DocNo: 001.C.4:1

X-Note
Feasibility Analysis Report
Version 1.0

By:
X-Note Developers
2019-03

Group Member:
Jingyu Li
Du Liu
Yu Fan
Qiuxuan Ling
Shixuan Gu

Document Language:
English

Revision History

Date	Version	Description	Author
04/06/2019	1.0	Finish the 1st edition of feasibility analysis report	Yu Fan, Qiuxuan Ling

Contents

1. Introduction

1.1 Propose

From ancient times, there exists large amount of need to take notes for better understanding of the knowledge. The old method is taking notes by notebooks and pens, which is inconvenient and inefficient because we should take a notebook and a pen with us all the day, and sometimes we may lose our notebook incautiously.

But with the rapid development of software, there comes into being a new method to take notes: taking notes via our digital device, synchronizing our notes to all our device with the same account, and save the notes in the cloud space. So we don't need to bring a notebook with us all the day and worry losing our notebooks. To some extent, this method is more efficient than the old one.

This note-taking software is named as X-Note. And this document is written for the teacher of software engineering and the user, like students and university teachers, to have an overall understanding of this software.

1.2 The Function of this Document

(1) By surveying the marketplace of desktop note-taking apps, set up the feasibility analysis report of the system preliminarily, audit and arrange the problems and solutions generated during the period of the software development properly. Determine the goal of this project specifically by comprehending the economic benefits and the risks.
(2) Record the arrangement of the personnel, expenditure, and the system resource in the form of document, making it easier for the software developers and relative staff to check this project.
(3) Hand in this document to the leader to audit.

1.3 Background

(1) The name of this software system: X-Note
(2) The name of the project presenter: Jian Cao
(3) The developers of this project: Jingyu Li, Du Liu, Shixuan Gu, Yu Fan, Qiuxuan Ling.
(4) The aimed user groups: students, teachers and other people having the need to take notes.
(5) The supported platforms: Windows, macOS and Linux.
(6) This software system's relationship between other software systems: the system is independent, while we may use some open source codes to build our system.

1.4 Definition

Please look at the reference vocabulary.

1.5 Reference Material

(1) Object-Oriented Software Engineering: Using UML, Patterns, and Java

2. Presupposition

2.1 Requirement

2.1.1 Functions

(1) User register and login. Or users can use WeChat account to login.

(2) Create note, edit note, save note and close note.
(3) Support both markdown and ordinary text format.
(4) Cloud synchronization users' note.
(5) Search key word in users' note.
(6) Generate mind maps automatically.
(7) Personalized users' interface style.
(8) Output html and pdf files.
(9) Support multiple platforms, including Windows, Linux and macOS.
(10) Support generating a sharing html link of users' note.

2.1.2 System Performance

(1) System processing capacity: The basic function such as creating and editing note, outputting pdf files can be down off-line. But the cloud synchronization will need on-line space to store the users' note. This space should be at least 1 TB, and every user has at most 1 GB space. So the system could support at most 1000 users.
(2) Time requirement: Under the premise of proper hardware and software support, daily operations, like creating, editing and saving notes should take no more than 0.5s, searching key word should take no more than 10s and generating mind maps should take no more than 5s.

2.1.3 Input Data

(1) User information:
Source: user registration
Type: composite types of data.
Number: <10000 ,> 5000;
Composition: user ID(integer), user name (string), contact information(string), e-mail(string)
(2) Note information:
Source: user input
Type: composite types of data(
Composition: date (string), title (string), notes (composite types of data)

2.1.4 Output Data

(1) Pdf and html files:
Meaning: the final output form of the notes.
Produce frequency: according to how often the user use this system.
Port: none
(2) Mind maps:
Meaning: a graph to let the user better understanding their notes.
Produce frequency: according to how often the user use this system.
Port: none.
(3) Sharing links:
Meaning: a hyperlink for the user to share his note with others.
Produce frequency: relatively higher.
Port: none.

2.1.5 Requirement in Safety and Secrecy

(1) User can only visit the note in their own account.
(2) The encryption of the user's password need further discussion.

(3) The safety of WeChat ID authorization need consideration.
(4) The cloud space may be built on the Ali Cloud to ensure safety.

2.1.6 Deadline

Jun 1st, 2019

2.2 Objective

Nowadays, taking notes plays an important role in people's daily study. But the old method, using notebooks and pens, is inconvenient to some extent, because users need carry certain subject notebooks, for example, users will not make math notes in their English notebooks and they should take many kinds of notebooks with them. And the existing note taking software can't give the users an overall understanding of the notes they make. So a new note-taking software is in urgent need. With our X-Note software, the user can not only take down formulas and codes easily, but also have a deep understanding of the notes they take via the mind maps and time line X-Note produces. So the X-Note can have great benefits to the users and improve their study efficiency.

