验证k8s运行wasm程序
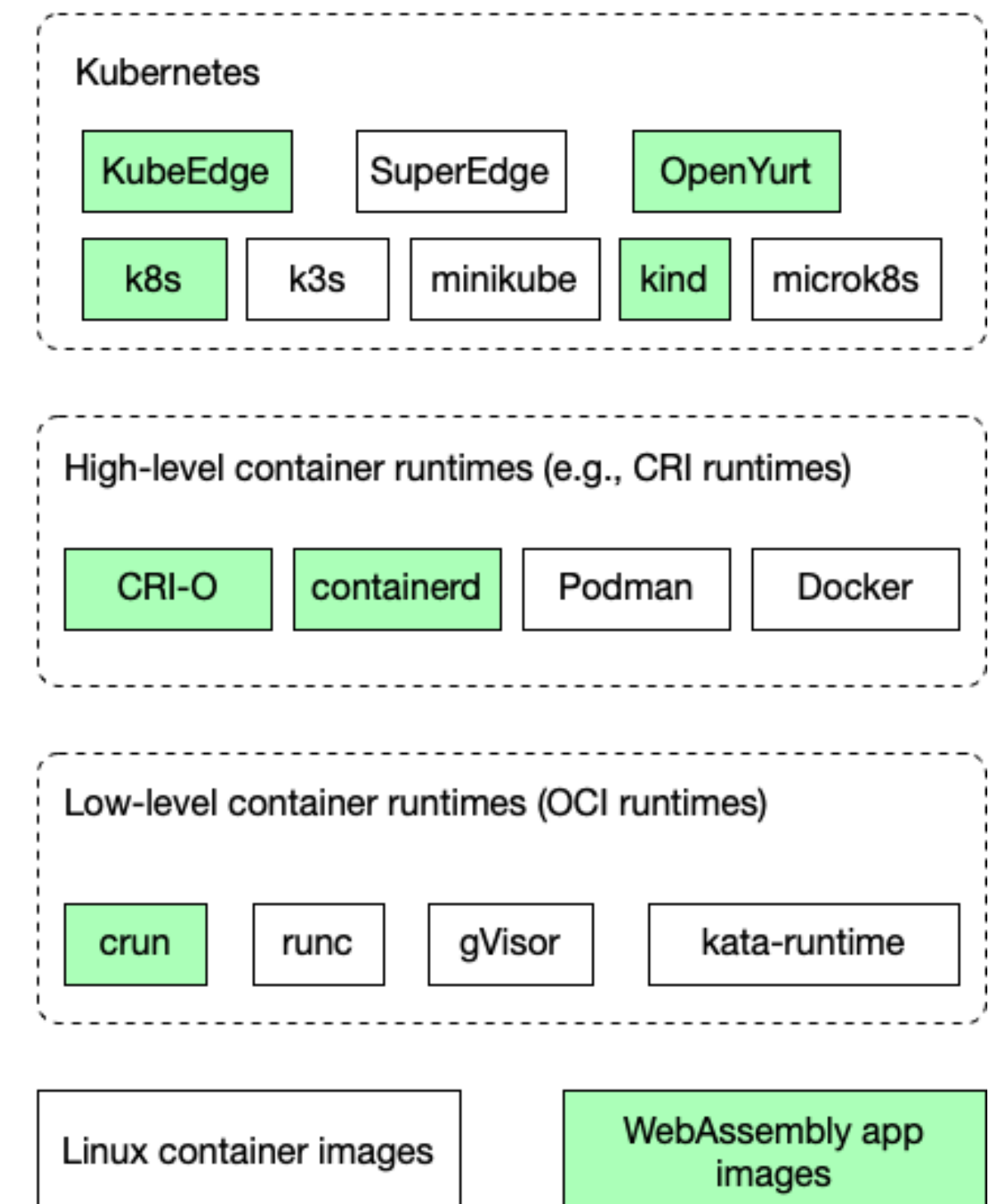## 使用官方wasm程序

- 官网的文档有问题

  - 【纠正】wasmedge官方文档

- kind create cluster --image ghcr.io/liquid-reply/kind-crun-wasm:v1.23.4

  - https://github.com/Liquid-Reply/kind-crun-wasm/blob/main/images/node/Dockerfile

