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----------PRACTICAL 07----------

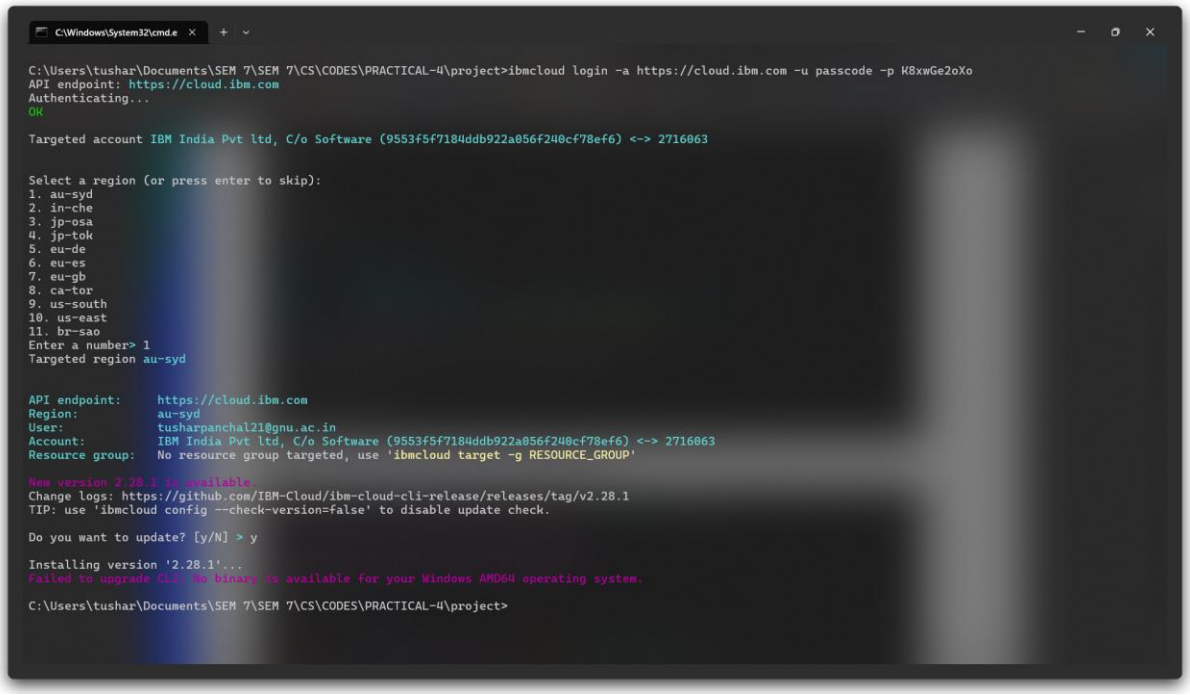
Securing a Docker Image Before Deployment to Production

John, a developer, is working on a web application called *SecureApp* that his team plans to deploy to a Kubernetes cluster in IBM Cloud. Before deployment, John wants to ensure the Docker image for *SecureApp* is secure and free from vulnerabilities. He decides to use IBM Cloud Container Registry and Vulnerability Advisor to scan the image for security issues and make the necessary corrections.

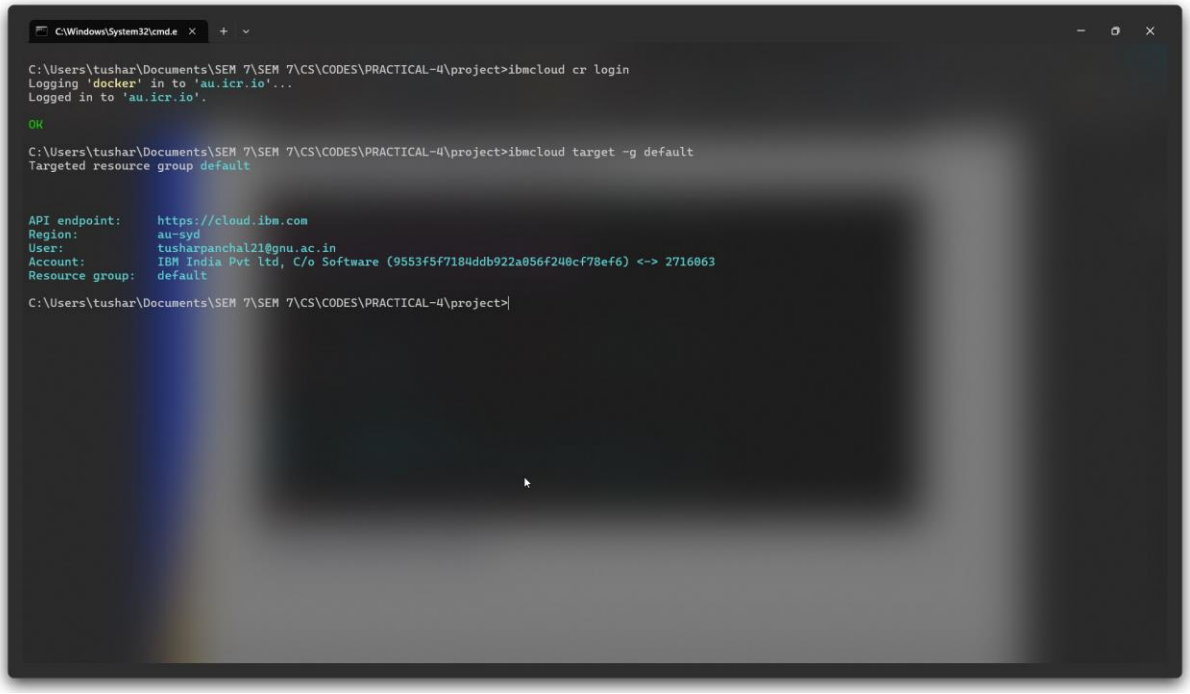
Steps:

- **Building the Docker Image**
- **Tag the image for container registry**
- **Login to IBM Cloud Container Registry**
- **Push Image to Container Registry**
- **Check Vulnerability Scan Results**
- **Address Vulnerabilities**
- **Rebuild and Re-scan the Image**
- **Deploy the Secure Image**

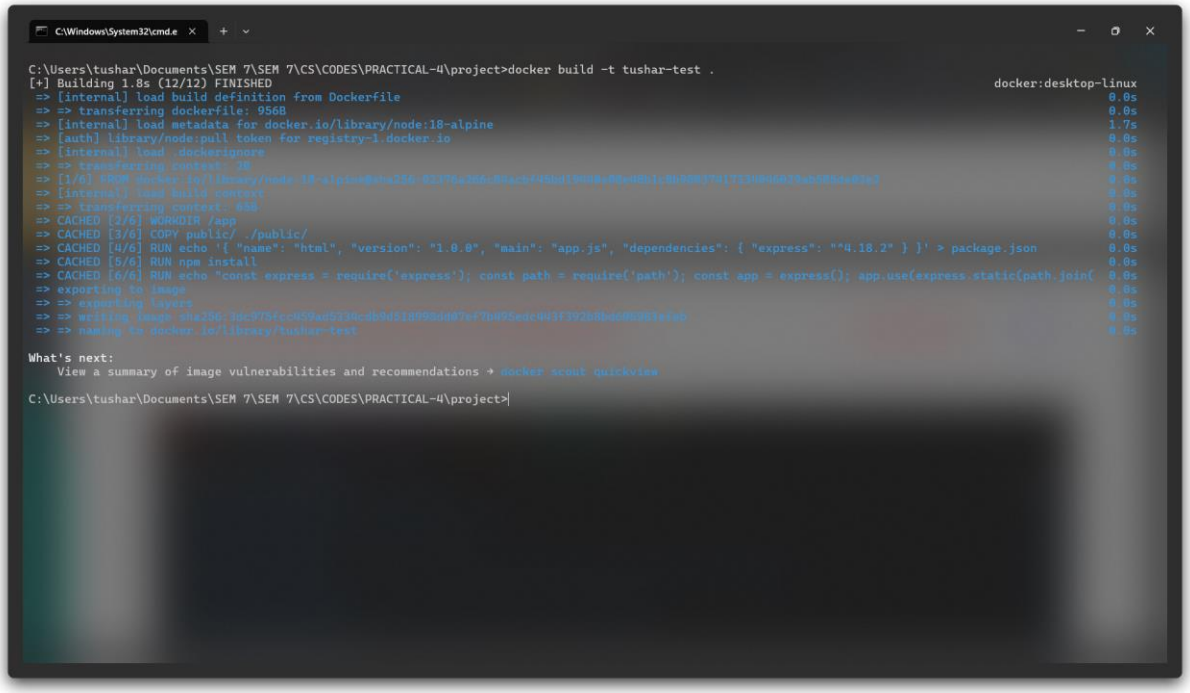
First we login to IBM cloud



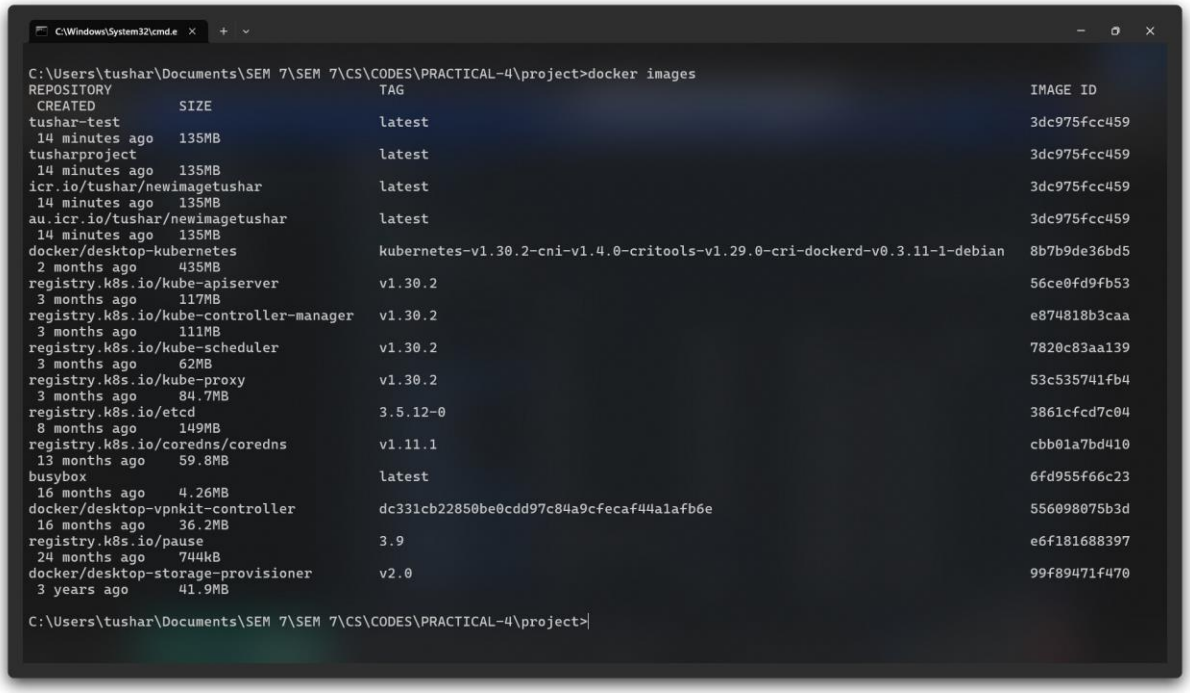
And we'll login to container registry too



And than build the image



Here we can see our new image is created



We need to install container-service and container-registry plugins

```
C:\Users\tushar\Documents\SEM 7\SEM 7\CS\CODES\PRACTICAL-4\project>ibmcloud plugin install container-registry container-service
Looking up 'container-registry' from repository 'IBM Cloud'...
Plug-in 'container-registry[cr] 1.3.11' found in repository 'IBM Cloud'
Plug-in 'container-registry[cr] 1.3.11' was already installed. Do you want to re-install it or not? [y/N] > y
Attempting to download the binary file...
 12.25 MiB / 12.25 MiB [=============================================================================================] 100.00% 1s
12842496 bytes downloaded
Installing binary...
OK
Plug-in 'container-registry 1.3.11' was successfully installed into C:\Users\tushar\.bluemix\plugins\container-registry. Use 'ibmcloud
 plugin show container-registry' to show its details.
Looking up 'container-service' from repository 'IBM Cloud'...
Plug-in 'container-service[kubernetes-service/ks] 1.0.665' found in repository 'IBM Cloud'
Plug-in 'container-service[kubernetes-service/ks] 1.0.665' was already installed. Do you want to re-install it or not? [y/N] > y
Attempting to download the binary file...
 30.75 MiB / 30.75 MiB [=============================================================================================] 100.00% 3s
32241152 bytes downloaded
Installing binary...
OK
Plug-in 'container-service 1.0.665' was successfully installed into C:\Users\tushar\.bluemix\plugins\container-service. Use 'ibmcloud
plugin show container-service' to show its details.

C:\Users\tushar\Documents\SEM 7\SEM 7\CS\CODES\PRACTICAL-4\project>
```

