# IETF Roundup for APNIC 54
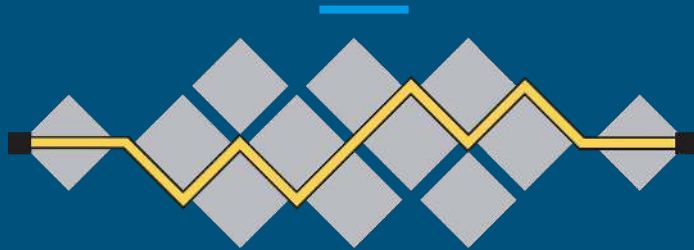
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# Internet Engineering Task Force (IETF)

# Internet Standards & IETF

- Internet Standards enables Interoperability. It ensures that s/w and h/w produced by different vendors can work together!
- The IETF ([Internet Engineering Task Force](#)) is the premier Internet standards organization with open process and freely available standards.
  - 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.
  - IETF is a large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet.

# How does IETF work?

- You are in individual when you participate at IETF
  - No membership / No dues!
  - Mostly sponsored by companies/institutions
  - But we are individuals, i.e. individual opinion and technical arguments matters only!
- Areas and Working Groups
- Mailing List is all that matters
  - All formal decision on the list

- IETF has 3 meetings per year
  - High-bandwidth F2F communication
  - Cross Area collaboration
- Rough Consensus
  - Measure of opinions, but no voting!
- Running Code
  - IETF Hackathon
  - Datatracker Code Sprint

# IETF Areas & Working Groups

- The IETF divides its work into a number of Areas, each comprised of working groups.
  - Applications and Real-Time Area (art)
  - General Area (gen)
  - Internet Area (int)
  - Operations and Management Area (ops)
  - Routing Area (rtg)
  - Security Area (sec)
  - Transport Area (tsv)
- Areas have Area Directors (ADs) that forms the Internet Engineering Steering Group (IESG)

- Working Groups (WGs) are the primary mechanism for development of IETF specifications and guidelines.
  - They are created with a charter that describes the specific problem or deliverables they will deliver.
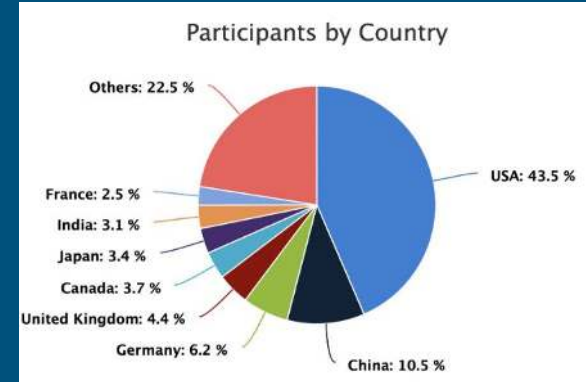- WG have WG co-chairs

5

# What is RFC?

- Request for Comment
  - The name is historic
    - it was created as a way to share notes among researchers.
  - RFC Series has a longer history (1969) than the IETF (1986)
    - By Steve Crocker
    - Internet Pioneer Jon Postel was RFC Editor for 28 years!

