



Electromagnetic
Field **2016**

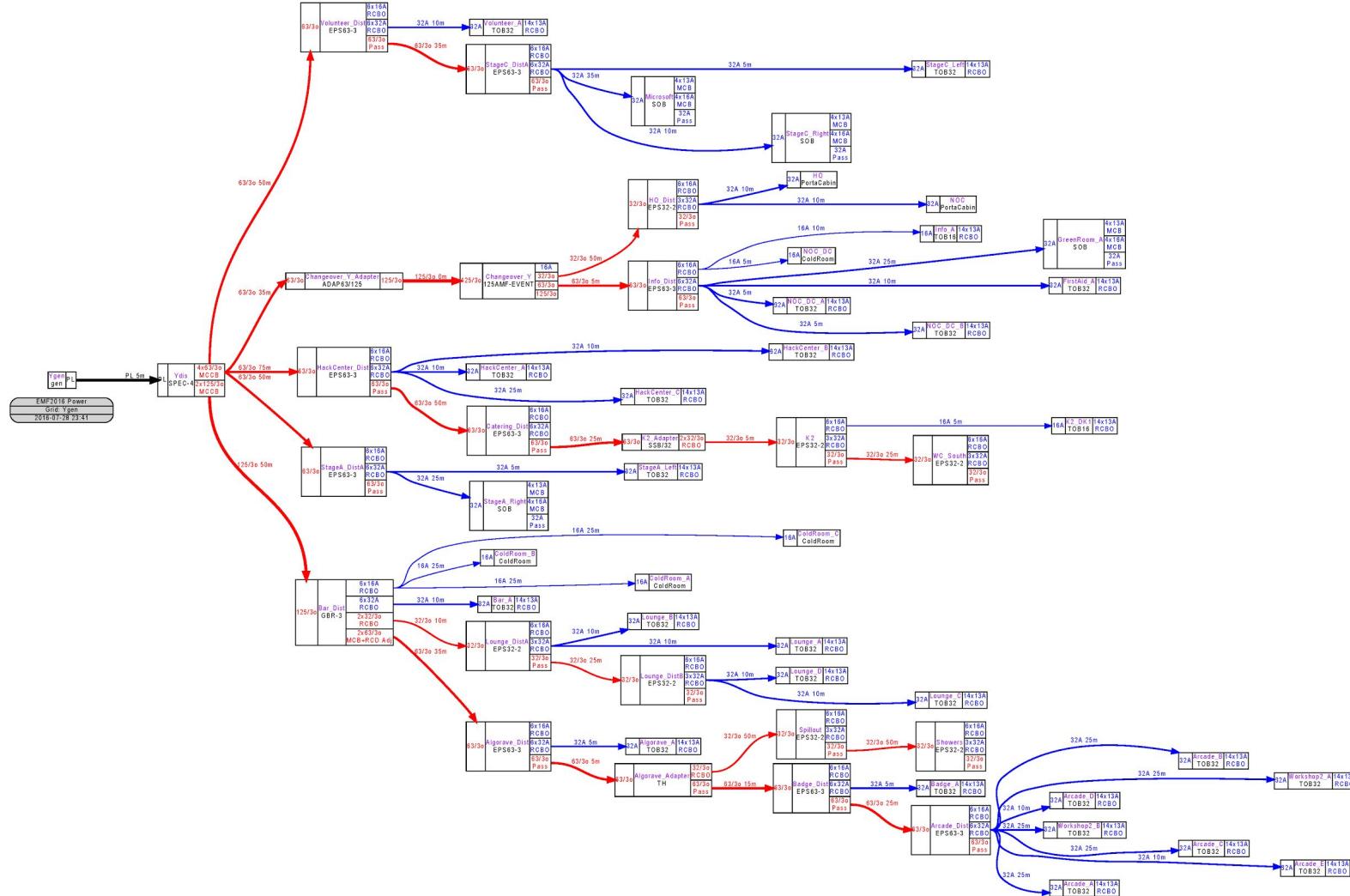


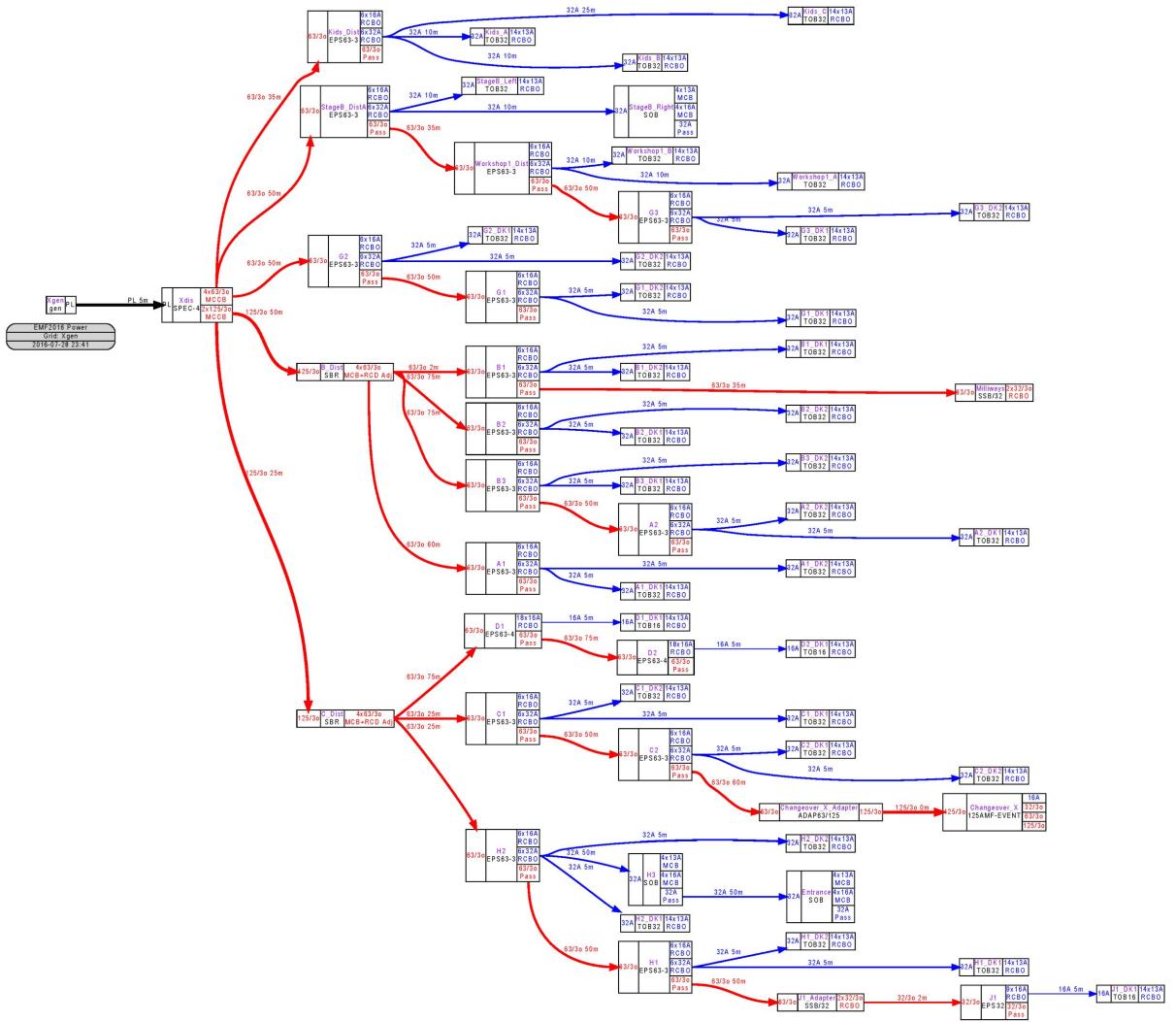
Infrastructure Review

Power, Network and Video

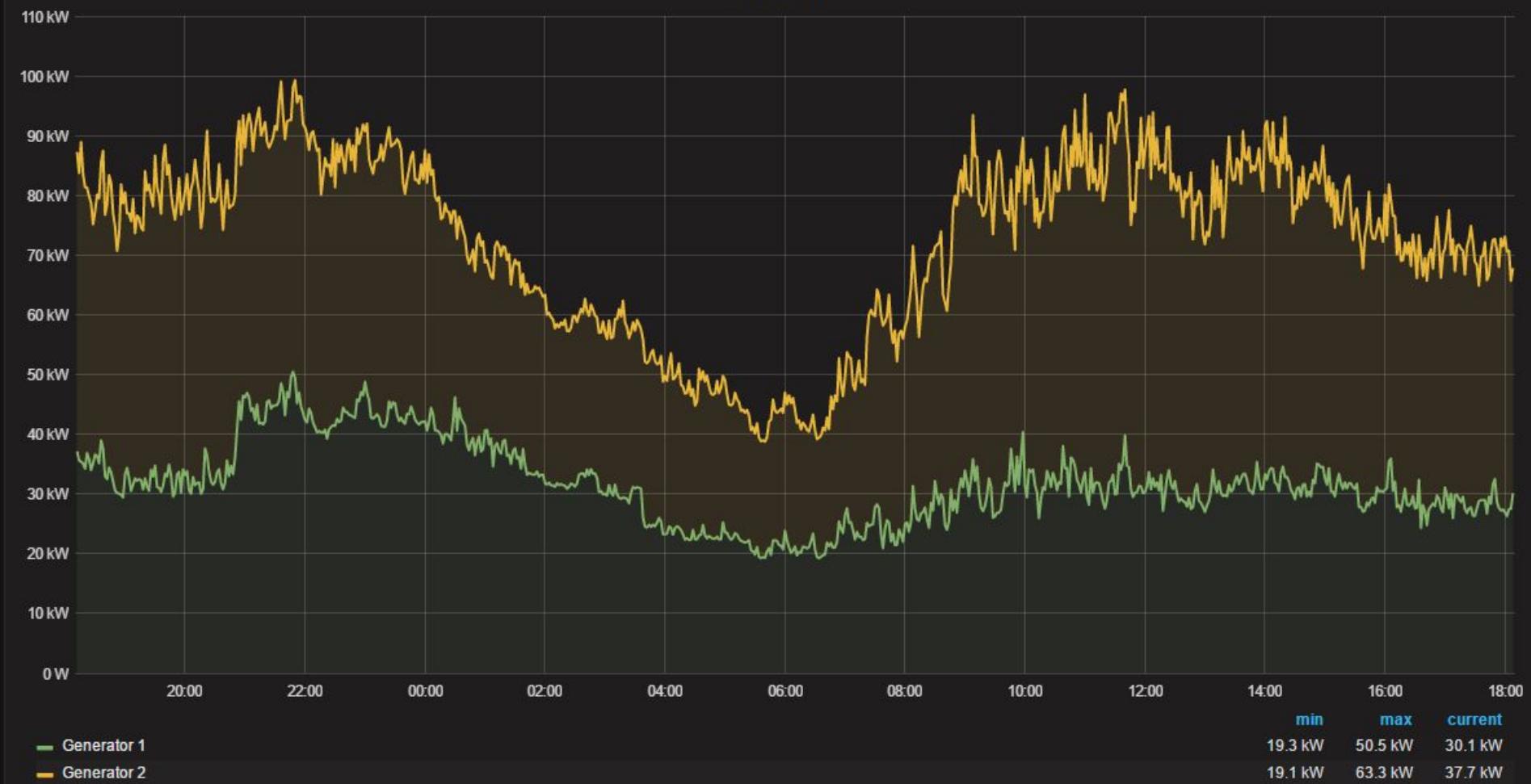


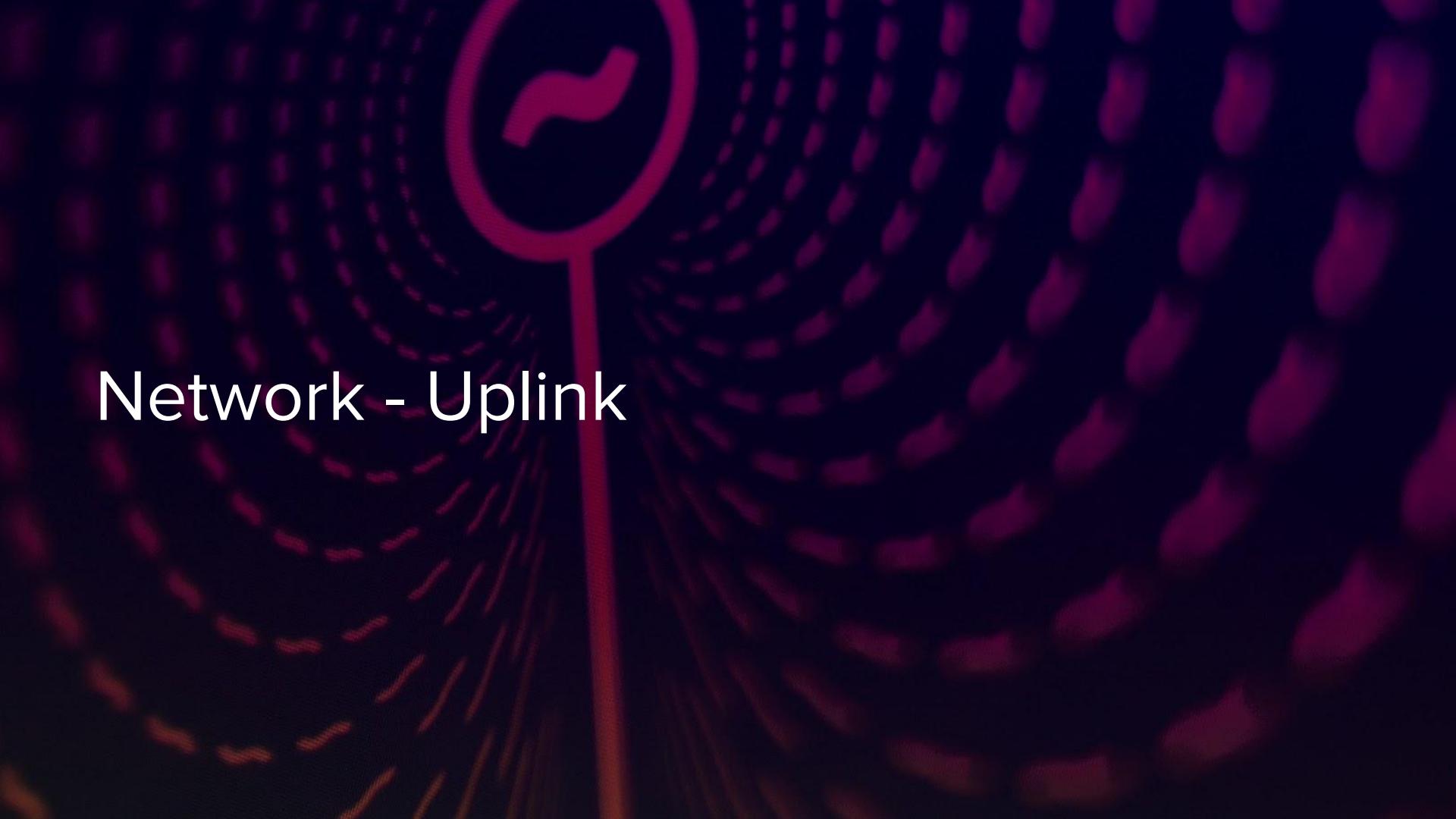
Power





Total Power





Network - Uplink

Electromagnetic Field 2012



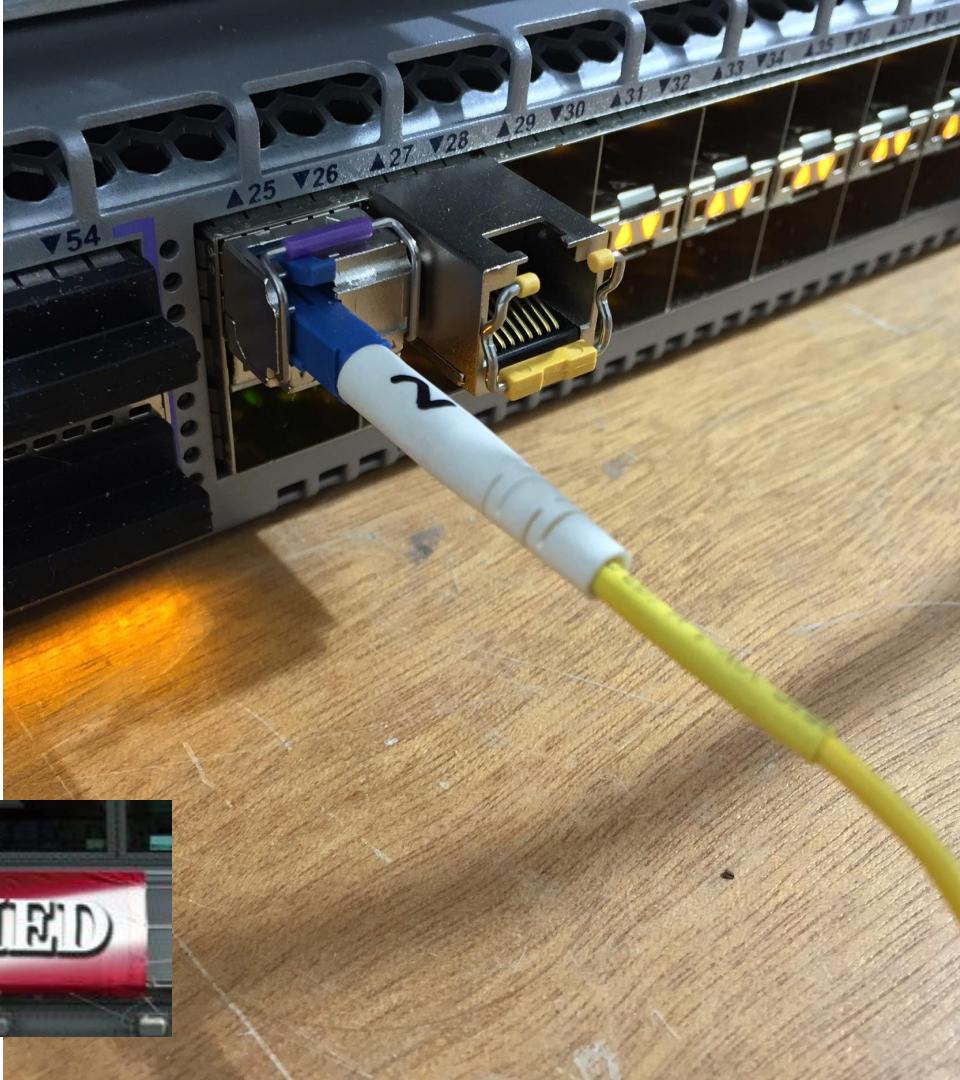
