

A web site for financial services

Loan Direct



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Table of Contents

1. PRESENTATION OF THE PROJECT / OBJECTIVES REQUIRED.....	3
2. UNFOLDING OF PROJECT IN THE TIME / MEETING	3
3. LIMITS OF OUR PROJECT	3
4. BENEFITS.....	3
5. CHOICE OF TECHNICAL SOLUTION.....	4
6. DISTRIBUTION OF WORK AMONG THE STUDENTS.....	4
7. FUNCTIONALITIES.....	5
8. INTERFACES	9
9. DATA BASE STRUCTURE.....	10
10. SECURITY.....	13
11. EVOLUTIONS OF OUR PROJECT.....	17
12. ASSESSMENT, CONTRIBUTION AND DIFFICULTIES	17
13. ACKNOWLEDGEMENT.....	18

1. Presentation of the project / Objectives required

The goal is to develop guidelines for the service and sale of loans on the Internet.

The web site will have to offer the same advantages as classic methods (offices, subsidiaries, ...) where the seller assesses the customer, can competently and flexibly answer technical questions and can persuade or convince hesitant customers and choose the right solution.

Cost advantages of the site will be the reduction of the time needed to deal with requests, better customer service through round the clock availability and instant application decisions.

The project is restricted to the implementation of a loan for financing a start up company. That means the borrower needs the money to launch his enterprise. The company either does not exist yet or has only existed since a short time.

2. Unfolding of project in the time / Meeting

This project has been cut up in different phases. In the first phase, the we gathered the necessary information about financial services, analysed existing Web sites and installed the software environment. In the second phase, we have defined the detailed architecture and the design of the site, as well as selection of software and hardware solutions for implementation. In the last phase, we have developed together the documentation, the presentation and the poster.

We have done several net-meetings, but most of the communication were done via email, because we could exchange documents easily. All our e-mail has been sent to every people in the group and to the professors.

3. Limits of our project

Our project manage a lot of functionalities. Because of a lack of time, we have not treated some of them.

With our Web site, you can not call your bank clerk clicking on his phone number. It is not possible to meet him with a numerical camera. These functionalities will be available in the future.

4. Advantage get by the use of site for the bank clerk and for the customer

For the bank clerk

This application allows to propose a fast and clear response to the customer's request.

For the customer

This site enables him to deposit a file of loan per hour that he wants since the Net is open 24h/24 and 7days/7, in a way fast and concise.

This application allows to obtain a fast and clear response to the request.

Other fonctionnalités of our site is the transmission of documents via Internet like tables of financings, assessments... for a better evaluation of the customer's file by the bank clerk.

5. Choice of technical solution

- Web server : Apache
- Database server : MySQL
- Script language : PHP4
- Extensions : PHPLib
- HTML
- CSS

6. Distribution of work among the students

Our group contains five students : three German (Susanne, Tang and Gaudenz who works in Nice), and two French (Catherine and Laetitia).

Before starting this project, we had to define the task of each one. For that, we have cut of the project in different parts:

Definition of functionalities :

This first point has been developed by Catherine and Laetitia, and completed by Susanne and Tang, because this task needs the advice of everybody.

Design of the Web site :

Susanne worked on the design of the Web site. Our product must attract the customer, so the design is very important. The Web site must be user-friendly.

Data base structure :

Catherine and Laetitia created the data base, with MySql. This data base has to keep all the data seized by the customer, and has to allow to establish all calculations required to help the bank clerk. This data base must keep as password and login when the customer and the bank clerk want to connect them on the Web site.

Calculations :

To establish a loan to a customer, the bank clerk needs some calculations, which are kept in the data base. Catherine and Laetitia has seek all calculations required. For this, they have met some people who work in the domain of finance for start-up. With their informations, the main calculations has been kept in our Web site.

Security :

This part of our Web site is very important. Every Web site needs security to protect the datas. Tang was the responsible of this task.

Server :

Gaudenz established the link between the data base and the Web site.

Final documentation :

The documentation has been started by the French students, and completed by the German students. When the data base has been finished, Catherine and Laetitia wrote the documentation .

7. Functionalities

7.1 Actors

Actor name	Description	Use cases
Client or Customer	A client (customer), is a person who uses the web site to take out a loan.	<ul style="list-style-type: none">• Choose language of the user interface• Log in• Apply for a loan
Bank clerk	A bank clerk represents the bank offering loans.	<ul style="list-style-type: none">• Manage loan data• Manage Client data• Log in
Administrator	A special bank clerk with more rights, maintains users.	<ul style="list-style-type: none">• Manage users

7.2 Use Cases

Use Case 1: Choose language of user interface

Goal

The Client wants to change the language of the user interface to English, French or German.

