Automated Benchmarking of Container Applications

Paulius Dilkas

1st August 2019

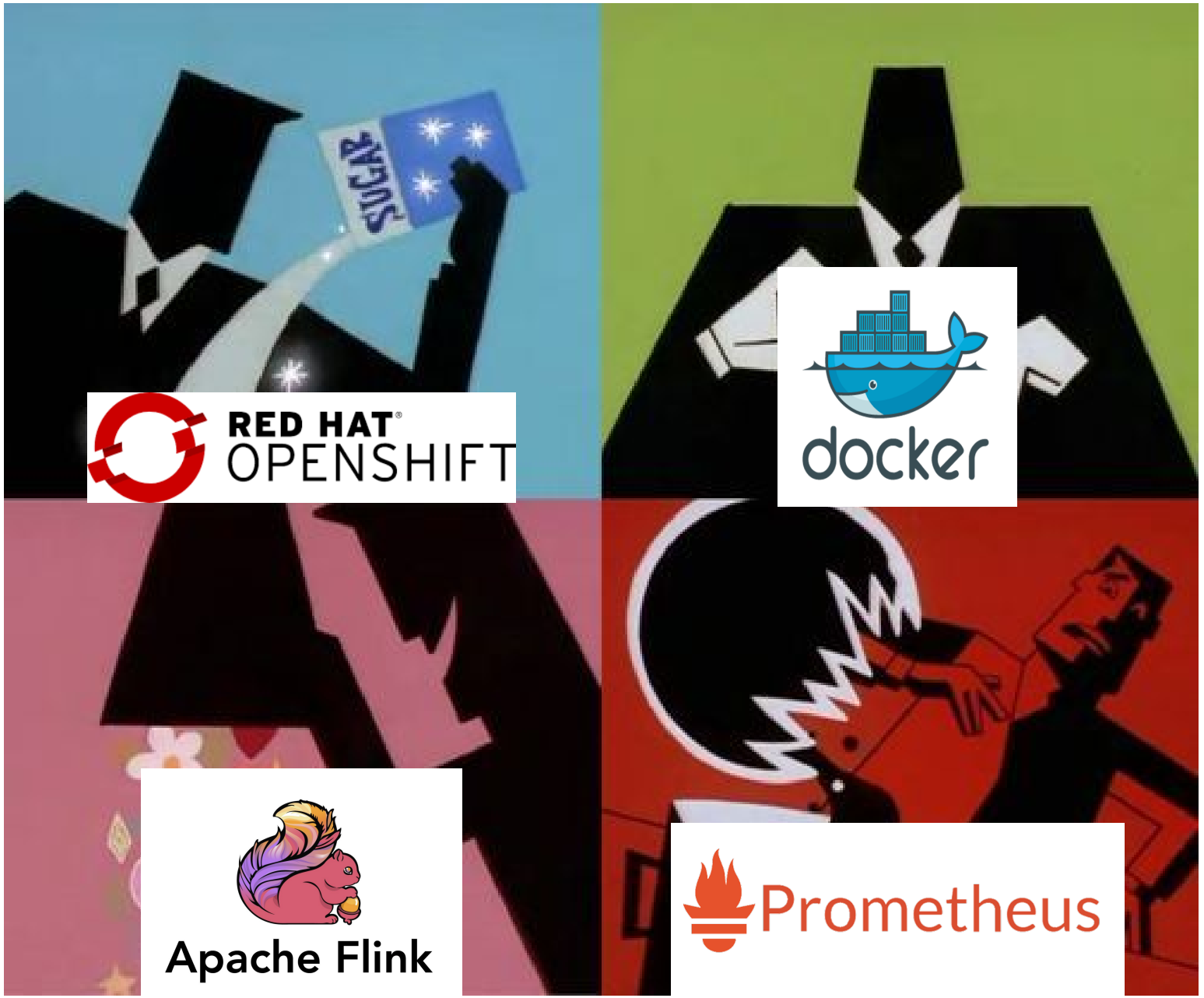
Introduction

- What resources does my application need?
- What if the workload increases?
- What if I add extra features to my software?

