IPv6 in Switzerland

IPv6 Kongress Frankfurt, May 2014

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Taking Off

IPv6 World Day, June 8, 2011

Jim Bound Award

For successfully achieving as the first country double digit IPv6 penetration

10% in 4-2013

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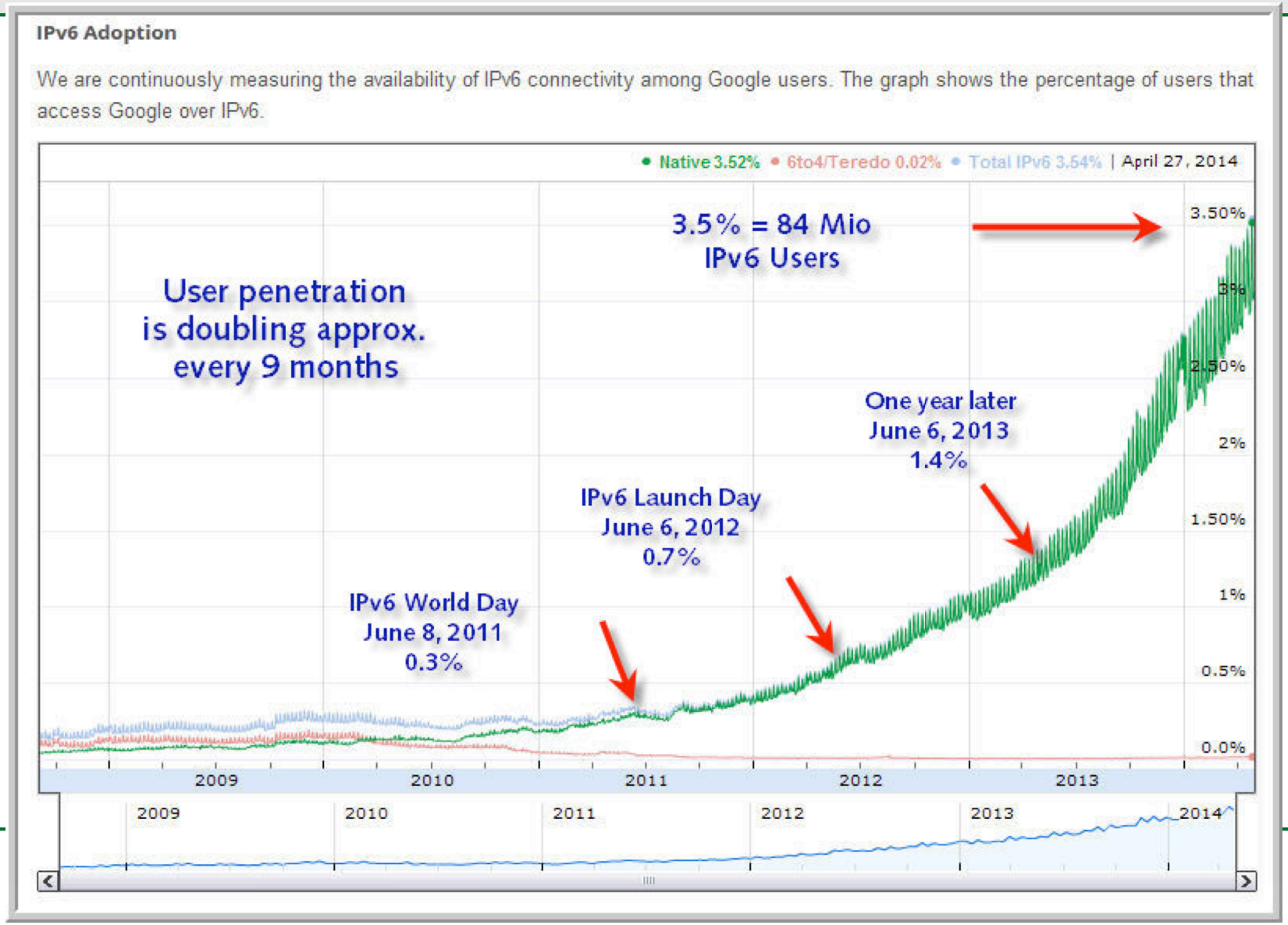
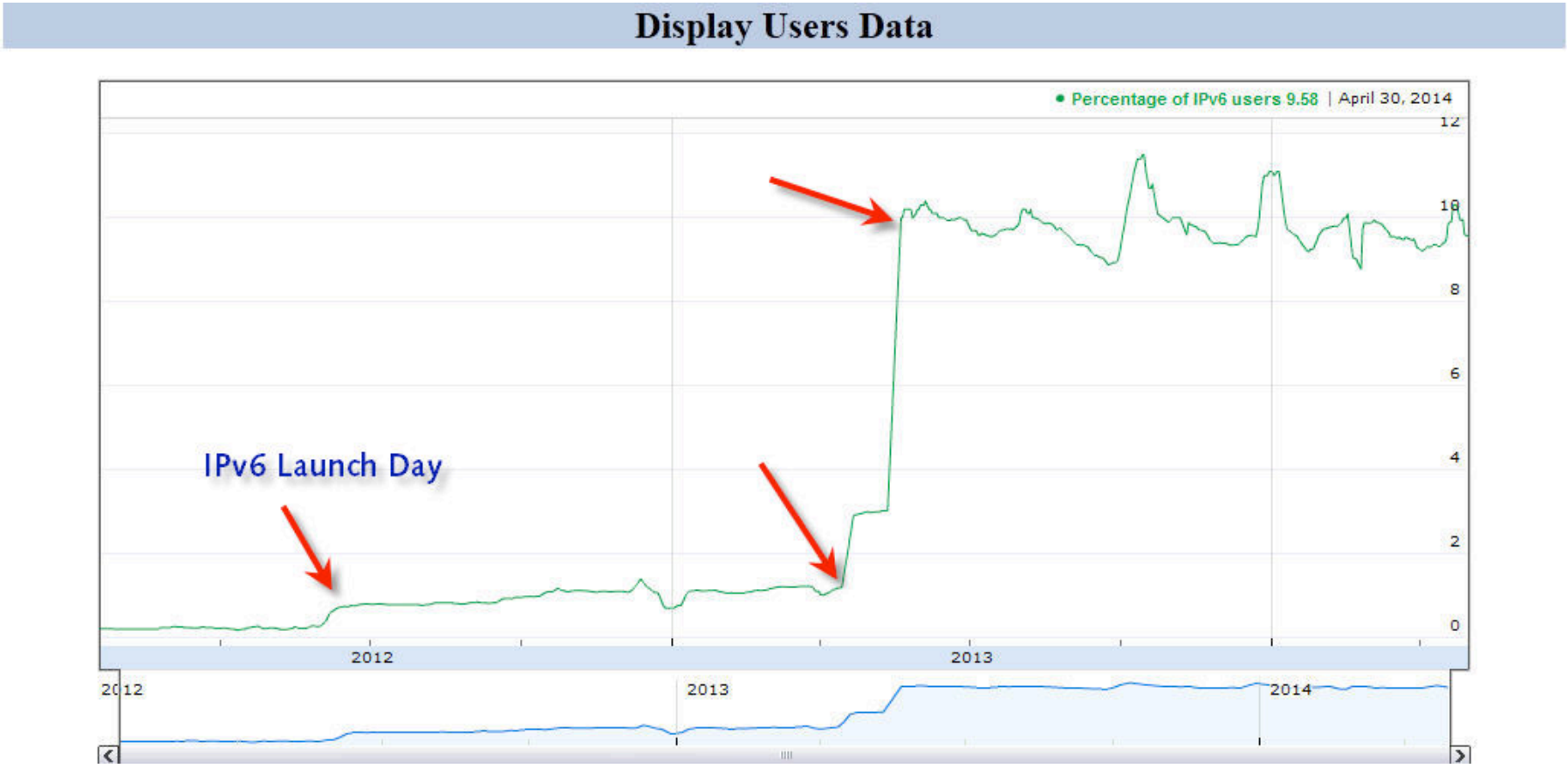
Data Sources

