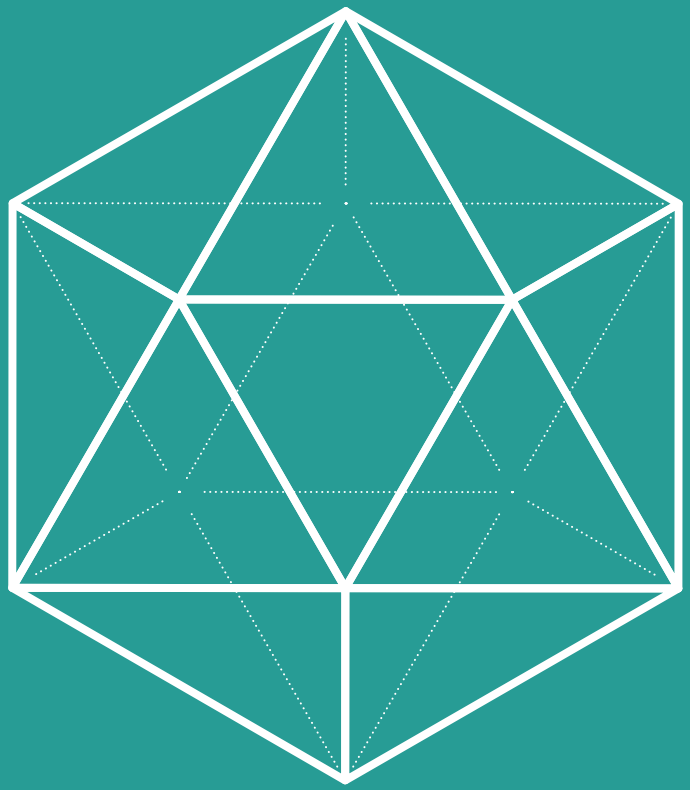


GUIDES FOR UNDERSTANDING INTERNET INFRASTRUCTURE

# IP ADDRESSES AND ASNs

## ALLOCATION TO INTERNET SERVICE PROVIDERS

Original content: nic.br cgi.br

Content translated, modified and adapted: lacnic

Original content in Portuguese:

**Núcleo de Informação e Coordenação do Ponto BR**

Director and President:
**Demi Getschko**
Managing and Finance Director:
**Ricardo Narchi**
Services and Technology Director:
**Frederico Neves**
Special Projects and Development Director:
**Milton Kaoru Kashiwakura**
Consulting Director for CGI.br Activities
**Hartmut Richard Glaser**

Authors
**Antonio Moreiras and Ricardo Patara**

Revision
**Julio Sirota, Caroline D'Avo and Everton Teles Rodrigues**

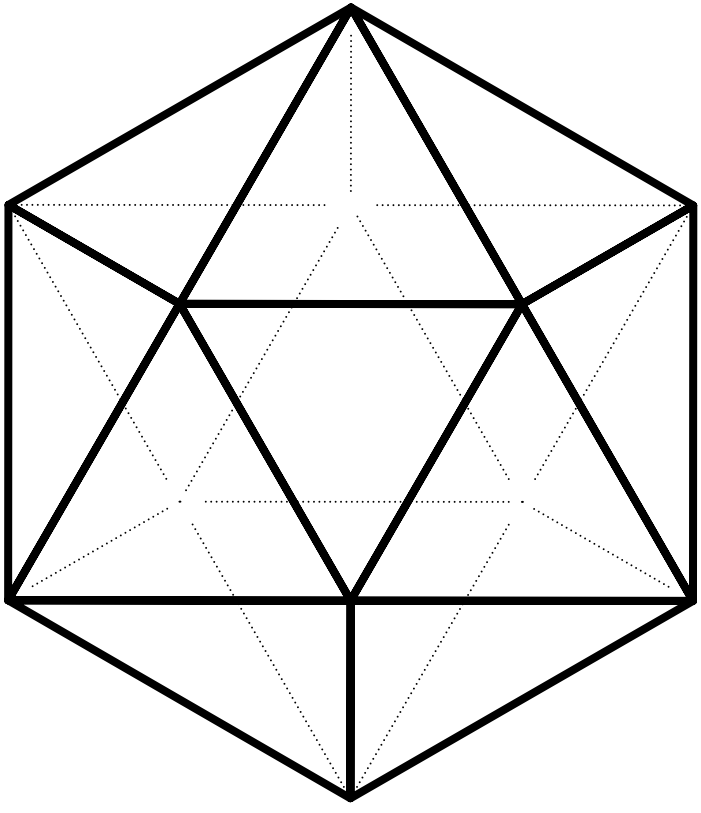
Editing, graphic design and publishing
**NIC.br Communications Department:**
**Caroline D'Avo, Everton Teles Rodrigues, Maricy Rabelo, Klezer Kenji Uehara and Giuliano Galvez**

--
Content translated, modified and adapted in Spanish:
**Latin American and Caribbean Internet Addresses Registry (LACNIC)**

Chief Technical Officer: **Carlos Martínez**
Chief Services Officer: **Alfredo Verderosa**
Head of Registration Services: **Sergio Rojas**
Policies and Training Coordinator: **Gianina Pensky**

Revision of the text **Carolina Badano, María Gayo**

Graphics design updates: **Martin Mañana**



GUIDES FOR UNDERSTANDING INTERNET INFRASTRUCTURE

# IP ADDRESSES AND ASNs

## ALLOCATION TO INTERNET SERVICE PROVIDERS

lacnic nic.br cgi.br

# ÍNDICE

# IP ADDRESSES

The Internet consists of many different networks that are interconnected to create a huge, global network. The Internet Protocol (IP) is the technology, the set of communication rules, that allows these different networks to work with each other.

The Internet Protocol specifies that each device on the global network must have **a unique numerical identifier**, an address that makes it possible for the device to be found without error or confusion, what **is known as an IP address**. The IP address is what allows data packets to be sent correctly from one network to another from the origin device to their final destination.

The IP protocol and the Internet use packet switching technology. Information is divided into small groups of data that are then encapsulated —they are placed into "IP envelopes"— and marked with their source and destination IP addresses. From then on, each packet can traverse the network independently.

