# Self-Healing Infrastructure with Prometheus, Alertmanager & Ansible

## Loom video:

https://www.loom.com/share/567ecf19c84f44ff9b635eef78c831f5?sid=b22cb210-7e61-468b-9000-efad3e8be193

## Github repo: vommidapuchinni/selfhealing

### Introduction:

This project automatically detects NGINX service failures and restarts the service using Prometheus, Alertmanager, and Ansible.

### Abstract:

Prometheus monitors NGINX. When it goes down, an alert is sent to Alertmanager, which triggers a webhook. The webhook runs an Ansible playbook to restart NGINX automatically.

### Tools Used:

- Prometheus
- Alertmanager & Flask (for webhook)
- Ansible
- Docker
- NGINX exporter

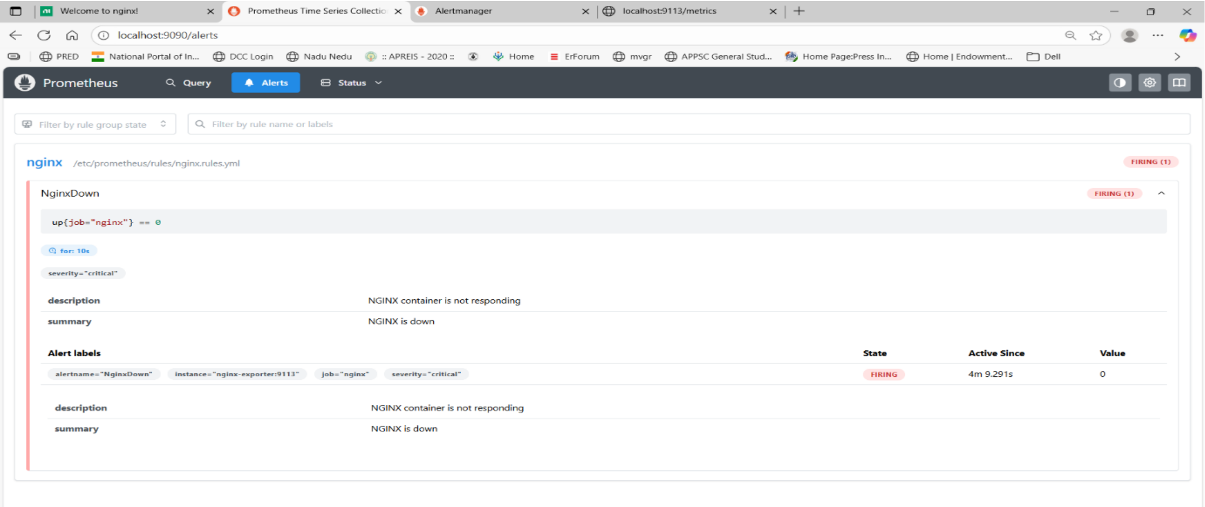
### Steps:

1. Run NGINX and NGINX exporter.
2. Configure Prometheus with rules to detect NGINX downtime.
3. Configure Alertmanager webhook pointing to Flask server.
4. Write Ansible playbook to restart NGINX container.
5. Test by stopping NGINX and checking auto-restart.

### Conclusion:

The system successfully detects failures and automatically restores NGINX without manual intervention.

### Prometheus Alert Firing



nginx /etc/prometheus/rules/nginx.rules.yml

NginxDown

```
up{job="nginx"} == 0
```

severity="critical"

