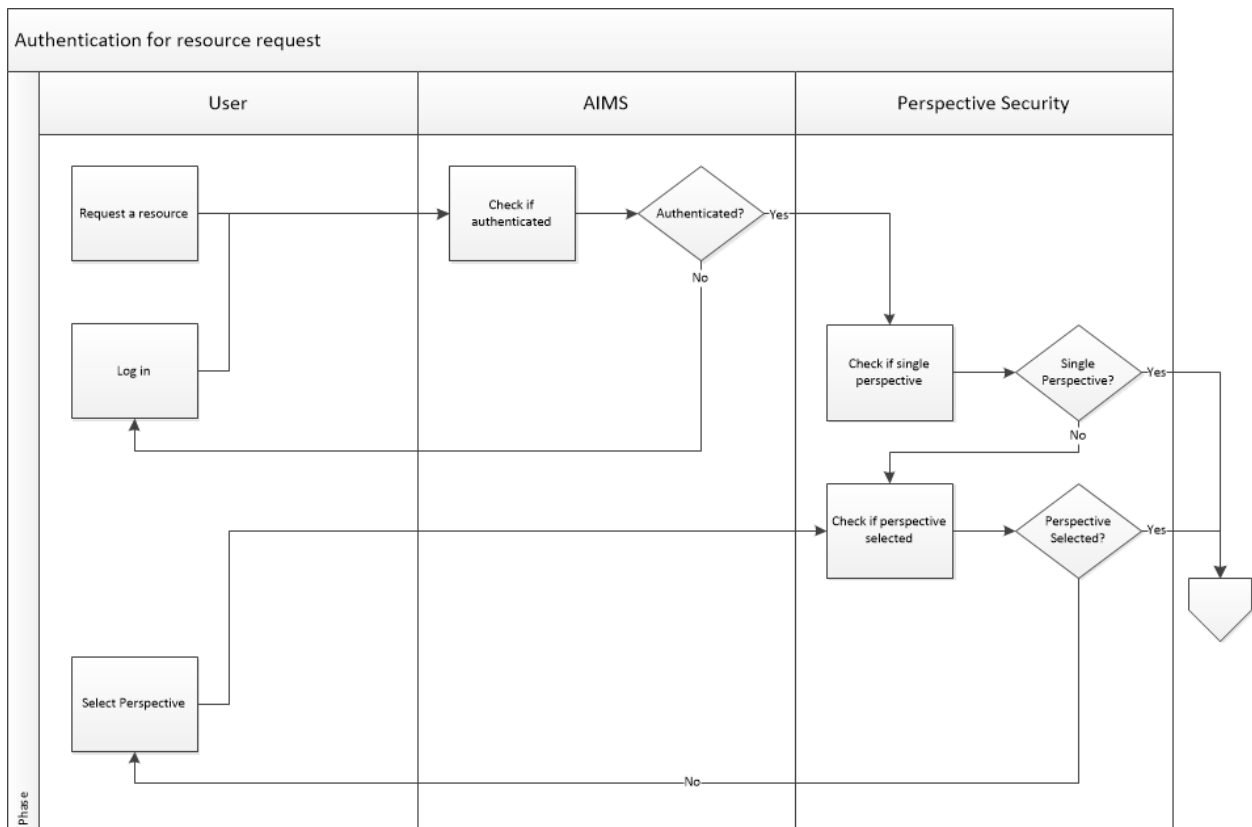
### 14.1 Performance Model

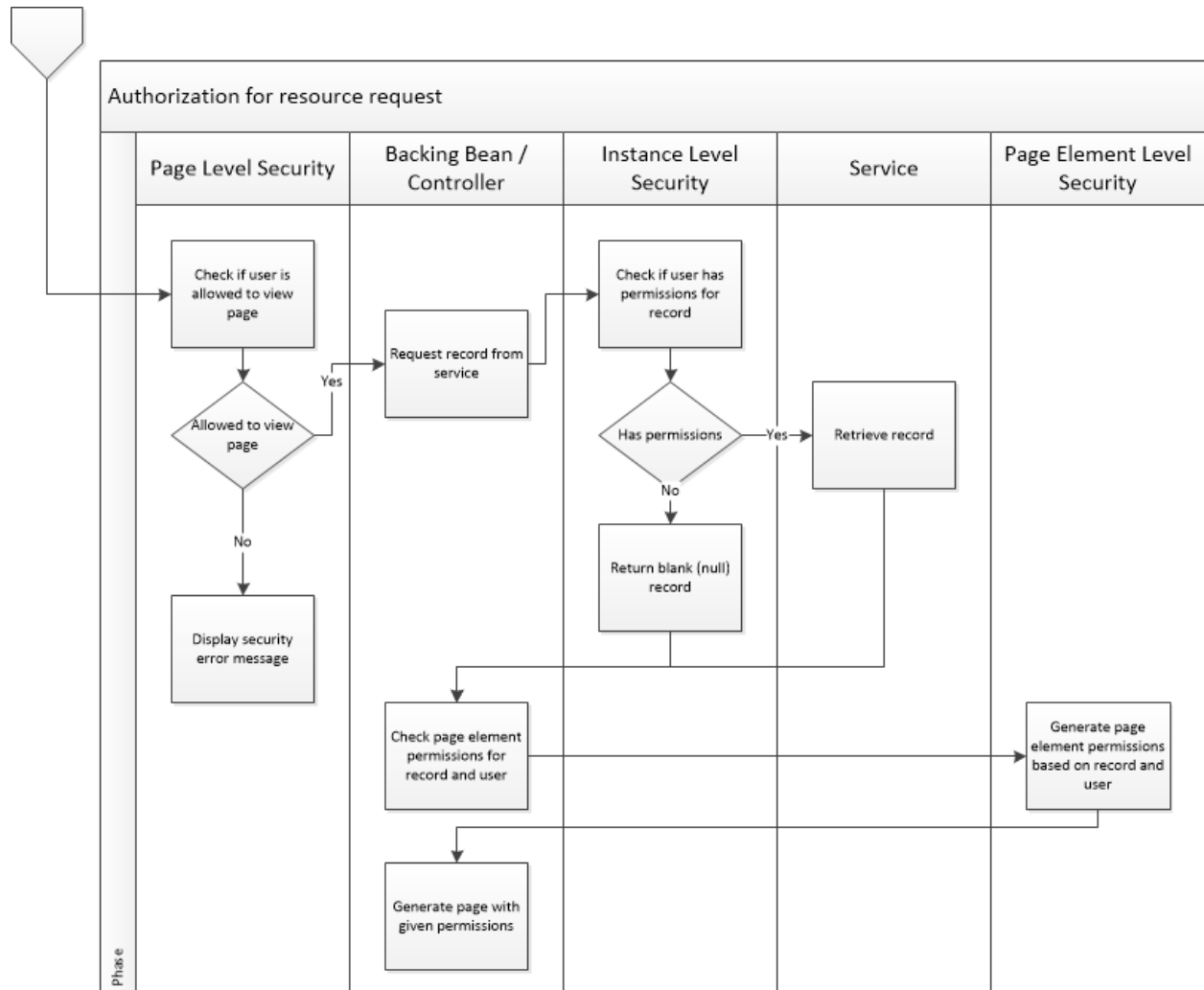
... need more info ....

### 14.2 Security and Privacy

These diagrams will be moved to the security design doc.

