

Internship Project Report (API Monitoring Dashboard)

Project report submitted in partial fulfillment of the requirement for the
degree of Bachelor of Technology

in

Computer Science and Engineering/Information Technology

By

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Under the supervision of

Dr. Jagpreet Sidhu (Assistant Professor (SG))

to



Department of Computer Science & Engineering and Information Technology

**Jaypee University of Information Technology Waknaghat, Solan-173234,
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CERTIFICATE

CANDIDATE'S DECLARATION

I hereby declare that the work presented in this report entitled “**API Monitoring Dashboard**” in partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology in Computer Science and Engineering/Information Technology** submitted in the department of Computer Science & Engineering and Information Technology, Jaypee University of Information Technology Waknaghat is an authentic record of my own work carried out over a period from July 2022 to May 2023 under the supervision of (**Dr. Jagpreet Sidhu**) (Assistant Professor (SG)(CSE/IT)).

The matter embodied in the report has not been submitted for the award of any other degree or diploma.

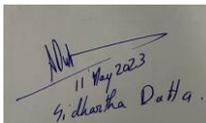
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This is to certify that the above statement made by the candidate is true to the best of my knowledge.

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11 May 2023
Mr. Sidhartha Dutta

Mr. Sidhartha Dutta

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ABSTRACT

Application Programming Interfaces are monitored with the aim to gain visibility into their reliability, availability, and functional exactness, this process is known as API monitoring.

After data correction, a step in the data analytics procedure called visualisation involves analysing the importance of a data set in a visual context. Datasets can be displayed using a variety of techniques, including dynamic or interactive displays and different types of visual insights. In today's world, Analytics and business intelligence are now more useful than ever thanks to visualisation.

The features of Microsoft Power BI, the variety of data sources that are available in banks as a tool, and its various related visual information or background information are the main topics of this report. The interactive API visualisation of Shivalik Bank using a database and the Microsoft Power BI tool is the subject of this report.

The organisational environment in Shivalik Bank, the use of tools like Postman, Finacle, PowerBI, Putty, SQL, and even application testing are all further extra advantages of this report.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

After converting from an Urban Co-operative Bank, **Shivalik Small Finance Bank Limited** became India's first Small Finance Bank. With regard to banking retail products and services, our business has more than 25 years of experience.



Shivalik was raised with a passion for technology, and he consistently emphasises the importance of the customer as a fundamental tenet. The bank is run by Infosys Finacle Core Banking and Digital Banking Suite, which consists of internet and mobile banking. The bank benefits from unmatched agility in managing scale and power growth thanks to the cloud-based architecture. Shivalik is a direct participant in the National Financial Switch and is accessible on all platforms for acknowledging payments from retail customers.

India's largest shared automated teller machine (ATM) network is run by **National Financial Switch (NFS)**. It was created, created, and deployed with the intention of connecting the nation's ATMs and enabling appropriate banking. The National Payments Corporation of India (NPCI) regulates it.

The Reserve Bank of India (RBI) and the Indian Banks Association (IBA) established the **National Payments Corporation of India (NPCI)** to manage India's retail payment and settlement systems. This organisation was founded in 2008 in accordance with the Payment and Settlement Systems Act of 2007.

Difference between small finance bank and commercial bank: Small finance banks target unorganised workers, small business owners, small-scale farmers, and small to medium-sized businesses, in contrast to commercial banks, which have no restrictions on the types of clients they must serve.

Our Vision: To be a trusted financial services provider and model employer by delivering digitally focused, affordable products and a differentiated customer experience to small and underserved segments.

We are Proud to Serve Our

- 6.41 Lakh Different Customers
- 54 Branches
- 75 Exclusive BC Branch

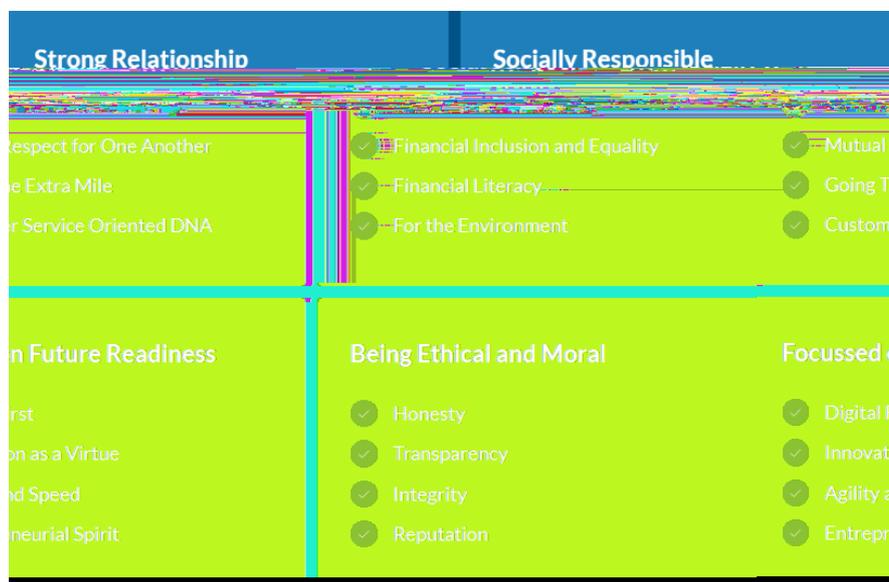


FIGURE 1.1 OUR VISION

Our Purpose:

- Impact lender with a social belief.
- A digital-first strategy for all product and service offerings.
- Compliant with environmental, social, and governance (ESG) norms
- Our target is to become a full-service solution provider for our customers.
- Customer, Organization and Shareholders in that order

1.1.2 FEW OF OUR PARTNERS

Shivalik is fortified and well-positioned for growth by leveraging the power of partnerships, providing best-in class products, and delighting customers.

- **Technology Partners**



- **Business Partners**



1.1.3 ECONOMY OVERVIEW

1. **Global Economy:** The pandemic's persistent challenges, which caused supply chain disruptions, dashed hopes for a quick economic recovery in 2021. Although vaccination efforts in many developed economies were quick and effective, immunization was slow in many emerging markets and developing countries, resulting in a slow economic recovery. According to the April 2022 International Monetary Fund (IMF) Report, the consequences of the Russia-Ukraine war are expected to reduce global growth rate from **6.1% in 2021 to 3.6% in 2022 and 2023**, respectively. These events have resulted in widespread inflation and supply chain disruptions. Higher, broader, and more persistent pricing pressures prompted many countries to tighten monetary policy. Economic risks overall have significantly increased, making trade-offs in policy more challenging.

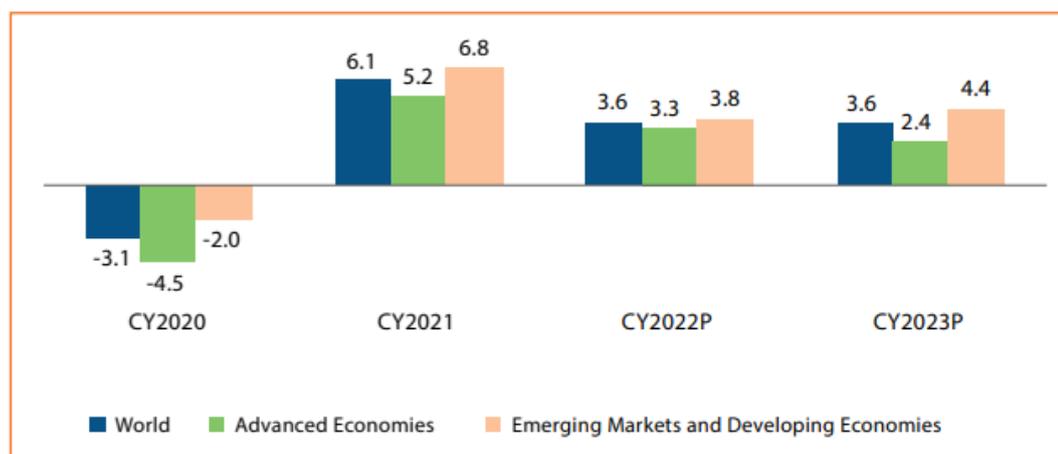


FIGURE 1.2 WORLD ECONOMIC OUTPUT (%)

2. **Indian Economy:** The economic damage caused by the second wave has already been reversed in India, and output has effectively returned to pre-pandemic levels as COVID-19 cases and restrictions have decreased because of the successful vaccination program. As long as India maintains its high

growth rate, it will have the world's fastest growing economy. According to the National Statistics Office (NSO), the GDP growth rate for fiscal year **2021-22** is expected to be **8.9%**.

