



# AFRINIC Numbering Services & Policy Updates

**James Chirwa**  
Registration Services Team  
SAFNOG-5 | 27th August 2019

# Agenda

1. IP Numbers Resource Management
2. Member Profile Management
3. Policy Development Process

# Internet Number Resource Management

## Scope

- The WHOIS database
- Managing the IP numbers
- IPv4 exhaustion
- Services
- Updates

# Internet Number Resource Management

Internet Number Resources

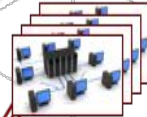


196.1.0.87  
2001:db8:c001::face



ISP

AS 15964



Address Management Objectives

Registration

Aggregation

Conservation

# Internet Number Resource Management

The Number resources managed in the **WHOIS database**.

The database uses the Routing Policy Specification Language (RFC2622)

Below are some of the important **objects in the database**:

- **INET(6)NUM** - Specifies a range of IP addresses (IPv4/IPv6)
- **AUT-NUM** - Representation of an Autonomous System Number (ASN).
- **DOMAIN** - It is used for Reverse DNS delegations
- **ROUTE** - Define an originating AS for a given IP prefix

# Internet Number Resource Management

## Internet Number Resources have the following states

- **Available** - These resources are available and shall be issued to resource requesters who satisfy the requirements of the applicable resource policies.
- **Allocated/Assigned** - They are registered on the AFRINIC WHOIS database to an organisation.
- **Reserved** - Not available for immediate allocations and assignments

# Internet Number Resource Management

## I have received IP Number Resources from AFRINIC. What Next??

1. New members ensure you received an email with login credentials to **MyAFRINIC** portal and the **mntner object** and its **password**.
  - Check that logins work and keep the **mntner** details **safe and available**
1. Create **route objects** in the IRR database
2. Create **Route Origin Authorization (ROA)** using **RPKI** interface
3. Register your **IP usage** in the WHOIS database.
4. Register your **Reverse DNS delegation**
5. Update the **contact details**

# Internet Number Resource Management

## How do I go about managing my IP resource?

Managing your IP resources can be done through the following interfaces:

1. <https://my.afrinic.net>

- Need a person object (NIC-HDL) and password to login

1. <https://whois.afrinic.net>

- Must have the plain-text password for **mntner** object(s)

1. E-mail to [auto-dbm@afrinic.net](mailto:auto-dbm@afrinic.net)

- Must have the plain-text password for **mntner** object(s)



# Internet Number Resource Management

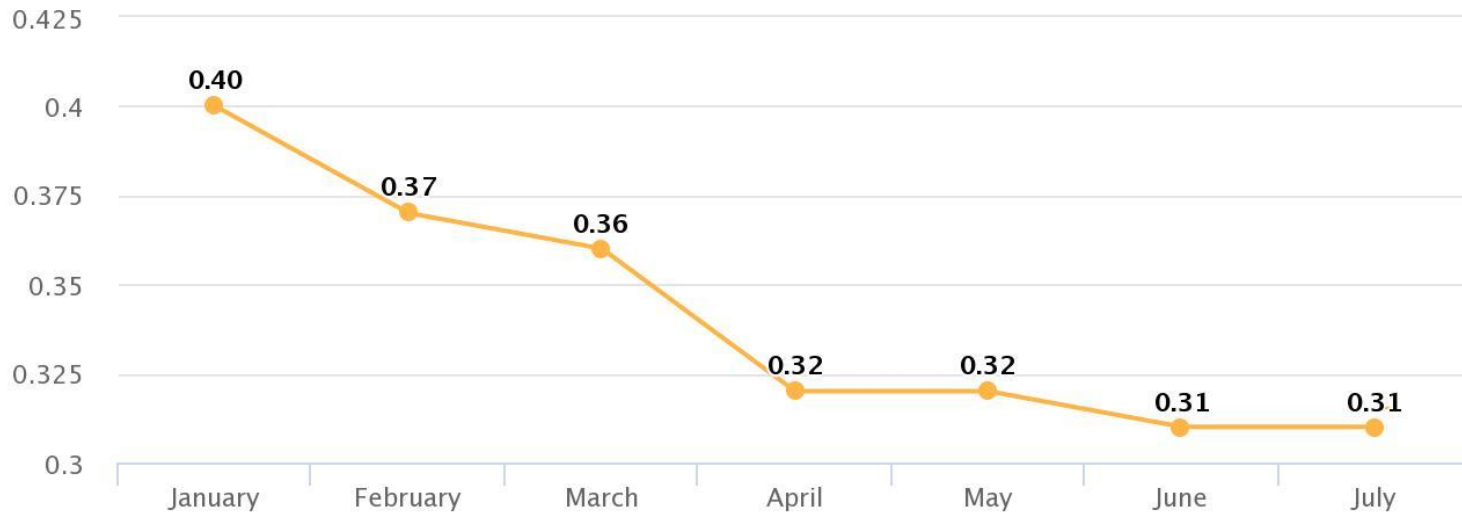
## IPv4 Depletion:

- On 2nd April 2017: Phase 1 of Soft-landing (Equivalent of a /8)
- Today, 27 August 2019 :  $\approx$  4.8 Million /32 IPv4 Available
- Approx. 2.7 Million /32 IPv4 Available until Phase 2 (IPv4 /11)

**We estimate that AFRINIC could hit phase 2 of Soft-landing by November 2019**

# Internet Number Resource Management

IPv4 available /8s per month in 2019



# Internet Number Resource Management

## Implications Phase 2 of Softlanding:

- Maximum of a /22 IPv4 allocation/assignment
- Increased cases of IPv4 hijacking and squatting
- Impact on IPv6 adoption?

# Internet Number Resource Management

## IPv6:

- Members with IPv6: 798
- ~ 9222 /32's issued
- ~ 1019567 /32s Available

## ASN:

- Members with asn: 1562
- 1761 ASN's allocated to members
- 365 ASN's Available - Replenishment to be done when threshold is reached

## Policy Reservations

- ASNs - "small" for Internet Exchange Points
- IPv4 - 2 /16 IPv4 prefixes for Internet Exchange Points
- /12 - future use, yet unforeseen

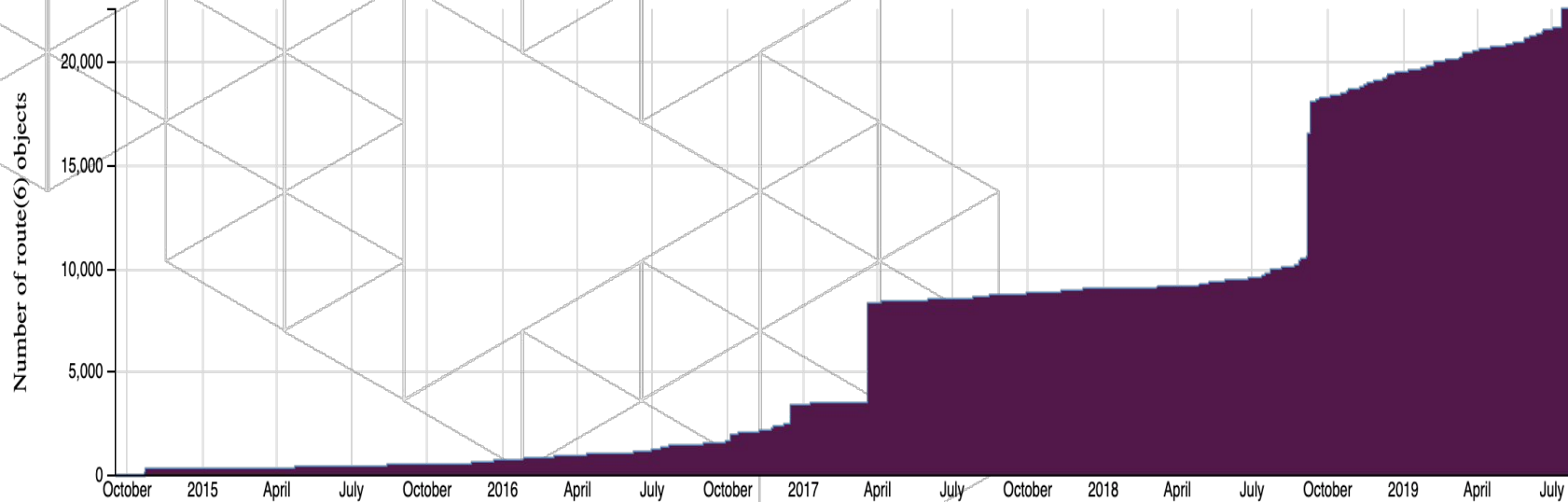
# Internet Number Resource Management

## Service - Internet Routing Registry (IRR)

- Stores routing policy information
- Defined by the Routing Policy Specification Language (RPSL) standard in [RFC2622](#)
- Provides for a common format that operators use to configure backbone router's route filters
- Network troubleshooting - use of whois contacts associated with the source ASN
- Router configuration: Tools such as [IRRToolset](#) can create router configurations
- Link: <https://afrinic.net/internet-routing-registry>

