Ubuntu Touch: What is it and why should you care?

Agenda

- Introduction
- History
- Technology
- App Development
- Porting

Introduction

Introduction

- The infamous mobile OS duopoly
  - Android
  - iOS

- It's big tech & proprietary
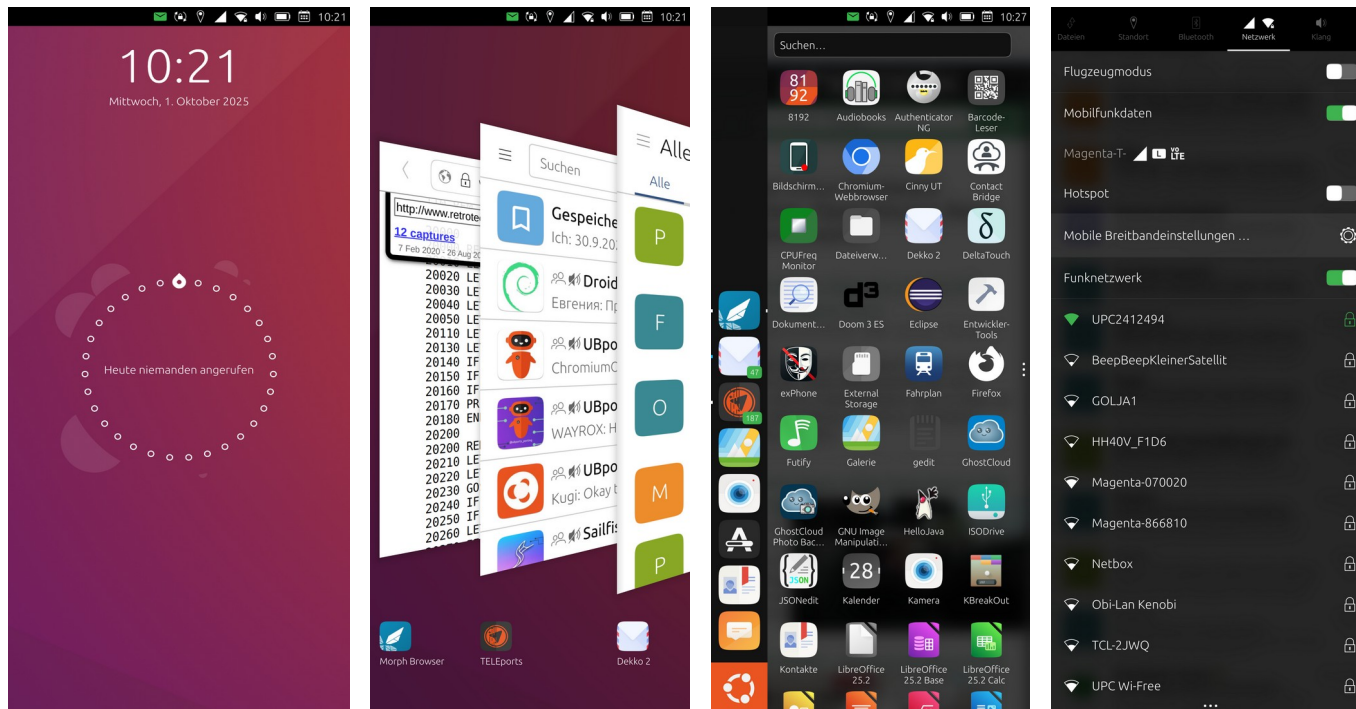
- We need something better

Introduction

- Meet Ubuntu Touch:
  - A Free and Open Source mobile Operating System
  - We don't spy on you
  - We don't target ads on you
  - The future: convergence and cross-formfactor UX

