

Funkfeuer.at

& community wireless networks running MANET protocols

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Clarification

- In my talk: “OLSR” = the OLSR.org implementation

Funkfeuer Vienna network



Philosophy

It [radio] is purely an apparatus for distribution, for mere sharing out. So here is a positive suggestion: change this apparatus over from distribution to communication. The radio would be the finest possible communication apparatus in public life, **a vast network of pipes.**

Bertolt Brecht

*«The Radio as an Apparatus of
Communication»*

(in Blätter des Hessischen Landestheaters, Darmstadt, No. 16, July 1932)

Open Source

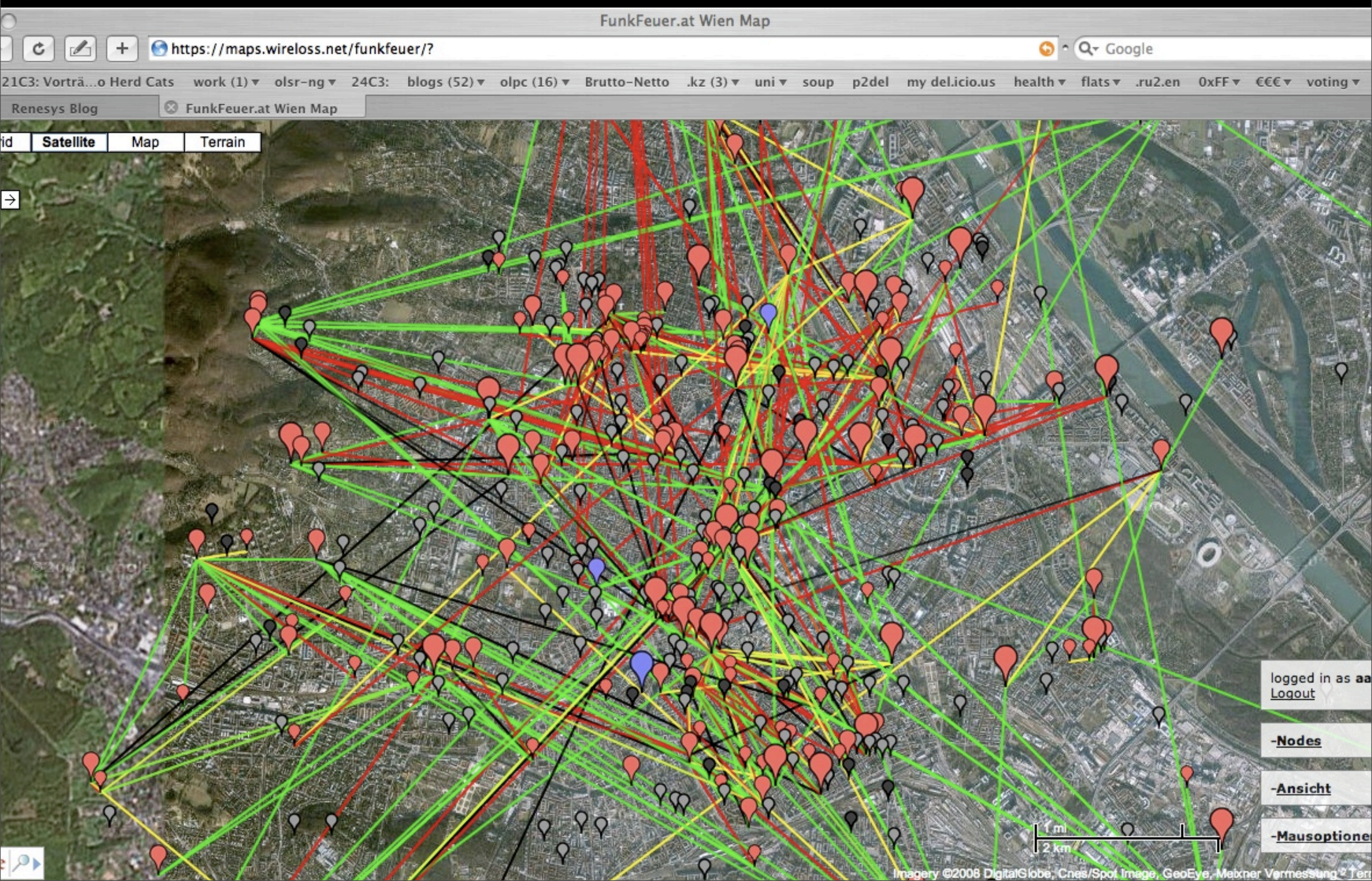
Open Hardware

“Free air” (ISM band)

