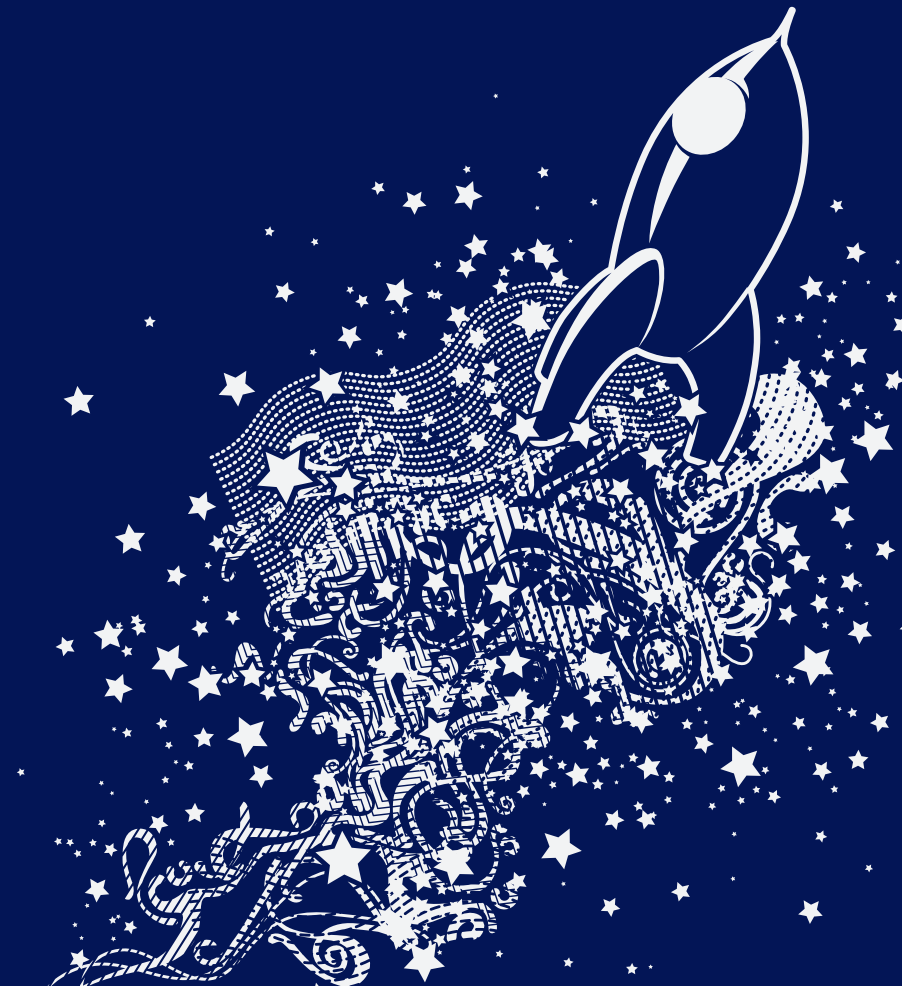


Networking @ Camp 07

Maxim Salomon
Niels Bakker
Elisa Jasinska



Camp Fiber

- 4 km of single and multimode fiber

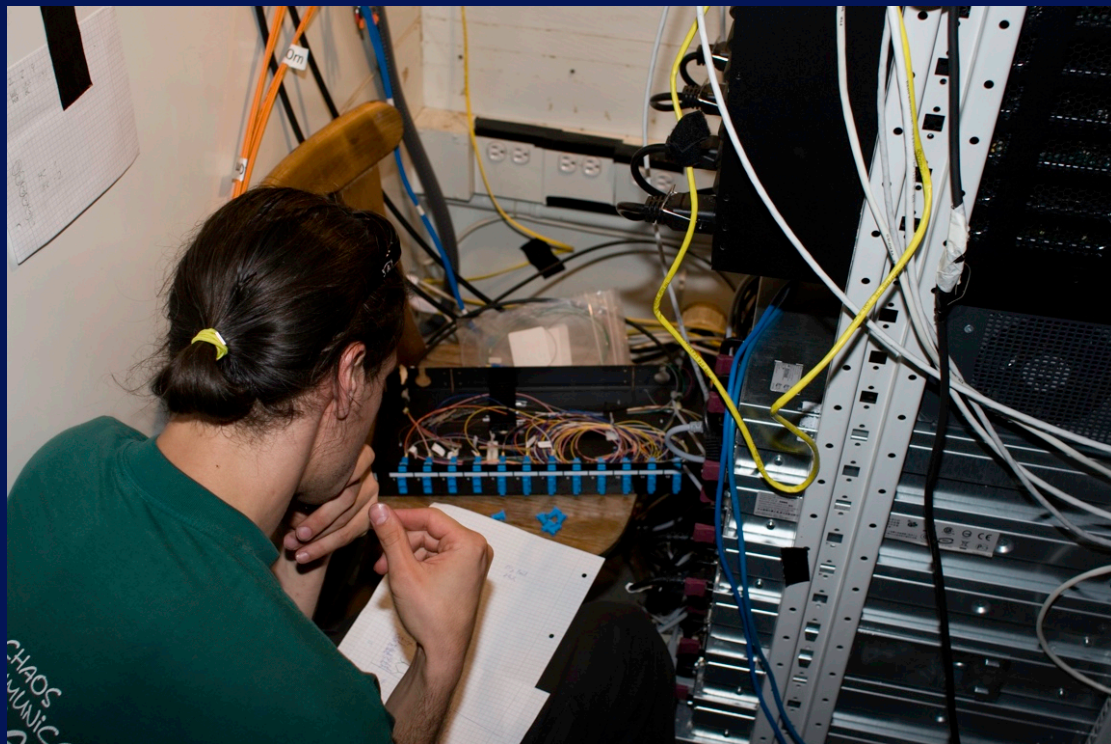


Camp Fiber



Camp Fiber

- 50+ multimode and single mode splices





Geländeplan 22. Juni 2007
prom

Hochschule		Finowfurt dwg / Revision 0.3a	
Luftfahrtmuseum Finowfurt		Chaos Communication Camp 2007	
Author	Andersson	Author	Andersson
Editor		Editor	
Reviewer		Reviewer	
Approver		Approver	
Project Manager		Project Manager	
Client		Client	
Version	0.3a	Version	0.3a
Date	22.06.2007	Date	22.06.2007
Sheet	1	Sheet	1