Preconditions

- The user interface is available in the three languages.
- The default language is English.
- The mechanism to change languages is visible (on screen) to the user.

Success end condition

The whole user interface is presented in the language chosen by the Client.

Failed end condition

The language remains unchanged. (A message is presented to the Client to explain the failure and choices in light of failure.)

Primary actor

Client

Main success scenario

Step 1

Client selects the language change function.

Step 2

Client sees the available languages.

Step 3

Client chooses a language.

Step 4

Client is returned to the previous page he was in, with the language of the user interface changed according to the choice made by the Client.

Exceptions

Exception Step 3.1

Changing the language does not succeed. The language may be temporarily unavailable or there may be other technical problems. User is informed of the cause of the failure.

Use case 2: Log in**Goal**

A Client or a Bank clerk wants to log in to the system (in order to change data, etc.).

Preconditions

- The Client / Bank clerk is registered with the system.

Success end condition

The Client / Bank clerk is successfully logged in.

Failed end condition

The Client / Bank clerk cannot log in. (A message is presented to the Bank clerk or Client to explain the failure and choices in light of failure.)

Primary actor

Bank clerk, Client

Main success scenario

Step 1

Bank clerk / Client selects the log in facility.

Step 2

Bank clerk / Client enters his User-ID and password.

Step 3

Bank clerk / Client is informed that he is successfully logged in.

Exceptions

Exception Step 2.1

The User-ID and password are inconsistent. The Bank clerk / Client may try to log in again. (log in restrictions: user can only try to log in three times?)

Exception Step 2.2

The Bank clerk / Client cannot log in due to technical problems. The Bank clerk / Client is informed of the cause of the failure.

Use case 3: Apply for a loan (general case)

Goal

The Client wants to borrow money from the bank for his project (start up company).
The loan is calculated according to his needs.

Preconditions

- Client is logged in.

Success end condition

The Client is granted a loan.

Failed end condition

The Client cannot borrow money. (A message is presented to the Client to explain the failure and choices in light of failure.)

Primary actor

Client

Main success scenario

Step 1

Client enters his personal details and the necessary data of his project.

Step 2

Creditworthiness of the Client is analysed.
include Use case Credit investigation

Step 3

The details of the Client's loan are calculated according to his needs.

Step 4

Client is granted a loan. He is sent the credit contract.

Exceptions

Exception Step 1.1

If the Client is not already logged in, he has to log in now.

include Use case Log in

Exception Step 1.2

If the Client is not a registered user, a new user is added to the system.

include Use case Add a user

Exception Step 1.3

The data entered by the Client contains errors. The Client is told about his errors and given the opportunity to correct them.

Exception Step 2.1

The Client is not creditworthy. The Client is informed of the refusal of his application.

Exception Step 2.2

The Client does not get a positive answer to his application because of technical problems. The Client is informed of the cause of the failure.

Exception Step 3.1

The details of the loan cannot be calculated due to technical problems. The Client is informed of the cause of the failure.

8. Interfaces

Language:

The interface should be available in three different languages, German, French, English. The language can be selected by the user.

Components of the user interface:

- **Print Button**

Wherever necessary the page contains a button allowing the user to print the page

- **Log in mechanism**

On the starting page registered users may log in with their User ID and password. If they are not registered, they have the possibility to choose a login and a password and to register them.

- **Possible headings of the navigation bar**

- Privacy Policy
- Search
- Help
- Links
- Contact us
- Your Opinion

User Interface

- web browser (e.g. Netscape Navigator, Internet Explorer)

configuration of the browser:

- JavaScript enabled
- Java enabled
- Stylesheets enabled
- Cookies enabled

Hardware Interface

The user must have a basic configuration with an Internet connection.

Software Interface

- Web server: Apache (version 1.3.?)
- Database: MySQL (version?)

9. Data base structure

9.1 Formulaire

As soon as the customer was recorded it will have to fill a formulaire. This formulaire contains various parts, which correspond with differents tables in our data base.

These informations are arranged by set of priorities.

The customer has the possibility to save his data entry, thanks to a « SAVE » button.

It last, is present after every part of the formulaire.

Identity of requester :

These datas informs the bank clerk about the requester : his last name, his e-mail...

The datas asked are :

- Last name
- First name
- Date of birth (form 'YYYY-MM-DD')
- Address
- Telephone
- E-mail
- Nationality
- Family situation ('single', 'married', 'widower')

Project presentation :

All informations below, concern the customer's project. This data entry allow the system to carry out calculations which will help the bank clerk to accept or not the loan desired.

