THESIS STATUS REPORT

WEEK 04 - 05

NOTICE

There is no report for week three because I was sick.

The submission date for the thesis was postponed to April 14th.

DONE

After a lot of research and trying out, I came to the following combination of parameters and metrics, I want to use (see table 1). Parameters are dimensions that can be changed in the deployment and metrics are dimensions that are influenced by them. The objective of any machine learning model is to minimize these metrics.

Parameter	Metrics
CPU limit	CPU usage [%]
Memory limit	Memory usage [%]
Number of Pods	Average response time [ms]
	Request failures [%]

Table 1: parameters and metrics

The parameters and the metrics “CPU usage [%]” and “memory usage [%]” are gathered through Prometheus. The metrics average “response time [ms]” and “request failures [%]” are gathered through locust in the synthetic load test and will be gathered through the linkerd Prometheus in real-world use.

To get these metrics it was necessary to automatically create a parameter variation matrix, which includes every expression of the parameters for given maxima. With the given matrix I had to implement the synthetic load test the way that I will deploy the pod with the given parameters for every entry in the matrix and then go through the load testing. E.g. there are five expressions for every parameter the synthetic load test had to go through 125 (5 * 5 * 5) iterations.

I did more research on the format that is necessary to use Extra-P and found out how the data has to be formated. Extra-P takes only one measurement point per parameter combination but the synthetic load testing delivers a time series for every parameter combination. Therefore I calculated the mean value of every metric to end up with one metric measurement per parameter combination. To establish a reasonable performance model, Extra-P suggests making a minimum of five runs for every parameter combination. This means that for one performance model the synthetic load testing has to go through 625 (125 * 5) runs.

At the moment I was only able to make the initial 125 runs.

I also implemented a method which will format all raw data, calculate the mean values and bring it in the Extra-P readable format.

UPDATE FROM SYNC MEETING (05.02.2021)

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NEXT STEPS

1. Make all 625 runs and automate Extra-P
2. Develop and implement the machine learning model
3. Implement the auto scaler