Datenklos

- Dixie toilets turned into advanced network facility

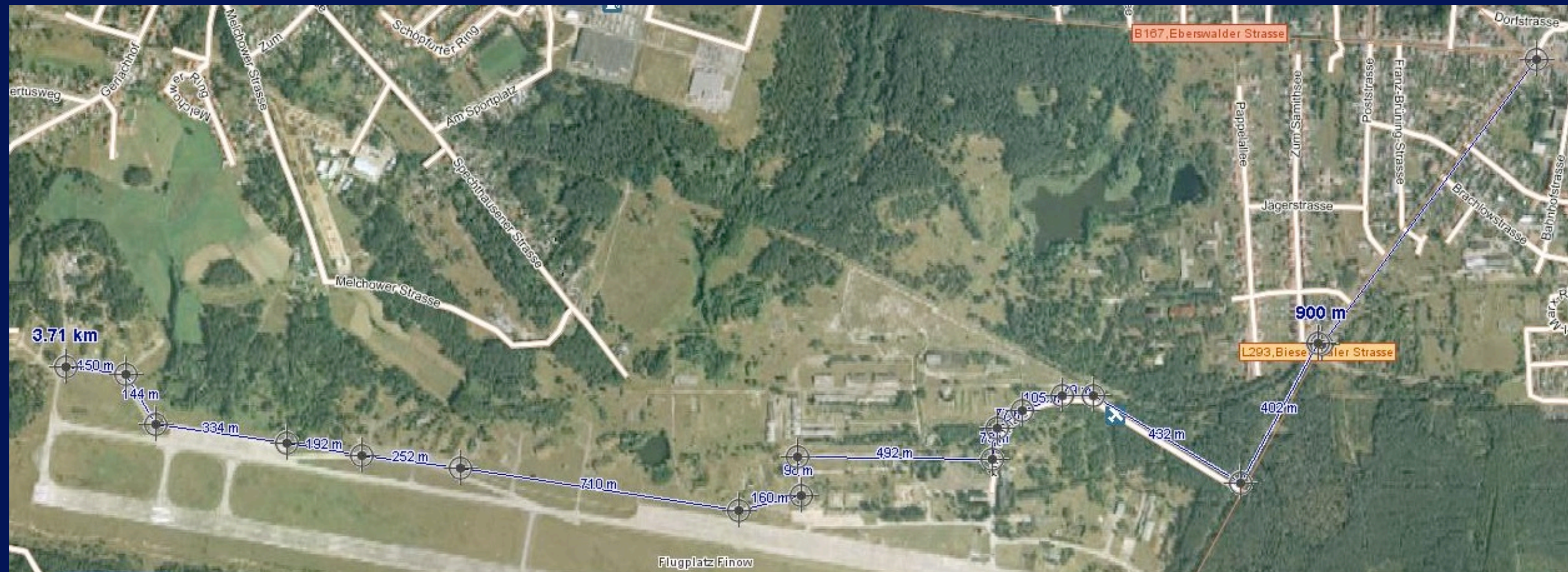


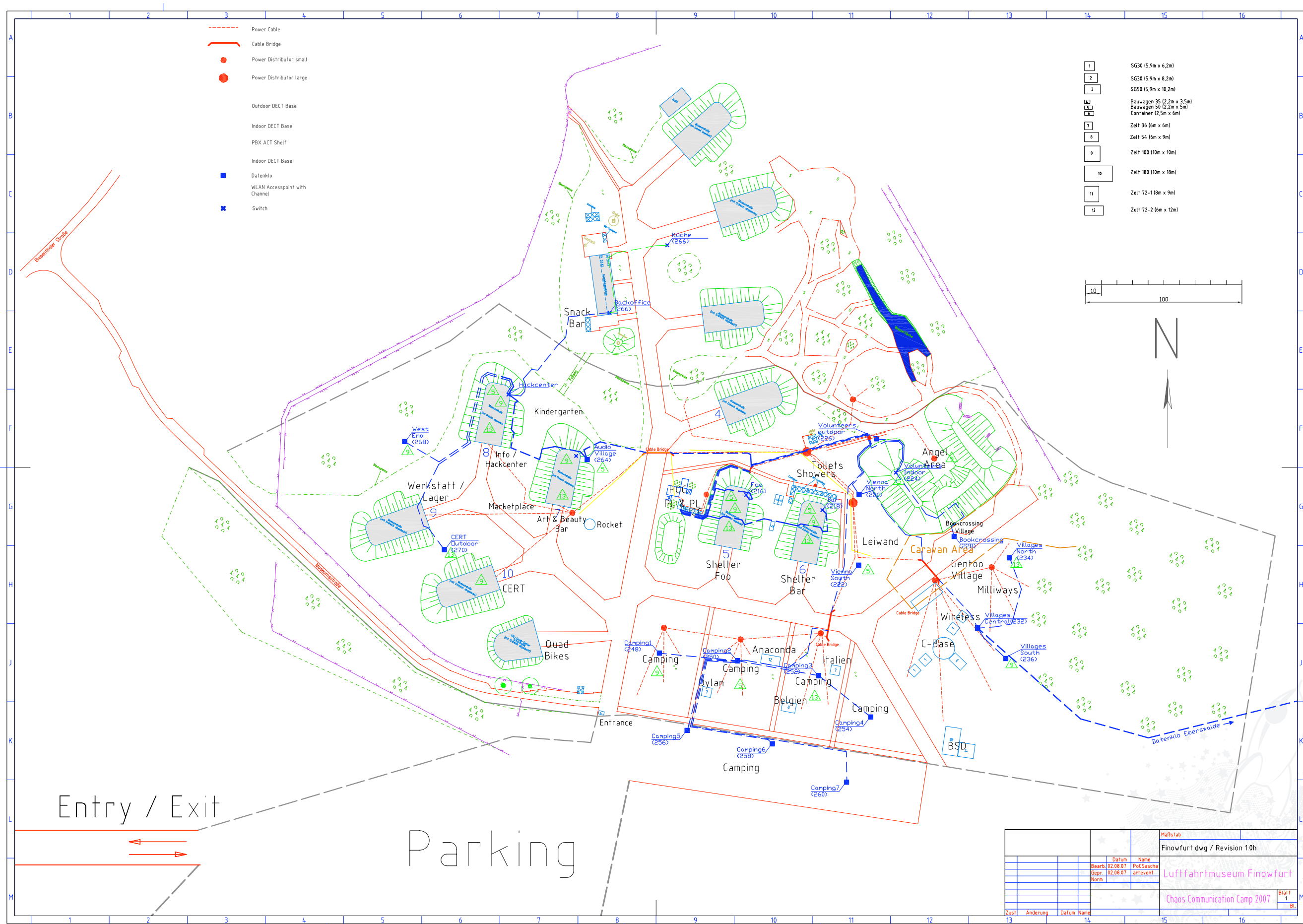
Uplink Fiber

- 3,7 km single mode fiber
- From datacenter in Finow to NOC at Camp



Uplink Fiber





Hardware

- Foundry
 - 1 * MLX-8
- Cisco
 - 2 * 7206VXR NPE-G1
 - 4 * 6509 w/ Sup720, Sup2
 - 2 * 4006
 - 25 * 3548XL
 - 15 * 3524XL
 - 11 * 2948G
 - 2 * 2950G-24
- Hirschmann
 - 3 * MACH 4002 - 48G + 3X
 - 2 * MACH 4002 - 24G + 3X
 - 2 * MACH 3002
 - 2 * Octopus 16M



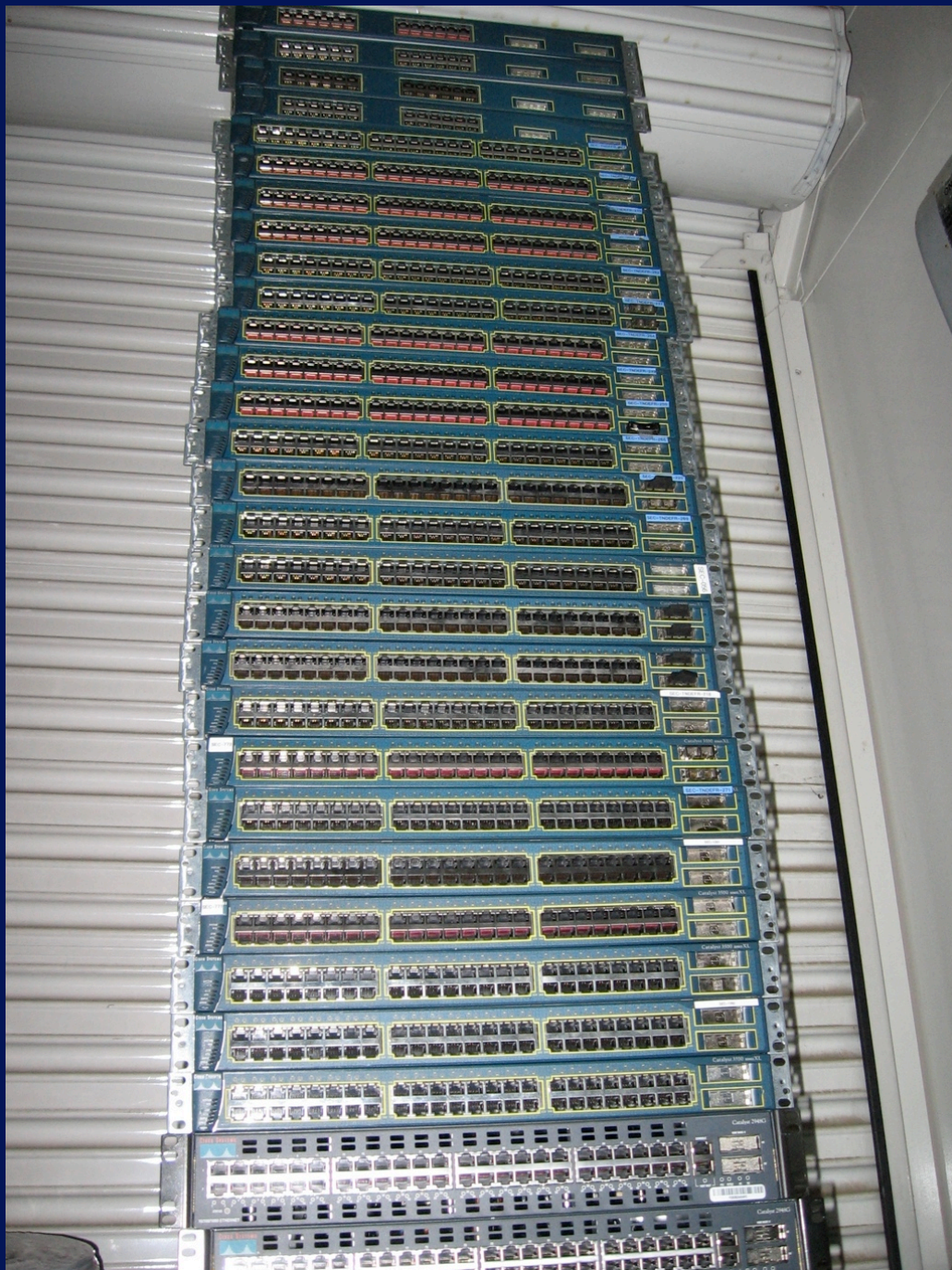
Servers

- 6 * HP DL380-G4
- 1 * HP DL580-G3
- 1 * HP DL585-G2
- 2 * Sun Netra X1
- 2 * Network Appliance
- 1 * Avocent Cyclades

...providing DHCP, DNS etc.



