# Marketing for Finance Analysis.
# Case Study

**Problem Statement:**

The primary issue revolves around the challenge faced by bank officials in effectively targeting the appropriate individuals for a successful campaign. This requires the marketing team to meticulously examine diverse customer details such as occupation, income, age, educational background, and more. Additionally, evaluating factors like existing loans and credit history offers insights into the customer's financial standing, aiding in gauging their potential to invest in the bank's term-deposit scheme. The initial phase of this analysis necessitates an appraisal of the accessible data, followed by exploratory analysis to unveil valuable patterns, trends, and meaningful insights.

**What is Expected?**

As a data engineer, your initial step involves generating a preliminary documentation outlining outcomes derived from your exploratory analysis. This should encompass identified patterns, anomalies, and potential data quality issues demanding further investigation. Alongside, a concise descriptive analysis must be included, emphasizing critical findings within the dataset. Subsequently, based on these insights, a roadmap for advanced analysis should be formulated. The crux of your responsibility lies in constructing a suitable pipeline to perform various analysis to campaigns success. This involves an exhaustive evaluation of diverse analysis using varied methodologies, followed by a comprehensive comparison of their effectiveness. The conclusive inferences drawn from this comparative study will guide the subsequent stages of analysis and decision-making.

1. Analysis of percentage turnout of marketing campaign.
2. Right mode to contact the customers (telephone or mobile).
3. Analysis on attempts made to turn a person into successful depositor.
4. Personal data analysis on marital status, existing loans, education, profession etc. and its impact on the campaign's success.
5. Socio-economic analysis of the customers.
6. Demographic analysis of the marketing campaign using the master files.

**Data Dictionary:**

https://github.com/manojkumarsingh77/Shell2023/blob/main/MarketingForFinance/DataDictionary/MarketingForFinance_DD.pdf

**Data Sets:**

https://github.com/manojkumarsingh77/Shell2023/blob/main/MarketingForFinance/DataSets/MarketingForFinanceDataset.zip

**Case Study Execution Plan:**

- The execution of each Case Study will involve a group of 4 or 5 members, with each member assigned specific tasks to align with the project's objectives.
- Each group member will work concurrently on their designated tasks, ensuring parallel progress, and the integration of individual contributions will occur during the Final Stage of the project.
- On the Final day, the completed Case Study will be presented to the Shell Subject Matter Experts (SME) and UNext Mentors, providing an opportunity to showcase the project's outcomes and achievements.
- The entire project development process will be implemented using a Continuous Integration/Continuous Deployment (CI/CD) pipeline. This approach ensures seamless integration of code changes, automated testing, and efficient deployment, promoting collaboration and efficiency throughout the project lifecycle.

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**Technicalities:**

In order to address the given problem statement, we will adhere to a standard data pipeline pattern. This structured approach will ensure a systematic and efficient workflow for data processing and transformation.

**The data pipeline will consist of the following key stages:**

- Data Ingestion.
- Data Processing.
- Data Storage.
- Data Visualization and Reporting.

**Data Layers:**

As part of a structured data storage approach, you will implement measures to ensure efficient data organization and management. The data will be divided into separate parent folders, one for each team, with sub-folders for **RAW**, **STG (Staging),** and **CURATED** data:

**Parent Folders:** Each team involved in the project will have its dedicated parent folder to manage their data processing activities. This ensures data isolation and promotes collaboration within the team.

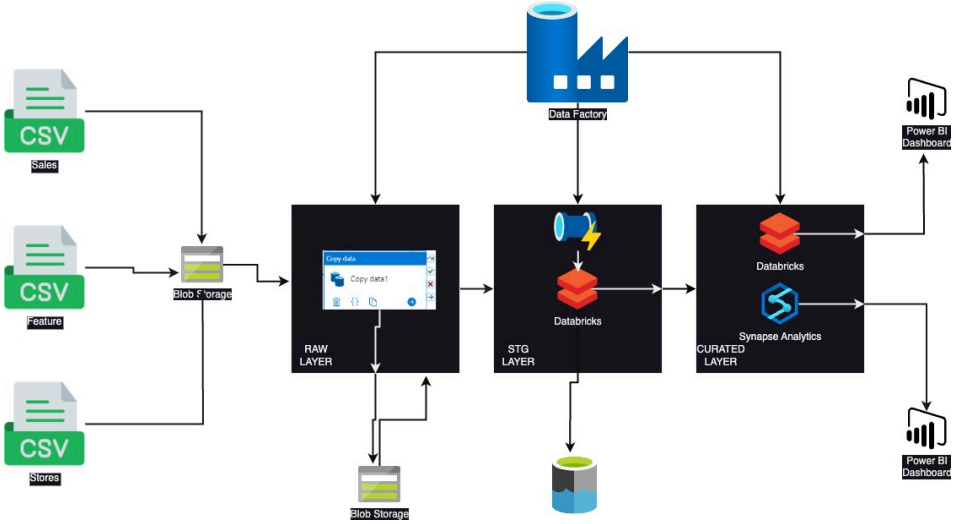
**RAW Sub-folder:** The RAW sub-folder within each team's parent folder will be used to store the raw and unprocessed data acquired from various sources. This includes the data ingested through Azure Data Factory or any other data ingestion mechanism.

