

# Big Project

Infrastructure Migration From On Premise to AWS Cloud



# Case Perusahaan Cilsy

Saat ini, Cilsy sedang melakukan development produk baru yang bernama Cilist (CilsyList). Cilist ini merupakan aplikasi to-do list yang berbasis web. Aplikasi ini dibangun menggunakan MERN Stack (MongoDB, ExpressJS, ReactJS, dan NodeJS).

## Problem

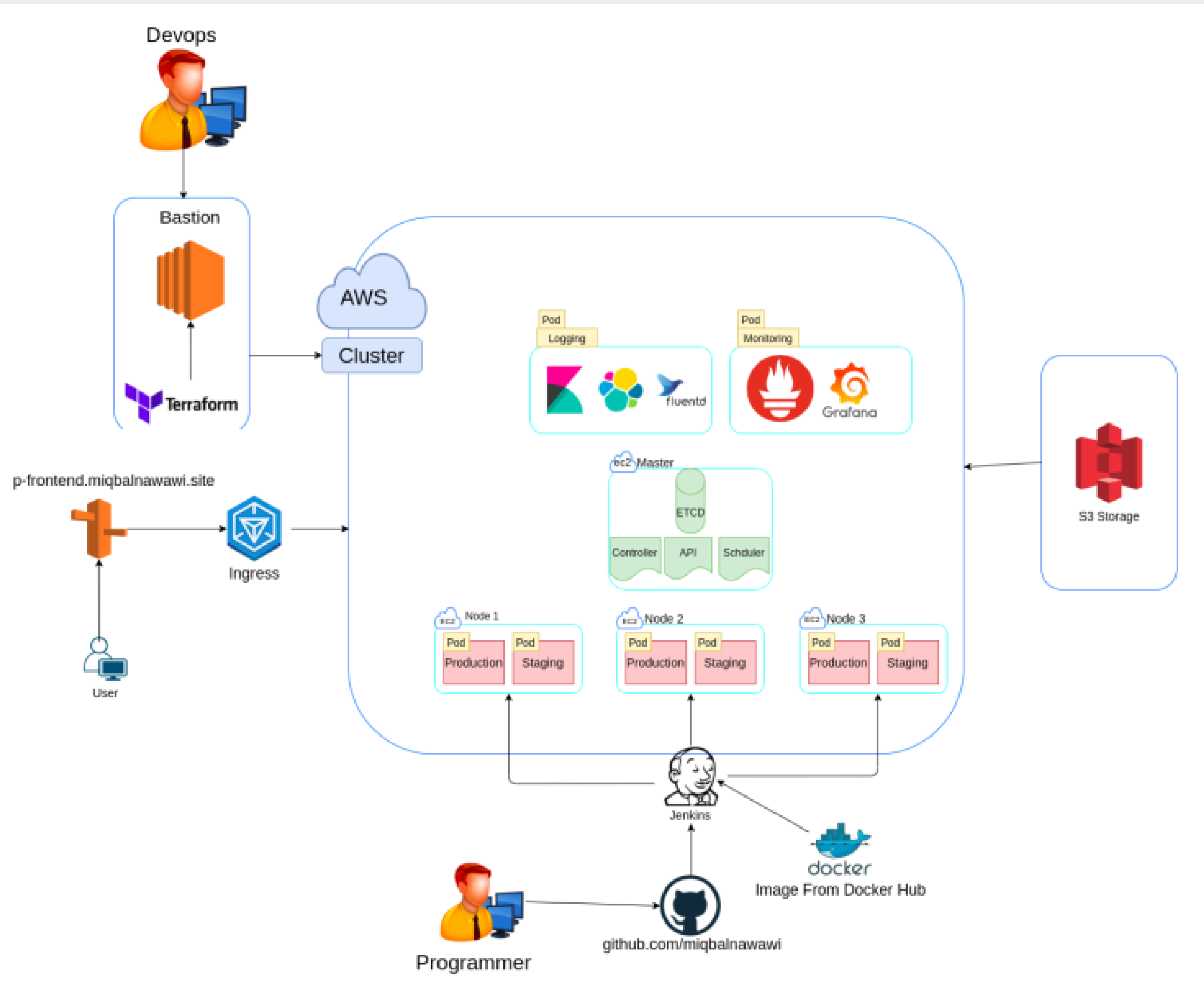
Saat ini frontend, backend, dan database baru disimpan di 1 vm yang sama sehingga apabila terjadi error di vm tersebut, maka aplikasi tidak bisa digunakan sama sekali.

