

OOAD MINI PROJECT PROPOSAL

STRUCTURES PLANNING FACILITATION SYSTEM

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OBJECTIVE

A dream of constructing a well-planned building is constantly dwelling around everyone's mind. Among them very few achieve this. The rest either don't have access to experienced architects or to constructors who doesn't implement the plan properly. Both planning and constructing must go hand-in-hand to build a structure as one dreamt about. The proposed system, makes sure that every client gets access to experienced architects and reliable constructors according to their taste of interest.

STAKEHOLDERS

The stakeholders of the system are

- Client
- Architect
- Builder

The platform gets many opportunities for the architects and builders. Whereas it provides the client with quality architects and builders to get their structures built.

Unique Selling Point (USP) - The system has facility to generate simulation of 3d models of building. Inspired by the idea of Autodesk to generate 3d models, the system makes it possible to transform the building plans in 2d to a 3d simulation for better understanding of ideas. The client can understand the architect's work better and the builder can understand the building plan much better for construction works as well.

WORKFLOW

The stakeholders get themselves registered into the system. When creating an account, the system makes sure that it records whether the stakeholder is a client or service provider (Architect or builder) so that the services can be provided accordingly. The client gets recommendations for the choice of service provider(Architect or builder) from which he chooses one and a contract is established with the approval of concerned service provider. An initial payment is made by the client to book the service provider. Having established a contract,

the client and the service provider can communicate with each other. Also, both the stakeholders agree to a maximum duration of contract. The system provides two modes of communication namely Chatbot and real time conferencing. This communication facility is to make sure that the service provider can understand the client's needs to serve them the best. The architect works on designing the blueprint of the building whereas the builder works on the construction of the building according to the plan provided by the client. The file transfer facility of the system makes it possible to exchange the blueprint within the stakeholders. The system provides access to 3d model simulation for which client has to subscribe with a payment. When the architect uploads the building plan to the client, the system delivers the plan in 2d or 3d according to the subscription. The client can either approve or disapprove to the architect's work. The client makes the final payment to the service provider on completion of work. Also the contract can be cancelled by the client or the service provider at any point of time. The client will be imposed cancellation charge based on the number of days of contact. The pay will be directed to the concerned service provider. In case the service provider cancels the contract, decrements will be allotted to the service provider which will have an impact on the position in the recommendation's list to the future clients. The client can provide feedback and rating for the service provider and to the system at any point of time. Again the client's feedback has an impact on the service provider's position in recommendation list. A positive feedback would improve their position whereas a negative feedback would add decrement. There are possibilities for the system to remove the service provider on crossing a certain threshold of maximum number of decrements.

The following interaction and behavior diagrams best explains the components and functioning of the system.

1. Use case model
2. Domain model
3. Class model
4. Sequence model
5. State model
6. Activity model

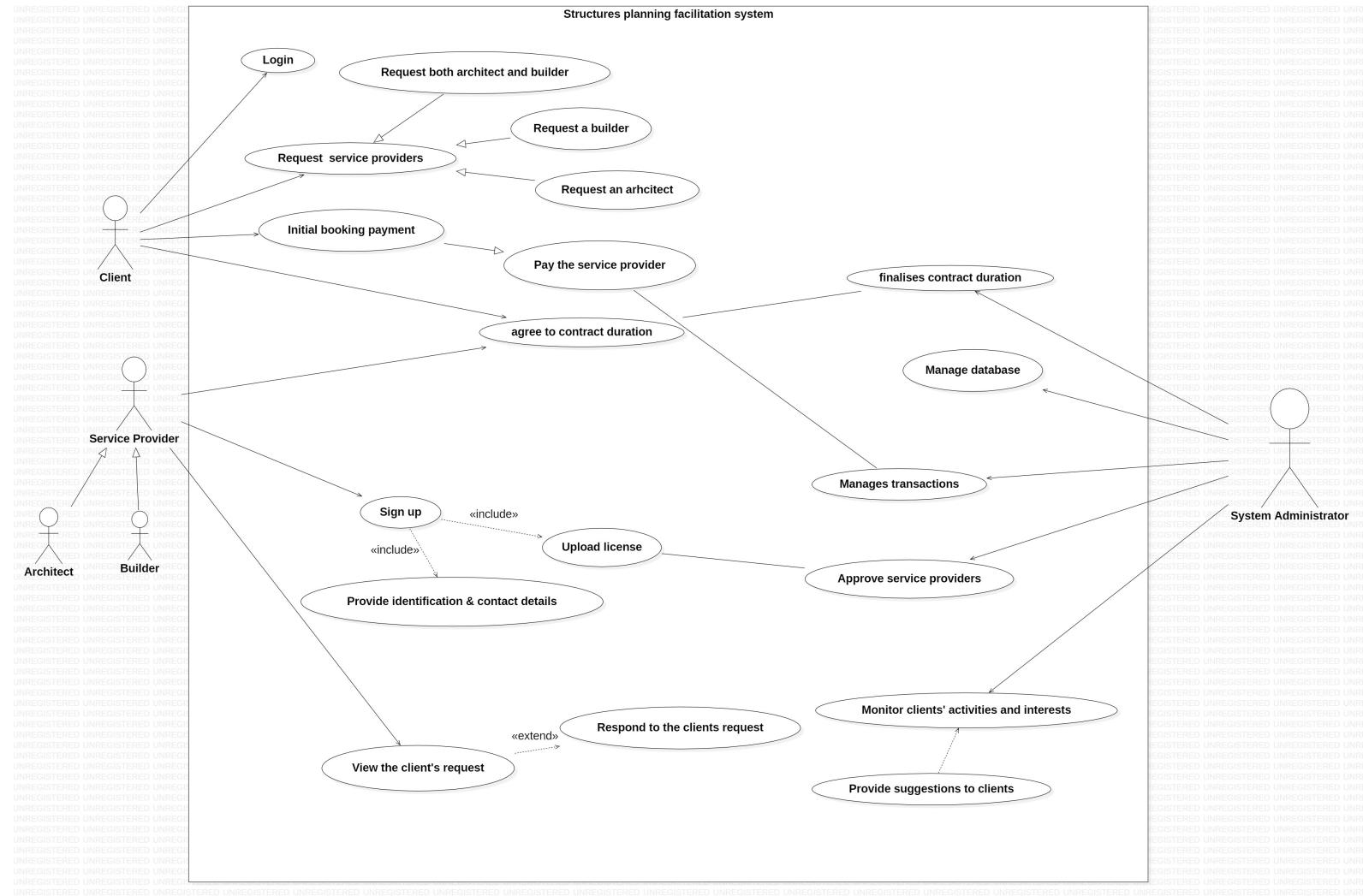
1. USE CASE MODEL

Actors involved

Client - Uses the system to get the building planned or constructed or both

Service provider - Involves **Architect & Builder** who works for the client and get paid for the quality work

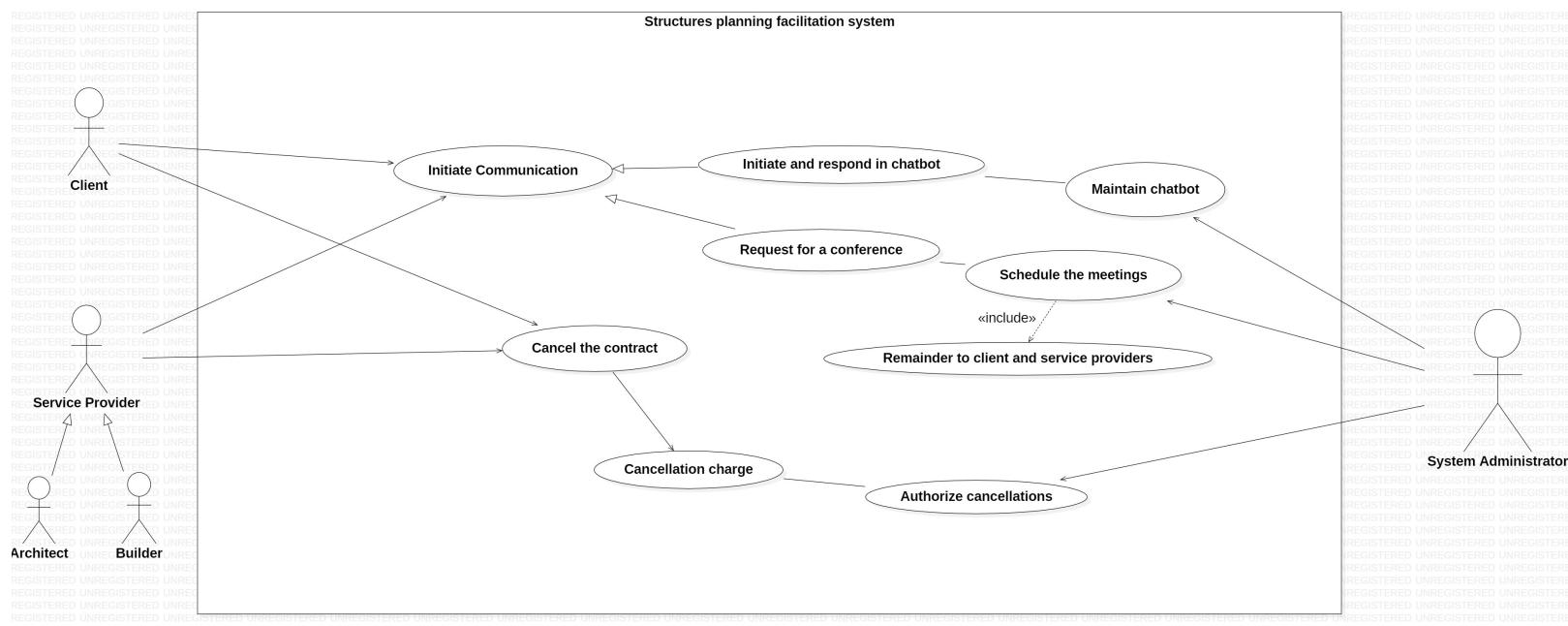
System Admin - Aids the activities for ongoing contract and monitors service providers



Use case diagram 1 - System access and Contract establishment

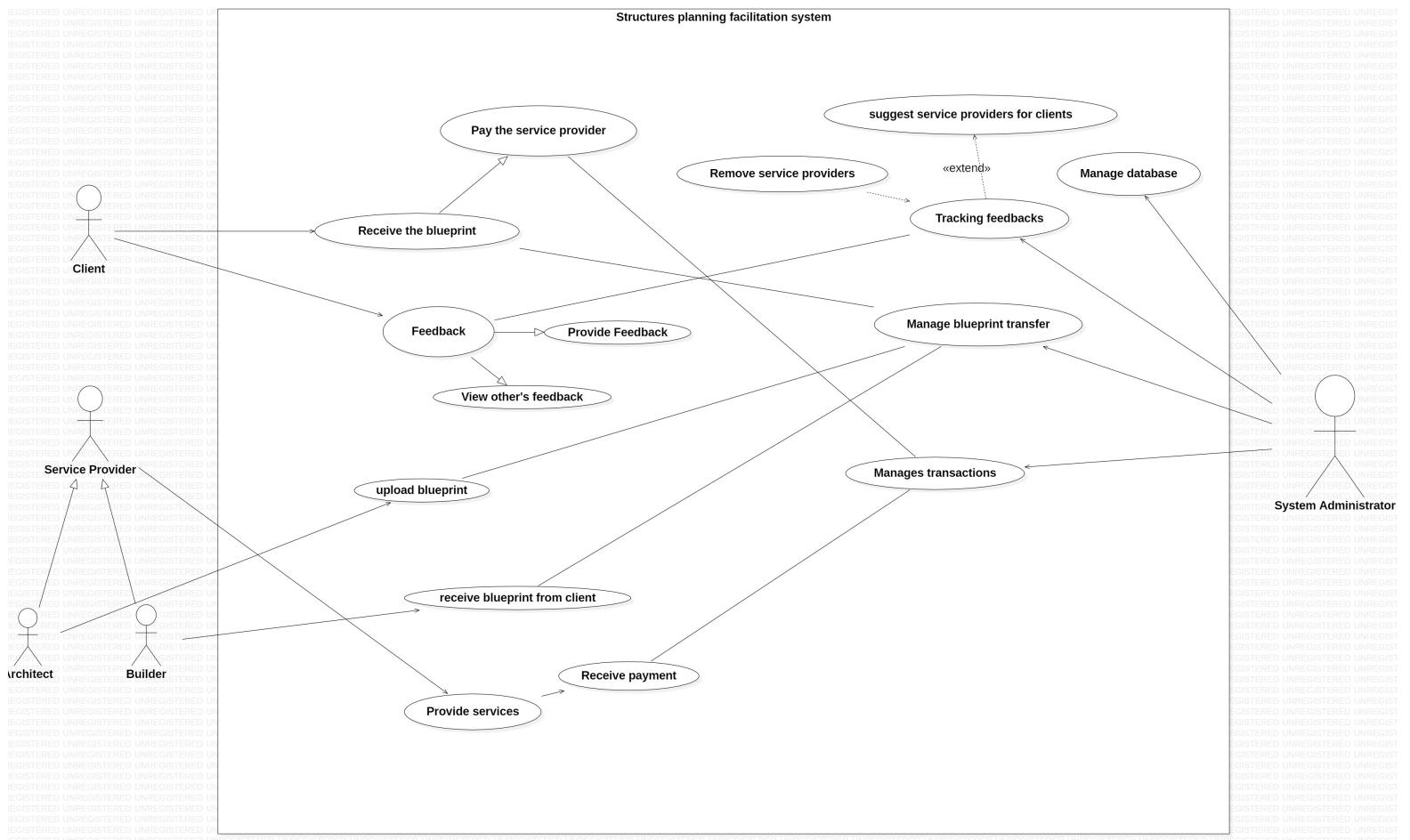
Use case scenario	Primary actor	Stakeholders & interests	Preconditions	Success guarantee
Sign up	Client & Service provider	The client and service provider creates their 'user profile' and verifies the email	NIL	On successful email verification, the user is added to the system
Approve service provider	System admin	The system approves the architects and builders by checking if their licenses are valid. This makes sure that the clients are offered access to reliable service providers.	The service provider should have uploaded their license in the system.	The system approves the service providers and makes the clients to access the service providers.

