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节

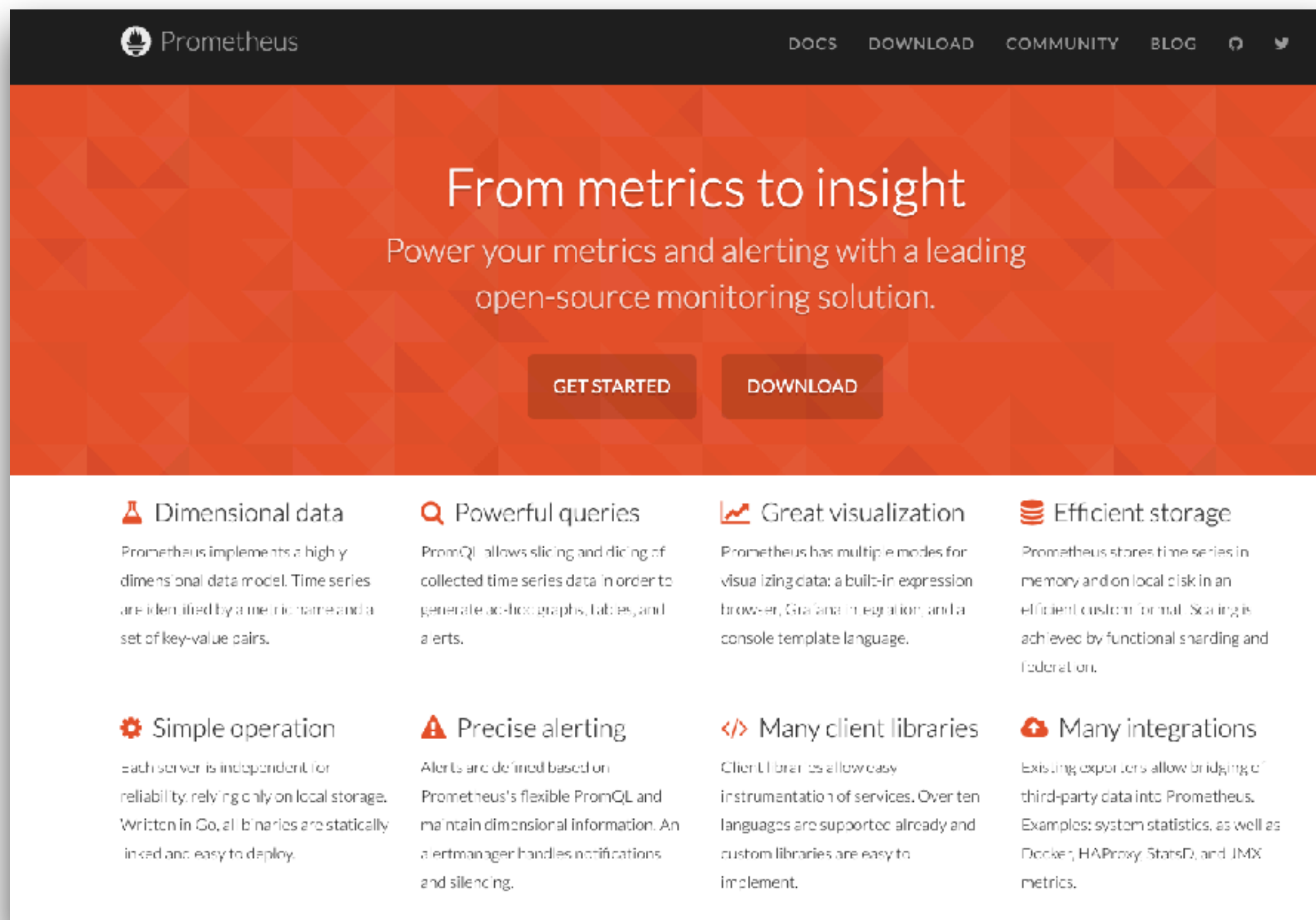
## Prometheus度量指标监控平台搭建

# 本课内容

- Prometheus监控相关工具和概念
- 在本地Minikube中安装Promethues Operator



# 什么是Prometheus

A screenshot of the Prometheus website. The header is dark with the Prometheus logo and navigation links: DOCS, DOWNLOAD, COMMUNITY, BLOG, and social media icons. The main section has an orange background with the text "From metrics to insight" and "Power your metrics and alerting with a leading open-source monitoring solution." Below this are two buttons: "GET STARTED" and "DOWNLOAD". The bottom section is white and features eight feature cards arranged in a 2x4 grid, each with an icon and a brief description.

