

qpodb  
micro-lending initiative  
jump-starting the developing world through  
microlending

Niki Hill  
Colby Jordan  
Mohamed Diabi

October 2<sup>nd</sup>, 2008

# Contents

- I Project Description** **2**
  - The Project . . . . . 3
  - The Problem . . . . . 3
  - The Motivation . . . . . 3
  - The Impact . . . . . 3
  
- II Database Entities** **4**
  - The Users . . . . . 5
    - The Administrator . . . . . 5
    - The Lender . . . . . 5
    - The Borrower . . . . . 6
  - The Objects . . . . . 7
    - The Requests . . . . . 7
    - The Loans . . . . . 8
  
- III Finite State Machines** **10**
  - New Account . . . . . 11
  - New Loan and new Request . . . . . 14
  - Moderate Abuse and Report Abuse . . . . . 14
  - LOAN object . . . . . 14
  - RQST object . . . . . 14
  
- IV Features** **16**
  - Risk Metric . . . . . 17
    - Computation Method . . . . . 17
    - Reason for Computation of Risk . . . . . 17
  - Social Impact . . . . . 17
    - Importance . . . . . 17
    - Implementation . . . . . 18
  
- V Bibliography and Scholarly Papers** **19**

**Part I**  
**project description**

## **qpob**

It is a denial of justice not to stretch out a helping hand to the fallen; that is the common right of humanity. Seneca (5 BC - 65 AD)

### **project**

The goal of the project is to provide a basic technological infrastructure allowing for the organization, distribution, and comprehensive communication for a microlending system in places where none exist currently. This infrastructure will work as an agent connecting borrowers with a project idea to lenders from all over the world. As a safety feature, there will be an integrated safety feature added where borrowers are rated on their personal information, project information, and payment history.

### **problem**

The key impediment of competitive economic progress in developing countries is a lack of access to start-up capital for individuals interested in establishing ways to eventually earn money for themselves. In many cases, even very small loans can provide the resources necessary to start. However, even with outsiders willing to help financially, there is often no existing framework for connecting financiers with individuals, tracking recipient progress, and facilitating monetary distribution of microloans

### **motivation**

The underlying idea of microcredit has been well tested and proven successful in countries like Bangladesh. Certain instances where the poor have been provided access to start-up capital to end up managing small businesses which helping to jump-start local economies provide ample motive to help people help themselves exit poverty. Organizations like MicroPlace.com and banks like NABARD in India showcase examples of highly successful existing microlending programs.

### **impact**

Providing financial services to the very poor has the potential to elevate impoverished people and spark societal progress from the bottom-up. Most significantly, the growth of small business in otherwise underdeveloped areas can lead to sustainable and more advanced economies with fewer people living in poverty. The concept of microlending can only be applied practically with the use of a complete system capable of organizing and facilitating the process.

**Part II**

**schema description**

Three types of **User** entities exist in the system: the administrator (**Admin**), the borrower (**Borrower**) and the lender (**Lender**). The administrator manages the functioning of the system and regulates the relations among the others user groups. Multiple instances of **User** exist in the system (i.e: Admin1, Admin2, Borrower1, Borrower2, Lender1, Lender2, etc...). There are also two types of **OBJECT** including loans (**LOAN**) and requests (**RQST**) representing the transactions existing in the system. **Borrower** and **Lender** have one-to-many relationships with loans and requests. However, there can only be a single loan financing a project.

## users

**User** is an abstract class. It is sub-classed by three user entities: **Lender**, **Borrower**, and **Admin**.

### admin

#### overview

The **Admin** is the administrative entity in our system. It actually plays a very minor role in the functioning of the organization. The transactions between the other **User** entities (**Borrower** and **Lender**) are automated and for the most part decided autonomously among themselves. The **Admin**'s role is thus to regulate decency of the postings and enforce the respect of etiquette within the community. Because of its limited role, the **Admin** has a limited number of fields.

#### fields

- AdminId: This fields has the unique identification number for User\_Admin.
- AdminUsername: This field contains the unique logon username for the User\_Admin.
- AdminPasswd: This field contains the password associated with the AdminUsername.

