Lucy in the Sky with IPv6

Conversations of v6 solutions, trends, tests, & results.

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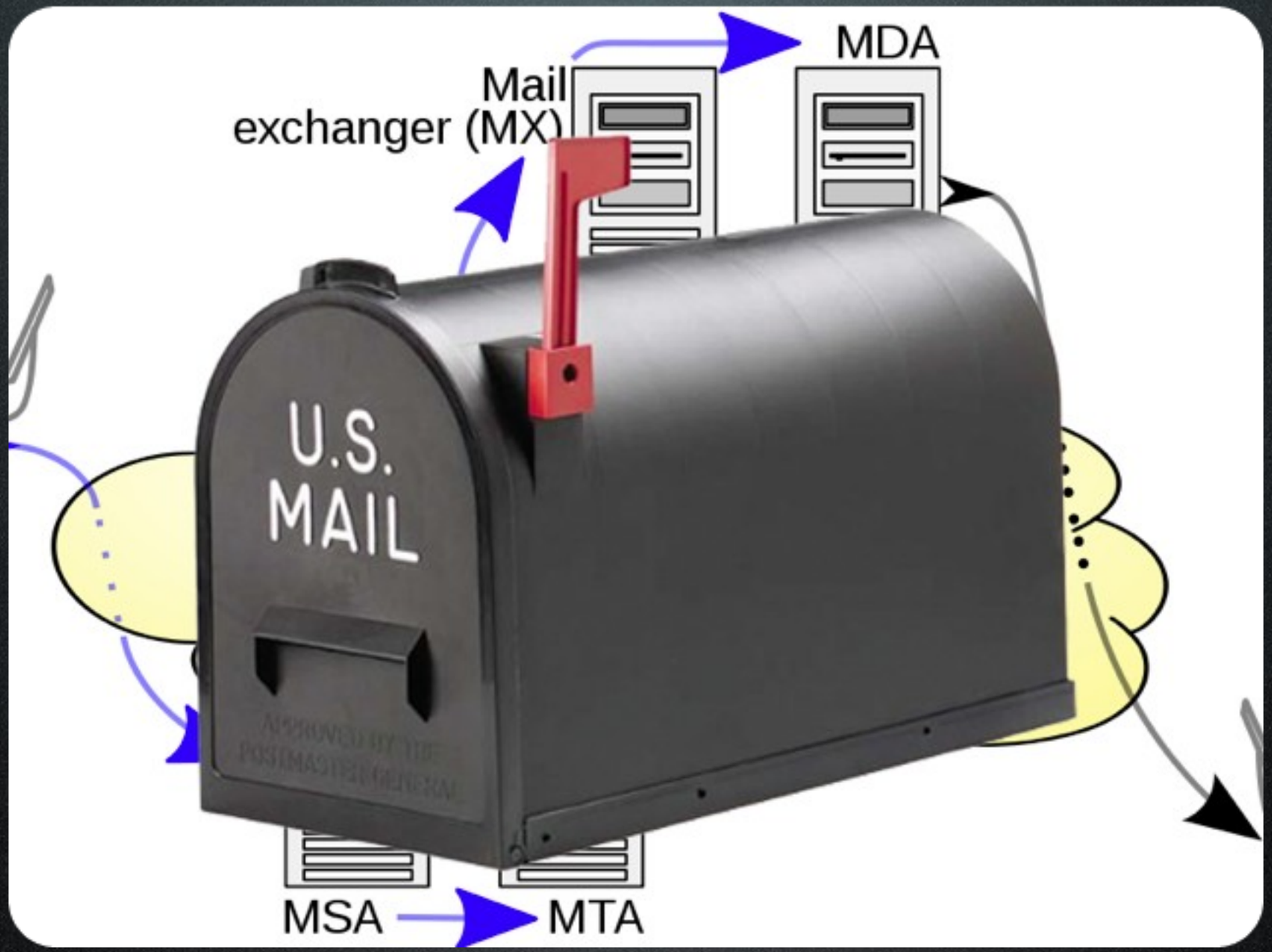
- IPv6 news and current affairs
- average 1500 views per webcast
- weekly videos for past 9 months
- enabled lots of **conversations**



SMTP on IPv6?

