

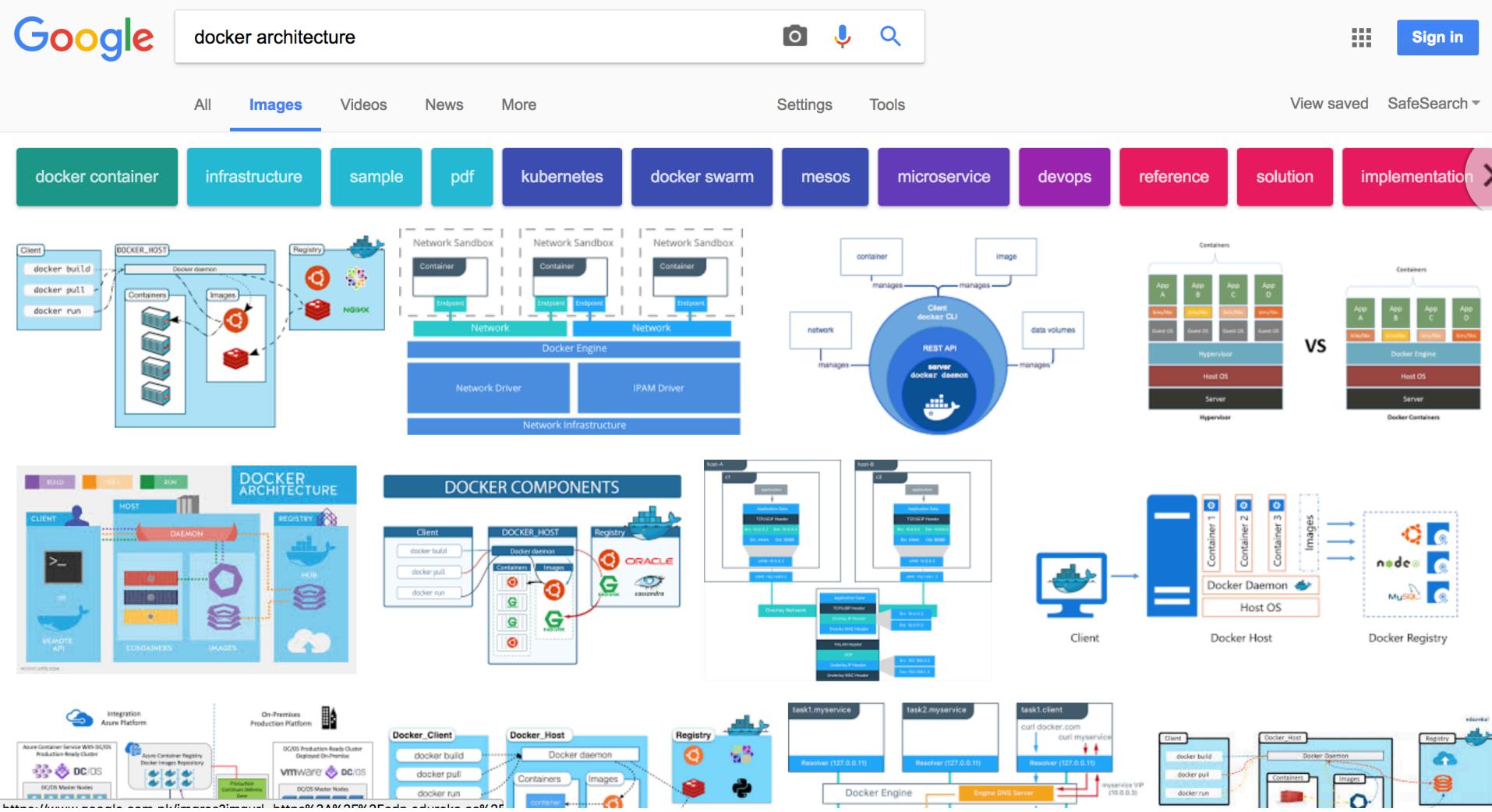
Docker Internal

@zeeshanalishah

Some slides taken from Scott @fatherlinux

- Docker internal
- Images
- Namespaces
 - Name space kernel code
- Libcontainer , runc
 - Libcontainer ,runc installation libs
- Kubernetes internal
- Kbn lab from scott
- Messos
- Messos lab
- GetFose.org or fosem.org
- Show a glimpse of spark with jupyter if possible.

