IPv4位址枯竭因應策略

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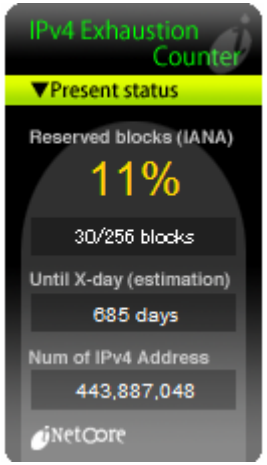
Outline

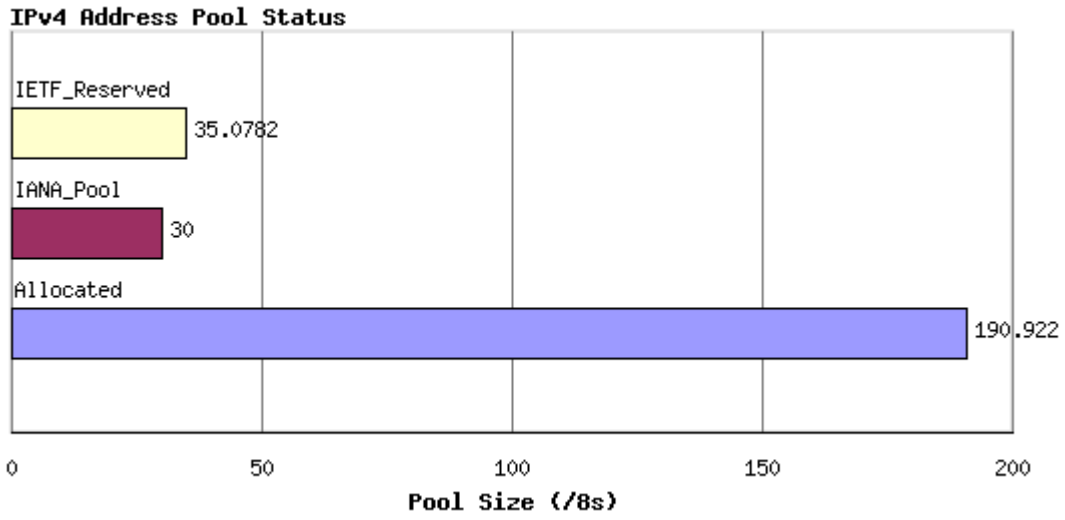
- 現況介紹
- 因應措施
  - 位址回收與轉移
  - 使用NAT等技術延緩IPv4位址需求成長
  - 使用IPv6
- 講員介紹

