SAFE AND SECURE LOCATION SHARING PLATFORM

A "Real Time Research Project" Report submitted to

JNTU Hyderabad in partial fulfilment

of the requirements for the award of the degree

BACHELOR OF TECHNOLOGY

In

CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

Submitted by

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MALLA REDDY INSTITUTE OF TECHNOLOGY & SCIENCE

(Approved by AICTE New Delhi and Affiliated to JNTUH)

(Accredited by NBA & NAAC with "A" Grade)

An ISO 9001: 2015 Certified Institution

Maisammaguda, Medchal (M), Hyderabad-500100, T. S.

MAY 2025

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CERTIFICATE

This is to certify that the Real- Time Research Project entitled "SAFE AND SECURE LOCATION SHARING PLATFORM" has been submitted by KARROLLA REKHA (23S11A6692), KOYYADA RAMYA (23S11A6694), SINGARI SAMYUKTHA (23S11A66C3) in partial fulfilment of the requirements for the award of BACHELOR OF TECHNOLOGY in CSE(AI&ML). This record of Bonafide work carried out by them under my guidance and supervision. **The result embodied in this Real-Time Research Project report has been submitted to any other University or Institute for the award of any degree.**

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ACKNOWLEDGEMENT

The Real-Time Research Project work carried out by our team in the Department of CSE (Artificial intelligence and Machine Learning), Malla Reddy Institute of Technology and Science, Hyderabad. ***This work is original and has not been submitted in part or full for any degree or diploma of any other university.***

We wish to acknowledge our sincere thanks to our project guide **Dr. Vaka Murali Mohan**, Principal and Professor of CSE, guidance and his continuous supervision during the course of work.

We acknowledge our sincere thanks **to Dr. Vaka Murali Mohan, Principal** and **Dr. A. Nagaraju** Head of the Department and Coordinator, faculty members of CSE Department for their kind cooperation in making this Real- Time Research Project work a success.

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INDEX

Chapter	Page No.
LIST OF FIGURES	**VI**
ABSTRACT	**VII**
1. SYSTEM ANALYSIS	**1**
1.1 Existing System	1
1.1.1 Disadvantages	1
1.2 Proposed System	1
1.2.1 Advantages	2
1.3 Introduction	3
2. LITERATURE SURVEY	**7**
3. SYSTEM DESIGN	**9**
3.1 System Architecture	9
3.2 Data Flow Diagram	10
3.3 UML Diagrams	12
3.4 System Requirements	17
3.4.1 Software Requirements	17
3.4.2 Hardware Requirement	17
4. INPUT & OUTPUT DESIGN	**18**
4.1 Input Design	18
4.2 Output Design	18
5. SYSTEM ENVIRONMENT	**20**
6. SYSTEM STUDY	**36**
6.1 Feasibility study	36
6.1.1 Economical feasibility	36
6.1.2 Technical feasibility	36
6.1.3 Social feasibility	36
7. SYSTEM TESTING	**37**
7.1 Testing methodologies	37
7.1.1 Unit Testing	37
7.1.2 Integration Testing	37
7.1.3 Functional Testing	37
7.1.4 System Testing	38
7.1.5 White Box Testing	38
7.1.6 Black Box Testing	38
7.2 Unit Training	38
7.3 Integration Testing	39

7.4 Acceptance Testing 39

8. RESULTS 40

9. CONCLUSION & FUTURE ENHANCEMENT 45

9.1 Conclusion 45

9.2 Future enhancement 45

10. Bibliography 46

11. YUKTHI CERTIFICATE 48

LIST OF FIGURES

Figure. No	Figure	Page
Chapter1: fig1	structure of mobile computing	3
Chapter3: fig2	block diagram	9
Chapter3: fig3	data flow diagram	11
Chapter3: fig4	use case diagram	13
Chapter3: fig5	class diagram	14
Chapter3: fig6	sequence diagram	15
Chapter3: fig7	activity diagram	16
Chapter4: fig8	execution process	21
Chapter4: fig9	JVM	21
Chapter4: fig10	Java platform	22
Chapter4: fig11	Java JDE	23
Chapter4: fig12	working of compilation and interpretation	28
Chapter4: fig13	flowchart of TCP/IP stack	29
Chapter4: fig14	General J2ME architecture	32
Chapter8: fig15	User Interface	40
Chapter8: fig16	User Interface	41
Chapter8: fig17	Login Page	41
Chapter8: fig18	Location Page	42
Chapter8: fig19	One Time Password Page	42
Chapter8: fig20	User Information Page	43
Chapter8: fig21	Location page to share	43
Chapter8: fig22	Location sharing page	44

ABSTRACT

Using geosocial applications, such as Four Square, millions of people interact with their surroundings through their friends and their recommendations. Without adequate privacy protection, however, these systems can be easily misused, for example, to track users or target them for home invasion. In this paper, we introduce LOCX, a novel alternative that provides significantly improved location privacy without adding uncertainty into query results or relying on strong assumptions about server security. Our key insight is to apply secure user-specific, distance-preserving coordinate transformations to all location data shared with the server. The friends of a user share this user's secrets so they can apply the same transformation. This allows all location queries to be evaluated correctly by the server, but our privacy mechanisms guarantee that servers are unable to see or infer the actual location data from the transformed data or from the data access. We show that LOCX provides privacy even against a powerful adversary model, and we use prototype measurements to show that it provides privacy with very little performance overhead, making it suitable for today's mobile devices.

CHAPTER-1: SYSTEM ANALYSIS

1.1 EXISTING SYSTEM:

Existing systems have mainly taken three approaches to improving user privacy in geosocial systems:

- Introducing uncertainty or error into location data.
- Relying on trusted servers or intermediaries to apply anonymization to user identities and private data.
- Relying on heavy-weight cryptographic or private information retrieval (PIR) techniques

None of them, however, have proven successful on current application platforms. Techniques using the first approach fall short because they require both users and application providers to introduce uncertainty into their data, which degrades the quality of application results returned to the user. In this approach, there is a fundamental trade of between the amount of error introduced into the time or location domain, and the amount of privacy granted to the user. Users dislike the loss of accuracy in results, and application providers have a natural disincentive to hide user data from themselves, which reduces their ability to monetize the data. The second approach relies on the trusted proxies or servers in the system to protect user privacy. This is a risky assumption, since private data can be exposed by either software bugs and configuration errors at the trusted servers or by malicious administrators. Finally, relying on heavy-weight cryptographic mechanisms to obtain provable privacy guarantees are too expensive to deploy on mobile devices and even on the servers in answering queries such as nearest neighbour and range queries.

1.1.1 DISADVANTAGES OF EXISTING SYSTEM:

- Location data privacy. The servers should not be able to view the content of data stored at a location.
- This new functionality comes with significantly increased risks to personal privacy.

1.2 PROPOSED SYSTEM:

In this paper, we propose LOCX (short for location to index mapping), a novel approach to achieving user privacy while maintaining full accuracy in location-based social applications (LBSAs from here on ward). Our insight is that many services do not need to resolve distance-

based queries between arbitrary pairs of users, but only between friends interested in each other's locations and data. Thus, we can partition location data based on users' social groups, and then perform transformations on the location coordinates before storing them on untrusted servers. A user knows the transformation keys of all her friends, allowing her to transform her query into the virtual coordinate system that her friends use. Our coordinate transformations preserve distance metrics, allowing an application server to perform both point and nearest-neighbour queries correctly on transformed data. However, the transformation is secure, in that transformed values cannot be easily associated with real-world locations without a secret, which is only available to the members of the social group. Finally, transformations are efficient, in that they incur minimal overhead on the LBSAs. This makes the applications built on LOCX lightweight and suitable for running on today's mobile devices.

1.2.1 ADVANTAGES OF PROPOSED SYSTEM:

- Our goal is to support both query types in an efficient fashion, suitable for today's mobile devices.
- Flexibility to support point, circular range, and nearest-neighbour queries on location data.
- Strong location privacy. The servers processing the data (and the administrators of these servers) should not be able to learn the history of locations that a user has visited.

1.3 INTRODUCTION

What is Mobile Computing?

Mobile computing is the discipline for creating an information management platform, which is free from spatial and temporal constraints. The freedom from these constraints allows its users to access and process desired information from anywhere in the space. The state of the user, static or mobile, does not affect the information management capability of the mobile platform. A user can continue to access and manipulate desired data while traveling on plane, in car, on ship, etc. Thus, the discipline creates an illusion that the desired data and sufficient processing power are available on the spot, where as in reality they may be located far away, Otherwise **Mobile computing** is a generic term used to refer to a variety of devices that allow people to access data and information from where ever they are.

Fig 1: Structure of mobile computing

Different types of devices used for the mobile computing:

1. Personal digital assistant/enterprise digital assistant
2. Smartphones
3. Tablet computers
4. Netbooks
5. Ultra-mobile PCs
6. Wearable computers
7. Palmtops/pocket computers

Applications of Mobile Computing:

1.Vehicles:

Tomorrow's cars will comprise many wireless communication systems and mobility aware applications. Music, news, road conditions, weather reports, and other broadcast information are received via digital audio broadcasting (DAB) with 1.5 M-bits/s. For personal communication, a global system for mobile communications (GSM) phone might be available offering voice and data connectivity with 384 k-bits/s. For remote areas satellite communication can be used, while the current position of the car is determined via global positioning system (GPS). Additionally, cars driving in the same area build a local ad-hoc network for fast information exchange in emergency situations or to help each other keeping a safe distance. In case of an accident, not only will the airbag be triggered, but also an emergency call to a service provider informing ambulance and police. Cars with this technology are already available. Future cars will also inform other cars about accidents via the ad hoc network to help them slowdown in time, even before a driver can recognize the accident. Buses, trucks, and train are already transmitting maintenance and logistic information to their home base, which helps improve organization (fleet management), and thus save time and money.

1.2 Emergency:

Just imagine the possibilities of an ambulance with a high-quality wireless connection to a hospital. After an accident, vital information about injured persons can be sent to the hospital immediately. There, all necessary steps for this particular type of accident can be prepared or further specialists can be consulted for an early diagnosis, Further more wireless networks are the only means of communication in the case of natural disasters such as hurricanes or earthquakes.

1.3 Business:

Today's typical traveling salesman needs instant access to the company's database: to ensure that the files on his or her laptop reflect the actual state, to enable the company to keep track of all activities of their traveling employees, to keep databases consistent etc., with wireless access, the laptop can be turned into a true mobile office.

Benefits of Mobile Computing:

- Improve business productivity by streamlining interaction and taking advantage of immediate access

- Reduce business operations costs by increasing supply chain visibility, optimizing logistics and accelerating processes
- Strengthen customer relationships by creating more opportunities to connect, providing information at their fingertips when they need it most
- Gain competitive advantage by creating brand differentiation and expanding customer experience
- Increase work force effectiveness and capability by providing on-the-go access
- Improve business cycle processes by redesigning work flow to utilize mobile devices that interface with legacy applications

Advantages of Mobile Computing:

Mobile computing has changed the complete landscape of human being life. Following are the clear advantages of Mobile Computing:

1. **Location flexibility:**

This has enabled user to work from anywhere as long as there is a connection established. A user can work without being in a fixed position. Their mobility ensures that they are able to carry out numerous tasks at the same time perform their stated jobs.

2. **Saves Time:**

The time consumed or wasted by travelling from different locations or to the office and back, have been slashed. One can now access all the important documents and files over a secure channel or portal and work as if they were on their computer. It has enhanced telecommuting in many companies. This also reduces unnecessary expenses that might be incurred.

3. **Enhanced Productivity:**

Productive nature has been boosted by the fact that a worker can simply work efficiently and effectively from which ever location they see comfortable and suitable. Users are able to work with comfortable environments.

4. **Ease of research:**

Research has been made easier, since users will go to the field and search for facts and feed them back to the system. It has also made it easier for field officer and researchers to collect and feed data from wherever they without making unnecessary trip to and from the office to the field.

5. **Entertainment:**

Video and audio recordings can now be streamed on the go using mobile computing. It's easy to access a wide variety of movies, educational and informative material. With the improvement and availability of high-speed data connections at considerable costs, one is able to get all the entertainment they want as they browser the internet for streamed data. One can

be able to watch news, movies, and documentaries among other entertainment offers over the internet. This was not such before mobile computing dawned on the computing world.

6. **Streamlining of Business Processes:**

Business processes are now easily available through secured connections. Basing on the factor of security, adequate measures have been put in place to ensure authentication and authorization of the user accessing those services.

Some business functions can be run over secure links and also the sharing of information between business partners. Also, it's worth noting that lengthy travelling has been reduced, since there is the use of voice and video conferencing.