Use case scenario	Primary actor	Stakeholders & interests	Preconditions	Success guarantee
Login	Client & Service provider	The client and service providers log into the system by giving their registered account details.	The client and the service providers should have a registered account with valid username and password.	The client and service providers log into the system to access the other.
Choose service provider	Client	The client gets a recommendation list from which he can choose one. The service provider on the other hand accepts the client's request	The client and service provider should have logged into the system.	The service provider accepts the client's request
Establish contract	Client & Service provider	The client and service providers agree to certain conditions like duration of contract.	The service provider should have accepted the client's request	The contract is almost established.
Make initial payment	Client	The client makes initial payment to the service provider to finalize the contract	The client and service provider must have agreed to conditions regarding contract	The contract is finalized and notifications are sent to the stakeholders



Use case diagram 2 - Communication establishment and contract cancellation

Use case scenario	Primary actor	Stakeholders & interests	Preconditions	Success guarantee
Establish communication	Client & Service provider	The client can communicate with the service providers and vice versa by any of the services offered by the system.	A contract must be established between the client and the service provider	The client and service providers communicate to satisfy their needs.
Maintain chatbot	System admin	The system maintains an end to end chatbot through which the client and the service providers communicate. This involves timely delivery of chats and proper encryption.	The client and service providers have to agree for a conversation that can be implemented by the system.	The system allows the client and service providers to have a chatbot.
Schedule meetings	System admin	Once the clients and service providers have requested and responded to a meeting, the system schedules a meeting and provides the meeting details to both of them.	The client and service providers have to agree for a meeting that can be implemented by the system.	The system schedules the meeting between client and service providers.
Reschedule meetings	System admin	If the client or the service provider is not available for the date and time as requested by the initiator, the system aids to reschedule the meeting	The stakeholder in the responding end have has to respond to the meeting request by the initiating stakeholder	The system successfully reschedules the meeting.
Cancel the contract	Client & Service provider	If the client cancels then he has to pay the cancellation charge which will be directed to the service provider by the system and if the service provider cancels then he would be blotted by the system.	The client or service provider must be involved in contract	The ongoing contract is cancelled



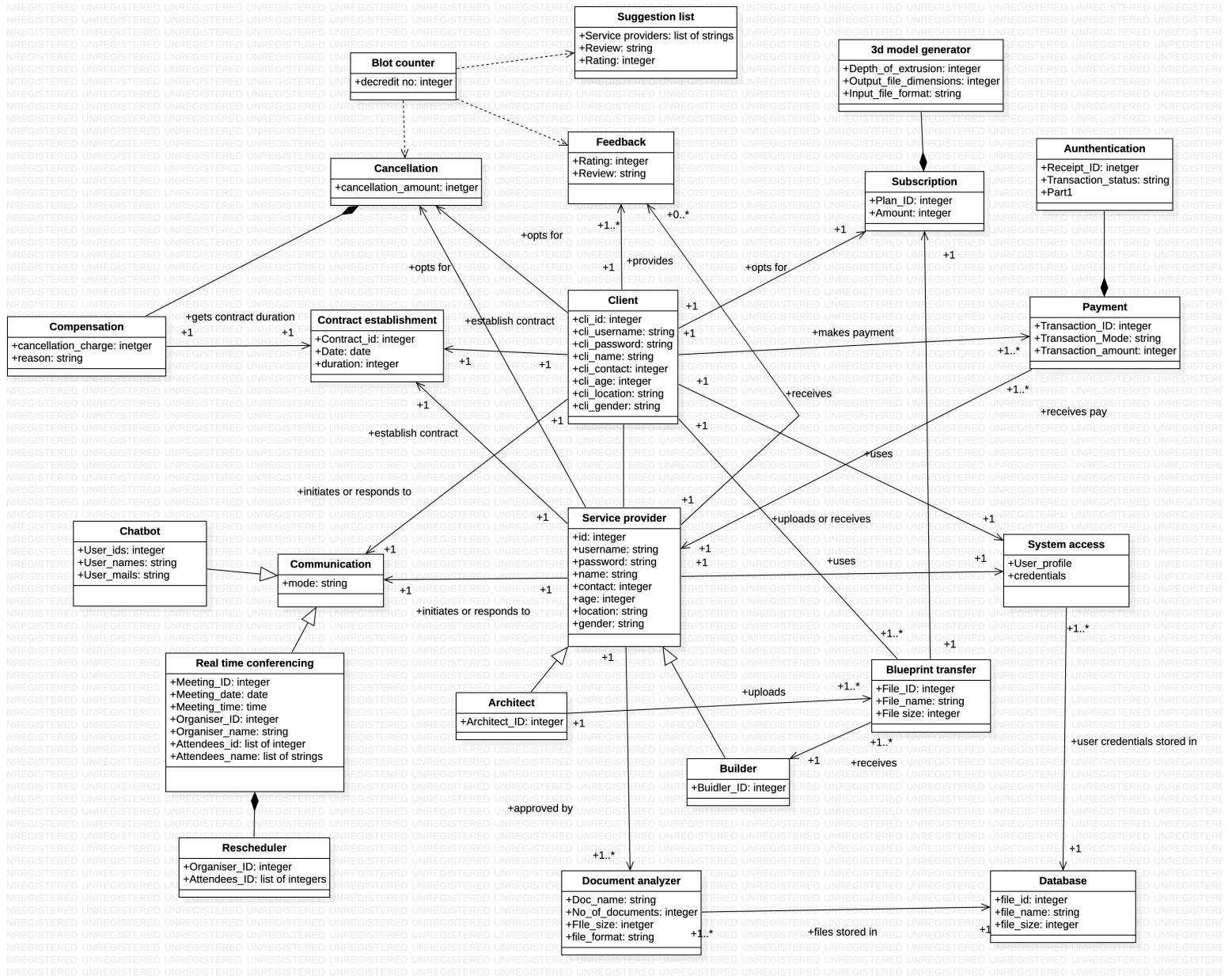
Use case diagram 3 - blueprint transfer and feedback

Use case scenario	Primary actor	Stakeholders & interests	Preconditions	Success guarantee
Manage blueprint transfer	System admin	The system analyzes if the client has subscribed to 3d model or not and forwards the file in 2d or 3d accordingly	The architect must have uploaded the blueprint to the system	The blueprint is delivered to the client in appropriate format (2d or 3d)
Pay the service provider	Client	Once the client is satisfied with the work of the service provider within the duration of contract, he proceeds to make the final payment	The client should be satisfied by the work of the service provider.	The client pays the service provider and the later receives the payment.

Provide feedback	Client	The client provides textual feedback and ratings regarding the service provider.	The client must be involved in a contract	The client's feedback recorded and analyzed by the system
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Track feedbacks	System admin	The system analyzes the feedbacks from the client regarding a service provider. Includes service provider in suggestion list if detected positive or increases the decredit count	The client must have provided feedback	Actions for the service provider taken accordingly
Maintain decredit count	System admin	The system decredits a service provider in case of negative feedback by the client and for cancelling an ongoing contract	The service provider must have involved in a contract	Decredit count for a service provider maintained properly

2. DOMAIN MODEL



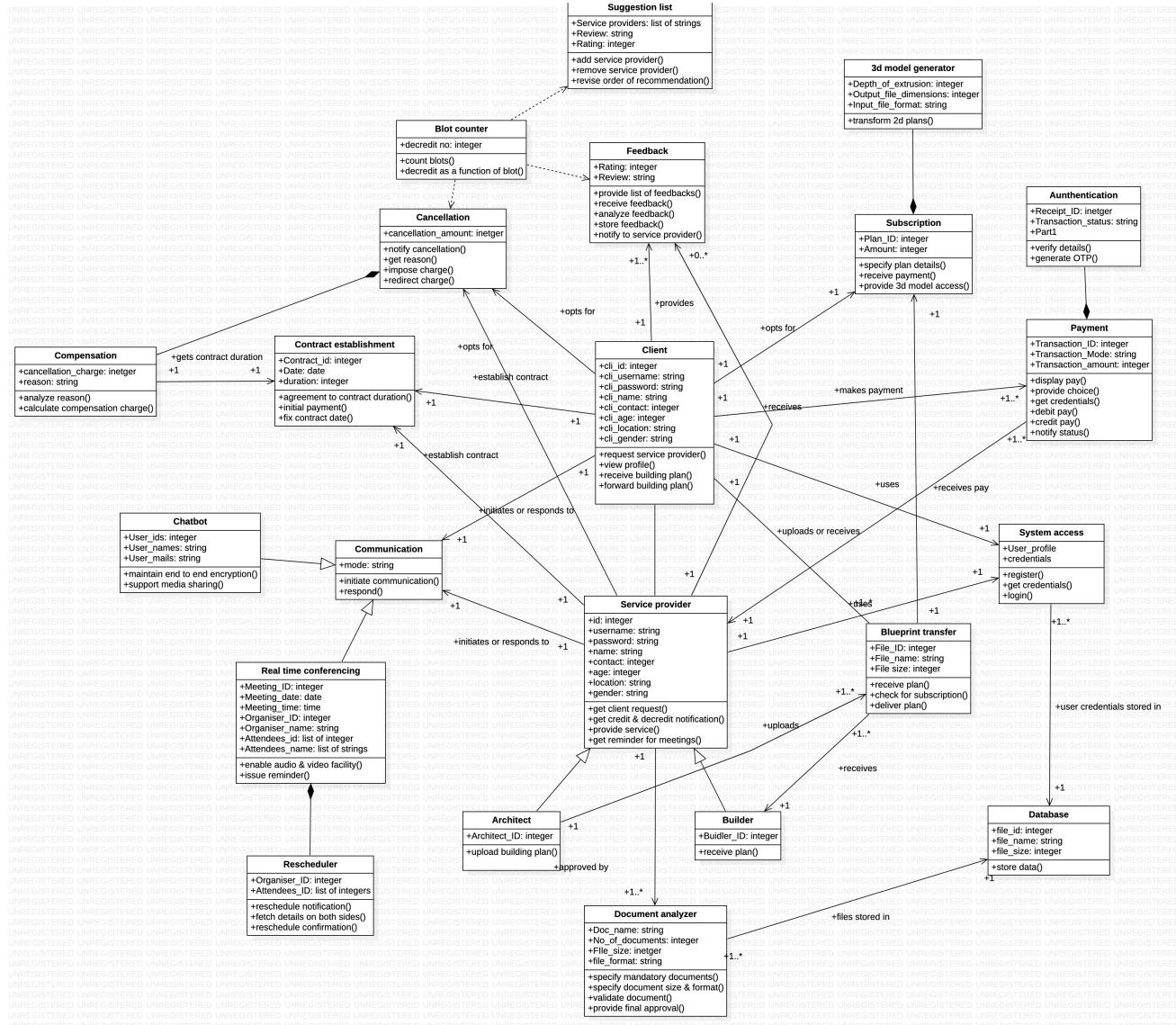
The overall domain model is as above. The attributes along with the operations would be elaborated in the upcoming section

Data dictionary

S no	Class	Description
1	Client	The client is the primary stakeholder of the system to whom the access to best architects and builders is made possible. The system functions in such a way to satisfy the client to the best possible extent.
2	Service provider	The service provider is the stakeholder who keeps the system running with the services offered to the client.
3	Architect	The Architect class is a specialization class of service provider who concentrates on designing the structures' blueprint. The prime task of the architect is to understand the client's interests and design plans accordingly for which gets paid appropriately.
4	Builder	The builder class is a specialization class of service provider who focusses on executing the buildings' blueprint i.e., on construction. The builder will also be updating the status of construction in case of remote clients.
5	System access	The system access enables the outsiders to signup into the system and the users to log into the system as well.
6	Document analyzer	The signup procedure for the service providers involve validating them legally which is done by the document analyzer class. Only upon the validation by the document analyzer, any service provider is allowed into the system.
7	Contract establishment	The contract establishment class focuses on certain agreement like contract duration (The maximum duration to which the contract can be extended) which both the client and service provider have to agree to. Also the initial payment to the service provider(advance) is paid after which a contract is finalized between the parties.
8	Subscription	The Subscription class provides the users with the feature of 3d model generation. The class offers many plans to the customers (including plan features and plan validity).
9	3d model generator	This class is responsible for transforming the 2 dimensional building plan to 3 dimensional models. This will help the client to understand the architect's ideas better and will help the builder to perceive the building plan clearly (would help in implementing the plan accurately)
10	Communication	The communication class enables the parties involved in a contract to communicate to each other and exchange ideas. The crucial part in a contract is that both parties understand each other better which requires communication.
11	Chatbot	Chatbot is one of the communication modes offered by the system. It maintains an end to end encryption between the parties and facilitates media transfer (image, audio, video files) apart from personalized chat experience.
12	Real time conferencing	The real time conferencing is the second mode of communication offered by the system. The parties can choose schedule and attend meetings and will be reminded regarding the meeting before 24 hours.

S no	Class	Description
13	Rescheduler	There are possibilities that the parties cannot have a meeting because one of the parties may not be available at that time. The system provides alternative for such inconveniences. If the party responding to the meeting is not available on the scheduled date and time, the rescheduler class indicates the initiated party regarding the change in schedule and displays the date and time of availability of the other party. Such process is looped until both the parties agree to the meeting.
14	Blueprint transfer	The blueprint transfer passes the uploaded file from one party to the other involved in the contract. Either the architect uploads the building plan which is delivered to the client or the client uploads the plan to the builder. In both the cases the class consults the subscription class to check if the receiving party has opted for 3d model generation. If so, the 3d model generator(aggregate class to subscription) transforms the blueprint to building plan in 3 dimensions and delivers. If not, delivers the uploaded plan as such.
15	Payment	The payment class facilitates and monitors the payment activities of the users (clients especially). A client pays to the system for 3d model generation or to the client under 3 circumstances. One to make initial payment to establish the contract, two to pay the service provider for completion of work and three to compensate the cancellation with a charge.
16	Authentication	The authentication class is responsible to authenticate the transactions with One Time Password(OTP) and to produce the final status of transaction.
17	Cancellation	The cancellation class facilitates the parties to cancel the ongoing contract at any point of time. If the cancelling party is a client, he has to pay the compensation charge to the service provider via the system. If the cancelling party is a service provider, he will be blotted with a decredit by the system.
18	Compensation	The compensation class analyzes the reason for cancellation (the cancelling party is prompted to provide the reason for cancellation). The reason if identified valid, the class reduces the compensation charge of the client or reduces the decredit intensity of the service provider.
19	Blot counter	The blot counter keeps track of the decrebits that a service provider earns in the lifetime and also updates the service provider regarding the current status periodically.
20	Feedback	The feedback class is responsible for obtaining the feedback from the clients as both rating and reviews. The feedbacks are identified as positive or negative and segregated accordingly. The class also notifies the concerned service provider regarding the feedback. The feedbacks regarding the system are noted and actions are taken accordingly by the admin
21	Suggestion list	The suggestion list takes the list of service providers regarding whom positive feedbacks are provided by the clients and presents them for future clients. The list is revised periodically.
22	Database	The database stores information like user's login credentials and the legal documents' soft copy of the service providers. Also the contract establishment date is noted for every user which will be used by the compensation class to calculate the number of days spent in the contract.

3. CLASS MODEL



S no	Class	Attributes	Operations	Collaborations	Associations
1	Client	<ul style="list-style-type: none"> • ID • Username • Password • E-mail • Contact • Age • Location 	<p>Request service provider() requests to the system to access the service providers</p> <p>View profile() have the access to view the profiles of the service providers</p> <p>Receive building plan() Receives the building plan(2d or 3d) from the service provider(architect especially) via a system</p> <p>Pay cancellation charge() Once the client cancels the contract, the system demands a compensation amount.</p>	<ul style="list-style-type: none"> • System access • Payment • Contract establishment • Cancellation • Communication • Blueprint transfer • Subscription • Feedback 	<ul style="list-style-type: none"> • The client uses system access to login or to register(1 - 1) • The client makes payment to the service provider or to the system (1 - 1) • The client ensures contract establishment to get the work done (1 - 1) • The client cancels an ongoing contract (1 - 1) • The client receives blueprint or uploads blueprint (1 - 1..*) • The client provides feedback regarding the system and the service provider (1 - 1..*)

2	<i>Service provider</i>	<ul style="list-style-type: none"> • ID • Username • Password • E-mail • Contact • Age • Location 	<p>Get client request () Get notified when a client offers to begin a contract</p> <p>Receive credit and decredit notification() Get notifications regarding credit and decredit activities by the system</p> <p>Receive reminder for meeting() Get reminder details for real time conferences</p>	<ul style="list-style-type: none"> • System access • Document analyzer • Contract establishment • Communication • Blueprint transfer • Payment • Cancellation • Blot counter • Feedback <p>SPECIALISATION</p> <ol style="list-style-type: none"> 1. Architect 2. Builder 	<ul style="list-style-type: none"> • The service providers uses system access to login and to sign up (1-1) • The document uploaded by the service provider is validated by the document analyzer (1..* - 1) • The service provider agrees to certain conditions for establishing the contract (1-1) • The service provider initiates or responds to messages and real time conferences (1-1) • The architect uploads blueprint and the builder receives the plan • Service providers receive payment for the work done • Service provider can cancel an ongoing contract • Service provider's total number of decredits are maintained by blot counter • Service provider receives feedback from the client
3	<i>System access</i>	<ul style="list-style-type: none"> • User profile • Credentials 	<p>Register() The client and service providers register in the system by creating user profile and mail validation</p> <p>Get credentials () Credentials like username and password are received from the stakeholder for future login purposes</p> <p>Login () client and service provider logs into the system using the credentials</p>	<ul style="list-style-type: none"> • Client • Service-provider • Database 	<ul style="list-style-type: none"> • The stakeholders(client and service provider) accesses the system every-time they enter the system • The user profiles and credentials are stored in the database