India's annual inflation rate reached its highest point since October 2020 in March 2022, when it rose to 6.95%. The policy repo rate was raised by the RBI by 40 basis points to 4.40% as a result. The required fiscal adjustments have stimulated investment, consumption, and liquidity. The RBI projects that conflict-related inflation will bring India's GDP growth in the fiscal year **2022–2023 down to 7.5%**.

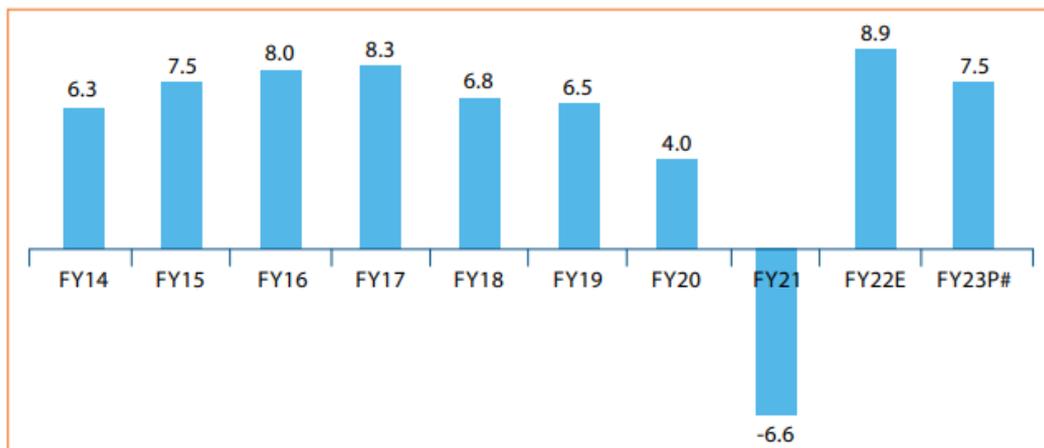


FIGURE 1.3 INDIAN ECONOMIC OUTLOOK (%)

1.1.4 RISK MANAGEMENT FRAMEWORK AND MONITORING STRUCTURE

The Bank's sound risk managements framework approved by the Board/Board of Directors includes the following:

- A comprehensive Risk Management approach.
- A Risk Management framework, including ICAAP policy, which serves as a primary tool for estimation of economic capital (EC).
- Guidelines, policies, processes, delegation matrix and other parameters to govern risk taking.
- Strong Management Information System (MIS) for measuring, monitoring, and controlling risk
- Appropriate limits for controlling exposures, and predetermination of tolerance levels along with adequate stress tests.
- Inculcating a strong risk culture across the Bank.
- RCSA exercise conducted across branches, Asset Centers and all verticals at the Head Office.
- Regular training to upgrade the skills and domain knowledge of the workforce

1.1.5 IT STRATEGY AND INFORMATION SYSTEMS SECURITY COMMITTEE

1. Annually review and approve IT strategy, policy documents/agreements of the Bank, taking into account the changes to the Bank's business plans and IT environment and recommend the same for the approval of the Board.
2. Making sure that administration has a working IT strategic planning process in position.
3. Evaluate and authorise the business strategy's alignment with the bank's IT strategy.
4. Ensuring that the IT organizational structure serves the business requirements of the Bank and its direction.

5. Exercise oversight over implementation of processes and practices so as to ensure that IT delivers value to the businesses of the Bank.
6. Monitoring the method used by management to determine the IT resources required to achieve strategic goals and provide the highest-level guidance for IT resource sourcing and operation.
7. Keeping up a proper balance of IT investments in order to sustain the bank's growth.
8. Assess exposure to IT risks and its controls and evaluate effectiveness of management in monitoring of such IT risks.
9. Assessing senior management's performance in implementing IT strategies.
10. Reviewing high level guidance of policy matters relating to IT viz. related to risk, funding or sourcing of tasks.
11. Assessing if IT architecture has been designed to derive maximum business value from IT.
12. Examining IT performance measurement and the IT Department's contribution to the Bank's operations, i.e., delivering the promised value.
13. To authorise capital and revenue spending for IT purchases.
14. Ensuring that IT investment budgets are reasonable and that risks and benefits are balanced.

1.2 PROBLEM STATEMENT

First, we should understand what API is and how Shivalik Bank could benefit from it. So, APIs (Application Programming Interface) serve as a tool for communicating between bank and client servers, helping in exchanging of information between these two systems in a simple and secure way; without having to change between his Enterprise Resource Planning (ERP) platform and bank, the client and customer can quickly complete banking operations and other services because of API's ability.

Benefits of API in Banking:

- Secure integration medium
- Direct integration and fast remedy
- An extremely successful banking method
- Time-saving and simple reconciliation

The API analytics dashboards consist of visualisations that track API success and failure rates, providing us insight into how APIs are used and how effectively they perform.

We receive success and failure rate of API from **cloud admin** and based on the report first we have to export the data to the excel sheet and then we make visualised graph based on the dataset on PowerBi tool.

Because Power BI is quick and simple to use, it can be connected to an Excel workbook or a local database with ease. As a Microsoft product with built-in connections to Excel, Power BI has a number of features that Excel users will be familiar with, which we will cover in our report.

1.3 OBJECTIVE

The flow starts at the Power BI Desktop, where a report is typically created. Users can access this created report from mobile apps by publishing it to the Power BI Service and sharing it with others.

This is the most common way of exchanging reports. There are other methods as well, but for the sake of this report, we'll stick with this flow to better explain the different features of PowerBI.

The following describes the standard Power BI activity flow:

- I. The data that you require for a report should be imported into Power BI Desktop.
- II. To create new dashboards or visual representations, upload your work to the Power BI service.
- III. Educate others about details dashboards, particularly those who use mobile devices.
- IV. Power BI Mobile apps allow you interact and view with shared dashboards and reports.

The main objective of our report

- Creating Dataset's
- Visualization's
- Making Report's
- Making Dashboard's

1.3.1 CREATING DATASETS

Data sets, which are collections of data, are used by Power BI to create its visualisations. You can have a simple dataset that is based on a single table from a Microsoft Excel workbook, similar to what is shown in the image below.

Partner/Integration Touch Point	API	SUB API	Total No. Of API hits(30 Days)	Success(30 Days)	Failure(30 Days)	Prior Day Success	Prior Day Failure
ADV	AadhaarDVGetUID		48	34	14		
	AadhaarDVInsertToken		838	804	34		
	AadhaarDVGetTokenValue		12509	5787	6722	156	148
	PennyDrop		22	18	4		
APB	AcctingAIA		79	77	2	3	0
	XFerTranAdd	Async	67	67	0	3	0
FSS	Custom	RRN_DETFRMPHN	2233	2204	19	84	0
IFL	Custom	addCoreCustomer	608	565	22		
		customerDetailsUpdate	871	830	20		
		form60	206	206	0		
	EKYCWithBiometric		1000	564	436		
	GoldJewelleryAdd		524	501	23		
	LinkCollateral		501	499	2		
	LoanAcctAdd		590	531	38		
	LoanDisbursement		522	496	26		
	RetCustAdd		281	258	18		
	ScheduleLAPayment		6563	3398	3155	131	7
VerifyCustomerDetails		259	0	259			
IGL	AadhaarDVGenerateToken		5919	5912	7	137	0
	Custom		5687	5678	9	161	0
	Disbursement_WF	Loan	2212	2192	20	61	1
	GetLoanAcctDetails		11057	11056	1	5601	1
	Gold Loan		1880	506	181	10	6

FIGURE 1.4 EXCEL SHEET(DATASET)

NOTE: This is merely an illustration; the remaining details are private. We generated an excel sheet using the following information: Partners, API, Prior day Success, Prior day Failure, and one additional detail of data which is date of the event.

The given data is provided to us by cloud admin which tells us about success and failure rate of custom APIs as well as product APIs, Custom APIs are made by our Shivalik team according to our necessity with the help of database while Product APIs are given to us by INFOSYS.

Once we have a dataset, we can begin to create visualisations that present various elements of it in various ways so that we can make conclusions from what we see and what insights we need. Reports play a part in that.

1.3.2 VISUALIZATIONS

A visualisation is a graphic representation of data. Any visual representation of the data which could be a line chart, bar graph, or color-coded map, is proper.

