

# Set up Grafana , Prometheus Node Exporter and Blackbox Exporter

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## 1. Definition of Grafana , Prometheus Node Exporter and Blackbox Exporter

- a. Grafana:** Grafana is an open-source analytics and monitoring platform that integrates with various data sources, allowing users to visualize and understand metrics through customizable dashboards.
- b. Prometheus:** Prometheus is an open-source monitoring and alerting toolkit designed for reliability and scalability. It collects and stores time-series data, offering powerful querying and alerting capabilities.
- c. Node Exporter:** Node Exporter is a Prometheus exporter that gathers system-level metrics from Linux/Unix machines. It provides valuable insights into the performance and health of a server by exposing metrics like CPU usage, memory usage, and disk space.
- d. Blackbox Exporter:** Blackbox Exporter is a Prometheus exporter designed for probing and monitoring external services. It allows users to check the availability and response of endpoints, such as HTTP, TCP, ICMP, and DNS, and generates metrics based on the results.

## 2. How to set up Grafana , Prometheus , Node Exporter and Blackbox Exporter on Podman Container ?

### System Requirement

- **Distributor ID: Ubuntu Description: Ubuntu 22.04.3 LTS Release: 22.04 Codename: jammy**
- **podman version 3.4.4**

### Step 1 . First, we will update and upgrade our system.

- `sudo apt update`

```

himanshu@MinIO:~$ sudo apt update
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [878 kB]
Get:6 https://download.opensuse.org/repositories/devel:/kubic:/libcontainers:/stable/xUbuntu_20.04 InRelease [1,642 B]
Get:7 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2,821 kB]
Get:8 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [2,434 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [465 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 DEP-11 Metadata [275 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [2,287 kB]
Get:12 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [646 kB]
Get:13 http://security.ubuntu.com/ubuntu focal-security/main Translation-en [381 kB]
Get:14 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metadata [59.9 kB]
Get:15 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [2,173 kB]
Get:16 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [320 kB]
Get:17 http://security.ubuntu.com/ubuntu focal-security/restricted Translation-en [304 kB]
Get:18 http://security.ubuntu.com/ubuntu focal-security/universe amd64 Packages [879 kB]
Get:19 http://security.ubuntu.com/ubuntu focal-security/universe Translation-en [184 kB]
Get:20 http://security.ubuntu.com/ubuntu focal-security/universe amd64 DEP-11 Metadata [96.5 kB]
Get:21 http://security.ubuntu.com/ubuntu focal-security/universe amd64 c-n-f Metadata [19.1 kB]
Get:22 http://in.archive.ubuntu.com/ubuntu focal-updates/universe i386 Packages [746 kB]
Get:23 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 DEP-11 Metadata [940 B]
Get:24 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1,110 kB]
Get:25 http://in.archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [265 kB]
Get:26 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 DEP-11 Metadata [410 kB]
Get:27 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [25.5 kB]
Get:28 http://in.archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 DEP-11 Metadata [940 B]
Get:29 http://in.archive.ubuntu.com/ubuntu focal-backports/main amd64 DEP-11 Metadata [7,988 B]
Get:30 http://in.archive.ubuntu.com/ubuntu focal-backports/universe amd64 DEP-11 Metadata [30.5 kB]
Fetched 17.2 MB in 7s (2,530 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.

```

- `sudo apt upgrade`

```

himanshu@MinIO:~$ sudo apt upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
Get more security updates through Ubuntu Pro with 'esm-apps' enabled:
mc mc-data
Learn more about Ubuntu Pro at https://ubuntu.com/pro
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.

```

## Step 2 . Create File and Folder regarding this set up .

- `mkdir Grafana`
- `cd Grafana`
- `touch prometheus.yml`
- `touch rules.yml`
- `ls` : Check List

```

himanshu@123:~/grafana$ ls
prometheus.yml  rules.yml