Hardware

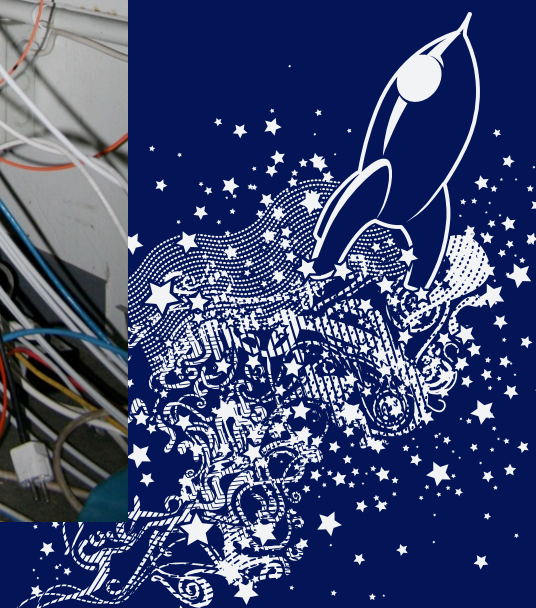
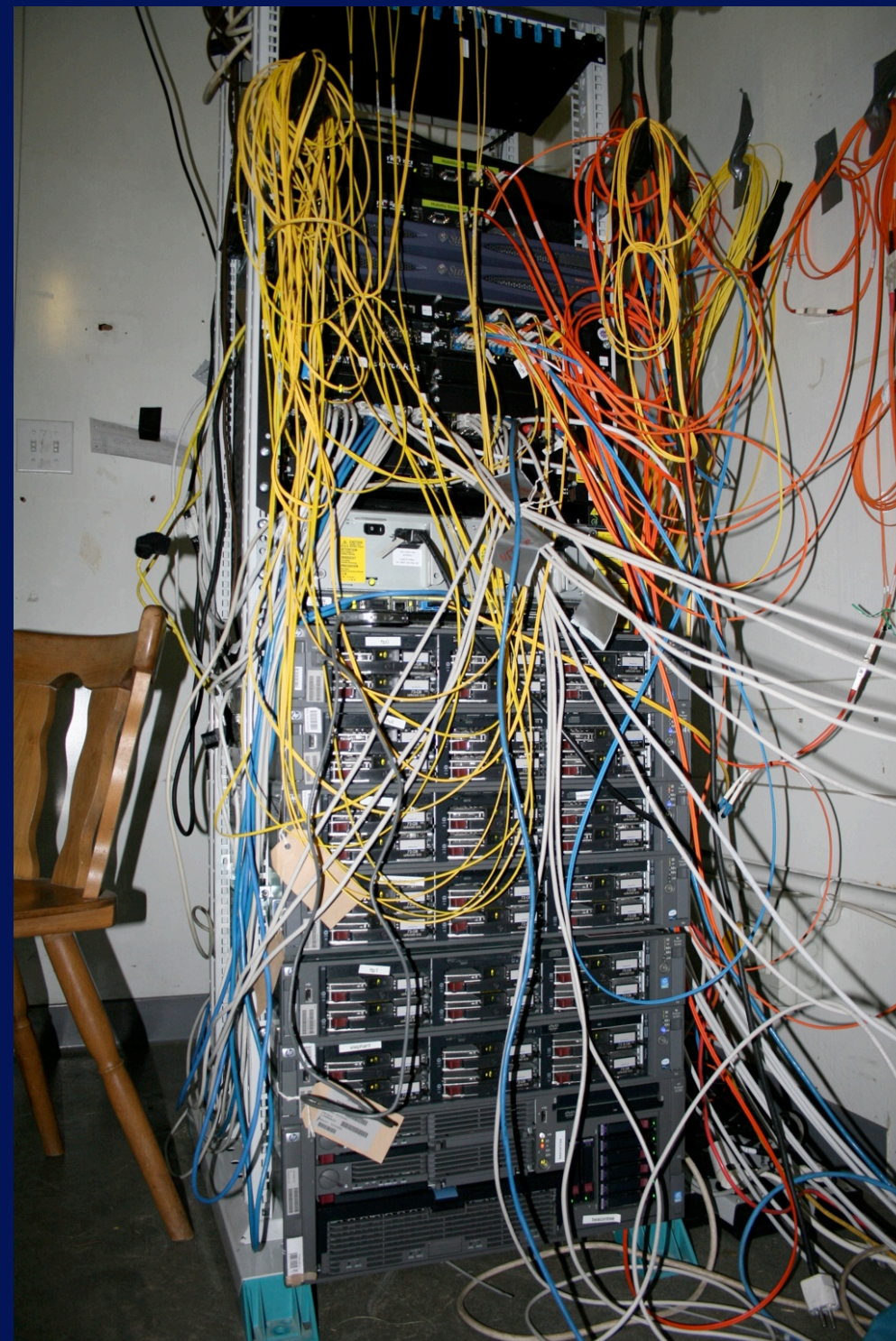




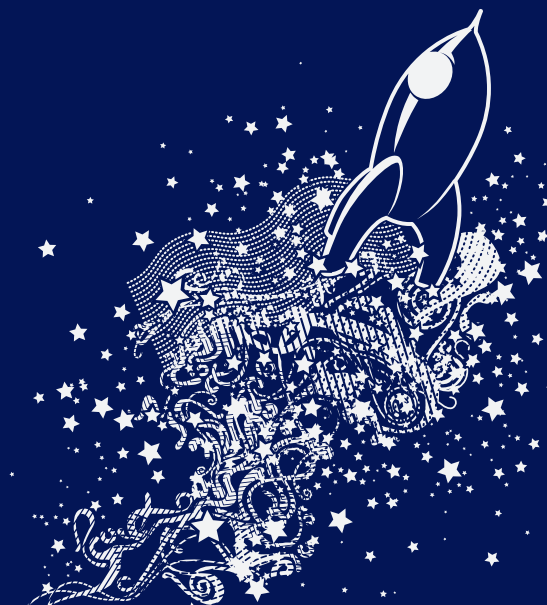
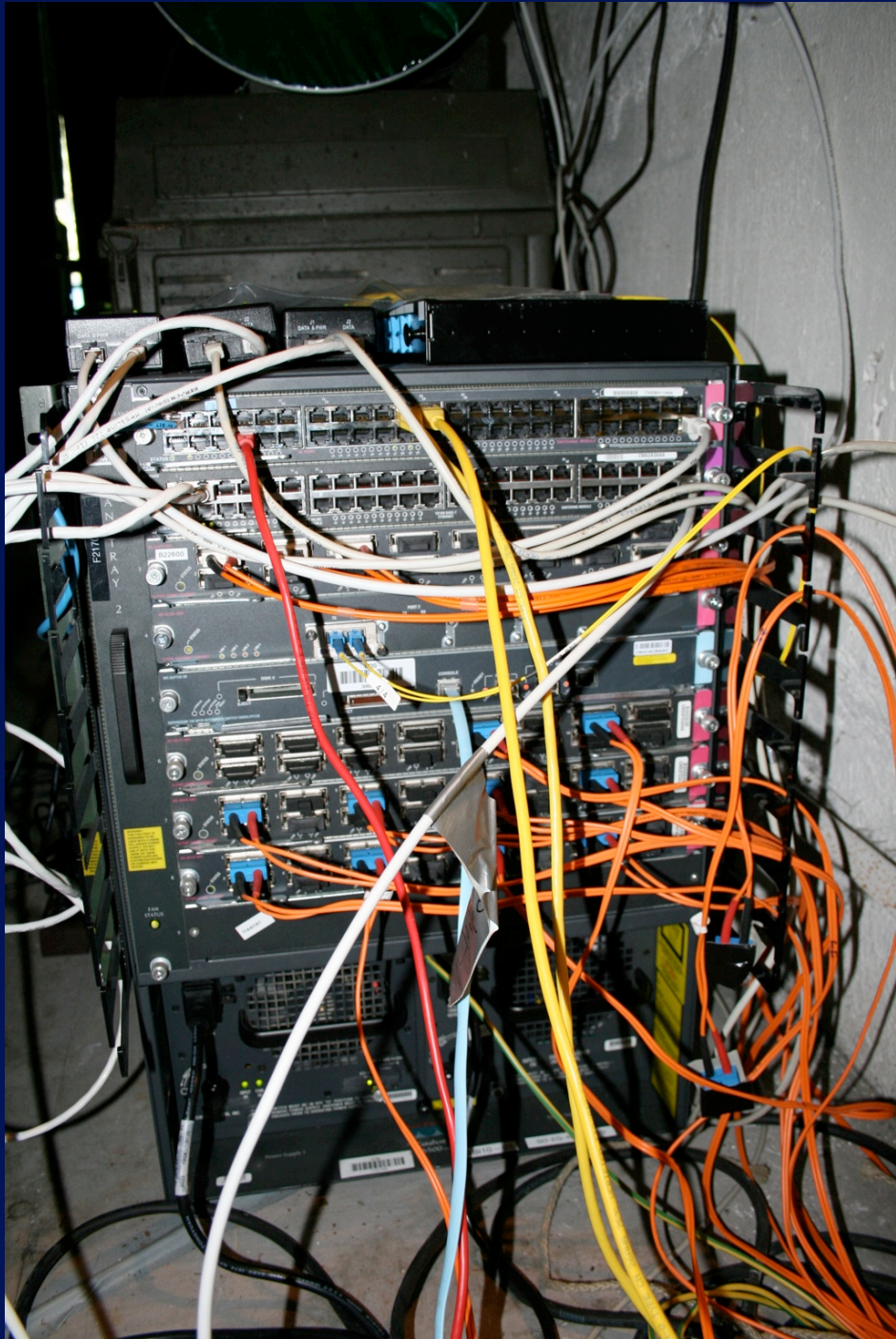
The Facility



