System and Software Architecture Description (SSAD)

Los Angeles Child Guidance Clinic Employment Opportunities Online Application System

Team 5

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Version History

Date	Author	Version	Changes made	Rationale
10/06/11	SX	1.0	• All details known as of 10/06/11	• Initial Draft
10/13/11	SX	1.1	• Fixed the use case bugs	• Second Draft
10/15/11	SX	1.2	• Redrew the diagrams with RSM	• Third Draft
10/16/11	SX	1.3	• Add some use cases and fixed the requirement bugs.	• Fourth Draft
10/21/11	SX	2.0	• Fixed the precondition problems	• Fifth Draft
11/20/11	SX	2.1	• Finished the remaining sections	• Draft for DCP
11/29/11	SX	2.2	• Fixed several bugs	• Revised version of Draft DCP
12/05/11	SX	2.3	• Updated the SSAD status	• Final Product for DCP
02/03/12	SX	3.0	• Changed the whole new design	• The draft for RDC ARB
02/15/12	SX	3.1	• Made some changes to the rationales	• The product for RDC package
03/24/12	SX	3.2	• Updated UML models and design	• The product for IOC Package
04/07/12	SX	3.3	• Updated UML models and design	• Revised version of previous design
04/26/12	SX	3.4	• Updated the design	• The product for TS SET package

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1. Introduction

1.1 Purpose of the SSAD

The purpose of the SSAD is to document the results of the analysis and design of the Los Angeles Child Guidance Clinic Employment Opportunities Online Application System. The developers use the SSAD as a reference to the system's architecture. Therefore, the system should be faithful to the architecture. The SSAD is also used by maintainers and clients to understand the structure and design of the system once the system is delivered.

1.2 Status of the SSAD

The current version of the SSAD is a part of the TS set package. The document provides an overview of the system, describes the system context, describes artifacts and information created by the system, and describes the behavior of the system. What's more, this version of SSAD also includes all the class diagrams, hardware component diagrams, software component diagrams, and sequence diagrams. The design of the system is fully detailed in this version of SSAD.
Due to the change of mind from our clients at the end of last semester, our development language has been changed from JSP to PHP. This means that our online application system was designed over again. Now, our website has been restructured using PHP Symfony framework.

2. System Analysis

2.1 System Analysis Overview

The primary purpose of the Los Angeles Child Guidance Clinic Employment Opportunities Online Application System is to expedite the application process for job applicants and for the Clinic's HR staff. This system will save time and be more attractive to job-seekers, facilitating the Clinic's hiring process. The system will allow job candidates to fill out forms directly on the website, which can then be submitted electronically to the Clinic's hiring department. Job listings will be sectioned off by department, with separate pages for each individual listing. The system will be easily edited by internal staff, as employment openings turn over too quickly to conveniently updated through a third party.

2.1.1 System Context

Figure 1 shows the operation context of the Los Angeles Child Guidance Clinic Employment Opportunities Online Application System.

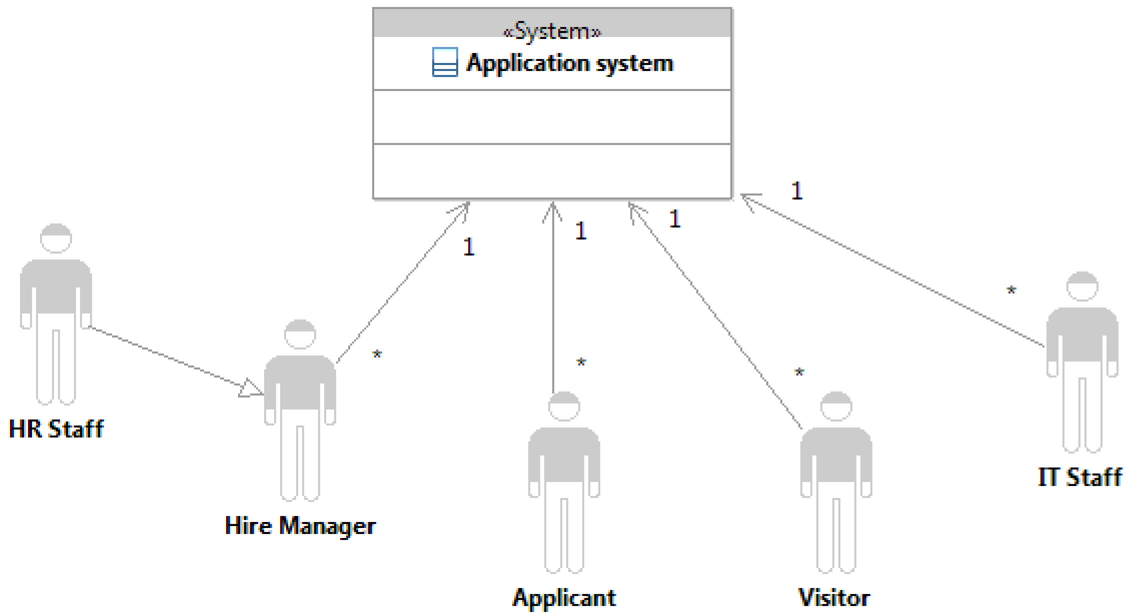

Figure 1: System Context Diagram

Table 1: Actors Summary describes the actors and their responsibilities related to the system.

Table 1: Actors Summary

Actor	Description	Responsibilities
HR Staff	HR Staff are the ones who manage the job postings and job applications.	• View, transfer, and manage the job applications. • Process and save applicant's information. • Edit, update the job postings.
HR Supervisor	HR Supervisor serves as the power user for the system and has full access to the entire system.	• Manage application reports • Edit, update the job postings.
IT Staff	IT staff serves as the system administrator and has full access to the entire system.	• Manage accounts for the system • System maintenance.

Actor	Description	Responsibilities
Job applicant	Job applicant serves as the normal user of the system and has limited access to his own profile.	• Submit job application form • Upload documents
Visitor	Visitors are the ones that browse the website.	• Visitors need to register if they want to apply for a job opening.
Hiring Manager	Hiring Manager is the one to determine qualified applicant.	• Change status for the qualified applicant.

2.1.2 Artifacts & Information

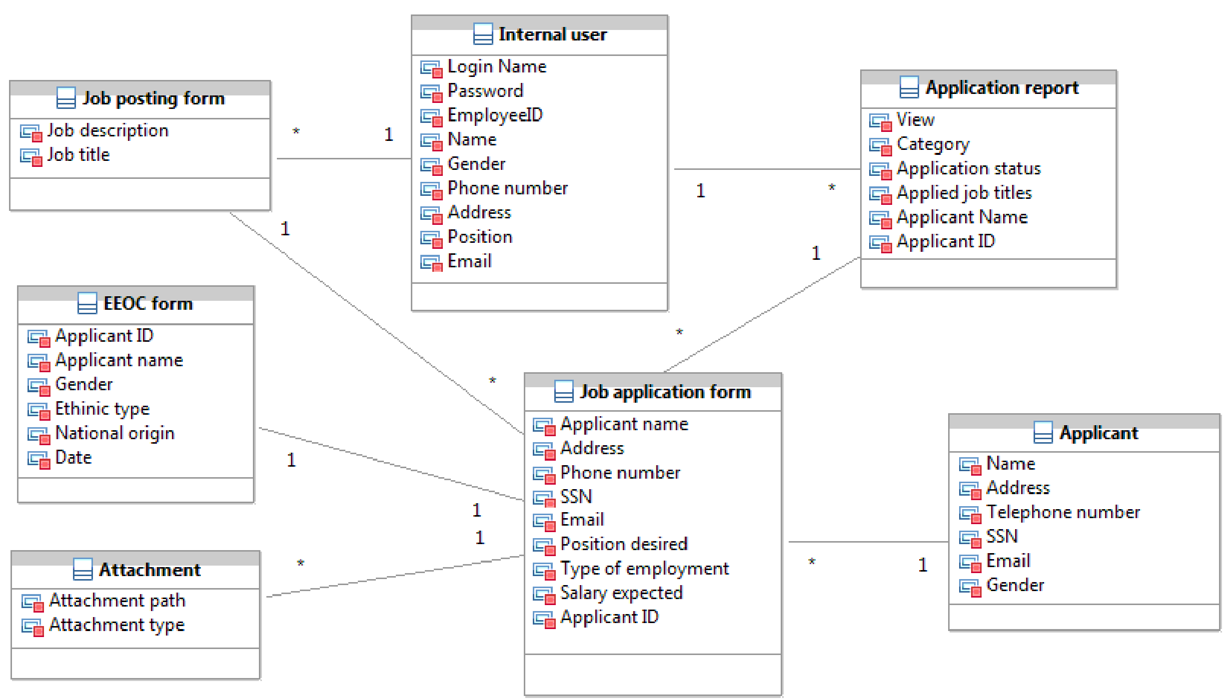

Figure 2: Artifacts and Information Diagram

Table 2 contains a description of each artifact shown in Figure 2.

