



Post-Doctoral Application Management System

Functional requirements and application design document

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Version 1.0

Iteration 2

Prepared for Ms. Cathy Sandis (UP Research Office)
by Soft**Serve** Group

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23/05/2014	v 0.99	Added user acceptance test.	Alfred Ngako
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1 Project Repository

<https://github.com/mox1990/Project-Postdoc.git>

2 Document description:

2.1 Document purpose:

This functional requirements and application design document serves the purpose of providing a detailed breakdown of the SoftServe's Post-Doctoral application management system's expected functionality and how it will be realised in terms of application design. Further it defines the services contracts required by each of the stakeholders with the proposed software system. Thus this document serves as a contract between SoftServe and the client, Mrs Cathy Sandis of the DRIS of the University of Pretoria in terms of project functional requirements and realisation thereof.

2.2 Documentation methodology

The documentation and software development methodology used by the project adhere to the guidelines set out by the scrum agile methodology. Thus this document has undergone and will undergo various iterations that may extend or reduce the contents of the document.

This document was created using the requirement elicitation techniques and requirement definitions as specified by Klaus Pohl's book Requirements Engineering: Fundamentals, Principles, and Techniques [Dr.Phol, K., 2010]. The requirements, vision and scope were elicited from the following sources:

- Numerous interviews with the client.
- On-line research into UP Post doctoral applications.
- Correspondence with the UP IT department.
- Collecting and analysing various documents such as:
 - The initial project request document
 - Application forms
 - Renewal forms
 - CV templates
 - Approval and recommendation forms

2.3 Document conventions:

- Documentation formulation tool: LaTeX
- Modelling language: UML 2.0, ERD Crow-Foot notation

2.4 References:

- Dr.Phol, K., 2010, *Requirements Engineering: Fundamentals, Principles, and Techniques*, Springer, Heidelberg.
- DRIS homepage. [online] Available: <http://web.up.ac.za/default.asp?ipkCategoryID=1630> [Accessed on: 31 March 2014].

3 Functional requirements

3.1 Introduction

This section outlines the functional requirements for SoftServe's Post-Doctoral application management system. The required functionality, domain objects, process specification and use cases related to the functional requirements of the project will be discussed in this sections.

3.2 Required functionality

The following sections will discuss the required functionality of all the major services handled by the system. Namely:

- User gateway
- Application service
- Report services
- Notification services
- User account management services
- Audit-Trail services
- Archival services
- Imports and exports services

3.2.1 User gateway

The user gateway provides the access control services of the system and acts as a centralised gateway through which all users have to go in order to gain access to the system and its services.

- The gateway must provide a user login facility which allows the users to authenticate themselves using their account user name or email address and their account password.
- The gateway must insure that the correct user privileges are loaded before allowing the system to proceed.
- The gateway must insure that the user is allocated a session so that the system can identify the user.

- All internal stakeholders should be able to log in with their PeopleSoft account details once the system is integrated but until such time they should login with the credentials specified at the time of account creation.
- The gateway needs to facilitate user account recovery.
- The gateway must facilitate the creation of accounts for prospective fellows and on-demand users which are users which don't have an account but need an account with other privileges than a prospective fellow account allows.

3.2.2 Application services

The application services encompasses the entirety of the application process undergone by prospective fellows namely new and renewal applications.

The main user of these services will be the prospective fellows who wishes to track their application progress or renew or apply for a Post-Doctoral fellowship. Other stakeholders will only make use of certain sub-services which are provided under the Application services. It should be noted that most of the different stakeholders' usage will be focused in this set of services only.

As specified in the vision and scope document under section 7.1 the application process of each application is broken up in stages. These stages run concurrently until they reach the stage where the post-doctoral committee meeting is to take place after which all eligible applications are batch processed for the stages that follow. In order to manage this after each stage is complete the applications will be automatically forwarded to the next. Only the system administrator will have the power to move applications back through the stages. It should be noted that if the system administrator moves an application back then all the data of the stages that have been undo will be removed.

- **Application approval levels:** Each stage the application goes through requires a different type of approval or check. Thus the approval level of each stage in order of first to last, is highlighted below. Note * indicates this stage is only for new applications:

1. **Open application** - This application is a newly created application.
2. ***Refereed application** - This application has a completed list of referral reports from the specified referees.
3. **Finalised application** - This application has been finalised by the respective grant holder.
4. **Recommended application** - This application has been recommended by the respective HOD.
5. **Endorsed application** - This application has been endorsed by the respective Dean's office.

6. **Eligible application** - This application has been checked for eligibility by the DRIS and has been found to be eligible.
7. **Fund-able application** - This application has been approved for funding and is complete.

- **New fellowship application service:**

1. A prospective fellow should be able to open a new application.
2. A prospective fellow should be able to add their CV in the required format.
3. A specified grant holder should be able to add their CV in the required format. If they are a NRF A or B rated researcher they are not required to enter their CV.
4. A owner of a CV should be able to add various qualifications and work experience to their CV.
5. A owner of a CV should be able to update their CV if it has been created.
6. Once the application has been finalised the CV will be locked until the application is complete or denied.
7. A prospective fellow should be able to specify their intended grant holder.
8. A prospective fellow should be able to specify their intended referees.
9. A application should be made available for stakeholders such as the DRIS, HOD and Dean to deny or approve it at the correct stage in the process.

- **Application renewal service:**

1. A research fellow should be able to open a new renewal application.
2. A research fellow should be able to add their progress report on all the work they have been working on.
3. A owner of a CV should be able to add various qualifications and work experience to their CV.
4. A owner of a CV should be able to update their CV if it has been created.
5. Once the application has been finalised the CV will be locked until the application is complete or denied.
6. A renewal application should be made available for stakeholders such as the DRIS, HOD and Dean to deny or approve it at the correct stage in the process.

- **Application Referees' report service:**

1. A referee should be able to login and create a referral report for the prospective fellow that has identified him/her.

- **Grant holder application finalisation service:**

1. A research fellow's grant holder should be able to finalise the renewal application of that research fellow.
2. A prospective fellow's grant holder should be able to finalise the prospective fellows application who he wishes to supervises.

- **HOD approval service:**

1. A HOD of a department should be able to login and approve, decline or ask for amendment of any pending applications.
2. A HOD of a department must be able to create a recommendation report for applications they approve.

- **Dean endorsement service:**

1. A member of the dean's office should be able to login and endorse the applications, that they approve of, with a motivation and be able to rank them.
2. A member of the dean's office should be able to login and deny applications that they disprove of.

- **DRIS approval service:**

1. A DRIS member who administers the process must be able to log in and review pending applications that need to be checked for eligibility and approve or deny them.
2. A DRIS member who administers the process must be able to create post doctoral committee meetings. And also be able to prepare the pre-documentation thereof.
3. A DRIS member who administers the process must be able to finally approve or deny the funding of any last stage applications and also be able to provide motivation and details thereof.

- **Application progress viewer service:**

1. A prospective fellow's application or a research fellow's renewal application status should be made available for their review if they have an application in the system.
2. The grant holder of an application should be able to view the status of the application.

3.2.3 Report services

The report services provides the reporting generation service for the DRIS in order to extract valuable information and allow them to provide electronic and hard copy data for review or archiving. The DRIS is the only stakeholder that will make use of this service. Note reports are temporal objects and do not get saved by the system.

- The DRIS member must be able to access a report generation tool which effectively allows them to:
 1. Open new report.
 2. Select report data from the database.
 3. Generate report.
 4. View report.
- The DRIS member viewing the report must be allowed to be exported the report to either a pdf or a spreadsheet format.

3.2.4 User account management services

The user account management services provide each user who has an account on the system with the facilities to manage their account and also a facility for the system administrator to manage the accounts on the system.

- A prospective fellow will be create a new account if they don't have one.
- Any identified user that is not already on the system should be allowed to create a new account.
- If integrated with peoplesoft the system should be able to pull all the account information of personnel but until such time the system administrator will have to be allowed create the accounts of all DRIS members, Dean's office members, HODs and post-doctoral committee members.
- A user should be able to modify their account details.
- A administrator should be able to modify any user account details.
- A administrator should be able to remove any user account.

3.2.5 Notification services

The system will need to generate automated notifications that are sent internally and to the corresponding email of the recipient. To prevent spamming the system will only allow users with the correct security roles to make use of the service.

- The system must be able to create a new notification.
- Stakeholders with the correct security roles must be able to create a new notification.
- A notification must allow for the specification of recipient.
- A notification must allow for the specification of a message.
- The service must allow the notification to be sent to both the user account and recipient's email address.

3.2.6 Audit-Trail services

The Audit-Trail services provide a means for the system administrator or DRIS members to view all the actions that were performed by a user of the system. It is important to note that the audit entries are read-only and can only be inserted by the system itself. The monitored actions are hard wired into the system so to prevent any tampering.

- An authorised user must be able to generate a report via the reporting services for the audit log.
- The system should be able to insert audit log entries when the monitored actions occur.

3.2.7 Archival services

The archival services of the system will be able to back up the current state of the database to a specified location. Further it should be able to remove old records from the working database that are no longer in use and store them in a location so that they can be retrieved on a on-demand basis.

- The system administrator needs to be able to perform a system backup.
- The system administrator needs to be able to perform an automatic archival of old data.
- The system administrator needs to be able to perform a backup of the current database.
- The system should be able to notify the system administrator of any possible archival data.

3.2.8 Imports and exports services

The imports and exports services of the system will allow the system administrator to export and import certain data. A sub-set of these services will also be made available to users of the appropriate security role.

- The system administrator will be able to export and import user accounts and their associated information and link to the on-demand user account creation service.

- The system administrator will also be able to import information of the departments and faculties for location purposes of users.
- The system administrator and authorised users will be able to import and export all the data associated with applications.

