

UE23CS351B: Cloud Computing

Lab-2: Monolithic Architecture

Name: Niharika Paul
SRN: PES1UG23AM189

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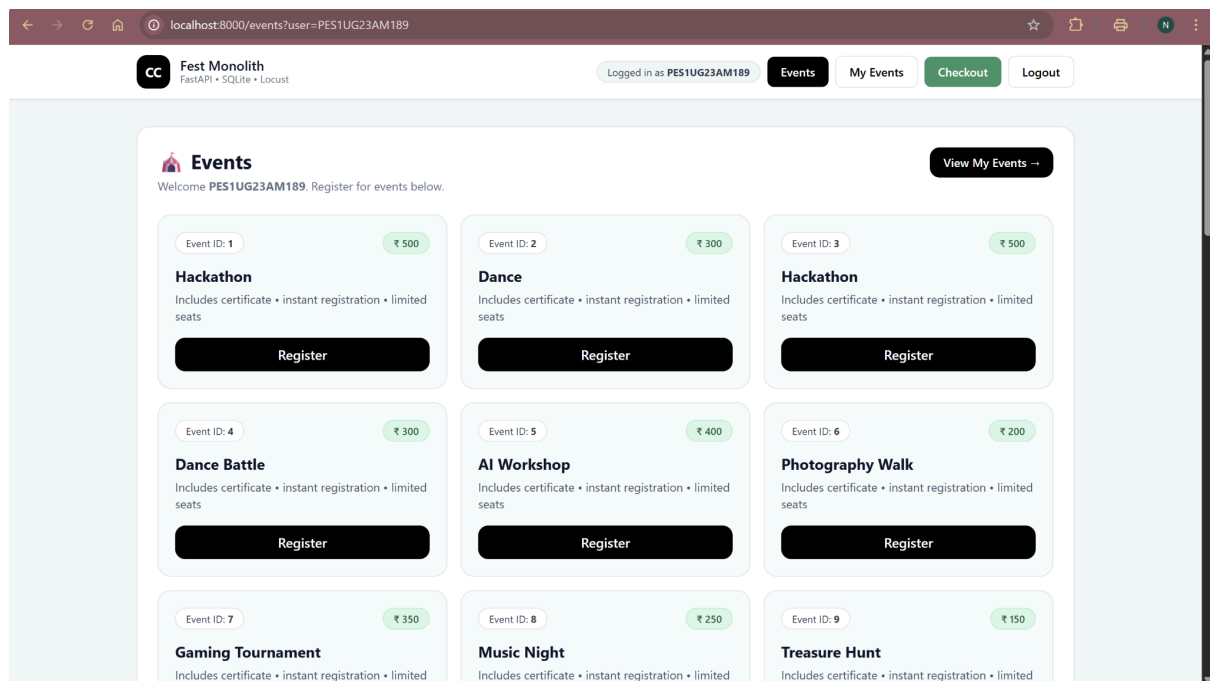
PART-1

```
(.venv) C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2>python insert_events.py
✓ Events inserted successfully!

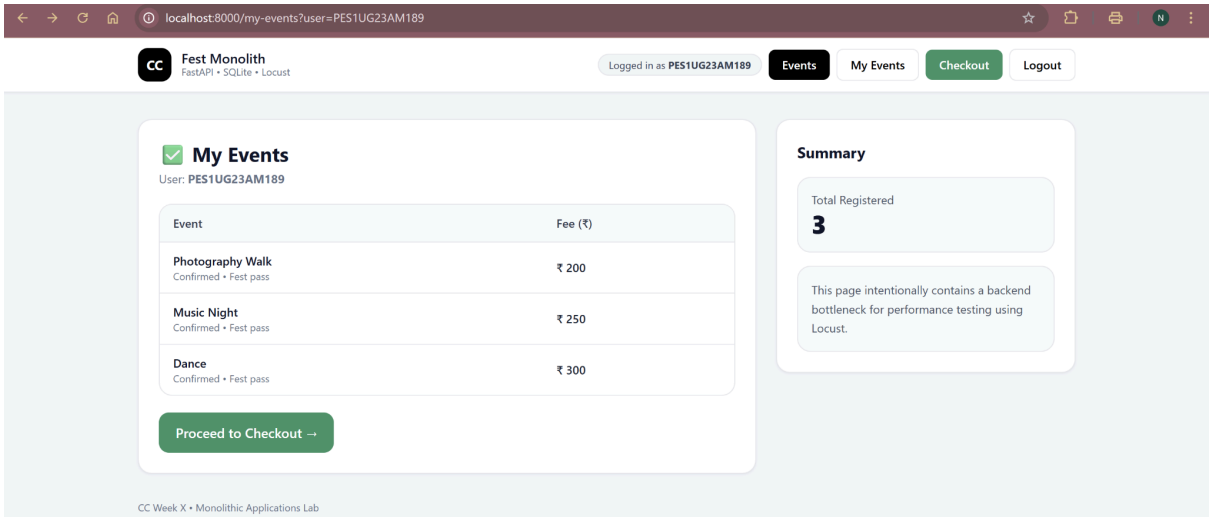
(.venv) C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2>uvicorn main:app --reload
INFO: Will watch for changes in these directories: ['C:\\SEM-6\\CC_Lab\\PES1UG23AM189\\CC_Lab2']
INFO: Uvicorn running on http://127.0.0.1:8000 (Press CTRL+C to quit)
INFO: Started reload process [4600] using StatReload
INFO: Started server process [25840]
INFO: Waiting for application startup.
INFO: Application startup complete.
```

