Department of Information Technology

A.P. Shah Institute of Technology

G.B.Road,Kasarvadavli, Thane(W), Mumbai-400615

UNIVERSITY OF MUMBAI

Academic Year 2019-2020

A Project Report on

Expeditious Banking using Blockchain Technology

Submitted in partial fulfillment of the degree of
Bachelor of Engineering(Sem-7)

in

INFORMATION TECHNOLOGY

By
Varsha Naik(16104054)
Riya Pejawar(16104040)
Rishabh Singh(14104017)

Under the Guidance of
Prof. Anagha Aher
Prof. Sneha Kanchan

1.Project Conception and Initiation

1.1 Abstract

- Blockchain is growing as a potentially Out of line force capable of changing the financial services industry by making the fund transfer immediate, cheaper and more secure.
- Current existing system is not secure enough to give 100% fraud protection because of more manual work and lack of security of data.
- Blockchain is nothing but a chain made of blocks (nodes).These process nodes do the all major work. These blocks are connected to each other using cryptography.
- This system will be more expeditious, more efficient, and has user affectional interfaces in the banking and has zero probability of losing data while processing of the user data.
- In integration to enabling trade, block chain is larceny-and tamper-resistant model.

1.2 Objectives

- To decentralize the entire banking scenarios.
- To make sure no one can manipulate or bypass the system.
- To ensure all the rules laid down by RBI are strictly abided to and none supersided.
- To protect the inter- block chain data from foreign entities through encryption techniques and checksum generation .

1.3 Literature Review

Sr No.	Year	Author	Title	Publication	Proposed Work	Research Gaps
1	2017	Chris Huls	Four Blockchain Use Cases For Banks.	Fintech Net-work(White Paper)	Application of block chain in Fraud Protec-tion, Know Your Cus-tomer, Trading Plat-forms and Payments.	Privacy issue in Know Your Customer.
2	2017	Xiubo Liang and Tong Wu	Exploration And Prac-tice Of Inter-bank Application Based On Blockchain.	IEEE	Typical architecture of blockchain with various layers and mention of X-swap credit matching trading system.	Only theoretical model.

1.3 Literature Review

Sr No.	Year	Author	Title	Publication	Proposed Work	Research Gaps
3	2016	Quoc Khanh Nguyen	Blockchain - Financial Technology for Future Sustainable Develop-ment.	IEEE	Hypothesis of blockchain usecase in banking system.	Only theoretical model.
4	2016	Konstantinos Christidis, Michael Devetsikio-tis	Blockchains and Smart Contracts for the Internet of Things.	IEEE	Blockchain and In-ternet of Things combination for pro-viding network where non-trusting members can interact with each other without a trusted intermediary.	Maintaining privacy on the blockchain is a complicated issue.

1.3 Literature Review

Sr No.	Year	Author	Title	Publication	Proposed Work	Research Gaps
5	2016	Xiwei Xu, Shiping Chen, Liming Zhu	The Blockchain as a Software Connector.	IEEE	This paper provide rationales to support the architectural decision on whether to employ a decentralized blockchain as opposed to other software solutions.	Limited size of the data store provided by the blockchain , an off-chain data store is needed for some applications.

1.4 Problem Definition

- To build an efficient and secure banking architecture using block-chain technology.
- Current banking architecture is largely centralised and therefore vulnerable to loan defaults and frauds like the PNB scam, Videocon case , Kingfisher scam and many more.
- Banking all over the world has adopted block chain technologies and it is the need of the hour for regulation and avoidance of such scams.
- Thus, we are using block chain technology for the decentralized working of banks and the complete removal of authoritarian interception.
- Software used: Java micro services, PKI , MAC hashing , Checksum generator for security module
- Hardware used: Laptop, cable, USB, SQL database, network support.

1.5 Scope

- To create an expeditious banking system .
- To ensure a decentralized banking transaction for NEFT using block-chain technology.
- Create a banking prototype for user interface for connecting the user to the backend processing.
- To ensure protection of data in transit i.e. inter-block communication by hashing and cryptographic algorithm.
- To ensure blocks are not bypassed by ensuring checksum matches by the majority in the pool of blocks.

1.6 Technology stack

- Software Requirement

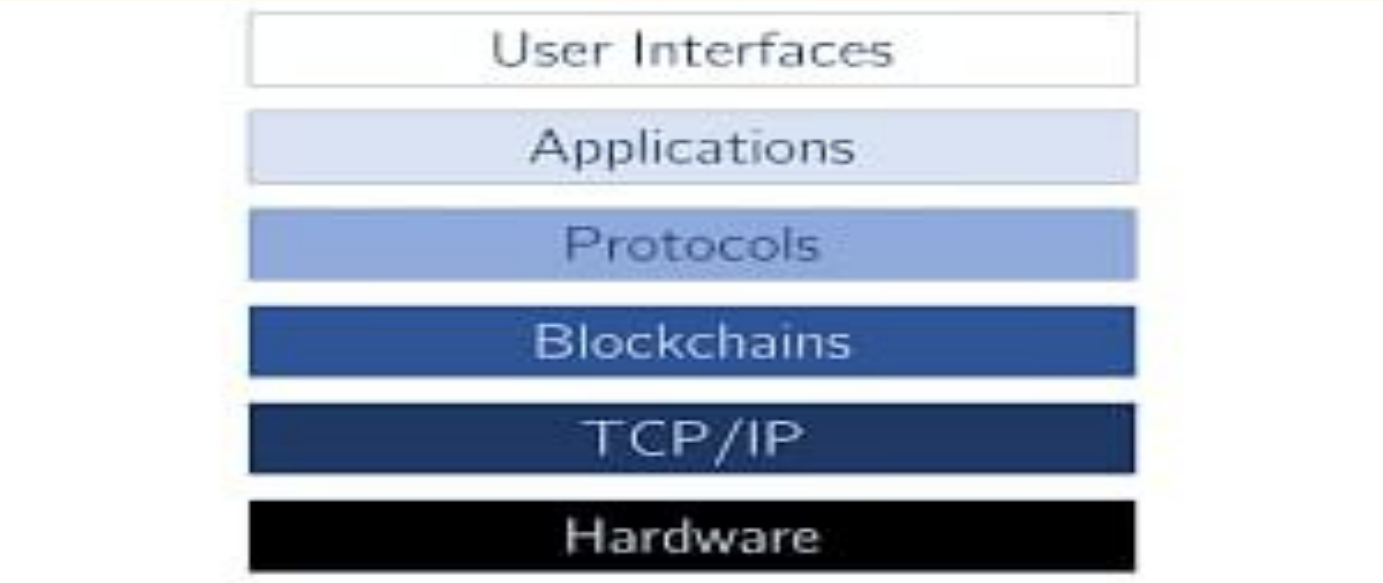
Operating System	Windows xp or later
Web Server	Apache Tomcat
Programming Languages	HTML5, CSS3, java ,SQL, JavaScript.
Database Technology	MySQL
Interface Application	Web Application
Browser Support	Any

