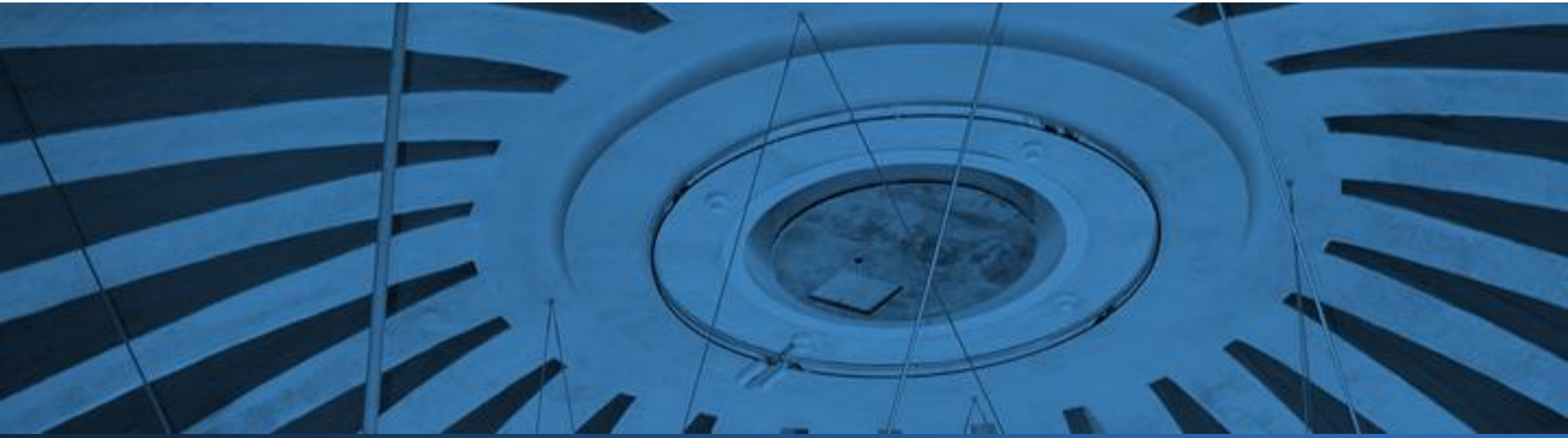
ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

