OpenStack Instance Monitoring with Prometheus - Grafana

Syah Dwi Prihatmoko - Cloud Engineer
moko@btech.id

Biznet GioCloud Biznet Mellanox TECHNOLOGIES BANK BRI OSF OpenStack Foundation

About me

- Cloud Engineer at Btech
- openSUSE Member (sdmoko@opensuse.org)
- openstack-id Member
- GNU/Linux Bogor Activist
- Free and Open Source Software Enthusiast and Contributor

Why Monitoring?

Know when things go wrong

Alerting

Be able to debug and gain insight

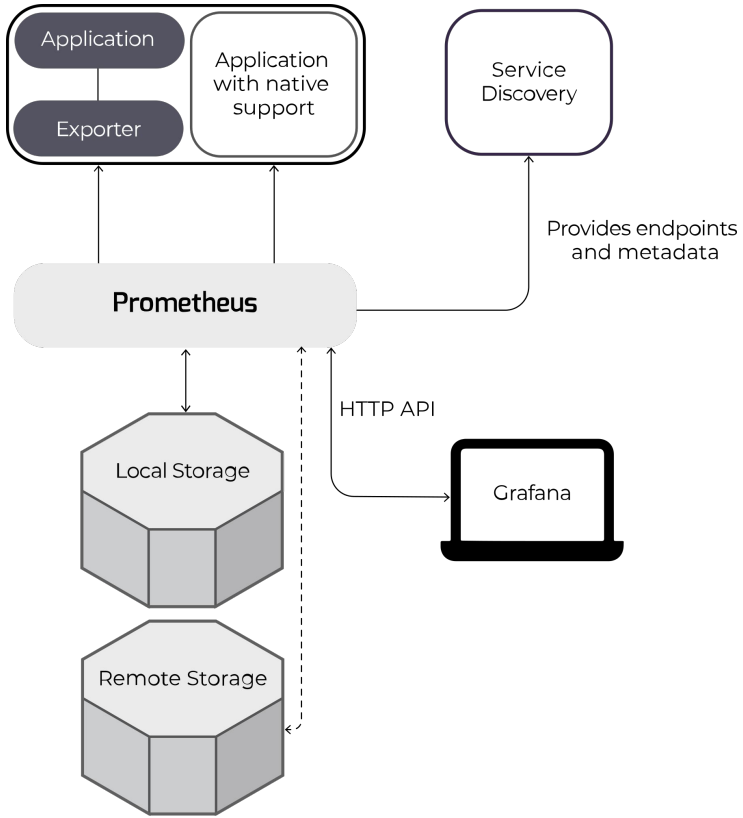
What to Monitoring?

Hosts
CPU, Memory, I/O, Network, Filesystem

Containers
CPU, Memory, I/O, Restarts, Throttling

Applications
Throughput, Latency

Prometheus


Application
Exporter
Application with native support
Service Discovery
Provides endpoints and metadata
Prometheus
HTTP API
Local Storage
Grafana
Remote Storage

INDONESIA
OpenInfra Days

Grafana

Biznet GioCloud Biznet Mellanox TECHNOLOGIES BANK BRI OSF OpenStack Foundation


Cluster Status
Uptime
3.1 week
CPU Usage
2887MHz
RAM Usage
8.34 GB
Cluster CPU
Cluster RAM
Cluster Network Usage
Cluster Storage Adapter
Datastores - Usage Capacity
Datastore Status
ISOS
91%
VMS-NFS41
91%
VeeamBackup_veeamsrv.zimbra.io
N/A
ZEXT-NETAPP-01
5.0%
ZEXT-QNAP-001
34%
ZINT-ESXi-01
0.3%
ZINT-ESXi-SSD-01
63%
ZINT-ESXi2-00
15%
ZINT-ESXi2-01
87%
ZINT-ESXi2-02
66%
ZINT-ESXi2-NVMe-01
45%
ZINT-ESXi2-SSD-01
47%
ZINT-ESXi2-SSD-02
32%
ZINT-ESXi2-SSD-03
77%
Hypervisor Status
Hypervisor CPU
Hypervisor Memory
Hypervisor Net Usage
vCenter CPU/RAM

