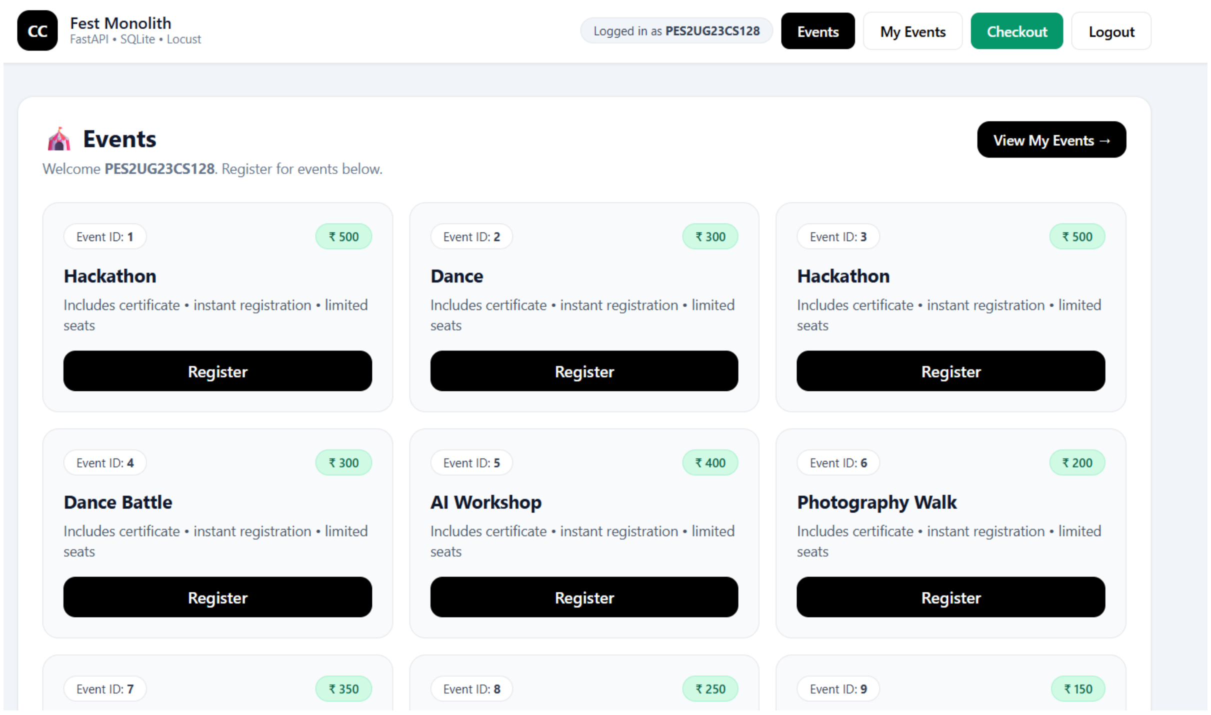
CLOUD COMPUTING LAB – 02

NAME: BHUMIKA GUPTA

SECTION: B

SRN: PES2UG23CS128

SS-1



CC Fest Monolith
FastAPI • SQLite • Locust

Logged in as **PES2UG23CS128** | Events | My Events | Checkout | Logout

Events

View My Events →

Welcome **PES2UG23CS128**. Register for events below.

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

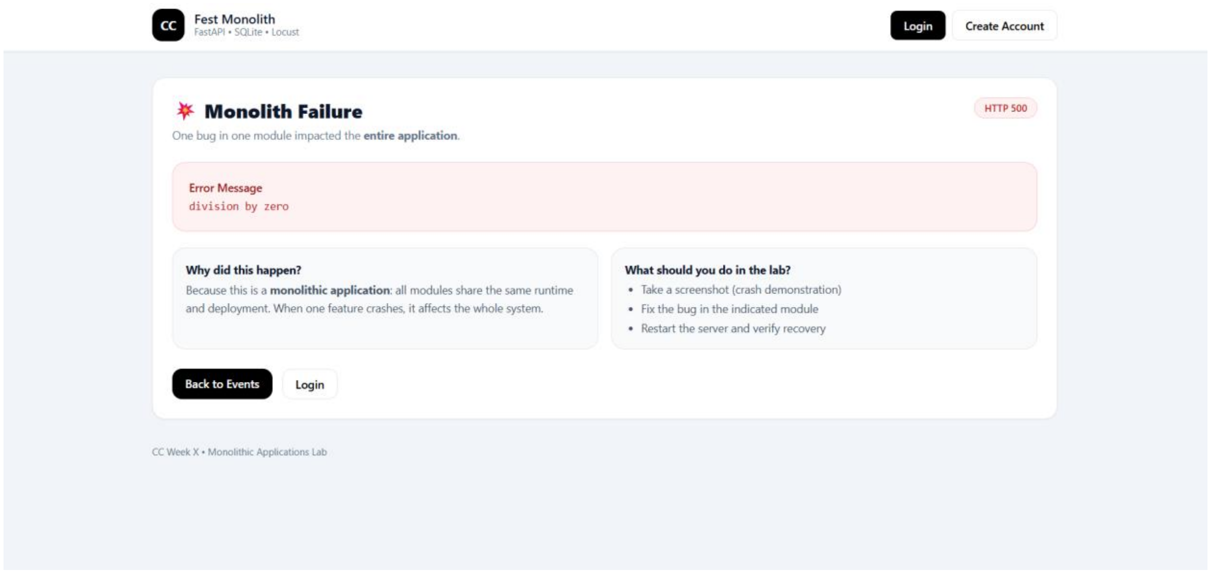
Event ID: **6** ₹ 200
Photography Walk
Includes certificate • instant registration • limited seats
Register

