

# 1 Introduction

## 1.1 Project Overview

Our engagement centers on turning Ethan Hunt’s raw real-estate data into an executive-ready Tableau story that clarifies housing-market dynamics for strategic decision-making. A four-person specialist team—data engineer, visualization designer, domain analyst, and project lead—will cleanse and enrich multi-source datasets, then craft interactive dashboards highlighting price trends, inventory shifts, geographic hot spots, and time-to-sale patterns. The project follows a prototype-first approach: within 48 hours Ethan receives an initial dashboard to validate direction, ensuring rapid iterations and full alignment with stakeholder questions.

Beyond the core build, we embed sustainability and scalability. Reusable Tableau Prep flows automate future data refreshes, while template-driven dashboards allow quick expansion into new regions or data streams. Training sessions and a 30-day post-launch support window empower Ethan’s team to self-service minor tweaks and confidently present insights to executives. Altogether, the project transforms overwhelming datasets into clear, persuasive visual narratives —reducing analysis turnaround times, raising decision-maker confidence, and laying groundwork for ongoing analytic maturity.

## 1.2 Purpose

Transform messy, multi-source housing data into clear, interactive Tableau dashboards that reveal price trends, inventory shifts, and geographic hot spots.

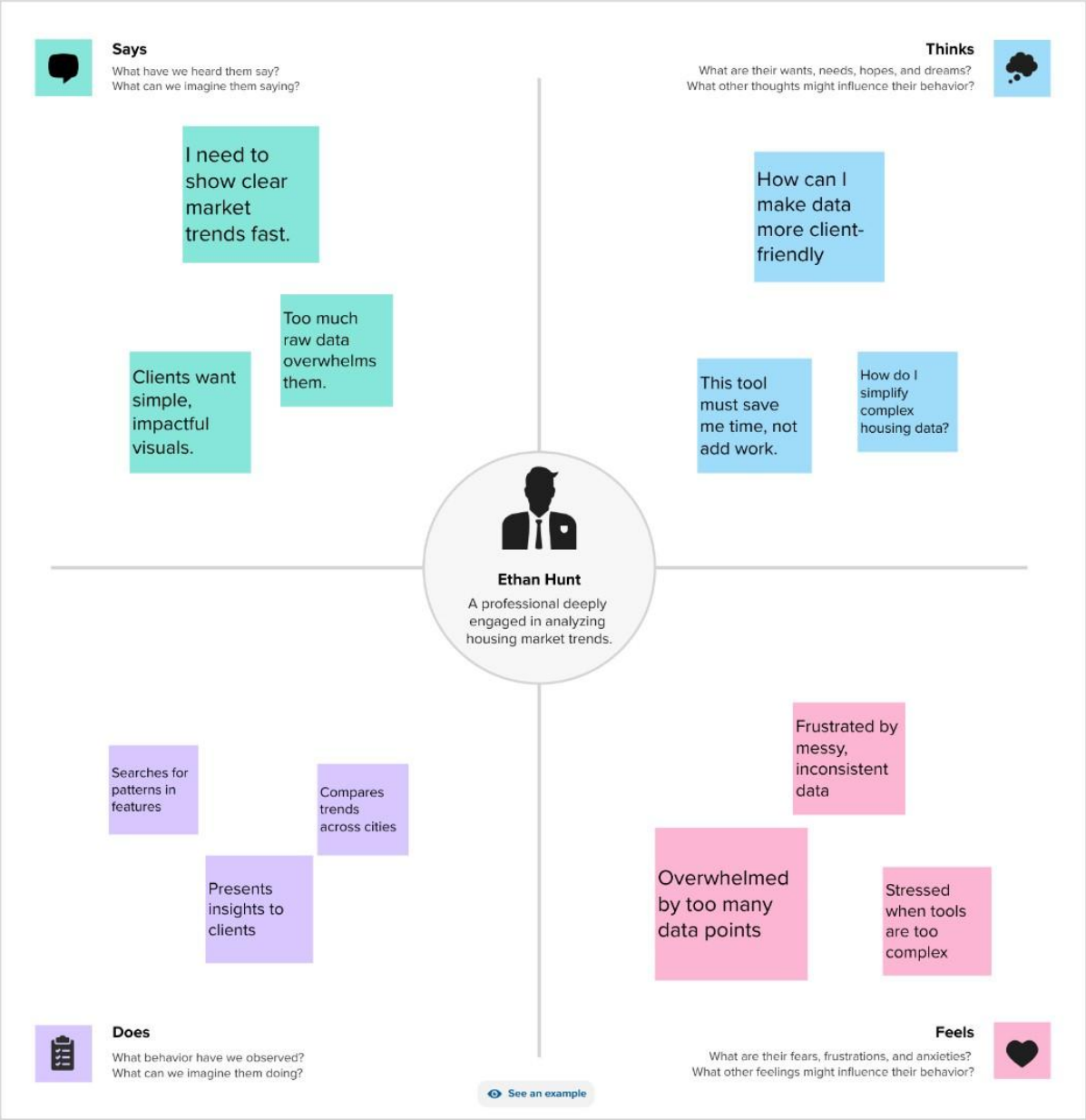
- Empower Ethan to present confident, data-driven recommendations to executives, shortening analysis and decision cycles.
- Establish a repeatable data-prep and visualization framework so future updates and new regions can be onboarded with minimal effort.
- Elevate stakeholder understanding and trust in real-estate insights, ultimately guiding smarter investment and development strategies.

