



How to manage Ubuntu systems in air-gapped environments

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Disclaimer!

- > No one-size-fits-all: the best system is the one that works for you!
- > Not rules, just experiences from my TSE work in providing bug/break fix to supported Linux infrastructure.
- > I am not a sysadmin or a devops guy but one with more VMs than friends!





Agenda

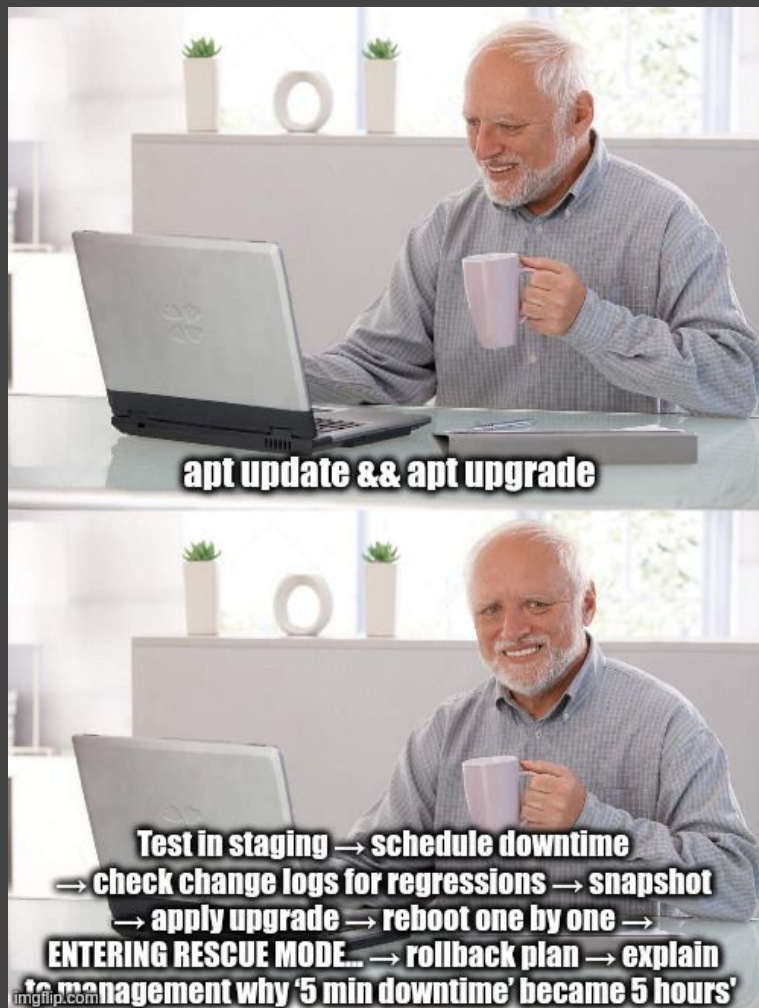
- Intro
- Lab setup
- Setup walkthrough
- More lab setups
- Features walkthrough
- Q.n.A



The General User

VS

Enterprise Reality ...





Challenges ...



Monitor machines at scale

Prometheus + Grafana ? [COS](#) ?



Manage multiple policies for different environment needs

Puppet / Ansible / Chef ?



Security and Compliance

Mirror tools - apt-mirror / reprepro ? Security patches - playbooks, unattended-upgrade, scripting ?



Remote access

SSH ?



Landscape

Landscape automates security patching, auditing, access management and compliance tasks across your Ubuntu estate. Use it in well-connected or air gapped environments: at sea, in space and everywhere in between