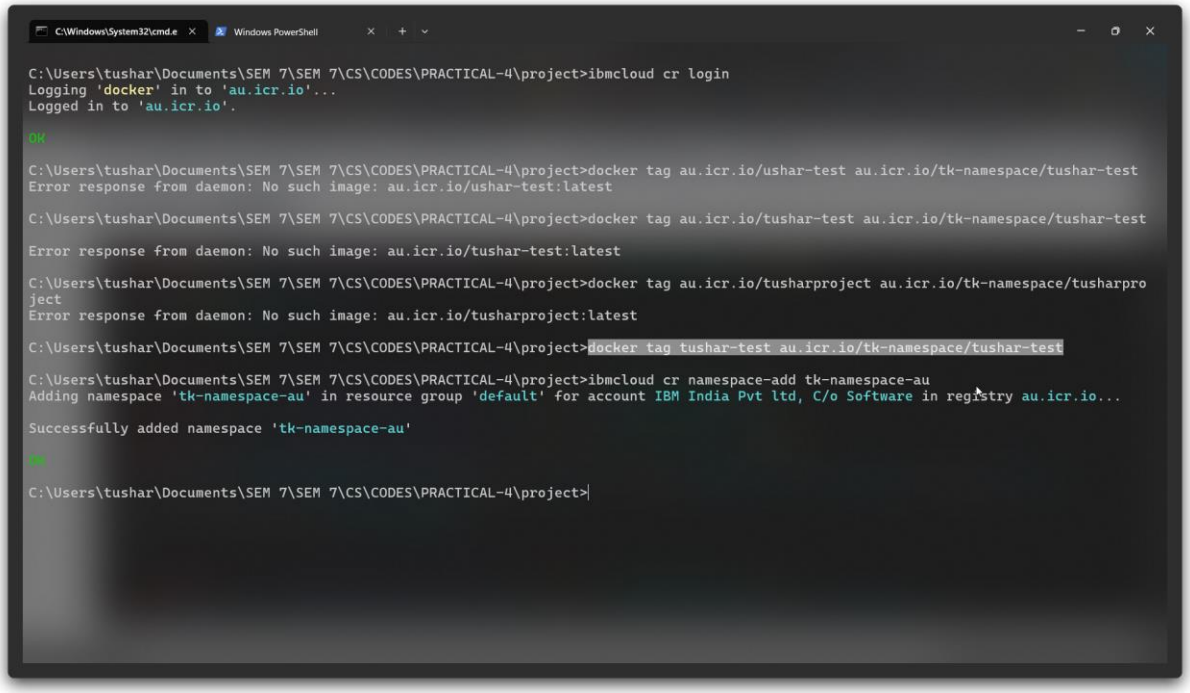
Now login to your cluster

```
C:\Users\tushar\Documents\SEM 7\SEM 7\CS\CODES\PRACTICAL-4\project>ibmcloud ks cluster config --cluster cr3cpfcs0m882o64nbq0
OK
The configuration for cr3cpfcs0m882o64nbq0 was downloaded successfully.

Added context for cr3cpfcs0m882o64nbq0 to the current kubeconfig file.
You can now execute 'kubectl' commands against your cluster. For example, run 'kubectl get nodes'.

C:\Users\tushar\Documents\SEM 7\SEM 7\CS\CODES\PRACTICAL-4\project>
```

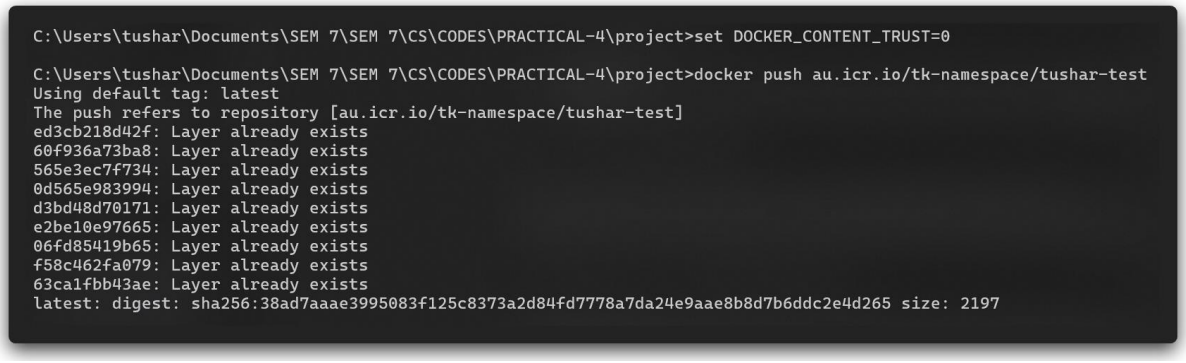
Now add namespace into your registry and make sure that your region is au-sydney and registry should be au.icr.io

```
C:\Users\tushar\Documents\SEM 7\SEM 7\CS\CODES\PRACTICAL-4\project>ibmcloud cr region-set au-syd
The region is set to 'ap-south', the registry is 'au.icr.io'.

OK

C:\Users\tushar\Documents\SEM 7\SEM 7\CS\CODES\PRACTICAL-4\project>ibmcloud cr namespace-add tk-namespace
Adding namespace 'tk-namespace' in resource group 'default' for account IBM India Pvt ltd, C/o Software in registry au.icr.io...

Successfully added namespace 'tk-namespace'

OK

C:\Users\tushar\Documents\SEM 7\SEM 7\CS\CODES\PRACTICAL-4\project>
```

