@ThanosMetrics

Thanos

Highly available, pluggable and long term storage metrics for everyone

Wiard van Rij - {Buzzword} Engineer @ Fullstaq

Wiardvanrij

RijWiard

Wiard van Rij

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{buzzword} Engineer @ FULLSTAQ

- All things observability
- Love for OSS
- Kubernetes
- A little bit of hacking

Let’s start with Prometheus first

We want to go from something like this

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localhost:3000/metrics

```
# TYPE http_server_requests_total counter
# HELP http_server_requests_total The total number of HTTP requests handled by the Rack application.
http_server_requests_total{code="200",method="get",path="/"} 1.0
# TYPE http_server_request_duration_seconds histogram
# HELP http_server_request_duration_seconds The HTTP response duration of the Rack application.
http_server_request_duration_seconds_bucket{method="get",path="/",le="0.005"} 0.0
http_server_request_duration_seconds_bucket{method="get",path="/",le="0.01"} 0.0
http_server_request_duration_seconds_bucket{method="get",path="/",le="0.025"} 0.0
http_server_request_duration_seconds_bucket{method="get",path="/",le="0.05"} 0.0
http_server_request_duration_seconds_bucket{method="get",path="/",le="0.1"} 0.0
http_server_request_duration_seconds_bucket{method="get",path="/",le="0.25"} 0.0
http_server_request_duration_seconds_bucket{method="get",path="/",le="0.5"} 1.0
http_server_request_duration_seconds_bucket{method="get",path="/",le="1"} 1.0
http_server_request_duration_seconds_bucket{method="get",path="/",le="2.5"} 1.0
http_server_request_duration_seconds_bucket{method="get",path="/",le="5"} 1.0
http_server_request_duration_seconds_bucket{method="get",path="/",le="10"} 1.0
http_server_request_duration_seconds_bucket{method="get",path="/",le="+Inf"} 1.0
http_server_request_duration_seconds_sum{method="get",path="/"} 0.251396
http_server_request_duration_seconds_count{method="get",path="/"} 1.0
# TYPE http_server_exceptions_total counter
# HELP http_server_exceptions_total The total number of exceptions raised by the Rack application.
```

To something like this

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Or this

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localhost:9090/alerts

Prometheus Alerts Graph Status Help

Alerts

high_load (1 active)

```
ALERT high_load
  IF node_load1 > 0.5
  ANNOTATIONS {description="{{ $labels.instance }} of job {{ $labels.job }} is under high load.", summary
="Instance {{ $labels.instance }} under high load"}
```

Labels	State	Active Since	Value	Silence
instance="node-exporter:9100" job="node-exporter"	FIRING	2020-02-20 13:01:37.812 +0000 UTC	0.53	

service_down (0 active)

Top-down view

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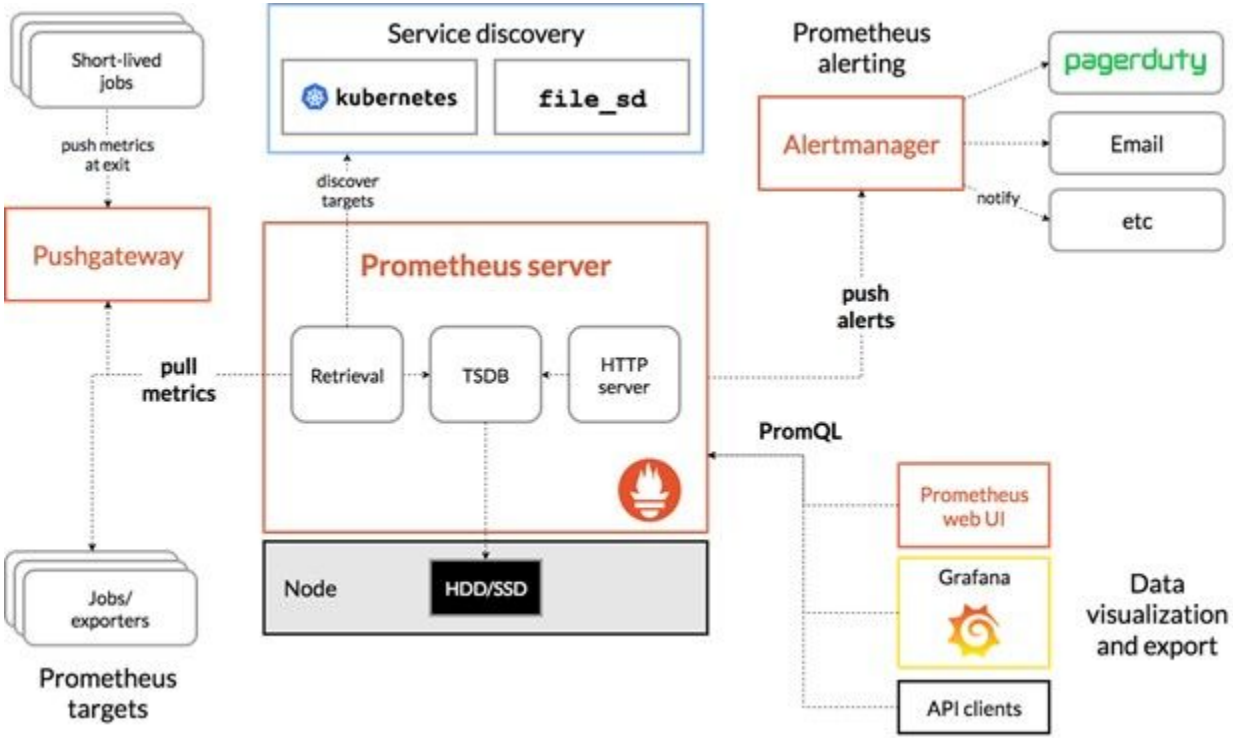
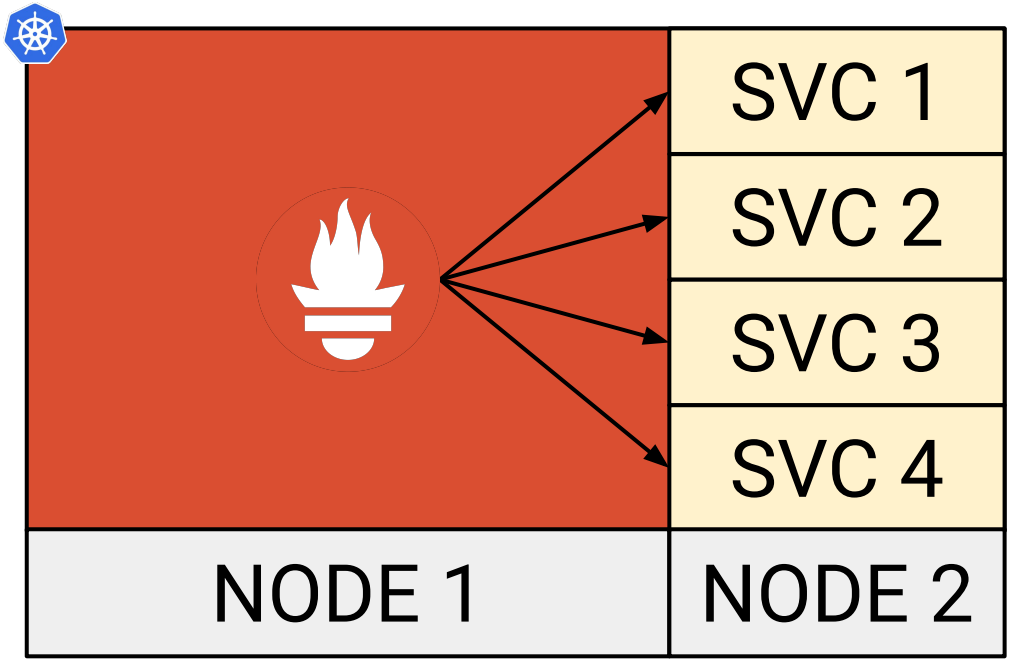