2.3 Condition, Supposition and Limitation

(1) Minimum life time of system: 2 years
(2) Time to select suitable solution: 2 weeks
(3) Our system is sponsored directly by software engineering department of Shanghai Jiaotong University, both technically and financially.
(4) Hardware: servers and personal computers.
(5) Software: Windows, Linux and macOS
(6) Time to put the system into use: June 1st, 2019.

2.4 Feasibility Analyzing Method

(1) Building models to confirm the function requirement and cost of our system.
(2) Asking professors for consultation.
(3) Get SJTU students' feedback by using some questionnaire.

2.5 Evaluation Criteria

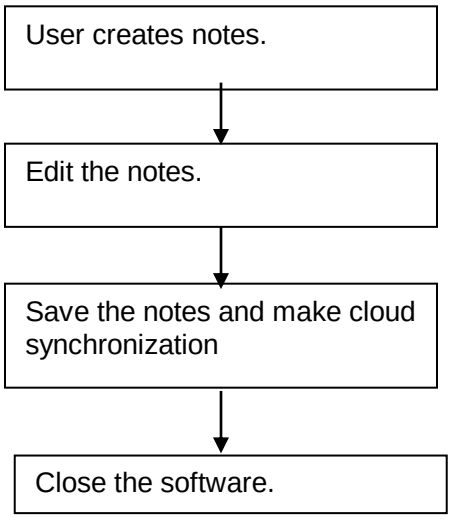
The criteria of evaluating the system are:
(1) Functions supported or provided by the system.
(2) Time and financial cost to develop the system.
(3) The usability of the system.
(4) The user number of the system.

3. Existing System Analysis

The existing note-taking software, like One Note, doesn't support much functions, like producing mind maps based on user's notes, show the user their notes in time order and compat notes in markdown form. So it is inefficient to use this software, which imposes restrictions on the scale of the users. That is why a new kind of note-taking software is needed.

3.1 Workflow and Dataflow

The ordinary workflow and dataflow is as follows.



3.2 Working Load

Since the software doesn't support markdown and produce mind maps, other software will be needed if the user wants to get the same result. This is quite exhausting. The working load is almost same as taking notes using notebooks.

3.3 Expenditure

Large amount of money is needed to maintain the software. Usually 50000 per month.

3.4 Personnel

Many employees will be needed for customer service, debugging and developing new functions.

3.5 Devices

To use this software, just a computer or PDA is enough. To maintain this software, cloud server will be needed.

3.6 Limitation

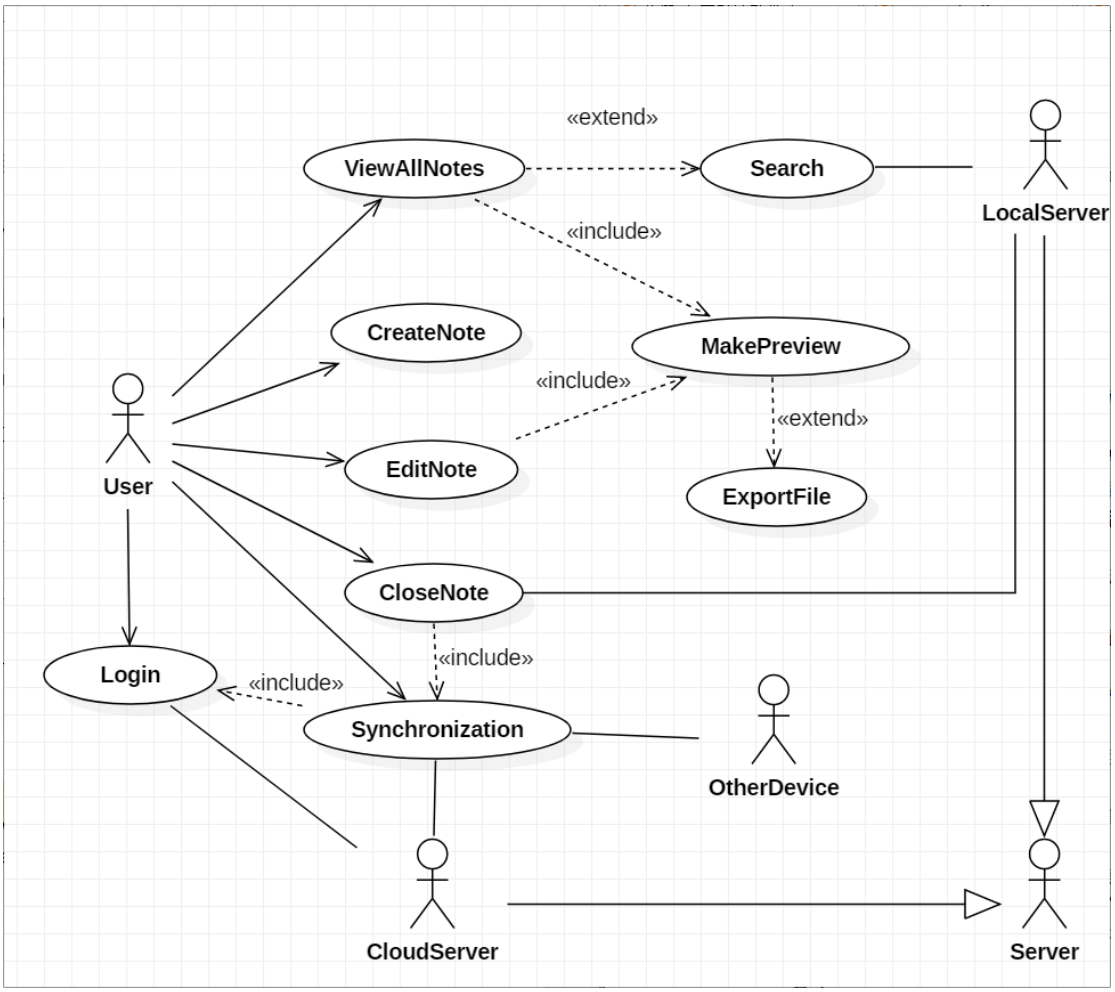
(1) don't support notes in the form of markdown.
(2) don't produce mind maps.
(3) don't show notes in time order.
In a word, this software is inefficient and lack some useful function.