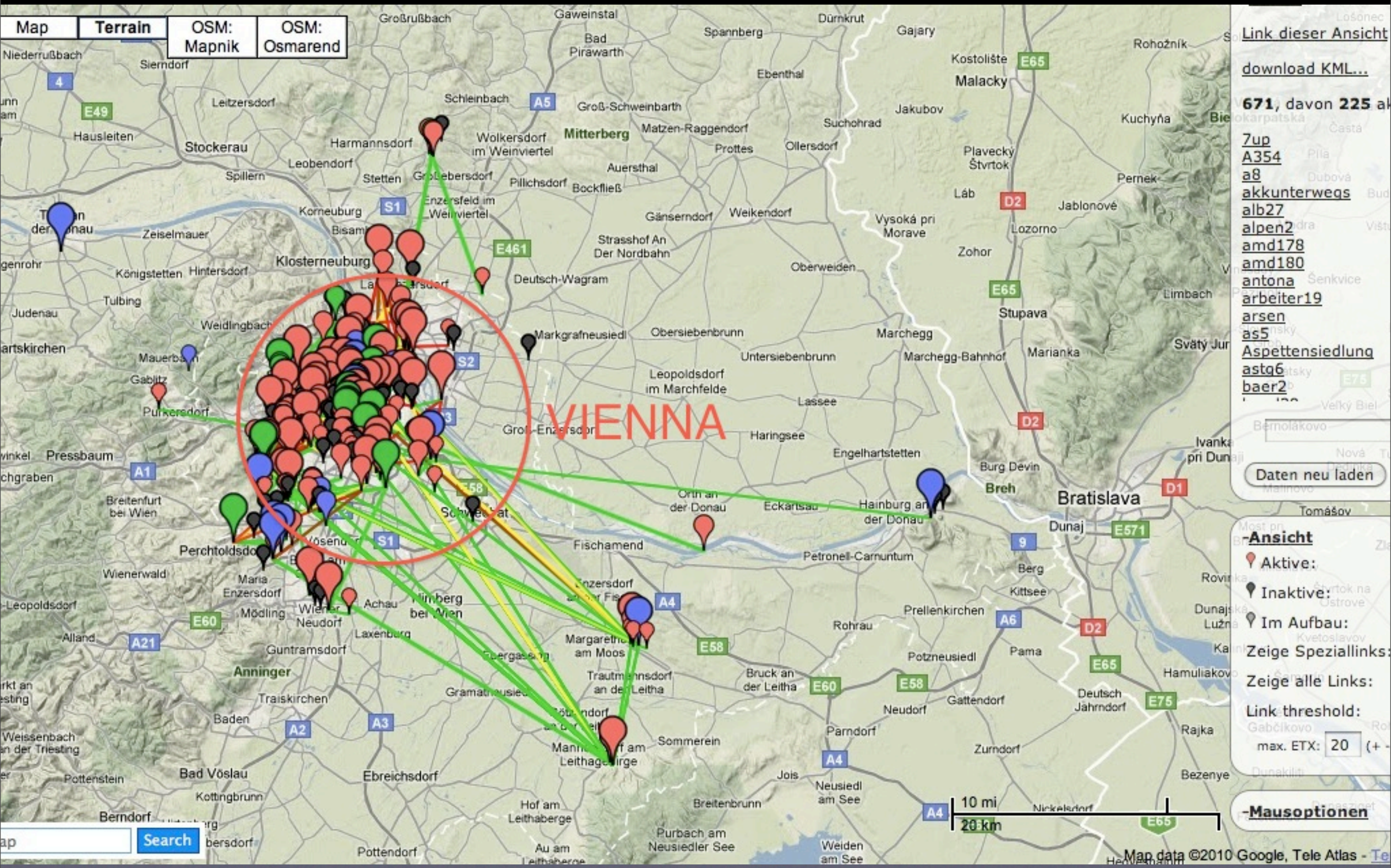
Open Networks

Pico-Peering Agreement

Funkfeuer Vienna network



Funkfeuer Vienna network



Motivation

- Why does AT&T charge me for shaking electrons?
- We are allowed to talk freely in acoustic space
- Censorship resistant networks (“3 strikes out”)
- **Independence**, running **own** network
- financially stable, self-sustaining

How it started in Vienna

2003

- q/spot history
- Book - asked if we can use 10 existing locations for free
- Jaap @ scii.nl experimenting with “mobile mesh”
- Tested AODV, mobilemesh, OLSR. OLSR sort of worked. Same results in Berlin Freifunk
- Public presentation, invitation to the public
- **Support by ISPs!**

Where are we now?

