

Summer class

Do-It-Yourself Networking

September 2016



DIYnet class in a nutshell

- 1 – 30 September 2016
- Focus: ideas, design, and implementation
- Lectures to introduce the background, concepts, tools, ...
- Hands-on exercises for warm-up
- Coding and experimental validation
- 10 ECTS
- Working in groups of two
- Grading based upon documentation, running code, contributions

Rough schedule

	Content
Week 1	Understanding the concepts, protocols, and sample systems (including sample applications) for hyperlocal DIY networking <ul style="list-style-type: none"> • Lectures on the content • Exercises for getting to know hardware, software, and tools
Week 2	Developing an application idea and then devising a specific system and application design <ul style="list-style-type: none"> • Exploring feasibility via experiments and rapid prototyping • Initial design documentation (subject to revisions)
Weeks 3-4	System implementation and testing Design revision as appropriate Completing documentation + small web site as user guide
Last day	Demo and presentations

Tools & prerequisites

- Raspberri Pis
- Android phones
- WLAN access points
- Optionally some sensors
- Expectations
 - Linux
 - System-level programming knowledge
 - Java
 - Scripting (e.g., PHP, python, perl, shell, ... -- whatever you'll need)
 - Web technologies: HTML 5, Javascript
 - Android native development (optional)

Next steps

- Moodle course details to come shortly
- Still some inconsistencies in the online system
- We'll start on 1 September @ 10ct

The Internet is convenient...

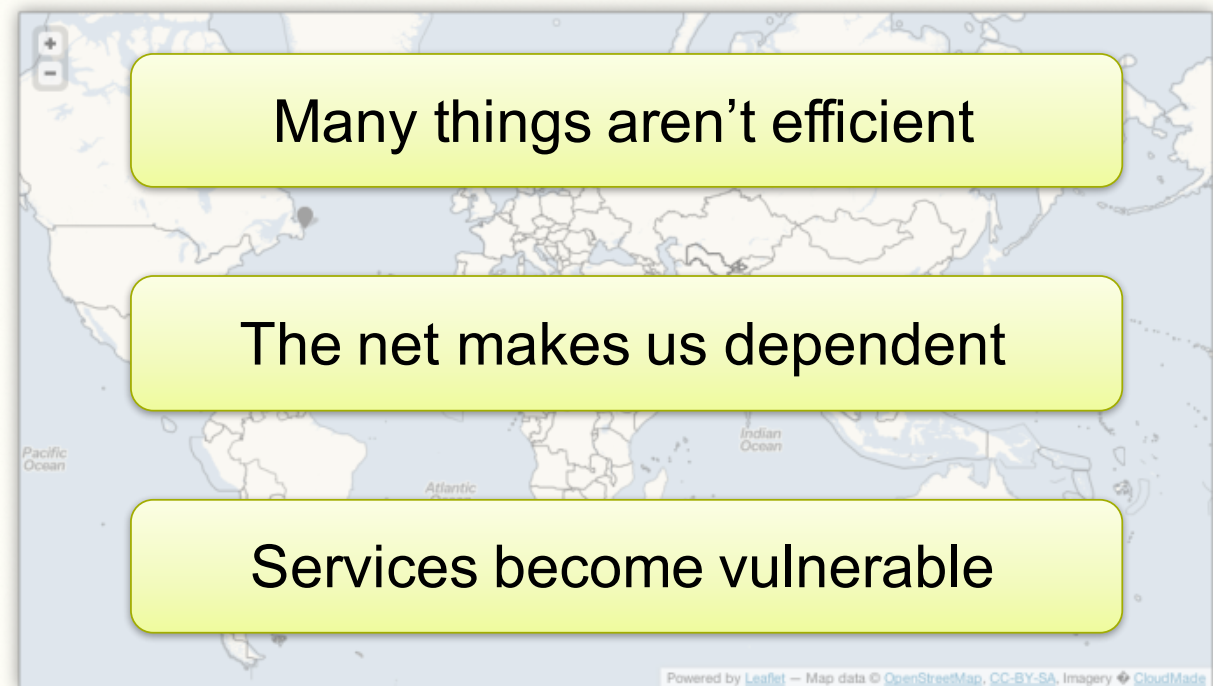


• Connects everybody, (almost) anywhere

- Cloud-based services relieve us of many hassles
 - Mobility between places and devices
 - Storage and content management
 - Wealth of services easy to try and use and to mash up
- Opens up unprecedented opportunities
 - Richness of content
 - Sharing, talking, networking
 - In unexpected ways

