

LinuxKit

Or: Why Composition Isn't Just for Music

Goal



Survey 1



Survey 1.1



Survey 1.END



Survey 1.END



Little Converter That Could

Little Converter That Could



Little Converter That Could



Little Converter That Could

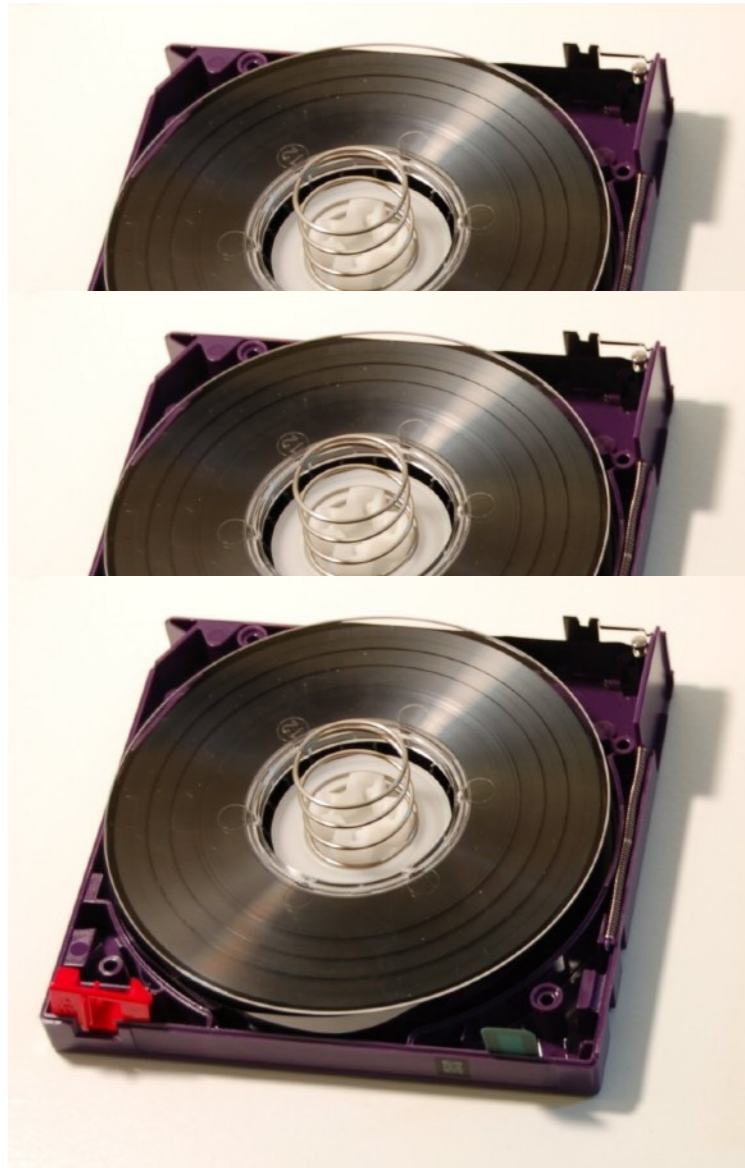


Little Converter That Could



mp3

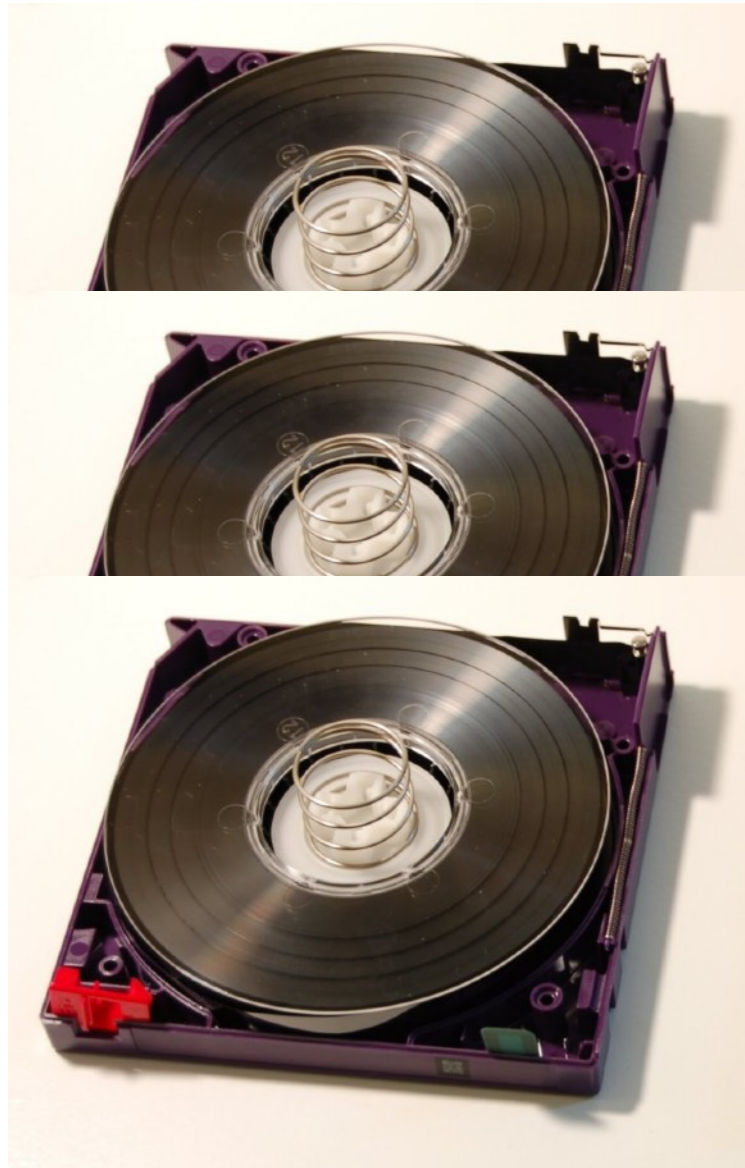
Little Converter That Could



mp3

MP4
VIDEO™

Little Converter That Could

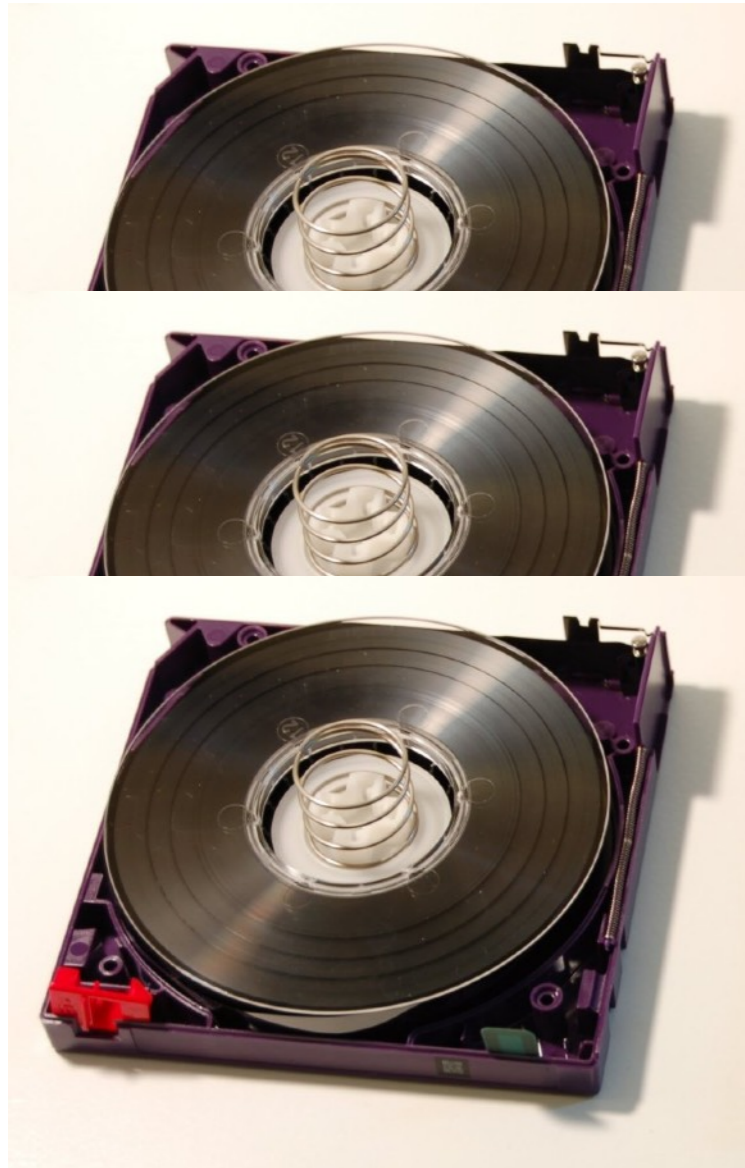


mp3

MP4
VIDEO™

Ogg

Little Converter That Could

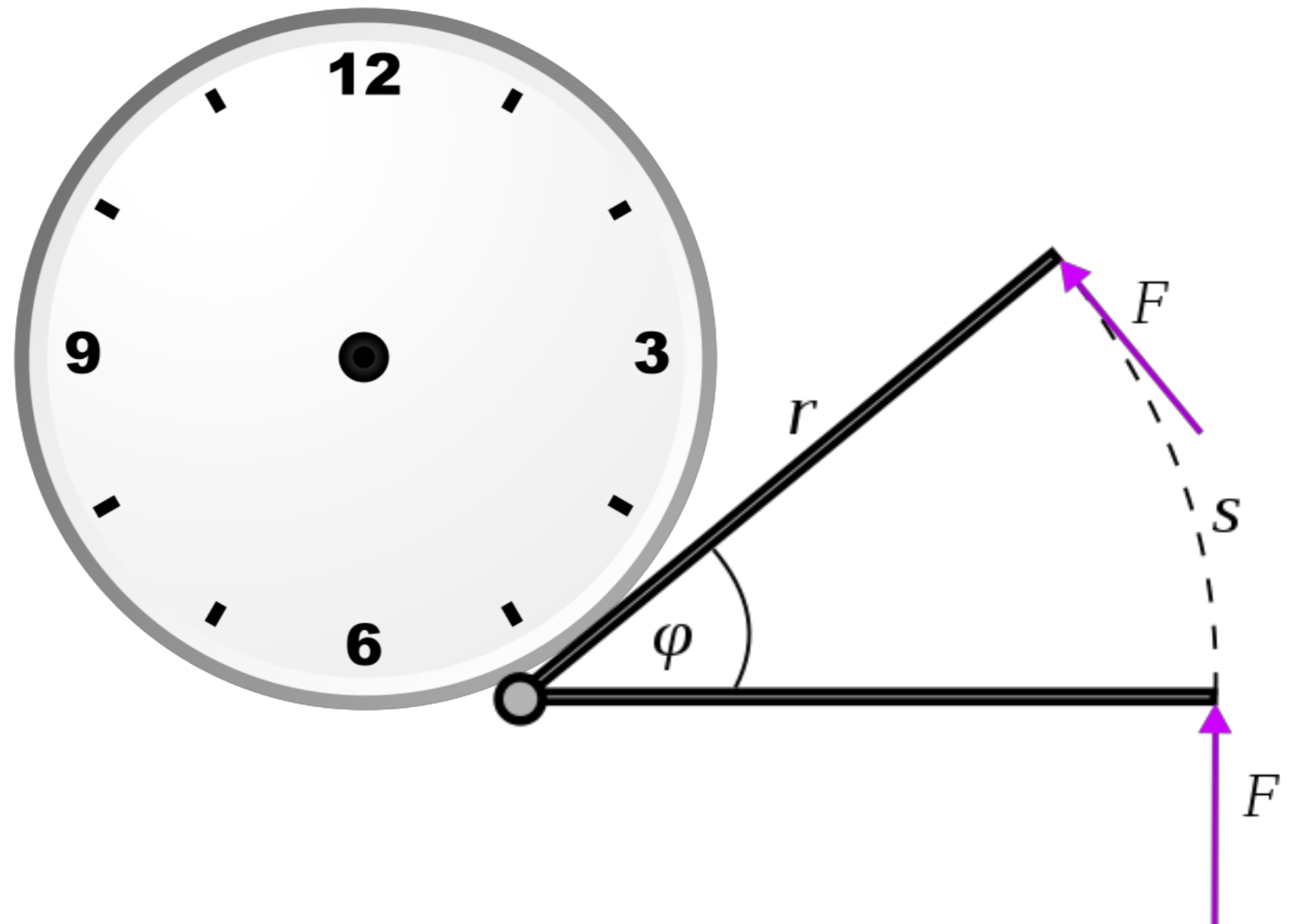


mp3

**MP4
VIDEO**

Ogg

Leverage?



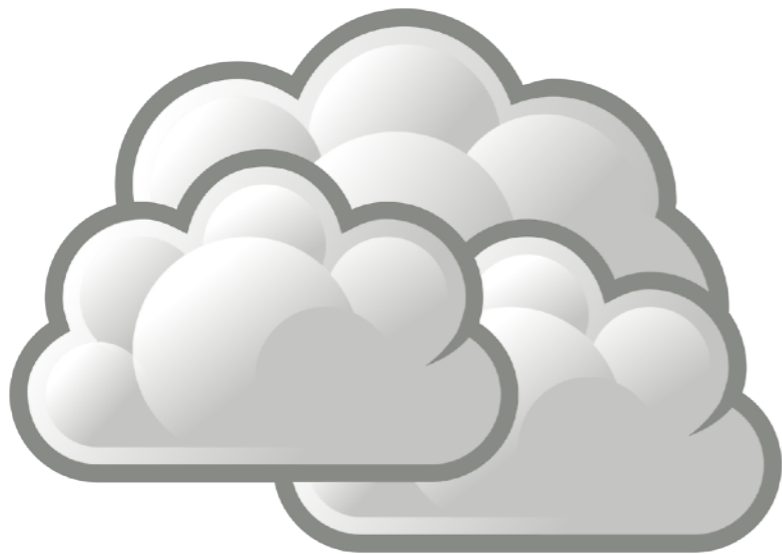
Leverage

Leverage

SaaS

Leverage

SaaS



Leverage

SaaS



Leverage

SaaS

Appliance



Leverage

SaaS



Appliance



Problems



Problems

- **How do I protect 20 years of engineering from 2 weeks of reverse engineering in an untrusted environment?**



Problems

- How do I protect 20 years of engineering from 2 weeks of reverse engineering in an untrusted environment?



Problems

- How do I protect 20 years of engineering from 2 weeks of reverse engineering in an untrusted environment?
- How do I minimize overhead so the deployment lasts?



Problems

- How do I protect 20 years of engineering from 2 weeks of reverse engineering in an untrusted environment?
- How do I minimize overhead so the deployment lasts?



You are not special!

Secure my operating environment



Optimize my operating environment



Who Am I?



Who Am I?

Life in Tech Business



Who Am I?



Life in Tech Business

Mission-Critical IT

10 yrs

Who Am I?



Life in Tech Business

Mission-Critical IT

Consulting



Who Am I?



Life in Tech Business

Mission-Critical IT

Consulting

S t a r t u p s

10 yrs

12+ yrs

Who Am I?



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S t a r t u p s

10 yrs

12+ yrs



Avid (if not very good) ice hockey player



Who Am I?



Life in Tech Business

Mission-Critical IT

Consulting

S t a r t u p s

10 yrs

12+ yrs

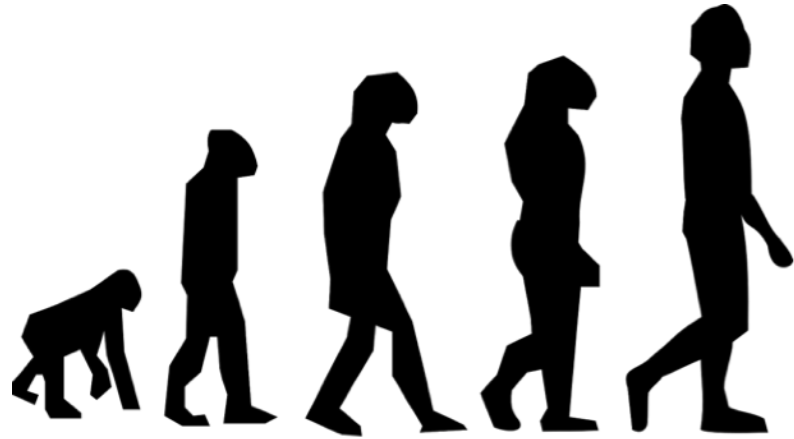


Avid (if not very good) ice hockey player

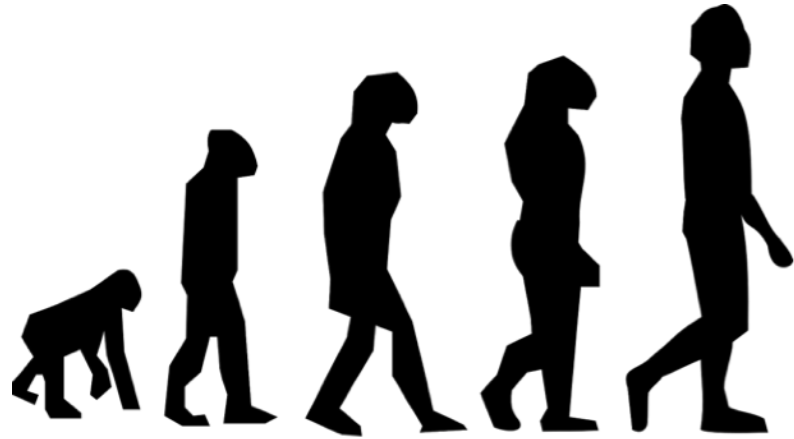


Long-time lover of great engineering... when used to make a real difference

Evolution

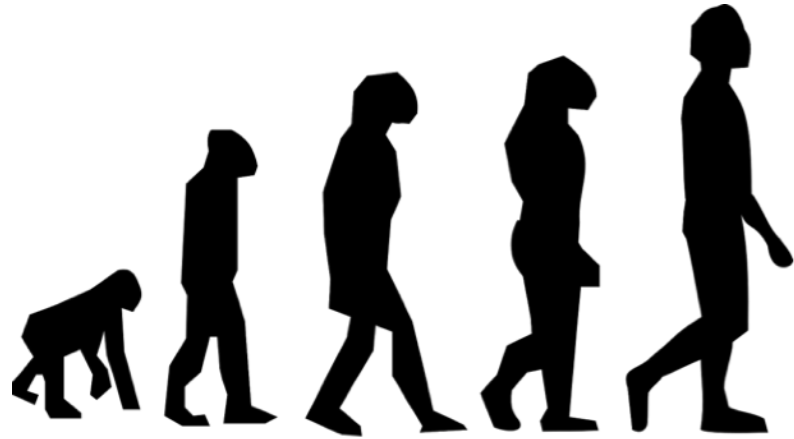


Evolution



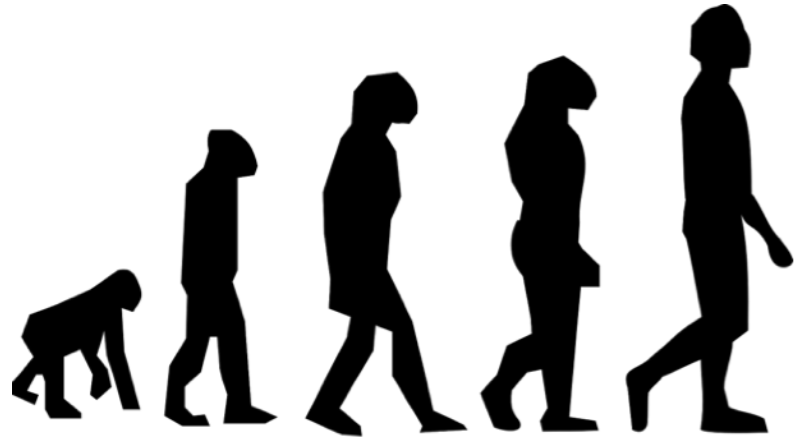
Manual

Evolution



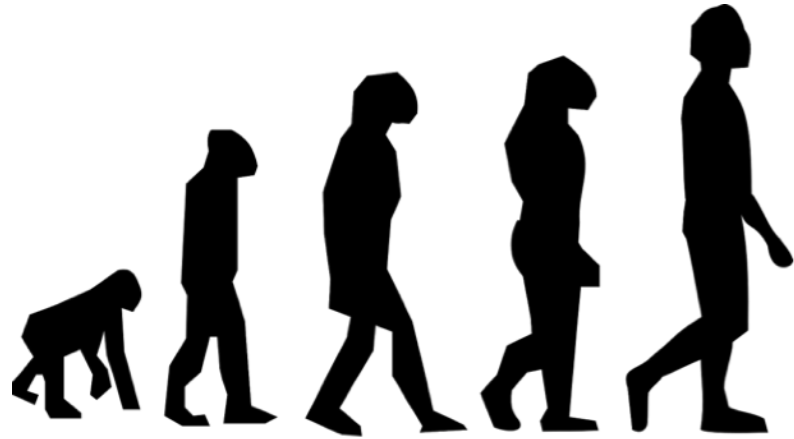
Manual

Evolution



Manual

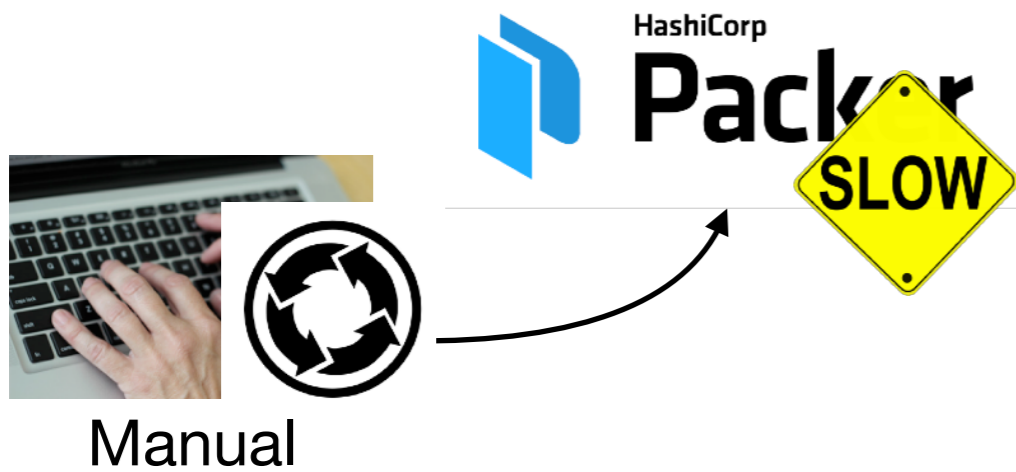
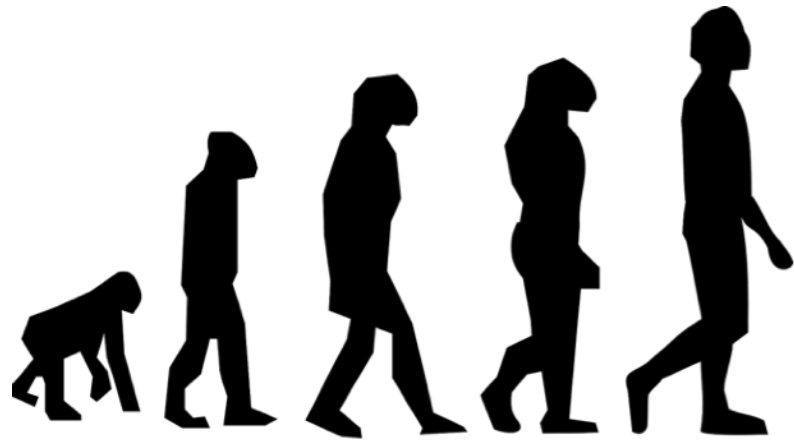
Evolution