INDONESIA
OpenInfra Days

Step by step
https://s.klas.or.id/moko-ioid19

Biznet GioCloud Biznet Mellanox TECHNOLOGIES BANK BRI OSF OpenStack Foundation

<>

Step by step monitoring OpenStack Instances

01 Prometheus

Install Prometheus server as TSDB

<>

Step by step monitoring OpenStack Instances

01 **Prometheus**
Install Prometheus server as TSDB

02 **Service Discovery**
Configure service discovery Prometheus to automatically check OpenStack instances

```
# my global config

global:
  scrape_interval:     15s # Set the scrape interval to every 15 seconds. Default is every 1 minute.
  evaluation_interval: 15s # Evaluate rules every 15 seconds. The default is every 1 minute.
  # scrape_timeout is set to the global default (10s).

# Alertmanager configuration
alerting:
  alertmanagers:
  - static_configs:
    - targets:
      # - alertmanager:9093

# Load rules once and periodically evaluate them according to the global 'evaluation_interval'.
rule_files:
  # - "first_rules.yml"
  # - "second_rules.yml"

# A scrape configuration containing exactly one endpoint to scrape:
# Here it's Prometheus itself.
scrape_configs:
  # The job name is added as a label `job=` to any timeseries scraped from this config.
  - job_name: 'prometheus'
    static_configs:
    - targets: ['localhost:9090']
  - job_name: 'openstack-sd'
    openstack_sd_configs:
      - identity_endpoint: https://keystone-url:5000/v3
        username: username
        project_id: projectid
        password: password
        role: instance
        region: region-name
        domain_name: domain-name
        port: 9100
```

<>

Step by step monitoring OpenStack Instances

01 **Prometheus**
Install Prometheus server as TSDB

02 **Service Discovery**
Configure service discovery Prometheus to automatically check OpenStack instances

03 **Grafana**
Install Grafana as dashboard to visualize metrics data

<>

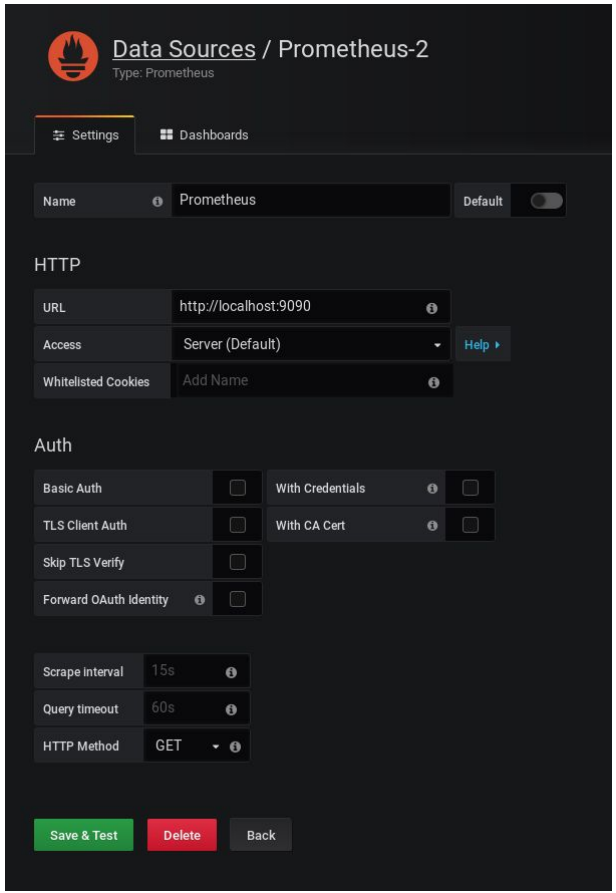
Step by step monitoring OpenStack Instances

