



Keptn

Getting app observability
to the next stage

May 18, 2022

> whoami



[@oleg_nenashev](#)



[oleg-nenashev](#)



dynatrace



CD.FOUNDATION



keptn



Dynatrace OSPO

// OSPO - Open Source Programs Office

- Started as Innovation Lab
- Reorganized as the OSPO in 2021
- Driving open source initiatives & strategy
- We help Dynatracers to participate in Open Source - infra, legal, consulting, tooling, community operations, ...



Dynatrace OSPO. Key projects / areas



Outline

- Open Observability 101
- Keptn - acting on observability data
- Keptn usage modes
- (?) Live demo
- Discussion

These slides



Disclaimer

- Opinions are my own, happy to discuss
- My talk does not represent opinions of my employer, the Continuous Delivery Foundation, or the Keptn community
- I present only open source projects today



Site Reliability Engineering (SRE)

SLA



SERVICE LEVEL AGREEMENT

the agreement you make with your clients or users

SLOs



SERVICE LEVEL OBJECTIVES

the objectives your team must hit to meet that agreement

SLIs



SERVICE LEVEL INDICATORS

the real numbers on your performance



ONE DOES NOT SIMPLY DO

SRE



Modern cloud native systems are no longer simple!

- CI/CD
- Production
- Staging



Operations at scale



- Configuration complexity
- Duplication
- Many parties involved
- Configuration drift



**Maintenance is
difficult**

Spaghetti Automation





**Observability
is a must**



Monitoring

 Prometheus CNCF Graduated		 cortex CNCF Incubating		 OPENMETRICS CNCF Incubating		 Thanos CNCF Incubating		 Amazon CloudWatch	 APPDYNAMICS	 Application High Availability Service	 Newrelic Applications Manager
 beats	 blumatador	 catchpoint	 centreon	 checkmk	 chronosphere	 CloudHealth	 DATADOG	 dynatrace	 epsagon	 Falcon	 FLUENTD
 FONIO	 Google Stackdriver	 Gradle	 Grafana	 Mimir	 graphite	 Honeybadger	 ICINGA	 influxdata	 INSTANA	 IRONdb	 kiali
 kuberhealthy	 LeanIX	 LogicMonitor	 logz.io	 M3	 mackerel	 Nagios	 NETDATA	 Netis	 New Relic	 NexClipper	 Nightingale
 NODESOURCE	 Opentext	 opstrace	 OverOps	 PIXIE	 replex	 ROOKOUT	 Sensu	 SENTRY	 SignalFx	 Skooner	 SOSIO
 StackState	 sysdig	 Tencent Cloud Logo	 trickster	 VECTOR By Timber.io	 VICTORIA METRICS	 virtasant	 WAVEFRONT by VMware	 weave cloud	 weave scope	 WhaTap	 ZABBIX



Open Observability Standards



OpenSLO

cloudevents



OPEN METRICS



Open Observability Standards... **and Implementations**



Prometheus



Thanos



OPEN METRICS



JAEGER



cortex

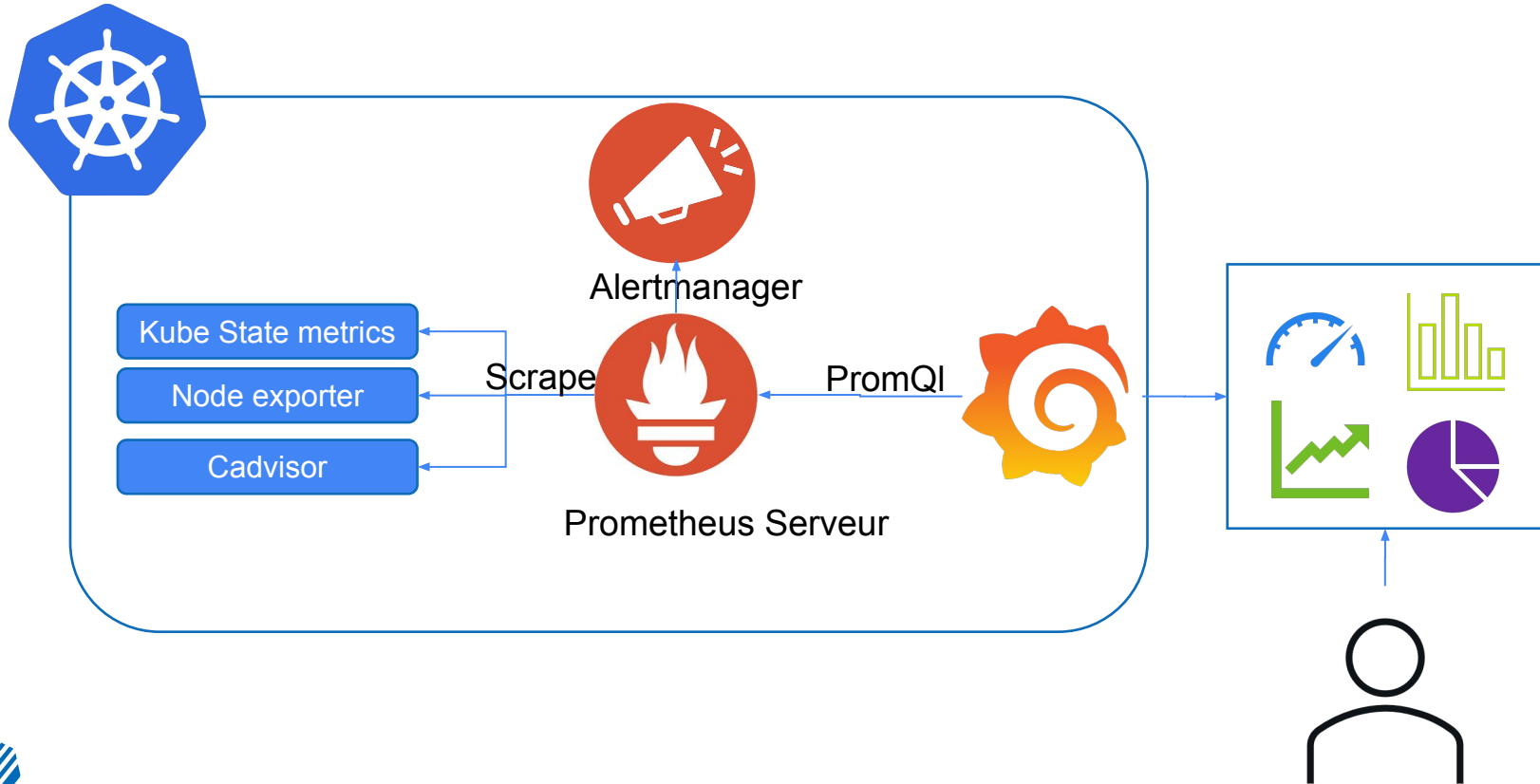


Grafana





Architecture of Prometheus



TOO MUCH DYNATRACE DATA?

GOOD



Got Data? Act On It!



