Attack-resilient media using phone-to-phone networking

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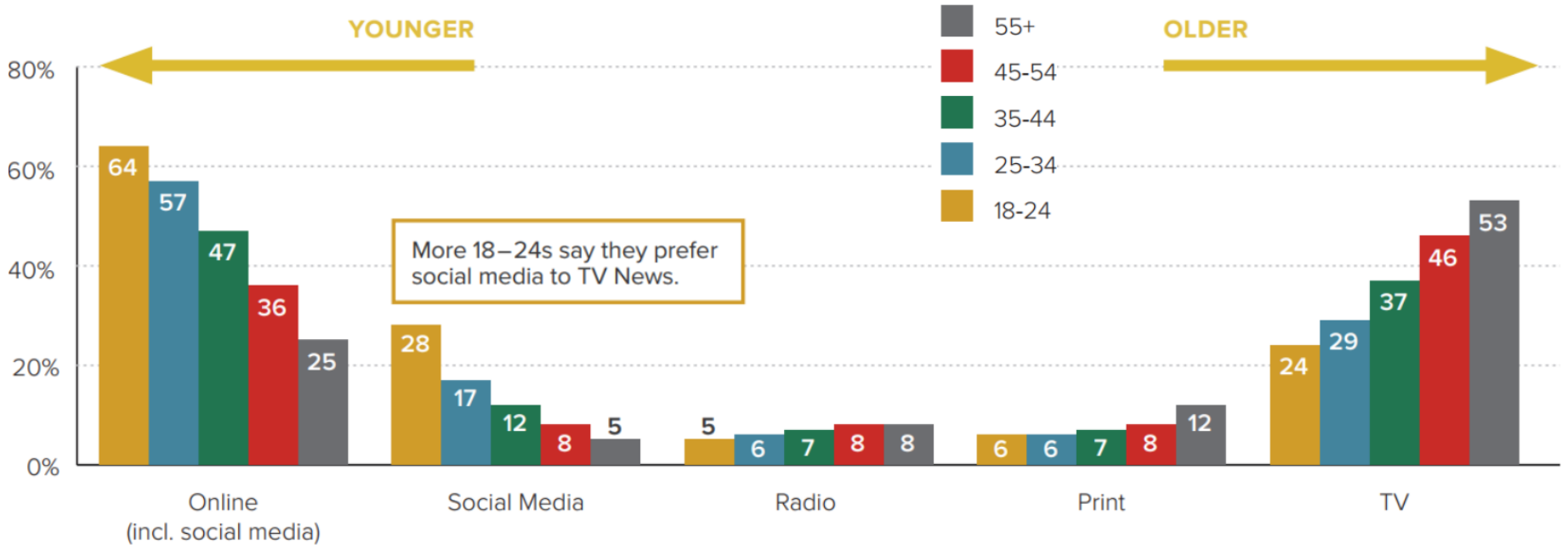
TU Delft

Context

- Smartphones are used for calling, mailing, navigating, dating, etc.
- Also: news consumption, production and distribution

