

can be linked to the class diagrams of another system, provided, there is a multi-system requirement.

2. Object diagram: Object diagram is similar to the above mentioned class diagram and is said to be a real entity or an instance of the Class used to mention the extra properties of an entity in addition to the properties depicted by the class.

3. Use case diagram: Use case diagram comprises of use cases and actors such that there would be various kinds of relationships among the use cases and the actors. A use case diagram shows all the actions that a particular actor needs to perform through out the system at every and any point of time. There would be only one use case diagram per each system.

4. Sequence diagram: This diagram, as the name suggests, contains the sequence of flow of actions that are processed through a system and the life lines of the entities, when and how are they accessed. It also contains the security like which entity can process which entity and which one is visible, etc. There can be many number of sequence diagrams per each activity being done.

5. Collaboration diagram: This diagram is a polymorphic form of the sequence diagram in which the representation is different but application is the same. If we are able to create one sequence diagram, then its very simple to create its collaboration diagram with a single key click that varies from to software. There can be many number of collaboration diagrams per each activity being done because there can be many number of sequence diagrams.

6. Activity diagram: This diagram denotes the structural flow of the activities in the form of flow chart with decision boxes enhanced and hence is also used for troubleshooting like raising exceptions when a particular action is done and the alternative to be done when something abnormal is done. There can be only one activity diagram for the entire system including all the activities that a system can perform.

7. Statechart diagram: This diagram is a polymorphic form of the activity diagram in which the representation is different but application is the same. It looks similar to a finite state machine state transition diagrams.

8. Deployment diagram: Deployment diagram is employed when we need to deploy the application we developed. A single deployment diagram is possible for a single system.

9. Component diagram: Component diagram represents the components in which the particular application needs to be installed or implemented on. It also shows the type of relation that exists among the various components that are represented. Hence, only a single component diagram representing all the components and their relations is needed for the entire system.

This article emphasizes on 8 most prominent diagrams out of the given 9 diagrams, excluding object diagram which has no greater importance than the rest of them.

Case Study1

Library Management System

Problem Statement:

The case study titled Library Management System is library management software for the purpose of monitoring and controlling the transactions in a library. This case study on the library management system gives us the complete information about the library and the daily transactions done in a Library. We need to maintain the record of new s and retrieve the details of books available in the library which mainly focuses on basic operations in a library like adding new member, new books, and up new information, searching books and members and facility to borrow and return books. It features a familiar and well thought-out, an attractive user interface, combined with strong searching, insertion and reporting capabilities. The report generation facility of library system helps to get a good idea of which are ths borrowed by the members, makes users possible to generate hard copy.

The following are the brief description on the functions achieved through this case study:

End-Users:

- Librarian: To maintain and update the records and also to cater the needs of the users.
- Reader: Need books to read and also places various requests to the librarian.
- Vendor: To provide and meet the requirement of the prescribed books.

Class Diagram

Classes identified:

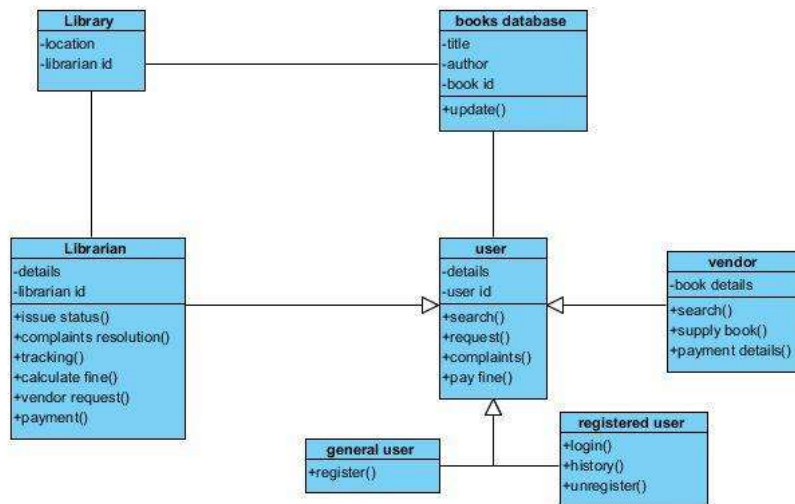
Library

Librarian

Books Database

User

Vendor



Use-case Diagram

Actors vs Use Cases:

Librarian

- Issue a book
- Update and maintain records
- Request the vendor for a book
- Track complaints

