



**I E T F<sup>®</sup>**

# IETF Annual Report 2020

A summary of Internet Engineering Task Force,  
Internet Architecture Board,  
Internet Research Task Force, and  
RFC Editor activities

The Internet Engineering Task Force (IETF) is the premier Internet standards organization, providing a neutral venue for developing open standards through open processes.

## Internet Engineering Task Force Activities

The IETF brings together a large international community of network designers, operators, vendors, and researchers to work on the evolution of the Internet architecture and the smooth operation of the Internet. The IETF pursues its mission by adhering to cardinal principles of open processes, technical competence, volunteer participation and leadership, rough consensus and running code, and by taking responsibility for all aspects of its protocols.

Working Groups (WGs) are the primary mechanism for developing IETF specifications and guidelines, many of which are intended to be standards or recommendations. Working Groups submit these specifications and guidelines for publication as RFCs. The RFC document series, which includes documents produced by the Internet Architecture Board (IAB), the Internet Research Task Force (IRTF), and the IETF—as well as individual submissions—contain technical and organizational notes about the Internet.

### IETF Working Groups

As of 31 December 2020, there were 7 active Areas containing a total of 121 active IETF Working Groups. The Internet Engineering Steering Group (IESG), consisting of the 14 Area Directors and the IAB Chair, is responsible for technical management of IETF activities and the Internet standards process. The active areas are:

#### **Applications and Real-Time (ART) Area**

Develops application protocols and architectures in the IETF. The work in the area falls into roughly three categories: delay-sensitive applications, delay-tolerant applications, and building blocks for general use.

#### **General (GEN) Area**

Consists of WGs and other activities focused on supporting, updating, and maintaining the IETF standards development process.

### **Internet (INT) Area**

Technical topics covered include IP layer (both IPv4 and IPv6), implications of IPv4 address depletion, co-existence between the IP versions, DNS, DHCP, host and router configuration, mobility, and how IP will run over new link layer protocols.

### **Operations and Management (OPS) Area**

Includes Network Management protocols such as NETCONF and YANG; autonomic networking; and various operational issues facing the Internet such as DNS operations, IPv6 operations, multicast operations, IoT-operations, operational security, (secure) routing operations, and benchmarking.

### **Routing (RTG) Area**

Maintains the scalability and stability characteristics of the existing routing protocols, as well as developing new protocols, extensions, and bug fixes to ensure continuous operation of the Internet routing system.

### **Security (SEC) Area**

Specifications developed in the IETF Security Area enable secure and privacy-preserving communications with confidentiality and integrity protection; improve the security of network end-points; standardize watch-and-warning information in security operations; and provide mechanisms for protocols and applications to handle the authentication, authorization, and accounting of users, applications, and devices.

### **Transport and Services (TSV) Area**

Works on mechanisms related to end-to-end data transport to support Internet applications and services that exchange potentially large volumes of traffic at potentially high bandwidths. A key focus are mechanisms to detect and react to congestion in the Internet, such as the congestion control algorithms in Internet transport control protocols including TCP, Stream Control Transmission Protocol (SCTP), Multipath TCP, Datagram Congestion Control Protocol (DCCP), and QUIC.

## New IETF Working Groups

The following new Working Groups were chartered during 2020:

- Reliable and Available Wireless ([raw](#))
- Adaptive DNS Discovery ([add](#))
- Drone Remote ID Protocol ([drip](#))
- WebTransport ([webtrans](#))
- Web Packaging ([wpack](#))
- Multiplexed Application Substrate over QUIC Encryption ([masque](#))
- Grant Negotiation and Authorization Protocol ([gnap](#))
- Privacy Pass ([privacypass](#))
- Stay Home Meet Only Online ([shmoo](#))\*
- Automatic SIP trunking And Peering ([asap](#))
- Revision of core Email specifications ([emailcore](#))
- A Semantic Definition Format for Data and Interactions of Things ([asdf](#))
- JSON Path ([jsonpath](#))
- Building Blocks for HTTP APIs ([httpapi](#))
- Secure Media Frames ([sframe](#))

\* Originally chartered using the name Stay Home Meet Online (shmo)

