APNIC/Cloudflare Long-Term Joint Research Project 2017

Introduction:

Cloudflare, Inc. ("Cloudflare," "we" or "our") is on a mission to help build a better Internet. Today we run one of the world's largest networks that powers more than 10 trillion requests per month, which is nearly 10 percent of all Internet requests for more than 2.5 billion people worldwide. As the Regional Internet Registry (RIR) in the Asia Pacific region, APNIC PTY LTD distributes "Internet resources" comprising Internet protocol (IP) addresses such as IPv4 and IPv6 addresses and Autonomous System Numbers (ASNs). Cloudflare and APNIC Labs, the research division of APNIC PTY LTD ("APNIC"), agree to the following:

APNIC/Cloudflare joint research project for public resolver:

APNIC Labs would benefit from data gleaned from a public DNS resolver operating on two of its specific IP blocks designated as unusable for normal member allocation or assignment. Cloudflare believes it can provide that data.

Cloudflare is interested in operating a public DNS resolver that is located close to eyeballs (end-users). Cloudflare would operate these resolvers in all our existing datacenters (over 115+ locations), plus new data centres as we continue to deploy around the globe. As the existing business specifically locates these datacenters as close to end-users as possible, this public DNS infrastructure would also follow that goal.

We believe a joint effort between APNIC and Cloudflare will speed up the internet for a vast number of end-users because Cloudflare's DNS deployment is significantly different from all the other DNS resolver-providers currently in this space. Most operate from a few large resolver-farms (hence don't reach as close to end-users as we do). Cloudflare has extensive experience in this arena as its authoritative DNS service is one of the fastest in the world due in large part to both the technology platform we created and this close datacenter proximity to the end-users.

Cloudflare matches the APNIC ethos of focusing on the stability, interoperability, and growth of the global Internet.

Access to APNIC Labs resources:

To gain "market share" for a public resolver it is important to have an easy to remember and configurable IP addresses. To this end APNIC and Cloudflare would like for Cloudflare to use two /24's from APNIC Labs, the 1.1.1.0/24 block and the 1.0.0.0/24 block (the "IPv Addresses").

We understand that the IPv4 addresses are marked as unusable due to a larger than normal volume of backscatter traffic and general internet noise that hits those addresses. This is addressed within this proposal.

Cloudflare bandwidth and compute size:

Cloudflare operates global infrastructure that is designed from the ground up to handle high traffic volumes, including bad/unwanted traffic (DDoS etc). As noted above, the IPv4 Addresses presently attract useless traffic. For Cloudflare these traffic levels would be insignificant as they are well-below our normal attack/background-noise traffic levels. Cloudflare could operate services within those address ranges while providing legitimate responses to end-user queries.

In fact, Cloudflare's architecture allows for massive packet filtering well before any useful compute-based service is touched. As this proposal is to operate a public DNS resolver, only specific ports (UDP & TCP port 53, etc) would be configured as a visible service offering. From the end-user point of view, all other ports would have traffic silently ignored. Within Cloudflare's system, these non-DNS ports would have traffic monitored, classified, and the data forwarded to APNIC Labs as per the reporting section below, as mutually agreed upon between the parties.

Based on the Cloudflare global footprint today, we have ample compute power available to operate the DNS resolver. This is a key point as it's important that anyone operating a public DNS resolver must be highly responsive to its end-users.

Project:

The parties agree to a long term joint research project to see if services can be reliably operated on the IPv4 Addresses. Accordingly, APNIC shall allocate or assign the IPv4 Addresses to Cloudflare during the Term (as defined below). During this experimentation relevant data about traffic will be shared between Cloudflare and APNIC Labs as specified in the reporting section below, and mutually agreed upon between the parties.

Furthermore, per APNIC Policy PROP-109, the IPv4 Addresses have been assigned to APNIC Labs for research projects. The parties agree that this is a research project, at-one with that policy, even if it has a long-term timeline.

Cloudflare believes this is a useful service for the Asia-Pacific region.

