



Electromagnetic  
Field

# 2018 Infrastructure Review

Site, Power, NOC, Telephony (DECT, GSM), Video (C3VOC)

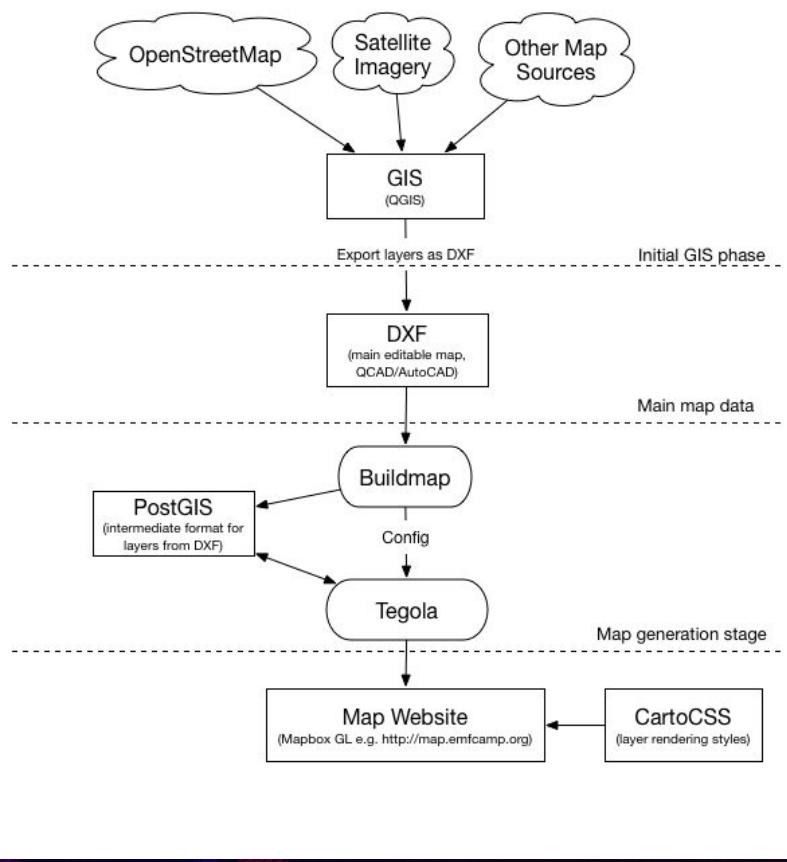


# Site Design









**[github.com/emfcamp/buildmap](https://github.com/emfcamp/buildmap)**  
(sorry the docs are out of date)

# Signs

Ledbury 6  
A438

Eastnor  
Castle

EMF  
←  
Eastnor  
Castle

S. WINSLOW & SON



**First on site - the bins**



# Power & Site Lighting

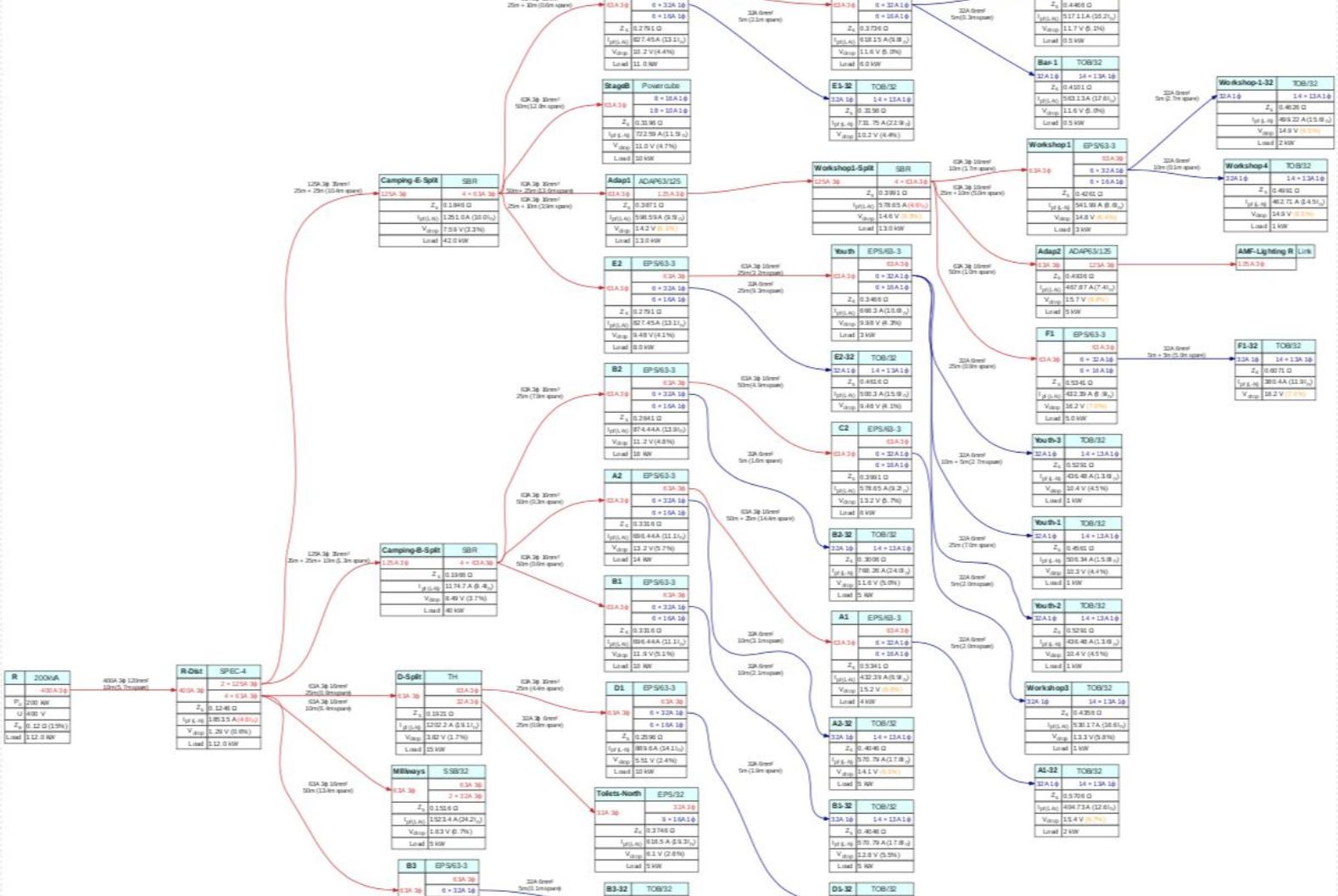
# Computer-Aided Power Design

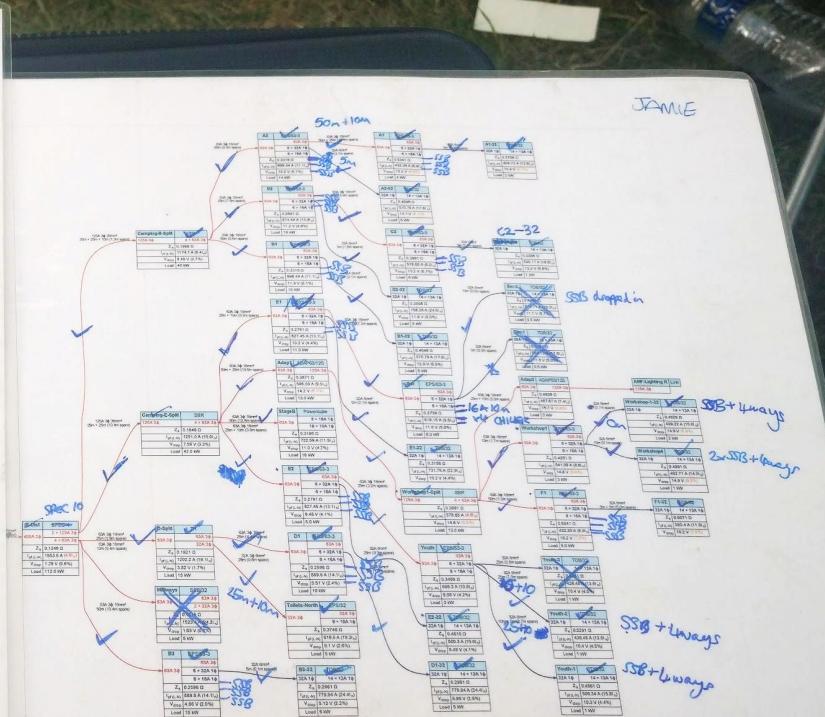
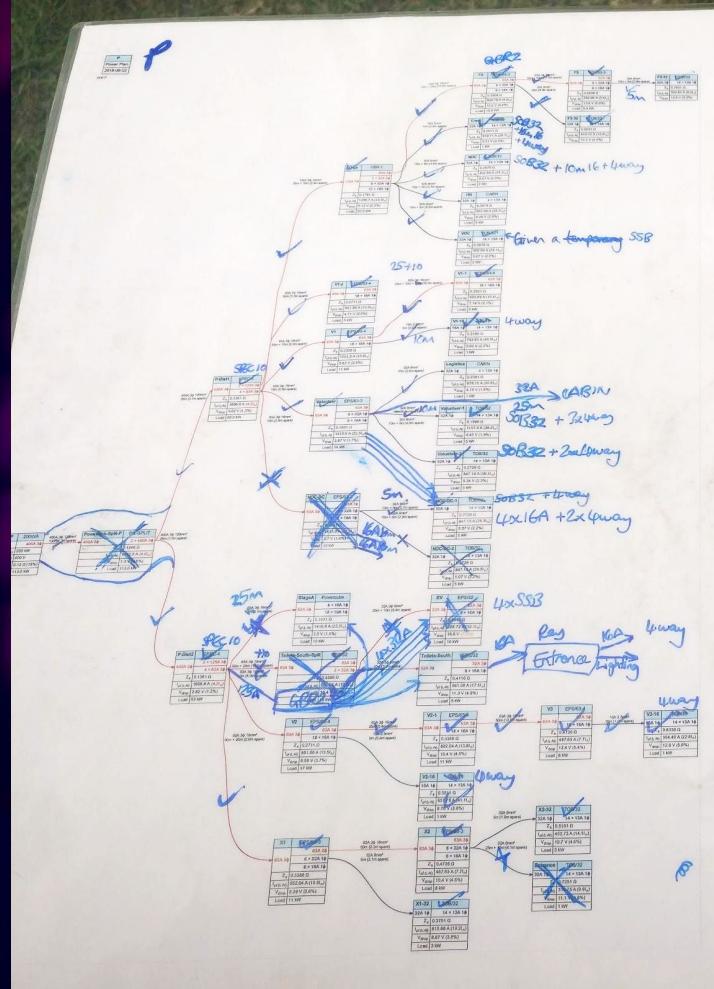
DXF to GraphViz via PostGIS