4	<i>Document analyzer</i>	<ul style="list-style-type: none"> • Document name • No of documents • File format • File size limit 	<p>Specify mandatory documents() specifies documents names that are mandatory to be uploaded</p> <p>Specify document format & size ()</p> <p>Validate document () Uploaded documents are validated completely</p> <p>Provide final approval () The final confirmation prompt regarding valid/invalid is issued to the service provider</p>	<ul style="list-style-type: none"> • Service-provider • Database 	<ul style="list-style-type: none"> • The document analyzer specifies and validates the mandatory legal documents that a service provider is expected to upload (1..* - 1) • The document analyzer updates a copy of the files to the database (1..* - 1)
5	<i>Contract establishment</i>	<ul style="list-style-type: none"> • Establishment date • Duration • Booking ID 	<p>Agreement to contract duration () The client and the service provider agrees to the maximum number of days of contact validity</p> <p>Initial payment () The client makes an initial payment to finalize the contract with the service provider</p> <p>Fix contract date () The date when the contract is finalized is noticed to keep track of the number of days</p>	<ul style="list-style-type: none"> • Client • Service-provider • Database 	<ul style="list-style-type: none"> • The stakeholders establish a contract between them (1-1) • The date when contract is fixed is stored in the database (1-1)
6	<i>Communication</i>		<p>Initiate communication() The stakeholders can initiate communication at any point of time in the contract</p> <p>Respond() The stakeholders respond to the incoming prompt for communication</p>	<ul style="list-style-type: none"> • Client • Service-provider <p>SPECIALISATION</p> <ol style="list-style-type: none"> 1. Chatbot 2. Real time conferencing 	<ul style="list-style-type: none"> • The stakeholders establish communication via different modes of communication offered by the system (1-1)

7	<i>Chatbot</i>	<ul style="list-style-type: none"> • User IDs • User names • User mail 	<p>Maintain end-to-end encryption() The chatbot maintains end to end encryption for the messages</p> <p>Support media sharing() Media files like images of different formats (png, jpeg..), audio, video and documents like pdf</p>	GENERALIZATION Communication	NIL
8	<i>Real time conferencing</i>	<ul style="list-style-type: none"> • Meeting ID • Meeting date • Meeting time • Organiser_ID • Organiser_name • Attendees_ID • Attendees_name 	<p>Enable audio & video facility () Proper audio and video facility for conferences</p> <p>Issue reminder for confirmed meetings () Once the meetings are finalized reminders are issued to the stakeholders</p>	GENERALIZATION Communication AGGREGATION Rescheduler	NIL
9	<i>Rescheduler</i>	<ul style="list-style-type: none"> • Organiser_ID • Attendees_ID 	<p>Reschedule notification () When one stakeholder is not available for real time conference at the proposed date&time specified, reschedule notification is provided to the other</p> <p>Fetch details on both sides () The rescheduler fetches details regarding approval and disapproval for meeting dates</p> <p>Rescheduler confirmation () Having cross-checked the dates, the rescheduler confirms the date of conference</p>	SUPER CLASS Real time conferencing	NIL

10	<i>Subscription</i>	<ul style="list-style-type: none"> • Plan_ID • Subscription amount 	<p>Specify plan details () the system provides plan details to the client and builder</p> <p>Receive payment () The system demands a payment for 3d model subscription</p> <p>Provide 3d model access () Having recorded successful payment, the system provides access to 3d models to client and builders</p>	<ul style="list-style-type: none"> • Client • Builder 	The client and the builder opts for subscription plan to 3d model access (1-1)
11	<i>3d model generator</i>	<ul style="list-style-type: none"> • Depth of extrusion • Output file dimension • Input file format 	<p>Transform 2d plans () The prime functionality of the algorithm is to transform the building plan in 2d to 3d model simulation</p>	<p>DEPENDENCY SUPER CLASS</p> <p>Blueprint transfer</p> <p>AGGREGATION SUPER CLASS</p> <p>Subscription</p>	NIL
12	<i>Blue print transfer</i>	<ul style="list-style-type: none"> • File ID • File name • File size 	<p>Receive plan () the building plan is uploaded by the architect(to client) or by the client(to service provider)</p> <p>Check for subscription () The recipient ID is cross checked if the subscription is available. If so simulation can be processed</p> <p>Deliver plan () The plan or simulation is delivered to the associated recipient involved in the contract</p>	<ul style="list-style-type: none"> • Client • Architect • Builder 	<ul style="list-style-type: none"> • The plan can be uploaded to the corresponding recipient involved in the contract (1..* - 1)

13	Payment	<ul style="list-style-type: none"> • Transaction ID • Transaction mode • Amount 	<p>Display pay () The system displays the pay according to the contract (in case of client paying service provider) or according to plan (in case of 3d plan subscription) or according to the no of days spent in contract (in case of cancellation)</p> <p>Provide choice () the payer can choose between the two modes of payment offered by the system namely Card and Netbanking</p> <p>Get credentials () Get card details in case of card and bank branch, username and password in case of net banking</p> <p>Debit pay () Debit from the account of the payer</p> <p>Credit pay () Credit to the account of the receiver</p> <p>Notify status () Notify the status of transaction (success/inprogress/failure)</p>	<ul style="list-style-type: none"> • Client • Service provider' • Authentication <p>AGGREGATION</p> <p>Authentication</p>	<ul style="list-style-type: none"> • The service providers receive payment from the client (1 -1)
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14	Authentication	<ul style="list-style-type: none"> • Receipt ID • Transaction status 	<p>Verify details () The details provided like card details, bank branch, username, password are all verified .</p> <p>Generate OTP () The final approval from the payer is received by generating One Time Password .</p>	<p>SUPER CLASS</p> <p>Payment</p>	<p>NIL</p>
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15	<i>Cancellation</i>	<ul style="list-style-type: none"> • Cancellation ID • Cancellation amount 	<p>Notify cancellation () The other stakeholder involved in the contract is notified regarding the cancellation by the other</p> <p>Get reason () The reason for cancellation is received by the system from the stakeholder who initiates cancellation</p> <p>Impose cancellation charge () The system imposes cancellation charge</p> <p>Redirect cancellation charge () In case if the client has initiated the cancellation, the imposed cancellation charge is redirected to the corresponding service provider</p>	<ul style="list-style-type: none"> • Client • Service provider <p>DEPENDANT</p> <p>Blot counter</p> <p>AGGREGATION</p> <p>Compensation</p>	The stakeholders proposes to cancel an ongoing contract for any random reason (1-1)
16	<i>Compensation</i>	<ul style="list-style-type: none"> • Reason for cancellation • Compensation charge 	<p>Analyze reason () Analyze the reason for cancellation from the stakeholder initiating the cancellation and considers compensation</p> <p>Compute compensation charge() The final compensation charge for the cancellation is confirmed</p>	<p>AGGREGATION SUPER CLASS</p> <p>Cancellation</p>	NIL

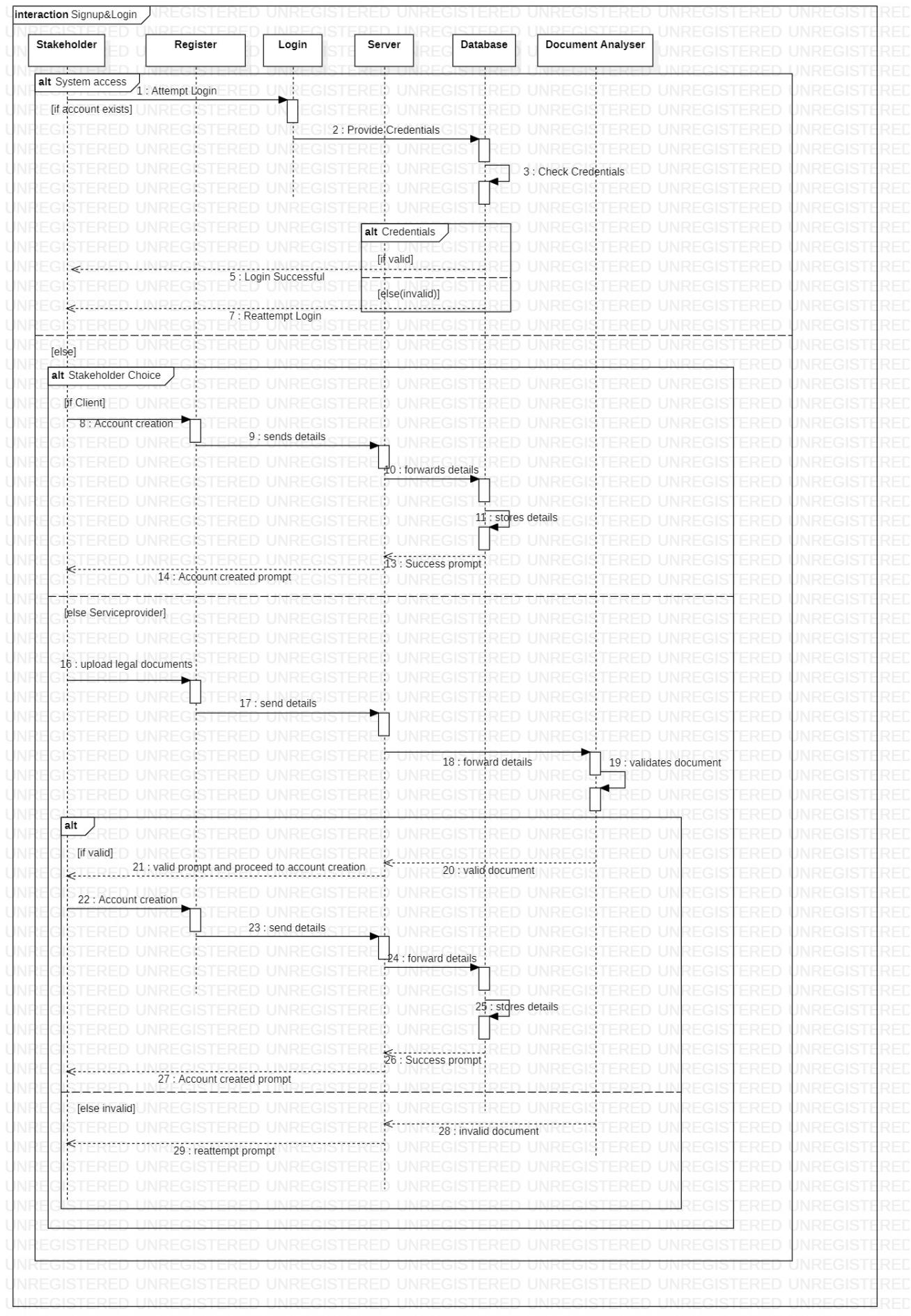
17	<p>Feedback</p> <ul style="list-style-type: none"> • Rating • Review 	<p>Provide list of feedbacks () The entire list of feedbacks regarding the system and the concerned service provider to the client</p> <p>Receive feedback () The feedback is received from the client in both rating and textual formats</p> <p>Analyze feedback() Analyze the sentiment of the received feedback from the client</p> <p>Store feedback () Store the feedback regarding the service provider in the database</p> <p>Notify to service provider () The concerned service provider is notified regarding the positive or negative feedback</p>	<ul style="list-style-type: none"> • Client • Service provider • Database <p>DEPENDANT</p> <p>Suggestion list Blot counter</p>	<ul style="list-style-type: none"> • The client provides feedback about the system or service provider (1 - 0..*) • The feedbacks are notified to the service providers (0..* - 1) • The feedbacks are recorded in the database (0..* - 1)
18	<p>Suggestion list</p> <ul style="list-style-type: none"> • List of service providers • Rating • Review 	<p>Add service providers () Add service providers to the list in case of positive reviews</p> <p>Remove service providers() Remove service providers in case of crossing a threshold of discredit count</p> <p>Revise the order of recommendations () Often revise the order of service providers by tracking the positive and negative feedbacks</p>	<ul style="list-style-type: none"> • Client <p>DEPENDANCE SUPER CLASS</p> <p>Feedback</p>	Many suggestions for service providers are provided to the client (1..*-1)

19	Blot counter	<ul style="list-style-type: none"> Decredit number 	<p>Count blots () Maintain the count of blots associated with a service provider</p> <p>Decredit as a function of blot() The decredit for a service provider is issued when crosses a threshold of blot counts</p>	<ul style="list-style-type: none"> Service provider <p>DEPENDENCE SUPER CLASS</p> <p>Feedback Cancellation</p>	The blots are notified to the service provider then and there when recorded (1..* - 1)
20	Database	<ul style="list-style-type: none"> Service provider profile Client ID Credentials Service provider license copy Feedbacks Contract date 	<p>Stores the data () Stores data of the attributes in fields across following datafile</p> <ul style="list-style-type: none"> Client data Service provider Contracts 	<ul style="list-style-type: none"> Client Service provider Document analyzer System access Feedback Contract establishment 	The database stores multiple details for the datafiles as mentioned (1-1..*)

3. SEQUENCE MODEL

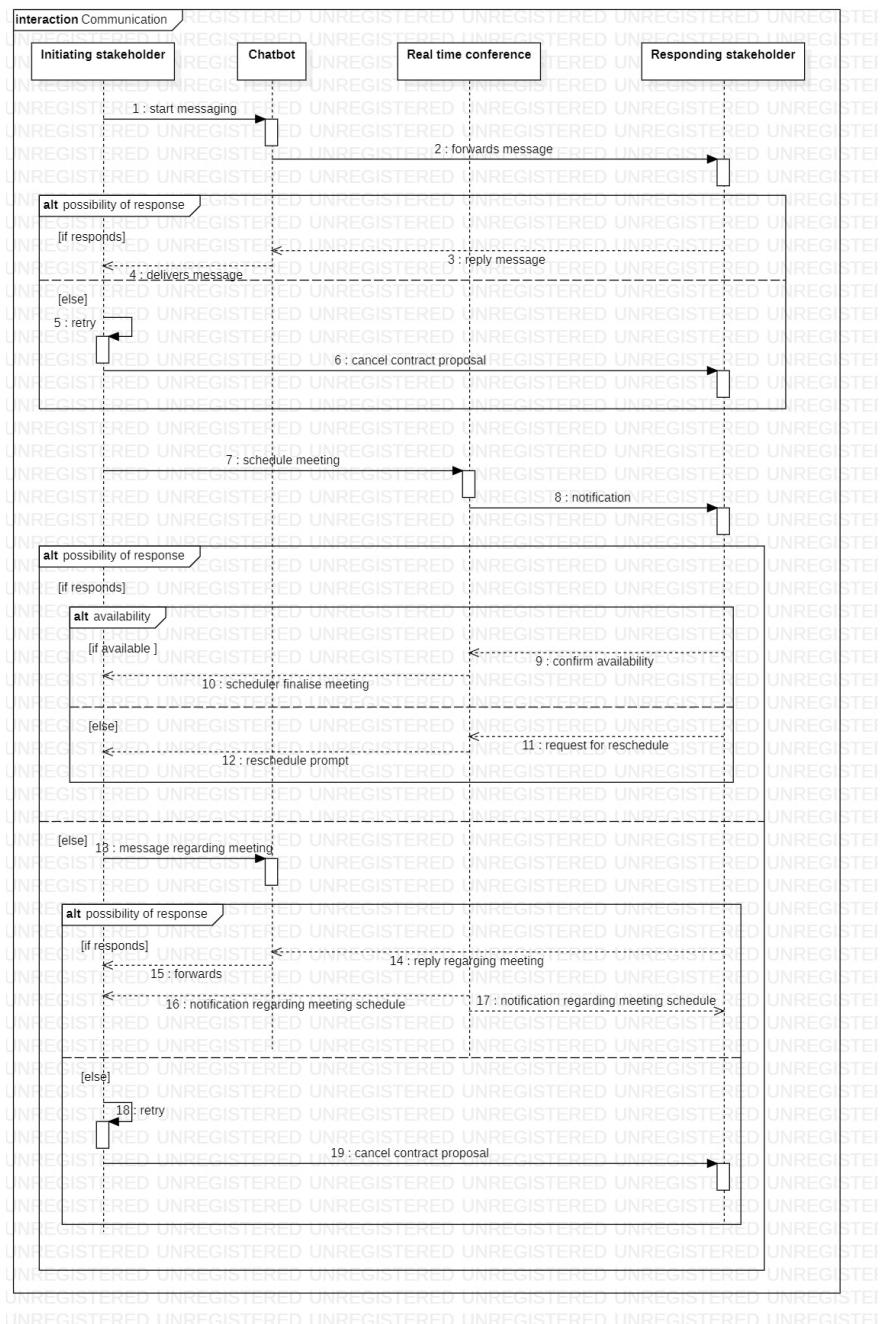
Sequence model 1 - System access

Use case scenario depicted	Possible outcomes	Classes involved
The stakeholders attempt to access the system. Both Login and Signup operations are carried out	<p>Account existence - If the stakeholder holds an account, login procedures are done.</p> <p>No account, register to system - If the stakeholder doesn't hold account, proceeds to signing in.</p> <p>Choice of stakeholder - The signing in procedures for client and service provider are not the same. The service provider has to upload legal decrements to prove that he/she is a legal architect/builder if validated by the system proceeds to account creation.</p>	<ul style="list-style-type: none"> Client Service provider System access Document analyzer Database