```

**Step 3 . Paste code in prometheus.yml and rules.yml file .**

- `vim prometheus.yml`

**Paste code in this configuration file .**

```
global:
  scrape_interval: 15s
  evaluation_interval: 15s

scrape_configs:
  - job_name: blackbox
    metrics_path: /metrics
    static_configs:
      - targets:
          - 192.168.29.152:9115
          - 192.168.29.152:9100
          - 192.168.29.152:9090
          - 192.168.29.152:3000

  - job_name: blackbox-http
    metrics_path: /probe
    params:
      module: [http_2xx]
    static_configs:
      - targets:
          - https://www.google.com
    relabel_configs:
      - source_labels: [__address__]
        target_label: __param_target
      - source_labels: [__param_target]
        target_label: instance
      - target_label: __address__
        replacement: 192.168.29.152:9115
```



```

global:
  scrape_interval: 15s
  evaluation_interval: 15s

scrape_configs:
  - job_name: blackbox
    metrics_path: /metrics
    static_configs:
      - targets:
          - 192.168.29.152:9115
          - 192.168.29.152:9100
          - 192.168.29.152:9090
          - 192.168.29.152:3000

  - job_name: blackbox-http
    metrics_path: /probe
    params:
      module: [http_2xx]
    static_configs:
      - targets:
          - https://www.google.com
    relabel_configs:
      - source_labels: [__address__]
        target_label: __param_target
      - source_labels: [__param_target]
        target_label: instance
      - target_label: __address__
        replacement: 192.168.29.152:9115

```

```

- job_name: blackbox-http
  metrics_path: /probe

```

```

100%
  params:
80%   module: [http_2xx]
60% static_configs:
40%   - targets:
20%       - https://www.google.com
0% relabel_configs:
    - source_labels: [__address__]
      target_label: __param_target
    - source_labels: [__param_target]
      target_label: instance
    - target_label: __address__
      replacement: 192.168.29.152:9115

```

- vim rules.yml

Paste code in this configuration file .

```

- name: alert.rules
  rules:
  - alert: EndpointDown
    expr: probe_success == 0
    for: 10s
    labels:
      severity: "critical"
    annotations:
      summary: "URLs of {{ $labels.instance }} down"

  - alert: EndpointUP
    expr: probe_success == 1
    for: 10s
    labels:
      severity: "ok"
    annotations:
      summary: "URLs of {{ $labels.instance }} up"

```

```

- name: alert.rules
  rules:
  - alert: EndpointDown
    expr: probe_success == 0
    for: 10s
    labels: { Mem / Disk
      severity: "critical"
      annotations:
        summary: "URLs of {{ $labels.instance }} down"
  - alert: EndpointUP
    expr: probe_success == 1
    for: 10s
    labels:
      severity: "ok"
      annotations:
        summary: "URLs of {{ $labels.instance }} up"

```

#### Step 4 . Run the container Prometheus on podman .

- `podman run -itd -p 9090:9090 --name prometheus -v /home/himanshu/grafana/rules.yml:/etc/prometheus/rules.yml -v /home/himanshu/grafana/prometheus.yml:/etc/prometheus/prometheus.yml docker.io/prom/prometheus:latest`

```

himanshu@123:~/grafana$ podman run -itd -p 9090:9090 --name prometheus -v /home/himanshu/grafana/rules.yml:/etc/prometheus/rules.yml
1 -v /home/himanshu/grafana/prometheus.yml:/etc/prometheus/prometheus.yml docker.io/prom/prometheus:latest
Trying to pull docker.io/prom/prometheus:latest...
Getting image source signatures
Copying blob 9a5555141b82 done
Copying blob ce5cd6bb9a56 done
Copying blob 07e931646da3 done
Copying blob 2abccce694348 done
Copying blob 04d12a144c6b done
Copying blob f8e22ccd8ad8 done
Copying blob fe7efe91c254 done
Copying blob 08be134b67e3 done
Copying blob a836be3b6eeb done
Copying blob fd09517fa2d8 done
Copying blob fadcaad2cfd9 done
Copying blob 8215e06ac3f8 done
Copying config 22010d1e55 done
Writing manifest to image destination
Storing signatures
b83ac08ffe3ea7a571eb5fbcf6bd59699b16b46b778fac96f40066f81620a7b9

```

- `podman images` : check images .

```
himanshu@123:~/grafana$ podman images
```

REPOSITORY	TAG	IMAGE ID	CREATED	Space Used	SIZE
docker.io/prom/prometheus	latest	22010d1e5539	17 hours ago	247 MB	
docker.io/grafana/grafana	latest	00a157ed8c1f	41 hours ago	400 MB	
docker.io/bitnami/blackbox-exporter	latest	73d1c0c833f9	2 days ago	102 MB	
quay.io/prometheus/node-exporter	latest	458e026e6aa6	2 months ago	24 MB	

