



RIR Blueprint for Evolution and Reform of Internet Address Management

October 2002

1. Preamble

The ICANN Evolution and Reform activity has been regarded by the RIRs as a timely initiative on the part of ICANN. Not only has this process offered ICANN itself the ability to objectively reassess its objectives and reassess the means to effectively and efficiently achieve these objectives, it also offers the opportunity for stakeholders in the various ICANN roles to reassess their roles and their means of interaction and relationship with ICANN, with a view to also initiating reform that will produce more effective and efficient outcomes.

The Regional Internet Registries, APNIC, ARIN, the emerging LACNIC, and the RIPE NCC, administer the allocation of Internet Number Resources to Local Internet Registries in their respective geographic regions. In terms of the current alignment of roles and responsibilities in this area, the RIRs are significant stakeholders in the overall ICANN role and its associated processes. On this basis the RIRs have taken the ICANN Evolution and Reform process as an opportunity to carefully consider various reform measures relating to the relative roles and responsibilities of ICANN and the RIRs with the objective of creating more efficient processes with greater levels of robustness and transparency. This document is one outcome of this RIR consideration.

The RIRs are concerned that there is a growing perception on the part of many that the RIRs and ICANN are diametrically opposed in regards to operational and policy matters concerning Internet number resources. In fact, some think that the RIRs are "anti-ICANN" and wish to break away from the ICANN structure. We wish to categorically state that this perception is completely false.

Throughout the evolution and reform process the RIRs have consistently had two concerns:

- A. The reforms that from the RIR perspective are needed to make ICANN a much more effective organization in the Internet number resource area.
- B. The reform process itself.

Each of these areas will be addressed separately.

A. The Reforms

This document enumerates the specific reform proposals of the RIRs in the Internet number

resource area. A specific, critical and necessary role for ICANN is defined. Of paramount concern to the RIRs are the policy development process and the role of the various entities that participate in that process. Until now the RIRs had been making policy in a bottom-up process. It has been the RIR's experience that anything other than this process will doom to failure any attempt at self-regulation; hence none of the RIR boards make or approve policy.

The RIRs are also concerned by what appears to be an attempt on the part of the ICANN Evolution and Reform process to achieve a degree of symmetry between the names organizations and the addressing organization. It needs to be recognized that these are two different areas with two different sets of concerns and needs. What is good for one is not necessarily good for the other. ICANN should carefully consider the implications of the imposition of a single structure across such diverse areas. Policy, technical administration, and operation in these two areas are distinct, and in many cases completely orthogonal. Any attempts to create an organizational structure and more importantly a policy development process that doesn't recognize this diversity of requirements is doomed to failure.

B. The Reform Process

The RIRs wish to state that they have a great concern about the reform process itself. In some regard the RIRs view that this is probably of a greater concern than the substance of ICANN reform. To date this process has not followed the bottom up process that the RIRs have been using for years; in fact from the perspective of the RIRs it appears to be a non-participatory process. While the RIRs recognize that the ERC cannot acknowledge the input from all individuals, it should recognize and engage an input that is and will continue to be the result of a globally coordinated effort. This blueprint is consistent with the previous RIR submissions to the ERC. This blueprint is pro-ICANN and details a specific and critical role for ICANN particularly in the Internet number resource policy development process. The RIRs recognize that this proposal will be refined in an open and transparent public process. The RIRs pledge to continue to work with ICANN under the terms of the current Memorandum of Understanding so that practical solutions in regards to Internet number resources that are best for the Internet community can be attained.

2. Purpose

This document proposes a number of reform measures that relate to the administration of Internet Number Resources.

The RIRs welcome stakeholders in this activity to consider this proposal and its objectives. Comments on this proposal should be made to nrr-blueprint@arin.net. All comments will be posted to a public forum at http://www.arin.net/mailing_lists/nrr-blueprint/index.html.