ICT-Networks

IPv6 at ETH Zurich

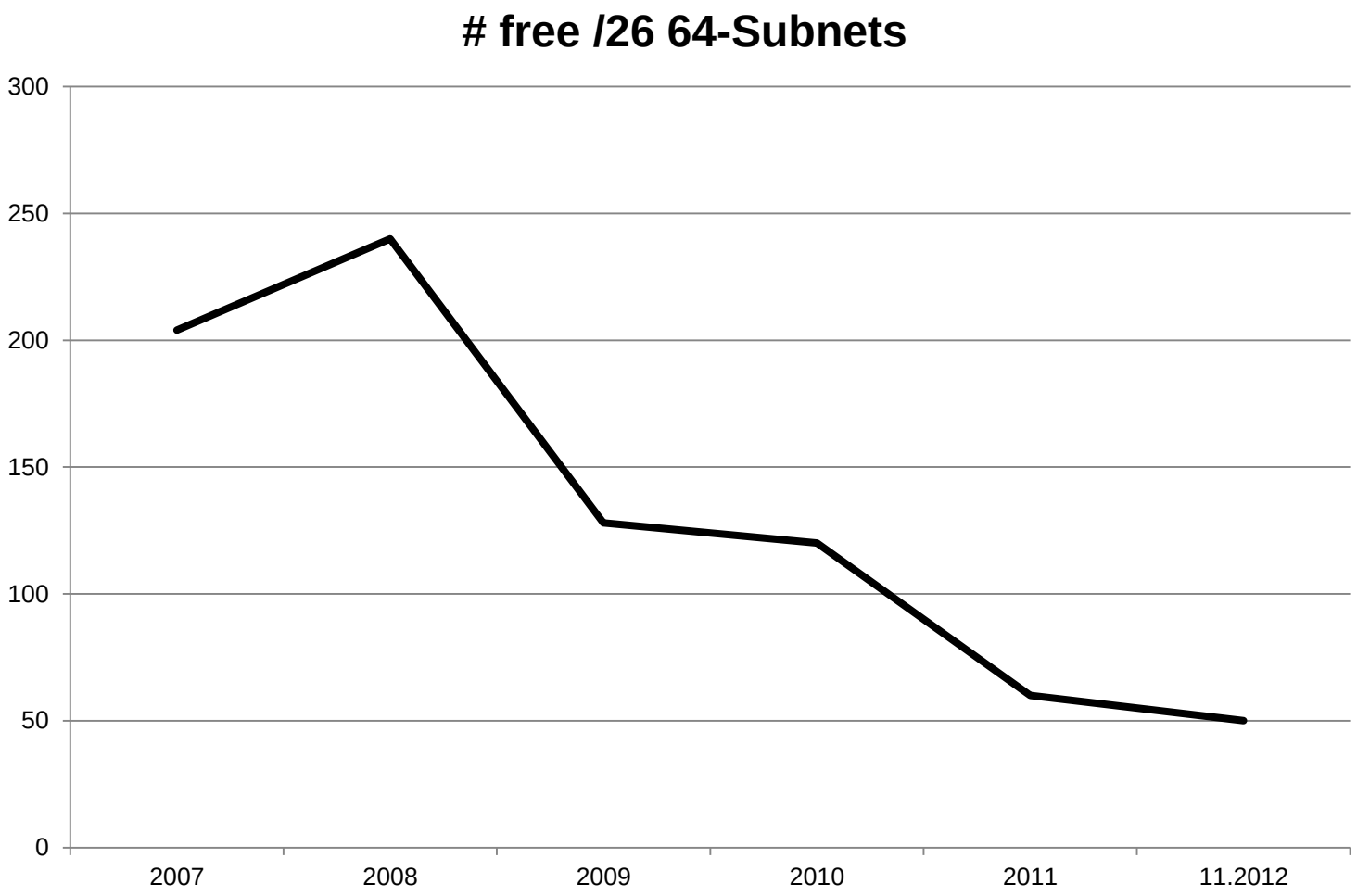
Armin Wittmann



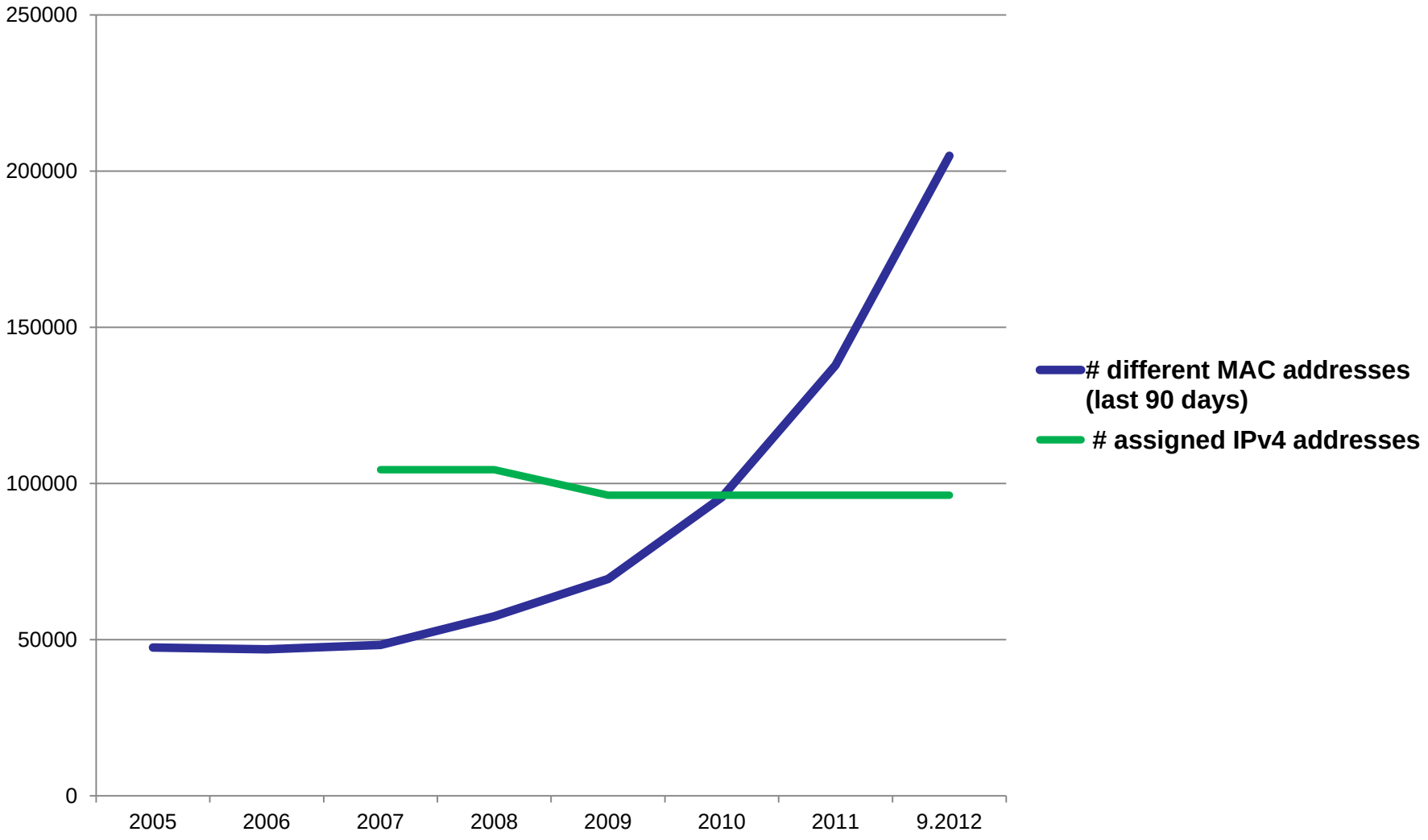
Agenda

- **IPv4 usage at ETH Zurich**
- **Changing IPv6 range before rollout**
- **Roadmap**

