IPv4 Consumption Update

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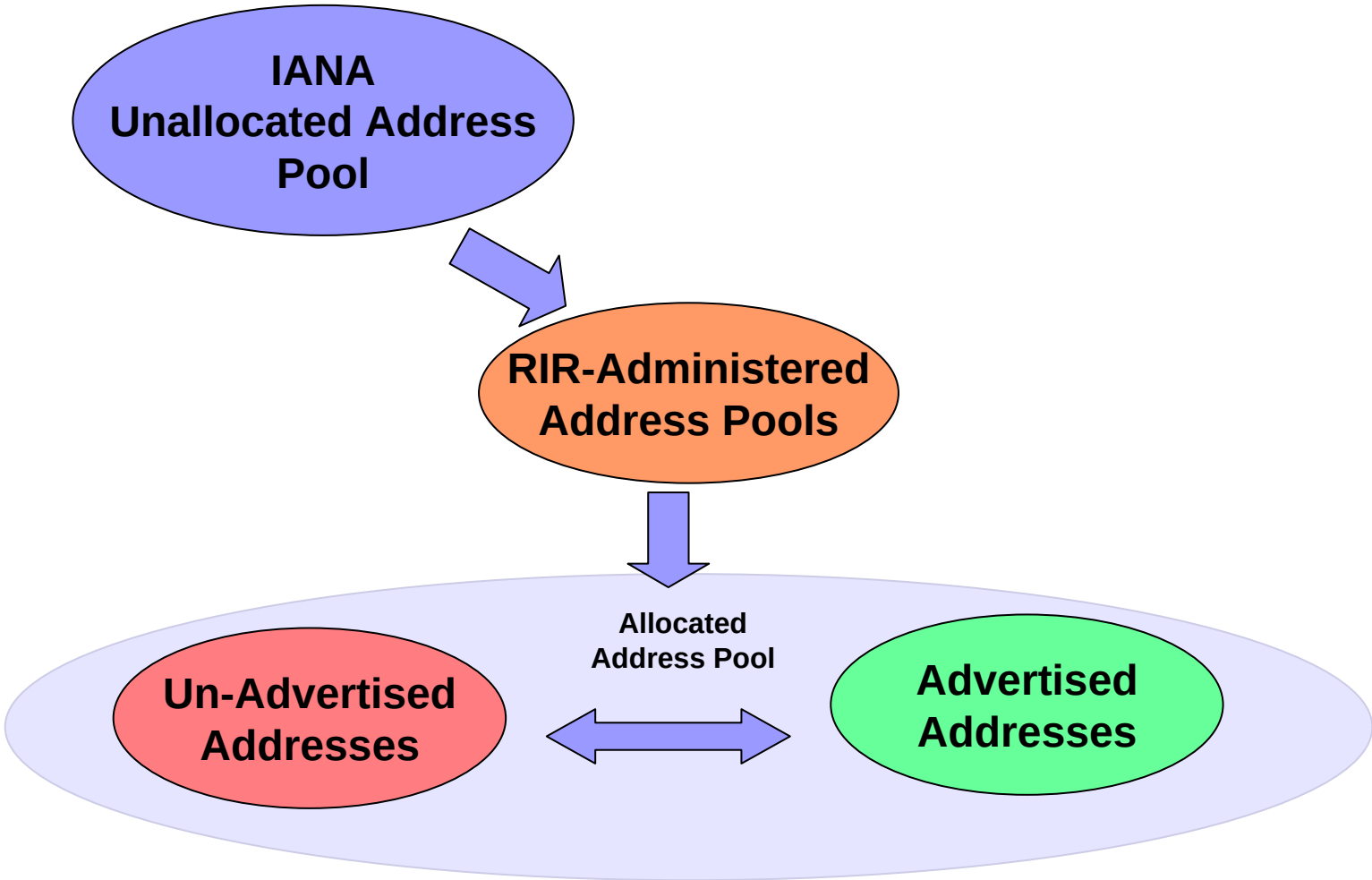
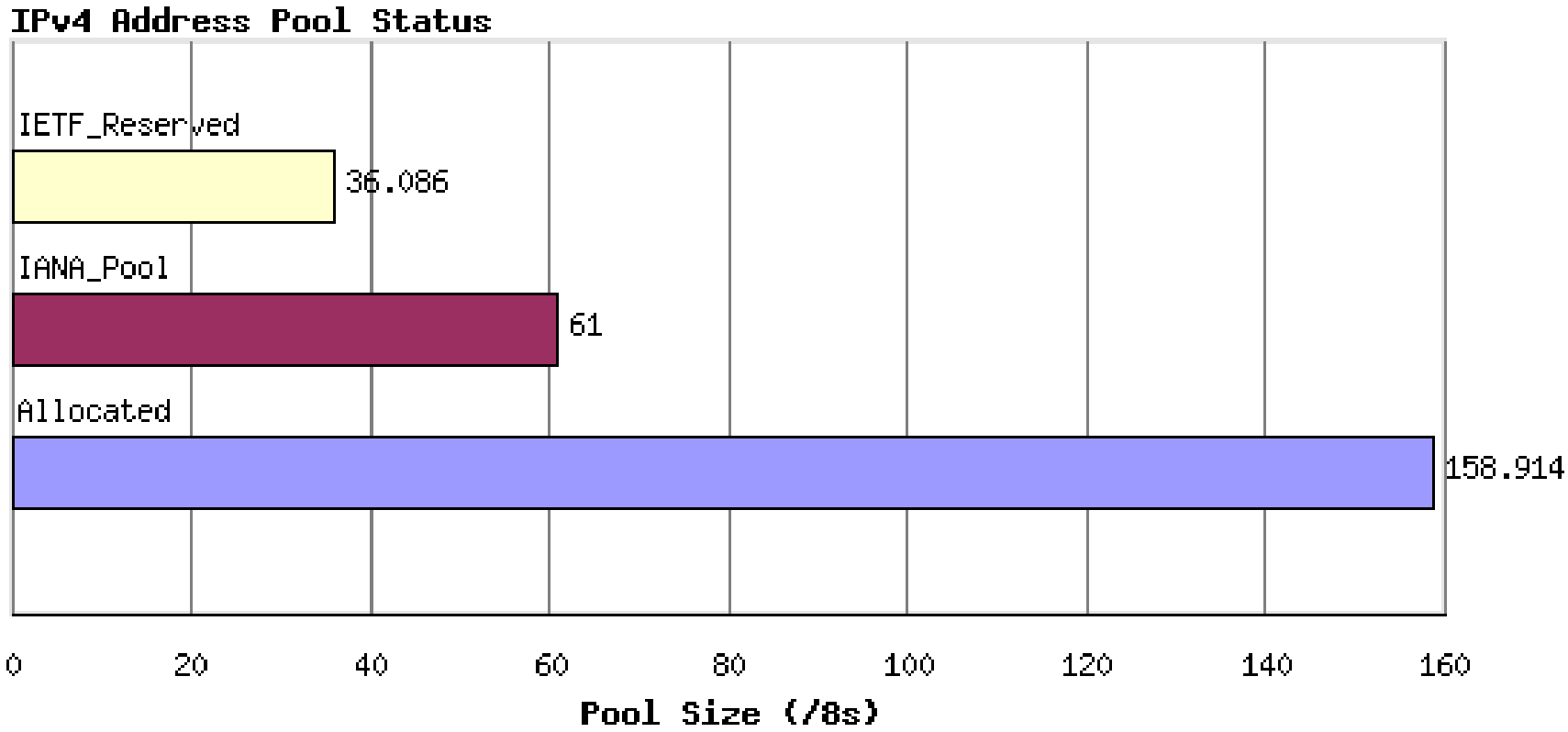
APNIC