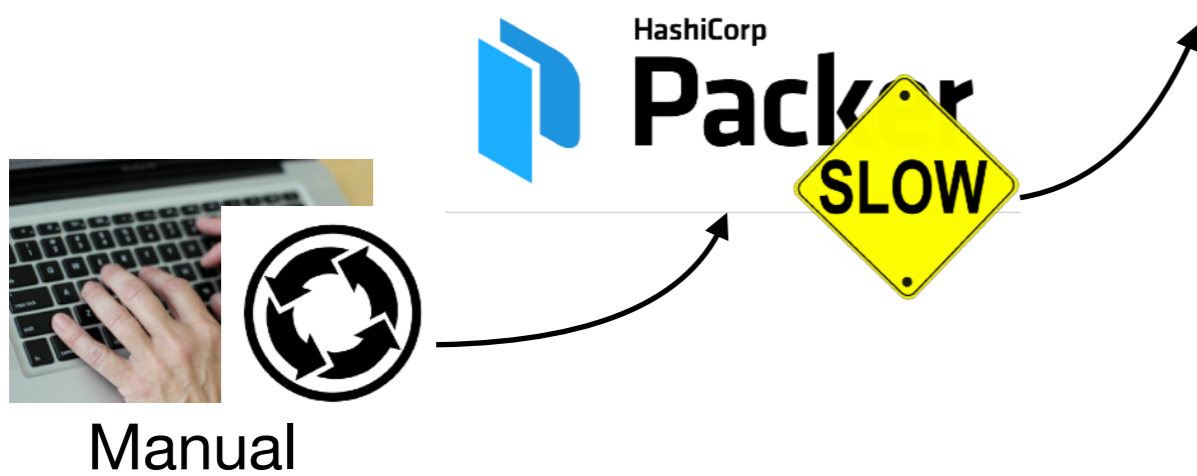
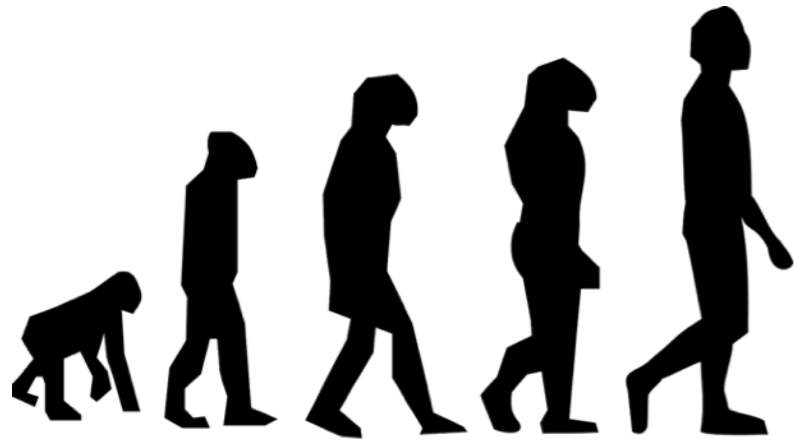
Manual



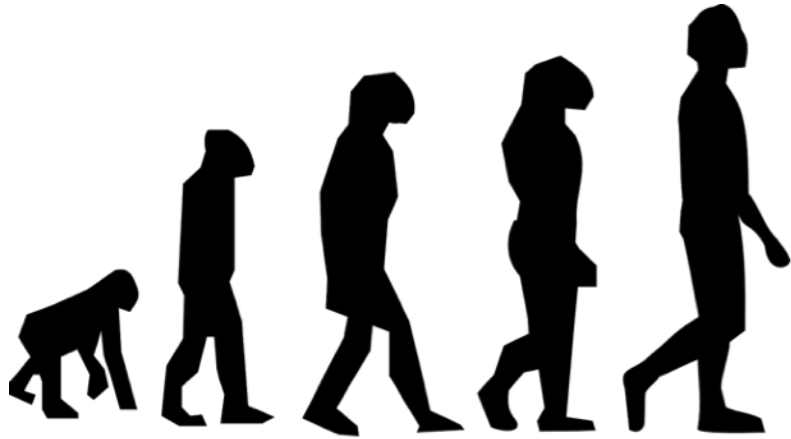
Evolution



Evolution



Evolution



```
FROM ubuntu:16.04
MAINTAINER Avi Deitcher <avi@atomicinc.com>
LABEL description="SecureAppliance Ubuntu Build" vendor="atomicinc.com" version="1.0"

# Setup the environment
ENV DEBIAN_FRONTEND=noninteractive

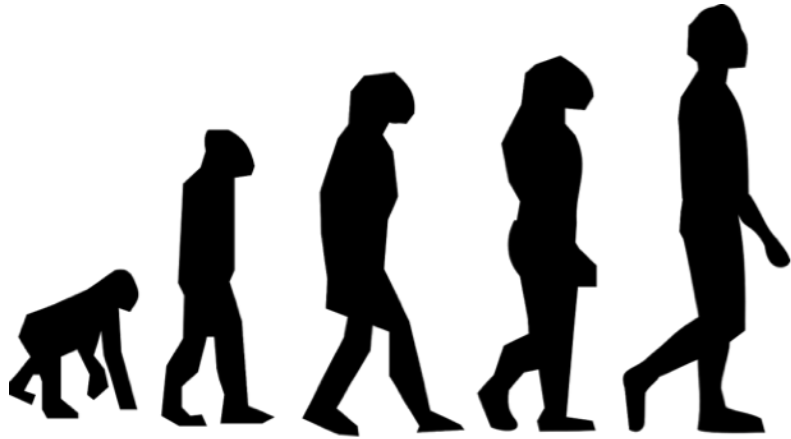
# Install packages
RUN apt-get -q update && \
    apt-get -y --no-install-recommends upgrade && \
    apt-get install -y --no-install-recommends ca-certificates && \
    apt-get install -y --no-install-recommends \
    bash \
    base-compat \
    bc \
    bindutils \
    ca-certificates \
    cron \
    cryptsetup \
    curl \
    dbus \
    dmcc \
    dnsmasq \
    ethtool \
    file \
    fig \
    http \
    ioping \
    jq \
    lsof \
    lsscsi \
    less \
    locales \
    lsb-release \
    lsof \
    mdx \
    nmap
```



Manual



Evolution



```
FROM ubuntu:18.04
MAINTAINER Avi Deitcher avideitcher@atomicinc.com
LABEL Description="SecureAppliance Ubuntu Build" Vendor="atomicinc.com" Version="1.0"

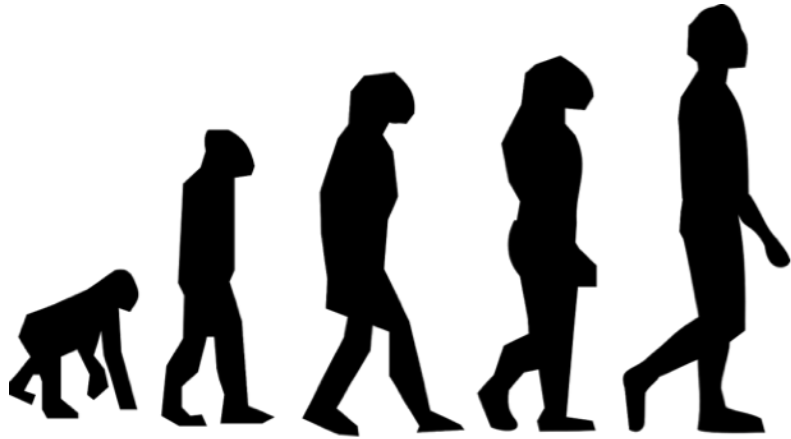
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    cron \
    cryptsetup \
    curl \
    dbus \
    dmidecc \
    dmcc \
    ethtool \
    file \
    find \
    gmp \
    gnupg \
    gnupg1 \
    gnupg2 \
    gnupg1-gnupg \
    less \
    locales \
    lsb-release \
    lsof \
    md5sum \
    nmap
```



Manual

Evolution



```
FROM ubuntu:16.04
MAINTAINER Avi Deitcher @avideitcher.com
LABEL description="SecureAppliance Ubuntu Build" vendor="atomicinc.com" version="1.0"

# Setup the environment
ENV DEBIAN_FRONTEND=noninteractive

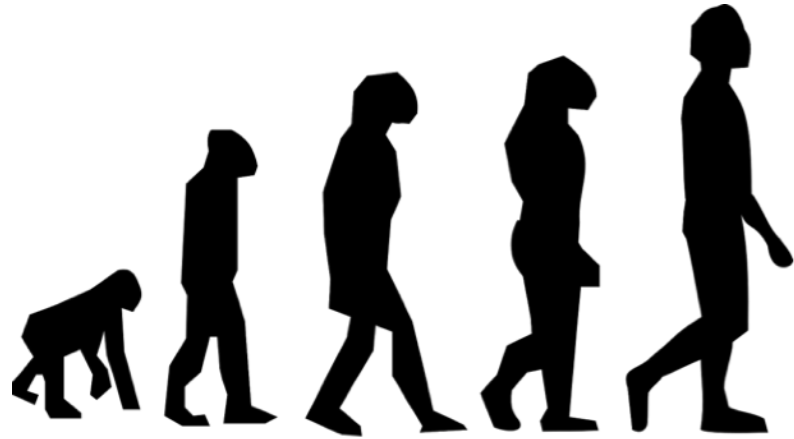
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    dbus \
    dmcc \
    dnsmasq \
    ethtool \
    file \
    find \
    http \
    iptables \
    iptables-persistent \
    less \
    locales \
    lsb-release \
    lsof \
    mdadm
```



Manual



Evolution



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FROM ubuntu:16.04
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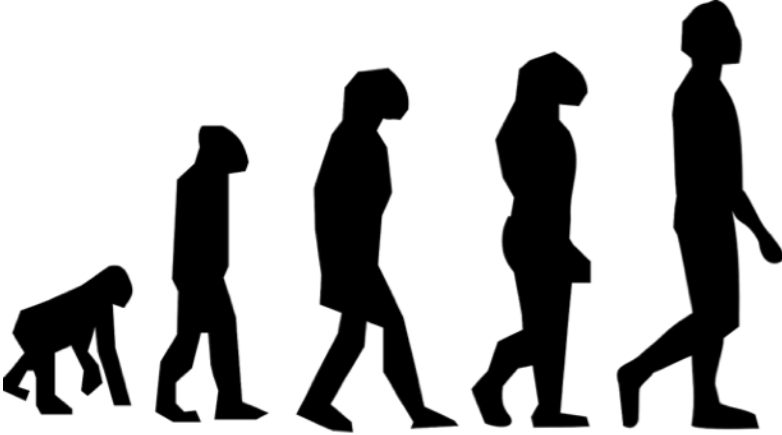
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  file \
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  ftp \
  http \
  iproute2 \
  iproute2 \
  iptables \
  iptables-persistent \
  less \
  locales \
  logrotate \
  logrotate \
  net \
  net \
  net \
  net
```



Manual

Evolution



LinuxKit

```
FROM ubuntu:16.04
MAINTAINER Avi Deitcher avideitcher@atomicinc.com
LABEL Description="SecurityAppliance Ubuntu Build" Vendor="atomicinc.com" Version="1.0"

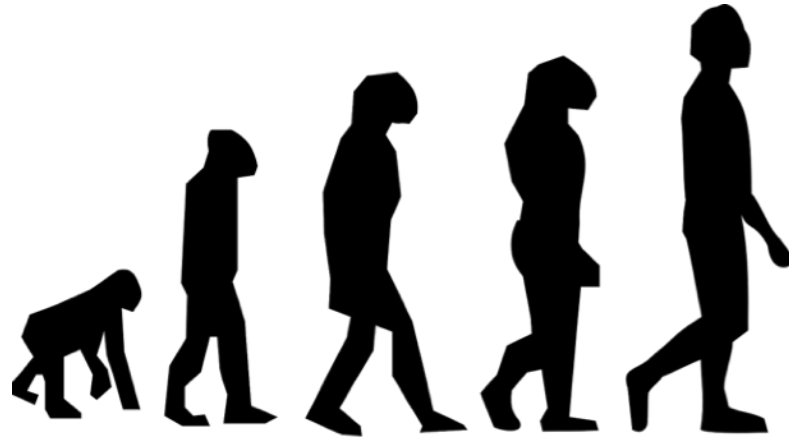
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  dmcc \
  ethtool \
  file \
  findutils \
  httpd \
  libcap2 \
  libcap2-bin \
  libcap2-dev \
  libcap-ng \
  less \
  locales \
  libmount \
  libmount1 \
  libmount1 \
  libmount1 \
  libmount1
```

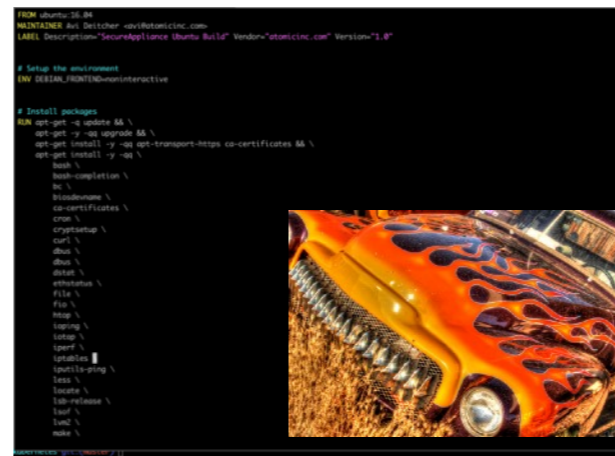
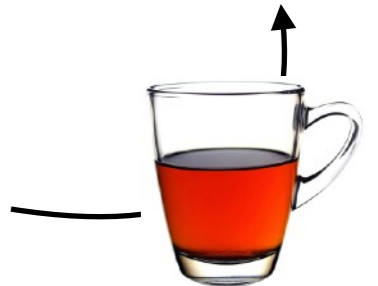


Manual

Evolution

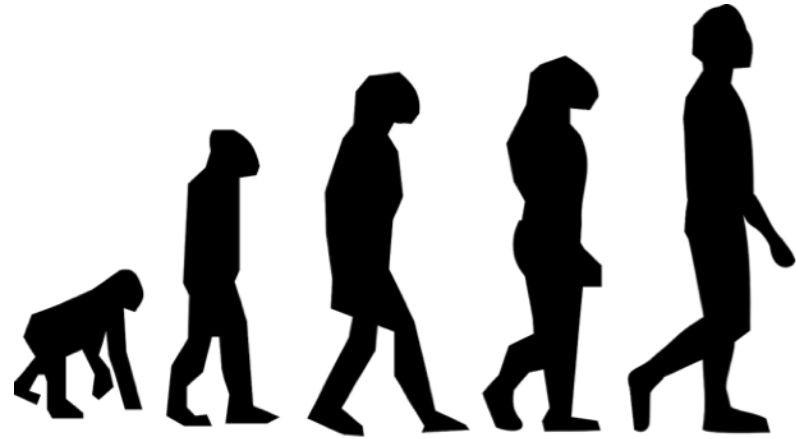


LinuxKit

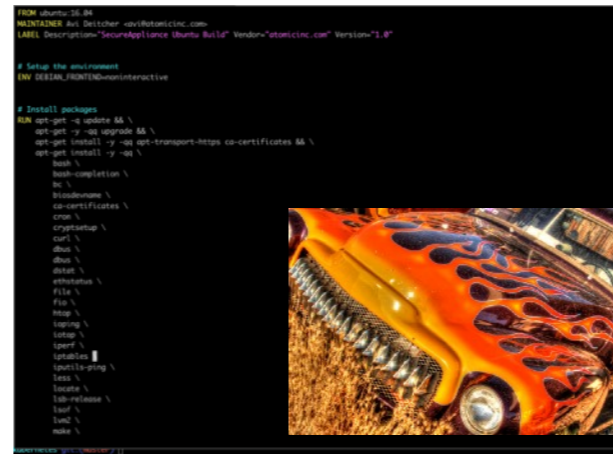


Manual

Evolution



LinuxKit



Manual

LinuxKit!

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ijc Merge pull request #3290 from ijc/containerd-v1.2.4 Latest commit 6b17ff4 4 days ago

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Why?



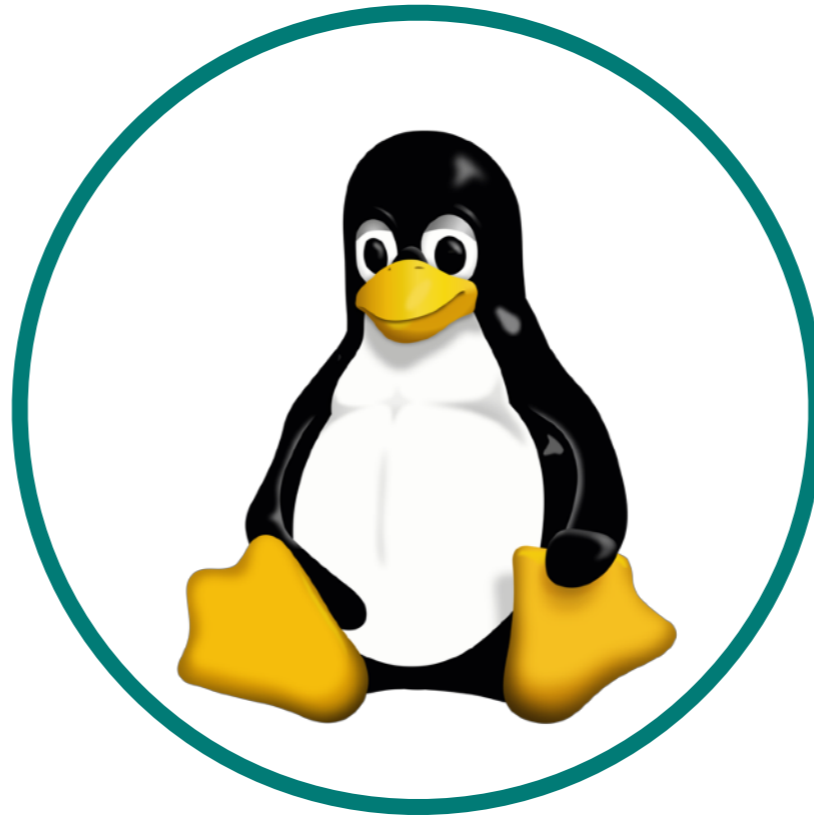
Why?



Why?



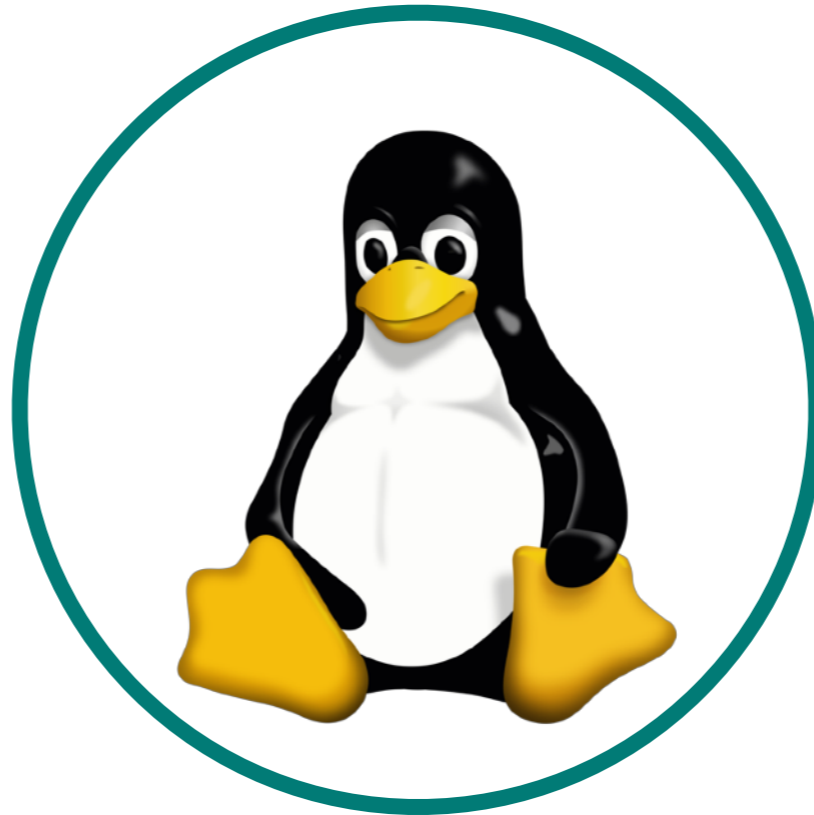
LinuxKit



LinuxKit



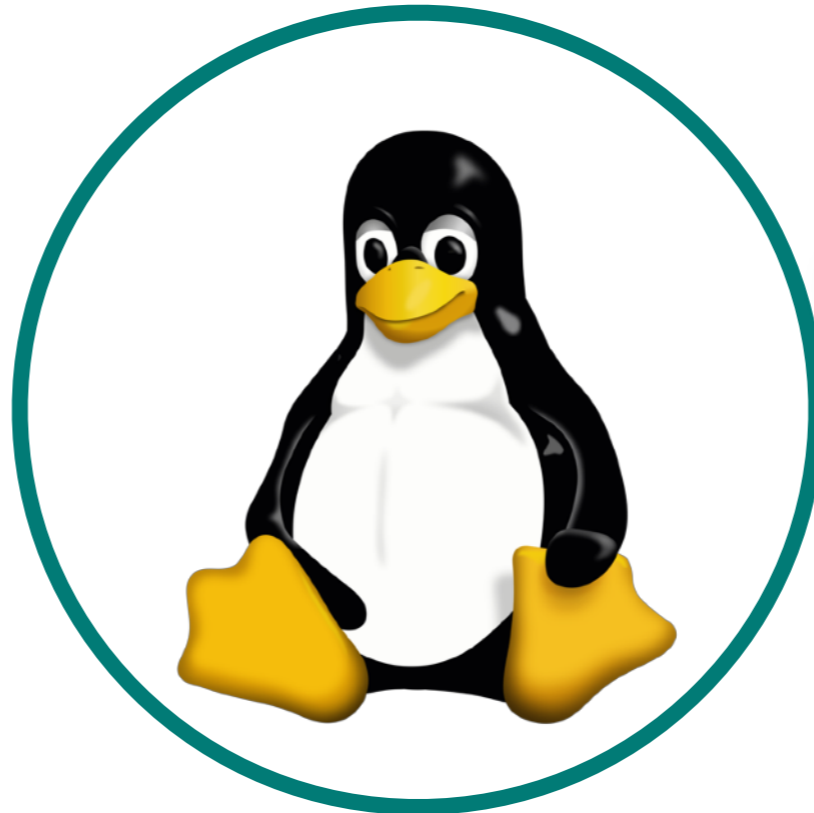
Runnable



LinuxKit



Runnable

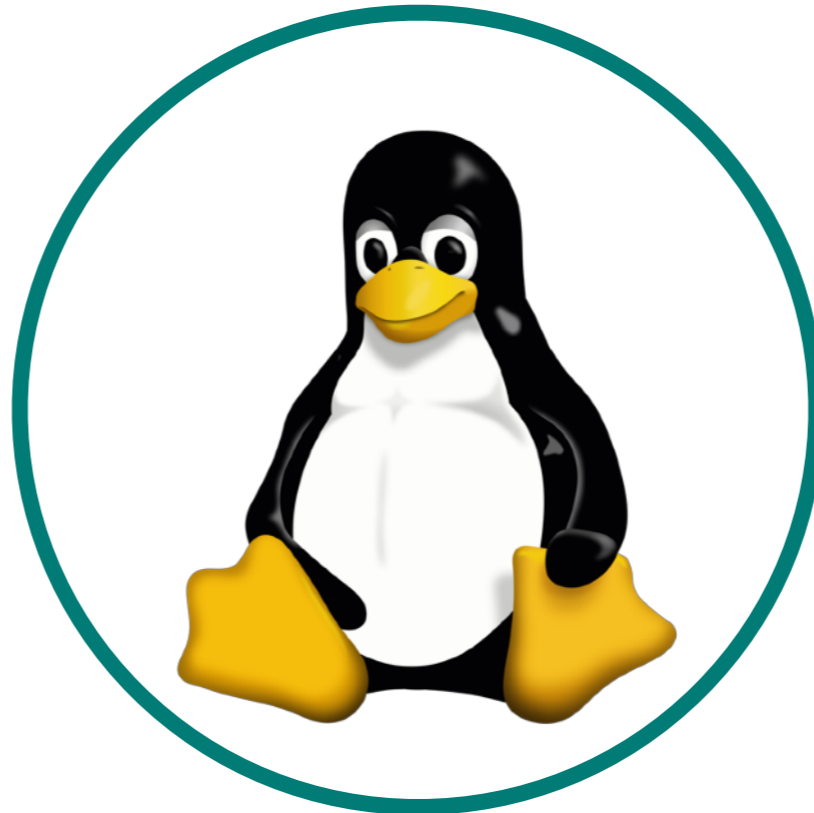


Disposable

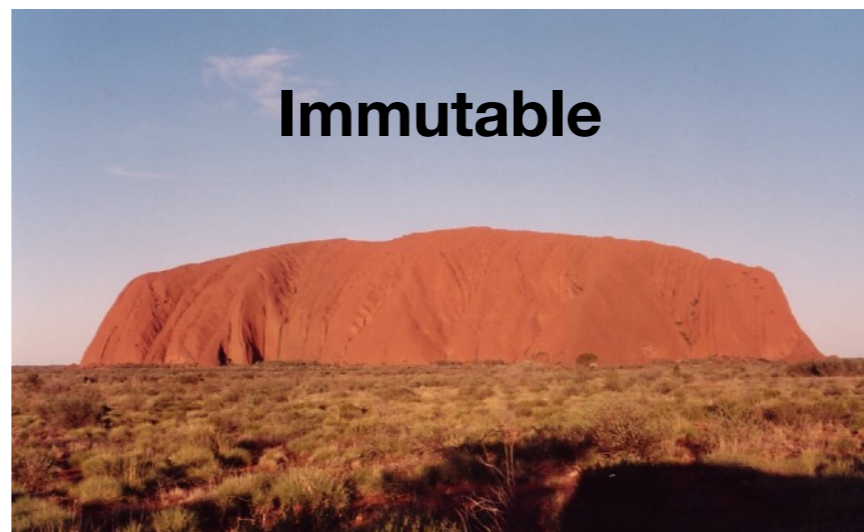
LinuxKit



Runnable



Disposable



Immutable

LinuxKit - So What?

LinuxKit - So What?



Size

LinuxKit - So What?



Size



Start Time

LinuxKit - So What?



Size



Cycle Time



Start Time

LinuxKit - So What?



Size



Debuggability



Cycle Time



Start Time

LinuxKit - So What?



Size



Debuggability



Cycle Time



Start Time



Performance

LinuxKit - So What?



Size



Debuggability



Cycle Time



Start Time



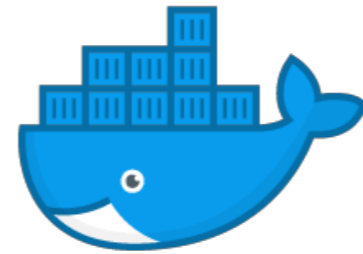
GCHQ

Security



Performance

Put It In Its Place



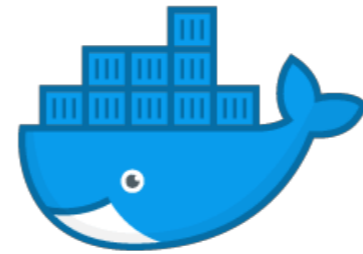
docker



container



Put It In Its Place



docker



container



LinuxKit

Use It

Use It

