VIDYAA VIKAS COLLEGE OF ENGINEERING AND TECHNOLOGY

Tiruchengode, Namakkal District, Tamil Nadu – 637214

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai

Accredited by NAAC with 'A' Grade

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

REPORT ON

HX8001 PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP

(Naalaiya Thiran Program)

PROJECT TITLE

DATA ANALYTICS FOR DHL LOGISTICS FACILITIES

TEAM ID: PNT2022TMID44827

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GitHub

Project Demo Link

1. INTRODUCTION

1.1. Project overview

Data Analytics For DHL Logistics Facilities

DHL is an international Umbrella brand and trademark for the courier, package delivery, and express mail service which is a division of the German logistics firm Deutsche Post. The company group delivers over 1.6 billion parcels per year.

The company DHL itself was founded in San Francisco, USA, in 1969 and expanded its service throughout the world by the late 1970s. In 1979, under the name of DHL Air Cargo, the company entered the Hawaiian Islands with an inter-island cargo service using two DC-3 and four DC-6 aircraft. Adrian Dalsey and Larry Hillblom personally oversaw the daily operations until its eventual bankruptcy closed the doors in 1983. At its peak, DHL Air Cargo employed just over 100 workers, management, and pilots.

1.2. Purpose

To provide Analytics to improve New Marks and grow the business .

2. LITERATURE SURVEY

2.1. EXISTING SYSTEM

DHL is a global expertise in express, air and ocean freight, overland transport and logistics solutions; DHL combines worldwide coverage with an in-depth understanding of local markets. DHL India has an outstanding reputation in the market for providing a reliable, fast and easy-to-use service. DHL offers highly

trained and professional staff, committed to being responsive to all customers' needs Customer Service Agents, available round-the-clock, 365 days of the year, to serve customers whenever and wherever they need them. Electronic pre-clearance of shipments through Customs Five international gateways proving direct-to-air networks and faster sorting of inbound and outbound shipments.

DHL India is a proven facilitator of trade, across the globe. His strength lies in our global network and the know-how of our people. Backed by strategic alliances with world-class partners and the innovative use of technology, they strive to continuously improve the quality of our service. Our services range from fast, responsive and cost-effective express deliveries toe-commerce fulfillment and intelligent logistics solutions. DHL Core Services consist of door-to-door air express delivery of documents and parcels of all sizes (and weight), both into and out of country.

Other value-added services are a. Kitting/Pre-Assembling. Kitting is the addition of items such as accessories and batteries to the product pack. Pre-assembling is completion of a finished product from component parts orpre-programming of products.

A. Re-Working/Re-Packing.

Repacking for a specific customer can include repalletization. Reworking is the modification of products to suit a local market.

B. Packaging/Bundling

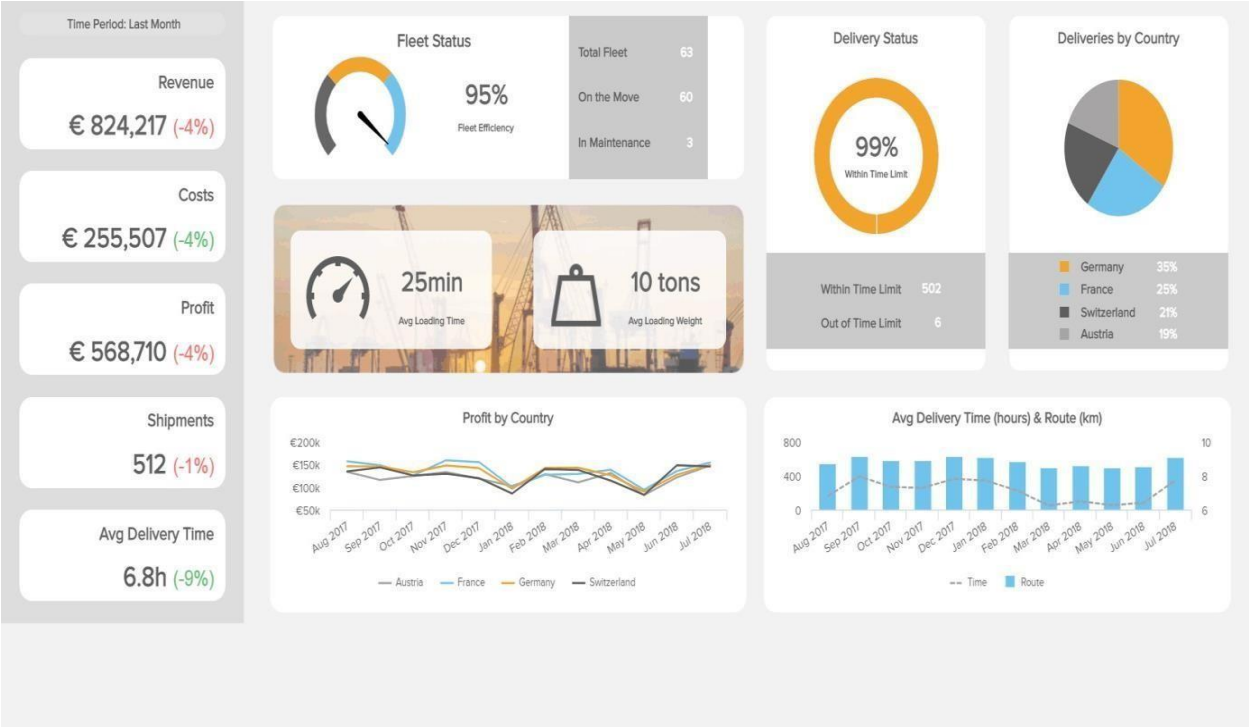
Packaging includes packing of products into suitable media for transportationand retail display. Bundling is the assembly of a number of pre-packaged products to make up an integrated product offering.

C. QA Control.

Quality control ensures that product is received into and dispatched from the warehouse in a suitable condition, free from faults and defects.

D. Labeling/Merchandising.

The application of labels either to the product or to the packaging Merchandising can include the addition of price stickers or promotional items readyfor retail display.



2.2 REFERNECES

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2.3 Problem Statement Definition

DHL is an international umbrella brand and trademark for the courier, package delivery, and express mail service which is a division of the German logistics firm Deutsche Post. The company group delivers over 1.6 billion parcels per year.

The company DHL itself was founded in San Francisco, USA, in 1969 and expanded its service throughout the world by the late 1970s. In 1979, under the name of DHL Air Cargo, the company entered the Hawaiian Islands with an inter-island cargo service using two DC-3 and four DC-6 aircraft. Adrian Dalsey and Larry Hillblom personally oversaw the daily operations until its eventual bankruptcy closed the doors in 1983. At its peak, DHL Air Cargo employed just over 100 workers, management, and pilots.

Logistics is being transformed through the power of data-driven insights. Thanks to the vast degree of digital transformation and the Internet of Things, unprecedented amounts of data can be captured from various supply chain sources. Capitalizing on its value offers massive potential to increase operational efficiency, improve customer experience, reduce risk, and create new business models.

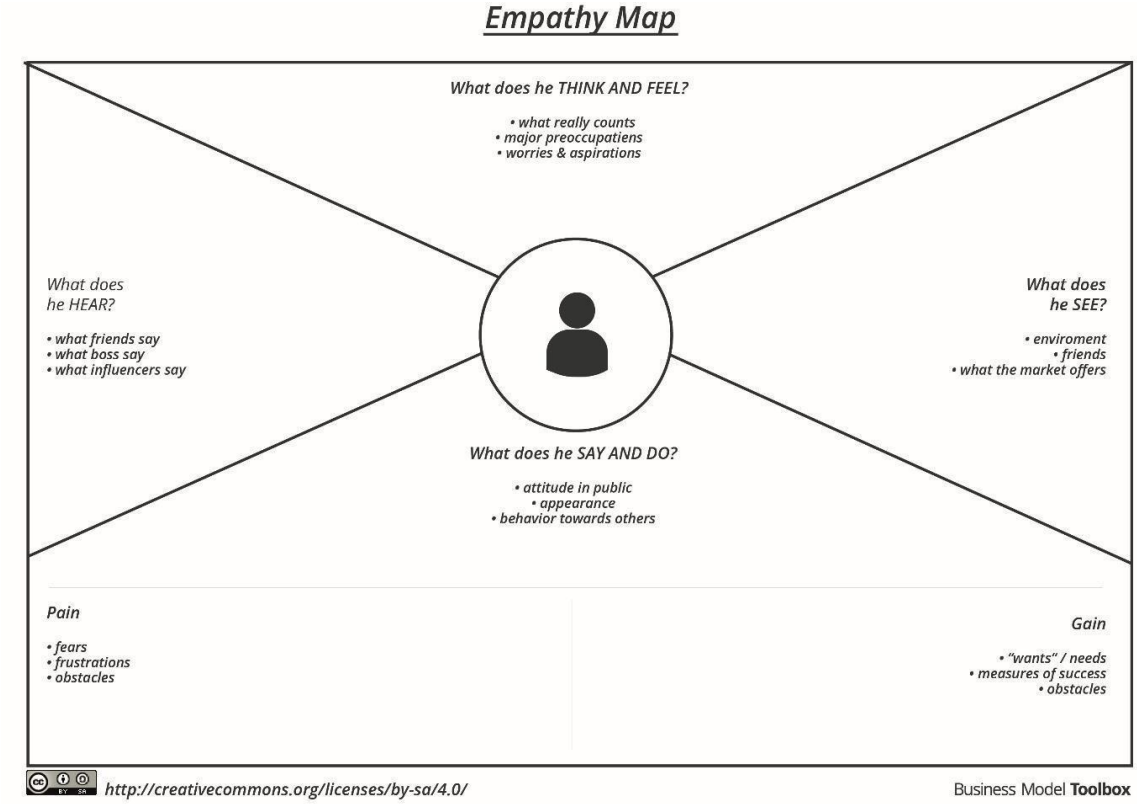
Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	Customer	send parcel	Parcel that I given is damaged	Bulk goods mixed up with my packages	Angry
PS-2	Customer	Get my parcel on time	Parcel is missing	Either delivered in wrong address nor theft issue was occurred	Sad
PS-3	User	Get my package fast	Package still not deliverable and updating wrong	Address is long and server issue	Tempting
PS-4	User	Track driver location status	The product status shown as Delivered	Wrong update by delivery person or server error	Bad
PS-5	Driver	Track customer location	Address found was error	Customer given wrong address	Frustrated
PS-6	Driver	deliver fast	Traffic occurs	big accident on the road lane	Worse
PS-7	Delivery person	Deliver the product	The Customer not avail in the home	They have emergency work	Tired

