

CLOUD COMPUTING – LAB 2 – MONOLITHIC ARCHITECTURE

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PART 2: Use the Application

Screenshot 1 (SS1)

The screenshot shows a web application interface for 'Fest Monolith' with the following details:

- Header:** 'Fest Monolith' logo, 'FastAPI + SQLite + Locust' text, 'Logged in as PES2UG23CS183', navigation links for 'Events', 'My Events', 'Checkout', and 'Logout'.
- Section:** 'Events' with a sub-section message: 'Welcome PES2UG23CS183. Register for events below.'
- Event Grid:** A 3x3 grid of event cards. Each card includes an event ID, price, event name, a brief description, and a 'Register' button.

Event ID	Price	Event Name	Description	Action
1	₹ 500	Hackathon	Includes certificate • instant registration • limited seats	Register
2	₹ 300	Dance	Includes certificate • instant registration • limited seats	Register
3	₹ 500	Hackathon	Includes certificate • instant registration • limited seats	Register
4	₹ 300	Dance Battle	Includes certificate • instant registration • limited seats	Register
5	₹ 400	AI Workshop	Includes certificate • instant registration • limited seats	Register
6	₹ 200	Photography Walk	Includes certificate • instant registration • limited seats	Register
7	₹ 350			
8	₹ 250			
9	₹ 150			

PART 3: Observe Monolithic Failure (Crash)

Screenshot 2 (SS2)

Fest Monolith
FastAPI • SQLite • Locust

Monolith Failure

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](#)

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```
(.venv) (base) PS C:\Users\diyab\sem6\CC\PES2UG23CS183\CC_LAB2> uvicorn main:app --reload
INFO:     Application startup complete.
INFO:     127.0.0.1:53023 - "GET /checkout HTTP/1.1" 500 Internal Server Error
ERROR:    Exception in ASGI application
```

PART 4: Fix the Bug

Screenshot 3 (SS3)

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).

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```
INFO:     127.0.0.1:61439 - "GET /checkout HTTP/1.1" 200 OK
```

PART 5: Load Testing using Locust

Screenshot 4 (SS4)

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	2100	2100	113.27	4	2066	2797	0.7	0
	Aggregated	19	0	5	2100	2100	113.27	4	2066	2797	0.7	0

```

[2026-01-20 14:44:44,285] lenovo_diya/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-20 14:44:44,286] lenovo_diya/INFO/locust.runners: All users spawned: {"CheckoutUser": 1} (1 total users)
Traceback (most recent call last):
[2026-01-20 14:45:54,063] lenovo_diya/INFO/locust.main: Shutting down (exit code 0)
Type      Name           # reqs   # fails | Avg     Min     Max     Med | req/s failures/s
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
GET    /checkout          18      0(0.00%) | 117     3       2030    5 | 0.64     0.00
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
[2026-01-20 14:45:54,063] lenovo_diya/INFO/locust.main: Shutting down (exit code 0)
Type      Name           # reqs   # fails | Avg     Min     Max     Med | req/s failures/s
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
GET    /checkout          18      0(0.00%) | 117     3       2030    5 | 0.64     0.00
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Aggregated          18      0(0.00%) | 117     3       2030    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    /checkout          5       6       6       7       7       2000   2000   2000   2000   2000   2000   2000   18
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Aggregated          5       6       6       7       7       2000   2000   2000   2000   2000   2000   2000   18
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
(.venv) (base) PS C:\Users\diyab\sem6\CC\PES2UG23CS183\CC_LAB2>

```

PART 6: Optimize the Checkout Route

Screenshot 5 (SS5)

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	106.81	4	2032	2797	0.7	0
	Aggregated	20	0	5	2000	2000	106.81	4	2032	2797	0.7	0

```

2026-01-20T09:22:33Z
[2026-01-20 14:52:33,535] lenovo_diya/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%) | 113     3       2065    5 | 0.64     0.00
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Aggregated          19      0(0.00%) | 113     3       2065    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    /checkout          5       5       5       5       6       2100   2100   2100   2100   2100   2100   2100   19
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Aggregated          5       5       5       5       6       2100   2100   2100   2100   2100   2100   2100   19
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
(.venv) (base) PS C:\Users\diyab\sem6\CC\PES2UG23CS183\CC_LAB2>