PART-2

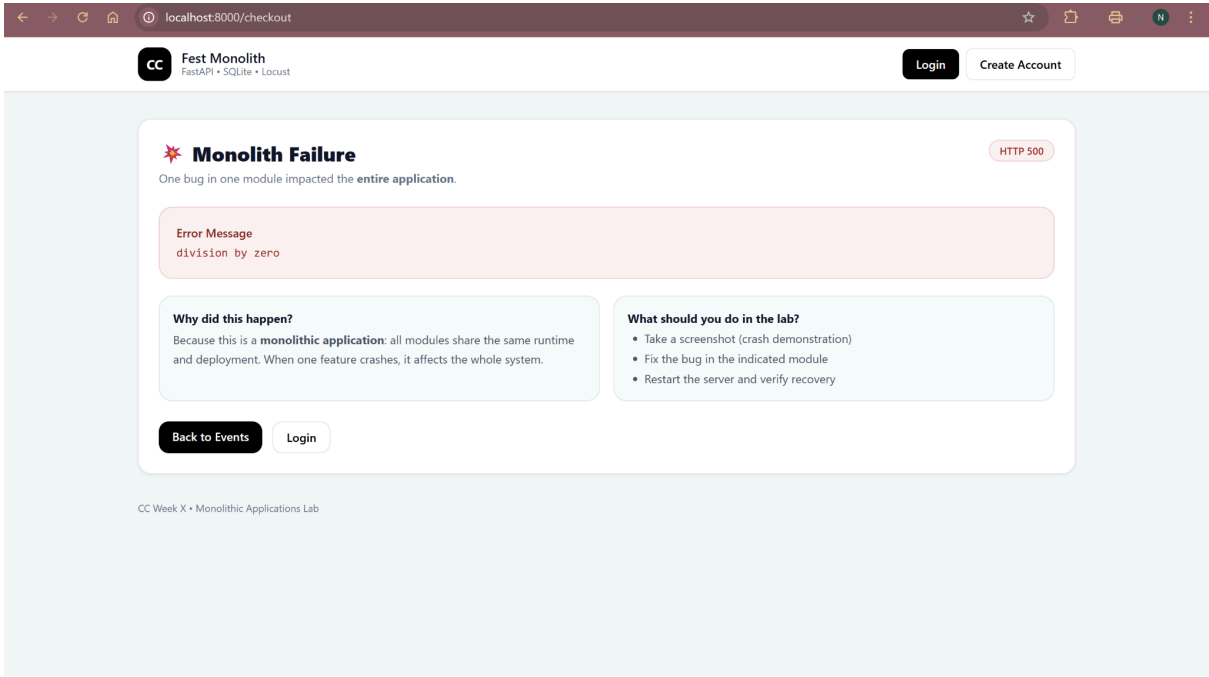
SS1:



PART-3



SS2:



```
INFO: 127.0.0.1:51731 - "GET /checkout HTTP/1.1" 500 Internal Server Error
ERROR: Exception in ASGI application
```

PART-4

SS3:

← → ↺ 🏠 🌐 localhost:8000/checkout ☆ 📄 🖨️ N ⋮

CC Fest Monolith
FastAPI • SQLite • Locust

Login Create Account

🏠 Checkout

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

Total Payable
₹ 9500

✅ 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: 127.0.0.1:57012 - "GET /checkout HTTP/1.1" 200 OK

PART-5

SS4:

CC Fest Monolith

Locust

localhost:8089

LOCUST

STATISTICS

CHARTS

FAILURES

EXCEPTIONS

CURRENT RATIO

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Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)
GET	/checkout	13	0	9	2100	2100	169.18	4
Aggregated		13	0	9	2100	2100	169.18	4

C:\Windows\System32\cmd.e

Microsoft Windows [Version 10.0.26100.7462]
(c) Microsoft Corporation. All rights reserved.

C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2>python -m venv .venv
Error: [Errno 13] Permission denied: 'C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2\venv\Scripts\python.exe'

C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2>.\venv\Scripts\activate

(.venv) C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2>locust -f locust/checkout_locustfile.py
[2026-01-21 11:58:27,148] NEHA-SAMSUNG-PC/INFO/locust.main: Starting Locust 2.43.1
[2026-01-21 11:58:27,149] NEHA-SAMSUNG-PC/INFO/locust.main: Starting web interface at http://localhost:8089, press enter to open your default browser.
[2026-01-21 12:02:21,985] NEHA-SAMSUNG-PC/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-21 12:02:22,002] NEHA-SAMSUNG-PC/INFO/locust.runners: All users spawned: {"CheckoutUser": 1} (1 total users)

CC Fest Monolith

Locust

localhost:8089

LOCUST

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Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)
GET	/checkout	19	0	8	2100	2100	118.28	4
Aggregated		19	0	8	2100	2100	118.28	4

C:\Windows\System32\cmd.e

[2026-01-21 11:58:27,149] NEHA-SAMSUNG-PC/INFO/locust.main: Starting web interface at http://localhost:8089, press enter to open your default browser.
[2026-01-21 12:02:21,985] NEHA-SAMSUNG-PC/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-21 12:02:22,002] NEHA-SAMSUNG-PC/INFO/locust.runners: All users spawned: {"CheckoutUser": 1} (1 total users)
Traceback (most recent call last):
File "C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2\venv\Lib\site-packages\gevent_ffi\loop.py", line 279, in python_check_callback
def python_check_callback(self, watcher_ptr): # pylint:disable=unused-argument
KeyboardInterrupt
2026-01-21T06:33:28Z
[2026-01-21 12:03:28,579] NEHA-SAMSUNG-PC/INFO/locust.main: Shutting down (exit code 0)

Type	Name	Avg	Min	Max	Med	req/s	failures/s	# reqs	# fails
GET	/checkout	118	3	2087	8	0.66	0.00	19	0(0.00%)
Aggregated		118	3	2087	8	0.66	0.00	19	0(0.00%)

Response time percentiles (approximated)

Type	Name	80%	90%	95%	98%	99%	99.9%	99.99%	100%	# reqs	50%	66%	75%
GET	/checkout	12	17	2100	2100	2100	2100	2100	2100	19	8	9	11
Aggregated		12	17	2100	2100	2100	2100	2100	2100	19	8	9	11

(.venv) C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2>

PART-6

SS5:

CC Fest Monolith

Locust

localhost:8089

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III

Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)
GET	/checkout	19	0	7	2100	2100	115.69	3
Aggregated		19	0	7	2100	2100	115.69	3

ABOUT

C:\Windows\System32\cmd.r

Command Prompt

interface at http://localhost:8089, press enter to open your default browser.
[2026-01-21 12:30:32,201] NEHA-SAMSUNG-PC/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-21 12:30:32,202] NEHA-SAMSUNG-PC/INFO/locust.runners: All users spawned: {"CheckoutUser": 1} (1 total users)
Traceback (most recent call last):
File "C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2\.venv\Lib\site-packages\gevent\ffi\loop.py", line 279, in python_check_callback
def python_check_callback(self, watcher_ptr): # pylint:disable=unused-argument