Electromagnetic Wave 2013



Electromagnetic Field 2014



Electromagnetic Field 2016



Uplink fibre



Splice



GPON ONT

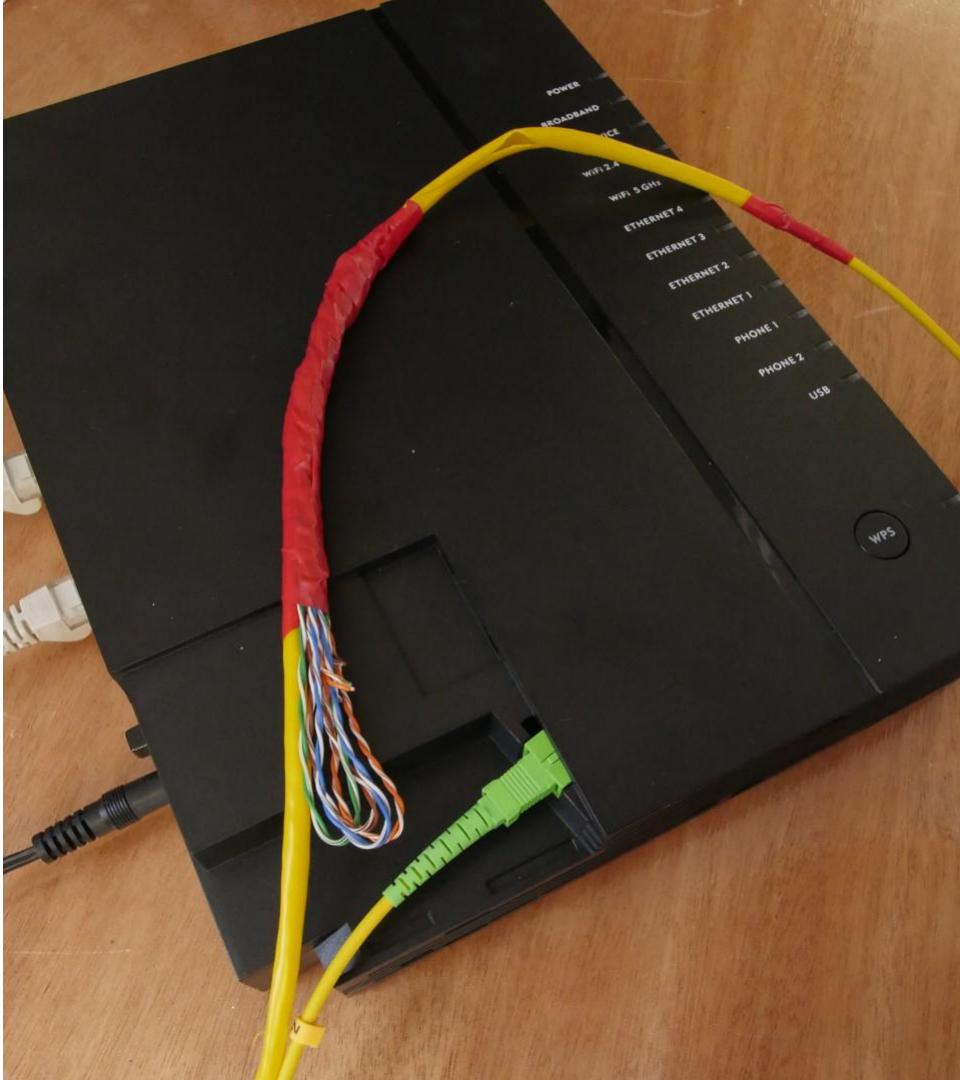
Passive Optical Network (2.488Gb) --
Fibre just splits up along the way,
timeslots for each ONT

600 MHz 2-core MIPS

Actually has WiFi and Phone ports

Bridge to Ethernet is software (Linux)
and only uses 1 core...

