

Pod should be automatically killed and restarted when unhealthy

29 December 2017

Abstract

Can we trust Kubernetes to restart our microservice when it detects it is unhealthy?

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Summary

Status	completed
Tagged	microservice, kubernetes, python
Executed From	sylvain-laptop
Platform	Linux-4.13.0-21-generic-x86_64-with-Ubuntu-17.10-artful
Started	Fri, 29 Dec 2017 17:23:51 GMT
Completed	Fri, 29 Dec 2017 17:25:07 GMT
Duration	1 minute

Experiment

The experiment was made of 2 actions, to vary conditions in your system, and 5 probes, to collect objective data from your system during the experiment.

Steady State Hypothesis

The steady state hypothesis this experiment tried was “**Services are all available and healthy**”.

It was verified with the following probes:

Probe	Tolerance
all-services-are-healthy	True
webapp-is-available	True

Method

The experiment method defines the sequence of activities that help gathering evidence towards, or against, the hypothesis.

The following activities were conducted as part of the experimental’s method:

Type	Name
action	talk-to-webapp
action	confirm-purchase
probe	collect-how-many-times-our-service-container-restarted-in-the-last-minute
probe	read-webapp-logs-for-the-pod-that-was-killed
probe	read-webapp-logs-for-pod-that-was-started
probe	collect-status-code-from-our-webapp-in-the-last-2-minutes
probe	plot-request-latency-throughout-experiment

Result

The experiment was conducted on Fri, 29 Dec 2017 17:23:51 GMT and lasted roughly 1 minute.

Action - talk-to-webapp

Status	succeeded
Background	True
Started	Fri, 29 Dec 2017 17:23:52 GMT
Ended	Fri, 29 Dec 2017 17:24:51 GMT
Duration	59 seconds

The action provider that was executed:

Type	process
Path	vegeta
Timeout	63
Arguments	{'attack': '', '-duration': '60s', '-connections': '1', '-rate': '1', '-output': 'report.bin', '-targets': 'urls.txt'}

Action - confirm-purchase

Status	failed
Background	False
Started	Fri, 29 Dec 2017 17:24:07 GMT
Ended	Fri, 29 Dec 2017 17:24:07 GMT
Duration	0 seconds
Paused Before	15s

The action provider that was executed:

Type	http
URL	\${webapp_service_url}/purchase/confirm
Method	GET
Timeout	N/A
Arguments	N/A

The *confirm-purchase* action raised the following error while running:

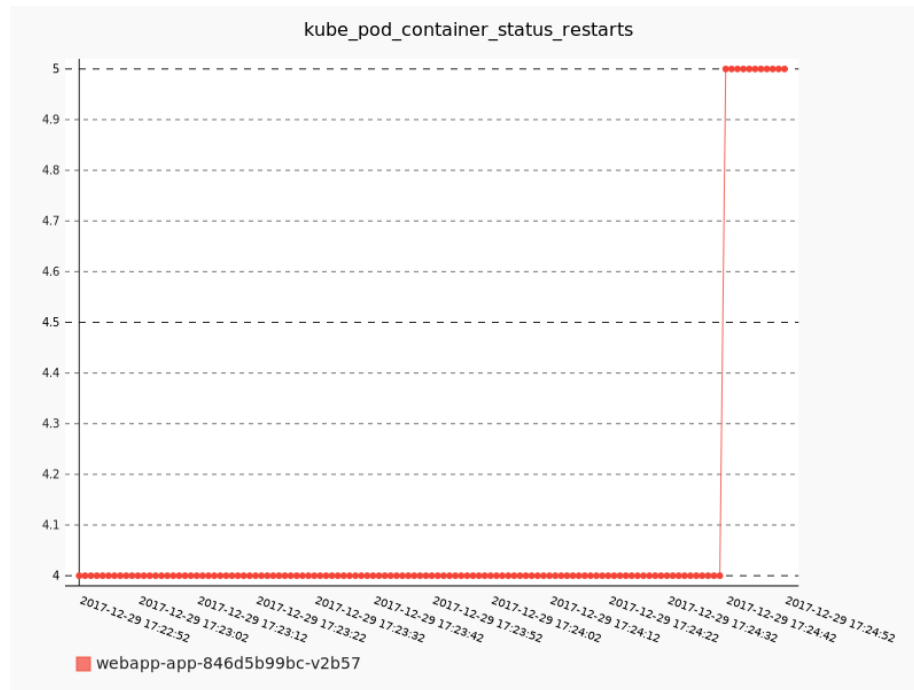
chaoslib.exceptions.FailedActivity: HTTP call failed with code 500 (expected 200): 500 Internal Server Error Internal Server Error The server encountered an internal error and was unable to complete your request. Either the server is overloaded or there is an error in the application.