Meetings, seminars and other informative services can be conducted using the video and voice conferencing. This cuts down on travel time and expenditure.

CHAPTER-2: LITERATURE SURVEY

1). Blind Evaluation of Nearest Neighbor Queries Using Space Transformation to Preserve Location Privacy

AUTHORS: A. Khosh Gozaran and C. Shahabi

In this paper we propose a fundamental approach to perform the class of Nearest Neighbor (NN) queries, the core class of queries used in many of the location-based services, without revealing the origin of the query in order to preserve the privacy of this information. The idea behind our approach is to utilize one-way transformations to map the space of all static and dynamic objects to another space and resolve the query blindly in the transformed space. However, in order to become a viable approach, the transformation used should be able to resolve NN queries in the transformed space accurately and more importantly prevent malicious use of transformed data by untrusted entities. Traditional encryption-based techniques incur expensive O(n) computation cost (where n is the total number of points in space) and possibly logarithmic communication cost for resolving a KNN query. This is because such approaches treat points as vectors in space and do not exploit their spatial properties. In contrast, we use Hilbert curves as efficient one-way transformations and design algorithms to evaluate a KNN query in the Hilbert transformed space. Consequently, we reduce the complexity of computing a KNN query to O (K × 22N/n) and transferring the results to the client in O(K), respectively, where N, the Hilbert curve degree, is a small constant. Our results show that we very closely approximate the result set generated from performing KNN queries in the original space while enforcing our new location privacy metrics termed u-anonymity and a-anonymity, which are stronger and more generalized privacy measures than the commonly used K-anonymity and cloaked region size measures.

2). PRIVE: Anonymous Location-Based Queries in Distributed Mobile Systems

AUTHORS: G. Ghinita, P. Kalnis, and S. Skiadopoulos

tutorial article, which has been submitted for publication in a journal or for consideration by the commissioning organization. The report represents the ideas of its author, and should not be taken as the official views of the School or the University. Any discussion of the content of the report should be sent to the author, at the address shown on the covers.

3). Enhancing Security and Privacy in Traffic-Monitoring Systems

AUTHORS: B. Hoh, M. Gruteser, H. Xiong, and A. Alrabady

Intelligent transportation systems increasingly depend on probe vehicles to monitor traffic: they can automatically report position, travel time, traffic incidents, and road surface problems to a telematics service provider. This kind of traffic-monitoring system could provide good coverage and timely information on many more roadways than is possible with a fixed infrastructure such as cameras and loop detectors. This approach also promises significant reductions in infrastructure cost because the system can exploit the sensing, computing, and communications devices already installed in many modern vehicles. This architecture separates

data from identities by splitting communication from data analysis. Data suppression techniques can help prevent data mining algorithms from reconstructing private information from anonymous database samples.

4). Space twist: Managing the Trade-Offs among Location Privacy Query Performance and Query Accuracy in Mobile Services

AUTHORS: M.L. Yiu, C.S. Jensen, X. Huang, and H. Lu

In a mobile service scenario, users query a server for nearby points of interest but they may not want to disclose their locations to the service. Intuitively, location privacy may be obtained at the cost of query performance and query accuracy. The challenge addressed is how to obtain the best possible performance, subjected to given requirements for location privacy and query accuracy. Existing privacy solutions that use spatial cloaking employ complex server query processing techniques and entail the transmission of large quantities of intermediate result. Solutions that use transformation-based matching generally fall short in offering practical query accuracy guarantees. Our proposed framework, called Space Twist, rectifies these shortcomings for k nearest neighbor (K NN) queries. Starting with a location different from the user's actual location, nearest neighbors are retrieved incrementally until the query is answered correctly by the mobile terminal. This approach is flexible, needs no trusted middleware, and requires only well-known incremental NN query processing on the server. The framework also includes a server-side granular search technique that exploits relaxed query accuracy guarantees for obtaining better performance. The paper reports on empirical studies that elicit key properties of Space twist and suggest that the framework offers very good performance and high privacy, at low communication cost.

5). Position Transformation: A Location Privacy Protection Method for

Moving Objects

AUTHORS: D. Lin, E. Bertino, R. Cheng, and S. Prabhakar

The expanding use of location-based services has profound implications on the privacy of personal information. In this paper, we propose a framework for preserving location privacy based on the idea of sending to the service provider suitably modified location information. Agents execute data transformation and the service provider directly processes the transformed dataset. Our technique not only prevents the service provider from knowing the exact locations of users, but also protects information about user movements and locations from being disclosed to other users who are not authorized to access this information. We also define a privacy model to analyze our framework, and examine our approach experimentally.

CHAPTER-3: SYSTEM DESIGN

3.1 System architecture

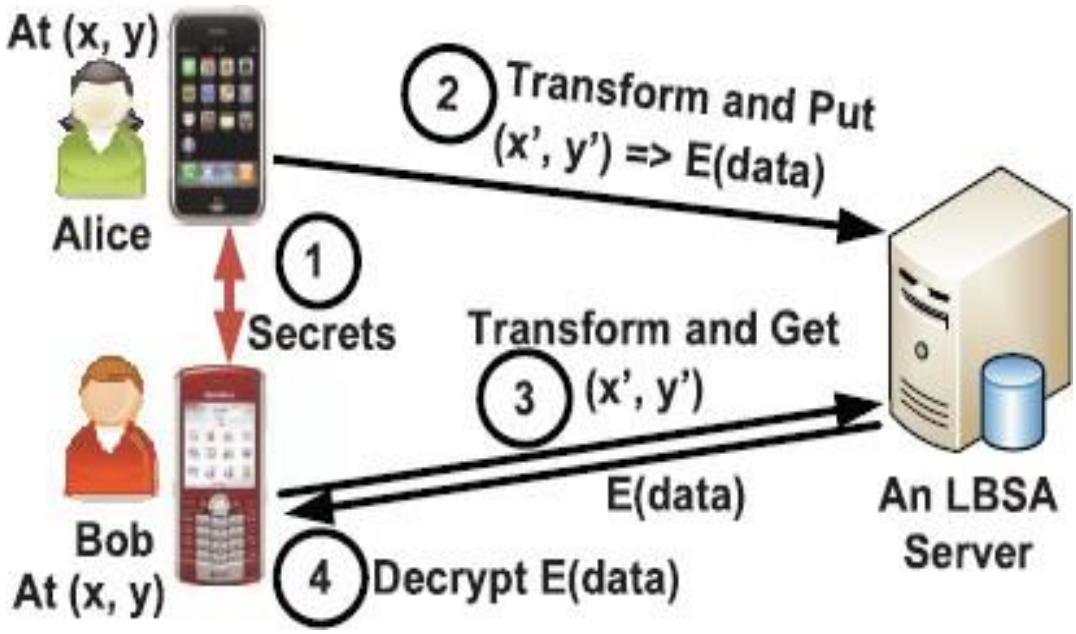

Fig 2: Block Diagram

DATA FLOW DIAGRAM:

1. The DFD is also called as bubble chart. It is a simple graphical formalism that can be used to represent a system in terms of input data to the system, various processing carried out on this data, and the output data is generated by this system.
2. The data flow diagram (DFD) is one of the most important modelling tools. It is used to model the system components. These components are the system process, the data used by the process, an external entity that interacts with the system and the information flows in the system.
3. DFD shows how the information moves through the system and how it is modified by a series of transformations. It is a graphical technique that depicts information flow and the transformations that are applied as data moves from input to output.
4. DFD is also known as bubble chart. A DFD may be used to represent a system at any level of abstraction. DFD may be partitioned into levels that represent increasing information flow and functional detail.

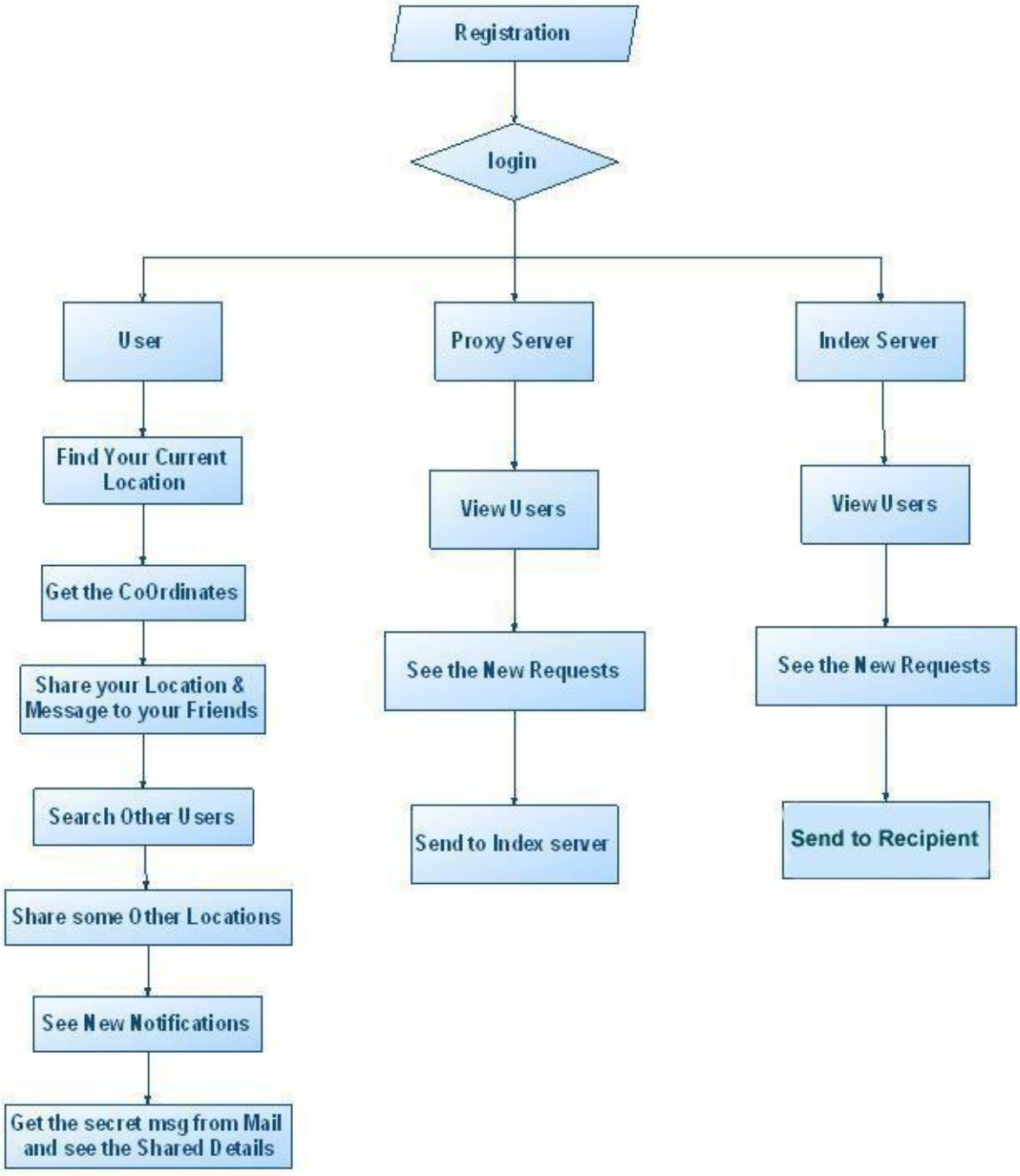

Figure 3: Data Flow Diagram

UML DIAGRAMS

UML stands for Unified Moulded Language. UML is a standardized general-purpose modelling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group.

The goal is for UML to become a common language for creating models of object-oriented computer software. In its current form UML is comprised of two major components: a Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML.

The Unified Modelling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modelling and other non-software systems.

The UML represents a collection of best engineering practices that have proven successful in the modelling of large and complex systems.

The UML is a very important part of developing object-oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

GOALS:

The Primary goals in the design of the UML are as follows:

1. Provide users a ready-to-use, expressive visual modelling Language so that they can develop and exchange meaningful models.
2. Provide extendibility and specialization mechanisms to extend the core concepts.
3. Be independent of particular programming languages and development process.
4. Provide a formal basis for understanding the modelling language.
5. Encourage the growth of OO tools market.
6. Support higher level development concepts such as collaborations, frameworks, patterns and components.
7. Integrate best practices.

USE CASE DIAGRAM:

A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted.