1.6 Technology stack

- Hardware Requirement

PROCESSOR	Dual core or more
RAM	2GB
Hard Disk	100MB
Internet	2MBPS

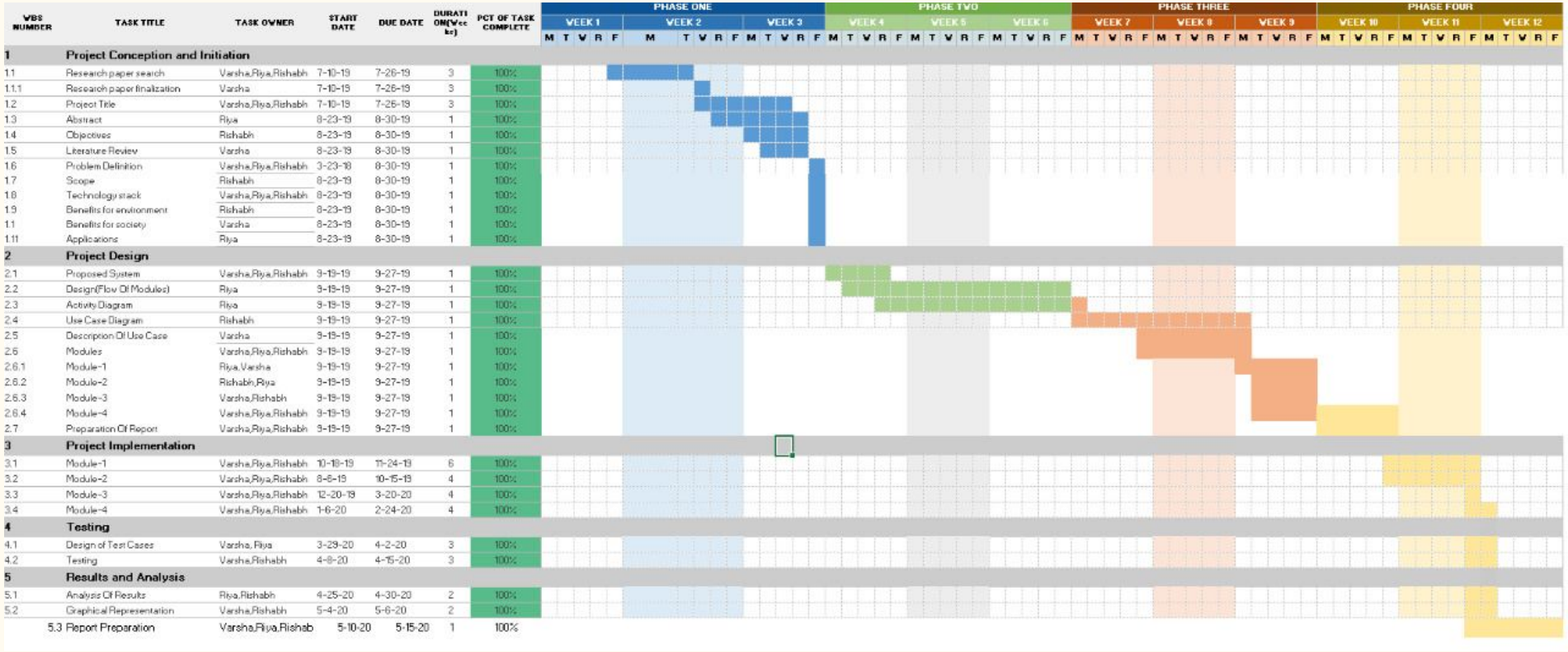
1.6 Technology stack



1.7 Benefits for environment & Society

- Our project is an efficient solution for bypassing human intervention and control in banking sector to make it reliable and secure.
- The project will ensure decentralized transfer of funds.
- Frauds and huge loans sanction can be done away with our perception of a solution using Blockchain which makes it free of manual intervention.