User

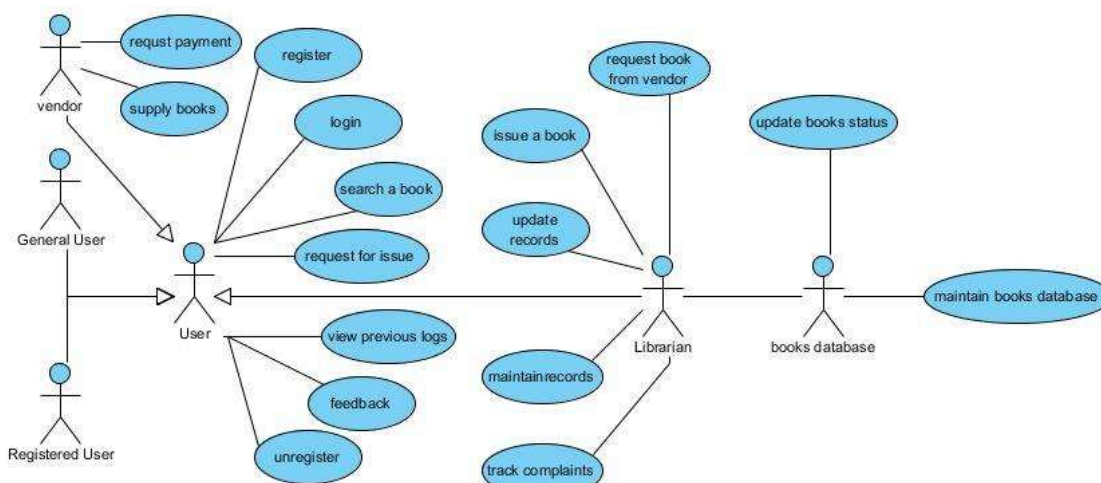
- Register
- Login
- Search a book
- Request for issue
- View history
- Request to the Librarian
- Unregister

Books Database

- Update records
- Show books status

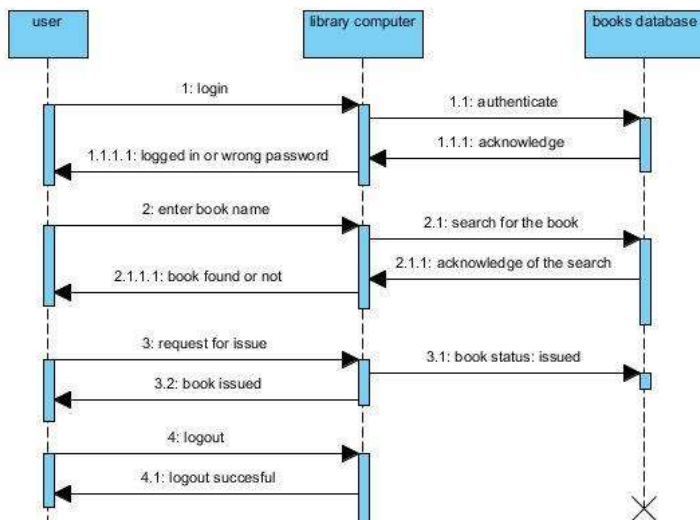
Vendors

- Provide books to the library
- Payment acknowledgement



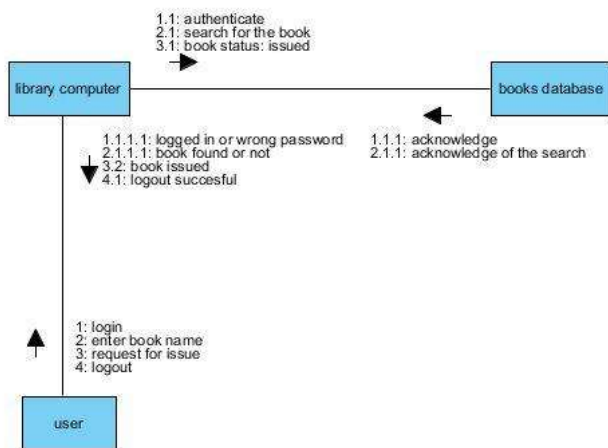
Sequence Diagram

Sequence diagram for searching a book and issuing it as per the request by the user from the librarian:



Collaboration Diagram

Collaboration Diagram for searching a book and issuing it as per the request by the user from the librarian:



Activity Diagram

Activities:

User Login and Authentication

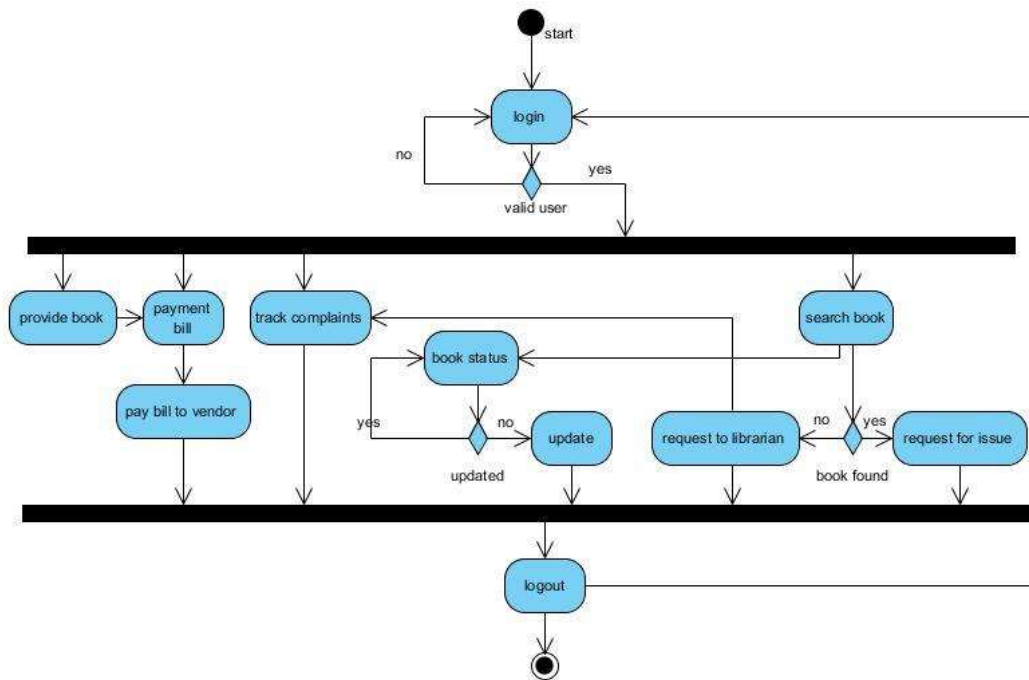
Search book operation for Reader

Acknowledge and Issue books to the users by the Librarian

Provide books requested by the Librarian from the Vendor

Bill payment from the Librarian to the Vendor

Status of the books updated in the Books Database



State Chart Diagram

States:

Authentication

Successfully logged on or re-login

Search for a book (user) / request the vendor (librarian) / provide the requested book (vendor)

Receive acknowledgement

Logged off / re-search / new function

Transitions:

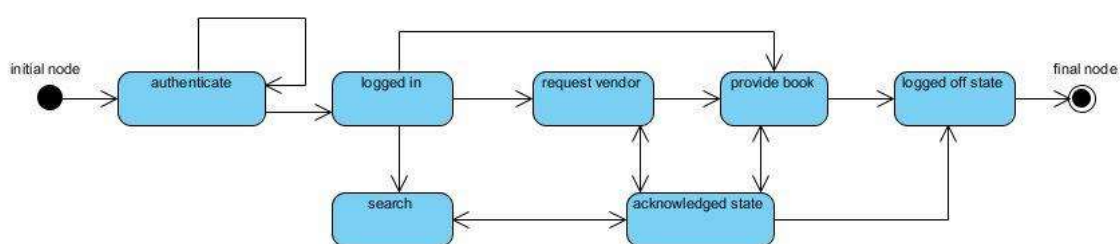
Authenticate ---> Logged in

Logged in ---> Search <---> Acknowledgement

Logged in ---> Request Vendor <---> Provide Book <---> Acknowledgement

Logged in ---> Provide Book <---> Acknowledgement

Acknowledgement ---> Logged off



Component Diagram

Components:

Register Page (visitor / vendor)

Login Page (user / librarian / vendor)

Search Page (user / librarian / vendor)

Request Vendor Page (librarian)

