

# U.S. Real Estate?

Explore 3 years (2023,2024,2025) of U.S. real estate in Chicago, Houston, Los Angeles , Miami , New York ,its challenges, and strategic future actions. This presentation highlights critical market insights paired with a sleek gold and black theme for a premium feel.



# Agenda

1

## Introduction

Project overview and objectives.

2

## Technical Steps

How we built the solution (Azure Database to Dashboard).

3

## Insights Gained

Key findings from the data.

4

## Recommendations

Actions based on the insights.

5

## Conclusion

Summary and next steps.



# Technical Steps

## Creating an Azure SQL Database

Action: Provisioned an Azure SQL Database to host real estate data.

Why Azure?: Scalability, security, and integration with Power BI.

## Importing Data

Action: Imported datasets (properties, visits, sales, agents, etc.) into the SQL database.





# Introduction

## Objective

Improve understanding of real estate performance.

Leverage data to support business decisions.

## Scope

Track property sales, visits, and performance metrics.

## Tools We Use :

- Microsoft Azure → Secure cloud storage and scalable analytics.
- SQL → SQL Server
- Python & Machine Learning → Pandas , Plotly , Seaborn , Matplotlib , scikit learn
- Power BI → Visualize insights for decision-making.

## Key Metrics We Track:

 Property Analytics: Market trends, pricing, and inventory.

 Sales Performance: Deals closed, revenue, and growth.

 Agent & Client Engagement: Agent productivity and client interactions.

 Location-Based Insights: Neighborhood demand and investment hotspots.

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Home - Microsoft Azure

portalazure.com/#home

Microsoft Azure


Upgrade


Search resources, services, and docs (G+)


Copilot


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DEFAULT DIRECTORY (OLOOM20...


### Azure services


  
Create a resource


  
Analysis Services


  
Users


  
SQL servers


  
SQL databases

  
Storage accounts

  
All resources

  
Billing access control (IAM)







  
Resource groups

  
More services

### Resources

Recent

Favorite

| Name  | Type           | Last Viewed  |
|---|----------------|--------------|
|  realestateteam4                               | SQL server     | 13 hours ago |
|  Realestate_db (realestateteam4/Realestate_db) | SQL database   | a day ago    |
|  Azure subscription 1                          | Subscription   | a day ago    |
|  RealEstate-Team4                              | Resource group | 7 days ago   |
|  rg-ecommerce-Team4                            | Resource group | 7 days ago   |
|  Database                                      | Resource group | 4 weeks ago  |

See all

portal azure - Search

SQL servers - Microsoft Azure

portal.azure.com/#browse/Microsoft.Sql%2Fservers

Microsoft Azure

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Home >

SQL servers

Default Directory (oloom2006outlook.onmicrosoft.com)

Create

Manage view

Refresh

Export to CSV

Open query

Assign tags

Group by none

You are viewing a new version of Browse experience. Some features may be missing. Click here to access the old experience.

Filter for any field...


Subscription equals all

Resource Group equals all

Type equals all

Location equals all

Add filter

| <input type="checkbox"/> | Name ↑  | Status | Resource Group | Location         | Subscription |                      |
|--------------------------|---|--------|----------------|------------------|--------------|----------------------|
| <input type="checkbox"/> |  realestateteam4 | ...    | Available      | RealEstate-Team4 | UAE North    | Azure subscription 1 |

Showing 1 - 1 of 1. Display count: 10

Give feedback



portal azure - Search

realestateteam4 - Microsoft Az...

portal.azure.com/#@oloom2006outlook.onmicrosoft.com/resource/subscriptions/51092add-31ea-4e2f-bce...

Microsoft Azure Upgrade Search resources, services, and docs (G+/) Copilot oloom2006@outlook.co... DEFAULT DIRECTORY (OLOOM20...

Home > SQL servers >

realestateteam4

SQL server

Search

Overview

Activity log

Access control (IAM)

Tags

Quick start

Diagnose and solve problems

Resource visualizer

Settings

Microsoft Entra ID

SQL databases

SQL elastic pools

Properties

Locks

Data management

Add or remove favorites by pressing Ctrl+Shift+F

Create database New elastic pool New dedicated SQL pool (formerly SQL DW) Import database Reset password Move Delete

Essentials

Resource group (move) : [RealEstate-Team4](#)

Status : Available

Location : UAE North

Subscription (move) : [Azure subscription 1](#)

Subscription ID : 51092add-31ea-4e2f-bce8-1735ec378110

Tags (edit) : [Add tags](#)

Server admin : Team4

Networking : [Show networking settings](#)

Microsoft Entra admin : [oloom2006\\_outlook.com#EXT#@oloom2006outlook...](#)

Server name : realestateteam4.database.windows.net

Notifications (0)

Features (6)

All Security (4) Performance (1) Recovery (1)

Microsoft Entra admin

Allows you to centrally manage identity and access to your Azure SQL databases.

CONFIGURED

Microsoft Defender for SQL

Vulnerability Assessment and Advanced Threat Protection.

NOT CONFIGURED

Automatic tuning

Monitors and tunes your database automatically to

Auditing

Track database events and writes them to an audit



portal azure - Search x realestatetteam4 - Microsoft Az x +

portal.azure.com/#@oloom2006outlook.onmicrosoft.com/resource/subscriptions/51092add-31ea-4e2f-bce...

Microsoft Azure Upgrade Search resources, services, and docs (G+/) Copilot oloom2006@outlook.co... DEFAULT DIRECTORY (OLOOM20...

Home > SQL servers >

realestatetteam4 SQL server

Search

+ Create database + New elastic pool + New dedicated SQL pool (formerly SQL DW) Import database Reset password Move Delete

Overview

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Server name : realestatetteam4.database.windows.net

JSON View

Notifications (0) Features (6)

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Track database events and writes them to an audit

# SQL Features:

The screenshot displays the Microsoft Azure portal interface. The top navigation bar includes the 'Microsoft Azure' logo, an 'Upgrade' button, a search bar, and a 'Copilot' button. The user's email 'oloom2006@outlook.co...' is visible in the top right corner.

The main content area is titled 'SQL servers' and shows the configuration for a specific server named 'realestateteam4'. The server is listed in a table on the left with columns for Name, Type, Status, and Pricing tier. The configuration details for the server are shown on the right, including options for Microsoft Entra admin, Microsoft Defender for SQL, Automatic tuning, and Auditing. The status of each feature is indicated as either 'CONFIGURED' or 'NOT CONFIGURED'.

**SQL servers**  
Default Directory (oloom2006outlook.onmicrosoft...)

**realestateteam4**  
SQL server

**Microsoft Entra admin**  
Allows you to centrally manage identity and access to your Azure SQL databases.  
**CONFIGURED**

**Microsoft Defender for SQL**  
Vulnerability Assessment and Advanced Threat Protection.  
**NOT CONFIGURED**

**Automatic tuning**  
Monitors and tunes your database automatically to optimize performance.  
**CONFIGURED**

**Auditing**  
Track database events and writes them to an audit log in Azure storage.  
**NOT CONFIGURED**

Available resources

Filter by name:  All types:

1 database

| Name          | Type         | Status | Pricing tier                              |
|---------------|--------------|--------|---|
| Realestate_db | SQL database | Online | Free - General Purpose - Serverless: S... |

portal azure - Search

SQL databases - Microsoft Azure

portal.azure.com/#browse/Microsoft.Sql%2Fservers%2Fdatabases

Microsoft Azure

Upgrade

Search resources, services, and docs (G+)

Copilot

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Home

SQL databases

Default Directory (oloom2006outlook.onmicrosoft.com)

Create

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You are viewing a new version of Browse experience. Some features may be missing. Click here to access the old experience.

Filter for any field...

Subscription equals all

Resource Group equals all

Type equals all

Location equals all

Add filter

| <input type="checkbox"/> | Name ↑   | Server          | Replica type | Pricing tier                 | Location  | Subscription                         |
|--------------------------|--|-----------------|--------------|------------------------------|-----------|--------------------------------------|
| <input type="checkbox"/> | Realestate_db (realestateteam4/Realestate_...) | realestateteam4 | --           | Free General Purpose: Ser... | UAE North | <a href="#">Azure subscription 1</a> |

Showing 1 - 1 of 1. Display count: 10

Give feedback

# Realestate\_db(realestateteam4):

portal azure - Search

Realestate\_db (realestateteam4)

portal.azure.com/#@oloom2006outlook.onmicrosoft.com/resource/subscriptions/51092add-31ea-4e2f-bce...

Microsoft Azure Upgrade Search resources, services, and docs (G+/) Copilot oloom2006@outlook.co... DEFAULT DIRECTORY (OLOOM20...

Home > SQL databases >

SQL

Realestate\_db (realestateteam4/Realestate\_db)

SQL database

Search

Copy Restore Export Set server firewall Delete Connect with... Feedback

Overview

Activity log

Tags

Diagnose and solve problems

Query editor (preview)

Mirror database in Fabric (preview)

Resource visualizer

Settings

Compute + storage

Connection strings

Properties

Locks

Data management

Mirror databases in Microsoft Fabric

Essentials

Resource group (...)

Status

Location

Subscription (move)

Subscription ID

Server name

Connection strings

Pricing tier

Overage billing

Free monthly vCore ...

Earliest restore point

Tags (edit)

Getting started

Monitoring

Properties

Features

Notifications (0)

Integrations

Tutorials

Start working with your database

Connect to your database and start working with data with a few simple steps. Learn more



# Database properties:

The screenshot displays the Microsoft Azure portal interface for a SQL database named 'Realestate\_db' (realestateteam4/Realestate\_db). The left sidebar contains a navigation menu with options: Overview, Activity log, Tags, Diagnose and solve problems, Query editor (preview), Mirror database in Fabric (preview), Resource visualizer, Settings, Compute + storage, Connection strings, Properties, Locks, and Data management. The main content area is divided into several sections:

- Compute + storage:**
  - Service tier: General Purpose
  - Compute tier: Serverless
  - vCores: 2 vCores
  - Max storage: 32 GB
- Availability:**
  - Zone redundancy: Disabled
  - Replication: 0 Replicas
  - Availability Zone: NoPreference
- Backups:**
  - Differential backup frequency: 12 hours
  - PITR retention: 7 days
  - Weekly LTR: --
  - Monthly LTR: --
- Networking:**
  - Public access: Enabled
  - Firewall rules: 7 firewall rules
  - Virtual networks: 0 virtual network service endpoints
  - Private access: 0 private endpoint connections
- Connections:**
  - Primary endpoint: realestateteam4.database.windows.net
- Authentication:**
  - Authentication method: AAD & SQL
  - SQL admin: Team4
  - AAD admin: oloom2006\_outlook.com#EXT#@oloom2006outlook.onmic
- Security:**
  - Microsoft Defender for SQL: Disabled

The top of the page shows the Microsoft Azure logo, an 'Upgrade' button, a search bar, and the user's profile information (oloom2006@outlook.co...).

