
# Container Standardization Introduction

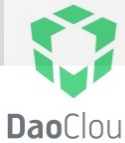
Ma Shimiao

# Who am I?



- Software Engineer at FNST
- Maintainer of Libstoragemgmt
- Maintainer of OCI runtime-tools
- Long-time Docker contributor and user
- Free software advocate

# Agenda





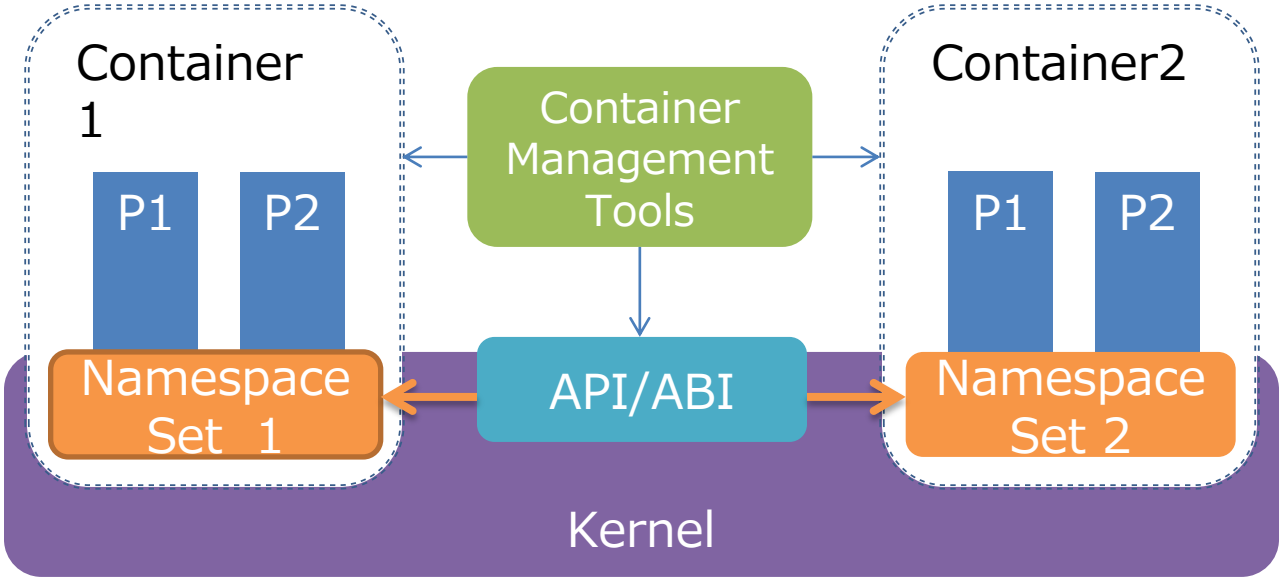
- Basic Knowledge
- The problem
- Goals of container standardization
- OCI Introduction
- Current state
- Future Plans
- Q&A

# Agenda

- **Basic Knowledge**
- The problem
- Goals of container standardization
- OCI Introduction
- Current state
- Future Plans
- Q&A

# Basic Knowledge

- What is container
  - Container: Operating system-level virtualization method for Linux

