Evaluation

Bachelorarbeit Tobias Rodestock

Current state

- Microservice System in Kubernetes deployed
- Scaling through the Horizontal Pod Autoscaler
- Metrics through Prometheus/Grafana

Events in the Kubernetes Dashboard

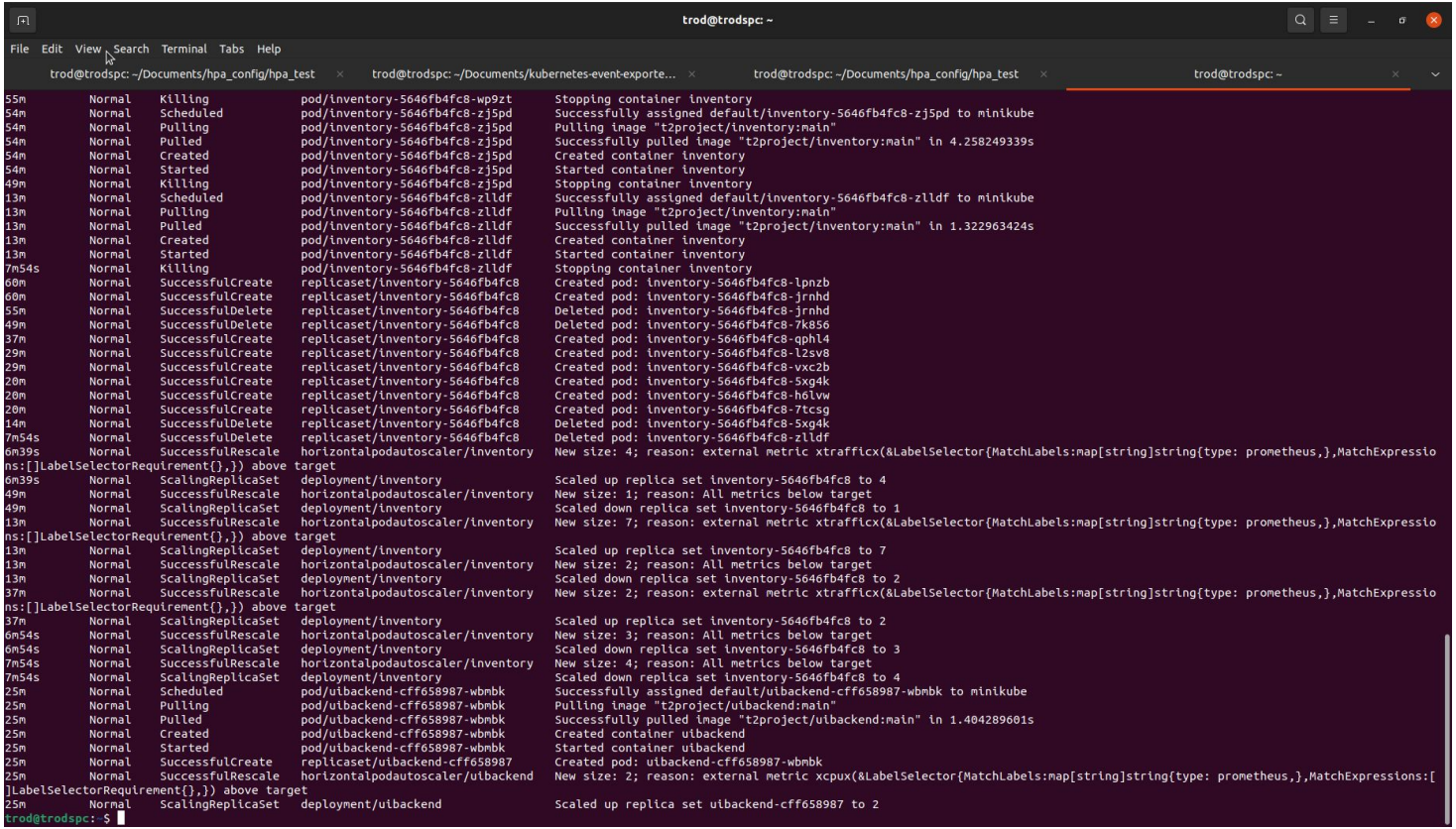
Name	Min Replicas	Max Replicas	Reference	Created ↑
inventory	1	7	Deployment / inventory	3 hours ago