KeyboardInterrupt
2026-01-21T07:01:57Z
[2026-01-21 12:31:57,328] NEHA-SAMSUNG-PC/INFO/locust.main: Shutting down (exit code 0)
Type Name # reqs # fails | Avg Min Max Med | r
eq/s failures/s
-----|-----|-----|-----|-----|-----|-----
GET /checkout 19 0(0.00%) | 115 3 2052 7
| 0.65 0.00
-----|-----|-----|-----|-----|-----|-----
Aggregated 19 0(0.00%) | 115 3 2052 7
| 0.65 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 8 10 12 23 2100 2100
2100 2100 2100 2100 19
-----|-----|-----|-----|-----|-----|-----
Aggregated 7 8 10 12 23 2100 2100
2100 2100 2100 2100 19
-----|-----|-----|-----|-----|-----|-----

(.venv) C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2>
(.venv) C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2>

PART-7

Route 1: /events

SS6 (BEFORE optimization):

Locust Web Interface Statistics (SS6 - BEFORE optimization):

Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)
GET	/events?user=locust_user	11	0	180	2300	2300	384.08
Aggregated		11	0	180	2300	2300	384.08

Terminal Output (SS6 - BEFORE optimization):

```
interface at http://localhost:8089, press enter to open your default browser.
[2026-01-21 12:41:26,726] NEHA-SAMSUNG-PC/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-21 12:41:26,740] NEHA-SAMSUNG-PC/INFO/locust.runners: All users spawned: {"EventsUser": 1} (1 total users)
Traceback (most recent call last):
  File "C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2\.venv\Lib\site-packages\gevent\ffi\loop.py", line 279, in python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disable=unused-argument

KeyboardInterrupt
2026-01-21T07:11:46Z
[2026-01-21 12:41:46,748] NEHA-SAMSUNG-PC/INFO/locust.main: Shutting down (exit code 0)
Type Name # reqs # fails | Avg Min Max Med | re
q/s failures/s
GET /events?user=locust_user 11 0(0.00%) | 384 135
2251 180 | 0.61 0.00
Aggregated 11 0(0.00%) | 384 135 2251 180
0.61 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 180 240 250 250 320
2300 2300 2300 2300 2300 2300 11
Aggregated 180 240 250 250 320 2300 2300
2300 2300 2300 2300 11
```

SS7 (AFTER optimization):

Locust Web Interface Statistics (SS7 - AFTER optimization):

Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)
GET	/events?user=locust_user	11	0	8	2100	2100	196.03
Aggregated		11	0	8	2100	2100	196.03

Terminal Output (SS7 - AFTER optimization):

```
[2026-01-21 12:45:43,730] NEHA-SAMSUNG-PC/INFO/locust.main: Starting web interface at http://localhost:8089, press enter to open your default browser.
[2026-01-21 12:45:49,855] NEHA-SAMSUNG-PC/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-21 12:45:49,858] NEHA-SAMSUNG-PC/INFO/locust.runners: All users spawned: {"EventsUser": 1} (1 total users)
Traceback (most recent call last):
  File "C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2\.venv\Lib\site-packages\gevent\ffi\loop.py", line 279, in python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disable=unused-argument

KeyboardInterrupt
2026-01-21T07:16:09Z
[2026-01-21 12:46:09,015] NEHA-SAMSUNG-PC/INFO/locust.main: Shutting down (exit code 0)
Type Name # reqs # fails | Avg Min Max Med | re
q/s failures/s
GET /events?user=locust_user 11 0(0.00%) | 196 3
2078 8 | 0.62 0.00
Aggregated 11 0(0.00%) | 196 3 2078 8
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 8 9 11 11 12
2100 2100 2100 2100 2100 2100 11
Aggregated 8 9 11 11 12 2100 2100
2100 2100 2100 2100 11
```

Route 2: /my-events

SS8 (BEFORE optimization):

