The bridge to possible

Making the Internet a Better Place by Participating in the IETF

Beginner's Guide

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Session Objectives

- Ever wondered how innovation for the Internet works? The IETF is the main place where a community of engineers that come together to share ideas and innovate. It can be daunting to think of developing and writing standards at first but know that this is a journey. Everyone is welcome at the IETF, this is free, and there is something for everyone to do and to learn.
- The presentation will be a unique and fun conversation between a veteran and a newcomer at the IETF to provide attendees with varied perspectives.
- Come to this session to learn about the IETF, the kind of work that happens there and how you can get started with your journey at the IETF.

Agenda

- Where do standards come from ?
- IETF Organizational Structure
- IETF Publication Process
- Newcomer's Perspective
- Some New Work
- Conclusion

Cisco Webex App

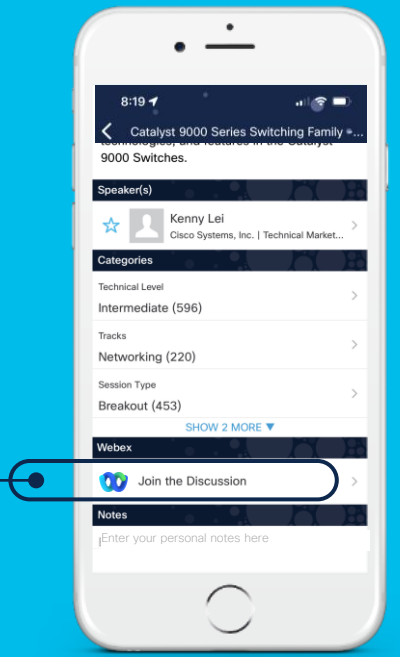
Questions?

Use Cisco Webex App to chat with the speaker after the session

How

1. Find this session in the Cisco Live Mobile App
2. Click “Join the Discussion”
3. Install the Webex App or go directly to the Webex space
4. Enter messages/questions in the Webex space

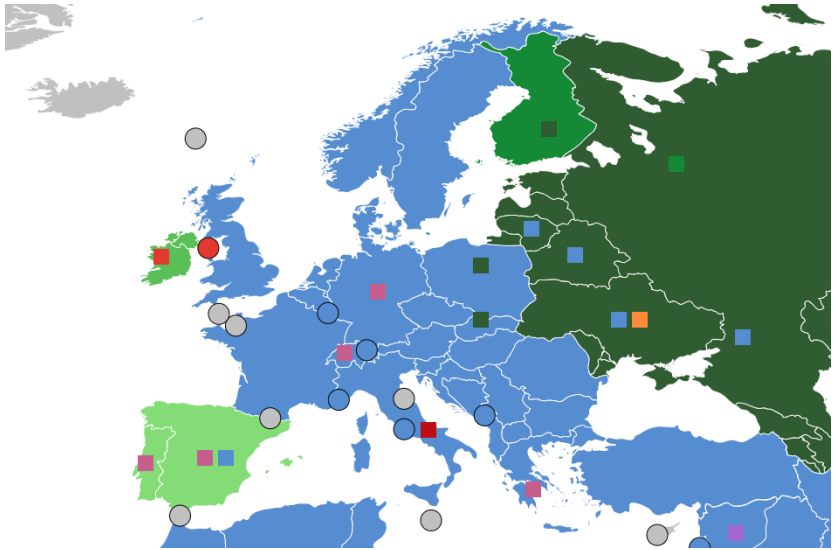
Webex spaces will be moderated until February 24, 2023.