3. IDEATION and PROPOSED SOLUTION

3.1. Empathy Map

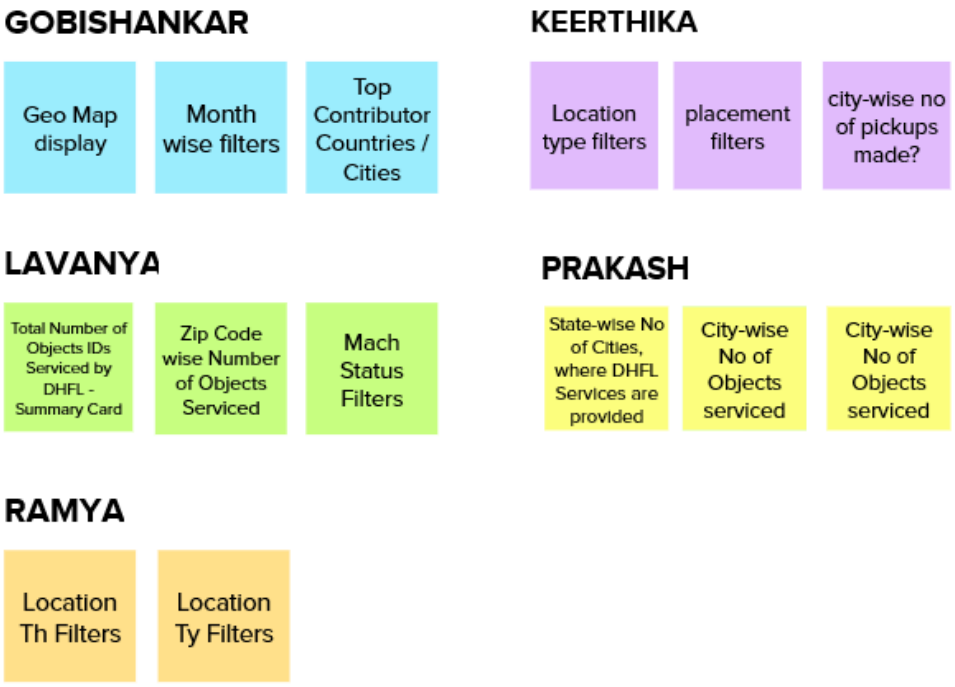
An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviors and attitudes.

It is a useful tool to helps teams better understand their users.
Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.



3.2. Brainstorming

Have each participant begin in the "solo brainstorm space" by silently brainstorming ideas and placing them into the template. This "silent-storming"avoids group-think and creates an inclusive environment for introverts and extroverts alike. Set a time limit. Encourage people to go for quantity.



3.3. Proposed Solution

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	A company's profitability may be severely impacted by continually shifting dynamics brought about by the global nature of the supply chain. The enormous burden that the COVID pandemic placed on logistics made this clear. As a result, manufacturers, shippers, andretailers are using data analytics to better understand their processes and optimise themin order to be more prepared for unforeseen events. Data-driven businesses are growing their profit margins and customer satisfactionlevels as a result.

2.	Idea / Solution description	New technology plays a vital part in improving operations, removing costs and improving customer service. With DHL you like technologyadvances and investments as we constantly review, evaluate and adopt new technological solutions. Augmented Reality , for instance, is already getting used to optimize warehouse processes, while a spread of automated guided vehicles and robots are being tested and assessed for future deployment.
3.	Novelty / Uniqueness	The specialist knowledge of your team has beenthe foundation for your company's success. By entrusting DHL with your logistics, you can concentrate on your core business rather than being side tracked by the requirements and complications of the global supply chain. DHL offers a wide range of ready-to-use solutions, technologies, and assets that would otherwise take a lot of time and money to implement, freeing up your cash to expand your business inother ways. Furthermore, outsourcing your logistics allows you the freedom to quickly scale up and down in response to new opportunitiesor issues with the least amount of risk.
4.	Social Impact / Customer Satisfaction	Customers want to understand when their items are delivered and whether a package's expected arrival date are later than expected. Customers are often happier as they get more knowledgeable. Real-time or nearly real-time status updates are now possible, and businesses that make it simple for purchasers to urge these logistics updates will enjoy higher customer satisfaction. Additionally, data can improve customer satisfaction in ways aside from just shipping monitoring.

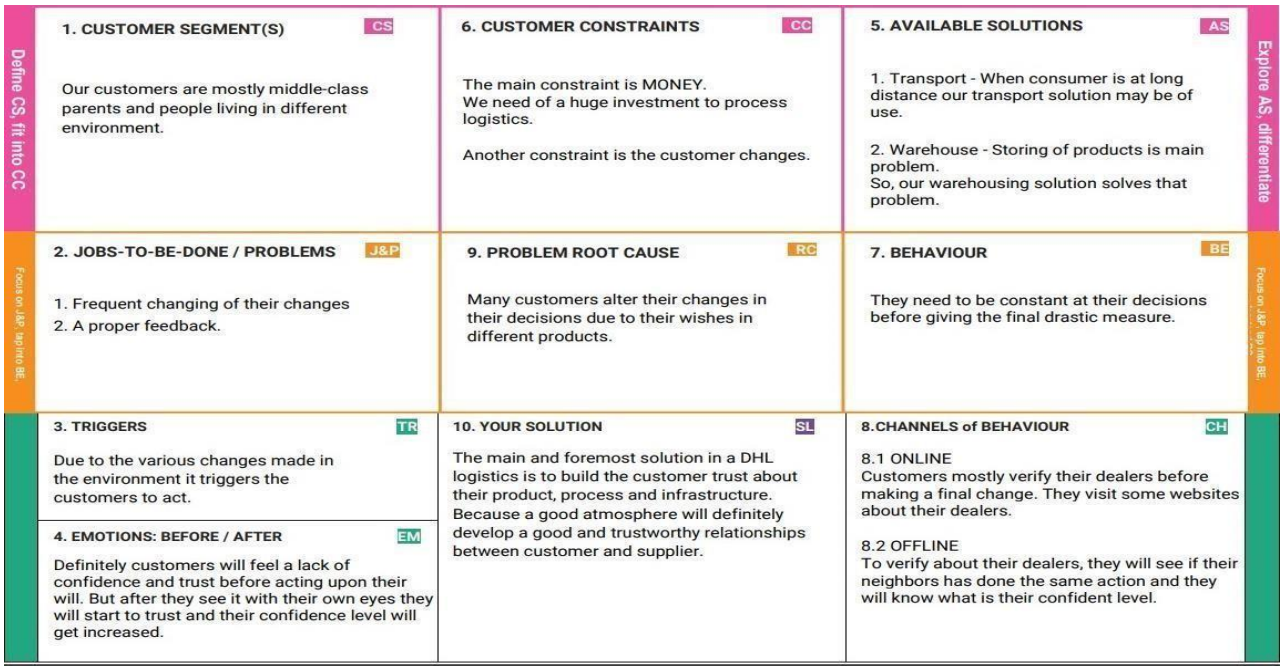
5.	Business Model (Revenue Model)	1 – Broker model This is the most common way 3PL works, and the one most organizations are probably familiar with. In the broker model, a 3PL buys cargo space in bulk from carriers and resells the space to its own customers at a premium. Oversized, his 3PL can afford to purchase large amounts of cargo space without delay, and can take advantage of economies of scale to significantly reduce costs. Even with a premium, they're still dealing with less than most sole proprietors could die for outright. 2 – Profit sharing With a profit-sharing model , 3PL works directly with customers to reduce costs. 3 – Fee model In the commission model , the 3PL "works" for the carrier and acts as an intermediary between the carrier and the buyer. From there, it works like some standard commission-based system. Fee models offer a lot of transparency within the process, and in many cases 3PLs can rely on carrier proprietary technology, which rarely leads to the most effective technical solutions.
6.	Scalability of the Solution	As market growth requires an expansion of your distribution network, you ideally desire a partner that incorporates a presence within the markets where you wish help. the choice to tapping into a scalable logistics infrastructure is either working with a replacement provider (new relationships to manage, new systems to integrate) or pushing an existing provider to enter new, unfamiliar markets. Look for partners who can walk the talk when it involves exchanging data between your two systems. The provider's size doesn't necessarily correlate with a classy IT capability. Vet providers carefully during this area or it can return to bite you. The largest 3PL providers will have virtually unlimited scale – a hugely attractive benefit. But their interest is also limited to serving only the most important companies out there. If that's not you, you'll find yourself being the proverbial small fish within the big pond.