Table 2: Artifacts and Information Summary

Artifact	Purpose
ATF-1: Job posting form	Contains job information by different titles and different departments, which will be viewed and referenced by the job applicants.
ATF-2: Job application form	Contains the application information for a job applicant.
ATF-3: EEOC form	Contains the ethnicity information of the applicant.
ATF-4: Applicant profile	Stores the applicant information like applicant id, type of applicant, contact information, etc.
ATF-5: Internal user profile	Stores the internal user information like employee id, employee name, email, etc.
ATF-6: Attachments	Contains the applicant's personal documents.
ATF-7: Application reports	Contains information on application status reports by different categories, different job titles, and different time periods.

2.1.3 Behavior

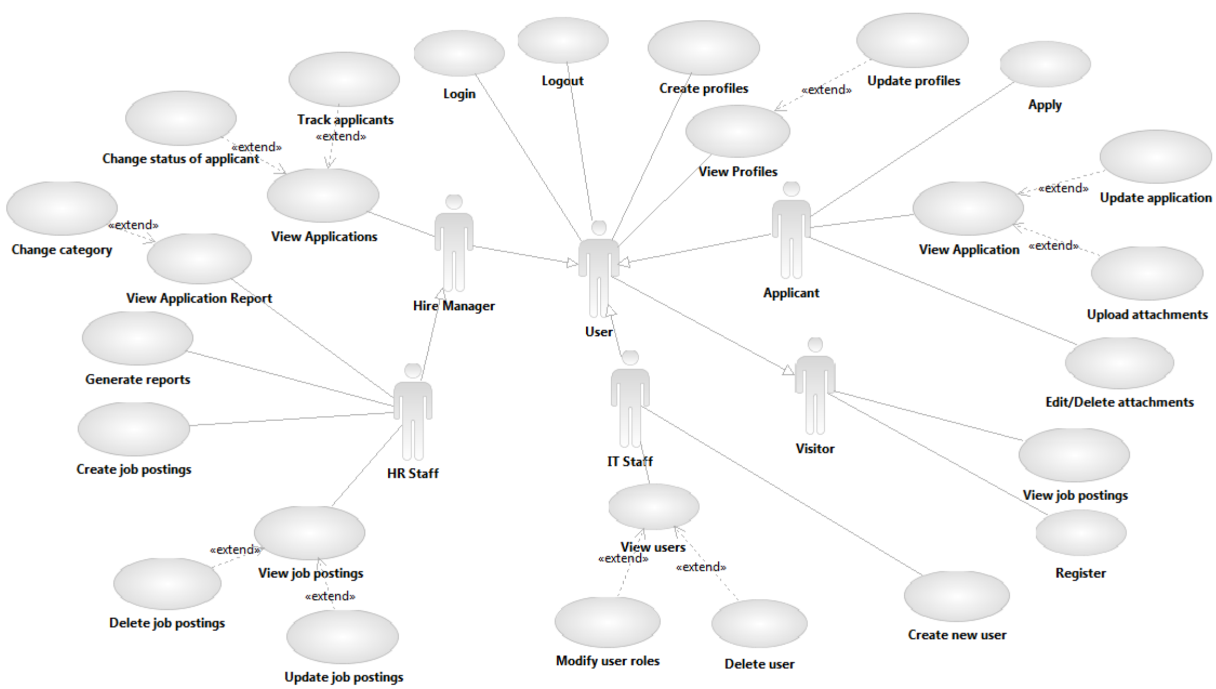

Figure 3: Process Diagram

2.1.3.1 Manage job postings

2.1.3.1.1 Create job postings

Table 3: Process Description – Create job postings

Identifier	UC-1: Create job postings
Purpose	Allow the HR staff to create job postings for the online system.
Requirements	CR-8 “Add a Job Post”
Development Risks	• None
Pre-conditions	• User is an HR staff or HR supervisor of the clinic • User is logged into the system • Database is initialized
Post-conditions	• Jobs information is available from the online system.

Table 4: Typical Course of Action – Create job postings

Seq#	Actor’s Action	System’s Response
1	Login as HR staff	
2	Attempt to create a job posting	
3		Check webpage for completeness
4		Display a message to indicate the job postings are updated

Table 5: Alternate Course of Action – Create job postings: Incomplete

Seq#	Actor’s Action	System’s Response
1	Login as HR staff	
2	Attempt to create a new job posting	
3	Fail to finish the job postings	
4	Click “Save”	
5		Check webpage for completeness
6		Reload the webpage and indicate which required information was not completed

2.1.3.1.2 Update job postings

Table 6: Process Description – Update job postings

Identifier	UC-2: Update job postings
Purpose	Allow the HR staff and HR supervisors to update the job postings for the online application system.
Requirements	CR-9 “Edit a Job Post”, CR10 “Remove an old post”
Development Risks	• None
Pre-conditions	• Job postings information is not up-to-date in the database.
Post-conditions	• Job postings are updated. • New job information is stored in the database.

Table 7: Typical Course of Action – Update job postings

Seq#	Actor’s Action	System’s Response
1	Log in as the HR staff	
2	Attempt to update the job posting	
3	Fill in all required fields	
4	Click “Edit”	
5		Check fields for completeness
6		Display a message to indicate that the job postings are updated successfully

Table 8: Alternate Course of Action – Update job postings

Seq#	Actor’s Action	System’s Response
1	Log in as the HR staff	
2	Attempt to update the job posting	
3	Fail to finish all required fields	
4	Click “Edit”	
5		Check fields for completeness
6		Reload the form page and indicate which required fields were not completed

2.1.3.1.3 View Job Postings

Table 9: Process Description – View job postings

Identifier	UC-3: View application report
Purpose	Allow the HR staff and HR supervisors to view job postings
Requirements	CR-1 "Internal query and display".
Development Risks	• None
Pre-conditions	• User is logged into the system as HR staff or as an HR supervisor.
Post-conditions	• Job postings of different categories or different titles are displayed to the HR staff.

Table 10: Typical Course of Action – View job postings

Seq#	Actor's Action	System's Response
1	Click "Manage Job Postings"	
2	Choose "by department" or "by title".	
3		Job posting is displayed to the HR Staff.

2.1.3.2 Application Process

2.1.3.2.1 Submit a job application form

Table 11: Process Description – Submit a job application form

Identifier	UC-4: Submit a job application form
Purpose	Allow an applicant to digitally submit a job application form so that applicants do not have to fax paper documents and the HR staff does not have to maintain the paper documents.
Requirements	CR-2 "Application attachments", CR-5 "EEOC Generation", CR-11 "One or more user applications", CR-26 "Applicant partial privileges", CR-27 "View Account".
Development Risks	• None
Pre-conditions	• Applicant is logged into the system. • Database is initialized
Post-conditions	• A job application form has been submitted. • A job application form is stored in the database.

Table 12: Typical Course of Action – Submit a job application form

Seq#	Actor's Action	System's Response
1	Fill in all required fields	
2	Click "Submit"	
3		Check form for completeness
4		Display a message to indicate the form has been submitted

Table 13: Alternate Course of Action – Submit a job application form: Incomplete

Seq#	Actor's Action	System's Response
1	Fail to finish all required fields	
2	Click "Submit"	
3		Check form for completeness
4		Reload the form page and indicate which required fields were not completed

2.1.3.2.2 Upload attachments

Table 14: Process Description – Upload attachments

Identifier	UC-5: Upload Scanned Documents
Purpose	Allow applicants to upload scanned documents.
Requirements	CR-2 "Application attachments"
Development Risks	• None
Pre-conditions	• Applicant is logged into the system • Applicant has access to upload a document
Post-conditions	• Uploaded documents are stored in the file system and path is stored in the database.

Table 15: Typical Course of Action – Upload attachments: Validate the formats

Seq#	Actor's Action	System's Response
1	Fill in required fields.	
2	Select files to upload.	
3		Check the formats – valid formats.
4		Store documents into the image server and store references into the database.

5		Notify the applicant that the documents have been uploaded successfully.

Table 16: Alternate Course of Action – Upload attachments: Invalid formats

Seq#	Actor's Action	System's Response
1	Fill in required fields.	
2	Select files to upload.	
3		Check the formats – invalid formats.
4		Notify the applicant that the documents have invalid file formats.
5		Redirect the applicant to the upload page.

2.1.3.2.3 Update application form

Table 17: Process Description – Update an application form

Identifier	UC-6: Update an application form
Purpose	Allow applicants to update their application form.
Requirements	CR-2 "Applicant attachments", CR-26 "Applicant partial privileges", CR-27 "View Account", CR-41 "Prevent single person/Multiple user accounts using email addresses".
Development Risks	• None
Pre-conditions	• Applicant is logged into the system • Applicant has access to update the application form
Post-conditions	• Updated application form is stored in the database

Table 18: Typical Course of Action – Update an application form

Seq#	Actor's Action	System's Response
1	Fill in all required fields	
2	Click "Edit"	
3		Check form for completeness
4		Display a message to indicate the form has been updated successfully.