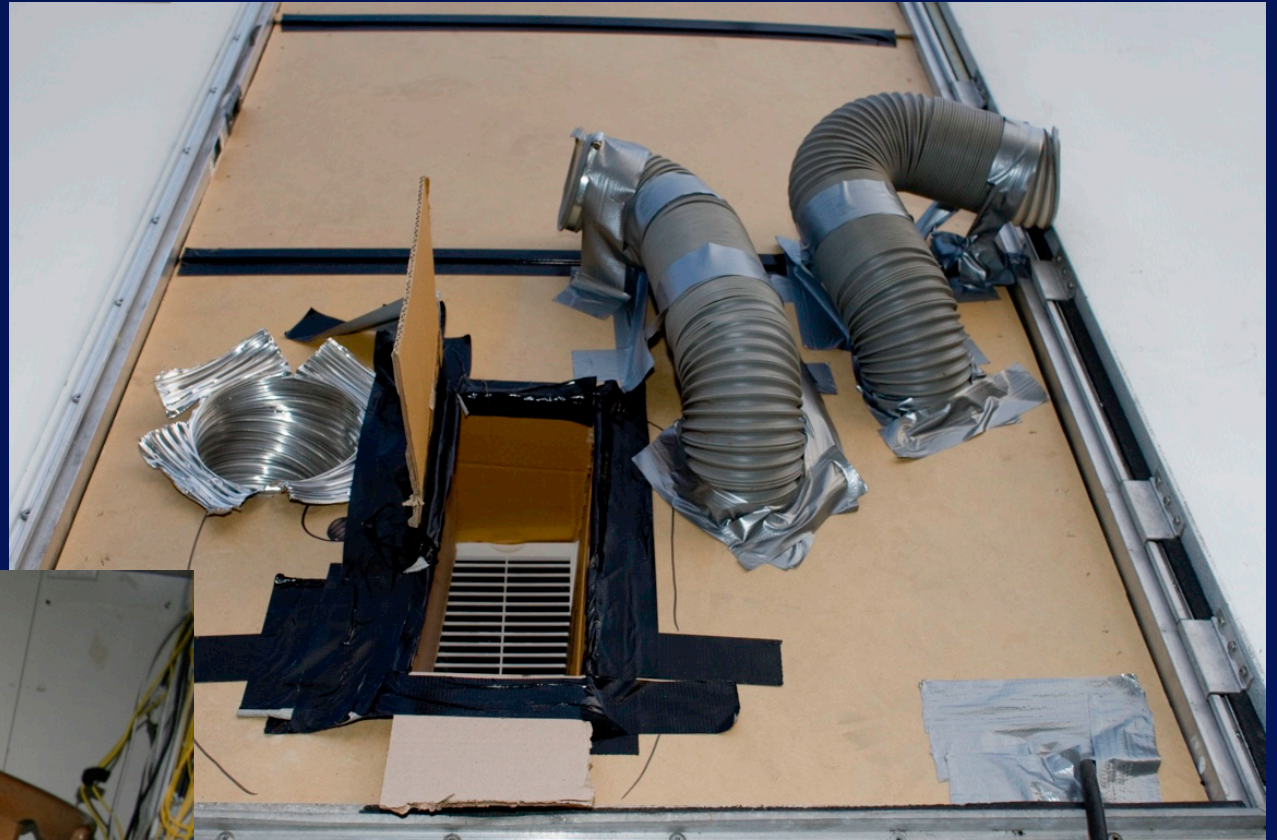
Core

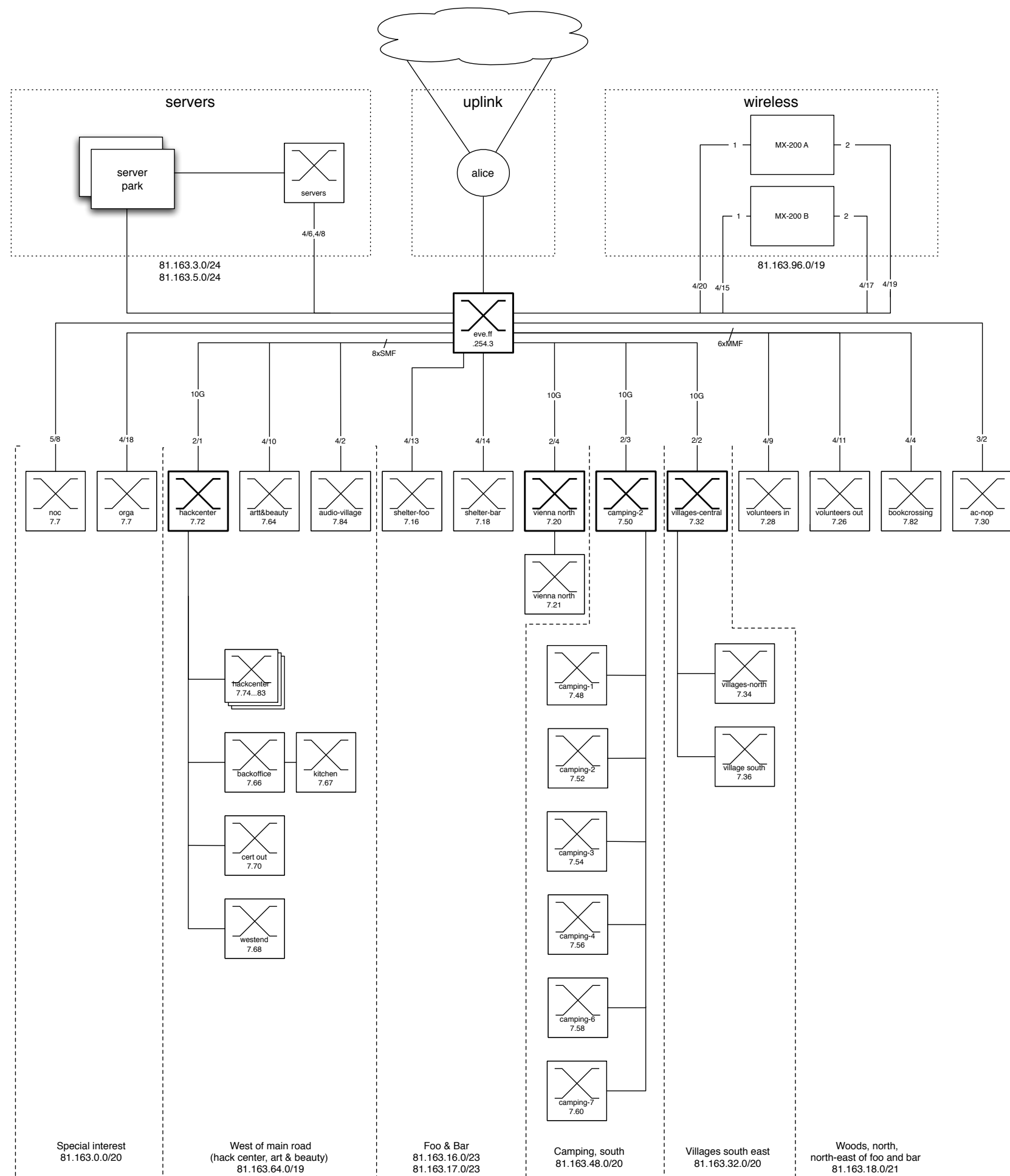


Hackcenter



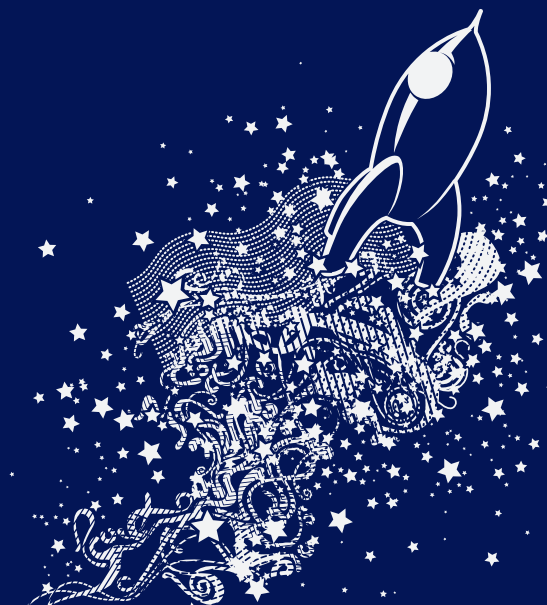
Global Warming





Misc Traffic Stats

- 800 Mbps to the west
(Hackcenter, marketplace)
- 850 Mbps to villages south-east
(Freifunk, c-base, camping)
- 1.1 Gbps to south camping
(campings 1, 2, 3, 4, 5, 6, 7)
- 200 Mbps to audio village
- 140 Mbps to wireless
- 600 kbps to Projektleitung



Design

- Bring Ethernet to all the people
- Keep local issues local by using small subnets
- Make router interfaces, 802.1Q VLAN IDs and subnets predictable
- Don't go overboard on redundancy, it adds complexity
- Hub + Spoke topology possible thanks to plenty of fibers and port density in core
- Fiber is vulnerable to bending and breaking
- Copper is very limited in distance - bigger problem
- Splicing pigtails in the field is possible!