The datas asked are :

- Type of project (' creation'take_over' , ' expansion' , ' transfer' , ' extension')
- Address (of the new company)
- Date of starting activity (form 'YYYY-MM-DD')
- Number of employees
- Form legal (' SARL' , ' SA' , ' EURL' , ' SNC' , ' EI')
- Idea of turnover
- Amount of contributions
- Amount of investments
- Amount of loads of personnel
- Amount of others loads
- Type of activity (' feeding' , ' financing' , ' trade' , ' distribution' , ' energy' , ' environn' , ' investment' , ' sale' , ' marketing' , ' construction' , ' telecommunication' , ' public-works'
- Loan VAT (when a company is created the deductible VAT is not refunded immediately, which creates a lack of money for the company. The company can then envisage this debt by asking for a loan of VAT.
This is not obligatory.)
- Amount of loan VAT (If the customer wants a loan VAT, he indicates the amount)
- Amount of others debts (If the customer has other loans in progress, he indicates here their amount)

About loan

All informations asked here, concern the loan desired by the customer.

The datas asked are :

- Amount of loan desired (This amount is not obligatory. If the customer has an idea of an amount, he indicates it in this field. If he seized any amount, it is the banker who will propose one of them to him according to calculations' carried out by the system.)
- Duration desired (The customer is not obliged to seize a duration. If he does not seize one, it is the banker who will propose one of them to him according to calculations carried out by the system.
In a number of months.)

Complements on the requester

This part completes « Identity of requester ». It makes it possible to the bank clerk to better know his interlocutor, and of doubts to contribute it to the decision.

These informations complete the loan file. Some datas concern the professional experience, to know if the customer has experience in the field of his new activity ; and the last loan.

The datas asked are :

- Number of working years
- Category of last diploma
- Type of diploma
- Professional experience
- Date of last professional experience (to know if that made a long time that the customer stopped his activity. Form 'YYYY-MM-DD'.)
- Name of last enterprise
- Country of last enterprise
- Last activity ('feeding', 'financing', 'trade', 'distribution', 'energy', 'environment', 'investment', 'sale', 'marketing', 'construction', 'telecommunication', 'public_works')
- Nature of any outstanding loans
- Amount of last loan
- Amount of mounthly payements
- Period outstanding (in a number of months)
- Credit company
- Country of credit company
- Total salary of last activity
- Income tax paid
- Reasons for requesting the loan
- Type of capital
- Amount of capital

Complements on the project

This part completes « Project presentation ». It makes it possible to the bank clerk to better know the customer's project, and of doubts to contribute it to the decision.

These informations complete the loan file. Some datas concern the building and the outstanding renovation envisaged.

The datas asked are :

- Area (in m²)
- Reasons of take over

- Type of premise
- Date (form 'YYYY-MM-DD')
- Duration (in a number of months)
- Monthly payements
- Global amount
- Nature of product bought or rented
- Name of rent establishment
- Nature of estimation
- Invoicing company
- Description of outstanding renovation
- Unit price
- VAT
- Price including VAT
- Duration of renovation (in a number of months)

9.2 Calculations and explanation

To take decisions, the bank clerk needs some calculations. In our system, there are three main calculations.

- The percentage of contributions compared to loan desired must be at least 50%. If this percentage is less than 50%, there is a problem, and the bank clerk can reject the loan.
- The amount of Contributions and of Loan desired must be more than the amount of investment. If this is not the case, our system find a problem, and the bank clerk can reject the loan.
- The turnover expected must be superior to the loads. Loads include loads of personnel and other loads.

If all these criteria are respected the answer will be positive and the customer will obtain his loan except contrary mention by the bank clerk.

If none of these criteria is respected, the request for loan will be rejected.

If some of these three criteria are respected and the other are not, the bank clerk will take the decision to accept or reject the loan. To take this decision, he will ask the customer for more information.

10.Security

10.1. Grant user privilege

From the aspect of database access, four kinds of user are defined: loan manager, customer manager, executive manager, registered client.

All the users have USAGE privileges in the database, which includes eight tables : loan, Bank_clerk, Project_presentation, complements_on_the_Project, Identity_of_requester, complements_on_the_requester , Activity, Calculations.

1. Loan manager :

They manage the loan to be offered to the customs, make changes of the calculation according to the activity of the customer's project, therefore, they have ALL privileges to table "loan", "calculations" and SELECT privilege to table "Activity".

2. Customer manager :

They manage all the information offered by the registered clients, analyse the demand of the customers and their creditworthy, decide whether to invest a loan or not. They are granted to view all the tables about the loans and the customers, but not allowed to alter the information. Their decision are only to be saved.