Table 19: Alternate Course of Action – Update an application form: Incomplete

Seq#	Actor's Action	System's Response
1	Fail to finish all required fields	

2	Click "Edit"	
3		Check form for completeness
4		Reload the form page and indicate which required fields were not completed.

2.1.3.2.4 View application form

Table 20: Process Description – View application form

Identifier	UC-7: View application form
Purpose	Allow the applicants to view their application forms
Requirements	CR-26 "Applicant Privileges", CR-27 "View Account".
Development Risks	• None
Pre-conditions	• User is logged into the system as an applicant.
Post-conditions	• Application form information is displayed to the applicant.

Table 21: Typical Course of Action – View application form

Seq#	Actor's Action	System's Response
1	Click "View your applications"	
2	Click "Edit" link	
3		The application form is displayed to the applicant.

2.1.3.2.5 View applications

Table 22: Process Description – View applications

Identifier	UC-8: View applications
Purpose	Allow the HR staff and HR supervisors to view applications
Requirements	CR-15 "View applicant application", CR-16 "Download applicant application".
Development Risks	• None
Pre-conditions	• User is logged into the system as HR staff or as an HR supervisor.
Post-conditions	• Applications of different categories or different titles or

	different time periods are displayed to the HR staff.

Table 23: Typical Course of Action – View applications

Seq#	Actor's Action	System's Response
1	Click "View your applications" link	
2	Choose "by department" or "by title" or "by time periods".	
3		The applications are displayed to the HR Staff.

2.1.3.3 Authentication

2.1.3.3.1 Login

Table 24: Process Description – Login

Identifier	UC-9: Login
Purpose	Authorize a user to log into the system and determine the user's role and access privileges.
Requirements	CR-12 "Applicant/HR/IT login"
Development Risks	• None
Pre-conditions	• System database is properly initialized
Post-conditions	• If the user's login successfully, the user is able to access system with the access privileges of the user's role • If the user's log in information is not valid, the system informs the user that she/he has entered an invalid username and password

Table 25: Typical Course of Action – Login: successful

Seq#	Actor's Action	System's Response
1	Enter a username and password	
2	Click the "Login" button	
3		Validate username and password
4		Redirect the user to their personal home page.

Table 26: Alternate Course of Action – Login: failure

Seq#	Actor's Action	System's Response
1	Enter a username and password	
2	Click the "Login" button	
3		Validate username and password
4		Redirect the user to the login page and informs the user that he/she has entered an invalid username or password.

Table 27: Exceptional Course of Action– Login: Four consecutive login failures

Seq#	Actor's Action	System's Response
1	Unsuccessfully attempt to log in to the system four consecutive times	
2		Disable the user's privilege to login.
3		Notify the user that he/she will have to contact the administrator.

2.1.3.3.2 Logout

Table 28: Process Description – Logout

Identifier	UC-10: Logout
Purpose	Enable a user to logout
Requirements	CR-14 "Applicant/HR/IT logout".
Development Risks	• None
Pre-conditions	• The user is logged in • The user's session exists
Post-conditions	• The user is logged out and the session is terminated

Table 29: Typical Course of Action – Logout

Seq#	Actor's Action	System's Response
1	Click the "log out" button.	
2		Log the user out and terminate the session.
3		Notify the user that he/she has logged out of the system.

Table 30: Exceptional Course of Action – Session timeout

Seq#	Actor's Action	System's Response
1	If the user doesn't stay active on the webpage for 10 minutes.	
2		Automatically logout the user and terminate the session.
3		Notify the user that the session was expired and that he was logged out.

2.1.3.4 Manage profiles

2.1.3.4.1 Create personal profile

Table 31: Process Description – Create personal profile

Identifier	UC-11: Create personal profile
Purpose	Allow a system user to create a personal profile.
Requirements	CR-13 "Distinct Applicant/HR/IT roles", CR-20 "External account creation".
Development Risks	• None
Pre-conditions	• User's personal profile is not created in the system
Post-conditions	• A personal profile is created for the system user

Table 32: Typical Course of Action – Create personal profile: Successful

Seq#	Actor's Action	System's Response
1	Select "Create profile" and enter all the required fields.	
2		Validate that if the user has filled all the required fields.
3		Add the user profile to the system.

Table 33: Alternate Course of Action – Create personal profile: Unsuccessful

Seq#	Actor's Action	System's Response
1	Select "Create profile" and enter all the required fields.	
2		Validate that if the user has filled all the required fields.
3		Notify the user that he needs to finish all the required fields.

2.1.3.4.2 Update a profile

Table 34: Process Description – update a profile

Identifier	UC-12: update a profile
Purpose	Enable users to edit their personal profiles.
Requirements	CR-26 "Applicant partial privileges", CR-27 "View Account".
Development Risks	• None
Pre-conditions	• User logs into the system • User has a profile in the system
Post-conditions	• User updated his/her profile successfully

Table 35: Typical Course of Action – update a profile

Seq#	Actor's Action	System's Response
1	Click "Profile".	
2		Display the profile information.
3	Click "Edit".	
4		Edit the profile information.

2.1.3.4.3 View profile

Table 36: Process Description – View profile

Identifier	UC-13: View profile
Purpose	Allow the system users to view their profiles
Requirements	CR-26 "Applicant Privileges", CR-27 "View Account".
Development Risks	• None
Pre-conditions	• User is logged into the system.
Post-conditions	• User profile is displayed to the user.

Table 37: Typical Course of Action – View profile

Seq#	Actor's Action	System's Response
1	Click "View Profile"	
2	Choose "by department" or "by title" or "by time periods".	

3		The user profile is displayed to the user.

2.1.3.5 Generate reports

2.1.3.5.1 Generate application report

Table 38: Process Description – Generate application report

Identifier	UC-14: Generate employment status report
Purpose	Allow the HR staff and HR supervisors to generate an application report
Requirements	CR-4 “System reports”, CR-7 “Applicant/Employment Category”.
Development Risks	• None
Pre-conditions	• User is logged into the system as HR staff or as an HR supervisor.
Post-conditions	• Application reports of different categories or different titles or different time periods are stored in the system.

Table 39: Typical Course of Action – Generate application report

Seq#	Actor’s Action	System’s Response
1	Click “Generate a Report”	
2	Choose “by department” or “by title” or “by time periods”.	
3		Generate an application report.
4		Store the application report in database.

2.1.3.5.2 View application report

Table 40: Process Description – View application report

Identifier	UC-15: View application report
Purpose	Allow the HR staff and HR supervisors to view an application report
Requirements	CR-4 “System reports”, CR-6 “Application/Position Status”.
Development Risks	• None

Pre-conditions	• User is logged into the system as HR staff or as an HR supervisor. • Application report is generated.
Post-conditions	• Application reports of different categories or different titles or different time periods are displayed to the HR staff.

Table 41: Typical Course of Action – View application report

Seq#	Actor’s Action	System’s Response
1	Click “Track”	
2	Choose “by department” or “by title” or “by time periods”.	
3		An application report is displayed to the HR Staff.

2.1.3.6 Manage application status

2.1.3.6.1 Track applicants

Table 42: Process Description – Track applicants

Identifier	UC-16: Track applicants
Purpose	Allow power users to search for specific applicant and track the applicant’s application status.
Requirements	CR-1 “Internal query and display”, CR-6 “Application/Position status”, CR-7 “Applicant/Employment Category”, CR-15 “View applicant application”, CR-16 “Download applicant application”, CR-17 “search user profiles”
Development Risks	• None
Pre-conditions	• HR Staff or HR supervisor logs into the system • Database is initialized
Post-conditions	• System displays a list of applicants meeting the search criteria.

Table 43: Typical Course of Action – Track applicants

Seq#	Actor’s Action	System’s Response

1	Fill in search field.	
2		Search within the system using the given parameters.
3		Display a list of search results that the user can view.

2.1.3.6.2 Change category

Table 44: Process Description – Change category

Identifier	UC-17: Change category
Purpose	Enable HR staff to change the applicant's category to either "qualified" or "unqualified".
Requirements	CR-13 "Distinct Applicant/HR/IT Roles".
Development Risks	• None
Pre-conditions	• HR staff logs into the system
Post-conditions	• Applicant's category is changed to "qualified" or "unqualified".

Table 45: Typical Course of Action – Change category: Yes

Seq#	Actor's Action	System's Response
1	Select the applicant.	
2	Click on "View"	
3	Click "Change category"	
4		Display a message saying that the applicant's category will be changed and ask the user to confirm.
5	Select – "Yes"	
6		Change the applicant's category.

