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Artificial Intelligence and Data Science Department

DevOps Lab/Even Sem 2023-23/Experiment 1

Name :	**Class/Roll No. :**	**Grade:**
Dyotak Kachare	D11AD/26	

Title of Experiment :

To understand DevOps: Principles, Practices, and DevOps Engineer Role and Responsibilities

Objective of Experiment :

To understand DevOps practices which aims to simplify Software Development Life Cycle

Outcome of Experiment :

To understand the fundamentals of DevOps engineering and be fully proficient with DevOps terminologies, concepts, benefits, and deployment options to meet your business requirements

Problem Statement :

To understand DevOps: Principles, Practices, and DevOps Engineer Role and Responsibilities

Description / Theory :

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Prometheus

Prometheus is an open-source systems monitoring and alerting toolkit originally built at SoundCloud. Since its inception in 2012, many companies and organizations have adopted Prometheus, and the project has a very active developer and user community. It is now a standalone open source project and maintained independently of any company. To emphasize this, and to clarify the project's governance structure, Prometheus joined the Cloud Native Computing Foundation in 2016 as the second hosted project, after Kubernetes.

Prometheus collects and stores its metrics as time series data, i.e. metrics information is stored with the timestamp at which it was recorded, alongside optional key-value pairs called labels.

For more elaborate overviews of Prometheus, see the resources linked from the media section.

Features

Prometheus's main features are:

- a multi-dimensional data model with time series data identified by metric name and key/value pairs
- PromQL, a flexible query language to leverage this dimensionality
- no reliance on distributed storage; single server nodes are autonomous
- time series collection happens via a pull model over HTTP
- pushing time series is supported via an intermediary gateway
- targets are discovered via service discovery or static configuration
- multiple modes of graphing and dashboarding support

What are metrics?

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Metrics are numerical measurements in layperson terms. The term time series refers to the recording of changes over time. What users want to measure differs from application to application. For a web server, it could be request times; for a database, it could be the number of active connections or active queries, and so on.

Metrics play an important role in understanding why your application is working in a certain way. Let's assume you are running a web application and discover that it is slow. To learn what is happening with your application, you will need some information. For example, when the number of requests is high, the application may become slow. If you have the request count metric, you can determine the cause and increase the number of servers to handle the load.

Components

The Prometheus ecosystem consists of multiple components, many of which are optional:

- the main Prometheus server which scrapes and stores time series data
- client libraries for instrumenting application code
- a push gateway for supporting short-lived jobs
- special-purpose exporters for services like HAProxy, StatsD, Graphite, etc.
- an alertmanager to handle alerts
- various support tools

Most Prometheus components are written in Go, making them easy to build and deploy as static binaries.

