Load Balancer with Service Turn-Off

Resources and microservices
Kara Dmitriy: access to the K8s cluster

Project statement

The project aims to enhance the functionality of a vanilla Kubernetes by enabling it to scale applications down to zero instances when they are not in use. This is relevant for ML applications that can be slow to start. The service will use event-driven automata to manage application scaling in response to real-time monitoring data and optimizing resource usage.
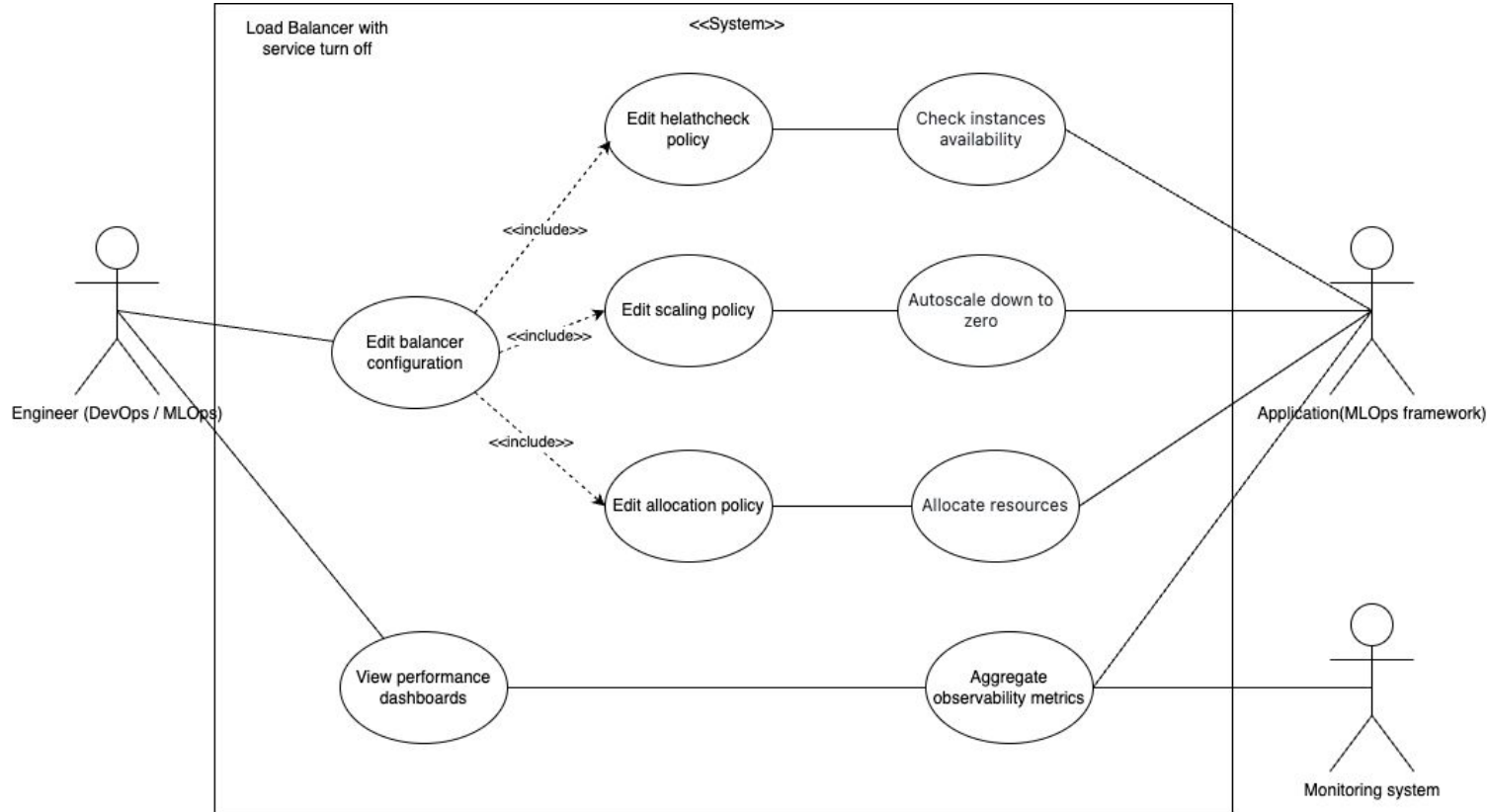
Team: Dmitry Kara, Daniil Mikulik, Ekaterina Karavayeva, Nikita Dumkin
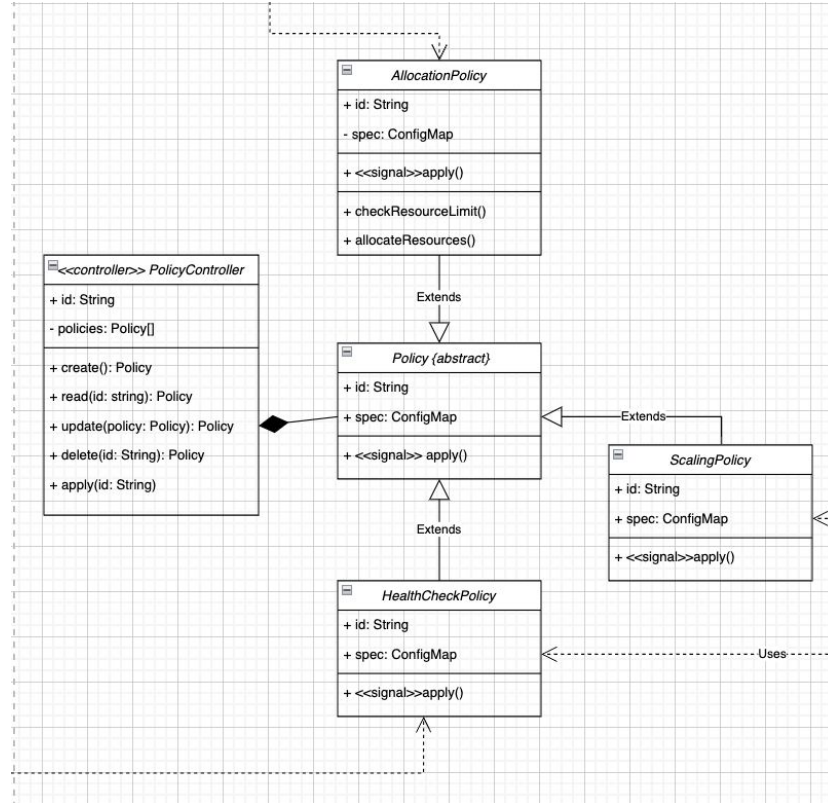
Project repo: https://github.com/dmitriykara/ads-tech-tornados-project