- Google Stats (www.google.com/ipv6/statistics.html)
- 6lab.cisco.com/stats
- RIPE Labs (www.ripe.net)
- Hurricane Electrics (http://bgp.he.net/ipv6-progress-report.cgi)

IPv6 in the World – Google Stats



Users in Switzerland



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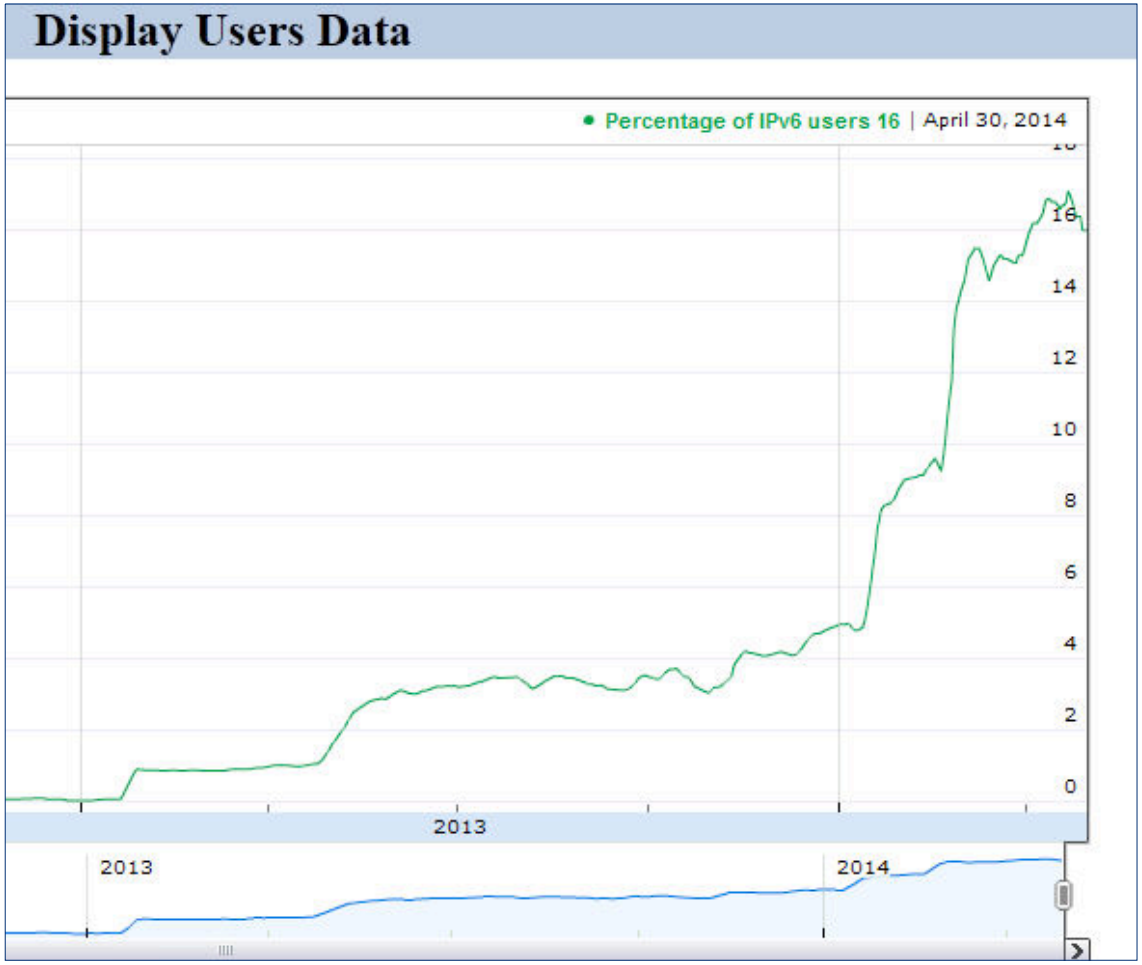
Now the Belgians are hunting us…..



