Set up Grafana , Prometheus and Blackbox Exporter

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1. Definition of Grafana , Prometheus 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. 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 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@123:~/Desktop/grafana-prometheus-blackbox$ sudo apt update
[sudo] password for himanshu:
Get:2 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Hit:3 http://in.archive.ubuntu.com/ubuntu jammy InRelease
Get:4 http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Hit:1 https://packages.cloud.google.com/apt kubernetes-xenial InRelease
Hit:5 http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease
Get:6 http://in.archive.ubuntu.com/ubuntu jammy-proposed InRelease [270 kB]
Fetched 499 kB in 2s (208 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up to date.
himanshu@123:~/Desktop/grafana-prometheus-blackbox$
```

- `sudo apt upgrade`

```
himanshu@123:~/Desktop/grafana-prometheus-blackbox$ sudo apt upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required:
  libgtkglext1
Use 'sudo apt autoremove' to remove it.
Get more security updates through Ubuntu Pro with 'esm-apps' enabled:
  libmagickcore-6.q16-dev python2.7-minimal libmagickwand-dev imagemagick
  libopenexr-dev libopenexr25 libpostproc55 libmagickcore-dev
  libmagickcore-6.q16-6-extra libavcodec58 libmagickwand-6.q16-6 libpython2.7
  libavutil56 imagemagick-6.q16 libswscale5 libmagickcore-6.q16-6
  libswresample3 imagemagick-6-common libmagickcore-6-arch-config ruby-rack
  libavformat58 python2.7-dev libpython2.7-dev libmagickwand-6-headers
  python2.7 libpython2.7-minimal libmagickwand-6.q16-dev
  libmagickcore-6-headers libpython2.7-stdlib libavfilter7
Learn more about Ubuntu Pro at https://ubuntu.com/pro
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
himanshu@123:~/Desktop/grafana-prometheus-blackbox$
```

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

- `mkdir grafana`
- `cd grafana`
- `touch prometheus.yml`
- `touch config.yml`
- `ls` : **Check List**

```
himanshu@123:~/Desktop/grafana$ ls
config.yml  prometheus.yml
himanshu@123:~/Desktop/grafana$
```

Step 3 . Paste code in prometheus.yml and config.yml file .

- `vim prometheus.yml`

Paste code in this configuration file .

```
global:
  scrape_interval: 15s
  scrape_timeout: 10s
  evaluation_interval: 15s

scrape_configs:
```

```
  - job_name: 'prometheus'
    scrape_interval: 5s
    static_configs:
      - targets: ['192.168.1.113:9090', '192.168.1.113:9115']