01 Prometheus
Install Prometheus server as TSDB

02 Service Discovery
Configure service discovery Prometheus to automatically check OpenStack instances

03 Grafana
Install Grafana as dashboard to visualize metrics data

04 Datasource
Add Prometheus as datasource on Grafana for source of metrics data

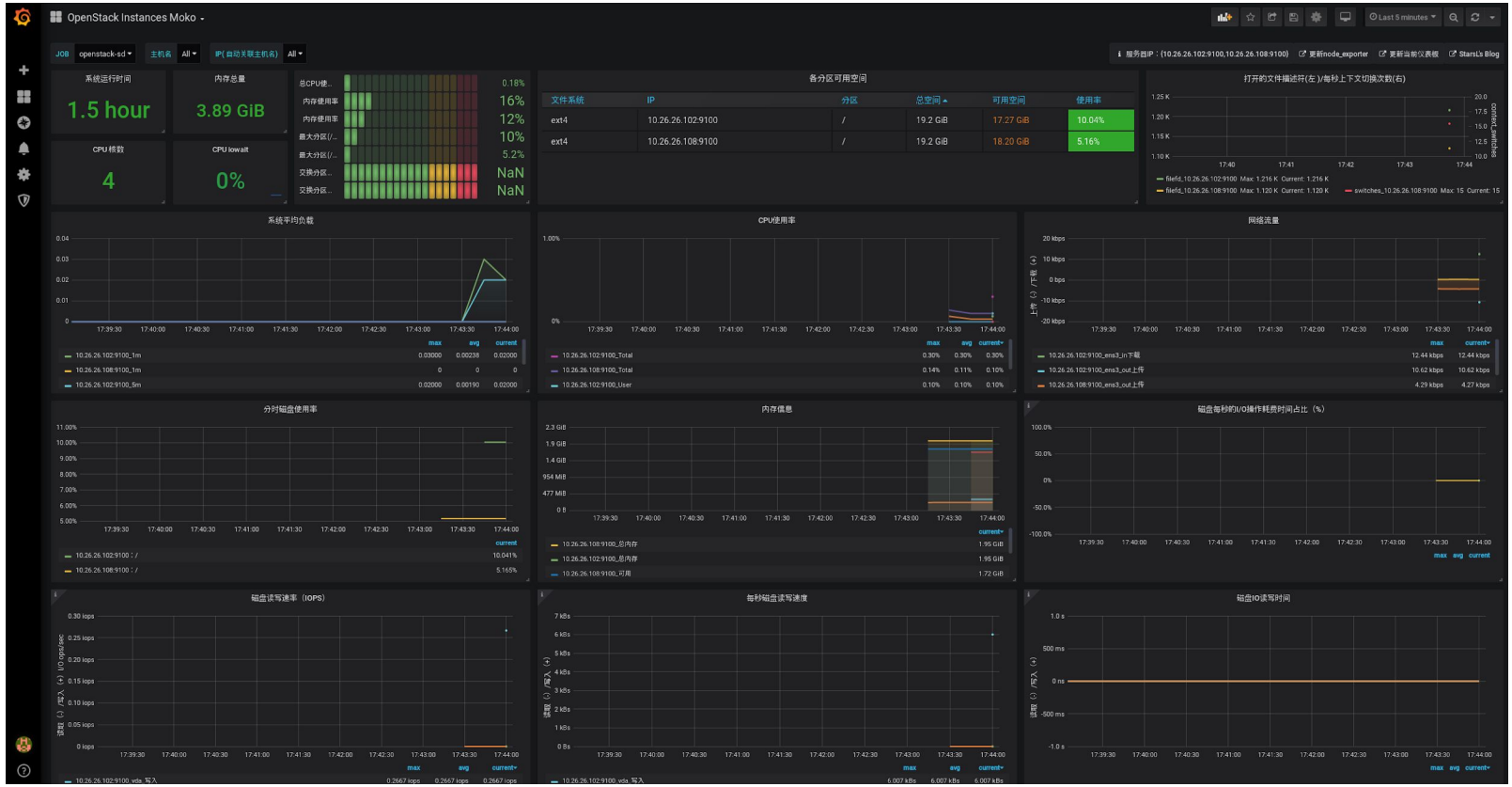

Data Sources / Prometheus-2
Type: Prometheus
Settings
Dashboards
Name
Prometheus
Default
HTTP
URL
http://localhost:9090
Access
Server (Default)
Help
Whitelisted Cookies
Add Name
Auth
Basic Auth
With Credentials
TLS Client Auth
With CA Cert
Skip TLS Verify
Forward OAuth Identity
Scrape interval
15s
Query timeout
60s
HTTP Method
GET
Save & Test
Delete
Back

<>

Step by step monitoring OpenStack Instances

05 **Dashboard**

Create Dashboard on Grafana as a visualization of metrics data on Prometheus


OpenStack Instances Moko
系统运行时间
1.5 hour
内存总量
3.89 GiB
CPU 核数
4
CPU iowait
0%
各分区可用空间
文件系统 IP 分区 总空间 可用空间 使用率
ext4 10.26.26.102:9100 / 19.2 GiB 17.27 GiB 10.04%
ext4 10.26.26.108:9100 / 19.2 GiB 18.20 GiB 5.16%
系统平均负载
CPU使用率
网络流量
分时磁盘使用率
内存信息
磁盘每秒的I/O操作耗费时间占比（%）
磁盘读写速率（IOPS）
每秒磁盘读写速度
磁盘IO读写时间