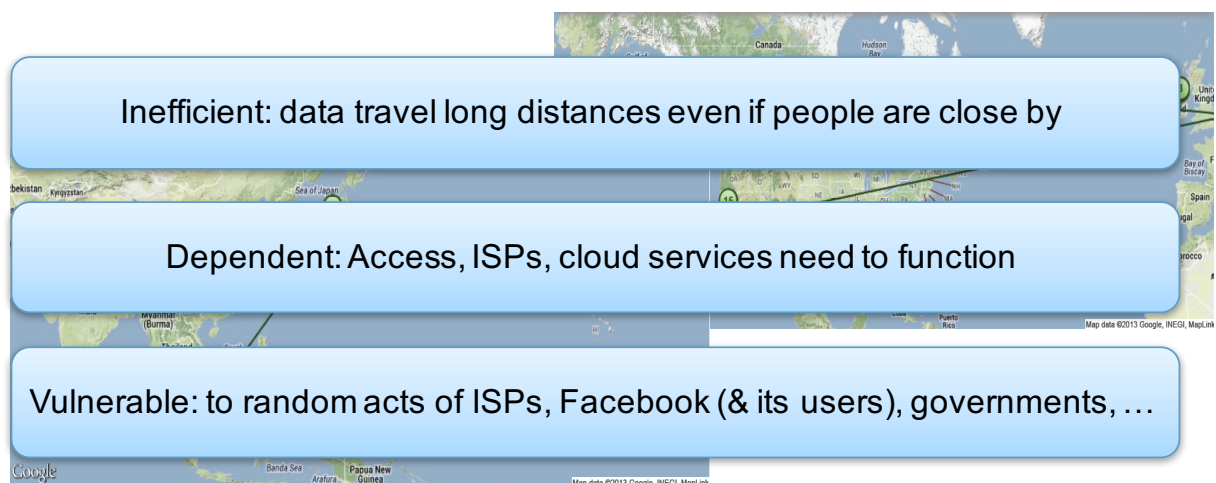
Powered by Leaflet — Map data © OpenStreetMap, CC-BY-SA, Imagery © CloudMade

BUT...

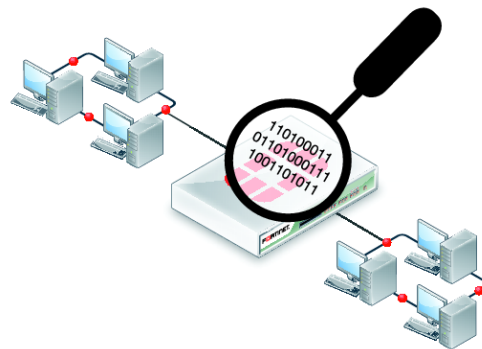


Example: Facebook

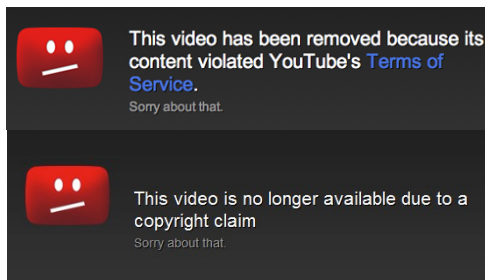
- Data centers in different parts of the world
- A network spanning continents with many peering points



Too easy...



