📄 Performance Test Report

**1. 🎯 Executive Summary**

* **Objective:** Validate the application’s capability to handle **500 concurrent users**.
* **Key Findings:**
  + Application meets performance criteria for most functionalities with an **average response time of 2 seconds**.
  + Checkout process shows minor bottleneck due to **database query inefficiencies**.
  + CPU and memory usage remain within acceptable limits.

**2. 📝 Test Objectives and Scope**

* **Objectives:** Assess performance of:
  + View Product
  + Search
  + Add to Cart
  + Checkout
* **Scope:** Tests executed under **normal** and **peak load** conditions.

**3. 🖥️ Test Environment**

| **Component** | **Specification** |
| --- | --- |
| Web Servers | 2 |
| Application Server | 1 |
| Database Server | 1 |
| Network | Simulated real-world latency |
| Monitoring | CPU, Memory, Network Bandwidth |

**4. 📊 Test Scenarios & Workload**

* **Scenarios:** Search, View Product, Add to Cart, Checkout
* **Workload:** 500 concurrent users for 2 hours
* **Execution Cycle:** 1 completed (recommend 3–4 additional cycles for trend analysis)

**5. 📈 Key Performance Metrics**

| **Metric** | **Value** |
| --- | --- |
| Avg. Response Time | 2 sec |
| Throughput | 300 transactions/min |
| CPU Utilization | Avg. 70% |
| Memory Utilization | Avg. 60% |
| Errors | 0–0.5% (Checkout only) |

**6. ⏱️ Detailed Results**

**Search**

* Avg. Response Time: 0.424s
* Throughput: 13.42 TPS
* Pass Rate: 100%

**View Product**

* Avg. Response Time: 0.39–1.23s
* Throughput: ~3 TPS
* Pass Rate: 100%

**Add to Cart**

* Avg. Response Time: 0.42–1.78s
* Throughput: ~6–10 TPS
* Pass Rate: 100%

**Checkout**

* Avg. Response Time: 0.27–1.55s
* Throughput: ~5–6 TPS
* Pass Rate: 99.5% (0.5% errors)

**7. ⚙️ Resource Utilization**

| **Metric** | **Web Server** | **App Server** | **DB Server** |
| --- | --- | --- | --- |
| Avg. Memory Usage | 36% | 42% | 49% |
| Avg. CPU Usage | 68% | 70% | 72% |
| Avg. Network Usage | 160 KB/s | 175 KB/s | 188 KB/s |

**8. 🔍 Analysis & Findings**

* **Bottleneck:** Checkout process affected by **slow database queries**.
* CPU & Memory usage are within optimal range — no immediate hardware scaling needed.

**9. 💡 Recommendations**

1. **Optimize database queries** in checkout flow to reduce latency.
2. Consider **scaling database server capacity** during peak loads.
3. Repeat **3–4 additional test cycles** to validate performance trends.

**10. ✅ Conclusion**

* Application is **production-ready** for normal load.
* **Peak load scenarios** require **checkout query optimization** to ensure seamless performance.

**📎 Appendices**

* Raw Test Data
* Load Test Scripts
* Configuration Details