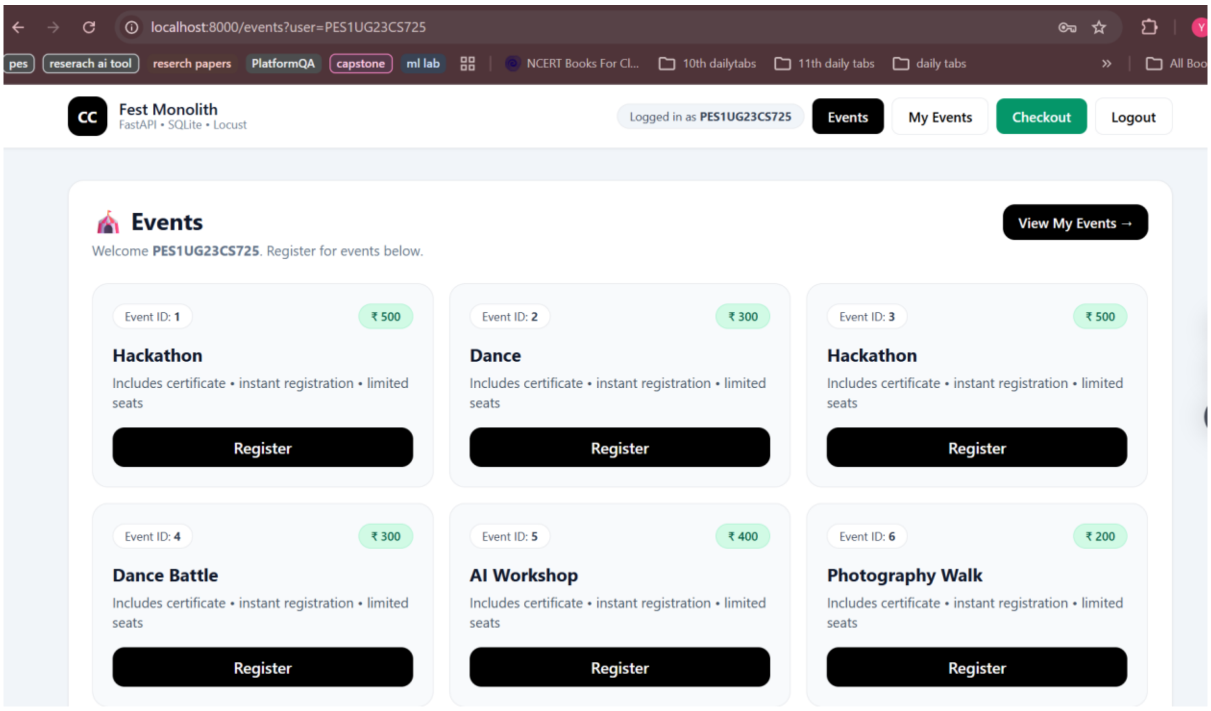
Ss1


localhost:8000/events?user=PES1UG23CS725

Fest Monolith
FastAPI • SQLite • Locust

Logged in as PES1UG23CS725 | Events | My Events | Checkout | Logout

Events
Welcome PES1UG23CS725. Register for events below.

View My Events →

Event ID: 1 — ₹ 500
Hackathon
Includes certificate • instant registration • limited seats
Register

Event ID: 2 — ₹ 300
Dance
Includes certificate • instant registration • limited seats
Register

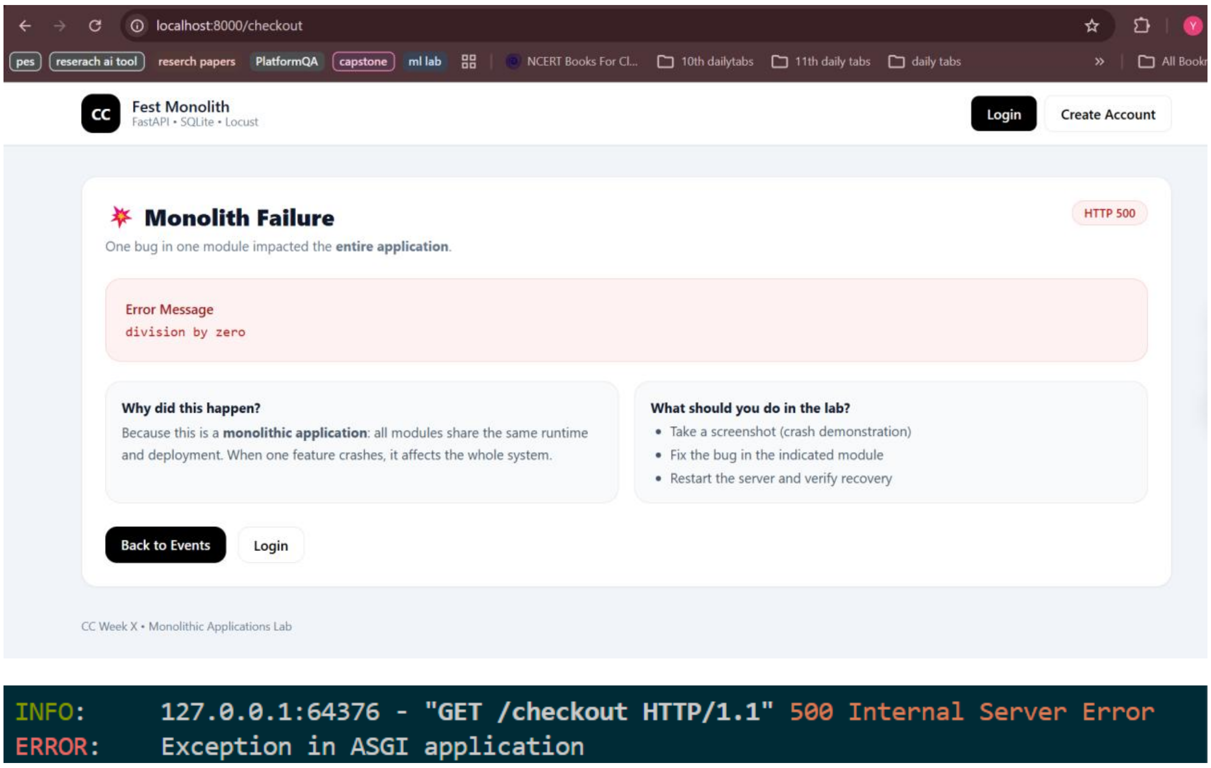
Event ID: 3 — ₹ 500
Hackathon
Includes certificate • instant registration • limited seats
Register

Event ID: 4 — ₹ 300
Dance Battle
Includes certificate • instant registration • limited seats
Register

Event ID: 5 — ₹ 400
AI Workshop
Includes certificate • instant registration • limited seats
Register

Event ID: 6 — ₹ 200
Photography Walk
Includes certificate • instant registration • limited seats
Register

Ss2


localhost:8000/checkout

Fest Monolith
FastAPI • SQLite • Locust

Login | Create Account

Monolith Failure
HTTP 500
One bug in one module impacted the **entire application**.