... using it to get a GigE port towards
EMF network didn't work out so hot



Bi-di optics

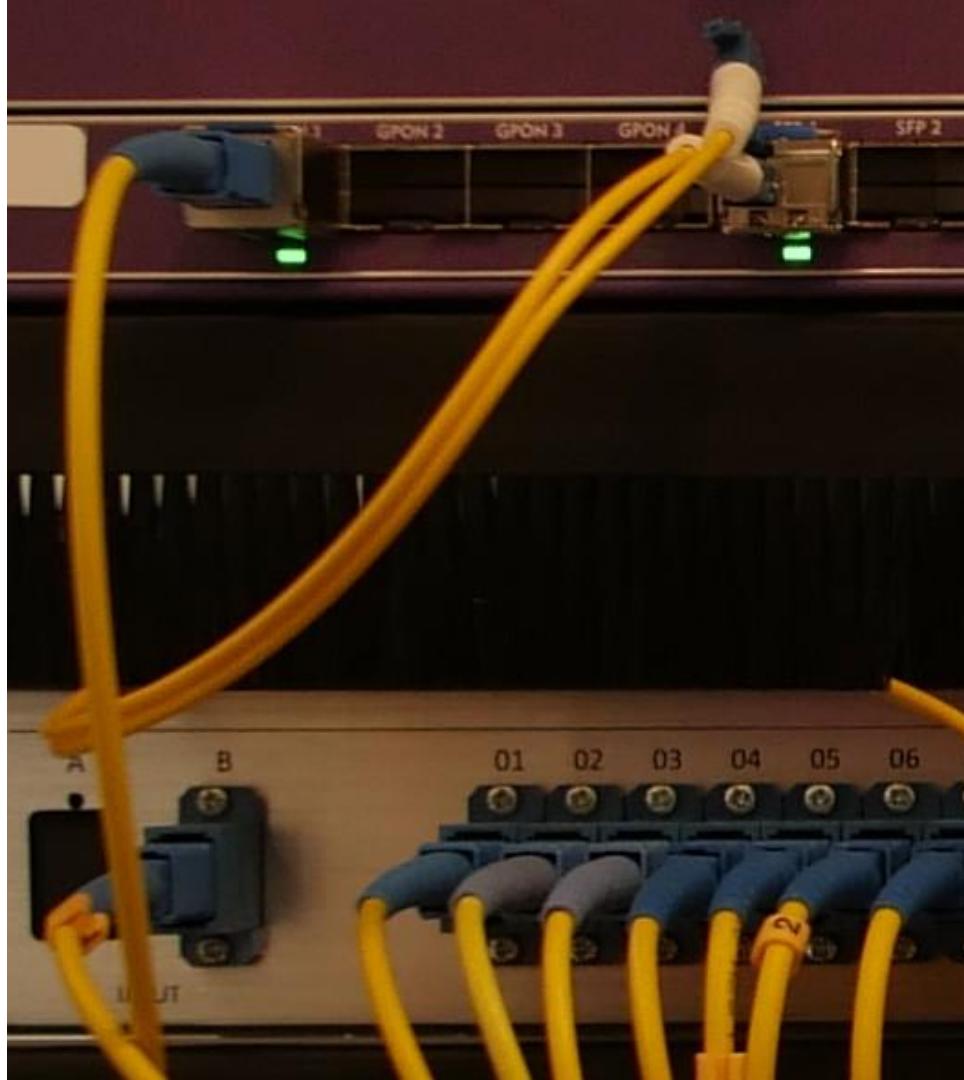
Luckily, there is only 1 optical splitter in the network here, directly below the PON head-end ...

... and the PON head-end has empty GigE SFP slots ...

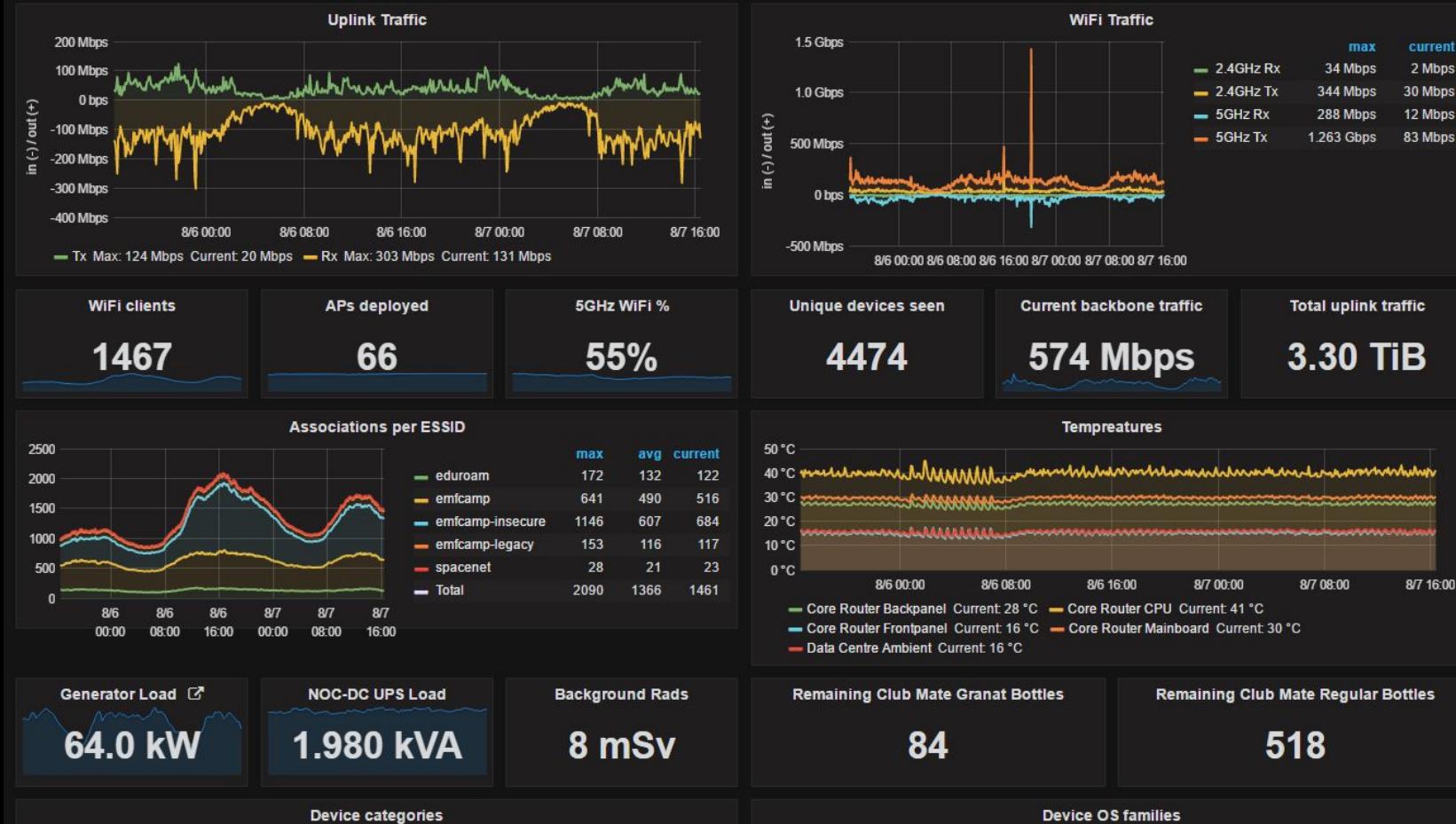
... and FlexOptix has the vendor ...