### lender

#### overview

The **Lender** traditionally defined as *public or private institution which makes funds available for borrowing* is the primary customer in our model. They are the financial muscle behind the projects submitted by the members. They have a very well defined set of roles and permissions. They select a project they would like to fund, make the money available, get periodical updates on

the project status and at the end of the transaction, rate the **Borrower** they just dealt with. **Lender** can fund several projects at the same time and thus they can "own" multiple **LOAN** each in turn associated with a unique **RQST**.

### fields

- LenderId: This field has the unique identification number for the User\_Lender.
- LenderUsername: This field contains the unique logon username for the User\_Lender.
- LenderPasswd: This field contains the password associated with the LenderUsername.
- activeLOANid: This field (can be multiple elements) contains the identification number for all the *active* **LOAN** associated with the **Lender**.
- LenderStatus: This field contains the status for a **Lender** vis-a-vis the system, the value is by default GOOD can only be changed by **Admin**.

## borrower

### overview

The **Borrower** is the member entity in our model. Traditionally defined as the individual or company that owes debt to another individual or company, as a result of borrowing or issuing bonds. Their main interaction happens through the request for funds **RQST** they create. Those **RQST** are stored on the database and made available **Lender** who can then generate queries and review them. These queries (searches) are driven by specific **KEYWORDS** that **Borrower** entered when creating their account and their **RQST**. They naturally have the most attributes in the system because of the complexity of their interactions. They also have **RISK** associated with their accounts and their **RQST**. Moreover unlike any other **User**, they create personal profiles containing information about themselves.

### fields

- BorrowerId: This field has the unique identification number for the User\_Borrower.
- BorrowerUsername: This field contains the unique username for the User\_Borrower.
- BorrowerPasswd: This field contains the password associated with the BorrowerUsername.
- BorrowerAge: This field contains the information about the borrower's age. It is used as searchable data and in the computation of the **RISK**
- BorrowerGender: This field contains the information about the borrower's gender. It is used as searchable data and in the computation of the **RISK**

- BorrowerMaritalStatus: This field contains the information about the borrower's marital status. It is used as searchable data and in the computation of the **RISK**
- BorrowerNumberofDependents: This field contains the information about the borrower's dependents. It is used as searchable data and in the computation of the **RISK**
- BorrowerLocation: This field contains information about the borrower's location.
- BorrowerRisk: This field contains the value assigned to the Borrower based on its credit-worthiness. It is composite and evolves with time.
- paymentRisk: This field contains the value assigned to the **Borrower's** payment history. It is automatically computed and changed.
- activeLOANid: This field (can be multiple elements) contains the identification number for all the active loans associated with the borrower.
- activeRQSTid: This field (can be multiple elements) contains the identification number for all the active requests associated with the borrower.
- BorrowerStatus: This field contains the status for a **Borrower** vis-a-vis the system, the value is by default GOOD, can only be changed by the administrators.

## objects

**OBJECT** is an abstract class. It is sub-classed by two object entities: **RQST** and **LOAN**.

### rqst

#### overview

The **RQST** object is the "project" entity of our system. It regroups all of the informations supplied by the borrower that is pertinent to what they want to do and need help with. When a borrower is trying to request funding for a endeavor, they fill out a form concerning their project and other important data. Information gathered by the form is relatively simple and can be applied to all requests i.e.: "how much money do you need?" or "What is the length the financing period?". Moreover, they select keywords among a predetermined list that will serve as searchable metadata for their project. Finally, a request is concluded by writing a paragraph that will be a personal statement explaining what the project means to them and why this request for fund is important or vital to their well being. Lenders will be able to narrow the fields according to description (keywords) or specific economical metrics (risk associated with project or loan amount,etc...) Finally, after a project gets funded, the **RQST** associated with it then becomes a vehicle for updates and communication between the borrower, the lender and the community at large.

