

# Membangun Sistem Monitoring untuk Penyimpanan Akses Acak dan Unit Pemrosesan Utama di Mesin Virtual dengan Grafana dan Prometheus

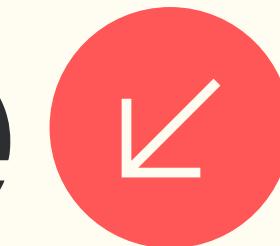


2 D4 IT A

Workshop Administrasi Jaringan



# Outline



Latar Belakang  
Ruang Lingkup  
Design System  
Team & Tugas

Tahapan Pelaksanaan  
Implementasi  
System Testing

# Latar Belakang

- 1** Kebutuhan terhadap sistem monitoring yang efektif
- 2** Kesulitan untuk melakukan monitoring RAM & CPU secara real-time
- 3** Kebutuhan akan sistem alert sebagai pengingat penggunaan RAM & CPU



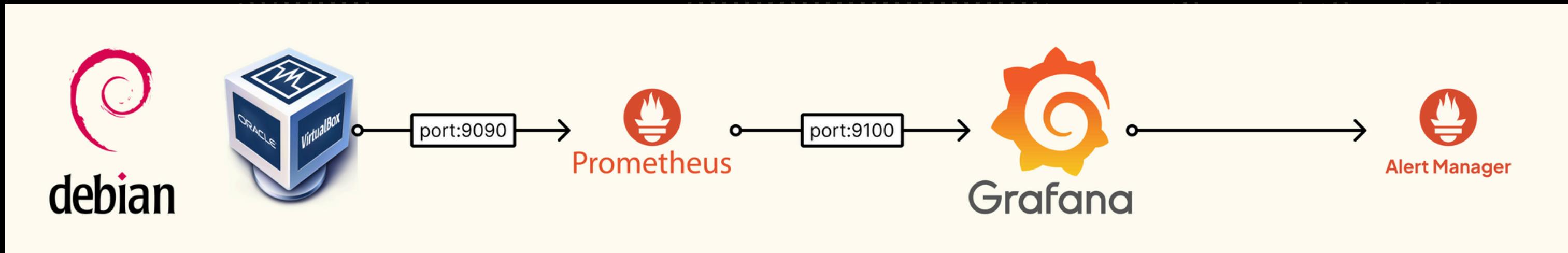


# Ruang Lingkup

- 1** Penggunaan RAM
- 2** Penggunaan CPU
- 3** Grafana Alert



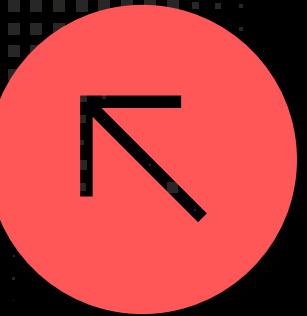
# Design System





Politeknik Elektronika Negeri Surabaya

# Support SysTeam



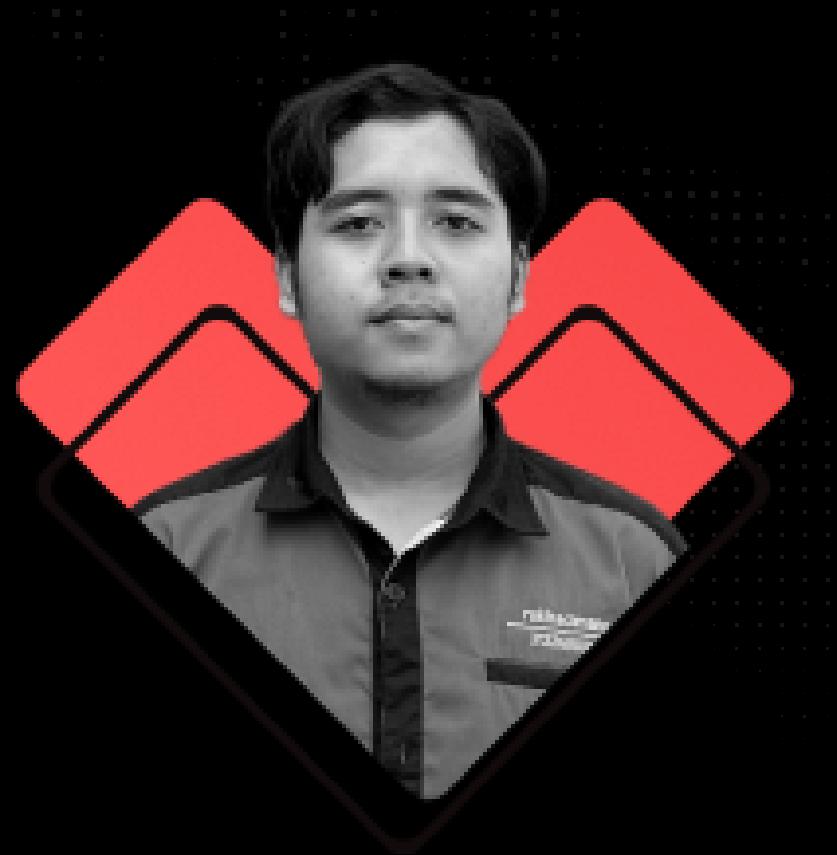
Tim kami yang beranggotakan:



**Dukhaan Kamimpangan**  
3122600003



**Diah Aulia Kusuma Putri**  
3122600008



**Rakha Putra Pratama**  
3122600005



# Project Timeline



**27 Mei 2024**

Merancang Project Chart & Pembagian Task Management

**29 Mei 2024**

Instalasi & Setup Prometheus dan Layanannya

**30 Mei 2024**

Instalasi & Setup Grafana dan Layanannya

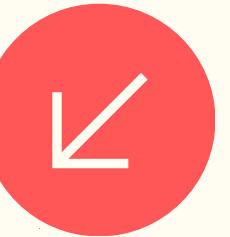
**1 Juni 2024**

Implementasi dari Integrasi Resource Monitor CPU dan RAM di VM  
Menggunakan Prometheus dan Grafana

**2 Juni 2024**

Pembuatan Laporan & Finalisasi Laporan

# Implementasi



The screenshot shows the Grafana Alerting 'Edit rule' interface. The URL in the browser is `10.0.2.15:3000/alerting/bdnk8rn0qg9vke/edit?return_to=/alerting/bdnk8rn0qg9vke`. The page title is 'Edit rule'.

**1. Enter alert rule name**  
Enter a name to identify your alert rule.  
Name: `grafana-default-telegram`

**2. Define query and alert condition**  
Define query and alert condition Need help?

**A** prometheus Options 10 minutes, MD = 43200, Min. Interval = 1s Set as alert condition  
Metrics browser `sum(rate(node_cpu_seconds_total{node!="system"} [5m])) by (instance, node)`  
Run queries Builder Code

**B** prometheus Options 10 minutes, MD = 43200, Min. Interval = 1s Set as alert condition  
Metrics browser `{instance="localhost:9100", node="localhost"}` 3.80163  
Run queries Builder Code

**C** prometheus Options 10 minutes, MD = 43200, Min. Interval = 1s Set as alert condition  
Metrics browser `Enter a PromQL query...`  
Run queries Builder Code

**D** prometheus Options 10 minutes, MD = 43200, Min. Interval = 1s Set as alert condition  
Metrics browser `Add query`

**Rule type**  
Select where the alert rule will be managed. Need help?

The left sidebar shows the navigation menu:

- Home
- Starred
- Dashboards
  - Playlists
  - Snapshots
  - Library panels
  - Public dashboards
- Explore
  - Metrics
- Alerting
  - Alert rules
  - Contact points
  - Notification policies
  - Silences
  - Groups
  - Admin
- Connections
  - Add new connection
  - Data sources
- Administration
  - General
    - Stats and license
    - Default preferences
    - Settings
    - Organizations
  - Plugins and data
    - Plugins
  - Users and access

Gambar 1. Proses query `node_cpu_seconds_total` di prometheus

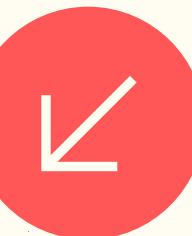
# Implementasi



```
1 {{ define "mymessage" }}
2 {{ if gt (len .Alerts.Firing) 0 }}
3 {{ len .Alerts.Firing }} firing:
4 {{ range .Alerts.Firing }} {{ template "myalert" .}} {{ end }}
5 {{ end }} [
6 {{ if gt (len .Alerts.Resolved) 0 }}
7 {{ len .Alerts.Resolved }} resolved:
8 {{ range .Alerts.Resolved }} {{ template "myalert" .}} {{ end }}
9 {{ end }}
10 {{ end }}
11
12 {{ define "myalert" }}
13 Labels: {{ range .Labels.SortedPairs }}
14 - {{ .Name }}: {{ .Value }} {{ end }}
15
16 Annotation: {{ if gt (len .Annotations) 0 }} {{ range .Annotations.SortedPairs }}
17 - {{ .Name }}: {{ .Value }} {{ end }} {{ end }}
18
19 {{ if gt (len .DashboardURL) 0 }} Go to dashboard: {{ .DashboardURL }}
20 {{ end }} {{ end }}
```