4. Proposed System

4.1 Introduction to the Proposed System

The system is aimed to solve the problems the user meet when using the existing system. With the proposed system, the user can easily insert markdown codes, view the notes in time order, produce mind maps based on the notes and get pdf files or html sharing links. This will make great benefits to their study.

4.2 Workflow and Dataflow



4.3 Improvement

Just as mentioned above, the proposed system adds many other functions and compats markdown codes.

4.4 Impacts

4.4.1 Impacts to the Devices

The server will be installed on the server of the SJTU Network Information Center, the SJTU NIC needs to provide relative system installation and running space. For any user want to use this software, he needs a computer and at least 512MB main memory.

4.4.2 Impacts to the Software

None.

4.4.3 Impacts to the User

The aimed user group is the university students and teachers, this system will improve their work efficiency, and a detailed specification is needed to make the user familiar with the system.

4.4.4 Impacts to the Run-time Process

By analyzing the workflow and dataflow, we can know the impacts to the run-time process.

(1) The operations flow of the user: The user can make any note-taking operation the system offers and get the file he needs. If he wants to search something, he can use the local server for search.
(2) The operations flow of the cloud server: when the user closes the notes, the notes will be saved automatically, and a copy of the note will be sent to the cloud server as the synchronization file.
(3) the relationship between the cloud server and the user: the cloud server doesn't influence the user's daily use of the software, and the cloud server only synchronizes the user's notes so the user can visit his notes in different devices.
(4) the operation of the source data: the data from the user's side, will be encrypted firstly and then sent to the cloud server, the cloud server will store the encrypted data. And when the user needs the source data, the cloud server will decode the data and send it to the user.
(5) the requirements for the data storage and data recovery: the data should be stored safely and properly. To write or read data from the system, certain access is necessary. Also, a mirror image backup of the data should be stored in another cloud server to ensure safety.
(6) the operations flow of the output report: when running the system, log should be printed out at regular intervals. The maintenance personnel should check the output report regularly, find the potential problems and report them. The report should be stored on other data storage hardware and the relative access should be open to all maintenance personnel.'
(7) the results of the system failure and the method to recover it: the obvious result is that this system stop working, user can't synchronize data. Once the system collapses, the port to receive user data should be closed. And the system should consider special operations to deal with the emergency. Meanwhile, the maintenance personnel should begin troubleshooting and save the present data. After solving the problems, maintenance personnel should recover the data based on the saved data and the data on the mirror image, illustrate the situations to the users and minimize the influence of the system failure.

4.4.5 Impacts to Development

User should give feedbacks of the software, expressing improvements and bugs they meet.
Development team members should be familiar with the technical the system uses.

4.4.6 Expenditure

The system is developed by students, so the development fee isn't too much.
The system development fee: 5000 yuan.
For the maintenance charge, the system is built on the network information center of SJTU, and the developers can maintain the software themselves. So the maintenance charge can be low, 500 yuan per month. So 17000 yuan is necessary to support the system for 2 years.

4.5 Limitation

The system involves many kinds of functions, so the system's stability may be lowered. And to encrypt the data, the speed of synchronization may be slower, which may have a bad influence in the user experience.