<>

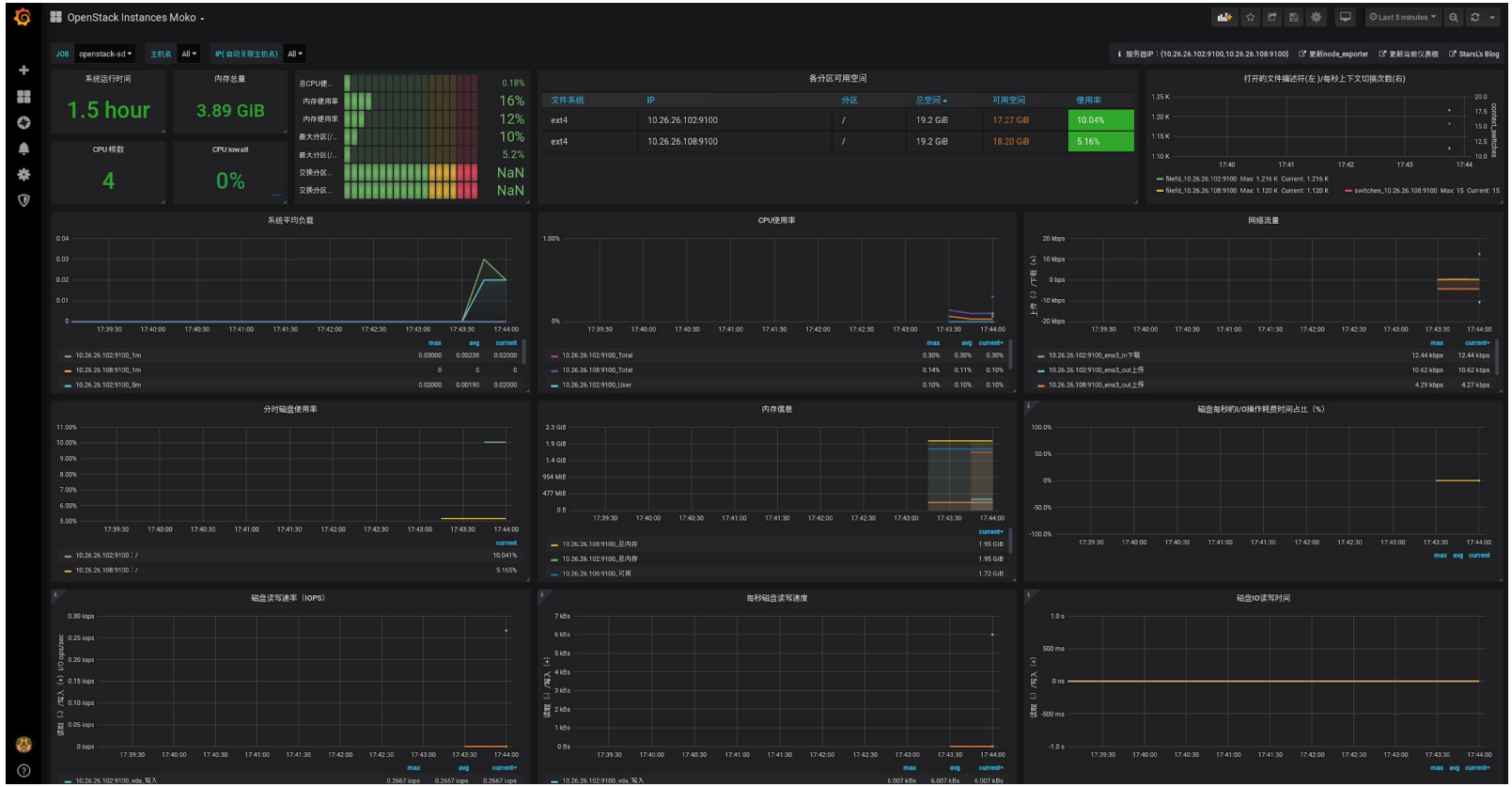
Step by step monitoring OpenStack Instances