ubuntu.com/landscape





Lab Setup - pro token

ubuntu.com/pro/dashboard

Canonical Ubuntu

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FREE PERSONAL TOKEN

Free Personal Token

Machines	Created	Expires
5	26 May 2023	Never

Free Personal Token

Cost	Billing	Machine type	Active machines
\$0.00	None	Physical	0 ⓘ
Token			



Lab Setup - enable pro

documentation.ubuntu.com/pro/

```
$ sudo pro attach ClfxxxLPt --no-auto-enable
This machine is now attached to 'Ubuntu Pro - free personal subscription'
SERVICE      ENTITLED  STATUS   DESCRIPTION
anbox-cloud    yes       disabled Scalable Android in the cloud
esm-apps       yes       disabled Expanded Security Maintenance for Applications
esm-infra      yes       disabled Expanded Security Maintenance for Infrastructure
fips-updates   yes       disabled FIPS compliant crypto packages with stable security updates
landscape      yes       disabled Management and administration tool for Ubuntu
livepatch      yes       disabled Canonical Livepatch service
realtime-kernel* yes       disabled Ubuntu kernel with PREEMPT_RT patches integrated
usg            yes       disabled Security compliance and audit tools

* Service has variants

NOTICES
Operation in progress: pro attach

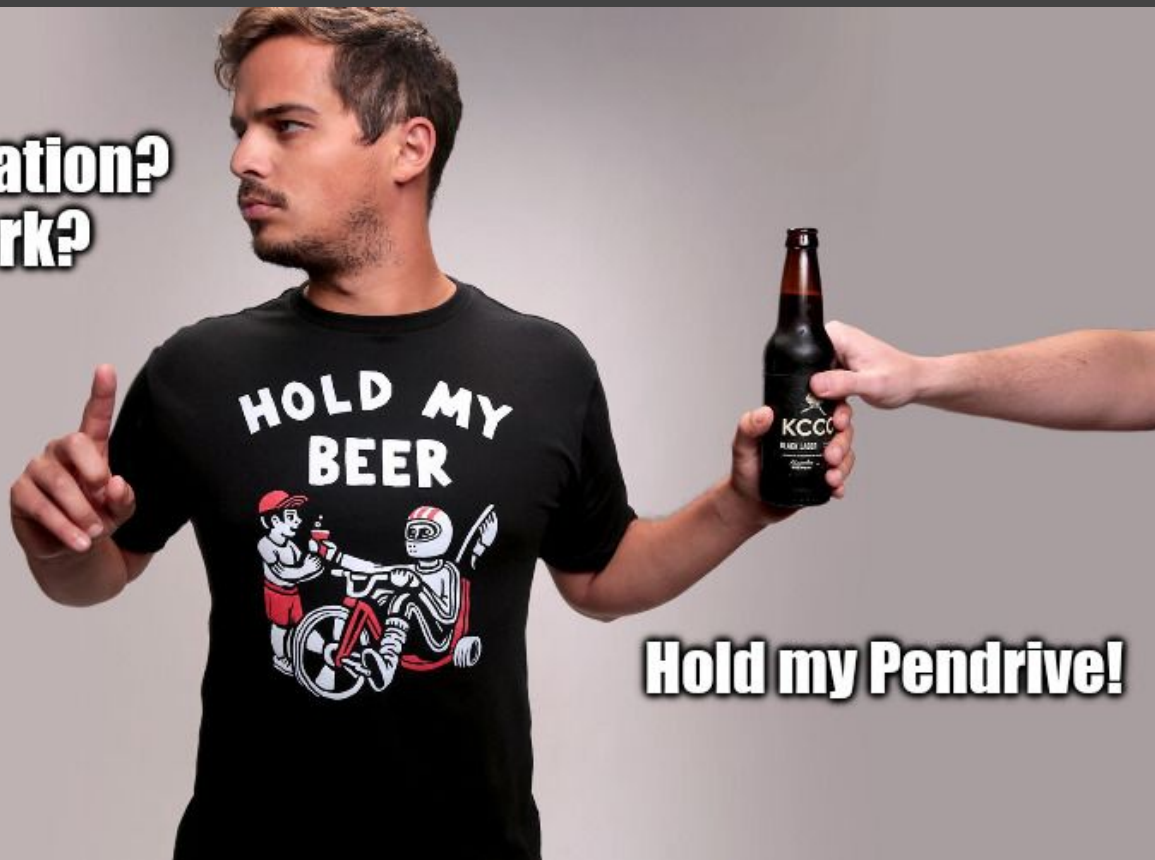
For a list of all Ubuntu Pro services and variants, run 'pro status --all'
Enable services with: pro enable <service>

Account: pravesh.gaire@canonical.com
Subscription: Ubuntu Pro - free personal subscription
```




Offline installation...

