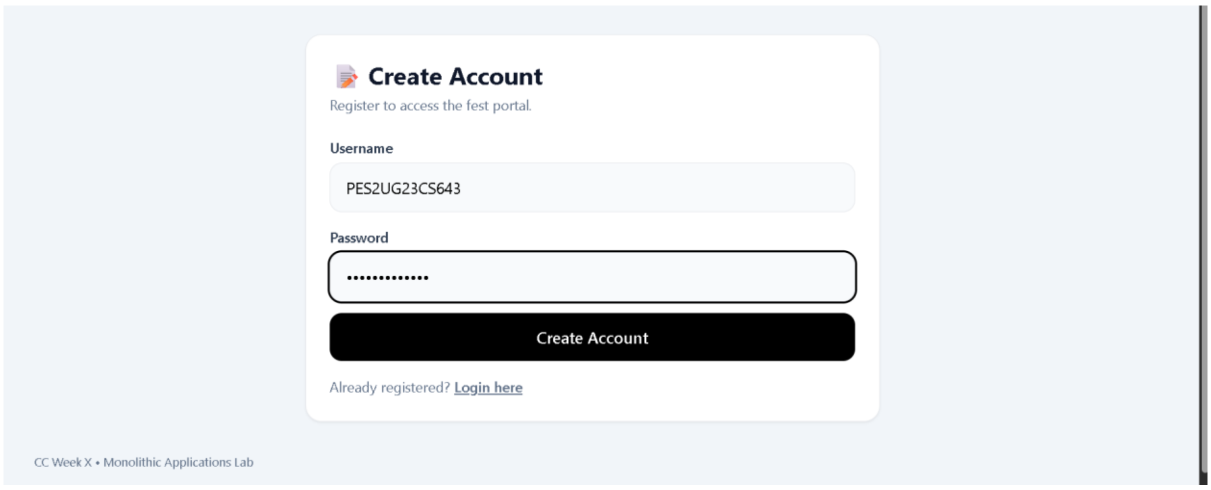
CC-LAB 2 MONOLITHIC

NAME:TANISHQ SINGH MEHTA

SRN:PES2UG23CS643

SECTION:'J'

GITHUB: https://github.com/tanishqsinghmehta/MONOLITHIC-CCLAB2



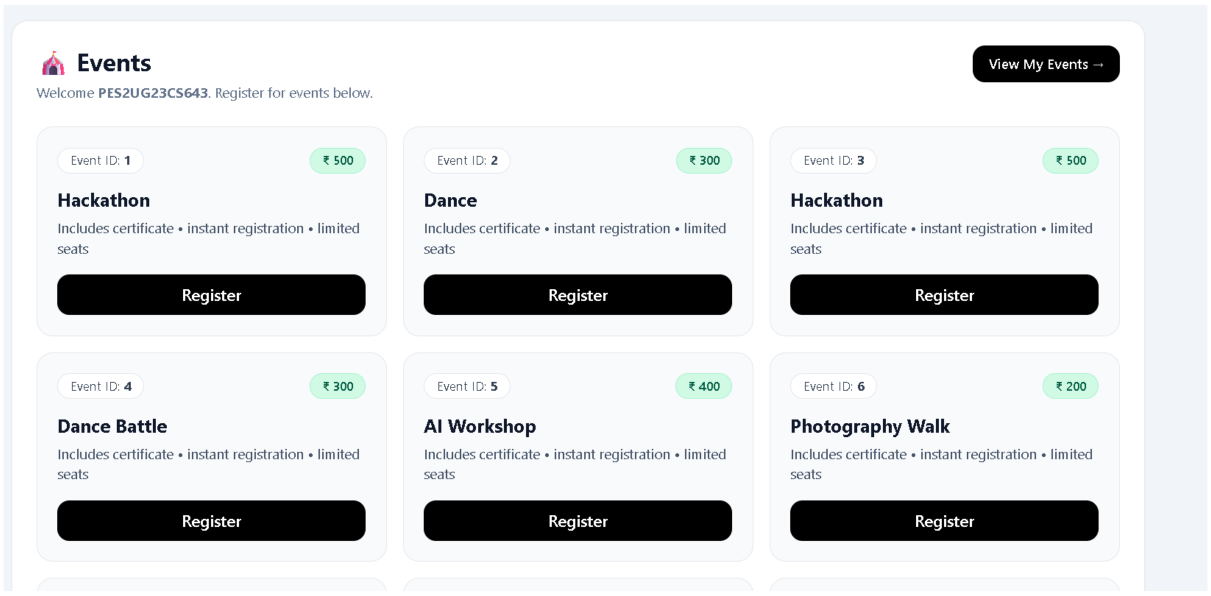
Create Account

Register to access the fest portal.

Username: PES2UG23CS643

Password: •••••••••••••

Create Account
Already registered? Login here
CC Week X • Monolithic Applications Lab


🎪 Events

Welcome **PES2UG23CS643**. Register for events below.

