



LACNIC IPv6 Policies

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Agenda



- ◆ **Internet Resources Distribution**
- ◆ **Policies**
- ◆ **LACNIC Policies**
 - ◆ **IPv6**
- ◆ **How to apply for IPv6 Addresses?**
- ◆ **IPv6 Metrics**



Internet Resources Distribution



- ◆ **Internet Resources: finite set and globally available.**
 - ◆ **Its distribution should follow certain criteria such as : *justified need*.**
 - ◆ **According to RFC 2050, it should also guarantee:**
 - ◆ *Uniqueness, Conservation, Routability and Registration*



Internet Resources Distribution



- ◆ **Conservation:**

- ◆ ***Fair distribution of globally unique Internet address space according to the operational needs... Prevention of stockpiling in order to maximize the lifetime of the Internet address space.***



Internet Resources Distribution



- ◆ **Routability:**
 - ◆ ***Distribution of globally unique Internet in an hierarchical manner, permitting the routing scalability of the address ...***



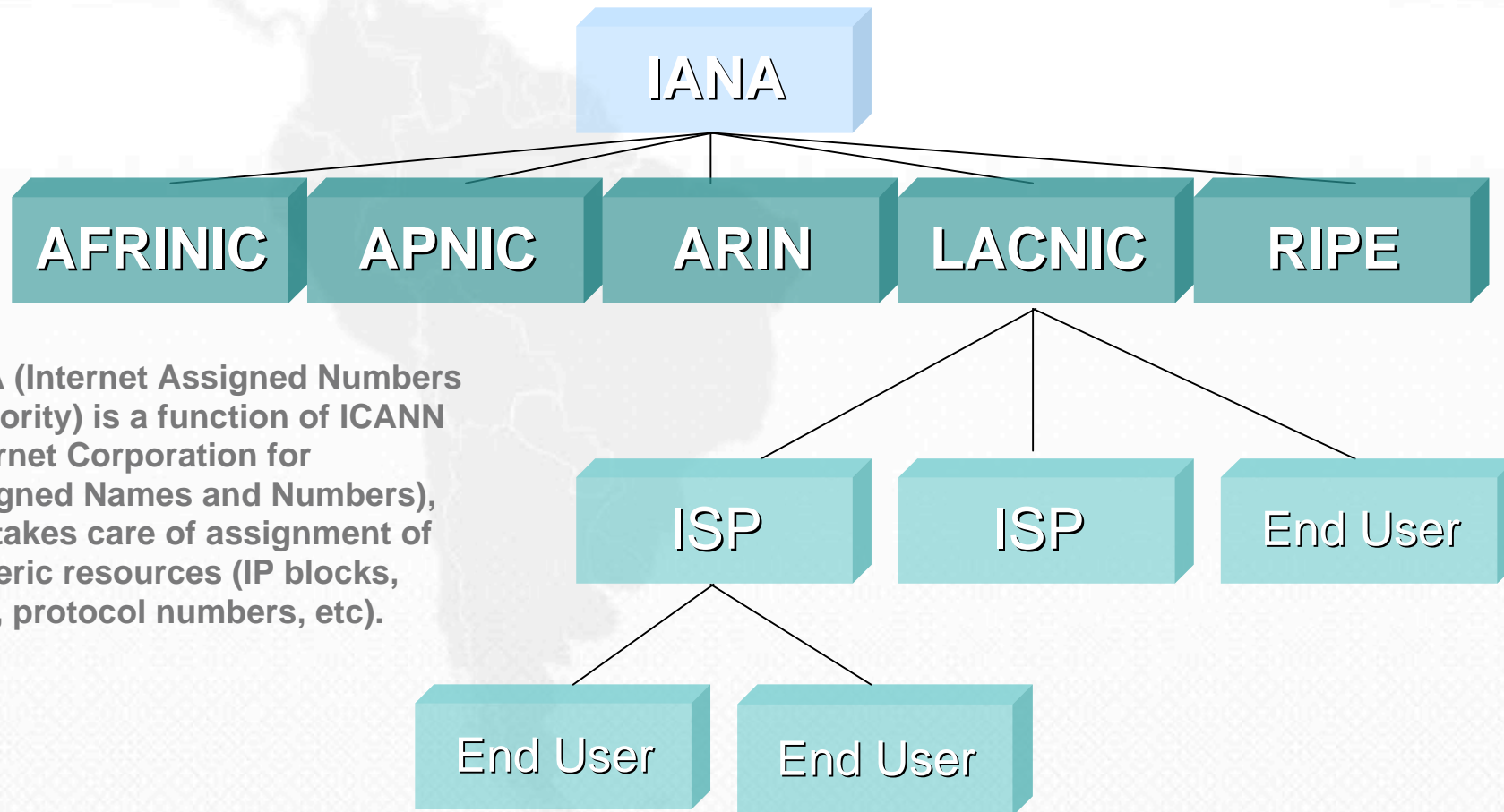
Internet Resources Distribution



- ◆ **Registration:**
 - ◆ ***Provisioning of a public registry documenting address space allocation and assignment. This is necessary to ensure uniqueness...***



Internet Resources Distribution



IANA (Internet Assigned Numbers Authority) is a function of ICANN (Internet Corporation for Assigned Names and Numbers), and takes care of assignment of numeric resources (IP blocks, ASN, protocol numbers, etc).