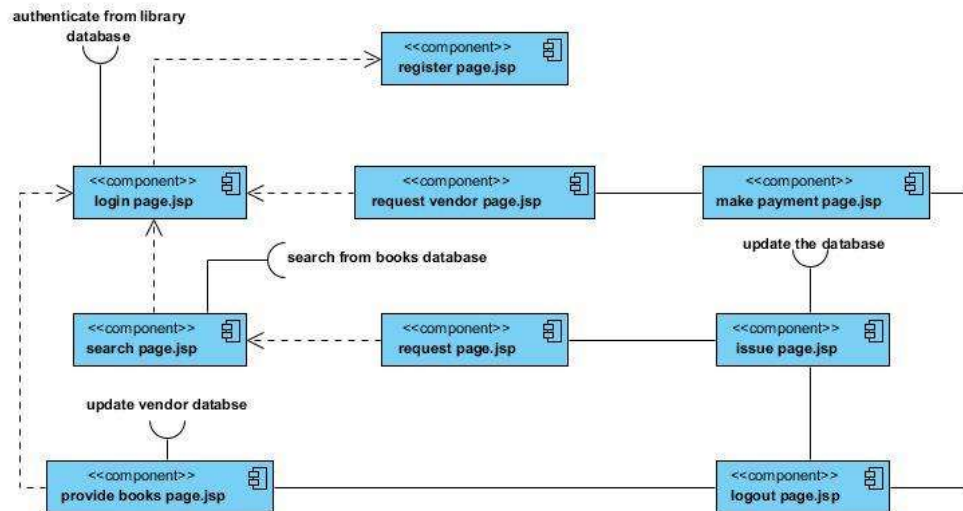
Request Book Issue Page (user / vendor)

Issue Status Page (librarian)

Make Payment Page (librarian / vendor)

Provide Books Page (librarian)

Logout Page (user / librarian / vendor)



Deployment Diagram

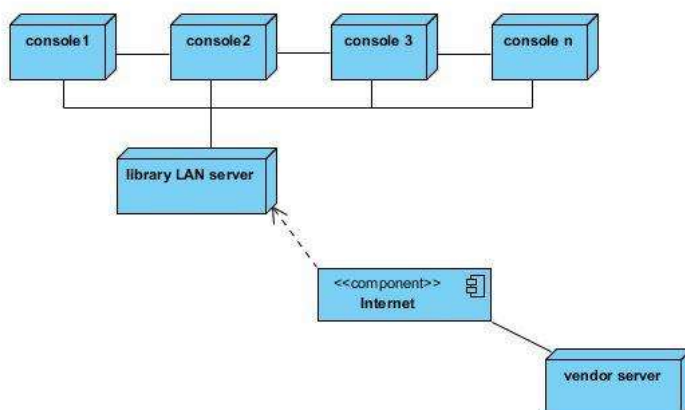
Systems Used:

Local Consoles / Computers for login and search purposes by users, librarian and vendors.

Library LAN Server interconnecting all the systems to the Database.

Internet to provide access to Vendors to supply the requested books by the Librarian

Vendor Server to maintain the records of the requests made by the librarian and books provided to the library.



Case Study2

Online Mobile Recharge

Problem Statement:

The case study 'Online Mobile Recharge' gives us the information about all the mobile service providers. This application provides us the complete information regarding any mobile service provider in terms of their plans, options, benefits, etc. Suppose, any Airtel customer wants to have the information of all the schemes and services provided by the company, he/she can have the information and according to his convenience he can recharge the mobile from the same application. The major advantage of this proposed system is to have the recharging facility of any service provider under same roof.

End users:

Service Provider:

Service Provider is the one who is nothing but the mobile service provider like all the companies who are giving the mobile connections come under

this module. Functionality of this module is to make the mobile recharging of their company basing on the availability of balance in the admin account. Request comes from the user and it is going to be verified at the admin for the availability of balance and then the request is forwarded to the service provided to make the mobile recharge.

Third party System Administrator:

Administrator is the one who monitors all users and user transactions. Admin also monitors all the Service Providers, all the user accounts, and amounts paid by the user and amounts paid to Service providers. When the request given by the user admin checks the available balance in the user account then request is forwarded to the Service Provider from there user request gets processed. Admin has the complete information related to user and all the information related to the schemes and other information of different recharge coupons provided by the Service Providers. All the data is maintained at the Admin level. Admin is having the rights to restrict any user.

User:

There are 2 categories in the user Module:

- Registered User and
- Visitor

Any person who wants to utilize the services of Online Mobile Recharge at any time from any where they should get registered in this application. After getting registered user can recharge the mobile at any time and from any where. Visitor is the one who visits the Online Mobile Recharge application and have the complete information related to the Service Providers and can make the mobile recharge by entering the bank details or by giving the credit card details.

