IBM NALAIYA THIRAN

PANIMALAR ENGINEERING COLLEGE

(AN AUTONOMOUS INSTITUTION)

GLOBAL SALES DATA ANALYTICS

TEAM ID: PNT2022TMID00625

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Global Sales Data Analytics

1.INTRODUCTION

1.1: PROJECT OVERVIEW :

Data analytics is the process of analyzing raw data in order to draw out meaningful ,actionable insights ,which are then used to inform and drive smart business decision sales analytics refers to the technology and processes used to gather sales data and gauge sales performance .Sales leaders use these metrics to set goals ,improve ,internal processes and forecast future sales and revenue more accurately.

1.2: PURPOSE :

Data is being generated very rapidly due to increase in information in everyday life. Huge amount of data gets accumulated from various organizations that is difficult to analyze and exploit. Processing, analyzing and communicating this data are a challenge. Online shopping websites get flooded with voluminous amount of sales data every day. Analyzing and visualizing this data for information retrieval is a difficult task. Therefore,system is requiredwhich will effectively analyze and visualize data.

2.LITERATURE SURVEY

2.1: EXISTING PROBLEM :

The existing problem simply means that you have found a problem with your customer and that the solution you have realized for its actually solves customer's problem. It help entrepreneurs ,marketer and corporate innovators identity behavioral patterns and recognize what would work and why.

2.2: REFERENCE :

- Data mining with its role in marketing, sales support and customer identification data analysis [Mohammed Bin Ali Al Atif, Ahmed H. Shakir, et al, 2022]
- Impact of big data analytics on sales performance in pharmaceutical organizations: The role of customer relationship management capabilities [Muhammad Shahbaz, Lili Zhai, et al, 2021]
- Data Analysis and Visualization of Sales Dataset using Power BI [Ms. Sarika Singh, Ms. Lavina Jadhav, 2022]
- Survey on Growth of Business using Data Analytics for Business Intelligence in RealTime world [Madamanchi Brahmani, Talluri Sreekrishna, 2021]

2.3: PROBLEM STATEMENT DEFINITION :

The Customer Problem Statement helps you focus on what matters to create experiences people will love. A well-articulated customer problem statement allows you and your team to find the ideal solution for the challenges your customers face. Throughout the process, you'll also be able to empathize with your customers, which

helps you better understand how they perceive your product or service.

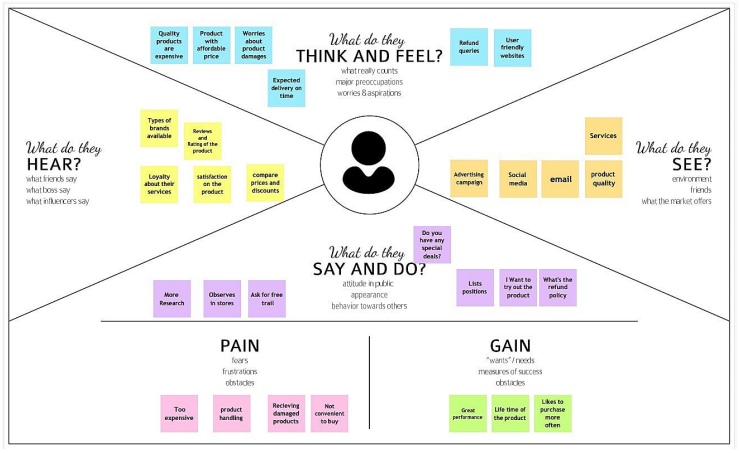
Its job is to gather and interpret data in order to solve a specific problem. Here data sets are examined to draw conclusions about the information they contain. Information is classified to identify and analyze the information and different techniques are there according to organizational requirements.We also called it data analytics.

3.IDEATION & PROPOSED SOLUTION

3.1: EMPATHY MAP CANVAS :

An empathy map is a simple ,easy to digest visual that captures knowledge about users behavior and attitudes . It is a useful tool to helps teams better understand their users .Creative 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 users perspective along with his or her goals and challenges .

Example for gob-al sales data analytics :

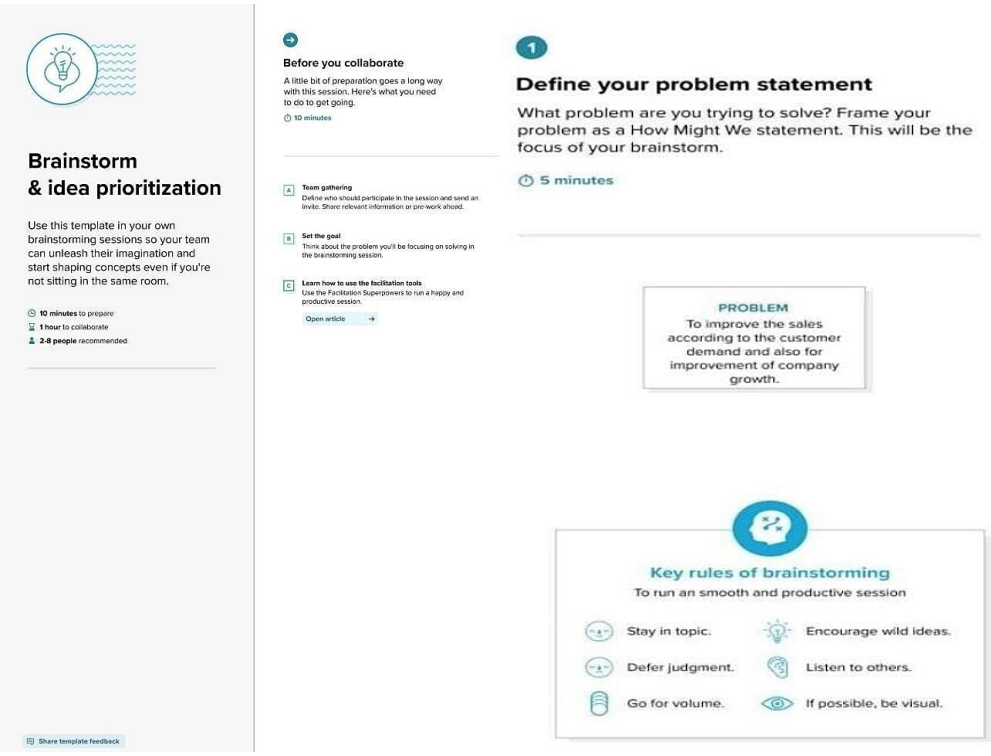


3.2: IDEATION & BRAINSTORMING :

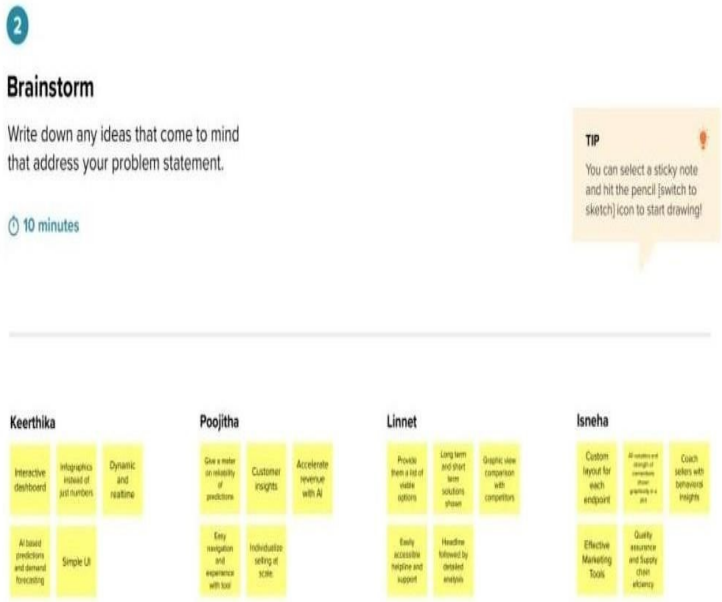
Brainstorming provides a free and open environment that encourages everyone within a team to participate in creative thinking process that leads to problem solving . Prioritizing volume over value ,out of the box ideas are welcome and build upon and all participants are encourage to collaborate ,helping each other develop a rich amount of creative solutions .