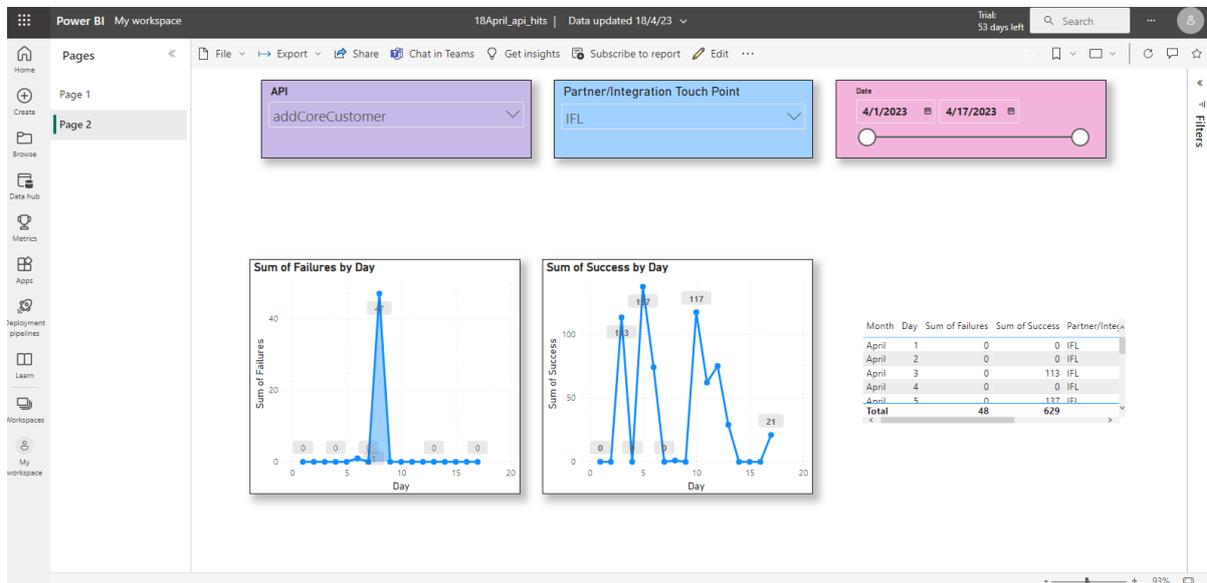


FIGURE 1.5 VISUALIZATION

Visualisations can differ from being as simple as a single number showing a significant calculation to being as complex as multiple charts showing the percentage of users who took part in a survey. Visualization's main goal is to present the data in a way that shows the message and fulfil our need.

As we can see in the above image which is showing the sum of APIs based on success and failures of prior day, here we set the name of **API** as addCoreCustomer, **Partner/Integration Touch Point** as IFL and **Date** from 1st of April to 17th of April.

1.3.3 MAKING REPORTS

A report in Power BI consists of a collection of visualisations that can be viewed on one or more pages. In Power BI, a report is a collection of items with a recurring pattern.

Reports give us the ability to design and organise visualisations on pages in accordance with the way we want to tell the story.

1.3.4 MAKING DASHBOARDS

A Power BI dashboard can be shared which includes a variety of illustrations from just one page. The information or story you are trying to present is frequently effortlessly comprehended with the help of a carefully chosen collection of visuals.

A dashboard must fit on a single page, also referred to as a canvas, where you can put visualisations in Power BI Desktop or the service. Consider it as a workspace where you can create, combine, and rework interesting and attractive visuals, similar to the canvas that an artist or artist might use. Users or groups who you share dashboards with can also access as well as interact with your dashboards while using the Power BI service or a mobile device.

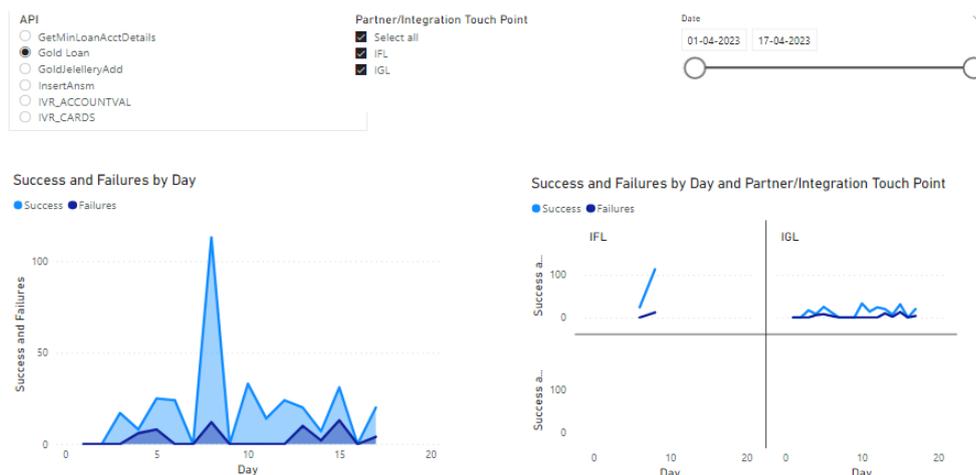


FIGURE 1.6 DASHBOARD VIEW

1.4 METHODOLOGY

Power BI's getting data function retrieves the various types of data from a variety of data sources, including Files, Databases, Azure, Online Services, and others. The details of data sources section give a more thorough explanation of each data source. Following the selection of the data sources, the data must be obtained either by selecting files from folders or, if the data source does not consist solely of files, by executing queries.

After being loaded into the Power BI tool, the data should be checked for errors using the tool's modify queries feature in the data section before being used to create a report. The tool's relationships section can also be used to establish relationships between various data sets.

The next step is to create a report by selecting the report option. After that, a blank white page where we can write our report appears on the screen. On the power BI tool's left side, you can see this option. We can continue if any conditional columns are required or if we need to use the edit query's function to add new data to datasets.

A variety of Visuals, including Custom Visuals and Power BI Visuals like stacked bar charts and stacked column charts, can be used to visualise the examined and corrected data.

The report is then published using the Publish option on the Power BI Services. Before performing any editing tasks, we must log in to power bi services; otherwise, the report is added to the dashboard using the functionality for publishing on the web and an embed link is created. Dashboards can be viewed by end users on any website by using the embedded link, which can be distributed to anyone.

1.5 OBJECTIVE AND WORKING

The purpose of this report is to present the responsibilities of the API team members as well as which platform they use for APIs. The document additionally clarifies the purpose and working of APIs in Shivalik bank.

We work as a team, the work is appropriately divided within a team, responsibilities are shared, and tasks are more likely to be completed within an allotted period for efficiency and productivity.

- Our team members make use of XML/JSON codes for communication between bank and client servers or for middleware.
- Major work is making custom APIs and testing them on POSTMAN platform before deploying code for production.
- Talking to vendors plays another important role as we help third-party platforms to make new products by giving them safe access to financial services.
- Working on SQL is the principle as we receive all the information from its database.
- PowerBi is used to find insights within an organization's data, our team works on it to see the daily graphical representation of API to check whether they are success or failure and time taken by them.

1.5.1 LIST OF USER APPLICATION/ENVIRONMENT

The following is a list of available user applications/environments. There is a separate Frontend, Backend, and Database application for each of the following:

- 1) Development Environment
- 2) UAT Environment
- 3) Production Environment

CHAPTER 2

LITERATURE SURVEY

2.1 LITERATURE SURVEY

1. Research Data Analysis with Power BI

Vijay Krishnan, S. Bharanidharan, G. Krishnamoorthy
11th International CALIBER-2017

Our experience with Power BI has demonstrated that it is a revolutionary approach to simplification in the business intelligence and data analytics space, enabling individuals and organisations to easily provide data, build reports or have them generated automatically, aggregate them in dashboards, and share it with the least amount of time and effort. It is obvious that Power BI is a special opportunity for research institutions and professionals to meet their data analysis needs when this service is provided by a company with the reputation of Microsoft and with independent verification by Gartner that has compared the competition.

2. Analysis and Design of Visualization of Educational Institution Database using PowerBI Tool

Mandava Geetha Bhargava, K. Tara Phani Surya Kiran & Duvvada Rajeswara Rao
Global Journal of Computer Science and Technology, 2018

Data visualisation is crucial to the growth of every business and organisation because it makes it easier and more convenient for the user to read and

comprehend the data. By analysing and correcting the data we collected from various data sources, we were able to visualise the educational institution database into three modules, including Placement Progression, Students Internal Marks, and a module for viewing purposes from the student's perspective. The Power BI tool's dashboards can be viewed through mobile applications like Power Apps and Mobile Power BI, as well as through the web via a website or shareable link. We can create additional modules on infrastructure-related amenities like the standard of the infrastructure offered and staff-related issues like feedback, work status, and other problems.