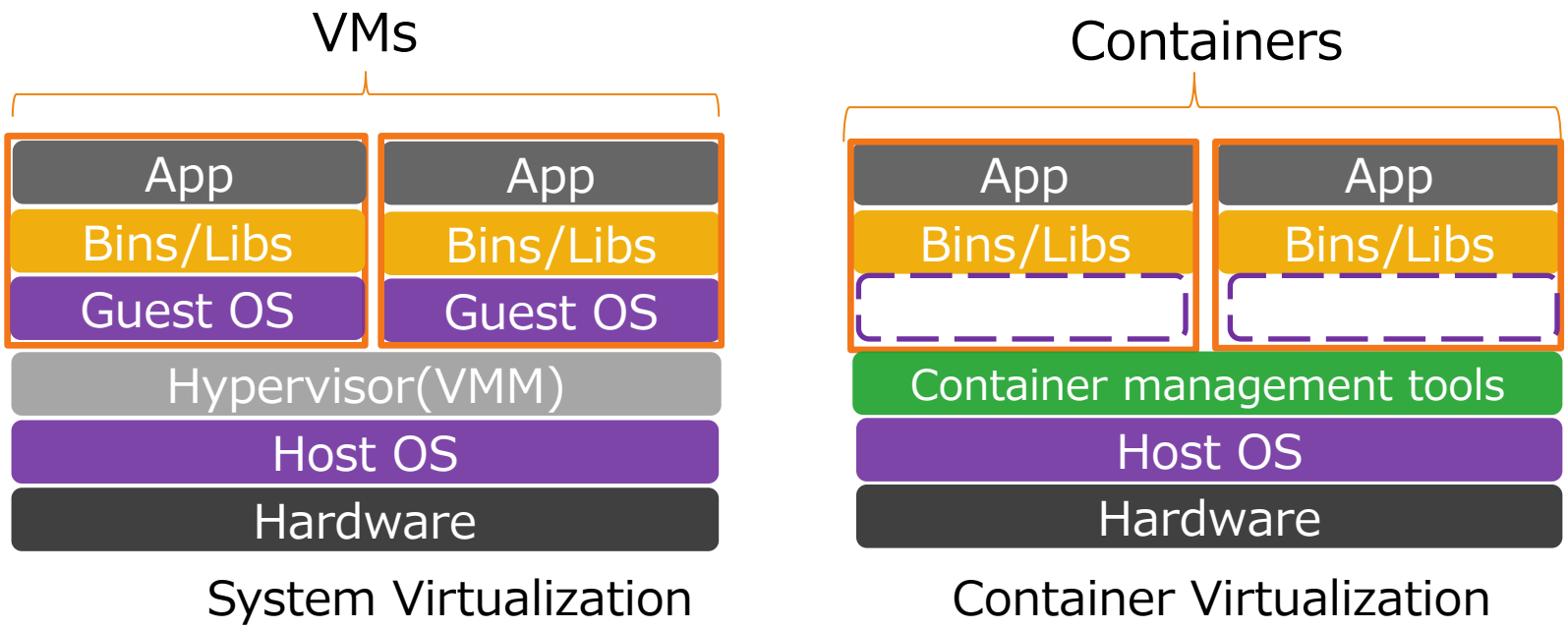


# Basic Knowledge

DaoCloud

FUJITSU IT大咖说 不止于技术

- Why Container
  - VM vs Container

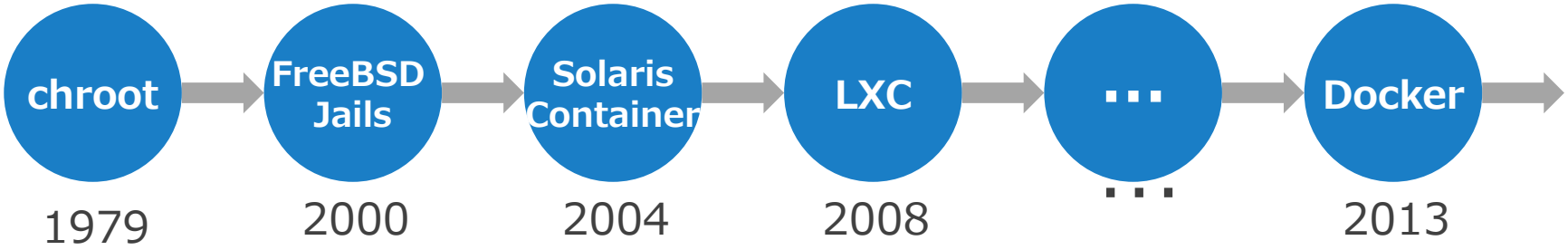


# Basic Knowledge

DaoCloud

FUJITSU IT大咖说 不止于技术

- Container History
  - Container technology is not a new technology




- Why grows so rapidly recently
  - Portability
  - Usability
  - Agility

# Agenda



- Basic Knowledge
- **The problem**
- Goals of container standardization
- OCI Introduction
- Fujitsu Contribution
- Future Plans
- Q&A

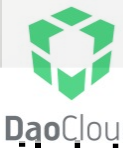
# The problem



- Container-based solutions grow rapidly
  - Almost all major IT vendors and cloud providers supply
  - More and more people try to use
- And, Popular Container Technologies
  - Docker
  - Rocket/rkt
  - OpenVZ/Odin
  - Hyper
  - …
- But, no open industry standards exist
  - Almost everyone has their own standards
- So, container technology seems to be fragmented

# The problem

# The problem




FUJITSU

IT大咖说 不止于技术

- Users hard to choose the best tools to build the best applications
  - No standards to evaluate
  - Not sure how to evaluate
  - …
- Users locked into any technology vendor for the long run
  - Hard to fit difference
  - High cost to transfer applications
  - …

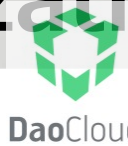
# Agenda

- Basic Knowledge
- Issues
- **Goals of container standardization**
- OCI Introduction
- Fujitsu Contribution
- Future Plans
- Q&A