Design

- Local area knowledge is invaluable
- Getting good connectivity outside major metropolitan areas remains a challenge
- Every minute you spend in preparation is saved in manifold on the field
- Trust among team members is very important - do not let bureaucracy get in the way



Uplink

- Up to a week before the camp we counted on 1 to 2.4 Gbps of uplink capacity
- A miscommunication between us and two telcos sponsoring us caused this to fall through
- Workaround: STMI from EDiscom to Berlin and rate-limited Gige via Telta for EWE TEL transit

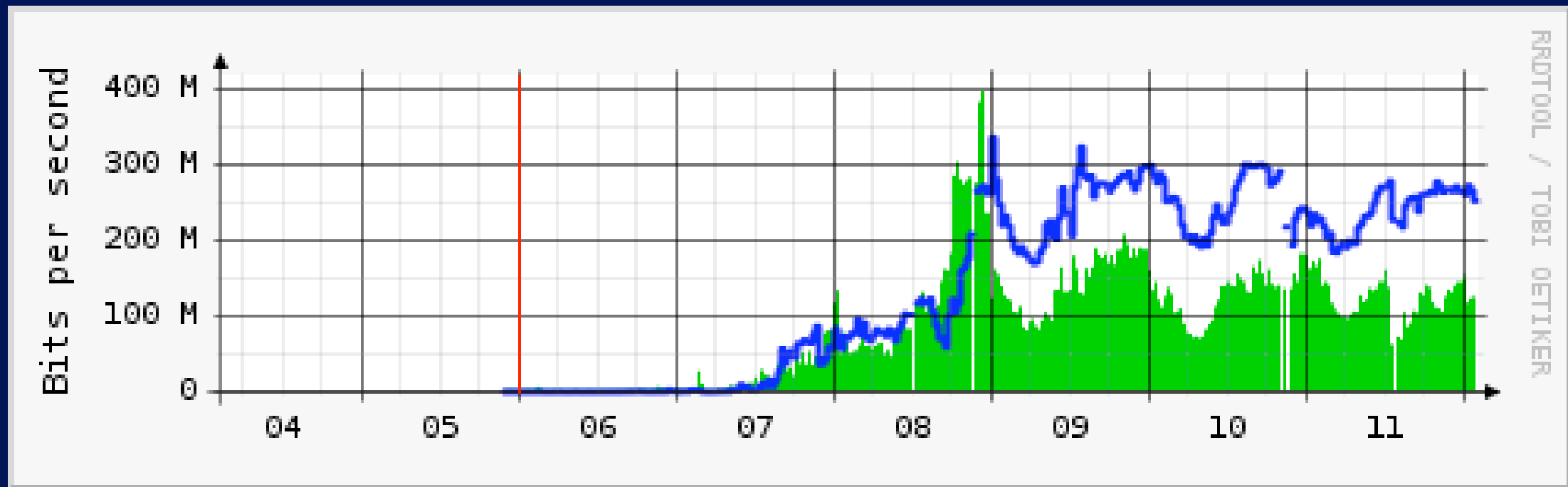


Uplink

- Transit in Berlin via Cogent (AS174), peering with IN-Berlin (AS29670), Netsign (AS31078), D-Hosting (AS12732, v6 transit)
- Transit via one hop over Telta (AS21032) to EWE TEL (AS9145)
- Berlin link first over P-t-P ATM until working POS cards were acquired (bah cell tax!)



