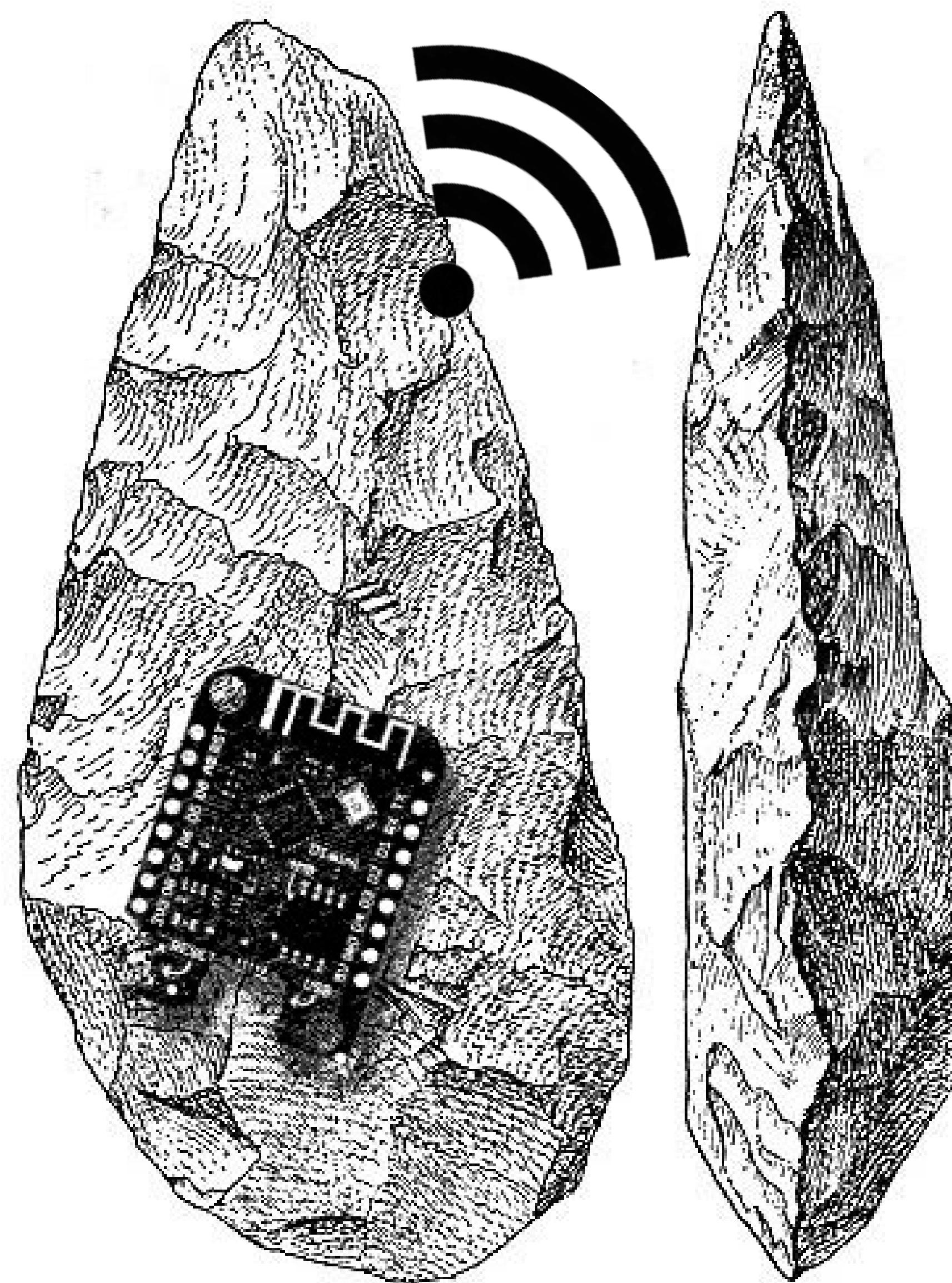


# *LoFi\**

# *WiFi*

DIY networks in 2020

\*high-tech, low performance



**“Long before there was wired  
communication, there was  
wireless”**

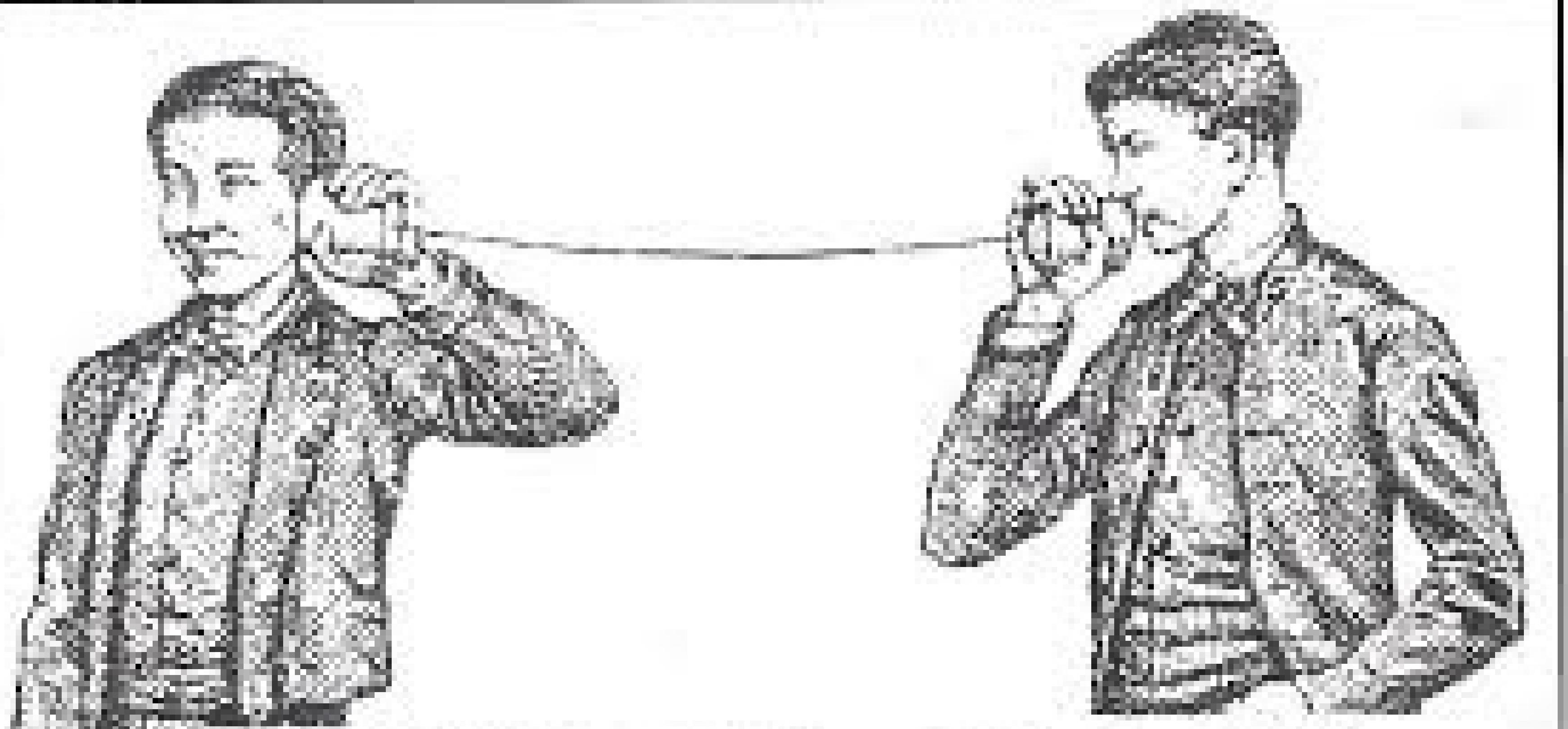
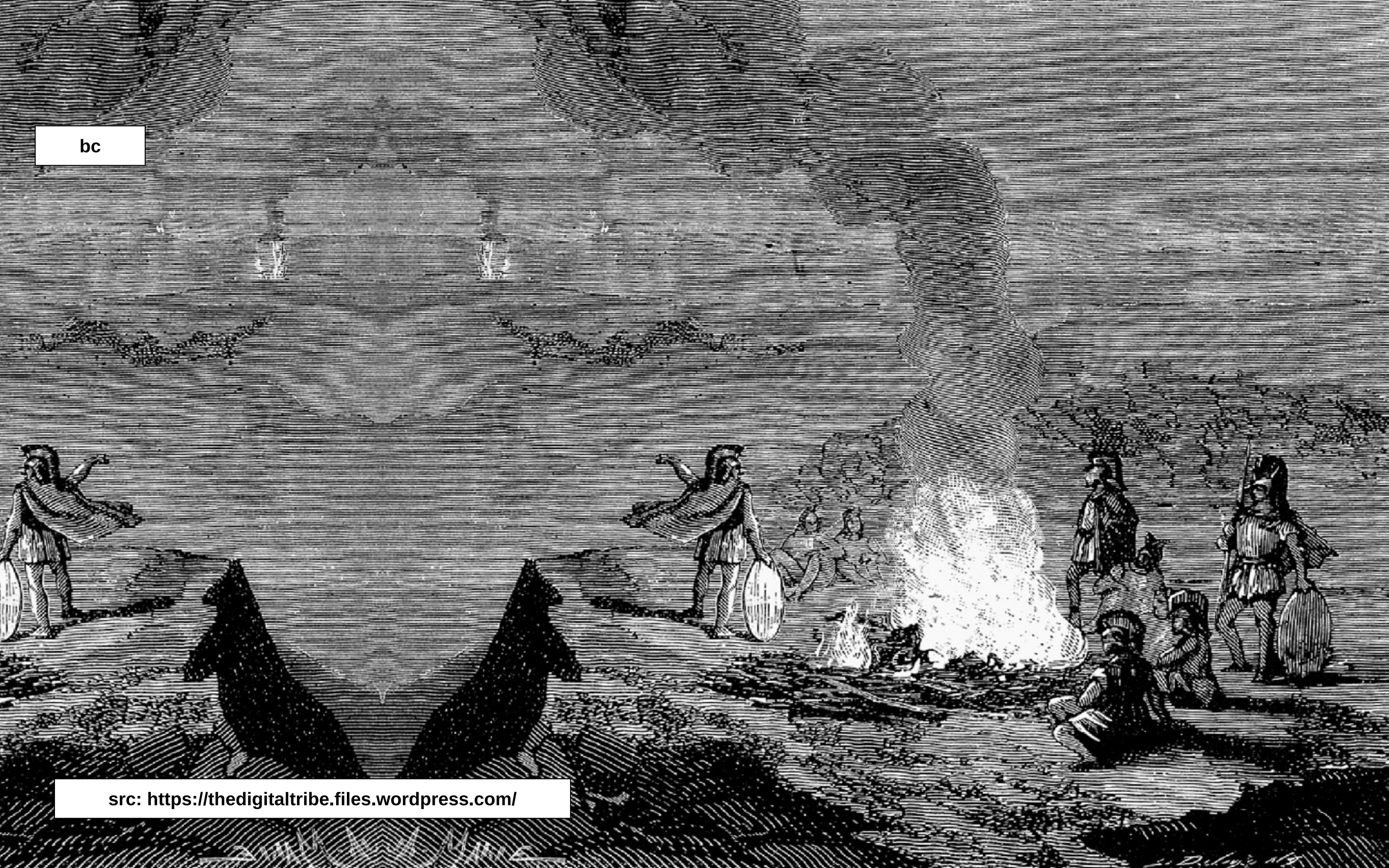


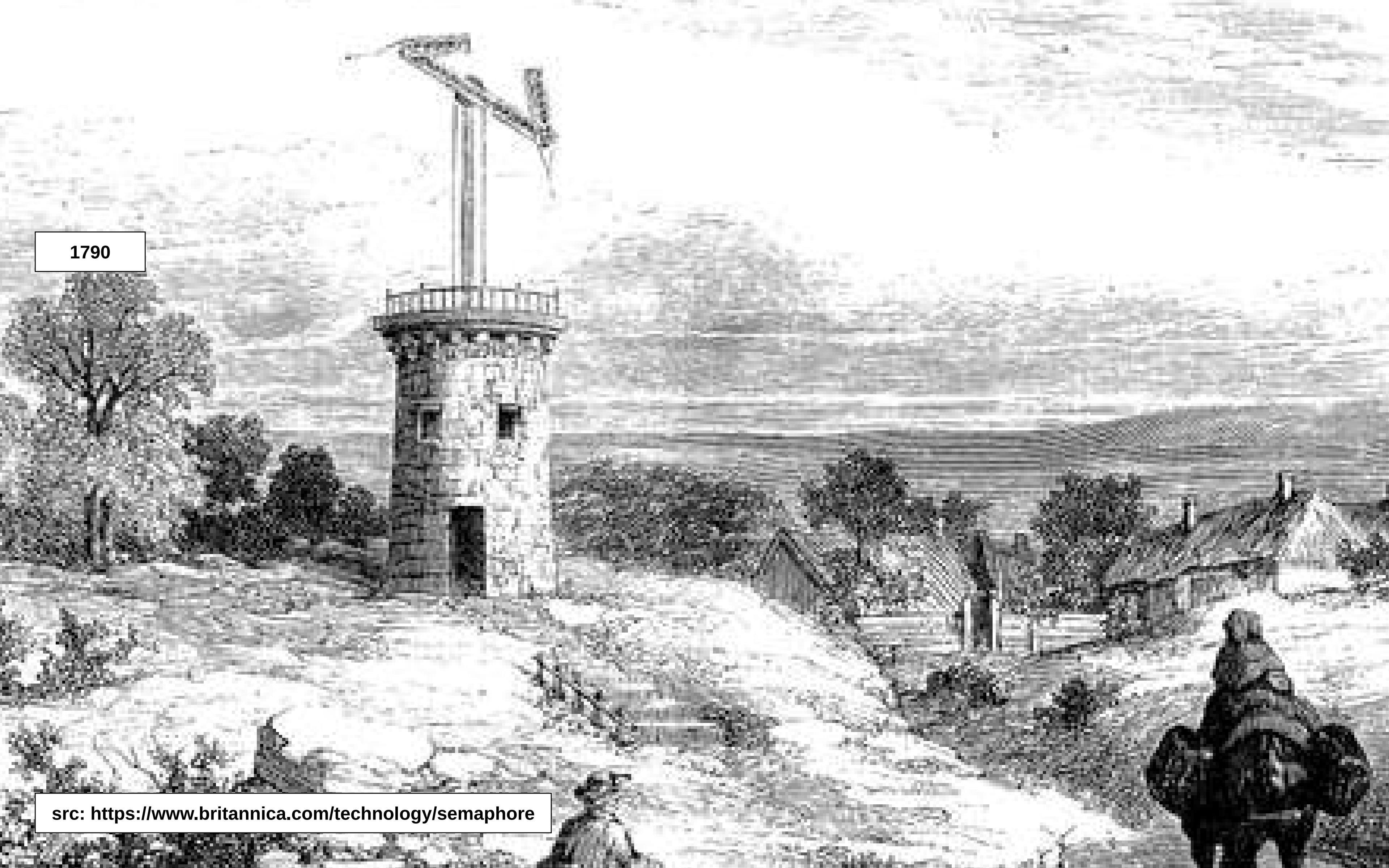
Figure VIII-1- Le téléphone à ficelle, 1667.

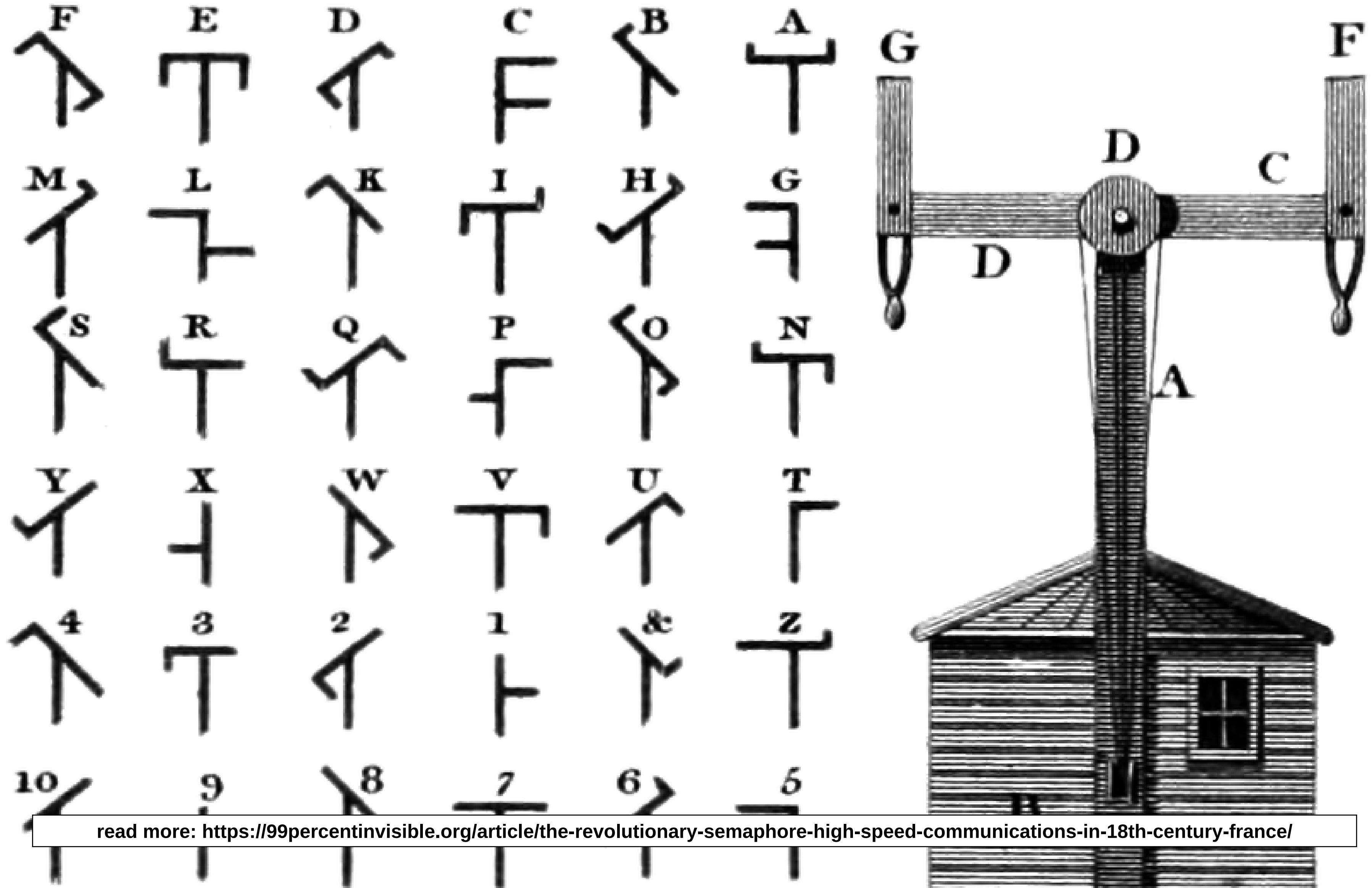
bc



src: <https://thedigitaltribe.files.wordpress.com/>

1790





read more: <https://99percentinvisible.org/article/the-revolutionary-semaphore-high-speed-communications-in-18th-century-france/>