Internet Resources Distribution



- ◆ They all use a set of written criteria or *policies* for the distribution of Internet Resources.
 - ◆ **Policy creation follows bottom-up process: *addressing community needs and technology development***



Internet Resources Distribution



- ◆ **LACNIC policies for Internet Resources Distribution:**
 - ◆ **Some parts from inherited from ARIN**
 - ◆ **Adjust to community/region needs:**
 - ◆ 9 public forum meetings since then
 - ◆ More than 20 proposals turned into policies.



LACNIC Policies



◆ Important terms:

- ◆ **ISP**
- ◆ **End-user**
- ◆ **Allocation**
- ◆ **Assignment**
- ◆ **Multihomed**
- ◆ **Singlehomed**
- ◆ **Membership**
- ◆ **Registration fee**
- ◆ **Maintenance fee**



LACNIC Policies



◆ ISP

- ◆ **Organization that will use the IP address space to provide services to third parties.**

◆ End user

- ◆ **Organization that will use IP address space inside its own infrastructure and to provide services.**



LACNIC Policies



◆ Allocation

- ◆ **The act of issuing IP address space to ISP, for further sub allocations to its customers (ISP or end-users)**

◆ Assignment

- ◆ **The act of issuing IP address space to End-Users for its use internally to its organization**



LACNIC Policies



- ◆ **Multihomed**

- ◆ **An organization connected to the internet through two or more independent transit providers**

- ◆ **Singlehomed**

- ◆ **An organization connect to the internet through only one transit provider.**



LACNIC Policies



- ◆ **Membership**

- ◆ **According to LACNIC bylaws, any organization allocated/assigned a IP address space (v4 or v6), is LACNIC member**

- ◆ What entitles the organization to attend LACNIC meetings, to vote on member meetings, be part of the board.



LACNIC Policies



◆ Fees

- ◆ **Registration fee once approved to receive a Internet resource.**
- ◆ **Maintenance fee.**
 - ◆ To maintain registration information
 - ◆ Inverse DNS delegation
 - ◆ IP Administration System, etc



LACNIC Policies



- ◆ **Set of policies for allocation and assignment of Public address space.**
 - ◆ **Out of scope: private resources**
 - ◆ Private (RFC 1918): Internal address for private networks.
 - ◆ Reserved: Multicast ...
- ◆ **Initial and additional process.**
- ◆ **Inverse DNS delegation.**



LACNIC Policies - IPv6



- ◆ **Initial/original policy:**
 - ◆ **Globally coordinated**
 - ◆ **Allocations only to ISPs**
 - ◆ Due to routing constraints / large size of total address space.
- ◆ **Globally coordinated policy has changed in all RIRs.**
- ◆ **Starting Sept. 1st LACNIC will assign IPv6 Provider Independent addresses to End Users.**



LACNIC Policies - IPv6



- ◆ **Allocations to ISPs:**
 - ◆ **Minimal allocation size: /32 (a lot of IPs)**
 - ◆ **Justification:**
 - ◆ Be a LIR or ISP;
 - ◆ Plan for services and connectivity to be offered.
 - ◆ Announce a single block to the routing system in no longer than 12 months
 - ◆ Offer service via IPv6 to clients or related entities in no longer than 24 months.



LACNIC Policies - IPv6



- ◆ **Assignment to End Users.**
 - ◆ **Min a /48, max a /32.**
 - ◆ **Justification:**
 - ◆ **Automatic if requestor has IPv4 assignments.**
 - ◆ **Else:**
 - ◆ 1) Not been an LIR
 - ◆ 2) Announce a single block in the inter-domain routing table
 - ◆ 3) Submit information showing address use plan for 3, 6 and 12 months
 - ◆ 4) Submit network topology, routing and addressing plan.



LACNIC Policies - IPv6



- ◆ **Micro assignment for critical structure:**
 - ◆ **Similar to IPv4. Organizations with key roles in the internet: ccTLDs, RIRs, IXPs ...**
 - ◆ **Assignment Size: min /48 max /32.**
 - ◆ **Justification:**
 - ◆ Demonstrate its role as one of mentioned organization.