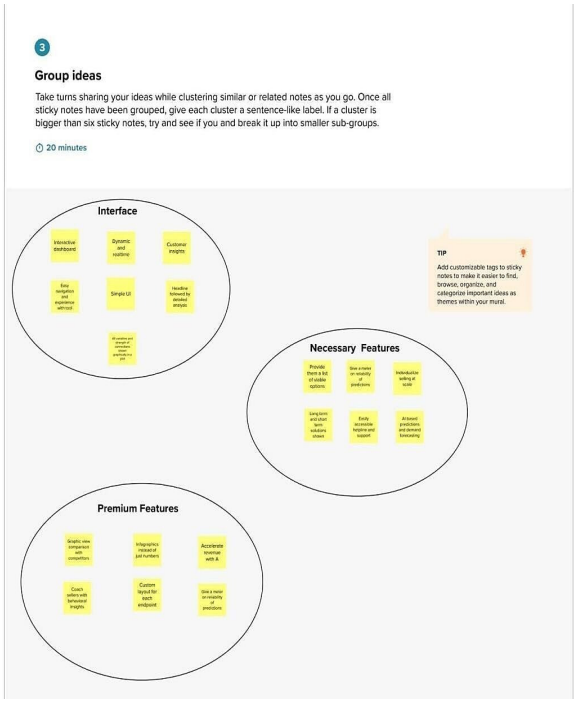
Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you are not in the same room .

Step-1: Team Gathering,Collaboration and Select the Problem Statement

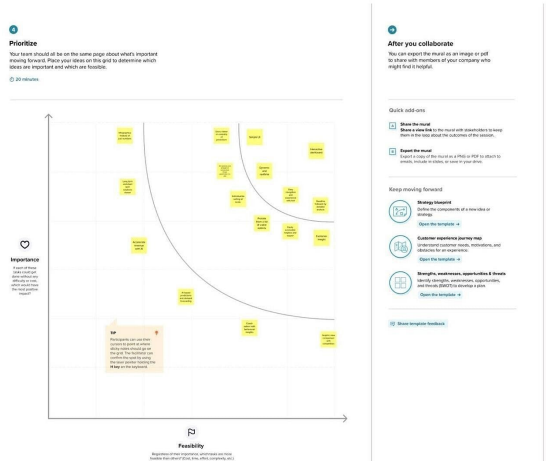


Step-2: Brainstorm,Idea listing and Grouping





Step-3: Idea prioritization

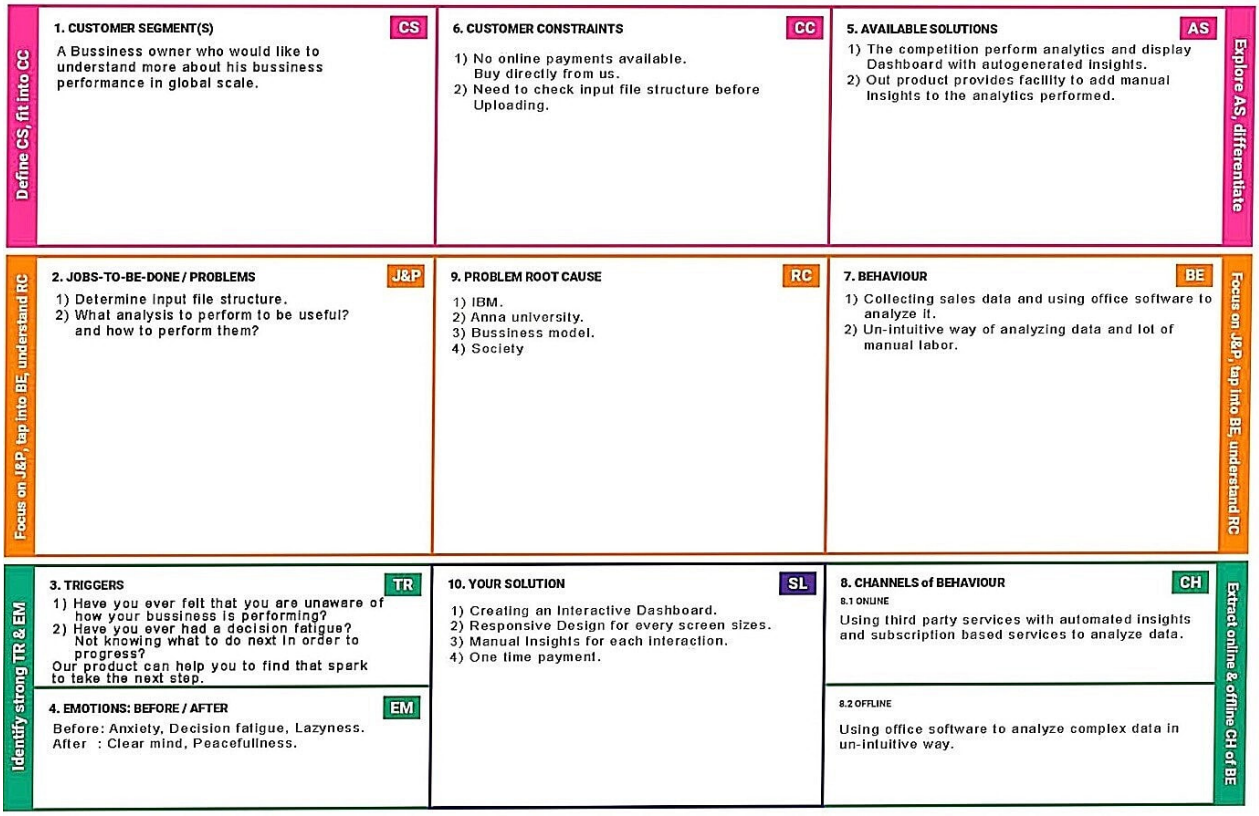


3.3: PROPOSED SOLUTION :

S. no	Parameter	Description
1.	Idea/Solution Description	An easy-to-use ,simple and powerful sales analytics tool that helps you automate and visualize sales trends to optimize desired outcomes
2.	Novelty/Uniqueness	Dynamic and real time analytics
3.	Social Impact/Customer Satisfaction	Make analysis of data patterns and trends very simple
4.	Business Model	Two tier pricing-standard,premium 1.Standard:limited dashboard features 2.Premium:customized dashboard features with automated reports
5.	Scalability of the solution	Usable by all e-commerce companies of all scale product based D2Ccompanies.

3.4: PROBLEM SOLUTION FIT :

Problem solution fit simply means that you have found a problem with your customer and the 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 .



4.REQUIREMENTS ANALYSIS

4.1: FUNCTIONAL REQUIREMENT :

Fr.No	Functional Requirement (epic)	Sub Requirement (story/subtask)
Fr-1	User Registration	Registration Through Form Or Gmail
Fr-2	User Confirmation	Confirmation Via Email/op
Fr-3	User Login	Login Via Email And Password
Fr-4	User Uploading Data (administrative)	To Store The Dataset Through The Cloud
Fr-5	End User Benefits	Getting Higher State Of Efficiency And Also To Know Entire Data Analysis

4.2: NON - FUNCTIONAL REQUIREMENTS :

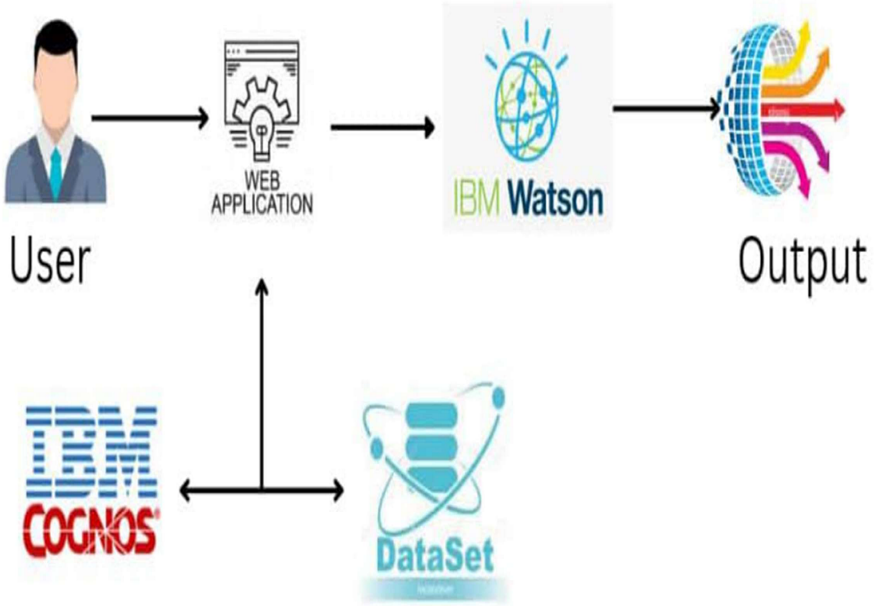
N fr.No	Non-functional Requirements	Description
Nfr-1	Usability	Optimized Resources And It Can Be Used By Everyone .
Nfr-2	Security	It Has Se-curable Because It Has End To End Encryption
Nfr-3	Reliability	It Has High Reliability Based On Development
Nfr-4	Performance	It Has High State Of Performance And

		Efficiency
Nfr-5	Availability	It Has Available In All Platforms And Websites
Nfr-6	Scalability	The Ability Of The Hardware And Software Parallel System To Expo-it Increasing Computing Resources Efficiency In The Analysis Of The Large Datasets

5.PROJECT DESIGN

5.1: DATA FLOW DIAGRAMS :

A Data Flow Diagram (DFD) is a graphical or visual representation using a standardized set of symbols and notations to describe a business's operations through data movement. They are often elements of a formal methodology such as Structured Systems Analysis and Design Method (SSADM). It shows how data enters and leaves the system, what changes the information, and where data is stored.



