

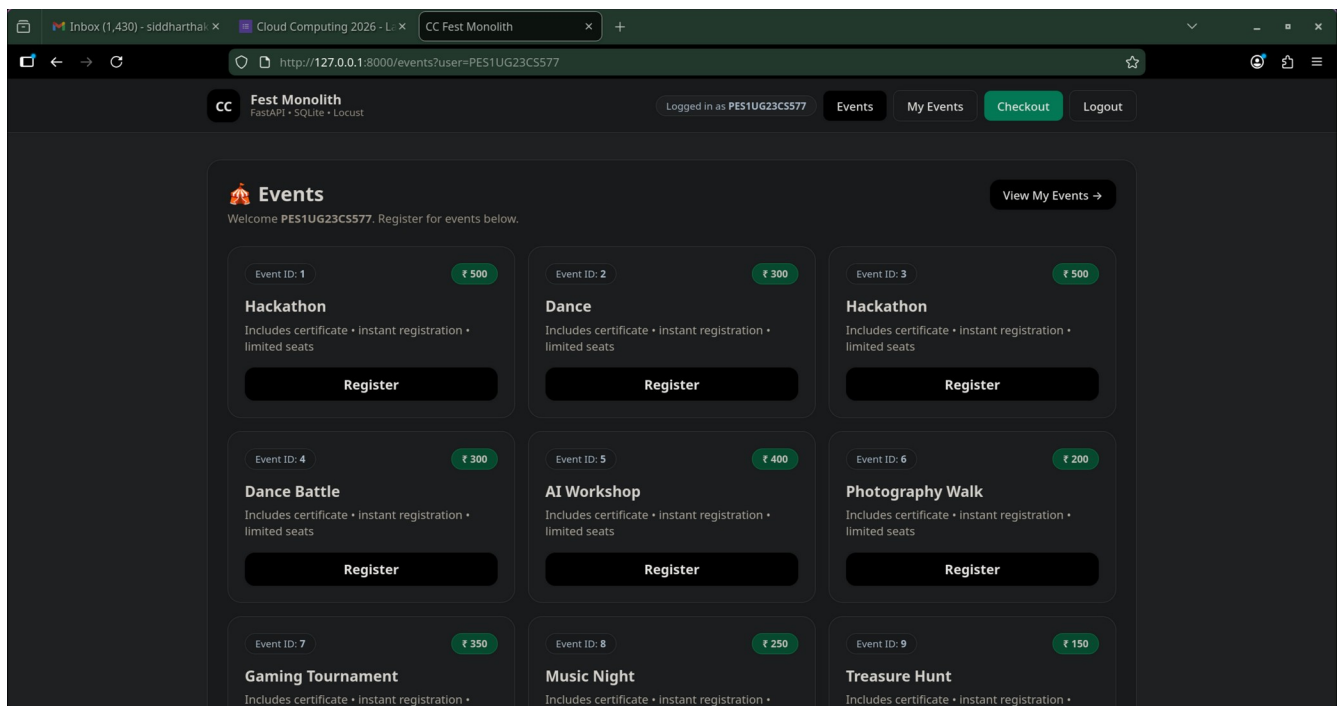
Cloud Computing

Lab 2

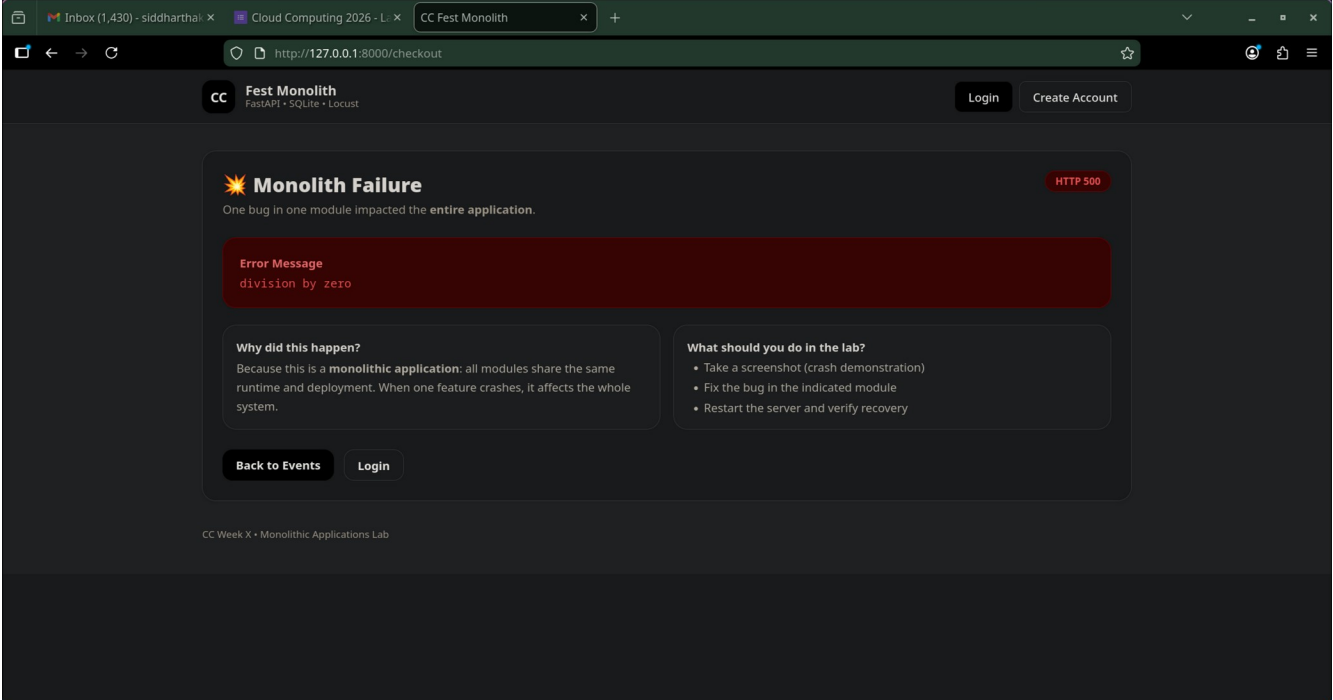
Monolithic Architecture

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Section J

ss1

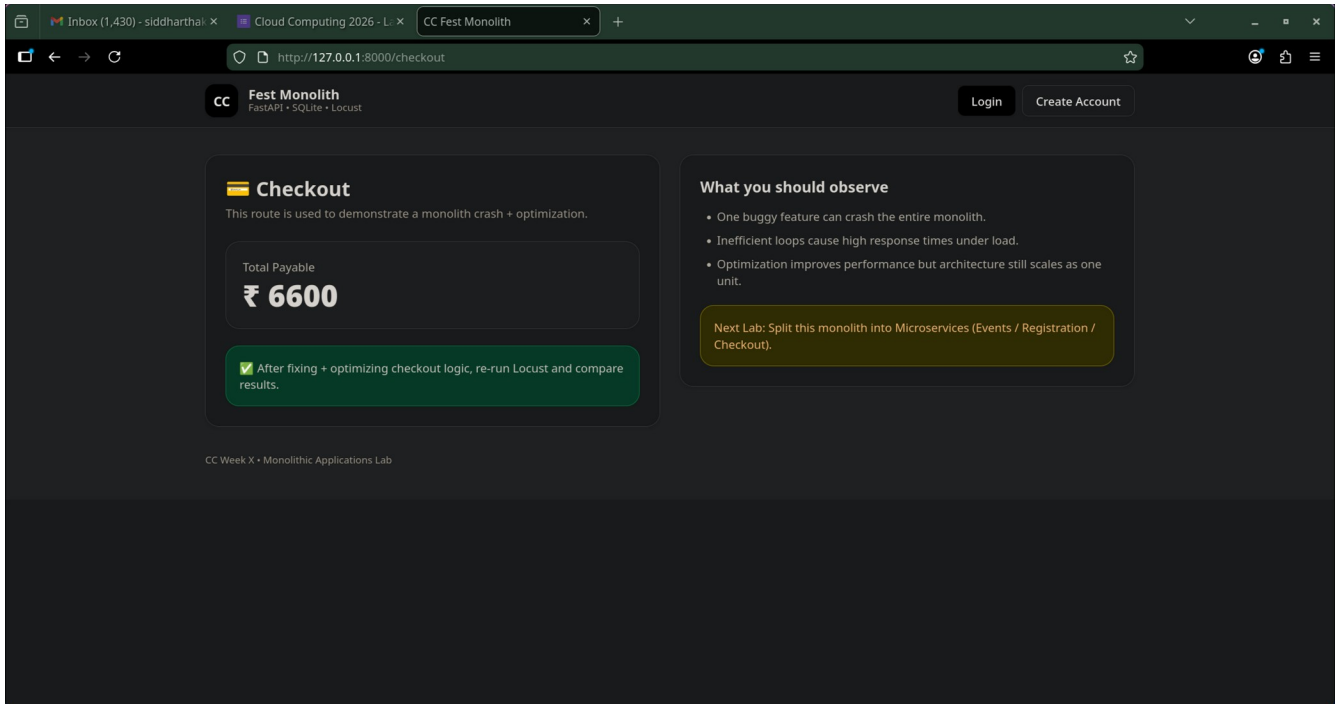


ss2



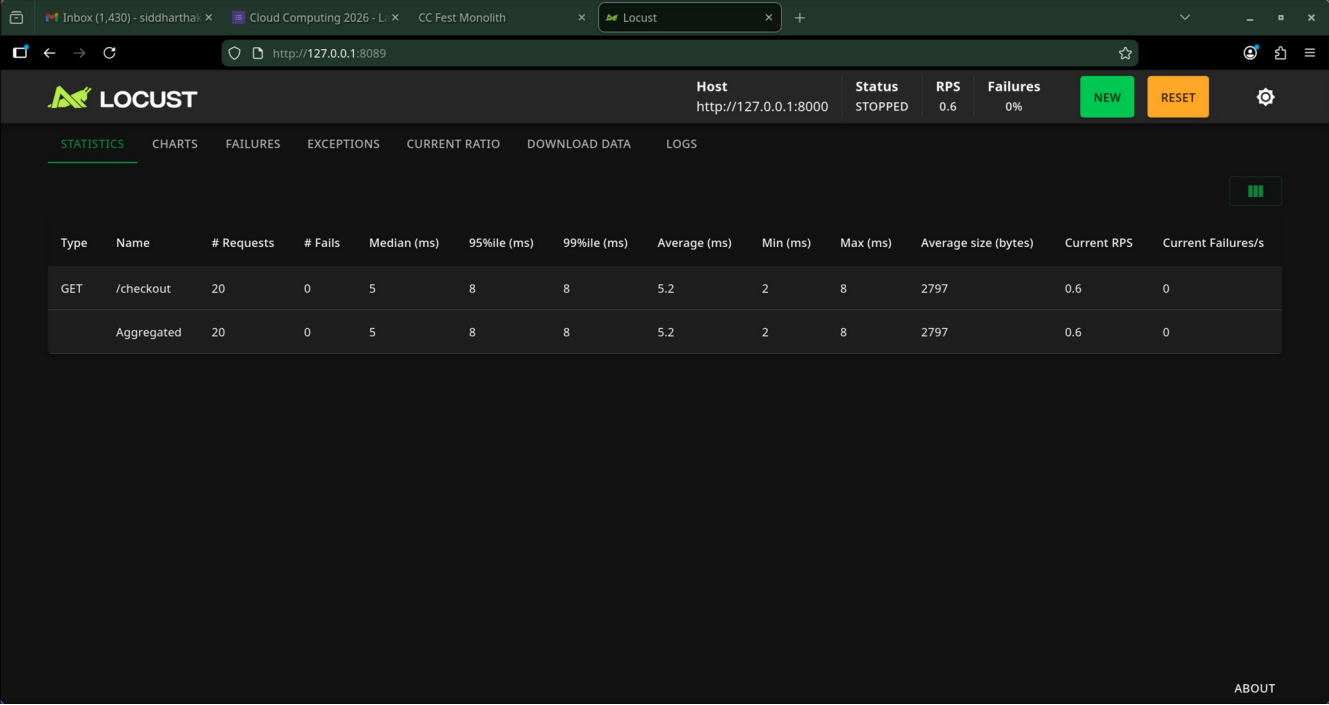
```
WARNING: StatReload detected changes in 'checkout/__init__.py'. Reloading...
INFO: Shutting down
INFO: Waiting for application shutdown.
INFO: Application shutdown complete.
INFO: Finished server process [44086]
INFO: Started server process [48322]
INFO: Waiting for application startup.
INFO: Application startup complete.
INFO: 127.0.0.1:59816 - "GET /checkout HTTP/1.1" 500 Internal Server Error
ERROR: Exception in ASGI application
Traceback (most recent call last):
  File "/home/sid/CC/PESIUG23CS577/CC Lab-2/.venv/lib/python3.14/site-packages/uvicorn/protocols/http/h11_impl.py", line 410, in run_asgi
    result = await app( # type: ignore[func-returns-value]
              ~~~~~^~
               ^^^^^^^
    self.scope, self.receive, self.send
    ~~~~~^~
    ~~~~~^~
```

ss3



```
WARNING: StatReload detected changes in 'checkout/__init__.py'. Reloading...
INFO: Shutting down
INFO: Waiting for application shutdown.
INFO: Application shutdown complete.
INFO: Finished server process [48322]
INFO: Started server process [49183]
INFO: Waiting for application startup.
INFO: Application startup complete.
INFO: 127.0.0.1:58328 - "GET /checkout HTTP/1.1" 200 OK
```