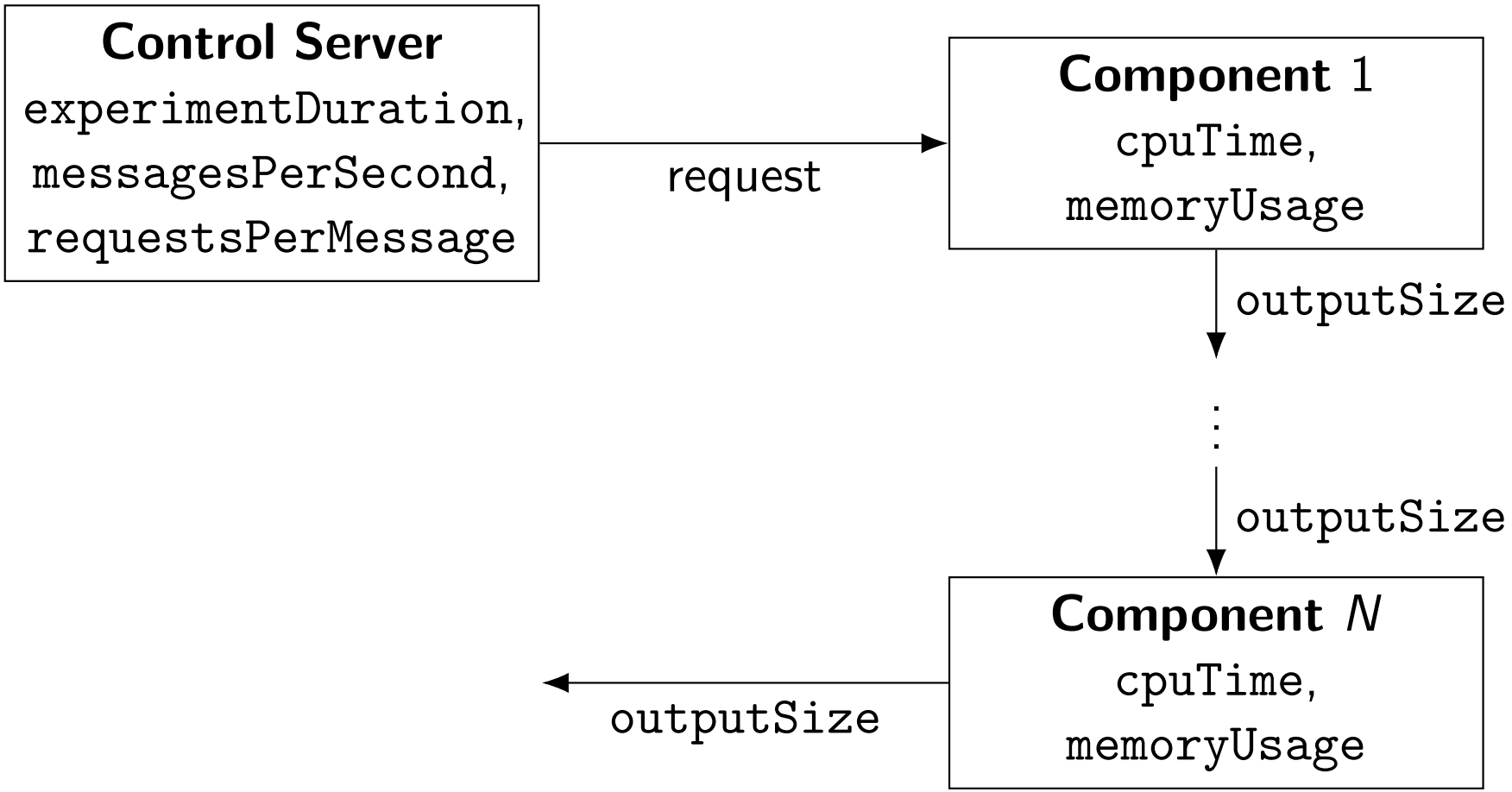
(Accomplished) Goals

- To implement a system that can simulate a wide range of distributed applications
  - with configurable memory usage, running time, etc.
- To record & plot various performance metrics
- To investigate the level of accuracy (in terms of performance data) that can be achieved on a cloud setup

