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SSAC Comments to the ICANN Board of Directors on *Proposed Global Policy for Allocation of IPv6 Address Space, 14 July 2006 (SAC012)*

The Security and Stability Advisory Committee (SSAC) welcomes the opportunity to comment on the IPv6 address allocation policy proposed by the global addressing community to the ICANN Board of Directors.

Ideally, the IPv6 address allocation unit for RIRs adopted by ICANN should be large enough to accommodate allocation demands over a long term. In particular, the allocation process should minimize the likelihood of address (and subsequently) route fragmentation, to the extent possible.

The ICANN SSAC recommends that the ICANN Board of Directors adopt the proposed global policy entitled *Allocation of IPv6 Address Space by the Internet Assigned Numbers Authority (IANA) to Regional Internet Registries* as presented to the ICANN Board of Directors by the Address Council of the Address Supporting Organization. SSAC bases its recommendation on the following rationale.

- 1) **In practice, the current allocation unit of /23 is smaller than the IPv6 address allocations taken by the RIRs today.** The current allocation unit is generally considered insufficient to satisfy an RIR's address assignment demands for the target of an 18 month period. Experience with routing fragmentation in IPv4 leads to the observation that fragmentation in address assignments is a significant long term cause of persistent routing fragmentation.
- 2) **Historically higher demand regions – e.g., those served by APNIC, ARIN and the RIPENCC –require an assignment block size of between a /14 to a /16** to avoid the onset of assignment window fragmentation across a three year assignment period. (This conclusion is based on simulations of IPv6 RIR registry operations using historical IPv4-based demand profiles.)
- 3) **Operational experience has revealed that an IPv6 address allocation unit size aligned to a “nibble” (4 bit) boundary is preferred.** In particular, the ability for RIRs to delegate a reverse DNS zone in conjunction with an address assignment is facilitated when allocations are aligned on byte and nibble boundaries (e.g., /8, /12, /16 and /20).

At first glance, it might appear that the size of the allocations from IANA to the RIRs would be related to the overall rate of consumption of address space. There is indeed some concern that the current block allocations to end users of a /48 are far too large and

should be scaled back. Although some RIRs are considering reducing allocations to a /56, this remains an open issue within the addressing community and further debate and analysis is scheduled to examine this matter. However, the interaction between the size of the end user allocation and the size of the allocation from IANA to the RIRs is only partially related. It is possible that if the end user allocations were reduced, the size of the allocations from the IANA to the RIRs could be smaller. However, that relationship does not work in the reverse direction. Changing the size of the allocation from the IANA to the RIR will not have any effect on the rate of consumption of address space. Rather, changes in the allocation size from IANA will affect only the rate at which the RIRs have to ask for more space, and, more importantly, the fragmentation of the address space as it is allocated. Prevention of fragmentation is the primary motivation for fairly large allocations from IANA to the RIRs.

Large allocations will retard but not totally solve the problem of routing table growth. Over the long term, it may be necessary to encourage address consolidation (and possibly renumbering). This subject deserves attention and additional study by the Internet community at large. The ICANN SSAC recommends that the ICANN Board of Directors conduct or commission a study regarding the factors affecting the consumption of IPv6 address space by the Internet community and publish a report of the results of this study.

The above rationale is a terse summary of the technical complexities behind the proposed address allocation policy. It would be desirable to have a more comprehensive analysis and documentation of the rationale for this policy. This would serve both the Board in its role of understanding and adopting policies, and the overall Internet community's need to understand the decision processes. This is a topic that requires further discussion in order to find the best way to serve the needs of all parties.

SSAC's membership includes participants from the Internet Number and Domain Name Registry communities. To enhance its understanding of the current matter, SSAC invited members of the IETF and IAB to participate in its consideration of the proposal. These guests provided background information and research that greatly assisted SSAC during its deliberations. SSAC therefore wishes to express its thanks in particular to Scott Bradner, Geoff Huston, and Dave Wodelet for volunteering their time and expertise.