

Grafana

Grafana??Grafana????????????????????????????????????
??Grafana????????????????
?????

- [Installation](#)
- [Learning](#)
- [InfluxDB](#)
- [vSphere Monitoring](#)
- [Telegraf](#)
- [DB2 Monitoring](#)
- [Dashboards Setup](#)
- [Why Monitoring](#)
- [Prometheus](#)
- [Plugins](#)
- [AIX/Linux Monitoring with njmon](#)
- [Datasource](#)

Installation

With Docker

- [Run Grafana Docker image | Grafana documentation](#)
- [Configure Docker image | Grafana documentation](#)

```
docker volume create grafana-storage
```

```
docker run -d --name=grafana -p 3000:3000 \  
-v grafana-storage:/var/lib/grafana \  
grafana/grafana
```

docker-compose.yml

```
version: '3.8'  
services:  
  grafana:  
    image: grafana/grafana  
    container_name: grafana  
    restart: unless-stopped  
    ports:  
      - '3000:3000'  
    volumes:  
      - grafana-storage:/var/lib/grafana  
volumes:  
  grafana-storage: {}
```

Persistent Configuration

```
docker cp grafana:/etc/grafana/grafana.ini grafana.ini  
docker stop grafana  
docker rm grafana
```

```
docker run -d --name=grafana -p 3000:3000 \  
-v grafana-storage:/var/lib/grafana \  
-v $PWD/grafana.ini:/etc/grafana/grafana.ini \
```

RHEL 8

- [Install on RPM-based Linux | Grafana documentation](#)

```
cat <<EOF | sudo tee /etc/yum.repos.d/grafana.repo
[grafana]
name=grafana
baseurl=https://packages.grafana.com/oss/rpm
repo_gpgcheck=1
enabled=1
gpgcheck=1
gpgkey=https://packages.grafana.com/gpg.key
sslverify=1
sslcacert=/etc/pki/tls/certs/ca-bundle.crt
EOF

dnf makecache
dnf install grafana
```

Start the service

```
systemctl start grafana-server
systemctl status grafana-server
systemctl enable grafana-server
```

Access to the Web site

- URL: `http://server-ip-address:3000`
- Login: admin / admin

Learning

Dashboard Visualizing

- [Visualising Latency Variance in Grafana in 2019](#)
- [Grafana] [Troubleshoot queries](#)

MySQL Monitoring

- [2MySQL Simple Dashboard](#)
- [2MySQL Simple Dashboard 4 MariaDB](#)
- [my2Collector](#)
- [Video] [Grafana : Install MySQL Dashboard and Collector in Grafana](#)
- [Install MySQL Dashboard and Collector](#)

vSphere ESXi Monitoring

- [Video] [Grafana Monitoring | FREE Beginner course | Collect vSphere Metrics](#)
- [How To Monitor VMware ESXi with Grafana and Telegraf](#)
- [SexiGraf - vSphere Appliance](#)

HAProxy Monitoring

- [HAProxy Monitoring \(the InfluxDB Way\)](#)

Grafana Tutorials

- <https://sbcode.net/grafana/>
- [Video] [Introduction to Grafana Variables and Templates with Prometheus](#)
- [Video] [Variables with AWS CloudWatch](#)

Telegraf

- [Custom log parsing with latest Tail Plugin, GROK and InfluxDB](#)
- [Parsing Logs into InfluxDB Using Telegraf's Logparser Plugin](#)
- [Visualising Latency Variance with ping in Grafana in 2019](#)

- [?????Telegraf+InfluxDB+Grafana?????????????](#)

Amazon Cloudwatch

- [Grafana cloudwatch | Dynamic dashboard creation with variables](#)

Loki + Promtail

- [How To Forward Logs to Grafana Loki using Promtail](#)
- [LOG SCRAPPING MADE EASY WITH GRAFANA LOKI IN WINDOWS](#)
- [Read Nginx Logs with Promtail](#)
- [Grafana] [Get logs into Loki](#)
- [Configuring Promtail](#)
- [Grafana] [Promtail Pipelines](#)
- [???????Grafana Loki](#)
- [Grafana Loki ?????????? ELK ? EFK](#)
- [Meet Grafana LOKI, a Log Aggregation System for Everything](#)

Plugins

Hourly Heatmap

- [Plugin showcase: The hourly heatmap panel, built on Grafana's new plugin platform](#)
- [Hourly Heatmap for Grafana](#)

Asterisk Integration

NOTE: For Grafana Cloud only.

- [How to observe your Asterisk instance with Grafana Cloud](#)
- [Asterisk integration for Grafana Cloud](#)

InfluxDB

Installation

- [Install InfluxDB | InfluxDB OSS v2 Documentation \(influxdata.com\)](#)
- Download: <https://portal.influxdata.com/downloads/>

Install Influx DB

```
# Red Hat/CentOS/Fedora
cat <<EOF | sudo tee /etc/yum.repos.d/influxdata.repo
[influxdata]
name = InfluxData Repository - Stable
baseurl = https://repos.influxdata.com/stable/$basearch/main
enabled = 1
gpgcheck = 1
gpgkey = https://repos.influxdata.com/influxdata-archive_compat.key
EOF

yum install influxdb2
```

```
# With Docker
# --reporting-disabled [REDACTED]
mkdir data

docker run \
  --name influxdb \
  -p 8086:8086 \
  --volume $PWD/data:/var/lib/influxdb2 \
  influxdb:2.7.4 --reporting-disabled
```

Install Influx CLI

? InfluxDB 2.1 ???influx CLI ? influxDB ????????

Download: [Install and use the influx CLI | InfluxDB OSS 2.7 Documentation \(influxdata.com\)](#)

```
# amd64
wget https://dl.influxdata.com/influxdb/releases/influxdb2-client-2.7.1-linux-amd64.tar.gz
tar xvzf path/to/influxdb2-client-2.7.1-linux-amd64.tar.gz
mv influx /usr/local/bin/
```

Start the service

```
systemctl start influxdb
systemctl status influxdb
systemctl enable influxdb
```

Set up and initialize DB (v2.7+)

1. Visit `localhost:8086` in a browser
2. Create a user, bucket and organization names.
 - Initial username
 - Password
 - Initial organization name
 - Initial bucket name
3. The **API Tokens** will be generated.
4. Copy the generated token and store it for safe keeping.