Error Message
```
division by zero
```

Why did this happen?
Because this is a **monolithic application**: all modules share the same runtime and deployment. When one feature crashes, it affects the whole system.

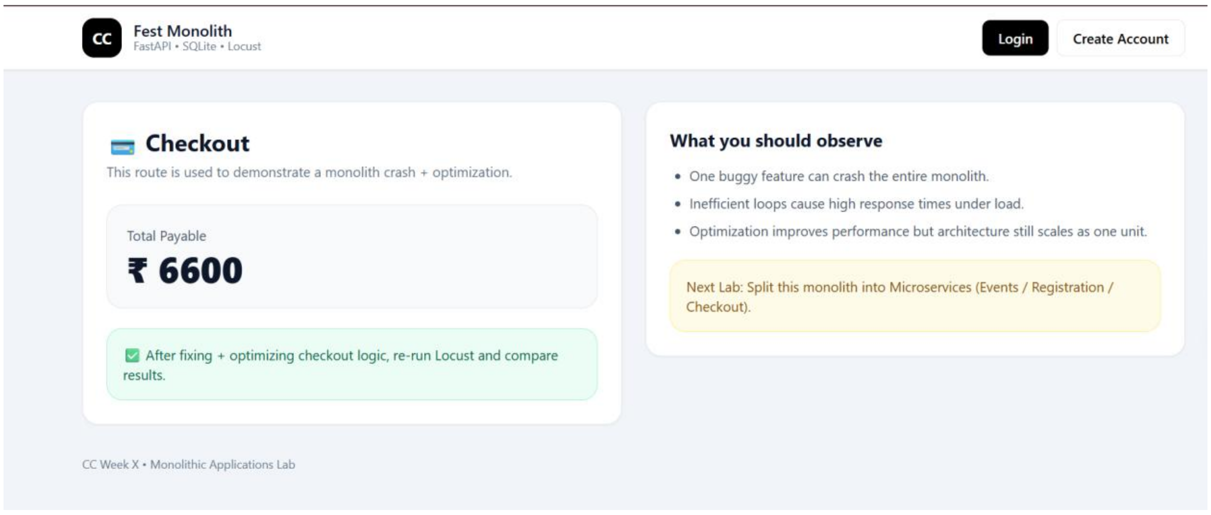
What should you do in the lab?
- Take a screenshot (crash demonstration)
- Fix the bug in the indicated module
- Restart the server and verify recovery

Back to Events | Login

CC Week X • Monolithic Applications Lab

```
INFO:     127.0.0.1:64376 - "GET /checkout HTTP/1.1" 500 Internal Server Error
ERROR:    Exception in ASGI application
```

Ss3



CC Fest Monolith
FastAPI • SQLite • Locust

Login | Create Account

Checkout

This route is used to demonstrate a monolith crash + optimization.

Total Payable
₹ 6600

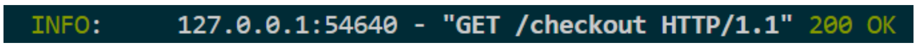
✓ After fixing + optimizing checkout logic, re-run Locust and compare results.

What you should observe

- One buggy feature can crash the entire monolith.
- Inefficient loops cause high response times under load.
- Optimization improves performance but architecture still scales as one unit.

Next Lab: Split this monolith into Microservices (Events / Registration / Checkout).

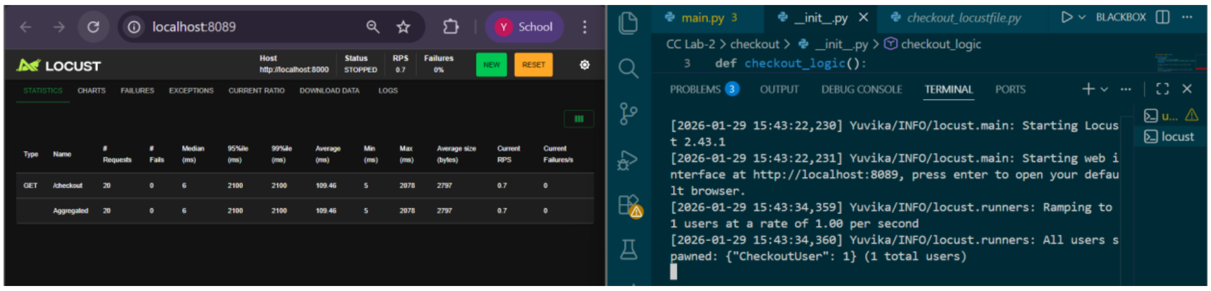
CC Week X • Monolithic Applications Lab



```
INFO:     127.0.0.1:54640 - "GET /checkout HTTP/1.1" 200 OK
```

Ss4

before optimizimg



localhost:8089

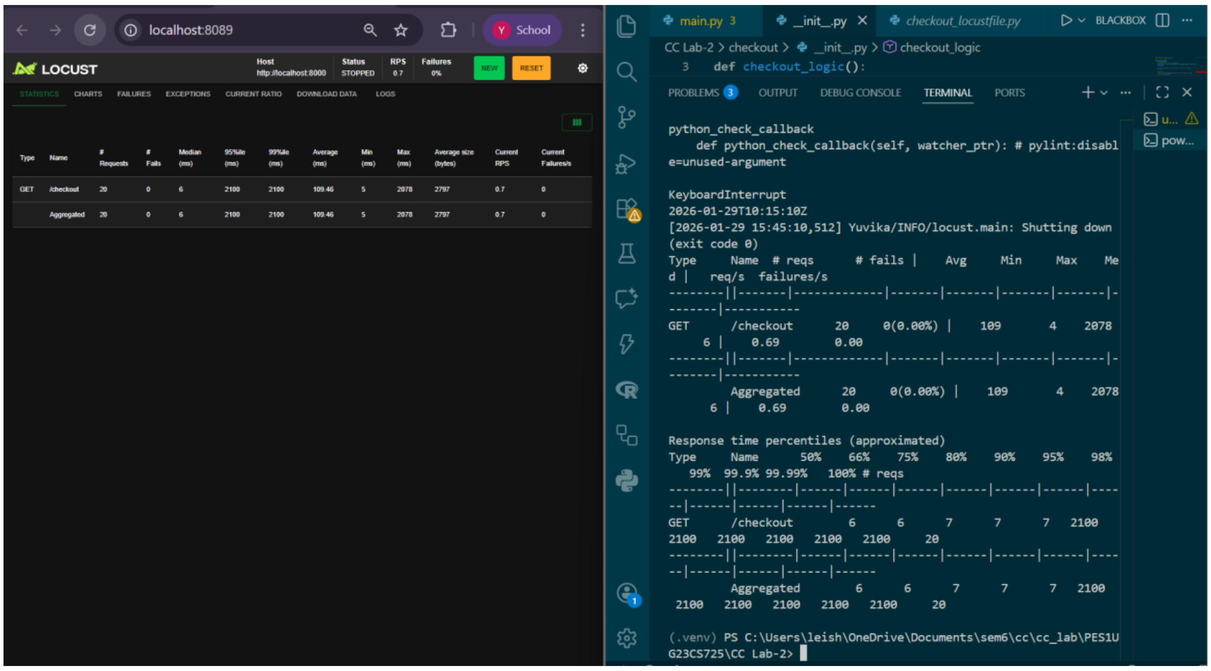
LOCUST — Host: http://localhost:8000 — Status: STOPPED — RPS: 0.7 — Failures: 0%

Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/checkout	20	0	6	2100	2100	109.46	5	2078	2797	0.7	0
	Aggregated	20	0	6	2100	2100	109.46	5	2078	2797	0.7	0

CC Lab-2 > checkout > _init_.py > checkout_logic

```
def checkout_logic():
```

```
[2026-01-29 15:43:22,230] Yuvika/INFO/locust.main: Starting Locus
t 2.43.1
[2026-01-29 15:43:22,231] Yuvika/INFO/locust.main: Starting web i
nterface at http://localhost:8089, press enter to open your defau
lt browser.
[2026-01-29 15:43:34,359] Yuvika/INFO/locust.runners: Ramping to
1 users at a rate of 1.00 per second
[2026-01-29 15:43:34,360] Yuvika/INFO/locust.runners: All users s
pawned: {"CheckoutUser": 1} (1 total users)
```



localhost:8089

LOCUST — Host: http://localhost:8000 — Status: STOPPED — RPS: 0.7 — Failures: 0%

Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/checkout	20	0	6	2100	2100	109.46	5	2078	2797	0.7	0
	Aggregated	20	0	6	2100	2100	109.46	5	2078	2797	0.7	0

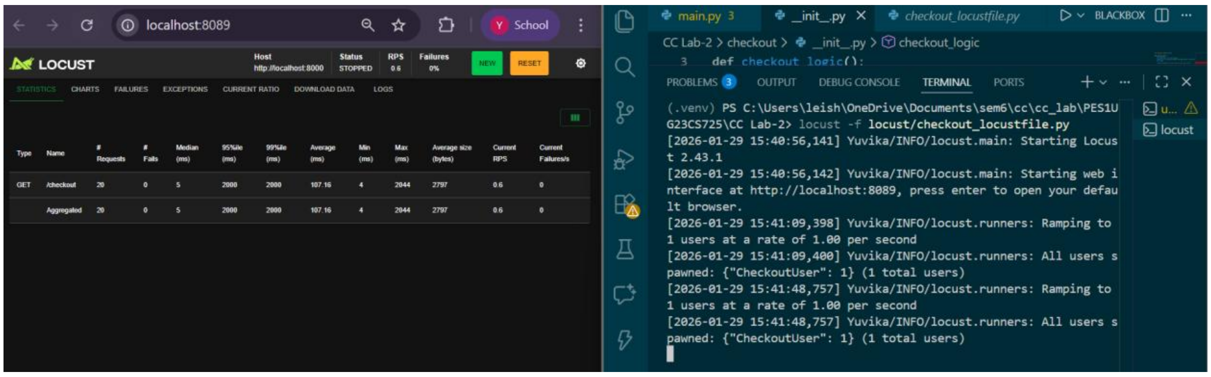
CC Lab-2 > checkout > _init_.py > checkout_logic

```
def checkout_logic():
```

```
python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disabl
e=unused-argument

KeyboardInterrupt
2026-01-29T10:15:10Z
[2026-01-29 15:45:10,512] Yuvika/INFO/locust.main: Shutting down
(exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max    Me
d |   req/s  failures/s
--------||-------|------------|-------|-------|-------|-------|-
-------|-----------
GET      /checkout      20     0(0.00%) |    109       4    2078
     6 |    0.69       0.00
--------||-------|------------|-------|-------|-------|-------|-
-------|-----------
         Aggregated      20     0(0.00%) |    109       4    2078
      6 |    0.69       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      6      7      7      7   2100
2100   2100   2100   2100   2100     20
--------||--------|------|------|------|------|------|------|----
--|------|------|------|------
         Aggregated        6      6      7      7      7   2100
 2100   2100   2100   2100   2100     20

(.venv) PS C:\Users\leish\OneDrive\Documents\sem6\cc\cc_lab\PES1U
G23CS725\CC Lab-2>
```

