

Results

```
(rskbansal@TUF-A15) - [/mnt/c/Users/ASUS/Desktop/POPL/POPL_Assignment]
$ ab -n 20 -c 20 "http://localhost:5000/get_weather?city=Goa"
This is ApacheBench, Version 2.3 <$Revision: 1903618 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/
```

Benchmarking localhost (be patient).....done

```
Server Software:      gunicorn/19.10.0
Server Hostname:      localhost
Server Port:          5000

Document Path:        /get_weather?city=Goa
Document Length:      31 bytes

Concurrency Level:    20
Time taken for tests:  0.064 seconds
Complete requests:    20
Failed requests:      0
Non-2xx responses:    20
Total transferred:    3880 bytes
HTML transferred:     620 bytes
Requests per second:  312.46 [#/sec] (mean)
Time per request:     64.008 [ms] (mean)
Time per request:     3.200 [ms] (mean, across all concurrent requests)
Transfer rate:        59.20 [Kbytes/sec] received
```

Connection Times (ms)

| | min | mean | mean[+/-sd] | median | max |
|-------------|-----|------|-------------|--------|-----|
| Connect: | 0 | 1 | 0.4 | 1 | 1 |
| Processing: | 4 | 31 | 18.2 | 35 | 60 |
| Waiting: | 2 | 30 | 18.3 | 32 | 59 |
| Total: | 4 | 32 | 18.0 | 36 | 60 |

Percentage of the requests served within a certain time (ms)

| | |
|------|----------------------|
| 50% | 36 |
| 66% | 44 |
| 75% | 47 |
| 80% | 50 |
| 90% | 57 |
| 95% | 60 |
| 98% | 60 |
| 99% | 60 |
| 100% | 60 (longest request) |

APACHE BENCHMARK

```
[2023-11-20 23:52:44] Response time for http://127.0.0.1:5000: 736 ms  
Body: {"city":"London","condition":"Cloudy","temperature":23}
```

```
[2023-11-20 23:52:44] Response time for http://127.0.0.1:5000: 754 ms  
Body: {"city":"London","condition":"Sunny","temperature":1}
```

```
[2023-11-20 23:52:45] Response time for http://127.0.0.1:5000: 802 ms  
Body: {"city":"London","condition":"Sunny","temperature":35}
```

```
[2023-11-20 23:52:45] Response time for http://127.0.0.1:5000: 806 ms  
Body: {"city":"London","condition":"Rainy","temperature":2}
```

```
[2023-11-20 23:52:45] Response time for http://127.0.0.1:5000: 808 ms  
Body: {"city":"London","condition":"Snowy","temperature":1}
```

```
[2023-11-20 23:52:45] Response time for http://127.0.0.1:5000: 813 ms  
Body: {"city":"London","condition":"Cloudy","temperature":29}
```

```
[2023-11-20 23:52:45] Response time for http://127.0.0.1:5000: 824 ms  
Body: {"city":"London","condition":"Snowy","temperature":34}
```

```
[2023-11-20 23:52:45] Response time for http://127.0.0.1:5000: 856 ms  
Body: {"city":"London","condition":"Snowy","temperature":31}
```

```
[2023-11-20 23:52:45] Response time for http://127.0.0.1:5000: 876 ms  
Body: {"city":"London","condition":"Snowy","temperature":21}
```

```
[2023-11-20 23:52:45] Response time for http://127.0.0.1:5000: 901 ms  
Body: {"city":"London","condition":"Rainy","temperature":31}
```

```
(rskbansal@TUF-A15) - [/mnt/c/Users/ASUS/Desktop/POPL/POPL_Assignment/src]  
$
```

RESULTS FOR C++

```
{'city': 'London', 'condition': 'Cloudy', 'temperature': 1}  
2068.2756900787354 ms  
{'city': 'London', 'condition': 'Sunny', 'temperature': 33}  
2068.2756900787354 ms  
{'city': 'London', 'condition': 'Rainy', 'temperature': 26}  
2076.88045501709 ms  
{'city': 'London', 'condition': 'Cloudy', 'temperature': 19}  
2076.88045501709 ms  
{'city': 'London', 'condition': 'Cloudy', 'temperature': 4}  
2081.3913345336914 ms  
{'city': 'London', 'condition': 'Snowy', 'temperature': -9}  
2089.4429683685303 ms  
{'city': 'London', 'condition': 'Rainy', 'temperature': 34}  
2081.467390060425 ms  
{'city': 'London', 'condition': 'Rainy', 'temperature': 26}  
2097.4578857421875 ms  
{'city': 'London', 'condition': 'Cloudy', 'temperature': 21}  
2105.4553985595703 ms  
{'city': 'London', 'condition': 'Rainy', 'temperature': 27}  
2089.4792079925537 ms  
{'city': 'London', 'condition': 'Sunny', 'temperature': 13}  
2089.4792079925537 ms  
{'city': 'London', 'condition': 'Snowy', 'temperature': 20}  
2089.4603729248047 ms  
{'city': 'London', 'condition': 'Snowy', 'temperature': -13}  
2097.470998764038 ms  
{'city': 'London', 'condition': 'Sunny', 'temperature': -19}  
2113.4822368621826 ms  
{'city': 'London', 'condition': 'Cloudy', 'temperature': 40}  
2129.4631958007812 ms  
{'city': 'London', 'condition': 'Snowy', 'temperature': 14}  
2105.468511581421 ms  
PS C:\Users\ASUS\Desktop\POPL\POPL_Assignment\src> █
```

RESULTS FOR PYTHON

```
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 338.7761ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Rainy\", \"temperature\": 38}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 344.1674ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Cloudy\", \"temperature\": 3}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 346.0162ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Cloudy\", \"temperature\": 31}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 348.2016ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Rainy\", \"temperature\": 12}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 350.5684ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Sunny\", \"temperature\": 16}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 351.55ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Snowy\", \"temperature\": -9}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 353.2503ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Rainy\", \"temperature\": 27}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 355.7076ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Sunny\", \"temperature\": 37}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 358.7067ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Sunny\", \"temperature\": 40}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 362.4549ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Sunny\", \"temperature\": 13}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 364.2761ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Rainy\", \"temperature\": 5}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 366.6395ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Rainy\", \"temperature\": 35}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 368.9062ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Sunny\", \"temperature\": 23}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 369.9165ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Cloudy\", \"temperature\": 12}\n")
Response time for http://localhost:5000/get_weather?city=London&api_key=p0pl-15-fun: 373.988ms
body = Ok(b"{\"city\": \"London\", \"condition\": \"Sunny\", \"temperature\": -2}\n")
PS C:\Users\ASUS\Desktop\POPL\POPL_Assignment>
```

RESULTS FOR RUST

```
(rskbansa1@TUF-A15) - [/mnt/c/Users/ASUS/Desktop/POPL/POPL_Assignment/src]
$ gunicorn -c gunicorn_config.py backend_api:app
[2023-11-20 22:00:29 +0000] [680] [INFO] Starting gunicorn 19.10.0
[2023-11-20 22:00:29 +0000] [680] [INFO] Listening at: http://127.0.0.1:5000 (680)
[2023-11-20 22:00:29 +0000] [680] [INFO] Using worker: threads
[2023-11-20 22:00:29 +0000] [684] [INFO] Booting worker with pid: 684
```

CODE FOR SERVER

CONCLUSION RESULT

As we can see clearly, the rust results are faster than the C++ code.