  - job_name: 'blackbox'
    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: 192.168.1.113:9115
```

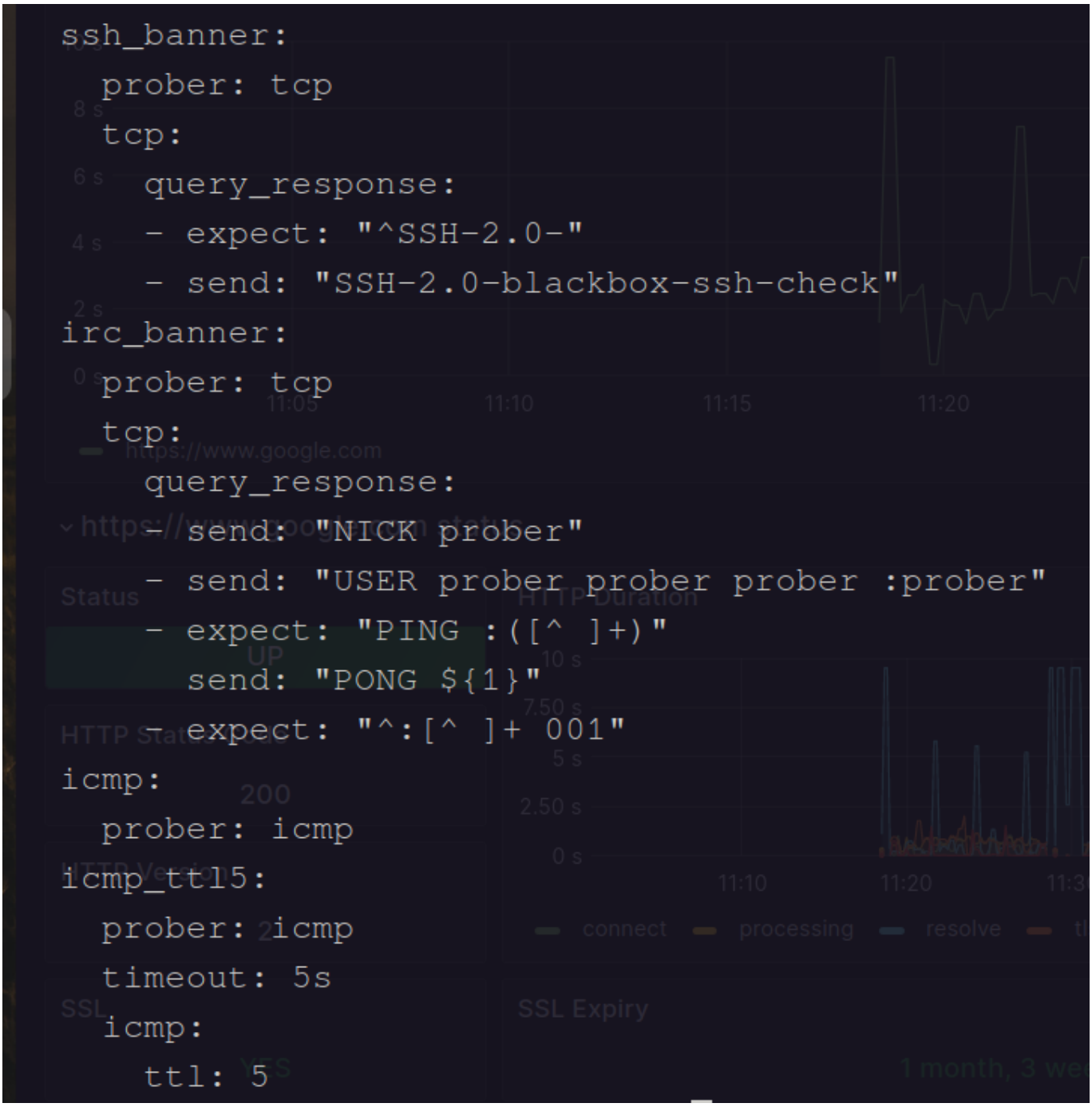
- vim config.yml

Paste code in this configuration file .

```
modules:
  http_2xx:
    prober: http
  http_post_2xx:
    prober: http
    http:
      method: POST
  tcp_connect:
    prober: tcp
  pop3s_banner:
```

```
      prober: tcp
      tcp:
        query_response:
        - expect: "^+OK"
        tls: true
        tls_config:
          insecure_skip_verify: false
    grpc:
      prober: grpc
      grpc:
        tls: true
        preferred_ip_protocol: "ip4"
    grpc_plain:
      prober: grpc
      grpc:
        tls: false
        service: "service1"
    ssh_banner:
      prober: tcp
      tcp:
        query_response:
        - expect: "^SSH-2.0-"
        - send: "SSH-2.0-blackbox-ssh-check"
    irc_banner:
      prober: tcp
      tcp:
        query_response:
        - send: "NICK prober"
        - send: "USER prober prober prober :prober"
        - expect: "PING :([^ ]+)"
          send: "PONG ${1}"
        - expect: "^:[^ ]+ 001"
    icmp:
      prober: icmp
    icmp_ttl5:
      prober: icmp
      timeout: 5s
      icmp:
        ttl: 5
```