## fields

- REQSTiD: This field contains the unique identification number for a Request
- LOANiD: This field contains the identification number for the Loan funding a request. Set to *null* is RQST not yet funded.
- LenderId: This field contains the identification number for the User\_Lender funding a request.
- BorrowerId: This field contains the identification number for the User\_Borrower that owns the request.
- RQSTamount: This field contains the amount requested
- RQSTstatus: This field contains the status of a RQST. Set to NOTFUNDED, FUNDED, SUSPENDED, etc...
- RQSTdescription: This field contains the keywords associated with a RQST (can be multiple)
- duration: This field contains the duration of the LOAN requested.
- interestRate: This field contains the value of the interest rate on the LOAN requested. By default set to "0"
- minPayment: This field contains the minimum amount due for each payment when the RQST will be funded.
- paymentFrequency: This field contains the information for the payment frequency. By default is set to "MONTHLY"
- RQST\_RM: This field contains the Risk Metric value computed after a request is completed and posted.
- RQSTvalue\_RM: This field contains the risk associated with the amount of the LOAN requested, the minimum payment and the payment frequency.
- BorrowerRisk: This field contains the value for the Risk associated with the RQST owner.

## loan

### overview

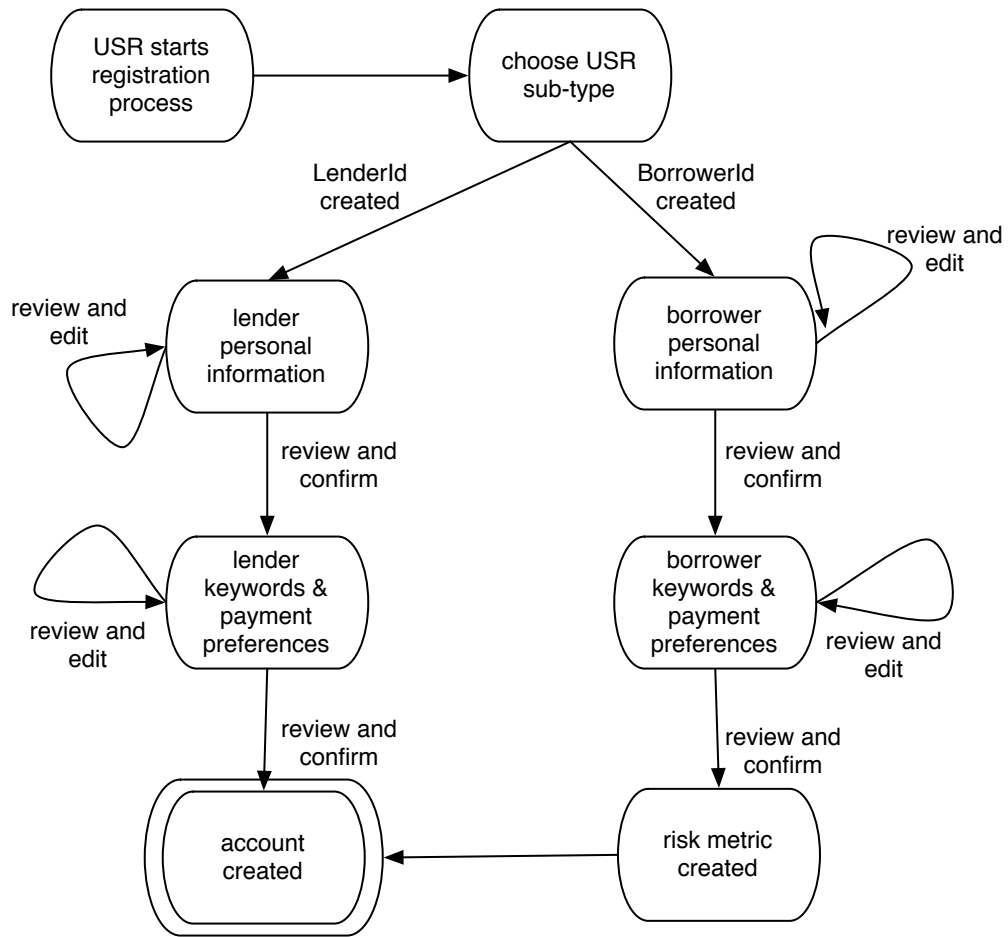
The **LOAN** object is the contract entity of our system. It is the agreement in which a **Lender** gives money to a **Borrower** while at the same time accepting the payment conditions and amount specified in the **RQST**. It is important to note that our system does not guarantee repayment; we provide a safer framework in which certain type of loans can be made by managing and measuring this unusual risk. **LOAN** can only be initiated by **Lender**. They make the decision based on the information provided by the **RQST** and the **Borrower** personal profile.