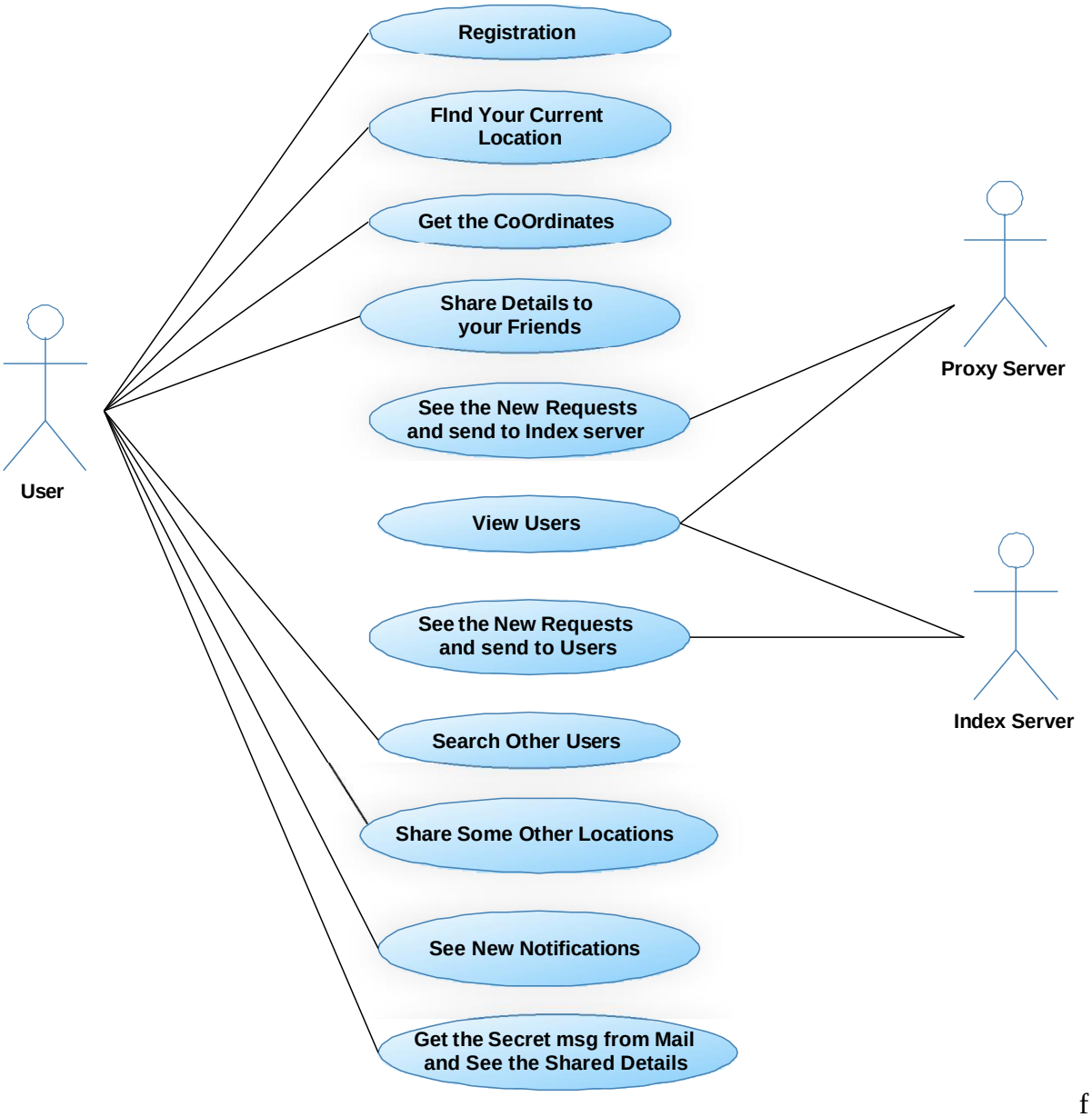

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Fig 4: Use Case Diagram

CLASS DIAGRAM:

In software engineering, a class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among the classes. It explains which class contains information.

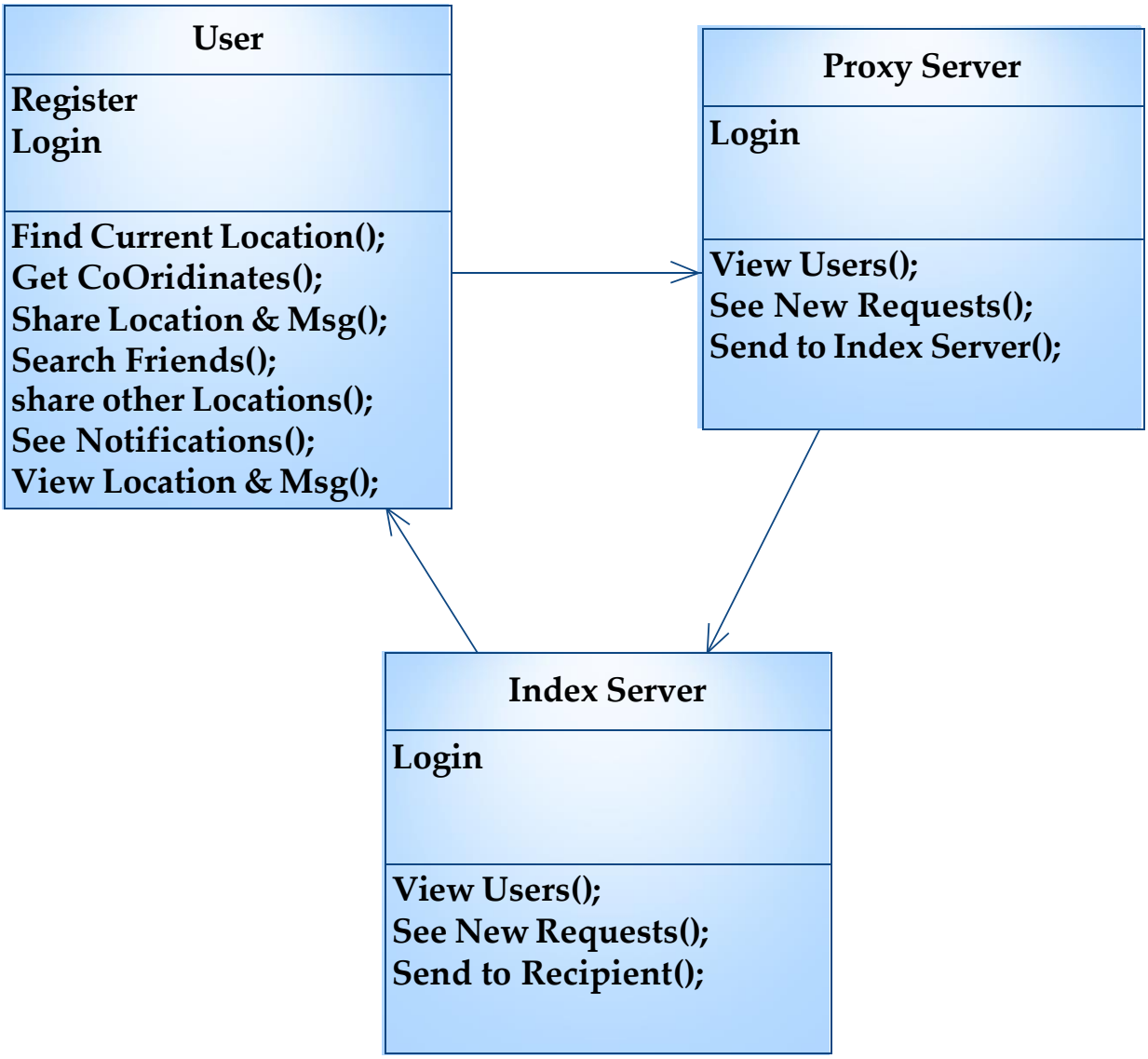


Fig 5: class diagram

SEQUENCE DIAGRAM:

A sequence diagram in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. Sequence diagrams are sometimes called event diagrams, event scenarios, and timing diagram.

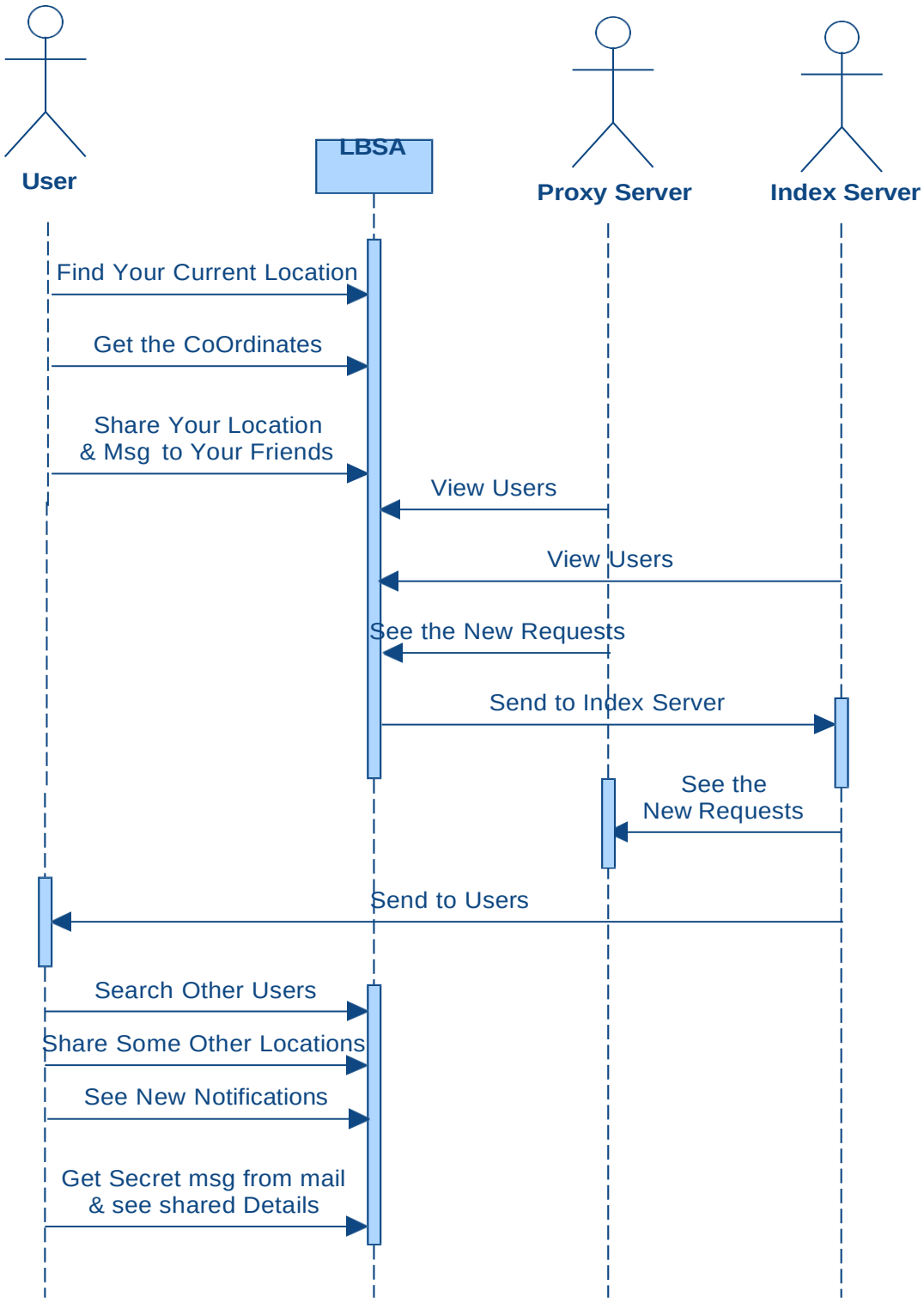


Fig 6: Sequence diagram

ACTIVITY DIAGRAM:

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.