- Ideas are published as Internet-drafts
  - Working documents (not standards)
  - This is where you start contributing to IETF!
- The final consensus ideas are published as RFCs
  - An archival document
  - Over 9200; around 200 RFCs per year!
  - RFCs can be from other streams (apart from IETF)
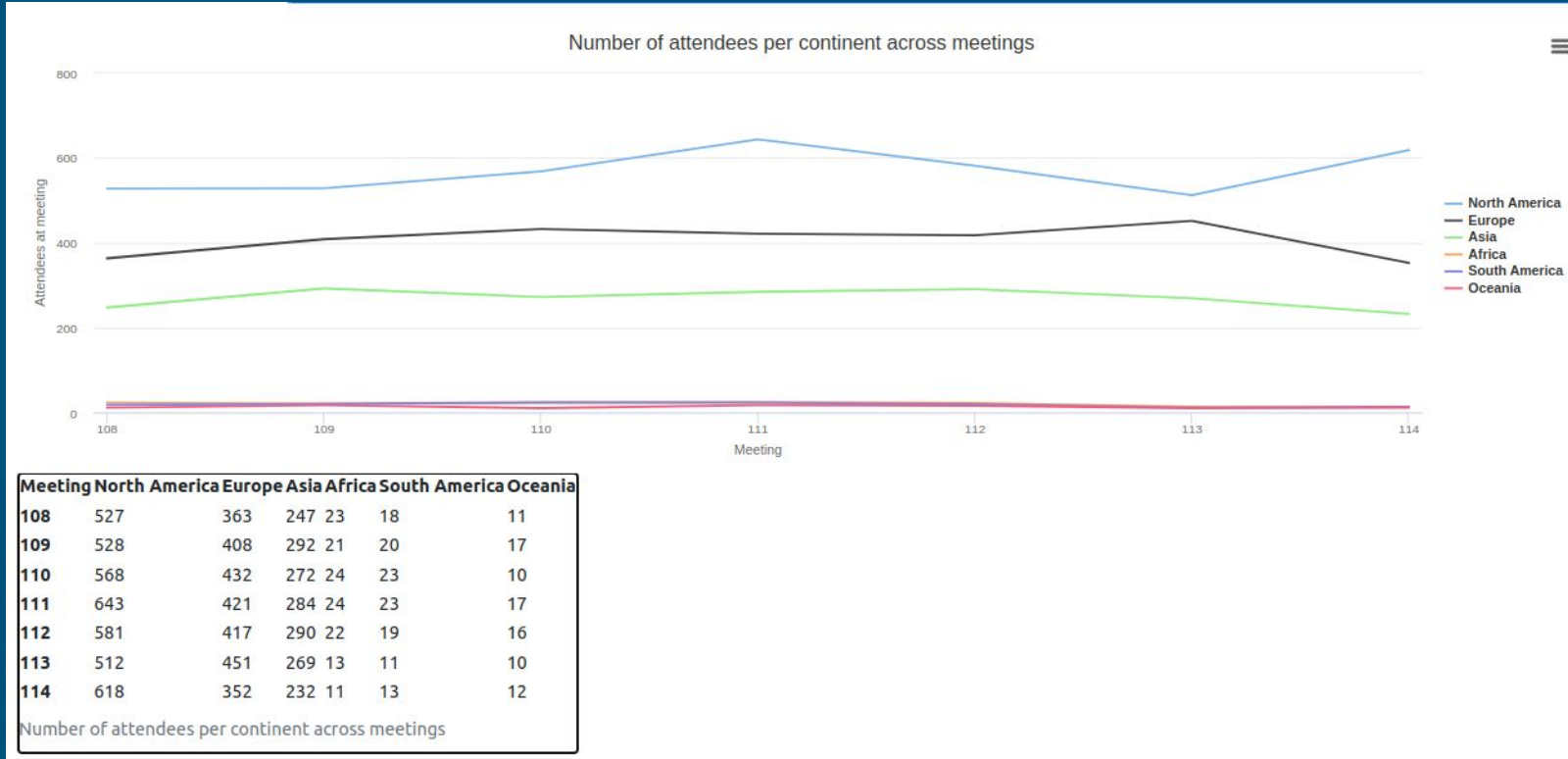
# IETF Participation

