



Agile Report

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Team 3

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Agile Stages

Inception Phase

The inception phase was crucial for our team, as it established a foundation for our project. To ensure progress in the right direction, we addressed the following:

1. **Project Vision:** After understanding the problem statement, we articulated our core objective: optimize delivery operations to 52 retail locations with efficient routes, specific delivery days, and time constraints.
2. **Lightweight Milestone Review:** We briefly summarized our key objectives: minimize travel time and distance, ensure timely deliveries, and increase delivery frequency.
3. **Stakeholder/Client Engagement:** We attended meetings with Rudi's Management to understand their operations, gather input on the problem statement, clarify expectations and constraints, and identify specific stakeholder requirements.
4. **Agile Team Formation:** We defined individual roles and accountabilities for the project's duration.
5. **Product Backlog Creation:** We compiled a task list based on user stories and requirements. Tasks were prioritized considering project goals, stakeholder needs, and user stories.
6. **Task Board:** We chose Trello to log activity, track progress, maintain sprint and product backlogs, and assign roles within the project.
7. **Technology and Tools:** We discussed the technologies we'd use, including Maps API, Python, and Excel.



Construction Phase

During this phase, our main goal was to produce a potentially consumable solution after each sprint. Our Construction Phase consists of 3 sprints.

Sprint 1: Initial Implementation

- **Sprint Planning:** We identified missing or inconsistent store information in the dataset, and discussed the need for data processing.
- **Sprint Goals:** We established clear goals for the sprint, including validating store data, selecting technologies, and researching optimization models for route planning (such as the Traveling Salesman Problem) and Maps API integration.
- **Task Breakdown and Assignment:** We divided, and assigned tasks related to data validation, technology selection for cleaning and validation, optimization model research, and Maps API exploration.
- **Weekly Stand-ups:** We held standups to communicate progress, challenges encountered with data validation, and approaches for achieving optimized delivery routes.
- **Sprint Review:** We evaluated the cleaned dataset and visualized store locations to gain insights.
- **Sprint Retrospective:** We discussed successes, challenges, and action items to improve our process in the next sprint.

Strategic Task Allocation and Integration for Route Optimization

- During Sprints 2 and 3, we executed two parallel strategies: Open Solver Modelling and Python Route Optimization, leveraging dual methodologies to enhance our results.
- We allocated tasks equitably among our team, carefully matching the complexity of assignments with individual members' experience and expertise to maximize efficiency.
- In the latter phase of Sprint 3, we integrated the outputs from both Open Solver and Python, synthesizing the collective effort of our team to optimize and finalize our routing solutions.

