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## Lab Title:

Deploying Prometheus and Grafana on EC2 for Monitoring Applications

## Objective:

Introduction to open-source monitoring tools — Prometheus for metrics collection and Grafana for visualization — using an Amazon EC2 instance.

## Duration:

2.5 – 3 hours

## Pre-requisites:

- AWS Free Tier account

- EC2 key pair created in advance

- SSH access enabled (port 22) and web access (port 3000)

- Basic knowledge of Linux command-line

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# Introduction: What are Prometheus & Grafana?

## Prometheus

- An open-source monitoring and alerting toolkit.

- Developed by SoundCloud, now part of the CNCF.

- Scrapes metrics from configured targets at specified intervals.

- Stores data in a time-series database and supports PromQL (Prometheus Query Language).

- Common targets: web apps, Node Exporter (system metrics), Kubernetes clusters.

**Core components:**

- Time-series database

- HTTP pull-based data collection

- Alertmanager (optional)

## Grafana

- An open-source analytics and visualization tool.

- Connects to data sources like Prometheus, InfluxDB, MySQL, etc.

- Builds rich dashboards to visualize time-series data.

- Supports alerting, templating, and team collaboration.

### Why Use Them Together?

- Prometheus collects & stores metrics.

- Grafana visualizes them in dashboards.

- Together they form a lightweight, powerful monitoring stack.

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# Part A: Launch EC2 Instance (15 mins)

## 1. Launch EC2 (Amazon Linux 2 or Ubuntu)

- Instance type: `t2.micro`

- Security group: allow **TCP 22 (SSH)** , **TCP 3000 (Grafana UI)** and **TCP 9090 (Prometheus UI)**

- Name: `monitoring-node`

## 2. Connect via SSH

```
ssh -i your-key.pem ec2-user@<public-ip>    # for Amazon Linux

# or

ssh -i your-key.pem ubuntu@<public-ip>       # for Ubuntu
```

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# Part B: Install Prometheus (30 mins)

## 1. Download Prometheus

```
sudo useradd --no-create-home --shell /bin/false prometheus

cd /opt

sudo curl -LO
https://github.com/prometheus/prometheus/releases/download/v2.52.0/
prometheus-2.52.0.linux-amd64.tar.gz

sudo tar -xvf prometheus-2.52.0.linux-amd64.tar.gz

sudo mv prometheus-2.52.0.linux-amd64 prometheus
```

## 2. Configure Prometheus

```
cd /opt/prometheus

sudo cp prometheus.yml prometheus.yml.bak
```

Edit `prometheus.yml`:

```
scrape_configs:

  - job_name: 'prometheus'

    static_configs:

      - targets: ['localhost:9090']
```

### 3. Run Prometheus

```
./prometheus –config.file=prometheus.yml &
```

- Access via browser: `http://<EC2-public-ip>:9090`

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# Part C: Install Grafana (30 mins)

### 1. Install Grafana (Amazon Linux)

```
sudo yum install -y https://dl.grafana.com/oss/release/grafana-10.2.3-1.x86_64.rpm
```

```
sudo systemctl enable grafana-server
```

```
sudo systemctl start grafana-server
```

### 2. Access Grafana UI

- Go to: `http://<EC2-public-ip>:3000`

- Login: `admin / admin`

- Change password on first login

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# Part D: Connect Prometheus to Grafana (20 mins)

### 1. Add Data Source in Grafana

- Go to: Grafana UI → **Settings** → **Data Sources** → **Add data source**

- Choose **Prometheus**

- URL: `http://localhost:9090`

- Save & Test

### 2. Import Dashboard

- Grafana → Dashboards → Import → Use ID: `1860` (Prometheus stats)

- Click Load → Select Prometheus as data source → Import

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# Part E: Optional — Add Node Exporter for System Metrics (15 mins)

```
cd /opt
```

```
sudo curl -LO
https://github.com/prometheus/node_exporter/releases/download/v1.8.1/
node_exporter-1.8.1.linux-amd64.tar.gz
```

```
sudo tar -xvf node_exporter-1.8.1.linux-amd64.tar.gz
```

```
cd node_exporter-1.8.1.linux-amd64
```

```
./node_exporter &
```

Edit `prometheus.yml` to add:

```
- job_name: 'node'
  static_configs:
    - targets: ['localhost:9100']
```

Restart Prometheus and view metrics from Node Exporter.

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# Part F: Cleanup (Optional)

- Terminate the EC2 instance

- Clear any stored dashboards or data

| Task | Result |
|---|---|
| Import Dashboard `1860` | Prometheus internal stats |
| Install Node Exporter | Get EC2 system metrics |
| Import Dashboard `8919` | Full system monitoring |
| Use Explore | Test metrics manually |