Probe - collect-how-many-times-our-service-container-restarted-in-the-last-minute

Status	succeeded
Background	False
Started	Fri, 29 Dec 2017 17:24:52 GMT
Ended	Fri, 29 Dec 2017 17:24:52 GMT
Duration	0 seconds
Paused Before	45s

The probe provider that was executed:

Type	python
Module	chaosprometheus.probes
Function	query_interval
Arguments	{'query': 'kube_pod_container_status_restarts{container="webapp-app"}', 'start': '2 minutes ago', 'end': 'now'}



Probe - read-webapp-logs-for-the-pod-that-was-killed

Status	succeeded
Background	False
Started	Fri, 29 Dec 2017 17:24:52 GMT
Ended	Fri, 29 Dec 2017 17:24:52 GMT
Duration	0 seconds

The probe provider that was executed:

Type	python
Module	chaosk8s.probes
Function	read_microservices_logs
Arguments	{'name': 'webapp-app', 'from_previous': True}

Probe - read-webapp-logs-for-pod-that-was-started

Status	succeeded
---------------	-----------

Background	False
Started	Fri, 29 Dec 2017 17:24:52 GMT
Ended	Fri, 29 Dec 2017 17:24:52 GMT
Duration	0 seconds

The probe provider that was executed:

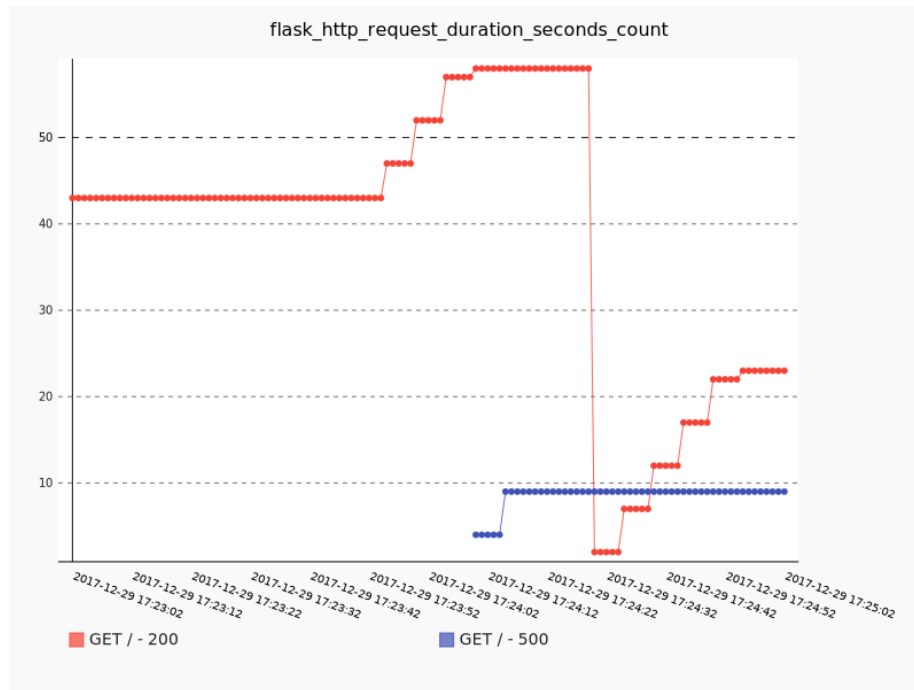
Type	python
Module	chaosk8s.probes
Function	read_microservices_logs
Arguments	{'name': 'webapp-app'}

Probe - collect-status-code-from-our-webapp-in-the-last-2-minutes

Status	succeeded
Background	False
Started	Fri, 29 Dec 2017 17:25:02 GMT
Ended	Fri, 29 Dec 2017 17:25:02 GMT
Duration	0 seconds
Paused Before	10s

The probe provider that was executed:

Type	python
Module	chaosprometheus.probes
Function	query_interval
Arguments	{'query': 'flask_http_request_duration_seconds_count{path="/" }', 'start': '2 minutes ago', 'end': 'now'}



Probe - plot-request-latency-throughout-experiment

Status	succeeded
Background	False
Started	Fri, 29 Dec 2017 17:25:07 GMT
Ended	Fri, 29 Dec 2017 17:25:07 GMT
Duration	0 seconds
Paused Before	5s

The probe provider that was executed:

Type	process
Path	vegeta
Timeout	5
Arguments	{'report': '', 'inputs': 'report.bin', 'reporter': 'plot', 'output': 'latency.html'}

Appendix

Action - talk-to-webapp

The *action* returned the following result:

```
[0, '', '']
```

Action - confirm-purchase

The *action* returned the following result:

```
None
```

Probe - collect-how-many-times-our-service-container-restarted-in-the-last-minute