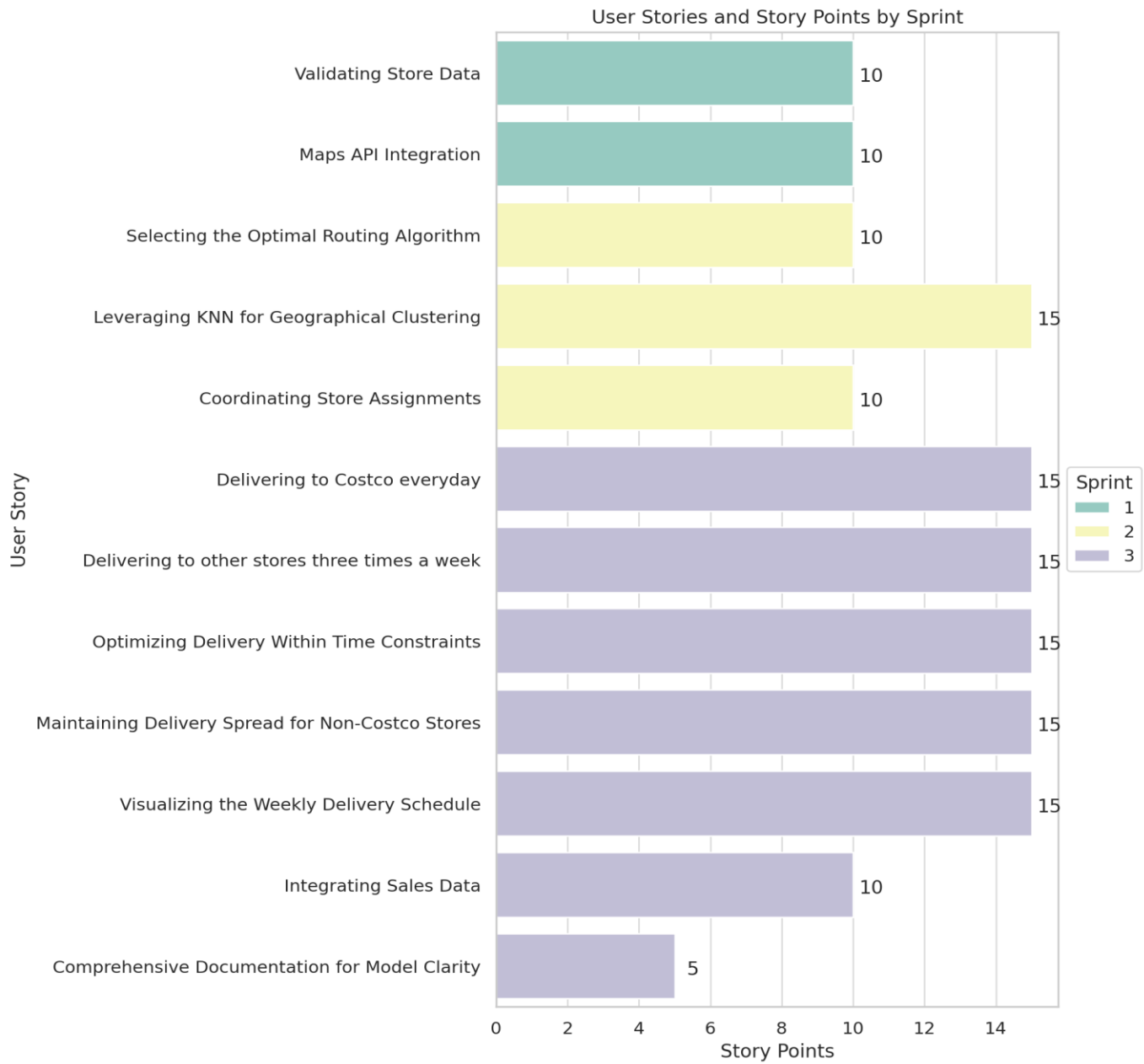
Sprint 2: Segregating Routes, and Developing Distance-Time Matrix

- **Sprint Planning:** Outlined methods for segregating routes to accommodate our two vehicles, and for developing a comprehensive distance-time matrix.
- **Sprint Goals:** To Establish two distinct routes by optimally clustering our 52 store locations, and generate a distance-time matrix encompassing all store-to-store combinations for this mTSP (Multiple Travelling Salesperson Problem).
- **Task Breakdown and Assignment:**
 - **Clustering:** Assigned team members to research clustering algorithms (e.g., KNN, heuristics) for efficient route design.
 - **Matrix Development:** allocated team members to construct the distance-time matrix using Python.
- **Stand-ups:** Conducted regular standups to discuss progress in clustering the stores dataset and creating the distance-time matrix.
- **Sprint Review:** Reviewed the clustering solution and validated the accuracy of the distance-time matrix.
- **Sprint Retrospective:** Brainstormed the integration of Open Solver for route optimization and accommodating the constraints in our model. Discussed the need to create smaller distance-time matrices tailored to each clustered route.