IPv4 Exhaustion Counter



http://www.inetcore.com/project/ipv4ec/index_en.html

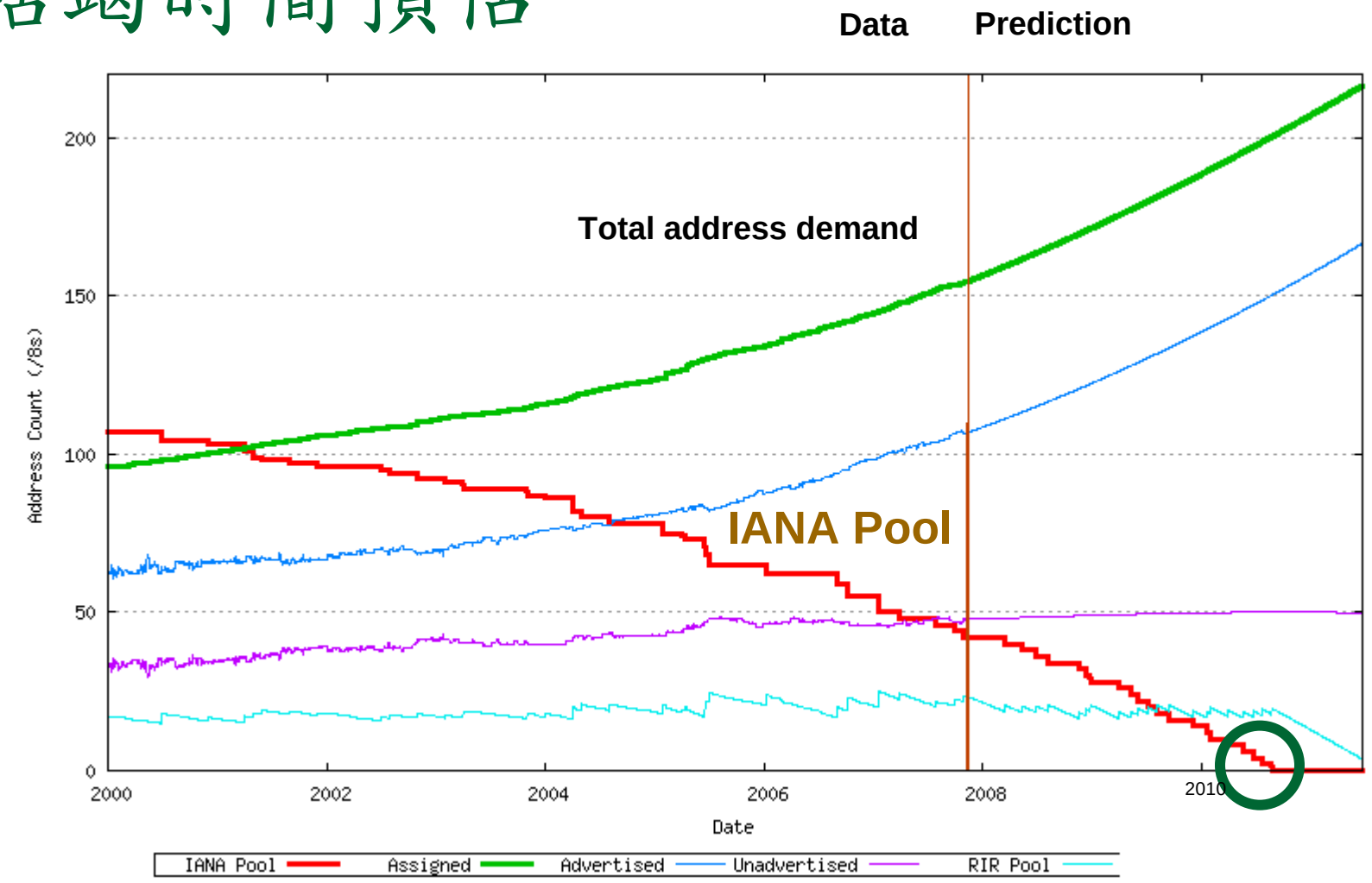
現況



2009/7/28

Source: Geoff Huston,
http://www.potaroo.net/tools/ipv4/index.html

枯竭時間預估



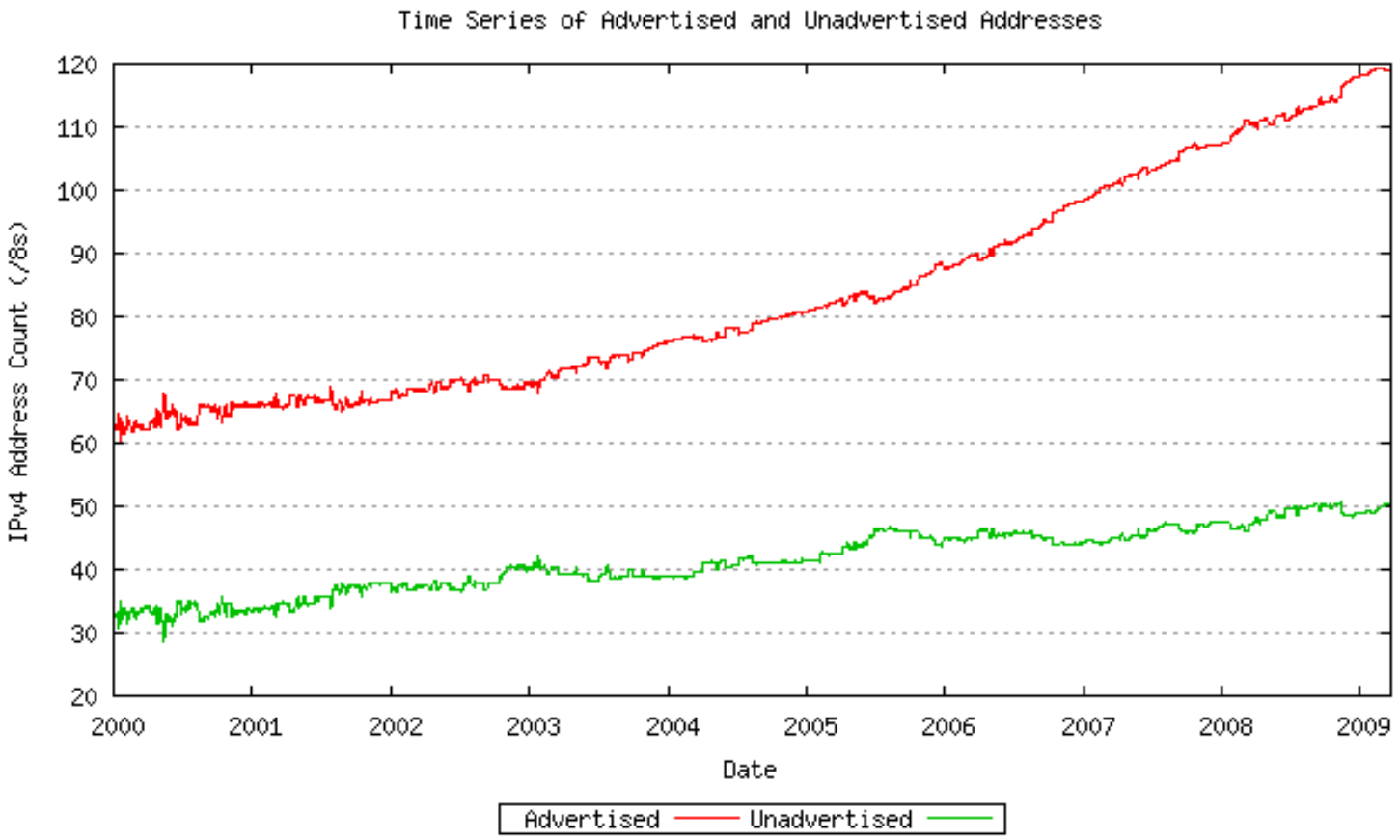
Exhaustion of IANA unallocated pool: **May-2011**