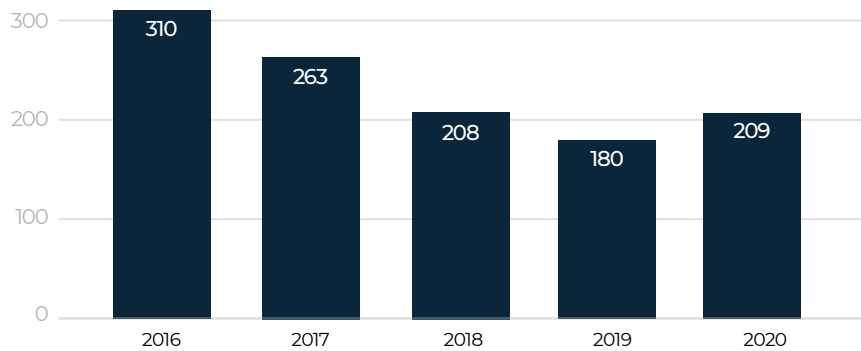
## Concluded IETF Working Groups

The following Working Groups were concluded during 2020:

- Softwires ([softwire](#))
- Managing, Ordering, Distributing, Exposing, & Registering telephone Numbers ([modern](#))
- IETF Administrative Support Activity 2 ([iasa2](#))
- DNS Over HTTPS ([doh](#))
- Multipath TCP ([mptcp](#))
- ControLling mUltiple streams for tElepresence ([clue](#))
- Internet Video Codec ([netvc](#))
- Meeting Venue ([mtgvenue](#))
- Interactive Connectivity Establishment ([ice](#))
- GitHub Integration and Tooling ([git](#))

## RFCs

The final form of the work undertaken in the IETF is captured in RFCs. RFCs are also published by the IAB, IRTF, and through independent submissions. In 2020, a total of 209 RFCs were published.



## Internet-Drafts

Internet-Drafts (I-Ds) are working documents of the IETF, its Areas, and its Working Groups, as well as groups such as IRTF Research Groups. While only some I-Ds eventually become RFCs, I-Ds are the focal points for much of the day-to-day work and discussion of the IETF. During 2020, I-Ds posted to IETF I-D repository included:

- **1017** I-Ds of all types\*
- **704** I-Ds authored by individuals
- **1154** Different I-D authors
- **290** I-Ds adopted by working groups

\*This is a count of unique I-D names, not counting different versions of the same I-D.

## IETF Meetings

While the work of the IETF is largely conducted over mailing lists, the IETF community holds a variety of online and in-person meetings to make progress. During 2020, the impact of COVID-19 meant that a full year of IETF meetings were held online for the first time ever. The IETF community proved to be incredibly resilient, adapting the format and technology used for meetings, and incorporating additional virtual interim meetings to make good progress despite the challenges of 2020. After a change to plans for IETF 107 on short notice, the year closed with IETF 109, the most interactive online meeting thus far.

### IETF 107 Virtual

23-27 March 2020

Hosted by Huawei

701 remote participants

Proceedings

### IETF 108 Online

27-31 July 2020

Hosted by Ericsson

1120 remote participants

Proceedings

### IETF 109 Online

16-20 November 2020

Hosted by Cisco

1279 remote participants

Proceedings

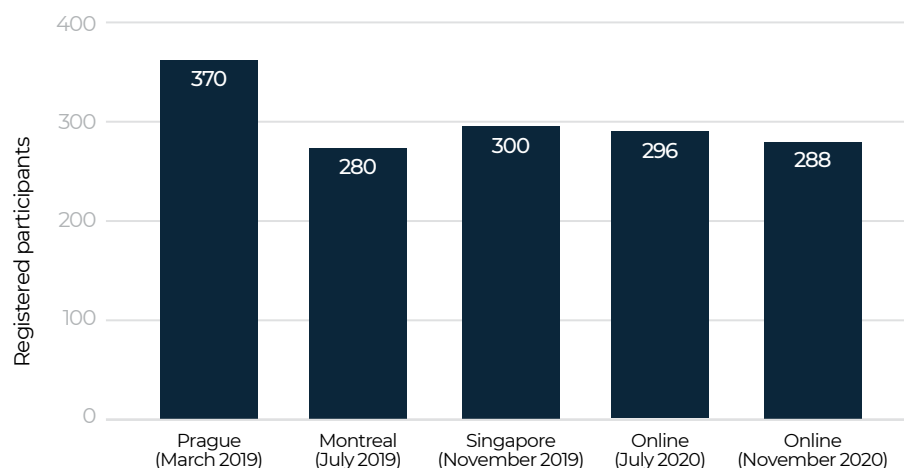
### Interim Meetings

Complementing the online IETF meetings during 2020, working groups held additional virtual interim meetings. Over the year, IETF working groups held more than 240 interim meetings, double the number held in 2019. More details, including agendas, minutes, and materials for each interim meeting can be found via the IETF Interim Meetings webpage.