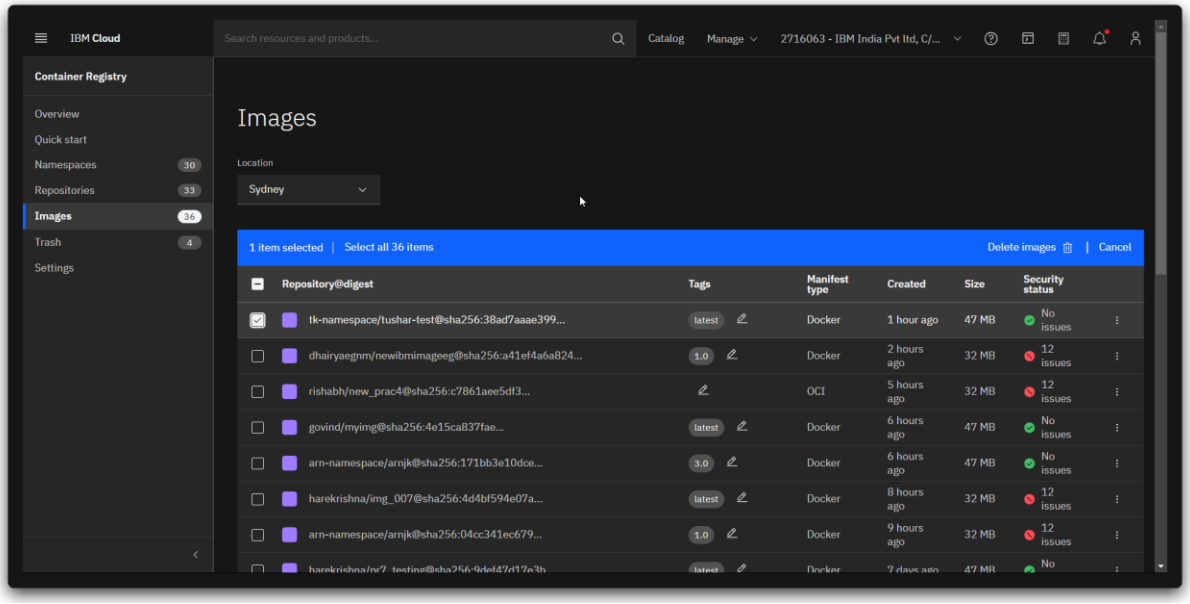
So i just exceed the quota for uploading image so i'm creating namespace in new region