Activity diagrams showing the authentication and authorization activities involved when an eCDRA resource (usually a page) is requested.

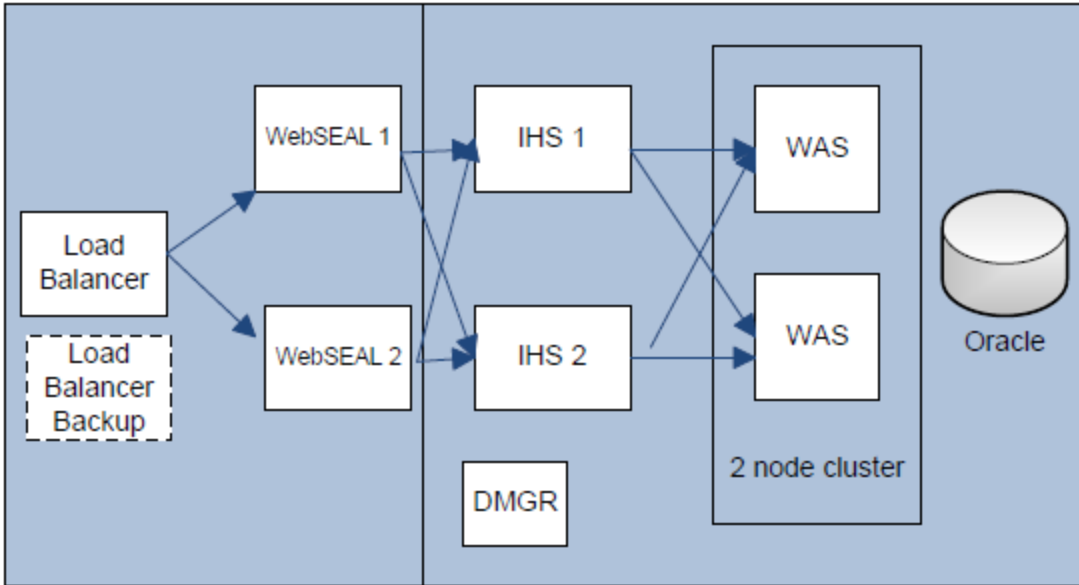




Refer to security design doc.

