

# The Role of the Regional Internet Registries in Global Incident Management

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## *Abstract*

This paper provides a high level overview of the Regional Internet Registry system, its core role as manager of the numbering resource pool of the Internet and also of the services the RIRs provide to the Internet community.

In addition, we describe the services the RIRs provide to the broader Internet community, in particular access to registration data via WHOIS.

The paper ends with some considerations about the current challenges faced by the RIRs in providing accurate and timely registration data for authorized stakeholders and the challenges presented by the upcoming IPv4 exhaustion and the transition to IPv6.

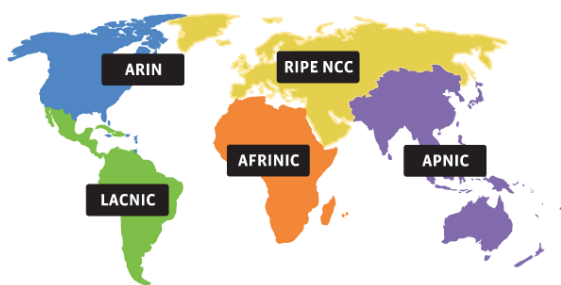
## Managing the Internet's Numbering Resources

Devices and networks that communicate amongst each other using the TCP/IP protocol stack rely on a set of *numbering resources* to appropriately identify elements like connection endpoints (*IPv4 and IPv6 addresses and TCP/UDP port numbers*) or routing protocol zones and areas (*autonomous systems*).

Each of these identifiers needs to satisfy different properties but all need to be **unique** for a given scope. In particular, IPv4 and IPv6 addresses and Autonomous System Numbers (ASNs) need to be **globally unique**, that is, no two devices or networks in all the Internet should have the same addresses and not two networks should use the same ASN.

This uniqueness is assured by keeping *registries* of numbering resources. These registries are structured in a hierarchy with the **Internet Assigned Numbers Authority** (IANA) [IANA] at the top and the five **Regional Internet Registries** (RIRs) immediately below. A historical overview of the evolution of the RIR system can be found in [APNIC1].

IANA allocates resources to the RIRs and not to individual users. The RIRs in turn allocate resources either to individual users or to local or national registries lying below in the hierarchy. The RIRs do not decide by themselves how to manage the numbering resources they hold. They instead apply a set of **policies** developed through a bottom-up policy development process (PDP) by their own communities. Further information about the RIR system can be found in RFC 7020 [RFC7020].



Registry	Area Covered
AFRINIC	Africa Region
APNIC	Asia/Pacific Region
ARIN	North America Region
LACNIC	Latin America and some Caribbean Islands
RIPE NCC	Europe, the Middle East, and Central Asia

The RIRs core function is thus the provision of *registration services* ensuring the uniqueness of the assigned numbers. This function or service is provided to an immediate community composed mostly by Internet service providers (ISPs) but including other organizations as well like universities and other end-users of registries.

The RIRs also provide some services to the broader Internet community. This broader community includes not only those organizations directly receiving numbering resources from the RIRs but includes other parties. In relation to incident response one could name law enforcement and CSIRTs among the relevant members of this broader community.

## Services Provided by the RIRs to their Constituencies

1. Registry Function

The RIRs allocate numbering resources to their immediate communities

2. WHOIS
3. Reverse DNS
4. Statistical Information

## Use of Registry Information for Incident Response

<<Detail the use that incident responders make of the above mentioned functions, in particular usage of WHOIS data.>>

## Current Issues faced by the Registries

<<whois contact information not always up to date>>

<<transfers, in particular gray market ones>>

<<lack of response from contacted WHOIS contacts>>

<<geolocation information>>

## Future Challenges

<<ipv4 exhaustion, keeping the registry up to date>>

<<address leasing>>

## Conclusions

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## References

[APNIC1] History of the RIRs,

<https://www.apnic.net/about-APNIC/organization/history-of-apnic/history-of-the-regional-internet-registries>

[IANA] Internet Assigned Numbers Authority, <http://www.iana.org>

[RFC7020] RFC 7020, "The Internet Numbers Registry System", <http://tools.ietf.org/rfc/rfc7020.txt>