3.3 Use case diagrams

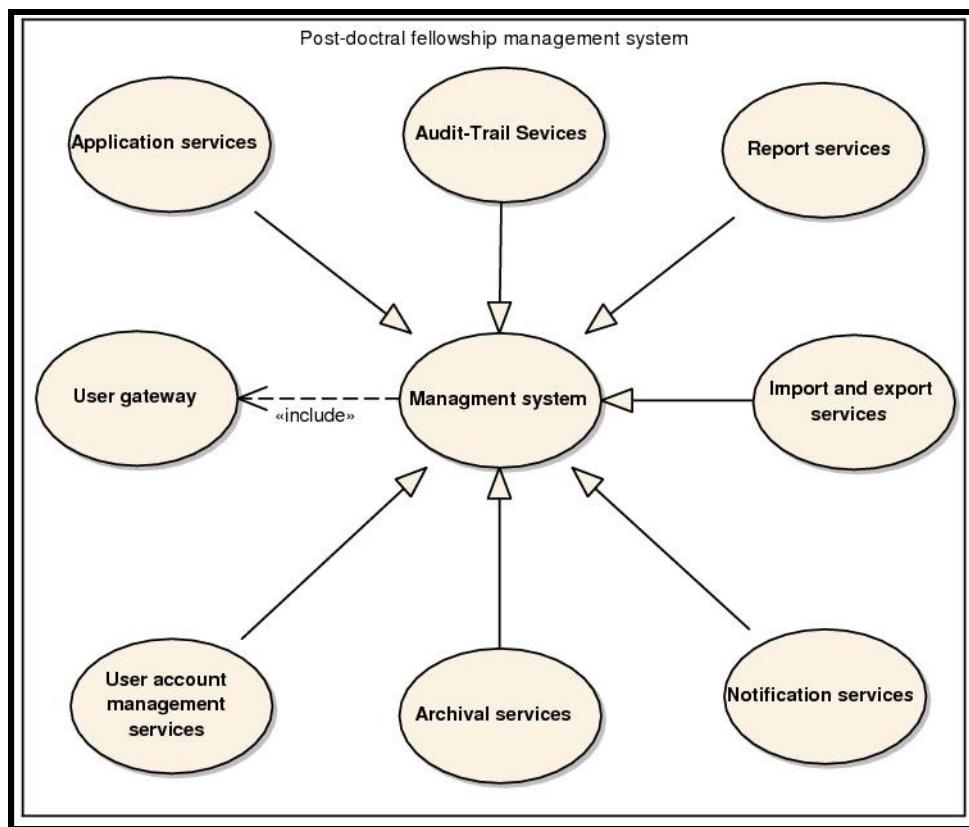


Figure 1: Use case diagram of Post-doctoral fellowship management system

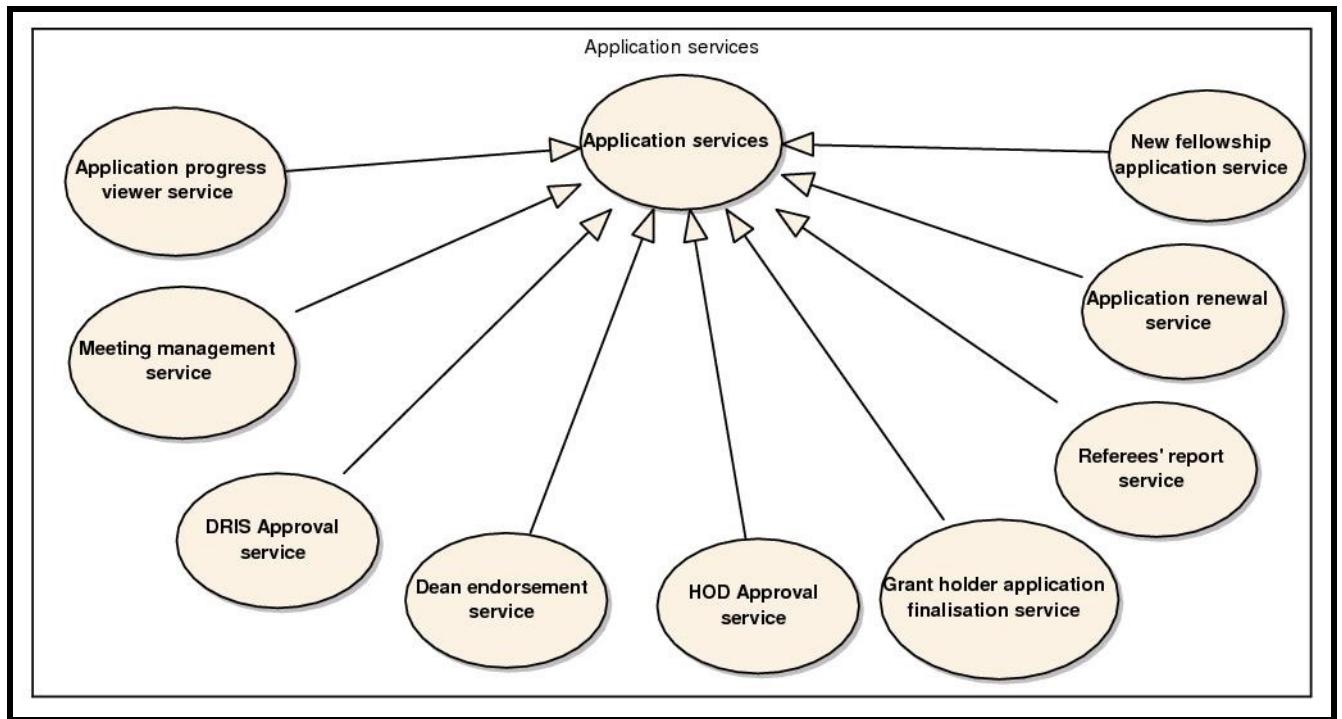


Figure 2: Use case diagram of Application service

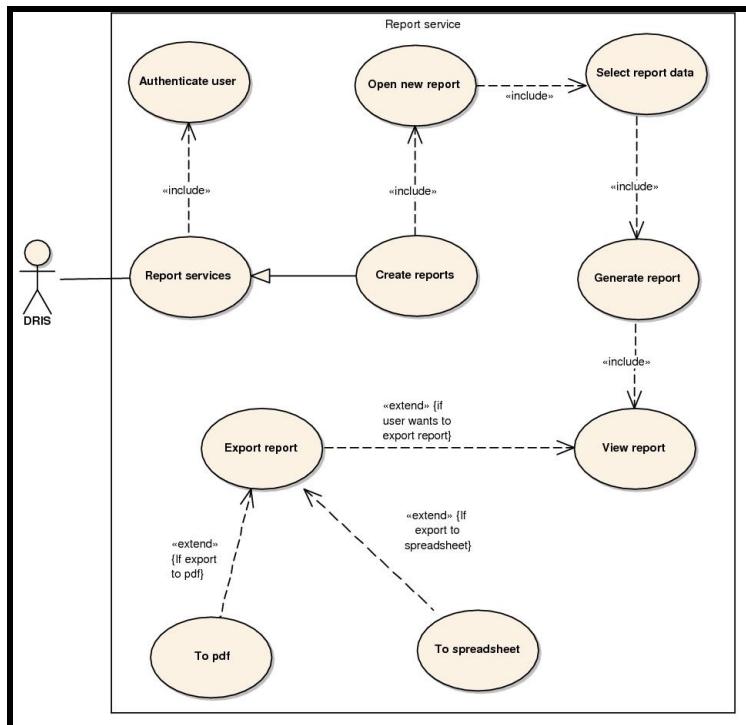


Figure 3: Use case diagram of Report service

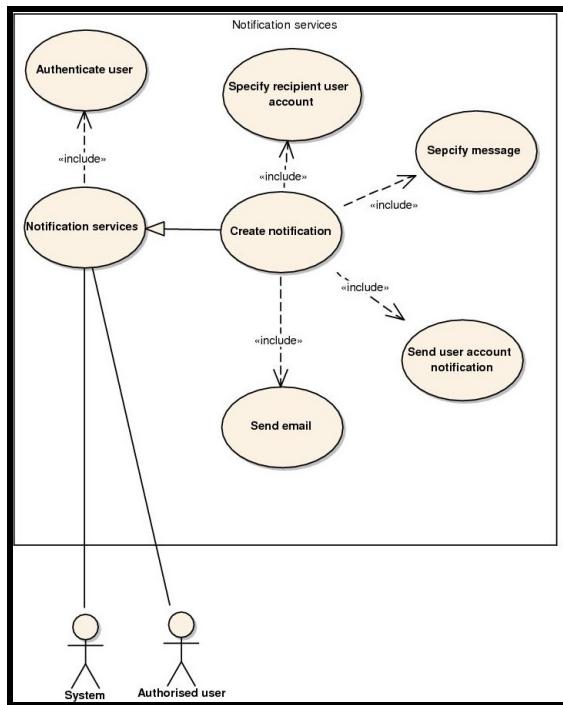


Figure 4: Use case diagram of Notification services

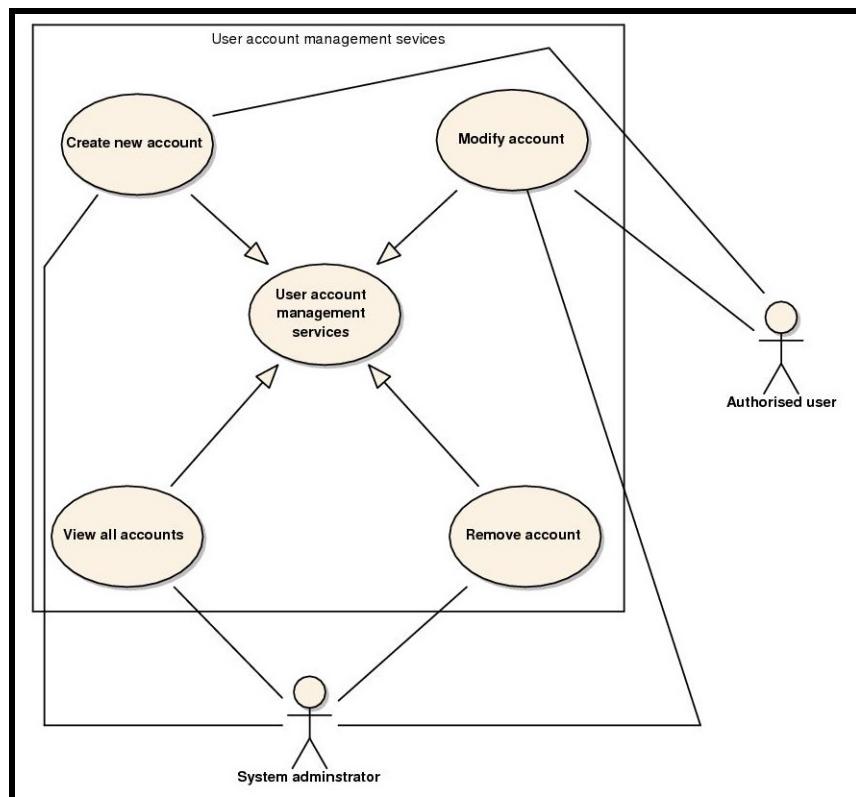


Figure 5: Use case diagram of User account management services

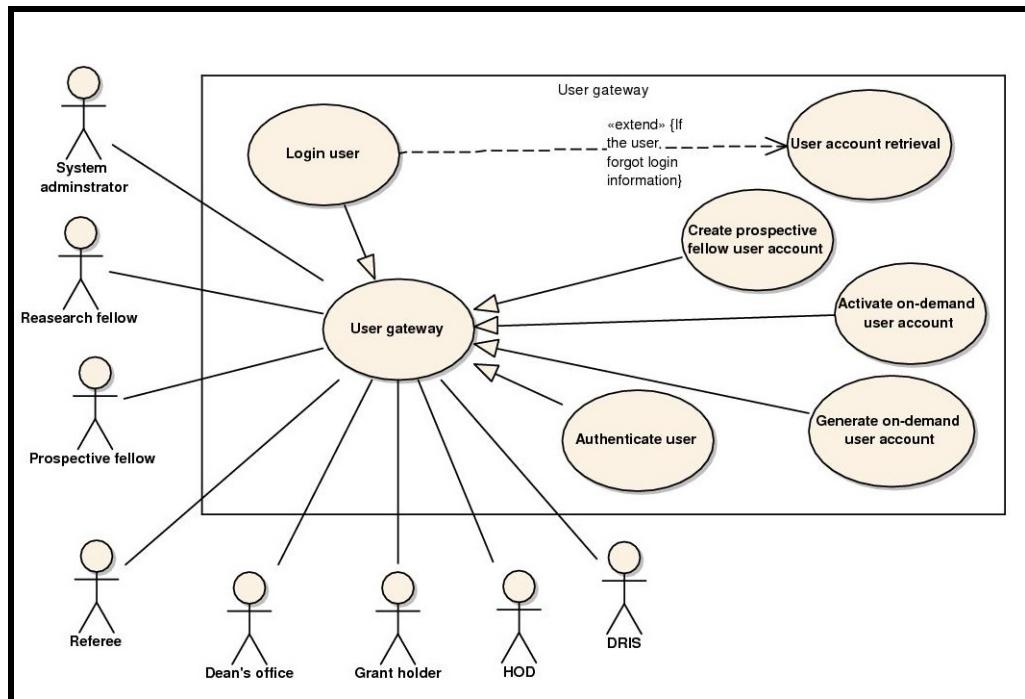


Figure 6: Use case diagram of User gateway

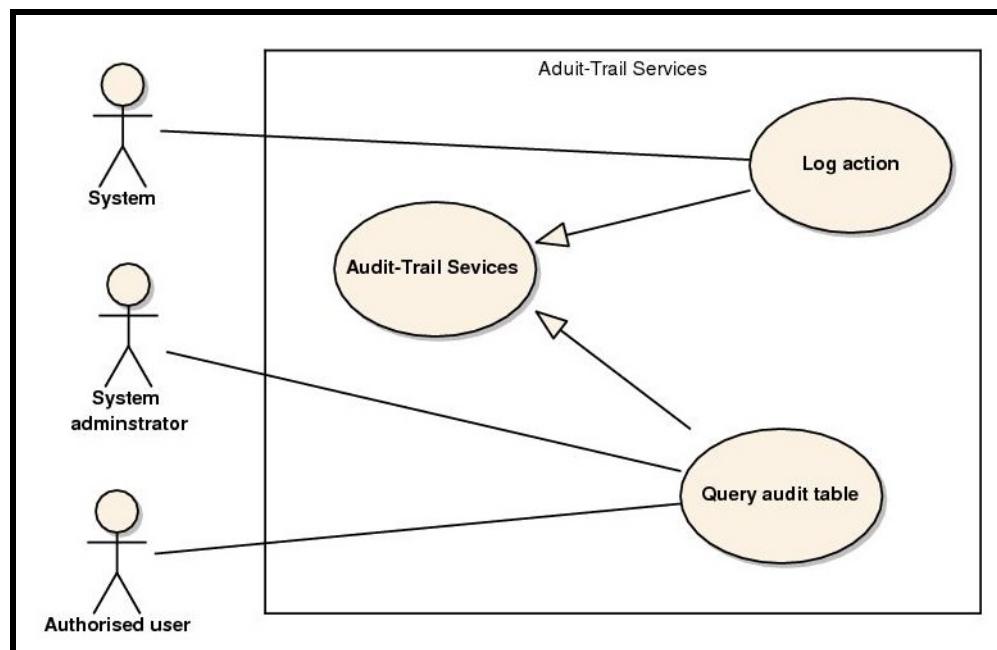


Figure 7: Use case diagram of Audit-Trail services

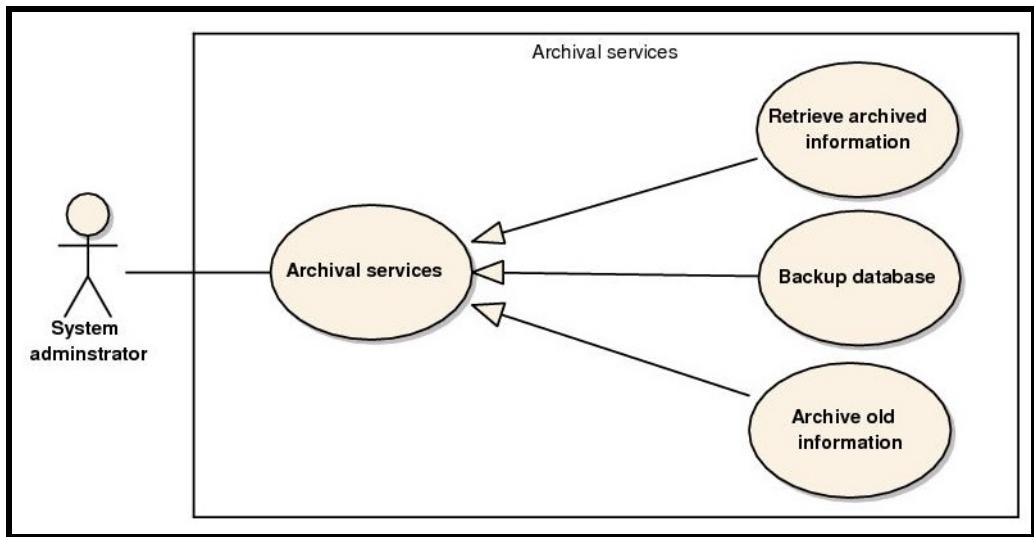


Figure 8: Use case diagram of Archival services

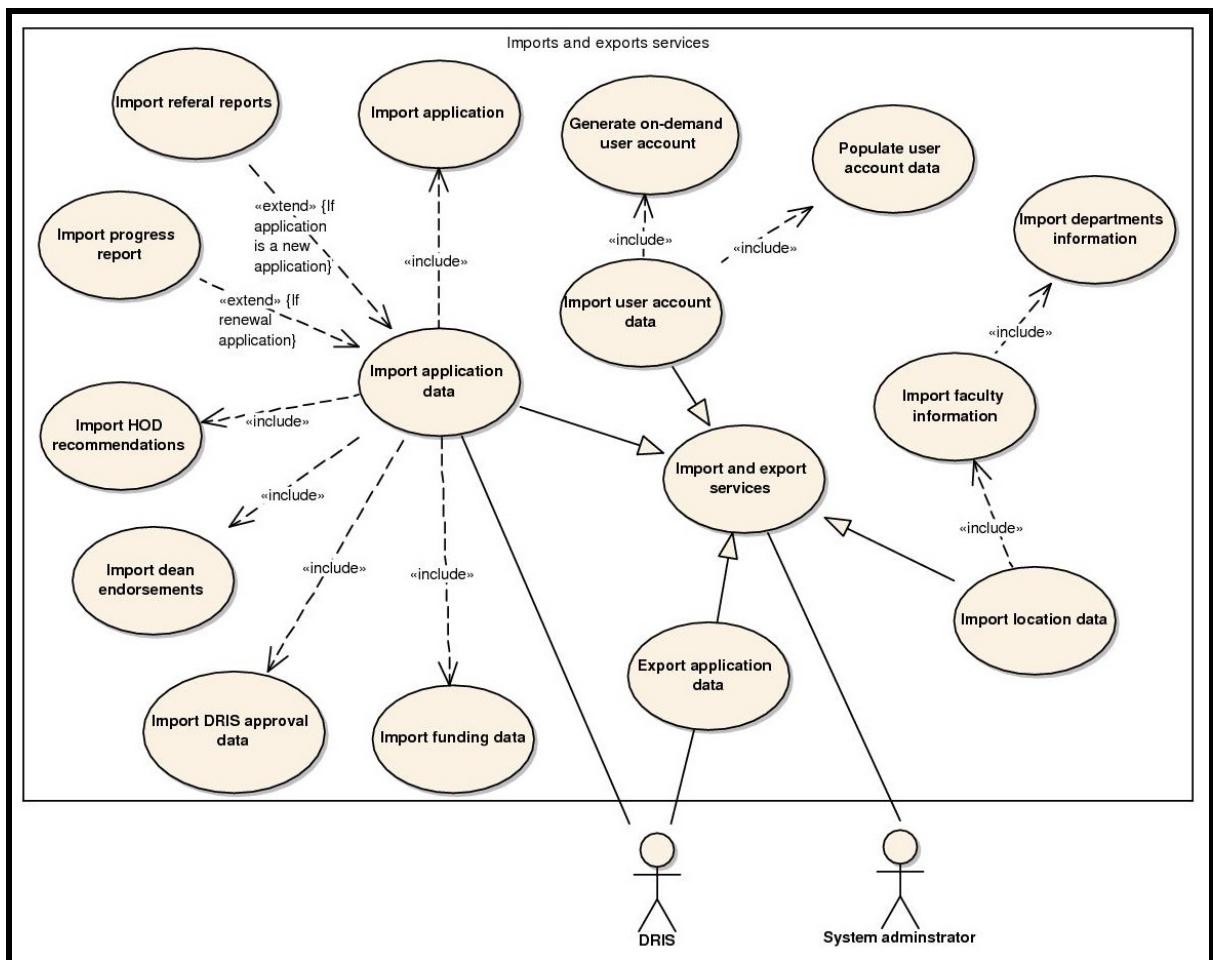


Figure 9: Use case diagram of Imports and exports services

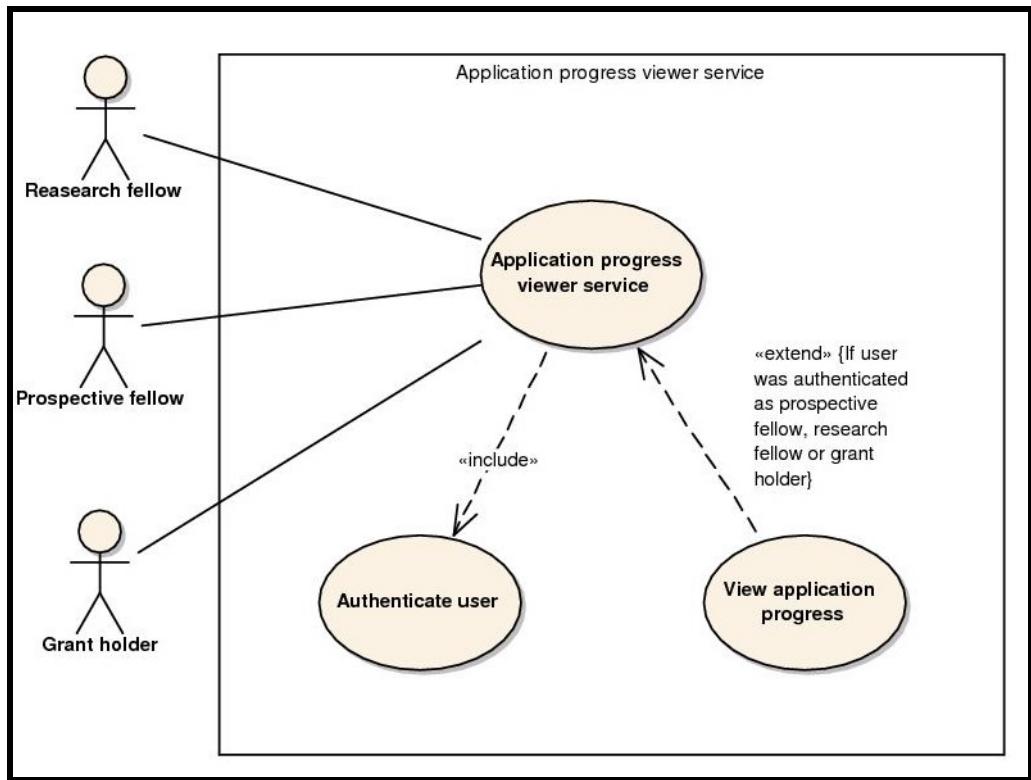


Figure 10: Use case diagram of Application progress viewer service

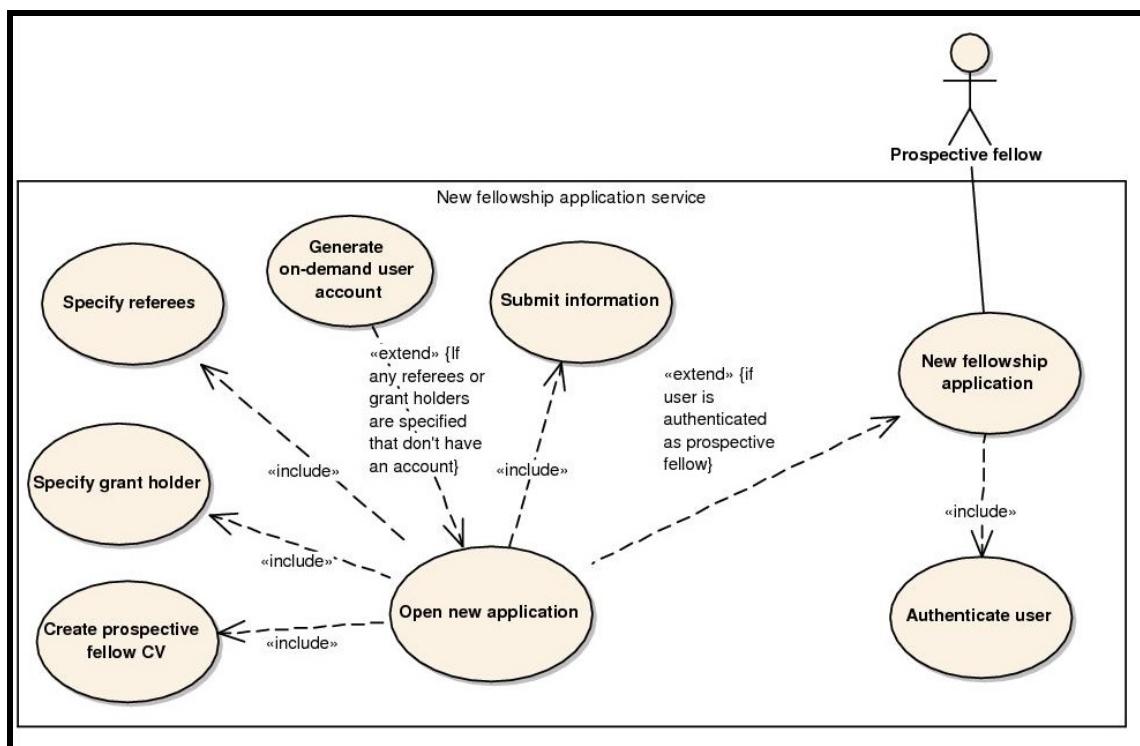


Figure 11: Use case diagram of New fellowship application service

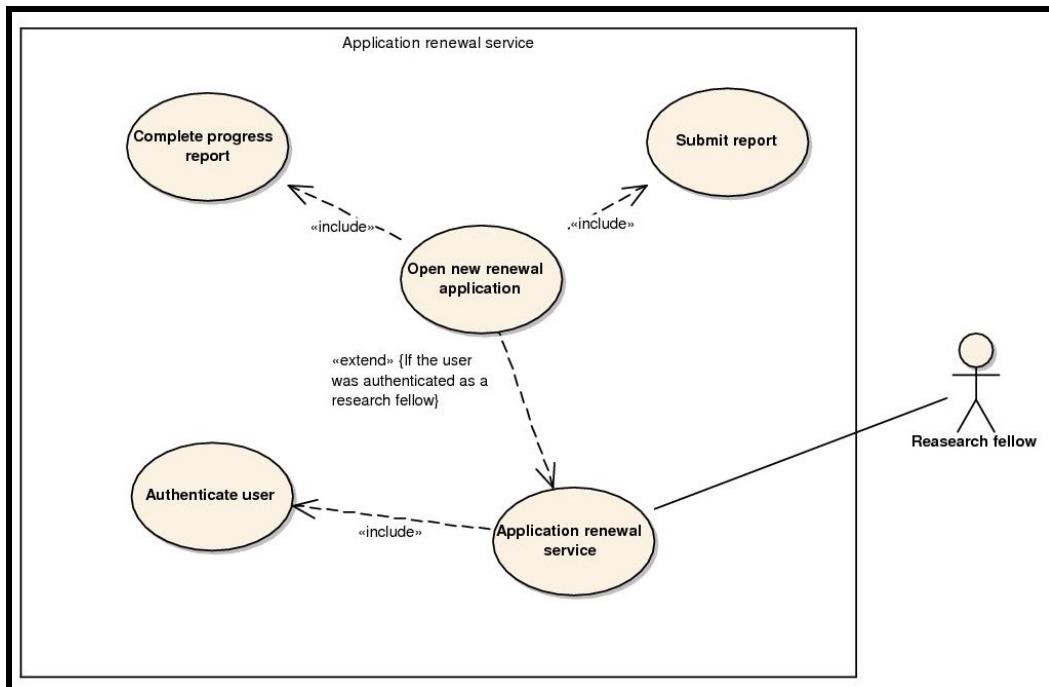


Figure 12: Use case diagram of Application renewal service

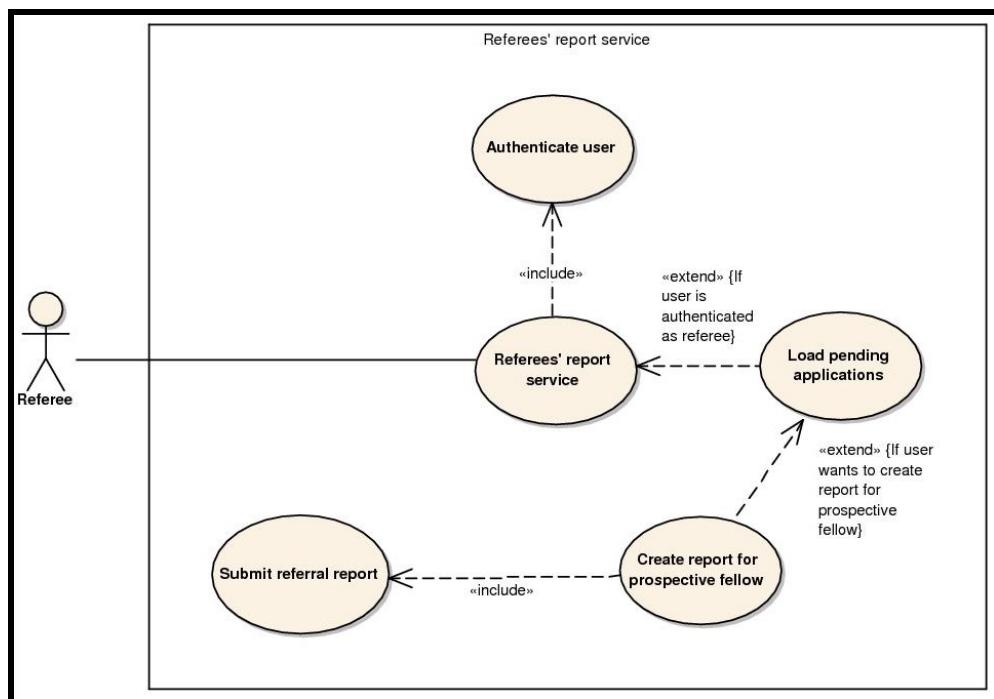


Figure 13: Use case diagram of Referees' report service

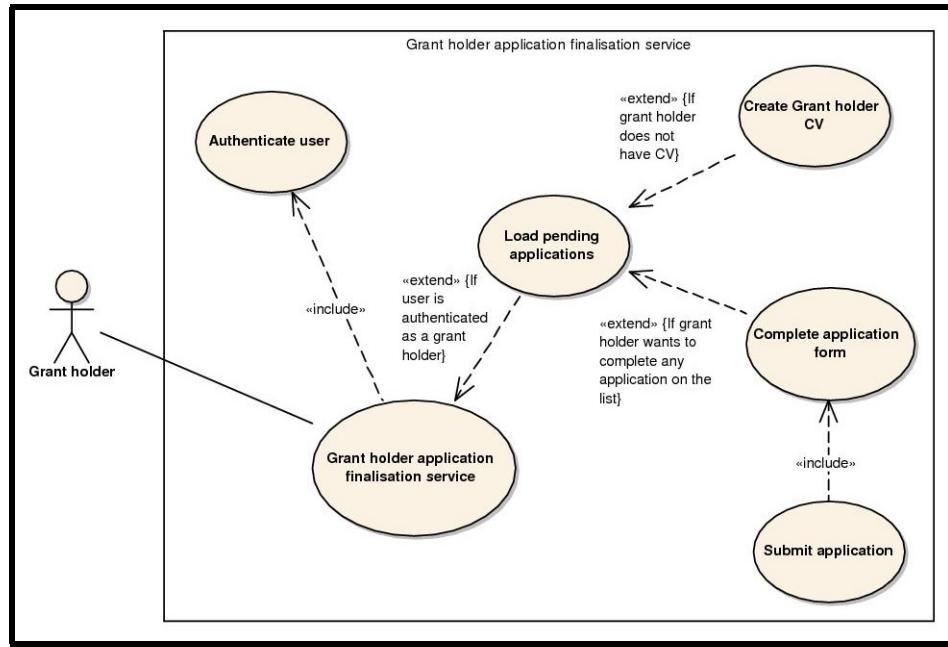


Figure 14: Use case diagram of Grant holder application finalisation service

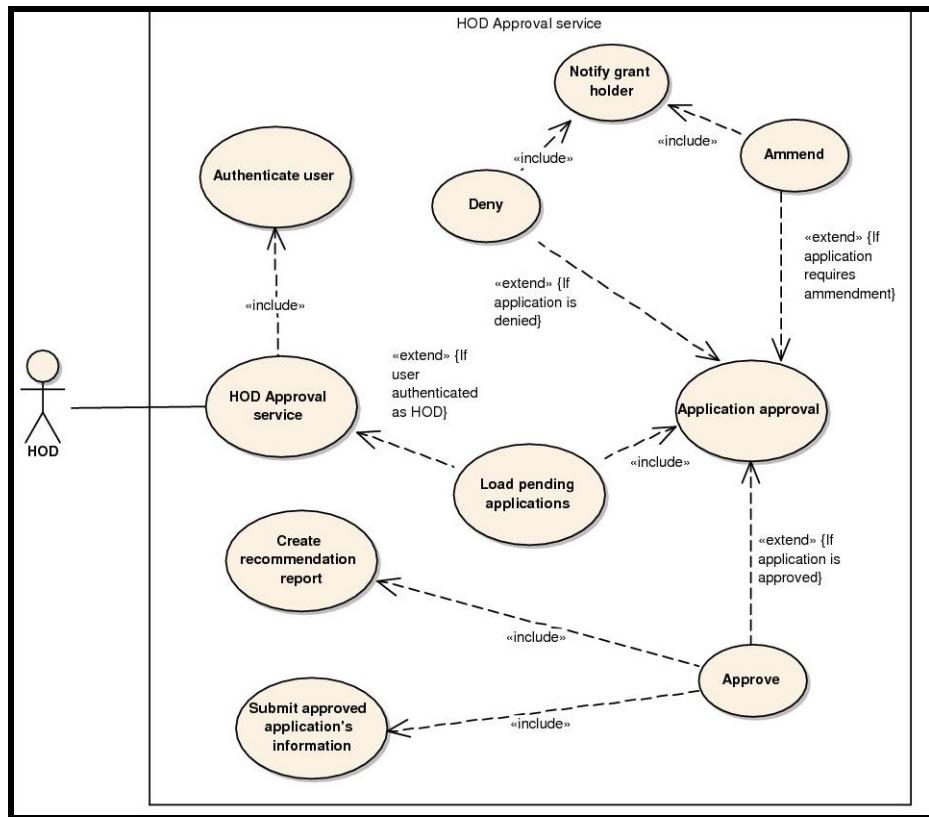


Figure 15: Use case diagram of HOD Approval service

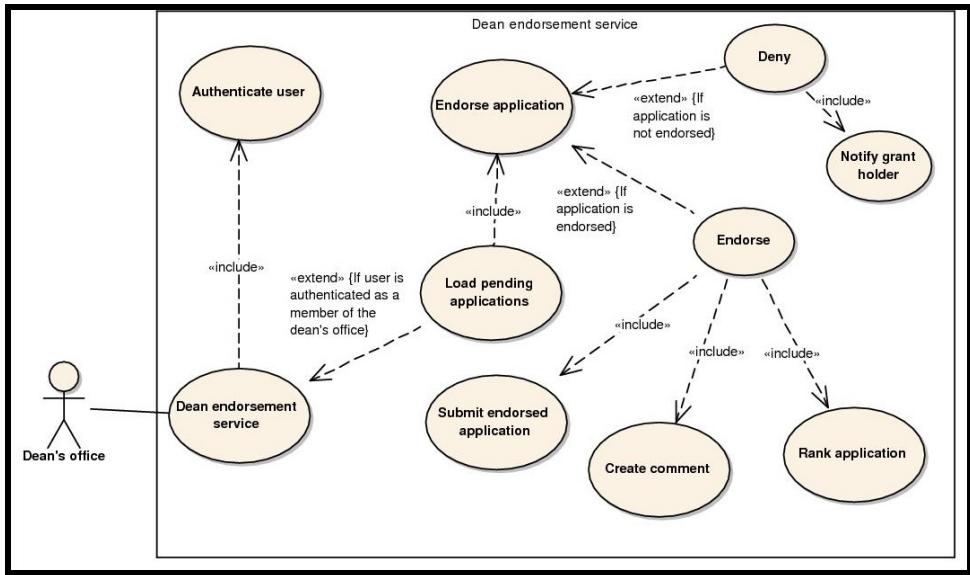


Figure 16: Use case diagram of Dean endorsement service

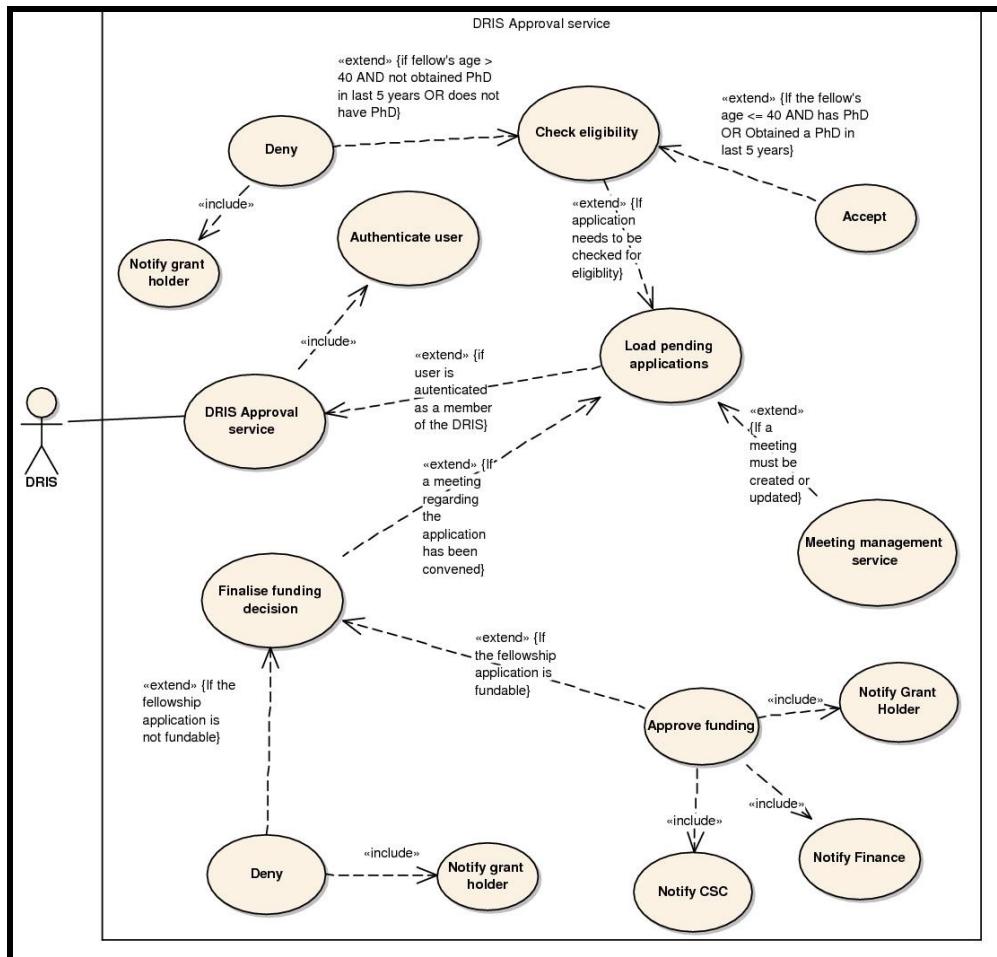


Figure 17: Use case diagram of DRIS approval service

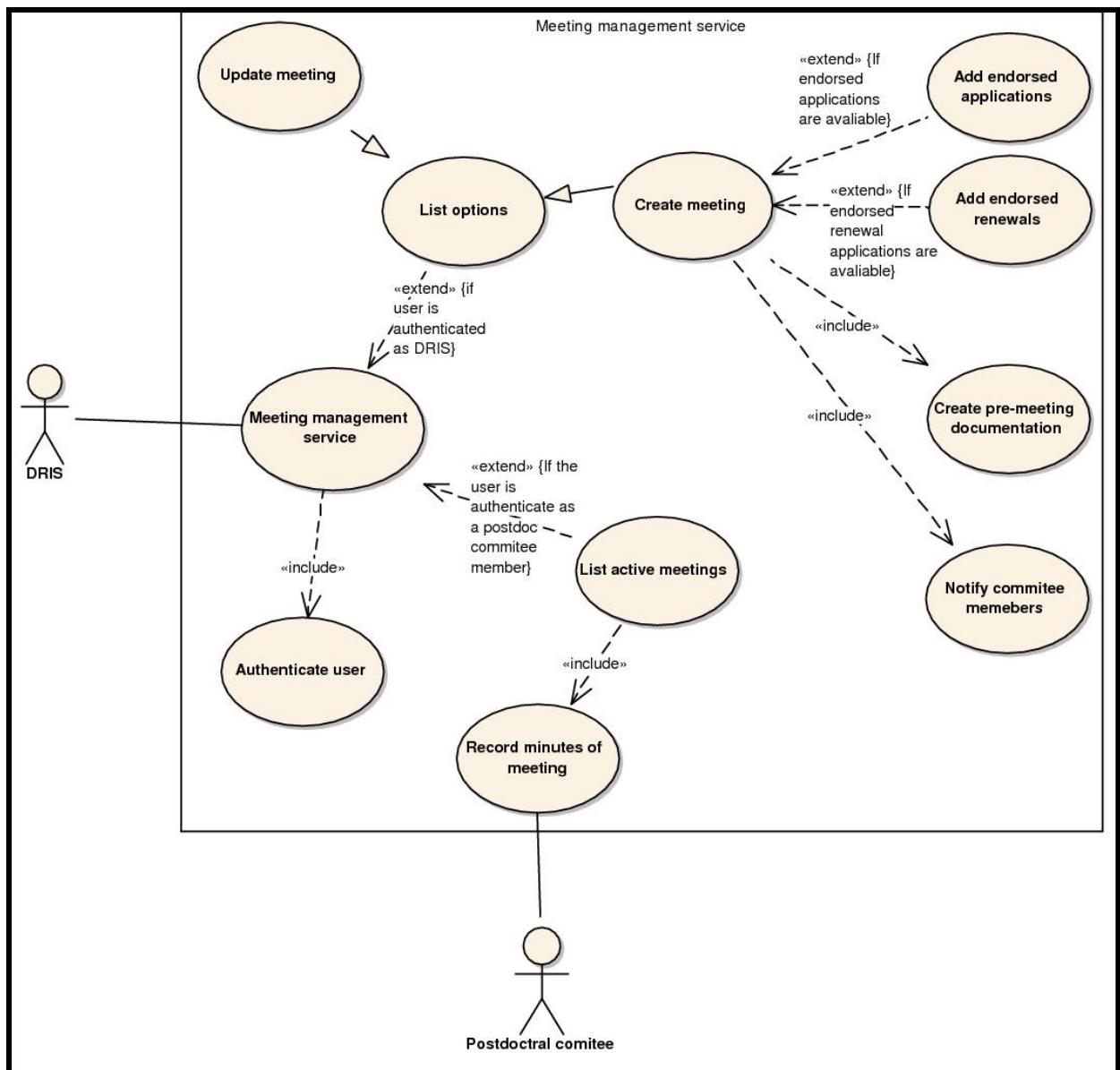


Figure 18: Use case diagram of Meeting management service

3.4 Use case prioritization

This section states the ranking in terms of priority of the service use case per use case diagram figure. The priorities are: Critical, Important and Nice to have.

