Topic: SDLCs in Smart Banking System

Object Oriented Analysis and Design Project

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Responsibilities:

Research and Survey of various papers and articles

Challenges of Banking Software development-> Ishika

Comparison of different types of sdlc in BFSI sector-> Kashish

Implementing security standards-> Kritika

Digital innovation using sdlc-> Sanya

Uml diagrams and Documentation->All

Abstract

The field of banking is one of the most important ones in the financial sectors. The need for automation of such a sector is a needful deed as the usage is increasing day by day and to a great extent. There is a scope of improvement in a lot of areas of the banking sector.

Today, like never before, IT captures the pulse of a banking organization. The success or failure of a banking enterprise bears a direct correlation to its ability and maturity in ensuring timely IT project delivery. Traditional Software Development Life Cycle has its own set of challenges as it is only concerned with software functionality. Along with digitalization, the banking industry has faced numerous challenges. These are mainly connected to security, regulatory compliance, fintech disruption, to name a few. It has become almost imperative for the practitioners to revisit their IT strategies and to seek business solutions that accommodate requirements pertaining to complexity, scalability, service and delivery, all at once. Question is, can all this be achieved with the technology bound limitations of the Software Development Lifecycle (SDLC), in its current practice? Ever increasing need to shift to a framework where Business, Analytics, Technology and Operations world break the silos and become intertwined in a manner that allows business solutions to be synthesized.

Challenges in Software development in Banking Sector

Security

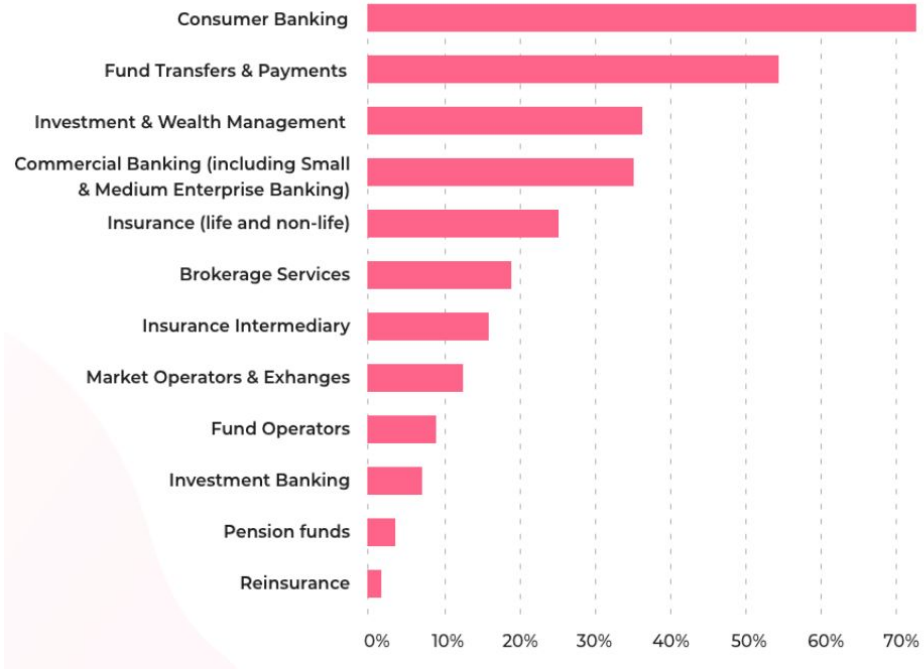
Since mobile banking has become available, the threat imposed by cybercrime increased. According to Forbes, over 25 percent of all malware attacks impacted banks, credit card compromise increased up to 200 percent. Banks started to search for more comprehensive security solutions, taking into account the need for safer storage of data to protect their customers. Protecting data from data-breach is a very crucial task.

Regulatory Compliance

Recent regulations such as PSD2 and GDPR have already changed the way banks processed personal data. For example, according to PSD2, banks should open their APIs to payment providers. GDPR obliged financial organizations to enforce an effective data management strategy and protect the data privacy of EU citizens.

Fintech Disruption

Fintech companies that appeared recently to improve financial services have matured into real competitors of banks. Providing better technology opportunities for the public, these companies have the powerful potential to even replace traditional banking. That is the reason why banks would better partner with fintech startups and organizations to retain customers.



Customer and Employee Retention

In the search for better services, personalized approach, and new possibilities, consumers turn to fintech companies more and more frequently. In this competition, banks realize that they should focus more on providing the services people require rather than improving their brand awareness. The same situation is with employees. To retain valuable human resources and find new experts, banks have to establish a culture addressing the values and expectations of employees.

Digital Innovation

Banks facing shared challenges to provide higher security, more personalized services, and better products are now on their way to digital transformation. To properly reshape their vision and find the right technology solutions, they often prefer contacting software development companies rather than creating solutions in house. Among the most popular technologies that banks implement today are predictive analytics tools, blockchain, RPA, open APIs, Cryptocurrency, AI and so on.

Integration of data

India is one of the largest population countries in the world and many are connected with the banking sector. Data of stakeholders is scattered, therefore compilation of this data in a systematic manner is very essential. IT should help banks not only to deliver robust and reliable services to their customers at lower cost, but also generate and manage information effectively. Information comprises data collected based on principles of integrity, reliability and accuracy. Banks are collecting humongous quantities and warehousing volumes of data relating to customers and transactions.