Table 46: Alternate Course of Action – Change category: No

Seq#	Actor's Action	System's Response
1	Select the applicant.	
2	Click on "View"	
3	Select "Change category"	
4		Display a message saying that the applicant's category will be changed and ask the user to confirm.
5	Select – "No"	

6		Redirect the user to the “Options” page.

2.1.3.6.3 Change status of an applicant

Table 47: Process Description – Change status of an applicant

Identifier	UC-18: Change status of an applicant
Purpose	Allow HR staff to change the status of applicants.
Requirements	CR-6 “Application/Position status”
Development Risks	• None
Pre-conditions	• The status of applicants were not updated in the database
Post-conditions	• The status of applicants is updated in the database.

Table 48: Typical Course of Action – Change status of an applicant: Successful

Seq#	Actor’s Action	System’s Response
1	Select the status in the dropdown list and click “Save changes”.	
2		Validate that if the HR staff has made the change successfully.
3		Update the applicant’s status in the system database.

Table 49: Alternate Course of Action – Change status of an applicant: Unsuccessful

Seq#	Actor’s Action	System’s Response
1	Select the status in the dropdown list and click “Save changes”.	
2		Validate that if the HR staff has made the change successfully.
3		Notify the HR staff that he needs to make the change.

2.1.3.7 Manage account

2.1.3.7.1 Create new user

Table 50: Process Description – Create new user

Identifier	UC-19: Create new user
Purpose	IT staff will be able to add new user to the system.
Requirements	CR-19 “Internal account creation”, CR-20 “External account creation”
Development Risks	• None
Pre-conditions	• IT staff logs into the system as an administrator. • Database is initialized
Post-conditions	• New user added to the system.

Table 51: Typical Course of Action – Create new user - Valid

Seq#	Actor’s Action	System’s Response
1	Fill in all required fields	
2	Click “Create new user”	
3		Validate all fields that have been entered.
4		Create a new user.
5		Send email notification to the new user that his user account has been created.

Table 52: Alternate Course of Action – Create new user - Invalid

Seq#	Actor’s Action	System’s Response
1	Didn’t finish all required fields or enter invalid inputs.	
2	Click “Create new user”	
3		Validate all fields that have been entered.
4		Reload the page and indicate which required fields were not completed or invalid.

2.1.3.7.2 Reset password

Table 53: Process Description – Reset password

Identifier	UC-20: Reset a user account password
Purpose	IT staff will be able to reset a user's password when the user forgets his password.
Requirements	CR-21 "Reset password", CR-22 "Recover password".
Development Risks	• None
Pre-conditions	• IT staff logs into the system as an administrator • Database is initialized
Post-conditions	• User's password is reset • User can log in successfully

Table 54: Typical Course of Action – Reset password

Seq#	Actor's Action	System's Response
1	Select the user	
2	Choose "Options"	
3	Click on "Reset password"	
4		Reset the user's password
5		Allow the user to log into the system
6		Send email notification that the user's password has been reset.

2.1.3.7.3 Modify User Roles

Table 55: Process Description – Modify user roles

Identifier	UC-21: Modify user roles
Purpose	IT staff is able to modify user roles.
Requirements	CR-25 "Modify user roles", CR-18 "Delete a user profile".
Development Risks	• None
Pre-conditions	• IT staff logs into the system as an administrator
Post-conditions	• Selected user's role is modified and saved in the database.

Table 56: Typical Course of Action – Modify user roles - Valid

Seq#	Actor's Action	System's Response
1	Select the user	

2	Choose “Option”	
3	Click on “Change role”	
4	Choose the new role	
5		System modifies the specified user’s roles.
6		System notifies the administrator the user’s role has been updated.

2.1.3.5.2 View users

Table 57: Process Description – View users

Identifier	UC-22: View users
Purpose	Allow the IT staff to view users.
Requirements	CR-13 “Distinct Applicant/HR/IT Roles.
Development Risks	• None
Pre-conditions	• User is logged into the system as an IT staff.
Post-conditions	• System users are displayed to the IT staff.

Table 58: Typical Course of Action – View users

Seq#	Actor’s Action	System’s Response
1	Click “View Users”	
2		The system users are displayed to the IT staff.

2.1.4 Modes of Operation

The LA Child Guidance Clinic Employment Opportunities Online Application System only operates in one mode.

2.2 System Analysis Rationale

2.2.1 System business workflow

1. A potential applicant views the job postings through the online system.
2. The potential applicant registers for a user account.
3. The applicant starts the application process by filling and submitting the application form and EEOC form.
4. HR staff sees and screens the job applicants for the hiring managers.
5. Hiring managers view the qualified applicants for their corresponding departments and decide whom to interview with.
6. After interview with the applicants, the hiring manager could change the status of the applicants to either “Accepted” or “Declined”.
7. HR staff receives the list of applicants for further background checking.
8. HR staff informs the HR supervisor of who the real accepted applicants are.

2.2.2 System privileges of different roles in the system

1. Visitors can only view the job listings.
2. Applicants have access to their own profiles and job posting information in the system.
3. HR staff has the full access to view and update the job postings, view and change the status of the applicants, view and change the category of the applicants, and generates application reports.
4. HR supervisors have the same system privileges as the HR staff.
5. Hiring managers have limited access to the system. They can view and change the status of the applicants.

5\. IT staff has the right to manage user accounts and reset passwords.