Gantt Chart & Project Timeline Chart

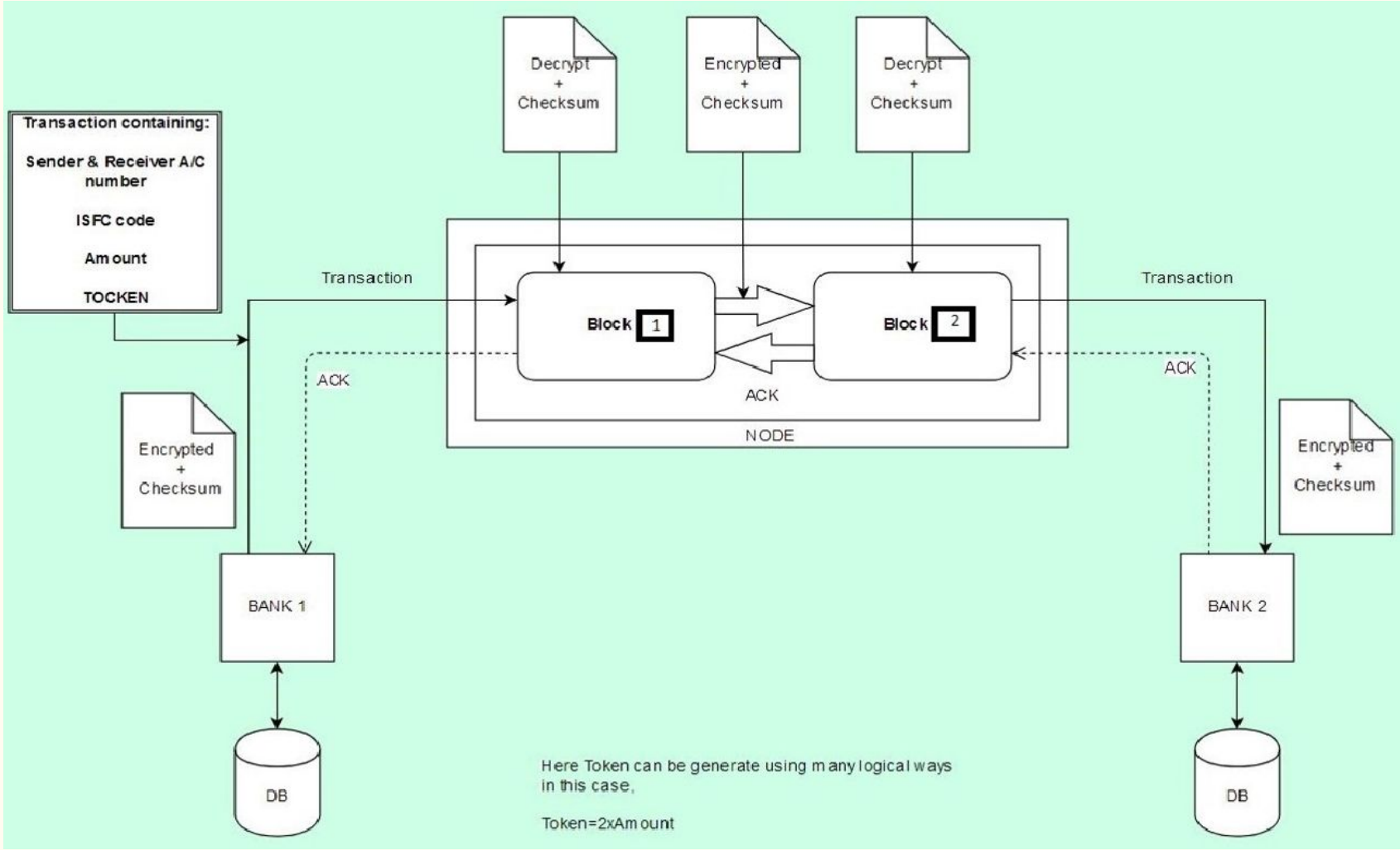


WBS NUMBER	TASK TITLE	TASK OWNER	START DATE	DUE DATE	DURATION(Week)	PCT OF TASK COMPLETE
1	**Project Conception and Initiation**					
1.1	Research paper search	Varsha,Riya,Rishabh	7-10-19	7-26-19	3	100%
1.1.1	Research paper finalization	Varsha	7-10-19	7-26-19	3	100%
1.2	Project Title	Varsha,Riya,Rishabh	7-10-19	7-26-19	3	100%
1.3	Abstract	Riya	8-23-19	8-30-19	1	100%
1.4	Objectives	Rishabh	8-23-19	8-30-19	1	100%
1.5	Literature Review	Varsha	8-23-19	8-30-19	1	100%
1.6	Problem Definition	Varsha,Riya,Rishabh	3-23-18	8-30-19	1	100%
1.7	Scope	Rishabh	8-23-19	8-30-19	1	100%
1.8	Technology stack	Varsha,Riya,Rishabh	8-23-19	8-30-19	1	100%
1.9	Benefits for environment	Rishabh	8-23-19	8-30-19	1	100%
1.1	Benefits for society	Varsha	8-23-19	8-30-19	1	100%
1.11	Applications	Riya	8-23-19	8-30-19	1	100%
2	**Project Design**					
2.1	Proposed System	Varsha,Riya,Rishabh	9-19-19	9-27-19	1	100%
2.2	Design(Flow Of Modules)	Riya	9-19-19	9-27-19	1	100%
2.3	Activity Diagram	Riya	9-19-19	9-27-19	1	100%
2.4	Use Case Diagram	Rishabh	9-19-19	9-27-19	1	100%
2.5	Description Of Use Case	Varsha	9-19-19	9-27-19	1	100%
2.6	Modules	Varsha,Riya,Rishabh	9-19-19	9-27-19	1	100%
2.6.1	Module-1	Riya,Varsha	9-19-19	9-27-19	1	100%
2.6.2	Module-2	Rishabh,Riya	9-19-19	9-27-19	1	100%
2.6.3	Module-3	Varsha,Rishabh	9-19-19	9-27-19	1	100%
2.6.4	Module-4	Varsha,Riya,Rishabh	9-19-19	9-27-19	1	100%
2.7	Preparation Of Report	Varsha,Riya,Rishabh	9-19-19	9-27-19	1	100%
3	**Project Implementation**					
3.1	Module-1	Varsha,Riya,Rishabh	10-18-19	11-24-19	6	100%
3.2	Module-2	Varsha,Riya,Rishabh	8-6-19	10-15-19	4	100%
3.3	Module-3	Varsha,Riya,Rishabh	12-20-19	3-20-20	4	100%
3.4	Module-4	Varsha,Riya,Rishabh	1-6-20	2-24-20	4	100%
4	**Testing**					
4.1	Design of Test Cases	Varsha, Riya	3-29-20	4-2-20	3	100%
4.2	Testing	Varsha,Rishabh	4-8-20	4-15-20	3	100%
5	**Results and Analysis**					
5.1	Analysis Of Results	Riya,Rishabh	4-25-20	4-30-20	2	100%
5.2	Graphical Representation	Varsha,Rishabh	5-4-20	5-6-20	2	100%
5.3	Report Preparation	Varsha,Riya,Rishab	5-10-20	5-15-20	1	100%