Prometheus

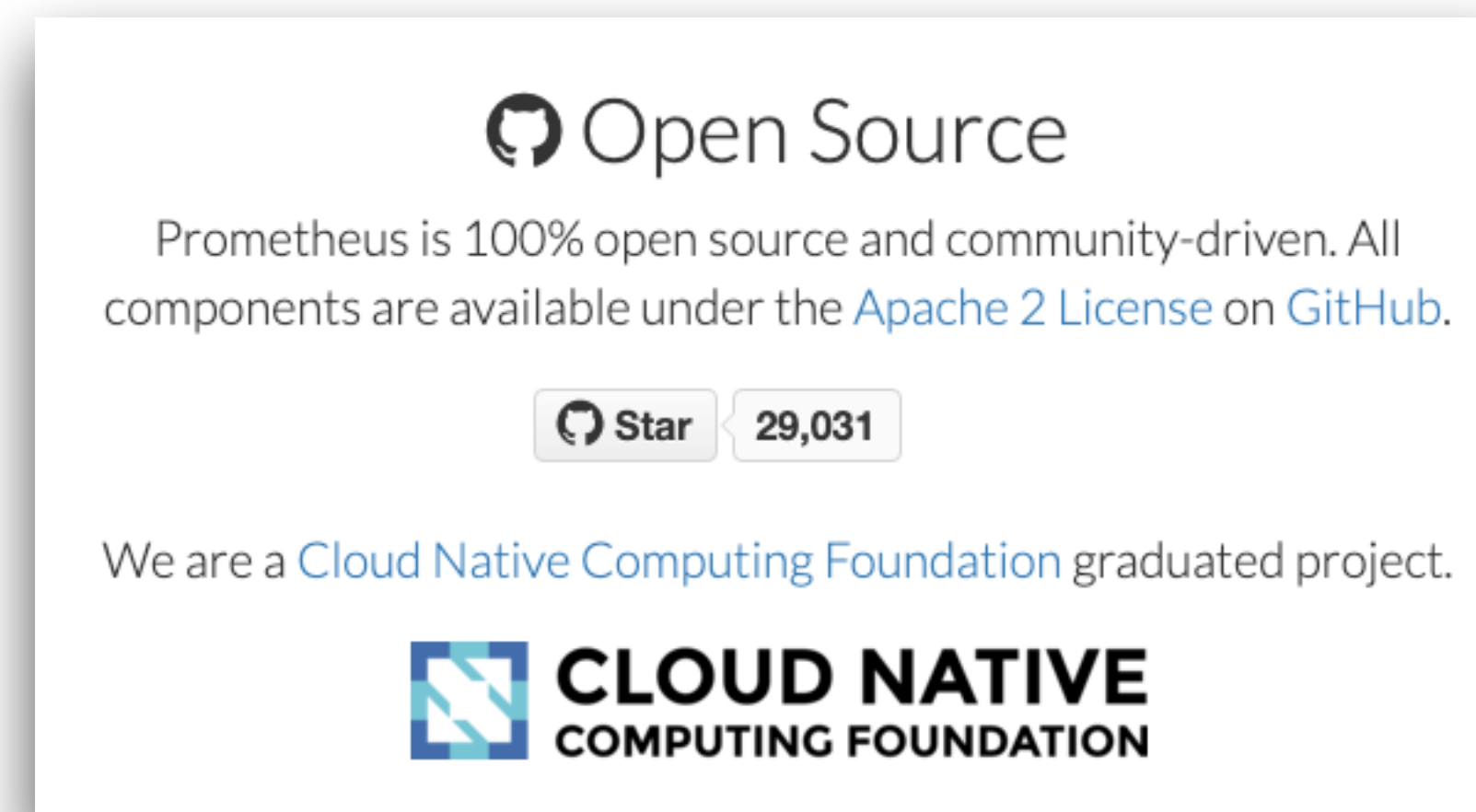
DOCS DOWNLOAD COMMUNITY BLOG


## From metrics to insight

Power your metrics and alerting with a leading open-source monitoring solution.