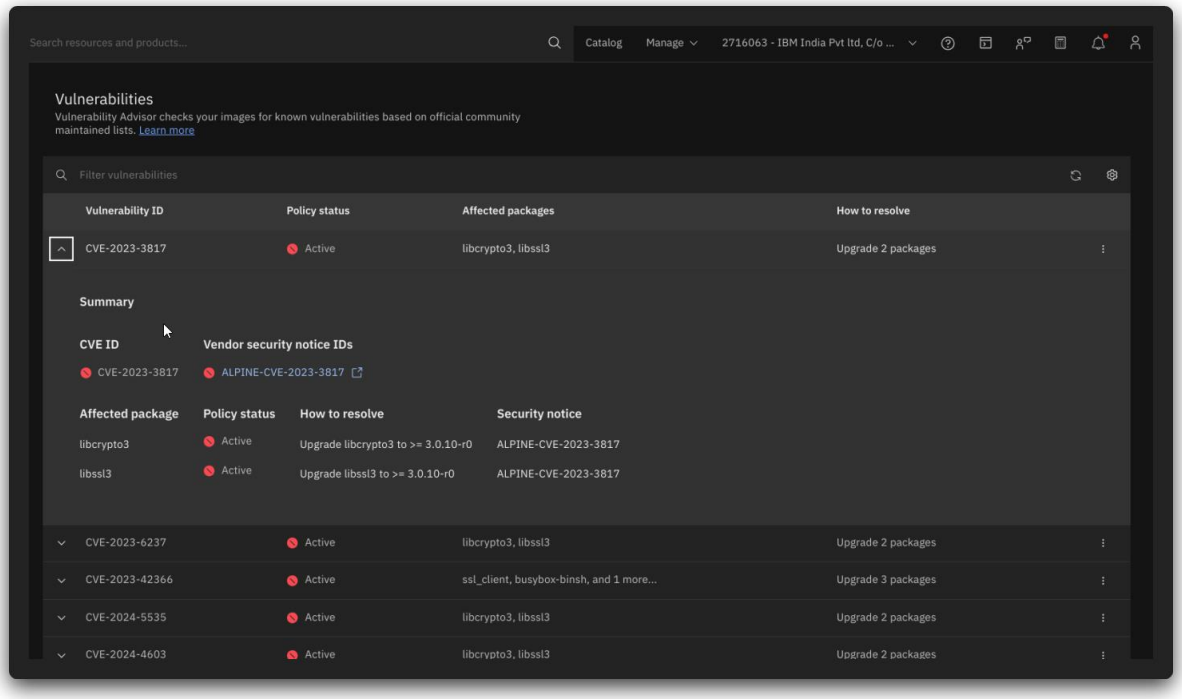
And than push image:



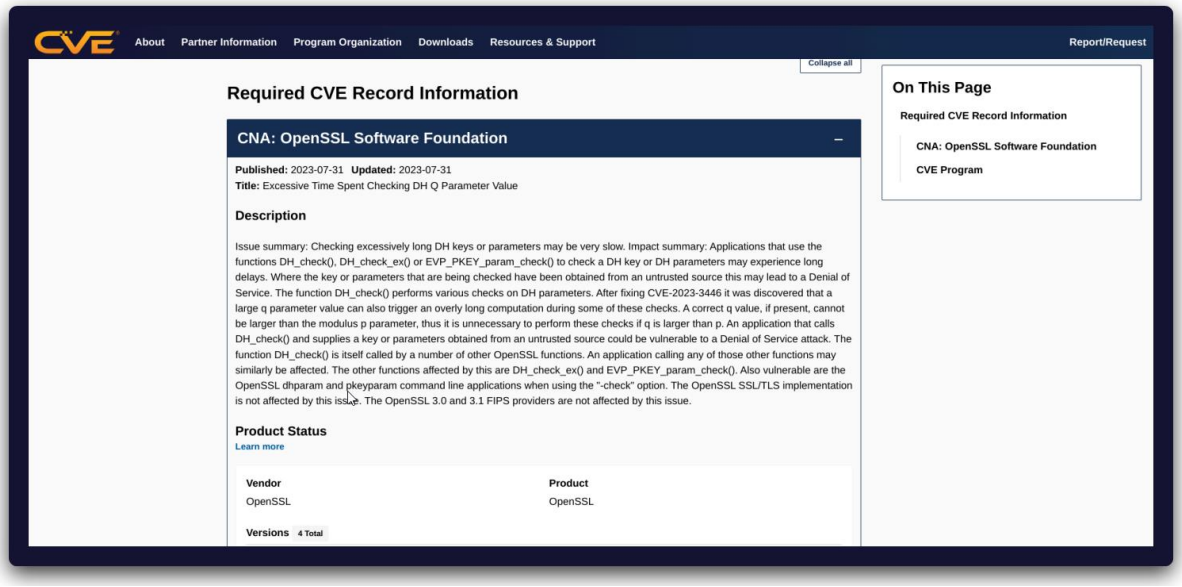
Now we can see on container registry that our image is there