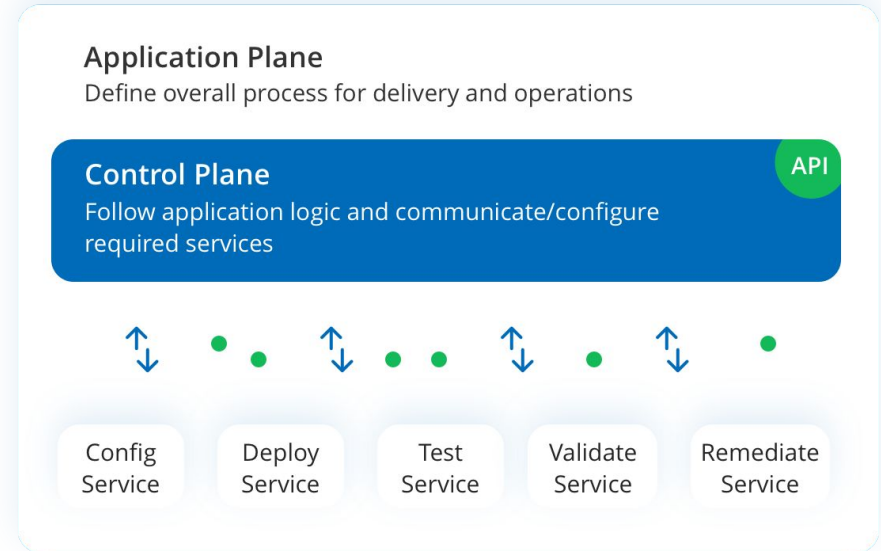
Getting Observability to the next stage

With Keptn



Keptn in other words ...

Observability-driven orchestration for your cloud native apps



<https://keptn.sh>



Keptn makes SRE easier



Taras Tsugrii • 1st

Software Engineer, Coach, Mentor, Host and Organizer of Performance Summit an...

1mo • 

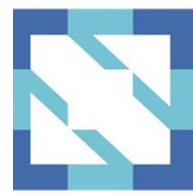
Keptn feels like a reference implementation of Google's "Site Reliability Engineering" and "The Site Reliability Workbook" books, so it's been an absolute pleasure to learn more about it from [Andreas Grabner](#) himself! I'm looking forward to seeing it establishing standards for such important concepts like SLI, SLO and remediation strategy.

[#keptn](#) [#continuousdelivery](#) [#sre](#)



Keptn

- CNCF Sandbox project
- Control plane, admin frontend/CLI
- Observability, dashboards & alerting
- SLO-driven multistage delivery
- Operations & remediation



**CLOUD NATIVE
COMPUTING
FOUNDATION**



<https://keptn.sh>

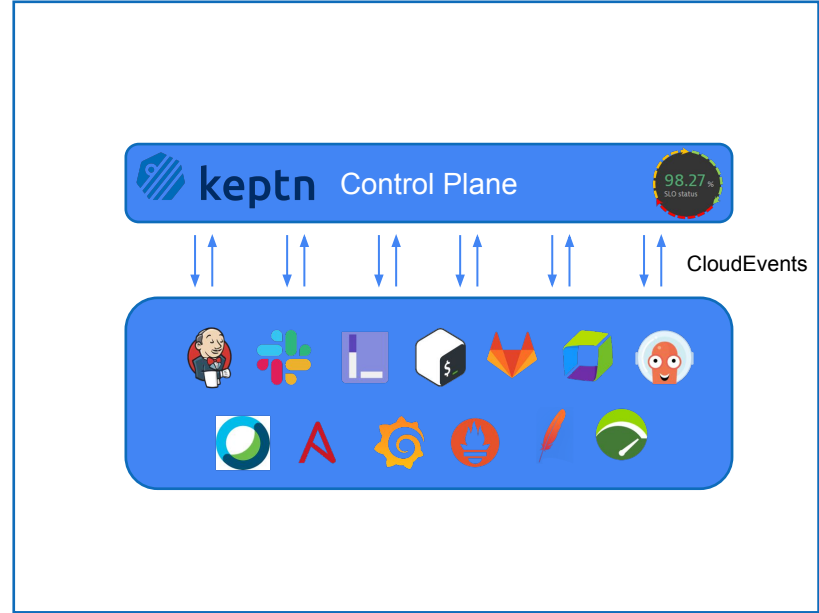
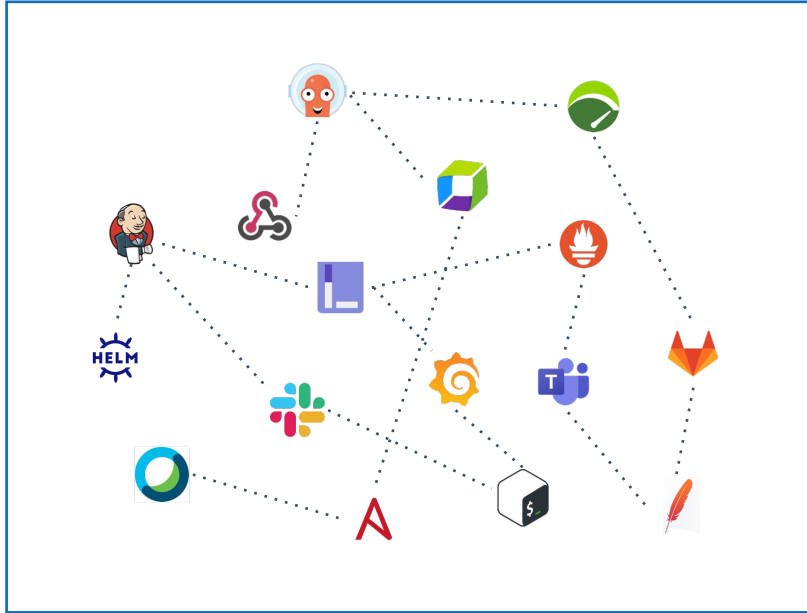


ONE PLATFORM



TO ORCHESTRATE THEM ALL

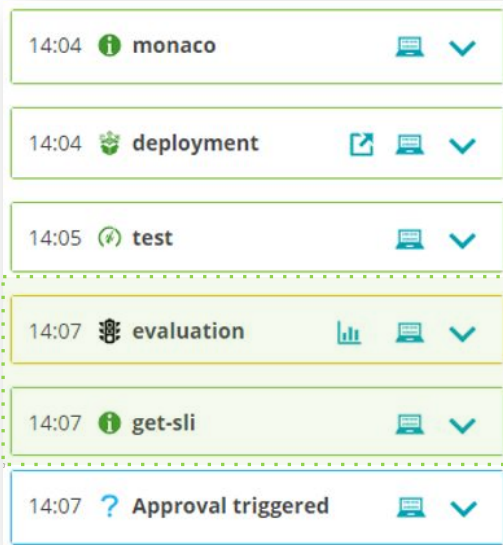
Automated Data-Driven Orchestration of all your tools



