2022 Internship Project Report

Name: Lakshya Gupta
Roll number: BTECH/10308/19
College: Birla Institute of Technology, Mesra

Disclaimer

About the company:

The Goldman Sachs Group, Inc. is a leading global investment banking, securities and investment management firm that provides a wide range of financial services to a substantial and diversified client base that includes corporations, financial institutions, governments and individuals. It was founded in

1869 and is headquartered in New York. It maintains offices in all major financial centers around the world.

It has four business segments:

1. Investment Banking
2. Global Markets
3. Asset Management
4. Consumer and Wealth Management

About Engineering:

The Engineering organization includes the Engineering Division and technology and strategist groups in Revenue and Federation divisions. Our engineers are responsible for building and deploying innovative technical and quantitative solutions for our clients and our firm.
At Goldman Sachs, our Engineers don't just make things – we make things possible. Build innovations that drive our business and financial markets worldwide. Solve the most challenging and pressing engineering problems for our clients. Our engineering teams build massively scalable software and systems, architect low latency infrastructure solutions, proactively guard against cyber threats, and leverage machine learning alongside financial engineering to continuously turn data into action. Create new businesses, transform finance, and explore a world of opportunity at the speed of markets. Engineering is at the critical center of our businesses. Our dynamic environment requires strategic thinking that is innovative and produces smart solutions.

Title of the project: **WiFi Prober**

Introduction:

The product serves as a client-side monitoring and alerting purpose of WiFi's within the firm.

The application performs the following functionalities: -

- Prober application is running within GS environment.
- It is collecting wifi sensors data from outside vendor within GS.
- It is processing & transforming the data by using required parameters.
- It is then exposing the metrics to some host within the GS.
- These metrics are being taken by Grafana to represent it in form of graphs.
- Then, after defining some rules within monitoring repository we are getting status signal of WiFi as uptime/downtime.

Objective:

There is currently no proactive alerting application for such Wi-Fi client issues within GS. With proper alerting in place serious incidents such as wifi being down for long time could be avoided. And helps market to sustain from heavy loss & damage.

Methodology:

The prober application, made using Java Maven (latest jdk17 version) and probes the specified web endpoints after a specific interval of time to collect metrics about their latency, jitter, speed, dns resolve time etc. parameters.

The collected metrics are collated, formatted and hosted to be pulled by the metric datastore of Prometheus. Additionally, log files are generated and hosted on GS server & can be viewed directly.

Prometheus instance, which is sharded and scaled using Thanos, forwards the data to a dynamic data visualizer called Grafana. Grafana generates specified monitoring dashboards. Then GS monitoring repository is taking the logs, monitoring & sending alerts depending on status signal as uptime & downtime.

Key learnings:

My Key learning for the project included the following technical as well as non-technical aspects: -

1. **Learning Java 17**: - Developed a Maven application from scratch. Made it highly configurable, deployed it on remote servers and optimized its workflow.
2. **Site Reliability Engineering including monitoring and alerting tools**: - Understood and used a host of SRE tools such as Prometheus, Grafana, Thanos, GS monitoring repository etc.
3. **Professional Software Development life cycle**: - Got through the process of deploying, maintaining, testing and scaling software in a professional SDLC environment.
4. **Industrial Coding/Testing Standards**: - Learnt about industrial coding practices including testdriven-development, increasing test coverage, continuous integration, centralized configuration, object-oriented design patters etc.
5. **Ownership and Responsibility**: - Developed experience of owning, delivering and being responsible for a product by creating an application from scratch to making it production ready.
6. **Time Management**: - Developed time-management skills by learning to balance and prioritize project deliverables along with training sessions and collaborative reviews.
7. **Collaboration across teams and regions**: - Learnt to collaborate with developers across teams, regions and skillsets.