Getting Ready for World IPv6 Day ... in 6 days

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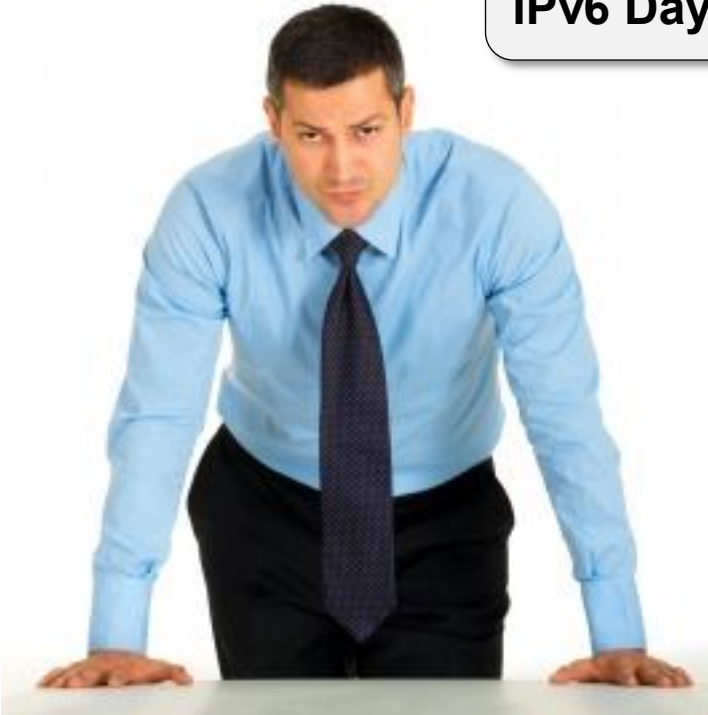
Presentation @ 5. Slovenian IPv6 Summit organized by go6.si

The troubles usually start here …

Someone Got the Next Great Idea

We are participating in the World IPv6 Day, aren't we?

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Now What?

"You can either do a planned, careful migration, or you can do it in a panic. And you should know full well that panicking is more expensive."

Martin Levy, Hurricane Electric

Can't do much planning in six days, can you?

Options: Build, Buy or B*tch

Build: Short To-do List

- Get external IPv6 connectivity
- Deploy 6-to-4 converter (don't even think about touching applications)
- Add AAAA record to your DNS

Safety first:

- Don't apply this recipe to your main web site
- Estimate the amount of IPv6 traffic you'll have to handle
  → Globally: less than 1%
  → You might see more based on your audience
- Prepare a quick fallback mechanism (short TTL on AAAA and DNS zone entries)

Sources:
   http://fud.no/talks/20110211-V6_World_Congress-Improving_IPv6.pdf
   http://www.google.com/intl/en/ipv6/statistics/

Get External Connectivity

IPv6 address space (What? You don't have it yet?)

- Provider Independent (PI) prefix is the right way to go (unfortunately)
- PI prefix with BGP is the only reliable IPv6 multihoming mechanism
- No time to get PI prefix – PA prefix will have to do

Get your ISPs on board

- Can they offer you IPv6?
  No – too bad, be more careful the next time you select your ISPs

- Can they propagate a /48 PA prefix learned through BGP?
  No – good bye reliable multihoming
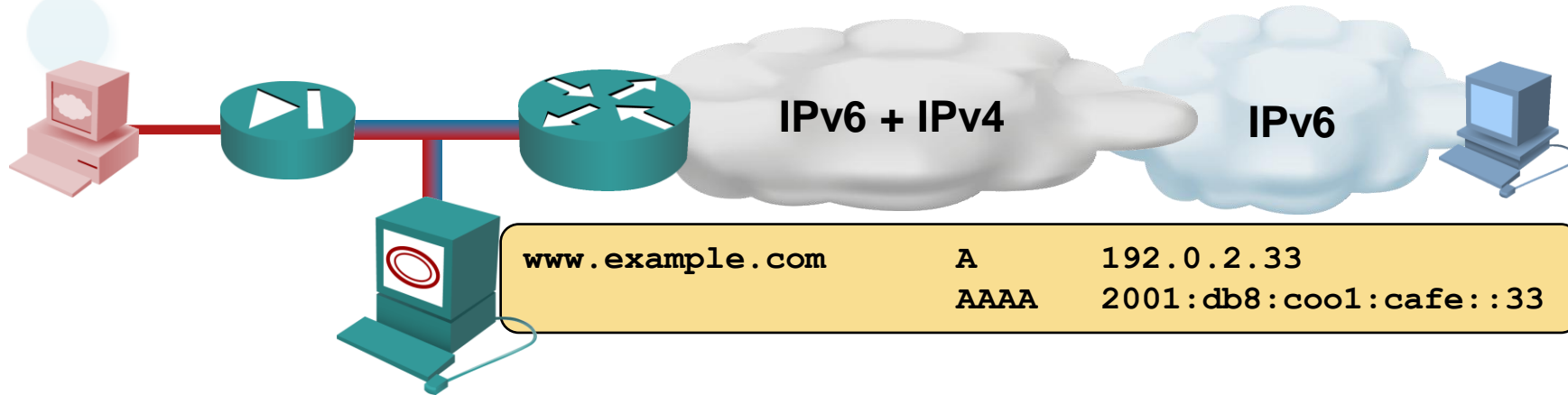 ... but we're building a kludge anyway

