

SET-222

Software Operations & Maintenance

Experiment # 06

**Experiment Title**

Visualizing Metrics with Grafana

**Assessment of CLO(s): 03**

**Performed on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Student Name:** |  | | |
| **Roll No.** |  | **Group** |  |
| **Semester** |  | **Session** |  |

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| --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Perf. Level**  **Criteria** | **Excellent**  **(2.5)** | **Good**  **(2)** | **Satisfactory**  **(1.5)** | **Needs Improvement**  **(0 ~ 1)** | **Marks Obtained** |
| **1** | Project Execution & Implementation | Fully functional, optimized, and well-structured. | Minor errors, mostly functional. | Some errors, requires guidance. | Major errors, non-functional, or not Performed. |  |
| **2** | Results & Debugging  Or Troubleshooting | Accurate results with effective debugging  Or Troubleshooting. | Mostly correct, some debugging Or Troubleshooting needed. | Partial results, minimal debugging  Or Troubleshooting. | Incorrect results, no debugging Or Troubleshooting, or not attempted. |  |
| **3** | Problem-Solving & Adaptability  (VIVA) | Creative approach, efficiently solves challenges. | Adapts well, minor struggles. | Some adaptability, needs guidance. | Lacks innovation or no innovation, unable to solve problems. |  |
| **4** | Report Quality & Documentation | Clear, structured, with detailed visuals. | Mostly clear, minor gaps. | Some clarity issues, missing details. | Poorly structured, lacks clarity, or not submitted. |  |
| **Total Marks Obtained Out of 10** | | | | | |  |

**Experiment evaluated by**

|  |  |  |  |
| --- | --- | --- | --- |
| **Instructor’s Name** | **Ms. Shagufta Aftab** | | |
| **Date** |  | **Signature** |  |

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**Objective**

* To understand the concept of monitoring and metric visualization.
* To install and configure Grafana for metric visualization.
* To connect Grafana with a data source such as Prometheus.
* To create and customize dashboards in Grafana.
* To interpret system and application metrics using visual tools.

**Tools/Software Required**

* Grafana (latest version)
* Prometheus or any supported data source (InfluxDB, MySQL, etc.)
* A system with internet access (Linux or Windows)
* Web browser
* Basic knowledge of system metrics and web services

**Theory**

Grafana is an open-source analytics and interactive visualization web application. It provides charts, graphs, and alerts for the web when connected to supported data sources. It is often used with time-series databases like Prometheus to monitor system performance, network health, and application behavior.

**Key Features of Grafana:**

* Supports multiple data sources
* Rich dashboard and panel visualizations
* User access control and sharing capabilities
* Alerting features for proactive monitoring

**Pre-Lab Preparation**

* Ensure Prometheus or another data source is already installed and running.
* Install Grafana on the local or cloud machine.
* Access to administrative credentials for Grafana setup.
* Basic understanding of metrics like CPU usage, memory, and response time.

**Lab Procedures**

**A. Installing Grafana**

1. Update system packages:  
   sudo apt update (for Linux)
2. Install Grafana (Debian-based system):  
   sudo apt install -y grafana
3. Start and enable Grafana service:

pgsql

CopyEdit

sudo systemctl start grafana-server

sudo systemctl enable grafana-server

1. Access Grafana via web browser:  
   <http://localhost:3000>  
   Default login: admin / admin

**B. Connecting a Data Source (e.g., Prometheus)**

1. Navigate to **Configuration > Data Sources**
2. Click **Add Data Source** and select **Prometheus**
3. Enter the URL (e.g., http://localhost:9090) and save
4. Click **Test Connection** to verify integration

**C. Creating Dashboards and Panels**

1. Go to **Dashboards > New > New Dashboard**
2. Click **Add new panel**
3. Choose a query (e.g., node\_cpu\_seconds\_total from Prometheus)
4. Select the desired visualization (graph, gauge, table, etc.)
5. Save the panel and name your dashboard appropriately

**Post-Lab Questions**

1. What are the advantages of using Grafana for monitoring systems?
2. How do you integrate Prometheus with Grafana?
3. Describe the steps to create a panel in Grafana.
4. What types of visualizations are supported in Grafana?
5. Explain how Grafana handles alerting.