LACNIC Policies - IPv6



- ◆ **Returning First allocation for a bigger one:**
 - ◆ **Organization with only one IPv6 allocation can return it within 6 months in order to apply for a new and bigger one.**
 - ◆ **This can be done only once**
 - ◆ **Same criteria as initial/first application.**
 - ◆ **New and more elaborated utilization plan.**



LACNIC Policies - IPv6



- ◆ **Additional allocation / assignment**
 - ◆ **Utilization of previous address space should meet a threshold in terms /48 assignments.**
 - ◆ **HD-Ratio of 0.94**

$$HD = \frac{\text{Log}(\text{number of allocated objects})}{\text{Log}(\text{max number of allocatable objects})}$$



How to apply for Internet Resources



How to apply



- ◆ **Organizations located in LACNIC coverage area:** <http://lacnic.net/sp/sobre-lacnic/cobertura>
- ◆ **Not necessary to become member first**
 - ◆ **Organizations with IP address allocation became member automatically**
- ◆ **Text based templates**
- ◆ **Email to *hostmaster@lacnic.net***



How to apply



- ◆ **One template for each and every type of resources**
- ◆ **Initial part equal to any of them:**
 - ◆ **Organization information: name, postal address, phone number, Organization-id (in the case of additional request)**
 - ◆ **Points of contact: admin, tech, billing, membership.**



How to apply



◆ Initial part equal to any of them:

0a. Organization ID. (OwnerID):

0b. Name of the Organization:

0c. Postal address:

0d. City:

0e. State:

0f. Country:

0g. ZIP Code:

1a. ID. technical contact (UserID):

1b. ID. billing contact (UserID):



How to apply



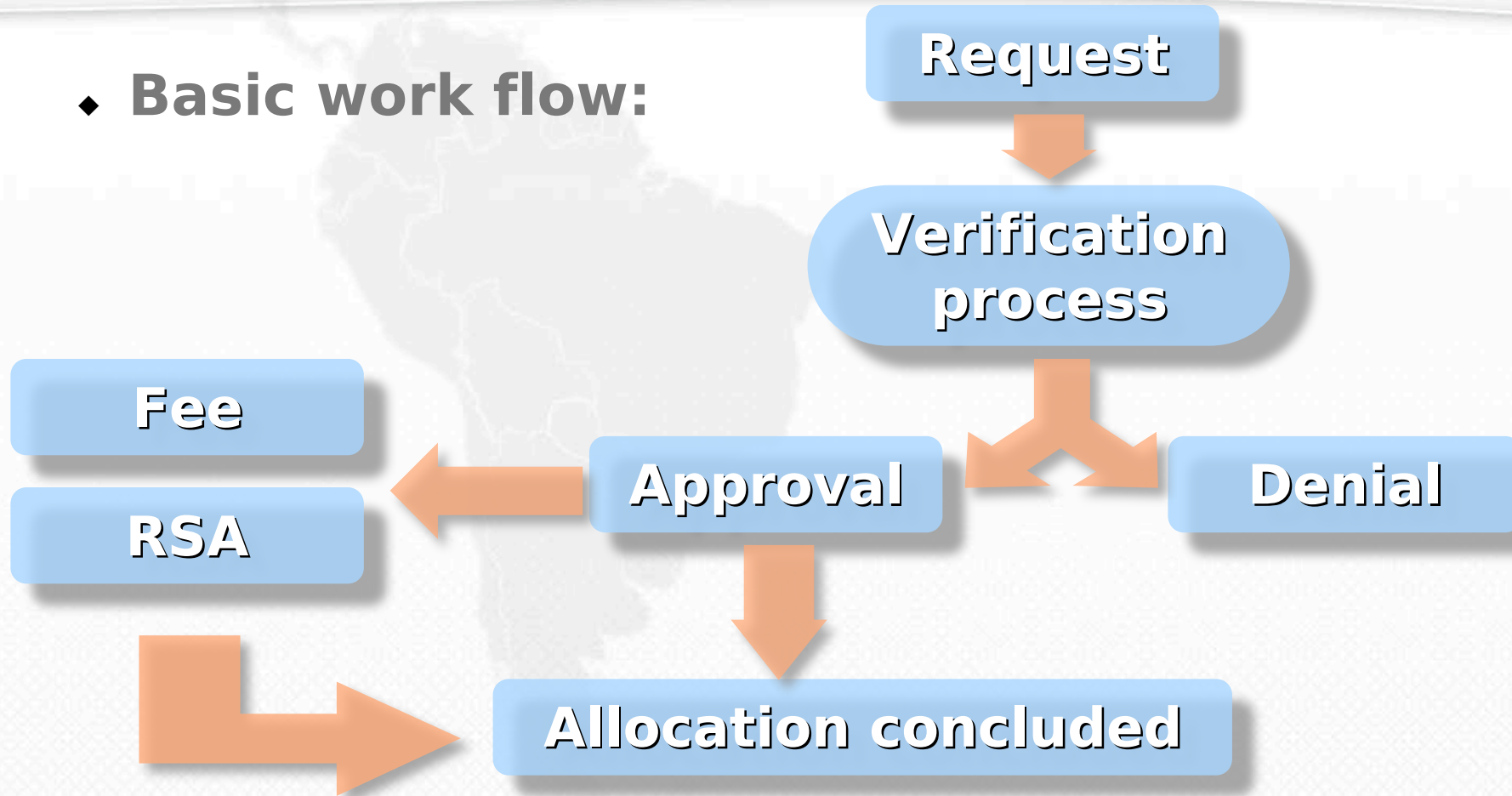
- ◆ **Organization ID created when of first allocation/assignment**
- ◆ **Point of contacts should be created by each contact:**
 - ◆ **Web form:** <https://lacnic.net/newid>
 - ◆ **Personal information, language preference, personal password...**
 - ◆ **An UserID created and sent by email.**



