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THE NETWORK AT #SSWC 2011

I want to in the start thank the ones that helped me. Without these people, the network at Tjärö would not have been what it was. To start with of course Tomas Wennström and Kristin Heinonen that arranged SSWC and the crew, specifically Sanny, at Tjärö. Then at Cisco Sweden: Håkan Palm, Peter Jerhamre, Jonas Malmgren and Annica Elgstam. At Teleservice: Philip Olsson. At Netnod: Kurtis Lindqvist. At Socialvideo: Björn Falkevik. At Netcomp: Jan Mattson, Jan Hejel and Ola Ling. At TDC: Malin Carlsson and Karl-Erik Svedin. Svenska Stadsnät: Lars Tegmyr. At City Networks: Magnus Bergman. And finally at Frobbit: Eva Frölich. And many more of the SSWC participants that happened to be close when something was needed.

Already 2009 I heard about SSWC (Sweden Social Web Camp). This initiative to meet on an island called Tjärö in the archipelago of Blekinge in south-eastern part of Sweden. I thought it was completely nuts as Karlshamn which is the city where this city is situated is not very well known for its broadband policy, or the results of the lack of one. The contrary. Karlshamn is one of the places where it is almost impossible to find (for example) dark fiber.

And on an island. What where they thinking? I was, partly pushed by my friend Joakim Jardenberg, then in contact with the arranger Tomas Wennström and Kristin Heinonen, and they of course challenged med and said what I still have in my ears: That it is hard does not imply we should not do it, the contrary. And that is not only true for what I did 2011, but for the conference as a whole. We do not do it because it is simple. We do it because it just must be done.

As Sir Winston Churchill is one of my favorite persons regarding quotes and statements, and because these words from Tomas resonated with that thinking, well, who am I to not take on that challenge. To get a working network during SSWC 2011 on Tjärö. I quickly did understand getting a good working network would be impossible, but why not try to get it *as good as possible* given the restrictions we have, like speed of light, value of π and direction of gravity?

As I work for Cisco, I did what I always do when I hear about conferences that both challenges me and seems interesting for Cisco -- from my perspective. I contacted the local country organization. In this case Cisco Sweden. They immediately not only said that they could help, but they also without me having to ask for it started to work on putting gear together.

I also relatively quickly reached out to Netnod that could help with IP addresses. A conference like this definitely need public IP addresses, and those are possible to get from in our region RIPE NCC. One "just" fill out the form, and request the addresses via a LIR. The only problem we had was that the toner was bad at the home of Tomas, so the then scanned copy of the signed agreement was not of good enough quality. Tomas was on a well deserved canoeing trip for two days, so there was the first delay. Not too long, but I was starting to get nervous as I did not want two days of delay already that early in the project. **Do request IP addresses as far in advance as possible.**

In parallel I was working with Cisco Sweden and the gear they where to send down. I had already together with Tomas and Björn visited Tjärö and made a detailed site inspection. **Do a detailed site inspection early in the process.** That lead to a preliminary plan of the physical layout of

the network. Internet would arrive via a 4-pair DSL connection giving hopefully 10Mbps in total (at the end it delivered 2x2Mbps, or about 7.5Mbps IP traffic). We found that the network would be star shaped, with one center in the main building and then two arms (later, when being on site, we actually did build a third arm). One of the arms where to be fiber from Netcomp that was to be installed on the island, while the other one had to be built by us on site. About 100 meters, across two roads. I decided to try to build this second arm via a wire between two buildings, as no cheap enough cable would be able to withstand being with that long air gap. Cheaper (I thought) to buy wire, and cheap cable. Maybe conclusion was wrong, but later it would definitely be a correct decision.

The IP addresses 91.231.0.0/22 arrived, and configuration of boxes was done in Stockholm in the Cisco office. Three Cisco 3950G and one 4402 wireless controller. When later discussing the setup, we also packed one extra 3950 and one 2800 router. **Do pack extra gear, specifically an extra switch or two.** Gear that we definitely needed on site, so adding gear *just in case* is something I strongly recommend for a setup like this. Part from that, we also packed 25 of the 1142 access points. Very good ones as they work perfectly with a wireless controller, are small (no external antennas), good hook for cable ties, and, they are PoE which the switches can handle. We also just in case packed a smaller wireless controller and a few extra access points for a second network. Something we never used, so I will not describe that part more.

One thing I afterwards see was very important, but I should have spent more time on it, was to build the network before I left my lab. **Do build as much of the network as possible in your lab before being on site.** All gear should have been configured so that one only had to change the IP addresses when coming on site. I almost had the gear in that state. If one do, one do check two things. First of all, one can spend time on site on trimming the base configuration. Secondly, one do know one have got all the gear one needs.

Specifically, when building things in my lab I saw that one of the switches could not communicate with the others. I had no idea what was wrong, so I just started from the beginning with a base configuration of the switches. I might have been able to find the problem after trying a bit more, but I felt at that time it was faster to start from the beginning. Because of that (and a problem I will describe a bit later), you will see that the configurations of the switches is kind of messy.

I also noticed and checked for the first time that I had all the fiber gear I needed. The switches wanted LC, but all fiber on the island had SC contacts. That implied I needed some SC/LC patches. And the correct SFP for the switches. On top of that, I found that the wireless controller had a line port with an SFP that was locked to 1Gpbs which implied it also had to use fiber, which implied I needed one more SFP than what I originally thought.

A quick call to Teleservice and it was clear I could borrow fiber gear from them. A late night raid ensured I had two boxes with various SC/LC gear, including a 100 meter long fiber that I could use instead of using copper. Excellent! I also got fiber cleaning gear, lots of connectors for fiber and I have no idea how many patches. Let me put it this way: even though I had to use three or four times more fiber than what I planned, I had more than the double that I did not use. **Do use as much fiber as possible, and bring much more fiber patches etc than you think you need (including converters between for example SC and LC), and do not forget to count the SFPs you bring.**

I also of course packed tons of ready made ethernet cable. The two lengths I by historical reasons know are needed are 20 meter and 1 meter (or even 0.5 meter) patches. I also brought 3x300 meter boxes of cable, tons of RJ45 contacts, measuring gear and clamping tools. I had use of all of that,

although only about 200 meter ethernet cable etc. One must absolutely have at least one 20 meter cable per access point. If not more than that. You can never bring too much. One thing I should have had more of are connections so you can easily extend a 20 meter cable with another 20 meter cable. bring such things. **Do bring tons of ethernet cable, both ready made and gear for creating more.**

Lastly, you always need normal hardware tools. Cable ties. Tons of them. Same with duct tape. Good quality duct tape. Same as one use at rock concerts etc. I bought a box. Unfortunately the tape I managed to buy was silver and not black, so it is not as interesting on the secondary market. Well, one can not win every time. You also need normal hardware. Like good knifes, tools to cut cable ties when you later pack the gear etc.

In this special case I also wanted to have a cable between two buildings, outdoors. To be able to carry the cable I bought 100 meter 4mm wire, with various other normal things you need when tying a wire. **Do bring more hardware tools than you think, specifically based on estimates made during the site inspection.**

At the site we found that the internal network that already existed consisted of specifically two things: the local guest wireless network and the network needed for the cache machines. Specifically the latter was of course important to not interrupt. You can see the layout of the existing network in Fig 1. What was newly installed was the DSL link using 4 pairs that theoretically gave 4x2.5Mbps, and measurements had shown 10Mbps symmetric connection was possible. Also newly installed was the fiber between main building and the newly built conference center. That an HP Procurve switch was the gear that managed the routing for the network was at this time unknown.