**In order for the communication to be established, IP addresses cannot be duplicated. This is the reason why these resources are managed globally.** Institutions exist that distribute IP address blocks to Internet service providers (ISPs) and other large networks in a controlled and organized manner. Internet service providers and other networks must also distribute IP addresses to their users in a planned manner, ensuring their uniqueness, documenting every aspect, preserving the resources, and allowing the routing protocols to use them in an optimized manner.

**Two versions of the IP protocol are currently used on the Internet: the old, legacy version known as IPv4 which has been in use since 1983 and remains the most widely used worldwide, and the current version known as IPv6, the use of which is rapidly increasing.**

IPv4 uses 32-bit addresses, which means that it allows 232 possible addresses. This means that IPv4 can be used to identify a little over 4 billion devices connected to the network. Practically all IPv4 addresses have already been allocated to a company or institution. In practice, the global IPv4 pool is depleted.

Throughout Latin America, Internet service providers and other institutions can no longer obtain additional IPv4 address blocks. Only "new entrants" —those who have never before received IPv4 addresses— can obtain these blocks and, even so, they can obtain at most one /22 block, i.e., 1024 addresses. The stock of IPv4 addresses reserved for new entrants in the region of Latin America is quickly running out. Very soon, it will not be possible to obtain IPv4 address blocks, even for new entrants.

**IPv6** uses 128-bit addresses. IPv6 allocation does not normally consider individual addresses, but instead large address blocks wich can be used to number multiple devices in large networks.

And this applies even when IPv6 addresses are allocated to residential users. With IPv6, IP addresses are no longer a scarce resource but have instead become an abundant resource. When planning a network, the preservation of resources is less important than the proper documentation, organization and optimized use of the routing protocols. The use of IPv6 is growing rapidly throughout the global Internet and is one of the factors that will allow the network's continued expansion, digital inclusion, the Internet of things and other innovations.

It is essential for Internet service providers to implement IPv6 in their networks. Currently, IPv6 is being deployed in parallel with the use of IPv4, which means that users and devices must use both types of addresses. In the near future, however, IPv6 will be the only IP protocol in use.

For more information on IP addresses, see RFCs 791 and 8200 (https://tools.ietf.org/html/rfc791[1] y https://tools.ietf.org/html/rfc8200[2]).

1.

2.

# AUTONOMOUS SYSTEM NUMBERS

**ASN** is the acronym for **Autonomous System Number**.

The Internet is a network of networks. A network made up by the joint operation of thousands of networks that belong to different institutions which, in turn, have different functions: access providers, content providers, universities, Internet users, government agencies, etc. **These networks that make up the Internet are known as autonomous systems (AS).**

Autonomous system is the term used in Internet jargon to define a network that:

- Is managed by the same organization, both from a technical and legal point of view (although this organization may have other dependent networks managed by other organizations, for example, customer networks);
- Uses one or more IP address blocks it has been assigned by a Regional Internet Registry (RIR) or National Internet Registry (RIR), i.e., it uses its own IP address blocks;
- Has a unique and clearly defined routing policy, which normally involves being connected to more than one autonomous system and using the dynamic Internet routing protocol (Border Gateway Protocol or BGP).

An **ASN is a 16-bit or 32-bit number** allocated by an RIR or an NIR to an autonomous system. **This number uniquely identifies the system in the BGP routing system.**

Normally, each autonomous system has a map of the entire Internet and knows which IP address blocks are linked to each of the other autonomous systems on the network, as well as the best way to reach each destination on the Internet. This map is created dynamically by the BGP protocol.

Using BGP, the routers in each of the networks that make up the Internet exchange information on which IP address blocks they are using, which other IP address blocks (linked to other autonomous systems) they already know and how to reach them. This information is gradually propagated, and routers continuously compile it in the form of a table —the global Internet routing table— which is a map of the entire global network.

For an AS, it is also possible to work with a partial view of the routing table, using a default route to another network that knows the global table and will be responsible for sending the packets to their correct destination.

**Internet service providers are generally autonomous systems.** Other types of entities such as government agencies, universities, banks, retailers, media companies, Internet users and other organizations with large networks can also be autonomous systems.

Operating a telecom network is not a requirement to be an autonomous system. This means that it is not a prerequisite for an organization to obtain a telecommunications license to be an autonomous system and have its own ASN.

For more information, see RFCs 4271 and 1930 (**https://tools.ietf.org/html/rfc4271**[3] **y https://tools.ietf.org/html/rfc1930**[4]).

3.

4.

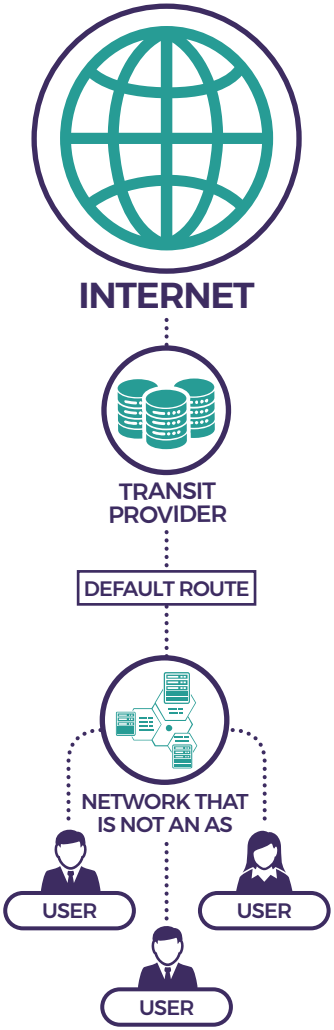
# WHY SHOULD AN INTERNET SERVICE PROVIDER HAVE ITS OWN IP ADDRESS BLOCK AND ASN?