InfluxDB configuration

file: `/etc/influxdb/config.{toml,yaml,yml,json}`

```
# View the server configurations
influx server-config
```

config.toml:

- `/var/lib/influxdb/engine` ??????

```
bolt-path = "/var/lib/influxdb/influxd.bolt"
engine-path = "/var/lib/influxdb/engine"
```

Optional: With Docker

```
docker exec -it influxdb influx config create --config-name local-admin --host-url http://localhost:8086 --org
<YOUR-ORG> --token <YOUR-TOKEN --active

docker cp influxdb:/etc/influxdb2/influx-configs ./
```

```
docker exec -it influxdb influx server-config > config.yml
```

```
docker run -p 8086:8086 \  
-v $PWD/config.yml:/etc/influxdb2/config.yml \  
-v $PWD/influx-configs:/etc/influxdb2/influx-configs \  
-v $PWD/data:/var/lib/influxdb2 \  
influxdb:2.7.4
```

Set up the influx CLI (v2.7+)

????????? influx CLI ???????????????? config create ????????????

```
# Create config  
influx config create --config-name <config-name> \  
--host-url http://localhost:8086 \  
--org <your-org> \  
--token <your-auth-token> \  
--active  
  
influx config ls  
  
# Enter InfluxQL shell  
influx v1 shell  
> show databases  
> quit  
  
# View the server configuration  
influx server-config
```

Schema Design

official tutorial: [InfluxDB schema design](#)

Data organization

- Bucket

- Measurement
 - Tags
 - Fields
 - Timestamp

Data Elements

- timestamp
- measurement
- tag key
- tag value
- field key
- field value

Where to store data (tag or field)

tag value

- ??????? string
- ????????
- ?????????????

field value

- ??????? strings, floats, integers, or boolean
- ??? String????????????
- ??? Integer???????????? i
- ??? GROUP BY ?????
- ?????????
- ????????????????? field value ?????????????????
- field ????? index???????? field????

?????

```
# Measurement name with spaces
my\ Measurement fieldKey="string value"

# Double quotes in a string field value
myMeasurement fieldKey="\string\ within a string"

# Tag keys and values with spaces
myMeasurement,tag\ Key1=tag\ Value1,tag\ Key2=tag\ Value2 fieldKey=100
```

?????

Measurement names, tag keys, and field keys ?????  ???

Management

Service

```
systemctl start influxdb
systemctl enable influxdb
systemctl stop influxdb
```

InfluxDB v2.7

```
# InfluxQL shell
influx v1 shell
> show databases
> quit

# User management
influx user ls
## Create user
influx user create -n <username> -p <password> -o <org-name>
## Delete user
influx user delete -i <user-id>

# Bucket management
influx bucket ls
## Create bucket
influx bucket create --name <bucket-name> --org <org-name> --retention <retention-period-duration>
influx bucket delete -n <bucket-name>
## Rename the bucket
influx bucket update -i <bucket-id> --name <new-bucket-name>
## Update the retention
influx bucket update -i <bucket-id> --retention 90d

# Token management
influx auth ls
```

Case: ?????? vmware ? token ???? bucket vmware

```
# Create a user for the Org windbs
influx user create -n vmware -o windbs
influx user password -n vmware

# Create a token for the User vmware and <bucket-id>

influx auth create \
  --org windbs \
  --read-bucket 299f5d260eab27cc \
  --write-bucket 299f5d260eab27cc \
  --user vmware \
  --description "vmware's token"
```

Case: ???? Token ??? Org ?????

```
influx auth create \
  --org my-org \
  --description "my-org-all-access" \
  --all-access
```

Case: ???? Token ??? Org ? Operator ??

```
influx auth create \
  --org my-org \
  --description "my-org-operator" \
  --operator
```

InfluxDB v1.8

Create a new user and database

```
influx
> CREATE USER admin WITH PASSWORD 'adminpass' WITH ALL PRIVILEGES
> exit

influx -username admin -password adminpass
> set password for admin = 'newpass'
>
```

```
> create database mmap_nmon with duration 180d
> create user mon with password 'thisispassword'
> grant ALL on mmap_nmon to mon
> show GRANTS for mon
```

Login to InfluxDB

```
# In the shell
influx -username admin -password thisispass

# In the InfluxDB CLI
> auth
username:
password
```

Logs (v2.7+)

```
journalctl -u influxdb
journalctl -n 50 -f -u influxdb
```

Configure log level

Level: debug, info (default), error

/etc/influxdb/config.toml:

```
log-level = "info"
```

Enable the Flux query log

/etc/influxdb/config.toml:

```
flux-log-enabled = true
```

Flux (v2.x)

2024/1/24 ??: Flux language ?????????????? InfluxQL ? core SQL ??????????

????? Flux language ?????????????? Web ?? Data Explorer?

List buckets

```
buckets()
```

List all measurements in a bucket

```
import "influxdata/influxdb/schema"

schema.measurements(bucket: "example-bucket")
```

List field keys

```
import "influxdata/influxdb/schema"

schema.fieldKeys(bucket: "example-bucket")
```

List fields in a measurement

```
import "influxdata/influxdb/schema"

schema.measurementFieldKeys(
  bucket: "example-bucket",
  measurement: "example-measurement",
)
```

List tags in a measurement

```
import "influxdata/influxdb/schema"

schema.measurementTagKeys(
  bucket: "example-bucket",
  measurement: "example-measurement",
)
```

Filter by fields and tags

```
from(bucket: "example-bucket")
  |> range(start: -1h)
  |> filter(fn: (r) => r._measurement == "example-measurement-name" and r.mytagname == "example-tag-value")
```

```
|> filter(fn: (r) => r._field == "example-field-name")
```

??????

```
|> first()
|> last()
|> limit(n: 3)
```

InfluxQL (v1.x)

```
> show databases
name: databases
name
----
_internal
nmon_reports
nmon2influxdb_log

> show users
user admin
---- ----
admin true
mon false

> use nmon_reports
Using database nmon_reports
> show measurements
name: measurements
name
----
CPU_ALL
DISKAVGRIO
DISKAVGWIO
DISKBSIZE
DISKBUSY
DISKREAD
DISKREADSERV
DISKRIO
```

```
DISKRXFER
```

```
DISKSERV
```

```
...
```

Retention Policy

```
# for current database
```

```
> show retention policies
```

```
name    duration  shardGroupDuration replicaN default
```

```
-----
```

```
autogen 8760h0m0s 168h0m0s      1    true
```

```
# for specified database
```

```
> show retention policies on nmon2influxdb_log
```

```
name      duration  shardGroupDuration replicaN default
```

```
-----
```

```
autogen    0s    168h0m0s      1    false
```

```
log_retention 48h0m0s 24h0m0s      1    true
```

```
# Create a policy
```

```
> CREATE RETENTION POLICY "one_day_only" ON "NOAA_water_database" DURATION 1d REPLICATION 1
```

```
# Alter the policy
```

```
> ALTER RETENTION POLICY "what_is_time" ON "NOAA_water_database" DURATION 3w SHARD DURATION 2h  
DEFAULT
```

```
# Delete a policy
```

```
> DROP RETENTION POLICY "what_is_time" ON "NOAA_water_database"
```

Verify the account

```
curl -G http://localhost:8086/query -u mon:thisispassword --data-urlencode "q=SHOW DATABASES"
```

```
{"results":[{"statement_id":0,"series":[{"name":"databases","columns":["name"],"values":[[{"mmap_nmon"}]]}]}
```

?????

```
SHOW MEASUREMENTS --[ ]
```

```
SHOW FIELD KEYS --[ ]
```

```
show field keys from <measurement-name>
```

```

SHOW series from pay --key
SHOW TAG KEYS FROM "pay" --key tag key
SHOW TAG VALUES FROM "pay" WITH KEY = "merId" --key tag key
SHOW TAG VALUES FROM cpu WITH KEY IN ("region", "host") WHERE service = 'redis'
DROP SERIES FROM WHERE ='' --key
SHOW CONTINUOUS QUERIES --
SHOW QUERIES --
KILL QUERY --
SHOW RETENTION POLICIES ON mydb --
show series cardinality on mydb --

```

????

```

SELECT * FROM ././ LIMIT 1 --
select * from pay order by time desc limit 2
select * from db_name."POLICIES name".measurement_name -- POLICIES name

```

????

```

delete from "query" --
drop MEASUREMENT "query" --delete
DELETE FROM cpu
DELETE FROM cpu WHERE time < '2000-01-01T00:00:00Z'
DELETE WHERE time < '2000-01-01T00:00:00Z'
DROP DATABASE "testDB" --
DROP RETENTION POLICY "dbbak" ON mydb --dbbak
DROP SERIES from pay where tag_key='' --key tag

```

????