3. RIR Position on ICANN Evolution and Reform Process

The RIRs have made two substantive submissions to the ICANN Evolution and Reform process.

The first RIR submission [\[1\]](#) enumerated 11 general principles regarding the RIR position on number administrative arrangements and the form of interaction with ICANN that, in the RIRs' view, would improve the overall efficiency and effectiveness of the process of number management from the perspectives of policy development, administrative control and operational processes.

The RIRs indicated in this submission that there was no absolute requirement for a two-tier process of allocation of number resources from ICANN to the RIRs and from the RIRs to local

registries. The RIRs indicated a desire to explore with ICANN an approach of RIR management of the unallocated number resources that would support a more efficient management process with adequate safeguards regarding longer term stewardship of the number resource. The RIRs indicated that they perceived that the effectiveness of ICANN in this area lay in a role of external review of aspects of RIR policy and practice.

The second RIR submission [\[2\]](#) outlined the relationship between the RIRs and ICANN and responded to a number of ICANN Evolution and Reform proposals that had a direct bearing on the number administration function.

In their second submission The RIRs outlined a proposal that was intended to allow ICANN to function as an independent body with the power of review over RIR processes. This proposal was intended to allow ICANN to properly assume a responsibility for oversight of the RIR activities, in terms of ensuring that the RIRs operate within their adopted policies and processes.

The RIRs recognized that with ICANN assuming such a role of independent review, there is the potential for this role to be compromised by ICANN also assuming a level of direct responsibility in the operation of the address management process. Some delineation of roles between review and operational responsibility is necessary. To this end, and also considering the desire to achieve enhanced stability and efficiency of the overall process, the RIRs have proposed in this submission that the responsibility for this part of the IANA operational function, namely that of maintaining the IANA Address Registry, should be undertaken by the RIRs. The RIRs would see it as a desirable consequence to develop with ICANN adequate safeguards regarding longer term stewardship of the address resource.

In this submission The RIRs also proposed some changes to the operation of the Address Council, proposing that the Council assume the responsibility for adoption of global policies and the recognition of new RIRs, and that ICANN act as a review body for such decisions.

This document built upon these previous two submissions by making a number of specific proposals regarding the relationship between ICANN, the Address Supporting Organization and the RIRs.

4. The Internet Number Resource Registry (NRR) Proposal

4.1 Definition of an Internet Number Resource

An Internet Number Resource is defined as encompassing the number values for three protocol parameter sets, namely:

- IP Version 4 addresses [\[3\]](#),
- IP version 6 addresses [\[4\]](#), and
- Identifiers used in Internet inter-domain routing, currently Border Gateway Protocol-4 Autonomous System numbers [\[5\]](#).

Changes to this definition of an Internet Number Resource would be considered as a matter of adoption of an NRR policy.

4.2 Definition of the Number Resource Registry

The NRR is composed of two registry components:

- An Allocated Number registry, and
- A registry of Inverse Number Delegations.

The Allocated Number Registry contains a list of all allocated, unallocated and reserved address space.

Allocated number space lists the allocated number block, the date of allocation, the RIR to whom the number block was allocated, and the record of correspondence between the RIR and the NRR leading to the allocation.

Reserved number space lists the reserved number block, and a reference to the document that describes the reservation. Adoption of a reserved block by the NRR is a matter of adoption of an NRR policy.

Unallocated number blocks are listed in the registry as unallocated.

The registry of inverse number delegations contains a list of all allocated number space that is reverse mapped in the DNS. The NRR undertakes delegation to RIRs in accordance to the allocation of matching address space to RIRs. Each entry in the registry shall contain the delegation point, the delegated RIR, and the delegated RIR's nominated name servers for the entry.

4.3 Procedures relating to the Operation of the Number Resource Registry

The procedures relating to the allocation of number resources from the Number Resource Registry shall be undertaken according to the process of adopted coordinated number policies.

Upon receipt of a request for a number allocation from an RIR, the NRR shall forward the request to all other RIRs for peer review.