ss4 unable to take side by side but its the same in 2 diff



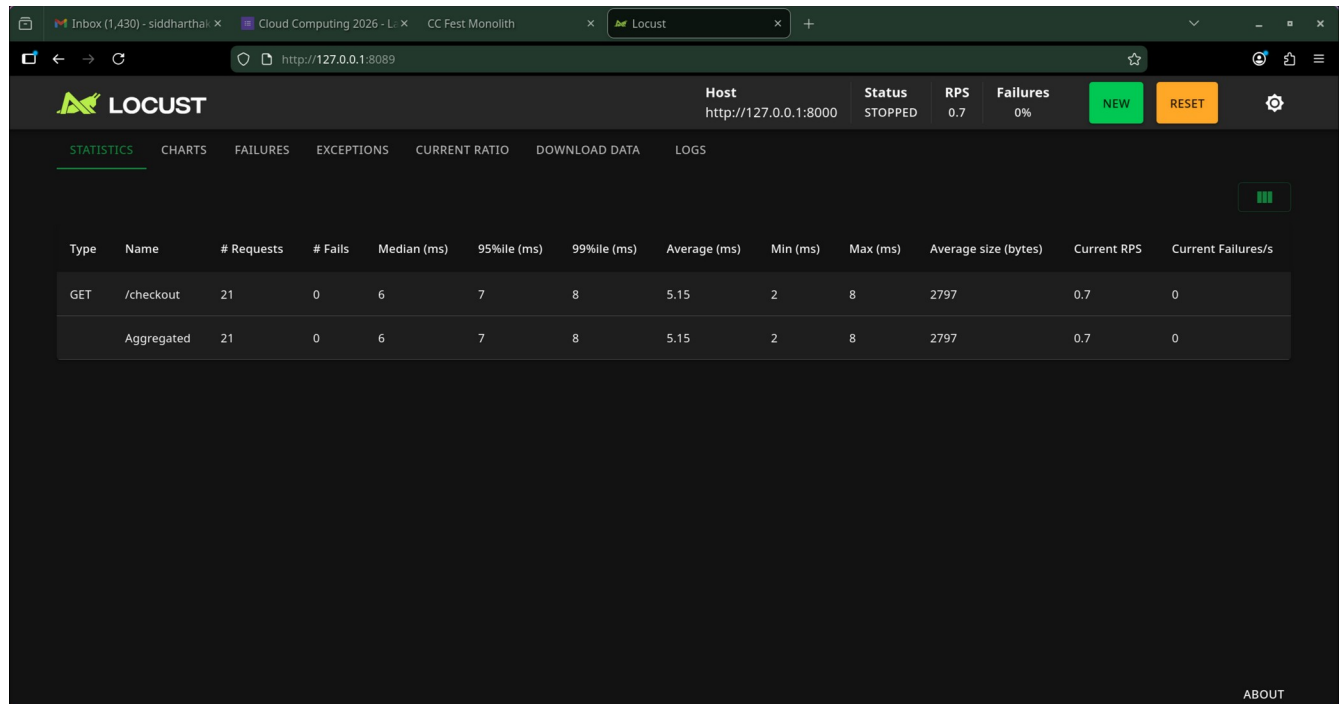
```
Type      Name      50%      66%      75%      80%      90%      95%      98%      99%      99.9%  99.99%  100% # reqs
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

> locust -f Locust/checkout_locustfile.py
[2026-01-29 14:57:46.304] archlinux/INFO/Locust.main: Starting Locust 2.43.1
[2026-01-29 14:57:46.305] archlinux/INFO/Locust.main: Starting web interface at http://0.0.0.0:8089, press enter to open your default browser.
[2026-01-29 14:58:39.184] archlinux/INFO/Locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 14:58:39.184] archlinux/INFO/Locust.runners: All users spawned: {"CheckoutUser": 1} (1 total users)
KeyboardInterrupt
2026-01-29T09:29:33Z
[2026-01-29 14:59:33.497] archlinux/INFO/Locust.main: Shutting down (exit code 0)
Type      Name      # reqs      # fails | Avg      Min      Max      Med | req/s      failures/s
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
GET       /checkout      20         0(0.00%) | 5         2         8         5 | 0.68         0.00
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Aggregated      20         0(0.00%) | 5         2         8         5 | 0.68         0.00

Response time percentiles (approximated)
Type      Name      50%      66%      75%      80%      90%      95%      98%      99%      99.9%  99.99%  100% # reqs
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
GET       /checkout      6         8         8         8         8         8         8         8         8         8         8         20
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Aggregated      6         8         8         8         8         8         8         8         8         8         8         20

~/CC/PESIUG23CS577/CC Lab-2 1m 47s CC Lab-2 >
```