05 **Dashboard**

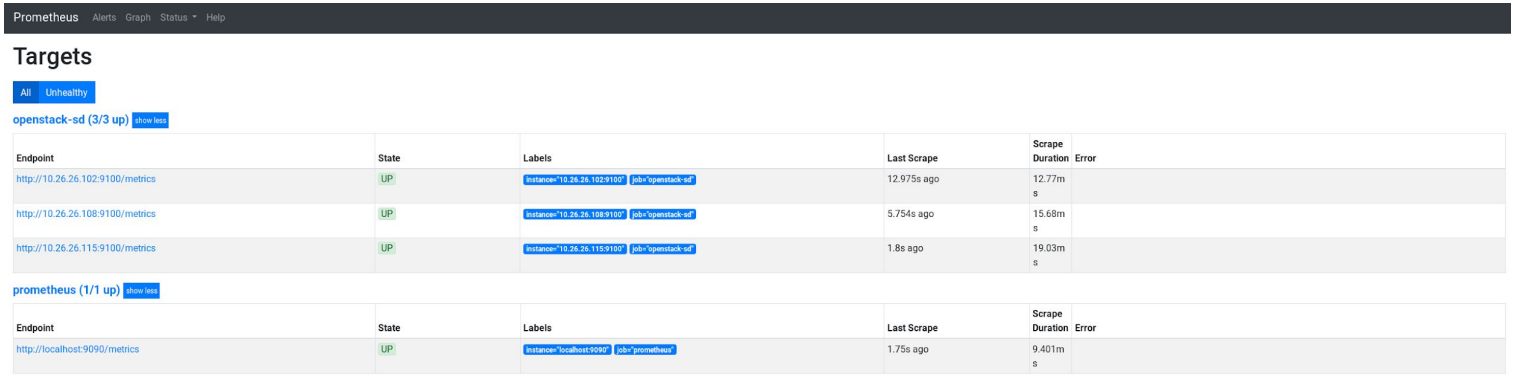
Create Dashboard on Grafana as a visualization of metrics data on Prometheus

06 **Node Exporter**

Install Node Exporter on OpenStack instances to make instances sent metrics to Prometheus


OpenStack Instances Moko
系统运行时间
1.5 hour
内存总量
3.89 GiB
CPU 核数
4
CPU iowait
0%
各分区可用空间
文件系统 IP 分区 总空间 可用空间 使用率
ext4 10.26.26.102:9100 / 19.2 GiB 17.27 GiB 10.04%
ext4 10.26.26.108:9100 / 19.2 GiB 18.20 GiB 5.16%
系统平均负载
CPU使用率
网络流量
分时磁盘使用率
内存信息
磁盘每秒的I/O操作耗费时间占比（%）
磁盘读写速率（IOPS）
每秒磁盘读写速度
磁盘IO读写时间


10.60.8.8:9100/metrics
HELP go_gc_duration_seconds A summary of the GC invocation durations.
TYPE go_gc_duration_seconds summary
go_gc_duration_seconds{quantile="0"} 0
go_gc_duration_seconds{quantile="0.25"} 0
go_gc_duration_seconds{quantile="0.5"} 0
go_gc_duration_seconds{quantile="0.75"} 0
go_gc_duration_seconds{quantile="1"} 0
go_gc_duration_seconds_sum 0
go_gc_duration_seconds_count 0
HELP go_goroutines Number of goroutines that currently exist.
TYPE go_goroutines gauge
go_goroutines 6
HELP go_info Information about the Go environment.
TYPE go_info gauge


Prometheus
Alerts
Graph
Status
Help
Targets
All
Unhealthy
openstack-sd (3/3 up)
show less
Endpoint
State
Labels
Last Scrape
Scrape Duration
Error
http://10.26.26.102:9100/metrics
UP
instance="10.26.26.102:9100"
job="openstack-sd"
12.975s ago
12.77ms
http://10.26.26.108:9100/metrics
UP
instance="10.26.26.108:9100"
job="openstack-sd"
5.754s ago
15.68ms
http://10.26.26.115:9100/metrics
UP
instance="10.26.26.115:9100"
job="openstack-sd"
1.8s ago
19.03ms
prometheus (1/1 up)
show less
Endpoint
State
Labels
Last Scrape
Scrape Duration
Error
http://localhost:9090/metrics
UP
instance="localhost:9090"
job="prometheus"
1.75s ago
9.401ms