Introduction

- There's more:
  - Immutable file system
  - The Open Store
  - .debs via Libertine
  - Snaps in 24.04
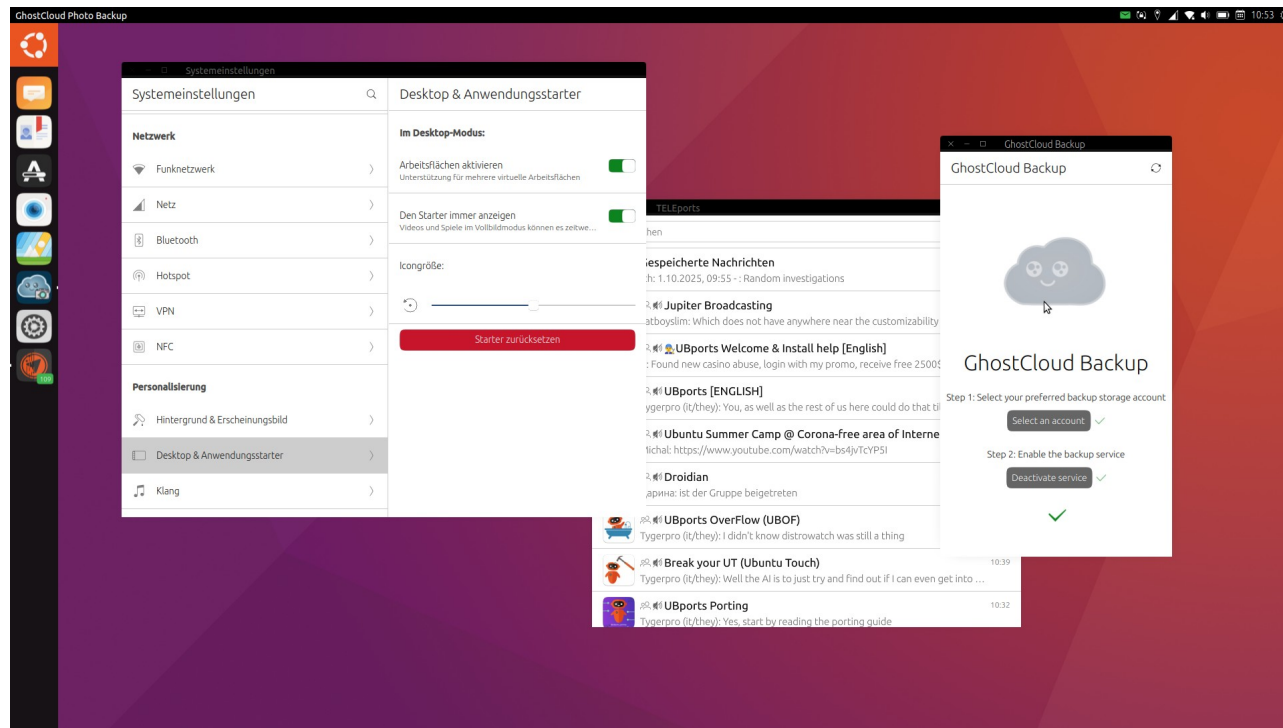 - Runs Android apps via Waydroid

Introduction

Introduction

- Convergence:
  - One UX for all kinds of form factors
  - Apps adapt to the running system
  - Seamless switching between devices
  - Mobile devices can power a full desktop experience

Introduction

History

History

- Announced in 2013
  - „Ubuntu for phones and tables"
  - Unity8
- Initial focus on developing markets
- First glimpse on the Galaxy Nexus
  - „Android with Ubuntu Touch running in a container"
- Rearchitecturing soon after
  - Ubuntu Touch as the host, stripped Android in a container

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History

- UBports community starts in 2015
  - Founded by Marius Gripsgard
  - Focussing on porting Ubuntu Touch to more Android phones
  - OnePlus One as premiere example device

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History

- 2016:
  - 6 devices sold with Ubuntu Touch preinstalled
    - BQ Aquaris E4.5
    - BQ Aquaris E5
    - Meizu MX4
    - Meizu Pro 5
    - BQ Aquaris M10 HD
    - BQ Aquaris M10 FHD

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History

- Canonical discontinues Ubuntu Touch & Unity8 in 2017
  - UBports takes over development
- UBports Foundation established in 2019
  - Foundation in accordance with German law
- Rebranding of Unity8 to Lomiri in 2020
  - Avoiding confusion with Unity Game Engine
  - Allows other distributions to ship it

