

Kubernetes Monitoring

Adfinis**sy**Group

Be smart. Think open source.

Kubernetes Monitoring

Monitoring dynamic environments

Monitoring Approaches

- Blackbox monitoring
- Whitebox monitoring

Blackbox Monitoring

Blackbox monitoring

Monitoring externally visible behavior

- Load
- Memory
- Diskspace
- Processes

Whitebox Monitoring

Whitebox monitoring

Monitoring application behavior

- Metrics representation of internal state
- Logs
- ...

Limitations

Blackbox monitoring

Can't provide detailed information the application

Whitebox monitoring

Information is only application specific

Big picture requires aggregation

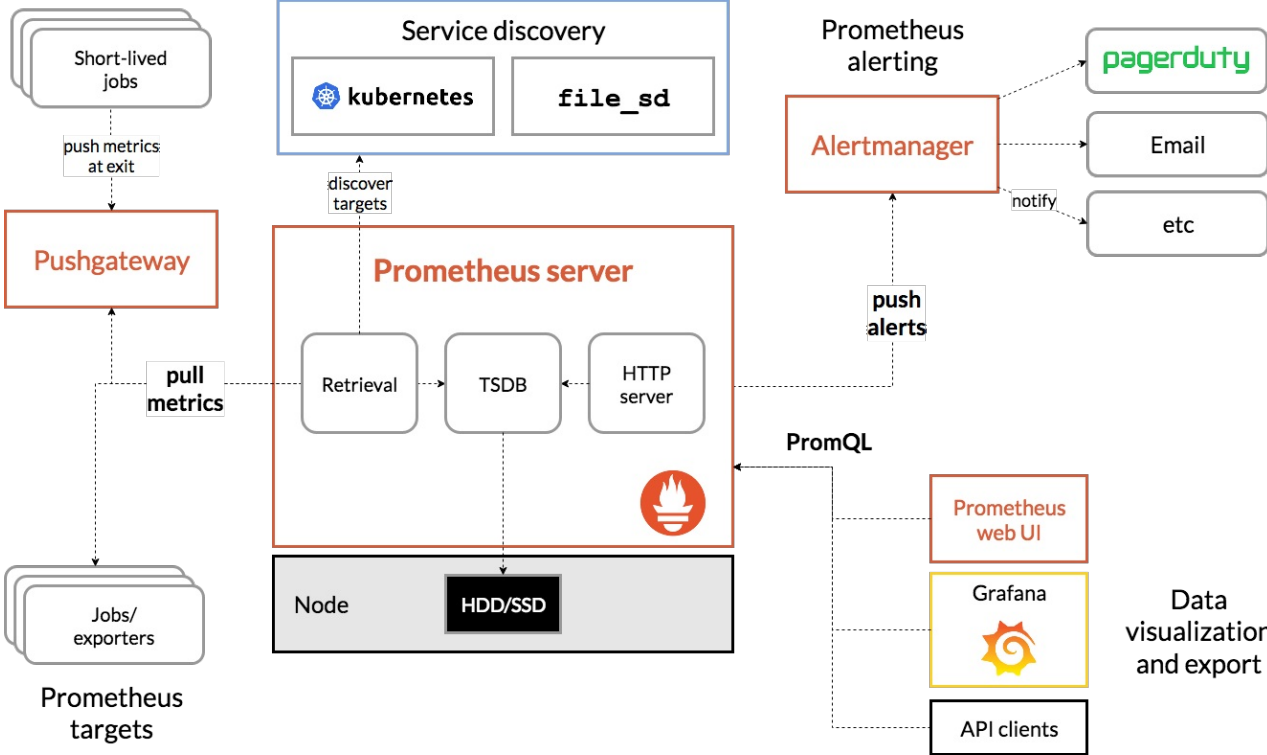
Prometheus

- de-facto standard for Kubernetes monitoring
- Time series database
- Alerting toolkit
- Query language to access time series data
- Service discovery for Kubernetes services

Prometheus Limitation

- Availability over accuracy
- No high-availability
- No distributed storage
- Pull based monitoring

Prometheus Architecture



Prometheus Data Format

Simple text based format

```
metric_name[label="value"] value timestamp
```

Each combination of `metric_name` and labels represents a time series.

```
# HELP http_requests_total The total number of HTTP requests.
# TYPE http_requests_total counter
http_requests_total[method="post",code="200"] 1027 1395066363000
http_requests_total[method="post",code="400"] 3 1395066363000

# A histogram, which has a pretty complex representation in the text format:
# HELP http_request_duration_seconds A histogram of the request duration.
# TYPE http_request_duration_seconds histogram
http_request_duration_seconds_bucket{le="0.1"} 33444
http_request_duration_seconds_bucket{le="0.5"} 129389
http_request_duration_seconds_bucket{le="1"} 133988
http_request_duration_seconds_bucket{le="+Inf"} 144320
http_request_duration_seconds_sum 53423
http_request_duration_seconds_count 144320
```

Prometheus Queries

How to query Prometheus time series

Prometheus Queries

Simple queries are similar to the data format

```
metric_name{label="value"}
```

The output is called instant vector, a single value for the current timestamp.

Prometheus Queries

Time series can be selected by labels

```
http_requests_total[namespace="default",service="wp-wordpress"]
```

Range vectors

A query can also requests all values within a timeframe

```
metric_name{label="value"}[5m]
```


Filters

Filters can be applied to vectors.

```
predict_linear(http_requests_total[namespace="default".service="wp-wordpress"][5m], 24*3600)
```

Alerting

Alerting Rules in Prometheus

Alert configuration

- Alerts are configured in Prometheus
- Prometheus sends alerts to Alertmanager
- Alertmanager triggers notifications

Alert definition

```
groups:  
- name: example  
rules:  
- alert: HighErrorRate  
  expr: http_requests_total{code=~"5[0-9][2]"} > 0  
  for: 10m  
  labels:  
    severity: page  
  annotations:  
    summary: "High error rate for {{ $labels.app }}"
```

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