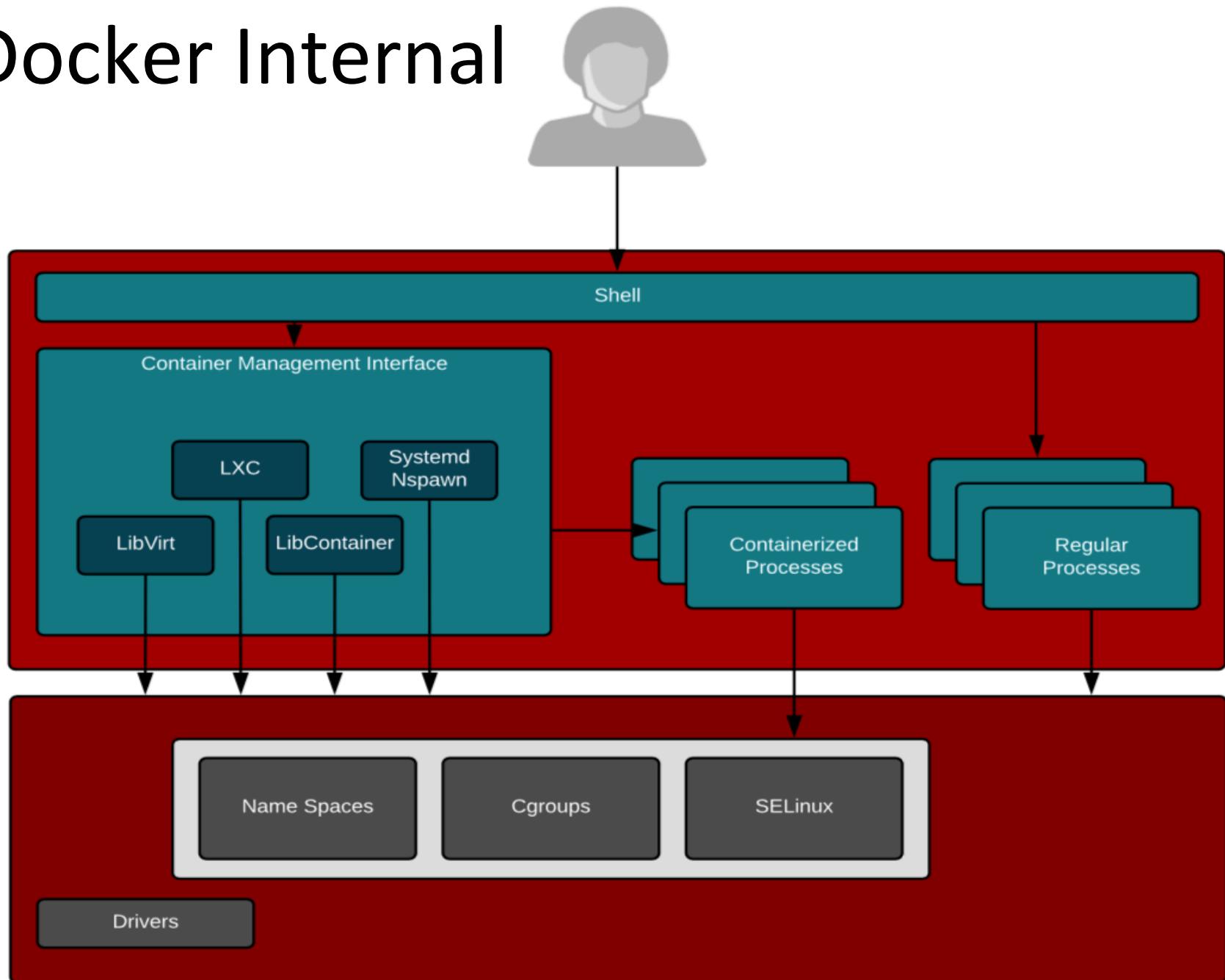
Architecture – Google searches are wrong 😊 !!!



Important corrections

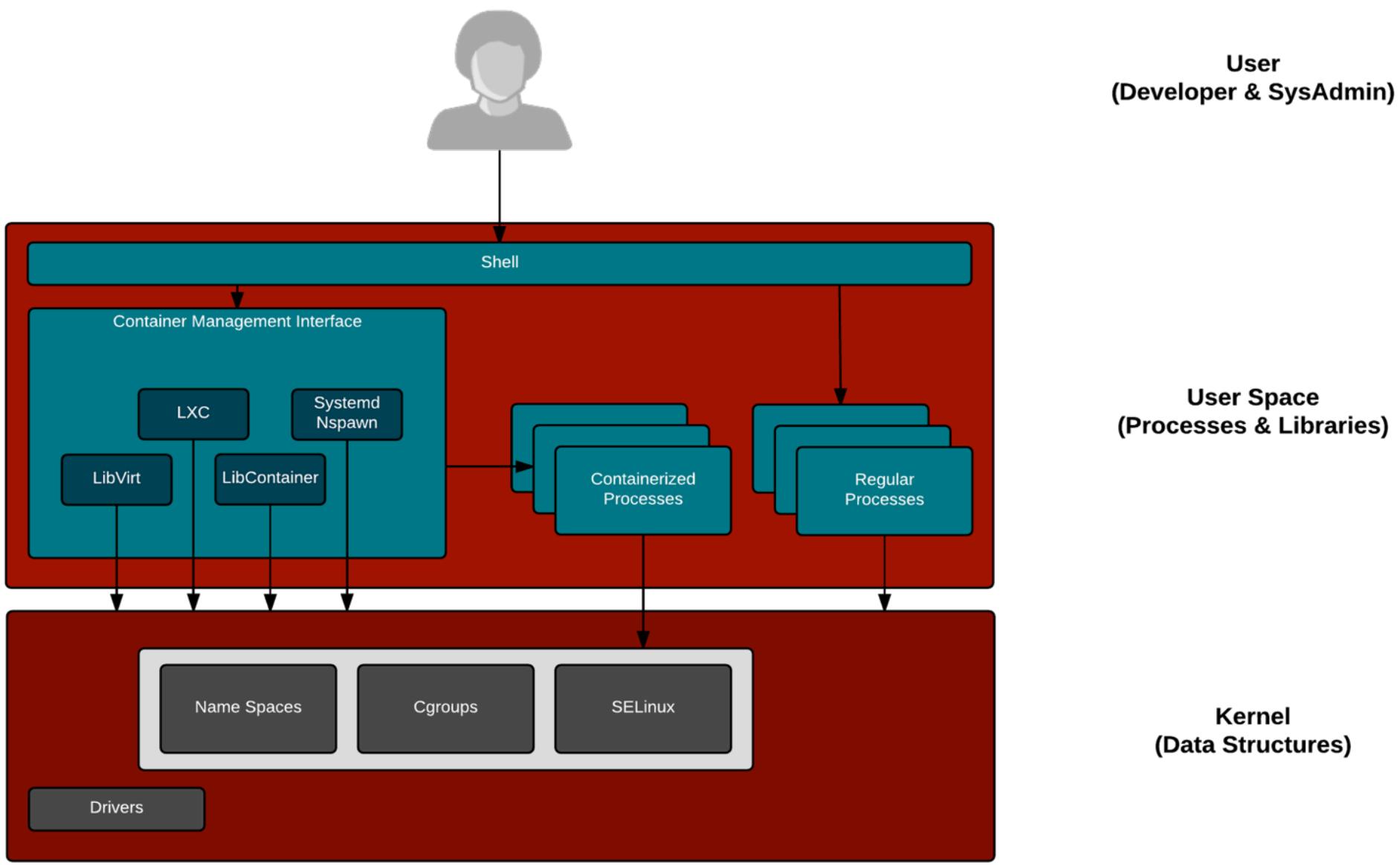
- . Containers do not run ON docker.
Containers are processes - they run on the Linux kernel. **Containers are Linux.**
- . **The docker daemon is one of the many user space tools/libraries that talks to the kernel to set up containers**