ss5



```
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
GET    /checkout    6      8      8      8      8      8      8      8      8      8      8      8      20
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Aggregated    6      8      8      8      8      8      8      8      8      8      8      8      20

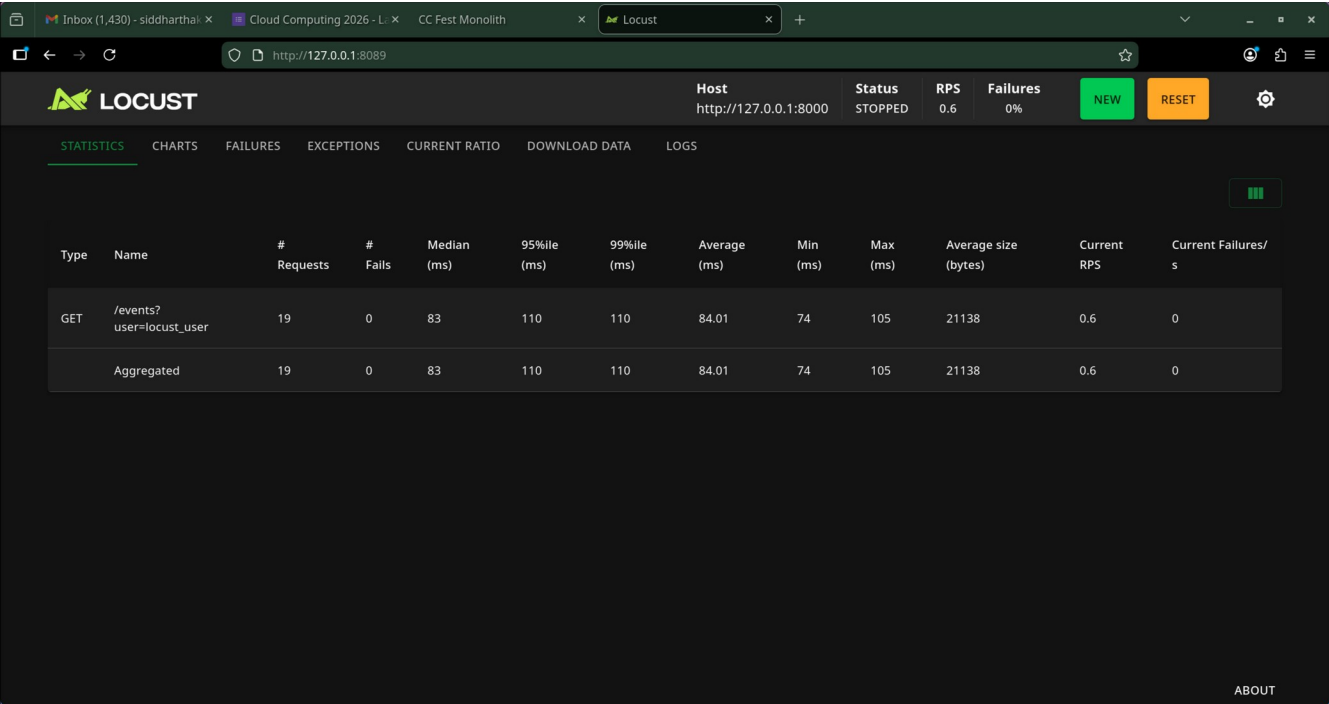
> locust -f locust/checkout_locustfile.py
[2026-01-29 15:03:15.171] archlinux/INFO/locust.main: Starting Locust 2.43.1
[2026-01-29 15:03:15.172] archlinux/INFO/locust.main: Starting web interface at http://0.0.0.0:8089, press enter to open your default browser.
[2026-01-29 15:03:55.074] archlinux/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 15:03:55.074] archlinux/INFO/locust.runners: All users spawned: {"CheckoutUser": 1} (1 total users)
KeyboardInterrupt
2026-01-29T09:34:37Z
[2026-01-29 15:04:37.174] archlinux/INFO/locust.main: Shutting down (exit code 0)
Type    Name    # reqs    # fails | Avg    Min    Max    Med | req/s    failures/s
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
GET    /checkout    21      0(0.00%) | 5      2      7      6 | 0.72     0.00
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Aggregated    21      0(0.00%) | 5      2      7      6 | 0.72     0.00

Response time percentiles (approximated)
Type    Name    66%    75%    80%    90%    95%    98%    99%    99.9%    99.99%    100% # reqs
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
GET    /checkout    6      7      7      7      7      7      8      8      8      8      8      21
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Aggregated    6      7      7      7      7      7      8      8      8      8      8      21

~/CC/PES1UG23C5577/CC Lab-2 1m 22s CC Lab-2 >
```

previously it was 5.2 now it is 5.15 showing increase under same load
number of requests also increased by 1 in the same time after optimization
rps increased by 0.1 0.6->0.7