## **fields**

- LOANiD: This field contains the unique identification number for the LOAN object.
- RQSTiD: This field contains the unique identification number for the RQST financed by the loan.
- LenderId: This field contains the unique identification number for User\_Lender that owns the request.
- BorrowerId: This field contains the identification number for the User\_Borrower whose request is being funded by this LOAN.
- LOANstatus: This field contains the information about the status of a loan. By default set to PENDING, can also be set to ACTIVE, DEFAULT, WAIT and TERMINATED
- balance: This field contains information about the amount still due on a LOAN.
- duration: This field contains information about the time remaining on a LOAN.
- interestRate: This field contains information about the interest rate for this loan.
- minPayment: This field contains the value for the minimum payment due for this loan.
- paymentFrequency: This field contains the value for the normal payment frequency for this loan (copied from RQST)

**Part III**

**finite state machines**



### USR newAccount()

Figure 1: Creation of a new Account

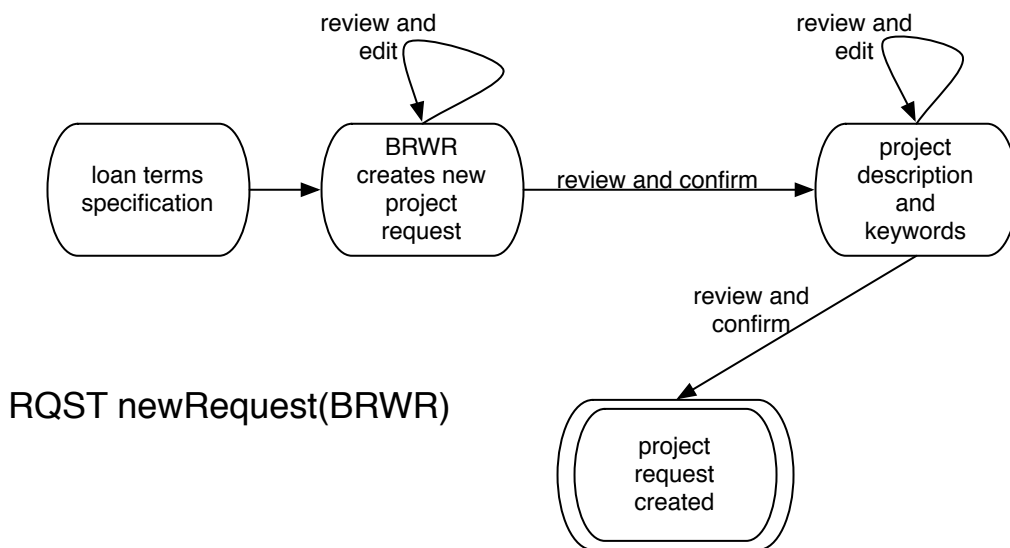
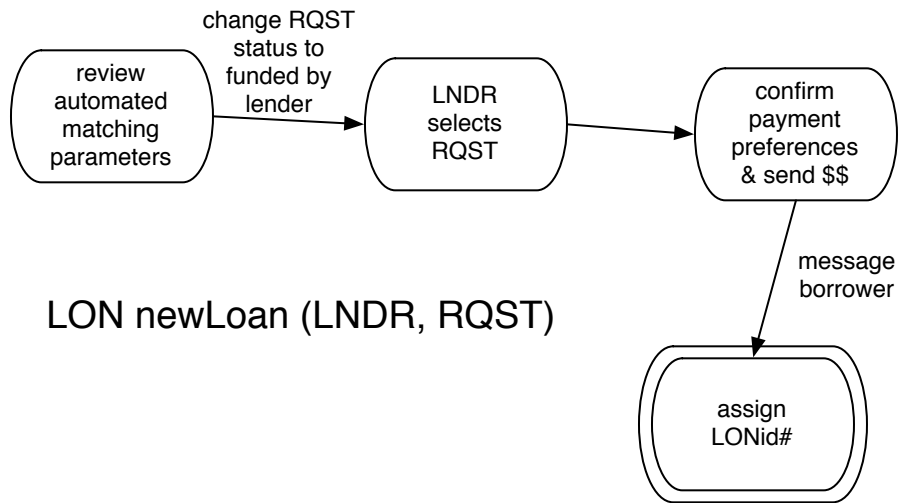