## Solution

- Membuat topologi yang cocok sesuai kebutuhan
- Membuat budgeting selama 6 bulan pemakaian
- Membuat Environment Staging dan Production
- Mendeploy Image tersebut ke kubernetes cluster
- Menggunakan fitur CI/CD dengan Jenkins
- Membuat tools monitoring dan logging untuk memantau kinerja Apps
- Memisahkan service antara backend, frontend dan database



# TOPOLOGI



# Estimate Budget

Service	Type	Count	Price
EC2	T2 Large	1	\$40.25
EC2	T2 Medium	3	\$45.87
EC1	T2 Micro	1	\$4.60
S3	-	1	\$0.03
Route 53	-	1	\$0.50
<u>LoadBalancer</u>	Classic	4	\$55.20
Total Monthly Payment			\$146.45
6 Months Total Payment			\$878.70

# CREATE BASTION WITH TERRAFORM

Create Env :

```
variable "aws_access_key" {
  default = "your_aws_access_key"
}

variable "aws_secret_key" {
  default = "your_aws_secret_key"
}

variable "region" {
  default = "ap-southeast-1"
}

variable "availability_zone" {
  default = "ap-southeast-1a"
}

variable "ami" {
  default = "ami-05b891753d41ff88f"
}

variable "instance_type" {
  default = "t2.micro"
}

variable "root_volume_size" {
  default = 22
}
```

Main.tf :

```
provider "aws" {
  access_key = "${var.aws_access_key}"
  secret_key = "${var.aws_secret_key}"
  region     = "${var.region}"
}

resource "aws_instance" "instance" {
  ami           = "${var.ami}"
  instance_type = "${var.instance_type}"
  key_name      = "${var.key_name}"
  vpc_security_group_ids = ["${var.vpc_security_group_ids}"]
  subnet_id    = "${var.subnet_id}"
  associate_public_ip_address = "${var.associate_public_ip_address}"
  count        = "${var.instance_count}"
  root_block_device {
    volume_type      = "${var.volume_type}"
    volume_size      = "${var.root_volume_size}"
    delete_on_termination = "${var.delete_on_termination}"
  }
}
```

# BASTION CREATED

Search for services, features, marketplace products, and docs[Alt+S]

miqbalnawawiSingapore

Instances (1)Info

Filter instances

search: bastion XClear filters

☐

Name

▼

☐

kubernetes dan bastion

Instance ID

i-0df05e9bbb127afff

Instance state

Running

🔍🔍

Instance type

t2.micro

Status check

2/2 checks passed

Alarm status

No alarms

+

Availability Zone

ap-southeast-1b

# CREATE JENKINS WITH TERRAFORM

Create Env :

```
variable "aws_access_key" {
  default = "your_aws_access_key"
}

variable "aws_secret_key" {
  default = "your_aws_secret_key"
}

variable "region" {
  default = "ap-southeast-1"
}

variable "availability_zone" {
  default = "ap-southeast-1a"
}

variable "ami" {
  default = "ami-05b891753d41ff88f"
}

variable "instance_type" {
  default = "t2.micro"
}

variable "root_volume_size" {
  default = 22
}
```

Main.tf :

```
provider "aws" {
  access_key = "${var.aws_access_key}"
  secret_key = "${var.aws_secret_key}"
  region     = "${var.region}"
}

resource "aws_instance" "instance" {
  ami           = "${var.ami}"
  instance_type = "${var.instance_type}"
  key_name      = "${var.key_name}"
  vpc_security_group_ids = ["${var.vpc_security_group_ids}"]
  subnet_id     = "${var.subnet_id}"
  associate_public_ip_address = "${var.associate_public_ip_address}"
  count         = "${var.instance_count}"
  root_block_device {
    volume_type      = "${var.volume_type}"
    volume_size      = "${var.root_volume_size}"
    delete_on_termination = "${var.delete_on_termination}"
  }
}
```

