



# Managing Internet Resources

## 4th Internet Governance Forum

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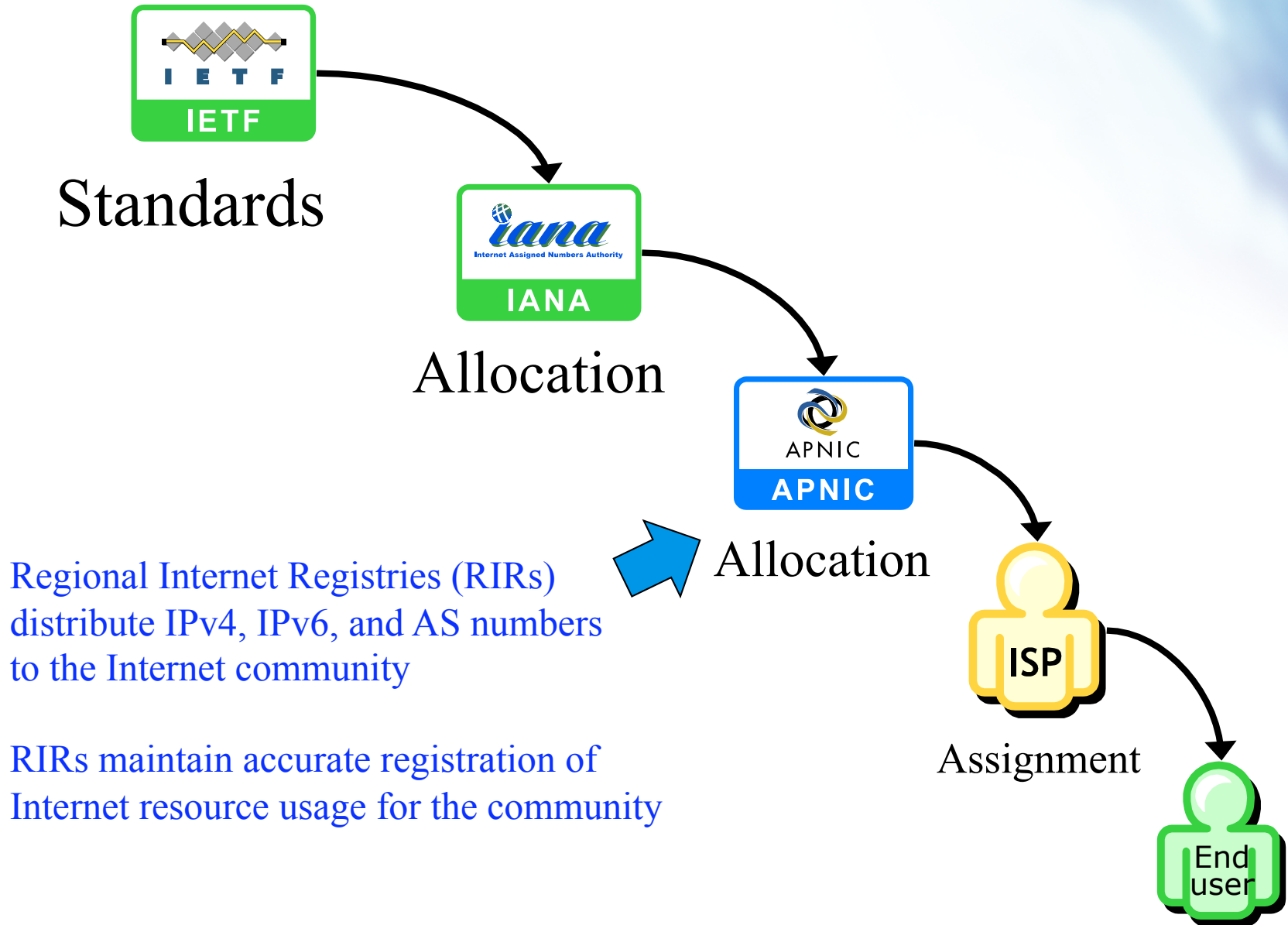
Sharm El Sheikh, Egypt  
15 October 2009