Docker Internal



CONTAINERS ARE LINUX

The Libraries, and Data Structures

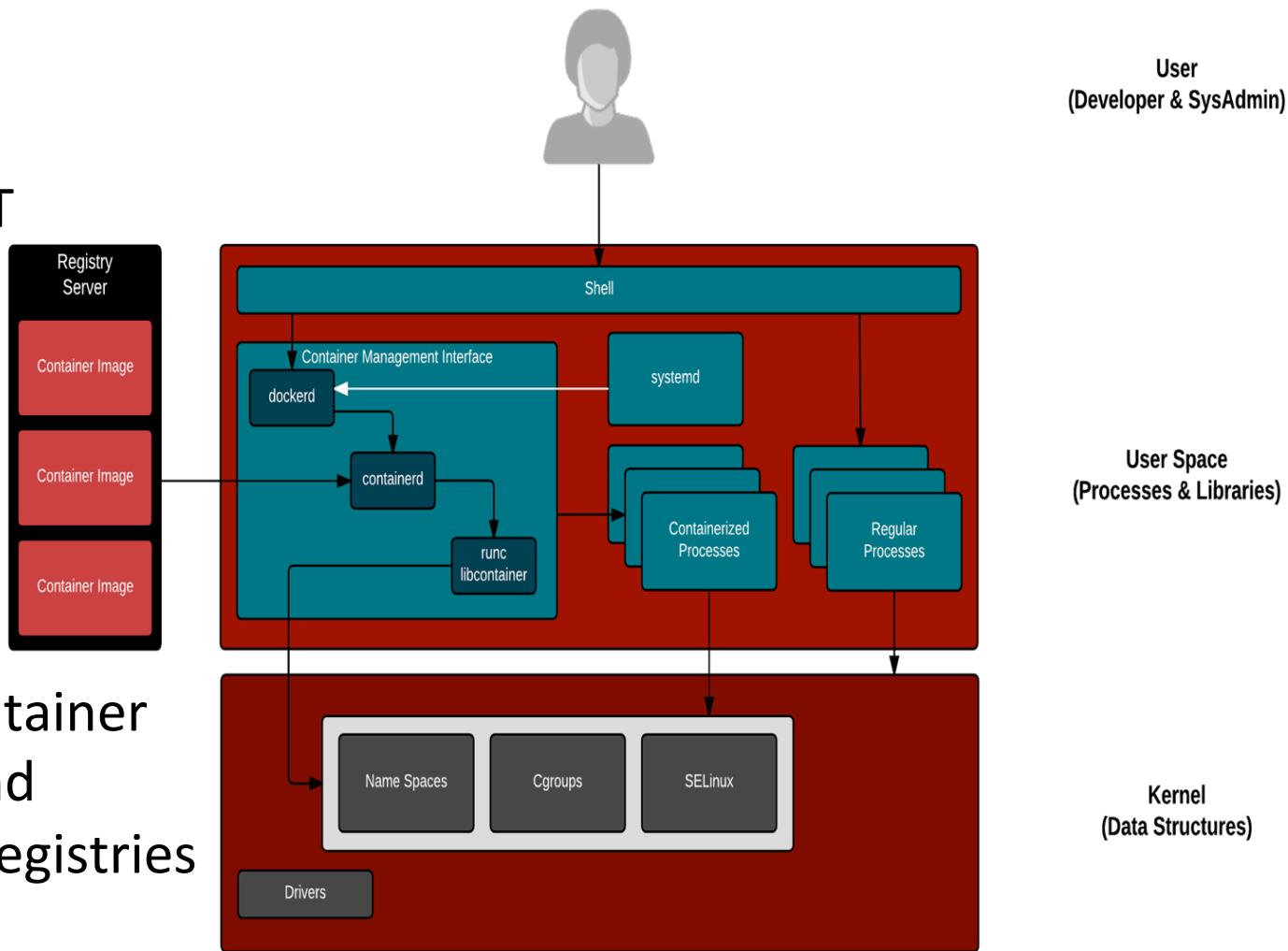


THE USER SPACE TOOL CHAIN

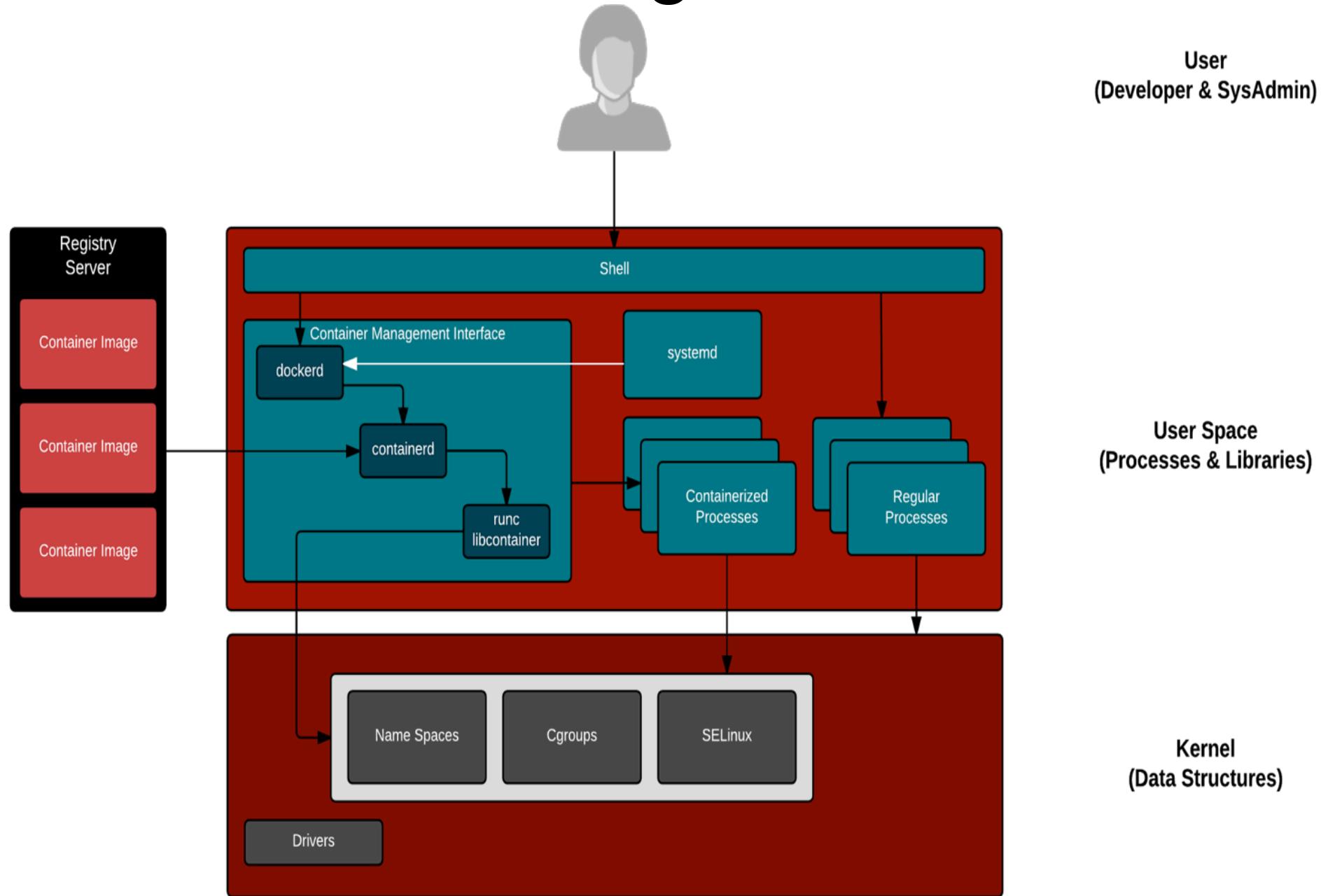
On a Single Host
The user space tool chain adds the following:

- A local daemon
- Simple CLI/REST interface

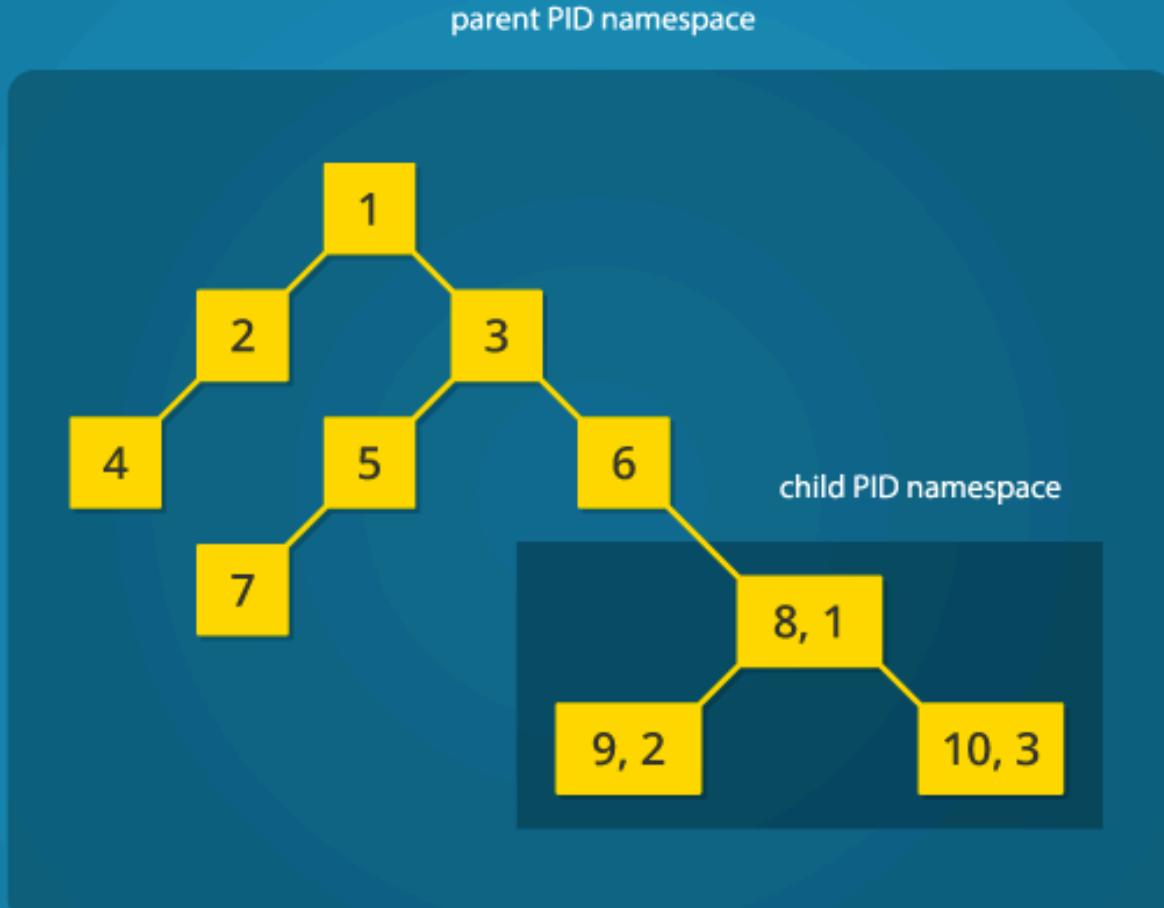
- Support for container images (OCI) and connection to registries



