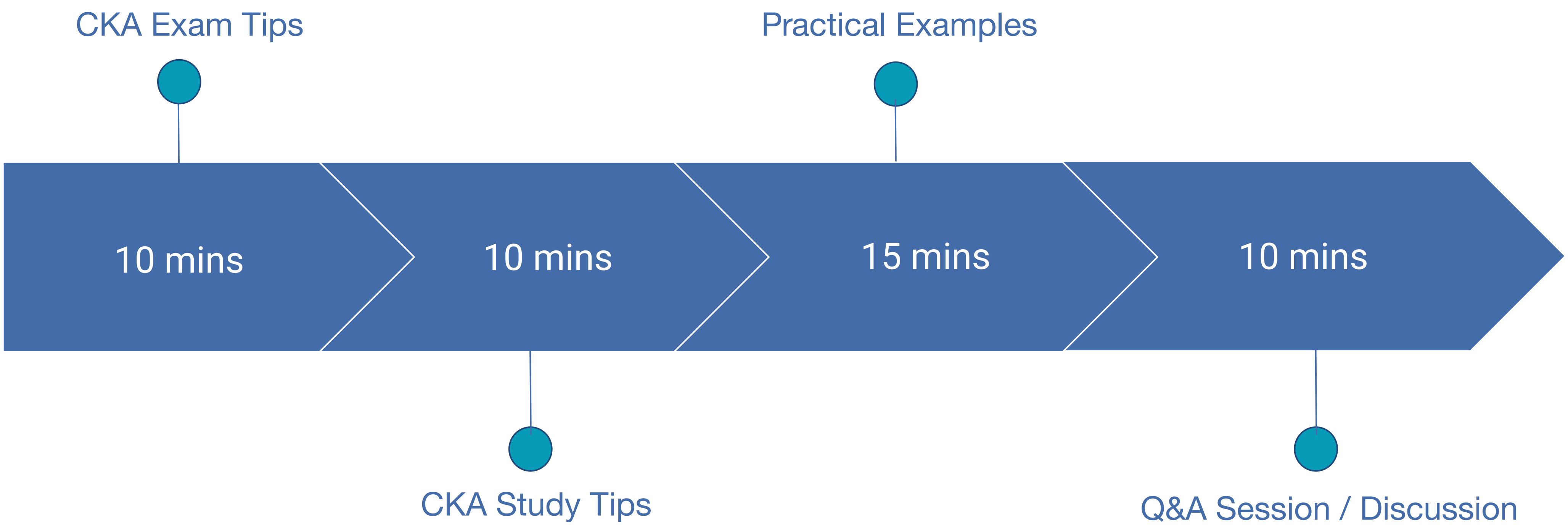
CLOUD NATIVE
COMPUTING
FOUNDATION

CKA Study & Exam Tips

https://community.cncf.io/manly

Agenda



CKA Exam Tips

10 mins

CKA Study Tips

10 mins

Practical Examples

15 mins

Q&A Session / Discussion

10 mins

Presenter

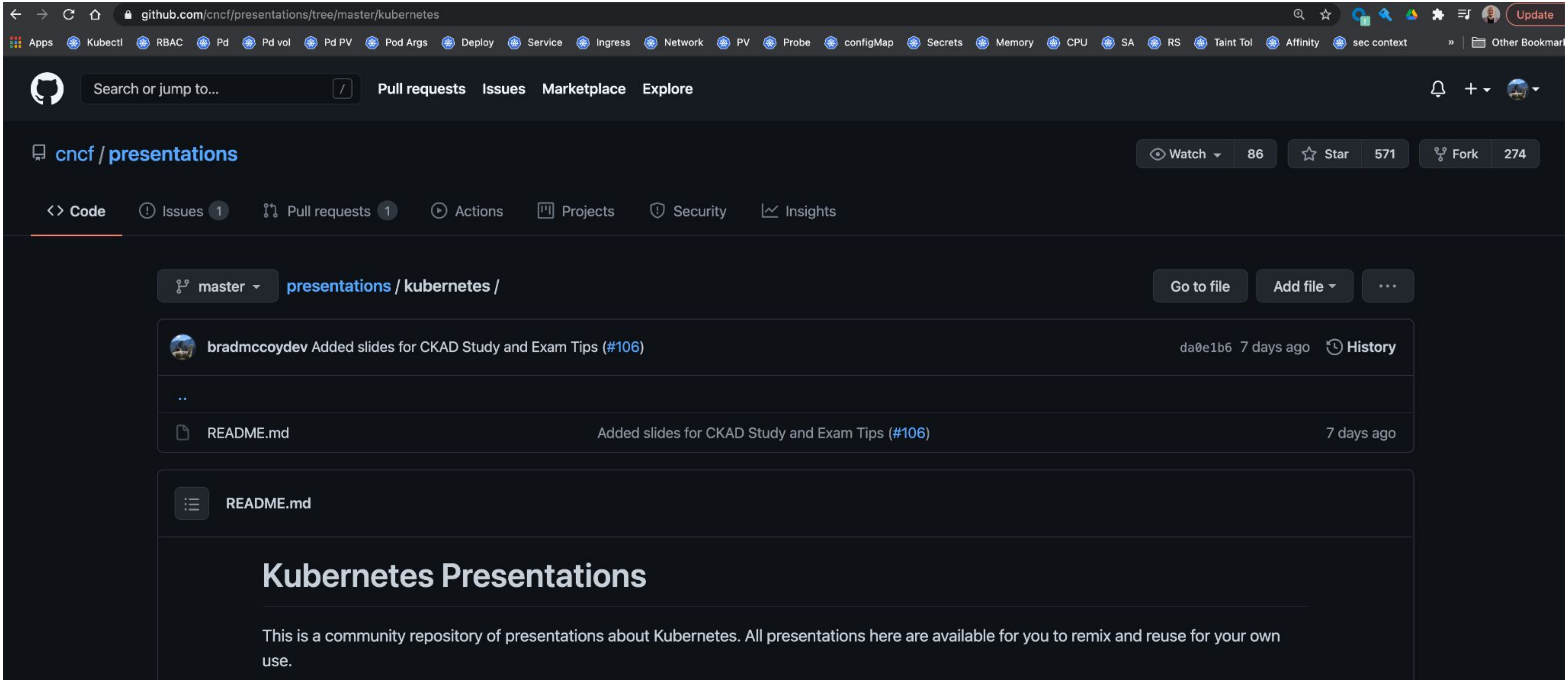
Brad McCoy

@bradmccoydev

CERTIFIED kubernetes ADMINISTRATOR

CERTIFIED kubernetes APPLICATION DEVELOPER

Do this talk yourself!



bradmccoydev Added slides for CKAD Study and Exam Tips (#106) da0e1b6 7 days ago

..

