NRO Response to ITU Comments on the Management of Internet Protocol (IP) Addresses

On 21 October 2004, the Director of ITU TSB published a memorandum, “ITU and Internet Governance” for public comment. The Number Resource Organization (NRO) respectfully offers this public response on behalf of the Regional Internet Registries: APNIC, ARIN, LACNIC and RIPE NCC.

This response is limited to section 4.2(b), titled "Management of Internet Protocol (IP) addresses". This focus is consistent with the purview of the RIRs, and should not be interpreted as agreement with the remainder of the ITU memorandum.

> *Note: Throughout this memo the terms "number" and "address" will be used interchangeably to denote network layer addresses. In particular the term "Internet address" does not refer to a domain name, URL, URI or mailbox name.*

Summary

The ITU memorandum has proposed a new IPv6 address space distribution process, based solely on national authorities. This proposal appears to be based on certain assumptions about the history and status of IPv4 address space and the current allocation principles for allocating IPv6 address space, and an attempt to safeguard what the memorandum terms the “sovereignty connected to the registration of addresses”.

It also appears that behind the proposal is an assertion of primacy of public sector interest in the administration of address resources for the Internet. Since the inception of the Regional Internet Registry (RIR) system in the early 1990s, the RIRs have recognized not only the legitimacy of this public sector interest but also that of the private sector. The RIRs believe that the balance of these two interests requires careful consideration. The RIRs work within a broad spectrum of stakeholders in Internet address administration, and have developed open regional policy development processes that include the active participation of both public and private sector bodies as well as civil society.

The IPv6 address space distribution proposal in the ITU memorandum overlooks the success of the RIRs in including public and private sector considerations in open regional policy development processes. It also disregards the widely accepted and long-held views that IP addresses are endpoint network identifiers that intrinsically have no national attributes, and that allocation principles regarding their distribution must be guided primarily by technical considerations relating to the viability of the operation of the Internet.

In addition, the memorandum makes assertions about IPv4 and IPv6 address space which are inconsistent both with authoritative statistics about IP address space and with the established consensus-based allocation principles developed by the global Internet community.

Rather than addressing the diversity of requirements of the global Internet community or the body of experience already gained in the operation of the global IP address distribution function, the ITU memorandum proposes a uniform model of Internet address distribution as a public sector activity within autonomous national boundaries. The memorandum ignores any consideration of the technical impacts of its proposal on the global Internet (specifically on address space routability) and simply suggests that considerations of "details and constraints, in particular issues related to routing table size" should be postponed until an unspecified time in the future.

This proposal, if adopted, would disrupt the stable, proven mechanisms for IP address space distribution on which the success of the Internet has been founded and on which the global Internet community relies for future operational stability and continued growth.

Internet Number Resource Distribution

Internet number resource distribution is an engineering function co-ordinated between Internet operators under consensus agreements. The development and execution of address allocation principles are organised on a regional level by four (shortly to be five) RIRs: APNIC, serving the Asia-Pacific region; ARIN, serving Northern America, parts of the Caribbean, and continental Africa south of the equator; LACNIC, serving Latin America and portions of the Caribbean; and RIPE NCC, serving Europe, the Middle East, Central Asia, and continental Africa north of the equator. AfriNIC will soon be formally recognised as the fifth RIR, to manage Internet number resources in Africa under an autonomous self-governing framework.

These RIRs are funded and governed by over 8000 organisations worldwide, representing the users of the Internet number resources. Allocation principles and procedures are developed in regional fora which are open not only to the RIR members, but to all interested parties including Government.

This long standing, open policy-making structure has been implemented since the early 1990s and has been a tremendous success. The fairness and efficiency of Internet number distribution is very widely recognised, as is the openness and accessibility of the associated allocation principles. In particular this structure has demonstrated repeatedly that it can adapt quickly to the rapid changes that take place in the Internet environment.

Diversity

The RIRs recognise that today different national environments feature a wide variety of models of regulation, public sector activity, private sector investment profiles, participatory frameworks, cultural considerations and technology deployment models. Such a broad diversity of profile across national communities does not readily lend itself to the uniform imposition of a particular administrative model for network infrastructure elements. The current RIR system can and does accommodate this diversity, while

avoiding the inherent shortcomings of a uniformly imposed public sector approach, based solely on national address distribution models. It also avoids pitting the public and private sector in direct competition at a regional or national level. Coordination functions such as these are not enhanced by allowing the operation of competitive markets to dictate polices and services. Where there is a strong coordination component of the activity, in order to ensure address routability, aggregation, fairness of access and ultimately considerations of viability of the Internet itself, competitive supply practices tend to undermine the orderly operation of responsible administration of such infrastructure elements.

The RIR system encompasses both private and public sectors within its global framework. The RIR system as a whole has specifically not mandated one model or the other, but has allowed regional and national communities to determine what is in their best interests in terms of structure of participation. For example, in several nations there are National Internet Registries with direct public sector involvement. In some cases this is a public sector activity, while in other cases this is a private sector activity within a national context.