```
5. adeitcher@MacBook-Pro-6: ~/Documents/Development/go/s
→ linuxkit git:(master) linuxkit help
USAGE: linuxkit [options] COMMAND

Commands:
  build      Build an image from a YAML file
  metadata   Metadata utilities
  pkg        Package building
  push       Push a VM image to a cloud or image store
  run        Run a VM image on a local hypervisor or remote cloud
  serve      Run a local http server (for iPXE booting)
  version    Print version information
  help      Print this message

Run 'linuxkit COMMAND --help' for more information on the command

Options:
  -q  Quiet execution
  -v  Verbose execution
```

Use It

```
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Options:
  -q  Quiet execution
  -v  Verbose execution
```

Use It

```
kernel:
  image: linuxkit/kernel:4.19.20
  cmdline: "console=tty0 console=ttyS0 console=ttyAMA0"
init:
- linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
- linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35
- linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069
- linuxkit/ca-certificates:v0.6
onboot:
- name: sysctl
  image: linuxkit/sysctl:v0.6
- name: dhcpcd
  image: linuxkit/dhcpcd:v0.6
  command: ["/sbin/dhcpcd", "--nobackground", "-f", "/dhcpcd.conf", "-1"]
onshutdown:
- name: shutdown
  image: busybox:latest
  command: ["/bin/echo", "so long and thanks for all the fish"]
services:
- name: getty
  image: linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
  env:
  - INSECURE=true
- name: rngd
  image: linuxkit/rngd:v0.6
- name: nginx
  image: nginx:1.13.8-alpine
capabilities:
- CAP_NET_BIND_SERVICE
- CAP_CHOWN
- CAP_SETUID
- CAP_SETGID
- CAP_DAC_OVERRIDE
binds:
- /etc/resolv.conf:/etc/resolv.conf
files:
- path: etc/linuxkit-config
  metadata: yaml
trust:
  org:
  - linuxkit
  - library
```

```
5. adeitcher@MacBook-Pro-6: ~/Documents/Development/go/s
→ linuxkit git:(master) linuxkit help
USAGE: linuxkit [options] COMMAND

Commands:
  build      Build an image from a YAML file
  metadata   Metadata utilities
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  push       Push a VM image to a cloud or image store
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  version    Print version information
  help       Print this message

Run 'linuxkit COMMAND --help' for more information on the command

Options:
  -q      Quiet execution
  -v      Verbose execution
```


Formats

```
→ linuxkit git:(master) lkt build --help
USAGE: linuxkit build [options] <file>[.yaml] | -

Options:
  -decompress-kernel
    Decompress the Linux kernel (default false)
  -dir string
    Directory for output files, default current directory
  -disable-content-trust
    Skip image trust verification specified in trust section of config (default false)
  -format value
    Formats to create [ aws docker dynamic-vhd gcp iso-bios iso-efi kernel+initrd kernel+iso kernel+squashfs qcow2-bi
os qcow2-efi raw-bios raw-efi rpi3 tar tar-kernel-initrd vhd vmdk ]
  -name string
    Name to use for output files
  -o string
    File to use for a single output, or '-' for stdout
  -pull
    Always pull images
  -size string
    Size for output image, if supported and fixed size (default "1024M")
```

Time Keeps on Slipping...

Time Keeps on Slipping...

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha256:f12348ec158121bd6dacd0f170e1423fb57bdc2a700eaf9f96a973008c0a052a
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
Pull image: docker.io/linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848@sha256:b60ebdc2d1fdf0facdde7cf00521543fe322156651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35@sha256:04c19d6f4cfc4446d893f3275dfe75fdb4f652dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069
Pull image: docker.io/linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069@sha256:5193622d7ad9239e6efcc43a7d0906610f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
  Create OCI config for linuxkit/sysctl:v0.6
  Create OCI config for linuxkit/dhcpd:v0.6
Add onshutdown containers:
  Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha256:061ca9704a714ee3e8b80523ec720c64f6209ad3f97c0ff7cb9ec7d19f15149f
Add service containers:
  Create OCI config for linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
Pull image: docker.io/linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478@sha256:4655abc25babb950d24ca64dce40aefd4c8f6b0e60f0f92fd6085b9522b06ee7
  Create OCI config for linuxkit/rngd:v0.6
  Create OCI config for nginx:1.13.8-alpine
Add files:
  etc/linuxkit-config
Create outputs:
  linuxkit-kernel linuxkit-initrd.img linuxkit-cmdline
linuxkit build linuxkit.yml 10.29s user 2.57s system 13% cpu 1:35.69 total
```

Time Keeps on Slipping...

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
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Add init containers:
Process init image: linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
Pull image: docker.io/linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848@sha256:b60ebdc2d1fdf0facdde7cf00521543fe322156651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35@sha256:04c19d6f4cfc4446d893f3275dfe75fdb4f652dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069
Pull image: docker.io/linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069@sha256:5193622d7ad9239e6efcc43a7d0906610f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
  Create OCI config for linuxkit/sysctl:v0.6
  Create OCI config for linuxkit/dhcpd:v0.6
Add onshutdown containers:
  Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha256:061ca9704a714ee3e8b80523ec720c64f6209ad3f97c0ff7cb9ec7d19f15149f
Add service containers:
  Create OCI config for linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
Pull image: docker.io/linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478@sha256:4655abc25babb950d24ca64dce40aefd4c8f6b0e60f0f92fd6085b9522b06ee7
  Create OCI config for linuxkit/rngd:v0.6
  Create OCI config for nginx:1.13.8-alpine
Add files:
  etc/linuxkit-config
Create outputs:
  linuxkit-kernel linuxkit-initrd.img linuxkit-cmdline
linuxkit build linuxkit.yml 10.29s user 2.57s system 13% cpu 1:35.69 total
```

Time Keeps on Slipping...

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha256:f12348ec158121bd6dacd0f170e1423fb57bdc2a700eaf9f96a973008c0a052a
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
Pull image: docker.io/linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848@sha256:b60ebdc2d1fdf0facdde7cf00521543fe322156651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35@sha256:04c19d6f4cfc4446d893f3275dfe75fdb4f652dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069
Pull image: docker.io/linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069@sha256:5193622d7ad9239e6efcc43a7d0906610f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
  Create OCI config for linuxkit/sysctl:v0.6
  Create OCI config for linuxkit/dhpcpd:v0.6
Add onshutdown containers:
  Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha256:061ca9704a714ee3e8b80523ec720c64f6209ad3f97c0ff7cb9ec7d19f15149f
Add service containers:
  Create OCI config for linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
Pull image: docker.io/linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478@sha256:4655abc25babb950d24ca64dce40aefd4c8f6b0e60f0f92fd6085b9522b06ee7
  Create OCI config for linuxkit/rngd:v0.6
  Create OCI config for nginx:1.13.8-alpine
Add files:
  etc/linuxkit-config
Create outputs:
  linuxkit-kernel linuxkit-initrd.img linuxkit-cmdline
linuxkit build linuxkit.yml 10.29s user 2.57s system 13% cpu 1:35.69 total
```

```
Create outputs:
  linuxkit-kernel linuxkit-initrd.img linuxkit-cmdline
linuxkit build linuxkit.yml 10.47s user 2.51s system 29% cpu 43.750 total
```

Time Keeps on Slipping...

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha256:f12348ec158121bd6dacd0f170e1423fb57bdc2a700eaf9f96a973008c0a052a
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
Pull image: docker.io/linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848@sha256:b60ebdc2d1fdf0facdde7cf00521543fe322156651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35@sha256:04c19d6f4cfd4446d893f3275dfe75fdb4f652dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069
Pull image: docker.io/linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069@sha256:5193622d7ad9239e6efcc43a7d0906610f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
  Create OCI config for linuxkit/sysctl:v0.6
  Create OCI config for linuxkit/dhpcd:v0.6
Add onshutdown containers:
  Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha256:061ca9704a714ee3e8b80523ec720c64f6209ad3f97c0ff7cb9ec7d19f15149f
Add service containers:
  Create OCI config for linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
Pull image: docker.io/linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478@sha256:4655abc25babb950d24ca64dce40aefd4c8f6b0e60f0f92fd6085b9522b06ee7
  Create OCI config for linuxkit/rngd:v0.6
  Create OCI config for nginx:1.13.8-alpine
Add files:
  etc/linuxkit-config
Create outputs:
  linuxkit-kernel linuxkit-initrd.img linuxkit-cmdline
linuxkit build linuxkit.yml 10.29s user 2.57s system 13% cpu 1:35.69 total
```