README.md Added slides for CKAD Study and Exam Tips (#106) 7 days ago

README.md

Kubernetes Presentations

This is a community repository of presentations about Kubernetes. All presentations here are available for you to remix and reuse for your own use.

https://community.cncf.io/manly

CLOUD NATIVE COMPUTING FOUNDATION

Special thanks

SIG Docs

https://kubernetes.io/docs/contribute/participate

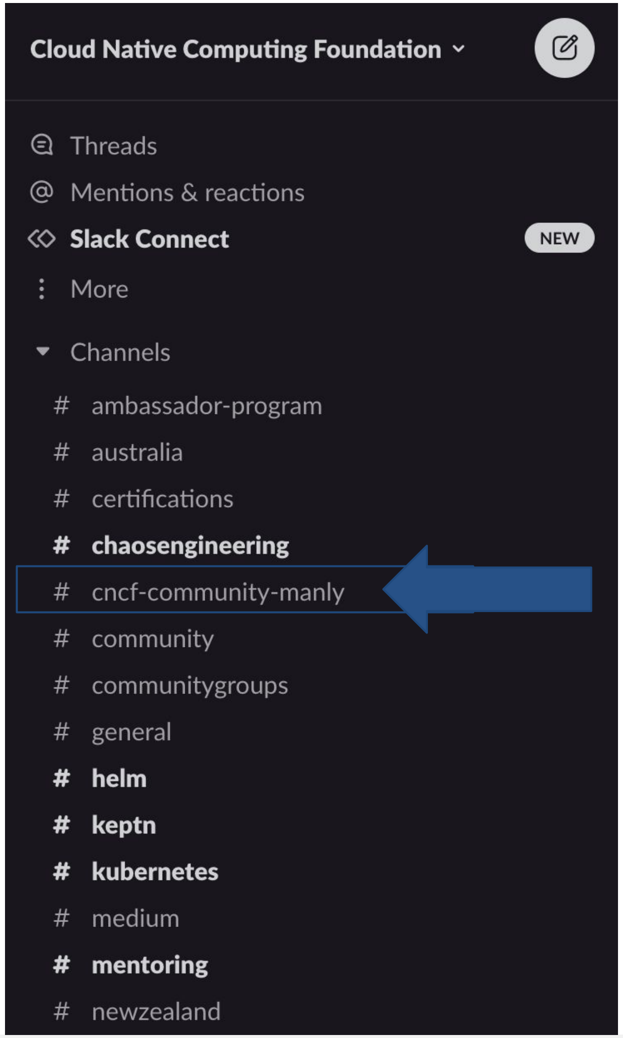
slack.cncf.io

slack.k8s.io

Find us on slack

slack.cncf.io

cncf-community-manly



Cloud Native Computing Foundation ⌄

Threads

Mentions & reactions

Slack Connect NEW

More

Channels

- # ambassador-program
- # australia
- # certifications
- **# chaosengineering**
- # cncf-community-manly
- # community
- # communitygroups
- # general
- **# helm**
- **# keptn**
- **# kubernetes**
- # medium
- **# mentoring**
- # newzealand

https://community.cncf.io/manly

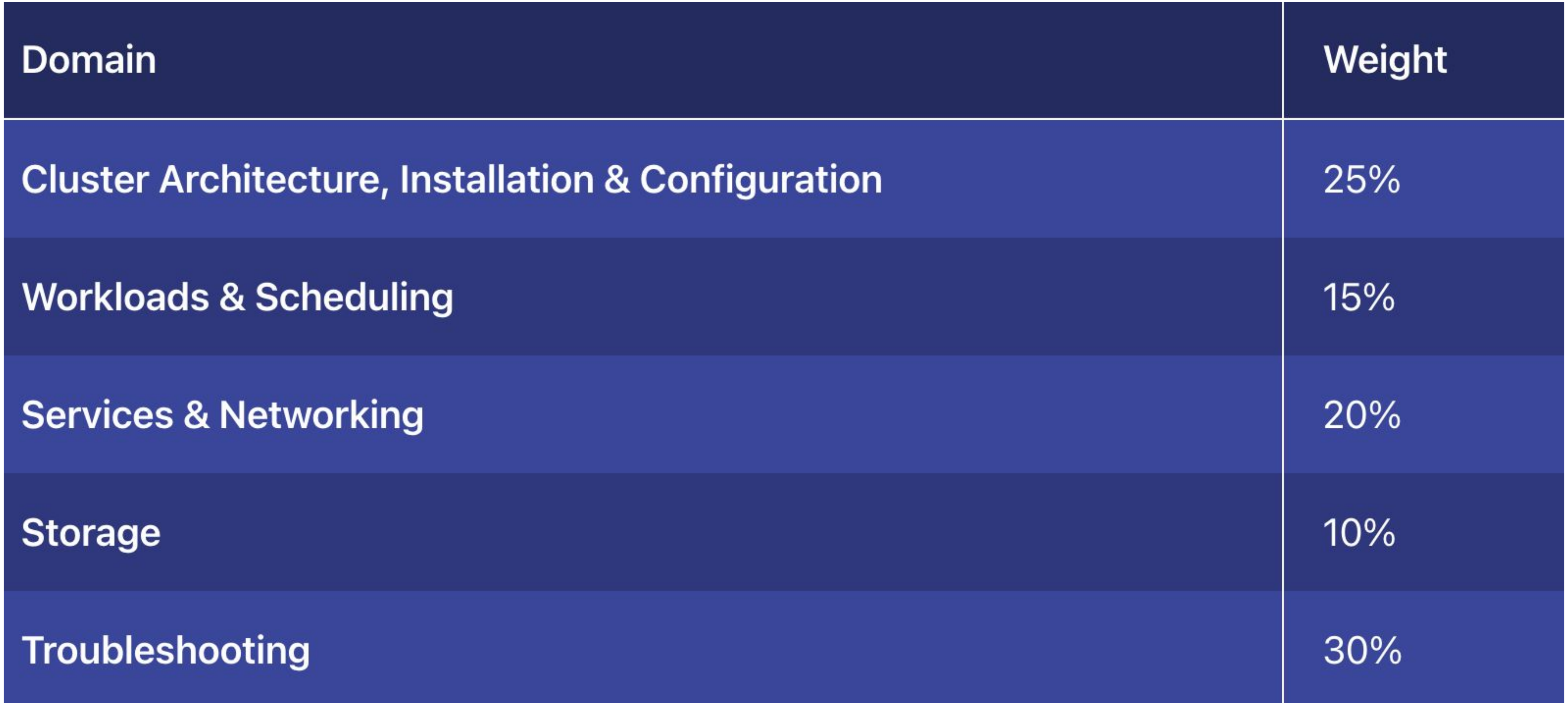
CLOUD NATIVE
COMPUTING FOUNDATION

Exam Overview

Exam Tips

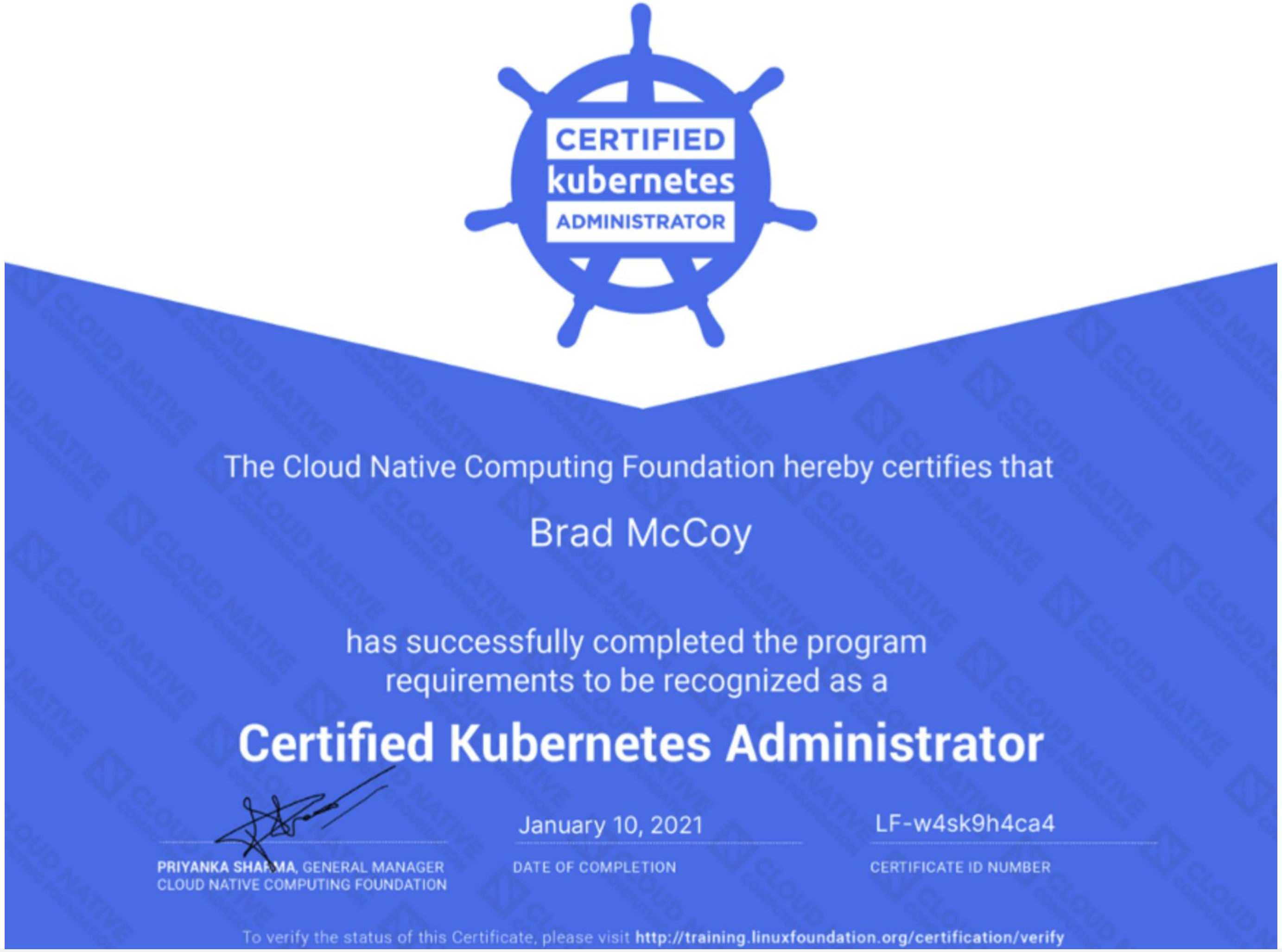
Why sit the exam?