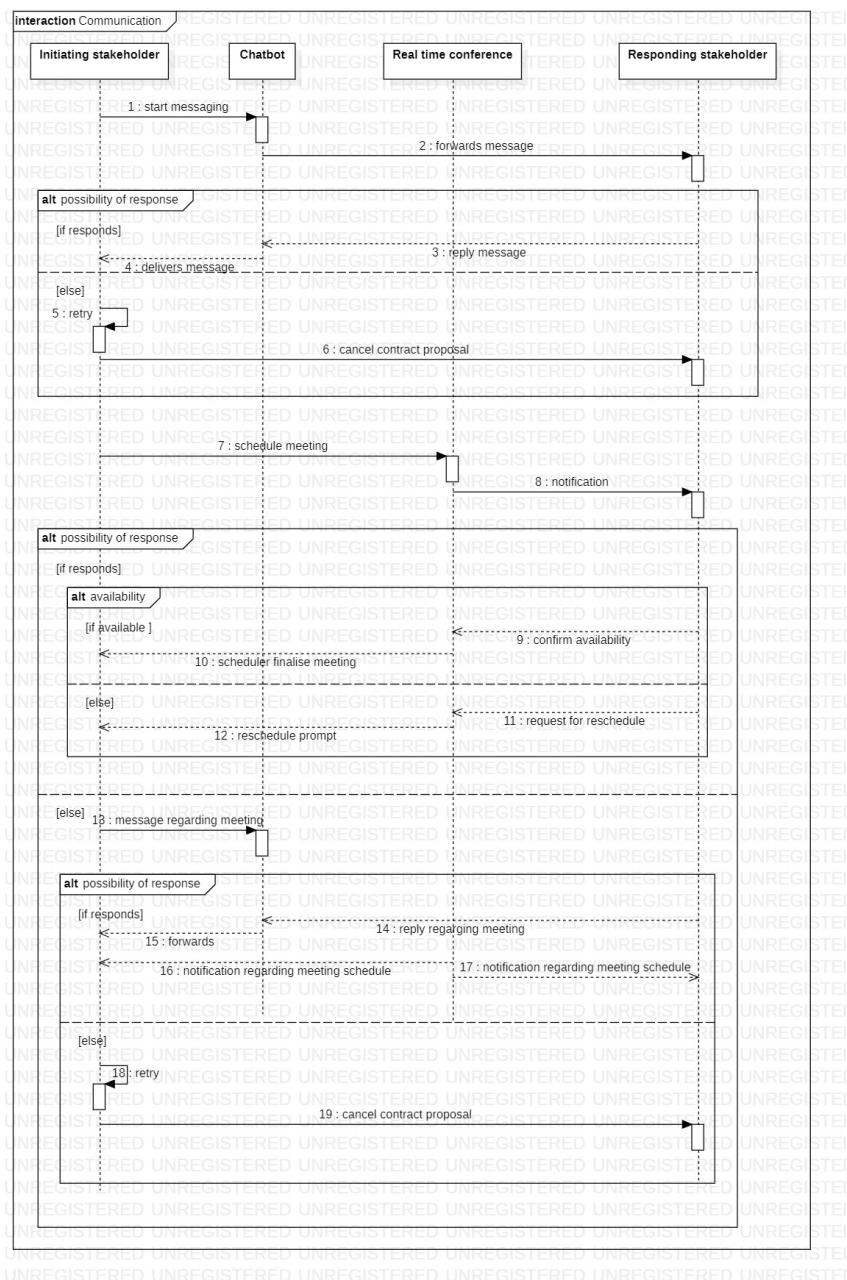
Sequence model 2 - Contract establishment

Use case scenario depicted	Possible outcomes	Classes involved
The client accesses the service providers via the recommendation list to which the service provider responds.	<p>Contract finalized - The client is satisfied with a service provider's profile provided by the database and sends a proposal to service provider. If the service provider accepts the proposal contract is finalized</p> <p>Revisit recommendation list - If the service provider denies the proposal, then the client has to revisit the recommendation list to select another service provider.</p>	<ul style="list-style-type: none"> Client Service provider Suggestion list Database Contract establishment



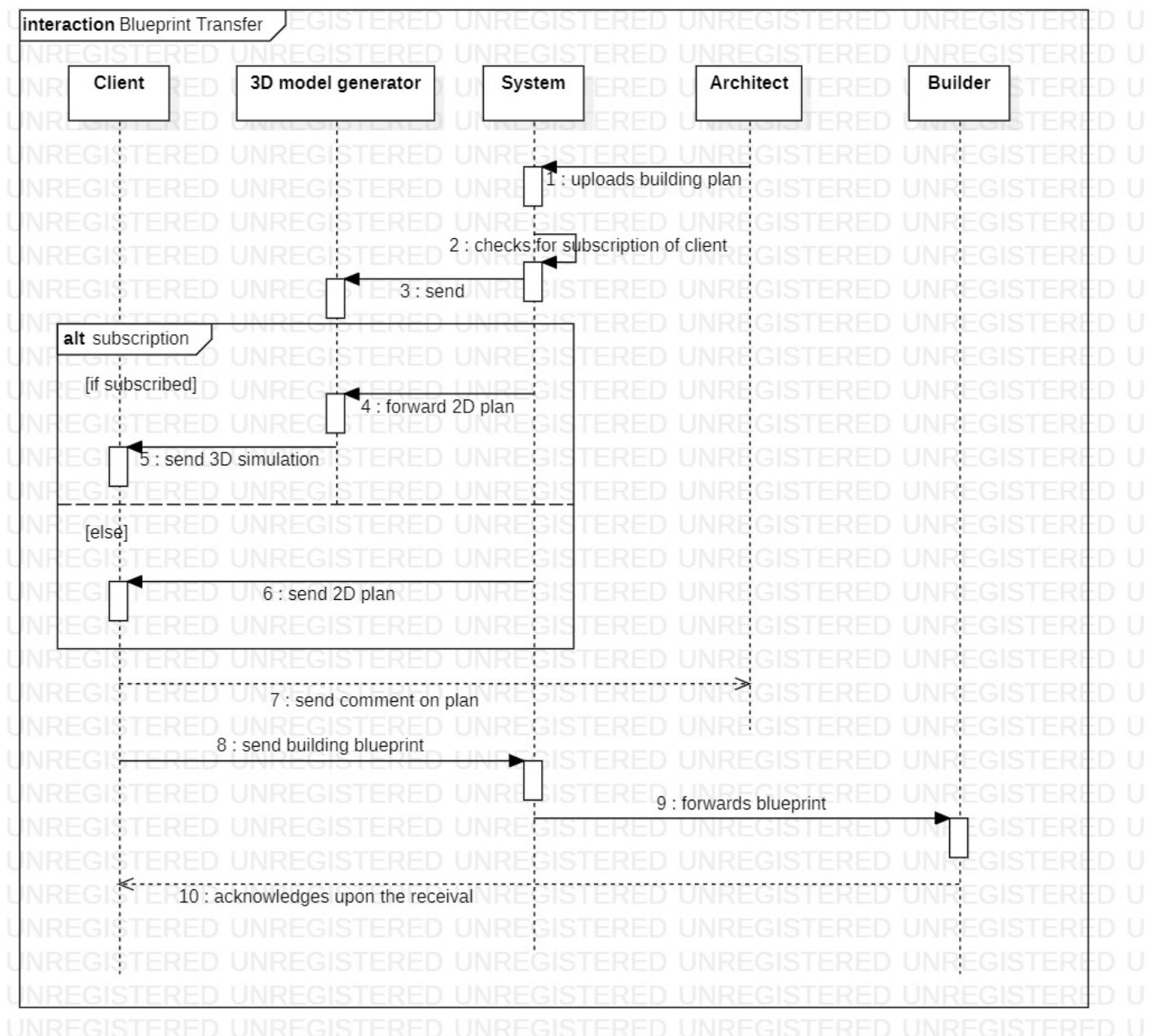
Sequence diagram 3 - Communication

Use case scenario depicted	Possible outcomes	Classes involved
<p>A stakeholder wishes to communicate to the other involved in the contract. Initiates communication via chatbot or real time conferencing.</p>	<p>Communication establishment - The stakeholder in the responding end cooperates to communicate either by replying to the message in the chatbot or agree to the scheduled meeting.</p> <p>Cancel contract prompt - Having established the contract, when the stakeholder in the responding end doesn't cooperates on repeated requisition, the other stakeholder issues cancel contract prompt.</p>	<ul style="list-style-type: none"> • Client • Service provider • Chatbot • Real time conferencing



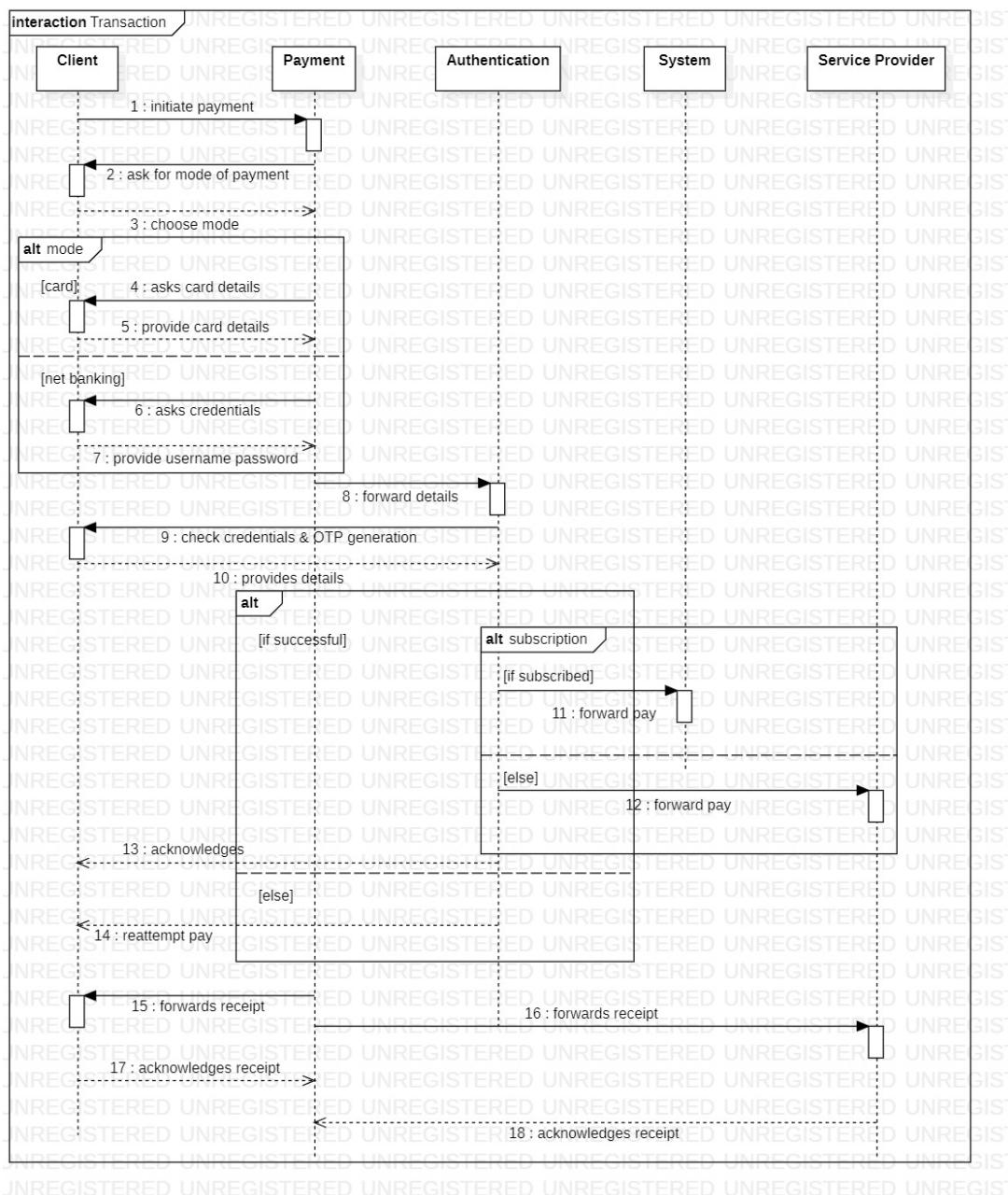
Sequence model 4 - Blueprint transfer

Use case scenario depicted	Possible outcomes	Classes involved
The stakeholders exchange the building plan.	<p>Client receives 2d or 3d model - The architect uploads the building blueprint. The system checks for the subscription details associated with a client. If the client has subscribed, the system generates 3d model for the 2d model provided. If not, the system forwards the 2d plan.</p> <p>Builder receives the building plan - The client forwards the 2d plan to the builder with which the builder begins or alters the field work</p>	<ul style="list-style-type: none"> • Client • Service provider • Subscription • 3d model generator • Blueprint transfer