When we arrived, the DSL modem was only using three pairs. And one of those three pairs flapped, so in reality only two where stable. Netcomp was called in, and they quickly responded by coming to the island with one staff while one staff was at the TeliaSonera station where the DSLAM was located. After some training of the modem it was decided the links should be put in 2Mbps fixed speed for each pair (instead of automatic training) which implied we got about 7.5Mbps good throughput. Something we later saw was surprisingly ok for a crowd of 400 social media geeks.

On site people started to build the physical network. We where not surprised we found out the normal challenges for networks in old buildings. For example that the easiest path for dragging cables where outside the building, using windows which we left open as openings. Duct tape is your friend at situations like these. We also put up a 70 + 20 meter long wire(s) in the air between three buildings which we later tied a fiber on using cable ties. This connected "the tent" and "the barn" with the main building.
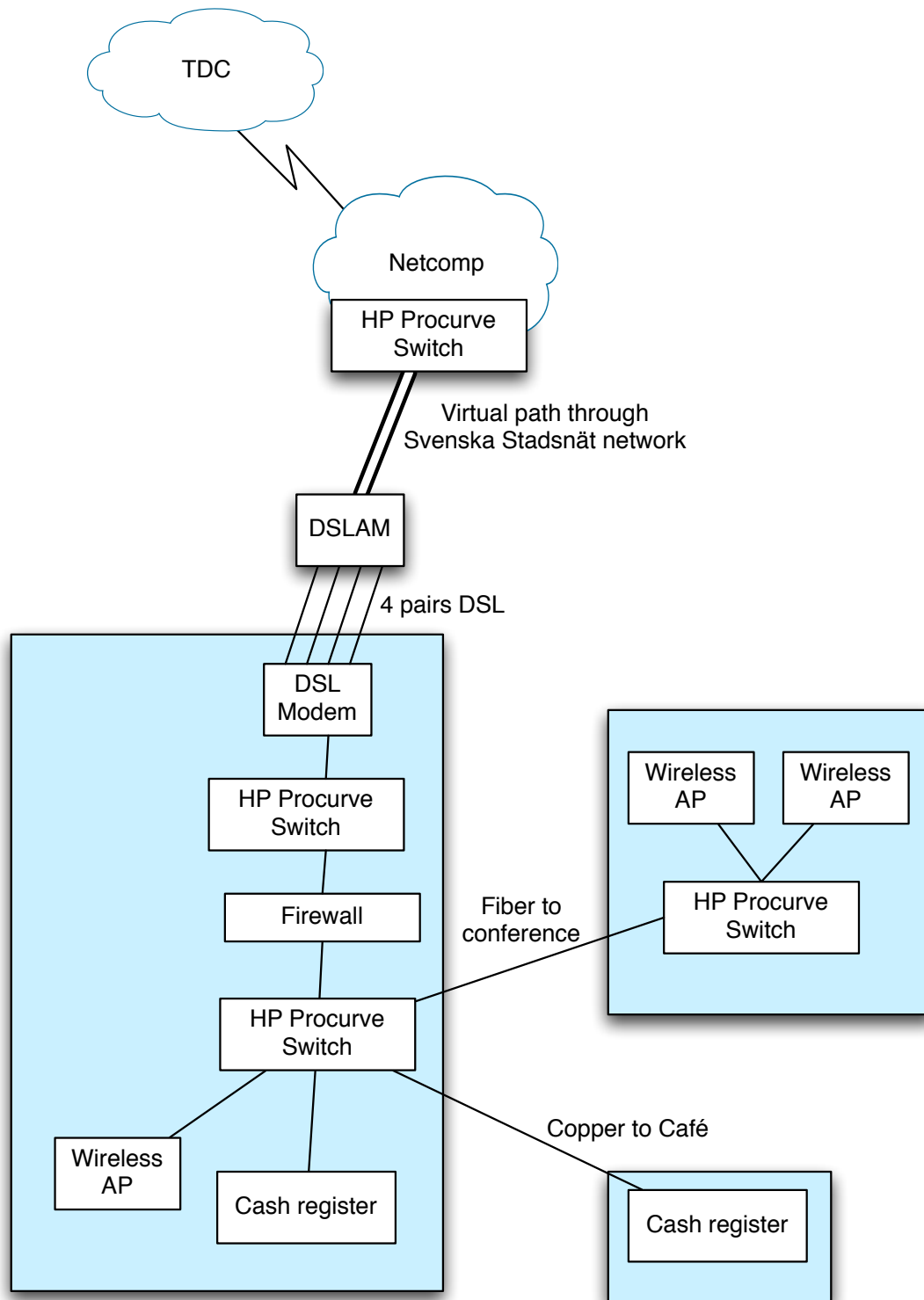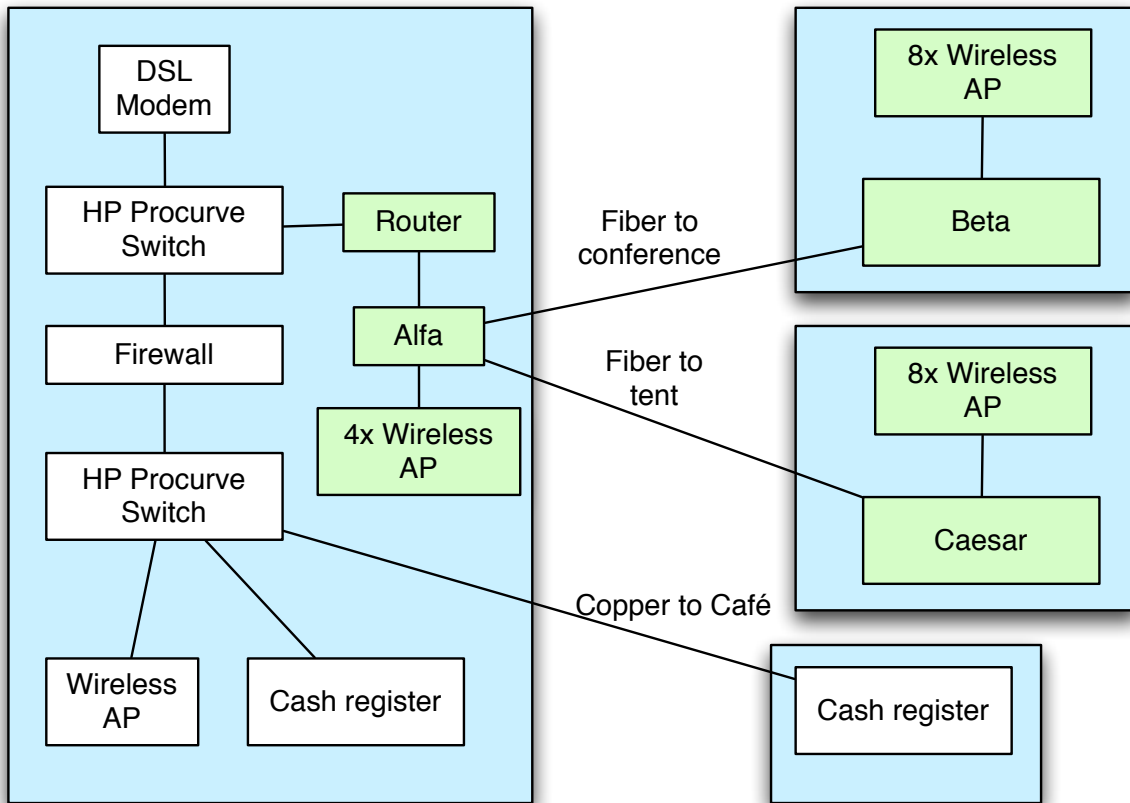
Fig 1: Network layout when SSWC arrived