Sprint 3: Finalizing the Optimization Model

- **Sprint Planning:**
 - Focused on integrating clustered routes with designated vehicles, establishing constraints, and developing the optimization model using Open Solver.
 - Discussed on preparing for a transition phase, including documentation efforts.
- **Sprint Goals:** To Incorporate constraints into the model (e.g., consecutive day restrictions, maximizing delivery frequencies, minimizing travel time) using MILP(mixed integer linear programming). and thoroughly document project work (including the Agile report).
- **Task Breakdown and Assignment:**
 - **Optimization Model:** Assigned team members to refine the optimization model, ensuring constraint integration.
 - **Documentation:** Allocated team members to finalize documentation, such as the Agile report.
- **Weekly Standups:**
 - **Sub-routing:** Discussed the issues on sub-routing within model and researched solutions.
 - **Documentation Progress:** Tracked progress on completing the Agile report.
- **Sprint Review:** Thoroughly assessed the finalized model, verifying that it satisfies all constraints and optimizes deliveries.
- **Transition Planning:** Planned for transition phase to present our work to Stakeholders/Client, and to showcase our Agile Report.

Product Backlog & Sprint Backlog

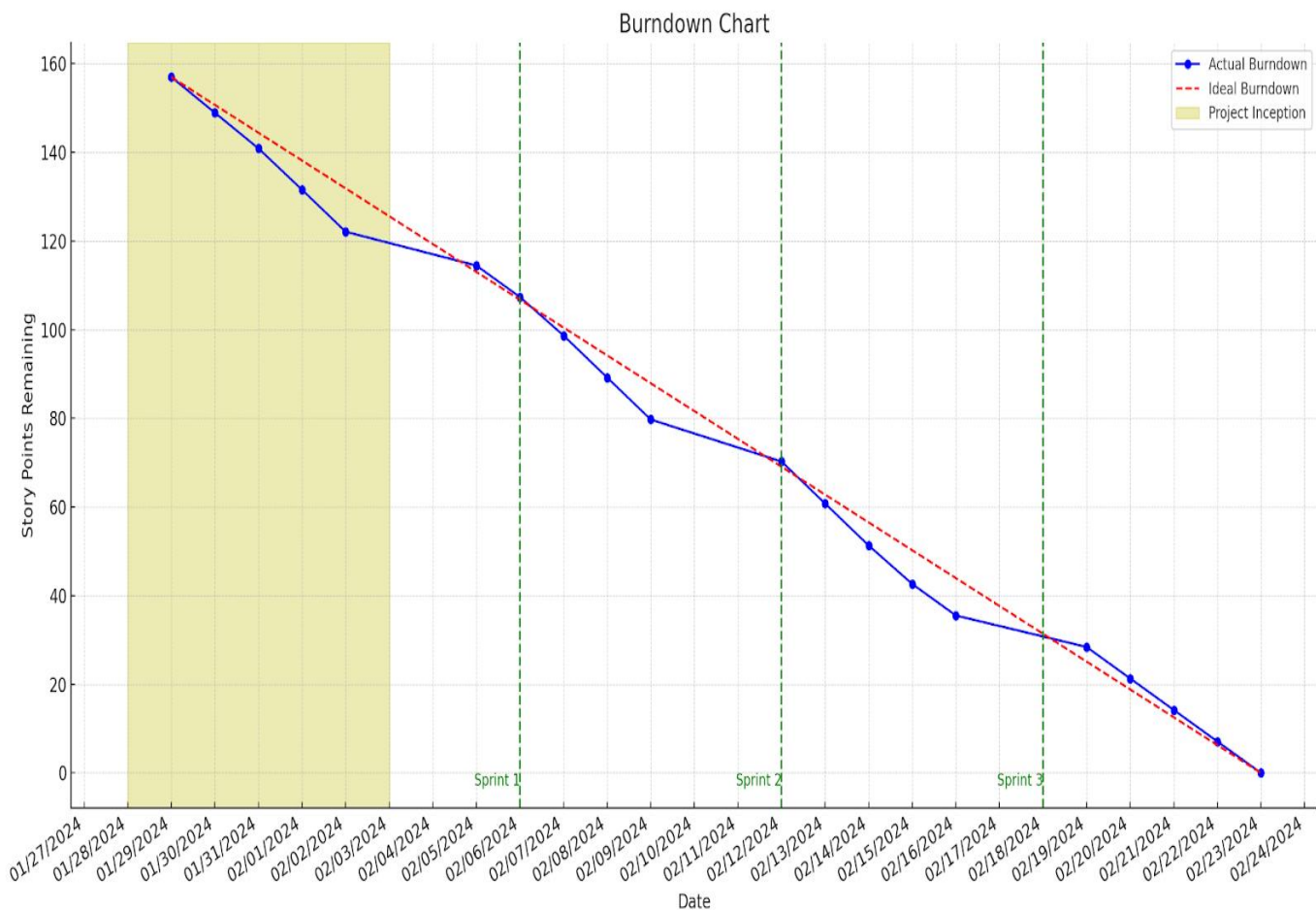


Story ID	User Story	Description	Story Points	Sprint	Status
1	Validating Store Data	As a logistics manager, I need to validate store information in our dataset to ensure accuracy and completeness. This will guarantee reliable data for our delivery routing system.	10	1	Completed