5.2: SOLUTION AND TECHNICAL ARCHITECTURE :

Based on the complexity of the deployment ,a solution architecture diagram may actually be a set of diagrams documenting various levels of the architecture.The diagram relates the information that you gather on the environment to both spacial and logical choices for your architecture in an easy understood manner.

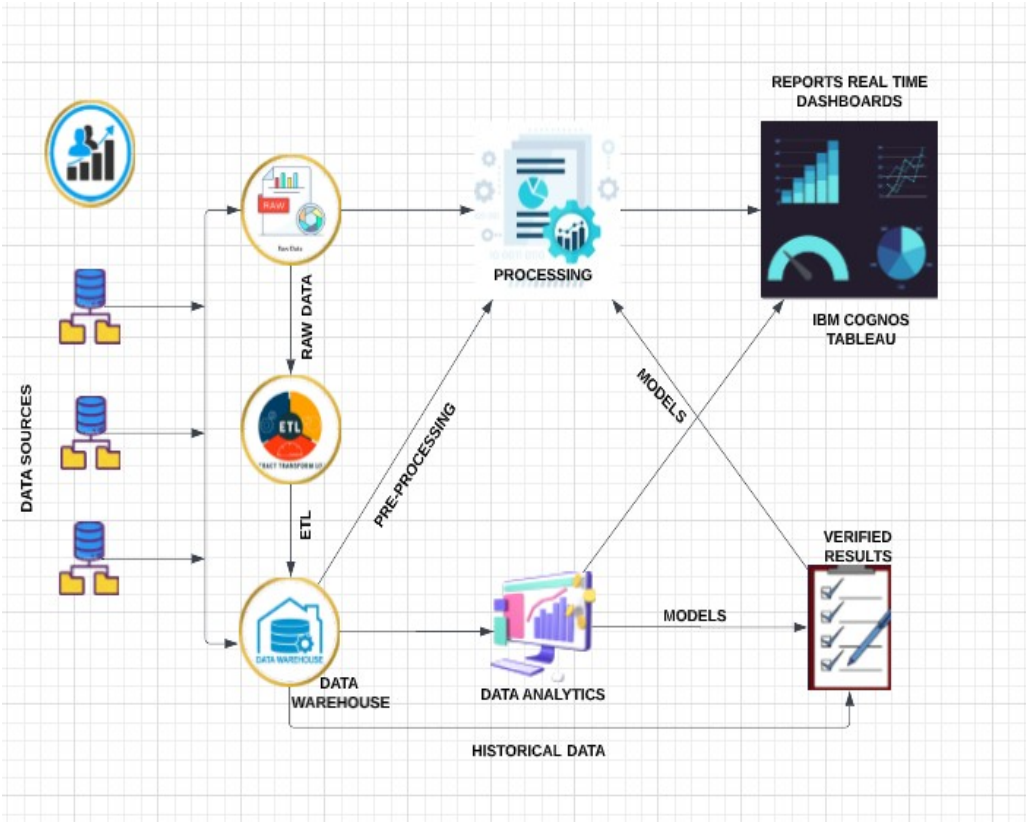


Table-1 : Components and Technologies :

S.NO	Component	Description	Technology
1.	USER	how user interacts with application	IBM Cog nos

	INTERFACE	e.g, Web UI,Mobile app ,Chatbot etc.	
2.	STORAGE INFRASTRUCTURE(CLOUD)	Customer sales data is uploaded in cloud through interface	IBM cloud
3.	Working with dataset	uploading ,cleaning and processing dataset	IBM Cognos+IBM Cloud
4.	Data Exploration	Uploaded data is explored to identify trends	IBM Cog nos
5.	Data Visualization	multiple types of graphs are shown according to customer data and requirements	IBM Cog nos Dashboard
6.	Cloud Database	Database Service on cloud	IBM DB2 ,IBM Cloud ant etc .
7.	Viewing Data	User login to application to view visualization for uploaded data	IBM Cog nos Dashboard

Table-2 : Application Characteristics :

S.NO	CHARACTERISTICS	DESCRIPTION	TECHNOLOGY
1.	Open source	List the open source	IBM Cog nos,IBM

	frameworks	frameworks used	Cloud,IBM Watson
2.	Security implementation	Secure user information and data	Active Directory
3.	Scalable Architecture	Supports various data sizes	Web 3.0 IBM Cloud
4.	Availability	Multi page layout providing various visualizations of data and pride full support	Cog nos Business Intelligence Server
5.	Performance	Withstand huge data and process them without crashing	IBM Cog nos ,Performance management HUB

5.3: USER STORIES :

User Type	**Functional Requirement**	**User Story Number**	**User Story/Task**	**Acceptance Criteria**	**Priority**	**Release**
Custome(mobile user)	Registration	Usn-1	As a user ,i can register for the application by entering my email ,password and	I can access my account	High	Sprint-1

			confirming password			
		Usn-2	As a user ,i will receive confirmation email once i have registered for the application	I can receive confirmation email&click confirm	High	Sprint -1
		Usn-3	As a user ,i can register for the application through facebook	I can register & access the dashboard with facebook login	Low	Sprint-2
		Usn-4	As a user , i can register for the application through gmail		Medium	Sprint -1
	Login	Usn-5	As a user ,i can log into the application by entering email&passwo		High	Sprint -1

			rd			
	Dashboard	Usn-6	As a user,i can create the visualization by using the dashboard application		High	Sprint-3

6.PROJECT PLANNING & SCHEDULING

6.1: SPRINT PLANNING & ESTIMATION :

SPRINT	FUNCTIONAL REQUIREMENTS (EPIC)	USER STORY NUMBER	USER STORY/TASK	STORY POINTS	PRIORITY	TEAM MEMBERS

Sprint-1	Registration	USN-1	As a user,I can register for the application by entering email,password ,and confirming my password.	2	High	IsnehaShankar Doommaraju Poojitha Keerthika Linnet Blessy
Sprint-1	Login	USN-2	As a user,I need valid credentials to log in to my application.	1	High	IsnehaShankar Dommaraju Poojitha Keerthika Linnet Blessy
Sprint-1	Data Collection	USN-3	As a user,I need to gather the data in the form of CSV/XLS and clean the data	2	High	IsnehaShankar Dommaraju Poojitha Keerthika Linnet Blessy
Sprint-2	Upload dataset	USN-4	As a user,I can view the data of the products	1	Low	IsnehaShankar Dommaraju Poojitha Keerthika Linnet Blessy

Sprint-2	Data Preparation	USN-5	As a user,I need to filter it for Data visualization	3	High	IsnehaShankar Dommaraju Poojitha Keerthika Linnet Blessy
Sprint-2	Data visualization	USN-6	As a user,I can easily visualize the data in the form of charts.	4	Medium	IsnehaShankar Dommaraju Poojitha Keerthika Linnet Blessy
Sprint-3	Dashboard	USN-7	As a user,I can view the summary of the product sales by the help of dashboar	2	Medium	IsnehaShankar Dommaraju Poojitha Keerthika Linnet Bless y

Sprint-3	Dashboard	USN-8	As a user,I must plan visualizations in a way that I'm able to gain insights regarding the sales based upon the category of sales and the respective region	4	High	IsnehaShankar Dommaraju Poojitha Keerthika Linnet Blessy

Sprint-3	Dashboard	USN-9	As a user,I must be able to gain insights from the charts/graphs through a variety of relationship established in the dashboard	4	Medium	IsnehaShankar Dommaraju Poojitha Keerthika Linnet Blessy
Sprint-4	Prediction	USN-10	As a user,I see the prediction of the specific products future sales expectation.	4	Medium	IsnehaShankar Dommaraju Poojitha Keerthika Linnet Blessy
Sprint-4	Report	USN-11	As a user,I can view the list of categorized products and their details as a report.	5	High	IsnehaShankar Dommaraju Poojitha Keerthika Linnet Blessy
			As a user,I can view the			IsnehaShankar

Sprint-4	Story	USN-12	product and customer description and more additional information as a story	5	High	Dommaraju Poojitha Keerthika R Linnet Blessy

6.2: SPRINT DELIVERY SCHEDULE :

Sprints	**Total Story Points**	**Duration**	**Sprint Start Date**	**Sprint End Date(Planned)**	**Story Points Completed(as on planned end date)**	**Sprint Release Date**
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	5	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	8	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	10	12 Nov 2022
			14 Nov	19 Nov		