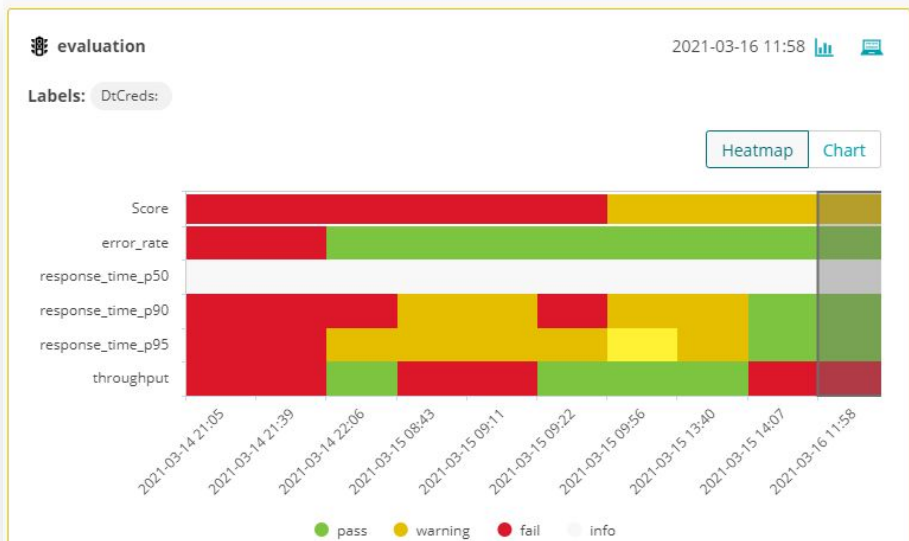
SLOs (queried from Observability) are in the core of Keptn



Orchestration sequences



Orchestration, monitoring, deployment, test, evaluation of SLOs

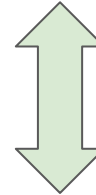


Keptn integrates with other tools

CLI / REST API



cloudevents



cloudevents



Integration services
(a.k.a. plugins)



Keptn Adopters

NTT Data

IVM
www.ivm.at



**Raiffeisen
Software**



3 Banken IT



T-Systems



ERT
Confidence at every turn™

CITRIX

 **Neotys**

Mediro ICT

(x) matters



 **SEC4YOU**

TIMEWARP
INFORMATION TECHNOLOGIES

 **dynatrace**



Keptn Use-Cases



Keptn use-case #0
IFTTT for operations

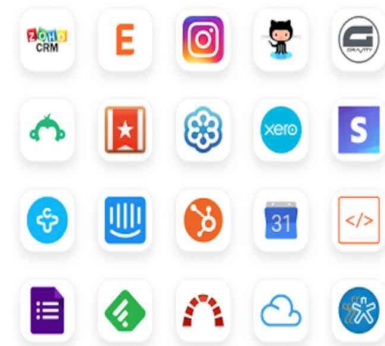




SLO Evaluation & Monitoring

Auto-remediation

Notifications



4,000+ apps



- Shipyard.yaml
- Internal Pipeline Engine
- Manual triggering
- Triggering on events

40 lines (40 sloc) | 1.11 KB

```
1  apiVersion: "spec.keptn.sh/0.2.0"
2  kind: "Shipyard"
3  metadata:
4    name: "shipyard-sockshop"
5  spec:
6    stages:
7      - name: "hardening"
8        sequences:
9          - name: "delivery"
10           tasks:
11             - name: "deployment"
12               properties:
13                 deploymentstrategy: "user_managed"
14             - name: "test"
15               properties:
16                 teststrategy: "performance"
17             - name: "evaluation"
18          - name: "production"
19            sequences:
20              - name: "delivery"
21                triggeredOn:
22                  - event: "hardening.delivery.finished"
23                tasks:
24                  - name: "deployment"
25                    properties:
26                      deploymentstrategy: "user_managed"
27                  - name: "release"
28              - name: "remediation"
29                triggeredOn:
30                  - event: "production.remediation.finished"
31                selector:
32                  match:
33                    evaluation.result: "fail"
34              tasks:
35                - name: "get-action"
36                - name: "action"
37                - name: "evaluation"
38                  triggeredAfter: "2m"
39                properties:
40                  timeframe: "2m"
```



Keptn sequences are extensible

The screenshot shows the Artifact Hub search results for 'Keptn'. The search bar at the top contains 'Keptn' and the results are sorted by 'Relevance'. The page displays 21 results, with the first 20 shown. The results are organized into a grid of cards, each representing a different Keptn package or integration. Each card includes the package name, origin (Keptn), repository (Keptn integrations), version, license, and a brief description. The cards also feature icons for 'Verified Publisher' and 'Images Security Rating'.

Filters:

- Official:** Official Verified publishers
- KIND:** Keptn integrations (15) Helm charts (5)
- CATEGORY:** Database Integration and Delivery Logging and Tracing Machine learning Monitoring Networking Security Storage Streaming and Messaging Web applications
- PUBLISHER:** Keptn (19) Artifact Hub (1) ntlshim (1)
- REPOSITORY:** Keptn Integrations (15) Keptn (3) Artifact Hub (1) Azure Orkestra (1)

Search Results:

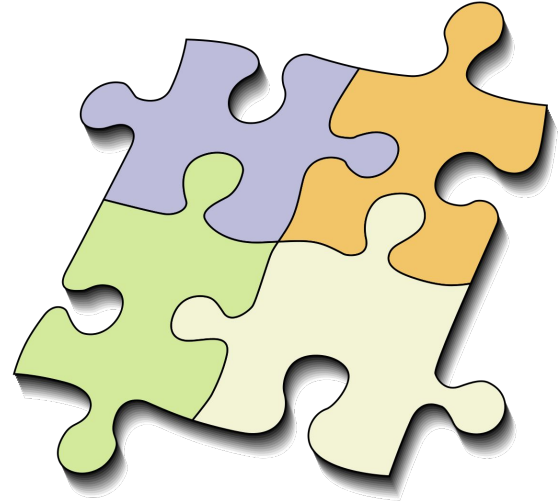
- keptn**
ORG: Keptn REPO: Keptn
VERSION: 0.12.0-nex... APP VERSION: 0.12.0-nex...
A Helm chart for Kubernetes
Updated 5 days ago
Verified Publisher Images Security Rating
- keptn-addons**
USER: ntlshim REPO: Azure Orkestra
VERSION: 0.1.0 APP VERSION: 1.0.0
A Helm chart for Keptn add-ons like Keptn job-executor-service, prometheus-service, etc.
Updated 3 months ago
Images Security Rating
- Argo Service**
ORG: Keptn REPO: Keptn integrations
VERSION: 0.8.4 LICENSE: Apache-2.0
Keptn service for Argo CD - Declarative GitOps CD for Kubernetes.
Updated 6 months ago
Verified Publisher
- Artillery Service**
ORG: Keptn REPO: Keptn integrations
VERSION: 0.3.1 LICENSE: Apache-2.0
Keptn service for artillery.io load testing tool.
Updated 6 months ago
Verified Publisher
- Dynatrace Service**
ORG: Keptn REPO: Keptn integrations
VERSION: 0.18.1 LICENSE: Apache-2.0
Keptn service that forwards Keptn events - occurring during a delivery workflow - to Dynatrace.
Updated a month ago
Verified Publisher
- GitHub Actions Webhook Integration**
ORG: Keptn REPO: Keptn integrations
VERSION: 0.1.0 LICENSE: Apache-2.0
This integration shows how to invoke GitHub Action workflows leveraging Keptn's webhook service.
Updated a month ago
Verified Publisher
- Jenkins Shared Library**
ORG: Keptn REPO: Keptn integrations
VERSION: 5.1.2 LICENSE: Apache-2.0
Jenkins shared library for integrating Keptn Use Cases with your Jenkins Pipelines
Updated 21 days ago
Verified Publisher
- Jira Service**
ORG: Keptn REPO: Keptn integrations
VERSION: 0.8.5 LICENSE: Apache-2.0
Keptn service for creating JIRA tickets upon problems and quality.
Updated 21 days ago
Keptn integration

