**Analysis Report**

Introduction

This performance testing script focuses on simulating user interactions with the Petstore API, with an emphasis on pet-related endpoints. Tasks are weighted using the @task(x) decorator, where higher weights indicate more frequent execution. Specifically:

* add\_pet (weight: 4) is the most frequent task.
* get\_pet\_by\_id (weight: 2) is tested less frequently.
* delete\_pet (weight: 1) is the least frequent.

Currently, the testing covers only the pet-related endpoints, but future plans include expanding the coverage to include store and user endpoints for a more comprehensive performance evaluation.

Result

| **Metric** | **Scenario 1: Low Load** | **Scenario 2: Moderate Load** | **Scenario 3: High Load (Stress Test)** | **Observations** |
| --- | --- | --- | --- | --- |
| **Total Requests** | 319 | 741 | 4262 | The total requests scale significantly as the load increases. |
| **Total Failures** | 9 | 48 | 196 | Failures increase with higher load, primarily affecting the GET endpoint. |
| **Failure Rate** | 2.82% | 6.48% | 4.6% | Failure rates peak in Scenario 2 but improve slightly in Scenario 3. |
| **Median Response Time** | 100 ms | 100 ms | 100 ms | Median response time remains consistent across all scenarios. |
| **95th Percentile** | 110 ms | 410 ms | 430 ms | Significant increase under moderate and high loads, highlighting bottlenecks. |
| **99th Percentile** | 420 ms | 430 ms | 450 ms | Performance degrades at higher percentiles, particularly under stress. |
| **Average Response Time** | 126.47 ms | 124.35 ms | 142.43 ms | Slight increase in average response time in Scenario 3. |
| **Requests Per Second (RPS)** | 6.39 | 15.8 | 141.5 | RPS scales well, showcasing system scalability under increasing loads. |
| **Failures Per Second** | 0.18 | 1.5 | 6.6 | Failure frequency increases dramatically under higher loads. |
| **Affected Endpoint** | GET /api/v3/pet/10 | GET /api/v3/pet/10 | GET /api/v3/pet/10 | The same endpoint consistently exhibits the highest failure rates. |

Scenarios

To evaluate the performance of the Petstore API under different conditions, we define three distinct testing scenarios. Each scenario represents a different load profile, varying the number of users and the ramp-up time to simulate different levels of traffic.

**Scenario 1: Low Load (Baseline)**

* **Number of users**: 25 users
* **Ramp-up**: 1 users/sec
* **Time duration**: 50 sec

Simulates 20 users ramping up at 1 users/sec, maintained for 50 seconds. Evaluates API performance under moderate load.

**Result:** Locust\_2025-01-07\_scenario\_1.html

**Observations:**

* Successful Endpoints: All endpoints except GET /api/v3/pet/10 handled requests with 0 failures.
* Failures: 9 requests failed for GET /api/v3/pet/10, resulting in a 12% failure rate for this endpoint.
* Response Times: The majority of requests responded within 100 ms, with higher response times (up to 450 ms) appearing in the 95th percentile and above.
* Performance Under Load: The system maintained a stable RPS of 6.39, suggesting acceptable performance under moderate load.

**Recommendations:**

Investigate the cause of the failures for GET /api/v3/pet/10 and optimize response times for edge cases (95th percentile and above).

**Scenario 2: Moderate Load**

* **Number of users**: 50 users
* **Ramp-up time**: 5 users/sec
* **Time duration**: 50 sec

Simulates 50 users ramping up at 5 users/sec, maintained for 50 seconds. Evaluates API performance under high load.

**Result:** Locust\_2025-01-07\_scenario\_2.html

**Observations:**

* **Successful Endpoints:** All endpoints except GET /api/v3/pet/10 handled requests with 0 failures.
* **Failures:** 48 requests failed for GET /api/v3/pet/10, resulting in a 23.88% failure rate for this endpoint.
* **Response Times:**
  + Median response time across all endpoints was consistent at 100 ms.
  + Higher response times (410–430 ms) occurred in the 95th and 99th percentiles.
* **Load Handling:** The system maintained a higher RPS (15.8) under increased load, indicating scalability, but the failure rate for GET /api/v3/pet/10 raises concerns about reliability under stress.

**Recommendations:**

* Investigate and resolve the high failure rate for GET /api/v3/pet/10.
* Review potential bottlenecks or timeout configurations causing higher response times in the 95th and 99th percentiles.

**Scenario 3: High Load (Stress Test)**

* **Number of users**: 500 users
* **Ramp-up time**: 10 users/sec
* **Time duration**: 50 sec

Simulates 500 users ramping up at 10 users/sec, maintained for 50 seconds. Evaluates API performance under very high load with gradual scaling.

**Result:** Locust\_2025-01-07\_scenario\_3.html

**Observations:**

* **Successful Endpoints:** The POST and DELETE endpoints performed consistently with minimal to no failures.
* **Failures:** GET /api/v3/pet/10 encountered 193 failures, resulting in an 18.13% failure rate for this endpoint, the most significant under high load.
* **Response Times:** Median response time remained stable at 100 ms across all endpoints. Higher response times (95th–99th percentiles) ranged from 430–450 ms, indicating some degradation under peak load.
* **Load Handling:** The API sustained a high RPS (141.5), demonstrating scalability, but reliability issues with GET /api/v3/pet/10 indicate a need for further optimization.

**Recommendations:**

* **Failure Mitigation:** Address the high failure rate for GET /api/v3/pet/10. Investigate server-side bottlenecks or resource constraints under stress conditions.
* **Performance Tuning:** Optimize the response times for the 95th and 99th percentiles to improve overall performance under high load.