- mean: ???
- sum: ??
- min: ???
- max: ???
- count: ???
- difference: ??? (?????????)
- non_negative_difference: ??? (?????????)

```

select * from pay order by time desc limit 2
select mean(allTime) from pay where time >= today() group by time(10m) tz('Asia/Taipei')
select * from pay tz('Asia/Taipei') limit 2

```



```
SELECT sum(allTime) FROM "pay" WHERE time > now() - 10s
select count(allTime) from pay where time > now() - 10m group by time(1s)

select difference("commit_sql") from "snapdb2" where time > now() - 1h limit 10
select non_negative_difference(*) from "snapdb2" where time > now() - 1h limit 10
select non_negative_difference(/commit_sql|rollback_sql/) from "snapdb2" where time > now() - 1h limit 10
```

User and Privileges

```
> CREATE USER "todd" WITH PASSWORD '123456'

> SHOW GRANTS for "todd"

> SET PASSWORD FOR "todd" = 'newpassword'

> GRANT READ ON "NOAA_water_database" TO "todd"
> GRANT ALL ON "NOAA_water_database" TO "todd"

> REVOKE ALL PRIVILEGES FROM "todd"
> REVOKE ALL ON "NOAA_water_database" FROM "todd"
> REVOKE WRITE ON "NOAA_water_database" FROM "todd"

> DROP USER "todd"
```

Covert timestamp to normal datetime

```
influx -precision rfc3339
# Or, in CLI
> precision rfc3339
```

Convert InfluxData to csv format

```
# With CLI
# There is also useful -precision option to set format of timestamp.
influx -database 'database_name' -execute "SELECT * FROM table_name" -format csv > test.csv

influx -username your_user_if_any -password "secret!" -database 'db_name' -host 'localhost' -execute 'SELECT *
FROM "db_name"."your_retention_policy_or_nothing"."your_measurement_name" WHERE time > \'2017-09-
05\' and time < \'2017-09-05T23:59:59Z\' AND other_conditions_if_required' -format 'csv' >
/tmp/your_measurement_name_20170905.csv
```

```
# With HTTP-API
# Samples:
# "q=SELECT * FROM \"mymeasurement\" where time > now() - 130d"
# "q=SELECT * FROM \"mymeasurement\" where (time < now() - 130d) and (time > now() - 260d)"
curl -G 'http://localhost:8086/query' --data-urlencode "db=mydb" --data-urlencode "epoch=#timeunit" --data-urlencode "q=SELECT * FROM \"mymeasurement\" " -H "Accept: application/csv" > mytargetcsv.csv
```

Tag Query

```
> show tag values from {measurement} with key={key}
> show tag values from {measurement} with key={key} where {tag-key}={tag-value}
```

Learning

- [\[Influxdb\] influxdb????](#)
- [Use Grafana with InfluxDB v1.8 | InfluxDB OSS 1.8 Documentation \(influxdata.com\)](#)
- [Setting up InfluxDB v2 \(Flux\) with InfluxQL in Grafana | by Ivana Huckova | Medium](#)

vSphere Monitoring

Method #1: Telegraf + InfluxDB

- [VMware vSphere - Overview | Grafana Labs](#)
- [Telegraf: VMware vSphere Input Plugin](#)

Install Telegraf

Download: <https://portal.influxdata.com/downloads/>

```
yum localinstall telegraf-1.18.3-1.x86_64.rpm
```

Configure Telegraf

Create a configuration file

```
telegraf config > /etc/telegraf/telegraf-vmware.conf
```

```
vi /etc/telegraf/telegraf-vmware.conf
```

Log file

```
...  
[agent]  
...  
logfile = "/var/log/telegraf/telegraf-vmware.log"  
...  
## If set to true, do not set the "host" tag in the telegraf agent.  
omit_hostname = true
```

Output for InfluxDB 1.x

```
# Configuration for sending metrics to InfluxDB 1.x  
[[outputs.influxdb]]  
  urls = ["http://10.10.2.209:8086"]  
  database = "vmware"
```

```
timeout = "0s"
username = "admin"
password = "dba4mis"
retention_policy = "200d"
```

Output for InfluxDB 2.x

```
[[outputs.influxdb_v2]]
## The URLs of the InfluxDB cluster nodes.
##
## Multiple URLs can be specified for a single cluster, only ONE of the
## urls will be written to each interval.
##  ex: urls = ["https://us-west-2-1.aws.cloud2.influxdata.com"]
urls = ["http://127.0.0.1:8086"]

## Token for authentication.
token = "Your-Token"

## Organization is the name of the organization you wish to write to.
organization = "Your-Org-Name"

## Destination bucket to write into.
bucket = "Tour-Bucket-Name"

## Timeout for HTTP messages.
timeout = "5s"
```

Input

????: [Telegraf: VMware vSphere Input Plugin](#)

```
#####
#####
#                INPUT PLUGINS                #
#####
#####

## Realtime instance
[[inputs.vsphere]]
```

```
interval = "60s"
```

```
## List of vCenter URLs to be monitored. These three lines must be uncommented  
## and edited for the plugin to work.
```

```
vcenters = [ "https://vcenter-server-ip/sdk" ]  
username = "admin@vsphere.local"  
password = "ThisPassword"
```

```
# Exclude all historical metrics  
datastore_metric_exclude = ["*"]  
cluster_metric_exclude = ["*"]  
datacenter_metric_exclude = ["*"]  
resourcepool_metric_exclude = ["*"]
```

```
#max_query_metrics = 256  
#timeout = "60s"  
insecure_skip_verify = true  
force_discover_on_init = true
```

```
collect_concurrency = 5  
discover_concurrency = 5
```

```
## Historical instance
```

```
[[inputs.vsphere]]  
interval = "300s"
```

```
vcenters = [ "https://vcenter-server-ip/sdk" ]  
username = "admin@vsphere.local"  
password = "ThisPassword"
```

```
host_metric_exclude = ["*"] # Exclude realtime metrics  
vm_metric_exclude = ["*"] # Exclude realtime metrics
```

```
insecure_skip_verify = true  
force_discover_on_init = true  
max_query_metrics = 256  
collect_concurrency = 3
```

Configure systemd

```
cp /usr/lib/systemd/system/telegraf.service /usr/lib/systemd/system/telegraf-vmware.service
sed -i 's/telegraf.conf/telegraf-vmware.conf/g' /usr/lib/systemd/system/telegraf-vmware.service
```

Startup Telegraf

```
systemctl daemon-reload
systemctl start telegraf-vmware
systemctl enable telegraf-vmware
```

Configure InfluxDB

Set the retention policy

```
[root@mm-mon ~]# influx -username admin -password dba4mis
Connected to http://localhost:8086 version 1.8.5
InfluxDB shell version: 1.8.5
> show retention policies on vmware
name    duration shardGroupDuration replicaN default
----  -
autogen 0s      168h0m0s      1      true
> alter retention policy "autogen" on "vmware" duration 200d shard duration 1d
> show retention policies on vmware
name    duration  shardGroupDuration replicaN default
----  -
autogen 4800h0m0s 24h0m0s      1      true
```

Configure Grafana

1. Add a datasource for InfluxDB
 - Name: VMware
 - Type: InfluxDB
 - Database: vmware
 - Username: <InfluxDB Credential>
 - Password: <InfluxDB Credential>
2. Import the dashboards
 1. <https://grafana.com/grafana/dashboards/8159>
 2. <https://grafana.com/grafana/dashboards/8165>
 3. <https://grafana.com/grafana/dashboards/8168>
 4. <https://grafana.com/grafana/dashboards/8162>

FAQ

Q: ????? VM ????? Dashboard?