# JENKINS CREATED

Instances (1) [Info](#)

🔄

Connect

Instance state ▼

Actions ▼

Launch instances ▼

🔍 Filter instances

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search:jenkins ✕

Clear filters

<input type="checkbox"/>	Name ▼	Instance ID	Instance state ▼	Instance type ▼	Status check	Alarm status	Availability Zone ▼	Public IPv4 DNS
<input type="checkbox"/>	Jenkins	i-04c2da239b8ca87f6	🟢 Running 🔍	t2.medium	🟢 2/2 checks passed	No alarms +	ap-southeast-1b	ec2-13-250-56-3



# CREATE CLUSTER WITH KOPS

Create Env :

```
export bucket_name=belajar-kubernetesexport  
KOPS_CLUSTER_NAME=belajarkubernetes.comexport  
KOPS_STATE_STORE=s3://${bucket_name}
```

Create Cluster Kubernetes :

```
kops create cluster --zones=ap-southeast-1 --node-count=3 --master-count=1 -  
-node-size=t2.medium --master-size=t2.large --  
name=${KOPS_CLUSTER_NAME} --ssh-public-key=~/.ssh/id_rsa.pub
```

Update Cluster :

```
kops update cluster --name ${KOPS_CLUSTER_NAME} --yes --admin
```

Validate CLuster :

```
kops validate cluster
```



# Cluster Created

Search for services, features, marketplace products, and docs [Alt+S]

