

Building OCI Images Without Privilege

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OPEN CONTAINER
INITIATIVE





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 **jonboulle** spec: add conversion references

db4d6de on Jun 26, 2017

8 contributors



```
70 lines (49 sloc) | 4.02 KB
```

Raw

Blame

History



Image Format Specification

This specification defines an OCI Image, consisting of a [manifest](#), an [image index](#) (optional), a set of [filesystem layers](#), and a [configuration](#).

The goal of this specification is to enable the creation of interoperable tools for building, transporting, and preparing a container image to run.

Table of Contents

- Introduction

\$ not #

```
yum -y install ...  
./configure ...  
sed -i ...
```


What exists?

shiftfs

- In kernel solution to uid-map files based on namespace map
- Author uses it for building container images
- Other interesting applications
- <https://lwn.net/ml/linux-fsdevel/1529098514.4048.41.camel@HansenPartnership.com/>

“rootless” containers

- umoci has rootless support without user namespaces
- Buildah has (recent) support for user namespaces
- <https://github.com/guinness/genuinetools> supports exactly the Docker “API” unprivileged

stacker

How do I use it?

first:

from:

type: docker

url: docker://centos:latest

import:

- config.json

- install.sh

run: |

mkdir -p /etc/myapp

cp /stacker/config.json /etc/myapp/

/stacker/install.sh

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cp /stacker/config.json /etc/myapp/

/stacker/install.sh

How do I use it?

```
first:
```

```
  from:
```

```
    type: docker # or tar, oci, etc.
```

```
    url: docker://centos:latest
```

```
import:
```

```
  - config.json
```

```
  - install.sh
```

```
run: |
```

```
  mkdir -p /etc/myapp
```

```
  cp /stacker/config.json /etc/myapp/
```

```
  /stacker/install.sh
```

How do I use it?

```
first:
  from:
    type: docker
    url: docker://centos:latest
  import:
    - config.json
    - install.sh
  run: |
    mkdir -p /etc/myapp
    cp /stacker/config.json /etc/myapp/
    /stacker/install.sh
```


How do I use it?

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first:
  from:
    type: docker
    url: docker://centos:latest
  import:
    - config.json
    - install.sh
  run: |
    mkdir -p /etc/myapp
    cp /stacker/config.json /etc/myapp/
    /stacker/install.sh
```

How does it work?

- liblxc
- go-lxc
- umoci
- skopeo
 - No API :(
- btrfs
 - Multiple images built from the same source are only extracted once

What does the run environment look like?

- User namespaces
- Host network namespace
- Bind mounted `/etc/resolv.conf`
- `/proc/sys` and `/proc/sysrq-trigger` readonly (proc:mixed in LXC)
- Reasonable devices in `/dev` (`lxc.autodev = 1`)
- Bind mounted `/sys` from host
- `/stacker` directory mounted r/o for import:s
- Reasonable default `$PATH`
- Mostly looks like a reasonable system, yum, apt, etc. work fine

odds & ends



--shell-fail



```
$ stacker inspect --oci-dir oci
```

```
a
```

```
    layer 0: sha256:256b176b... (75 MB)
```

```
    layer 1: sha256:276a625d... (156 kB)
```

```
Annotations:
```

```
    ws.tycho.stacker.stacker_yaml: ...
```

```
Image config:
```

```
{  
  "created": "2018-08-06T16:33:04.379695767-06:00",  
  "os": "linux",  
  "config": {  
    "Env": [  
      "PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"  
    ], ...  
  }  
}
```


updating.

A strategy for container updating

A:

from:

type: docker

url: docker://centos:latest

run:

- yum install openssl
- yum install python3
- git clone https://example.com/A
- ./A/install

B:

from:

type: docker

url: docker://centos:latest

run:

- yum install openssl
- yum install python3
- git clone https://example.com/B
- ./B/install

A strategy for container updating

```
python3:
  from:
    type: docker
    url: docker://centos:latest
  run:
    - yum install python3
ssl:
  from:
    type: docker
    url: docker://centos:latest
  run:
    - yum install openssl
```

```
A:
  from:
    type: docker
    url: docker://centos:latest
  apply:
    - docker://ssl:latest
    - docker://python3:latest
  run:
    - git clone https://example.com/A
    - ./A/install
```

A strategy for container updating

```
python3:  
  from:  
    type: docker  
    url: docker://centos:latest  
  run:  
    - yum install python3
```

```
8ab6c5e1cb34a35a35... -> python:latest  
e05fab2a890d758805... -> centos:latest  
39ad9e63562e5d7087...
```

A strategy for container updating

```
python3:  
  from:  
    type: docker  
    url: docker://centos:latest  
  run:  
    - yum install openssl
```

64fabd853e4de75a7e... -> ssl:latest

e05fab2a890d758805... -> centos:latest

39ad9e63562e5d7087...

End result

e05fab2a890d758805... -> centos:latest
39ad9e63562e5d7087...

End result

64fabd853e4de75a7e... -> ssl:latest, included verbatim
e05fab2a890d758805... -> centos:latest
39ad9e63562e5d7087...

End result

8ab6c5e1cb34a35a35... -> python:latest, included verbatim
64fabd853e4de75a7e... -> ssl:latest, included verbatim
e05fab2a890d758805... -> centos:latest
39ad9e63562e5d7087...

End result

c34553482dda4a28dd... -> diff from app install
8ab6c5e1cb34a35a35... -> python:latest, included verbatim
64fabd853e4de75a7e... -> ssl:latest, included verbatim
e05fab2a890d758805... -> centos:latest
39ad9e63562e5d7087...

End result

c34553482dda4a28dd...

8ab6c5e1cb34a35a35...

64fabd853e4de75a7e...

e05fab2a890d758805...

39ad9e63562e5d7087...

A:

from:

type: docker

url: docker://centos:latest

apply:

- docker://ssl:latest

- docker://python3:latest

run:

- git clone https://example.com/A

- ./A/install

For posterity

- <https://github.com/anuvu/stacker>
(<https://github.com/anuvu/stacker/blob/master/doc/tutorial.md>)
- <https://github.com/opencontainers/image-spec>
- <https://github.com/lxc/lxc>

Thanks!

We are hiring! Linux, containers, secure boot, etc.

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<http://github.com/tych0>

