Prometheus

scripts/deploy

REPOS

github.com/GhostX94/prometheus

github.com/grobie/prometheus-on-kubernetes

Monitoring Kubernetes with Prometheus

Isaac Rubio T, Jul 2018

Bootkube or Minikube

scripts/deploy

Prometheus

Monitoring system and time series database

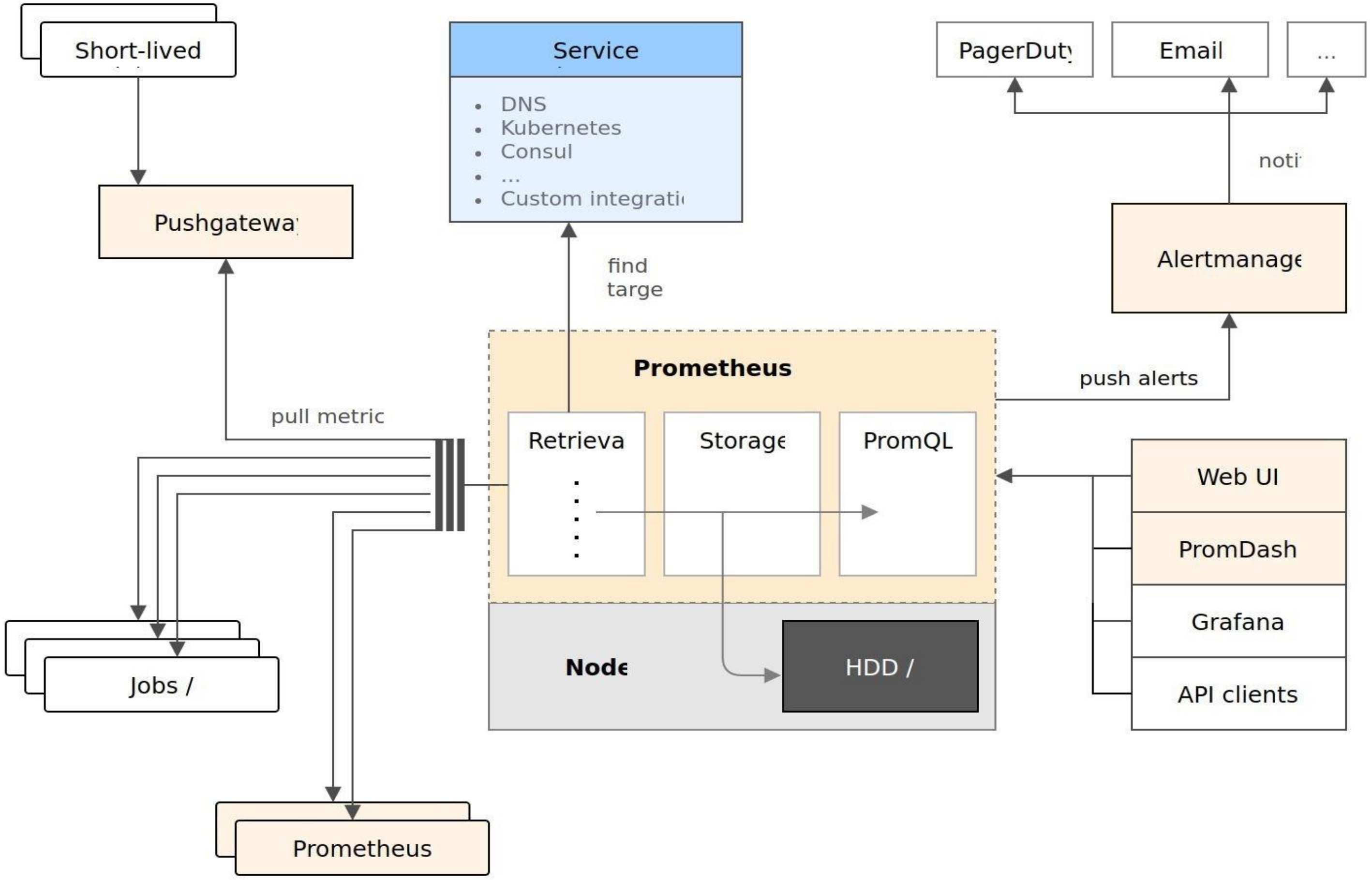
Motivation

- Microservice architecture
  - Many more services than in traditional host-based monitoring
  - Short lifecycles
  - Heterogeneous workloads
- Insight
  - Detailed (instance/endpoint/version/... drilldown) and aggregated