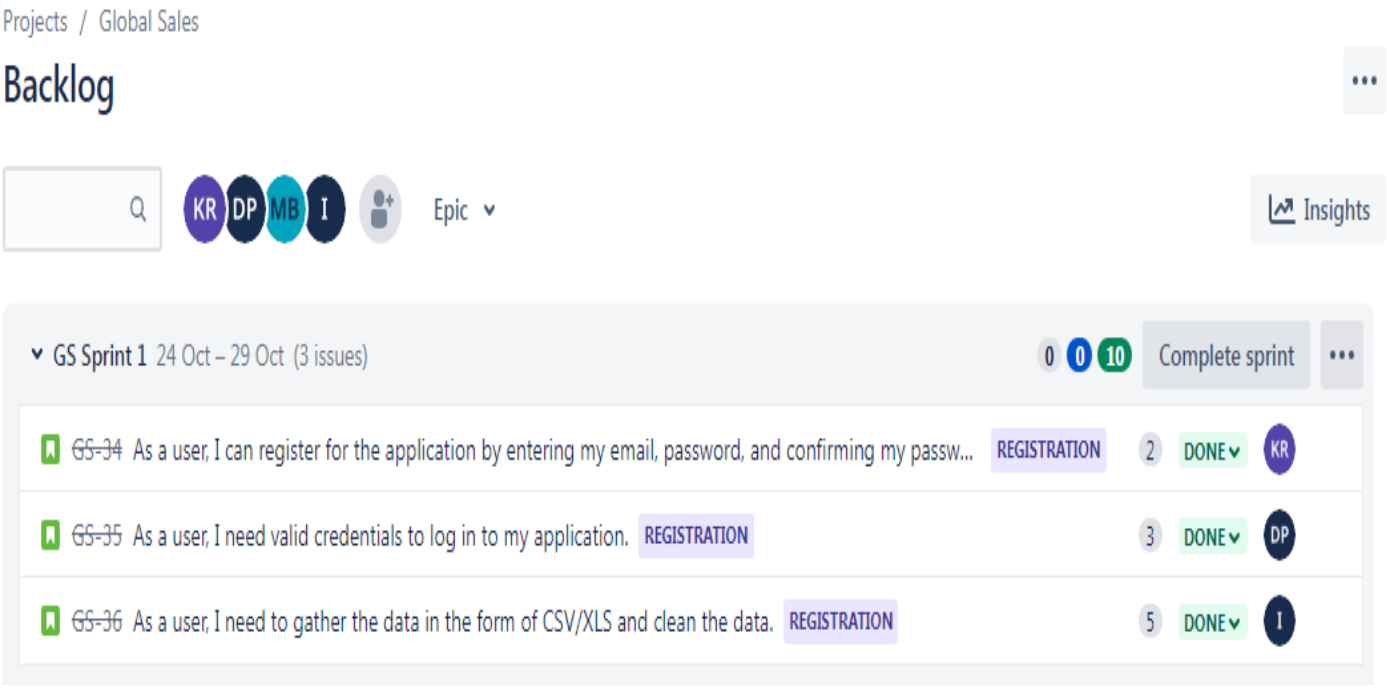
Sprint-4	20	6 Days	2022	2022	14	19 Nov 2022

Velocity: Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

AV = Sprint Duration/Velocity = 20/10 = 2

6.3 REPORTS FROM JIRA :

6.3.1: SPRINTS :



Projects / Global Sales

Backlog

KR DP MB I Epic Insights

+ Create issue

GS Sprint 2 31 Oct – 5 Nov (3 issues) 0 0 10 Complete sprint

GS-38	As a user, I can view the data of the products.	DATA PROCESSING	5 DONE	DP
GS-37	As a user, I need to filter it for Data visualization.	DATA PROCESSING	2 DONE	KR
GS-39	As a user, I can easily visualize the data in the form of charts.	DATA PROCESSING	3 DONE	MB

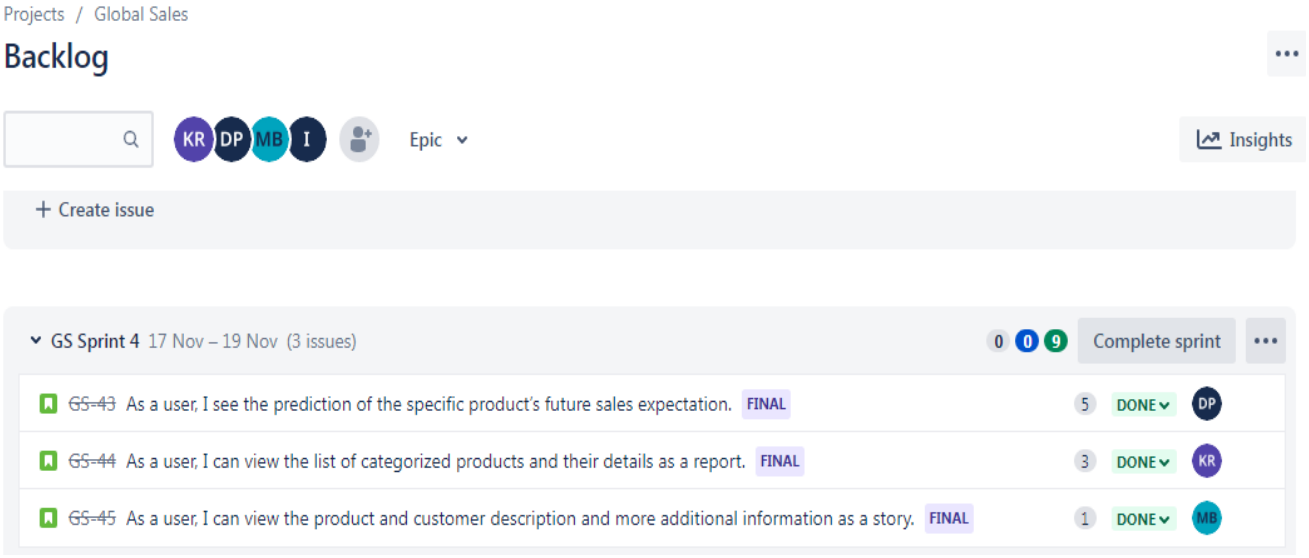
Projects / Global Sales

Backlog

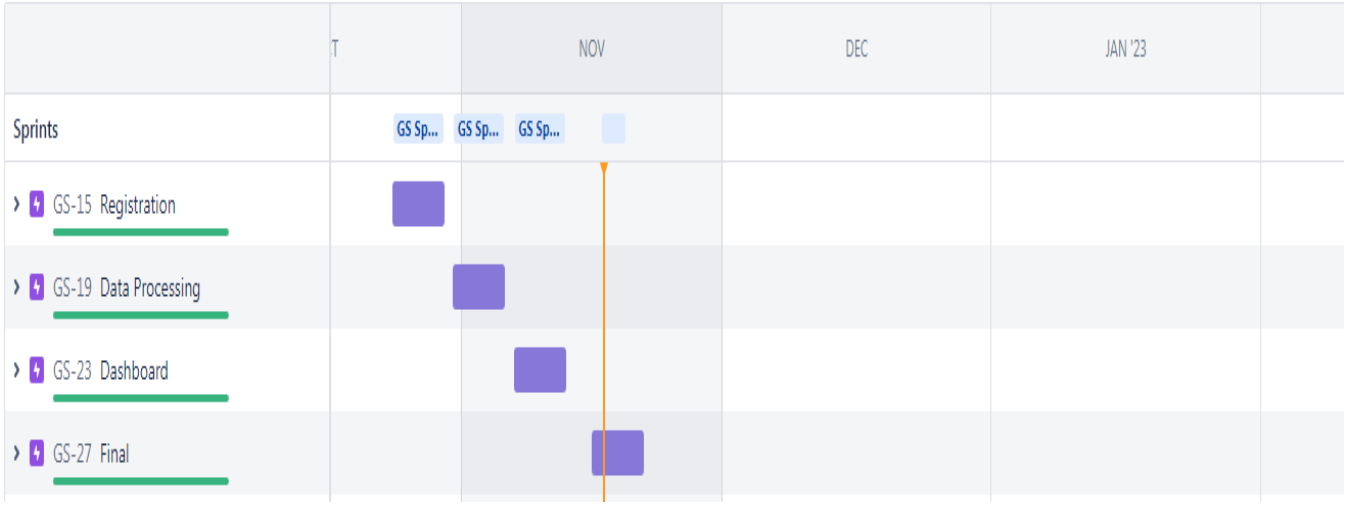
KR DP MB I Epic Insights

GS Sprint 3 7 Nov – 12 Nov (3 issues) 0 0 10 Complete sprint

GS-40	As a user, I can view the summary of the product sales by the help dashboard.	DASHBOARD	5 DONE	KR
GS-41	As a user, I must plan visualizations in a way that I'm able to gain insights regarding the sales based up...	DASHBOARD	3 DONE	DP
GS-42	As a user, I must be able to gain insights from the charts/graphs through a variety of relationships esta...	DASHBOARD	2 DONE	I