[github.com/emfcamp/powerplan](https://github.com/emfcamp/powerplan)

Undocumented but well-tested (!)

Probably quite UK-specific





19 power distribution boards >16A

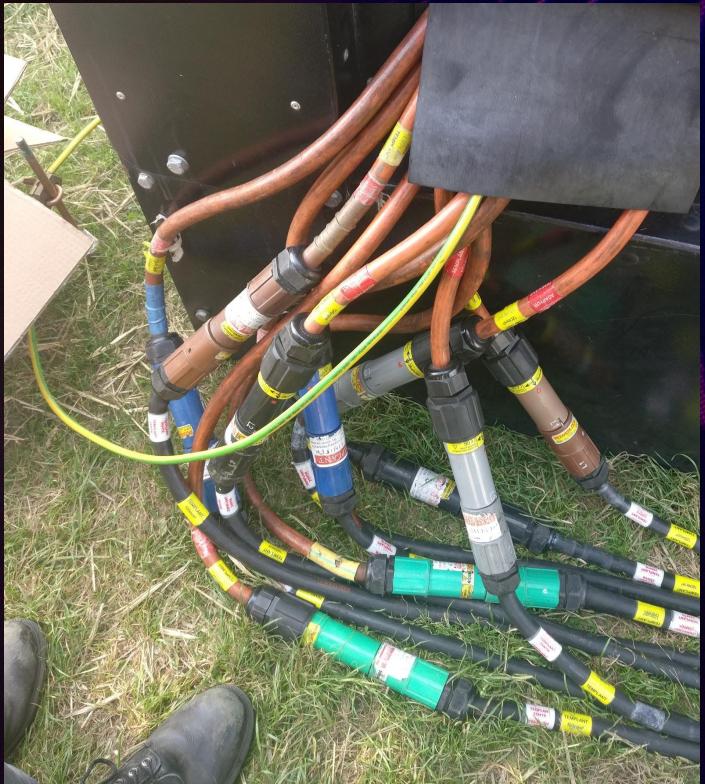
>5200m of power cable

Generators: 2 x 300kVA & 1 x  
200kVA

~130kW total peak load

>400 mains connected tents





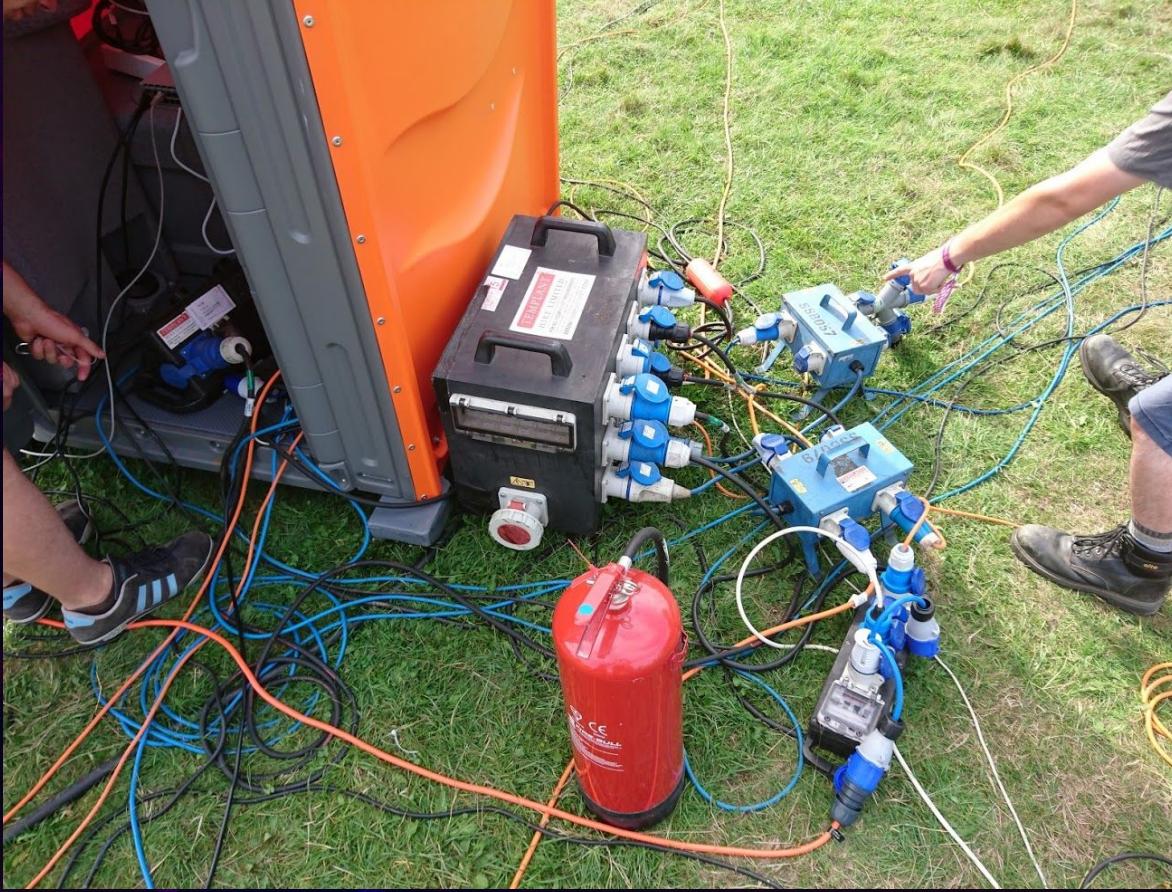
**400A main supply**



# Templant Distro Delivery!



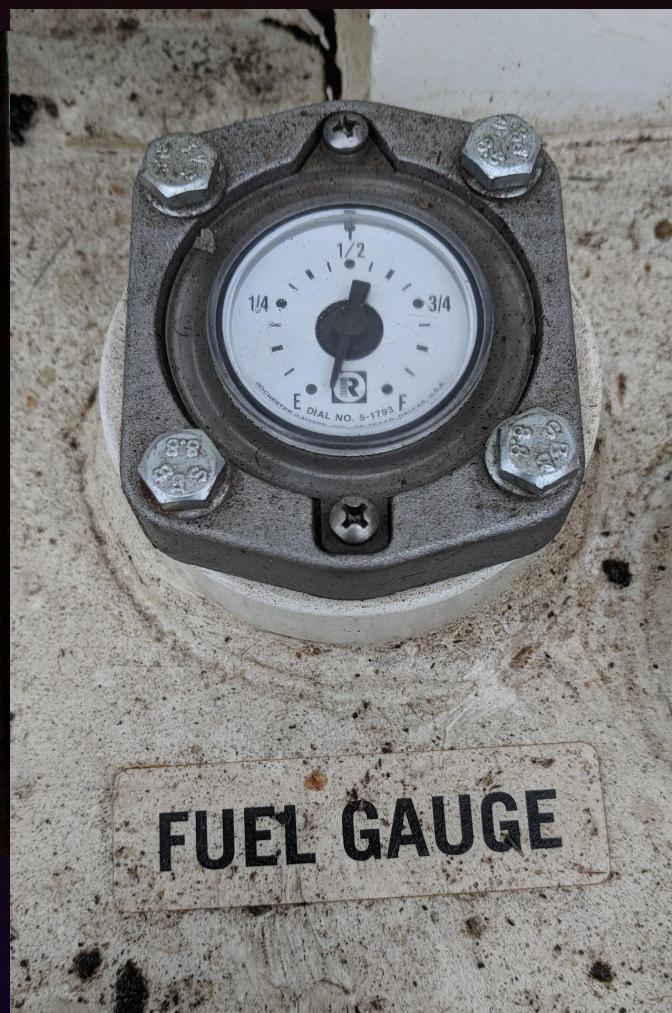
## Overhead distribution



Full DKs



**EMF 2016 - Fuel Shortage  
EMF 2018 - Fixed with 2000l tanks**





# Hard ground



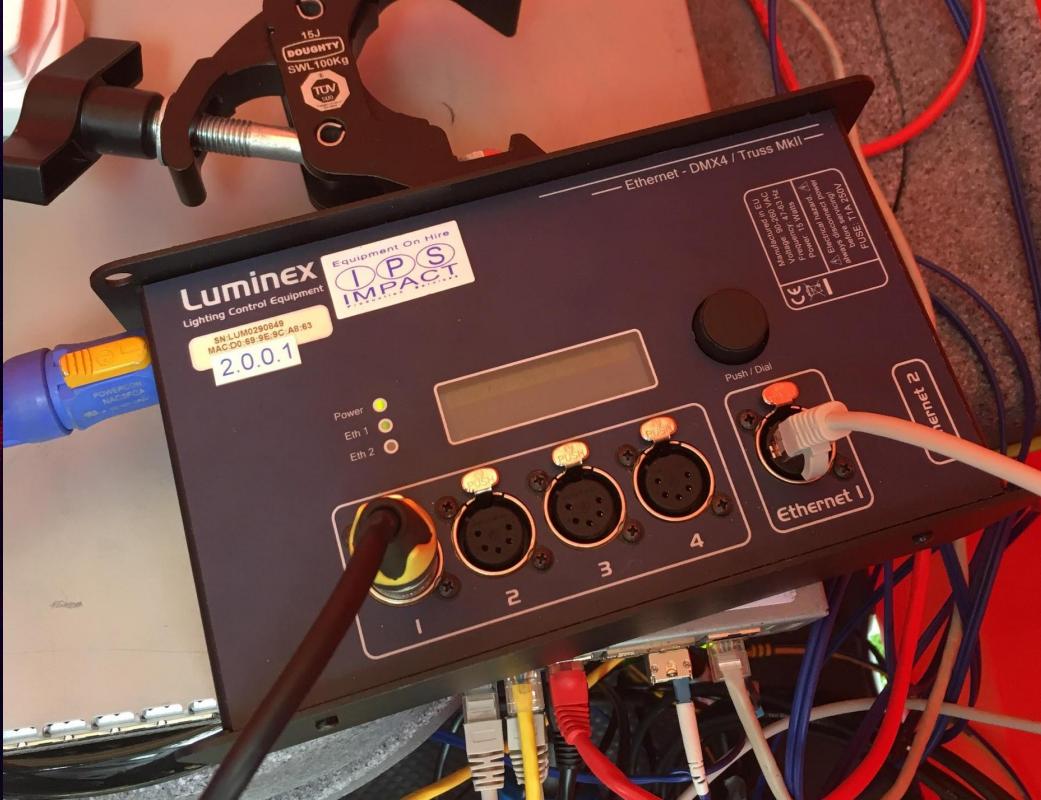
**1km - 330 7w LED bulbs**

Credit: @grahamparks



**37x RGB LED PARs**





**2x Chamsys and 2x Luminex ArtNet nodes  
and several hundred metres of DMX**



**Controlled by...**



This isn't supposed to go in there...



**Network**



# Uplink



Digging in snow



**By request, sheep.**



**Off-street furniture**







We energised team synergy to assemble an enterprise grade fibre spool unspooling solution.



# Splicing the uplink



# NOC & NOC-DC



## Network Operations Centre of Excellence

Incorporating GCHQ Liaison Office



EMF NOC

[dashboard.emf.camp](http://dashboard.emf.camp)