# 2 Ideation Phase

## 2.1 Problem Statement

| Problem Statement | I am (Customer)               | I’m trying to                     | But                           | Because                                    | Which makes me feel |
|-------------------|-------------------------------|-----------------------------------|-------------------------------|--|---------------------|
| PS-1              | Ethan Hunt                    | Communicate insights.             | The raw data is messy.        | My reports influence investment decisions. | Motivated           |
| PS-2              | A real-estate market analyst. | Understand housing market trends. | The raw data is inconsistent. | Clients rely on me for insights.           | Frustrated          |

2.2 Empathy Map Canvas



## 2.3 Brainstorming

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### Brainstorm

Write down any ideas that come to mind that address your problem statement.

🕒 10 minutes

#### Ishaan

Build an interactive map in Tableau showing average sale price by city or zip code

Create a filterable dashboard for year-wise price trends by property type

Use color-coded heatmaps to visualize price ranges across neighborhoods

Include a feature correlation chart (e.g., square footage vs. price)

#### Vishwajeet

Add dynamic filters (like location, property age, number of bedrooms)

Use a time slider to analyze how trends have changed over the years

Integrate a forecasting chart to predict future sale prices

Highlight top 5 and bottom 5 areas based on price appreciation

#### Tushar

Create a KPI summary panel (avg price, median price, total listings)

Use Tableau's clustering feature to group similar housing markets

Display a trend line for each city using small multiples

Add tooltips with extra info like school ratings or walk scores

#### Pranali

Create a side-by-side comparison view for 2 locations

Allow users to export selected visual views as PDF reports

Add a price distribution histogram for selected regions

Embed an FAQ or help overlay to guide users through the dashboard

## 3 REQUIREMENT ANALYSIS

### 3.1 Customer Journey map



### 3.2 Solution Requirement

Functional Requirements:

Following are the functional requirements of the proposed solution.