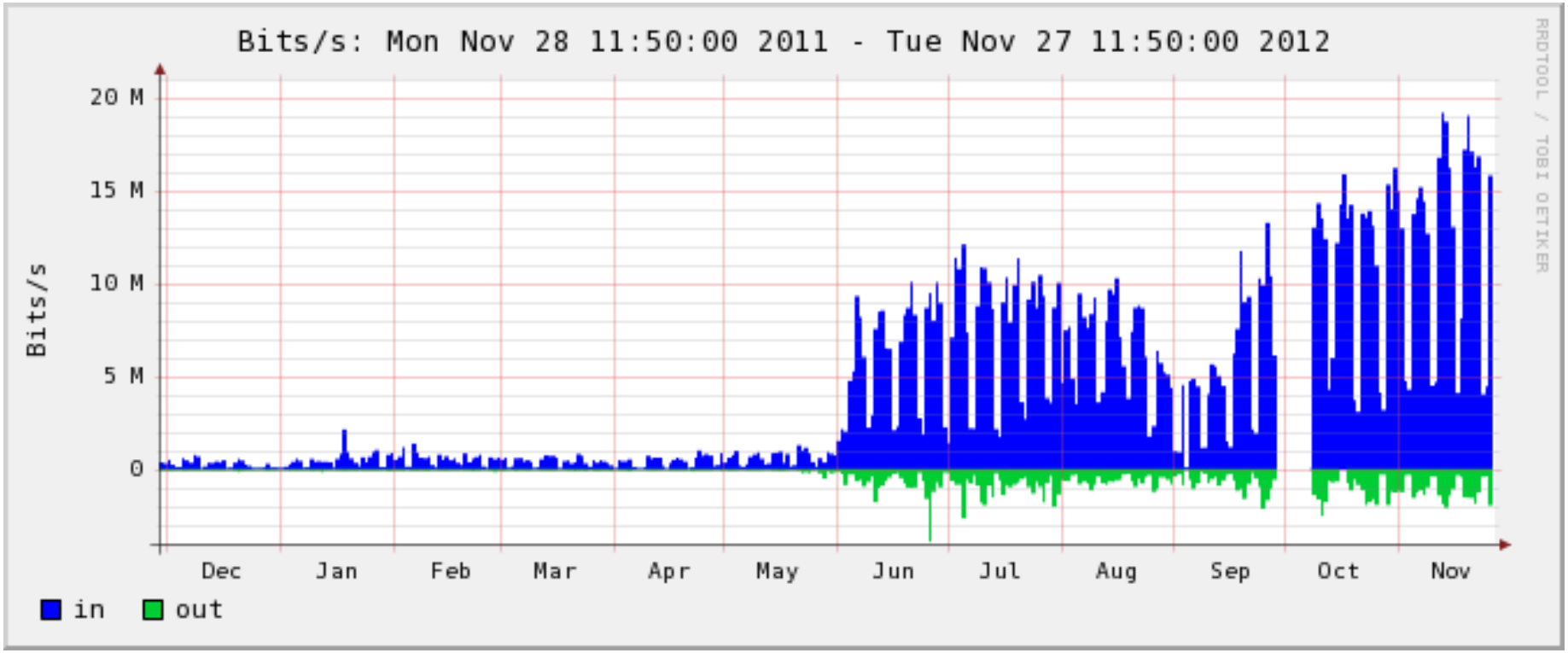
IPv4: free 64 (/26) subnets



devices detected last 90 days vs. IPv4-Range



IPv6-Traffic (last 12 months)



Changing IPv6 range before rollout

- **BCM analysis**
- **BIA analysis**
- **new *Provider Independent (PI)* IPv6 range will replace old one**
- **Request:**

  Request made by SWITCH: 13.9.2012

  Routing to ETH done: 21.9.2012

IPv6-Roadmap: Management view

- **IPv6 pilot projekt started**
