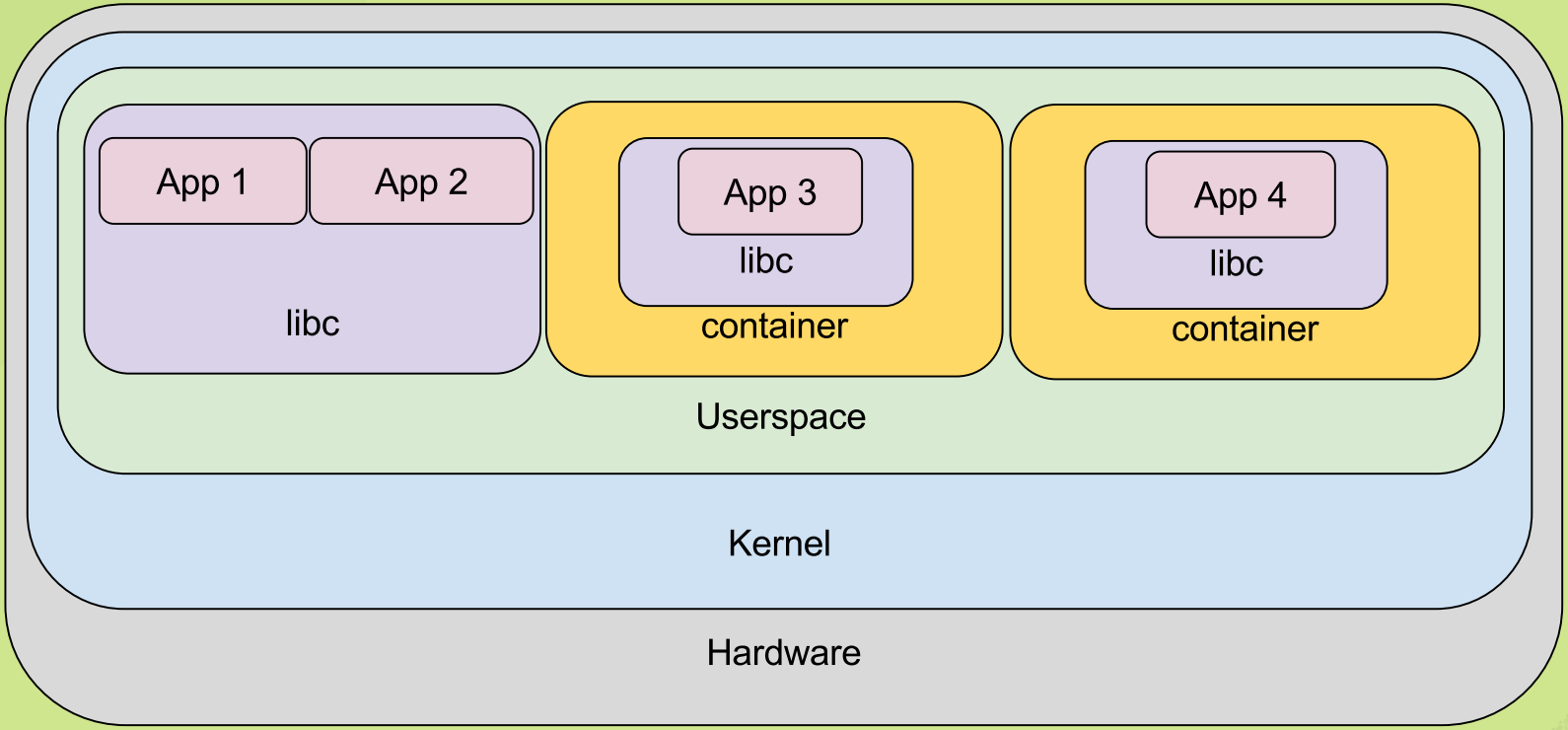
CONTAINERS, COMPUTING AND CHANGE

Vincent Batts @vbatts

```
$> finger $(whoami)
Login: vbatts                           Name: Vincent Batts
Directory: /home/vbatts                 Shell: /bin/bash
Such mail.
Plan:
OHMAN
$> id -Gn
devel opencontainers docker appc redhat golang slackware
```