Exam Tips - Exam Curriculum



Domain	Weight
Cluster Architecture, Installation & Configuration	25%
Workloads & Scheduling	15%
Services & Networking	20%
Storage	10%
Troubleshooting	30%

CKA Certificate



CERTIFIED kubernetes ADMINISTRATOR

The Cloud Native Computing Foundation hereby certifies that

Brad McCoy

has successfully completed the program requirements to be recognized as a

Certified Kubernetes Administrator

	January 10, 2021	LF-w4sk9h4ca4
PRIYANKA SHARMA, GENERAL MANAGER CLOUD NATIVE COMPUTING FOUNDATION	DATE OF COMPLETION	CERTIFICATE ID NUMBER

To verify the status of this Certificate, please visit **http://training.linuxfoundation.org/certification/verify**

CERTIFIED kubernetes ADMINISTRATOR

Exam Tips

Exam Tips - Booking your exam

To book goto: https://www.cncf.io/certification/cka

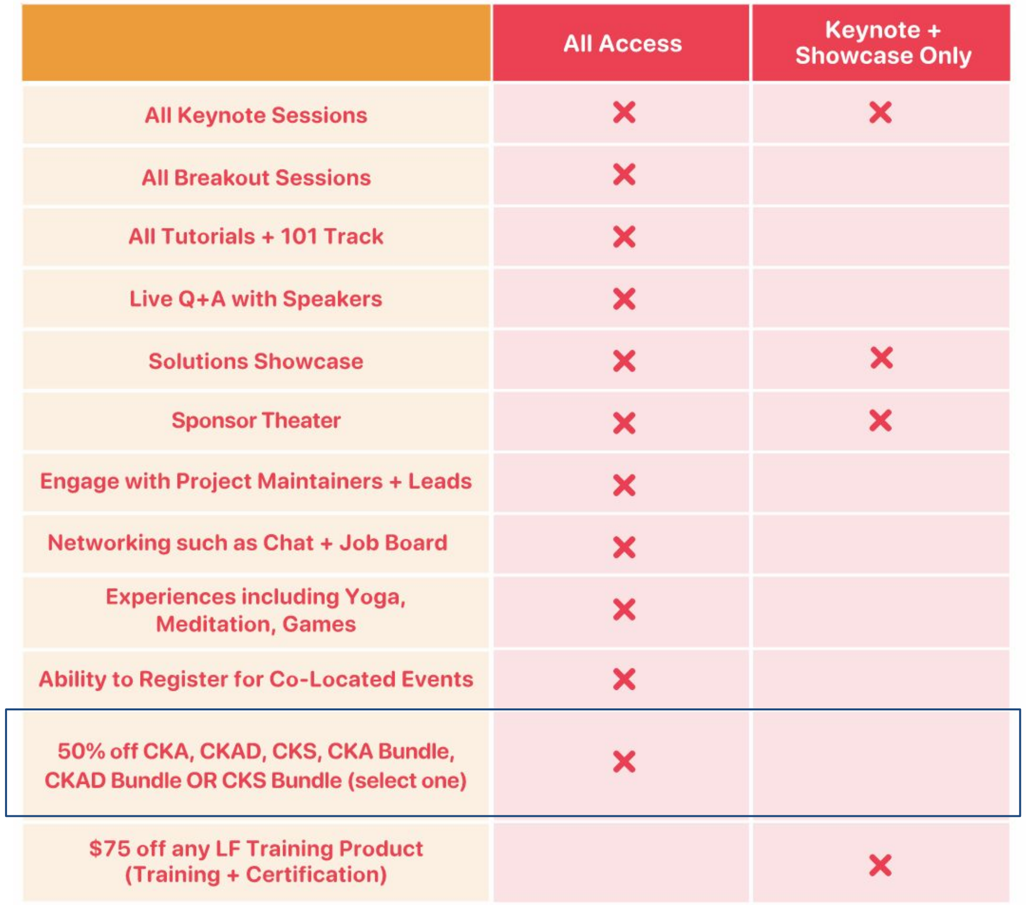
- Book exam straight away to set your goal
- Free reschedule as many times as you want 24 hours in advance
- Price is in US dollars
- One free retake