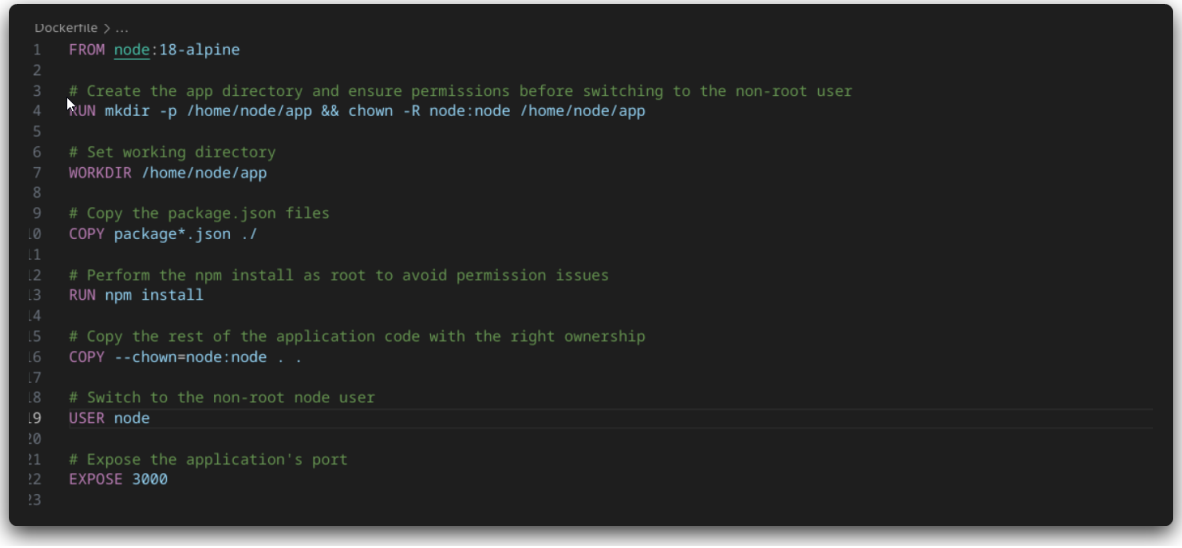
And also it has many issues So what we do to remove that issue is we check for the issue in detailed



Than check for it that what is error we'll search for it see what kind of issues we're getting

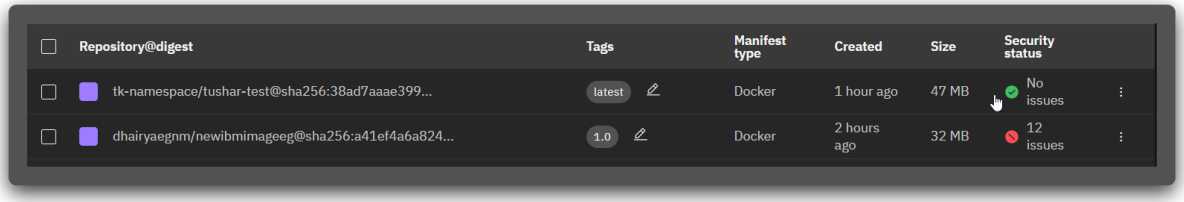


So we learn that our alpine version 12 is giving the issue so we'll update it to alpine18 . Now again we have to build the docker file



Now we again build image and tag image and pus that image

And now if we see on registry we can see there is no issues now



We can find issues through vulnerability adviser

We can scan image with

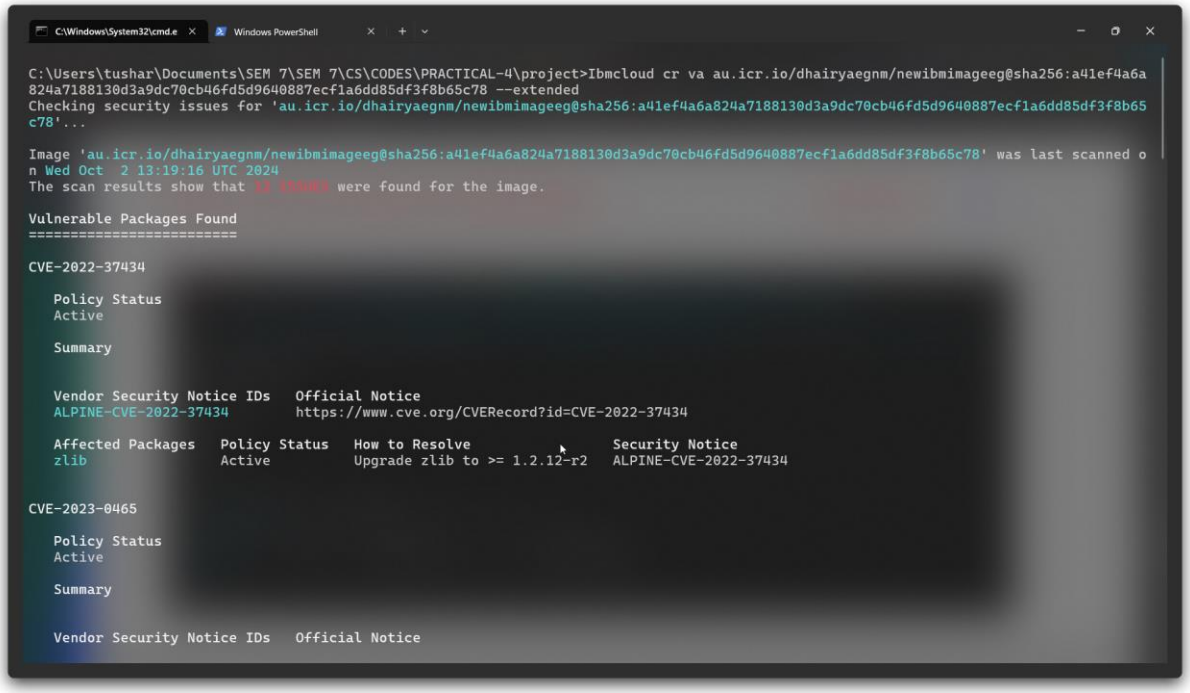
Ibmcloud cr va au.icr.io/tk-namespace/tushar-test

```
C:\Users\tushar\Documents\SEM 7\SEM 7\CS\CODES\PRACTICAL-4\project>Ibmcloud cr va au.icr.io/tk-namespace/tushar-test
Checking security issues for 'au.icr.io/tk-namespace/tushar-test:latest'...

Image 'au.icr.io/tk-namespace/tushar-test:latest' was last scanned on Wed Oct  2 13:19:16 UTC 2024
The scan results show that NO ISSUES were found for the image.

OK
```