This report: https://docs.google.com/presentation/d/1IaeXMkLVIqLq7L1JCghJjV8ALhiMkqwj1j UcEOtdsyg/edit?usp=sharing
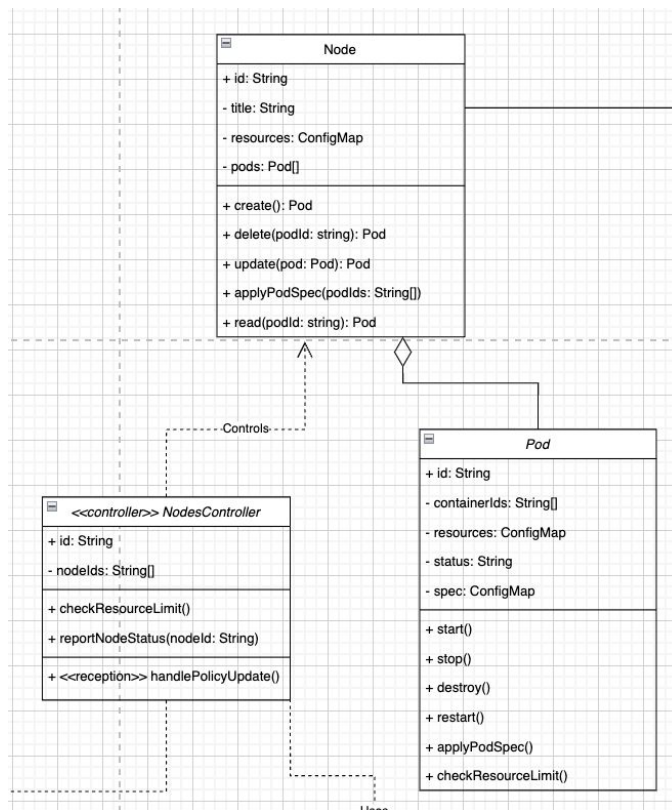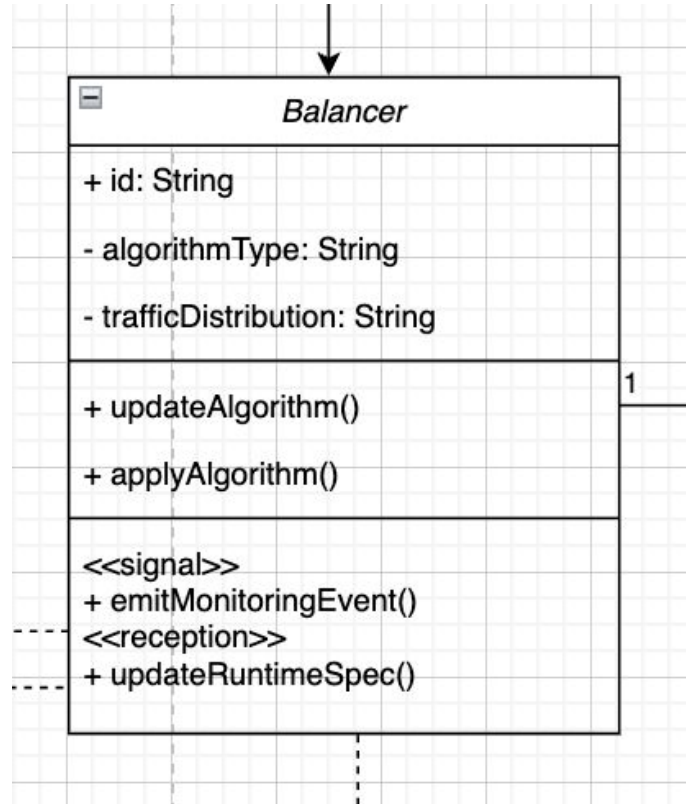
Use case diagram