@emfnoc



**Our 2016 design worked well**

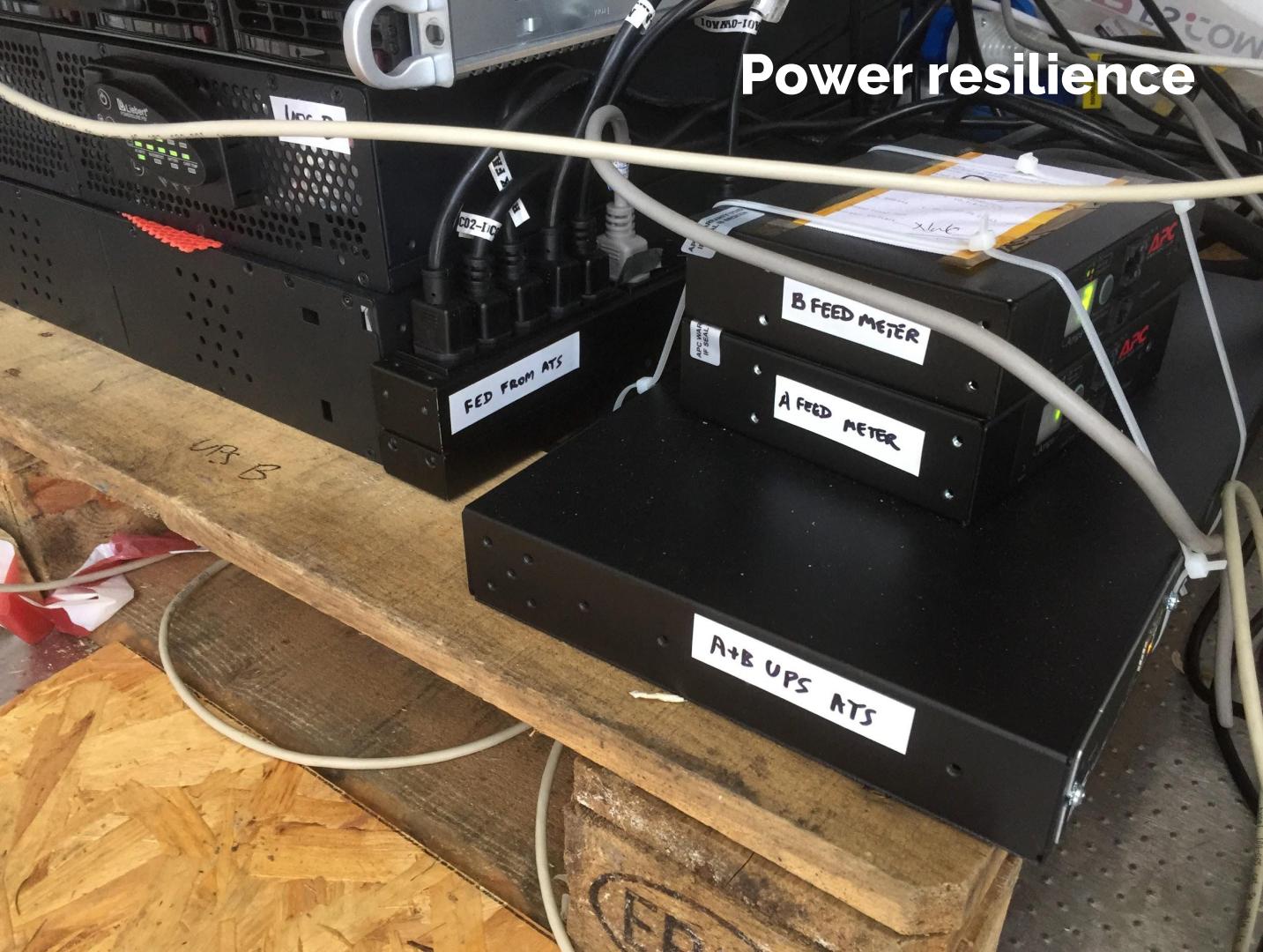




# There is no flat



# Power resilience



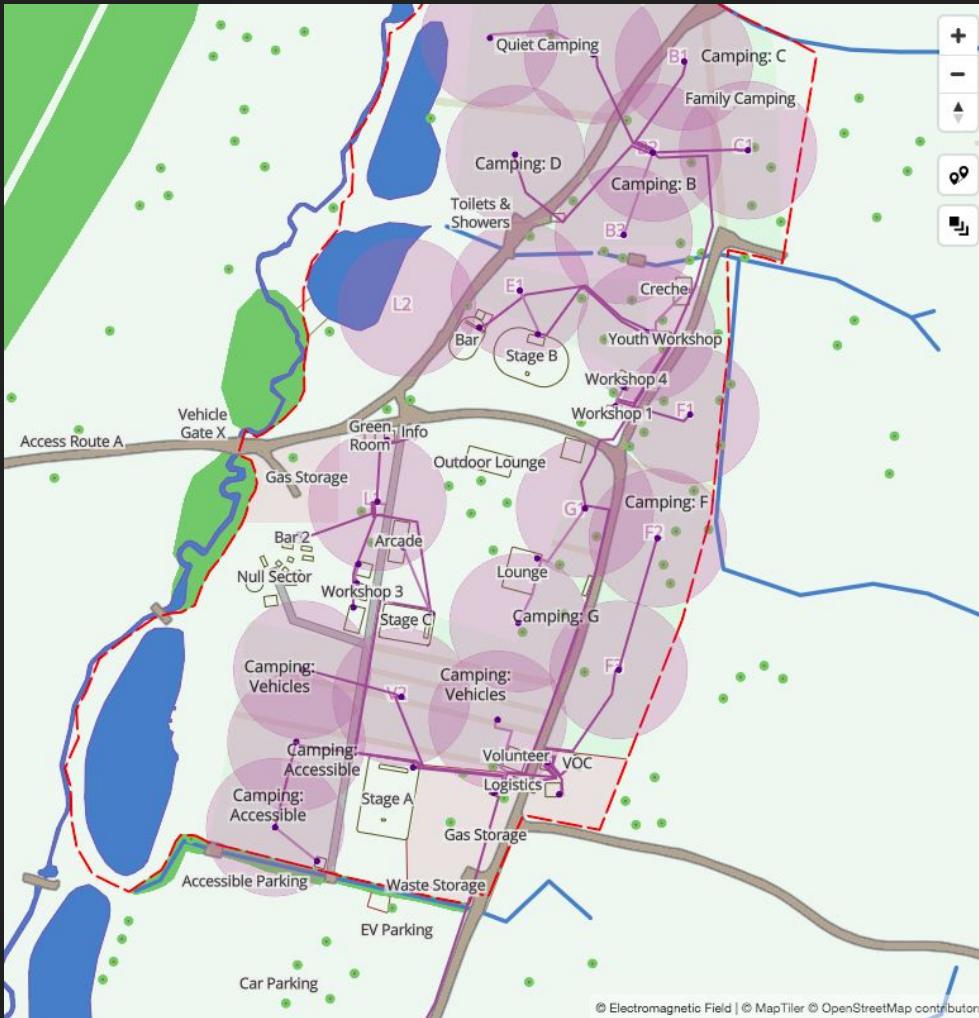


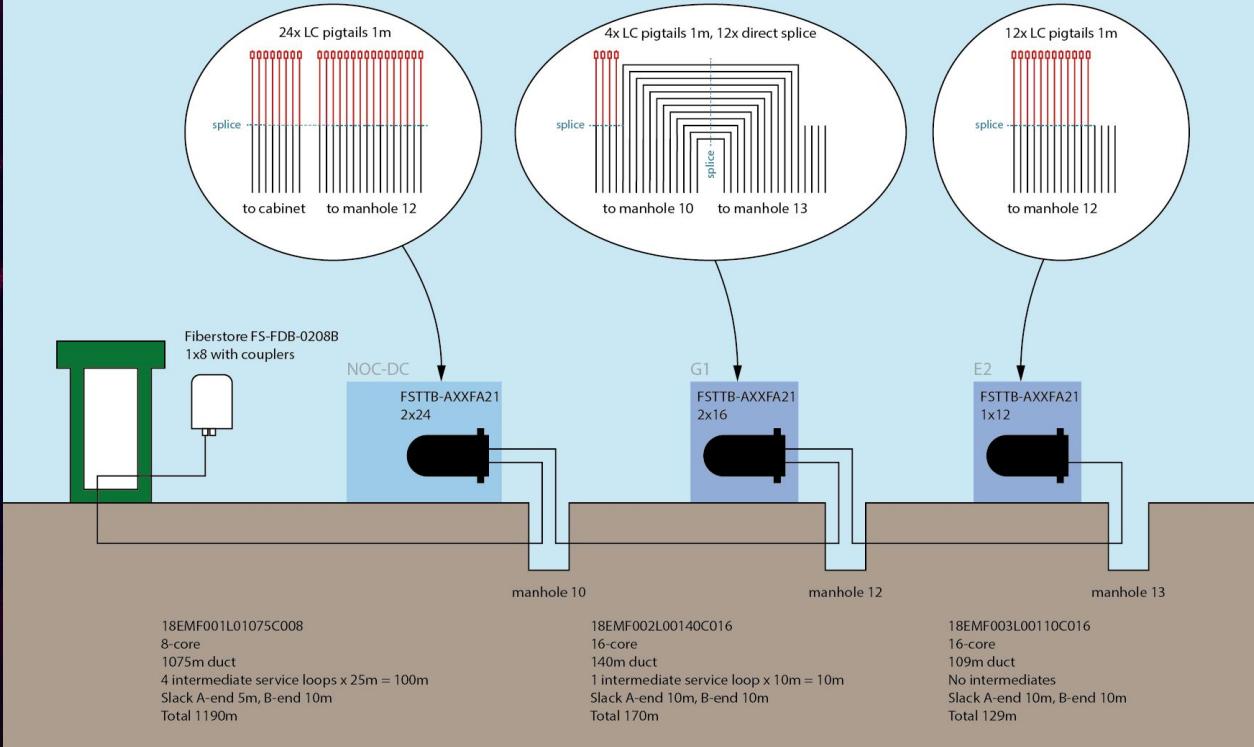
# On-site Distribution

# Network

Purple lines: fibres deployed

Purple circles: DK coverage

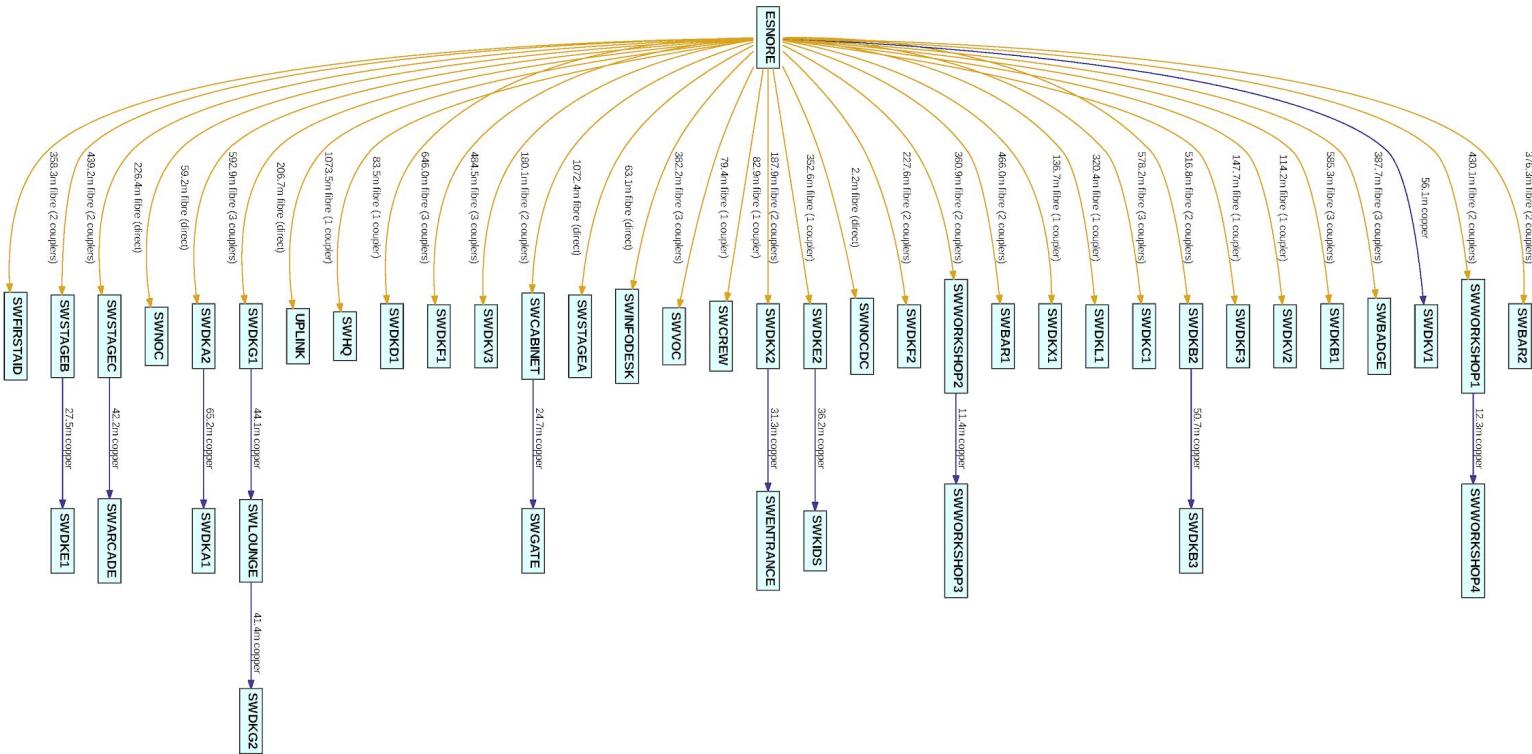




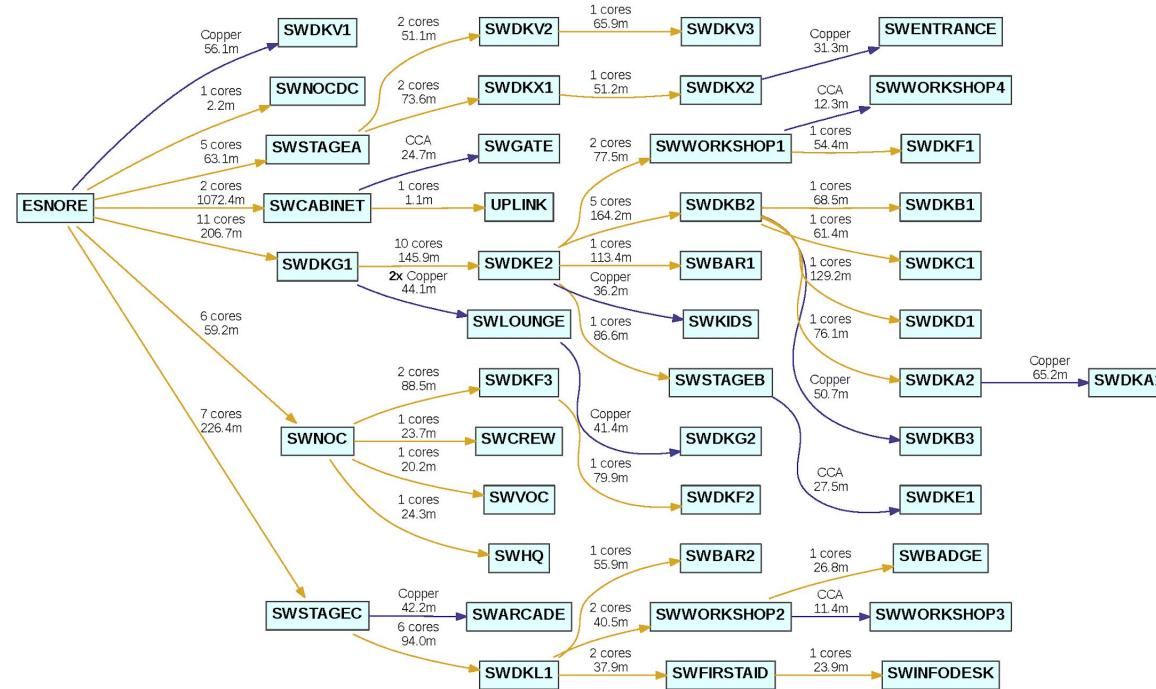
# Duct plan



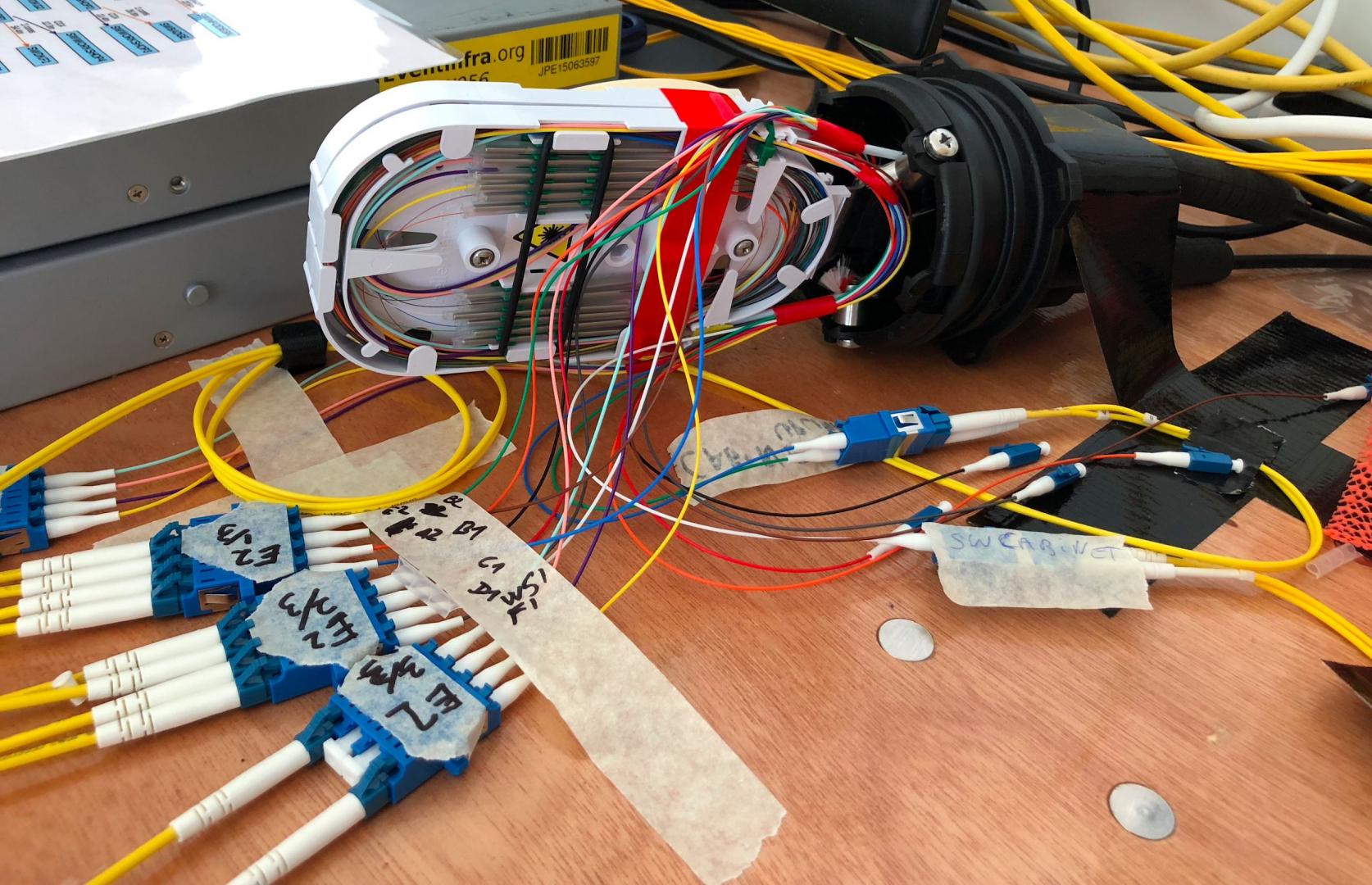
# Network Distribution



# Logical design (generated from CAD)



**Physical design (generated