Event ID: **7** ₹ 350

Event ID: **8** ₹ 250

Event ID: **9** ₹ 150

SS-2



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Login | Create Account

Monolith Failure

HTTP 500

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

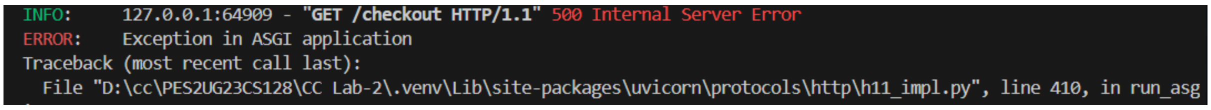
Error Message
```
division by zero
```

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

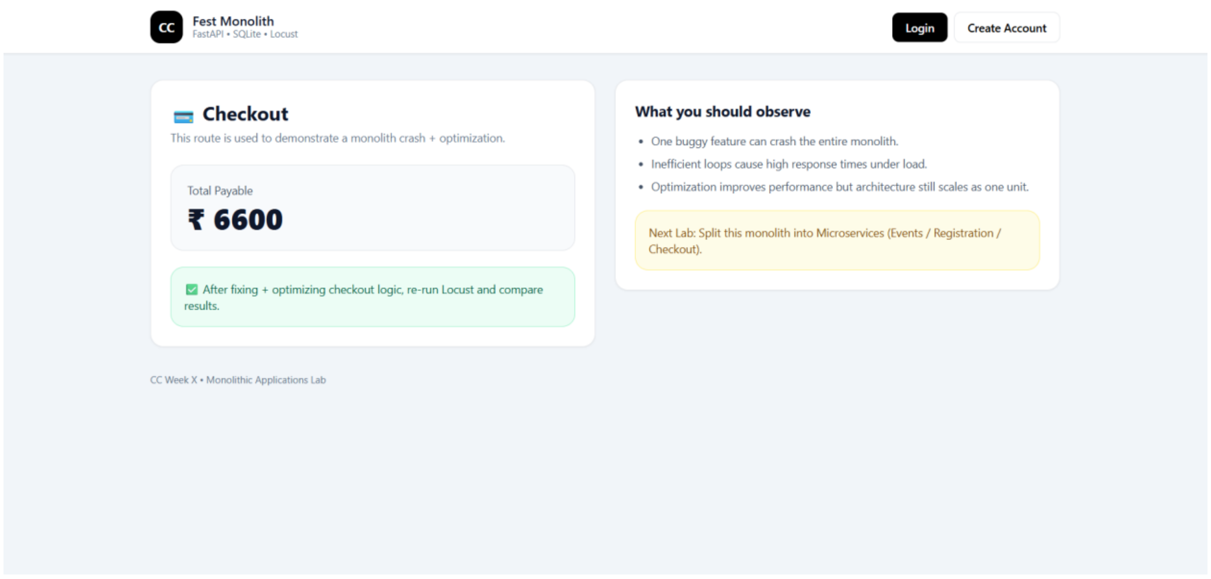
Back to Events | Login

CC Week X • Monolithic Applications Lab



```
INFO:     127.0.0.1:64909 - "GET /checkout HTTP/1.1" 500 Internal Server Error
ERROR:    Exception in ASGI application
Traceback (most recent call last):
  File "D:\cc\PES2UG23CS128\CC Lab-2\.venv\Lib\site-packages\uvicorn\protocols\http\h11_impl.py", line 410, in run_asg
```

SS-3



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Login | Create Account

Checkout

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

Total Payable

₹ 6600

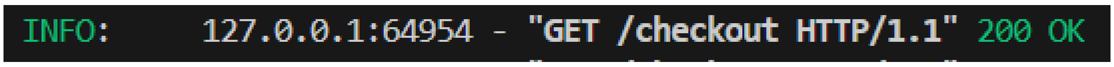
After fixing + optimizing checkout logic, re-run Locust and compare results.

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.