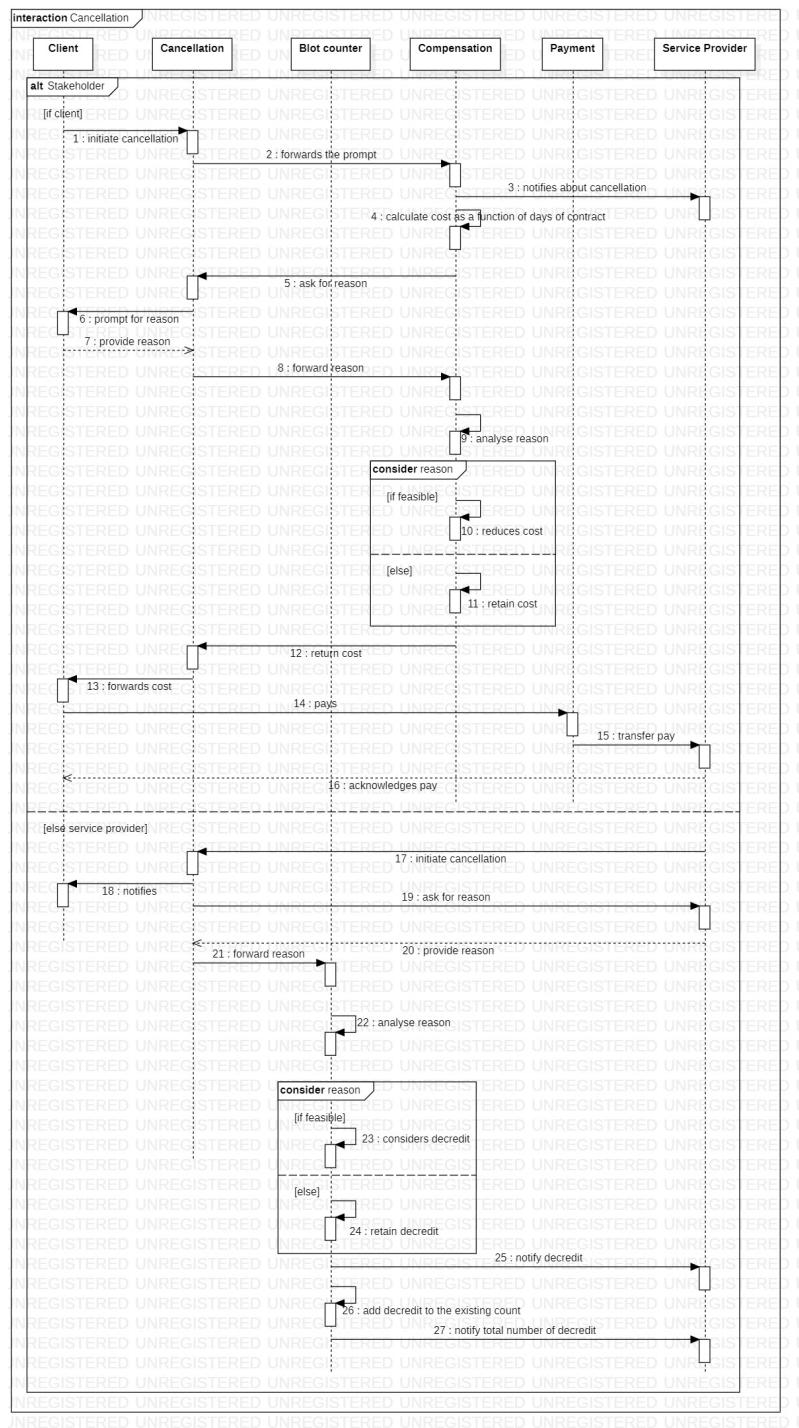
Sequence diagram 5 - Transaction

Use case scenario depicted	Possible outcomes	Classes involved
<p>The client pays the service provider and client under 4 circumstances.</p> <p>Initial payment</p> <p>Final payment</p> <p>Contract cancellation</p> <p>Subscription</p>	<p>Successful payment - The pay from the client successfully reaches the service provider or the system and receipt is forwarded to the user's mail ID</p> <p>Reattempt pay - Due to server or network issues the pay doesn't credit or debit properly because of which the client reattempts to pay</p>	<ul style="list-style-type: none"> • Client • Service provider • Payment • Authentication • System



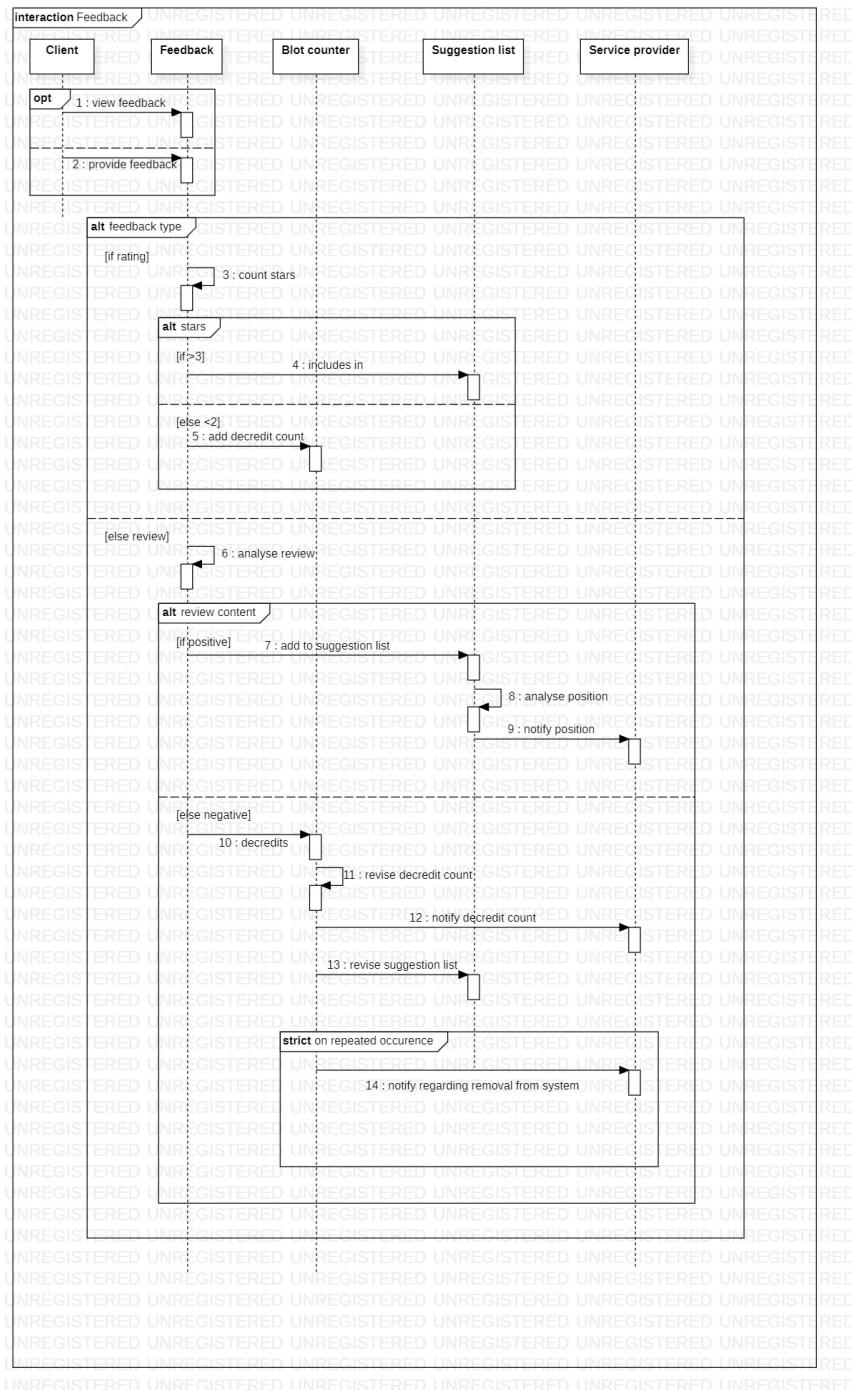
Sequence diagram 6 - Cancellation

Use case scenario depicted	Possible outcomes	Classes involved
The client or the service provider cancels the contract at any point of time	<p>Compensation charge - In case if the client cancels the contract, the compensation charge will be imposed on the client</p> <p>Increment decredit - In case if the service provider cancels the contract, the blot count would increase - meaning that decredit would be incremented.</p>	<ul style="list-style-type: none"> Client Service provider Cancellation Blot counter Compensation Payment



Sequence diagram 7 - Feedback

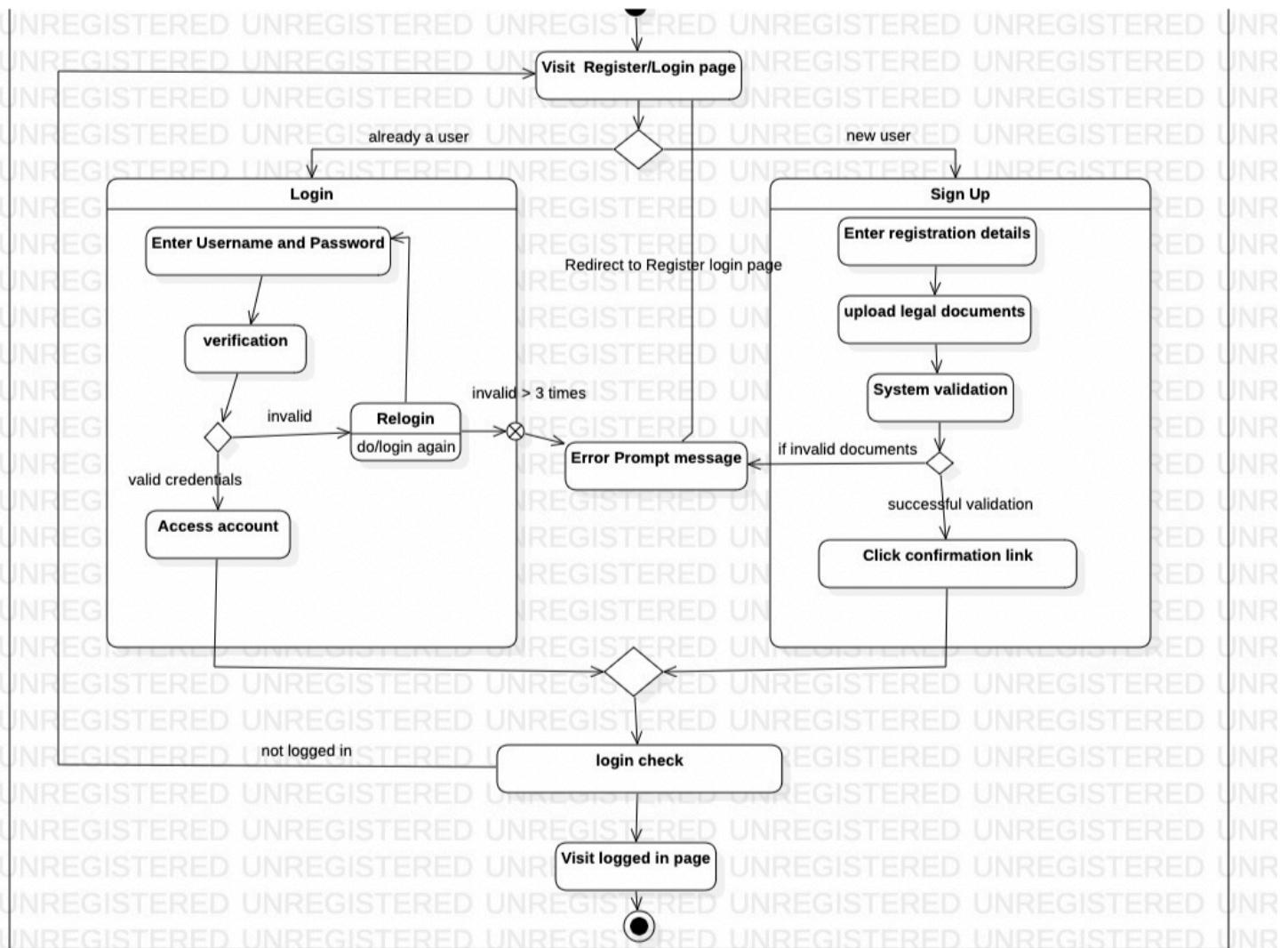
Use case scenario depicted	Possible outcomes	Classes involved
The client provides feedback regarding the experience with the system or regarding the service provider.	<p>Service provider added in suggestion list - In case of positive feedback by the client, the corresponding service provider gets added to the suggestion list that the system provides for future clients</p> <p>Blot service provider - In case of negative feedback by the client, the corresponding service provider receives a decredit and get blotted by the system</p>	<ul style="list-style-type: none"> Client Feedback Blot counter Suggestion list Service provider



5. STATE MODEL

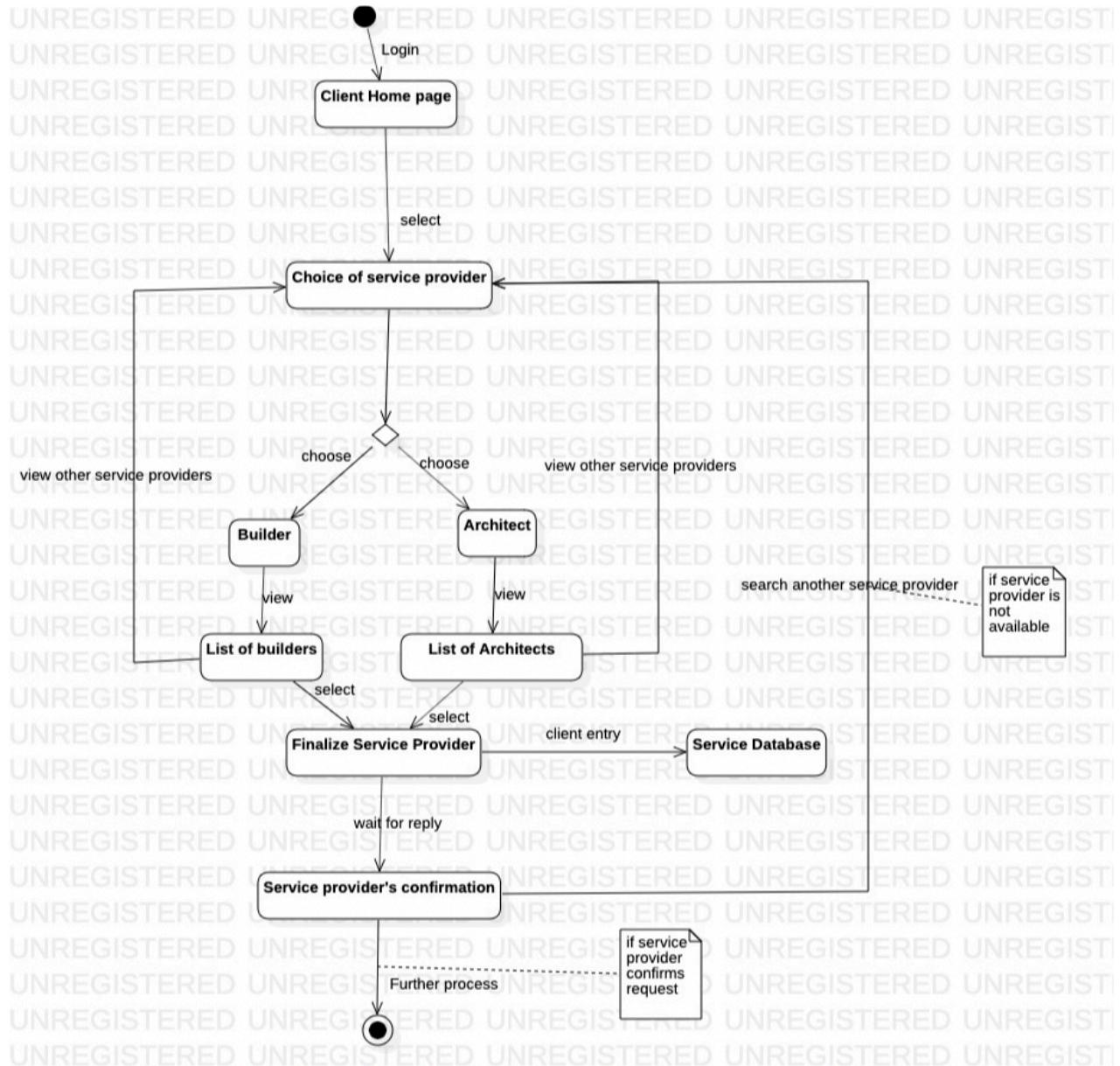
State diagram 1 - System access

States involved	Description
<ul style="list-style-type: none"> Visit register/login page Enter username & password Verification Relogin Access account Enter registration details Upload legal documents System validation Error prompt 	<p>The service provider who wishes to join the system is prompted to provide for legal documents of proof for the profession. The service provider submits all the required legal documents which the system approves if they are valid. In case if the licenses are not seen as valid by the system, the prompt message saying “Invalid credentials” is thrown to the service provider.</p> <p>The client or the service provider who wishes to login after signing up into the system is prompted to enter the mandatory credentials. Upon validity, the system lets the stakeholder in and upon error throws the error prompt</p>