3.4. Problem Solution Fit

The Problem-Solution Fit simply means that you have found a problem with your customer and thatthe solution you have realized for it actually solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioral patterns and recognize what would work and why

Purpose:

- ✈ Solve complex problems in a way that fits the state of your customers.
- ✈ Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behavior.
- ✈ Sharpen your communication and marketing strategy with the right triggers and messaging.
- ✈ Increase touch-points with your company by finding the right problem-behavior fit and building trust by solving frequent annoyances, or urgent or costly problems.



4. REQUIREMENT ANALYSIS

4.1. Functional Requirements

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through any google account or social media accounts.
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Dataset	The DHL_Facilities.csv record are collected as a dataset and upload to Cognos analytics
FR-4	Prepare/Analyze	The dataset is moved around to prepare and analyze using Cognos
FR-5	Exploration	The data are explored using logistics dataset by Cognos
FR-6	Dashboard	The Prepared and Explored data are Visualize and created in different type of dashboards. i.e., charts, graphs, tree, reports, summary, etc..

4.2. Non Functional Requirements

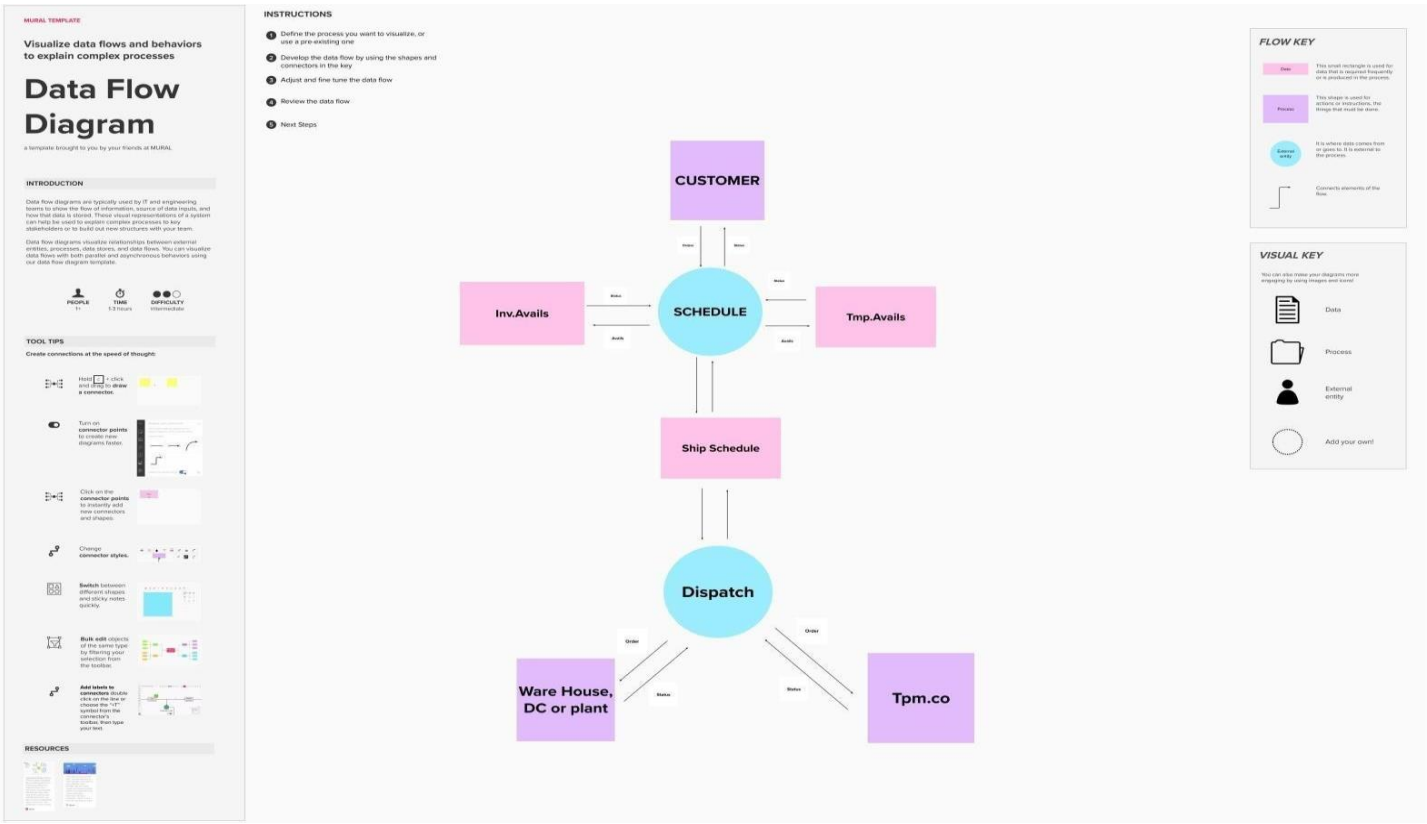
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	No prior experience required to use the dashboard. People with basic understanding can use the system.
NFR-2	**Security**	Only registered user can use this application.
NFR-3	**Reliability**	The Analytics system ensures the reliability
NFR-4	**Performance**	Gets updated regularly to improve the performance of the application.
NFR-5	**Availability**	The availability of dataset must be constrained for accurate data
NFR-6	**Scalability**	Any kind of data can be explored and the system is quiet expandable

5. PROJECT DESIGN

5.1. Data Flow Diagram

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows withina system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enter and leaves the system, what changes the information, and where data is stored.