Quick Audit of Your Infrastructure
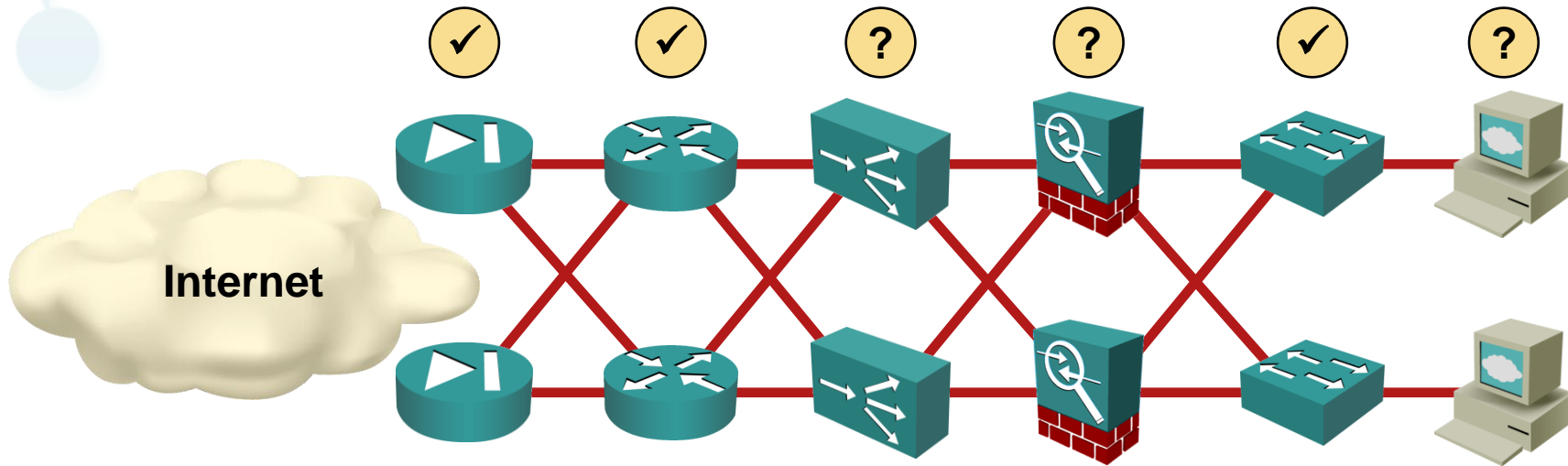
- Routers and switches usually not an issue (check licensing and TCAM sizes)
- Check firewalls status
- Load balancers and WAFs can be a showstopper
- Don't even think about touching applications
- Deploy 6-to-4 converter as close to the network edge as possible

Fix the problems with NAT64 or load balancers

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Option#1 – Russian Roulette


```
www.example.com          A         192.0.2.33
                         AAAA      2001:db8:cool:cafe::33
```

Enable IPv6 on your web servers and hope that everything works

- IPv6 works well on most server OS and with most web servers
- Web applications will see IPv6 addresses in REMOTE_ADDR CGI field
- Might break applications that use IP addresses (logging, access control)
- Not applicable to high-availability or e-commerce sites w/o extensive testing