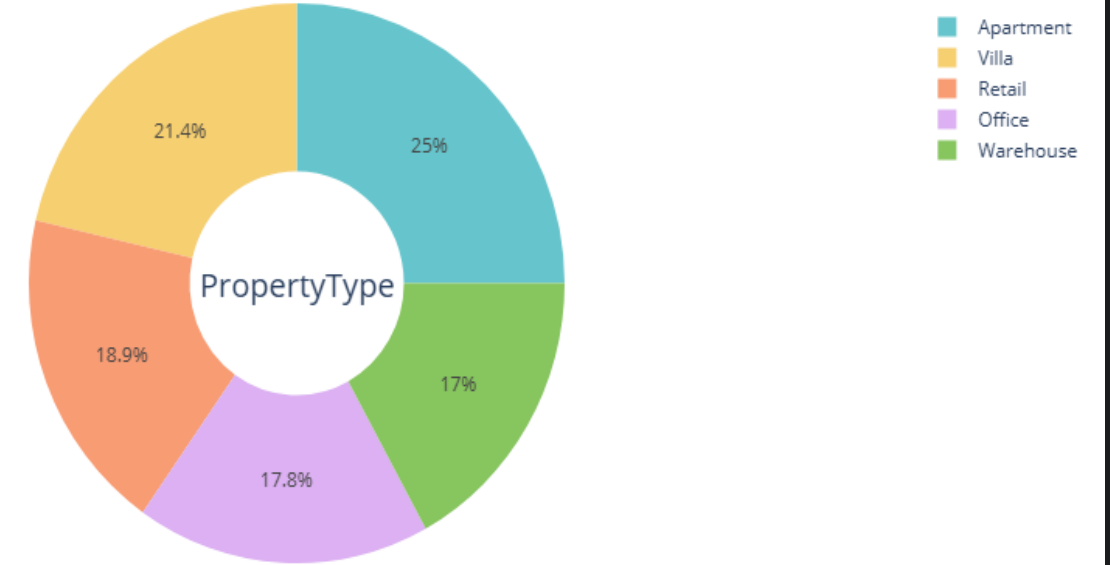


# Property Analytics

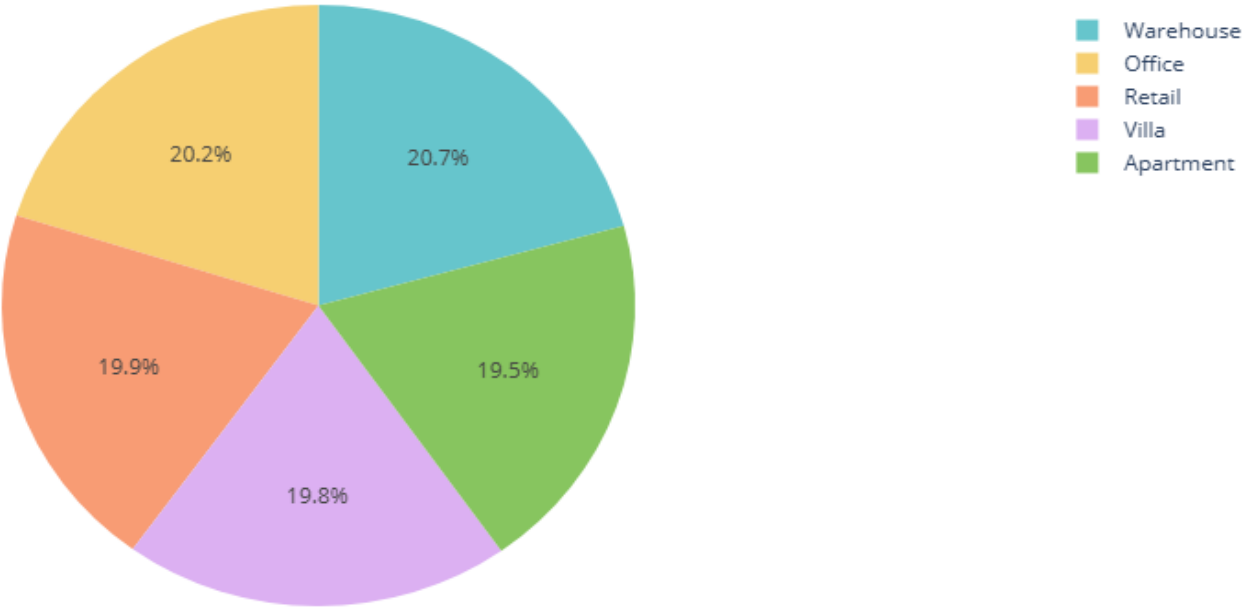
PropertyType Distribution VS Location



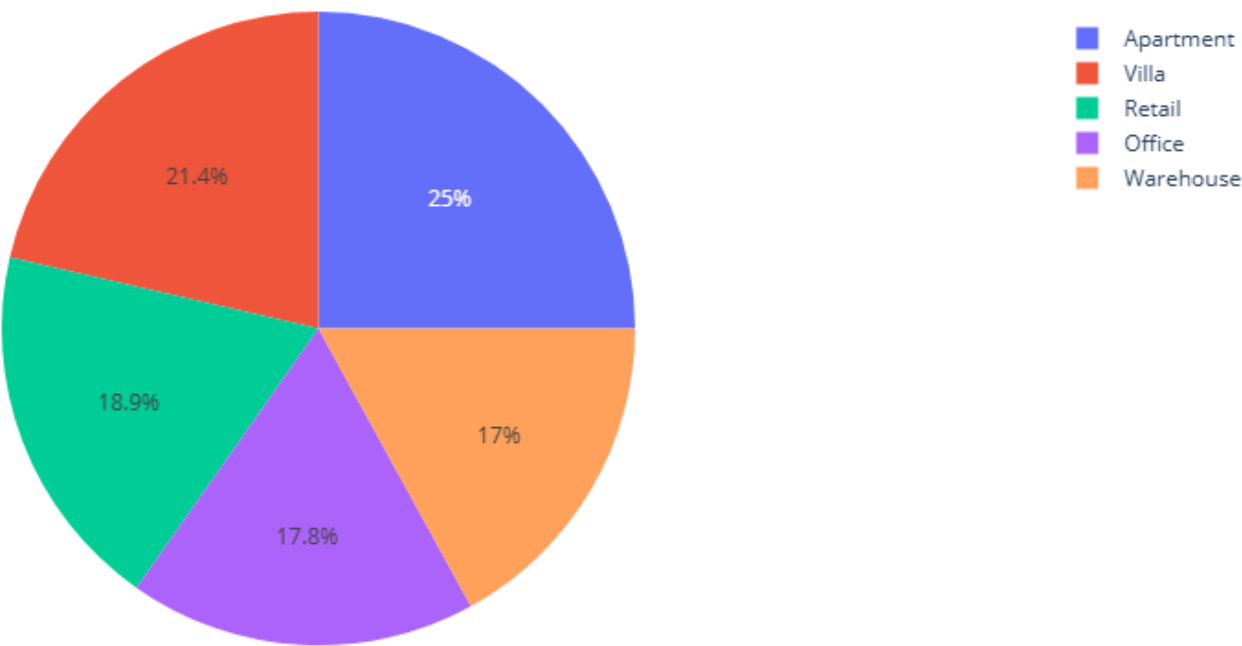
Distribution of PropertyType



Average Sales Distribution by Property Type



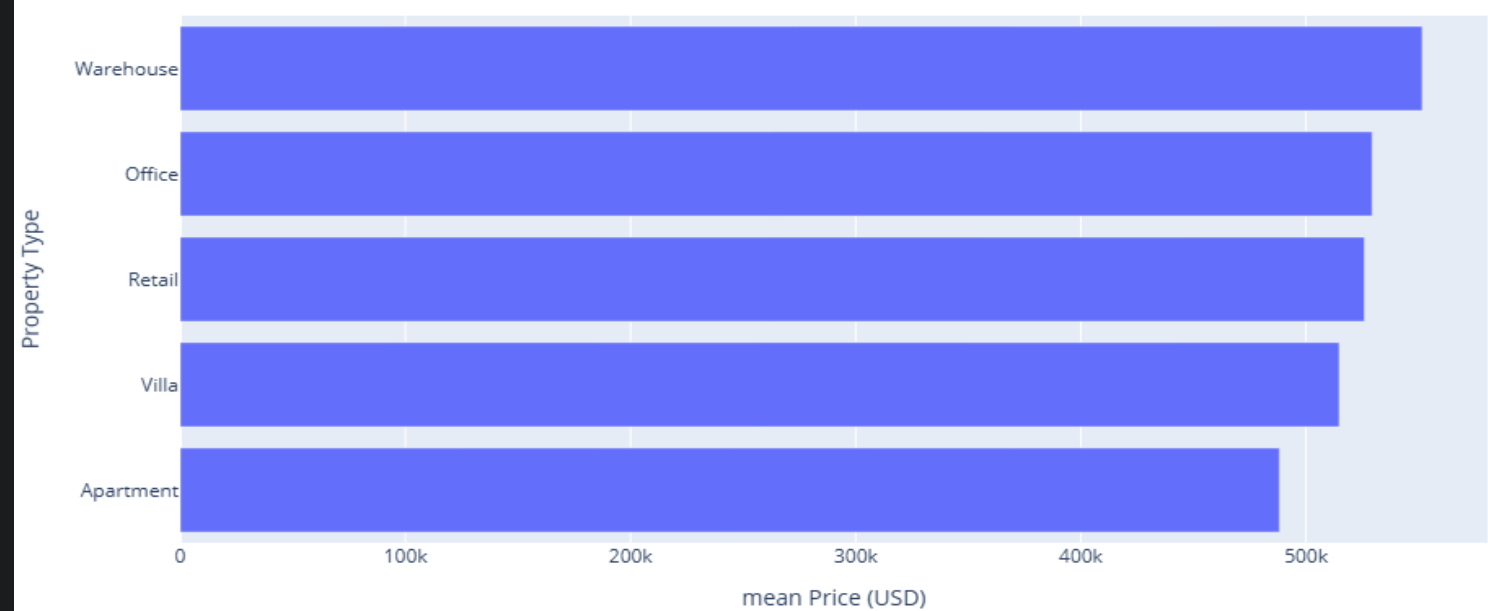
Number of Properties Visited per Property Type