# Internet Number Resource Management

## Service Adoption - IRR



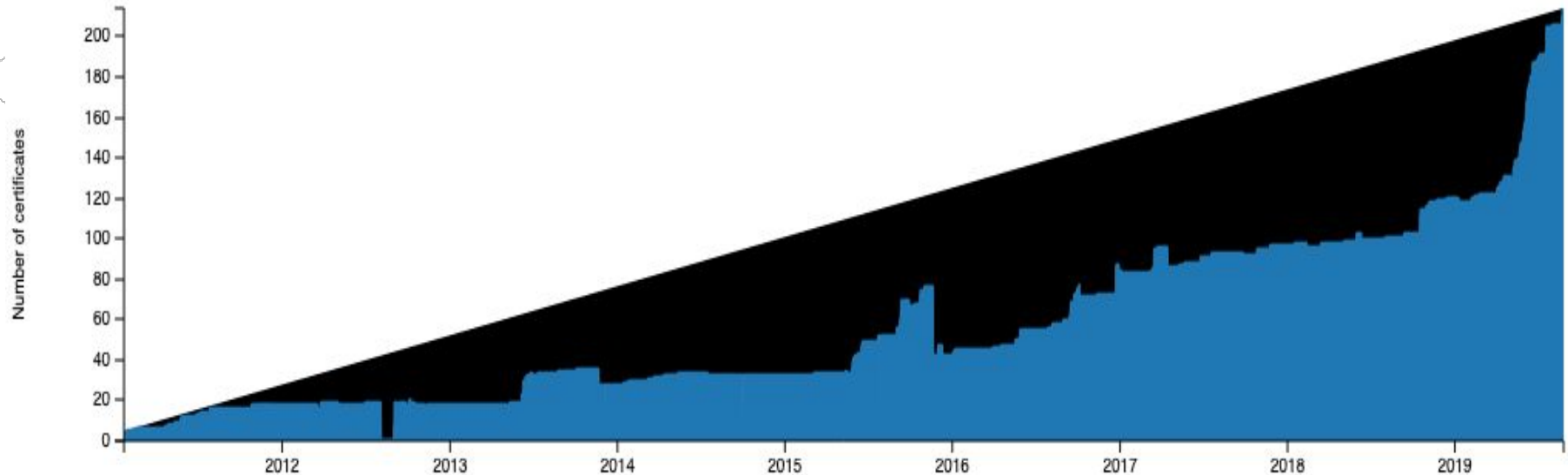
# Internet Number Resource Management

## Service - Resource Public Key Infrastructure (RPKI)

- security framework for verifying the association between Internet number resources (IP addresses and AS Numbers)
- Prove the right to use resources
- Sign Route Origin Authorisations
- Prove ownership of Internet number resources in the context of IPv4 transfer after the exhaustion of the IPv4 pool of the RIR
- Help to secure the inter-domain routing protocol by conveying the right-to-use of the resources and to validate routing information
- Link: <https://afrinic.net/resource-certification>