2. Project Design

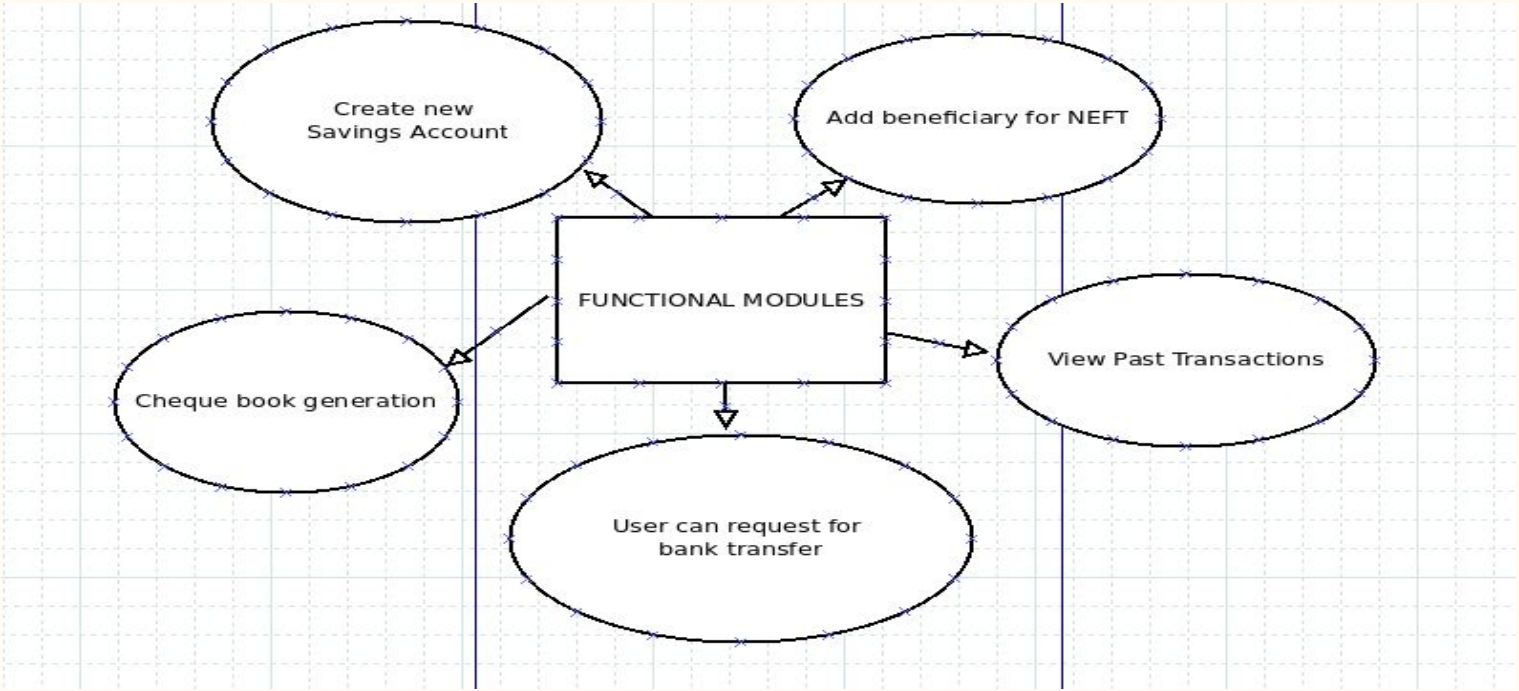
2.1 Proposed System

- The web application will help the bank users to perform the banking transaction more securely and with faster response by eliminating the third parties and the concept of blockchain technology is used which is very power full as compare to other modern world technology.
- The system includes two main modules User, Admin.
- User module contains sub-modules such as money transfer, OTP generation, My statement, Add beneficiary.
- Admin module has viewing of all of the user request and add branch.


Transaction containing:
Sender & Receiver A/C number
ISFC code
Amount
TOCKEN
Decrypt + Checksum
Encrypted + Checksum
Decrypt + Checksum
Transaction
Block 1
Block 2
ACK
ACK
NODE
Transaction
ACK
Encrypted + Checksum
Encrypted + Checksum
BANK 1
BANK 2
DB
DB
Here Token can be generate using many logical ways in this case,
Token=2xAmount

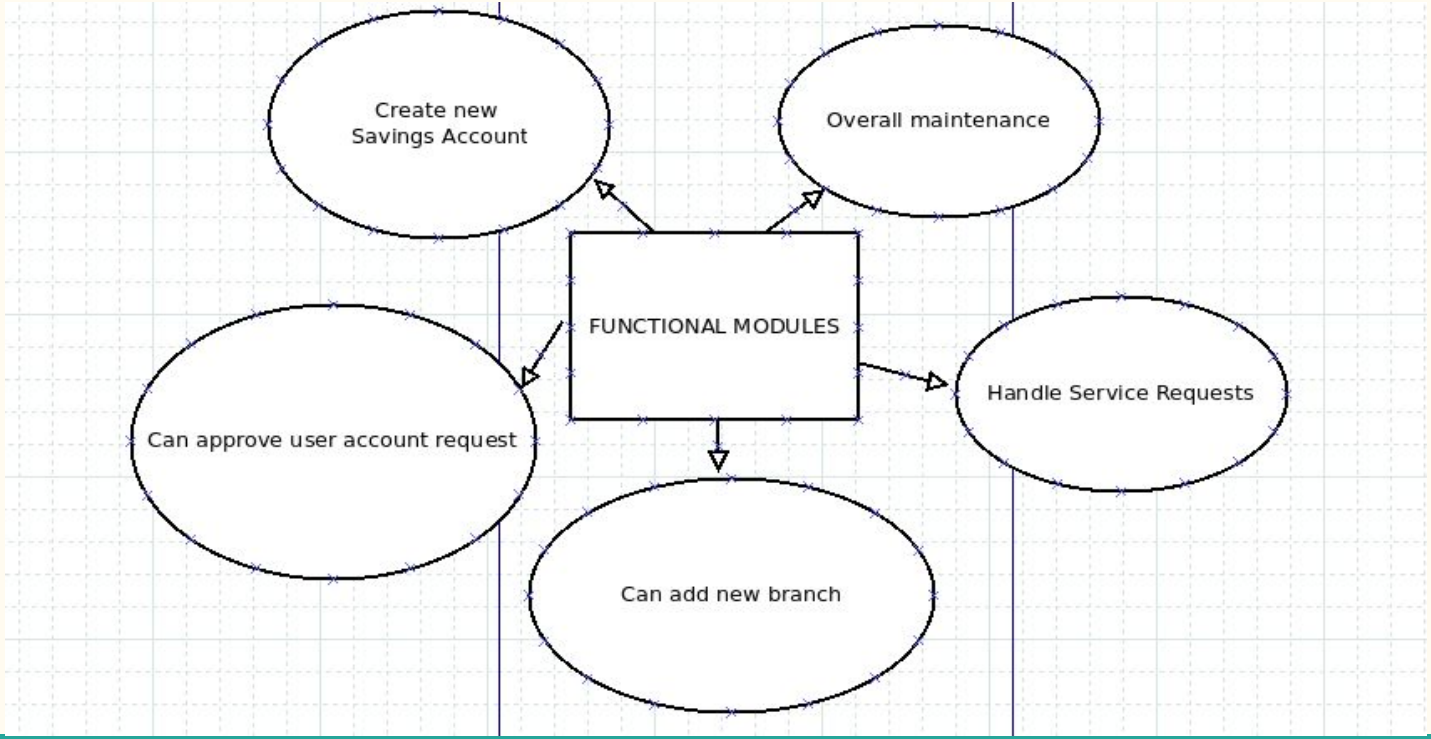
2.2 Design(Flow Of Modules)

- User Module



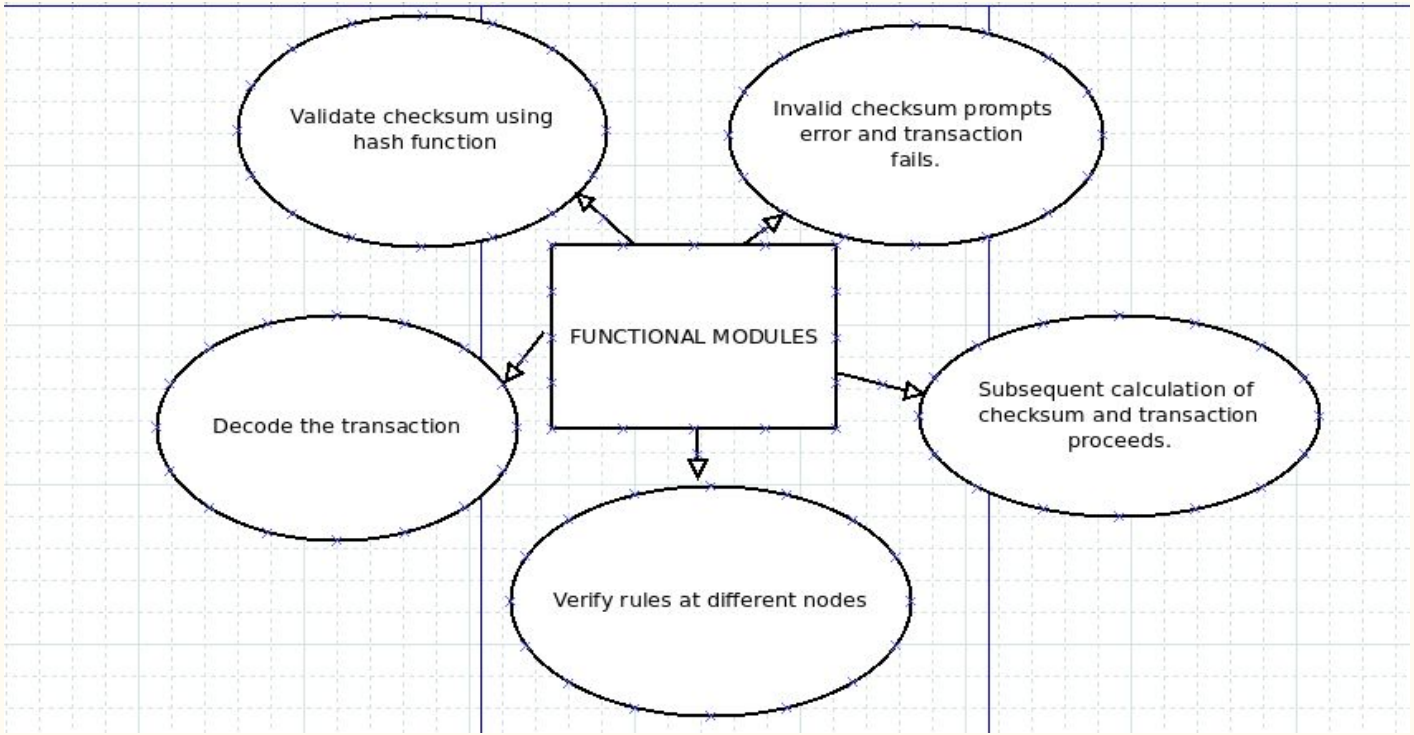
2.2 Design(Flow Of Modules)