Ss5

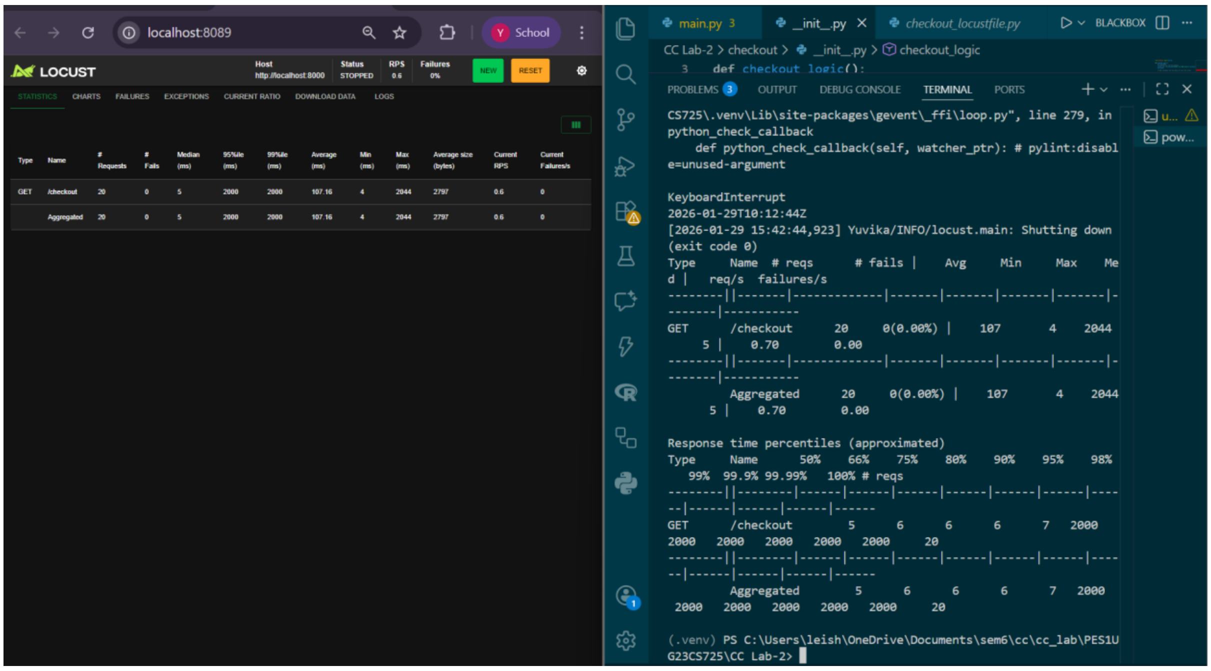
After optimizing



Host http://localhost:8000 | Status STOPPED | RPS 0.6 | Failures 0%

Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/checkout	20	0	5	2000	2000	107.16	4	2044	2797	0.6	0
	Aggregated	20	0	5	2000	2000	107.16	4	2044	2797	0.6	0

```
  3    def checkout_logic():
(.venv) PS C:\Users\leish\OneDrive\Documents\sem6\cc\cc_lab\PES1U
G23CS725\CC Lab-2> locust -f locust/checkout_locustfile.py
[2026-01-29 15:40:56,141] Yuvika/INFO/locust.main: Starting Locus
t 2.43.1
[2026-01-29 15:40:56,142] Yuvika/INFO/locust.main: Starting web i
nterface at http://localhost:8089, press enter to open your defau
lt browser.
[2026-01-29 15:41:09,398] Yuvika/INFO/locust.runners: Ramping to
1 users at a rate of 1.00 per second
[2026-01-29 15:41:09,400] Yuvika/INFO/locust.runners: All users s
pawned: {"CheckoutUser": 1} (1 total users)
[2026-01-29 15:41:48,757] Yuvika/INFO/locust.runners: Ramping to
1 users at a rate of 1.00 per second
[2026-01-29 15:41:48,757] Yuvika/INFO/locust.runners: All users s
pawned: {"CheckoutUser": 1} (1 total users)
```



Host http://localhost:8000 | Status STOPPED | RPS 0.6 | Failures 0%

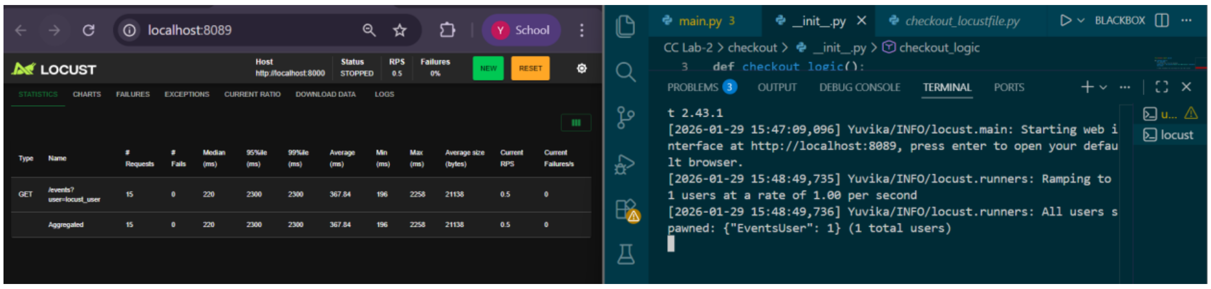
Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/checkout	20	0	5	2000	2000	107.16	4	2044	2797	0.6	0
	Aggregated	20	0	5	2000	2000	107.16	4	2044	2797	0.6	0

```
  3    def checkout_logic():
CS725\.venv\Lib\site-packages\gevent\_ffi\loop.py", line 279, in
python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disabl
e=unused-argument

KeyboardInterrupt
2026-01-29T10:12:44Z
[2026-01-29 15:42:44,923] Yuvika/INFO/locust.main: Shutting down
(exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max    Me
d |   req/s  failures/s
--------||-------|-------------|-------|-------|-------|-------|-
-------|-----------
GET      /checkout      20     0(0.00%) |    107       4    2044
    5 |    0.70        0.00
--------||-------|-------------|-------|-------|-------|-------|-
-------|-----------
         Aggregated      20     0(0.00%) |    107       4    2044
    5 |    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      /checkout         5      6      6      6      7   2000
2000   2000   2000   2000   2000     20
--------||--------|------|------|------|------|------|------|----
--|------|------|------|------
         Aggregated        5      6      6      6      7   2000
 2000   2000   2000   2000   2000     20

(.venv) PS C:\Users\leish\OneDrive\Documents\sem6\cc\cc_lab\PES1U
G23CS725\CC Lab-2>
```