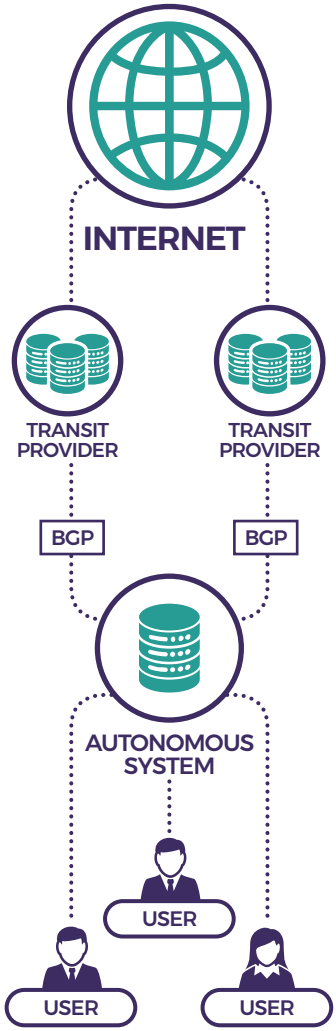
A network that is not an autonomous system will always rely on another network that is indeed an autonomous system, for example, their Internet transit provider. Therefore, it will also depend on the IP addresses assigned by the transit provider and the routing policies they use.

**Not being an autonomous system and relying on a IP transit provider is a huge limitation for any Internet service provider.**

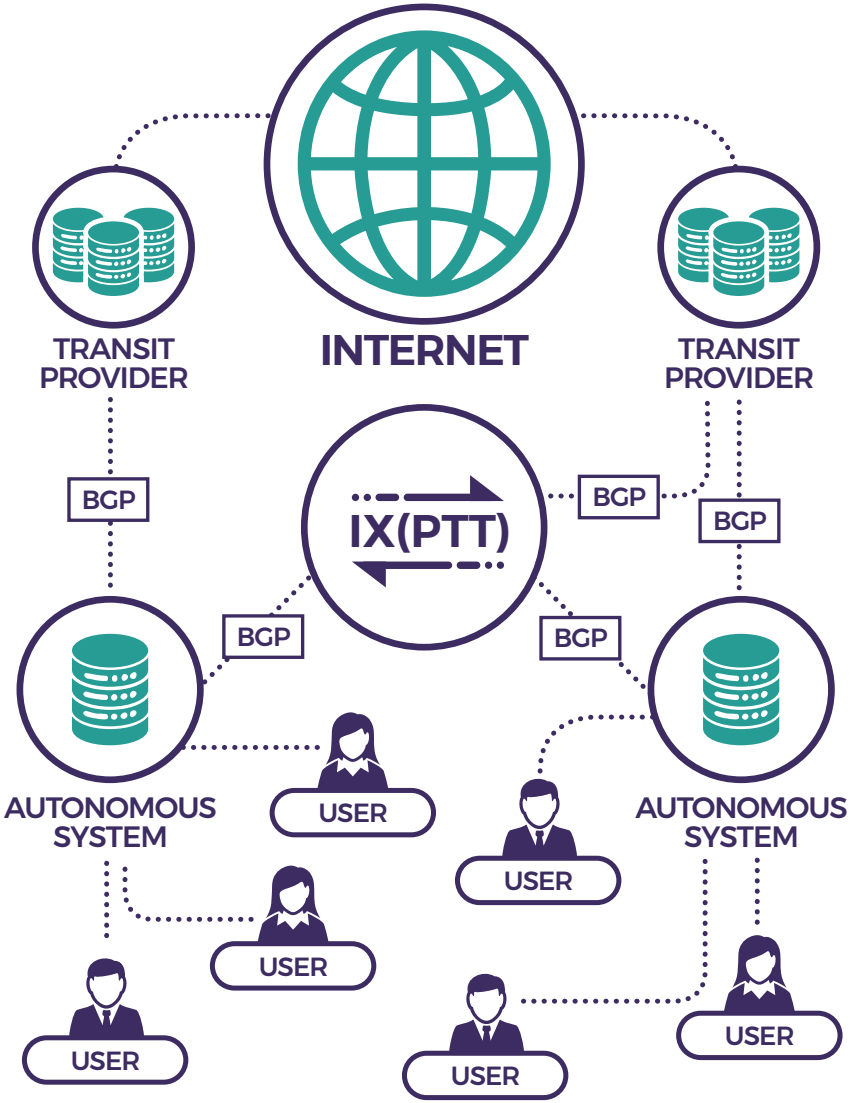
A provider that is an autonomous system can:

- Have several different traffic providers without using NAT, which improves their redundancy. In this case, they can use load balancing or other strategies, depending on their traffic engineering and routing policy.






- Switch transit providers without worrying about the size of the block offered by the new provider or about renumbering the servers and other devices on their network. An AS uses its own IP address block, not an IP address block provided by others.
- Enter into peering agreements with other autonomous systems. Under these agreements, one AS allows the other to access its network and vice versa without providing transit, i.e., without delivering the other's packets or announcing the other's IP address blocks to third-party networks. These agreements are very common on the Internet and are generally collaborative. Their purpose is to improve the connectivity between two networks, increasing their resistance and often also reducing their costs.
- Participate in Internet exchanges or Internet exchange points (IXs or IXPs). An IXP is the physical Internet infrastructure where several autonomous systems interconnect to exchange traffic with each other, or to purchase or sell services such as IP traffic or layer 2 transport. IXPs mainly favor the interconnection of networks located in the same geographical region, such as within the same city or between neighboring cities, but other IXPs connect networks in different regions, for example, networks in different states or even in different countries. The number of autonomous systems that participate in an IXP ranges from just a few to several hundred. Participating in an IXP usually results in an increase of a provider's perceived quality, as well as in the rationalization of its costs.


INTERNET
TRANSIT PROVIDER
TRANSIT PROVIDER
IX(PTT)
BGP
BGP
BGP
BGP
BGP
AUTONOMOUS SYSTEM
AUTONOMOUS SYSTEM
USER
USER
USER
USER
USER
USER

**Historically, many Internet service providers began operating on a very small scale**, sometimes in an informal and even irregular manner. However, if they wish to continue to operate, grow and evolve in a market that continues to mature at a rapid pace, it is essential that they work professionally. **From a technical point of view, this means becoming an autonomous system and improving their interconnection with the rest of the Internet.**

**Being an autonomous system allows an Internet service provider to have greater control over its network and how it interconnects to other networks on the Internet. It allows them to improve their connectivity and their service quality perceived by their users.**

# WHO MANAGES IP ADDRESSES AND ASNS ON THE INTERNET?

IP addresses are the device identifiers used by the Internet protocol; ASNs are the autonomous system identifiers used by the BGP protocol. These numbers must be unique. Two devices connected to the global Internet cannot have the same IP address, and two networks using the BGP protocol cannot have the same ASN. In addition, both are finite resources. This means that **these resources must be managed globally.**

Today, IP addresses and ASNs are managed by organizations that operate hierarchically.