Therefore, there is no valid reason to impose a single uniform administrative model upon each regional community that implicitly scripts a leadership role to either the public or private sector. To impose a level of uniformity to this sector at an international level by asserting the primacy of participation of either the public or private sector is not an accurate or helpful characterization of the Internet as a truly international facility. Nor are there grounds to set up public and private sector activities that engage in openly competitive frameworks for infrastructure administrative services. The RIRs accurately reflect the diversity of the international environment, and the outcome of their framework is a stable administrative service that is performed efficiently and effectively, and in which diversity is a strength and asset. The RIR system, with its diversity of models for national community participation, is one of the more eloquent expressions of today's richly diverse environment.

IPv4 Address Space: Allocated Globally According to Regional Needs

It is important to understand the issue of historical allocation of IPv4 address space. The ITU memorandum refers to "geographic imbalances and an excessive possession of the address space by early adopters", but recognises correctly that the current Regional Internet Registry system has successfully addressed that problem. However since the historical imbalance is sometimes described as a failing of the current system, this issue will be addressed specifically.

During the 1980s and early 1990s, early adopters of the Internet were able to receive IPv4 address space under the allocation policies that existed at the time. These early adopter organisations were allocated and often still hold many more addresses than they would be allocated under present allocation principles, placing them in a relatively advantaged position today. This enduring imbalance is not a result of the current principles but rather

a reflection that different allocation principles were in place in the past. Those principles reflected certain technological constraints of the time, and assumptions about the limited function and future of the Internet itself, which together promoted a relatively lax approach to address consumption.

Fortunately, technology has improved since the early days of the Internet, as have the systems under which addresses are allocated. Indeed, today's Regional Internet Registry system was proposed in 1992 specifically to address the administrative problems evident at that time, and is recognised widely as an outstandingly successful solution.

Today, it is clear that sufficient IPv4 addresses are available to be allocated on a fair and equal basis to all users for many years to come. Through the current system of IP address administration, IP addresses are allocated according to immediate need wherever that need is demonstrated, in accordance with well-known allocation principles. The distribution of this global resource is organised in an efficient and very widely accepted manner.

While there are many issues in the management of IP address space, the transformation of IP addresses into a nationalised management regime has never emerged as a relevant solution. On the contrary, such a move is widely regarded as a significant step towards stockpiling and unfair distribution of Internet number resources. Under the current system, sufficient IPv4 addresses are available to all network users, on a fair and equal basis. The distribution of this resource is organised in an efficient and very widely accepted manner.

IPv6 Address Space Distribution

The ITU proposal is founded on the premise that transforming IP addresses to a national resource will ensure that IPv6 distribution would somehow avoid the problems that are allegedly experienced with IPv4 distribution.

Under the current distribution scheme IPv6 service providers receive address space following current allocation principles, established through open self-regulatory industry processes. These principles have been developed not in isolation, but by building on the extensive experience of developing the IPv4 system. They use the already established and globally recognised framework of the Regional Internet Registries for developing and executing the associated allocation principles. The distribution of IPv6 address space is not only building on what has been already developed, but is starting with a playing field which is level from the outset. In addition, there is also allowance for future changes in allocation principles.

The ITU memorandum proposes a new, independent and unproven process for IPv6 address space distribution, based solely on national authorities. This disregards the fact that IP addresses have no national attributes and that there is no compelling reason for specific national policies regarding their distribution. Unlike other number spaces such as E.164, IP addresses are not structured along national boundaries. IP addresses are also

invisible to the Internet user, unlike E.164 numbers that are visible to the user and thus also serve as "names". Naming, addressing and routing are separate functions in the Internet. Languages are visible in Internet domain names and a large part of the domain name space is indeed structured along national boundaries. This has led to the development and implementation of national policies through appropriate local mechanisms. This works well because separate parts of the Internet domain name space can be administered and operated totally independently from each other. However this model does not apply to IP addresses, which are useful because of their uniqueness and require global coordination, which would be disrupted, not aided, by competition. While competition is a good mechanism in many areas, it is hard to see how different systems can compete meaningfully in the distribution of a global resource.

Conclusion

The RIRs observe that the ITU is proposing a model of IP address space distribution that is based on a limited set of considerations and has not adequately considered the need to ensure stable, fair and consistent distribution of a global resource. The ITU proposal has no means to guarantee stable mechanisms for IP address space distribution, and for the benefit of the Internet (including the ITU's own constituency), we urge the ITU to carefully reconsider this proposal.

There are many issues within the area of what has come to be known as "Internet Governance", particularly issues of fairness and a level playing field on a global level that accommodates public and private sector interests The Regional Internet Registry system has evolved over more than a decade to become one of the successes in this area. Internet number resource distribution is fair and accessible to all. Its policy development process is open and transparent.

The NRO welcomes the opportunity to contribute to this memorandum, and looks forward to further discussion with the ITU TSB on these important matters.

Signed

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