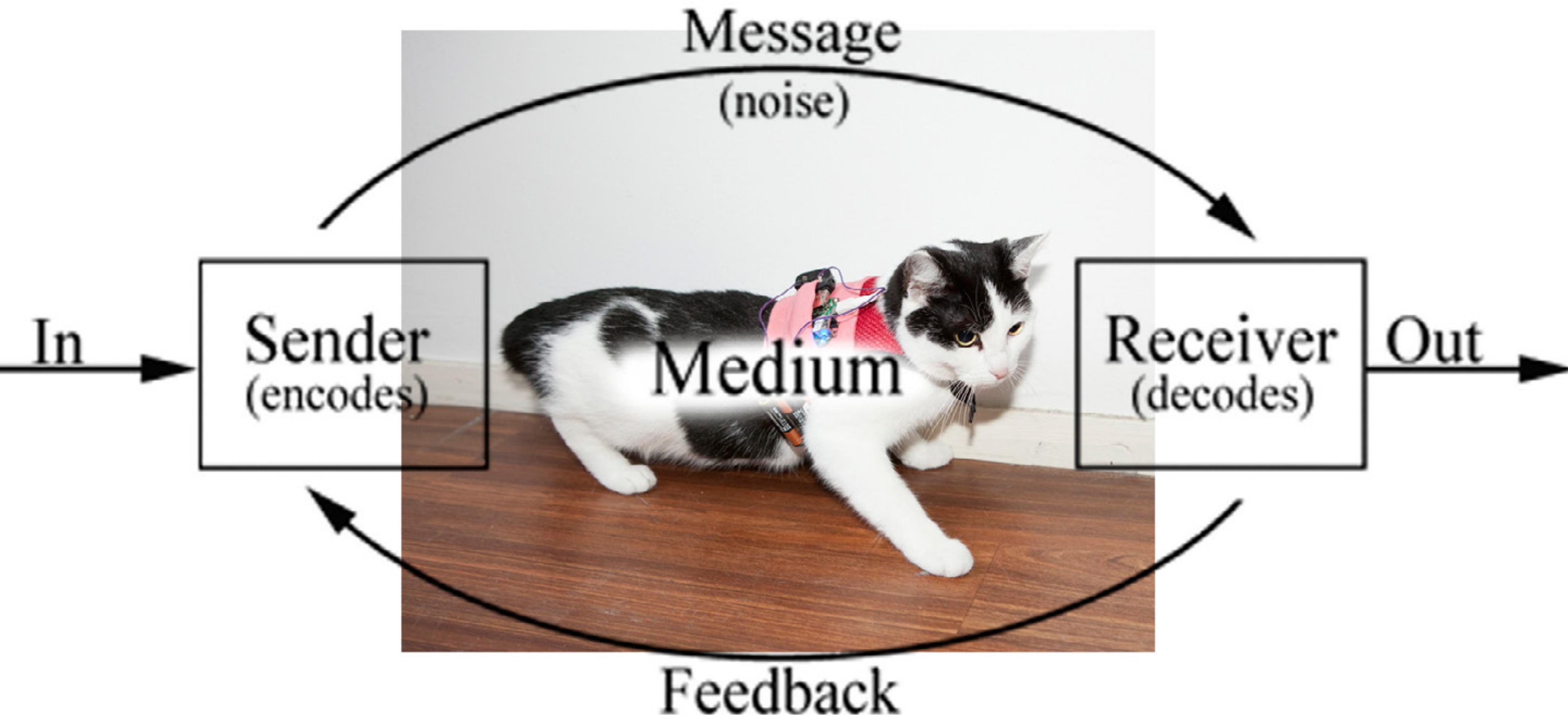
**“The ‘90s called, they want their  
WiFi hacks back”**

In the advent of cheap consumer wifi cards and inhospitable climates (economically and geographically) local amenities were often abused to extend the range of these devices, plus cheaper than laying copper cable. For a collection of these contraptions see link below.

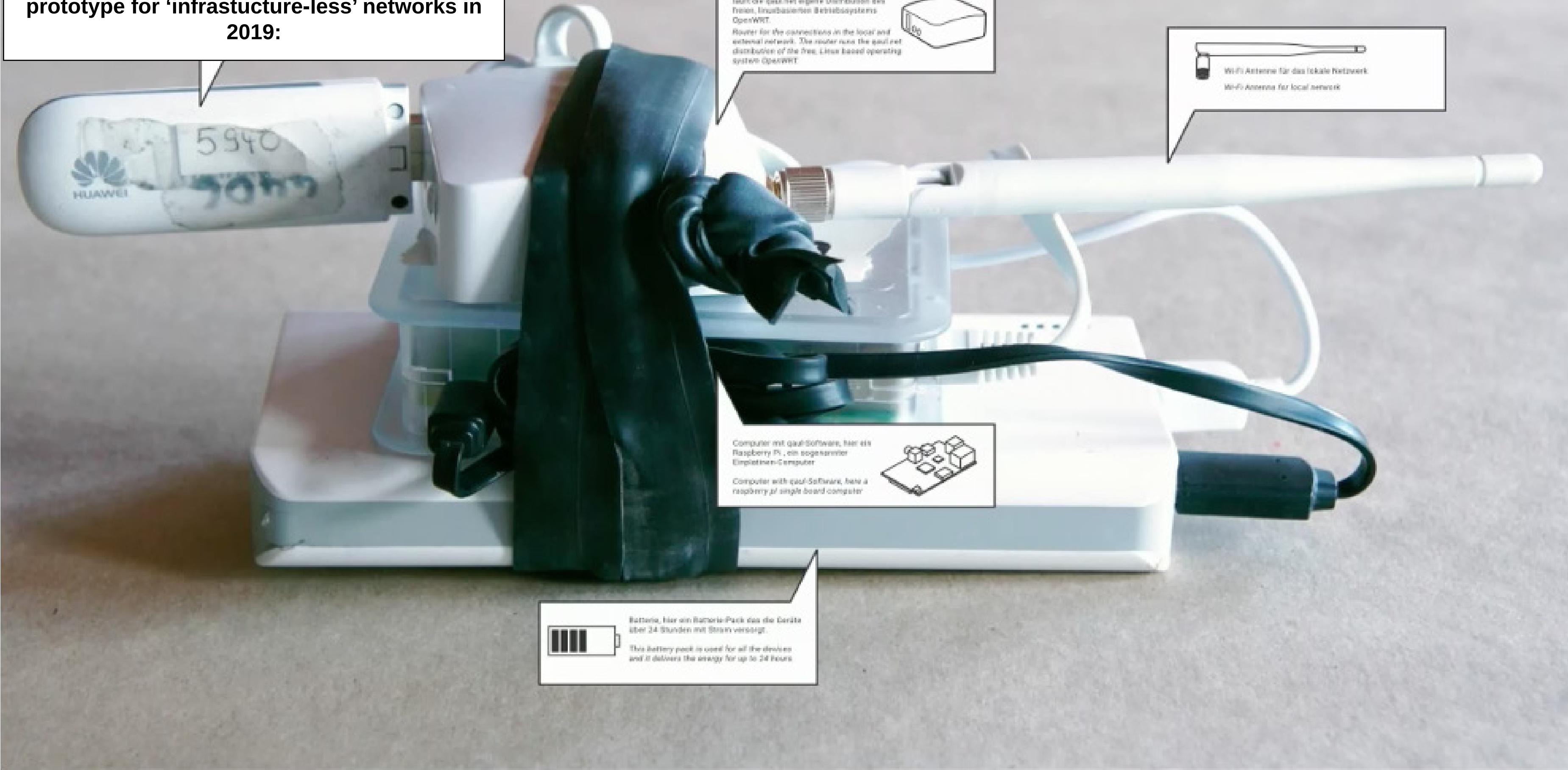


src: roel roscam abbing, pretty fly for a wifi, 2014. <https://test.roelof.info/pretty-fly-for-a-wi-fi.html>

prototype for 'infrastructure-less' networks in  
2014:



## prototype for 'infrastructure-less' networks in 2019:



**Too complicated...**



Everyday wireless networks, 'El Paquete Semanal' offline filesharing\* in Cuba since 2008.

src: [https://en.wikipedia.org/wiki/El\\_Paquete\\_Semanal](https://en.wikipedia.org/wiki/El_Paquete_Semanal)

\*aka 'sneakernet' (<https://en.wikipedia.org/wiki/Sneakernet>), see also The Pirate Book

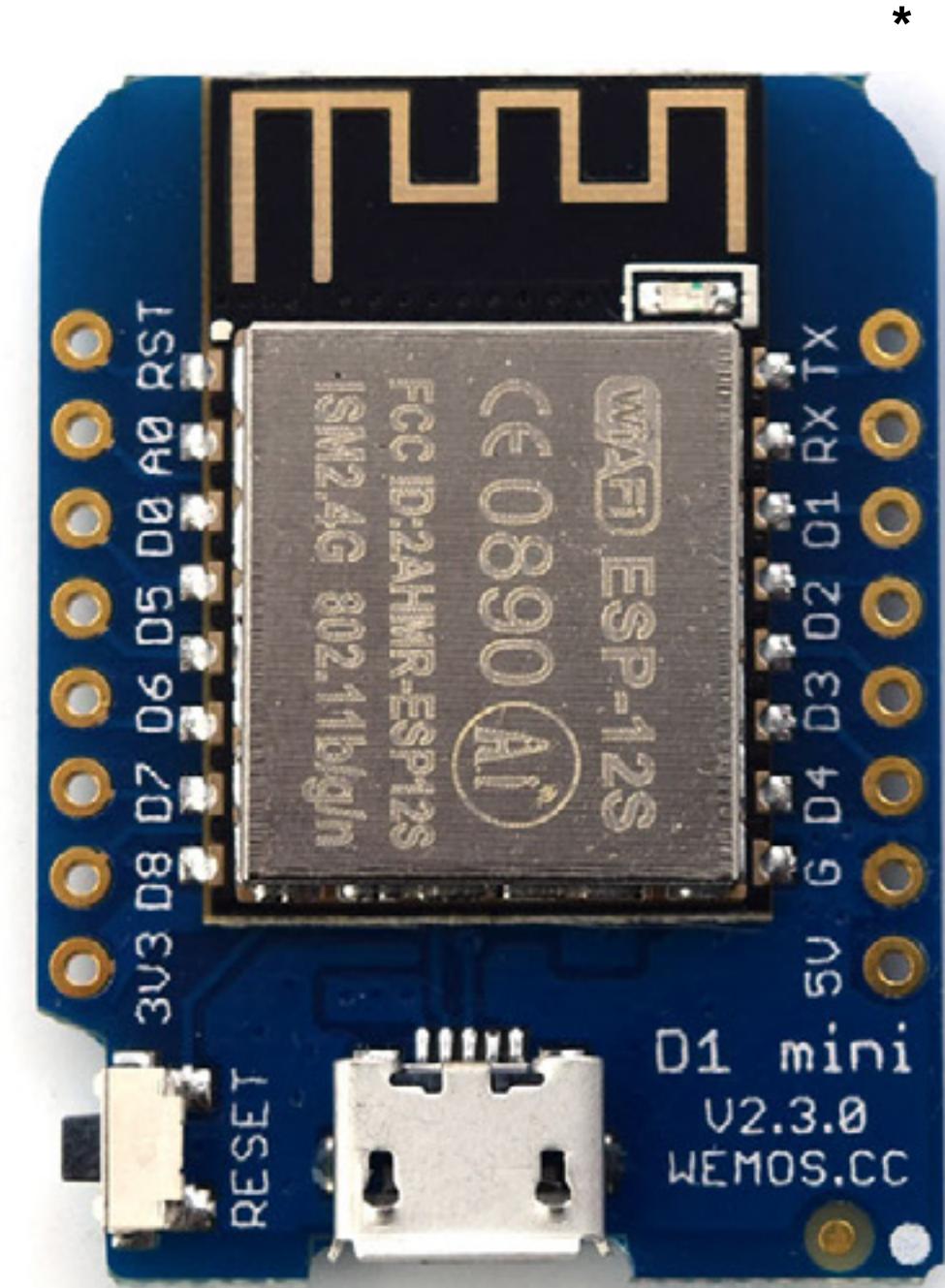
**Introducing:**



# *Wemos*

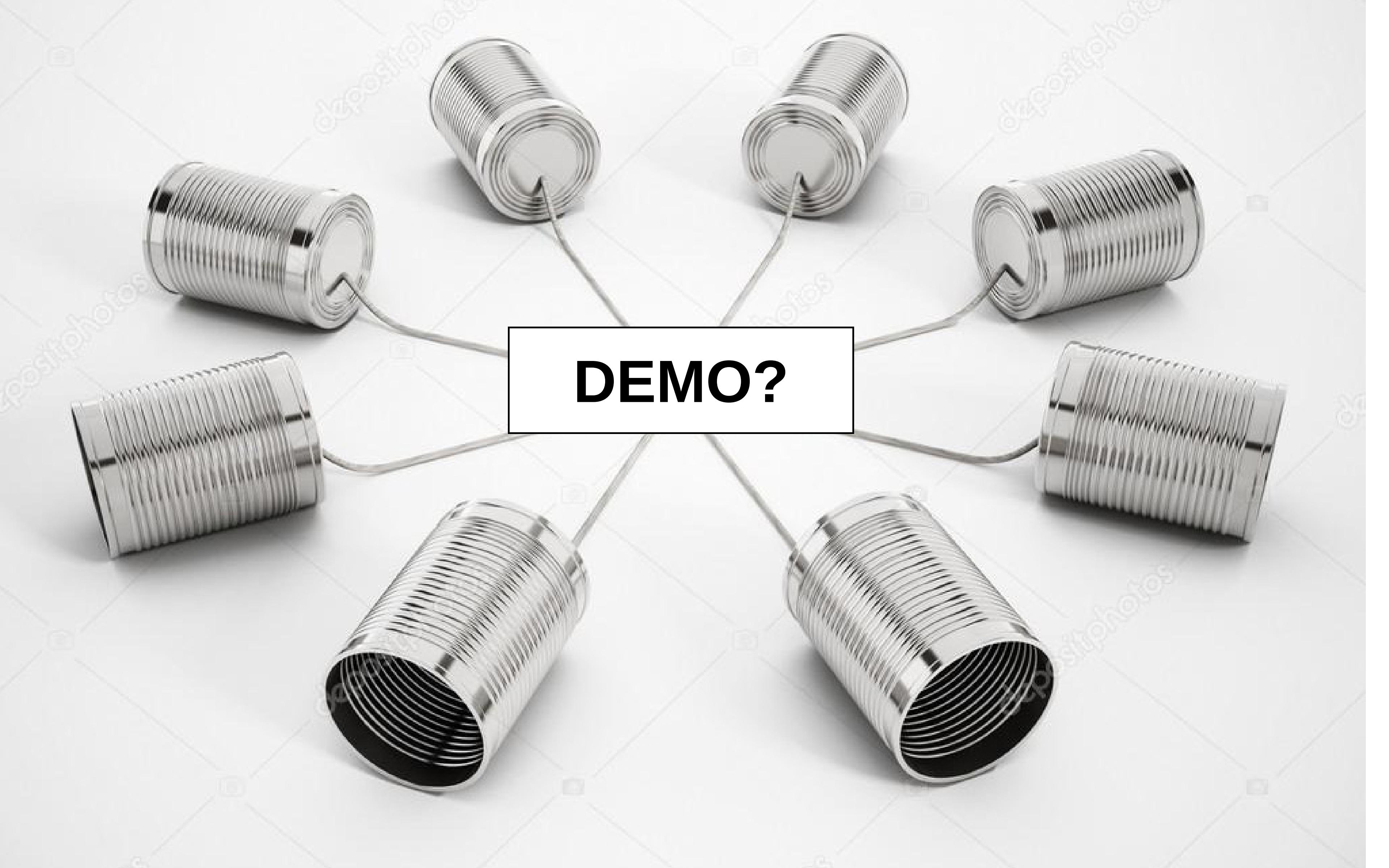
## *D1 Mini*

Nodemcu

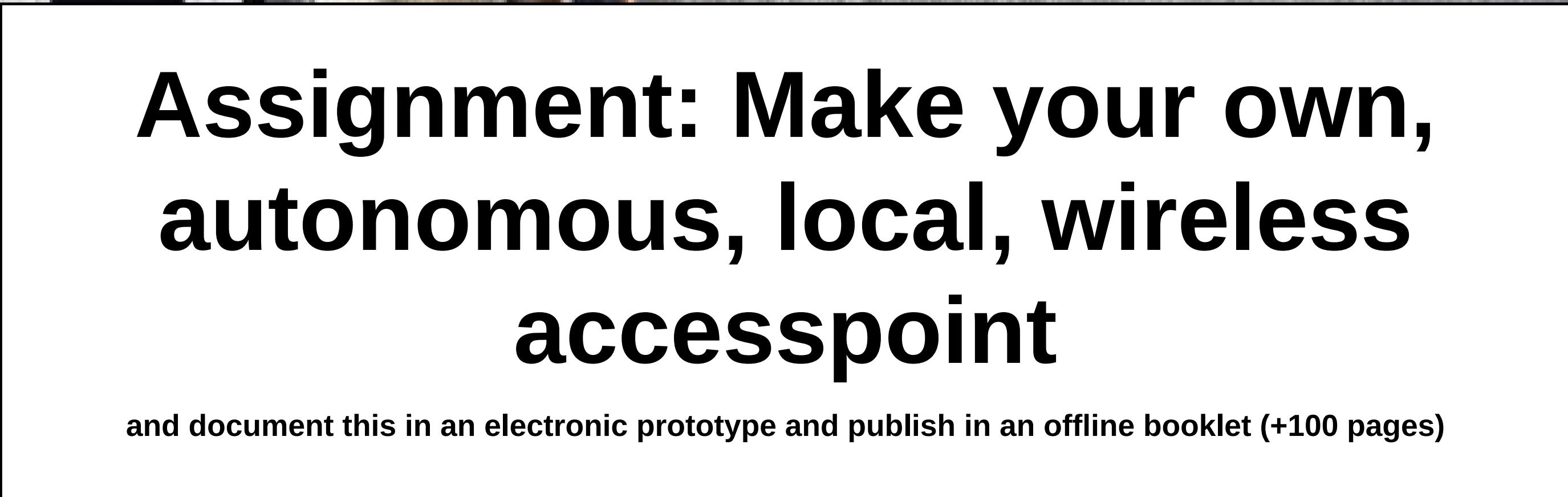


**ESP8266**

\*not real size (available since 2014)



**DEMO?**



# **Assignment: Make your own, autonomous, local, wireless accesspoint**

**and document this in an electronic prototype and publish in an offline booklet (+100 pages)**



Please join the LoFiWiFi padje and write down your name!