Ooops

They are number one now!

We promised:

Not for long!😉

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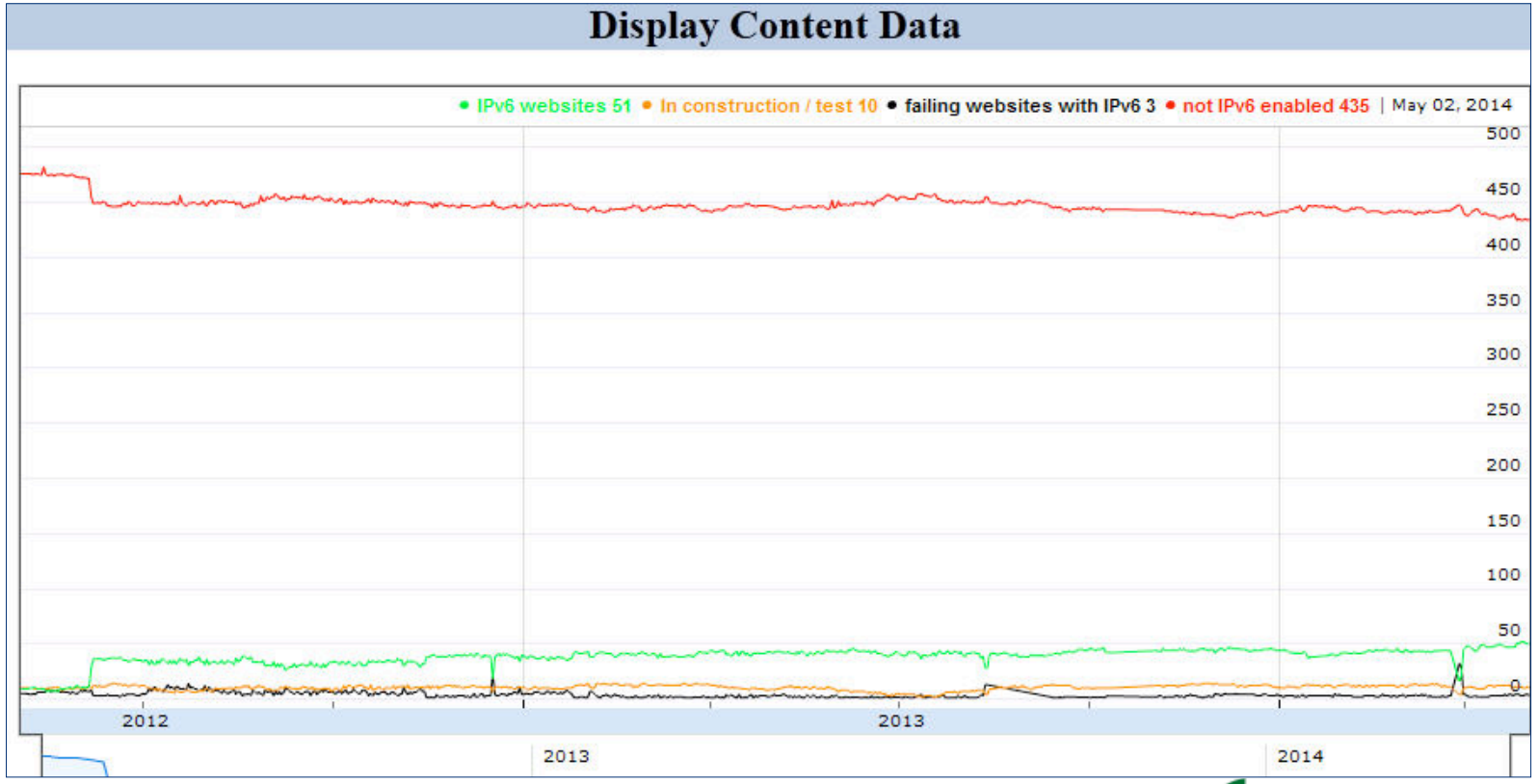
Content missing – not only in CH!

