Prometheus

In Greek mythology, Prometheus, possibly meaning “forethought”), is a Titan god of fire. Prometheus is known for his intelligence and for being a champion of humankind, and is also seen as the author of the human arts and sciences generally.

What is Prometheus (software)?

Prometheus is a free software application used for event monitoring and alerting thus Prometheus is an open-source systems monitoring and alerting toolkit.

- Prometheus was developed at SoundCloud starting in 2012.
- Prometheus was introduced for production monitoring at SoundCloud By 2013.
- In May 2016, the Cloud Native Computing Foundation accepted Prometheus as its second incubated project, after Kubernetes.
- Prometheus 1.0 was released in July 2016
- Prometheus 2.0 in November 2017]
- The project is written in Go and licensed under the Apache 2 License
- Source code available on GitHub
- A multi-dimensional data model
- Operational simplicity
- Scalable data collection
- Powerful query language

Features of Prometheus

Prometheus’s main features are:

- A multi-dimensional data model with time series data identified by metric name and key/value pairs
- PromQL, a flexible query language to leverage this dimensionality
- No reliance on distributed storage; single server nodes are autonomous
- Time series collection happens via a pull model over HTTP
- Pushing time series is supported via an intermediary gateway
- Targets are discovered via service discovery or static configuration
- Multiple modes of graphing and dashboarding support

What are the Prometheus Components?

A typical monitoring platform with Prometheus is composed of multiple tools:

- **Prometheus server:** the main Prometheus server which scrapes and stores time series data
- **Client libraries:** client libraries for instrumenting application code
- **Push gateway:** a push gateway for supporting short-lived jobs
- **Exporters:** special-purpose exporters for services like HAProxy, StatsD, Graphite, etc.
- **Alertmanager:** an alertmanager to handle alerts
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What is PromQL?

Prometheus provides its own query language PromQL (Prometheus Query Language) that lets users select and aggregate data. PromQL is specifically adjusted to work in convention with a Time-Series Database and therefore provides time-related query functionalities. Examples include the rate() function, the instant vector and the range vector which can provide many samples for each queried time series. Prometheus has four clearly defined metric types around which the PromQL components revolve. The four types are

- Gauge
- Counter
- Histogram
- Summary

Prometheus Client libraries

Before you can monitor your application services, you need to add instrumentation to their code via one of the Prometheus client libraries. Client libraries lets you define and expose internal metrics via an HTTP endpoint on your application's instance. Prometheus Client libraries support multiple programming languages

- Go
- Java or Scala
- Python
- Ruby
- Bash

- C
- C++
- Common Lisp
- Dart
- Elixir
- Erlang
- Haskell
- Lua for Nginx
- Lua for Tarantool
- .NET / C#
- Node.js
- Perl
- PHP
- R
- Rust

Prometheus Push gateway

Occasionally you will need to monitor components which cannot be scraped. The Prometheus Pushgateway allows you to push time series from short-lived service-level batch jobs to an intermediary job which Prometheus can scrape.

The Prometheus Pushgateway exists to allow ephemeral and batch jobs to expose their metrics to Prometheus. Since these kinds of jobs may not exist long enough to be scraped, they can instead push their metrics to a Pushgateway. The Pushgateway then exposes these metrics to Prometheus.

What is Alertmanager?

Configuration for alerts can be specified in Prometheus that specifies a condition that needs to be maintained for a specific duration in order for an alert to trigger. When alerts trigger, they are forwarded to Alertmanager service. Alertmanager can include logic to silence alerts and also to forward them to email, Slack, or notification services such as PagerDuty. Some other messaging systems like

Microsoft Teams[29] could be configured using the Alertmanager Webhook Receiver as mechanism for external integrations.