Gambar 2. Template alert message ke Telegram

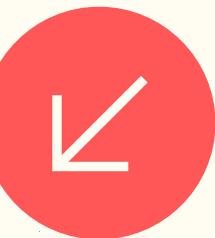
# Implementasi



```
1 {{ define "mymessage" }}
2 {{ if gt (len .Alerts.Firing) 0 }}
3 {{ len .Alerts.Firing }} firing:
4 {{ range .Alerts.Firing }} {{ template "myalert" .}} {{ end }}
5 {{ end }} [
6 {{ if gt (len .Alerts.Resolved) 0 }}
7 {{ len .Alerts.Resolved }} resolved:
8 {{ range .Alerts.Resolved }} {{ template "myalert" .}} {{ end }}
9 {{ end }}
10 {{ end }}
11
12 {{ define "myalert" }}
13 Labels: {{ range .Labels.SortedPairs }}
14 - {{ .Name }}: {{ .Value }} {{ end }}
15
16 Annotation: {{ if gt (len .Annotations) 0 }} {{ range .Annotations.SortedPairs }}
17 - {{ .Name }}: {{ .Value }} {{ end }} {{ end }}
18
19 {{ if gt (len .DashboardURL) 0 }} Go to dashboard: {{ .DashboardURL }}
20 {{ end }} {{ end }}
```

Gambar 3. Template alert message ke Telegram

# System Testing



The screenshot shows a monitoring tool interface with two main sections: Expressions and Threshold.

**Expressions:** Manipulate data returned from queries with math and other operations.

**B Reduce:** Set as alert condition. An expression warning message states: "Reduce operation is not needed. Input query or expression A is already reduced data." Below this, there are input fields for Input (A), Function (Last), and Mode (Strict). The preview shows a single series: {instance="localhost:9100", node="localhost"} 3.90163. There is also an "Add expression" button and a "Preview" button.

**C Threshold:** Alert condition. This section takes one or more time series and checks if any of the series match the threshold condition. It has an "Input" dropdown set to B, an "IS ABOVE" dropdown set to 1, and a "Custom recovery threshold" toggle switch. The preview shows a single series: {instance="localhost:9100", node="localhost"} 1 Firing. Below it, a status message says "1 series: 1 firing, 0 normal".

Gambar 4. Proses menambahkan threshold agar trigger bot telegram dapat dieksekusi

# System Testing



The screenshot shows the Prometheus Alerting interface with the following details:

- Path:** Home > Alerting > Alert > Default > Memory Alert Rule
- Title:** Memory Alert Rule (Firing)
- Evaluation interval:** Every 1m
- Description:** Penggunaan memory di {{ \$labels.node }} sudah mencapai {{ printf "% .2f" \$values.B.Value }} %
- Query and conditions** tab is selected.
- Query A:** prometheus 12m to now  
Query: `(sum(node_memory_MemAvailable_bytes) by (node) / sum(node_memory_MemAvailable_bytes) by (node)) * 100`
- Table:** {node="localhost"} 100
- Reduce B:** Function: Last, Input: A, Mode: Strict  
Query: `{node="localhost"} 100`
- Threshold C:** Alert condition: Is above 10  
Input: B, Condition: Is above 10  
Query: `{node="localhost"} 1 Firing`

Gambar 5. Memory alert rule ketika threshold di atas 10% maka akan terjadi firing

# System Testing



Gambar 6. Hasil trigger bot telegram untuk CPU threshold > 3



Politeknik Elektronika Negeri Surabaya

It's  
Demo Time!

**Membangun Sistem Monitoring untuk Penyimpanan Akses Acak dan Unit  
Pemrosesan Utama di Mesin Virtual dengan Grafana dan Prometheus**

Workshop Administrasi Jaringan



Politeknik Elektronika Negeri Surabaya

# Terimakasih Atas Perhatiannya

Membangun Sistem Monitoring untuk Penyimpanan Akses Acak dan Unit  
Pemrosesan Utama di Mesin Virtual dengan Grafana dan Prometheus

Workshop Administrasi Jaringan