IP addresses and ASNs are managed globally by the Internet Assigned Numbers Authority (IANA). The IANA is operated by a non-profit organization called Public Technical Identifiers (PTI), an affiliate of the Internet Corporation for Assigned Names and Numbers (ICANN).

**The IANA manages the central pool of IP addresses and ASNs.** It allocates large blocks of IP addresses and ASNs to regional organizations known as Regional Internet Registries.

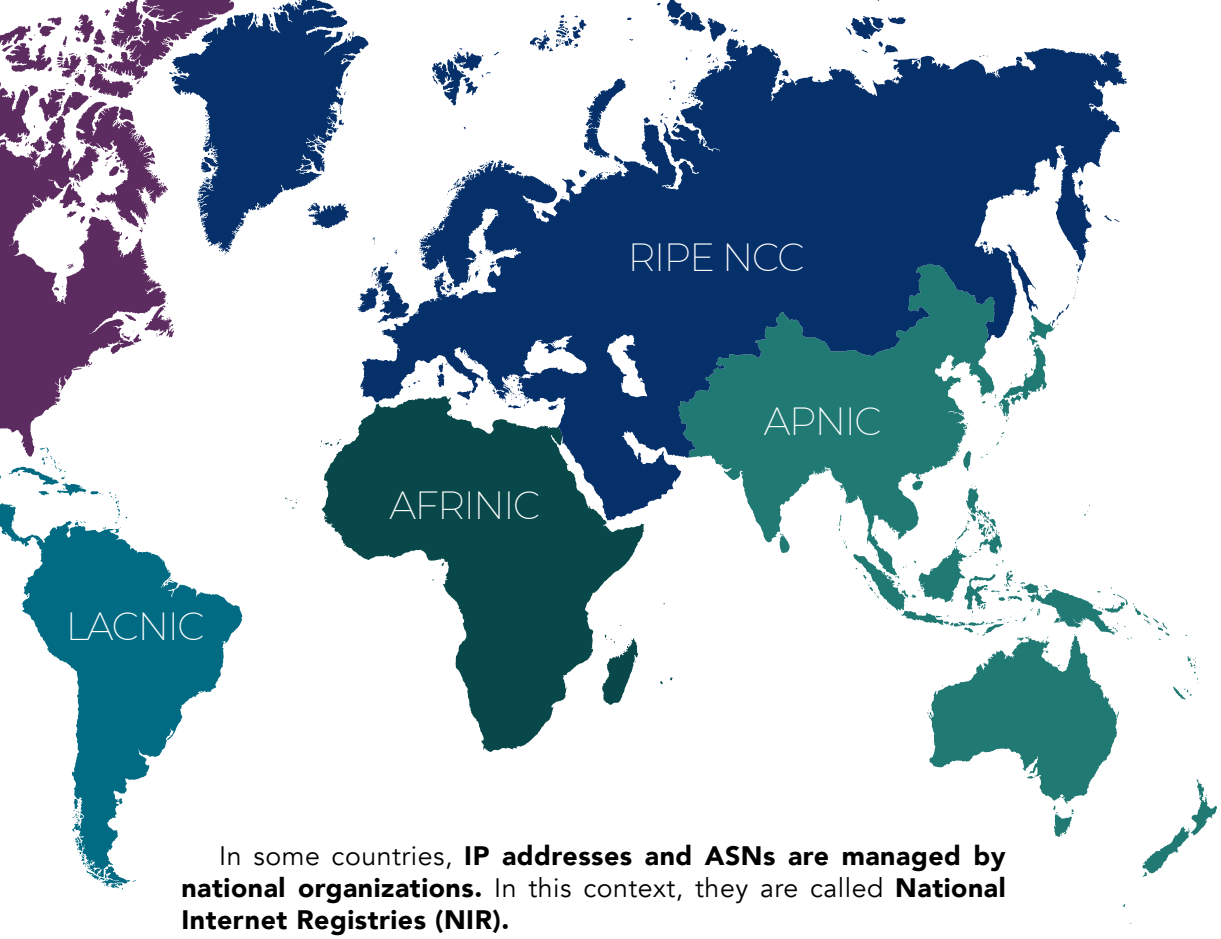

# IANA

| Regional Internet Registries | National Internet Registries |
|---|---|
| **ARIN** North America | |
| **LACNIC** Latin America | **NIC.br**<br>**NIC Mexico** |
| **APNIC** Asia-Pacific | **APJII** • Indonesia<br>**CNNIC** • China<br>**JPNIC** • Japan<br>**KRNIC** • Korea<br>**VNNIC** • Vietnam<br>**TWNIC** • Taiwan |
| **AFRINIC** Africa | |
| **RIPE NCC** Europe/Part of Asia/ The Middle East | |

**There are five RIRs, each of which is responsible for managing the IP addresses and ASNs for a specific region:**

- ARIN: United States, Canada and some of the Caribbean islands
- RIPE: Mainly Europe, but also part of Asia
- APNIC: Asia Pacific
- AFRINIC: Africa
- **LACNIC: Latin America (Mexico, Central and South America, including Brazil)**

Collectively, the five RIRs have created the Number Resource Organization (NRO), an organization that coordinates joint actions and publishes resource allocation statistics.




In some countries, **IP addresses and ASNs are managed by national organizations.** In this context, they are called **National Internet Registries (NIR).**

For example, in Latin America —LACNIC's service region— there are two NIRs: NIC.br in Brazil and NIC Mexico.

The pool of both IPv4 and IPv6 addresses and ASNs is unique for the entire region. This means that **LACNIC, NIC Mexico and NIC.br (Registro.br) use the same reserve of IP address and ASNs. The rules for the allocation of IP addresses and ASNs are also the same throughout the region, as well as the administrative fees paid for the service.**

5. 

For more information, go to the following websites: registro.br[5], lacnic.net[6], nro.net[7], iana.org[8] y icann.org[9], nic mexico[10]

6. 

7. 

8. 

9. 

10. 