Dual-stacked MX records

- Publish AAAA records for MX?
- Anyone turn it on for World IPv6 Day?
- How far away from moving SMTP to IPv6 -- 1 year? 2 years? More?

Dual-stacked MX records

- Hurricane Electric recommends moving SMTP to v6 early on.
- Grey-listing, black hole listing (RBLs), and filters can be effective spam management

Dual-stacked MX records

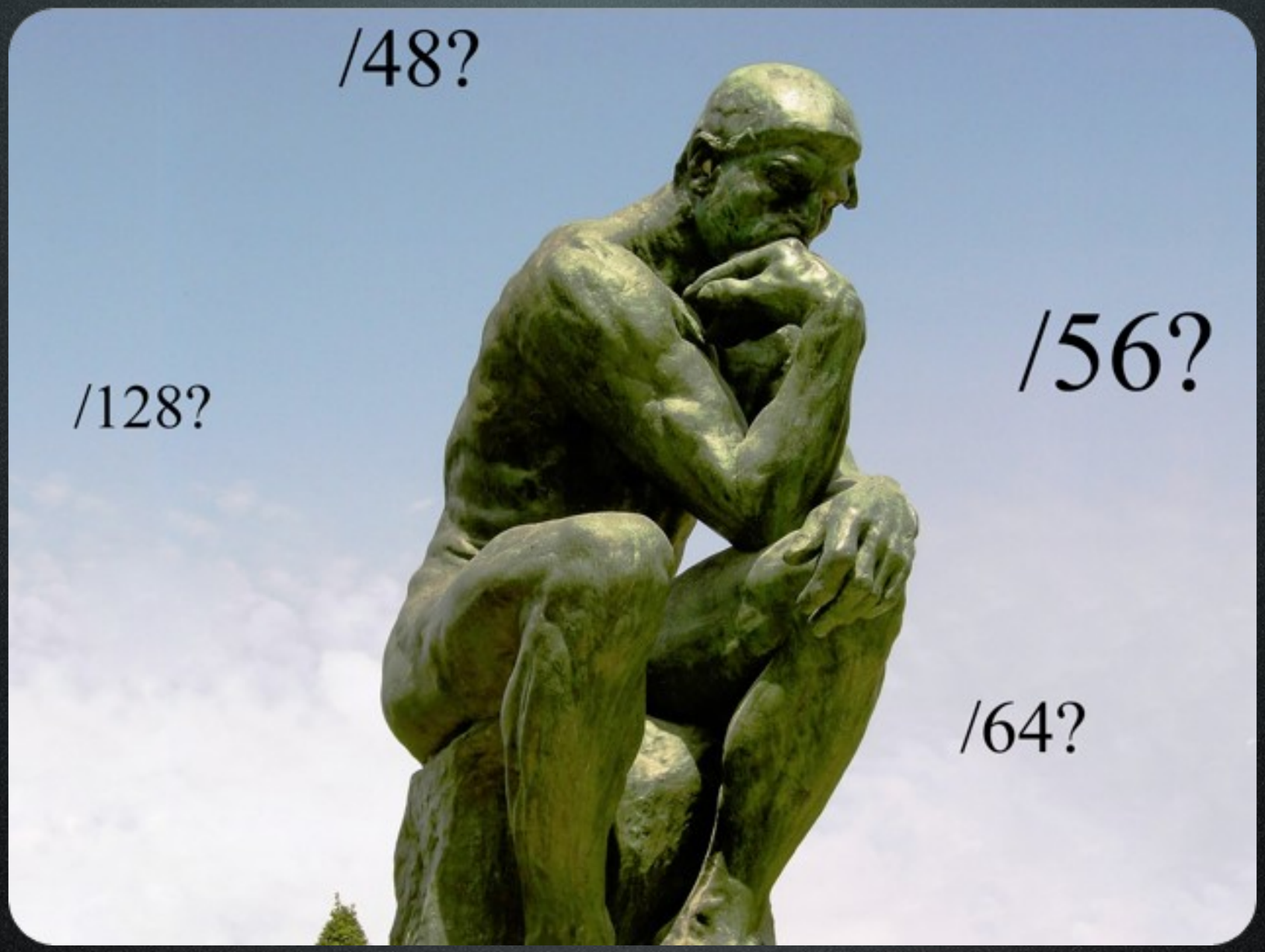
- Lots of disagreement. Reasons to stay v4:
  - mail doesn't need a lot of IP addresses
  - doesn't need end-to-end connections
  - might be difficult to migrate services
- Wait till anti-spam & anti-abuse quality is "as reliable or better" than IPv4