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Instances (10) Info

Refresh Connect Instance state Actions Launch Instances

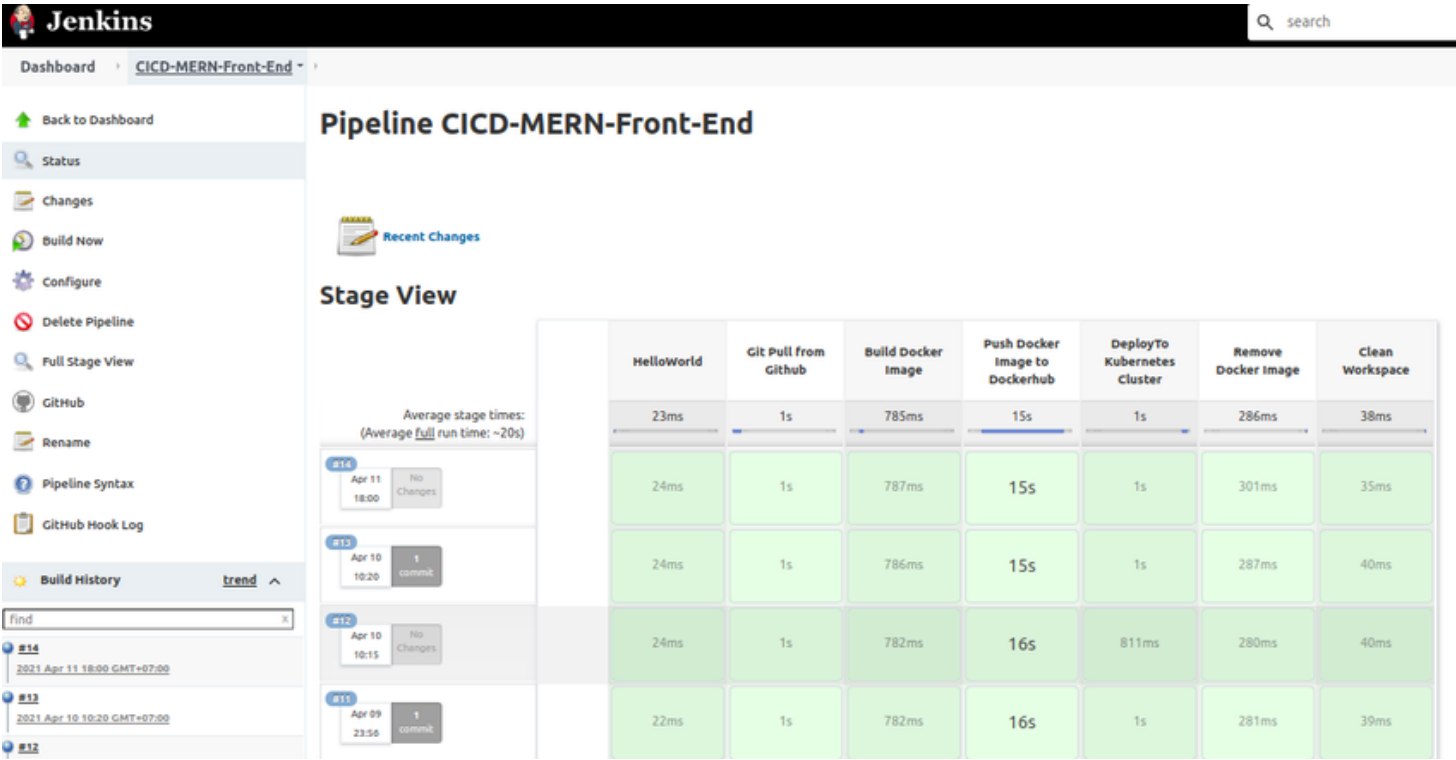
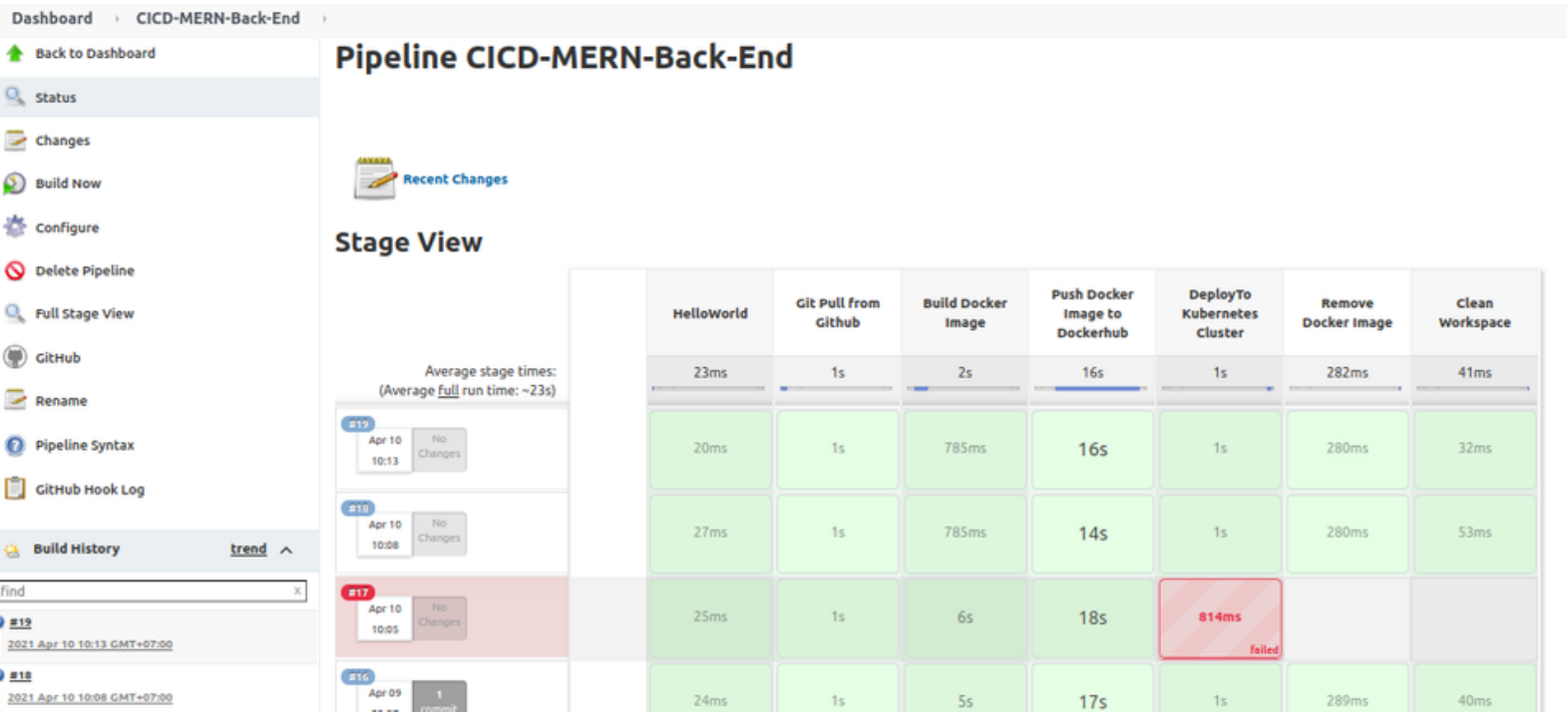
Filter instances