# ALLOCATION OF IP ADDRESS BLOCKS AND ASNs

IP address blocks and ASNs are finite resources that must be managed carefully. In the case of IPv4, the resource is not only finite but also extremely scarce. They are not products for sale, which is why the term "allocation" is used.

**An allocation consists of the temporary assignment of an IP address block or an ASN to an organization, subject to certain conditions.**

Before receiving an allocation, the organization must justify the use of the resources, submitting documents to prove that it satisfies certain requirements.

Once allocated, the organization must use the resources. In addition, this use must be in accordance with certain rules.

An IP address block or an ASN allocated to an Internet service provider or other organization is not owned by that organization.

The payment made for the allocation of resources and all subsequent annual payments are administrative fees to be applied to the maintenance of the services associated with the allocation, such as the directory service (WHOIS or RDAP), DNS delegation and others. In no way should these payments be interpreted to be for the purchase or even for the lease of IP addresses and ASNs.

If the resources are not utilized or if the rules for their utilization are not followed, the allocation may be revoked, regardless of the payment of the corresponding administrative fees. This means that the resources return to LACNIC and may be allocated to a different organization.

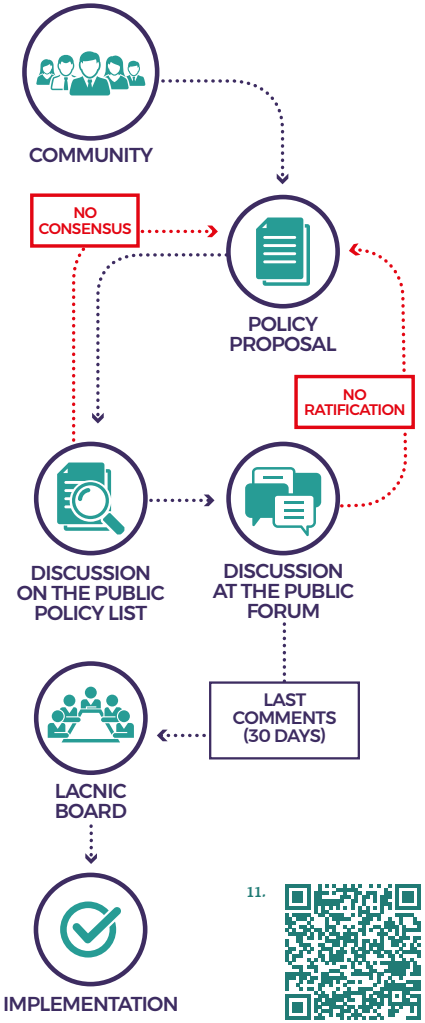
# WHO DEFINES THE RULES FOR THE ALLOCATION OF IP ADDRESS BLOCKS AND ASNs?

Several entities operate hierarchically in the allocation of IP addresses and ASNs. First, the IANA allocates the resources to the RIRs, in the region of Latin America and the Caribbean, to LACNIC. RIRs then allocate the resources to any existing NIRs.

RIRs or NIRs allocate the resources to Internet service providers and other networks. In Brazil, NIC.br is responsible for allocating the resources, while in Mexico it is NIC.mx.

The rules for the management of Internet number resources are defined through a public, transparent and participatory process that is open to anyone who wishes to participate and based on consensus.

This means that the very users of the resources —or the potential users of the resources— define the rules that will be implemented and applied by the Regional Registries. The participation of the different stakeholders ensures that the policies are in line with the regional interests, thus safeguarding the interests of the community. In the LACNIC region, all policy proposals are presented and discussed on the Policy Mailing List before being presented at the Forums for the purpose of seeking consensus.




Anyone can propose modifications to the policies currently in force for the allocation of IP addresses and ASNs. Any proposed modification will be discussed on the mailing list and at the face-to-face meeting. If there is a rough consensus, i.e., if there is a majority of well-founded opinions in favor of the proposal and there are no strong technical arguments against it, the proposal enters into force and becomes part of the rules. Otherwise, the proposal is rejected.

To be approved, the rules followed by the IANA must be approved through similar processes at the five RIRs.

**In this process, the participation of professionals representing Internet service providers and other types of networks is extremely important.** In this type of open and democratic processes, the higher the number of participants, the better the results.

For more information, see: https://www.lacnic.net/995/1/lacnic/desarrollo-de-politicas[11].

11.

# HOW TO PARTICIPATE IN THE PROCESS OF DEFINING THE RULES FOR THE ALLOCATION OF IP ADDRESSES AND ASNS

Go to https://www.lacnic.net/politicas and then:

1. Carefully read the information on how the Policy Development Process works.
2. Read the Policy Manual and familiarize yourself with the current rules for the allocation of IP addresses and ASNs.
3. Subscribe to the Public Policy List (mailing list).
4. Read the proposals currently under discussion, analyze their impact and share your opinions on the List. Engage in the discussions.
5. Participate at the Public Policy Forum during LACNIC's in-person meetings and share your opinions. Remote participation is also available.
6. If you believe that one of the rules should be changed, formally submit your proposal for discussion on the List and at the Forum. To do so, use the form available on the website.

# REQUIREMENTS FOR OBTAINING AN IP ADDRESS BLOCK AND AN ASN

- In order to obtain an IPv4 address block, an applicant must not have received any prior IPv4 address assignments either from LACNIC or from the organizations that preceded LACNIC (legacy resources). The policies (rules) currently in force only allow IPv4 allocations to new entrants.
- The organization must be legally incorporated in the LACNIC service region.
- Applicants can request IPv4 blocks from a /24 (256 IP addresses) to a /22 (1024 IP addresses), justifying the immediate utilization of 25% of the addresses and 50% utilization within a year. In other words, if you wish to request 1024 IP addresses, you must justify the immediate utilization of at least 256 IP addresses and submit detailed plans to prove that in one year you will use at least 512 IP addresses.
- Return to the upstream provider any IPv4 addresses received from them within a period not longer than 12 months.
- Along with the IPv4 block, applicants must also request an IPv6 assignment.

11. 

The main requirements for requesting IP address and ASN assignments are available at https://www.lacnic.net/solicitar-ip[11]. The Policy Manual for the assignment of IP address blocks and ASNs in the LACNIC region is available at https://www.lacnic.net/543/1/lacnic/manual-de-politicas[12].