# Internet Number Resource Management

## Service Adoption - RPKI





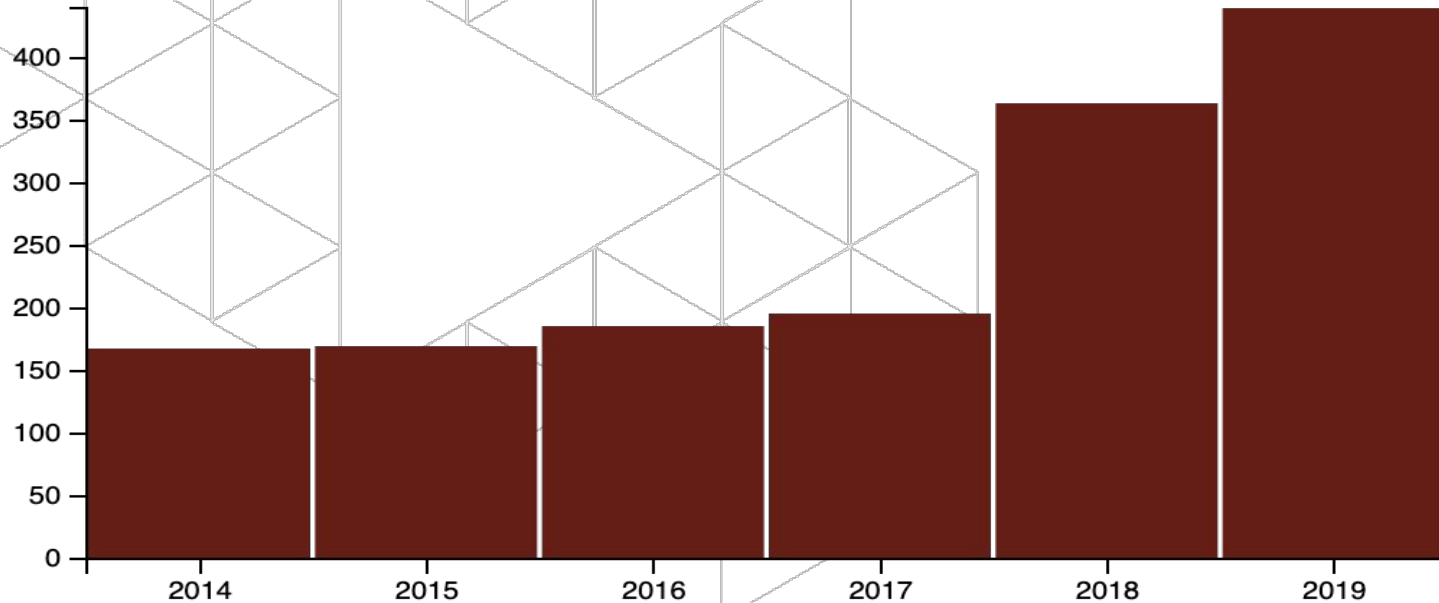
# Internet Number Resource Management

## Service - DNSSEC

- AFRINIC manages and publishes Reverse DNS (RDNS) zone data for the IP space we allocate or assign to members
- DNSSEC deployment at AFRINIC aims to
  - Signing Reverse DNS zones.
  - Publish DS record in parent zones
  - Accept and publish DS records from our members
- Link: <https://afrinic.net/dnssec>

# Internet Number Resource Management

## Service Adoption - DNSSEC



# Internet Number Resource Management

## Service: Policy Based Transfer

- Applicable to IPv4 resource only
- Applicable to Companies incorporated in the AFRINIC's Service region
- Must meet policy conditions
- Partial-transfers are accepted
- Policy ratified by AFRINIC Board on 26th April 2017
- Went live on 22nd February 2018

# Internet Number Resource Management

## Service: Mergers & Acquisition based Transfer

- Applicable to IPv4, IPv6 & ASN
- Applicable to Companies incorporated in the AFRINIC's Service region
- Evidence of a merger/acquisition must be available

Details published:

**[ftp://ftp.afrinic.net/stats/afrinic/transfers/transfers\\_latest.json](ftp://ftp.afrinic.net/stats/afrinic/transfers/transfers_latest.json)**

# Internet Number Resource Management

## Service Updates

- Introduction of
  - Payment preference - Credit Card or Wire Transfer
  - Credit Card payment without login
  - Withholding tax declaration
  - Electronic documents use
- Upcoming updates
  - IRR Integration
  - BPKI enrolment interface

# Resource Member Management

## Scope:

- Membership Account
- Membership Growth
- Maintainer Objects
- Contact Objects

# Resource Member Management

## Resource Membership Types

- Local Internet Registry (LIR)
- End-User member (EU)

## Why Get Own IP Number Resources From AFRINIC?

Better  
multihoming

Identity  
independence

Avoid  
renumbering

# Resource Member Management

## Becoming A New Resource Member:

- Send your request at <https://nmrp.afrinic.net>

### Provide:

- Organisation and points of contact details
- Certificate of incorporation (incorporation within AFRINIC region)
- Detailed IP addressing plan
- Service regulators license (where applicable)
- Contract with upstream ISP
- Sign RSA
- Other available documentation justifying your IP needs
- May be required to provide evidence of infrastructure in the region



# Resource Member Management

## Managing your resource membership account

- Organisation and Points of contact details kept up-to-date
- Points of Contact enrol and get BPKI certificate
- Have a signed Registration Services Agreement (RSA)
- Update preferences
  - Payment method and currency
  - Withholding tax
- Register your IP addressing utilisation
- Annual fees paid on time
  - Avoid delays in getting urgent service support
  - Avoid membership account closure