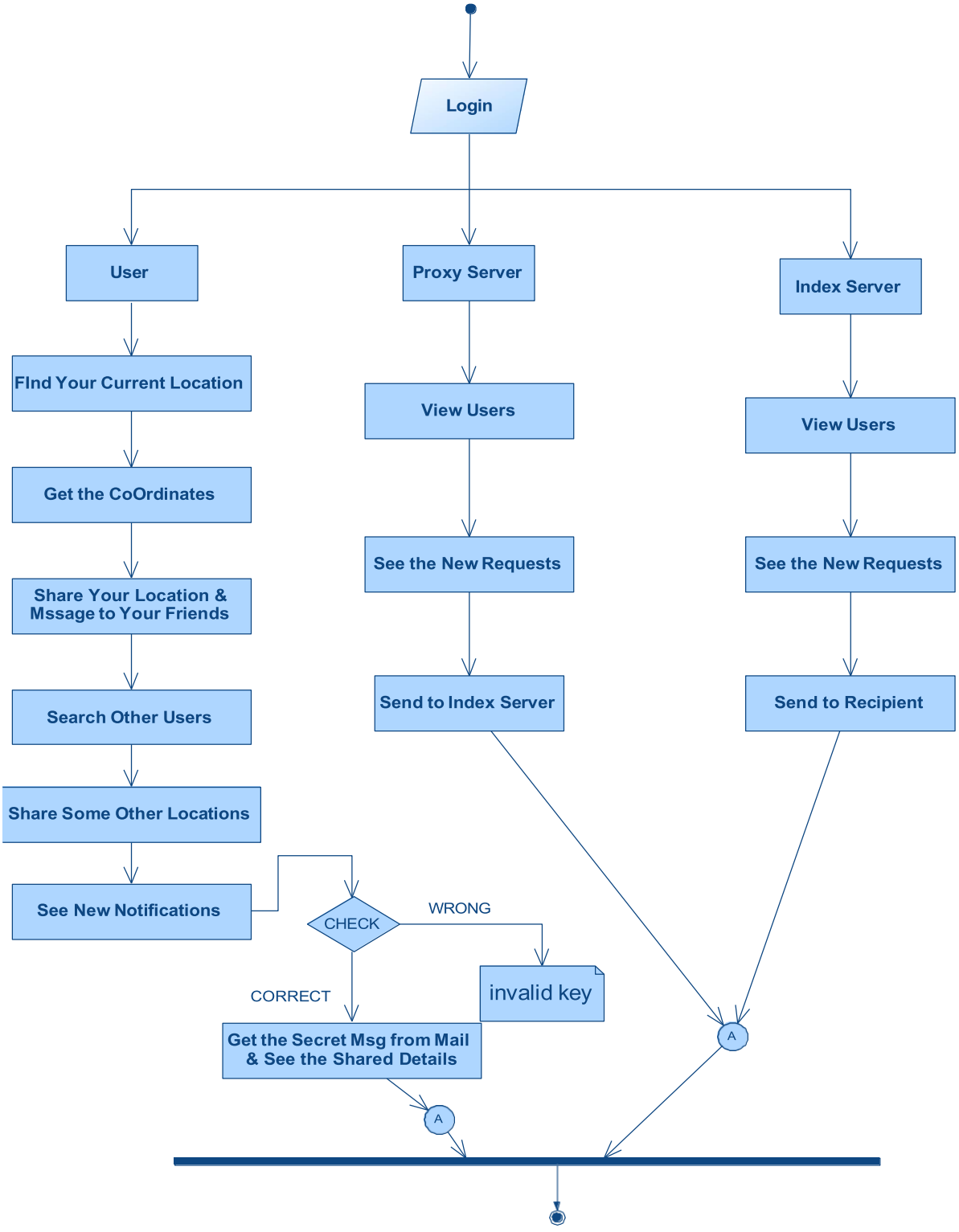


Fig 7: diagram

3.2 SYSTEM REQUIREMENTS

3.2.1 SOFTWARE REQUIREMENTS

- System: Pentium IV 2.4 GHz.
- Hard Disk: 500 GB (40GB).
- Ram: 8GB(1GB).

3.2.2 HARDWARE REQUIREMENTS

- Operating system: Windows XP.
- Coding Language: C#.NET
- Data Base: MS SQL SERVER 2005

CHAPTER 4: INPUT AND OUTPUT DESIGN

4.1 INPUT DESIGN

The input design is the link between the information system and the user. It comprises the developing specification and procedures for data preparation and those steps are necessary to put transaction data in to a usable form for processing can be achieved by inspecting the computer to read data from a written or printed document or it can occur by having people keying the data directly into the system. The design of input focuses on controlling the amount of input required, controlling the errors, avoiding delay, avoiding extra steps and keeping the process simple. The input is designed in such a way so that it provides security and ease of use with retaining the privacy. Input Design considered the following things:

- What data should be given as input?
- How the data should be arranged or coded?
- The dialog to guide the operating personnel in providing input.
- Methods for preparing input validations and steps to follow when error occur.
-

OBJECTIVES

1. Input Design is the process of converting a user-oriented description of the input into a computer-based system. This design is important to avoid errors in the data input process and show the correct direction to the management for getting correct information from the computerized system.

2. It is achieved by creating user-friendly screens for the data entry to handle large volume of data. The goal of designing input is to make data entry easier and to be free from errors. The data entry screen is designed in such a way that all the data manipulates can be performed. It also provides record viewing facilities.

3. When the data is entered it will check for its validity. Data can be entered with the help of screens. Appropriate messages are provided as when needed so that the user

will not be in maize of instant, Thus the objective of input design is to create an input layout that is easy to follow

4.2 OUTPUT DESIGN

A quality output is one, which meets the requirements of the end user and presents the information clearly. In any system results of processing are communicated to the users and to other system through outputs. In output design it is determined how the information is to be displaced for immediate need and also the hard copy output. It is the most important and direct source information to the user. Efficient and intelligent output design improves the system's relationship to help user decision-making.

1. Designing computer output should proceed in an organized, well thought out manner; the right output must be developed while ensuring that each output element is designed so that people will find the system can use easily and effectively. When analysis design computer output, they should Identify the specific output that is needed to meet the requirements.

2. Select methods for presenting information.

3. Create document, report, or other formats that contain information produced by the system.

The output form of an information system should accomplish one or more of the following objectives.

- Convey information about past activities, current status or projections of the
- Future.
- Signal important events, opportunities, problems, or warnings.
- Trigger an action.
- Confirm an action.

CHAPTER-5: SYSTEM ENVIRONMENT

Java Technology

Java technology is both a programming language and a platform.

The Java Programming Language

The Java programming language is a high-level language that can be characterized by all of the following buzzwords:

- Simple
- Architecture neutral
- Object oriented
- Portable
- Distributed
- High performance
- Interpreted
- Multithreaded
- Robust
- Dynamic
- Secure

With most programming languages, you either compile or interpret a program so that you can run it on your computer. The Java programming language is unusual in that a program is both compiled and interpreted. With the compiler, first you translate a program into an intermediate language called *Java byte codes* —the platform-independent codes interpreted by the interpreter on the Java platform. The interpreter parses and runs each Java byte code instruction on the computer. Compilation happens just once; interpretation occurs each time the program is executed. The following figure illustrates how this works.

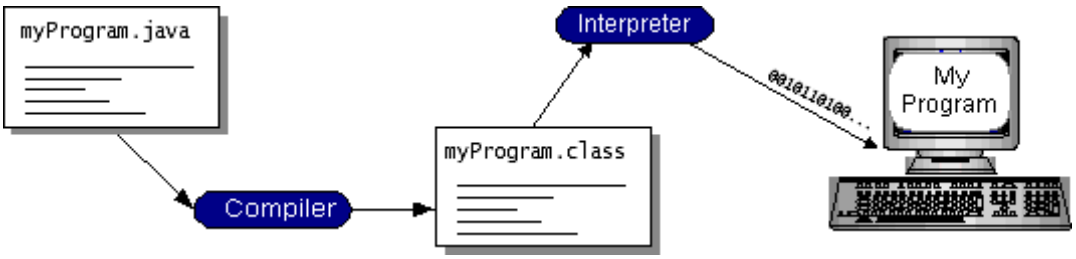


Fig 8: Execution process

You can think of Java byte codes as the machine code instructions for the *Java Virtual Machine* (Java VM). Every Java interpreter, whether it's a development tool or a Web browser that can run applets, is an implementation of the Java VM. Java byte codes help make "write once, run anywhere" possible. You can compile your program into byte codes on any platform that has a Java compiler. The byte codes can then be run on any implementation of the Java VM. That means that as long as a computer has a Java VM, the same program written in the Java programming language can run on Windows 2000, a Solaris workstation, or on an iMac.

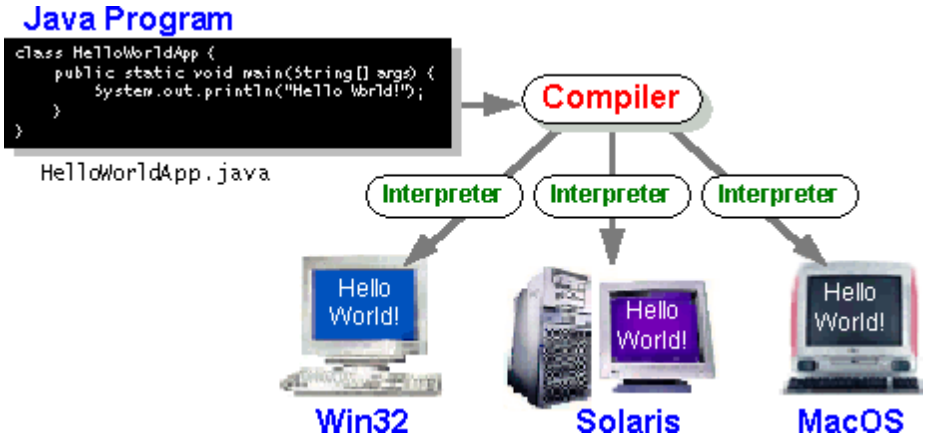


Fig 9: JVM

The Java Platform

A *platform* is the hardware or software environment in which a program runs. We've already mentioned some of the most popular platforms like Windows 2000, Linux, Solaris, and MacOS. Most platforms can be described as a combination of the operating system and hardware. The Java platform differs from most other platforms in that it's a software-only platform that runs on top of other hardware-based platforms.

The Java platform has two components:

- The *Java Virtual Machine* (Java VM)
- The *Java Application Programming Interface* (Java API)

You've already been introduced to the Java VM. It's the base for the Java platform and is ported onto various hardware-based platforms.

The Java API is a large collection of ready-made software components that provide many useful capabilities, such as graphical user interface (GUI) widgets. The Java API is grouped into libraries of related classes and interfaces; these libraries are known as *packages*. The next section, What Can Java Technology Do? Highlights what functionality some of the packages in the Java API provide.

The following figure depicts a program that's running on the Java platform. As the figure shows, the Java API and the virtual machine insulate the program from the hardware.

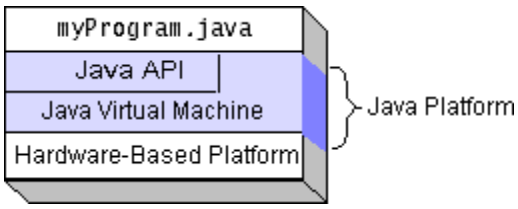


Fig 10: Java platform

Native code is code that after you compile it, the compiled code runs on a specific hardware platform. As a platform-independent environment, the Java platform can be a bit slower than native code. However, smart compilers, well-tuned interpreters, and just-in-time byte code compilers can bring performance close to that of native code without threatening portability.

What Can Java Technology Do?

The most common types of programs written in the Java programming language are *applets* and *applications*. If you've surfed the Web, you're probably already familiar with applets. An applet is a program that adheres to certain conventions that allow it to run within a Java-enabled browser.

However, the Java programming language is not just for writing cute, entertaining applets for the Web. The general-purpose, high-level Java programming language is also a powerful software platform. Using the generous API, you can write many types of programs.

An application is a standalone program that runs directly on the Java platform. A special kind of application known as a *server* serves and supports clients on a network. Examples of servers are Web servers, proxy servers, mail servers, and print servers. Another specialized program is a *servlet*. A servlet can almost be thought of as an applet that runs on the server side. Java Servlets are a popular choice for building interactive web applications, replacing the use of CGI scripts. Servlets are similar to applets in that they are runtime extensions of applications. Instead of working in browsers, though, servlets run within Java Web servers, configuring or tailoring the server.

How does the API support all these kinds of programs? It does so with packages of software components that provides a wide range of functionality. Every full implementation of the Java platform gives you the following features:

- **The essentials**: Objects, strings, threads, numbers, input and output, data structures, system properties, date and time, and so on.
- **Applets**: The set of conventions used by applets.
- **Networking**: URLs, TCP (Transmission Control Protocol), UDP (User Data gram Protocol) sockets, and IP (Internet Protocol) addresses.
- **Internationalization**: Help for writing programs that can be localized for users worldwide. Programs can automatically adapt to specific locales and be displayed in the appropriate language.
- **Security**: Both low level and high level, including electronic signatures, public and private key management, access control, and certificates.
- **Software components**: Known as JavaBeans ™, can plug into existing component architectures.
- **Object serialization**: Allows lightweight persistence and communication via Remote Method Invocation (RMI).
- **Java Database Connectivity (JDBC™)**: Provides uniform access to a wide range of relational databases.