Dual-stacked MX records

- RBL/IPv6 issues:
  - ✦ no production quality solution?
  - ✦ without drops from reputation-based RBLs, will other filters suffer performance issues?
- More requests from customer base.
  - ✦ Justifying /24 requests with “mail reputation” concerns now requesting /48s or /64s.
  - ✦ Still, most MXes aren’t listening over IPv6.

Dual-stacked MX records

- One of the tests for HE's IPv6 certification is to send and receive mail over v6.
- Anecdotally, many success stories regarding enabling AAAA records and not experiencing issues fighting spam.
- Spamhaus released IPv6 blocklist strategy on June 6th for DNSBL
- The future of legitimate mail vs. spam is hard to anticipate; such little use of SMTP over IPv6 as of yet.



What size netblock to assign end users?

Residential End User Allocation

- How many delegate /48s?
  /56s?
  /64s?
  /128s?
- RFC 3177 vs. RFC 6177

Residential End User Allocation

- RFC 6177:
  - Addresses must aggregate and scale well.
  - No one should have to use address conservation techniques like bridging for v6 unless they want to.
  - Shorter prefix sizes allow for ease of renumbering (without renumbering into a smaller subnet).
  - rDNS management is simpler when all links have the same subnet IDs.
  - Must support any type of growth.

Residential End User Allocation

- Problem #1:

Is giving out /48s really wasteful?

Residential End User Allocation

- There are eight /3s of v6 space. We're using one of them.
- 512 /12 netblocks for the RIRs.
- Each RIR /12 block gives us a million /32s.
- There are 65.000 /48 netblocks in each /32.
- Each /12 to an RIR can give /48s to over 68 billion end sites or residential end users.

Residential End User Allocation

- For this /3 we're using, assume each of the 5 RIRs gets an average of about 100 /12s.
- Each RIR then gets about 7 trillion /48s (1600 times the size of the entire v4 address space).
- That's just the first /3; can adjust policy later if need be.
- Much more will be possible with an automatic, more complex network topology. Don't use v4 thinking with v6.

Residential End User Allocation

- Problem #2:

Does giving out /48s increase the potential for spam over v6?

Dual-stack timeout solution: turn off v6?