4.6 Technique Capability

(1) In the current situation, if we want to make a different note-taking software, then all the superior functions need be finished.
(2) Using current techniques, developers should have a deep understanding of Electron framework and JavaScript, which is the base of the software.
The Electron framework is efficient in developing software like X-Note. It uses Node.js runtime for the backend and Chromium for the frontend so it enables us to use web technologies, like JavaScript, CSS and HTML to build desktop Apps. We may use the open source code from markdown official to do the markdown support part of our App. And since it is written in JavaScript so we will mainly use CSS and HTML. It will contain A text editor, a typeset view, a mind map view and a timeline to record the use. We believe a simple style is appropriate while also give the users options to create their own style.
(3) Our developing team is made of 5 people with more than 2 years development experience and necessary ability. The team is well-organized and united.
(4) After preliminary assessment, the develop target can be finished before the deadline.

5. Alternative Solution

There exist lots of similar software in the market, and they can be regarded as alternate solutions. But our software makes great progress compared with them. So the alternate solution is using the current software.

6. Cost/Benefit Analysis

6.1 Cost

6.1.1 Cost for Infrastructure

(1) Hardware Devices: Server (one or more than one)
5 Personal Computers
Storage (Array Disk, Compact Disk)

(2) Software: Windows 10 by Microsoft
Electorn
(3) Facilities:

Office facilities: 2 air-conditions
Net construction: Net wire, Net Adaptation, Hub
Security Device: Firewall
(4) Update the original system
(5) Necessary place to locate hardware device
(6) Cost of fixing hardware and software
(7) Cost of recruiting employers

6.1.2 Other Cost for One-off Investment

(1) Requirement Research & Design Research
(2) Develop Plan Research & Measure Criterion Research
(3) Cost of employing consultant
(4) Database Construction
(5) Cost for start project
(6) Cost for technology management
(7) Insurance for employers
(8) Pension for employers
(9) Training Fee

6.1.3 Non-one-off Investment

(1) Device rent and cost to maintain
(2) Software rent and cost to maintain
(3) Cost of data storage
(4) Salary and Premium for employers
(5) Cost of the communication between team members
(6) The office and space rent
(7) Cost of Advertisement
(8) Public facility expense
(9) Other necessary usual expense such as the electric and water expense

6.2 Benefit

As for benefits, there exists three ways to get benefits. One is that we sell this software to school or other company and get immediate benefits, another is that we maintain this software ourselves and get benefits from selling VIP and advertisements. The last is that we can this software totally free to everyone and get benefits by donations.

6.2.1 One-off Benefit

Imagine that once we sell this software, we can get 20000 yuan as income.

6.2.2 Non-One-off Benefit

We can consider the commercial model used by BaiduNetDisk, let the user use the software freely and consider advertisements and selling VIP as non-one-off benefits. The VIP can have larger cloud space and non-advertisements service. Imagine every year we have 15000 yuan from advertisement and 10000 yuan from selling VIP. According to the expenditures in 4.4.6, the maintenance fee is 500 yuan per month, i.e. 6000 yuan per year. So we can get 19000 yuan per year as benefits.

6.2.3 Immeasurable Benefit

The software can improve the users' daily work efficiency improve the students school life satisfaction.

6.3 Benefit/Cost Ratio

According to similar software and our experience in development, we suppose the life cycle of this software is over 2 years, the development cost, according to 4.4.6, is 5000 yuan.
If we sell the software at once, we can get 20000 yuan at a time, and the benefit is 15000 yuan and the cost/benefit ratio is 15000/5000 = 3
If we maintain the software ourselves, then we can get 19000 yuan per year, and assume the annual interest rate of the bank is 5%, then we can get this table below:

Year	Income/ yuan	$1/(1+5\%)^n$	Discounted value
1	19000	0.95	18050
2	19000	0.91	17290

So the benefit/cost ratio is:
(18050+17290)/5000 = 7.068

6.4 Investment Return Period

If we sell the software, then the investment will be returned as soon as the software is sold.
If we maintain the software, then the investment will be returned in one quarter.

6.5 Sensibility Analysis

Life cycle of the system: 2 years
Workload of the system: medium
Working type of the system: data processing
Speed of the system: the daily use speed of the system is mainly depended on the user's computer.
Software requirement: this software doesn't require special software.

7. Other Social Factors

7.1 Law Based Factors

(1) This system may use some open-source code, if we want to put it into commercial use, some modification should be made, and we should ask professional legal experts for suggestions.
(2) This system involves user's private information, and to avoid potential legal risks, a detailed user agreement should be made.

7.2 Usability Based Factors

As mentioned above, the main user group is the university students and teachers, most of them are familiar with computer operations and have strong ability to learn new knowledge. So there will be no problems for them to use this system after reading the user instruction.

8. Conclusion

We can get a conclusion from the all the analyze aboved: we can start the project at once.