Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau

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PROJECT NAME	Visualizing Housing market Trends: An Analysis of Sale prices and Features Using Tableau
MAXIMUM MARKS	4 MARKS

4.3 Solution Architecture

Visualizing housing market trends in Tableau involves a robust solution architecture comprising data ingestion (CSV/SQL), cleaning (Python/Pandas or Tableau Prep), and interactive dashboard creation to analyse price drivers like location, square footage, and amenities. This approach delivers actionable insights, enabling stakeholders to explore trends, filter by, property features, and forecast market movements.

Solution Architecture for Housing Data Analysis

- **Data Sources:** Raw data typically includes listing price, sale price, square footage, location (zip code/district), number of bedrooms/bathrooms, and, for example, pool availability.
- **Data Processing (ETL):** Missing values and inconsistencies are handled using Python, Excel, or Tableau Prep to ensure data quality before analysis.
- **Data Analysis & Modelling:** Exploratory Data Analysis (EDA) identifies correlations between features and price. Advanced analysis may include linear regression or machine learning models (e.g., Random Forest) to predict future prices.
- **Visualization (Tableau):**
- **Interactive Dashboards:** Create comprehensive views with filters for location, size, and price.
- **Geographic Mapping:** Visualize price variations by district or suburb.
- **Trend Analysis:** Use line charts to track price changes over time.
- **Feature Comparison:** Use bar charts and scatter plots to compare features like, for example, number of bathrooms and, for example, house age.

- **Insights Generation:** Identify key market drivers, such as location and size, to help buyers or agents make informed decisions.

Key Features of the Tableau Solution

- **Real-time Interaction:** Users can filter data on-the-fly to find comparable homes, as shown in this example.
- **Dynamic Dashboards:** Combine multiple views to show, for example, price trends alongside property features, like, for example, in this Scribd report.
- **Predictive Analytics:** Incorporate forecasting to determine, for example, the best time to buy or sell.

Architecture Overview

The solution follows a **3-layer architecture**:

1. **Data Layer** – Data collection & storage
2. **Processing Layer** – Data cleaning & analysis
3. **Visualization Layer** – Interactive dashboards

Built primarily using:

- Tableau Desktop
- Optional publishing via Tableau Public

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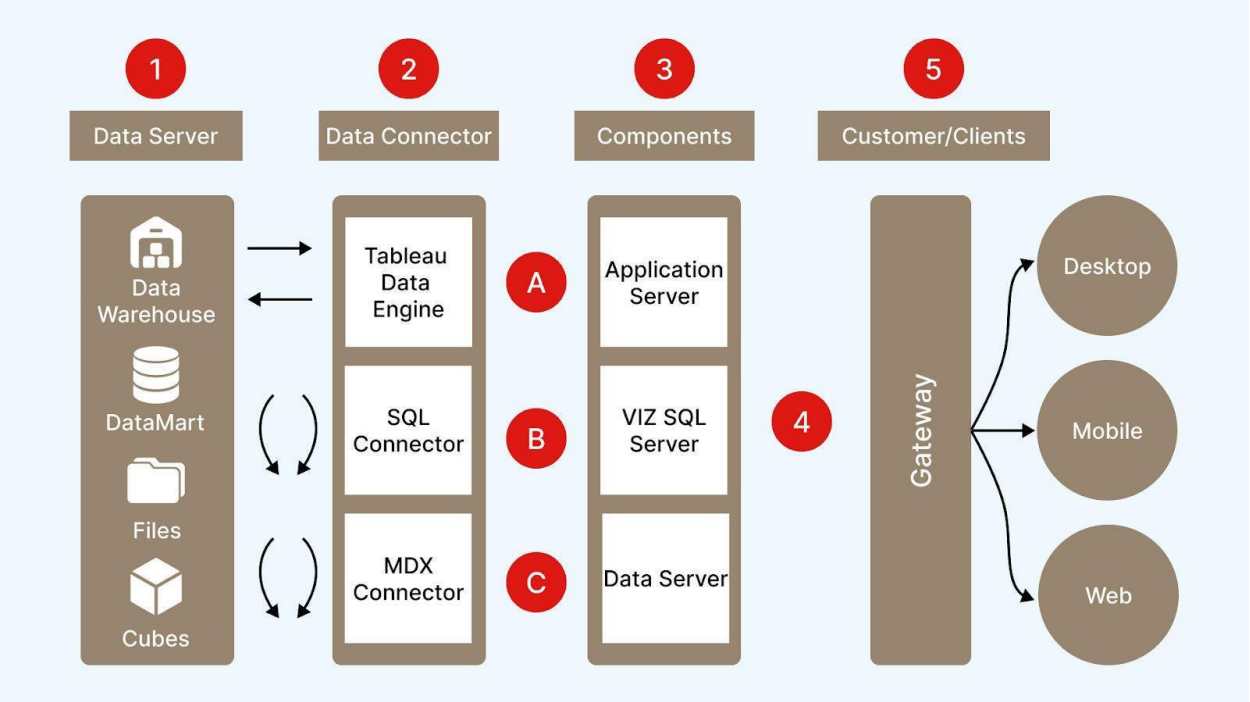

Data Layer (Input Layer)

Data Sources

- Excel (.xlsx) files
- CSV datasets
- Real estate transaction records

Data Elements

- Sale Price
- Sale Date
- Bedrooms
- Bathrooms
- Square Footage
- Property Type
- Location / Neighbourhood

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Responsibilities

- Store raw housing data
- Provide structured input to Tableau

Data Processing Layer (Business Logic Layer)

This layer handles transformation and analysis.

Key Processes

- Data cleaning
- Missing value handling
- Duplicate removal
- Date formatting
- Creating calculated fields:
  - Price per Sq. Ft
  - Yearly Growth Rate of ROI metrics

Analytical Features

- Aggregations (AVG, SUM, MEDIAN)
- Trend analysis
- Correlation analysis
- Forecasting (optional)

This logic is handled inside Tableau's data engine.

Visualization Layer (Presentation Layer)

This layer presents processed data through dashboards.

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Dashboards Included

A. Market Overview

- KPI indicators
- Price trend line
- Sales count
- Geographic map

B. Feature Analysis

- Scatter plots
- Bar charts
- Comparative feature charts

C. Location & Investment Insights

- Neighbourhood comparison
- Growth trends
- ROI charts

Interactive Features

- Filters (Year, Location, Property Type)
- Drill-down analysis
- Parameter controls

Deployment Architecture

Option 1: Local Deployment

- Tableau Desktop for development
- Dashboard shared as packaged workbook (.tab)

Option 2: Cloud Publishing

- Publish on Tableau Public

- Accessible via web browser
- Embedded in reports or presentations

Security & Data Considerations

- Use anonymized datasets
- Validate calculations
- Ensure data accuracy
- Maintain version control of dashboards

Benefits of This Architecture

- Simple and scalable
- Clear separation of data and visualization
- Easy to maintain
- Interactive and user-friendly
- Suitable for academic and professional use

Example

The proposed solution architecture follows a three-layer structure consisting of the Data Layer, Processing Layer, and Visualization Layer. Raw housing data is imported from Excel or CSV files into Tableau, where it undergoes cleaning and transformation.