- aaron@viviroof:~\$ ip route show table all | wc -l
674
- ~ 240 roofs. ~ 500 devices.
- Repeated in Graz, Bad Ischl, Weinviertel, Linz
- 10km distance to Bratislava
- Planning link to Slovenija
- Planning connection to Hamnet
- Longest links ~ 40km
- Vibrant very active community
- **our own fibre!**

Principles of Funkfeuer

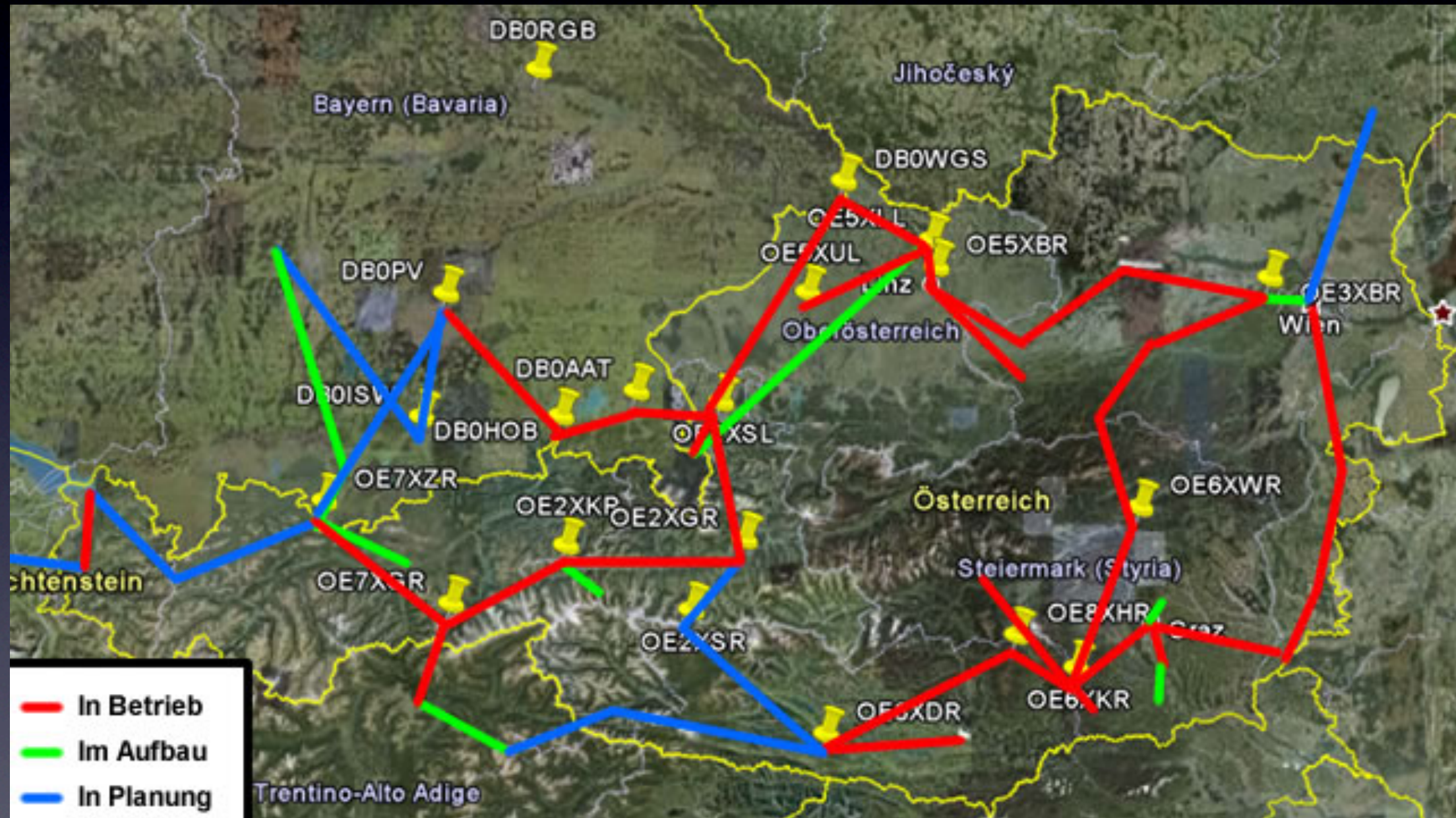
- Free, everybody is allowed to join
- Pico peering agreement. Free transit
- Bandwidth provided by association
- Experimental network
- Value is (in) the network

Who?