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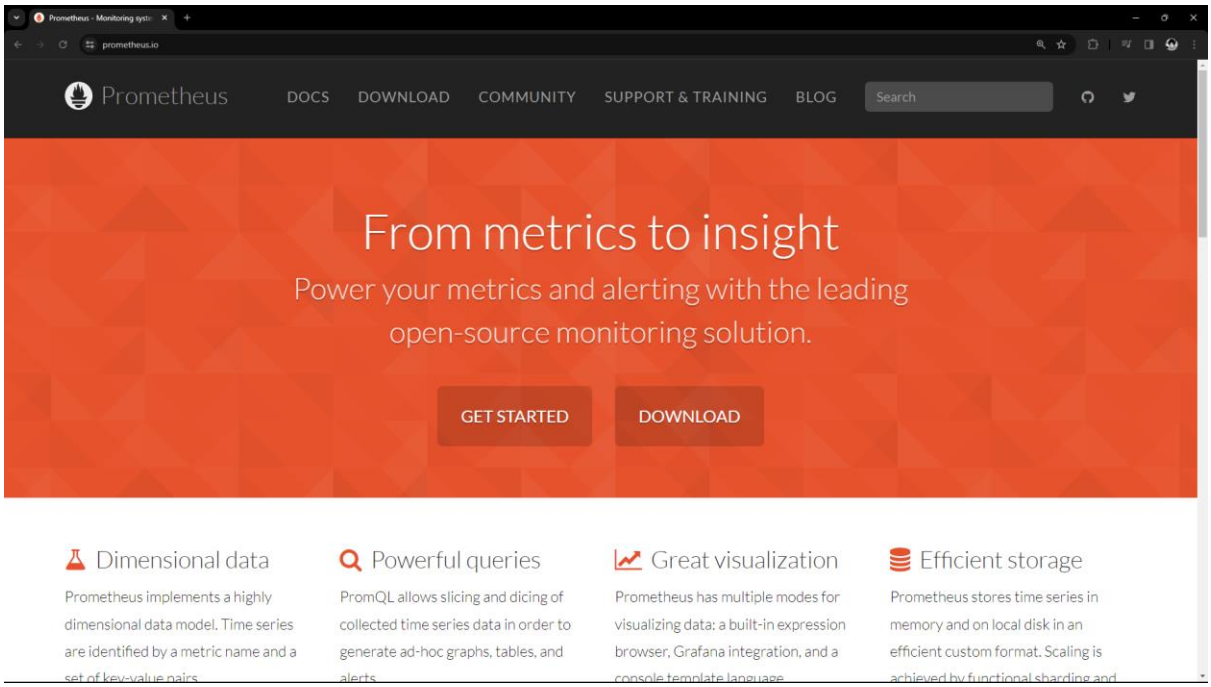
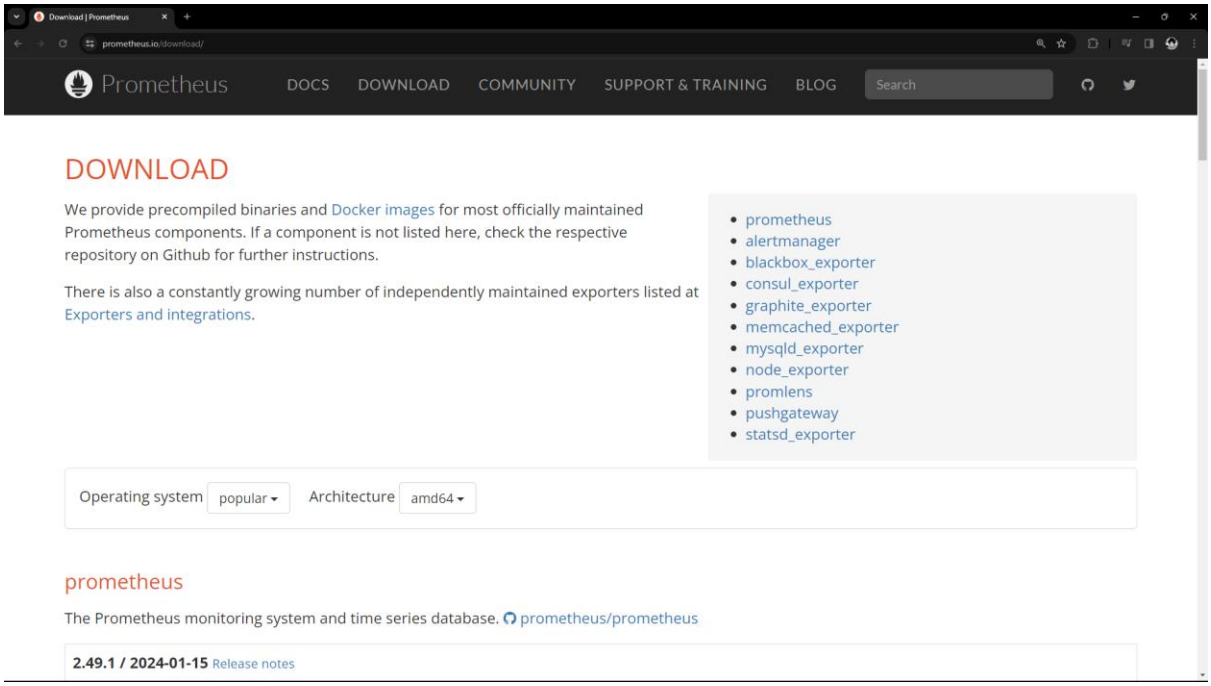
Code and Output :





