

# Monitoring and Data-Driven Decisions with Prometheus and SUSE Manager

How monitoring of dynamic environments can be made easier with SUSE Manager, Prometheus and Grafana

João Cavalheiro and Johannes Renner

#### **Observability**

"...a measure of how well internal states of a system can be inferred from knowledge of its external outputs."

- Metrics
- Logging
- Distributed tracing

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If systems don't adequately externalize their state, monitoring will fall short.

## **Monitoring – Metrics**

Main data source for Alerting and Visualization:

- Starting point for troubleshooting
  - "Something looks wrong on this dashboard"
- Used as Service Level Indicators
- How available are we to the outside world?
- What are our customers experiencing?

#### **Monitoring – Metrics**

Main data source for Alerting and Visualization:

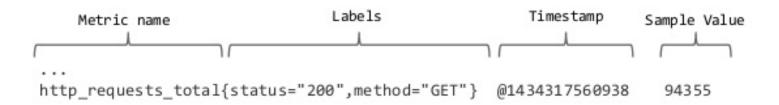
- Starting point for troubleshooting
  - "Something looks wrong on this dashboard"
- Used as Service Level Indicators
- How available are we to the outside world?
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Good metrics help to eliminate hypotheses before you investigate them.

## **Prometheus and Grafana**

#### **About Prometheus**

- Originally built at SoundCloud
- Has its own time-series database
- Data collection via pull model over HTTP
- Targets are set via static configuration or service discovery
- Metrics have a name, a set of labels, a timestamp and a value



## **Exposing Metrics**

- Each application/system we want to monitor must expose metrics
- Instrumentation vs Exporters
- When the metrics endpoint is embedded into an existing application, it's referred to as instrumentation. When it is part of a stand-alone process, we call it an Exporter.
- Extensive list of Prometheus exporters
  - https://prometheus.io/docs/instrumenting/exporters/
- Node exporter is one of the most widely used
- Easy to build your own exporters
- You can monitor almost anything

## **Blackbox Monitoring**

- Enables probing of endpoints over HTTP(s), DNS, TCP and ICMP
- Blackbox exporter is a helper daemon that can accept commands from Prometheus
- Preferred method to monitor services from the outside
- Can easily measure service latency
- Transparent integration with Prometheus
- The blackbox daemon is yet another scrape target
- Can be useful when you have no access to client internals
- But should not be used as a replacement for proper instrumentation

## **Querying Metrics**

- Prometheus has its own query language PromQL
- PromQL is a functional expression language
- Easily filter multi-dimensional time-series
- Example: HTTP internal server errors per second... an hour ago
- rate(api\_http\_requests\_total{status=500}[5m] offset 1h)
- Regex matching
- up{instance=~"web-server-.\*"} == 0
- Used in all interactions with Prometheus (visualization, alerts)

#### **Alerts**

- Prometheus has its own alerting system Alert Manager
- Takes care of deduplicating, grouping, and routing
- Alerting rules are written in PromQL
- Supports HA setups
- Integration with email, PagerDuty and OpsGenie
- HTTP API and CLI tool: amtool
- Can be "plugged" into your existing scripts

#### Grafana

- Used to query and visualize metrics
- Works with Prometheus, but not only...
- Grafana supports multiple backends
- It is possible to combine data from different sources in the same dashboard
- Fully customizable
- Each panel has a wide variety of styling and formatting options
- Supports templates
- Collection of add-ons and pre-built dashboards

## **Putting the Pieces Together**

#### **How to Get Started**

- Which Prometheus components will I need?
- How can I configure my clients to expose metrics?
- What can be automated?
- How do I get started with building graphics?
- And, what should I monitor?

## **Building Blocks**

- Packaged Prometheus, Grafana and exporters
- Integration with SUSE Manager
- Monitoring best practices
- Future vision

# **SUSE Manager**

#### What Is SUSE Manager?

- Systems and infrastructure management (on-prem or cloud)
- Based on Spacewalk in the past, now forked into Uyuni:
  - https://www.uyuni-project.org/
- Backend based on Salt Open
- Management of diverse client architectures and OSs
- Scalability is an ongoing challenge

## **SUSE Manager Meets Monitoring**

Set up and automate Prometheus monitoring with SUSE Manager

- Packages will be provided via official channels:
  - Main packages (Prometheus, Grafana) from SUSE Manager channels
  - Specific metrics exporters alongside the respective applications
- Enable exporters on managed clients using Salt Formulas
- Group systems to define data exporter templates
- Integration with Prometheus service discovery

## **SUSE Manager Meets Monitoring**

#### **Self-monitoring of SUSE Manager Server and Proxy**

- Easily enable monitoring of SUSE Manager Server
- Pre-installed exporters can expose metrics about:
  - Hardware
  - Java virtual machines
  - Apache and PostgreSQL
  - SUSE Manager's internals
- SUSE Manager Proxy to be monitored via squid exporter

## **SUSE Manager Meets Monitoring**

#### Coming next...

- Provisioning of Prometheus and Grafana servers
- Integration with existing Prometheus setups
- Closing the monitoring loop
  - Automatically enable monitoring during client onboarding
  - Alert templates by system group and integration with AlertManager
  - Fully automated integration with Prometheus service discovery
  - Optional encryption and authentication on the metrics endpoints
  - Automatic provisioning of Grafana dashboard templates

## Researching

**Grafana Loki: Prometheus-inspired logging** 

Common monitoring building blocks for SUSE products

**Grafana add-on development** 

# **Live Demo**

#### **Live Demo**

- SUSE Manager self-monitoring
- Install and enable exporters on managed clients
- Integration with Prometheus service discovery
- Grafana dashboards
- Alerts



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