

Robotics In A Hostile World

Security, Automated Maintenance and Upgrades



✦ What you're about to hear

Security
Landscape
Today

Why Ubuntu
Core

Advantages
of Snaps



Security



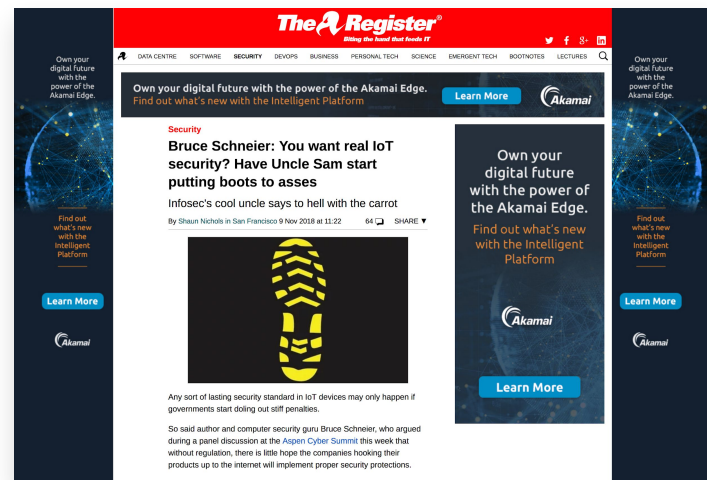
“every company needs to prepare themselves for thingbot attacks, every business and government entity with IoT devices deployed should be securing them.”

— *F5 Labs*



Dec 10: EU takes further steps to strengthens Cybersecurity Act, ENISA

Bruce Schneier calls for governments to regulate IoT security



F5 labs reports that IoT now the top attack target

The screenshot shows the Dark Reading website interface. At the top, there's a navigation bar with links like 'Dark Reading', 'Network Computing', 'About Us', 'Advertise', 'Register', and 'Login to your account'. Below this is a banner for 'mimicast' and 'Gartner'. The main content area features a large article titled 'New Report: IoT Now Top Internet Attack Target' dated 10/25/2018 05:00 PM. The article text states: 'IoT devices are the top targets of cyberattacks -- most of which originate on IoT devices, new report finds. A new threat analysis report shows that IoT devices are now the primary target of criminals working on the Internet. And those criminals are learning and adapting their tactics to meet the improved defenses being put into place. The report, The Hunt for IoT, is the fifth volume of the IoT threat report from F5 Labs. Among their findings are that the classic Port 23 attack using telnet has declined as organizations shut down that service, and targeted probes now have been replaced by an increase in hits on every IoT-related port. According to F5 Labs, the vast majority (94%) of attack source traffic is coming from telecom companies, indicating that existing botnets are busy trying to recruit new devices into their nets. For more, read here.' Below the article is a 'blackhat' logo and a brief synopsis. To the right of the article is a 'Related Content' section with links to 'A Guide to Read in the Real World', 'The SIEM Buyer's Guide', 'The Top Essential Capabilities of an Analytics-Driven SIEM', 'The Essential Guide to Security', and 'Four Easy Ways Central Logging Improves Security Posture'. The left sidebar contains a 'MASTERMIND AN EFFECTIVE SECURITY AWARENESS PROGRAM' section with a 'READ EBOOK' button. The right sidebar also features a 'MASTERMIND AN EFFECTIVE SECURITY AWARENESS PROGRAM' section with a 'READ EBOOK' button. The bottom of the page has a 'TERRANOVA' logo.

The screenshot shows the Wired website interface. At the top, there's a navigation bar with links like 'SHARE', '1756', 'TWEET', 'COMMENT', and 'EMAIL'. Below this is a banner for 'slack' and 'Verringere dein E-Mail-Aufkommen um 48,6 %'. The main content area features a large article titled 'THE SERIOUS SECURITY PROBLEM LOOMING OVER ROBOTICS' by MATT SIMON, dated 08-24-18 07:00 AM. The article image shows a red robotic arm in a workshop. Below the image is the author's name 'JEAN CLAUDE MOSCHETTI/REA/REDUX'. To the right of the article is a 'MOST POPULAR' section with links to 'SECURITY: Manafort and Cohen Sentencing Documents Put Donald Trump in Spotlight', 'IDEAS: My Befuddling Dinner With Facebook Empress Sherry Sandberg', and 'DEAR: Best Noise-Cancelling Headphones (2018): Bose, Sony, Plantronics, and More'. The bottom of the page has a 'MORE STORIES' button.