- Admin Module



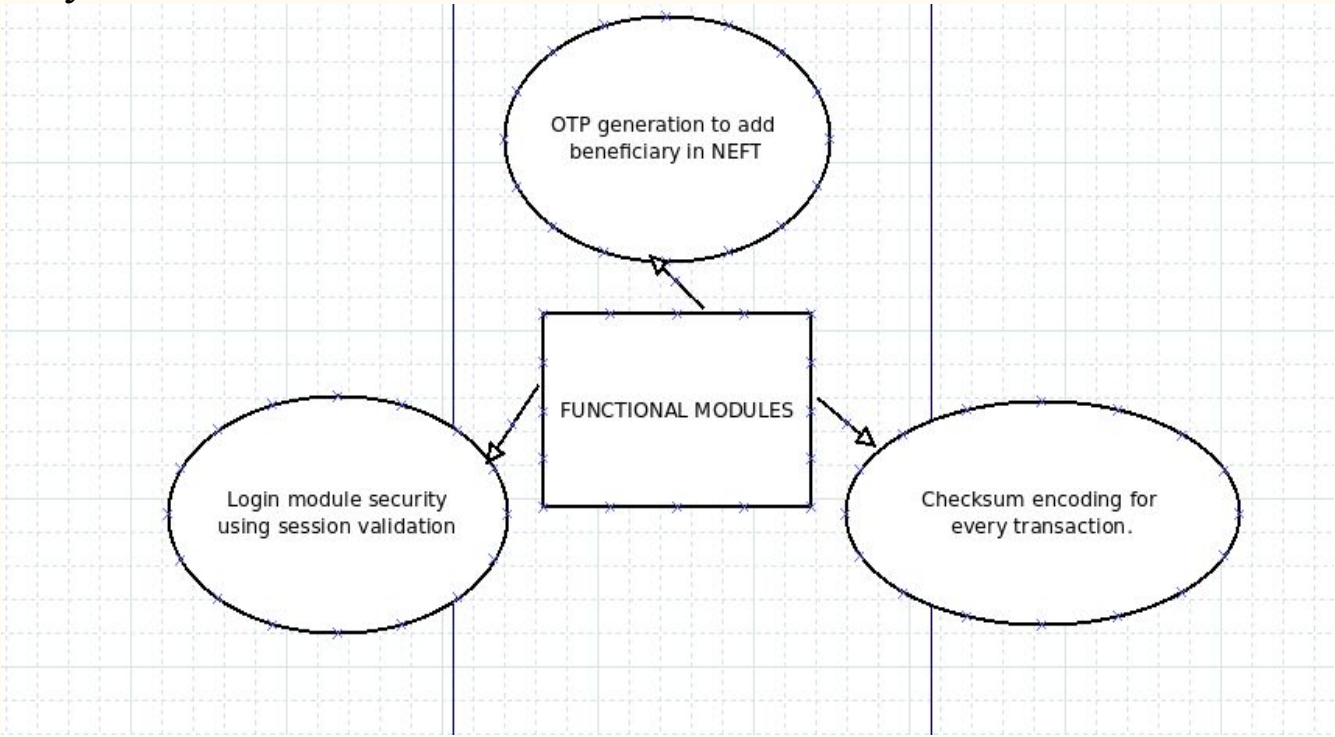
2.2 Design(Flow Of Modules)