Help fix my IPv6

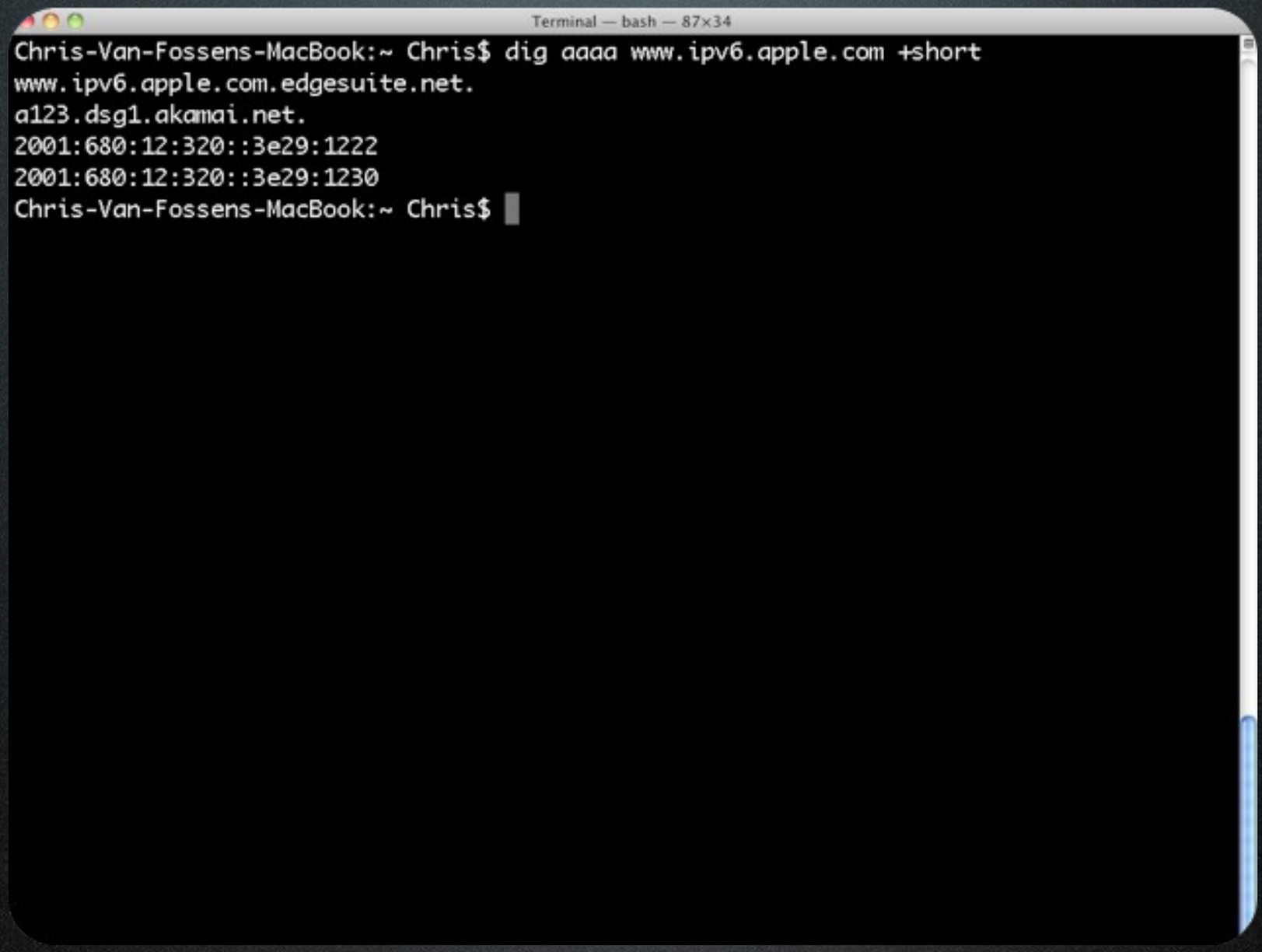
- Microsoft FixIt de-preferences IPv6 until after World IPv6 Day.
- Facebook help page recommends turning off IPv6 if you can't access FB.
- Even ARIN's v6 wiki ends with turning off v6.

Help fix my IPv6

- Dual-stacking white screen of death.
- he.net probably sees more than the average amount of timeouts. Why? Tunnel Broker users.
- “Turning off IPv6” in Mac OSX doesn’t affect a tunnel.

Help fix my IPv6

- Update, update, update (OS, browser, gateway). Disable tunnels.
- Switch to Google Chrome?
  - ✦ reduces brokenness by 80%
  - ✦ implements a variant of parallel connect that reduces latency of broken IPv6 connections.
  - ✦ fallback socket connect - 300ms to connect to IPv6, launches second v4 connect. Uses socket that connects first.



Multiple AAAAAs?

Multiple AAAAs

- Multiple DNS records (A & AAAA) is fairly common
- Some clients (Opera 11.10 & newer, some of IE 6/7/8) break, sleep, timeout, or give up with multiple AAAAs in certain networks.
- Occasionally doesn't fall back to IPv4.