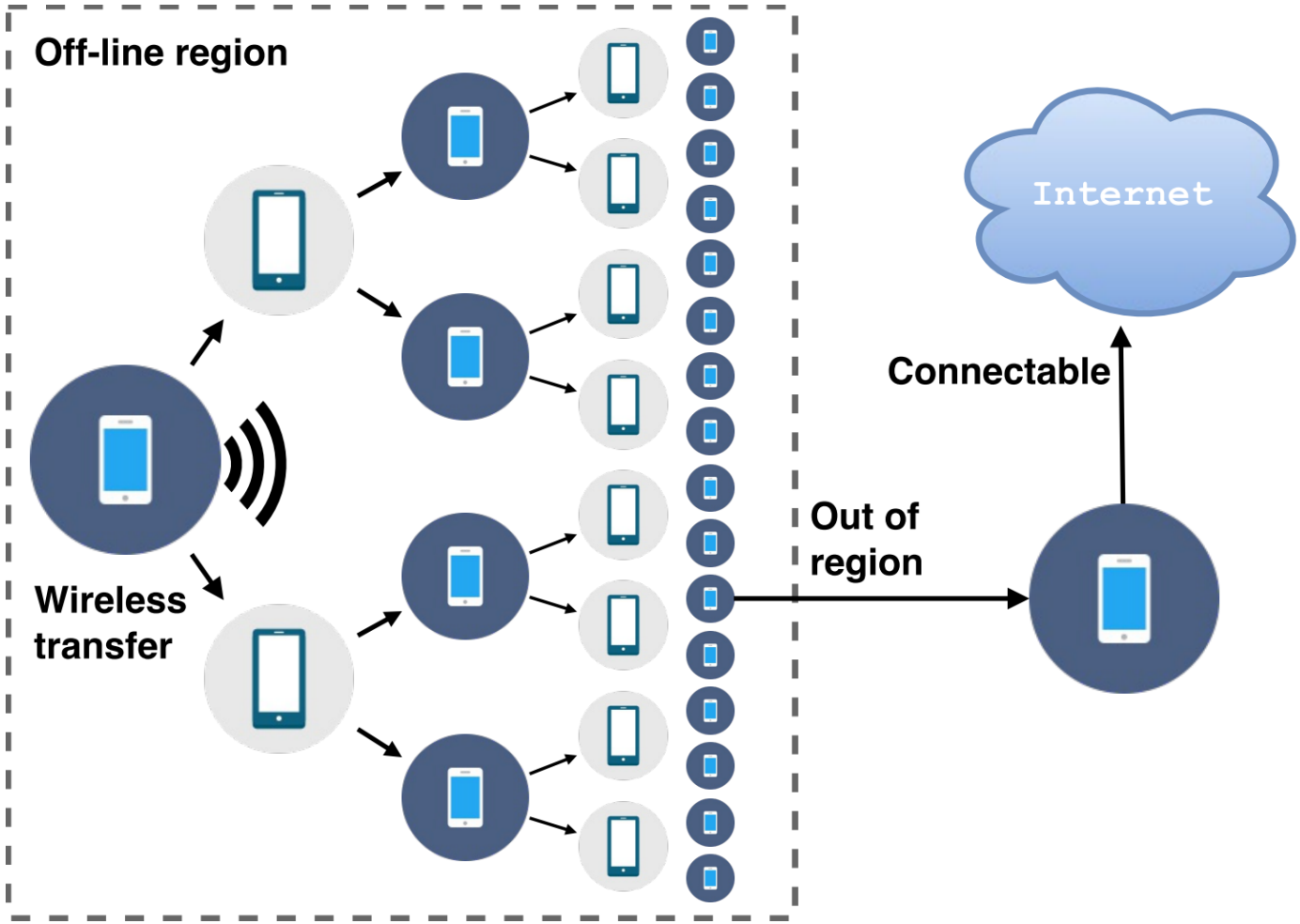


Adversary model

Internet access is sometimes limited:

- Censorship and kill-switches
  - Egypt, Syria, Turkey
- Natural disasters
  - Katrina, Nepal
- Not solved yet

Off-line information spreading



Possible solution: Tribler

- TU Delft research project
- Distributed information sharing platform
- Attack-resilience: hard to take down
  - Fully decentralized
- Route traffic for others
  - Trust: blockchain
- Now: to mobile