The Serious Security Problem Looming Over Robotics *Wired, Aug 2018*



“Security is best built in from day one,
rather than bolting it on.”

— *Mark Nunnikhoven, VP cloud research Trend Micro*



Why your next robot should run Ubuntu Core



Setting up a new
project... not
fun!



Linux Software Delivery



Hidden Challenges

- **Requires knowledge of Linux internals**
- **Complex packaging code**
- **Not transactional**
- **Unbounded**
- **Risky**

Working in this loosely-defined environment is unpredictable, time-consuming, and costly



Maintenance

The nightmare begins!

Ubuntu Core benefits



A minimal, transactional Ubuntu for appliances



Safe, reliable updates with tests and rollback



App containment and isolation with managed access to resources



Amazing 'devops for IoT' experience from device to cloud
Familiar development environment for Linux developers

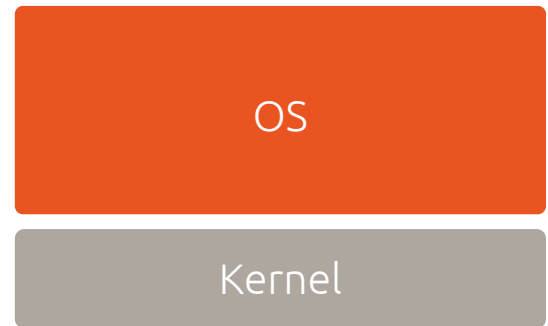


Easily create app stores for all your devices

Automatically **confines** applications



Snaps are confined
and isolated

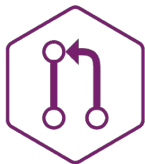


Build Environment



Automation

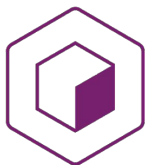