Figure 2: Creation of a new Loan and a new Request

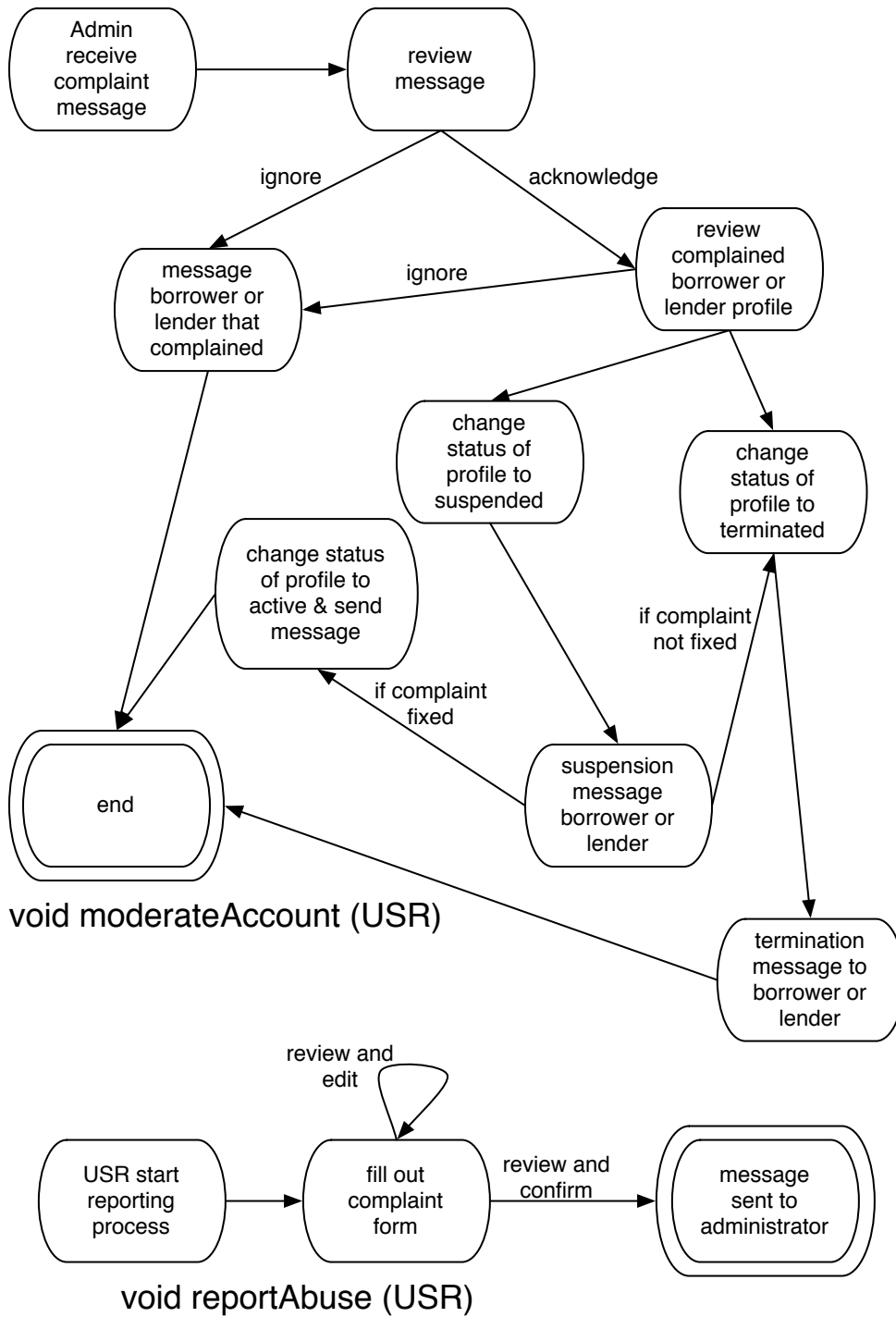
