



Data centers from discarded cell phones

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MOTIVATION

- Phones have 10 yr lifespan, but are usually discarded in 1-2 yrs*
- Phones are **hard to recycle**



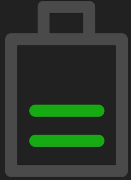
*<https://link.springer.com/content/pdf/10.1007/s00170-009-2228-z.pdf>

PROPOSAL



- Collect discarded phones that are still functional (broken screen is OK)
- Connect them up to a management device
- Try to do something useful :)

CHALLENGES



Power

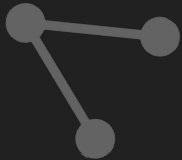
- Phone batteries swell with continued use
- Phones can't be turned on/off remotely

Operating system



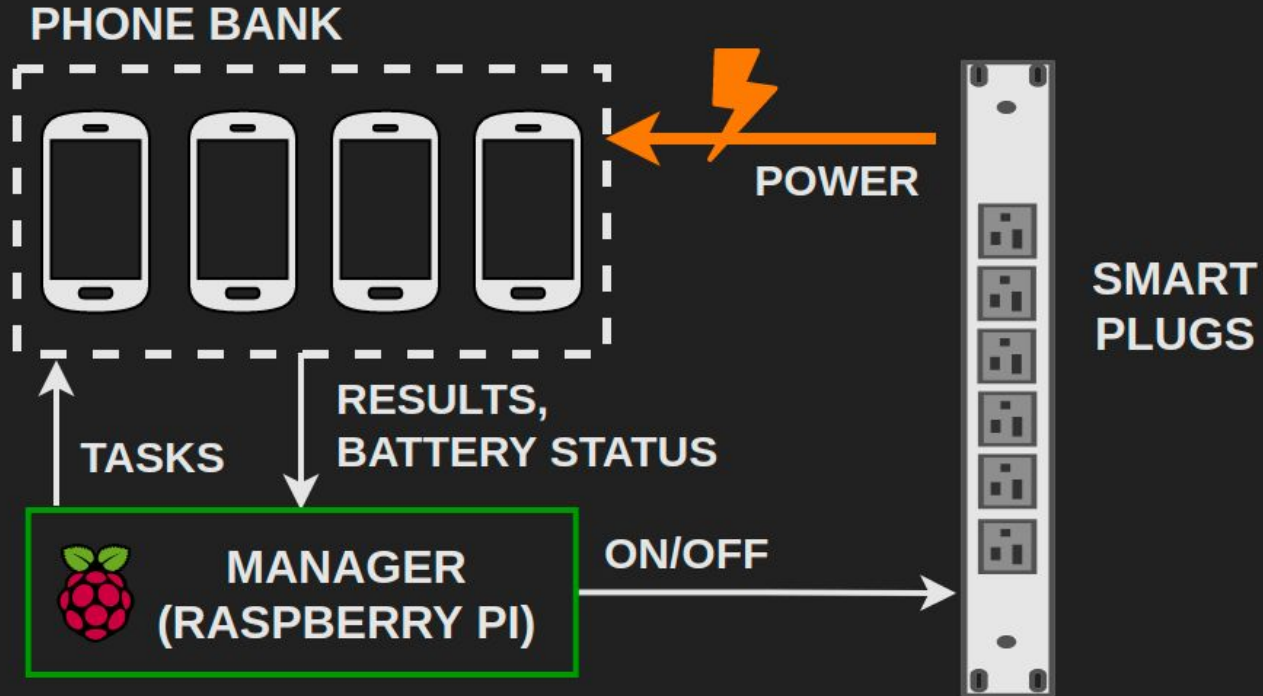
- Mobile OS' expect human input
- Compatibility issues between versions

Task management



- Tasks must be distributed
- Resources (e.g. RAM) is limited
- Phones will fail

SYSTEM OVERVIEW



CURRENT STATE

- Acquired basic hardware
 - Raspberry Pi
 - Smart plugs
 - 3 old phones
- Replaced Android with Ubuntu Touch OS



GOALS FOR THE QUARTER



1. Write software for the manager (Raspberry Pi) and workers (phones)
2. Interface devices + build physical container
3. Stress test + evaluate on a variety of workloads

Answer the questions:

- What is the energy efficiency of the system?
- How does physical hardware degrade?
- **What type of workloads are appropriate?**

SUMMARY



- Phones are hard + energy-intensive to recycle; better to reuse
- Old phones can be repurposed as general-purpose compute devices
- **Proposal: Build a cell phone data center**

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