

IETF Year in Review for 2019

ICANN Office of the Chief Technology Officer

Paul Hoffman
OCTO-005
29 January 2020



TABLE OF CONTENTS

1 INTRODUCTION	3
1.1 IETF Meetings in 2019	3
2 PRIMARY WORKING GROUPS AND BOFS	3
2.1 DNSOP	3
2.2 DPRIVE	4
2.3 REGEXT	5
2.4 ADD and ABCD BoFs	5
3 LEADERSHIP, ADMINISTRATION, AND OTHER ACTIVITIES	6
3.1 IESG and IAB	6
3.2 RFC Series	6
3.3 IETF Hackathon	7
4 EXPECTED ACTIVITIES OF INTEREST DURING 2020	7
4.1 Encrypted DNS	7
4.2 DNSOP	8
4.3 REGEXT	8

This document is part of the OCTO document series. Please see <https://www.icann.org/resources/pages/octo-publications-2019-05-24-en> for a list of documents in the series. If you have questions or suggestions on any of these documents, please send them to octo@icann.org.

Many people in the ICANN organization contributed to various sections of this document.

1 Introduction

This document is an informal overview of the activities in the Internet Engineering Task Force (IETF) during 2019 that are of most interest to ICANN. The primary audience is those in ICANN org interested in the technical side of ICANN's remit, but do not actively follow the IETF. Thus, the coverage of what the IETF has done is fairly narrow; a document like this prepared for a different organization such as a large company would have a very different focus.

In the past, employees of ICANN org who have participated in IETF meetings wrote trip reports that covered working groups and Birds of a Feather (BoF) meetings. This document can be considered as a replacement for those reports. It covers a whole year instead of just one IETF meeting because a great deal of the IETF's work happens between each meeting, and meeting reports miss some of the larger movements in the IETF.

Readers who want more background on the IETF should see *The Tao of the IETF*¹ and the introductory material on the IETF web site.² Links in this document for working groups are in the IETF Datatracker;³ readers who want to browse IETF working groups, Internet-Drafts, RFCs, meetings, and so on should explore the Datatracker.

1.1 IETF Meetings in 2019

The IETF meets three times a year in various parts of the world. The three IETF meetings in 2019 were:

- ⦿ IETF 104, Prague, 2019 March 23-29
- ⦿ IETF 105, Montréal, 2019 July 20-26
- ⦿ IETF 106, Singapore, 2019 November 16-22

The ICANN org employees that attended these meetings include Adiel Akplogan, Eduardo Alvarez, Shaunte Anderson, Roy Arends, Francisco Arias, Amanda Baber, Michelle Cotton, Kim Davies, Paul Hoffman, Darren Kara, Gustavo Lozano Ibarra, Terry Manderson, Andrew McConachie, Rachel Reyes, Ozan Sahin, Samaneh Tajalizadehkhoob, Sabrina Tanamal, and Mauricio Vergara Ereche. In addition, ICANN Board members often attend IETF meetings.

2 Primary Working Groups and BoFs

This section covers the primary IETF working groups of interest to ICANN. In this case, interest is measured by ICANN org active participation in specific working groups.

2.1 DNSOP

¹ See <https://www.ietf.org/about/participate/tao/>

² See <https://www.ietf.org/about/>

³ See <https://datatracker.ietf.org/>

The DNS Operations (DNSOP) Working Group⁴ is responsible for most of the DNS-related work in the IETF. Although the name indicates that it is only about operations, most new DNS protocol work is done in DNSOP as well.

During 2019, four RFCs came out of DNSOP:

- ⦿ RFC 8552, *Scoped Interpretation of DNS Resource Records through "Underscored" Naming of Attribute Leaves*,⁵ and its companion RFC 8553, *DNS Attrleaf Changes: Fixing Specifications That Use Underscored Node Names*,⁶ are Best Current Practice documents that describe the now-common use of using underscore characters (“_”) in domain labels at the left side of domain names. These documents codify the practice that had mostly been used informally, and update the many RFCs that used underscore node names.
- ⦿ RFC 8618, *Compacted-DNS (C-DNS): A Format for DNS Packet Capture*,⁷ is a new standard for storing information from DNS packet captures. It is based on work that ICANN sponsored to help make captures from the ICANN Managed Root Server (IMRS) instances less formidable for the host systems.
- ⦿ RFC 8624, *Algorithm Implementation Requirements and Usage Guidance for DNSSEC*,⁸ is a standards-track document that updates earlier documents that set requirements of which cryptographic algorithms implementations of DNSSEC should support. This document is only aimed at software implementations, not the people signing DNSSEC zones.

At the end of the year, there was also one document from the working group awaiting publication by the RFC Editor: draft-ietf-dnsop-obsolete-dlv, *Moving DNSSEC Lookaside Validation (DLV) to Historic Status*,⁹ a minor document that formally makes an early experiment in DNSSEC validation obsolete.