**Slow installation?
No network?**

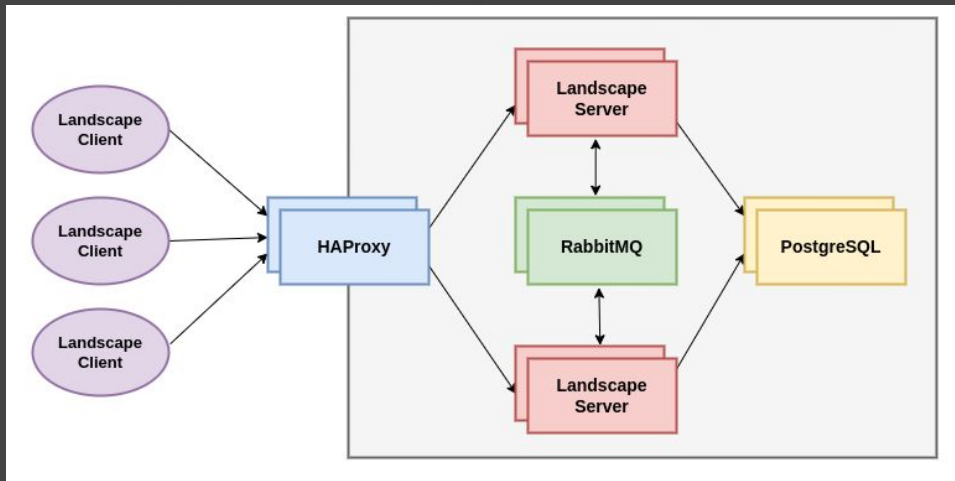


Hold my Pendrive!



Lab Setup - Landscape quickstart

documentation.ubuntu.com/landscape/how-to-guides/landscape-installation-and-set-up/



[Script: lab-setup.sh](#)

```
sudo apt install  
landscape-server-quickstart -y
```





Multipass

Multipass is a tool to generate cloud-style Ubuntu VMs quickly on Linux, macOS and Windows. It provides a simple but powerful CLI that enables you to quickly access an Ubuntu command line or create your own local mini-cloud.

documentation.ubuntu.com/multipass

```
$ multipass launch noble --name $SERVER_NAME --cpus 4 --memory 6G --disk 450G --cloud-init landscape-  
server.yaml  
  
$ ps -ef | grep landscape-server  
root      4000    1970   1 Aug29 ?           00:28:05 /snap/multipass/15565/usr/bin/qemu-system-x86_64 -  
bios OVMF.fd --enable-kvm -cpu host -nic  
tap,ifname=tap-1737f2e1bd1,script=no,downscript=no,model=virtio-net-pci,mac=52:54:00:21:43:80 -device  
virtio-scsi-pci,id=scsi0 -drive file=/var/snap/multipass/common/data/multipassd/vault/instances/  
landscape-server/ubuntu-24.04-server-cloudimg-amd64.img,if=none,format=qcow2,discard=unmap,id=hda -  
device scsi-hd,drive=hda,bus=scsi0.0 -smp 4 -m 6144M -qmp stdio -chardev null,id=char0 -serial  
chardev:char0 -nographic -cdrom /var/snap/multipass/common/data/multipassd/vault/instances/landscape-  
server/cloud-init-config.iso -loadvm suspend -machine pc-i440fx-8.2
```



Why multipass and not lxd?

<https://insgr.uk/2024/06/desktop-vms-lxd-multipass/>

Multipass is perfect for quickly launching Ubuntu VMs

Ephemeral jobs

Developer experience

Supports linux, mac, windows (hypervisors)

LXD, originally a container manager, now supports full-fledged VMs

Long running workloads

Cluster friendly

Only for linux (lxc)



Customized instances with multipass and cloud-init

cloud-init is a tool for automatically initializing and customizing an instance of a Linux distribution.

documentation.ubuntu.com/lxd/latest/cloud-init/

```
# client configurations
# landscape-client.yaml
cat <<EOF > landscape-client.yaml
#cloud-config
package_update: true
packages:
  - software-properties-common


runcmd:
  - add-apt-repository -y ppa:landscape/latest-stable
  - apt-get update
  - echo "${SERVER_IP} ${SERVER_NAME}" | sudo tee -a /etc/hosts
  - sudo pro attach ${PRO_TOKEN} --no-auto-enable
  - apt-get install -y landscape-client
  - echo | openssl s_client -connect ${SERVER_NAME}:443 2>/dev/null | openssl x509 | sudo -u landscape
tee /etc/landscape/landscape-server.crt
- |
  landscape-config \
    --computer-title="$(hostname)" \
    --account-name standalone \
    --url https://${SERVER_NAME}/message-system \
    --ping-url http://${SERVER_NAME}/ping \
    -k /etc/landscape/landscape-server.crt \
    --silent
EOF
```



Landscape account setup

landscape-server/new-standalone-user

b vault

 Landscape

Welcome to Landscape

Name *

The first and last name.

