HURRICANE ELECTRIC
INTERNET SERVICES

IPv6 Implementation Motivations and Lessons Learned

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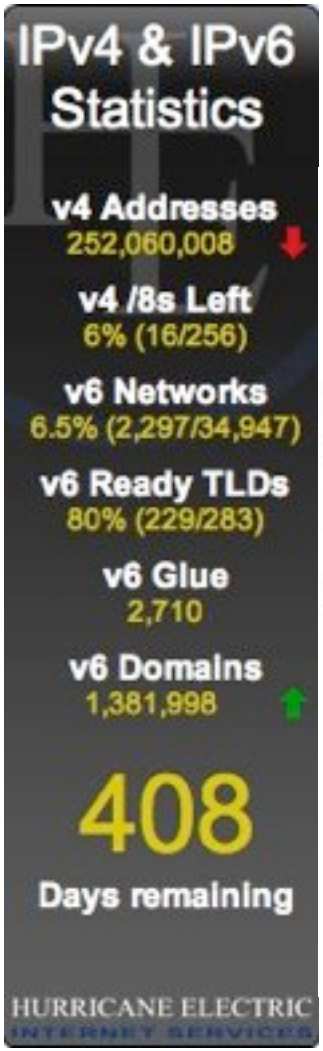
Motivation:


IPv4 & IPv6 Statistics
v4 Addresses
252,060,008
v4 /8s Left
6% (16/256)
v6 Networks
6.5% (2,297/34,947)
v6 Ready TLDs
80% (229/283)
v6 Glue
2,710
v6 Domains
1,381,998
408
Days remaining
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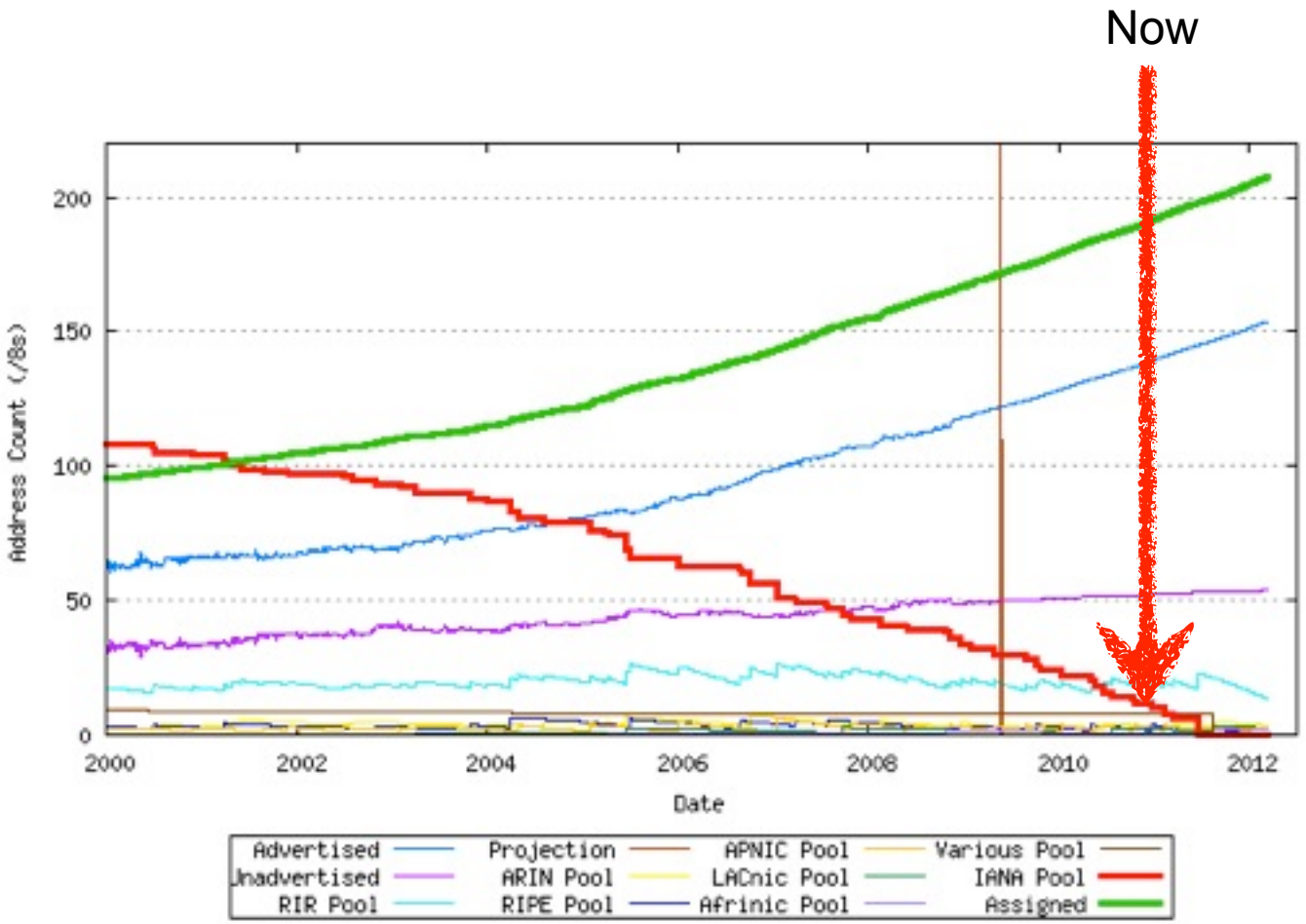
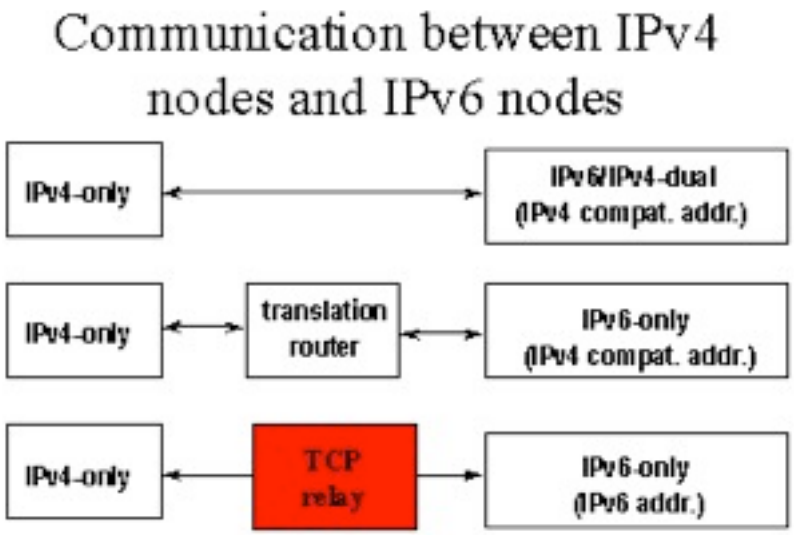
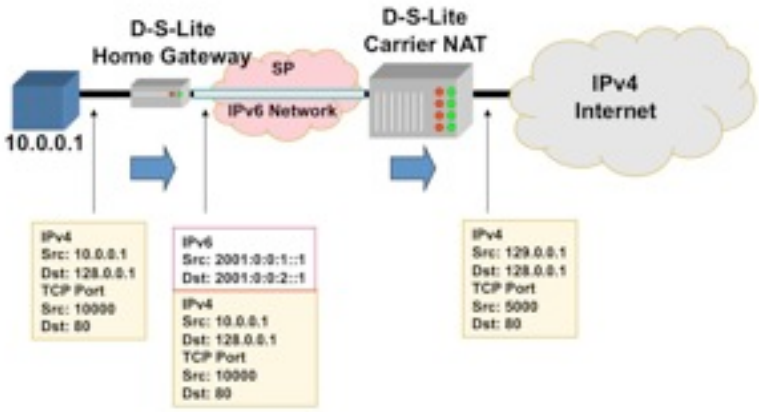
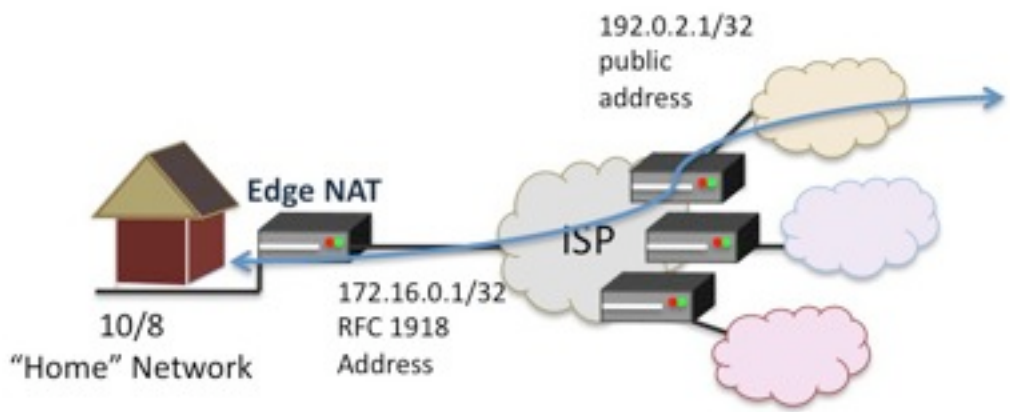

