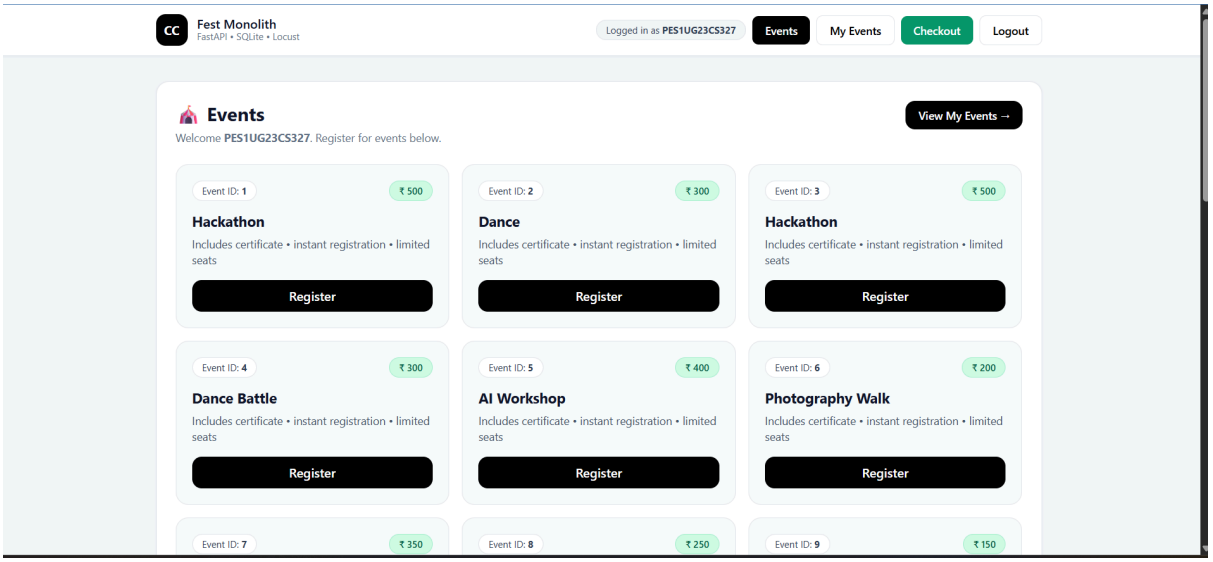
# Cloud Computing

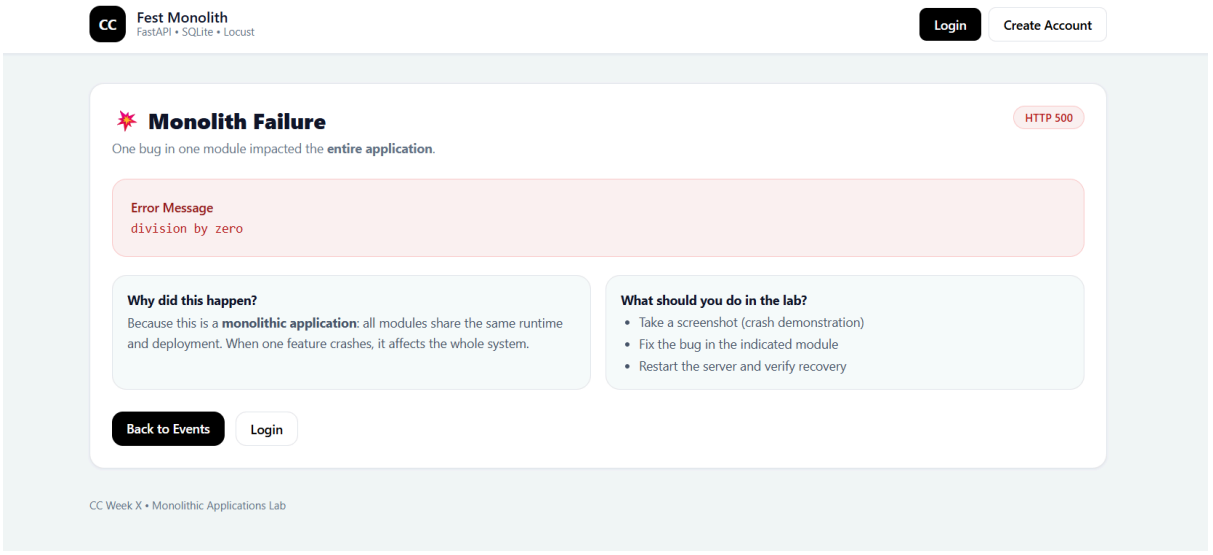
# LAB 2 - MONOLITHIC ARCHITECTURE

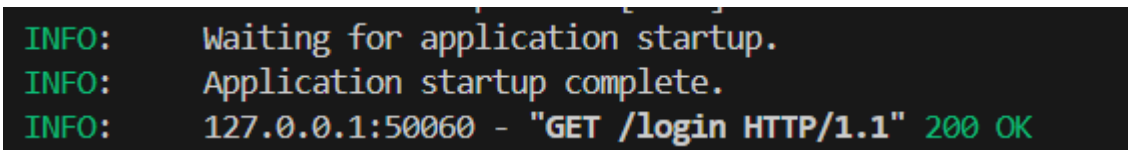
**Github url :**
**https://github.com/Laxmisah/Monolithic-Application_PES1UG23CS327**