The working group continues to work on documents on a variety of DNS-related topics and meets at every IETF meeting. ICANN org is active in the working group as document authors, particularly on documents that relate to the contents and distribution of the DNS root zone.

2.2 DPRIVE

The DNS PRIVate Exchange (DPRIVE) Working Group¹⁰ covers issues related to adding privacy to DNS. It is the working group in which DNS over TLS (DoT) was developed. Recently, it has focused more on privacy in DNS operations. The major work for 2019 was getting two drafts ready for IETF Last Call:

⁴ See <https://datatracker.ietf.org/wg/dnsop>

⁵ See <https://datatracker.ietf.org/doc/rfc8552/>

⁶ See <https://datatracker.ietf.org/doc/rfc8553/>

⁷ See <https://datatracker.ietf.org/doc/rfc8618/>

⁸ See <https://datatracker.ietf.org/doc/rfc8624/>

⁹ See <https://datatracker.ietf.org/doc/draft-ietf-dnsop-obsolete-dlv/>

¹⁰ See <https://datatracker.ietf.org/wg/dprive/about/>

-
- ⦿ *Recommendations for DNS Privacy Service Operators*¹¹ helps operators of recursive resolvers who offer either DoT or DNS over HTTP (DoH) to understand the many implications of different choices they can make in providing those services.
 - ⦿ *DNS Privacy Considerations*¹² is an update to the privacy recommendations that were created in 2015, before DoT and DoH had seen much implementation.

The working group's mailing list was where many discussions about how to discover DoT and DoH servers occurred, although those discussions have (mostly) moved to the Applications Doing DNS (ADD) mailing list, described later in this document. ICANN org is active in the working group reviewing documents as they progress.

2.3 REGEXT

The Registration Protocols Extensions (REGEXT) Working Group¹³ is the main place where extensions to the Extensible Provisioning Protocol (EPP) are developed. EPP is the standard way for registries and registrars to communicate, so EPP extensions are of particular interest to ICANN. The working group also covers the Registration Data Access Protocol (RDAP).

During 2019, three RFCs came out of REGEXT:

- ⦿ RFC 8543, *EPP Organization Mapping*,¹⁴ creates registration entities such as registrars, resellers, DNS service operators, and privacy proxies, and gives a way to store information about those entities in EPP messages.
- ⦿ RFC 8544, *Organization Extension for EPP*,¹⁵ defines how to associate domain names, hosts, and contacts with the organizations defined in RFC 8543.
- ⦿ RFC 8590, *Change Poll Extension for EPP*,¹⁶ describes an extension for notifying clients of operations on client-sponsored objects that were not initiated by the client through EPP. Because this information didn't originate on the client, this extension helps EPP clients have the same information in their database as those on the server.

The working group has one RFC that it will issue soon (describing how EPP clients can ask servers about financial information such as fees and credits), and one that is still in the Internet Engineering Steering Group (IESG) review (a non-standard extension for describing one way to describe bundled domain names in the registration process).

REGEXT is working on numerous other documents about EPP and RDAP. ICANN org are particularly active in REGEXT as authors of extensions that are useful for registry-registrar interactions that may be required in future gTLD contracts.

2.4 ADD and ABCD BoFs

¹¹ See <https://datatracker.ietf.org/doc/draft-ietf-dprive-bcp-op/>

¹² See <https://datatracker.ietf.org/doc/draft-ietf-dprive-rfc7626-bis/>

¹³ See <https://datatracker.ietf.org/wg/regext/about/>

¹⁴ See <https://datatracker.ietf.org/doc/rfc8543/>

¹⁵ See <https://datatracker.ietf.org/doc/rfc8544/>

¹⁶ See <https://datatracker.ietf.org/doc/rfc8590/>

In 2019, the IETF had many wide-ranging discussions about how to deal with a world where DNS is encrypted. As described in OCTO-003, *Local and Internet Policy Implications of Encrypted DNS*,¹⁷ there are many policy issues of concern to a wide variety of audiences. Many of those concerns can only be addressed by implementers of DNS clients and resolvers, but some may involve new protocol work for the IETF. Two major topics of possible future work are:

- ⦿ Discovering which DNS resolvers a system administrator wants a computer to use.
- ⦿ Discovering which security and privacy features a DNS resolver supports.

There are currently active discussions in the IETF to create one or more working groups that might cover these and other related topics. There was a formal Applications Doing DNS (ADD) BoF meeting at IETF 105,¹⁸ and there was an Application Behavior Considering DNS (ABCD) BoF meeting at IETF 106.¹⁹ At the time that this document is being published, the acronym “ADD” has been changed to mean “Adaptive DNS Discovery”, and a working group under that name may become chartered in the near future.²⁰

3 Leadership, Administration, and Other Activities

3.1 IESG and IAB

In the fall of each year, approximately half of the IESG and half of the Internet Architecture Board (IAB) are selected through a Nominating Committee (NomCom).²¹ The IETF NomCom is selected at random from volunteers who have attended at least three of five previous IETF face-to-face meetings. The IETF NomCom also selects members for other boards and committees that are related to the IETF’s work.