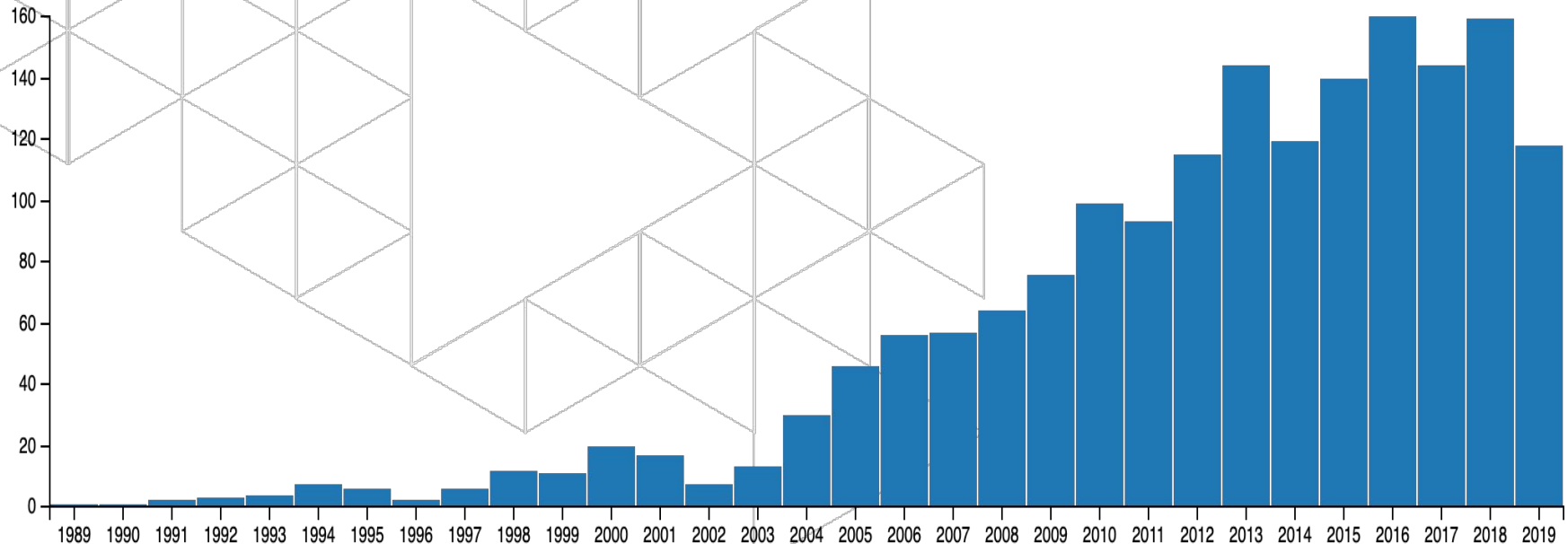
# Resource Member Management

## Requesting additional IPv4 space:

- Must be compliant with the contractual obligations.
  - Must be in good financial standing (All pending fees are paid)
  - Registration Service Agreement on file
  - Updated contact details
- Must have used at least 90% of current IPv4 allocation/assignment
- Provide Details on how the current IPs allocation/assignment are being used
- Provide a detailed IP addressing plan showing your needs
- May require a remote desktop session

# Resource Member Management

## Membership Growth:



# Resource Member Management

## Important Membership Account Details

- **MNTNER** - Specifies authentication information required to authorise creation, deletion or modification of other objects protected by it.
- **ORGANISATION (ORG-HDL)** - Provides information identifying an organisation such as a company.
- **PERSON (NIC-HDL)** - Contains personal information such as name, email address and phone number.  
Can be referenced as **Admic-c**, **Tech-c** or **Zone-c** in other objects.
- **ROLE** - Similar to the person but it describes a role performed by one or more human beings.