from CAD)**



# The Basic Unit of Site Internet Distribution: The Datenklo (DK)



(Fire extinguisher is for use  
on the field, not inside the DK)





# Network Challenges



# **Moving uplink from temporary setup to production setup**

# SFP incompatibility





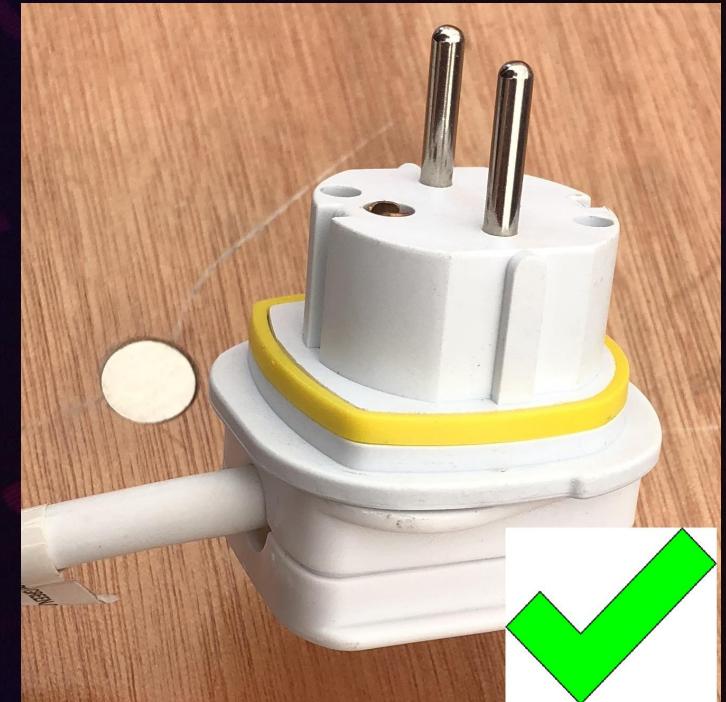
# “Drawing in graphs”

*Don't.*

# Unsafe Wiring



# Proposed solution

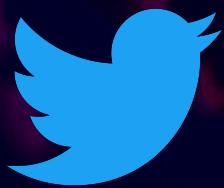




Produced and directed by  
**DAVID CROFT**  
© BBC MCMLXXXII



Wi-Fi



@eventinfra



**Accesspoints, accesspoints,  
accesspoints**

# Wi-Fi Stats

- 72 Aruba 802.11ac AP's deployed
- Peak 2800 concurrent stations
- 5900 unique devices seen on Wi-Fi
- 94% of devices on Wi-Fi (other 6% on wired)
- 67% of stations on encrypted Wi-Fi
- About 80% of stations on 5GHz



## Usernames (inc. eduroam realms):

1. emf: 1775 (30.9%)
2. internetofstuff: 994 (17.3%)
3. anonymous: 335 (5.8%)
4. emfcamp: 127 (2.2%)
5. @soton.ac.uk: 36 (0.6%)
6. outboundonly: 31 (0.5%)
7. @ucl.ac.uk: 22 (0.4%)
8. @york.ac.uk: 18 (0.3%)
9. @nottinghack.org.uk: 17 (0.3%)
10. @noc: 15 (0.3%)