DIY

Ss6

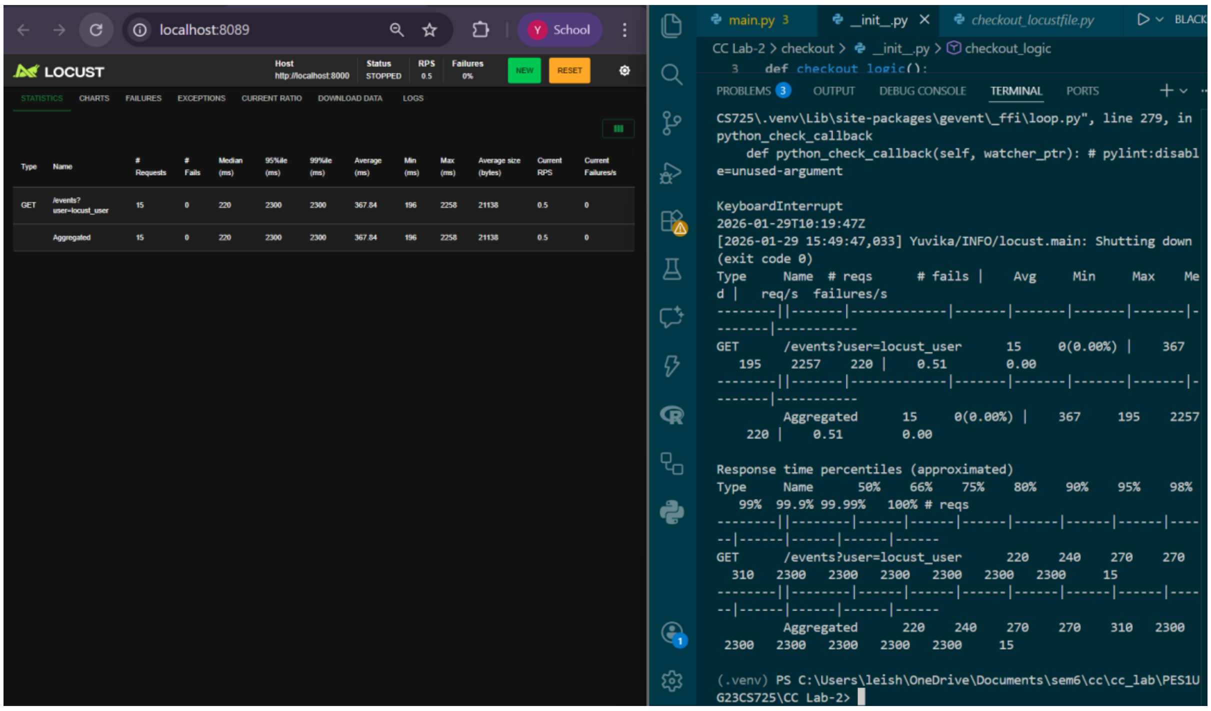
Before



Host http://localhost:8000 | Status STOPPED | RPS 0.5 | Failures 0%

Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/events?user=locust_user	15	0	220	2300	2300	367.84	196	2258	21138	0.5	0
	Aggregated	15	0	220	2300	2300	367.84	196	2258	21138	0.5	0

```
  3    def checkout_logic():
t 2.43.1
[2026-01-29 15:47:09,096] Yuvika/INFO/locust.main: Starting web i
nterface at http://localhost:8089, press enter to open your defau
lt browser.
[2026-01-29 15:48:49,735] Yuvika/INFO/locust.runners: Ramping to
1 users at a rate of 1.00 per second
[2026-01-29 15:48:49,736] Yuvika/INFO/locust.runners: All users s
pawned: {"EventsUser": 1} (1 total users)
```



Host	Status	RPS	Failures
http://localhost:8000	STOPPED	0.5	0%

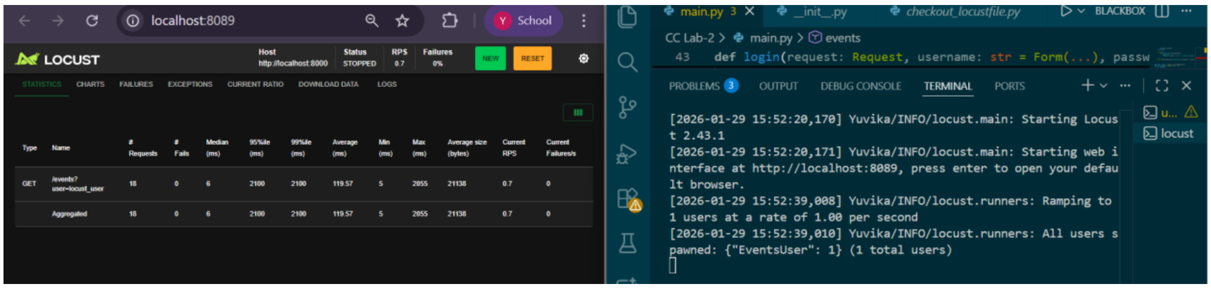
Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/events?user=locust_user	15	0	220	2300	2300	367.84	196	2258	21138	0.5	0
	Aggregated	15	0	220	2300	2300	367.84	196	2258	21138	0.5	0

```
    def checkout_logic():
```

```
CS725\.venv\Lib\site-packages\gevent\_ffi\loop.py", line 279, in
python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disabl
e=unused-argument

KeyboardInterrupt
2026-01-29T10:19:47Z
[2026-01-29 15:49:47,033] Yuvika/INFO/locust.main: Shutting down
(exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max    Me
d |   req/s  failures/s
--------||-------|-------------|-------|-------|-------|-------|-
-------|-----------
GET      /events?user=locust_user      15     0(0.00%) |    367
   195    2257    220 |    0.51        0.00
--------||-------|-------------|-------|-------|-------|-------|-
-------|-----------
         Aggregated      15     0(0.00%) |    367     195    2257
    220 |    0.51        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      220    240    270    270
   310   2300   2300   2300   2300   2300   2300     15
--------||--------|------|------|------|------|------|------|----
--|------|------|------|------
         Aggregated        220    240    270    270    310   2300
  2300   2300   2300   2300   2300     15

(.venv) PS C:\Users\leish\OneDrive\Documents\sem6\cc\cc_lab\PES1U
G23CS725\CC Lab-2> 
```

Ss7

After optimizing

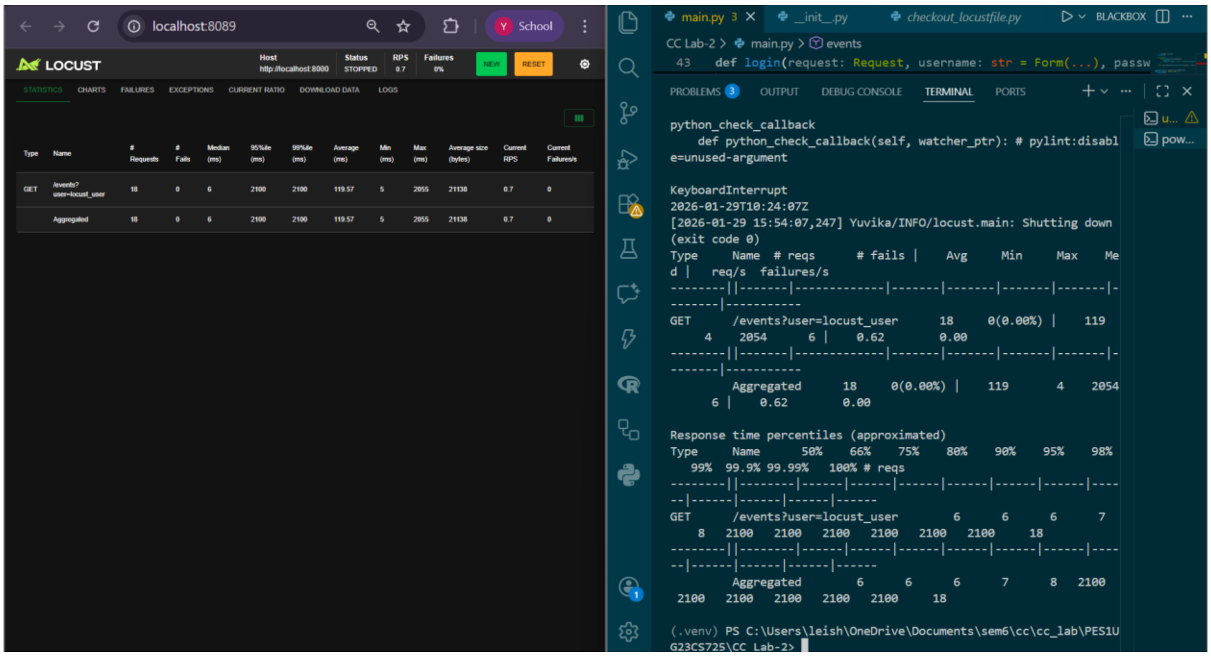


Host	Status	RPS	Failures
http://localhost:8000	STOPPED	0.7	0%

Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/events?user=locust_user	18	0	6	2100	2100	119.57	5	2055	21138	0.7	0
	Aggregated	18	0	6	2100	2100	119.57	5	2055	21138	0.7	0

```
  def login(request: Request, username: str = Form(...), passw
```

```
[2026-01-29 15:52:20,170] Yuvika/INFO/locust.main: Starting Locus
t 2.43.1
[2026-01-29 15:52:20,171] Yuvika/INFO/locust.main: Starting web i
nterface at http://localhost:8089, press enter to open your defau
lt browser.
[2026-01-29 15:52:39,008] Yuvika/INFO/locust.runners: Ramping to
1 users at a rate of 1.00 per second
[2026-01-29 15:52:39,010] Yuvika/INFO/locust.runners: All users s
pawned: {"EventsUser": 1} (1 total users)
```