The Java platform also has APIs for 2D and 3D graphics, accessibility, servers, collaboration, telephony, speech, animation, and more. The following figure depicts what is included in the Java 2 SDK.

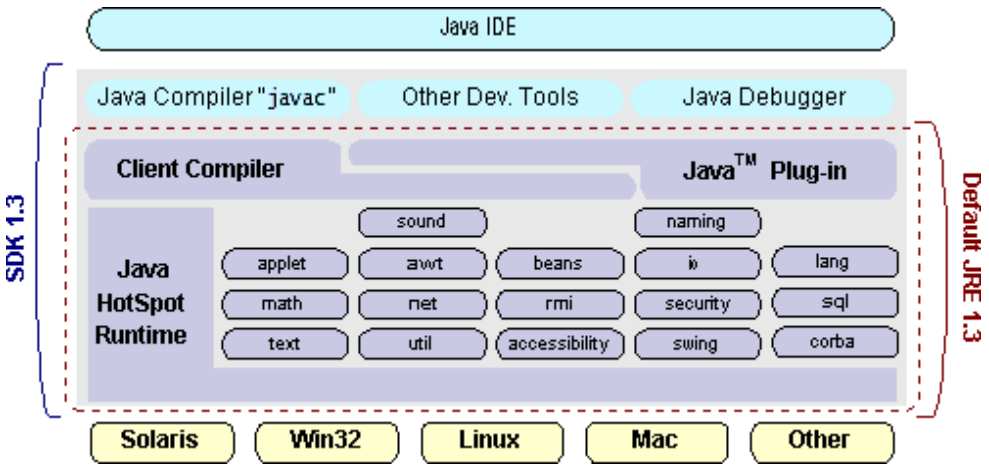


Fig 11: Java JDE

How Will Java Technology Change My Life?

We can't promise you fame, fortune, or even a job if you learn the Java programming language. Still, it is likely to make your programs better and requires less effort than other languages. We believe that Java technology will help you do the following:

- **Get started quickly**: Although the Java programming language is a powerful object-oriented language, it's easy to learn, especially for programmers already familiar with C or C++.
- **Write less code**: Comparisons of program metrics (class counts, method counts, and so on) suggest that a program written in the Java programming language can be four times smaller than the same program in C++.
- **Write better code**: The Java programming language encourages good coding practices, and its garbage collection helps you avoid memory leaks. Its object orientation, its JavaBeans component architecture, and its wide-ranging, easily extendible API let you reuse other people's tested code and introduce fewer bugs.
- **Develop programs more quickly**: Your development time may be as much as twice as fast versus writing the same program in C++. Why? You write fewer lines of code and it is a simpler programming language than C++.
- **Avoid platform dependencies with 100% Pure Java**: You can keep your program portable by avoiding the use of libraries written in other languages. The 100% Pure Java ™ Product Certification Program has a repository of historical process manuals, white papers, brochures, and similar materials online.
- **Write once, run anywhere**: Because 100% Pure Java programs are compiled into machine-independent byte codes, they run consistently on any Java platform.
- **Distribute software more easily**: You can upgrade applets easily from a central server. Applets take advantage of the feature of allowing new classes to be loaded "on the fly," without recompiling the entire program.

ODBC

Microsoft Open Database Connectivity (ODBC) is a standard programming interface for application developers and database systems providers. Before ODBC became a *de facto* standard for Windows programs to interface with database systems, programmers had to use proprietary languages for each database they wanted to connect to. Now, ODBC has made the choice of the database system almost irrelevant from a coding perspective, which is as it should be. Application developers have much more important things to worry about than the syntax that is needed to port their program from one database to another when business needs suddenly change.

Through the ODBC Administrator in Control Panel, you can specify the particular database that is associated with a data source that an ODBC application program is

written to use. Think of an ODBC data source as a door with a name on it. Each door will lead you to a particular database. For example, the data source named Sales Figures might be a SQL Server database, whereas the Accounts Payable data source could refer to an Access database. The physical database referred to by a data source can reside anywhere on the LAN.

The ODBC system files are not installed on your system by Windows 95. Rather, they are installed when you setup a separate database application, such as SQL Server Client or Visual Basic 4.0. When the ODBC icon is installed in Control Panel, it uses a file called ODBCINST.DLL. It is also possible to administer your ODBC data sources through a stand-alone program called ODBCADM.EXE. There is a 16-bit and a 32-bit version of this program and each maintains a separate list of ODBC data sources.

From a programming perspective, the beauty of ODBC is that the application can be written to use the same set of function calls to interface with any data source, regardless of the database vendor. The source code of the application doesn't change whether it talks to Oracle or SQL Server. We only mention these two as an example. There are ODBC drivers available for several dozen popular database systems. Even Excel spreadsheets and plain text files can be turned into data sources. The operating system uses the Registry information written by ODBC Administrator to determine which low-level ODBC drivers are needed to talk to the data source (such as the interface to Oracle or SQL Server). The loading of the ODBC drivers is transparent to the ODBC application program. In a client/server environment, the ODBC API even handles many of the network issues for the application programmer.

The advantages of this scheme are so numerous that you are probably thinking there must be some catch. The only disadvantage of ODBC is that it isn't as efficient as talking directly to the native database interface. ODBC has had many detractors make the charge that it is too slow. Microsoft has always claimed that the critical factor in performance is the quality of the driver software that is used. In our humble opinion, this is true. The availability of good ODBC drivers has improved a great deal recently. And anyway, the criticism about performance is somewhat analogous to those who said that compilers would never match the speed of pure assembly language. Maybe not, but the compiler (or ODBC) gives you the opportunity to write cleaner programs, which means you finish sooner. Meanwhile, computers get faster every year.

JDBC

In an effort to set an independent database standard API for Java; Sun Microsystems developed Java Database Connectivity, or JDBC. JDBC offers a generic SQL database access mechanism that provides a consistent interface to a variety of RDBMSs. This consistent interface is achieved through the use of "plug-in" database connectivity modules, or *drivers*. If a database vendor wishes to have JDBC support, he or she must provide the driver for each platform that the database and Java run on.

To gain a wider acceptance of JDBC, Sun based JDBC's framework on ODBC. As you discovered earlier in this chapter, ODBC has widespread support on a variety of platforms. Basing JDBC on ODBC will allow vendors to bring JDBC drivers to market much faster than developing a completely new connectivity solution.

JDBC was announced in March of 1996. It was released for a 90-day public review that ended June 8, 1996. Because of user input, the final JDBC v1.0 specification was released soon after.

The remainder of this section will cover enough information about JDBC for you to know what it is about and how to use it effectively. This is by no means a complete overview of JDBC. That would fill an entire book.

JDBC Goals

Few software packages are designed without goals in mind. JDBC is one that, because of its many goals, drove the development of the API. These goals, in conjunction with early reviewer feedback, have finalized the JDBC class library into a solid framework for building database applications in Java.

The goals that were set for JDBC are important. They will give you some insight as to why certain classes and functionalities behave the way they do. The eight design goals for JDBC are as follows:

1. ***SQL Level API***

   The designers felt that their main goal was to define a SQL interface for Java. Although not the lowest database interface level possible, it is at a low enough level for higher-level tools and APIs to be created. Conversely, it is at a high enough level for application programmers to use it confidently. Attaining this goal allows for future tool vendors to "generate" JDBC code and to hide many of JDBC's complexities from the end user.

2. ***SQL Conformance***

   SQL syntax varies as you move from database vendor to database vendor. In an effort to support a wide variety of vendors, JDBC will allow any query statement to be passed through it to the underlying database driver. This allows the connectivity module to handle non-standard functionality in a manner that is suitable for its users.

3. ***JDBC must be implemental on top of common database interfaces***

   The JDBC SQL API must "sit" on top of other common SQL level APIs. This goal allows JDBC to use existing ODBC level drivers by the use of a software interface. This interface would translate JDBC calls to ODBC and vice versa.

4. ***Provide a Java interface that is consistent with the rest of the Java system***

   Because of Java's acceptance in the user community thus far, the designers feel that they should not stray from the current design of the core Java system.

5. ***Keep it simple***

   This goal probably appears in all software design goal listings. JDBC is no exception. Sun felt that the design of JDBC should be very simple, allowing for only one method of completing a task per mechanism. Allowing duplicate functionality only serves to confuse the users of the API.

6. ***Use strong, static typing wherever possible***

   Strong typing allows for more error checking to be done at compile time; also, less error appear at runtime.

7. ***Keep the common cases simple***

   Because more often than not, the usual SQL calls used by the programmer are simple SELECT's, INSERT's, DELETE's and UPDATE's, these queries should be simple to perform with JDBC. However, more complex SQL statements should also be possible.

Finally, we decided to proceed the implementation using Java Networking.

And for dynamically updating the cache table we go for MS Access database.

Java ha two things: a programming language and a platform.

Java is a high-level programming language that is all of the following

	Simple	Architecture-neutral
	Object-oriented	Portable
Distributed	High-performance	
	Interpreted	multithreaded
	Robust	Dynamic
	Secure	

Java is also unusual in that each Java program is both compiled and interpreted. With a compile you translate a Java program into an intermediate language called Java byte codes the platform-independent code instruction is passed and run on the computer.

Compilation happens just once; interpretation occurs each time the program is executed. The figure illustrates how this works.

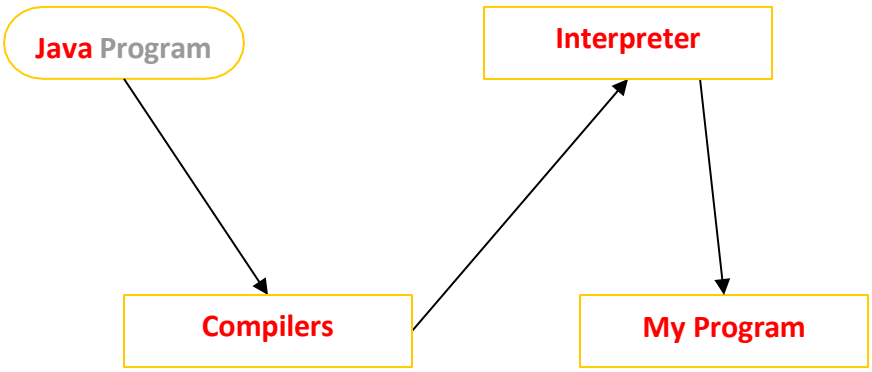


Fig 12: Working of compilation and interpretation

You can think of Java byte codes as the machine code instructions for the Java Virtual Machine (Java VM). Every Java interpreter, whether it's a Java development tool or a Web browser that can run Java applets, is an implementation of the Java VM. The Java VM can also be implemented in hardware.

Java byte codes help make "write once, run anywhere" possible. You can compile your Java program into byte codes on my platform that has a Java compiler. The byte codes can then be run any implementation of the Java VM. For example, the same Java program can run Windows NT, Solaris, and Macintosh.

TCP/IP stack

The TCP/IP stack is shorter than the OSI one:

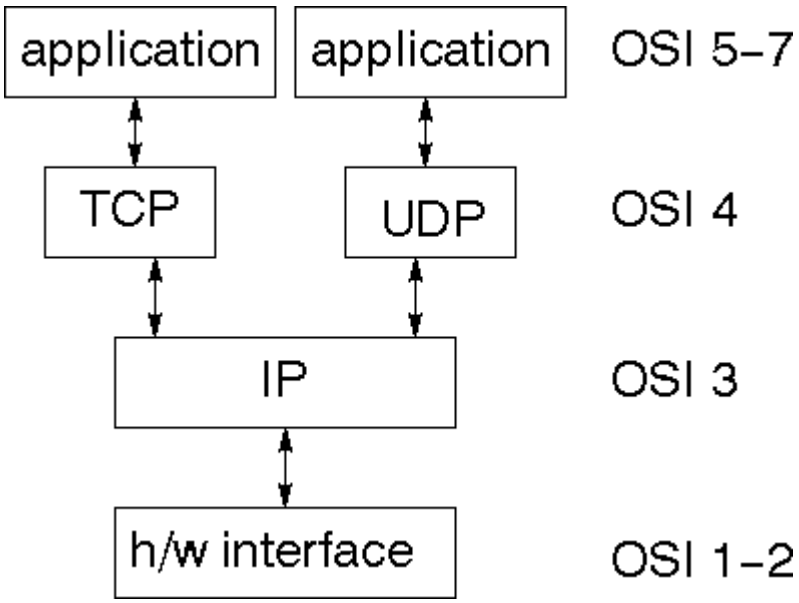


Fig 13: Flowchart of TCP/IP stack

TCP is a connection-oriented protocol; UDP (User Datagram Protocol) is a connectionless protocol.