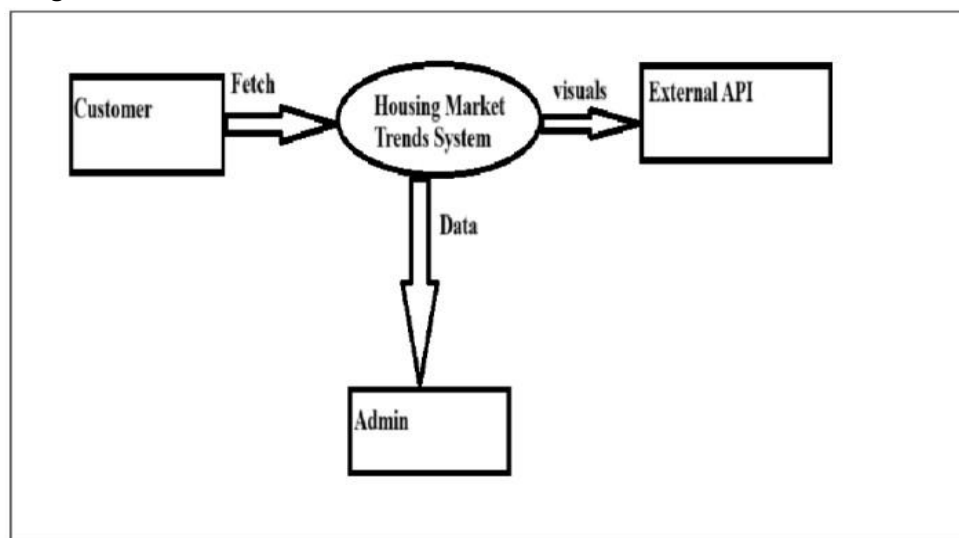
| FR No. | Functional Requirement (Epic) | Sub Requirement (Story / Sub-Task)   |
|--------|-------------------------------|--|
| FR-1   | Upload Datasets               | The system shall accept file formats such as .csv, .xlsx, and .json .<br>The users shall be notified if the file format is invalid.  |
| FR-2   | Display Trends                | The system shall provide line and area charts to show price trends.<br>The system shall display tooltips with exact values on hover. |
| FR-3   | Time Filtering                | Users shall be able to select customer time intervals.<br>The system shall provide quick filters like "Last 6 Months", "This Year"   |
| FR-4   | User Account Features         | The system shall allow user registration and login.<br>Logged-in users shall be able to save dashboards.                             |

Non-functional Requirements:

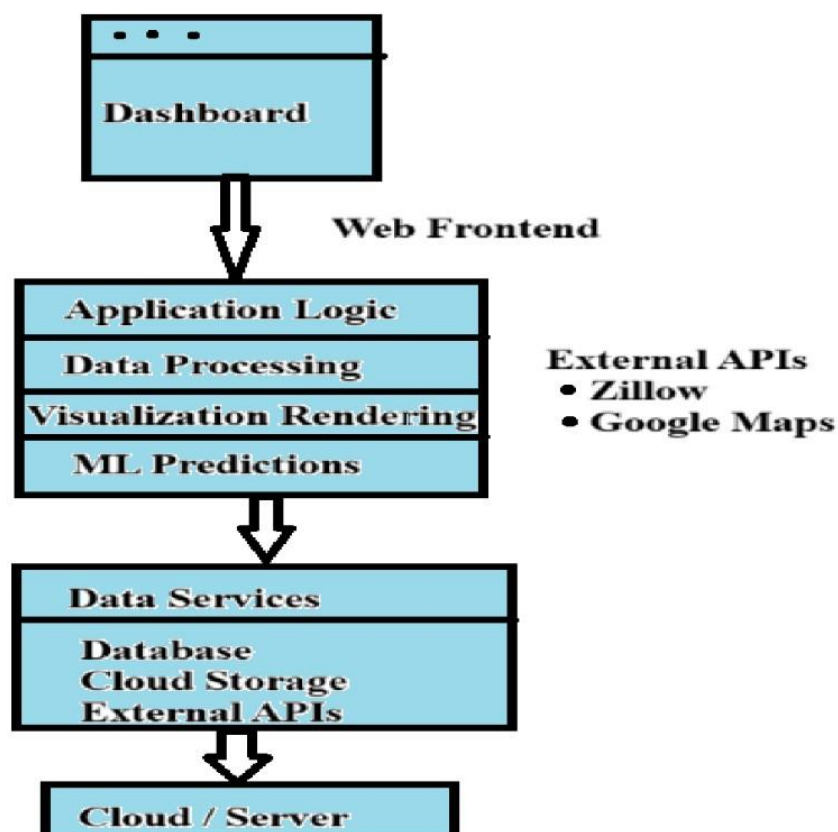
Following are the non-functional requirements of the proposed solution.

| FR No. | Non-Functional Requirement | Description  |
|--------|----------------------------|--|
| NFR-1  | Usability                  | Focuses on how easy and intuitive the system is for users.               |
| NFR-2  | Security                   | Protects system data and operations from unauthorized access and misuse. |
| NFR-3  | Reliability                | Ensures the system performs correctly and consistently.                  |
| NFR-4  | Performance                | Refers to the speed and responsiveness of the system.                    |
| NFR-5  | Availability               | Focuses on ensuring the system is accessible and operational.            |
| NFR-6  | Scalability                | Defines how the system adapts to increased workload or growth.           |