Prometheus Limitations

@ThanosMetrics



Prometheus Limitations

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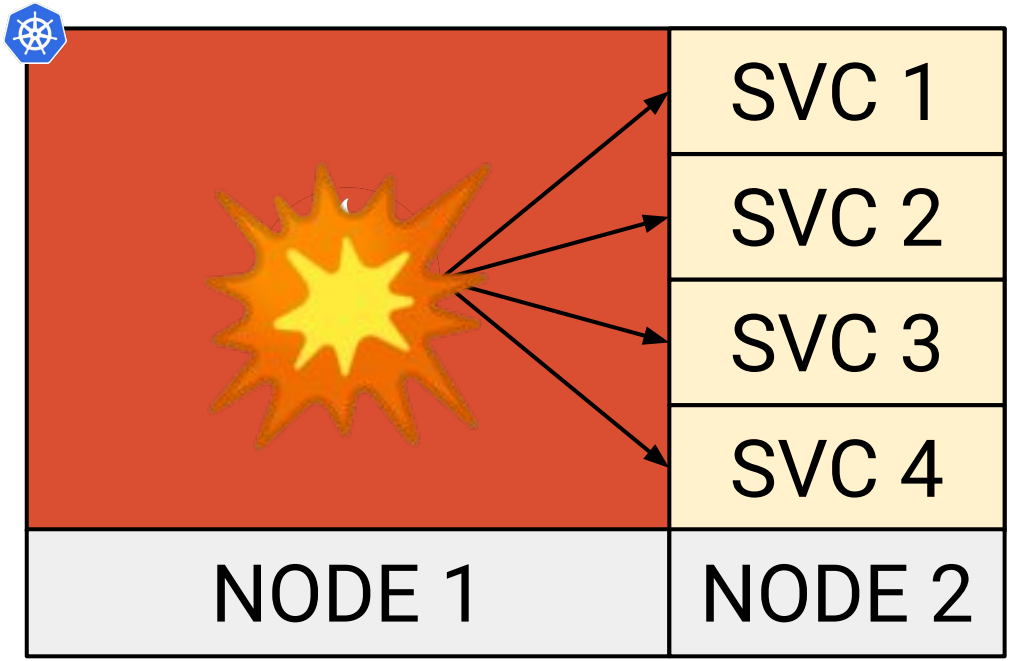

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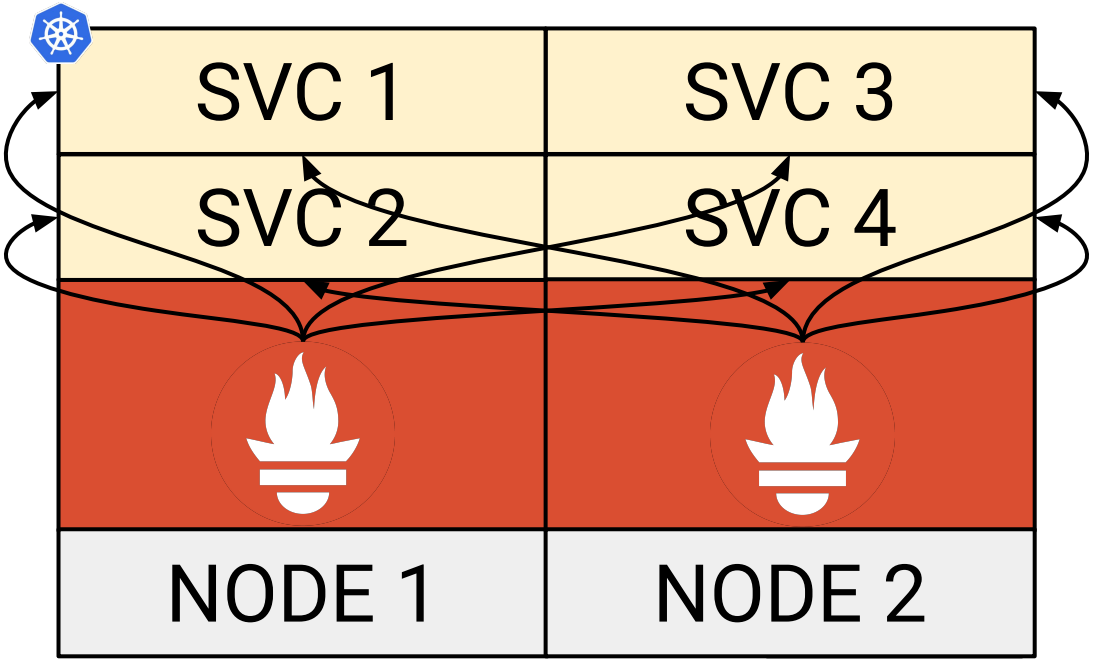