# Internet Resources

*how are they managed?*



# Where do IP addresses come from?



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

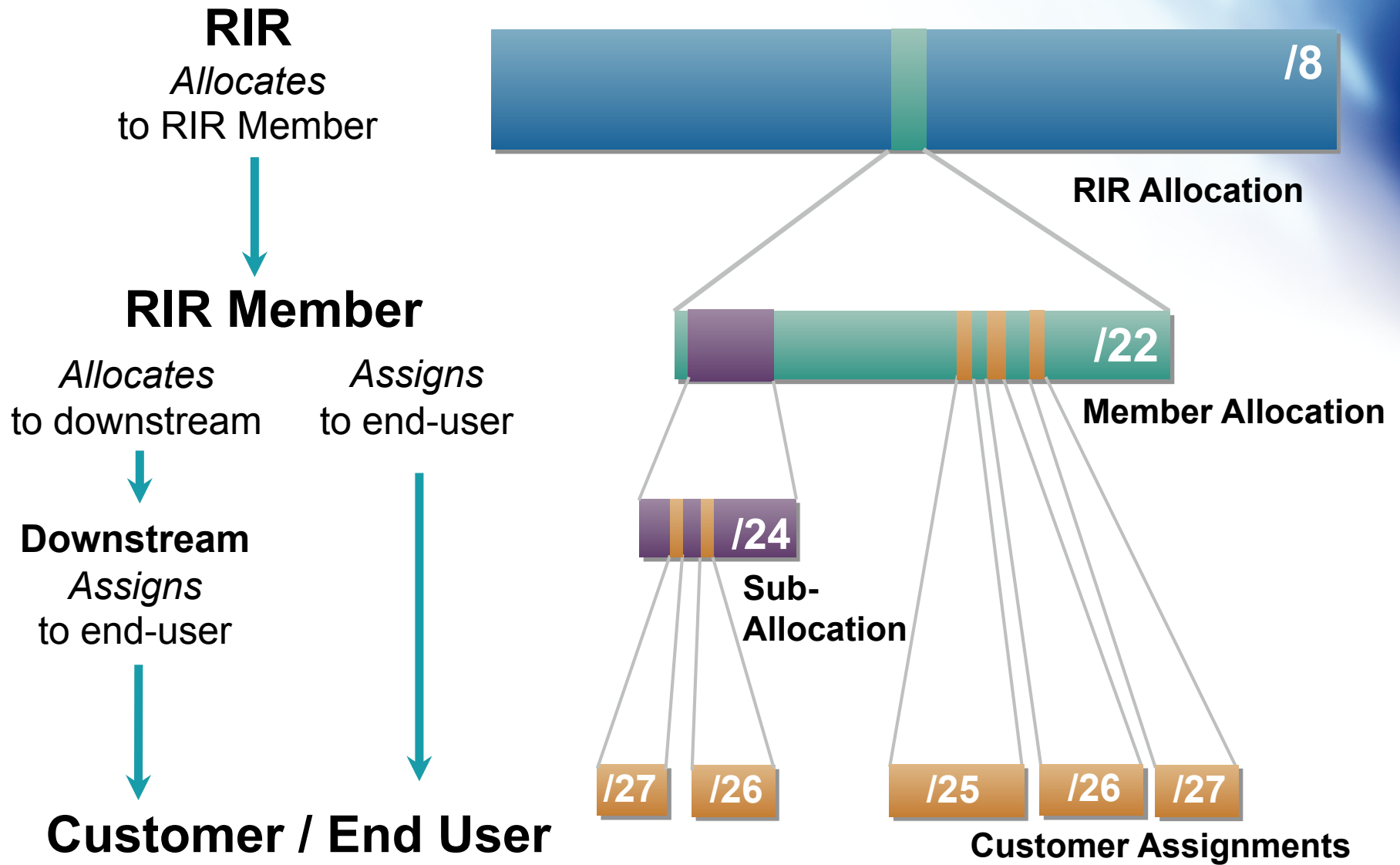
- Ensure uniqueness
- Facilitate trouble shooting