Address Distribution Framework



IPv4 - Current Status (July 2006)



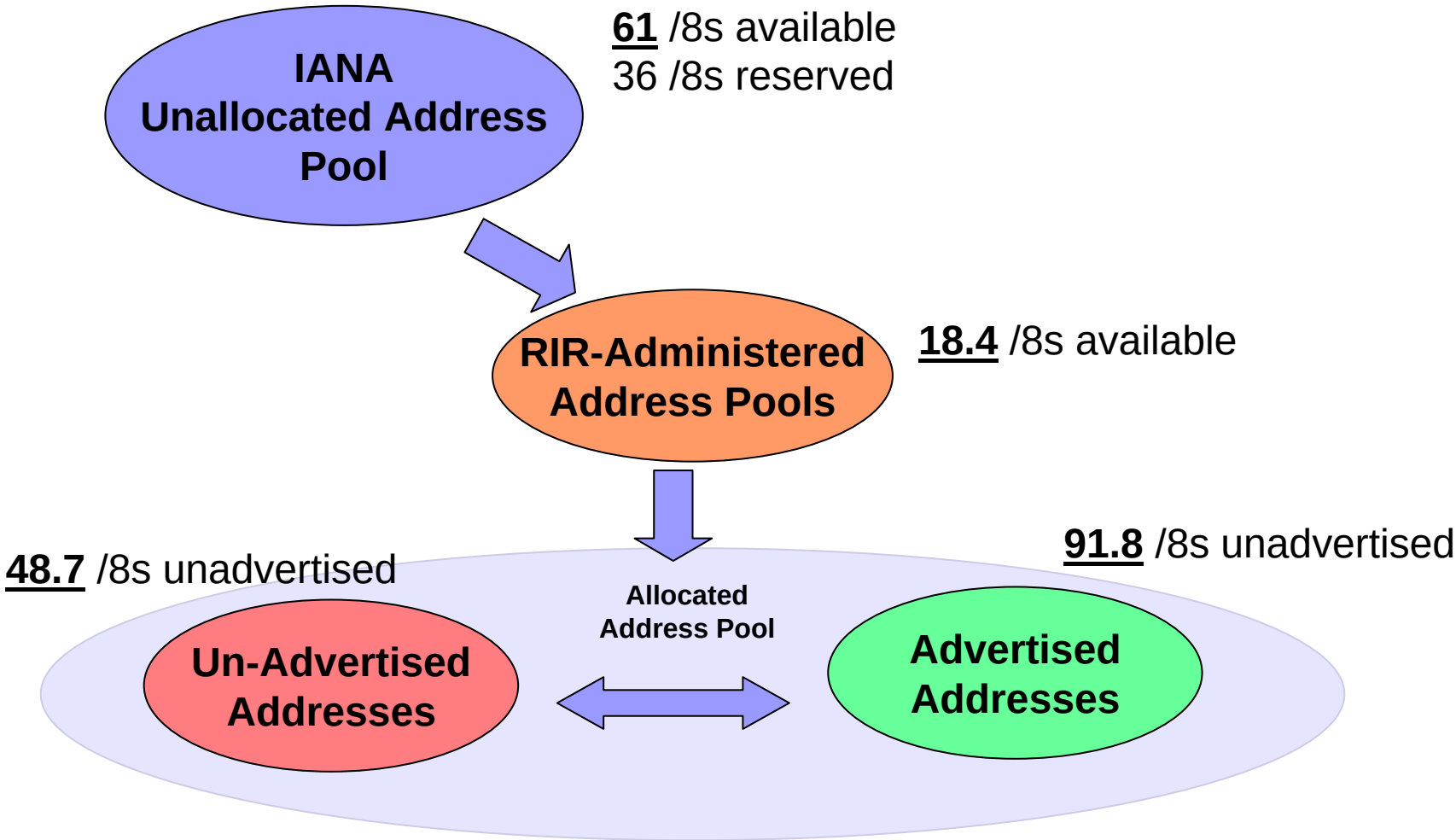
What's the Question?

- Some possibilities:
  - When do we 'run out' of IPv4 address space?
  - When will it be impossible to obtain an IPv4 address block?
  - When will it be impossible to obtain an IPv4 address block for any price?
  - When do we need to have IPv6 deployed?
  - When will the current IPv4 address distribution policies fail?
  - What would / might happen thereafter?

My Question:

- When will the first RIR exhaust its IPv4 address pool, and be unable to service a request for IPv4 address space?