Host	Status	RPS	Failures
http://localhost:8000	STOPPED	0.7	0%

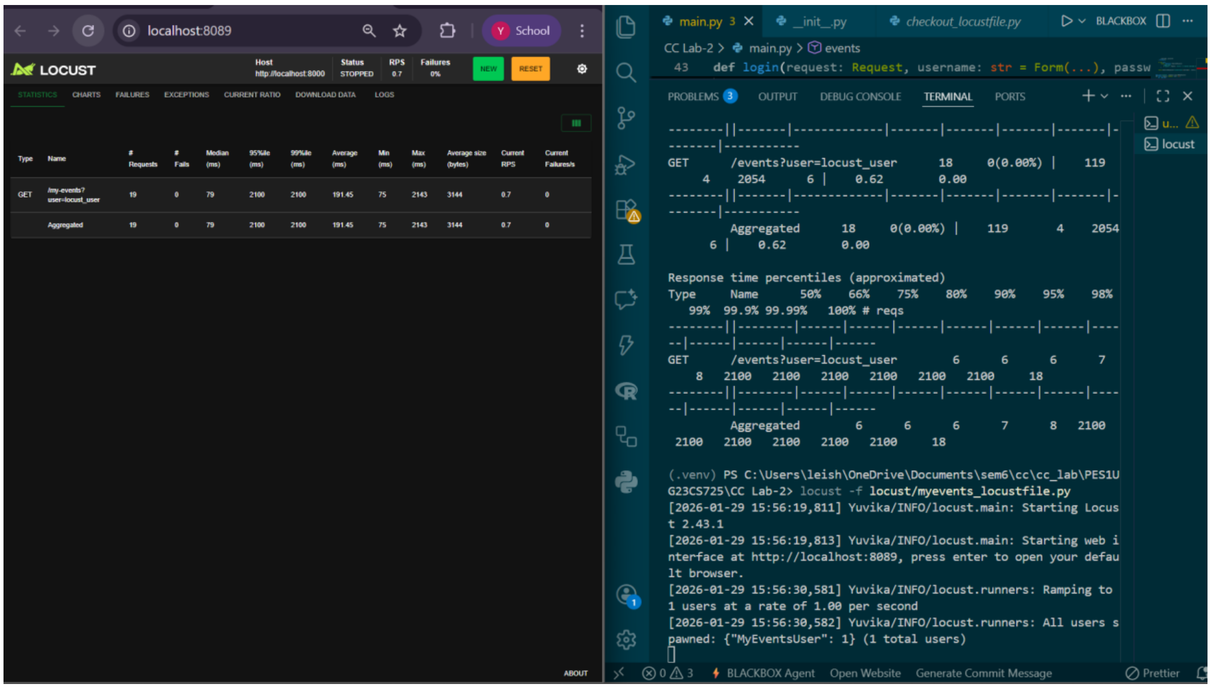
Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/events?user=locust_user	18	0	6	2100	2100	119.57	5	2055	21138	0.7	0
	Aggregated	18	0	6	2100	2100	119.57	5	2055	21138	0.7	0

```
  def login(request: Request, username: str = Form(...), passw
```

```
python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disabl
e=unused-argument

KeyboardInterrupt
2026-01-29T10:24:07Z
[2026-01-29 15:54:07,247] Yuvika/INFO/locust.main: Shutting down
(exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max    Me
d |   req/s  failures/s
--------||-------|-------------|-------|-------|-------|-------|-
-------|-----------
GET      /events?user=locust_user      18     0(0.00%) |    119
     4    2054      6 |    0.62        0.00
--------||-------|-------------|-------|-------|-------|-------|-
-------|-----------
         Aggregated      18     0(0.00%) |    119       4    2054
      6 |    0.62        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        6      6      6      7
     8   2100   2100   2100   2100   2100   2100     18
--------||--------|------|------|------|------|------|------|----
--|------|------|------|------
         Aggregated          6      6      6      7      8   2100
   2100   2100   2100   2100   2100     18

(.venv) PS C:\Users\leish\OneDrive\Documents\sem6\cc\cc_lab\PES1U
G23CS725\CC Lab-2> 
```

