ubuntu
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現場教學：快速開發具備CI/CD的Ubuntu Snap應用

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Embedded Software Development CI/CD on Ubuntu

Snapcraft and Snap Store

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CANONICAL · ubuntu

Snap - a universal Linux package format

Supported distros

ubuntu

debian

gentoo linux

yocto PROJECT

openembedded

openSUSE

archlinux

OpenWrt Wireless Freedom

fedora

Example snaps / frameworks

openHAB
empowering the smart home

ELECTRON

Nextcloud

Qt

EVRYTHNG

ROS

MQTT.ORG

ethereum

Multi CPU Architecture

Number	Build trigger	Architecture	Duration	Result	
#604800	Commit 58e0927	s390x	2 minutes	Built and released	4 hours ago
#604799	Commit 58e0927	ppc64el	3 minutes	Built and released	4 hours ago
#604798	Commit 58e0927	arm64	5 minutes	Built and released	4 hours ago
#604797	Commit 58e0927	armhf	5 minutes	Built and released	4 hours ago
#604796	Commit 58e0927	amd64	3 minutes	Built and released	4 hours ago
#604795	Commit 58e0927	i386	3 minutes	Built and released	4 hours ago

Build manually now

Built-in CI/CD

You receive a pull request on GitHub

Test with Travis or other CI system

The code lands on your GitHub master

Snapcraft builds a new snap version

Auto-released to the snap store for testing

You promote to beta / candidate / stable

Building Snap

Building Snaps - Snapcraft

- "A delightful packaging tool"
  - Build snaps from source or binary artifacts
  - Register snap names in the store
  - Push snaps to the store
  - Release snaps to channels
  - Query status of own snaps
- Available as a snap
- Can be used in 3rd party CI systems (travis/circleci) or hosted build environments
- Docker image available

```
alan@hal:~$ snap help
Usage:
  snap <command>

Install, configure, refresh and remove snap packages. Snaps are
'universal' packages that work across many different Linux systems,
enabling secure distribution of the latest apps and utilities for
cloud, servers, desktops and the internet of things.

This is the CLI for snapd, a background service that takes care of
snaps on the system. Start with 'snap list' to see installed snaps.

Available commands:
  abort        Abort a pending change
  ack          Add an assertion to the system
  alias        Set up a manual alias
  aliases      List aliases in the system
  buy          Buy a snap
  changes      List system changes
  connect      Connect a plug to a slot
  disable      Disable a snap in the system
  disconnect   Disconnect a plug from a slot
  download     Download the given snap
  enable       Enable a snap in the system
  find         Find packages to install (aliases: search)
  get          Print configuration options
  help         Show help about a command
  info         Show detailed information about snaps
  install      Install a snap to the system
  interface    List snap interfaces
  interfaces   List interfaces in the system
  known        Show known assertions of the provided type
  list         List installed snaps
  login        Authenticate to snapd and the store
  logout       Log out of snapd and the store
  logs         Retrieve logs of services
  pack         Pack the given directory as a snap
  prefer       Prefer aliases from a snap and disable conflicts
  refresh      Refresh a snap in the system
  remove       Remove a snap from the system
  restart      Restart services
  revert       Reverts the given snap to the previous state
  run          Run the given snap command
  services     Query the status of services
  set          Change configuration options
  start        Start services
  stop         Stop services
  switch       Switches snap to a different channel
  tasks        List a change's tasks (aliases: change)
  try          Test a snap in the system
  unalias      Unalias a manual alias or an entire snap
  version      Show version details
  wait         Wait for configuration
  watch        Watch a change in progress
  whoami       Print the email the user is logged in with
alan@hal:~$
```

Managing Snaps - snap

- The cli for snapd daemon
  - Search for snaps in the store
  - Get detailed snap package info
    - Grant permissions
    - Aliases defined in a snap
  - Download & install snaps from the store
  - Revert snaps to a previous revision
  - Refresh snaps from the store
  - Remove snaps (and their data) from a system
  - Create snapshot of snap data
  - Install development snaps from local filesystem

Getting set up to create snaps

Snapcraft is available on any system with snap support enabled. Some distributions, like Ubuntu, enable snaps by default.