12. 

# COST OF OBTAINING AN IP ADDRESS BOCK AND AN ASN

## Internet Service Providers

An Internet Service Provider (ISP) is an organization that allocates IP addresses to third parties. Likewise, organizations that provide web hosting, co-location, VPS or cloud services are also considered ISPs.

**The cost depends on the category in which the provider is classified and is defined according to the number of requested resources.**

If the ISP requests **an IPv4 block smaller than a /22 (< 1024 IP addresses) and a /32 IPv6 block**, this provider will be classified in the nano category.

If the ISP requests a **/22 IPv4 block and a /32 IPv6 block**, it will be classified in the micro category.

Today, it is no longer possible to request IPv4 blocks larger than a /22. The initial allocation fee for the **nano category is USD 600**; for the **micro category, USD 1,000**. In both cases, the renewal fee is equivalent to the initial allocation fee.

Once the resource request has been approved, the requesting organization must pay the allocation fee and mail the Service Agreement signed by its legal representative to LACNIC. After the payment and the required information have been received, the applicant will be notified of the allocated resources. Resources are renewed yearly on the date of the allocation's anniversary.

### End Users

An end user is an organization that uses IP addresses for its own infrastructure and does not sub-assign any addresses to third parties. Examples of end users include universities, financial institutions, academic networks and government agencies.

An end user may receive a one-time allocation of an IPv4 block ranging from a /24 (256 addresses) to a /22 (1024 addresses). They must also request an IPv6 block, for which the minimum is a /48.

The initial assignment fee for an IPv4 block plus an IPv6 block up to a /34 is USD 2,500. The annual renovation fee is USD 600. There are higher categories that apply to end users depending on the number of IPv6 addresses they receive.

For more information on the rates in force, go to:

https://www.lacnic.net/2397/1/lacnic/categorias-y-cuotas-de-asociados.

# PROCESS FOR OBTAINING AN IP ADDRESS BLOCK AND AN ASN

The applicant must login to the online resource request system at http://solicitudes.lacnic.net. If the applicant does not have a username, they must go to http://milacnic.lacnic.net and click on the "Create new account" button.

Once they have logged into the application system, they must click on the "Create new organization" button and complete the form with the required information about their organization.

Important: The "Type of organization" must be correctly selected, bearing in mind that any organization that sub-assigns IPv4 address space to third parties is considered an ISP. If an organization uses their IP addresses exclusively for their internal network, they must select End User.

After creating the organization in the system, the applicant must select the form for the resource they wish to request.

The form will require information such as the provider's point of contact, transit providers, IP addresses they use in their operation, information about their network and how the requested resources will be used.

Under the policies currently in force, an applicant must identify a technical need that justifies the allocation. Thus, the better the description of the network, the services offered and the need for Internet resources, the shorter the analysis and approval stages. At the end of the form, there is an "Additional Information" field where applicants can expand and provide any other information they wish to share and even allows attaching a file if they prefer.

Once the form is complete, the applicant will receive an email confirming reception of their request. One of our analysts will then contact them within 72 hours to request additional documentation and ask for clarification of any information provided in the form.

Once the request is approved, the analyst will send the applicant a notice of approval, along with the Service Agreement and instructions on how to proceed with the submission. Likewise, LACNIC's Billing and Collections department will email a link to the corresponding electronic invoice as well as instructions and the available forms of payment. Once the invoice has been paid and the required documentation has been received and verified, the analyst will notify the applicant of the resources that have been assigned to their organization and which they may utilize from that moment on.

# DOCUMENTS EQUIRED DURING THE PROCESS OF OBTAINING AN IP ADDRESS BLOCK AND AN ASN

The purpose of the process of analyzing a resource request and its related documents is to check the veracity of the information provided in the form and verify whether the applicant meets the requirements to receive the resources.

Among others, the analysis includes:

- Documentation attesting the legal incorporation of the requesting organization and that it is located within the LACNIC service region.
- The website of the requesting organization.
- Assignment of the IP address blocks in the WHOIS or RDAP, in reference to any IP transit service contracts.
- Current use of the IP address block received by the upstream provider.
- Projected use of the IP address block during the following 12 months.

**Additional documents** may eventually be required, includin:

- Contracts and payment receipts for any IP transit services that are used (upstream provider, IXP, others).
- A report (graph) obtained using a monitoring system that shows the number of connected clients. For example: Radius, PPPoE, DHCP or similar.
- Contracts that the requesting organization has signed with its customers.
- Network diagram.

**For this type of allocation, the LACNIC team may, at any time, request additional information that helps justify a minimum allocation.**

# WHY IS THE PROCESS SO DEMANDING?

The LACNIC team is responsible for ensuring that the policies for IP address and ASN allocation currently in force are followed. These policies are defined by the Internet community itself.

The reason why the process is so demanding is to avoid the improper allocation of scarce resources such as IPv4 addresses.

Today, different forms of fraud are being attempted, so we must redouble our efforts to guarantee that resources will be available to those who actually meet the requirements.

If you represent an Internet service provider that meets the necessary requirements, rest assured that you will receive the requested resources.

# CAN AN ORGANIZATION OBTAIN ADDITIONAL IPV4 BLOCKS?

Currently, the policies in force allow only one IPv4 assignment and only to new entrants. The alternative for obtaining additional IPv4 resources is through an IPv4 transfer.

# RECEIVING AN IPV4 BLOCK TRANSFER

Internet resources assigned by LACNIC may be transfered within the region. Such transfers are recognized provided they take place in the following scenarios:

1. Mergers and acquisitions among ISPs

If an organization merges with or acquires another, it must initiate the transfer process. To do so, it must submit legal documentation to prove the consolidation.

2. IPv4 block transfers

The transfer of IPv4 blocks from one organization to another is allowed provided that the transfer meets certain requirements and is in accordance with the conditions set forth in the applicable policy.

More information on both types of transfers is available at the following link: https://www.lacnic.net/981/1/lacnic/

# THE WHOIS AND RDAP SERVICES

WHOIS is a service used to query Internet number resources. A WHOIS query allows determining the organization to which a specific block of IP addresses or ASN was assigned, as well as displaying contact information, particularly the resources' security contacts.