## IETF Hackathons

IETF Hackathons encourage developers to collaborate and develop utilities, ideas, sample code, and solutions that show practical implementations of IETF standards. IETF Hackathons are collaborative events, not competitions. Past IETF Hackathons have covered a range of topics, including: DNS, HTTP 2.0, NETVC, OpenDaylight, ONOS, VPP/FD.io, RiOT, SFC, TLS 1.3, WebRTC, and YANG/NETCONF/RESTCONF. Since beginning in 2015 with approximately 50 participations, IETF Hackathons have grown dramatically with a peak of 296 registered participants in 2020. While the hackathon originally planned to be held in conjunction with IETF 107 had to be cancelled, the hackathons preceding IETF 108 and IETF 109 were moved to an online format and the nearly 300 registered participants for each found new ways to collaborate and make progress on dozens of projects despite not being able to gather in person.

IETF Hackathons 2019-2020



Support for IETF Hackathons is provided by Cisco DevNet. ICANN generously sponsored IETF Hackathons held in conjunction with IETF 108 and IETF 109.

## IETF Administration LLC Updates

Established in 2018 after an extensive community process to update the administrative arrangements supporting the work of the IETF, the IETF Administration LLC (IETF LLC) completed its second full year of operation in 2020.

### Noteworthy accomplishments and developments during 2020 include:

- Engaged Director of Communications and Operations
- Developed its first major strategic plan
- Completed successful first annual financial audit
- Built up a strong governance framework through extensive community consultation
- Extended significant financial support agreement with the Internet Society

The IETF LLC provides the corporate legal home for the IETF, the IAB, and the IRTF. It is responsible for supporting ongoing operations, managing finances and budget, raising money, and establishing and enforcing policies to ensure compliance with applicable laws, regulations, and rules. Key principles guiding the IETF LLC include trust, responsiveness, and transparency. To that end, board meetings are open to observers except for items such as legal, contracts, and personnel matters, with meeting agendas published prior to the meeting and minutes published afterwards.