You receive a pull request on GitHub



Test with Travis or other CI system



The code lands on your GitHub master



Snapcraft builds a new snap version

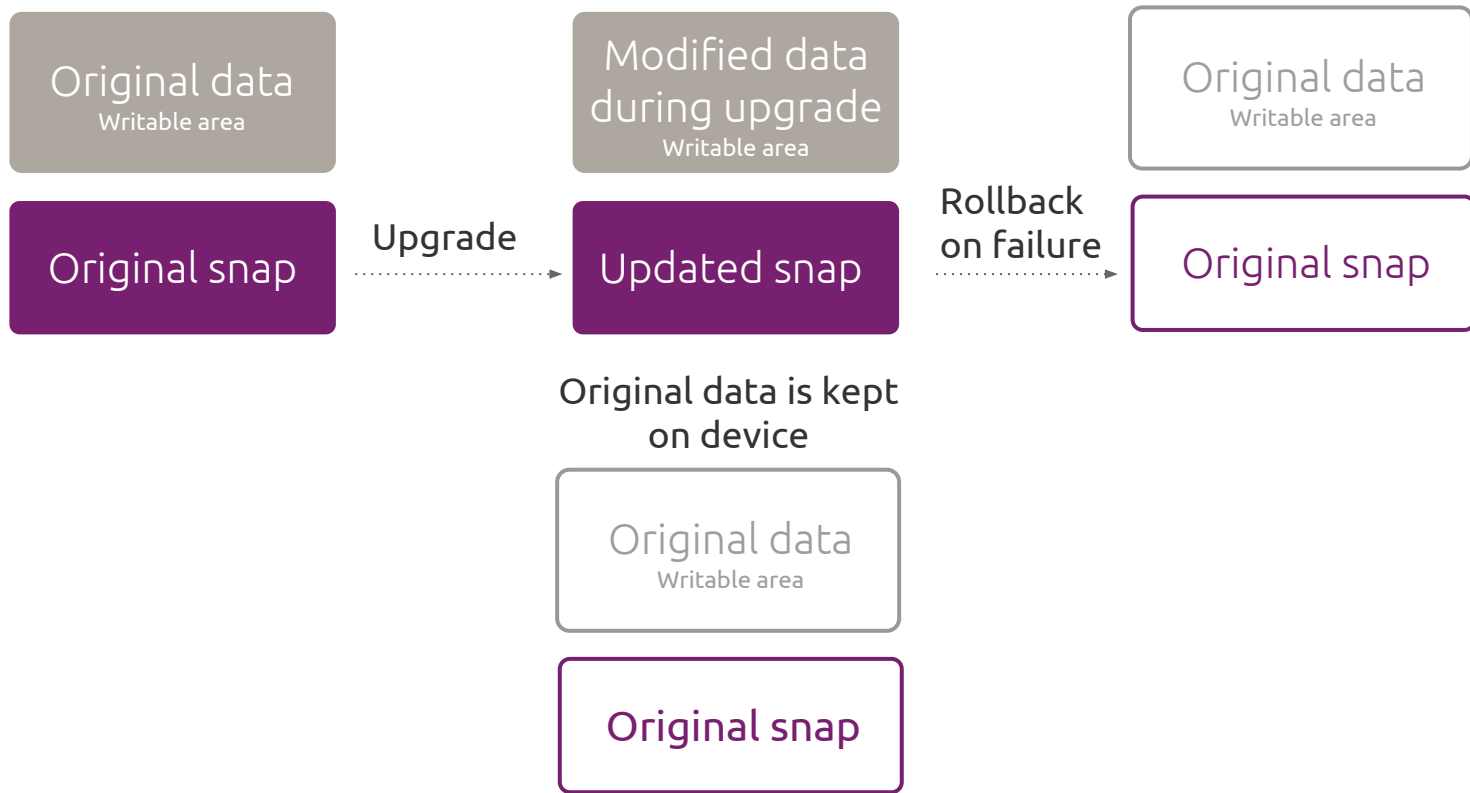


Auto-released to the snap store for testing



You promote to beta / candidate / stable

Transactional updates: Apps, OS and kernel



Ubuntu Core benefits



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Amazing 'devops for IoT' experience from device to cloud
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Easily create app stores for all your devices

Simple, Declarative App Definitions

```
name: ros-talker-listener
version: 0.1
summary: ROS Talker/Listener Example
description: |
  This example requires roscore as well as a talker and listener.

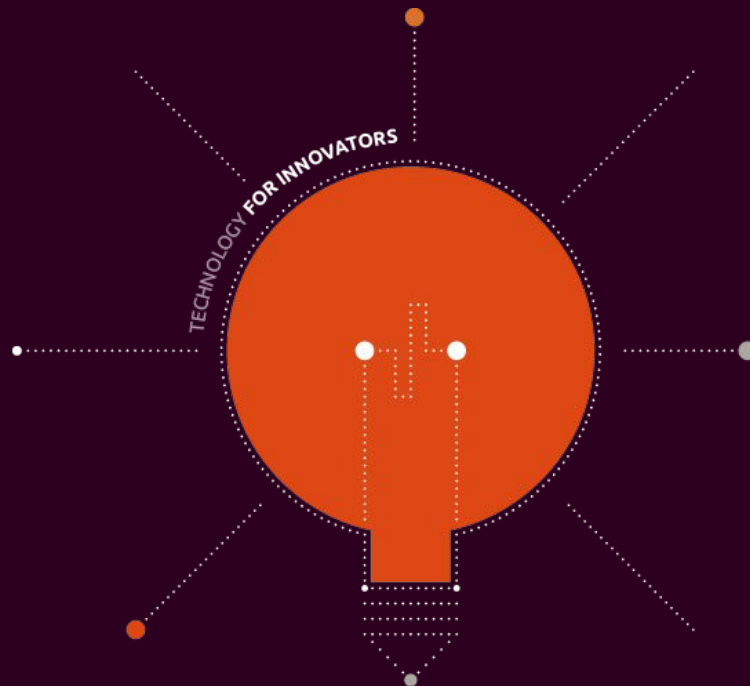
grade: devel
confinement: devmode

parts:
  ros-tutorials:
    source: https://github.com/ros/ros_tutorials.git
    source-branch: kinetic-devel
    plugin: catkin
    rosdistro: kinetic
    source-space: roscpp_tutorials/
    catkin-packages: [roscpp_tutorials]

apps:
  run:
    command: roslaunch roscpp_tutorials talker_listener.launch
```