GET STARTED DOWNLOAD

- Dimensional data**  
Prometheus implements a highly dimensional data model. Time series are identified by a metric name and a set of key-value pairs.
- Powerful queries**  
PromQL allows slicing and dicing of collected time series data in order to generate ad-hoc graphs, tables, and alerts.
- Great visualization**  
Prometheus has multiple modes for visualizing data: a built-in expression browser, Grafana integration, and a console template language.
- Efficient storage**  
Prometheus stores time series in memory and on local disk in an efficient custom format. Scaling is achieved by functional sharding and federation.
- Simple operation**  
Each server is independent for reliability, relying only on local storage. Written in Go, all binaries are statically linked and easy to deploy.
- Precise alerting**  
Alerts are defined based on Prometheus's flexible PromQL and maintain dimensional information. An alertmanager handles notifications and silencing.
- Many client libraries**  
Client libraries allow easy instrumentation of services. Over ten languages are supported already and custom libraries are easy to implement.
- Many integrations**  
Existing exporters allow bridging of third-party data into Prometheus. Examples: system statistics, as well as Docker, HAProxy, StatsD, and JMX metrics.


A white rectangular box containing information about Prometheus being an open-source project and a Cloud Native Computing Foundation (CNCF) graduated project. It includes the GitHub logo, the text "Open Source", a paragraph stating Prometheus is 100% open source and community-driven, a GitHub Star button showing 29,031 stars, and the CNCF logo with the text "We are a Cloud Native Computing Foundation graduated project.".

 Open Source

Prometheus is 100% open source and community-driven. All components are available under the [Apache 2 License](#) on [GitHub](#).