Typical test setup: use a different hostname for IPv6-only or dual-stack access
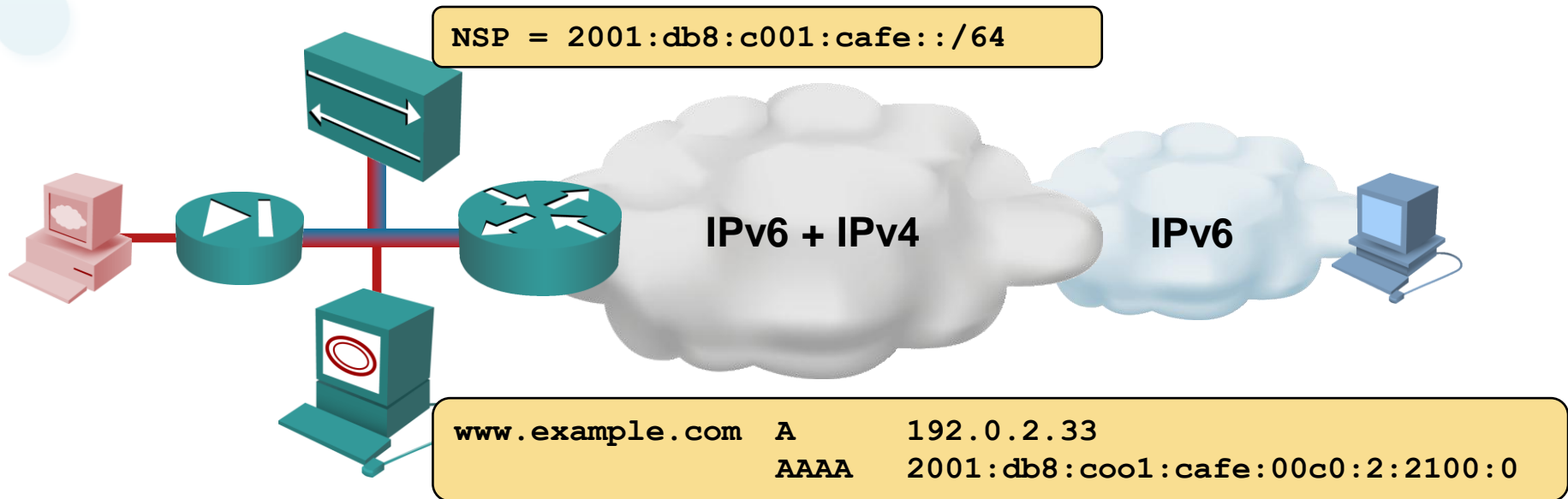
Option#2 – IPv6-to-IPv4 Load Balancing

www.example.com	A	192.0.2.33
	AAAA	2001:db8:cool:cafe::33
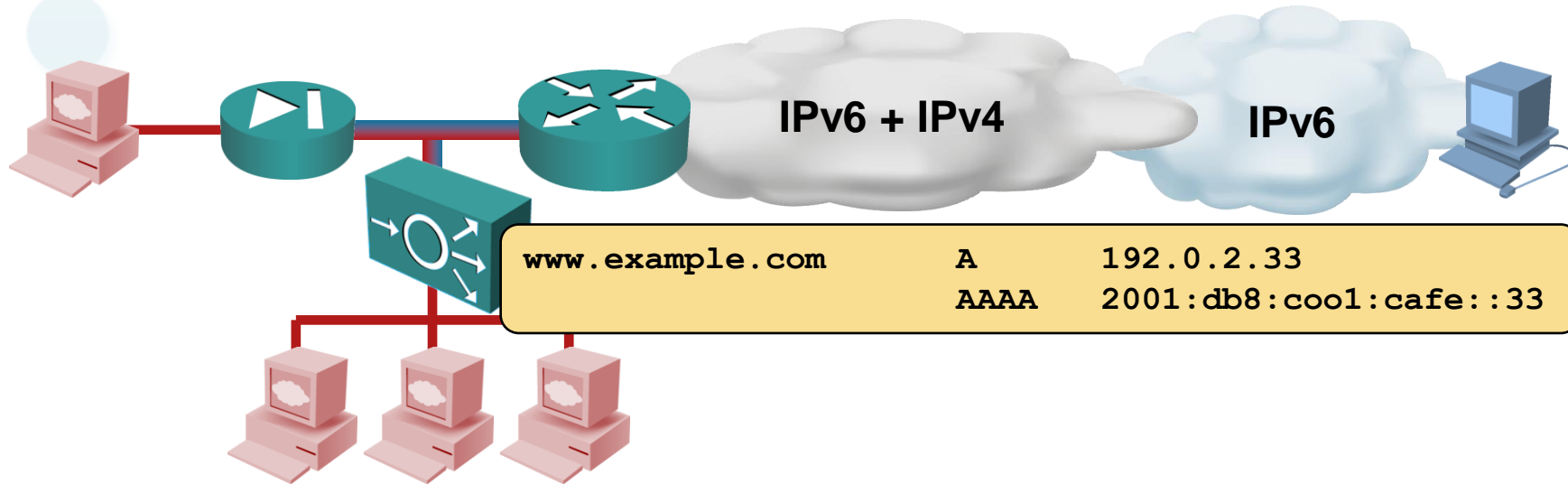
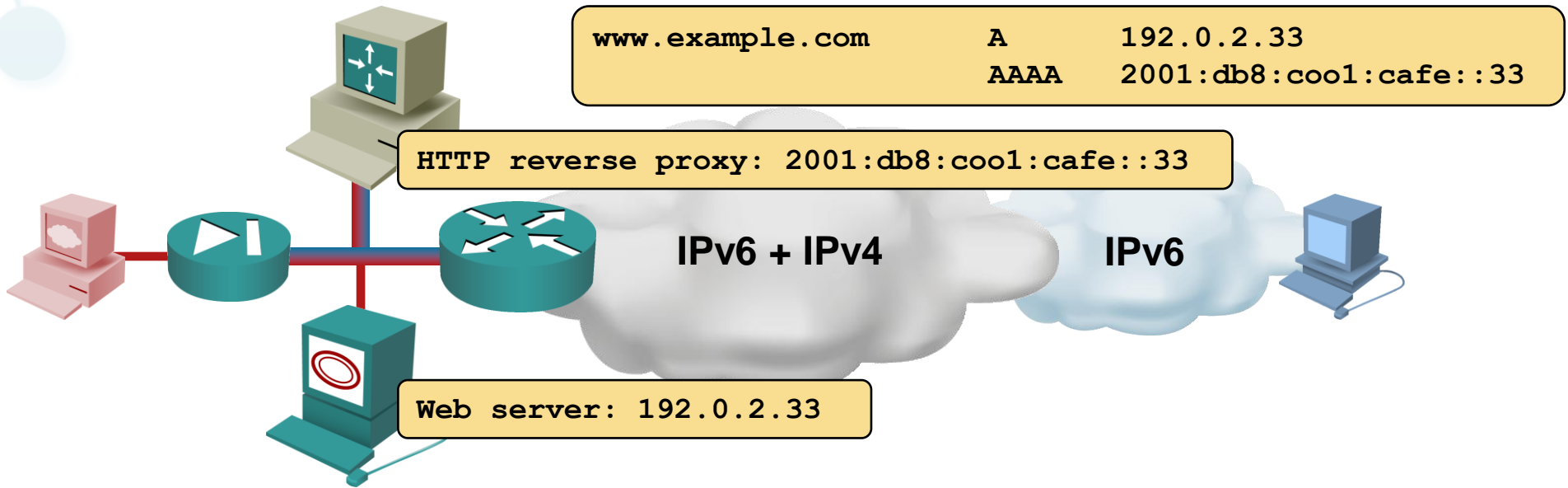Some load balancers can perform IPv6-to-IPv4 translation