3. The Development of Performance Dashboard Visualization with Power Bi as Platform

Surlisa Widjaja, Tuga Mauritsius

International Journal of Mechanical Engineering and Technology (IJMET), 2019

Based on results discussion and implementation using Power BI as a platform In Indomobil, the conclusions are:

1. Development of business intelligence performance dashboards can be used as a reference in the decision-making process.
2. The data cleansing process is the most important stage to produce the right information.
3. The involvement of the user from the analysis and design process to the result validation will greatly improve the quality of the required dashboard.
4. Power BI can conduct a business analysis at a higher level (predictive and prescriptive) by utilizing Azure Machine Learning Studio where users can

quickly create prediction models by dragging, dropping, and connecting module data and visualizing the results of machine learning algorithms.

4. Power Bi Dashboard for Data Analysis

Galiveedu Shoaib, Somesh Nandi

International Research Journal of Engineering and Technology (IRJET),2022

Reports are created by using the tools available in the Power Bi and hence creating the Dashboard. Synchronizing the Dashboard gives the modified content in the Dashboard if there are any updates. Synchronization happens while performing scheduled refreshments which is fully automatic. Reports created in Power Bi Desktop Application are published in the Power Bi browser, to make the Dashboard available to view by the specific employees who got access to view.

The usage data of the future months can be updated in the Dashboard by scheduling refresh once in month (according to the requirement). Gaining Ownership of the Dashboard will allow the Power Bi pro License Users to make updates or Advancements in the Dashboard with new constraints. As far as India is concerned, more than 1000 companies are using it as a top product in data visualization and will continue to do so in the near future.

5. Literature Review of Business Intelligence

Rasmey Heang and Raghul Mohan

School of Business and Engineering Halmstad University, Sweden

Although the idea of BI was only developed a few decades ago, it is now a major concern for businesses of all sizes to consider whether they should invest in this system or not in order to satisfy the needs and wants of their customers. Today, BI establishes the true business value of data assets and significantly improves the ability to spot and seize business opportunities. Although many multinational corporations have adopted the BI system, some of them have had trouble implementing it. The implementation and integration of BI systems are significantly influenced by operational and organisational factors such as strategy, human capital, leadership, culture, quality management, and strategic orientation of a firm. Understanding capabilities of both technological and management aspect is a key success in adopting BI system in the firm.

CHAPTER 3

SYSTEM DEVELOPMENT

3.1 PLATFORMS USED IN SHIVALIK SMALL FINANCE BANK FOR APIs.

3.1.1 FINACLE by INFOSYS

The largest supplier of online banking solutions is Finacle. To encourage better banking, we collaborate with both new and established financial institutions. Our SaaS services and suite of cloud-native solutions assist banks in better engagement, innovation, operation, and transformation.

Our business is a part of EdgeVerve Systems, a wholly owned product subsidiary of Infosys, a global technology market leader with annual revenues exceeding USD 15 billion.

Our functionally rich solution portfolio, composable architecture, startup-like culture, and entrepreneurial spirit set us apart from the competition. Additionally, we have a proven track record of accelerating the digital transformation of financial institutions of all sizes.

Today, Finacle is used by financial institutions in over 100 countries to assist millions of businesses and over a billion individuals in better saving, paying, borrowing, and investing practises.

What can banks expect from Finacle?

Five commitments serve as the basis of our mission to encourage better banking.

1. To provide better technology-based solutions so banks can open up new doors and improve their customers' financial lives.

2. To assist banks in better engaging with their partners, clients, and staff in order to promote purposeful growth.
3. To encourage banks to innovate more effectively, produce new value, and increase their level of competition.
4. To find better ways to operate, so banks can spend less money and be more sustainable.
5. To aid banks in better transformation so they can remain relevant to changing market dynamics.

Finacle solutions assist financial institutions in meeting their needs in terms of core banking, lending, digital engagement, payments, cash management, wealth management, treasury, analytics, AI, and blockchain.

Finacle solutions support a wide range of enterprise functionalities, line-of-business elements, and business segments, including retail, wealth, Islamic, corporate, and business banking, as well as a wide range of modern and historical customer engagement channels.

The componentized design of Finacle enables banks to deploy and upgrade solutions flexibly in accordance with their operational priorities. For financial institutions of all types and sizes, whether established or new, international or regional, omnichannel or digital-only, our comprehensive and adaptable suite powers truly digital transformation.

3.1.2 PUTTY

PuTTY is a terminal emulator, serial console, and free and open-source network file transfer programme. SCP, SSH, Telnet, rlogin, and raw socket connections are just a few of the network protocols it supports. A serial port is another option for connecting. It is unclear what "PuTTY" means.

PuTTY was initially created for Microsoft Windows, but it has since been ported to a variety of other operating systems. Platforms like Symbian, Windows Mobile, and Windows Phone have received unofficial ports. Some Unix-like platforms have official ports that are available, and work-in-progress ports for Classic Mac OS and macOS are also available.

Simon Tatham, a British programmer, is mainly accountable for writing and maintaining PuTTY.

The user can control the SSH encryption key and protocol version in PuTTY, as well as other cyphers like AES, 3DES, RC4, Blowfish, DES, and public-key authentication. There is also support for a huge range of secure remote terminal configurations. Protected by Message Authentication Code (PPK) format is how PuTTY stores its own key files. Along with user-supplied GSSAPI DLLs, GSSAPI enables PuTTY to support SSO. It can also simulate control sequences from xterm, VT220, VT102, or ECMA-48 terminal emulation, as well as local, remote, or dynamic port forwarding with SSH (including X11 forwarding). IPv6 is supported at the network communication layer, and zlib@openssh.com is supported by the SSH protocol. Additionally, it is compatible with nearby serial ports.

PuTTY comes with command-line SCP and SFTP clients, referred to as "**pscp**" and "**psftp**" respectively, in addition to plink, a connection tool used for non-interactive sessions.

3.1.3 SQL

- Structured Query Language, or SQL
- Database management and access are both possible with SQL.
- 'American National Standards Institute' (ANSI) and 'International Organisation for Standardisation' (ISO) both recognised SQL as a standard in 1986.

In contrast to more traditional read-write APIs like ISAM or VSAM, SQL has two major advantages. The idea of accessing multiple files with a single

command was first introduced. The requirement to specify how to access a record, such as with or without an index, is also removed.

- SQL has the ability to use databases to run queries.
- SQL can retrieve's data from a database.
- SQL can also be used to add records to databases.
- SQL can also be used to update the record's in a database.
- SQL can be used to delete record's from a database.
- Use SQL to create new database's.
- SQL has the ability to add new tables to database's.
- SQL can also create stored procedure's in a database.
- SQL can create views for a database's.
- Permissions for table's, procedures, and views can all be set by SQL.

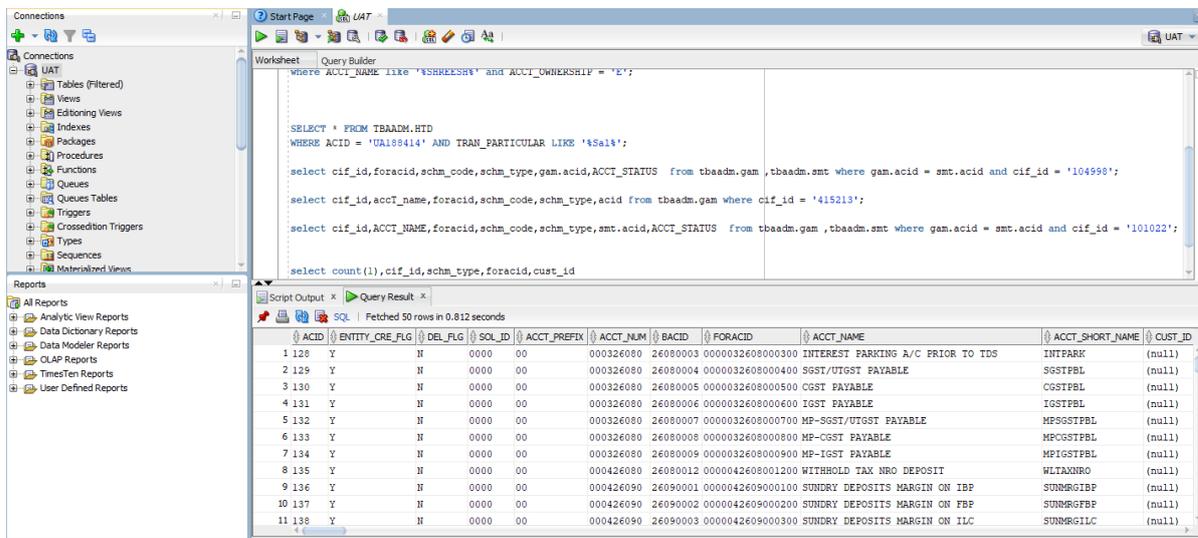


FIGURE 3.1 EXAMPLE OF DATABASE

Tables that are frequently used in our banks are as follows:

- SELECT *FROM TBAADM.GAM;(Master table)
- SELECT *FROM TBAADM.DTD;(For Daily Transaction)
- SELECT *FROM TBAADM.HTD;(For History Transaction)
- SELECT *FROM TBAADM.RTT;(For Switch Transaction)

- SELECT *FROM TBAADM.TAM;(For Top Up Transaction)
- SELECT *FROM TBAADM.LAM;(For Loan Transaction)
- SELECT *FROM CRMUSER.CMG;
- SELECT *FROM TBAADM.CMG;(For Customer name and cif_id)
- SELECT *FROM CRMUSER.ACCOUNTS;(For Customer details)
- SELECT *FROM CRMUSER.PHONEEMAIL;

Note: Cif: Customer Information File

Relational Database Management System is known as RDBMS. All contemporary database systems, including MS SQL Server, IBM DB2, Oracle, MySQL, and Microsoft Access, are based on RDBMS.

Tables are database objects that are used by RDBMS to store data. A table is a collection of related data entries that consists of rows and columns.

3.1.4 POSTMAN

For building and testing the API's we use **POSTMAN** Platform in Shivalik bank. The Postman API Platform offers automated testing, mocking capabilities as well as a simple method for sharing your documentation.

In our banks, we have two primary types of APIs: **Custom and Product**, Custom APIs are made by our Shivalik team according to our necessity with the help of a database while Product APIs are given to us by INFOSYS.



FIGURE 3.2 GET URL

NOTE: In FIGURE. 1, the given URL should be same as:
<https://999.shivalikbank.com>

In the HTTP protocol, both the GET and POST methods are used to transfer data from client to server.

Working with GET Requests: The GET method is used to retrieve data from a server using a given URI.

Working with POST Requests: The POST requests are used to send information to the server.

a) Documenting your API

Documentation is an essential component of any collection or the application programming interface good documentation helps consumers understand what your collection does and how each request works. In addition, comprehensive API documentation informs your customers about the endpoints that are available and how to interact with them.

Users can view the documentation for your collection or API in Postman once it has been generated. Since your documentation is private by default, you must share this with others before they can access it. If you're creating a public API, you can publish your documentation in order to ensure anyone with a web browser can access it.

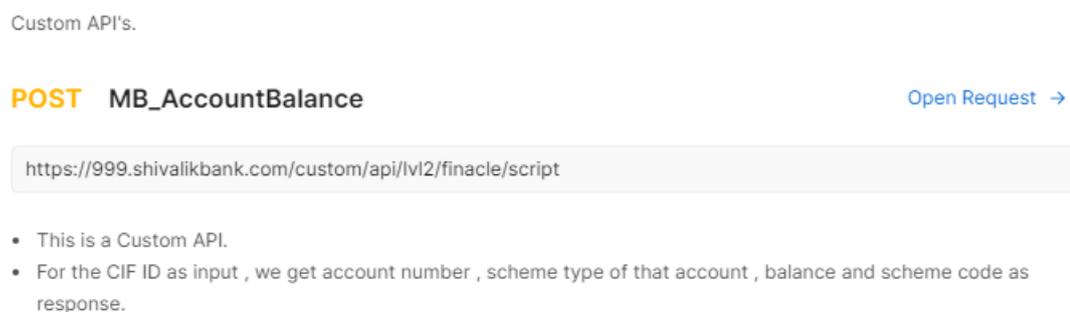


FIGURE 3.3 DOCUMENTATION

b) Monitoring your API

Postman Monitors provide you with real-time information about the health and performance of your APIs. Monitors allow you to run API test scripts, chain multiple requests together, and validate critical API flows. A monitor executes a set number of requests from the Postman cloud.

c) Governance and API Security

API governance is the process of establishing and upholding development rules that encourage consistent API behaviour across your organization's API landscape. A strong API security posture indicates that your organisation has development rules in place that encourage security-first API behaviours. Postman API Governance and Postman API Security can detect inconsistencies or weaknesses in your APIs and recommend potential fixes or improvements.

d) HTTP

A set of rules known as HTTP (Hypertext Transfer Protocol) governs the transmission of multimedia data, including text, audio, video, and graphic images, over the Internet. The moment a user launches a web browser, HTTP is being used.

The HTTP methods GET, POST, PUT, PATCH, HEAD, DELETE, and OPTIONS are the most frequently used ones.

e) Reasons For Using Postman

The power tools within which Postman is built are all incredibly user-friendly. For more than 8 million users, Postman is now a helpful tool. Following are some uses for Postman:

1. **Accessibility-** Postman can be used from anywhere by simply logging in to an account after it has been installed on a device.
2. **Use Collections-** Create collections for your API calls by using Postman's collection feature. Each set has the power to make a number of requests and subfolders. It will help with test suite organisation.
3. **Test development-** Verification of a successful HTTP response status must be added to all API calls in order to test checkpoint development.
4. **Automation testing-** Tests can be run in multiple iterations or repetitions using the Collection Runner or Newman, saving time for repeated tests.
5. **Creating Environments-** Because the same collection can be used in various contexts, the design of multiple environments reduces the need for test replication.
6. **Debugging-** Postman's console makes it easier to debug tests by keeping track of the data that is being retrieved.
7. **Collaboration-** Importing and exporting environments and collections can help with file sharing. Additionally, a direct connection can be used to share the collections.
8. **Continuous integration-** Continuous integration is possible with it because it can support it.