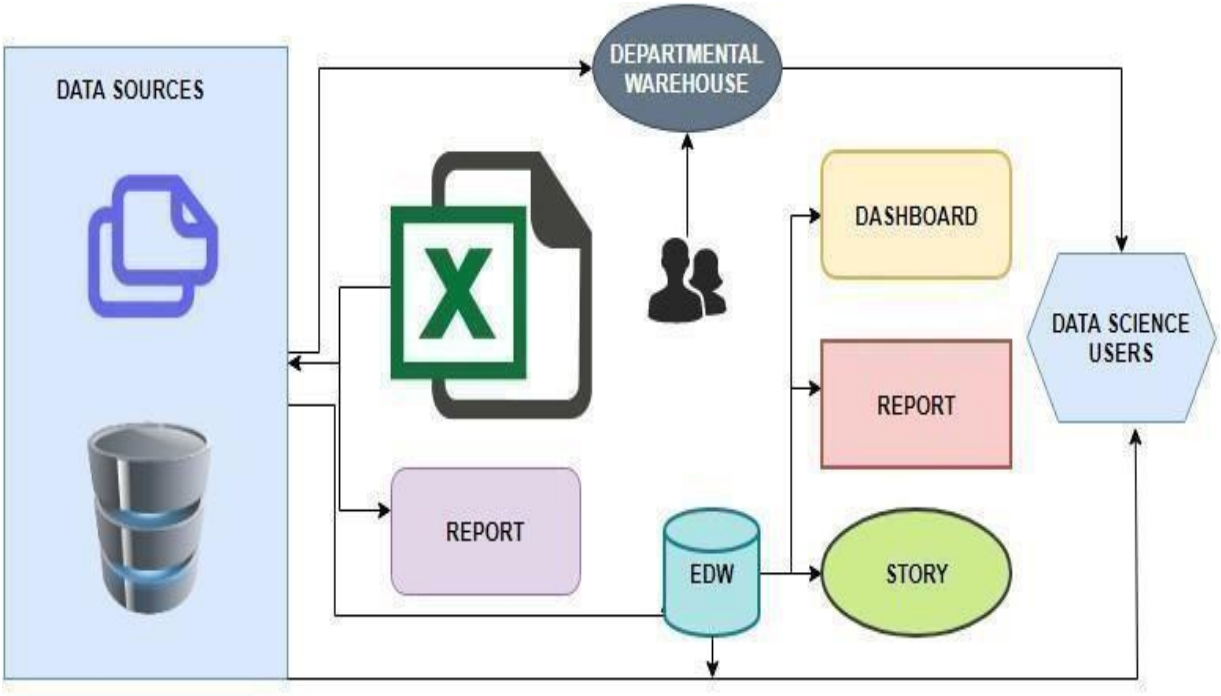


5.2. Solution Architecture

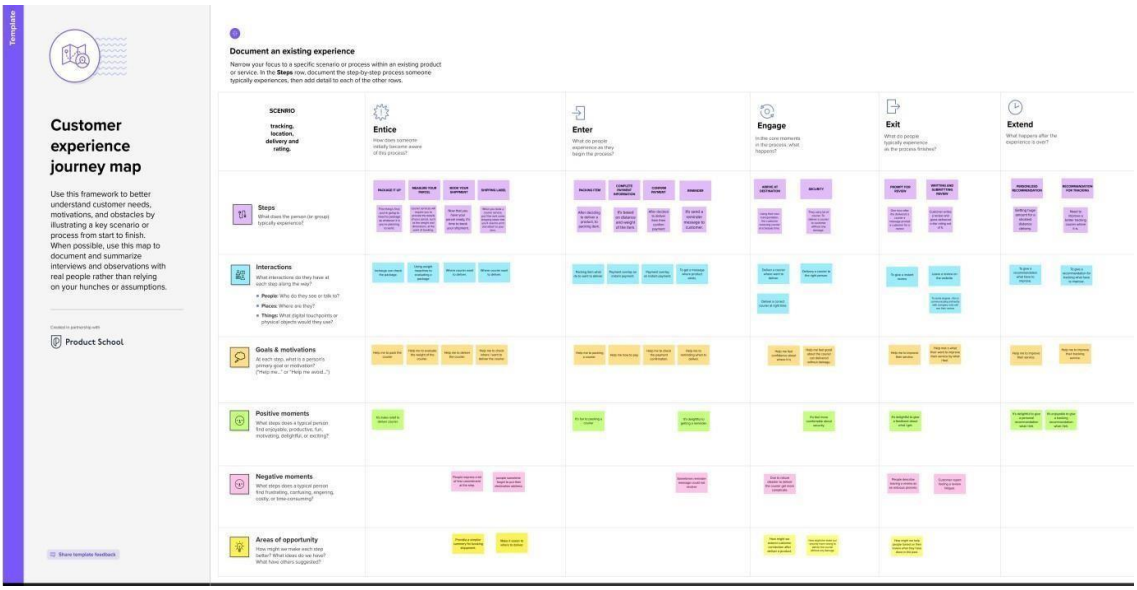
Solution architecture is a complex process – with many sub-processes – that bridgesthe gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of thesoftware to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed,and delivered.

Project - Data Analytics for DHL Logistics Facilities- Solution ArchitectureDiagram:



5.3. Customer Journey



6. PROJECT PLANNING AND SCHEDULING

6.1. Sprint Planning And Estimation

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Velocity:

we have a 6-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) periterationunit (story points per day)

AV = Sprint duration / Velocity = 20/6 =3.33

6.2. Sprint Delivery Schedule

Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Member
Sprint-1	Login	USN-1	As a user, I can register & log into the application by entering email & password	10	High	Gobishankar G
Sprint-1	Verify	USN-2	As a user, I can verify the email with given otpand check for correct subscription access	10	High	Lavanya M
Sprint-2	Collect Data	USN-3	As an admin I can define questions & goals then collect data & provide the dataset in IBMCognos analytics	10	High	Prakash P
Sprint-2	Prepare & Explore	USN-4	As an admin I can prepare, explore & presentthe dataset in IBM Cognos analytics	10	High	Ramya E
Sprint-3	Analyze	USN-5	As an admin, I will analyze the given dataset (Data pre-processing)	10	High	Keerthika R

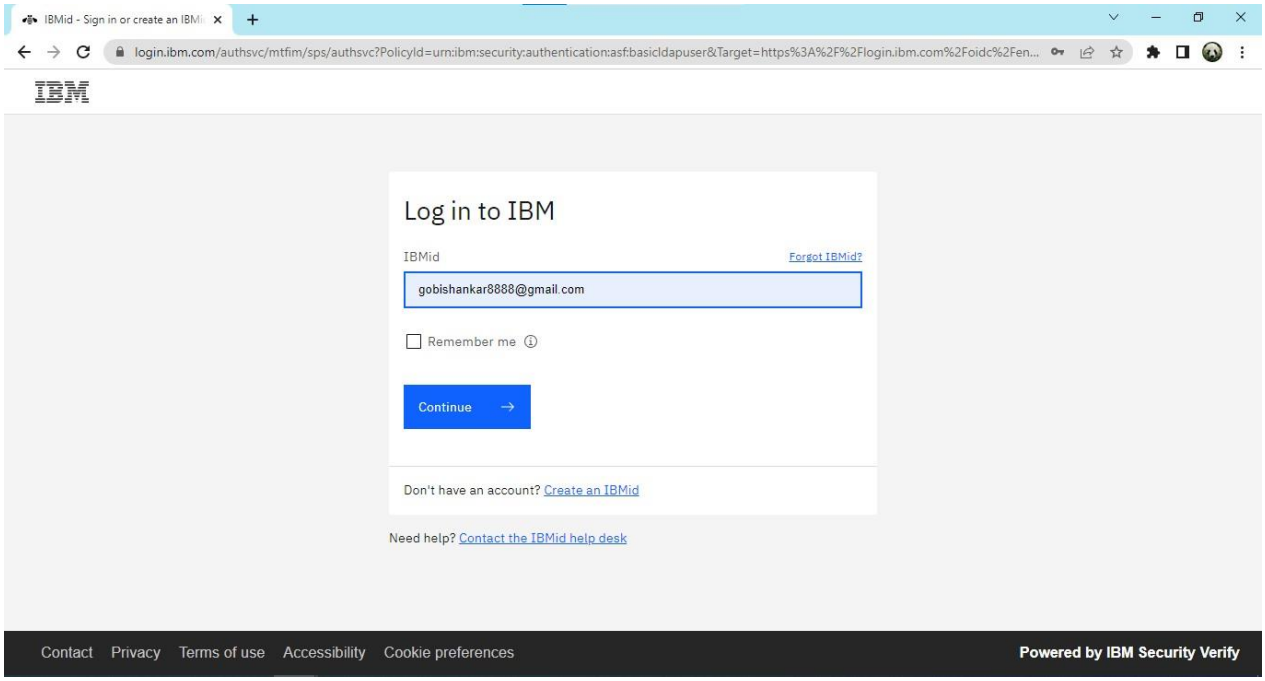
Sprint-3	Predict	USN-6	As an admin, I will predict the length ofstay (Prediction)	10	High	Ramya E
Sprint-4	Visualization	USN-7	As a user, I can select the visualization type likeReport, Dashboard and story (Creating visualization)	7	Medium	Gobishankar G
Sprint-4	Dashboard	USN-8	As a user, I can upload the datasets to the dashboard and view visualizations	8	High	Keerthika R
Sprint-4	Communicate	USN-9	As an admin, I can communicate to the client foruser queries and visualize the best dashboards in any platform as a user expected	5	Low	Lavanya M