How to apply



- ◆ **Basic work flow:**





How to apply – IPv6



- ◆ **Provide information about:**
 - ◆ **Upstream providers: name, postal address, ASN, and its ability to route IPv6.**
 - ◆ **Address distribution plan:**
 - ◆ **Planned prefixes for each type of customer, for equipments, POPs, etc.**
 - ◆ **Planned IPv6 enabled services.**



How to apply – IPv6



- ◆ **Verification process**
 - ◆ **Organization should be a Internet provider (internal or external to the organization) or an End Users.**
 - ◆ **Current IPv4 allocation/utilization (specially in cases of larger prefix requests and End Users).**
 - ◆ **Should compromise to start announcing prefix within 12 months, and to offer IPv6 enabled services within 24 months**
 - ◆ **No registration fee at the moment**



How to apply – IPv6 / Critical Infra



- ◆ **Organizations with keys roles for internet:
ccTLD operators, IXP, RIRs**
- ◆ **Minimal size: /48**
- ◆ **Information necessary:**
 - ◆ **Confirmation about its activity.**
 - ◆ ccTLD: checking IANA information about organization role
 - ◆ IXP: incorporation act, list of potential members, open policy for member joining.



IPv6 Metrics, Life Demo.



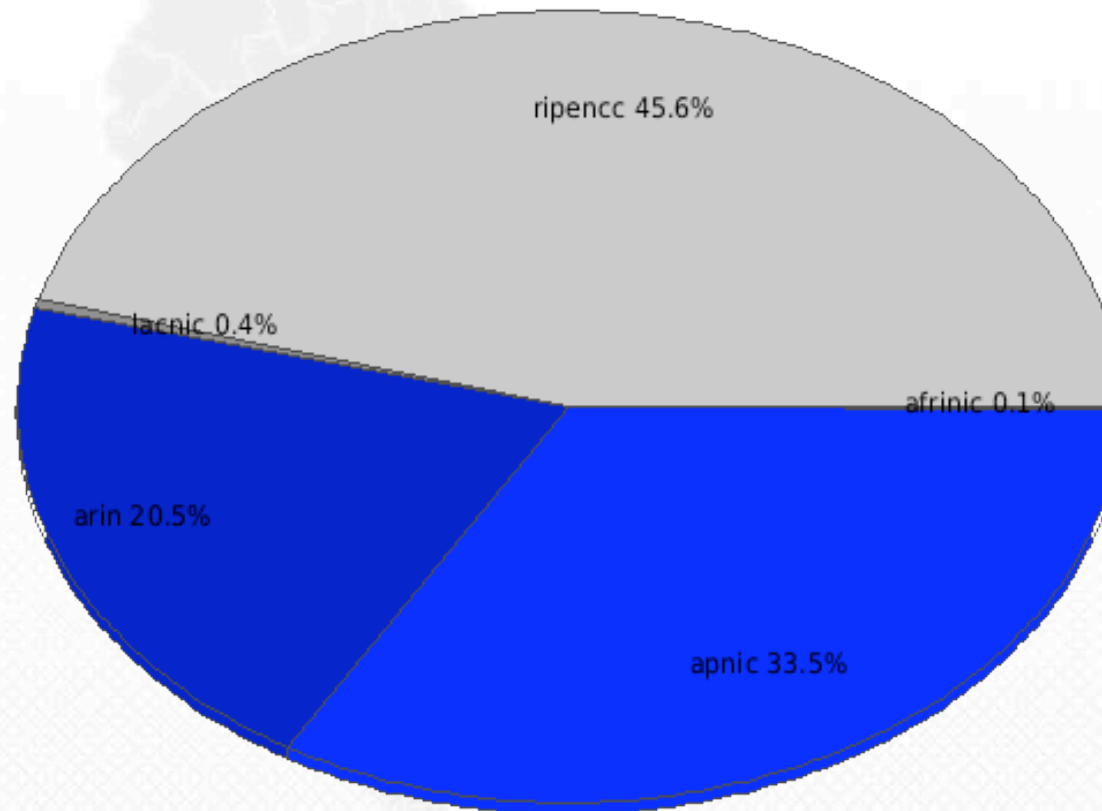
Thank you!