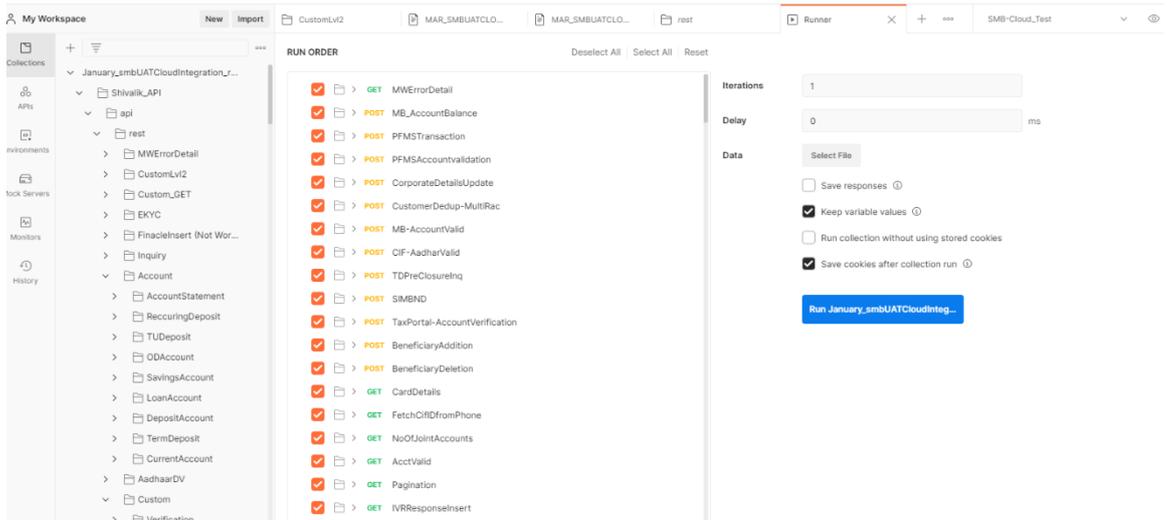


FIGURE 3.4 TESTING OF API

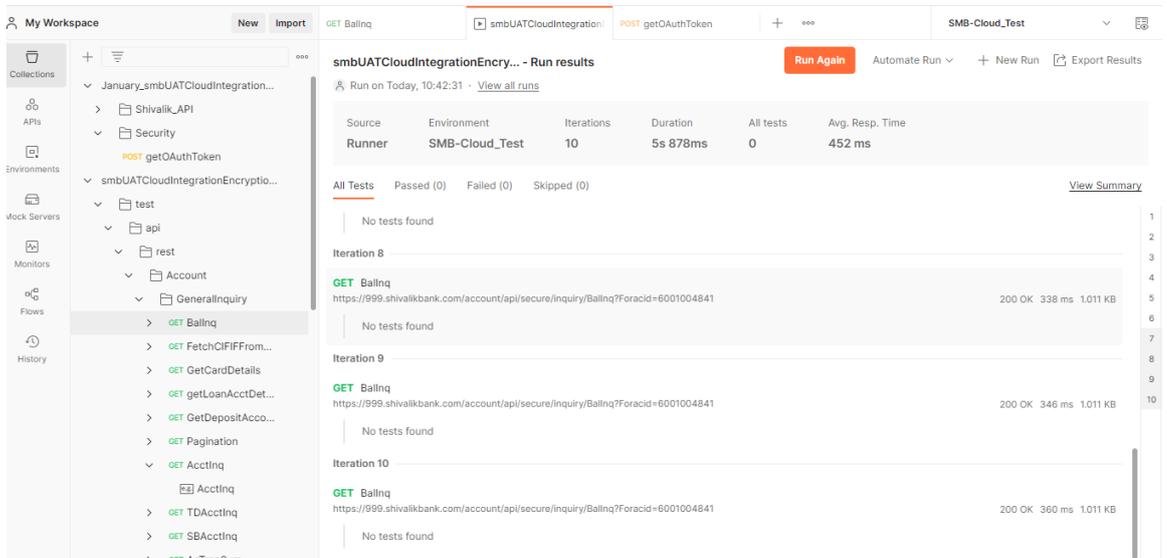


FIGURE 3.5 RESULT OF TESTING OF API

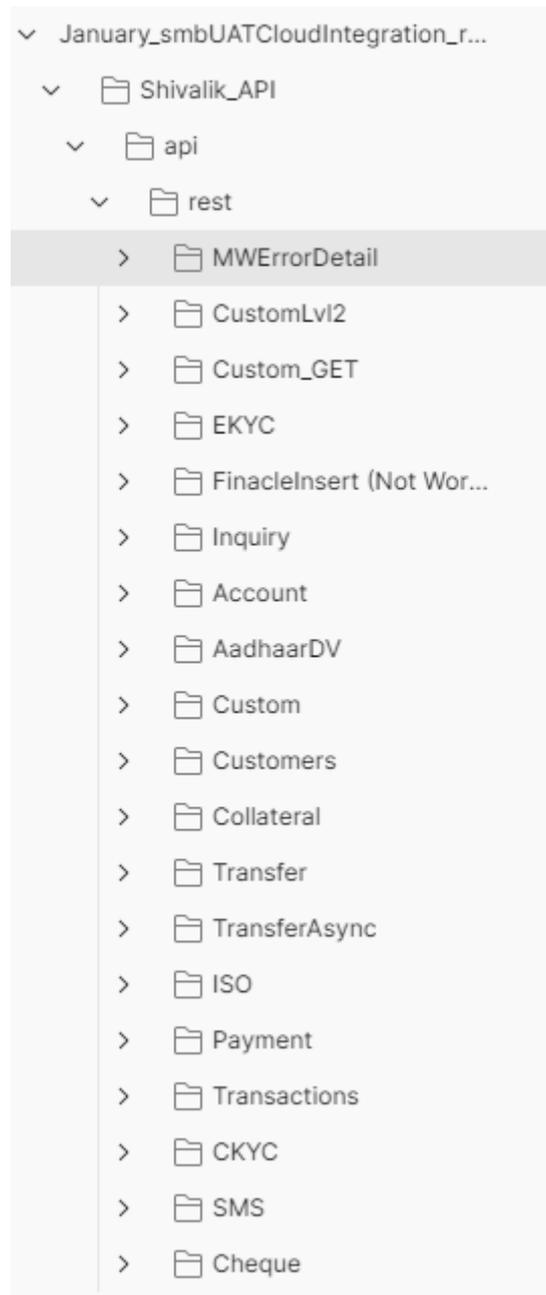


FIGURE 3.6 SOME OF THE APIs OF SHIVALIK BANK

3.2 SOME APIs WITH THEIR SUMMARY

Below are the APIs used in postman collection in Shivalik Bank which are used to fetch information's.

- **GetOAuthToken:** Before running any API on postman we must first run this API and as a result it gives "access_token", after 59 minutes we again have to run this API otherwise all APIs will show "1" as a result.
- **MB_AccountBalance:** This POST API is used to get account number, scheme type of that account, balance and scheme code only CIF ID is required as an input.
- **PFMSTransaction:** This POST API is used to fetch all the transactions done for the requested date along with all the details of each transaction.
- **CIF-AadharValid:** This POST API is used to check the CIF Aadhar combination that whether the CIF is mapped with the given reference number in database or not.
- **SIMBND:** This POST API is used to BIND the Phone number to bank.
- **15G:** This POST Custom API is used to fill Form 15G.
- **MWErrorDetail:** This GET API fetches all the records for the given error Code.
- **GoldRate:** This POST API is used to get the rate of gold on respective date.
- **FrozenAcc:** This POST API is used to freeze the account by providing account number as an input.
- **NEFT/RTGS:** This POST API is used to check the NEFT/RTGS status whether it is failed or successful where reference number is given as an input.

3.3 VALUABLE PARTNERS OF SHIVALIK BANK FOR APIs

INDIA GOLD	NOCPL	AROHAN	IIFL	ERGOS
ASHV	MoneyView	INCA	TCN	Airtel
Paytm	Treasury	Miscot	SwiftDoc	DhanVarsha
BlackBuck	Falcon	Kamal	WinJit	Upswing
Sahaj	ZenPAY	Sand Box		

3.4 PROCESS FOR MAKING CUSTOM APIs

STEP 1: The foremost step in The API is to ask the requirement from the dedicated department.

STEP 2: CHECKING PROCESS

- If some API already exists which is close to our requirement, then we make changes in that API and after doing the necessity we deliver it.
- Otherwise, if it's non-existing then we make a custom API which fulfils the given requirements.

STEP 3: The making of Custom API consists of many steps, the starting point is to create an algorithm for input and output in which we enter the input and receive the required output. The algorithm which we make is in script form or it is in direct mapping with middleware.

STEP 4: Now, the Custom script has to be tested on the bank's server and connected database. The testing is done in Finacle integrator tool provided by Finacle itself. The tool uses XML format to test the script.

NOTE: Finacle only supports XML format.

(Above mentioned points are done from our END)

STEP 5: The mapping of API starts at the end of Middleware once the testing is successful on Finacle Integrator, after receiving the collection from us the Middleware team maps the input and output at their end with the input and output which we have defined in our script.

They also change the XML format to JSON format. The mapping at Middleware improves our security since partners no longer have direct access to our database and must go through multiple verification processes at Middleware.

STEP 6: The Middleware team sends back the postman collection for testing. After successful testing of the API, we forward it to the partner or the dedicated department.

3.5 REQUIREMENTS

Here, we'll give an in-depth explanation of all the requirements needed to make the dashboard.

- I. EXCEL
- II. POWERBI

EXCEL:

The Office family of business software programmes includes Microsoft's Excel spreadsheet programme. Data in a spreadsheet can be formatted, organised, and computed by Microsoft Excel users.

Data analysts and other users can organise data using programmes like Excel to make information easier to view as data is added or changed. The rectangular containers in Excel are referred to as cells, and they are arranged into rows and columns. In these cells, information is kept.

The Microsoft Office and Office 365 suites contain Excel, which works with the other Office applications. The spreadsheet application can be used on Windows, macOS, Android, and iOS devices.

Microsoft Excel is used by businesses for the following things:

1. Data entry and storage
2. Data analysis
3. Performance reporting
4. Collection and verification of business data
5. Business analysis
6. Strategic analysis
7. Accounting and budgeting
8. Administrative and managerial management
9. Account management
10. Project management

POWERBI:

Data analysis and knowledge sharing in the workplace are both supported by Power BI. Power BI has access to data warehouse features like data preparation, data discovery, and interactive dashboards thanks to its cloud integration. Microsoft makes an additional set of support features known as Embedded Power BI available on the Azure cloud platform.

Power BI also has the ability to combine multiple databases, files, and web services in order to make changes quickly or automatically fix data and problems. Power BI also updates data automatically and ensures privacy when disseminating internal reports. Since Power BI has a gateway that enables connection to Server databases, Analysis Services models, and numerous other data sources on the dashboard, Power BI can also integrate all data in the company, whether it is in the cloud or on-premises.