## 802.11 phy-types:

1. 11ac 5GHz: 2549 (44%)
2. 11n 2.4 GHz: 2517 (43.4%)
3. 11n 5 GHz: 688 (11.9%)
4. 11g 2.4 GHz: 20 (0.3%)
5. 11a 5 GHz: 17 (0.3%)

## SSIDs:

1. emfcamp: 2185 (37.7%)
2. emfcamp-insecure18: 1894 (32.7%)
3. emfcamp-legacy18: 1288 (22.2%)
4. eduroam: 385 (6.6%)
5. spacenet: 35 (0.6%)
6. emfcamp-pin: 4 (0.1%)

## OS:

1. Linux: 1203 (30.6%)
2. iOS: 917 (23.4%)
3. Android: 878 (22.4%)
4. Mac OS X: 444 (11.3%)
5. Windows: 368 (9.4%)
6. Windows 7: 36 (0.9%)
7. Chrome OS: 32 (0.8%)
8. Windows XP: 26 (0.7%)
9. Windows 8: 13 (0.3%)
10. Windows 98: 2 (0.1%)

“Dark-Dark  
Dark-Matter  
Matter-Matter”

“Urban Beekeeping”

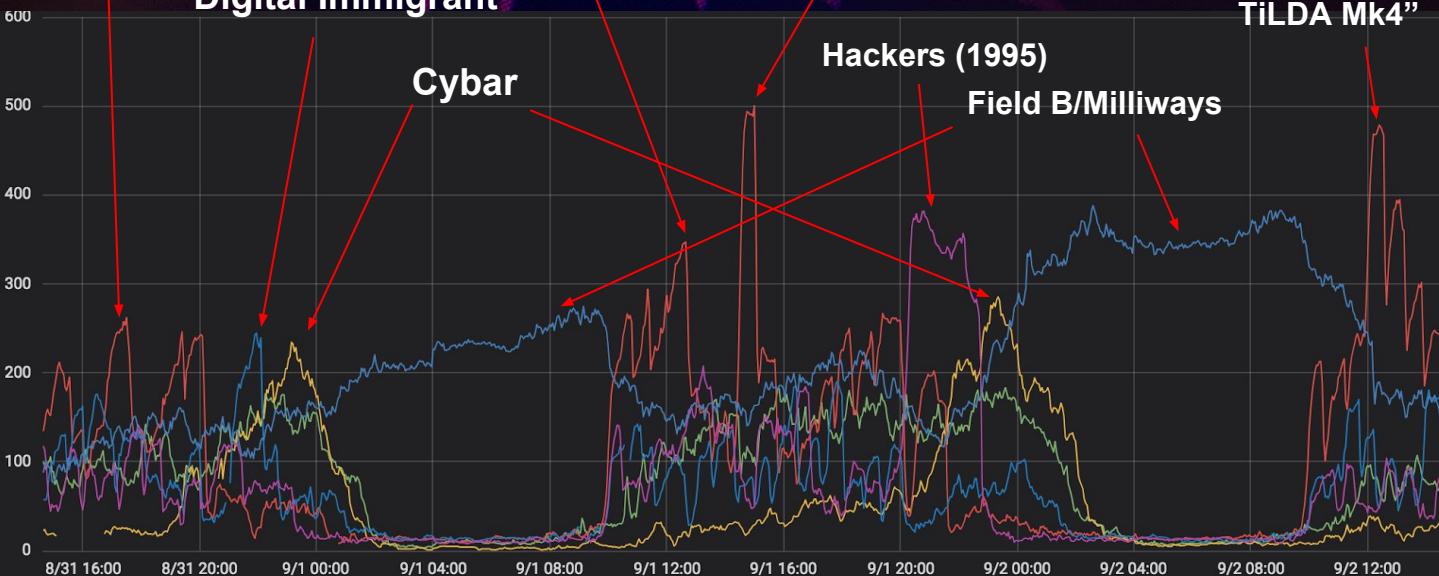
“Digital Immigrant”

Cybar

“Banned from encrypting”

Hackers (1995)  
Field B/Milliways

“The making of  
TiLDA Mk4”



	max	current
Bar	183	77
Cybar	285	33
Crew/Staff area	116	76
Lounge area	205	153
Stage A	500	201
Stage B	245	158
Stage C	382	95
Workshop 2/3/Badge	272	106
Workshop 1/4	203	117
Field A	286	56
Field B	388	146
Field C	177	80
Field D	215	110
Field E	165	79
Field F	232	119
Field G	154	123
Field V	158	108
Field X/Entrance/Toilets	148	122

WiFi associations per location/area



# Statistics

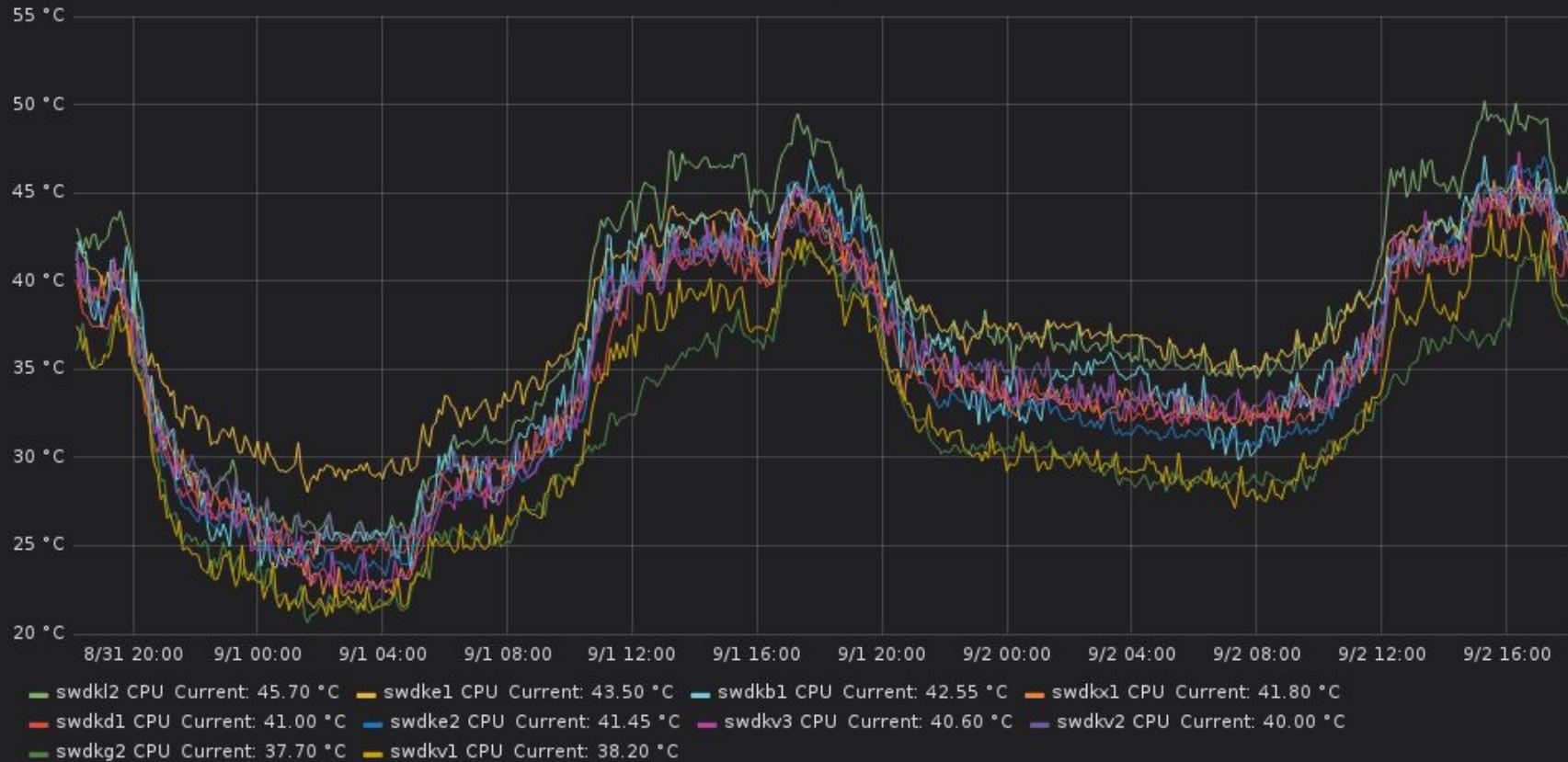
# 1.0 Gbps

Peak throughput (to field)