description NGINX container is not responding

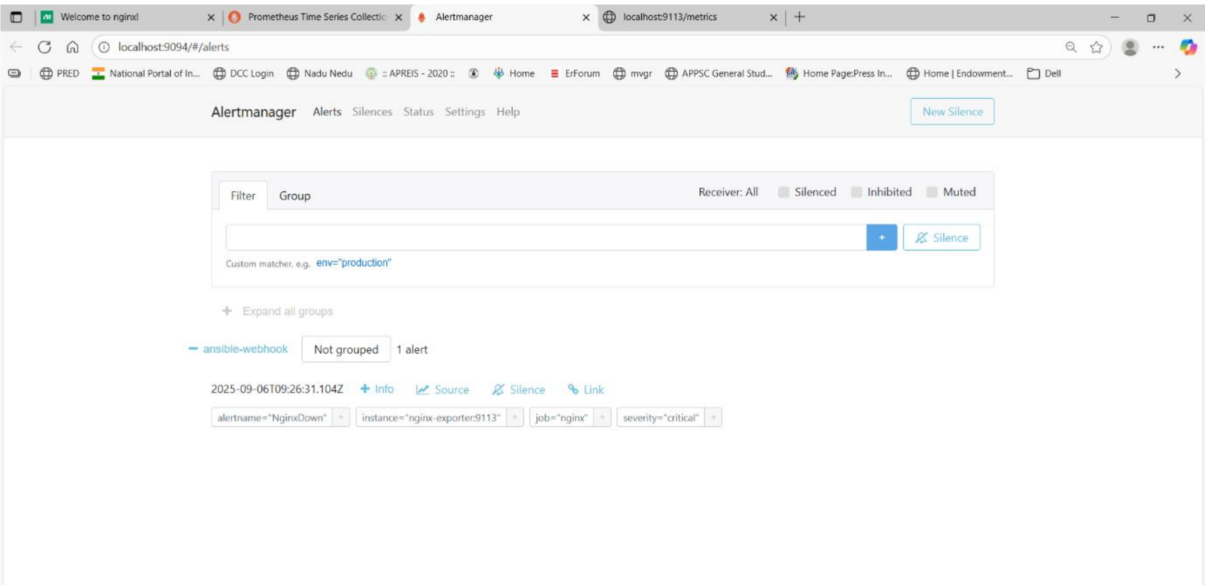
summary NGINX is down

| Alert labels | State | Active Since | Value |
|---|---|---|---|
| alertname="NginxDown" instance="nginx-exporter:9113" job="nginx" severity="critical" | FIRING | 4m 9.291s | 0 |

description NGINX container is not responding

summary NGINX is down

## Alertmanager Receiving Alert

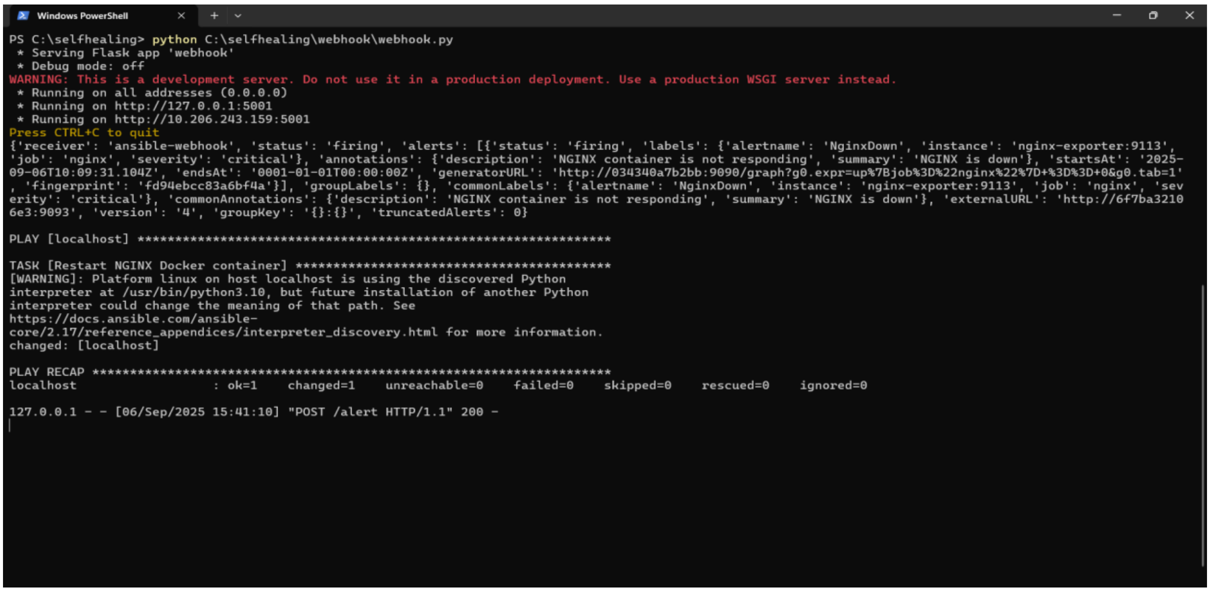


− ansible-webhook  Not grouped  1 alert

2025-09-06T09:26:31.104Z  + Info  Source  Silence  Link

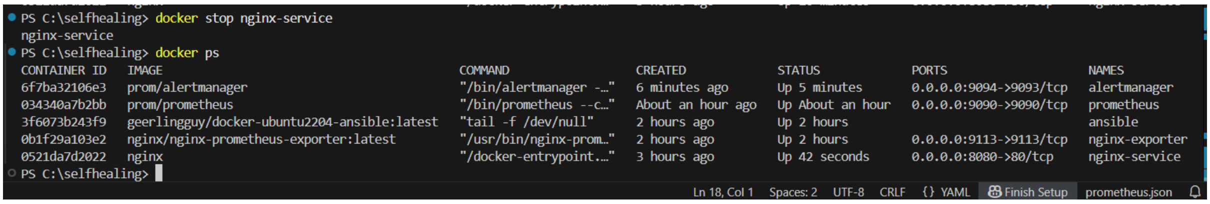
alertname="NginxDown" +  instance="nginx-exporter:9113" +  job="nginx" +  severity="critical" +

