Demonstration of Rancher Resources Control policies

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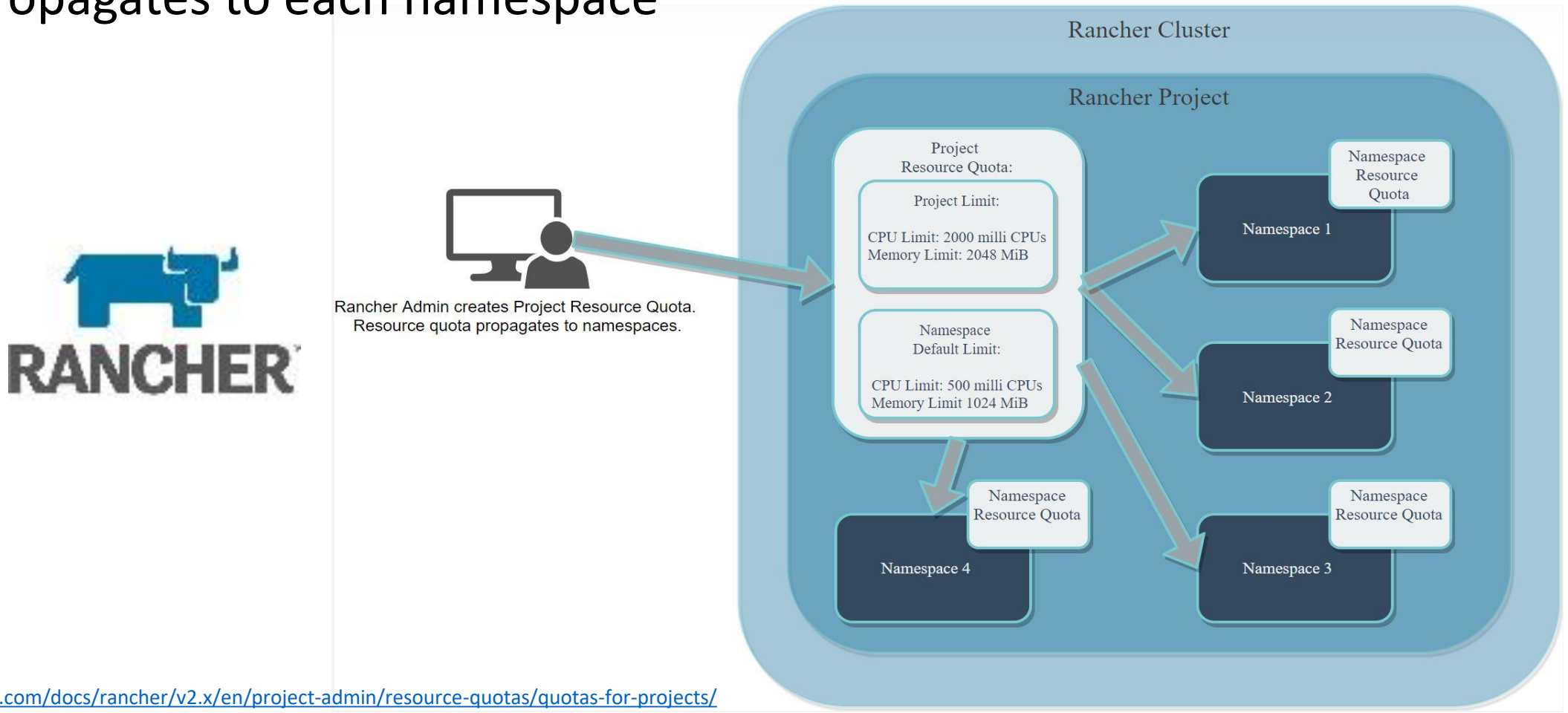
Topics

- Resources Quota on Rancher
- Resources Control Approach on IoTcloudServe@Tein
- Demonstrations
  - CPU & MEM
    - Concept of Limit & Reserve
    - POD Schelduling
    - Monitor Tools for Computing Resources (Grafana Dash Board)
  - PVC

Resource Quota on Rancher ?