- Block-chain Module

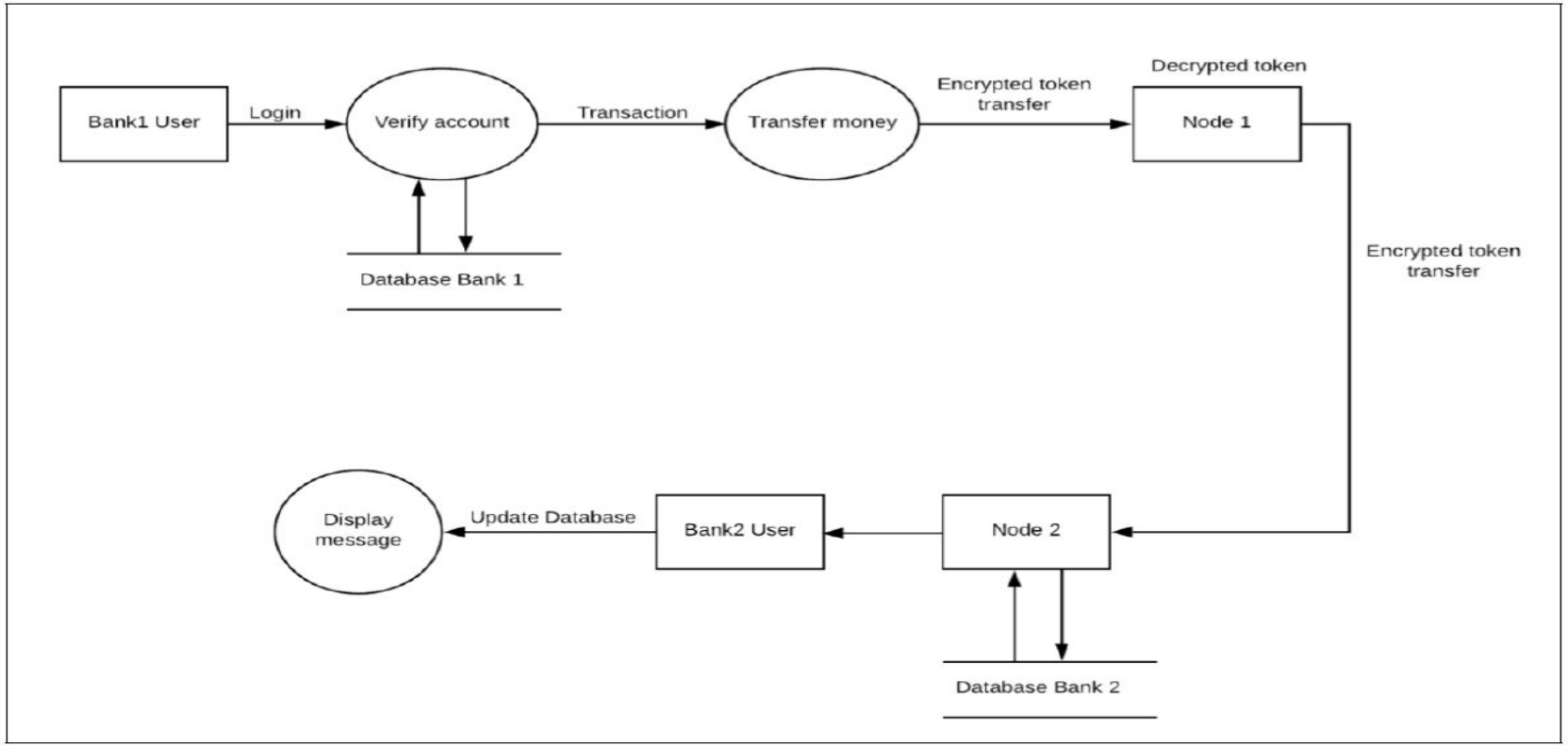


2.2 Design(Flow Of Modules)

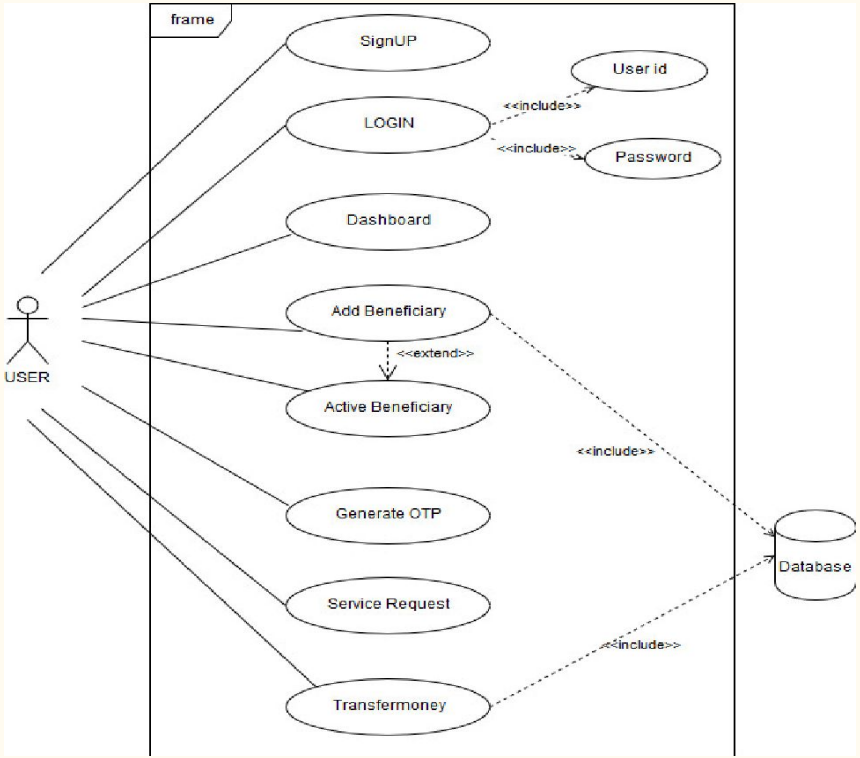
- Security Module

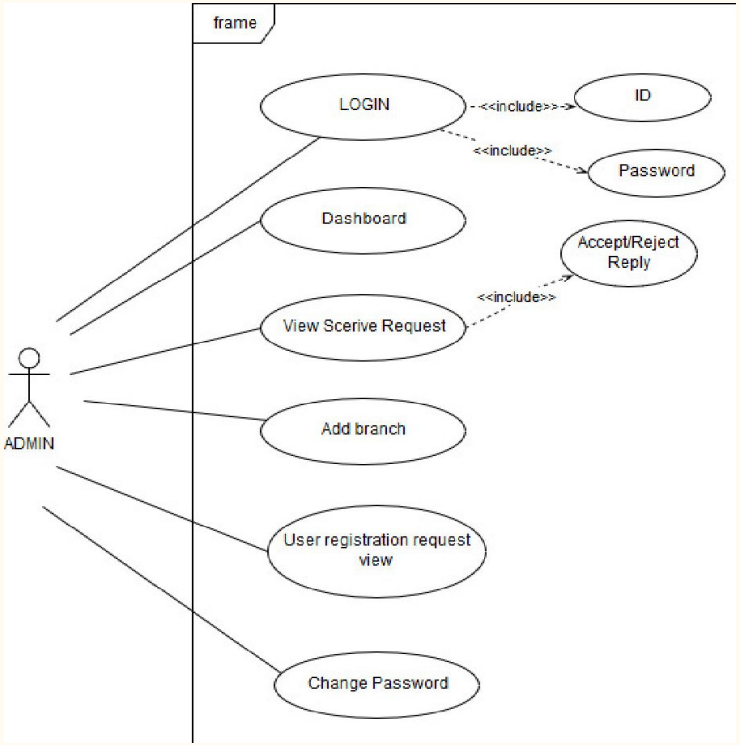


2.2 Design(Flow Of Modules)

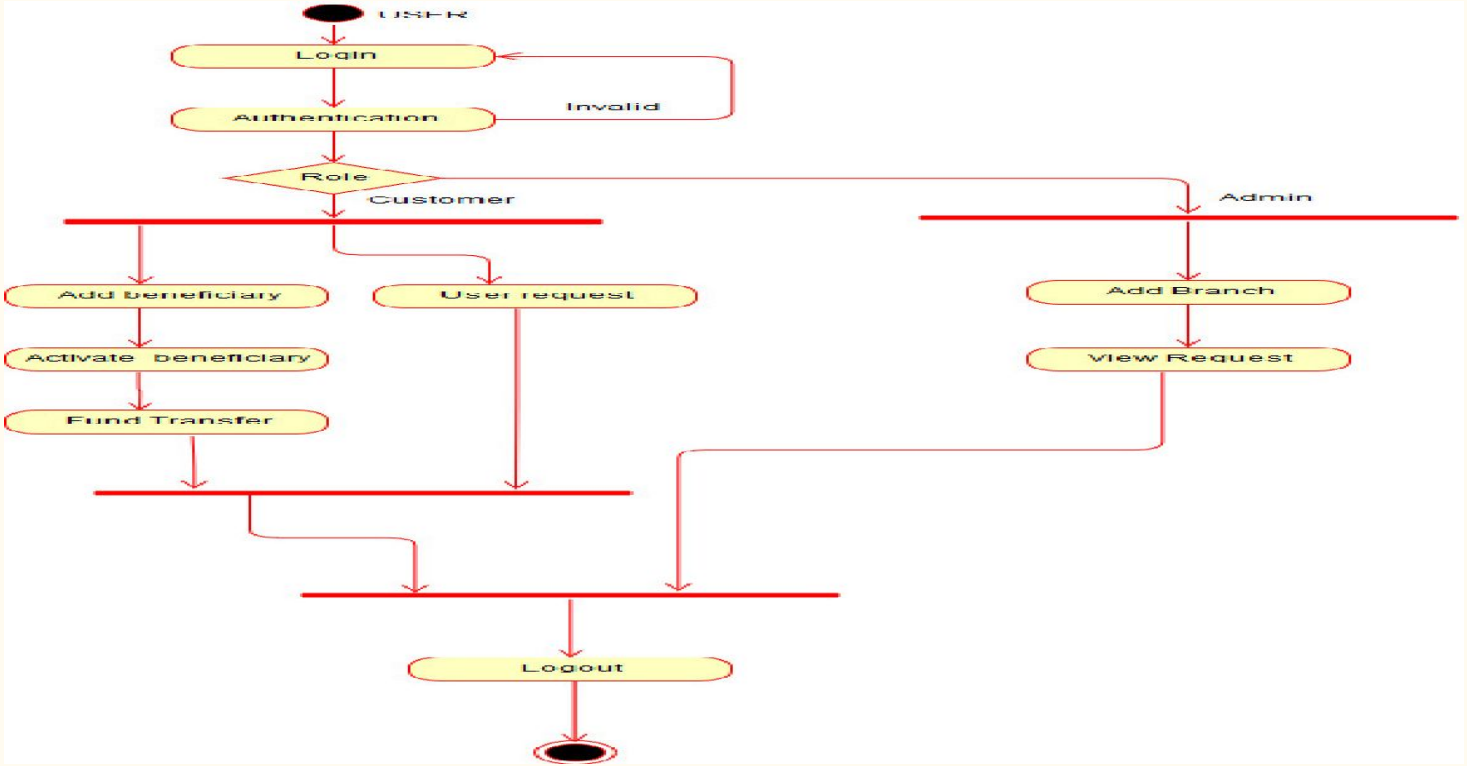


2.3 Description of Use-Case

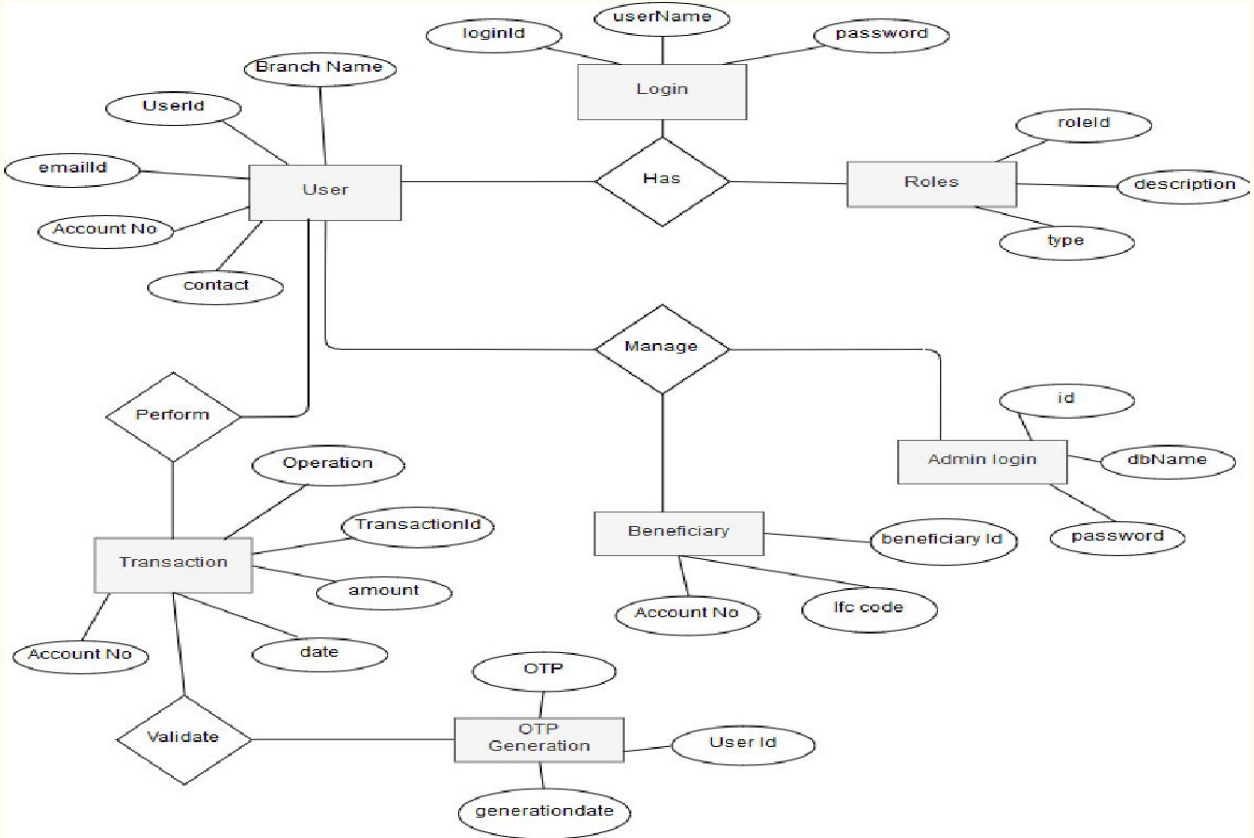




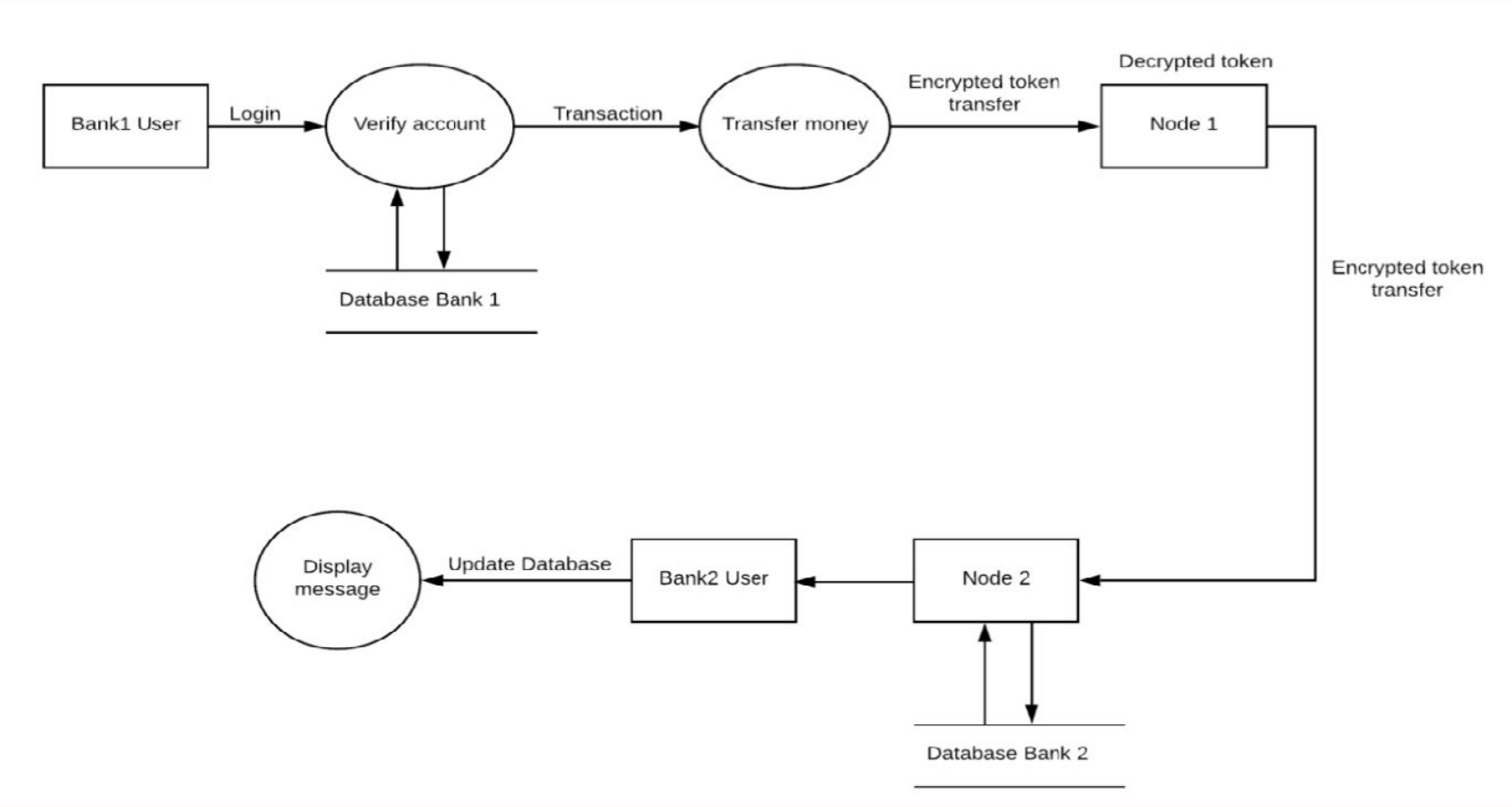
2.4 Activity Diagram



2.5 Class Diagram



2.6 Data Flow Model



Module-1:BANK 1

Bank User

- The application consists of the User interface with all the required links and buttons for navigating inside banking application.
- For sign up user has to provide the personal details like Name, email, PAN.
- After sign up the user will receive the mail containing the details like login id, login password.
- Whenever user wants to do the transaction user has to enter transaction password the user can proceed with transaction.

Bank Admin

- This part of an application also consists of the User interface with all the required links and buttons for navigating inside banking application.
- Whenever new user register himself as new customer this request is received by admin, once admin approve this user gets mail of acceptance along with credentials in it.
- The admin has the ability to accept or reject the service requests of users, he can also add the new branches of his bank into the system.

Module-2 : Processing NODE 1

- A node is a device on a blockchain network, that is in essence the foundation of the technology, allowing it to function and survive.
- Nodes are distributed across a widespread network and carry out a variety of tasks.