- User gateway: Critical
 - Login user: Critical
 - User account retrieval: Important
 - Create prospective fellow user account: Critical
 - Generate on-demand user account: Critical
 - Activate on-demand user account: Critical
 - Authenticate user: Critical
- Application services: Critical
 - New fellowship application service: Critical
 - Application renewal service: Critical
 - Referees' report service: Critical
 - Grant holder application finalisation service: Critical
 - HOD Approval service: Critical
 - Dean endorsement service: Critical
 - DRIS approval service: Critical
 - Meeting management service: Important
 - Application progress viewer service: Important
- Report services: Important
- Notification services: Critical
- User account management services: Critical
 - Create new account: Critical
 - Modify account: Critical
 - Remove account: Important
 - View all accounts: Important
- Audit-Trail services: Critical

- Log action: critical
 - Query audit table: Important
- Archival services: Nice to have
 - Retrieve archived information: Nice to have
 - Archive old information: Nice to have
 - Backup database: Important
- Imports and exports services: Important
 - Import user account data: Important
 - Import application data: Nice to have
 - Import location data: Important
 - Export application data: Important

3.5 Use case/Services contracts

This section states the preconditions and postconditions of the each use case per use case diagram figure.

3.5.1 Preconditions

These are conditions that must be met by the system or user before they are allowed to use the use case.

- Fig 2.
 - New fellowship application service: Can only be accessed if new applications are open.
 - Application renewal service: Can only be accessed if renewals are open and if the user is a research fellow that is still in possession of a fellowship.
 - Referees' report service: Can only be accessed if user is a referee.
 - Grant holder application finalisation service: Can only be accessed if user is a grant holder.
 - HOD Approval service: Can only be accessed if user is a HOD.

- Dean endorsement service: Can only be accessed if user is a member of the dean’s office.
- DRIS Approval service: Can only be accessed if user is a member of the DRIS.
- Meeting management service: Can only be accessed if user is a member of the DRIS or post-doctoral committee member.
- Application progress viewer service: Can only be accessed if user logged as a prospective fellow, research fellow or grant holder. Also the user needs to have at least one application on the system.

- Fig 3.

- Create report: If a user with the associated credentials has been authenticated as a member of the DRIS or with the correct security role.
- Open new report: If no report is currently open.
- Select report data: If report is open and data is available for report.
- Generate report: If data has been selected.
- View report: If a report has been generated.
- Export report: If user wants to export report and the user is busy viewing the report.
- To spreadsheet: If user wants to export report to a spreadsheet.
- To pdf: If user wants to export report to a pdf.

- Fig 4.

- Create notification: If requesting user is the system or an authorised user.
- Specify recipient user account: If a notification is in its setup stage.
- Specify message: If a notification is in its setup stage.
- Send user account notification: If notification is ready to be sent.
- Send email: If notification is ready to be sent.

- Fig 5.

- Create new account: If requesting user has the appropriate security role.
- Modify account: If requesting user has the appropriate security role or is the owner of the account.
- Remove account: If requesting user has the appropriate security role.
- View all accounts: If requesting user is a system administrator.

- Fig 6.

- Login user: If requesting user is a user of the system.
 - User account retrieval: If requesting user has forgotten their user credentials.
 - Create prospective fellow account: If a new prospective fellow wishes to create an account.
 - Activate on-demand user account: If a user has been identified by an applicant and has a security token.
 - Authenticate user: if user is logged in.
- Fig 7.
 - Log action: If requesting user is the system.
 - Query audit table: If the user has the correct security role.
 - Fig 8.
 - Retrieve archived information: If requesting user is a system administrator or the system.
 - Archive old information: If requesting user is a system administrator or the system.
 - Backup database: If requesting user is a system administrator.
 - Fig 9.
 - Import application data: If requesting user is a system administrator or a DRIS member.
 - Export application data: If requesting user is a system administrator or a DRIS member.
 - Import location data: If requesting user is a system administrator.
 - Import faculty information: If no such faculty is in the database already.
 - Import departments information: If no such department is in the database and the faculty it relates to is in the database.
 - Import user account data: If requesting user is a system administrator.
 - Populate user account data: If the user account exists in the database and the data is valid.
 - Import referral reports: If the application is a new application.
 - Import progress report: If the application is a renewal application.
 - Import HOD recommendations: If the application has a valid HOD recommendation.

- Import dean endorsements: If the application has a valid dean's endorsement.
 - Import DRIS approval data: If the application has valid DRIS approval data.
 - Import funding data: If the application has a valid funding data and has been funded.
- Fig 10.
 - View application progress: Can only be used if there are any applications made by the user.
- Fig 11.
 - Generate on-demand user account: If the prospective fellow has identified a referee or grant holder not on the system.
 - Submit information: If all the application information is complete.
- Fig 12.
 - Open new renewal application: If research fellow has a fellowship that is renewable.
 - Submit report: If the progress report has been completed.
 - Submit renewal application: If all the required information for the renewal has been entered.
- Fig 13.
 - Load pending applications: If there are any pending applications for the referee and if the user was authenticated as the referee.
 - Create report: If a application is selected from the list of pending applications.
 - Submit referral report: If the referral report has been completed.
- Fig 14.
 - Load pending applications: If there are any pending applications for the grant holder and if the user was authenticated as the grant holder.
 - Create Grant holder CV: If grant holder does not have a CV.
 - Complete application form: If grant holder has selected any application that is still pending.
 - Submit application: If all the required information has been entered
- Fig 15.

- Load pending applications: If there are any finalised application available for approval and the grant holder of the application falls under department the HOD is in charge of and if user has been authenticated as the HOD.
- Application approval: If HOD has selected a application from the application list.
- Create recommendation report: If the application has been approved.
- Submit approved application’s information: If the recommendation report has been completed.

- Fig 16.

- Load pending applications: If there are any approved application available for endorsement and the grant holder of the application falls under faculty of which the Dean’s office is in charge of and the user has been authenticated as a member of the dean’s office.
- Endorse application: If a application is selected from the pending list.
- Rank application: If the application has been endorsed.
- Create comment: If the application has been ranked.
- Submit endorsed application: If the required endorsement information has been completed.

- Fig 17.

- Load pending applications: If the user is authenticated as a member of the DRIS and if there are any endorsed application available for eligibility checking or applications available for finalising their funding decisions.
- Check eligibility: If there are any endorsed application available for its eligibility check.
- Deny: If the prospective fellow is older than 40 and has not obtained their PhD in the last 5 years or if the prospective fellow does not have a PhD.
- Accept: If the prospective fellow is younger than 40 or is 40 and they have a PhD or if they have obtained a PhD in the last 5 years.
- Meeting management service: If a meeting is to be created or updated.
- Finalise funding decision: If the meeting regarding the application has been concluded.
- Create funding information: The application has been approved for funding.
- Deny: If the application’s funding was denied.
- Approve funding: If the application’s funding was denied.

- Fig 18.
 - List options: If user is a authenticated DRIS member.
 - Create meeting: If any eligible applications are available and the user selects the service from the options list.
 - Add endorsed applications: If any new applications that are eligible are available.
 - Add endorsed renewals: If any renewal applications that are eligible are available.
 - List active meetings: If user is a authenticated post doctoral committee member.
 - Record minutes of meeting: If the selected meeting has been listed.

3.5.2 Postconditions

These are conditions that must be met by the system and the data after the use case has been used.

- Fig 3.
 - Authenticate user: The user has been authenticated as a DRIS member or has the appropriate security role.
 - Open new report: A new report is active.
 - Select report data: The data for the active report is selected.
 - Generate report: The report is available for viewing.
 - View report: The report is available for export and must be visible.
- Fig 4.
 - Authenticate user: The user was authenticated as the system or a user with the appropriate security role.
 - Create notification: A possible notification is open for receiving its contents.
 - Specify recipient user account: The notification has a a recipient.
 - Specify message: The notification has a message.
 - Send user account notification: The message is sent to the user.
 - Send email: The message is sent the email associated with recipients user account.
- Fig 5.
 - Create new account: A new user account is added to the system.
 - Modify account: The specified user account is updated.

- Remove account: The specified user account is removed from the system.
 - View all accounts: All user accounts are listed.
- Fig 6.
 - Login user: User is verified and logged in.
 - User account retrieval: An recovery email is sent to the user account that has been queried for recovery.
 - Create prospective fellow user account: A prospective fellows user account was created.
 - Generate on-demand user account: A user account identified by the system and account security token was created.
 - Activate on-demand user account: The on-demand account has been confirmed is active.
 - Authenticate user: The user is confirmed to be logged in and has the security role expected by the system.
- Fig 7.
 - Log action: A user action was recorded in the audit table and cannot be changed by user nor by the system.
 - Query audit table: An valid response to the query was returned.
- Fig 8.
 - Retrieve archived information: The current working database has been repopulated with the selected archive database data.
 - Archive old information: Any old information in the current working database is moved to the archived database.
 - Backup database: The database has been backed up the specified location.
- Fig 9.
 - Import application data: All the specified application data is now in the database.
 - Export application data: All the specified application data has been exported.
 - Import location data: All the specified location data is now available in the database.
 - Import faculty information: The specified faculty is now in the database.
 - Import departments information: The specified department is now in the database.

- Import user account data: The user account has been created on the system and the user is notified of this.
- Populate user account data: The data of the user has been imported into the new user account.
- Import referral reports: The associated application’s referral reports are in the database.
- Import progress report: The associated application’s progress report is in the database.
- Import HOD recommendations: The associated application’s HOD recommendation is in the database.
- Import dean endorsements: The associated application’s dean endorsement is in the database.
- Import DRIS approval data: The associated application’s DRIS approval data is in the database.
- Import funding data: The associated application’s funding data is in the database.

- Fig 10.

- Authenticate user: The current user was authenticated as a grant holder or research fellow or a prospective fellow.
- View application progress: The application progress of the specified user application is visible.

- Fig 11.

- Authenticate user: The current user was authenticated as a prospective fellow.
- Create prospective fellow cv: The CV is created and associated with the prospective fellow.
- Specify grant holder: The grant holder’s contact information is associated with the application.
- Specify referees: The referees’ contact information is associated with the application.
- Submit information: The initial application data is complete. Referees are notified. And the prospective fellow is associated with the application.

- Fig 12.

- Authenticate user: The current user was authenticated as a research fellow.
- Open new renewal application: A new renewal is for a fellowship is open.

- Complete progress report: The progress report associated with the renewal is completed.
- Submit report: The initial renewal information is complete. Grant holder is notified.

- Fig 13.

- Authenticate user: The current user was authenticated as a referee.
- Load pending applications: Any applications that need a referral report from the specified referee must be listed.
- Create report for prospective fellow: The report is complete and ready to be submitted.
- Submit referral report: The referral report has been finalised and associated with the application and the Grant Holder of the application is notified.

- Fig 14.

- Authenticate user: The current user was authenticated as a grant holder.
- Load pending applications: Any applications that need to be finalised from the specified grant holder must be listed.
- Create report for prospective fellow: The report is complete and ready to be submitted.
- Submit referral report: The referral report has been finalised and associated with the application and the Grant Holder of the application is notified.
- Create grant holder cv: The grant holder's CV is associated with the grant holder.
- Complete application form: The application data is complete and the application is ready to be finalised.
- Submit application: The application is now a finalised application and the grant holder is associated with the application. The HOD of the relative department is notified.

- Fig 15.

- Authenticate user: The current user was authenticated as a HOD.
- Load pending applications: Any applications that need to be approved by the specified HOD must be listed.
- Deny: Application has status changed to denied.
- Amend: Application is reopened and status changed to amend.

- Notify grant holder: A denied or amend notification is sent to the Grant holder of the application appropriately.
- Approve: The application recommendation report becomes available for completion.
- Create recommendation report: The recommendation report is associated with the application and the Approval is ready to be finalised.
- Submit approved application’s information: The application approval is finalised and the application is now a approved application and the Dean’s Office of the relevant faculty is notified.

- Fig 16.

- Authenticate user: The current user was authenticated as a member of a dean’s office.
- Load pending applications: Any applications that need to be approved by the specified dean’s office must be listed.
- Deny: The application’s status is changed to denied.
- Notify grant holder: A denied notification is sent to the Grant holder of the application.
- Endorse: The application’s endorsement information becomes available for completion.
- Rank application: The application has a rank associated with it.
- Create comment: The application has a endorsement comment associated with it.
- Submit endorsed application: The application endorsement is finalised and the application is now an endorsed application and the DRIS is notified.

- Fig 17.

- Authenticate user: The current user was authenticated as a member of the DRIS.
- Load pending applications: Any applications that need to be checked for eligibility or have their final funding decision made by the DRIS must be listed.
- Deny: The application’s status is changed to denied if it is not eligible.
- Notify grant holder: A denied notification is sent to the Grant holder of the application.
- Accept: The application is ready for discussion and is now an eligible application.
- Deny: The application’s status is changed to denied if its funding is not approved.
- Approve funding: The application is now a complete application.

- Create funding information: The application has its funding information associated with it.
- Notify grant holder: A notification is sent to the Grant holder of the application that it is successful.
- Notify CSC: A customizable notification is sent to the CSC.
- Notify Finance: A customizable notification is sent to the Finance department.
- Fig 18.
 - Authenticate user: The current user was authenticated as a member of the DRIS or the Post doctoral committee.
 - List options: The option to update or create meeting are listed.
 - Create meeting: A new meeting is open for modification.
 - Add endorsed applications: An endorsed new application has been added to the agenda of the meeting.
 - Add endorsed renewals: An renewal application has been added to the agenda of the meeting.
 - Create pre-meeting documentation: Documentation complete and associated with meeting and the meeting is closed for modification.
 - Notify committee members: A notification is sent to all the committee members.
 - List active meetings: All active meetings at the time are listed.
 - Record minutes of meeting: The meeting is finalised and it's minutes stored.

3.5.3 Request and result data structures

The system will be following a object oriented approach due it being the paradigm of the Java programming language. Therefore the input and output structure will mainly be in the form of objects. Also the objects that will be produced and used inside the system will adhere to the domain objects specification found below.

3.6 Process specifications

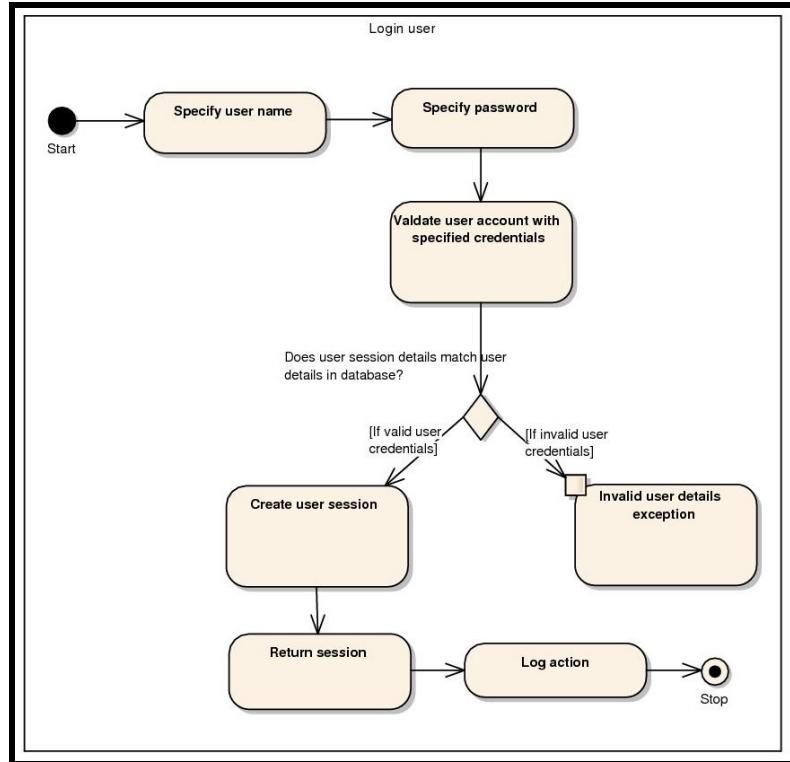


Figure 19: Activity diagram of the Login user use case.

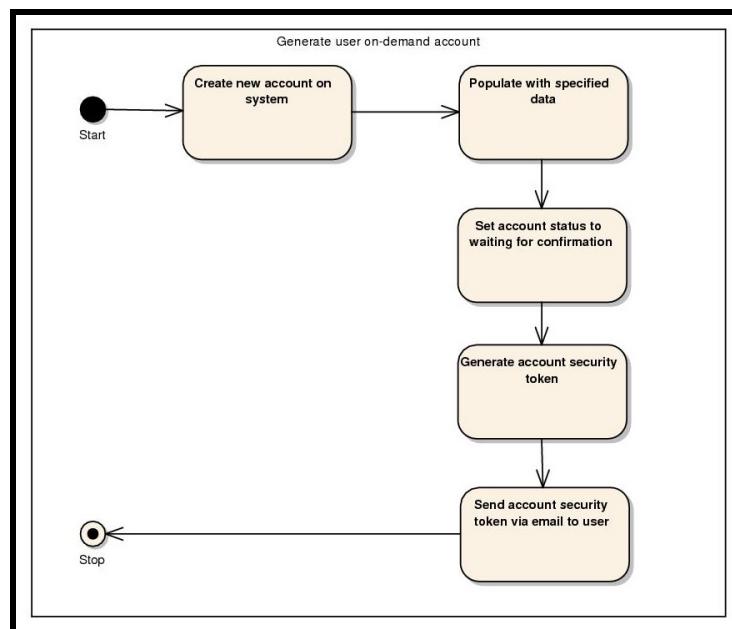


Figure 20: Activity diagram of the Generate user on-demand account use case.

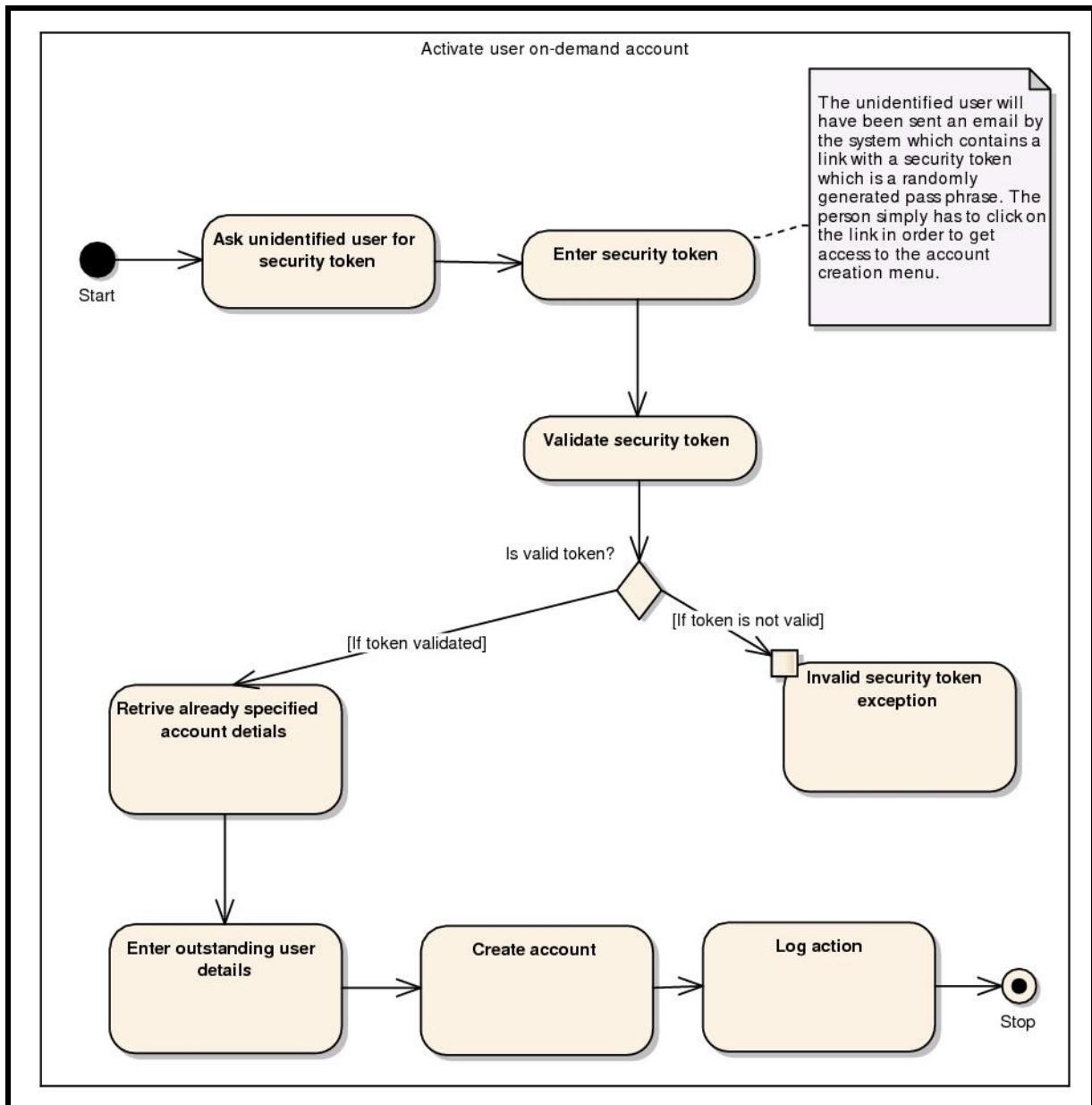


Figure 21: Activity diagram of the Activate user on-demand account use case.