IP datagram's

The IP layer provides a connectionless and unreliable delivery system. It considers each datagram independently of the others. Any association between datagram must be supplied by the higher layers. The IP layer supplies a checksum that includes its own header. The header includes the source and destination addresses. The IP layer handles routing through an Internet. It is also responsible for breaking up large datagram into smaller ones for transmission and reassembling them at the other end.

UDP

UDP is also connectionless and unreliable. What it adds to IP is a checksum for the contents of the datagram and port numbers. These are used to give a client/server model - see later.

TCP

TCP supplies logic to give a reliable connection-oriented protocol above IP. It provides a virtual circuit that two processes can use to communicate.

Internet addresses

In order to use a service, you must be able to find it. The Internet uses an address scheme for machines so that they can be located. The address is a 32-bit integer which gives the IP address. This encodes a network ID and more addressing. The network ID falls into various classes according to the size of the network address.

Network address

Class A uses 8 bits for the network address with 24 bits left over for other addressing. Class B uses 16-bit network addressing. Class C uses 24-bit network addressing and class D uses all 32.

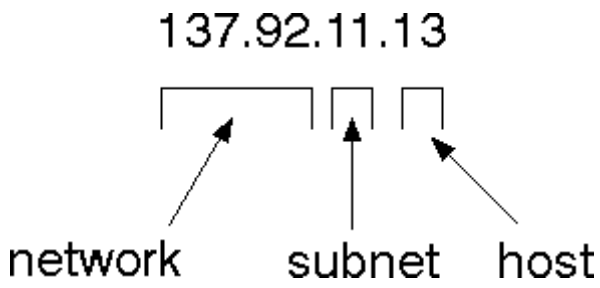
Subnet address

Internally, the UNIX network is divided into sub networks. Building 11 is currently on one sub network and uses 10-bit addressing, allowing 1024 different hosts.

Host address

8 bits are finally used for host addresses within our subnet. This places a limit of 256 machines that can be on the subnet.

Total address



The 32-bit address is usually written as 4 integers separated by dots.

Port addresses

A service exists on a host, and is identified by its port. This is a 16-bit number. To send a message to a server, you send it to the port for that service of the host that it is running on. This is not location transparency! Certain of these ports are "well known".

Sockets

A socket is a data structure maintained by the system to handle network connections. A socket is created using the call socket. It returns an integer that is like a file descriptor. In fact, under Windows, this handle can be used with Read File and Write File functions.

#include <sys/types .h>

#include <sys/socket .h>

int socket (int family, int type, int protocol);

Here "family" will be AF_INET for IP communications, protocol will be zero, and type will depend on whether TCP or UDP is used. Two processes wishing to communicate over a network create a socket each. These are similar to two ends of a pipe - but the actual pipe does not yet exist.

J Free Chart

J Free Chart is a free 100% Java chart library that makes it easy for developers to display professional quality charts in their applications. J Free Chart's extensive feature set includes:

A consistent and well-documented API, supporting a wide range of chart types;

A flexible design that is easy to extend, and targets both server-side and client-side applications;

Support for many output types, including Swing components, image files (including PNG and JPEG), and vector graphics file formats (including PDF, EPS and SVG);

J Free Chart is "open source" or, more specifically, free software. It is distributed under the terms of the GNU Lesser General Public License (LGPL), which permits use in proprietary applications.

1. Map Visualizations

Charts showing values that relate to geographical areas. Some examples include: (a) population density in each state of the United States, (b) income per capita for each country in Europe, (c) life expectancy in each country of the world. The tasks in this project include:

Sourcing freely redistributable vector outlines for the countries of the world, states/provinces in particular countries (USA in particular, but also other areas);

Creating an appropriate dataset interface (plus default implementation), a rendered, and integrating this with the existing X Y Plot class in J Free Chart;

Testing, documenting, testing some more, documenting some more.

2. Time Series Chart Inter activity

Implement a new (to J Free Chart) feature for interactive time series charts --- to display a separate control that shows a small version of ALL the time series data, with a sliding

"view" rectangle that allows you to select the subset of the time series data to display in the main chart.

3. Dashboards

There is currently a lot of interest in dashboard displays. Create a flexible dashboard mechanism that supports a subset of J Free Chart, chart types (dials, pies, thermometers, bars, and lines/time series) that can be delivered easily via both Java Web Start and an applet.

4. Property Editors

The property editor mechanism in J Free Chart only handles a small subset of the properties that can be set for charts. Extend (or reimplement) this mechanism to provide greater end-user control over the appearance of the charts.

J2ME (Java 2 Micro edition):

Sun Microsystems defines J2ME as "a highly optimized Java run-time environment targeting a wide range of consumer products, including pagers, cellular phones, screen-phones, digital set-top boxes and car navigation systems." Announced in June 1999 at the Java One Developer Conference, J2ME brings the cross-platform functionality of the Java language to smaller devices, allowing mobile wireless devices to share applications. With J2ME, Sun has adapted the Java platform for consumer products that incorporate or are based on small computing devices.

1. General J2ME architecture

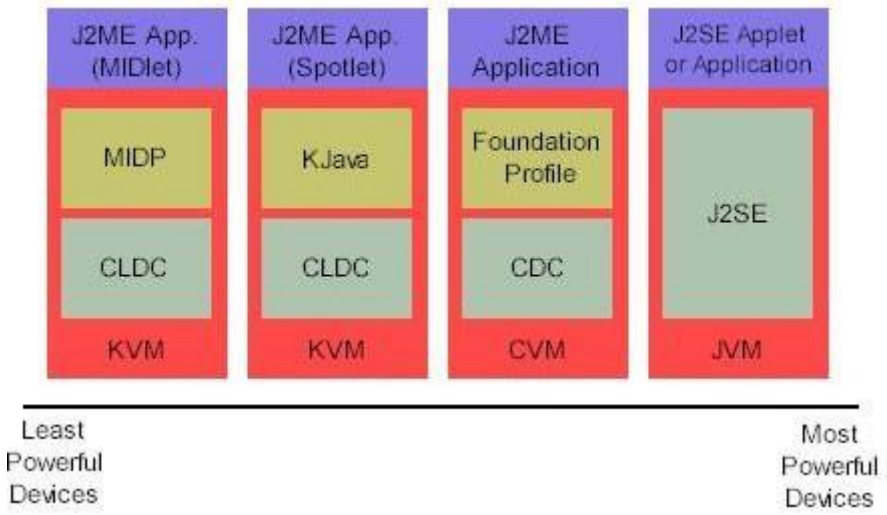


Fig 14: J2ME Architecture

J2ME uses configurations and profiles to customize the Java Runtime Environment (JRE). As a complete JRE, J2ME is comprised of a configuration, which determines the JVM used, and a profile, which defines the application by adding domain-specific classes. The configuration defines the basic run-time environment as a set of core classes and a specific JVM that run on specific types of devices. We'll discuss configurations in detail in profile, The profile defines the application; specifically, it adds domain-specific classes to the J2ME configuration to define certain uses for devices. We'll cover profiles in depth in the following graphic depicts the relationship between the different virtual machines, configurations, and profiles. It also draws a parallel with the J2SE API and its Java virtual machine. While the J2SE virtual machine is generally referred to as a JVM, the J2ME virtual machines, KVM and CVM, are subsets of JVM. Both KVM and CVM can be thought of as a kind of Java virtual machine -- it's just that they are shrunken versions of the J2SE JVM and are specific to J2ME.

2. Developing J2ME applications

Introduction In this section, we will go over some considerations you need to keep in mind when developing applications for smaller devices. We'll take a look at the way the compiler is invoked when using J2SE to compile J2ME applications. Finally, we'll explore packaging and deployment and the role pre verification plays in this process.

3. Design considerations for small devices

Developing applications for small devices requires you to keep certain strategies in mind during the design phase. It is best to strategically design an application for a small device before you begin coding. Correcting the code because you failed to consider all of the "gotchas" before developing the application can be a painful process. Here are some design strategies to consider:

* Keep it simple. Remove unnecessary features, possibly making those features a separate, secondary application.

* Smaller is better. This consideration should be a "no brainer" for all developers. Smaller applications use less memory on the device and require shorter installation times. Consider packaging your Java applications as compressed Java Archive (jar) files.

* Minimize run-time memory use. To minimize the amount of memory used at run time, use scalar types in place of object types. Also, do not depend on the garbage collector. You should manage the memory efficiently yourself by setting object references to null when you are finished with them. Another way to reduce run-time memory is to use lazy instantiation, only allocating objects on an as-needed basis. Other ways of reducing overall and peak memory use on small devices are to release resources quickly, reuse objects, and avoid exceptions.

4. Configurations overview

The configuration defines the basic run-time environment as a set of core classes and a specific JVM that run on specific types of devices. Currently, two configurations exist for J2ME, though others may be defined in the future:

* **Connected Limited Device Configuration (CLDC)** is used specifically with the KVM for 16-bit or 32-bit devices with limited amounts of memory. This is the configuration (and the virtual machine) used for developing small J2ME applications. Its size limitations make CLDC more interesting and challenging (from a development point of view) than CDC. CLDC is also the configuration that we will use for developing our drawing tool application. An example of a small wireless device running small applications is a Palm hand-held computer.

* **Connected Device Configuration (CDC)** is used with the C virtual machine (CVM) and is used for 32-bit architectures requiring more than 2 MB of memory. An example of such a device is a Net TV box.

5. J2ME profiles

What is a J2ME profile?

As we mentioned earlier in this tutorial, a profile defines the type of device supported. The Mobile Information Device Profile (MIDP), for example, defines classes for cellular phones. It adds domain-specific classes to the J2ME configuration to define uses for similar devices. Two profiles have been defined for J2ME and are built upon CLDC: K Java and MIDP. Both K Java and MIDP are associated with CLDC and smaller devices. Profiles are built on top of configurations. Because profiles are specific to the size of the device (amount of memory) on which an application runs, certain profiles are associated with certain configurations.

A skeleton profile upon which you can create your own profile, the Foundation Profile, is available for CDC.

Profile 1: K Java

K Java is Sun's proprietary profile and contains the K Java API. The K Java profile is built on top of the CLDC configuration. The K Java virtual machine, KVM, accepts the same byte codes and class file format as the classic J2SE virtual machine. K Java contains a Sun-specific API that runs on the Palm OS. The K Java API has a great deal in common with the J2SE Abstract Windowing Toolkit (AWT). However, because it is not a standard J2ME package, its main package is com. sun. k java. We'll learn more about the K Java API later in this tutorial when we develop some sample applications.

Profile 2: MIDP

MIDP is geared toward mobile devices such as cellular phones and pagers. The MIDP, like K Java, is built upon CLDC and provides a standard run-time environment that allows new applications and services to be deployed dynamically on end user devices. MIDP is a common, industry-standard profile for mobile devices that is not dependent on a specific vendor. It is a complete and supported foundation for mobile application

development. MIDP contains the following packages, the first three of which are core CLDC packages, plus three MIDP-specific packages.

* Java. lang

* java.io

* Java. util

* Java x. micro edition. io

* Java x. Micro edition. lc dui

* Java x. Micro edition. Mid let

* Java x. micro edition. rms

CHAPTER -6 SYSTEM STUDY

FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ECONOMICAL FEASIBILITY
- TECHNICAL FEASIBILITY
- SOCIAL FEASIBILITY

6.1 ECONOMICAL FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified,Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

SOCIAL FEASIBILITY

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

CHAPTER-7: SYSTEM TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub-assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the

Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of tests. Each test type addresses a specific testing requirement.

7.1 TYPES OF TESTS

7.1.1 Unit testing

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

Integration testing

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

Functional test

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input: identified classes of valid input must be accepted.

Invalid Input: identified classes of invalid input must be rejected.

Functions: identified functions must be exercised.

Output: identified classes of application outputs must be exercised.

Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

System Test

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration-oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

White Box Testing

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

Black Box Testing

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box ,You cannot “see” into it. The test provides inputs and responds to outputs without considering how the software works.

7.2 Unit Testing:

Unit testing is usually conducted as part of a combined code and unit test phase of the software lifecycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

Test strategy and approach

Field testing will be performed manually and functional tests will be written in detail.

Test objectives

- All field entries must work properly.
- Pages must be activated from the identified link.
- The entry screen, messages and responses must not be delayed.

Features to be tested

- Verify that the entries are of the correct format
- No duplicate entries should be allowed
- All links should take the user to the correct page.

7.3 Integration Testing

Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects.