ss6

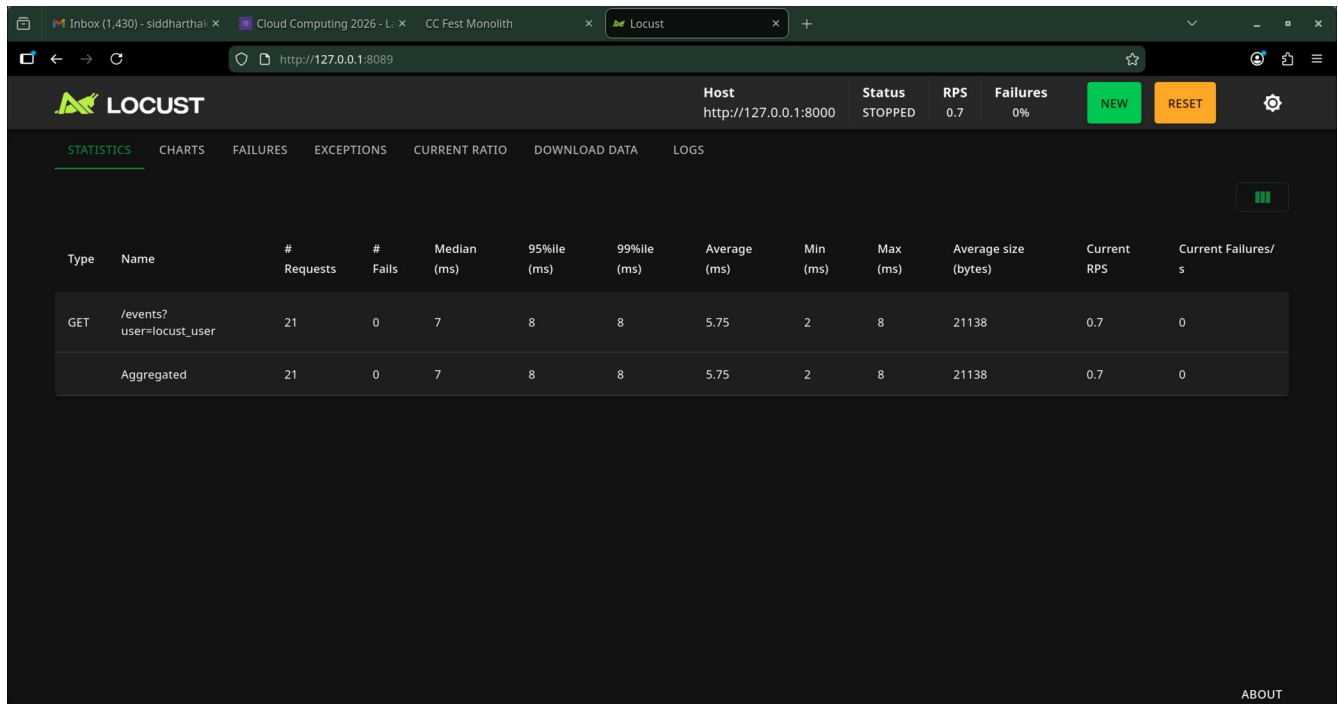


```
Response time percentiles (approximated)
Type Name 50% 66% 75% 80% 90% 95% 98% 99% 99.9% 99.99% 100% # reqs
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
GET /checkout 6 7
> locust -f locust/events_locustfile.py
[2026-01-29 15:14:23,915] archlinux/INFO/locust.main: Starting Locust 2.43.1
[2026-01-29 15:14:23,915] archlinux/INFO/locust.main: Starting web interface at http://0.0.0.0:8089, press enter to open your default browser.
[2026-01-29 15:15:04,321] archlinux/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 15:15:04,322] archlinux/INFO/locust.runners: All users spawned: {"EventsUser": 1} (1 total users)
KeyboardInterrupt
2026-01-29T09:45:54Z
[2026-01-29 15:15:54,725] archlinux/INFO/locust.main: Shutting down (exit code 0)
Type Name # reqs # fails | Avg Min Max Med | req/s failures/s
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
GET /events?user=locust_user 19 0(0.00%) | 84 74 105 83 | 0.67 0.00
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
Aggregated 19 0(0.00%) | 84 74 105 83 | 0.67 0.00

Response time percentiles (approximated)
Type Name 50% 66% 75% 80% 90% 95% 98% 99% 99.9% 99.99% 100% # reqs
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
GET /events?user=locust_user 83 86 87 88 90 110 110 110 110 110 110 19
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
Aggregated 83 86 87 88 90 110 110 110 110 110 110 19

~/CC/PES1UG23C5577/CC Lab-2 1m 31s CC Lab-2 >
```

ss7



```
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
GET    /checkout  6      7      7      7      7      7      7      7      7      7      7      7      7      21
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Aggregated  6      7      7      7      7      7      7      7      7      7      7      7      7      21

> locust -f locust/events_locustfile.py
[2026-01-29 15:29:32.632] archlinux/INFO/locust.main: Starting Locust 2.43.1
[2026-01-29 15:29:32.632] archlinux/INFO/locust.main: Starting web interface at http://0.0.0.0:8089, press enter to open your default browser.
[2026-01-29 15:33:28.825] archlinux/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 15:33:28.826] archlinux/INFO/locust.runners: All users spawned: {"EventsUser": 1} (1 total users)
KeyboardInterrupt
2026-01-29T10:04:21Z
[2026-01-29 15:34:21.771] archlinux/INFO/locust.main: Shutting down (exit code 0)
Type   Name   # reqs   # fails |   Avg   Min   Max   Med |  req/s  failures/s
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
GET    /events?user=locust_user  21      0(0.00%) |    5    2    8    7 |    0.70    0.00
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Aggregated  21      0(0.00%) |    5    2    8    7 |    0.70    0.00

Response time percentiles (approximated)
Type   Name   50%   66%   75%   80%   90%   95%   98%   99%   99.9%  99.99%  100% # reqs
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
GET    /events?user=locust_user    7     7     8     8     8     8     8     8     8     8     8     8     21
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Aggregated    7     7     8     8     8     8     8     8     8     8     8     8     21

~/CC/PES1UG23CS577/CC Lab-2 4m 49s CC Lab-2 >
```