Uplink

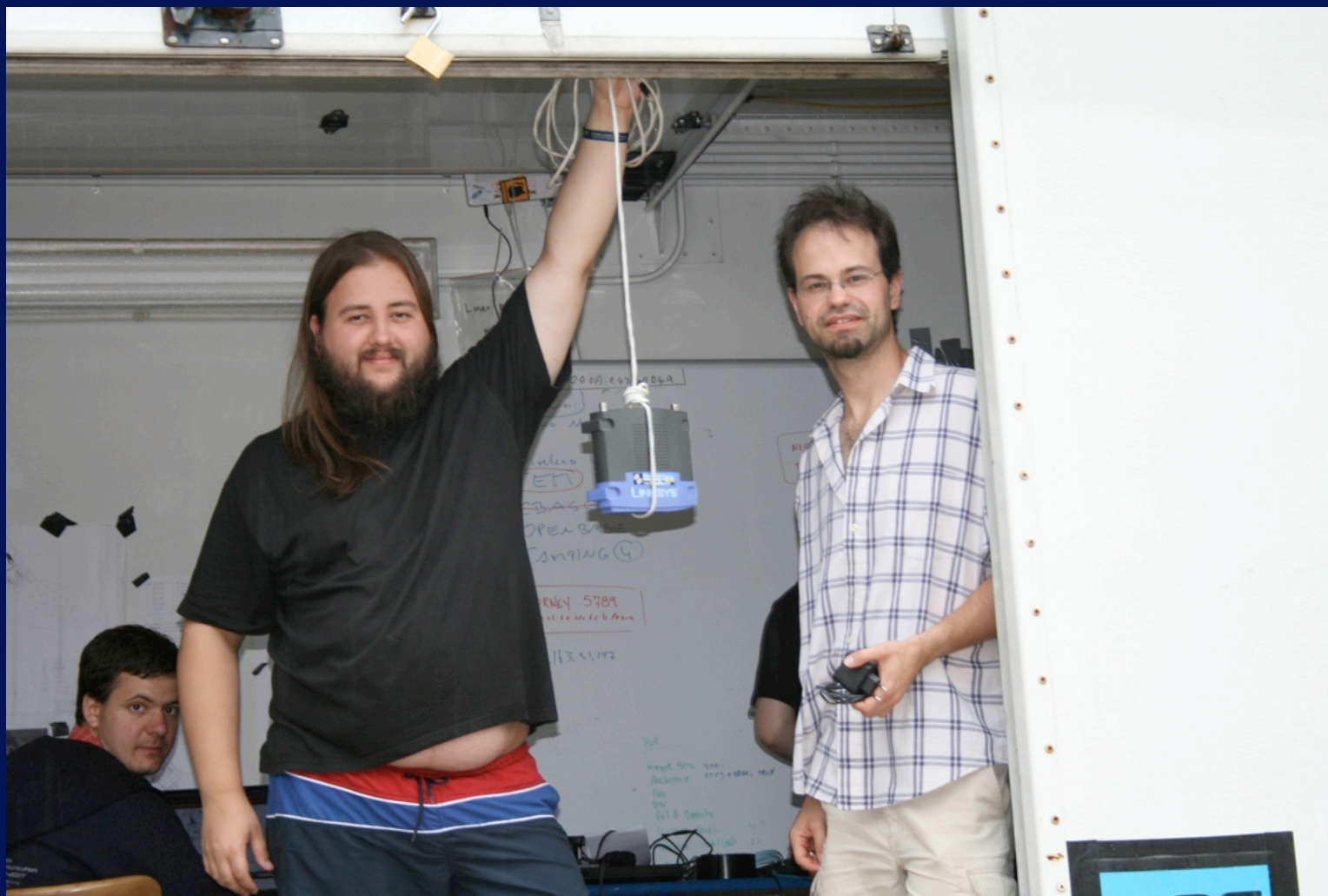


- Peak^Wflatline to 300 Mbps outgoing
- No separate IPv6 stats :(



Issues

```
SSH@eve.ff#sh cpu lp
SLOT #:          LP CPU UTILIZATION in %:
          in 1 second:  in 5 seconds:  in 60 seconds:  in 300 seconds:
2:          1          1          1          1
3:          1          1          1          1
4:          1          1          2          1
5:          1          1          1          1
6:          73          73          67          43
```



High Line Card CPU Utilisation

- Traffic that could have been forwarded in hardware was sent to linecard CPU instead
- Suboptimal performance ensued
- From first look it seemed the router forgot its own MAC address
- Rebooting the linecard helped



Randomly Crashing Linecards

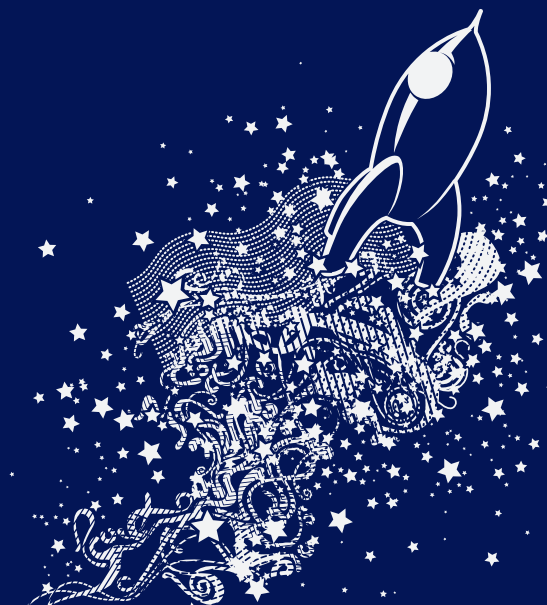
```
Aug 10 20:21:28 eve.ff, System: Module down in slot 6, reason CARD_DOWN_REASON_LOSS_HEARTBEAT
Aug 10 20:21:28 eve.ff, Module 6 is reset by mgmt (reason: heartbeat loss)
Aug 10 20:21:35 eve.ff, System: Module down in slot 3, reason CARD_DOWN_REASON_LOSS_HEARTBEAT
Aug 10 20:21:35 eve.ff, Module 3 is reset by mgmt (reason: heartbeat loss)
Aug 10 20:21:49 eve.ff, System: Module down in slot 5, reason CARD_DOWN_REASON_LOSS_HEARTBEAT
```

- Still searching for the magic packet that breaks the switch ...



Local Switching Broken

- Core device stopped switching frames between ports in the same VLAN
- Started after linecard crashes
- Workaround: move affected ports to a separate Cisco Catalyst 4006 chassis



Wireless

- Trapeze Networks
 - Centralised solution
 - Wireless LAN Controller MX-200
 - Access point MP-372



Wireless Deployment

- Access Points



Someone had a lot of fun :)

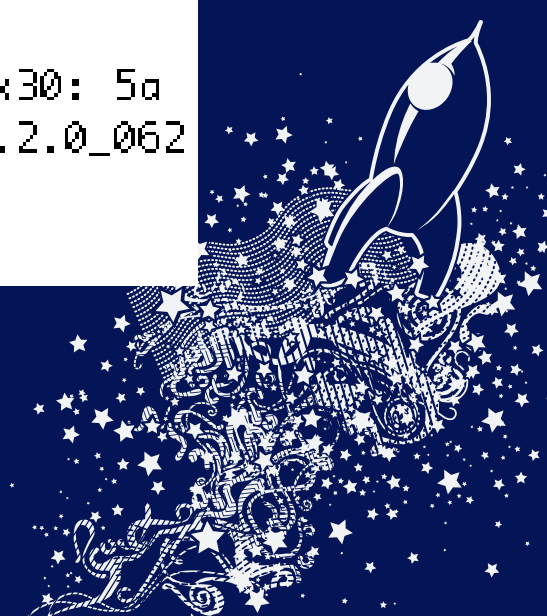
```
mx@# sh log buf match Crash
```

```
MP Aug 10 20:09:17.123896 ALERT AP 13 AP Buffered Log (4): 88842.214 radio: 0x30:  
59 68 06 01 a6 55 d9 48 b8 7c 1f 0f 70 b9 91 fdAP Crash Dump. Version: 6.0.3.2.0_  
062207_1655_  
Cause: ASSERT:,
```

```
MP Aug 10 20:14:11.565170 ALERT AP 11 AP Buffered Log (4): 76467.673 radio: 0x30:  
f3 e0 7e e9 15 ab c1 d6 5c db 83 9d 60 18 8b d9AP Crash Dump. Version: 6.0.3.2.0_  
062207_1655_  
Cause: ASSERT:,
```

```
MP Aug 11 02:50:00.246309 ALERT AP 7 AP Buffered Log (4): 21862.268 radio: 0x30: e  
c d1 c6 b0 a4 38 5d 08 c0 fc 87 e2 55 8a 60 f5AP Crash Dump. Version: 6.0.3.2.0_  
62207_1655_  
Cause: ASSERT:,
```

```
MP Aug 11 02:54:10.982094 ALERT AP 7 AP Buffered Log (4): 248.864 radio: 0x30: 5a  
a4 80 4b ae 70 9a 82 5a ba a6 81 98 c7 1b a8AP Crash Dump. Version: 6.0.3.2.0_062  
207_1655_  
Cause: ASSERT:,
```

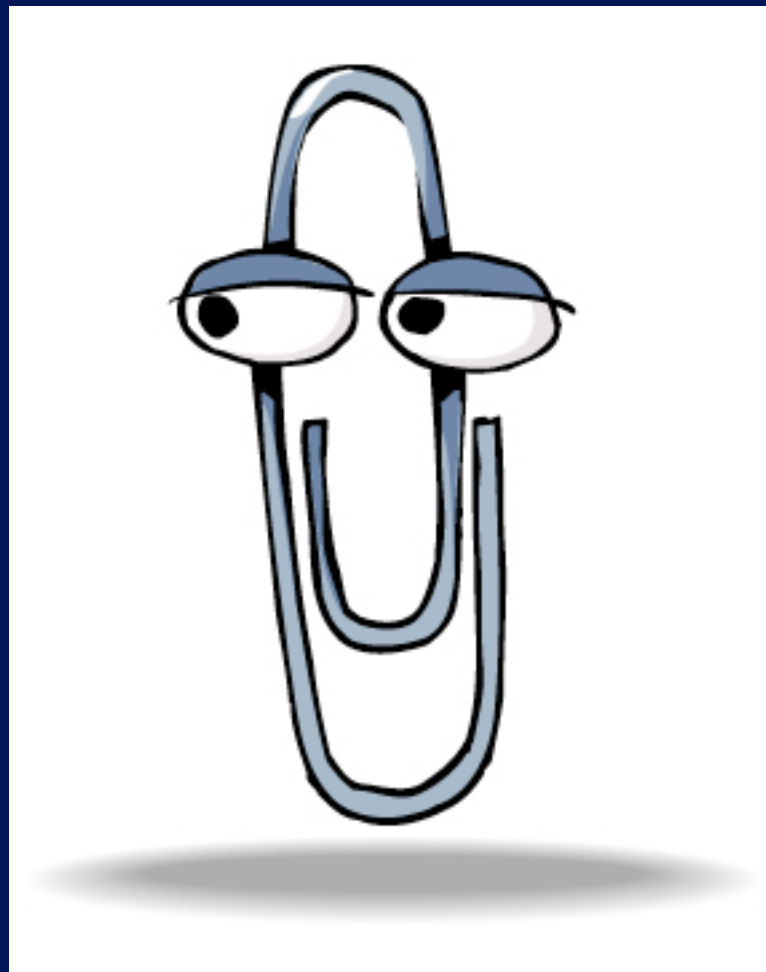


Cables & Connectors

What's wrong in this picture?