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Locust

localhost:8089

LOCUST

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Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)
GET	/my-events?user=locust_user	14	0	130	2100	2100	265.38
Aggregated		14	0	130	2100	2100	265.38

```
[2026-01-21 12:43:16,498] NEHA-SAMSUNG-PC/INFO/locust.main: Starting web interface at http://localhost:8089, press enter to open your default browser.
[2026-01-21 12:43:23,257] NEHA-SAMSUNG-PC/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-21 12:43:23,262] NEHA-SAMSUNG-PC/INFO/locust.runners: All users spawned: {"MyEventsUser": 1} (1 total users)
Traceback (most recent call last):
  File "C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2\.venv\Lib\site-packages\event\ffi\loop.py", line 279, in python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disable=unused-argument
KeyboardInterrupt
2026-01-21T07:13:48Z
[2026-01-21 12:43:48,460] NEHA-SAMSUNG-PC/INFO/locust.main: Shutting down (exit code 0)
Type Name # reqs # fails | Avg Min Max Med | re
q/s failures/s
GET /my-events?user=locust_user 15 0.60 0.00 15 0(0.00%) | 254 6
Aggregated 15 0.60 0.00 15 0(0.00%) | 254 66 2109 130
Response time percentiles (approximated)
Type Name 50% 66% 75% 80% 90% 95% 98% 99%
GET /my-events?user=locust_user 130 140 160 160 170
2100 2100 2100 2100 2100 2100 15
Aggregated 130 140 160 160 170 2100 2100
2100 2100 2100 2100 15
```

SS9 (AFTER optimization):

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Locust

localhost:8089

LOCUST

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STATISTICS

Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)
GET	/my-events?user=locust_user	15	0	7	2100	2100	144.11
Aggregated		15	0	7	2100	2100	144.11

```
[2026-01-21 12:47:08,926] NEHA-SAMSUNG-PC/INFO/locust.main: Starting web interface at http://localhost:8089, press enter to open your default browser.
[2026-01-21 12:47:13,339] NEHA-SAMSUNG-PC/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-21 12:47:13,347] NEHA-SAMSUNG-PC/INFO/locust.runners: All users spawned: {"MyEventsUser": 1} (1 total users)
Traceback (most recent call last):
  File "C:\SEM-6\CC_Lab\PES1UG23AM189\CC_Lab2\.venv\Lib\site-packages\event\ffi\loop.py", line 279, in python_check_callback
    def python_check_callback(self, watcher_ptr): # pylint:disable=unused-argument
KeyboardInterrupt
2026-01-21T07:17:42Z
[2026-01-21 12:47:42,229] NEHA-SAMSUNG-PC/INFO/locust.main: Shutting down (exit code 0)
Type Name # reqs # fails | Avg Min Max Med | re
q/s failures/s
GET /my-events?user=locust_user 16 0.56 0.00 16 0(0.00%) | 135 3
Aggregated 16 0.56 0.00 16 0(0.00%) | 135 3 2067 7
Response time percentiles (approximated)
Type Name 50% 66% 75% 80% 90% 95% 98% 99%
GET /my-events?user=locust_user 7 7 9 9 10
2100 2100 2100 2100 2100 2100 16
Aggregated 7 7 9 9 10 2100 2100
2100 2100 2100 2100 16
```

Explanation of optimizations:

Route 1: /events

- **What was the bottleneck?**

The bottleneck was unnecessary CPU-heavy computation inside the route (for i in range(3000000)), which wasted time on every request.

- **What change did you make?**

Removed/reduced the unnecessary loop (dummy computation) so the route mainly performs the database query and returns the template.

- **Why did the performance improve?**

Because the server stopped spending extra CPU time on useless calculations, the request finished faster and response time reduced.

Route 2: /my-events

- **What was the bottleneck?**

The bottleneck was extra CPU work inside the route (for _ in range(1500000)), which slowed down every request even after fetching the required data.

- **What change did you make?**

Removed/reduced the dummy loop and kept only the required database query + response rendering.

- **Why did the performance improve?**

Because the endpoint no longer wastes CPU cycles, it processes requests quicker, so the average response time improved under Locust load.
