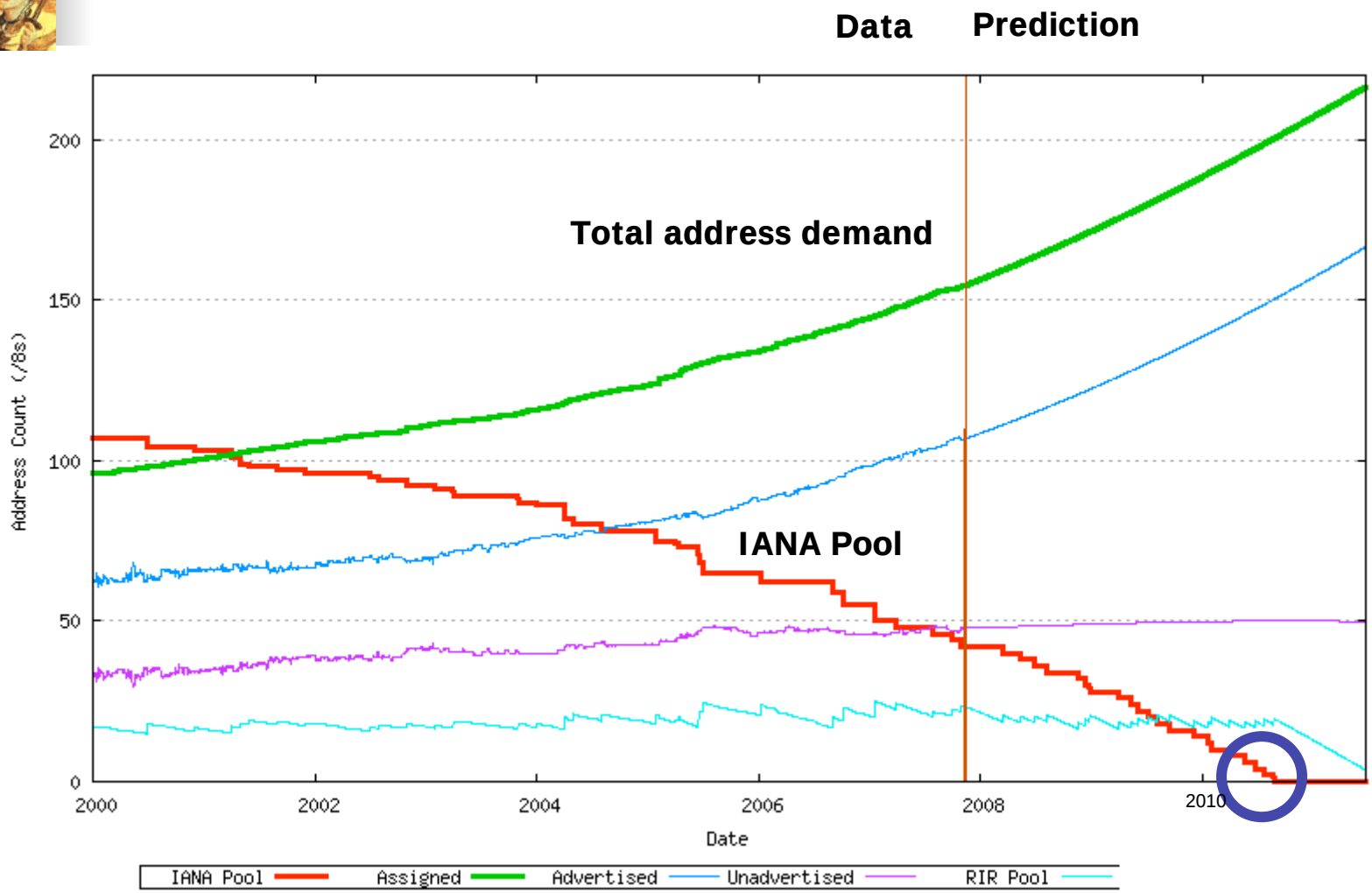
The IPv4 Consumption Model



So what?

In this model, IANA allocates its last IPv4 /8 to an RIR in the next three years or so

Or a whole lot sooner if we all panic!