(across a service) of everything (hardware to service)
    - Trends (act before something becomes a problem)
- Alerting
    - Symptom vs. Cause
    - Grouping, flexible silencing

scripts/deploy

Overview


Short-lived
Pushgatewa
Service
DNS
Kubernetes
Consul
...
Custom integrati
find
targe
PagerDuty
Email
...
noti
Alertmanage
push alerts
pull metric
Prometheus
Retrieva
Storage
PromQL
Node
HDD /
Web UI
PromDash
Grafana
API clients
Jobs /
Prometheus

Examples

```
# HELP etcd_store_writes_total Total number of writes seen
…
# TYPE etcd_store_writes_total counter
etcd_store_writes_total{action="compareAndDelete"} 2
etcd_store_writes_total{action="compareAndSwap"} 4016
etcd_store_writes_total{action="create"} 218
etcd_store_writes_total{action="set"} 5
```

scripts/deploy

```
count by(job)(up == 0) / count by(job)(up)
rate(etcd_store_writes_total{action="set"}[1m]))
sum
without(action)(rate(etcd_store_writes_total[1m]))
```

Configuration

```
# prometheus.yaml
prometheus.io/docs/operating/configuration/ global:
    # Settings applying to all jobs

scrape_configs:
    # Define different scrape jobs

Rules_files:
    # Load files specifying rules to pre-calculate
    expressions # as well as alerts.
```

Configuration

```
scrape_configs: - job_name:
etcd   static_configs:   -
targets: ["172.17.4.51:2379"]
```

scripts/deploy

```
- job_name: kube-
  components
  kubernetes_sd_configs:
  - role: endpoints
  relabel_configs:
- # Custom filtering and
  label mapping
```

Configuration

```
# continued relabel_configs: - action: keep
source_labels: [__meta_kubernetes_service_name]
```

```
regex: "kube-(.*)-prometheus-discovery" - action:
keep   source_labels:
[__meta_kubernetes_endpoint_port_name]   regex:
"prometheus" - action: replace   source_labels:
[__meta_kubernetes_service_name]   target_label:
job   regex: "(kube-.*)-prometheus-discovery"
```

Kubernetes

Container orchestration system **Domain objects**

scripts/deploy

- Pod
    - Group of one or more containers, share context and namespaces
    - Co-located and co-scheduled (allows for side-cars)
- Service
    - Logical set of Pods, stable access points
- Deployment
    - Declaration of the desired state (what to run, how to get there)
- Daemon / Pet / Replica sets
    - Definition of groups of pods (each node / stateful / stateless)
- ConfigMap
    - Configuration data / files (can be mounted in containers)