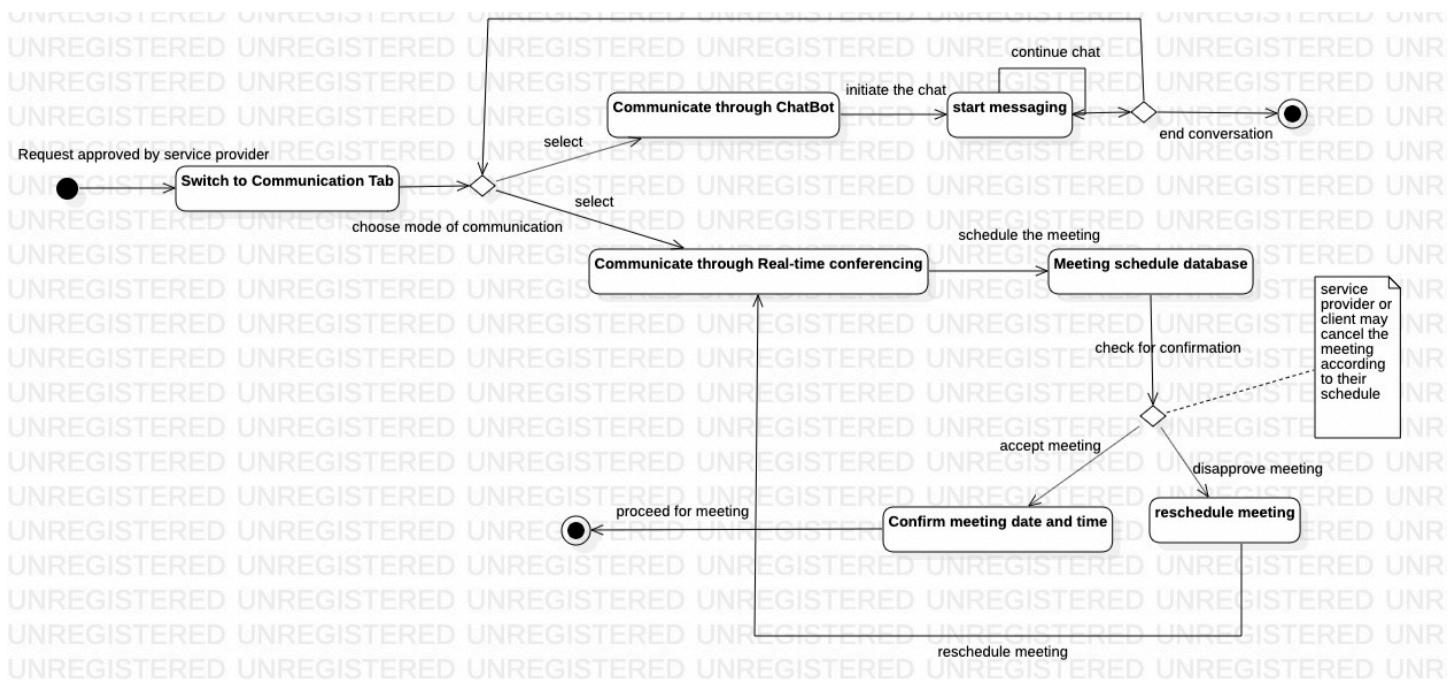
State diagram 2 - Contract establishment

States involved	Description
<ul style="list-style-type: none"> • Home page • Choice of service provider • Builder • Architect • List of architects • List of builders • Finalize service provider • Service database • Service provider's confirmation 	<p>The client logs into the system successfully and is asked for the choice of service provider. The client is provided with a list of recommendations for architect or builder depending on the choice by the client. When the client chooses an architect or a builder after viewing the profile, the service provider gets notified regarding the request. The service provider can either approve to work for the client or disapprove the request for any personal reason. In case of disapproval by the service provider, the client has to choose another architect or builder from the recommendation list.</p>



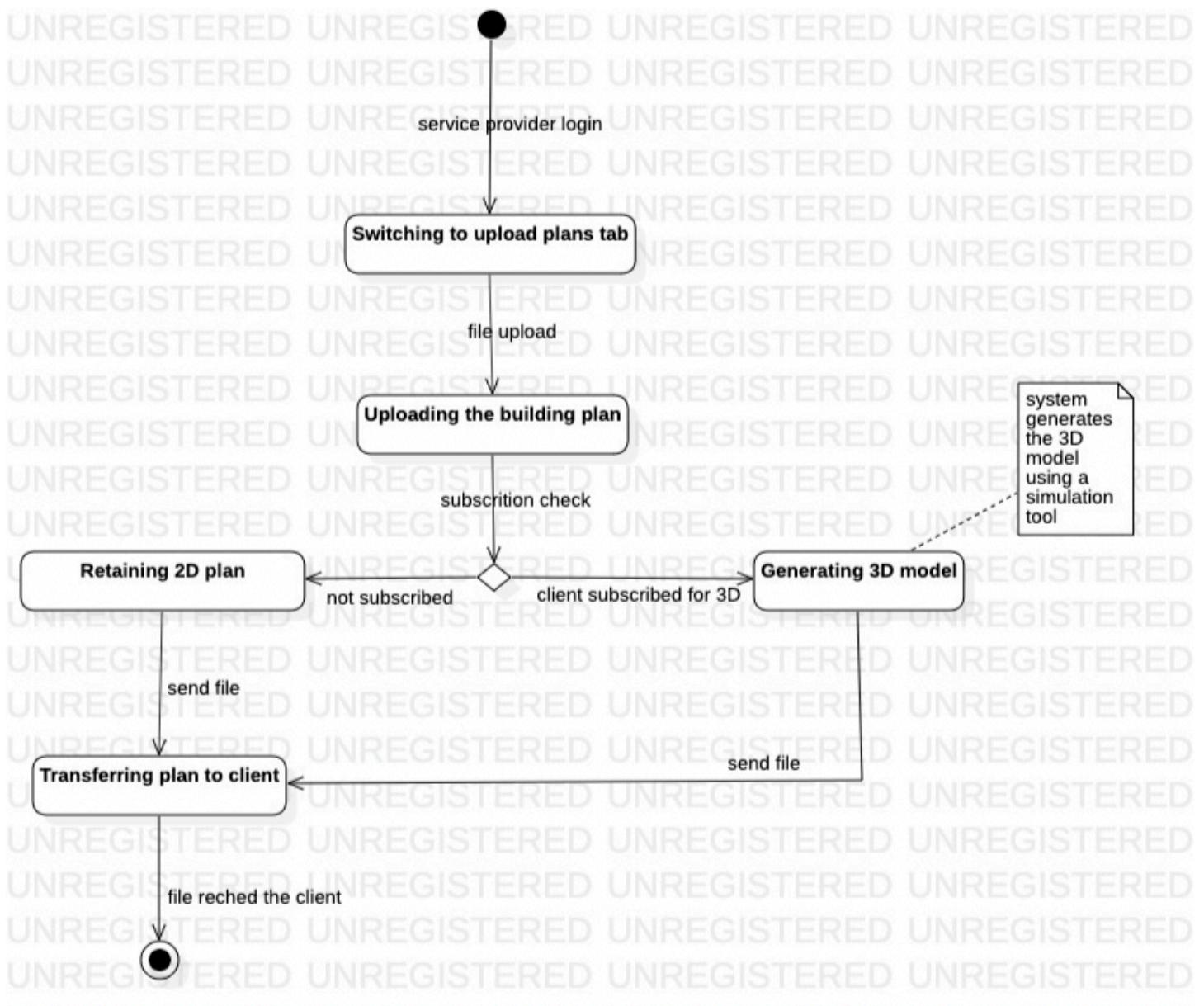
State diagram 3 - Communication

States involved	Description
<ul style="list-style-type: none"> • Switch to communication tab • Communicate through chatbot • Start messaging • Communicate real time conferencing • Meeting schedule database • Confirm meeting • Reschedule meeting 	<p>Once the contract is approved from both sides, either the client or the service provider can initiate the conversation. The system provides two modes of communication which are 1. Chatbot and 2. Real Time conferencing. The stakeholder selects one of the choices provided at a given time and proceeds accordingly. In case of choosing Chatbot, the stakeholder moves to the chat interface and initiates and continues to chat. In case of choosing real-time conferencing, the stakeholder who wishes to schedule the meeting asks the stakeholder on the other end to confirm the meeting date and time(if client schedules the meeting, request for approval sent to service provider and vice versa). In case the stakeholder on the approving end doesn't accept the meeting, then the meeting is rescheduled.</p>



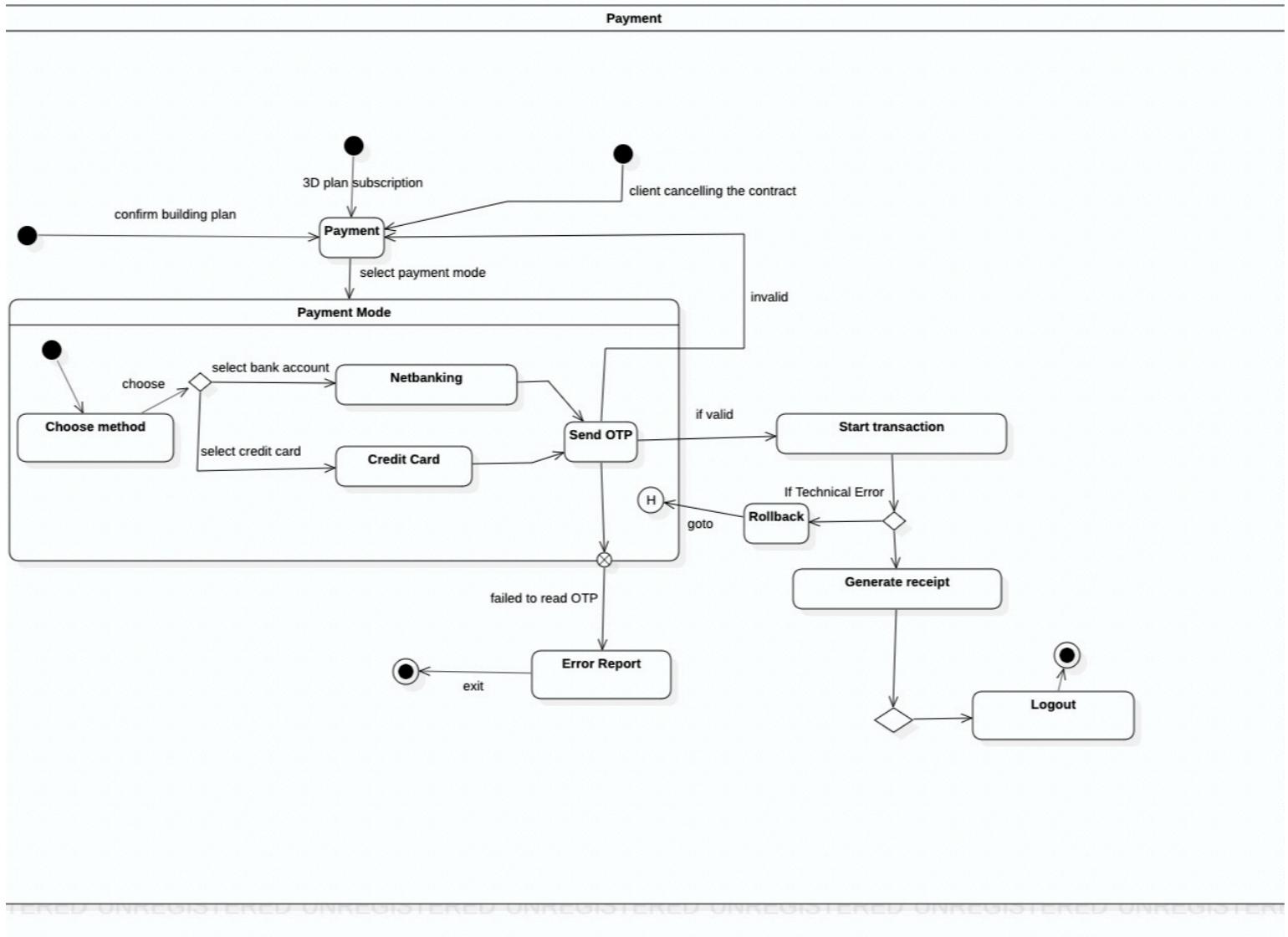
State diagram 4 - Blueprint transfer

States involved	Description
<ul style="list-style-type: none"> • Switch to uploads tab • Upload the plan • Generating 3d model • Retain 2d plan • Transferring to client 	The architect on completing the building plan attempts to send it to the client via the system. The architect uploads the building plan in usual 2d version. On successfully updating the plan, the system checks if the concerned client has subscribed to 3d plan or not. If the client has paid for the subscription, the system generates 3d model for the 2d building plan uploaded by the architect and incase if the client doesn't have subscription the uploaded building plan is forwarded as such to the client.



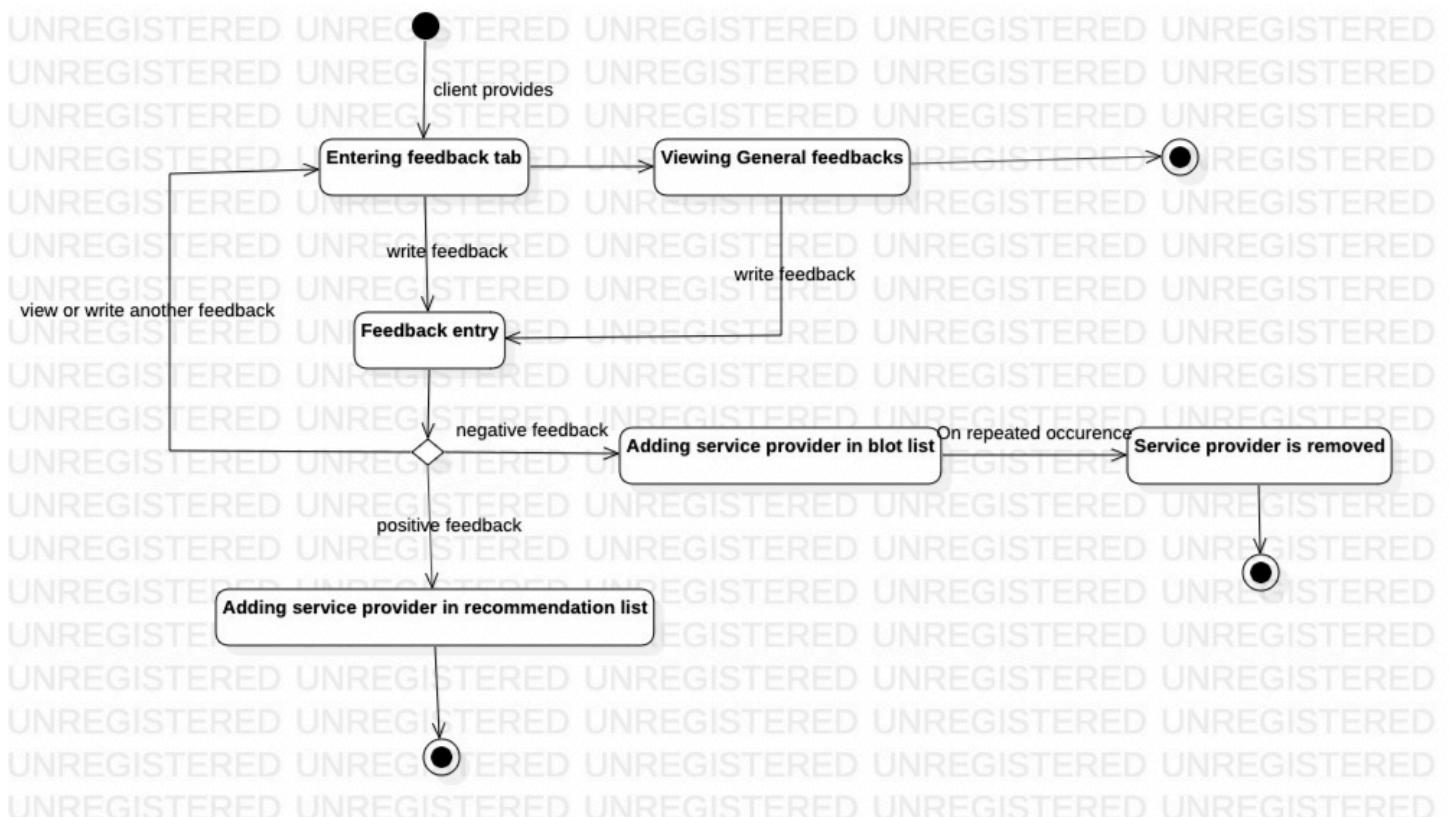
State diagram 5 - Payment

States involved	Description
<ul style="list-style-type: none"> • Switch to payment • Choose method • Netbanking • Credit card • Send OTP • Start transaction • Rollback • Generate receipt • Error report 	<p>The client makes payment via the system on 3 scenarios namely 1. Subscription for 3d plans, 2. Pay the service provider on completion of the contract and 3. Pay the service provider for cancelling an ongoing contract. The states seen by all the three scenarios are the same.</p> <p>The client is asked to choose the mode of payment (Netbanking or credit card). A One Time Password is sent for user verification. On successful authorization, the transaction begins and upon failure error report is prompted. On successful transaction the receipt is generated and upon failure the transaction is rolled back.</p>