# APNIC Region

- While participation from east asia have somewhat good participation, the participation from other regions are lagging!
  - Lack of IETF meetings in the region
    - IETF follows 1-1-1 policy (NA-Europe-Asia), but not all regions are the same!
- Network operator participations from the region is especially a concern.
  - All networks are not same, this region has unique challenges and thus it is key that those are well represented in the standard making process!
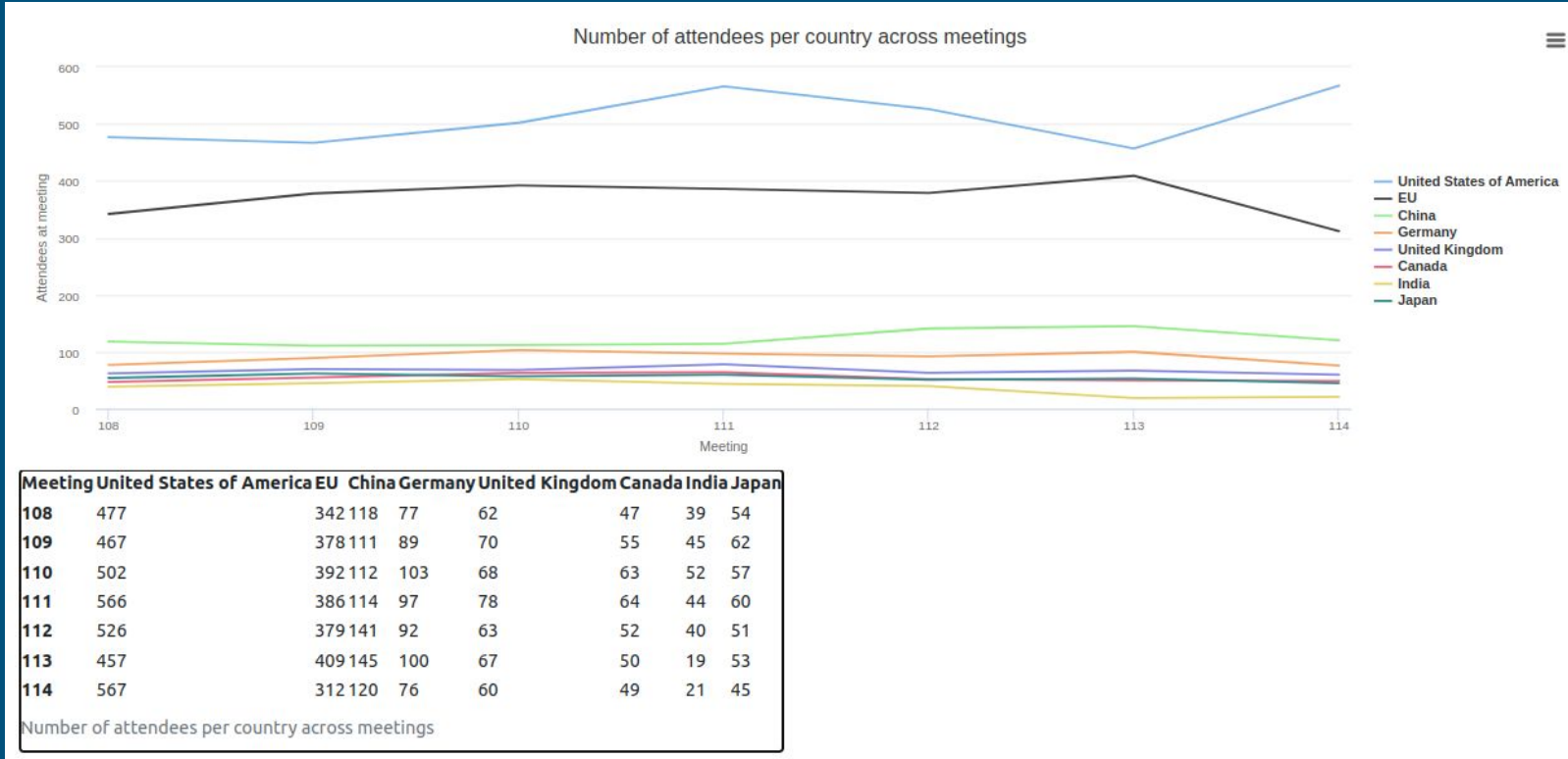


