


IPv4 depletion and migration to IPv6

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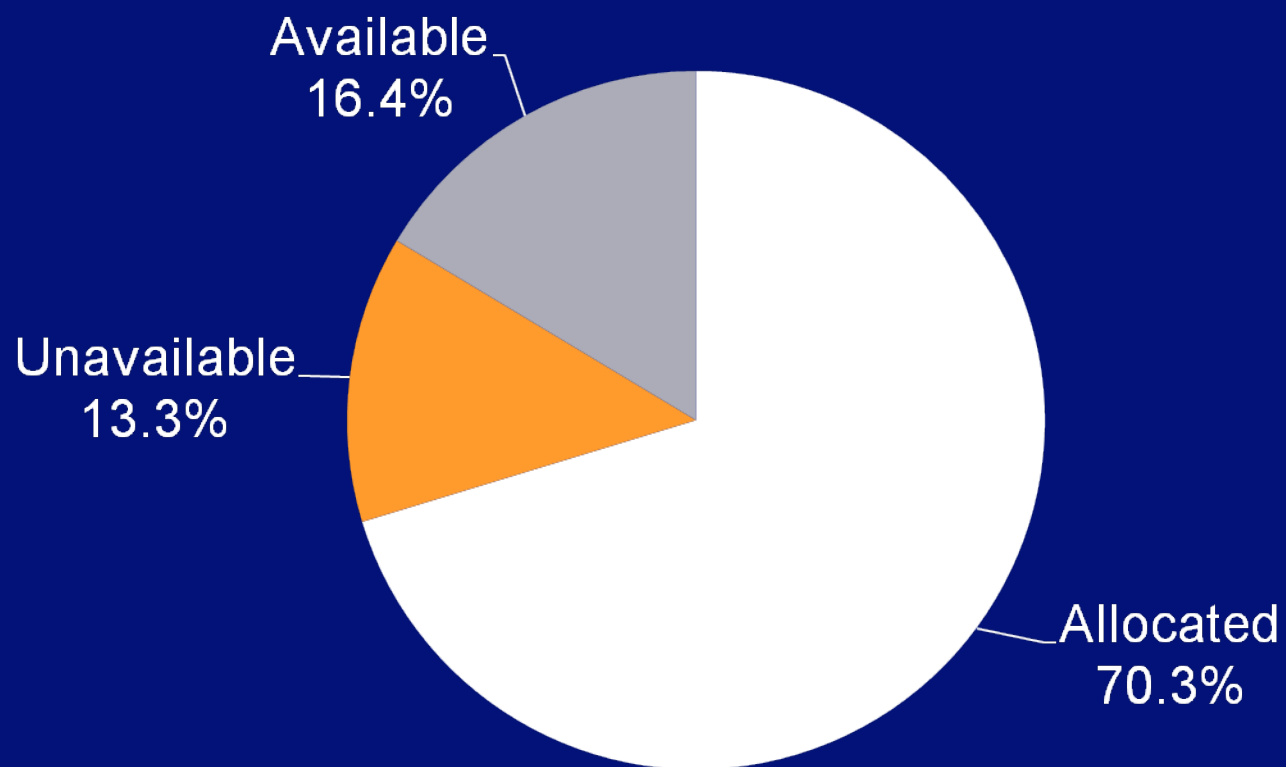
Agenda

- * Quick History of IPv4 & IPv6
- * IPv4 Utilization and Trend
- * Situation
- * Call for Action
- * Q & A