Multiple AAAAAs

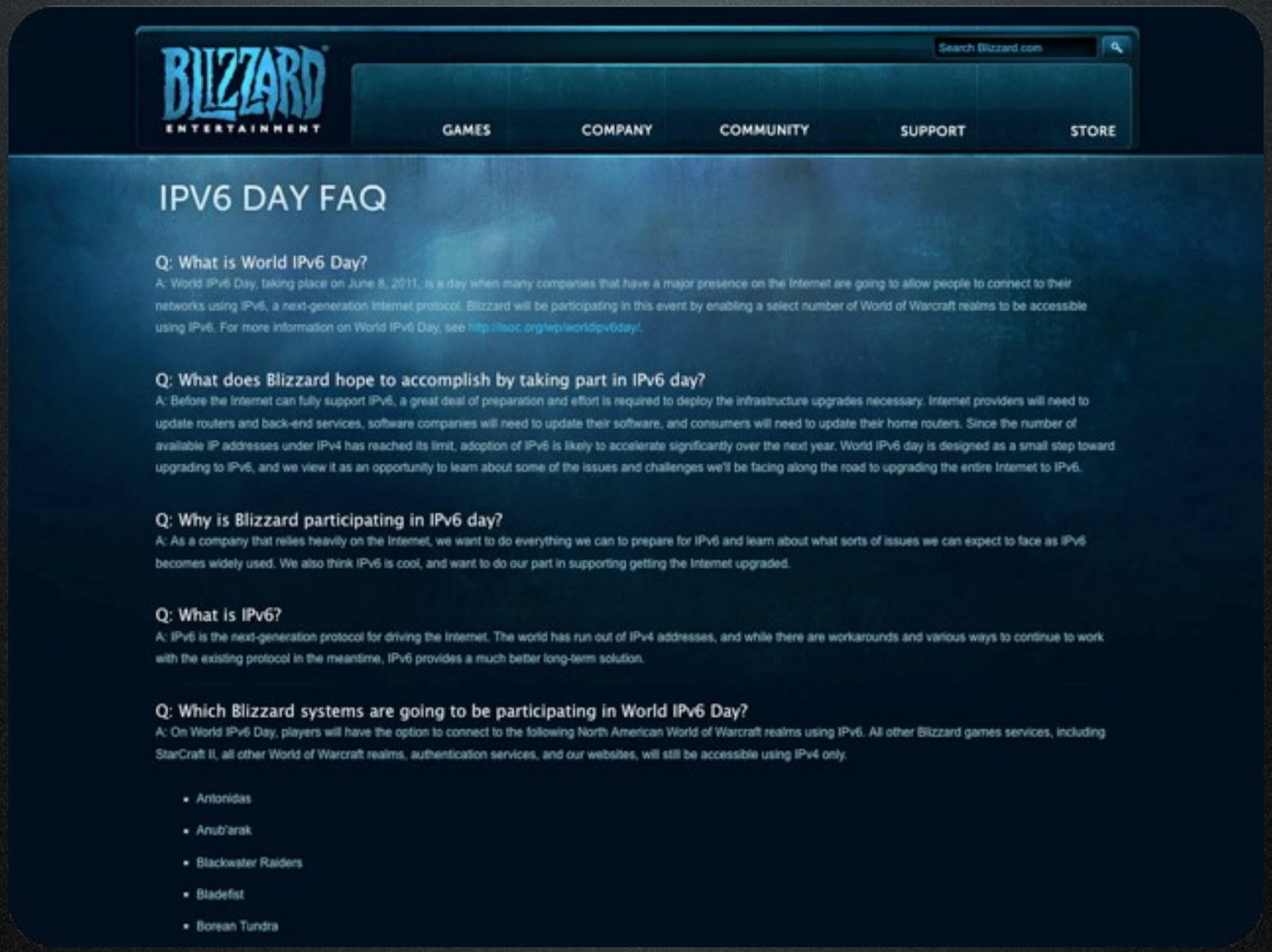
- The goal of W6D is to test long-term, permanent solutions.
- Whatever is turned on today should be capable of being left on (no lower MTU, no DNS whitelist, no limit of AAAA records returned).
- Common part of load balancing solutions that include DNS, so CDNs not anticipating future limits.

