SPECPIPE

SpecPipe is a distributed, ML-facilitating pipeline for radio spectrum data

Omair Alam, William Almy, Hao-Ming Hsu, Alice Lee
Advisors: Dr. Anant Sahai, Dr. Ali Abedi, Josh Sanz

WHAT IS SPECPIPE

Background

In today's interconnected world, radio spectrum signals surround us, yet there exist noticeable limitations in the data systems created to access, monitor, perform AI experiments, and contribute to this analog data.

Goals

To democratize access to spectrum data, we have built SpecPipe, a distributed AI/ML data pipeline. This platform's core values of accessibility, extensibility and scalability ensure that individual users can start to work with radio data with inexpensive hardware, minimal configuration, and easy onboarding docs.

PROJECT OBJECTIVE

Problem

Supporting high-volume spectrum data requires a custom-built architecture specifically designed for performance and scalability. This can require a significant amount of expertise, with little motive for industry leaders to share their progress.

Solution

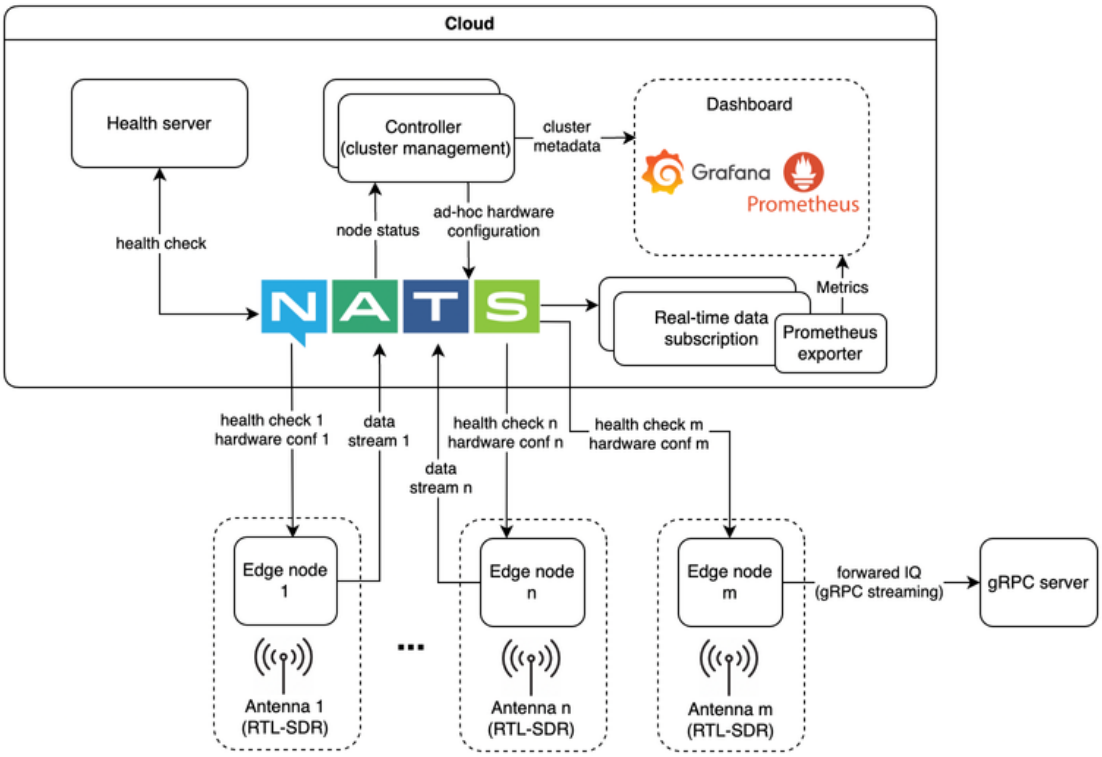
SpecPipe is designed with accessibility, extensibility, and performance serving as key project goals. We make it easy for people from all backgrounds to integrate SpecPipe into their new and existing ML workflows.

ARCHITECTURE

The entire application is containerized with Docker allowing for easy setup and deployment across Cloud environments

SpecPipe is written in Go, a highly performant language which leads to reduced costs in a cloud environment.

NATS is the key pillar that SpecPipe was built upon, handling communication, data, and configuration requests across nodes



DASHBOARD

SpecPipe comes with a built-in Grafana monitoring dashboard, allowing users to track load, node health, and other key metrics.

The dashboard can be integrated with any additional custom data sources easily.