



## The NRO & Resource Certification (RPKI)

This fact sheet is a basic overview of Internet resource certification and an update on the discussions among the Regional Internet Registries (RIRs) and their communities on developing a global certification system.

### Background

Internet security is a broad and complex issue, but it is important for anyone who uses and conducts business on the Internet to have at least a basic understanding of how Internet security affects them.

Security of the Internet address and routing systems is one aspect of Internet security that the Internet Engineering Task Force (IETF) and the five RIRs are currently working to improve. The digital certification of Internet number resources, including IP addresses that have been distributed by the RIRs is one key to improving the security of the Internet routing system.



[www.apnic.net](http://www.apnic.net)



# How the Internet works

Every device that connects to the Internet has a unique “address”, called an IP address.

Every web address, i.e. `www.nro.net`, resolves to an IP address.

There are two types of IP addresses in use – Internet Protocol version 4 (IPv4) and Internet Protocol version 6 (IPv6)

An IP addresses looks like this:

**192.168.0.1**

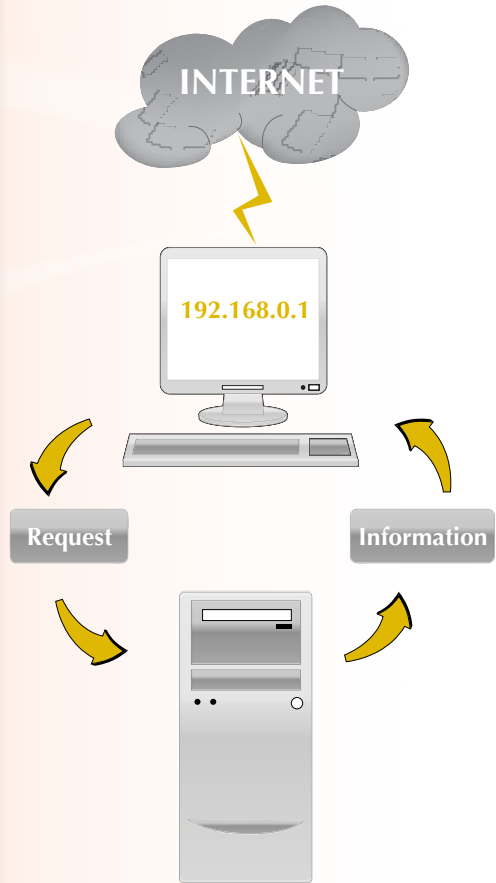
**IP  
v4**

OR this

**2001:dc0:a000:4:225:4bff:fea9:d558**

**IP  
v6**

IP addresses are distributed by the five RIRs: AfriNIC, APNIC, ARIN, LACNIC, and the RIPE NCC.



Your device sends data in the form of a request to the device that holds the information you need and information is sent back to your device.

To make this process efficient, web page data is split into small bite-size pieces called packets.

# What is **Routing**?

Routing is the critical decision-making process that allows information to move around the Internet. A router sends “packets” of data to a chosen neighbour when it believes that it represents the intended destination, or the best path to that destination. A router receives information on these destinations via routing “announcements” sent through the network.

While routing is an automatic process, it is configured manually by Internet operators. This informal trust-based model works for the most part, and has allowed the growth of the Internet we know today. But there is now an effort underway to deploy a more secure routing infrastructure, where authority

to originate a routing announcement is represented by standard digital certificates.

In order to employ this secure routing option, the network operator will need to be able to authorize others to announce routes to their own Internet resources (IP addresses). The technology involved in this process is called resource certification and is being developed in the IETF.

As the source of IP address allocations, the RIRs have been involved in developing resource certification as an extension of the resource and routing registration services that RIRs already provide (via the whois database and related services).

## Creating Trust with **Resource Certification (RPKI)**

The RIRs are independent, not-for-profit organizations that serve communities in their respective regions. When an RIR allocates IP addresses, the RIR maintains a registry of addresses to ensure each address allocated is unique. The five RIRs and their communities are working to develop a global Resource Public Key Infrastructure (RPKI) that utilizes the open Public Key Infrastructure (PKI) standard and relies on resource certification technology being in place.

This will mean that when an RIR member receives IP addresses from their RIR, the RIR can issue a certificate digitally stating that these addresses have been allocated. Based on those certificates, anyone can verify that IP addresses announced by a specific network were legitimately allocated by an RIR.

RIR-issued certificates can assist routing decisions by allowing a router to check whether a route announcement is

authorized by the legitimate holder of the address space. Network operators can then configure their routers to communicate only with certified IP addresses.

It is also possible for RIR members to establish their own Certificate Authorities (CAs) and issue certificates to their own customer networks, creating a “chain of trust”.

## Roadmap towards **global RPKI**

This proposed implementation of Internet resource certification is an initiative of the RIRs, in an effort to make the Internet more secure for users.

Many IP address holders (for example your local telecommunications company, Internet Service Provider, or other large network) can already certify their IP address holdings through their RIR.

## The Next Step

Internet resource certification is being discussed in individual RIR communities and Internet governance forums. Like any system of security, resource certification will rely on widespread deployment and widespread recognition to be fully effective. For more detailed information on the technical side of resource certification, please visit:

**[www.nro.net/rpki](http://www.nro.net/rpki)**