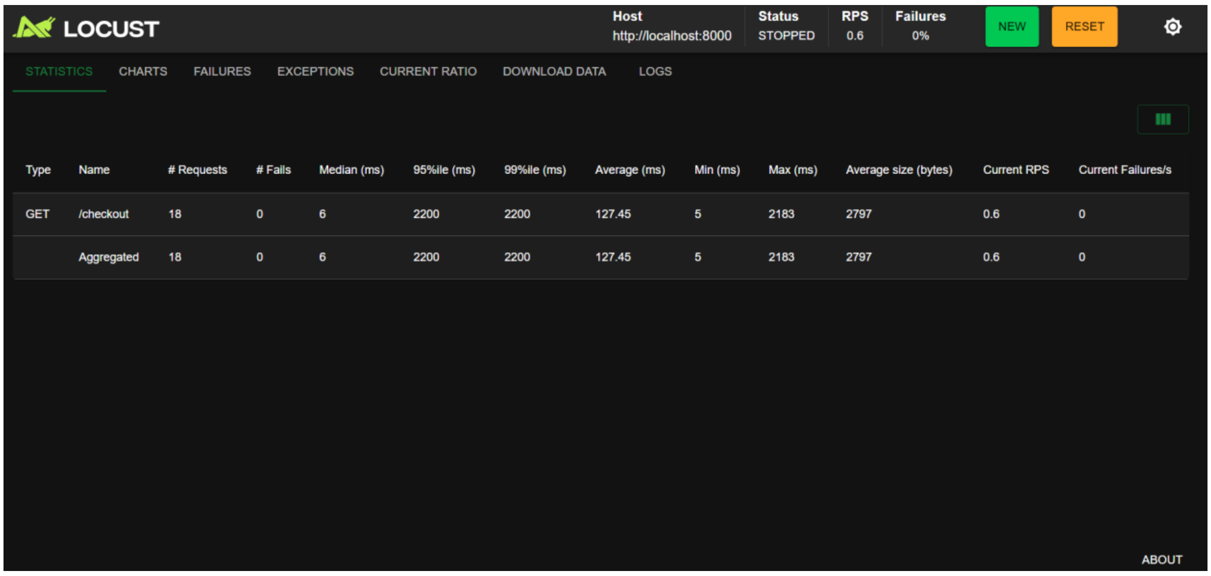
Next Lab: Split this monolith into Microservices (Events / Registration / Checkout).

CC Week X • Monolithic Applications Lab



```
INFO:     127.0.0.1:64954 - "GET /checkout HTTP/1.1" 200 OK
```

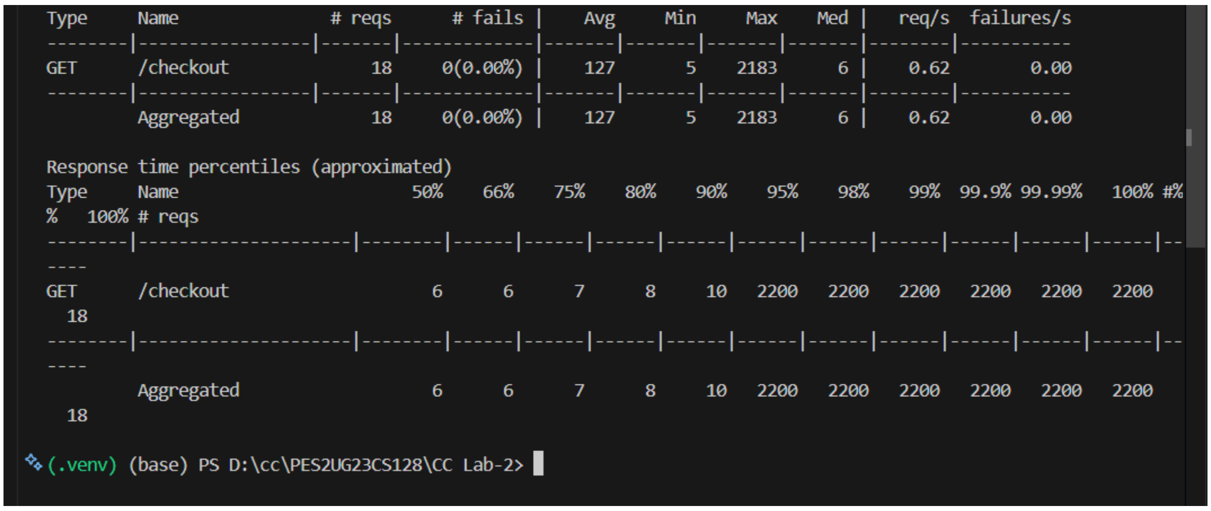
SS-4



LOCUST

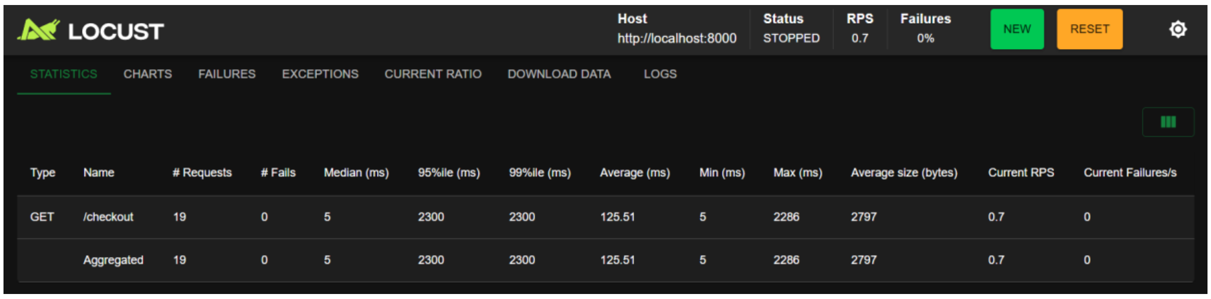
Host http://localhost:8000 | Status STOPPED | RPS 0.6 | Failures 0%