SS1

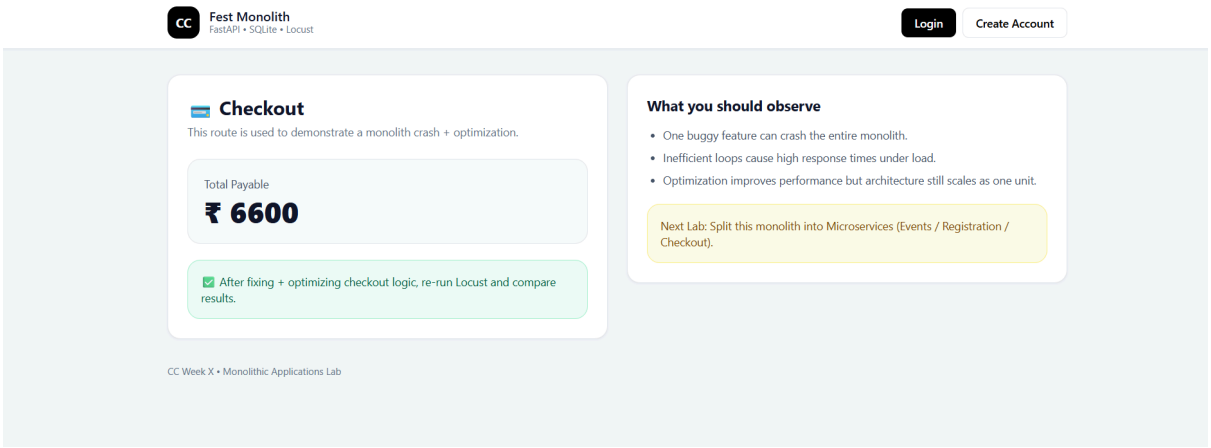



SS2



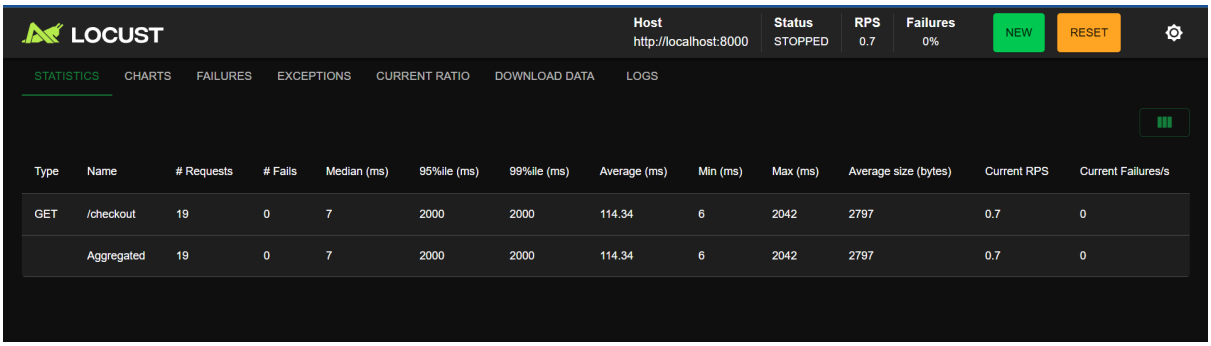



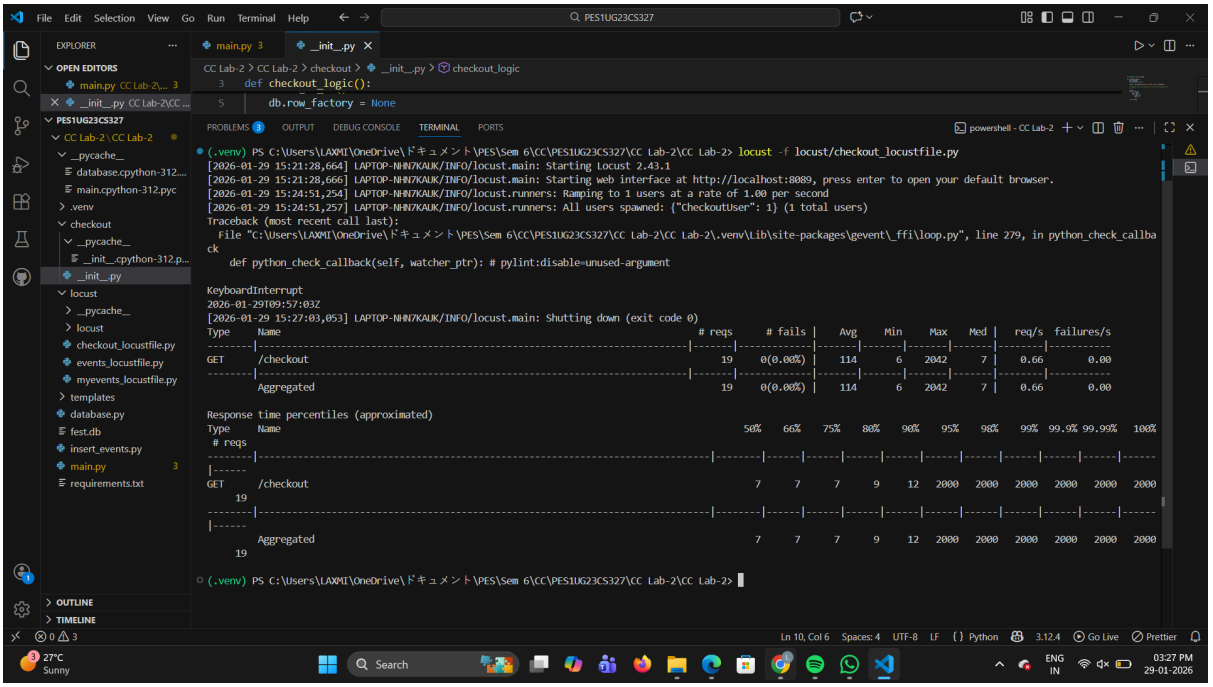
SS3


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

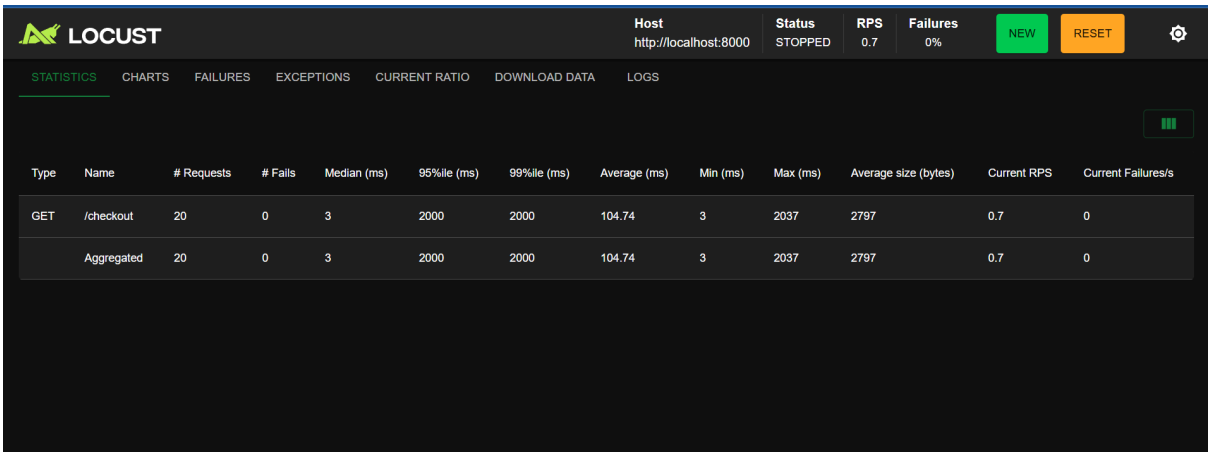

INFO: 127.0.0.1:64866 - "GET /checkout HTTP/1.1" 200 OK

