Manitoba UNIX User Group
Tuesday, April 12, 2022
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Cloud-init
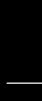
What is Cloud-init?

A standard method to automate the initialization of a generic OS image during boot

Originally developed by Canonical for Ubuntu on Amazon EC2 (ca. 2006)

Now supported by

Alpine Linux

ArchLinux

Debian

DragonFlyBSD

Fedora

FreeBSD

Gentoo Linux

NetBSD

OpenBSD

Photon OS

RHEL/CentOS/AlmaLinux/
  Rocky Linux/EuroLinux

SLES/openSUSE

Ubuntu

On many public cloud providers

Amazon Web Services

Microsoft Azure

Google Cloud Platform

Oracle Cloud Infrastructure

Softlayer

Rackspace Public Cloud

IBM Cloud

DigitalOcean

Bigstep

Hetzner

Joyent

CloudSigma

Alibaba Cloud

OVH

OpenNebula

Exoscale

Scaleway

CloudStack

AltCloud

SmartOS

UpCloud

Vultr

Zadara Edge Cloud Platform

Not to mention

Bare metal installs

OpenStack

LXD

KVM

Metal-as-a-Service (MAAS)

VMware

Cloud-init configures

- Networking
- Storage
- Package Installation
- User creation
- Group creation
- Security keys
- Locale
- Timezone

- And much more

Cloud-init configures what?

A cloud-specific OS image – not an install disc!

But whyyyyyyyyyyyy?

If you want provisioning which is
Fast
Reliable
Repeatable
Documented

How does it work?

- It's integrated into the boot process in five stages
    - Generator
    - Init Local
    - Init Network
    - Modules configure
    - Modules final

Generator

When booting, systemd checks if cloud-init.target is needed; if so, systemd will enable cloud-init.

Don't want cloud-init at all?

→ Create `/etc/cloud/cloud-init.disabled` (empty) or

→ Add `cloud-init=disabled` to the kernel command line

and cloud-init will never bother you again!

Init Local

- Runs as soon as / is mounted read-write

- Checks for any local cloud-init data sources to use

- Network is configured, using a fallback (i.e. DHCP on the 'first' interface) if necessary

Init Network

- Runs after networking is up

- Checks for any network cloud-init data sources to use

- Allows for custom storage configurations and expanding disk volumes very early on

- Modules listed in `cloud_init_modules` in `/etc/cloud/cloud.cfg` will run

Modules Config

- Modules in `cloud_config_modules` in `/etc/cloud/cloud.cfg` will run

- apt/yum configured; SSH keys are imported; time-related services are configured, etc.

Modules Final

- Modules listed in `cloud_final_modules` in `/etc/cloud/cloud.cfg` will run

- Package installs, scripts

How do I use it?

- On public cloud providers there will be a form where you can paste the configuration

CLOUD INIT

Cloud init is a widely used approach to customize a Linux VM as it boots for the first time. You can use cloud-init to install packages and write files or to configure users and security. Learn more

Cloud init

Review + create   Previous   Next : Tags >
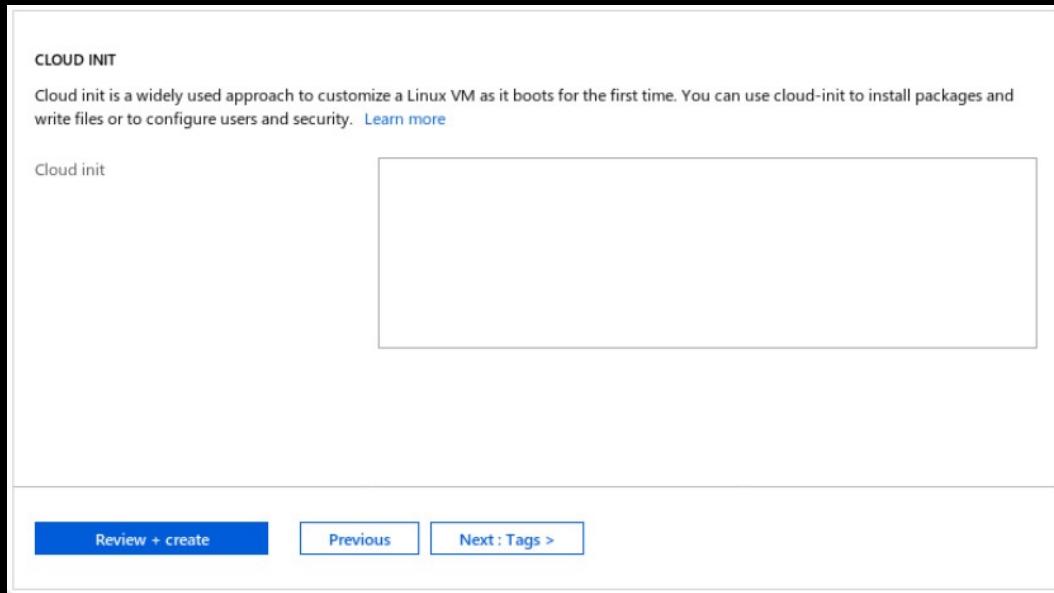
Try it at home!

- For local/no-cloud cloud-init, create a VFAT or ISO image with volume name 'cidata' or 'CIDATA'

- You'll need two files:

  - `meta-data` (must exist but may be empty)

  - `user-data` (contains your configuration)

    - Must begin with '`#cloud-config`'

- `genisoimage -output cloud-config.iso -volid cidata -joliet -rock user-data meta-data`

- Connect this ISO to the VM you're booting, or burn a disc and insert it when you're booting hardware

- A floppy or image of one also works

Some examples

```
#cloud-config
users:
# An OS-specific user is created with this
  - default
```

Some examples

```
users:
  - name: user1
    groups: sudo
    sudo: ['ALL=(ALL) NOPASSWD:ALL']
    plain_text_passwd: redacted
    lock_passwd: false
```

Some examples

```
users:
  - name: user2
    passwd: < hashed password here >
    lock_passwd: false
    shell: /bin/bash
```

Some examples

```
users:
  - name: user3
    gecos: User_real_name
    groups: group1,group2
    ssh-authorized-keys:
      - < ssh public key here >
    lock_passwd: true
```

Some examples

```
timezone: America/Winnipeg
bootcmd:
  - echo 192.168.1.130 us.archive.ubuntu.com >> /etc/hosts
runcmd:
  - [ ls, -l, / ]
  - ls -l /root
packages:
  - mypackage
package_upgrade: true
```

Special note

Don't go too crazy; user-data is limited to 64 KB

Debugging and logging

- See

  `/var/log/cloud-init.log`

  `/var/log/cloud-init-output.log`

Some links

http://cloud-init.io/

https://docs.microsoft.com/en-us/azure/virtual-machines/linux/cloud-init-deep-dive

https://help.ubuntu.com/community/CloudInit

https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/8/html-single/configuring_and_managing_cloud-init_for_rhel_8/index