E-mail address *

Personal e-mail address.

Passphrase *

A secret passphrase.

Verify passphrase *

Verify the secret passphrase.

[Sign up](#)

pravesh

pravesh.gaire@canonical.com

[Edit settings](#)

Timezone:	Asia/Kathmandu
Identity URL:	

API access ?

API credentials for Organisation

Endpoint:	https://landscape-server/api/
Access key:	6LTK97AEVMQ4OACSALLM
Secret key:	8A4y59Ip8KDI12F0Nfo7Z8X4owKH+d0FuEkHZGcU

[Regenerate API credentials](#)



Major challenge when air gapped?

Package management



apt...





apt ...

General Process:

1. Configure sources at
/etc/apt/sources.list{,.d}
2. `apt update` to download
package index at
/var/lib/apt/lists/
3. Query package cache for details -
`apt show`
4. Select correct candidate for
package based on apt preferences
5. Resolve conflicts & dependencies
6. dpkg install ...

```
$ apt-cache policy | head -n 6
Package files:
100 /var/lib/dpkg/status
   release a=now
500 https://packages.microsoft.com/repos/code stable/main armhf Packages
   release o=code stable,a=stable,n=stable,l=code stable,c=main,b=armhf
   origin packages.microsoft.com

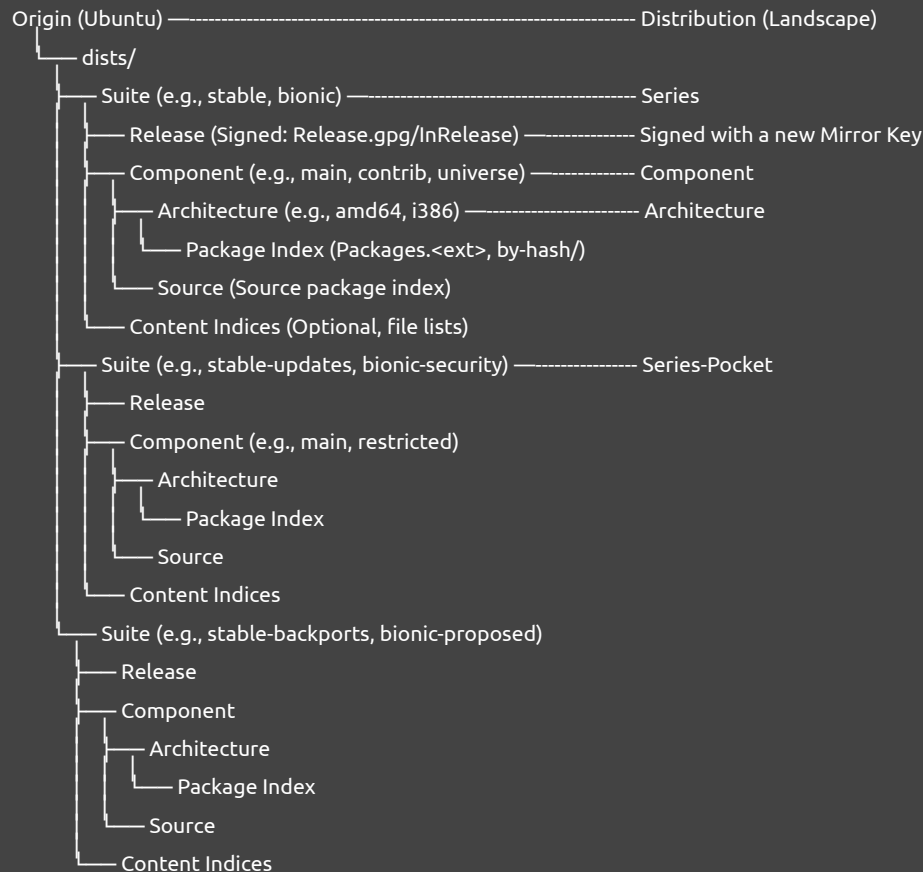
$ ls /var/lib/apt/lists/ | head -n 2
download.sublimetext.com_apt_stable_Packages
esm.ubuntu.com_apps_ubuntu_dists_noble-apps-security_InRelease

$ apt show landscape-client
Package: landscape-client
Version: 25.04-0landscape0
Priority: optional
Section: admin
Maintainer: Ubuntu Developers <ubuntu-devel-discuss@lists.ubuntu.com>
Original-Maintainer: Landscape Team <landscape-team@canonical.com>
Installed-Size: 711 kB
Depends: python3:any, debconf (>= 0.5) | debconf-2.0, libc6 (>= 2.34), landscape-common (=
25.04-0landscape0), python3-pycurl, python3-dbus, python3-yaml
Download-Size: 130 kB
APT-Sources: https://ppa.launchpadcontent.net/landscape/latest-stable/ubuntu noble/main amd64 Packages
Description: Landscape administration system client
 Landscape is a web-based tool for managing Ubuntu systems. This
 package is necessary if you want your machine to be managed in a
 Landscape account.
.
This package provides the Landscape client and requires a Landscape account.

N: There are 2 additional records. Please use the '-a' switch to see them.
```