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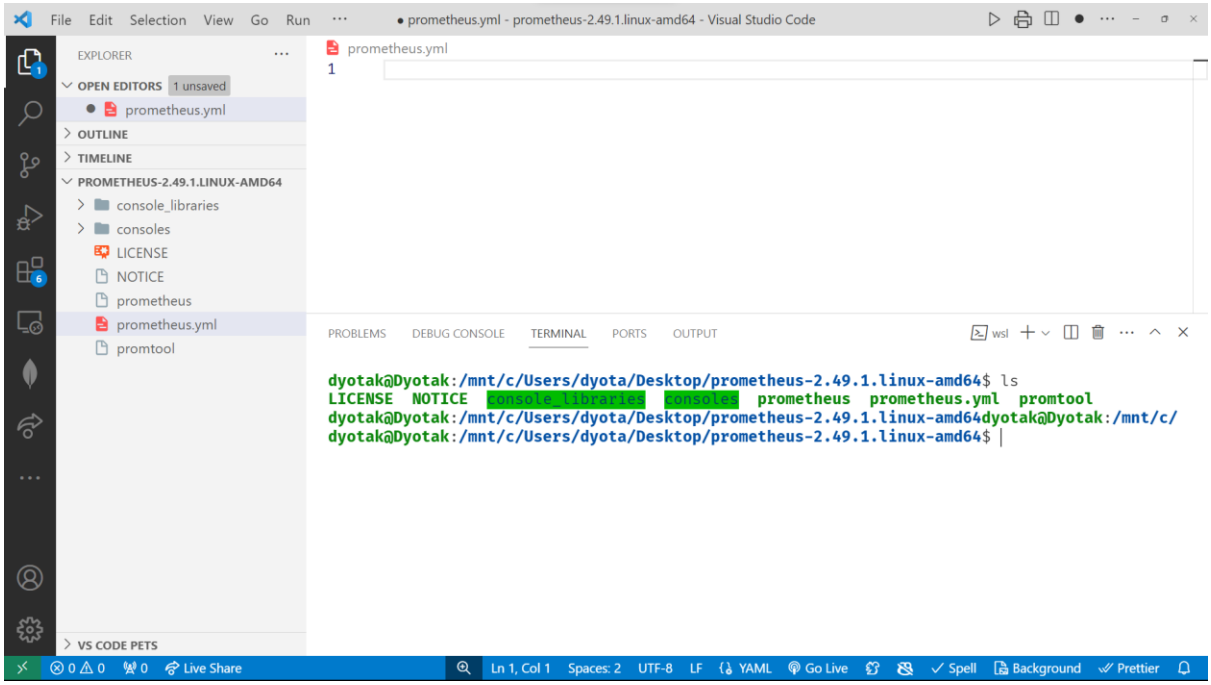