Uniqueness, fairness and consistency

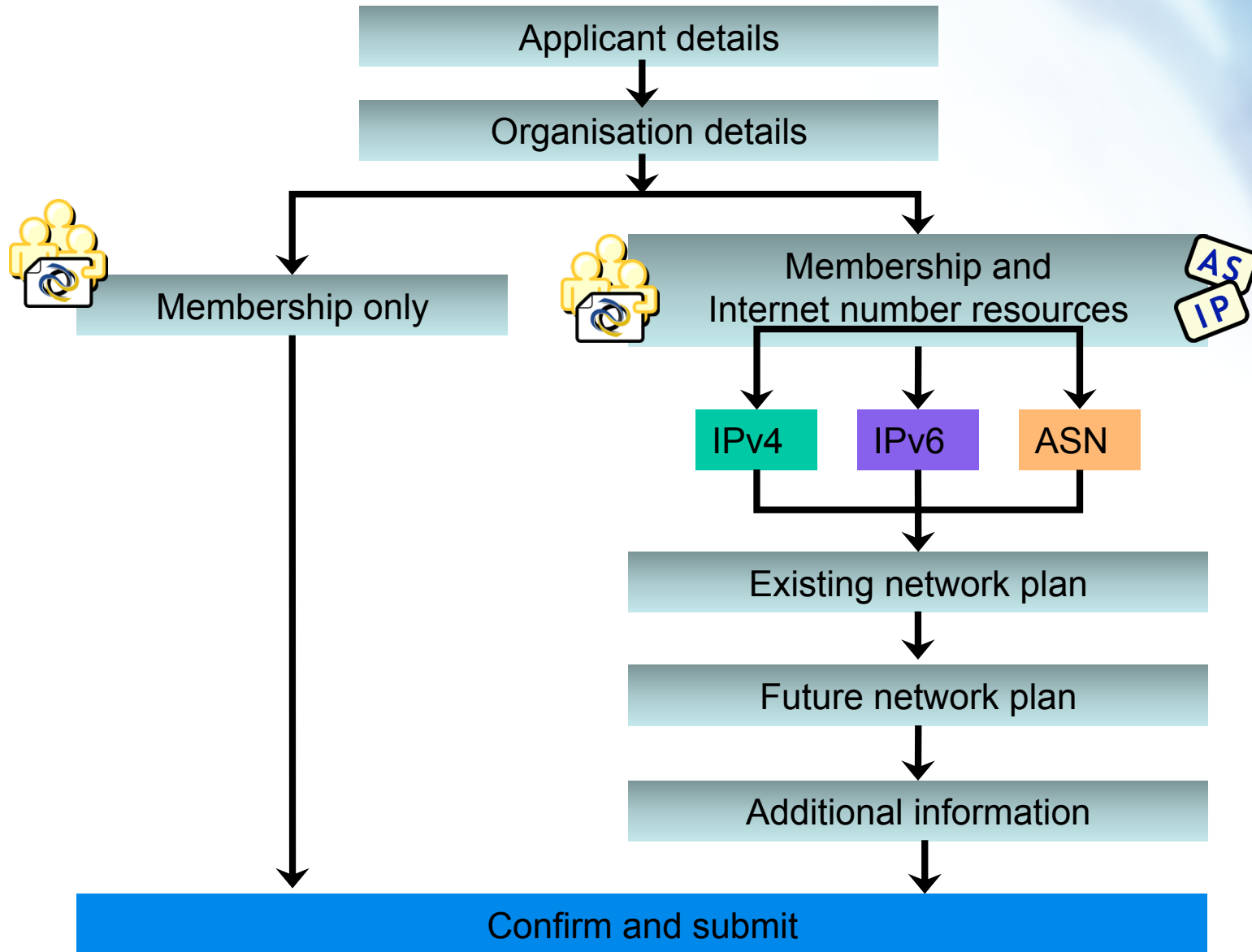
# Evaluation by RIR

- 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