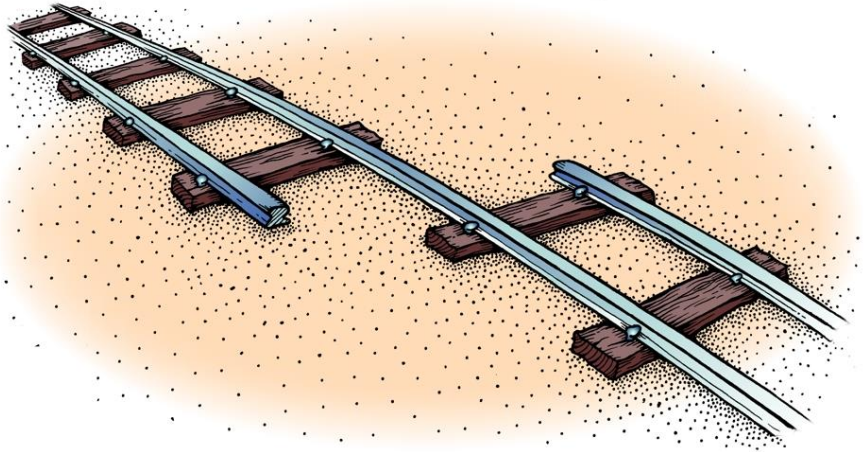


Where do standards come from ?

Without Standards

- Different railway track standards





20+ Years Ago

Different Standard Develoment Organisations (SDOs)

- Open (with enterprise sponsoring)

- Country or region-oriented

- Vertical Market

IETF vs. Other Standard Development Organizations (SDOs)

- IETF
  - No formal voting
  - Self-selected individual participants;
    No formal government role;
    Market-based adoption
  - Focused on Internet technologies;
  - Bottom-up

- Traditional SDOs
  - Formal voting
  - National members or organizational members – rarely individuals; Sometimes treaty-based; Sometimes legally mandated adoption
  - Wide range of technical, process & physical standards
  - Often top-down

IETF Organizational Structure

IETF Mission

- https://www.ietf.org/about/mission/

"The mission of the IETF is to make the Internet work better by producing high quality, relevant technical documents that influence the way people design, use, and manage the Internet."

- Focus is on the Internet even if IETF protocols are used in private / isolated domain

IETF Purpose

- Develop and maintain standards for technologies used to provide Internet service or to provide services over the Internet
- Ensure that the technology can perform needed functions
- Ensure that the technology will support the proper scale of deployment and usage
- Ensure that the technology itself is secure and can be operated securely
- Ensure that the technology is manageable

The IETF

- Organized activity of the Internet Society
- A voluntary Standards Development Organization
- Consists of !many! Working Groups (WGs)
  - Organized by Areas of related WG
- Most standards work is done by the Working Groups
- Internet Architecture Board (IAB) is a related organization

Acronym Decoder

- Internet Architecture Board (IAB – www.iab.org):
  - long-range technical direction
  - ensuring the Internet continues to grow and evolve
- Internet Engineering Steering Group (IESG):
  - technical management of IETF activities and the Internet standards process.
- IETF Administration LLC: corporate legal home
  - supporting the ongoing operations
  - IETF's finances and budget
- IETF Trust:
  - acquire, hold, and maintain intellectual property and other property

More Acronyms

- Internet Research Task Force (IRTF – www.irtf.org)
  - Focused on long term research topic
  - No Working Groups (WG) but Research Groups (RG)
  - E.g., Information-Centric Networking ICNRG, Quantum Internet QIRG
- Internet Assigned Number Authority (IANA – www.iana.org)
  - Registry for all port numbers, MIME types, ...
- RFC Editor www.rfc-editor.org
  - Last editorial and consistency review of drafts before publication
  - Assign RFC numbers
  - Publish them and maintain errata as RFC are never modified

Working Group

- Where the main work of the IETF takes place
- Bottom-up formation
  - Generally proposed by IETF participants to meet a perceived need, i.e, bottom-up
  - Often preceded by (usually one) Birds of a Feather session(s)
  - Negotiates a charter with the AD (with advice and consent of IESG and IAB)
- Has an agreed work plan and schedule
- “F2F” or interim meetings ideally focused on key issues
- Lives on between IETF Meetings (ironing details)

WG are Aggregated into Areas

- 7 areas:
  - GEN: general, AD = IETF chair
  - ART: Application and Real-Time
  - TSV: Transport and services
  - INT: Internet
  - RTG: Routing
  - OPS: Operation and Management
  - SEC: Security
- 1, 2 or 3 ‘selected’ Area Directors per area for a 2-year term
- https://www.ietf.org/topics/areas/

WG Mailing List

- Every WG has one mailing list
  - https://www.ietf.org/mailman/listinfo
  - Archives are always public
  - Subscription is always open and free
- The only ‘official’ media for adopting or for ‘last calls’