2	Maps API Integration	As a part of development team, I need to explore and integrate Maps API into our system so that we can visualize store locations and calculate optimized delivery routes.	10	1	Completed
3	Selecting the Optimal Routing Algorithm	As a key member of the development team, my responsibility lies in identifying and implementing the most effective routing algorithm that aligns with our unique delivery logistics. This entails a thorough evaluation of various models, considering factors like route efficiency, delivery time windows, and scalability.	10	2	Completed
4	Leveraging KNN for Geographical Clustering	In our approach to enhancing Rudi's delivery operations, we've employed the K-Nearest Neighbours (KNN) algorithm to sequence stores based on their geographical locations and distances from one another. This method allows us to group and sequence stores that are in close proximity to each other, facilitating the creation of more coherent and efficient delivery routes.	15	2	Completed
5	Coordinating Store Assignments	As Rudi's Logistics Manager, it's crucial for me to assign stores to each driver, ensuring that there is no overlap in their routes.	10	2	Completed
6	Delivering to Costco everyday	As a Costco store manager, I expect reliable delivery service five days a week to ensure our shelves are consistently stocked with fresh bread, meeting our customer demand and contributing to higher sales volumes.	15	3	Completed
7	Delivering to other stores three times a week	As a store manager, I want to receive regular deliveries three times a week as per the optimized schedule, ensuring a steady supply of fresh bread to attract	15	3	Completed