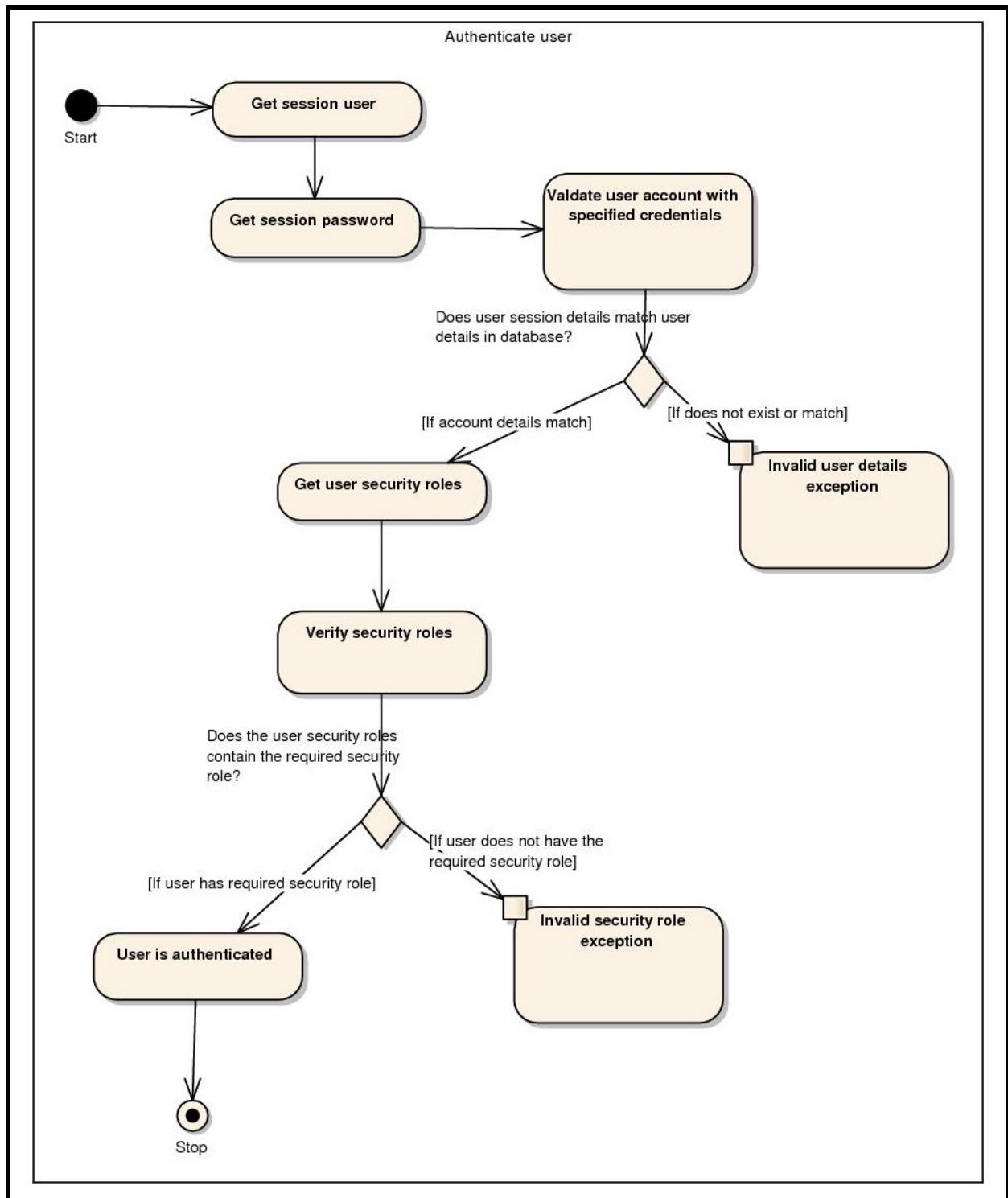


Figure 22: Activity diagram of the Authenticate user use case.

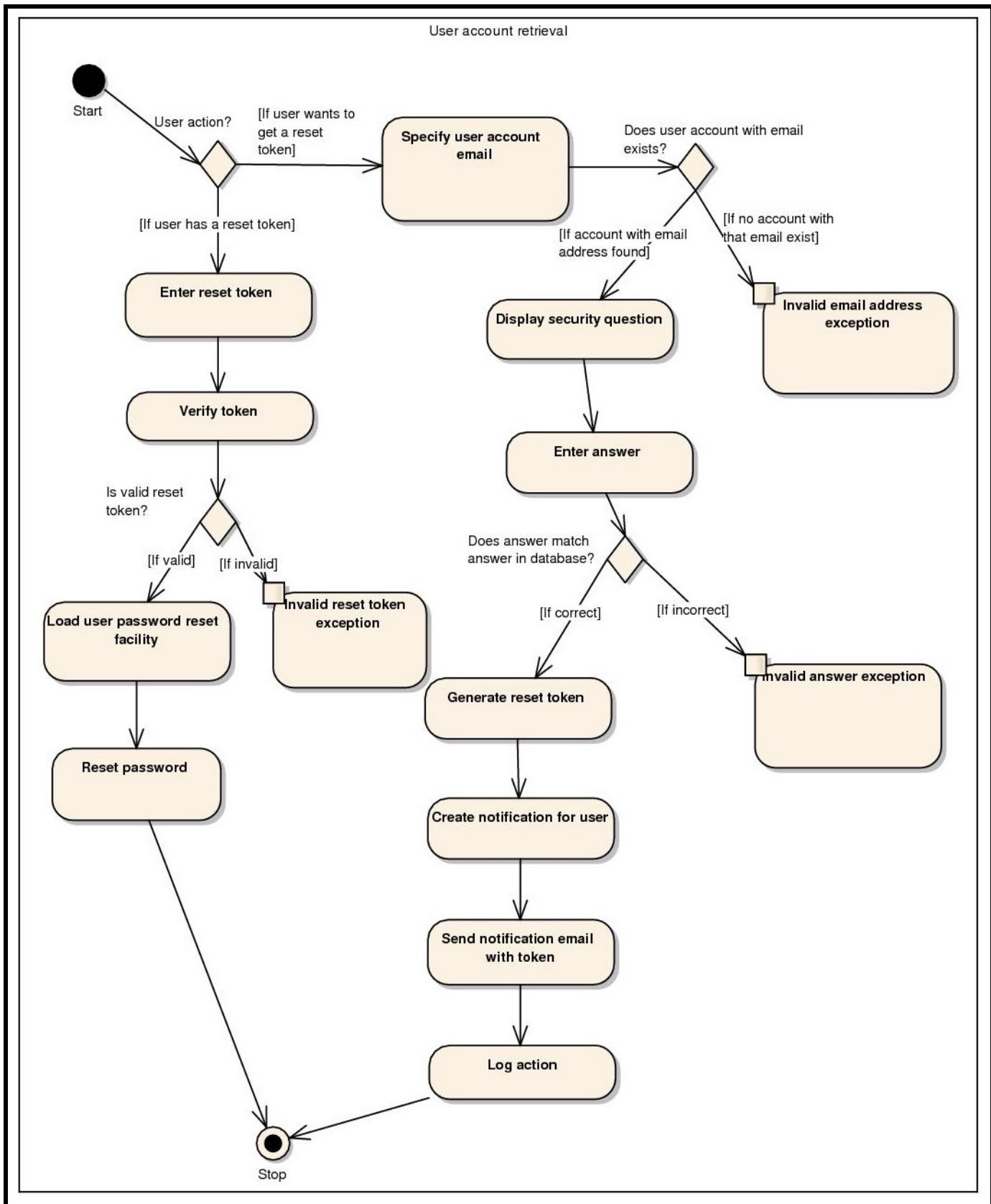


Figure 23: Activity diagram of the User account retrieval use case.

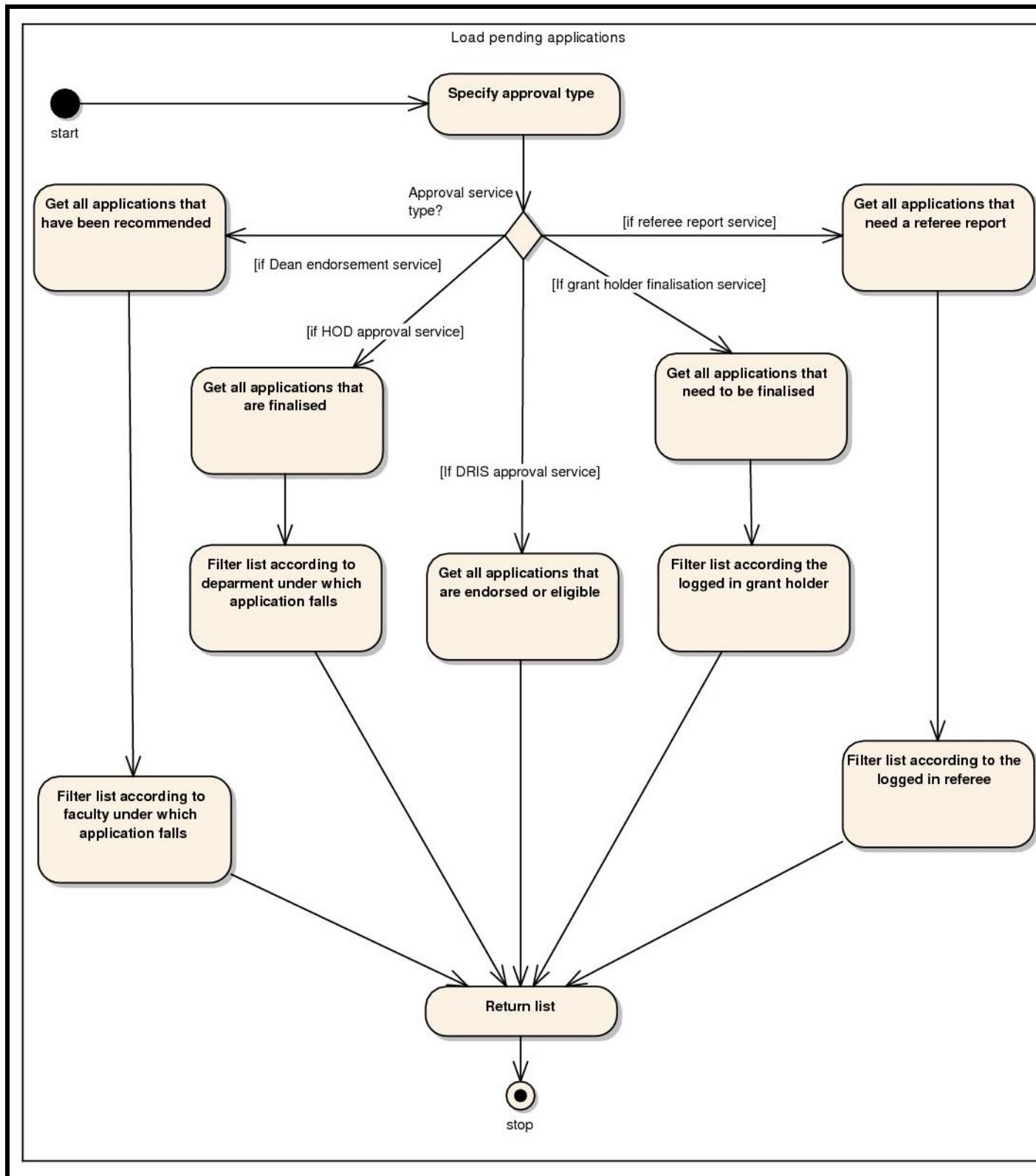


Figure 24: Activity diagram of the Load pending applications use case.

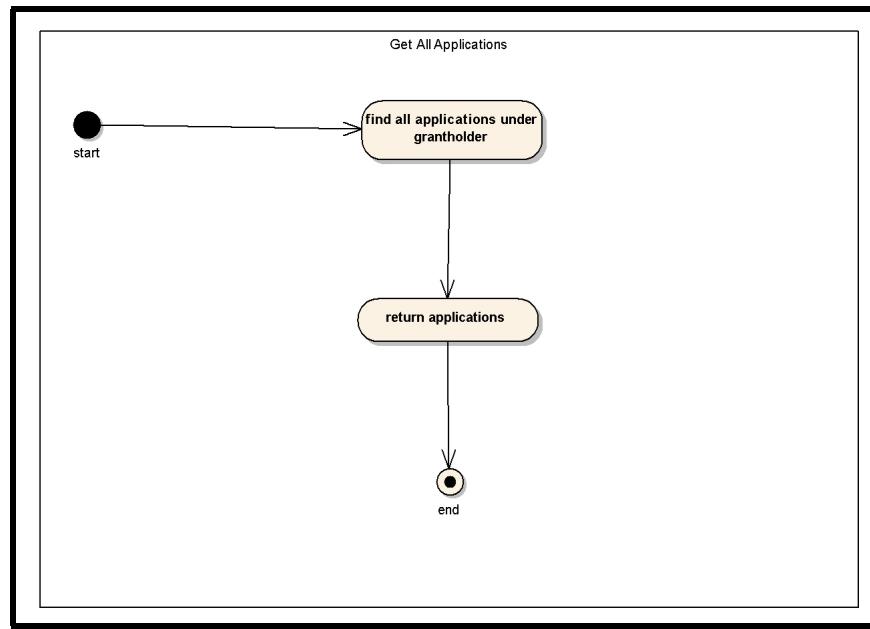


Figure 25: Activity diagram of the Get All Applications use case.

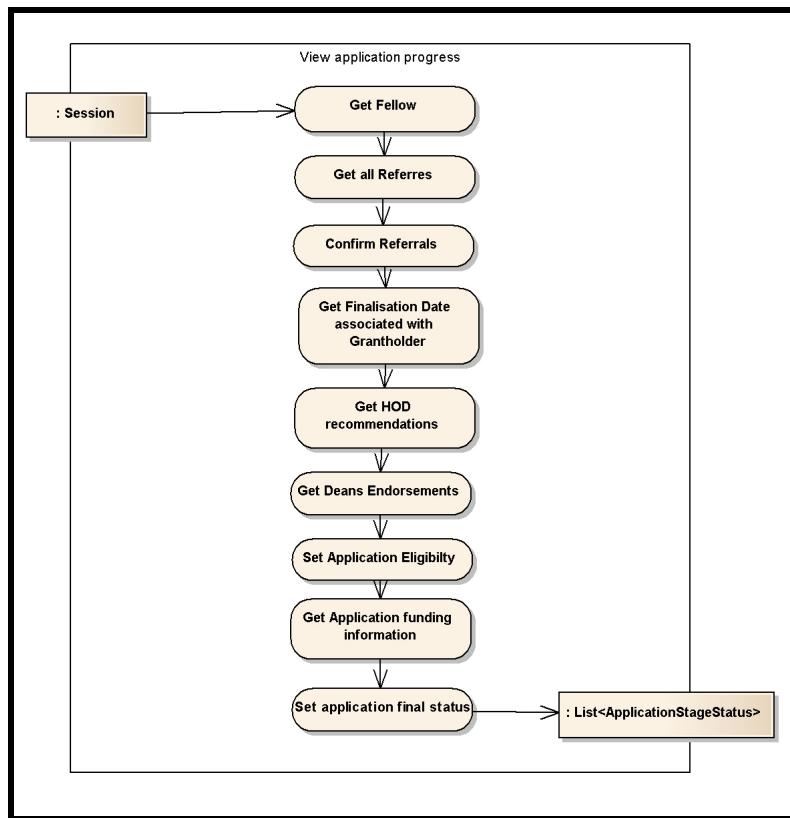


Figure 26: Activity diagram of the View application progress use case.

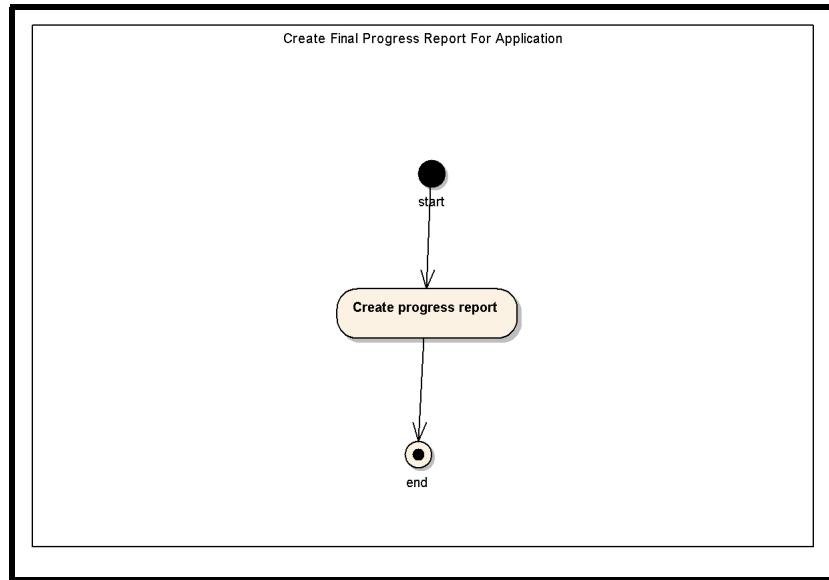


Figure 27: Activity diagram of the Create Final Progress Report For Application use case.

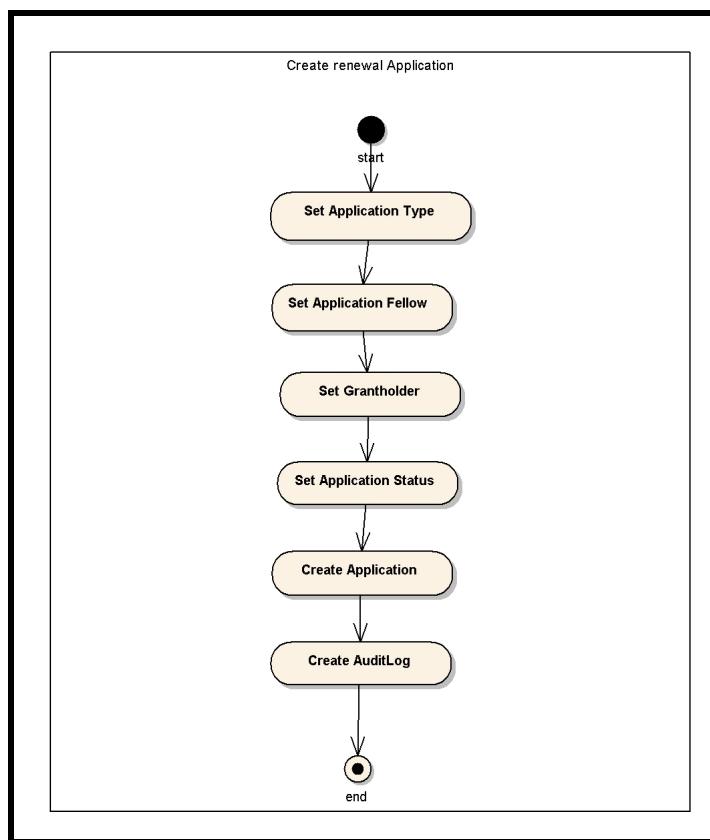


Figure 28: Activity diagram of the Create renewal Application use case.

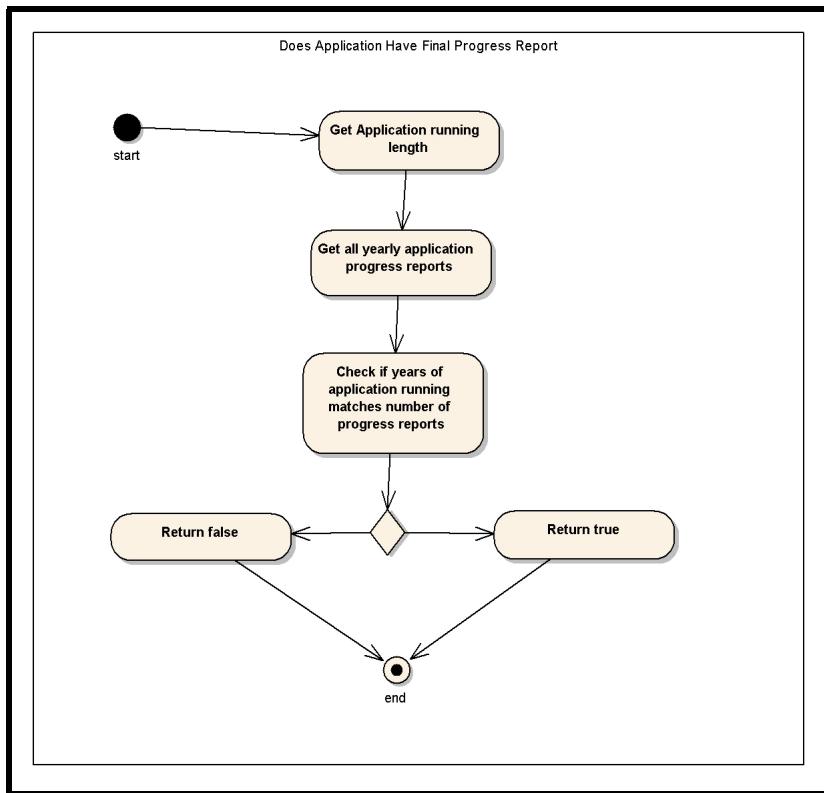


Figure 29: Activity diagram of the Does Application Have Final Progress Report use case.

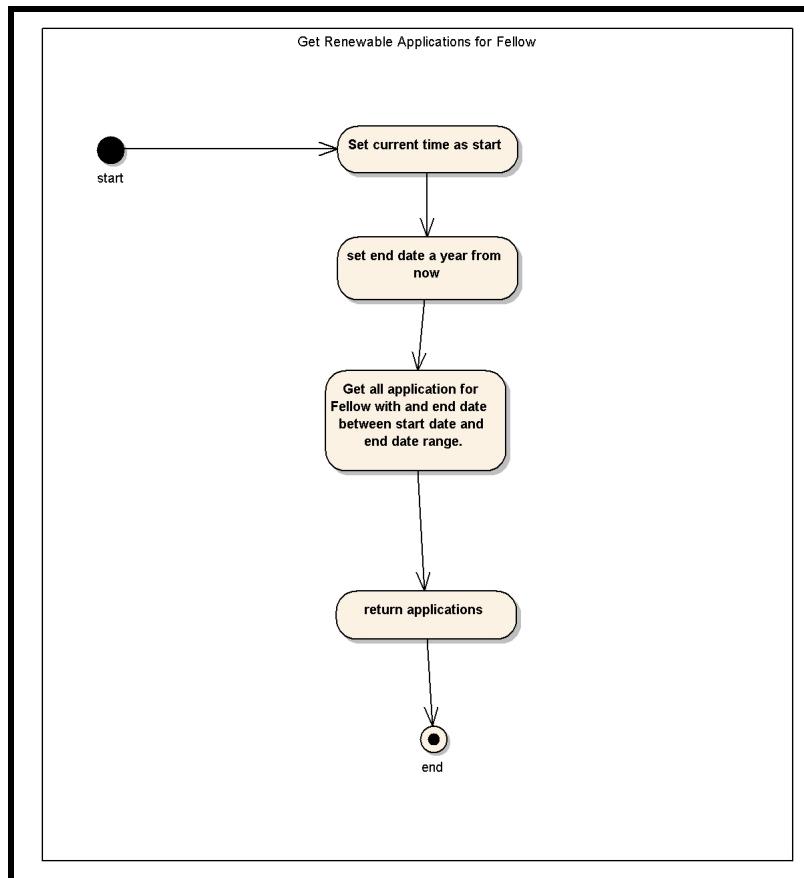


Figure 30: Activity diagram of the Get Renewable Applications for Fellow use case.

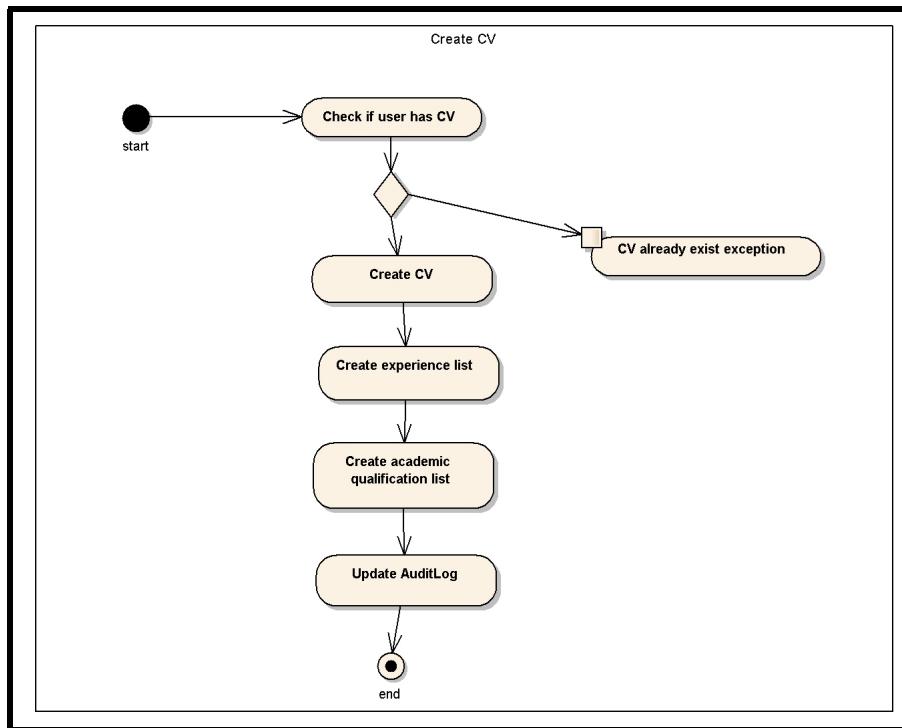


Figure 31: Activity diagram of the Create CV use case.

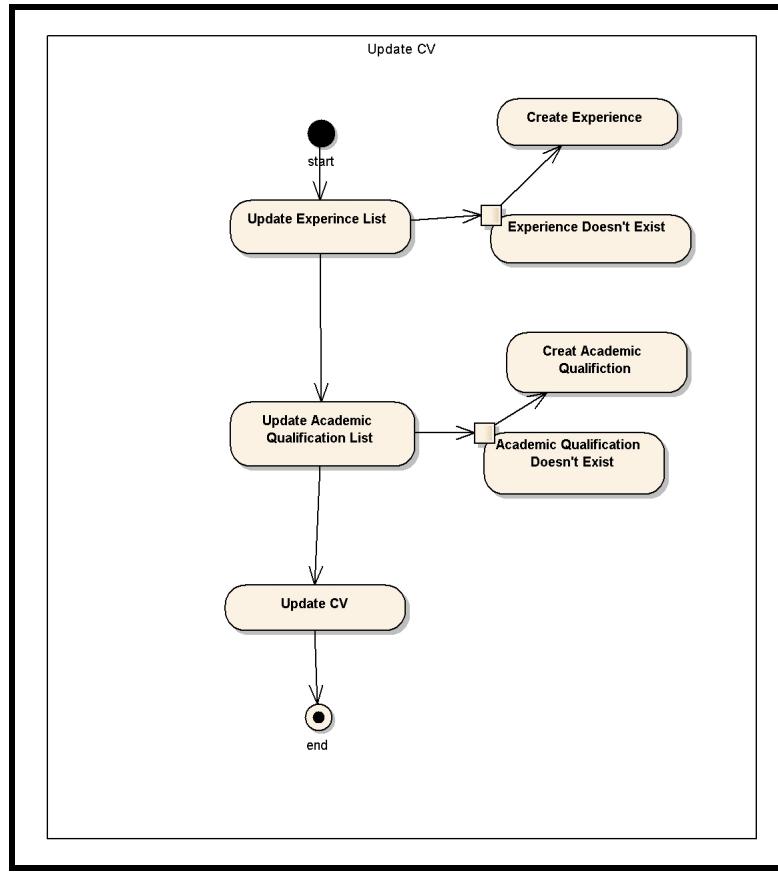


Figure 32: Activity diagram of the Update CV use case.