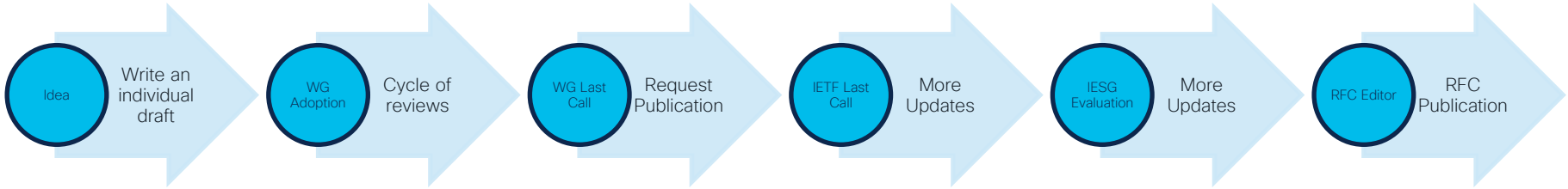
- GitHub also starts to be used
  - E.g., https://github.com/IETF-OPSAWG-WG
  - “Opening issues in github” vs. “email discussion” ?

IETF Publication Process

Document Names and Categories

- IETF draft = work in progress = not an IETF standard
  - E.g., draft-grant-tacacs-00 (1996) no WG
  - draft-author-wgname-title: individual draft hoping to be adopted (ex draft-dahm-opsawg-tacacs-01)
  - draft-ietf-wgname-title: draft adopted by a working group, i.e., the WG has control of the content (ex draft-ietf-opsawg-tacacs)
- RFC Categories
  - Standards Track
  - Informational (ex RFC 8907), not a standard
  - Experimental, not a standard
  - Best Current Practice (BCP)

From an Idea to a RFC



Publication Process 1/2

- Individual draft
  - Publish the document as an individual Internet Draft (I-D).
  - Receive comments on the draft => edit your draft based on the comments.
  - Repeat… And request WG adoption by consensus
- WG draft
  - Re-publish the document as WG draft
  - WG is now the control change (authors -> editors)
  - Comments, reviews, changes, revised I-D
  - Until WG Last Call consensus
- The WG chair asks the Area Director (AD) to take it to the IESG.

Publication Process 2/2

- AD does his/her own initial review, and maybe ask for updates
- Get reviews from the wider IETF membership (IETF *Last Call*)
- Discuss concerns with the IESG members (could lead to changes as one AD can block a document https://datatracker.ietf.org/iesg/discusses/)
- Wait for the document to be reviewed and published by the RFC Editor.
  - IANA has often to review the I-D and allocates some code points

All in all, it is about 2 years minimum...