Prometheus Limitations

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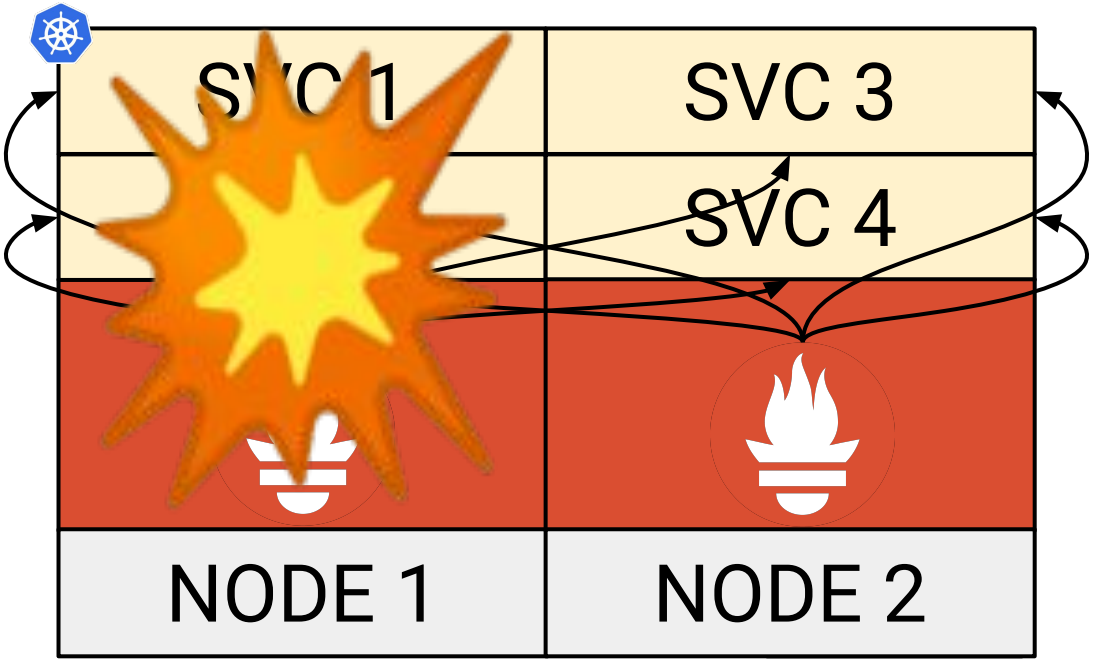

Prometheus Limitations

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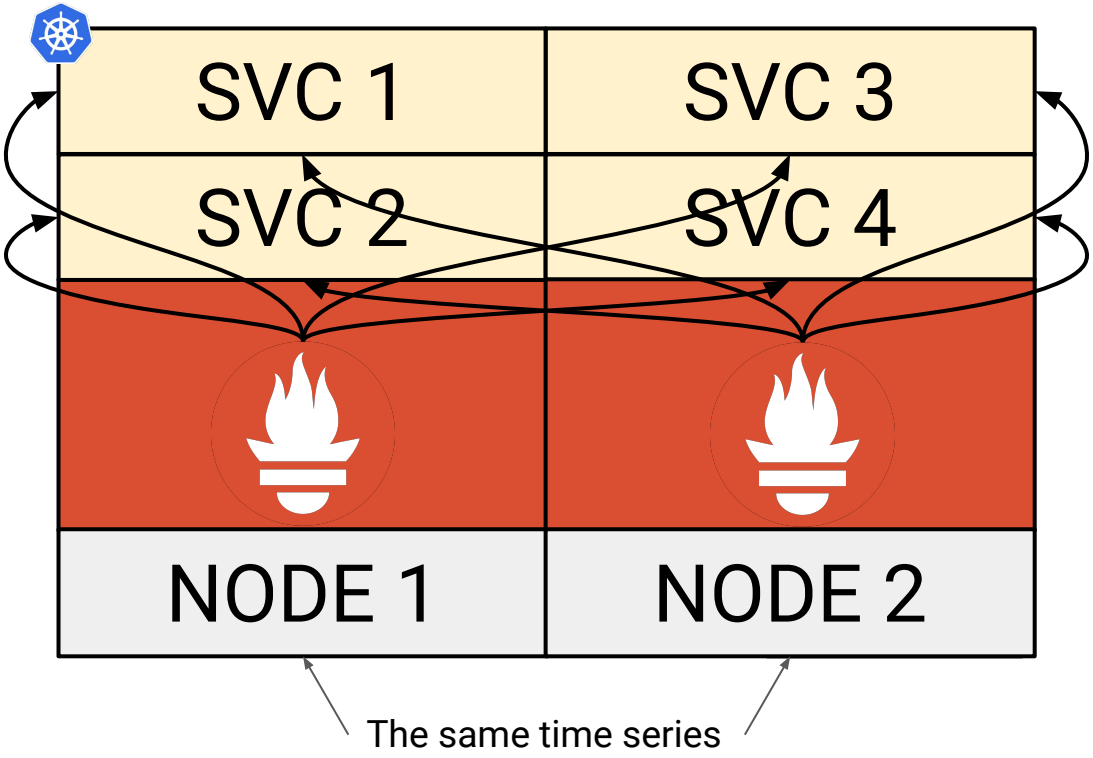

Unified view

Can we solve this natively?