```
himanshu@123:~/Desktop/grafana$ cat config.yml
modules:
  http_2xx:
    prober: http
  http_post_2xx:
    prober: http
    http:
      method: POST
  tcp_connect:
    prober: tcp
  pop3s_banner:
    prober: tcp
    tcp:
      query_response:
      - expect: "^+OK"
      tls: true
      tls_config:
        insecure_skip_verify: false
  grpc:
    prober: grpc
    grpc:
      tls: true
      preferred_ip_protocol: "ip4"
  grpc_plain:
    prober: grpc
    grpc:
      tls: false
      service: "service1"
```



Step 4 . Run the container Prometheus on podman .

- `podman run -p 9090:9090 -v /home/himanshu/Desktop/grafana/prometheus.yml:/etc/prometheus/prometheus.yml /prom/prometheus`

```
podman run -p 9090:9090 -v /home/himanshu/Desktop/grafana/prometheus.yml:/etc/prometheus/prometheus.yml prom/prometheus
```

- **podman run:** This is the basic command to run a container using Podman. Podman is a container management tool similar to Docker.
- **-p 9090:9090:** This part of the command specifies port mapping. It maps port 9090 from the container to port 9090 on the host. This is typically done to allow external access to the service running inside the container on port 9090.

- **-v /home/himanshu/Desktop/grafana/prometheus.yml:/etc/prometheus/prometheus.yml:** This part specifies a volume mount. It takes a file from the host system and mounts it into the container. In this case, it's taking the file located at /home/himanshu/Desktop/grafana/prometheus.yml on the host and mounting it into the container at **/etc/prometheus/prometheus.yml**. This is often used for configuration files, so the Prometheus configuration can be customized.

- **/prom/prometheus:** This is the name of the container image that you want to run. In this case, it seems to be referring to a container image named "prom/prometheus," which is likely an official Prometheus container image.

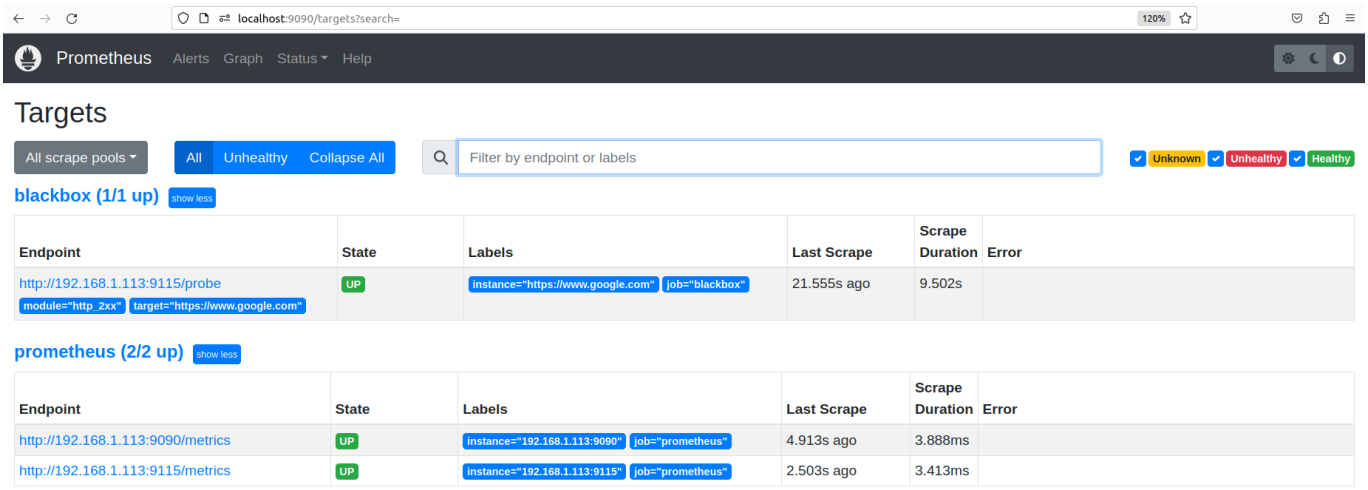
- `podman images` : check images .

```
himanshu@123:~/Desktop/grafana$ podman images
REPOSITORY                      TAG         IMAGE ID      CREATED      SIZE
docker.io/prom/prometheus       latest      22010d1e5539  6 days ago   247 MB
```

- `podman ps` : check container .