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	18	0	6	2200	2200	127.45	5	2183	2797	0.6	0
	Aggregated	18	0	6	2200	2200	127.45	5	2183	2797	0.6	0

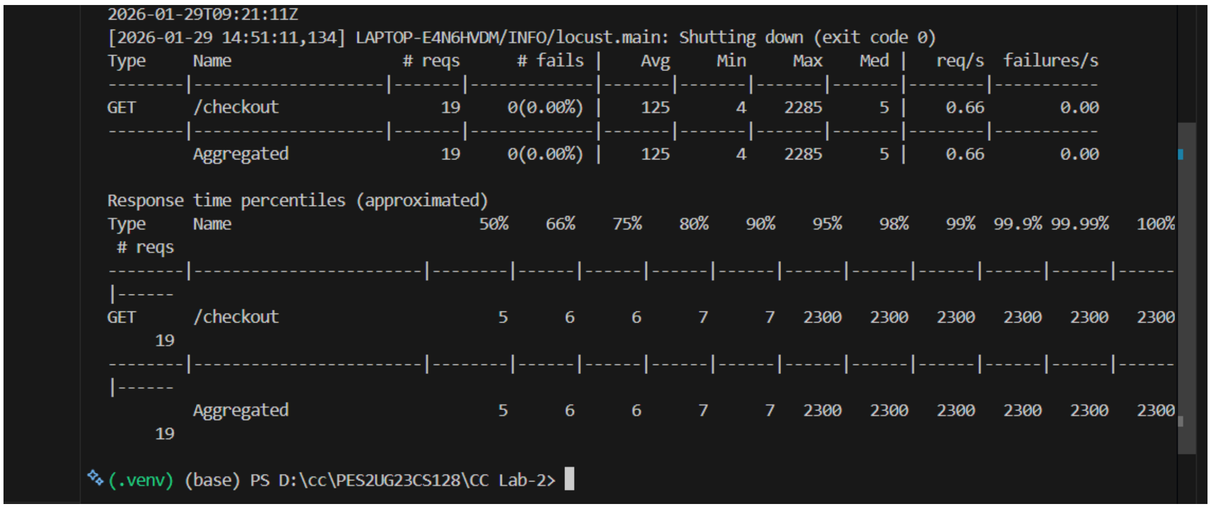


```
Type     Name                 # reqs      # fails |    Avg     Min     Max    Med |   req/s  failures/s
--------|-----------------|-------|-------------|-------|-------|-------|-------|--------|-----------
GET      /checkout                18     0(0.00%) |    127       5    2183      6 |    0.62        0.00
--------|-----------------|-------|-------------|-------|-------|-------|-------|--------|-----------
         Aggregated               18     0(0.00%) |    127       5    2183      6 |    0.62        0.00

Response time percentiles (approximated)
Type     Name                         50%    66%    75%    80%    90%    95%    98%    99%  99.9% 99.99%   100% #%
%   100% # reqs
--------|--------------------|--------|------|------|------|------|------|------|------|------|------|------|--
----
GET      /checkout                      6      6      7      8     10   2200   2200   2200   2200   2200   2200
  18
--------|--------------------|--------|------|------|------|------|------|------|------|------|------|------|--
----
         Aggregated                     6      6      7      8     10   2200   2200   2200   2200   2200   2200
  18

(.venv) (base) PS D:\cc\PES2UG23CS128\CC Lab-2>
```

SS-5

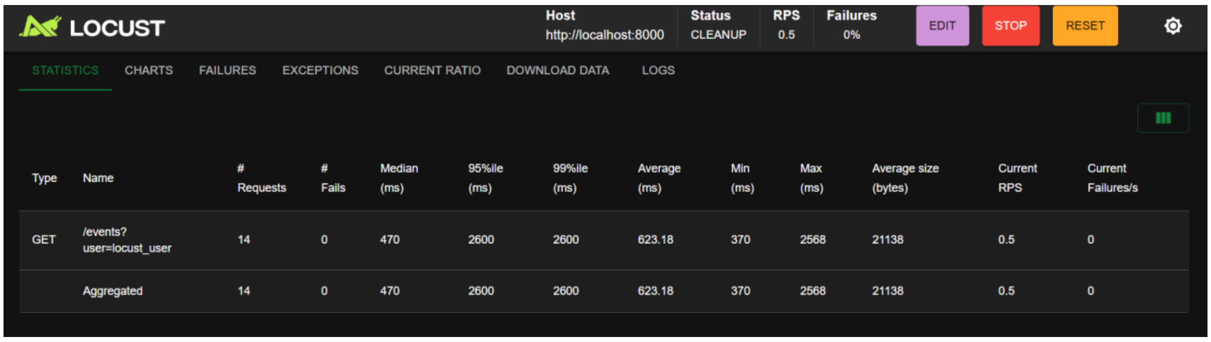


Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/checkout	19	0	5	2300	2300	125.51	5	2286	2797	0.7	0
	Aggregated	19	0	5	2300	2300	125.51	5	2286	2797	0.7	0