3. Technology-Specific System Design

3.1 Design Overview

3.1.1 System Structure

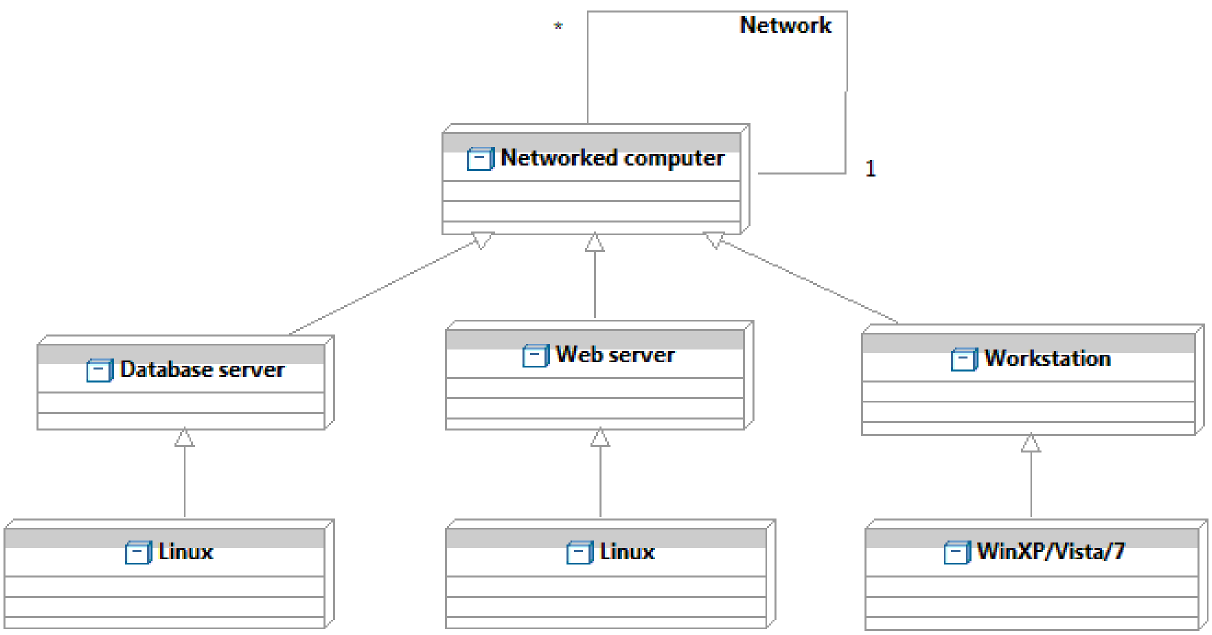

Figure 4: Hardware Component Class Diagram

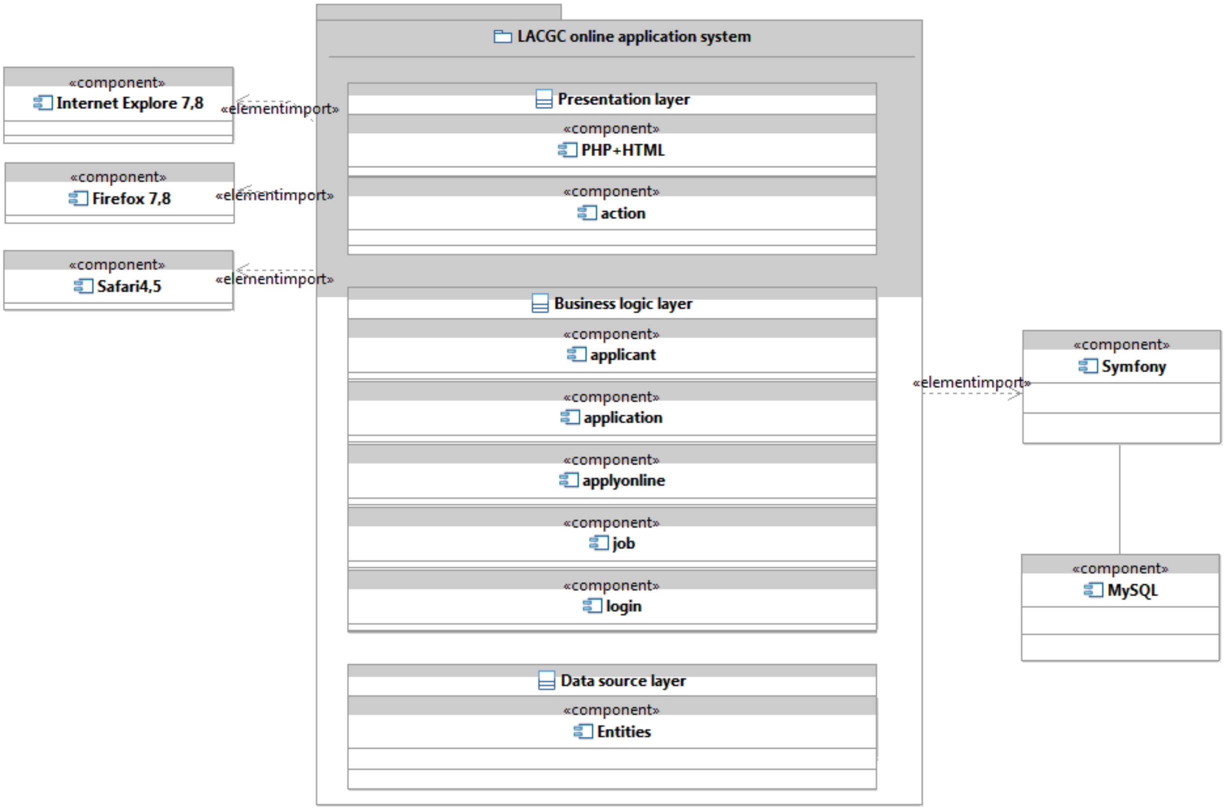

Figure 5: Software Component Class Diagram

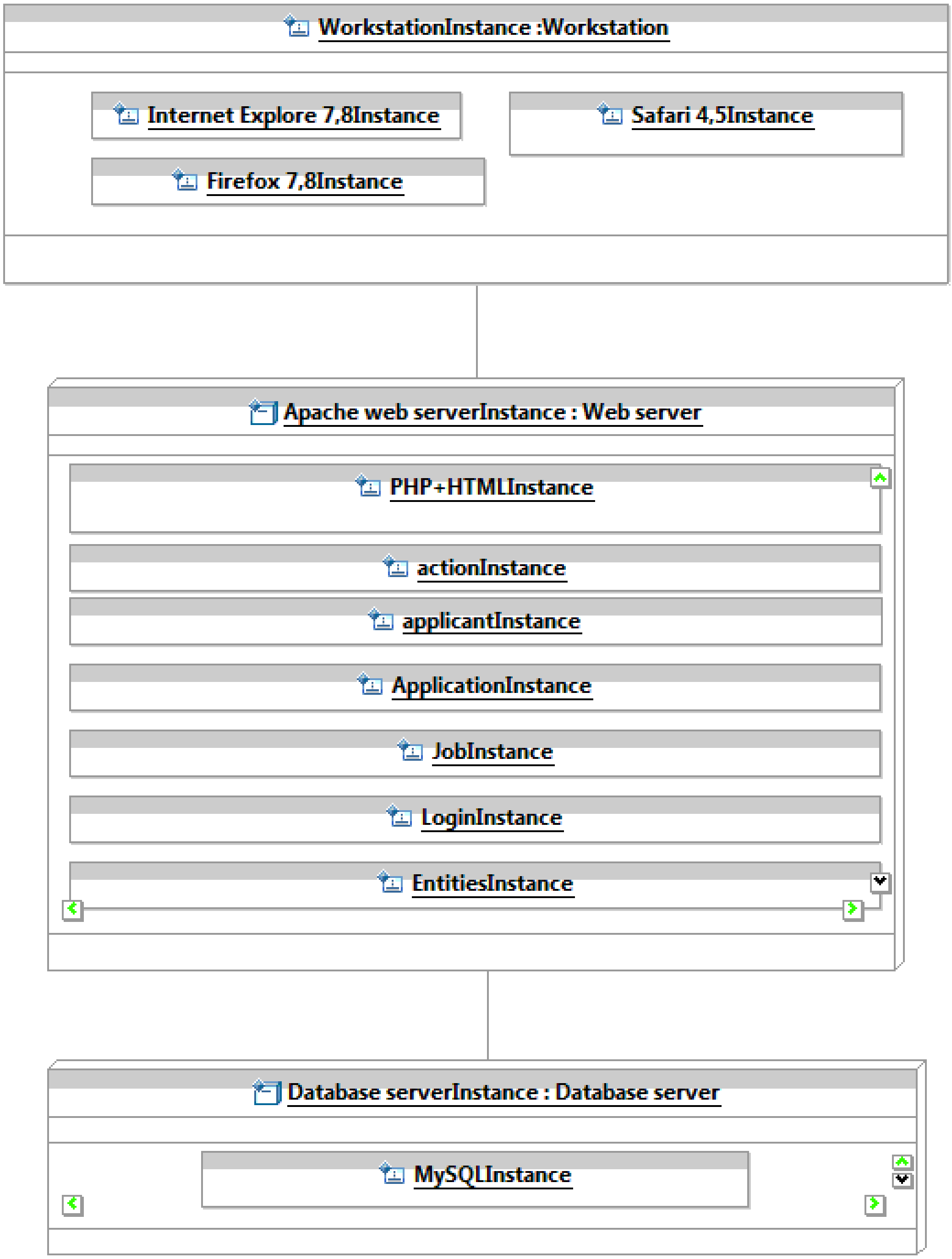

Figure 6: Deployment Diagram

Table 59: Hardware Component Description

Hardware Component	Description
Workstation	The workstation is the user's machine in which the user uses browsers to connect to the system trough internet.

Web server	Web server is the hardware component where the system resides.
Database server	A specialized hardware component where the MySQL server runs on.

Table 60: Software Component Description

Software Component	Description
Presentation layer	This layer includes GUI components, action. GUI is the software component for web pages interface. Action component is the controller for mapping inputs into operations.
Business logic layer	This layer contains all logic components. Application component provides functionalities for applicants to use the system to sign up, apply, upload attachments, and edit profiles. Job posting component provides functionalities for HR staff to manage job postings which includes “post job”, “delete job”, and “edit job”. Track application component provides functionalities for employee to manage applications including change status, change category, track applicants and export reports. User component provides functionalities for managing all user accounts including create, edit, and delete accounts and login, logout the system.
Data source layer	This layer includes all components to interact with the database. Entity component represents the entity classes which are mapped into the database tables. Doctrine component contains all the operating classes accounting for all the database operations.

3.1.2 Design Classes

3.1.2.1 Main Class Diagram

Figure 7: Main Class Diagram

Table 61: Design Class Description

Class	Type	Description
Applicant	Entity	Encapsulate applicant's profile and operations, and then map applicant's attributes into the database.

Application	Entity	Encapsulate applicant’s application fields and operations, and then map them into the database.
EEOC	Entity	Encapsulate fields and operations of “Equal Employment Opportunity Commission”, and map it into the database.
ApplyForm	Entity	Encapsulate fields and operations of the application forms, and then map them into the database.
Education	Entity	Encapsulate fields of applicant’s education information, and then map them into the database.
WorkExperience	Entity	Contains fields of applicant’s work experience information, and then map them into the database.
Attachment	Entity	Contains the applicant’s attachment’s information, and then map them into the database.
User	Entity	Encapsulate the entire system user’s login information, and map it into the database.
Employee	Entity	Encapsulate employee’s profile and operations, and then map employee’s attributes into the database.
Job	Entity	Encapsulate job fields and operations, and map them into the database.