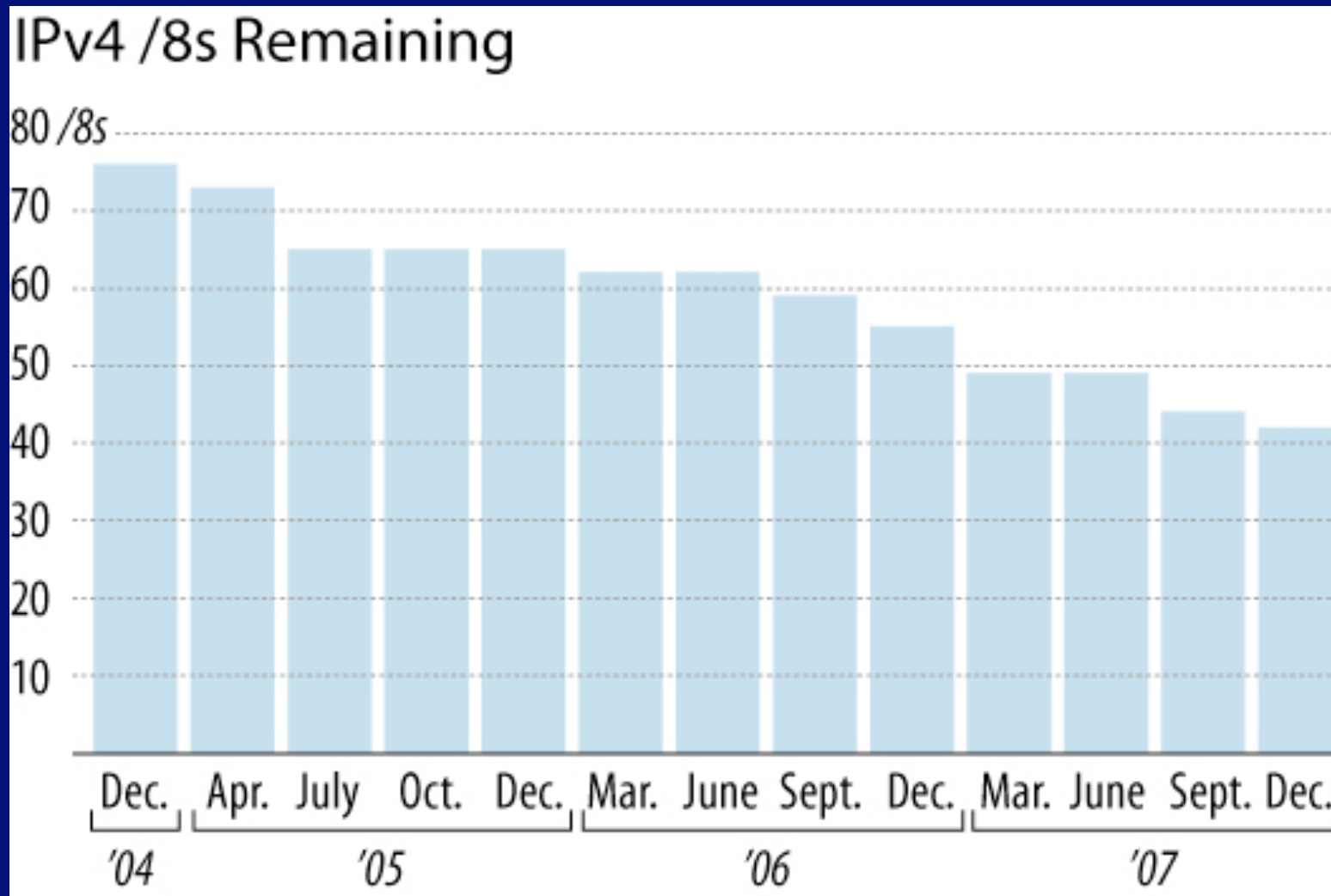
Quick History of IPv4 & IPv6

- * Internet Protocol (IPv4)
 - ▶ ARPANET - Spring 1978
- * IAB / IETF ROuting and ADdressing (ROAD) Effort
 - ▶ 1991 - 1993
 - ▶ Two outcomes: CIDR and IPng
- * Classless Inter-Domain Routing (CIDR)
 - ▶ Removal of the strict class A / B / C address boundaries
 - ▶ Allows for more granular allocations by IP registries and ISP's
- * IP Next-Generation (IPng)
 - ▶ Established criteria for next version of Internet Protocol
 - ▶ Evaluated numerous submissions
 - ▶ Final consensus output became Internet Protocol version 6 (IPv6)

IPv4 - Address Space Utilization



IPv4 - Address Space Trend



Situation

- ★ “...Migration to IPv6 numbering resources is necessary for any applications which require ongoing availability from ARIN of contiguous IP numbering resources” - ARIN Board, 7 May 2007

- ★ What applications are likely require ongoing availability of contiguous IP number resources?
 - ▶ Build out of major new networks
 - ▶ Addition of new customers by Internet Service Providers
 - ▶ However, creative alternatives might suffice for the immediate future

- ★ What does this mean for:
 - ▶ Enterprise Customers?
 - ▶ Internet Service Providers?
 - ▶ Equipment Vendors?
 - ▶ Content and Hosting Firms?

Call for Action - Enterprise Customers

"Be liberal in what you accept, and conservative in what you send."
- Jon Postel, Internet Pioneer, RFC760.

- ★ Today, there are organizations attempting to reach your mail and web servers via IPv6
- ★ In the near future, there will be organizations that have no choice but to reach your mail and web servers via IPv6
- ★ To meet their expectations and expectations of your internal customers (who wish to be reachable from "the entire Internet"), your mail and web servers need to be reachable via IPv6 in addition to IPv4
- ★ Purely each organization's decision regarding timeline & investment level

Call for Action - Internet Service Providers

- * Today, the Internet is predominantly based on IPv4
- * We must evolve the Internet to have two IP versions at the same time (IPv4 & IPv6) - this is the "dual-stack" approach.
- * There is no choice in this matter; IPv4 can enumerate billions of systems but once depletion occurs we will not be able to maintain the hierarchical assignment model of IPv4 that allows today's Internet routing to scale
- * Interoperability during the transition will exist but be quite limited in functionality. Begin planning on connecting customers via both IPv4 and IPv6 now, and IPv6 alone in the future
- * You don't need to consider IPv6 if you don't plan on growing your business, and your customer don't mind a subset of the Internet.

Call for Action - Equipment Vendors

- * You are likely seeing very limited demand for IPv6 support
- * Customers always know best (but seldom with enough lead time)
- * The demand for IPv6 support in your equipment will go optional to mandatory very, very quickly.
- * IPv6 is very similar to IPv4, but there are significant technical differences
- * Introduce IPv6 support into your product cycle as soon as possible.

Call for Action - Content Providers

- * For a brief while, IPv6 poses no benefit at all and real work to support (as all customers who have IPv6 also have IPv4)
- * At some point, there will be IPv6 only Internet users being connected by the ISP community
- * Your content clients are not going to accept not being reachable to newer Internet customers, and will find a way to fix this quickly.
- * Begin planning on connecting hosting customers via both IPv4 and IPv6 now
- * Encourage customers to use IPv6 and test their applications over it as soon as possible.

Q & A

- ▶ Thank you!
- ▶ For more information, see <<http://www.arin.net/media>>