Fig 2: The planned network layout, added gear in green

Very quickly we saw problems with the upstream connection. After 1200 seconds, the connection died. In fact, every 1200 seconds the connection died. When disconnecting and connecting the physical port, the problem went away. We first thought it might have been the interface on the router that had problems (when having things connected as in Fig 3), so we swapped the interfaces, replaced the HP switch on upstream of router with a VLAN in our switch, and did various things. We also saw it was really on the upstream interface of the new gear we had problems. We also found that shut/no shut on the interface solved the problem. Finally we ended up with what you see in Fig 4. The problem was though that we still saw problems every 1200 seconds.
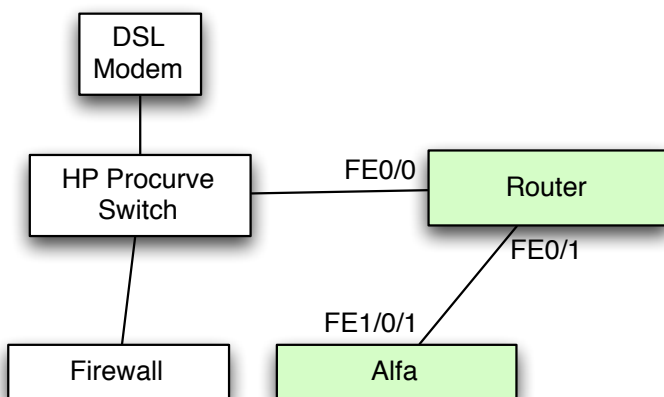

Fig 3: Original connections between switches and router

One of the problems was of course that after each try, we had to wait 1200 seconds to see whether the fix did solve the problems. So trying to find the issue took a very long time.
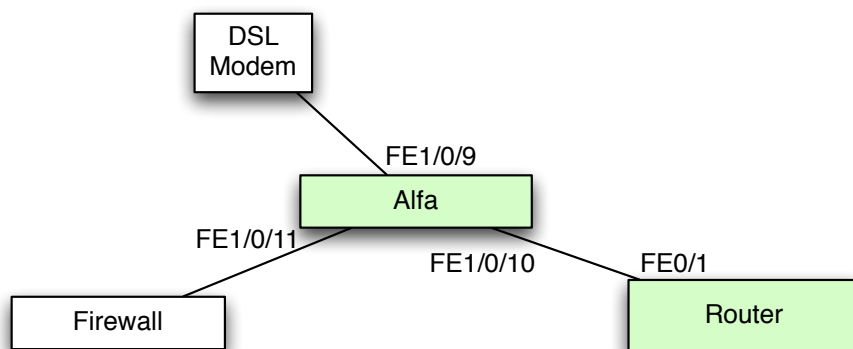

Fig 4: Final connections on VLAN200

Finally, we created a monitoring port on the switch on VLAN200, and connected a computer which we did tcpdump for 1200 seconds on. Later inspections of the pcap file showed that something happened at the shut/no shut that triggered us to do an arp request. Inspections of the arp caches in our get showed that we did not have any problems, but we definitely thought arp was the problem here.

After discussions with Netcomp we found out the upstream box was another procurve switch. We also had guarantees from Svenska Stadsnät that no problems existed in their network. Inspection on site of the upstream procurve switch did show that the arp cache did timeout after 1200 seconds, and no new arp was sent. Some use of google gave us the answer. When being under stress (like getting a /22 to route) the procurve under some circumstances would not reissue an arp request, and of course the default timeout of the arp cache was 20 minutes (1200 seconds). Netcomp increased the timeout to "infinite", and the problem was solved. After some 20 hours. **Do ensure that all involved gear, including upstream, can handle the load of traffic and addressing**

When having the router just configured on one of the interfaces on the switch, we decided to keep it that way. The switch alfa worked, was doing routing already, so we did not see any reason for changing that. We did though still want the router as we wanted to terminate an IPv6 tunnel in the router. The switch did not have that capability.

Of course the tunnel termination was not simple either. The router at Teleservice that was supposed to terminate the tunnel in the other end did run ios-xr did not have the same tunneling mechanism capabilities as the 2800 using ios. Teleservice did bring up a 6500 that was not in use and finally the tunnel came up when using ios in both ends of the tunnel.

For DNS and DHCP a server was supposed to be used that also could do monitoring of DHCP usage and bandwidth usage. Everything was configured beforehand in the lab. Unfortunately I did forget the computer at home when packing, so a quick reconfiguration of a MacBook Pro made it the new DHCP and DNS resolver. **Do bring some extra laptops, because you never know what you need them for.** The DHCP thanks to extensive use of DHCP relay between the various VLANs as you can see in the configurations, including the wireless controller. **Do bring a "real" DHCP server, because stability in DHCP is one of the key factors for a successful event.**

The wireless controller was at first not very easy to configure. Although it was configured to 99%, it was important to find the last 1% that was needed to get things going. One trick is to ensure the management interface as well as the AP management interface and the APs are all on the same VLAN, and that one use Layer-2 as the communication mechanism between APs and WLC. If one use layer 3 instead, the ap's must be configured how to find the WLC, via DHCP or what not, which is just more complicated. Because of this, we run a special VLAN for this management. Note, the actual traffic is not going in this VLAN, part from inside the tunnels between the APs and the WLC.

We did at this time see that the allocation of IP addresses was unfortunate. The WLC could only map one subnet to one VLAN and because of that one WLAN (i.e. one SSID). We had one /22 from which we had carved off some addresses for management and server VLANs. The actual network for the participants was because of that one /23 plus one /24. Easy to handle in a router (and the DHCP server), but not in the WLC. So we decided to only run with one /23 for the DHCP range for the clients. This was btw one of the things that made me most nervous. One do want long lease time for the clients, but on the other hand, one must have enough number of addresses in the pool. Next time I think I will ask for one network for the participants and one /24 for management etc. As it was now, lots of address space was wasted. And the /24 could possibly be allocated temporarily from the upstream ISP so no interaction with the RIR would be needed for that. **Do use public IP addresses for management, as you can get help from ninjas from outside.**

At this point in time, the network was up and running. The local DNS resolver was validating DNSSEC signed responses. We had public IPv6 and IPv4 addresses on the wireless network. You can find as an appendix the result of running Netalyzr on the network. But there are always fun things to do. We unfortunately only had time to do a few extensions. We added some APs to *The .SE Barn* and also one AP to a tent about 50 meters east of the conference center. The good thing with this tent was that it was surrounded by tents the participants had brought.