<https://pad.vvvvvvaria.org/lofiwifi>

# *Tools*



Not all micro usb cables are  
created equally

*Power  
your  
node*



And protect it against the ele-  
ments...like metal macbooks

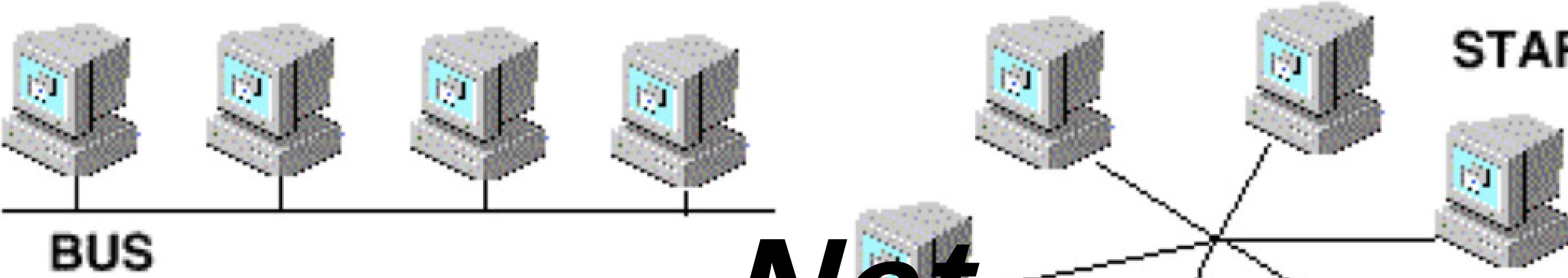
## **Break Time aka Scavenge/Buy\*/Ar-range/Borrow/Steal:**

- micro usb cable WITH data lanes...**
- powerbank (not needed right now)**

**\*Keep receipts!**

**Assignment Practical:**  
**Bring Object**  
**Make Spot**  
**Make Doc**  
**Make Pub ('phonebook')**

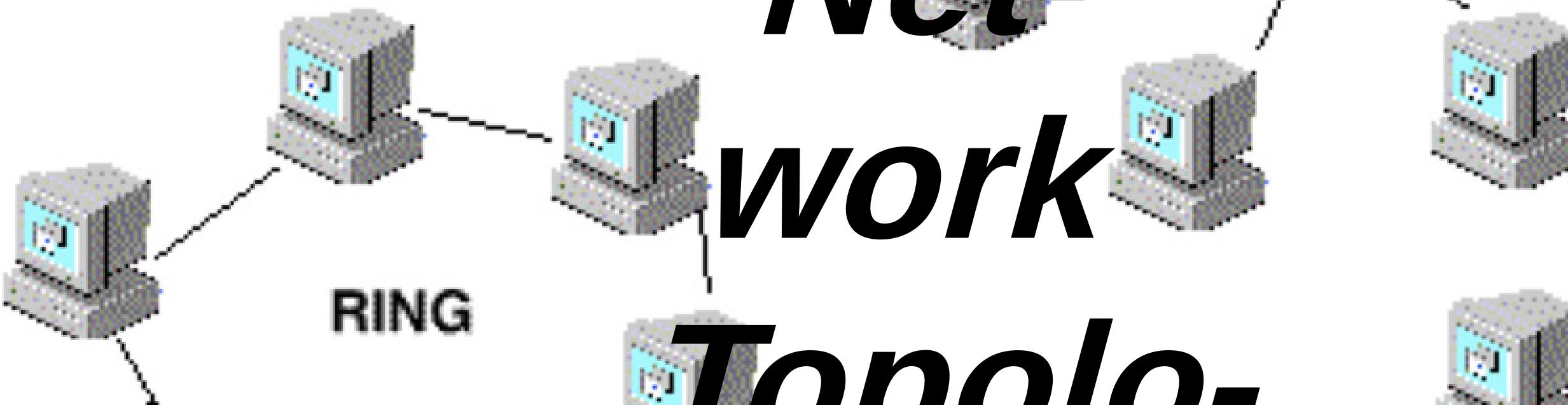




**BUS**

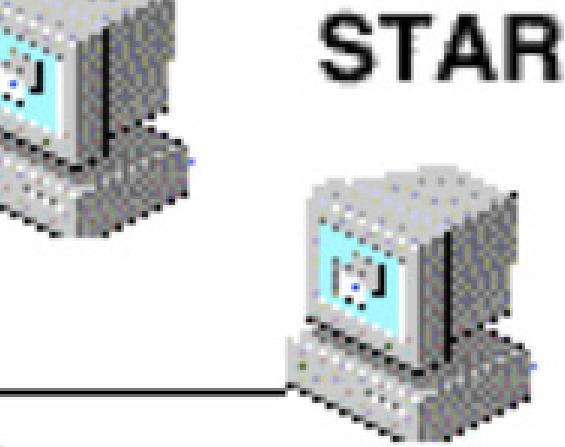
*Net-*

*work*

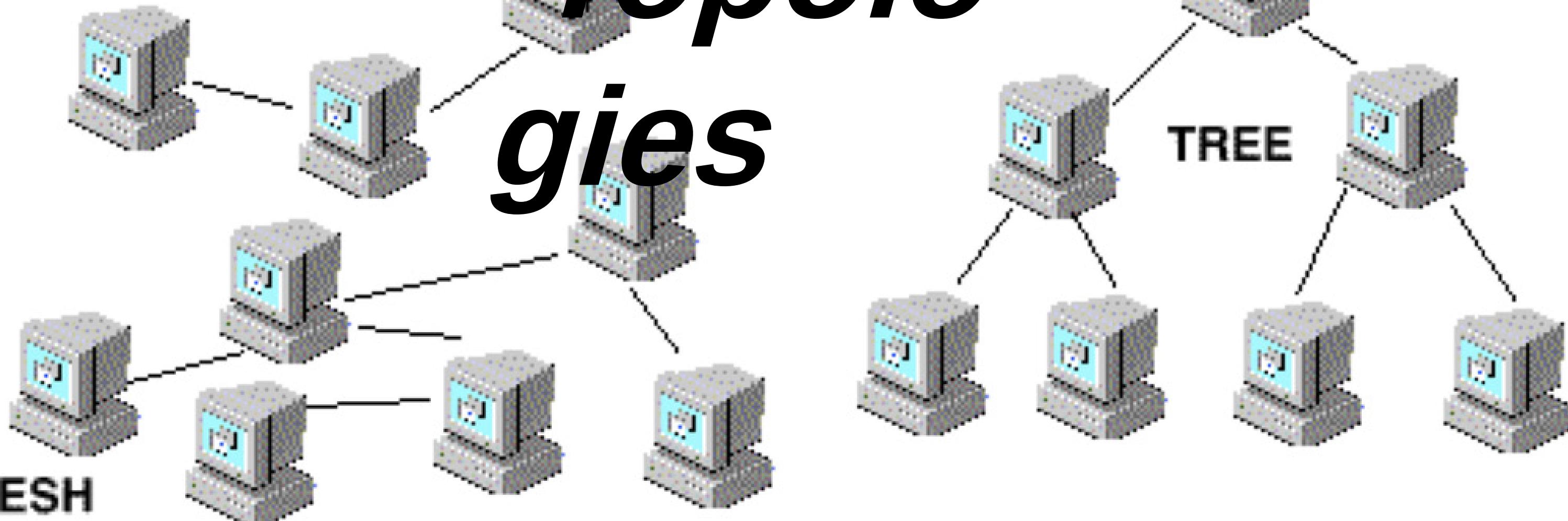


**RING**

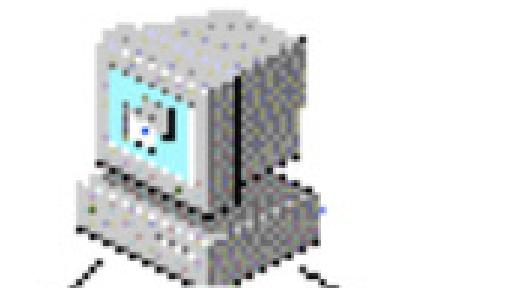
*Topolo-*  
*gies*



**STAR**

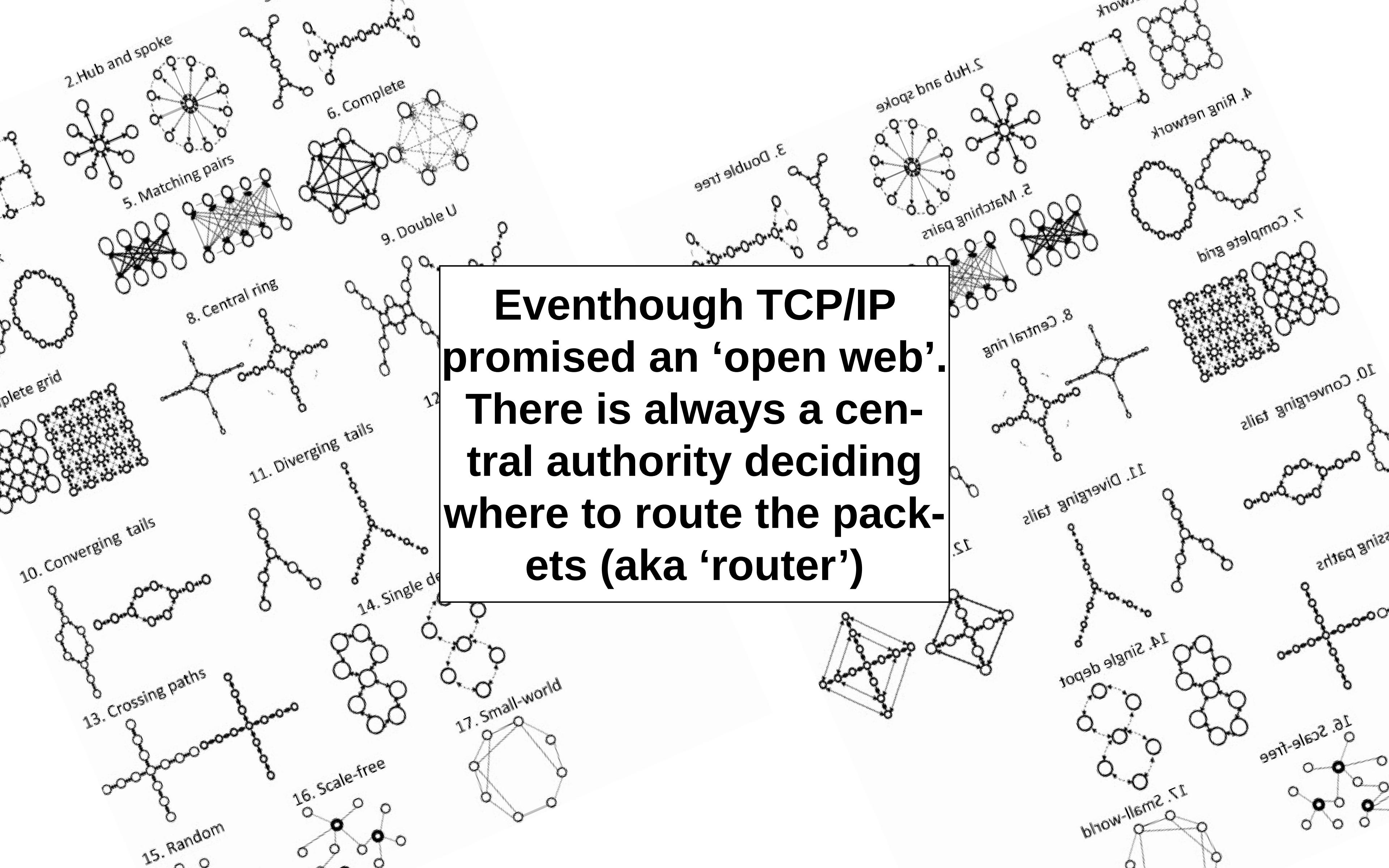


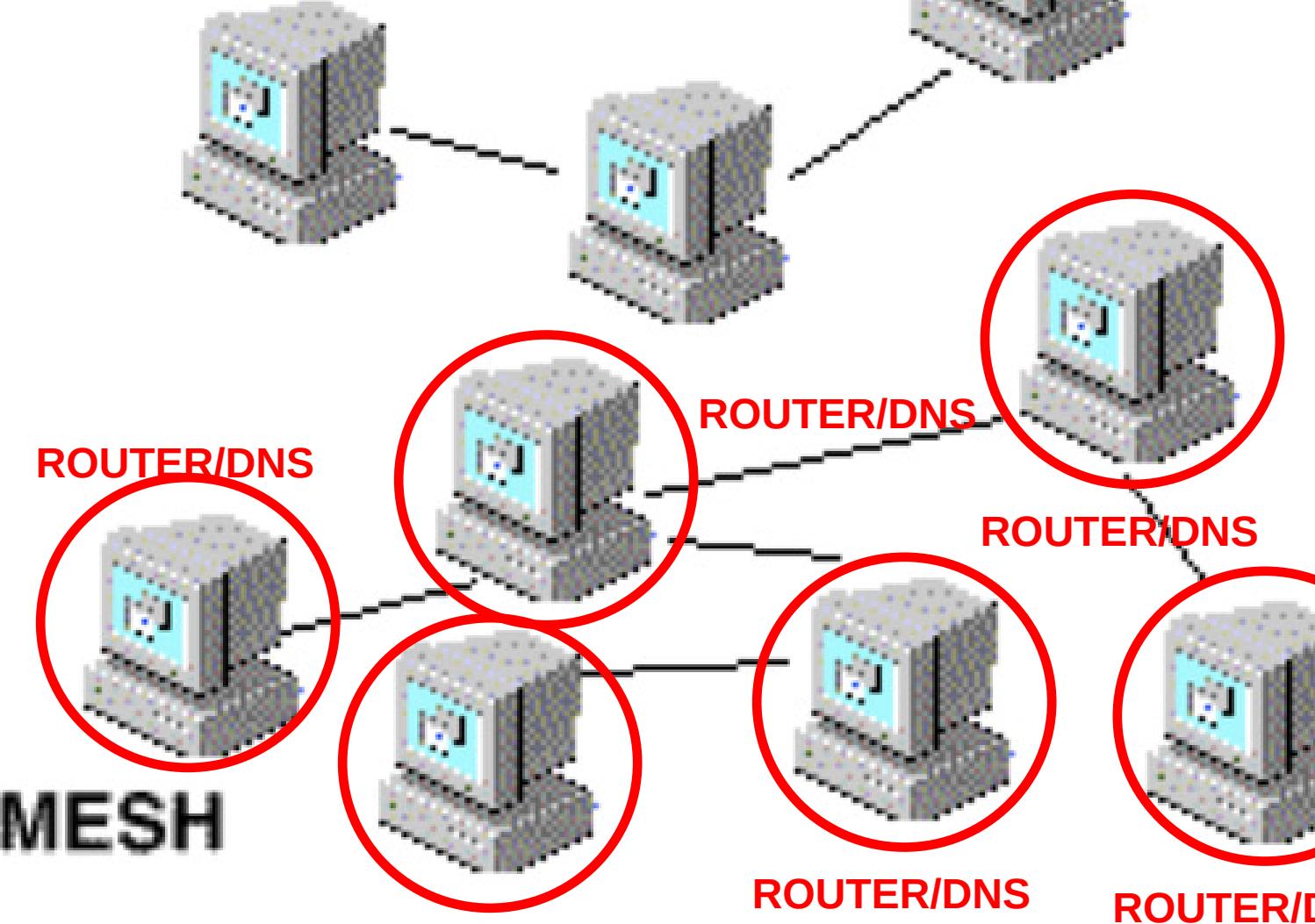
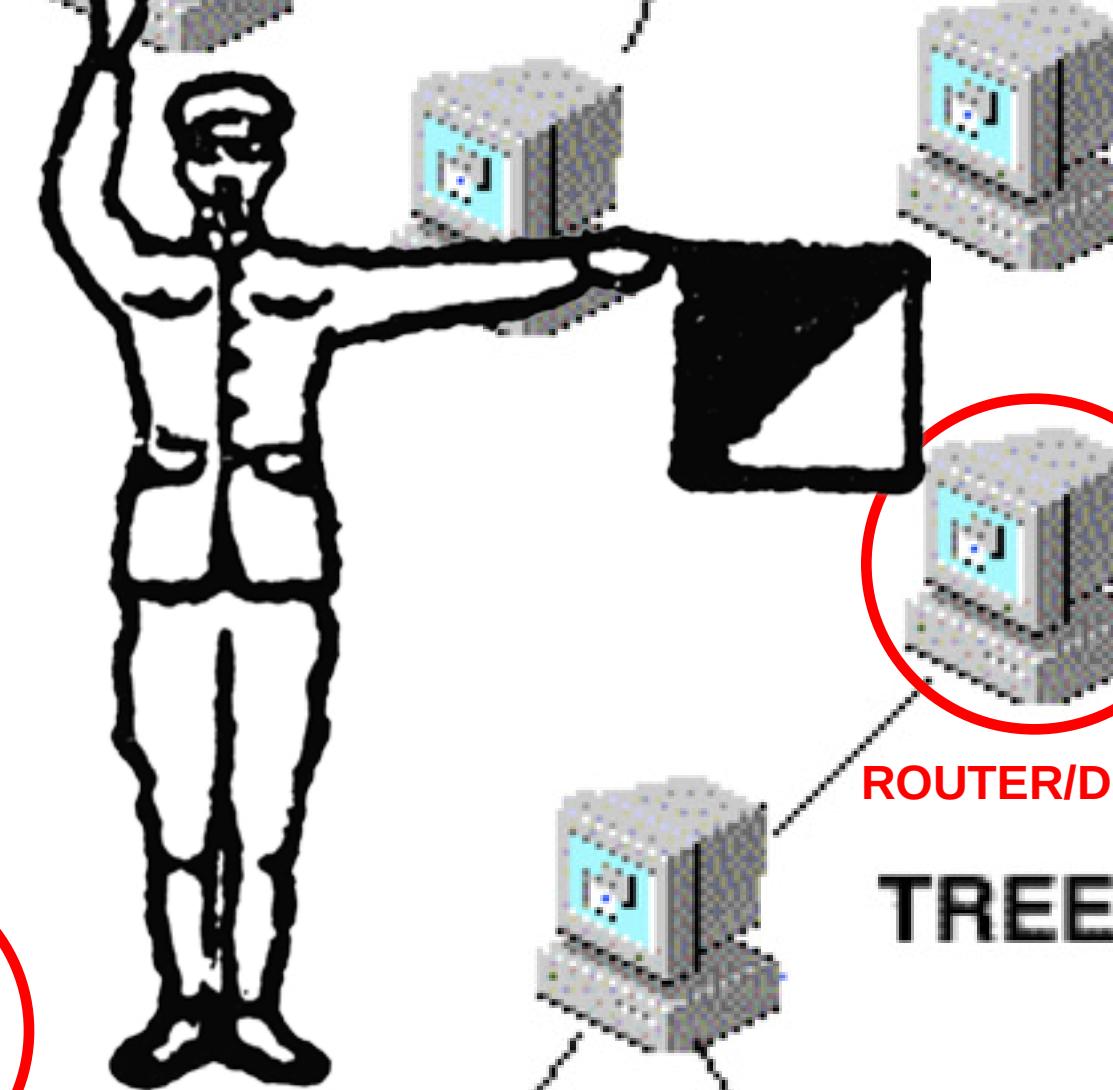
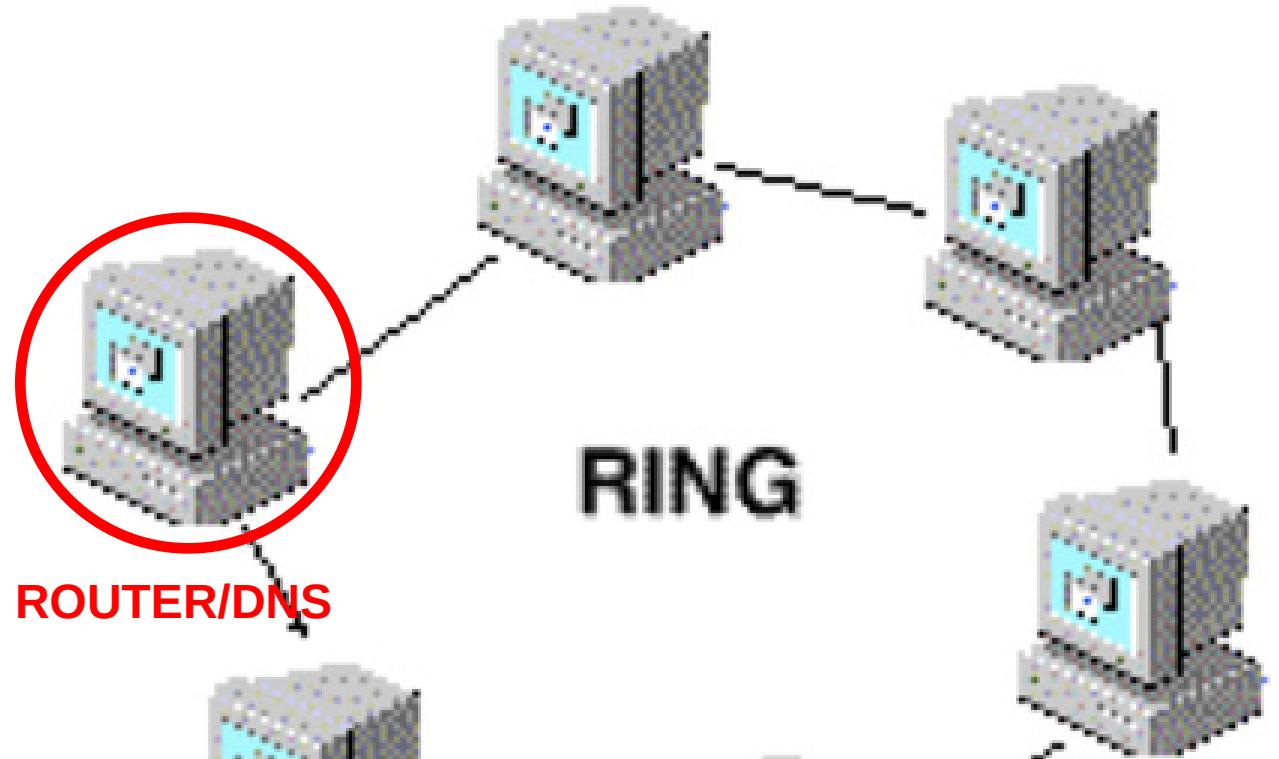
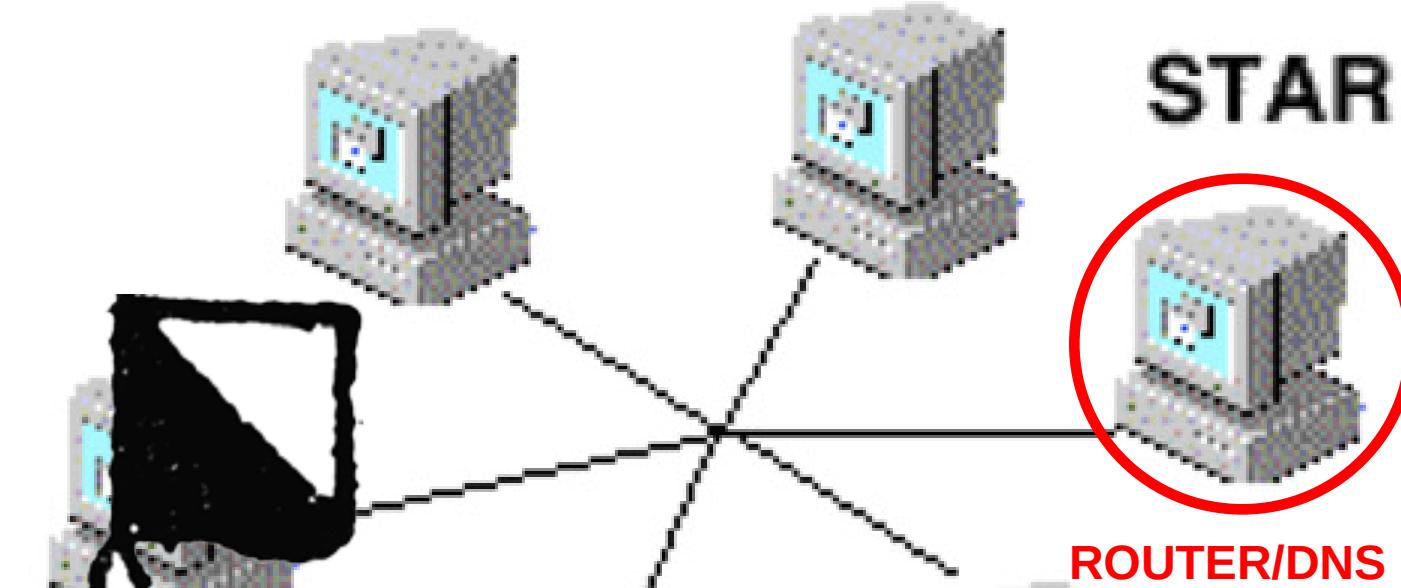
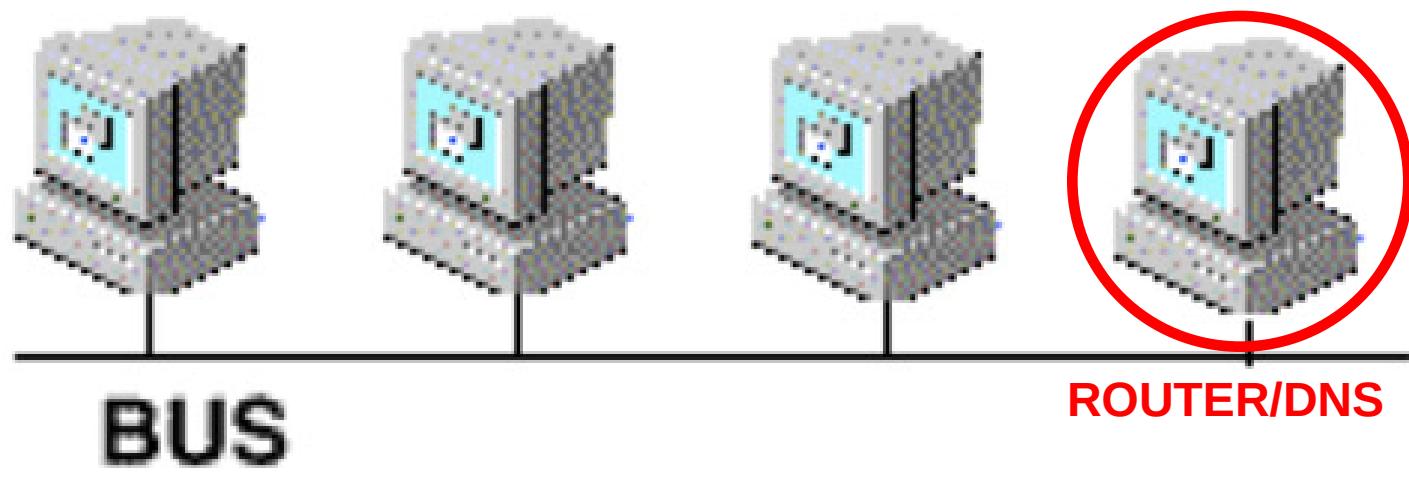
**MESH**