Mean Size (sqm) for Each Property Type



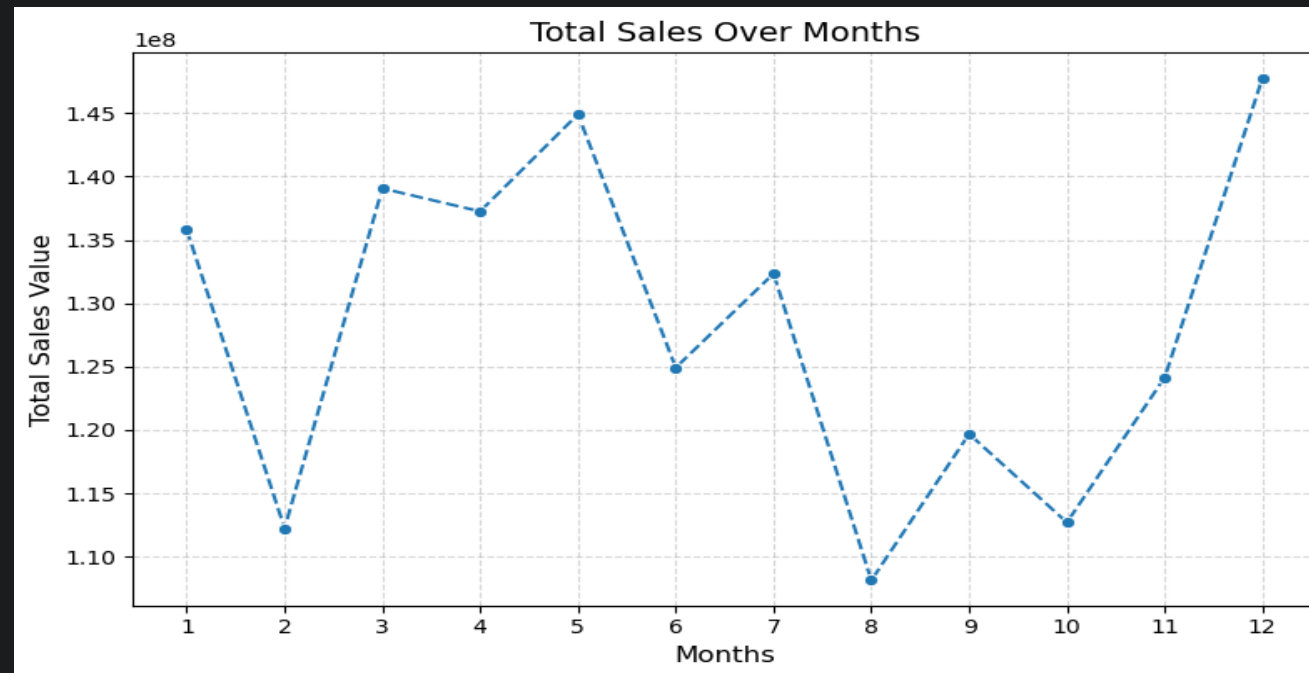
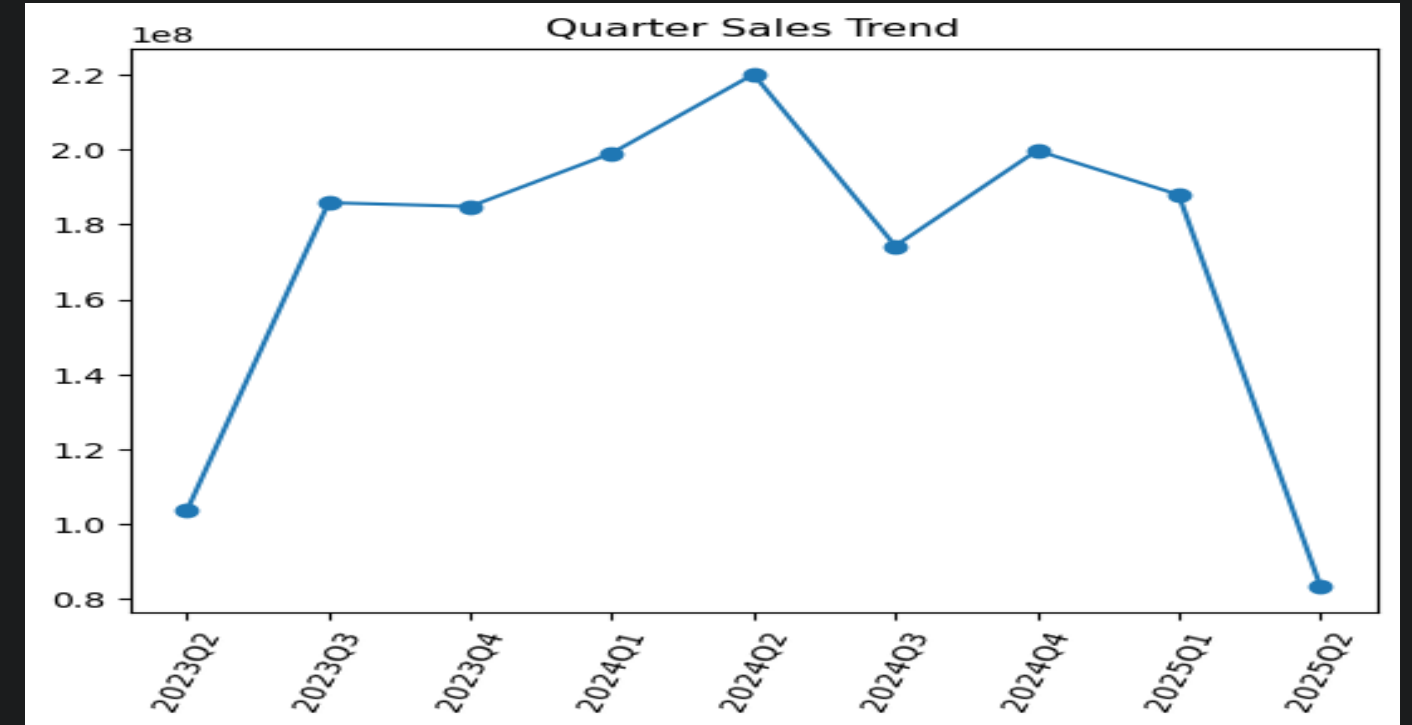
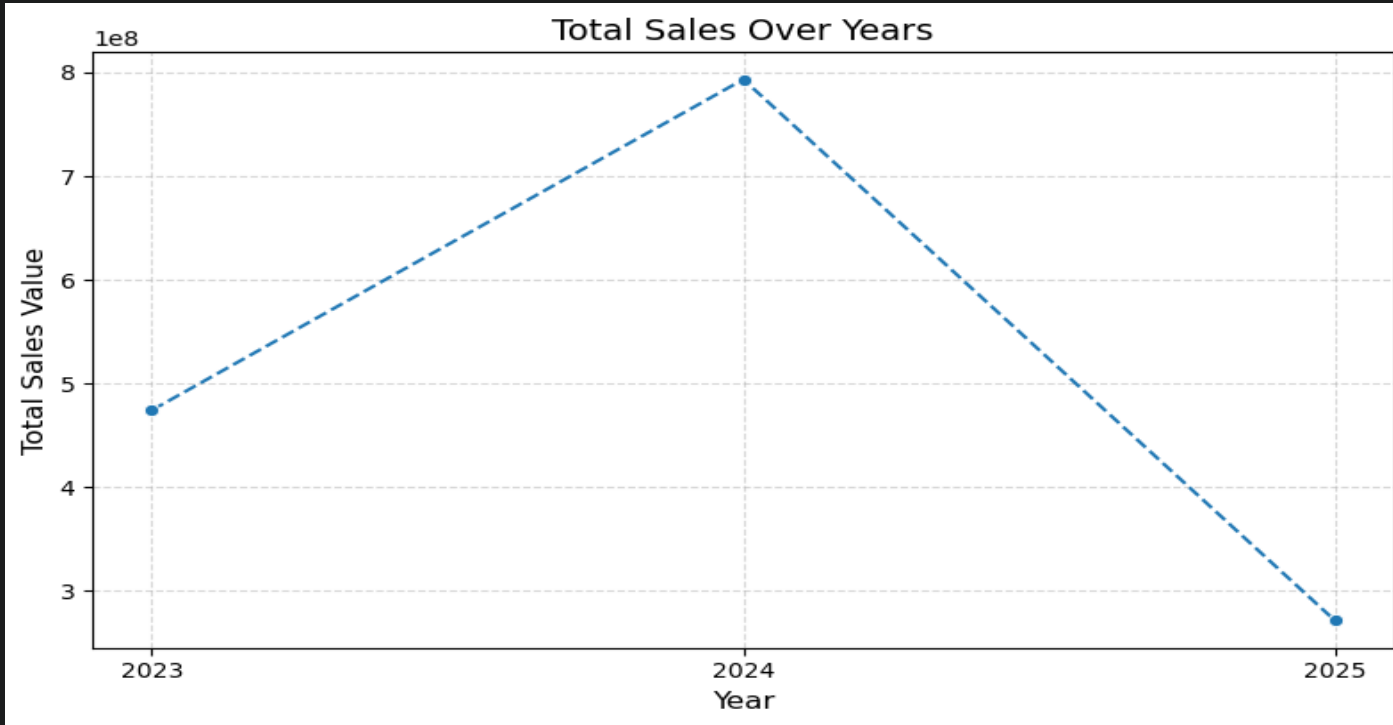
mean Prices for Each Property Type