Backed by Canonical

It is our mission to make open source software available to people everywhere. We believe the best way to fuel innovation is to give the innovators the technology they need.





GAZEBO



Robotics Library



ROS



ethereum



DRONEKIT



IOTA



Open Source Routing



Over 3 million
developers use
ubuntu



Pre-built apps



C/C++



Go



Java



Node.js



Electron



Python



Ruby



Rust



MOOS



ROS



ROS 2



ROS

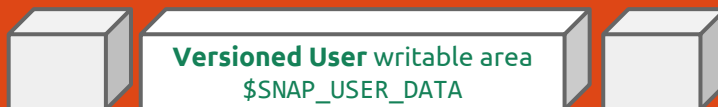
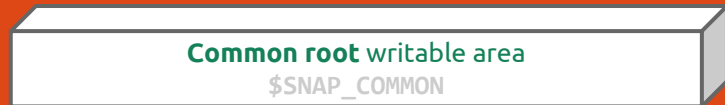
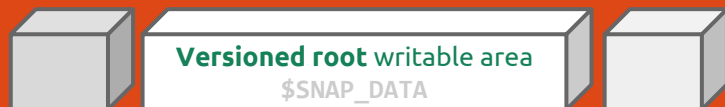
2



Additional Advantages of Snaps

Snap Package Architecture

- **MAC** to other resources (Paths (/home), Devices /dev, etc) mediated with interfaces



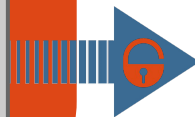
Service

Service

CLI

GUI

snap code & assets
(squashfs, RO bind-mounted in `/snap/<snap_name>/<version>`)
`$SNAP`



Security Alerts, Audits and Compliance

- Automatic Security Warnings on your snaps
 - Daily checks on your software components with alerts
- Audit your systems through package verification
 - For OS and apps
 - Confirm that exactly what you deployed is still running on the device, no more or less
- Compliance management
 - Archive source code used to build your snaps
 - Aggregate licenses



Snap Store

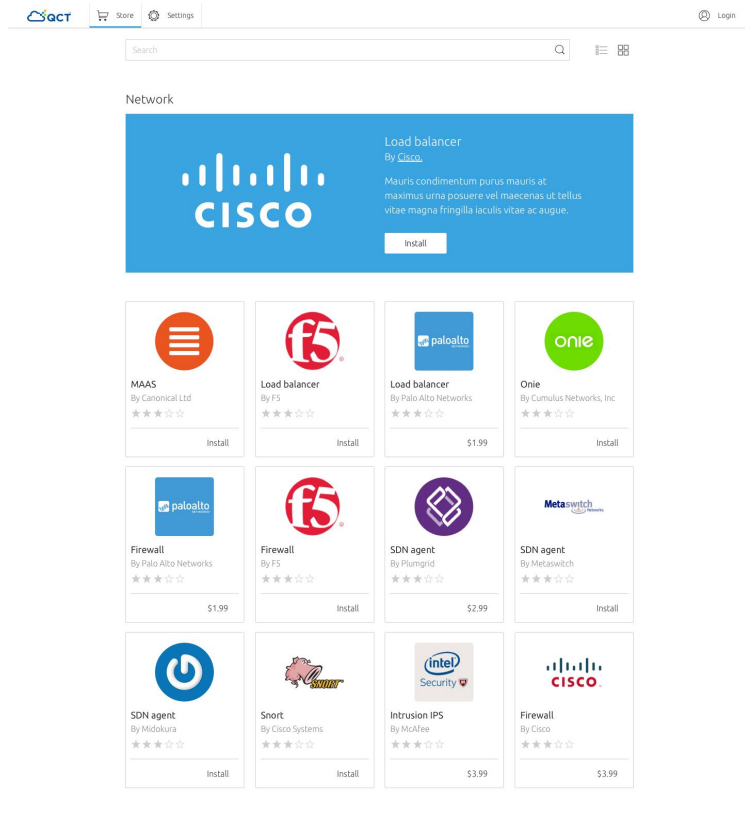
A repeating pattern of light gray icons representing various devices: laptops, desktop monitors, smartphones, and tablets, arranged in a grid-like fashion across the background.

