



5G Optimization System

Team Members:

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INTRODUCTION

Primary Objective:

- Develop a Kubernetes-based deployment system using Docker, Helm charts, and MongoDB, with a WebUI for subscriber management and connectivity testing.

Key Accomplishments:

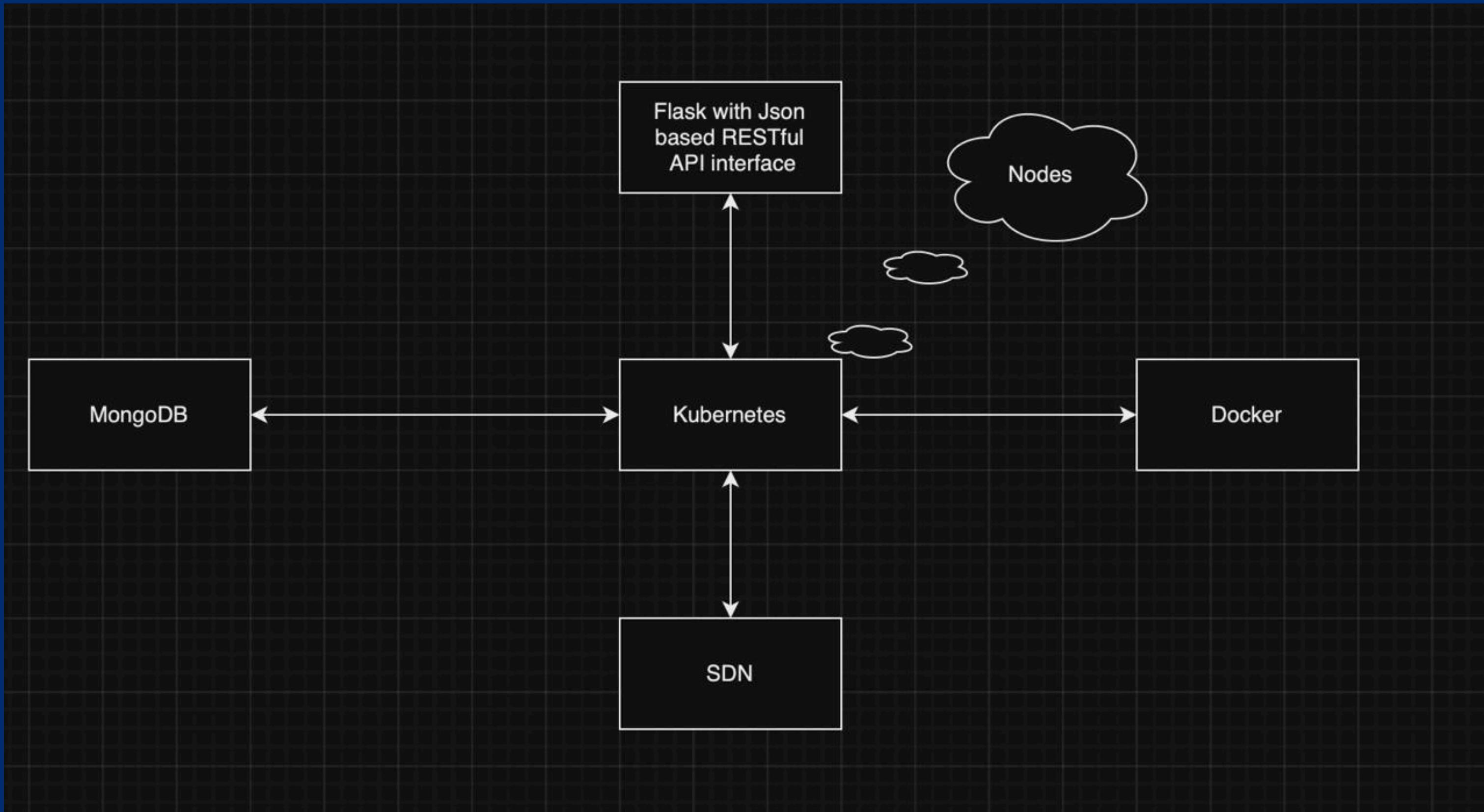
- Built a scalable deployment leveraging Kubernetes and Docker.
- Integrated MongoDB with a user-friendly WebUI.
- Demonstrated real-time connectivity and network performance using ping tests.

Software Components



- **WebUI for subscriber management and connectivity testing.**
- **JSON-based RESTful API endpoint**
- **MongoDB for database management.**
- **Kubernetes for container orchestration.**
- **Docker for containerization.**
- **Software-Defined Networks (SDNs) for efficient network management.**
- **Helm charts for streamlined Kubernetes deployments.**
- **Open5GS and UERANSIM for 5G simulation.**

Architecture Diagram



Component Interactions

- **WebUI and MongoDB:** WebUI facilitates the creation of new subscribers and retrieves data from MongoDB.
- **Docker and Kubernetes:** Docker containers run services, and Kubernetes manages their orchestration.
- **Helm Charts:** Simplify Kubernetes deployments for scalable and reproducible setups.
- **5G Simulation:** Open5GS and UERANSIM simulate connectivity to test network interactions and ensure system reliability.

Testing and Debugging

Debugging Techniques:

- Log analysis for MongoDB and WebUI errors.
- Kubernetes monitoring tools to track container health.
- Ping test metrics to validate connectivity.

Testing Approach:

- Load testing to evaluate Kubernetes scalability.
- Connectivity testing using UERANSIM and Open5GS.



Demonstration



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Thank You

SLIDE PRESENTATIONS DESIGN