```

PART 7: Optimise events and my_events(DIY)

Screenshot 6 (SS6)

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	520	2600	2600	652.79	401	2617	21138	0.5	0
	Aggregated	15	0	520	2600	2600	652.79	401	2617	21138	0.5	0


```

2026-01-20T09:30:05Z
[2026-01-20 15:00:05,316] lenovo_diya/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%) | 652    400    2616    520 | 0.51    0.00
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
          Aggregated        15      0(0.00%) | 652    400    2616    520 | 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  520    530    570    570    620    2600   2600   2600   2600   2600   2600   15
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
          Aggregated        520    530    570    570    620    2600   2600   2600   2600   2600   2600   15
  
```

(.venv) (base) PS C:\Users\diyab\sem6\CC\PES2UG23CS183\CC_LAB2>

Screenshot 7 (SS7)

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	4	0	7	2100	2100	528.74	7	2092	21138	0.5	0
	Aggregated	4	0	7	2100	2100	528.74	7	2092	21138	0.5	0


```

2026-01-20T09:36:06Z
[2026-01-20 15:06:06,862] lenovo_diya/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    16      0(0.00%) | 138    6      2092    8 | 0.70    0.00
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
          Aggregated        16      0(0.00%) | 138    6      2092    8 | 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  8      8      9      9      10     2100   2100   2100   2100   2100   2100   16
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
          Aggregated        8      8      9      9      10     2100   2100   2100   2100   2100   2100   16
  
```

(.venv) (base) PS C:\Users\diyab\sem6\CC\PES2UG23CS183\CC_LAB2>

Screenshot 8 (SS8)

Host: http://localhost:8000 Status: RUNNING Users: 1 RPS: 0 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	2	0	14	2100	2100	1055.93	14	2098	21138	0	0
	Aggregated	2	0	14	2100	2100	1055.93	14	2098	21138	0	0

```
KeyboardInterrupt
Type      Name          # reqs    # fails | Avg     Min     Max     Med | req/s   failures/s
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
GET     /events?user=locust_user        19      0(0.00%) | 118      6     2098     8 | 0.64     0.00
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Aggregated                         19      0(0.00%) | 118      6     2098     8 | 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     /events?user=locust_user        8       8      9      9     14     2100    2100    2100    2100    2100    2100    19
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Aggregated                         8       8      9      9     14     2100    2100    2100    2100    2100    2100    19

(.venv) (base) PS C:\Users\diyab\sem6\CC\PES2UG23CS183\CC_LAB2> 
```

Screenshot 9 (SS9)

Host: http://localhost:8000 Status: RUNNING Users: 1 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	/events?user=locust_user	17	0	8	2100	2100	131.92	7	2107	21138	0.7	0
	Aggregated	17	0	8	2100	2100	131.92	7	2107	21138	0.7	0

```
[2026-01-20 15:11:49,068] lenovo_diyा/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        20      0(0.00%) | 113      6     2107     8 | 0.68     0.00
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Aggregated                         20      0(0.00%) | 113      6     2107     8 | 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     /events?user=locust_user        8       8      8      8     18     2100    2100    2100    2100    2100    2100    20
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Aggregated                         8       8      8      8     18     2100    2100    2100    2100    2100    2100    20

(.venv) (base) PS C:\Users\diyab\sem6\CC\PES2UG23CS183\CC_LAB2> 
```

3. Short explanation of optimizations

Route: /events

What was the bottleneck?

The /events route had an unnecessary loop that ran lot of times and did not contribute to displaying the events. This caused extra CPU usage and slowed down the response.

What change did you make?

I commented the redundant loop from the /events route and then executed it.

Why did the performance improve?

By commenting the unnecessary computation, the server handled requests faster, reducing the response time under load.

Route: /my-events**What was the bottleneck?**

The /my-events route contained a dummy loop with a large number of iterations, which added delay without affecting the output.

What change did you make?

I commented the unused loop from the /my-events route logic and then executed it.

Why did the performance improve?

Commenting the extra loop reduced CPU overhead, resulting in faster request processing and improved response time.

Github Link

https://github.com/PES2UG23CS183/Cloud_Computing_Lab_Diya/tree/main/Week%202%20-%20Monolithic%20Architecture