View My Events →

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

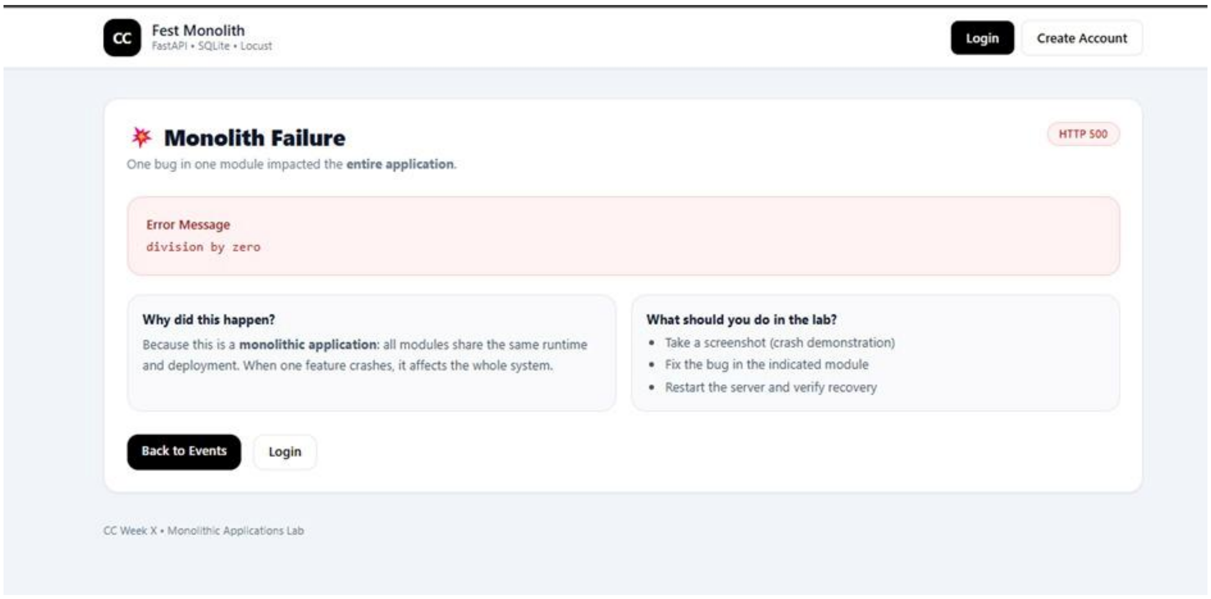
Event ID: **2** ₹ 300
Dance
Includes certificate • instant registration • limited seats
Register

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


CC Fest Monolith
FastAPI • SQLite • Locust

Login Create Account

💥 **Monolith Failure**

HTTP 500

One bug in one module impacted the **entire application**.