- The blocks of data are stored on nodes (compare it to small servers). Nodes can be any kind of device (mostly computers, laptops or even bigger servers). Nodes form the infrastructure of a blockchain.
- All nodes on a blockchain are connected to each other this unit of an application is one of the main processing component of the system which runs in background without having any user interface.
- The whole transaction process is divided into two different blocks.
- NODE 1 is first block and the responsibility of it is validating the sender bank and the user by decrypting the token encrypted from the requested transaction.
- Another responsibility is again encrypting the decrypted token to send it securely on network to next processing unit NODE 2. If this unit fails the system will not work.

Module-3 : Processing NODE 2

- The nodes (blocks) are connected to each other forming a chain of blocks. The NODE 2 is the second processing unit of entire banking system which runs in background.
- Transaction packet encrypted by NODE 1 is received by NODE 2.
- Now NODE 2 decrypt this package then NODE 2 validates the receiver’s bank, receiver’s name also because money should not get sent to other user by mistakenly and Indian Financial System Code(ISFC).
- After that updating the receiver’s bank database and giving the acknowledgement for the same to sending bank user. Nodes follows consensus algorithm.

Module-4 : BANK 2

Bank User

- The application consists of the User interface with all the required links and buttons for navigating inside banking application.
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3. Conclusion and Future Scope

3.1 Conclusion

- As banks need to make numerous transactions every day, Blockchain technology could be of enormous significance by bringing in security and genuineness in transactions using our approach.