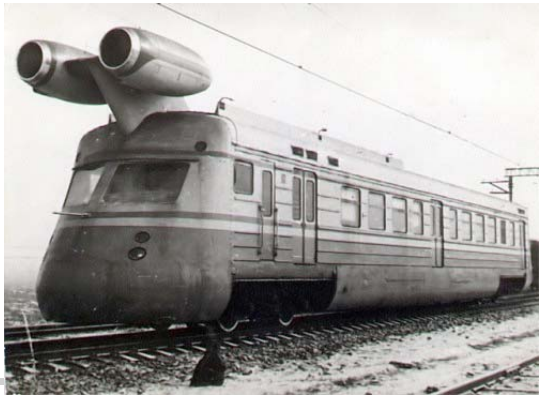
http://ipv4.potaroo.net

What then?

The “Just Add More NATs” Option

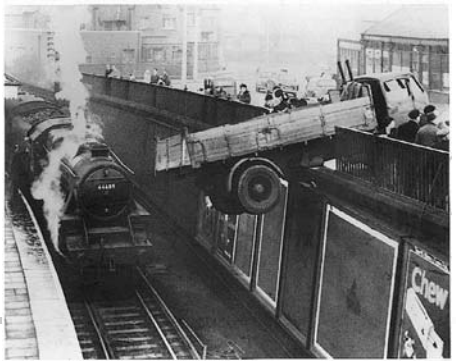
- Demand for increasing NAT “intensity”
  - Shift ISP infrastructure to private address realms
  - Multi-level NAT deployments both at the customer edge and within the ISP network
    - This poses issues in terms of application discovery and adaptation to NAT behaviours
  - Costs for public addresses may increase

The Other Option: IPv6?



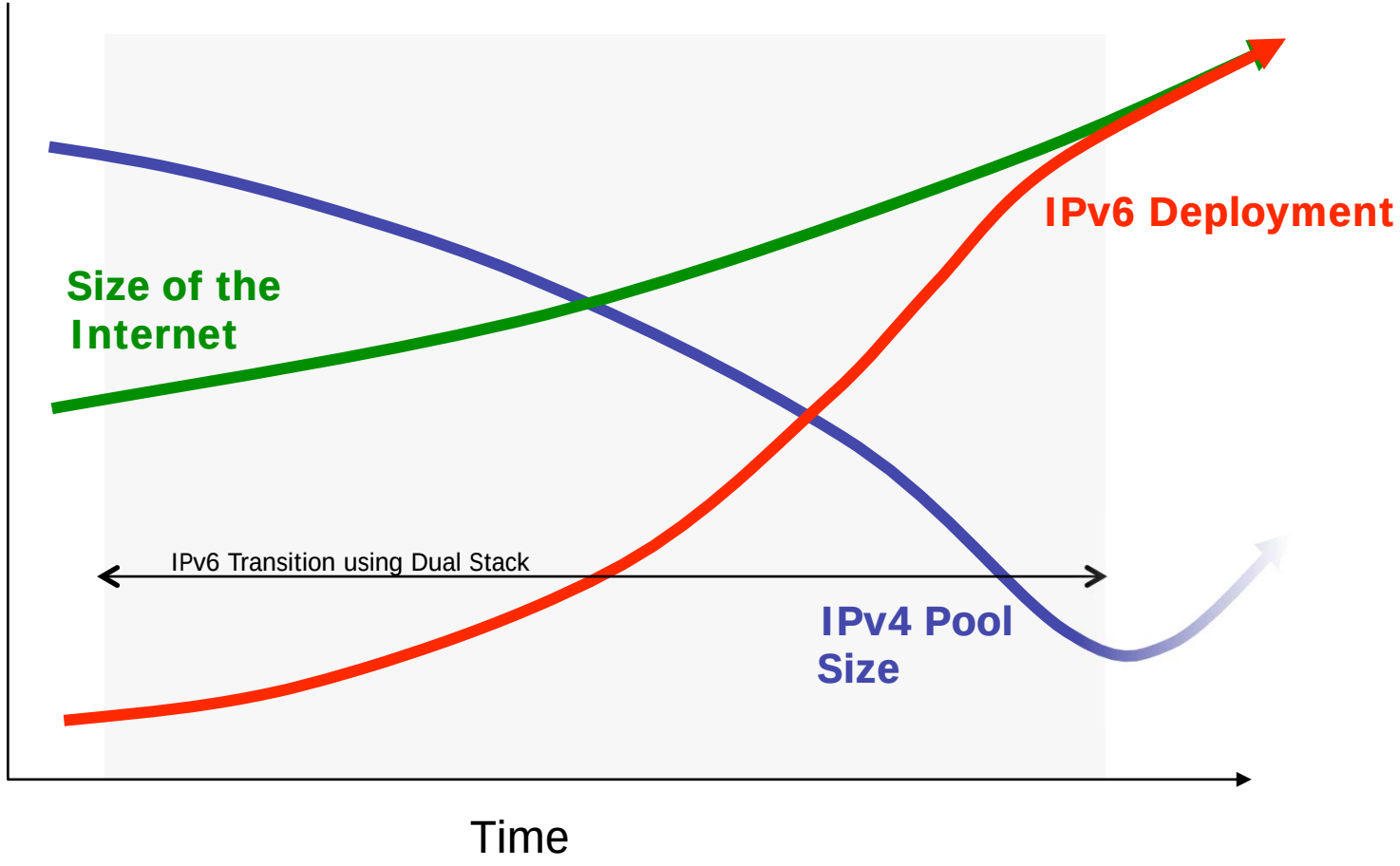
- Transition to IPv6
  - But IPv6 is not backward compatible with IPv4 on the wire
  - So the plan is that we need to run some form of a “dual stack” transition process
    - Dual stack in hosts, or dual stack via protocol translating proxies at edges, or various hybrids of the two