search: southeast Clear filters

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
<input type="checkbox"/>	master-ap-southeast-1a.masters.kube.miqbalnaw...	i-00b2fe2b9d5f9f257	Running	t2.large	2/2 checks passed	No alarms	ap-southeast-1a	ec2-13-229-104
<input type="checkbox"/>	nodes-ap-southeast-1a.kube.miqbalnawawi.site	i-0f354ac6699281780	Running	t2.medium	2/2 checks passed	No alarms	ap-southeast-1a	ec2-52-77-221-
<input type="checkbox"/>	nodes-ap-southeast-1a.kube.miqbalnawawi.site	i-005e2e3262d963200	Running	t2.medium	2/2 checks passed	No alarms	ap-southeast-1a	ec2-18-136-105
<input type="checkbox"/>	kubernetes dan bastion	i-0df05e9bbb127afff	Running	t2.micro	2/2 checks passed	No alarms	ap-southeast-1b	ec2-13-229-212
<input type="checkbox"/>	Jenkins	i-04c2da239b8ca87f6	Running	t2.medium	2/2 checks passed	No alarms	ap-southeast-1b	ec2-13-250-56-
<input type="checkbox"/>	ELK	i-0e619d630af2c2673	Stopped	t2.medium	-	No alarms	ap-southeast-1b	-
<input type="checkbox"/>	Ansible	i-04b33af8d1b6edabe	Stopped	t2.micro	-	No alarms	ap-southeast-1b	-

Select an instance above

# Build Deployment Backend – Frontend on Jenkins



## Pods Production Created

```
root@ip-10-0-1-154:~# kubectl get pods -n production
NAME                                READY   STATUS    RESTARTS   AGE
backend-prod-5d6db44455-tn7h7       1/1     Running   0           147m
backend-prod-5d6db44455-zq9n2       1/1     Running   0           147m
frontend-prod-ddf8b476f-7qt4v       1/1     Running   0           78m
frontend-prod-ddf8b476f-p757j       1/1     Running   0           78m
mongodb                             1/1     Running   0           147m
root@ip-10-0-1-154:~#
```

# Build Pods Monitoring Grafana – Prometheus

```
root@ip-10-0-1-154:~# kubectl get pods -n monitoring
```

NAME	READY	STATUS	RESTARTS	AGE
grafana-86cbd5568d-zt8xb	1/1	Running	0	2d8h
prometheus-9974bdd74-jrm6m	1/1	Running	0	2d8h

```
root@ip-10-0-1-154:~#
```