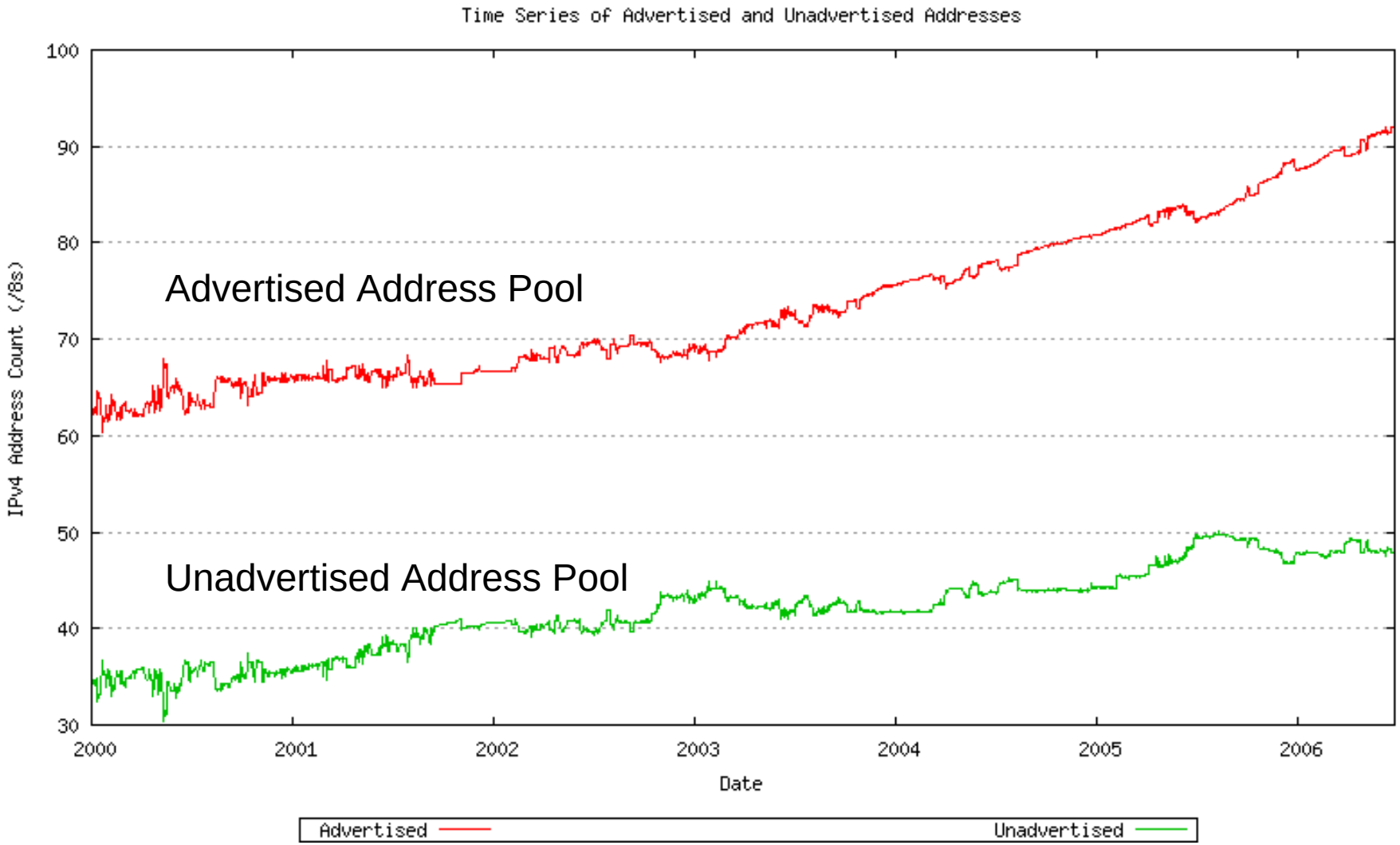
Address Distribution Framework



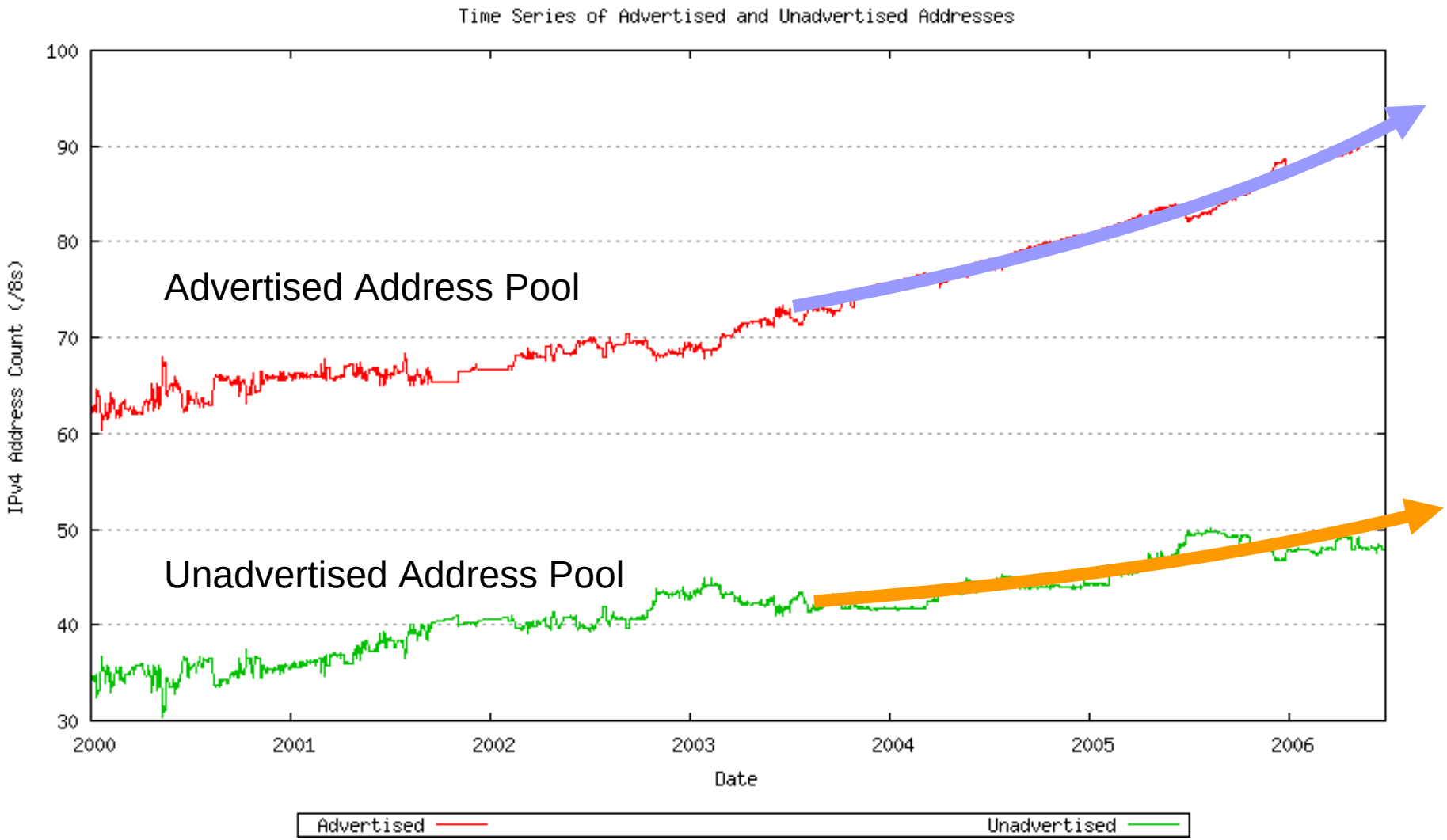
Prediction Model

- Total Address “demand” is expressed by the size of the allocated address pool
  - This is the sum of advertised and unadvertised address pools
  - So a total demand predictive model can be constructed from predictors of advertised and unadvertised address space