- Currently, our system is for small scale environment we can extend the number of nodes in the future to provide higher level of security on large scale.
- Endorsing an idea of trust economy, Blockchain can give financial institutions an opportunity to win the faith and confidence of their customers.
- Not to ignore are the potential savings that it could bring in terms of cost and labour for the banking sector.

3.2 Future Scope

- Our system could further scale up to accomodate more banks and their branches for a wider network of operation.
- The system could also introduce more features in the user interface for a good experience for the customer altogether.
- Also, the crypt algorithms used could be taken a notch up by introducing newer and more efficient algorithms.
- Lastly, time complexity could be increased for efficient performance.

4.References

4. References

[1] Chris Huls, "Four Blockchain Use Cases for Banks (white paper)", Fintech network, Febuary 2017.

[2] Tong Wu, Xiubo Liang, "Exploration and Practice of Inter-bank Application Based on Blockchain", Institute of Electrical and Electronics Engineers, August 2017.

[3] Quoc Khanh Nguyen, "Blockchain–A Financial Technology for Future Sustainable Development", Institute of Electrical and Electronics Engineers, November 2016.

[4] Konstantinos Christidis, Michael Devetsikiotis "Blockchains and Smart Contracts for the Internet of Things", Institute of Electrical and Electronics Engineers, June 2016.

[5] Xiwei Xu, Liming Zhu, Shiping Chen, "The Blockchain as a Software Connector", Institute of Electrical and Electronics Engineers, April 2016.

Thank You