Customer awareness

Consumer awareness is a major challenge. Bank customers must understand the pros and cons of various products. Banks must educate the consumers about various products. Later, consumers would move towards use of technological products, which in turn will be a positive impact on bank performance. The entire institution of banking is built on consumer trust.

TRADITIONAL SDLC AND ITS CHALLENGES

Traditional Software Development Life Cycle has its own set of challenges as it is only concerned with software functionality. Requirements pertaining to the underlying systems and infrastructure, although addressed, are dealt within a technology silo. Similarly, availability, usability, support and training requirements are handled separately by operations. Continuous collaboration is reduced to an orchestrated intervention driven approach.

Case Studies on Challenges

RBS IT Upgrade Failure

Upgrade of core payments system (CA-7 software) failed, resulting in disruption of bank payments for ~ 2 week

- Affected RBS, NatWest and Ulster Bank payments
- Inability to make payments, access cash from ATMs
- Double entry of payments, corrupted transactions

Business Impact

- RBS Fined £56m by Bank of England and FCA
- Loss of customers and reputational impact

Two years later, the same thing happened again, 600,000 customer payments went “missing”.

Why Did It Happen?

- The bank’s archaic technology systems struggled with the growing weight of customer transactions spurred by digital banking.
- The regulator told banks to make sure their computers are able to support millions of their customers’ accounts after RBS’s earlier failure highlighted the antiquated state of many of their systems.

TSB Data Migration Failure

Customer accounts were migrated from existing platform managed by Lloyds Banking Group to new Proteo platform

Capacity Issues -Web, mobile, branch banking not available

Data Integrity Issues -Customers could see each other accounts

Business Implications

- Instead of saving £ 100m/year, it will cost ~ £30m in incentives to retain people, plus fines of > £ 70m
- Would have been worse if GDPR was already in force

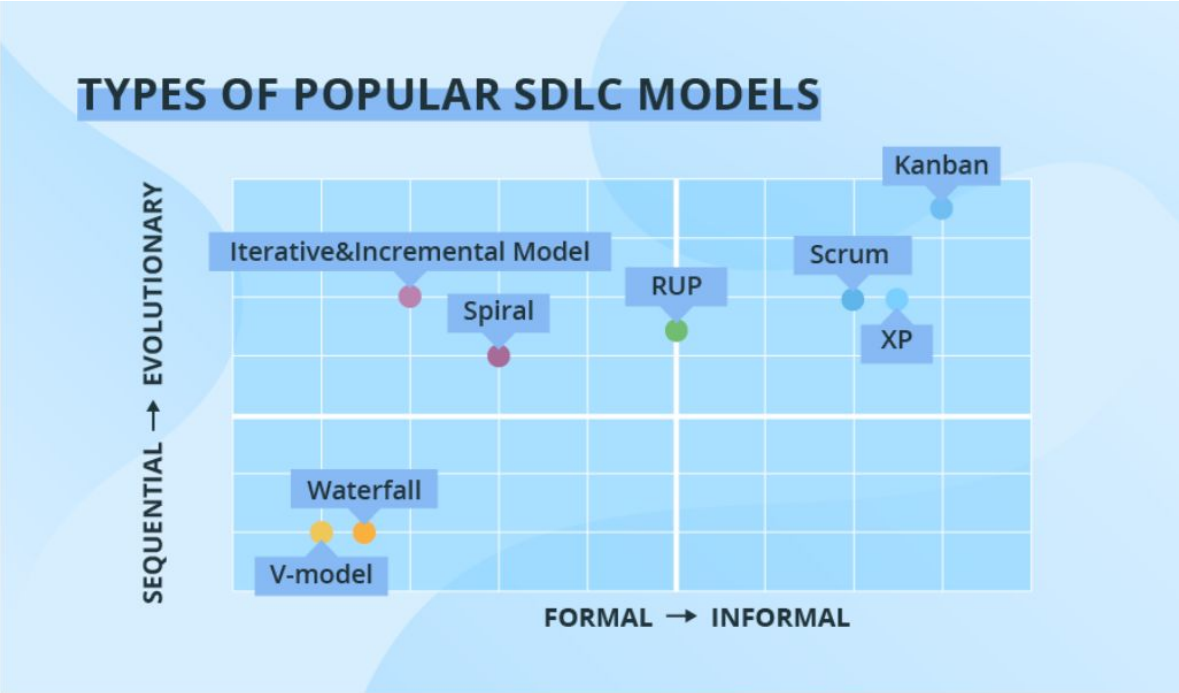
Why Did It Happen?

- “The conversion of the systems – the data and the interface accessing the data, which links up to the banking system – clearly has not been well-tested before it went online,” Shujun Li, a professor of cybersecurity at the University of Kent’s School of Computing.
- "The scale of the problem we saw is incredible. It’s impossible if they had done systematic testing of the system. For me, it’s clearly a case of management, rather than purely a technical problem.”