Total Address Demand

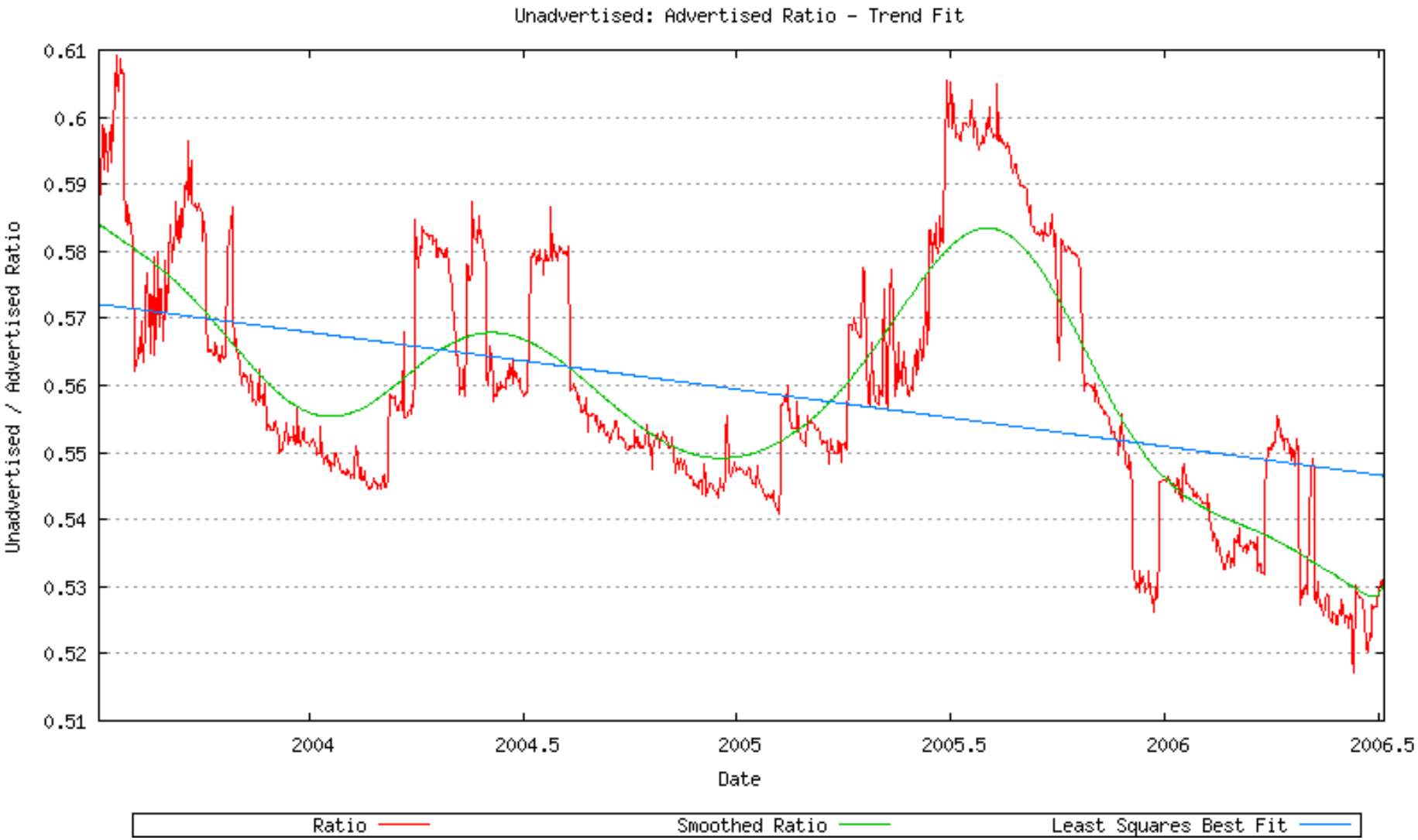


Address Demand

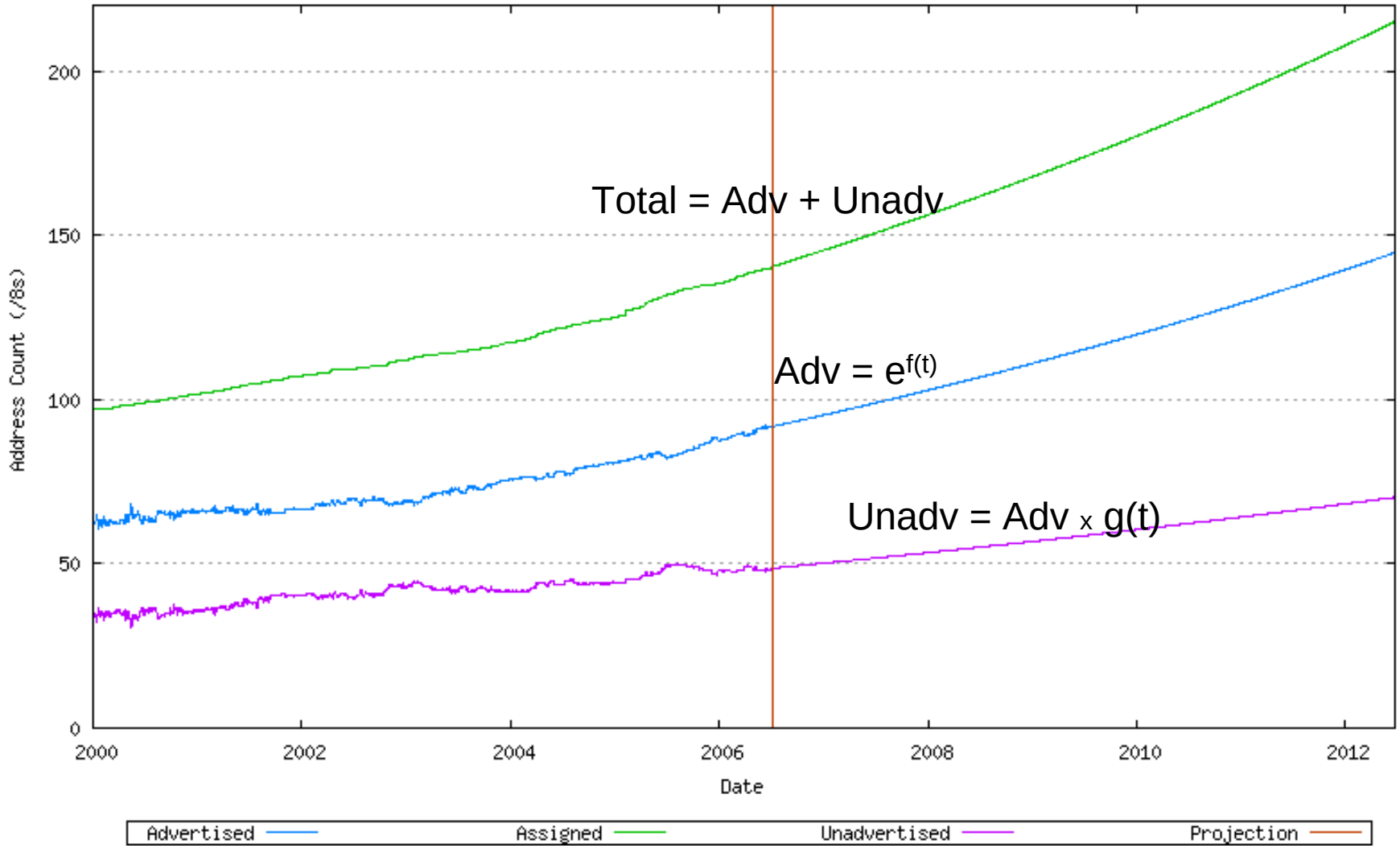


Advertised Address Growth

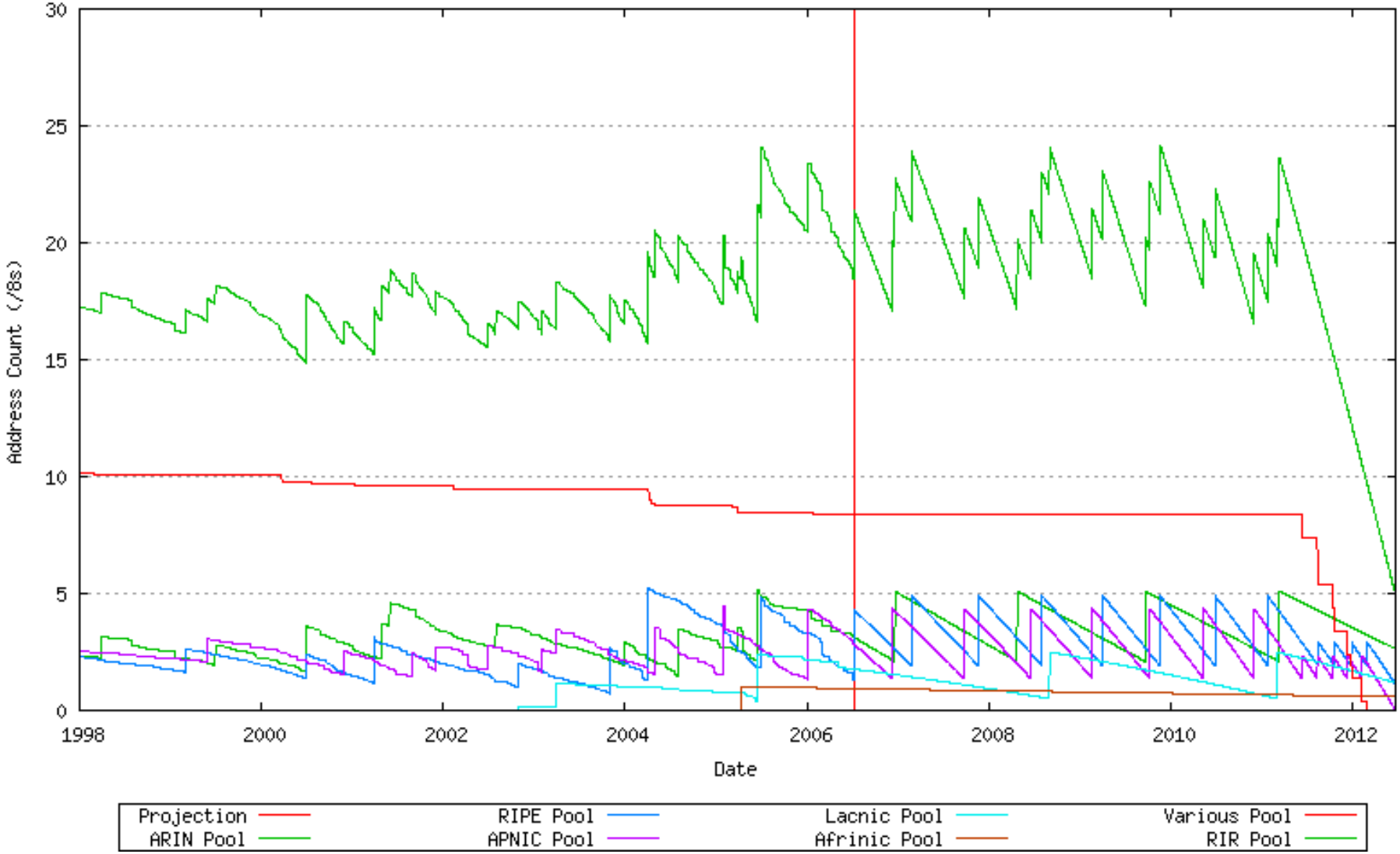
Unadvertised : Advertised Ratio



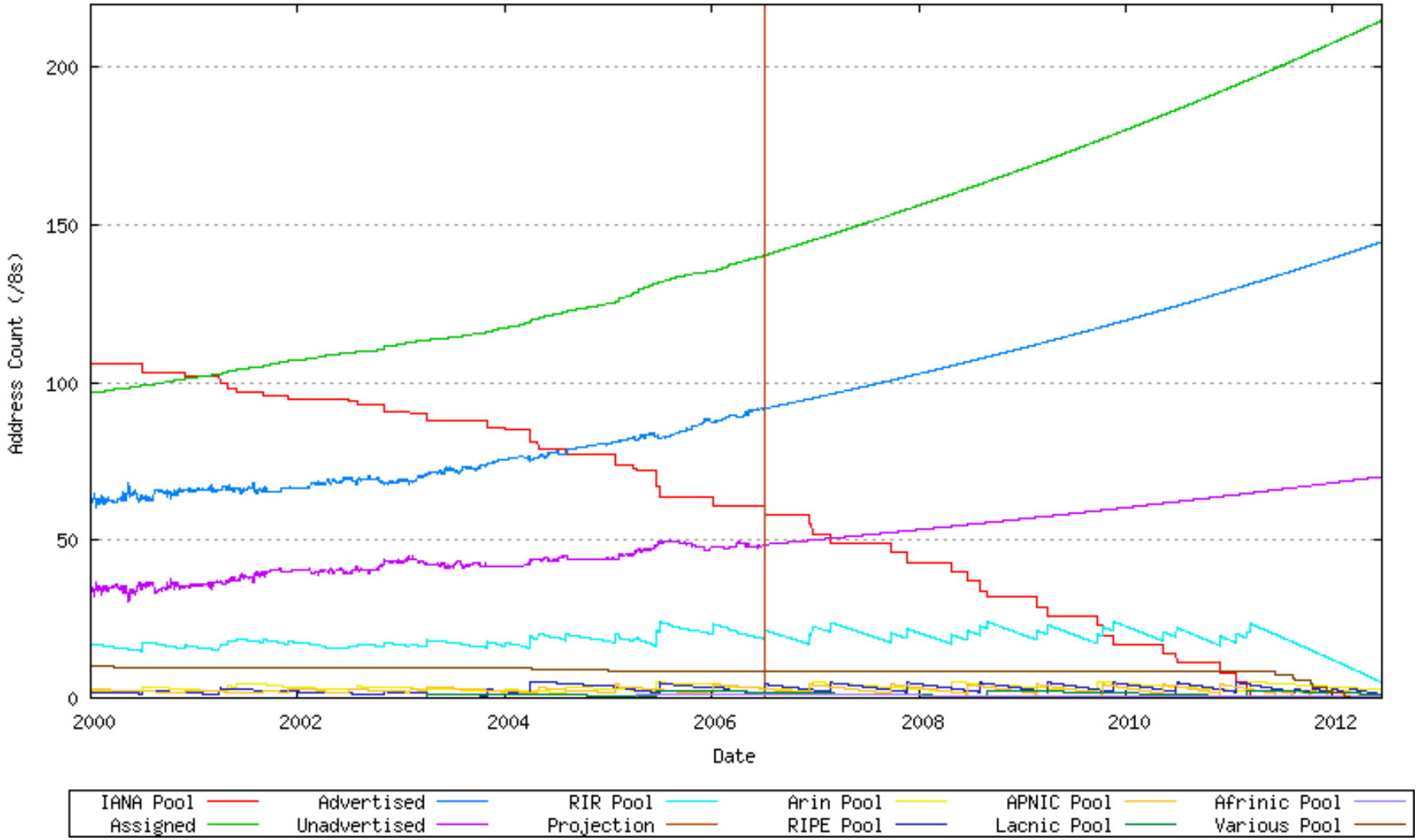
Address Demand Prediction Model



Modelling RIR Address Pools



Demand and Supply



My Question:

- When will the first RIR exhaust its IPv4 address pool, and be unable to service a request for IPv4 address space?

  Currently, the model predicts: March 2011

How reliable is this prediction?

- The model applies an exponential curve fits to recent (3 year) data and then undertakes forward extrapolation
  - Address consumption has been increasing over the past 24 months at a slightly faster than modelled exponential growth rate, so the model has been under-predicting for the past 6 months.
  - A better fit to recent data would be via an O(2) polynomial.
  - Are we actually modelling industry growth (consumption) or consumption plus some level of hoarding behaviours?
  - Either way, there are a lot of uncertainties associated with this consumption model

What does this mean?

- This model indicates that the current IPv4 address allocation framework will reach its logical conclusion in the 2009 – 2012 timeframe, when the first of the RIR's unallocated address pools is exhausted

What Then?

- Some possibilities include:
  - Policy shifts in the address distribution function?
  - Emergence of markets that would mediate supply and demand of address transfer through a pricing function?
  - Further impetus to NAT deployment?
  - Impetus to IPv6 deployment?
  - The destruction of the Internet as we know it?

Some Resources:

- IPv4 Address Report
  http://ipv4.potaroo.net
- Internet Protocol Journal, Vol. 8, No. 3
  http://www.cisco.com/web/about/ac123/ac147/archived_issues/ipj_8-3/ipv4.html
- Internet Identifier Consumption
  http://www.caida.org/research/id-consumption/

Thank You