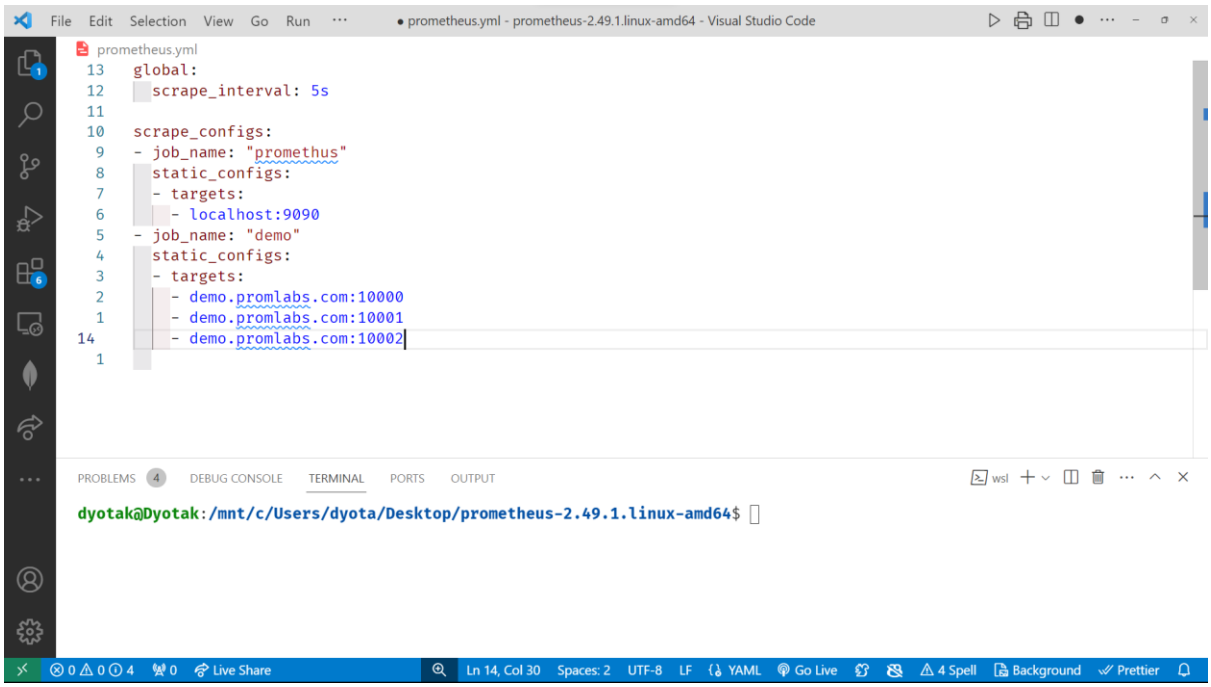

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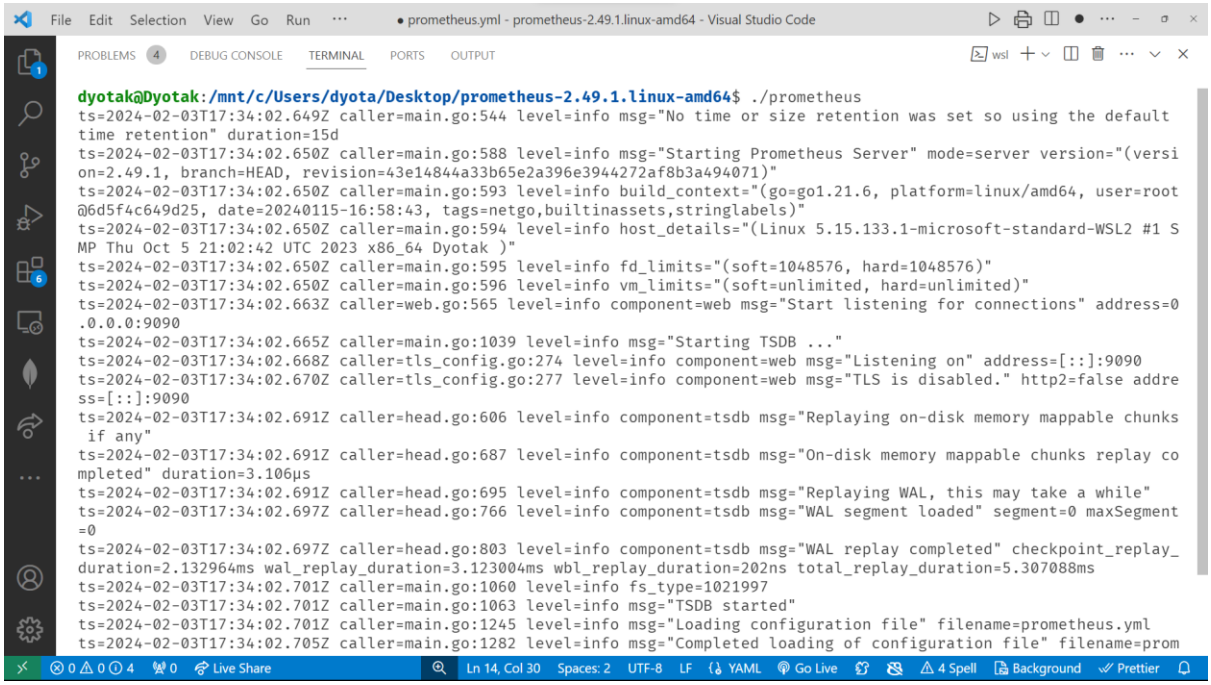