- 14% of Top 1000 Alexa Websites are dual-stack



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Potential is with Top Alexa Sites

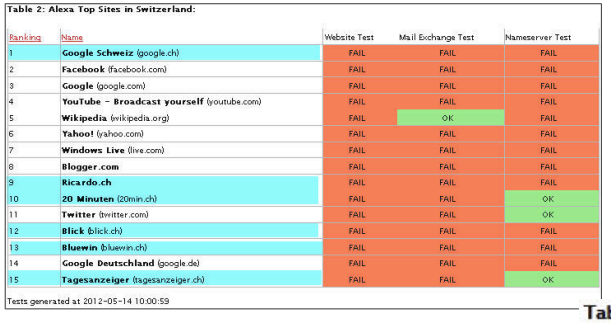

Table 2: Alexa Top Sites in Switzerland:

Ranking	Name	Website Test	Mail Exchange Test	Nameserver Test
1	**Google Schweiz** (google.ch)	FAIL	FAIL	FAIL
2	**Facebook** (facebook.com)	FAIL	FAIL	FAIL
3	**Google** (google.com)	FAIL	FAIL	FAIL
4	**YouTube – Broadcast yourself** (youtube.com)	FAIL	FAIL	FAIL
5	**Wikipedia** (wikipedia.org)	FAIL	OK	FAIL
6	**Yahoo!** (yahoo.com)	FAIL	FAIL	FAIL
7	**Windows Live** (live.com)	FAIL	FAIL	FAIL
8	**Blogger.com**	FAIL	FAIL	FAIL
9	**Ricardo.ch**	FAIL	FAIL	FAIL
10	**20 Minuten** (20min.ch)	FAIL	FAIL	OK
11	**Twitter** (twitter.com)	FAIL	FAIL	OK
12	**Blick** (blick.ch)	FAIL	FAIL	FAIL
13	**Bluewin** (bluewin.ch)	FAIL	FAIL	FAIL
14	**Google Deutschland** (google.de)	FAIL	FAIL	FAIL
15	**Tagesanzeiger** (tagesanzeiger.ch)	FAIL	FAIL	OK

Tests generated at 2012-05-14 10:00:59

Please ask every company you deal with to IPv6-enable their website

(BTW - how about yours?) ☺

There is slightly more green in the newer table

Table 2: Alexa Top Sites in Switzerland:

Ranking	Name	Website Test	Mail Exchange Test	Nameserver Test
1	**Google Schweiz** (google.ch)	OK	OK	FAIL
2	**Facebook** (facebook.com)	OK	FAIL	FAIL
3	**Google** (google.com)	OK	OK	FAIL
4	**YouTube – Broadcast yourself** (youtube.com)	OK	OK	FAIL
5	**Wikipedia** (wikipedia.org)	OK	OK	FAIL
6	**Yahoo!** (yahoo.com)	OK	FAIL	FAIL
7	**Windows Live** (live.com)	FAIL	FAIL	OK
8	**Blogger.com**	OK	OK	FAIL
9	**Ricardo.ch**	FAIL	FAIL	OK
10	**20 Minuten** (20min.ch)	FAIL	FAIL	OK
11	**Twitter** (twitter.com)	FAIL	OK	OK
12	**Blick** (blick.ch)	FAIL	FAIL	FAIL
13	**Bluewin** (bluewin.ch)	FAIL	FAIL	FAIL
14	**Google Deutschland** (google.de)	OK	OK	FAIL
15	**Tagesanzeiger** (tagesanzeiger.ch)	FAIL	FAIL	OK

