Weekly Report: Application Monitoring Dashboards

Course: UE22CS351B: Cloud Computing (4-0-2-5-5)

Project Title: Application Monitoring Dashboards

Date: April 18, 2025

Overview

This report details the progress of the 'Application Monitoring Dashboards' project over three weeks.

The project implements a real-time log analytics platform using Kafka, Docker, MySQL, and Grafana, processing log rows.

Weekly Progress

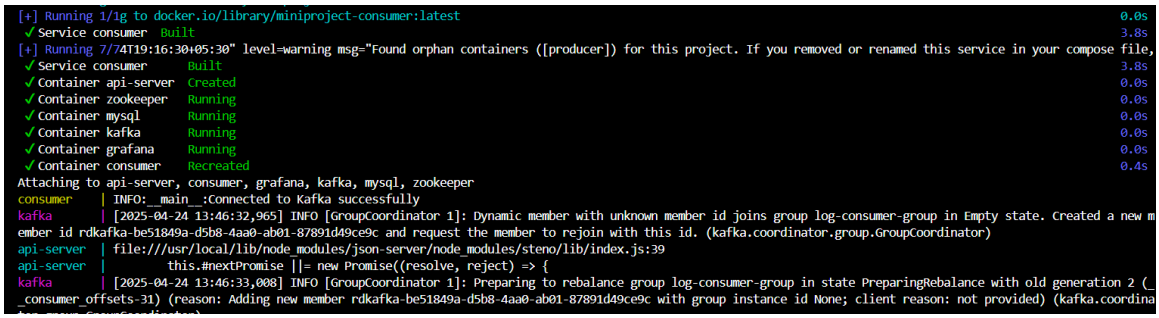
Week	Objective	Activities	Challenges	Outcome
Week 1: Infrastructure and API Development (April 1–7, 2025)	Infrastructure & API Development	- Configured api-server with json-server in docker-compose.yml, using db.json for endpoints (e.g., /users, /checkout). - Built producer.js with kafka-node to generate logs every 2 seconds (endpoints, statuses, errors, response times). - Configured confluentinc/cp-kafka:latest with Zookeeper on 2181, exposing 9092/9093. - Integrated producer.js to push logs to logs topic. - Containerized all services (zookeeper, kafka, mysql, etc.).	- Kafka connection failed at 9092; switched to localhost:9093 on April 7. - json-server SyntaxError resolved by uninstalling it.	- Infrastructure operational, logs flowing to Kafka (e.g., { logs: { '0': 149 } }).

Week 2: Log Processing and Storage (April 8–14, 2025)	Log Processing & Storage	- Developed consumer.py with confluent-kafka, reading logs and storing in MySQL with retry logic (max_retries = 10). - Created logs table with id, timestamp, endpoint, etc., later expanded. - Set up mysql:latest with 33061:33060 mapping, using init.sql.	- Unknown MySQL server host 'mysql' fixed by using localhost. - Unknown column 'endpoint' resolved by recreating table on April 14.	- Consumer stored rows in MySQL logs table.
Week 3: Visualization (April 15–16, 2025)	Visualization	- Connected Grafana to MySQL (mysql:3306), fixed 'protocol 41+' error by disabling SSL. - Built panels: - Request Count: SELECT endpoint, COUNT(*)... (bar chart) - Response Time: SELECT timestamp, AVG(response_time)... (time series) - Errors: SELECT error_type, COUNT(*)... (pie chart) - Real-Time Logs: SELECT timestamp, endpoint... (table) - Set 5-second refresh for live updates.	- Grafana 'No data' due to time range and connection issues; fixed with 'Last 5minutes' and correct host on April 16.	- Dashboard visualizes rows, showing metrics (e.g., 500: 13) and live logs.

TEST CASES:

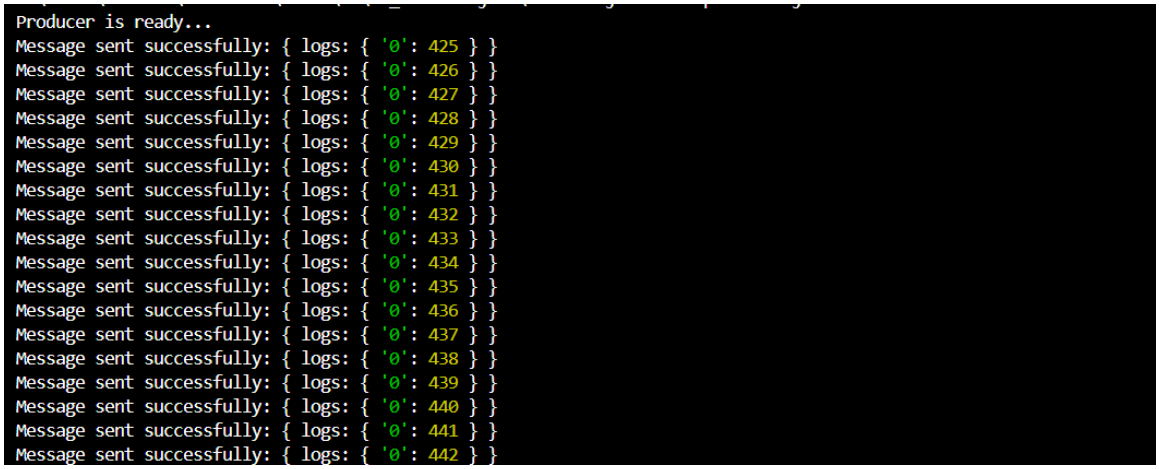
Screenshot 1: Successful container orchestration using Docker Compose

It ensures that each container (e.g., Kafka, Zookeeper, MySQL, API server) is built from the latest configuration and started in the correct order. It streamlines the setup of multi-container environments



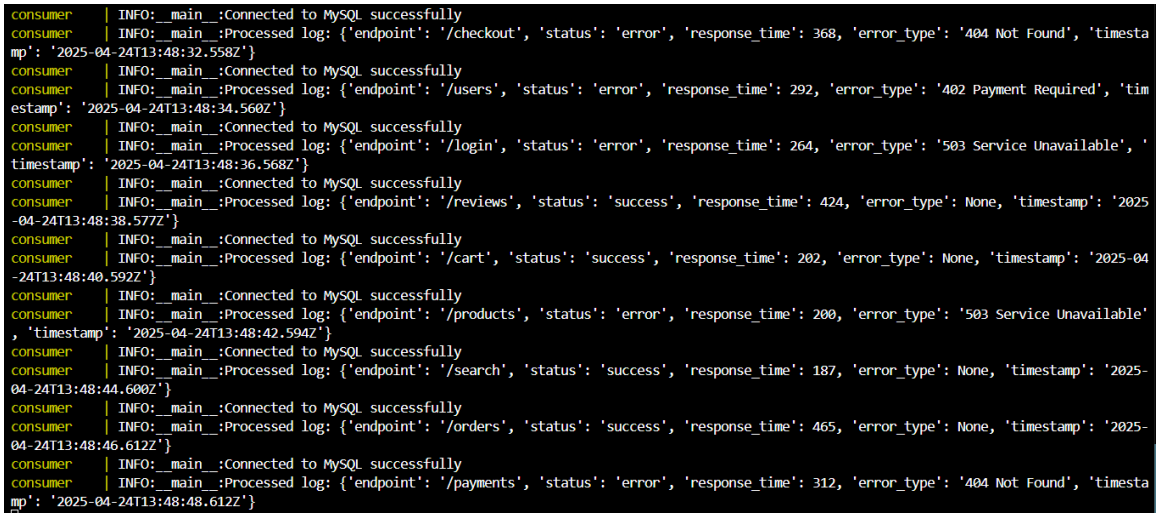
Screenshot 2: Log generation and transmission to Kafka by producer.py

This screenshot shows the output of producer.py, which continuously sends log entries to the Kafka topic. Each log contains a simulated request to an endpoint with status, response time, and potential errors.



Screenshot 3: Log consumption and storage in MySQL via consumer.py

Here, consumer.py reads messages from Kafka and inserts them into the MySQL database. The screenshot confirms successful data ingestion with retry mechanisms in action.