**GOVERNMENT
CENSORSHIP
PROTECTING YOU FROM REALITY**

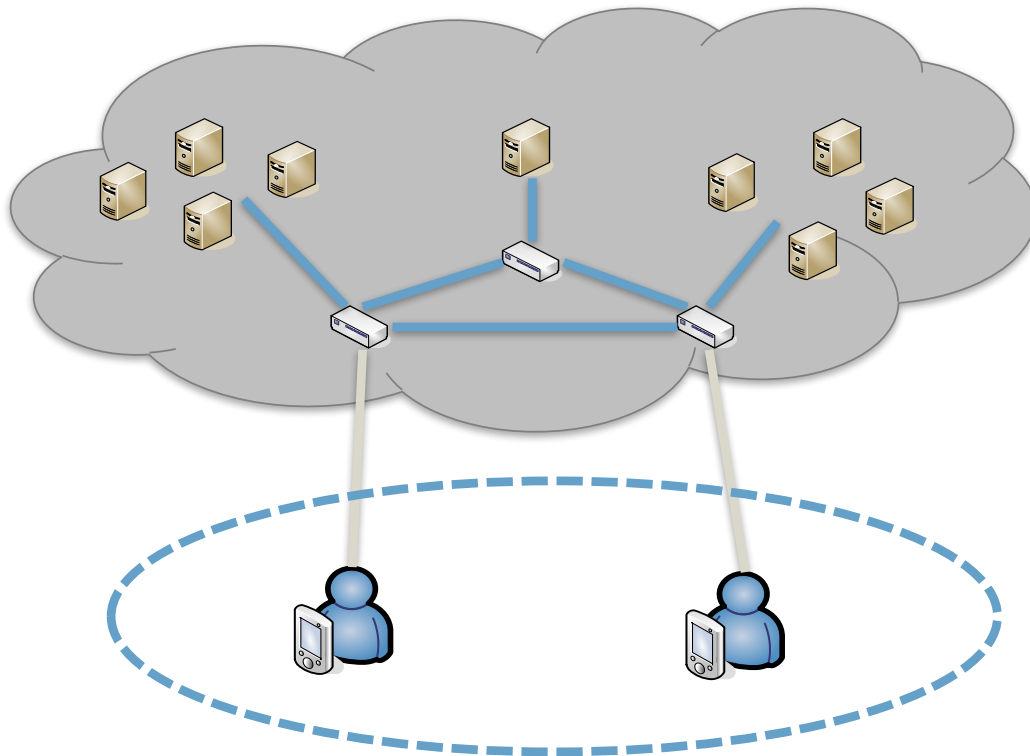


Neighborhood Networking: Localizing Content Sharing

- Keeping content that matters where it matters
- Limiting third party dependencies
- An intuitive understanding of the sharing context:
“What happens in Vegas stays in Vegas!”



Do-It-Yourself...



Do-It-Yourself...



Do-It-Yourself Networking

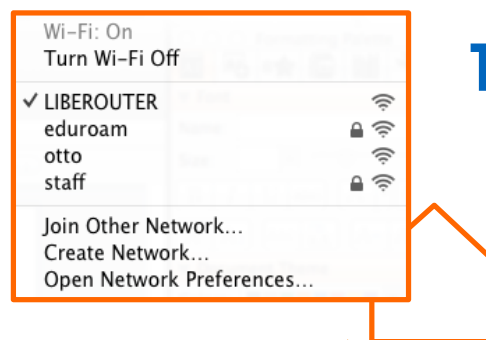


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Liberouter

- Basic features
 - WLAN access point
 - Captive portal
 - SCAMPI router
 - Storage node
 - Can mesh with other liberouters
 - Servers as a local app store
- Applications
 - Android liberouter distribution
 - Native SCAMPI (Java) applications
 - HTML5 applications (SCAMPI-enabled)



Teemu Kärkkäinen, Jörg Ott: Liberouter: Towards Autonomous Neighborhood Networking. Proceedings of IEEE/IFIP WONS, March 2014.

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LIBEROUTER

Welcome

You have found a Liberouter, a do-it-yourself opportunistic router. Liberouters work together with mobile devices to build a store-carry-forward message passing network, completely separate and independent of the Internet.

The Liberouter you are currently connected to is a Raspberry Pi running opportunistic router software. The router exchanges messages with any connected mobile device that is also running the router software (download below).

Our goal is to create a device that anyone can build and deploy cheaply to create a communication network that is not dependent on the Internet infrastructure, cannot be shut down and cannot be censored. Each device acts as a message store, with mobile devices like yours creating and consuming content, and spreading messages between the Liberouters.