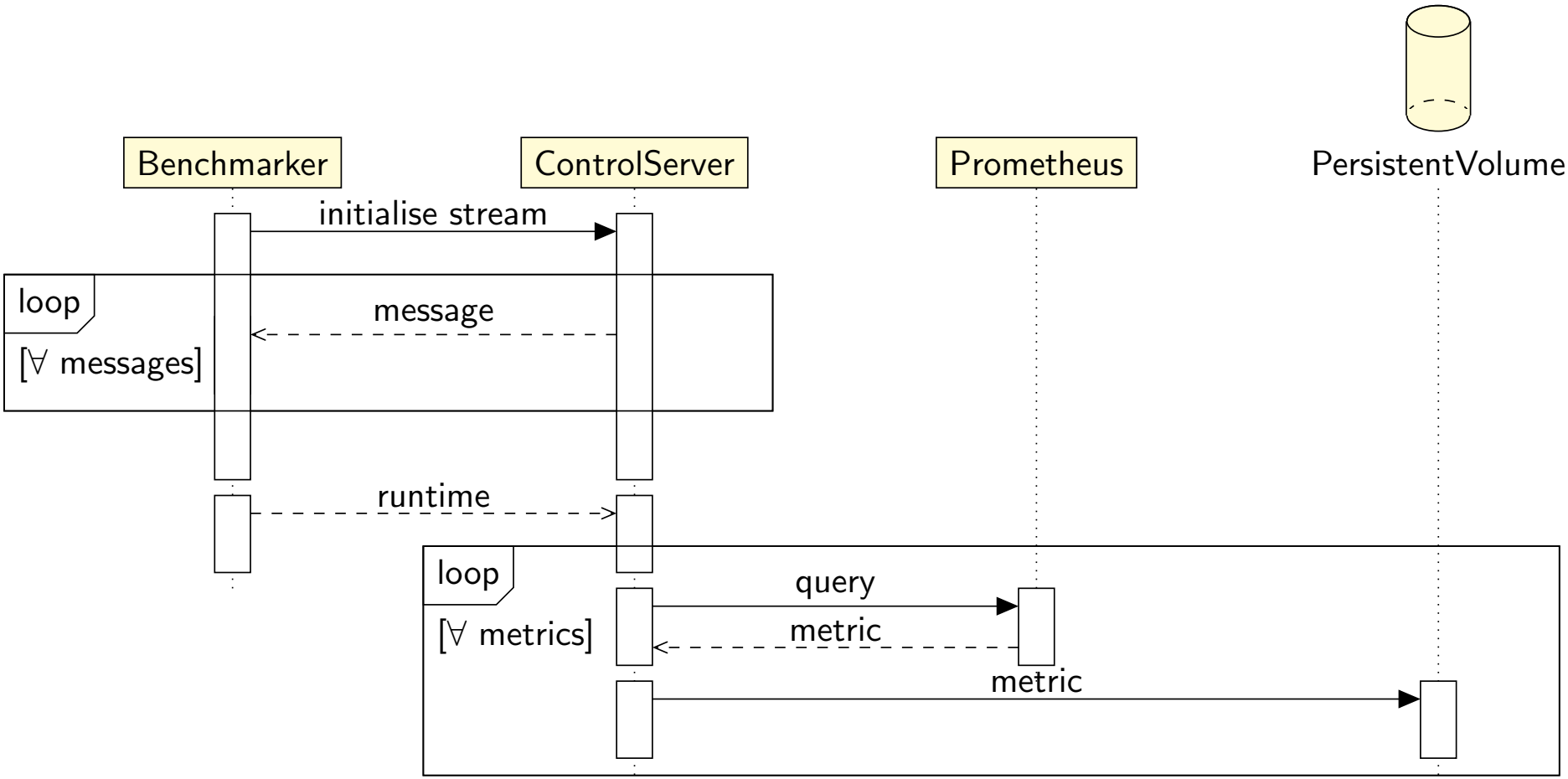
Main Ingredients



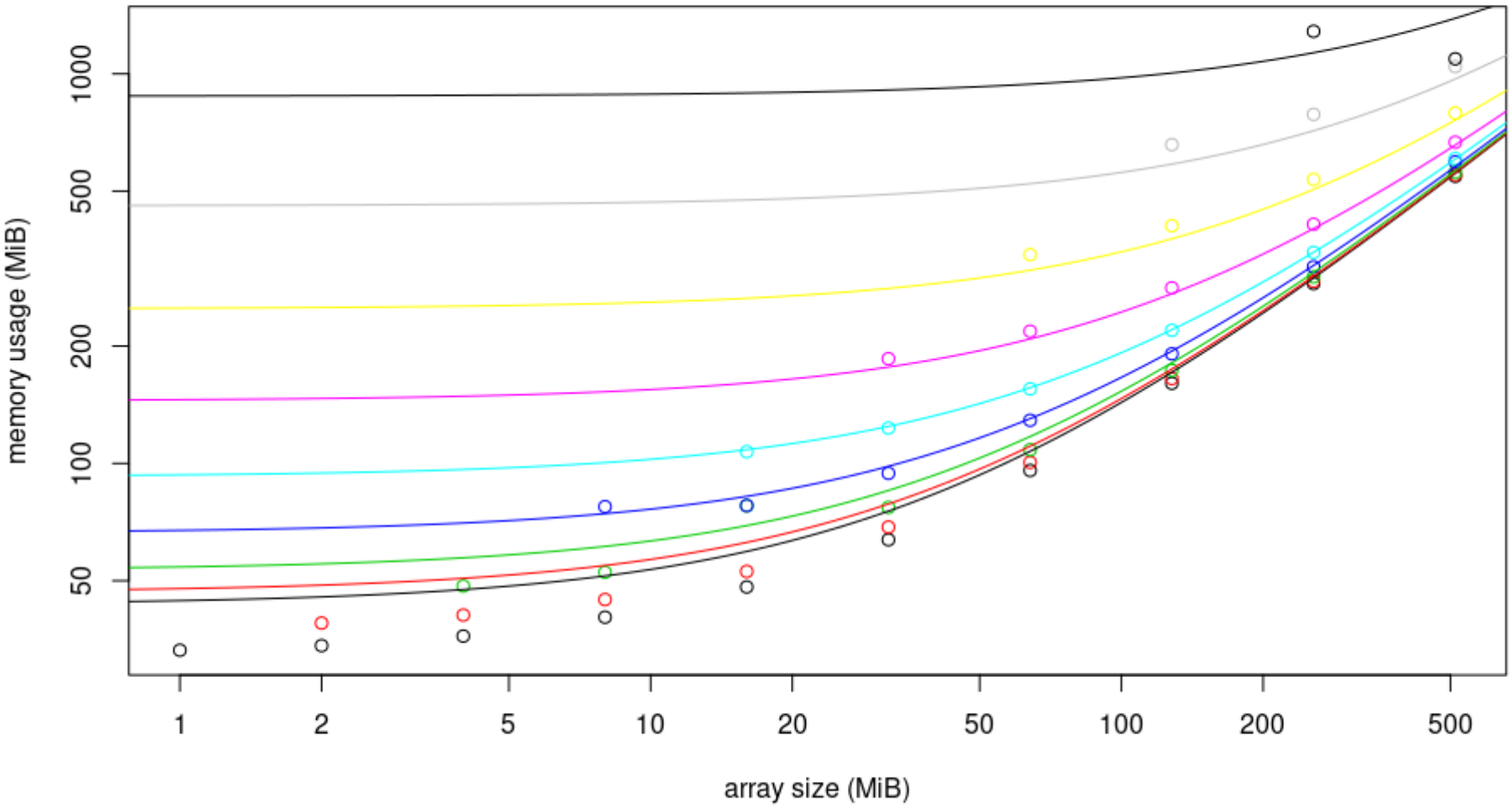
The General Idea



Execution


Benchmarker
ControlServer
Prometheus
PersistentVolume