CERTIFIED kubernetes APPLICATION DEVELOPER

$300
Exam only

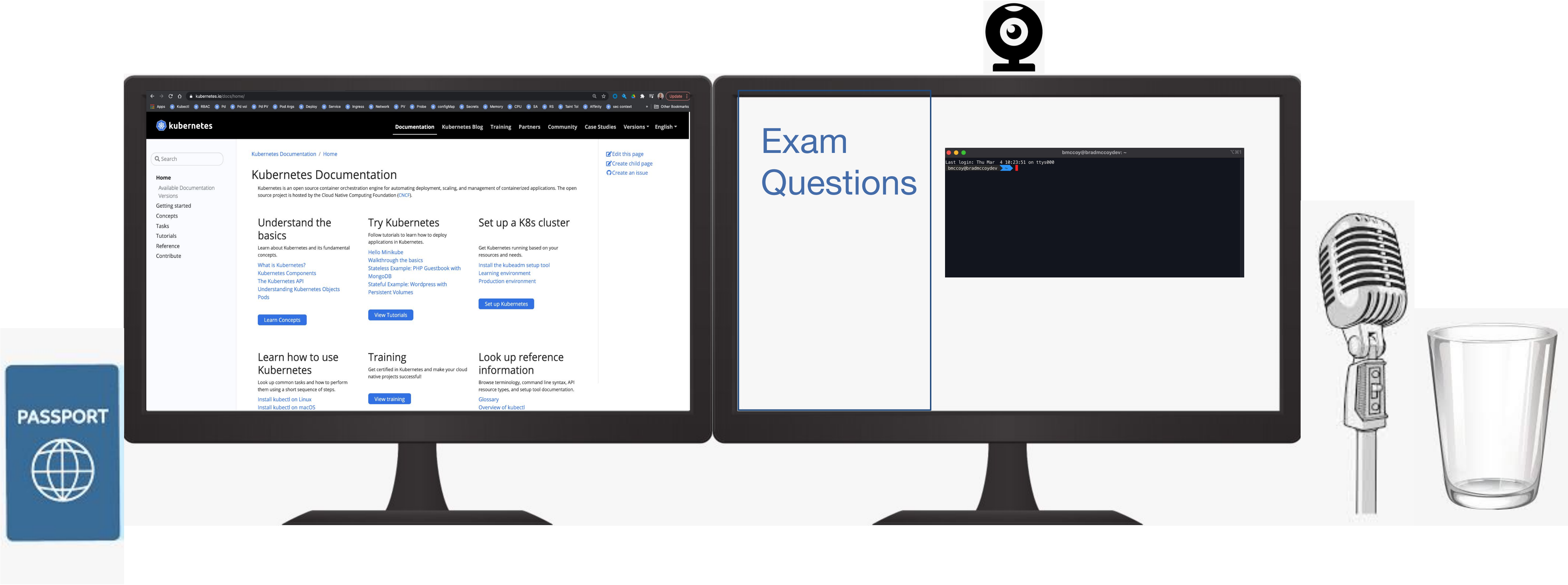
Exam Tips - Discount Codes

https://events.linuxfoundation.org/kubecon-cloudnativecon-europe/register



	All Access	Keynote + Showcase Only
All Keynote Sessions	×	×
All Breakout Sessions	×	
All Tutorials + 101 Track	×	
Live Q+A with Speakers	×	
Solutions Showcase	×	×
Sponsor Theater	×	×
Engage with Project Maintainers + Leads	×	
Networking such as Chat + Job Board	×	
Experiences including Yoga, Meditation, Games	×	
Ability to Register for Co-Located Events	×	
50% off CKA, CKAD, CKS, CKA Bundle, CKAD Bundle OR CKS Bundle (select one)	×	
$75 off any LF Training Product (Training + Certification)		×

Exam Day



Kubernetes Documentation / Home

Kubernetes Documentation

Kubernetes is an open source container orchestration engine for automating deployment, scaling, and management of containerized applications. The open source project is hosted by the Cloud Native Computing Foundation (CNCF).

Understand the basics

Learn about Kubernetes and its fundamental concepts.

What is Kubernetes?
Kubernetes Components
The Kubernetes API
Understanding Kubernetes Objects
Pods

Try Kubernetes

Follow tutorials to learn how to deploy applications in Kubernetes.

Hello Minikube
Walkthrough the basics
Stateless Example: PHP Guestbook with MongoDB
Stateful Example: Wordpress with Persistent Volumes

Set up a K8s cluster

Get Kubernetes running based on your resources and needs.

Install the kubeadm setup tool
Learning environment
Production environment

Learn how to use Kubernetes

Look up common tasks and how to perform them using a short sequence of steps.

Install kubectl on Linux
Install kubectl on macOS

Training

Get certified in Kubernetes and make your cloud native projects successful!

Look up reference information

Browse terminology, command line syntax, API resource types, and setup tool documentation.

Glossary
Overview of kubectl

Exam Questions

```
Last login: Thu Mar  4 10:23:51 on ttys000
 bmccoy@bradmccoydev  ~ 
```

Exam Tips

- The exam consists of 15-20 performance based tasks
- Each question has a weight eg 5% skip hard ones and flag them for later
- Straight away use **sudo -i** to assume elevated privileges to make things easier. If you want to get out type exit or **su student**
- Use “**ssh <Node Name>**” to get into the node, remember which node you are in so you don't get confused
- Always copy pod names etc instead of typing out to avoid spelling mistakes
- Use imperative commands over YAML

Exam Tips - Naming YAML files

When generating YAML files, name them with the question number

Example

1.yaml
1-svc.yaml

```
kubectl run example bradmccoydev/test:latest -o yaml > 1.yaml
```

```
cp 1.yaml 1a.yaml
```
(backup if required)

```
kubectl create -f 1.yaml
```

Exam Tips - alias k=kubectl

```
alias k=kubectl
```

Use this so you don’t have to keep typing kubectl all the time

Eg.

```
alias k=kubectl
k run nginx --image=nginx
```

Exam Tips

Make sure you are in the right cluster, and the right namespace as specified in the question, to avoid deploying to the wrong namespace when using YAML to create resources specify it in the metadata in case you forget.

Exam Tips - kubectl api-resources

kubectl api-resources to get names/short names *eg. kubectl get svc*

Exam Tips - Reverse Search (Ctrl + r)

Exam Tips - Watch command

Make use of the **watch** command when checking if deployments worked etc it will execute the command every 2 seconds until you **ctrl + c** *eg watch kubectl get pods*

Exam Tips - kubectl -h command

Use the **-h** for help! **kubectl run -h** gives some hints if you forgot imperative commands under pressure.

Practice the **-h** command on other options such as **kubectl create deploy -h** etc

Exam Tips - etcdctl help

If you forgot etcdctl commands under pressure use the -h param for help

```
ETCDCTL_API=3 etcdctl snapshot save -h

ETCDCTL_API=3 etcdctl snapshot restore -h
```

Exam Tips - etcdctl snapshot save -h

```
$ ETCDCTL_API=3 etcdctl snapshot save -h

NAME: snapshot save - Stores an etcd node backend snapshot to a given file

USAGE: etcdctl snapshot save <filename> [flags]

OPTIONS:
  -h, --help[=false]    help for save

GLOBAL OPTIONS:
      --cacert=""                          verify certificates of TLS-enabled secure servers using this CA bundle
      --cert=""                            identify secure client using this TLS certificate file
      --command-timeout=5s                 timeout for short running command (excluding dial timeout)
      --debug[=false]                      enable client-side debug logging
      --dial-timeout=2s                    dial timeout for client connections
      -d, --discovery-srv=""               domain name to query for SRV records describing cluster endpoints
      --discovery-srv-name=""              service name to query when using DNS discovery
      --endpoints=[127.0.0.1:2379]         gRPC endpoints
      --hex[=false]                        print byte strings as hex encoded strings
      --insecure-discovery[=true]          accept insecure SRV records describing cluster endpoints
      --insecure-skip-tls-verify[=false] skip server certificate verification (CAUTION: this option should be enabled only for testing purposes)
      --insecure-transport[=true]          disable transport security for client connections
      --keepalive-time=2s                  keepalive time for client connections
      --keepalive-timeout=6s               keepalive timeout for client connections
      --key=""                             identify secure client using this TLS key file
      --password=""                        password for authentication (if this option is used, --user option shouldn't include password)
      --user=""                            username[:password] for authentication (prompt if password is not supplied)
  -w, --write-out="simple"                 set the output format (fields, json, protobuf, simple, table)
```

Exam Tips - etcdctl snapshot restore -h

```
controlplane $ ETCDCTL_API=3 etcdctl snapshot restore -h

NAME:    snapshot restore - Restores an etcd member snapshot to an etcd directory
USAGE:   etcdctl snapshot restore <filename> [options] [flags]

OPTIONS:
      --data-dir=""                                       Path to the data directory
  -h, --help[=false]                                      help for restore
      --initial-advertise-peer-urls="http://localhost:2380"    List of this member's peer URLs to advertise to the rest of the cluster
      --initial-cluster="default=http://localhost:2380"   Initial cluster configuration for restore bootstrap
      --initial-cluster-token="etcd-cluster"              Initial cluster token for the etcd cluster during restore bootstrap
      --name="default"                                    Human-readable name for this member
      --skip-hash-check[=false]                           Ignore snapshot integrity hash value (required if copied from data directory)
      --wal-dir=""                                        Path to the WAL directory (use --data-dir if none given)

GLOBAL OPTIONS:
      --cacert=""                        verify certificates of TLS-enabled secure servers using this CA bundle
      --cert=""                          identify secure client using this TLS certificate file
      --command-timeout=5s               timeout for short running command (excluding dial timeout)
      --debug[=false]                    enable client-side debug logging
      --dial-timeout=2s                  dial timeout for client connections
  -d, --discovery-srv=""                 domain name to query for SRV records describing cluster endpoints
      --discovery-srv-name=""            service name to query when using DNS discovery
      --endpoints=[127.0.0.1:2379]       gRPC endpoints
      --hex[=false]                      print byte strings as hex encoded strings
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      --insecure-skip-tls-verify[=false] skip server certificate verification (CAUTION: this option should be enabled only for testing purposes)
      --insecure-transport[=true]        disable transport security for client connections
      --keepalive-time=2s                keepalive time for client connections
      --keepalive-timeout=6s             keepalive timeout for client connections
      --key=""                           identify secure client using this TLS key file
      --password=""                      password for authentication (if this option is used, --user option shouldn't include password)
      --user=""                          username[:password] for authentication (prompt if password is not supplied)
  -w, --write-out="simple"               set the output format (fields, json, protobuf, simple, table)
```