git checkout 1.setup

kubectl get nodes

Running Prometheus in Kubernetes

Installation and configuration

scripts/deploy

Running Prometheus

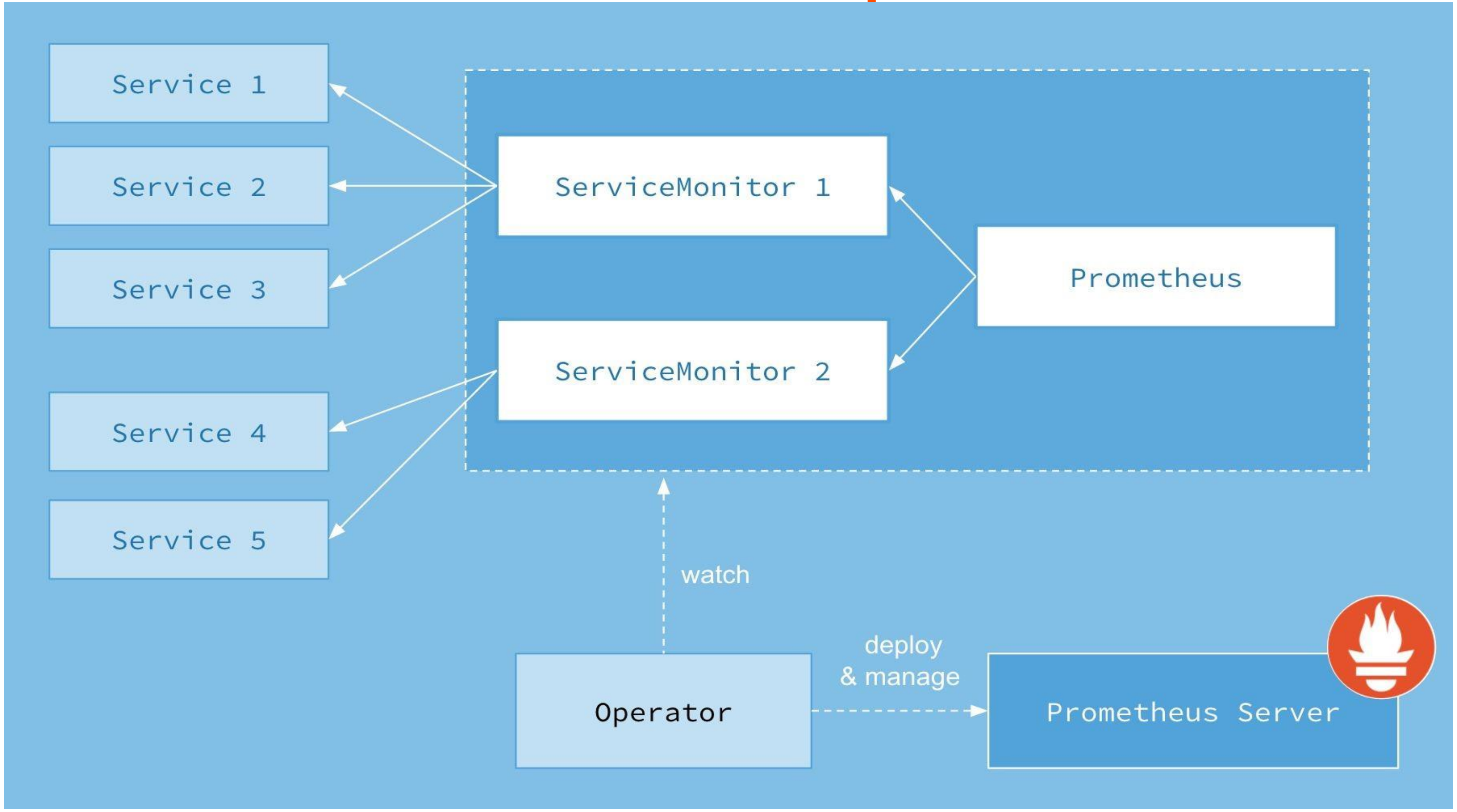
inside of Kubernetes

- What we need
  - Pod specification defining how to run Prometheus
  - Load and manage configuration
  - Service specification to access Prometheus on stable IP
- Options
  - Write own pod+service+petset+... manifests

- Kubernetes Helm chart in the making
  https://github.com/kubernetes/charts/pull/151
- CoreOS wrote an Operator managing Prometheus and its configuration: https://github.com/coreos/kube-prometheus
  https://coreos.com/blog/the-prometheus-operator.html