- In Rancher, you apply a resource quota to the project, and then the quota propagates to each namespace



Ref. :https://rancher.com/docs/rancher/v2.x/en/project-admin/resource-quotas/quotas-for-projects/

Resources Control

Admins assign Resource Quota to Project/Namespace

Smart Mobility 01 : SDWMN
- SDWMN

Smart Mobility 02 : Traffic Analysis
- Wireless-quality-Analysis

Smart Agriculture 01: NUOL Team
- NUOL Team

Smart Energy 01 : NETPIE based CUBEM gateway
- CUBEM-gateway

Smart Energy 02 : CU Smart Campus
- SmartCampus

Smart Energy 03 : CUBEM Data Analytic Parllelization
- Parallel-computing-demo

Smart Energy 04 : CU Smart Classroom
- ISE

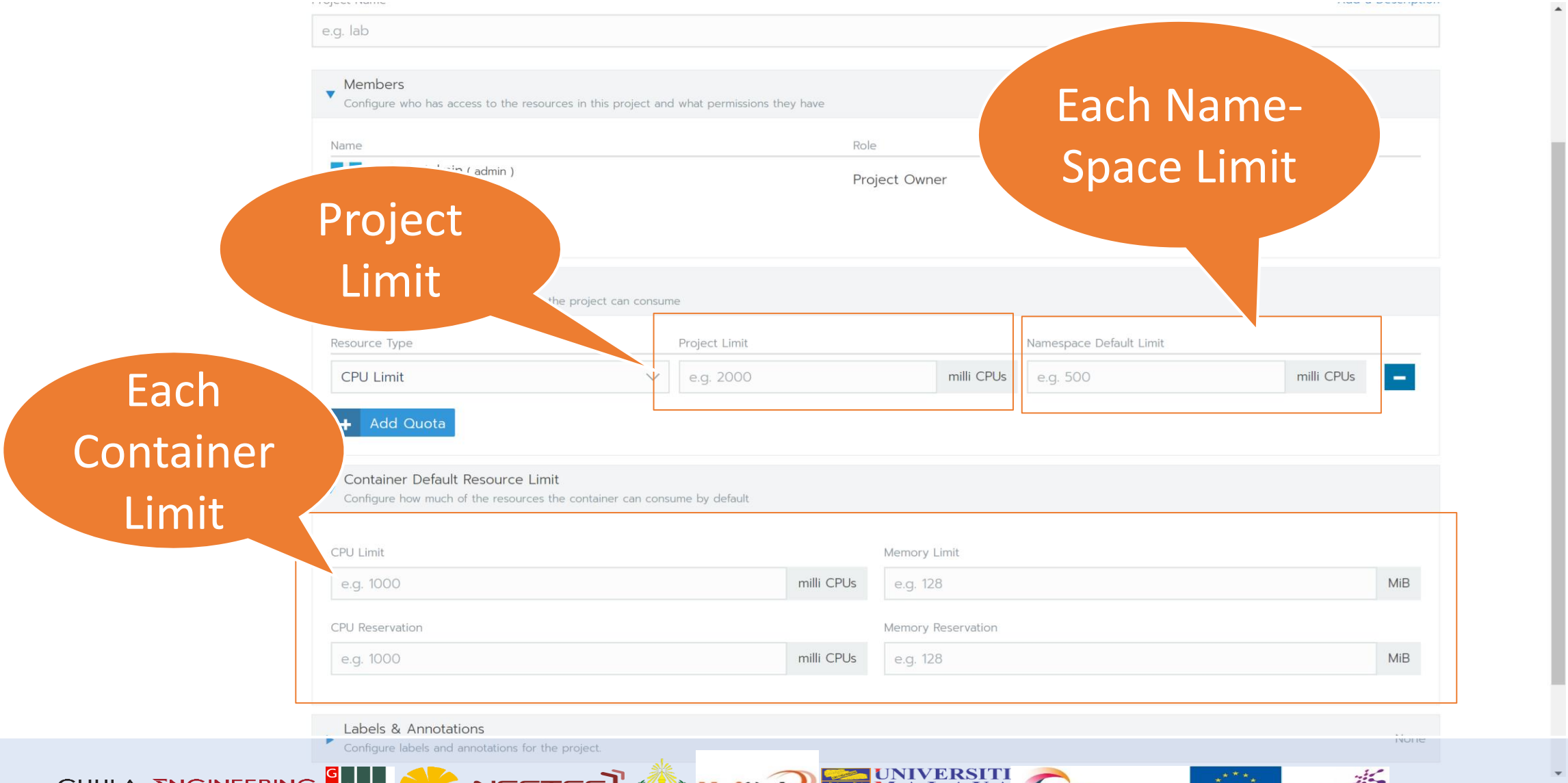
= K8S Cluster
= Project
= NameSpace

Config Parameter

- CPU limit
  - Example: 100m (0.1 vCPU, "100 Millicores")
- Memory limit
  - Example: 500Mi (500 MiB memory)
- Pod
- Persistent Volume Claim (PVC) → Use .ymal file
  - Example: 20G (20 GiB Storage claim)

Config in Rancher GUI

Resource Quota in Rancher GUI



Resource Quota in Rancher (.yaml)

Import YAML

Read from a file

```yaml
apiVersion: v1
kind: ResourceQuota
metadata:
  name: mem-cpu-example
spec:
  hard:
    requests.cpu: 500m
    requests.memory: 0.5Gi
    limits.cpu: "1"
    limits.memory: 1Gi
```

Import Mode

- ○ Cluster: Direct import of any resources into this cluster
- ◉ Project: Import resources into this project
- ○ Namespace: Import all resources into a specific namespace

Resources that do not specify a namespace will be imported into the selected default.
If a resource specifies a namespace that doesn't exist, it will be created and added to this project.