Exam Tips - Kubelet Problems

```
systemctl daemon-reload && systemctl restart kubelet
```

Study Tips

Study Tips - Courses

THE LINUX FOUNDATION

KODEKLOUD

Udemy

A CLOUD GURU

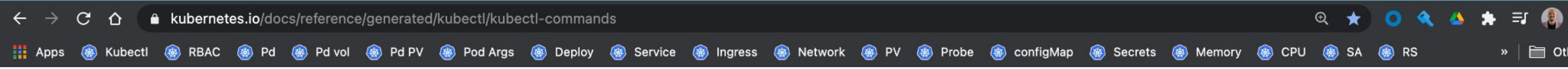
walidshaari/Kubernetes-Certified-Administrator.git

PLURALSIGHT

$ killer_ Kubernetes Exam Simulator

CloudAcademy

Study Tips - Use bookmarks!

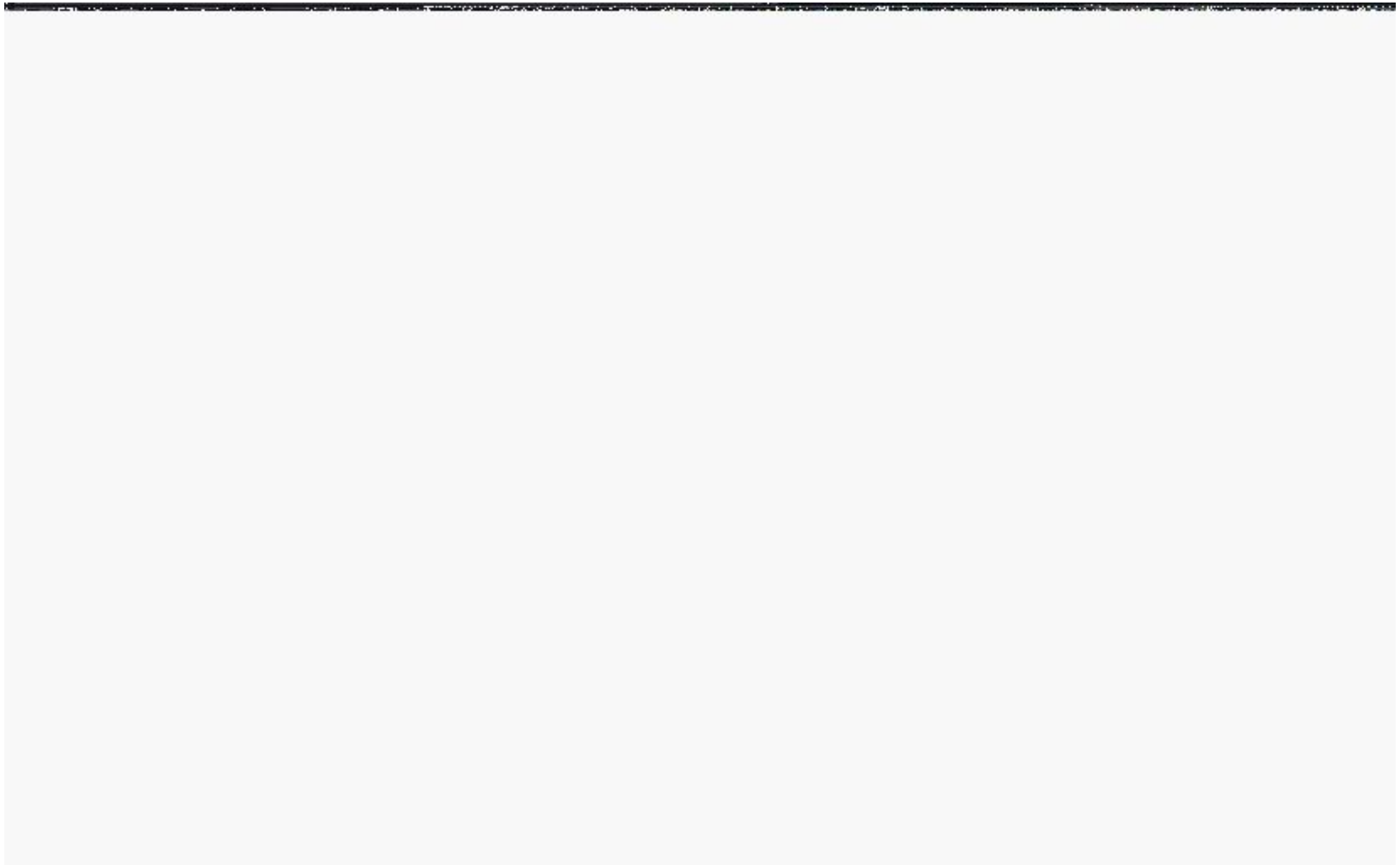


kubernetes.io/docs/reference/generated/kubectl/kubectl-commands

In the exam you are allowed to use bookmarks for the documentation so as you study and learn add bookmarks to the page in kubernetes docs.

When you do your practice tests and practical work, refer to the bookmarks and not your notes, this will help you be fast for exam day.

Study Tips - Use bookmarks!



Study Tips - kubectl Reference Docs

Study Tips - VIM

If you don’t know VIM editor learn it. You can get away with just knowing nano, by setting KUBE_EDITOR=”nano” but when you need to edit deployments etc it will default to VIM so you don’t want to risk being stuck. If you don't know VIM you are not ready for you exam.

VIM Cheat Sheet: vim.rtorr.com

Study Tips - VIM

There are two modes, for writing/deleting text press **i**, then press **esc** for edit mode

To exit without saving press **esc** and type **:q!**
To exit with saving press **esc** and type **:wq!**

To delete a line type **dd**
To delete more than one line type **5dd** (substitute 5 for the number you want to delete)

To Goto line 5 type **5gg** (substitute 5 for the number you want to goto)
To Jump to the end of the line type **$**

To search for a word eg image press **esc** then type **/image** and press **enter**