IETF and Consensus RFC 7282

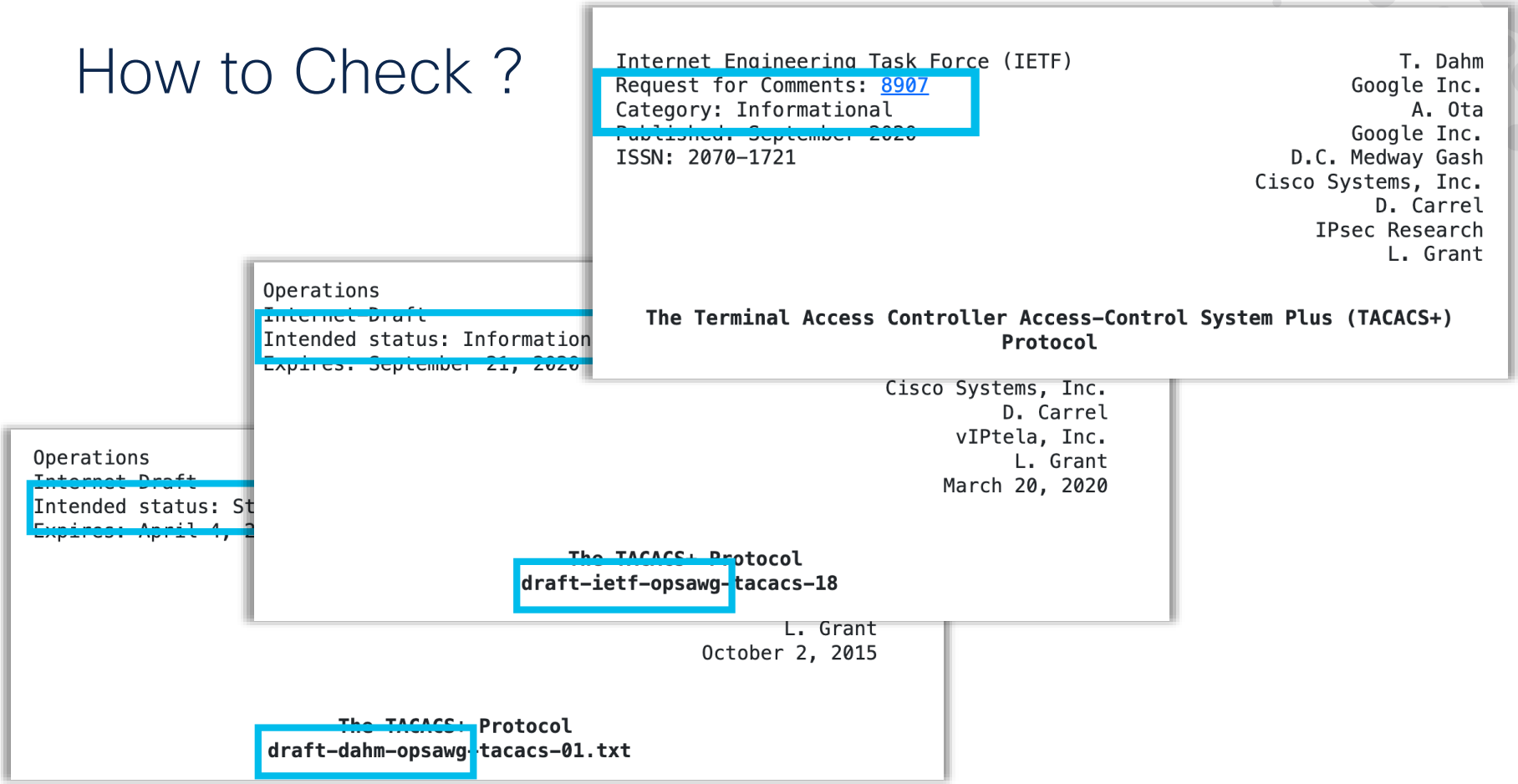
"We reject kings, presidents and voting. We believe in rough consensus and running code." – David Clark

- "Rough Consensus" – **Rough consensus is achieved when all issues are addressed, but not necessarily accommodated**
- Humming – a way of measuring consensus that is not voting
- The session chair is usually the arbiter of consensus, but WG session consensus must yield to WG mailing list consensus
- Dissenting opinions are heard, but are not controlling