For the proper operation of the Internet, it is extremely important that Internet providers update their contact information, primarily in the case of abuse contacts.

Similarly, it is very important that someone reads and processes the emails received at the abuse email address. These addresses are used by different security teams to alert providers about problems in their networks. They are also used by law enforcement agencies and the justice system.

The information for each resource can be updated using MiLACNIC, the resource management portal LACNIC offers its members, or the systems offered by the NIRs in the case of members in Brazil and Mexico.

The mechanism used to access WHOIS data is currently being replaced by RDAP https://rdap-web.lacnic.net/

The Registration Data Access Protocol (RDAP) is a new standard defined by the Internet Engineering Task Force (IETF) to replace the WHOIS protocol for querying data on Internet number resources (IPv4/IPv6 addresses and ASNs). The enhancements introduced by RDAP include support for internationalization and authentication and the standardization of query and response formats.

RDAP uses HTTP as the transport protocol, the same protocol used to browse the web. A query returns a JavaScript Object Notation (JSON) file. This format is easily processed automatically with scripts and it is also human-readable.

LACNIC has already implemented RDAP, which is available at https://rdap-web.lacnic.net/ The following are examples of URL address queries:

- https://rdap-web.lacnic.net/ip/45.6.248/22
- https://rdap-web.lacnic.net/ip/2001:13c7:7002::/48
- https://rdap-web.lacnic.net/entity/uy-lacn-lacnic
- https://rdap-web.lacnic.net/autnum/28000

# IMPORTANCE OF DEPLOYING RPKI

Recent years have seen an increase of RPKI adoption worldwide, both by users and by organizations who are are performing BGP origin validation. Operators' increased use of Resource Certification - RPKI strengthens global routing security.

Resource Public Key Infrastructure (RPKI) is a group of protocols, standards and systems that allows verifying the right to use specific Internet number resources, i.e., IPv4 and IPv6 addresses and autonomous systems. The goal of this Internet resource certification system is to improve the reliability and security of the Internet routing system.

Over time, different techniques have been used to verify that the information received by BGP is legitimate, from Letters of Authorization (LoA) to Internet Routing Registries (IRR).

RPKI is the most recent method specified as an IETF standard to verify published information.

By using RPKI, an organization can certify its resources and BGP advertisements, protecting themselves against the unauthorized use of their resources and route hijacking.

LACNIC's RPKI resource certification system is available at: http://rpki.lacnic.net/

More information: https://www.lacnic.net/502/1/lacnic/informacion-general-sobre-certificacion-de-recursos-rpki

# MORE INFORMATION ABOUT ALLOCATED IP ADDRESSES AND ASNS

Information about all the resources assigned by LACNIC in the region is available at: http://ftp.lacnic.net/pub/stats/lacnic/

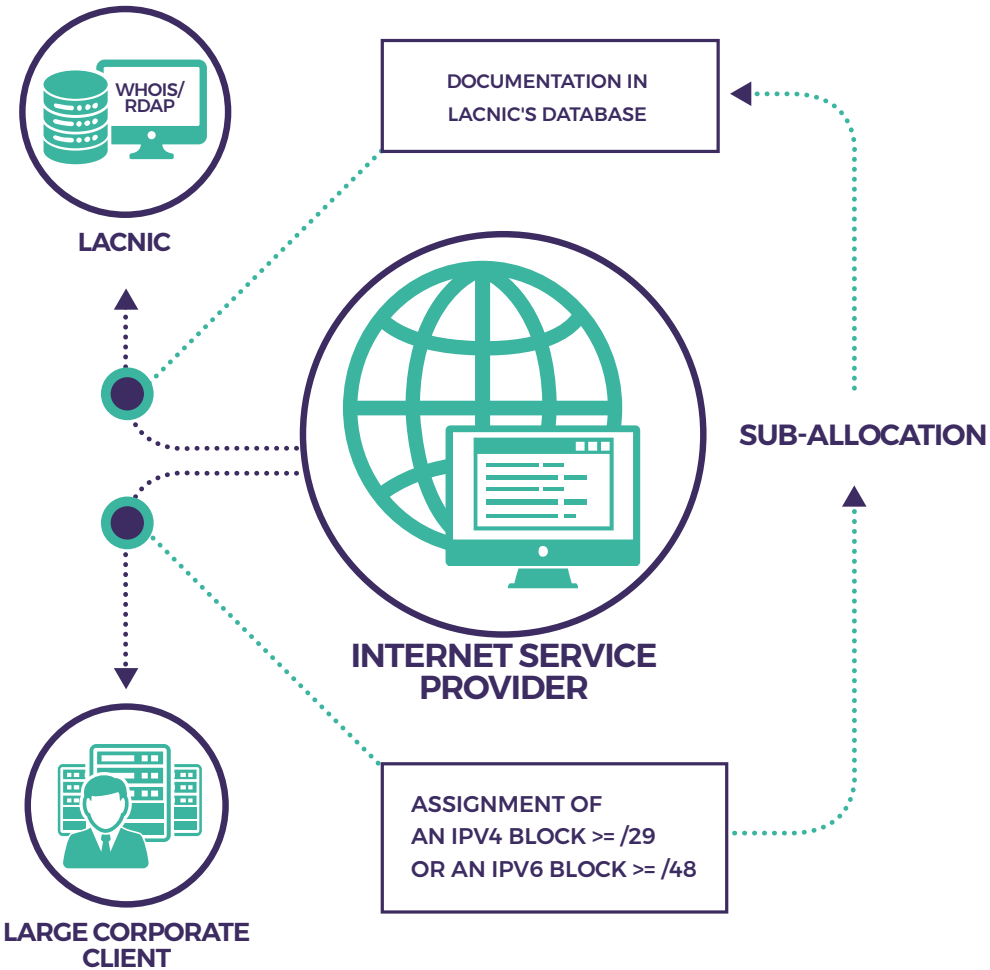
Information about the resources allocated by the IANA to the RIRs is available at: https://www.iana.org/numbers

# REGISTERING ASN AND IP ADDRESS BLOCK SUB-ASSIGNMENTS

Every time an Internet provider assigns one of its customers a **/29 or larger IPv4 block or a /48 or larger IPv6 block**, this must be registered in the LACNIC system. This process is known as sub-assignment registration.