We also used physical ethernet split (run two two-pair connections over a 4-pair cable) to reach to the café building. There we could use the spare switch, and put up two extra AP, which was appreciated. We had an idea to extend the network even further south using a radio link, but lack of power injectors for the APs made us not do that project. **Do bring power injectors for whatever gear you serve via PoE, because you might not always have PoE available.**

All together I think this was the gear we used:

1 Cisco 2800 router
4 Cisco 3850 switches
1 Cisco 4402 Wireless controller
25 Cisco 1142 access points
2 Apple MacBook Pro
1 100 meter long fiber patch
about 12 SC/LC converter patches with connectors
about 8 SFPs of various kinds
about 25 20 meter long pre-made ethernet cable
around 10 1 meter long ethernet cables
around 12 rolls of duct tape
lots and lots of cable ties
250 meter ethernet cable with various RJ45 connectors etc
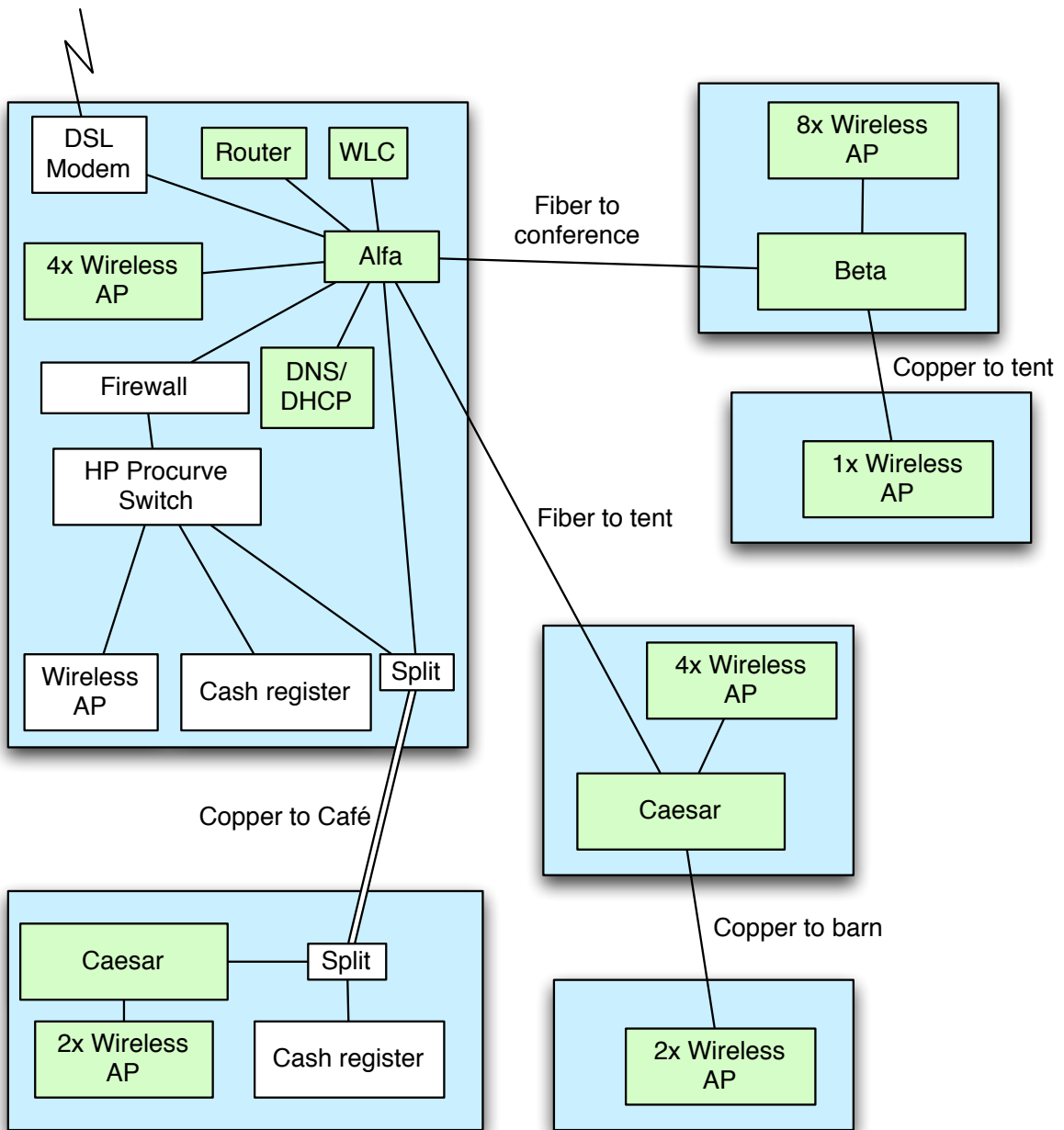100 meter wire with various hardware attached to it (turnbuckles etc)

Fig 5: The final network layout

Appendix A: Configuration Router

```
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname router
!
boot-start-marker
boot-end-marker
!
logging message-counter syslog
logging buffered 65500
no logging console
!
no aaa new-model
!
dot11 syslog
ip source-route
!
ip cef
!
no ip domain lookup
ip domain name sswc.frobbit.se
ipv6 unicast-routing
ipv6 cef
!
multilink bundle-name authenticated
!
voice-card 0
!
username sswc privilege 15 secret 5 $1$FdRK$x23S6xwkm.oXWVb8wxmJf/
archive
 log config
  hidekeys
!
ip ssh version 2
!
interface Tunnel1
 no ip address
 ipv6 address 2a02:80:0:10::2/64
 tunnel source 91.231.0.7
 tunnel destination 85.30.128.122
!
interface FastEthernet0/0
 description "To server network, VLAN 10"
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface FastEthernet0/1
 description "To Internal Network"
 no ip address
 logging event subif-link-status
 duplex auto
 speed auto
!
interface FastEthernet0/1.10
 description "Server Network"
 encapsulation dot1Q 10
```

```
  ip address 91.231.0.7 255.255.255.224
 no ip redirects
 no ip unreachables
!
interface FastEthernet0/1.100
 encapsulation dot1Q 100
 no ip redirects
 no ip unreachables
!
interface FastEthernet0/1.101
 encapsulation dot1Q 101
 no ip redirects
 no ip unreachables
!
interface FastEthernet0/1.102
 encapsulation dot1Q 102
 no ip redirects
 no ip unreachables
!
interface FastEthernet0/1.103
 encapsulation dot1Q 103
 no ip redirects
 no ip unreachables
 ipv6 address 2a02:80:0:11::1/64
 ipv6 nd prefix 2a02:80:0:11::/64
!
interface FastEthernet0/1.110
 encapsulation dot1Q 110
 no ip redirects
 no ip unreachables
!
ip forward-protocol nd
ip route 0.0.0.0 0.0.0.0 91.231.0.1
no ip http server
no ip http secure-server
!
ipv6 route ::/0 2a02:80:0:10::1
!
snmp-server community SSWC2011ro RO
snmp-server location SSWC2011
snmp-server contact paf@frobbit.se
!
control-plane
!
mgcp fax t38 ecm
!
line con 0
 login local
line aux 0
line vty 0 4
 login local
line vty 5 15
 login local
!
scheduler allocate 20000 1000
ntp maxdistance 1
ntp server 192.36.134.17
end
```