7. CREATING PRODUCT BACKLOG

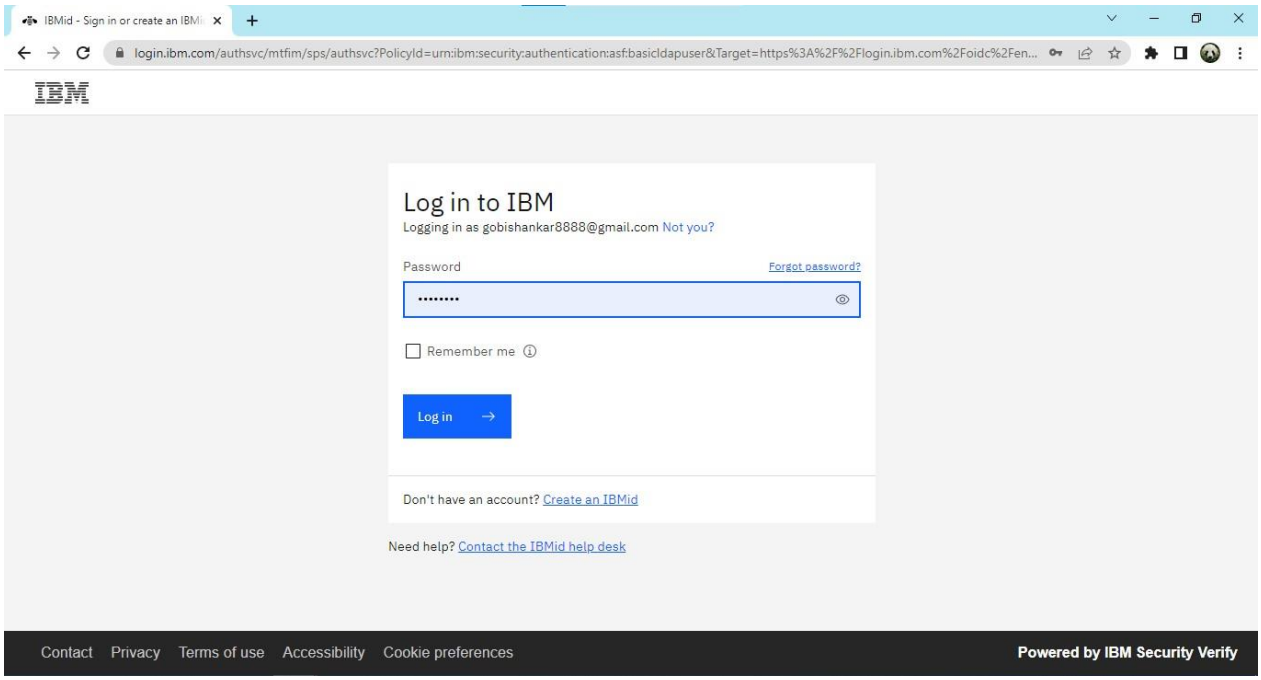
7.1. Login and Verify

Login

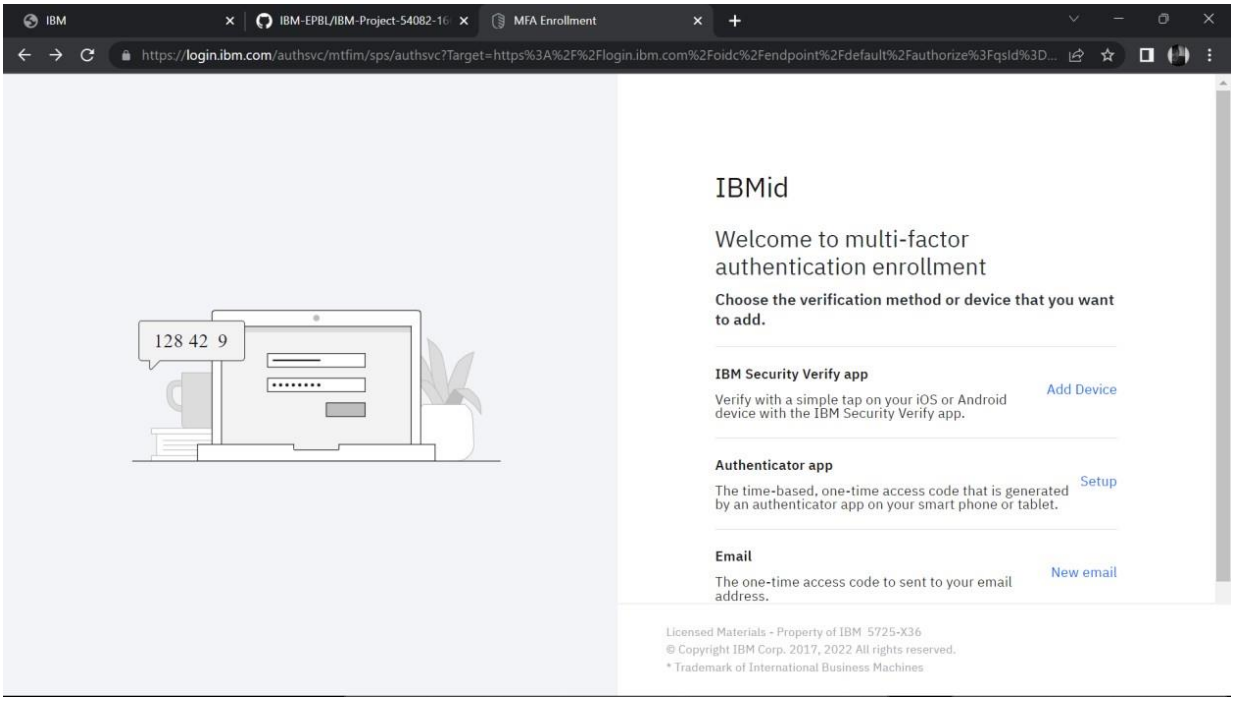
Enter Mail Id

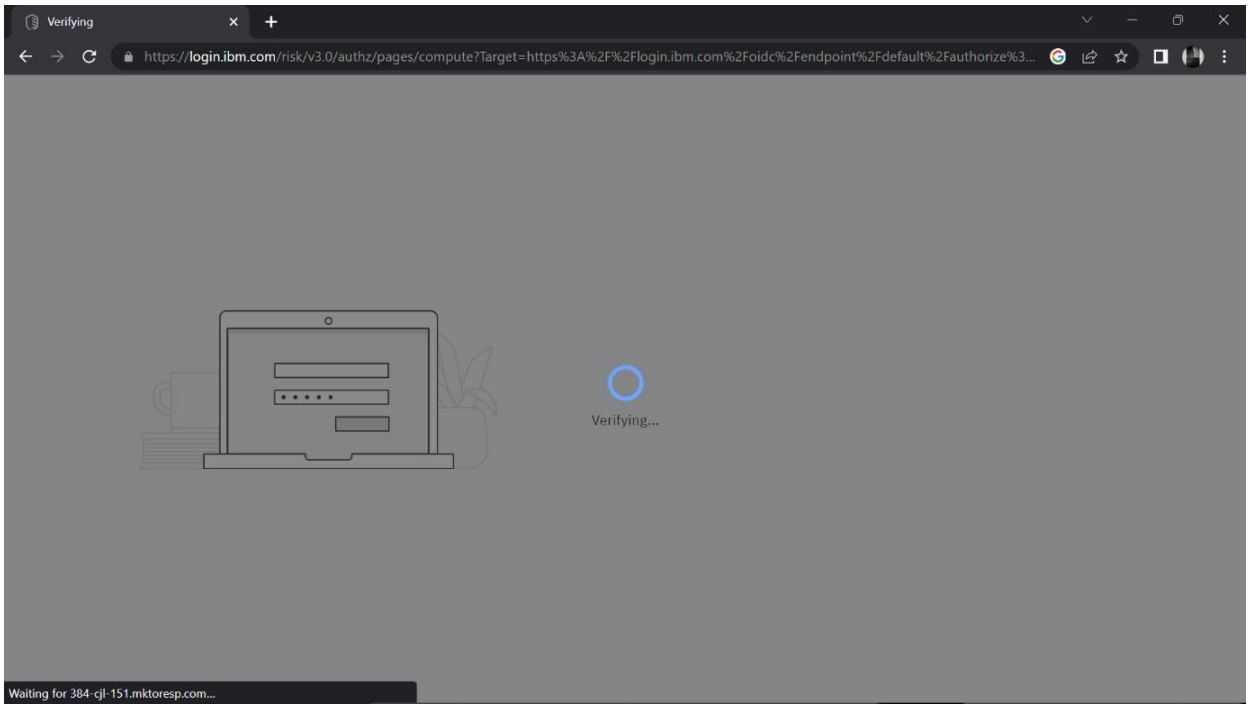


Enter Password



Verify





7.2. Collect Data and Prepare

Collect Data:

The data can be [downloaded from Kaggle (DHL Courier Facilities Dataset)]

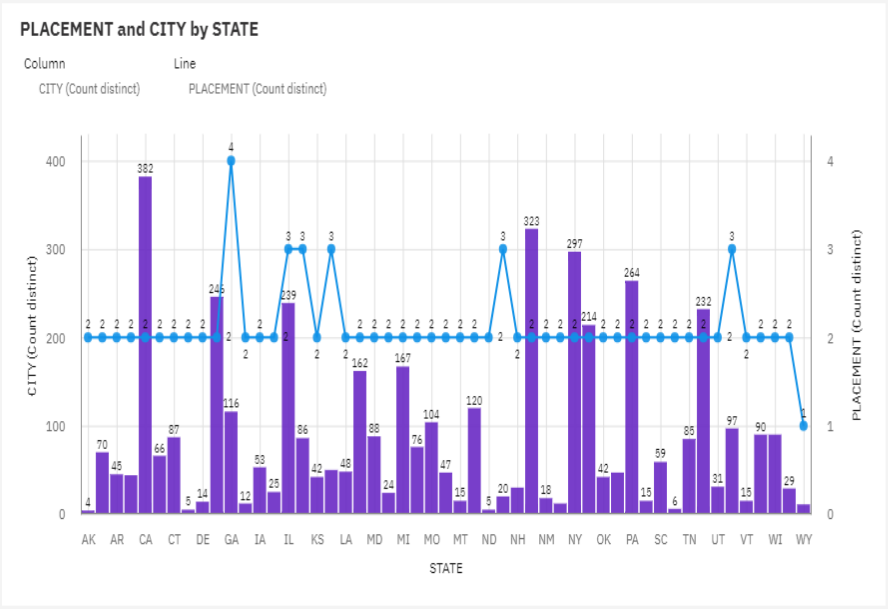
Prepare Data:

The dataset contains the below columns of data.