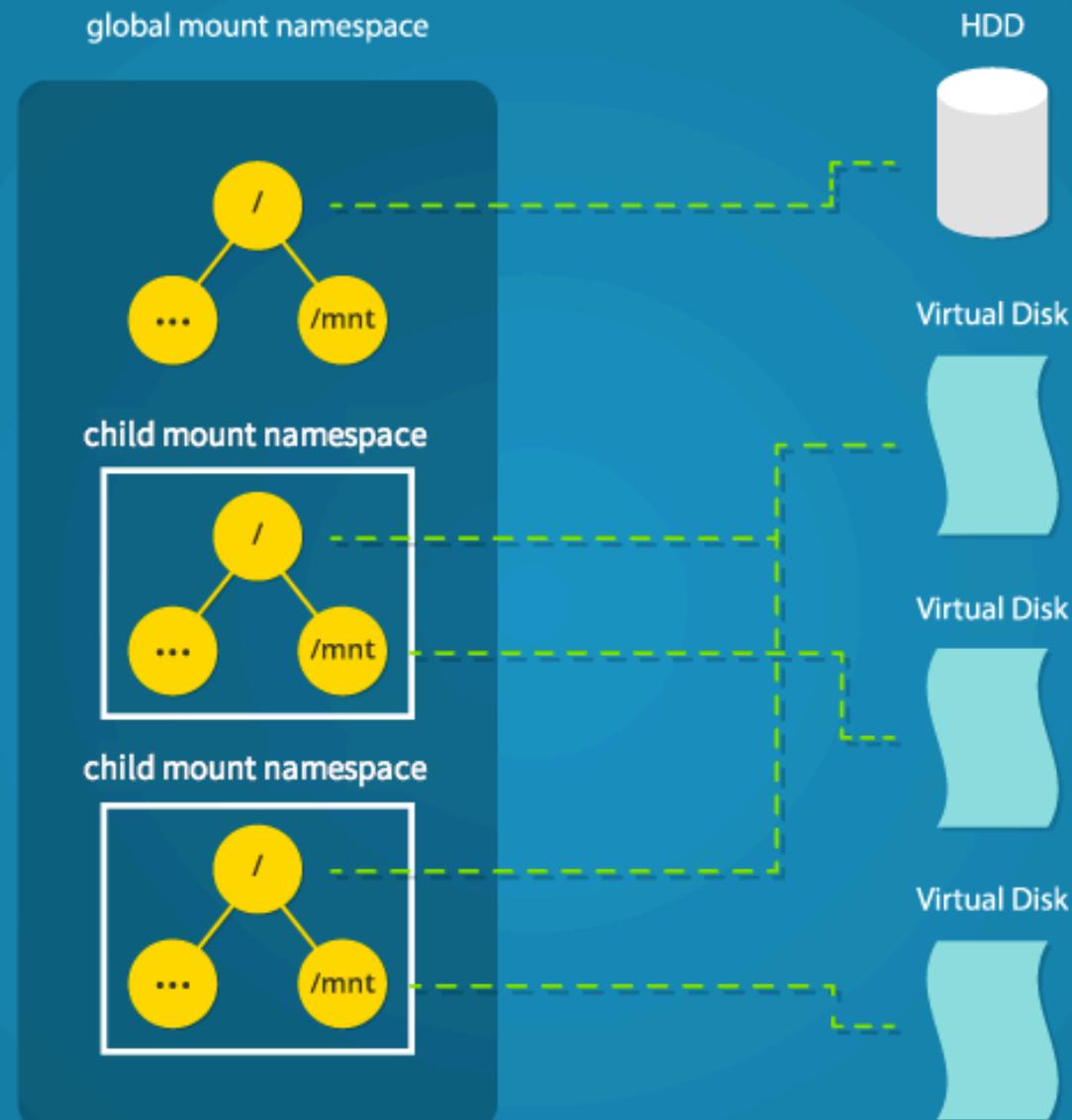
On Single Host



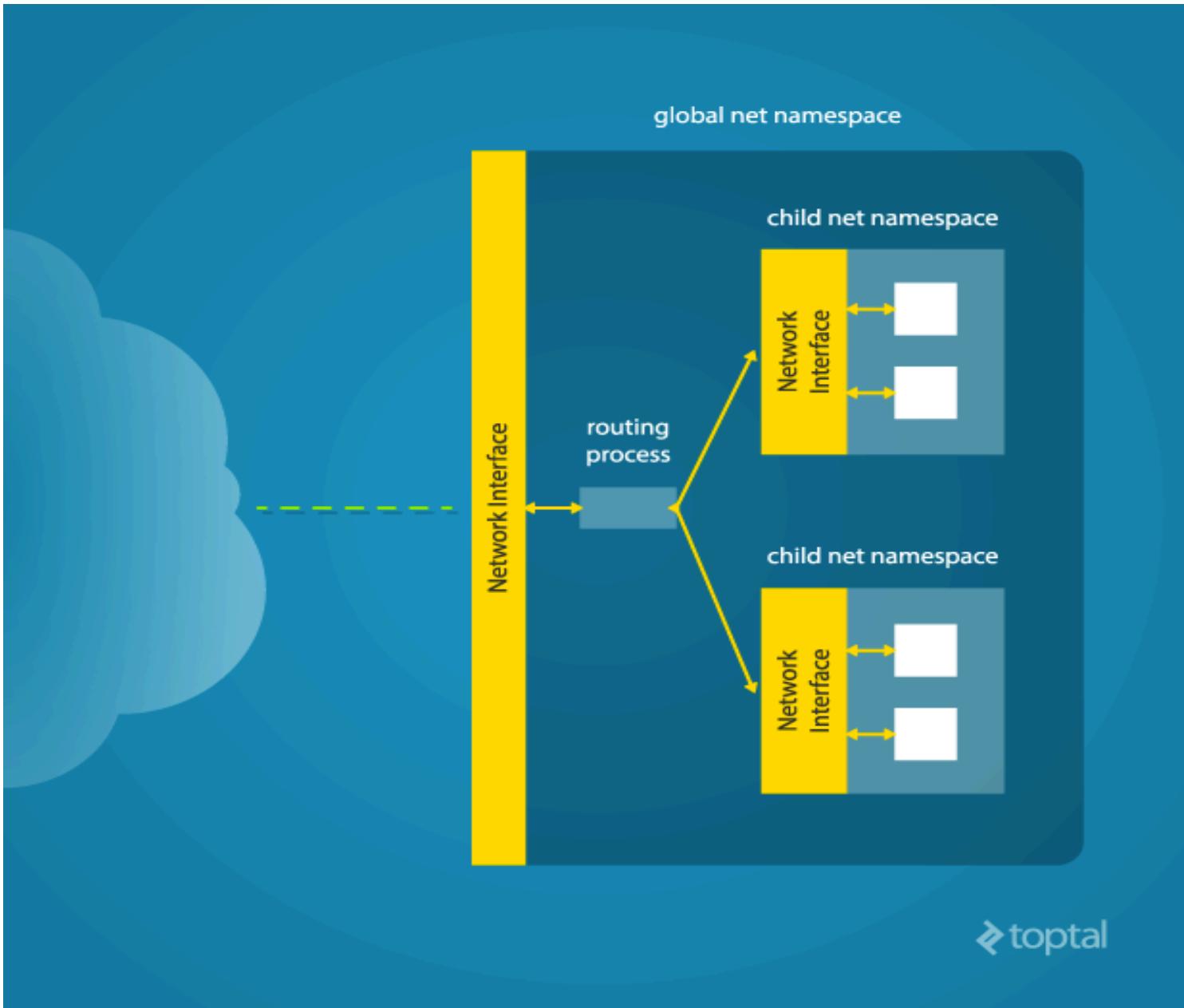
Namespace



Namespace



Namespace



How does it look in Linux Kernel source

Here is how the struct pid looked like before introducing the PID namespaces:

```
struct pid {  
    atomic_t count;           /* reference counter */  
    int nr;                 /* the pid value */  
    struct hlist_node pid_chain; /* hash chain */  
    struct hlist_head tasks[PIDTYPE_MAX]; /* lists of tasks */  
    struct rcu_head rcu;      /* RCU helper */  
};
```

And this is how it looks now:

```
struct upid {  
    int nr;                 /* moved from struct pid */  
    struct pid_namespace *ns; /* the namespace this value  