... and Fibre Options said, “sure,” ...

... 1000base-BX > GPON



<https://dashboard.emf.camp>



505 Mbps

peak throughput (down)

(1 minute average)

3.5 TB

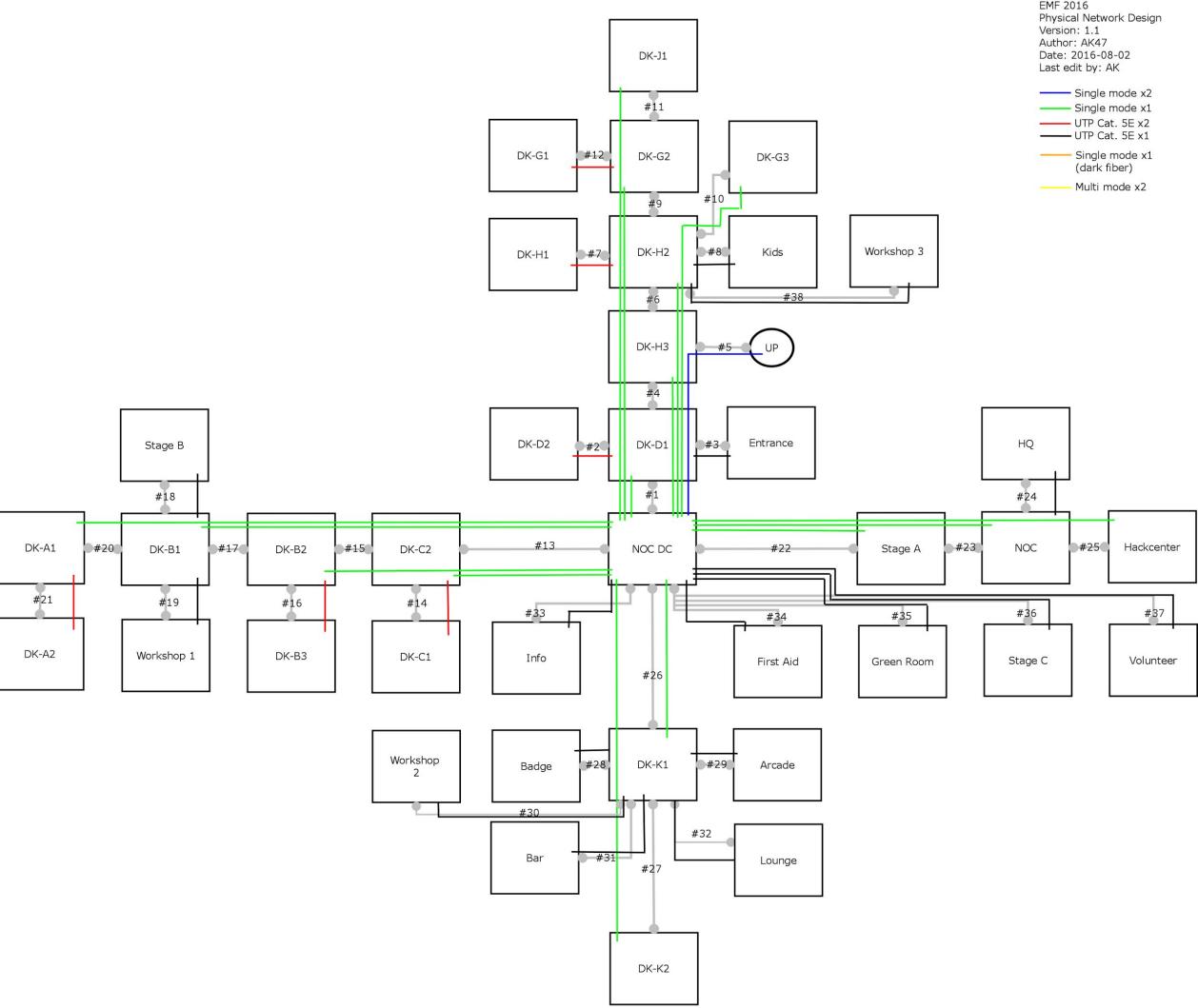
data transferred to/from Internet



Network - On the Field

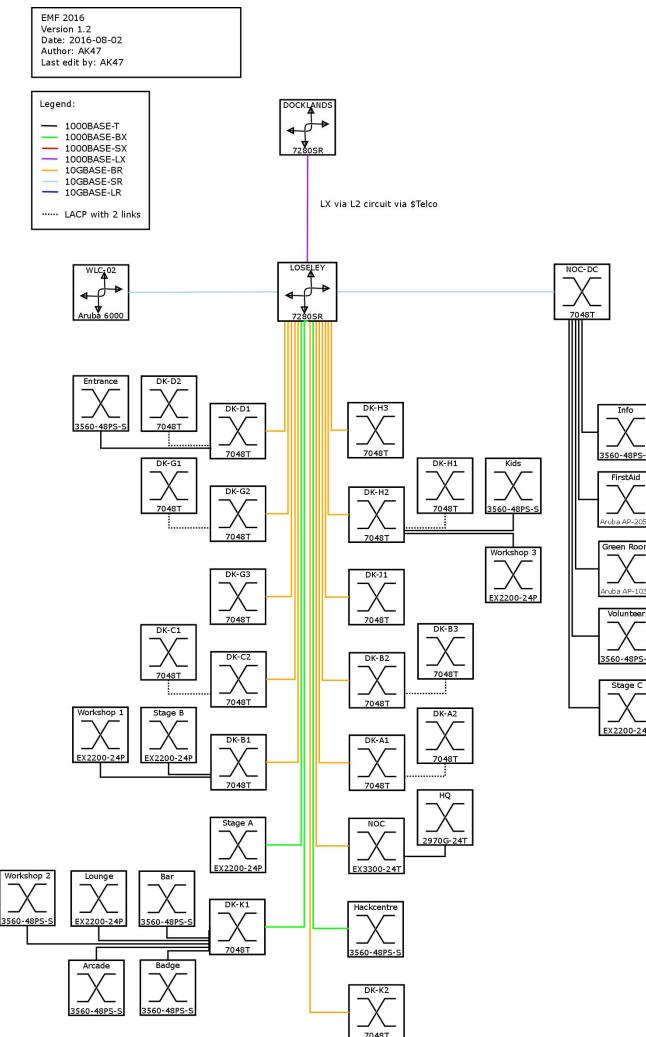
Network Map (Physical)