State diagram 6 - Feedback

States involved	Description
<ul style="list-style-type: none"> • Switch to feedback tab • Viewing general feedbacks • Feedback entry • Add service provider in blot list • Removal of service provider • Add service provider in recommendation list 	<p>The client can provide any number of feedbacks about a service provider at any point of time during the contract. Also the client can view the feedbacks from other clients. Upon the entry of a feedback, the message is stored in the system's database. The outcomes can be positive or negative. In case if the feedback about a service provider is positive, the system adds the service provider in the recommendation list provided to future clients. In case if the feedback is negative, the system adds the service provider in the blot list(de-credit to the service provider). Also on receiving such negative feedbacks continuously from the clients, the system is forced to remove the service provider.</p>

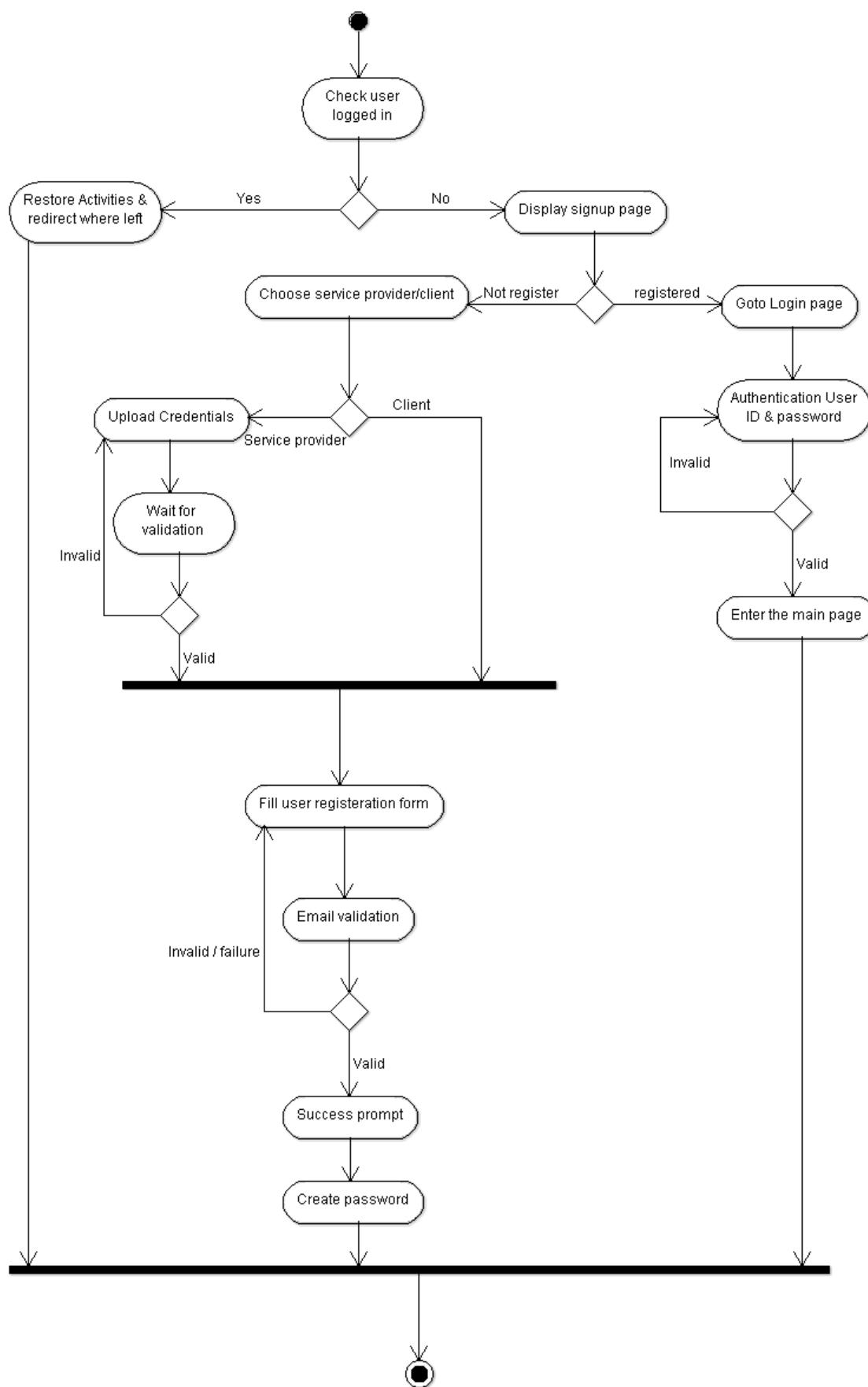


6. ACTIVITY MODEL

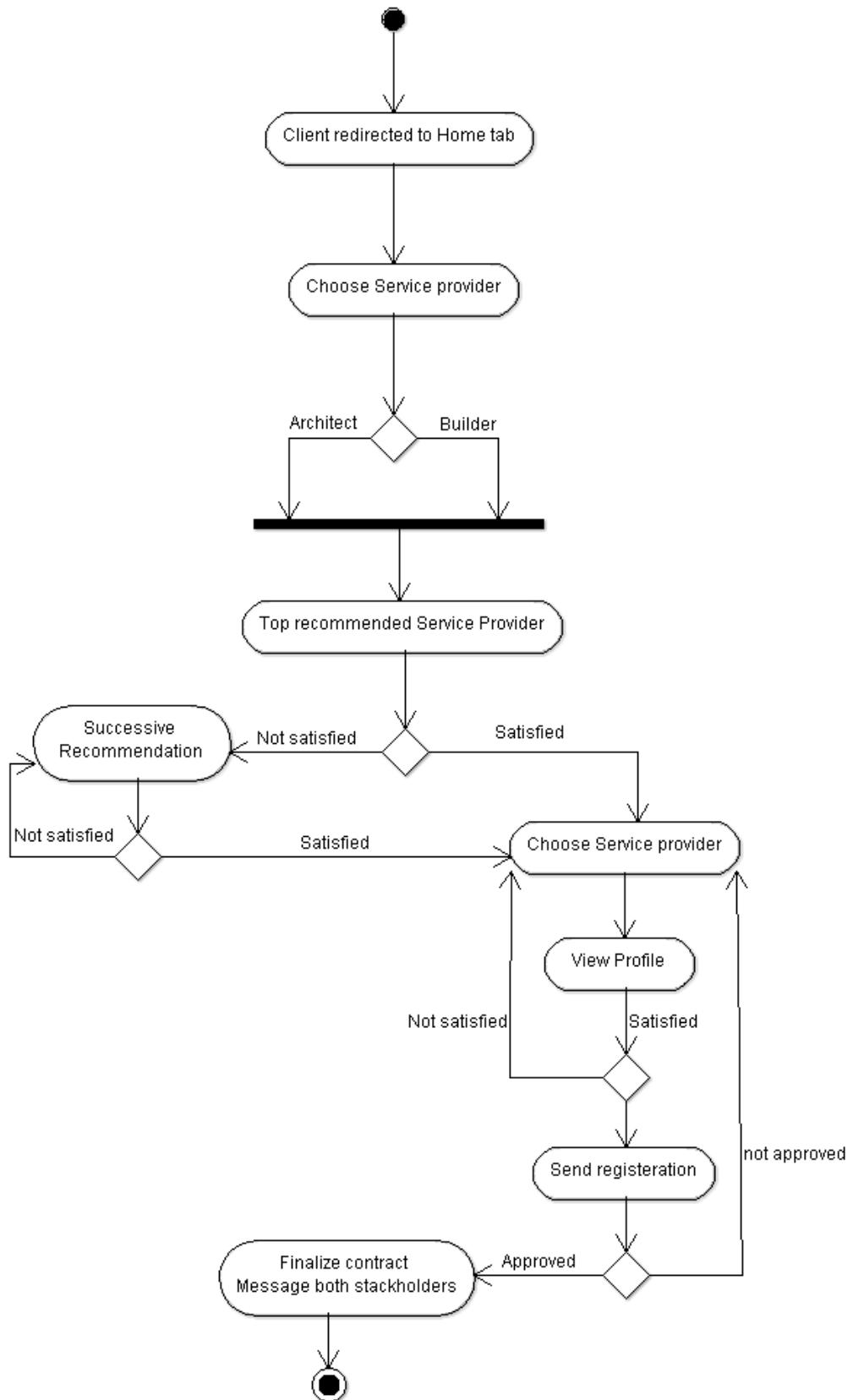
{Each of the models are described in the table and the diagrammatic representation follows the description}

MODEL NAME	DESCRIPTION
System access	Initially the user is checked if he has logged in or not. In case if logged in, redirects to the page where the client left. If not checks for account existence. If exists, then the system directs to the login page where the user will be entering the credentials (username and password). On successful validation of the credentials the client is directed to the page where he left for the last time else prompted with an error message. If the user doesn't hold an account, the signup page is opened and the system prompts to choose the kind of stakeholder he is (whether client or service provider). If client, a usual sign up page will be displayed to create a user profile. Else if the user is a service provider, the system demands to provide legal documents for proof. The service provider is not let into the system unless validated by the system.
Contract establishment	Once the client registers into the system, he wishes to establish a contract by requesting the service provider. The client is provided with a list of recommendations based on the choice of service provider. If the client is satisfied with a service provider from the list, he gets the entire profile of the concerned service provider from the database. He can choose to send request to the service provider or to go back to the recommendation list to get another service provider. The service provider on the other side can accept or reject the proposal for whatever reason. After which agreement to certain aspects like contact duration is made and the contract is established between the two parties.
Communication	The parties involved in the contract can communicate with each other using the two modes of communication provided by the system - Chatbot & Real time conferencing. The party can start messaging via chatbot or schedule meetings. He waits for the response from the other side for a limited duration like 48 hours . On repeated waiting the party can choose to send 'contract cancellation' notification to the other party. In case of chatbot, the other party reacts with a reply message. In case of real time conferencing, the other party mayn't be available in the scheduled time or date. In such a case, the meeting is rescheduled.

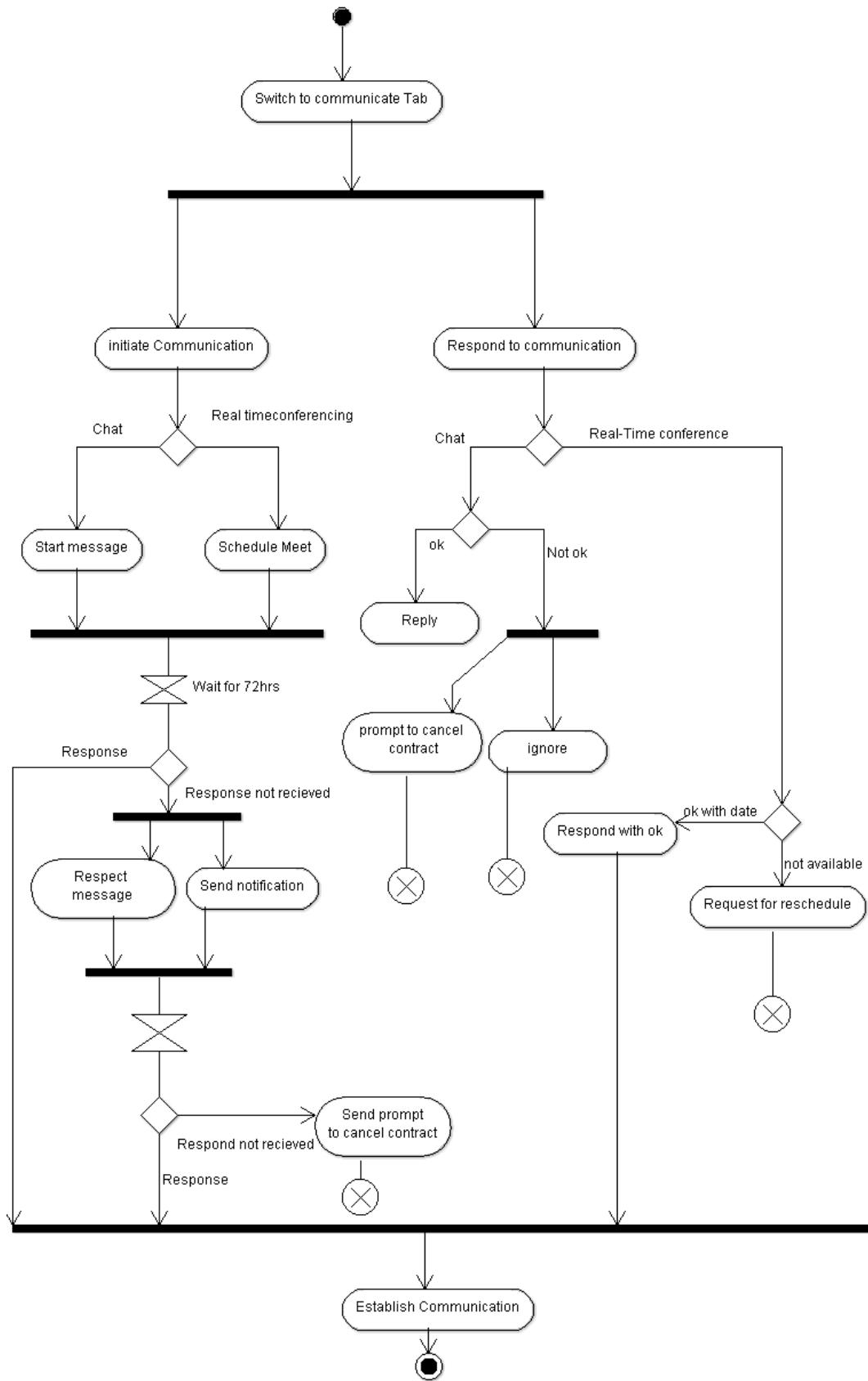
Blueprint transfer	<p>There are two scenarios where the building's blueprint is transferred. One when the architect chooses to send the work to the Client. Two when the user wants to send the plan to the builder for construction. Whenever a file is transferred, the system checks if the receiving party has subscribed for 3d model generation or not and forwards the plan accordingly.</p>
Payment	<p>The client makes payment via the system on 3 scenarios namely 1. Subscription for 3d plans, 2. Pay the service provider on completion of the contract and 3. Pay the service provider for cancelling an ongoing contract. The client is asked to choose the mode of payment (Netbanking or credit card). A One Time Password is sent for user verification. On successful authorization, the transaction begins and upon failure error report is prompted. On successful transaction the receipt is generated and upon failure the transaction is rolled back.</p>
Feedback	<p>The client can choose to view or provide feedbacks. The client is provided with a list of feedbacks of the concerned service provider from which one can agree (like) or disagree (dislike) or comment on. The client is insisted to provide feedback regarding the system for the betterment of the system and regarding the service provider for the system to take action accordingly. The system gets the feedback in the form of rating and review. The system analyzes the sentiment of the feedback. If positive, adds the service provider to the recommendation list. In case in the feedback is negative, the service provider is assigned with a decredit and added to blotlist. On crossing a certain threshold of decredit count, the service provider is prompted for removal from the system.</p>