Class Diagram

Classes Identified:

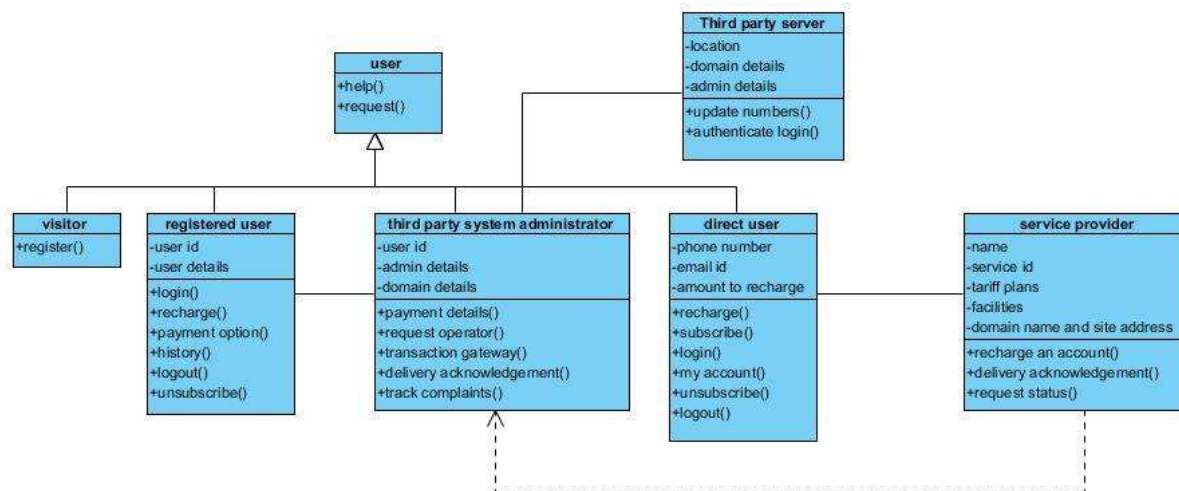
User: Registered , Visitor

Third Party System Administrator

Third Party Server/ Database

Service Provider

Direct or Non- Third Party User (Direct access through Service Provider Site)



Use-Case Diagram

Actors vs Use Cases:

User

- Register.
- Recharge.
- Select Payment Gateway.
- Select service Provider.
- Make payment.

Third Party Administrator

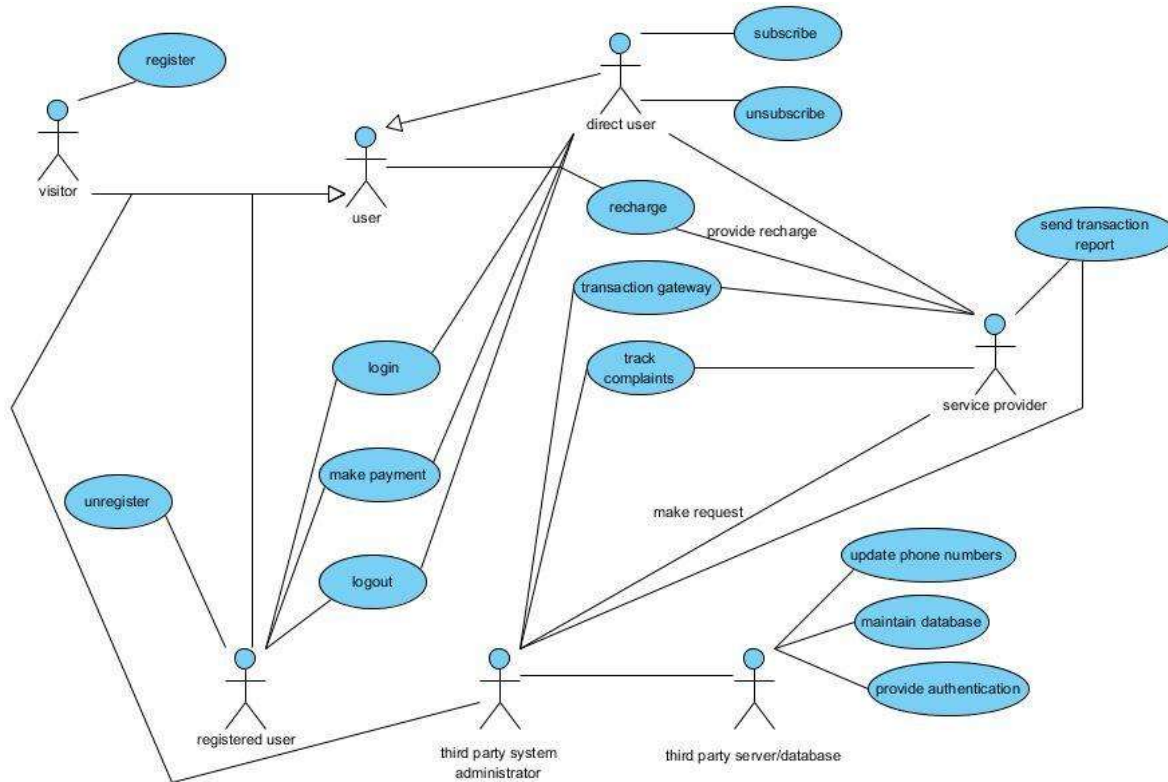
- Forward User request to Service Provider.
- Track Complaints.