### 14.3 Reliability and Availability

Figure 14-1 shows the core components in the path of user request and response. The WebSEAL, IBM Http Server (IHS) and WebSphere Application Server (WAS) components are designed for high availability and failover. eCDRAppeals will be hosted in a 2 node cluster with 1 JVM per node. If future demands require additional capacity, JVMs can be added to each node, or additional nodes can be added to the cluster.



**Figure 14-1: Logical Architecture Diagram**

The Oracle database operates as a data grid with multiple servers. It is configured for High Availability operation so that a single server failure will not cause the application to stop working.

## Appendix A. Acronyms and Abbreviations

Table 14-1: Acronyms

Item	Definition
AIMS	Access and Identity Management System
eCDRAppeals	Electronic Cohort Default Appeals
EJB	Enterprise Java Bean
JEE	Java Enterprise Edition
JPA	Java Persistence API
JSF	JavaServer Faces
UI	User Interface
ORM	Object-relational Mapping

## NIST Guides for the Security Portal

NIST Security Guidance	Document Explanation
<a href="#">NIST 800-18 Guide for Developing Security Plans for Information Technology Systems</a>	NIST 800-18 describes the specific management, technical and operational controls that should be documented in a system security plan.
<a href="#">NIST 800-26 Security Self-Assessment Guide for Information Technology Systems</a>	NIST 800-26 provides a method for agency officials to determine the current status of their information technology security programs and where necessary, establish a target for improvement. This self-assessment guide utilizes an extensive questionnaire containing specific control objectives against which a system can be tested.
<a href="#">NIST 800-34 Contingency Planning Guide for Information Technology Systems</a>	NIST Special Publication 800-34 provides instructions, recommendations, and considerations for government IT contingency planning.
<a href="#">NIST 800-35 Guide to Information Technology Security Services</a>	More agencies are contracting out for security services that support their products and programs. NIST 800-35 outlines a life cycle for these buying services -- from determining whether a service can help in the first place all the way to ending it. The guide details the pros and cons of possibilities instead of prescribing a specific way to go about dealing with issues.
<a href="#">NIST 800-36 Guide to Selection Information Security Products</a>	NIST 800-36 looks at product. It reviews potential issues for many types of products, including identification and authorization, firewalls, vulnerability scanners and forensics. It highlights the Common Criteria Evaluation and Validation Scheme, an international standard for evaluating security products now required for defense and national security and being considered for civilian agencies.
<a href="#">NIST 800-37 Guide for the Security Certification and Accreditation of Federal Information Systems</a>	NIST 800-37 provides guidelines for certifying and accrediting federal information systems.
<a href="#">NIST 800-42 Guideline on Security Network Testing</a>	NIST 800-42, "Guideline on Network Security Testing," is meant for information technology and security officials in an agency. It focuses on the details of setting up, maintaining and acting on standard enterprise network penetration testing programs. Constant testing is a major component of a security program, highlighted first by the Government Information Security Reform Act (GISRA) of 2000, and now FISMA.
<a href="#">NIST 800-47 Security Guide for</a>	NIST 800-47 provides guidance for planning,



<a href="#"><u>Interconnecting Information Technology Systems</u></a>	establishing, maintaining, and terminating interconnections between information technology (IT) systems that are owned and operated by different government organizations.
<a href="#"><u>NIST 800-50 Building an Information Technology Security Awareness and Training Program</u></a>	NIST 800-50 identifies four critical steps for training and awareness -- from assessing agency wide needs to post-implementation feedback and adjustment.
<a href="#"><u>NIST 800-64 Security Considerations in the Information System Development Life Cycle</u></a>	NIST 800-64 discusses the benefits of integrating security into a system's life cycle and the framework to do so.

**OPTION #1 - Modify FSA's eCDR**

Estimated Duration (Total # of Months)	Estimated Level of Effort (Total # of Hours)	Estimated Total Price
		\$0.00
<b>Estimated Total LOE &amp; Price (ROM)</b>	-	<b>\$0.00</b>

**OPTION #2A - Service-based Solution***(Existing workflow application/system)*

Estimated Duration (Total # of Months)	Estimated Level of Effort (Total # of Hours)	Estimated Total Price
		\$0.00
<b>Estimated Total LOE &amp; Price (ROM)</b>	-	<b>\$0.00</b>

**OPTION #2B - Service-based Solution***(New COTS-based workflow application/system)*

Estimated Duration (Total # of Months)	Estimated Level of Effort (Total # of Hours)	Estimated Total Price
		\$0.00
<b>Estimated Total LOE &amp; Price (ROM)</b>	-	<b>\$0.00</b>