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History

- Fast forward to 2025

  - Partnerships with hardware manufacturers

    - Volla

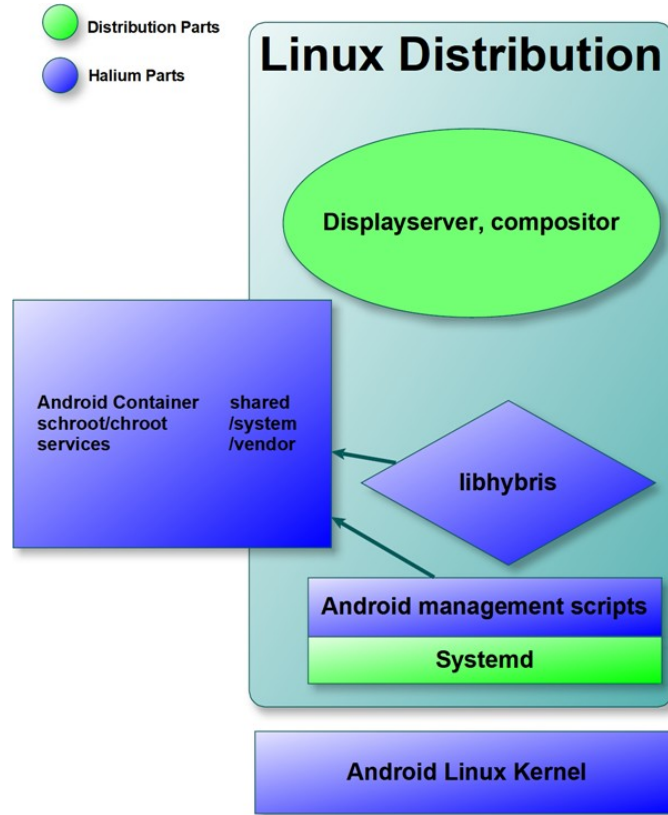   - Pine64

    - Fairphone

Technology

Technology

- libhybris
  - Allows loading Android libraries into a GNU/Linux process
  - Supplements drivers with glibc-residing wrapper libraries
    - libEGL
    - libGLESv2
  - Compatibility layers for accessing camera, multimedia and various Android C++ classes from GNU/Linux

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Technology

- Halium
  - Hardware abstraction layer for Android devices
  - Allows running GNU/Linux with Android blobs
  - Runs all necessary HAL services in a LXC container
  - Not used on the PinePhone

Technology

Technology

- Lomiri

  - Our convergent desktop shell

  - Switches appearance based on usage scenario

  - Written in C++ with Qt, QML & JavaScript

Technology

- Mir & QtMir
  - Mir display server
  - Integrated into the Qt Scene Graph
  - Powers the Lomiri shell
  - Works on Mesa & KMS, plus others using platform plugins

Technology

- Mir Android Platform
  - Integrates Android drivers into the Mir compositor
  - Every device using Ubuntu Touch is hardware-accelerated by default
  - Supports external monitors

Technology

- Aethercast
  - Provides our „Wireless Desktop Mode"
  - Streams an H264 virtual screen cast over Miracast to a display adapter
  - Integrates with Android's multimedia framework
  - Low resource usage

Technology

Technology

- Qt
  - Qt5 and Lomiri UI Toolkit 1.3
    - Currently shipped with Ubuntu Touch 24.04-1.0
  - Qt6 and Lomiri UI Toolkit 2.0
    - In the works
    - Will power new Morph with Qt6 WebEngine first

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Technology

- Telephony Stack:
  - ofono
    - Powers modem using plugins to the Halium-side RIL & IMS daemons
  - telephony-service
    - Maintains state over incoming and outgoing calls
  - telepathy-ofono
    - Bridges ofono and telepathy

Technology

- Audio
  - Using PulseAudio modules for Android HALs
    - Uses HALs provided by the vendor
    - Creates Pulseaudio Sinks & Sources
    - Has mutiple profiles to switch between hardware-wired inputs and outputs
  - PipeWire is a dream for now

Technology

- Multimedia
  - Hardware-accelerated video using Halium-side video decoders & encoders
  - GStreamer pipelines using gst-hybris
  - Out-of-process video playback using media-hub
    - Allows pausing music apps while playing in the background

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Technology

- Filesystem encryption
  - fscrypt
  - Only encrypts /home
  - Operating system & userdata are split

App development

App development

- Clickable
  - All-in-one toolchain
  - Docker container
  - Includes compilers and IDE
  - Allows running on device or testing on the desktop
  - Runs your app through review
  - And much more

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App development

- Recommended toolkits
  - Lomiri UI Toolkit
    - The „Ubuntu Touch Experience"
    - Great for Ubuntu Touch-only apps
  - Qt Quick Controls 2
    - Multiplatform Qt apps
    - Themed to look like an Ubuntu Touch app
  - SDL
    - Used in games
    - Works using Wayland

Porting

Porting

- Porting nowadays is easy
  - Patch your kernel
    - AppArmor
    - Namespacing features
  - Overlay files for configuration
    - ofono, PulseAudio, etc
  - Halium image is provided by UBports

Porting

- Built on GitLab CI
  - Fetches generic Halium build tools
  - Builds your port
  - Makes it ready for system-image server
  - Hosted on UBports infrastructure for OTA updates

Thank you!

Links

- https://ubports.com

- https://ubuntu-touch.io

- https://halium.org

- https://fredl.me