Download Android Apps



LibeRouter (required)
Opportunistic router



GuerrillaTags
Messaging application



GuerrillaPics
Photo sharing application



PeopleFinder
Distributed People Finder

SCAMPI Networking Platform

Message-based interactions

- Self-contained ADUs (arbitrary size)
- Metadata
- Lifetime

Unicast / multicast / broadcast

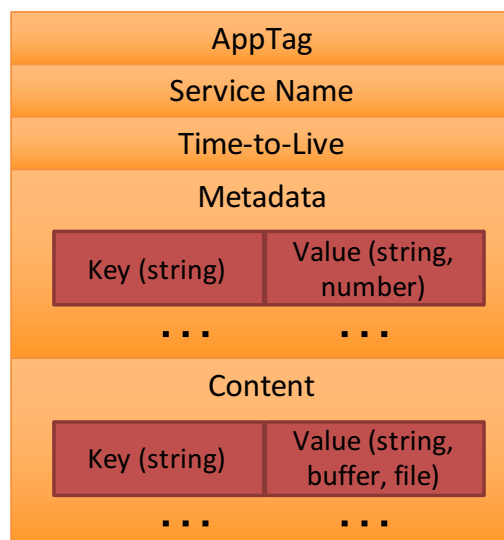
- Messaging + real-time streams

Publish / subscribe

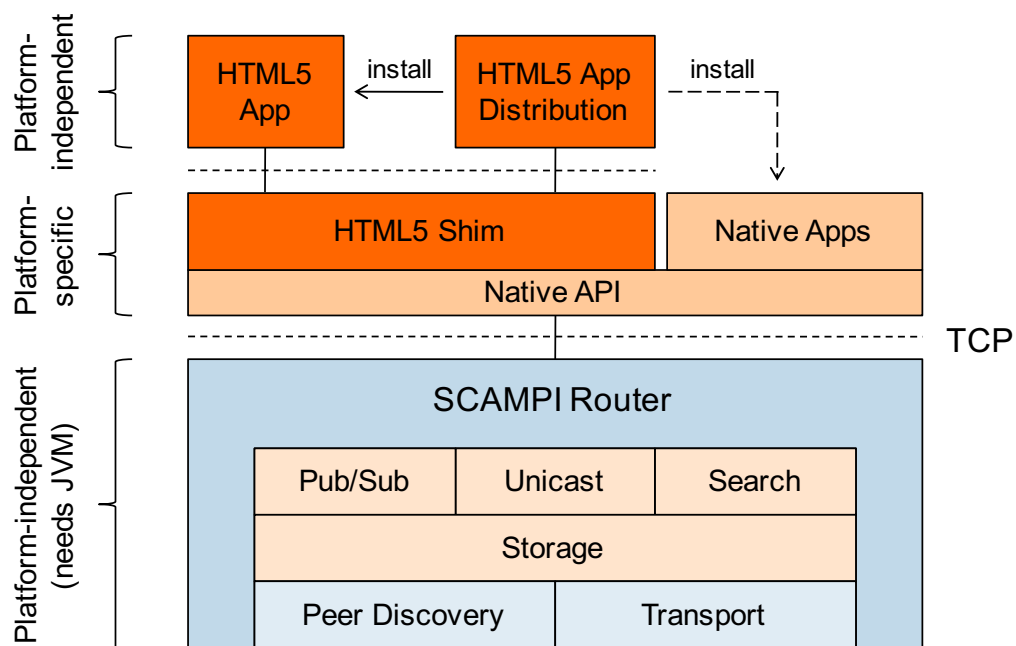
Search using metadata

Geo-based content sharing (Floating Content)