Peer review by an RIR shall be conducted to ensure that the request conforms to the adopted number resource management policy, and that the process associated with the policy has been followed. Reviewing RIRs shall forward their peer review outcomes to all other RIRs.

Allocation shall be undertaken by the NRR operator upon the achieving of consensus by peer reviewing RIRs of acceptability of the request.

The NRR will then allocate a number block according to the relevant NRR policy and shall record the date of the allocation, the RIR, and the application made by the requesting RIR into the NRR Registry.

If the application requires the addition of an inverse number delegation, the inverse number delegation registry shall be modified to reflect this allocation, and the master NRR DNS zone file shall be modified to delegate the applicable DNS zone to the RIR.

The NRR shall publish the contents of the registry using a published data format. The registry publication shall allow online retrieval via generally accepted protocols.

The published registry shall be updated to reflect current registry allocations.

4.4 Adoption of NRR Policies

Coordinated policy development shall be undertaken within the RIRs according to the policy process of each RIR. These processes are based on the principle of open and inclusive participation where all interested parties can contribute, and where the RIR acts as a secretary to record progress and outcomes. When adopted as a policy proposal by these open policy processes, this policy shall be forwarded to the Address Council for ratification as a coordinated number resource policy.

It is recognized that definition of number resources is a part of the definition of Internet Protocol Parameters, and that such parameters are defined as part of the Internet Standards Process [6]. Internet RFCs that require specific actions on the part of the Number Resource Registry describe such actions within the IANA Considerations section of the RFC [7]. The IETF IANA shall refer all actions that specifically relate to the allocation of address space and the allocation of inter-domain identifiers to the Number Resource Registry.

Upon receipt of this advice the NRR will forward this to the RIRs for adoption as a NRR policy action as appropriate.

Where the proposed action is encompassed by existing NRR policies, the NRR shall refer the advice to the RIRs for inclusion in operational procedures.

Current allocations shall be made according to NRR allocation policy relating to IPv4, IPv6 and AS numbers.

4.5 The Number Resource Registry

It is proposed that the registry be operated by a distinct entity, termed here the Number Resource Registry. The proposed organizational structure of this entity, together with a description of the entity's operating procedures is included in this document as [Attachment A](#).

5. The Role of the RIRs

5.1 NRR administration

Each RIR shall nominate three individuals to serve on the NRR Advisory Board. The process of selection of nominees shall be of the RIR's choosing.

Each RIR shall undertake the functions of the Secretariat of the NRR in rotation. The period of the RIR function shall be one year.

The RIR that undertakes the functions of NRR Secretariat shall select a Chairman of the Advisory Board, using a method of its own choosing.

5.2 NRR Operation

Each RIR shall operate the NRR for a period of one year, with this function being rotated between the RIRs in a manner of the RIR's choosing.

Each RIR shall hold copies of all NRR data. The NRR shall publish the authoritative master registry information, and the other RIRs will publish NRR information as synchronized secondary servers.

The NRR shall be operated strictly in accordance with the adopted NRR policies and

documented NRR procedures. In the case of any ambiguity or uncertainty on the part of the NRR operator in the operation of the NRR, the query shall be referred to the Chair of the NRR Advisory Committee for resolution.

6. The Role of the ASO

6.1 NRR policies

To the extent that NRR policies are global coordinated RIR policies, the policy process described in section 6.2 of this document describes the NRR policy adoption process.

6.2 Global RIR policies

In the interests of simplifying the current process, and reducing the levels of duplication of function, the ASO shall be responsible for formal adoption of global RIR policies, allowing for open review of such policies as part of the ASO function of review and evaluation.

Actions of the ASO in adopting global RIR policies shall be consistent with the objective of clear consensus within all RIRs of approval to adopt the policy.

