



Credit Bureau Integration Phase 3

Proposal - Google Summer of Code 2020

Personal Details:

Name : Rahul Pawar

Telephone :

Country of Residence : India

Overview:

Currently, Fineract has all pre-requisite modules of the Credit bureau integration project. Phase 3 aims to extend these modules (Configuration module, Address module and Family module) and create a base infrastructure. This base infrastructure can then be used to integrate any credit bureau in future.

Approach:

Why do we need common Base Infrastructure supporting multiple Credit Bureaus in Fineract?

Fineract is empowering Core-Banking infrastructure of Micro-Finance institutions around the globe and has a diverse user base in different regions. Thus, when we develop a new feature in Fineract, it must accommodate the requirements of this diverse global user base.

The base infrastructure which is being proposed needs to have a design which is extensible and reusable which can accommodate different credit bureaus around the globe. It is practically not possible to get the perfect design at very first attempt, however, if we come up with a design which is extensible, we may iteratively achieve our goal.

The design:

If we go through the design patterns literature, we may be able to relate some design patterns which appear to solve our problem at hand. However, there is no “one size fits all” design pattern which would solve our problem. Hence, I propose we should use combination of design patterns which would help us to achieve our design goal for base infrastructure.

The domain design:

Before we delve into technical design of the project, we should first explore the domain aspects of the Credit Bureau integration project. I propose, we should have common states which would be same across different credit bureaus. The states which one can think of in any request response workflow would be as follow:

- 1) Create Inquiry Request.
- 2) Send Inquiry Request.
- 3) Parse Inquiry Response.
- 4) Display Inquiry Response.

Let us now see, the role of the above proposed states in our workflow.

Create Inquiry Request: As you may have observed during opening of any credit application, banks ask us for common information, which is of similar nature around the globe. For example – Name, Identification document, address, family members etc. This state aims to collect such information either through Fineract database or through user input and create a common internal representation (an Object) to initiate the credit bureau inquiry.

Send Inquiry Request: Different credit bureaus would have different format for their request and thus we would need a state which converts our internal representation into the respective formats. Besides this transformation, each credit bureau would have different API mechanism to accept the request. The aim of this state would be to handle the transformation of mapping internal representation to external format and provide mechanism to send request to Credit Bureaus.

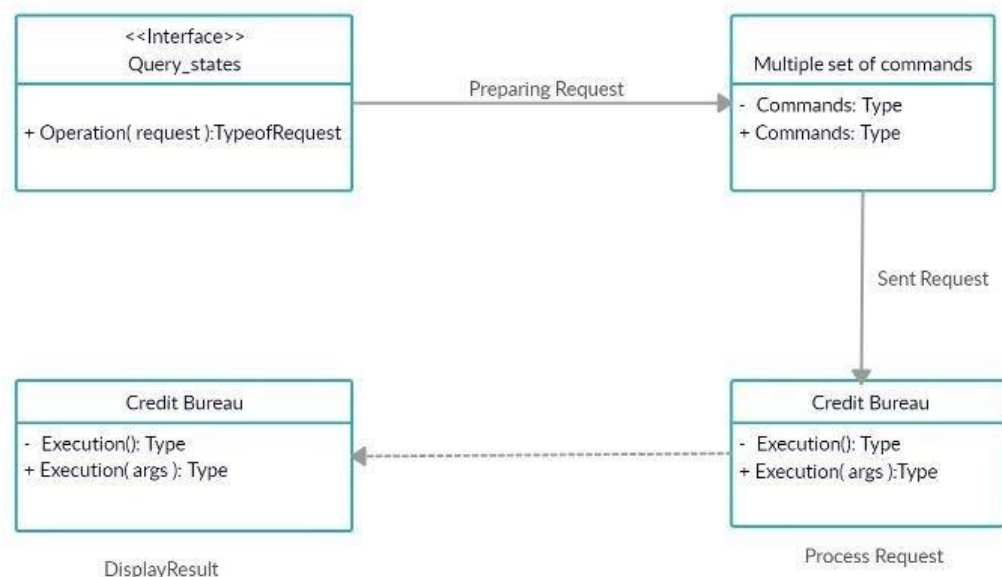
Parse Inquiry Response: As there would be different formats for sending request, there would be different format of response. This state would parse the incoming responses to internal common format/representation.

Display Inquiry Response: This state would be responsible to persist the response and display the response in Mifos Community App.