### Upstream Traffic



## Switch Tempreatures

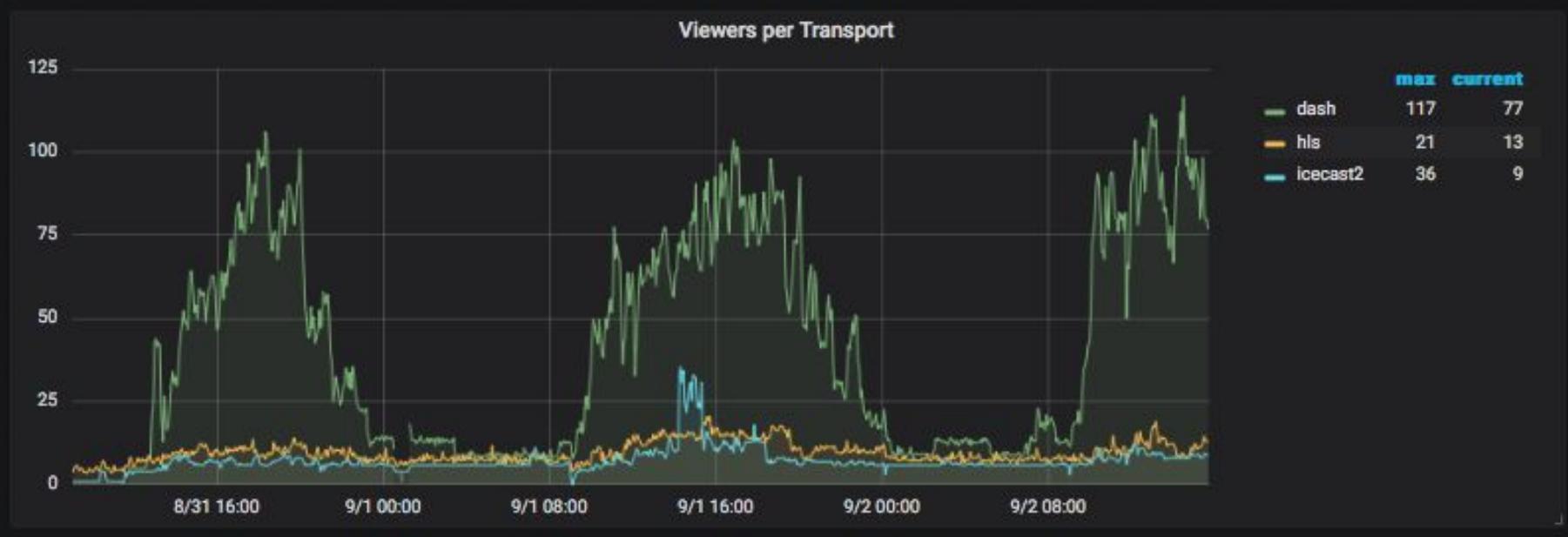


# Video (c3voc)



@c3voc

## Viewer Stats



# Viewer statistics

## Statistics

	Count	Recording Duration
All tickets	143	–
Staging tickets	–	–
Staged tickets	117	61h 50m
Closed tickets	26	

**Tracker statistics**

## Challenges at EMF

- Tents arrived too late
- Power outages
- Intros with transparency
- Emojis in lecture title
- One HDMI Splitter bricked by Tesla Coil

# Thanks for the appreciation!

You can find the recordings at  
[media.ccc.de](http://media.ccc.de) and on YouTube





**EVENTPHONE**  
s t a y c o n n e c t e d



**DECT**



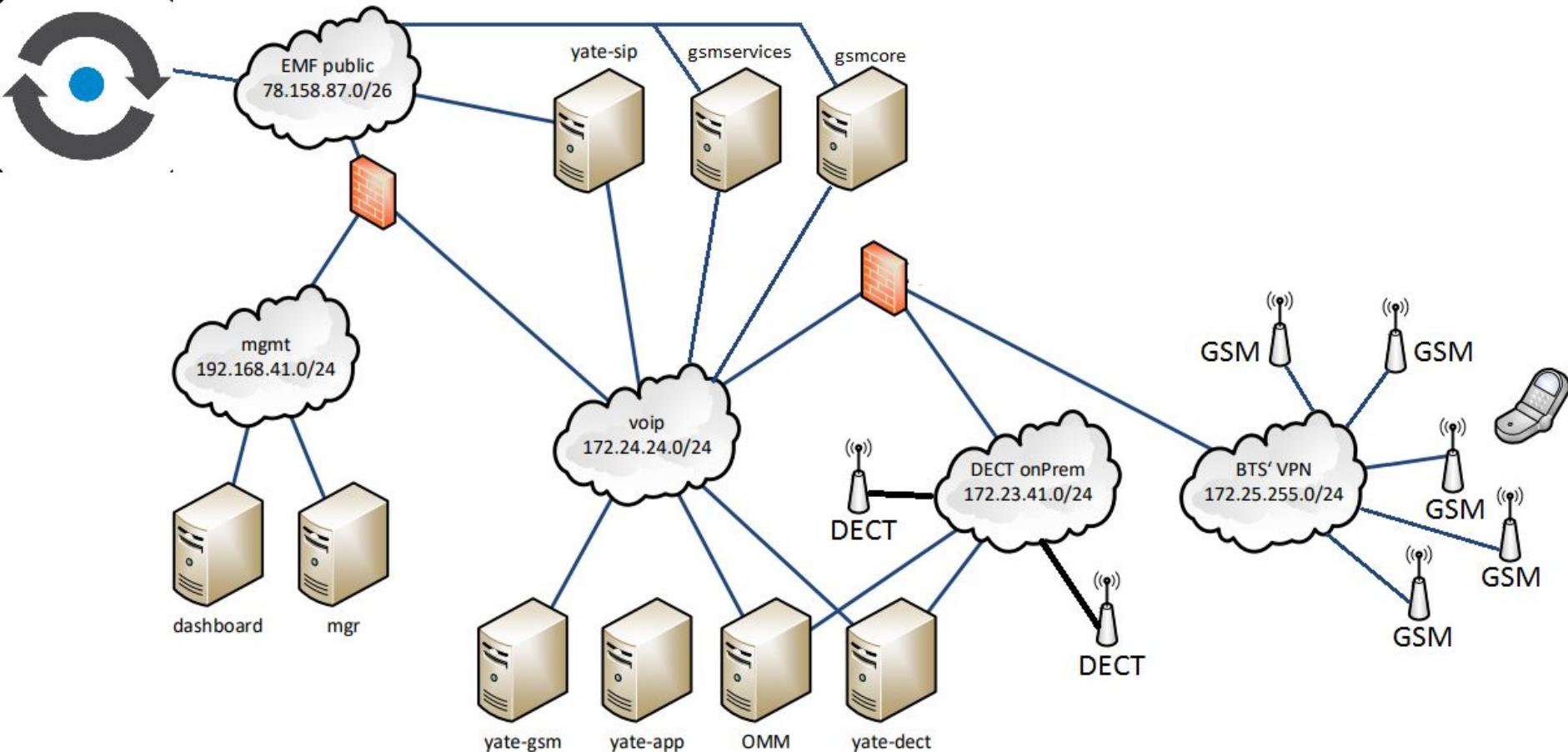
@eventphone



[youtube.com/c/  
eventphone](https://youtube.com/c/eventphone)

# Numbers and Activation

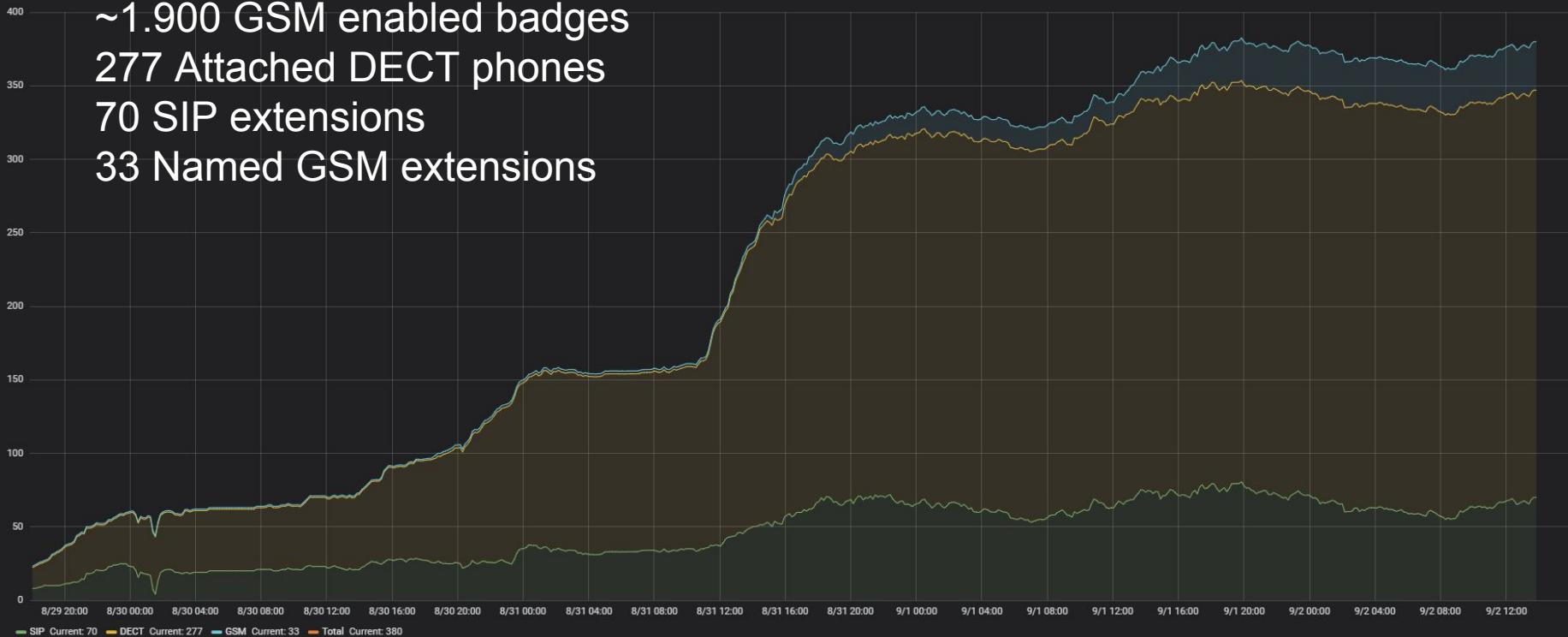
- Self service for DECT registration
- Extension mobility between GSM, SIP and DECT
- Unified user experience between networks
- Improvements for EMF
  - Captcha in GURU3 :)
  - Display SIP details in GURU3
  - Self service call groups
  - Indicate calls for groups to users