SCAMPI Message



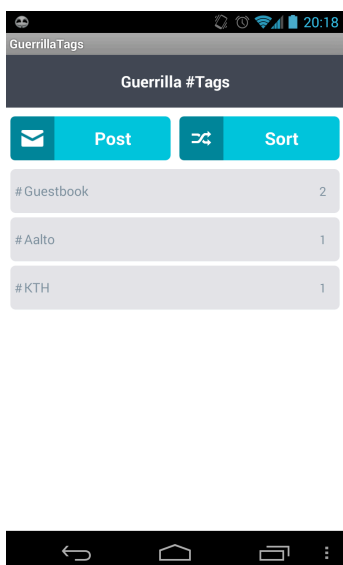
SCAMPI Platform and Apps



Sample Applications

Some Apps

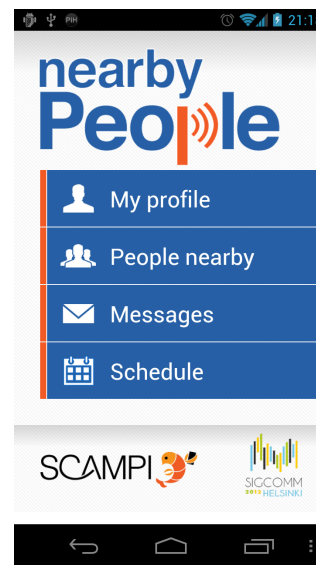
GuerrillaTags



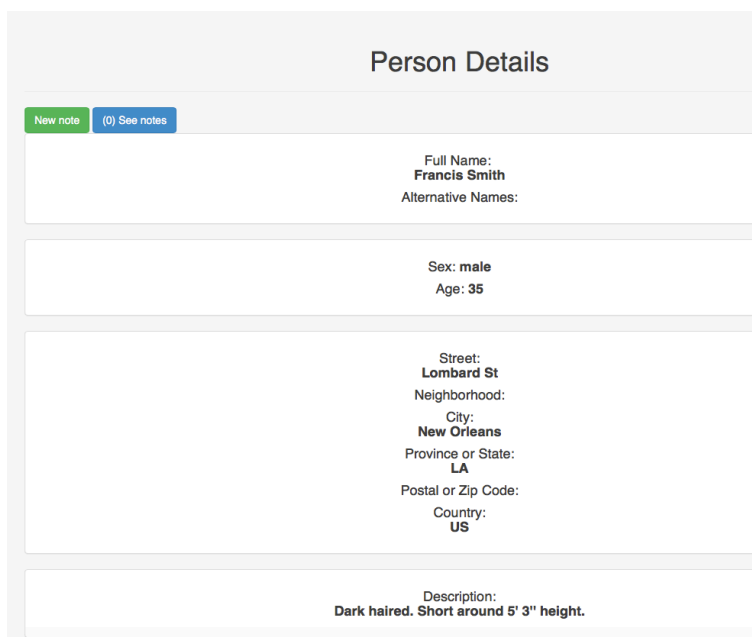
GuerrillaPics



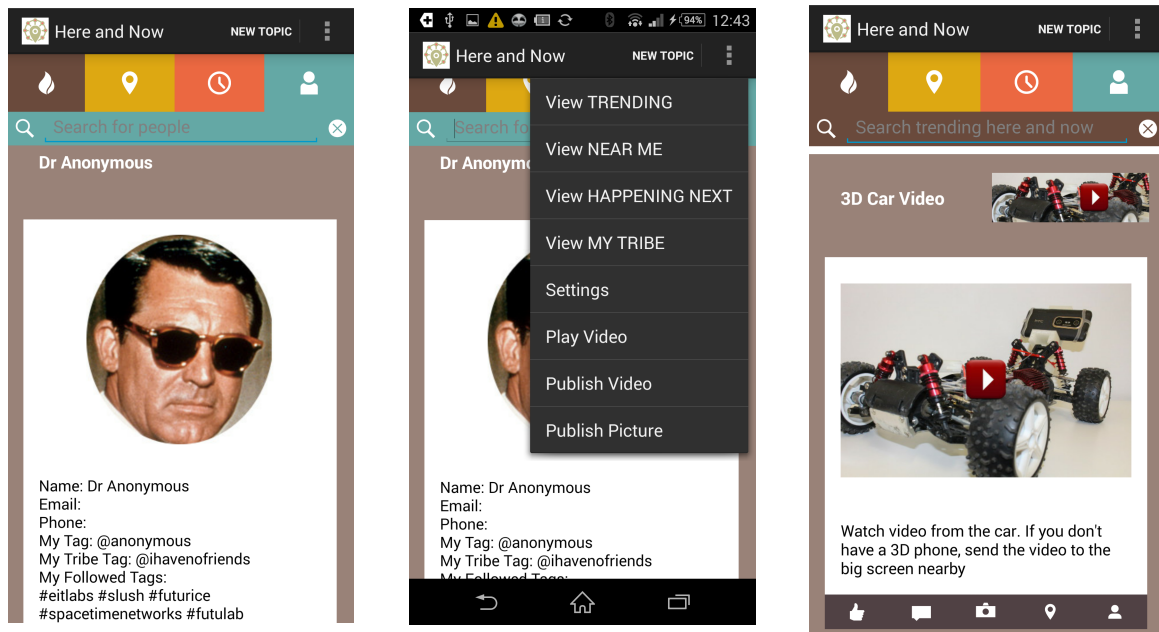
Instant Social Networking



PeopleFinder



More complex WiP: Here & Now



Weird apps: messages in bottles