Benefits of Business Intelligence

1. Automate and improve processes that require a lot of information, such as those that are used to plan corrective actions, analyse variances, manage performance, and encourage repeat business.
2. The unit-business dashboard, KPI, and on-time automation are all intended to assist businesses in focusing their efforts on the important customers and distribution channels that produce the desired results, track advancement towards predetermined KPI targets, and have an effect on management-with-exception strategies.
3. Automate the evaluation of trade promotion performance to boost sales support through consumer advertising and marketing to achieve the best outcomes.
4. Provide standard and thorough historical business information about information / facts as input for different company plans and budgets as well as for control in a short amount of time to facilitate effective planning and control.
5. Enable regular but dynamic opinions about the profitability and performance of customers, segments, categories, brands, products, factories, and networks that have a significant impact on sales, costs, services, and profits in order to enable timely and cost-effective monitoring of the company's business and financial performance.
6. Providing users, the option to enter pertinent variables and "as-of" dates for analyses and reports that run quickly, while also making business information and analysis simple to understand and use. Business professionals can specify their preferred usage styles, including standard reports, ad hoc access to big data sets, OLAP and iris, scorecards and dashboards, and predictive analysis.
7. Modify the reporting and warehousing methods as needed to mitigate performance issues in the current setting.is made to provide a thorough framework to help businesses achieve their IT governance and management objectives.

Cloud BI

As businesses recognise the value of data analytics, they are becoming more and more interested in cloud BI solutions. Businesses now more than ever need insightful analysis supported by reliable data. Cost effectiveness, flexibility, and scalability are the main advantages of cloud BI, along with improved data sharing abilities, multiple redundant sites, and low total cost of ownership, reliability has been improved.

3.6 TICKETING TOOL (Microsoft Power Automate)

Microsoft developed Microsoft Power Automate, a very basic drag-and-drop workflow-based automation programme, to automate manual and repetitive tasks. To enable both coders and non-coders to automate repetitive tasks by using a sequential rule-based flow, Microsoft Power Automate (previously known as Microsoft Flow) was developed.

In other words, Let's say you want to automate something. You can try to visualise the process flow before you start by creating a flowchart. Different steps, variables, loops, and even conditions are included in this flowchart. Once completed, you can use Microsoft Power Automate to recreate the same flowchart.

An additional accomplishment that I would like to highlight in my report is utilising power automation in Shivalik Bank to develop a ticketing tool.

TICKETING TOOL

Hello!
Shaswat Sahu

ADD TICKET

VIEW/EDIT TICKETS



FIGURE 3.7 HOME SCREEN OF TICKETING TOOL



ADD TICKET

* Notice Type	Find items	* Regulator Name	Find items	* Place of Notice Received	
* Case Date	12/31/2001	* Notice Issuance Date	12/31/2001	* Customer Name	
* Department Concerned	Find items	* Notice Receiving Date	12/31/2001	* Notice Due Date	12/31/2001
* Account Number		* CIF		* Assigned To	Find items
* PAN Number		* Priority	Find items	* Current Status	Find items

Submit

FIGURE 3.8 ADD TICKET OPTION

The screenshot shows a web interface for managing tickets. At the top, there is a blue header with a home icon, the word 'TICKETS', and a plus sign. Below the header, there is a 'View closed tickets' button, a search icon, and a filter icon. Two ticket cards are displayed, each with a light blue background and rounded corners. Each card contains the following information:

Field	Value	Action
Ticket No:	1	Edit (pencil icon)
Assigned To:	Suveer Kumar Gupta	
Customer Name:	Shreesh	Info (i icon)
Priority:	Low	
Regulator Name:	Sales Tax	Info (i icon)
Status:	In Review	
Department:	1	Info (i icon)
Due Date:	4/27/2023	
Assigned By:	testing1	

Field	Value	Action
Ticket No:	3	Edit (pencil icon)
Assigned To:	Suveer Kumar Gupta	
Customer Name:	te	Info (i icon)
Priority:	Low	
Regulator Name:	GST	Info (i icon)
Status:	Done	
Department:	2	Info (i icon)
Due Date:	5/4/2023	

FIGURE 3.9 VIEW/EDIT TICKET OPTION

NOTE: The purpose of the ticketing tool is to assign the ticket to the needful person directly.

CHAPTER 4

PERFORMANCE ANALYSIS

4.1 SCREENSHOTS OF THE PROJECTS

We have three options, which are listed below, for building our PowerBI dashboard and visualizing the success and failure rates generated for our API.

1. Partner/Integration Touch Point
2. Name of API
3. Date



FIGURE 4.1 PARTNER/INTEGRATION TOUCH POINT

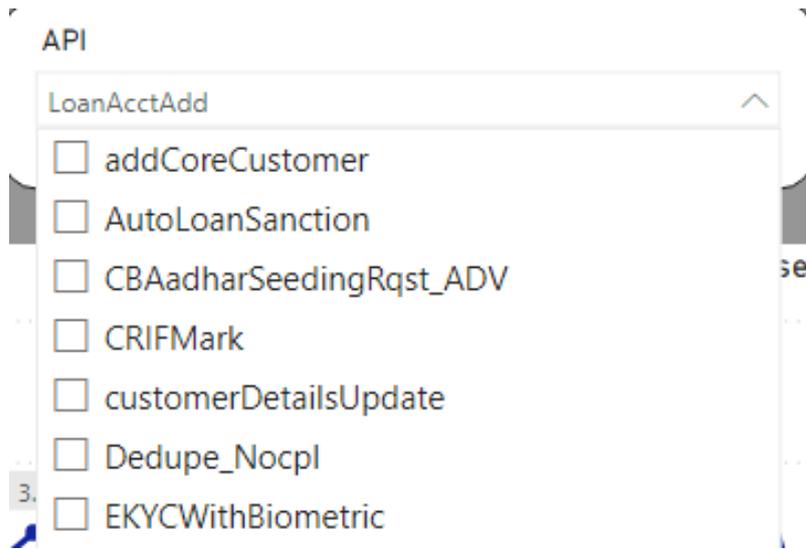


FIGURE 4.2 NAME OF APIs



FIGURE 4.3 DATE

4.2 BUSINESS INTELLIGENCE ARCHITECTURES

Data sources: The sources mostly come from operationalized systems, but they could also come from emails and unstructured data sourced from outside vendors.

Data warehouse/data mart: In order to standardise the results across systems that can be queried, data warehouses use the extract, transform, and load (ETL) process to combine different types of data into one location. Data marts are typically tiny warehouses that focus on information about a single department rather than gathering data from across the entire business. As opposed to full warehouses, they are simpler to implement and keep database complexity to a minimum.

Data exploration: A passive BI analysis, data exploration makes use of statistical methods in addition to query and reporting systems.

Data exploration: Data exploration is a passive BI analysis that uses statistical techniques, query and reporting systems, and other tools.

Data mining: To extract knowledge and information from data, active BI techniques such as data mining are used.

Optimisation: Using an optimisation model, we can choose the best course of action from a large—and occasionally infinite—set of possible options.

Decisions: When business intelligence methodologies are available and properly implemented, it is up to the decision makers to make the final call. However, they may also choose to modify and adapt the findings and suggestions produced by the use of mathematical models using the informal and unstructured information that is readily available.

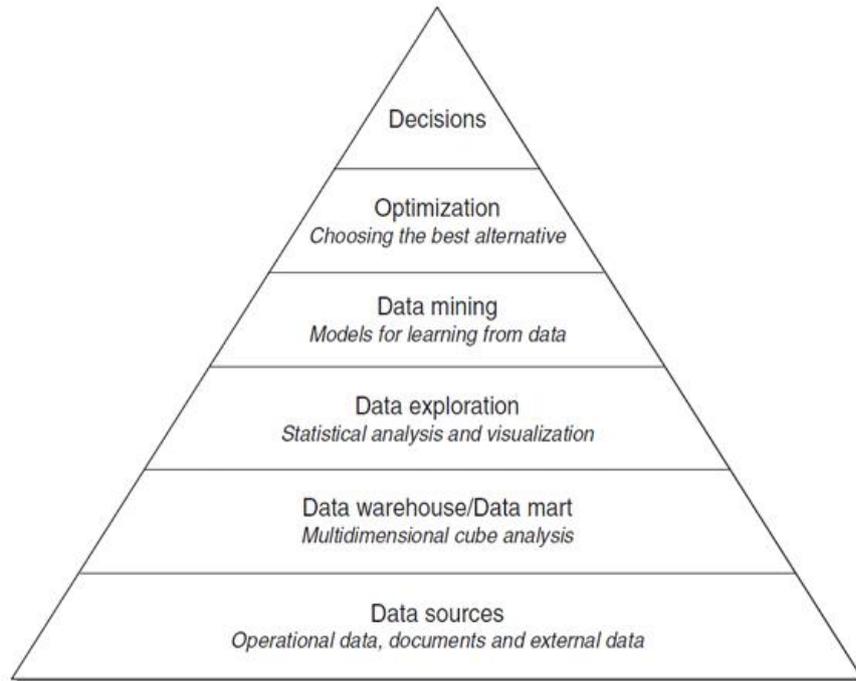


FIGURE 4.3 THE MAIN COMPONENTS OF A BUSINESS INTELLIGENCE SYSTEM

4.3 RESULTS

A visualization that represents the way our dashboard will look like is displayed below.