                             * is visible in  
                             */  
    struct hlist_node pid_chain; /* moved from struct pid */  
};
```

..

<https://lwn.net/Articles/259217/>

Process Namespace

```
sudo unshare --fork --pid --mount-proc bash
```

```
nsenter --target $PID --mount --uts --ipc --net -pid
```

```
sudo apt-get install cgroup-bin cgroup-lite cgroup-tools cgroupfs-mount  
libcgroup1
```

Read man nsenter

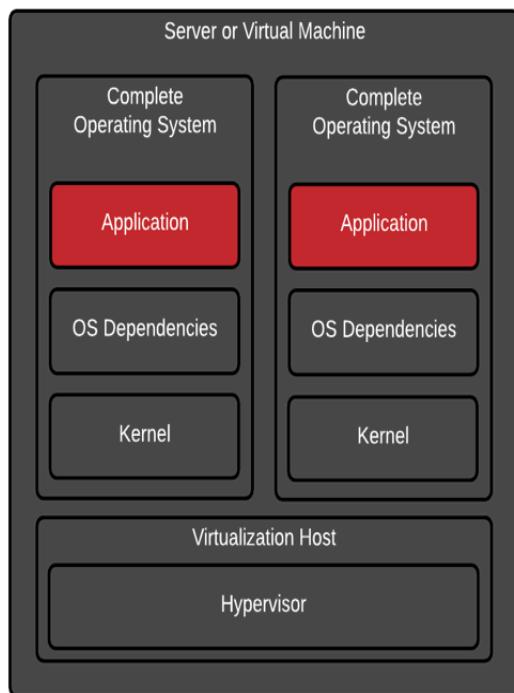
Use it here

A photograph of terraced rice fields in Sapa, Vietnam, showing the characteristic stepped patterns of the fields winding up a mountain slope. A large, solid red triangle is overlaid on the upper right portion of the image, containing the text.