For other distributions, refer to the instructions at
https://docs.snapcraft.io/core/install

Once snap support is enabled, run:

```
$ snap install snapcraft --classic
```

Pre-built apps

C/C++

Go

Java

Node.js

Electron

Python

Ruby

Rust

MOOS

ROS

ROS 2

Short and simple app definition

```
1  name: wethr
2  version: "1.4.0"
3  summary: Command line weather tool.
4  description: |
5    Get current weather.
6
7  confinement: strict
8
9  apps:
10   wethr:
11     command: wethr
12     plugs:
13       - network
14
15 parts:
16   wethr:
17     plugin: nodejs
18     source-tag: "v1.4.0"
19     source: https://github.com/twobucks/wethr.git
```

- The format is simple and declarative
- Just four stanzas:
  - metadata
  - confinement
  - Commands (apps)
  - build definition (parts)

Metadata

```
 1  name: wethr
 2  version: "1.4.0"
 3  summary: Command line weather tool.
 4  description: |
 5    Get current weather.
 6
 7  confinement: strict
 8
 9  apps:
10    wethr:
11      command: wethr
12      plugs:
13        - network
14
15  parts:
16    wethr:
17      plugin: nodejs
18      source-tag: "v1.4.0"
19      source: https://github.com/twobucks/wethr.git
```

- Human readable text

- Typically can be lifted directly from source control or README.md

- Will be used later when uploading to the store

- End users will see this in snap `find` and snap `info`.

Confinement

```
 1  name: wethr
 2  version: "1.4.0"
 3  summary: Command line weather tool.
 4  description: |
 5    Get current weather.
 6
 7  confinement: strict
 8
 9  apps:
10    wethr:
11      command: wethr
12      plugs:
13        - network
14
15  parts:
16    wethr:
17      plugin: nodejs
18      source-tag: "v1.4.0"
19      source: https://github.com/twobucks/wethr.git
```

- One of:
  - strict
  - classic
  - devmode
- We encourage developers to work towards strict confinement, grantting best portability
- classic snaps are only allowed in the store after vetting
- devmode snaps are not allowed in the stable channel (more on channels later)

Apps

```
 1  name: wethr
 2  version: "1.4.0"
 3  summary: Command line weather tool.
 4  description: |
 5    Get current weather.
 6
 7  confinement: strict
 8
 9  apps:
10    wethr:
11      command: wethr
12      plugs:
13        - network
14
15  parts:
16    wethr:
17      plugin: nodejs
18      source-tag: "v1.4.0"
19      source: https://github.com/twobucks/wethr.git
```

- Defines the executables in the snap which are exposed to the host
- This example only has one, which uses one plug to gain access to the network
- Snaps may contain many binaries which need to be exposed as commands
- These can be fully-fledged graphical desktop applications, simple non-interactive console commands or daemons

Parts

```
1   name: wethr
2   version: "1.4.0"
3   summary: Command line weather tool.
4   description: |
5     Get current weather.
6
7   confinement: strict
8
9   apps:
10    wethr:
11      command: wethr
12      plugs:
13        - network
14
15  parts:
16    wethr:
17      plugin: nodejs
18      source-tag: "v1.4.0"
19      source: https://github.com/twobucks/wethr.git
```

- Define how to build the application(s) to be packaged inside the snap
- Source may be a local or remote repo or tarball
- Plugins determine how a part is built, and may have further options to control the build
  - e.g. nodejs plugin has a 'node-engine' option to specify the version of node used in the build
- Parts may be defined to run after others, to fulfill build dependency chains
- Parts may specify 'build-packages' which pull in pre-build deb packages from the Ubuntu archive to fulfil build dependencies
- Stage packages may be listed which are bundled into the snap to fulfill runtime requirements

Build and test the snap

Build

```
$ snapcraft
```

Install

```
$ sudo snap install wethr_1.4.0_amd64.snap --dangerous --devmode
```

Test

```
$ snap run wethr
```

or

```
$ wethr
```

Remove

```
$ sudo snap remove wethr
```

Publish

Publishing

20

1 Account

2 Snap name

3 Upload

4 Showcase

5 Review

One account to log in to everything on Ubuntu

Snap Store → log in with Ubuntu One

Please type your email:

Your email address

○ I don't have an Ubuntu One account

● I have an Ubuntu One account and my password is:

Password

Log in   Forgot your password?

Ubuntu One is the single account you use to log in to all services and sites related to Ubuntu.

If you have an existing Ubuntu Single Sign On account, this is now called your Ubuntu One account. Read More ›

https://snapcraft.io/account

Register snap

Before you can push your snap to the store, its name must be registered

Snap name

Snap privacy
This can be changed at any time after the initial upload

● Public

○ **Private** Snap is hidden in stores and only accessible by the publisher and collaborators

Cancel   Register

https://snapcraft.io/account/register-snap

```
$ snapcraft whoami
You need to first login to use this command.


$ snapcraft login
Enter your Ubuntu One e-mail address and password.
If you do not have an Ubuntu One account, you can create one at
https://dashboard.snapcraft.io/openid/login
Email: ondrej.kubik@canonical.com
Password:

Login successful.


$ snapcraft whoami
email:        ondrej.kubik@canonical.com


$ snapcraft push atom_1.30.0_amd64.snap
Uploading atom_1.30.0_amd64.snap [====================] 100%
Processing ...
Ready to release!
Revision 1 of 'atom' created.
```

```
$ snapcraft list-revisions atom
Rev.     Uploaded               Arch     Version        Channels
1        2018-08-31T08:21:30Z   amd64    1.30.0         -


$ snapcraft release atom 1 stable
Track    Arch   Channel     Version   Revision
latest   amd64  stable      3.10.0    1
                candidate   -         -
                beta        -         -
                edge        -         -
The 'stable' channel is now open.
```

node

by NodeSource, Inc.