6.3 Recognition of Additional RIRs

The Memorandum of Understanding relating to the establishment of the ASO assigned to ICANN the responsibility for the development of requirements and policies for the approval of additional RIRs, and enumerated a number of requirements that were agreed to form part of that policy. The RIRs note that they have unanimously supported and encouraged the establishment of LACNIC and AFRINIC.

The RIRs propose that this responsibility be delegated to the ASO, and the recognition of new RIRs be an ASO function.

6.4 ICANN

Decisions made by the ASO may be reviewed by the Board of ICANN. Such review would be initiated as part of the ASO appeals process. The review would not review the merits or otherwise of the individual case. The review would be to ensure that the RIRs and the ASO correctly followed their own documented procedures and policies for reaching the outcome. If the ICANN review concludes that these procedures and policies were not followed, then ICANN may specify remedial actions to be undertaken by the ASO or the RIRs to resolve the matter.

7. The Role of ICANN

7.1 ASO

ICANN's role in this area is proposed to be that of oversight of the ASO process, ensuring that the RIRs and the ASO adhere to their stated procedures in the undertaking of this function. In this fashion ICANN provides the appropriate checks and balances in the RIRs' and the ASO's policy development process to ensure that the process is managed with the appropriate level of integrity.

The review process is documented in section 6.4 of this document.

8. DoC MoU Considerations

Delegation of the operation of the NRR from ICANN to the NRR, and the proposed ICANN role of review and oversight of the delegated activity, are consistent with ICANN's obligations under the terms of its agreement with the United States Department of Commerce [8].

The RIRs recognize that this NRR activity is undertaken under the terms of an ICANN coordination role.

9. References

[1] First Joint RIR Response to ICANN Evolution and Reform Committee, 20th May 2002.

<http://www.apnic.net/community/icann/docs/rir-statement-20020508.html>

[2] Second Joint RIR Response to ICANN Evolution and Reform Committee, 20th June 2002.

<http://www.apnic.net/community/icann/docs/rir-statement-20020621.html>

[3] "Internet Protocol", J. Postel, ed., STD-5, RFC 791, September 1981

[4] "Internet Protocol, Version 6 (IPv6) Specification", S. Deering, R. Hinden, RFC 2460, December 1998.

[5] "A Border Gateway Protocol 4 (BGP-4)", Y. Rekhter, T. Li, RFC1771, March 1995.

[6] "The Internet Standards Process -- Revision 3.", S. Bradner, BCP19, RFC2026, October 1996.

[7] "IANA Allocation Guidelines For Values In the Internet Protocol and Related Headers", S. Bradner, V. Paxson, BCP37, RFC 2780, March 2000.

[8] Memorandum of Understanding between the United States Department of Commerce and Internet Corporation for Assigned Names and Numbers, 25 November 1998.

<http://www.ntia.doc.gov/ntiahome/domainname/icann-memorandum.htm>

Amended (1) 10 November 1999

Amended (2) 30 August 2000

Amended (3) 25 May 2001

Amended (4) 10 September 2001

Amended (5) 19 September 2002

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Attachment A

DRAFT DOCUMENT

A Description of the Number Resource Registry Organization

Organization

The name of this organization is Number Resource Registry (NRR)

Purpose

The Number Resource Registry shall be operated for the purpose of:

1. Serving as the central repository for the distribution and registration of Internet address space;
2. Serving as the central repository for the distribution and registration of identifiers used in Internet inter-domain routing (currently Border Gateway Protocol autonomous system numbers); and
3. Administration of the part of the Domain Name System name space which is derived from the Internet address space and inter-domain routing identifiers (currently in-addr.arpa and ip6.arpa).

Membership

The NRR is a confederation of the Regional Internet Registries (RIRs). Additional RIRs shall become members of the NRR upon recognition of RIR status by the Address Council.

Composition

The NRR shall consist of its Board of Management and its Secretariat. There shall be no compensated employees of the NRR.

Offices

There shall be no central office for the NRR. The operational office of NRR shall reside with the Secretariat of the NRR.

