



nerdctl: yet another Docker & Docker Compose
implementation, based on **containerd**

github.com/containerd/nerdctl

What is nerdctl?

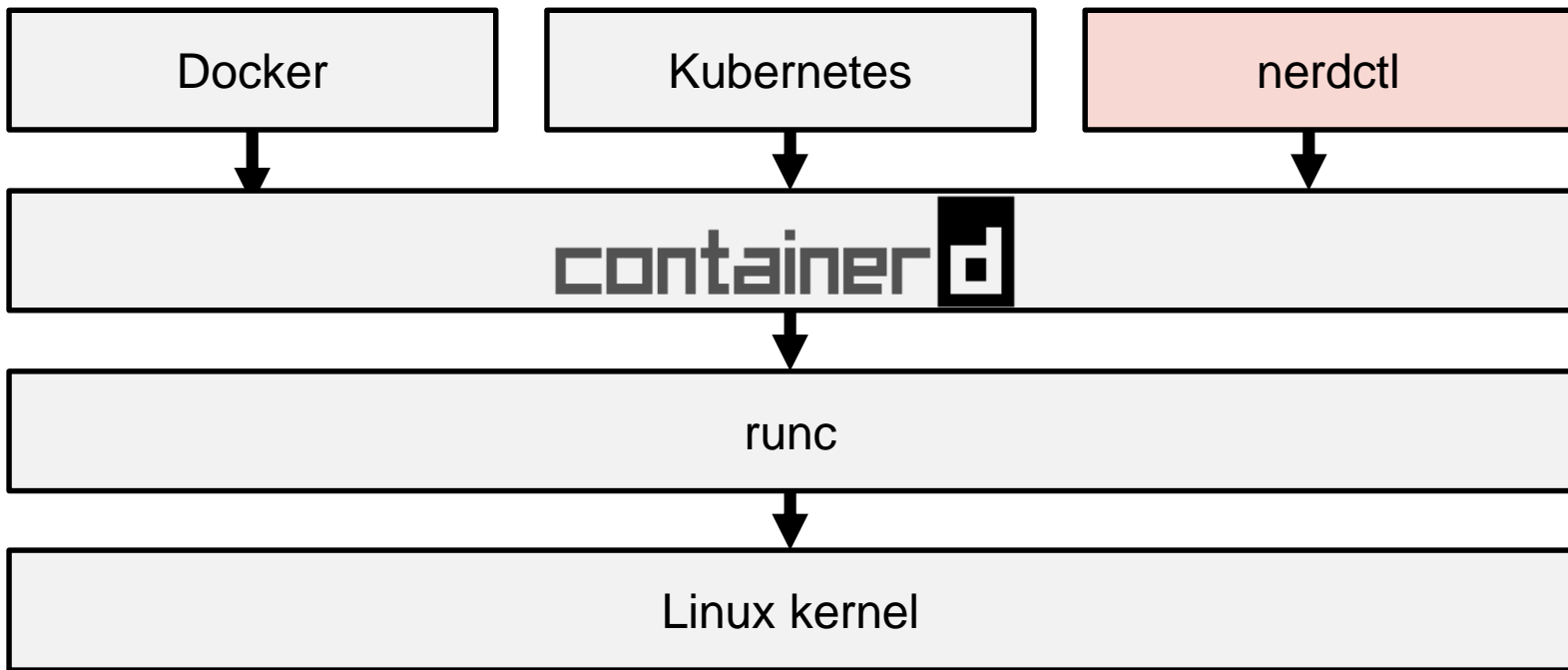
- Docker-compatible CLI for **containerd**
- Same UI/UX as Docker & Docker Compose
- Supports lazy-pulling (Stargz)
- Supports encrypted images (OCIAcrypt)
- Also supports rootless mode, of course 😊

```
$ nerdctl run ...
```

```
$ nerdctl compose up ...
```

What is containerd?