S#	Field Name	Type	Description
1	X	Geo	Geo Code
2	Y	Geo	Geo Code
3	OBJECTID	int	Object ID – Sequence Number
4	FEATURE_ID	Int	Feature ID – Int number
5	NAME	Text	Name of the Client
6	ADDRESS	Text	Address 1
7	ADDRESS2	Text	Address 2
8	CITY	Text	City Name
9	STATE	State	State Name
10	ZIP	Int	Zip code
11	LATITUDE	Geo	Geo value of Latitude

7.3. Analyze and Predict

Analyze



Details

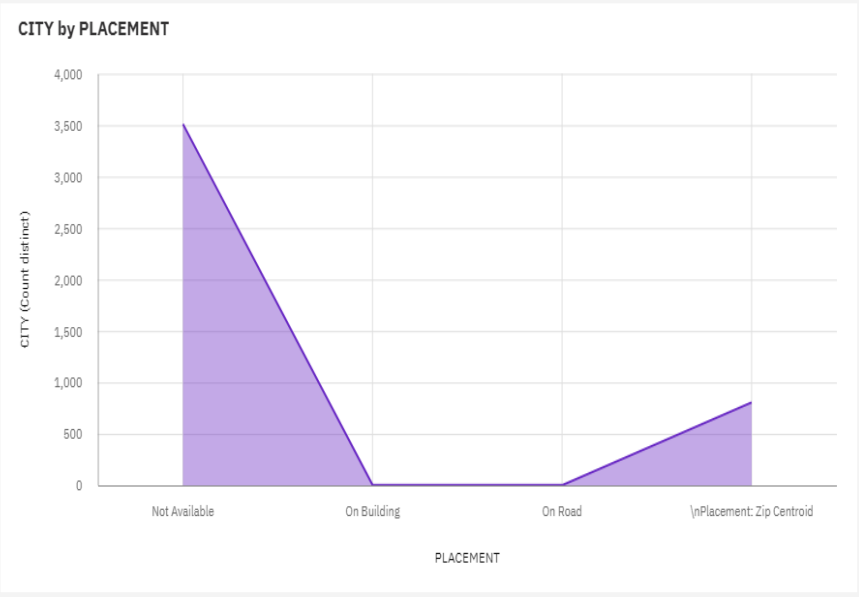
The total number of results for **CITY**, across all **states**, is over 24 thousand.

The most common values of **STATE** are TX (9.2 %), FL (8.7 %), and CA (8.3 %), together occurring almost 6500 times, which is 26.3 % of the total.

The total number of results for **PLACEMENT**, across all **states**, is over 24 thousand.

The most common values of **STATE** are TX (9.2 %), FL (8.7 %), and CA (8.3 %), together occurring almost 6500 times, which is 26.3 % of the total.

Tab 1 +



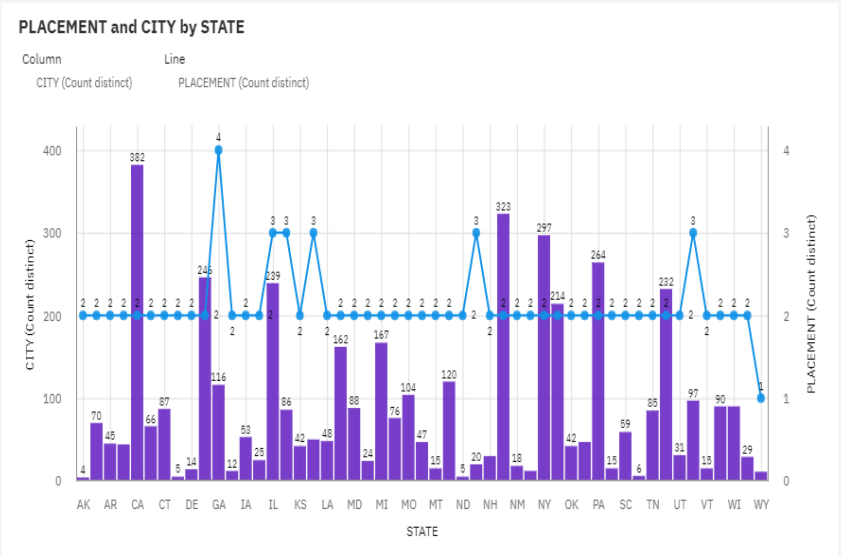
Details

The total number of results for **CITY**, across all **placements**, is over 24 thousand.

The most common value of **PLACEMENT** is Not Available, occurring almost 23 thousand times, which is 93.9 % of the total.