 Star **29,031**

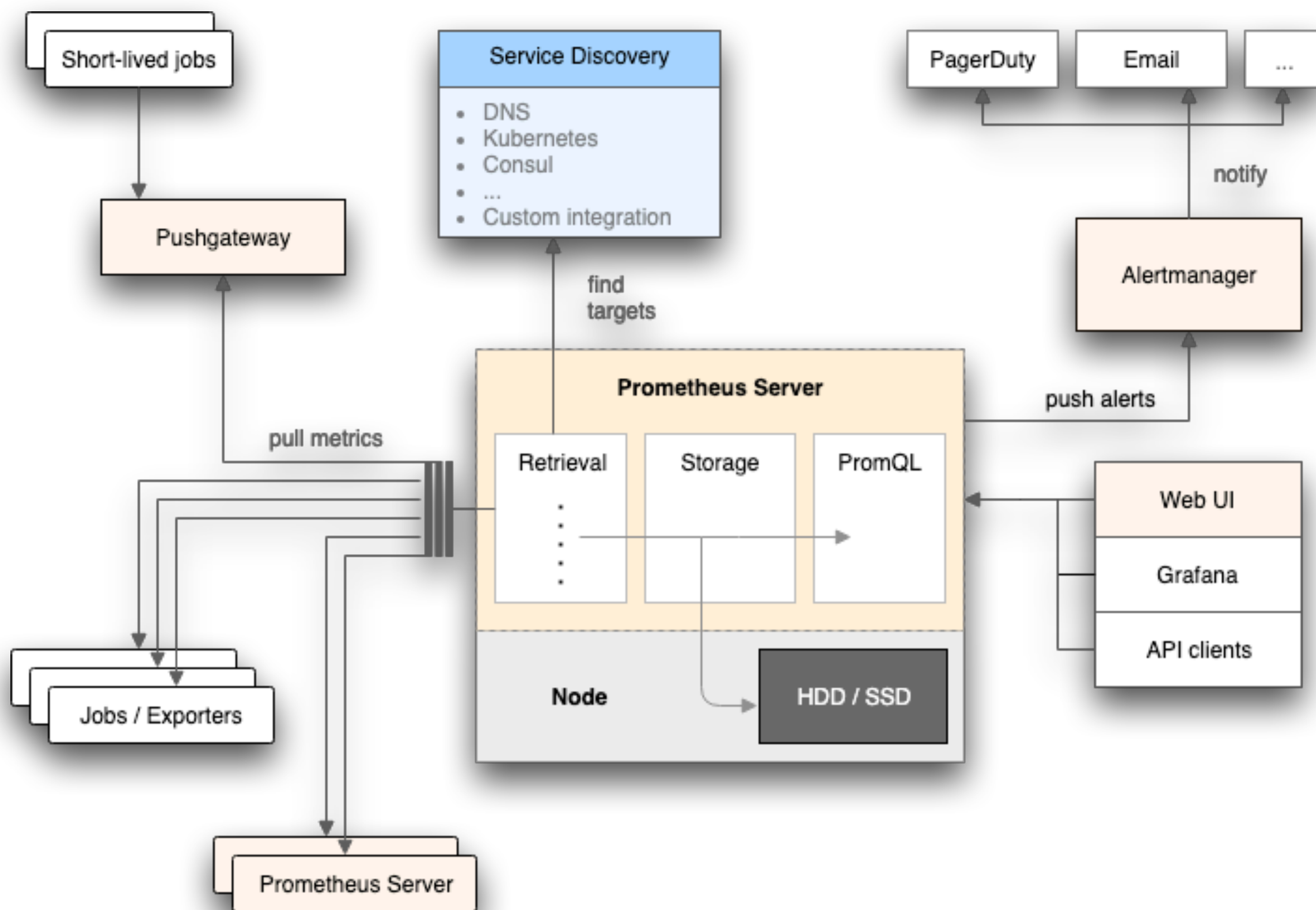
We are a [Cloud Native Computing Foundation](#) graduated project.

 **CLOUD NATIVE**  
COMPUTING FOUNDATION

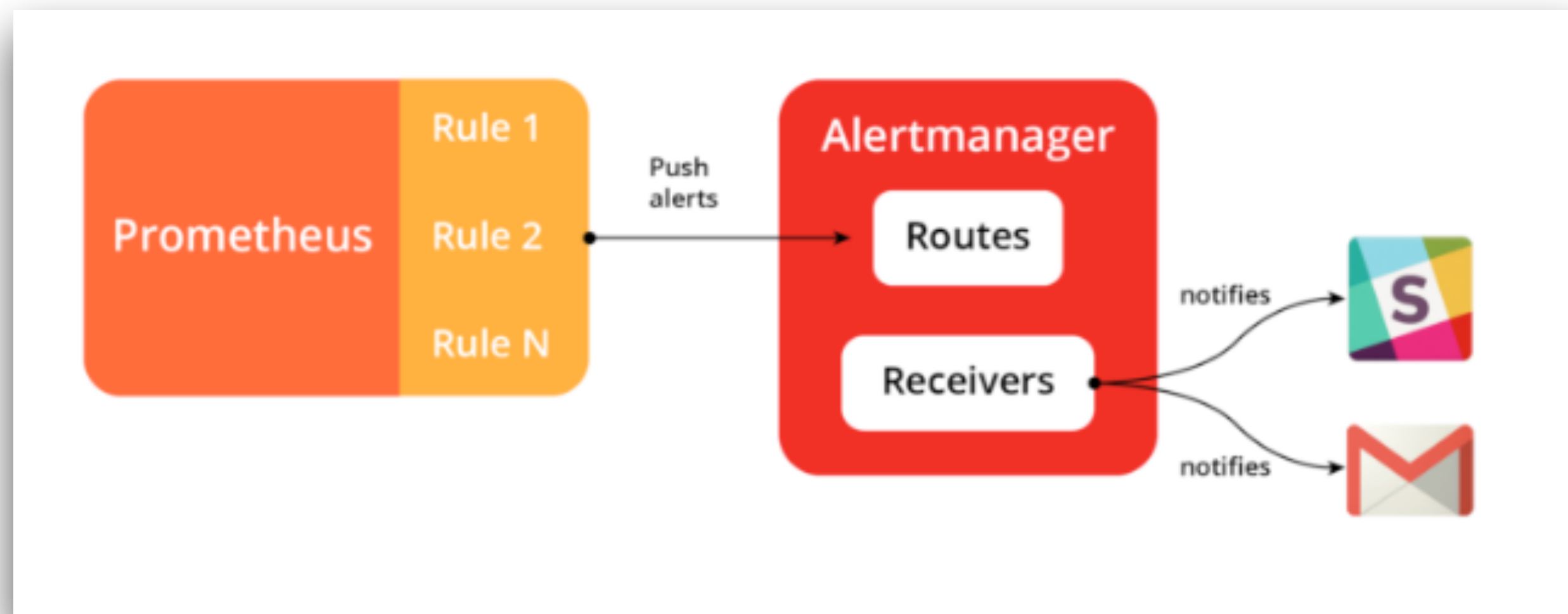
[prometheus.io](https://prometheus.io)