Third Party Server/ Database

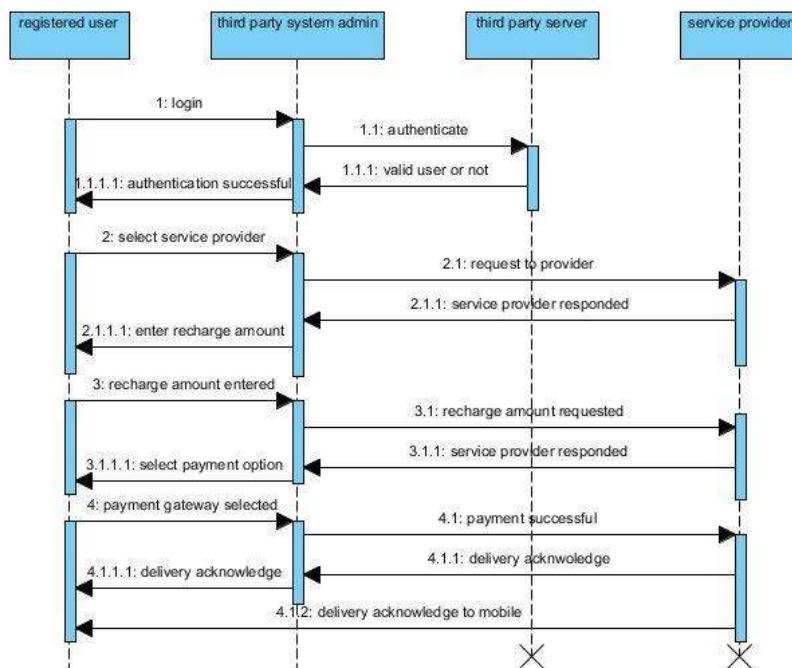
- Authenticate the Registered users.
- Maintain the Log.

Service Provider

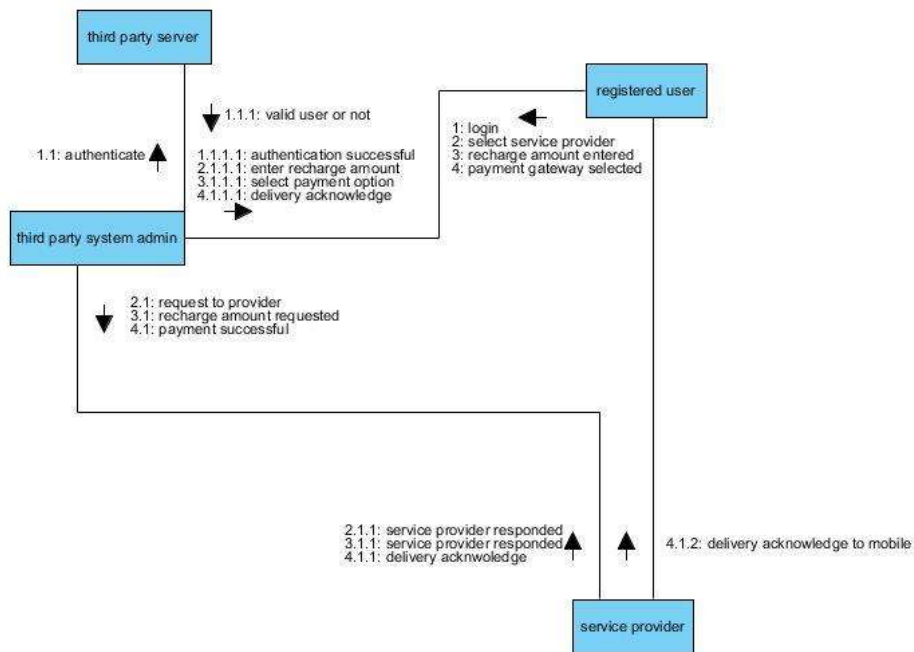
- Recharge the user requested either directly or through the third party system.
- Provide various plans to the user.