CONTAINERS

(Cite: The Internet)


App 1
App 2
libc
App 3
libc
container
App 4
libc
container
Userspace
Kernel
Hardware

CONTAINERS:

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Share the host's kernel

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Crashes and Exploits alike

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virtualizing by "namespacing" kernel resources and concepts

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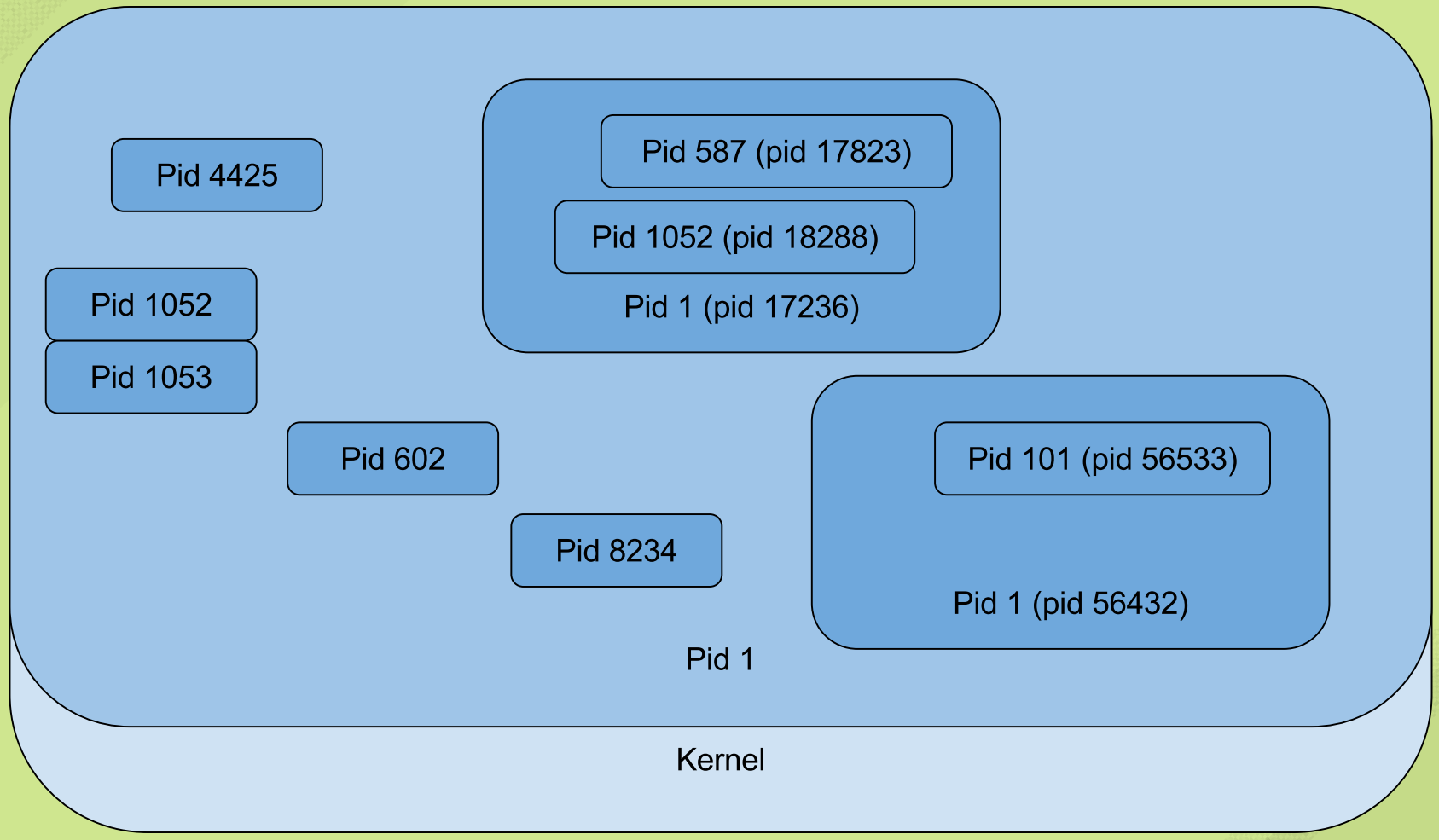
Isolation by control groups, syscall filtering, and Linux Security Modules (SELinux, apparmor, etc.)