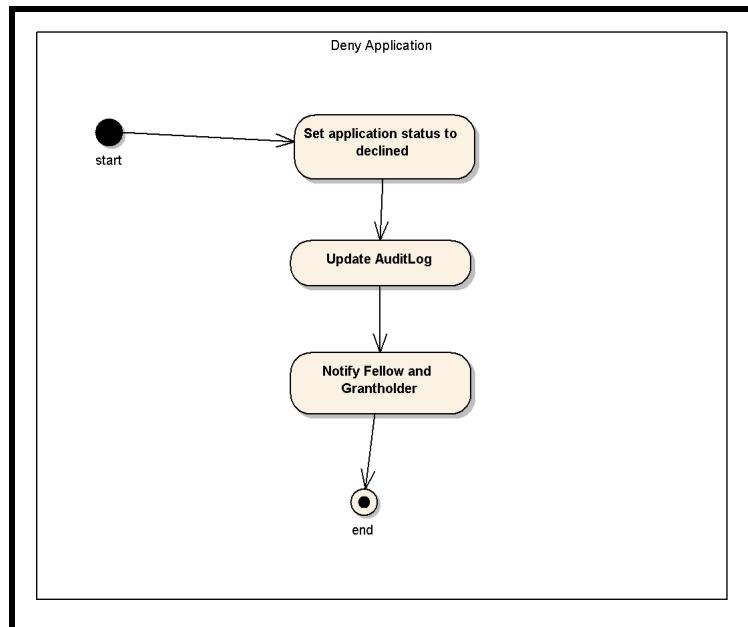


Figure 33: Activity diagram of the Deny Application use case.

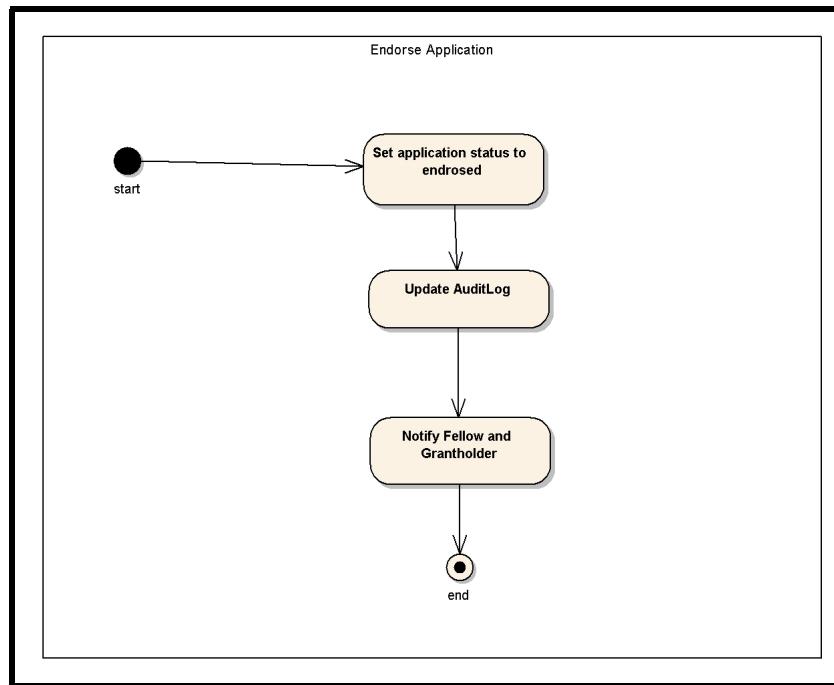


Figure 34: Activity diagram of the Endorse Application use case.

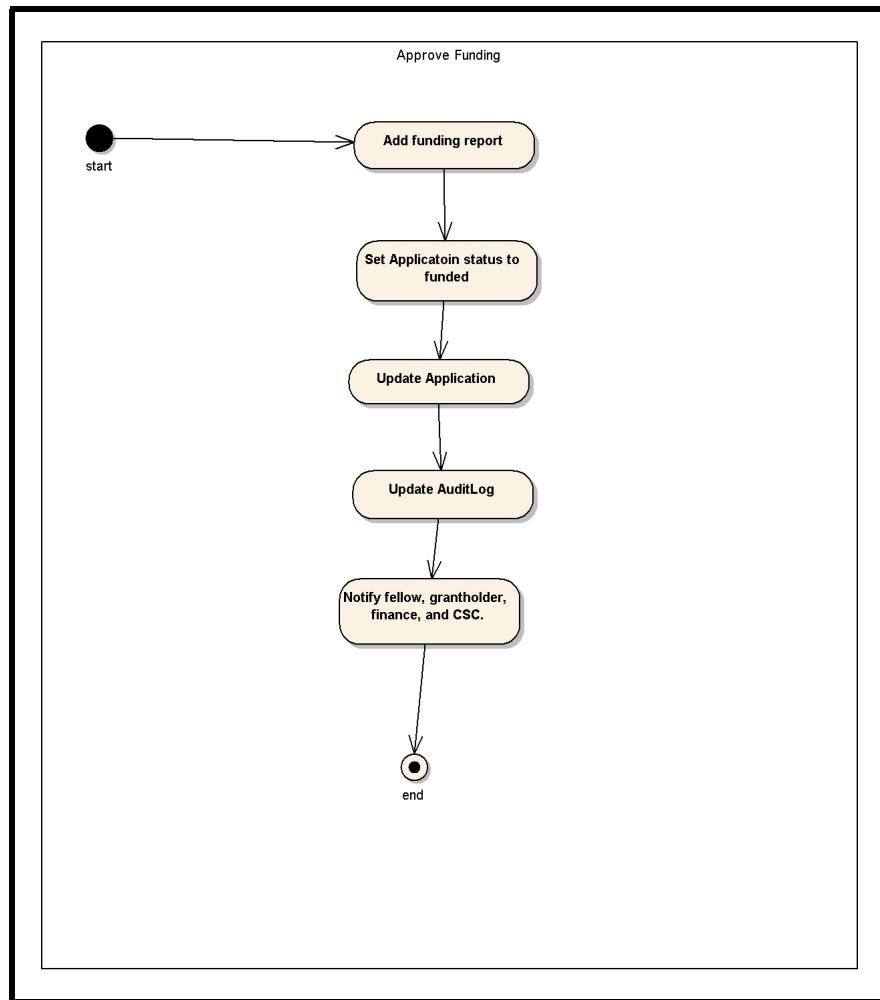


Figure 35: Activity diagram of the Approve Funding use case.

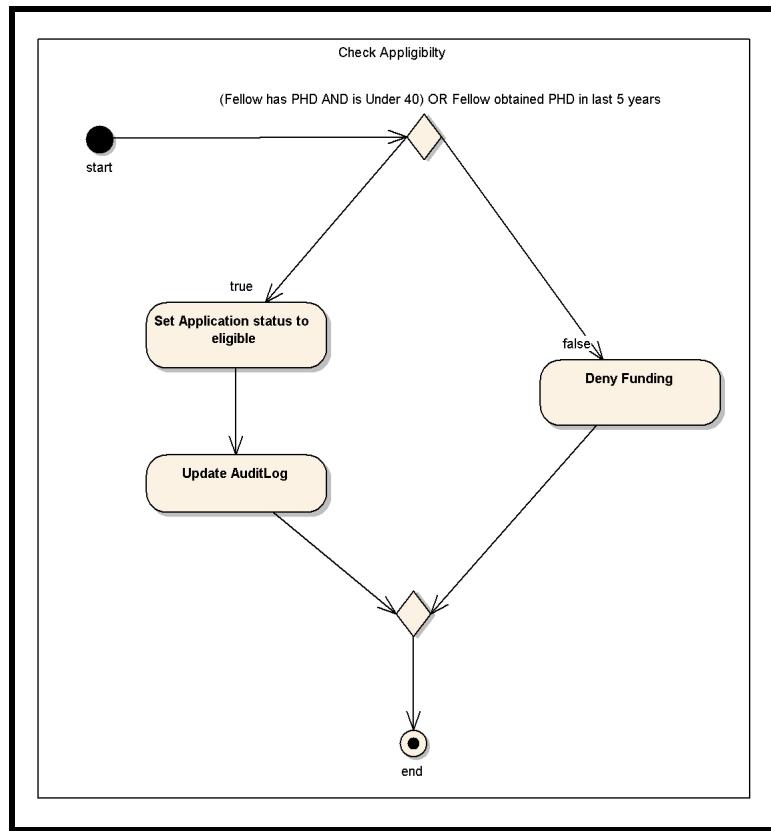


Figure 36: Activity diagram of the Check Applicability use case.

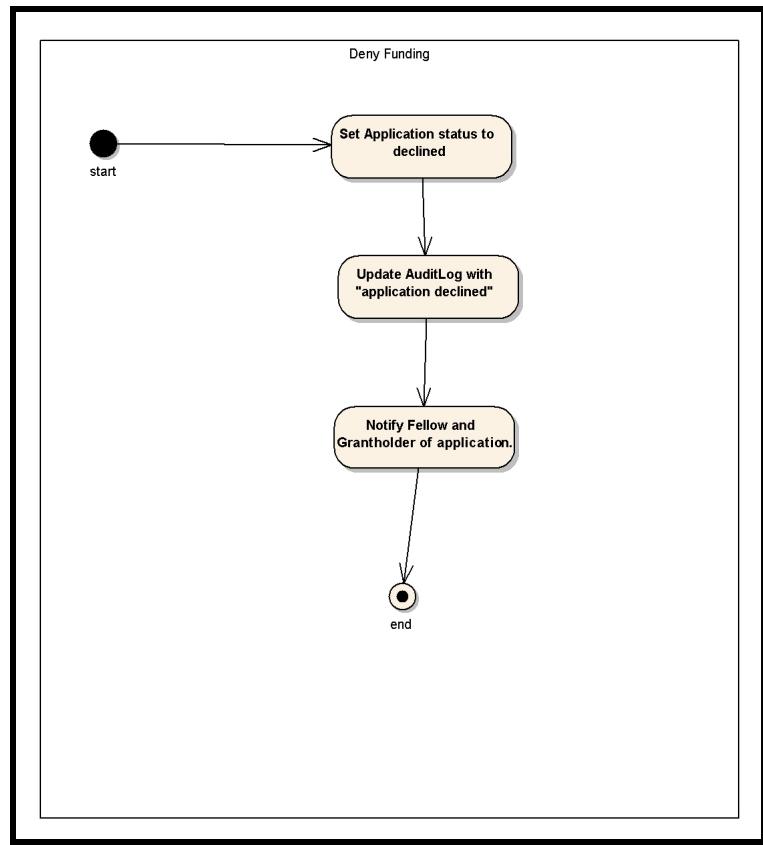


Figure 37: Activity diagram of the Deny Funding use case.

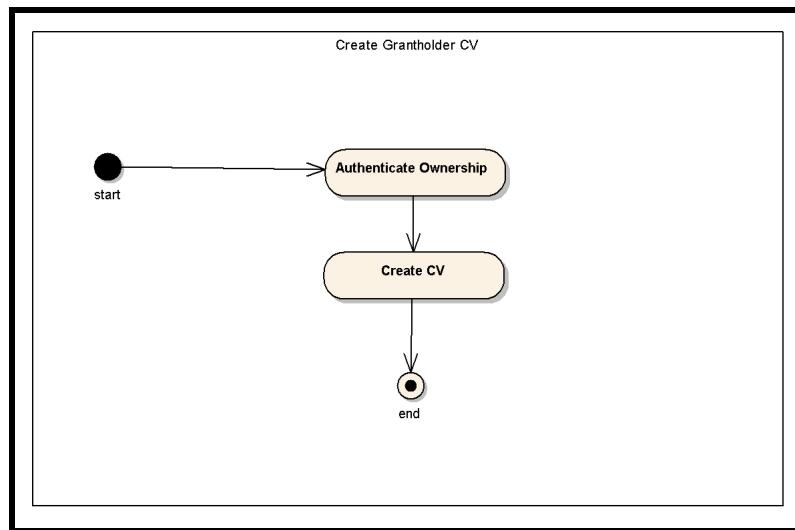


Figure 38: Activity diagram of the Create Grantholder CV use case.

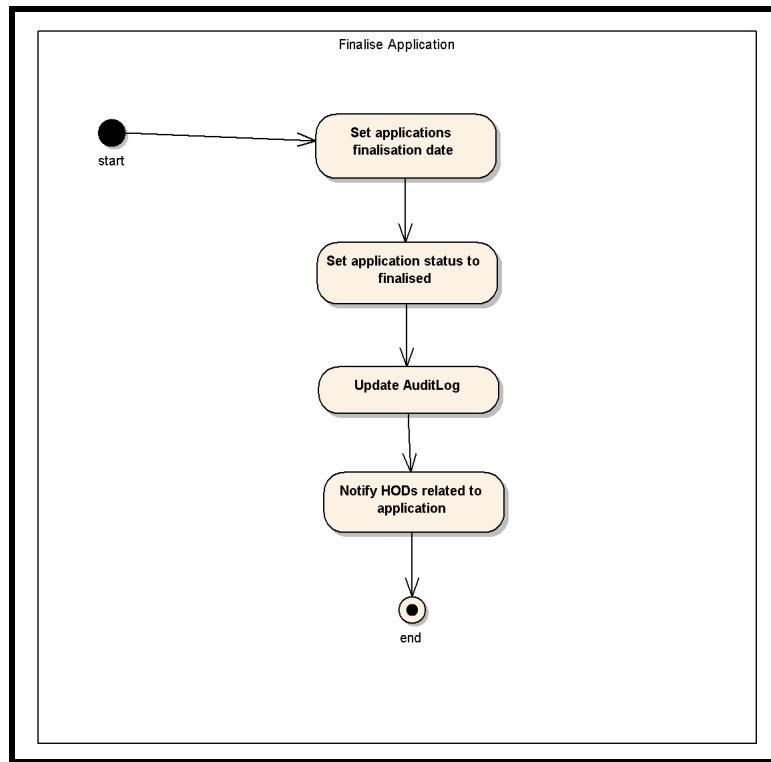


Figure 39: Activity diagram of the Finalise Application use case.

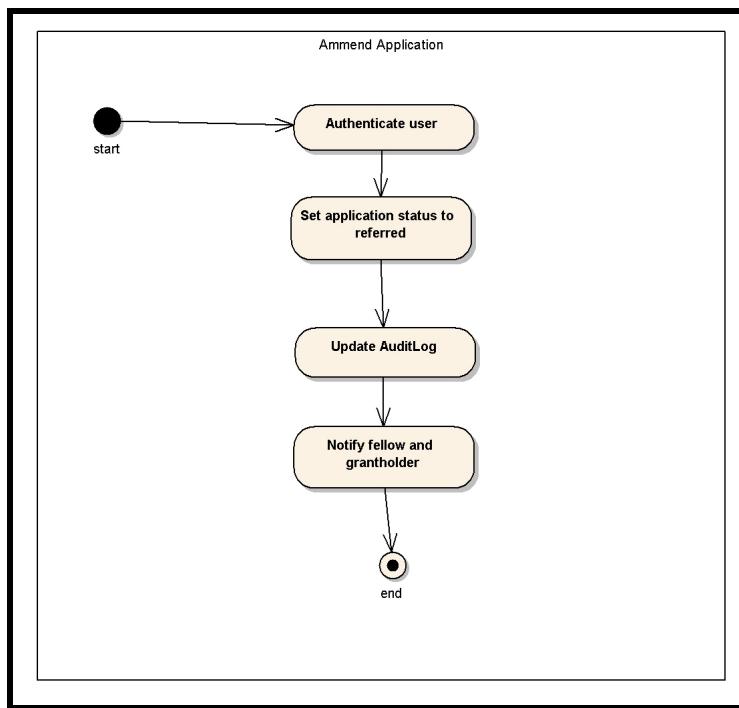


Figure 40: Activity diagram of the Ammend Application use case.

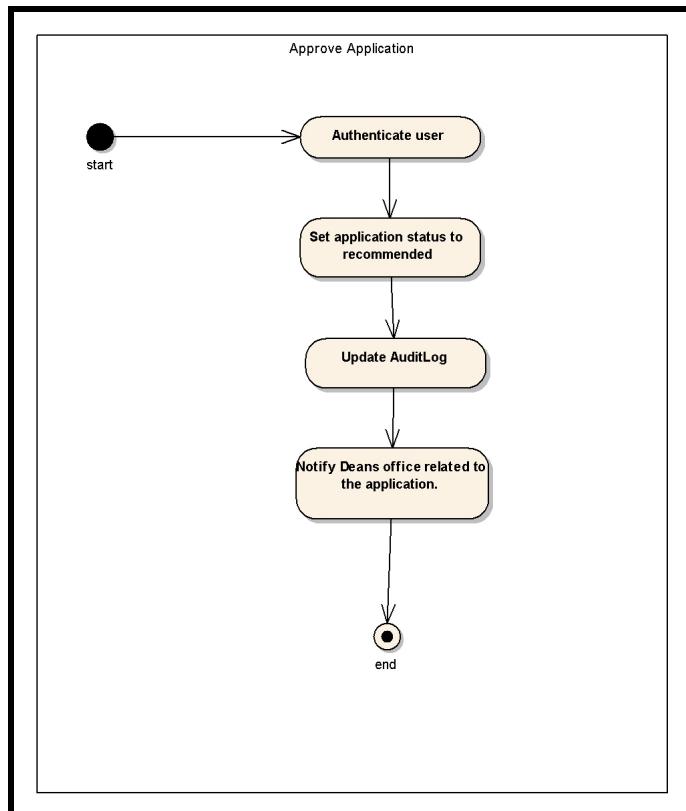


Figure 41: Activity diagram of the Approve Application use case.

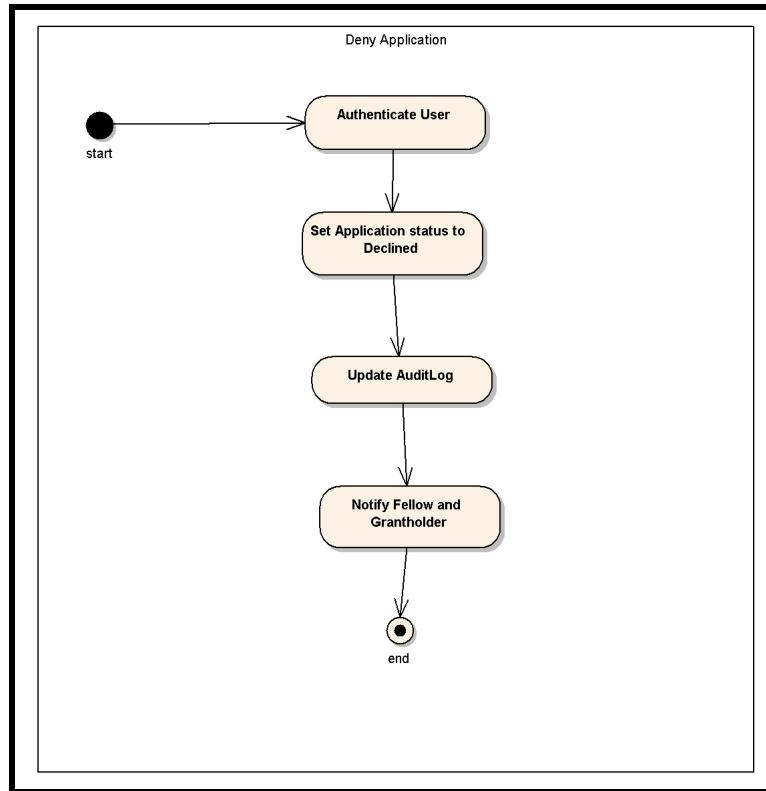


Figure 42: Activity diagram of the Deny Application use case.

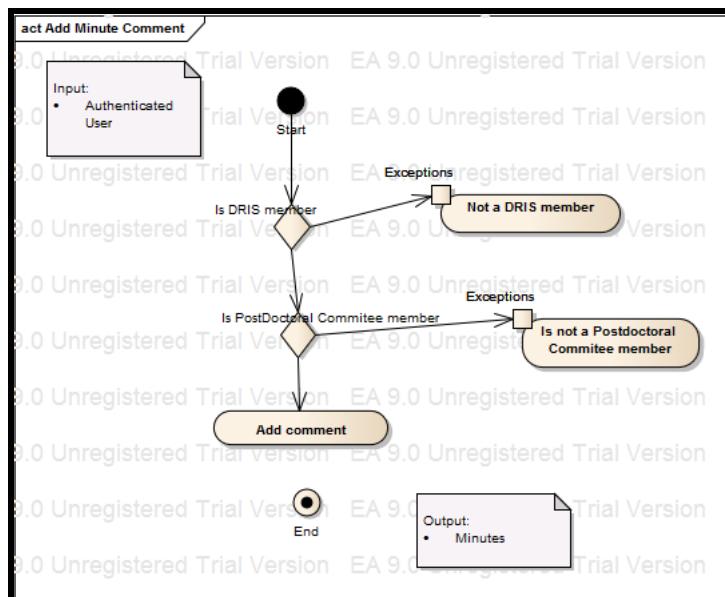


Figure 43: Activity diagram of the Add Minute Comment use case.

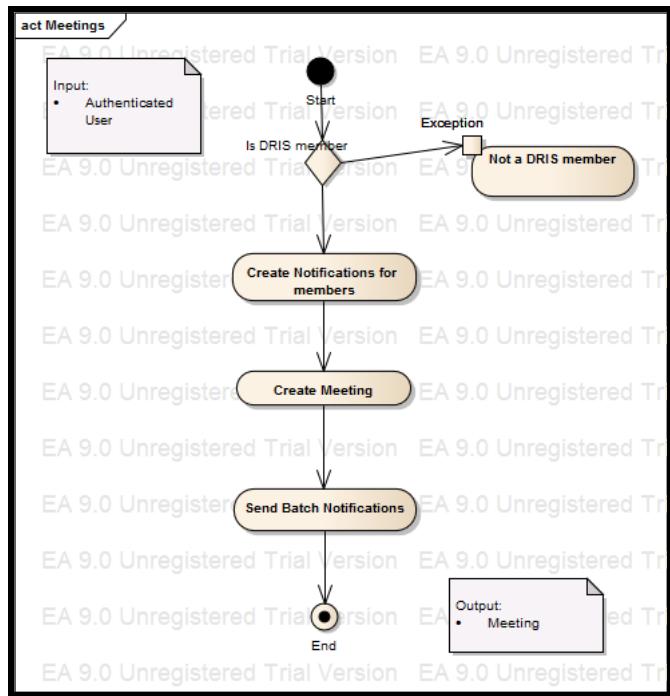


Figure 44: Activity diagram of the Create Meeting use case.

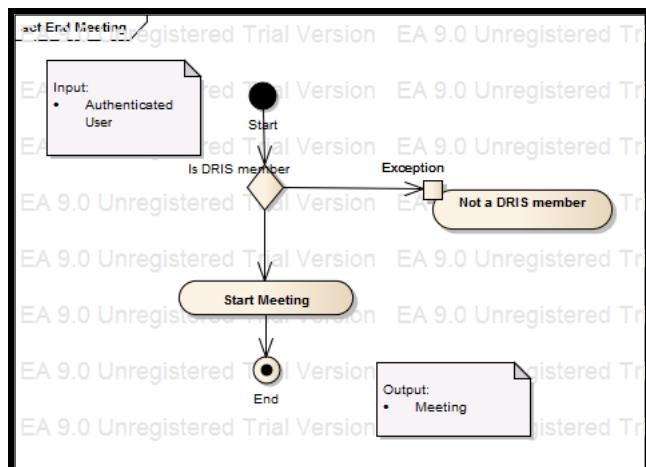


Figure 45: Activity diagram of the End Meeting use case.

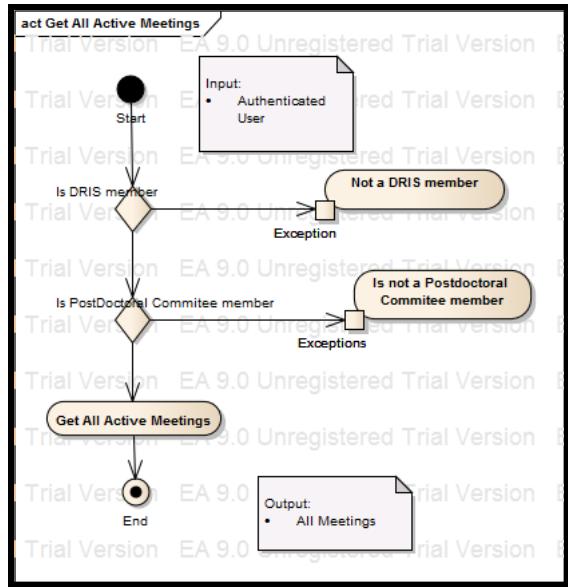


Figure 46: Activity diagram of the Get All Active Meetings use case.