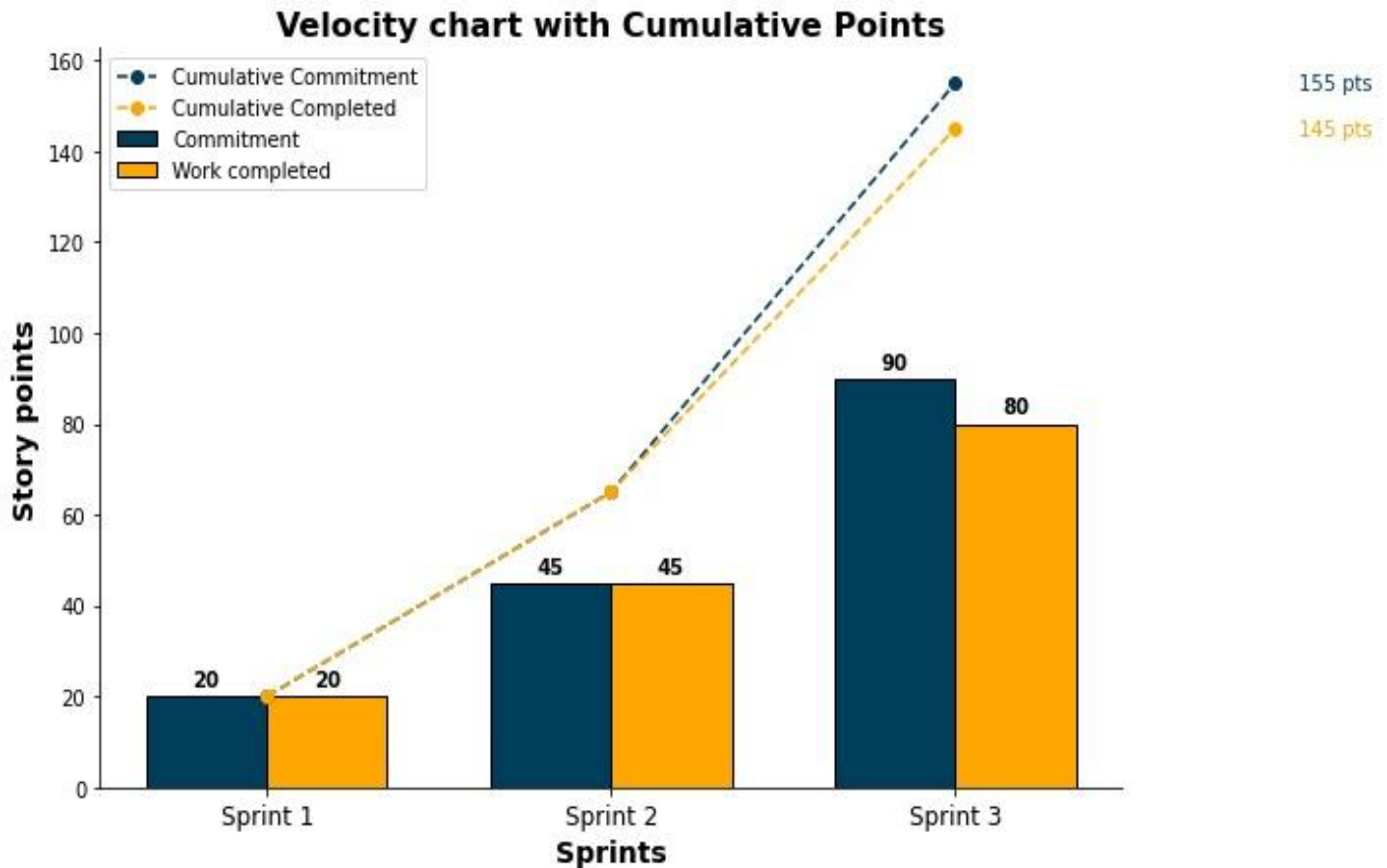
		customers and boost sales, while also managing inventory efficiently to minimize waste.			
8	Optimizing Delivery Within Time Constraints	As the Logistics Manager at Rudi's, ensuring that all routes are meticulously planned to fit within a 9-hour workday is paramount. This precision in scheduling guarantees that our drivers can complete their deliveries within the allotted time, maintaining operational efficiency and adhering to our commitment to timely service.	15	3	Completed
9	Maintaining Delivery Spread for Non-Costco Stores	As Rudi's Logistics Manager, it's essential to ensure that deliveries to non-Costco stores are evenly distributed throughout the week and not clustered on consecutive days.	15	3	Completed
10	Visualizing the Weekly Delivery Schedule	As the Logistics Manager at Rudi's, having a clear and detailed view of the weekly delivery schedule, along with the specific routes assigned to each driver, is instrumental in gaining a comprehensive understanding of our revamped operations.	15	3	Completed
11	Integrating Sales Data	As a logistics manager at Rudi's, I aim to enhance the frequency of deliveries to our retail partners who generate higher revenue for us over the other clients having lower dollar value.	10	3	Incomplete
12	Comprehensive Documentation for Model Clarity	As a member of the development team, I'm committed to ensuring our routing model is not only effective but also transparent and accessible. To achieve this, we have focused on creating documentation that covers every aspect of our model, from the rationale behind using the KNN algorithm for geographical clustering to the step-by-step process of route optimization.	5	3	Completed

