

IPv6 Implementation Motivations and Lessons Learned

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Motivation:

IPv4 & IPv6 Statistics

v4 Addresses
329,642,493 ↓

v4 /8s Left
7% (20/256)

v6 Networks
6% (2,143/34,366)

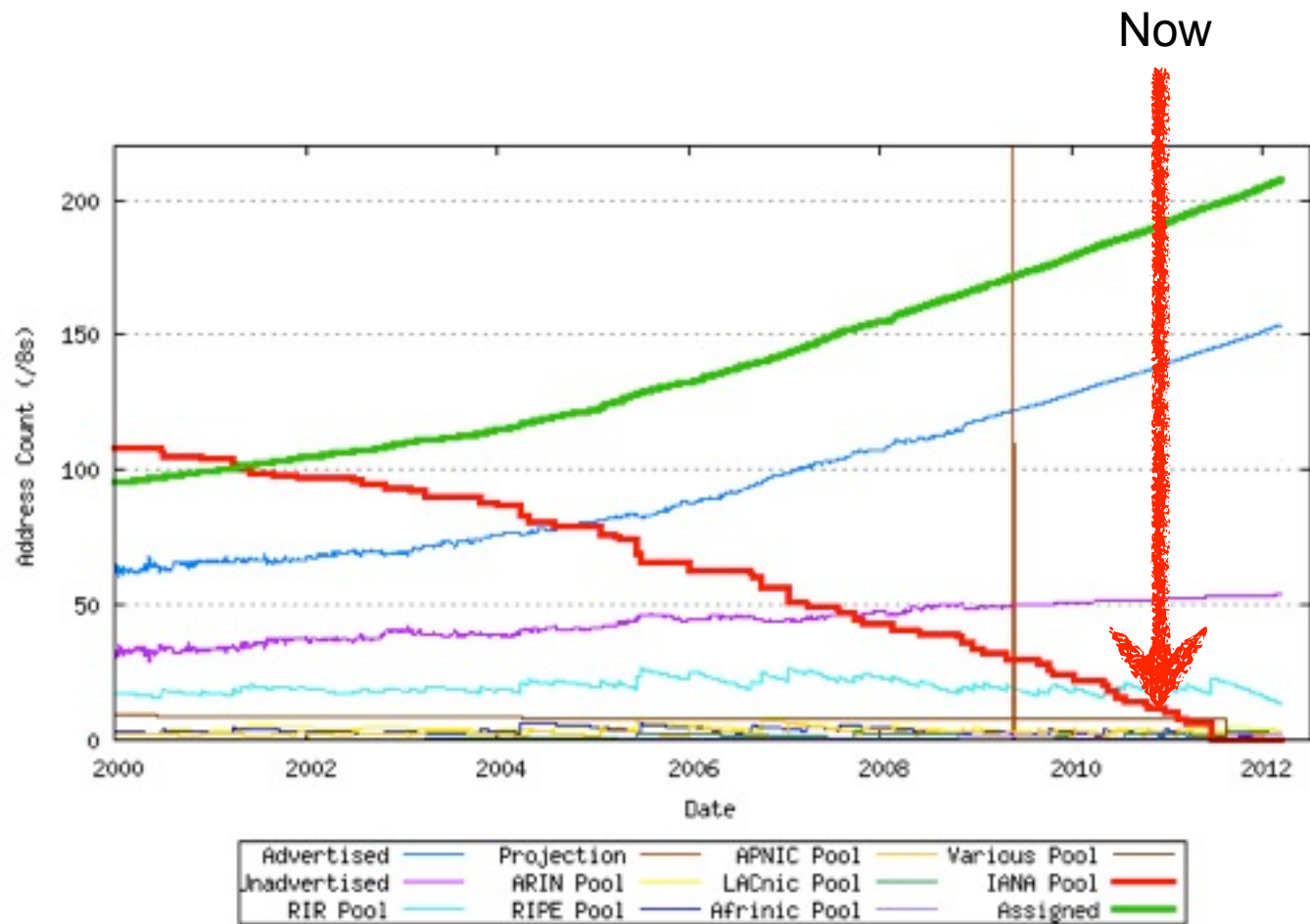
v6 Ready TLDs
80% (225/279)