# Prometheus架构

<https://github.com/prometheus/prometheus>



# Alertmanager



路由转发(Routing)

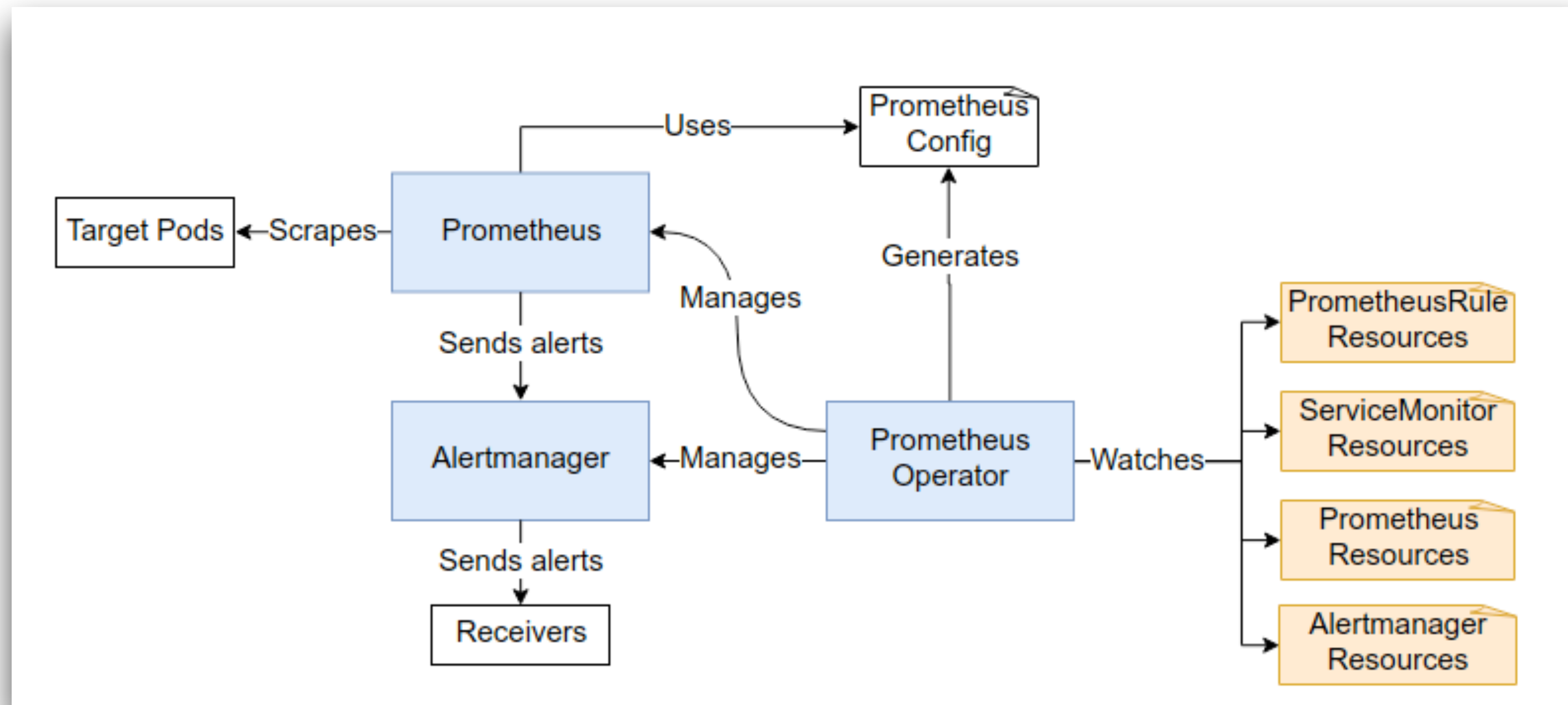
去重(Deduplicating)

