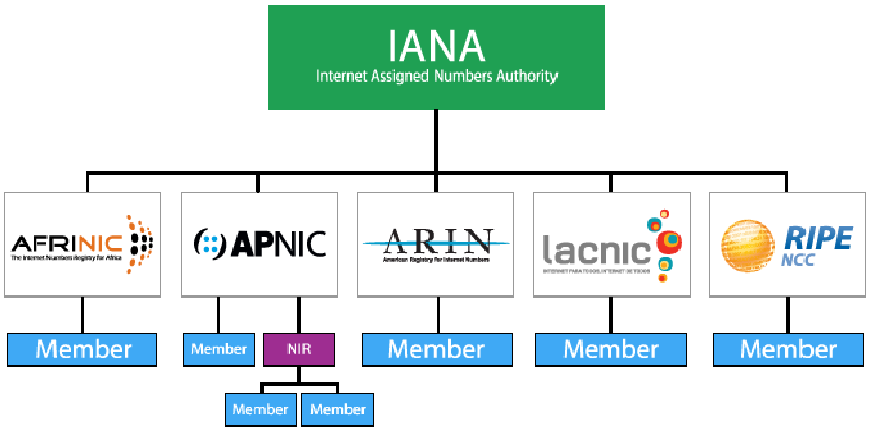
The Internet Registry System

Internet number resources are distributed globally according to a hierarchical registry system that has evolved over the past two decades.

This graph shows how Internet number resources are distributed from the central IANA-managed pool to the five Regional Internet Registries and then onto their Members (Local Internet Registries, or LIRs).

Global Structure of the Internet Registry System



* Note that the APNIC community includes National Internet Registries, which distribute resources to their members.

IANA

The Internet Assigned Numbers Authority has authority over all number spaces used in the Internet, including IP address space and Autonomous system (AS) Numbers.

IANA allocates public Internet address space to Regional Internet Registries (RIRs) according to their established needs.

Regional Internet Registries (RIRs)

RIRs operate in large, geopolitical regions that are continental in scope. Currently, there are five RIRs:

AFRINIC	Serving Africa	Founded in 2005
APNIC	Serving the Asia Pacific region	Founded in 1993
ARIN	Serving North America	Founded in 1997
Lacnic	Serving South America and the Caribbean	Founded in 2001
RIPE NCC	Serving Europe, Central Asia and the Middle East	Founded in 1992

- List of Country Codes and RIRs

The duties of an RIR include the coordination and representation of the members in its region. Additional RIRs may be established in the future, although their number will remain relatively low.

The RIRs work closely together to develop consistent policies and promote best current practice for the Internet. Some RIR coordination activities are done under the umbrella of the Number Resource Organization (NRO).

An article published in the Cisco Internet Protocol Journal, December 2001, provides more information about the history of RIRs:

- Development of the Regional Internet Registry System

RIPE NCC Members or Local Internet Registries (LIRs)

LIRs are established under the authority of an RIR. LIRs are typically operated by Internet Service Providers and serve the customers of those ISPs. Other organizations such as large Enterprises can also operate LIRs.

Much of this document is concerned with the responsibility of the LIR in the assignment process. In some cases, the LIR assigning the address space is not run by the ISP that will provide connectivity. It is important to note that the maintenance of the administrative information regarding the assigned address space is the responsibility of the LIR that makes the assignment and not of the ISP providing the connectivity. Furthermore, only RIRs and LIRs can hold address allocations.

End Users

An entity that uses IP address space for its network only and does not provide IP/ASN services to customers is called an End User. Strictly speaking, End Users are not part of the Internet Registry System. They do, however, play an important role with respect to the goals defined above.

In order to achieve the conservation goal, for example, End Users should plan their networks to use a minimum amount of address space. They must document their addressing and deployment plans to the LIR and furnish any additional information required by the LIR for making assignment decisions.

To achieve the aggregation goal, an End User should choose an appropriate LIR. End Users should be aware that changing ISPs may require replacing addresses in their networks.

End Users must provide and update registration data for the address space assigned to them in the RIPE Database.

Requesters

In addition to these key players in the Internet Registry System, there are often consultants who set up and manage networks for End Users. The consultants may be the persons submitting a request for address space to an LIR on behalf of an End User. We refer to the person making the request for an End User as a requester, whether that person is employed by the organisation, or is simply acting on behalf of the organisation with respect to the address space request.

IANA

The Internet Assigned Numbers Authority (IANA) is responsible for the global coordination of the DNS Root, IP addressing, and other Internet protocol resources. It is a set of functions that is currently contracted out by the National Telecommunications and Information Administration (NTIA), an agency in the U.S. Department of Commerce. The IANA function is currently carried out by ICANN.

With regard to Internet number resources, IANA's role is to allocate IP addresses and AS Numbers from the pools of unallocated resources to the Regional Internet Registries (RIRs) according to their needs, and

to document protocol assignments made by the IETF. When an RIR requires more IP addresses for allocation or assignment within its region, IANA makes an additional allocation to the RIR.

IANA does not make allocations directly to ISPs or end users except in specific circumstances, such as allocations of multicast addresses or other protocol-specific needs.

Global Policy Development

The policies under which the IANA role is carried out are referred to as Global Addressing Policies, and must be agreed to by all of the five RIR communities. Any new policy proposal must go through the Policy Development Process in each RIR and be ratified by each community, and this process will then be reviewed by the ASO Address Council (ASO AC) before the new global policy is adopted.

More information:

- Global Policies Development
- Global Addressing Policies

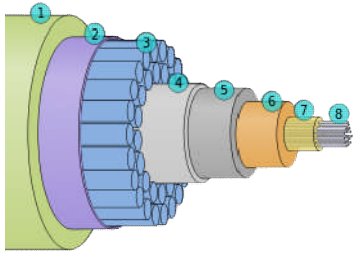
Internet Backbone Networks:

The **Internet backbone** refers to the principal data routes between large, strategically interconnected networks and core routers on the Internet. These data routes are hosted by commercial, government, academic and other high-capacity network centers, the Internet exchange points and network access points, that interchange Internet traffic between the countries, continents and across the oceans of the world. Internet service providers (often Tier 1 networks) participate in Internet backbone exchange traffic by privately negotiated interconnection agreements, primarily governed by the principle of settlement-free peering

Marine (submarine Cable):

A **submarine communications cable** is a cable laid on the sea bed between land-based stations to carry telecommunication signals across stretches of ocean. The first submarine communications cables, laid in the 1850s, carried telegraphy traffic. Subsequent generations of cables carried telephone traffic, then data communications traffic. Modern cables use optical fiber technology to carry digital data, which includes telephone, Internet and private data traffic.

Modern cables are typically 69 millimetres (2.7 in) in diameter and weigh around 10 kilograms per metre (7 lb/ft), although thinner and lighter cables are used for deep-water sections.[1] As of 2010, submarine



cables link all the world's continents except Antarctica.

A cross section of a modern submarine communications cable.
1 – Polyethylene
2 – Mylar tape
3 – Stranded steel wires
4 – Aluminium water barrier
5 – Polycarbonate
6 – Copper or aluminium tube
7 – Petroleum jelly
8 – Optical fibers