v6 Glue
2,305

v6 Domains
1,474,747 ↑

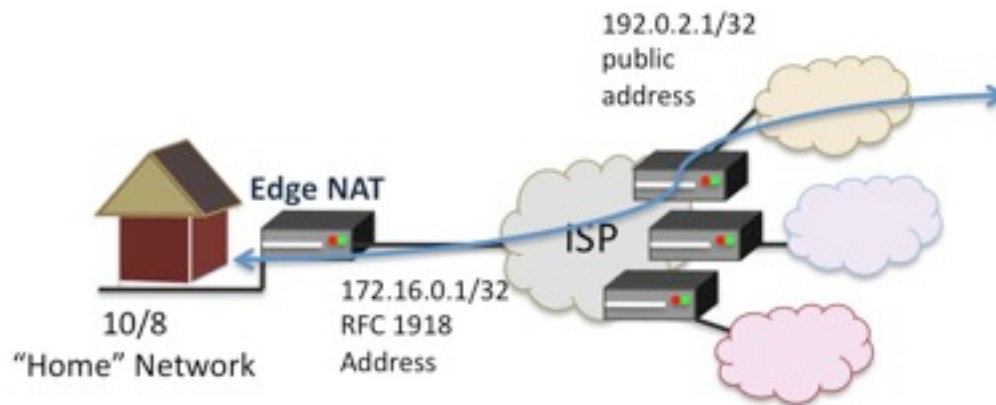
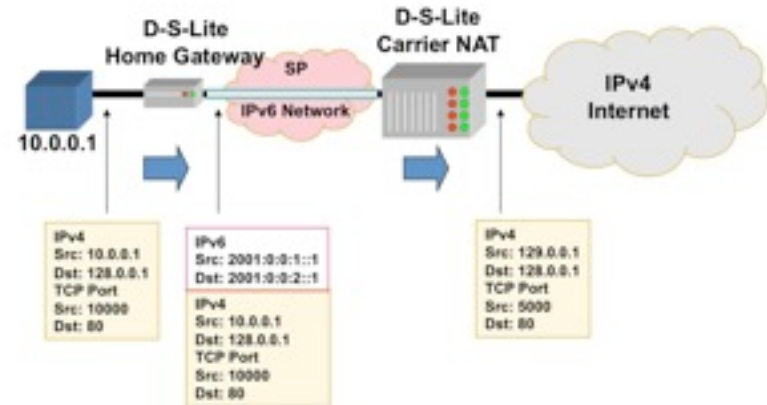
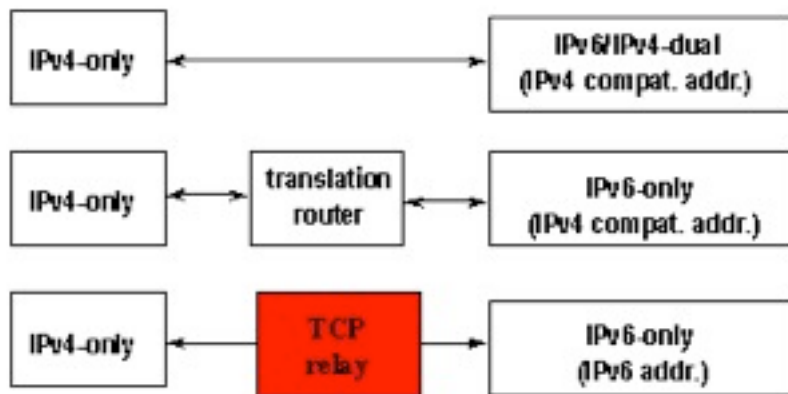
518
Days remaining