Sequence Diagram

Sequence Diagram for a user to recharge his account through third party site:

Collaboration Diagram

Collaboration diagram for a user to recharge his account through third arty site:



Activity Diagram

Activities:

User login and authentication for Registered user.

Forward the request to service provider if logged in as a Administrator.

Enter service provider site for a direct user.

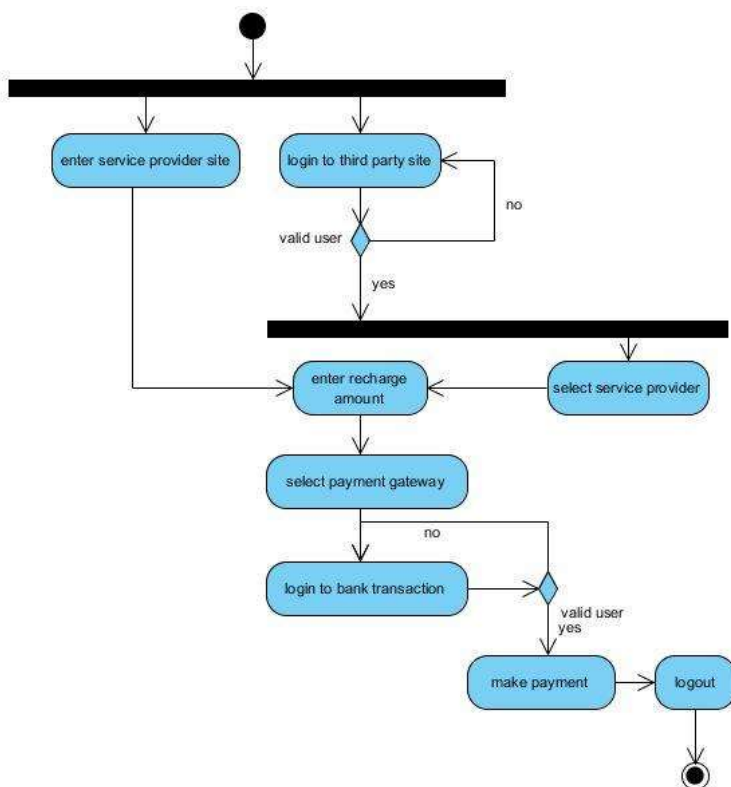
Enter recharge amount.

Select Payment Gateway.

Login and authenticate Bank Account.

Make payment.

Check for the recharge processed successfully or not.



State Chart Diagram

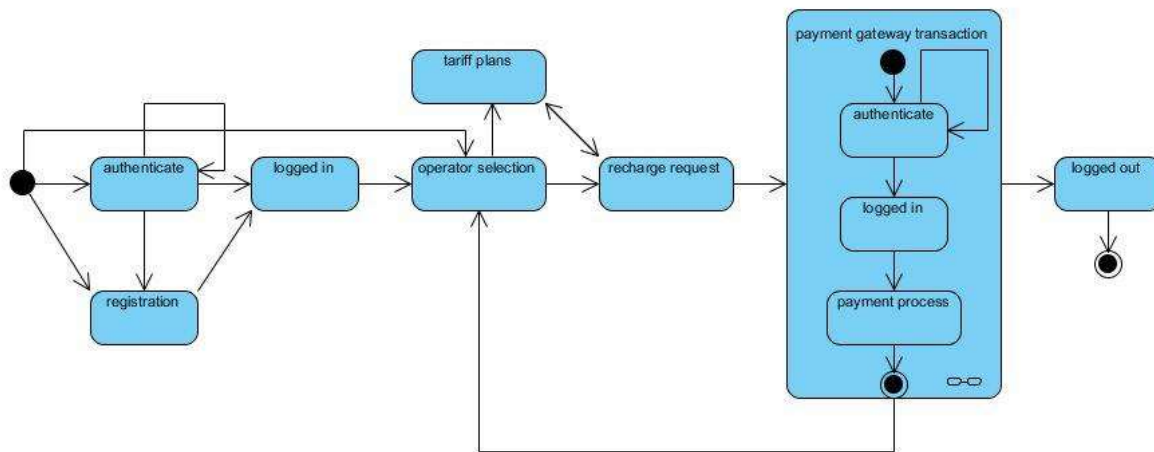
States:

Authentication for registered users / Registration for unregistered users

Successfully logged on or re-login
 Operator Selection
 Show the tariff plans available and applicable
 Request recharge
 Go through Payment Gateway Transaction process
 •Authentication to enter the gateway site
 •Successfully logged on or re-login
 •Payment made
 Logged off.