  important infrastructures (Exchange, CMS, Hosting, Storage)
- **Instruction initiative**
  Server-Admins, IT-Supporter, end user, students
  documentation must be made first
- **DHCPv6 release in December 2012**
  produktive per April 2013
  client networks will be forced
  IPv6-only network zone offered for all ETH
- **IPv4-NAT/PAT project started (usage for next 10 years ☺)**

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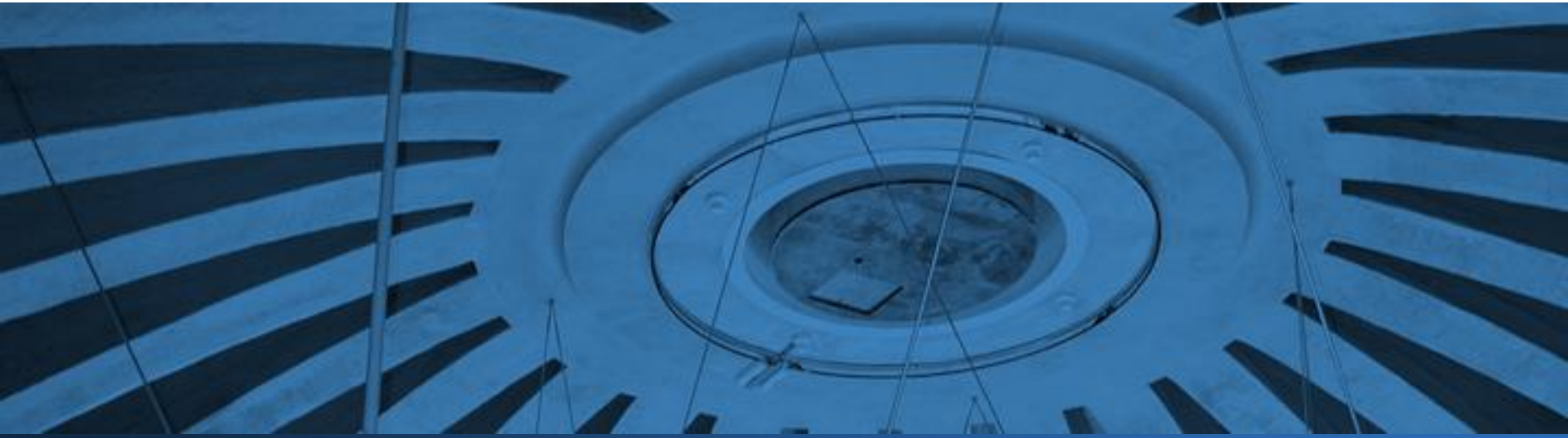
Derk Valenkamp