They have SELECT privileges to table "loan", "Identity_of_requester", "complements_on_the_requester", "Activity", "project_presentation", "complements_on_the_Project".

3. Executive manager :

They view the decision of the customer manager, contact the clients and invest a loan; they should also inform the loan manager to update the loan offer. They can view all the information, but in principle don't make any changes.

They have ALL privileges to all the tables.

4. Registered client :

They can view all the loan offers and apply them but can't alter the loan table, they can also view and edit their personal data, but are not allowed to access any information of other clients.

They have SELECT privileges to table "loan"; have SELECT, UPDATE, INSERT, DELETE privileges to table "Identity_of_requester", "complements_on_the_requester", "Activity", "project_presentation", "complements_on_the_Project".

10.2 Backup Strategy

10.2.1 The Backup System

What to be protected :

All of the eight tables are the critical data and should be prevented from any data loss and damage. Program and application files stored in the system, which are easily restored from the original media are not mission-critical.

Data volume :

The data amount of the whole database is considered to be under 50GB.

How often does data change :

Data stored in table *Bank_clerk* are considered to be static since the staffs won't change for a relative long term, so they need only a single back up.

Data in other seven tables are assumed to be changed frequently, depending on the amount of the website reader, registered users and the offer, therefore these data should be backed up every specific period of time.

Maximum allowed recovery time:

Take account of the expected rate of the website viewer's flow and the general case, that the sale of loan is a cautious business activity, a maximum system offline time of three hours is acceptable for a recovery.

Backup platform (physical media):

According to the above mentioned technical parameters of the database and the requirements for system downtime, the DLT tape system is recommended to be used as portable media, since tape systems are generally the least expensive and least technologically complex of the choices on the market today, and the DLT driver at speeds of up to 5Mbps can generally meet the audit and reporting requirements of the system. At the same time, disk backup is also to be utilized as a combination, which would minimize losing a backup due to a media failure.

10.2.2 Three levels Protection :

In this backup strategy, a low end server in terms of RAM and number of processors is specified to use as a backup repository. This backup server can contain all of the backups from the individual applications using throughout the organization, is also the only one that generally has a tape device hooked to it, thus, in case of server crashes and the local disk failed, meanwhile the tape happened to be bad, the backup server can still proceed the recovery as normal.

The process of three levels Protection is as follows :

- Each of the individual servers backup their data to the local hard disk.
- Redirect all the backups to the backup server.
- The backups are then archived to tape for media.
- The tapes are then rotated offsite.

10.2.3 Backup Methodology

Considering the business requirements of system downtime and data loss, as well as the utilities provided by MySQL DBMS, two kinds of methodology showed below are planed to be used:

- Full Backups:

This methodology transfers a copy of all data within the scope of the backup to tape, regardless of whether the data has been changed since the last backup was performed.

- Incremental Backups:

Here, only those files that have changed since the last backup operation of any kind (full or incremental) will be transferred to tape.

10.2.4 Tape Rotation Scheme

By reusing tapes after a predetermined period of time, tape rotation schemes ensure that a minimum number of tapes are stored off-site.

1. Full backups are done monthly, the backups are stored both in local hard disk backup server disk, and immediately stored offsite in tapes.
2. Weekly full backups are also performed, and these are generally held on-site in the backup server for the week of their use, then moved off-site for a predetermined number of two weeks' cycles.
3. Daily incremental backups are performed and stored on-site for the week of their use as well both in local server and the backup server disk, then moved off-site with the corresponding weekly backup on the same cycle schedule.