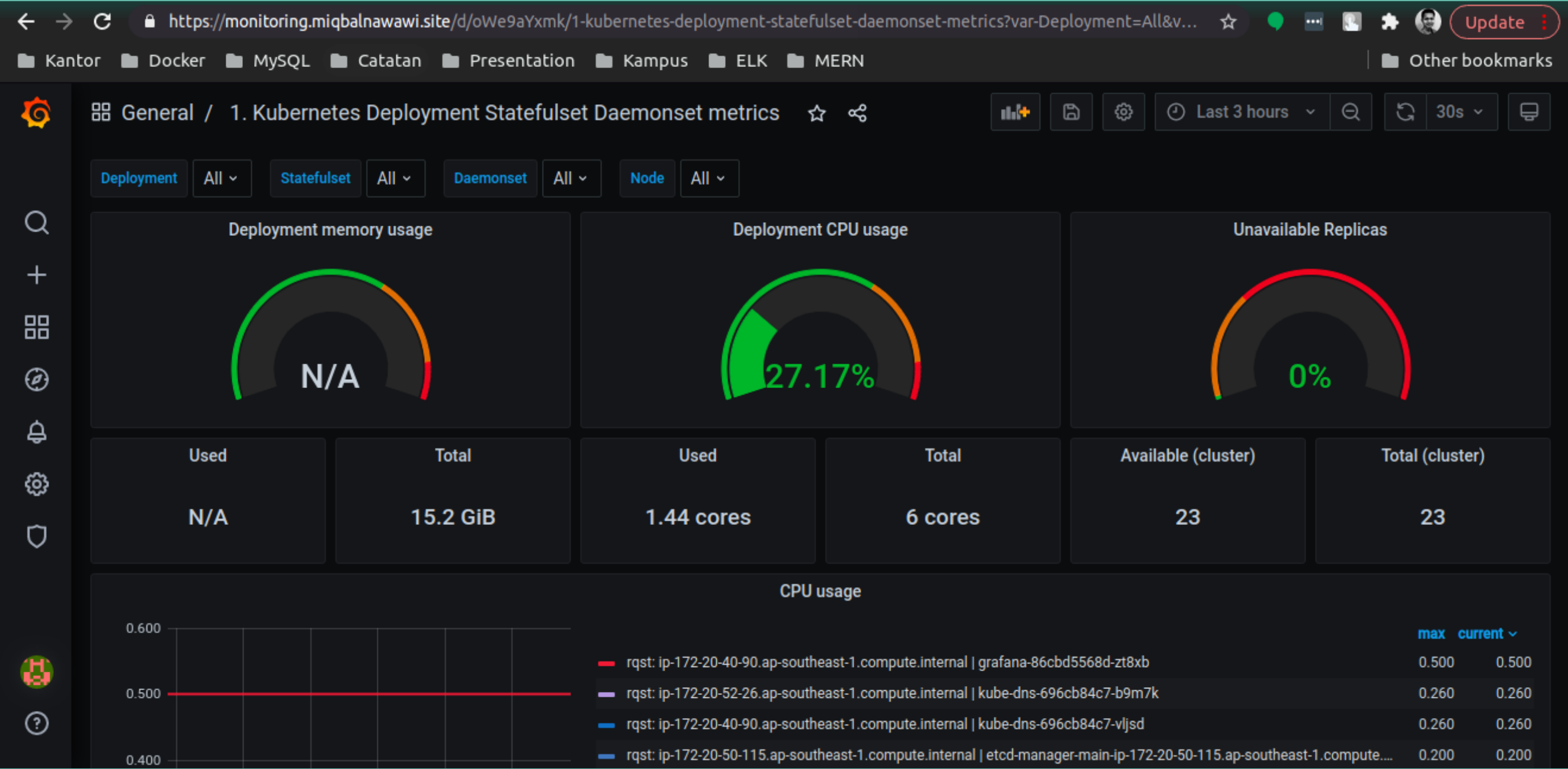
# Build Pods Logging Kibana

```
root@ip-10-0-1-154:~# kubectl get pods -n kube-logging
```

