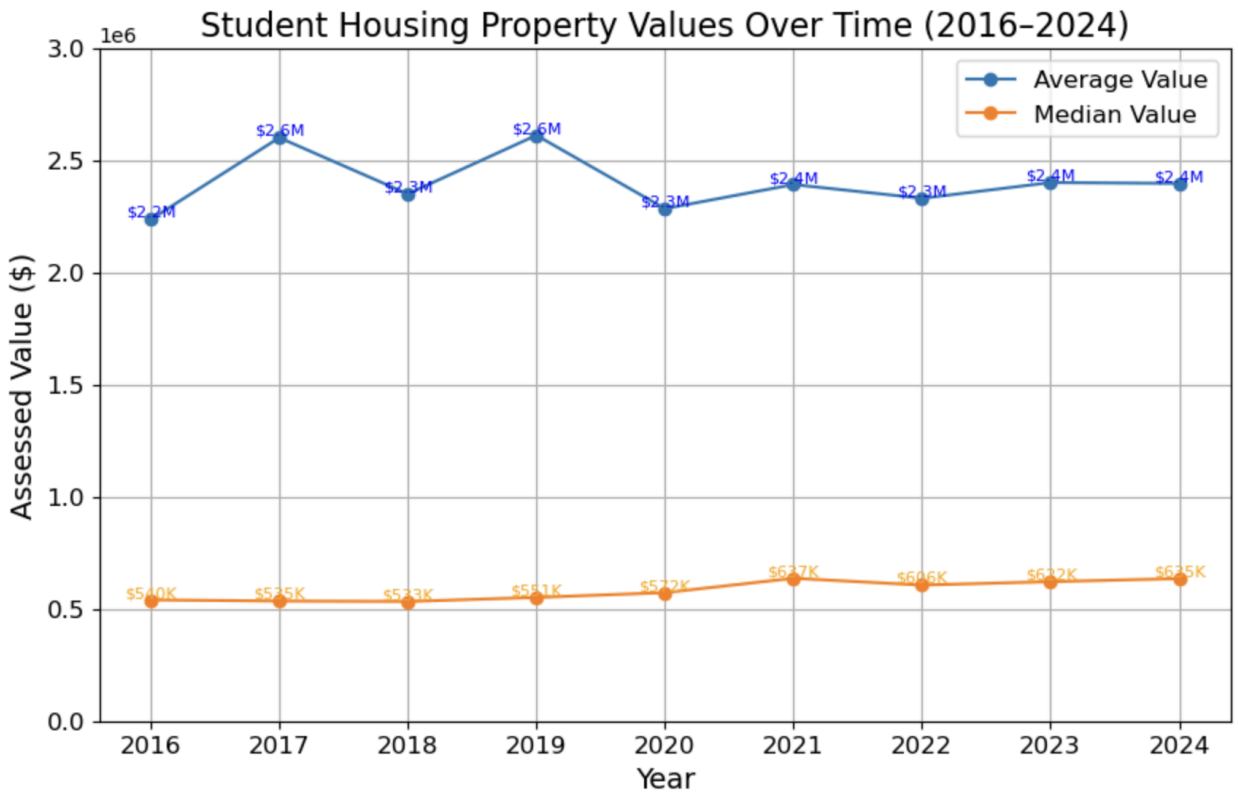
Question 5: How has the value of these off campus housing options changed over time?



I. Interpretation:

From 2016 to 2024, the **average assessed value** of student housing properties remained between approximately $2.3 million and $2.6 million, indicating relative stability with slight fluctuations.

In contrast, the **median property value** showed a more modest, steady increase, rising from around $540,000 to $635,000.

The widening gap between the average and median suggests that a **small number of extremely high-value properties** continue to skew the average upward, while typical property values grew at a more moderate pace.

This divergence highlights the importance of using both median and mean when evaluating housing markets.

II. Method:

We used Boston's property assessment datasets from 2016 to 2024 alongside student housing address records to analyze changes in off-campus housing values over time. The data processing steps were:

- **Student Housing Cleaning:**
    - Standardized street numbers and street names by uppercasing, stripping whitespace, and dropping street suffixes.
    - Corrected ZIP codes by adding missing leading zeros.
- **Property Assessment Cleaning:**
    - Address inconsistencies were corrected by extracting only the numeric portion of street numbers and removing extra symbols (e.g., spaces, hyphens, letters).
    - Street names were standardized to match the student housing format.
    - ZIP code fields were sanitized to remove invalid characters (e.g., underscores) and formatted uniformly to five digits.

    - Address fields were inconsistent across years, requiring dynamic handling of different column names (`ZIPCODE` vs `ZIP_CODE`, `AV_TOTAL` vs `TOTAL_VALUE`).

- **Data Merging and Matching:**
    - Student housing addresses were matched with property assessment records using exact matches on street number, street name, and ZIP code.
    - After merging, assessed property values were extracted and cleaned to remove dollar signs, commas, and spaces before conversion to numeric format.
- **Trend Analysis:**
    - For each year from 2016 to 2024, the average and median assessed property values were calculated.
    - Trends were visualized using a line plot with labeled points for clarity.

III. Limitations:

While the analysis provides a broad view of trends in student housing property values, several limitations must be acknowledged:

- **Address Matching Precision:**
    - Some student housing addresses could not be matched due to differences in formatting or missing property records.
    - Street ranges and special unit numbers (e.g., "134-136" or "205A") had to be simplified, which may have excluded a small number of properties.
- **Inconsistent Data Across Years:**

    - Property assessment files varied in structure over time, requiring dynamic column handling.
    - There may be inconsistencies in how properties were categorized across years (e.g., reassignment of property types).
- **Assessed Value Limitations:**
    - Assessed values may not fully capture actual market values, particularly for rapidly changing housing markets.
    - Skewed distributions, with a few extremely high-value properties, inflated the mean assessed values compared to the median.

Despite these challenges, the analysis provides a strong overview of off-campus student housing property trends in Boston from 2016 to 2024.

IV. Conclusion:

This analysis examined the assessed values of off-campus student housing properties in Boston from 2016 to 2024. While the **median property values** rose modestly over time — from approximately **$540K to $635K** — the **average property values** remained consistently much higher, ranging between **$2.3M and $2.6M**. This pattern suggests that although most student housing units experienced gradual value increases, a few extremely high-value properties heavily skewed the overall average upward. Overall, the results highlight both the **relative stability of the typical student housing market** and the **importance of examining both median and mean values** when interpreting property value trends in heterogeneous urban areas.