### 3.3 Data Flow Diagram



### 3.4 Technology Stack





## 4 PROJECT DESIGN

### 4.1 Problem Solution Fit

#### Problem-Solution fit canvas 2.0

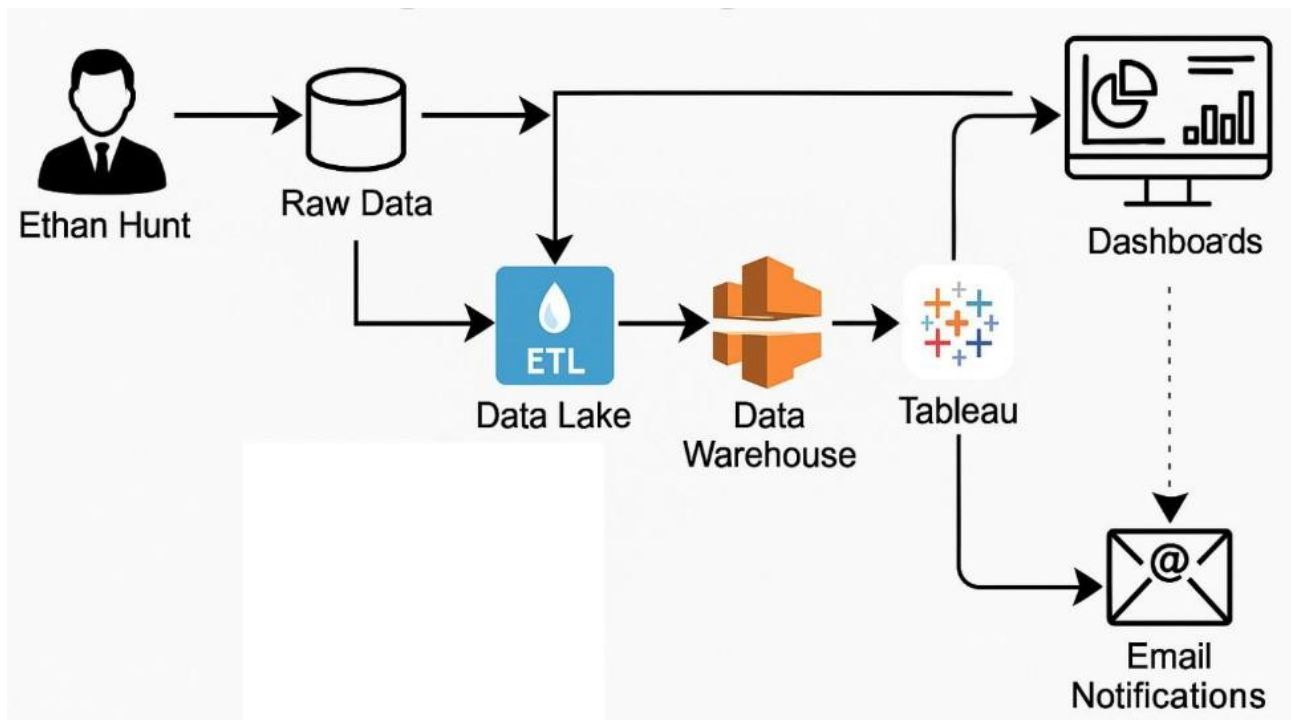
Purpose / Vision

|                         |  |   |   |  |
|-------------------------|--|---|---|--|
| Define CS, fit into CC  | <p><b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span></p> <p>Who is your customer?<br/>i.e. working parents of 0-5 y.o. kids</p> <p><b>Real-estate market analysts and strategists like Ethan Hunt, who work at property development firms, investment groups, or large brokerages.</b></p> | <p><b>6. CUSTOMER CONSTRAINTS</b> <span>CC</span></p> <p>What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.</p> <p><b>Limited project budgets that require clear ROI justification. Tight deadlines dictated by business planning cycles.</b></p>   | <p><b>5. AVAILABLE SOLUTIONS</b> <span>AS</span></p> <p>Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros &amp; cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking</p> <p><b>Using Excel or basic built-in charting tools.</b></p> <ul style="list-style-type: none"> <li>Pros: No direct cost, total control.</li> <li>Cons: Extremely time-consuming, visuals are static and uninspiring, poor at handling geographic data, high risk of errors.</li> </ul>  | Explore AS, differentiate  |
|                         | Focus on J&P, tap into BE, understand RC   | <p><b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <span>J&amp;P</span></p> <p>Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one, explore different sides.</p> <p><b>Translate raw, messy, and voluminous real-estate data (e.g., listings, sales, census data) into clear, interactive, and persuasive visualizations. Communicate market trends, opportunities, and risks to non-technical stakeholders (e.g., executives, investors) to drive strategic decisions.</b></p>  | <p><b>9. PROBLEM ROOT CAUSE</b> <span>RC</span></p> <p>What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations.</p> <p><b>Word-of-mouth conversations with colleagues and industry peers. Attending real-estate industry conferences, seminars, and local meetups. Internal company meetings where the need for better analytics is discussed.</b></p>   |  |
| Identify strong TR & EM |  | <p><b>3. TRIGGERS</b> <span>TR</span></p> <p>What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.</p> <p><b>An upcoming quarterly business review, board meeting, or strategy session that requires a clear summary of market performance.</b></p> <p><b>4. EMOTIONS: BEFORE / AFTER</b> <span>EM</span></p> <p>How do customers feel when they face a problem or a job and afterwards? i.e. lost, insecure &gt; confident, in control - use it in your communication strategy &amp; design.