initialise stream
loop
[∀ messages]
message
runtime
loop
[∀ metrics]
query
metric
metric

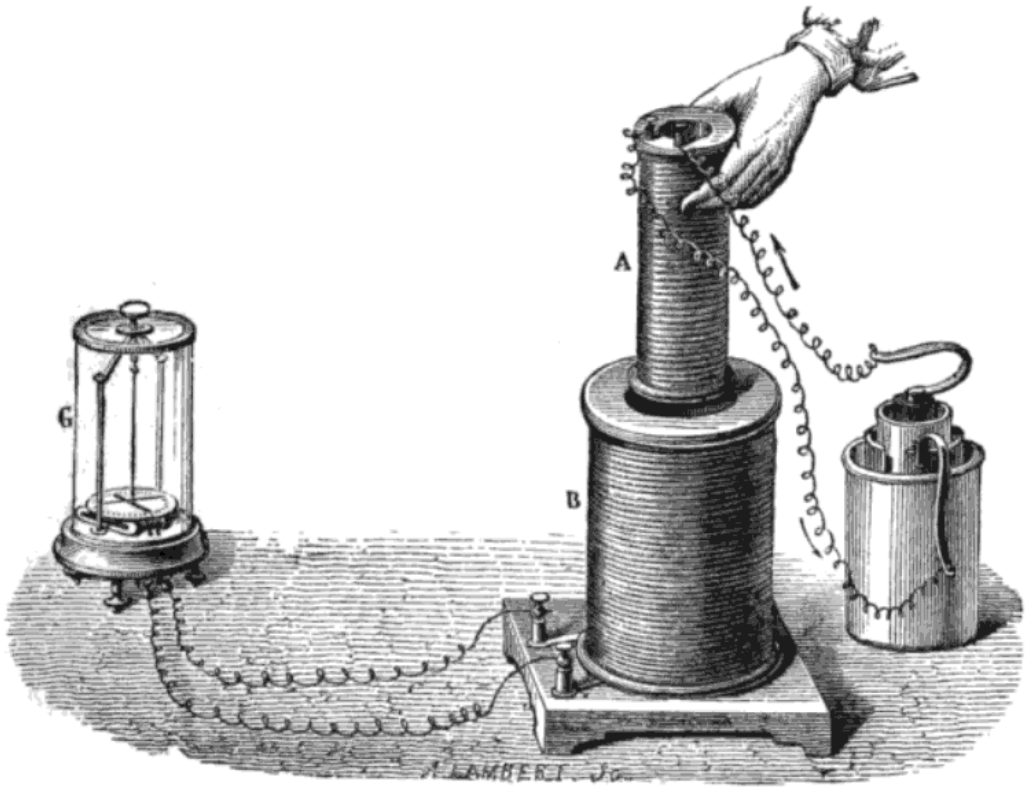
Simple Linear Regression for Memory Usage Prediction