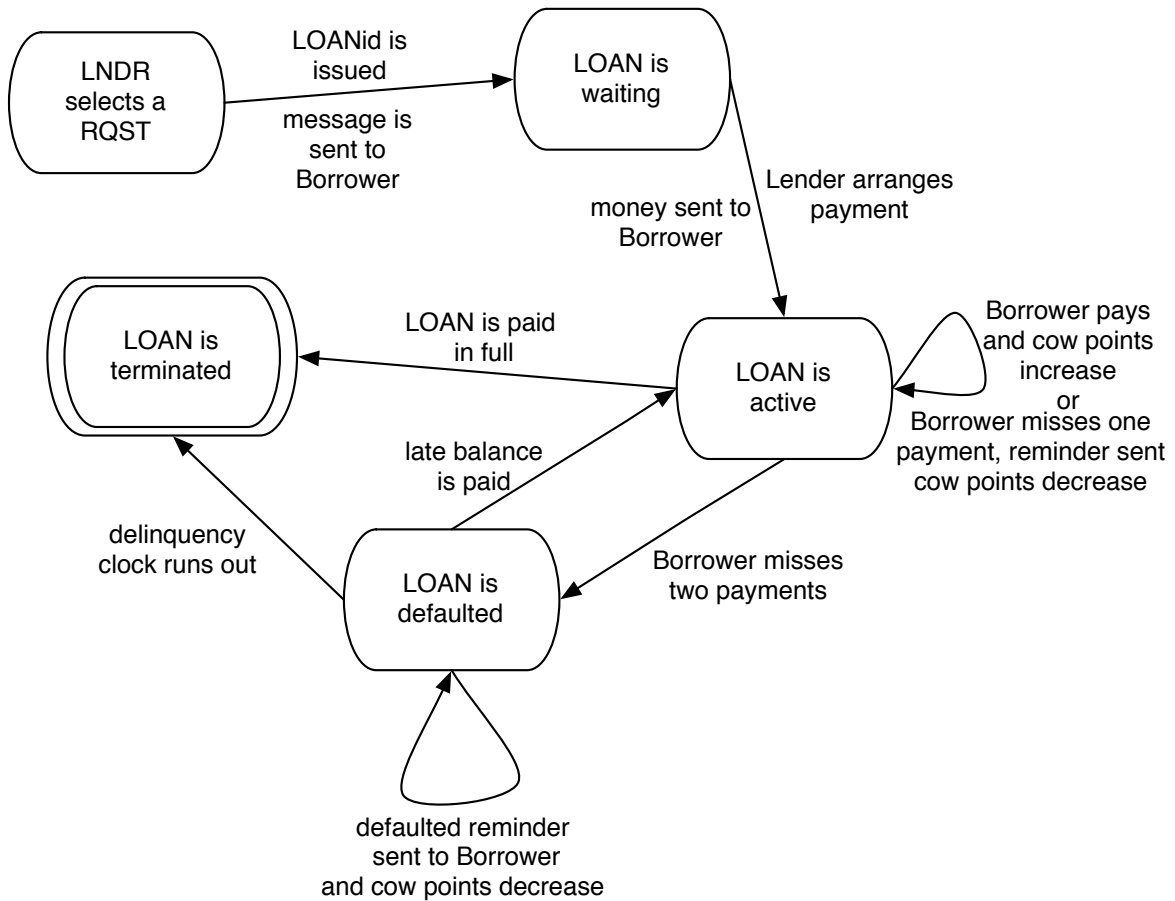
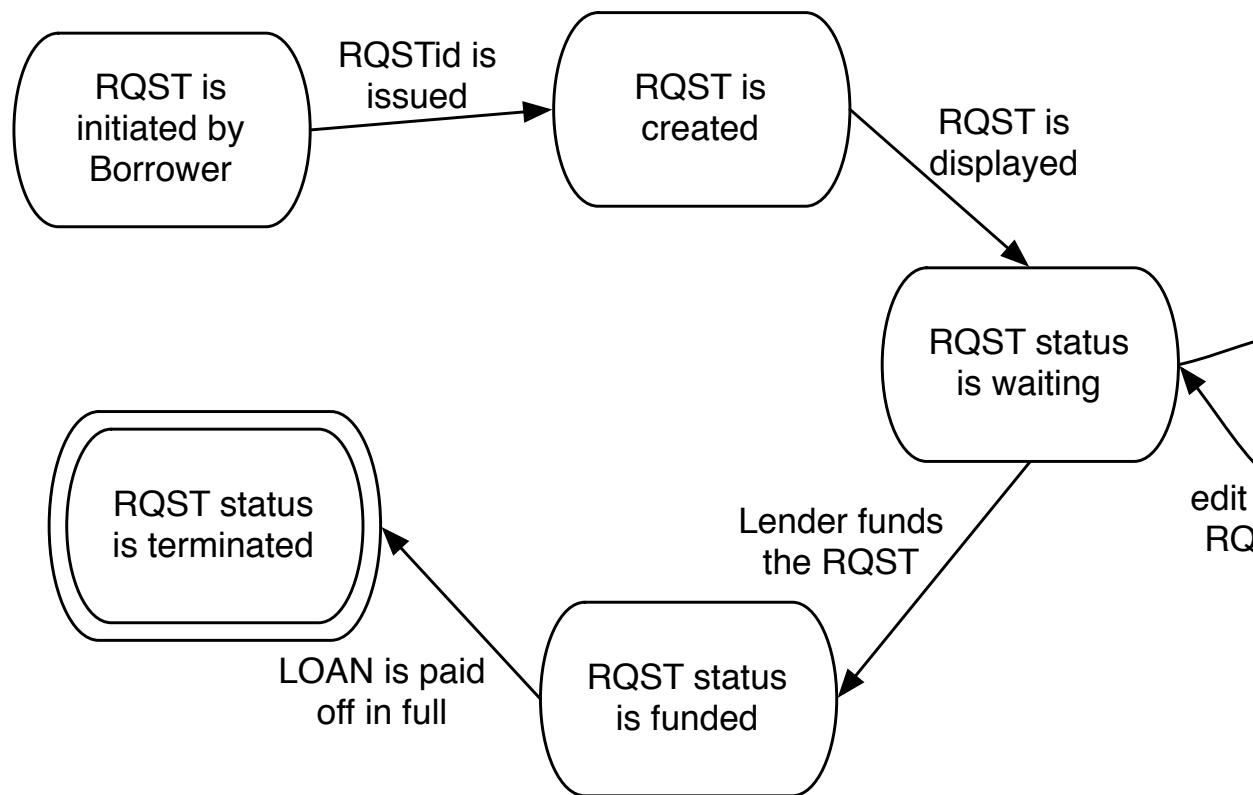