3.1.2.2 User Class Diagram

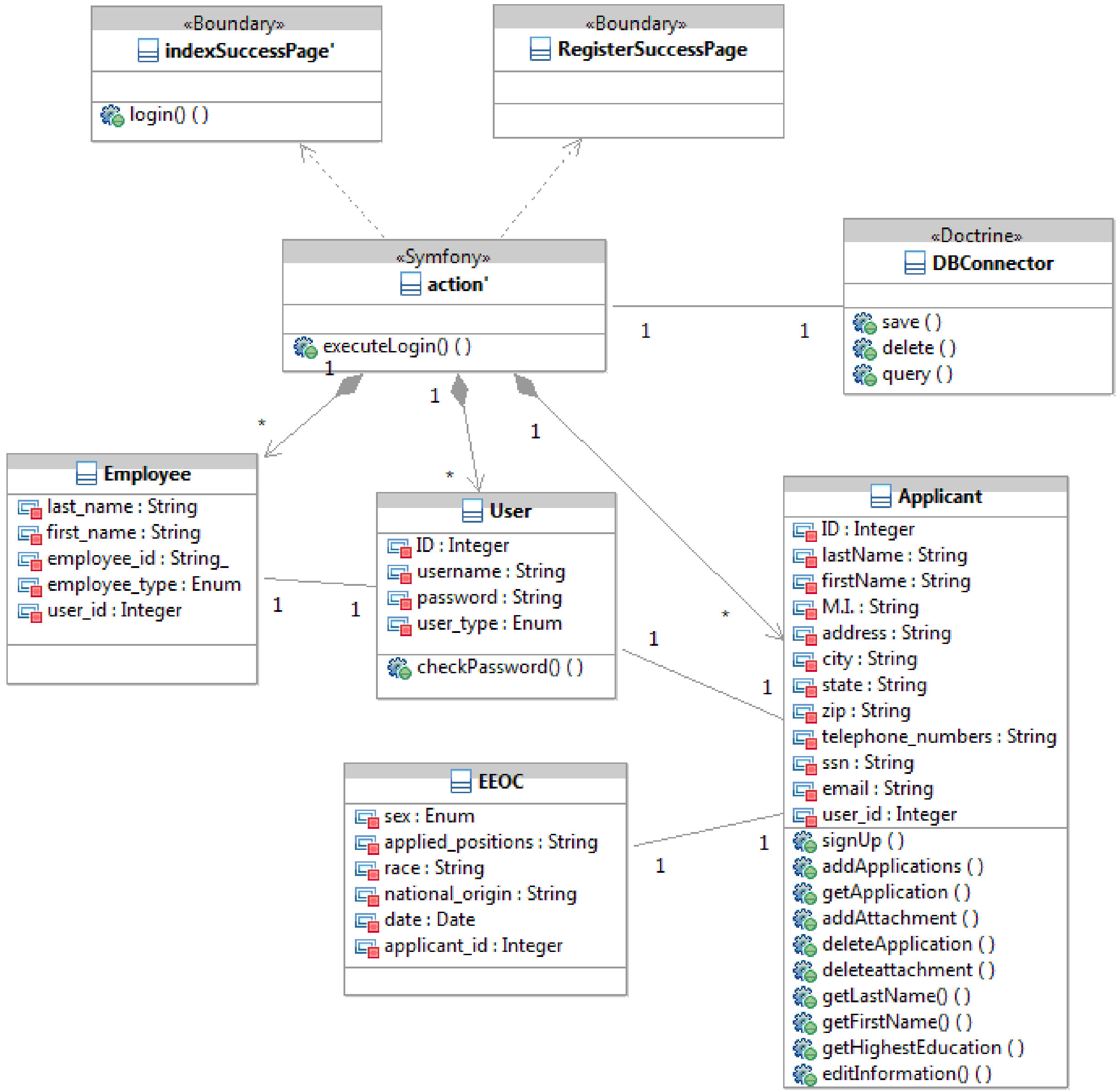

Figure 8: User Class Diagram

Table 62: Design Class Description

Class	Type	Description
indexSuccessPage, RegisterSuccessPage	PHP Boundary	Web GUI.
Action'	Symfony	Validates inputs from the GUI webpages and calls on corresponding services and functions.
DBconnector	Doctrine	Interface of Doctrine for manipulating

		database.

3.1.2.3 Application Class Diagram

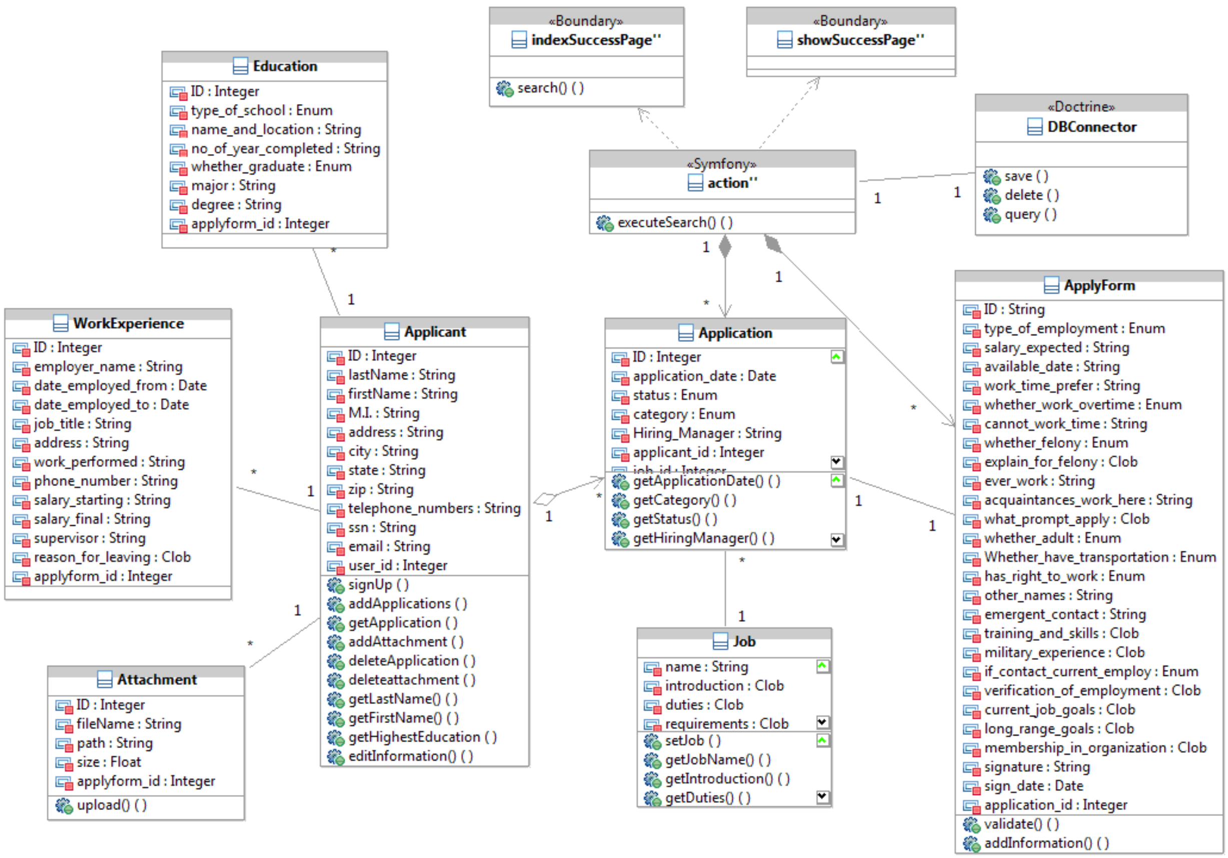

Figure 9: Application Class Diagram

Table 63: Design Class Description

Class	Type	Description
indexSuccessPage, showSuccessPage	Boundary	Web GUI.
Action''	Symfony	Validate inputs from the GUI webpages and call on corresponding functions.

3.1.2.4 Apply Class Diagram

Figure 10: Apply Class Diagram

Table 64: Design Class Description

Class	Type	Description
indexSuccessPage, confirmApplyFormSuccessPage, stepOneSuccessPage……	PHP Boundary	Web GUI.
Action'''	Symfony	Encapsulate form fields submitted by the corresponding boundary web pages, validate

		inputs and call on corresponding functions.

