PERFORMANCE TESTING GUIDE - HOUSING DASHBOARD PROJECT

This document outlines performance testing strategies applicable to data dashboards and analytical workflows.

1. TABLEAU DASHBOARD PERFORMANCE

a. Load Time Testing:

- Use Tableau's built-in Performance Recorder.

Steps: Help > Settings and Performance > Start Performance Recording.

- Analyze: Query Time, Data Source Load, Rendering Time.

b. Optimization Tips:

- Use extracts instead of live data connections.
- Minimize the use of high-cardinality filters.
- Combine worksheets when possible to reduce complexity.
- Reduce custom calculations and use indexing fields.

c. Tools:

- Tableau Performance Recorder
- Tabjolt (load testing tool by Tableau)
- Web browser DevTools (for rendering/network stats)

2. DATA PROCESSING PERFORMANCE (Python / Pandas)

a. Time and Memory Profiling:

- Use `time` or `timeit` to measure code block execution.
- Use `memory_profiler` to track RAM usage.

b. Optimization Techniques:

- Use vectorized operations instead of loops.
- Avoid repeated computation by caching results.
- Limit data copies, use `inplace=True` where applicable.

- For large datasets, consider using Dask or PySpark.

Example:

```python
import time
start = time.time()
# your processing code here
end = time.time()
print("Execution time:", end - start)
```

3. DATABASE QUERY PERFORMANCE

a. Indexing and Query Plan:

- Ensure relevant columns are indexed.
- Use `EXPLAIN` or `EXPLAIN ANALYZE` in SQL to understand query execution.

b. Data Volume Impact:

- Test queries with subsets vs full data
- Use LIMIT and pagination during development

4. LOAD TESTING TOOLS

- Apache JMeter
- Locust (Python-based)
- Tabjolt (for Tableau)

Always ensure performance is tested under realistic conditions.