Fibers are
passively
patched through



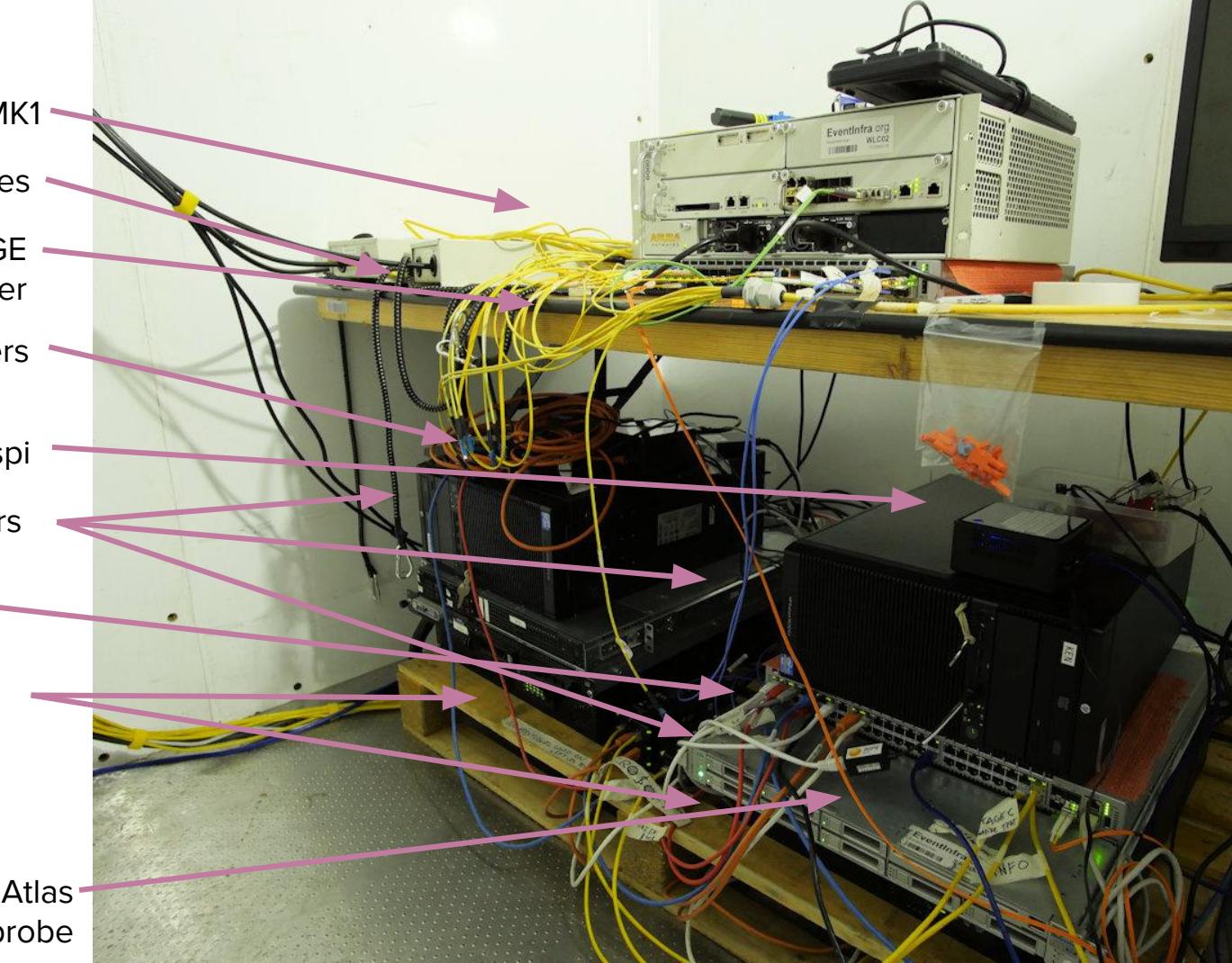
Network Map (Logical)

- Arista 7280SR edge/BGP router
- Arista 7280SR inter-VLAN router
- 20x Arista 7048T in datenklo's
- 6x Juniper EX2200P in stages
- 10x Cisco 3560P
- Aruba 6000 w/ M3MK1



Data Centre in a Field

- Aruba 6000 w/ M3MK1
- Fibre splice boxes
- Arista 7280SR 10GE/100GE switch/router
- VOC servers
- Radiation/humidity sensor Raspi
- Servers
- Arista 7048T 1GE switch
- 2x UPS
- RIPE Atlas probe



Data Centre in a Field

There's 2 kW of thermal output in there...

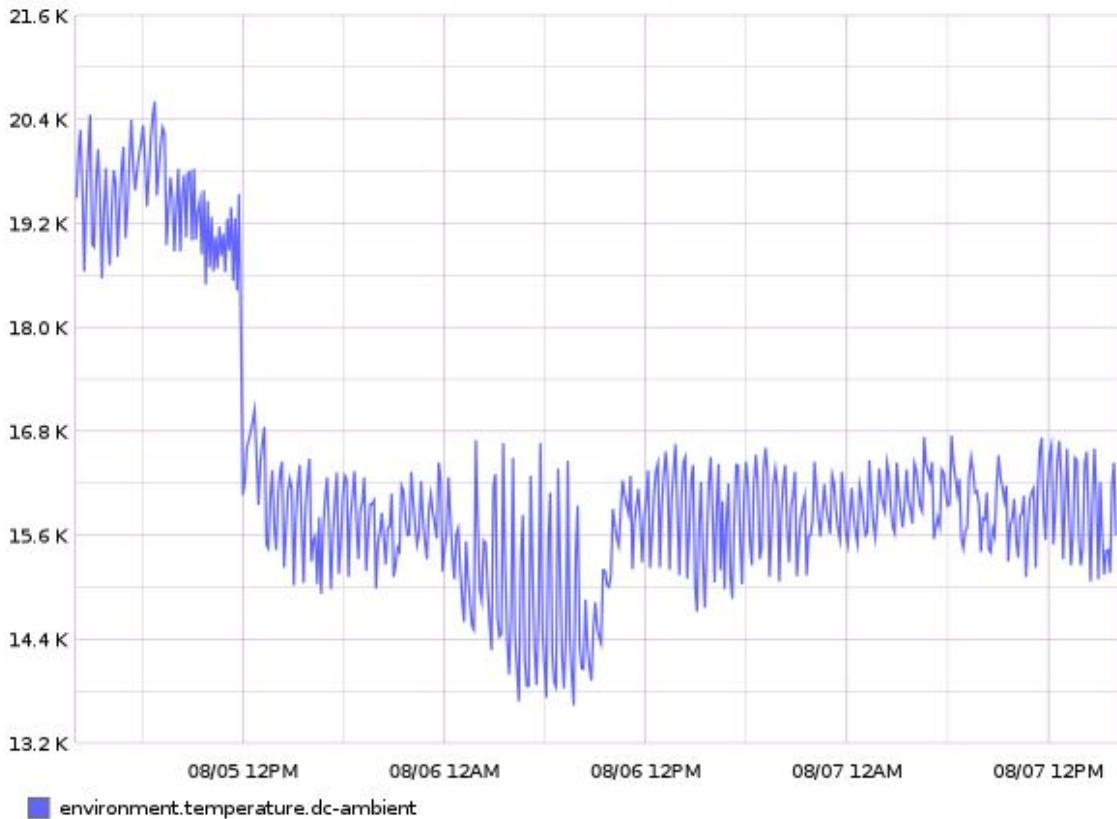


Resilient Cooling



Tempreature

It's super effective!



Datenklo (DK)

**Thanks to all Volunteers
doing cable-plugging
rounds!**

Arista 7048T

802.3at/af PoE(+) injector

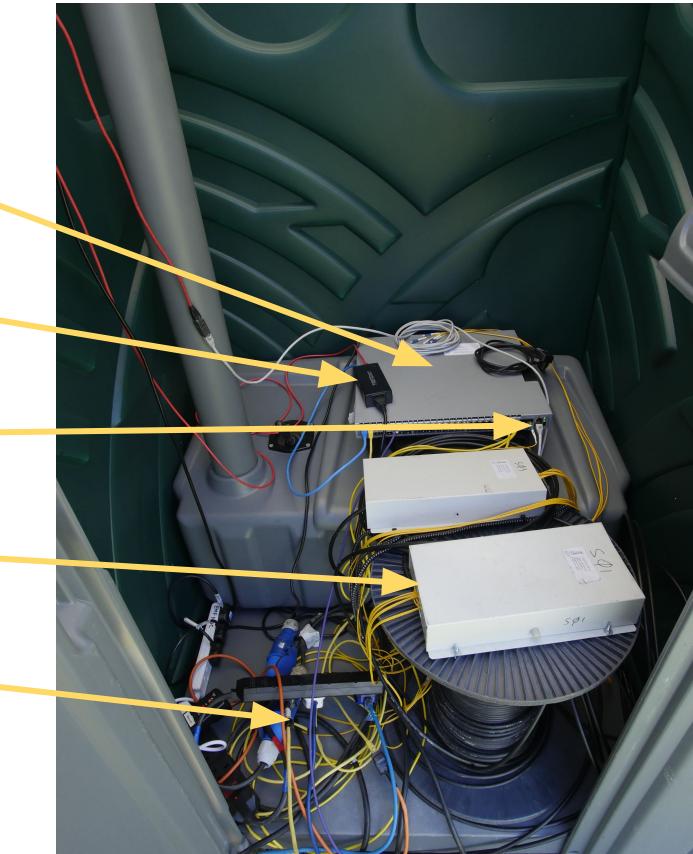
10GBASE-BR (BiDi) Flexoptix
SFP+ uplink in Arista

Fibre spool and splice boxes for
fibre coming in and out of the DK

Power distro

OHM2013 Artnet LED pole (*)

Aruba AP-135 in plastic box



Fibre leaving
DK on scaff
tubes

3.3 km

fibre on the field

2 km

copper around the field
(core network only)

22

VoIP phones

A large, semi-transparent circular icon with a red outline and a red curved arrow inside, centered on a vertical red line. The background consists of a dark purple gradient with faint, concentric red lines radiating from behind the central icon.