Comparison of different types of SDLC in BFSI

Comparison of different types of SDLC in BFSI

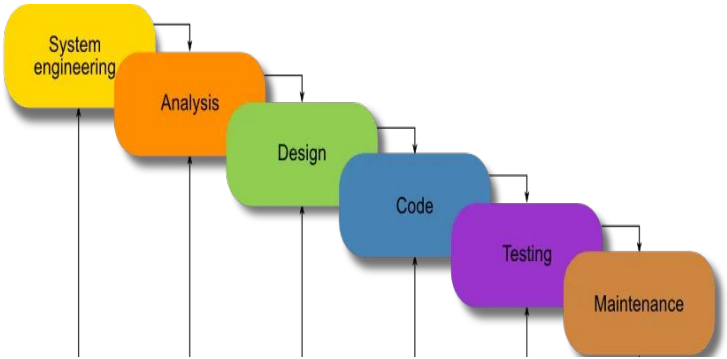
Today, more than ever before, success or failure of a banking enterprise abides a direct correlation towards its ability to meet the demanding time to market conditions. It has become almost imperative for the practitioners to revisit their IT strategies and to seek business solutions that accommodate requirements pertaining to complexity, scalability, service and delivery, all at once. Question is, can all this be achieved with the technology bound limitations of the Software Development Lifecycle (SDLC), in its current practice? Ever increasing need to shift to a framework where Business, Analytics, Technology and Operations world break the silos and become intertwined in a manner that allows business solutions to be synthesized. SDLC would thus no longer be a series of isolated phases, but encompass the entire mechanism of transforming a business problem to an executable solution.


TYPES OF POPULAR SDLC MODELS
SEQUENTIAL → EVOLUTIONARY
FORMAL → INFORMAL
Kanban
Iterative&Incremental Model
RUP
Scrum
Spiral
XP
Waterfall
V-model

1. Waterfall model

For and if banking sector is concerned:

- Requirement Analysis - requirements are gathered from client and captured in a document.
- System Design - which programming language, databases to use and other technical details
- Implementation - the actual coding starts here!
- Testing - Unit test the product in dev environment, perform various other testings in quality environment and make sure code is bug-free.
- Deploy - Move the application/product to production environment (go live)
- Maintenance - Provide post production support, user training etc.



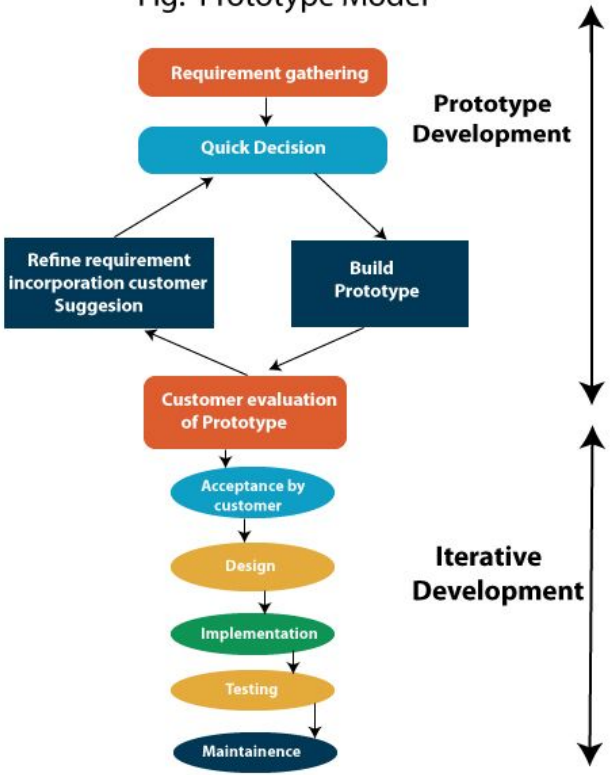
2. Prototype model

A prototype is a toy implementation of a system.

In BFSI,

- Developers and clients interact to understand and freeze the basic requirements.
- Lessons learned from prototype are retained and used in subsequent development phases.

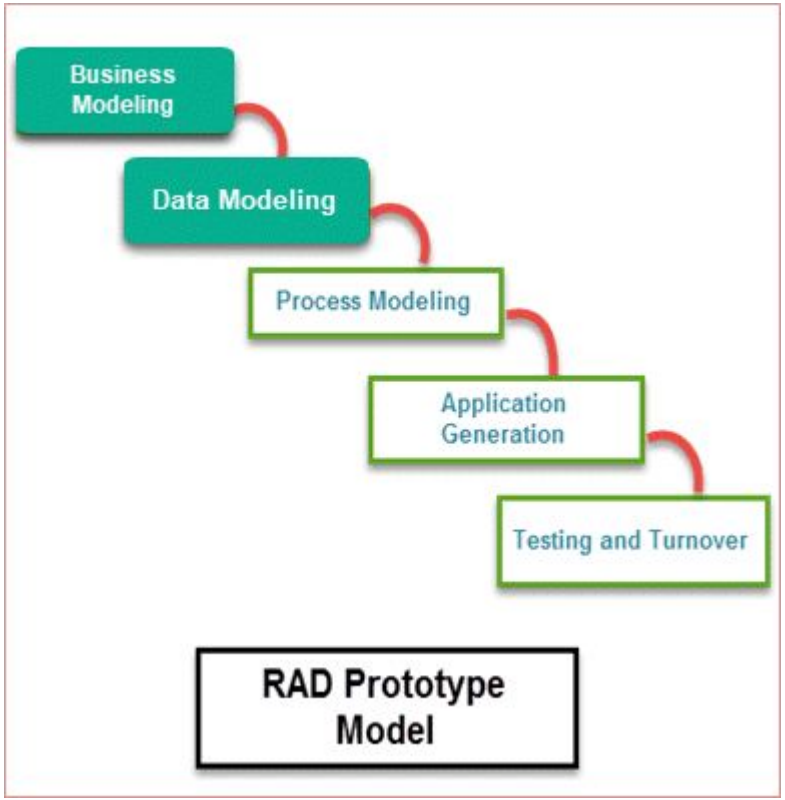
Fig: Prototype Model



3. RAD model

For BFSI,

- Developer knows the requirements of customer in advance.
- The development cycle is extremely small.
- User or customer involvement is there in every stage of RAD model.
- This model has four phase requirement planning, user description, construction and cutover. A number of teams work on a single function and then it is integrated to form whole software.



