

This paper is a 'draft working paper' reflecting the preliminary findings of the drafting team. It has been subject to review by all WGIG members, but it does not necessarily present a consensus position nor does it contain agreed language accepted by every member. This draft working paper has been published on the WGIG website for public comment.

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Cluster One B3 Assessment Report

1. Issue: IP Numbers

2. Institutions

- The **Internet Engineering Task Force (IETF)** is responsible for technical standard setting with regard to IP addresses
- The **Internet Corporation for Assigned Names and Numbers (ICANN)** coordinates the allocation and assignment of Internet protocol (IP) addresses and autonomous system (AS) numbers;
- The **Internet Assigned Numbers Authority (IANA)** is responsible for the allocation of address blocks to Regional Internet Registries (RIR);
- The **Address Supporting Organisation (ASO)**, composed [of representatives from each of the ~~by five~~four](#) Regional Internet Registries (RIR) [communities](#), advises the ICANN Board with respect to policy issues relating to the operation, assignment, and management of Internet addresses via the Address Council.
- The **Number Resource Organization (NRO)** is the coordinating mechanism of the RIRs to act collectively on matters relating to the interests of the RIRs
- The **Regional Internet Registries (RIR)** for
 - Europe [and the Middle East](#) (RIPE NCC)
 - North America (ARIN)
 - Latin America and the Caribbean (LACNIC)
 - Asia & Pacific (APNIC)
 - Africa (AFRINIC)

are allocating [and assigning](#) IP [and AS](#) numbers on request to [their members and customers of their members](#) (ISPs and NICs).

3. Relationship to the Internet

The IP Address System is part of the underlying infrastructure of the Internet. Each [hostDomain Name](#) needs an IP number. IP numbers are allocated [or assigned](#), on documented requests, in form of address blocks from IANA to the RIRs and from the RIRs to the ISPs or other units, [who in turn use them to number downstream customers](#) ~~which register domain names~~.

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The IPv4 address space has a capacity of about 4 billion addresses. There are different interpretations about the unused IPv4 space. While some groups argue, that the Internet community is running out of new IPv4 addresses, there is evidence that only half of the IPv4 addresses are used at the moment. A substantial number of IPv4 address blocks are allocated to individual organizations but are not used.

In the middle of the 1990s, a more extended Internet Address Protocol (IPv6) was developed which creates de facto an unlimited address space. Transition from IPv4 to IPv6 has started already before 2000 but has moved forward slowly.

4. Governance mechanisms

ICANN/IANA allocates blocks of IP address space to the RIRs. Policies for the allocation of IP addresses are developed under the regional Policy Development Process in the Public Forums of the **Regional Internet Registries**. These policies have been developed bottom up and are specifically designed to meet the needs of the regional Internet community. Each RIR's Public Forum is sovereign in its policy development process. [While the RIRs are membership-based organizations, policy development is OPEN to all interested parties.](#) Members are mainly Internet Services Providers (ISPs), telecommunication organizations and large corporations. RIPE NCC has for instance more than 3800 members.

RIRs are following general guidelines, as laid down in **RFC 2050** (Internet Registry IP Allocation Guidelines) and **RFC 2901** (Guide to Administrative Procedures of the Internet Infrastructure).

The Numbers Resource Organization (NRO) coordinates, where needed, global policies and activities, in particular with regard to ICANN. The NRO was established by a "**NRO Memorandum of Understanding**" among the four RIRs on October, 24, 2003. The NRO has an Executive Committee, a Number Council and a Secretariat.

The Address Supporting Organization (ASO) is a [supporting subsidiary](#) organization of ICANN, which was established on the basis of a "**ASO Memorandum of Understanding**", signed by ICANN, the NRO and the four RIRs [in existence](#) on October, 21, 2004 which substituted the former ASO MoU from 1999. [A fifth RIR, AfriNIC, has since been accredited and joined the NRO.](#) The ASO has an ASO Address Council, composed of two representatives from each regional community and one representative of each RIR.

The Governmental Advisory Committee (GAC) has established a GAC IPv6 Working Group, which has prepared a number of recommendations, laid down in relevant GAC Communiqués, for the ICANN Board of Directors.

5. Evaluation against WSIS criteria

5.1 Process Criteria *To what extent to the institution's Internet-related governance mechanisms meet the following criteria, given what could be reasonably expected in light of the governance mechanism used?*

- *Multilateral*
- *Transparent*
- *Democratic*

• *Full involvement of governments, the private sector, civil society and international organizations*

The main actors in this field of the Management/Governance of IP addresses are the [members of the respective RIR communities, the coordinating bodies are](#) ICANN, IANA, IETF, [the](#) Regional Internet Registries (RIRs), the NRO and the ASO.

The general process of the [Allocation and Assignmentmanagement](#) of IP addresses is rather transparent [in that address blocks are listed in public RIR WHOIS Databasesand democratic.](#) [Allocation and assignment policies are made in an open, multistakeholder, democratic way.-](#) IP addresses are allocated on the basis of [confidential](#) requests for documented needs [made byto](#) members [toof](#) the RIRs. There are no limitations on membership of RIRs.