**TREE**

**Eventhough TCP/IP  
promised an ‘open web’.  
There is always a cen-  
tral authority deciding  
where to route the pack-  
ets (aka ‘router’)**





**How to find your way?  
(pre-Google)**



# Exercise: What a SSID\* could be, potential of a limited medium

ster? joke? evil? cute? useful? poetry? game? provocation? distribution? publication?)

**Device set identifier or ‘network name’**

*ding...*

*ching...*

# **JS.EXE**

# *Bus-Infected Wi-Fi*

# *Starbucks Wi-Fi*

# ####-##### for Password Get

## for Password

*password Is 1234*

# *public Wi-Fi*

**Get Wi-Fi Here**

*Our Own Damp Wi-Fi*      *C*

*Martin Router King*  
*John Wilkes Bluetooth*  
*Pretty Fly for a Wi-Fi*  
*Bill Wi the Science Fi*  
*I Believe Wi Can Fi*  
*Tell My Wi-Fi Love Her*  
*No More Mister Wi-Fi*  
*LAN Solo*  
*One LAN Before Time*  
*ence of the LANs*  
*ternet Is Coming*

*Drop It Like It's Hotspot*  
*Life in the Fast LAN*  
*The Creep Next Door*  
*Ye Olde Internet*  
*Penny From The Blockchain*  
*Drop It Like It's Hotspot*  
*You Shalt Not Covet Thy*  
*Neighbor's Wifi*  
*Fight the Inevitable*  
*Friends When IP*  
*I am Linksys*  
*King of the LAN*  
*Bandwidth Together*  
*Wififi*  
*Wifi for the Wicked*  
*Wi Can Fi*  
*ng*  
*ased LAN*  
*Yo Momma*  
*and Honey*  
*the Free*  
*Wifi*  
*ownload*  
*ce You Man*  
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*Trust*  
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*Scooby-D*  
*Pokemon*  
*Saved a Bu*  
*Half Life 3 S*  
*Modem Pole*  
*Steal Our Wi*  
*Wi-Fry Chick*  
*W^3*  
*Join My Bandw*  
*Wifi Art Thou Re*  
*Russian Hackers*  
*Chinese Hackers*  
*Chaos Computer*  
*We've Got the Go*  
*Guess Where We L*  
*Is it me you're looki*  
*12C is the Loneliest*  
*Safe Levels of Radiat*  
*Panic at the Cisco*  
*Wi-Fight the Feeling*  
*IanTernet*  
*Cheeses Take the Whee*  
*For Whom the Belkin To*  
*RIP Net Neutrality*  
*Who What When Where W*

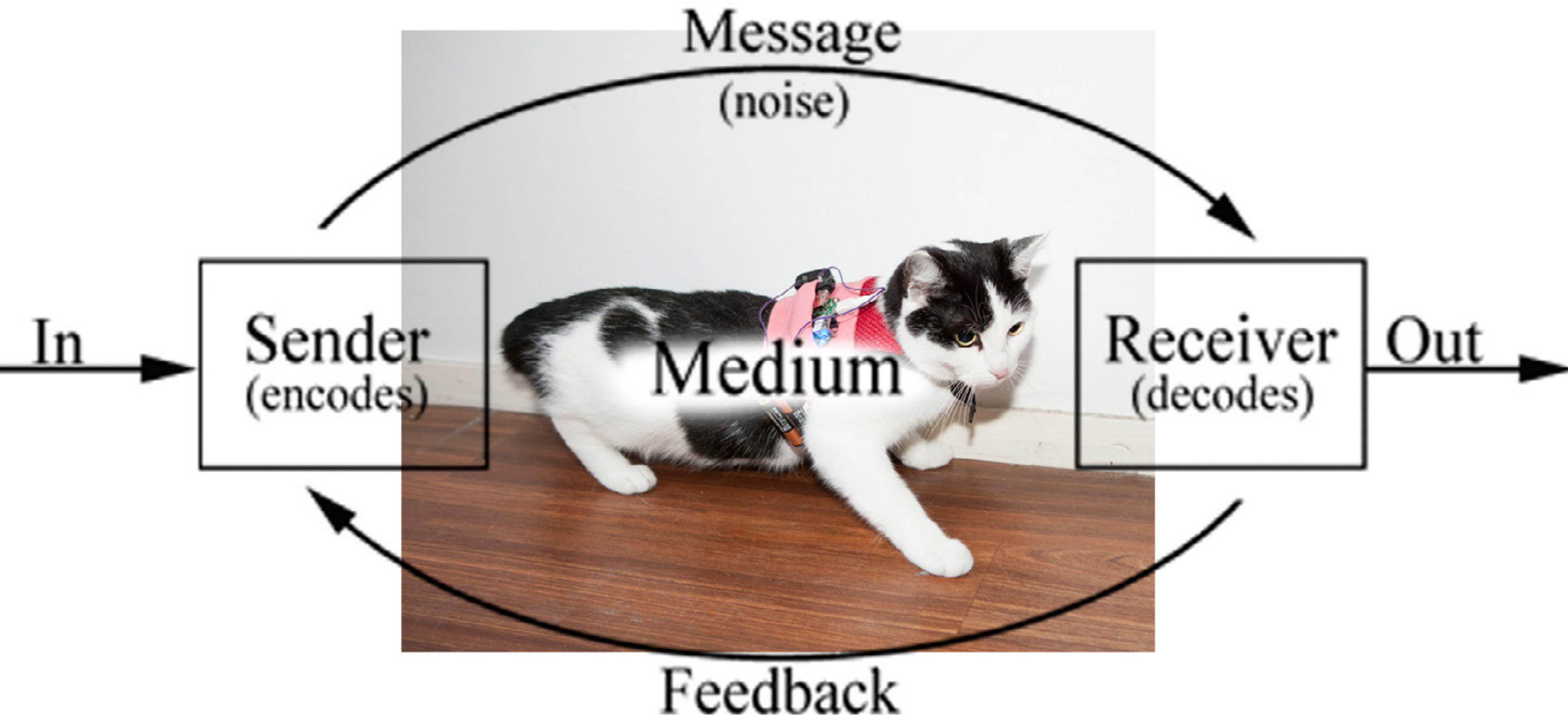
## **REFERENCES**

In the advent of cheap consumer wifi cards and inhospitable climates (economically and geographically) local amenities were often abused to extend the range of these devices, plus cheaper than laying copper cable. For a collection of these contraptions see link below.

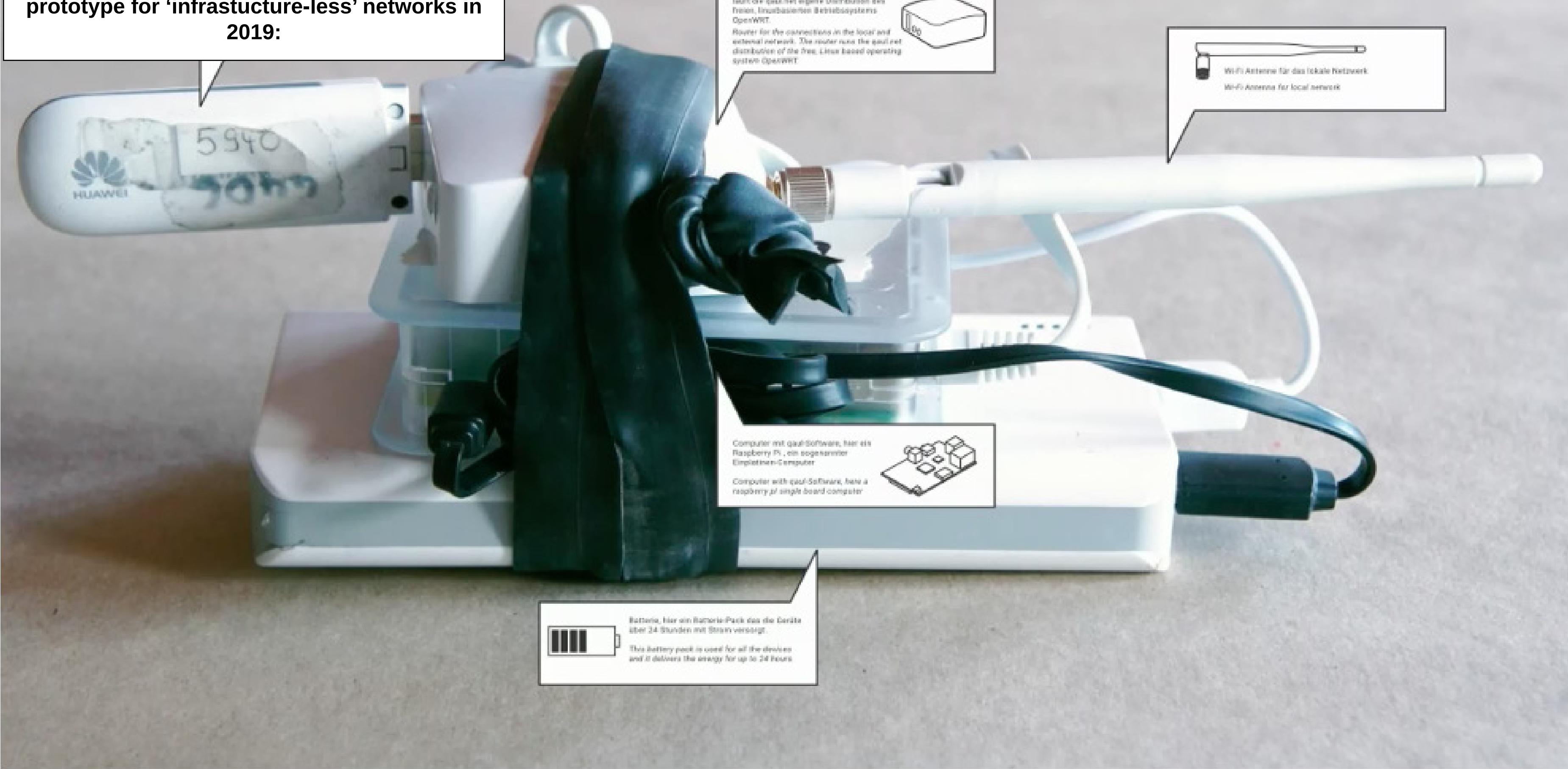


src: roel roscam abbing, pretty fly for a wifi, 2014. <https://test.roelof.info/pretty-fly-for-a-wi-fi.html>

prototype for 'infrastructure-less' networks in  
2014:



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**Too complicated...**



Everyday wireless networks, 'El Paquete Semanal' offline filesharing\* in Cuba since 2008.

src: [https://en.wikipedia.org/wiki/El\\_Paquete\\_Semanal](https://en.wikipedia.org/wiki/El_Paquete_Semanal)

\*aka 'sneakernet' (<https://en.wikipedia.org/wiki/Sneakernet>), see also The Pirate Book



piratebox file sharing software - <http://piratebox.cc>



<https://arambartholl.com/dead-drops/>



<https://arambartholl.com/dead-drops/>



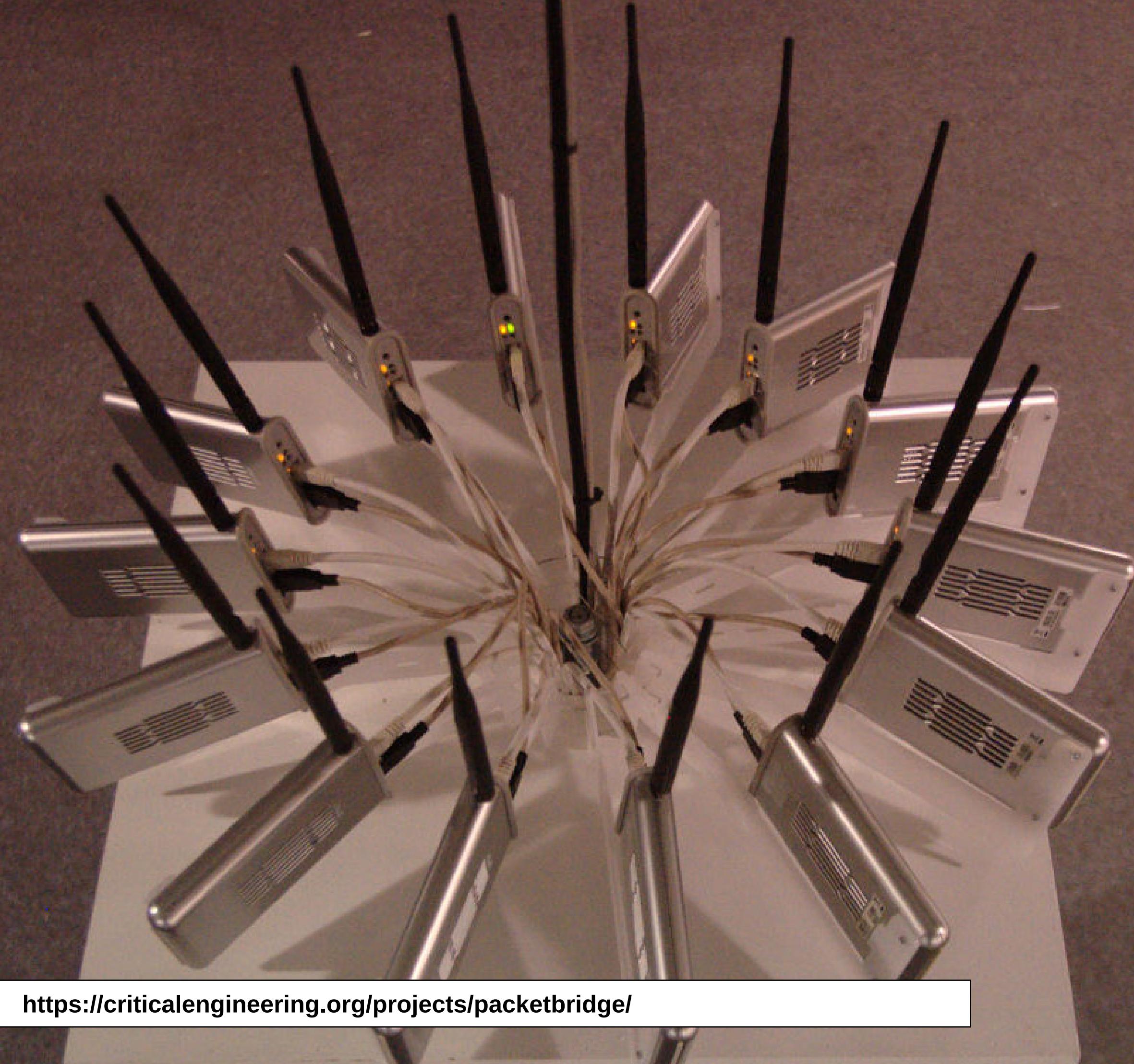
survival pdf fire powered router - <https://arambartholl.com/keepalive/>