Exhaustion of the first RIR unallocated pool: **Sep-2012**

Source: Geoff Huston

IPv4位址回收策略

Unadvertised Address



Reserved Address

- 36.086 /8 address blocks (RFC 3330)
  - 16 /8 blocks reserved for multicast (224~239)
  - 16 /8 blocks reserved for future use (240~255)
  - 1 /8 block (0.0.0.0/8) for local identification
  - 1 /8 block for loopback (127.0.0.0/8)
  - 1 /8 block for private use (10.0.0.0/8)
    - 172.16.0.0/12, 192.168.0.0/16
  - 1 /8 block for "public data networks" (14.0.0.0/8)
  - …
- APNIC Proposal 17: Recovery of unused address space

國外IPv4位址回收策略 - IANA回收策略

- IANA (Internet Assigned Numbers Authority)的IPv4位址回收策略分成兩階段進行
  - 階段 I—回收IPv4位址空間
    - 轄下每個RIR(Regional Internet Registries)將以 “季”為單位，來回收 /24或更大區塊的IPv4位址，並將回收的IPv4位址集中到IANA的 “Recovered IPv4 Pool”中
    - 這個階段不進行位址分配
  - 階段 II--由IANA分配IPv4位址
    - IPv4位址分配的時間為3月1日和9月1日一年兩次分兩個期間來發放
    - 在分配的期間內，IANA將會決定分配數量的單位，以IPv4 Address Pool的1/10來計算並採用CIDR (power-of-2) 來切割區間，最小區間單位為/24
    - 當RIR向IANA提出分配IPv4 位址要求時，該要求分配的RIR所持有的IPv4位址必須少於IANA規劃分配單位的50%，並且該RIR在這次發放期間沒有被分配過為原則

國內IPv4位址回收策略 - TANet回收策略

- 核發原則
  - 大專校院
    - 於原使用IP之基礎下，擬增加申請IP數
      - 專任教師*3+兼任教師*1+職員*2+學生*1.8
    - 於配合更換為連續IP網段，擬增加申請IP數
      - 專任教師*3+兼任教師*1+職員*2+學生*2
  - 高中職以下：教師*3+職員*2+學生*0.3
  - 各縣（市）立所屬學校，由縣（市）教育網路中心核發
  - 本部附屬館所：依網路設施及管理需求核發
  - 其它：依網路設施及管理需求，或因學術研究專案申請核可者，依審核結果核發
- 回收原則
  - 申請IPv4核發如併各機關或學校現有IP之重整計畫者，需於新IP網段核發後起計6個月內繳還原IP網段

Transfer Policy

- APNIC Prop-50
  - APNIC will process IPv4 address transfer requests … subject to the following conditions:
  - 4.1 The minimum transfer size accepted will be a /24.
  - 4.4 APNIC is to maintain a public log of all transfers.
  - 4.5 Address transfers should be permitted between APNIC account holders and NIR members, if and when individual NIRs implement the transfer policy.
  - 4.6 Address transfers are permitted between APNIC account holders and other RIR account holders, following the policies of all the respective RIRs.
  - 4.7 This proposal to take effect as soon as the APNIC Secretariat can implement the mechanisms of the policy.

New NAT Technologies

What's New

- Carrier grade NAT (CGN)
- If replacing customers' CPE is possible…
  - "A+P"
    - ID: 32-bit IPv4 address + 10 or 12-bit port number
  - Stateless Address Mapping
    - a global IPv4 address that is shared amongst several subscribers through a SAM-capable tunnel concentrator
  - Dual Stack Lite
    - a global IPv4 address that is shared amongst several subscribers through a CGN
  - NAT444
    - NAT twice: first using a NAT device in CPE and another NAT device in CGN

An IPv4 address shared amongst several subscribers.

IPv6

Transit to IPv6

- Technology ready?
  - Survey on IPv6 readyness
- Transition or co-exist?
  - IPv4/IPv6 may co-exist for a long time (tens of years)
  - Experience of transition
  - Experience of IPv4/IPv6 co-existence
  - Standard procedure
- IPv6 policies?