Yes and no.

kubernetes_sd_config


```
# The API server addresses. If left empty, Prometheus is assumed to run inside
# of the cluster and will discover API servers automatically and use the pod's
# CA certificate and bearer token file at /var/run/secrets/kubernetes.io/serviceaccount/.
[ api_server: <host> ]
```

Federation


```
scrape_configs:
  - job_name: 'federate'
    scrape_interval: 15s

    honor_labels: true
    metrics_path: '/federate'

    params:
      'match[]':
        - '{job="prometheus"}'
        - '{__name__=~"job:.*"}'

    static_configs:
      - targets:
        - 'source-prometheus-1:9090'
        - 'source-prometheus-2:9090'
        - 'source-prometheus-3:9090'
```

exposes metric endpoints in other clusters

"Meh"

Thanos Community

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- Fully open source from the start
- Started in Nov 2017
- **CNCF Incubating** project!

- 9300 Github stars
- 374 contributors
- ~2500 slack users
- 8 maintainers, 6 triagers
- Transparent Governance

  (max 2 votes per company)

- Prometheus Ecosystem

Production Users

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51 known companies to be using Thanos in production and growing!

Adobe

Alibaba.com

BlaBlaCar

CIVO

ebay

GitLab

IMPROBABLE

monzo

de volksbank

SNS asn bank RegioBank BLGwonen

HETZNER

FULLSTAQ

Red Hat

Thanos Features

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Global Query View

Scale your Prometheus setup by enabling querying of your Prometheus metrics across multiple Prometheus servers and clusters.

Unlimited Retention

Extend the system with the object storage of your choice to store your metrics for unlimited time. Supports GCP, S3, Azure, Swift and Tencent COS.

Prometheus Compatible

Use the same tools you love, such as Grafana and others, that support the Prometheus Query API.

Downsampling & Compaction

Downsample historical data for massive query speedup when querying large time ranges or configure complex retention policies.

Multiple components

- Sidecar
- Query
- Store
- Compactor

And more

- Query frontend
- Ruler
- Receiver
- Tools

The sidecar

- Gets deployed along with a Prometheus instance
- Optionally upload metrics to object storage
- Allow Queriers to query Prometheus data

Query

- Query data in a Thanos cluster via PromQL
- Gathers the data needed to evaluate the query from underlying StoreAPIs

Compactor

- Compactor procedure of the Prometheus 2.0 storage engine but on data stored in the object storage
- Responsible for downsampling of data

Store

- Implements the Store API on top of historical data in an object storage bucket
- Acts primarily as an API gateway

Typical Highly Available Set Up

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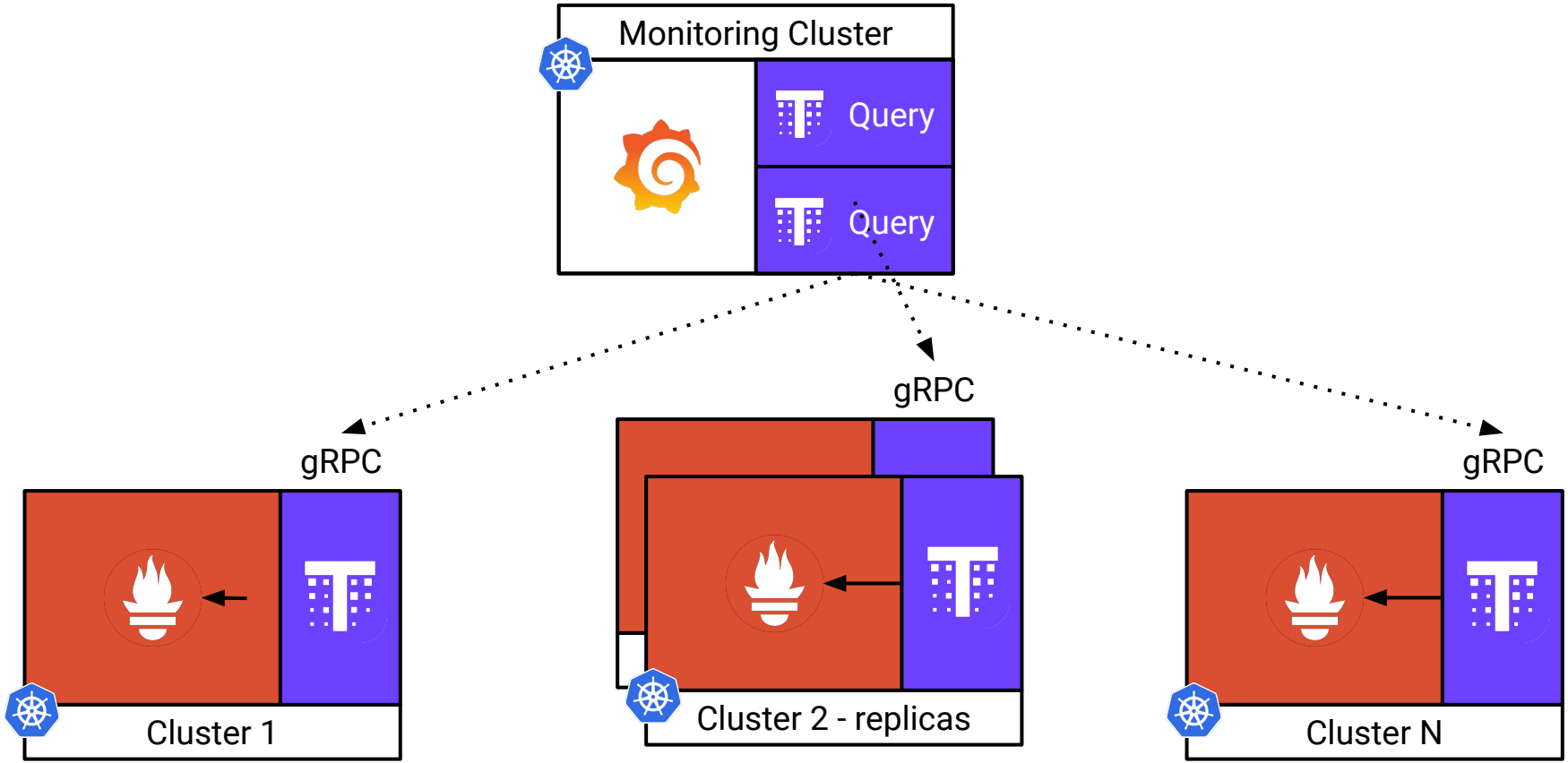