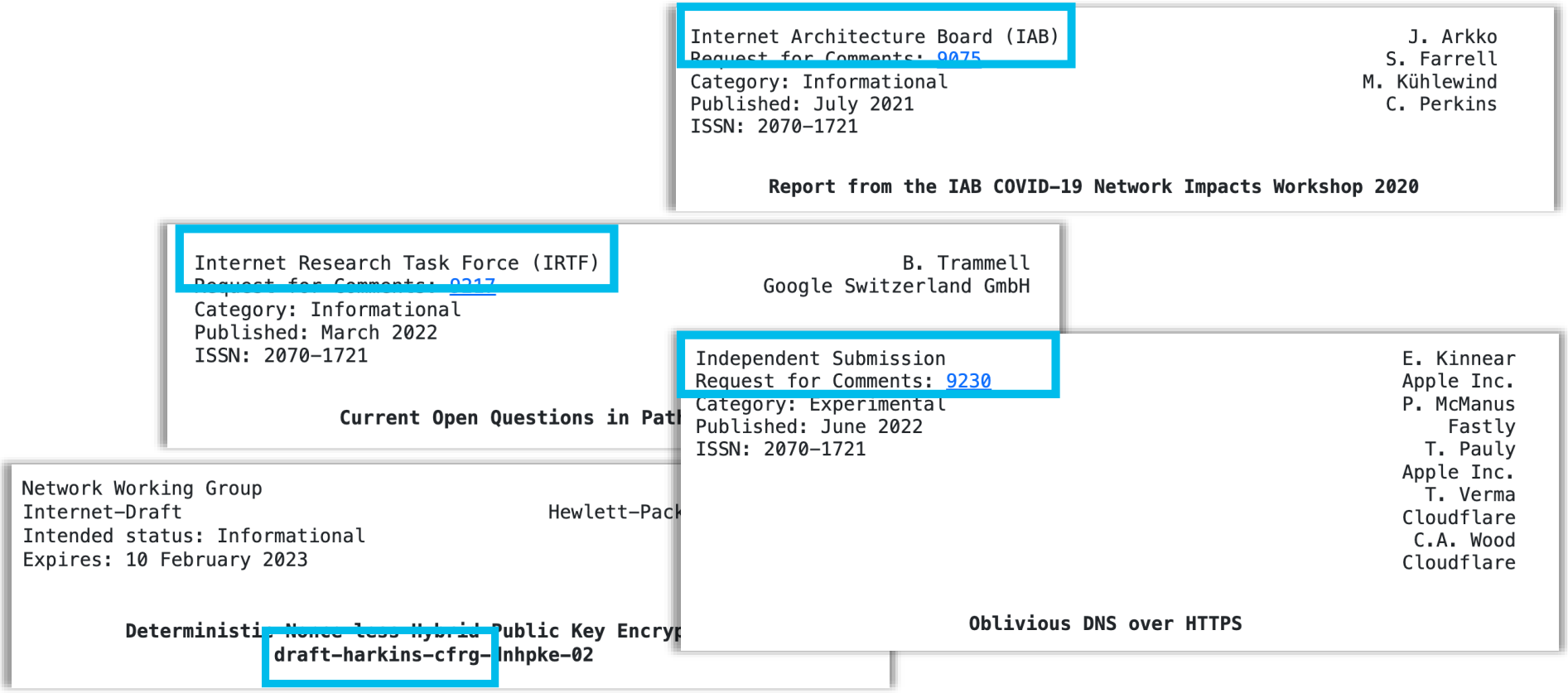
Publication Streams

- IETF:
  - WG (or AD sponsorship) then IETF consensus and approved by I
  - Only stream with ‘standards track’ category
- IAB
  - informational only
  - https://datatracker.ietf.org/stream/iab/
- IRTF:
  - RG consensus, informational/experimental, IESG to detect potential conflicts, approved by IRSG
  - https://datatracker.ietf.org/stream/irtf/
- Independent Submission Stream:
  - informational/experimental, no IETF consensus, IESG to detect potential conflicts, approved by Independent Stream Editor (ISE)
  - https://datatracker.ietf.org/stream/ise/