4. Incremental model

Concerning BFSI,

- A reusable product is released at the end of each cycle.
- **Highest priority requirement** is handled first and sub systems produce a final total system.
- Requirements are clearly understood and **high-risk features** are involved.

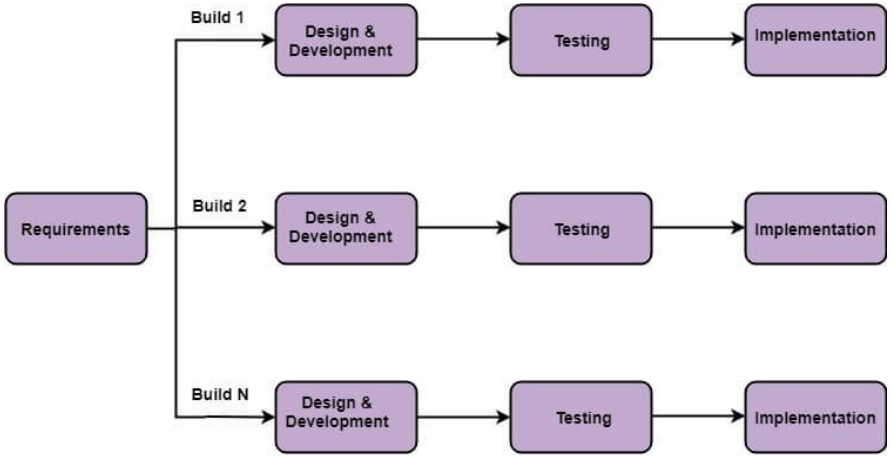
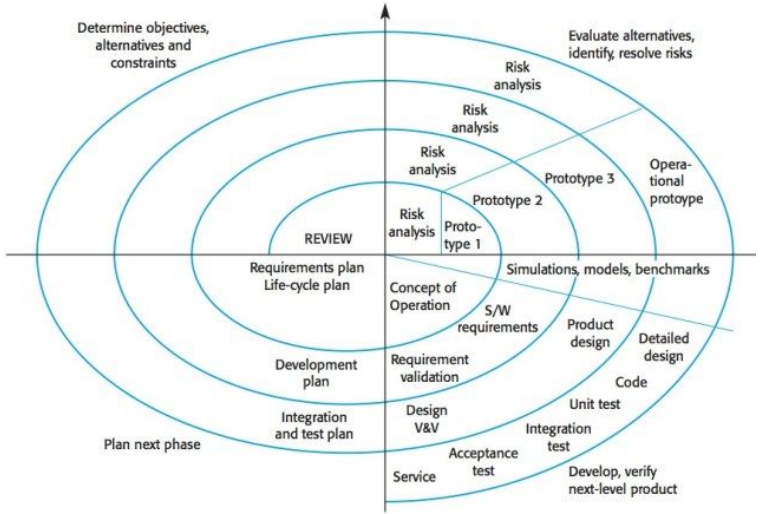


Fig: Incremental Model

5. Spiral model

AS BFSI is concerned,

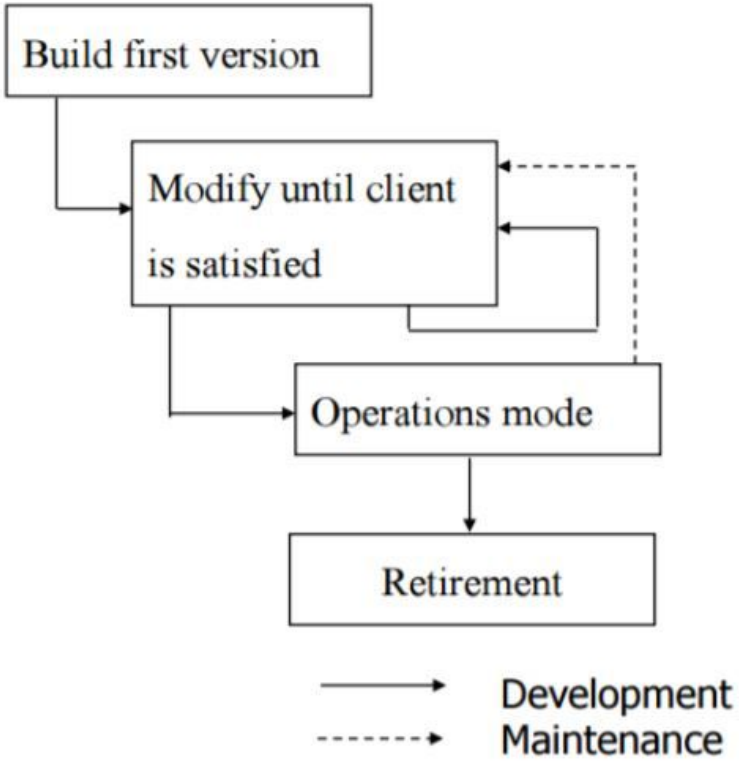
- Planning - estimate cost, schedule and resources.
- Risk analysis - finalize the risk mitigation strategy
- Engineering - coding, testing and deployment.
- Evaluation - Customer evaluation including time and cost over runs etc.