https://artifacthub.io/packages/search?ts_query_web=Keptn



Extensions

- Integration services (a.k.a plugins)
- Job Executor Service steps
- Webhook service steps



keptn-contrib/job-executor-service



 11
Contributors

 16
Issues

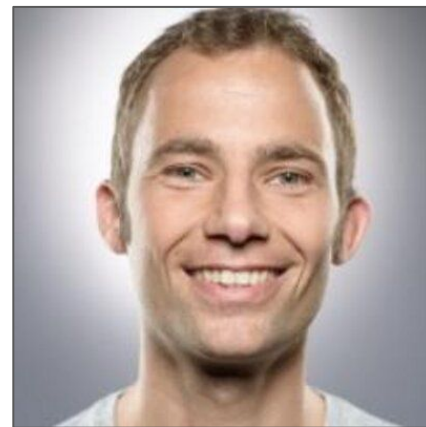
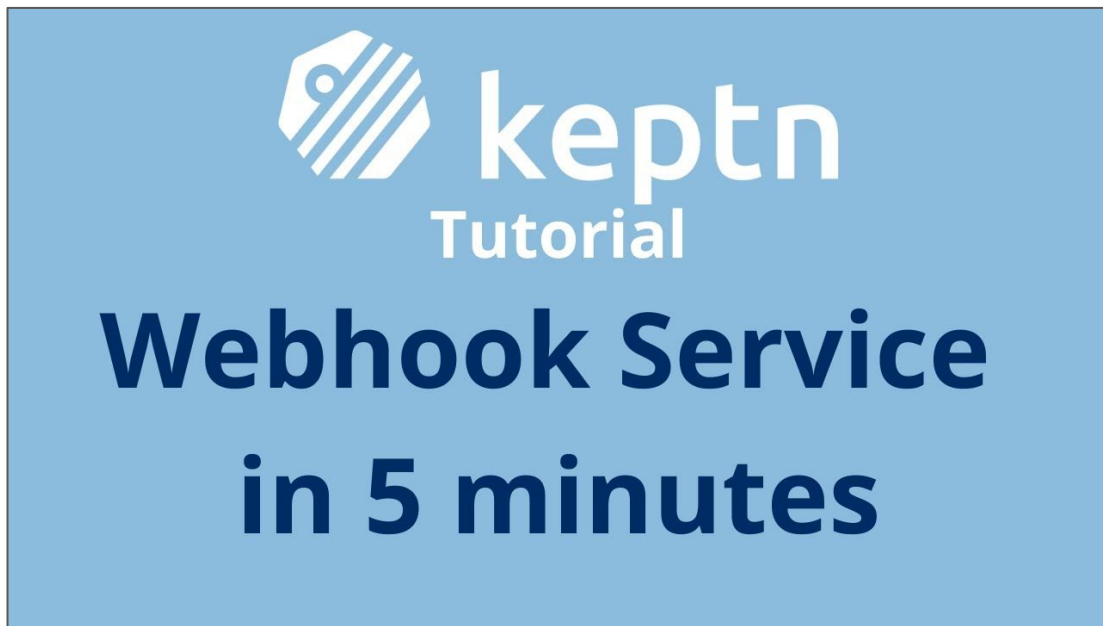
 1
Discussion

 6
Stars

 7
Forks



Webhook Service



[youtube.com/watch?v=0vJS7ecayGw](https://www.youtube.com/watch?v=0vJS7ecayGw)

https://artifacthub.io/packages/search?ts_query_web=Keptn



Example: Zapier Webhook Integration

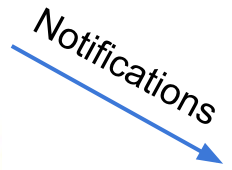


**Metrics / SLI
Providers**

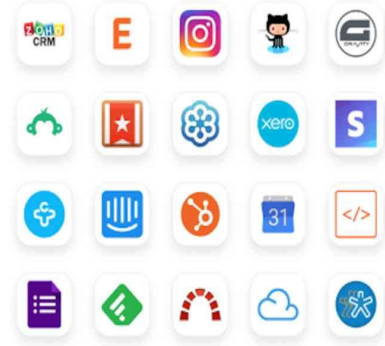
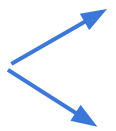


keptn

SLO Evaluation &
Monitoring



zapier



https://artifacthub.io/packages/search?ts_query_web=Keptn



Keptn use-case #1

SLO Monitoring





**Metrics / SLI
Providers**

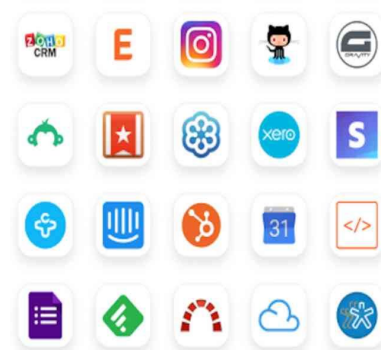


keptn

SLO Evaluation &
Monitoring

Auto-remediation

Notifications



sli.yml

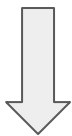
```
8 lines (8 sloc) | 748 Bytes

1 ---
2 spec_version: '1.0'
3 indicators:
4   http_response_time_seconds_main_page_sum: sum(rate(http_server_request_duration_seconds_sum{method="GET",route="/",status_code="200",jo
5   failing_request: promhttp_metric_handler_requests_total{code!="200",job="$SERVICE-$PROJECT-$STAGE"})
6   http_requests_total_success: http_requests_total{status="success",job="$SERVICE-$PROJECT-$STAGE"})
7   go_routines: go_goroutines{job="$SERVICE-$PROJECT-$STAGE"}
8   request_throughput: sum(rate(http_requests_total{status="success",job="$SERVICE-$PROJECT-$STAGE"}[$DURATION_SECONDS]))
```