# Sales Performance

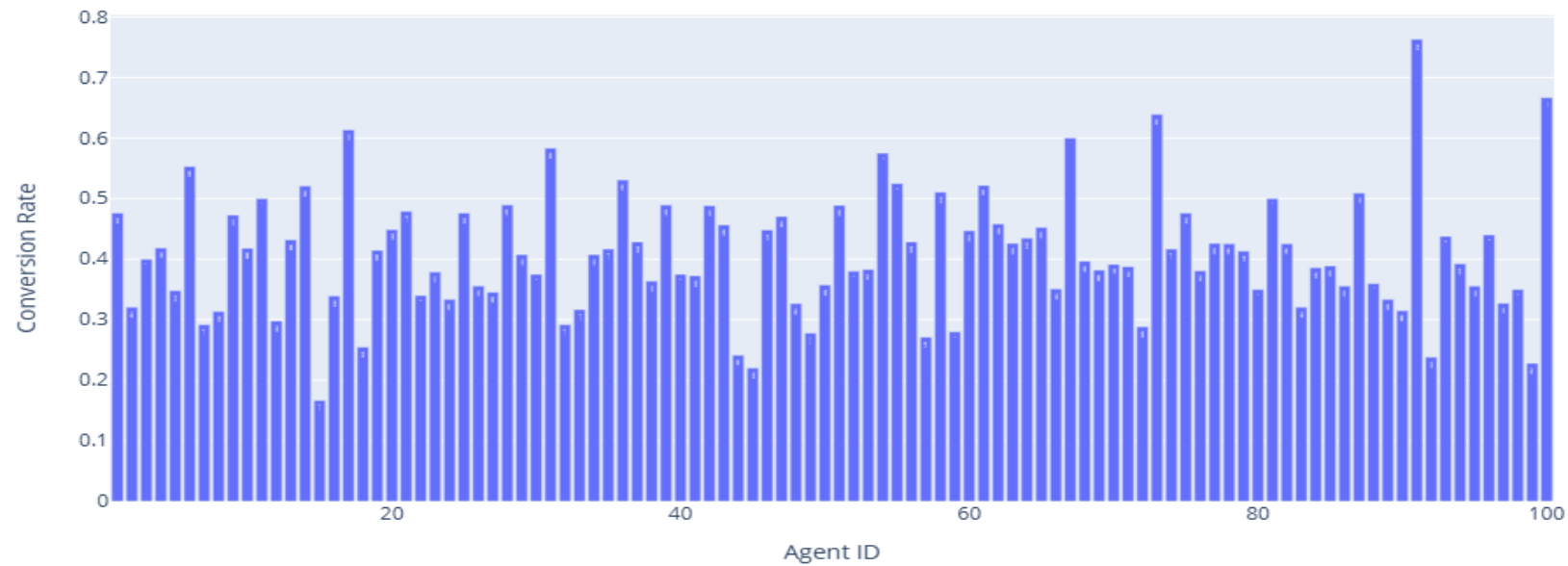


# Top-Performing Agent

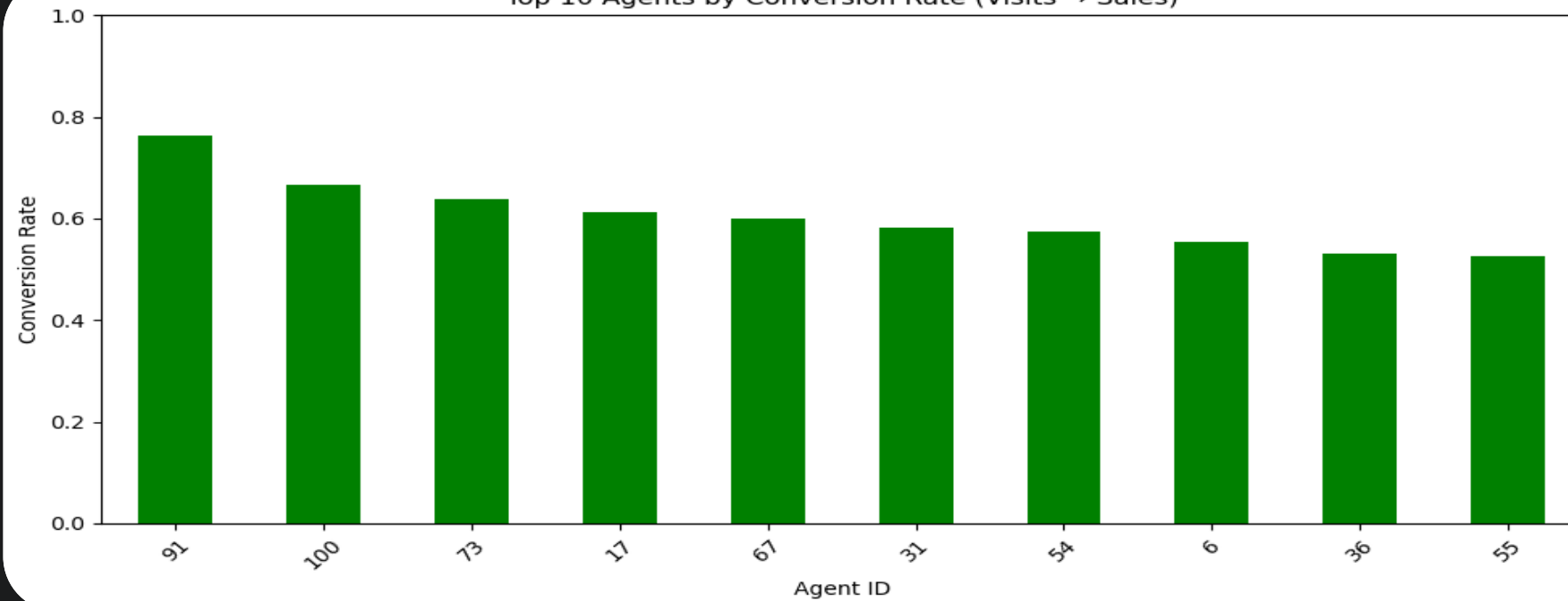
Agent ID : 91

Conversion rate : 76%

Conversion Rate per Agent



Top 10 Agents by Conversion Rate (Visits → Sales)



most frequent client

```
# most_frequent_client|
df[df['ClientID'] == 1034][['ClientID','FirstName_x','LastName_x','PropertyType','Location']]
```

|      | ClientID | FirstName_x | LastName_x | PropertyType | Location |
|------|----------|-------------|------------|--------------|----------|
| 384  | 1034     | Miranda     | Gomez      | Villa        | Miami    |
| 1343 | 1034     | Miranda     | Gomez      | Office       | New York |
| 1643 | 1034     | Miranda     | Gomez      | Apartment    | Chicago  |
| 1666 | 1034     | Miranda     | Gomez      | Office       | Chicago  |
| 1712 | 1034     | Miranda     | Gomez      | Office       | Miami    |
| 1713 | 1034     | Miranda     | Gomez      | Retail       | Miami    |
| 1909 | 1034     | Miranda     | Gomez      | Apartment    | New York |

# Average visit-to-sale ratio per location

|   | Location    | AvgVisitToSaleRatio |
|---|-------------|---------------------|
| 0 | Chicago     | 2.628272            |
| 2 | Los Angeles | 2.528205            |
| 1 | Houston     | 2.526738            |
| 3 | Miami       | 2.486998            |
| 4 | New York    | 2.350348            |





# First-time vs repeat buyers

## First-time

first\_time\_purchases

|      | ClientID | FirstName_x | LastName_x | Email_x                           | Phone_x              | PropertyType | Location    |
|------|----------|-------------|------------|-----------------------------------|----------------------|--------------|-------------|
| 0    | 291      | John        | Schroeder  | elijahrichards@hotmail.com        | (701)136-6900x97927  | Warehouse    | Los Angeles |
| 5    | 437      | Amy         | Peterson   | jennifer40@crawford.com           | 307-195-5748         | Retail       | Chicago     |
| 7    | 616      | Rhonda      | Banks      | dsalinas@yahoo.com                | 5921562407           | Warehouse    | Miami       |
| 8    | 946      | David       | Wheeler    | moorejeremy@hotmail.com           | +1-102-891-2137x2171 | Warehouse    | Los Angeles |
| 15   | 1333     | Micheal     | Bennett    | qharper@marquez.com               | (013)638-3210        | Apartment    | Houston     |
| ...  | ...      | ...         | ...        | ...                               | ...                  | ...          | ...         |
| 1974 | 317      | Mark        | Hall       | willie89@gmail.com                | 705.381.0786x95520   | Apartment    | Houston     |
| 1990 | 383      | Vincent     | Russell    | brownsuzanne@hotmail.com          | 083.152.0999x3238    | Warehouse    | Houston     |
| 1991 | 998      | Jacob       | Romero     | jcobb@yahoo.com                   | 3829863968           | Retail       | Chicago     |
| 1992 | 583      | Joel        | Dominguez  | crawfordmichele@schwartz-diaz.com | (451)052-5898        | Villa        | Miami       |
| 1998 | 403      | Christine   | Miller     | juarezmatthew@noble.com           | (511)660-7946x6868   | Office       | New York    |