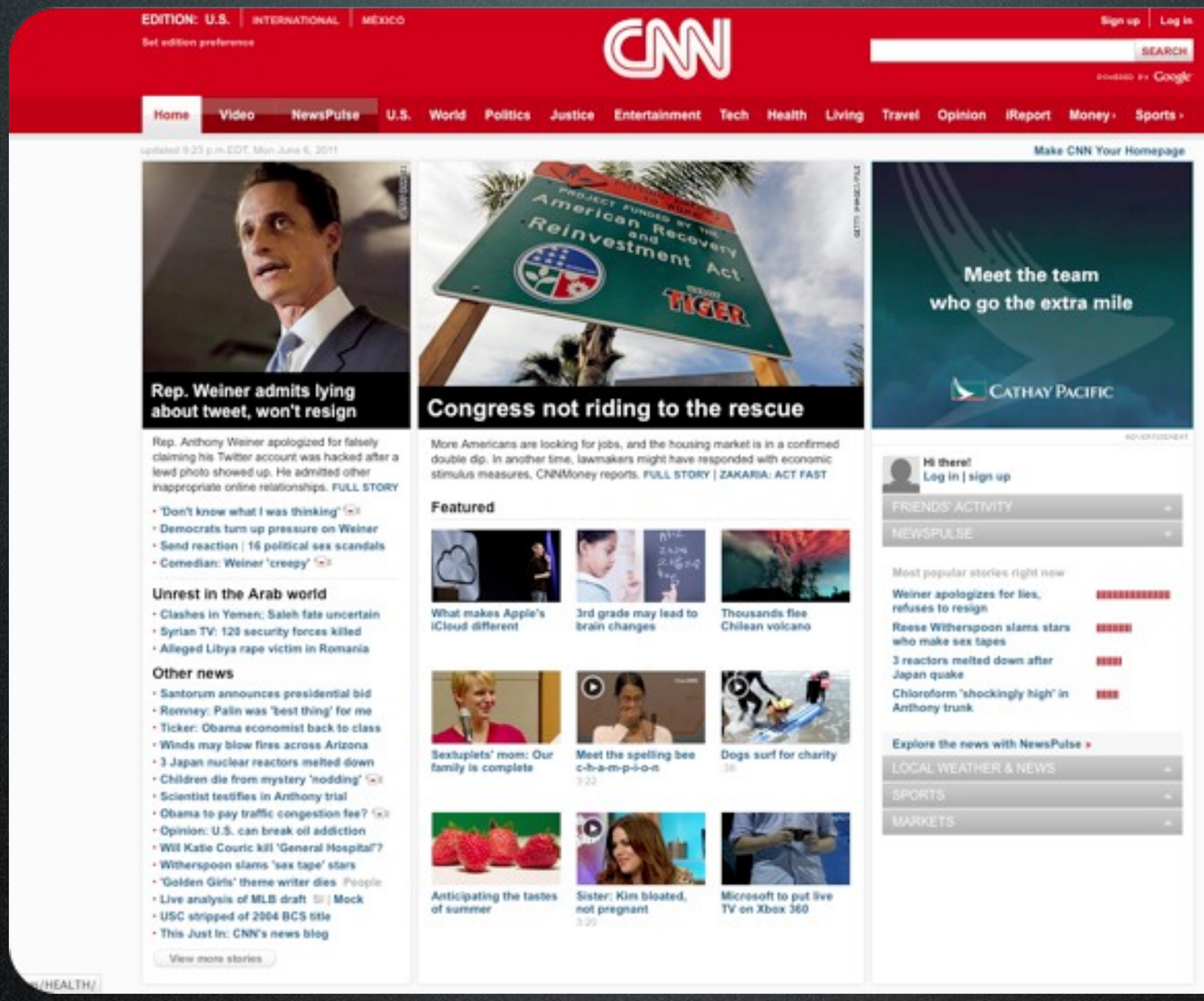
OH MY WORD,
I DON'T THINK YOU UNDERSTAND...