Reach millions of devices with the Snap Store.

Add your snap

- Public store hosted by Canonical
- Ubuntu systems point to the snap store by default
- Access the store and manage your snaps from the CLI or the web

Brand Store



- snap store as a service
- Full control over the store content
- Review queue for third parties
- Endless possibilities



Maintenance

And relax



Visit snapcraft.io





Visit ubuntu.com/core

Releases available for install

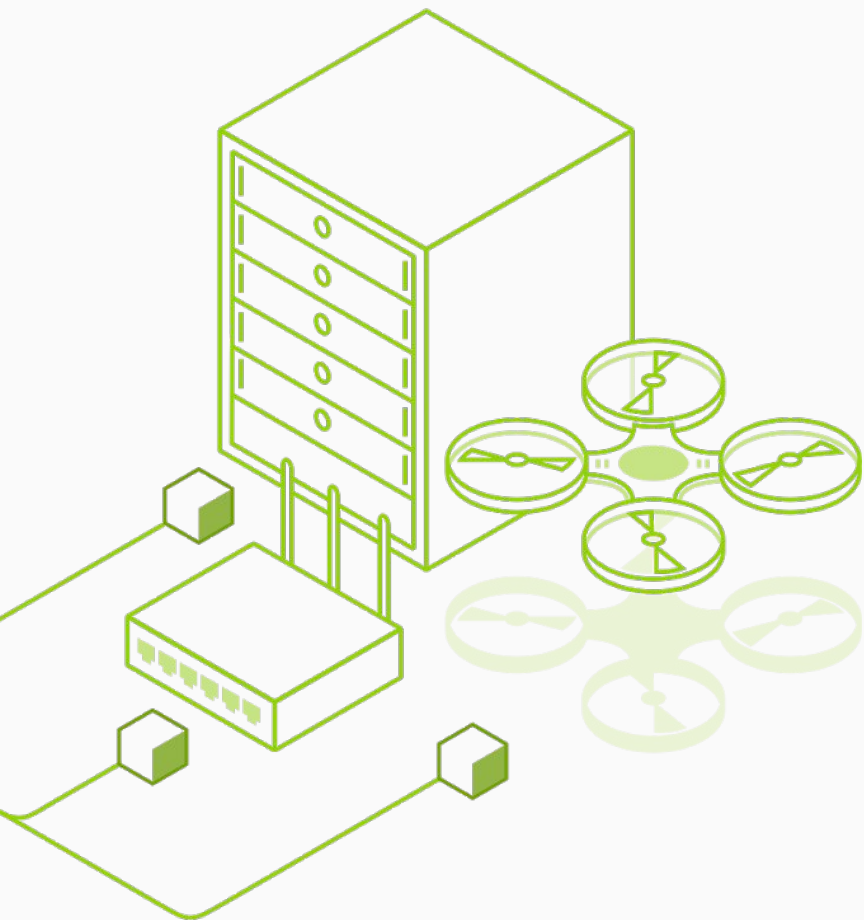
	amd64
latest/stable	1.30.0
latest/candidate	-
latest/beta	1.30.0
latest/edge	1.30.0