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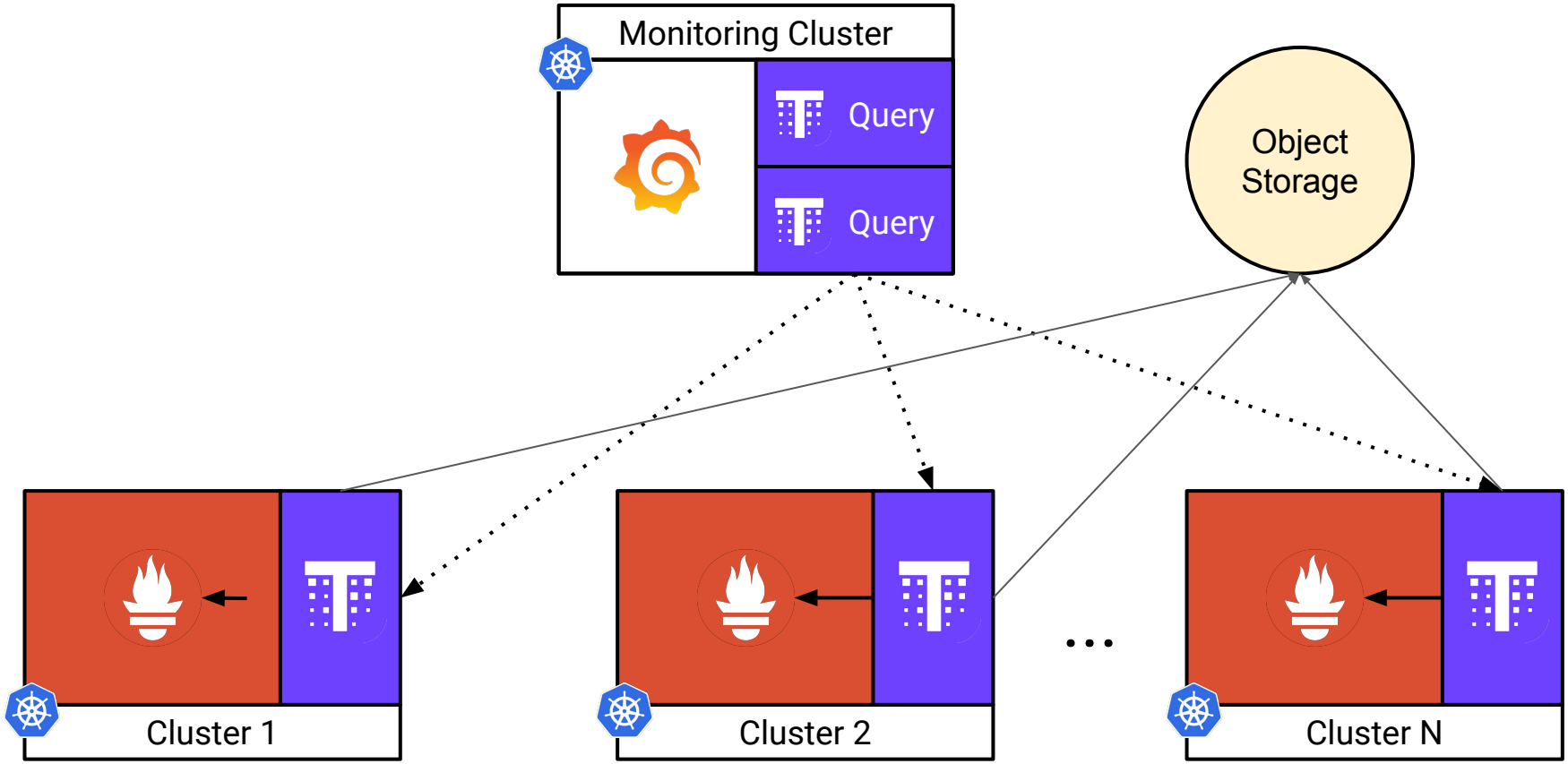

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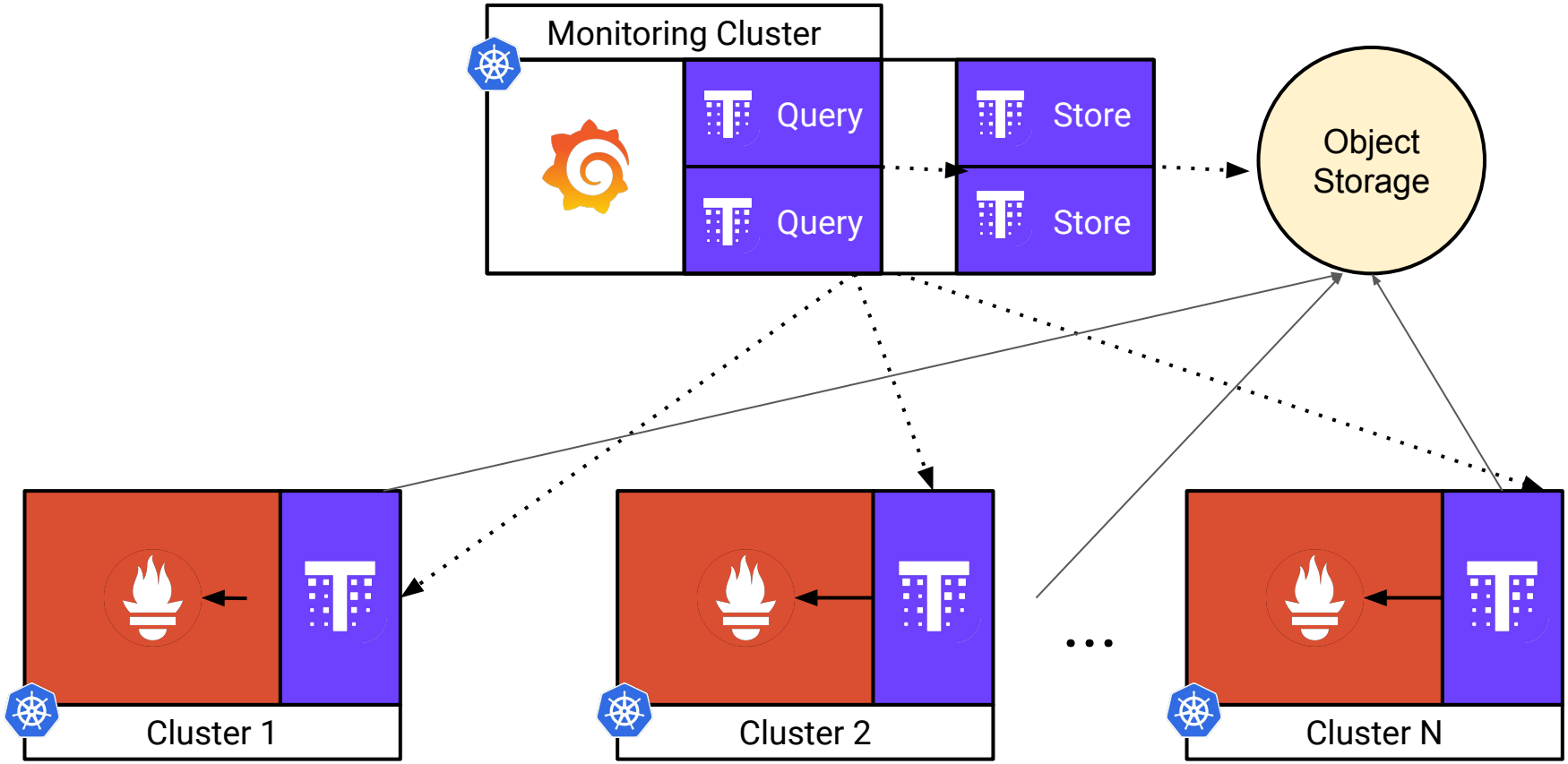