I FREAKING LOVE IPV6

Fun additions
to the v6 space
to the v6 space

ipv6.blizzard.com

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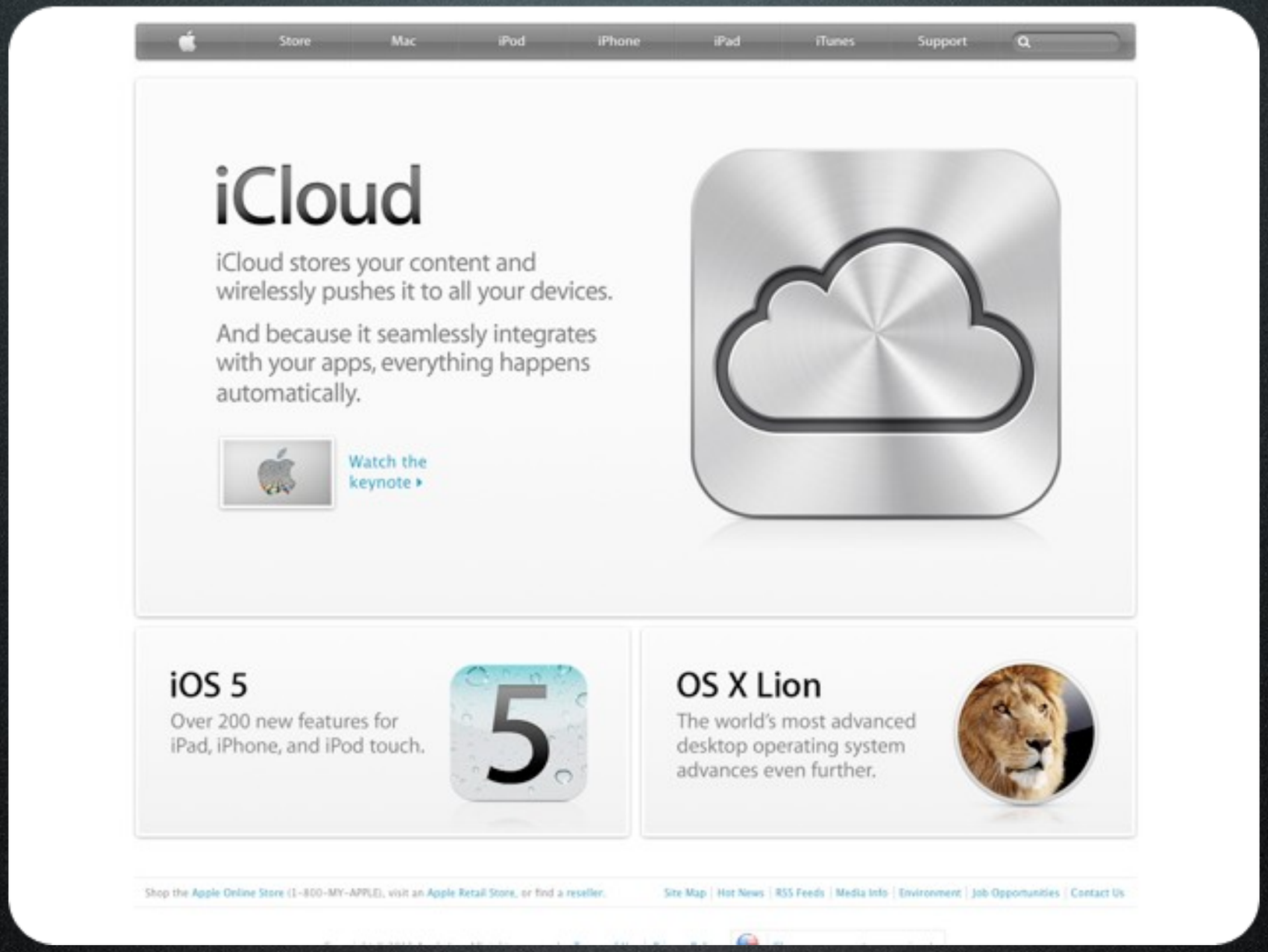