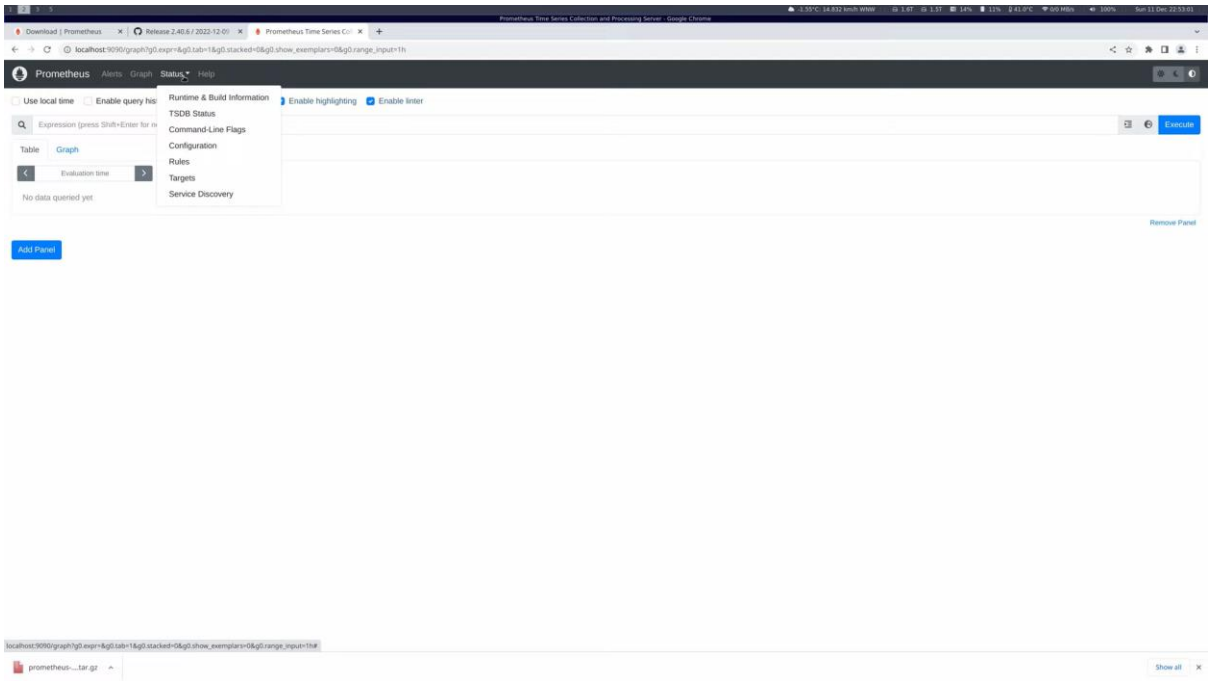

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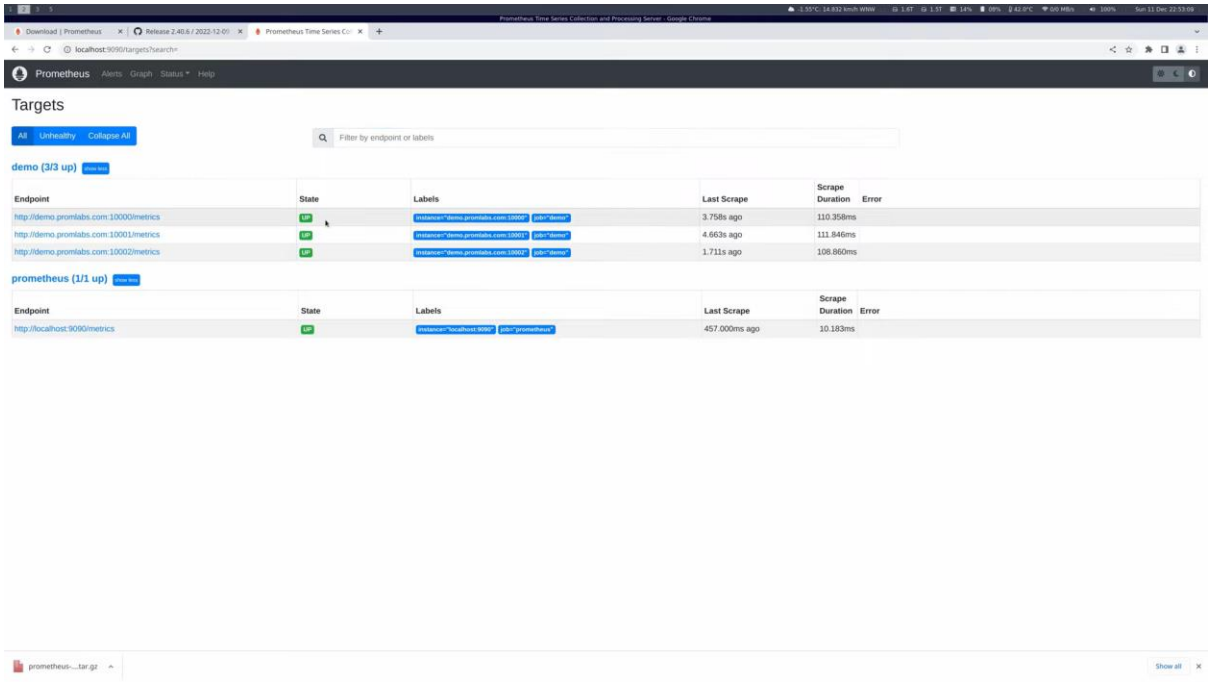