Figure 3: Admin manages users and User report obscene profile



## LOAN FSM

Figure 4: Different stages of a loan



RQST FSM<sup>5</sup>

**Part IV**  
**features**

## cow points

### How are cow points weighted?

For one of the core features of qpodb, a value is calculated and displayed to represent the expected degree of risk for lender of a proposed project. This comparative metric serves as a useful tool to potential lenders to aid in deciding which project they are willing to finance. The value is comprised of several components and is calculated on request and separately for every project proposal listing.

### cow points Composition

- 30% - Payment history algorithm** if no payment history, assume half credit; history data stored in borrower object]
- 30% - Project risk factors** likelihood of borrower earning back loan amount
- 20% - Borrower personal background** represents relationship with community
- 20% - Project value assessment** represents benefit to community

### Why are cow points calculated?

Managing risk is the most challenging aspect of micro-finance. With no clear cut metrics such as assets evaluation and credit history, quantifying human skills capital become the primary concern. Cow Points in qpod (named after the Cow example that started it all) are awarded following a complex methodology taking roots in personality testing, psychological evaluation and empirical research on defaulting and uncertainty. Several organizations such as the FBI, the CIA or more commonly banks, give new hire personality tests supposed to measure honesty and integrity. qpodb hopes to capitalize on this research and design an algorithm who assigns risk values to answers given by new members when creating their profiles. We feel that while micro-finance like any other investment vehicle carries a healthy amount of uncertainty, providing an additional layer of screening dramatically increases the quality of the service we can provide.