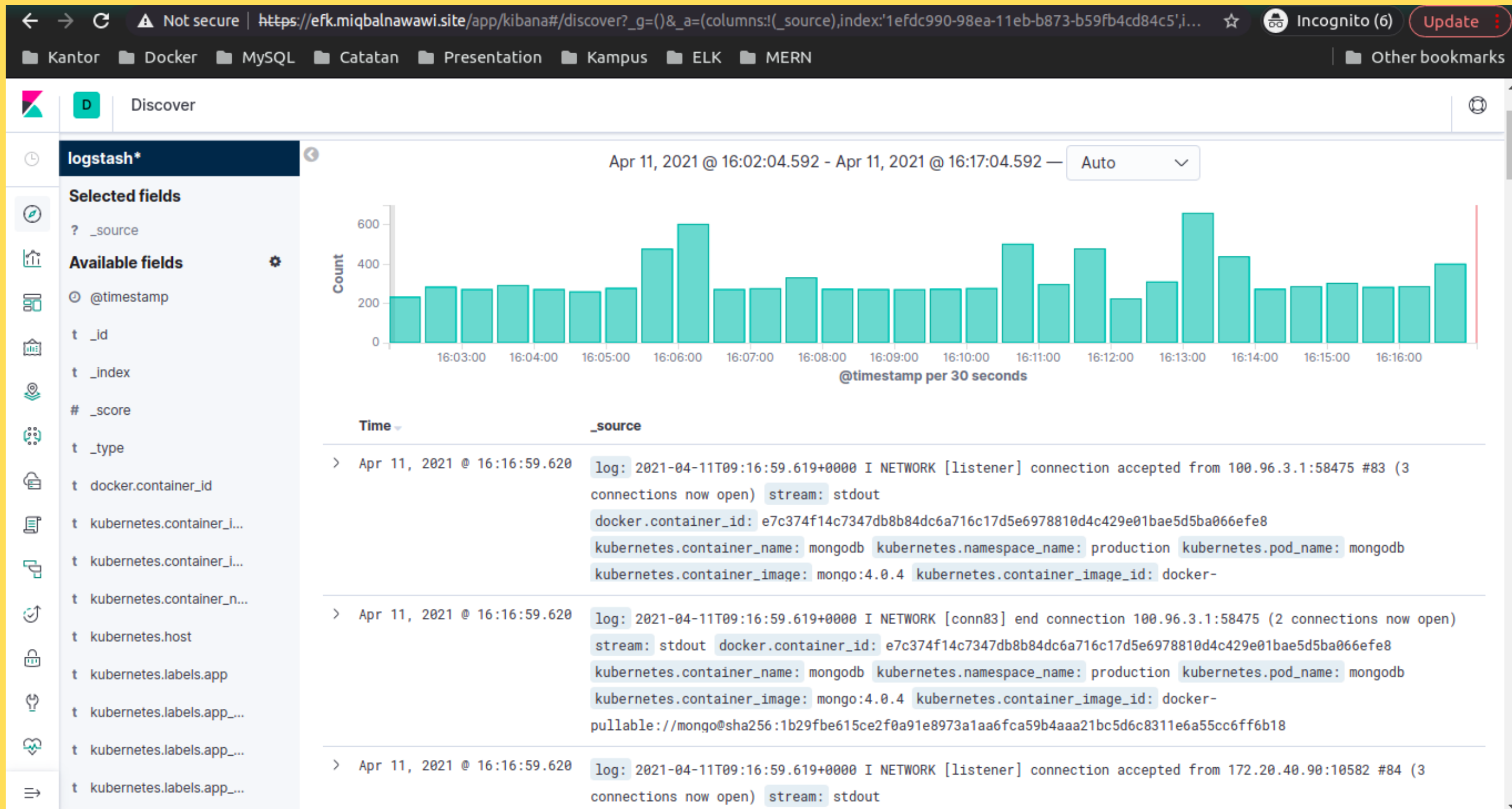
NAME	READY	STATUS	RESTARTS	AGE
es-cluster-0	1/1	Running	0	42h
es-cluster-1	1/1	Running	0	42h
es-cluster-2	1/1	Running	0	42h
fluentd-5jwrn	1/1	Running	0	2d7h
fluentd-894q9	1/1	Running	0	42h
fluentd-z5bbb	1/1	Running	0	2d7h
kibana-84cf7f59c-5htt	1/1	Running	0	42h

```
root@ip-10-0-1-154:~#
```