# Resource Member Management

## The Maintainer objects - Why do I need this??

### Secure the WHOIS database objects

- Protect Database Objects from unauthorised updates.
  - Reference a **mntner** in other objects.
  - Use **MNT-BY** attribute
- Control creation of IP resources' child objects
  - Authenticate by using **password** of **MNT-LOWER/MNT-ROUTES/MNT-DOMAINS** value from parent object
  - Same **mntner** referenced as **MNT-BY** in child objects
- **Forgot your password?**

Go to: <https://www.afrinic.net/whois/utilities#crypt>

# Resource Member Management

## Maintainer Objects Use Cases

## Protecting Database Objects.

```
inetnum:      196.1.0.0 - 196.1.0.255
netname:      AfrinIC-Office-Block1
descr:        -----
descr:        PI Assignment for AfrinIC
descr:        Local Infrastructure and Network.
descr:        -----
country:      MU
org:          ORG-AFNC1-AFRINIC
admin-c:      CA15-AFRINIC
tech-c:       IT7-AFRINIC
status:       ASSIGNED PI
notify:       contact@afrinic.net
mnt-by:       AFRINIC-HM-MNT
mnt-lower:    AFRINIC-IT-MNT
mnt-domains:  AFRINIC-IT-MNT
mnt-routes:   AFRINIC-IT-MNT
mnt-irt:      IRT-AFRINIC-IT
changed:      hostmaster@afrinic.net 20061026
```

## Creation of IP resources child objects

```
domain:       0.1.196.in-addr.arpa
descr:        AfrinIC Corporate
nserver:      ns1.afrinic.net
nserver:      ns2.afrinic.net
nserver:      ns3.afrinic.net
org:          ORG-AFNC1-AFRINIC
admin-c:      TEAM-AFRINIC
tech-c:       TEAM-AFRINIC
zone-c:       TEAM-AFRINIC
mnt-by:       AFRINIC-IT-MNT
mnt-lower:    AFRINIC-IT-MNT
notify:       sysadmin@afrinic.net
```

```
route:        196.1.0.0/24
descr:        AFRINIC-MUR-OPS
origin:       AS37708
mnt-by:       AFRINIC-IT-MNT
changed:      [REDACTED]
changed:      [REDACTED] 20160318
source:       AFRINIC
```

# Resource Member Management

Point of contacts - **Person & Role**

**Why are Contact details important in Resource Manage?**

- Point-of-Contact can:
  - Login to myafrinic portal and manage account details and resources
  - Receive important communication from AFRINIC
  - Receive network problem/troubleshooting related notification

**Why Maintain Contact Details Update??**

- Effectively manage your number resources
- Avoid service interruption due to missed communication
- Avoid membership account closures

# Resource Member Management

## Leveraging the “ROLE” object:

- Personal Information privacy concerns
- Can be referenced everywhere a PERSON object can
- While people performing a role may change jobs; the role itself remains.
- Change only effected on role object but all other references remain intact.
- Ease of maintenance than a person object



## Policy Development Process

The set of steps by which the **Internet community**, proposes, deliberates and adopts the policies that guide the use of number resources in the AFRINIC service region.

- This audience is part of **AFRINIC Internet community**
- Minimal engagement in policy discussion so far
- It is important to get engaged in the policy development process
- The policies affect all network operators
- Very important to read and understand the policies before requesting IP resources and related services
- Subscribe to the **resource policy discussion** mailing list

# Policy Development Process

## Policies in Last Call

- **IPv6 PI Clarification** - AFPUB-2019-V6-001-DRAFT01
- **SL-Update** - AFPUB-2018-v4-001-DRAFT-01

## Policies Ratified - Pending Implementation

- **Clarification on IPv6 Sub-Assignments** - AFPUB-2018-V6-002-DRAFT02
- **IPv6 PI Update** - AFPUB-2018-V6-004-DRAFT01

# Policy Development Process

## Policies under discussion

- **AFRINIC Policy Development Process Bis v5 -**  
AFPUB-2017-GEN-002-DRAFT-05
- **Abuse Contact Policy Update -** AFPUB-2018-GEN-001-DRAFT02
- **Internet Number Resources review by AFRINIC -**  
AFPUB-2016-GEN-001-DRAFT-08
- **Multihoming not required for ASN -** AFPUB-2019-ASN-DRAFT02
- **IPv4 Inter-RIR Resource Transfers (Comprehensive Scope) -**  
AFPUB-2019-IPv4-002-DRAFT01
- **IPv4 Inter-RIR Legacy Resource Transfers -** AFPUB-2019-IPv4-001-DRAFT01
- **Provisions for Resource Hijacking -** AFPUB-2019-GEN-001-DRAFT01

## Recommendations

- Read and Understand policies
- Visit the FAQ pages on our websites
- Read member support documentation on our websites
- Subscribe here <https://lists.afrinic.net/> and get engaged on mailing lists

Contribute your ideas on the **database working group**

Contribute to the **resource policy discussions**

- Contact: **hostmaster@afrinic.net**

**irr@afrinic.net**

**Thank you  
for your  
Attention  
Questions?**

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