Tests generated at 2014-05-02 20:06:39

Data Source: dashboard.swissipv6council.ch

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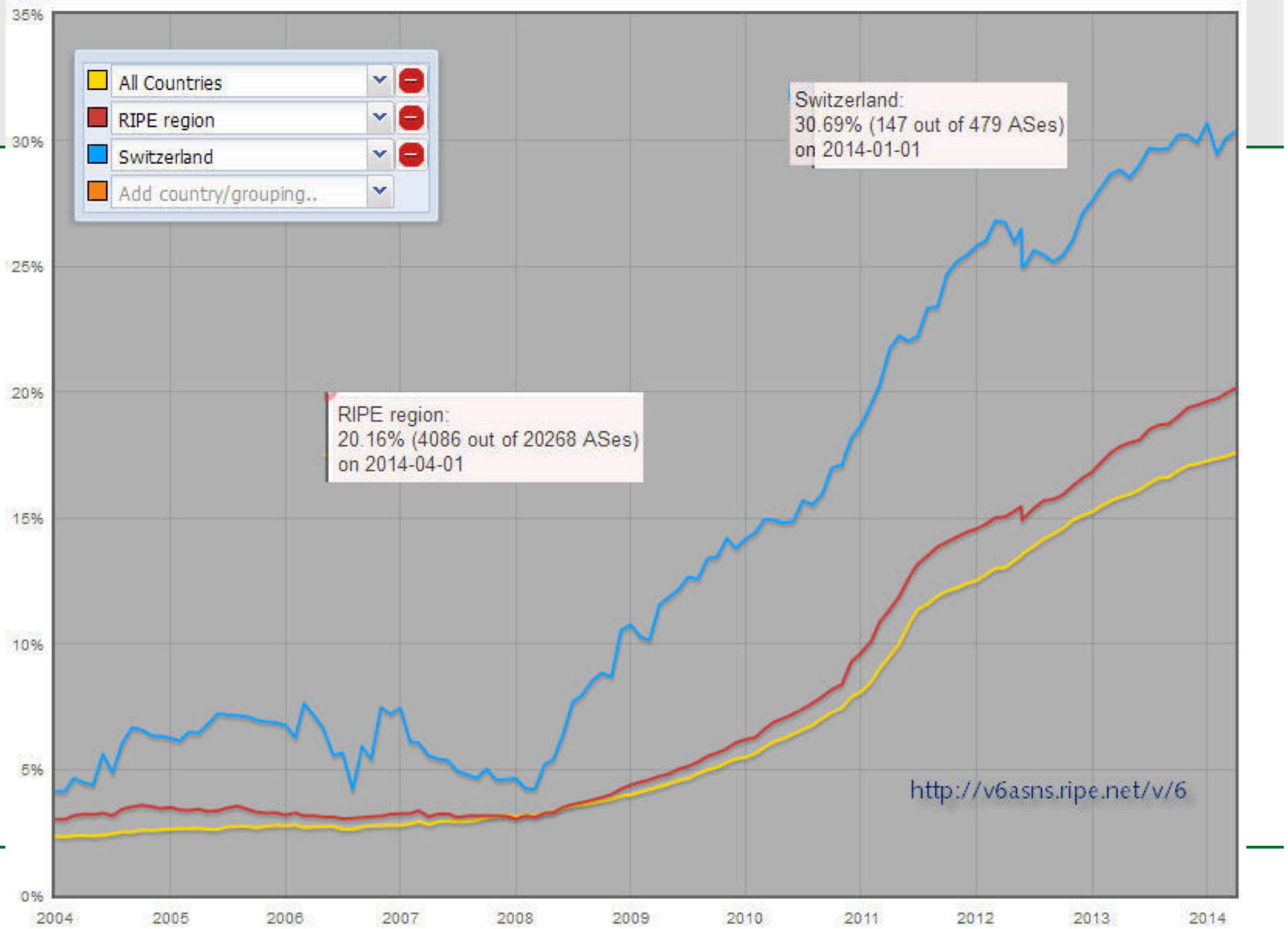
All Countries
RIPE region
Switzerland
Add country/grouping..
Switzerland:
30.69% (147 out of 479 ASes)
on 2014-01-01
RIPE region:
20.16% (4086 out of 20268 ASes)
on 2014-04-01
http://v6asns.ripe.net/v/6
35%
30%
25%
20%
15%
10%
5%
0%
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

Schweizerische Post

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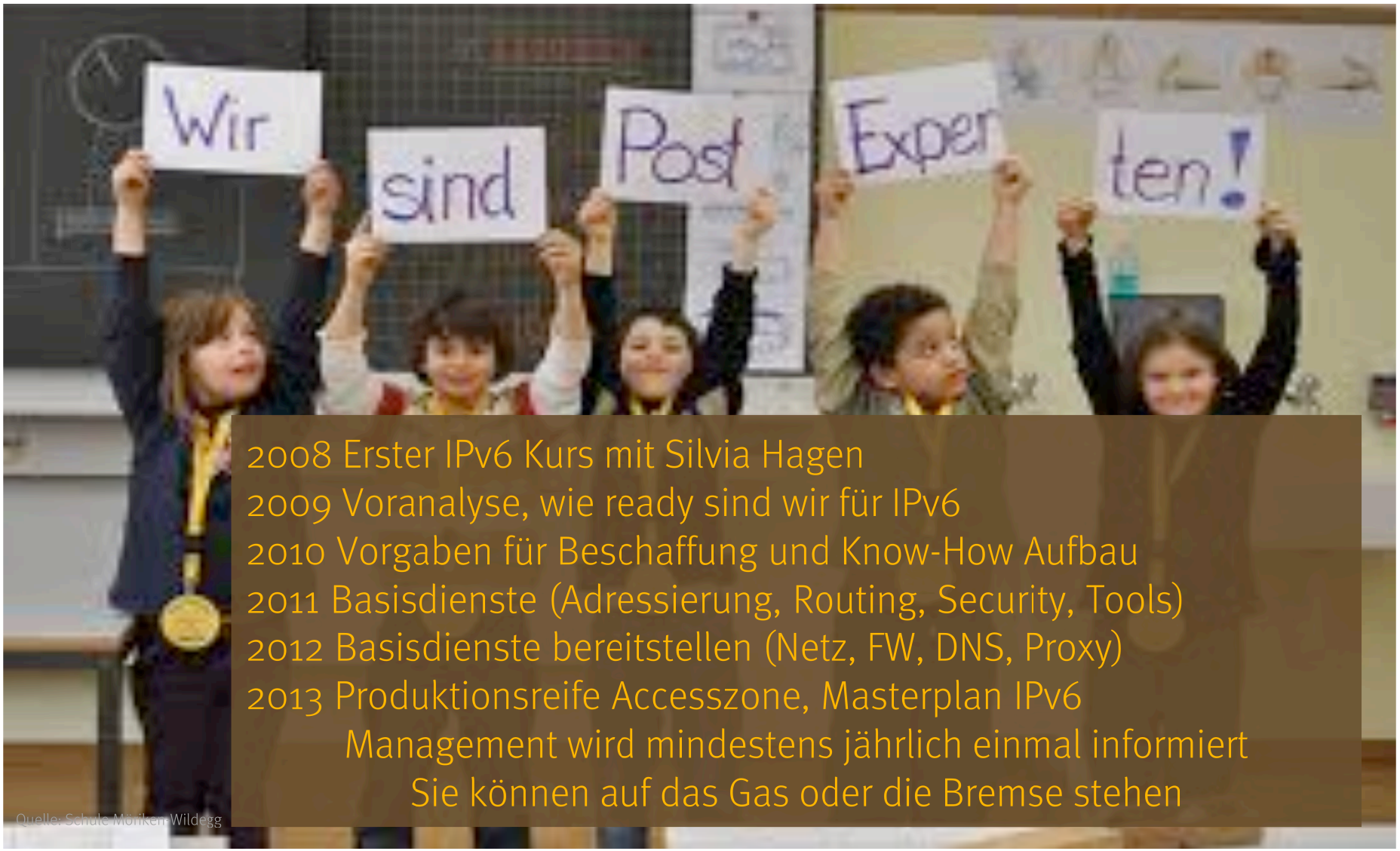
Wer sind wir
Projektteam, Projekt