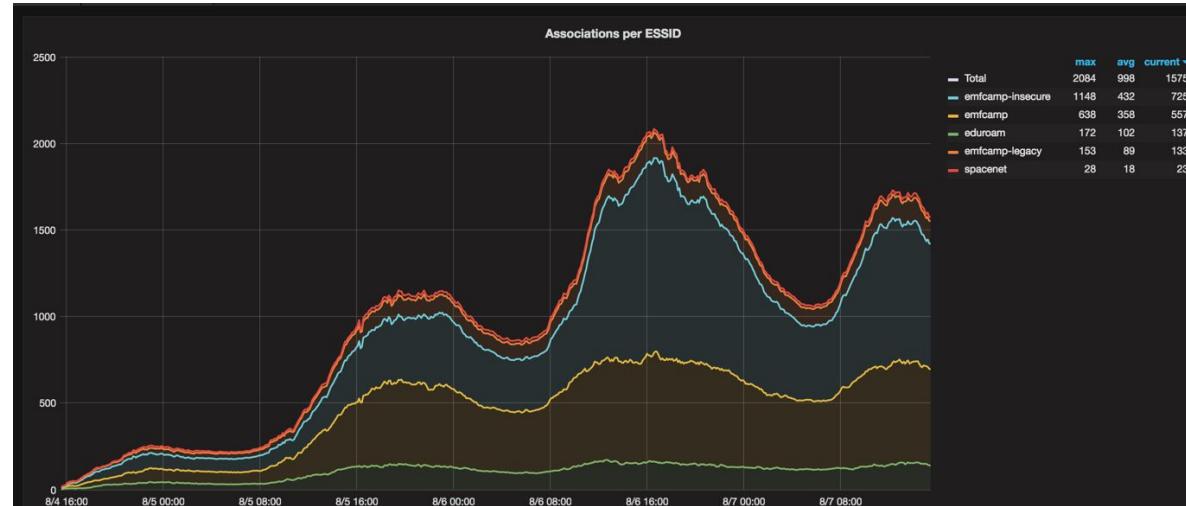
Network - Wireless

Wireless stats

- 66 AP's deployed
(Aruba AP-114/115/135/205/215/225/274/277)
- Peak 2084 clients
- 50% 5GHz (with badges)
- Peak 350Mbit/s rx+tx
- 4200 unique devices seen on WiFi
- 1404 badges seen
- 300 unique devices seen on wired
- 65% 802.1X (without badges)

SSID stats without badges:

1. emfcamp: 1142 (42%)
2. emfcamp-insecure: 961 (35%)
(+ 1404 badges)
3. eduroam: 303 (11.0%)
4. emfcamp-legacy: 296 (10.8%)
5. spacenet: 45 (1.6%)



Welcome to the Internet of Sh..tuff

The badge:

- 2.4GHz only (no 5GHz support)
- No channel 13 support at first
- 802.1X didn't work at first

(patches available on GitHub)

% of 5GHz clients on WiFi:



Obligatory device and username stats

Device categories (incl. wired):

1. 1566 SmartDevices (35%)
2. 1457 Embedded (33%)
3. 1205 Computer (27%)

Usernames (802.1X)

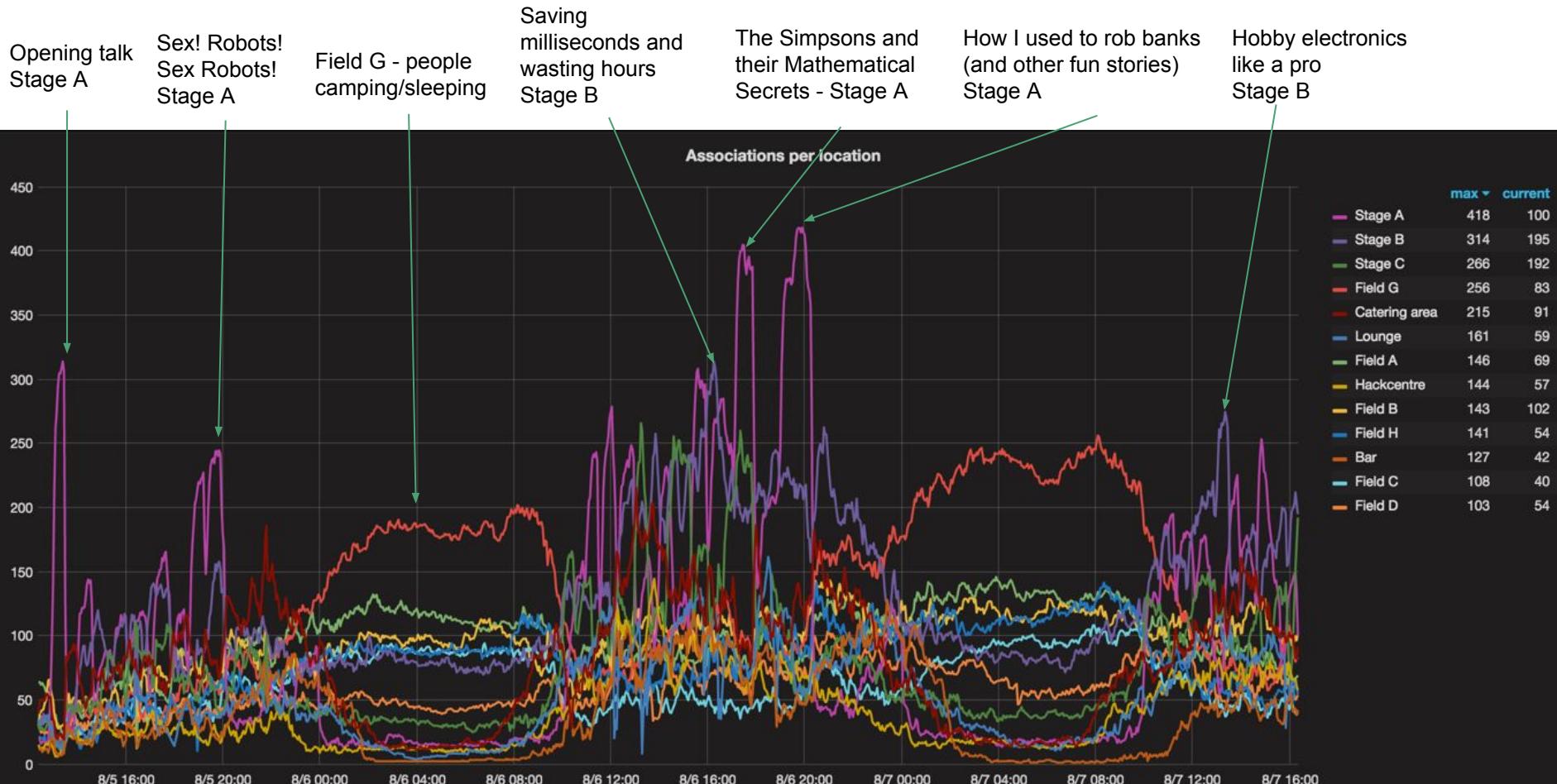
(includes spacenet & eduroam realms)

1. emf: 997 (24.6%)
2. anonymous: 146 (3.6%)
3. emfcamp: 76 (1.9%)
4. @soton.ac.uk: 31 (0.8%)
5. @cam.ac.uk: 26 (0.6%)
6. @nottinghack.org.uk: 21 (0.5%)
7. @noc: 21 (0.5%)
8. @ucl.ac.uk: 15 (0.4%)
9. @surrey.ac.uk: 11 (0.3%)
10. @york.ac.uk: 11 (0.3%)

Device OS families (incl. wired)

1. 1406 Texas Instruments (Badge) (32%)
2. 946 Android (21%)
3. 615 Apple iOS (14%)
4. 432 Apple Mac (10%)
5. 393 Windows (8%)
6. 392 Linux (8%)
7. 66 Aruba (1.5%)
8. 38 Raspberry Pi (0.9%)

Associations per location vs. talks



WiFi probes

3 probes deployed

Automated WiFi testing using OpenWRT/wpa_supplicant

<https://github.com/bitlair/wifi-probe>

Probe02 Stage B HTTP download speed 5GHz (target/max = 15Mbit/s)



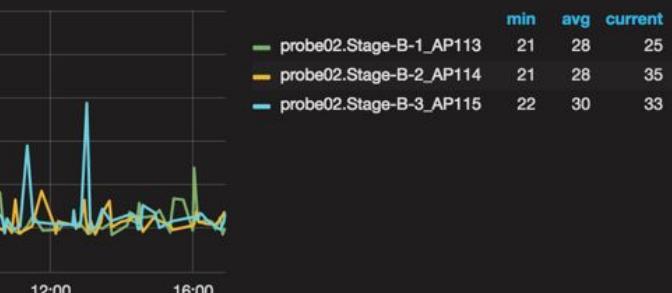
Probe02 Stage B HTTP download speed 2.4GHz (target/max = 15Mbit/s)