Install   Other versions

Node.js

A JavaScript runtime built on Chrome's V8 JavaScript
event-driven, non-blocking I/O model that makes it li
Node.js' package ecosystem, npm, is the largest ecos
libraries in the world. https://nodejs.org/

Contact NodeSource, Inc.

Options to install this snap

Show architecture amd64

CHANNEL	VERSION	PUBLISHED
10/stable	10.10.0	5 days ago
latest/edge	11.0.0-nightly2018...	24 minutes ago
9/stable	9.11.2	3 months ago
8/stable	8.12.0	a day ago
6/stable	6.14.4	a month ago

Thanks for trying out these new pages. Use dashboard for other functions, report an issue or give us your feedback.

‹ My snaps

atom

Listing   **Releases**   Metrics

Releases available for install

	amd64
latest/stable	1.30.0
latest/candidate	-
latest/beta	1.30.0
latest/edge	1.30.0

Revisions available

REVISION	VERSION	ARCHITECTURE	CHANNELS	SUBMISSION DATE
192	1.30.0	amd64	edge, stable, beta	11 days ago
191	1.30.0	amd64	edge, stable, beta	13 days ago
190	1.29.0	amd64	edge, stable, beta	a month ago
189	1.29.0			a month ago

https://snapcraft.io/account/snaps

snapcraft

Thanks for trying out these new pages. Use dashboard for other functions⧉, report an issue⧉ or give us your feedback⧉.

‹ My snaps

Atom

Listing   Releases   Metrics

Changes you make here will appear immediately on the public listing.

Revert   Save

Title:

Atom

Snap name: atom

Publisher: Snapcrafters

Privacy: ◉ Public

○ Private Snap is hidden in stores and only accessible by the publisher and collaborators

Summary: A hackable text editor for the 21st Century.

Description: Atom is a free and open source text editor that is modern,
approachable and hackable to the

Atom

Install   Other versions ⌄

by Snapcrafters

›
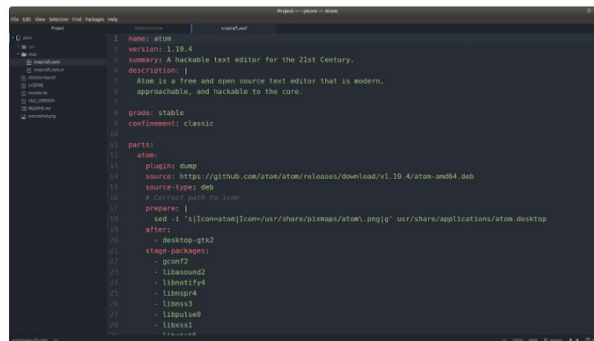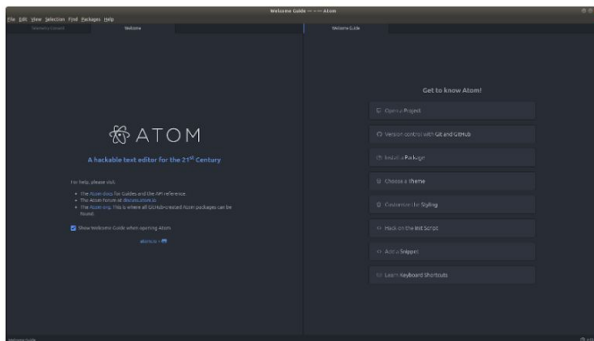
A hackable text editor for the 21st Century.

Atom is a free and open source text editor that is modern, approachable, and hackable

Contact Snapcrafters

License	Other Open Source
Last updated	Aug 31

https://snapcraft.io/atom

snapcraft

Evan
evandandrea

Repos to build

Add repos…

Name	Configured		Registered for release		Latest build		
CanonicalLtd/multipass	✅	⌄	✅ multipass	⌄	Built and released	4 days ago	🗑
CanonicalLtd/prometheus-openstack-exporter	✅	⌄	Not registered	⌄	Never built		🗑
CanonicalLtd/serial-vault	✅	⌄	✅ factory-serial-vault	⌄	Built and released	13 days ago	🗑
evandandrea/assemblyscript	✅	⌄	✅ assemblyscript-ev	⌄	Built and released	a day ago	🗑