To show line numbers press **esc** and then type **:set number**

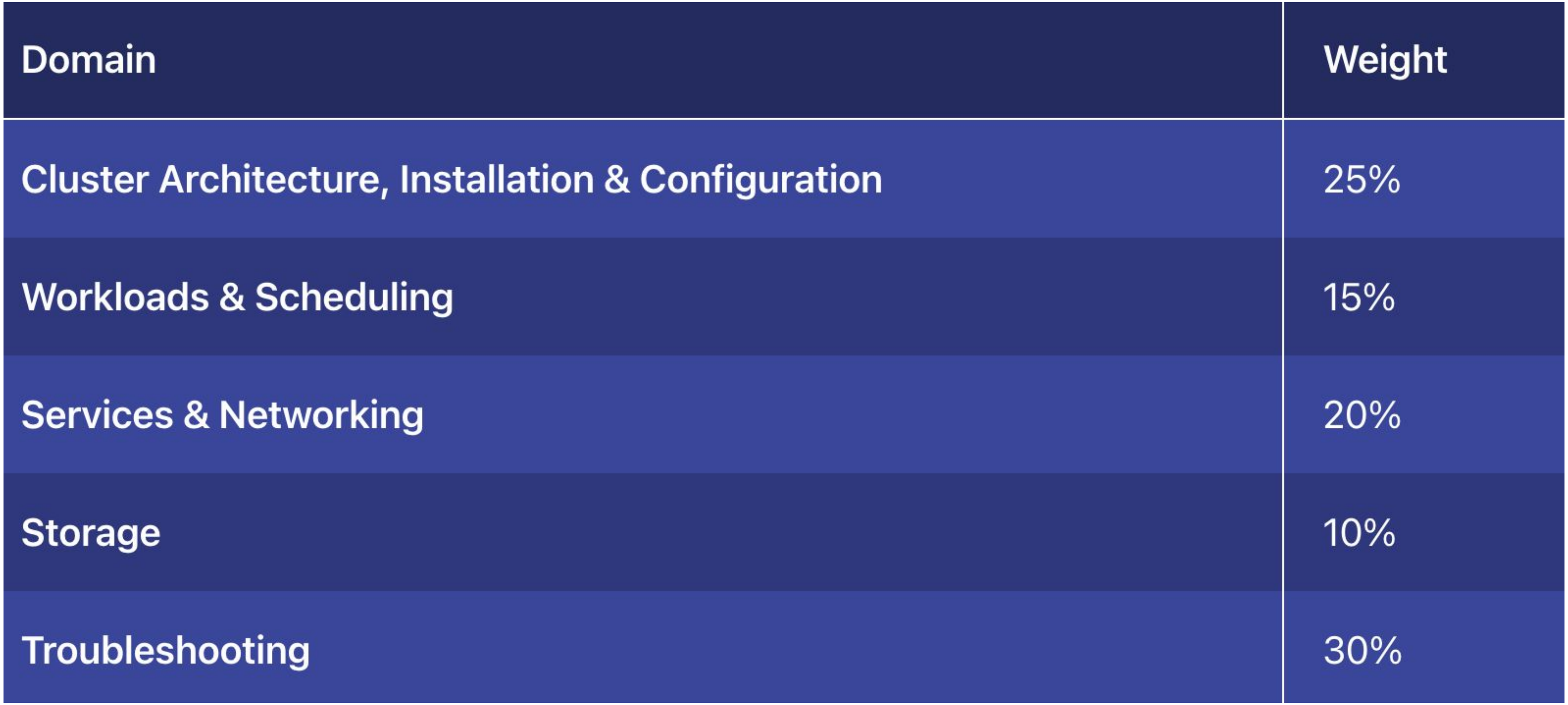
Study Tips - Basic linux commands

If you are a developer doing this course and you are not used to linux, it is worth learning basic linux commands.

Command	**Description**	**Example**
cd	Used to go into or out of a folder	**cd myfolder** (**cd ..** to go back)
ls	List files/folders in a directory	**ls** (**ls myfolder** to list contents of myfolder)
grep	Searches for text	**cat 1.yaml | grep image**
cat	Read a file on the console	**cat deployment.yaml**
cp	Copy a file	**cp 1.yaml 1a.yaml**
mv	Move a file	**mv 1.yaml backup/1.yaml**
mkdir	Make a directory	**mkdir test**
rm	Removes a file or folder	**rm 1.yaml** (**rm -R myfolder** for directory)
vi	Go into vi editor	**vi deployment.yaml**

Practical Examples

Practical Examples



Domain	Weight
Cluster Architecture, Installation & Configuration	25%
Workloads & Scheduling	15%
Services & Networking	20%
Storage	10%
Troubleshooting	30%

Practical Examples - Upgrade Cluster

https://kubernetes.io/docs/tasks/administer-cluster/kubeadm/kubeadm-upgrade/

Update kubeadm

```
apt-get update && apt-get install -y kubeadm=1.20.x-00
sudo kubeadm upgrade apply v1.20.x
```

```
[upgrade/successful] SUCCESS! Your cluster was upgraded to "v1.20.x". Enjoy!
```

Practical Examples - Upgrade Cluster

https://kubernetes.io/docs/tasks/administer-cluster/kubeadm/kubeadm-upgrade/

Update kubelet and kubectl

```
kubectl drain <node-to-drain> --ignore-daemonsets
```

```
apt-get update && apt-get install -y kubelet=1.20.x-00 kubectl=1.20.x-00
```

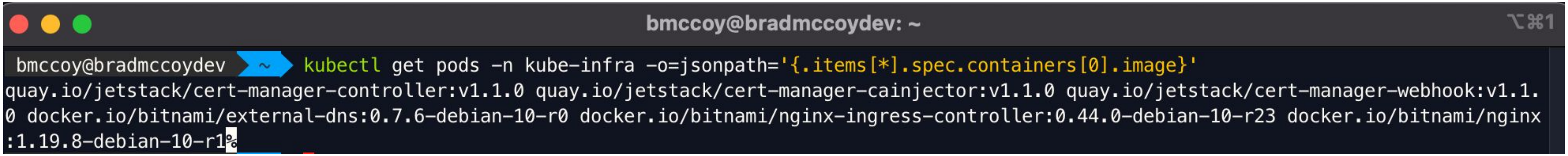
```
sudo systemctl daemon-reload
sudo systemctl restart kubelet
```

```
kubectl uncordon <node-to-drain>
```

Practical Examples - JSON PATH

kubectl get pods -o json

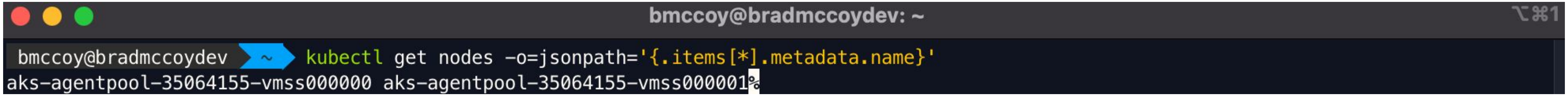
kubectl get pods -o=jsonpath=’{.items[*].spec.containers[0].image}’



```
 bmccoy@bradmccoydev  ~  kubectl get pods -n kube-infra -o=jsonpath='{.items[*].spec.containers[0].image}'
quay.io/jetstack/cert-manager-controller:v1.1.0 quay.io/jetstack/cert-manager-cainjector:v1.1.0 quay.io/jetstack/cert-manager-webhook:v1.1.
0 docker.io/bitnami/external-dns:0.7.6-debian-10-r0 docker.io/bitnami/nginx-ingress-controller:0.44.0-debian-10-r23 docker.io/bitnami/nginx
:1.19.8-debian-10-r1%
```

Practical Examples - JSON PATH

kubectl get nodes -o=jsonpath=’{.items[*].metadata.name}’

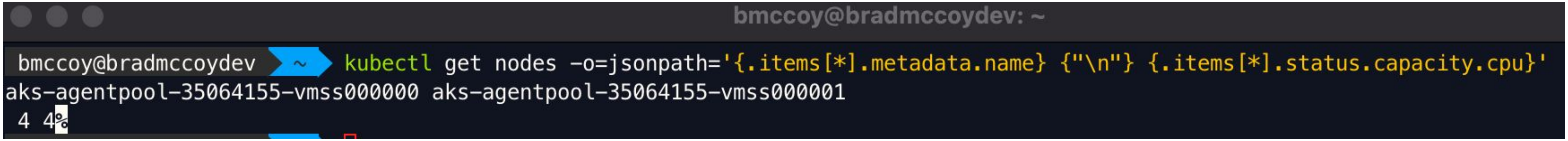


```
 bmccoy@bradmccoydev  ~  kubectl get nodes -o=jsonpath='{.items[*].metadata.name}'
aks-agentpool-35064155-vmss000000 aks-agentpool-35064155-vmss000001%
```

Practical Examples - JSON PATH

{“\n”} new line
{“\t”} Tab

kubectl get nodes -o=jsonpath='{.items[*].metadata.name} {"\n"} {.items[*].status.capacity.cpu}'