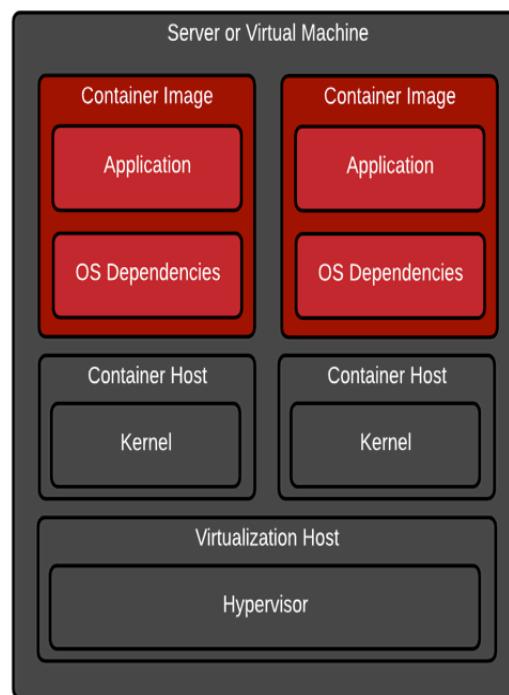
CONTAINER IMAGES

Container Images

Virtual machines and container environments



Application & Infrastructure
Updates Tightly Coupled

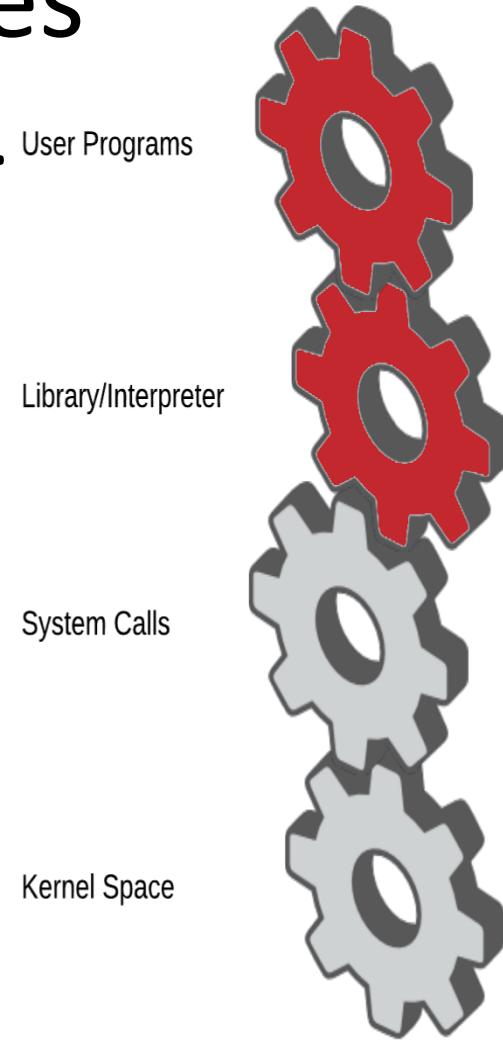


Application & Infrastructure
Updates Loosly Coupled

- Optimized for agility
- Optimized for stability

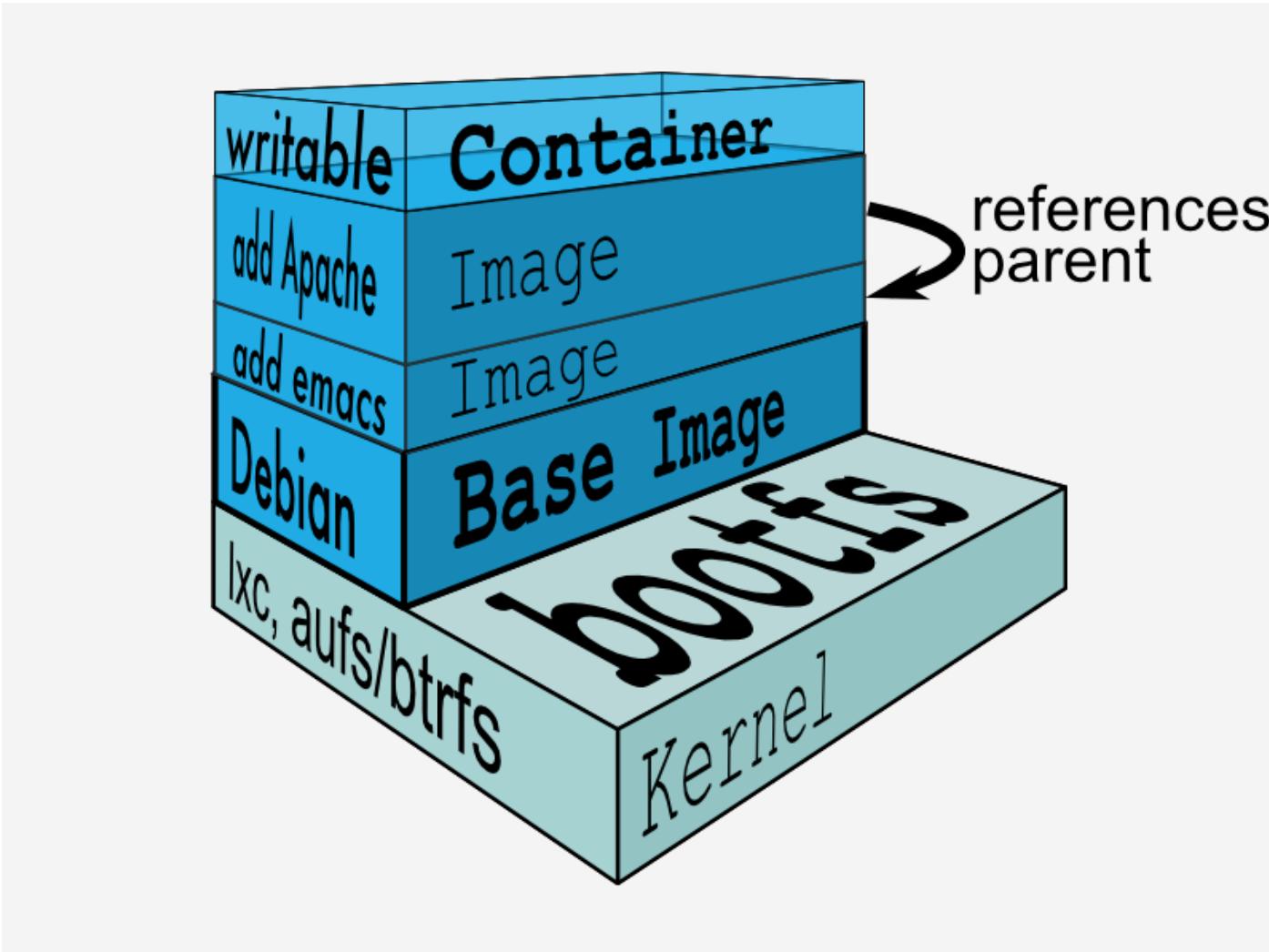
Fancy Files

People forget about Glibc... User Programs



Onion Mount file System

Aufs, Overlay2



Fancy File Servers

Actually, they are repositories

Command:

```
docker pull registry.access.redhat.com/rhel7/rhel:latest
```

Decomposition:

access.registry.redhat.com / rhel7 / rhel : latest

Generalization:

Registry Server / namespace / repo : tag

Fancy Files

How do we currently collaborate in the user space?