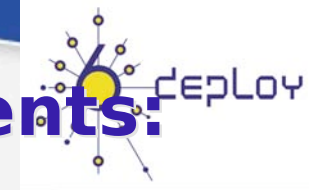


IPv6 Allocations and Assignments: The world So Far.



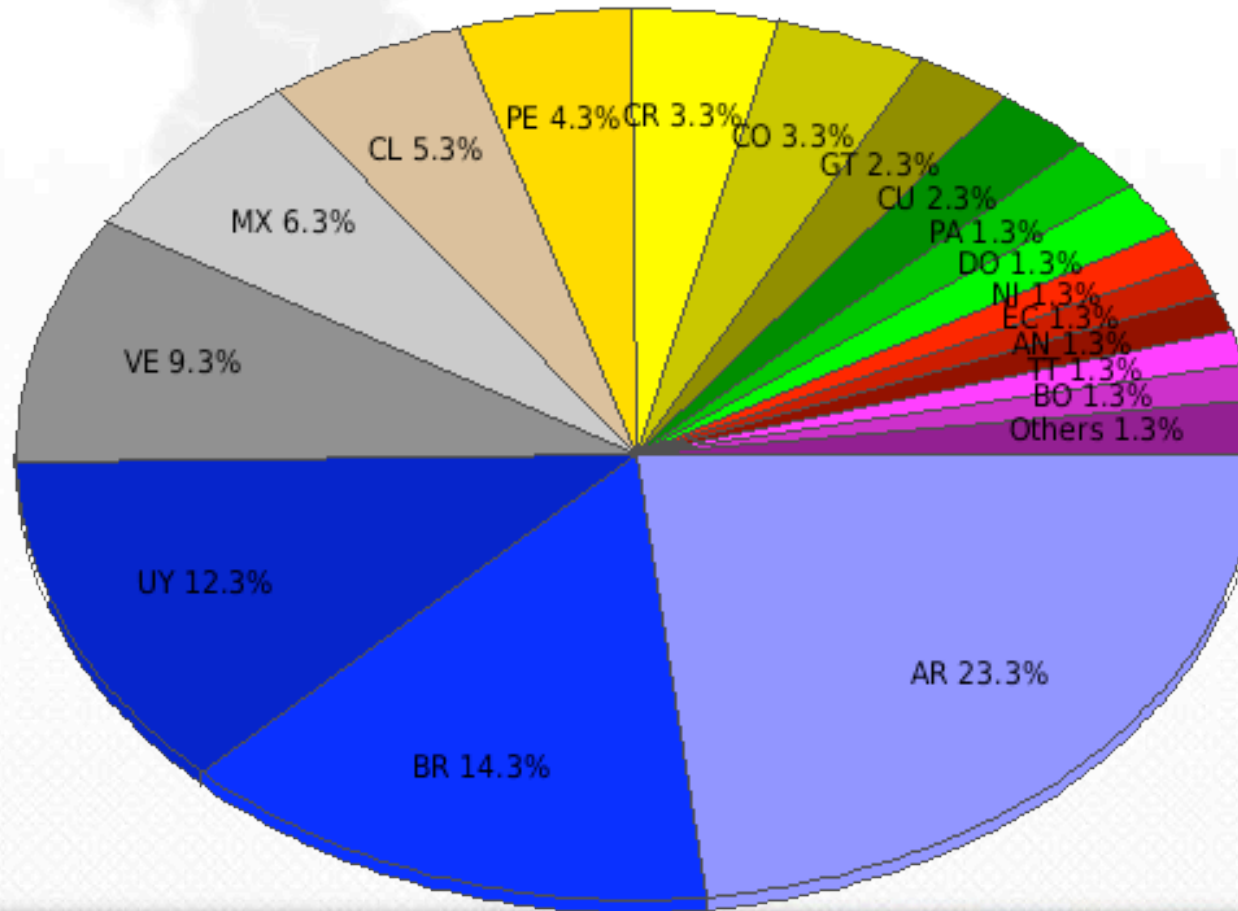
IPv6 Global Stats. Total of 72327 /32s(as at 24-Aug-2008)





IPv6 Allocations and Assignments: LACNIC Region.

IPv6 distribution, total of 155 /32 (as at 24-Aug-2008)