There is no formal involvement of governments and civil society in the RIR structures. Governments have used the channel of the Governmental Advisory Committee to comment on IP address policies and in particular to the transfer to the IPv6 address space and the establishment of new Regional Internet Registries, in particular for Africa. However, they have no [decisionmore decision-](#)making authority in the establishment of policy [than any other actor.-](#)

5.2 Role and responsibility criteria (To what extent do the institution's Internet-related governance mechanisms enable the different stakeholder groups to fulfill their roles and responsibilities as defined by WSIS? To what extent to the different stakeholder groups have the capacity to fulfill their roles and responsibilities?)

- Governments
- Private Sector
- Civil society
- Intergovernmental organizations
- Other international organizations

The management of IP addresses is primarily in the hands of the **private, non-profit sector**, that is ICANN/IANA and the five Regional Internet Registries (RIRs). The RIRs have demonstrated their capability to fulfill their tasks and to make their contribution to the functioning of the Internet. They have been able to manage the transfer of functions from ARIN to LACNIC and from ARIN, RIPE NCC and APNIC to AFRINIC in a way which did not only not interrupt Internet services and connectivity for end users but also developed broader opportunities for the regional Internet community in regions served by the newer [er](#) RIRs. IP numbers are considered a valuable international resource shared by all users in all nations. Although it can be said that the current management system and distribution of responsibilities for number allocation has worked so far, the rapid increase of demand and utilization of the internet requires a [recommitment toreview of](#) the current numbering management approach to ensure equitable distribution of resources and access for all.

As said above, there is no [formal](#) involvement of governments and civil society in the practical management of IP addresses [beyond that which is afforded to any Internet user, except for the GAC and the NIRs in the APNIC region.](#) Nevertheless, some member states of the International Telecommunication Union (ITU) have the position that the allocation of IP numbers should be under the sovereignty of national governments and should be managed via a National Internet Registry (NIR). This proposal has been rejected by other ITU member states and sector members, which do not see the need for any change of the existing system. In [the APNIC some](#) regions there are some NIRs,

which respond to ~~national~~regional needs. The allocation of IP addresses from RIRs to NIRs is also made on the basis of documented needs.

5.3 Outcome Criteria (How effectively to the institution's Internet-related governance mechanisms contribute to achievement of the following goals?)

- Equitable distribution of resources
- Access for all
- Stable and secure functioning
- Multilingualism

The present management system for IP addresses has, so far, provided a stable and secure functioning Internet.

The IPv4 address space is a limited resource. While distribution of IPv4 addresses is unbalanced, some argue that there is no discrimination in this unequal distribution, which reflects an unequal need for IP addresses. Others believe that the legacy allocation of large blocks of numbers to early adopters and the imposition of charges for late-comers results in an inequitable distribution of resources.

Since the creation of the RIRs, the allocations made to each region have been made based in real needs and it has been an efficient way to address the concerns regarding the unbalanced distribution of those resources.

Although some IPv4 address blocks are not in use, there are no cases known to date where a request for IP address blocks has been rejected as a result of a shortage of IP addresses but the RIRs' staff [determines rationales](#) the size of the allocations based on proven needs. In the IPv6 address space, there are more than one million IP numbers available for each of the six billion people on the globe. This should ensure that access for all to the IP address space is guaranteed.

There is no role for multilingualism in the IP numbering and addressing system. Nevertheless it would be helpful if written policies in this field, developed by RIRs, would be available in the local languages of the region.

6. Coordination: How effectively is governance of this issue coordinated with governance of other Internet-related issues?

The coordination between the DNS, IP addresses and the root server system is mainly organized via ICANN. The ASO can send two directors to the ICANN Board. The cross constituency coordination is guaranteed via a system of liaisons in the relevant councils of the ASO, GNSO and the CNSO. There is no special coordination mechanism between the IP numbering and addressing system and other applications and services, which make use of IP addresses like eCommerce, eGovernment and others. [Coordination occurs in multiple channels with DNS root operators, vendors and IG Civil Society actors attending RIR public policy meetings and participating in mailing list discussions.](#)

7. Overall assessment: What are the points that most need improvement in order to meet the WSIS criteria?

Proposals for improvement need to consider that in general the existing system has so far functioned for more than two decades and that adjustments, where needed, both for technical and political reasons, have to be made in a proper and adequate way related to the functioning, stability, security and further development of the Internet.

Based on this general evaluation, improvements could be made in the following directions:

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- Full use of the IPv4 space;
- Sustainable transformation of the IP addressing and numbering system to IPv6;
- Clarification of the role of national governments in the policies for the allocation of IP addresses;
- Availability of IP addresses and Numbering Policies of each region in the main regional languages;
- Ensuring equitable distribution of IP addresses.