## Ansible Playbook Execution

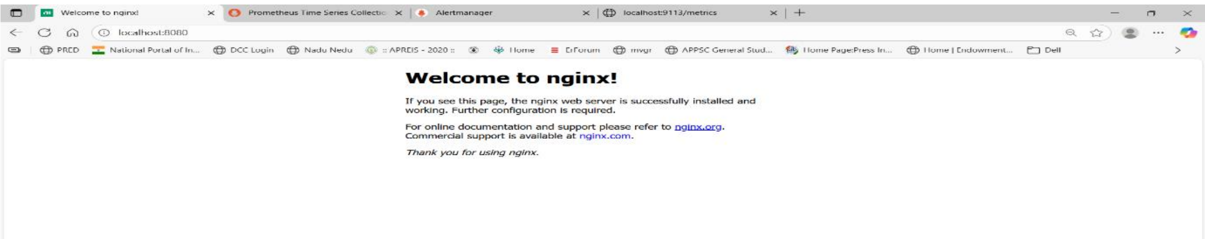


```
PS C:\selfhealing> python C:\selfhealing\webhook\webhook.py
 * Serving Flask app 'webhook'
 * Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on all addresses (0.0.0.0)
 * Running on http://127.0.0.1:5001
 * Running on http://10.206.243.159:5001
Press CTRL+C to quit
{'receiver': 'ansible-webhook', 'status': 'firing', 'alerts': [{'status': 'firing', 'labels': {'alertname': 'NginxDown', 'instance': 'nginx-exporter:9113',
'job': 'nginx', 'severity': 'critical'}, 'annotations': {'description': 'NGINX container is not responding', 'summary': 'NGINX is down'}, 'startsAt': '2025-
09-06T10:09:31.104Z', 'endsAt': '0001-01-01T00:00:00Z', 'generatorURL': 'http://034340a7b2bb:9090/graph?g0.expr=up%7Bjob%3D%22nginx%22%7D+%3D%3D+0&g0.tab=1'
, 'fingerprint': 'fd94ebcc83a6bf4a'}], 'groupLabels': {}, 'commonLabels': {'alertname': 'NginxDown', 'instance': 'nginx-exporter:9113', 'job': 'nginx', 'sev
erity': 'critical'}, 'commonAnnotations': {'description': 'NGINX container is not responding', 'summary': 'NGINX is down'}, 'externalURL': 'http://6f7ba3210
6e3:9093', 'version': '4', 'groupKey': '{}:{}', 'truncatedAlerts': 0}

PLAY [localhost] ***************************************************************

TASK [Restart NGINX Docker container] ******************************************
[WARNING]: Platform linux on host localhost is using the discovered Python
interpreter at /usr/bin/python3.10, but future installation of another Python
interpreter could change the meaning of that path. See
https://docs.ansible.com/ansible-
core/2.17/reference_appendices/interpreter_discovery.html for more information.
changed: [localhost]

PLAY RECAP *********************************************************************
localhost                  : ok=1    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

127.0.0.1 - - [06/Sep/2025 15:41:10] "POST /alert HTTP/1.1" 200 -
```

## NGINX Service Recovered



```
PS C:\selfhealing> docker stop nginx-service
nginx-service
PS C:\selfhealing> docker ps
CONTAINER ID   IMAGE                                        COMMAND                  CREATED              STATUS              PORTS                    NAMES
6f7ba32106e3   prom/alertmanager                            "/bin/alertmanager -…"   6 minutes ago        Up 5 minutes        0.0.0.0:9094->9093/tcp   alertmanager
034340a7b2bb   prom/prometheus                              "/bin/prometheus --c…"   About an hour ago    Up About an hour    0.0.0.0:9090->9090/tcp   prometheus
3f6073b243f9   geerlingguy/docker-ubuntu2204-ansible:latest "tail -f /dev/null"      2 hours ago          Up 2 hours                                   ansible
0b1f29a103e2   nginx/nginx-prometheus-exporter:latest       "/usr/bin/nginx-prom…"   2 hours ago          Up 2 hours          0.0.0.0:9113->9113/tcp   nginx-exporter
0521da7d2022   nginx                                        "/docker-entrypoint.…"   3 hours ago          Up 42 seconds       0.0.0.0:8080->80/tcp     nginx-service
PS C:\selfhealing>
```



**Welcome to nginx!**

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

*Thank you for using nginx.*