```
Create outputs:
  linuxkit-kernel linuxkit-initrd.img linuxkit-cmdline
linuxkit build linuxkit.yml 10.47s user 2.51s system 29% cpu 43.750 total
```

Demo Time!

Demo Time!

Nothing to see here..

Demo Time!

Nothing to see here..

it's all in the terminal...

Demo Time!

Nothing to see here..

it's all in the terminal...

move on now!

Demo Time!

Nothing to see here..

it's all in the terminal...

move on now!



Under the



- Engine systems
- Components
- Driving controls
- Manufacturing

Under The Hood: *Engine Systems*

Under The Hood: *Engine Systems*

kernel

Under The Hood: *Engine Systems*

kernel

init

Under The Hood: *Engine Systems*

kernel

init

 runc

- onboot[0]
- .
- onboot[n]

} *sequential*

Under The Hood: *Engine Systems*

kernel

init

 runc

- onboot[0]
- .
- onboot[n]

} *sequential*

 containerd

services[0] services[1] ... services[n]

} *Parallel*

Under The Hood: *Engine Systems*

kernel

init

 runc

- onboot[0]
- .
- onboot[n]

} *sequential*

 container 

services[0] services[1] ... services[n]

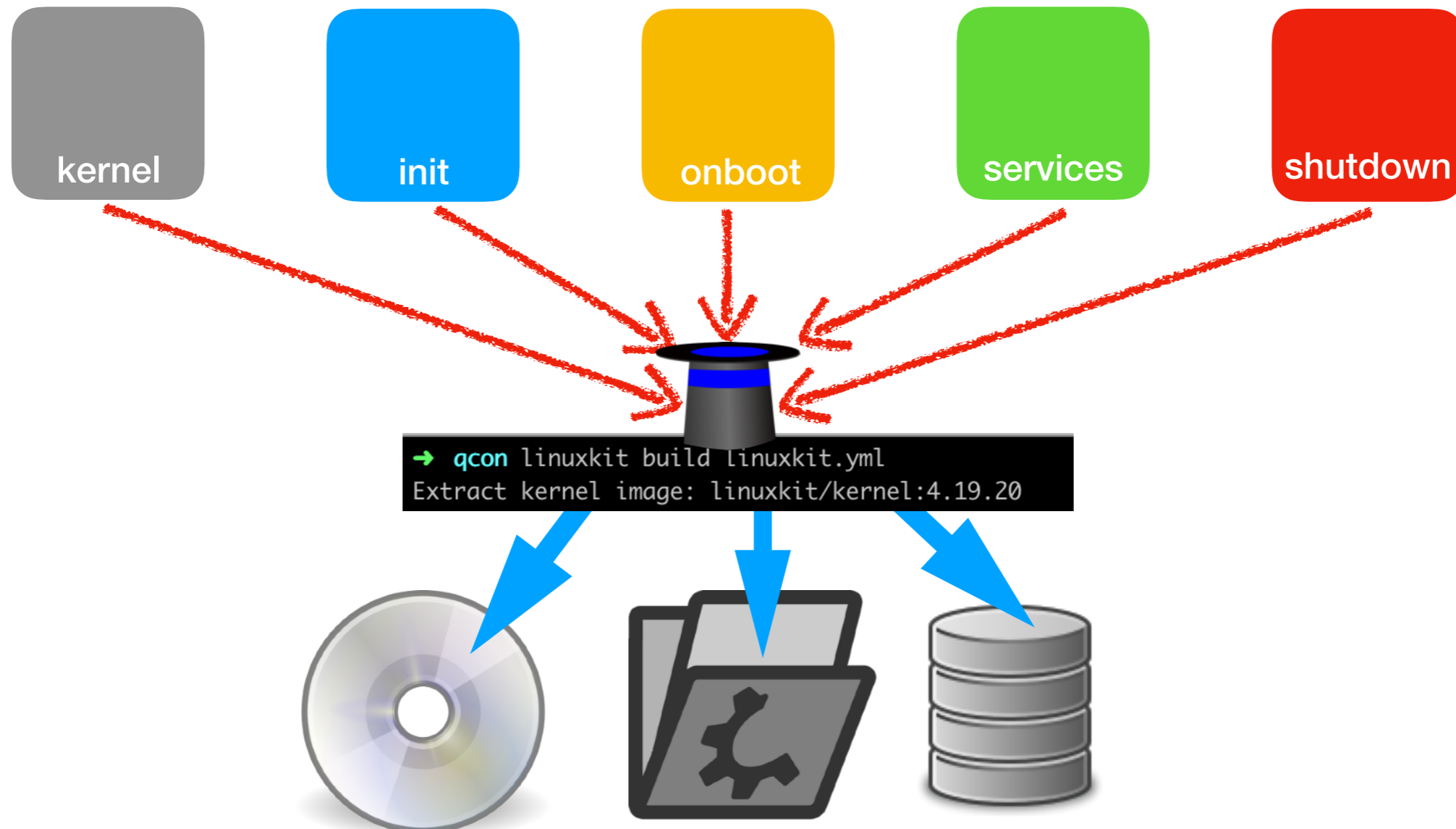
} *Parallel*

 runc

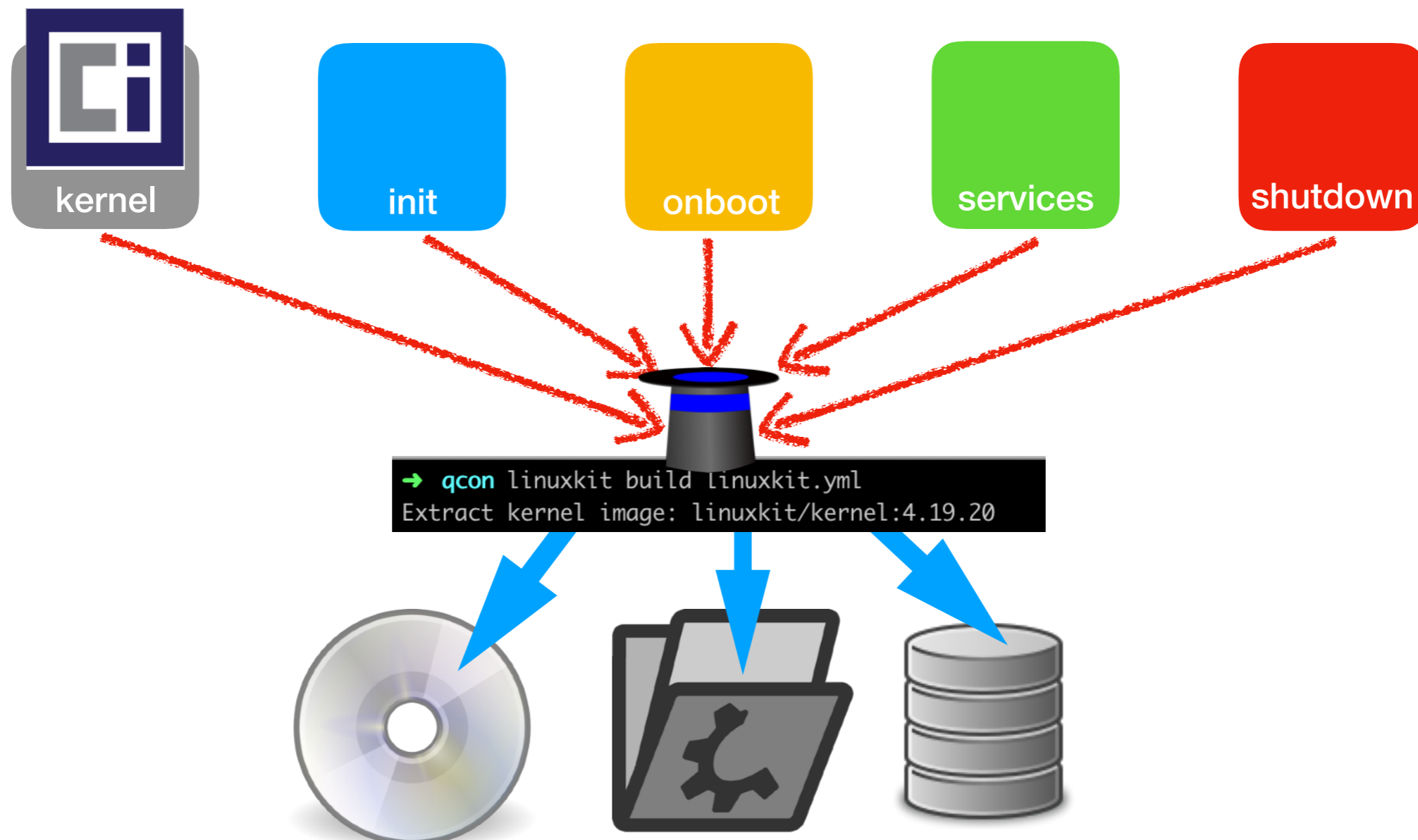
- onshutdown[0]
- .
- onshutdown[n]

} *sequential*

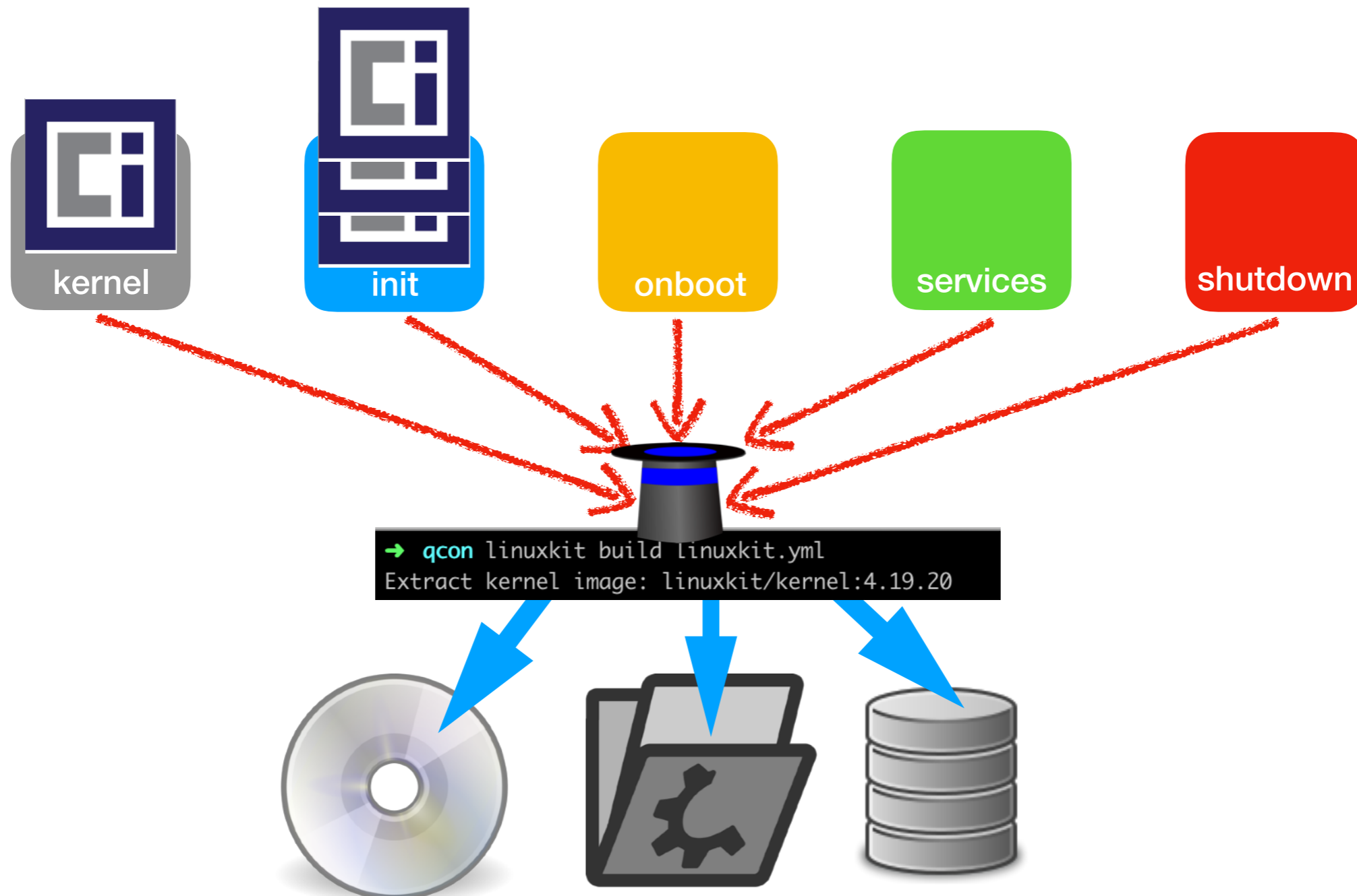
Under The Hood: *Components*



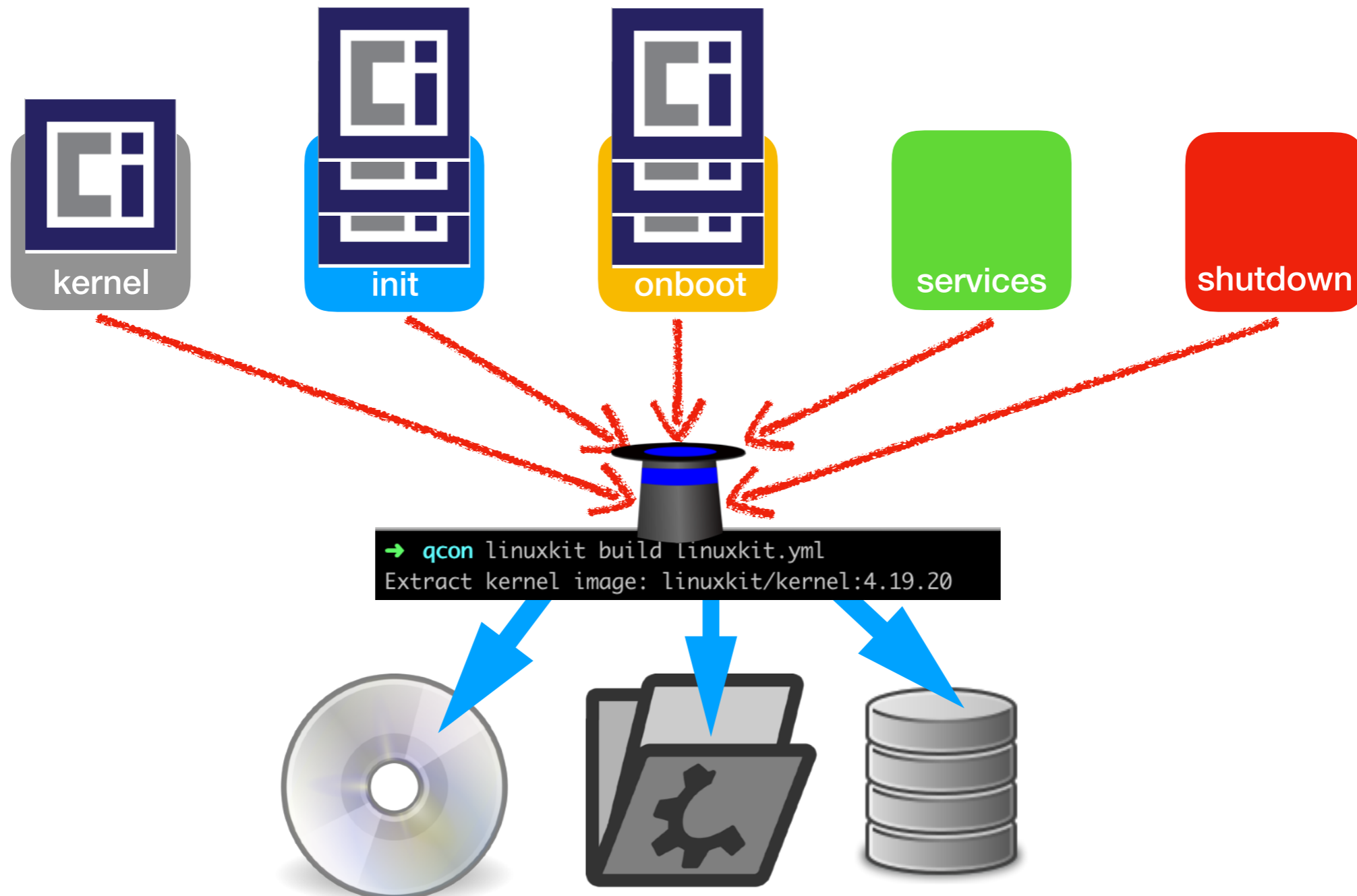
Under The Hood: *Components*



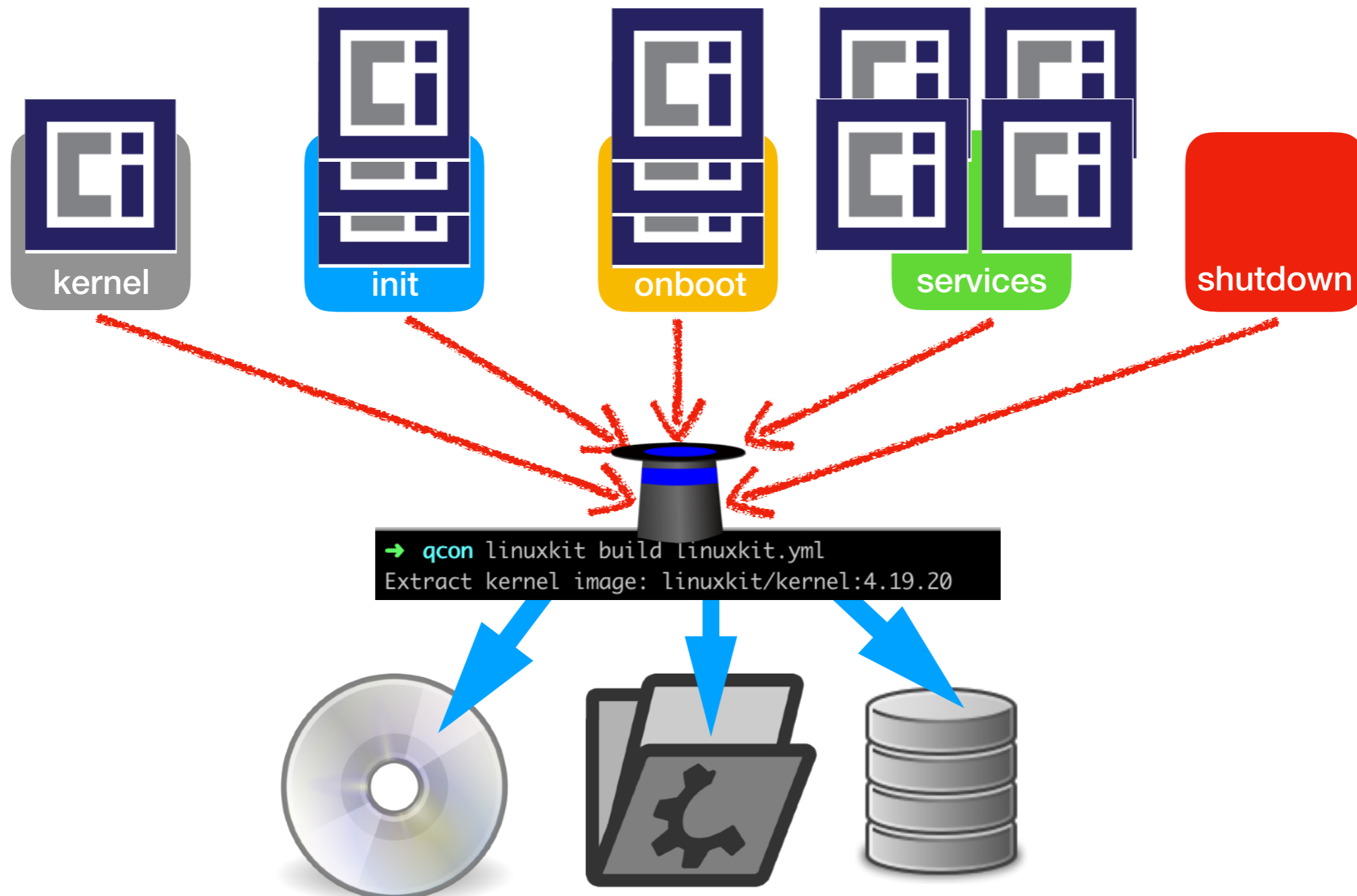
Under The Hood: *Components*



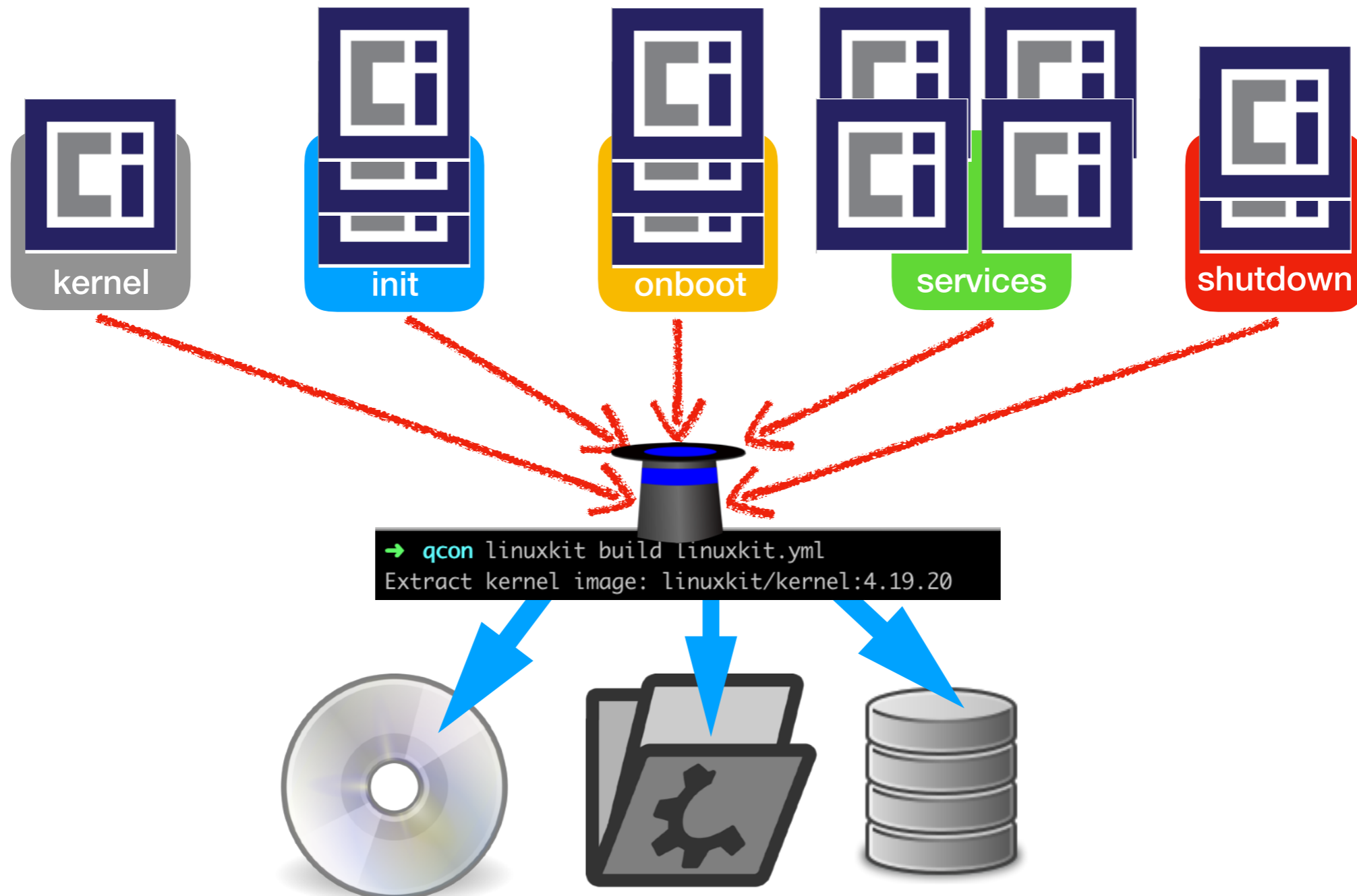
Under The Hood: *Components*



Under The Hood: *Components*



Under The Hood: *Components*



Controls



```
kernel:
  image: linuxkit/kernel:4.19.20
  cmdline: "console=tty0 console=ttyS0 console=ttyAMA0"
init:
  - linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
  - linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35
  - linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069
  - linuxkit/ca-certificates:v0.6
onboot:
  - name: sysctl
    image: linuxkit/sysctl:v0.6
  - name: dhcpcd
    image: linuxkit/dhcpcd:v0.6
    command: ["/sbin/dhcpcd", "--nobackground", "-f", "/dhcpcd.conf", "-1"]
onshutdown:
  - name: shutdown
    image: busybox:latest
    command: ["/bin/echo", "so long and thanks for all the fish"]
services:
  - name: getty
    image: linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
    env:
      - INSECURE=true
  - name: rngd
    image: linuxkit/rngd:v0.6
  - name: nginx
    image: nginx:1.13.8-alpine
    capabilities:
      - CAP_NET_BIND_SERVICE
      - CAP_CHOWN
      - CAP_SETUID
      - CAP_SETGID
      - CAP_DAC_OVERRIDE
    binds:
      - /etc/resolv.conf:/etc/resolv.conf
files:
  - path: etc/linuxkit-config
    metadata: yaml
trust:
  org:
    - linuxkit
    - library
```

```
kernel:
  image: linuxkit/kernel:4.19.20
  cmdline: "console=tty0 console=ttyS0 console=ttyAMA0"
init:
  - linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
  - linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35
  - linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069
  - linuxkit/ca-certificates:v0.6
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  - name: sysctl
    image: linuxkit/sysctl:v0.6
  - name: dhcpcd
    image: linuxkit/dhcpcd:v0.6
    command: ["/sbin/dhcpcd", "--nobackground", "-f", "/dhcpcd.conf", "-1"]
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  - name: shutdown
    image: busybox:latest
    command: ["/bin/echo", "so long and thanks for all the fish"]
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  - name: getty
    image: linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
    env:
      - INSECURE=true
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    image: linuxkit/rngd:v0.6
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    image: nginx:1.13.8-alpine
    capabilities:
      - CAP_NET_BIND_SERVICE
      - CAP_CHOWN
      - CAP_SETUID
      - CAP_SETGID
      - CAP_DAC_OVERRIDE
    binds:
      - /etc/resolv.conf:/etc/resolv.conf
files:
  - path: etc/linuxkit-config
    metadata: yaml
trust:
  org:
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  image: linuxkit/kernel:4.19.20
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  - linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
  - linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35
  - linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069
  - linuxkit/ca-certificates:v0.6
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  - name: sysctl
    image: linuxkit/sysctl:v0.6
  - name: dhcpcd
    image: linuxkit/dhcpcd:v0.6
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  - name: shutdown
    image: busybox:latest
    command: ["/bin/echo", "so long and thanks for all the fish"]
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  - name: getty
    image: linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
    env:
      - INSECURE=true
  - name: rngd
    image: linuxkit/rngd:v0.6
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    image: nginx:1.13.8-alpine
    capabilities:
      - CAP_NET_BIND_SERVICE
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      - CAP_SETUID
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      - /etc/resolv.conf:/etc/resolv.conf
files:
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  - linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
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  - name: dhcpcd
    image: linuxkit/dhcpcd:v0.6
    command: ["/sbin/dhcpcd", "--nobackground", "-f", "/dhcpcd.conf", "-1"]
onshutdown:
  - name: shutdown
    image: busybox:latest
    command: ["/bin/echo", "so long and thanks for all the fish"]
services:
  - name: getty
    image: linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
    env:
      - INSECURE=true
  - name: rngd
    image: linuxkit/rngd:v0.6
  - name: nginx
    image: nginx:1.13.8-alpine
    capabilities:
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      - CAP_CHOWN
      - CAP_SETUID
      - CAP_SETGID
      - CAP_DAC_OVERRIDE
    binds:
      - /etc/resolv.conf:/etc/resolv.conf
files:
  - path: etc/linuxkit-config
    metadata: yaml
trust:
  org:
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```
kernel:
  image: linuxkit/kernel:4.19.20
  cmdline: "console=tty0 console=ttyS0 console=ttyAMA0"
init:
  - linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
  - linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35
  - linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069
  - linuxkit/ca-certificates:v0.6
onboot:
  - name: sysctl
    image: linuxkit/sysctl:v0.6
  - name: dhcpcd
    image: linuxkit/dhcpcd:v0.6
    command: ["/sbin/dhcpcd", "--nobackground", "-f", "/dhcpcd.conf", "-1"]
onshutdown:
  - name: shutdown
    image: busybox:latest
    command: ["/bin/echo", "so long and thanks for all the fish"]
services:
  - name: getty
    image: linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
    env:
      - INSECURE=true
  - name: rngd
    image: linuxkit/rngd:v0.6
  - name: nginx
    image: nginx:1.13.8-alpine
    capabilities:
      - CAP_NET_BIND_SERVICE
      - CAP_CHOWN
      - CAP_SETUID
      - CAP_SETGID
      - CAP_DAC_OVERRIDE
    binds:
      - /etc/resolv.conf:/etc/resolv.conf
files:
  - path: etc/linuxkit-config
    metadata: yaml
trust:
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    - library
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kernel:
  image: linuxkit/kernel:4.19.20
  cmdline: "console=tty0 console=ttyS0 console=ttyAMA0"