# IETF ADMINISTRATION LLC 2020 FINANCIALS

The unaudited Statement of Activity for the 2020 year is shown below

	2020 Actual	Original	Reforecast
<b>NON-MEETING REVENUE</b>			
<b>Contributions</b>	<b>\$12,783,939</b>	<b>\$5,075,000</b>	<b>\$5,075,000</b>
ISOC Contribution Cash	\$12,742,209	\$5,000,000	\$5,000,000
Other Contributions	\$41,729	\$75,000	\$75,000
<b>Administrative In-Kind Contribution</b>	<b>\$35,000</b>	<b>\$9,000</b>	<b>\$9,000</b>
<b>Other (including investment interest</b>	<b>\$2,162,850</b>	<b>\$373,414</b>	<b>\$373,414</b>
<b>TOTAL NON-MEETING REVENUE</b>	<b>\$14,981,789</b>	<b>\$5,457,414</b>	<b>\$5,457,414</b>
<b>MEETING REVENUE</b>			
Registration Fees	\$431,276	\$2,145,625	\$340,000
Sponsorship (including In-Kind)	\$1,024,433	\$1,402,550	\$658,001
Hotel Commissions/Rebates/Comps	\$0	\$255,824	\$0
Misc (including insurance claim)	\$50	\$15,000	\$392,492
<b>TOTAL MEETING REVENUE</b>	<b>\$1,455,759</b>	<b>\$3,818,999</b>	<b>\$1,390,493</b>
<b>TOTAL REVENUE</b>	<b>\$16,437,548</b>	<b>\$9,276,413</b>	<b>\$6,847,907</b>
<b>MEETING EXPENSES</b>			
Venue Costs	\$6,604	\$1,458,848	\$0
Meeting Support	\$926,787	\$1,317,680	\$929,100
NOC Support	\$429,915	\$1,100,219	\$519,002
Other	\$88,499	\$146,995	\$90,599
Site Visits (formerly Future Meetings)	\$19,280	\$86,500	\$19,288
<b>TOTAL MEETING EXPENSES</b>	<b>\$1,471,084</b>	<b>\$4,110,242</b>	<b>\$1,557,989</b>
<b>OPERATING EXPENSES</b>			
<b>RFC Services</b>	<b>\$1,391,408</b>	<b>\$1,371,444</b>	<b>\$1,403,544</b>
RFC Production Center	\$1,312,944	\$1,252,144	\$1,313,944
RFC Series Editor	\$78,464	\$110,300	\$80,600
Independent Submissions Editor	\$0	\$9,000	\$9,000
<b>IETF Secretariat</b>	<b>\$1,492,003</b>	<b>\$1,429,120</b>	<b>\$1,472,120</b>
Administration	\$886,080	\$886,080	\$886,080
IT	\$443,040	\$443,040	\$443,040
CPA Financial Services	\$162,883	\$100,000	\$143,000
<b>Administration</b>	<b>\$1,399,078</b>	<b>\$1,671,084</b>	<b>\$1,469,124</b>
IETF Admin Support	\$1,380,142	\$1,430,960	\$1,298,000
IESG Support	\$0	\$31,500	\$12,000
IAB Support	\$1,163	\$31,500	\$12,000
IRTF Support	\$0	\$33,624	\$33,624
NomCom Support	\$0	\$1,500	\$1,500
Board Support	\$17,773	\$92,000	\$92,000
Community Leadership Training	\$0	\$50,000	\$20,000
<b>IETF Trust Contribution</b>	<b>\$87,000</b>	<b>\$110,000</b>	<b>\$110,000</b>
<b>RFP Management Expenses</b>	<b>\$10,000</b>	<b>\$95,000</b>	<b>\$20,000</b>
<b>Special Projects</b>	<b>\$1,500</b>	<b>\$50,000</b>	<b>\$100,000</b>
<b>Tools</b>	<b>\$360,815</b>	<b>\$378,800</b>	<b>\$560,830</b>
<b>TOTAL OPERATING EXPENSES</b>	<b>\$4,741,804</b>	<b>\$9,215,690</b>	<b>\$6,693,607</b>
<b>TOTAL EXPENSES</b>	<b>\$6,212,889</b>	<b>\$9,215,690</b>	<b>\$6,693,607</b>
Net Income	\$10,224,659	\$60,723	\$154,300
Capital Investment	\$359,687	\$160,500	\$160,500
<b>NET INCOME (AFTER CAPITAL EXPENDITURE)</b>	<b>\$9,864,972</b>	<b>\$(99,777)</b>	<b>\$(6,200)</b>

## Notes for 2020 Financials

- a. The 2020 budget was reforecast in July to address significant changes to underlying assumptions, such as the global pandemic and subsequent changes to IETF meetings.
- b. The 2021 and 2022 Internet Society contributions as part of the new funding agreement are being recognized in 2020.
- c. It has been confirmed that the IETF will receive an insurance payout for IETF 107 but not IETF 108 as that made a surplus, and that this payment will be made in 2021 not in 2020 as budgeted.
- d. Full details and further financial reports are posted on the IETF LLC webpages.

## IETF Global Hosts and Sponsors

Work in the IETF is supported by contributions from dozens of sponsors each year. Significant ongoing support is provided by IETF Global Hosts. Global hosts have made sustained commitments to ensure the standards that power the Internet remain open for permissionless innovation. See the IETF website for [more information about IETF sponsors](#) and how they support the IETF.





## Internet Architecture Board Activities

The Internet Architecture Board ([IAB](#)) provides long-range technical direction for Internet development, ensuring the Internet continues to grow and evolve as a platform for global communication and innovation. The IAB provided reports to the community throughout 2020:

- **[IAB report to the community for IETF 107](#)**

This report notes the adoption of a Conflict of Interest policy, the publication of a set of RFCs updating process related documents due to the creation of the IETF LLC, as well as the publication of a retrospective on the RFC Series, “50 years of RFCs”. Further, the IAB created two new programs to work on updating the Internet Threat Model ([model-t](#)) and potential changes to the RFC Editor model ([rfced-future](#)).

- **[IAB report to the community at IETF 108](#)**

The IAB published the report (RFC8753) for the Content Aggregation and the Publisher Ecosystems (ESCAPE) workshop .

- **[IAB Comments on the Draft Final Report on the new gTLD Subsequent Procedures Policy Development Process](#)**

- **[IAB report to the community for IETF 109](#)**

IAB published RFC 8890 “The Internet is for End Users” and formally created the Evolvability, Deployability, and Maintainability (EDM) Technical Program .

The IAB publishes a [list of documents](#) on its website, with [active Internet-Drafts](#) and [published RFCs](#) available via the IETF Datatracker.