- Students (IT, EE)
- Doctors
- Journalists
- Dentist
- Construction workers
- Unemployed
- Radio amateurs
- Nerdfactor++;

Just a hobby?

Hamnet



Wireless networks
don't scale?

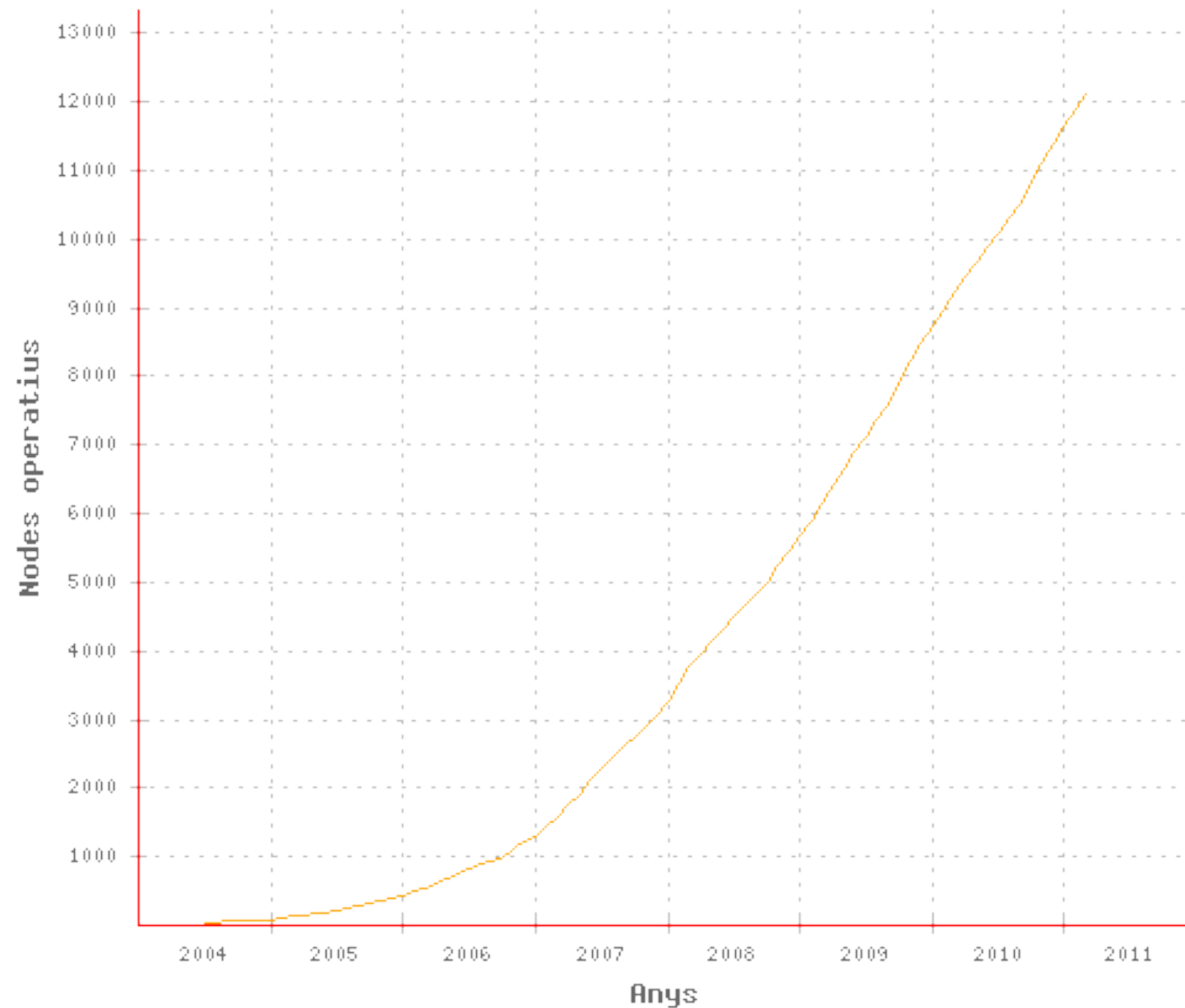
Yeah, right!