Events

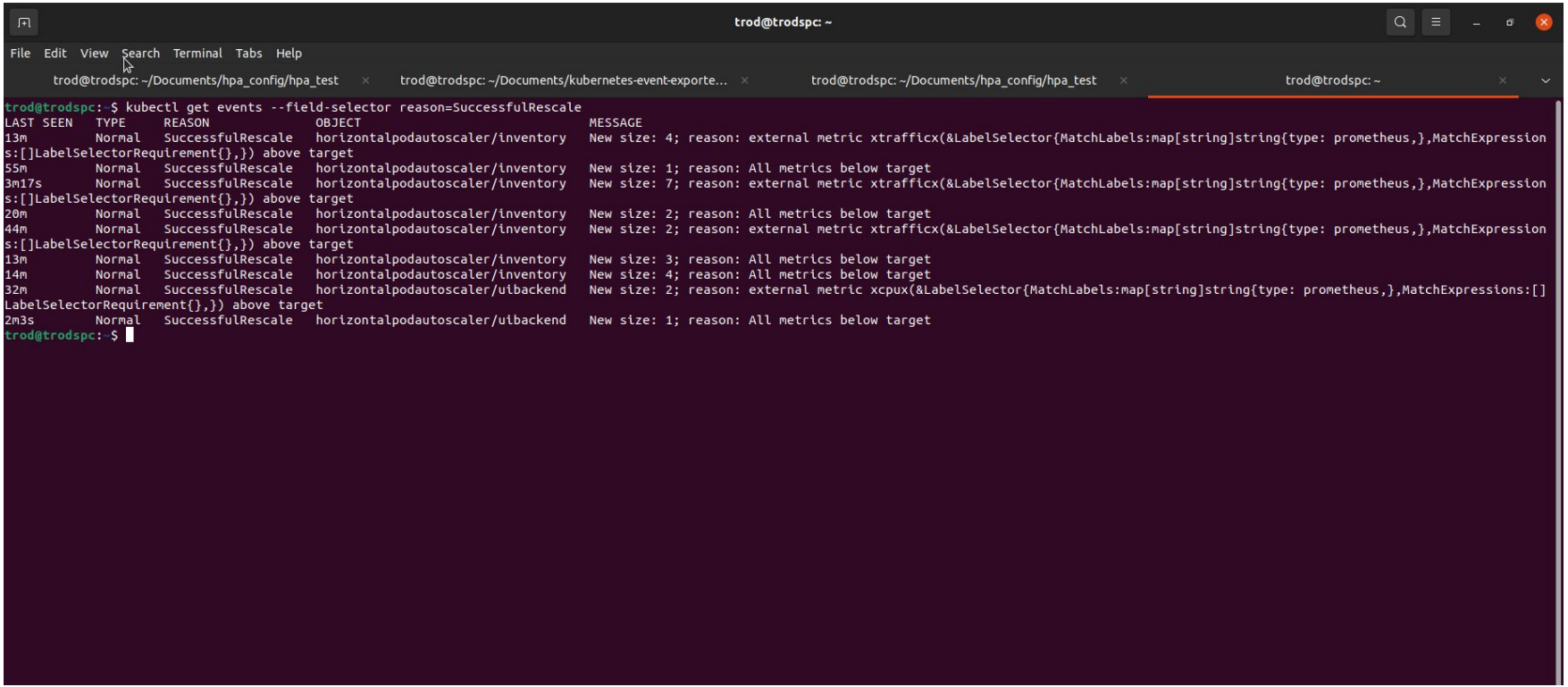
Message	Source	Sub-object	Count	First Seen	Last Seen
New size: 4; reason: external metric xtrafficx(&LabelSelector{MatchLabels:map[string]string{type prometheus,},MatchExpressions: []LabelSelectorRequirement{},}) above target	horizontal-pod-autoscaler	-	7	an hour ago	5 minutes ago
Scaled up replica set inventory-5646fb4fc8 to 4	deployment-controller	-	7	an hour ago	5 minutes ago
New size: 1; reason: All metrics below target	horizontal-pod-autoscaler	-	6	an hour ago	48 minutes ago
Scaled down replica set inventory-5646fb4fc8 to 1	deployment-controller	-	6	an hour ago	48 minutes ago
New size: 7; reason: external metric xtrafficx(&LabelSelector{MatchLabels:map[string]string{type prometheus,},MatchExpressions: []LabelSelectorRequirement{},}) above target	horizontal-pod-autoscaler	-	5	an hour ago	12 minutes ago
Scaled up replica set inventory-5646fb4fc8 to 7	deployment-controller	-	5	an hour ago	12 minutes ago
New size: 2; reason: All metrics below target	horizontal-pod-autoscaler	-	2	an hour ago	12 minutes ago
Scaled down replica set inventory-5646fb4fc8 to 2	deployment-controller	-	2	an hour ago	12 minutes ago
New size: 2; reason: external metric xtrafficx(&LabelSelector{MatchLabels:map[string]string{type prometheus,},MatchExpressions: []LabelSelectorRequirement{},}) above target	horizontal-pod-autoscaler	-	2	an hour ago	36 minutes ago
Scaled up replica set inventory-5646fb4fc8 to 2	deployment-controller	-	2	an hour ago	36 minutes ago

1 – 10 of 14

Events in the CLI



Events in the CLI



Procedure

Receiving Events → Relation of Events → Performance Problems

1. Convert to a nicer format
2. Extract information
   a. Metric
   b. Scaling type
   c. Replica size

Relation of Events:

- Scaling type
- Time interval
- Metric type
- Derivation

- Classify load
- Collect metrics
- Analyse for performance problems

Create Issues

Error in the HPA:

- Metric not available

Adaption not successful:

- Scaling till maxReplica

Performance Problem:

- Reporting the problem type

Evaluation Questions:

1. Which are the biggest challenges developers face when trying to understand/verify the autoscaling behavior of a microservice system?

2. Please order the following points by how much they challenge developers, when trying to understand/verify the autoscaling behavior of a microservice system?

    1. High effort to provide information for analysis

    2. Information is scattered through to many tools/dashboards

    3. There are to many autoscaling decisions taken to keep an overview

Evaluation Questions:

3.Which of the problems from question 1 and 2 are solved by the system proposed in this bachelor thesis?

4.Which of the problems from question 1 and 2 are reduced by the system in this bachelor thesis? If yes, how much are they reduced? (1-5) (1, not very much, 5, very much)

5.Are there features missing that you would need to better understand/verify the autoscaling behavior of a microservice system?

6.Would you use a completely implemented version of the tool proposed in this bachelor thesis?