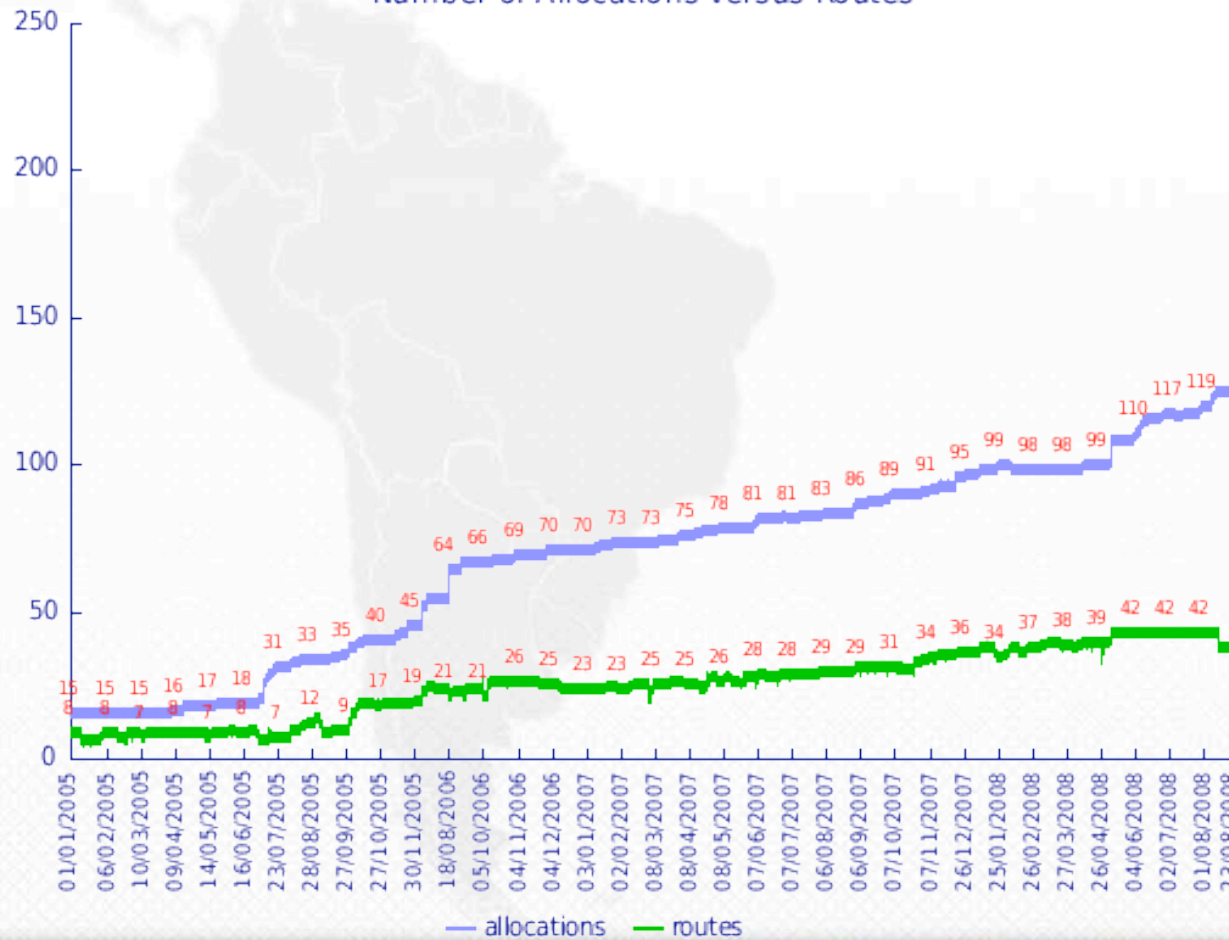




IPv6 Metrics (1): Allocated vs Routed.