Transitions:

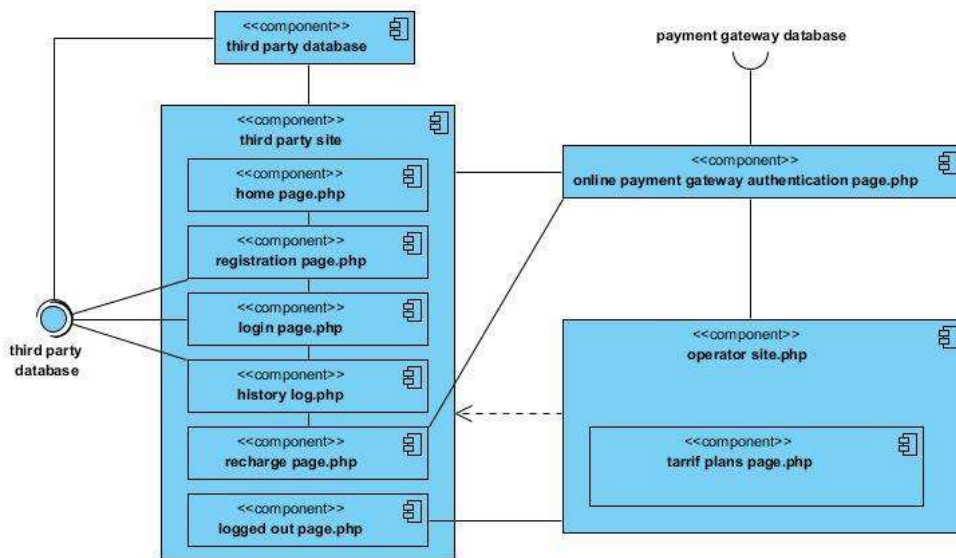
Registration ----> Authenticate ----> Logged in
 Logged in ----> Operator Selection ----> Tariff Plans <----> Request Recharge
 Operator Selection ----> Request Recharge ----> Payment Gateway Transaction
 Payment Gateway Transaction ----> Operator Selection
 Payment Gateway Transaction ----> Logged off



Component Diagram

Components:

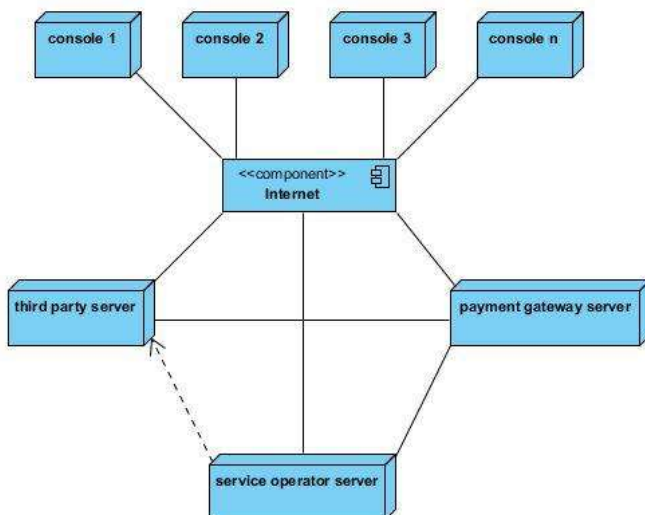
Third Party Home Page (visitor / registered user / admin / service provider)
 Third Party Register Page (visitor)
 Third Party Login Page (registered user)
 Third Party User History Page (registered user)
 Request Recharge Page (registered user)
 Third Party Logout Page (registered user)
 Online Payment Transaction Gateway Page (direct user / registered user)
 Service Provider Home Page (visitor / registered user / admin / service provider)
 Tariff Plans Page (visitor / registered user / admin / service provider)



Deployment Diagram

Systems Used:

- 1) Consoles / Computers for registration, login purposes by third party users and for quick recharge by direct users.
- 2) Third Party Server to receive and respond to all the requests from various users.
- 3) Internet to provide access to users to recharge their accounts through payment gateways by placing requests through Third Party Sites and Service Providers sites.
- 4) Payment Gateway Server like Bank's server to provide online payment through their personal accounts to meet the requirements of the users.
- 5) Service Provider Server to maintain the records of the requests made by the users.



Comments

Guest Author: Zou 21 Aug 2013

The class diagram for the library management system is really interesting. For further help, I designed an UML-compliant version with an online UML modeler called GenMyModel. It may help here to get a usable/clonable version, export as PDF, generate Java. Library Management System