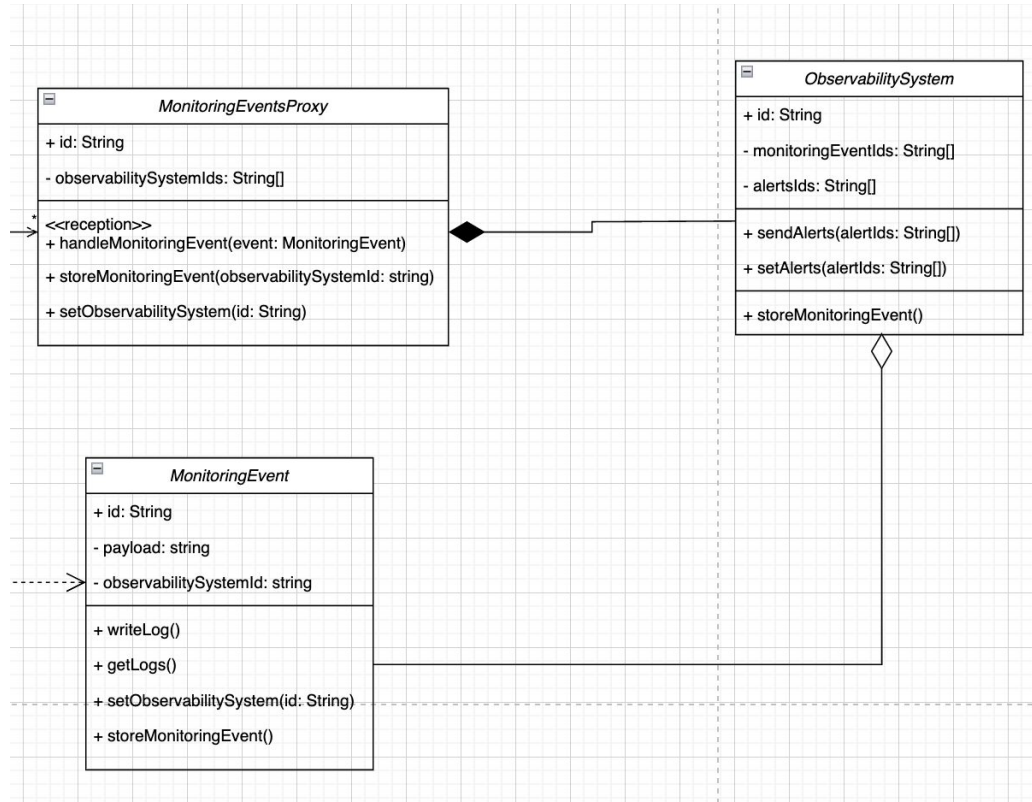# Detailed class diagram - Policies manager service