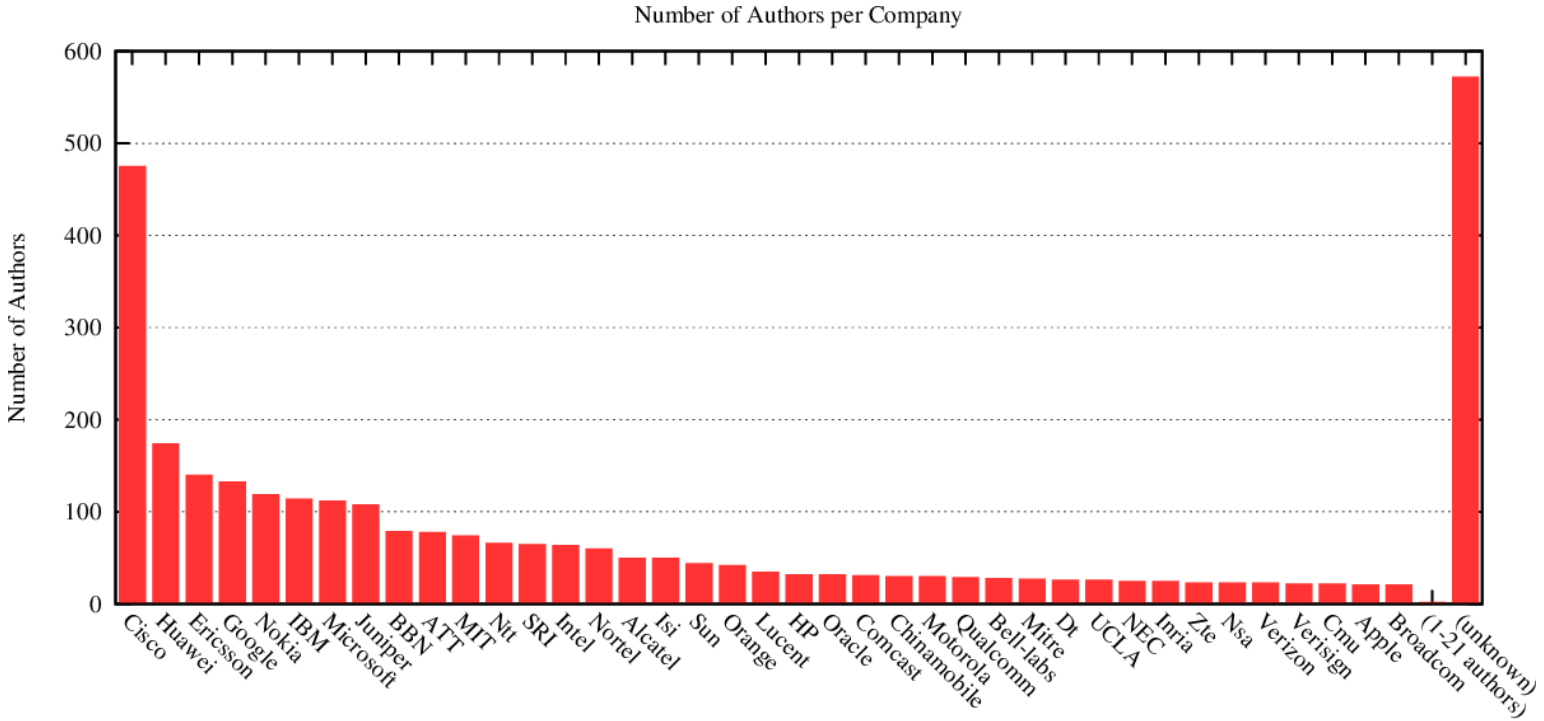
How to Check ?



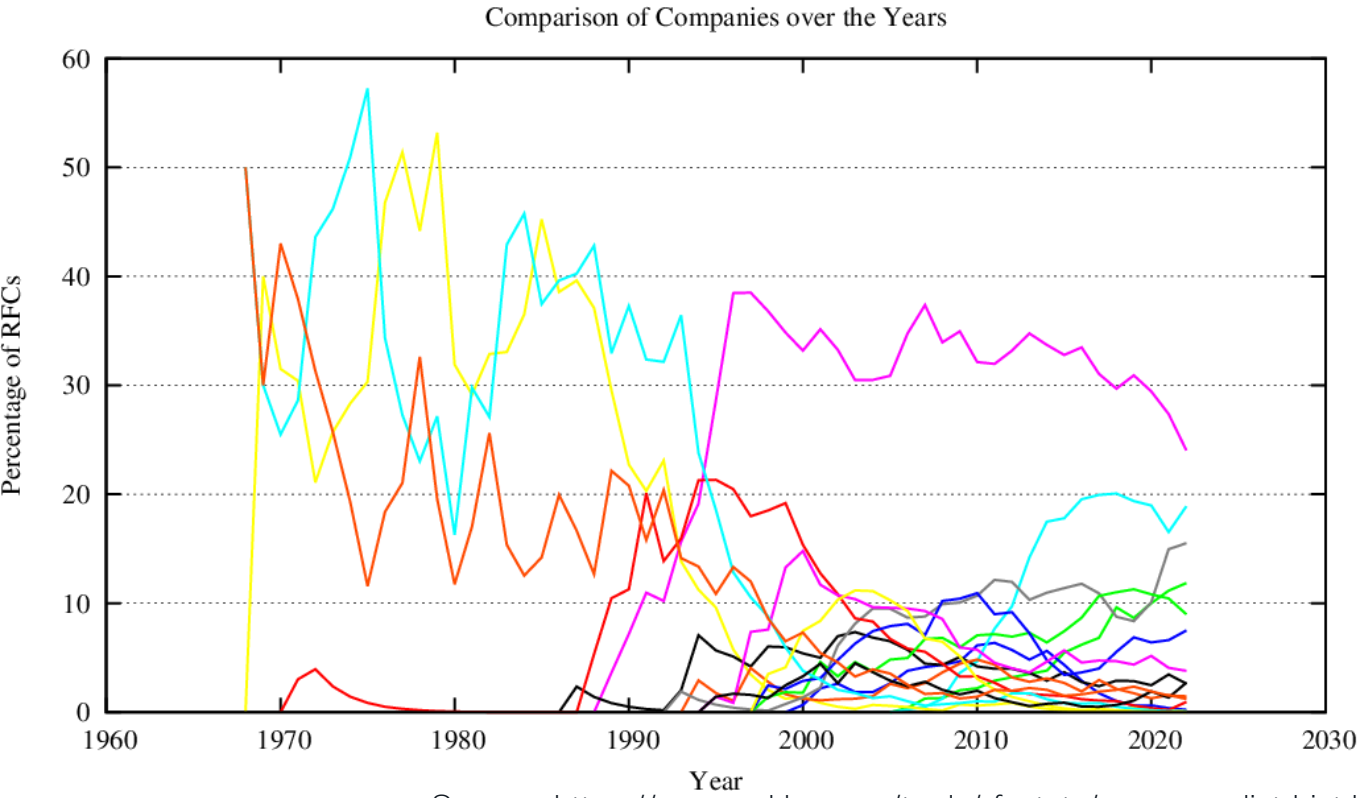
How to Check the Streams ?