HURRICANE ELECTRIC
INTERNET SERVICES

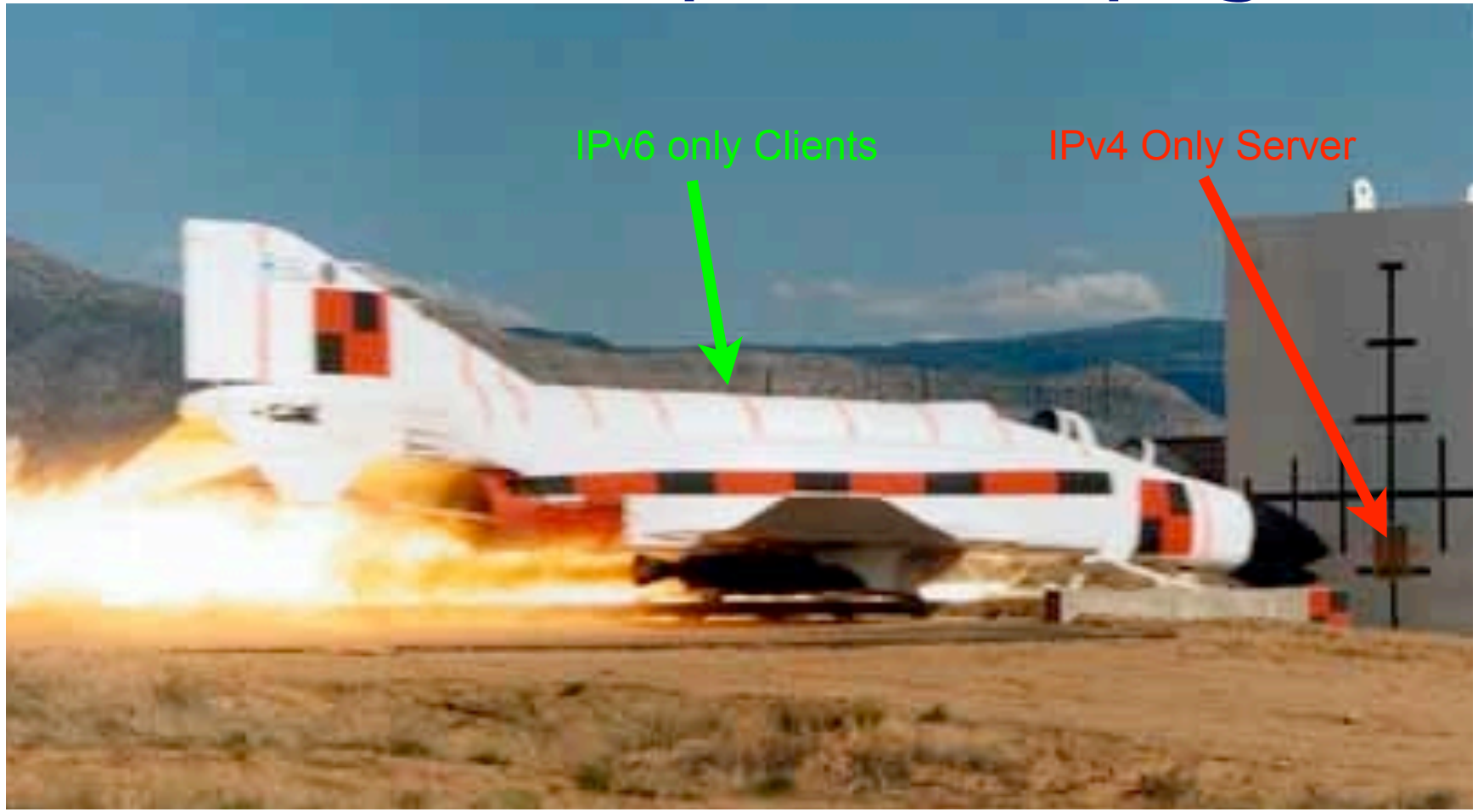


More Motivation IPv6 or THIS!

Communication between IPv4 nodes and IPv6 nodes



Summary of the technologies shown on the previous page



Motivation to Lead

- We looked at IPv4 runout and IPv6 and saw IPv6 as inevitable rather than possible.
- We didn't think it looked all that hard. (It isn't now)
- We viewed it as a learning opportunity
- It has actually worked well for us.
- In a couple of years, we'll be able to continue business as usual while much of our competition is scrambling for IPv6.



