

K8s 1

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Part A

Container image running on Nautilus with the jalexhurt/imagemagick container

```
base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1/partA git:(main)±1 * nautilus (0.564s)
kubecttl describe pod rdc2f-pvc-pod
  Started:      2024, 14 Apr 2024 12:26:10 -0800
  Ready:        True
  Restart Count: 0
  Limits:
    cpu:        2
    memory:     10Gi
  Requests:
    cpu:        2
    memory:     10Gi
  Environment:
    NVIDIA_VISIBLE_DEVICES: none
  Mounts:
    /data from rdc2f-hpc-pvc (rw)
  Conditions:
    Type          Status
    Initialized    True
    Ready          True
    ContainersReady True
    PodScheduled   True
  Volumes:
    rdc2f-hpc-pvc:
      Type:          PersistentVolumeClaim (a reference to a PersistentVolumeClaim in the same namespace)
      ClaimName:     rdc2f-hpc-pvc
      ReadOnly:      false
      QoS Class:     Guaranteed
      Node-Selectors: <none>
      Tolerations:   node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                    node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
                    nvidia.com/gpu:PreferNoSchedule op=Exists
  Events:
    Type      Reason      Age   From      Message
    ----      -
    Normal    Scheduled   4m32s default-scheduler Successfully assigned gpn-mizzou-cs8275/rdc2f-pvc-pod t
    Normal    SuccessfulAttachVolume 4m32s attachdetach-controller AttachVolume.Attach succeeded for volume "pvc-5fba2eaa-3
    Normal    Pulling     4m14s kubelet   Pulling image "jalexhurt/imagemagick"
    Normal    Pulled      4m7s kubelet   Successfully pulled image "jalexhurt/imagemagick" in 6.6
    Normal    Created     4m7s kubelet   Created container rdc2f-pvc-con
    Normal    Started     4m7s kubelet   Started container rdc2f-pvc-con
base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1/partA git:(main)±1 * nautilus
```

Steps to copy, convert, and resize image

```
base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1 git:(main)±1 (0.023s)
cd partA/

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1/partA git:(main)±1 * nautilus (0.484s)
kubecttl get pods
NAME                                READY   STATUS    RESTARTS   AGE
askvy-k81-job-hm264                 1/1     Running   0           2d19h
gpu-pod-strict                       0/1     Pending   0           4d21h
rdc2f-pvc-pod                       1/1     Running   0           80s

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1/partA git:(main)±1 * nautilus (3.86s)
kubecttl cp lena.pgm rdc2f-pvc-pod:/workspace/

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1/partA git:(main)±1 * nautilus (1m 2.65s)
kubecttl exec -it rdc2f-pvc-pod -- /bin/bash
root@rdc2f-pvc-pod:/workspace# ls
lena.pgm
root@rdc2f-pvc-pod:/workspace# magick lena.pgm lena.png
bash: magick: command not found
root@rdc2f-pvc-pod:/workspace# convert lena.pgm lena.png
root@rdc2f-pvc-pod:/workspace# ls
lena.pgm  lena.png
root@rdc2f-pvc-pod:/workspace# convert lena.png -resize 256x256! lena_resized.png
root@rdc2f-pvc-pod:/workspace# ls
lena.pgm  lena.png  lena_resized.png
root@rdc2f-pvc-pod:/workspace# exit
exit

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1/partA git:(main)±1 * nautilus (2.429s)
kubecttl cp rdc2f-pvc-pod:/workspace/lena_resized.png lena_resized.png
tar: Removing leading '/' from member names

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1/partA git:(main)±1 (0.03s)
ls
lena.pgm          lena_resized.png  script.py
base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1/partA git:(main)±1
```

Output Image (256 x 256)



Part B

Container Building

```
base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1/partB git:(main)± (1m 4.96s)
docker build --platform="linux/amd64" -t test .

[+] Building 64.4s (10/10) FINISHED                                docker:desktop-linux
=> [internal] load .dockerignore                                  0.0s
=> => transferring context: 2B                                     0.0s
=> [internal] load build definition from Dockerfile              0.0s
=> => transferring dockerfile: 2.09kB                             0.0s
=> [internal] load metadata for docker.io/library/ubuntu:20.04  1.1s
=> [internal] load build context                                0.0s
=> => transferring context: 1.86kB                                 0.0s
=> [1/5] FROM docker.io/library/ubuntu:20.04@sha256:80ef4a44043dec4490506e6cc4289eeda2d106a70148b74b5ae91ee670e9c3 2.4s
=> => resolve docker.io/library/ubuntu:20.04@sha256:80ef4a44043dec4490506e6cc4289eeda2d106a70148b74b5ae91ee670e9c3 0.0s
=> => sha256:17d0386c2fff30a5b92652bbef2b84639dba9b9f17bdbb819c8d10badd827fdb 27.51MB / 27.51MB 1.5s
=> => sha256:80ef4a44043dec4490506e6cc4289eeda2d106a70148b74b5ae91ee670e9c3 1.13kB / 1.13kB 0.0s
=> => sha256:48c35f3de33487442af224ed4aabc19fd9bfb9d1ee90e9471d412706b20ba73 424B / 424B 0.0s
=> => sha256:3cfffccff37a0101a08119d0743ba95c7f505d00798f5a169129e4e9086cde9e 2.29kB / 2.29kB 0.0s
=> => extracting sha256:17d0386c2fff30a5b92652bbef2b84639dba9b9f17bdbb819c8d10badd827fdb 0.8s
=> [2/5] RUN apt update -y && apt install -y imagemagick wget 60.0s
=> [3/5] RUN mkdir -p /workspace                                0.2s
=> [4/5] WORKDIR /workspace                                     0.0s
=> [5/5] COPY lena.pgm lena.pgm                                0.0s
=> exporting to image                                           0.6s
=> exporting layers                                              0.6s
=> writing image sha256:f0a96d21fe7ab452a20248856313b5fde3719cc57fada166fb11ba38eab5ee6 0.0s
=> naming to docker.io/library/test                             0.0s

View build details: docker-desktop://dashboard/build/desktop-linux/desktop-linux/og90al257khtjr5rcq4823dj

What's Next?
View a summary of image vulnerabilities and recommendations → docker scout quickview

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1/partB git:(main)± (0.122s)
docker tag test rchristopher27/k8s1:partbtest

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1/partB git:(main)± (21.495s)
docker push rchristopher27/k8s1:partbtest
The push refers to repository [docker.io/rcristopher27/k8s1]
6edfcf06b820: Pushed
5f70bf18a086: Layer already exists
5e17436a3185: Pushed
2f7c39451dee: Pushed
5faf9c0a9efe: Mounted from library/ubuntu
partbtest: digest: sha256:deb36c42dc6336e72041733068437ad21dcfdb7fa3fc43e2b278c13997383bd7 size: 1363

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1/partB git:(main)±
```