scripts/deploy

Prometheus Operator



```
git checkout 2.install-prometheus
```

Monitoring Kubernetes infrastructure

scripts/deploy

Configuration and discovery

git checkout 3.monitor-nodes git checkout 4.monitor-kubernetes

scripts/deploy

git checkout 5.install-grafana

Monitoring services in Kubernetes

scripts/deploy

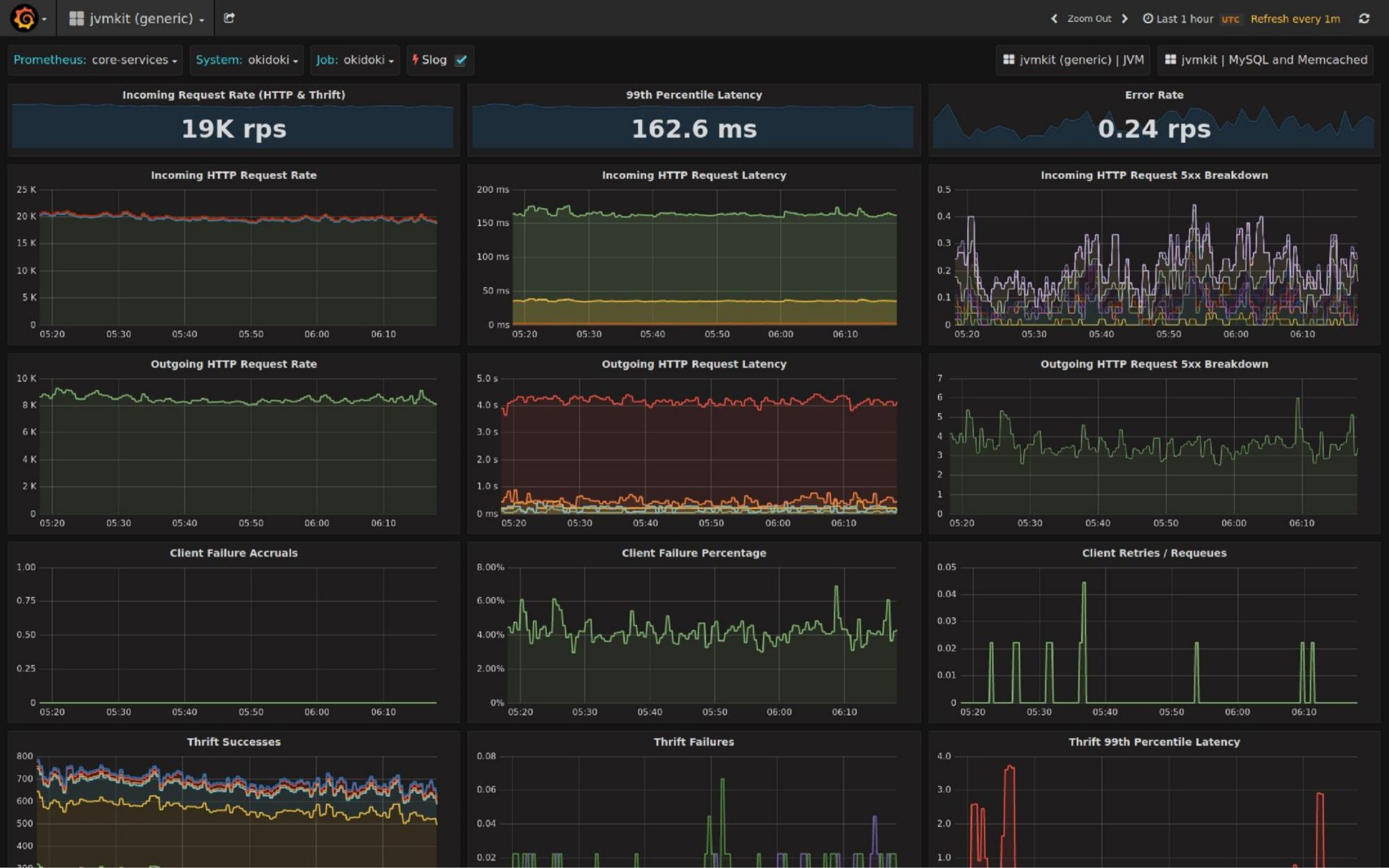
Configuration and discovery

git checkout 6.monitor-example-app

Practical examples

Queries and dashboards

git checkout 7.add-rules



jvmkit (generic)

Zoom Out | Last 1 hour UTC | Refresh every 1m

Prometheus: core-services | System: okidoki | Job: okidoki | Slog ✓

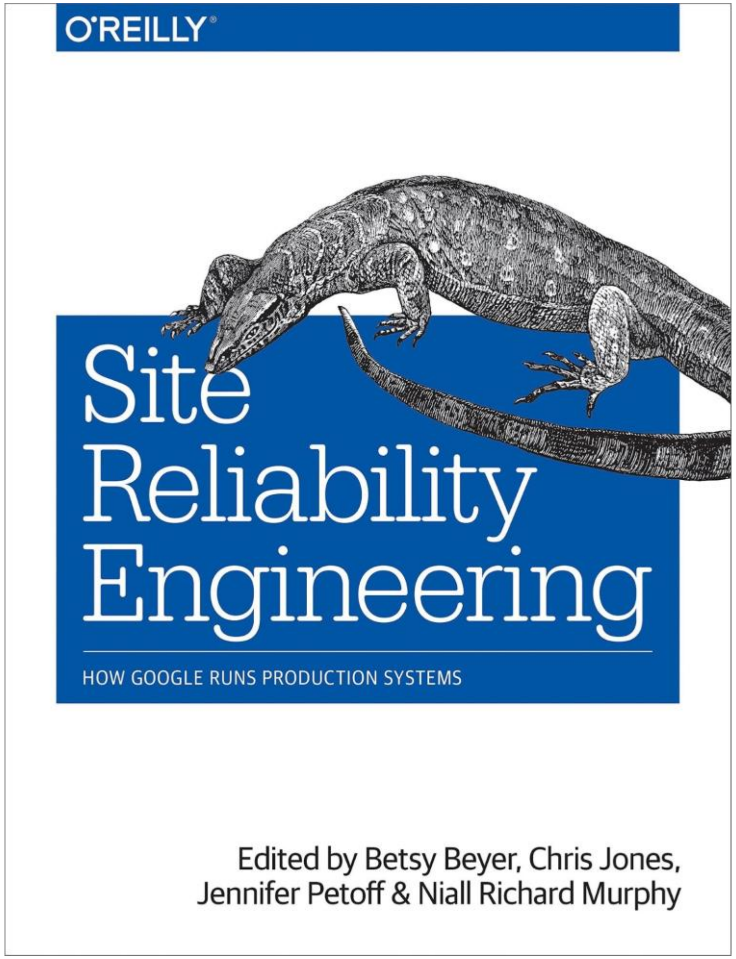
jvmkit (generic) | JVM | jvmkit | MySQL and Memcached

Incoming Request Rate (HTTP & Thrift): 19K rps

99th Percentile Latency: 162.6 ms

Error Rate: 0.24 rps

Further reading



O'REILLY

Site Reliability Engineering

HOW GOOGLE RUNS PRODUCTION SYSTEMS

Edited by Betsy Beyer, Chris Jones, Jennifer Petoff & Niall Richard Murphy

Thank you

Isaac