# Goals of Container Standardization


ORDER & GUIDE

# Goals of Container Standardization




FUJITSU

IT大咖说 不止于技术

- Make open industry standards for container
  - Unambiguous development direction
  - Portability issue
  - Promote development of container technology
- Help users to choose container-based solutions
  - Users can be guided by choosing the best tools to build the best applications they can
  - Users will not be locked into any technology vendor for the long run
  - Get high quality services

# Agenda



- Basic Knowledge
- Issues
- Goals of container standardization
- **OCI Introduction**
- Fujitsu Contribution
- Future Plans
- Q&A

# OCI Introduction

DaoCloud

FUJITSU IT大咖说 不止于技术

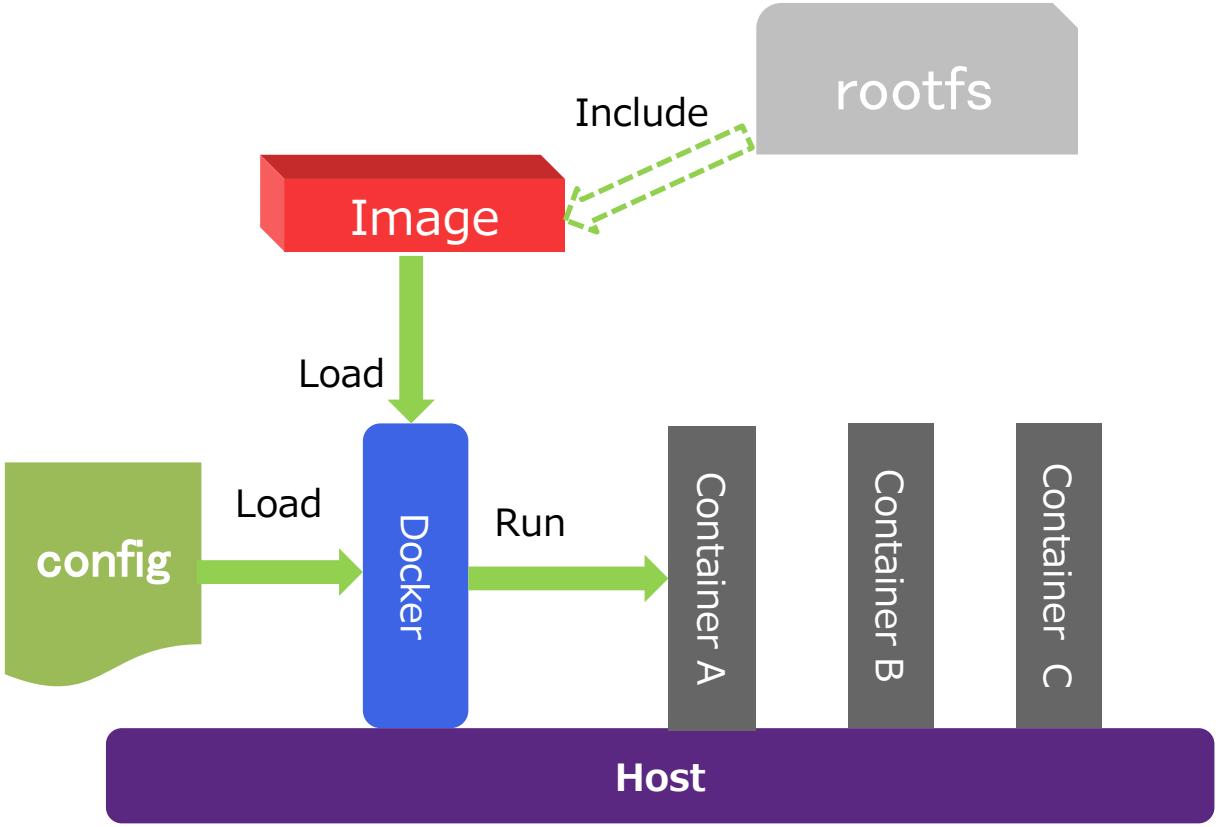
- What is OCI
  - Open Container Initiative, launched on June 22nd 2015
  - a lightweight, open governance structure (project), formed under the auspices of the Linux Foundation
  - 47 members, almost all major of IT vendors and cloud providers
- Mission of the OCI
  - promote and promulgate a set of common, minimal, open standards and specifications around container technology
- Duties of OCI
  - Creating a formal specification for container image formats and runtime
  - Accepting, maintaining and advancing the projects associated with these standards
  - Harmonizing the above-referenced standard with other proposed standards