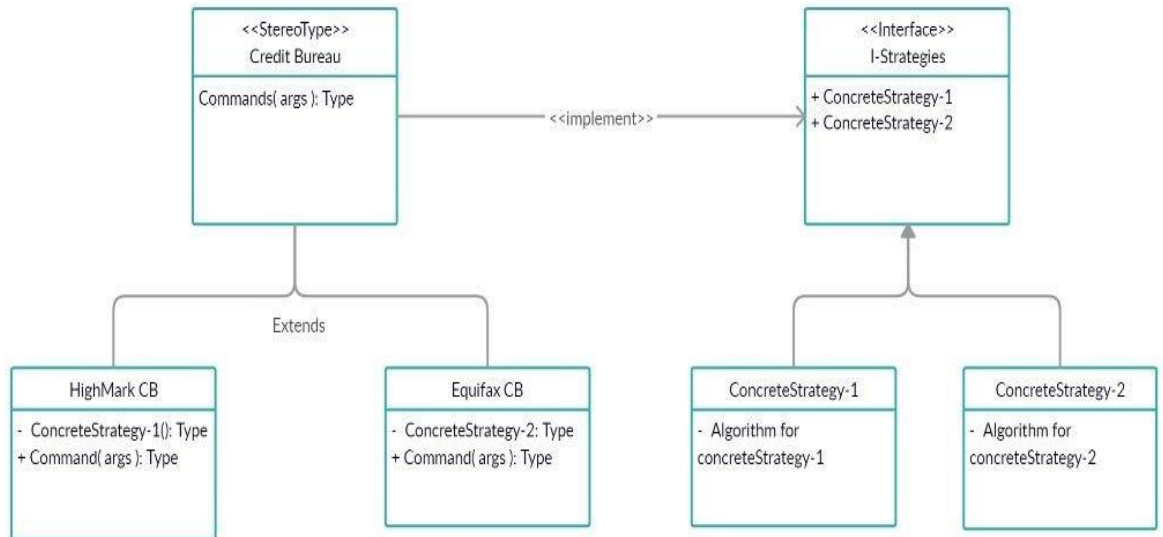
Mapping of Domain model to Design/Architecture:

Now that we have our domain design, we can now map it to our architecture. I would think of combination of Command pattern and Strategy pattern as a solution to our architecture. We can map the states to commands and create handlers to handle them. And each Credit Bureau would have different strategy inside command handlers which would handle their differing behaviour.

States mapped to commands:



Individual Strategies for implementing workflow inside commands:




Scope of the project:

The scope of this project would be to design and implement Base infrastructure and integrate sandbox environment of one Credit Bureau.

TimeLine:

The tentative timeline I foresee is as below:

Time span	Deliverables
May 4 – May 31st	<ul style="list-style-type: none"> · Engage with the community to discuss and get feedback on the Design of project. · Finalize the design and create specification. · Reach out to credit bureaus with our proposal and get access to sandbox environment.
June 1 – June 15	<ul style="list-style-type: none"> · Implement skeleton of the architecture: · Create command and command handlers.
June 16 – June 30	<ul style="list-style-type: none"> · Write unit test cases and mocks to test the command handlers.



July 1 – July 20	<ul style="list-style-type: none">· By now, we should have access to at least one sandbox environment. And we should start implementing strategies inside the handlers which would materialise the working of our workflow. In case we are still waiting for the access, we can mock the API and move forward.
July 21 – July 31	<ul style="list-style-type: none">· Write test cases and work on merging the code, if it implements a real credit bureau.· Parallely work on design on UI.
August 1 – August 17	<ul style="list-style-type: none">· Implement UI interface in community app.· Prepare documentation for the module.· Write integration test cases.· Start work towards getting the code merged into production repository.

Answers to question by Mifos:

Why are you the right person for this project?

I have been collaborating with Mifos/Fineract community since a year now and have been iteratively sending pull requests. This collaboration helped me to develop understanding of Fineract platform. Besides, that I am currently pursuing Master of Science in Information Technology and hence I think I have the right fundamentals and background.

Also, I like to take up challenging projects, which help me to develop professional skills required to be a software engineer. One such example is my Final year project in which I implemented Machine Learning Algorithms to predict heart disease given a openly available dataset.

I think credit bureau project is a challenging project and hence I have chosen it. This project would be a milestone in my career and would help to showcase my skills.

If in college, current area of study?

I am pursuing Master of Science degree in Information Technology at Nagindas Khandwala College affiliated to Mumbai University.

Previous contribution to Open Source/Community Engagement:

Fixed some bugs and wrote Integration-Testcases for glim_gsim module and rebased GLIM+GSIM PR: <https://github.com/apache/fineract/pull/73> 8

Do you have any previous experience with AngularJS /Java /Spring /Hibernate /MySQL /Android ?

I have experience with Java, SQL (MySQL and Oracle favours). I am beginner in Spring and Android.

What other commitments do you have this summer?

No, I have no commitments in the summer.

Contact Information and preferred method of contact:

Name:Rahul Pawar

Email:rrpawar141996@gmail.com

Phone:

GitterId: @rrpawar96

TimeZone: IST(GMT +5:30)

Have you deployed and run the Mifos X Platform

Yes, besides deploying Mifos/Fineract platform, I have also sent PR.

Have you previously participated in the Google Summer of Code?

No.

Are you applying to multiple organizations this year?

No.