Implementation Summary

- Plan
- Build Lab
- Learn from Lab
- Add IPv6 Capability to existing network
- Add IPv6 knowledge/awareness to management applications
- Add IPv6 Capability to public-facing services and content
- Test



Implementation Summary (cont.)

- Add IPv6 DNS for public-facing services and content (if you're brave)
 - If you're not so brave:
 - Create new DNS view
 - Duplicate existing DNS data into new view
 - Map test clients to new view (remember to get a mix of v4, v6, and dual-stack clients if possible)
 - Test (make sure test clients have original functionality)
 - Add IPv6 records to new view
 - Test

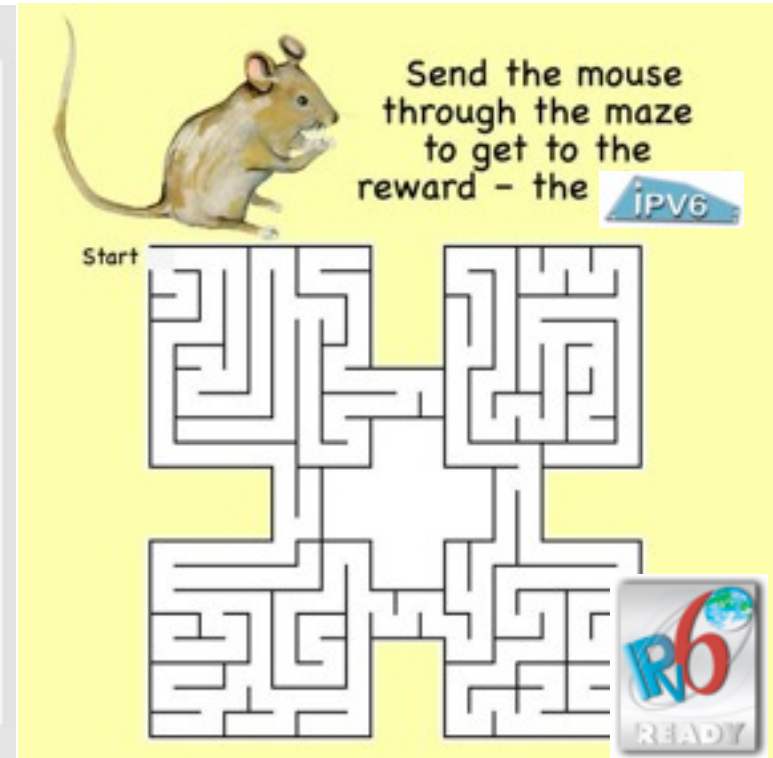


Graphical version of the previous slide

Brave:



Timid:



Lessons Learned

- There's more documentation available if you start later. (It's pretty good now, but could be better)
- Libraries change.
- Change isn't always good or bad. Sometimes it's both.
- Router vendors are willing to experiment on your production network.
- Router vendors don't always know when they are experimenting.



IPv6 Implementation -- Lessons Learned

- These look a lot like common IPv4 lessons learned.
- They are!
- The biggest lesson learned: IPv6 is a lot more like IPv4 than different, but, the differences can be important.
- Long term address policy planning is a new discipline for the internet. Learn it. Love it.



Some other lessons (less IPv4 like)

- If you get on the bus early, you might get to drive.
- The sooner you start, the more you know when others start to catch on.
- Life without NAT is good!



Some IPv6 Vendor Gotchas

- Juniper
 - routing-options and other RIB/FIB-oriented operations default to inet.0. The base IPv6 table is inet6.0. Usually you get an error message when at commit when you miss this.
- Cisco
 - BGP defaults to placing operations in family inet, silently rendering your IPv6 configurations useless unless you put them specifically under family inet6. (no error message)
- Force10
 - Single CAM cards won't take a full IPv4 table if you partition `_ANY_ IPv6`. (OUCH! -- \$\$\$)





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