3.1.2.5 Job Posting Class Diagram

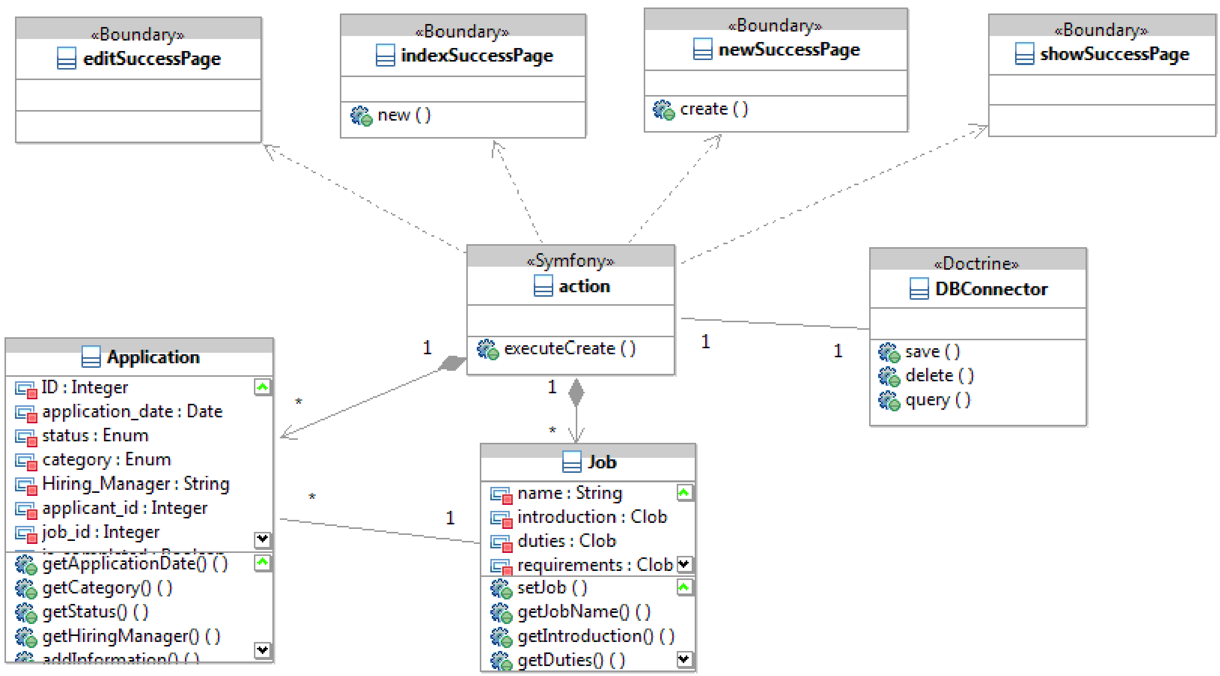

Figure 11: Job Posting Class Diagram

Table 65: Design Class Description

Class	Type	Description
editSuccessPage, indexSuccessPage, newSuccessPage, showSuccessPage	Boundary	Web GUI.
action	Symfony	Encapsulate form fields submitted by the corresponding boundary web pages, validate inputs and call on corresponding services.