6. Build and fix model

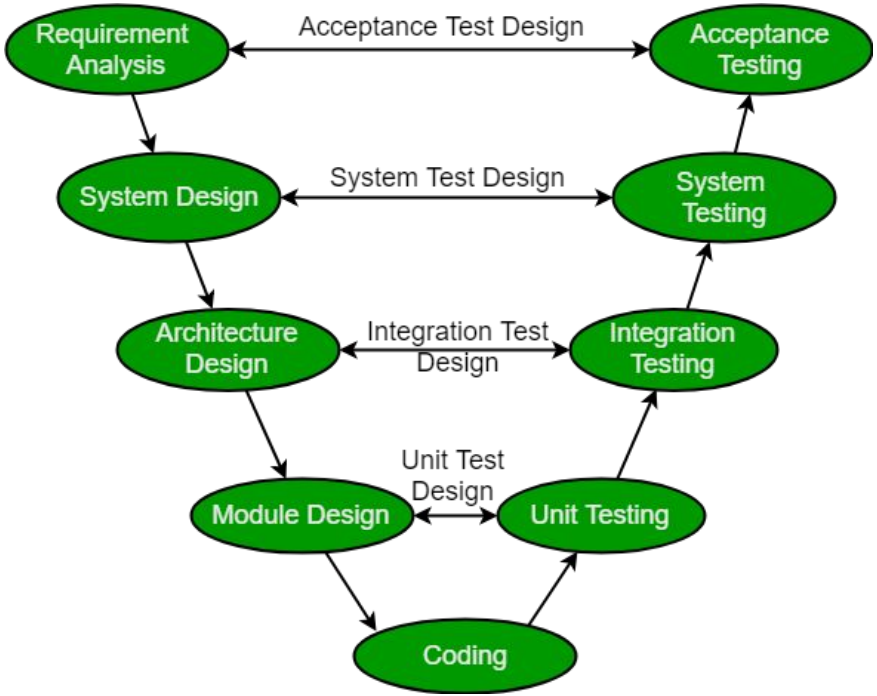
Relating to BFSI,

- Software product is built without any specification and without applying any kind of design.
- Adopt an adhoc approach which is not well defined.
- This model includes the two phases.
- Build: In this phase, the software code is developed and passed on to the next phase for the launch.
- Fix: In this phase, the code which has been developed in build phase is made error free.



7. V-Shaped model

- Requirements have to be very clear before work on the project starts.
- It is strictly disciplined domain, hence can be used in BFSI for highly secure environment.
- Following are the suitable scenarios for BFSI where V-Model can be used:
  - Requirements are well defined, clearly documented and fixed.
  - Product definition is stable.
  - Technology is not dynamic and is well understood by the project team.
  - There are no ambiguous or undefined requirements.



Implementing Security Standards

Vulnerabilities

- **Using Unsecured Wi-Fi Connections:** Some of these Wi-Fi connections(free) are unsecured and serve as the bait set by cyber criminals to gain access into the PCs or mobile systems of their targets.
- **Third Party Applications:** Usually, the banks instruct customers to download official apps from their website or recommend a trusted supplier to handle mobile application creation and control. Hackers could create an exact replica of the apps, stock them up with malware and put it out there for customers to download.
- **Phishing Attacks:** Internet fraudsters use a process called phishing to obtain private information on their preys, one that comes in handy when they wish to commit cyber atrocities.
- **Slip-ups and Omissions:** In the course of data capturing, errors can be made either intentionally or not, either from the data supplier or customer's end that bypasses fraud/error detection systems. Wrongful supply of sensitive information used in creating a personal banking profile may leave loopholes for hackers to breach.
- **Staff Integrity:** Internal staff who have access to the web database of the bank or the entire security framework could tamper with it and wreck the whole system.

Measures

- Anti-virus and anti-malware protection
- Firewalls
- Secure Socket Layer (SSL) encryption
- Cookies
- Account monitoring
- Site and app review
- Multi-factor authentication measures
- Credential confidentiality
- Automatic logout
- Biometric authentication
- Limited liability

Sdlc in banking system

A clear outline of SDLC and deployments helps manage the process effectively and timely address all the possible issues. The stages we provide below can be applied to software development, system development, and app development.

Initiation Phase

The initiation phase starts with a formal request to develop and implement new software or system and to integrate it with existing applications. Typically, it begins when banks understand that they need or have the opportunity to develop a new system or to modernize the existing one. One more important aspect of this stage is to ensure that all the challenges are properly addressed.

Analysis Phase

The analysis phase may encompass multiple analyses depending on what you need to determine or verify. Collecting requirements is all about asking the end-users what they want, need and expect of the future product. This process consists of several phases like elicitation, validation, specification, and verification. It is aimed at capturing, documenting, communicating, and managing the initial requirements.

Design Phase

Below are three goals of the design phase:

- To incorporate the requirements collected during the previous phase with the system's architecture.
- To assess and plan for security risks.
- To get approve for production.

Implementation Phase

The objectives of the development stage include building, testing and integrating the system. Also, developers prepare the technical environment for implementation and get approvals to proceed to test the system.

Role of digitization in banking Role of digitization in banking

- Banks are not just a part of our lives, but have a significant role in our daily lives. For many, day will not end without at least a single financial transaction. Thus banks always try to adopt latest technologies to enhance customer experience.
- Digitization is not an option for banking industry, rather it is inevitable because every industry is being digitized and banking sector is no exception.
- Mobile banking is increasing at a fast pace more than online banking.