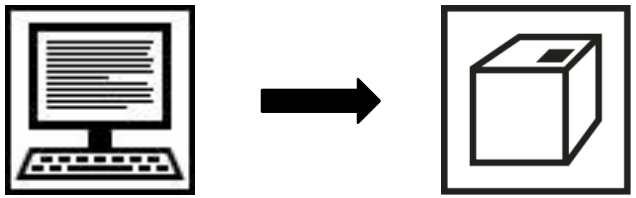


2008 Erster IPv6 Kurs mit Silvia Hagen
2009 Voranalyse, wie ready sind wir für IPv6
2010 Vorgaben für Beschaffung und Know-How Aufbau
2011 Basisdienste (Adressierung, Routing, Security, Tools)
2012 Basisdienste bereitstellen (Netz, FW, DNS, Proxy)
2013 Produktionsreife Accesszone, Masterplan IPv6
Management wird mindestens jährlich einmal informiert
Sie können auf das Gas oder die Bremse stehen

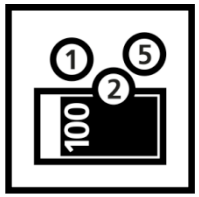
Quelle: Schule Möriken-Wildegg

Wo der Mischkonzern Post tätig ist
Vier Märkte

- **Logistikmarkt**

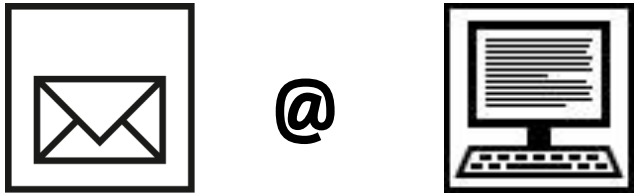


- **Retailfinanzmarkt**



- **Markt für öffentlicher Personenverkehr**

- **Kommunikationsmarkt**



Milestones

- 2013 Post wird Aktiengesellschaft
- Most Domain entries had to be adjusted – this was used to add IPv6 records at the same time
- Saved a lot of money!
- Took more than a year.

Addressing

- Post Worldwide /32
  - Country Aggregation /40
- Post Switzerland /36
    - Region Aggregation /48
    - Local Aggregation /56
- Optimized for routing
- Based on geography. Each country has its own legal situation.
- Internet Services are offered over Internet only. Everything else is routed internally.
- Default Gateways (link-local) are standardized
- No identifiers in IPv6 address (e.g. phone, VLAN etc)
- No decimal identifications in IPv6 address

Security

- Goal to reach same security standard as in IPv4
- Starting with separate firewalls for IPv6 (thorough testing)
- Adjust configuration and operational documentation
- List services that can be reached over IPv6
- Document decisions and exceptions