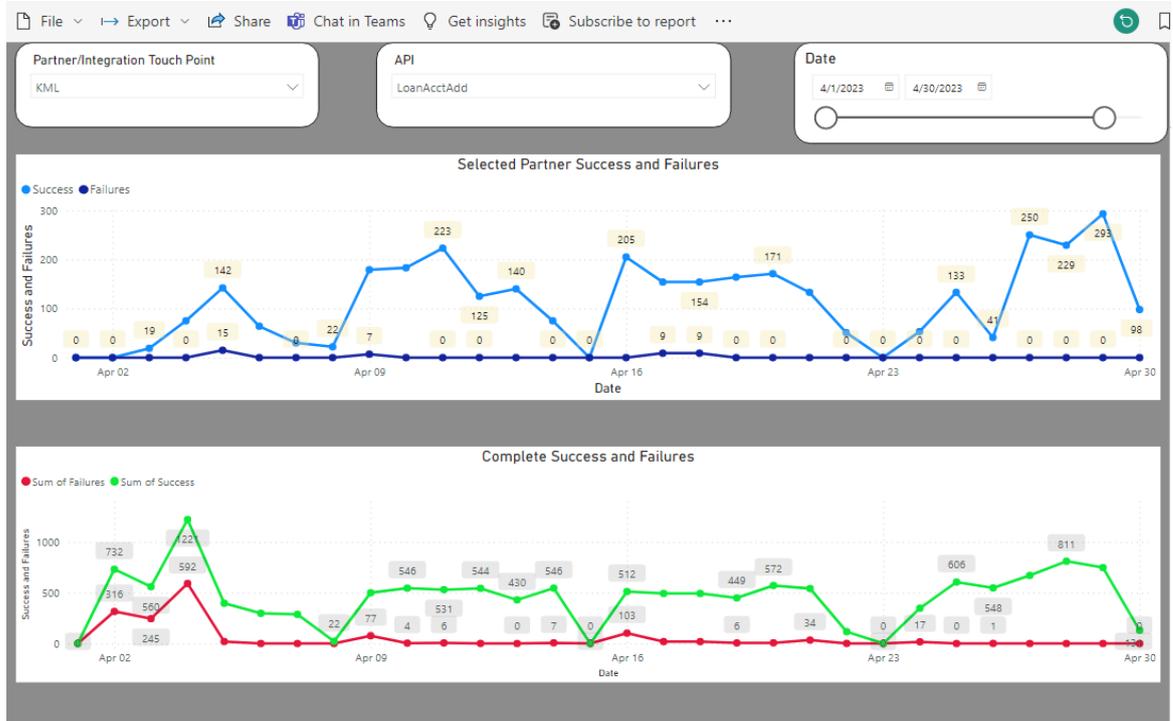


FIGURE 4.4 DASHBOARD VIEW



FIGURE 4.5 DASHBOARD VIEW

CHAPTER 5

CONCLUSIONS

5.1 CONCLUSIONS

In every organisation and business development, data visualisation is crucial because it makes it easier and more convenient for the end user to read and understand the data. In this study, the Application Programming Interface (SUCCESS AND FAILURE RATE) database has been divided into three modules, including PARTNERS NAME, NAME OF API, and DATE.

The dashboards created with the Power BI tool can be viewed through mobile applications like Power Apps and Mobile Power BI, as well as through websites or shareable links on the web.

1. Business intelligence development Performance dashboards may be used as a resource when making choices.
2. To produce precise information, the data cleansing process is important.
3. The user's participation throughout the analysis, design, and result validation processes will significantly raise the required dashboard's quality.
4. By applying Azure Machine Learning Studio, Power BI can perform business analysis at a higher level (predictive as well as prescriptive), allowing users to quickly create prediction models by dragging, dropping, and connecting module data as well as visualizing the results of machine learning algorithms.

Despite the fact that the concept of BI was only created a little over a century ago, it is now a top priority for businesses of all sizes to decide whether or not to invest in this system in order to meet the needs and desires of their customers. The ability to recognise and seize business opportunities has significantly improved thanks to BI, which now determines the true business value of data assets. Despite the fact that many multinational corporations have embraced the BI system, some of them have had difficulties putting it into practise. Operational and organisational factors like strategy, human capital, leadership, culture, quality management, and a firm's strategic orientation have a significant impact on the implementation and integration of BI systems.

5.2 FUTURE SCOPE

You can use any of the several types of **alerts**. You can create basic alerts for API Manager and Any point Runtime Manager from the Alerts page in Any point Monitoring, or you have access to existing alerts for API Manager and Any point Runtime Manager.

Alarm indicates whether a resource (such as a Mule app) is acting normally or exceeding a predefined threshold.

As the first stage of BI development, the scenario study at this time focuses only on both descriptive and predictive analysis. In the future, Power BI will need to be enhanced with machine learning at a higher level of analytics (prescriptive) in order to cover complex modelling and data combination scenarios, which will ultimately allow organizations to make data-based decisions in all facets of the business.

REFERENCES

- [1] Lennart Harnefors et al. “*Robust Analytic Design of Power-Synchronization Control*”. In: IEEE Transactions on Industrial Electronics 66.8 (2019), pp. 5810–5819. DOI: 10.1109/TIE.2018.2874584. M. Young, The Technical Writer’s Handbook. Mill Valley, CA: University Science, 1989.
- [2] Richard C Schaefer. “*The art of generator synchronizing*”. In: 2019 IEEE Pulp, Paper Forest Industries Conference (PPFIC). 2019, pp. 88–95. DOI: 10.1109/PPIC.2019.7523471.K. Elissa, “Title of paper if known,” unpublished.
- [3] Bin Wu and Lei Qin. “*Design and implementation of business-driven BI platform based on cloud computing*”. In: 2021 IEEE International Conference on Cloud Computing and Intelligence Systems. IEEE. 2021, pp. 118–122.
- [4] Lin Lin. “*Research and Analysis on Key Technologies of Cloud Computing Platform Based on IPv6*”. In: 2020 IEEE International Conference on Power, Intelligent Computing and Systems (ICPICS). IEEE. 2020, pp. 181183.
- [5] Wei Hu et al. “*Power BI for Impacts Analysis on Cost of Living Caused by Industry Prevalence in Smart Cities*”. In: 2019 3rd International Conference on Smart Grid and Smart Cities (ICSGSC). 2019, pp. 134–139. DOI: 10.1109/ICSGSC.2019.000-6.
- [6] Jamás Vincen. “*Introduction of Innovative SAP Development Solutions at University Level*”. In: 2020 IEEE 18th World Symposium on Applied Machine Intelligence and Informatics (SAMII). IEEE. 2020, pp. 171–174.

- [7] Henry W. Davis and Leon E. Winslow. “*Computational Power in Query Languages*”. In: *SIAM Journal on Computing* 11.3 (2019), pp. 547–554. DOI: 10.1137/ 0211044.
- [8] Viorel Costin Banta and Dorian Cojocaru. “*Development Center Tool a software application for change request management*”. In: 2021 17th International Conference on System Theory, Control and Computing (ICSTCC). IEEE. 2021, pp. 42–47.
- [9] PT. Indomobil Sukses Internasional, “*Annual Report 2017 PT Indomobil Sukses Internasional Tbk .,*” www.indomobil.com, vol. 2017, 2017.
- [10] L. Moss and S. Atre, *Business Intelligence Roadmap*. 2003.
- [11] D. Delen and H. Demirkan, “*Data, information and analytics as services,*” *Decis. Support Syst.*, vol. 55, no. 1, pp. 359363, 2013.
- [12] D. Appelbaum, A. Kogan, M. Vasarhelyi, and Z. Yan, “*Impact of business analytics and enterprise systems on managerial accounting,*” *Int. J. Account. Inf. Syst.*, vol. 25, no. March, pp. 2944, 2017.