**STG (Staging) Sub-folder:** The STG sub-folder will serve as an intermediate storage location where data from the RAW sub-folder is transformed and prepared for further processing. This staging step ensures data quality and consistency before moving it to the CURATED sub-folder.

**CURATED Sub-folder:** The CURATED sub-folder will hold the processed and curated data ready for visualization and analysis. This data is transformed, cleansed, and enriched to meet specific business requirements.

**Reference architecture diagram:**

The provided architecture diagram serves as a foundational reference for each team to envision their own version while building upon it. This diagram presents a clear and structured visualization of the system's components and their interactions. Each team is tasked with developing their own iteration of the architecture diagram, using the provided sample as a foundation. This approach fosters creativity and empowers teams to tailor the solution to meet specific requirements and address unique challenges. By building upon the initial reference, teams can explore diverse design choices and leverage individual expertise, resulting in a comprehensive and adaptable solution. This collaborative process ensures a successful outcome that aligns with the project's goals and objectives.



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## Activity Breakdown:

In the case study, data engineers will perform data ingestion and cleansing activities to ensure data quality and integrity. They will create a reusable and secured connection for data ingestion and handle tasks like removing duplicate records, handling missing values through imputation techniques, and correcting data anomalies.

For ETL and analysis, data engineers will filter out irrelevant or incomplete data, aggregate data to calculate summary statistics, transform data types and create derived columns, perform data joining based on common keys, and apply data partitioning for improved query performance. They will also conduct data deduplication and implement validation checks to ensure data quality and adherence to business rules.

The Case Study is divided into two parallel streams, each handled by separate teams:

i. **Stream 1:** This stream utilizes SQL Data Warehouse/Database (SQL DW/DB) as the data storage and management solution. The team in charge of this stream will leverage the capabilities of Power BI for data visualization and creating interactive dashboards. The combination of SQL DW/DB and Power BI ensures efficient data processing, storage, and analysis, providing stakeholders with valuable insights to support data-driven decision-making.

ii. **Stream 2:** In this stream, the team will employ Azure Databricks with SQL End-point (ADB SQL End-point) as the data processing and analysis platform. Power BI will be used for data visualization and interactive dashboard creation. By leveraging the distributed data processing capabilities of Azure Databricks and combining it with Power BI's visualization capabilities, this stream enables efficient and scalable data processing, ensuring stakeholders have access to timely and insightful information.

By splitting the case study into these two streams, the project benefits from parallel efforts, maximizing efficiency and expertise in both SQL-based and Databricks-based data processing approaches. This approach allows for a comprehensive exploration of different technologies, resulting in a well-rounded and robust solution for meeting the specified data processing and visualization requirements.

## Deliverables:

**Create a presentation which has:**

Slide 1: BatchName_FirstName_SecondName
Slide 2: Problem statement
Slide 3: Implemented data flow diagram showing various technical components and Layers.
Slide 4-6: Snapshots of developments in each layer (RAW, STAGING(STG), CURATED)
Slide 7: Screenshot of dashboards built on Power BI.
Slide 8: GitHub link where solution is available
Slide 9: System Demo
Slide 10: Q&A
Slide 11: Challenges faced, learnings, suggestions, and feedback.

## Rubrics for Case Study Evaluation:

| Deliverables / milestones | Remarks | Max Marks |
|---|---|---|
| ▪ GitHub account creation (5 Marks)<br>▪ Proposing your own Architecture design and details (15Marks) | Activities | 20 |
| ▪ Data Management and Storage (10 marks) | Activities | 10 |
| ▪ Data ingestion and Transformation technique details (20 marks) | Activities | 20 |
| ▪ Visualization of data, by keeping scope of Business User (10 Marks)<br>▪ Story telling by visualizing data (10 marks) | Activities | 20 |
| ▪ Live presentation of Solution on Azure portal (15 marks)<br>▪ Viva (15 marks) | Activities | 30 |
| | **Total Marks** | **100** |