Kubernetes

KubeEdge | SuperEdge | OpenYurt

k8s | k3s | minikube | kind | microk8s

High-level container runtimes (e.g., CRI runtimes)

CRI-O | containerd | Podman | Docker

Low-level container runtimes (OCI runtimes)

crun | runc | gVisor | kata-runtime

Linux container images | WebAssembly app images

The container ecosystem

验证k8s运行wasm程序
使用官方wasm程序

- kubectl run -it --rm --restart=Never wasi-demo --image=hydai/wasm-wasi-example:with-wasm-annotation --annotations="module.wasm.image/variant=compat" /wasi_example_main.wasm 50000000

  - **crun** requires the annotation "module.wasm.image/variant=compat" on the container image to indicate that it is **a WebAssembly application without a guest OS**

- 官方程序的运行结果

```
root@VM-0-17-ubuntu:~# kubectl run -it --rm --restart=Never wasi-demo --image=wasmedge/example-wasi:lates
t --annotations="module.wasm.image/variant=compat-smart" /wasi_example_main.wasm 50000000
Random number: 732391116
Random bytes: [56, 251, 177, 234, 99, 195, 203, 211, 112, 204, 127, 69, 204, 173, 229, 41, 46, 241, 69, 9
9, 57, 27, 104, 105, 91, 238, 88, 66, 188, 35, 153, 78, 93, 203, 11, 17, 185, 189, 96, 60, 7, 126, 215, 1
19, 11, 129, 63, 75, 229, 88, 161, 206, 35, 105, 169, 181, 202, 128, 93, 22, 178, 251, 185, 208, 210, 21,
 105, 222, 141, 102, 45, 186, 193, 4, 82, 79, 93, 113, 202, 119, 22, 79, 211, 131, 107, 210, 115, 121, 23
, 179, 19, 5, 218, 170, 7, 114, 185, 165, 204, 117, 156, 37, 88, 163, 92, 5, 75, 143, 66, 7, 59, 149, 245
, 92, 252, 207, 116, 16, 206, 130, 123, 10, 162, 233, 108, 247, 16, 115]
Printed from wasi: This is from a main function
This is from a main function
The env vars are as follows.
The args are as follows.
/wasi_example_main.wasm
50000000
File content is This is in a file
pod "wasi-demo" deleted
```

验证k8s运行wasm程序
使用自制wasm程序

- 自制镜像

  - Dockerfile： https://github.com/leviyanx/wasm-program-image/blob/main/wasm-hello/Dockerfile

    - scratch - an explicitly **empty image**

- 自制镜像的运行结果

  - kubectl run -it --rm --restart=Never wasm-hello --image=leviyanx/wasm-hello-example:v1.0 --annotations="module.wasm.image/variant=compat" /hello.wasm 20000

```
root@VM-0-17-ubuntu:~# kubectl run -it --rm --restart=Never wasm-hello --image=leviyanx/
wasm-hello-example:v1.0 --annotations="module.wasm.image/variant=compat" /hello.wasm 200
00
hello
20000
pod "wasm-hello" deleted
```
-

验证k8s运行wasm程序
分析

- wasm原程序 vs. 制作成镜像后

Name: hello.wasm

Type: Program (application/octet-stream)

Size: 2.2 MB (2,206,899 bytes)

TAG

v1.0

Last pushed 42 minutes ago by leviyanx

docker pull leviyanx/wasm-he…

DIGEST

413bad539ad2

OS/ARCH

linux/amd64

COMPRESSED SIZE ⓘ

540.19 KB

验证k8s运行wasm程序
## 实验条件

- 【纠正】云服务器可以运行k8s

  - 要使用docker-compose，参考：腾讯云ubuntu20.04安装docker避坑笔记

- 为了保证网络、方便实验，选用位于硅谷的云服务器

  - 我自己的实验机docker.io的镜像也不好pull

调研k8s调用链上的组件
OCI runtime

- 调查角度：oci runtime支持wasm的程度

- runc

  - 没有与wasm结合的消息

- gvisior

  - [Some attempts to combine WASM and gVisor #5811](#)

  - 官方没有提供对wasm支持的说明

- 调查角度：从wasm runtime支持k8s的程度?