Athens wireless network - awmn.net



Guifi.net

guifi.net
Corba de creixement



Guifi.net

guifi.net World

[availability](#)

[data](#)

[map](#)

[networks](#)

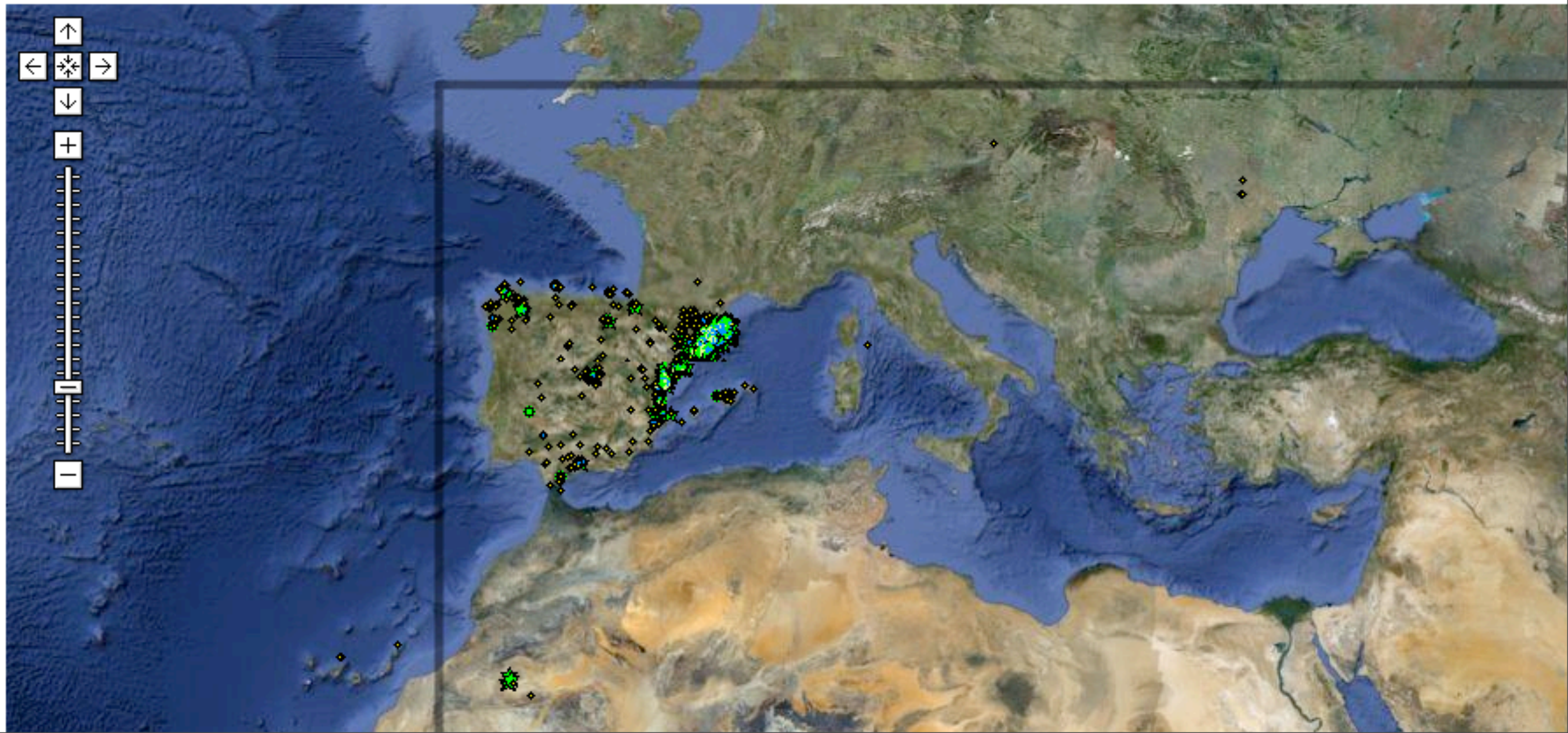
[nodes](#)

[pending/review](#)

[services](#)

[suppliers](#)