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	amd64	edge, stable	a month ago
188	1.28.2	amd64	edge	2 months ago
187	1.28.2	arm64	edge	2 months ago
186	1.28.2	armhf	edge	2 months ago
185	1.28.2	amd64	edge, stable, beta	2 months ago
184	1.28.2	i386	edge	2 months ago
183	1.28.2	armhf	edge	2 months ago
182	1.28.2	arm64	edge	2 months ago
181	1.28.2	amd64	edge	2 months ago
180	1.28.2	i386	edge	2 months ago
179	1.28.2	arm64	edge	2 months ago
178	1.28.2	amd64	edge	2 months ago
177	1.28.2	armhf	edge	2 months ago
176	1.28.2	i386	edge	2 months ago
175	1.28.1	armhf	edge	2 months ago

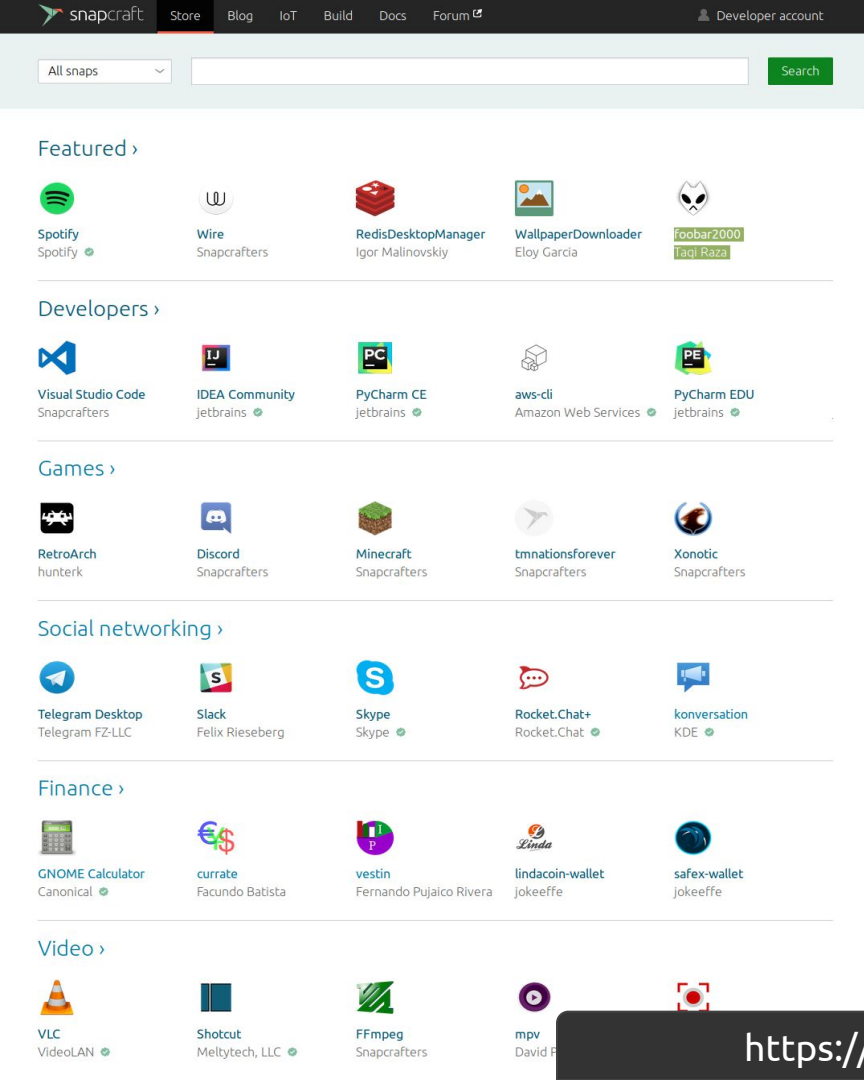
Full control of update lifecycle

- Updates published instantly
- Cryptographically signed and tamper-proof
- Risk-based update channels for creating software testing programmes



Automatic over-the-air updates

- No additional infrastructure or code needed
- End user systems automatically apply updates, four times per day
- Eliminate the long tail of releases to support and lower your costs