分组(Grouping)

抑制(Inhibition)

静默(Silence)

# Prometheus Operator



<https://github.com/coreos/prometheus-operator>



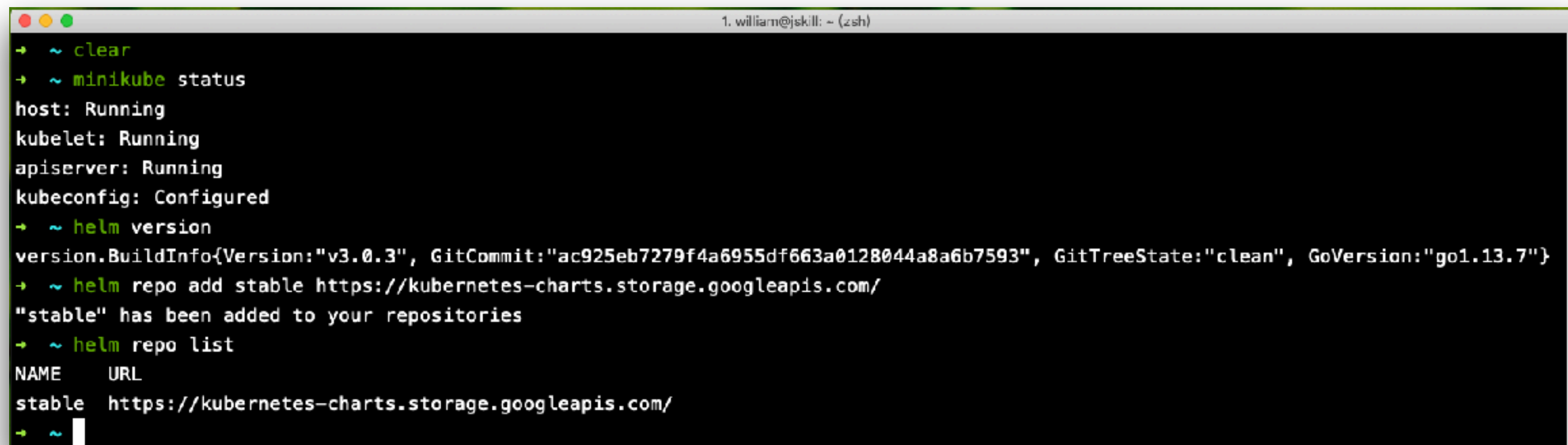
# 先决条件

- 安装minikube + kubectl

- 安装helm <https://github.com/helm/charts/tree/master/stable/prometheus-operator>

<https://helm.sh/docs/intro/install/>

<https://helm.sh/docs/intro/quickstart/>

A terminal window with a dark background and light green text. The window title is "1. william@jskill: ~ (zsh)". The terminal shows the following commands and output:

```
→ ~ clear
→ ~ minikube status
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured
→ ~ helm version
version.BuildInfo{Version:"v3.0.3", GitCommit:"ac925eb7279f4a6955df663a0128044a8a6b7593", GitTreeState:"clean", GoVersion:"go1.13.7"}
→ ~ helm repo add stable https://kubernetes-charts.storage.googleapis.com/
"stable" has been added to your repositories
→ ~ helm repo list
NAME      URL
stable    https://kubernetes-charts.storage.googleapis.com/
→ ~
```