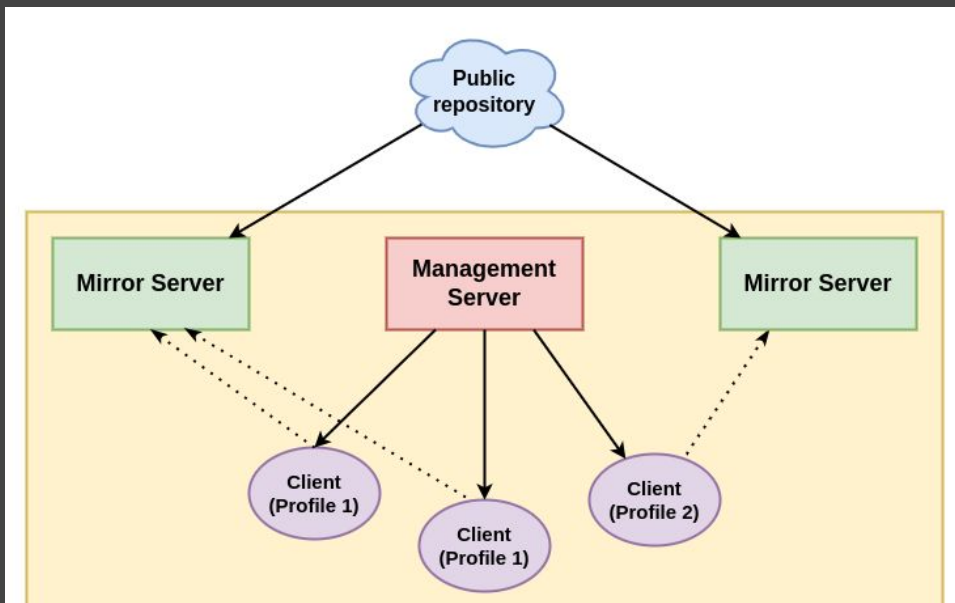
Debian Repository Structure





Lab Setup - Repository Mirroring

<https://documentation.ubuntu.com/landscape/how-to-guides/repository-mirrors/>



Available Tools:

- [reprepro](#) (used by Landscape)
- [apt-offline](#)
- [aptly](#)
- [apt-mirror](#)
- [debmirror](#)
- [apt-cacher-ng](#)

Mirroring Ubuntu Archive:

[Script: mirror-setup.sh](#)

```
$ landscape-api create-distribution ubuntu

$ landscape-api create-series jammy ubuntu \
--pockets backports \
--components main \
--architectures amd64 \
--gpg-key mirror-key \
--mirror-uri http://archive.ubuntu.com/ubuntu/ \
--mirror-series jammy

$ landscape-api sync-mirror-pocket backports jammy ubuntu
```



Security and Compliance - Walkthrough

- Repository Profiles (Landscape managed apt sources)
- Package Profiles (meta-package)
- Upgrade Profiles (package upgrades and USN fixes)
- Security Profiles (USG/DISA-STIG fix & audit)
- External authentication (AD, OIDC)
- RBAC (access groups, permissions and roles)



Misc features

- Remote script execution
- Legacy and Rest API
- Graphs
- Alerts



Why Landscape?

- [Offline Installation](#)
- [Self-Hosted](#) - Scalable with juju/charms
- Repository Management:
 - [Manage tiered repository mirrors for multi-region and air-gapped deployments](#)
- Security upgrades in offline environments
- Compliance Audits, Fixes and Reports
- RBAC and Policy-Based Management
- API endpoints, etc ...



Thank you!
Questions?

Contact: google @gairepravesh



THIS IS A MYTH!