- Server pool has IPv4 and IPv6 public addresses
- Servers have just IPv4 addresses
- **Caveat:** source address in server logs = load balancer, use *X-Forwarded-For* HTTP header
- **Kludge:** F5 BIG-IP LTM VE Trial (throughput: 1 Mbps)

Option#3 – NAT64 or NAT-PT

```
NSP = 2001:db8:c001:cafe::/64
```

IPv6 + IPv4   **IPv6**

```
www.example.com  A      192.0.2.33
                 AAAA   2001:db8:coo1:cafe:00c0:2:2100:0
```

- Use stateful NAT64 to make IPv4-only servers available to IPv6 clients
- Static entries in DMZ zone; DNS64 is not needed
- **Caveat**: servers cannot possibly get original clients' IPv6 addresses
- **Ideal**: two NAT64 devices with stateful failover
- **Kludge**: a single router running NAT-PT (performance !!!)

Option#4 – Reverse Proxy


```
www.example.com          A        192.0.2.33
                         AAAA     2001:db8:coo1:cafe::33
```

HTTP reverse proxy: 2001:db8:coo1:cafe::33

IPv6 + IPv4   IPv6

Web server: 192.0.2.33

Use any HTTP proxy that supports reverse-proxy deployment

Caveats

- Proxy must terminate SSL sessions
- Client certificates might not work
- Source IP address will be proxy's IP address (use X-forwarded-for)

Last Step: Changing the DNS Information

Looks simple

- Add an AAAA record to the hostname in your public zone file
- Wait for the change to propagate (depends on your SOA record)

Quick fallback is not a bad idea

- Hard to do if you don't control all name servers
- Create a separate child zone for the dual-stack web server
- Now you're in total control: use short TTL values
- Have I told you not to play with your main web site?

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When Everything Else Fails ... BUY

AWS offers 6-to-4 load
balancing with EBS
load balancer

- Deploy parts of your web site on AWS
- The ultimate kludge: run a reverse proxy on an EC2 instance

  You'll get enough bandwidth (and associated invoice), latency
  "might" be a problem

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More Information

- Enterprise IPv6 Deployment – The First Steps
  http://www.ioshints.info/IPv6E101

- Building IPv6 Core and Access Network
  http://www.ioshints.info/IPv6SPCore

- IPv6-related blog posts
  http://blog.ioshints.info/search/label/IPv6

Dual-stack tools

- Warning broken users with JavaScript
  http://www.getipv6.info/index.php/Warning_broken_users_with_JavaScript

- User-friendly deployment of dual-stack web server (slide 18)
  http://www.fud.no/talks/20110513-IPv6-Kongress-Inciting_Norwegian_IPv6_deployment.pdf

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Questions?