```
himanshu@123:~/Desktop/grafana$ podman ps
CONTAINER ID  IMAGE                                COMMAND               CREATED       STATUS           PORTS
      NAMES
b815bdb83559  docker.io/prom/prometheus:latest      --config.file=/et...  14 hours ago  Up 45 minutes ago  0.0.0.0:9090->9090
/tcp  vibrant_bassi
```

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



Step 5 . Run the container Blackbox Exporter on podman .

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

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

- **podman run:** This is the basic command for running a container with Podman.

- **-d:** This flag stands for "detached" mode, which means that the container will run in the background, and you'll get your terminal prompt back immediately.

- **--name black:** This flag assigns a name "black" to the running container, allowing you to easily reference it by name instead of a container ID.

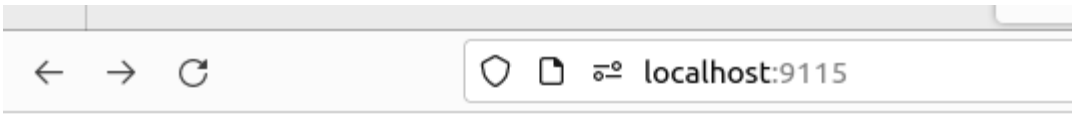
- **-p 9115:9115:** This flag maps ports between the host and the container. In this case, it's mapping port 9115 on the host to port 9115 in the container. This is useful if the container is running a service that you want to access from your host machine.
- **bitnami/blackbox-exporter:latest:** This is the name of the Docker image that you want to run as a container. It's specifying the image "bitnami/blackbox-exporter" with the "latest" tag, meaning the latest available version of that image.
- `podman images` : check images .

```
himanshu@123:~/Desktop/grafana-prometheus-blackbox$ podman images
REPOSITORY                          TAG         IMAGE ID      CREATED       SIZE
docker.io/prom/prometheus           latest      22010d1e5539  9 days ago    247 MB
docker.io/grafana/grafana           latest      00a157ed8c1f  10 days ago   400 MB
docker.io/bitnami/blackbox-exporter latest      73d1c0c833f9  11 days ago   102 MB
```

- `podman ps` : check container .

```
himanshu@123:~/Desktop/grafana$ podman ps
CONTAINER ID  IMAGE                                COMMAND               CREATED       STATUS            PORTS
      NAMES
b815bdb83559  docker.io/prom/prometheus:latest      --config.file=/et...  14 hours ago  Up 45 minutes ago  0.0.0.0:9090->9090
/tcp  vibrant_bassi
dee3f9214945  docker.io/grafana/grafana:latest                           14 hours ago  Up 45 minutes ago  0.0.0.0:3000->3000
/tcp  grafana
05fb613f2e1d  docker.io/bitnami/blackbox-exporter:latest                 14 hours ago  Up 45 minutes ago  0.0.0.0:9115->9115
/tcp  black
```

- show on Localhost : http://localhost:9115



Blackbox Exporter

Probe prometheus.io for http_2xx

Debug probe prometheus.io for http_2xx

Metrics

Configuration

Recent Probes

Module	Target	Result	Debug
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	**Failure**	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	**Failure**	Logs
http_2xx	https://www.google.com	**Failure**	Logs
http_2xx	https://www.google.com	**Failure**	Logs
http_2xx	https://www.google.com	**Failure**	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs
http_2xx	https://www.google.com	Success	Logs

Step 6 . Run the container Grafana on podman .

- `podman run -d --name grafana -p 3000:3000 -e "GF_SECURITY_ADMIN_PASSWORD=admin" grafana/grafana`