Default Namespace *

Add to a new namespace

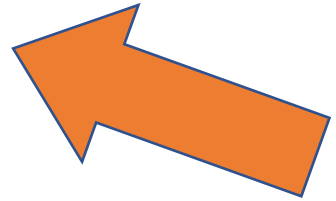
cpumem

Import Cancel

Concept : POD Schelduling

Node 1

Node 2



Work 1

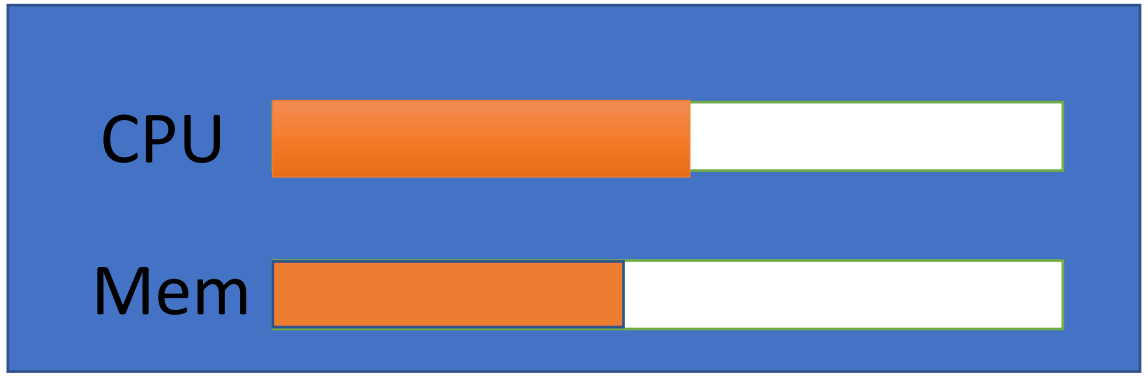
Request

CPU

MEM

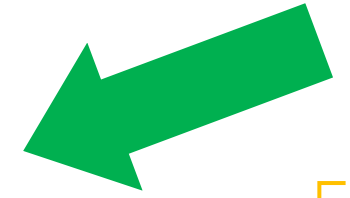
Concept : POD Schelduling

Node 1



Node 2

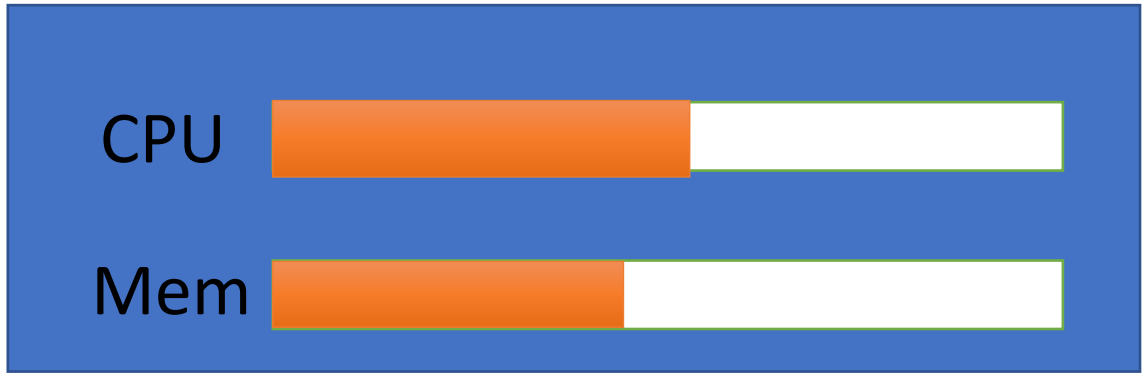
Work 2



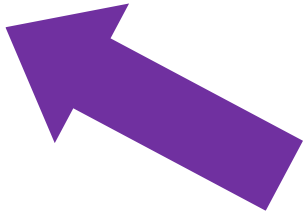
Request

Concept : POD Schelduling

Node 1

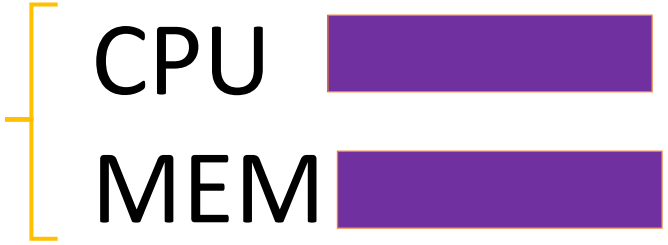


Node 2