Appendix B: Configuration Alfa

```
!
version 12.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service unsupported-transceiver
!
hostname Alpha
!
boot-start-marker
boot-end-marker
!
username sswc privilege 15 secret 5 $1$FdRK$x23S6xwkm.oXWVb8wxmJf/
!
no aaa new-model
clock timezone MET 1
clock summer-time MET-DST recurring last Sun Mar 2:00 last Sun Oct 2:00
switch 1 provision ws-c3750-48p
system mtu routing 1500
vtp domain sswc
vtp mode transparent
ip routing
ip arp gratuitous local
ip domain-name alpha.sswc.frobbit.se
!
mls qos
!
no errdisable detect cause gbic-invalid
!
spanning-tree mode pvst
spanning-tree extend system-id
no spanning-tree vlan 1-4094
!
vlan internal allocation policy ascending
!
vlan 10
 name srv-lan
!
vlan 100
 name sw-mgmt
!
vlan 101
 name inet-wired
!
vlan 102
 name inet-wireless
!
vlan 103
 name inet-wireless2
!
vlan 110
 name wlc
!
vlan 200
 name netcomp
!
interface FastEthernet1/0/1
 description "To Router"
 switchport trunk encapsulation dot1q
 switchport mode trunk
```

```
!
interface FastEthernet1/0/2
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/3
 description "To FreeBSD Server"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/4
 description "To Servers"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/5
 description "To Servers"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/6
 description "To Servers"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/7
 description "To Servers"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/8
 description "To Servers"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/9
 description "Upstream Interface Towards NetComp"
 switchport access vlan 200
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/10
 description "Netcomp"
 switchport access vlan 200
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/11
 description "Netcomp"
 switchport access vlan 200
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/12
 description "Netcomp"
 switchport access vlan 200
```

```
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/13
!
interface FastEthernet1/0/14
!
interface FastEthernet1/0/15
!
interface FastEthernet1/0/16
 description "To WLC"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/17
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/18
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/19
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/20
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/21
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/22
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/23
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/24
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
```

```
interface FastEthernet1/0/25
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/26
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/27
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/28
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/29
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/30
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/31
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/32
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet1/0/33
 description "Sniffing port for NetComp"
 switchport access vlan 200
!
interface FastEthernet1/0/34
!
interface FastEthernet1/0/35
!
interface FastEthernet1/0/36
!
interface FastEthernet1/0/37
!
interface FastEthernet1/0/38
!
interface FastEthernet1/0/39
```

```
!
interface FastEthernet1/0/40
!
interface FastEthernet1/0/41
!
interface FastEthernet1/0/42
!
interface FastEthernet1/0/43
!
interface FastEthernet1/0/44
!
interface FastEthernet1/0/45
 description "To Access Switches"
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport nonegotiate
 storm-control broadcast level pps 550
 storm-control multicast level pps 1.5k
!
interface FastEthernet1/0/46
 description "To Access Switches"
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport nonegotiate
 storm-control broadcast level pps 550
 storm-control multicast level pps 1.5k
!
interface FastEthernet1/0/47
 description "To Access Switches"
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport nonegotiate
 storm-control broadcast level pps 550
 storm-control multicast level pps 1.5k
!
interface FastEthernet1/0/48
 description "To Access Switches"
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport nonegotiate
 storm-control broadcast level pps 550
 storm-control multicast level pps 1.5k
!
interface GigabitEthernet1/0/1
 description "To Access Switches"
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport nonegotiate
 storm-control broadcast level pps 550
 storm-control multicast level pps 1.5k
!
interface GigabitEthernet1/0/2
 description "To Access Switches"
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport nonegotiate
 storm-control broadcast level pps 550
 storm-control multicast level pps 1.5k
!
interface GigabitEthernet1/0/3
 description "To Access Switches"
 switchport trunk encapsulation dot1q
 switchport mode trunk
```

```
  switchport nonegotiate
  storm-control broadcast level pps 550
  storm-control multicast level pps 1.5k
 !
 interface GigabitEthernet1/0/4
  description "To WLC"
  switchport trunk encapsulation dot1q
  switchport mode trunk
  switchport nonegotiate
  storm-control broadcast level pps 550
  storm-control multicast level pps 1.5k
 !
 interface Vlan1
  no ip address
  shutdown
 !
 interface Vlan10
  description "Server Network"
  ip address 91.231.0.1 255.255.255.224
  no ip redirects
  no ip unreachables
 !
 interface Vlan100
  ip address 192.168.100.1 255.255.255.0
  no ip redirects
  no ip unreachables
 !
 interface Vlan101
  ip address 91.231.0.129 255.255.255.128
  ip helper-address 91.231.0.10
  no ip redirects
  no ip unreachables
 !
 interface Vlan102
  ip address 91.231.1.1 255.255.255.0
  ip helper-address 91.231.0.10
  no ip redirects
  no ip unreachables
 !
 interface Vlan103
  ip address 91.231.2.1 255.255.254.0
  ip helper-address 91.231.0.10
  no ip redirects
  no ip unreachables
 !
 interface Vlan110
  ip address 192.168.110.1 255.255.255.0
  ip helper-address 91.231.0.10
  no ip redirects
  no ip unreachables
 !
 interface Vlan200
  description "To NetComp / Internet"
  ip address 195.84.66.187 255.255.255.224
  no ip redirects
  no ip unreachables
 !
 ip classless
 ip route 0.0.0.0 0.0.0.0 195.84.66.161
 no ip http server
 no ip http secure-server
 !
 ip sla 5
```

```
   icmp-echo 195.84.66.161
   timeout 100
   frequency 2
ip sla schedule 5 life forever start-time now
ip sla enable reaction-alerts
arp 195.84.66.161 0018.71a5.4400 ARPA
!
snmp-server community SSWC2011ro RO
snmp-server location SSWC2011
snmp-server contact paf@frobbit.se
!
line con 0
 login local
line vty 0 4
 login local
line vty 5 15
 login local
!
monitor session 1 source interface Fa1/0/9
monitor session 1 destination interface Fa1/0/33
ntp clock-period 36029523
ntp server 192.36.144.22
ntp server 192.36.133.17
ntp server 192.36.134.17
event manager applet SLAtimeout
 event snmp oid 1.3.6.1.4.1.9.9.42.1.2.9.1.6.5 get-type exact entry-op eq
entry-val "1" exit-op eq exit-val "2" poll-interval 5
 action 1.0 syslog msg "Ping to default route failed"
!
end
```

Note that there is a line break inserted on line starting with "`event snmp oid`" because the page width is not wide enough to display the whole line that ends with "`poll-interval 5`".