Dual Stack Assumptions



- That we could drive the entire transition to IPv6 while there were still ample IPv4 addresses to sustain the entire network and its growth
- Transition would take some (optimistically) small number of years to complete
- Transition would be driven by individual local decisions to deploy dual stack support
- The *entire* transition would complete *before* the IPv4 unallocated pool was exhausted

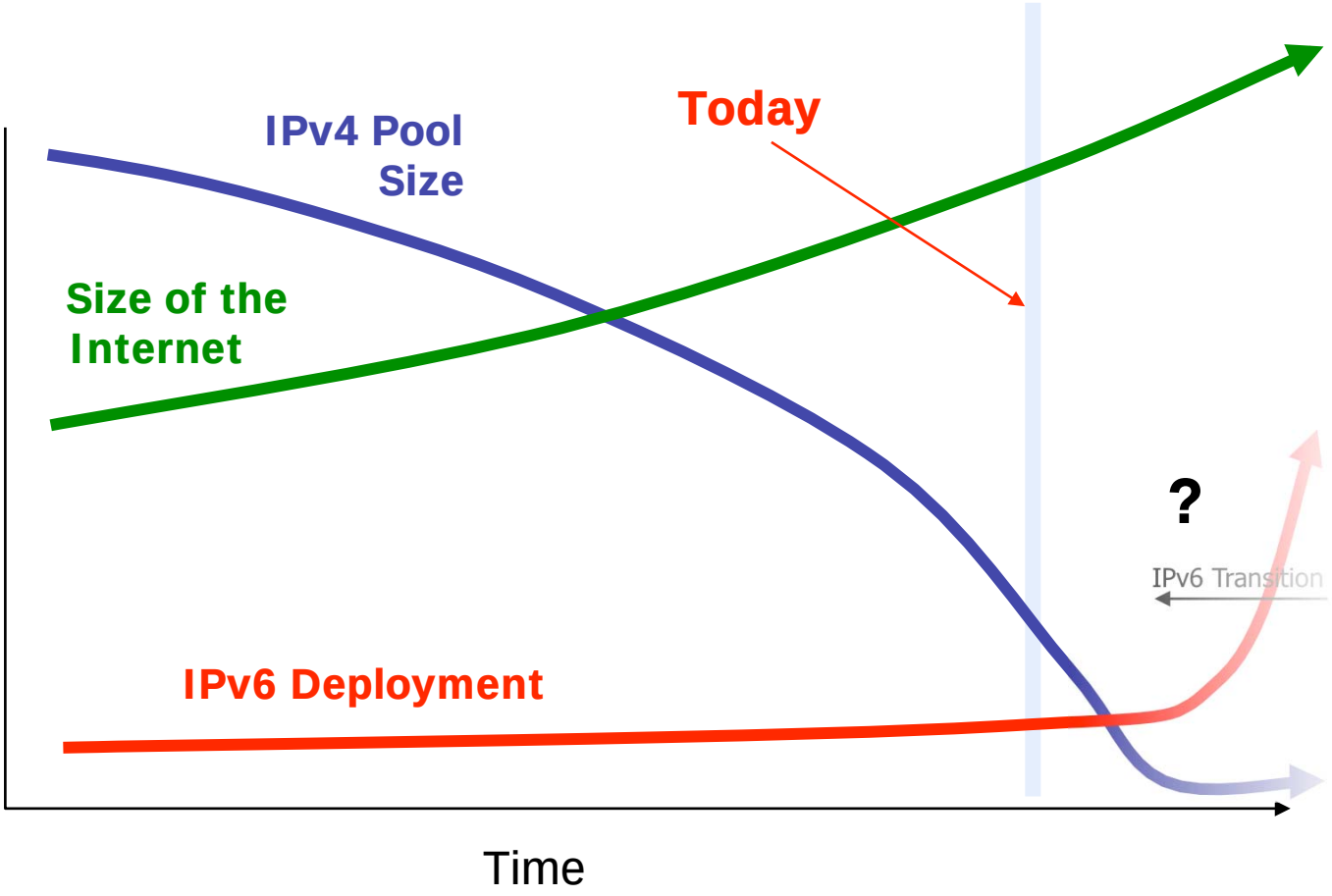
We had a plan ...