7.4. Visualization, Dashboard and Export

Visualization



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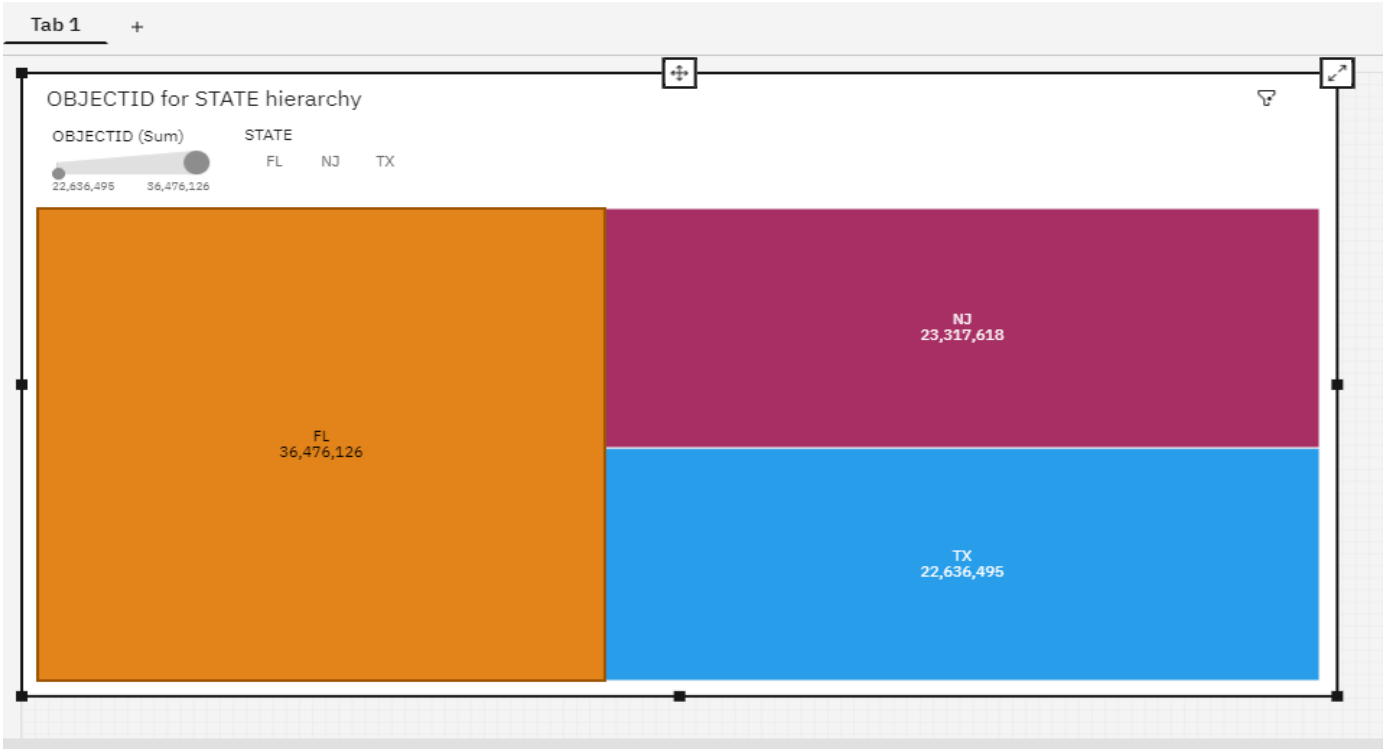
Tab 1
+
OBJECTID for STATE hierarchy
OBJECTID (Sum)
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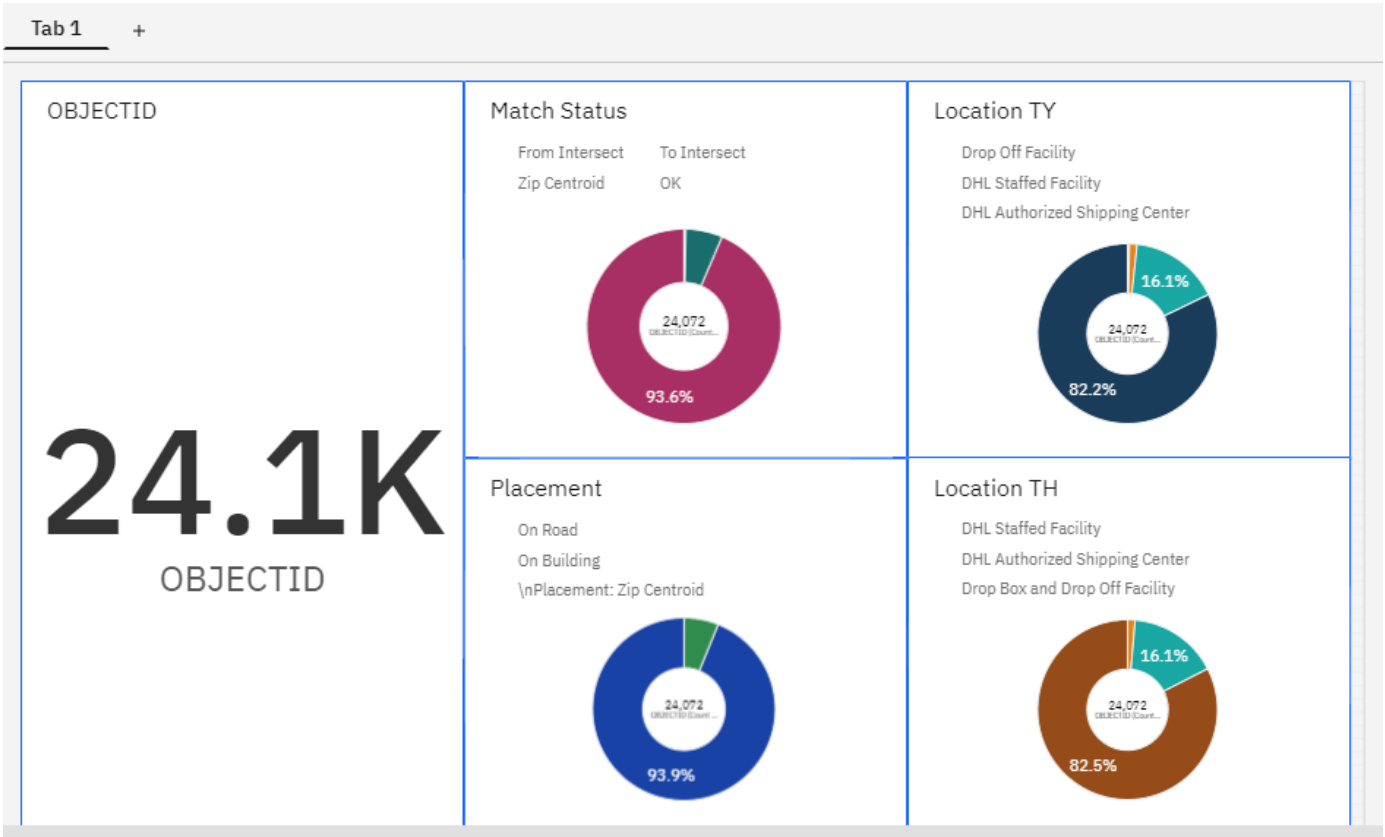
36,476,126
STATE
FL
NJ
TX
NJ
23,317,618
FL
36,476,126
TX
22,636,495

Dashboard


Tab 1
+
OBJECTID
24.1K
OBJECTID
Match Status
From Intersect
To Intersect
Zip Centroid
OK
24,072
93.6%
Location TY
Drop Off Facility
DHL Staffed Facility
DHL Authorized Shipping Center
16.1%
24,072
82.2%
Placement
On Road
On Building
\nPlacement: Zip Centroid
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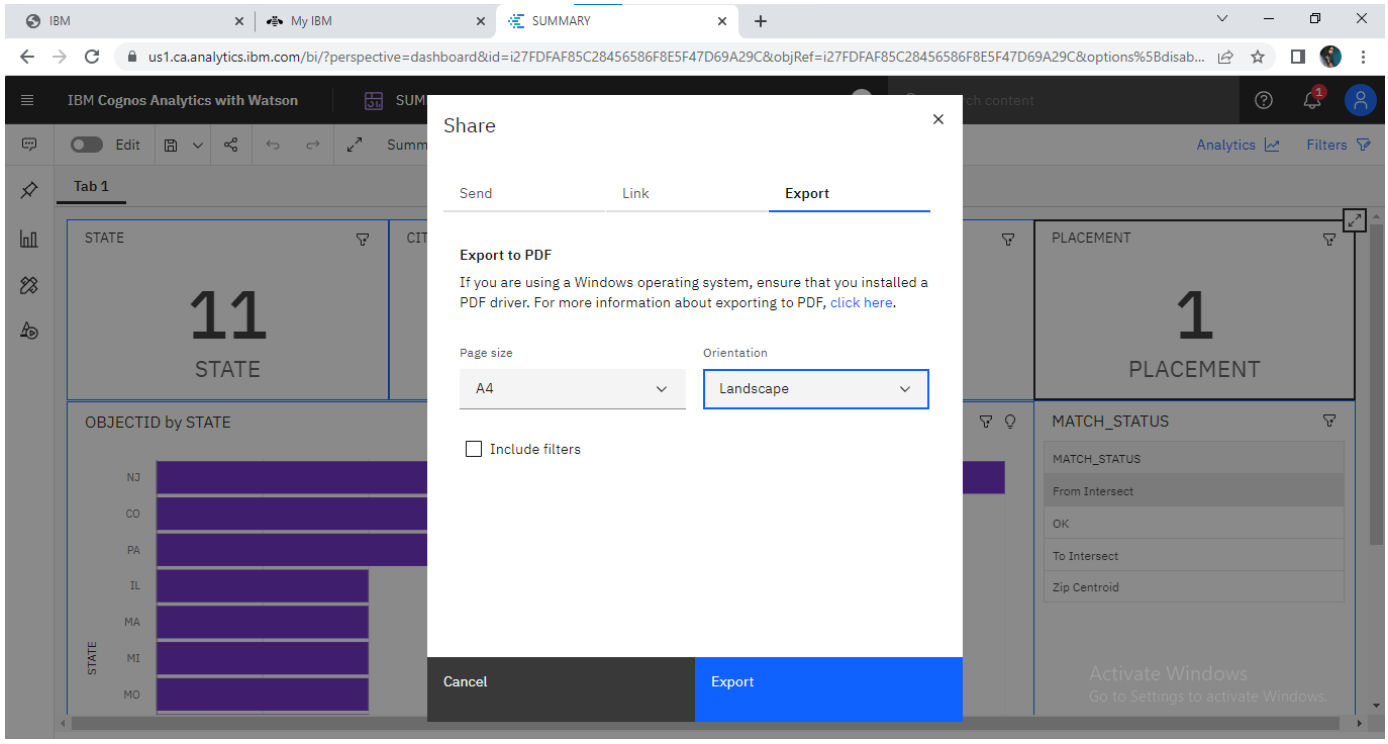
93.9%
Location TH
DHL Staffed Facility
DHL Authorized Shipping Center
Drop Box and Drop Off Facility
16.1%
24,072
82.5%