We know that there is not any issue for this image so we'll check for another image which is on sydney region

```
C:\Windows\System32\cmd.e   Windows PowerShell

C:\Users\tushar\Documents\SEM 7\SEM 7\CS\CODES\PRACTICAL-4\project>Ibmcloud cr va au.icr.io/dhairyaegnm/newibmimageeg@sha256:a41ef4a6a
824a7188130d3a9dc70cb46fd5d9640887ecf1a6dd85df3f8b65c78
Checking security issues for 'au.icr.io/dhairyaegnm/newibmimageeg@sha256:a41ef4a6a824a7188130d3a9dc70cb46fd5d9640887ecf1a6dd85df3f8b65
c78'...

Image 'au.icr.io/dhairyaegnm/newibmimageeg@sha256:a41ef4a6a824a7188130d3a9dc70cb46fd5d9640887ecf1a6dd85df3f8b65c78' was last scanned o
n Wed Oct  2 13:19:16 UTC 2024
The scan results show that 12 ISSUES were found for the image.

Vulnerable Packages Found
=========================

Vulnerability ID   Policy Status   Affected Packages            How to Resolve
CVE-2022-37434     Active          zlib                         Upgrade zlib to >= 1.2.12-r2
CVE-2023-0465      Active          libcrypto1.1 and libssl1.1   Upgrade 2 packages. Re-run command with --extended to view.
CVE-2023-5678      Active          libcrypto1.1 and libssl1.1   Upgrade 2 packages. Re-run command with --extended to view.
CVE-2023-3817      Active          libcrypto1.1 and libssl1.1   Upgrade 2 packages. Re-run command with --extended to view.
CVE-2023-0464      Active          libcrypto1.1 and libssl1.1   Upgrade 2 packages. Re-run command with --extended to view.
CVE-2022-4450      Active          libssl1.1 and libcrypto1.1   Upgrade 2 packages. Re-run command with --extended to view.
CVE-2022-4304      Active          libcrypto1.1 and libssl1.1   Upgrade 2 packages. Re-run command with --extended to view.
CVE-2023-0215      Active          libcrypto1.1 and libssl1.1   Upgrade 2 packages. Re-run command with --extended to view.
CVE-2023-3446      Active          libssl1.1 and libcrypto1.1   Upgrade 2 packages. Re-run command with --extended to view.
CVE-2023-0286      Active          libcrypto1.1 and libssl1.1   Upgrade 2 packages. Re-run command with --extended to view.
CVE-2023-2650      Active          libcrypto1.1 and libssl1.1   Upgrade 2 packages. Re-run command with --extended to view.
CVE-2022-2097      Active          libcrypto1.1 and libssl1.1   Upgrade 2 packages. Re-run command with --extended to view.

To see the details about the fixes for these packages, run the command again with the '--extended' flag.

OK

C:\Users\tushar\Documents\SEM 7\SEM 7\CS\CODES\PRACTICAL-4\project>
```

We can see extended version with adding –extended in command



Now we can scan our image locally through Scout

Through this command

Docker scout recommendation ImageName