Projects / Global Sales
Backlog
KR DP MB I
Epic
Insights
+ Create issue
GS Sprint 4 17 Nov – 19 Nov (3 issues)
0 0 9
Complete sprint
GS-43 As a user, I see the prediction of the specific product's future sales expectation. FINAL
5 DONE DP
GS-44 As a user, I can view the list of categorized products and their details as a report. FINAL
3 DONE KR
GS-45 As a user, I can view the product and customer description and more additional information as a story. FINAL
1 DONE MB

6.3.2: ROADMAP :


T
NOV
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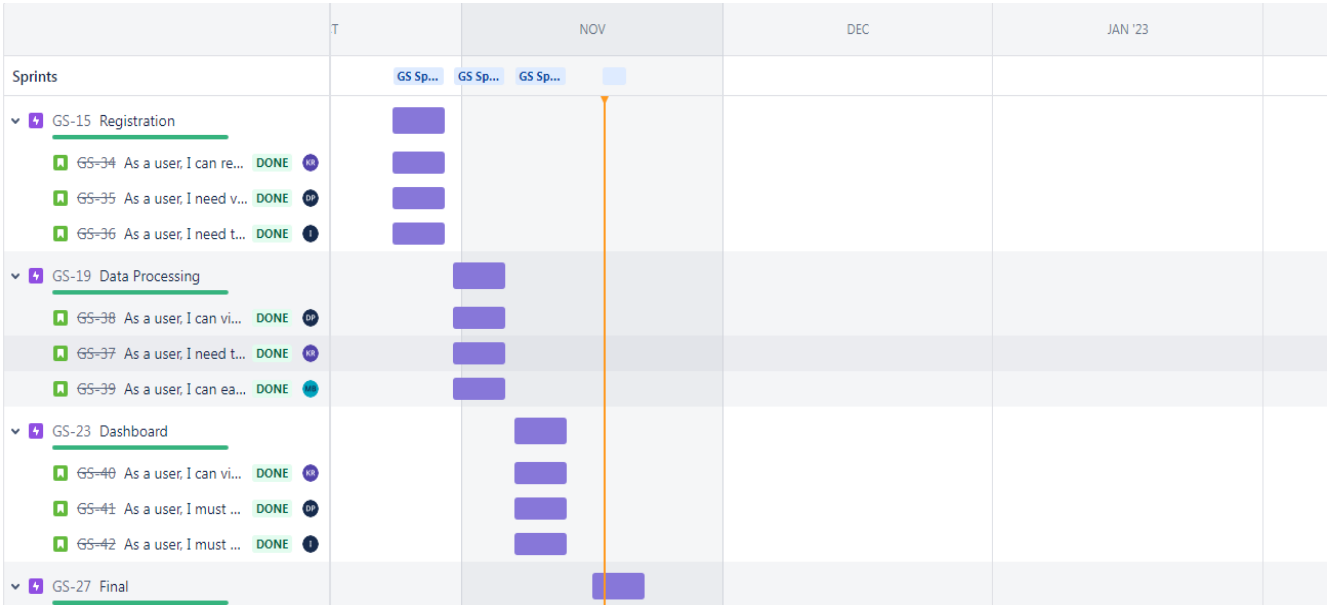
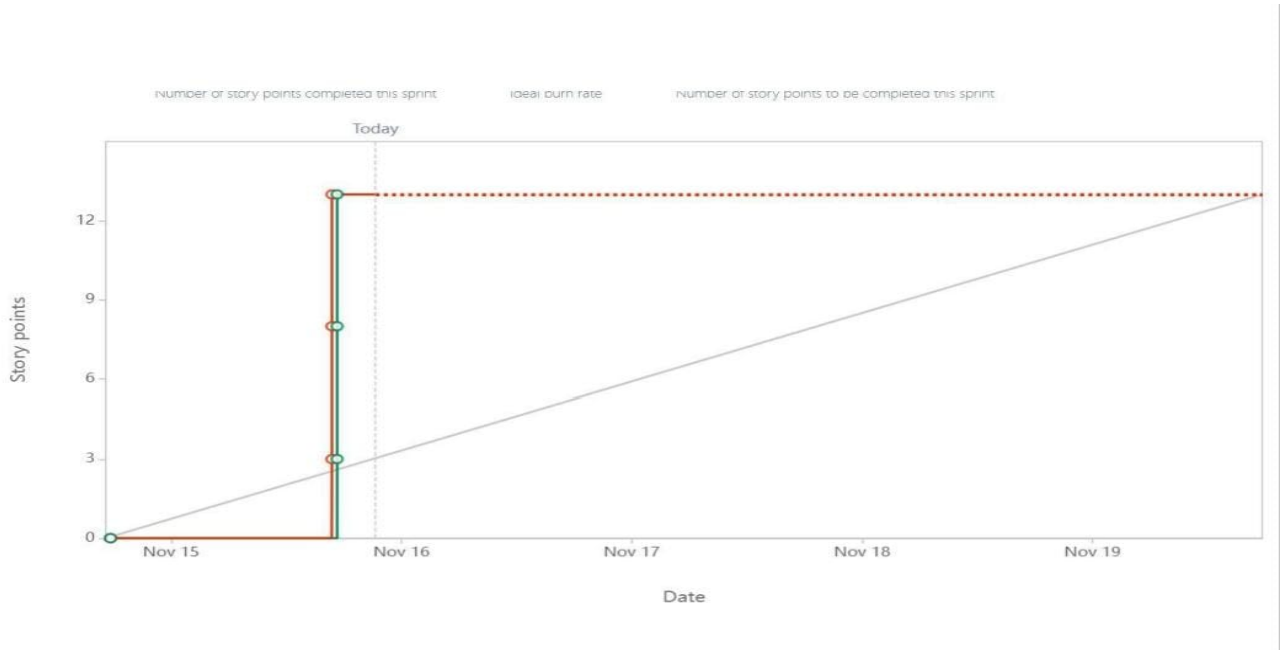
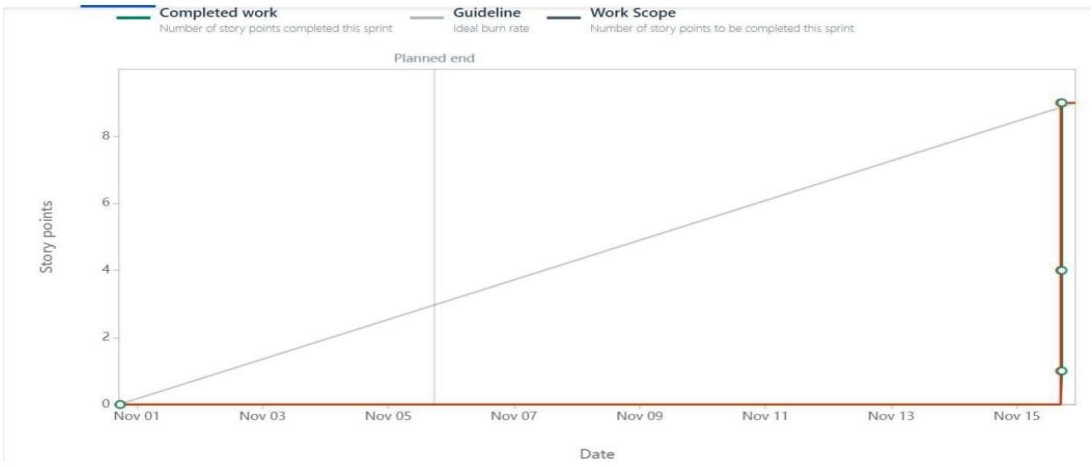
JAN '23
Sprints
GS Sp...
GS Sp...
GS Sp...
GS-15 Registration
GS-19 Data Processing
GS-23 Dashboard
GS-27 Final



6.3.3: BURNUP CHARTS :