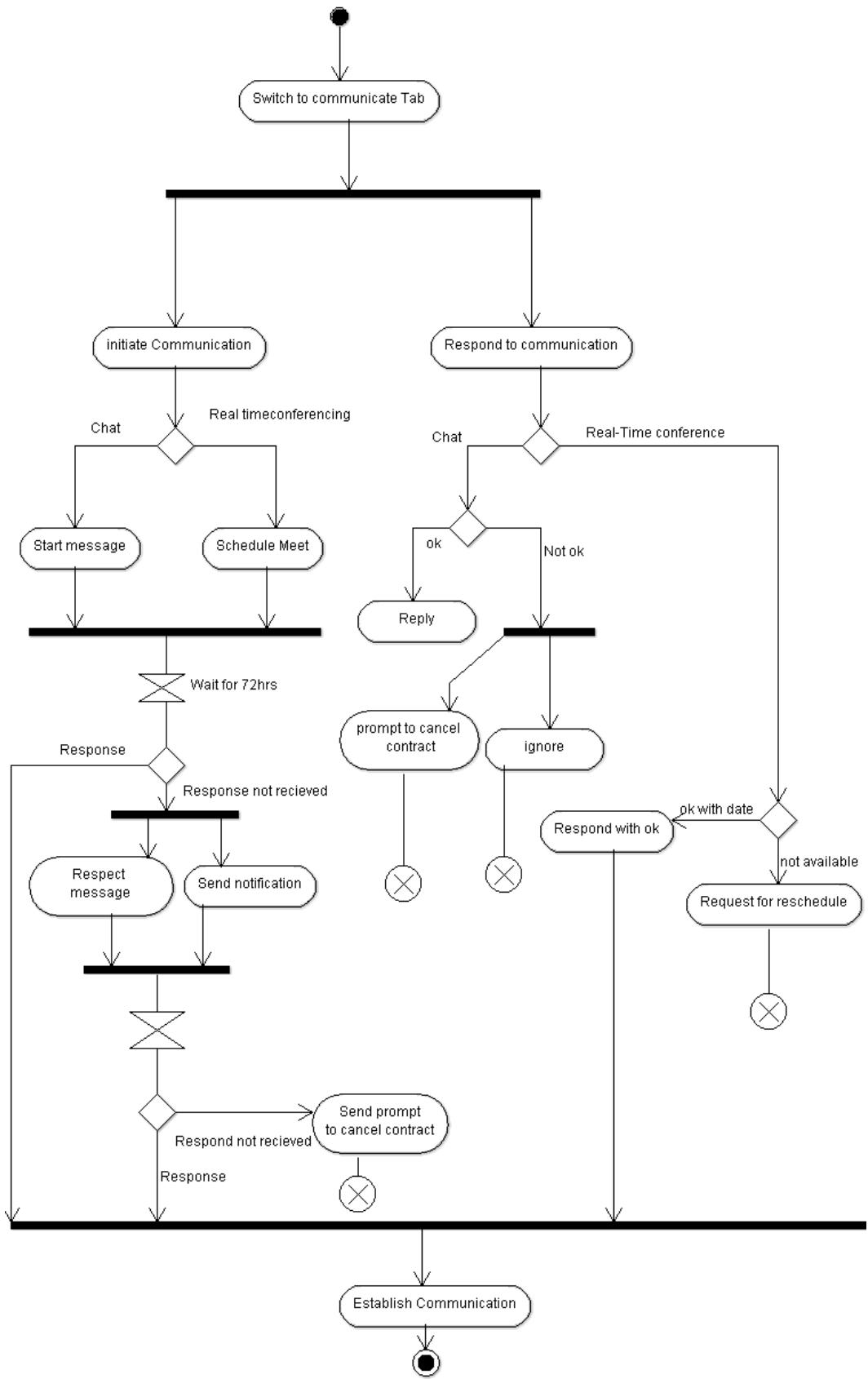
Activity diagram 1 - System access



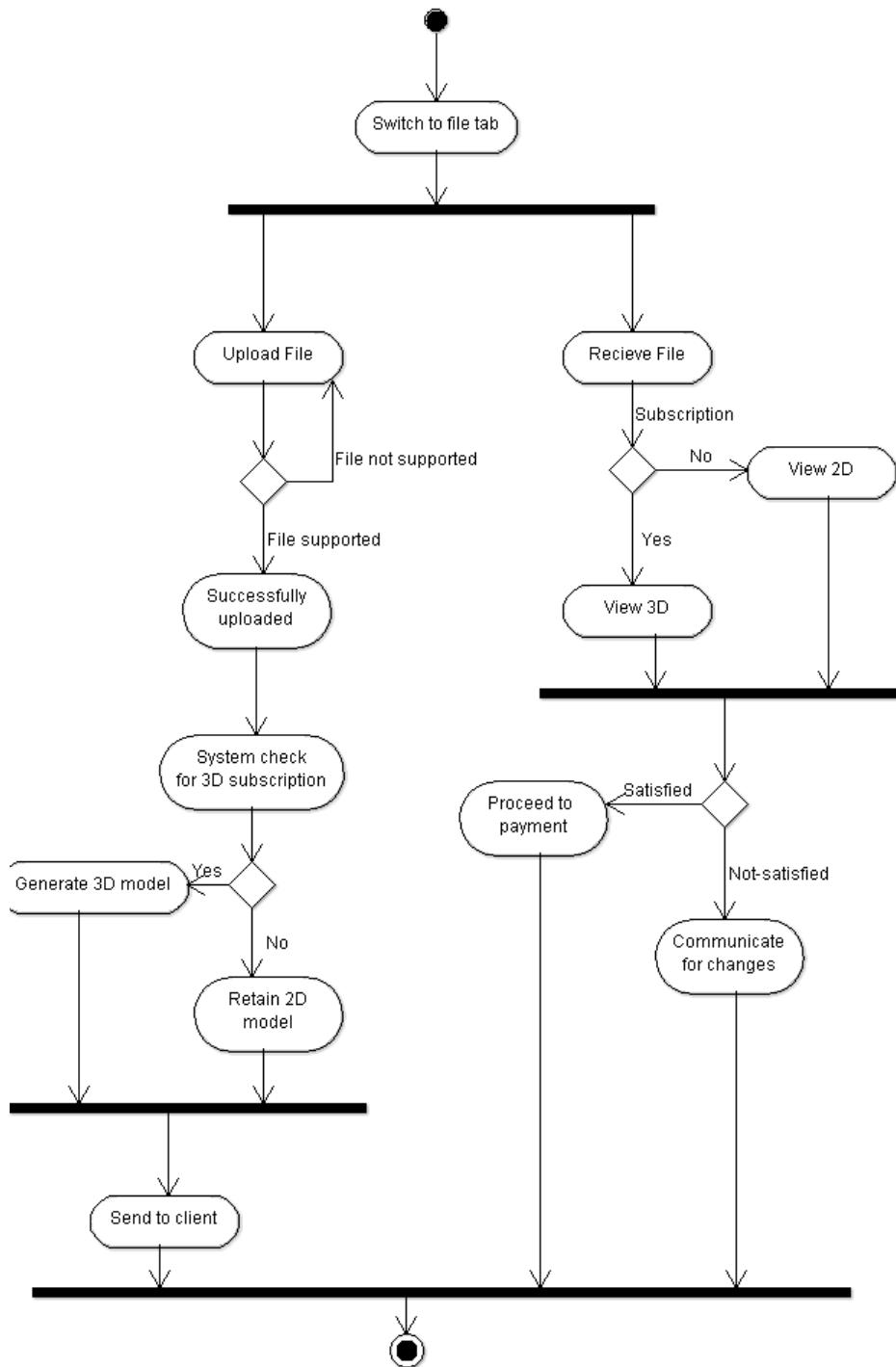
Activity diagram 2 - Contract establishment



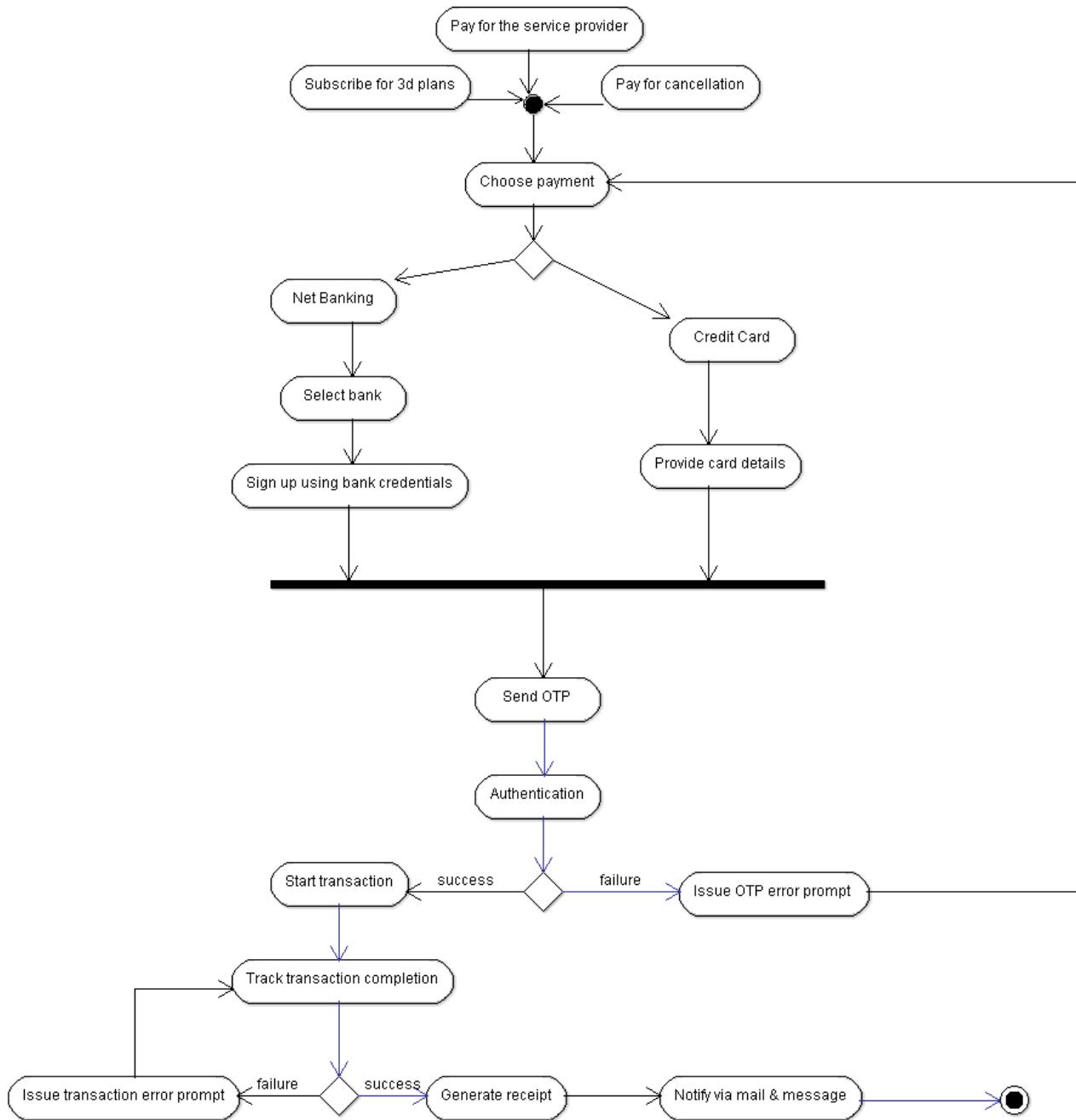
Activity diagram 3 - Communication



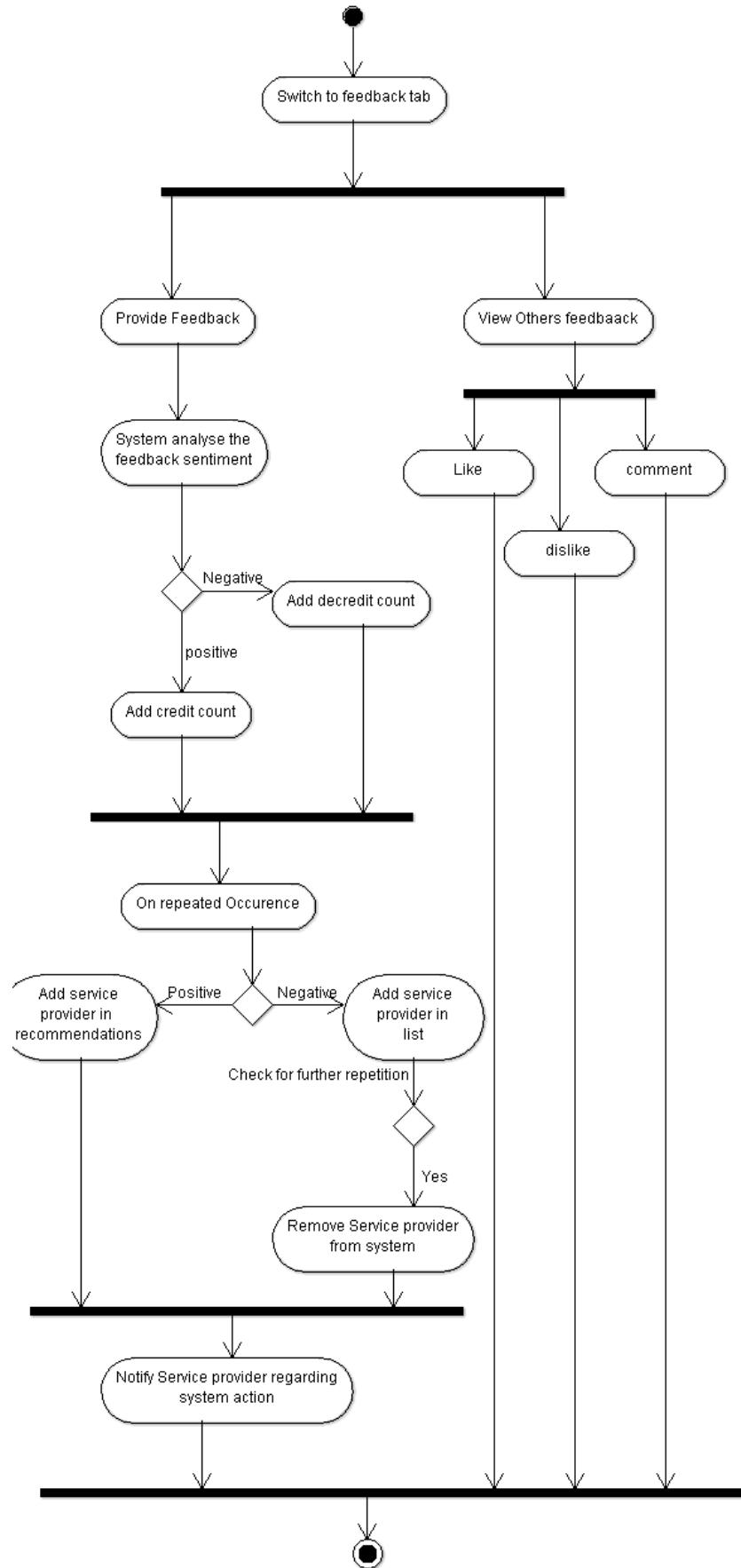
Activity diagram 4 - Blueprint transfer



Activity diagram 5 - Payment



Activity diagram 6 - Feedback



IMPROVEMENTS AND FUTURE OF THE PROJECT

The system can be improved by incorporating technologies like Augmented Reality to view the generated 3d model in the real life space. When the 3d model gets out of the device in which the system operates (whether it be mobile or iPad) and simulated in real life especially in the landscape where the structure is planned to be built, the user get even better visualization of the plan. Also, Machine Learning techniques can be employed to better analyze textual inputs (with higher accuracy - just as how we humans interpret) from user like feedback and reason for cancellation and steps can be taken accordingly. These improvements can be employed to increase the efficiency as well as popularity of the system.

CONCLUDING REMARKS

The proposed idea is presented in best possible way with the 6 models. The use case and class diagrams provide an overall idea about the system and the flow of procedures are explained via Sequence, State and Activity models. The presented idea has great welcome from the side of general public as well as from the service providers' side when implemented properly. The clients can find reliable architects and builders. The architects and builders can get themselves engaged to some contract consistently provided if they continue to satisfy the clients with their work. The 'structures planning facilitation system' can get stronger and inspiring structures for the public.