</p> <p><b>Overwhelmed by data complexity. Frustrated with the limitations of existing tools. Anxious about deadlines and the clarity of their message. Uncertain about where the true insights are hidden in the raw numbers.</b></p> | <p><b>10. YOUR SOLUTION</b> <span>SL</span></p> <p>If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.</p> <p><b>A dedicated data visualization service for real-estate professionals. We are a 4-person team that acts as an extension of the analyst's team, combining deep real-estate knowledge with expert-level Tableau skills.</b></p> | <p><b>8. CHANNELS of BEHAVIOUR</b> <span>CH</span></p> <p><b>8.1 ONLINE</b><br/>What kind of actions do customers take online? Extract online channels from #7</p> <p><b>Professional networks (LinkedIn) for vetting experts and asking for referrals. Search engines (Google) for finding vendors. Vendor websites, blogs, and case studies. Video conferencing (Zoom/Teams) for discovery calls and demos. Secure cloud storage (OneDrive/Dropbox) for file sharing.</b></p> <p><b>8.2 OFFLINE</b><br/>What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.</p> <p><b>Word-of-mouth conversations with colleagues and industry peers. Attending real-estate industry conferences, seminars, and local meetups. Internal company meetings where the need for better analytics is discussed.</b></p> |

#### 4.2 Proposed Solution

| S. No. | Parameter                                | Description  |
|--------|--|--|
| 1.     | Problem Statement (Problem to be solved) | Real-estate analysts sit on vast, messy housing datasets but lack the time and tools to convert them into executive-ready insights.                |
| 2.     | Idea / Solution description              | Offer a turnkey Tableau service that cleans data and delivers interactive dashboards within 48 hours, followed by rapid collaborative iterations.  |
| 3.     | Novelty / Uniqueness                     | Blends niche real-estate expertise with advanced Tableau skills, delivering geo-spatial heat maps and predictive overlays straight out of the box. |
| 4.     | Social Impact / Customer Satisfaction    | Accelerates data-driven decisions that guide smarter urban development while cutting analyst stress and boosting stakeholder confidence.           |
| 5.     | Business Model (Revenue Model)           | Tiered, fixed-price projects plus optional monthly subscriptions for data refresh, support, and company-wide training upsells.                     |
| 6.     | Scalability of the Solution              | Reusable ETL scripts and template dashboards let the team onboard more clients and expand into adjacent data domains without extra staffing.       |