```
podman run -d --name grafana -p 3000:3000 -e "GF_SECURITY_ADMIN_PASSWORD=admin" grafana/grafana
```

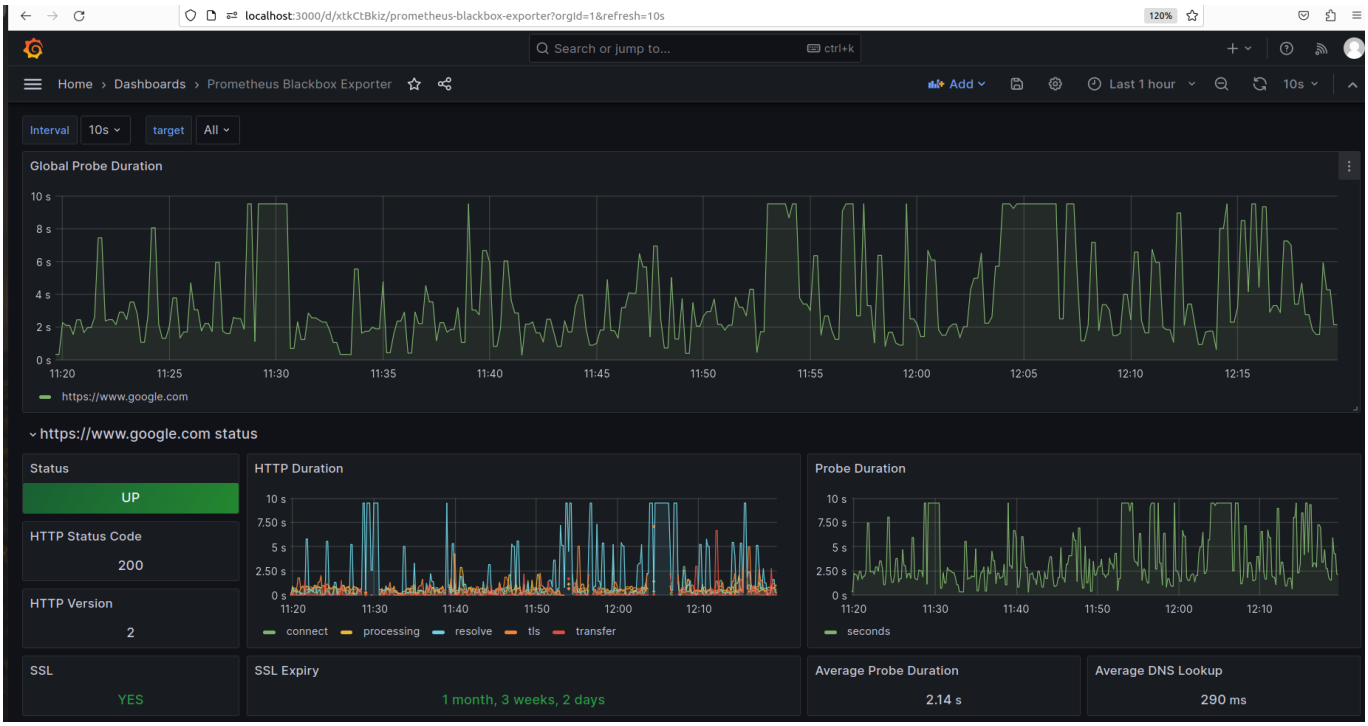
- **podman run:** This is the command to run a container using Podman, a containerization tool similar to Docker.
- **-d:** This flag stands for "detached" mode, which means that the container will run in the background as a daemon.
- **--name grafana:** This flag assigns a name to the container, in this case, "grafana." This name can be used to reference and manage the container.
- **-p 3000:3000**: This flag is used to map ports between the host machine and the container. It specifies that port 3000 on the host should be mapped to port 3000 inside the Grafana container. This is important for accessing Grafana's web interface, as the Grafana server runs on port 3000 by default.
- **-e "GF_SECURITY_ADMIN_PASSWORD=admin":** This flag is used to set an environment variable within the container. In this case, it's setting the Grafana admin user's password to "admin." This is a common initial setup step to secure your Grafana instance.
- **grafana/grafana:** This is the name of the Docker image that you want to run. It specifies that you want to run the official Grafana Docker image from the "grafana" repository on Docker Hub.
- `podman images` : check images .

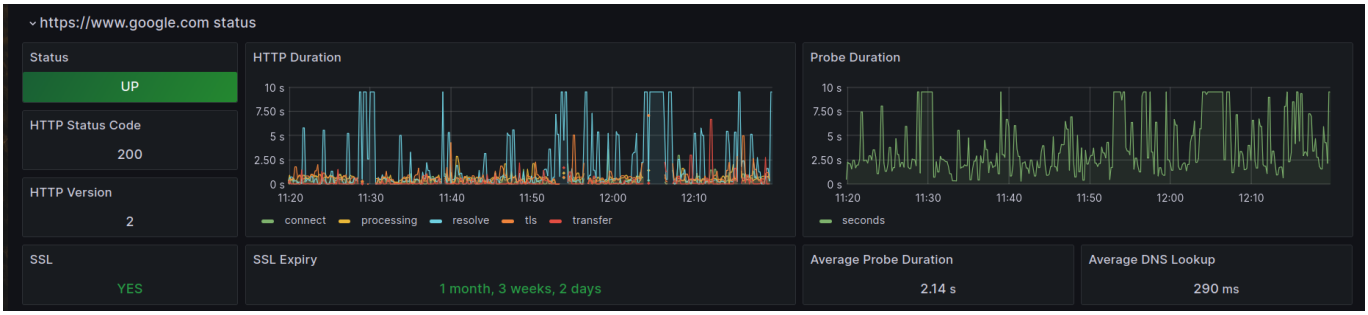
```
himanshu@123:~/Desktop/grafana$ podman images
REPOSITORY                      TAG         IMAGE ID      CREATED     SIZE
docker.io/prom/prometheus       latest      22010d1e5539  6 days ago  247 MB
docker.io/grafana/grafana       latest      00a157ed8c1f  7 days ago  400 MB
```

- `podman ps` : check container .