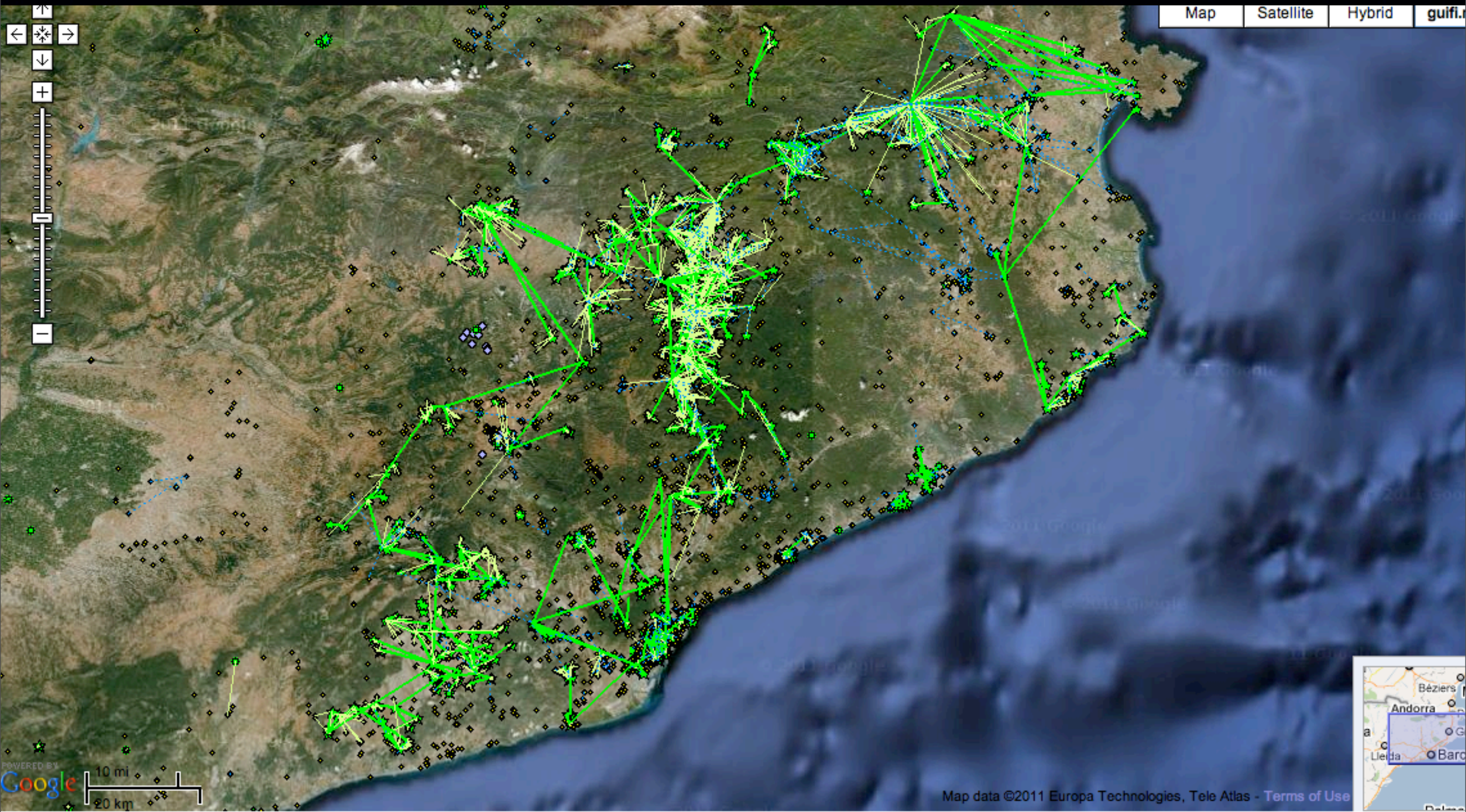
[users queue](#)



Guifi.net



Guifi.net



Summary

- Guifi.net Barcelona ~ 12300 nodes - (BGP, OSPF, OLSR, BATMAN)
- Djursland - forgotten by the telco industry
- Berlin Freifunk - (OLSR + BATMAN)
- Athens wireless ~ 5000 nodes (OLSR, BGP)
- Funkfeuer.at - (OLSR, OSPF, BGP)
- czfree.cz - little info
- ninux Roma - (OLSR)

Financial Sustainability of Funkfeuer

Colocation center



Facts about the colo center

- 1 GB uplink directly to the VIX
- multihomed
- LIR. Ripe member, public IPs (v6, v4)
- slightly below market rates for server colo