A: ??? InfluxDB ????? VM ? data????????? Dashboard Settings > Variables > virtualmachine > ?? Update??? Preview of values ????? VM name?

?? InfluxDB

```
# Check all current VM names
select DISTINCT("vmname") from (select "ready_summation","vmname" from "vsphere_vm_cpu" WHERE time >
now() - 10m)
```

Q: Telegraf ????

“ [inputs.vsphere] Error in plugin: while collecting vm: ServerFaultCode: A specified parameter was not correct: querySpec[0].endTime

A: ??????????

```
force_discover_on_init = true
```

Q: Issue: VMware vSphere - Overview

“ vCenter CPU/RAM ?????????

A: ???? > Flux language syntax

? <vcenter-name> ????? vm ??

```
from(bucket: v.defaultBucket)
  |> range(start: v.timeRangeStart, stop: v.timeRangeStop)
  |> filter(fn: (r) => r["_measurement"] == "vsphere_vm_cpu")
  |> filter(fn: (r) => r["_field"] == "usage_average")
  |> filter(fn: (r) => r["vmname"] == "<vcenter-name>_vCenter")
  |> group(columns: ["vmname"])
  |> aggregateWindow(every: v.windowPeriod, fn: mean, createEmpty: false)
  |> yield(name: "mean")
```

“ Cluster ????????? cluster name

A: ?? Dashboard > Variables > clustername > Flux language syntax

```
from(bucket: v.defaultBucket)
  |> range(start: v.timeRangeStart, stop: v.timeRangeStop)
  |> filter(fn: (r) => r["_measurement"] == "vsphere_host_cpu")
  |> filter(fn: (r) => r["clustername"] != "")
  |> filter(fn: (r) => r["vcenter"] == "${vcenter}")
  |> keep(columns: ["clustername"])
  |> distinct(column: "clustername")
  |> group()
```

Method #2: SexiGraf

- Official: <http://www.sexigraf.fr/quickstart/>
- OS-based: Ubuntu 16.04.6 LTS

Download the OVA appliance

- <http://www.sexigraf.fr/quickstart/>
- <https://github.com/sexibytes/sexigraf>

vCenter/vSphere Credential for monitor only

vCenter Web Client > ??? > ????? > Single Sign On: ?????? > ??

- ?????: winmon
- ??: xxxx
- ?????: xxxx

vCenter Web Client > ??? > ????? > ?? > ?????

- ????: vsphere.local , ?? winmon
- ??: ??
- ??????: ??

Deploy the OVA to vCenter/ESXi

??? ESXi 6.5 ????????

Line 163: Unable to parse 'tools.syncTime' for attribute 'key' on element 'Config'.

????: ?? OVF-Tool ??? OVA ???? OVF ????

Before

```
<vmw:Config ovf:required="true" vmw:key="tools.syncTime" vmw:value="true"/>
```

After

```
<vmw:Config ovf:required="false" vmw:key="tools.syncTime" vmw:value="true"/>
```

????????????

First to Start the VM

1. SSH Credential: root / Sex!Gr@f

2. Need to manually configure the IP, Edit the `/etc/network/interfaces` .

3. Configure the hostname

```
hostnamectl set-hostname esx-mon
```

4. Configure the timezone and time server

```
timedatectl set-timezone Asia/Taipei
```

vi `/etc/ntp.conf`

```
#pool 0.ubuntu.pool.ntp.org iburst
#pool 1.ubuntu.pool.ntp.org iburst
#pool 2.ubuntu.pool.ntp.org iburst
#pool 3.ubuntu.pool.ntp.org iburst

# Use Ubuntu's ntp server as a fallback.
#pool ntp.ubuntu.com

# Added the local time server
server 192.168.21.86 prefer iburst
```

Restart the ntpd

```
systemctl stop ntp  
systemctl start ntp  
  
# Check the timeserver  
ntpq -p
```

First to Login the Grafana Web

1. Login: admin / Sex!Gr@f
2. Add the credential to connect to the vCenter server managed: Search > SexiGraf > SexiGraf Web Admin > Credential Store
 - vCenter IP: <vCenter/ESXi IP or FQDN>
 - Username: <Username to login to vCenter/ESXi>
 - Password: <Password to login to vCenter/ESXi>

Telegraf

Installation

- [Install Telegraf | Telegraf 1.26 Documentation \(influxdata.com\)](https://docs.influxdata.com/telegraf/v1.26/installation/)

RHEL

```
cat <<EOF | sudo tee /etc/yum.repos.d/influxdb.repo
[influxdb]
name = InfluxData Repository - Stable
baseurl = https://repos.influxdata.com/stable/$basearch/main
enabled = 1
gpgcheck = 1
gpgkey = https://repos.influxdata.com/influxdata-archive_compat.key
EOF

sudo yum install telegraf
```

Ubuntu/Debian

```
curl -s https://repos.influxdata.com/influxdata-archive_compat.key > influxdata-archive_compat.key
echo '393e8779c89ac8d958f81f942f9ad7fb82a25e133faddaf92e15b16e6ac9ce4c influxdata-
archive_compat.key' | sha256sum -c && cat influxdata-archive_compat.key | gpg --dearmor | sudo tee
/etc/apt/trusted.gpg.d/influxdata-archive_compat.gpg > /dev/null
echo 'deb [signed-by=/etc/apt/trusted.gpg.d/influxdata-archive_compat.gpg] https://repos.influxdata.com/debian
stable main' | sudo tee /etc/apt/sources.list.d/influxdata.list
sudo apt-get update && sudo apt-get install telegraf
```

Configuration

```
telegraf config > telegraf.conf

# Using filter
telegraf --input-filter exec --output-filter influxdb_v2 config > /etc/telegraf/telegraf.conf
```

```
# Test for the configuration
telegraf -config /etc/telegraf/telegraf.conf -test
```

Custom systemd

```
cp /usr/lib/systemd/system/telegraf.service /etc/systemd/system/telegraf-db2.servic
```

telegraf-db2.service:

```
## [Unit]
EnvironmentFile=-/etc/default/telegraf-db2

## [Service]
ExecStart=/usr/bin/telegraf -config /etc/telegraf/telegraf-db2.conf $TELEGRAF_OPTS
```