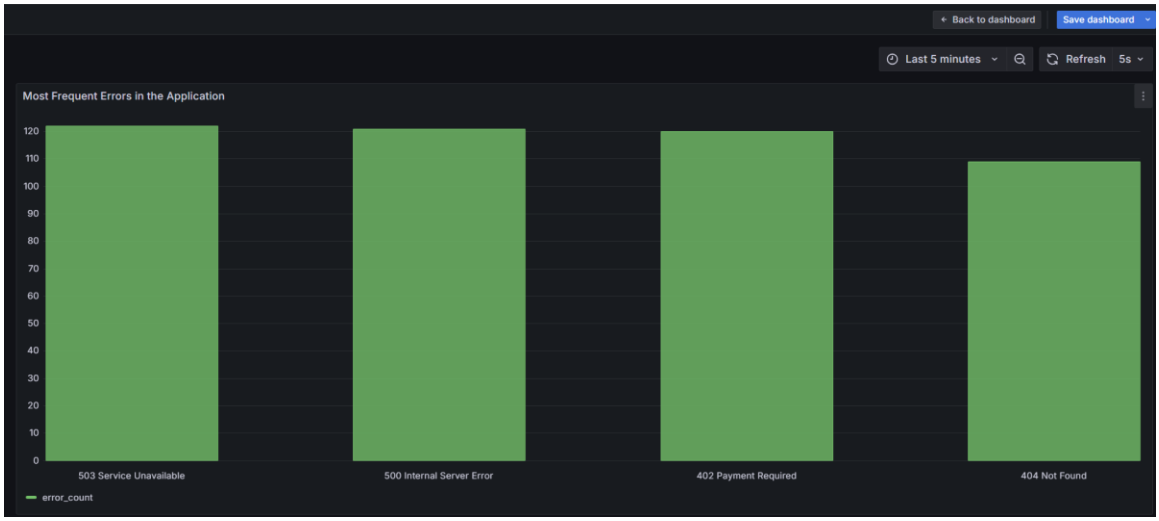
Screenshot 4: Grafana dashboard showing real-time analytics and metrics

This image captures the Grafana dashboard with real-time visualization of the log data, including

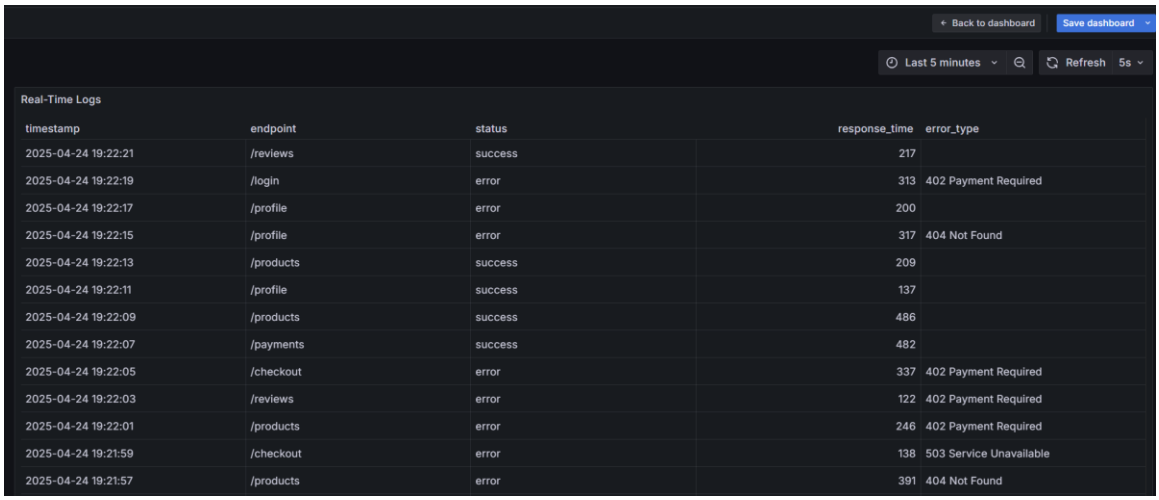
1. **Request Per Endpoints:**

2.Response Time Trend:

3.Most frequent Errors in the Application:



4. Real-Time Logs:



timestamp	endpoint	status	response_time	error_type
2025-04-24 19:22:21	/reviews	success	217	
2025-04-24 19:22:19	/login	error	313	402 Payment Required
2025-04-24 19:22:17	/profile	error	200	
2025-04-24 19:22:15	/profile	error	317	404 Not Found
2025-04-24 19:22:13	/products	success	209	
2025-04-24 19:22:11	/profile	success	137	
2025-04-24 19:22:09	/products	success	486	
2025-04-24 19:22:07	/payments	success	482	
2025-04-24 19:22:05	/checkout	error	337	402 Payment Required
2025-04-24 19:22:03	/reviews	error	122	402 Payment Required
2025-04-24 19:22:01	/products	error	246	402 Payment Required
2025-04-24 19:21:59	/checkout	error	138	503 Service Unavailable
2025-04-24 19:21:57	/products	error	391	404 Not Found

5. Error Rate by Endpoint