Most Active Organization in 2023



Most Active Companies



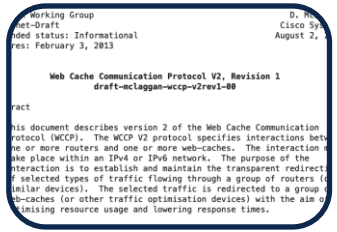
Google
Alcatel
Cisco
Huawei
Sri
Att
Ntt
Ericsson
Ibm
Juniper
Nokia
Microsoft
Bbn
Nortel
Intel
Mit

! Same colour used twice

Source: https://www.arkko.com/tools/rfcstats/companydistrhist.html

Newcomer's Perspective

Why did I choose to go after the IETF?



Working Group
Internet-Draft
Intended status: Informational
Expires: February 3, 2013

D. Re
Cisco Sy
August 2,

Web Cache Communication Protocol V2, Revision 1
draft-mclaggan-wccp-v2rev1-00

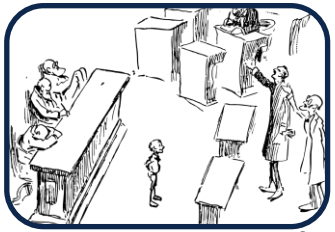
Abstract

This document describes version 2 of the Web Cache Communication Protocol (WCCP). The WCCP V2 protocol specifies interactions between one or more routers and one or more web-caches. The interaction takes place within an IPv4 or IPv6 network. The purpose of the interaction is to establish and maintain the transparent redirection of selected types of traffic flowing through a group of routers (or similar devices). The selected traffic is redirected to a group of web-caches (or other traffic optimisation devices) with the aim of optimising resource usage and lowering response times.

Exposed to RFCs early on

Personal growth

Learning new things



Represent myself and not employer

Free Membership ☺

Imagination vs Reality

- Group of experts who know it all
- Closed group that is not welcoming of newcomers
- I have to do a lot to get up to speed
- Fear of embarrassment – My thoughts and ideas will be laughed at/frowned upon

Imagination vs Reality

- Truly open community – encourages participation from all walks of life
- Something for everyone (Areas, WG, BOFs, individual drafts, etc.)
  - Example of GAIA research group
- Welcoming of ideas from anyone (BOFs, WG presentations)

Global Access to the Internet for All (gaia)

Charter for Research Group

Charter

The Internet Society's Global Internet User Survey 2012 reveals that a large majority of respondents believe that Internet access should be considered a basic human right. However, in the reality of today's Internet, the vision of global access to the Internet faces the challenge of a growing digital divide, i.e., a growing disparity between those with sufficient access to the Internet and those who cannot afford access to the essential services provided by the Internet.