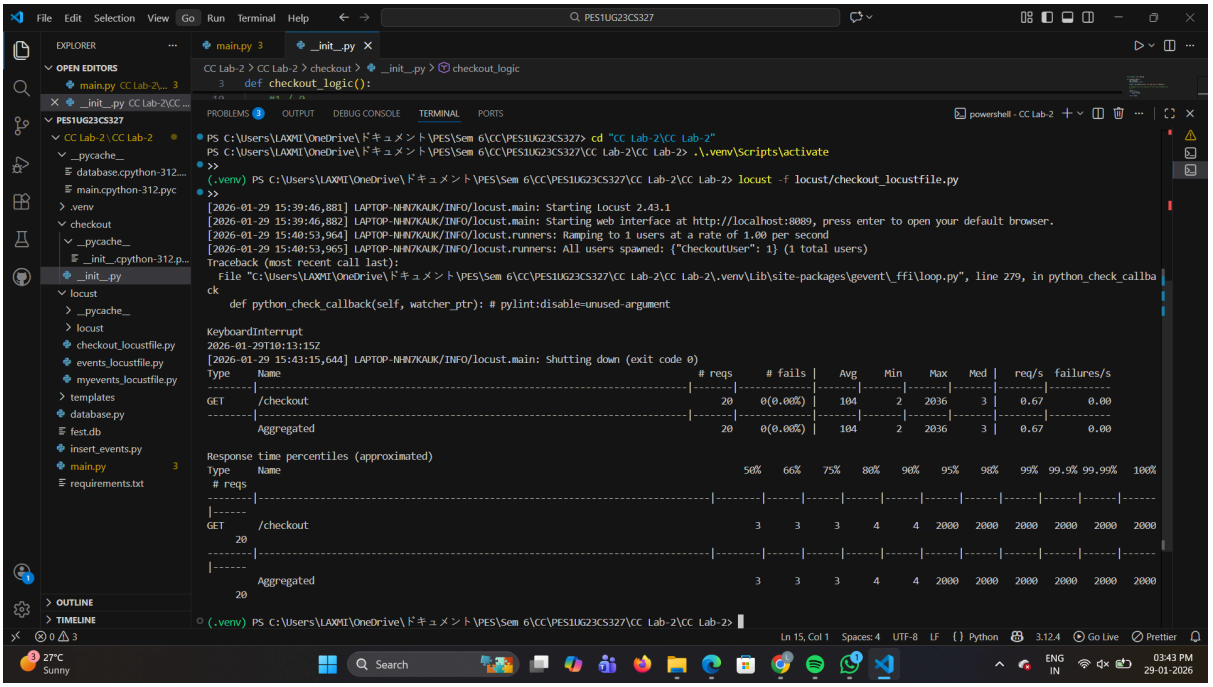
SS4


LOCUST
Host
http://localhost:8000
Status
STOPPED
RPS
0.7
Failures
0%
NEW
RESET
STATISTICS
CHARTS
FAILURES
EXCEPTIONS
CURRENT RATIO
DOWNLOAD DATA
LOGS
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 2000 2000 114.34 6 2042 2797 0.7 0
Aggregated 19 0 7 2000 2000 114.34 6 2042 2797 0.7 0