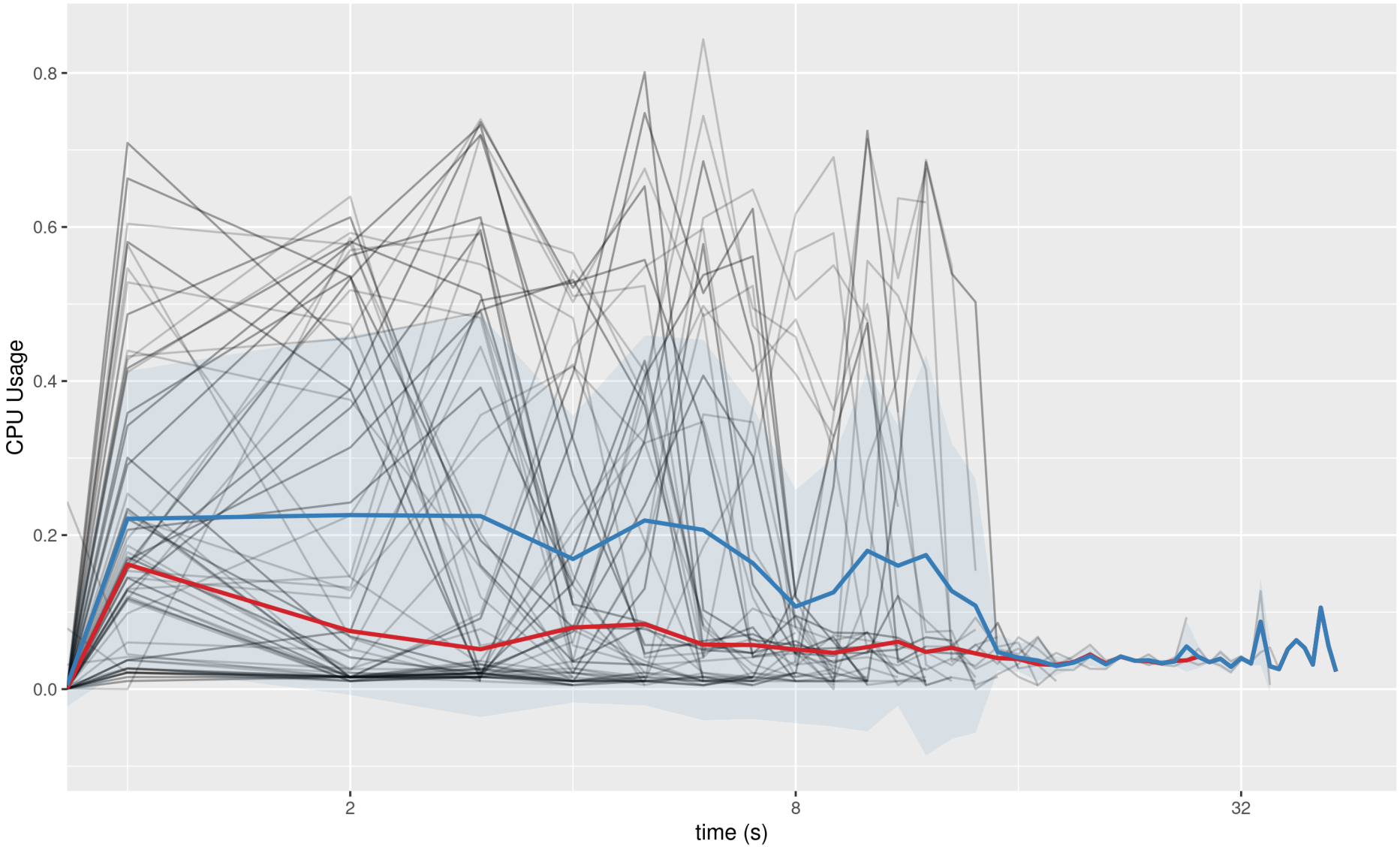
Experiments on MiniShift

Research Questions

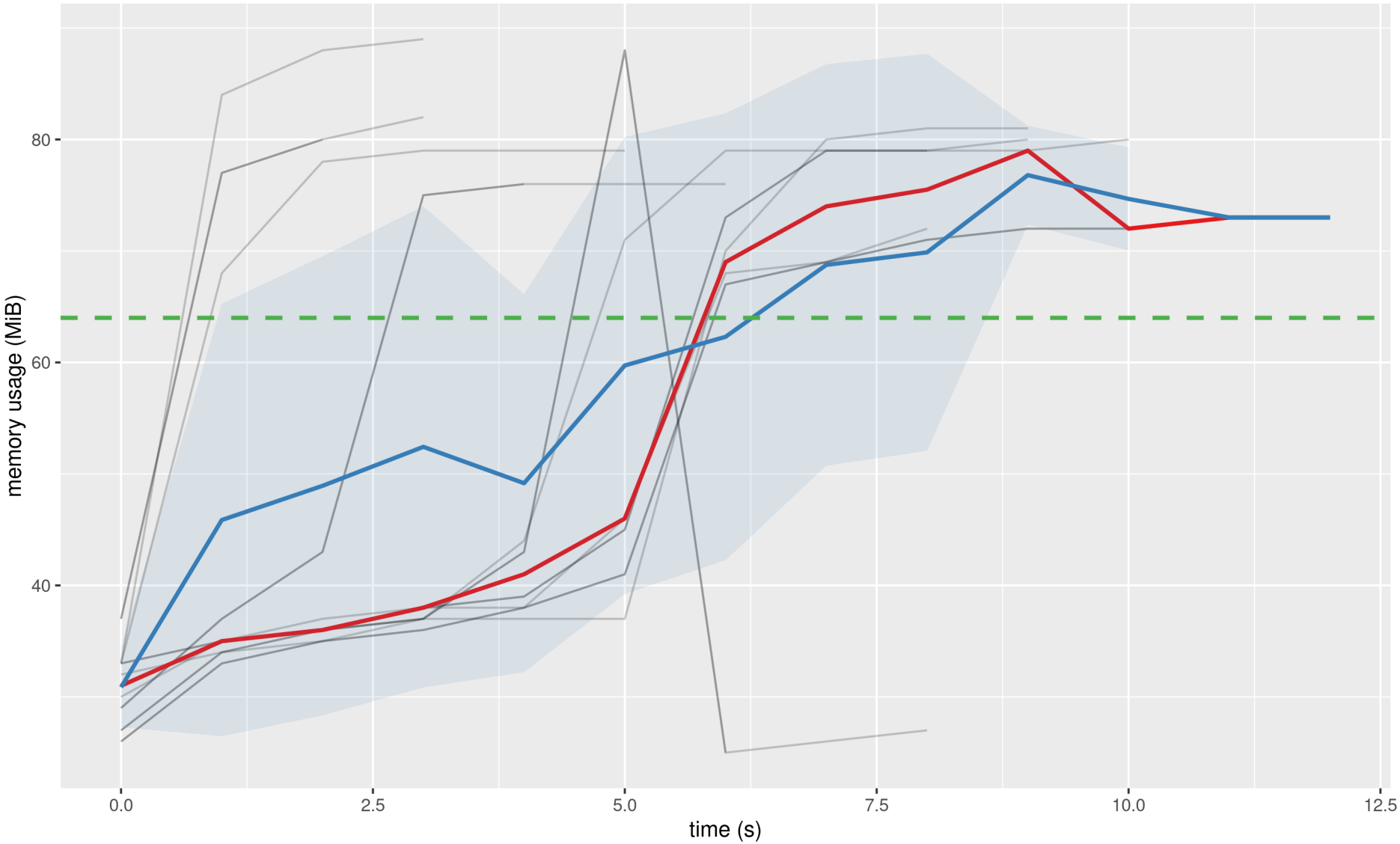
- How does perfected local performance transfer to a cloud setup?
- Can we use performance data in a time series format to recognise whether an application is performing as expected?