IETF 114

# Continent Participation



Number of attendees per continent across meetings

| Meeting | North America | Europe | Asia | Africa | South America | Oceania |
|---------|---------------|--------|------|--------|---------------|---------|
| 108 | 527 | 363 | 247 | 23 | 18 | 11 |
| 109 | 528 | 408 | 292 | 21 | 20 | 17 |
| 110 | 568 | 432 | 272 | 24 | 23 | 10 |
| 111 | 643 | 421 | 284 | 24 | 23 | 17 |
| 112 | 581 | 417 | 290 | 22 | 19 | 16 |
| 113 | 512 | 451 | 269 | 13 | 11 | 10 |
| 114 | 618 | 352 | 232 | 11 | 13 | 12 |

Number of attendees per continent across meetings

# Top Countries



Number of attendees per country across meetings

| Meeting | United States of America | EU | China | Germany | United Kingdom | Canada | India | Japan |
|---|---|---|---|---|---|---|---|---|
| 108 | 477 | 342 | 118 | 77 | 62 | 47 | 39 | 54 |
| 109 | 467 | 378 | 111 | 89 | 70 | 55 | 45 | 62 |
| 110 | 502 | 392 | 112 | 103 | 68 | 63 | 52 | 57 |
| 111 | 566 | 386 | 114 | 97 | 78 | 64 | 44 | 60 |
| 112 | 526 | 379 | 141 | 92 | 63 | 52 | 40 | 51 |
| 113 | 457 | 409 | 145 | 100 | 67 | 50 | 19 | 53 |
| 114 | 567 | 312 | 120 | 76 | 60 | 49 | 21 | 45 |

Number of attendees per country across meetings

# WHY participate in IETF?

- IETF mission "make Internet work better" is **everyone's mission**!
- The **quality of the standards** and documents impacts everyone in the industry!
  - It impacts Interoperability
  - It impacts network operations and stability
  - It impacts features and services
- Open process allows for anyone interested in providing technical contributions
  - Standards involve **balancing** various (and sometimes competing) interests! You are likely to be impacted, if your interests are not well represented during deliberations.
  - From consumer of standards become a participant in standard making!

# WHY network operators needs to participate?

- Be on top of the new internet protocols and extensions
- Lot of work explicitly on Network Operations
  - input of operators is quite valuable to keep this work vibrant and relevant.
- Why should you care?
  - Are these real problems that impacts you?
  - Are these real network requirements? What's missing?
  - Are these in sync with operator's reality?
  - Is this going to be easy to deploy?
  - How would I troubleshoot this?
  - You might be deploying this and then you will most definitely care and it's usually too late to do anything!

# Challenges to participation

- **Time** - It takes a lot of time to read mails, participate in meetings. No easy way to filter out information and engage in long discussions!
- **Culture** - Feeling that operator's input is not welcomed. Perception of not being welcoming to newcomers. Consensus building is a long tiring process. Governance model could be the best and worst thing about IETF. Seen as a vendor playground. WG meetings with document updates are difficult to follow...
- **Money** - Expensive to attend meetings 3 times a year!
- Awareness - what it does? How it operates? How to participate? How to take the first step?
- Seen as **not relevant** for operators - fights over bits on wire, things that are far away from real deployments, no support from management...

# Tips to participate

- Identify what interest you, pick 1-2 key WG, monitor a few more!
  - Join with mailing list (use digest mode for a single mail) if you are worried about number of emails
  - Use IMAP to read when free (if you don't want to subscribe)
  - Start reviewing stuff and provide inputs
- Start with remote participation to IETF meetings
  - Use fee waivers
  - Participate in IEPG, Hackathon, and other events
- Ask for help!

# Links

- Join the mailing list - https://www.ietf.org/how/lists/
- Attend IETF meetings - https://www.ietf.org/how/meetings/
  - Online with Fee Waiver available - https://www.ietf.org/forms/115-registration-fee-waiver/
- Prepare for the meeting
  - Agenda, slides, internet drafts are posted in advance
  - Check past discussions - mailing list archives, minutes
  - Pick a small set of sessions to prepare in-depth (be a tourist for the rest)
- Ask for help
- Learn the culture
- IETF 115 in Nov https://www.ietf.org/how/meetings/115/
  - Hybrid meeting based in London (and online)!