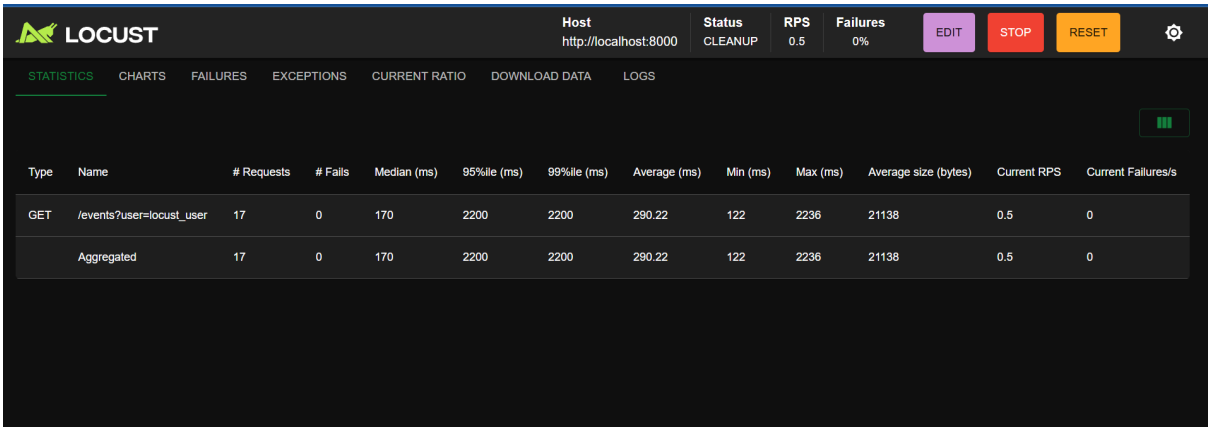

File Edit Selection View Go Run Terminal Help
PES1UG23CS327
EXPLORER
OPEN EDITORS
main.py CC Lab-2\... 3
__init__.py CC Lab-2\CC ...
PES1UG23CS327
CC Lab-2 \ CC Lab-2
__pycache__
database.cpython-312....
main.cpython-312.pyc
.venv
checkout
__pycache__
__init__.cpython-312.p...
__init__.py
locust
__pycache__
locust
checkout_locustfile.py
events_locustfile.py
myevents_locustfile.py
templates
database.py
fest.db
insert_events.py
main.py 3
requirements.txt
OUTLINE
TIMELINE
main.py 3
__init__.py
CC Lab-2 > CC Lab-2 > checkout > __init__.py > checkout_logic
3 def checkout_logic():
5 db.row_factory = None
PROBLEMS 3
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
powershell - CC Lab-2
(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2> locust -f locust/checkout_locustfile.py
[2026-01-29 15:21:28,664] LAPTOP-NHN7KAUK/INFO/locust.main: Starting Locust 2.43.1
[2026-01-29 15:21:28,666] LAPTOP-NHN7KAUK/INFO/locust.main: Starting web interface at http://localhost:8089, press enter to open your default browser.
[2026-01-29 15:24:51,254] LAPTOP-NHN7KAUK/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 15:24:51,257] LAPTOP-NHN7KAUK/INFO/locust.runners: All users spawned: {"CheckoutUser": 1} (1 total users)
Traceback (most recent call last):
File "C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2\.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
2026-01-29T09:57:03Z
[2026-01-29 15:27:03,053] LAPTOP-NHN7KAUK/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 6 2042 7 | 0.66 0.00
Aggregated 19 0(0.00%) | 114 6 2042 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 7 9 12 2000 2000 2000 2000 2000 2000
19
Aggregated 7 7 7 9 12 2000 2000 2000 2000 2000 2000
19
(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2>
Ln 10, Col 6 Spaces: 4 UTF-8 LF { } Python 3.12.4 Go Live Prettier
27°C Sunny
Search
ENG IN
03:27 PM 29-01-2026

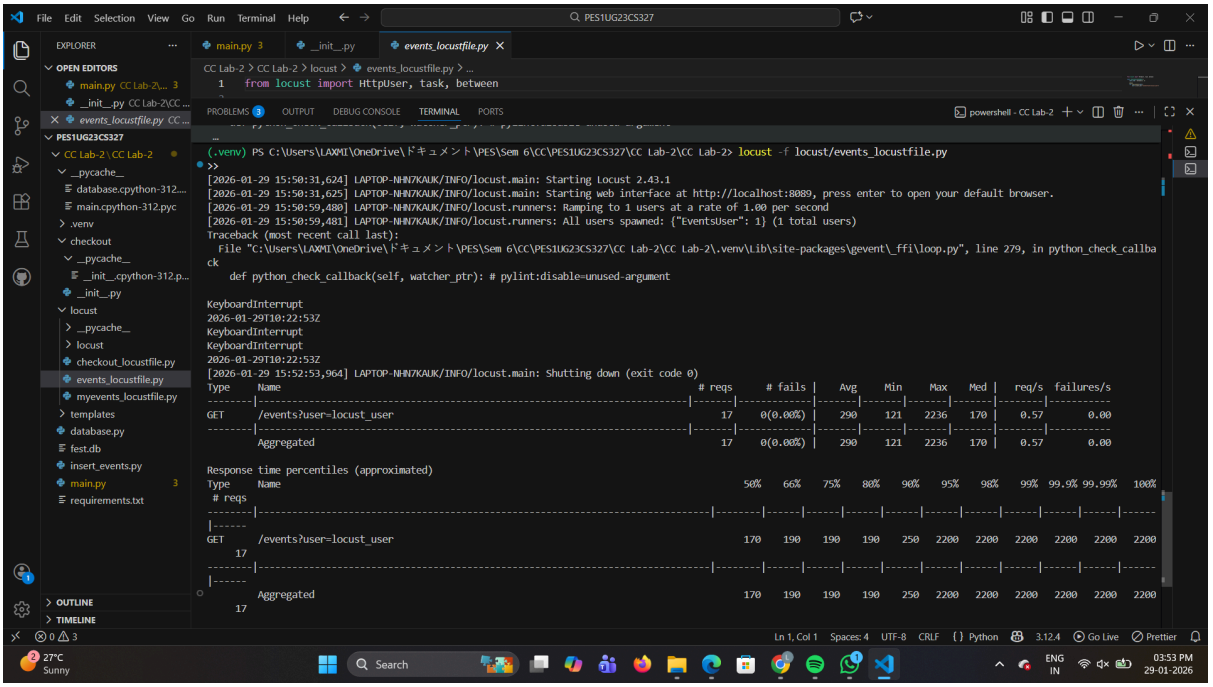
SS5


LOCUST
Host http://localhost:8000
Status STOPPED
RPS 0.7
Failures 0%
NEW
RESET
STATISTICS
CHARTS
FAILURES
EXCEPTIONS
CURRENT RATIO
DOWNLOAD DATA
LOGS
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 3 2000 2000 104.74 3 2037 2797 0.7 0
Aggregated 20 0 3 2000 2000 104.74 3 2037 2797 0.7 0