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- linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
- linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35
- linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069
- linuxkit/ca-certificates:v0.6

onboot:
- name: sysctl
  image: linuxkit/sysctl:v0.6
- name: dhcpcd
  image: linuxkit/dhcpcd:v0.6
  command: ["/sbin/dhcpcd", "--nobackground", "-f", "/dhcpcd.conf", "-1"]

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  image: busybox:latest
  command: ["/bin/echo", "so long and thanks for all the fish"]

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  image: linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
  env:
  - INSECURE=true
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  image: linuxkit/rngd:v0.6
- name: nginx
  image: nginx:1.13.8-alpine
  capabilities:
  - CAP_NET_BIND_SERVICE
  - CAP_CHOWN
  - CAP_SETUID
  - CAP_SETGID
  - CAP_DAC_OVERRIDE
  binds:
  - /etc/resolv.conf:/etc/resolv.conf

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- path: etc/linuxkit-config
  metadata: yaml

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  - linuxkit
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  image: linuxkit/kernel:4.19.20
  cmdline: "console=tty0 console=ttyS0 console=ttyAMA0"

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- linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
- linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35
- linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069
- linuxkit/ca-certificates:v0.6

onboot:
- name: sysctl
  image: linuxkit/sysctl:v0.6
- name: dhcpcd
  image: linuxkit/dhcpcd:v0.6
  command: ["/sbin/dhcpcd", "--nobackground", "-f", "/dhcpcd.conf", "-1"]

onshutdown:
- name: shutdown
  image: busybox:latest
  command: ["/bin/echo", "so long and thanks for all the fish"]

services:
- name: getty
  image: linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
  env:
  - INSECURE=true
- name: rngd
  image: linuxkit/rngd:v0.6
- name: nginx
  image: nginx:1.13.8-alpine
  capabilities:
  - CAP_NET_BIND_SERVICE
  - CAP_CHOWN
  - CAP_SETUID
  - CAP_SETGID
  - CAP_DAC_OVERRIDE
  binds:
  - /etc/resolv.conf:/etc/resolv.conf

files:
- path: etc/linuxkit-config
  metadata: yaml

trust:
  org:
  - linuxkit
  - library
```



```
kernel:
  image: linuxkit/kernel:4.19.20
  cmdline: "console=tty0 console=ttyS0 console=ttyAMA0"

init:
  - linuxkit/init:a2166a6048ce041eebe005ab99454cfdeaa5c848
  - linuxkit/runc:069d5cd3cc4f0aec70e4af53aed5d27a21c79c35
  - linuxkit/containerd:2aff4d486220667364b2971b5fc6225bf165a069
  - linuxkit/ca-certificates:v0.6

onboot:
  - name: sysctl
    image: linuxkit/sysctl:v0.6
  - name: dhcpcd
    image: linuxkit/dhcpcd:v0.6
    command: ["/sbin/dhcpcd", "--nobackground", "-f", "/dhcpcd.conf", "-1"]

onshutdown:
  - name: shutdown
    image: busybox:latest
    command: ["/bin/echo", "so long and thanks for all the fish"]

services:
  - name: getty
    image: linuxkit/getty:2eb742cd7a68e14cf50577c02f30147bc406e478
    env:
      - INSECURE=true
  - name: rngd
    image: linuxkit/rngd:v0.6
  - name: nginx
    image: nginx:1.13.8-alpine
    capabilities:
      - CAP_NET_BIND_SERVICE
      - CAP_CHOWN
      - CAP_SETUID
      - CAP_SETGID
      - CAP_DAC_OVERRIDE
    binds:
      - /etc/resolv.conf:/etc/resolv.conf

files:
  - path: etc/linuxkit-config
    metadata: yaml

trust:
  org:
    - linuxkit
    - library
```

Under The Hood: *Manufacturing*

Under The Hood: *Manufacturing*



Under The Hood: *Manufacturing*

Under The Hood: *Manufacturing*

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha2
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041e
Pull image: docker.io/linuxkit/init:a2166a6048ce04
56651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0aec
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0d
52dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d4862
Pull image: docker.io/linuxkit/containerd:2aff4d48
10f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
  Create OCI config for linuxkit/sysctl:v0.6
  Create OCI config for linuxkit/dhcpd:v0.6
Add onshutdown containers:
  Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha25
Add service containers:
  Create OCI config for linuxkit/getty:2eb742cd7a6
Pull image: docker.io/linuxkit/getty:2eb742cd7a68e
6b0e60f0f92fd6085b9522b06ee7
  Create OCI config for linuxkit/rngd:v0.6
  Create OCI config for nginx:1.13.8-alpine
Add files:
  etc/linuxkit-config
Create outputs:
  linuxkit-kernel linuxkit-initrd.img linuxkit-cm
linuxkit build linuxkit.yml 10.29s user 2.57s sys
```

Under The Hood: *Manufacturing*

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha2
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041e
Pull image: docker.io/linuxkit/init:a2166a6048ce04
56651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0aed
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0d
52dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d4862
Pull image: docker.io/linuxkit/containerd:2aff4d48
10f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
  Create OCI config for linuxkit/sysctl:v0.6
  Create OCI config for linuxkit/dhcpd:v0.6
Add onshutdown containers:
  Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha25
Add service containers:
  Create OCI config for linuxkit/getty:2eb742cd7a6
Pull image: docker.io/linuxkit/getty:2eb742cd7a68e
6b0e60f0f92fd6085b9522b06ee7
  Create OCI config for linuxkit/rngd:v0.6
  Create OCI config for nginx:1.13.8-alpine
Add files:
  etc/linuxkit-config
Create outputs:
  linuxkit-kernel linuxkit-initrd.img linuxkit-cm
linuxkit build linuxkit.yml 10.29s user 2.57s sys
```



Under The Hood: *Manufacturing*

Extract Location

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha2
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041e
Pull image: docker.io/linuxkit/init:a2166a6048ce04
56651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0aed
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0d
52dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d4862
Pull image: docker.io/linuxkit/containerd:2aff4d48
10f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
  Create OCI config for linuxkit/sysctl:v0.6
  Create OCI config for linuxkit/dhcpd:v0.6
Add onshutdown containers:
  Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha25
Add service containers:
  Create OCI config for linuxkit/getty:2eb742cd7a6
Pull image: docker.io/linuxkit/getty:2eb742cd7a68e
6b0e60f0f92fd6085b9522b06ee7
  Create OCI config for linuxkit/rngd:v0.6
  Create OCI config for nginx:1.13.8-alpine
Add files:
  etc/linuxkit-config
Create outputs:
  linuxkit-kernel linuxkit-initrd.img linuxkit-cm
linuxkit build linuxkit.yml 10.29s user 2.57s sys
```



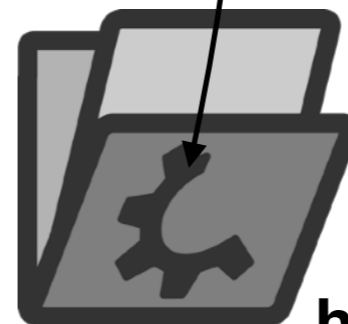
Under The Hood: *Manufacturing*

Extract Location

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha256:56651072217f38a8addde3b4c74
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041e56651072217f38a8addde3b4c74
Pull image: docker.io/linuxkit/init:a2166a6048ce041e56651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0aed52dbd23937951dcc99bda4cd7da
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0aed52dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d486210f083bc1a796ad097f8e15eef63503e2
Pull image: docker.io/linuxkit/containerd:2aff4d486210f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
  Create OCI config for linuxkit/sysctl:v0.6
  Create OCI config for linuxkit/dhcpd:v0.6
Add onshutdown containers:
  Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha256:6b0e60f0f92fd6085b9522b06ee7
Add service containers:
  Create OCI config for linuxkit/getty:2eb742cd7a68e6b0e60f0f92fd6085b9522b06ee7
  Create OCI config for linuxkit/rngd:v0.6
  Create OCI config for nginx:1.13.8-alpine
Add files:
  etc/linuxkit-config
Create outputs:
  linuxkit-kernel linuxkit-initrd.img linuxkit-cmd
linuxkit build linuxkit.yml 10.29s user 2.57s sys
```

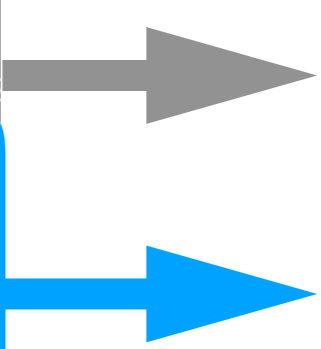


/boot/kernel
/



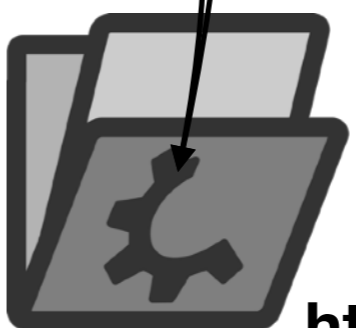
Under The Hood: *Manufacturing*

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha256:
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041
Pull image: docker.io/linuxkit/init:a2166a6048ce0
56651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0ae
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0
52dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d486
Pull image: docker.io/linuxkit/containerd:2aff4d4
10f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
  Create OCI config for linuxkit/sysctl:v0.6
  Create OCI config for linuxkit/dhcpd:v0.6
Add onshutdown containers:
  Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha25
Add service containers:
  Create OCI config for linuxkit/getty:2eb742cd7a6
Pull image: docker.io/linuxkit/getty:2eb742cd7a68e
6b0e60f0f92fd6085b9522b06ee7
  Create OCI config for linuxkit/rngd:v0.6
  Create OCI config for nginx:1.13.8-alpine
Add files:
  etc/linuxkit-config
Create outputs:
  linuxkit-kernel linuxkit-initrd.img linuxkit-cm
linuxkit build linuxkit.yml 10.29s user 2.57s sys
```



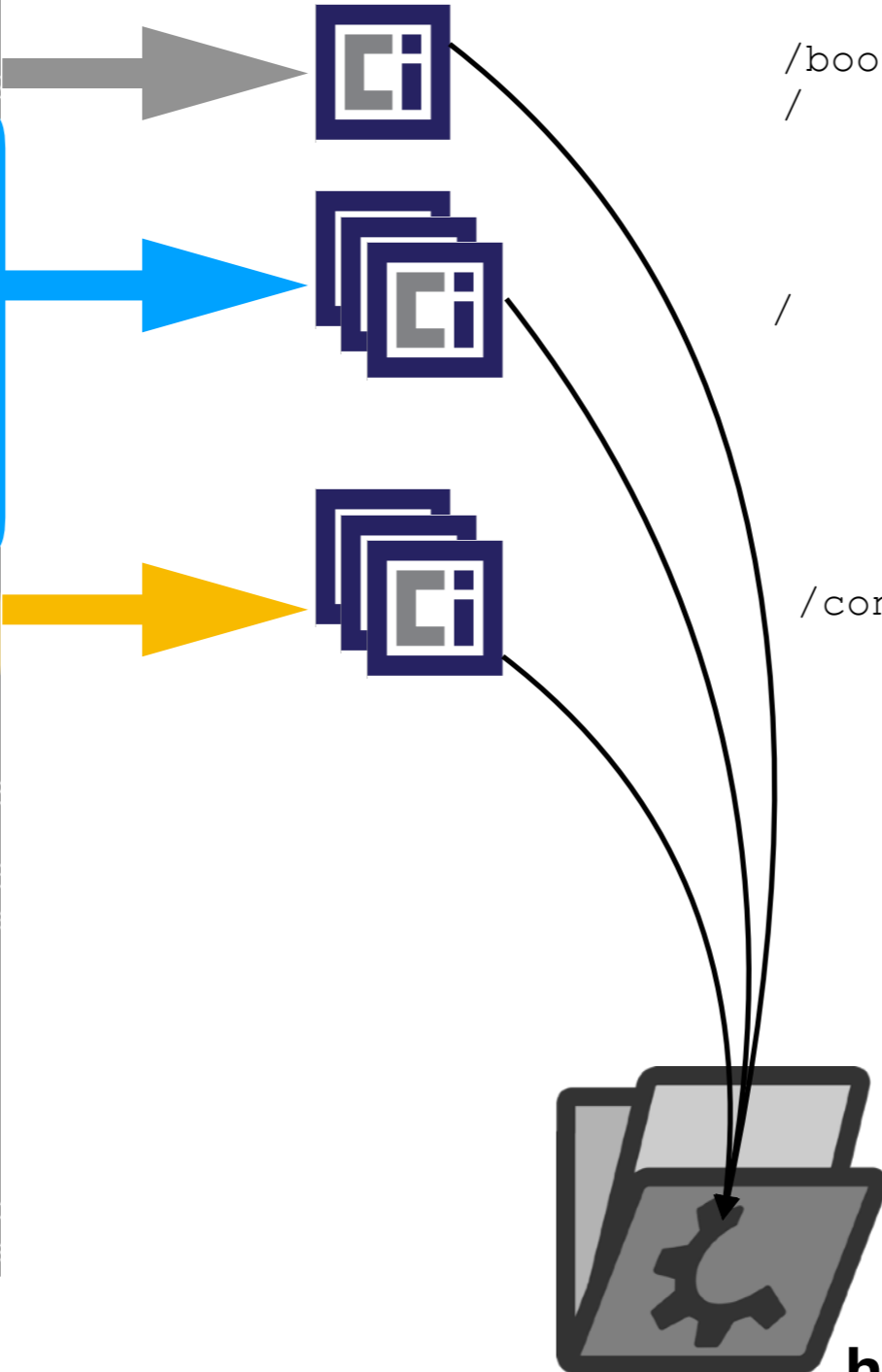
Extract Location

/boot/kernel
/
/
/



Under The Hood: *Manufacturing*

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha256:
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041
Pull image: docker.io/linuxkit/init:a2166a6048ce0
56651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0ae
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0
52dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d486
Pull image: docker.io/linuxkit/containerd:2aff4d4
10f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
Create OCI config for linuxkit/sysctl:v0.6
Create OCI config for linuxkit/dhcpd:v0.6
Add onshutdown containers:
Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha25
Add service containers:
Create OCI config for linuxkit/getty:2eb742cd7a6
Pull image: docker.io/linuxkit/getty:2eb742cd7a68e
6b0e60f0f92fd6085b9522b06ee7
Create OCI config for linuxkit/rngd:v0.6
Create OCI config for nginx:1.13.8-alpine
Add files:
etc/linuxkit-config
Create outputs:
linuxkit-kernel linuxkit-initrd.img linuxkit-cm
linuxkit build linuxkit.yml 10.29s user 2.57s sys
```



Extract Location

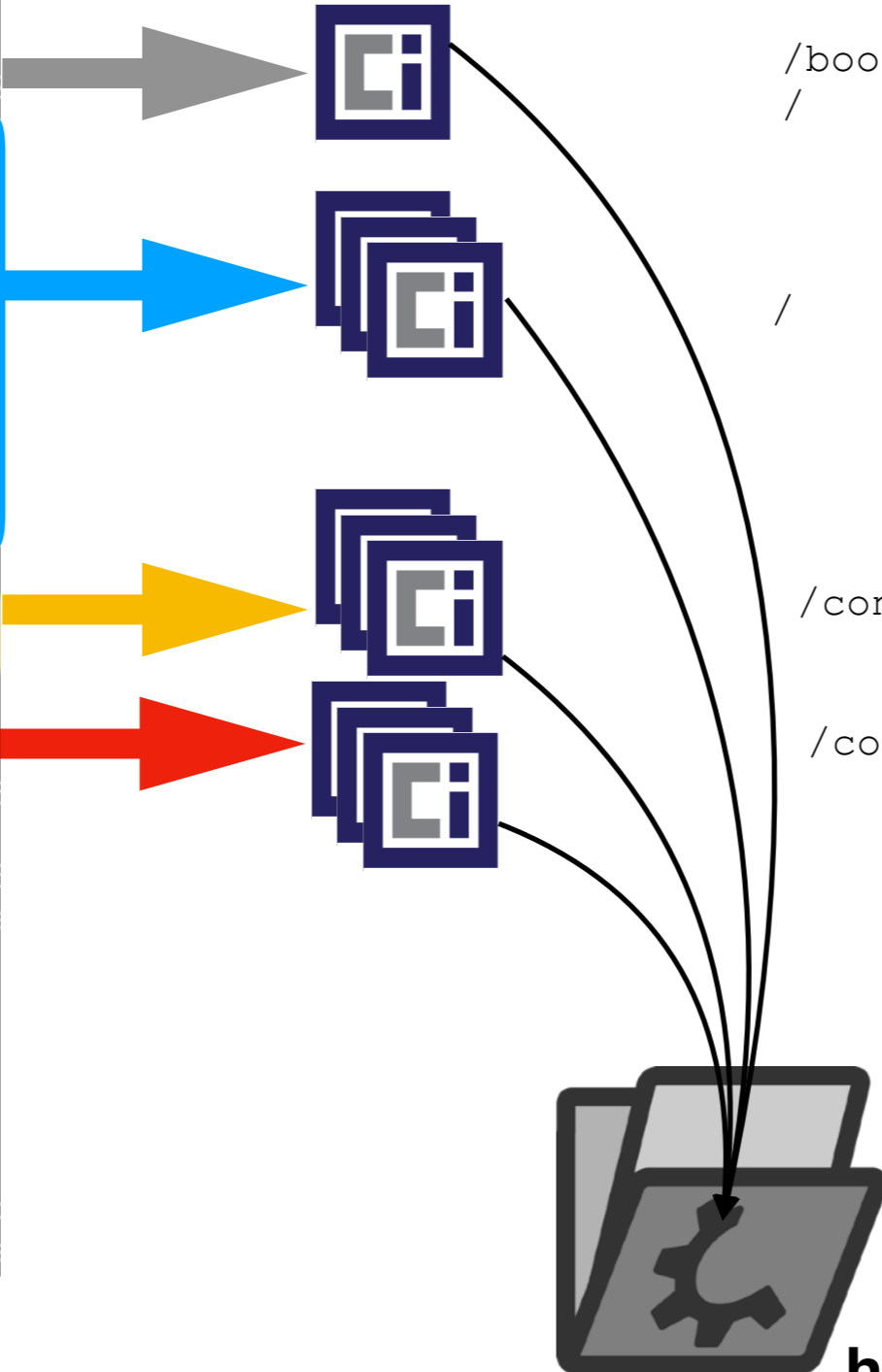
/boot/kernel
/

/

/containers/onboot/<nnn>-<name>/

Under The Hood: *Manufacturing*

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha256:
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041
Pull image: docker.io/linuxkit/init:a2166a6048ce0
56651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0ae
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0
52dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d486
Pull image: docker.io/linuxkit/containerd:2aff4d4
10f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
Create OCI config for linuxkit/sysctl:v0.6
Create OCI config for linuxkit/dhcpd:v0.6
Add onshutdown containers:
Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha256:
Add service containers:
Create OCI config for linuxkit/getty:2eb742cd7a6
Pull image: docker.io/linuxkit/getty:2eb742cd7a68e
6b0e60f0f92fd6085b9522b06ee7
Create OCI config for linuxkit/rngd:v0.6
Create OCI config for nginx:1.13.8-alpine
Add files:
etc/linuxkit-config
Create outputs:
linuxkit-kernel linuxkit-initrd.img linuxkit-cm
linuxkit build linuxkit.yml 10.29s user 2.57s sys
```