Access to VIX



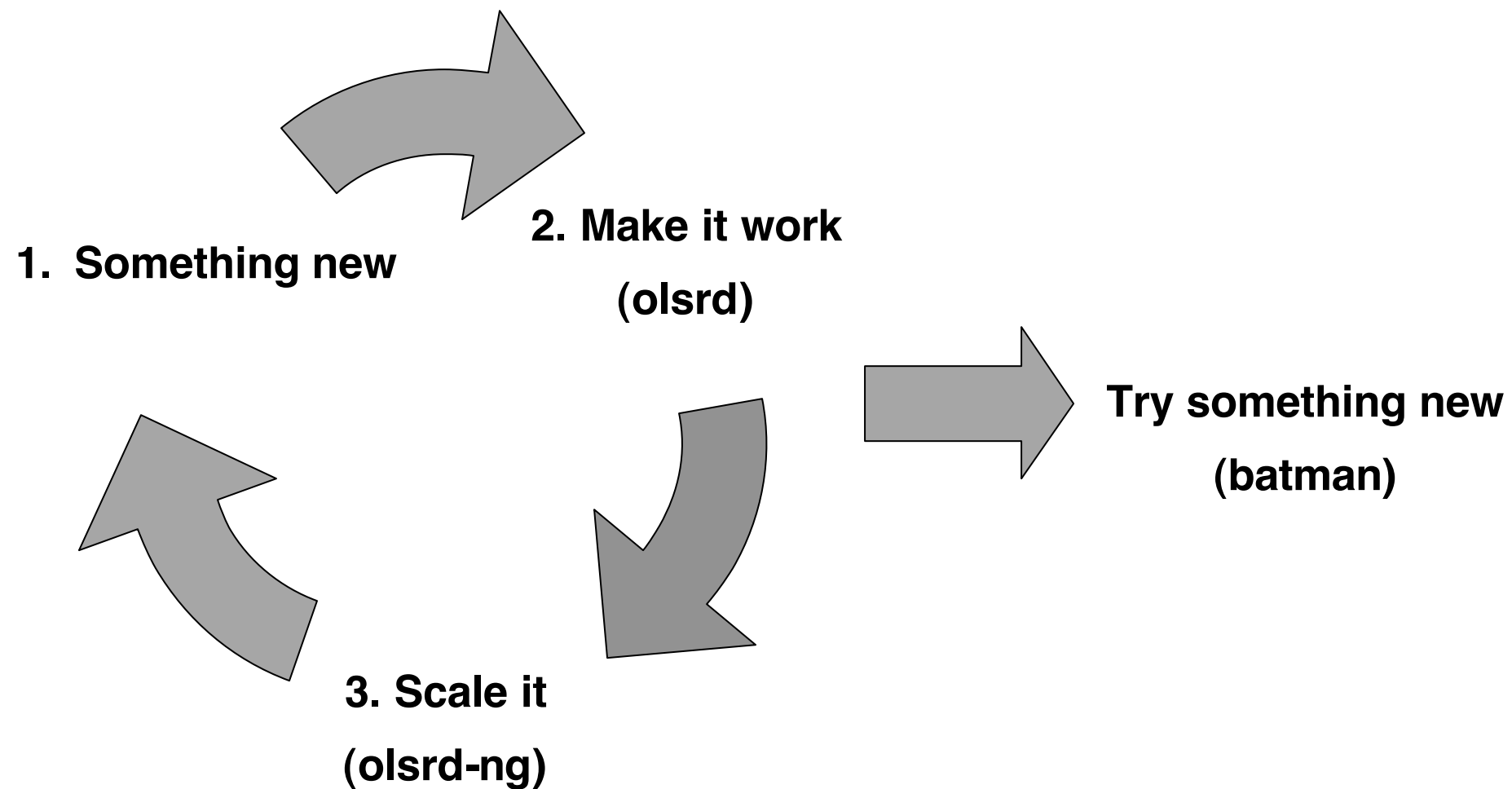
Colocation hosts

- local TV and radio stations
- VOIP server
- network mgmt servers

OLSR.org history

- RFC 3626, etc etc.. you know this part
- Andreas Tønnesen, UNIK Oslo (Norway) implemented it as diploma thesis for Thales
- licensed as BSD. Freifunk + Funkfeuer took the code and made it work **in practice**
- First extension: LQ (=ETX metric from MIT roofnet)
- Second extension: Fisheye (=HSLS)
- Third coding project for OLSR: “OLSR-NG”. (cleaning up the code base, make it **fast** and scalable)