# helm search

```
+ ~ helm search repo stable
```

NAME	CHART VERSION	APP VERSION	DESCRIPTION
stable/acs-engine-autoscaler	2.2.2	2.1.1	DEPRECATED Scales worker nodes within agent pools
stable/aerospike	0.3.2	v4.5.0.5	A Helm chart for Aerospike in Kubernetes
stable/airflow	6.0.0	1.10.4	Airflow is a platform to programmatically autho...
stable/ambassador	5.3.1	0.86.1	A Helm chart for Datawire Ambassador
stable/anchore-engine	1.4.2	0.6.1	Anchore container analysis and policy evaluatio...
stable/apm-server	2.1.5	7.0.0	The server receives data from the Elastic APM a...
stable/ark	4.2.2	0.10.2	DEPRECATED A Helm chart for ark
stable/artifactory	7.3.1	6.1.0	DEPRECATED Universal Repository Manager support...
stable/artifactory-ha	0.4.1	6.2.0	DEPRECATED Universal Repository Manager support...
stable/atlas	3.11.0	v0.11.1	A Helm chart for Atlantis <a href="https://www.runatlant...">https://www.runatlant...</a>
stable/auditbeat	1.1.0	6.7.0	A lightweight shipper to audit the activities o...
stable/aws-cluster-autoscaler	0.3.3		Scales worker nodes within autoscaling groups.
stable/aws-iam-authenticator	0.1.2	1.0	A Helm chart for aws-iam-authenticator
stable/bitcoind	1.0.0	0.17.1	Bitcoin is an innovative payment network and a ...
stable/bookstack	1.2.0	0.27.5	BookStack is a simple, self-hosted, easy-to-use...
stable/buildkite	0.2.4	3	DEPRECATED Agent for Buildkite
stable/burrow	1.5.2	0.29.0	Burrow is a permissionable smart contract machine
stable/centrifugo	3.1.1	2.1.0	Centrifugo is a real-time messaging server.
stable/cerebro	1.3.1	0.8.5	A Helm chart for Cerebro - a web admin tool tha...
stable/cert-manager	v0.6.7	v0.6.2	A Helm chart for cert-manager
stable/chaoskube	3.1.3	0.14.0	Chaoskube periodically kills random pods in you...

```
+ ~ helm search repo prometheus
```

