Performance Test Evaluation

Team Members Involved:

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HTTP-Server tests repeated (Prak2)

Test Configuration

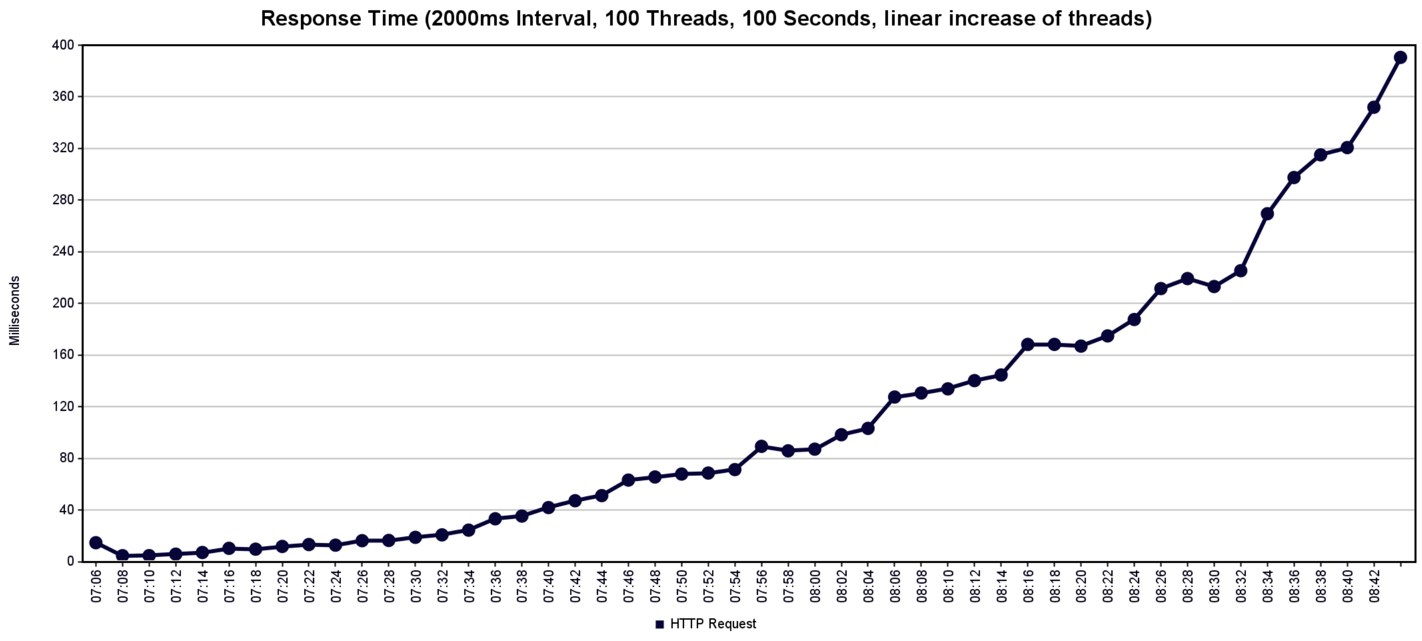
- **Tool**: Apache JMeter
- **Thread Group**: 100 threads (users)
- **Ramp-up Period**: 100 seconds (linear increase of 1 user per second)
- **Test Duration**: 100 seconds
- **Test Type**: Continuous POST requests to the API endpoint measuring Round Trip Time (RTT)

Old Results

Results Analysis

The performance test demonstrates how our HTTP server responds under gradually increasing load.

Graphs



The graph shows an **square increase** in response times as the number of concurrent users increases.