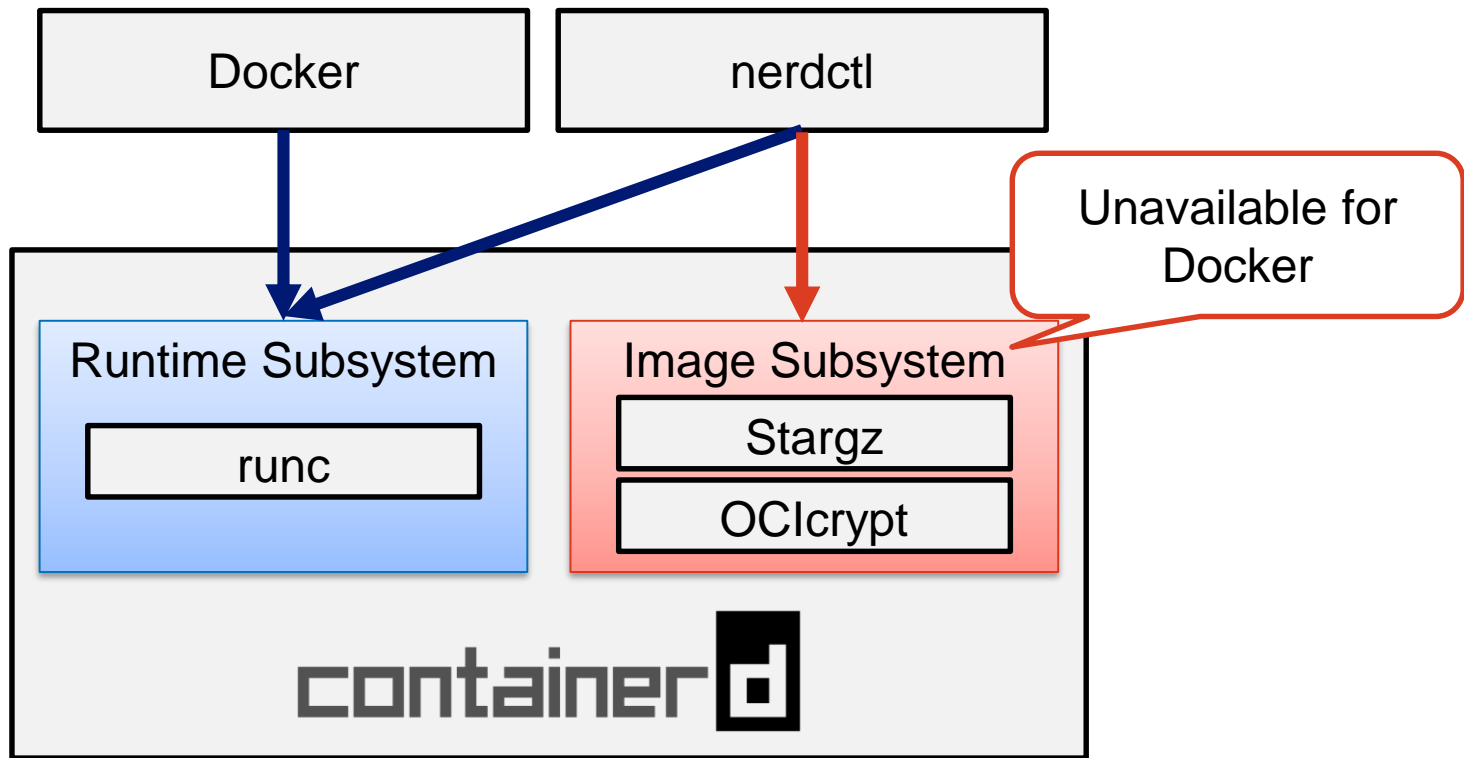
- The universal container runtime
- Used by Docker, Kubernetes, BuildKit, faasd, etc.



Why another Docker-like CLI?

- Docker partially uses containerd, but not fully
- Docker cannot support recent innovations in the containerd ecosystem
 - Lazy-pulling (Stargz)
 - Encryption (OClcrypt)
 - ...

Why another Docker-like CLI?



Why another Docker-like CLI?



- So we had to create a new CLI for the containerd-native ecosystem
- Designed to be Docker-compatible so that users do not need to learn something new

What about ctr? crictl?

- ctr: the CLI included in containerd
- crictl: the CLI for Kubernetes CRI API
- Unlike nerdctl, ctr and crictl were made solely for debugging purpose

What about ctr? crictl?

- ctr lacks lots of features
 - docker run -p
 - docker run --restart=always
 - docker pull, with ~/.docker/config.json
 - docker logs ...
- crictl has similar restrictions, too
- nerdctl provides all these features