# OCI Introduction

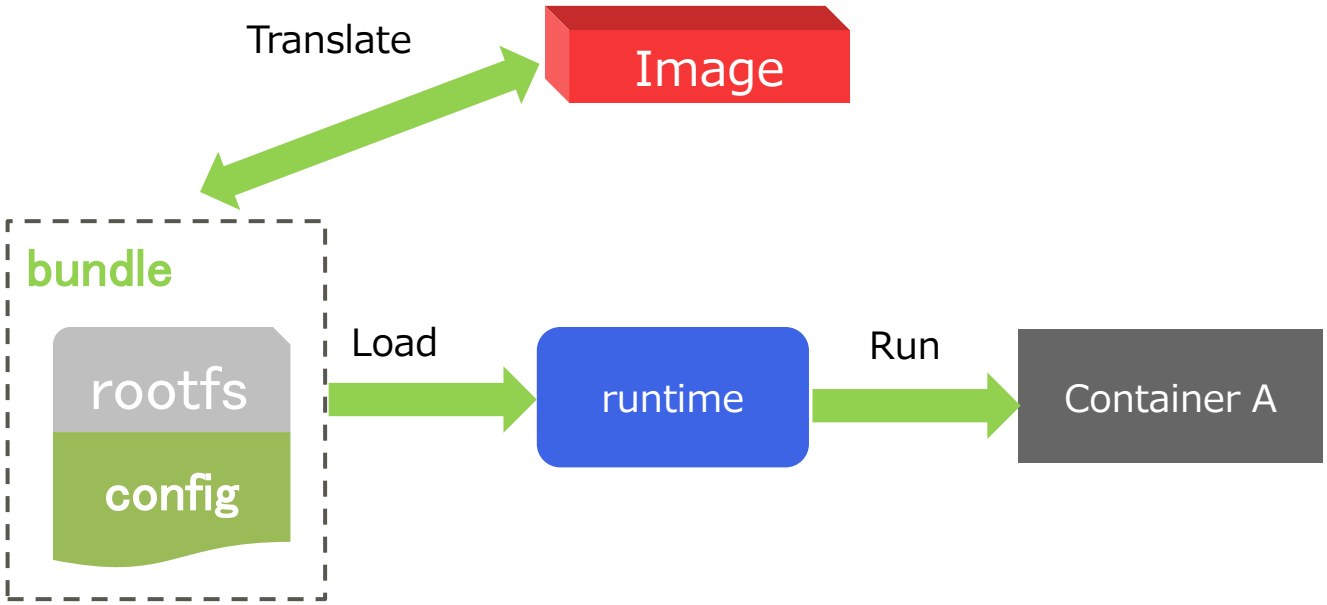


http://www.opencontainers.org

# OCI Introduction



# OCI Introduction



# OCI Introduction

DaoCloud

FUJITSU IT大咖说 不止于技术

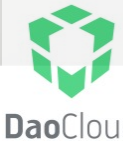
- runtime-spec
  - specifications for standards on Operating System process and application containers
- image-spec
  - creates and maintains the software shipping container image format spec
- runc
  - a CLI tool for spawning and running containers according to the OCI specification
- runtime-tools
  - a collection of tools for working with the OCI runtime specification.
- image-tools
  - a collection of tools for working with the OCI image specification.

# Agenda



- Basic Knowledge
- Issues
- Goals of container standardization
- OCI Introduction
- **Current State**
- Future Plans
- Q&A