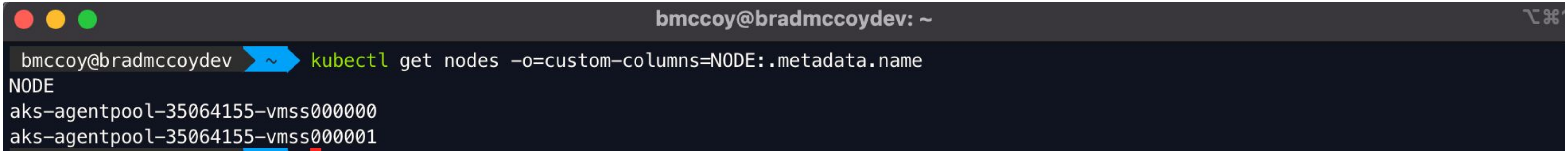


```
bmccoy@bradmccoydev ~ kubectl get nodes -o=jsonpath='{.items[*].metadata.name} {"\n"} {.items[*].status.capacity.cpu}'
aks-agentpool-35064155-vmss000000 aks-agentpool-35064155-vmss000001
 4 4%
```

Practical Examples - JSON PATH

kubectl get nodes -o=custom-columns=<COLUMN NAME>:<JSON PATH>

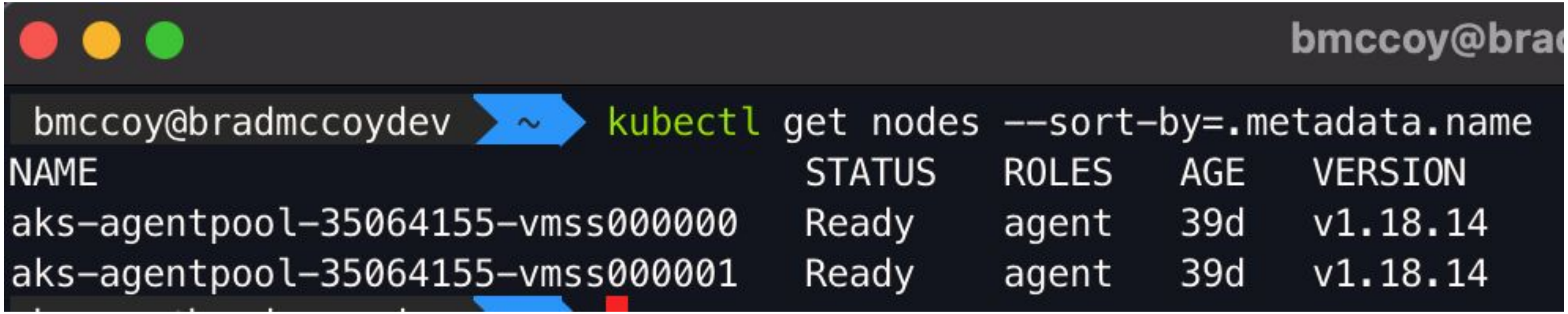
kubectl get nodes -o=custom-columns=NODE:.metadata.name



```
 bmccoy@bradmccoydev  ~  kubectl get nodes -o=custom-columns=NODE:.metadata.name
NODE
aks-agentpool-35064155-vmss000000
aks-agentpool-35064155-vmss000001
```

Practical Examples - JSON PATH

kubectl get nodes --sort-by=.metadata.name



```
 bmccoy@bradmccoydev  ~  kubectl get nodes --sort-by=.metadata.name
NAME                                STATUS   ROLES   AGE   VERSION
aks-agentpool-35064155-vmss000000   Ready    agent   39d   v1.18.14
aks-agentpool-35064155-vmss000001   Ready    agent   39d   v1.18.14
```

Practical Examples - General

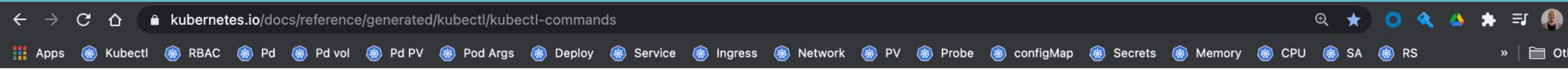
Command	Description
kubectl get pods --show-labels	Show labels for pods
Kubectl get pods -l app=postgres	List pods that have the label app=postgres
kubectl get pods -A	Show pods in all namespaces
kubectl get all -n dev	Show all (most) things in the namespace dev
kubectl api-resources	Get names/short names for resources
kubectl run -h	Get help for kubectl
alias k=kubectl	Sets k as the alias for kubectl

Practical Examples - Core Concepts

```
kubectl run -h
kubectl run nginx --image nginx --dry-run=client -o yaml > 1.yaml
```

```
kubectl run hazelcast --image=hazelcast/hazelcast --port=5701

kubectl run hazelcast --image=hazelcast/hazelcast --env="app=hazelcast,env=prod"

kubectl run hazelcast --image=hazelcast/hazelcast --labels="app=hazelcast,env=prod"

kubectl run hazelcast --image=hazelcast/hazelcast --command ‘sleep 3600’

kubectl run hazelcast --image=hazelcast/hazelcast --requests=’cpu=100m,memory=256Mi’
kubectl run hazelcast --image=hazelcast/hazelcast --limits=’cpu=200m,memory=512Mi’
```

Practical Examples - Configuration


kubernetes.io/docs/reference/generated/kubectl/kubectl-commands

# Config Maps (cm for short)

kubectl create configmap myconfig --from-literal=username=brad

kubectl get configmap myconfig -o yaml

kubectl run test-pod --image busybox --dry-run=client -o yaml > 1.yaml

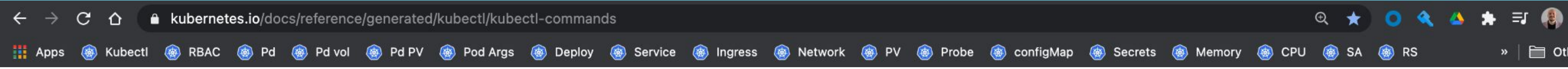
kubectl create -f 1.yaml

https://kubernetes.io/docs/reference/generated/kubectl/kubectl-commands#-em-configmap-em-

https://kubernetes.io/docs/tasks/configure-pod-container/configure-pod-configmap

```
apiVersion: v1
kind: Pod
metadata:
  name: test-pod
spec:
  containers:
    - name: test-container
      image: busybox
      env:
        # Define the
environment variable
        - name: USERNAME
          valueFrom:
            configMapKeyRef:
              # The ConfigMap
containing the value you want
to assign to USERNAME
              name: myconfig
              # Specify the
key associated with the value
              key: username
```

Practical Examples - Configuration



# Secrets

kubectl create secret generic mysecret --from-literal=password=123

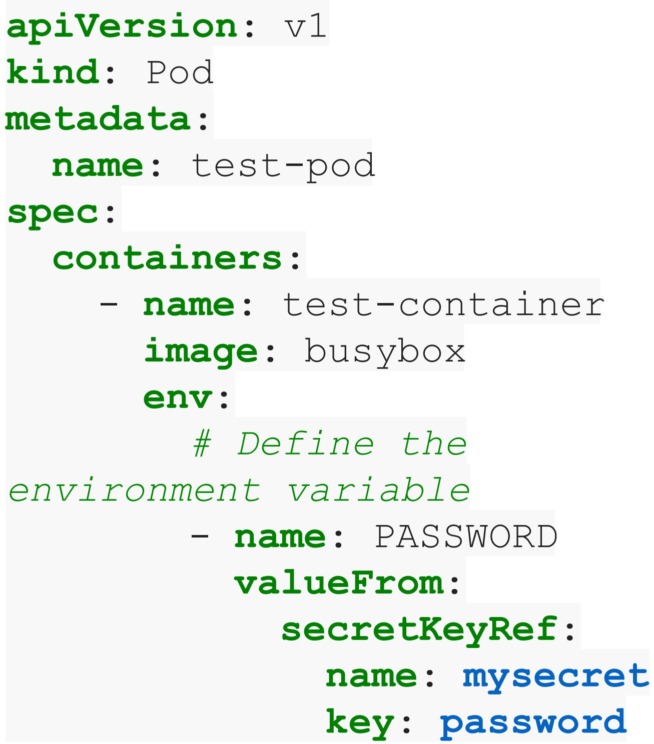
kubectl get secret mysecret -o yaml

kubectl run test-pod --image busybox --dry-run=client -o yaml > 1.yaml

kubectl create -f 1.yaml

https://kubernetes.io/docs/reference/generated/kubectl/kubectl-commands#-em-secret-generic-em-