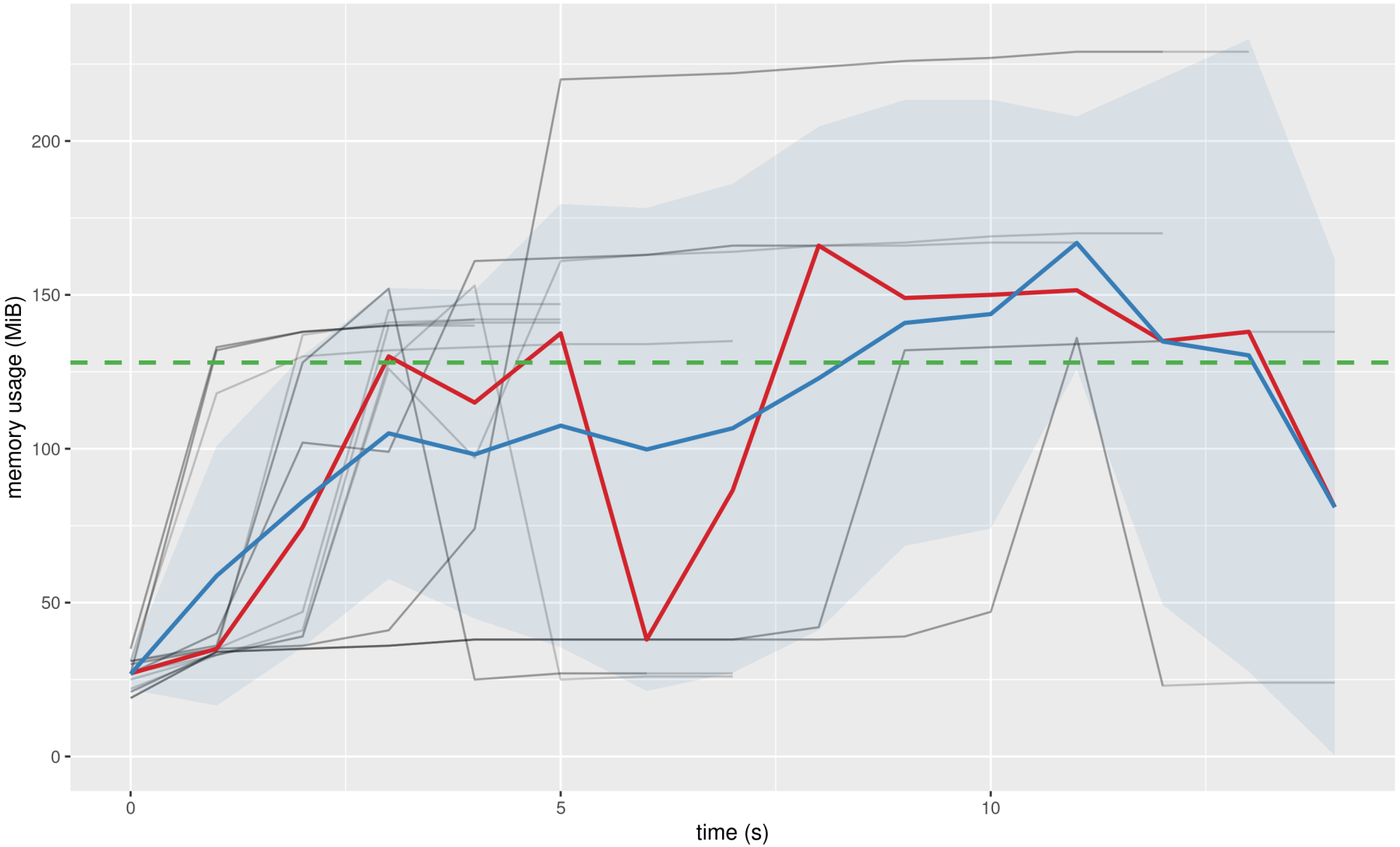
CPU Usage



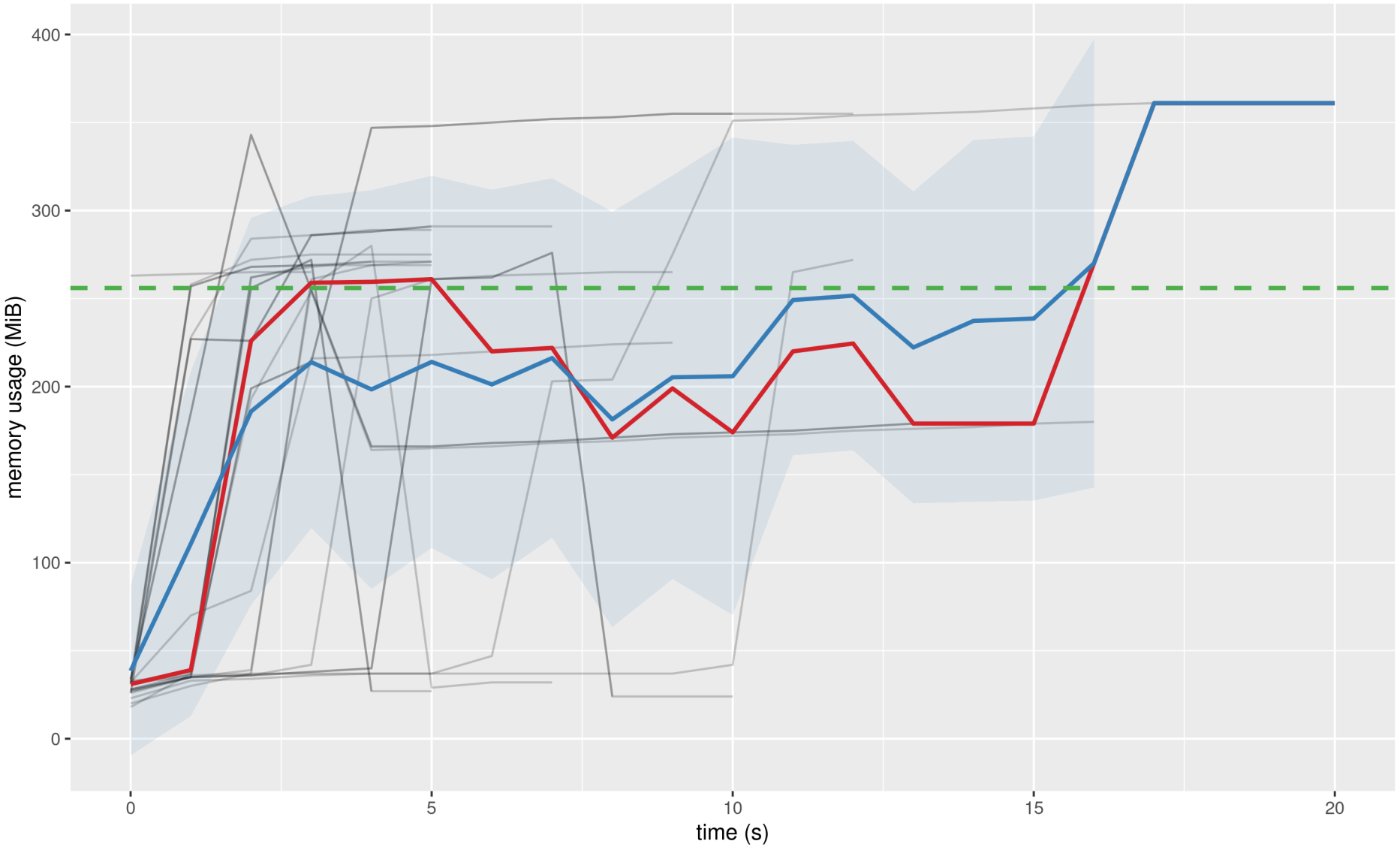
Memory (64 MiB)