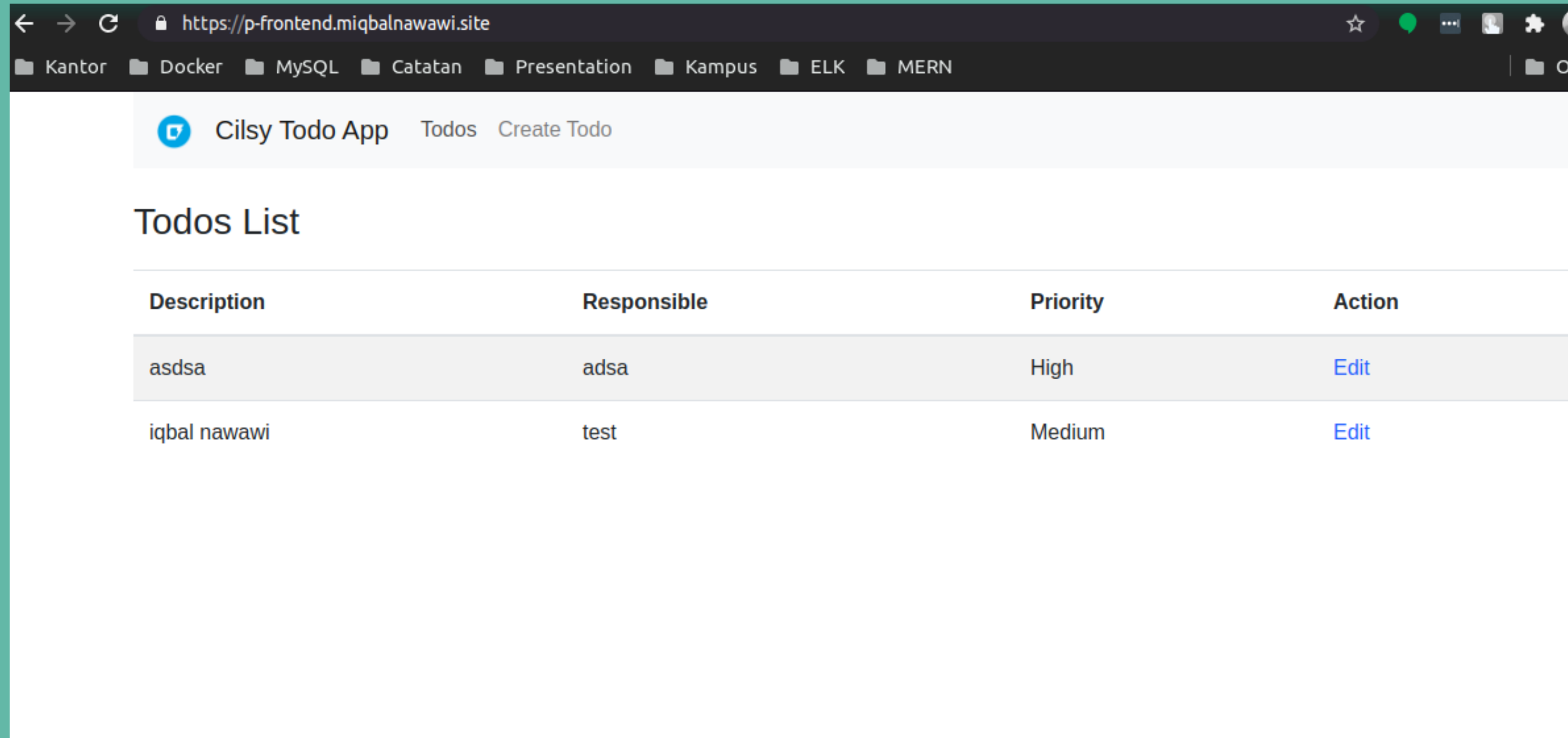
# Monitoring With Prometheus



# Monitoring With Logging EFK



# Page View Frontend





# Thank You

## Contact Me :

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