3.1.3 Process Realization

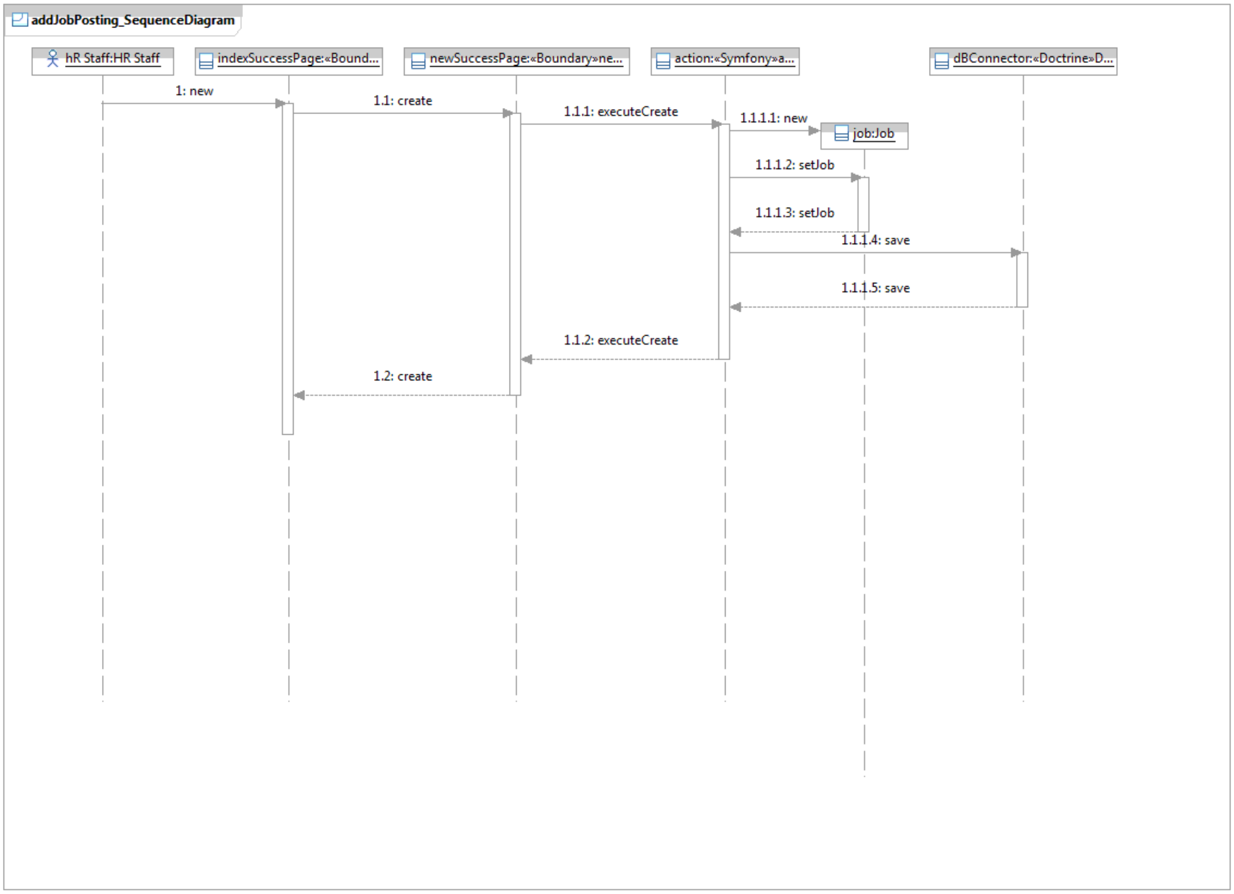

Figure 12: Process Realization Diagram

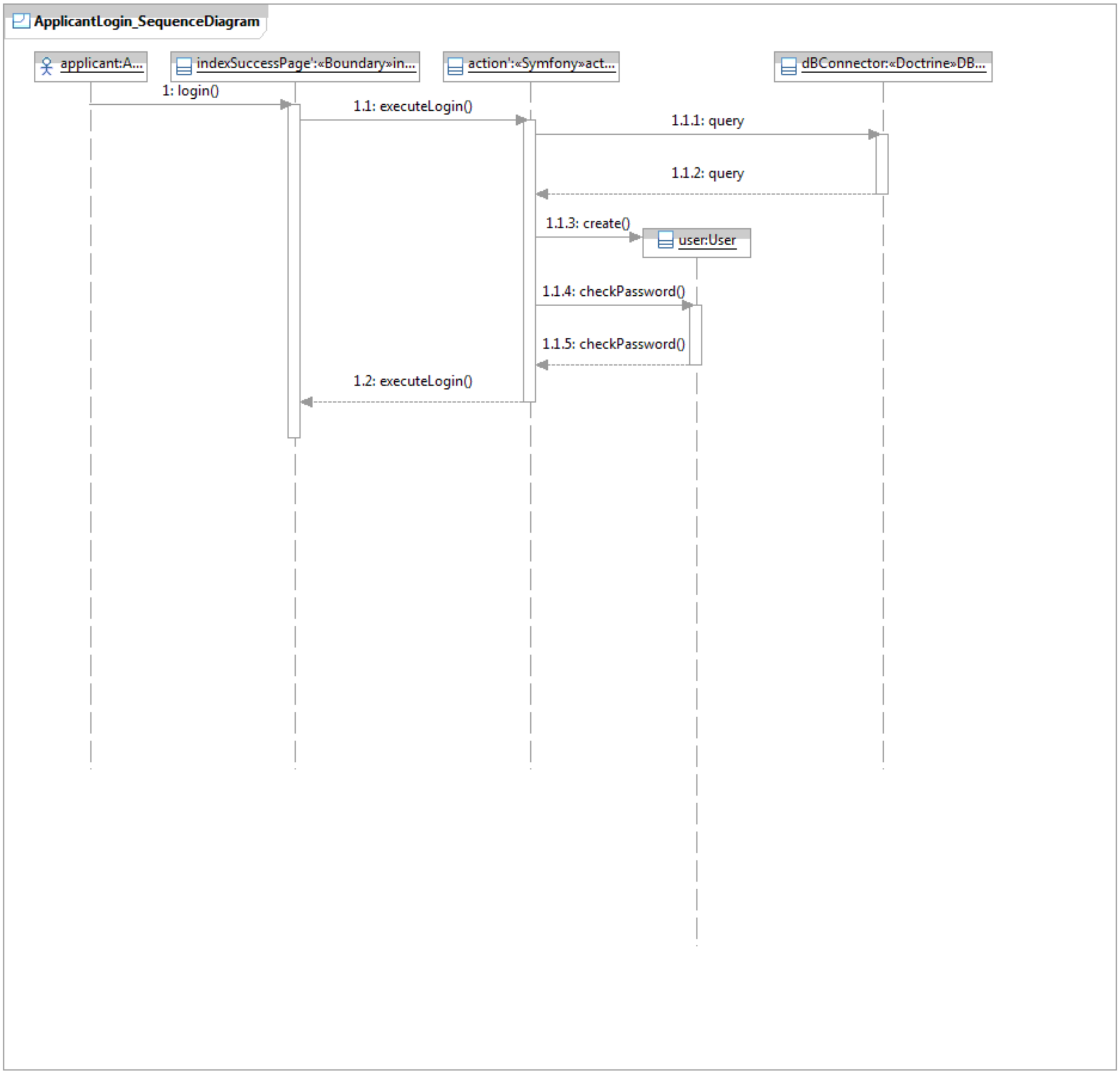

Figure 13: Process Realization Diagram

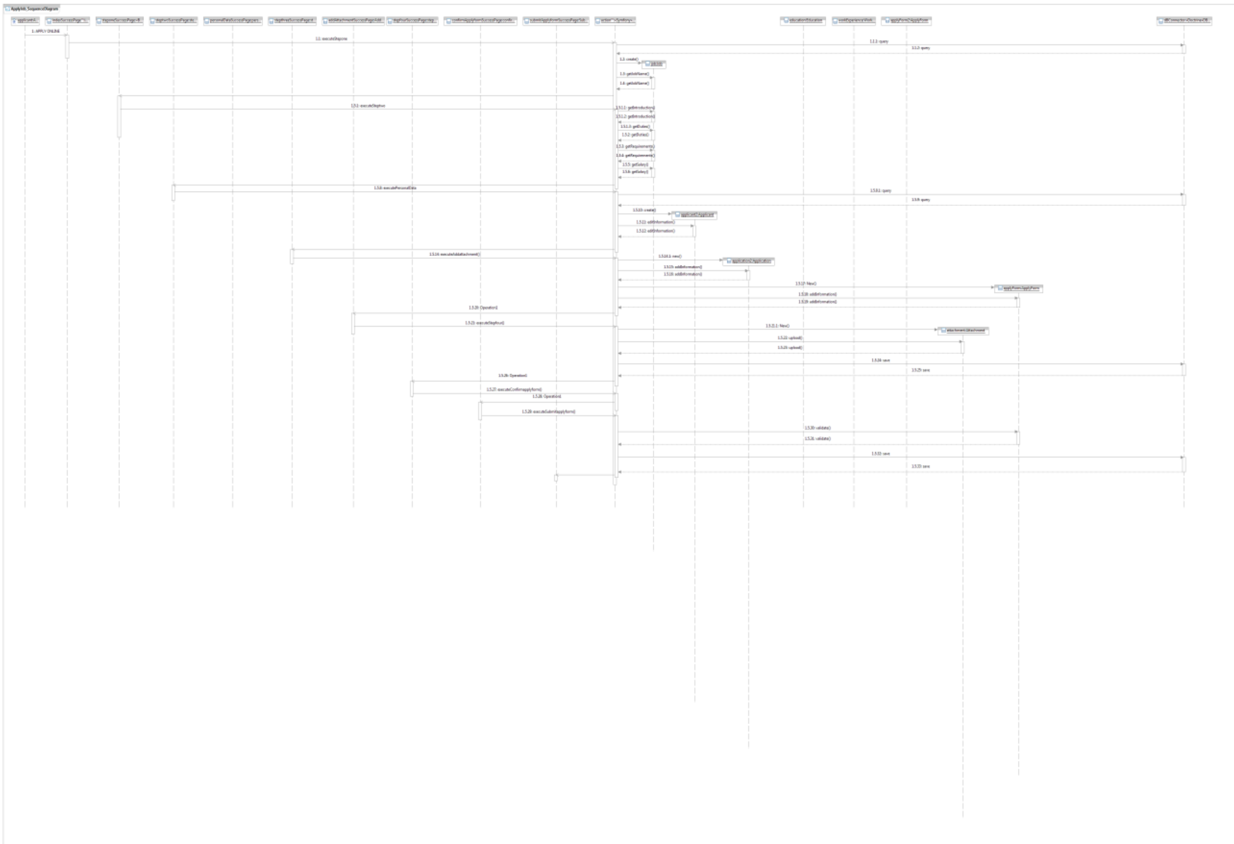

Figure 14: Process Realization Diagram

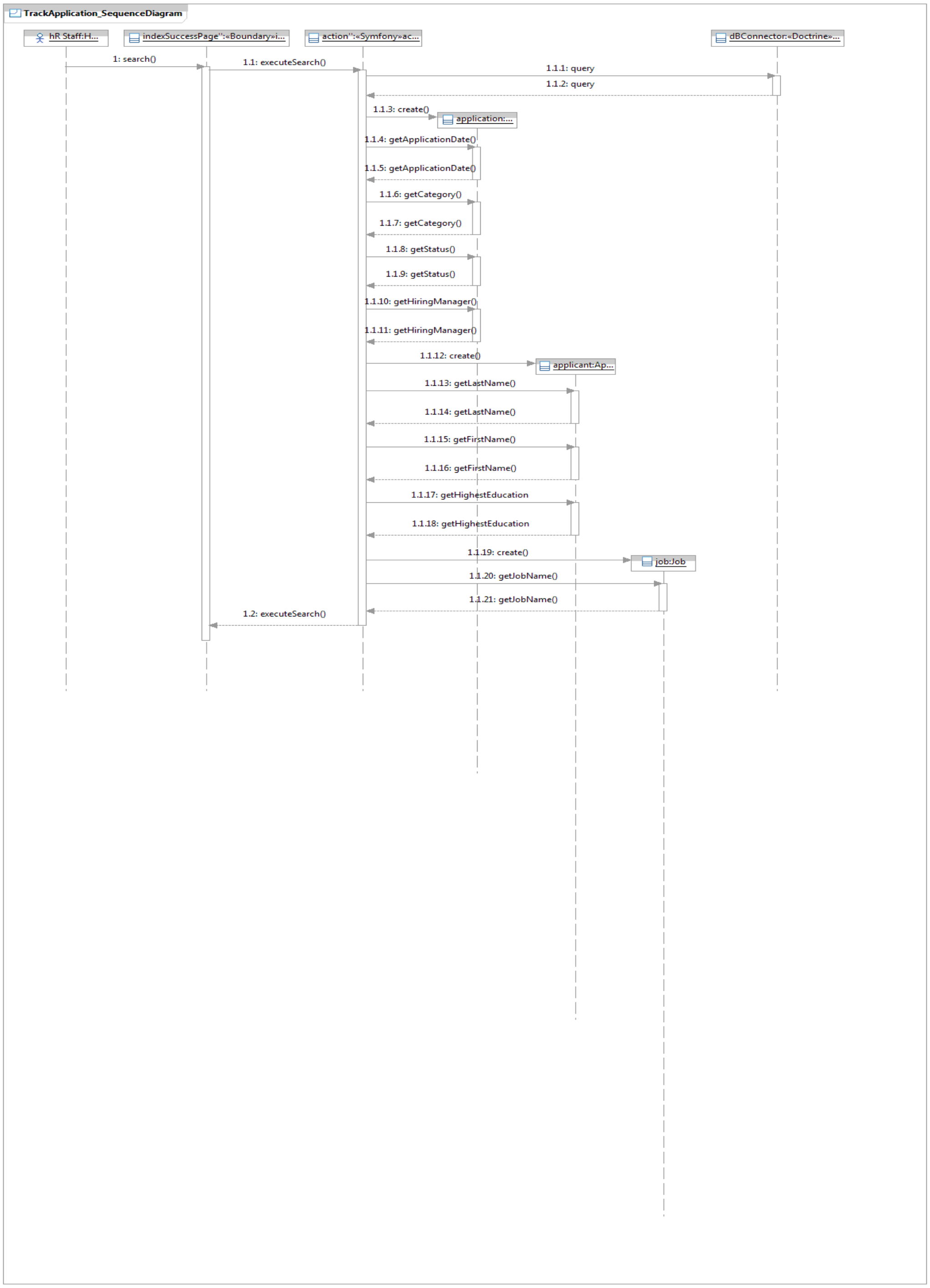

Figure 15: Process Realization Diagram

3.2 Design Rationale

Our project architecture design is based on PHP MVC Framework of Symfony.

Model---includes all the components of business logic and database manipulation. Business logic consists of job posting component, applicant component, application component, and login component. Database manipulation includes entity classes.

View---All the boundary web pages are designed in order to serve as Views in MVC Framework.

Controller---contains actions which validate inputs and map inputs into operations and return process results.

4. Architectural Styles, Patterns and Frameworks

Table 66: Architectural Styles, Patterns, and Frameworks

Name	Description	Benefits, Costs, and Limitations
Symfony MVC Framework	Symfony is an open source framework for building PHP web applications using Model View Controller (MVC) design pattern.	Symfony provide the basic infrastructure for implementing MVC allowing developers to concentrate on the business logic. Symfony also provides the doctrine to map database tables into objects. The framework is also flexible and can be extended to meet the requirements specific to a project.