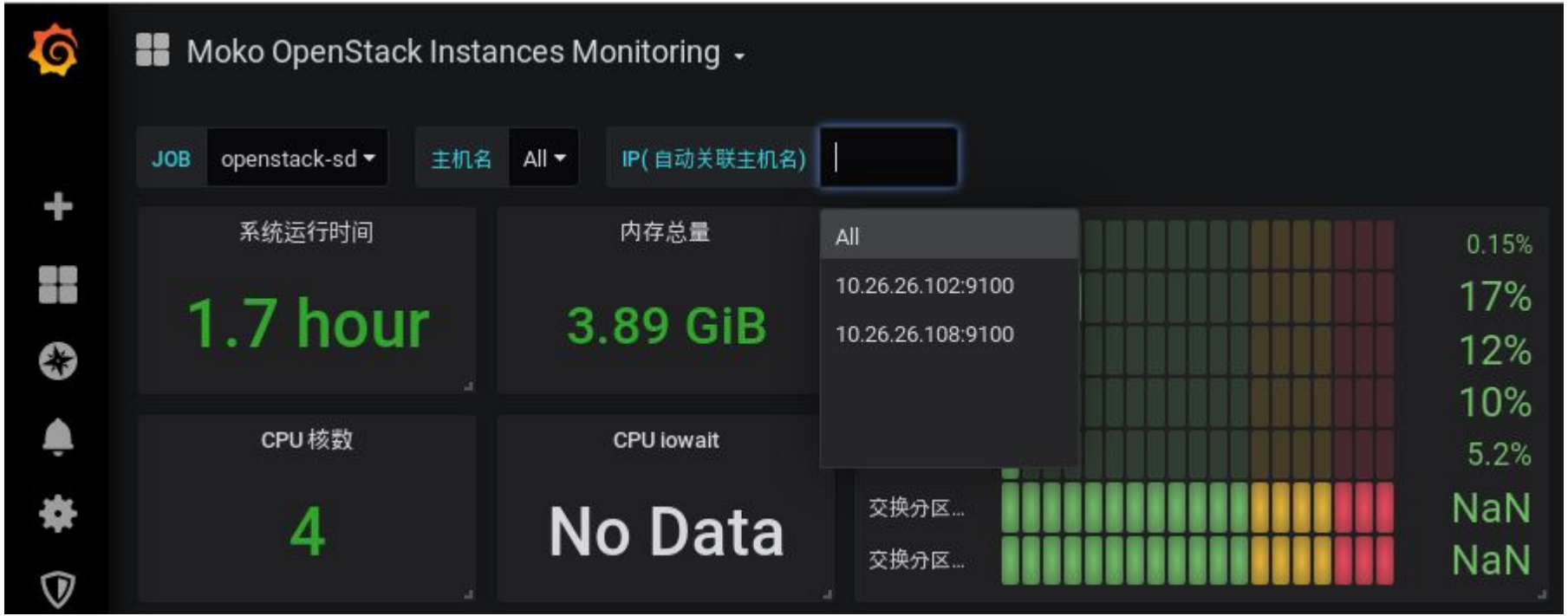
<>

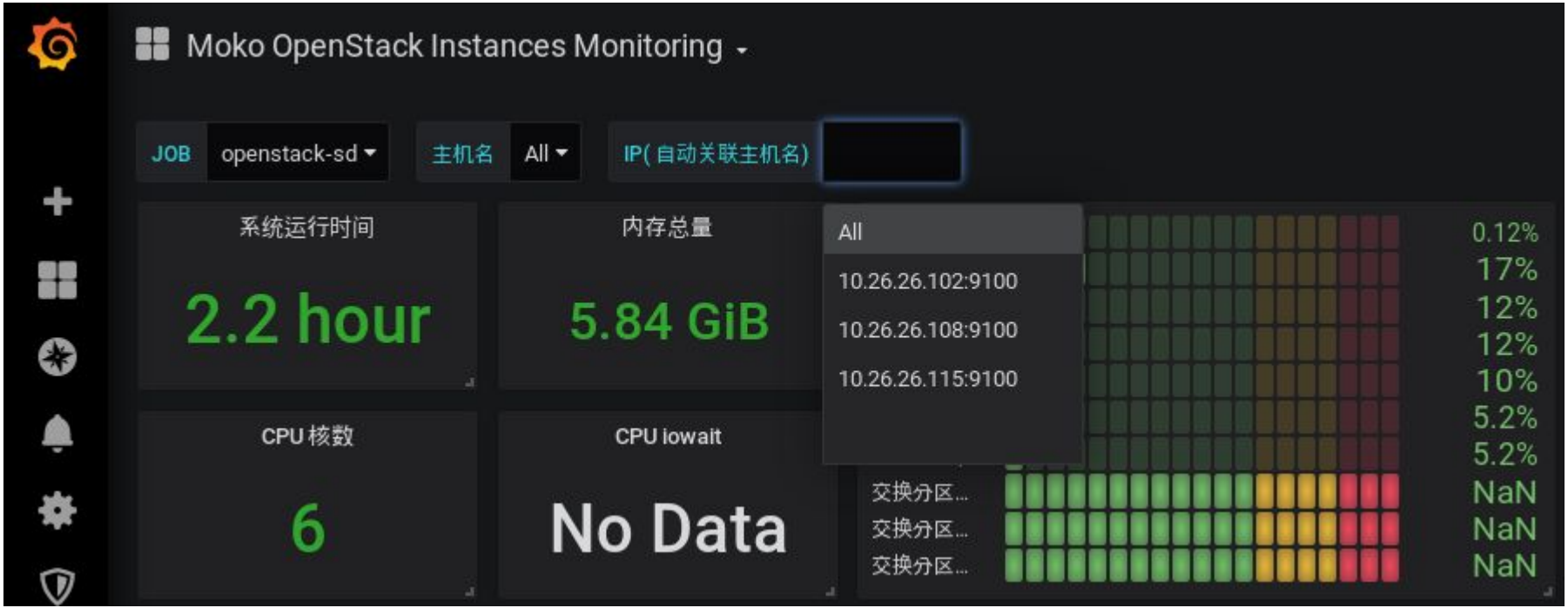
Step by step monitoring OpenStack Instances