Size of the Internet
IPv6 Deployment
IPv6 Transition using Dual Stack
IPv4 Pool Size
Time

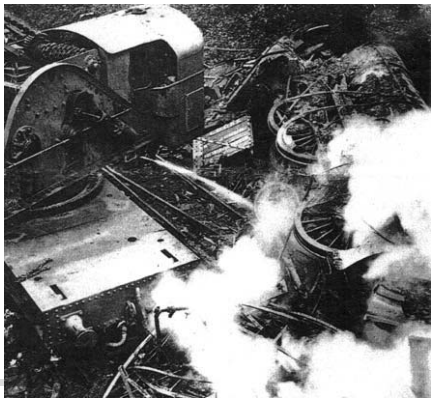
Oops!

- We were meant to have completed the transition to IPv6 BEFORE we completely exhausted the supply channels of IPv4 addresses

What's the revised plan?



Implications



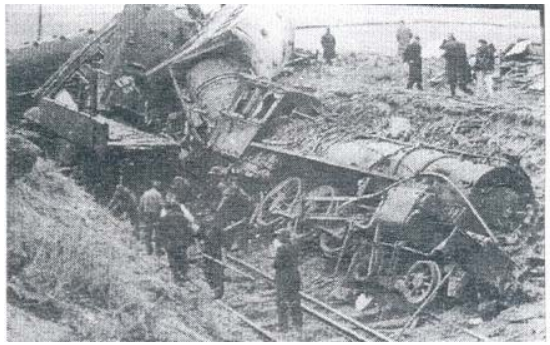
- Whether its just IPv4 NATs OR transition to IPv6 ...
  - IPv4 addresses will continue to be in demand far beyond the date of exhaustion of the unallocated pool
    - In the transition environment, all new and expanding network deployments will need IPv4 service access and addresses for as long as we are in this dual track transition
  - But the process is no longer directly controlled through today's address allocation policies
    - that IPv4 address pool in the sky will run out!
    - the mechanisms of management of the IPv4 address distribution and registration function will necessarily change

Making IPv4 Last Longer

- For how long?
- For what cumulative address demand?
- For what level of fairness of access?
- At what cost?
- For whom?
- To what end?

- What if we actually achieve what we set out to do?
  - How would the Law of Unintended Consequences apply here?
  - Would this negate the entire “IPv6 is the solution” philosophy?

Implications



It is likely that there will be some disruptive aspects of this situation that will impact the entire industry

- the original transition plan is a business failure
- resolution of this failure is now going to be tough

This will probably not be seamless nor costless

And will probably involve various forms of regulatory intervention, no matter what direction we might take from here