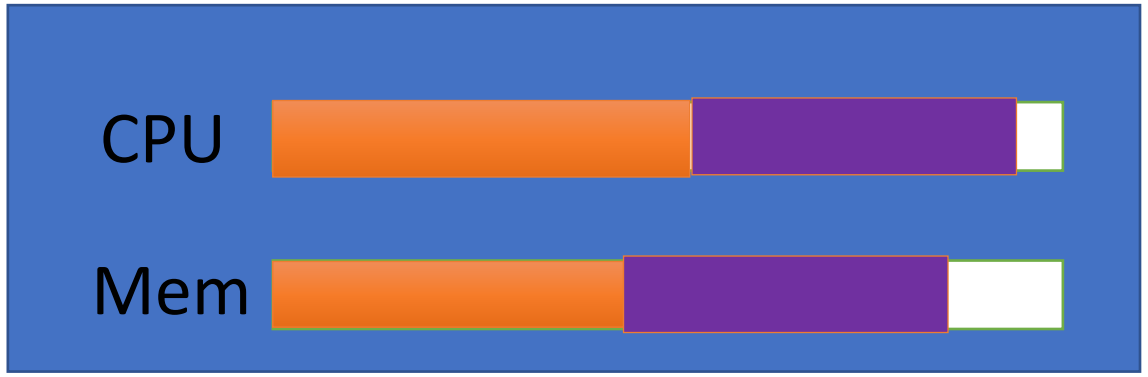
Work 2

Request



Concept : POD Schelduling

Node 1



Node 2

Work 2

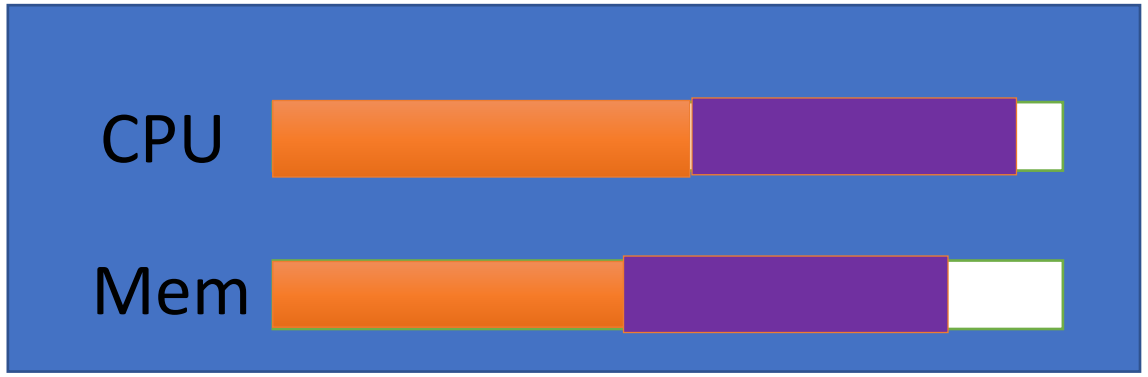
Request

CPU

MEM

Concept : POD Schelduling

Node 1

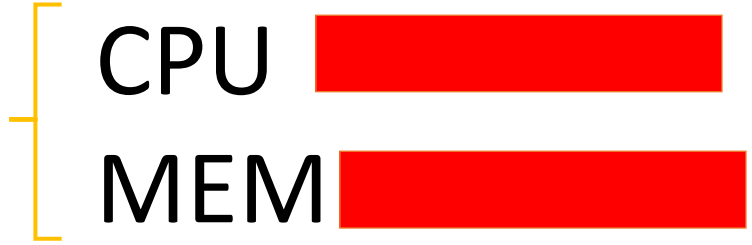


Node 2

"PENDING"

Work 2

Request



Concept Limit and Reserve

Requests
- Affect Scheduling Decision
- Priority (CPU, OOM adjust)

Limits
- Limit maximum container usage

```
resources:
  requests:
    cpu: 100m
    memory: 300Mi
  limits:
    cpu: 1
    memory: 300Mi
```