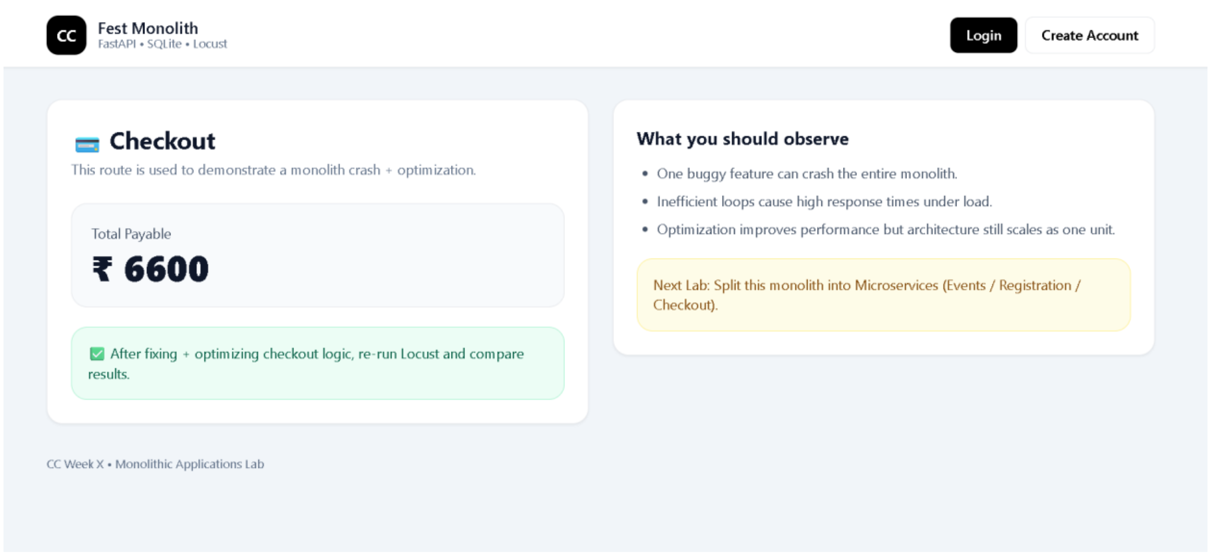
Error Message
```
division by zero
```

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


CC Fest Monolith
FastAPI • SQLite • Locust

Login Create Account

💳 **Checkout**

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

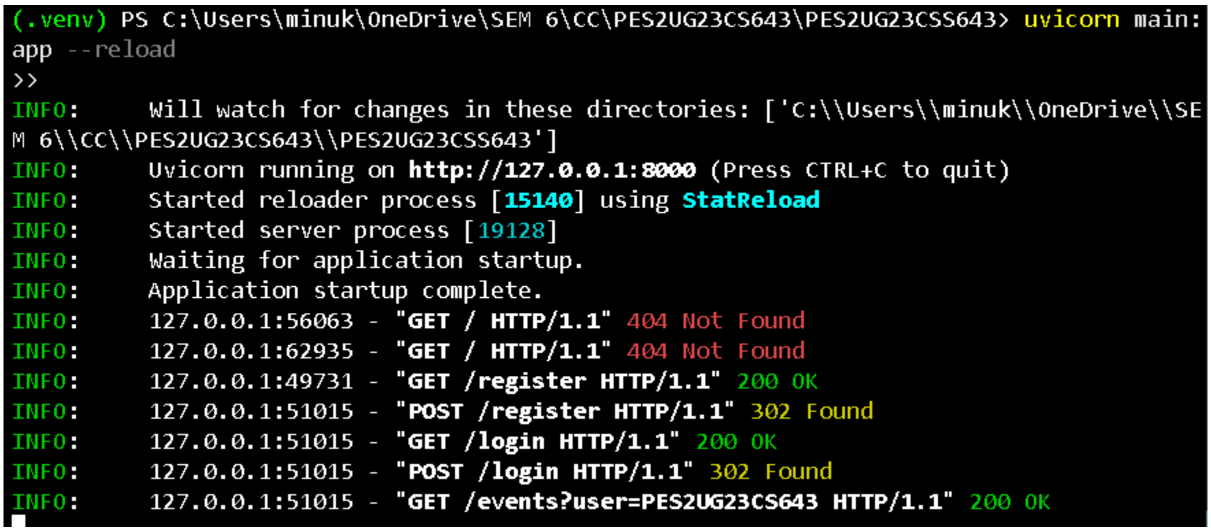
Total Payable
₹ 6600

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

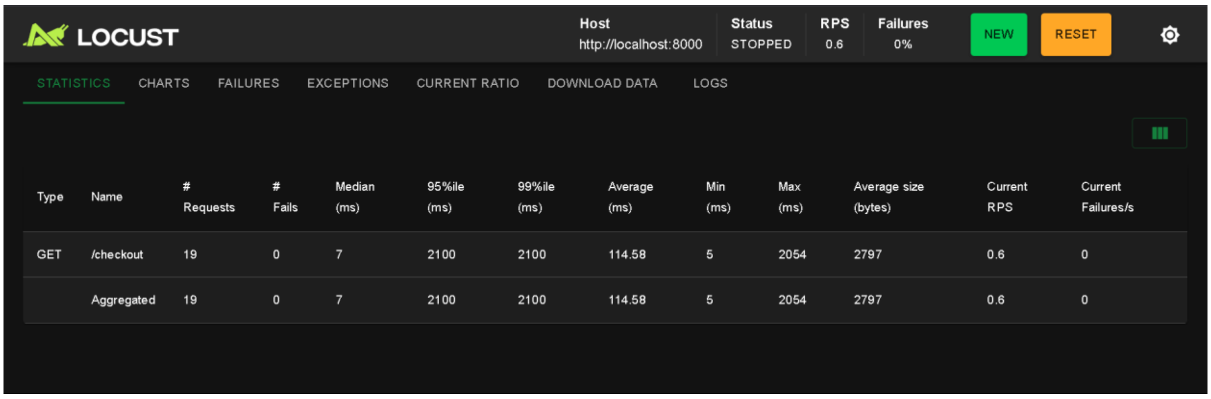
What you should observe
- One buggy feature can crash the entire monolith.
- Inefficient loops cause high response times under load.
- Optimization improves performance but architecture still scales as one unit.

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

CC Week X • Monolithic Applications Lab

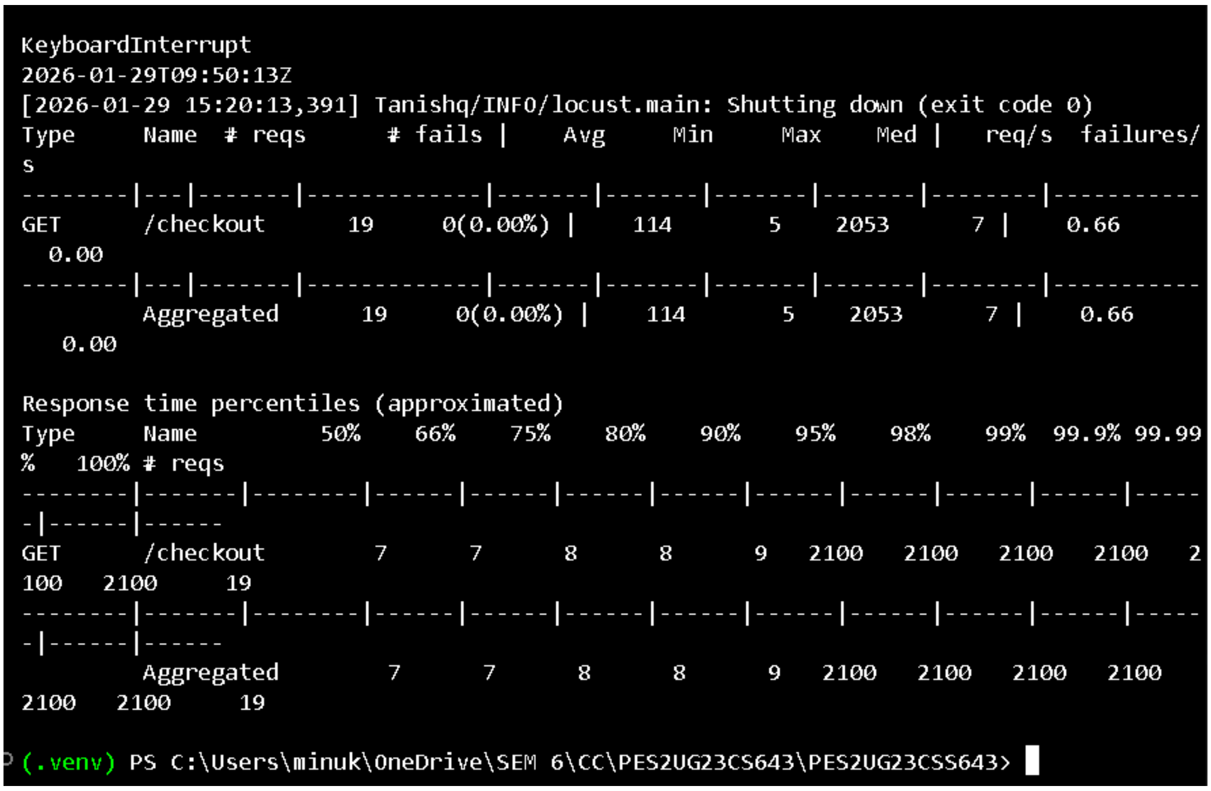


```
(.venv) PS C:\Users\minuk\OneDrive\SEM 6\CC\PES2UG23CS643\PES2UG23CSS643> uvicorn main:
app --reload
>>
INFO:     Will watch for changes in these directories: ['C:\\Users\\minuk\\OneDrive\\SE
M 6\\CC\\PES2UG23CS643\\PES2UG23CSS643']
INFO:     Uvicorn running on http://127.0.0.1:8000 (Press CTRL+C to quit)
INFO:     Started reloader process [15140] using StatReload
INFO:     Started server process [19128]
INFO:     Waiting for application startup.
INFO:     Application startup complete.
INFO:     127.0.0.1:56063 - "GET / HTTP/1.1" 404 Not Found
INFO:     127.0.0.1:62935 - "GET / HTTP/1.1" 404 Not Found
INFO:     127.0.0.1:49731 - "GET /register HTTP/1.1" 200 OK
INFO:     127.0.0.1:51015 - "POST /register HTTP/1.1" 302 Found
INFO:     127.0.0.1:51015 - "GET /login HTTP/1.1" 200 OK
INFO:     127.0.0.1:51015 - "POST /login HTTP/1.1" 302 Found
INFO:     127.0.0.1:51015 - "GET /events?user=PES2UG23CS643 HTTP/1.1" 200 OK
```