## the community

### The impact of social networking on the success of micro-lending

Banks in our world today have lending mechanisms that are in place only for a targeted group of people. One cannot get a loan if they don't already have access to capital and resources. Micro-lending offers credit to borrowers

that up until now were considered high risk because of a perceived lack of collaterals. However, what makes a venture successful is more often than not "human skill capital", dedication and hard work. qpodb hopes to offer a space where people that are in need of help and the people who extend this help to come together. Additionally, qpodb is hope to create a larger community, where "neighbors" share their lives, their happiness, their sadness, their hopes and dreams. We strongly believe that intertwining the "lending" with the "sharing" is vital to the success of our enterprise. It is indeed easier for everyone to take advantage of a faceless bank rather than someone you know, talk to and shared thoughts with. Also, the human dimension of the investments raises the stakes and the satisfaction for lenders. A money market may be safe, but nothing beats the satisfaction of having participated at the embryonic stages of a family business.

### **The implementation of the social dimension of qpodb**

Within qpodb's member community, several but simple ways to communicate with each other exist. Borrowers will represent the bulk of membership so it is logical that their "lives" are the most heavily monitored. They will have access to a blog-like profile page, they will be encouraged to post pictures of themselves as well as talk about events in their lives. Most importantly however, they will provide periodical updates about their projects. This is a key components in creating the overall feeling of community within our members. Cross-involvement nurtures bonds of friendship that dramatically decrease default rates and loan delinquency. The members are also provided with the ability to "rate" or recommend each other. This mirrors real-life informal economy where before two individual go in business, a third person knowing both vouches on the good faith and honesty of the protagonists. Lastly, post-project completion, Borrowers and Lenders are automatically required to report on their experience with each other. Much like transaction-based websites like eBay, the better the rating, the better credit rating for the user, the easier it is for them to get funding and grow.

**Part V**  
**annex**

# Bibliography

- [1] Vrajlal K. Sapovadia: *Micro Finance: The Pillars of a Tool to Socio-Economic Development* Indian Institute of Management Indore Finance & Accounting. 2006
- [2] Richard Montgomery: *Disciplining or protecting the poor? Avoiding the social costs of peer pressure in micro-credit schemes* Journal of International Development Volume 8 Issue 2
- [3] Sarah H. Alvord, L. David Brown, Christine W. Letts: *Social Entrepreneurship and Social Transformation: An Exploratory Study* Harvard University - John F. Kennedy School of Government 2002.
- [4] Denise L. Anthony: *Micro-lending Institutions: Using Social Networks to Create Productive Capabilities* International Journal of Sociology and Social Policy 1997.
- [5] Hassan Zaman: *Assessing the Poverty and Vulnerability Impact of Micro-Credit in Bangladesh: A case study of BRAC* Office of the Chief Economist and Senior vice-President. The World Bank 1999
- [6] Yi-Wen Chien, Sharon A. Devaney: *The Effects of Credit Attitude and Socioeconomic Factors on Credit Card and Installment Debt* Journal of Consumer Affairs. Volume 35 Issue 2.
- [7] John B. Miner, Michael H. Capps: *How Honesty Testing Works* Greenwood Publishing Group. 1996
- [8] John W. Jones: *Preemployment Honesty Testing: Current Research and Future Directions* Greenwood Publishing Group. 1991
- [9] Daniel Rosch; *An empirical comparison of default risk forecasts from alternative credit rating philosophies* Department of Statistics, University of Regensburg, Germany. 2008
- [10] Kay Giesecke, Lisa R. Goldberg: *Forecasting Default in the Face of Uncertainty* Journal of Derivatives. Fall 2004