<https://github.com/keptn/examples/blob/master/quickstart/demo/prometheus/sli.yml>



sli.yml



slo.yml

<https://github.com/keptn/examples/blob/master/quickstart/demo/slo.yaml>

35 lines (35 sloc) | 737 Bytes

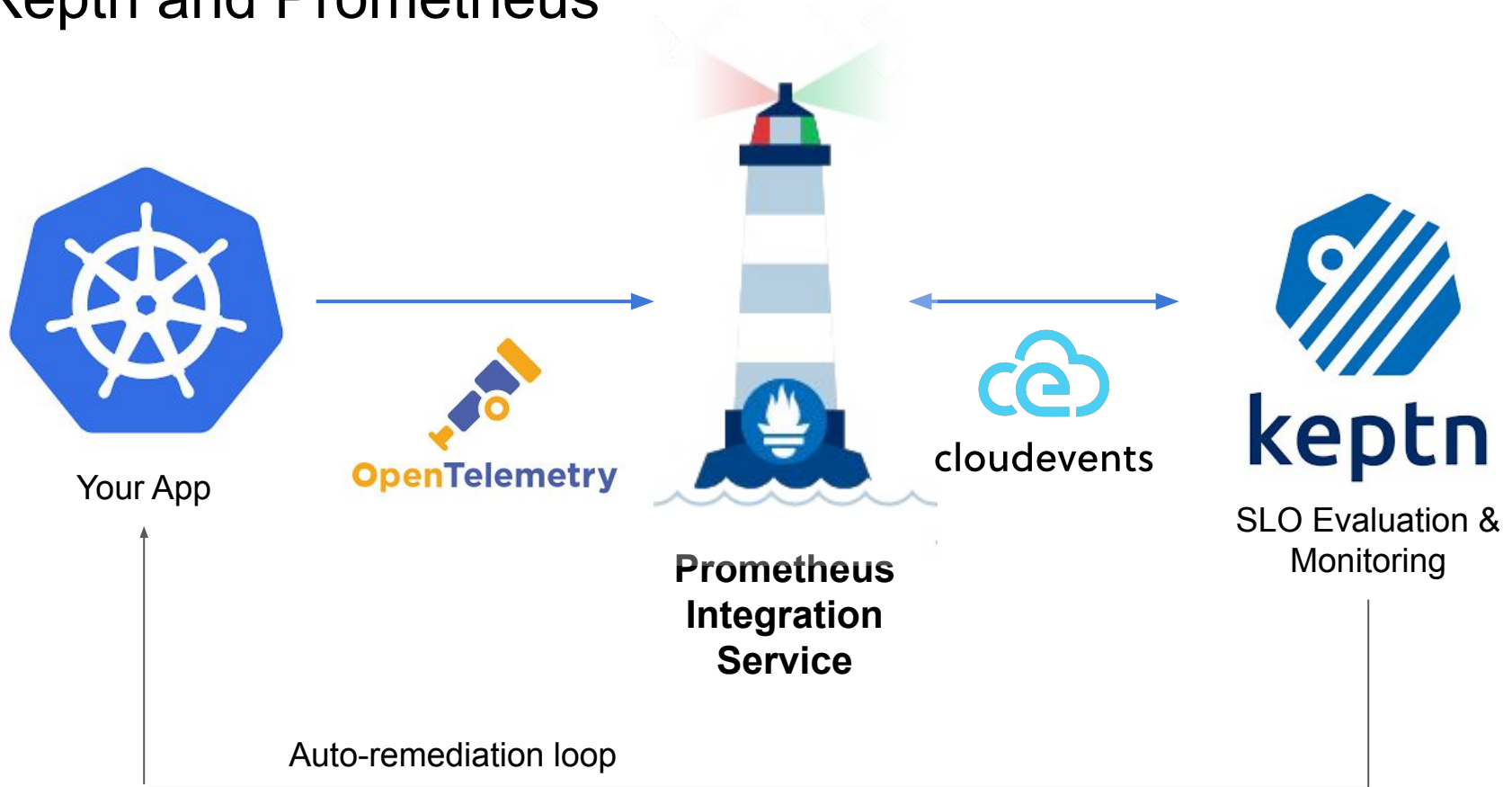
```
1 ---
2 spec_version: '0.1.0'
3 comparison:
4   compare_with: "single_result"
5   include_result_with_score: "pass"
6   aggregate_function: avg
7 objectives:
8   - sli: http_response_time_seconds_main_page_sum
9     displayName: "HTTP Response Time"
10    pass:
11      - criteria:
12        - "<=0.4"
13      warning:
14        - criteria:
15          - "<=0.1"
16    - sli: request_throughput
17      displayName: "Request Throughput"
18      pass:
19        - criteria:
20          #- "<=+100%"
21          - ">=-80%"
22    - sli: go_routines
23      displayName: "Go Routines"
24      key_sli: true
25      pass:
26        - criteria:
27          - "<=30"
28    - sli: failing_request
29      displayName: "Failing Requests"
30      pass:
31        - criteria:
32          - "<10"
33 total_score:
34   pass: "90%"
35   warning: "75%"
```

Keptn use-case #2

Auto-remediation



Keptn and Prometheus



Auto-remediation in Keptn

- Triggered on failing SLO evaluation
- Remediation.yml

```
17 lines (17 sloc) | 425 Bytes
1  apiVersion: spec.keptn.sh/0.1.4
2  kind: Remediation
3  metadata:
4    name: carts-remediation
5  spec:
6    remediations:
7      - problemType: out_of_memory
8        actionsOnOpen:
9          - action: restart
10            name: restart
11              description: Restart Pod
12      - problemType: response_time_p90
13        actionsOnOpen:
14          - action: scaling
15            name: scaling
16              description: Scale up
17            value: "1"
```



Auto-remediation in Keptn

- Triggered on failing SLO evaluation
- Remediation.yml
- Auto-remediation definition in shipyard.yml
- Triggered by events

```
28     - name: "remediation"
29       triggeredOn:
30         - event: "production.remediation.finished"
31           selector:
32             match:
33               evaluation.result: "fail"
34       tasks:
35         - name: "get-action"
36         - name: "action"
37         - name: "evaluation"
38           triggeredAfter: "2m"
39         properties:
40           timeframe: "2m"
```