https://kubernetes.io/docs/concepts/configuration/secret/



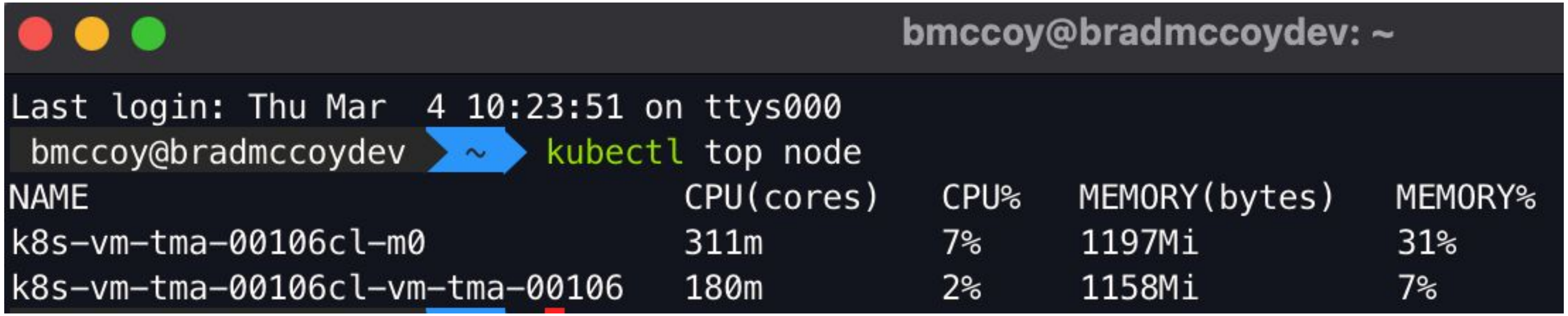
```
apiVersion: v1
kind: Pod
metadata:
  name: test-pod
spec:
  containers:
    - name: test-container
      image: busybox
      env:
        # Define the
environment variable
        - name: PASSWORD
          valueFrom:
            secretKeyRef:
              name: mysecret
              key: password
```

Practical Examples - Observability

```
# Get logs from pod
kubectl logs my-pod

# Get logs from pods with the name label myLabel
kubectl logs -l name=myLabel

# Output logs to console
kubectl exec my-pod -c my-container -- cat /var/log.txt (multi container)

# Go into the pod to look for the logs
kubectl -n your-namespace exec -it pod/your-pod  -- /bin/sh

# Kubectl cheatsheet
https://kubernetes.io/docs/reference/kubectl/cheatsheet
```

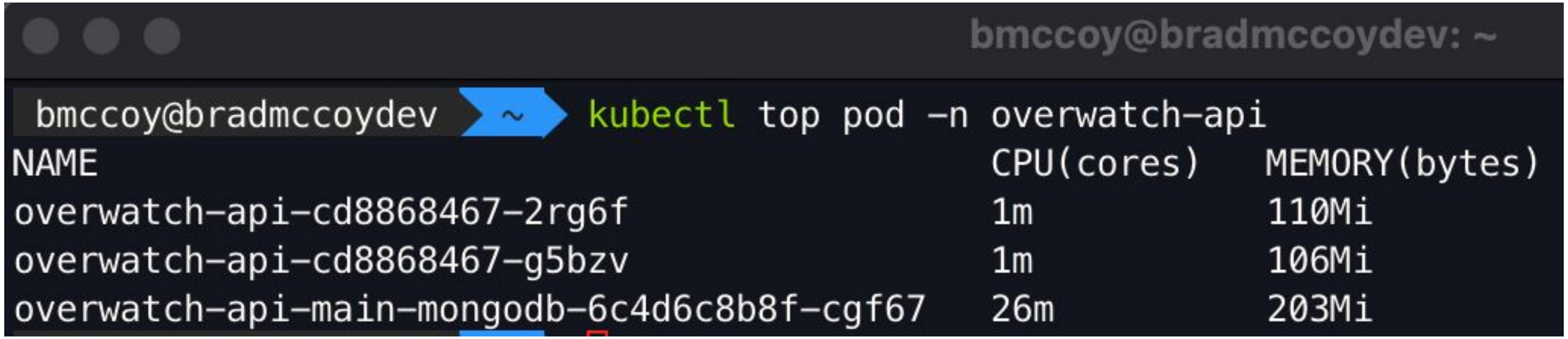
Practical Examples - Observability

kubectl top node



```
Last login: Thu Mar  4 10:23:51 on ttys000
 bmccoy@bradmccoydev  ~  kubectl top node
NAME                              CPU(cores)   CPU%   MEMORY(bytes)   MEMORY%
k8s-vm-tma-00106cl-m0             311m         7%     1197Mi          31%
k8s-vm-tma-00106cl-vm-tma-00106   180m         2%     1158Mi          7%
```

kubectl top pod



```
 bmccoy@bradmccoydev  ~  kubectl top pod -n overwatch-api
NAME                                    CPU(cores)   MEMORY(bytes)
overwatch-api-cd8868467-2rg6f           1m           110Mi
overwatch-api-cd8868467-g5bzv           1m           106Mi
overwatch-api-main-mongodb-6c4d6c8b8f-cgf67   26m    203Mi
```

Practical Examples - Services and Networking

```
# Services

kubectl create service clusterip my-cs --tcp=5678:8080

kubectl create service nodeport my-ns --tcp=5678:8080

Kubectl expose deployment nginx --port=80 --target-port=8000 (--type=ClusterIP,NodePort)


# Network policies
```

https://kubernetes.io/docs/concepts/services-networking/network-policies/

Practical Examples - State Persistence

# Host path example

https://kubernetes.io/docs/concepts/storage/volumes

If you can't find something in the documentation remember you can use the kubectl explain command

kubectl explain pv --recursive

kubectl explain pod --recursive

```
apiVersion: v1
kind: Pod
metadata:
  name: test-pd
spec:
  containers:
  - image: k8s.gcr.io/test-webserver
    name: test-container
    volumeMounts:
    - mountPath: /test-pd
      name: test-volume
  volumes:
  - name: test-volume
    hostPath:
      # directory location on host
      path: /data
      # this field is optional
      type: Directory
```

Practical Examples - State Persistence

Make sure you have the correct access modes, storage requests, namespaces

https://kubernetes.io/docs/tasks/configure-pod-container/configure-volume-storage

https://kubernetes.io/docs/tasks/configure-pod-container/configure-persistent-volume-storage

Conclusion

Don’t be afraid to fail. I failed my first attempt but it gave me a good opportunity to see where I needed to improve, and passed on my free retake with a high score.

Learn the basics first, you will save time in the long run, learn basic linux, learn VIM, learn kubectl well.

Have fun studying, and remember there is a wonderful community out there to help you!

Important Links

Presentations added to: https://github.com/cncf/presentations

https://kubernetes.io/docs/contribute/participate

https://www.cncf.io/certification/cka

https://kubernetes.io/docs/home

https://itnext.io/kubernetes-journey-cka-ckad-exam-tips-ff73e4672833

https://events.linuxfoundation.org/kubecon-cloudnativecon-europe/register

slack.k8s.io

slack.cncf.io

vim.rtorr.com

Q&A Session

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Thank You

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