The *probe* returned the following result:

```
{'data': {'result': [{'metric': {'__name__': 'kube_pod_container_status_restarts',  
                                'app': 'prometheus',  
                                'chart': 'prometheus-4.6.6',  
                                'component': 'kube-state-metrics',  
                                'container': 'webapp-app',  
                                'heritage': 'Tiller',  
                                'instance': '172.17.0.5:8080',  
                                'job': 'kubernetes-service-endpoints',  
                                'kubernetes_name': 'prometheus-prometheus-kube-state-metrics',  
                                'kubernetes_namespace': 'default',  
                                'namespace': 'default',  
                                'pod': 'webapp-app-846d5b99bc-v2b57',  
                                'release': 'prometheus'},  
                        'values': [[1514568172.4, '4'],  
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[1514568289.4, '5'],
[1514568290.4, '5'],
[1514568291.4, '5'],
[1514568292.4, '5']]},
  'resultType': 'matrix'},
  'status': 'success'}

```

Probe - read-webapp-logs-for-the-pod-that-was-killed

The *probe* returned the following result:

```

{'webapp-app-846d5b99bc-v2b57': '2017-12-29T17:15:23.238069544Z '
    '[29/Dec/2017:17:15:23] ENGINE Listening for '
    'SIGTERM.\n'
    '2017-12-29T17:15:23.238112105Z '
    '[29/Dec/2017:17:15:23] ENGINE Listening for '
    'SIGHUP.\n'
    '2017-12-29T17:15:23.238213944Z '
    '[29/Dec/2017:17:15:23] ENGINE Listening for '
    'SIGUSR1.\n'
    '2017-12-29T17:15:23.238388864Z '
    '[29/Dec/2017:17:15:23] ENGINE Bus STARTING\n'
    '2017-12-29T17:15:23.416210117Z '
    '[29/Dec/2017:17:15:23] ENGINE Serving on '
    'http://0.0.0.0:8080\n'
    '2017-12-29T17:15:23.416323029Z '
    '[29/Dec/2017:17:15:23] ENGINE Bus STARTED\n'
    '2017-12-29T17:24:19.151192496Z '
    '[29/Dec/2017:17:24:19] ENGINE Caught signal '
    'SIGTERM.\n'
    '2017-12-29T17:24:19.151354514Z '
    '[29/Dec/2017:17:24:19] ENGINE Bus STOPPING\n'
    '2017-12-29T17:24:24.197317636Z '
    '[29/Dec/2017:17:24:24] ENGINE HTTP Server '

```

```
"cherryypy._cpwsgi_server.CPWSGIServer(('0.0.0.0', "
'8080')) shut down\n'
'2017-12-29T17:24:24.19802443Z '
'[29/Dec/2017:17:24:24] ENGINE Bus STOPPED\n'
'2017-12-29T17:24:24.19879267Z '
'[29/Dec/2017:17:24:24] ENGINE Bus EXITING\n'
'2017-12-29T17:24:24.199526444Z '
'[29/Dec/2017:17:24:24] ENGINE Bus EXITED\n'
'2017-12-29T17:24:24.200507699Z '
'[29/Dec/2017:17:24:24] ENGINE Waiting for '
'child threads to terminate...\n'}
```

Probe - read-webapp-logs-for-pod-that-was-started

The *probe* returned the following result:

```
{'webapp-app-846d5b99bc-v2b57': '2017-12-29T17:24:28.302932053Z '
'[29/Dec/2017:17:24:28] ENGINE Listening for '
'SIGTERM.\n'
'2017-12-29T17:24:28.303183581Z '
'[29/Dec/2017:17:24:28] ENGINE Listening for '
'SIGHUP.\n'
'2017-12-29T17:24:28.30401749Z '
'[29/Dec/2017:17:24:28] ENGINE Listening for '
'SIGUSR1.\n'
'2017-12-29T17:24:28.304705044Z '
'[29/Dec/2017:17:24:28] ENGINE Bus STARTING\n'
'2017-12-29T17:24:28.437046594Z '
'[29/Dec/2017:17:24:28] ENGINE Serving on '
'http://0.0.0.0:8080\n'
'2017-12-29T17:24:28.437436129Z '
'[29/Dec/2017:17:24:28] ENGINE Bus STARTED\n'}
```

Probe - collect-status-code-from-our-webapp-in-the-last-2-minutes

The *probe* returned the following result:

```
{'data': {'result': [{'metric': {'__name__': 'flask_http_request_duration_seconds_count',
'instance': 'webapp-service:8080',
'job': 'webapp',
'method': 'GET',
'path': '/',
'status': '200'}},
{'values': [[1514568182.73, '43'],
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[1514568298.73, '23'],
[1514568299.73, '23'],
[1514568300.73, '23'],
[1514568301.73, '23'],
[1514568302.73, '23']],
{'metric': {'__name__': 'flask_http_request_duration_seconds_count',
'instance': 'webapp-service:8080',
'job': 'webapp',
'method': 'GET',
'path': '/',
'status': '500'},
'values': [[1514568250.73, '4'],
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[1514568301.73, '9'],  
[1514568302.73, '9']]},  
  'resultType': 'matrix'},  
  'status': 'success'}
```


Probe - plot-request-latency-throughout-experiment

The *probe* returned the following result:

```
[0, '', '']
```