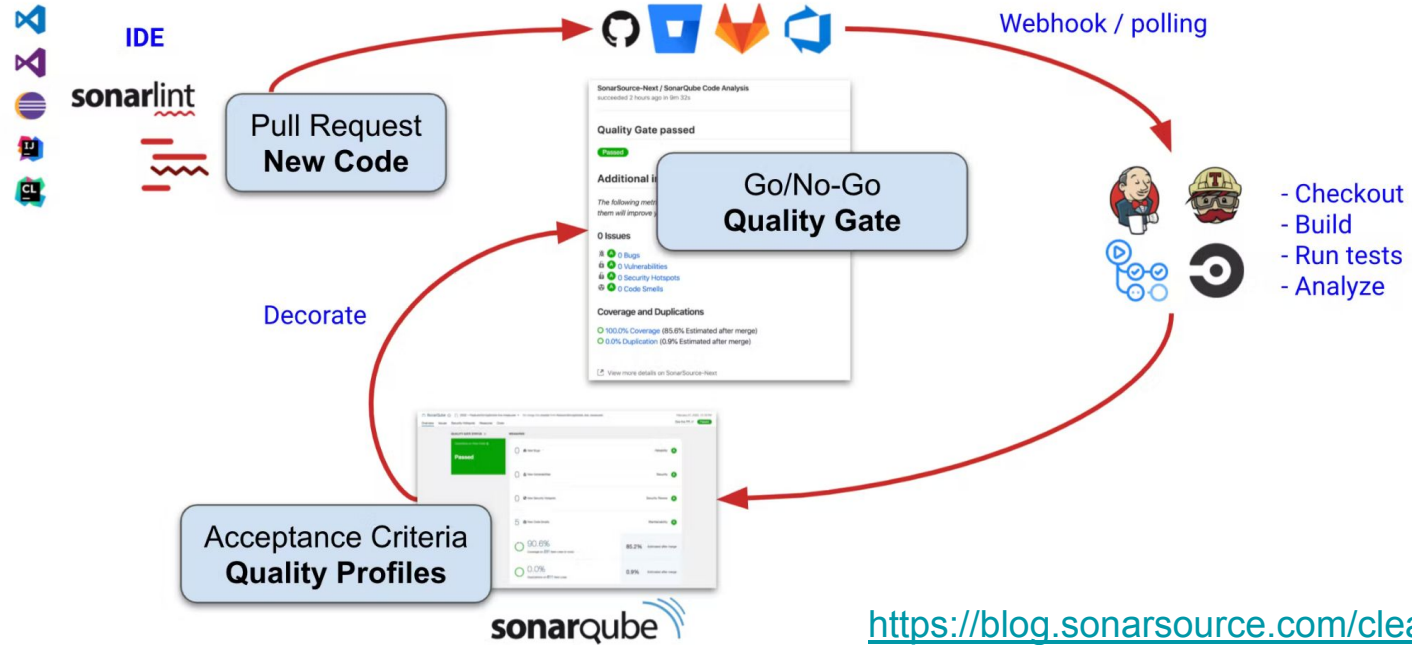
Keptn use-case #3

Embedding Keptn in your pipelines



Quality Gates. Example

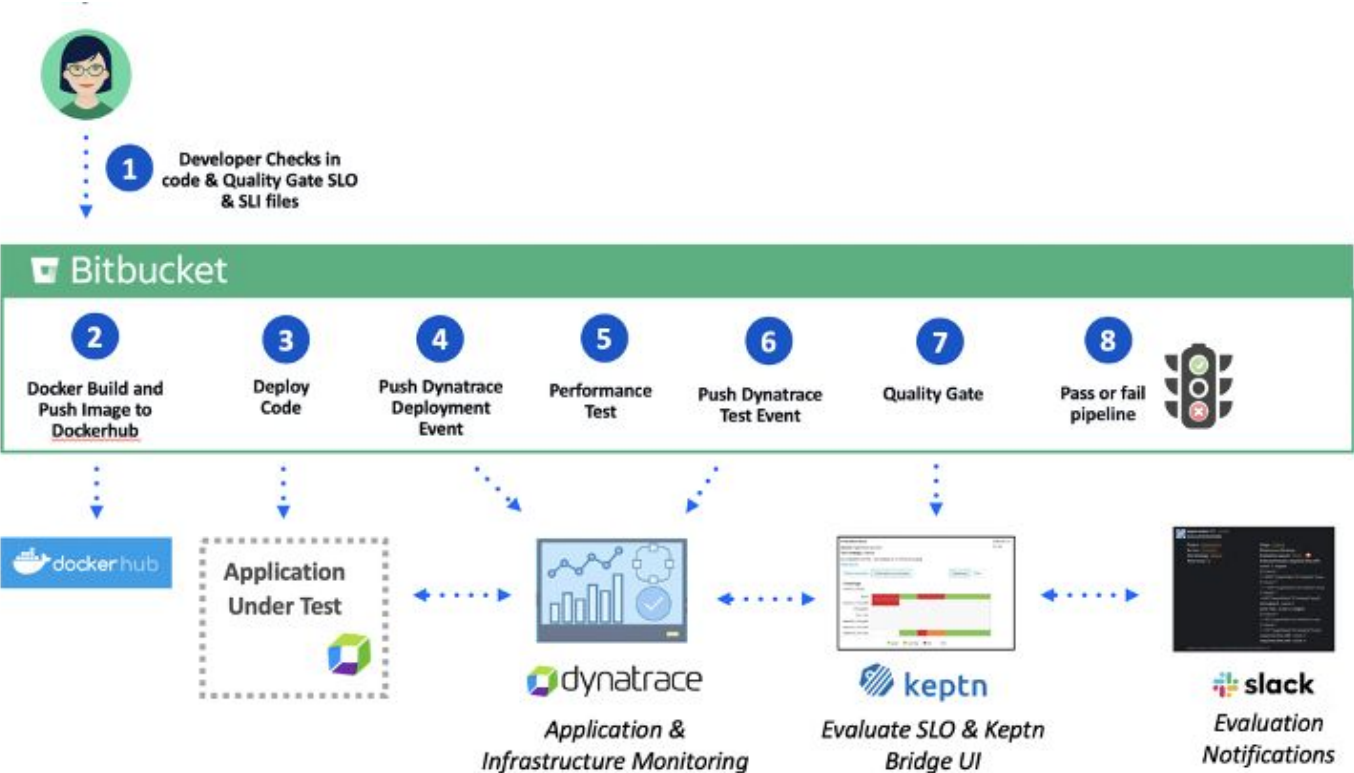
SonarQube Pull Request Analysis Workflow



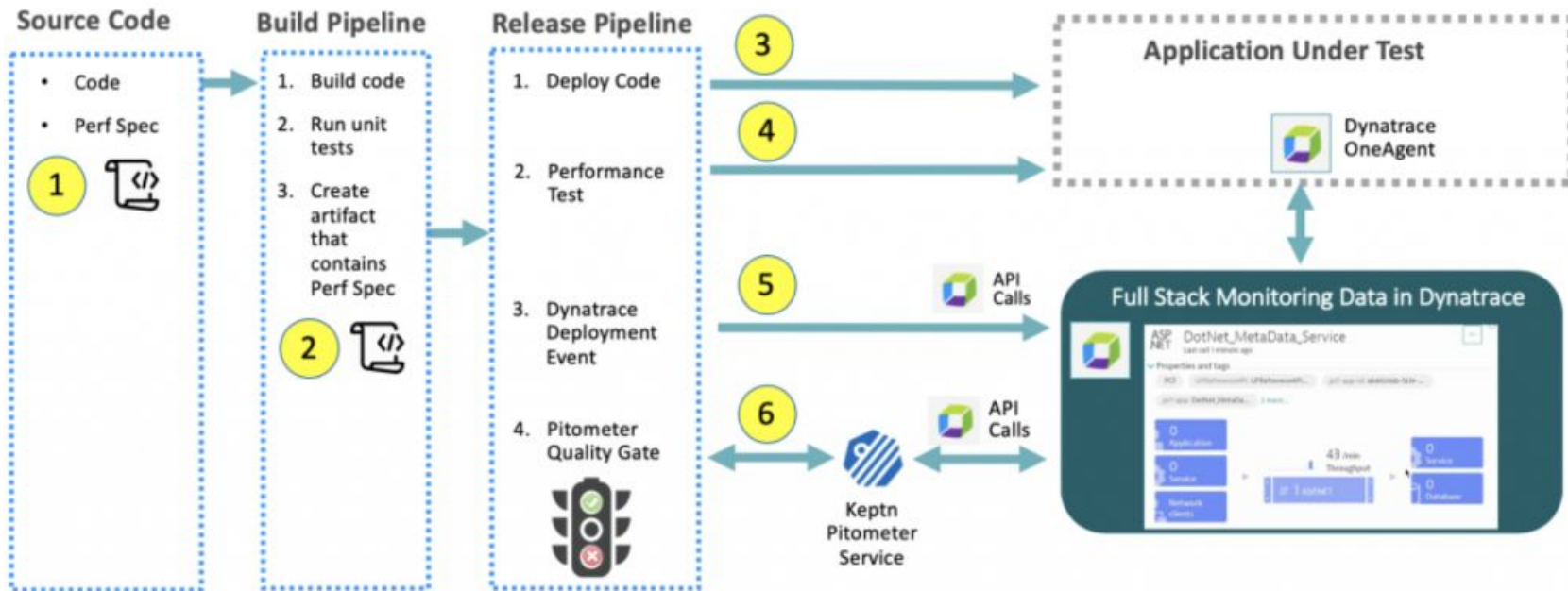
https://blog.sonarsource.com/clean_coding-quality_profile_quality_gate_guidance