Now
Address Count (/8s)
200
150
100
50
0
2000
2002
2004
2006
2008
2010
2012
Date
Advertised
Unadvertised
RIR Pool
Projection
ARIN Pool
RIPE Pool
APNIC Pool
LACnic Pool
Afrinic Pool
Various Pool
IANA Pool
Assigned

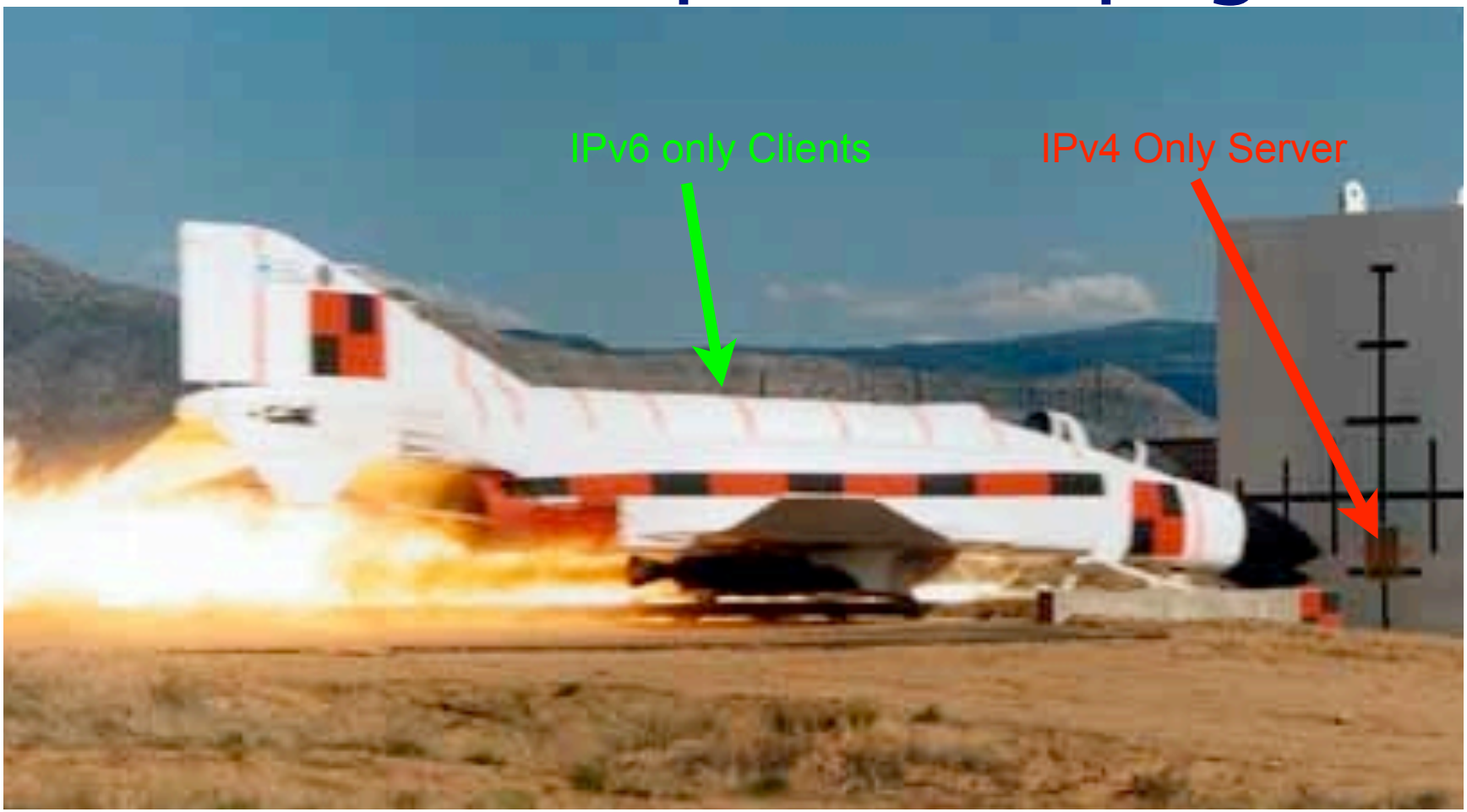
More Motivation: IPv6 or THIS!