Burndown Chart

- **We're Leading the Pace:** Our actual progress is tracking below the ideal burndown line, a testament to our team's efficiency and our ability to tackle tasks swiftly.
- **Sprints 1 and 2:** We successfully navigated complex tasks such as "Data Cleaning" and "Maps API Integration" early on, which proved crucial and boosted our momentum through the initial sprints.
- **Consistent Delivery:** The chart reflects our team's consistent hard work, as we've managed to avoid any standstills or bottlenecks, ensuring a smooth flow of task completion throughout the project.
- **Solid Start from Inception:** We kicked off the project with a productive inception phase, wrapping up foundational tasks that paved the way for the sprints to follow.

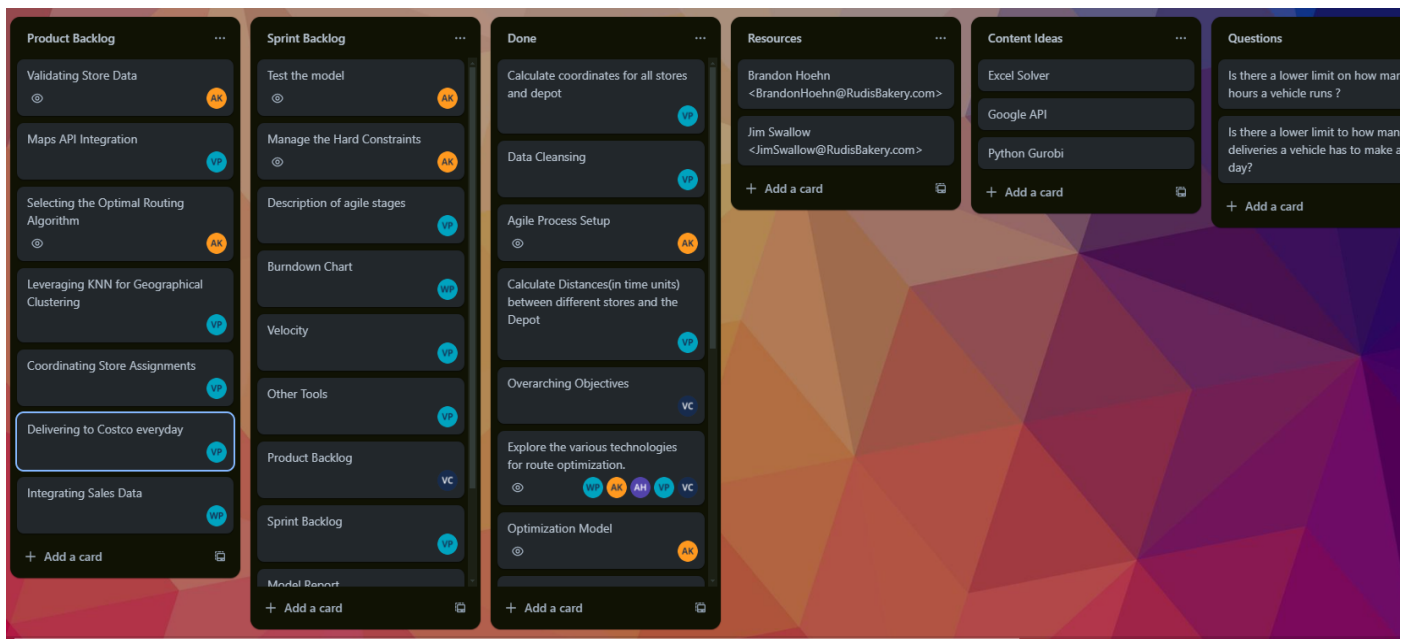
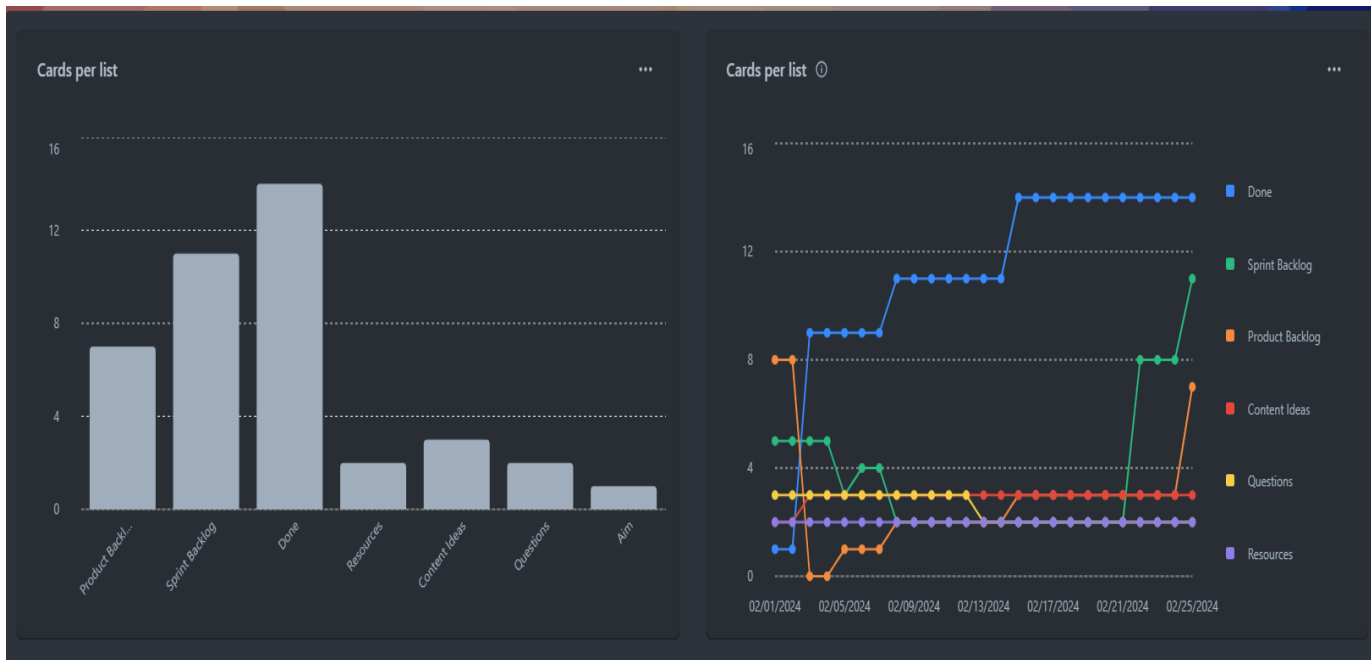


Velocity Chart



- **Increasing Momentum:** Our velocity has increased with each sprint; we delivered 20 story points in Sprint 1, 45 in Sprint 2, and completed 90 in Sprint 3, showing our growing efficiency. (Reason Being most valuable work was completed in Sprint 3, but started initially)
- **Cumulative Success:** The cumulative points indicate that we've not only been meeting our sprint goals but also progressively taking on more work, with a total of 145 points completed by the end of Sprint 3.
- **Sprint 3 Peak:** Sprint 3 stands out as our most productive period so far, where we completed the most work relative to our commitments.
- The 10 story points which we missed out on, were the integration of Sales Data into our Model. We did not have the time to clean the Sales data which was mandatory.

Trello Dashboard



- At the end of the project, all our product backlog items were moved to the sprint backlog, and the 'Done' list. For the sake of this screenshot, we moved some of them back to the Product Backlog