Ss8

Before optimizing

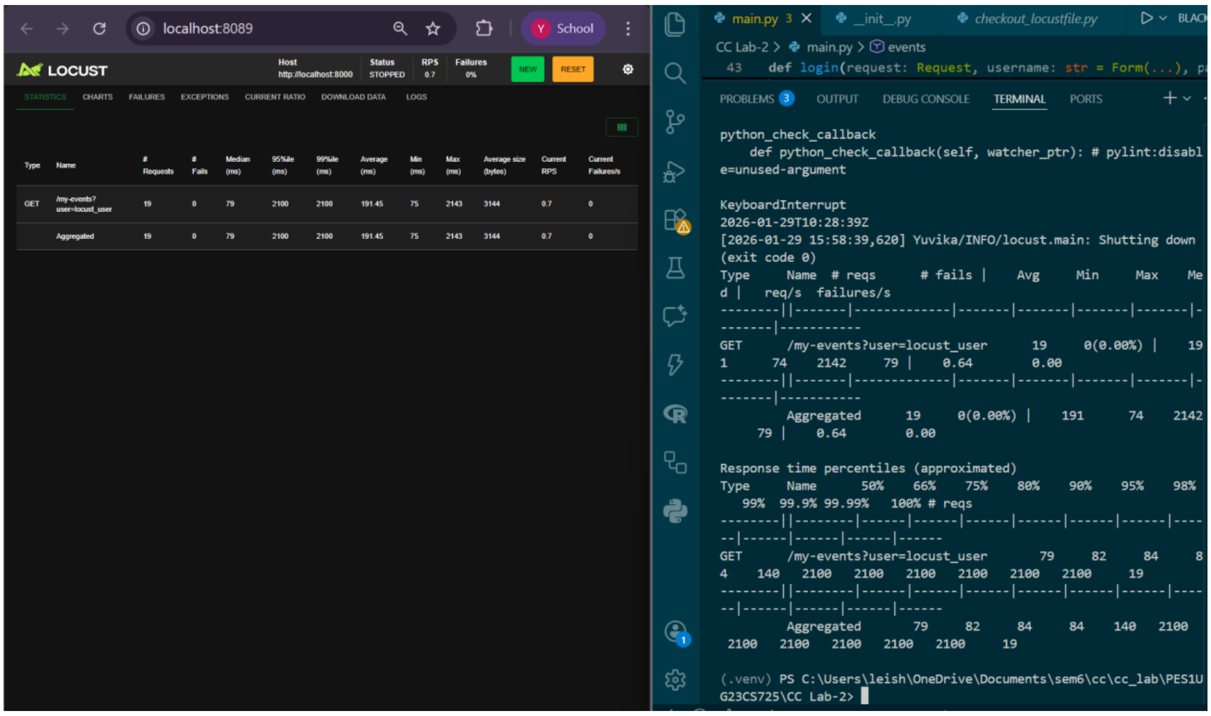


Host http://localhost:8000 | Status STOPPED | RPS 0.7 | Failures 0%

Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/my-events?user=locust_user	19	0	79	2100	2100	191.45	75	2143	3144	0.7	0
	Aggregated	19	0	79	2100	2100	191.45	75	2143	3144	0.7	0

```
43    def login(request: Request, username: str = Form(...), passw
```

```
--------||-------|-------------|-------|-------|-------|-------|-
-------|-----------
GET      /events?user=locust_user      18     0(0.00%) |    119
     4    2054      6 |    0.62        0.00
--------||-------|-------------|-------|-------|-------|-------|-
-------|-----------
         Aggregated      18     0(0.00%) |    119       4    2054
      6 |    0.62        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       6       6       6       7
    8   2100   2100   2100   2100   2100   2100      18
--------||--------|------|------|------|------|------|------|----
--|------|------|------|------
         Aggregated       6       6       6       7       8   2100
 2100   2100   2100   2100   2100      18

(.venv) PS C:\Users\leish\OneDrive\Documents\sem6\cc\cc_lab\PES1U
G23CS725\CC Lab-2> locust -f locust/myevents_locustfile.py
[2026-01-29 15:56:19,811] Yuvika/INFO/locust.main: Starting Locus
t 2.43.1
[2026-01-29 15:56:19,813] Yuvika/INFO/locust.main: Starting web i
nterface at http://localhost:8089, press enter to open your defau
lt browser.
[2026-01-29 15:56:30,581] Yuvika/INFO/locust.runners: Ramping to
1 users at a rate of 1.00 per second
[2026-01-29 15:56:30,582] Yuvika/INFO/locust.runners: All users s
pawned: {"MyEventsUser": 1} (1 total users)
```



Host http://localhost:8000 | Status STOPPED | RPS 0.7 | Failures 0%

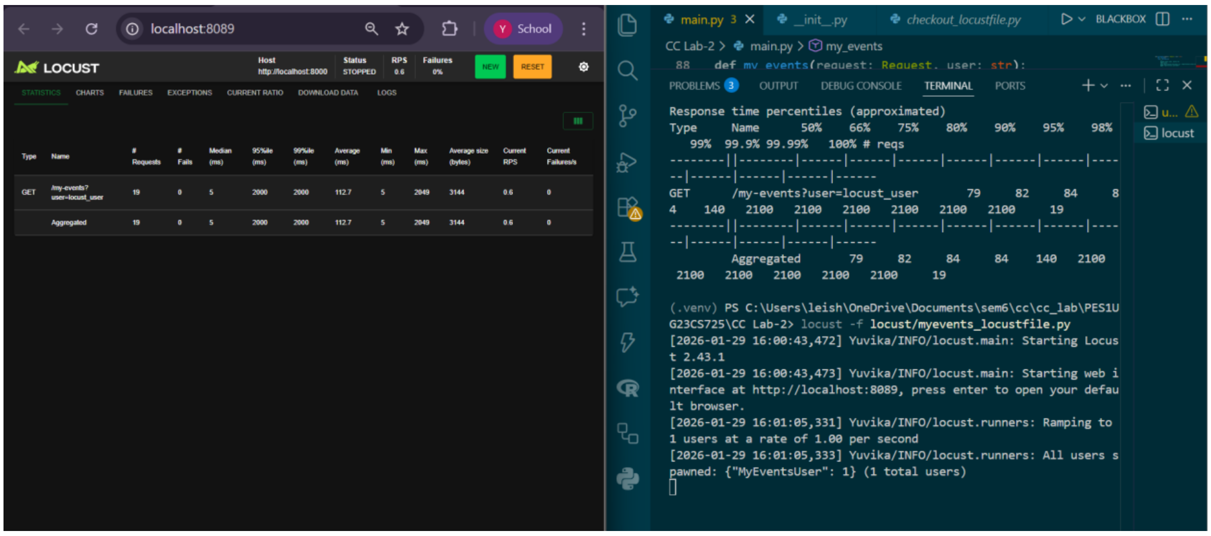
Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/my-events?user=locust_user	19	0	79	2100	2100	191.45	75	2143	3144	0.7	0
	Aggregated	19	0	79	2100	2100	191.45	75	2143	3144	0.7	0

```
43    def login(request: Request, username: str = Form(...), pa
```

```
python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disabl
e=unused-argument

KeyboardInterrupt
2026-01-29T10:28:39Z
[2026-01-29 15:58:39,620] Yuvika/INFO/locust.main: Shutting down
(exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max    Me
d |   req/s  failures/s
--------||-------|-------------|-------|-------|-------|-------|-
-------|-----------
GET      /my-events?user=locust_user      19     0(0.00%) |    19
1      74    2142     79 |    0.64        0.00
--------||-------|-------------|-------|-------|-------|-------|-
-------|-----------
         Aggregated      19     0(0.00%) |    191      74    2142
      79 |    0.64        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      79      82      84      8
4     140   2100   2100   2100   2100   2100   2100      19
--------||--------|------|------|------|------|------|------|----
--|------|------|------|------
         Aggregated      79      82      84      84     140    2100
 2100   2100   2100   2100   2100      19

(.venv) PS C:\Users\leish\OneDrive\Documents\sem6\cc\cc_lab\PES1U
G23CS725\CC Lab-2> 
```

