Managing Internet Resources

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Internet Resources

how are the managed?
Where do IP addresses come from?

Standards

Regional Internet Registries (RIRs) distribute IPv4, IPv6, and AS numbers to the Internet community.

RIRs maintain accurate registration of Internet resource usage for the community.
Resource management challenges in early 90’s

• Address space depletion
  – IPv4 address space is finite
  – Historically, many wasteful allocations

• Routing chaos
  – Legacy routing structure, router overload
  – CIDR & aggregation are now vital

• Inequitable management
  – Unstructured and wasteful address space distribution
Evolution of resource management

• Administrative problems remained
  – Increasing complexity of CIDR-based allocations
  – Increasing awareness of conservation and aggregation goals
  – Need for fairness and consistency

• RFC 1366 (1992)
  – Described the “growth of the Internet and its increasing globalization”
  – Additional complexity of address management
  – Set out the basis for the creation of the RIR System
Evolution of resource management policies

- Establishment of RIRs
  - Open
  - Transparent
  - Neutral and impartial
  - Not for profit membership organisation
    - Membership open to all interested parties
    - Bottom up, self-regulatory structure

- Policies developed by industry at large
  - Through open policy processes

- Fair Access to Addresses
  - Based on need
  - No discrimination
Internet resource management today
## What does RIR do?

### Resource service
- IPv4, IPv6, ASNs
- Reverse DNS delegation
- Resource registration
  - Authoritative registration server
    - whois
    - IRR

### Policy development
- Facilitating the policy development process
- Implementing policy changes

### Information dissemination
- RIR meetings
- Web and ftp site
- Publications, mailing lists
- Outreach seminars

### Training
- Face to Face
- Via e-learning
Internet Resource Distribution
Internet resource management objectives

Conservation
- Efficient use of resources
- Based on demonstrated need

Aggregation
- Limit routing table growth
- Support provider-based routing

Registration
- Ensure uniqueness
- Facilitate trouble shooting

Uniqueness, fairness and consistency
Evaluation by RIR

• All address space held should be documented

• ‘No reservations’ policy
  – Reservations may never be claimed
  – Fragments address space
  – Customers may need more or less address space than is actually reserved
IP Address Distribution

RIR Allocates to RIR Member

RIR Member Allocates to downstream

Downstream Allocates to end-user

Customer / End User

Customer Assignments

RIR Allocation

Member Allocation

Sub-Allocation

Customer Assignments
Streamline Processes

1. Applicant details
2. Organisation details

Membership only

Membership and Internet number resources

- IPv4
- IPv6
- ASN

Existing network plan

Future network plan

Additional information

Confirm and submit
First allocation

- Must meet criteria
  - (discussed in policy section)
- Requires clear detailed and accurate request
- Efficient assignments planned
- Minimum allocation size
  - ‘slow start’ concept
Subsequent allocations

- Utilisation checks
  - Unless large assignment pending
- Demonstrated conservative assignments
- Correct customer registrations in db
  - Need to fix inconsistencies before next allocation
- Allocation size to cover the need for “X” period of time
  - Based on previous utilisation rate
- Contiguous allocation not guaranteed
  - But every effort made
Registering Internet Resources

- Public network management database
  - Operated by Internet Registries
  - Better known as Whois DB
- Tracks network resources
  - IP addresses, ASNs, Reverse Domains, Routing policies
- Records administrative information
  - Contact information (persons/roles)
  - Authorisation
Future Challenges
IPv4 ADDRESS SPACE
What is the status of each of the 256 /8s?

TOTAL IPv4 SPACE

- CENTRAL REGISTRY 91
- RIRs 100
- APNIC 32
- ARIN 31
- AfriNIC 3
- LACNIC 6
- RIPE NCC 28

IANA RESERVED 30

NOT AVAILABLE 35

EXPERIMENTAL 16
LOCAL IDENTIFICATION 1
LOOPBACK 1
PRIVATE USE 1
MULTICAST 16

+2
IPv4 Consumption: Projection

- Projected IANA Pool Exhaustion: 27 July 2011
- Projected RIR Pool Exhaustion: 19 May 2012
Summary

• Internet Resource Management
  – Efficient use of resources
  – Based on Demonstrated needs
  – Ensure uniqueness
  – Fair treatment of any request
  – Provide accurate information of the allocated resources
  – Adjust to the reality of the Industry