- `podman ps` : check container .

```
himanshu@123:~/grafana$ podman ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NA
b83ac08ffe3e	docker.io/prom/prometheus:latest	--config.file=/et...WA25	seconds ago	Up 26 seconds ago	0.0.0.0:9090->9090/tcp	pr

- show on Localhost : `http://localhost:9090`

**Targets**

All scrape pools: All Unhealthy Collapse All

Filter by endpoint or labels

Unknown Unhealthy Healthy

**blackbox (4/4 up)** [show less](#)

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
<a href="http://192.168.29.152:9115/metrics">http://192.168.29.152:9115/metrics</a>	UP	instance="192.168.29.152:9115" job="blackbox"	1.362s ago	4.243ms	
<a href="http://192.168.29.152:9100/metrics">http://192.168.29.152:9100/metrics</a>	UP	instance="192.168.29.152:9100" job="blackbox"	2.955s ago	41.706ms	
<a href="http://192.168.29.152:9090/metrics">http://192.168.29.152:9090/metrics</a>	UP	instance="192.168.29.152:9090" job="blackbox"	4.738s ago	9.201ms	
<a href="http://192.168.29.152:3000/metrics">http://192.168.29.152:3000/metrics</a>	UP	instance="192.168.29.152:3000" job="blackbox"	3.803s ago	10.288ms	

**blackbox-http (1/1 up)** [show less](#)

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
<a href="http://192.168.29.152:9115/probe">http://192.168.29.152:9115/probe</a> module="http_2xx" target="https://www.google.com"	UP	instance="https://www.google.com" job="blackbox-http"	3.936s ago	648.046ms	

## Step 5 . Run the container Node Exporter on podman .

- `podman run -itd --name=node -p 9100:9100 -v"/:/host:ro,rslave" quay.io/prometheus/node-exporter:latest --path.rootfs=/host`

```
himanshu@123:~/grafana$ podman run -itd --name=node -p 9100:9100 -v"/:/host:ro,rslave" quay.io/prometheus/node-exporter:latest --pa
```

th.rootfs=/host

Trying to pull quay.io/prometheus/node-exporter:latest...

Getting image source signatures

Copying blob 2f5f7d8898af done

Copying blob d5c4df21b127 done

Copying blob 2b6642e6c59e done

Copying config 458e026e6a done

Writing manifest to image destination

Storing signatures

440089e13bacae7190d86009a51a42aad6226a7d5a815cf50673029aee4bc335

- `podman images` : check images .



```
himanshu@123:~/grafana$ podman images
```

REPOSITORY	TAG	IMAGE ID	CREATED	Space Used	SIZE
docker.io/prom/prometheus	latest	22010d1e5539	17 hours ago	247 MB	
docker.io/grafana/grafana	latest	00a157ed8c1f	41 hours ago	400 MB	
docker.io/bitnami/blackbox-exporter	latest	73d1c0c833f9	2 days ago	102 MB	
quay.io/prometheus/node-exporter	latest	458e026e6aa6	2 months ago	24 MB	

- **podman ps** : check container .

```
himanshu@123:~/grafana$ podman ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
b83ac08ffe3e	docker.io/prom/prometheus:latest	--config.file=/et...	About a minute ago	Up About a minute ago	0.0.0.0:909
0->9090/tcp	prometheus				
440089e13bac	quay.io/prometheus/node-exporter:latest	--path.rootfs=/ho...	3 seconds ago	Up 3 seconds ago	0.0.0.0:910
0->9100/tcp	node				

- show on Localhost : <http://localhost:9100>

```
# HELP go_gc_duration_seconds A summary of the pause duration of garbage collection cycles.
# TYPE go_gc_duration_seconds summary
go_gc_duration_seconds{quantile="0"} 1.8847e-05
go_gc_duration_seconds{quantile="0.25"} 3.4301e-05
go_gc_duration_seconds{quantile="0.5"} 4.1199e-05
go_gc_duration_seconds{quantile="0.75"} 4.7954e-05
go_gc_duration_seconds{quantile="1"} 0.000214815
go_gc_duration_seconds_sum 0.001563407
go_gc_duration_seconds_count 34
# HELP go_goroutines Number of goroutines that currently exist.
# TYPE go_goroutines gauge
go_goroutines 8
# HELP go_info Information about the Go environment.
# TYPE go_info gauge
go_info{version="go1.20.6"} 1
# HELP go_memstats_alloc_bytes Number of bytes allocated and still in use.
# TYPE go_memstats_alloc_bytes gauge
go_memstats_alloc_bytes 2.53668e+06
# HELP go_memstats_alloc_bytes_total Total number of bytes allocated, even if freed.
# TYPE go_memstats_alloc_bytes_total counter
go_memstats_alloc_bytes_total 6.40379e+07
# HELP go_memstats_buck_hash_sys_bytes Number of bytes used by the profiling bucket hash table.
# TYPE go_memstats_buck_hash_sys_bytes gauge
go_memstats_buck_hash_sys_bytes 1.46221e+06
# HELP go_memstats_frees_total Total number of frees.
# TYPE go_memstats_frees_total counter
go_memstats_frees_total 722033
# HELP go_memstats_gc_sys_bytes Number of bytes used for garbage collection system metadata.
# TYPE go_memstats_gc_sys_bytes gauge
go_memstats_gc_sys_bytes 8.41662e+06
# HELP go_memstats_heap_alloc_bytes Number of heap bytes allocated and still in use.
# TYPE go_memstats_heap_alloc_bytes gauge
go_memstats_heap_alloc_bytes 2.53668e+06
# HELP go_memstats_heap_idle_bytes Number of heap bytes waiting to be used.
# TYPE go_memstats_heap_idle_bytes gauge
go_memstats_heap_idle_bytes 3.78470e+06
# HELP go_memstats_heap_inuse_bytes Number of heap bytes that are in use.
# TYPE go_memstats_heap_inuse_bytes gauge
go_memstats_heap_inuse_bytes 4.07961e+06
# HELP go_memstats_heap_objects Number of allocated objects.
# TYPE go_memstats_heap_objects gauge
go_memstats_heap_objects 17080
# HELP go_memstats_heap_released_bytes Number of heap bytes released to OS.
# TYPE go_memstats_heap_released_bytes gauge
go_memstats_heap_released_bytes 3.00012e+06
# HELP go_memstats_heap_sys_bytes Number of heap bytes obtained from system.
# TYPE go_memstats_heap_sys_bytes gauge
go_memstats_heap_sys_bytes 7.86432e+06
# HELP go_memstats_last_gc_time_seconds Number of seconds since 1970 of last garbage collection.
# TYPE go_memstats_last_gc_time_seconds gauge
go_memstats_last_gc_time_seconds 1.6971887701048422e+09
# HELP go_memstats_lookups_total Total number of pointer lookups.
# TYPE go_memstats_lookups_total counter
go_memstats_lookups_total 0
```