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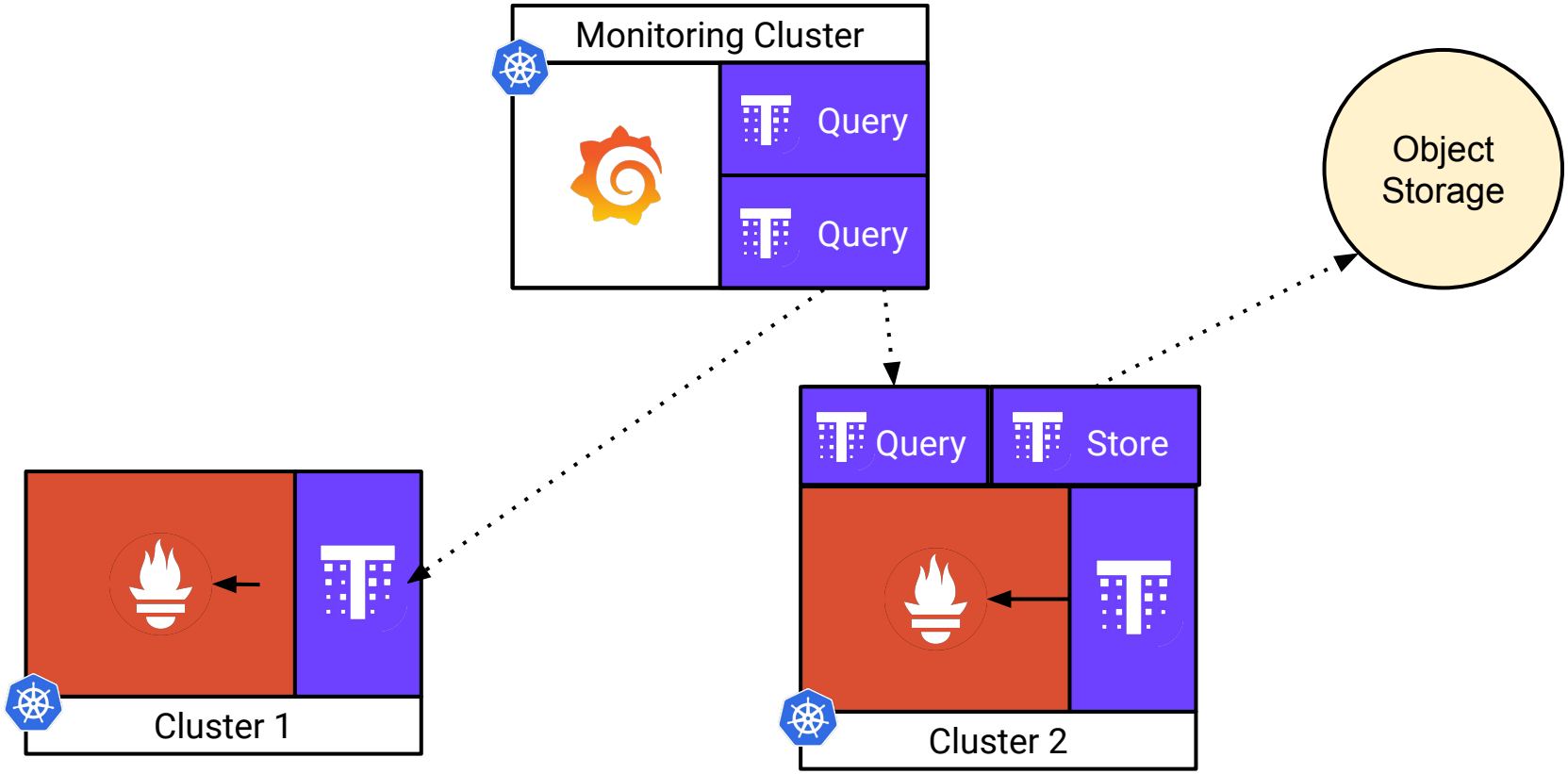