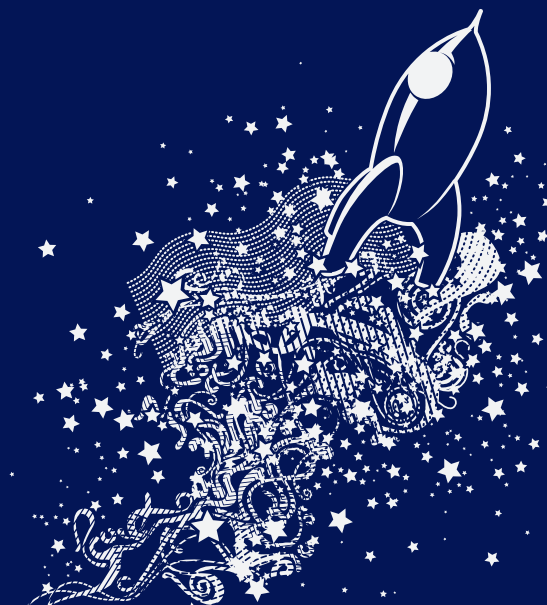


The Patch



Configuration

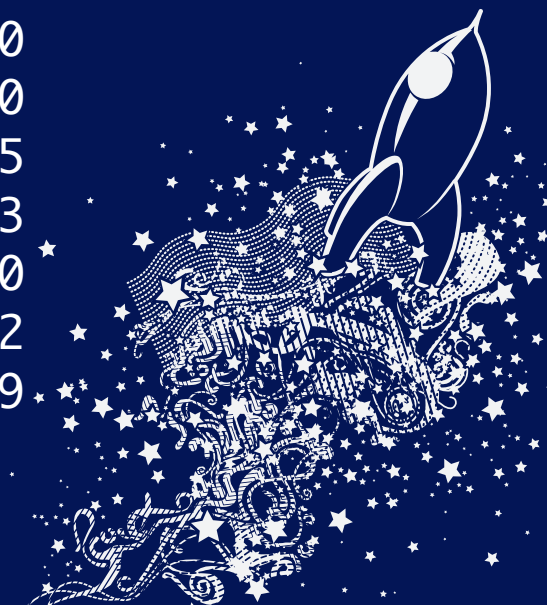
- About 20 802.1Q VLANs
- Location-based SSIDs
- 510 line config!



rfdetect Counters

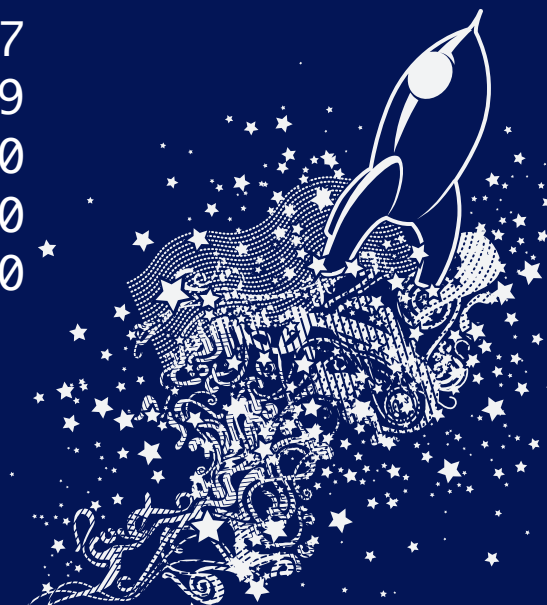
mx# show rfdetect counters

Type	Current	Total
-----	-----	-----
Rogue access points	23	4885
Interfering access points	21	4344
Rogue 802.11 clients	5	1578
Interfering 802.11 clients	3	18241
802.11 adhoc clients	29	6319
Unknown 802.11 clients	169	38551
Interfering 802.11 clients seen on wired network	5	1521
802.11 probe request flood	0	116
802.11 authentication flood	0	10
802.11 null data flood	0	75
802.11 mgmt type 6 flood	0	0
802.11 mgmt type 7 flood	0	0
802.11 mgmt type d flood	0	0
802.11 mgmt type e flood	0	0
802.11 mgmt type f flood	0	0
802.11 association flood	0	245
802.11 reassociation flood	0	3
802.11 disassociation flood	0	10
Weak wep initialization vectors	0	352
Spoofed access point mac-address attacks	11	769



rfdetect Counters

Type	Current	Total
-----	-----	-----
Spoofed client mac-address attacks	0	0
Ssid masquerade attacks	4	132
Spoofed deauthentication attacks	0	21
Spoofed disassociation attacks	0	0
Null probe responses	0	19425
Broadcast deauthentications	0	52
FakeAP ssid attacks	0	1
FakeAP bssid attacks	0	0
Netstumbler clients	0	0
Wellenreiter clients	0	0
Active scans	0	239
Wireless bridge frames	3	4200
Adhoc client frames	55424	0
Access points present in attack-list	27	4127
Access points not present in ssid-list	22	3639
Access points not present in vendor-list	0	0
Clients not present in vendor-list	0	0
Clients added to automatic black-list	0	250



El Paquete

No.	Time	Source	Destination	Protocol	Info
871	158.324530	0.0.0.0	255.255.255.255	IP	Unknown (0x63)

Frame 871 (74 bytes on wire, 74 bytes captured)

Arrival Time: Aug 11, 2007 18:06:10.060655000

Ethernet II, Src: 00:02:8a:fc:e3:ad (00:02:8a:fc:e3:ad), Dst: ff:ff:ff:ff:ff:ff (ff:ff:ff:ff:ff:ff)

Destination: ff:ff:ff:ff:ff:ff (ff:ff:ff:ff:ff:ff)

Source: 00:02:8a:fc:e3:ad (00:02:8a:fc:e3:ad)

Type: IP (0x0800)

Internet Protocol, Src: 0.0.0.0 (0.0.0.0), Dst: 255.255.255.255 (255.255.255.255)

Version: 4

Source: 0.0.0.0 (0.0.0.0)

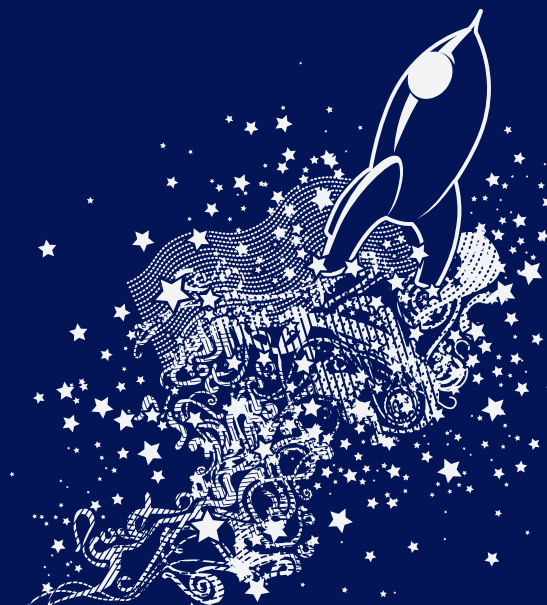
Destination: 255.255.255.255 (255.255.255.255)