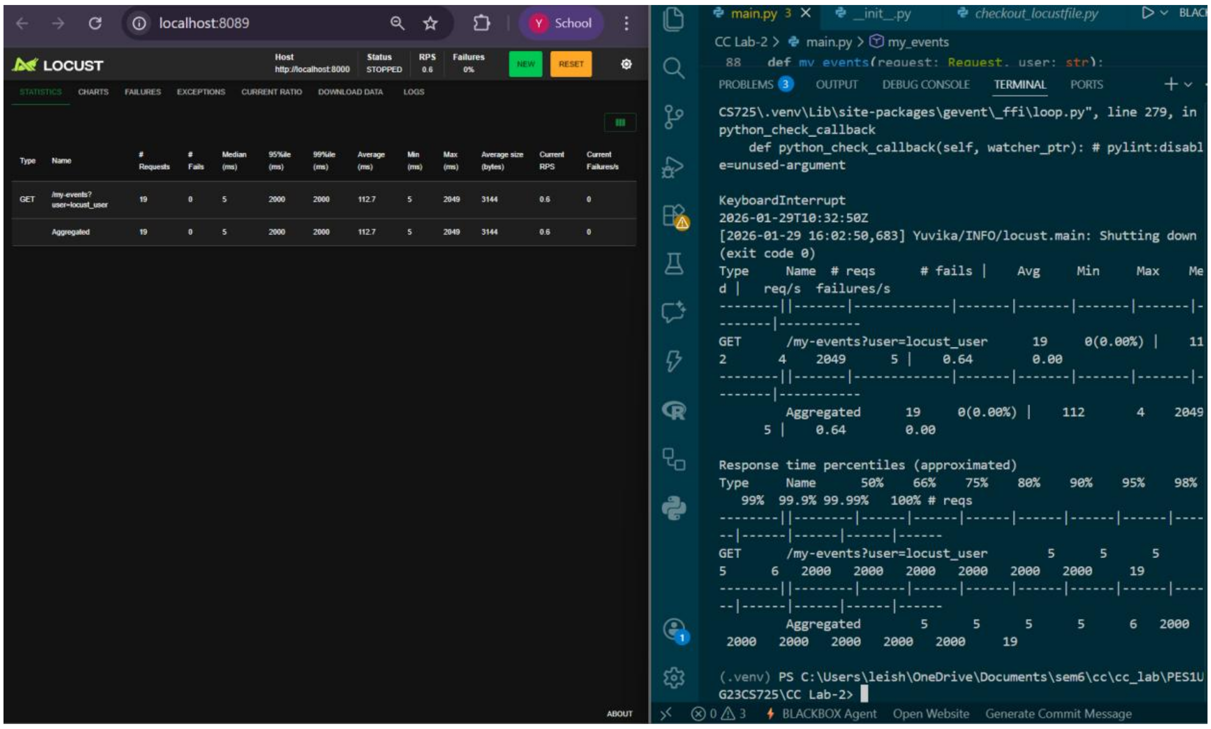
Ss9

After optimizing



Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/my-events?user=locust_user	19	0	5	2000	2000	112.7	5	2049	3144	0.6	0
	Aggregated	19	0	5	2000	2000	112.7	5	2049	3144	0.6	0

```
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       79     82     84     8
4    140   2100   2100   2100   2100   2100   2100     19
--------||--------|------|------|------|------|------|------|----
--|------|------|------|------
         Aggregated          79     82     84     84    140   2100
 2100   2100   2100   2100   2100     19

(.venv) PS C:\Users\leish\OneDrive\Documents\sem6\cc\cc_lab\PES1U
G23CS725\CC Lab-2> locust -f locust/myevents_locustfile.py
[2026-01-29 16:00:43,472] Yuvika/INFO/locust.main: Starting Locus
t 2.43.1
[2026-01-29 16:00:43,473] Yuvika/INFO/locust.main: Starting web i
nterface at http://localhost:8089, press enter to open your defau
lt browser.
[2026-01-29 16:01:05,331] Yuvika/INFO/locust.runners: Ramping to
1 users at a rate of 1.00 per second
[2026-01-29 16:01:05,333] Yuvika/INFO/locust.runners: All users s
pawned: {"MyEventsUser": 1} (1 total users)
```



Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/my-events?user=locust_user	19	0	5	2000	2000	112.7	5	2049	3144	0.6	0
	Aggregated	19	0	5	2000	2000	112.7	5	2049	3144	0.6	0

```
CS725\.venv\Lib\site-packages\gevent\_ffi\loop.py", line 279, in
python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disabl
e=unused-argument

KeyboardInterrupt
2026-01-29T10:32:50Z
[2026-01-29 16:02:50,683] Yuvika/INFO/locust.main: Shutting down
(exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max    Me
d |    req/s  failures/s
--------||-------|-------------|-------|-------|-------|-------|-
-------|-----------
GET      /my-events?user=locust_user       19     0(0.00%) |     11
2      4    2049      5 |    0.64        0.00
--------||-------|-------------|-------|-------|-------|-------|-
-------|-----------
         Aggregated        19     0(0.00%) |    112       4    2049
     5 |    0.64        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        5      5      5
5      6   2000   2000   2000   2000   2000   2000     19
--------||--------|------|------|------|------|------|------|----
--|------|------|------|------
         Aggregated          5      5      5      5      6   2000
  2000   2000   2000   2000   2000     19

(.venv) PS C:\Users\leish\OneDrive\Documents\sem6\cc\cc_lab\PES1U
G23CS725\CC Lab-2>
```

Questions and answers:-

1)Route: /checkout

What was the bottleneck?

The primary bottleneck was a Single Point of Failure where a "division by zero" error crashed the entire application. Additionally, the logic used an inefficient while loop to calculate the total, incrementing the value by 1 for every unit of the fee, which wasted CPU cycles

What change did you make?

I first commented out the line causing the zero-division crash to restore system stability. I then replaced the inefficient while loop with an optimized version that uses direct addition: total += e[0].

Why did the performance improve?

erformance improved because direct addition is a constant-time operation, whereas the previous loop forced the CPU to perform millions of unnecessary increments. In a monolith, removing these blocks unfastens the single process to handle requests immediately.

2)Route: /events

What was the bottleneck?

The bottleneck was an intentional "waste" loop that executed 3,000,000 iterations for every request. This blocked the FastAPI event loop, causing high latency and making the "All-in-One Counter" (the monolith) sluggish.

What change did you make?

I deleted the waste loop and its associated logic inside the @app.get("/events") function in main.py.

Why did the performance improve?

By removing the loop, the server no longer had to perform 3 million useless calculations before rendering the page. This allowed the application to jump directly to database retrieval and template rendering, significantly dropping the average response time.

3)Route: /my-events

What was the bottleneck?

The bottleneck was a "dummy" loop that ran 1,500,000 iterations. Even though it was smaller than the events bottleneck, it still forced the server to stay busy with meaningless tasks while users waited for their data.

What change did you make?

I removed the dummy loop code from the my_events function in main.py.

Why did the performance improve?

The performance improved because the request-handling process became leaner. Removing the artificial delay allowed the server to process the SQL join and render the my_events.html template instantly, leading to a much lower average response time in Locust.