## Step 6 . Run the container Blackbox Exporter on podman .

- **podman run -d --name black -p 9115:9115 bitnami/blackbox-exporter:latest**

```
himanshu@123:~/grafana$ podman run -d --name black -p 9115:9115 bitnami/blackbox-exporter:latest
Resolved "bitnami/blackbox-exporter" as an alias (/home/himanshu/.cache/containers/short-name-aliases.conf)
Trying to pull docker.io/bitnami/blackbox-exporter:latest...
Getting image source signatures
Copying blob dd6a93b8db28 done
Copying config 73d1c0c833 done
Writing manifest to image destination
Storing signatures
d9d947ea06dcde48124c31c4b8be1dcc3486154d650158437151c196d2633b87
```

- **podman images** : check images .



```
himanshu@123:~/grafana$ podman run -itd --name=grafana -p 3000:3000 docker.io/grafana/grafana
Trying to pull docker.io/grafana/grafana:latest...
Getting image source signatures
Copying blob 489445caa350 done
Copying blob b3c1a013194b done
Copying blob d4be54823e17 done
Copying blob e388a4e75972 done
Copying blob 7264a8db6415 done
Copying blob 789b40acee8b done
Copying blob 4fd39ec4a428 done
Copying blob a8f2d7424111 done
Copying blob 89ed2a719120 done
Copying blob 303ecd267e done
Copying config 00a157ed8c done
Writing manifest to image destination
Storing signatures
c371c267f2643f2717245b3dda64389b3a4cee372539a12a8d2d58244fa83bcd
```

- `podman images` : check images .

```
himanshu@123:~/grafana$ podman images
REPOSITORY          TAG          IMAGE ID          CREATED          SIZE
docker.io/prom/prometheus   latest       22010d1e5539     17 hours ago    247 MB
docker.io/grafana/grafana    latest       00a157ed8c1f     41 hours ago    400 MB
docker.io/bitnami/blackbox-exporter  latest       73d1c0c833f9     2 days ago      102 MB
quay.io/prometheus/node-exporter     latest       458e026e6aa6     2 months ago    24 MB
```

- `podman ps` : check container .

```
himanshu@123:~/grafana$ podman ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS
b83ac08ffe3e   docker.io/prom/prometheus:latest   --config.file=/et...  3 minutes ago Up 3 minutes ago  0.0.0.0:9090->9090/tcp
440089e13bac   quay.io/prometheus/node-exporter:latest --path.rootfs=/ho...  2 minutes ago Up 2 minutes ago  0.0.0.0:9100->9100/tcp
d9d947ea06dc   docker.io/bitnami/blackbox-exporter:latest  26 seconds ago Up 26 seconds ago  0.0.0.0:9115->9115/tcp
c371c267f264   docker.io/grafana/grafana:latest    2 seconds ago Up 3 seconds ago  0.0.0.0:3000->3000/tcp
00/tcp grafana
```

- show on Localhost : `http://localhost:3000`