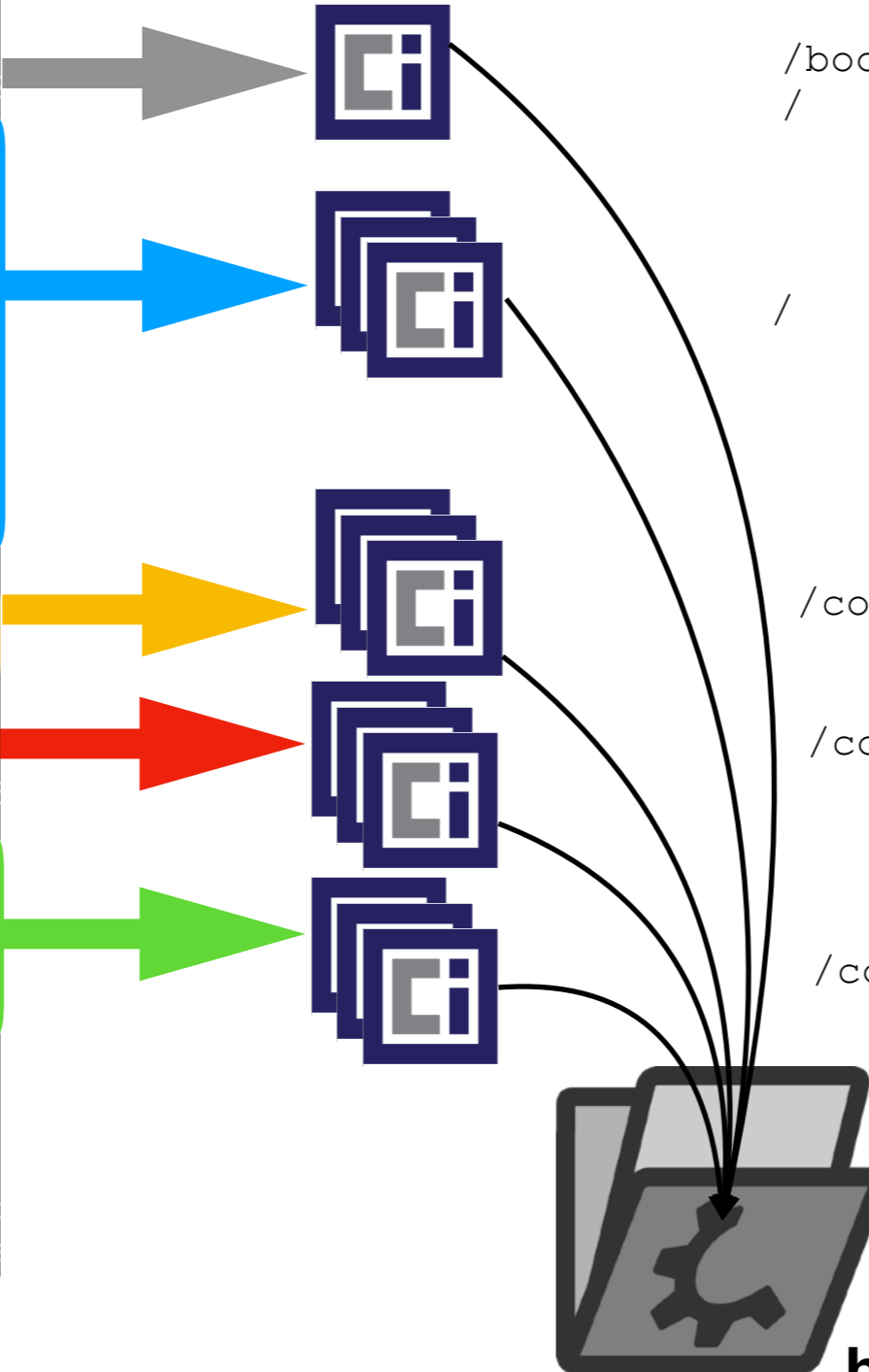
Extract Location

- /boot/kernel
- /
- /
- /containers/onboot/<nnn>-<name>/
- /containers/onshutdown/<nnn>-<name>/

Under The Hood: *Manufacturing*

Extract Location

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha256:
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041
Pull image: docker.io/linuxkit/init:a2166a6048ce0
56651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0ae
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0
52dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d486
Pull image: docker.io/linuxkit/containerd:2aff4d4
10f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
Create OCI config for linuxkit/sysctl:v0.6
Create OCI config for linuxkit/dhcpd:v0.6
Add onshutdown containers:
Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha256
Add service containers:
Create OCI config for linuxkit/getty:2eb742cd7a
Pull image: docker.io/linuxkit/getty:2eb742cd7a68
6b0e60f0f92fd6085b9522b06ee7
Create OCI config for linuxkit/rngd:v0.6
Create OCI config for nainx:1.13.8-alpine
Add files:
etc/linuxkit-config
Create outputs:
linuxkit-kernel linuxkit-initrd.img linuxkit-cm
linuxkit build linuxkit.yml 10.29s user 2.57s sys
```

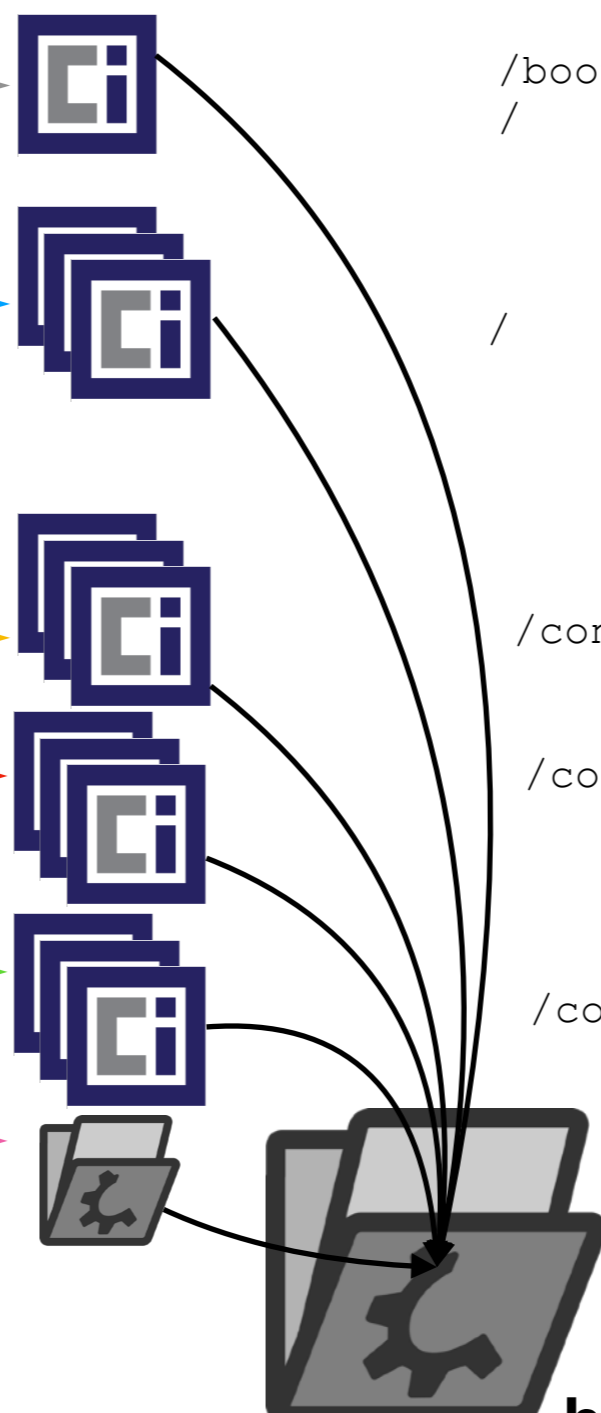


- /boot/kernel
- /
- /
- /containers/onboot/<nnn>-<name>/
- /containers/onshutdown/<nnn>-<name>/
- /containers/services/<name>/

Under The Hood: *Manufacturing*

Extract Location

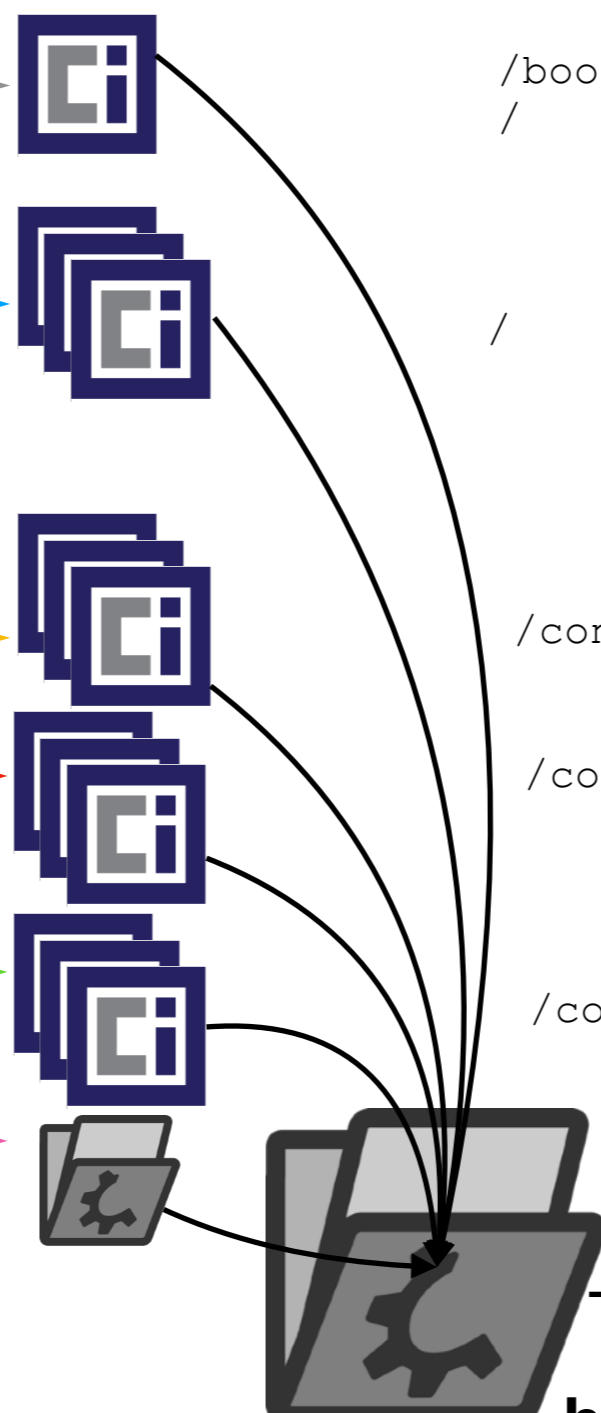
```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha256:
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041
Pull image: docker.io/linuxkit/init:a2166a6048ce0
56651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0ae
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0
52dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d486
Pull image: docker.io/linuxkit/containerd:2aff4d4
10f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
Create OCI config for linuxkit/sysctl:v0.6
Create OCI config for linuxkit/dhcpd:v0.6
Add onshutdown containers:
Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha256
Add service containers:
Create OCI config for linuxkit/getty:2eb742cd7a
Pull image: docker.io/linuxkit/getty:2eb742cd7a68
6b0e60f0f92fd6085b9522b06ee7
Create OCI config for linuxkit/rngd:v0.6
Create OCI config for nainx:1.13.8-alpine
Add files:
etc/linuxkit-config
Create outputs:
linuxkit-kernel linuxkit-initrd.img linuxkit-cm
linuxkit build linuxkit.yml 10.29s user 2.57s sys
```



/boot/kernel
/
/
/containers/onboot/<nnn>-<name>/
/containers/onshutdown/<nnn>-<name>/
/containers/services/<name>/

Under The Hood: *Manufacturing*