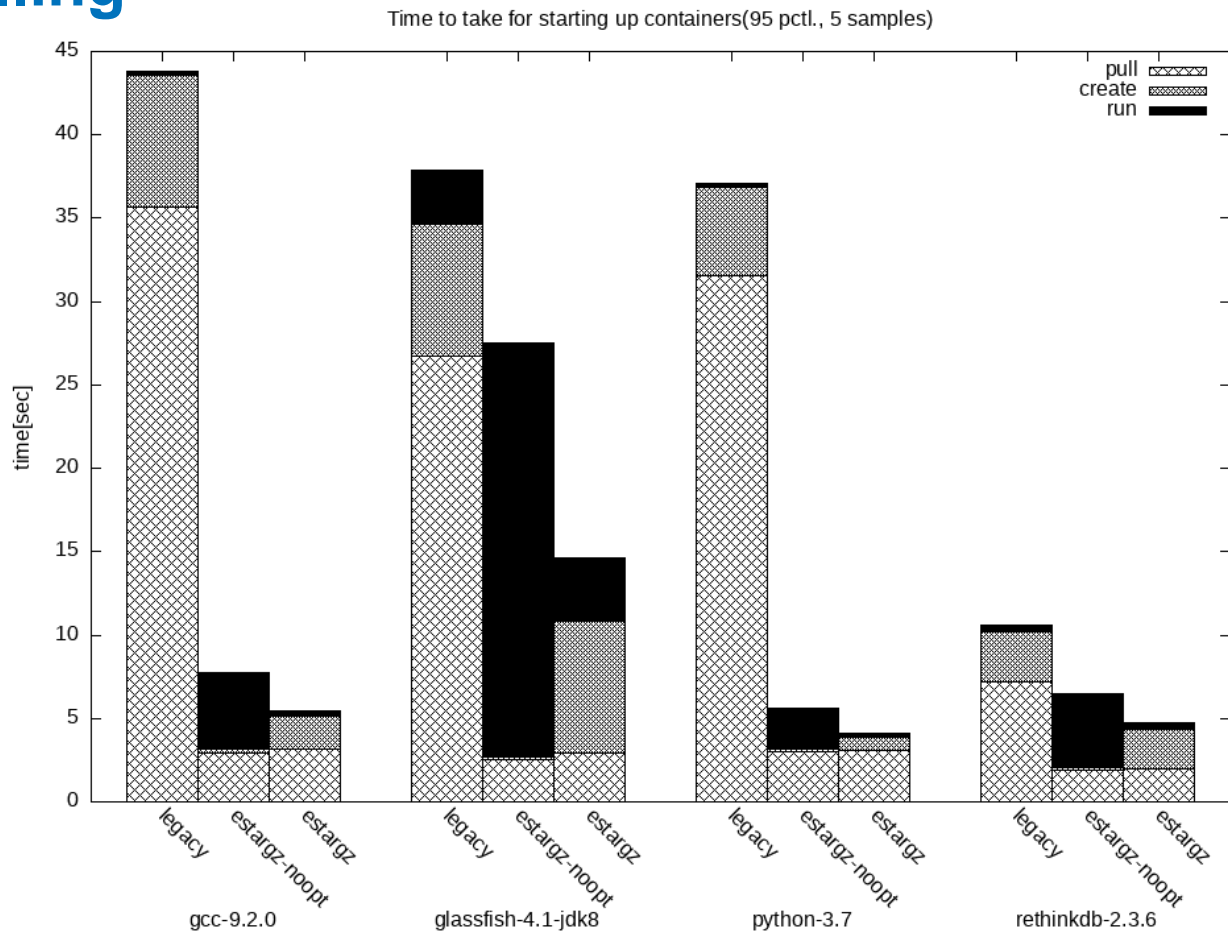
The goal is to defeat Docker...?



- No
- The goal is to provide a comfortable environment for playing around with the modern ecosystem of containerd
 - Lazy-pulling, OCIcrypt, ...
- These features are expected to be available in Docker as well, eventually (but not soon) <https://github.com/moby/moby/pull/41002>

- Lazy-pulling means running a container ahead of completion of pulling its image from the registry
- With a new image format: eStargz
 - Forked from Stargz: Seekable tar gz (<https://github.com/google/crfs>)
 - Compatible with the legacy Docker/OCI format
- <https://github.com/containerd/stargz-snapshotter>

Lazy-pulling



Demo: lazy-pulling

```
$ nerdctl --snapshotter=stargz ...
```

- Transparently encrypt and decrypted images
- Tolerant to leakage of private images on a registry
- <https://github.com/containers/ocicrypt>

nerdctl on macOS (for Linux containers)

- Lima: Linux virtual machines on macOS (The name may change in future)
<https://github.com/AkihiroSuda/lima>
- Made for containerd & nerdctl
- Supports filesystem sharing & port forwarding
- Similar to WSL2

Demo: nerdctl on macOS

```
$ lima start  
  
$ lima nerdctl run ...
```


nerdctl on macOS (for Linux containers)



- Hypervisor: QEMU with HVF accelerator
 - Intel Mac: no patch is needed
 - ARM Mac: QEMU needs to be patched <https://lists.gnu.org/archive/html/qemu-devel/2021-05/msg06220.html>
- File system sharing
 - Current implementation: “Reverse SSHFS” (sshfs -o slave)
 - Future: virtio-9p-pci
- Port forwarding
 - The guest agent daemon watches /proc/net/tcp, per 3 seconds
 - The host agent runs `ssh -L` on demand to set up port forwarding

nerdctl on Windows

- Known to work on WSL2 for running Linux containers
- Native support for Windows is in progress (Thanks to James Sturtevant)
<https://github.com/containerd/nerdctl/pull/197>

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- <https://github.com/containerd/nerdctl/releases>
- `nerdctl-full-<VERSION>-linux-amd64.tar.gz` contains all the dependencies (containerd, runc, ...)

Rootful :

```
$ sudo systemctl enable --now containerd  
$ sudo nerdctl run -d --name nginx -p 80:80 nginx:alpine
```

Rootless (more secure) :

```
$ containerd-rootless-setuptool.sh install  
$ nerdctl run -d --name nginx -p 8080:80 nginx:alpine
```

80:80 is typically prohibited
for non-root users, so use 8080:80

Further information

- <https://github.com/containerd/nerdctl>
- #containerd channel of CNCF slack (<https://slack.cncf.io>)

Thanks to contributors!



- Fahed Dorgaa
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