KERNEL NAMESPACES:

unshare() docs

- mount
- IPC (message queues, semaphores, shm)
- UTS (hostname)
- network
- PID
- cgroup
- user

KERNEL NAMESPACES: PID



CONTAINER RUNTIME STANDARDS

OpenContainer Initiative Runtime Specification

```
$> runc spec
$> less config.json
{
        "ociVersion": "1.0.0-rc5",
        "platform": {
                "os": "linux",
                "arch": "amd64"
        },
        "process": {
                "terminal": true,
...
```

Using runc

CONTAINER DISTRIBUTION

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Root ('/') File System

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Approaches:

- Tar Archive
- Raw Image
- rsync
- ostree

CONTAINER DISTRIBUTION

```
$ skopeo copy docker://opensuse/amd64:42.2 oci:opensuse:latest
Getting image source signatures
Copying blob sha256:b0d17859d0e6c32023637374cc2a58223f013758bf13b5b390e00f1c89556cb8
 47.09 MB / 47.09 MB [============================================================]
Copying config sha256:402d70d449419de6963c694b69af418d35a026ad14159e93da8ef9973db21605
 0 B / 805 B [--------------------------------------------------------------------]
Writing manifest to image destination
Storing signatures
$ find ~/opensuse -type f
/home/vbatts/opensuse/blobs/sha256/ca2b806433c495ede5114aec2ffd567b43f084c60774346214b610f8ba0b830
/home/vbatts/opensuse/blobs/sha256/402d70d449419de6963c694b69af418d35a026ad14159e93da8ef9973db2160
/home/vbatts/opensuse/blobs/sha256/b0d17859d0e6c32023637374cc2a58223f013758bf13b5b390e00f1c89556cb
/home/vbatts/opensuse/refs/latest
/home/vbatts/opensuse/oci-layout
```

tools like:

- projectatomic/skopeo
- jessfraz/riddler
- openSUSE/umoci
- opencontainers/image-tools
- opencontainers/runtime-tools

CONTAINER DISTRIBUTION

Distributable formats (see Open Container Initiative)

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 0 B / 805 B [--------------------------------------------------------------------]
Writing manifest to image destination
Storing signatures
$ find ~/opensuse -type f
/home/vbatts/opensuse/blobs/sha256/ca2b806433c495ede5114aec2ffd567b43f084c60774346214b610f8ba0b830
/home/vbatts/opensuse/blobs/sha256/402d70d449419de6963c694b69af418d35a026ad14159e93da8ef9973db2160
/home/vbatts/opensuse/blobs/sha256/b0d17859d0e6c32023637374cc2a58223f013758bf13b5b390e00f1c89556cb
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WHAT'S NEXT?

Desktop applications will shape and mold (see flatpak.org)

Get used to not having root privileges (see bubblewrap and bwrap-oci)

Get used to not having capabilities (see System Tap)

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Cloud Native application development (see CNCF)

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intercommunication (see gRPC)

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"Scheduled" functionality (see OpenShift and Kubernetes)

intercommunication (see gRPC)

event and metric driven services

CLOUD

(Cite: the internet)

SHAMELESS PLUG

Red Hat is active in this area

(both technology and proximity)

VINCENT BATTS
@VBATTS| VBATTS@REDHAT.COM

THANKS!