526 rows × 7 columns

## repeat\_buyers\_purchases

repeat\_buyers\_purchases

|      | ClientID | FirstName_x | LastName_x | Email_x                        | Phone_x                | PropertyType | Location    |
|------|----------|-------------|------------|--------------------------------|------------------------|--------------|-------------|
| 1    | 979      | Keith       | Valenzuela | awilson@gmail.com              | 001-860-877-0940       | Retail       | Miami       |
| 2    | 527      | Charles     | Miles      | elizabethsanchez@yahoo.com     | +1-406-225-7870x547    | Retail       | Houston     |
| 3    | 226      | Sergio      | Williams   | hunterkeith@taylor.com         | 001-565-647-2177x498   | Office       | Los Angeles |
| 4    | 498      | Kelli       | Woodard    | jason06@hotmail.com            | 6519818654             | Villa        | Houston     |
| 6    | 339      | Catherine   | Rangel     | kanejessica@berry-palmer.com   | 232.949.2466x256       | Retail       | New York    |
| ...  | ...      | ...         | ...        | ...                            | ...                    | ...          | ...         |
| 1994 | 655      | Vanessa     | Mcgee      | thomas12@skinner-robinson.info | 001-133-345-9565x52815 | Villa        | New York    |
| 1995 | 35       | Daniel      | Wilson     | julia18@yahoo.com              | 540.181.0038x57035     | Office       | Chicago     |
| 1996 | 890      | Alyssa      | Rowe       | xsmith@gmail.com               | 001-547-590-3064x272   | Retail       | New York    |
| 1997 | 1167     | Todd        | Whitehead  | kathypatterson@west.com        | 465.187.1041x970       | Villa        | Miami       |
| 1999 | 849      | David       | Mccormick  | charles05@gmail.com            | 375.799.0547x25418     | Office       | New York    |

1474 rows × 7 columns

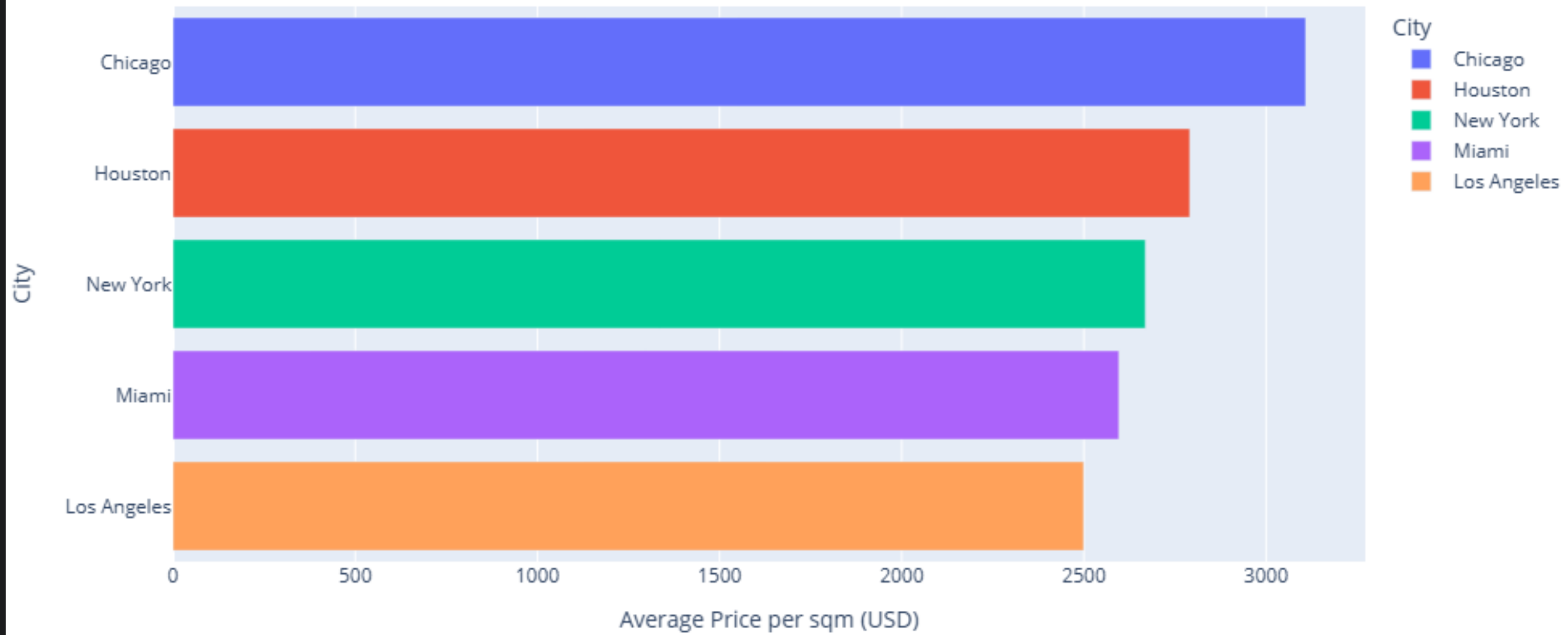
# Customer Purchase Frequency Distribution

| Frequency Purchase | Number of clients |
|--------------------|-------------------|
| 1                  | 526               |
| 2                  | 333               |
| 3                  | 165               |
| 4                  | 51                |
| 5                  | 18                |
| 6                  | 2                 |
| 7                  | 1                 |

Top 10 spender clients

|      | ClientID | FirstName_x | LastName_x | SalePrice |
|------|----------|-------------|------------|-----------|
| 748  | 1034     | Miranda     | Gomez      | 5309528   |
| 537  | 751      | Deborah     | Gibson     | 5059593   |
| 997  | 1378     | Brenda      | Cobb       | 4975928   |
| 215  | 315      | William     | Brown      | 4788386   |
| 705  | 973      | James       | Andrade    | 4726575   |
| 336  | 486      | Michelle    | Martin     | 4674197   |
| 325  | 466      | Kimberly    | Bowen      | 4501210   |
| 524  | 736      | Joshua      | Gray       | 4444278   |
| 1025 | 1416     | Eric        | Lambert    | 4319775   |
| 574  | 798      | Jessica     | Vasquez    | 4301397   |