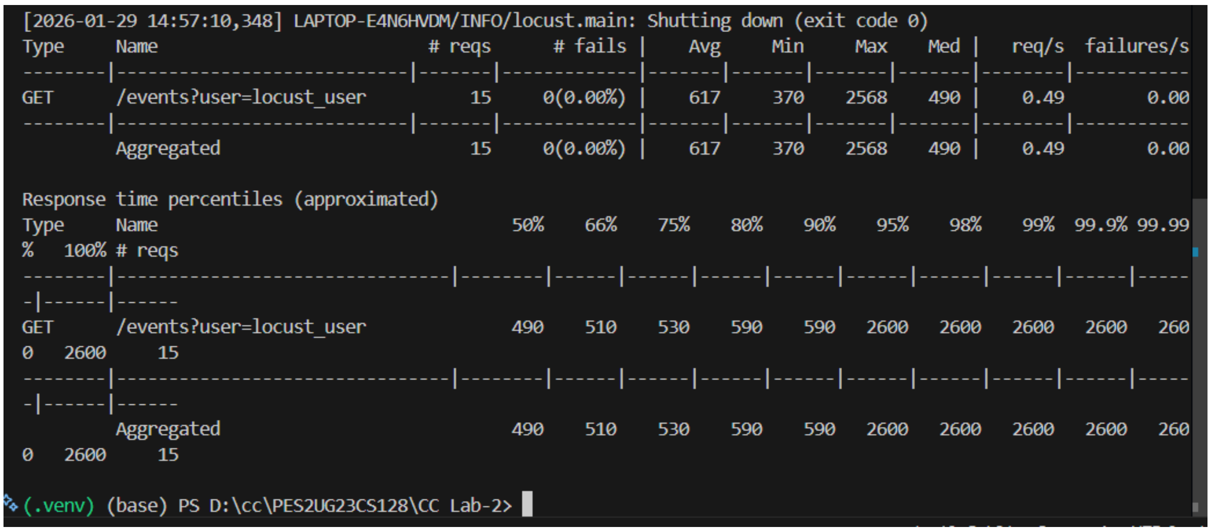
```
2026-01-29T09:21:11Z
[2026-01-29 14:51:11,134] LAPTOP-E4N6HVDM/INFO/locust.main: Shutting down (exit code 0)
Type     Name                  # reqs      # fails |    Avg     Min     Max    Med |   req/s  failures/s
--------|--------------------|-------|-------------|-------|-------|-------|-------|--------|-----------
GET      /checkout                 19     0(0.00%) |    125       4    2285      5 |    0.66        0.00
--------|--------------------|-------|-------------|-------|-------|-------|-------|--------|-----------
         Aggregated                19     0(0.00%) |    125       4    2285      5 |    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                         5      6      6      7      7   2300   2300   2300   2300   2300   2300
     19
--------|----------------------|--------|------|------|------|------|------|------|------|------|------|------
|------
         Aggregated                        5      6      6      7      7   2300   2300   2300   2300   2300   2300
     19

(.venv) (base) PS D:\cc\PES2UG23CS128\CC Lab-2>
```

SS-6



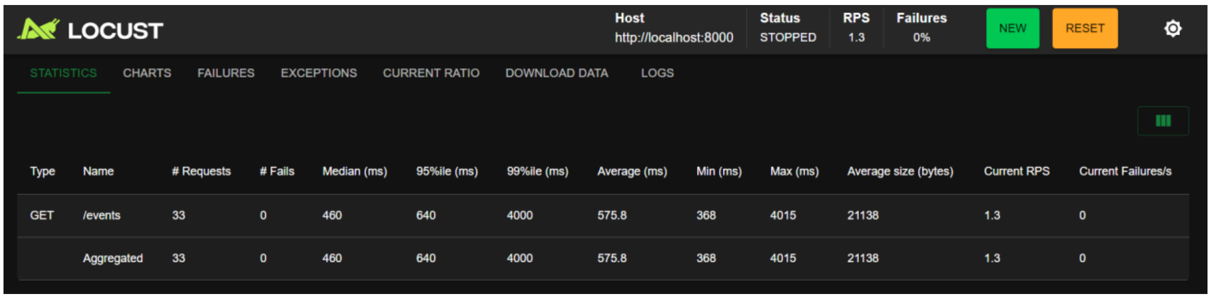
Host http://localhost:8000 | Status CLEANUP | RPS 0.5 | Failures 0%