Probe02 Stage B association time 5GHz



Probe02 Stage B association time 2.4GHz



Some pictures

Aruba AP-274 in the tree near bar/NOC



Aruba AP-277 on fence near Field G

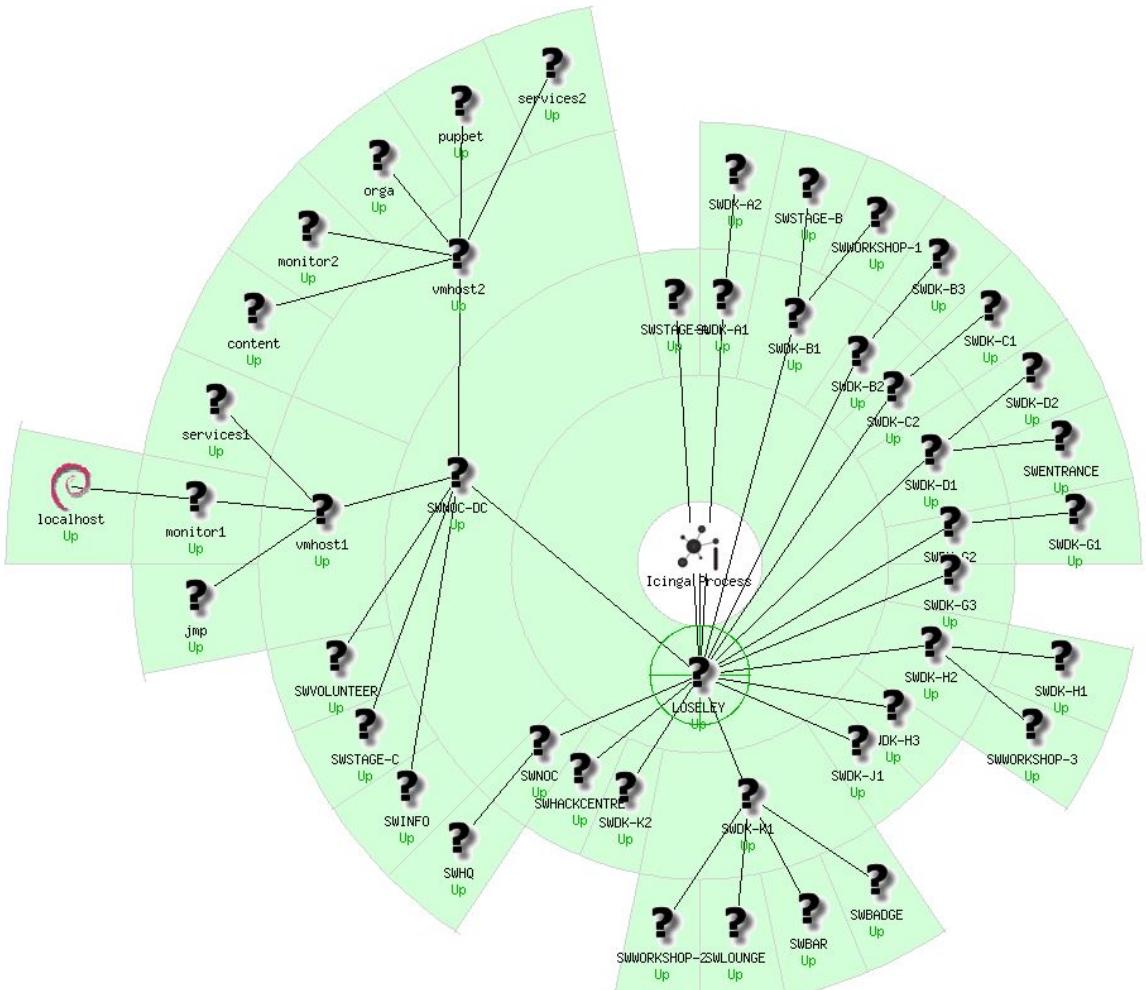


Aruba AP-135 in plastic boxes
ready to be deployed on DK's

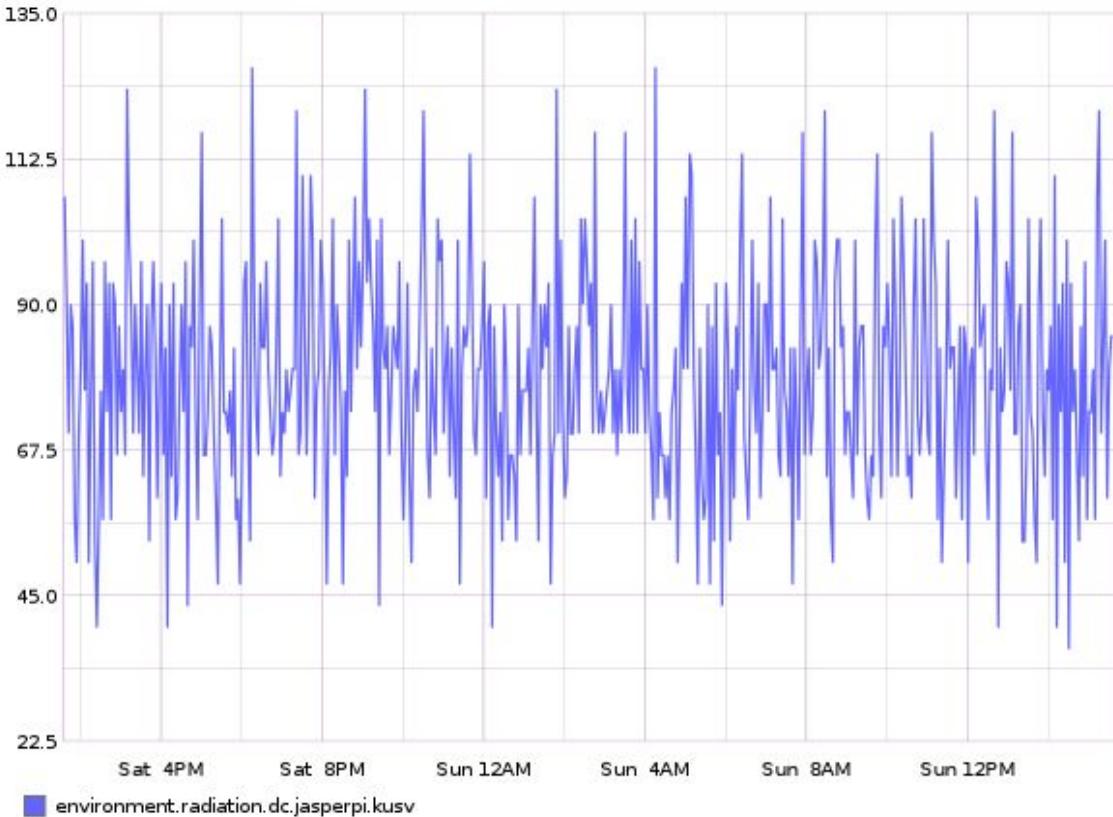


NOC Post Setup

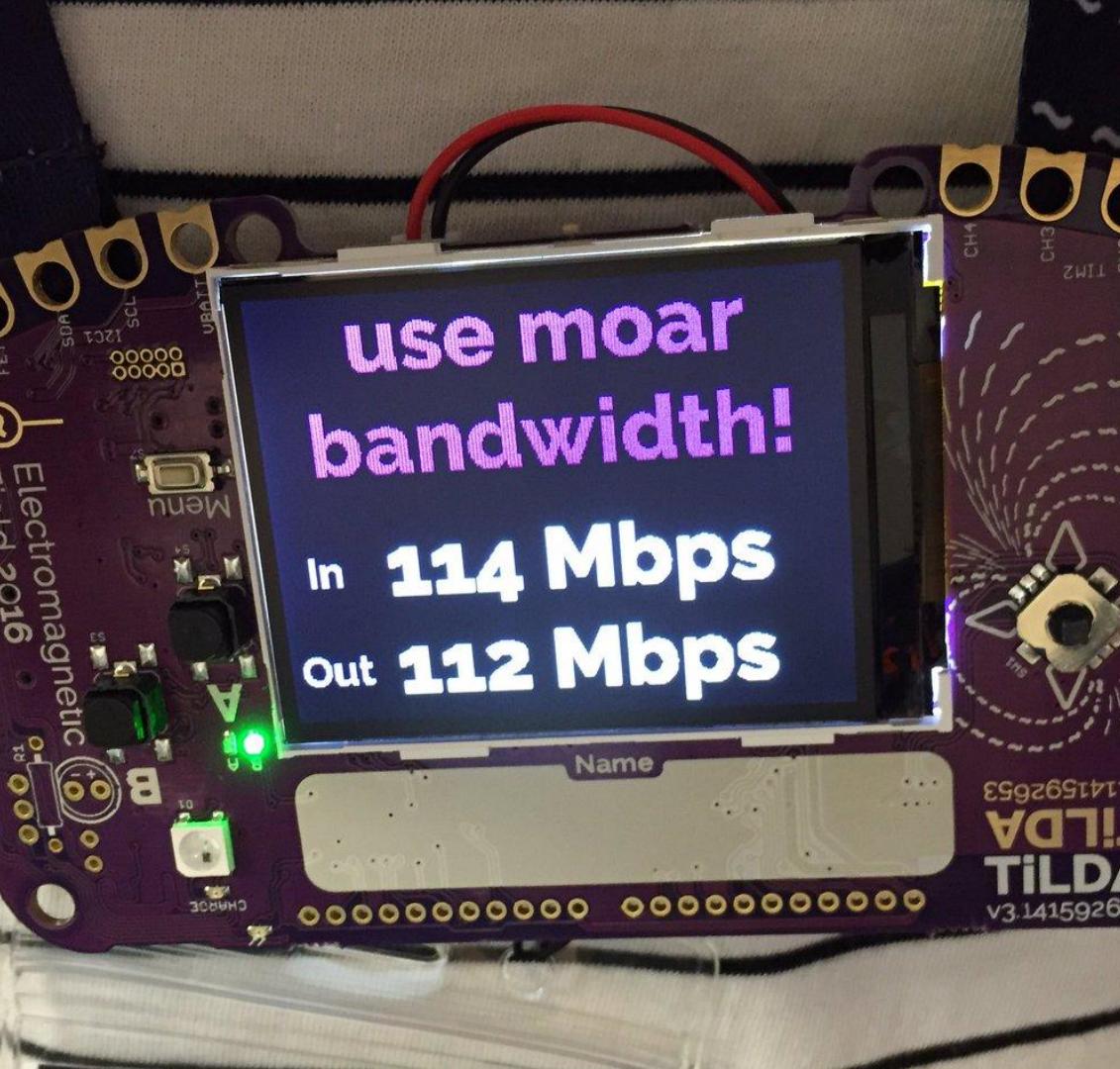
Nothing to see here



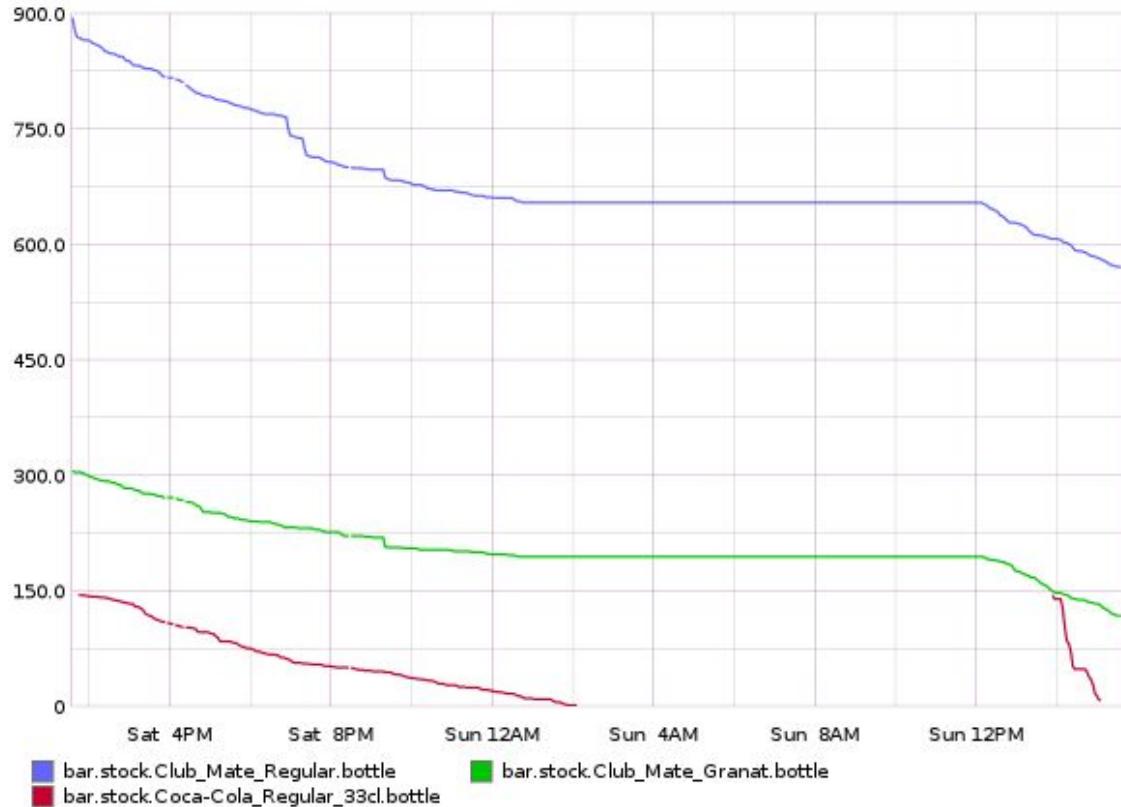
Background Radiation



Badge



Bar Stock



3

copyright complaints received (so far)

Are you guys
trolling us?

Infringement Details

Title: The Legend of Tarzan
Timestamp: 2016-08-05T15:21:48Z
IP Address: [REDACTED]
Port: 6881
Type: BitTorrent
Torrent Hash: 43c112f4d5b662ef6c0b17ba94ec59e0f6...
Filename: The Legend of Tarzan 2016 720p HC H...
Filesize: 799 MB

Evidentiary Information:
Protocol: BITTORRENT
Infringed Work: Zoolander
Infringing FileName: Zoolander 2001 1080p BluRay x...
Infringing FileSize: 3726192407
Infringer's IP Address: [REDACTED]
Infringer's Port: 62063
Initial Infringement Timestamp: 2016-08-05T22:10:29

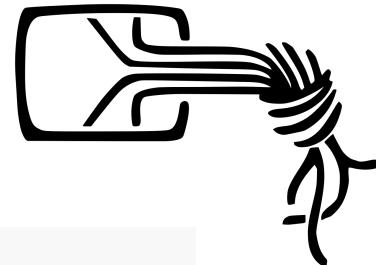
Evidentiary Information:
Protocol: BITTORRENT
Infringed Work: Zoolander 2
Infringing FileName: Zoolander 2 2016 1080p BluRay x...
Infringing FileSize: 2753637169
Infringer's IP Address: [REDACTED]
Infringer's Port: 8999
Initial Infringement Timestamp: 2016-08-05T22:07:04Z



Many Thanks



Booking.com



EventInfra.org



Network Sponsors