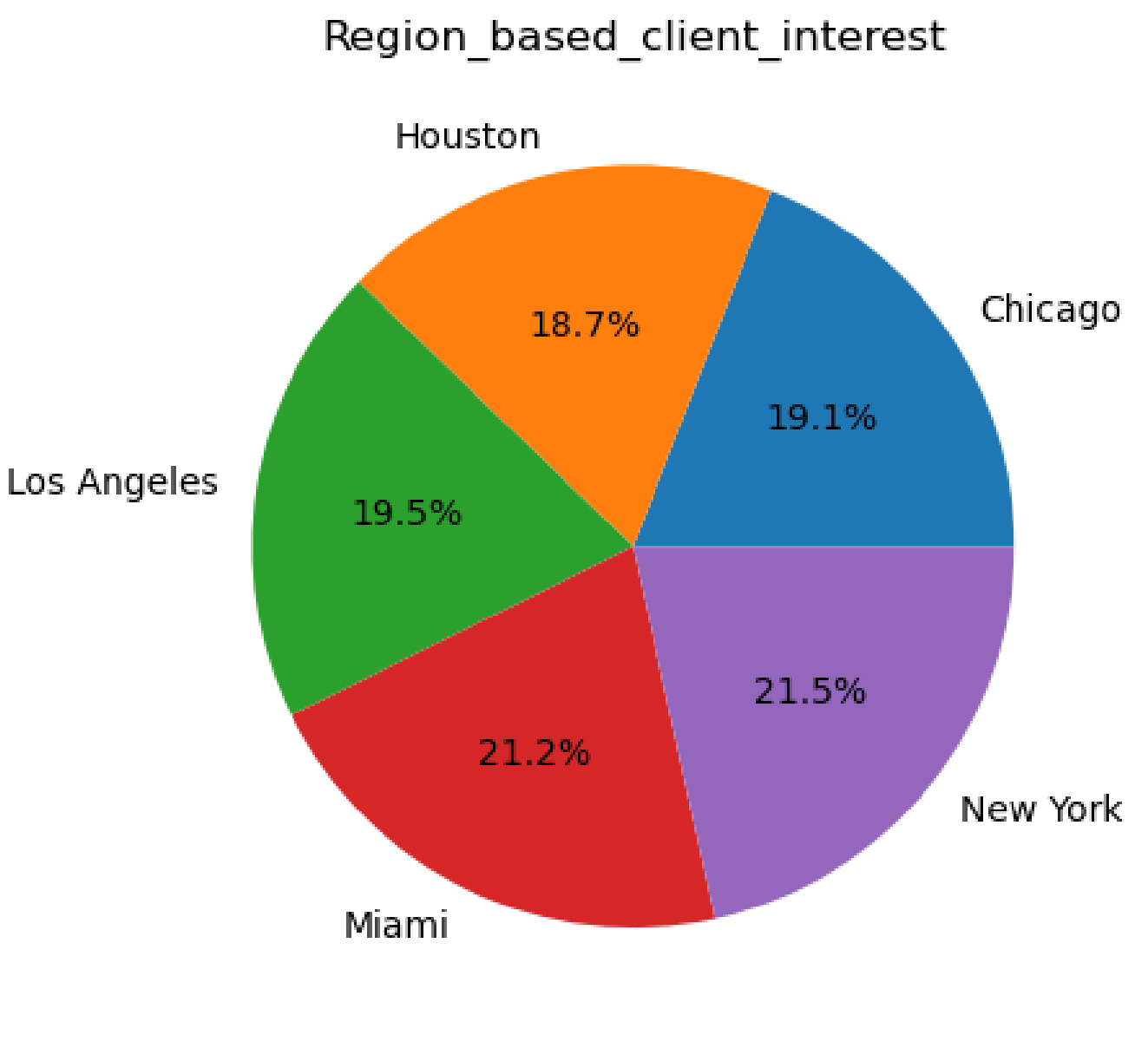
## Most Expensive City per Square Meter

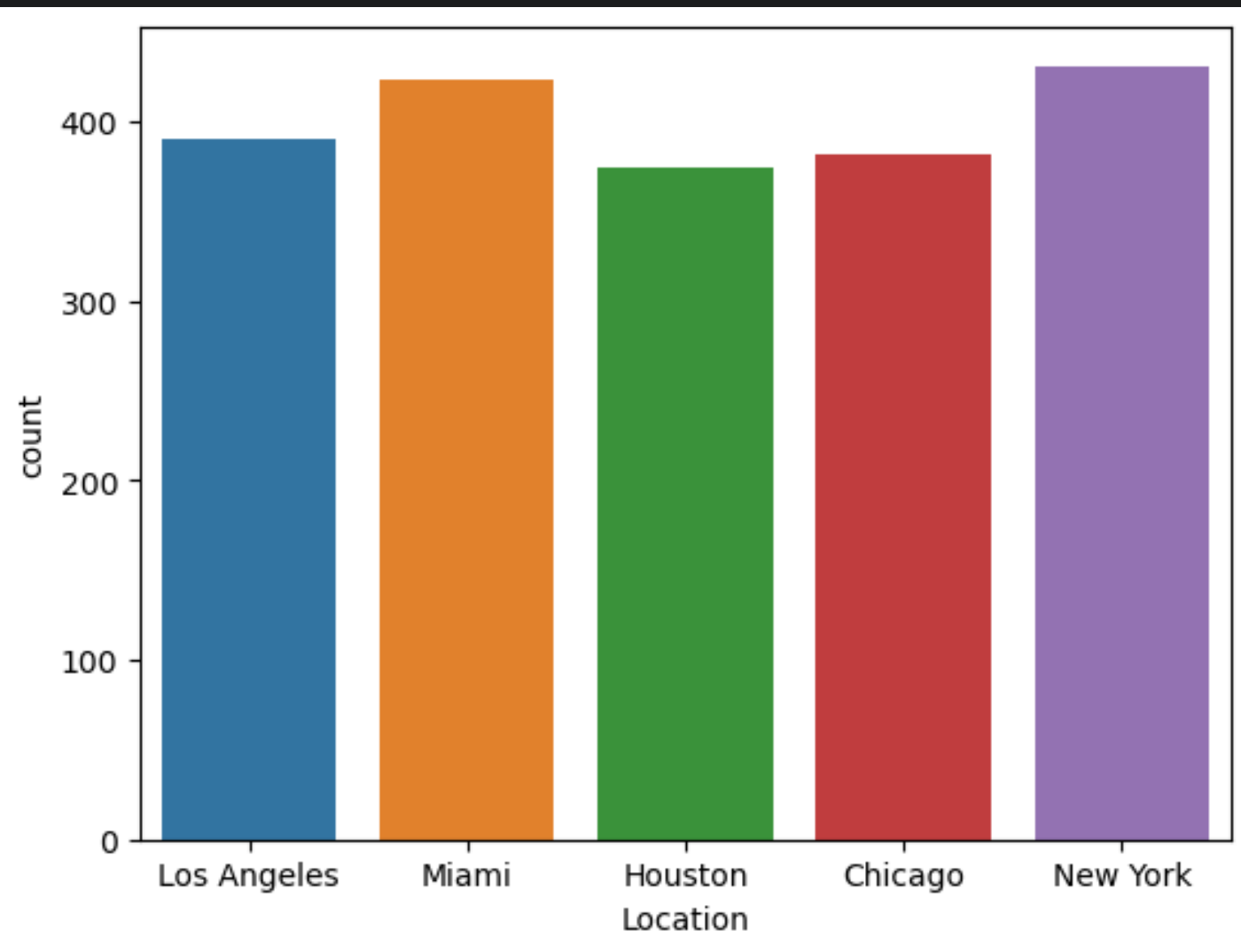




Region\_based\_client\_interest

|   | Region      | Frequency of clients |
|---|-------------|----------------------|
| 0 | Chicago     | 382                  |
| 1 | Houston     | 374                  |
| 2 | Los Angeles | 390                  |
| 3 | Miami       | 423                  |
| 4 | New York    | 431                  |



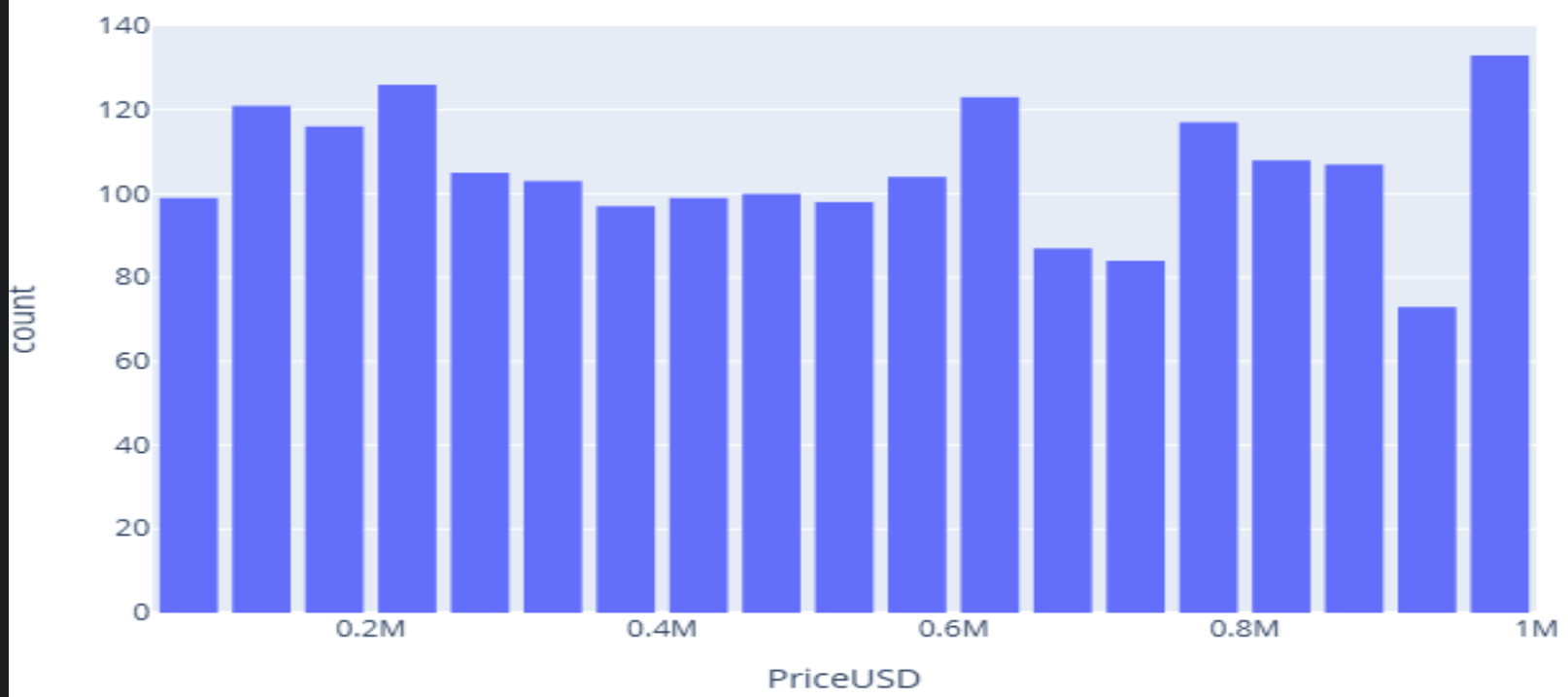


"The most sold property type in Miami is:"

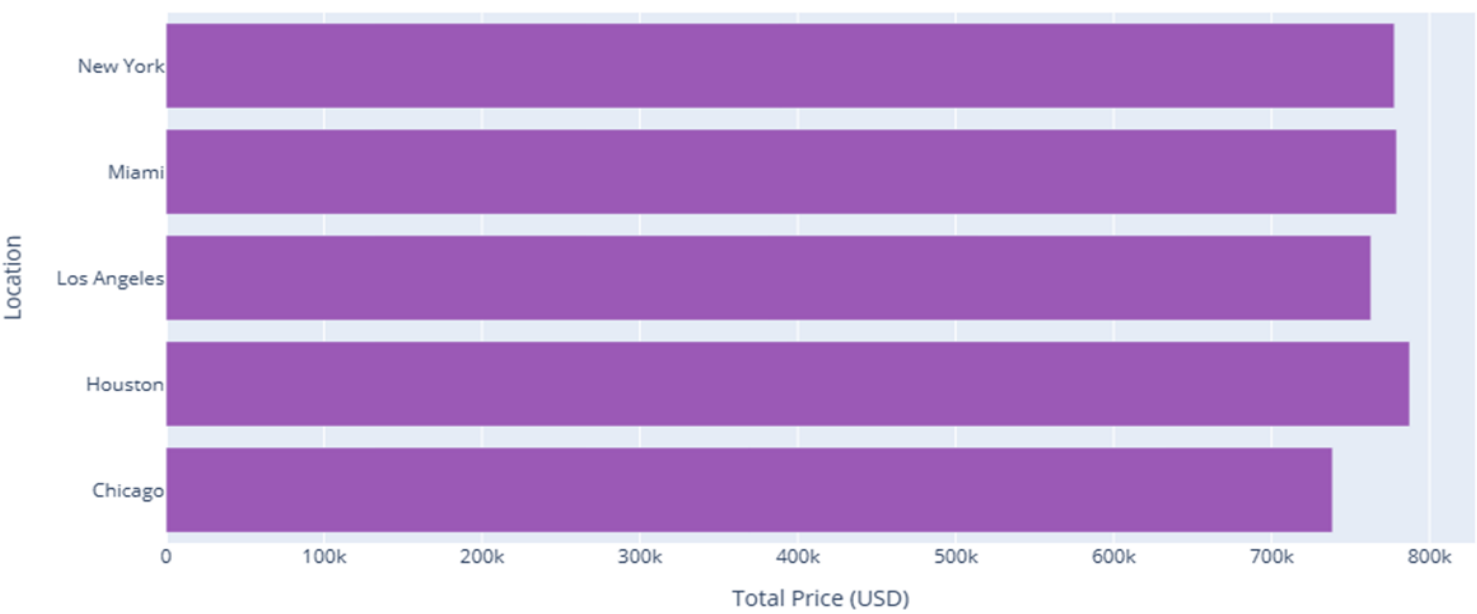
```
miami_df = df[df['Location'] == 'Miami']  
most_common_property = miami_df['PropertyType'].value_counts().idxmax()  
print(most_common_property)
```