```
himanshu@123:~/Desktop/grafana$ podman ps
CONTAINER ID  IMAGE                                COMMAND               CREATED      STATUS          PORTS
     NAMES
b815bdb83559  docker.io/prom/prometheus:latest      --config.file=/et...  14 hours ago  Up 45 minutes ago  0.0.0.0:9090->9090
/tcp  vibrant_bassi
dee3f9214945  docker.io/grafana/grafana:latest                           14 hours ago  Up 45 minutes ago  0.0.0.0:3000->3000
/tcp  grafana
05fb613f2e1d  docker.io/bitnami/blackbox-exporter:latest                  14 hours ago  Up 45 minutes ago  0.0.0.0:9115->9115
/tcp  black
```

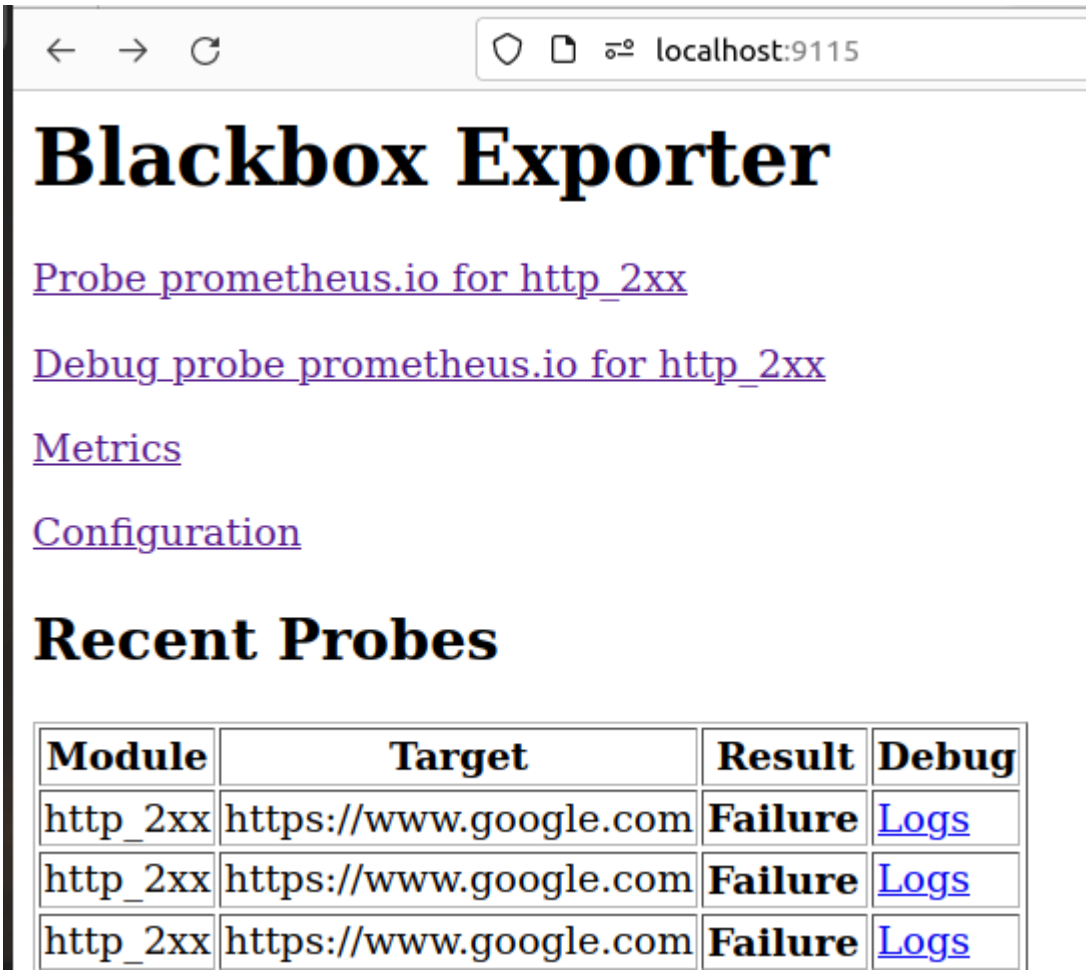
- show on Localhost : http://localhost:3000



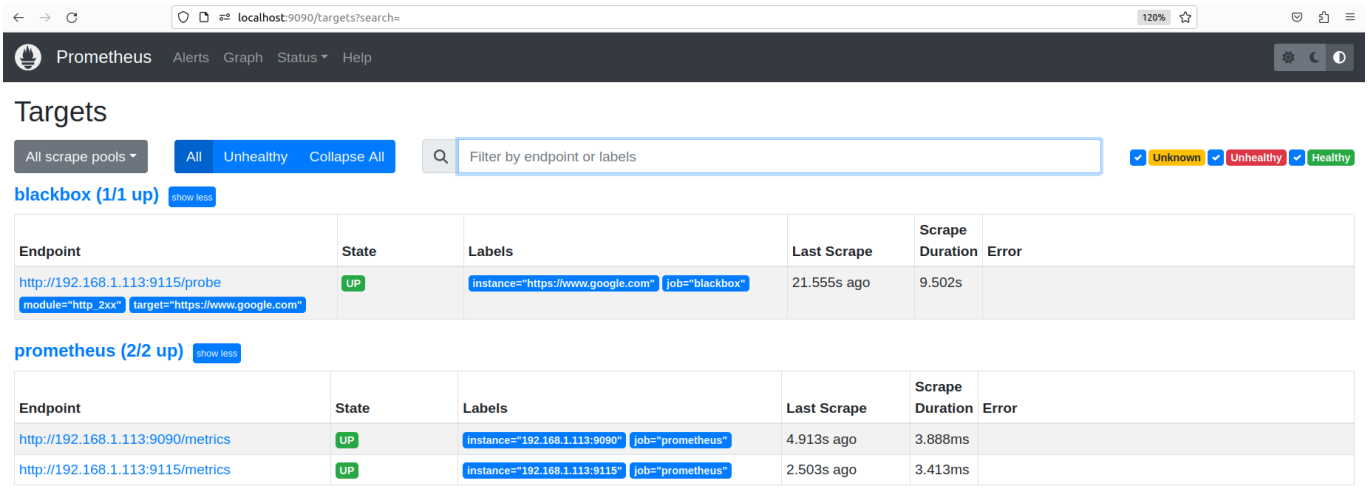


Step 7 . If a website's URL returns a low failure response, then in this situation, the dashboard will be down.

- **Blackbox Exporter**



- **Prometheus**



- **Grafana**