**End-to-End Monitoring Setup – Prometheus, Node Exporter, and Grafana (Ubuntu)**

**Architecture Overview**
Ubuntu Server
- Node Exporter (9100) – exposes OS metrics
- Prometheus (9090) – scrapes metrics & stores time-series
- Grafana (3000) – visualizes metrics using dashboards

**Flow**
Node Exporter → Prometheus → Grafana Dashboard

**PART 1: PROMETHEUS INSTALLATION**

**Step 1: Create Prometheus user**
sudo useradd --no-create-home --shell /bin/false prometheus

**Step 2: Create directories**
sudo mkdir -p /etc/prometheus
sudo mkdir -p /etc/prometheus/rules
sudo mkdir -p /opt/prometheus/data

sudo chown -R prometheus:prometheus /etc/prometheus
sudo chown -R prometheus:prometheus /opt/prometheus

**Step 3: Download Prometheus**
cd /tmp
wget https://github.com/prometheus/prometheus/releases/download/v2.48.0/prometheus-2.48.0.linux-amd64.tar.gz

tar -xvf prometheus-2.48.0.linux-amd64.tar.gz
cd prometheus-2.48.0.linux-amd64

**Step 4: Install binaries**
sudo cp prometheus /usr/local/bin/
sudo cp promtool /usr/local/bin/

sudo chown prometheus:prometheus /usr/local/bin/prometheus
sudo chown prometheus:prometheus /usr/local/bin/promtool

**Step 5: Copy console files**
sudo cp -r consoles /etc/prometheus/
sudo cp -r console_libraries /etc/prometheus/
sudo chown -R prometheus:prometheus /etc/prometheus

**Step 6: Create Prometheus config**
/etc/prometheus/prometheus.yml

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

scrape_configs:
  - job_name: "prometheus"
    static_configs:
      - targets: ["localhost:9090"]
```

```
  - job_name: "node_exporter"
    static_configs:
      - targets: ["localhost:9100"]
```

**Step 7: Create systemd service**
/etc/systemd/system/prometheus.service

**Step 8: Start Prometheus**
sudo systemctl daemon-reload
sudo systemctl enable prometheus
sudo systemctl start prometheus

Access UI: http://server-ip:9090

**PART 2: NODE EXPORTER INSTALLATION**

**Step 1: Create node exporter user**
sudo useradd --no-create-home --shell /bin/false node_exporter

**Step 2: Download Node Exporter**
wget https://github.com/prometheus/node_exporter/releases/download/v1.7.0/node_exporter-1.7.0.linux-amd64.tar.gz

**Step 3: Install and start Node Exporter**
sudo cp node_exporter /usr/local/bin/
sudo systemctl enable node_exporter
sudo systemctl start node_exporter

Verify: http://localhost:9100/metrics

**PART 3: GRAFANA INSTALLATION**

Add Grafana repository and install Grafana

sudo apt update
sudo apt install -y grafana

sudo systemctl enable grafana-server
sudo systemctl start grafana-server

Access UI: http://server-ip:3000
Default login: admin / admin

**PART 4: CONNECT PROMETHEUS TO GRAFANA**

Add Prometheus Data Source
URL: http://localhost:9090

**PART 5: EXAMPLE DASHBOARD**

Import Dashboard ID: 1860
Displays CPU, Memory, Disk, Network metrics

**PART 6: Verification**

- Prometheus Targets page shows UP
- Node Exporter metrics accessible
- Grafana dashboard shows live data

**Summary**

Implemented a complete monitoring stack using Prometheus, Node Exporter, and Grafana with systemd services and production best practices.