# SIP, DECT, GSM Topology

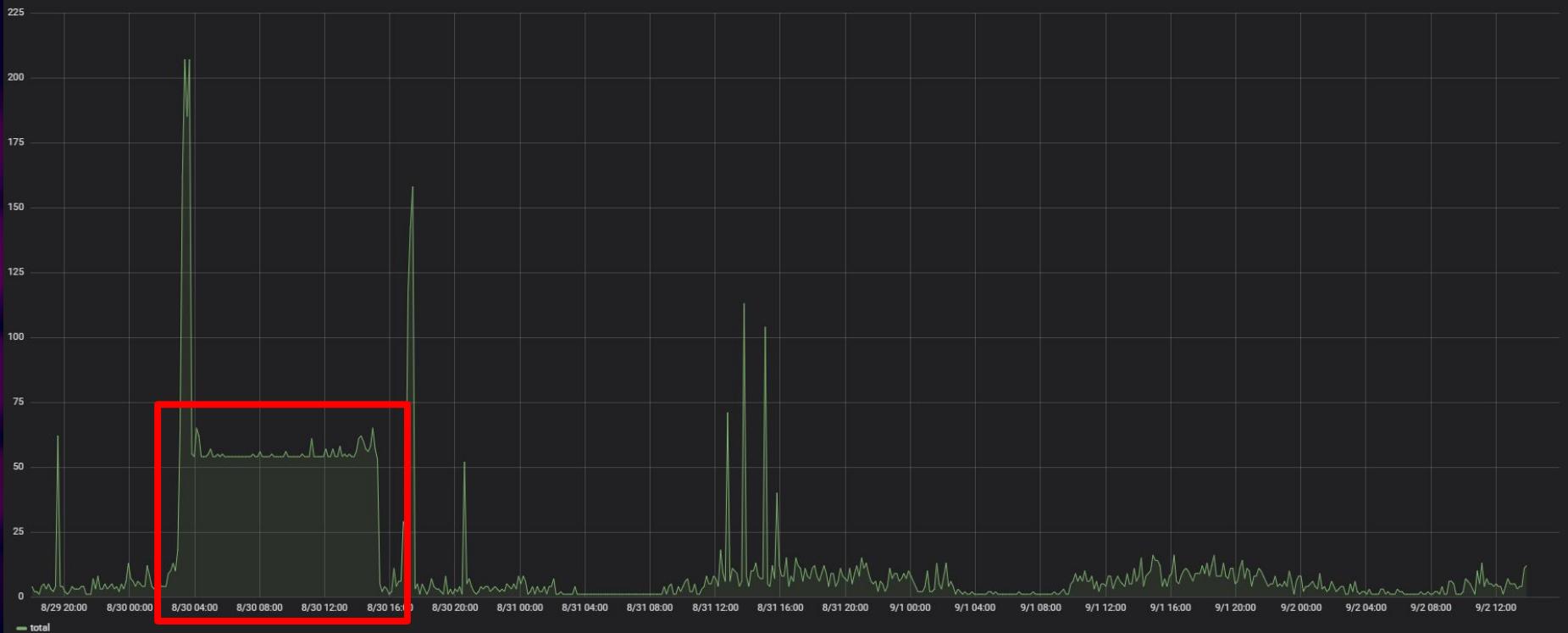
~1.900 GSM enabled badges  
277 Attached DECT phones  
70 SIP extensions  
33 Named GSM extensions

Extensions

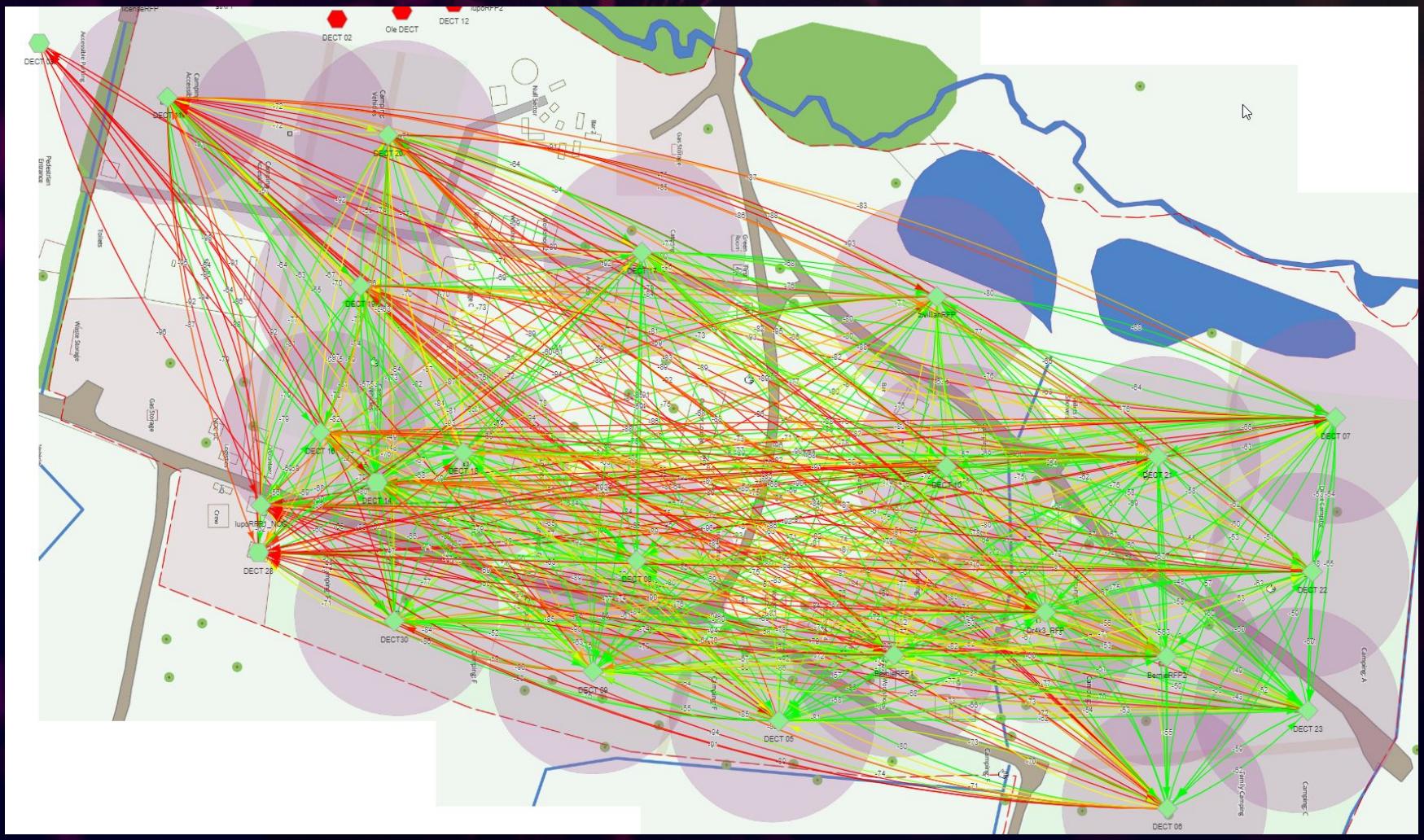


# Registered Extensions

Current Calls



# Concurrent active calls



# Challenges

- Getting more followers
  - Twitter
  - Youtube



**GSM**

# Challenges

- Timeframe
- Putting BTS in the real world
- Manpower & womanpower



# Concurrent active GSM calls



**Many thanks**

**sky** | FOR BUSINESS

**EventInfra.org**

 **FLEXOPTIX**

 **Sargasso**  
NETWORKS

 **LONAP™**

 **comtec**

**claranet**   **babiel**   **ARISTA**

**Many thanks**

Teardown begins  
tomorrow 09:00

Please come to NOC tent!

Slides and tools will be online:

[github.com/emfcamp/emfnoc](https://github.com/emfcamp/emfnoc)

@emfnoc @eventphone @c3voc