Export


IBM
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SUMMARY
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IBM Cognos Analytics with Watson
Edit
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Filters
Tab 1
STATE
11
STATE
PLACEMENT
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PLACEMENT
OBJECTID by STATE
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PA
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STATE
MATCH_STATUS
MATCH_STATUS
From Intersect
OK
To Intersect
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Send
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Export
Export to PDF
If you are using a Windows operating system, ensure that you installed a PDF driver. For more information about exporting to PDF, click here.
Page size
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Include filters
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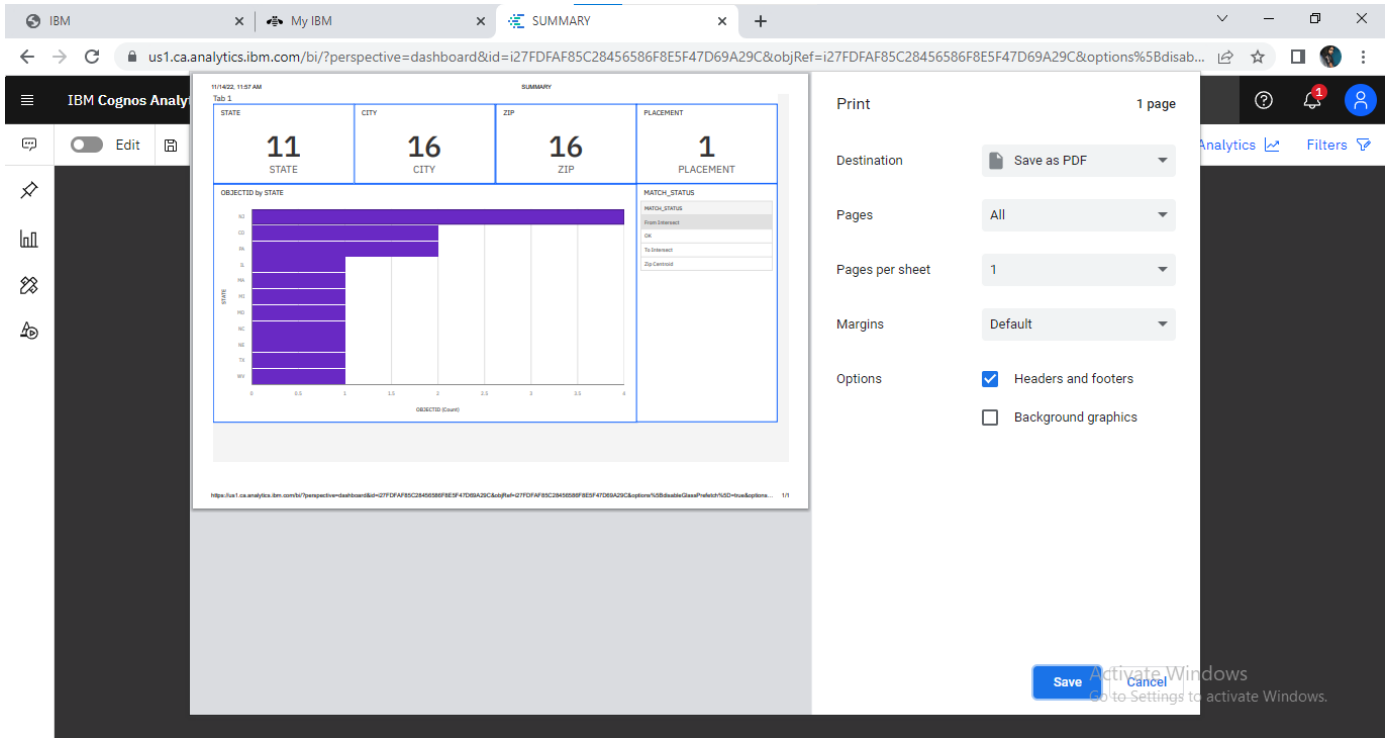
Activate Windows
Go to Settings to activate Windows.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Pages
All
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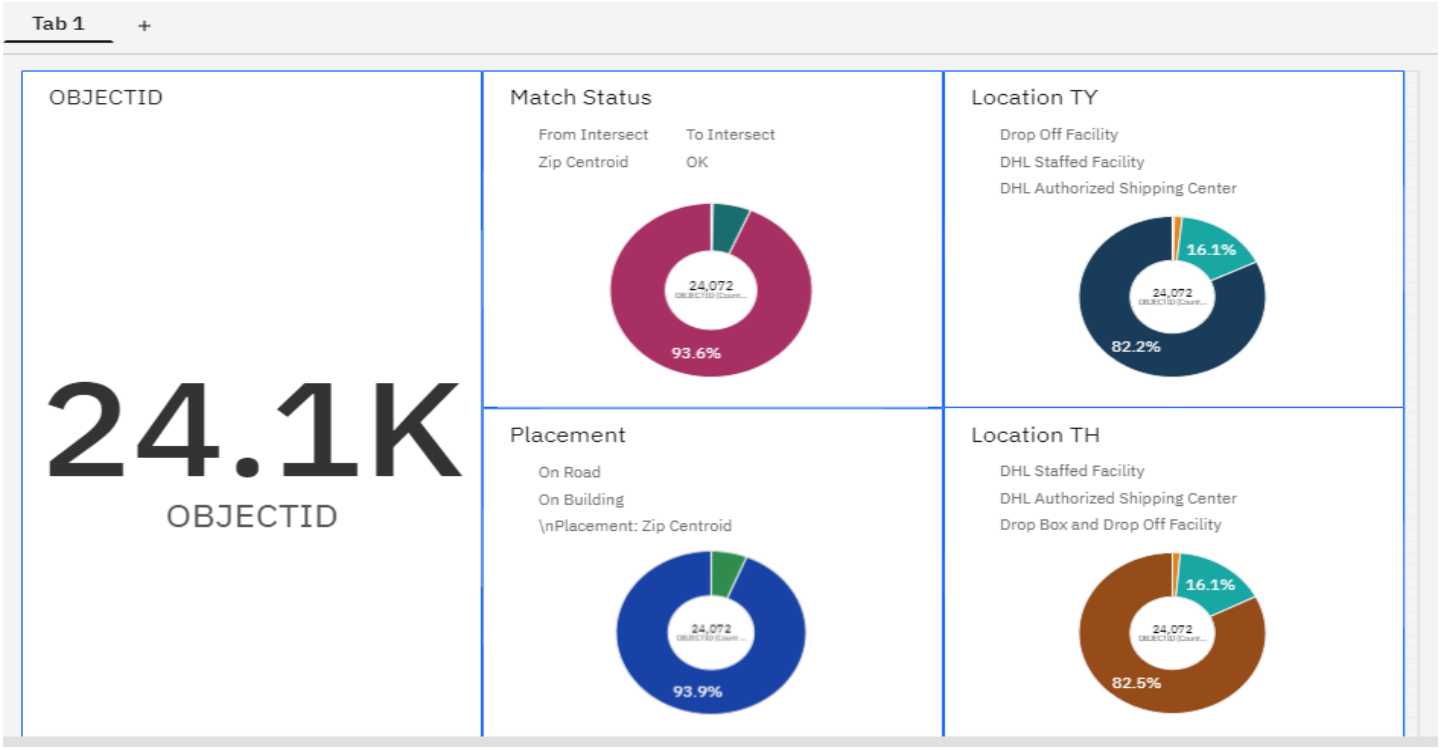
Go to Settings to activate Windows.

8. RESULT

Dashboard



9. ADVANTAGE and DISADVANTAGE

Advantage

- Usability
  No prior experience required to use the dashboard. People with basic understanding can use the system.
- Security
  Only registered user can use this application.
- Reliability
  The Analytics system ensures the reliability
- Performance
  Gets update regularly to improve the performance of the application.
- Availability
  The availability of dataset must be constrained for accurate data.
- Scalability
  Any kind of data can be explored and the system is quiet expandable

Disadvantage

- Logistics industry requires huge investment to set up operations and grows.DHL also require heavy investment to grow its business and to generate return on investment.
- DHL is expected to act in compliance with regulatory guidelines and localauthorities. Regulations can be different in the source and destination locations, and so it can be impossible to obey different rules.
- Logistic Market is filled with many local and international players and the market growth is distributed among all the players and due to high pricing strategy DHL market share is restricted in developed and developingeconomies.
- Due to a very large market and a large network of delivery partners are required. DHL also depends on small and local entities for delivery. And this has a direct influence on DHL efficacy, and so teamwork becomes verynecessary.
- DHL has less marketing cost as compared to FedEx or UPS and does not spend much on advertisement and branding practices. This impacts the success and recognition of brands.

10. CONCLUSION

Logistics is being transformed through the power of data-driven insights. Thanks tothe vast degree of digital transformation and the Internet of Things, unprecedented amounts of data can be captured from various supply chain sources. Capitalizing on its value offers massive potential to increase operational efficiency, improve customer experience, reduce risk, and create new business models.

11. FUTURE SCOPE

Shifting demographics, technology advancement, digitalization, and the COVID-19 pandemic are greatly transforming work in the logistics industry. Humans working collaboratively with robots, flexible work systems, and continuous learning and upskilling will help businesses future-proof, stay competitive, and attract and retain the workforce – in spite of the current skilled labor shortage.

Building on findings from the last Logistics Trend Radar, DHL issued a global workforce survey that generated over 7,000 responses from logistics professionals early to mature in their careers for on-the-ground insight into the preferences, tools, environments, and expectations shaping the next decade to produce part one of the latest Trend Report.

Now, in part two, you'll see how an automated and augmented future will shape the future, with technology reducing manual tasks and improving efficiencies along six segments of the supply chain. The report also outlines three levers of success for managing the large-scale change management influencing the digitalization of work, with key considerations and practical guidance for ensuring employees are drivers of change as they adopt newly created roles. Gain new insights and prepare for what's next.

12. APPENDIX

Github Link- https://github.com/IBM-EPBL/IBM-Project-52026-1660988183

Project Demo Link- https://drive.google.com/file/d/1Powr0_w4C78SnO78348Oz7YBWe3xsuiJ/view?usp=share_link