# In India

IIESoc
https://www.iiesoc.in/

- IIESoc (India Internet Engineering Society) is a non-profit entity that brings together different stakeholders from the computer networking community across industry, academia, service providers and government.
  - It exists to further the adoption of IETF standards and increase awareness & participation in the IETF process.
- Established in 2017 by some of us regular IETFers from India and diaspora.
- Aim to bridge the gap between India and Internet Standards

- Organize various events
  - IPv6 Webinar Series
  - Regular RFCsWeLove Meetup
  - Annual Connections Event
  - Indian Community @ IETF get together
- Provide
  - Help and guidance to anyone interested in participating in IETF from India
  - Mentor during the IETF week
  - Informal discussions on any technical internet topic
- Helped many
  - with writing their first draft and attending meetings!

# News from IETF 114

July 2022, Philadelphia, USA

# Disclaimer

- This is not an official IETF report
- There is no official IETF Liaison from APNIC or any RIR
- This is all my opinion and my view and does not cover all aspects, just some key highlights
- *If attended IETF 114 and have an interesting item I missed please speak up*

# Key areas of interest for the APNIC community

## Operations

IEPG (Internet Engineering and Planning Group), Operations and Management Area Working Group (opsawg), IOT Operations (iotops)

## IPv6

IPv6 Operations (v6ops),  IPv6 Maintenance (6man)

## Routing

Global Routing Operations (grow), Inter-Domain Routing (idr), BGP Enabled ServiceS (BESS), SIDR Operations (sidrops), Link-state routing (LSR),  Segment Routing (SPRING)

## DNS

Domain Name System Operations (dnsop), Extensions for Scalable DNS Service Discovery (dnssd)

## Research

ACM/IRTF Applied Networking Research workshop (anrw), Network Management (nmrg)

## Measurements

IP Performance Measurement (ippm), Measurement and Analysis for Protocols (maprg)

# Lets go over a few of them...

# Internet Engineering and Planning Group (IEPG)

- The IEPG is an informal gathering that meets on the Sunday prior to IETF meetings. The intended theme of these meetings is essentially one of operational relevance in some form or fashion.
- As per RFC 1690, IEPG is an Internet Service Operators' forum, intended to assist Service Operators to coordinate in operational aspects of managing Internet services.
- At IETF 114 good discussion on IPv6 extension headers (PDM) testing on the Internet, measurements on QUIC, measuring the impact of RPKI ROV, and DANEportal.net - making DANE easy!
- In the past topics of interest includes IPv6, BGP, BGPSec, DNS, DNSSEC, Network operations, RPKI, Measurements, Network attacks,
- Join mailing list - iepg@iepg.org

# IPv6 Extension headers @ v6ops/IEPG

- Can IPv6 Extension header be used in Internet has been an issue?
- Various measurements have shown EH to fail.
- Aim is to do a deep dive on when the EH works and when it does not?
  - And more importantly focusing on "why"?
  - Figuring out where the problem lies - Routers, Firewalls, CDNs, ISP, are there some bugs, DNS, unsupported features!
- Testing initially focussed on a destination option EH called Performance and Diagnostic Metrics (PDM)
  - Testing on a small hosting service with modification in kernel
- I am involved, if this interests you, please reach out!

# Intent based routing @ IDR

- The evolving network requirements (e.g. 5G, native cloud) in a multi-domain network requires the establishment of paths that span multiple domains or AS's while maintaining specific transport characteristics or intent (e.g. bandwidth, latency).
- There is also a need to provide flexible, scalable, and reliable end-to-end connectivity for multiple services across the network domains.
- IDR WG is working on use-cases and requirements for a distributed routing based solution to establish end-to-end intent-aware paths spanning multi-domain packet networks using BGP.
- IDR WG has adopted two experimental approaches.

# MNA @ MPLS WG

- The MPLS enables packet forwarding through a network without requiring the intermediate routers to do any inspection/analysis of the packet payload network layer header (only MPLS header).
- New use-cases and applications have recently emerged which require intermediate MPLS routers to make forwarding decisions based on inspection of the network layer header, or some other ancillary data encapsulated in the packet.
  - IOAM, Network Slicing, DetNet, APN
- MPLS WG is working on **MPLS Network Actions** (MNA) refers to the technologies used to indicate network actions for MPLS packets and to transfer data needed for these actions in the MPLS Header.