```
→ qcon time lkt build linuxkit.yml
Extract kernel image: linuxkit/kernel:4.19.20
Pull image: docker.io/linuxkit/kernel:4.19.20@sha256:
Add init containers:
Process init image: linuxkit/init:a2166a6048ce041
Pull image: docker.io/linuxkit/init:a2166a6048ce0
56651072217f38a8addde3b4c74
Process init image: linuxkit/runc:069d5cd3cc4f0ae
Pull image: docker.io/linuxkit/runc:069d5cd3cc4f0
52dbd23937951dcc99bda4cd7da
Process init image: linuxkit/containerd:2aff4d486
Pull image: docker.io/linuxkit/containerd:2aff4d4
10f083bc1a796ad097f8e15eef63503e2
Process init image: linuxkit/ca-certificates:v0.6
Add onboot containers:
Create OCI config for linuxkit/sysctl:v0.6
Create OCI config for linuxkit/dhcpd:v0.6
Add onshutdown containers:
Create OCI config for busybox:latest
Pull image: docker.io/library/busybox:latest@sha256:
Add service containers:
Create OCI config for linuxkit/getty:2eb742cd7a
Pull image: docker.io/linuxkit/getty:2eb742cd7a68
6b0e60f0f92fd6085b9522b06ee7
Create OCI config for linuxkit/rngd:v0.6
Create OCI config for nix:1.13.8-alpine
Add files:
etc/linuxkit-config
Create outputs:
linuxkit-kernel linuxkit-initrd.img linuxkit-cm
linuxkit build linuxkit.yml 10.29s user 2.57s sys
```



Extract Location

/boot/kernel
/

/containers/onboot/<nnn>-<name>/

/containers/onshutdown/<nnn>-<name>/

/containers/services/<name>/



Under The Hood: *Finishing*

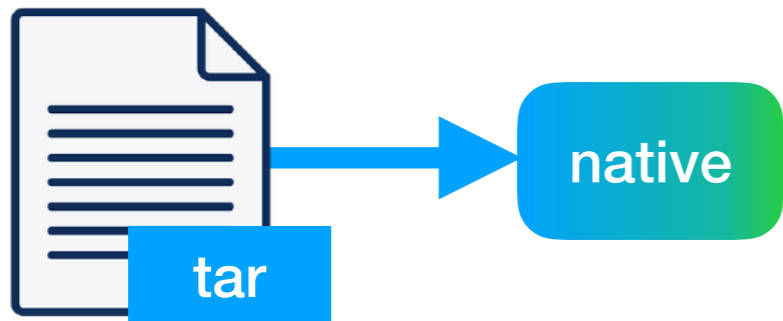
Under The Hood: *Finishing*



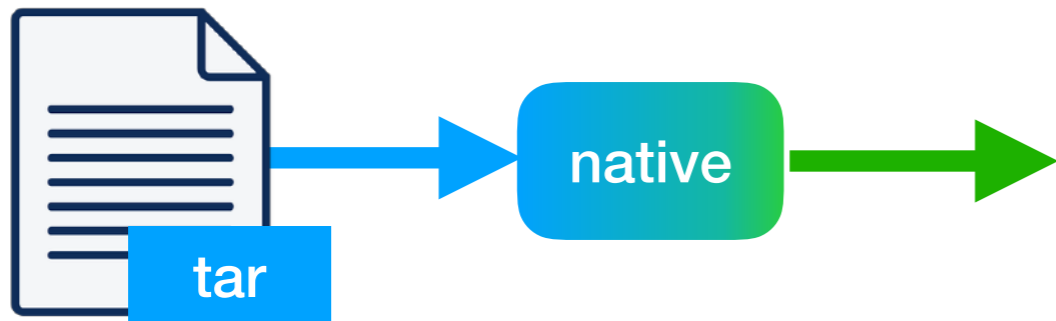
Under The Hood: *Finishing*



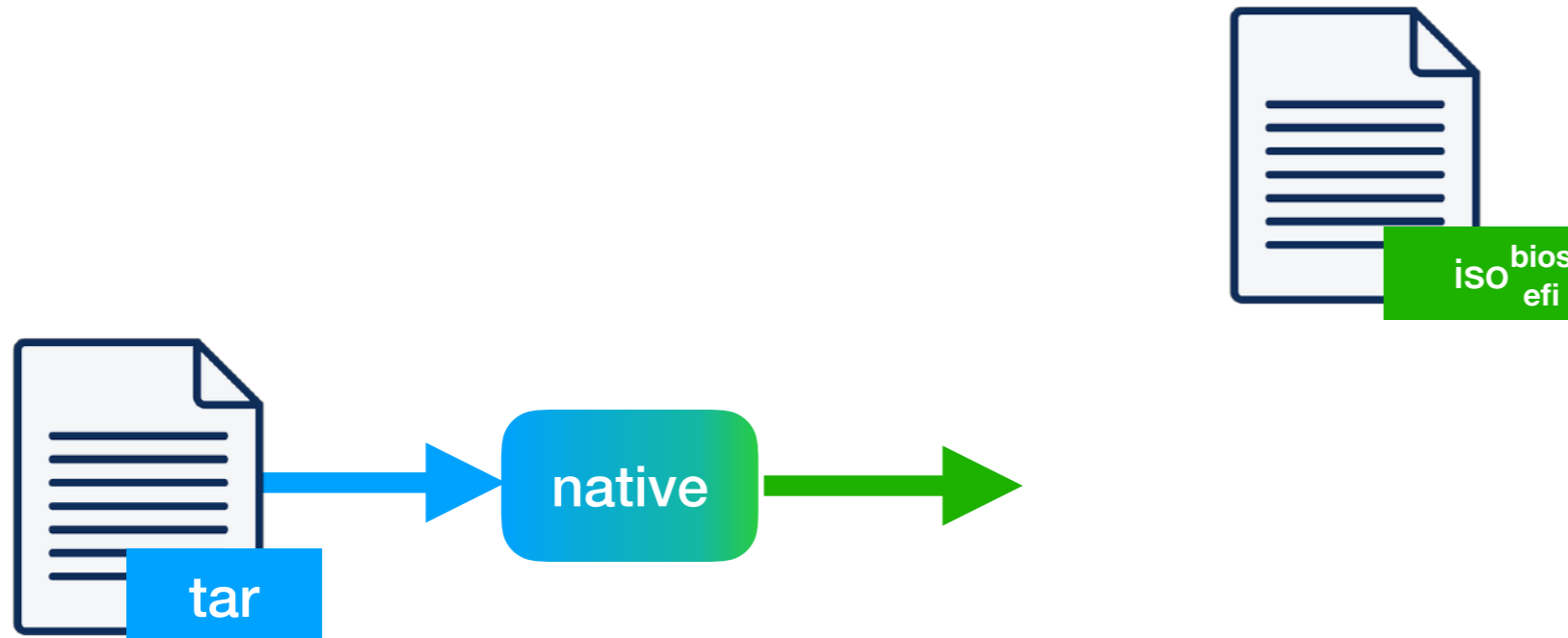
Under The Hood: *Finishing*



Under The Hood: *Finishing*

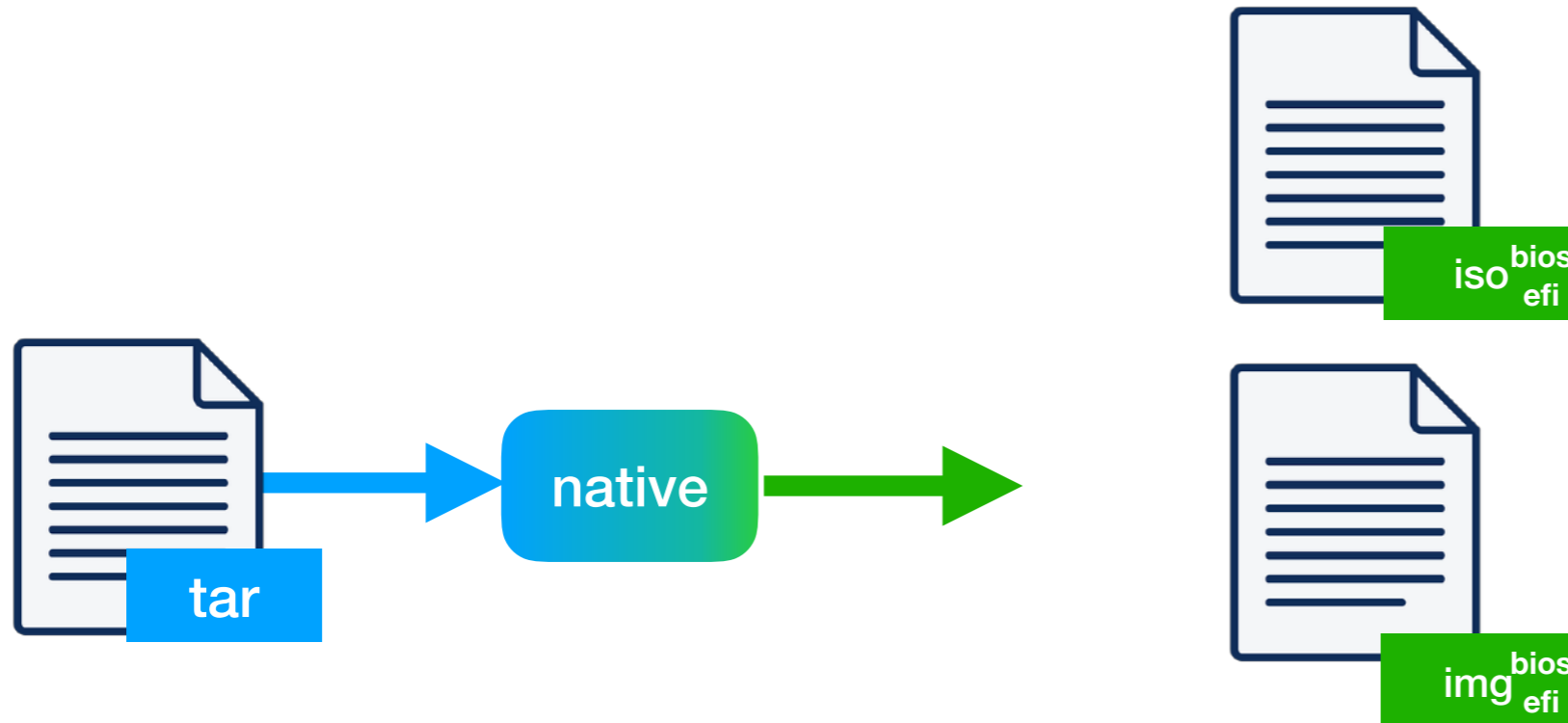


Under The Hood: *Finishing*



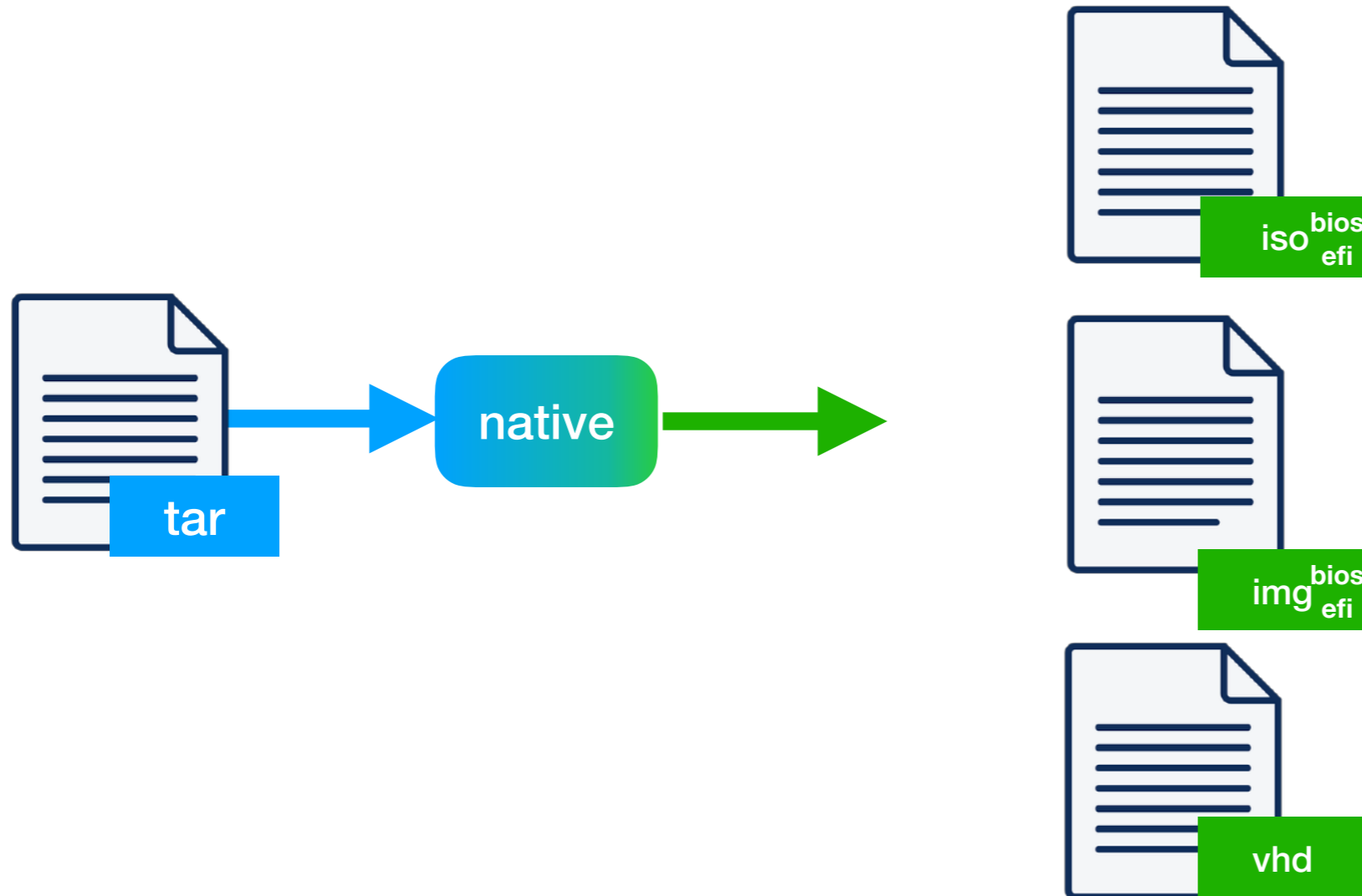
Under The Hood:

Finishing

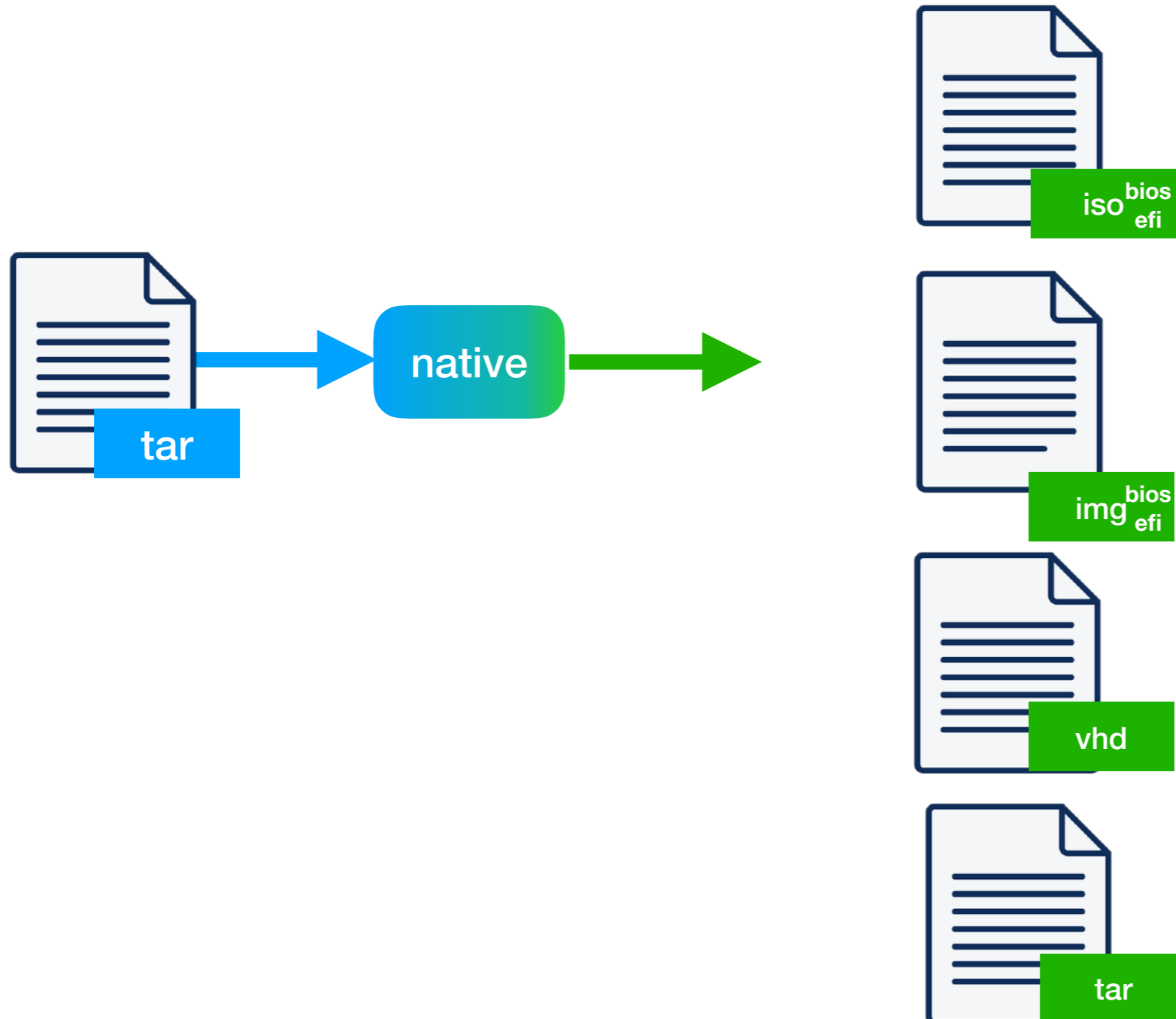


Under The Hood:

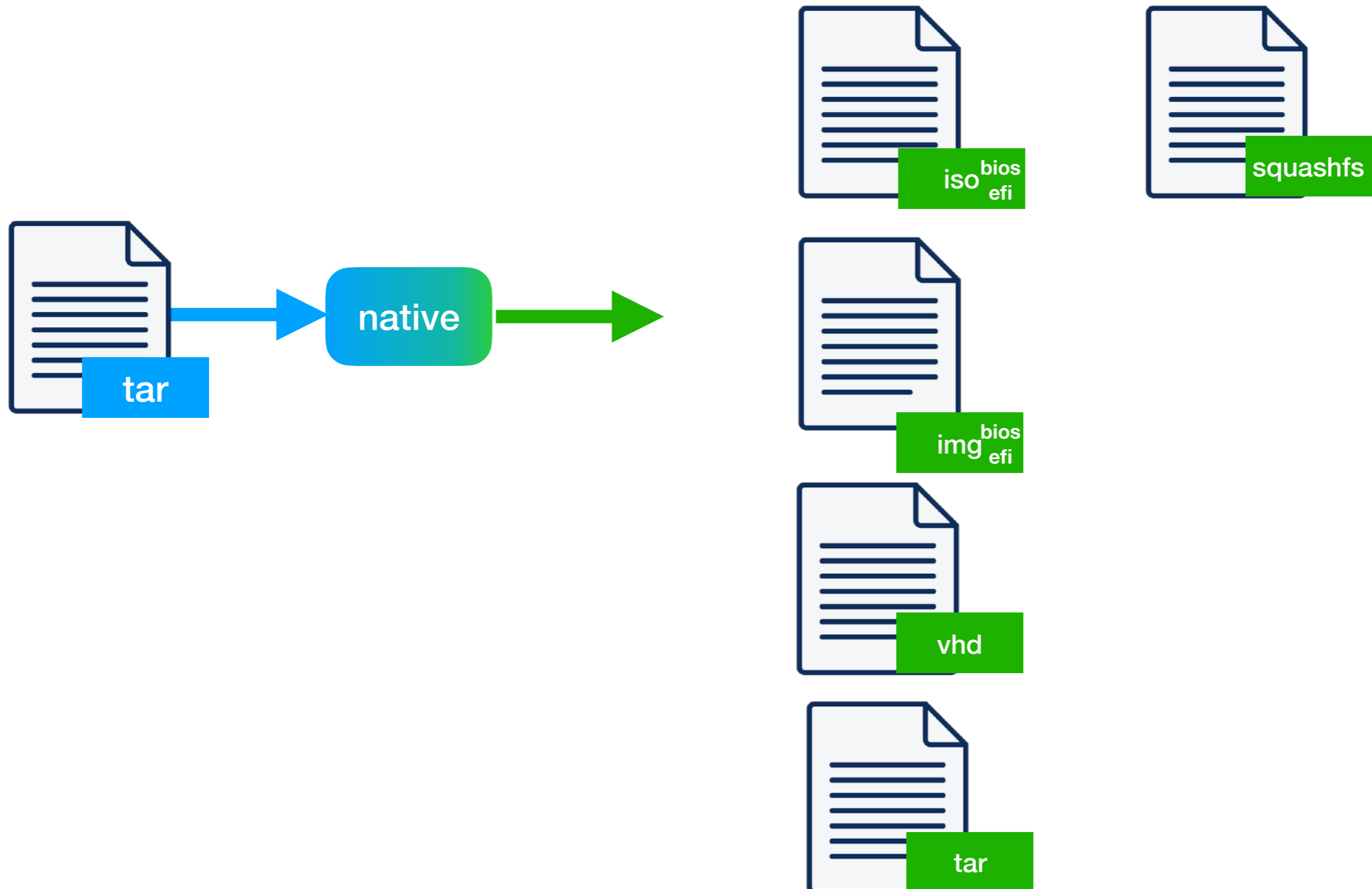
Finishing



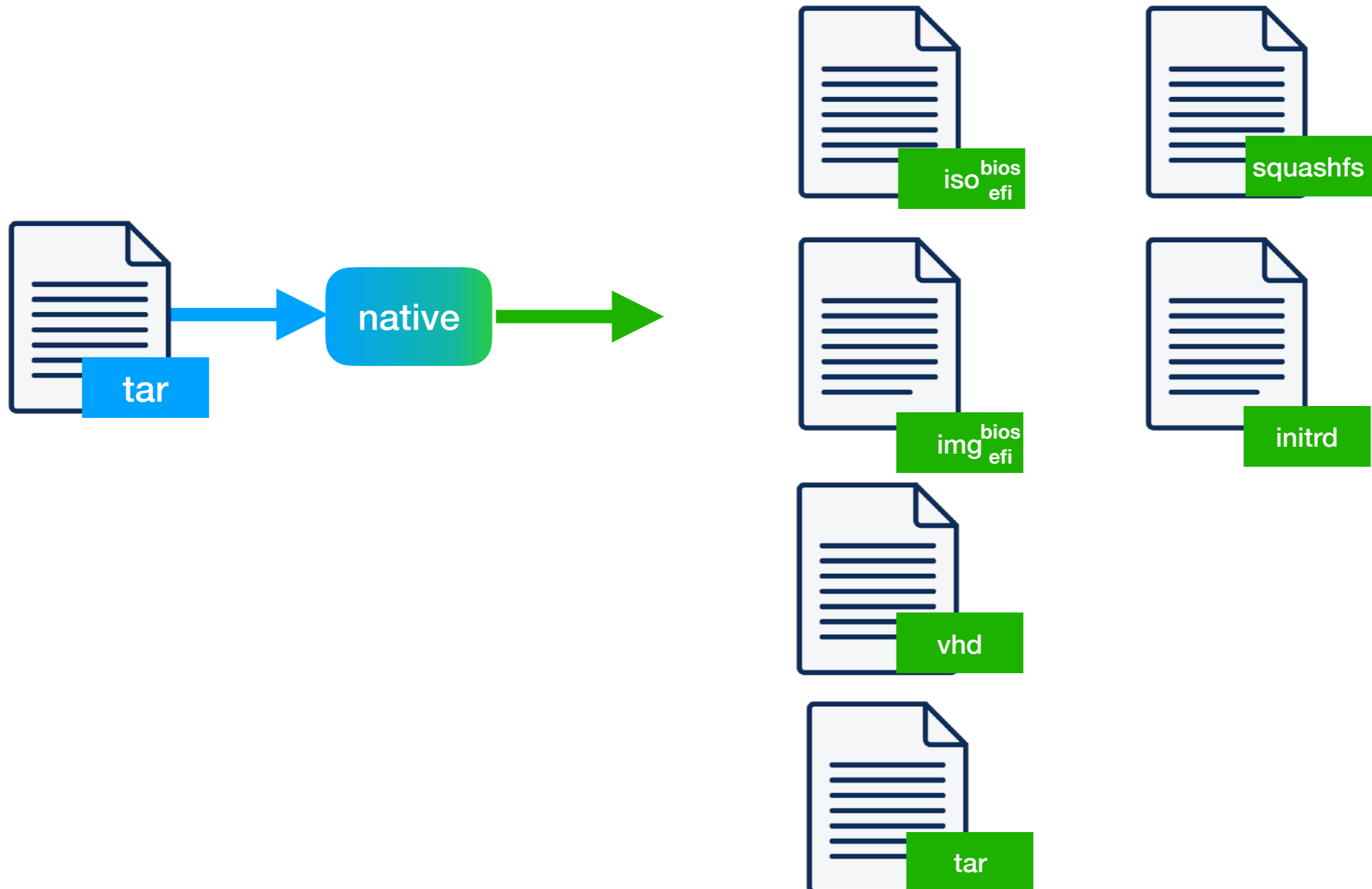
Under The Hood: *Finishing*



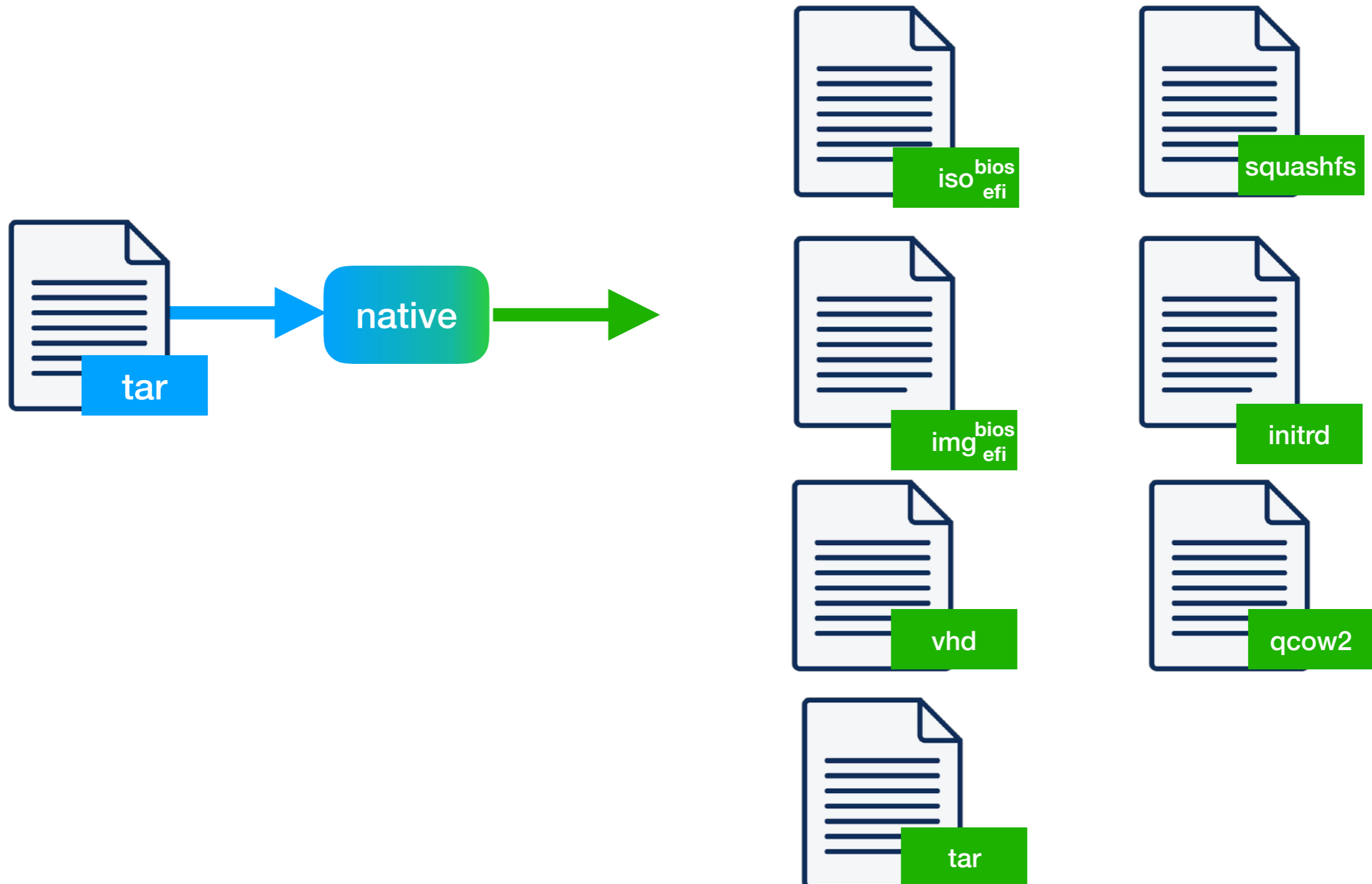
Under The Hood: *Finishing*



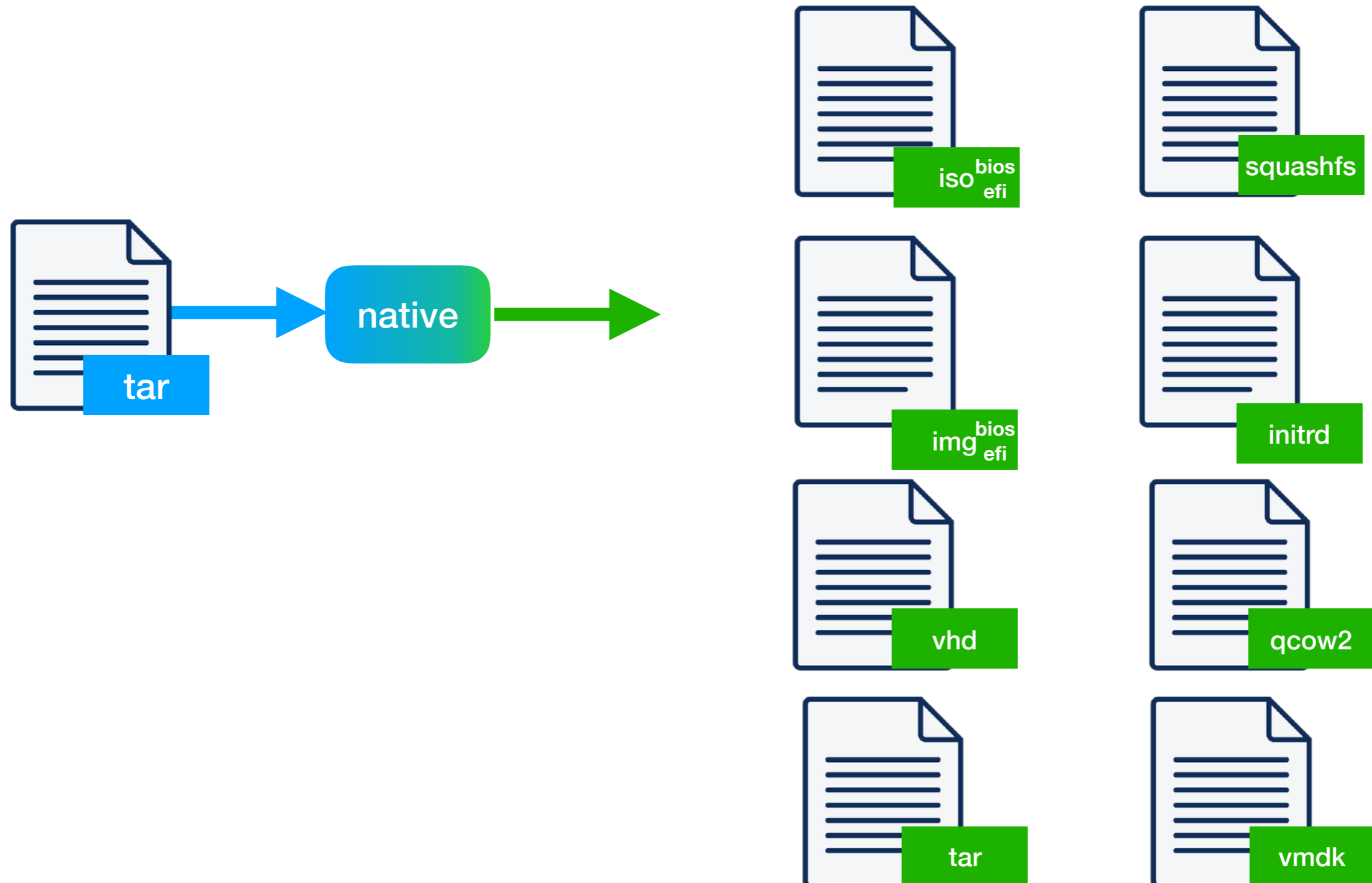
Under The Hood: *Finishing*



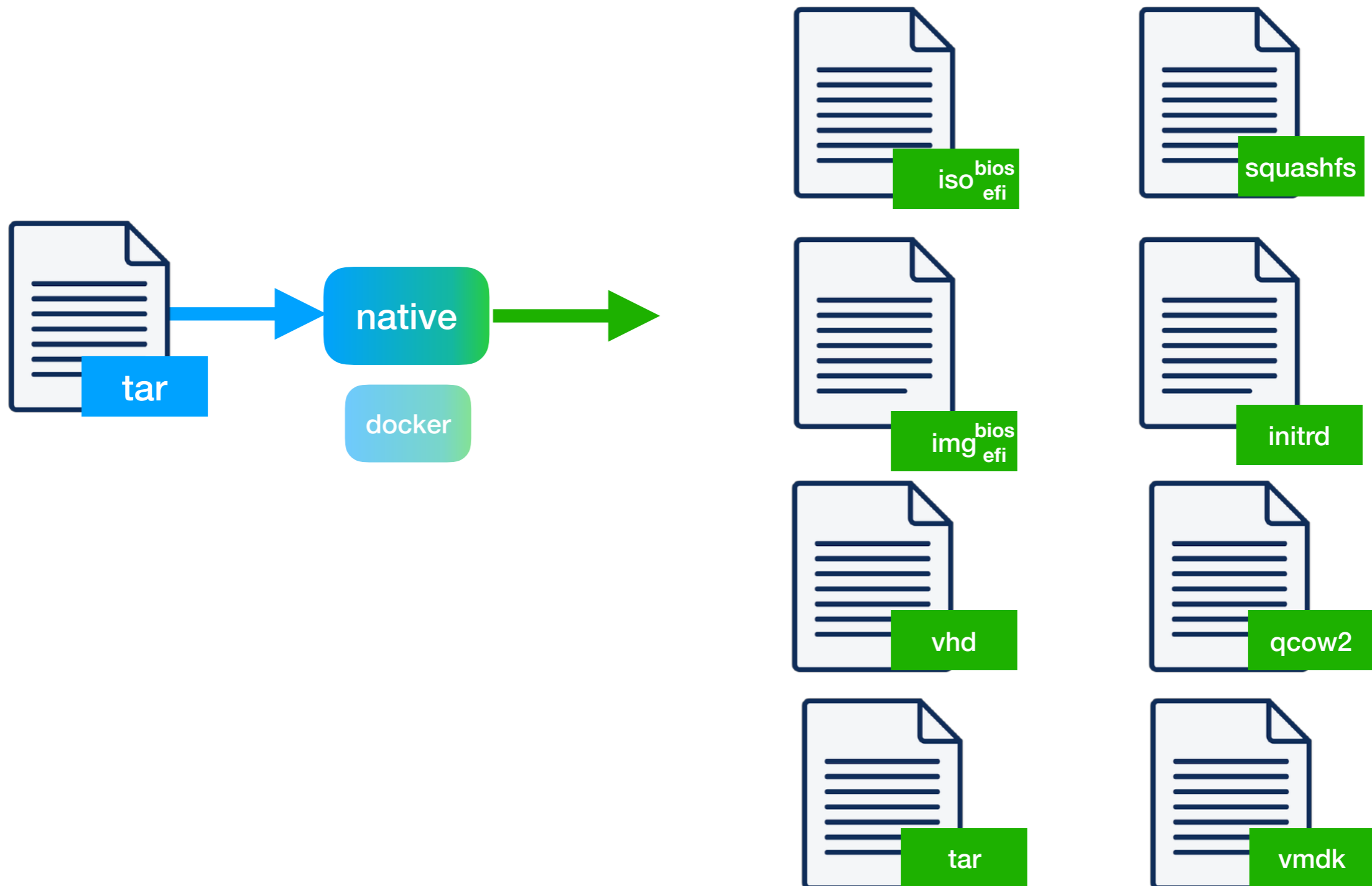
Under The Hood: *Finishing*



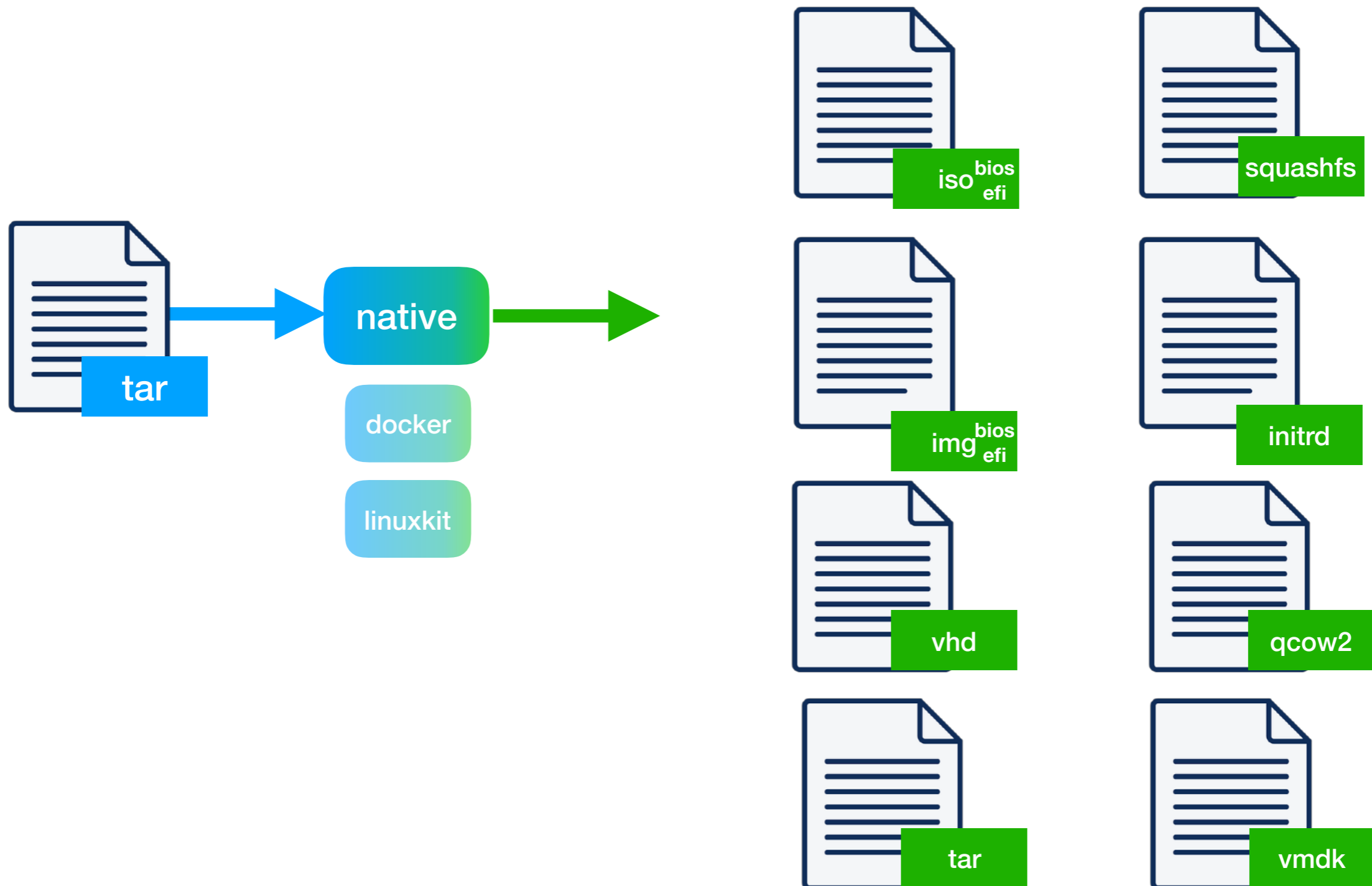
Under The Hood: *Finishing*



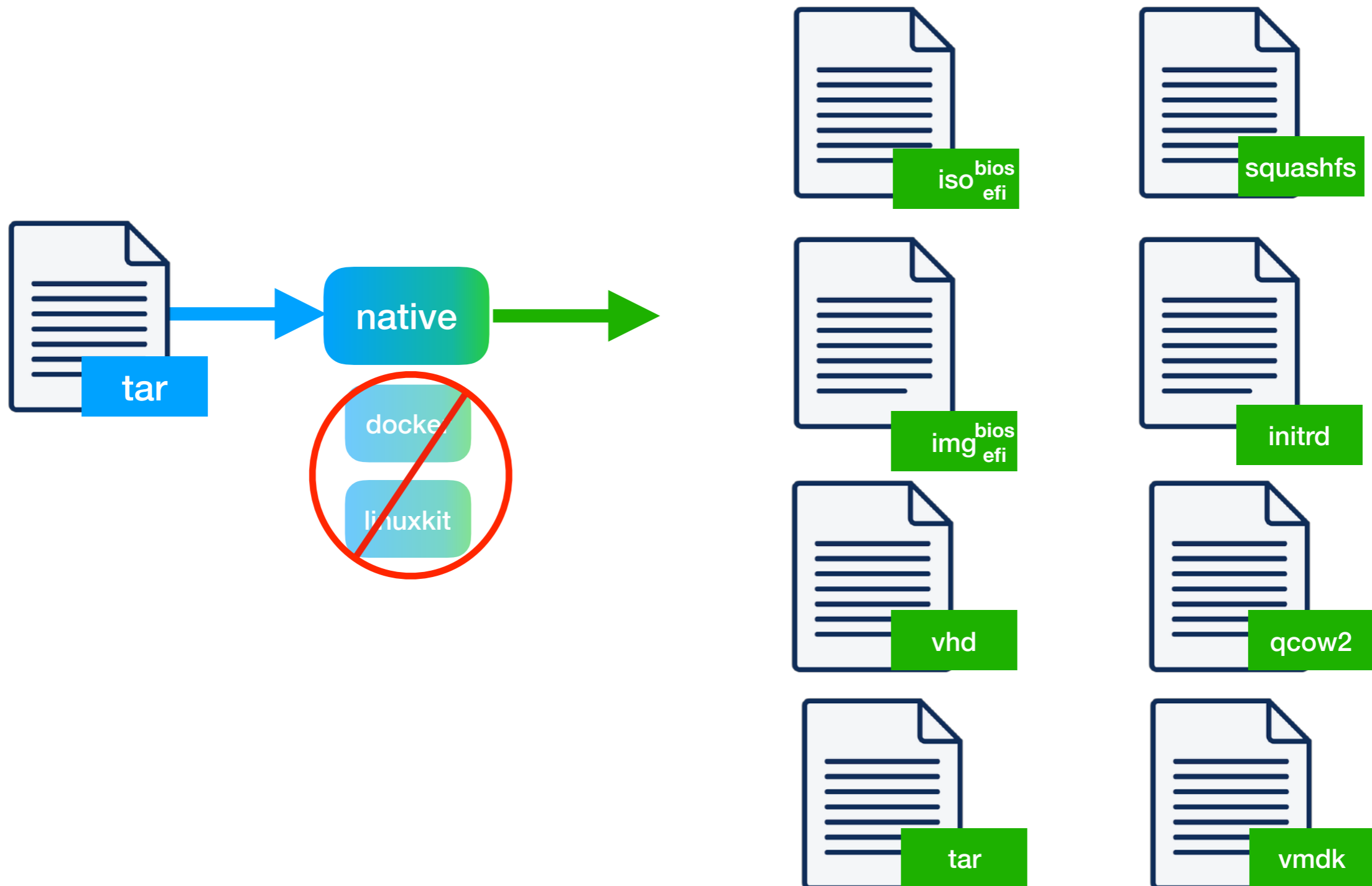
Under The Hood: *Finishing*