It is important to register sub-assignments because, when the WHOIS or RDAP is queried, it will display the information of the client and the user who received the block, not the information of the Internet service provider. This makes it easier to contact the persons responsible for the IP addresses in cases of abuse.

Sub-assignments can be registered through the MiLACNIC platform, available at http://milacnic.lacnic.net

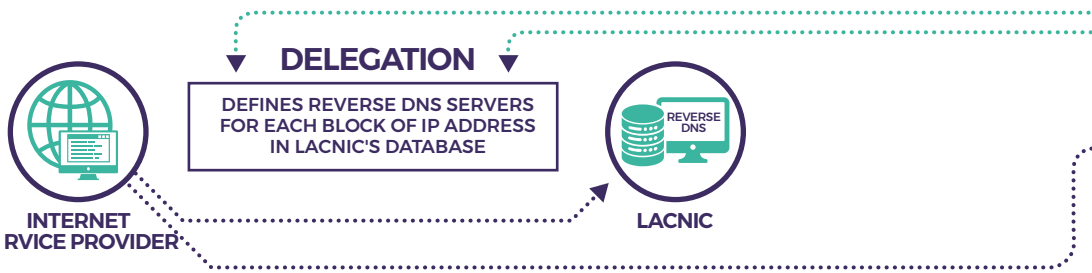

WHOIS/
RDAP
LACNIC
DOCUMENTATION IN
LACNIC'S DATABASE
SUB-ALLOCATION
INTERNET SERVICE
PROVIDER
ASSIGNMENT OF
AN IPV4 BLOCK >= /29
OR AN IPV6 BLOCK >= /48
LARGE CORPORATE
CLIENT

# IP BLOCK DELEGATION

When queried for a domain name, the DNS system usually responds with an IPv4 or IPv6 address.

However, the opposite is also possible and often desirable or even necessary. In other words, when queried for IP address, the response may be a related domain name. This is known as reverse DNS lookup or reverse DNS resolution. Reverse DNS is used when the address appears in commands such as traceroute. It is also used for email validation and other scenarios.

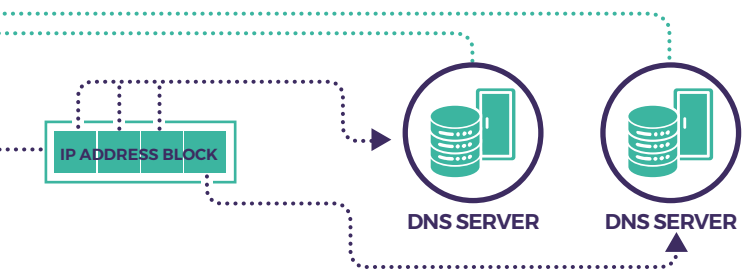
Reverse DNS uses names created in the DNS tree specifically for this purpose: inaddr.arpa for IPv4 and ip6.arpa for IPv6. IP addresses are reversed, i.e., they are written from back to front, and then separated and organized as subdomains: octets in IPv4 and hexadecimal digits in IPv6.



In IPv4, it is a good practice to configure the domain names (reverse resolution) for each IP address that is part of the block allocated to the provider. In IPv6, this is impossible, although it is a good practice to configure reverse resolution for statically assigned IP addresses such as the IPv6 addresses of servers, routers, etc.

It is recommended that providers create an authoritative server for the reverse lookup of the assigned IP address blocks. Delegation is the mechanism by which the LACNIC system is used to inform the authoritative server for the reverse DNS resolution of each IPv4 or IPv6 block.

The delegation can be performed at http://milacnic.lacnic.net More information is available at: https://www.lacnic.net/979/1/lacnic/resolucion-reversa-_-dns




**example: zona 203.0.113.0/24**

```
$ORIGIN 113.0.203.in-add-arpa
$TTL 86400

@ IN SOA ...

  IN NS ns1.servidor.provedor.br
  IN NS ns2.servidor.provedor.br
1 IN PTR nome.doipfinal1.provedor.br
2 IN PTR nome.doipfinal2.provedor.br
...
```

# IS IT NECESSARY TO HIRE A CONSULTANT TO OBTAIN IP ADDRESSES AND AN ASN?

The process for obtaining an IP address block and an ASN is simple and can be handled directly by the technical and administrative staff of your organization.

Some providers choose to request the help of a consultant, as often the same consultant will then help them configure BGP and operate the AS. This is not a problem, as long as the provider's points of contact are aware of all the steps and information provided during the resource request process. This is the reason why the persons responsible for the requesting organization must be copied in all the emails exchanged by the consultant and the LACNIC analyst. This is essential for a successful process.

# IPV4 ADDRESSES RECOVERED BY LACNIC

LACNIC may sometimes recover IPv4 addresses. This happens when they are not used properly.

For example:

- The IP addresses do not appear on the global routing table
- Breach of the LACNIC policies
- Breach of the service agreement
- The organization no longer exists, and its address blocks have not been transfered
- Unauthorized transfer of the address block

Addresses may also be returned voluntarily by an organization that no longer uses them.

In both cases, **under the policies in force, returned and recovered addresses are returned to LACNIC's central pool of addresses and will be allocated to other organizations, but not until the end of the IPv4 exhaustion phase.** In other words, they will only be allocated to new entrants, considering a maximum assignment of a /22 block (1024 IP addresses).

Under no circumstances can recovered or returned IPv4 addresses be allocated to an organization that has already received a prior distribution.

# DO YOU HAVE ANY QUESTIONS?

For detailed information about the process, rules, costs, recommendations, etc., go to: https://www.lacnic.net/21/1/lacnic/servicios

On LACNIC's YouTube channel you will find educational videos, as well as event, conference and tutorial recordings, with relevant information on this and other topics: https://www.youtube.com/user/lacnicstaff

You can also contact the LACNIC team responsible for number resources at hostmaster@lacnic.net. This team will answer any questions you may have regarding the IP address and ASN allocation process and offer guidance on good practices and the proper use of the resources that have already been assigned.

More information: https://www.lacnic.net/contacto

Original content: nic.br cgi.br

Content translated, modified and adapted: lacnic

www.lacnic.net • www.nic.br • www.cgi.br