Apartment

Distribution of PriceUSD



Total Prices for Each Location



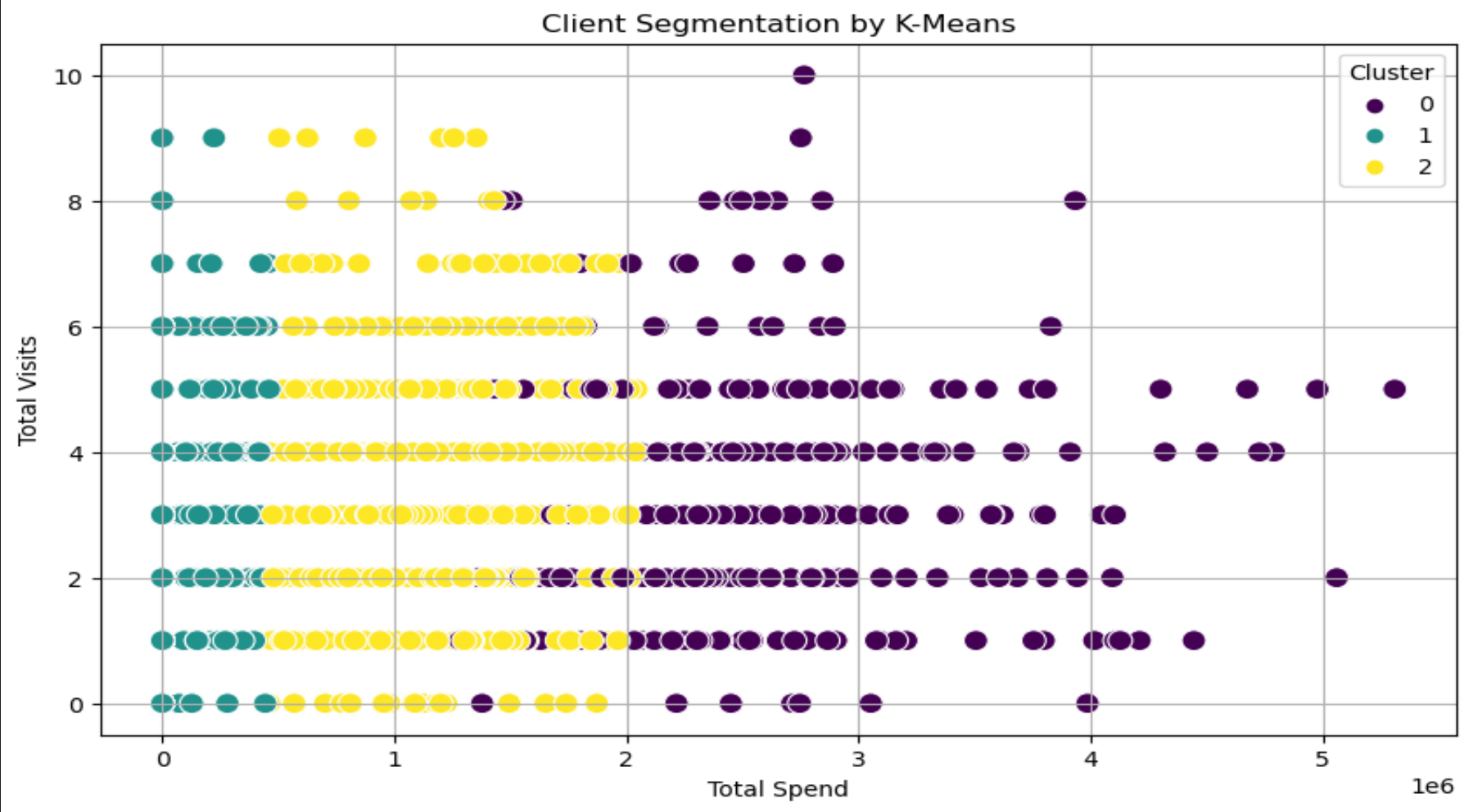
# Customer Segmentation With Real Estate CRM





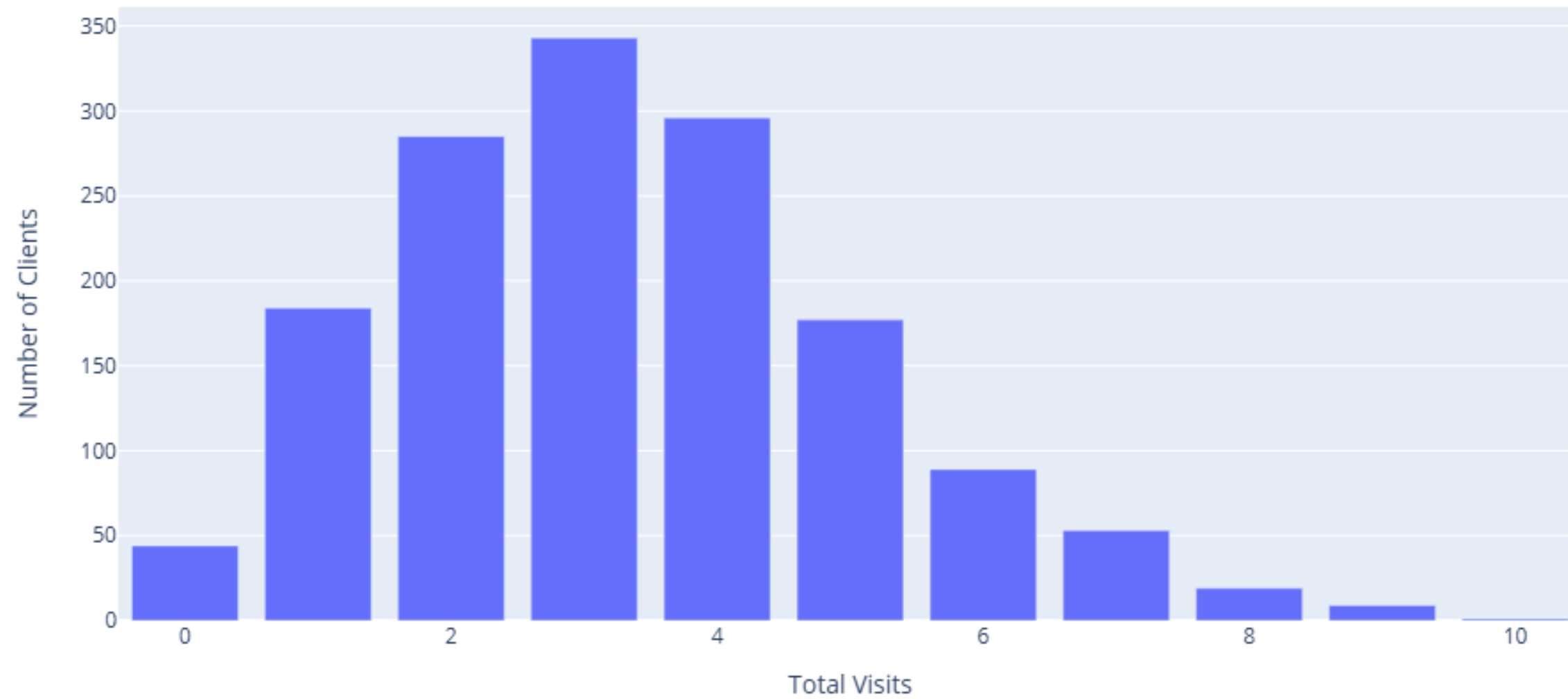


# Using K-Means Cluster



|   | Cluster | TotalVisits | PurchaseFrequency | TotalSpend   | AvgSpend      |
|---|---------|-------------|-------------------|--------------|---------------|
| 0 | 0       | 3.286667    | 3.073333          | 2.623646e+06 | 894425.244167 |
| 1 | 1       | 3.355752    | 0.299115          | 7.571453e+04 | 73123.053097  |
| 2 | 2       | 3.335433    | 1.431496          | 1.116656e+06 | 836169.334646 |

Distribution of Clients by Total Visits



```
cluster_0_clients = client_features[client_features['Cluster'] == 0]
cluster_0_clients
```



|  | ClientID | FirstName | LastName | Phone    | Email                  | TotalVisits             | PurchaseFrequency | TotalSpend | AvgSpend  | Cluster      |     |
|--|----------|-----------|----------|----------|------------------------|-------------------------|-------------------|------------|-----------|--------------|-----|
|  | 2        | 3         | Shelia   | Ryan     | 001-444-315-7702x8262  | bradleybell@hotmail.com | 5.0               | 3.0        | 2266640.0 | 7.555467e+05 | 0   |
|  | 7        | 8         | Teresa   | Smith    | (573)794-8059x9130     | randy50@yahoo.com       | 6.0               | 2.0        | 2631772.0 | 1.315886e+06 | 0   |
|  | 12       | 13        | Debra    | White    | 139-196-1817x120       | kingrachel@gmail.com    | 5.0               | 3.0        | 2765309.0 | 9.217697e+05 | 0   |
|  | 14       | 15        | Kimberly | Hill     | 111.374.8590           | ileach@yahoo.com        | 0.0               | 4.0        | 3052637.0 | 7.631592e+05 | 0   |
|  | 22       | 23        | Todd     | Weaver   | 001-117-059-9016x52810 | jortiz@hotmail.com      | 4.0               | 4.0        | 2133710.0 | 5.334275e+05 | 0   |
|  | ...      | ...       | ...      | ...      | ...                    | ...                     | ...               | ...        | ...       | ...          | ... |
|  | 1464     | 1465      | Latoya   | Neal     | +1-226-958-0522x69409  | thomaslewis@ortiz.com   | 2.0               | 2.0        | 2125064.0 | 1.062532e+06 | 0   |
|  | 1470     | 1471      | Patricia | Patel    | 7282605378             | joseph71@rivera.com     | 2.0               | 4.0        | 2796593.0 | 6.991482e+05 | 0   |
|  | 1477     | 1478      | Vincent  | Martinez | 599.920.7341           | yrowe@ali.biz           | 5.0               | 2.0        | 2317288.0 | 1.158644e+06 | 0   |
|  | 1485     | 1486      | Donald   | Todd     | (473)472-1800x8009     | amandaclark@gmail.com   | 4.0               | 4.0        | 2850660.0 | 7.126650e+05 | 0   |
|  | 1486     | 1487      | Deanna   | Robinson | +1-350-955-9701x78430  | nathaniel13@hotmail.com | 2.0               | 4.0        | 2620723.0 | 6.551808e+05 | 0   |