Reload the daemon

```
systemctl list-unit-files --type service
systemctl daemon-reload
```

Outputs.InfluxDB v1

```
#####
#####
#                OUTPUT PLUGINS                #
#####
#####

# Configuration for sending metrics to InfluxDB
[[outputs.influxdb]]
  urls = ["http://influxdb.server.ip.addr:8086"]
  database = "db-name"
  timeout = "0s"
  username = "db-user"
  password = "db-pass"
```

Outputs.InfluxDB v2

```
#####  
#####  
#                OUTPUT PLUGINS                #  
#####  
#####  
  
[[outputs.influxdb_v2]]  
  urls = ["http://influxdb.server.ip.addr:8086"]  
  token = "example-token"  
  organization = "example-org"  
  bucket = "example-bucket"
```

Inputs.exec

data_format = "influx"

???????

```
# Syntax for Line protocol  
<measurement>[,<tag_key>=<tag_value>[,<tag_key>=<tag_value>]]  
<field_key>=<field_value>[,<field_key>=<field_value>] [<timestamp>]  
                                     |                               |  
                                     <whitespace>                 <whitespace>  
  
# Example  
airsensors,location=bedroom,sensor_id=MI0201 temperature=19.1,humidity=85i,battery=78i  
1556813561098000000
```

- “
- ?? Timestamp ???????????? InfluxDB ??????(UTC)?
 - ?????? [Line protocol | InfluxDB OSS v2 Documentation \(influxdata.com\)](#)
 - field_value ??? Integer???? i?? String???????
 - measurename, tag_key, tag_value, field_key ????????
 - ?????? measurename, field_key, field_value?
 - ?????????????????????? (\n) ????
 - ??????????

Plugins

- [Plugin directory | Telegraf Documentation \(influxdata.com\)](https://influxdata.com/docs/plugins/)

Scripts

Samples #1

```
#!/bin/bash
```

```
devname=(`lsblk| grep 'disk'|awk '{print $1}'`)
```

```
dirname=(`lsblk| grep 'disk'|awk '{if ($7=="") print "/";else print $7}'`)
```

#At that time, I wanted to store these directory names in dictionary format, and later changed to variable mode, shell Of [] { } * @ \$Special characters will drive you crazy

```
#declare -A devdict
```

```
devnum=`expr ${#devname[@]} - 1`
```

```
for i in `seq 0 $devnum`;do
```

```
if [-z "${dirname[$i]}" ];then
```

```
eval ${devname[$i]}="/"
```

```
else
```

```
eval ${devname[$i]}="${dirname[$i]}"
```

```
fi
```

```
#devdict+=([${devname[$i]}]=${dirname[$i]})
```

```
done
```

```
#echo ${!devdict[*]}
```

```
#echo ${devdict[*]}
```

```
ioarray=`iostat -x | grep sd|awk '{print
```

```
"datadir=${!1}"@r="$4",w="$5",await="$10",svctm="$11",util="$12}'`
```

```
for i in ${ioarray[@]};do
```

```
eval temp="${!i}"
```

#Replace the special character @, and the space in the shell will be truncated to two elements

```
temp=${temp/@/ }
```

```
echo "exec,${temp}"
```

#Ensure that the final output is in the following format. The first character is the measurement name. If the input.exec plug-in has the configuration name "suffix", the suffix will be added automatically

#The output format is measurement name, comma, tag keys (comma separated), space, filed keys (comma separated)

#The data format output mismatch will lead to the failure of telegraf to parse the data and go to the influxdb. It took a long time to debug and didn't look at the hole dug by the official website

```
#exec,datadir=/data/data11 r=4.1,w=6.1,await=0.83,svctm=1.35,util=1.46"
done
#echo ${devdict[@]}
```

```
[[inputs.exec]]
##Commands array
commands = ["bash /appcom/telegraf/collect_iostat.sh",]
timeout='5s'
##Suffix for measurements
name_suffix="_collectiostat"
data_format="influx"
```

Sample #2

```
#!/bin/sh
hostname=`hostname`
uptime=`awk '{print $1}' /proc/uptime`
if uptime |grep -q user ; then
load1=`uptime | grep -ohe 'up .*' | sed 's/,//g' | awk '{ print $7}'`
load5=`uptime | grep -ohe 'up .*' | sed 's/,//g' | awk '{ print $8}'`
load15=`uptime | grep -ohe 'up .*' | sed 's/,//g' | awk '{ print $9}'`
else
load1=`uptime | grep -ohe 'up .*' | sed 's/,//g' | awk '{ print $5}'`
load5=`uptime | grep -ohe 'up .*' | sed 's/,//g' | awk '{ print $6}'`
load15=`uptime | grep -ohe 'up .*' | sed 's/,//g' | awk '{ print $7}'`
fi
echo "uptime,host=$hostname uptime=$uptime,load1=$load1,load5=$load5,load15=$load15"
```

```
[agent]
interval = "5s"
round_interval = true
[[inputs.swap]]
[inputs.swap.tags]
metrics_source="telegraf_demo"
[[inputs.exec]]
commands = ["/etc/telegraf/uptime.sh"]
data_format = "influx"
[inputs.exec.tags]
metrics_source="telegraf_demo"
[[outputs.influxdb]]
```

```
url = "https://influxdemo:8086"
database = "telegraf"
```

Sample #3

```
#!/bin/bash
/usr/bin/speedtest --format json | jq '.download.bandwidth = .download.bandwidth / 125000 | .upload.bandwidth
= .upload.bandwidth / 125000'
```

```
[[inputs.exec]]
  commands = [
    "/home/rock64/speedtest.sh"
  ]
  interval = "300s"
  timeout = "60s"
```

Sample #4

```
[[inputs.exec]]
  commands = ["sh -c 'sysctl -n dev.cpu.0.temperature | tr -d C'"]
  name_override = "cpu_temp"
  timeout = "5s"
  data_format = "value"
  data_type = "float"
[inputs.exec.tags]
  core = "core0"

[[inputs.exec]]
  commands = ["sh -c 'sysctl -n dev.cpu.1.temperature | tr -d C'"]
  name_override = "cpu_temp"
  timeout = "5s"
  data_format = "value"
  data_type = "float"
[inputs.exec.tags]
  core = "core1"

[[inputs.exec]]
  commands = ["sh -c 'sysctl -n dev.cpu.2.temperature | tr -d C'"]
  name_override = "cpu_temp"
  timeout = "5s"
```



```

data_format = "value"
data_type = "float"
[inputs.exec.tags]
  core = "core2"

[[inputs.exec]]
  commands = ["sh -c 'sysctl -n dev.cpu.3.temperature | tr -d C'"]
  name_override = "cpu_temp"
  timeout = "5s"
  data_format = "value"
  data_type = "float"
[inputs.exec.tags]
  core = "core3"

```

Q & A

[agent] Error terminating process: operation not permitted

Causation: ? telegraf.conf ?????? agent ?????????? timeout ?????????? agent ??????????telegraf
 ?????? agent ???

Solution: ?????????????? agent ?????????? timeout ??????????????????????

????????????? timeout ?????? agent ??????????????????????????????????

?? telegraf ??? agent ?????????????????? timeout ???