The main bottleneck was the intentional loops in `/events` loop running 3,000,000 iterations

```
waste = 0  
for i in range(3000000):  
    waste += i % 3
```

removed these lines

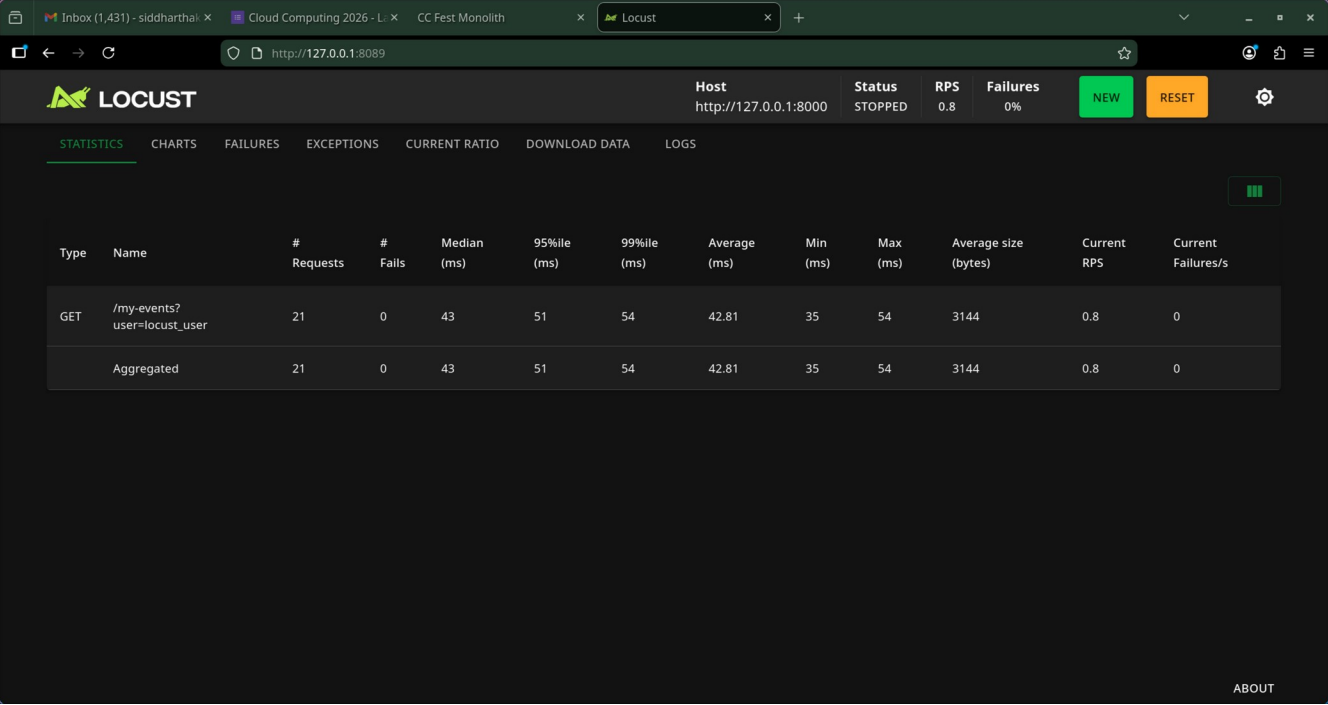
Performance improved because:

The server no longer wastes CPU time

Requests complete faster

Response time dropped because only useful work is executed

ss8

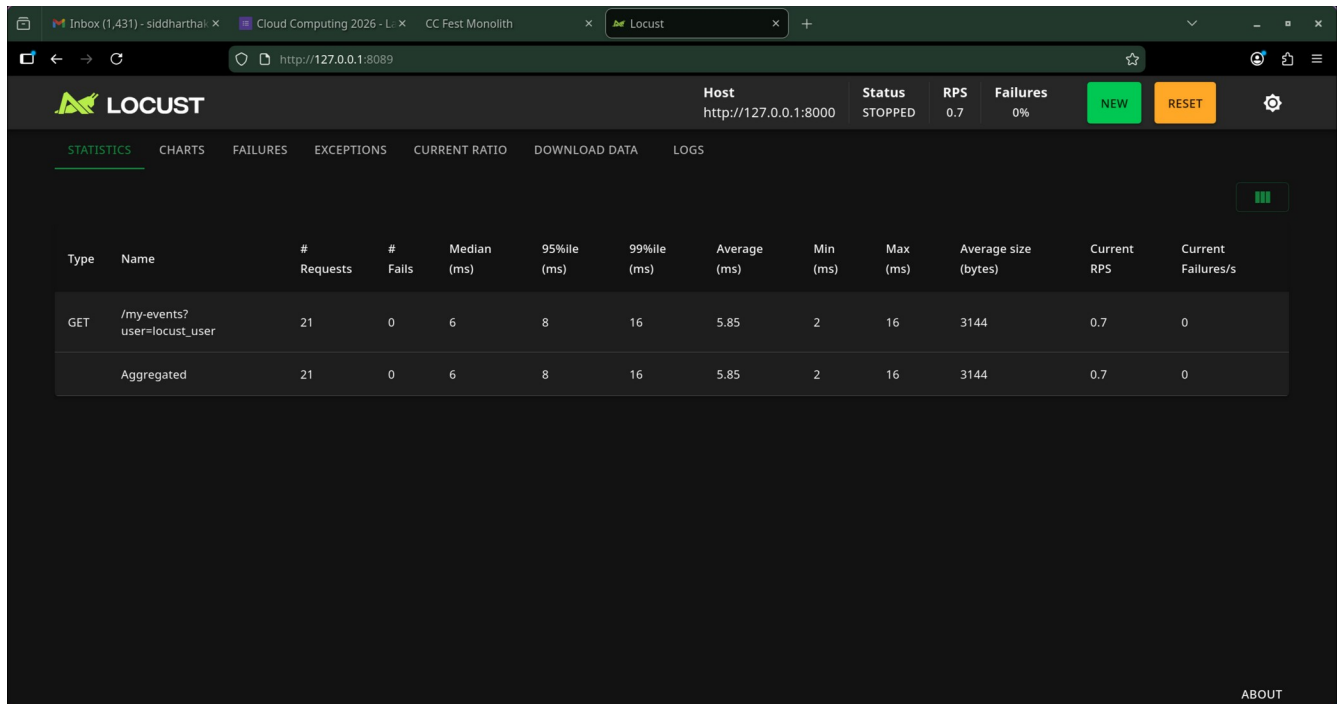


```
> Locust -f Locust/myevents_locustfile.py
[2026-01-29 15:43:48.064] archlinux/INFO/locust.main: Starting Locust 2.43.1
[2026-01-29 15:43:48.065] archlinux/INFO/locust.main: Starting web interface at http://0.0.0.0:8089, press enter to open your default browser.
[2026-01-29 15:45:02.719] archlinux/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 15:45:02.719] archlinux/INFO/locust.runners: All users spawned: {"MyEventsUser": 1} (1 total users)
KeyboardInterrupt
2026-01-29T10:16:05Z
[2026-01-29 15:46:05.270] archlinux/INFO/locust.main: Shutting down (exit code 0)
Type      Name                                     # reqs   # fails |  Avg   Min   Max   Med |  req/s  failures/s
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
GET        /my-events?user=locust_user              21       0(0.00%) |   42   34   54   43 |   0.71   0.00
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
Aggregated                                     21       0(0.00%) |   42   34   54   43 |   0.71   0.00

Response time percentiles (approximated)
Type      Name                                     50%    66%    75%    80%    90%    95%    98%    99%    99.9%  99.99
% 100% # reqs
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
GET        /my-events?user=locust_user              43    44    46    46    50    51    54    54    54    5
4      54      21
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
Aggregated                                     43    44    46    46    50    51    54    54    54    5
4      54      21

~/CC/PES1UG23CS577/CC Lab-2 2m 17s CC Lab-2 >
```

ss9



```
> locust -f Locust/myevents_locustfile.py
[2026-01-29 15:48:22,370] archlinux/INFO/Locust.main: Starting Locust 2.43.1
[2026-01-29 15:48:22,370] archlinux/INFO/Locust.main: Starting web interface at http://0.0.0.0:8089, press enter to open your default browser.
[2026-01-29 15:48:34,099] archlinux/INFO/Locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 15:48:34,099] archlinux/INFO/Locust.runners: All users spawned: {"MyEventsUser": 1} (1 total users)
KeyboardInterrupt
2026-01-29T10:19:20Z
[2026-01-29 15:49:20,723] archlinux/INFO/Locust.main: Shutting down (exit code 0)
Type      Name                                     # reqs   # fails | Avg    Min    Max    Med | req/s  failures/s
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
GET       /my-events?user=locust_user              21       0(0.00%) | 5      2     15     6 | 0.70   0.00
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Aggregated                                     21       0(0.00%) | 5      2     15     6 | 0.70   0.00

Response time percentiles (approximated)
Type      Name                                     50%    66%    75%    80%    90%    95%    98%    99%    99.9%  99.99
% 100% # reqs
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
GET       /my-events?user=locust_user              6      7      7      7      8      8     16     16     16     1
6 16 21
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Aggregated                                     6      7      7      7      8      8     16     16     16     1
6 16 21

~/CC/PES1UG23C5577/CC Lab-2 59s CC Lab-2 > | 03:49:20 PM
```

bottleneck was caused by these lines in `/my-events`

it ran 1,500,000 iterations

```
dummy = 0
```

```
for _ in range(1500000): dummy += 1
```

removed these lines

Performance improved because of the same reasons as above:

The server no longer wastes CPU time

Requests complete faster

Response time dropped because only useful work is executed