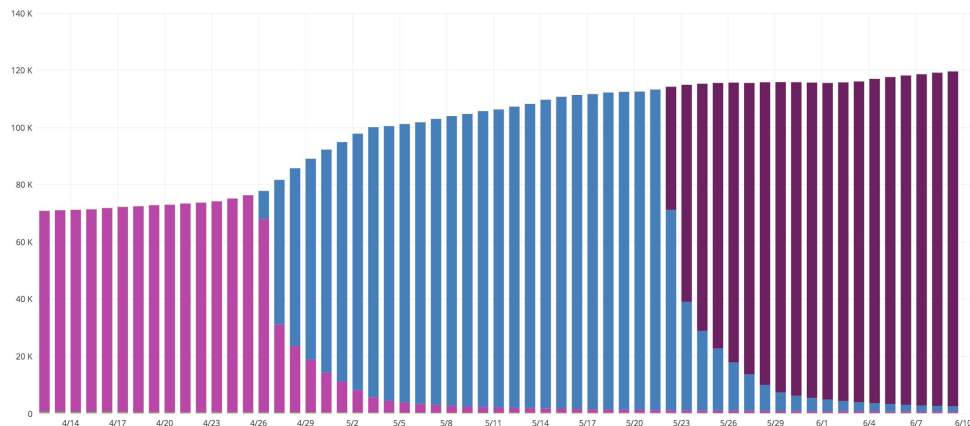


Out of the box discovery by tens of millions

- All Ubuntu versions since 14.04 and other major Linux distributions gives broad coverage
- All software welcome, regardless of license or cost

<https://snapcraft.io/store>

Developer dashboards



Weekly active devices

32,824

Past 30 days

By version

20k
10k

2018-09-08

1.1.23.353.g15c... 23,594
1.1.22.142.a23c... 6,985
1.1.21.128.ef12... 934
1.0.42.117.b98... 857
1.0.89.311.gb4... 324
6 other 130