???????agent ?? sudo ??? db2 ???????????

```

[[inputs.exec]]
  interval = "1h"
  commands = ["sudo -u db2mon sh -c '/home/db2mon/bin/collect_db2x1h.sh -d centdb -a b_centdb'"]
  timeout = "5s"
  data_format = "influx"

```

?? telegraf ?? kill ? sudo ?????????????????????? collect_db2x1h.sh????? telegraf ?? sudo
 ??????

```

[[inputs.exec]]
  interval = "1h"
  commands = ["/home/db2mon/bin/collect_db2x1h.sh -d centdb -a b_centdb"]

```

```
timeout = "15s"
data_format = "influx"
```

?????timeout ?????????? agent????????????????

```
## [inputs.exec] Error in plugin: exec: command timed out for command
'/home/db2mon/bin/collect_db2x1h.sh -d centdb -a b_centdb'
```

????????????? timeout?

Error in plugin: metric parse error: expected tag at 7:20:

Causation: ??? Influxdata ???????

Solution: ??? 7 ??? 20 ?????Influxdada ???

```
measurement, tag-key1=tag-value1,tag-key2=tag-value2 field-key1=field-value1,field-
key2=field-value2,...
```

- tag-key type: string
- tag-value type: string
NOTE: ????????
- field-key type: string
- field-value type: Float | Integer | UInteger | String | Boolean
NOTE: ??? string ??????

max-series-per-database limit exceeded: (1000000)

Causation: ???????????????????? 1000000?

? InfluxDB CLI ??????????????????

```
show series cardinality on <db-name>
```

Solution: ?? InfluxDB ?????????? /etc/influxdb/influxdb.conf ??? 1000000

```
# max-series-per-database = 1000000
max-series-per-database = 2000000
```

?? InfluxDB

```
systemctl restart influxdb
```


DB2 Monitoring

Prerequisites

- InfluxDB (the host is the same as Grafana)
- Separated Linux host
 - Install and running telegraf
 - Install DB2 Client
 - Implement custom scripts

InfluxDB

?? database

```
> create database db2_mon with duration 180d
> create user mon with password 'thisispassword'
> grant read on db2_mon to mon
```

“ mon ?????? Grafana ? datasource ???

Telegraf

??????? telegraf-db2.conf

```
telegraf --input-filter exec --output-filter influxdb config > /etc/telegraf/telegraf-db2.conf
```

?????

```
[agent]
...
...
logfile = "/var/log/telegraf/telegraf-db2.log"

# Configuration for sending metrics to InfluxDB
[[outputs.influxdb]]
```

```
urls = ["http://10.10.2.209:8086"]
```

```
database = "db2_mon"
```

```
timeout = "0s"
```

```
username = "admin"
```

```
password = "Thispassword"
```

```
[[inputs.exec]]
```

```
interval = "300s"
```

```
## Commands array
```

```
#commands = [
```

```
# "/tmp/test.sh",
```

```
# "/usr/bin/mycollector --foo=bar",
```

```
# "/tmp/collect_*.sh"
```

```
#]
```

```
commands = ["sudo -u db2mon sh -c '/home/db2mon/bin/collect_db2.v2.sh -d dcdb -a b_dcdb -u dbuser -p dbpass'"]
```

```
## Timeout for each command to complete.
```

```
timeout = "5s"
```

```
## measurement name suffix (for separating different commands)
```

```
#name_suffix = "_mycollector"
```

```
## Data format to consume.
```

```
## Each data format has its own unique set of configuration options, read
```

```
## more about them here:
```

```
## https://github.com/influxdata/telegraf/blob/master/docs/DATA\_FORMATS\_INPUT.md
```

```
data_format = "influx"
```

```
[[inputs.exec]]
```

```
interval = "1h"
```

```
commands = ["sudo -u db2mon sh -c '/home/db2mon/bin/collect_db2x1h.sh -d dcdb -a b_dcdb -u dbuser -p dbpass'"]
```

```
timeout = "5s"
```

```
data_format = "influx"
```

```
### CENTDB
```

```
[[inputs.exec]]
```

```
interval = "300s"
```

```

    commands = ["sudo -u db2mon sh -c '/home/db2mon/bin/collect_db2.v2.sh -d centdb -a b_centdb -u dbuser -p dbpass'"]
    timeout = "5s"
    data_format = "influx"

```

?????????? telegraf-db2.service

“ NOTE: ?? telegraf ???????????????????????? Output ???????????? telegraf
???

```
cp /usr/lib/systemd/system/telegraf.service /etc/systemd/system/telegraf-db2.service
```

?????

```
// [ ] [ ] [ ] [ ]  
ExecStart=/usr/bin/telegraf -config /etc/telegraf/telegraf-db2.conf $TELEGRAF_OPTS
```

```
ExecStart=/usr/bin/telegraf -config /etc/telegraf/telegraf-db2.conf $TELEGRAF_OPTS
```

???????????? telegraf-db2??????????

```
systemctl list-unit-files --type service
systemctl daemon-reload
```

```
systemctl daemon-reload
```

DB2 Metrics

Bufferpool

```
-- DATA_HIT_RATIO_PERCENT: Data hit ratio, that is, the percentage of time that the database manager did not
need to load a page from disk to service a data page request.

-- INDEX_HIT_RATIO_PERCENT: Index hit ratio, that is, the percentage of time that the database manager did not
need to load a page from disk to service an index data page request.

select BP_NAME, DATA_HIT_RATIO_PERCENT, INDEX_HIT_RATIO_PERCENT
from sysibmadm.MON_BP_UTILIZATION
where BP_NAME not like 'IBMSYS%' and BP_NAME<>'IBMDEFAULTBP'
```

```
select BP_NAME, DATA_HIT_RATIO_PERCENT, INDEX_HIT_RATIO_PERCENT
from sysibmadm.MON_BP_UTILIZATION
where BP_NAME not like 'IBMSYS%' and BP_NAME <> 'IBMDEFAULTBP'
```

Logs (active log & archive log)

```
-- LOG_UTILIZATION_PERCENT: Percent utilization of total log space. (active logs)
-- TOTAL_LOG_USED_KB: The total amount of active log space currently used in the database
-- TOTAL_LOG_AVAILABLE_KB: The amount of active log space in the database that is not being used by
```


uncommitted transactions.

```
select DB_NAME, LOG_UTILIZATION_PERCENT, TOTAL_LOG_USED_KB, TOTAL_LOG_AVAILABLE_KB
from sysibmadm.log_utilization
```

Connections

```
-- APPLS_CUR_CONS: Indicates the number of applications that are currently connected to the database.
-- LOCKS_WAITING: Indicates the number of agents waiting on a lock.
-- NUM_INDOUBT_TRANS: The number of outstanding indoubt transactions in the database.
select DB_NAME,APPLS_CUR_CONS,LOCKS_WAITING,NUM_INDOUBT_TRANS from sysibmadm.snapdb
```

Transactions

```
-- 
-- COMMIT_SQL_STMTS: The total number of SQL COMMIT statements that have been attempted.
-- ROLLBACK_SQL_STMTS: The total number of SQL ROLLBACK statements that have been attempted.
select COMMIT_SQL_STMTS, ROLLBACK_SQL_STMTS from sysibmadm.snapdb
```

Custom scripts

Learning

Archive Log Monitor

- [Generating Log Archive Activity Histograms](#)