Agenda

- My personal impression about IPv6
- Roadmap
- IPv6-Concept (ID ICT-Networks)
- DHCPv6
- Firewall
- IPv6 SSID ‚eth' design
- Multicast
- What is done
- ?

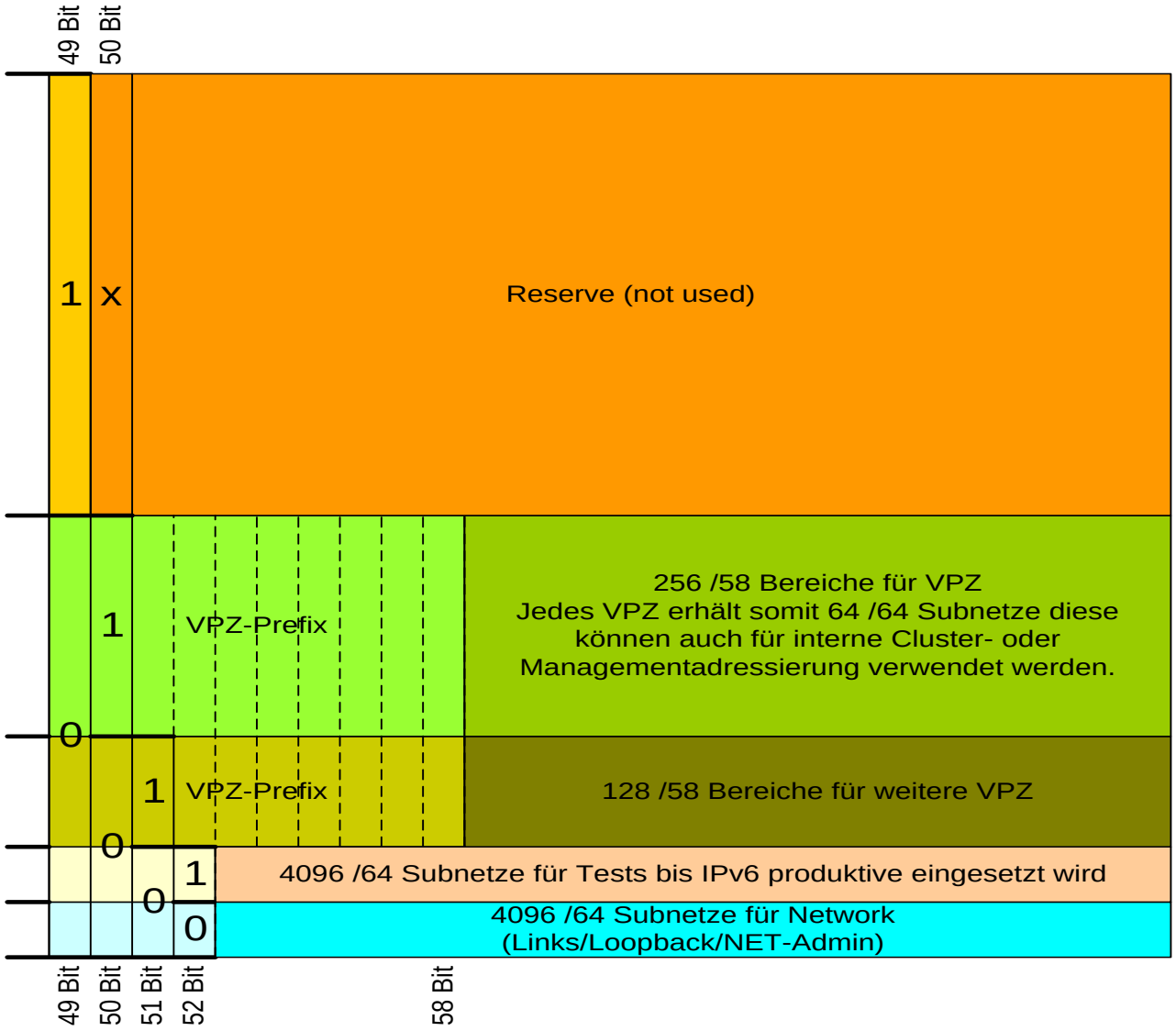
My personal impression about IPv6

- No way around IPv6 to connect all the devices to the Internet/Intranet
- Phase 4 in Gartner‘s Hype Cycle (Slope of enlightenment)
- It is not enterprise ready yet (DHCP, OS-Support,...)
- It is mainly designed for ISP‘s
- Nearly no IPv6 rollout-project‘s in other Universities/Companies
- Client-side: no fallback to IPv4 (DNS) – new rfc announced

Roadmap

- 1H 2013 Network Ready for IPv6 large scale deployment (Firewall; DHCP-Relay; IPv6-only test-VPZ)
- 2014 get experience
- 2015 start IPv6 Rollout (Dualstack)
- 2020 start a ‚get rid of IPv4'-project

IPv6-Concept (2001:067C:10ec::/48 PI)



IPv6 Concept

- One IPv6-Range (/58; Prefix) per VRF -> 64 subnets
- One /64-Subnetz reserved per VLAN
- But on the Router will be configured only a
  /118 subnet configured for Server (1024 IPv6's)
  /115 subnet Docking/Client (8192 IPv6's)
- Prevent for DoS (Router breaks down during scans)
- No auto configured addresses allowed.
  - No MAC-Addresses leave the ETH Zurich
  - No Random IPv6 Addresses (IDS, Support)
- Always configured in Dual Stack with IPv4 (no 6to4-NAT)
- Source-Routing will be blocked
- Some Multicast addresses will be blocked (DHCP,DNS..)
- Incoming IPv6 RAs will be blocked on access ports.

DHCPv6

- DHCPv6-Relay standard ... use outgoing interface of the router, which is IPv4 only ...will change
- ‚No' redundant server -> 2 standalone Server with independent ranges (2x 4096 = 8192)
- DHCPv6 lease depend to DUID (DHCP Unique ID), which is assigned by the OS...PXE-Boot?
- Not all OS Support DHCPv6 – Android 4.x