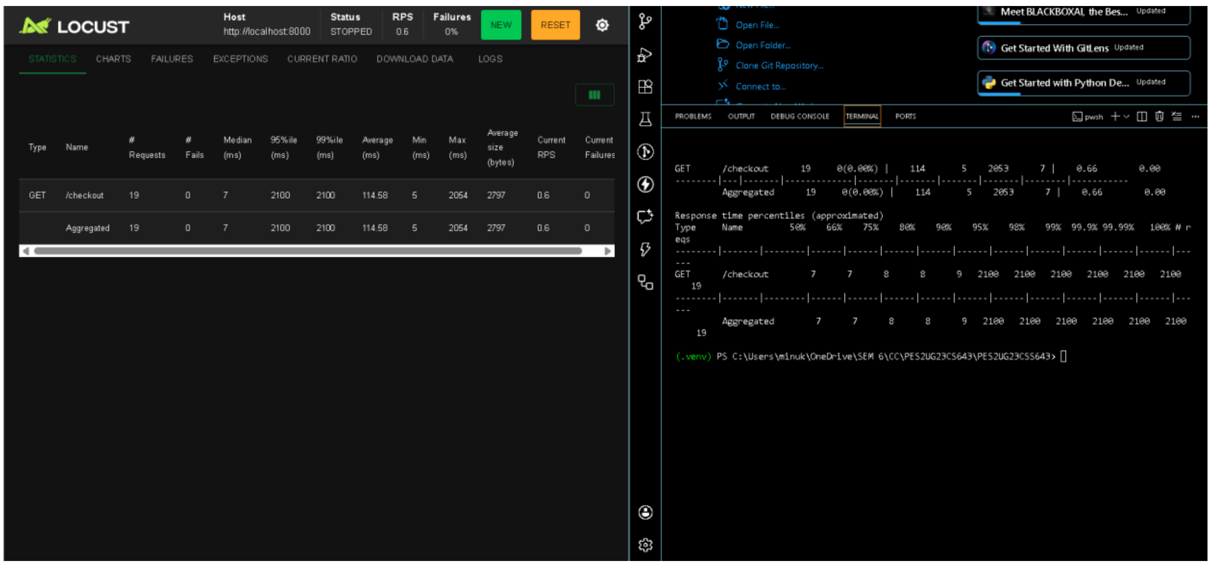


Host http://localhost:8000 | Status STOPPED | RPS 0.6 | Failures 0%

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	19	0	7	2100	2100	114.58	5	2054	2797	0.6	0
	Aggregated	19	0	7	2100	2100	114.58	5	2054	2797	0.6	0