In 2019, of the seven IESG members who could have asked for their positions to be renewed, only two did; of the six IAB members who could have asked for their positions to be renewed, only one did. The one IAB member who stood for renewal was not accepted, so all six members chosen are new to the IAB.

3.2 RFC Series

In 2016, the IETF decided to change the official format for the RFC series from plain ASCII text to XML, where the RFC Editor would also publish HTML, PDF, and plain text versions derived from the canonical XML. The first RFCs to be published in this new format came out in late 2019, and all new RFCs now use this format.

¹⁷ See <https://www.icann.org/en/system/files/files/octo-003-en.pdf>

¹⁸ See <https://datatracker.ietf.org/wg/add/meetings/>

¹⁹ See <https://datatracker.ietf.org/wg/abcd/about/>

²⁰ See <https://datatracker.ietf.org/doc/charter-ietf-add/>

²¹ See <https://ietf.org/about/groups/nomcom/>

The RFC Series Editor (RSE) is chosen by the IAB to oversee the contracted professionals that maintain the RFC series.²² In 2019, the RSE chose not to continue due to the way that they and the RFC series had been treated by the IAB.²³ This caused a major conflict in the IETF concerning the series and the IAB's management of the series. The conflict is one of the reasons given for so few IAB members asking to have their positions renewed.

3.3 IETF Hackathon

The IETF Hackathon²⁴ attracts hundreds of developers who are working on a variety of IETF standards to come together to code, design, and test. In the past few years, the DNS community has been well-represented at the Hackathons. A common theme has been to be sure that protocols that are near completion actually work as described, and to find edge cases that need to be documented before the protocols are standardized.

In 2019, ICANN sponsored the IETF Hackathons at IETF 105, IETF 106, and will sponsor the upcoming IETF Hackathon at IETF 107 in Vancouver.

4 Expected Activities of Interest During 2020

It is difficult to make long-term predictions about the IETF and its activities because of shifting trends in Internet traffic, unexpected security threats, and changes in the ways that the billions of Internet users access their favorite content. Thus, this section focuses only on short-term (one year) predictions that relate to IETF work that is of most interest to ICANN.

4.1 Encrypted DNS

The high interest in encrypted DNS from 2019 will likely continue this year.

- ⦿ It seems likely that at least one new working group will form to develop protocols for discovery of DNS resolvers and of their properties.
- ⦿ The DPRIVE Working Group will possibly begin serious work on adding encryption to the communications between DNS resolvers and authoritative servers. Currently, the working group is only looking at potential requirements for a new protocol.²⁵
- ⦿ The QUIC protocol²⁶ will likely be finalized in the QUIC Working Group²⁷ this year. This then brings up the question of whether we should expect DNS-over-QUIC²⁸ and/or DNS-over-HTTP/3²⁹ (where “HTTP/3” means “HTTP over QUIC”). It is too early to tell whether there is much interest from applications and operating system vendors to go with one or

²² See <https://www.rfc-editor.org/>

²³ See <https://mailarchive.ietf.org/arch/msg/ietf/Qy8yFoM0AMcGOGEEExZ5BPrtsl4>

²⁴ See <https://ietf.org/how/runningcode/hackathons/>

²⁵ See <https://datatracker.ietf.org/doc/draft-ietf-dprive-phase2-requirements/>

²⁶ See <https://datatracker.ietf.org/doc/draft-ietf-quic-transport/>

²⁷ See <https://datatracker.ietf.org/wg/quic/about/>

²⁸ See <https://datatracker.ietf.org/doc/draft-huitema-quic-dnsquic/>

²⁹ See <https://datatracker.ietf.org/doc/draft-ietf-quic-http/>

both of these variants, or whether the vendors want to stay with DoT and DoH until they know more about the operational effects of encrypted DNS.

- ⦿ Groups outside the IETF will likely show increased interest in the deployment of encrypted DNS.

4.2 DNSOP

The DNSOP Working Group has over a dozen documents that it has agreed to work on, and has a handful more waiting to be adopted. Two of these are updates to RFCs published earlier to cover recent experience with implementations: *Running a Root Server Local to a Resolver*,³⁰ and *DNS Query Name Minimisation to Improve Privacy*.³¹

4.3 REGEXT

The REGEXT Working Group will continue working on improvements to the RDAP protocol, and some current drafts (such as those about data escrow) could be moved to IETF Last Call during 2020.

³⁰ See <https://datatracker.ietf.org/doc/draft-ietf-dnsop-7706bis/>

³¹ See <https://tools.ietf.org/html/draft-ietf-dnsop-rfc7816bis>