< My snaps

Atom

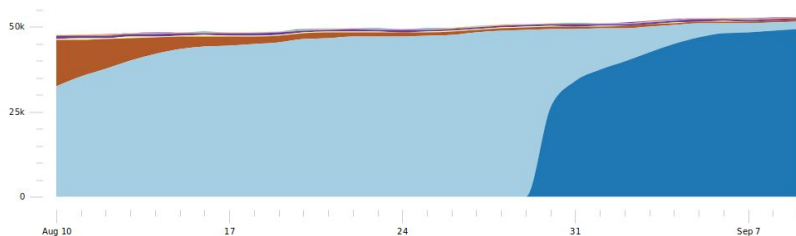
Listing Releases Metrics

Weekly active devices

52,827

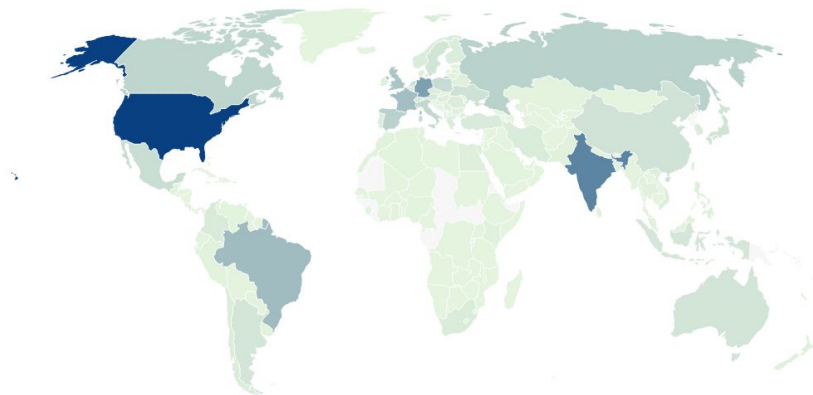
Past 30 days

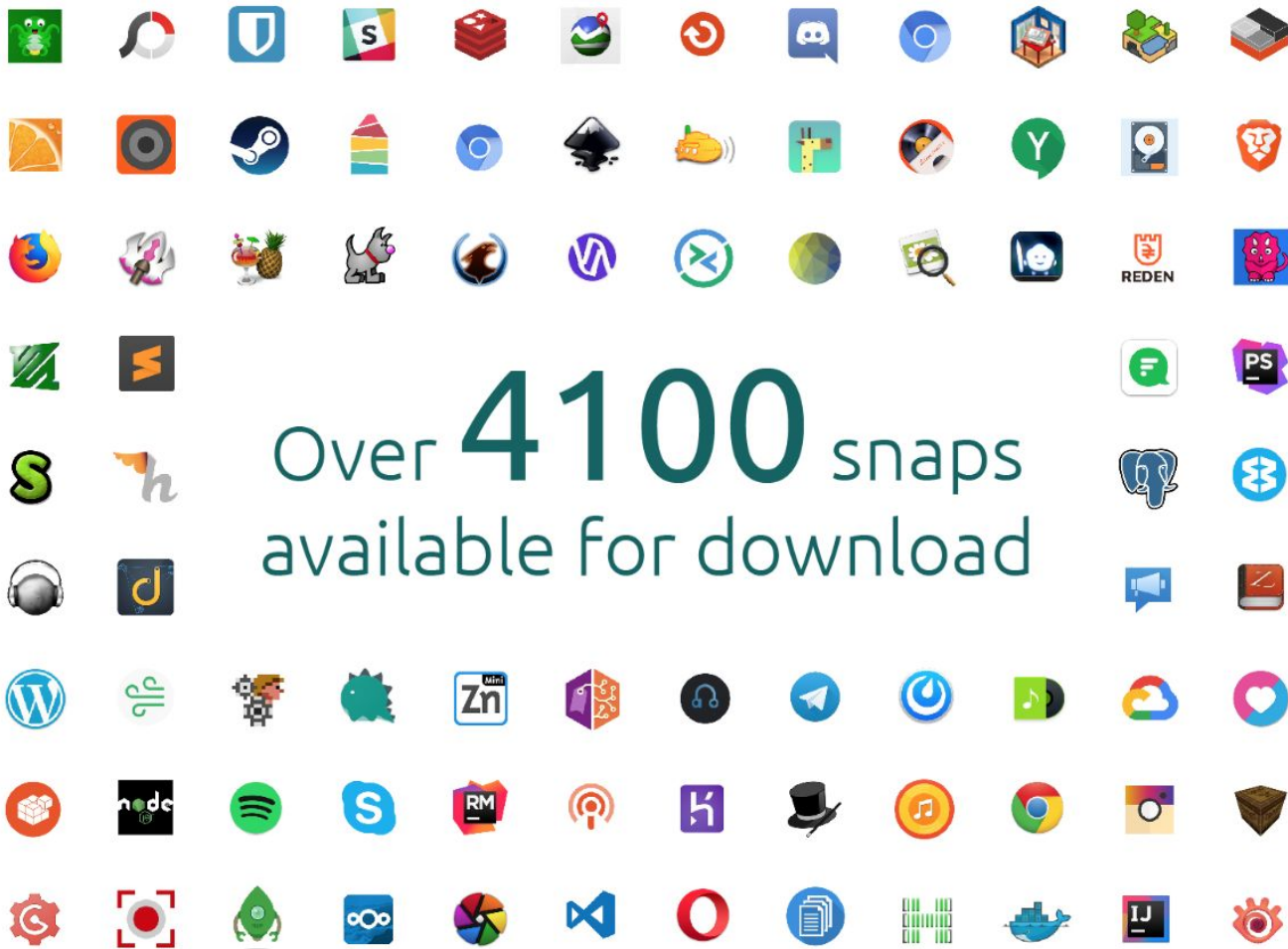
By version



Territories

185





Enterprise Proxy

- **Enterprise Proxy** enables fine-grained control over which snaps and revisions of snaps are available for **consumption** by their fleet of devices
 - Also provides a means to access the Snap Store for devices with restricted network access