Appendix C: Configuration Bravo (Charlie and Delta are based on this)

```
!
Current configuration : 16798 bytes
!
version 12.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service unsupported-transceiver
!
hostname Bravo
!
boot-start-marker
boot-end-marker
!
username sswc privilege 15 secret 5 $1$FdRK$x23S6xwkm.oXWVb8wxmJf/
!
no aaa new-model
switch 1 provision ws-c3750-48p
system mtu routing 1500
vtp domain sswc
vtp mode transparent
ip domain-name beta.sswc.frobbit.se
!
crypto pki trustpoint TP-self-signed-236614528
 enrollment selfsigned
 subject-name cn=IOS-Self-Signed-Certificate-236614528
 revocation-check none
 rsakeypair TP-self-signed-236614528
!
crypto pki certificate chain TP-self-signed-236614528
 certificate self-signed 01
  3082023D 308201A6 A0030201 02020101 300D0609 2A864886 F70D0101 04050030
  30312E30 2C060355 04031325 494F532D 53656C66 2D536967 6E65642D 43657274
  69666963 6174652D 32333636 31343532 38301E17 0D393330 33303130 30303135
  345A170D 32303031 30313030 30303030 5A303031 2E302C06 03550403 1325494F
  532D5365 6C662D53 69676E65 642D4365 72746966 69636174 652D3233 36363134
  35323830 819F300D 06092A86 4886F70D 01010105 0003818D 00308189 02818100
  C992C965 053842D3 9DEB036B AE600A0D FC9BA3DC 74A45CAA F844CAD4 BAE57137
  3F2F12DE 66EF5C8B D2958E30 B4FF67A3 96190499 C47DEF34 B0A14B0B 62A239C9
  6A82DCDB 8823DFDC 66226EA9 EF6ACF9F 9DF23EA1 58636B50 1F08CF39 CBD87228
  656CD015 AB070DF1 3AF7F55F 366D0AF6 8833ACA6 90668029 E0734935 B392D2C9
  02030100 01A36730 65300F06 03551D13 0101FF04 05300301 01FF3012 0603551D
  11040B30 09820753 77697463 682E301F 0603551D 23041830 16801467 63B4A328
  BD35441F 9FCA3DB7 E383890F 82A5E930 1D060355 1D0E0416 04146763 B4A328BD
  35441F9F CA3DB7E3 83890F82 A5E9300D 06092A86 4886F70D 01010405 00038181
  0045CF74 55738A72 3120ACE4 00482F2F 0CE8EF14 FF0010BF 4472FC7F 2311B482
  781A70D6 4E9BBF44 5D6C4E45 243F0B96 816E2B14 62ACC82F 2D0AA9D0 F15A82CC
  6B978103 D7E693A8 7CB0DCC6 964A2F4B 3E5455F7 2B62A7E9 E3BB4B85 0CF11B1E
  58323DC1 7D6652FA D1F6CD54 A7D65D05 CEB28165 E77186BC 0B24CAE1 5CE6BF11 67
  quit
!
spanning-tree mode pvst
spanning-tree extend system-id
no spanning-tree vlan 1-4094
!
vlan internal allocation policy ascending
!
vlan 10
 name srv-lan
!
```

```
vlan 100
 name sw-mgmt
!
vlan 101
 name inet-wired
!
vlan 102
 name inet-wireless
!
vlan 103
 name inet-wireless2
!
vlan 110
 name wlc
!
vlan 200
 name netcomp
!
interface FastEthernet1/0/1
 description "To Servers"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/2
 description "To Servers"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/3
 description "To Servers"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/4
 description "To Servers"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/5
 description "To Servers"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
```

```
interface FastEthernet1/0/6
 description "To Servers"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/7
 description "To Servers"
 switchport access vlan 10
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/8
 description "Wired Connections"
 switchport access vlan 101
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/9
 description "Wired Connections"
 switchport access vlan 101
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/10
 description "Wired Connections"
 switchport access vlan 101
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/11
 description "Wired Connections"
 switchport access vlan 101
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/12
 description "Wired Connections"
 switchport access vlan 101
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
```

```
interface FastEthernet1/0/13
 description "Wired Connections"
 switchport access vlan 101
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/14
 description "Wired Connections"
 switchport access vlan 101
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/15
 description "Wired Connections"
 switchport access vlan 101
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/16
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/17
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/18
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/19
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
```

```
interface FastEthernet1/0/20
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/21
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/22
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/23
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/24
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/25
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/26
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
```

```
interface FastEthernet1/0/27
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/28
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/29
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/30
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/31
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/32
 description "WLAN AP"
 switchport access vlan 110
 switchport mode access
 switchport nonegotiate
 storm-control broadcast level pps 150
 storm-control multicast level pps 1.5k
 spanning-tree bpdufilter enable
!
interface FastEthernet1/0/33
!
interface FastEthernet1/0/34
!
interface FastEthernet1/0/35
!
interface FastEthernet1/0/36
!
interface FastEthernet1/0/37
```

```
!
interface FastEthernet1/0/38
!
interface FastEthernet1/0/39
!
interface FastEthernet1/0/40
!
interface FastEthernet1/0/41
!
interface FastEthernet1/0/42
!
interface FastEthernet1/0/43
!
interface FastEthernet1/0/44
!
interface FastEthernet1/0/45
!
interface FastEthernet1/0/46
!
interface FastEthernet1/0/47
!
interface FastEthernet1/0/48
 description "Upstream to Alpha"
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport nonegotiate
!
interface GigabitEthernet1/0/1
 description "Upstream to Alpha"
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport nonegotiate
!
interface GigabitEthernet1/0/2
 description "Upstream to Alpha"
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport nonegotiate
!
interface GigabitEthernet1/0/3
 description "Upstream to Alpha"
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport nonegotiate
!
interface GigabitEthernet1/0/4
 description "Upstream to Alpha"
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport nonegotiate
!
interface Vlan1
 no ip address
 shutdown
!
interface Vlan10
 description "Server Network"
 ip address 91.231.0.3 255.255.255.224
 no ip redirects
 no ip unreachables
!
interface Vlan110
 no ip address
```

```
!
ip default-gateway 91.231.0.1
ip classless
no ip http server
no ip http secure-server
!
ip sla enable reaction-alerts
!
snmp-server community SSWC2011ro RO
snmp-server location SSWC2011
snmp-server contact paf@frobbit.se
!
line con 0
 login local
line vty 0 4
 login local
line vty 5 15
 login local
!
end
```

Appendix D: Result Bredbandskollen

.se | bredbandskollen TPTEST

TA EMOT FILER: **7.38 Mbit/s** | SKICKA FILER: **7.33 Mbit/s**

SVARSTID: 23 ms, LEVERANTÖR: Out of the Box, MÄTSERVER: Sundsvall

Appendix D: Result Bredbandskollen

Appendix E: Interface configuration on WLC

Interface Name	VLAN Identifier	IP Address	Interface Type	Dynamic AP Management	
ap-manager	110	192.168.110.11	Static	Enabled	
client101	101	91.231.0.130	Dynamic	Disabled	▾
client102	102	91.231.1.2	Dynamic	Disabled	▾
client103	103	91.231.2.2	Dynamic	Disabled	▾
management	110	192.168.110.10	Static	Not Supported	
server010	10	91.231.0.6	Dynamic	Disabled	▾
service-port	N/A	192.168.1.1	Static	Not Supported	
virtual	N/A	1.1.1.1	Static	Not Supported	

Appendix E: Interface configuration on WLC

Appendix F: Netalyzr result of checking the network

The ICSI Netalyzr

Start » Analysis » **Results**

Result Summary +/– (help)

91.231.2.61

Recorded at 23:47 PDT (06:47 UTC next day), Aug 13 2011. Permalink. Client/server transcript.

### Summary of Noteworthy Events –

Minor Aberrations

- Certain TCP protocols are blocked in outbound traffic ↓

Address-based Tests –

NAT detection (?): No NAT Detected

Your global IP address is 91.231.2.61 and matches your local one. You are not behind a NAT.

Your machine numbers TCP source ports sequentially. The following graph shows connection attempts on the X-axis and their corresponding source ports used by your computer on the Y-axis.
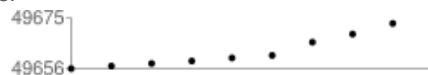
TCP ports are not renumbered by the network.