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Number of story points completed this sprint
Guideline
Ideal burn rate
Work Scope
Number of story points to be completed this sprint
Planned end
Story points
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4
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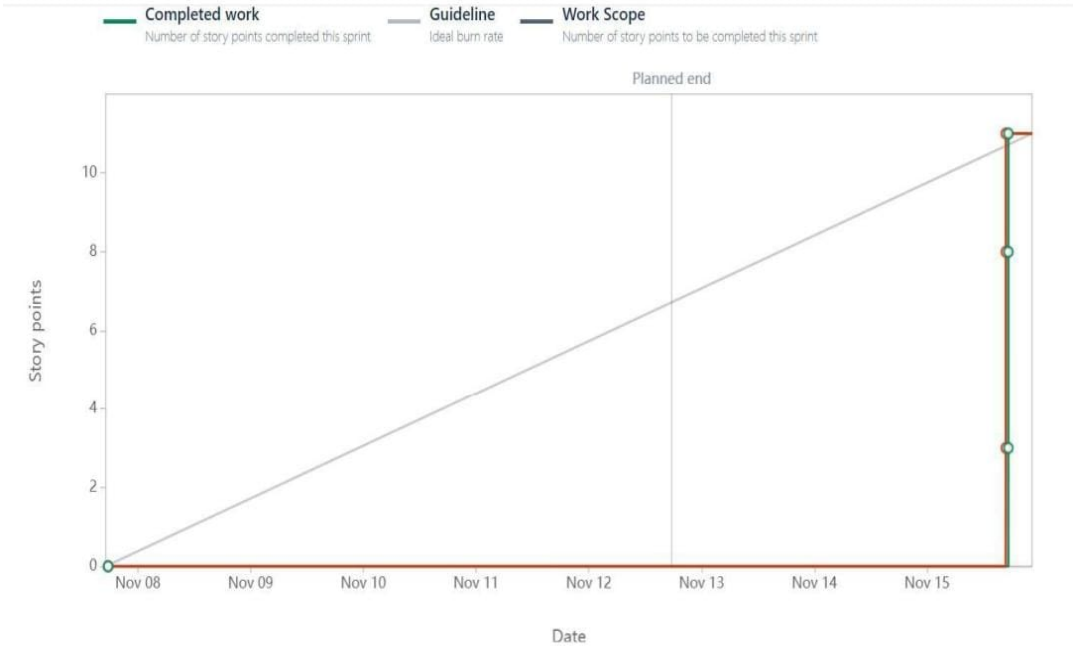
Date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Guideline
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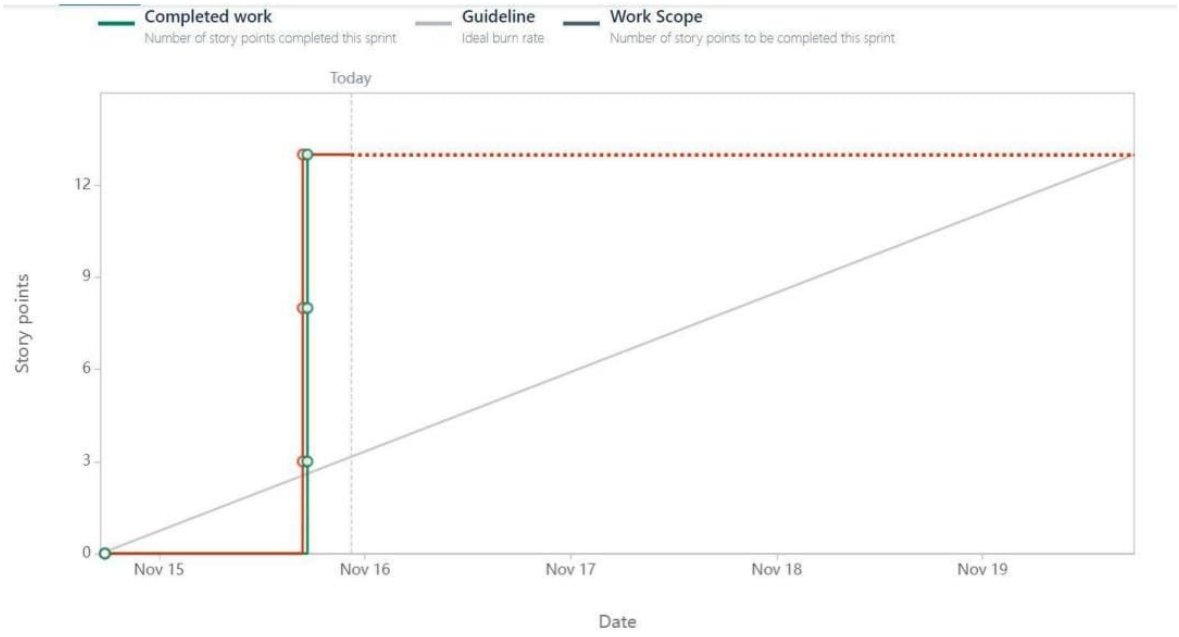
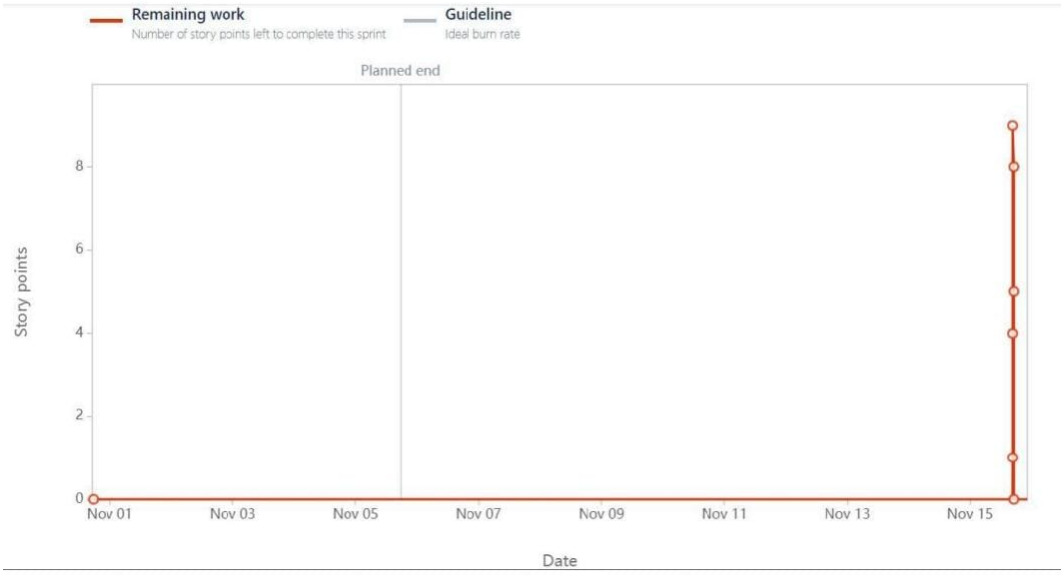
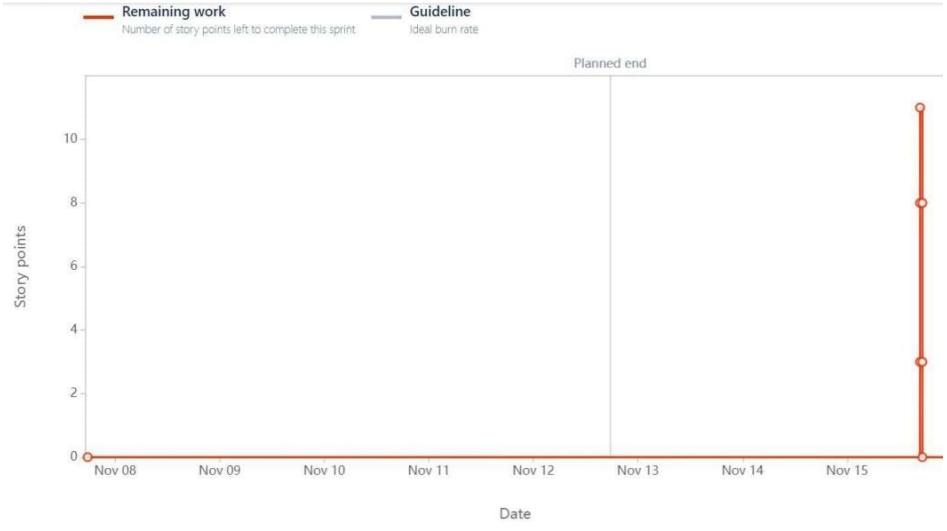


6.3.4: BURNDOWN CHARTS :