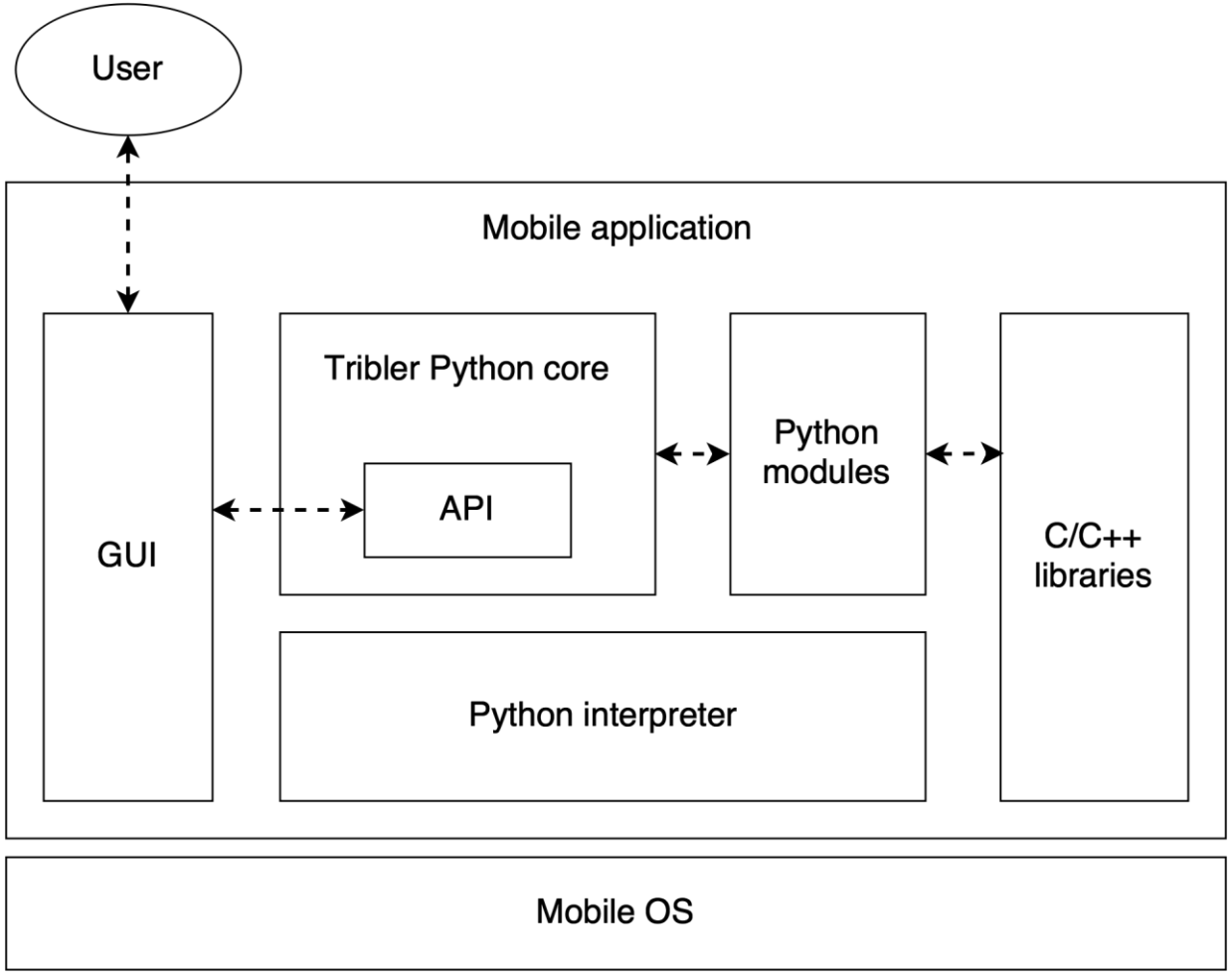
Research questions

1. How feasible is it to run all Tribler functionality on mobile devices?
2. Given the constraints and unique abilities of mobile devices, what functionality of Tribler can be added or enhanced?

Constraints and unique abilities of mobile devices

- Connectable: Wi-Fi, Bluetooth, NFC
- Ubiquitous
- Resource limited: battery, processing power

System architecture design



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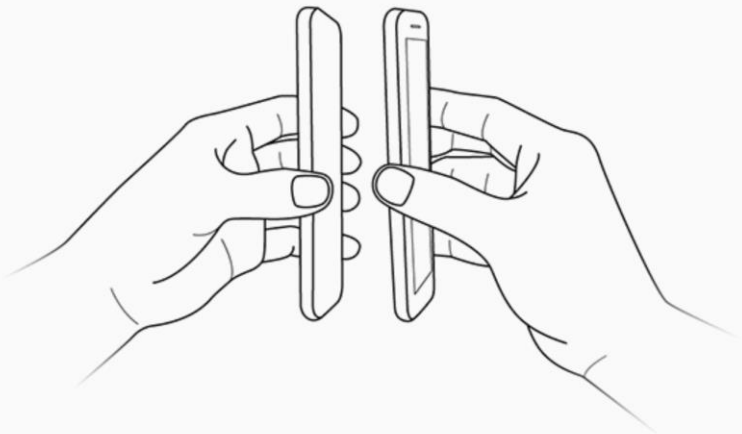
Send to nearby phone