Dashboards Setup

Variables

Get the value from a tag

```
> show tag values from "snapdb" with key="db"
```

Get the value from a field

```
> select DISTINCT("vmname") from (select "ready_summation","vmname" from "vsphere_vm_cpu")
```

Query Editor

InfluxQL with InfluxDB v2

```
SELECT * FROM cpu WHERE time >= $__timeFrom AND time <= $__timeTo  
SELECT * FROM cpu WHERE $__timeFilter(time)  
SELECT $__dateBin(time) from cpu
```

Time Series: vSphere Cluster CPU Usage

```
SELECT mean("usage_average")  
FROM "vsphere_host_cpu"  
WHERE ("clustername" =~ /^$clustername$/ AND "cpu" = 'instance-total') AND $timeFilter  
GROUP BY time($inter), "clustername", "cpu" fill(none)
```

Gauge: vSphere Datastore Status

```
SELECT mean("used_latest") * (100 / mean("capacity_latest"))  
FROM "vsphere_datastore_disk"  
WHERE ("source" =~ /^$datastore$/) AND $timeFilter  
GROUP BY time($inter) fill(none)
```

Bar gauge: vSphere Datastore Usage Capacity


```
SELECT last("used_latest") * (100 / last("capacity_latest"))
FROM "vsphere_datastore_disk"
WHERE ("source" =~ /^$datastore$/) AND $timeFilter
GROUP BY time($inter) , "source" fill(none)
```

Stat: Uptime

```
SELECT last("uptime_latest") AS "Uptime"
FROM "vsphere_host_sys"
WHERE ("vcenter" =~ /^$vcenter$/ AND "clustername" =~ /^$clustername$/) AND $timeFilter
GROUP BY time($inter) fill(null)
```

Flux with InfluxDB v2

Time Series: vSphere Cluster CPU Usage

```
from(bucket: v.defaultBucket)
  |> range(start: v.timeRangeStart, stop: v.timeRangeStop)
  |> filter(fn: (r) => r["_measurement"] == "vsphere_host_cpu")
  |> filter(fn: (r) => r["_field"] == "usage_average")
  |> filter(fn: (r) => r["cpu"] == "instance-total")
  |> filter(fn: (r) => r["clustername"] =~ /^${clustername:regex}/)
  |> group(columns: ["clustername"])
  |> aggregateWindow(every: v.windowPeriod, fn: mean, createEmpty: false)
  |> yield(name: "mean")
```

Gauge: vSphere Datastore Status

```
from(bucket: v.defaultBucket)
  |> range(start: v.timeRangeStart, stop: v.timeRangeStop)
  |> filter(fn: (r) => r["_measurement"] == "vsphere_datastore_disk")
  |> filter(fn: (r) => r["_field"] == "capacity_latest" or r["_field"] == "used_latest")
  |> filter(fn: (r) => r["source"] =~ /^${datastore:regex}/)
  |> group()
  |> pivot(rowKey: ["_time"], columnKey: ["_field"], valueColumn: "_value")
  |> map(fn: (r) => ({ r with _value: float(v: r.used_latest) / float(v: r.capacity_latest) * 100.0 }))
  |> group(columns: ["source", "_field"])
  |> aggregateWindow(every: v.windowPeriod, fn: mean, createEmpty: false)
```

Bar gauge: vSphere Datastore Usage Capacity

```

from(bucket: v.defaultBucket)
  |> range(start: v.timeRangeStart, stop: v.timeRangeStop)
  |> filter(fn: (r) => r["_measurement"] == "vsphere_datastore_disk")
  |> filter(fn: (r) => r["_field"] == "capacity_latest" or r["_field"] == "used_latest")
  |> filter(fn: (r) => r["source"] =~ /${datastore:regex}/)
  |> pivot(rowKey:["_time"], columnKey: ["_field"], valueColumn: "_value")
  |> map(fn: (r) => ({ r with _value: float(v: r.used_latest) / float(v: r.capacity_latest) * 100.0 }))
  |> group(columns: ["source", "_field"])
  |> aggregateWindow(every: v.windowPeriod, fn: mean, createEmpty: false)

```

Stat: Uptime

```

from(bucket: v.defaultBucket)
  |> range(start: v.timeRangeStart, stop: v.timeRangeStop)
  |> filter(fn: (r) => r["_measurement"] == "vsphere_host_sys")
  |> filter(fn: (r) => r["_field"] == "uptime_latest")
  |> filter(fn: (r) => r["vcenter"] =~ /${vcenter:regex}/)
  |> filter(fn: (r) => r["clustername"] =~ /${clustername:regex}/)
  |> group(columns: ["clustername"])
  |> aggregateWindow(every: v.windowPeriod, fn: mean, createEmpty: false)
  |> yield(name: "mean")

```

Why Monitoring

Why Monitoring

Sample #1

- Know when things go wrong
 - Detection & Alerting
- Be able to debug and gain insight
- Detect changes over time and drive technical/business decisions
- Feed into other system/processes (e.g. security, automation)

Sample #2

- Monitoring is used to assess performance of services & applications
- Timely detection of issues and preventing failures
- Capacity planning

Presentation Videos

- [Infrastructure and application monitoring using Prometheus by Marco Pas](#)

Prometheus

Installation

Download: [Download | Prometheus](#) ?select Operating system: linux, Architecture: amd64

```
tar xzf prometheus-2.43.0.linux-amd64.tar.gz
mv prometheus-2.43.0.linux-amd64 /opt/prometheus
```

?????

```
cd /opt/prometheus/
./prometheus --config.file="prometheus.yml"
```

???? (????????):

- <http://localhost:9090/metrics>
???????????????
- <http://localhost:9090/>
?? Graph?? Expression ?? `promhttp_metric_handler_requests_total` ???
Execute?????????

Configuration

???????????

```
./prometheus --config.file="prometheus.yml" \  
--storage.tsdb.path="/data/prometheus" \  
--storage.tsdb.retention.time=30d
```

- `--storage.tsdb.path`:
Where Prometheus writes its database. Defaults to data/.
- `--storage.tsdb.retention.time`:
When to remove old data. Defaults to 15d. Overrides storage.tsdb.retention if this flag is set to anything other than default.
- `--storage.tsdb.retention.size`:
The maximum number of bytes of storage blocks to retain. The oldest data will be removed first. Defaults to 0 or disabled. Units supported: B, KB, MB, GB, TB, PB, EB. Ex: "512MB". Based on powers-of-2, so 1KB is 1024B. Only the persistent blocks are

deleted to honor this retention although WAL and m-mapped chunks are counted in the total size. So the minimum requirement for the disk is the peak space taken by the wal (the WAL and Checkpoint) and chunks_head (m-mapped Head chunks) directory combined (peaks every 2 hours).

????(????)