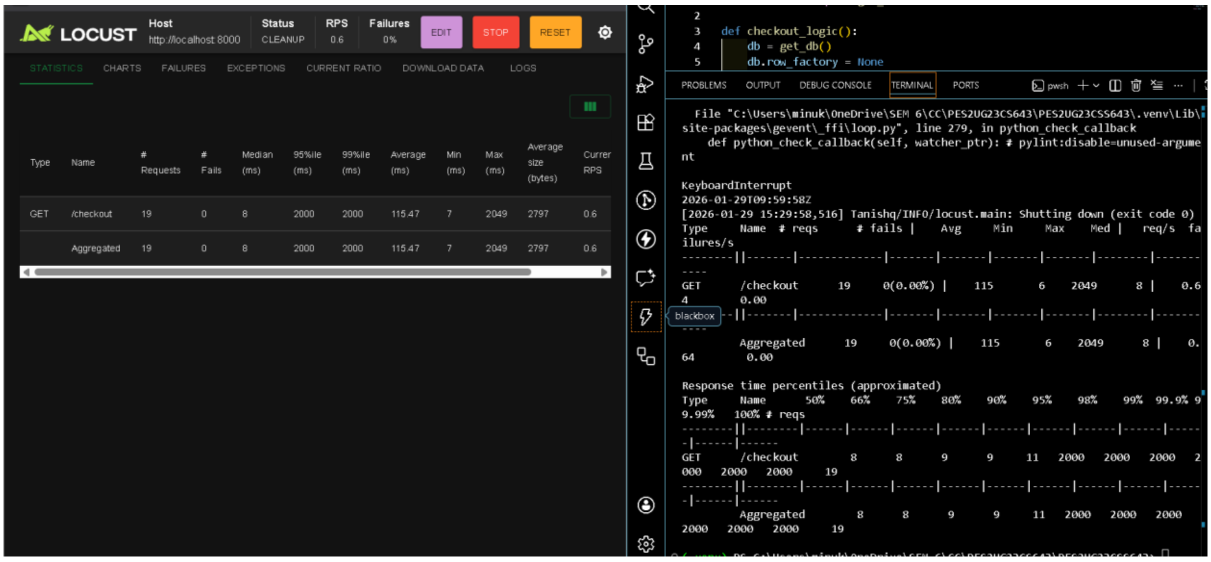
```
KeyboardInterrupt
2026-01-29T09:50:13Z
[2026-01-29 15:20:13,391] Tanishq/INFO/locust.main: Shutting down (exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max    Med |   req/s  failures/
s
--------|---|-------|-------------|-------|-------|-------|-------|--------|-----------
GET      /checkout      19     0(0.00%) |    114       5    2053      7 |    0.66
  0.00
--------|---|-------|-------------|-------|-------|-------|-------|--------|-----------
         Aggregated      19     0(0.00%) |    114       5    2053      7 |    0.66
   0.00

Response time percentiles (approximated)
Type     Name             50%    66%    75%    80%    90%    95%    98%    99%  99.9% 99.99
%    100% # reqs
--------|-------|--------|------|------|------|------|------|------|------|------|-----
-|------|------
GET      /checkout         7      7      8      8      9   2100   2100   2100   2100    2
100   2100     19
--------|-------|--------|------|------|------|------|------|------|------|------|-----
-|------|------
         Aggregated         7      7      8      8      9   2100   2100   2100   2100
2100   2100     19

(.venv) PS C:\Users\minuk\OneDrive\SEM 6\CC\PES2UG23CS643\PES2UG23CSS643>
```



Host	Status	RPS	Failures
http://localhost:8000	STOPPED	0.6	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
GET	/checkout	19	0	7	2100	2100	114.58	5	2054	2797	0.6	0
	Aggregated	19	0	7	2100	2100	114.58	5	2054	2797	0.6	0

```
GET      /checkout      19     0(0.00%) |    114       5    2053      7 |    0.66        0.00
--------|---|-------|-------------|-------|-------|-------|--------|-----------
         Aggregated      19     0(0.00%) |    114       5    2053      7 |    0.66        0.00

Response time percentiles (approximated)
Type     Name          50%    66%    75%    80%    90%    95%    98%    99%  99.9% 99.99%   100% # r
eqs
--------|-------|--------|------|------|------|------|------|------|------|------|------|------|---
---
GET      /checkout       7      7      8      8      9   2100   2100   2100   2100   2100   2100
   19
--------|-------|--------|------|------|------|------|------|------|------|------|------|------|---
---
         Aggregated       7      7      8      8      9   2100   2100   2100   2100   2100   2100
    19

(.venv) PS C:\Users\minuk\OneDrive\SEM 6\CC\PES2UG23CS643\PES2UG23CSS643>
```



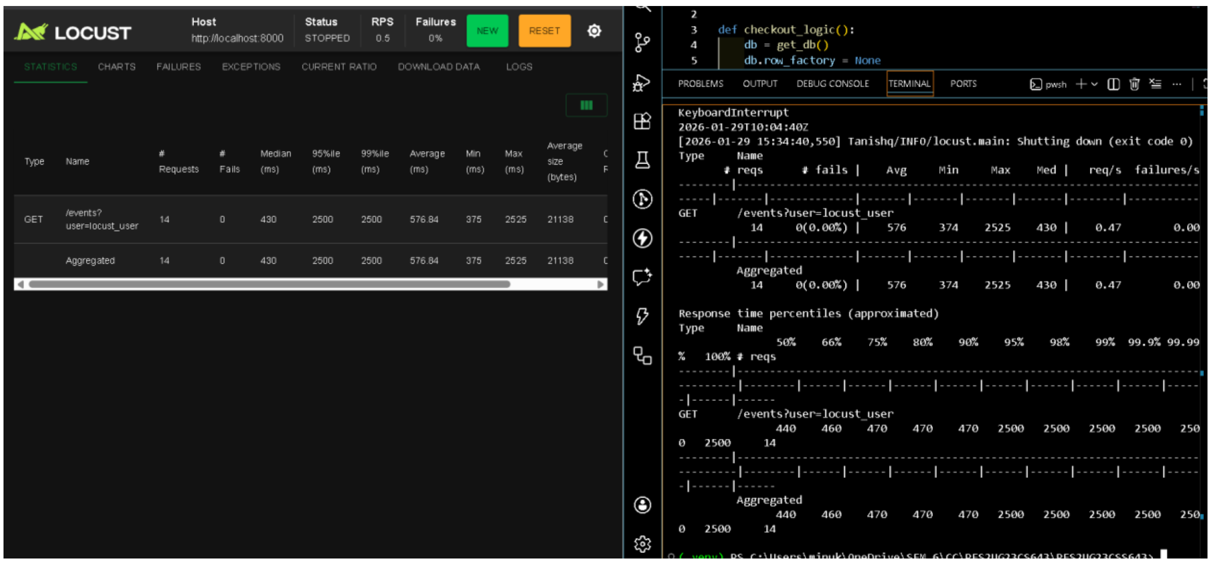
Host	Status	RPS	Failures
http://localhost:8000	CLEANUP	0.6	0%

Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS
GET	/checkout	19	0	8	2000	2000	115.47	7	2049	2797	0.6
	Aggregated	19	0	8	2000	2000	115.47	7	2049	2797	0.6

```python
def checkout_logic():
    db = get_db()
    db.row_factory = None
```

```
  File "C:\Users\minuk\OneDrive\SEM 6\CC\PES2UG23CS643\PES2UG23CSS643\.venv\Lib\
site-packages\gevent\_ffi\loop.py", line 279, in python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disable=unused-argume
nt

KeyboardInterrupt
2026-01-29T09:59:58Z
[2026-01-29 15:29:58,516] Tanishq/INFO/locust.main: Shutting down (exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max    Med |   req/s  fa
ilures/s
--------||-------|------------|-------|-------|-------|-------|--------|-------
----
GET      /checkout      19     0(0.00%) |    115       6    2049      8 |    0.6
4        0.00
--------||-------|------------|-------|-------|-------|-------|--------|-------
----
         Aggregated      19     0(0.00%) |    115       6    2049      8 |    0.
64        0.00

Response time percentiles (approximated)
Type     Name       50%    66%    75%    80%    90%    95%    98%    99%  99.9% 9
9.99%   100% # reqs
--------||--------|------|------|------|------|------|------|------|------|-----
-|------|------
GET      /checkout       8      8      9      9     11   2000   2000   2000   2
000   2000   2000     19
--------||--------|------|------|------|------|------|------|------|------|-----
-|------|------
         Aggregated       8      8      9      9     11   2000   2000   2000
2000   2000   2000     19
```

Before optimization 2:



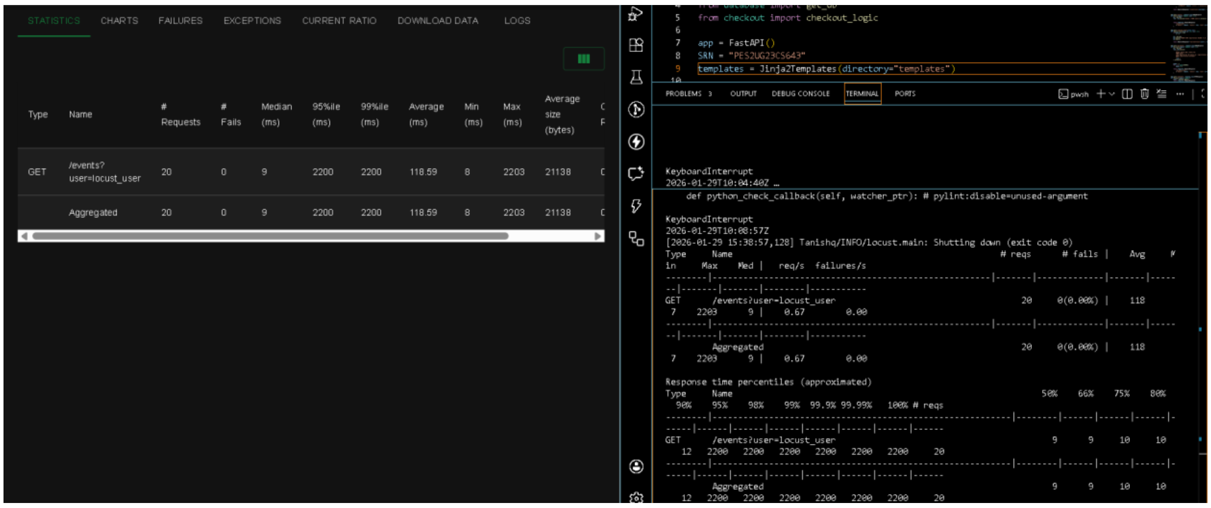
Host	Status	RPS	Failures
http://localhost:8000	STOPPED	0.5	0%

Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)
GET	/events?user=locust_user	14	0	430	2500	2500	576.84	375	2525	21138
	Aggregated	14	0	430	2500	2500	576.84	375	2525	21138

```python
def checkout_logic():
    db = get_db()
    db.row_factory = None
```

```
KeyboardInterrupt
2026-01-29T10:04:40Z
[2026-01-29 15:34:40,550] Tanishq/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
           14     0(0.00%) |    576     374    2525    430 |    0.47        0.00
--------|-----------------------------------------------------------------------
-----|-------|------------|-------|-------|-------|-------|--------|----------
         Aggregated
           14     0(0.00%) |    576     374    2525    430 |    0.47        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
                440    460    470    470    470   2500   2500   2500   2500   250
0   2500     14
--------|-----------------------------------------------------------------------
---------|--------|------|------|------|------|------|------|------|------|-----
-|------|------
         Aggregated
                440    460    470    470    470   2500   2500   2500   2500   250
0   2500     14
```