Please stay to help
with teardown

Meeting 09:30
outside NOC

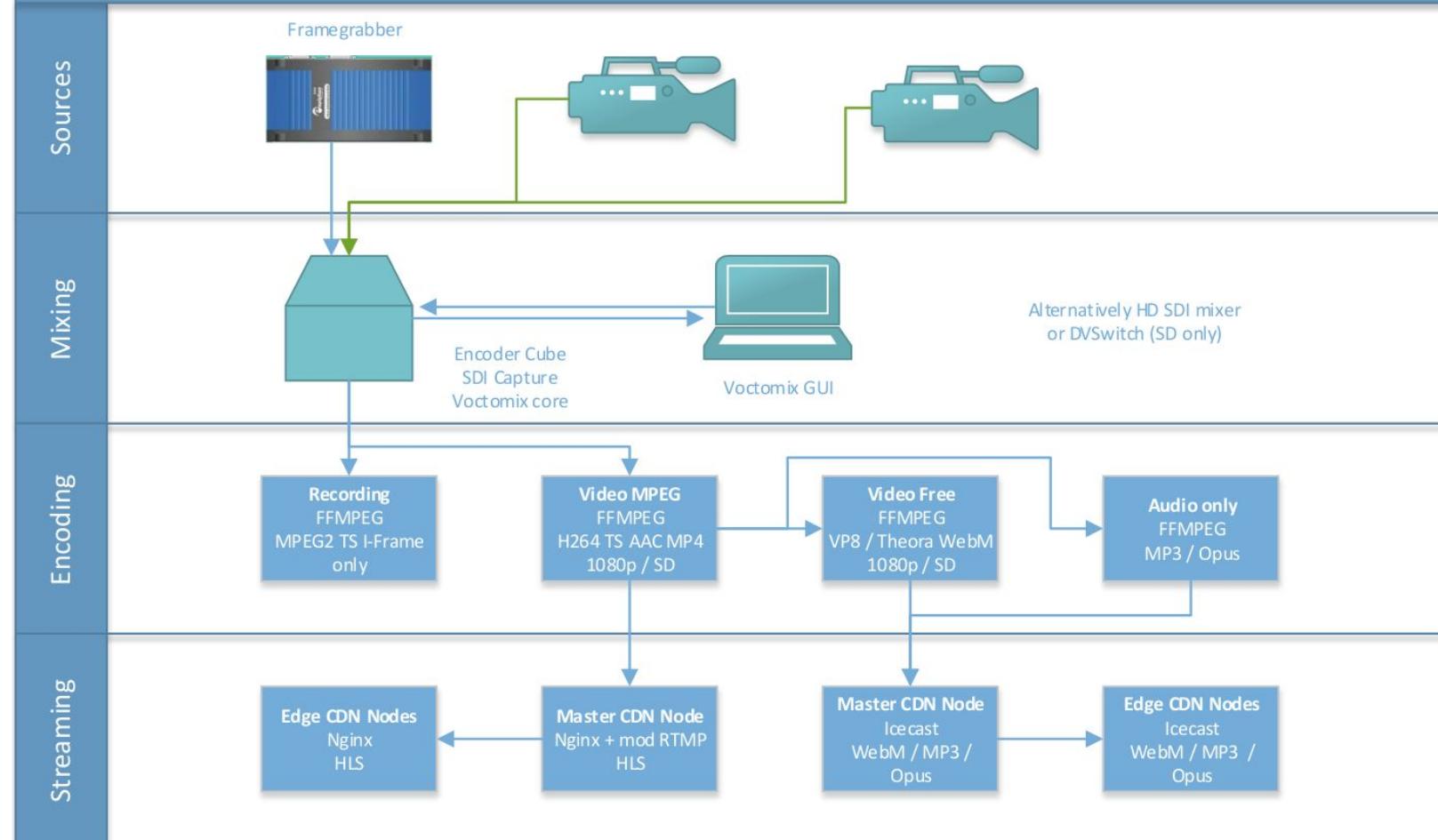


Video

Chaos Computer Club Video Team



C3VOC Signal Path



C3VOC Postprocessing with C3TT

Recording



Editing



Encoding



Publishing



52 hours of talks

~ 2,5 TB data produced

~ 40 GB releases

First two days published, day 3
nearly done

Releases on media.ccc.de and EMF
youtube channel

H264 / WebM in FullHD and SD,
opus / mp3

Use Kodi.tv and media.ccc plugin



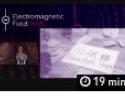
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ccc-tv

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Search...   

EMF Camp 2016 emf16

name	duration	date
 Morality in video games: when it's not just a game	33 min	2016-08-07 by Catherine Flick
 How we created a hackathon with 50/50 female and male participants	19 min	2016-08-07 by Caroline Arkenson
 Holonomic robots, and why you should build one	47 min	2016-08-07 by Tom Oinn
 Ragequit! Game design principles for better online communities.	35 min	2016-08-07 by Laurie James
 WhiteSpace	45 min	2016-08-06 by Beth Healey
 Lightning Talks		

Twitter @c3voc

IRC irc.hackint.eu #voc-lounge

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media.ccc.de

thx to info-beamer.com

thx to the all volunteers
and the EMF crew





Electromagnetic Field **2016**



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github.com/emfcamp/emfnoc

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