# Network Slicing @ TEAS

- The Traffic Engineering Architecture and Signaling (teas) WG in IETF has been working towards defining the IETF network slice within the scope of the IETF networks.
- The E2E 5G network slice would require stitching the IETF and the non-IETF slice (edge RAN and core DC).
- The term "Slice" refers to a set of characteristics and behaviors that differentiate one type of user-traffic from another within a network.  An IETF Network Slice is a logical partition of a network that uses IETF technology.
- To realize IETF network slice, a Network Resource Partition (NRP) as a collection of resources (bufferage, queuing, scheduling, etc.) in the underlay network is used.
- Framework is getting ready for WGLC and YANG model is in active development.

# Other Hot Topics @ 114

- Interaction between Application and Networks with proposals such as computing aware network (CAN), Application aware networking (APN6),
- DetNet Enhancements
- Oblivious HTTP - proxy ensures that the server cannot see source addressing information for clients
- Energy consumption / Green Networking
- Proposals for  addressing the threats to classic cryptography posed by quantum computing.

# New Work / BoFs @ 114

- Stub Network Auto Configuration for IPv6 (snac)
  - the stub network is able to connect automatically any infrastructure link/capability
- Source Address Validation in Intra-domain and Inter-domain Networks (savnet)
  - Beyond uRPF, a new routing-protocol-independent architectures and procedures to accurately determine the valid incoming router interfaces for specific source prefixes
  - primitives of selective disclosure and unlinkability
- Multicast Source Routing over IPv6 (msr6)
  - Native IPv6 based multicast source routing solution
- Secure Asset Transfer Protocol (satp)
  - transferring digital assets between networks or systems