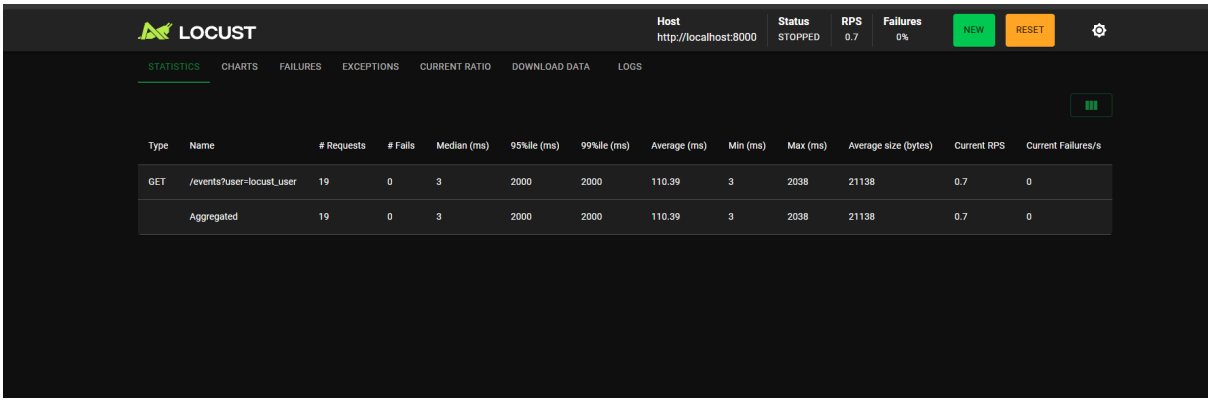

File Edit Selection View Go Run Terminal Help
PES1UG23CS327
EXPLORER
OPEN EDITORS
main.py CC Lab-2\... 3
__init__.py CC Lab-2\CC ...
PES1UG23CS327
CC Lab-2\CC Lab-2
__pycache__
database.cpython-312....
main.cpython-312.pyc
.venv
checkout
__pycache__
__init__.cpython-312.p...
__init__.py
locust
__pycache__
locust
checkout_locustfile.py
events_locustfile.py
myevents_locustfile.py
templates
database.py
fest.db
insert_events.py
main.py 3
requirements.txt
OUTLINE
TIMELINE
main.py 3
__init__.py
CC Lab-2 > CC Lab-2 > checkout > __init__.py > checkout_logic
def checkout_logic():
PROBLEMS 3
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
powershell - CC Lab-2
PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327> cd "CC Lab-2\CC Lab-2"
PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2> .\.venv\Scripts\activate
>>
(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2> locust -f locust/checkout_locustfile.py
>>
[2026-01-29 15:39:46,881] LAPTOP-NHN7KAUK/INFO/locust.main: Starting Locust 2.43.1
[2026-01-29 15:39:46,882] LAPTOP-NHN7KAUK/INFO/locust.main: Starting web interface at http://localhost:8089, press enter to open your default browser.
[2026-01-29 15:40:53,964] LAPTOP-NHN7KAUK/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 15:40:53,965] LAPTOP-NHN7KAUK/INFO/locust.runners: All users spawned: {"CheckoutUser": 1} (1 total users)
Traceback (most recent call last):
File "C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2\.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
2026-01-29T10:13:15Z
[2026-01-29 15:43:15,644] LAPTOP-NHN7KAUK/INFO/locust.main: Shutting down (exit code 0)
Type Name # reqs # fails | Avg Min Max Med | req/s failures/s
GET /checkout 20 0(0.00%) | 104 2 2036 3 | 0.67 0.00
Aggregated 20 0(0.00%) | 104 2 2036 3 | 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 /checkout 3 3 3 4 4 2000 2000 2000 2000 2000 2000 20
Aggregated 3 3 3 4 4 2000 2000 2000 2000 2000 2000 20
(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2>
Ln 15, Col 1 Spaces: 4 UTF-8 LF { } Python 3.12.4 Go Live Prettier
27°C Sunny
Search
ENG IN
03:43 PM 29-01-2026

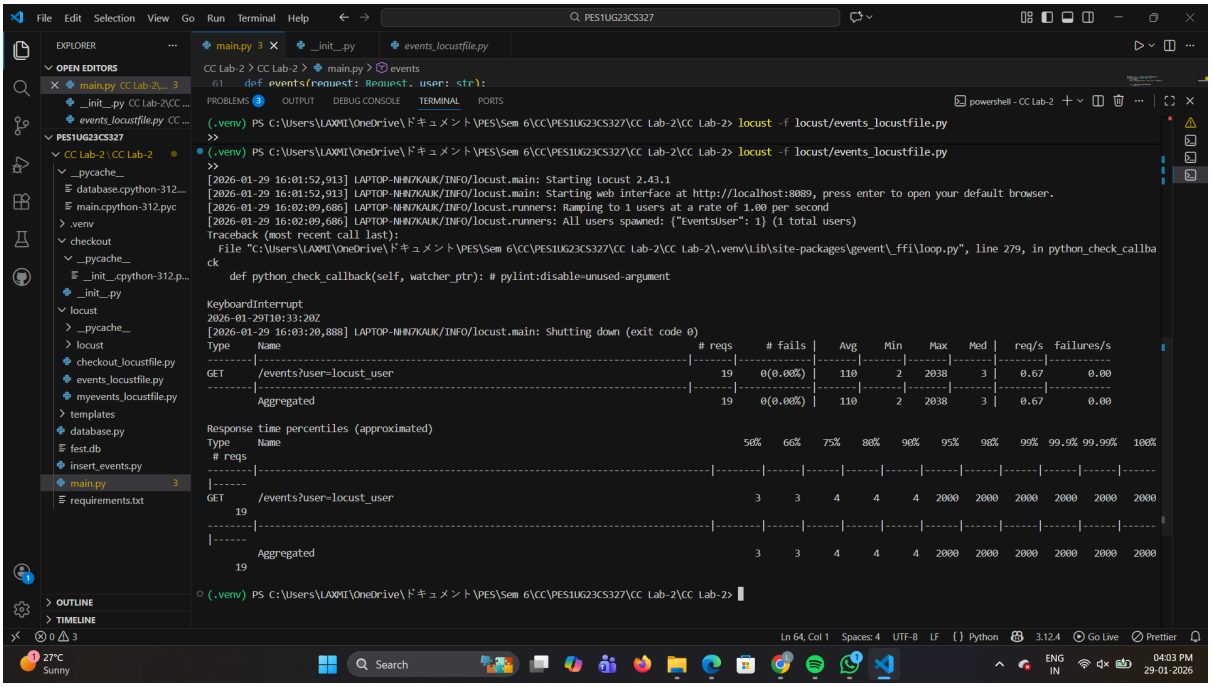
SS6


LOCUST
Host http://localhost:8000
Status CLEANUP
RPS 0.5
Failures 0%
EDIT
STOP
RESET
STATISTICS
CHARTS
FAILURES
EXCEPTIONS
CURRENT RATIO
DOWNLOAD DATA
LOGS
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 0 170 2200 2200 290.22 122 2236 21138 0.5 0
Aggregated 17 0 170 2200 2200 290.22 122 2236 21138 0.5 0