So how did I get started?

Read the getting started @ IETF guide

Research areas and pick 2 of interest (int and sec)

Within the 2, pick WGs of interest

Pick ones without a lot of history or work already done (dance)

- Subscribe to mailers, read up on charter, look at timeline and history
- Read any documents/drafts

Attend meetings especially IETF online

- Participate in any interesting BOFs

Looking forward

- Reality of time investment
- Transition to active contribution
- Goal #1: Present at IETF Online
- Goal #2: Submit proposal (draft, BOF, etc.)

Some New Work

MAC Address Device Identification for Network and Application Services (madinas WG)

- Host OS vendors and IEEE want to randomize and change MAC addresses
  - Currently: when changing network
  - Later: periodically

- Outside of IETF but impacting IETF protocols
  - NDP/ARP cache
  - Captive Portal
  - ....

Stub Network Auto Configuration for IPv6 (snac WG)

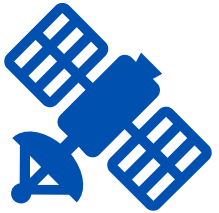
- How to connect IEEE 802.15.4 IPv6 network to the Internet via the residential/home Wi-Fi ?
  - Different MAC address lengths 16/64 vs. 48 for Wi-FI
  - IPv6 is a must as ‘stub’ networks are IoT

- Challenge
  - Not a single change in the existing residential/home Wi-Fi
  - Must work with IPv4-only, dual-stack, IPv6-only Wi-Fi

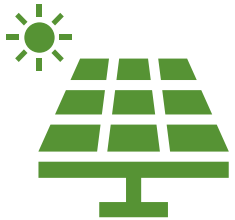
Multiple Key Exchanges in IKEv2

- draft-ietf-ipsecme-ikev2-multiple-ke
- Quantum Computers render (elliptic curve) Diffie-Hellman key exchange unsecure
- Post-Quantum Crypto : new algorithms immune to quantum computer
  - Alas not well-tested / understood yet...
  - So, combine entropy from classical (EC)DH with post-quantum crypto to get enough entropy
- Can also be used when initiator and responder do not have a single key exchange algo in common => let's use both of them ;-)

Time-Variant Routing



- Brand new WG
- Routing protocols are reactive: adjency loss detected, rerouting
- But, some events are scheduled:
  - Maintenance
  - PoP/router power down (e.g., no more solar/wind energy)
  - Satellites have very predictable orbits



- TVR WG will ‘enhance’ existing routing protocols with above info
  - => routing protocols will be proactive

Conclusion

Thank you

- For listening
- But also, to ACT

- IETF is not about superpower of Gods
- It is about engineering mainly (and vendor politics sometime)
- Decisions are made on MAILING LIST
- Free
- You are an individual and not an employee/student
- No NEED to be in physical meetings

Complete your Session Survey

- Please complete your session survey after each session. Your feedback is important.
- Complete a minimum of 4 session surveys and the Overall Conference survey (open from Thursday) to receive your Cisco Live t-shirt.

- All surveys can be taken in the Cisco Events Mobile App or by logging in to the Session Catalog and clicking the "Attendee Dashboard" at https://www.ciscolive.com/emea/learn/sessions/session-catalog.html

Continue Your Education

Visit the Cisco Showcase for related demos.

Book your one-on-one Meet the Engineer meeting.

Attend any of the related sessions at the DevNet, Capture the Flag, and Walk-in Labs zones.

Visit the On-Demand Library for more sessions at ciscolive.com/on-demand.

More references

- The Tao of the IETF – “Everything you always wanted to know about the IETF, but were afraid to ask” https://www.ietf.org/tao.html
- See also https://www.ietf.org/about/participate/tutorials/
- The list of mailing lists – https://www.ietf.org/meeting/email-list.html

Resources

- IETF Getting Started document
- IETF 116 Online - https://www.ietf.org/how/meetings/116/
- Current active WGs - https://datatracker.ietf.org/wg/
- BOFs - https://datatracker.ietf.org/wg/bofs/
- To submit:
  - New BOF request - https://datatracker.ietf.org/doc/bof-requests
  - New Internet-draft (I-D) - https://datatracker.ietf.org/submit/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