Remaining work
Number of story points left to complete this sprint
Guideline
Ideal burn rate
Planned end
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Story points
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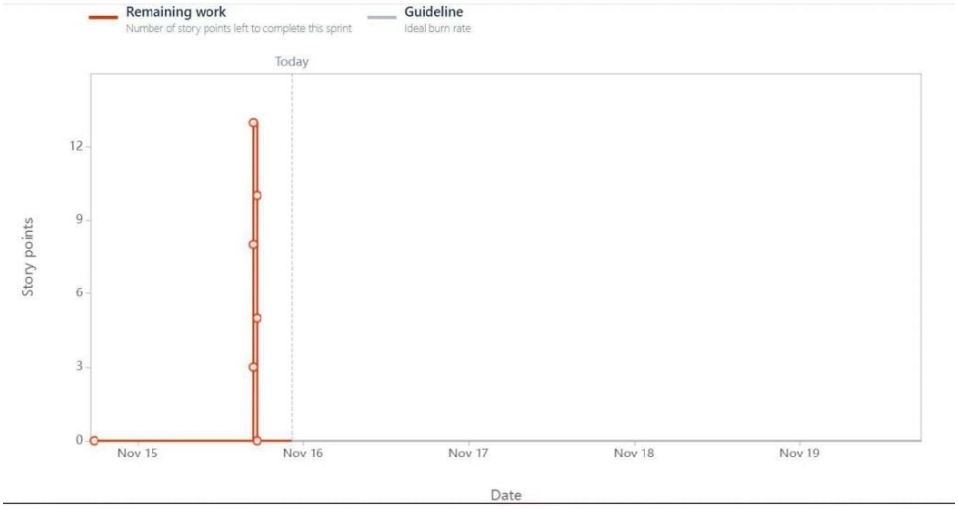
Remaining work
Number of story points left to complete this sprint
Guideline
Ideal burn rate
Today
12
9
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3
0
Story points
Nov 15
Nov 16
Nov 17
Nov 18
Nov 19
Date

7.CODING & SOLUTIONING

7.1: FEATURE 1 :

Sales – Analysis: This is an analysis of the sales data with particular focus given to how promotions and advertising translate into sales, in terms of both units sold and sales dollars.

Different types of Sales Analysis :

- Furniture company sales analysis HTML file
- Cereal Company Sales Analysis HTML file
- Financial Statement Analysis PDF file

Feature-1 :

Step 1: Understand the Business

Step 2: Get Your Data

Step 3: Explore and Clean Your Data

Step 4: Enrich Your Dataset

8.TESTING

8.1: TEST CASES :

S.NO	PARAMETER	SCREENSHOT/VALUES
1	Dashboard design	No.of visualizations/Graphs-7-8-visualization/6-7 graphs
2	Data Responsiveness	User and Analyst or developers
3	Amount Data to Rendered(DB2 Metrics)	5 countries
4	Utilization of Data Filters	sales,profit,products,market rate and order id filtration
5	Effective user story	No.of.scene Added-30 user stories
6	Descriptive Reports	No.of.Visulizations/Graph-4 visualizations/6 graph

8.2: USER ACCEPTANCE TESTING :

Purpose of Document : The purpose of this document is to briefly explain the test coverage and open issues of the Global Sales Data Analytics project at the time of the release to User Acceptance Testing (UAT).

Defect Analysis : This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	0	0	1	1

Totals	24	9	11	26	71

Test Case Analysis : This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report				

Output	4	0	0	4
Version Control	2	0	0	2

9.RESULTS :

9.1: PERFORMANCE METRICS :

The analysis covered the period from 2012 to 2015, with conversion to the Brazilian currency Real BRL (R$). Some results:

• The US was the country with the highest profit. • The country that presented the biggest loss in sales was Turkey.

• There was greater demand for Superstore products to be shipped via the standard mode.

• The Technology Category presented better results in Profit and Sales.

• The Retail segment performed better for all the years evaluated.

10.ADVANTAGES & DISADVANTAGES :

ADVANTAGES :

- **Marketing Support :**

Sales of a certain product may require one_time marketing support or multiple times or seasonal support.Those decisions are taken based on Sales analysis.

- **Opportunities :**

It helps to identify missed opportunities,supports future decision-making,shows the current mark-rt trends,and enhances customer analysis.

- **Accessibility Improvements :**

Any organization has to be able to access its data and provide reliable reports from wherever .Sales analytics helps to view the same information on any device with an internet connection.There is no necessity to be concerned about accessibility.

DISADVANTAGES :

- **Cost :**

  A detailed Sales Analysis along with its interpretation is outsourced by many companies.The dedicated firms or software may be costly which the company would have to bear regularly.

- **Technical Knowledge :**

  High technical knowledge is required for Sales Analysis .Good Arithmetic

skill along with high market knowledge are basic requirements and those may not be fulfilled by every Salesperson.

- **Reliability :**

  A lot of times,Sales Analysis might have done in a haphazard way or the reasons for the increase in sales of a particular product may go up purely on the effort of Salespersons or offers rolled out.This may have nothing to do with customer or trends and relaying on those conclusions can be problematic for the company.

11.CONCLUSION :

Sales analytics is an indispensable tool for businesses all over the globe.It keeps our Business updated.This is the must-have element, our business won't last long in a highly competitive industry.Provides better Insights via Data Visualization.Depending on the company we are managing,finding the right sales analytics software is crucial.With the benefits that sales analytics provides,making the most out of the tool will keep our business running efficiently and maintain superior productivity for years to come.

12.FUTURE SCOPE :

The future of sales analytics brings with it a more accurate yet dynamic picture of buyer behavior and needs,which will drive significantly more commercial impact for frontline sales teams and commercial leadership than is typically offered by sales analytics today."Sales analytics functions that dont fully understand the information needs of the larger organization are missing the opportunity to share insights among commercial functions to drive more cohesive decision making",says Steve Rietberg,Senior Director Analyst, Garner."Align stakeholders on a vision,prioritize use

cases for the sales analytics,and then establish governance,elevate data literacy and prioritize analytics technologies"Knowing what will characterize valuable sales analytics going forward gives sales operations leaders a set of objectives to strive for so they can promise more value to their stakeholders.

13.APPENDIX

SOURCE CODE :

Dashboard.html

```
<!DOCTYPE html>

<htmllang="en">

<head>

<linkrel="stylesheet" href="index.css">

</head>

<body>

<divclass="whole-page">

<divclass="navbar">

<divclass="one">
```

```
<p>Global Sales Data  Analytics</p>

</div>

<divclass="two">

</div>

<divclass="three">

<ahref="dashboard.html">Dashboard</a>

<ahref="report1.html">Report</a>

<ahref="story.html">Story</a>

</div>

</div>

<divclass="pic">

<div>

<imgsrc="dashboard.JPG">

</div>

</div>

</div>
```

```
</body>

</html>
```

Report.html

```
<!DOCTYPE html>

<html lang="en">

<head>

  <link rel="stylesheet" href="index.css">

</head>

<body>

  <div class="whole-page">

    <div class="navbar">

        <div class="one">

          <p>Global Sales Data Analytics</p>

        </div>

        <div class="two">
```

```
    </div>
    <div class="three">
      <a href="dashboard.html">Dashboard</a>
       <a href="report.html">Report</a>
      <a href="story.html">Story</a>
    </div>
</div>
<div class="pic">
  <div>
    <image src="dash1.JPG">
  </div>
  <div>
    <image src="dash2.JPG">
  </div>
  <div>
     <image src="dash3.JPG">
```

```
    </div>
  </div>
 </div>
</body>
</html>
```

Story.html

```
<!DOCTYPE html>
<html lang="en">
<head>
 <link rel="stylesheet" href="index.css">
</head>
<body>
 <div class="whole-page">
  <div class="navbar">
   <div class="one">
    <p>Global Sales Data Analytics</p>
```

```
        </div>
        <div class="two">
         </div>
        <div class="three">
          <a href="dashboard.html">Dashboard</a>
          <a href="report1.html">Report</a>
          <a href="story.html">Story</a>
        </div>
    </div>
    <div class="pic">
      <div>
        <image src="story.JPG">
       </div>
    </div>
  </div>
</body>
```

```
</html>
```