The task of the integration test is to check that components or software applications, e.g. components in a software system or – one step up – software applications at the company level – interact without error.

Test Results: All the test cases mentioned above passed successfully. No defects encountered.

7.4 Acceptance Testing

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

Test Results: All the test cases mentioned above passed successfully. No defects encountered.

CHAPTER-8: RESULT

Fig-15: User Interface

Fig-16: User Interface

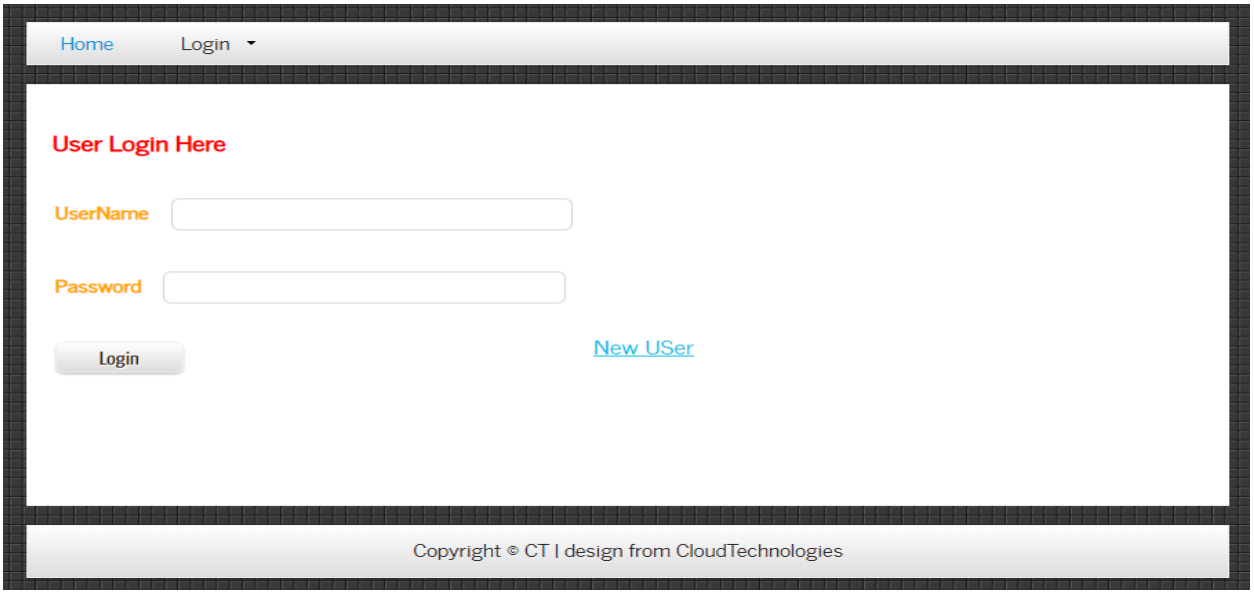


Fig-17: Loging Page

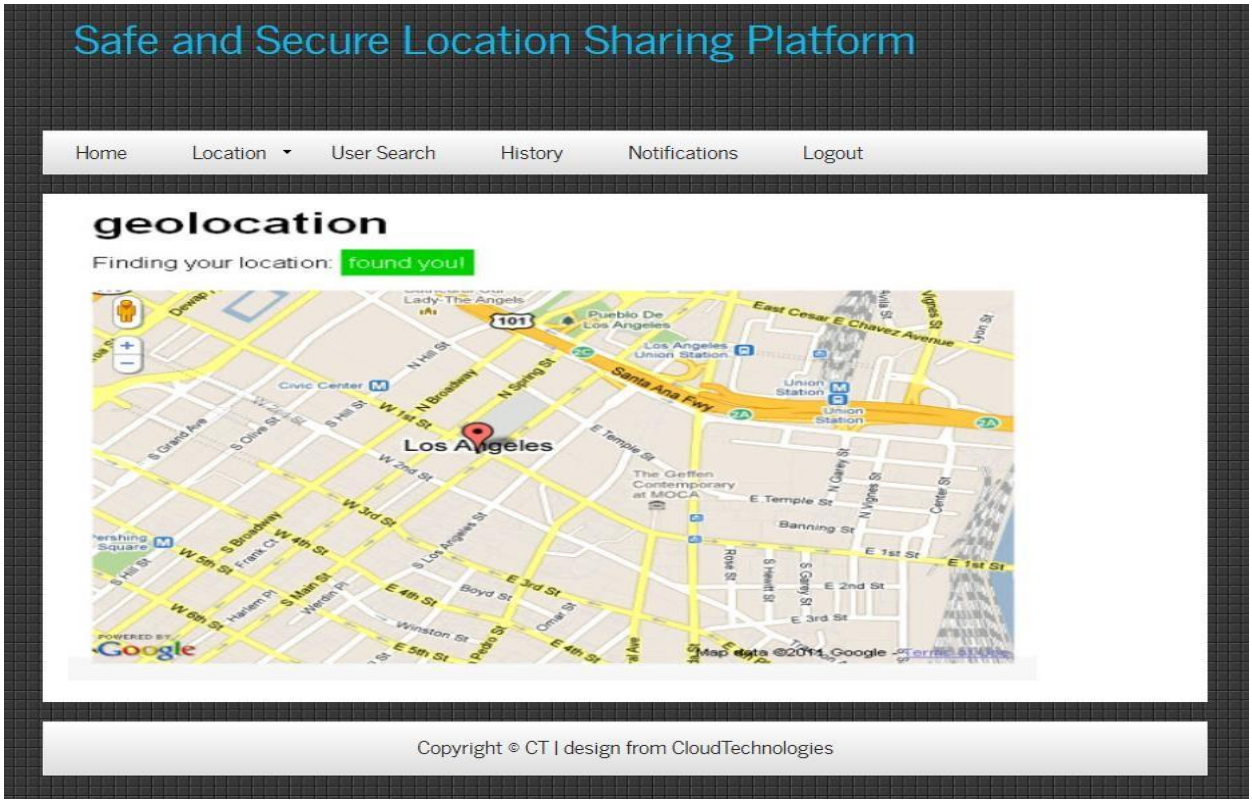


Fig-18: Location Page

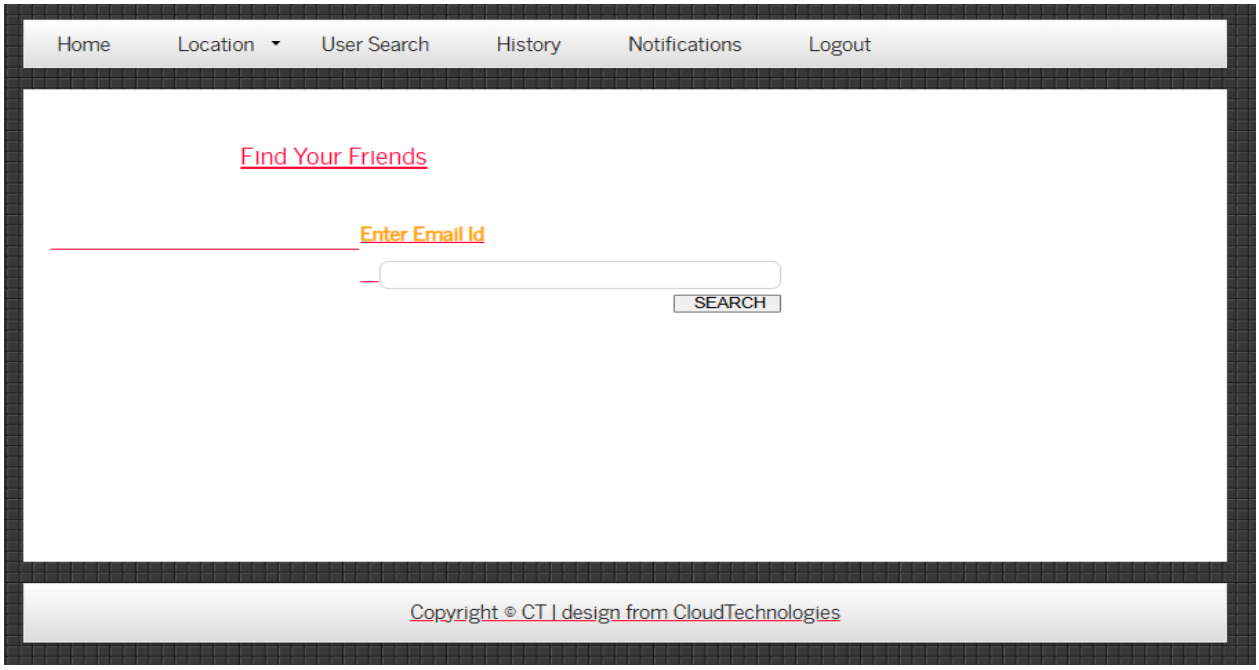


Fig-19: One time Password Page

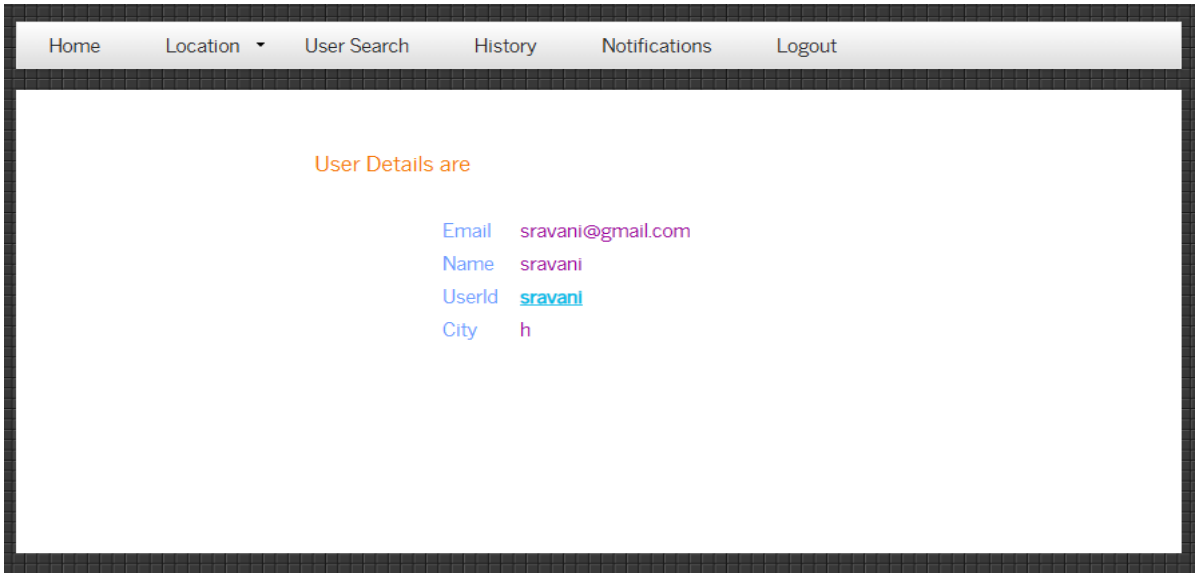


Fig-20: User information Page

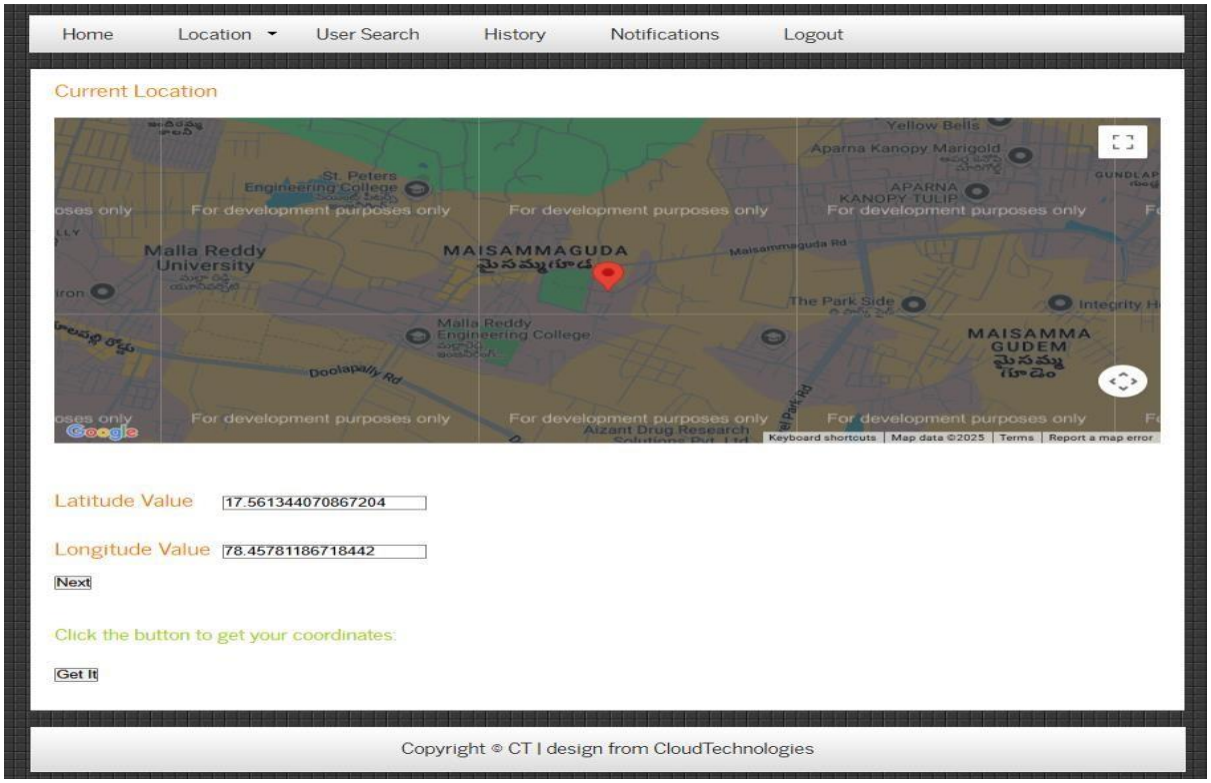


Fig-21: Location page to Share

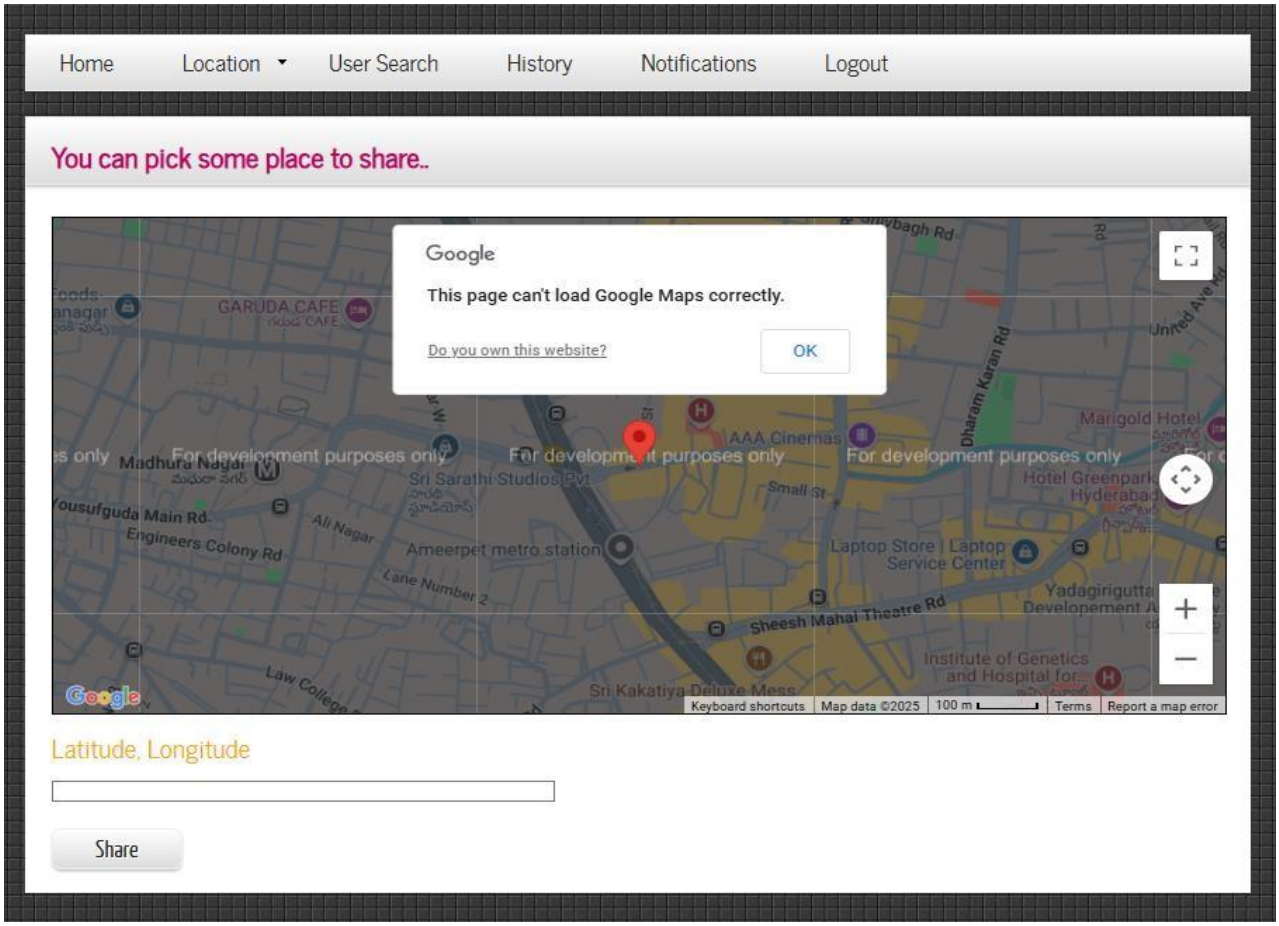


Fig-22: Location sharing Page

CHAPTER-9: CONCLUSION & FUTURE ENHANCEMENT

This paper describes the design, prototype implementation, and evaluation of LOCX, a system for building location based social applications (LBSAs) while preserving user location privacy. LOCX provides location privacy for users without injecting uncertainty or errors into the system, and does not rely on any trusted servers or components. LOCX takes a novel approach to provide location privacy while maintaining overall system efficiency, by leveraging the social data-sharing property of the target applications. In LOCX, users efficiently transform all their locations shared with the server and encrypt all location data stored on the server using inexpensive symmetric keys. Only friends with the right keys can query and decrypt a user's data. We introduce several mechanisms to achieve both privacy and efficiency in this process, and analyze their privacy properties.

Using evaluation based on both synthetic and real-world LBSA traces, we find that LOCX adds little computational and communication overhead to existing systems. Our LOCX prototype runs efficiently even on resource constrained mobile phones. Overall, we believe that LOCX takes a big step toward making location privacy practical for a large class of emerging geosocial applications.

CHAPTER -10: BIBLIOGRAPHY

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CHAPTER -11: YUKTHI INNOVATION CERTIFICATION

MoE's INNOVATION CELL (GOVERNMENT OF INDIA)

INSTITUTION'S INNOVATION COUNCIL
MOE'S INNOVATION CELL

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

Institute Name: Malla Reddy Institute of Technology & Science			
Title of the Innovation/Prototype: PRIVIMAP			
Team Lead Name: KOYYADA RAMYA	**Team Lead Email:** koyyada.ramya2211@gmail.com	**Team Lead Phone:** 6301917824	**Team Lead Gender:** Female
Website (if any): null			
Startup/Venture Registered as: Not Yet Registered as an entity			
Does your Startup/Venture Recognized by DPIIT, Startup India?: No			
Name a Key Innovation which is Core to the Startup /Venture: PRIVIMAP			
Year of Started Receiving Pre-incubation/IncubationSupport for the Development of Innovation-Startup from the Institute (FY): 2024-25	**The Key Innovation which is Core to your Startup /Venture was Developed as:** Academic Requirement/Study Project	**Choose the Type of Innovation:** Service	**TRL LEVEL:** 6
The Sector/Domain of Focus of the Innovation/Startup / Venture: ICT, cyber-physical systems, Blockchain, Cognitive computing, Cloud computing, AI & ML.,			
Define the problem and its relevance to today's market / sociaty / industry need: Privacy Concerns: Users' location data is often shared without explicit consent or control. Security Risks: Location data can be vulnerable to interception, tampering, or exploitation by malicious actors. User Trust and Adoption: Concerns about privacy and security can hinder user adoption and trust in location sharing platforms. Scalability and Performance: Existing platforms may struggle with scalability, leading to performance issues or delays in location updates. Decentralized Architecture: Utilize blockchain technology to create a decentralized, peer-to-peer network for location sharing. Secure Authentication			
Describe the Solution / Proposed / Developed:			
Explain the uniqueness and distinctive features of the (product / process / service) solution:			

How your proposed / developed (product / process / service) solution is different from similiar kind of product by the competitors if any:
Is there any IP or Patentable Component associated with the Solution?: No
Copy of IP/Patent Applied or Obtained: View File
Did the venture/startup receive any innovation grant from the Institute? Yes