Advantages of digitization in banking

- Greater efficiency in processes
- Cost reduction
- Better decisions based on data
- Increase in the number of clients
- User experience
- 24/7 Banking
- Competitive advantage
- Cross-sell / up-sell opportunities

Disadvantages of digitization in banking

- Security and Identity Theft Concerns
- Technology and Service Interruptions
- Limitations on deposits
- Convenient but Not Always Faster
- Lack of Personal Banker Relationship
- Lack of Personal Banker Relationship
- Potential to Overspend

Technological issues

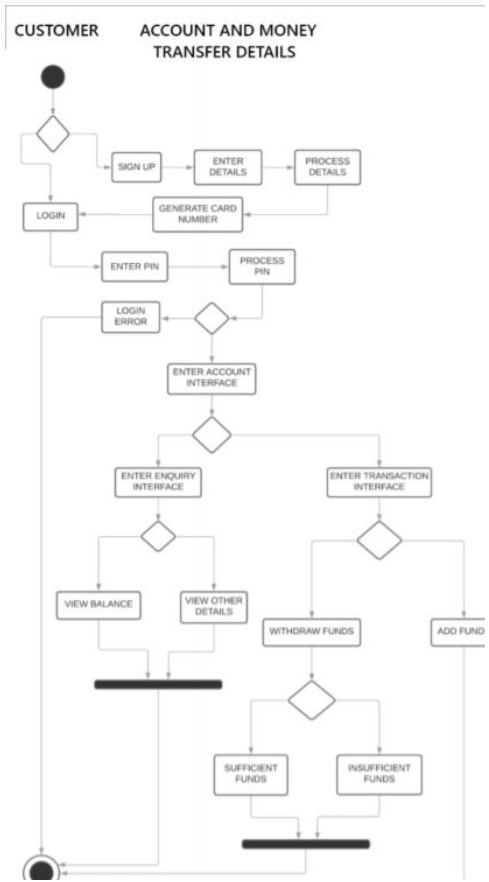
- Digitalization reduces the effort of employees and hence results in loss of jobs.
- Some bank branches may cease to exist with the increasing use of online banking.
- Banks will be more vulnerable to cyber attacks.
- Loss of jobs will be compensated through creation of new jobs such as cyber security, research team for innovation in technology etc.

Incorporation of digitalization in SDLC

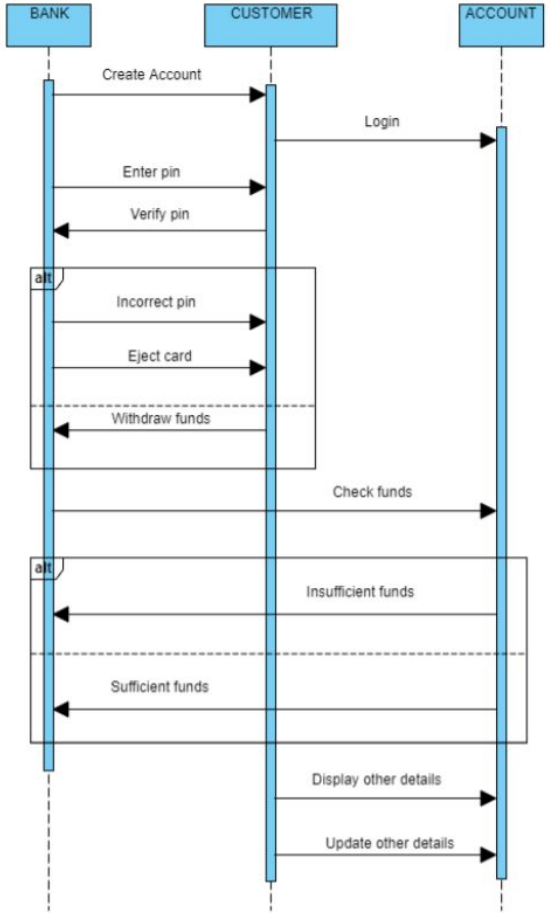
Having seen the vivacious effect of digitalization of in banking sector, it is more than obvious that it would be of tremendous help to incorporate these digitalization changes in the BFSI sector. The digitalization is not just a phase but is itself a major change in SDLC. Hence incorporating digitalization in every phase of SDLC is required as a part of development.