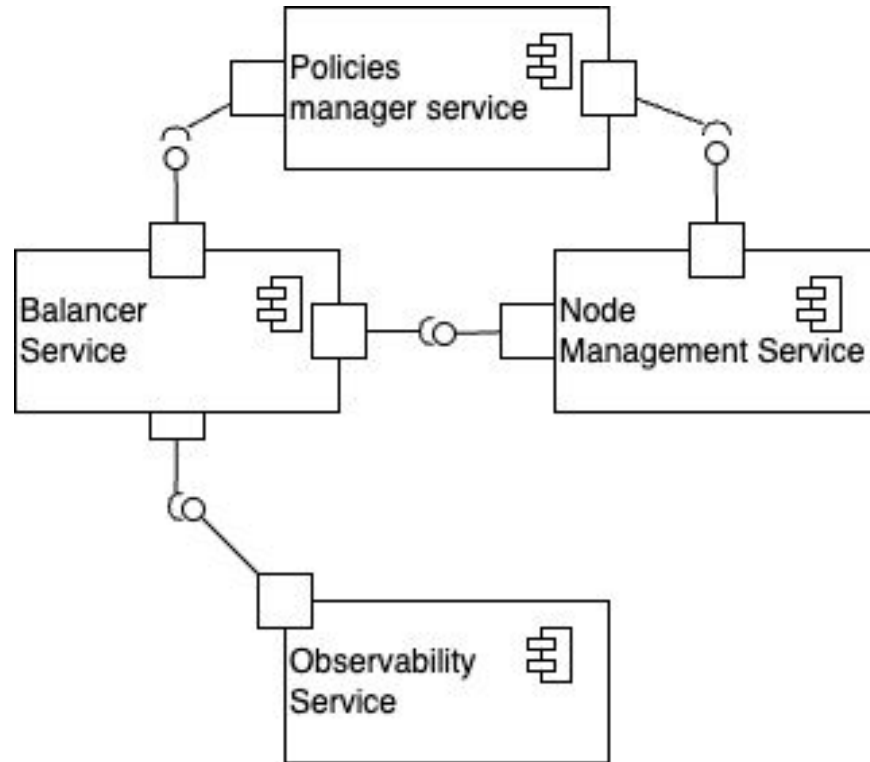# Detailed class diagram - Node management service

Detailed class diagram - Balancer service

Detailed class diagram - Observability service

Service diagram

Traceability

Microservice (component)	Resource (interface)	Domain classes in the microservice	Use case that use the microservice
Balancer Service	- Check Node & Pod Status - Send Metrics	- TrafficBalancer - LoadBalancerConfig	- Balance Traffic - Monitor Pod Health
Policies Manager Service	- Apply Policies to Nodes - Apply Policies to Balancer	- PolicyController - AllocationPolicy - ScalingPolicy	- Manage Policies - Apply Resource Allocation Policies
Node Management Service	- Send Node & Pod Data - Send Metrics	- Node - Pod - Kubelet	- Manage Node Lifecycle - Collect Node and Pod Metrics
Observability Service	- Receive Metrics - Store Node & Pod Data	- MetricsCollector - Logger	- Monitor Node and Pod Health - Track System Metrics