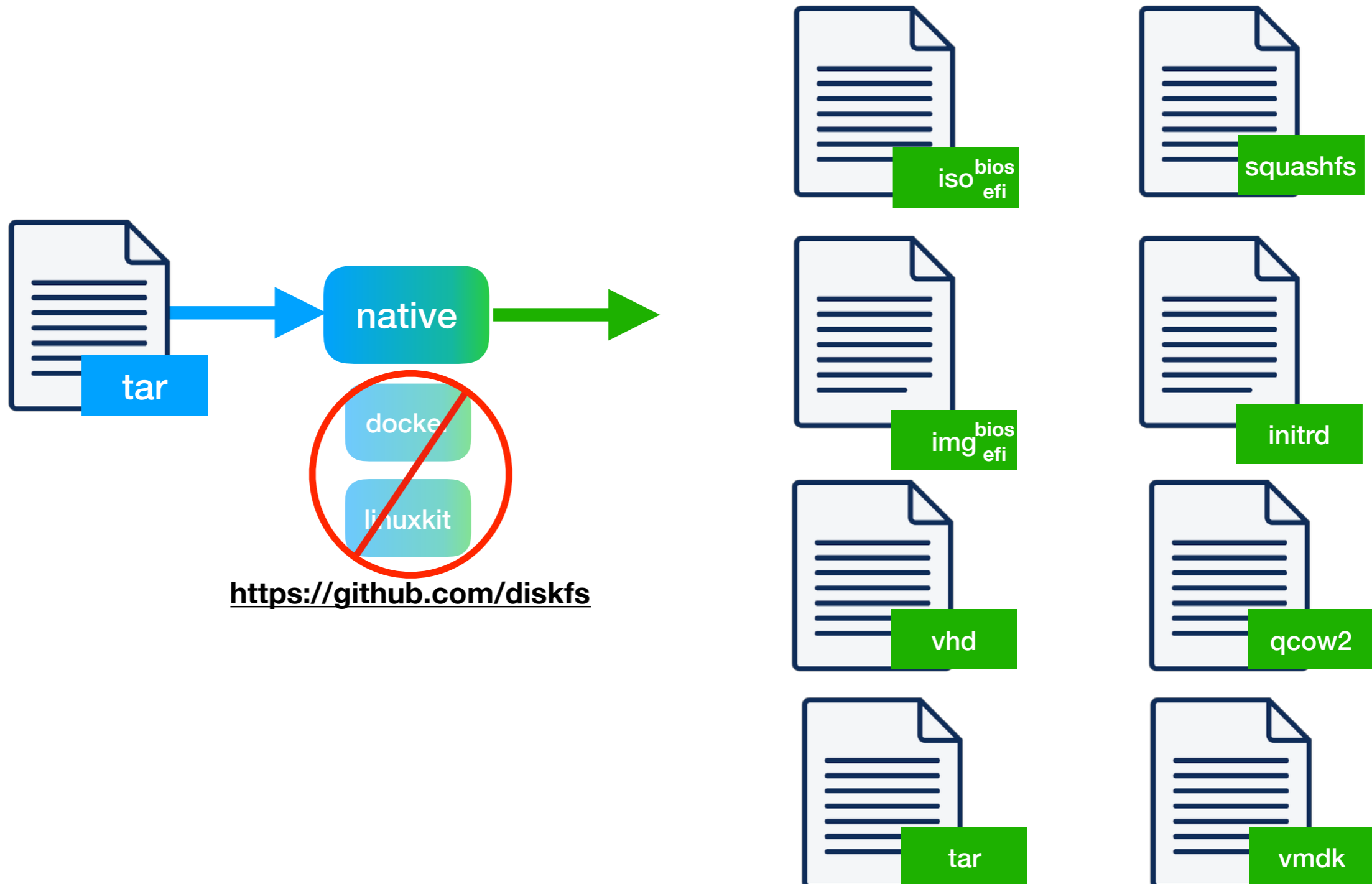
Under The Hood: *Finishing*



Under The Hood: *Finishing*



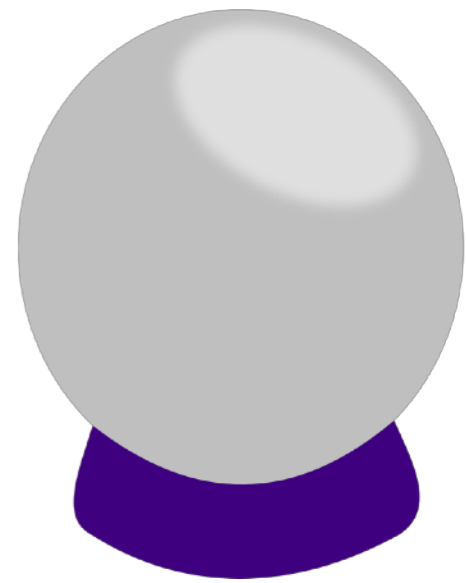
Under The Hood: *Finishing*



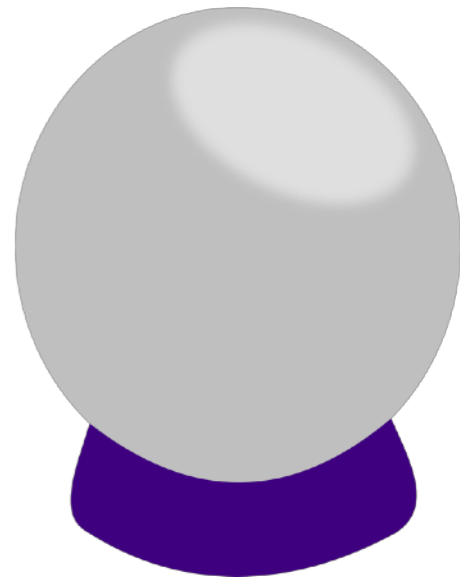
<https://github.com/diskfs>

<https://www.atomicinc.com>

Future of LinuxKit

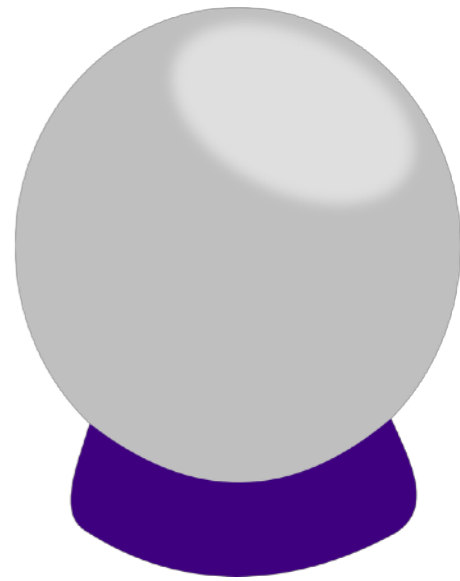


Future of LinuxKit



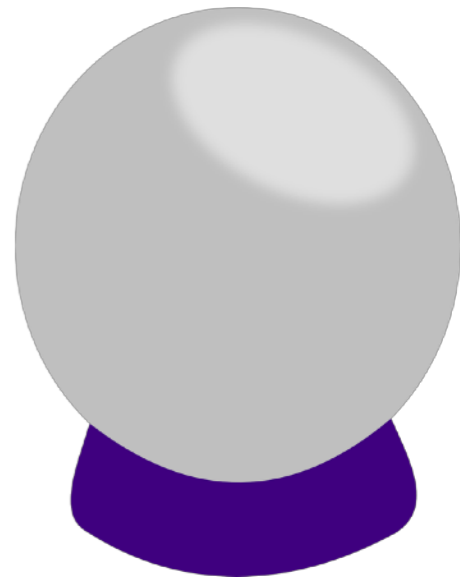
- Eliminate execs / docker / linuxkit

Future of LinuxKit



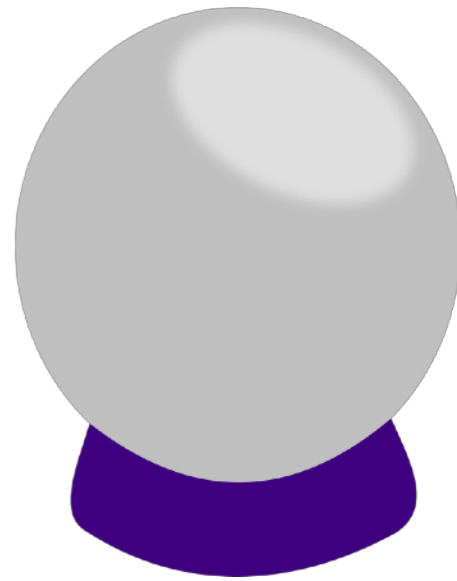
- Eliminate execs / docker / linuxkit
- Greater service composition

Future of LinuxKit



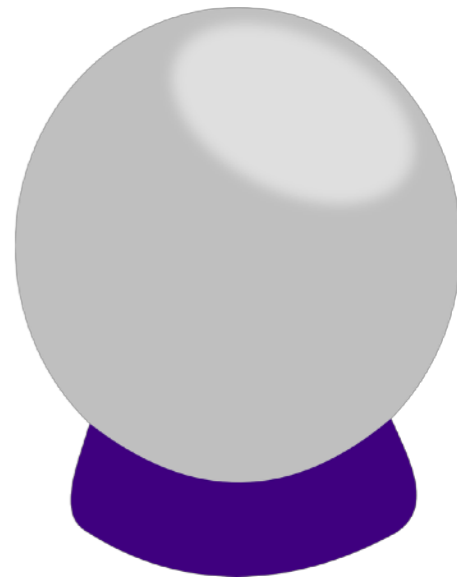
- Eliminate execs / docker / linuxkit
- Greater service composition
- Direct UEFI/BIOS boot

Future of LinuxKit



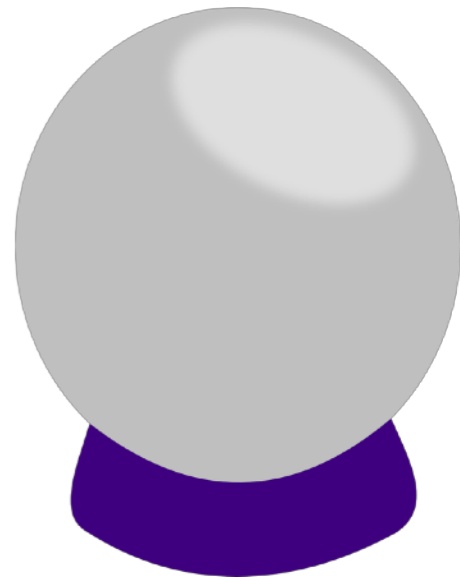
- Eliminate execs / docker / linuxkit
- Greater service composition
- Direct UEFI/BIOS boot
- Increased tpm/tpm2 support

Future of LinuxKit



- Eliminate execs / docker / linuxkit
- Greater service composition
- Direct UEFI/BIOS boot
- Increased tpm/tpm2 support
- Remove alpine entirely from base image

Future of LinuxKit



- Eliminate execs / docker / linuxkit
- Greater service composition
- Direct UEFI/BIOS boot
- Increased tpm/tpm2 support
- Remove alpine entirely from base image
- Compose _____ ?

Summary

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Operating Systems can (**should**) be like applications:

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- minimal

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Operating Systems can (**should**) be like applications:

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- targeted

Summary

Operating Systems can (**should**) be like applications:

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- targeted
- composed

Summary

Operating Systems can (**should**) be like applications:

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- targeted
- composed
- immutable

Summary

Operating Systems can (**should**) be like applications:

- minimal
- targeted
- composed
- immutable
- CI/CD pipelined

Summary

Operating Systems can (**should**) be like applications:

- minimal
- targeted
- composed
- immutable
- CI/CD pipelined

Go forth and build **runnable** *disposable*, immutable images!





