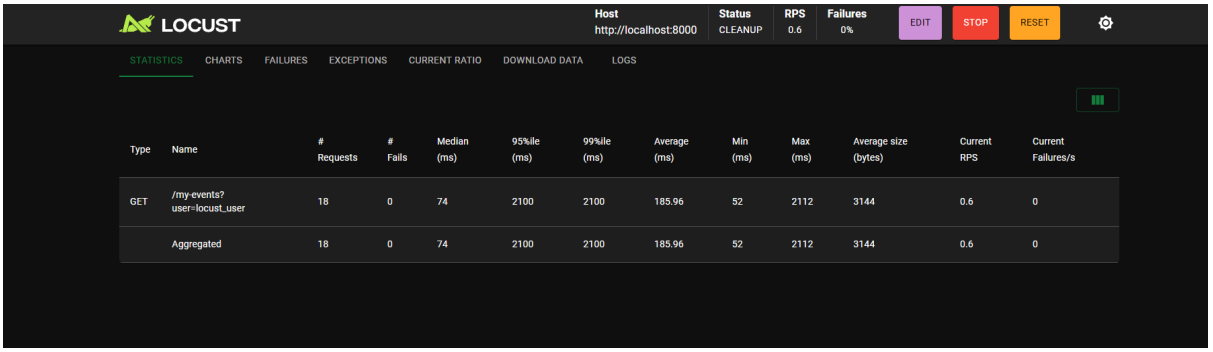

(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2> locust -f locust/events_locustfile.py
[2026-01-29 15:50:31,624] LAPTOP-NHN7KAUK/INFO/locust.main: Starting Locust 2.43.1
[2026-01-29 15:50:31,625] LAPTOP-NHN7KAUK/INFO/locust.main: Starting web interface at http://localhost:8089, press enter to open your default browser.
[2026-01-29 15:50:59,480] LAPTOP-NHN7KAUK/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 15:50:59,481] LAPTOP-NHN7KAUK/INFO/locust.runners: All users spawned: {"EventsUser": 1} (1 total users)
KeyboardInterrupt
[2026-01-29 15:52:53,964] LAPTOP-NHN7KAUK/INFO/locust.main: Shutting down (exit code 0)
GET /events?user=locust_user 17 0(0.00%) | 290 121 2236 170 | 0.57 0.00
Aggregated 17 0(0.00%) | 290 121 2236 170 | 0.57 0.00

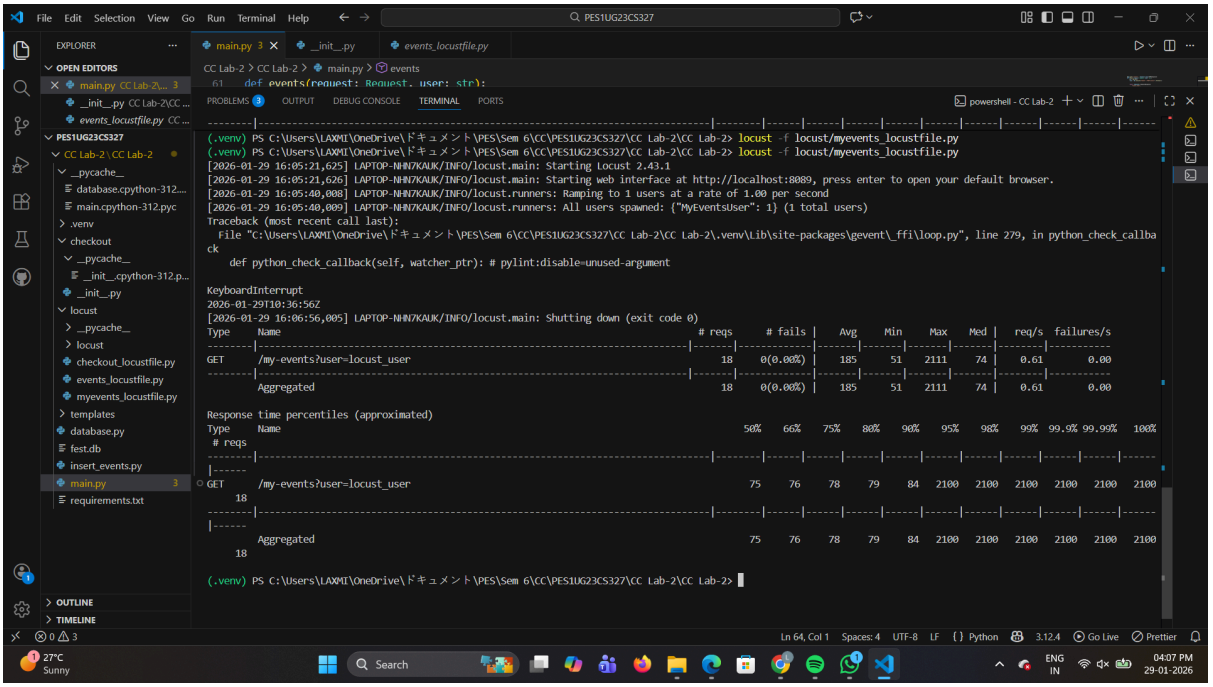
SS7


LOCUST
Host http://localhost:8000
Status STOPPED
RPS 0.7
Failures 0%
NEW
RESET
STATISTICS
CHARTS
FAILURES
EXCEPTIONS
CURRENT RATIO
DOWNLOAD DATA
LOGS
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 19 0 3 2000 2000 110.39 3 2038 21138 0.7 0
Aggregated 19 0 3 2000 2000 110.39 3 2038 21138 0.7 0