NAME	CHART VERSION	APP VERSION	DESCRIPTION
stable/prometheus	10.4.0	2.15.2	Prometheus is a monitoring system and time seri...
stable/prometheus-adapter	2.0.1	v0.5.0	A Helm chart for k8s prometheus adapter
stable/prometheus-blackbox-exporter	3.1.0	0.15.1	Prometheus Blackbox Exporter
stable/prometheus-cloudwatch-exporter	0.6.0	0.6.0	A Helm chart for prometheus cloudwatch-exporter
stable/prometheus-consul-exporter	0.1.4	0.4.0	A Helm chart for the Prometheus Consul Exporter
stable/prometheus-couchdb-exporter	0.1.1	1.0	A Helm chart to export the metrics from couchdb...
stable/prometheus-mongodb-exporter	2.4.0	v0.10.0	A Prometheus exporter for MongoDB metrics
stable/prometheus-mysql-exporter	0.5.2	v0.11.0	A Helm chart for prometheus mysql exporter with...
stable/prometheus-nats-exporter	2.3.0	0.6.0	A Helm chart for prometheus-nats-exporter
stable/prometheus-node-exporter	1.8.1	0.18.1	A Helm chart for prometheus node-exporter
stable/prometheus-operator	8.7.0	0.35.0	Provides easy monitoring definitions for Kubern...
stable/prometheus-postgres-exporter	1.2.0	0.8.0	A Helm chart for prometheus postgres-exporter
stable/prometheus-pushgateway	1.2.14	1.0.1	A Helm chart for prometheus pushgateway
stable/prometheus-rabbitmq-exporter	0.5.5	v0.29.0	Rabbitmq metrics exporter for prometheus
stable/prometheus-redis-exporter	3.2.2	1.3.4	Prometheus exporter for Redis metrics
stable/prometheus-snmp-exporter	0.0.4	0.14.0	Prometheus SNMP Exporter
stable/prometheus-to-sd	0.3.0	0.5.2	Scrape metrics stored in prometheus format and ...
stable/elasticsearch-exporter	2.3.0	1.1.0	Elasticsearch stats exporter for Prometheus
stable/helm-exporter	0.3.3	0.4.0	DEPRECATED Exports helm release stats to promet...
stable/karma	1.4.1	v0.55	A Helm chart for Karma - an UI for Prometheus A...
stable/stackdriver-exporter	1.2.2	0.6.0	Stackdriver exporter for Prometheus
stable/weave-cloud	0.3.7	1.4.0	Weave Cloud is a add-on to Kubernetes which pro...
stable/kube-state-metrics	2.6.4	1.9.4	Install kube-state-metrics to generate and expo...
stable/kuberhealthy	1.2.6	v1.0.2	The official Helm chart for Kuberhealthy.
stable/mariadb	7.3.7	10.3.22	Fast, reliable, scalable, and easy to use open-...

```
+ ~
```



# 安装stable/prometheus-operator

```
1. william@jskill: ~ (zsh)
→ ~ helm install prometheus-operator stable/prometheus-operator -n monitoring
manifest_sorter.go:175: info: skipping unknown hook: "crd-install"
manifest_sorter.go:175: info: skipping unknown hook: "crd-install"
manifest_sorter.go:175: info: skipping unknown hook: "crd-install"
manifest_sorter.go:175: info: skipping unknown hook: "crd-install"
manifest_sorter.go:175: info: skipping unknown hook: "crd-install"
NAME: prometheus-operator
LAST DEPLOYED: Sun Feb  9 20:21:48 2020
NAMESPACE: monitoring
STATUS: deployed
REVISION: 1
NOTES:
The Prometheus Operator has been installed. Check its status by running:
  kubectl --namespace monitoring get pods -l "release=prometheus-operator"

Visit https://github.com/coreos/prometheus-operator for instructions on how
to create & configure Alertmanager and Prometheus instances using the Operator.
→ ~ kubectl get po -n monitoring
NAME                                                    READY   STATUS    RESTARTS   AGE
alertmanager-prometheus-operator-alertmanager-0      2/2     Running   0           16s
prometheus-operator-grafana-65dc66c89d-s76pm           2/2     Running   0           22s
prometheus-operator-kube-state-metrics-8467c5bdbc-jhcf 1/1     Running   0           22s
prometheus-operator-operator-6f9fd5d858-n64tq         2/2     Running   0           22s
prometheus-operator-prometheus-node-exporter-2z6rh    1/1     Running   0           22s
prometheus-prometheus-operator-prometheus-0          3/3     Running   1           7s
→ ~ helm list -n monitoring
NAME                NAMESPACE    REVISION    UPDATED                               STATUS    CHART                APP VERSION
prometheus-operator monitoring    1           2020-02-09 20:21:48.421835 +0800 CST    deployed prometheus-operator-8.7.0 0.35.0
→ ~
```

# 本课小结



- Prometheus监控工具和概念
  - Promethues ~ 时间序列监控工具，拉取/存储/查询QL
  - Alertmanager ~ 告警消息的路由转发
  - Prometheus-Operator ~ 针对k8s的prometheus封装包，简化部署和配置
- 在本地Minikube中安装Promethues Operator
  - helm ~ k8s包管理工具
  - chart - k8s资源安装包
  - repository ~ chart仓库
  - release ~ 一个chart在k8s中的一个部署实例
  - stable/promethues-operator