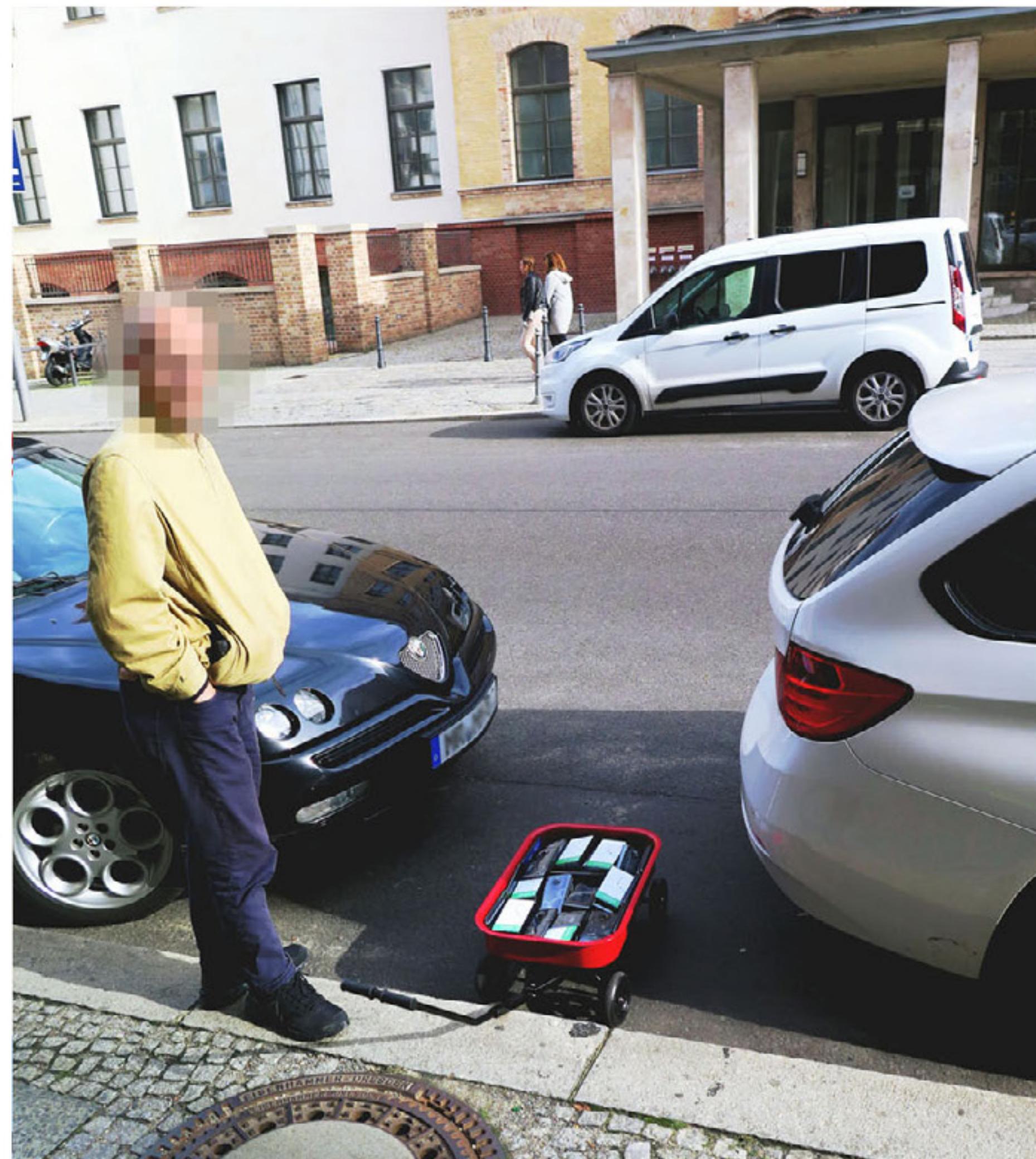
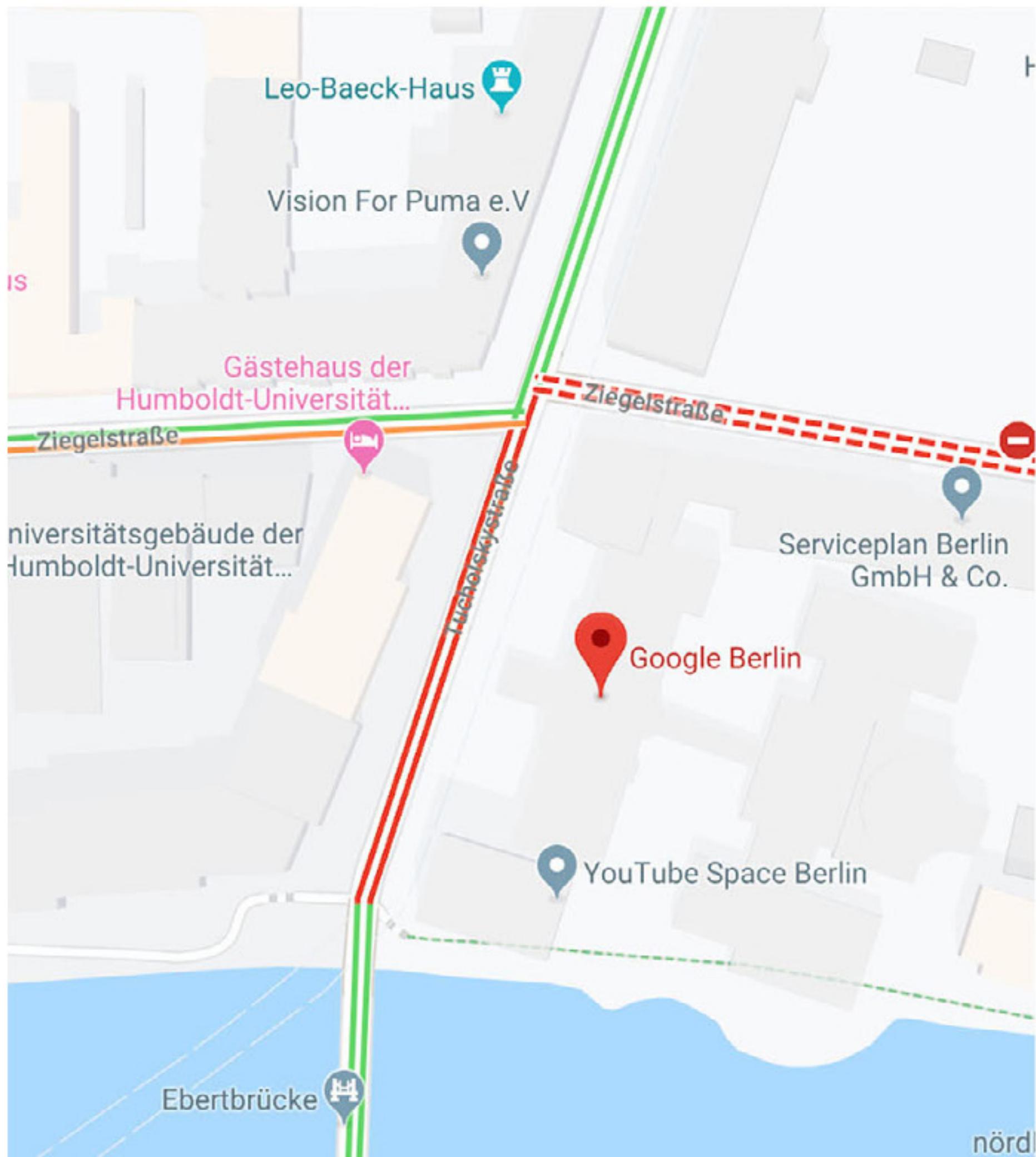
<https://arambartholl.com/forgot-your-password-city-version/>



danja vasiliev - netless - <https://k0a1a.net/netless/>



<https://criticalengineering.org/projects/packetbridge/>





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# LOW←TECH MAGAZINE

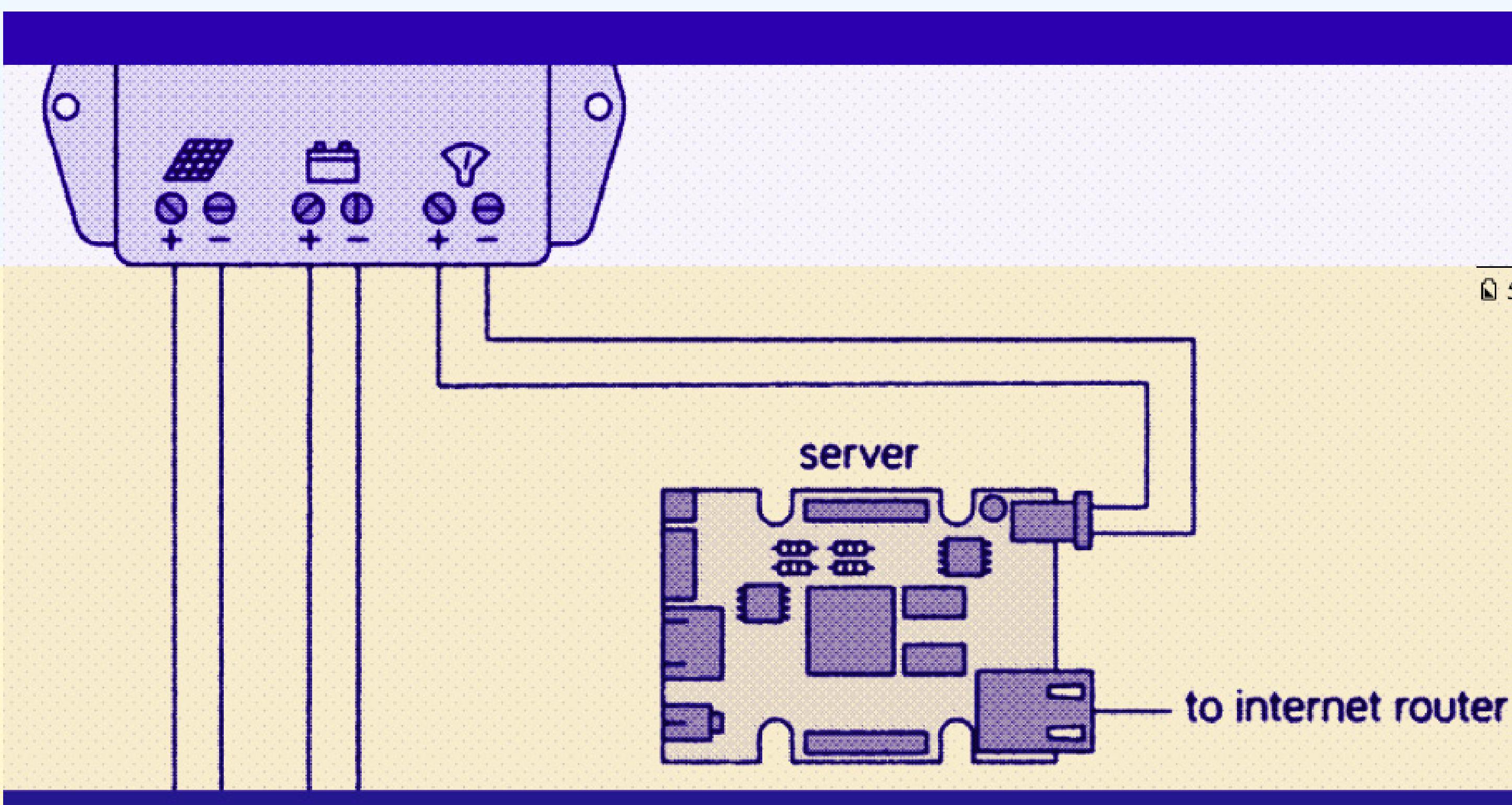
This is a solar-powered website, which means it sometimes goes offline \*

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## How Sustainable is a Solar Powered Website?

We present our website's energy  
and uptime data, calculate the  
embodied energy of our  
configuration, consider the optimal  
balance between sustainability and  
server uptime, and outline  
possible improvements.

January 2020





harvest - <https://julianoliver.com/output/harvest>

text: thoughts on 'harvest' <https://workofwind.ca/project/harvest/>



color-assimilations-grid - <https://www.patreon.com/posts/color-grid-28734535> (included in gimp now?)

The Unicode Consortium, made up of several of these same

Modifying the Universal

in charge of responding to the pressure.<sup>8</sup>

A problem that in essence was caused by an awkward design-decision from Apple, conveniently became a problem to be solved on the abstract level of the Unicode standard. In this meta-context it was clear that the issue could only be addressed through technological means.<sup>9</sup>

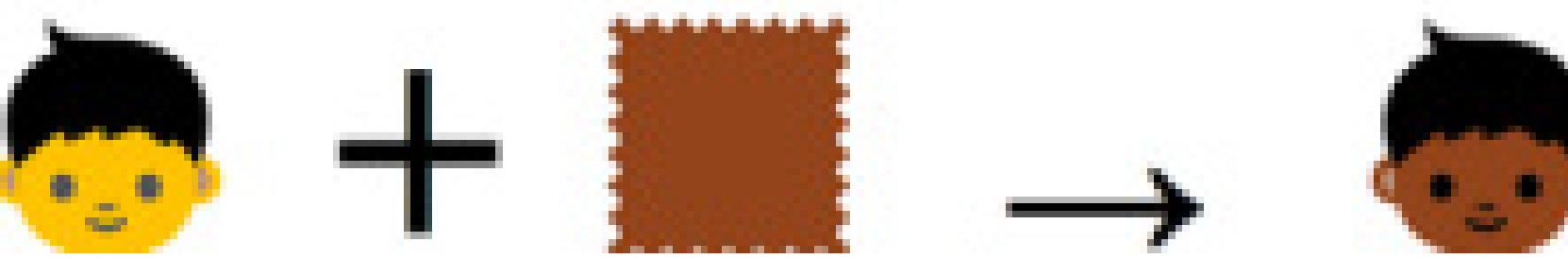


Figure 3. Yellow base character with FITZPATRICK TYPE-5 modifier.

Screenshot from the Unicode Technical Report 51: <http://www.unicode.org/reports/tr51/>.

The solution that the Unicode Consortium decided to implement was to add "skin tone modifiers", six new characters that could

pdf: db06\_executing\_practices\_modifying\_the\_universal\_pierrot\_rosacam\_abbing\_snelting.pdf

dered to represent

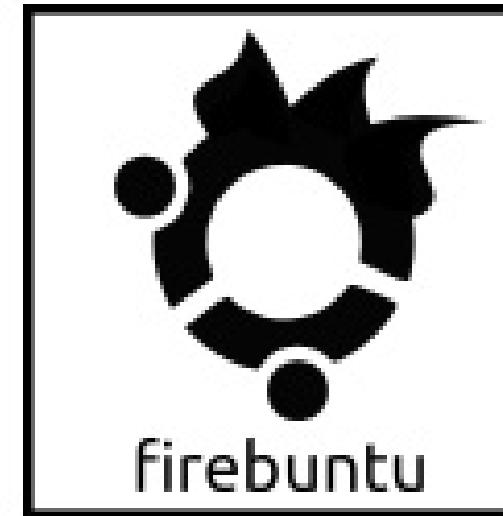
video: [https://www.youtube.com/watch?v=ZP2bQ\\_4Q7DY](https://www.youtube.com/watch?v=ZP2bQ_4Q7DY)

irism that is

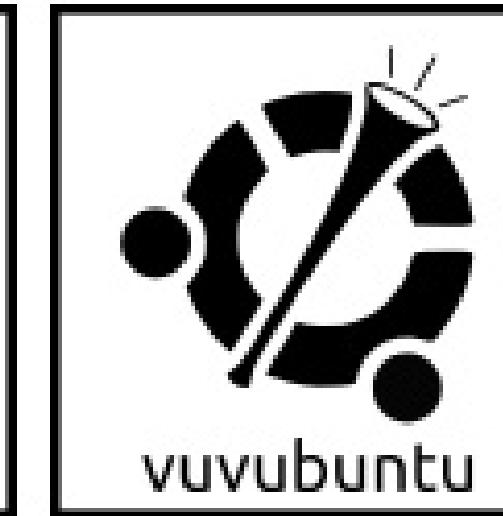
## Distros >



punkbuntu



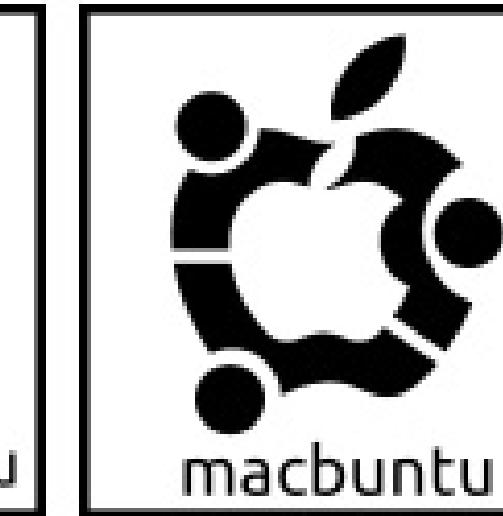
firebuntu



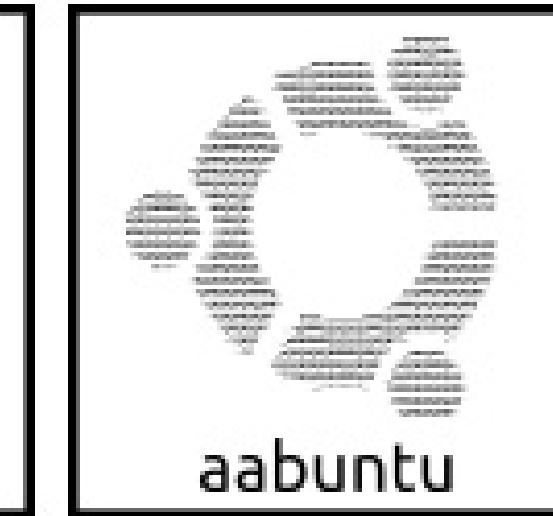
vuvubuntu



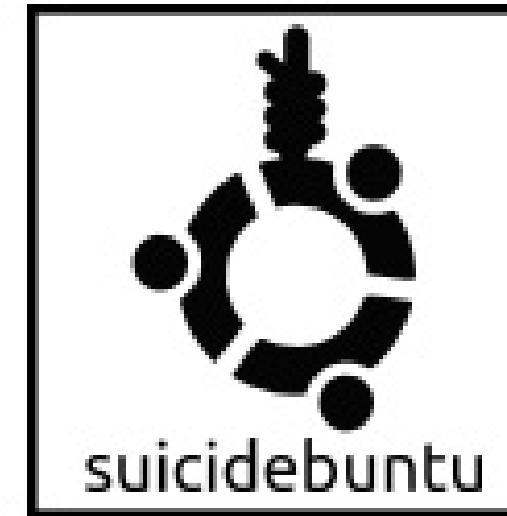
rotterdambuntu



macbuntu



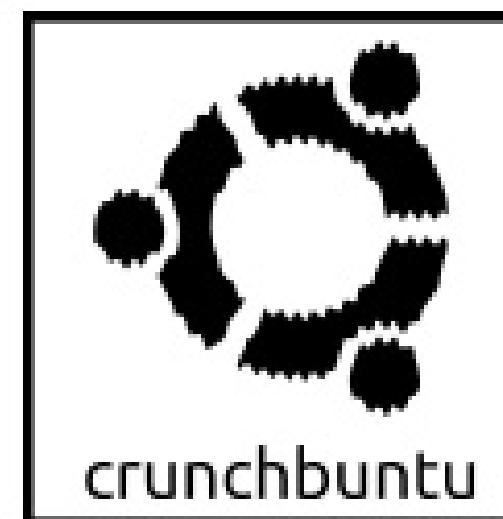
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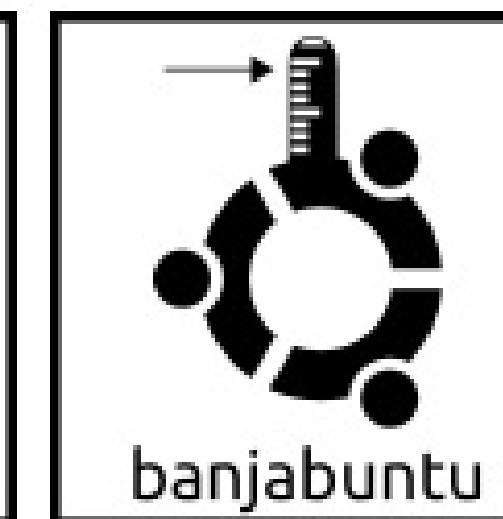
suicidebuntu