# runtime-spec



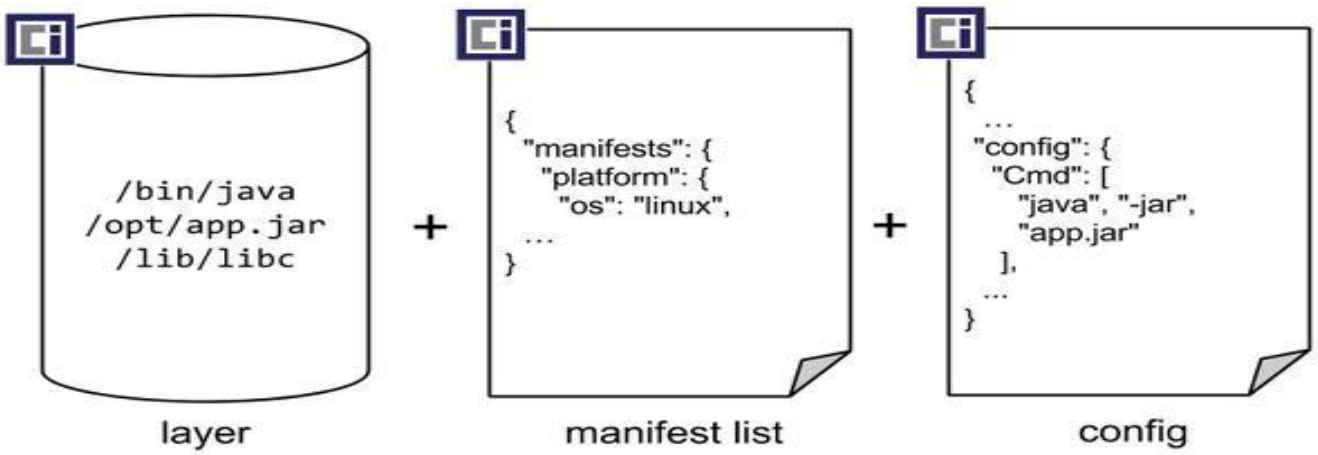

FUJITSU

IT大咖说 不止于技术

- bundle, runtime&lifecycle, configuration
- platforms: linux, solaris, windows
- specs-go package(config, state)
- json schema
- latest v1.0.0-rc4, released 9 versions

# image-spec

- image-layout, config, manifest
- specs-go package
- json schema
- latest v1.0.0-rc5, released 10 versions



# runc

DaoCloud

FUJITSU IT大咖说 不止于技术

- create, start, state, kill, list, etc.

```
cd /mycontainer

runc create mycontainerid

# view the container is created and in the "created" state
runc list

# start the process inside the container
runc start mycontainerid

# after 5 seconds view that the container has exited and is now in the stopped state
runc list

# now delete the container
runc delete mycontainerid
```

- latest v1.0.0-rc2, already release 14 versions
- support by docker, kubernetes, …
- But, only support cgroups v1

# runtime-tools

- config generation
  - already finished 80%
- bundle validation
  - already finished 70%
- runtime validation
  - reforming
  - cgroups, lifecycle

# image-tools

DaoCloud

FUJITSU IT大咖说 不止于技术

## image-validation

```
$ oci-image-validate --type imageLayout --ref latest busybox-oci
busybox-oci: OK
```

## Unpack

```
$ mkdir busybox-bundle
$ oci-unpack --ref latest busybox-oci busybox-bundle
$ tree busybox-bundle
busybox-bundle
├── bin
│   ├── [
│   ├── [[
│   ├── acpid
│   ├── addgroup
│   ├── add-shell
[...]
```

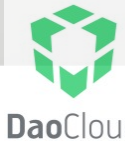
## bundle-create

```
$ mkdir busybox-bundle
$ oci-create-runtime-bundle --ref latest busybox-oci busybox-bundle
$ cd busybox-bundle && sudo runc run busybox
```

# OCI Introduction

All OCI projects at
https://github.com/opencontainers

# Agenda





- Basic Knowledge
- Issues
- Goals of container standardization
- OCI Introduction
- Current State
- **Future Plans**
- Q&A

# Future Plans

- **runtime-spec**
  - follow community's steps, expect V1.0.0 release
- **image-spec**
  - follow community's steps, expect V1.0.0 release
- **runc**
  - Interacting with cgroups v2
  - Features based on runtime-spec
  - Quality improve

# Future Plans

- **runtime-tools**
  - validation for Linux cgroups
  - runtime validation reform
  - readability of output
  - portability
- **image-tools**
  - structure reform
  - validation enhancement
  - portability

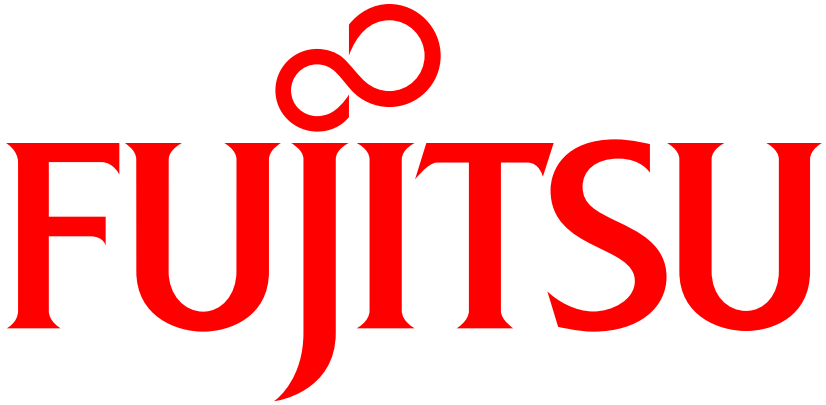
# Q&A


FUJITSU

IT大咖说 不止于技术

Thank you!
Q&A

DaoCloud | IT大咖说 不止于技术




shaping tomorrow with you