## IAB Technical Programs and Administrative Support Groups

The IAB has been refactoring its programs into Technical Programs and Administrative Support Groups. The latter contains groups of experts that support the IAB to handle its long-term oversight responsibility. The former supports the IAB in its architectural work and therefore are created based on identified current issues and are active until the IAB has come to a conclusion on the relevant group of topics. As of 31 December 2020, there were the following active [IAB Technical Programs](#) and Administrative Support Groups.

### Active Technical Programs

- [Evolvability, Deployability, & Maintainability \(EDM\) Program](#)
- [Internet Thread Model \(model-t\) Program](#)

### Administrative Support Groups

- [IANA Program](#)
- [Liaison Oversight Program](#)
- [Plenary Planning Program](#)

### RFC Editor related activities (under reorganization)

- [RFC Editor Future Development Program](#)
- [The RFC Series Oversight Committee \(RSOC\)](#)

## IAB Workshops

Workshops provide a way to bring together experts on a focused topic of interest to the work of the IAB. In 2020, the IAB held an online workshop on [COVID-19 Network Impacts](#) during the week of 9 November.



## Internet Research Task Force Activities

The Internet Research Task Force ([IRTF](#)) promotes research of importance to the evolution of the Internet protocols, applications, architecture, and technology.

The IRTF is managed by the IRTF Chair in consultation with the Internet Research Steering Group ([IRSG](#)).

### Research Groups

The IRTF consists of a number of focused and long-term Research Groups (RGs) working on topics related to Internet protocols, applications, architecture, and technology. Research Groups have the stable long-term membership needed to promote the development of research collaboration and teamwork in exploring research issues. Participation is by individual contributors rather than by representatives of organizations. Research Groups active as of 31 December 2020 were:

- Crypto Forum Research Group ([cfrg](#))
- Computing in the Network Research Group ([coinrg](#))
- Decentralized Internet Infrastructure ([dinrg](#))
- Global Access to the Internet for All ([gaia](#))
- Human Rights Protocol Considerations ([hrpc](#))
- Internet Congestion Control ([iccrgr](#))
- Information-Centric Networking ([icnrg](#))
- Measurement and Analysis for Protocols ([maprg](#))
- Network Management ([nmrg](#))
- NetWork Coding for efficient Network Communications Research Group ([nwcrg](#))
- Path Aware Networking RG ([panrg](#))
- Privacy Enhancements and Assessments Research Group ([pearg](#))
- Quantum Internet Research Group ([qirg](#))
- Thing-to-Thing Research Group ([t2trg](#))

## Applied Network Research Prize

The Applied Networking Research Prize ([ANRP](#)) is awarded for recent results in applied networking research that are of potential interest to the Internet standards community. Researchers with relevant, recent results are encouraged to apply for this prize, which offers the opportunity to present and discuss their work with the engineers, network operators, policy makers, and scientists that participate in the IETF and the IRTF. From the 60 nominations received for the 2020 edition of the ARNP, six awards were presented, to Shehar Bano, Debopam Bhattacharjee, Georgia Fragkouli, Chaoyi Lu, Ingmar Poese, and Ranysha Ware.

## Applied Network Research Workshop

The [ACM/IRTF Applied Networking Research Workshop \(ANRW\)](#) provides a forum for researchers, vendors, network operators, and the Internet standards community to present and discuss emerging results in applied networking research. The workshop offers an opportunity for academics to transition research back into IETF standards and protocols and to find inspiration from topics and open problems discussed at the IETF. To foster this cross-community collaboration, the workshops are co-located with IETF meetings once a year and organized in a way that allows ample time for discussion and interaction.

The [ANRW 2020](#) was held in conjunction with the IETF 108 Online meeting. The workshop consisted of a mix of invited talks, submitted talks, and submitted short papers. [Video recordings](#) from the workshop are available from the IRTF website. [Workshop proceedings](#) have been published by the ACM.

# Information Resources

## Internet Architecture Board (IAB)

[IAB website](#)

[IAB on Twitter](#)

## Internet Engineering Task Force (IETF)

[IETF website](#)

[IETF Datatracker](#)

[IETF Mailarchive](#)

[IETF on Twitter](#)

## IETF Administration LLC (IETF LLC)

[IETF LLC webpages](#)

[IETF LLC on LinkedIn](#)

## Internet Research Task Force (IRTF)

[IRTF website](#)

[IRTF on Twitter](#)

## RFC Editor

[RFC Editor website](#)