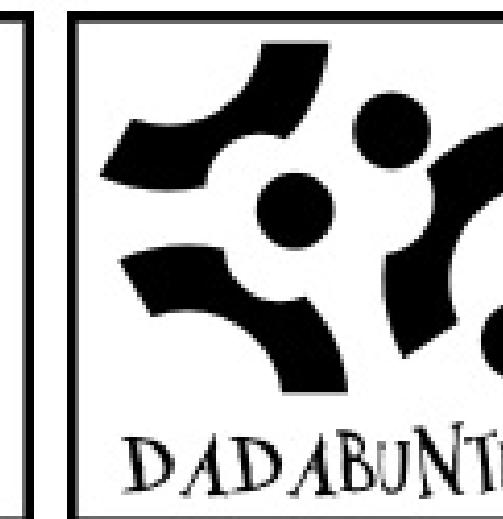
shufflebuntu



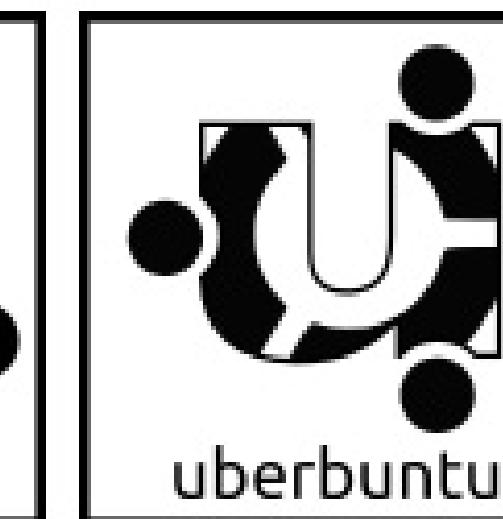
crunchbuntu



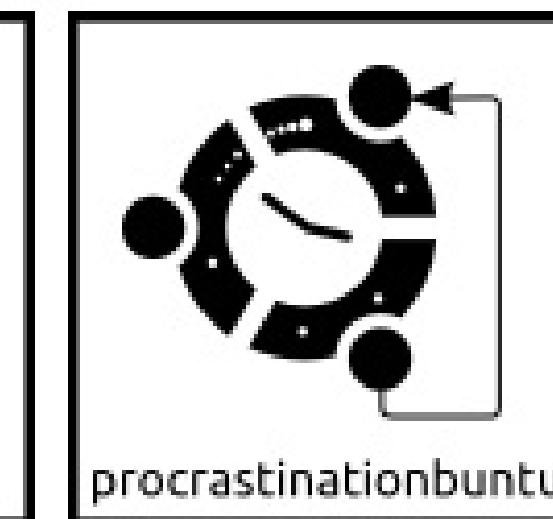
banjabuntu



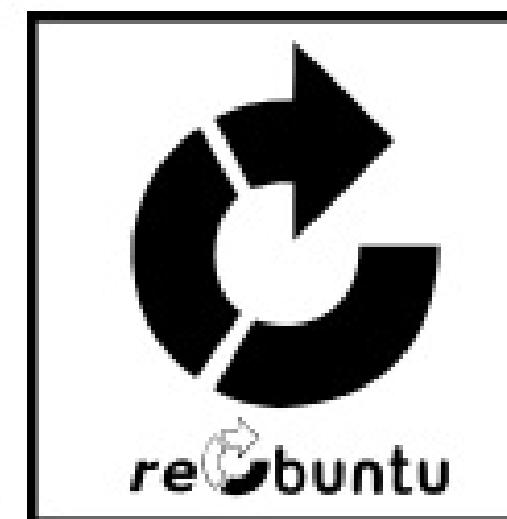
DADABUNTU



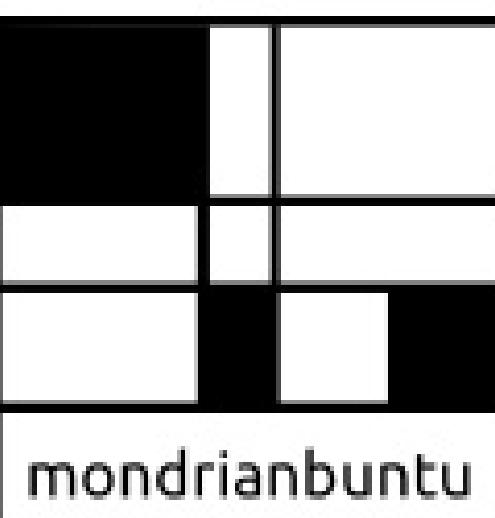
uberbuntu



procrastinationbuntu



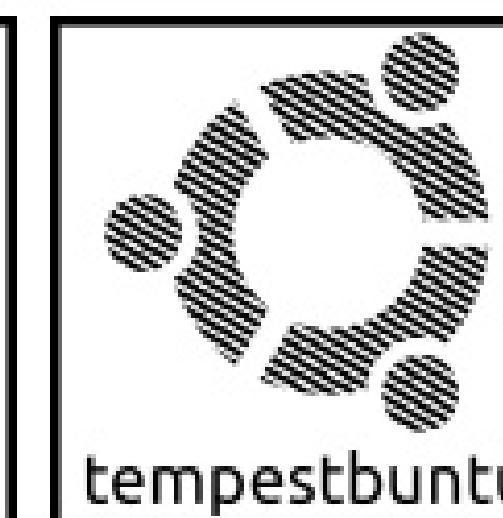
rebuntu



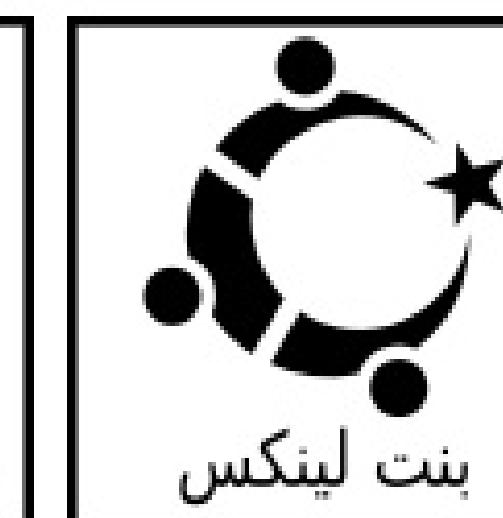
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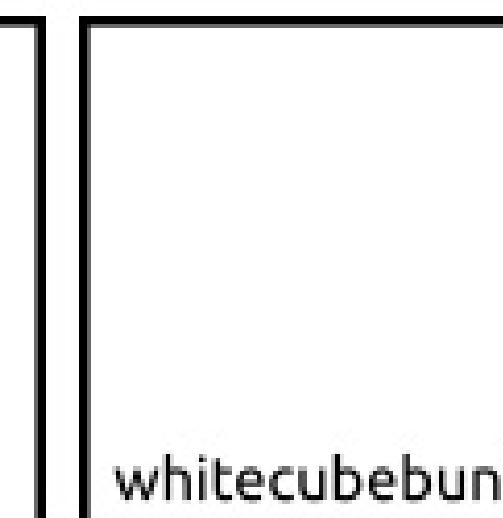
lowresbuntu



tempestbuntu



Bent لينكس



whitecubebuntu



trevor paglen nsa tapped cable - <https://www.wired.com/2016/09/trevor-paglen-internet-cables-nsa/>

# Groningen - Eemshaven

Guided tour to:

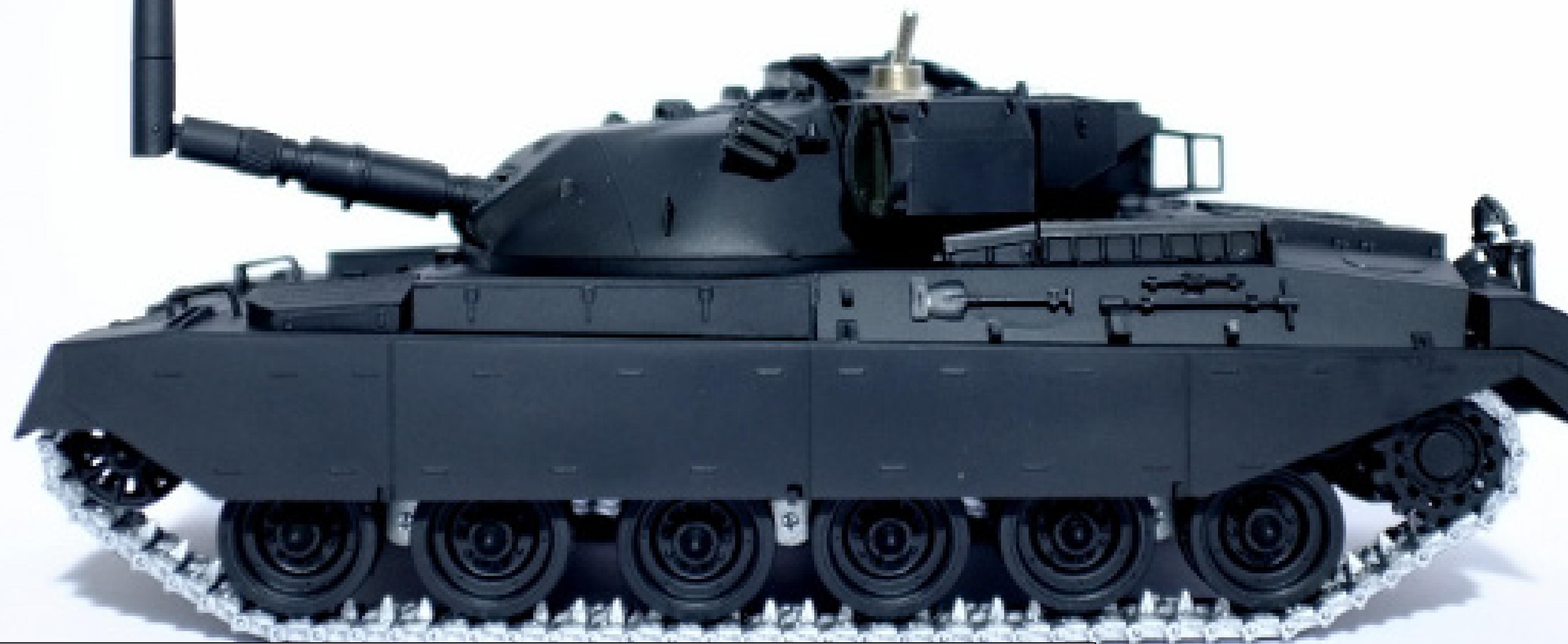
- TGN Submarine Data Cable
- Google datacenter
- Largest coalplant in NL
- Largest gasplant in NL
- Gasdrilling installations

December 13th 2015  
departure 13:00 from  
SIGN, Winschoterkade 10,  
Groningen

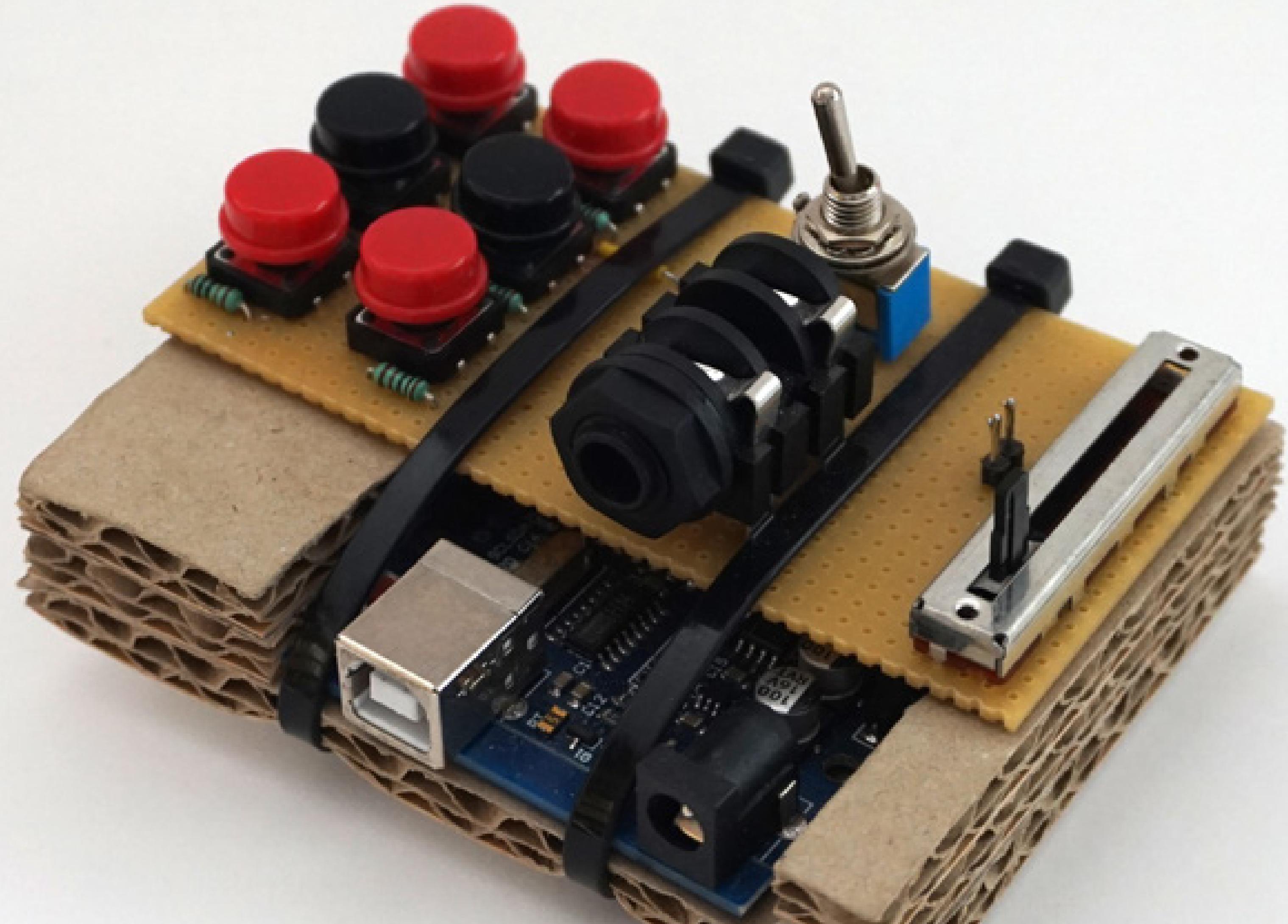
**INFRASTRUCTOURS**



diy printable cable cutter - <https://escuderoandaluz.com/2017/11/01/free-universal-cut-kit-for-internet-dissidence-f-u-c-k-id/>



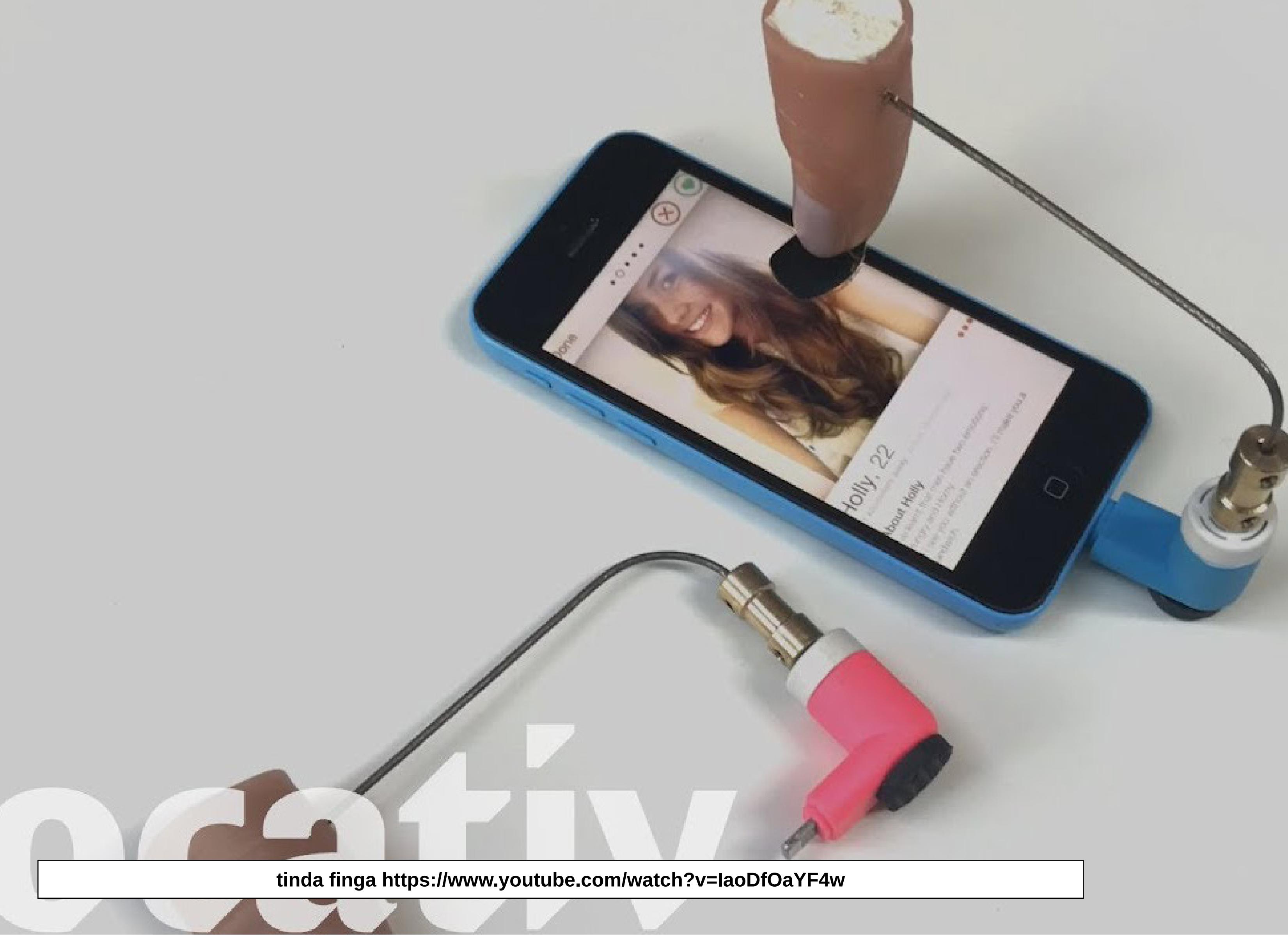
no network - <https://julianoliver.com/output/no-network.html>