Der Weg vom Home User zur Post
Wo stehen wir heute

User *(Home User)*
Ready OS, Browser

ISP Home User *(Internet Service Provider)*
Ready Schweiz ca. 10 %

ISP Post *(Internet Service Provider)*
Ready seit 2012

DDos Abwehr beim ISP
Ready Swisscom, Sunrise

Netz *(Access Zone / DMZ)*
Ready seit 2012

IPS / Firewall *(Intrusion Prevention System)*
Ready seit 2012

DNS *(Domain Name Server)*
Ready seit 2012

GSLB *(Global Server Load Balancer)*
Ready, Ersatz im Lifecycle

NTP (*Network Time Protocol)*
Ready seit September 2013

LSLB *(Local Server Loadbalancer)*
Ready seit 2012

Web Server *(Testserver)*
Ready seit 2012

XML GWY *(Extensible Markup Language)*
Ready seit 2013

Was es sonst noch braucht
Wo stehen wir heute

Adressverwaltung *(IPAM/Inventar)*
Ready seit 2013

Outgoing Proxies *(IPv6 Sites erreichen)*
Ready seit Herbst 2013

Prozesse *(Workflow Tool)*
Ready seit September 2013

Mail (*Contentfilter)*
Not ready, geplant 2014

ADS *(Access Detection System)*
Ready seit 2012

Homepage Post *(Internetauftritt Post)*
Not ready, Projekt für Ablösung

NetViz *(Network Visualization)*
Ready seit 2013

Management *(Server/Network)*
Not ready, zur Zeit auf IPv4

MRTG/Cacti *(Messen, Statistik)*
Not Ready MIB's fehlen

Schulung *(Know How)*
30 MA drei Tage Schulung

Issues

- Post will only go to production when DDoS IPv6 has same maturity as with IPv4, Swisscom June 2013 ready, Sunrise ready since 2014
- Waiting for new NTP releae that can also work with off-link systems (worked only with link-locals, waiting 15 months for fix)
- Had to wait for update of loadbalancer services. Migration took quite some time.
- Addressmanagement: Want to work with standard products – not possible yet to fulfill all post-specific requirements, too many manual processes still needed, no full integration of inventory and address management
- A bug in Bluecoat prevented internal clients to reach dual-stack websites over IPv6, has now been solved (filtered on addressses instead of URLs)

Issues continued

- Mail/Contentscanner was announced for fall 2013. Tests are running. Now updating production systems, done by fall 2014.
- Design scenarios for downgrade in case of problems.
- Purchasing guidelines that have requirements at feature level are a MUST
- Threats:
  - Lack of vendor implementation especially in endpoint security
  - RA guard and Destination guard are important (Cisco announces support for both in Q2/2014

Status

- Backbone is IPv6 ready and can be activated
- Firewalls and network infrastructure are ready by 2015, maybe even by end of 2014
- IPv4 islands are identified (Paket- und Briefzentren, due to third party systems not IPv6-enabled, long lifecycles)
- Swiss Post will be reachable over IPv4 and IPv6 in the Internet (DNS, Mail and Website) by Quarter 3 2014
- Currently building testlab for applications
- We know what it takes to integrate IPv6 in the datacenter and in the intranet, Masterplan and roadmap defined

Fragen
bringen uns weiter

Aspectra

- Founded in 2000
- Hosting. Each customer has its dedicated zone and servers.
- Target customers: high availability, high security
- 2 Datacenters
- 23 employees

How we got started

- Reading books, watching videos, visited IPv6 classes – this explained many technical aspects but raised new questions
  - How do we implement?
  - Where do we start?
  - How far are we going?
- Core to Edge or Edge to Core? Islands? Or vice versa? ☺
- ISP (many clients) have different requirements than hosters (many servers)
- Many case studies for ISPs, not many for hosters or content providers…..

Finding a provider

- Asking for IPv6 we get the following answers:
  - The second largest referred us to sales (meaning: we don't do IPv6)
  - The largest said "we can, in 3 – 6 months, it'll cost xxxx
  - The smallest said "yes we can, no problem, here's the contract