Container Running on Nautilus with rchristopher27/k8s1:partbtest image

```
base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1 git:(main)± * nautilus (0.368s)
kubectl describe pod rdc2f-pvc-pod
memory: 10Gi
Requests:
  cpu: 2
  memory: 10Gi
Environment:
  NVIDIA_VISIBLE_DEVICES: none
Mounts:
  /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-5c49j (ro)
  /workspace from rdc2f-hpc-pvc (rw)
Conditions:
  Type           Status
  Initialized     True
  Ready           True
  ContainersReady True
  PodScheduled    True
Volumes:
  rdc2f-hpc-pvc:
    Type: PersistentVolumeClaim (a reference to a PersistentVolumeClaim in the same namespace)
    ClaimName: rdc2f-hpc-pvc
    ReadOnly: false
  kube-api-access-5c49j:
    Type: Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName: kube-root-ca.crt
    ConfigMapOptional: <nil>
    DownwardAPI: true
  QoS Class:           Guaranteed
  Node-Selectors:      <none>
  Tolerations:         node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                      node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
                      nvidia.com/gpu:PreferNoSchedule op=Exists
Events:
  Type    Reason      Age    From          Message
  ----    -
  Normal  Scheduled   44s    default-scheduler  Successfully assigned gpn-mizzou-cs8275/rdc2f-pvc-pod to rci-tide-cpu-04.sd
  Normal  Pulling     37s    kubelet        Pulling image "rchristopher27/k8s1:partbtest"
  Normal  Pulled      21s    kubelet        Successfully pulled image "rchristopher27/k8s1:partbtest" in 16.200720379s (
  16.200729515s including waiting)
  Normal  Created     21s    kubelet        Created container rdc2f-pvc-con
  Normal  Started     21s    kubelet        Started container rdc2f-pvc-con

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1 git:(main)±
```

Steps to copy, convert, and resize image

```

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1 git:(main)❯ * nautilus (0.368s)
kubectl describe pod rdc2f-pvc-pod
Name:         rdc2f-pvc-pod
ReadOnly:     false
kube-api-access-5c49j:
  Type:                Projected (a volume that contains injected data from multiple sources)
  TokenExpirationSeconds: 3607
  ConfigMapName:        kube-root-ca.crt
  ConfigMapOptional:    <nil>
  DownwardAPI:          true
QoS Class:       Guaranteed
Node-Selectors:  <none>
Tolerations:     node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                  node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
                  nvidia.com/gpu:PreferNoSchedule op=Exists

Events:
  Type    Reason      Age   From              Message
  ----    -
  Normal  Scheduled   44s   default-scheduler Successfully assigned gpn-mizzou-cs8275/rdc2f-pvc-pod to rci-tide-cpu-
su.edu
  Normal  Pulling     37s   kubelet           Pulling image "rchristopher27/k8s1:partbtest"
  Normal  Pulled      21s   kubelet           Successfully pulled image "rchristopher27/k8s1:partbtest" in 16.2007203
16.200729515s including waiting)
  Normal  Created     21s   kubelet           Created container rdc2f-pvc-con
  Normal  Started     21s   kubelet           Started container rdc2f-pvc-con

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1 git:(main)❯ * nautilus (1m 23.45s)
kubectl exec -it rdc2f-pvc-pod -- /bin/bash
root@rdc2f-pvc-pod:/workspace# ls
lena.pgm
root@rdc2f-pvc-pod:/workspace# convert lena.pgm lena.png
root@rdc2f-pvc-pod:/workspace# convert lena.png -resize 256x256 lena_resized_b.png
root@rdc2f-pvc-pod:/workspace# ls
lena.pgm  lena.png  lena_resized_b.png
root@rdc2f-pvc-pod:/workspace# exit
exit

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1 git:(main)❯ * nautilus (1.042s)
kubectl cp rdc2f-pvc-pod:/workspace/lena_resized_b.png lena_resized_b.png
tar: Removing leading '/' from member names

(base) ~/Desktop/Code/CS-8275-ParallelComputing/k8s1 git:(main) (0.028s)
ls
hpc_pvc.yaml          hpc_pvc_pod_gpu.yaml  partA                test_pod.yaml
hpc_pvc_pod.yaml      lena_resized_b.png    partB

base ~/Desktop/Code/CS-8275-ParallelComputing/k8s1 git:(main)❯1

```

Output image