# New Work / BoFs @ 114

- Transfer dIGital cREdentialS Securely (tigress)
  - A protocol that will facilitate credential transfers from one person's device to another person's device.
- Supply Chain Integrity, Transparency, and Trust (scitt)
  - Aims to improve supply chain security by making the actions of entities in that supply chain transparent and thereby accountable
- JSON Web Proofs (jwp)
  - JSON Object Signing and Encryption (JOSE) extension to support the privacy-enhancing
- Media over QUIC (moq)
  - a low-latency media delivery protocol for ingest and distribution for live streaming, gaming, and media conferencing and allows efficient scaling.
- Check out this Blog
  - https://www.ietf.org/blog/ietf114-new-topics/
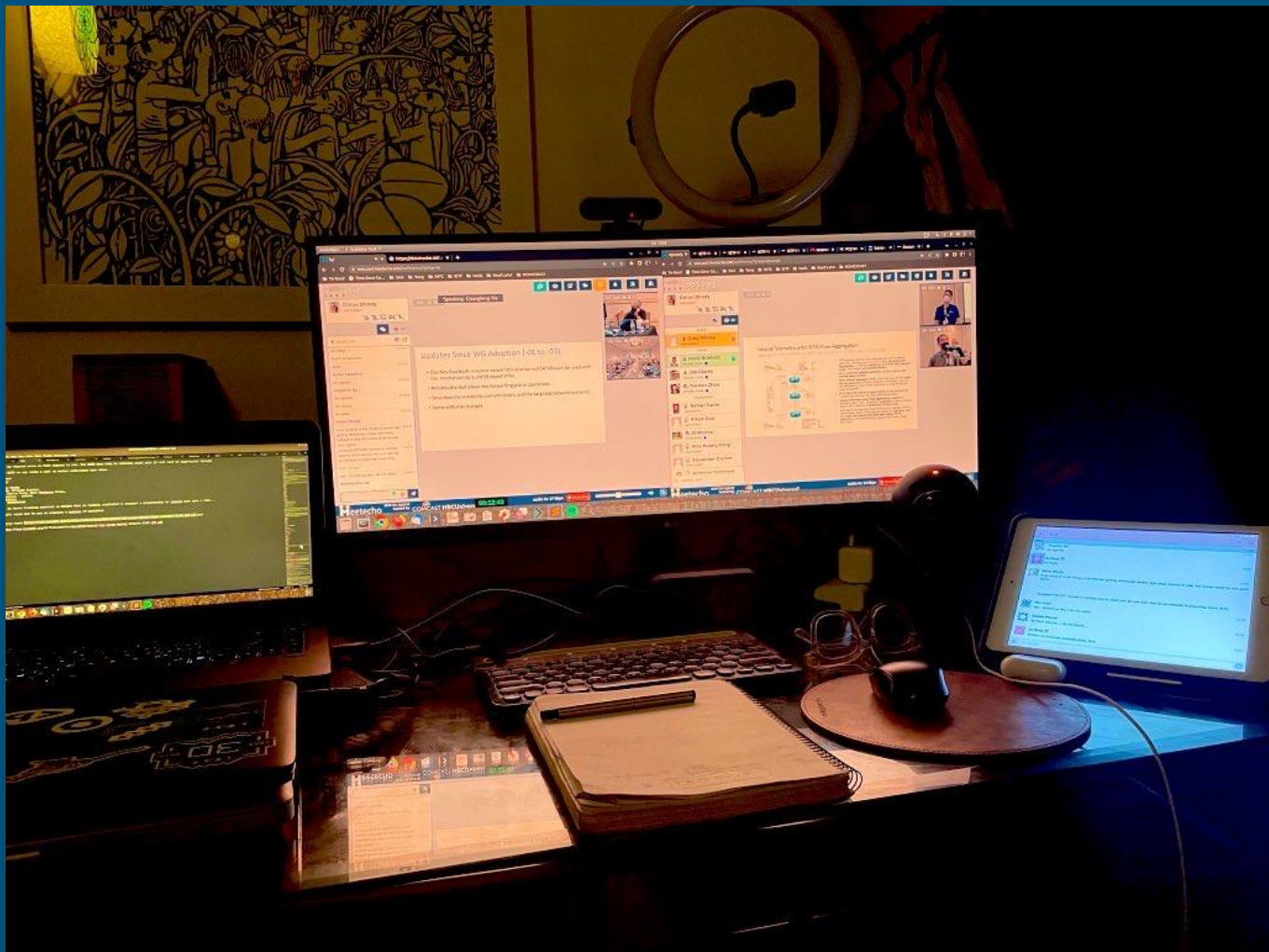
# Thank You!

# Backup

# IETF Principles

- Open Process - anyone can participate, everything is open!
- Technical Competence - based on sound network engineering principles; in areas where IETF has technical competence!
- Volunteer Core - participants/leadership are those who come to IETF to further IETF's mission of "making the Internet work better!"
- Rough consensus and running code - combined engineering judgement and real-world experience in implementation/deployment
- Protocol Ownership - accepts the responsibility for all aspects of the protocol!

# Internet-Drafts (I-Ds)

- Working documents
  - Capture ideas or discussion points
  - Multiple revision leading upto RFCs
- I-Ds are posted (not published)
  - Anyone can do it
- Starting point for discussion
  - Don't have to complete/perfect
  - They may go many changes, completely re-written, merged or abandoned!

- I-Ds expire in 6 months
  - Referenced as "work in progress"
- Working Group Adopted I-Ds
  - When a WG is ready to develop a particular document, it "adopts" an existing individual document as a starting point.
  - Leads to change in the name
    - draft-ietf-<wgname>-... from draft-<lastname>-...

# Towards Consensus

- You need to get agreement and support from across the WG
  - It could be rough! It is NOT a majority rule!
- Consensus doesn't require that everyone is happy and agrees that the chosen solution is the best one.  Consensus is when everyone is sufficiently satisfied with the chosen solution, such that they no longer have specific objections to it.

- You must address any valid technical objection
  - Address, not necessarily accommodate!
- Read more
  - RFC 7282: On Consensus and Humming in the IETF