<https://www.marloesvanson.nl/>



simone giertz - shitty robots - <https://medium.com/desk-of-van-schneider/simonegiertz-6fff84999670>



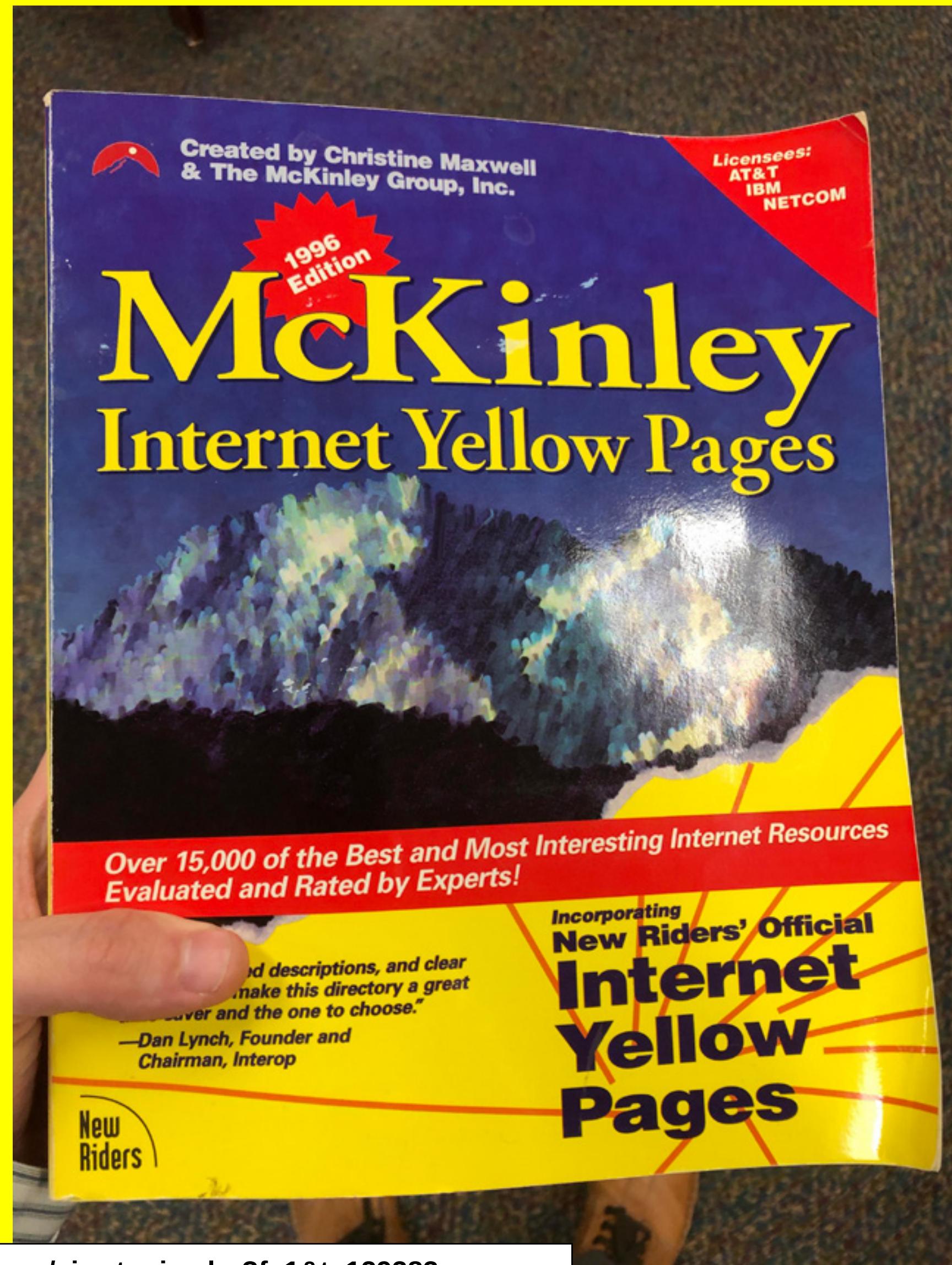
tinda finga <https://www.youtube.com/watch?v=IaoDfOaYF4w>

tender - <https://vimeo.com/111997940>



interfight robots - [https://escuderoandaluz.com/2015/06/08/inter\\_fight/](https://escuderoandaluz.com/2015/06/08/inter_fight/)

# Nav- igat- ing The Net- work





## WorldWide Marketplace



This home page offers promises that a huge mall with lots of departments will be here in the future, but currently it's practically empty. It does house travel services, Internet services, consulting, telecommunications providers, a couple of bookstores, a real estate agency, sport cards and comics dealers. You can place your own business here. There's no electronic ordering. User must telephone the companies to order products.

**KEYWORDS** Computer Consulting, Shopping Malls, Telecommunications, Travel

**AUDIENCE** Computer Users, Internet Users, Tourists

**CONTACT** Info-Request@cygnus.nb.ca

**FREE**

**<http://www.cygnus.nb.ca/mall/mall.html>**

Through  
photograph  
(<http://w>)

**Tele**

*See also*  
Arts & Music ·  
Popular Culture

*Personalities*

Popular Culture

**Association**  
**Public Tele**

This site is a collection of links to information about television in the United States, from general publications to specific regulatory bodies and access issues, as well as links to other sites related to television.

# **DEMOS**

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navimon.baidu.com  
dcps.nuomi.com  
map-mobile-lbsapp.cdn.bce-  
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passport.baidu.com  
googletagmanager.com  
hma.baidu.com  
mps.mxdata.co.uk  
offnavi.map.baidu.com  
ndservice.google.com  
uiduapi.nuomi.com  
ps.nuomi.com  
p-mobile-lbsapp.cdn.bce-  
.com  
ss.baidu.com  
vi.map.baidu.com  
bdstatic.com  
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gsp64-ssl.ls.apple.com  
play.googleapis.com  
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data.flurry.com  
p7-buy.itunes.apple.com  
navimon.baidu.com  
dcps.nuomi.com  
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passport.baidu.com  
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bdstatic.com  
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apple.com

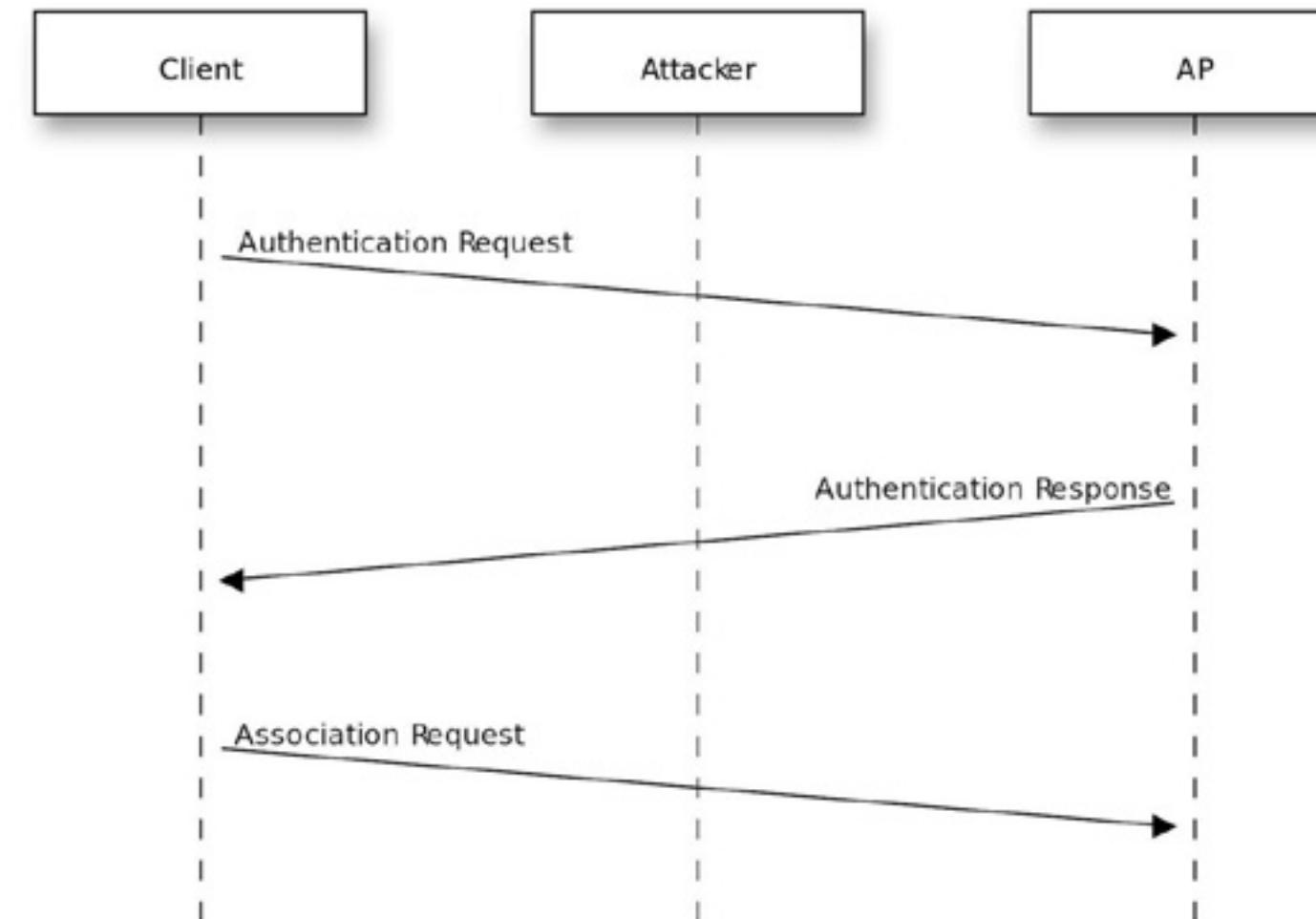
7-courier.push.apple.com  
19-courier.push.apple.com  
44-courier.push.apple.com  
gs-loc.apple.com  
ads.mopub.com  
6-courier.push.apple.com  
gateway.icloud.com  
cl3.apple.com  
ads.mopub.com  
25-courier.push.apple.com  
22-courier.push.apple.com  
app-measurement.com  
gsp64-ssl.ls.apple.com  
play.googleapis.com  
play.googleapis.com  
api-glb-ams.smoot.apple.com  
api.tuisong.baidu.com  
passport.baidu.com  
hma.baidu.com  
google.com  
data.flurry.com  
p7-buy.itunes.apple.com  
navimon.baidu.com  
dcps.nuomi.com  
map-mobile-lbsapp.cdn.bce-  
bos.com  
gipass.baidu.com  
passport.baidu.com  
googletagmanager.com  
hma.baidu.com  
mps.mxdata.co.uk  
offnavi.map.baidu.com  
ndservice.google.com  
uiduapi.nuomi.com  
ps.nuomi.com  
p-mobile-lbsapp.cdn.bce-  
.com  
ss.baidu.com  
vi.map.baidu.com  
bdstatic.com  
p.baidu.com  
.baidu.com  
rt.baidu.com  
aidu.com  
ub.com  
l.baidu.com  
.su.bcebos.com  
.com  
ss.com  
ud.co  
sh.ap  
sh.ap  
.appl  
apple.com  
apple.com

nsclick.baidu.com  
passport.baidu.com  
hma.baidu.com  
ads.mopub.com  
mapglobal.baidu.com  
bus-config.su.bcebos.com  
googleapis.com  
pdisp01.c-wss.com  
gateway.icloud.com  
10-courier.push.apple.com  
10-courier.push.apple.com  
7-courier.push.apple.com  
19-courier.push.apple.com  
44-courier.push.apple.com  
gs-loc.apple.com  
ads.mopub.com  
6-courier.push.apple.com  
gateway.icloud.com  
cl3.apple.com  
ads.mopub.com  
25-courier.push.apple.com  
22-courier.push.apple.com  
app-measurement.com  
gsp64-ssl.ls.apple.com  
play.googleapis.com  
play.googleapis.com  
api-glb-ams.smoot.apple.com  
api.tuisong.baidu.com  
passport.baidu.com  
hma.baidu.com  
google.com  
data.flurry.com  
p7-buy.itunes.apple.com  
navimon.baidu.com  
dcps.nuomi.com  
map-mobile-lbsapp.cdn.bce-  
bos.com  
gipass.baidu.com  
passport.baidu.com  
googletagmanager.com  
hma.baidu.com  
mps.mxdata.co.uk  
offnavi.map.baidu.com  
ndservice.google.com  
uiduapi.nuomi.com  
ps.nuomi.com  
p-mobile-lbsapp.cdn.bce-  
.com  
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vi.map.baidu.com  
bdstatic.com  
p.baidu.com  
.baidu.com  
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aidu.com  
ub.com  
l.baidu.com  
.su.bcebos.com  
.com  
ss.com  
ud.co  
sh.ap  
sh.ap  
.appl  
apple.com  
apple.com

## Example DNS ‘Sniffing’



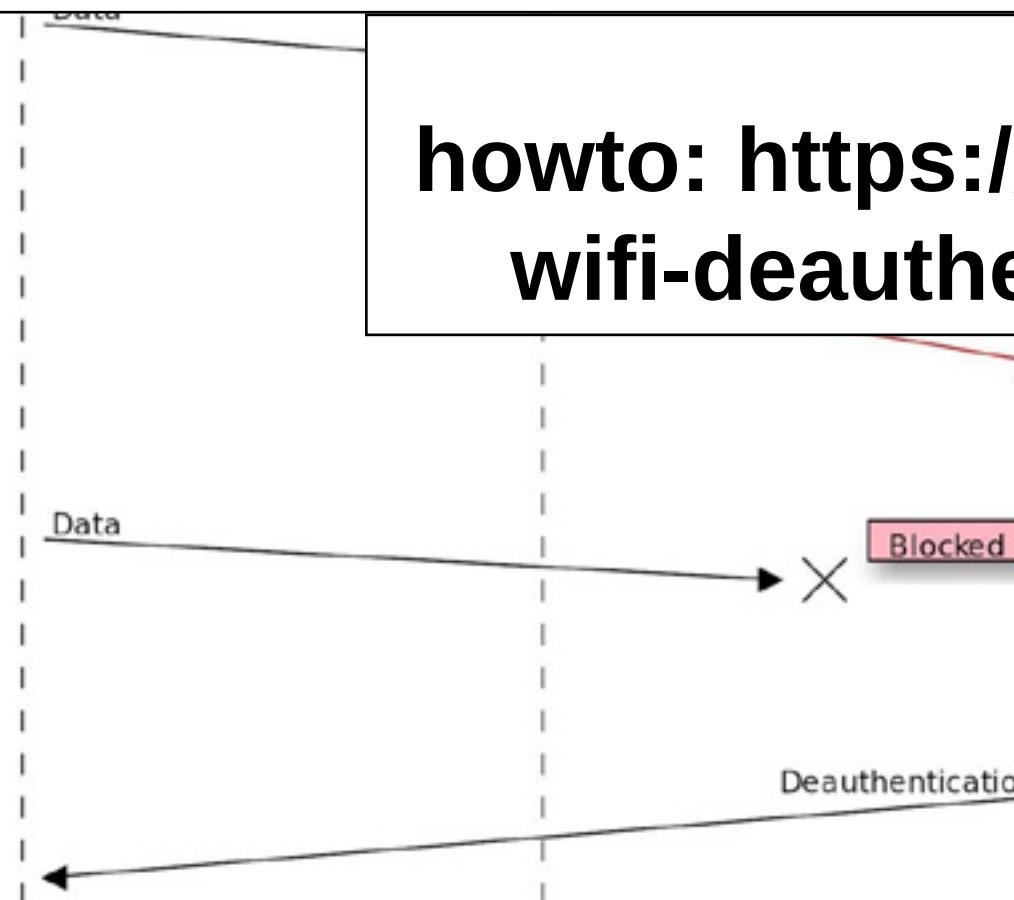
# *Deauth*



**code:** [https://github.com/spacehuhn/  
esp8266\\_deauther](https://github.com/spacehuhn/esp8266_deauther)

**howto:** [https://www.hackster.io/234v244/  
wifi-deauthentication-attack-4ed3d3](https://www.hackster.io/234v244/wifi-deauthentication-attack-4ed3d3)

Bumping clients of the network



# Glossary

**Wifi** - Marketing term for 2.4GHz radio communication.

**Electromagnetic Spectrum** - Range of frequencies: (visible)light to ...

**2.4GHz** - Frequency of oscillations: 2.4 Giga Hertz or 2400Mhz is 2400 milion oscillations (virbrations) per second.

**ISM Band** - Piece of the radio spectrum reserved for Industrial, Scientific and Medical uses. No license required. Low power (<1 Watt).

**Node** - a 'knot' in a network, where connections meet.

**TCP** -

**IP** - internet protocol

**IP address** - address of a device on a network

255.255.255.255

**Top Level Domain** - a domain name ending with .com, net, nl, etc....

**DNS** - domain name server, translates IP addresses to human readable names.

# Refer- ences

## **NOTES**

<https://pad.vvvvvvaria.org/lofiwifi>

## **EXAMPLE CODE**

[http://dennisdebel.nl/workshops/lofiwifi/  
example-code.zip](http://dennisdebel.nl/workshops/lofiwifi/example-code.zip)

## **WIFI HAX**

**arpspoof**- send 'router' packets as client to redirect all traffic through a machine in your control

**driftnet** - display all images flying around on your network <https://github.com/deiv/driftnet>

**SSLstrip** - strip the 's' from https: allowing you to view unencrypted packets/data (not sure if it still works in 2020).