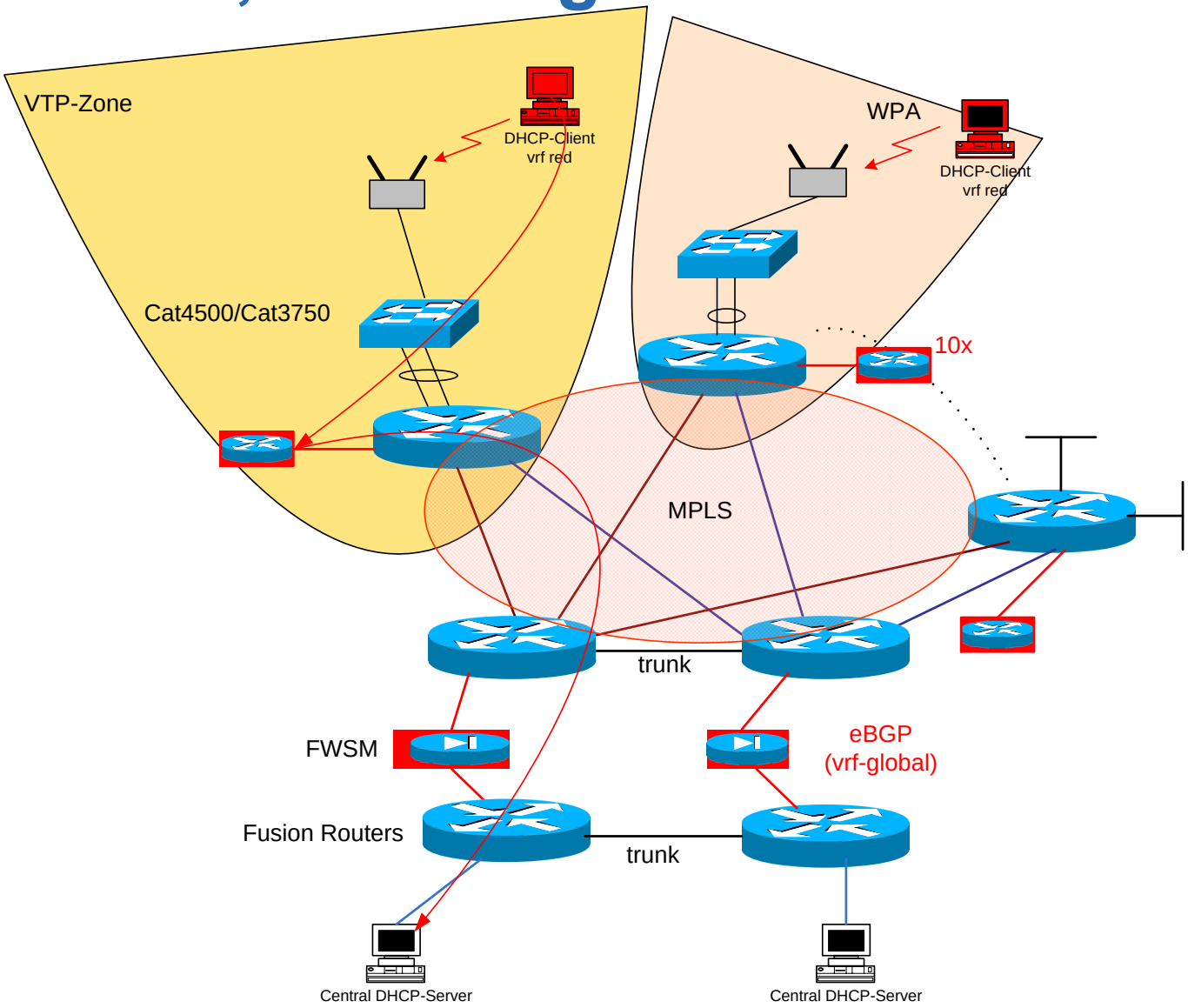
Firewall IPv6

- Old Firewall Service Module not capable
- New Hardware onsite, migration by end 2012
- Separate ACL for IPv4 and IPv6

  → new Firmware available now

  → CSM Release in Q1.2013

IPv6 SSID ‚eth' design



What is done

- 2001:067c:10ec::/48 = ETH Zurich Subnet
- 10-Gig Dual-Stack-connection to SWITCH
- Core is ready, but some issues with DHCP
- DHCP (with limitations)
- DNS
- IPv6 rough concept
- IPv6 Firewall
- IPv6 VPN-Client (IPv6 tunneled over IPv4)
- Mgmt Tool ‘Netcenter’ (Reports, IP-Tool, Firewall)
- IPv6 Loadbalancer

What is not planed yet

- SEND/CGA (secure arp)
- ➢ Router performance, whole Subnet have to be open
- IPv6 to IPv4 NAT nor IPv4 to IPv6 NAT
- ➢ DNS-Problems, IPv4-NAT is easier
- IPv6 HTTP-Proxy
- IPv6 Multicast (Not supported yet)

?