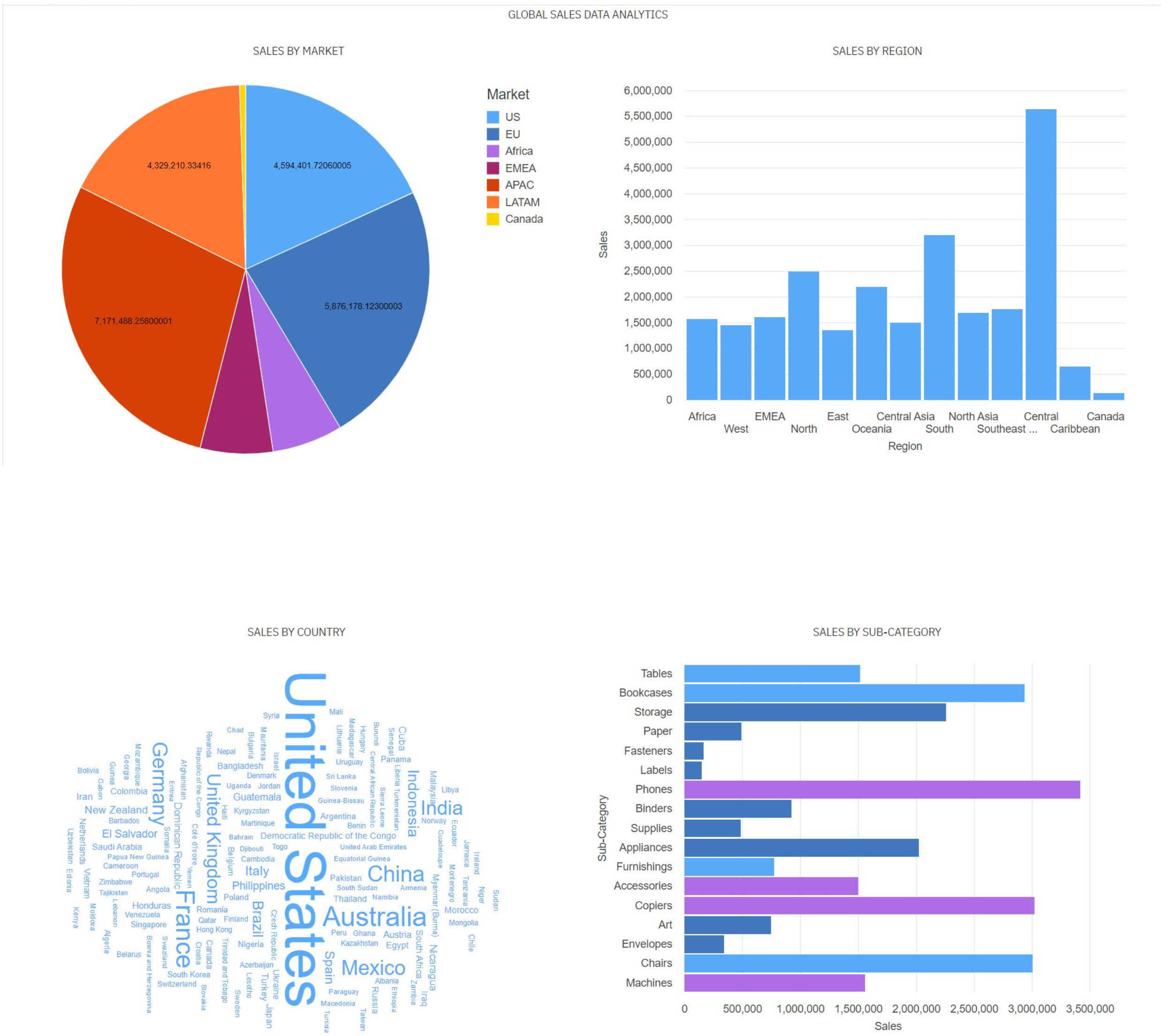
Index.css

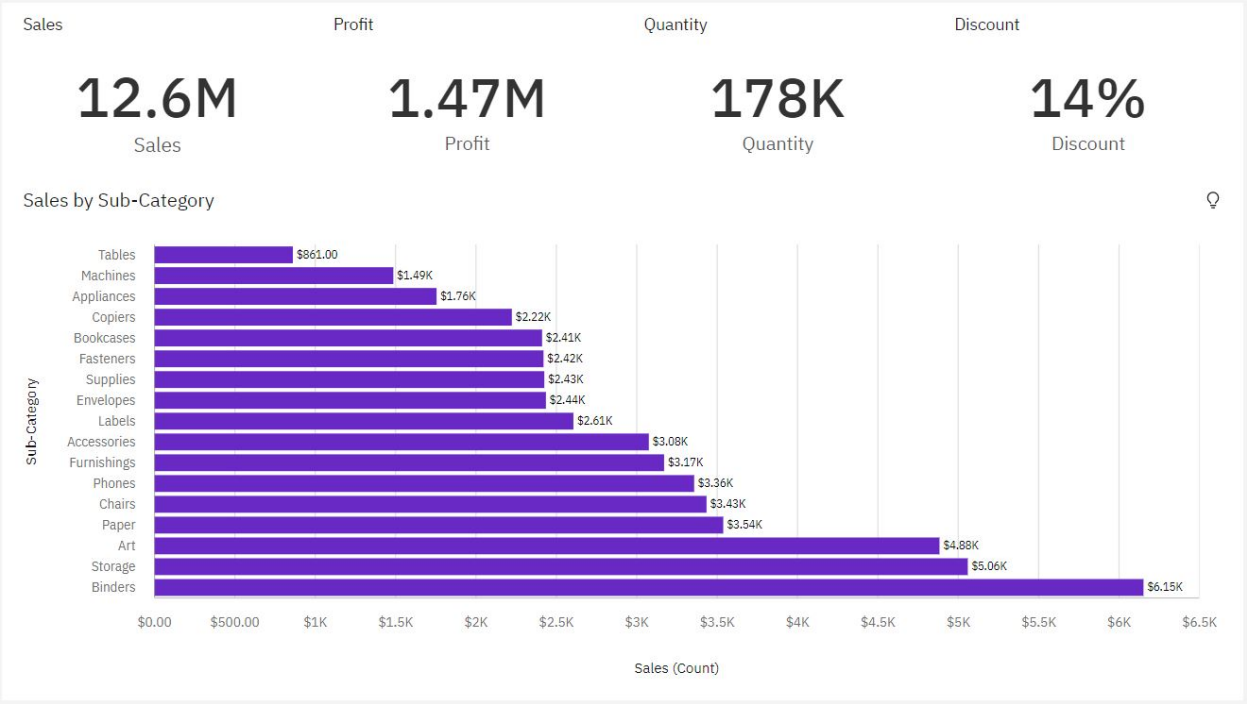
```
.whole-page{
  height:2200px;
  display:grid;
  grid-template-rows: 1fr 10fr;
}
.navbar{
  background-color: rgb(255, 255, 255);
  display: grid;
  grid-template-columns: 4fr 5fr 5fr;
}
.pic{
  background-color: rgb(255, 255, 255);
  display: grid;
  grid-template-rows:1fr 1fr 1fr ;
```

```
}
image{
  width:100%;
}
.one{
  background-color: rgb(255, 255, 255);
  text-align: center;
  margin-top: 30px;
}
.two{
  background-color: rgb(255, 255, 255);
}
.three{
  background-color: rgb(255, 255, 255);
  display:grid;
  grid-template-columns: 1fr 1fr 1fr;
```

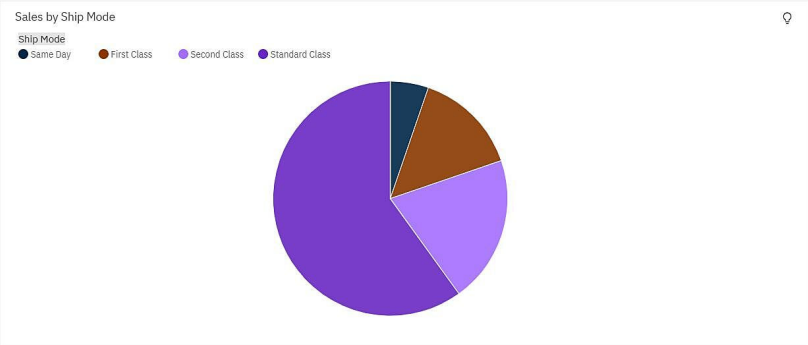
```
  text-align: center;
  margin-top: 30px;
}
p{
  font-family:sans-serif;
  font-size: 25px;
}
a{
  font-family:sans-serif;
  font-size: 25px;
  text-decoration: none;
  color:black;
}
a:hover{
  color:blue;
}
```

OUTPUT :


GLOBAL SALES DATA ANALYTICS
SALES BY MARKET
Market
US
EU
Africa
EMEA
APAC
LATAM
Canada
4,329,210.33416
4,594,401.72060005
5,876,178.12300003
7,171,488.25800001
SALES BY REGION
6,000,000
5,500,000
5,000,000
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
Sales
Africa
West
EMEA
North
East
Oceania
Central Asia
South
North Asia
Southeast ...
Central
Caribbean
Canada
Region
SALES BY COUNTRY
United States
Australia
France
China
India
Germany
United Kingdom
Mexico
Indonesia
Brazil
Italy
Philippines
Spain
Nicaragua
SALES BY SUB-CATEGORY
Tables
Bookcases
Storage
Paper
Fasteners
Labels
Phones
Binders
Supplies
Appliances
Furnishings
Accessories
Copiers
Art
Envelopes
Chairs
Machines
Sub-Category
0
500,000
1,000,000
1,500,000
2,000,000
2,500,000
3,000,000
3,500,000
Sales



Sales by Ship Mode



GITHUB Link : https://github.com/IBM-EPBL/IBM-Project-6494-1658830123

PROJECT DEMO LINK : https://youtu.be/TpzGWMuWdGw