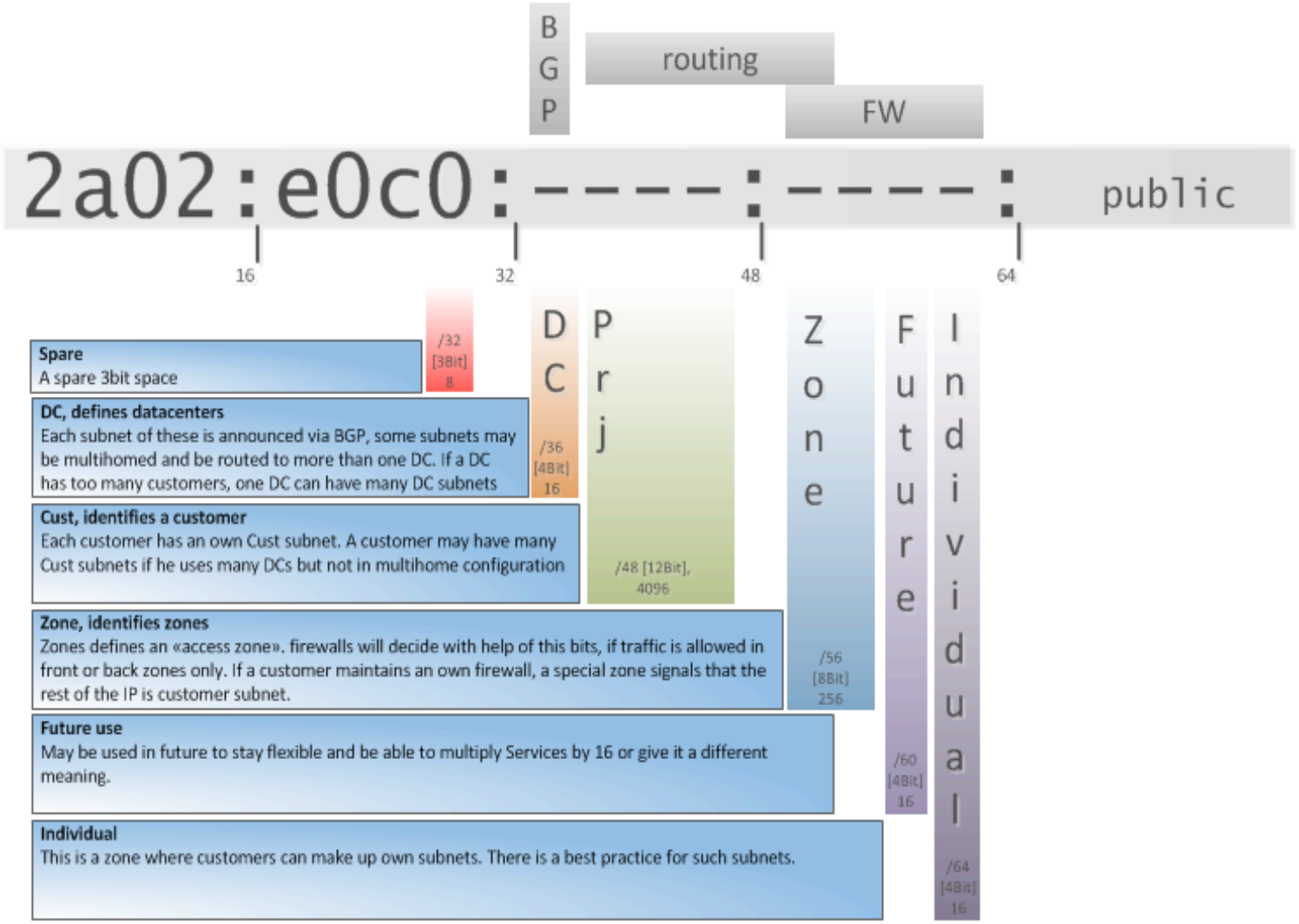
Addressing

- We decided to become a LIR (Memberfee, /32)
- Visited the courses at RIPE and learned a lot
- 2a02:e0c0::/32

- We took a lot of time to discuss all the questions
- Goal: as simple as possible, as flexible and scalable as possible
- Minimal set of rules, routing centralized, distributed across DCs
- Make daily tasks easy (such as following an IP packet)
- No encodings in IPv6 addresses
- No ULA's

Paradigm shift

- No hierarchy in address space
- Each project gets its own space (project over customer, customer may have several projects – helps a lot in traceability – 12 bits)
- DC encoded in address, 4 bits
- Zone encoded, 12 bits



01.2013 – IP Konzept II

aspectra
hosting your future

Milestones and Timeline

- Started August 2013 – 2nd site, BGP Announcement
- September 2013 – Education all engineers, routing and firewalls 2nd site, first server implemented
- October 2013 – DNS, Clients IPv6 range at office, tunnel to Datacenter
- November 2013 – basic monitoring, DNS security and cleanup, start primary site
- December 2013 – first vertical integration finished, christmas freeze, implement first services, webstats, homepage, reverse proxy, customer cockpit
- January/February 2014 – DNS AAAA entry, activated reverse DNS at RIPE, glue record – IPv6 goes production!

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Lessons learned – the Do's

- Use your own addresses, become LIR
- Find out if hardware can cope with extra load (dual-stack)
- Set a top level goal, define scopes, budget, roadmap
- Invest enough time for concept and deployment plan:
  - IPv6 addressing plan
  - Routing concept
  - DNS
- Test test test test test test test test test
- One thing at a time, isolated steps
- Expect the unexpected! (Monitoring, Microsoft AD, global catalogue)

Do not

- … think you can dual-stack in two weeks
- … overdefine your concepts, it will restrict you later
- … believe manufacturers are IPv6 ready. They will write anything on the box, just to sell it. Most products have limitations.
- … buy new hardware just because of IPv6. Use regular product life cycles
- … forget monitoring, logging, security: one for IPv4, one for IPv6
  - System/network performance
  - E2E scans
  - Firewall rules and logs

What it took

- 20% FTE
- Many maintenance windows on live systems (night work)
- External man power (for security and network)

- It's no rocket science
- Next step – activating customers

Upcoming – Swiss IPv6 Business Conference

- June 17, Zürich, Arena Sihlcity
- **www.ipv6conference.ch**
- Many international speakers you don't wanna miss!

VIP Ticket including Dinner with the Speakers available

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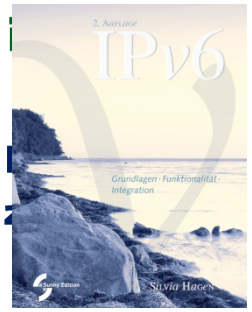
Thank You For Your Attention!

IPv6 Grundlagen, Funkti t, Integration

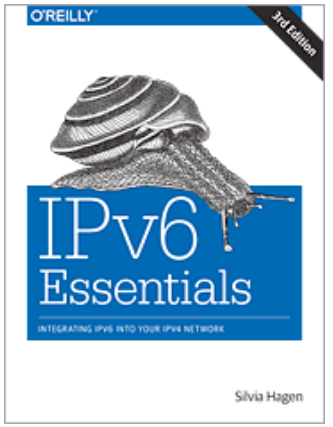
von Silvia Hagen, Deutsc
2. Auflage, Sunny Edition, 2
ISBN 978-3-9522942-2-2



NEW

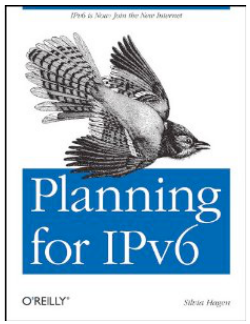
IPv6 Essentials

by Silvia Hagen, English
3rd Edition, O'Reilly, June 2014
ISBN 978-1-4493-1921-2



Planning for IPv6

by Silvia Hagen, Engli
O'Reilly, July 2011
ISBN 978-1-4493-0539-0
eBook 978-1-4493-0538-3



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