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pioneer

Pioneer.One.SEASON1.720p.x264-VODO
7.9 GB

Pioneer.One.S01E03.Xvid-VODO
402.5 MB

Pioneer.One.S01E04.720p.x264-VODO
1.2 GB

Pioneer.One.S01E03.Theora.HDTV.XviD-helder1965.avi
171.1 MB

Pioneer.One.S01E01.REDUX.Xvid-VODO
377.1 MB

Pioneer.One.S01E01.REFIX.720p.x264-VODO
1.3 GB

Pioneer.One.S01E05.720p.x264-VODO
1.7 GB

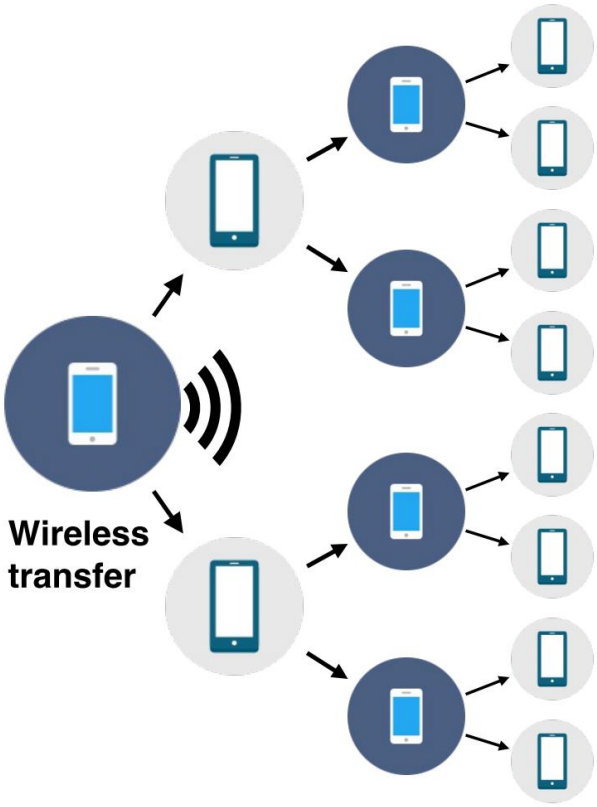
Pioneer.2013.1080p.BluRay.DTS.x264-

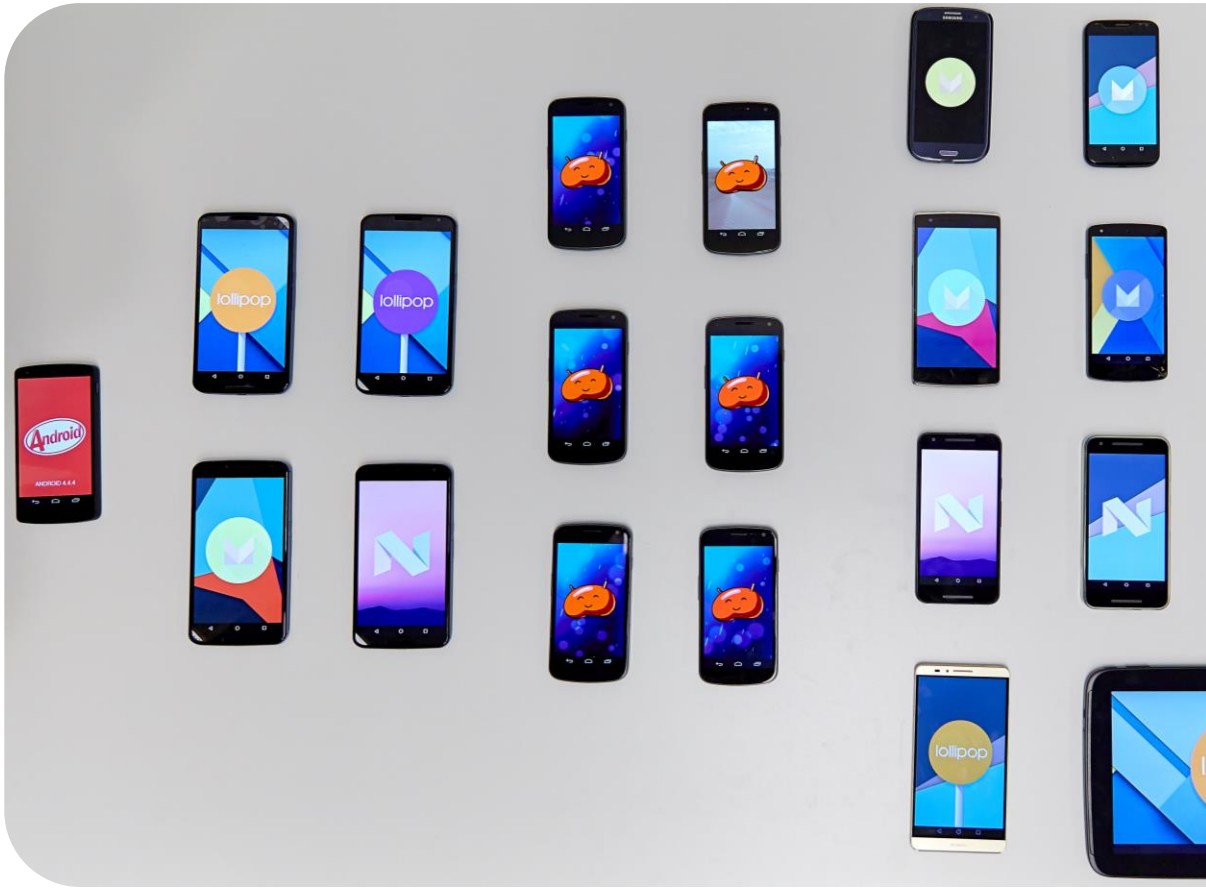
Experiments

1. Content discovery
2. Multichain
3. Startup time
4. API responsiveness
5. CPU utilization

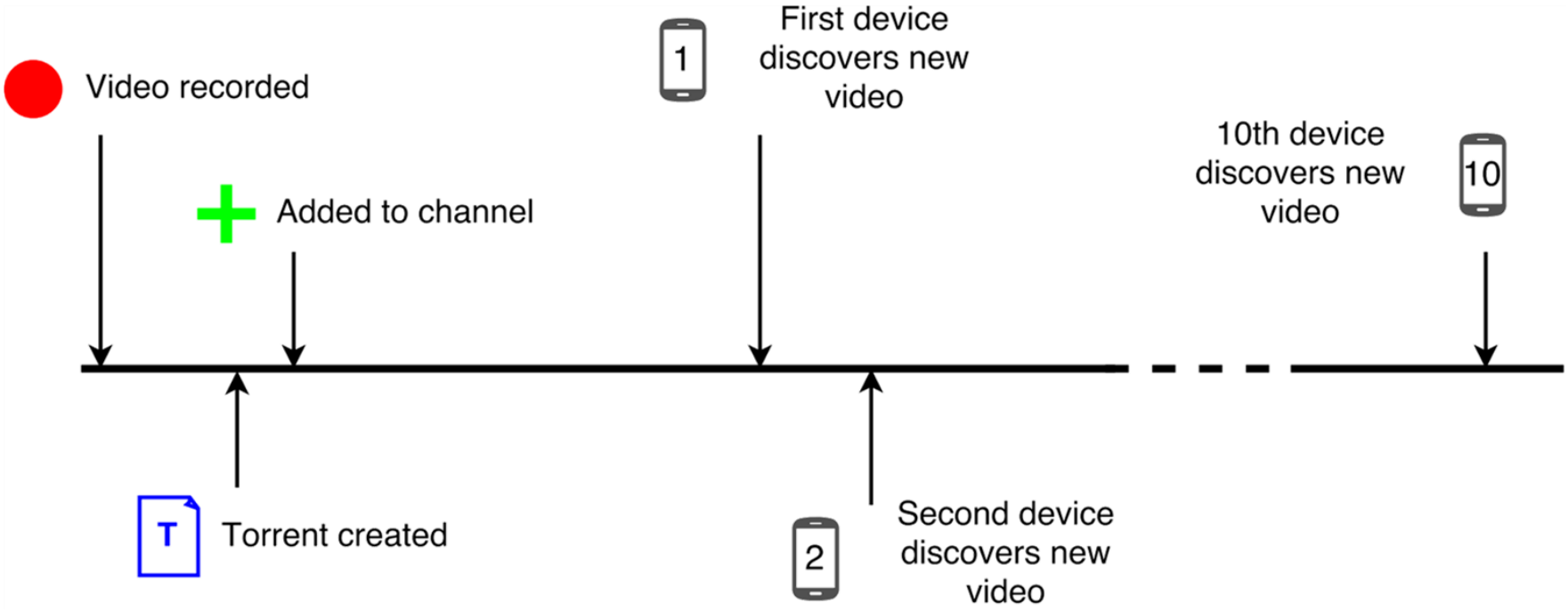
And more

1. Content discovery – Setup

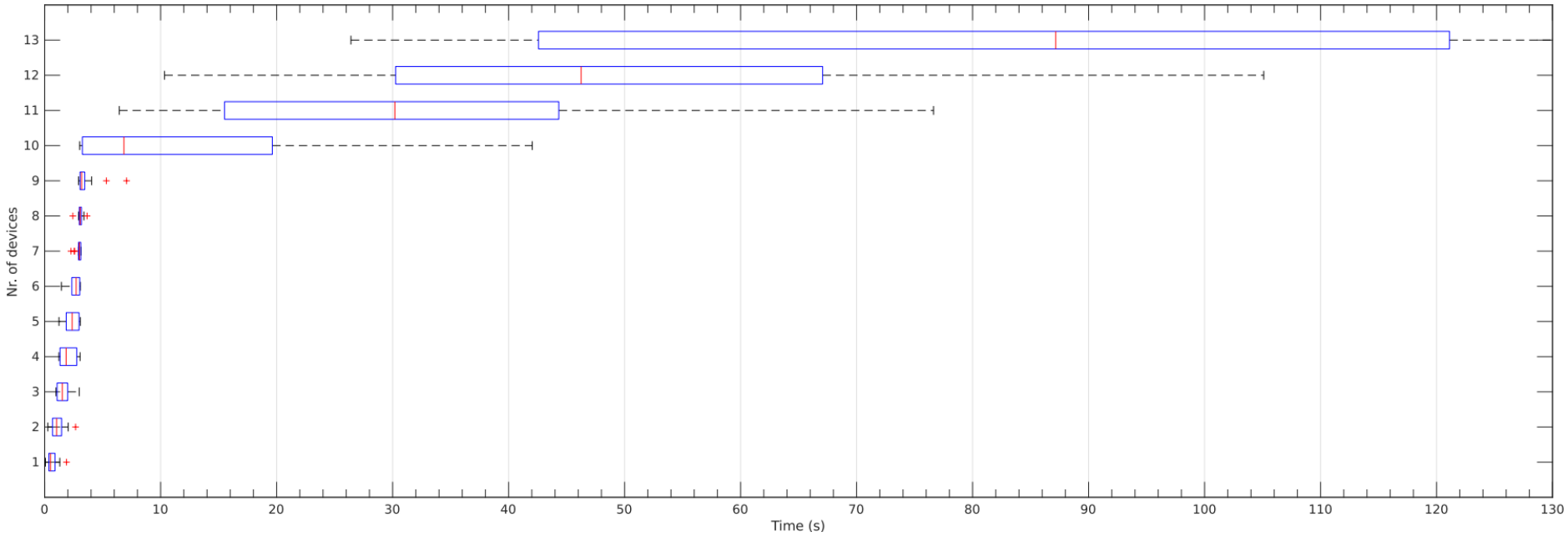