300 rows × 10 columns



```
cluster_1_clients = client_features[client_features['Cluster'] == 1]
cluster_1_clients|
```



|      | ClientID | FirstName | LastName   | Phone                 | Email                           | TotalVisits | PurchaseFrequency | TotalSpend | AvgSpend | Cluster |
|------|----------|-----------|------------|-----------------------|---------------------------------|-------------|-------------------|------------|----------|---------|
| 0    | 1        | Daniel    | Hoffman    | 5519656988            | deborah83@hotmail.com           | 7.0         | 0.0               | 0.0        | 0.0      | 1       |
| 1    | 2        | Heather   | Good       | +1-570-565-8487x89968 | tamaraellis@dean.com            | 4.0         | 0.0               | 0.0        | 0.0      | 1       |
| 6    | 7        | Vanessa   | Hill       | 655-830-8435x43747    | sarahheath@yahoo.com            | 4.0         | 1.0               | 162691.0   | 162691.0 | 1       |
| 9    | 10       | Garrett   | Owens      | 037.196.2178x793      | royortega@hotmail.com           | 4.0         | 0.0               | 0.0        | 0.0      | 1       |
| 10   | 11       | Tami      | Watkins    | 201.090.1239x2453     | mccoytony@smith.com             | 6.0         | 1.0               | 132709.0   | 132709.0 | 1       |
| ...  | ...      | ...       | ...        | ...                   | ...                             | ...         | ...               | ...        | ...      | ...     |
| 1484 | 1485     | Karen     | Stephenson | (143)015-3840x940     | hunteramy@hotmail.com           | 1.0         | 0.0               | 0.0        | 0.0      | 1       |
| 1488 | 1489     | Emily     | Roberts    | 649.311.5230          | kaitlinheath@simpson-oliver.com | 5.0         | 1.0               | 221056.0   | 221056.0 | 1       |
| 1491 | 1492     | Gregory   | Peters     | 777.289.5014          | tturner@gmail.com               | 1.0         | 1.0               | 150305.0   | 150305.0 | 1       |
| 1497 | 1498     | Paul      | Taylor     | 6930999306            | alexandra71@yahoo.com           | 1.0         | 0.0               | 0.0        | 0.0      | 1       |
| 1498 | 1499     | William   | Watkins    | 001-091-126-8710x812  | davidfriedman@hotmail.com       | 7.0         | 0.0               | 0.0        | 0.0      | 1       |

565 rows × 10 columns

```
cluster_2_clients = client_features[client_features['Cluster'] == 2]
cluster_2_clients
```



|      | ClientID | FirstName | LastName | Phone                 | Email                        | TotalVisits | PurchaseFrequency | TotalSpend | AvgSpend  | Cluster |
|------|----------|-----------|----------|-----------------------|------------------------------|-------------|-------------------|------------|-----------|---------|
| 3    | 4        | Margaret  | Knight   | 001-752-253-9221x228  | mcmillanjulia@lindsey.com    | 5.0         | 2.0               | 1141581.0  | 570790.5  | 2       |
| 4    | 5        | Jesus     | Moore    | 633.478.9307x986      | patelrebecca@day.com         | 3.0         | 1.0               | 1057874.0  | 1057874.0 | 2       |
| 5    | 6        | Jose      | Gibson   | 636-419-8972          | brianguerra@hotmail.com      | 4.0         | 2.0               | 1364904.0  | 682452.0  | 2       |
| 8    | 9        | Rachel    | Odom     | 384.798.7184x33461    | jade73@yahoo.com             | 2.0         | 1.0               | 1470352.0  | 1470352.0 | 2       |
| 15   | 16       | Stephen   | Jackson  | 803-950-5199x380      | hancocknatalie@gmail.com     | 2.0         | 1.0               | 889976.0   | 889976.0  | 2       |
| ...  | ...      | ...       | ...      | ...                   | ...                          | ...         | ...               | ...        | ...       | ...     |
| 1493 | 1494     | Carl      | Hill     | 605.821.9900x455      | daniellemcdonald@hotmail.com | 5.0         | 1.0               | 739817.0   | 739817.0  | 2       |
| 1494 | 1495     | Amy       | Wise     | 905-603-5407x7060     | jeffreybryant@yahoo.com      | 3.0         | 1.0               | 888063.0   | 888063.0  | 2       |
| 1495 | 1496     | Victoria  | Decker   | +1-794-705-0520x43162 | chaveztyler@gmail.com        | 1.0         | 2.0               | 1465643.0  | 732821.5  | 2       |
| 1496 | 1497     | Richard   | Benjamin | (898)658-0405x89259   | harriseileen@yahoo.com       | 8.0         | 1.0               | 804149.0   | 804149.0  | 2       |
| 1499 | 1500     | Miranda   | Martinez | +1-206-460-6537x47745 | johnsondevin@flores.com      | 2.0         | 2.0               | 1560225.0  | 780112.5  | 2       |

635 rows × 10 columns

```
interested_no_purchase = client_features[
    (client_features['Cluster'] == 1) &
    (client_features['TotalSpend'] == 0) &
    (client_features['TotalVisits'] > 0)
]
```

interested\_no\_purchase

|      | ClientID | FirstName | LastName   | Phone                 | Email                       | TotalVisits | PurchaseFrequency | TotalSpend | AvgSpend | Cluster |
|------|----------|-----------|------------|-----------------------|-----------------------------|-------------|-------------------|------------|----------|---------|
| 0    | 1        | Daniel    | Hoffman    | 5519656988            | deborah83@hotmail.com       | 7.0         | 0.0               | 0.0        | 0.0      | 1       |
| 1    | 2        | Heather   | Good       | +1-570-565-8487x89968 | tamaraellis@dean.com        | 4.0         | 0.0               | 0.0        | 0.0      | 1       |
| 9    | 10       | Garrett   | Owens      | 037.196.2178x793      | royortega@hotmail.com       | 4.0         | 0.0               | 0.0        | 0.0      | 1       |
| 11   | 12       | Travis    | Nelson     | 481.039.6516x236      | rebecca52@proctor.com       | 1.0         | 0.0               | 0.0        | 0.0      | 1       |
| 13   | 14       | James     | Webster    | (196)343-3877x50593   | dianejohnson@yahoo.com      | 2.0         | 0.0               | 0.0        | 0.0      | 1       |
| ...  | ...      | ...       | ...        | ...                   | ...                         | ...         | ...               | ...        | ...      | ...     |
| 1474 | 1475     | Christina | Cabrera    | 772-501-3528          | ywhite@richard-jennings.net | 4.0         | 0.0               | 0.0        | 0.0      | 1       |
| 1476 | 1477     | Michael   | Kline      | +1-961-966-1935x13855 | wstuart@cardenas-perez.com  | 1.0         | 0.0               | 0.0        | 0.0      | 1       |
| 1484 | 1485     | Karen     | Stephenson | (143)015-3840x940     | hunteramy@hotmail.com       | 1.0         | 0.0               | 0.0        | 0.0      | 1       |
| 1497 | 1498     | Paul      | Taylor     | 6930999306            | alexandra71@yahoo.com       | 1.0         | 0.0               | 0.0        | 0.0      | 1       |
| 1498 | 1499     | William   | Watkins    | 001-091-126-8710x812  | davidfriedman@hotmail.com   | 7.0         | 0.0               | 0.0        | 0.0      | 1       |

392 rows × 10 columns

unengaged\_clients

|      | ClientID | FirstName | LastName   | Phone                 | Email                           | TotalVisits | PurchaseFrequency | TotalSpend | AvgSpend | Cluster |
|------|----------|-----------|------------|-----------------------|---------------------------------|-------------|-------------------|------------|----------|---------|
| 162  | 163      | Erica     | Cruz       | (464)591-0883         | grantdenise@gmail.com           | 0.0         | 0.0               | 0.0        | 0.0      | 1       |
| 180  | 181      | Brendan   | Cole       | +1-748-246-8366x9273  | wkhan@gmail.com                 | 0.0         | 0.0               | 0.0        | 0.0      | 1       |
| 239  | 240      | Regina    | Harris     | 492.793.2798          | sparksmarc@yahoo.com            | 0.0         | 0.0               | 0.0        | 0.0      | 1       |
| 320  | 321      | Crystal   | Morales    | 2713369268            | kevin17@hotmail.com             | 0.0         | 0.0               | 0.0        | 0.0      | 1       |
| 412  | 413      | Lorraine  | Bauer      | +1-588-156-0228x989   | joneszachary@gmail.com          | 0.0         | 0.0               | 0.0        | 0.0      | 1       |
| 480  | 481      | Rachel    | Stephenson | +1-519-092-5441x8441  | trankent@stein.com              | 0.0         | 0.0               | 0.0        | 0.0      | 1       |
| 518  | 519      | Jason     | Reese      | 708-880-2320          | uwright@long.biz                | 0.0         | 0.0               | 0.0        | 0.0      | 1       |
| 809  | 810      | Travis    | Richardson | (170)446-8434         | barry92@hotmail.com             | 0.0         | 0.0               | 0.0        | 0.0      | 1       |
| 934  | 935      | Amanda    | Mcguire    | 001-951-226-0629      | harristimothy@yang-humphrey.com | 0.0         | 0.0               | 0.0        | 0.0      | 1       |
| 1110 | 1111     | Omar      | Wheeler    | (846)259-5426         | znguyen@yahoo.com               | 0.0         | 0.0               | 0.0        | 0.0      | 1       |
| 1203 | 1204     | Jennifer  | Ho         | 001-265-198-9492      | thomasmoore@brooks-gray.com     | 0.0         | 0.0               | 0.0        | 0.0      | 1       |
| 1372 | 1373     | Marie     | Rose       | 001-889-969-8402x8147 | brookecortez@brooks.com         | 0.0         | 0.0               | 0.0        | 0.0      | 1       |



# Power BI Dashboard





# Conclusion

## Built Robust Data Solution

From Azure SQL to Power BI

## Expand Analysis

Include customer satisfaction and agent performance metrics



## Derived Actionable Insights

That can drive real estate growth

## Continuously Refine

Dashboards and analysis

# Action Plan

1

Norhan Zaid

2

Safey El Deen Mohamed

3

Maged Fouad Mohamed

4

Ramy Elbouhy

5

Rawan Mohi

6

abdelghany ahmed



# Q&A



## Questions

Invite questions from the audience



## Feedback

Welcome feedback on the presentation



## Discussion

Open floor for further discussion

Invite questions and feedback from the audience.