Key Metrics

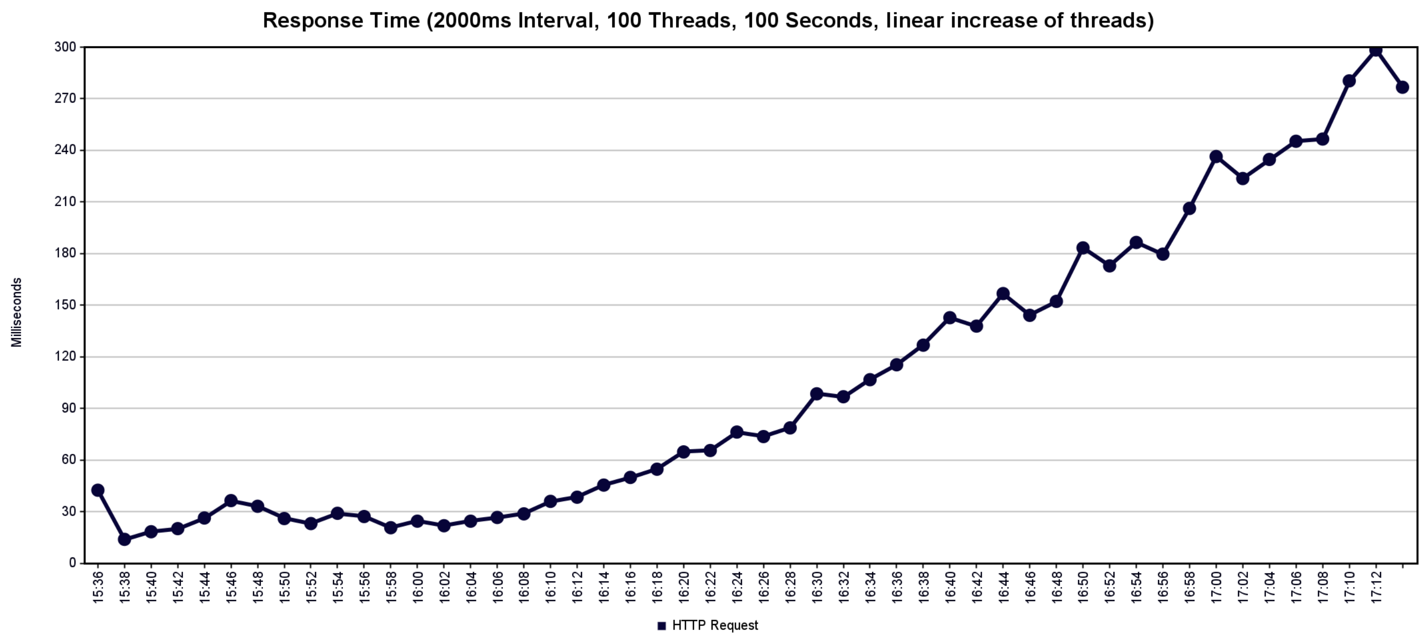
According to the aggregated results:

- **Total Samples**: 67949
- **Average Response Time**: 74ms
- **Median Response Time**: 36ms
- **90% Line**: 201ms (90% of requests completed within this time)
- **Maximum Response Time**: 614ms
- **Throughput**: ~677 requests/second
- **Error Rate**: 0%

Results with RPC

Results Analysis

Graphs



The graph shows an **square increase** in response times as the number of concurrent users increases.

Key Metrics

According to the aggregated results:

- **Total Samples**: 58928
- **Average Response Time**: 85ms
- **Median Response Time**: 52ms
- **90% Line**: 210ms (90% of requests completed within this time)
- **Maximum Response Time**: 937ms
- **Throughput**: ~588 requests/second

- **Error Rate**: 0%

Comparison with Previous Results

When comparing the RPC implementation with the previous HTTP-only implementation:

- The average and median response time increased as the RPC communication adds a new delay.
- The throughput decreased slightly from ~677 to ~588 requests/second
- The increase looks similar. However, under higher load, the increase in RPC response time is less significant.