# Streamline Processes



# 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

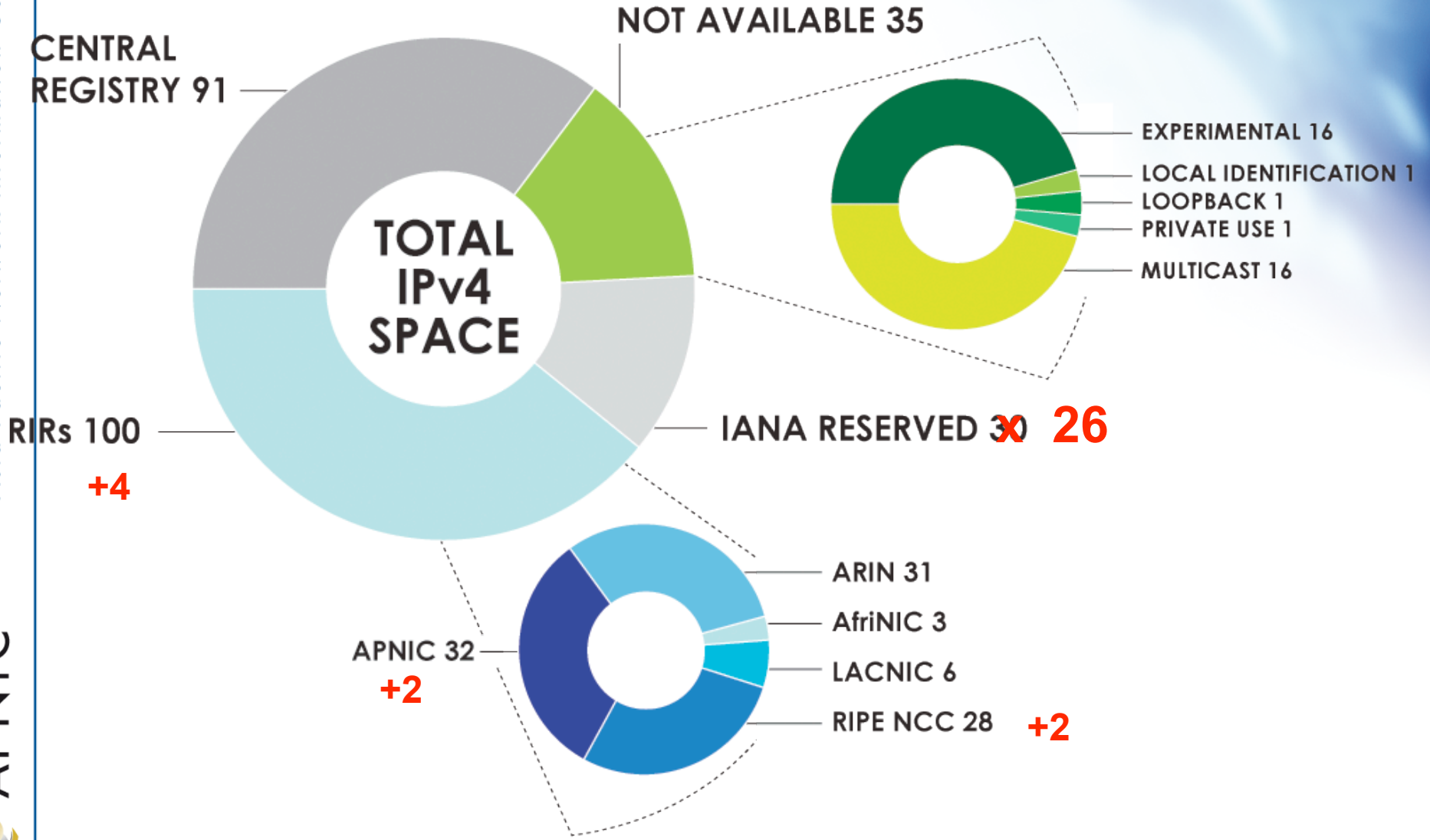
# Future Challenges





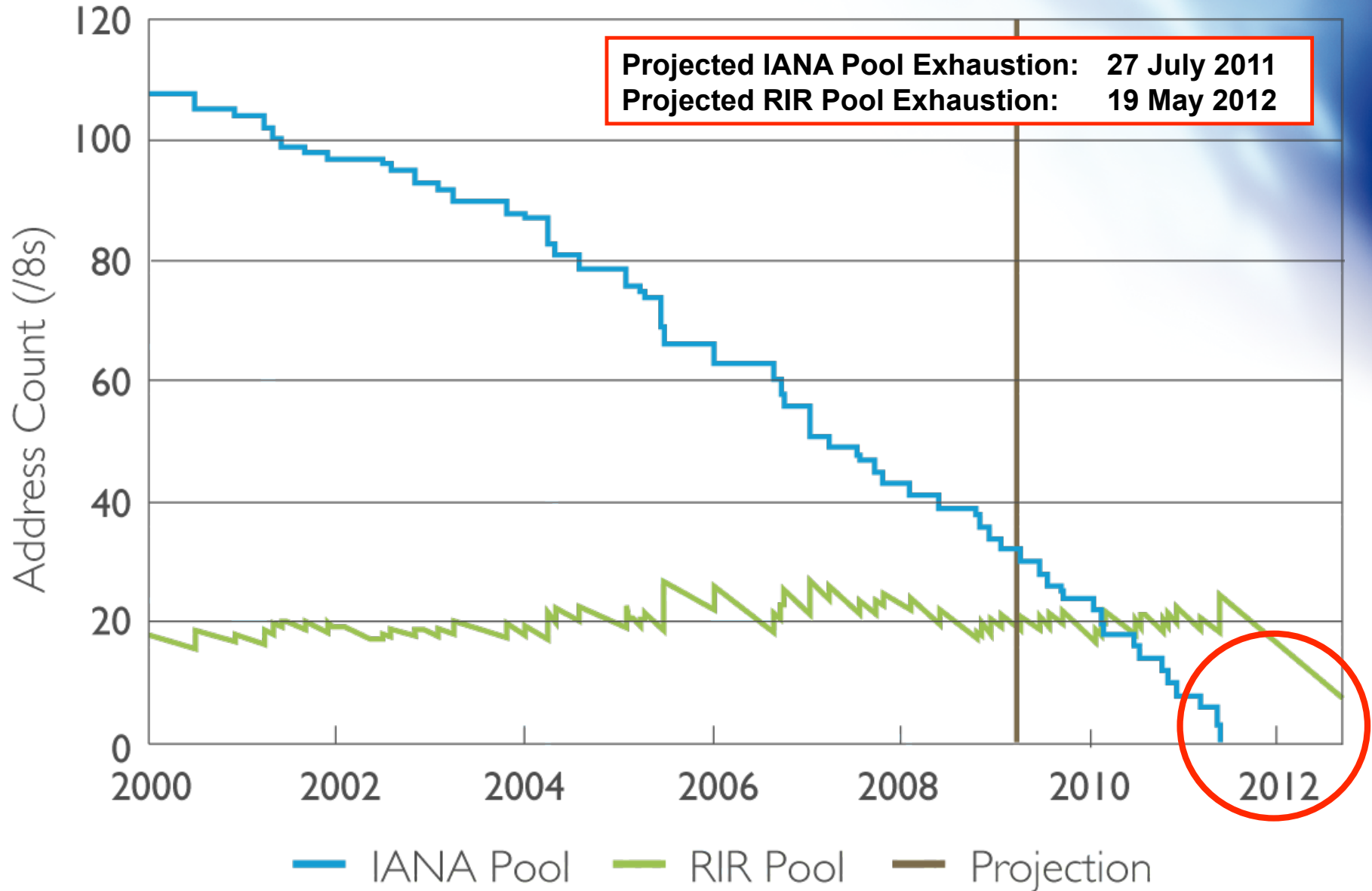
# IPv4 ADDRESS SPACE

What is the status of each of the 256 /8s?





# IPv4 Consumption: Projection



# 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