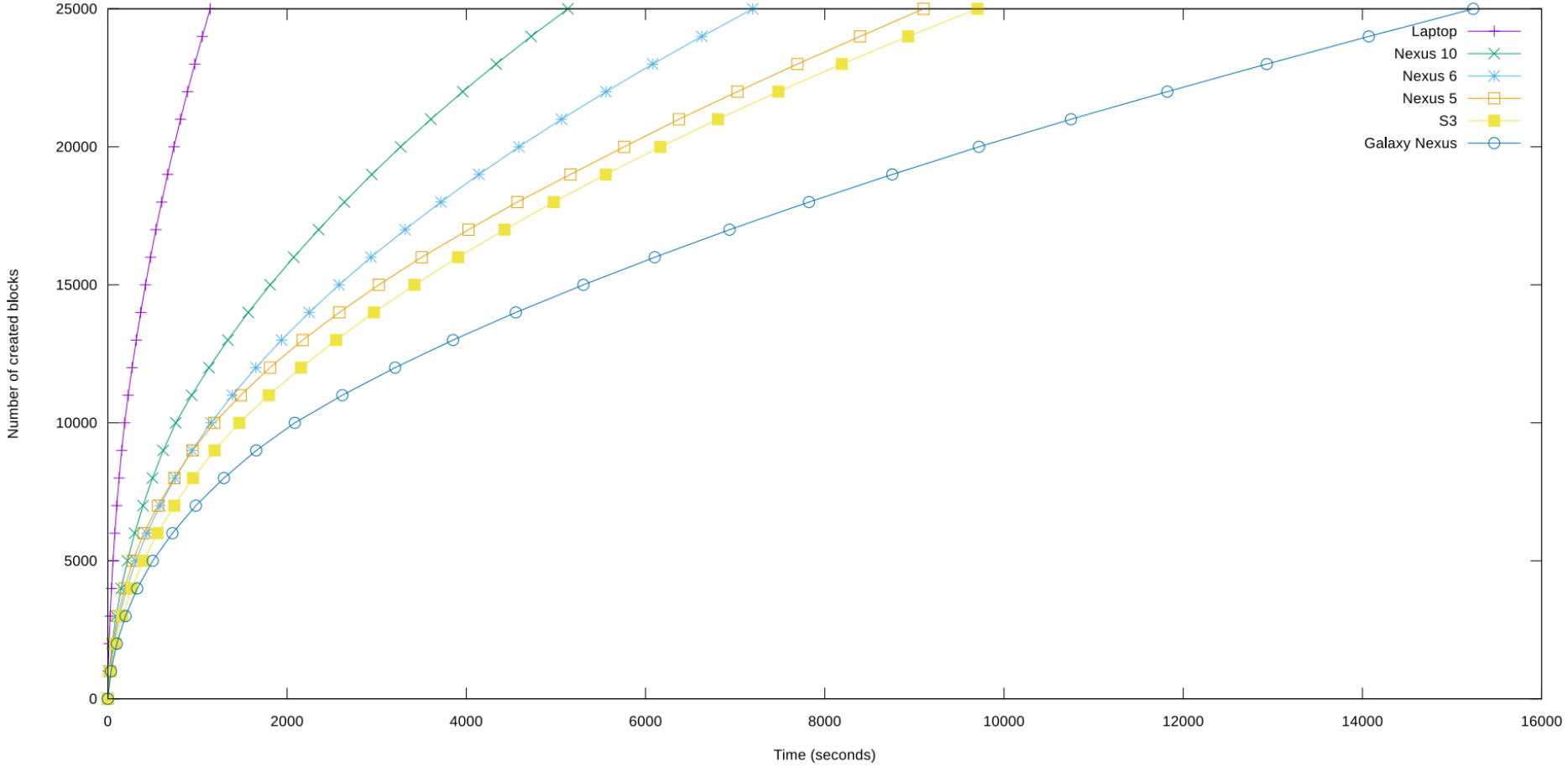
1. Content discovery – Sequence



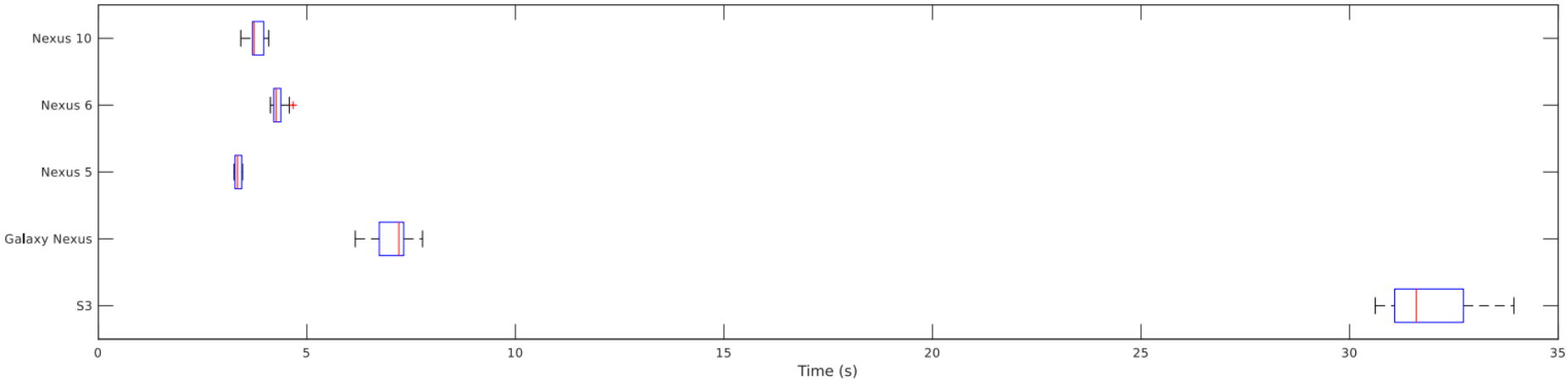
1. Content discovery – Results



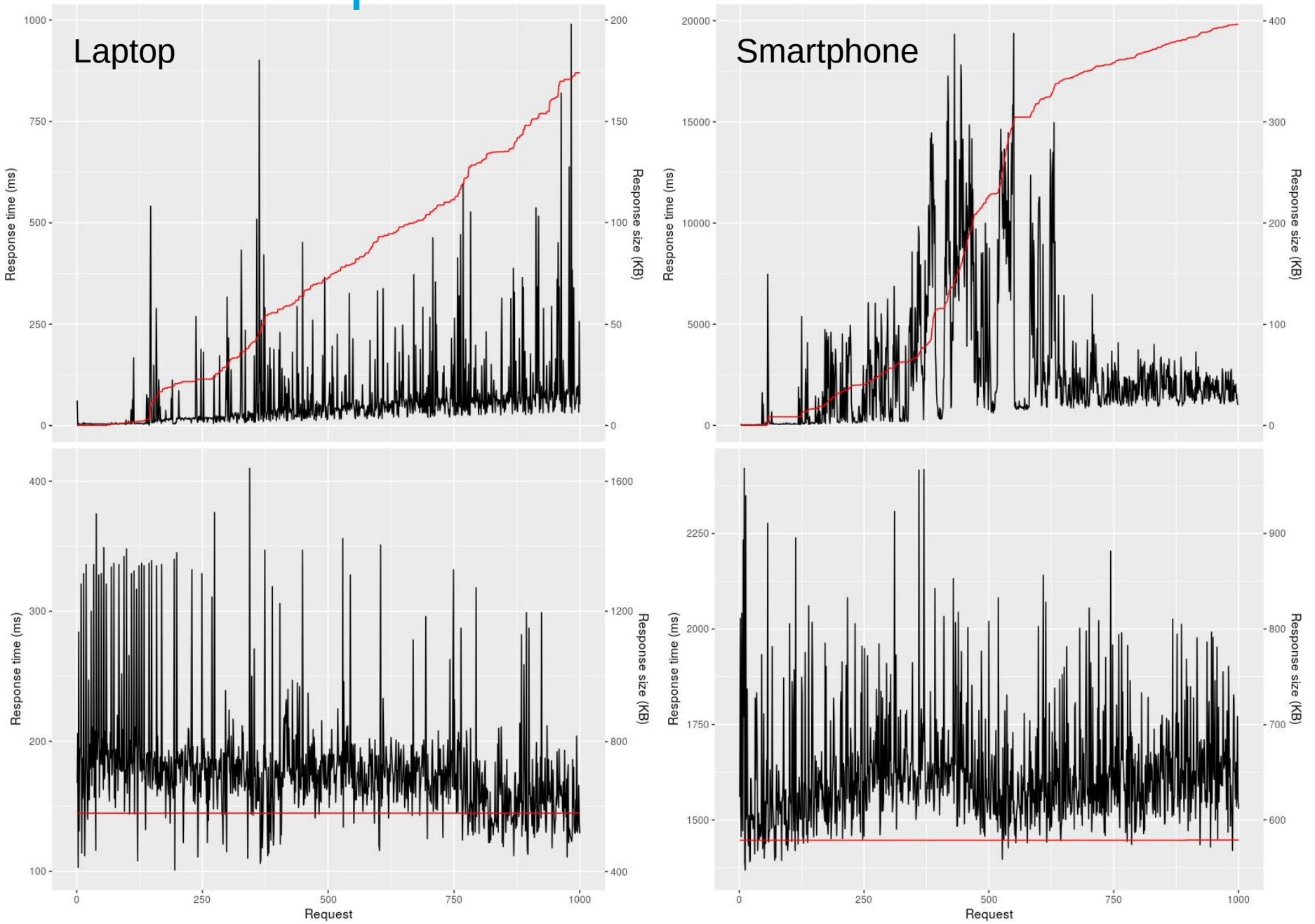
2. Multichain



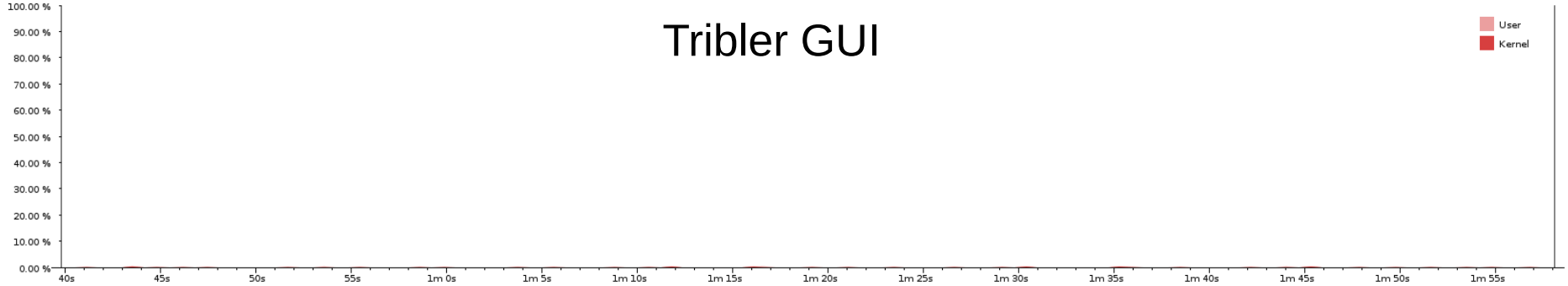
3. Startup time

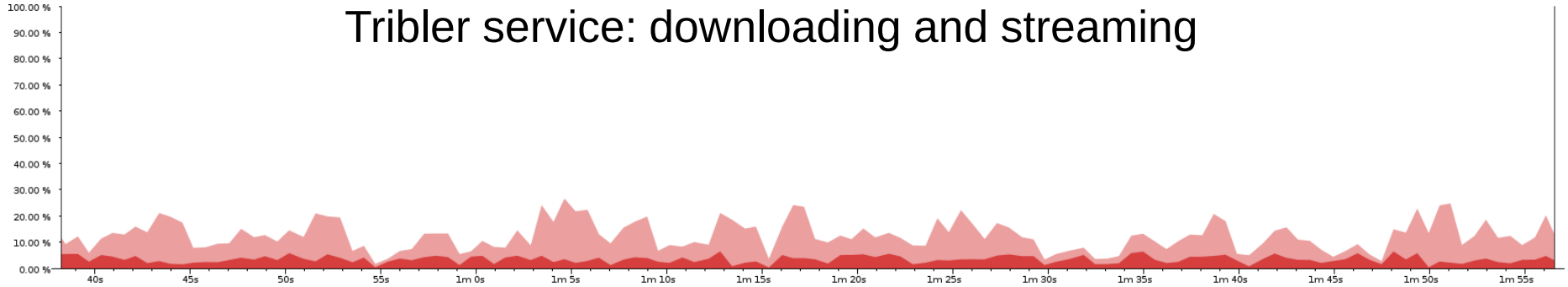


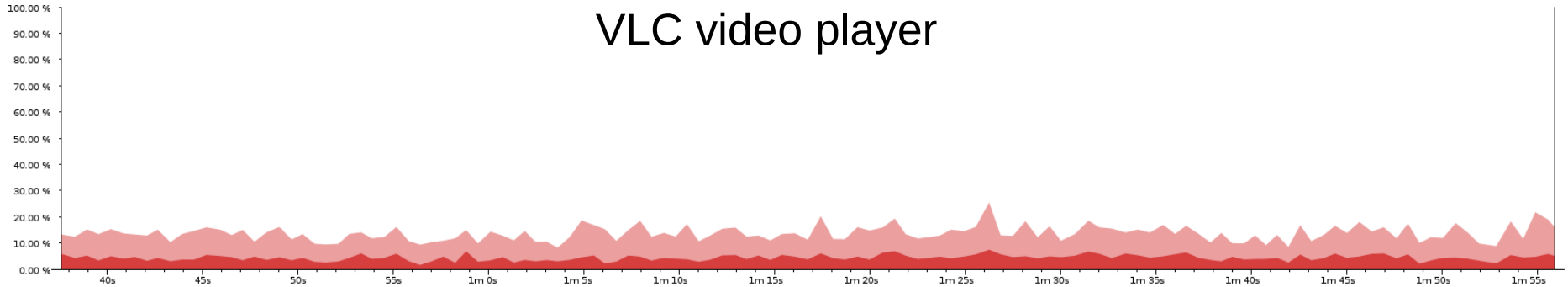
4. API responsiveness



5. CPU utilization – HD video streaming







Conclusions

- We now have a feasible mobile solution with Tribler
- First step to overcoming state censorship
- Potential user base of millions of people

Future work – Implementation

- Multi-core optimization
- Streaming API
- Towards other platforms
- Self-compilation and morphing stealth capabilities

Future work – Research

- New directions in Tribler research
  - How viral spreading of eyewitness content behaves in the real world
  - Effects of local crowds on anonymity with onion routing
  - Large-scale experiment with various degrees of powerful censors
  - Credit mining using shared private keychain

Questions?