Local Network Interfaces (?): OK

Your computer reports the following network interfaces, with the following IP addresses for each one:

- en0: (an ethernet interface)
  - 2a02:80:0:11:60c:ceff:fe1f:f1dc (probably a public IPv6 address)
  - fe80::60c:ceff:fe1f:f1dc [air.local] (a link-local IPv6 address)
  - 91.231.2.61 (a public IPv4 address)
- lo0: (a local loopback interface)
  - fd2f:b83c:88f4:1011:60c:ceff:fe1f:f1dc (a private IPv6 address)
  - fe80::1 (a link-local IPv6 address)
  - ::1 [localhost] (an IPv6 loopback address)
  - 127.0.0.1 [localhost] (an IPv4 loopback address)
- utun0:
  - fd00:6587:52d7:f8f5:60c:ceff:fe1f:f1dc (a private IPv6 address)
  - fe80::60c:ceff:fe1f:f1dc [air.local] (a link-local IPv6 address)

DNS-based host information (?): OK

You are not a Tor exit node for HTTP traffic.

You are not listed on any Spamhaus blacklists.

The SORBS DUHL believes you are using a statically assigned IP address.

Reachability Tests –

TCP connectivity (?): Note

Direct TCP access to remote FTP servers (port 21) is allowed.

Direct TCP access to remote SSH servers (port 22) is allowed.

Direct TCP access to remote SMTP servers (port 25) is allowed.

Direct TCP access to remote DNS servers (port 53) is allowed.

Direct TCP access to remote HTTP servers (port 80) is allowed.

Direct TCP access to remote POP3 servers (port 110) is allowed.

Direct TCP access to remote RPC servers (port 135) is blocked.
This is probably for security reasons, as this protocol is generally not designed for use outside the local network.

Direct TCP access to remote NetBIOS servers (port 139) is allowed.

Direct TCP access to remote IMAP servers (port 143) is allowed.

Direct TCP access to remote SNMP servers (port 161) is allowed.

Direct TCP access to remote HTTPS servers (port 443) is allowed.

Direct TCP access to remote SMB servers (port 445) is blocked.
This is probably for security reasons, as this protocol is generally not designed for use outside the local network.

Direct TCP access to remote SMTP/SSL servers (port 465) is allowed.

Direct TCP access to remote secure IMAP servers (port 585) is allowed.

Direct TCP access to remote authenticated SMTP servers (port 587) is allowed.

Direct TCP access to remote IMAP/SSL servers (port 993) is allowed.

Direct TCP access to remote POP/SSL servers (port 995) is allowed.

Direct TCP access to remote OpenVPN servers (port 1194) is allowed.

Direct TCP access to remote PPTP Control servers (port 1723) is allowed.

Direct TCP access to remote SIP servers (port 5060) is allowed.

Direct TCP access to remote BitTorrent servers (port 6881) is allowed.

Direct TCP access to remote TOR servers (port 9001) is allowed.

UDP connectivity (?): OK

Basic UDP access is available.
The applet was able to send fragmented UDP traffic.
The applet was able to receive fragmented UDP traffic.

Direct UDP access to remote DNS servers (port 53) is allowed.

Direct UDP access to remote NTP servers (port 123) is allowed.

Direct UDP access to remote OpenVPN servers (port 1194) is allowed.

Direct UDP access to remote MSSQL servers (port 1434) is allowed.

Traceroute (?): OK

It takes 12 network hops for traffic to pass from our server to your system, as shown below. For each hop, the time it takes to traverse it is shown in parentheses.

1. 10.254.184.2 (0 ms)
2. ip-10-1-6-1.ec2.internal (0 ms)
3. ip-10-1-2-130.ec2.internal (0 ms)
4. 216.182.232.64 (0 ms)
5. 216.182.232.48 (0 ms)
6. 72.21.222.148 (0 ms)
7. 72.21.220.132 (1 ms)
8. 64.211.194.153 (0 ms)
9. TDC-TeleDenmark-New-York.TenGigabitEthernet2-3.ar4.NYC1.gblx.net (100 ms)
10. po3-40G.ar4.NYC1.gblx.net (6 ms)
11. static-195.84.9.226.addr.tdcsong.se (112 ms)
12. *

Path MTU (?): OK

The path between your network and our system supports an MTU of at least 1500 bytes, and the path between our system and your network has an MTU of 1500 bytes.

Network Access Link Properties –

Network latency measurements (?): Latency: 120ms Loss: 1.0%

The round-trip time (RTT) between your computer and our server is 120 msec, which is good.

We recorded a packet loss of 1.0%. This loss rate is within the range commonly encountered and not usually inducing significant performance problems. Of the packet loss, at least 1.0% of the packets appear to have been lost on the path from your computer to our servers.

TCP connection setup latency (?): 190ms

The time it takes your computer to set up a TCP connection with our server is 190 msec, which is good.

Network background health measurement (?): no transient outages

During most of Netalyzr's execution, the applet continuously measures the state of the network in the background, looking for short outages. During testing, the applet observed no such outages.

Network bandwidth measurements (?): Upload 7.8 Mbit/sec, Download 7.5 Mbit/sec

Your Uplink: We measured your uplink's sending bandwidth at 7.8 Mbit/sec. This level of bandwidth works well for many users.
During this test, the applet observed 7 reordered packets.

Your Downlink: We measured your downlink's receiving bandwidth at 7.5 Mbit/sec. This level of bandwidth works well for many users.

Network buffer measurements (?): Uplink 160 ms, Downlink 160 ms

We estimate your uplink as having 160 msec of buffering. This level may serve well for maximizing speed while minimizing the impact of large transfers on other traffic.

We estimate your downlink as having 160 msec of buffering. This level may serve well for maximizing speed while minimizing the impact of large transfers on other traffic.

HTTP Tests –

Address-based HTTP proxy detection (?): OK

We detected no explicit sign of HTTP proxy via IP address changes.

Content-based HTTP proxy detection (?): OK

No HTTP header or content changes hint at the presence of a proxy.

HTTP proxy detection via malformed requests (?): OK

Deliberately malformed HTTP requests arrive at our server unchanged. We are not able to detect a proxy along the path to our server using this method.

Filetype-based filtering (?): OK

We did not detect file-content filtering.

HTTP caching behavior (?): OK

We detected no signs of a transparent HTTP cache in your network path.

JavaScript-based tests (?): OK

The applet did not execute within a frame.

Your web browser reports the following cookies for our web page:

- netAlizEd = BaR (set by our server)
- netalyzrStatus = running (set by our server)

Your web browser is able to fetch an image using IPv6. Your network is IPv6 enabled.

DNS Tests −

Restricted domain DNS lookup (?): OK

We can successfully look up a name which resolves to the same IP address as our webserver. This means we are able to conduct many of the tests on your DNS server.

Unrestricted domain DNS lookup (?): OK

We can successfully look up arbitrary names from within the Java applet. This means we are able to conduct all test on your DNS server.

Direct DNS support (?): OK

All tested DNS types were received OK.

Direct EDNS support (?): OK

EDNS-enabled requests for small responses are answered successfully.

EDNS-enabled requests for medium-sized responses are answered successfully.

EDNS-enabled requests for large responses are answered successfully.

DNS resolver address (?): OK

The IP address of your ISP's DNS Resolver is 91.231.0.10, which does not resolve.

DNS resolver properties (?): Lookup latency 200ms

Your ISP's DNS resolver requires 200 msec to conduct an external lookup. It takes 190 msec for your ISP's DNS resolver to lookup a name on our server.

Your resolver correctly uses TCP requests when necessary.

Your resolver is using QTYPE=A for default queries.

Your host or resolver also performs IPv6 queries in addition to IPv4 queries.