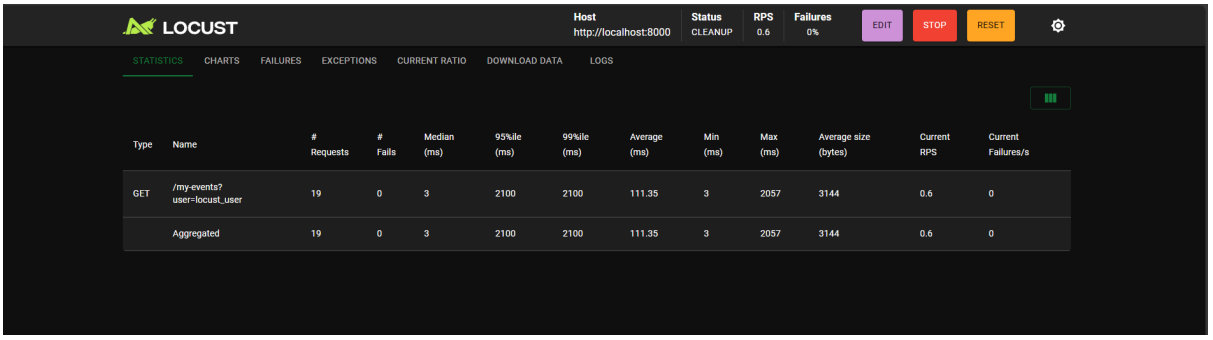

File Edit Selection View Go Run Terminal Help
PES1UG23CS327
EXPLORER
OPEN EDITORS
main.py CC Lab-2\... 3
__init__.py CC Lab-2\CC ...
events_locustfile.py CC ...
PES1UG23CS327
CC Lab-2\CC Lab-2
__pycache__
database.cpython-312....
main.cpython-312.pyc
.venv
checkout
__pycache__
__init__.cpython-312.p...
__init__.py
locust
__pycache__
locust
checkout_locustfile.py
events_locustfile.py
myevents_locustfile.py
templates
database.py
fest.db
insert_events.py
main.py 3
requirements.txt
OUTLINE
TIMELINE
main.py 3
__init__.py
events_locustfile.py
CC Lab-2 > CC Lab-2 > main.py > events
61 def events(request: Request, user: str):
PROBLEMS 3
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
powershell - CC Lab-2
(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2> locust -f locust/events_locustfile.py
>>
(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2> locust -f locust/events_locustfile.py
>>
[2026-01-29 16:01:52,913] LAPTOP-NHN7KAUK/INFO/locust.main: Starting Locust 2.43.1
[2026-01-29 16:01:52,913] LAPTOP-NHN7KAUK/INFO/locust.main: Starting web interface at http://localhost:8089, press enter to open your default browser.
[2026-01-29 16:02:09,686] LAPTOP-NHN7KAUK/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 16:02:09,686] LAPTOP-NHN7KAUK/INFO/locust.runners: All users spawned: {"EventsUser": 1} (1 total users)
Traceback (most recent call last):
File "C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2\.venv\Lib\site-packages\gevent_ffi\loop.py", line 279, in python_check_callba
ck
def python_check_callback(self, watcher_ptr): # pylint:disable=unused-argument
KeyboardInterrupt
2026-01-29T10:33:20Z
[2026-01-29 16:03:20,888] LAPTOP-NHN7KAUK/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 19 0(0.00%) | 110 2 2038 3 | 0.67 0.00
Aggregated 19 0(0.00%) | 110 2 2038 3 | 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 3 3 4 4 4 2000 2000 2000 2000 2000 2000
19
Aggregated 3 3 4 4 4 2000 2000 2000 2000 2000 2000
19
(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2>
Ln 64, Col 1 Spaces: 4 UTF-8 LF { } Python 3.12.4 Go Live Prettier
27°C Sunny
Search
ENG IN
04:03 PM 29-01-2026