Code maturity cycle

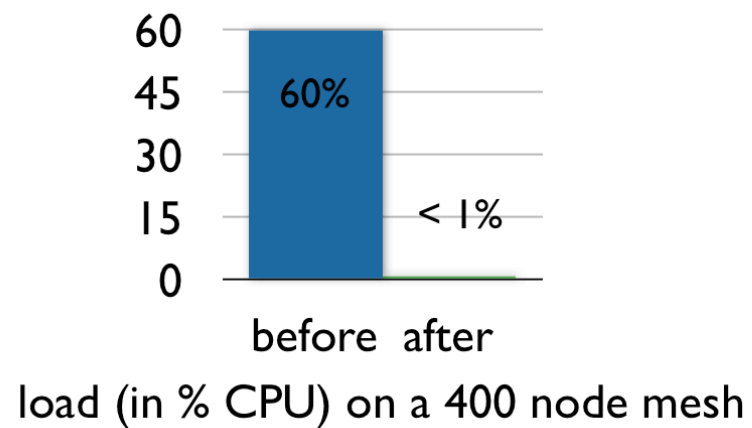
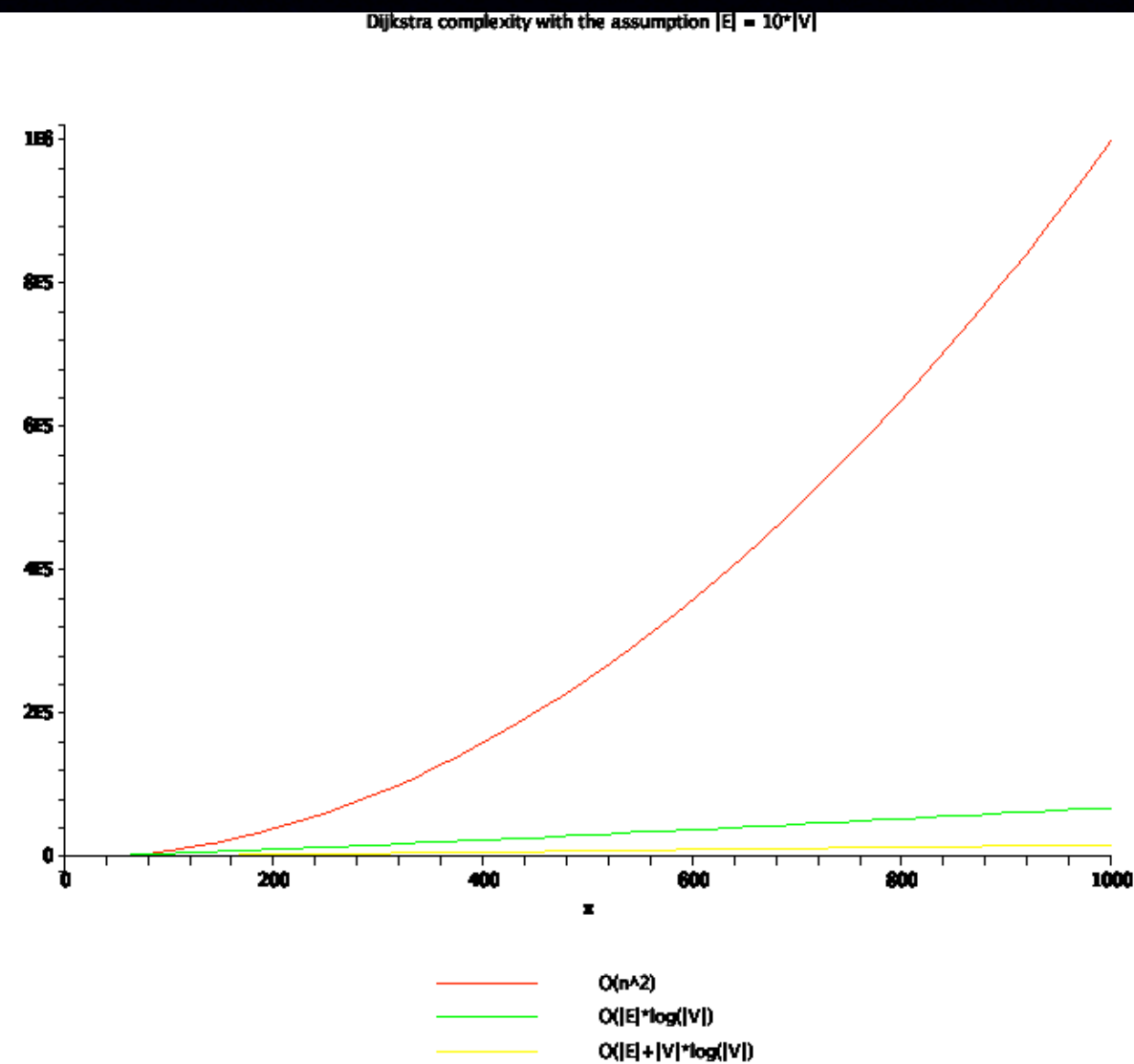


CPU load improvements

1. Dijkstra was shamefully inefficient!
2. Work with in place datastructures
3. avoid malloc() thrashing
4. olsr polls, times used to be very inefficient
5. clean up

Effect: under 1% CPU load on a 200MHz
linksys in a 400 node mesh

CPU load



Wishlist

- Metrics!
- More Interops
- avanti avanti
MANET WG!!
(OLSRv2)



Avanti MANET WG!