Example. Quality Assurance



Quality gates with Keptn: Real life example



<https://cloudblogs.microsoft.com/opensource/2019/06/11/five-steps-add-automated-performance-quality-gates-azure-devops-pipelines/>



Keptn use-case #4

Drive your pipelines

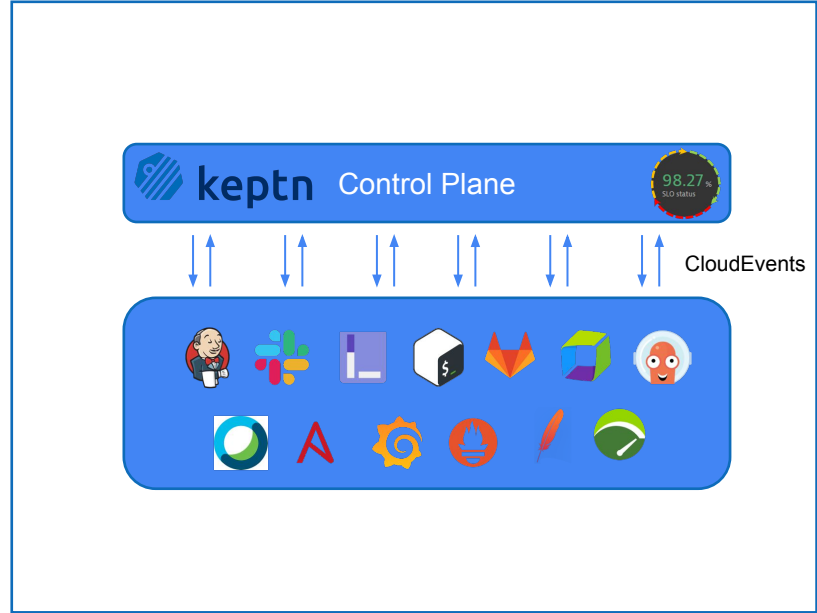
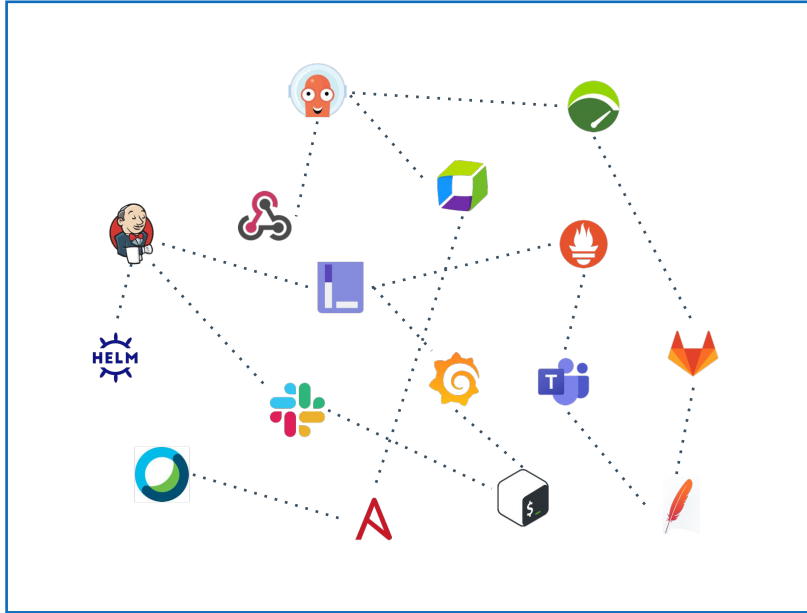


ONE PLATFORM



TO ORCHESTRATE THEM ALL

Data-Driven Orchestration of your tools



Story time!