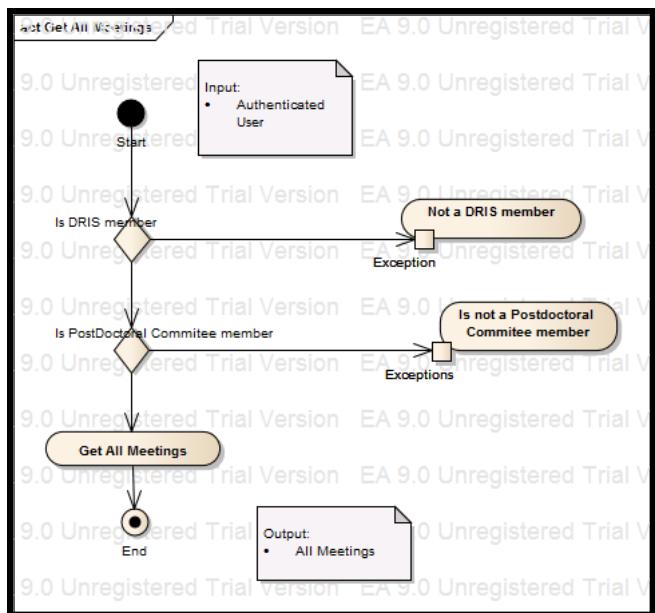


Figure 47: Activity diagram of the Get All Meetings use case.

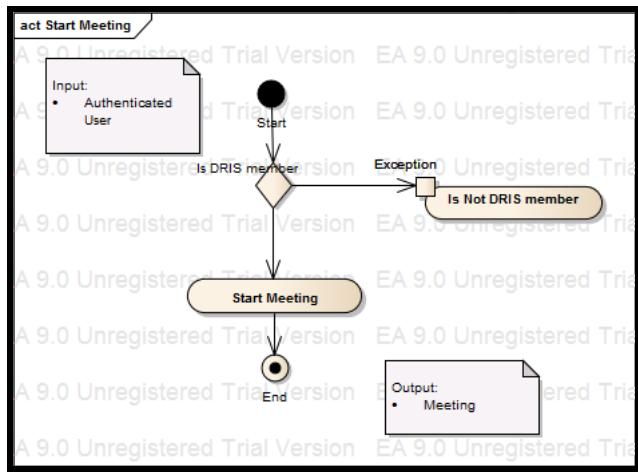


Figure 48: Activity diagram of the Start Meeting use case.

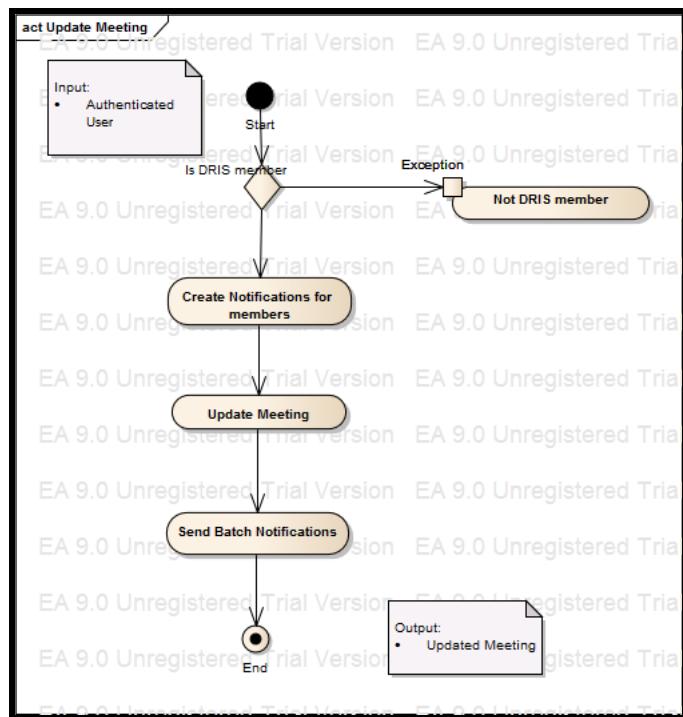


Figure 49: Activity diagram of the Update Meeting use case.

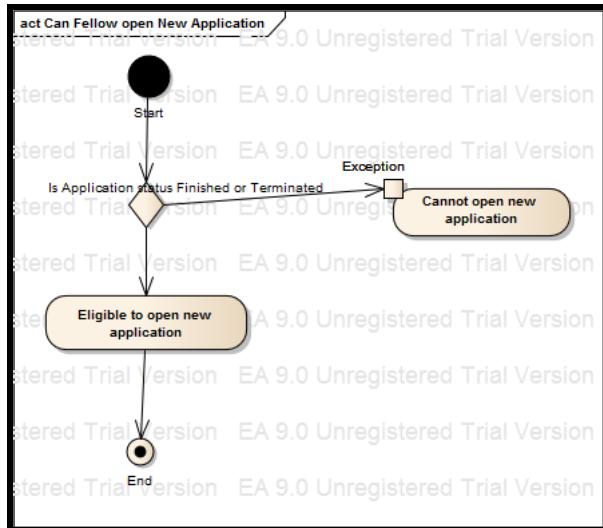


Figure 50: Activity diagram of the Can the fellow open a New Application use case.

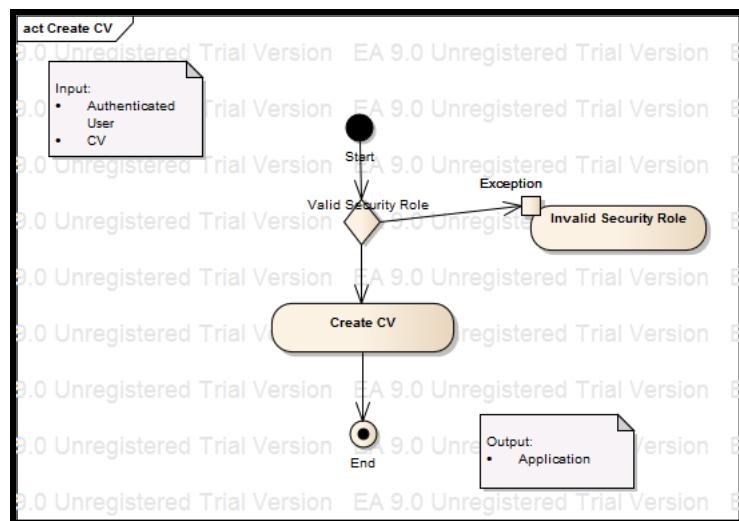


Figure 51: Activity diagram of the Create CV use case.

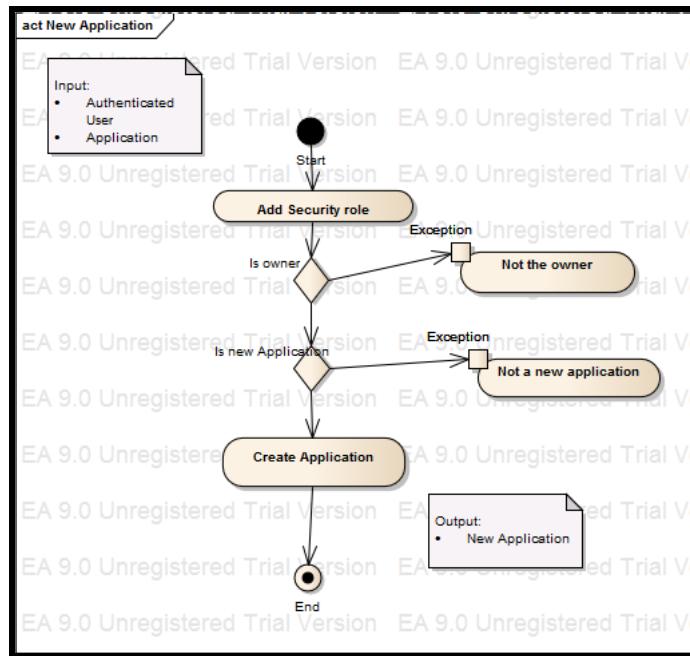


Figure 52: Activity diagram of the Create New Application use case.

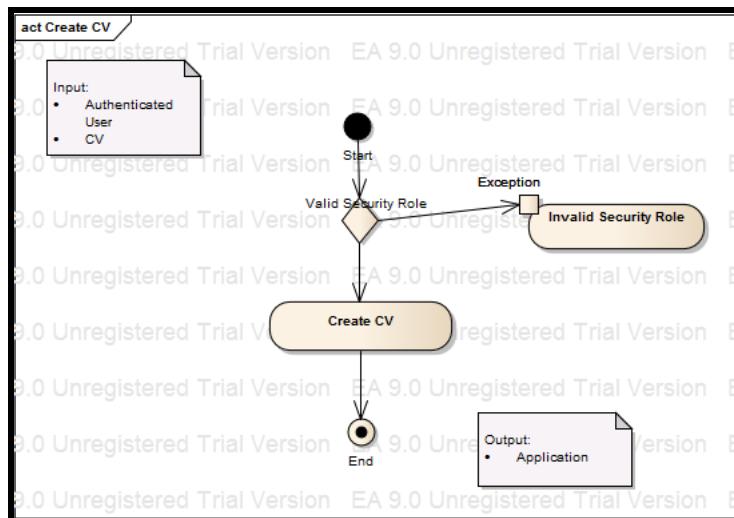


Figure 53: Activity diagram of the Get Open Application use case.

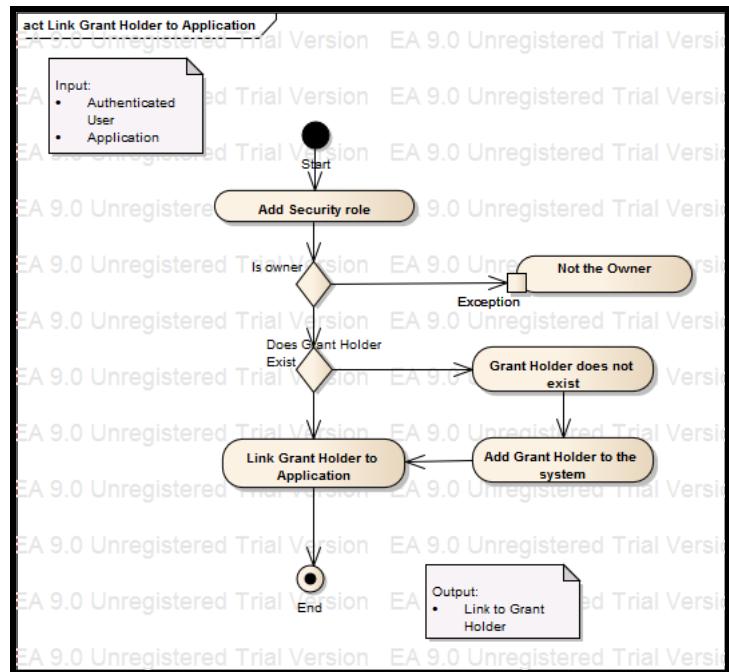


Figure 54: Activity diagram of the Link Grant Holder to Application use case.

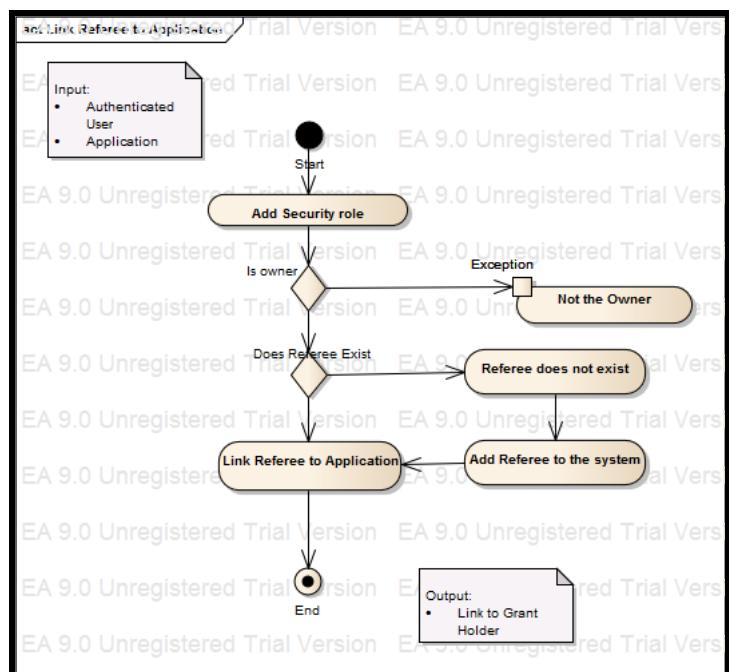


Figure 55: Activity diagram of the Link Referee to Application use case.

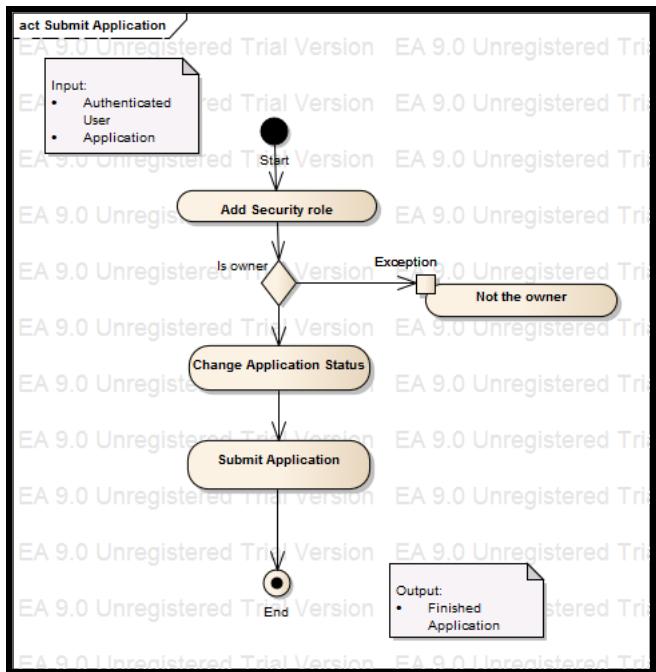


Figure 56: Activity diagram of the Submit Application use case.

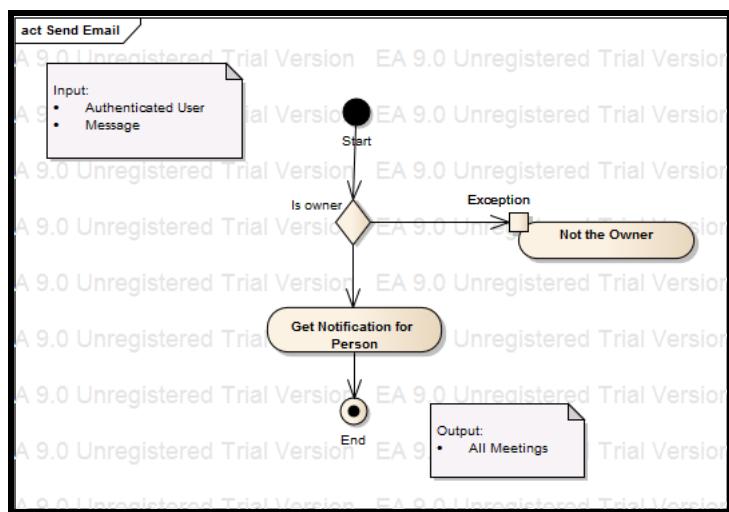


Figure 57: Activity diagram of the Get Notifications for Person use case.

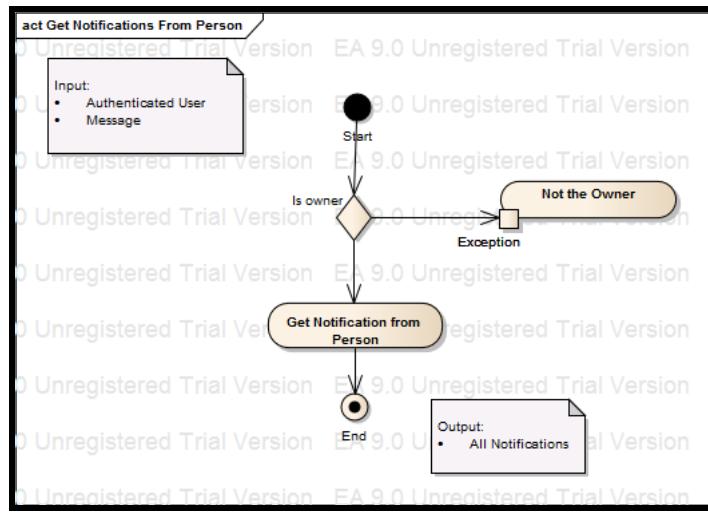


Figure 58: Activity diagram of the Get Notifications from Person use case.

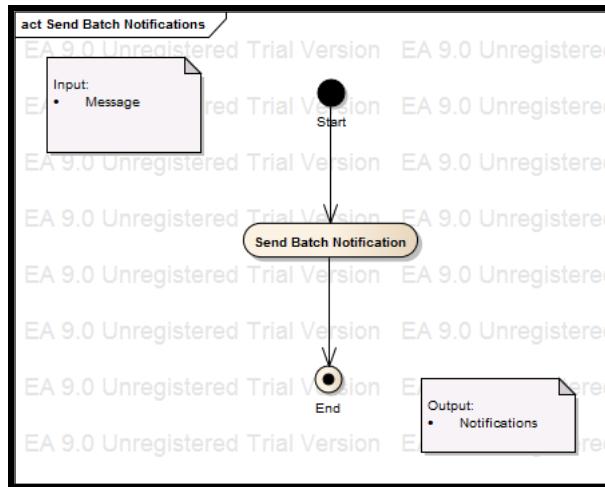


Figure 59: Activity diagram of the Send batch Notifications use case.

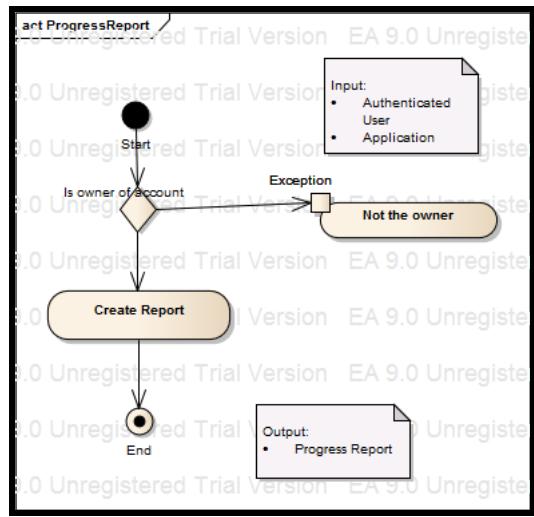


Figure 60: Activity diagram of the Create Progress Report use case.

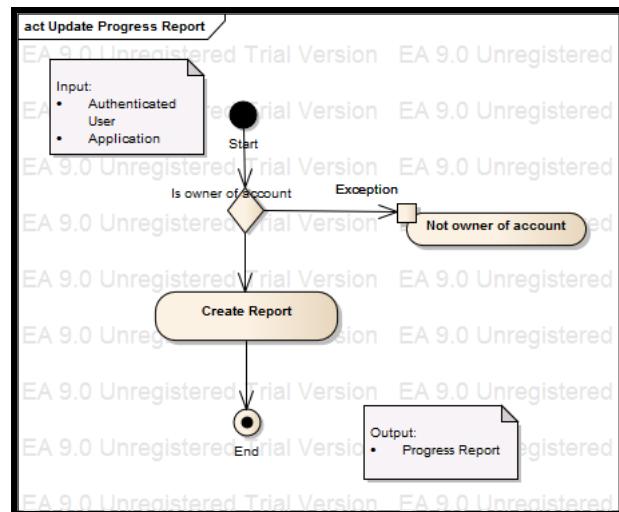


Figure 61: Activity diagram of the Update Progress Report use case.

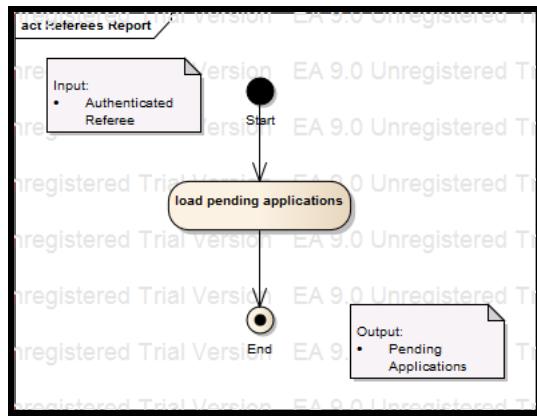


Figure 62: Activity diagram of the Create Referee Report use case.

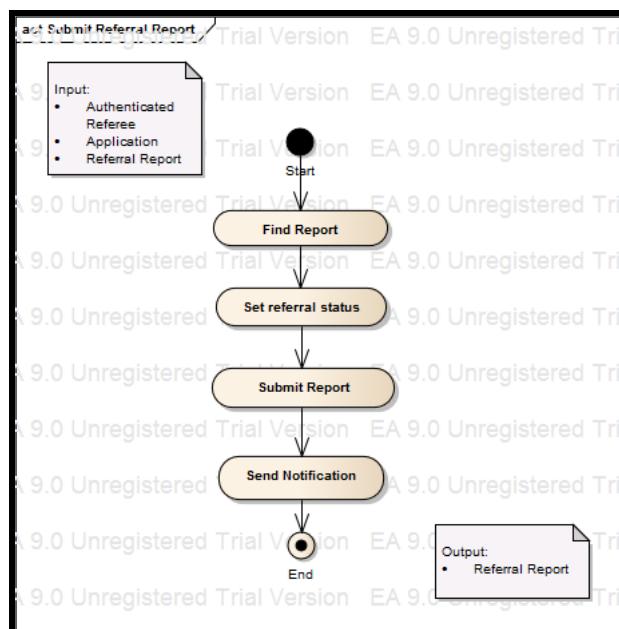


Figure 63: Activity diagram of the Submit Referee Report use case.

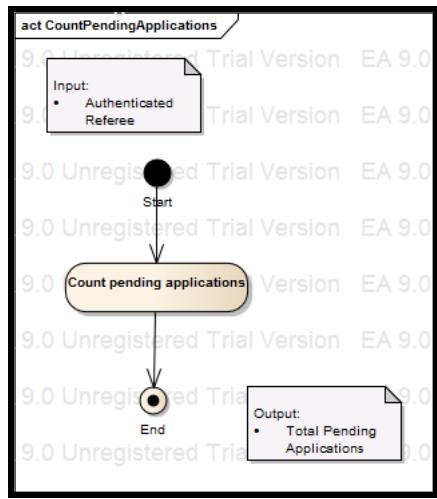


Figure 64: Activity diagram of the Count Pending Reports use case.

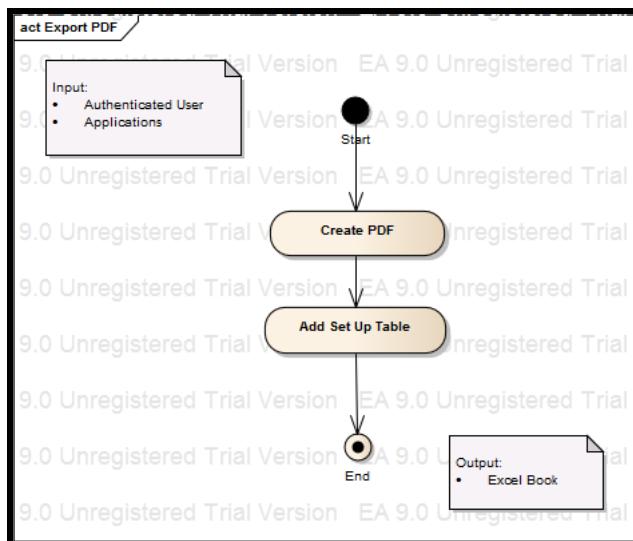


Figure 65: Activity diagram of the Export PDF Report use case.

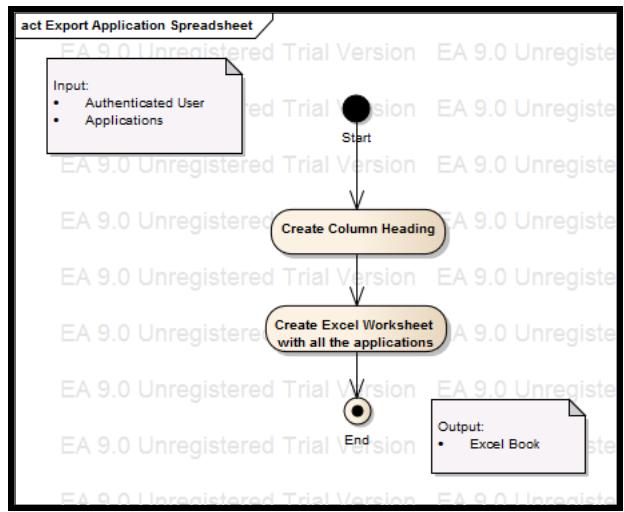


Figure 66: Activity diagram of the Export PDF Report use case.

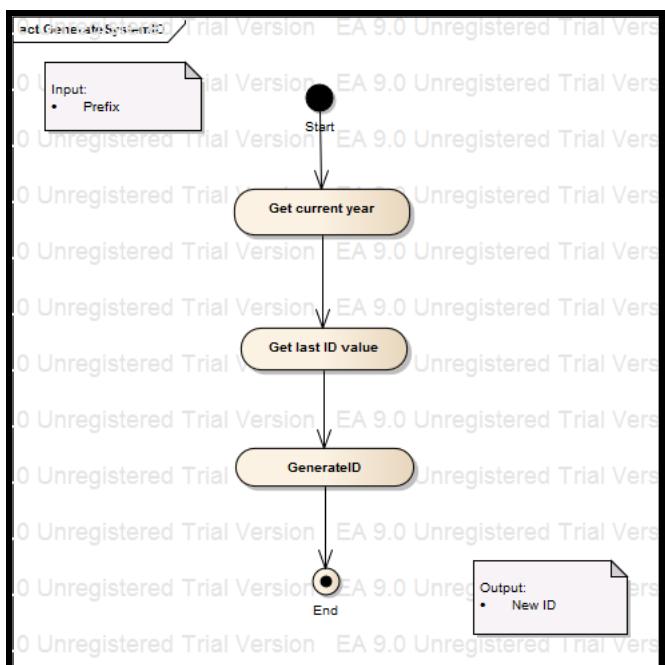


Figure 67: Activity diagram of the Generate System ID use case.

