Report on Workshop #76,

What is the best response to IPv4 scarcity? Exploring a global number market for IPv4

The emergence of a trading market for IP address blocks as a response to the exhaustion of available pools of IPv4 addresses in the registry system is an important development that affects the Internet service provider industry, users, and the transition to IPv6. By raising the economic stakes of IP addressing issues, an emerging market for IP addresses leads to greater policy contention and could pose further challenges to the policies and structures of existing Internet governance institutions involved in IP number allocation.

This workshop experimented with a new method of deliberation in the IGF. Instead of a few selected panelists giving talks to an audience and then answering questions, it featured an open discussion guided by a framework. The framework, which is included in this report, set out 5 policy issues related to market trading of IPv4 number blocks. The five issues were:

1) The role of RIR needs assessments in transfers
2) The status of (uncontracted) legacy block holders
3) The accuracy of post-transaction records
4) Aggregation
5) Market power

For each issue, several policy alternatives were defined, and were intended to be used as the basis for discussion. The policy options could be – and were – modified during the session. At the end of the discussion a straw poll was held to see how many participants agreed with one of the articulated alternatives, and whether anyone had changed their mind.

The discussion was moderated by two experts on Internet addressing policy issues: Dr. Milton Mueller, Syracuse University School of Information Studies, and Geoff Huston, Chief Scientist at the Asia Pacific Network Information Center (a regional internet registry). Both moderators gave a brief introduction to the issue. Approximately 30 people attended the workshop in Baku, and another 12 or so participated via remote participation.

The workshop discussion succeeded in clarifying some of the policy options proposed in the workshop, but this discussion did not result in consensus. Instead, the discussion, and the straw polls demonstrated how divided participants were over some of the policy options. Two participants objected to even having any kind of straw poll. The discussion and debate did, however, lead to modification of the original framework's definition of the policy options. In issue A (needs assessment), several new policy options were added, including the idea that if

needs assessments were meant to prevent monopolistic forms of hoarding or unproductive speculation, that it might be possible for other entities, such as national regulators, to undertake that function rather than using registry as a mechanism to enforce market behaviours. "None of the above" was added for those who felt that there might be policy options not represented, and "abstain" for those who did not want to express an opinion.

Most of the issues were too complex to be fully aired in the short time of a workshop, but there was a robust discussion of the needs assessment issue in particular. The results of the straw poll for needs assessment are displayed in Table 2. It shows that 9 participants would like to end needs assessments altogether for IPv4 transfers; 6 supported retaining them in their current form; 6 would like to search for another party to enforce the policy objectives and remove that function from IP address registries. Four (4) participants abstained or went for none of the above. Thus, a clear majority of the straw poll (9 for A1, 6 for A3, and 2 for None of the above for a total of 17, or 68%) supports some kind of change in our approach to needs assessments, but there is no consensus on what that change should be. Given that this is was a short session that included a very small set of IGF participants it is not possible to draw any further conclusions from this exercise.

Issues B and C were collapsed into the same discussion, as it was agreed that the policy options for both issues were essentially the same. The issue is whether holders of legacy address blocks that are not under contract to an RIR need the approval of an RIR to sell their number block to another organization. There were some assertions that this was exclusively a North American problem, but it was noted that legacy blocks currently held by North American companies could be and almost certainly would be transferred to other regions.

Consideration of Issue C led to intensive discussion of the role of the address registry. The discussion could be said to have produced a strong consensus on the importance of a common, comprehensive registry that maintains the uniqueness of all IP number allocations and assignments. The differences arose over whether the registries should be allowed to use that essential function as leverage for imposing other policies on legacy holders, or enforcing certain market behaviors in the context of a aftermarket for addresses. Several participants noted that the IP numbers had no utility without a uniqueness-maintaining registry, and that all entities described in the registry had a common interest in the maintainence of the registry function. This led to the modification of policy option C1 to include a proviso that those parties who held addresses that were described in the registry should be required to pay their "fair share of related registry costs."

The straw poll for Issue C revealed even sharper division than on Issue A. Unfortunately, the number of votes was diminished by the fact that the operators of the remote participation process failed to submit the poll to the remote participants. At any rate, only 3 of the 11 participants in the poll supported alternative C3, that "RIRs should not update records unless receiving party signs a contract and conforms to RIR policies." Five (5) supported C2; that "RIRs should update legacy transactions based on legal proof of transfer, but legacy holders should pay a fair share of related

registry costs." No one (0) supported the view that legacy transfers should be updated regardless of whether the parties pay a fair share of registry costs. There were 3 abstentions.

While recognizing that these are complex issues that bring a wide panoply of perspectives and motivations to bear, the workshop was able to illustrate to a broader group some perspectives on the underlying issues and options in this matter, and that it probably sharpened the participants' sense of what the policy options are and why one would or would not support a specific option.

Table 1
Workshop 76 Framework for Discussion (original)

BACKGROUND			
Nature of scarcity in IPv4	Huston, Mueller set the stage (10-12 minutes) *How much is left? How much is unused & available for trading? How much is being traded? How long is the transition likely to be?*		
ISSUE	**POLICY ALTERNATIVES**	**SUPPORTERS**	**OPPONENTS**
A. Role of needs assessment in transfers	A1 Needs assessments are inefficient and arbitrary		
	A2 Needs assessments are needed to prevent hoarding and speculation		
B. Status of legacy holders	B1 Absent RSA legacy blocks are not subject to RIR policies		
	B2 Legacy blocks should be subject to RIR policies		
C. Accuracy of post-transaction records	C1 RIRs should update legacy transactions based on legal proof of transfer		
	C2 RIRs should not update records unless receiving party signs a contract and conforms to RIR policies		
D. Aggregation	D1 No need for limits on block size		
	D2 Set minimal block size for transfers		
	D3 RIR last /8 policies should be changed because they create deaggregation		
E. Market power	E1 RIRs should limit acquisitions in some way		
	E2 Issues of concentration should be left to national antitrust authorities		
	E3 RIRs' RPKI cross-certification raises market power issues		

Table 2
Workshop 76 Framework for Discussion (as modified by Baku meeting)

ISSUE	POLICY ALTERNATIVES	SUPPORTERS
A. Role of needs assessment in transfers	A1 Needs assessments are inefficient and arbitrary and should be ended	9
	A2 Needs assessments are needed to prevent hoarding and speculation	6
	A3 Search for another party to enforce the policy objectives that needs assessments are supposed to support	6
	A4 None of the above	2
	A5 Abstain	2
B. Status of legacy holders	This issue determined to be the same as Issue C	
C. Accuracy of post-transaction records*	C1 RIRs should update legacy transactions based on legal proof of transfer	0
	C2 RIRs should update legacy transactions based on legal proof of transfer, but legacy holders should pay a fair share of related registry costs	5
	C3 RIRs should not update records unless receiving party signs a contract and conforms to RIR policies	3
	C4 Abstain	3
D. Aggregation	No time to discuss	
E. Market power	No time to discuss	

* Remote moderators failed to submit this straw poll to remote participants