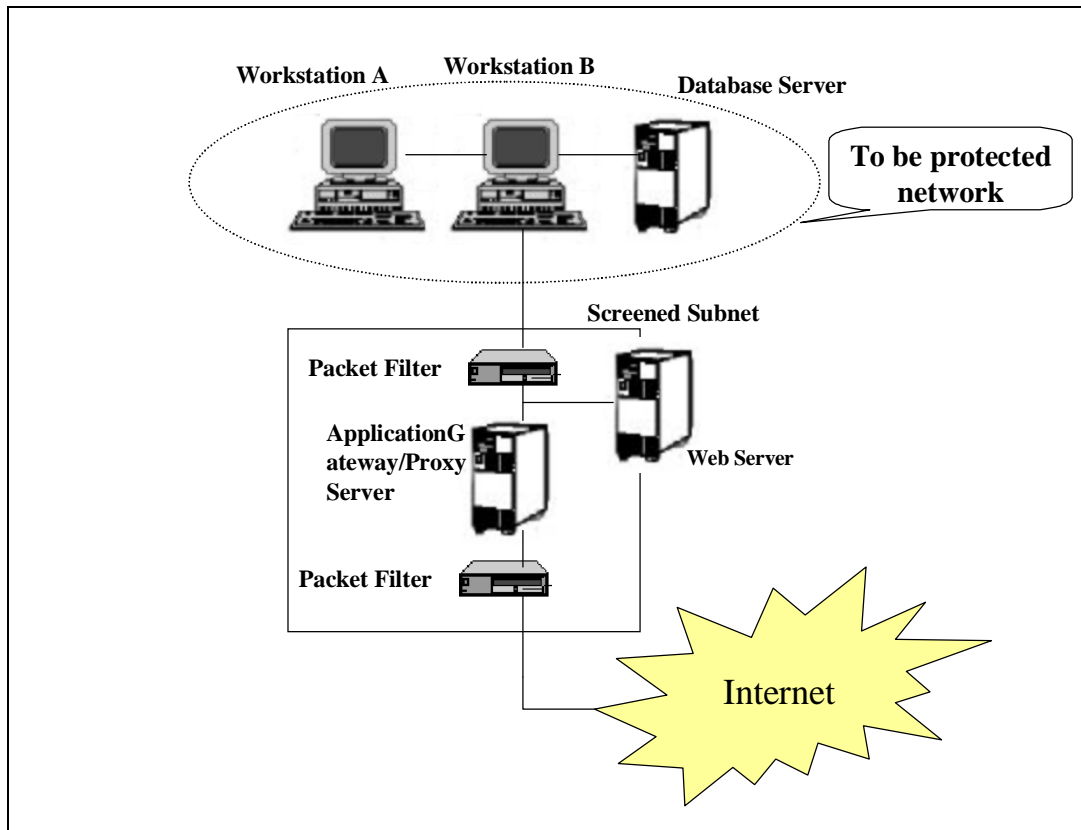
At the end of a cycle for a set of tapes, those tapes can be returned to the system and reused. Each monthly tape would be held for 12 months before being reused. The monthly backups to be immediately stored in a secure location, while the most current weekly full backups and incremental backups are housed for immediate use in restoration.

10.2.5 Data Backup Manipulation in MySQL

- Incremental backup :
Run the MySQL server with logging by starting it with
SAFE_MYSQLD --LOG-UPDATE &
- Full backup :
Perform mysqldump weekly and monthly. Specifying the --flush -logs option to automatically flush logs each time doing a dump.

10.3 Firewall Architecture

This firewall system consists of two packet filter as screened subnet and a dual-homed application gateway. The dual-homed application gateway runs proxy software, has two network interfaces and blocks all traffics passing through it. The two packet filter communicate only with the dual-homed application gateway and the network on each side, protect the proxy server against the attacks from network of both sides. Diverse operation systems are used on different active firewall-elements because of security reason, e.g. an UNIX-operation system for the Application Gateway and a real-time-operation system for the packet filter. The packet filters interpret the transferred packet from bottom to top on the data link, network and transport layers while the dual-homed application gateway interprets the communication on the application layer.



11. Evolutions of our project

Our project could make it possible to establish a communication between the customer and the bank clerk, when the customer clicked on a button which will compose the telephone number of the bank and the possibility of conversion of the call into a visio conference between the customer and the bank clerk.

12. Assessment of work in group and remotely / Contribution and difficulties met

The remote work requires a perpetual communication between the various members of the group, which must be held to inform of the evolutions and work of each one.

It is easier to communicate by mail than by visio conference, because we can seek our words and our sentences. The visio conference makes it possible to have an immediate answer to a question. It is interactive. But it needs proper preparation beforehand and everybody is shy of talking at a video conference (I suppose partly due to the bad quality regarding voice and image transfer and due to the use of a non-native language as a means of communication).

This project enabled us to discover other working methods, and their adequacies.

The communication being done in English, that enabled us to develop our English practice and to learn a precise vocabulary (field of finance). The usage of the non-native language results in problems understanding the written word (e.g. mails, documents).

Because of the vast geographical distance between the participants it is easy to get out of touch and neglect the work on the project.

As a result of the distance problems in understanding the ideas and work of the others may occur because it is more tedious to write back and ask by mail, if you don't get a thing than it would be the case if you were on the scene and could ask your project partners directly and on the spot.

To conclude, our project brought us much as much at the relational level, the linguistic level and the professional level.

This experiment was very enriching at various levels, we advise it and let us remake it if we had of it opportunity.

13. Acknowledgement

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