# *Appen-* **dix**







**“Development of wired and wireless communication modes have since been intertwined”**

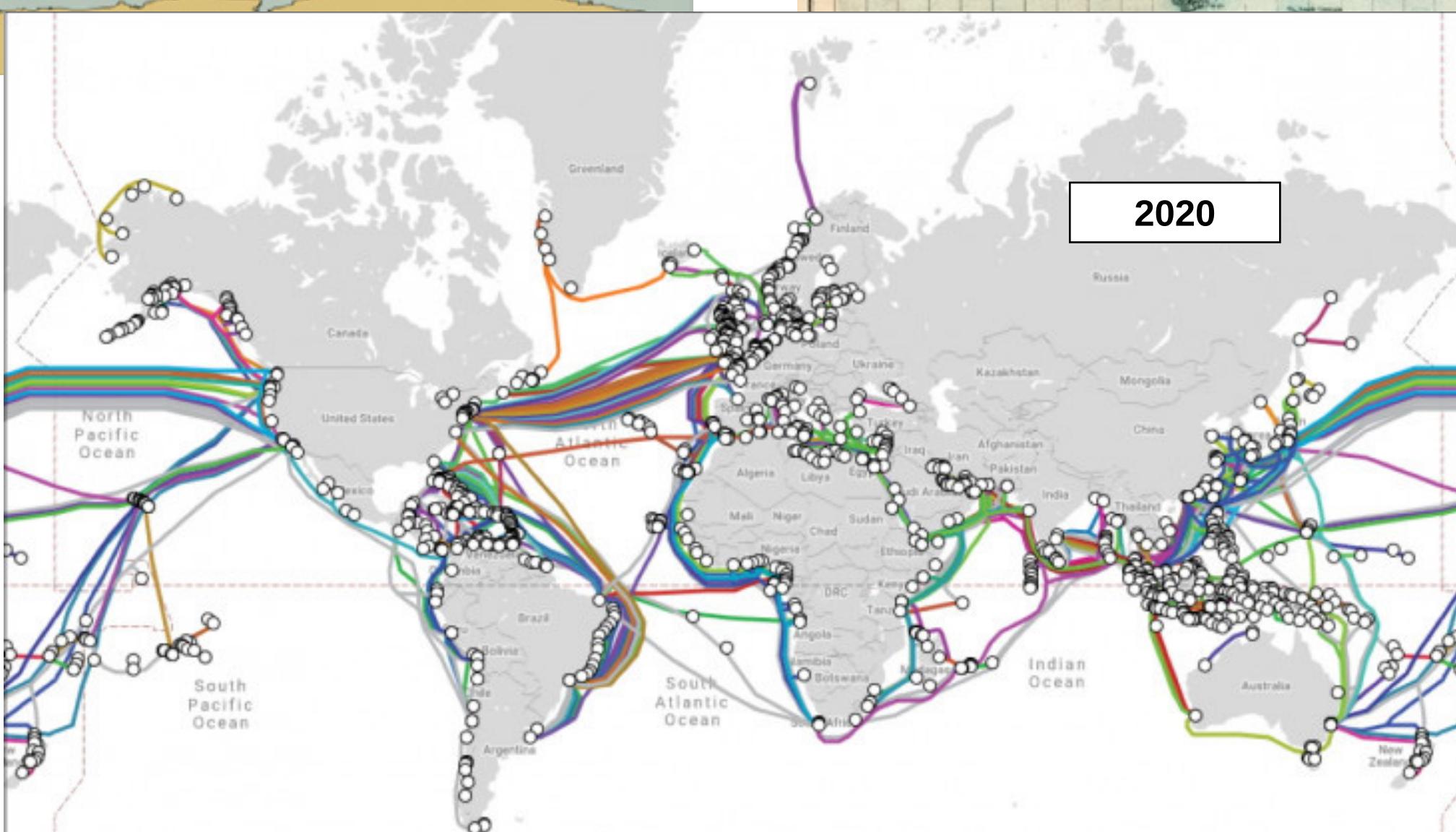
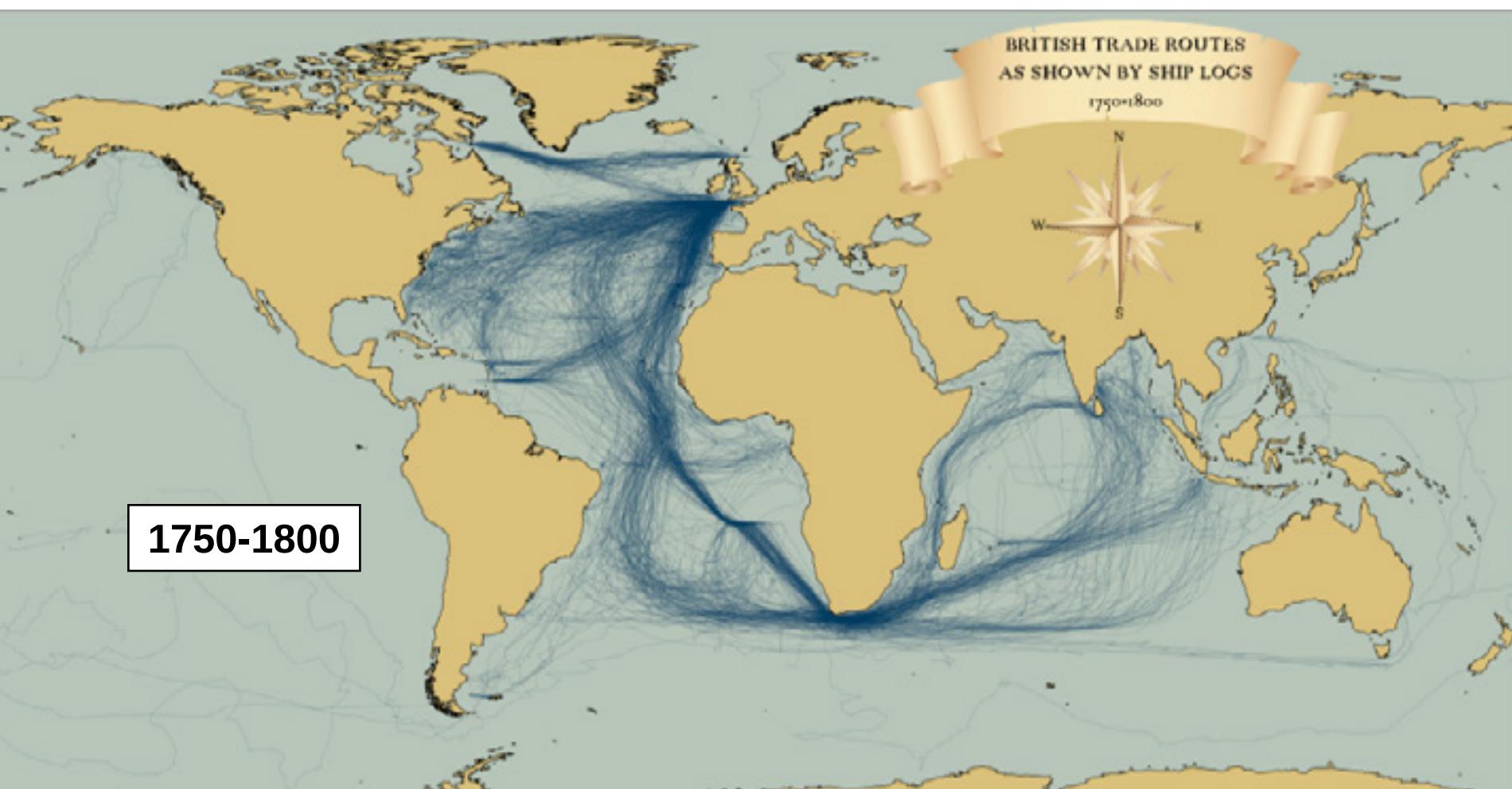
1935 map of british wireless telegraph connections. Notice the 'imperial projection' with the UK in the center

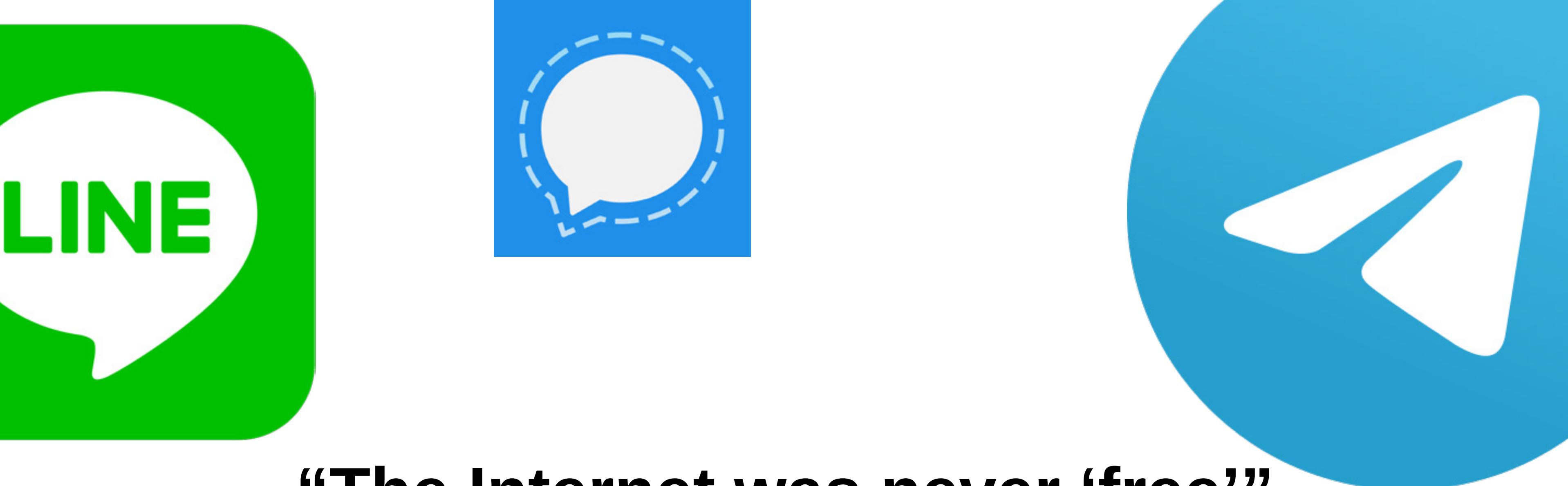
# POST OFFICE RADIO-TELEPHONE SERVICES



src: [https://www.reddit.com/r/MapPorn/comments/bczu50/macdonald\\_gill\\_british\\_post\\_office\\_map\\_of/](https://www.reddit.com/r/MapPorn/comments/bczu50/macdonald_gill_british_post_office_map_of/)

# British shipping routes 1750-1800, 1901 British Eastern Telegraph Company and submarine internet cables 2020





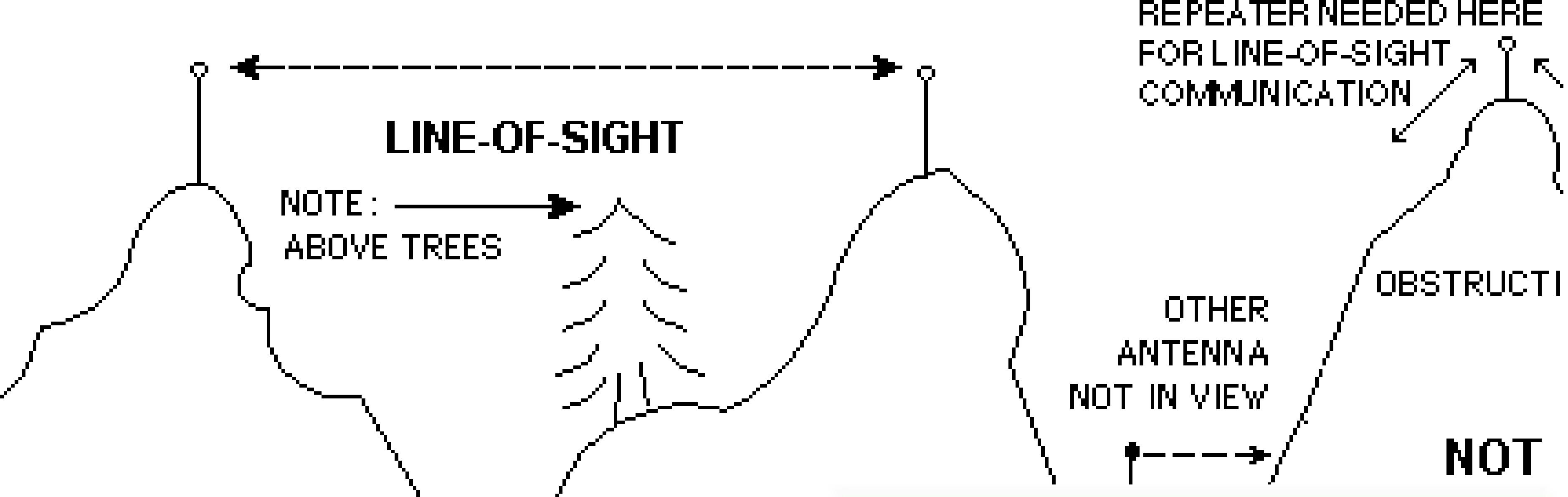
**“The Internet was never ‘free’”**



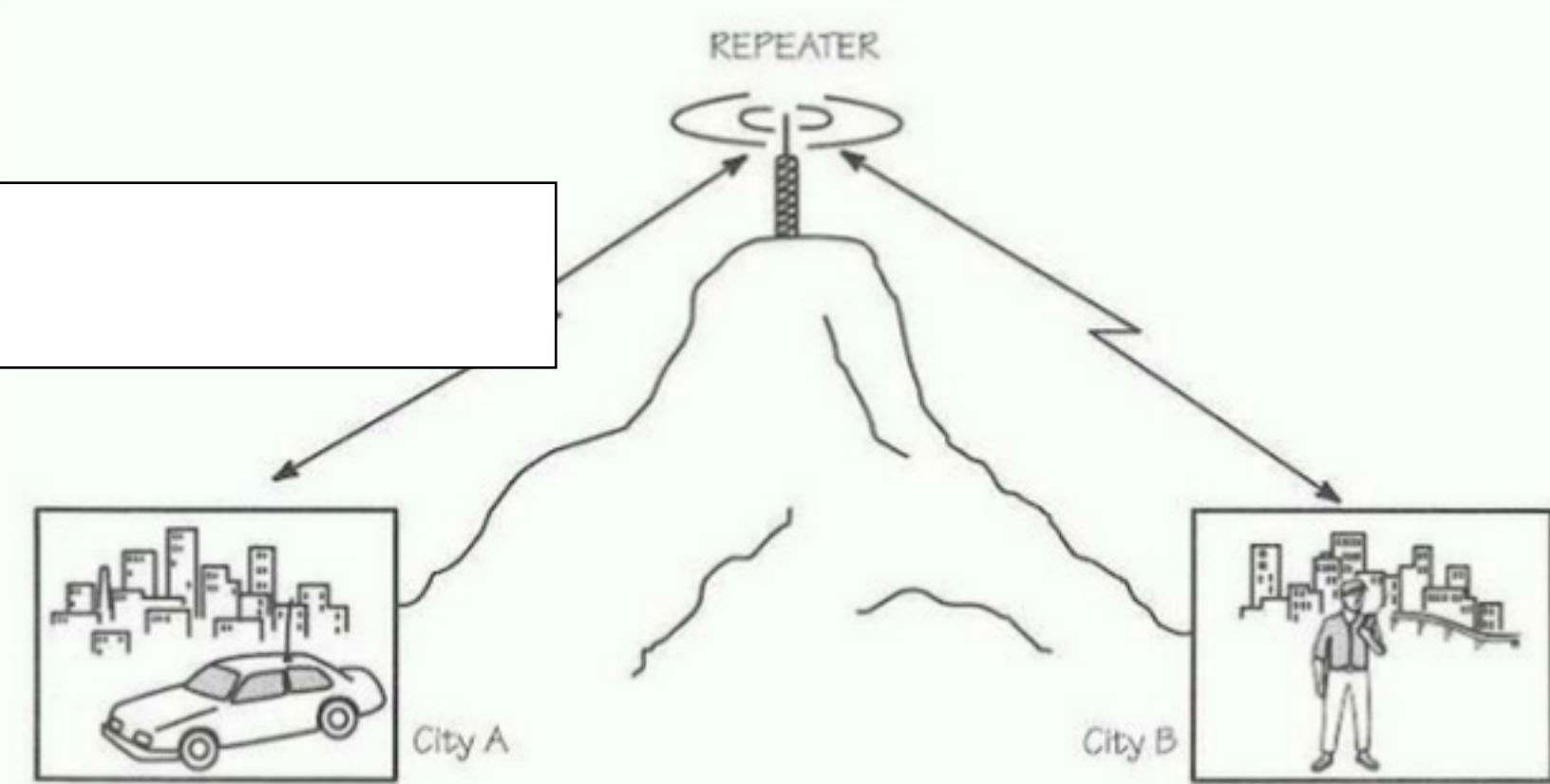
**“There is no such thing as ‘Free WiFi”**

# **WiFi = Radio\***

**\*no matter the marketing claims, Wifi, LTE, Bluetooth LE, 5g, 6g still obey the laws of physics**



While having a wirelessconnection.....

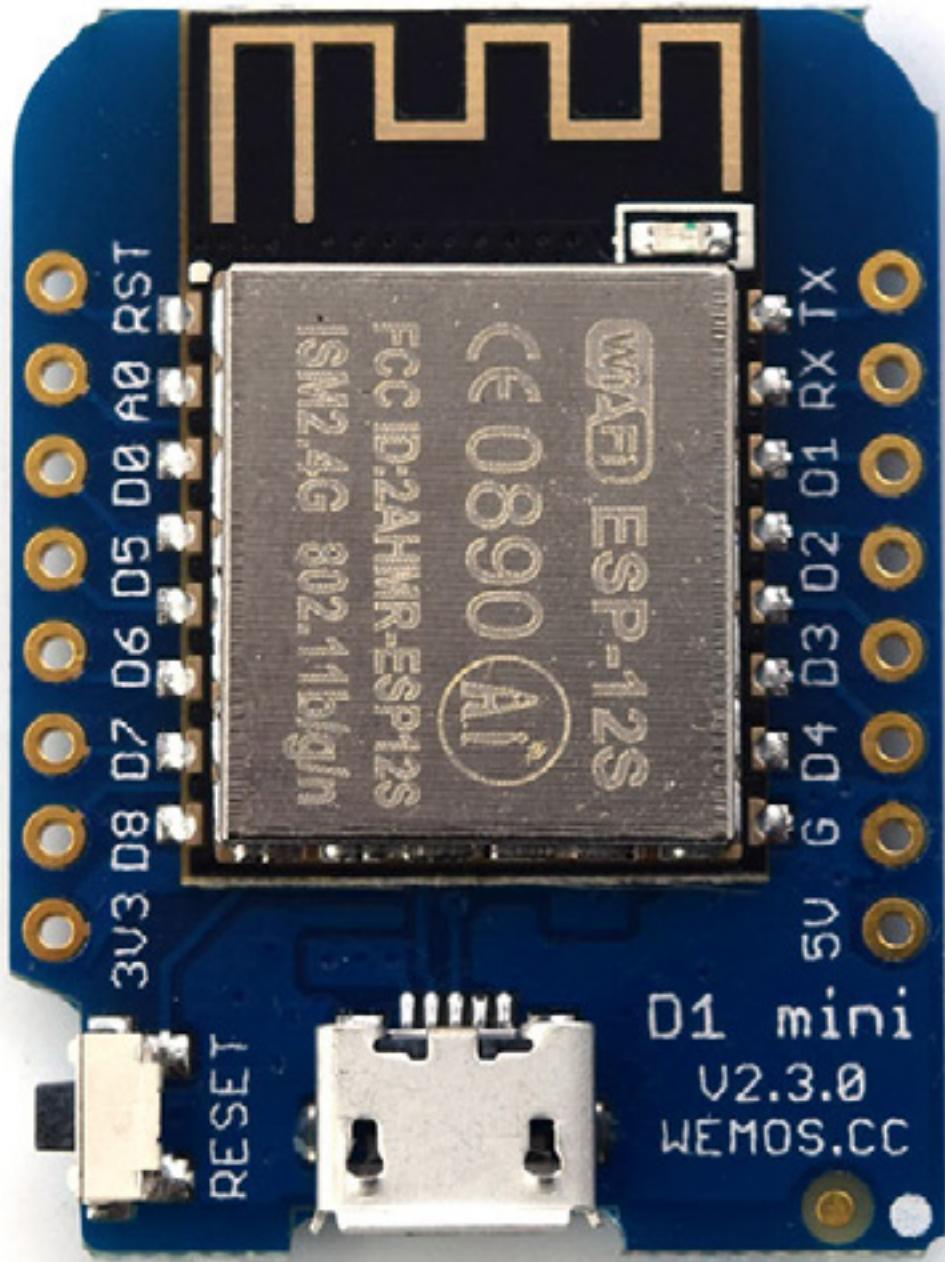


This can be solved easily with a repeater



# *Wemos*

## *D1 Mini*



### **Quirks:**

- code/wifi doesn't appear, just reset (pluout/plugin) the wemos module again.
- code doesn't upload, speed might be too fast: set upload speed to 115200 (Arduino>Tools>Upload Speed)