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	14	0	470	2600	2600	623.18	370	2568	21138	0.5	0
	Aggregated	14	0	470	2600	2600	623.18	370	2568	21138	0.5	0



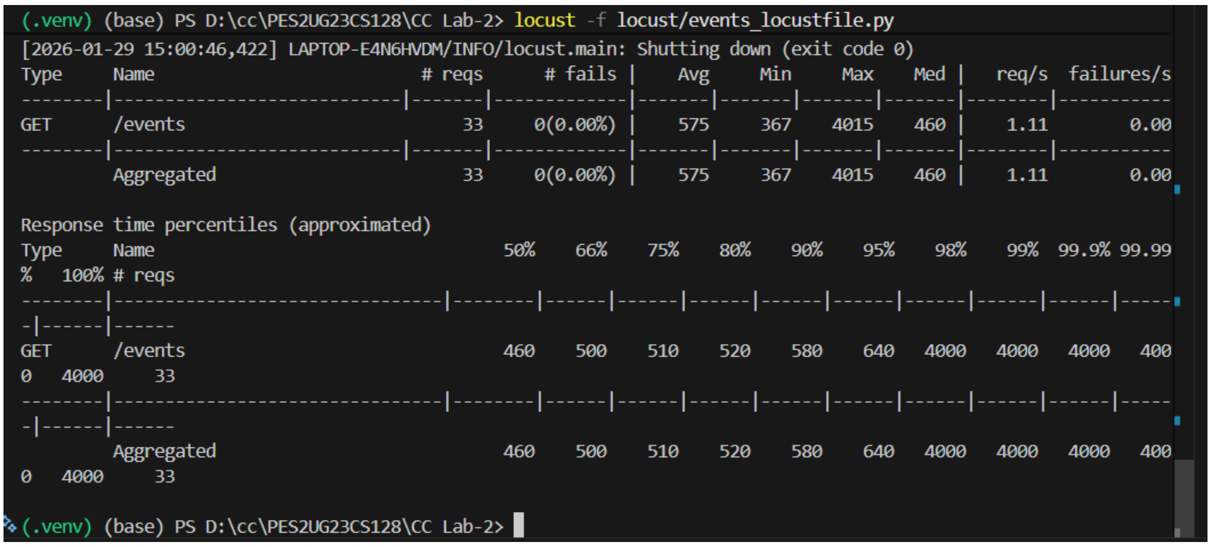
```
[2026-01-29 14:57:10,348] LAPTOP-E4N6HVDM/INFO/locust.main: Shutting down (exit code 0)
Type     Name                                # reqs      # fails |    Avg     Min     Max     Med |   req/s  failures/s
--------|----------------------------|-------|-------------|-------|-------|-------|-------|--------|-----------
GET      /events?user=locust_user                15     0(0.00%) |    617     370    2568     490 |    0.49        0.00
--------|----------------------------|-------|-------------|-------|-------|-------|-------|--------|-----------
         Aggregated                              15     0(0.00%) |    617     370    2568     490 |    0.49        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                    490    510    530    590    590   2600   2600   2600   2600    260
0   2600     15
--------|------------------------------|--------|------|------|------|------|------|------|------|------|-----
-|------|------
         Aggregated                                  490    510    530    590    590   2600   2600   2600   2600    260
0   2600     15

(.venv) (base) PS D:\cc\PES2UG23CS128\CC Lab-2>
```

SS-7



Host http://localhost:8000 | Status STOPPED | RPS 1.3 | 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	33	0	460	640	4000	575.8	368	4015	21138	1.3	0
	Aggregated	33	0	460	640	4000	575.8	368	4015	21138	1.3	0



```
(.venv) (base) PS D:\cc\PES2UG23CS128\CC Lab-2> locust -f locust/events_locustfile.py
[2026-01-29 15:00:46,422] LAPTOP-E4N6HVDM/INFO/locust.main: Shutting down (exit code 0)
Type     Name                                # reqs      # fails |    Avg     Min     Max     Med |   req/s  failures/s
--------|----------------------------|-------|-------------|-------|-------|-------|-------|--------|-----------
GET      /events                                 33     0(0.00%) |    575     367    4015     460 |    1.11        0.00
--------|----------------------------|-------|-------------|-------|-------|-------|-------|--------|-----------
         Aggregated                              33     0(0.00%) |    575     367    4015     460 |    1.11        0.00

Response time percentiles (approximated)
Type     Name                                        50%    66%    75%    80%    90%    95%    98%    99%  99.9% 99.99
%   100% # reqs
--------|------------------------------|--------|------|------|------|------|------|------|------|------|-----
-|------|------
GET      /events                                     460    500    510    520    580    640   4000   4000   4000    400
0   4000     33
--------|------------------------------|--------|------|------|------|------|------|------|------|------|-----
-|------|------
         Aggregated                                  460    500    510    520    580    640   4000   4000   4000    400
0   4000     33

(.venv) (base) PS D:\cc\PES2UG23CS128\CC Lab-2>
```