RPC performance tests

Average Response Times

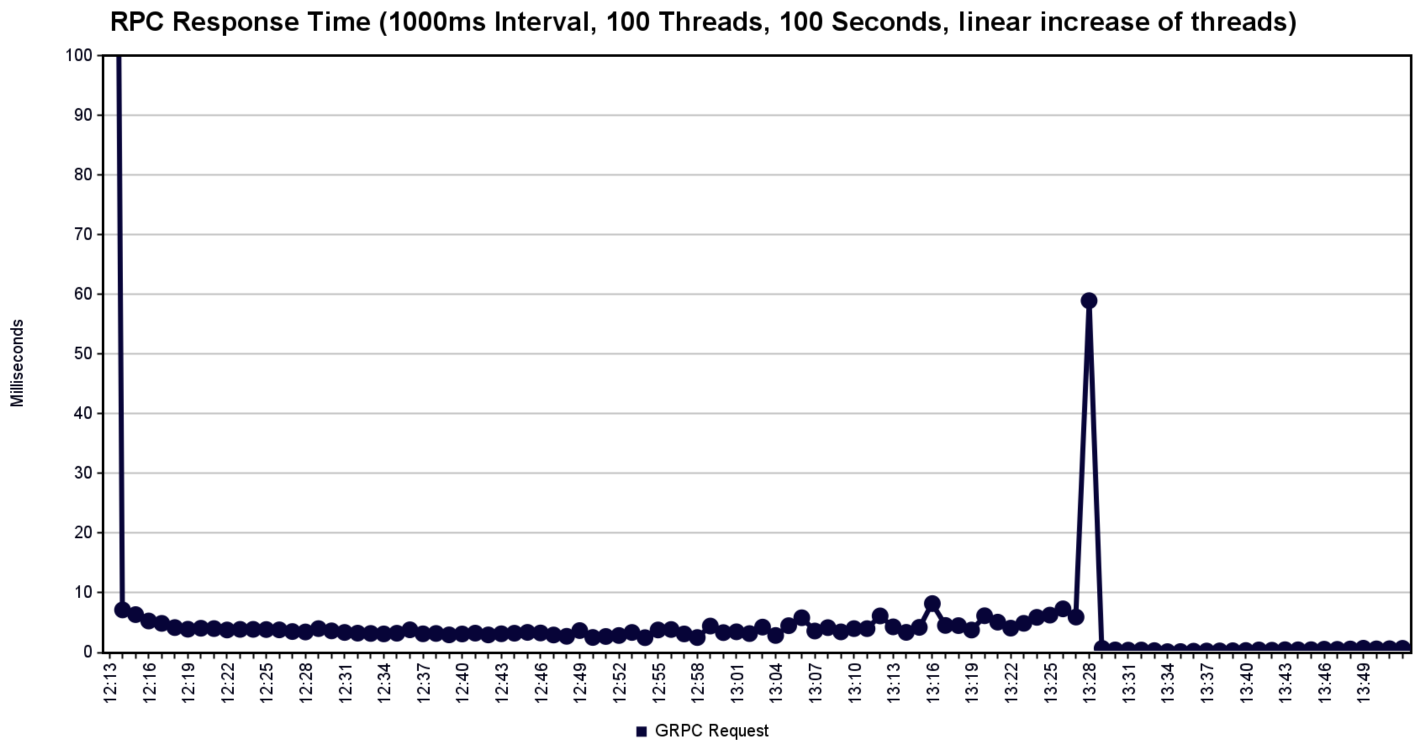
Metric	RPC (gRPC)	HTTP	HTTP with RPC
Average	3ms	74ms	85ms
Median	3ms	36ms	52ms
90% Line	5ms	201ms	210ms
Max	363ms	614ms	937ms
Throughput	1017 req/s	677 req/s	588 req/s

Stress Test Analysis

Test Configuration

- **Tool**: Apache JMeter
- **Thread Group**: 100 threads (users)
- **Ramp-up Period**: 100 seconds
- **Test Duration**: 100 seconds
- **Test Type**: Continuous gRPC calls measuring Round Trip Time (RTT)

Graphs



Results Analysis

The stress test reveals a critical threshold in the RPC system's performance:

- **Total Samples**: 212110
- **Average Response Time**: 2ms
- **Median Response Time**: 2ms
- **90% Line**: 5ms
- **Maximum Response Time**: 1008ms
- **Throughput**: ~2135 requests/second
- **Error Rate**: ~37%

1. Initially, the system maintains stable response times
2. At a certain threshold there is a sudden spike in response times
   - This spike likely indicates that a system resource limit was reached (e.g., CPU saturation, I/O bottleneck, or thread pool exhaustion)
3. After the spike, the response times drop to zero
   - This indicates that the server started rejecting requests

```
Response code: 500
Response message: 14 UNAVAILABLE
```

It has a hard limit where the system becomes overwhelmed and fails completely rather than gracefully degrading.

Important Note

When replicating this test with JMeter, make sure to increase your `ephemeral port range` or reduce `TcpTimedWaitDelay` This is crucial to prevent port exhaustion issues.