Mention the Pre-Incubation / Incubation Unit Name: MRITS
Total Grant Amount Received (Rs.) in FY 2019-20: 0
Total Grant Amount Received (Rs.) in FY 2020-21: 0
Total Grant Amount Received (Rs.) in FY 2021-22: 0
Did the venture/startup receive any innovation grant from any external sources, so far? No
Did the venture/startup raise any Angel/Venture Capital Investment so far? No
Are there any recognitions/awards received by the venture/startup for the innovation in National/International Competitions?: No
Upload the Audited copy of the financial Statement clearly indicating the FY and Annual turnover amount of Rs. 50 Lakhs or above: No

Define the Problem – Solution fit achieved/to be achieved by the Startup: Briefly explain the relevance of the innovative solutions are being offered by the startup and what/whose problem (Industry/Society/Market) these are solving:
Privacy Concerns: Users' location data is often shared without explicit consent or control. Security Risks: Location data can be vulnerable to interception, tampering, or exploitation by malicious actors. User Trust and Adoption: Concerns about privacy and security can hinder user adoption and trust in location sharing platforms. Scalability and Performance: Existing platforms may struggle with scalability, leading to performance issues or delays in location updates. Decentralized Architecture: Utilize blockchain technology to create a decentralized, peer-to-peer network for location sharing. Secure Authentication

Define the Product-Market fit achieved/ to be achieved by the Startup: Briefly explain the readiness levels (Technology Readiness Level and Manufacturing Readiness Level) of innovations/solutions offered by the startup to meet the customer need/requirement.
Market Validation: Target Market Identification: Families with young children, elderly, and individuals with disabilities. Market Size: Estimated 10 million potential users in the United States alone. Competitive Landscape: Unique value proposition of end-to-end encryption and user-controlled permissions. Product Validation: Core Features: End-to-end encryption, user-controlled permissions, GPS and cell ID integration. User Experience: Intuitive and user-friendly interface. Security and Compliance: Meets or exceeds industry standards for security and compliance.

Detail the potential market size and target customers/segment (Total Available Market -TAM, Serviceable Available Market - SAM, Serviceable Obtainable Market - SOM):
Estimated Market Size: Global Location-Based Services (LBS) Market: Projected to reach $43.8 billion by 2025, growing at a CAGR of 22.5%. Global Mobile Location-Based Services Market: Expected to reach $61.9 billion by 2027, growing at a CAGR of 24.1%. Target Customer Segments: Families with Young Children: Parents seeking to ensure their children's safety and whereabouts. Elderly and Senior Citizens: Individuals requiring assistance with navigation or emergency response. Individuals with Disabilities: People with disabilities relying on location sharing for safety and independence. Businesses and Enterprises: Companies seeking to enhance employee safety, logistics, and fleet management.

Detail the Business fit achieved/ to be achieved by the Startup: Briefly explain the business model readiness level of innovations to be commercialized. Business Tractions Achieved for the innovation if any, briefly explain the customer tractions achieved for the innovations or solutions offered by the Startup as an attempt to commercialization:
Validated problem-solution fit: Confirmed market demand and validated the solution. Refined value proposition: Clearly defined and differentiated value proposition. Established revenue streams: Identified and established revenue streams. Developing key partnerships: Building strategic partnerships to enhance the platform.

Highlight any competitive advantages such as Intellectual property (IP) or any Unique Selling Proposition (USP) etc. associate with the product/service/business model/startup:
Our goal is to support both query types in efficient fashion , suitable for todays mobile devices . Flexibility to support point ,circular range and nearest neighbour queries on location data . Strong location privacy,the servers processing the data (and administrators of these servers)should not be able to learn the history of locations that a user has visited. Maintaining security(safety) and accuracy in location based applications . Not accessing others to see the location without having the secret key.

Video URL:
https://drive.google.com/file/d/1nX5oDzyb2AqO6OQUdd0OmIkB5RG9Hqx4/view?usp=drivesdk

Innovation Photograph:
View File

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)