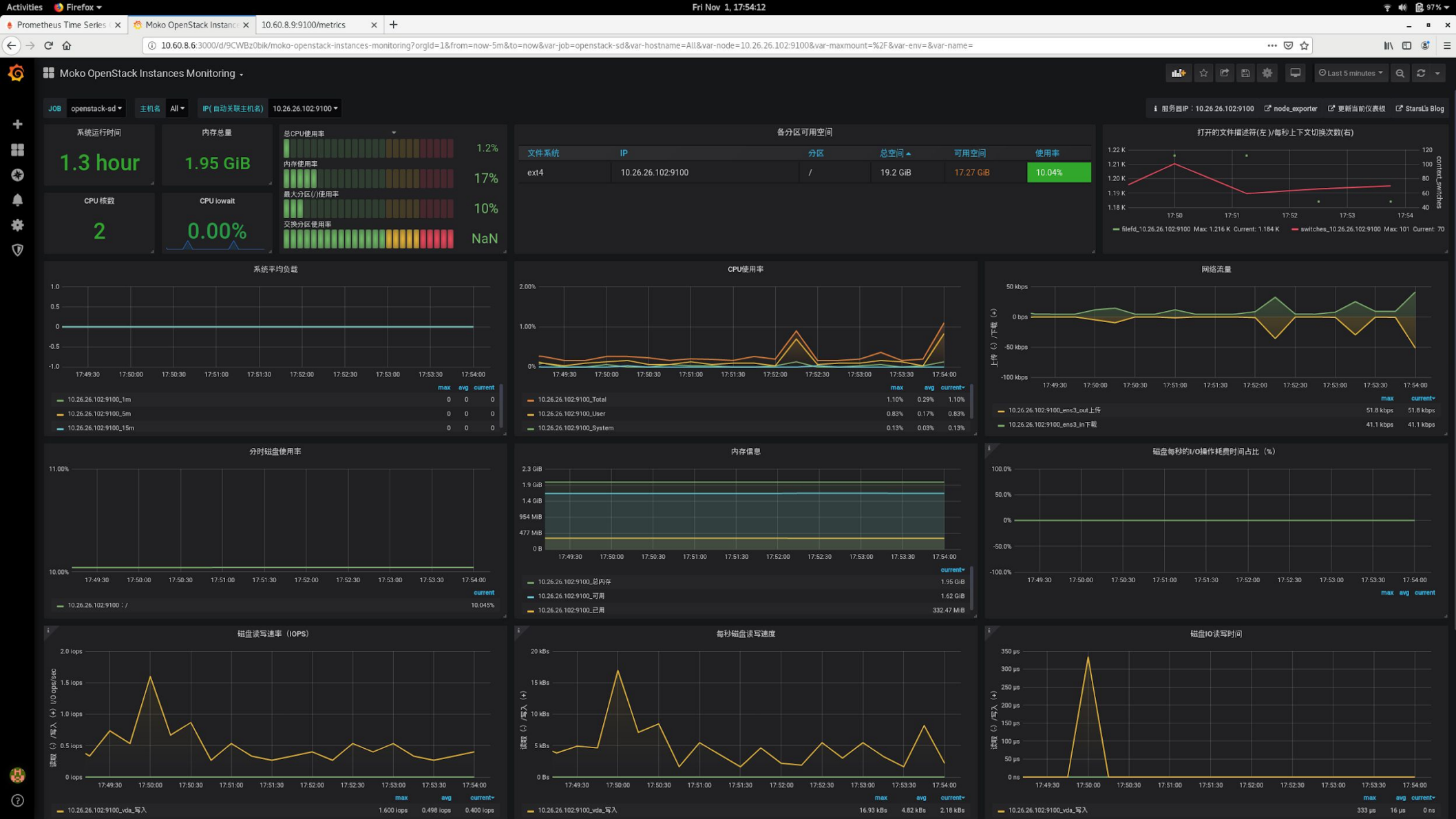
05 **Dashboard**
Create Dashboard on Grafana as a visualization of metrics data on Prometheus