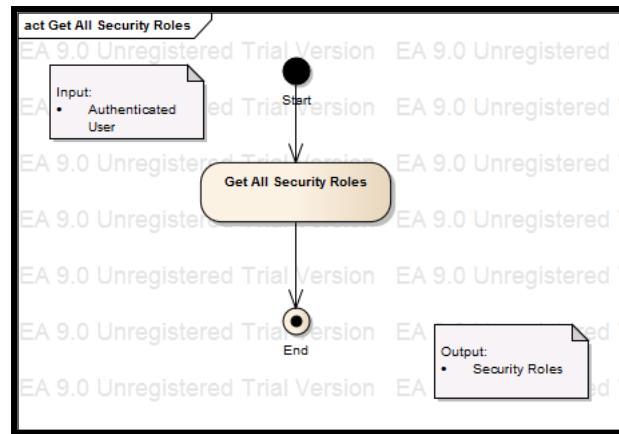


Figure 68: Activity diagram of the Get All Security Roles use case.

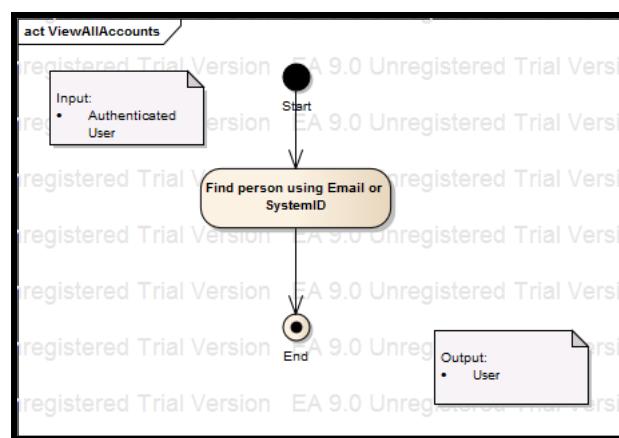


Figure 69: Activity diagram of the Get user by Email use case.

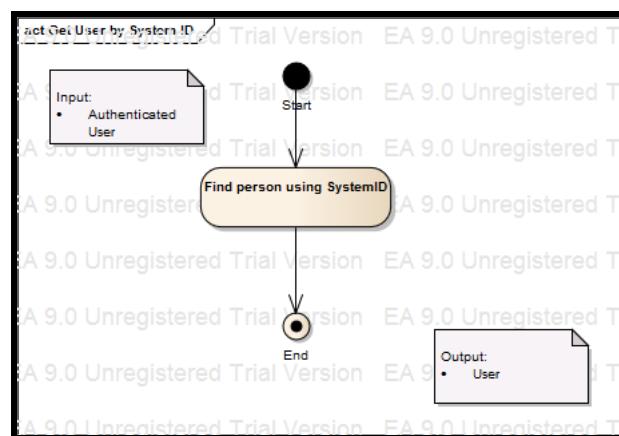


Figure 70: Activity diagram of the Get User by System ID use case.

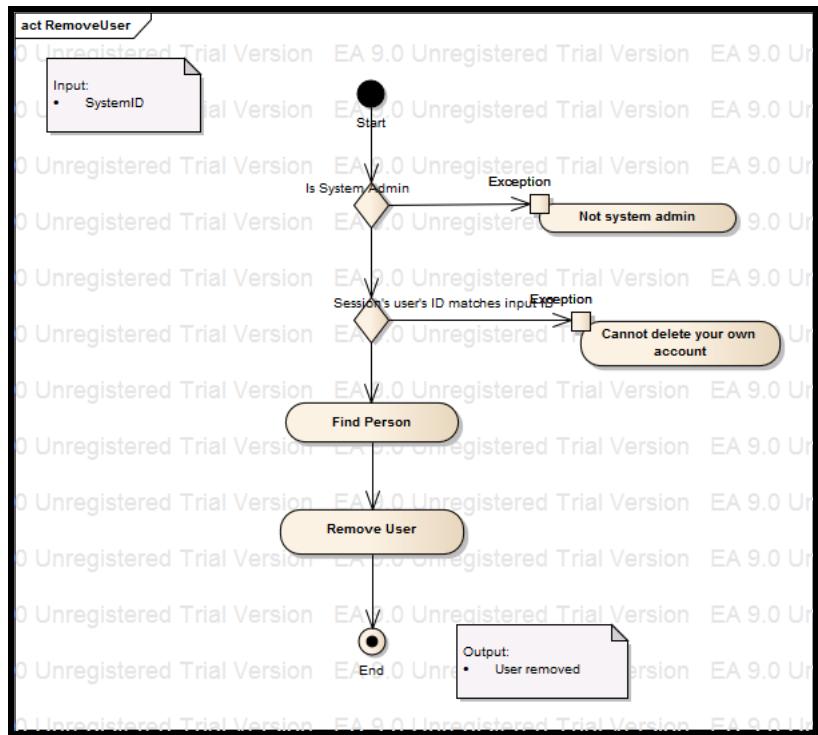


Figure 71: Activity diagram of the Remove User use case.

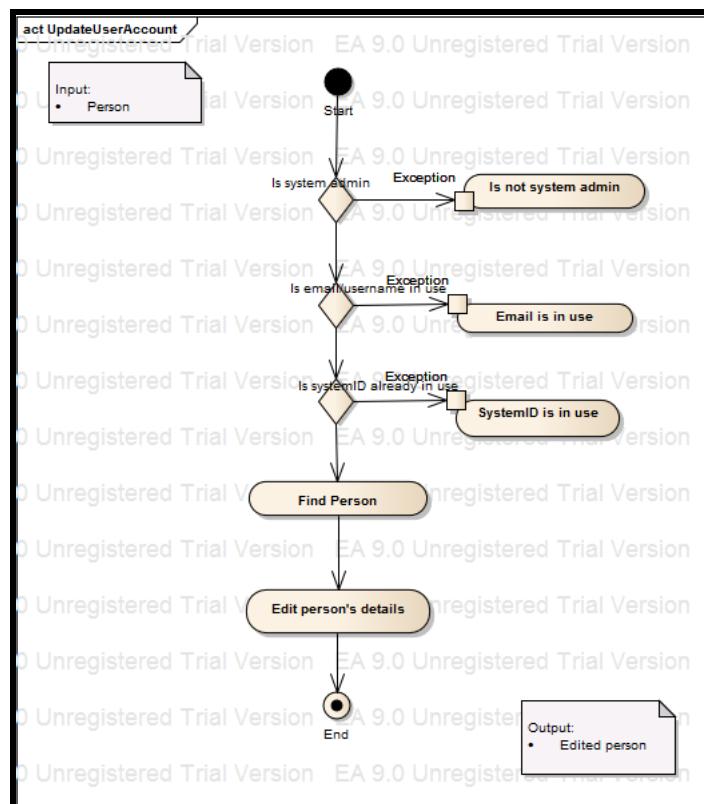


Figure 72: Activity diagram of the Update User use case.

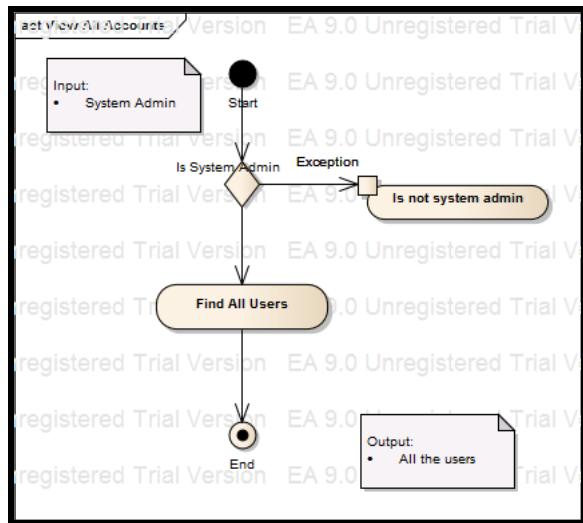


Figure 73: Activity diagram of the View All Users use case.

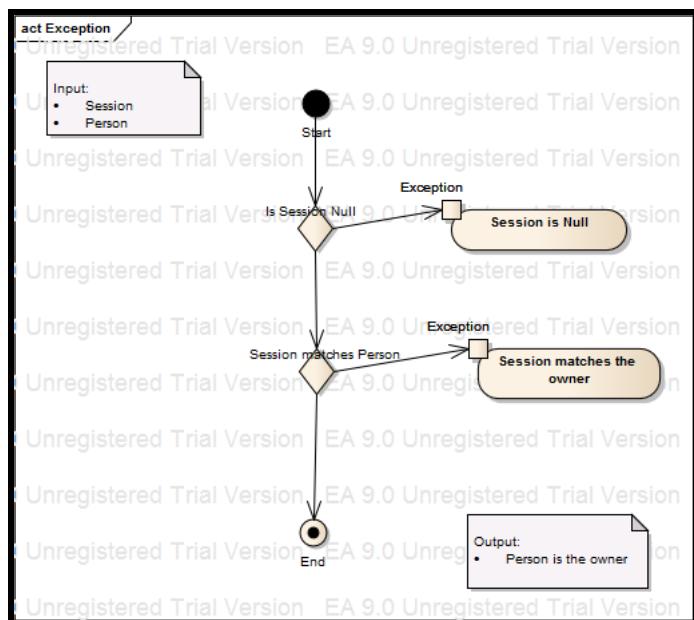


Figure 74: Activity diagram of the Authenticate User as Owner use case.

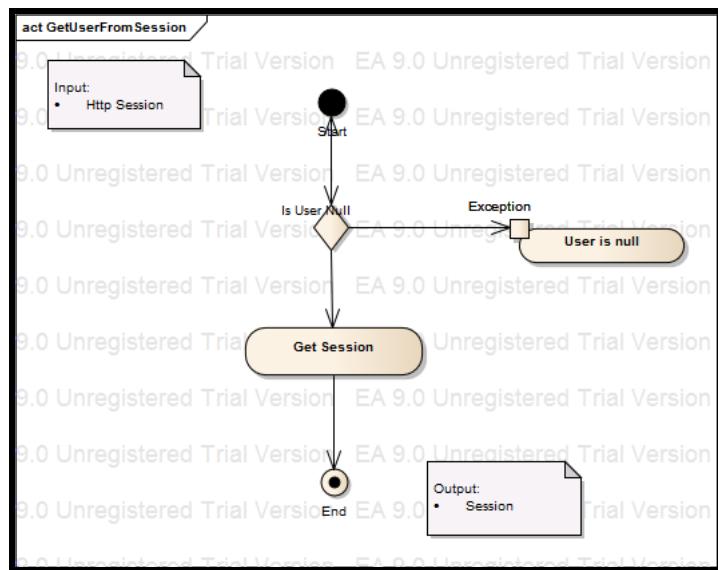


Figure 75: Activity diagram of the Get Http Session from Session use case.

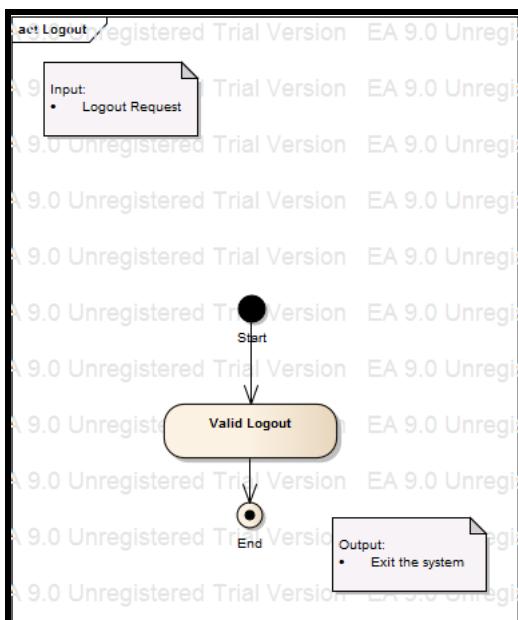


Figure 76: Activity diagram of the Logout use case.

3.7 Interface Diagrams

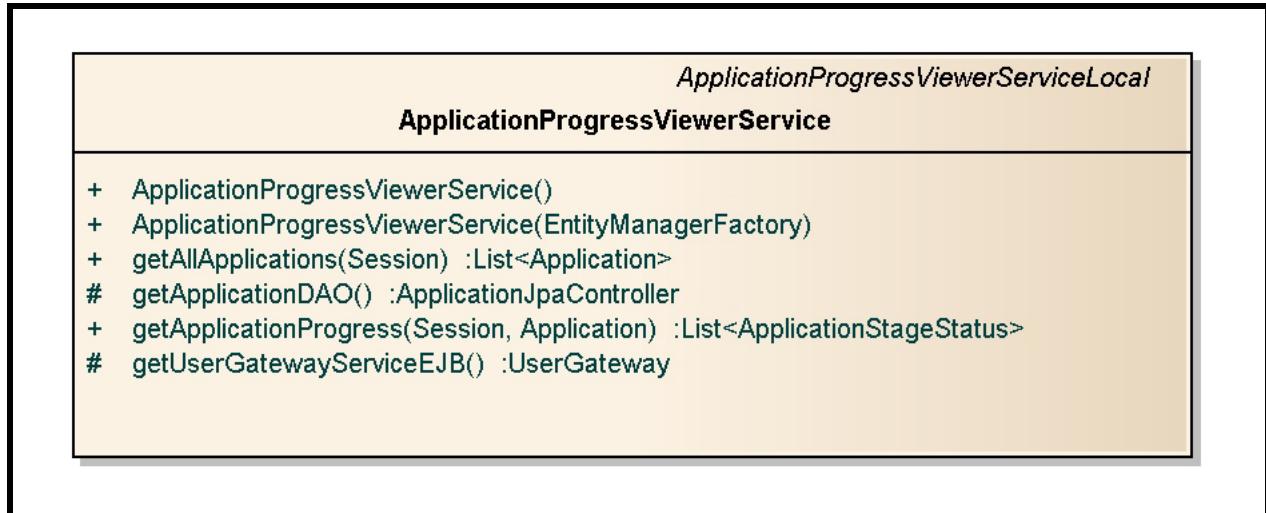


Figure 77: Interface Diagram for the Application Progress Viewer service.

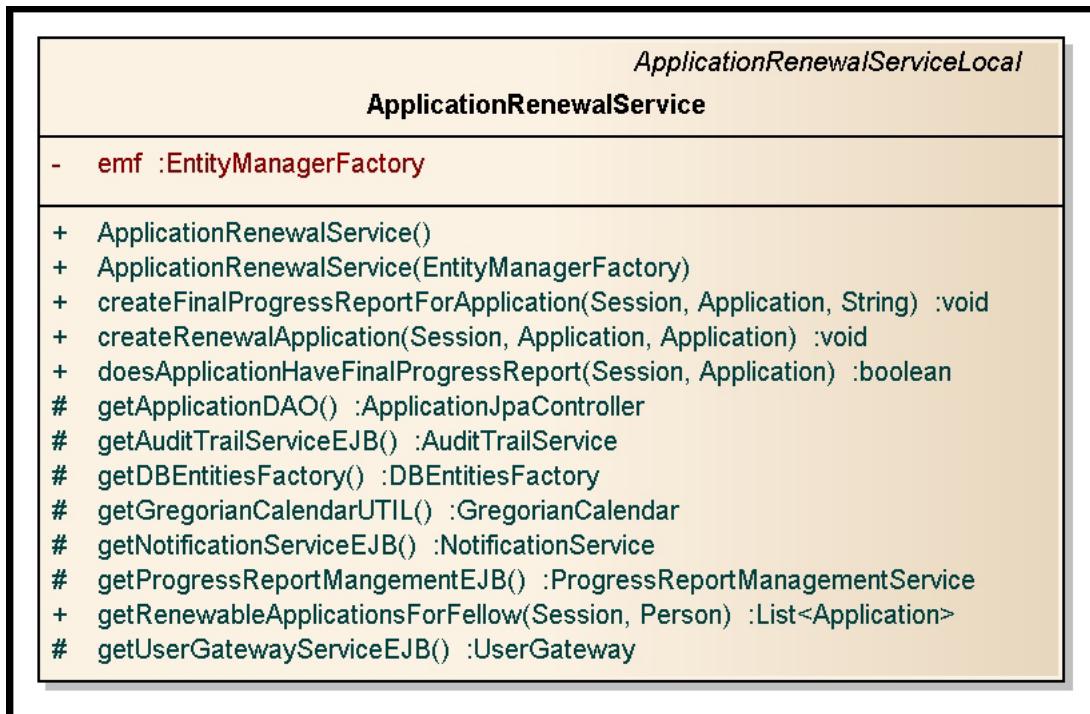


Figure 78: Interface Diagram for the Application Renewal service.

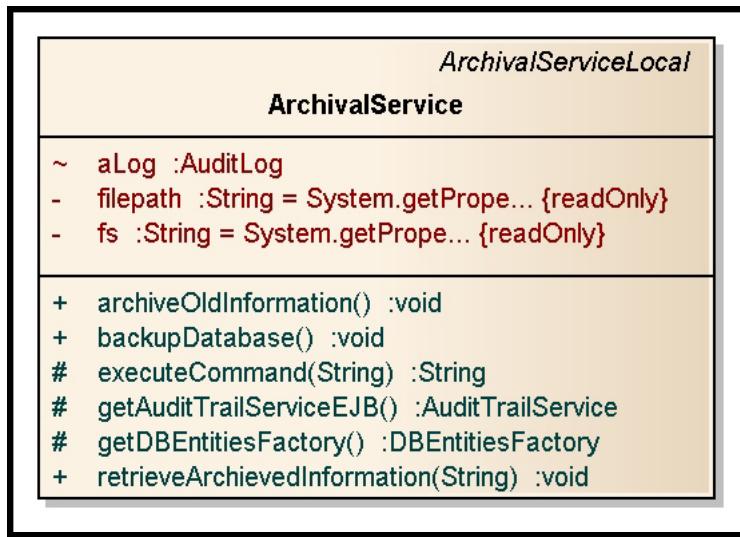


Figure 79: Interface Diagram for the Archival service.

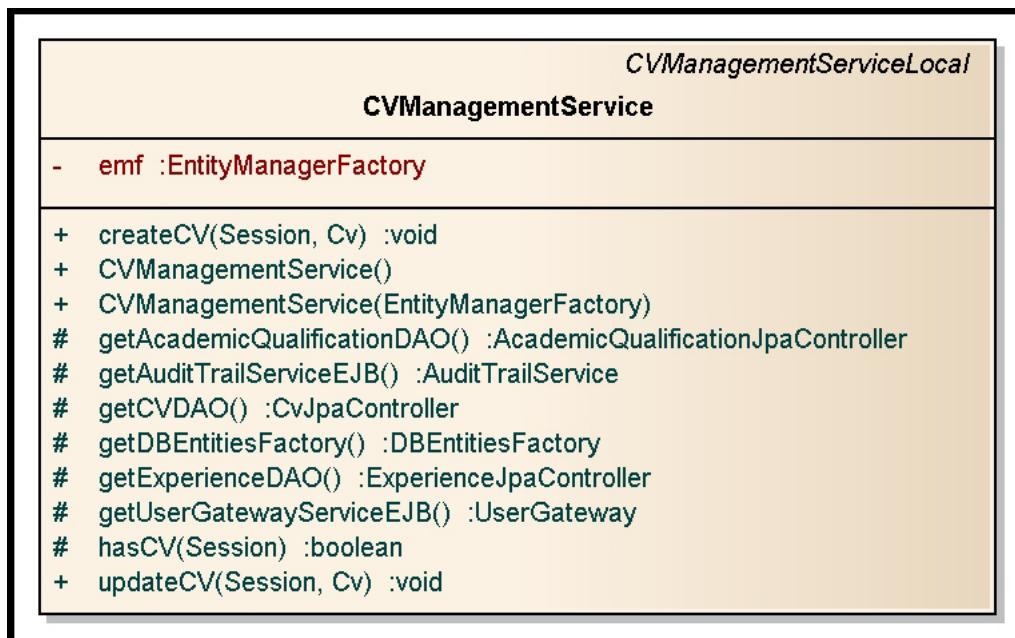


Figure 80: Interface Diagram for the CV Management service.

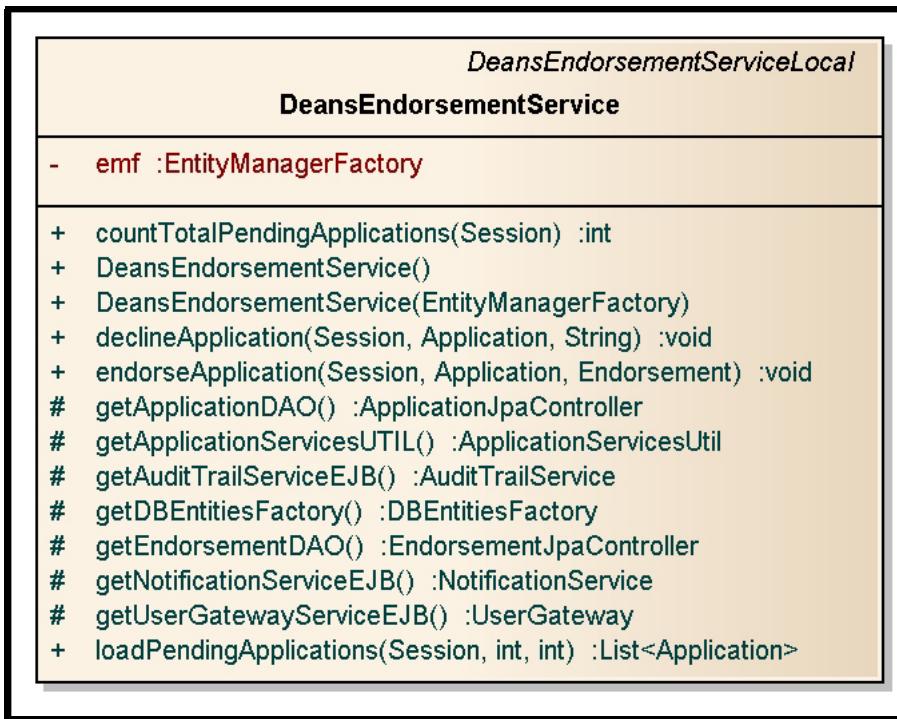


Figure 81: Interface Diagram for the Deans Endorsement service.

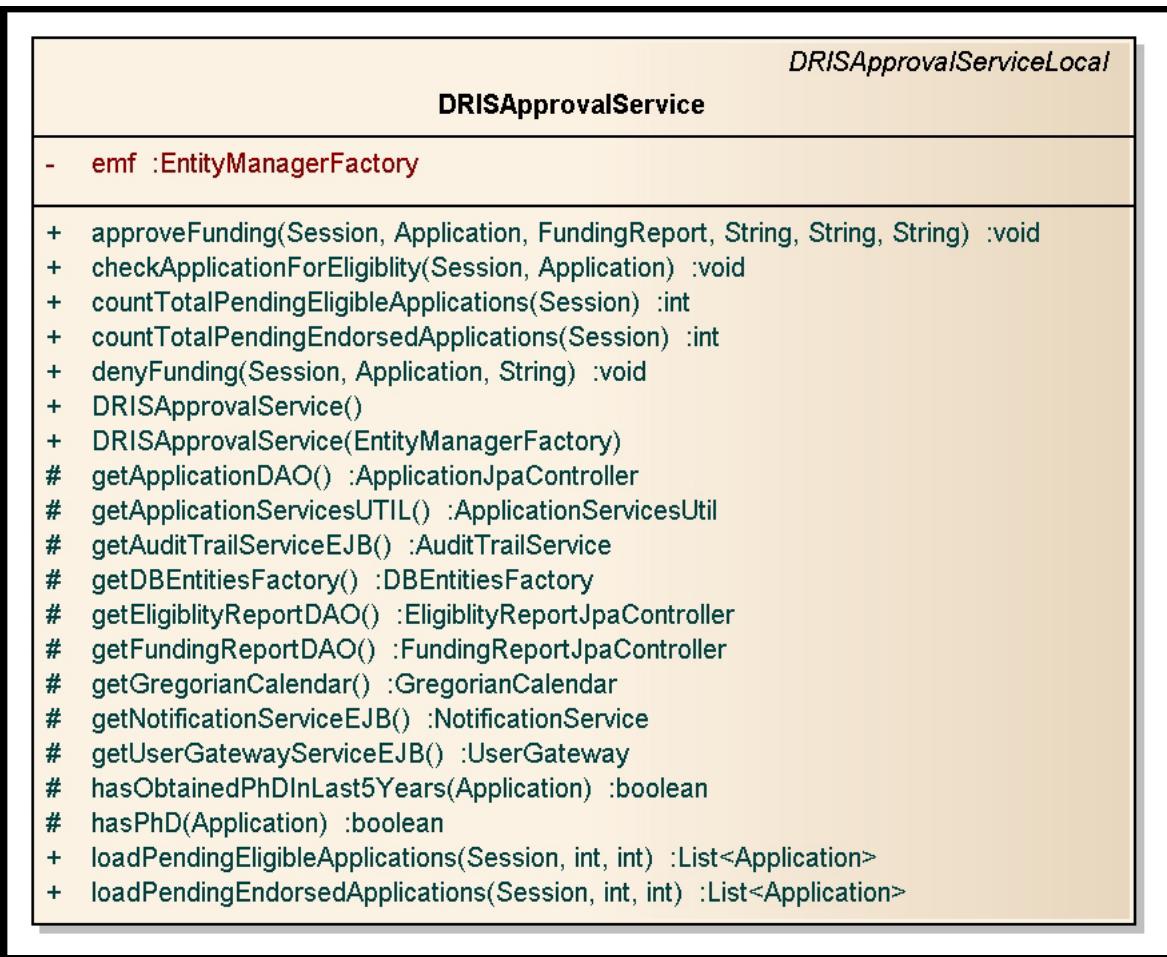


Figure 82: Interface Diagram for the DRIS Approval service.