https://snapcraft.io/build

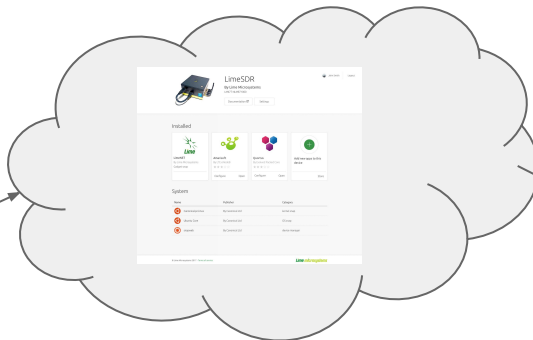# Operationalising software deployment with health checks, phased updates & channels
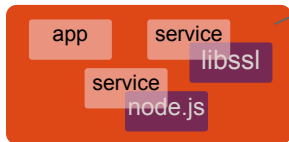
1. Use channels to deploy test snaps to limited set of device and use health check to see if update is successful
2. Once a new snap version is proven to be successful on a limited number of devices phased update can be initiated
3. Use phased update to deploy new snap across the entire fleet of devices, use health check to monitor that devices have been correctly upgraded
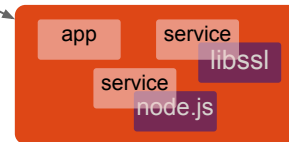
Beta

Candidate

Stable

Stable

1)

2)

3)

4)
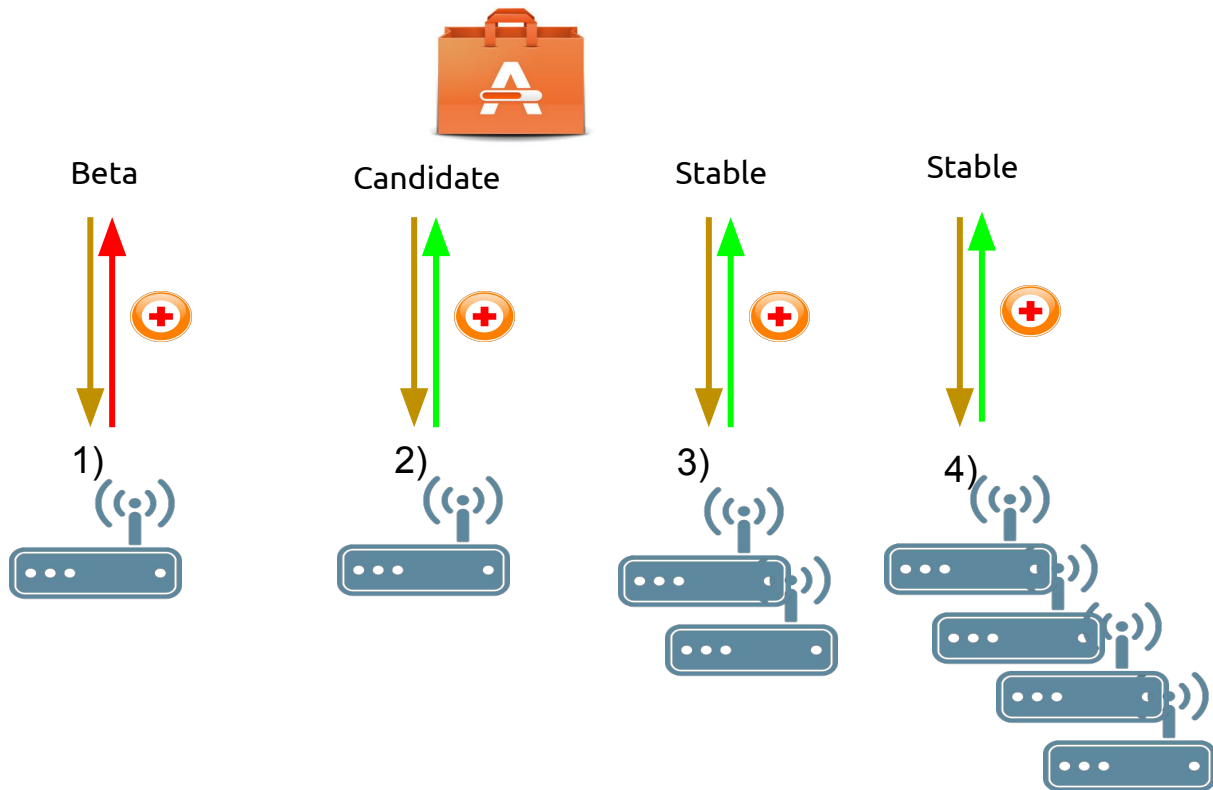
Developer Journey

App development on PC, packaged in Snap

Deploy snaps on any version of **Ubuntu Core** Or server/desktop

app   service   libssl   service   node.js

app   service   libssl   service   node.js

Canonical hosted Brand Store

Ubuntu Desktop or Server

Ubuntu certified hardware

Thank you. Questions?