Number of Allocations versus Routes

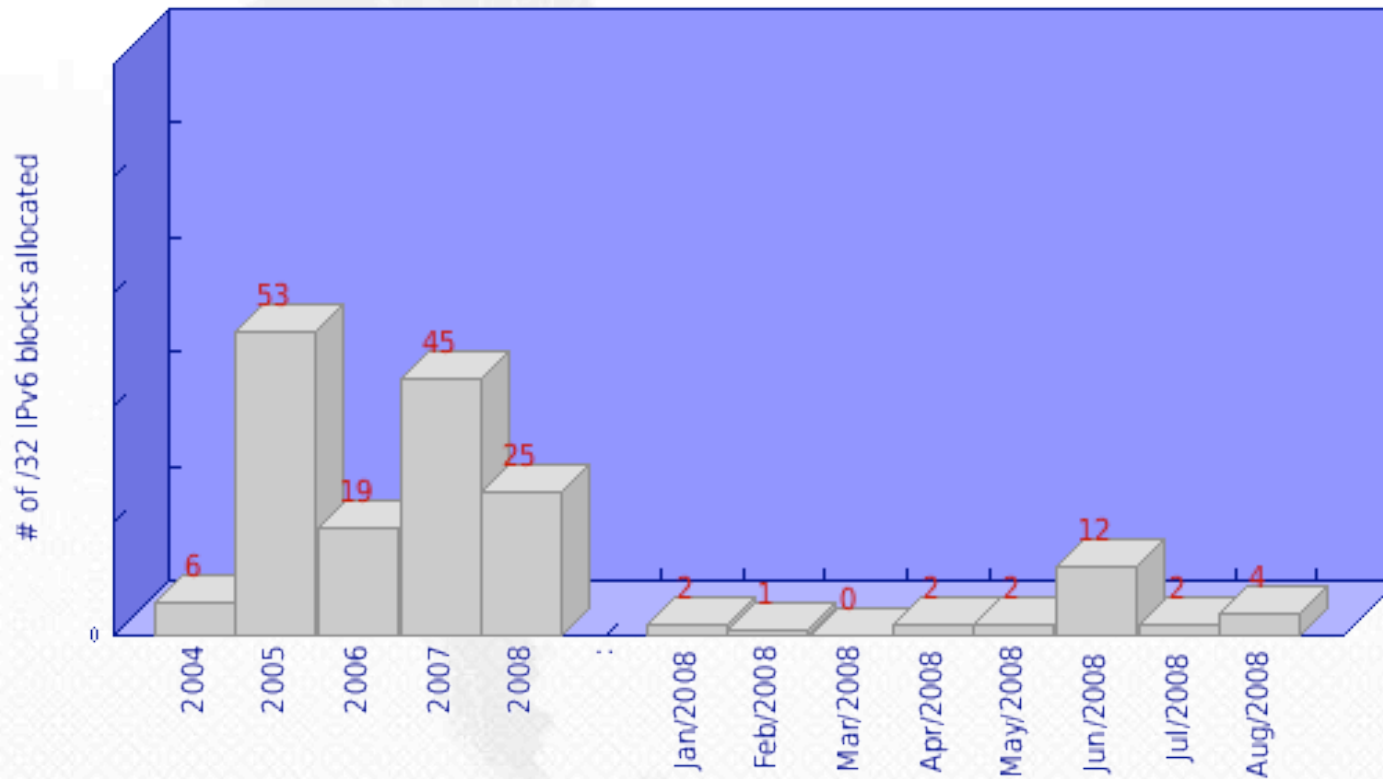




IPv6 Metrics (1): Allocated vs Routed.

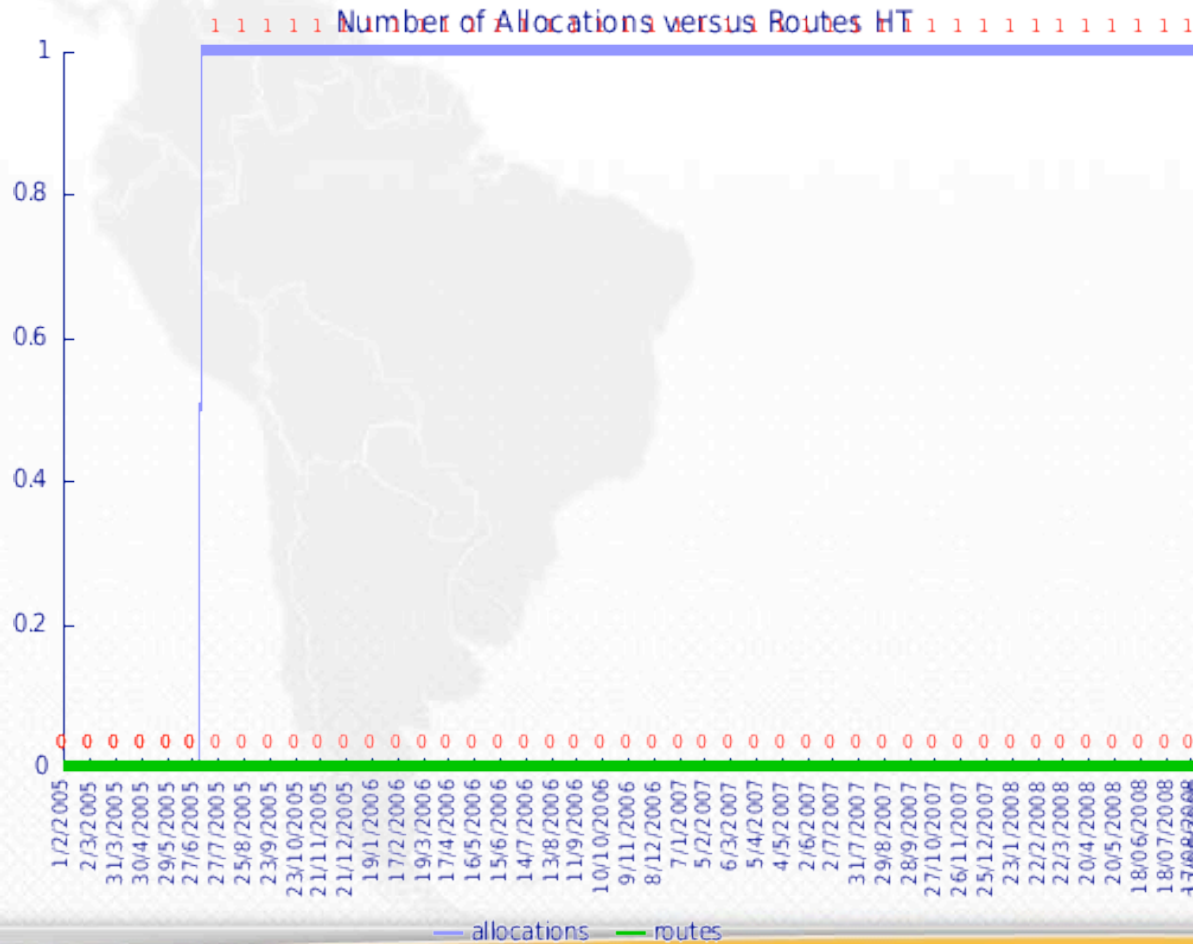


IPv6 blocks (as at 24-Aug-2008)