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

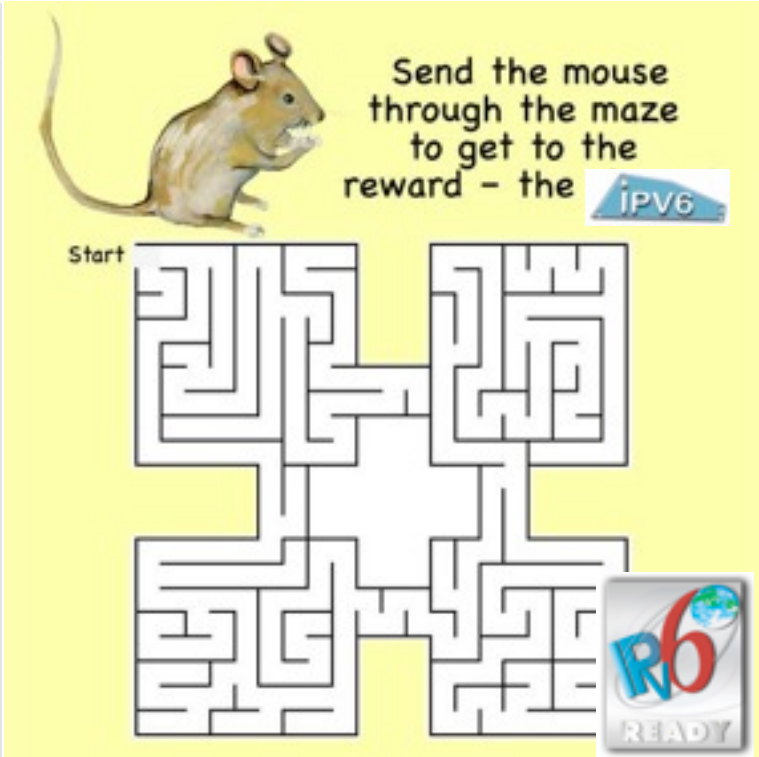
Implementation Summary (cont.)

- 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! -- $$$)

Q&A

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