Advisory Board

The NRR Advisory Board shall consist of members selected by the RIRs. Each RIR will select three members in a manner of its choosing. The term of Board members will be three (3) years commencing on first day of January following their selection. No member will serve more than two (2) successive terms. The initial Board members selected within each region will have staggered terms of one (1), two (2), and three (3) years. The process by which these initial members are selected by the RIRs will be in a manner of their own choosing.

Any RIR may remove, in a manner of its own choosing, one of its Board members during his or her term if the RIR determines that the member should for any reason no longer serve on the Advisory Board.

Any member of the Board may resign at any time by giving notice to the Secretariat.

In the event the position of an Board member becomes vacant, the affected RIR may select, in a manner of its own choosing, a person to complete the term of the vacancy.

The RIR operating the Secretariat will select the Chairman of the Board in a manner of its own choosing.

The Advisory Board will act in an advisory capacity to the governing Boards of the RIRs on matters as the Boards individually or collectively may, from time to time, request involving the operation of the NRR and related matters. Specifically this responsibility is limited to the above and does not extend to the business practices or local policies of the RIRs. Between meetings of the Advisory Board, the Chairman of the Board will be the point of contact between the Advisory Board and the RIRs.

No Advisory Board member shall receive any compensation for services rendered. Advisory Board members may at their request to their respective RIR, be reimbursed for actual and necessary travel and subsistence expenses incurred by them in the performance of their duties if that is the policy of their sponsoring RIR.

The Advisory Board will meet physically at least once annually at the last open meeting of the year for the RIR that is the Secretariat. Other meetings of the Advisory Board may be held by means of conference telephone calls. Advisory Board members participating in such meetings shall be deemed to be present in person at the meetings. Notice of all meetings of the Advisory Board will be given by Internet email at least ten (10) calendar days before the meeting.

At all meetings of the Advisory Board a majority of the members will constitute a quorum for the transaction of business. Decisions of the Advisory Board will be made by the concurring vote of a majority of the members of the Advisory Board present and voting. If at any meeting there is less than a quorum present, the Board shall transact no business and the only motion that the members will consider will be a motion to adjourn.

Secretariat

The operation of NRR will rotate amongst the RIRs. The RIR performing this function will be the Secretariat for NRR. The Secretariat will act as maintainer of the central repositories and the technical administrator of the domain name system domains of the NRR. The Secretariat's term of operation will be one year. The order of rotation shall be agreed upon by the RIRs.

Each RIR will operate a database server, the server that is located at the NRR Secretariat will be the master, the servers at the other RIR locations will be mirrors of the master. This data base will NOT be a whois data base. It will contain only the information necessary to identify the RIR that made the allocation and the information necessary to generate the reverse delegation DNS zone file. All information required for the RIR to manage the address space and to provide whois information will be resident at the respective RIRs and subject to their specific processes and procedures. Allocations will be made from the master server by the NRR Secretariat. The mirror data base servers at the other RIR locations server provide robustness to the system by being redundant to the master.

Each RIR will operate a DNS server, the server that is located at the Secretariat will be the silent master for these domains, the servers at the other RIR locations will be mirrors of the master. The zone files will be created from the master registration data base server that is located at the Secretariat location. Each RIR will operate a suite of servers that will be the secondary servers for these domains. The SOA records for these domains will be transparent.

The specific functions of the Secretariat are:

1. Operate and maintain the master data base server of the central repository for the distribution and registration of Internet address space and identifiers used in Internet inter-domain routing;
2. Operate and maintain the master server of the part of the Domain Name System name space which is derived from the Internet address space and inter-domain routing identifiers;
3. Operate and maintain a Web site devoted to information pertaining to Number Resource Registry; and
4. Coordinate administrative matters relating to the Advisory Board;

Resource Allocation and Management

Resources will be allocated and managed in a manner to be agreed to by the RIRs.