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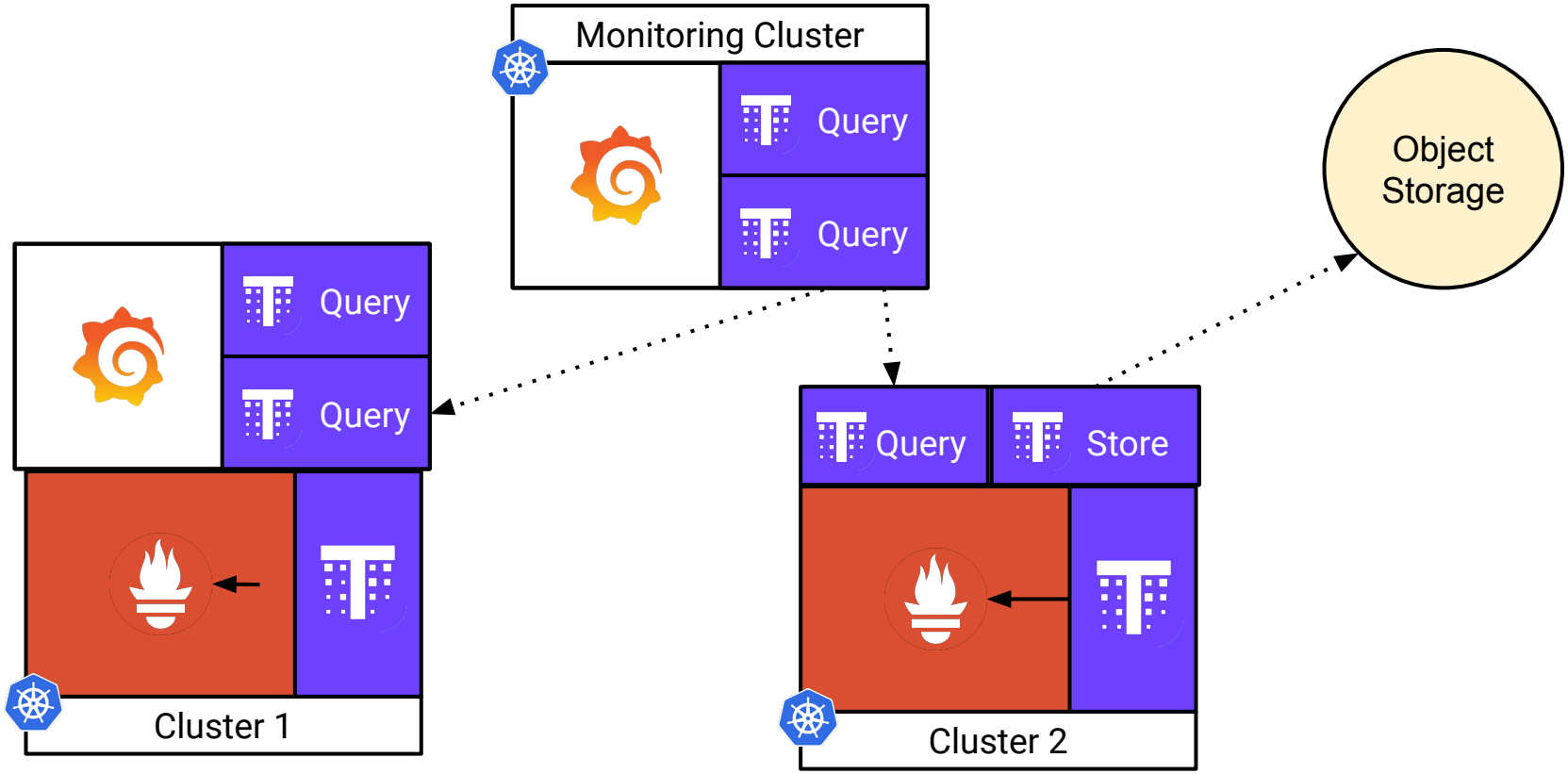

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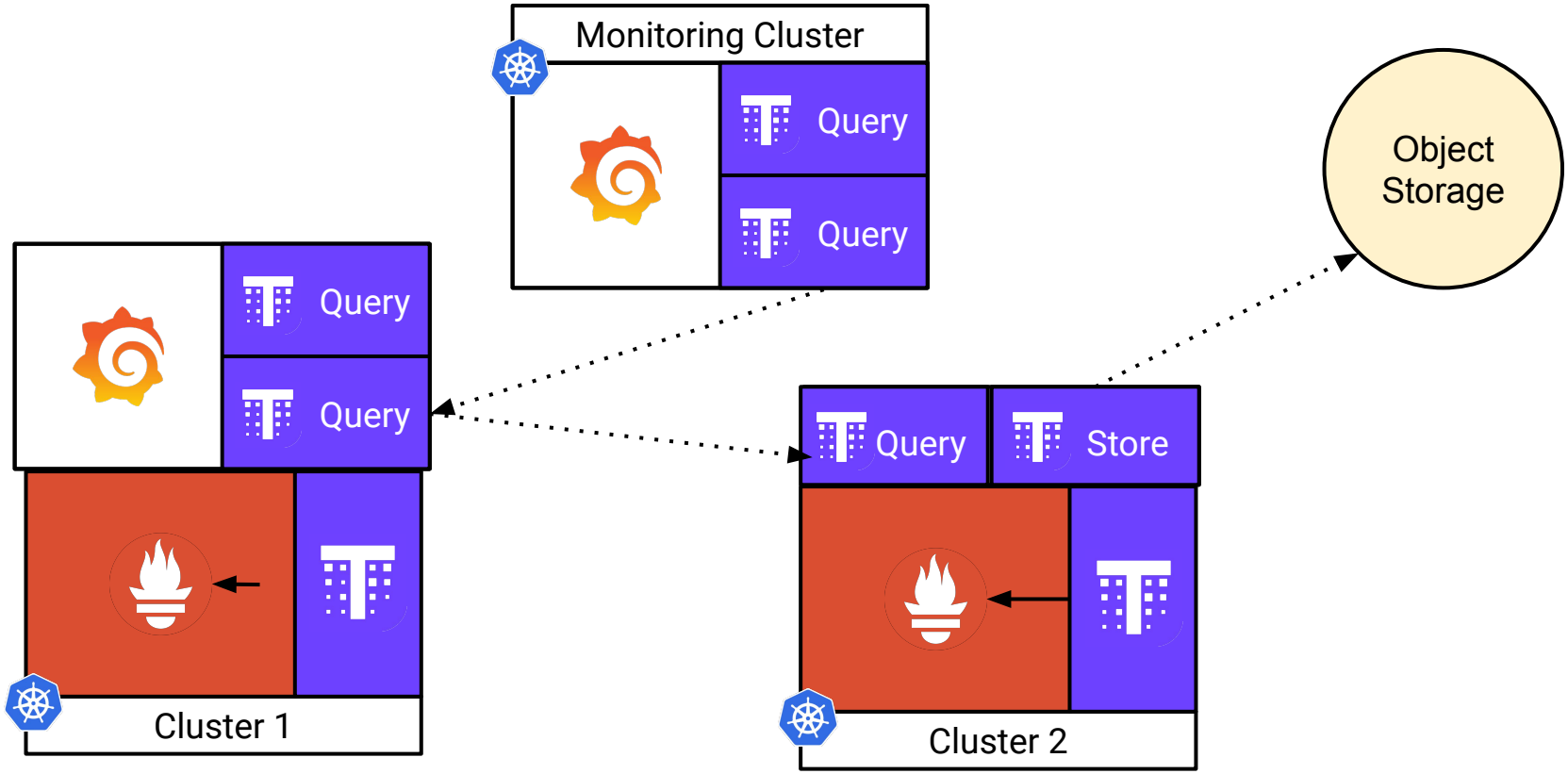