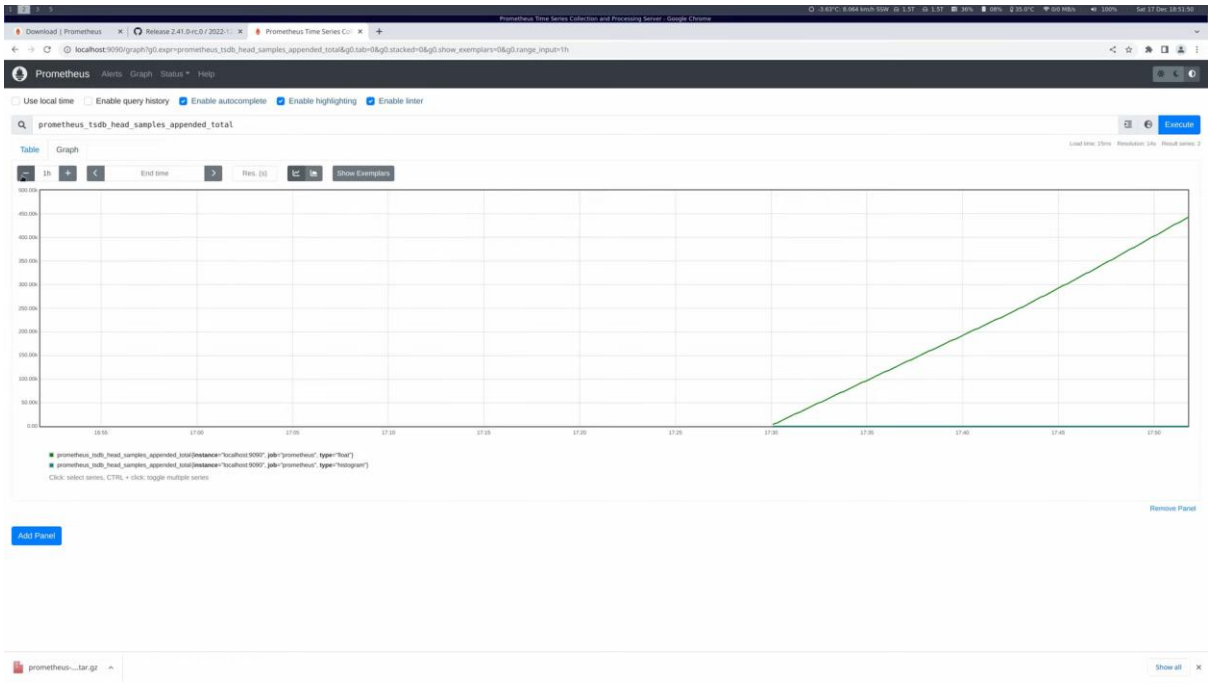

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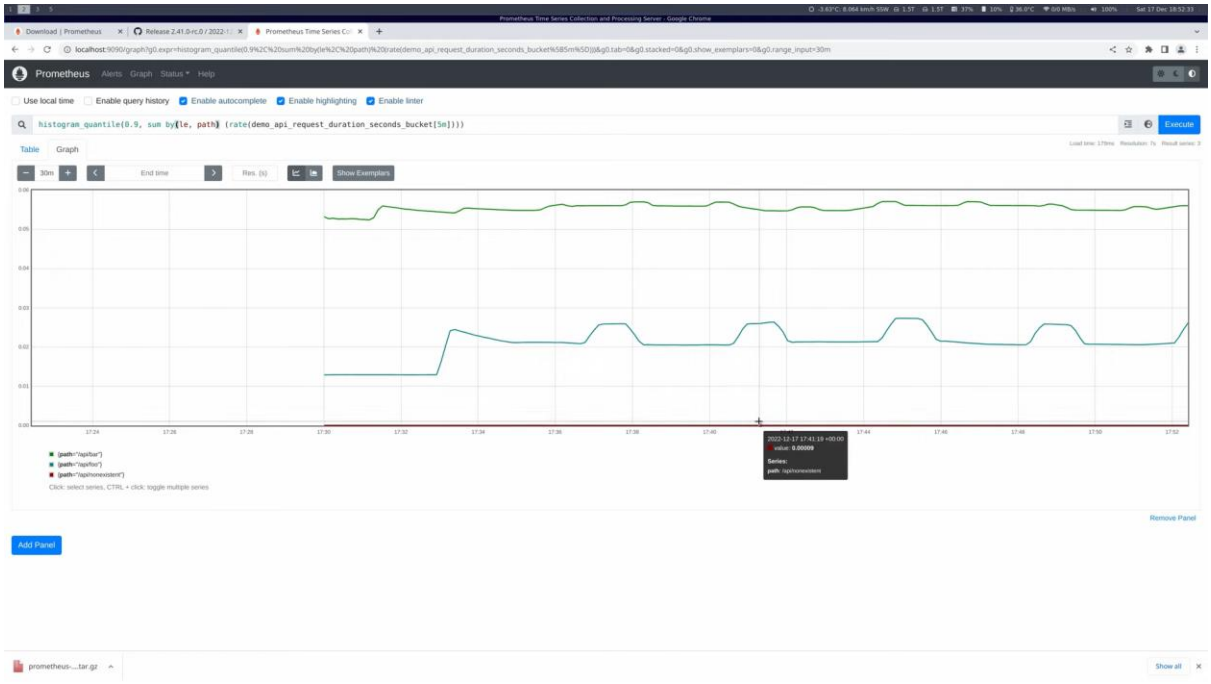

Result and Discussion :

Using Prometheus has provided valuable insights into monitoring and managing the performance of systems. It offers a robust platform for collecting and storing metrics, enabling real-time visibility into various aspects of applications and infrastructure.