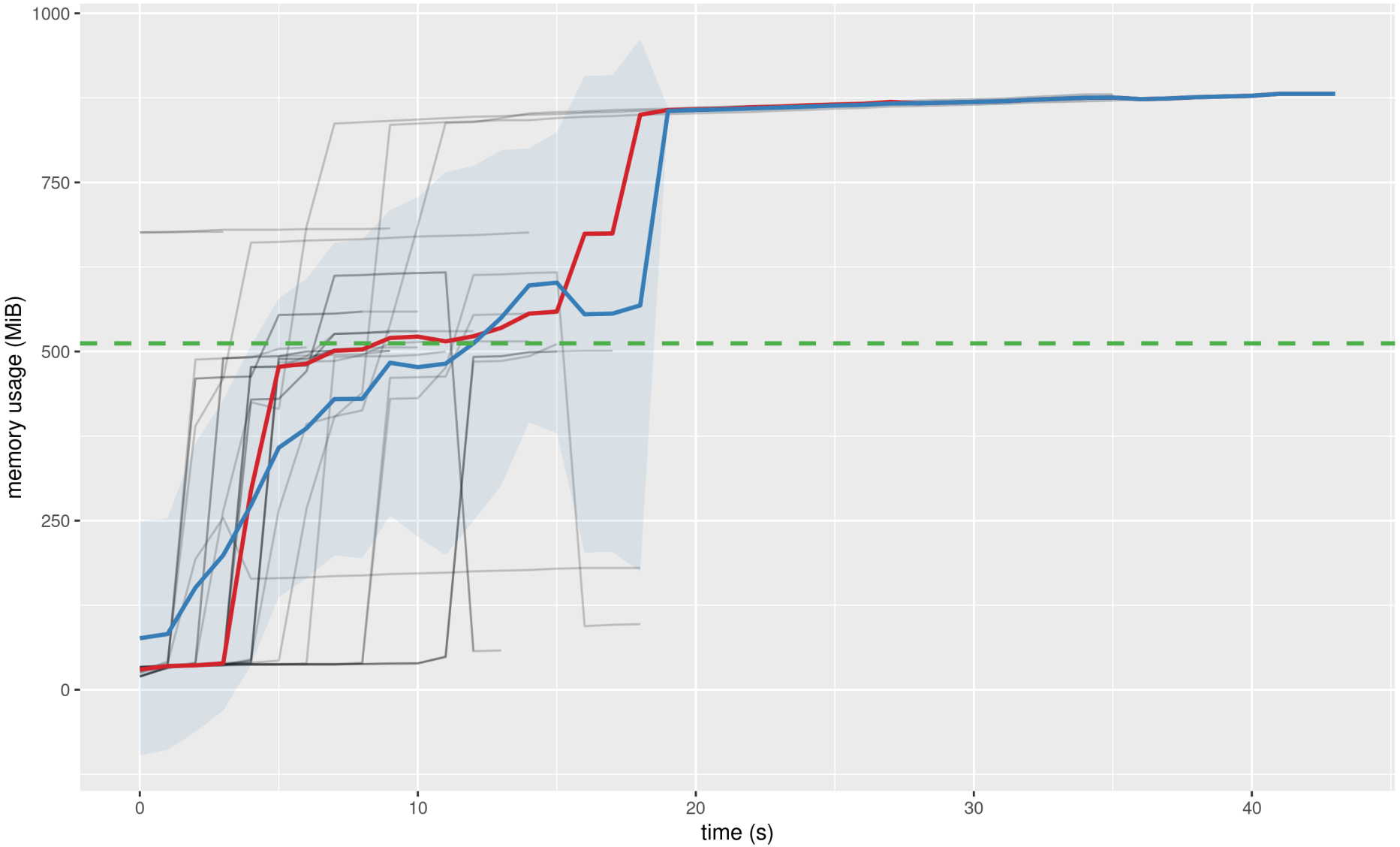
Memory (128 MiB)



Memory (256 MiB)



Memory (512 MiB)



Future Work

- Input/output simulation
- Complex usage patterns
- Automatically answering the question:
  - does this experiment show that the application could benefit from more resources?
- Complex component topologies

Future Work

- Input/output simulation
- Complex usage patterns
- Automatically answering the question:
  - does this experiment show that the application could benefit from more resources?
- Complex component topologies

Thank You!