The main bottleneck was request handling overhead and slow tail responses which were caused by:

- Rebuilding query strings on every request
- No request timeout
- Endpoint stats being fragmented

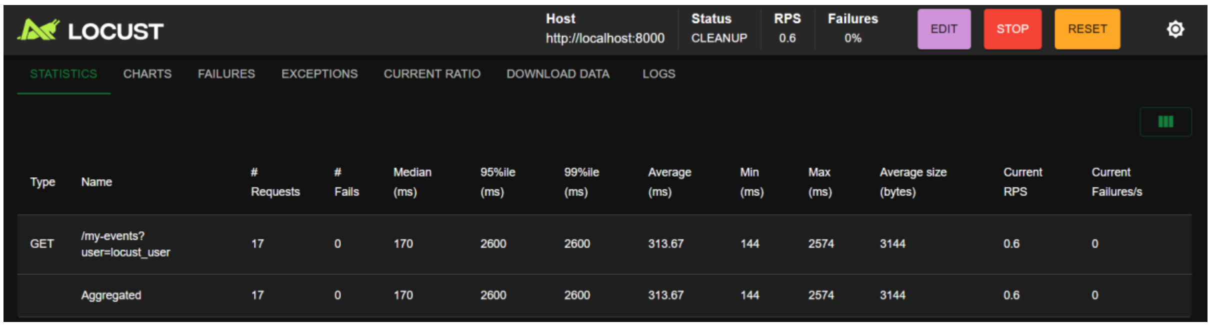
Changes made:

- Used params instead of embedding query strings
- Added a request timeout
- Grouped requests using name="/events"
- Reduced wait time to keep connections warm

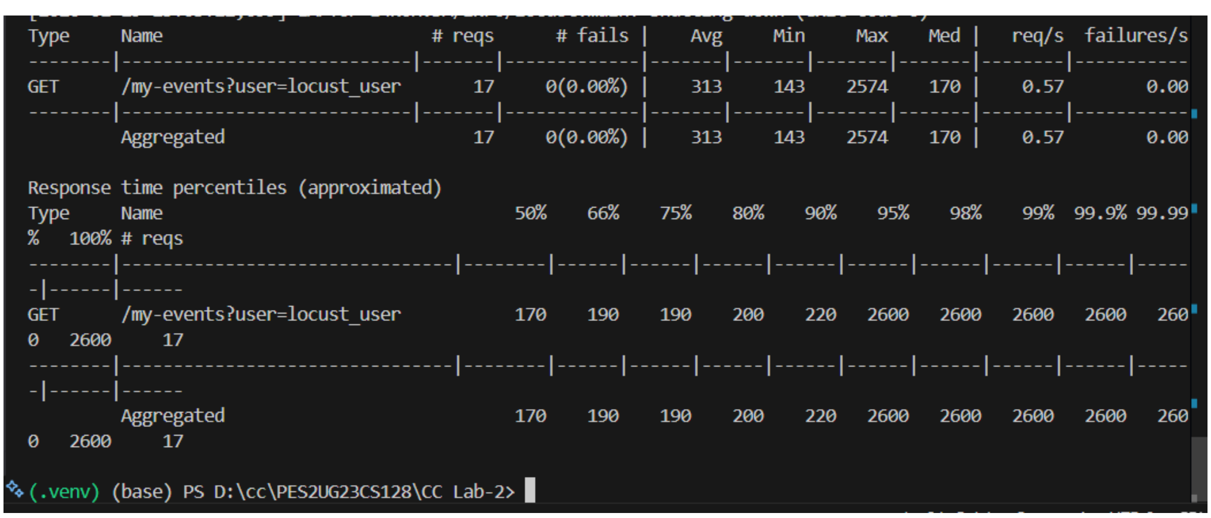
Performance improved because:

- Connection reuse reduced TCP overhead
- Timeouts prevented very slow requests from skewing averages
- Stat grouping gave accurate aggregation
- Reduced idle time improved request throughput

SS-8

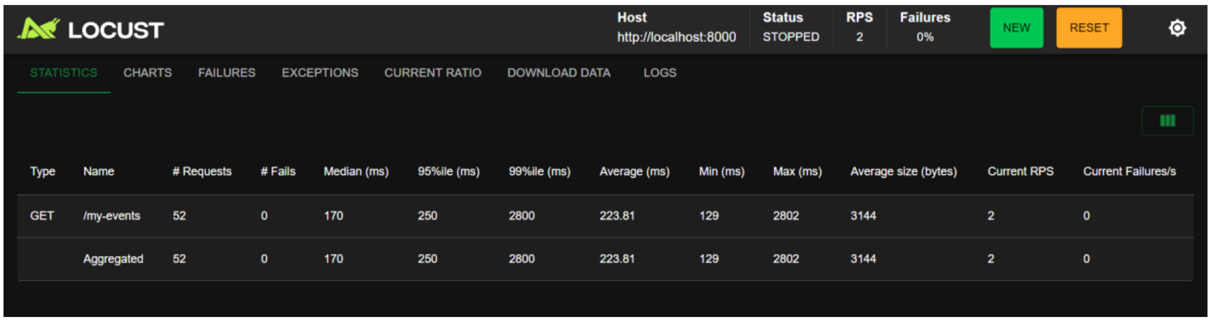


Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
GET	/my-events?user=locust_user	17	0	170	2600	2600	313.67	144	2574	3144	0.6	0
	Aggregated	17	0	170	2600	2600	313.67	144	2574	3144	0.6	0