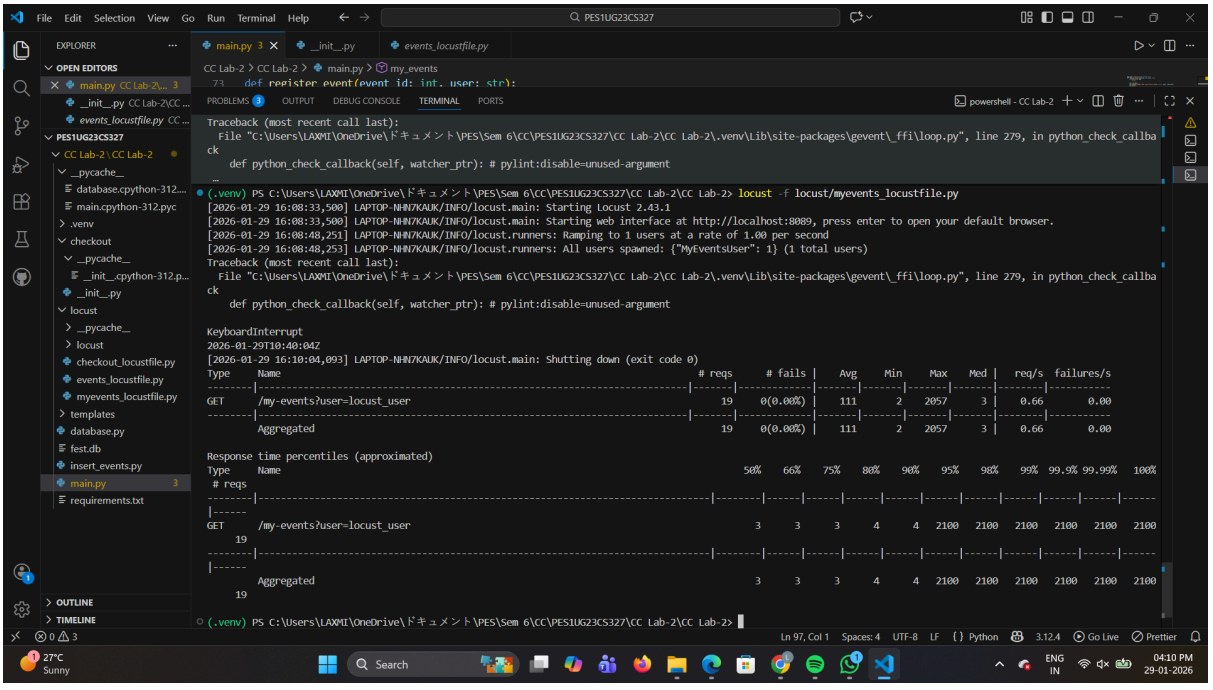
SS8


LOCUST
Host http://localhost:8000
Status CLEANUP
RPS 0.6
Failures 0%
EDIT
STOP
RESET
STATISTICS
CHARTS
FAILURES
EXCEPTIONS
CURRENT RATIO
DOWNLOAD DATA
LOGS
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 18 0 74 2100 2100 185.96 52 2112 3144 0.6 0
Aggregated 18 0 74 2100 2100 185.96 52 2112 3144 0.6 0


File Edit Selection View Go Run Terminal Help
PES1UG23CS327
EXPLORER
OPEN EDITORS
main.py 3
__init__.py
events_locustfile.py
CC Lab-2 > CC Lab-2 > main.py > events
def events(request: Request, user: str):
PROBLEMS 3
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
powershell - CC Lab-2
(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2> locust -f locust/myevents_locustfile.py
(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2> locust -f locust/myevents_locustfile.py
[2026-01-29 16:05:21,625] LAPTOP-NHN7KAUK/INFO/locust.main: Starting Locust 2.43.1
[2026-01-29 16:05:21,626] LAPTOP-NHN7KAUK/INFO/locust.main: Starting web interface at http://localhost:8089, press enter to open your default browser.
[2026-01-29 16:05:40,008] LAPTOP-NHN7KAUK/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 16:05:40,009] LAPTOP-NHN7KAUK/INFO/locust.runners: All users spawned: {"MyEventsUser": 1} (1 total users)
Traceback (most recent call last):
File "C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2\.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
2026-01-29T10:36:56Z
[2026-01-29 16:06:56,005] LAPTOP-NHN7KAUK/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 18 0(0.00%) | 185 51 2111 74 | 0.61 0.00
Aggregated 18 0(0.00%) | 185 51 2111 74 | 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 /my-events?user=locust_user 75 76 78 79 84 2100 2100 2100 2100 2100 2100
18
Aggregated 75 76 78 79 84 2100 2100 2100 2100 2100 2100
18
(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2>
OUTLINE
TIMELINE
Ln 64, Col 1 Spaces: 4 UTF-8 LF { } Python 3.12.4 Go Live Prettier
27°C Sunny
Search
ENG IN
04:07 PM 29-01-2026

SS9


LOCUST
Host http://localhost:8000
Status CLEANUP
RPS 0.6
Failures 0%
EDIT
STOP
RESET
STATISTICS
CHARTS
FAILURES
EXCEPTIONS
CURRENT RATIO
DOWNLOAD DATA
LOGS
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 3 2100 2100 111.35 3 2057 3144 0.6 0
Aggregated 19 0 3 2100 2100 111.35 3 2057 3144 0.6 0


File Edit Selection View Go Run Terminal Help
PES1UG23CS327
EXPLORER
OPEN EDITORS
main.py 3
__init__.py
events_locustfile.py
CC Lab-2 > CC Lab-2 > main.py > my_events
def register event(event id: int, user: str):
PROBLEMS 3
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
powershell - CC Lab-2
Traceback (most recent call last):
File "C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2\.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
(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2> locust -f locust/myevents_locustfile.py
[2026-01-29 16:08:33,500] LAPTOP-NHN7KAUK/INFO/locust.main: Starting Locust 2.43.1
[2026-01-29 16:08:33,500] LAPTOP-NHN7KAUK/INFO/locust.main: Starting web interface at http://localhost:8089, press enter to open your default browser.
[2026-01-29 16:08:48,251] LAPTOP-NHN7KAUK/INFO/locust.runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-29 16:08:48,253] LAPTOP-NHN7KAUK/INFO/locust.runners: All users spawned: {"MyEventsUser": 1} (1 total users)
Traceback (most recent call last):
File "C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2\.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
2026-01-29T10:40:04Z
[2026-01-29 16:10:04,093] LAPTOP-NHN7KAUK/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 19 0(0.00%) | 111 2 2057 3 | 0.66 0.00
Aggregated 19 0(0.00%) | 111 2 2057 3 | 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 /my-events?user=locust_user 3 3 3 4 4 2100 2100 2100 2100 2100 2100
19
Aggregated 3 3 3 4 4 2100 2100 2100 2100 2100 2100
19
(.venv) PS C:\Users\LAXMI\OneDrive\ドキュメント\PES\Sem 6\CC\PES1UG23CS327\CC Lab-2\CC Lab-2>
OUTLINE
TIMELINE
Ln 97, Col 1 Spaces: 4 UTF-8 LF { } Python 3.12.4 Go Live Prettier
27°C Sunny
Search
ENG IN
04:10 PM 29-01-2026

# Short Expanation :

## Route 1: `events`

### What was the bottleneck?

The `events` route was fetching all event records and then filtering them in Python using loops. This caused unnecessary processing on every request and increased response time.

### What change did you make?

The filtering logic was optimized by reducing Python-level loops and moving the filtering to a more efficient approach (single query / simplified logic). Redundant computations were removed.

### Why did the performance improve?

By reducing looping and unnecessary data processing, the server performed less work per request, resulting in faster response times during load testing.

## Route 2: `my-events`

### What was the bottleneck?

The `my-events` route used inefficient logic where multiple checks and iterations were performed to find events registered by a user, leading to repeated processing.

### What change did you make?

The code was optimized to directly fetch only the required user-specific events, minimizing loops and avoiding repeated data access.

### Why did the performance improve?

The optimized logic reduced the number of operations executed per request, lowering CPU usage and improving average response time under load.