You can go bananas

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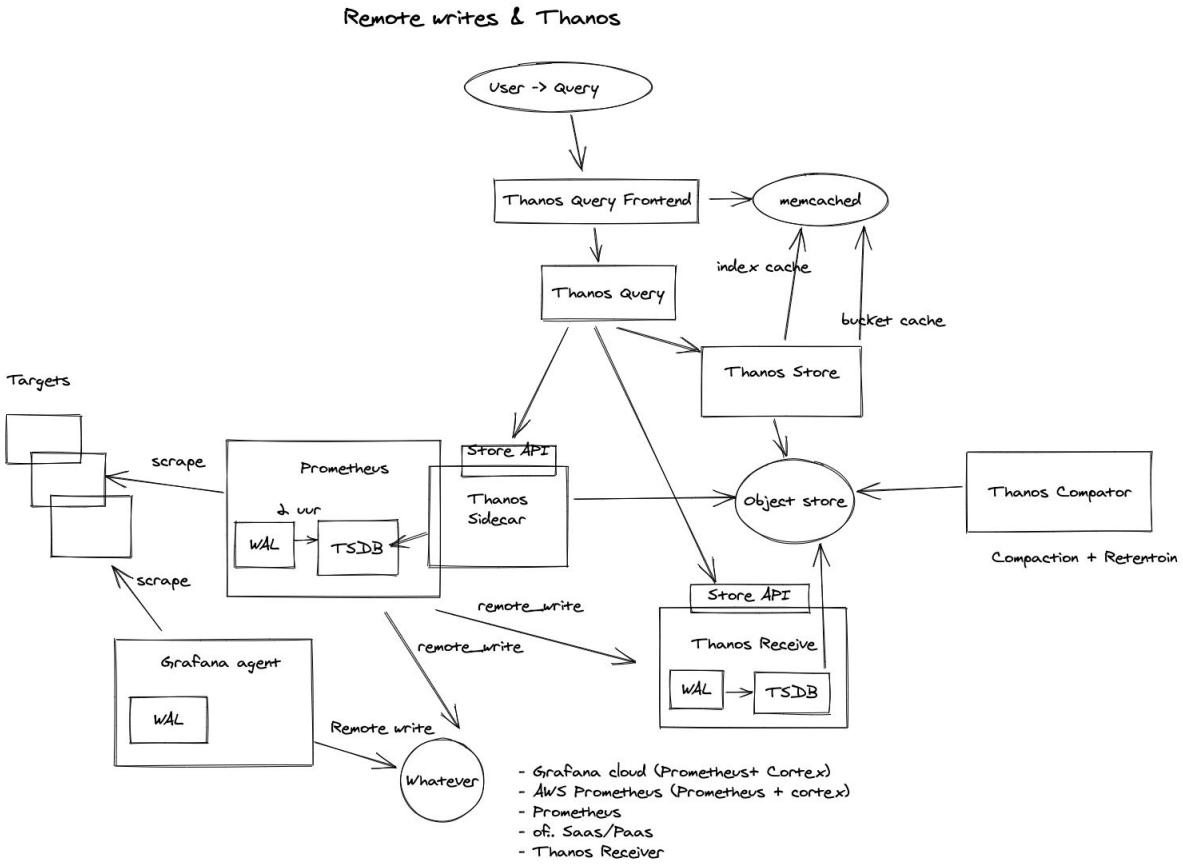
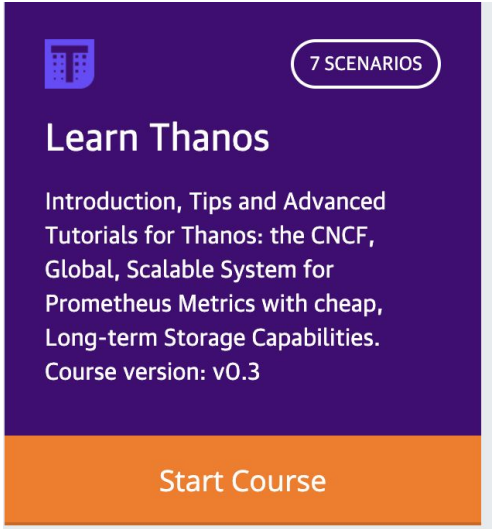


How you can get started?

- The Thanos website: https://thanos.io/tip/thanos/getting-started.md/
- Prometheus operator: https://github.com/prometheus-operator/prometheus-operator
- Kube-thanos chart: https://github.com/thanos-io/kube-thanos
- Community charts: https://artifacthub.io/packages/search?ts_query_web=thanos&sort=relevance&page=1

Katacoda!

https://katacoda.com/thanos



More...

Slack: https://cloud-native.slack.com/archives/CK5RSSC10
Questions/discussions: https://github.com/thanos-io/thanos/discussions
Github in general: https://github.com/thanos-io/thanos

And obviously the website itself: https://thanos.io/

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Thank you!

https://thanos.io