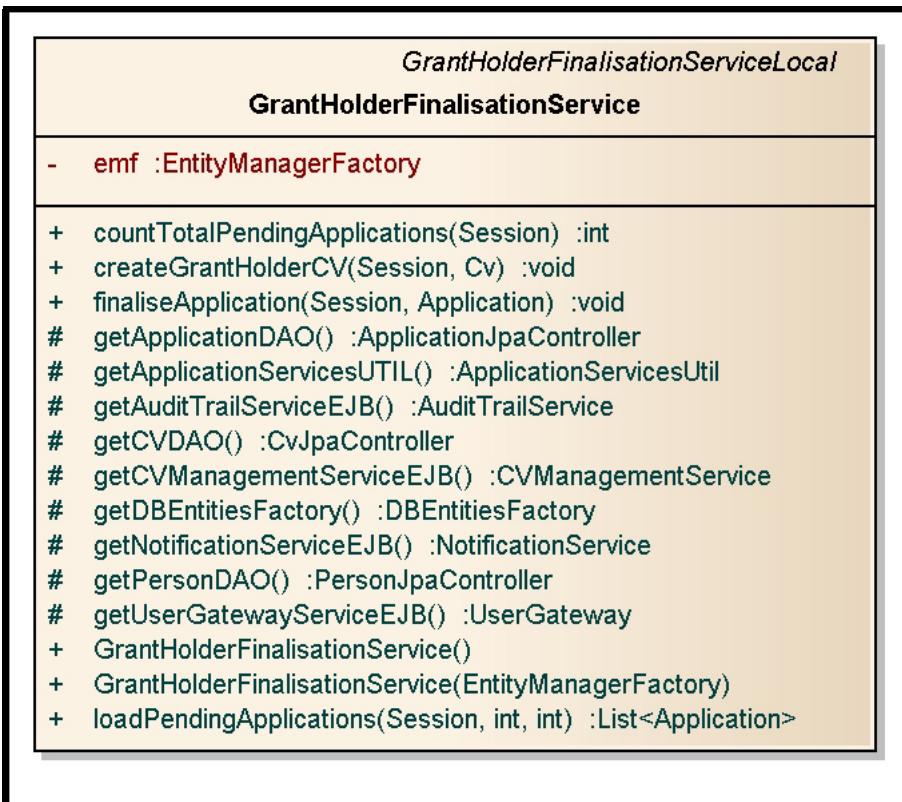


Figure 83: Interface Diagram for the Grant Holder Finalisation service.

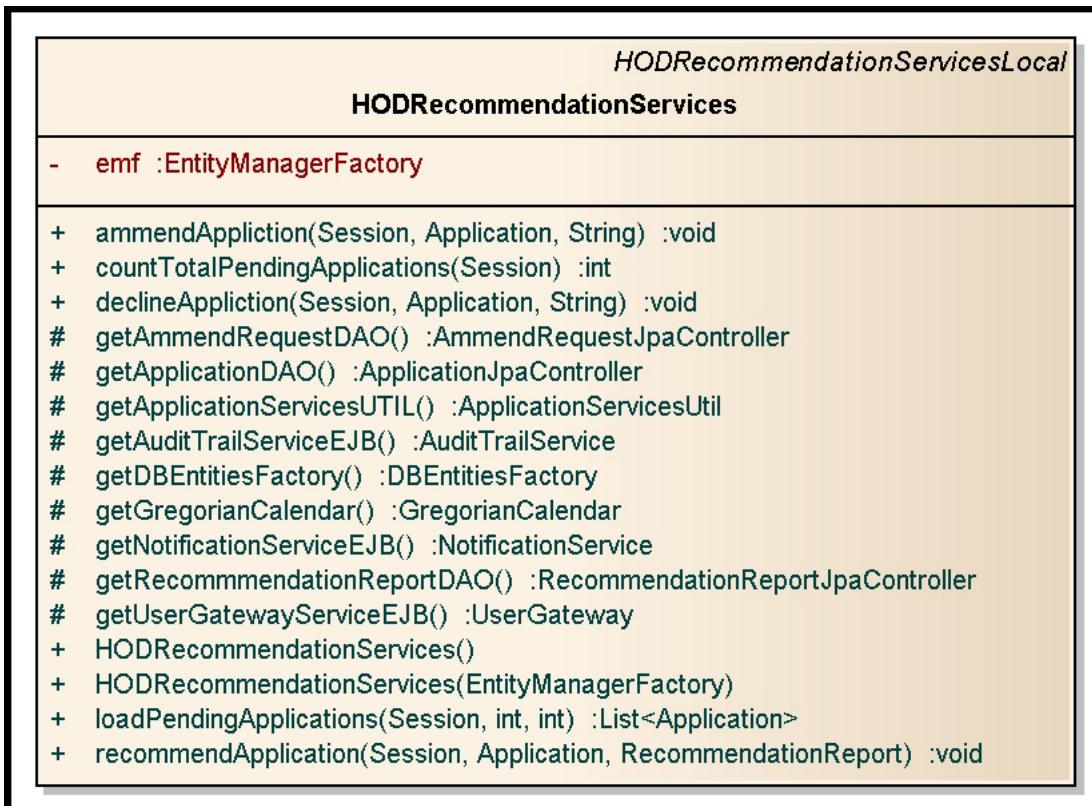


Figure 84: Interface Diagram for the HOD Recommendation service.

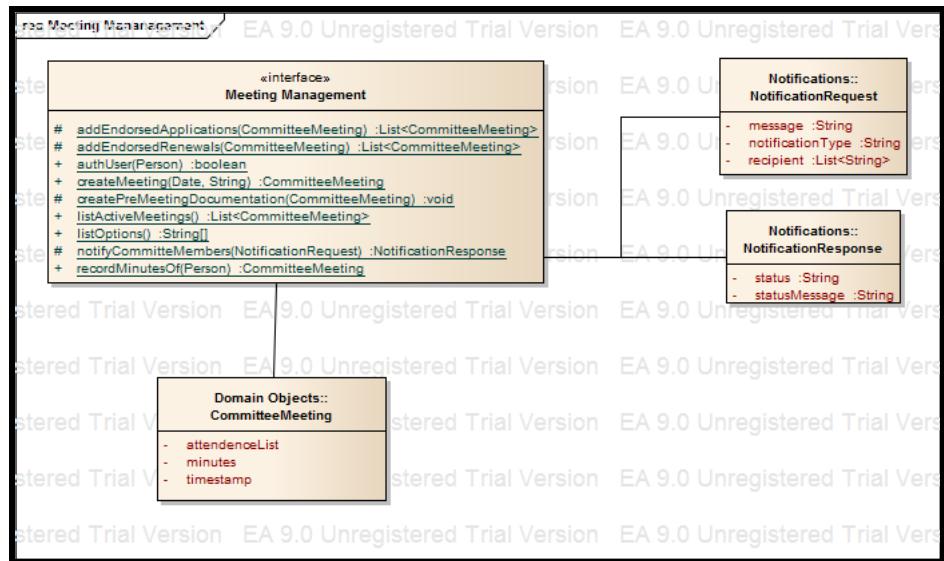


Figure 85: Interface Diagram for the Meeting Management service.

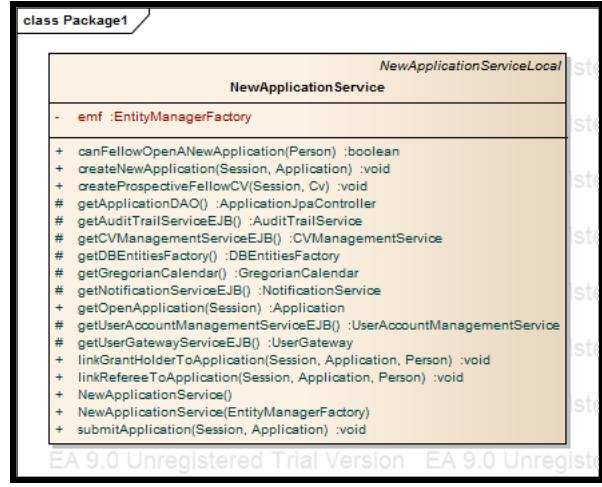


Figure 86: Interface Diagram for the New Application service.



Figure 87: Interface Diagram for the Notification service.

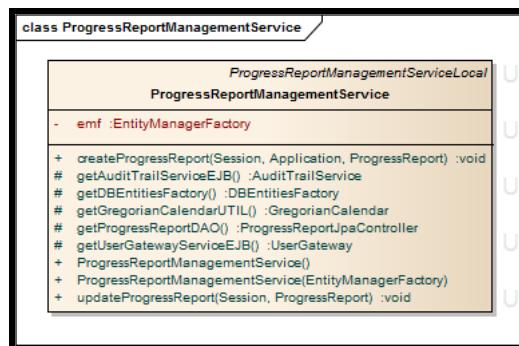


Figure 88: Interface Diagram for the Progress Report Management service.

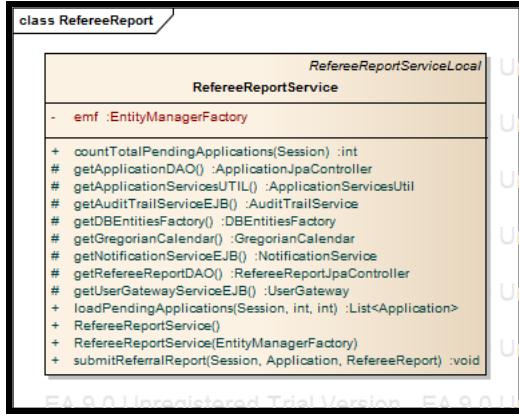


Figure 89: Interface Diagram for the Referee Report service.

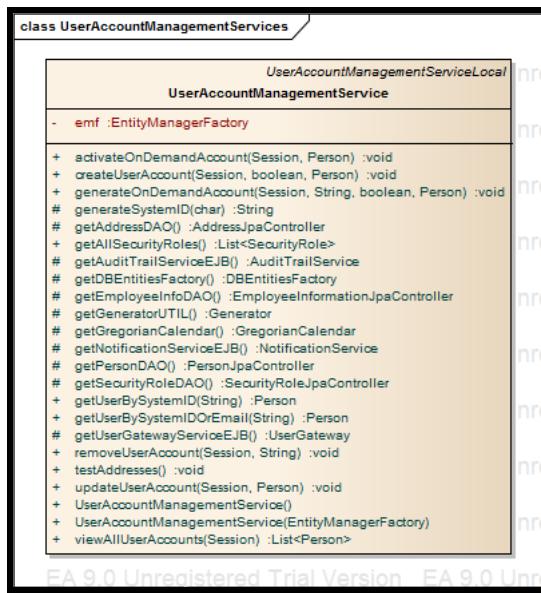


Figure 90: Interface Diagram for the User Account Management service.

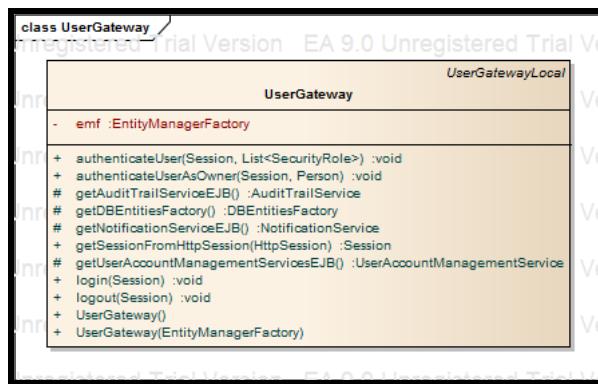


Figure 91: Interface Diagram for the User Gateway service.

3.8 Domain Objects

3.8.1 Overview

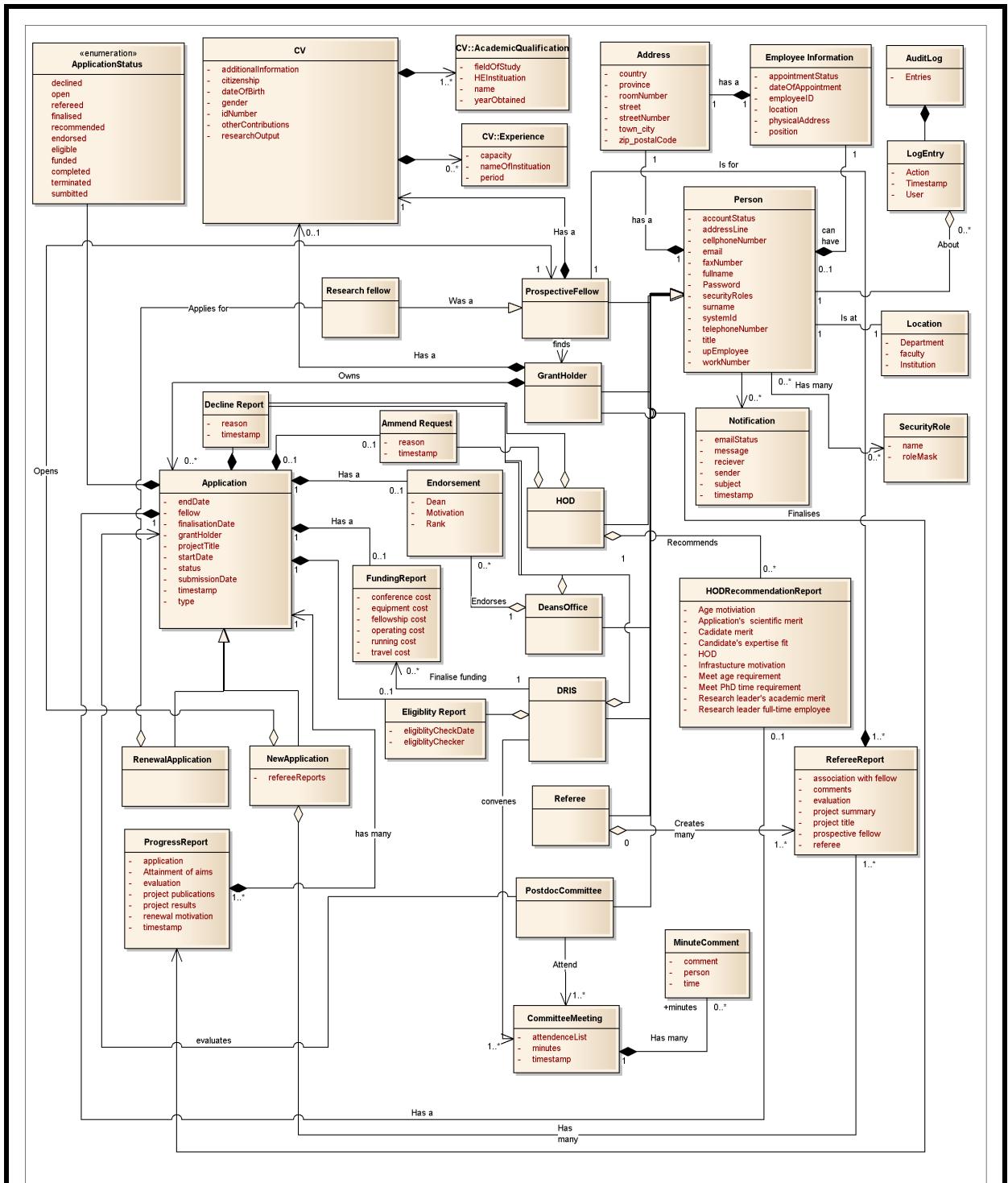


Figure 92: Overview of the data structures and relationships for the core domain objects of the system.

3.8.2 Person

This object represents the stakeholders that will make use of the system. All stakeholders will have accounts which they will use to log on to the system, using a unique user id and a predefined or user specified password. The unique user id can either be a Peoplesoft Emplid number or a email address. The person has an associated **Location** and **SecurityRole(s)**

3.8.3 Location

This object represents the location of a **Person** in the institution if they are a member of the University of Pretoria. This object will no longer be needed if the system is integrated with peoplesoft as it would cause redundancy.

3.8.4 SecurityRole

This object represents a particular security role of a **Person**. A **Person** may have many different security roles.

3.8.5 DRIS

This object represents members of Department of Research and Innovation Support who administers the process.

3.8.6 ProspectiveFellow

This inherited object represents a prospective fellow who is a holder of a PhD obtained in the last five years (or nearing completion of a PhD) or is 40 years or younger and has a PhD. The prospective fellow can open a **NewApplication**.

3.8.7 ResearchFellow

This inherited object represents a research fellow who is currently a researcher at the University of Pretoria. This object was initially a **ProspectiveFellow**. The research fellow can apply for a **RenewalApplication** if their application falls in their renewal time frame.

3.8.8 GrantHolder

This inherited object represents a grant holder who can be a rated researcher by the NRF or not. The system should not require the CV's of A and B rated researchers to be added to the system. The reason for this is that the CV's of such researchers can be easily obtained from the NRF and tend to be very long. A grant holder is the supervisor for one or many **ProspectiveFellow(s)** or **ResearchFellow(s)** and owns the **Application** of the **ProspectiveFellow(s)** or **ResearchFellow(s)**.

3.8.9 HOD

This inherited object represents a HOD of a particular department. The HOD creates the recommendation reports for **Application(s)** they consider to meet their requirements.

3.8.10 HODRecommendationReport

This inherited object represents a recommendation report highlighting the reasons to why the **Application** of a **ProspectiveFellow** or **ResearchFellow** is needed by the department.

3.8.11 Deans Office

The Dean's office object represents the relevant faculty's Dean and Deputy Dean. The Dean's Office creates the **Endorsement** for any the **Application** that is approved by them.

3.8.12 Endorsement

This object represents the endorsement of an **Application** of a **ProspectiveFellow** or **ResearchFellow** and contains the rank in comparison to other pending **Application(s)** with a **Endorsement**.

3.8.13 Referee

This inherited object represents the referees of any **ProspectiveFellow** and is responsible for creating **RefereeReport** regarding the **ProspectiveFellow**.

3.8.14 RefereeReport

This object represents the referral report from an identified referee of a **ProspectiveFellow**.

3.8.15 PostDocCommittee

This inherited object represents the individual members of the post-doctoral committee who approves all available **Applications** during committee meetings and records the **Minutes** of the meeting.

3.8.16 CommitteeMeeting

This object represents a meeting of the **PostDocCommittee** convened by the **DRIS** that will be review the **Applications** and will evaluate each. This object contains the attendance list, date and time convened and the **Minutes** of the meeting.

3.8.17 Minutes

This object represents the minutes of the **CommitteeMeeting** and holds the **MinuteComment(s)** of the meeting.

3.8.18 MinuteComment

This object represents a comment made by a **PostDocCommittee** member during a **CommitteeMeeting**.

3.8.19 Application

This object represents an applications and will contain the information of **ProspectiveFellow** or **ResearchFellow** and **GrantHolder** who owns it. The object holds the status of the application. As well as the **HODRecommandationReport** of a **HOD** and **Endorsement** from a **DeansOffice**.

3.8.20 NewApplication

This inherited object represents new application for a **ProspectiveFellow** who is currently not a fellow in the system. Also it holds any **RefereeReport(s)** that has been created for the application.

3.8.21 RenewalApplication

This inherited object represents renewal application for a **ProspectiveFellow** who is a fellow in the system. Also it holds the **ProgressReport** that has been created for the application.

3.8.22 ProgressReport

This object represents a report on the research that the **ResearchFellow** had done through the duration of their fellowship.

3.8.23 CV

This object represents a CV and contains all the information such as personal details, **AcademicQualification(s)**, **Experience** regarding a **GrantHolder** or **ProspectiveFellow** in the system.

3.8.24 AcademicQualification

This object represents a academic qualification and the information regarding it such as the qualification name, field, where it was obtained and when it was obtained.

3.8.25 Experience

This object represents a work experience and the information regarding it such as the capacity of the work, where this work was done and when it was done.

3.8.26 Notification

This object represents a email or internal message sent by a user to a user via the system. The system itself may also seen as a user in this regard.

3.8.27 AuditLog

This object represents a audit log that stores all the actions of all users within the system.

3.8.28 LogEntry

This object represents a **AuditLog** entry which records the action, who committed the action as well as at what time the action was committed.

4 User acceptance tests

This user acceptance document, as specified in the "V" model for testing, is a quality assurance activity through which we will be enabled to ensure that the new system does actually meet the essential user requirements. It acts as a means to gain quality assurance as it allows to detect deviations between the implementation of the system and the specified requirements. Since test cases are essentially derived from the quality and functional requirements provided by the requirement engineering process. Quality assurance, in turn, requests requirements engineering to resolve requirements defects detected during quality assurance activities and if necessary, to clarify requirements to enable the specification of adequate test artefacts (Pohl 2010).

This section test items and identifiers with regards to the systems behaviour. All the steps entailed below are added to the audit log.

4.1 User Accounts

4.1.1 Creating prospective fellow user account

Step	Action	Expected System response
1	The user enters the required information such as names and email address to the system.	The system will check that all fields were filled as expected and that no necessary fields were skipped. If all fields are valid the user is allowed to continue
2	Once all the fields are checked as valid by the system the user can now submit their account.	The system will now create the users account in the system database.

4.1.2 Creating stakeholder user account

Step	Action	Expected System response
1	The administrator enters the required information such as names, security level required by the user account and email address to the system.	The system will check that all fields were filled as expected and that no necessary fields were skipped. If all fields are valid the user is allowed to continue
2	Once all the fields are checked as valid by the system the user can now submit their account.	The system will now create the users account in the system database.

Preconditions

The administrator is logged on to the system.

Postconditions

The user account is now created in the system identified as a prospective fellow.

4.1.3 Modifying user account

Step	Action	Expected System response
1	The user alters all the fields they want to change such as email and names.	The system will check that all fields were filled as expected and that no necessary fields were skipped. If all fields are valid the user is allowed to continue.
2	Once all the fields are checked as valid by the system the user can now submit their account.	The system will now create the users account in the system database.

Preconditions

The administrator is logged on to the system.

Postconditions

The user account is now created in the system identified as a prospective fellow.

4.2 New Application

4.2.1 Prospective Fellow Creates new application

Step	Action	Expected System response
1	The user enters their relevant details in CV form.	The system will check that all fields were filled as expected and that no necessary fields were skipped. If all fields are valid the user is allowed to continue
1	The user specifies their intended supervisor.	The system will check that all fields were filled as expected and that no necessary fields were skipped. If all fields are valid the user is allowed to continue
2	The user enters the details/documents of their referees.	The system will store the documents or check the validity of the referees details binding them to the applicants application. If all fields are valid the user is allowed to continue
3	The user enters their previous academic experience(s), attaching the supporting documents.	The system will store the documents binding them to the applicants application. If all fields are valid the user is allowed to continue
4	The user enters their previous work experience(s), attaching the supporting documents.	The system will store the documents binding them to the applicants application. If all fields are valid the user is allowed to continue
5	Once the user has completed all the above steps they will be allowed to submit the application.	The system will now process the application to the specified supervisor and let the user know that the application is under way.

Preconditions

The user is on the website through a supported web client and logged on to the system.

Postconditions

The user is on the website through a supported web client and logged on to the system.

4.2.2 Referees submit Motivation

Step	Action	Expected System response
1	The user enters their relevant details in CV form.	The system will check that all fields were filled as expected and that no necessary fields were skipped. If all fields are valid the user is allowed to continue
1	The user specifies their intended supervisor.	The system will check that all fields were filled as expected and that no necessary fields were skipped. If all fields are valid the user is allowed to continue
2	The user enters the details/documents of their referees.	The system will store the documents or check the validity of the referees details binding them to the applicants application. If all fields are valid the user is allowed to continue
3	The user enters their previous academic experience(s), attaching the supporting documents.	The system will store the documents binding them to the applicants application. If all fields are valid the user is allowed to continue
4	The user enters their previous work experience(s), attaching the supporting documents.	The system will store the documents binding them to the applicants application. If all fields are valid the user is allowed to continue
5	Once the user has completed all the above steps they will be allowed to submit the application.	The system will now process the application to the specified supervisor and let the user know that the application is under way.

Preconditions

The user is on the website through a supported web client and logged on to the system.

Postconditions

The user is on the website through a supported web client and logged on to the system.

4.2.3 Grant holder validation of application

Step	Action	Expected System response
1	Grant holder verifies and finalizes the application.	The system accepts the verifications
2	Once all the reports and referrals have been submitted the application can now be sent through	The system now sets the application to be processed. A notification is sent to the DRIS.

Preconditions

The grant holder is logged on to the system. The application has instantiated by the prospective fellow.

Postconditions

The application is now available to the stakeholders.

4.2.4 Application approval by stakeholder

Step	Action	Expected System response
1	Stakeholder verifies and finalizes the application or leaves suggestion for the application.	The system accepts the verifications.
2	Once all the reports and referrals have been submitted the application can now be sent through	The system now sets the application to be processed. A notification is sent to the DRIS.

Preconditions

The stakeholder is logged on to the system. The application has been approved and finalized by the grant holder.

Postconditions

The application is now available to the DRIS consideration.

5 Glossary:

- **Activity diagram** - A UML diagram that depicts the flow of actions or activities in the process.
- **API** - Application Programming Interface
- **Audit log** - A log that keeps track of user actions.
- **Application** - Both renewal applications or new fellowship applications are seen as applications by this project.
- **CV** - Curriculum Vita
- **Domain objects** - Are the objects that are present in the system being modelled.

- **HTML** - Hyper Text Mark-up Language
- **Java EE** - Java Enterprise Edition
- **NRF** - National Research Foundation
- **PhD** - A doctoral degree in a particular field of study.
- **PDF** - Portable Document Format file
- **Peoplesoft** - A management system designed by oracle.
- **Spreadsheet** - A special type of digital document that is used to represent data in rows and columns
- **Use case diagram** - A UML diagram that gives a visual depiction of a service or group of services.
- **UML** - Unified modelling language. A commonly used model standard to provide technology neutral models of different aspects of software.
- **UP** - University of Pretoria