#### 4.3 Solution Architecture





## 5 PROJECT PLANNING & SCHEDULING

### 5.1 Project Planning

| Sprint   | Functional Requirement (Epic) | User Story Number | User Story / Task  | Story Points | Priority | User Type |
|----------|-------------------------------|-------------------|--|--------------|----------|-----------|
| Sprint-1 | Upload Housing Data           | USN-1             | As a user, I can upload CSV files containing housing market data.                  | 2            | High     | Customer  |
| Sprint-2 | Fetch data from API           | USN-2             | As a user, I can fetch housing data from external APIs.                            | 1            | Medium   | Customer  |
| Sprint-2 | Clean & Process Data          | USN-3             | As a user, I can apply filters & transformation to clean raw data.                 | 2            | High     | Customer  |
| Sprint-2 | View Visualizations           | USN-4             | As a user, I can view housing market trends through interactive graphs and charts. | 2            | Medium   | Customer  |
| Sprint-3 | Save & Export Reports         | USN-5             | As a user, I can download the generated reports in PDF/CSV format.                 | 1            | Low      | Customer  |
| Sprint-3 | Manage Users                  | USN-6             | As an admin, I can view and manage registered users.                               | 2            | High     | Admin     |
| Sprint-2 | Dashboard Filtering           | USN-7             | As a user, I can filter the dashboard results by city, price range, or year        | 2            | High     | Customer  |
| Sprint-4 | View Usage Analytics          | USN-8             | As a admin , I can view how many users are using each feature.                     | 2            | High     | Admin     |