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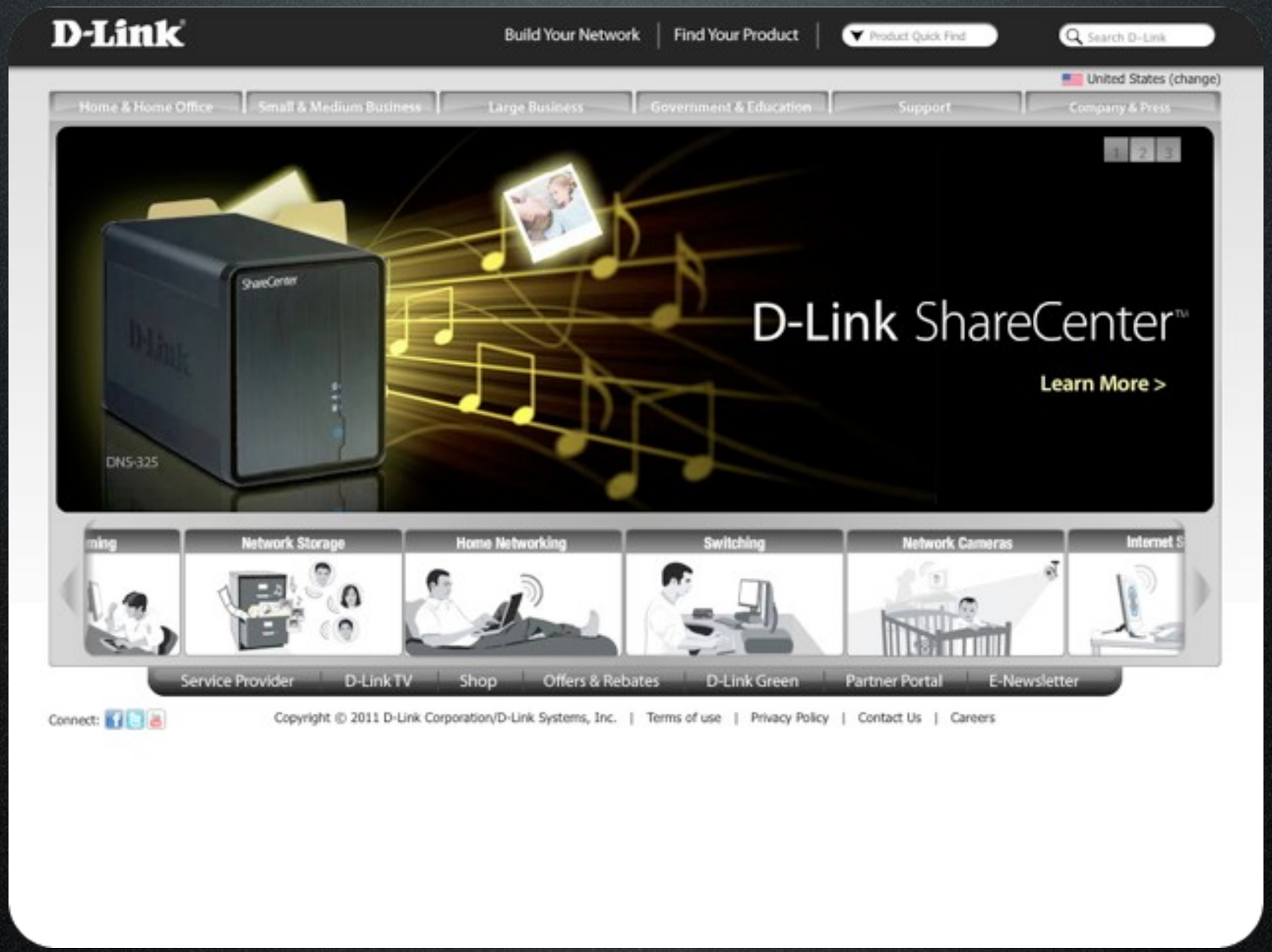
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