Reporting:

Cloudflare shall share with APNIC the mutually agreed upon (i) DNS query stream data received at the IPv4 Addresses on the applicable DNS ports (the "DNS Data"), and (ii) traffic data on the non-DNS ports of the IPv4 Addresses (the "Traffic Data," together with the DNS Data, the "Research Data"), provided that Cloudflare shall remove or obfuscate any personally identified information in the Research Data before sharing it with APNIC. The method of transmitting the Research Data shall be mutually agreed upon between the Parties.

Subject to the mutual agreement of the parties, APNIC may (i) use and publish aggregated analysis of the Research Data at any time, and (ii) publicly share Research Data twelve (12) months after its receipt of the applicable Research Data from Cloudflare.

Project management:

This APNIC/Cloudflare Long-Term Joint Research Project shall commence on the date of last signature below and shall be in effect for a period of five (5) years (the "Initial Term"). Following the Initial Term, this APNIC/Cloudflare Long-Term Joint Research Project shall renew for successive five (5) year renewal terms (each, a "Renewal Term," the Initial Term and Renewal Term(s) shall be collectively known as the "Term") unless either party notifies the other party in writing of its intention not to renew no later than three (3) years prior to the expiration of the Initial Term or the applicable Renewal Term, as the case may be. Upon the expiration of the Initial Term, or at any time thereafter, APNIC shall consider a request by Cloudflare for a permanent allocation of the IPv4 Addresses to Cloudflare. APNIC undertakes to refer any such request to the regional Address Policy Special Interest Group as a matter of a change to the current research use designation of these IPv4 addresses, and APNIC shall be bound to the outcomes of this policy group.

Expenses:

Cloudflare will promote and operate the public DNS resolver completely within its own budget. No debts or credits shall arise under this APNIC/Cloudflare Long-Term Joint Research Project. Costs relating to each of the parties' under this APNIC/Cloudflare Long-Term Joint Research Project shall be entirely the responsibility of the respective party, and neither party shall ask the other to pay costs relating to its own part of the peering agreement

If one of the parties incurs a loss or damage as a result of this APNIC/Cloudflare Long-Term Joint Research Project, the other party shall not be responsible for compensating for the said loss or damage. Without limiting the foregoing, to the extent legally permissible, in no event will one party be liable to the other party or to any third party for any special, indirect, punitive, incidental or consequential damages resulting from or in connection with this APNIC/Cloudflare Long-Term Joint Research Project.

Contacts:

The contacts on the Cloudflare side are as follows.
- Ólafur Guðmundsson <olafur@cloudflare.com>
- Martin J. Levy <martin@cloudflare.com>
- Dani Grant <dani@cloudflare.com>

The contacts on the APNIC side are as follows:
- Paul Wilson <pwilson@apnic.net>
- Geoff Huston <gih@apnic.net>
- George Michaelson <ggm@apnic.net>

This APNIC/Cloudflare Long-Term Joint Research Project is the final, complete and exclusive agreement of the parties with respect to the subject matter hereof and supersedes and merges all prior discussions between the parties with respect to such subject matter. No modification of, amendment to, or waiver of any rights under this APNIC/Cloudflare Long-Term Joint Research Project will be effective unless in writing and signed by an authorized signatory of each of the parties. Each signing party represents and warrants to the other that the execution and delivery of this APNIC/Cloudflare Long-Term Joint Research Project, and the performance of such party's obligations hereunder, have been duly authorized and that this APNIC/Cloudflare Long-Term Joint Research Project is a valid and legally binding agreement on each such party, enforceable in accordance with its terms. The relationship of the parties is that of independent contractors, neither party is an agent or partner of the other. Neither party will have, and will not represent to any third party that it has, any authority to act on behalf of or bind the other party. The APNIC/Cloudflare Long-Term Joint Research Project and any action related thereto will be governed and interpreted by and under the laws of California, without giving effect to any conflicts of laws principles that require the application of the law of a different jurisdiction. This APNIC/Cloudflare Long-Term Joint Research Project may be executed in counterparts, each of which shall be deemed to be an original, but all of which, taken together, shall constitute one and the same agreement.

Cloudflare, Inc.	APNIC Labs, research division of APNIC Pty Ltd
Signature: _____ Name: _____ Title: _____ Date: _____	Signature: Name: Geoffrey Huston Title: Chief Scientist, APNIC Date: 4th December 2017