RedHat 8

???????

```
useradd -s /sbin/nologin --system prometheus
mkdir /etc/prometheus /data/prometheus
```

????

```
tar xvf prometheus-*.tar.gz
cd prometheus-*/
cp prometheus promtool /usr/local/bin/
cp -r prometheus.yml consoles/ console_libraries/ /etc/prometheus/

chown -R prometheus.prometheus /etc/prometheus
chmod -R 0755 /etc/prometheus
chown prometheus.prometheus /data/prometheus
```

?????: `/etc/systemd/system/prometheus.service`

[Unit]

Description=Prometheus Time Series Collection and Processing Server
Wants=network-online.target
After=network-online.target

[Service]

User=prometheus
Group=prometheus
Type=simple
ExecReload=/bin/kill -HUP \$MAINPID
EnvironmentFile=/etc/sysconfig/prometheus
ExecStart=/usr/local/bin/prometheus \$OPTIONS

[Install]

```
WantedBy=multi-user.target
```

?????: `/etc/sysconfig/prometheus`

```
OPTIONS="
--config.file /etc/prometheus/prometheus.yml \
--storage.tsdb.path /data/prometheus/ \
--storage.tsdb.retention.time=30d \
--web.console.templates=/etc/prometheus/consoles \
--web.console.libraries=/etc/prometheus/console_libraries \
"
```

????

```
systemctl daemon-reload
systemctl start prometheus.service
systemctl enable prometheus.service
```

Monitor to Linux node

Linux Monitoring with Node Exporter

- [Node Exporter for Prometheus Dashboard EN v20201010](#)
- [Node Exporter Full](#)
- [Node Exporter Server Metrics](#)
- [Node Exporter for Prometheus Dashboard based on 11074](#)
- [Node Exporter Quickstart and Dashboard](#)
- [Video] [Setting up Prometheus and Grafana for monitoring your servers](#)
- [MONITORING LINUX HOST METRICS WITH THE NODE EXPORTER](#)

On Linux target

Node Exporter Installation

Download: [Download | Prometheus](#)

```
tar xzf node_exporter-1.5.0.linux-amd64.tar.gz
mv node_exporter-1.5.0.linux-amd64 /opt/node_exporter
```

```
chown -R root.root /opt/node_exporter
```

```
cd /opt/node_exporter
```

```
./node_exporter
```

```
# Ctrl + C to exit
```

Set up node_exporter as service

```
# Create a user
```

```
useradd -r -c "Node Exporter" -s /sbin/nologin node_exporter
```

```
# Create a service file
```

```
cat <<EOF>/etc/systemd/system/node_exporter.service
```

```
[Unit]
```

```
Description=Node Exporter
```

```
[Service]
```

```
User=node_exporter
```

```
EnvironmentFile=/etc/sysconfig/node_exporter
```

```
ExecStart=/opt/node_exporter/node_exporter $OPTIONS
```

```
[Install]
```

```
WantedBy=multi-user.target
```

```
EOF
```

```
# Create the file /etc/sysconfig/node_exporter
```

```
echo '#OPTIONS=""' > /etc/sysconfig/node_exporter
```

```
# Start the node exporter
```

```
systemctl daemon-reload
```

```
systemctl start node_exporter.service
```

On Prometheus Server

prometheus.yml:

```
scrape_configs:
```

```
# Linux Nodes
```

```
- job_name: linux
```

```
# Override the global default and scrape targets from this job every 5 seconds.
scrape_interval: 15s

static_configs:
  - targets: ['linux-node-ip:9100']
```

Monitor to MySQL

- [MySQL Overview](#)
- [MySQL Server Exporter](#)
- [Video] [Setting up Prometheus and Grafana for monitoring your servers](#)
- [Prometheus ??Mysql????Grafana???](#)

Monitor to AIX

- [nimon working with Prometheus](#)

Monitor to RabbitMQ

prometheus.yml:

```
scrape_configs:

  # RabbitMQ Nodes
  - job_name: rabbitmq

    # Override the global default and scrape targets from this job every 5 seconds.
    scrape_interval: 15s

    static_configs:
      - targets: ['rmq01:15692', 'rmq02:15692', 'rmq03:15692']
```

Monitor to Containers

- [MONITORING DOCKER CONTAINER METRICS USING CADVISOR](#)
- [Video] [Node Application Monitoring with cAdvisor Prometheus and Grafana | part 1](#)
- [?????cAdvisor](#)

Plugins

Install plugin on local Grafana

Option 1: with grafana-cli

```
# Internet network is required  
# reference to https://grafana.com/docs/grafana/latest/administration/cli/#plugins-commands  
grafana-cli plugins install marcusolsson-hourly-heatmap-panel
```

Option 2: manually unpack the .zip file

```
unzip my-plugin-0.2.0.zip -d YOUR_PLUGIN_DIR/my-plugin
```

“ By default the plugin_dir is `/var/lib/grafana/plugins`?

Restart the Grafana

```
systemctl stop grafana-server  
systemctl start grafana-server
```

Q & A

Q: ??? marcusolsson-hourly-heatmap-panel-1.0.0 plugin???? Visualization ??????

A: ?? grafana-cli ??? UI ??? Plugins ??????? plugin?????????????

AIX/Linux Monitoring with njmon

nimon (NOT njmon) + InfluxDB + Grafana

- njmon = JSON output
- nimon = njmon but straight to InfluxDB

“ NOTE: as of version 78, the njmon and nimon have been merged into one binary file.

Using the option `-J` (nimon mode) or `-I` (nimon mode).

njmon

Download: <http://nmon.sourceforge.net/pmwiki.php?n=Site.Njmon>

InfluxDB

Create a new database for njmon

```
create database aix_njmon with duration 180d
create user mon with password 'thisispassword'
grant ALL on aix_njmon to mon
show GRANTS for mon
```

Grafana

Dashboards

- [njmon for AIX Large Set v66](#)
 - Plugin Clock: <https://grafana.com/grafana/plugins/grafana-clock-panel/>
 - Plugin Pie Chart: <https://grafana.com/grafana/plugins/grafana-piechart-panel/>
- [njmon for AIX Simple Six PLUS Copy V78](#)

- Plugin Clock: <https://grafana.com/grafana/plugins/grafana-clock-panel/>
- [njmon Linux Simple Six Plus v67](#)
- Plugin Clock: <https://grafana.com/grafana/plugins/grafana-clock-panel/>

AIX/Linux

Cron job:

```
## Gathing AIX/Linux performance data with njmon
# Running forever, in case the process is killed the cron job will restart it every one hour.
# -i : the hostname of InfluxDB
# -x : the DB name in InfluxDB
# -y : the DB user
# -z : the DB password
3 * * * * /usr/local/bin/njmon -l -s 60 -k -i <ip-or-hostname-to-InfluxDB> -x <db-name> -y <db-user> -z <db-pass> > /dev/null 2>&1
```

Datasource

InfluxDB

InfluxDB v2 + InfluxQL (*Recommend*)

- Name: InfluxDBv2_InfluxQL-<BUCKET-NAME> (*Recommend*)
- Query Language: InfluxQL
- HTTP.URL: <URL-TO-InfluxDB-Server>
- Custom HTTP Headers
 - Header: Authorization
 - Value: Token <INFLUX-API-TOKEN>
- Database: <BUCKET-NAME>

InfluxDB v2 + Flux

- Name: InfluxDBv2_Flux-<BUCKET-NAME> (*Recommend*)
- Query Language: Flux
- HTTP.URL: <URL-TO-InfluxDB-Server>
- Organization: <ORG-NAME>
- Token: <INFLUX-API-TOKEN>
- Default Bucket: <BUCKET-NAME>