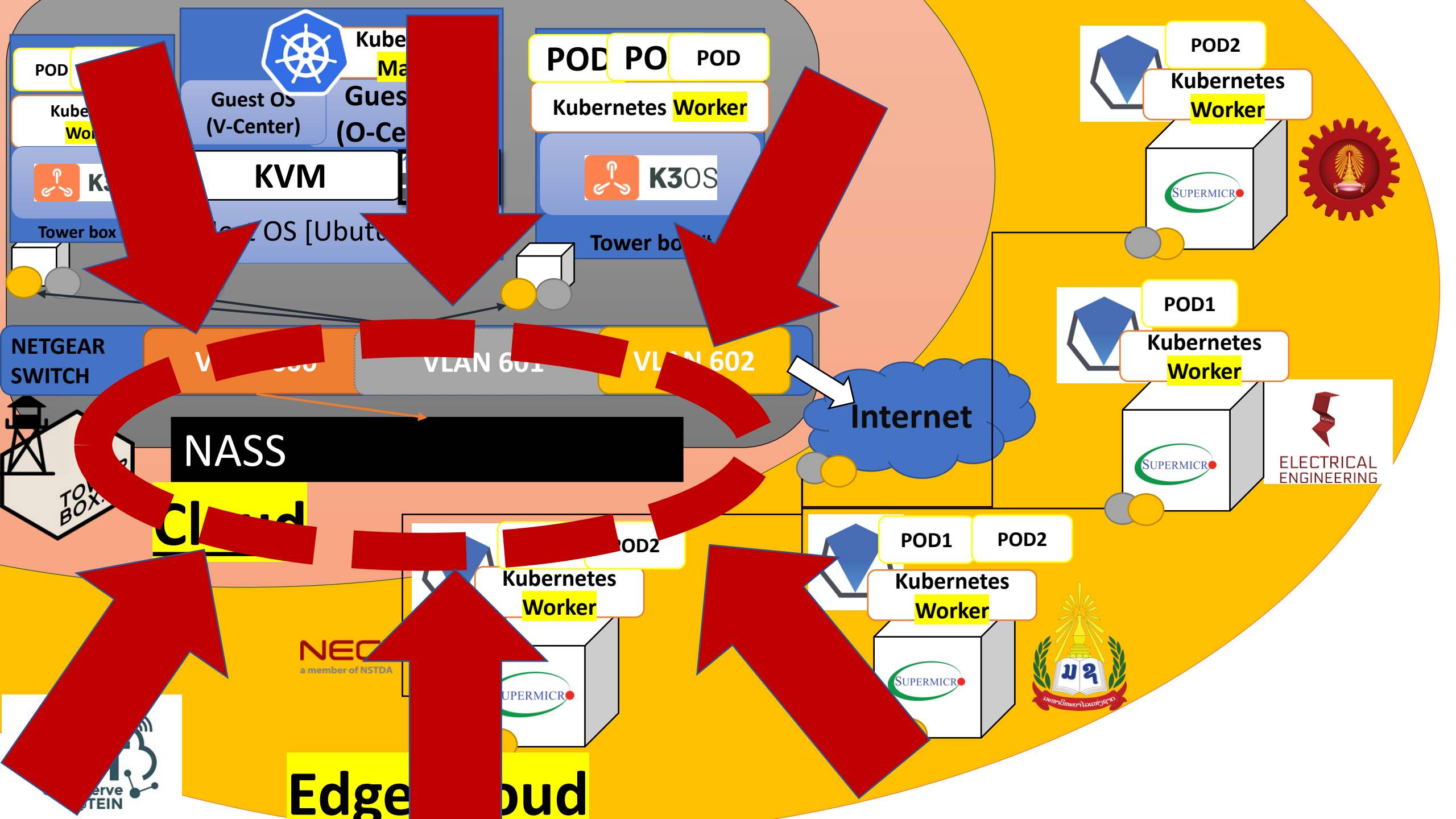
Monitor Tools

open source visualization and analytics software

Grafana

Ref. https://grafana.com/oss/grafana/

LIVE Demo : Request & Limit CPU, MEM


POD
Kube
Wor
Kube
Ma
Guest OS
(V-Center)
Gues
(O-Ce
KVM
K3
Tower box
OS [Ubut
POD
PO
POD
Kubernetes Worker
K3OS
Tower bo
NETGEAR
SWITCH
VLAN 601
VLAN 602
NASS
Cl
Internet
POD2
Kubernetes
Worker
SUPERMICRO
POD1
Kubernetes
Worker
SUPERMICRO
ELECTRICAL
ENGINEERING
OD2
Kubernetes
Worker
NEC
a member of NSTDA
SUPERMICRO
POD1
POD2
Kubernetes
Worker
SUPERMICRO
Edge
oud

Persistent Volume Claim (PVC) quota

- The admin can limit …
  1. The **number of persistent volume claims**
  2. The **amount of storage each claim** can request
  3. Total **storage Claim in the NameSpace**

Ref https://kubernetes.io/docs/tasks/administer-cluster/limit-storage-consumption/

LIVE Demo : PVC Claim