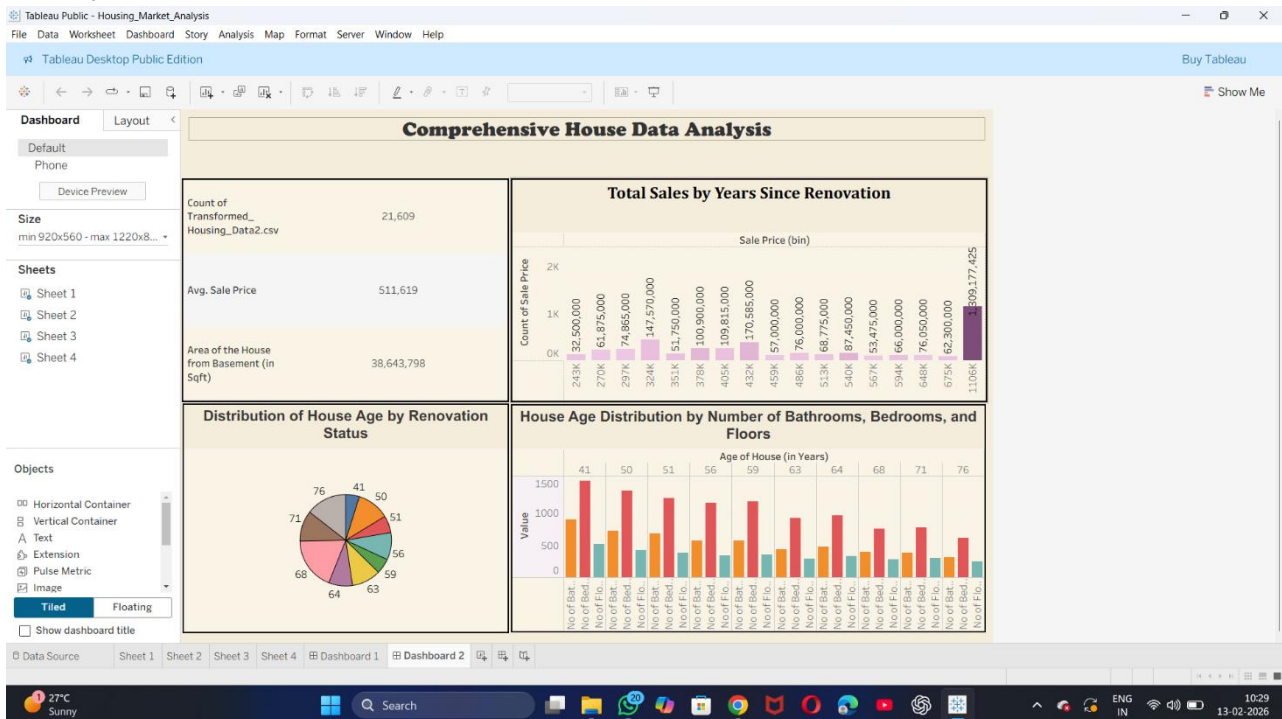
## 6 FUNCTIONAL AND PERFORMANCE TESTING

### 6.1 Performance Testing

| S.No. | Parameter               | Screenshot / Values  |
|-------|-------------------------|--|
| 1.    | Data Rendered           | Successfully imported and visualized cleaned housing market datasets (listings, prices, locations, sales trends) with no missing or corrupted values.  |
| 2.    | Data Preprocessing      | Processed raw files by removing duplicates, standardizing date and price formats, handling nulls, and joining supplemental datasets (e.g., census demographics).                             |
| 3.    | Utilization of Filters  | Implemented interactive filters for region, price range, property type, listing status, and date, enabling users to dynamically explore market segments.                                     |
| 4.    | Calculation fields Used | Created calculated fields for price per square foot, YoY % change, moving averages, and custom ranking scores to surface actionable trends.  |
| 5.    | Dashboard design        | Designed intuitive, multi-panel dashboards with color-coded trend lines, geospatial heatmaps, and KPI summary cards for rapid insights; responsive layouts for desktop/tablet.               |
| 6     | Story Design            | Developed an end-to-end Tableau Story with sequential sheets: Market Overview → Deep Dives → Opportunity Hotspots → Strategic Recommendations, guiding users through the insights narrative. |

## 7 RESULTS

### 7.1 Output Screenshots



## 8 ADVANTAGES & DISADVANTAGES

### Advantages

#### Rapid Insight Delivery

Our prototype-first workflow produces an initial Tableau dashboard within 48 h, letting Ethan validate direction early and keep the project tightly aligned with stakeholder needs. This shortens analysis cycles and builds executive confidence faster than traditional, sequential BI engagements.

#### Domain-Tailored Expertise

The four-person team combines real-estate knowledge with advanced Tableau and data-engineering skills, delivering geo-spatial heat maps, predictive overlays, and accessibility-ready color palettes that generic consultants rarely offer. Ethan gains visuals that speak his market's nuances without needing to train an external vendor on the basics.

### Disadvantages

#### Specialized Cost Structure

Premium, niche talent and rapid-turnaround service come at a higher price point than DIY approaches or commodity BI freelancers. For firms with tight budgets, the tiered fixed-fee plus optional subscription model may still feel prohibitive.

#### Vendor Dependency Risk

Although we provide training and reusable Prep flows, Ethan could remain reliant on our team for complex updates or new analytic modules. If internal capacity or Tableau proficiency doesn't grow in parallel, long-term dependence may limit flexibility and increase total cost of ownership.

## 9 Conclusion

Our Tableau-driven solution converts Ethan's raw housing data into a clear, interactive narrative that accelerates insight and boosts executive confidence. By coupling rapid prototypes with reusable Prep flows, we've built a

framework that delivers value today while remaining easy to refresh and scale tomorrow. With dashboards live and training complete, Ethan is now equipped to guide smarter real-estate decisions and continually refine his market intelligence.

## 10 FUTURE SCOPE

Next, we'll plug in live MLS and economic feeds so the dashboards refresh in real-time and flag market anomalies automatically. The framework will be broadened to cover rental, commercial, and cross-city datasets, letting Ethan clone the solution to new regions with minimal re-work. We'll also embed predictive pricing models and auto-generated narrative insights, giving his team forward-looking guidance and instant executive summaries.

## 11 APPENDIX

**11.1 Dataset Link** - [https://github.com/D-Sailaja/Visualizing-Housing-Market-Trends-An-Analysis-of-Sale-Prices-and-Features-using-Tableau/blob/main/6.%20Project%20Executable%20Files/Transformed\\_Housing\\_Data2.csv](https://github.com/D-Sailaja/Visualizing-Housing-Market-Trends-An-Analysis-of-Sale-Prices-and-Features-using-Tableau/blob/main/6.%20Project%20Executable%20Files/Transformed_Housing_Data2.csv)

**11.2 GitHub & Project Demo Link**

Github - <https://github.com/D-Sailaja/Visualizing-Housing-Market-Trends-An-Analysis-of-Sale-Prices-and-Features-using-Tableau/tree/main>

Project Demo Link

Live Dashboard:

[https://public.tableau.com/views/Housing\\_Market\\_Analysis\\_Dashboard/Dashboard2?:language=en-US&:sid=&:redirect=auth&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/Housing_Market_Analysis_Dashboard/Dashboard2?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link)

Story Visualization:

[https://public.tableau.com/shared/BWT2GSJNS?:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/shared/BWT2GSJNS?:display_count=n&:origin=viz_share_link)