UML diagrams

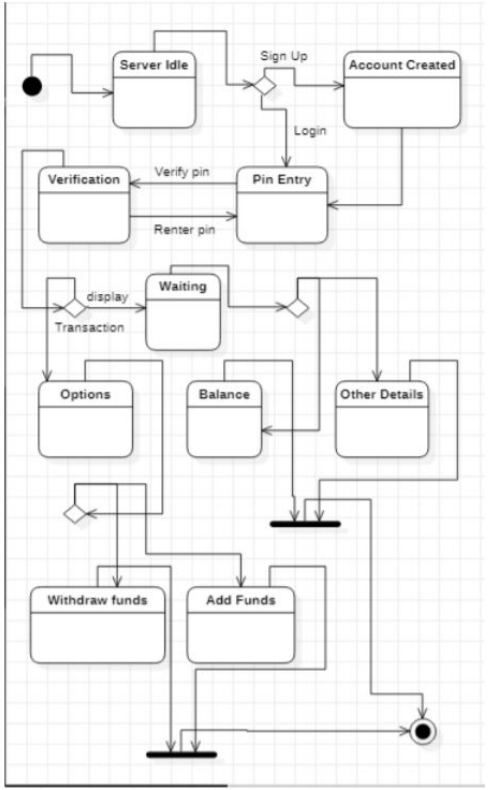
Activity diagram



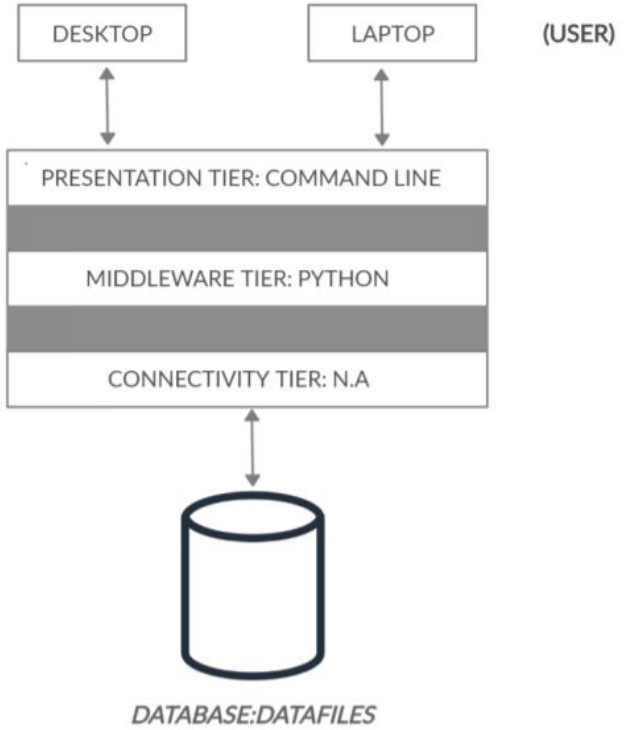
Sequence diagram



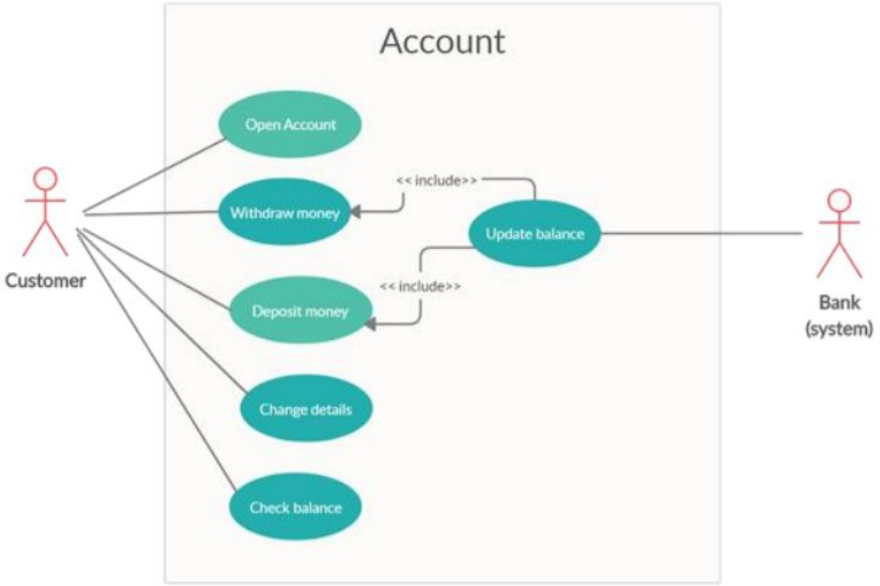
State diagram



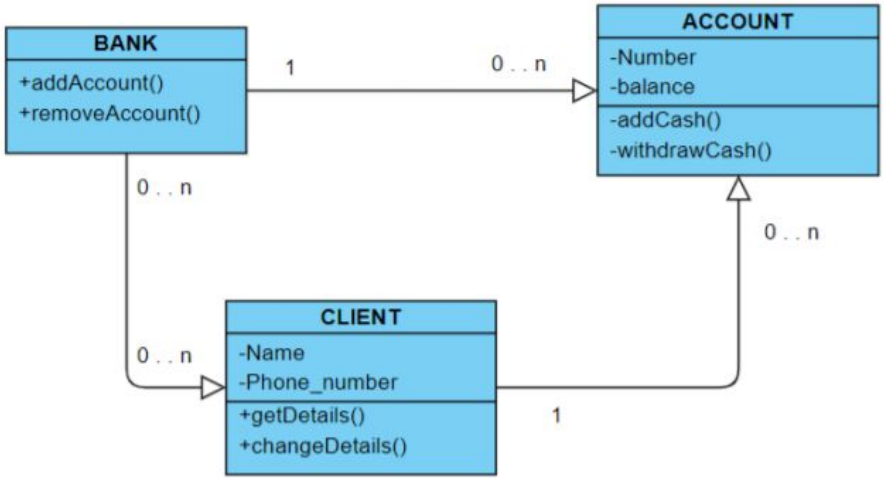
Architecture diagram



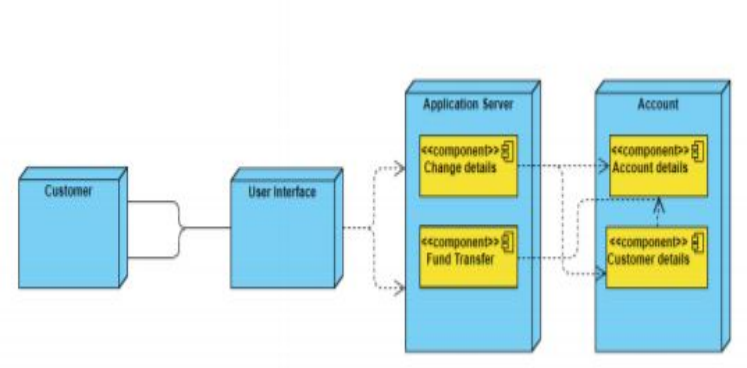
Use Case diagram



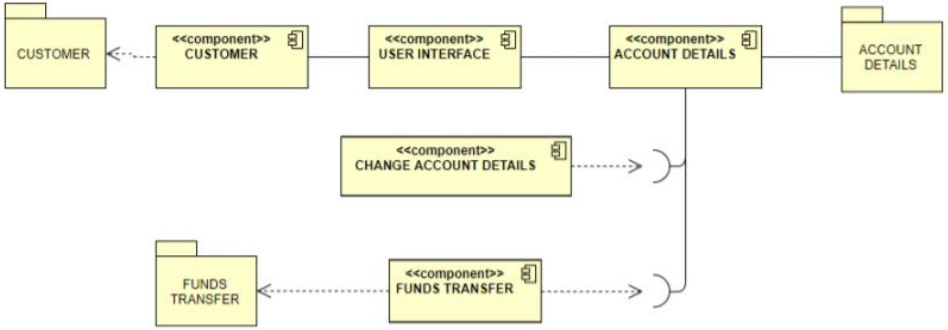
Class diagram



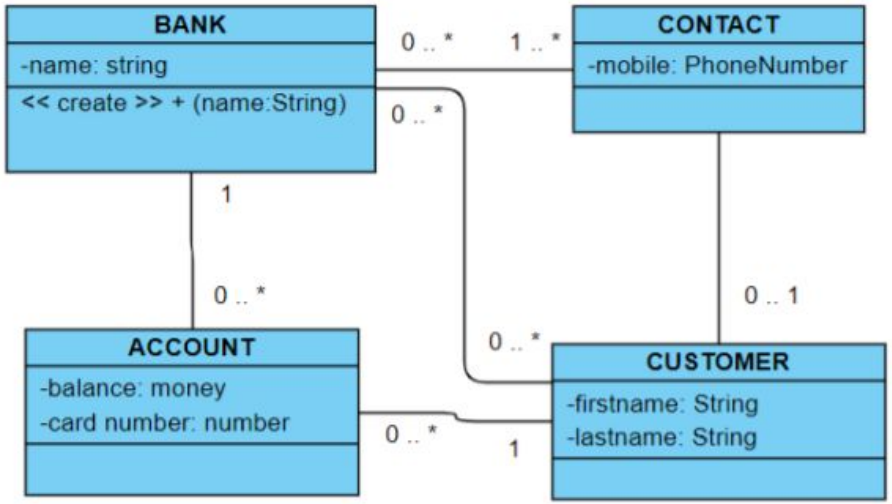
Deployment diagram



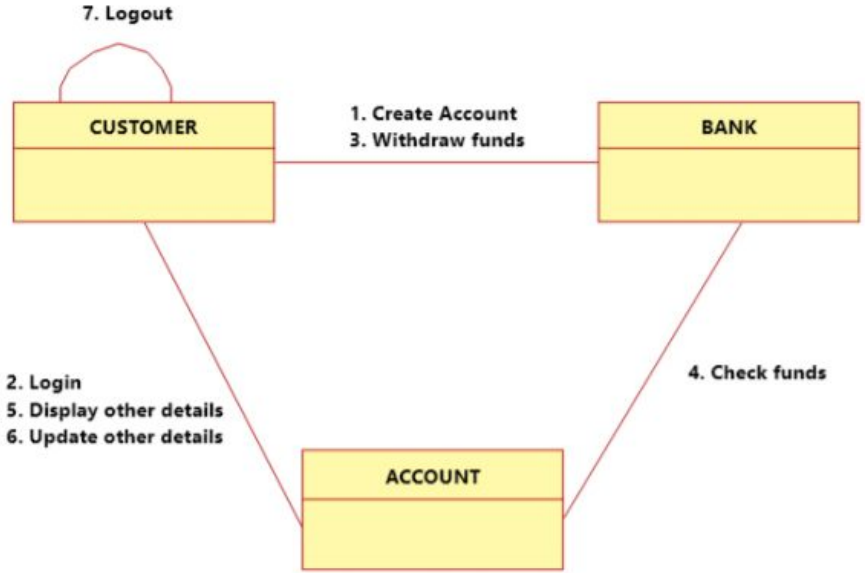
Component diagram



Object diagram



Collaboration diagram



Conclusion

With the increasing usage of smartphones, digitization of banking sector is inevitable to catch up the increasing expectations of the world. It indeed reduced human errors and increased convenience. But the fact that cyber threats are on the rise, banks must be very careful and should be prepared to handle cyber attacks.

Digitalisation has many obvious advantages such as accessibility to information, easy and immediate communication and ability to share information, new jobs, and increased commercial competition. However, there are also downsides to this such as dependence on an unreliable source, the risk of being hacked, the weakening of social skills and the sense of community, and the misuse of information.