06 **Node Exporter**
Install Node Exporter on OpenStack instances to make instances sent metrics to Prometheus

07 **Verification**
Check on Prometheus (targets) and Grafana (dashboard) to see the new instances added


Moko OpenStack Instances Monitoring
JOB
openstack-sd
主机名
All
IP(自动关联主机名)
系统运行时间
1.7 hour
内存总量
3.89 GiB
CPU 核数
4
CPU iowait
No Data
All
10.26.26.102:9100
10.26.26.108:9100
交换分区...
交换分区...
0.15%
17%
12%
10%
5.2%
NaN
NaN


Moko OpenStack Instances Monitoring
JOB
openstack-sd
主机名
All
IP(自动关联主机名)
系统运行时间
2.2 hour
内存总量
5.84 GiB
CPU 核数
6
CPU iowait
No Data
All
10.26.26.102:9100
10.26.26.108:9100
10.26.26.115:9100
交换分区...
交换分区...
交换分区...
0.12%
17%
12%
12%
10%
5.2%
5.2%
NaN
NaN
NaN


Activities
Firefox
Fri Nov 1, 17:54:12
Prometheus Time Series
Moko OpenStack Instance
10.60.8.9:9100/metrics
10.60.8.6:3000/d/9CWBz0bik/moko-openstack-instances-monitoring?orgId=1&from=now-5m&to=now&var-job=openstack-sd&var-hostname=All&var-node=10.26.26.102:9100&var-maxmount=%2F&var-env=&var-name=
Moko OpenStack Instances Monitoring
JOB
openstack-sd
主机名
All
IP(自动关联主机名)
10.26.26.102:9100
服务器IP：10.26.26.102:9100
node_exporter
更新当前仪表板
StarsLs Blog
Last 5 minutes
系统运行时间
1.3 hour
内存总量
1.95 GiB
CPU 核数
2
CPU iowait
0.00%
总CPU使用率
1.2%
内存使用率
17%
最大分区(/)使用率
10%
交换分区使用率
NaN
各分区可用空间
文件系统
IP
分区
总空间
可用空间
使用率
ext4
10.26.26.102:9100
/
19.2 GiB
17.27 GiB
10.04%
打开的文件描述符(左)/每秒上下文切换次数(右)
filefd_10.26.26.102:9100 Max: 1.216 K Current: 1.184 K
switches_10.26.26.102:9100 Max: 101 Current: 70
系统平均负载
10.26.26.102:9100_1m
10.26.26.102:9100_5m
10.26.26.102:9100_15m
CPU使用率
10.26.26.102:9100_Total
10.26.26.102:9100_User
10.26.26.102:9100_System
网络流量
10.26.26.102:9100_ens3_out上传
10.26.26.102:9100_ens3_in下载
分时磁盘使用率
10.26.26.102:9100：/
内存信息
10.26.26.102:9100_总内存
10.26.26.102:9100_可用
10.26.26.102:9100_已用
磁盘每秒的I/O操作耗费时间占比（%）
磁盘读写速率（IOPS）
10.26.26.102:9100_vda_写入
每秒磁盘读写速度
10.26.26.102:9100_vda_写入
磁盘IO读写时间
10.26.26.102:9100_vda_写入

References

- https://medium.com/@pasquier.simon/monitoring-your-openstack-instances-with-prometheus-a7ff4324db6c
- https://blog.aryulianto.com/monitoring-openstack-instances-with-service-discovery-prometheus-grafana/
- https://prometheus.io/blog/2018/07/05/implementing-custom-sd/
- https://grafana.com/grafana/dashboards/9276

INDONESIA
OpenInfra Days

Thank you!

Biznet GioCloud Biznet Mellanox TECHNOLOGIES BANK BRI OSF OpenStack Foundation