The container ecosystem

参考

- https://github.com/Liquid-Reply/kind-crun-wasm
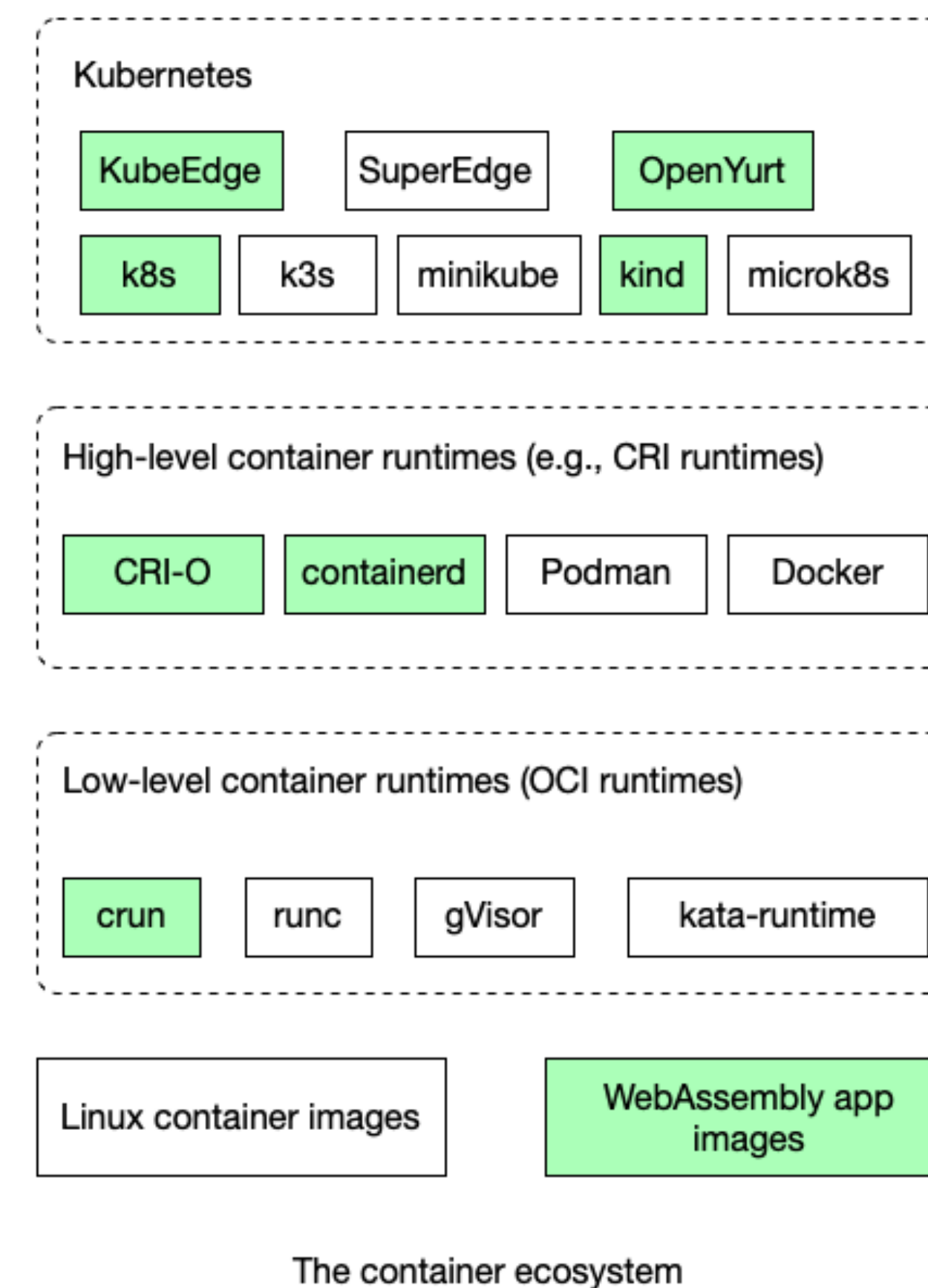
- https://wasmedge.org/book/en/use_cases/kubernetes/demo/wasi.html