IPv4: an Interesting Future

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IPv4 Facts

Projected IANA Unallocated Address Pool
Exhaustion: 23-May-2011

Projected RIR Unallocated Address Pool
Exhaustion: 17-Jan-2012

Source: Geoff Huston <www.potaroo.net/tools/ipv4>
As of 20-Sept-2010

IPv4 Future

IPv4 Future: what we know

- the Internet keeps working

- the demand for IPv4 addresses is still there:

  - growth of existing ISPs

  - new ISPs

- the large scale deployment of IPv6 will take many, many years

IPv4 Future: demand continues

existing ISPs have a few short term options:

- look on dusty shelves and in dark corners for allocated, unused address space

- economise on address usage

- build an ever growing labyrinth of NAT boxes

This does not help new ISPs

IPv4 Future: demand continues

If the need for IPv4 address space continues

to grow, where do these addresses come from?

The answer is clear:

- borrow
- buy
- steal

from current users of IPv4 address space.

All of the above methods are already in use today!

IPv4 Future: protect yourself

Problem: how can the rightful user of IPv4
address blocks be protected from
third party misuse?

Solution: proper registration and documentation
of their IPv4 address space

IPv4 Future: the Registry

RIPE-495: Principles for Number Resource

Registration Policies

This document describes the properties of a
registry for Internet number resources

IPv4 Future: the Registry

- ## Comprehensive
  - The registry has to cover all address space the RIPE NCC is responsible for, without exceptions

- ## Current
  - The registry must be kept up to date

- ## Correct
  - The registry must correctly document the holder of the address space

The Future: Certificate
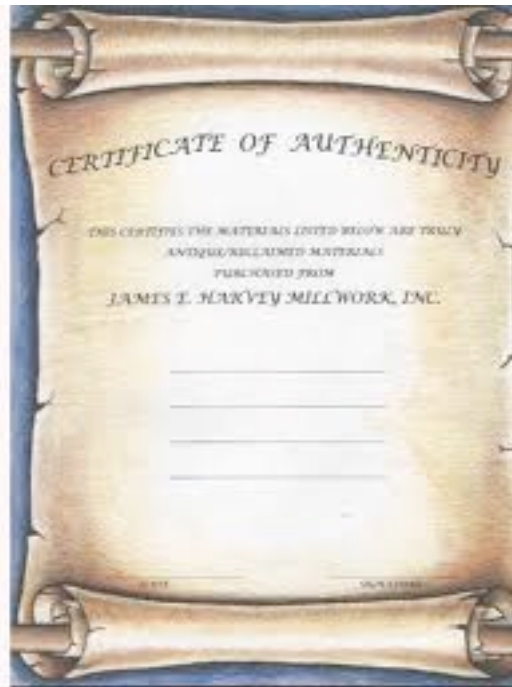
Digital Resource Certificate

- Issued by the RIPE NCC

- The certificate states that a particular Internet number resource has been registered by the RIPE NCC.

- The certificate does NOT give any indication of the identity of the holder of the resource or the certificate

- All further information on the resource can be found in the registry

Certificate: some technicalities

- Public Key Infrastructure (PKI) defined in X.509 by the CCITT/ITU

- Resource PKI (RPKI) defined by the IETF SIDR WG (Secure InterDomain Routing)

- Implementation(s) developed by
  - APNIC
  - ARIN
  - RIPE NCC

Certificate and Routing

- a certificate can be used by the holder to generate a Route Origin Authorisation Object (ROA)

- the ROA can be incorporated in BGP announcements

- routers can check the validity of route announcements based on ROAs

Certificates: who controls Routing

- Certificates do not create additional powers for the Regional Registries

- Certificates, at the most, reflect the registration status of a resource:

  - no registration --> no certificate

  - the reverse is not true!

- Routing decisions are based on the contents of the registry – as is the case today

- ROAs give easy access by routers to the registry

The Registry

The Registry can be viewed from different angels:

- secure your resources

  - Internet Service Providers

- secure your routing

  - Internet Service Providers

- responsible stewardship of public resources

  - governments and regulators

- authenticated source of data

  - Internet Service Providers

  - law enforcement agencies

The Registry – the Missing Element

many bits and pieces of this whole framework are still missing – or better:

under development

most important part to develop in the coming months is an

Registration Policy