Your DNS resolver requests DNSSEC records.

Your DNS resolver advertises the ability to accept DNS packets of up to 4096 bytes.

Your DNS resolver can successfully receive a smaller (~1400 byte) DNS response.

Your DNS resolver can successfully receive a large (>1500 byte) DNS response.

Your DNS resolver can successfully accept large responses.

Your resolver does not use 0x20 randomization, but will pass names in a case-sensitive manner.

Your ISP's DNS server cannot use IPv6.

No transport problems were discovered which could affect the deployment of DNSSEC.

Direct probing of DNS resolvers (?)

Your system is configured to use 1 DNS resolver(s).

The resolver at 91.231.0.10 can process all tested types. It validates DNSSEC. It does not wildcard NXDOMAIN errors. The resolver reports the following properties:

- Hostname: beef.local
- Version: 9.7.3-P3
- Authors: James Brister, Ben Cottrell, Michael Graff, Andreas Gustafsson, Bob Halley, Evan Hunt, JINMEI Tatuya, David Lawrence, Danny Mayer, Damien Neil, Matt Nelson, Jeremy C. Reed, Michael Sawyer, Brian Wellington, Mark Andrews

DNS glue policy (?): OK

Your ISP's DNS resolver does not accept generic additional (glue) records — good.

Your ISP's DNS resolver does not accept additional (glue) records which correspond to nameservers.

Your ISP's DNS resolver does not follow CNAMEs.

DNS resolver port randomization (?): OK

Your ISP's DNS resolver properly randomizes its local port number.
The following graph shows DNS requests on the x-axis and the detected source ports on the y-axis.
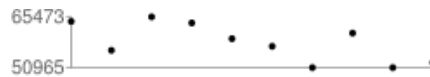
DNS lookups of popular domains (?): OK

79 of 79 popular names were resolved successfully. Show all names.

13 popular names have a mild anomaly. The ownership suggested by the reverse name lookup does not match our understanding of the original name. The most likely cause is the site's use of a Content Delivery Network. Show all names.

2 popular names have a mild anomaly: we are unable to find a reverse name associated with the IP address provided by your ISP's DNS server. This is most likely due to a slow responding DNS server or misconfiguration on the part of the domain owner. Show all names.

DNS external proxy (?): OK

Your host ignores external DNS requests.

DNS results wildcarding (?): OK

Your ISP correctly leaves non-resolving names untouched.

DNS-level redirection of specific sites (?): OK

Your ISP does not appear to be using DNS to redirect traffic for specific websites.

IPv6 Tests —

DNS support for IPv6 (?): OK

Your system can successfully look up IPv6 addresses. Your DNS resolver is not on Google's IPv6 "whitelist", which means that Google does not enable IPv6 access to their services for you.

IPv4, IPv6, and your web browser (?): OK

Your browser successfully fetched a test image from our IPv6 server. Your browser prefers IPv6 over IPv4.

IPv6 connectivity (?): OK

Your host was able to contact our IPv6 test server successfully. The requests originated from 2a02:80:0:11:60c:ceff:fe1f:f1dc.

It takes 268 ms for your computer to fetch a response from our test server using IPv6, while it takes 228 ms for the same host to fetch a response using IPv4 from the same server.

IPv6 TCP connectivity (?): OK

Direct TCP access to remote FTP servers (port 21) is allowed.

Direct TCP access to remote SSH servers (port 22) is allowed.

Direct TCP access to remote SMTP servers (port 25) is allowed.

Direct TCP access to remote POP3 servers (port 110) is allowed.

Direct TCP access to remote RPC servers (port 135) is allowed.

Direct TCP access to remote NetBIOS servers (port 139) is allowed.

Direct TCP access to remote IMAP servers (port 143) is allowed.

Direct TCP access to remote SNMP servers (port 161) is allowed.

Direct TCP access to remote HTTPS servers (port 443) is allowed.

Direct TCP access to remote SMB servers (port 445) is allowed.

Direct TCP access to remote SMTP/SSL servers (port 465) is allowed.

Direct TCP access to remote secure IMAP servers (port 585) is allowed.

Direct TCP access to remote authenticated SMTP servers (port 587) is allowed.

Direct TCP access to remote IMAP/SSL servers (port 993) is allowed.

Direct TCP access to remote POP/SSL servers (port 995) is allowed.

Direct TCP access to remote OpenVPN servers (port 1194) is allowed.

Direct TCP access to remote PPTP Control servers (port 1723) is allowed.

Direct TCP access to remote SIP servers (port 5060) is allowed.

Direct TCP access to remote BitTorrent servers (port 6881) is allowed.

Direct TCP access to remote TOR servers (port 9001) is allowed.

IPv6 Path MTU (?): OK

Your system can send and receive fragmented traffic with IPv6.
The path between your network and our system supports an MTU of at least 1472 bytes.
The path between our system and your network has an MTU of 1476 bytes. The bottleneck is at IP address 2a02:80:0:f::2.

IPv6 Traceroute (?): OK

It takes 18 network hops for IPv6 traffic to pass from our IPv6 server to your system, as shown below. For each hop, the time it takes to traverse it is shown in parentheses.

1. 2607:f740:b::1 (0 ms)
2. 2607:f108:300::6 (0 ms)
3. 2001:1900:4:2::29d (0 ms)
4. vl-60.car2.Washington1.Level3.net (1 ms)
5. vl-4061.car1.NewYork2.Level3.net (164 ms)
6. vl-4041.car1.NewYork1.Level3.net (16 ms)
7. *
8. *
9. *
10. vl-52.car2.Amsterdam1.Level3.net (84 ms)
11. Swipenet-level3-1x10g.Amsterdam.Level3.net (87 ms)
12. ams-core-1.bundle-ether1.tele2.net (88 ms)
13. gbg-core-1.pos8-0-0.tele2.net (119 ms)
14. lim-core-2.tengige0-0-0-2.tele2.net (125 ms)
15. lim-core-1.tengigabiteth9-0.tele2.net (122 ms)
16. 2a00:800:752:10::3:2 (120 ms)
17. 2a02:80:0:f::2 (119 ms)
18. 2a02:80:0:10::2 (129 ms)

It takes 8 network hops for traffic to pass from the same server to your system over IPv4, as shown below. For each hop, the time it takes to traverse it is shown in parentheses.

1. gateway-1-iad2.vr.org (0 ms)
2. cr1.iad1.inforelay.net (117 ms)
3. 216.151.186.221 (1 ms)
4. 216.151.179.142 (1 ms)
5. te1-2.ashbnxc7.us.ip.tdc.net (1 ms)
6. *
7. static-195.84.9.226.addr.tdcsong.se (106 ms)

8. static-195.84.66.187.addr.tdcsong.se (107 ms)

Host Properties –

System clock accuracy (?): OK

Your computer's clock agrees with our server's clock.

Browser properties (?): OK

Your web browser sends the following parameters to all web sites you visit:

- User Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8) AppleWebKit/534.50 (KHTML, like Gecko) Version/5.1 Safari/534.50
- Accept: text/html,application/xhtml+xml,application/xml; q=0.9,*/*; q=0.8
- Accept Language: en-us
- Accept Encoding: gzip, deflate
- Accept Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7

Java identifies your operating system as Mac OS X.

Uploaded data (?): OK

The applet uploaded the following additional content:

- apache_404
- custom_404
- plain_404
- raw_http_content

Feedback

No feedback was reported for this session.

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