keptn
User group meeting

Cloud Native Delivery with Keptn

Breaking down your monolithic Jenkins pipeline



Rene Forstner
NTT DATA



Oleg Nenashev
Dynatrace

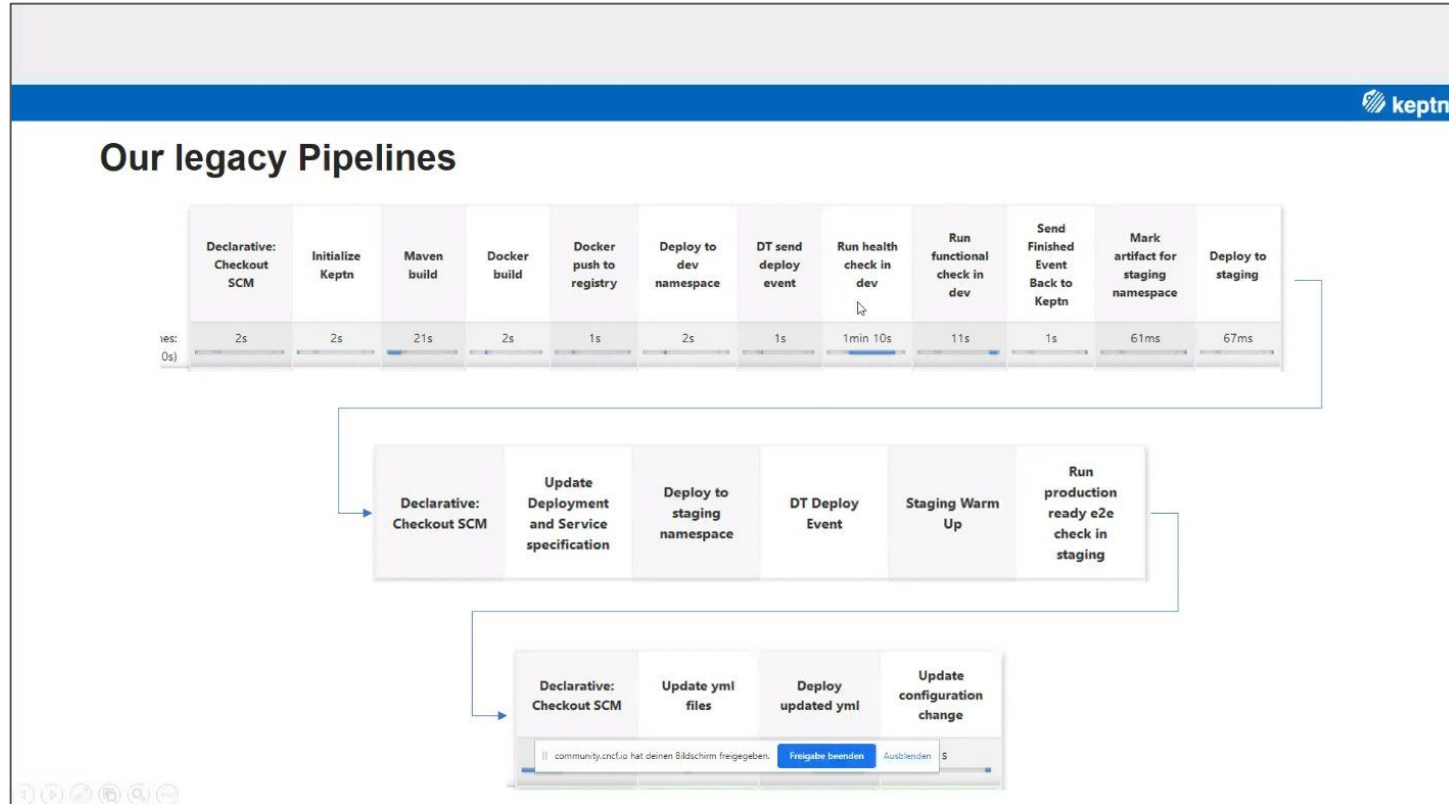
April 19, 2022
3PM UTC

youtube.com/watch?v=9yCahPW7s8U

community.cncf.io/events/details/cncf-keptn-community-presents-keptn-office-hours-at-kubecon-cloud-native-con/



Story by NTT Data



Story by NTT Data

Jenkins orchestrated through keptn

Labels: buildId: 13 buildNumber: 13 jobname: sockshop/carts.build

20:27 **delivery**

Labels: buildId: 13 buildNumber: 13 jobname: sockshop/carts.build

20:27 **deployment**

Labels: buildId: 13 buildNumber: 62 jobname: sockshop/carts.deploy

20:27 **test**

Labels: buildId: 13 buildNumber: 79 jobname: sockshop/carts.test

20:28 **evaluation** 75%

Labels: buildId: 13 buildNumber: 79 jobname: sockshop/carts.test

Declarative: Checkout SCM Initialize Keptn Maven build Docker build Docker push to registry Trigger keptn Delivery Sequence

Declarative: Checkout SCM Initialize Keptn Update SLI/SLO Deploy to namespace Run health check Send Finished Event Back to Keptn

Declarative: Checkout SCM Initialize Keptn Update SLI/SLO Warm up Mark Test Start Time Run Performance Test Evaluate Build with Keptn

Load Testing Request Throughput: 1.05k /min

Load Distribution by Test Step

community.on/fis hat deinen Bildschirm folgegeben. Frage die beenden Ausblenden



Story by NTT Data

The screenshot displays the AWS Cloud Automation console for a pipeline named 'sockshop'. The interface is divided into several sections:

- Left Sidebar:** Contains navigation options for Service (carts), Stage (dev, staging, production), Sequence (delivery), and Status (Active, Failed, Aborted, Succeeded).
- Main Content Area:** Shows a list of pipeline runs. The top run is highlighted in red, indicating a failure. It shows a 'delivery' stage that failed at 16:47. Below this, other runs are shown as 'aborted' or 'failed'.
- Right Panel:** Provides a detailed view of the selected pipeline run. It shows the 'delivery' stage starting at 16:47 and failing. The 'deployment' stage also failed at 16:47. The 'test' stage failed at 16:47. The 'evaluation' stage succeeded at 16:49. The 'get-ali' stage failed at 16:49. The pipeline run ended at 16:51 with the message 'shinyard-control finished with result: pass'.

At the bottom of the console, there is a notification: 'community:snf1e has deleted Bidachim Folgegepost. Prognose beenden Ausblenden'. The system clock at the bottom right shows the date and time as 18:12 on 18.04.2022.



Thank you,
Keptn Obvious!



keptn.sh

Takeaways

- Keptn - Data-driven delivery and operations for **YOUR** cloud native apps
- Keptn is not a CI/CD tool
- Keptn is not just for quality gates
- Evaluating quality gates is important in software development
- Keptn can help with automating quality gates!











Come aboard!

Quickstart (K3D, K8s)

[keptn.sh/docs/
quickstart](https://keptn.sh/docs/quickstart)

Tutorials:

- Prometheus
- Dynatrace
- ArgoCD
- Jenkins
- Soon: Datadog

Quickstart: Keptn and Prometheus Shows how to get started with Keptn and Prometheus in 30 minutes 30 min Level: introduction Updated Nov 12, 2020  Start	Keptn Full Tour on Prometheus Full Keptn installation on a Kubernetes cluster (GKE recommended) 86 min Level: advanced Updated Nov 19, 2021  Start	
Keptn Full Tour on Dynatrace Full Keptn installation on a Kubernetes cluster (GKE recommended) 104 min Level: advanced Updated Nov 19, 2021  Start	Keptn Multi Stage Delivery with Argo Rollouts and Dynatrace on k3s 5 minute installation. All running on K3s with a single line installation. No Kubernetes cluster needed. 34 min Level: introduction Updated Dec 17, 2021  Start	Keptn Quality Gates with Dynatrace using k3s 5 minute installation. All running on K3s with a single line installation. No Kubernetes cluster needed. 36 min Level: introduction Updated Nov 19, 2021  Start
Keptn Quality Gates with Prometheus 5 minute installation. All running on K3s with a single line installation. No Kubernetes cluster needed. 17 min Level: introduction Updated Nov 19, 2021  Start	Keptn in a Box 5 minute installation. All running on MicroK8s with a single line installation. No Kubernetes cluster needed. 36 min Level: introduction Updated Nov 19, 2021  Start	Multi-stage delivery with Quality Gates using Prometheus and Podtato-head application Full Keptn installation on a Kubernetes cluster (GKE recommended) 57 min Level: advanced Updated Nov 19, 2021  Start



More about Keptn

Techworld with Nana,
March 2022



<https://www.youtube.com/watch?v=3EEZmSwMXp8>



Participating in Keptn

- We are looking for users and contributors!
- keptn.sh/community/contributing
 - K8s, Golang, Javascript, Documentation, etc.
 - SRE and Operations
- We participate in Google Summer of Code
- Slack: keptn.sh/community/#slack





Keptn

100% OFF*

** unlimited offer*



**BLACK
FRIDAY**

Get it at keptn.sh!!!

QUESTIONS?

Contacts:

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 GitHub [oleg-nenashev](https://github.com/oleg-nenashev)

 Twitter: [@oleg_nenashev](https://twitter.com/oleg_nenashev)