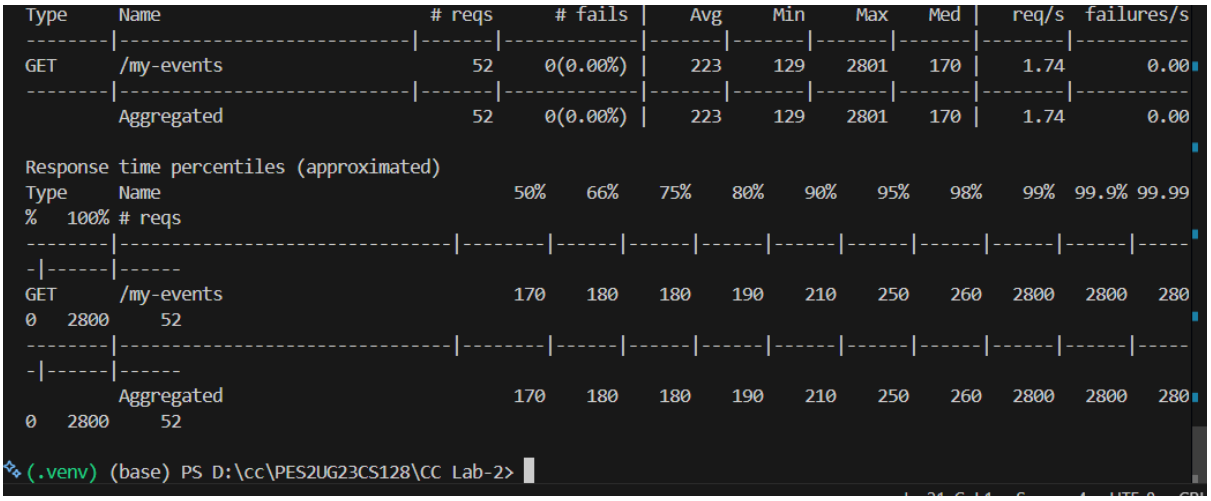
```
Type     Name                          # reqs      # fails |    Avg     Min     Max     Med |   req/s  failures/s
--------|----------------------------|-------|-------------|-------|-------|-------|-------|--------|-----------
GET      /my-events?user=locust_user       17     0(0.00%) |    313     143    2574     170 |    0.57        0.00
--------|----------------------------|-------|-------------|-------|-------|-------|-------|--------|-----------
         Aggregated                        17     0(0.00%) |    313     143    2574     170 |    0.57        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           170    190    190    200    220   2600   2600   2600   2600    260
0   2600     17
--------|--------------------------------|--------|------|------|------|------|------|------|------|------|-----
-|------|------
         Aggregated                            170    190    190    200    220   2600   2600   2600   2600    260
0   2600     17

(.venv) (base) PS D:\cc\PES2UG23CS128\CC Lab-2>
```

SS-9



Host http://localhost:8000 | Status STOPPED | RPS 2 | 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	52	0	170	250	2800	223.81	129	2802	3144	2	0
	Aggregated	52	0	170	250	2800	223.81	129	2802	3144	2	0



```
Type     Name                                   # reqs      # fails |    Avg     Min     Max    Med |   req/s  failures/s
--------|------------------------------------|-------|-------------|-------|-------|-------|-------|--------|-----------
GET      /my-events                                52     0(0.00%) |    223     129    2801    170 |    1.74        0.00
--------|------------------------------------|-------|-------------|-------|-------|-------|-------|--------|-----------
         Aggregated                                52     0(0.00%) |    223     129    2801    170 |    1.74        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                                        170    180    180    190    210    250    260   2800   2800    280
0   2800     52
--------|------------------------------------------------|--------|------|------|------|------|------|------|------|------|-----
-|------|------
         Aggregated                                        170    180    180    190    210    250    260   2800   2800    280
0   2800     52

(.venv) (base) PS D:\cc\PES2UG23CS128\CC Lab-2>
```

The bottleneck here was:

- Additional backend filtering
- Potential lack of indexing on user
- Same locust side overhead as /events

Changes made:

- Reused query parameters via params
- Added request timeout
- Grouped endpoint stats with name="/my-events"
- Reduced wait time for better connection reuse

The performance improved because:

- Cleaner client-side request handling using artificial latency
- Timeouts prevented slow queries from dominating averages
- More realistic load pattern produced lower and more consistent response times