Total Length: 60

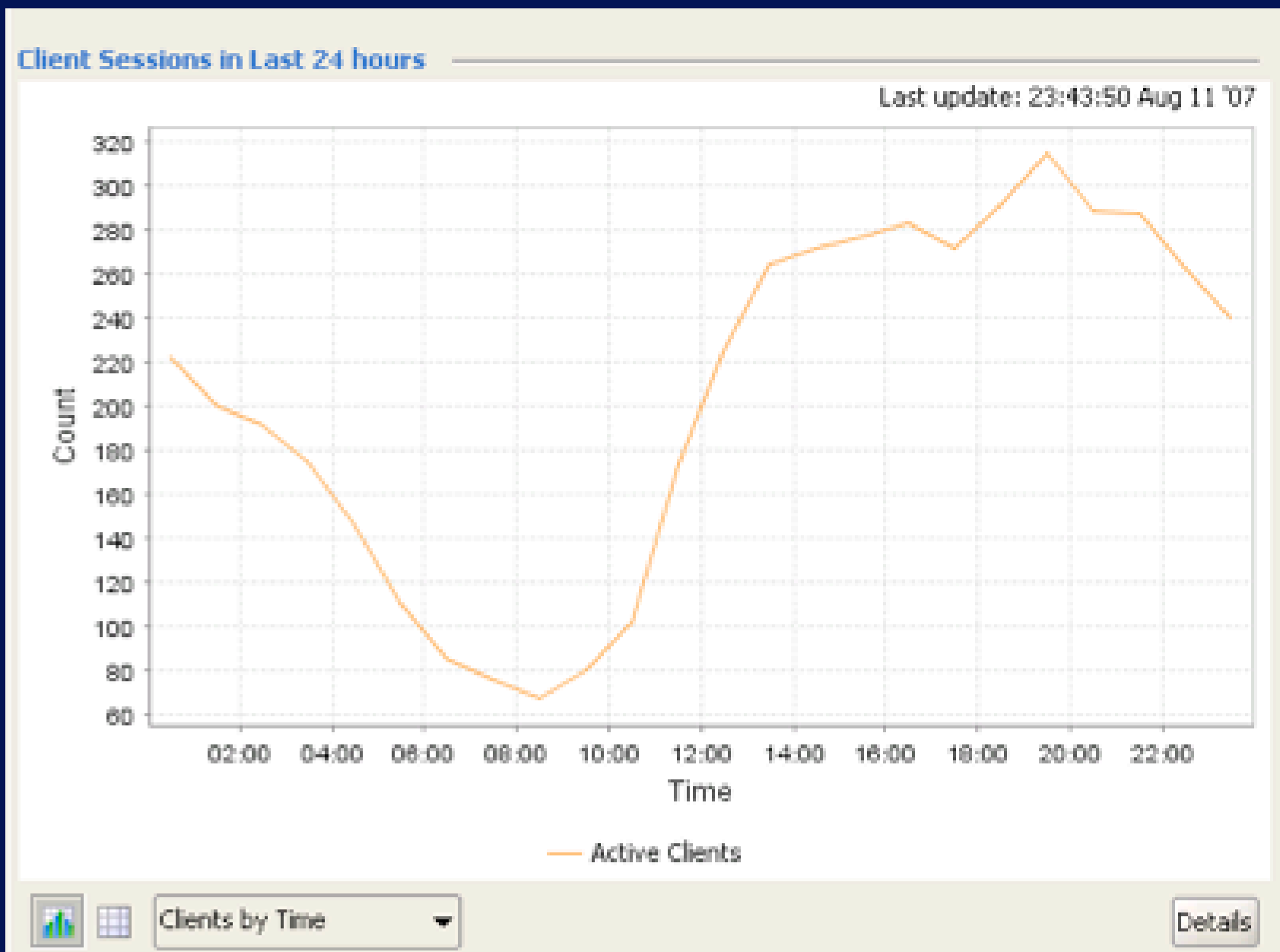
Identification: 0x0000 (0)

Data (40 bytes)

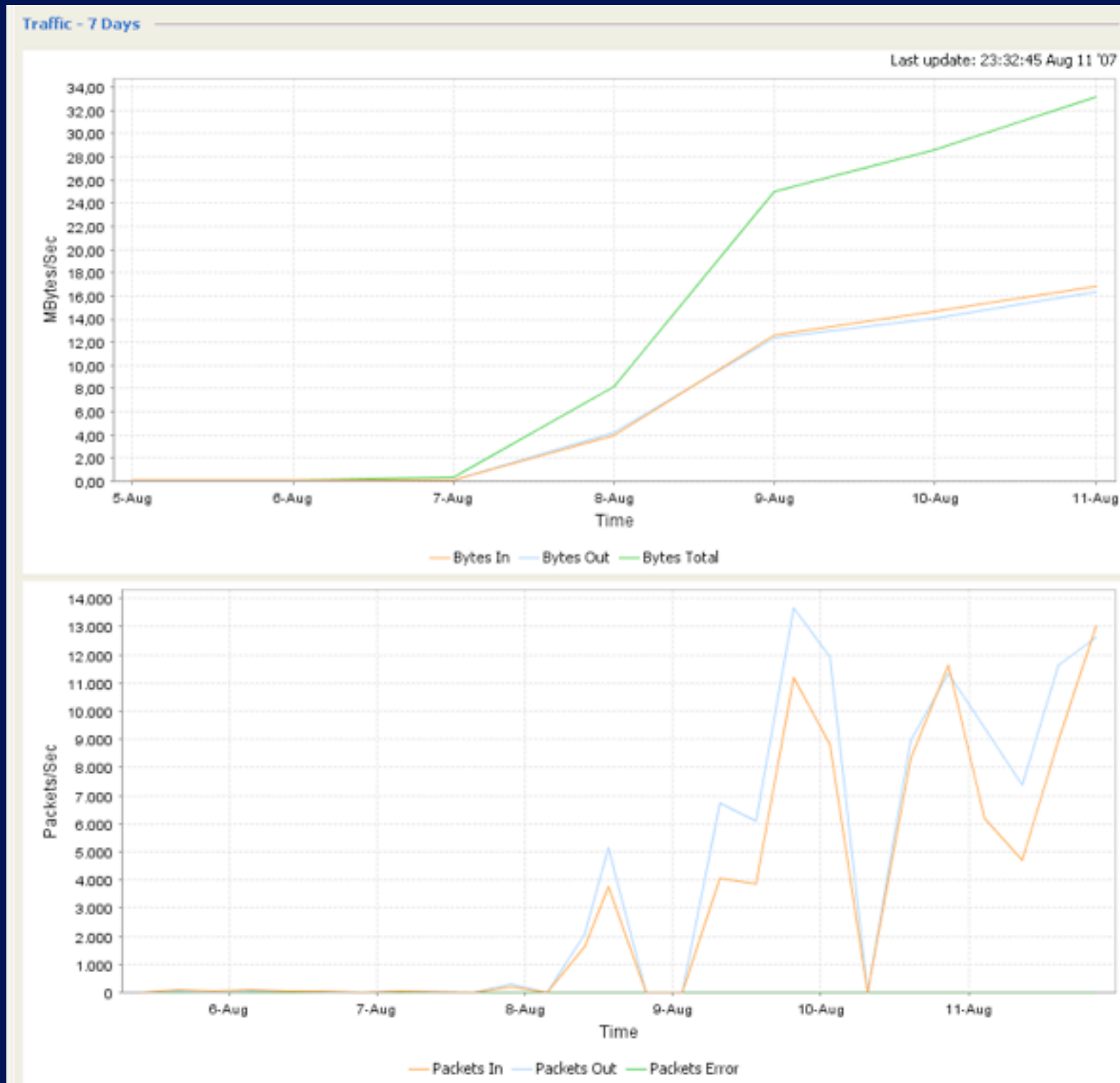
0000	ff	ff	ff	ff	ff	ff	00	02	8a	fc	e3	ad	08	00	45	00E.
0010	00	3c	00	00	00	00	00	63	ba	60	00	00	00	00	ff	ff	.<.....c.`.....
0020	ff	ff	57	4c	41	4e	20	66	6f	72	77	61	72	64	69	6e	..WLAN forwardin
0030	67	20	75	70	64	61	74	65	20	66	72	6f	6d	20	38	31	g update from 81
0040	2e	31	36	33	2e	31	31	37	2e	33							.163.117.3



Statistics



Statistics



Thanks!

- Alex Le Heux, Ariën Vijn, bounce, Cpunkt, Dvorak, Hacko, Jean, Niels, Phils, Prom, Roh, Ruben, Sasha, Sebastian, souls, starbug, Stefan Wahl, Oliver, webmind, ZaphodB
- NOC Helpdesk
- Engel (for digging in all fibers!)
- Many others

2009 ... You?



Today - Important!

- We will start to roll in the network starting now!
- Please leave your cables rolled up at the Datenklos, we will also come by regularly to unplug marked cables
- Internet access (no WLAN) might still be available in select locations after the closing event

