CLOUD COMPUTING APPLICATIONS

Containers: Docker Architecture

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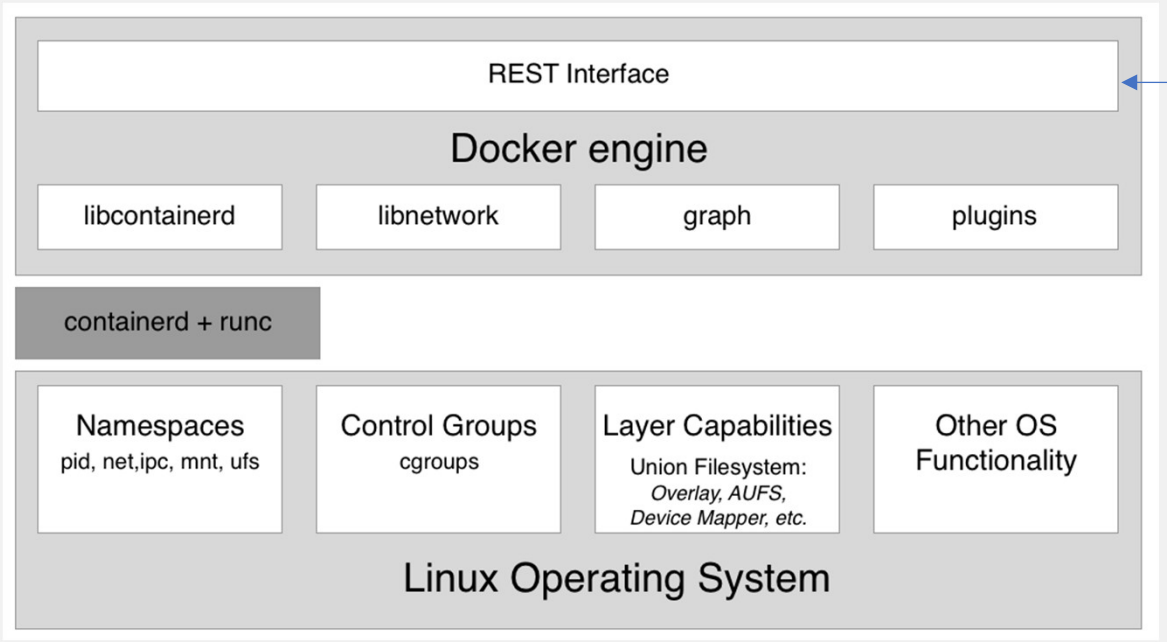
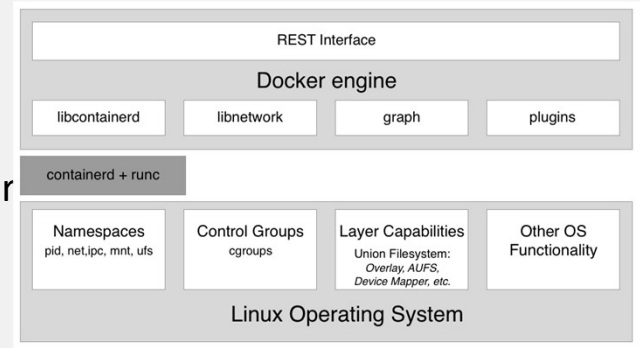
Docker Architecture



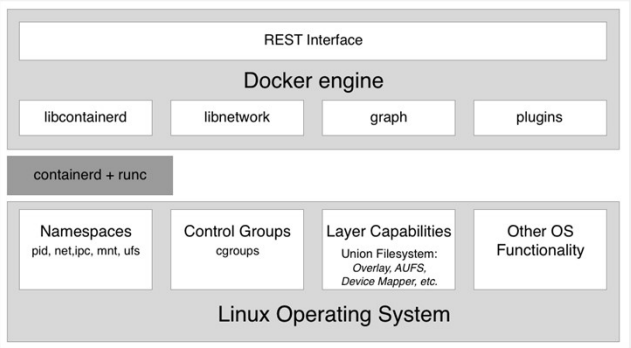
Container Runtime

- Docker was originally monolithic
  - Later the runtime was separated
- Responsible for the whole life cycle of a container
- pulls a container image (which is the template for a container) from a registry
- Creates a container from that image
- Initializes and runs the container
- Eventually stops and removes the container from the system
- The container runtime on a Docker host consists of `containerd` and `runc`
- Both are open source and have been donated by Docker to the CNCF
  - CNCF: Cloud Native Computing Foundation, a Linux Foundation project



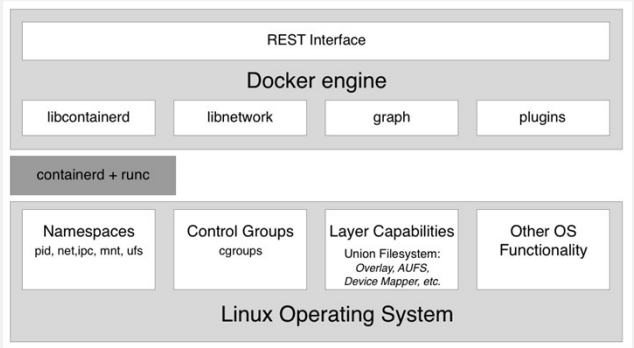
Container Runtime: `containerd`

- `containerd` is based on `runc`, provides higher-level functionality
  - Image push and pull
  - Managing of storage
  - executing of Containers by calling **runc** with the right parameters to run containers
  - Managing of network primitives for interfaces
  - Management of network namespaces for containers to join existing namespaces
- reference implementation of the OCI specifications
  - OCI: Open Container Initiative, a Linux Foundation Project
- `containerd` was donated to and accepted by the CNCF in 2017



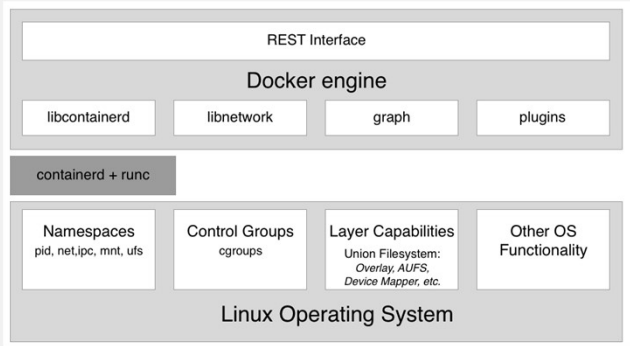
Container Runtime: `runc`

- `runc` is the low-level functionality of the container runtime
  - full support for Linux namespaces
  - native support for all security features available on Linux
    - SELinux
    - AppArmor
    - Seccomp
    - `cgroups`
- Spawns and runs containers according to the **Open Container Initiative** (**OCI**) specification
  - Containers are configured using bundles
  - A bundle for a container is a directory that includes a specification file named "config.json" and a root filesystem
  - The root filesystem contains the contents of the container



Docker Engine

- **Docker engine** provides additional functionality on top of the container runtime
  - E.g. network libraries or support for plugins.
- Provides a REST interface over which all container operations can be automated
  - The Docker command-line interface is one of the consumers of this REST interface



Docker Overview

- Container Orchestration
- Windows Containers