After optimization 2:

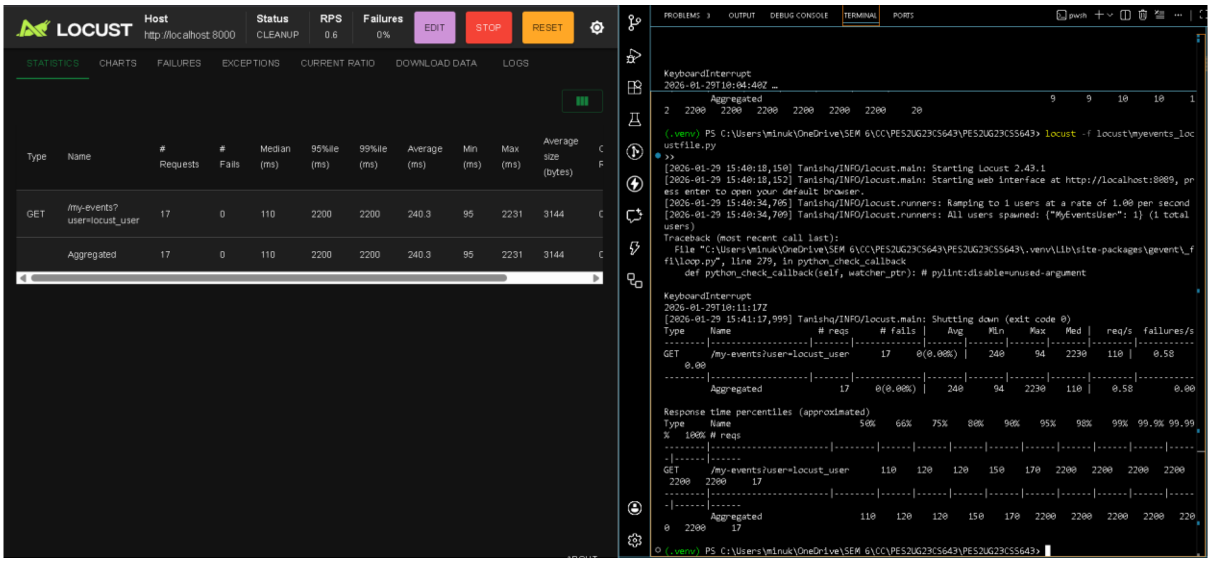


Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)
GET	/events?user=locust_user	20	0	9	2200	2200	118.59	8	2203	21138
	Aggregated	20	0	9	2200	2200	118.59	8	2203	21138

```
from checkout import checkout_logic

app = FastAPI()
SRN = "PES2UG23CS643"
templates = Jinja2Templates(directory="templates")
```

```
KeyboardInterrupt
2026-01-29T10:04:40Z …
    def python_check_callback(self, watcher_ptr): # pylint:disable=unused-argument

KeyboardInterrupt
2026-01-29T10:08:57Z
[2026-01-29 15:38:57,128] Tanishq/INFO/locust.main: Shutting down (exit code 0)
Type     Name                                                          # reqs      # fails |    Avg     M
in     Max    Med |   req/s  failures/s
--------|-------------------------------------------------------------|-------|-------------|-------|-----
--|-------|-------|--------|-----------
GET      /events?user=locust_user                                         20     0(0.00%) |    118
 7    2203      9 |    0.67        0.00
--------|-------------------------------------------------------------|-------|-------------|-------|-----
--|-------|-------|--------|-----------
         Aggregated                                                       20     0(0.00%) |    118
 7    2203      9 |    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                                               9      9     10     10
   12   2200   2200   2200   2200   2200   2200     20
--------|-------------------------------------------------------------------|--------|------|------|------|-
-----|------|------|------|------|------|------|------
         Aggregated                                                             9      9     10     10
   12   2200   2200   2200   2200   2200   2200     20
```

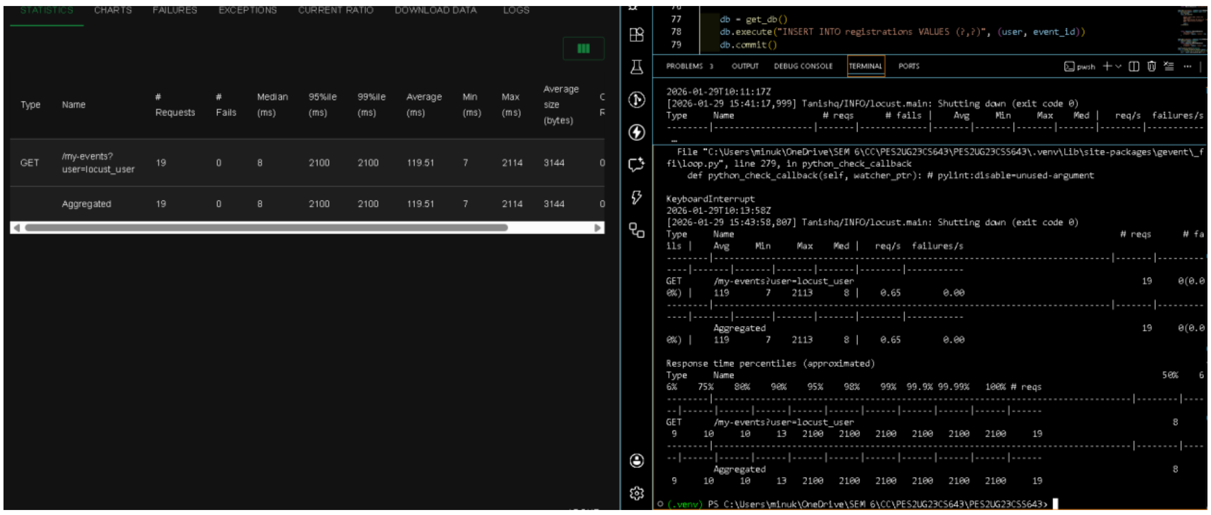
BEFORE OPTIMIZATION 3:



Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)
GET	/my-events?user=locust_user	17	0	110	2200	2200	240.3	95	2231	3144
	Aggregated	17	0	110	2200	2200	240.3	95	2231	3144

```
KeyboardInterrupt
2026-01-29T10:04:40Z …
         Aggregated                                                9      9     10     10     1
2   2200   2200   2200   2200   2200   2200     20

(.venv) PS C:\Users\minuk\OneDrive\SEM 6\CC\PES2UG23CS643\PES2UG23CSS643> locust -f locust\myevents_loc
ustfile.py
>>
[2026-01-29 15:40:18,150] Tanishq/INFO/locust.main: Starting Locust 2.43.1
[2026-01-29 15:40:18,152] Tanishq/INFO/locust.main: Starting web interface at http://localhost:8089, pr
ess enter to open your default browser.
[2026-01-29 15:40:34,705] Tanishq/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 15:40:34,709] Tanishq/INFO/locust.runners: All users spawned: {"MyEventsUser": 1} (1 total
users)
Traceback (most recent call last):
  File "C:\Users\minuk\OneDrive\SEM 6\CC\PES2UG23CS643\PES2UG23CSS643\.venv\Lib\site-packages\gevent\_f
fi\loop.py", line 279, in python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disable=unused-argument

KeyboardInterrupt
2026-01-29T10:11:17Z
[2026-01-29 15:41:17,999] Tanishq/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      17     0(0.00%) |    240      94    2230     110 |    0.58
    0.00
--------|-------------------------|-------|-------------|-------|-------|-------|-------|--------|-----------
         Aggregated                       17     0(0.00%) |    240      94    2230     110 |    0.58        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      110    120    120    150    170   2200   2200   2200   2200
 2200   2200     17
--------|---------------------------|--------|------|------|------|------|------|------|------|------|-----
-|------|------
         Aggregated                       110    120    120    150    170   2200   2200   2200   2200    220
0   2200     17

(.venv) PS C:\Users\minuk\OneDrive\SEM 6\CC\PES2UG23CS643\PES2UG23CSS643>
```

AFTER:



Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	C F
GET	/my-events? user=locust_user	19	0	8	2100	2100	119.51	7	2114	3144	0
	Aggregated	19	0	8	2100	2100	119.51	7	2114	3144	0

```
    db = get_db()
    db.execute("INSERT INTO registrations VALUES (?,?)", (user, event_id))
    db.commit()
```

```
2026-01-29T10:11:17Z
[2026-01-29 15:41:17,999] Tanishq/INFO/locust.main: Shutting down (exit code 0)
Type     Name                  # reqs      # fails |    Avg     Min     Max    Med |   req/s  failures/s
--------|--------------------|-------|-------------|-------|-------|-------|-------|--------|-----------
 …
  File "C:\Users\minuk\OneDrive\SEM 6\CC\PES2UG23CS643\PES2UG23CS5643\.venv\Lib\site-packages\gevent\_f
fi\loop.py", line 279, in python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disable=unused-argument

KeyboardInterrupt
2026-01-29T10:13:58Z
[2026-01-29 15:43:58,807] Tanishq/INFO/locust.main: Shutting down (exit code 0)
Type     Name                                                                          # reqs      # fa
ils |    Avg     Min     Max     Med |   req/s  failures/s
--------|----------------------------------------------------------------------------|-------|----------
----|-------|-------|-------|-------|--------|-----------
GET      /my-events?user=locust_user                                                       19     0(0.0
0%) |    119       7    2113       8 |    0.65        0.00
--------|----------------------------------------------------------------------------|-------|----------
----|-------|-------|-------|-------|--------|-----------
         Aggregated                                                                        19     0(0.0
0%) |    119       7    2113       8 |    0.65        0.00

Response time percentiles (approximated)
Type     Name                                                                                  50%    6
6%    75%    80%    90%    95%    98%    99%  99.9% 99.99%   100% # reqs
--------|------------------------------------------------------------------------------|--------|----
--|------|------|------|------|------|------|------|------|------|------
GET      /my-events?user=locust_user                                                            8
 9     10     10     13   2100   2100   2100   2100   2100   2100     19
--------|------------------------------------------------------------------------------|--------|----
--|------|------|------|------|------|------|------|------|------|------
         Aggregated                                                                             8
 9     10     10     13   2100   2100   2100   2100   2100   2100     19
○ (.venv) PS C:\Users\minuk\OneDrive\SEM 6\CC\PES2UG23CS643\PES2UG23CS5643>
```

FINAL EXPLANATION

Route: /events

Bottleneck: A loop performing 3 million unnecessary calculations on each request
Fix: Removed the artificial delay loop
Result: Reduced CPU usage and improved response time

Route: /my-events

Bottleneck: A loop running 1.5 million redundant increments
Fix: Removed the dummy loop
Result: Lower processing time per request and faster responses