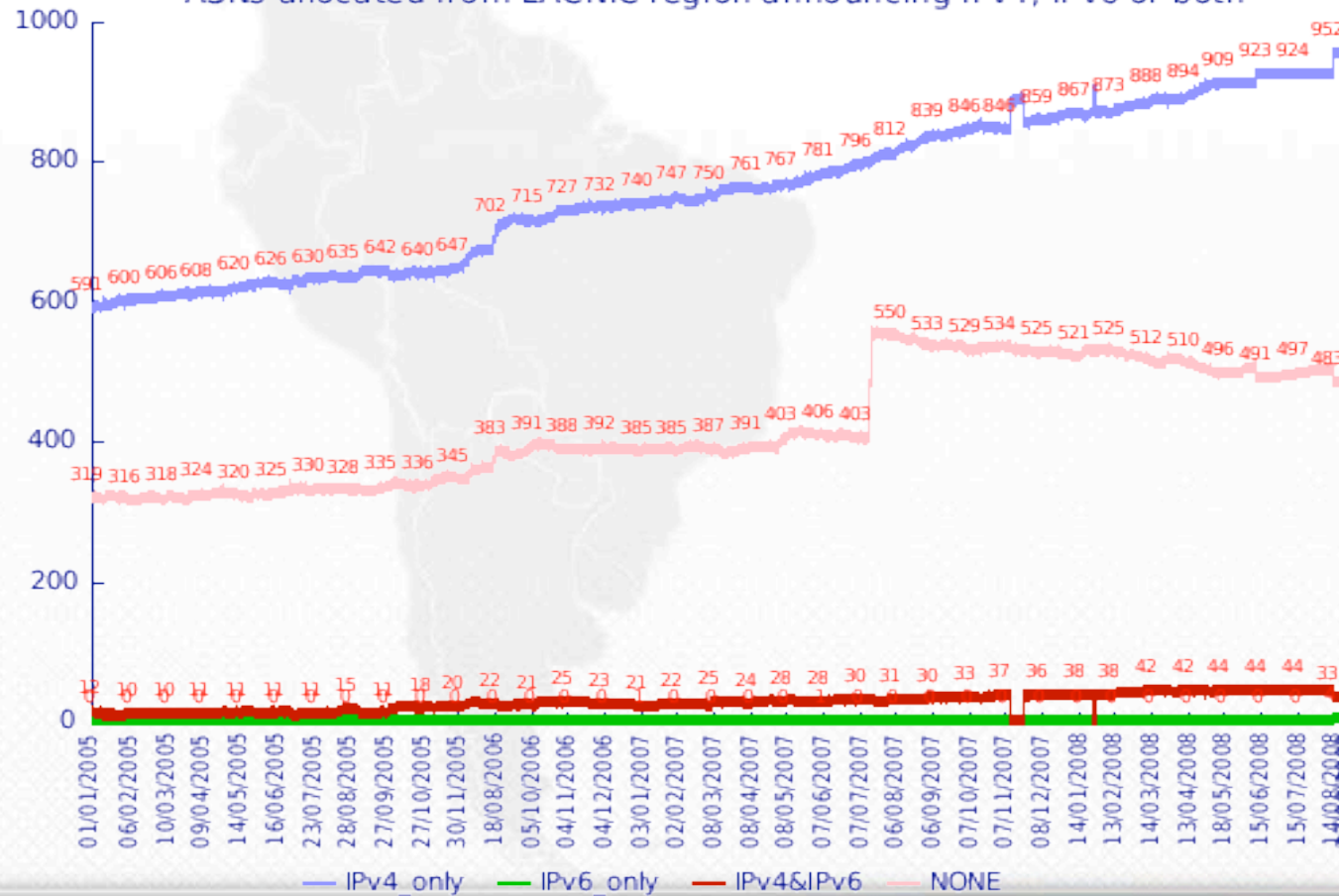
IPv6 Metrics (2): Allocated vs Routed (HT).





IPv6 Metrics (3): ASNs Analysis.

ASNs allocated from LACNIC region announcing IPv4, IPv6 or both





IPv6 Metrics (3): ASNs Analysis (HT).



ASNs allocated from LACNIC region announcing IPv4, IPv6 or both

