

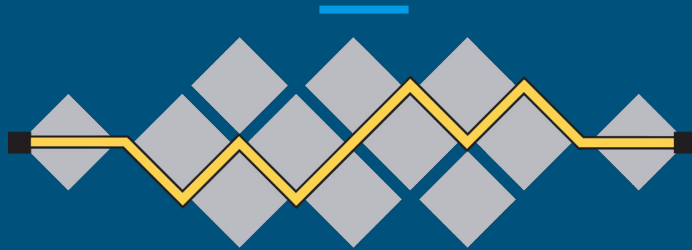


IETF Roundup for APRICOT 2023

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Internet Engineering Task Force (IETF)



I E T F[®]

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.

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 need 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 impact 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!

How to get your voice heard!

- Tell your requirements directly to the IETF -
 - Don't let vendors and researchers tell what the operator needs!
 - Bust myths with clear evidence and insights
 - Rationalize requirements that are of immediate need
- Provide insights that only you as an operator has -
 - Operational considerations are sometimes an after-thought, you can make sure that is not the case!
- Don't shy away from using your “operator” card!
 - Your voice is the most important one, as it will be you who would be operating the network when a new feature/protocol is deployed!

Tips to participate

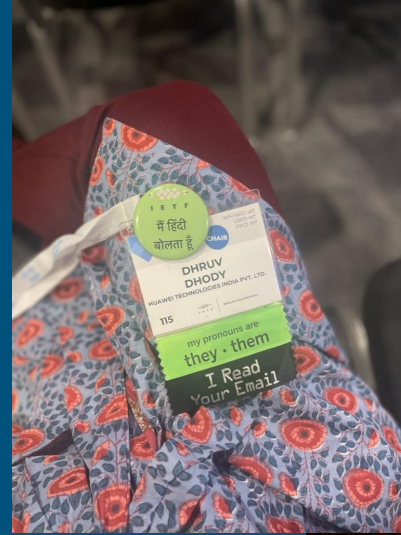
- Identify what interest you, pick 1-2 key WG, monitor a few more!
 - Join with mailing list (use digest mode for a single mail) if you are worried about number of emails
 - Use IMAP to read when free (if you don't want to subscribe)
 - Start reviewing stuff and provide inputs via mailing list (and github)
- Start with remote participation to IETF meetings
 - Use fee waivers
 - Participate in IEPG, Hackathon, technology deep dives, and other “side” events!
- Play special interest to new work
 - where it is easier to join in and the operators input is needed!
 - Dispatch WG also see proposals for new work
- Ask for help!

News from IETF 115

Nov 2022, London, UK

Disclaimer

- This is not an official IETF report.
- There is no official IETF Liaison from APNIC (or any RIR).
- This is all our opinions and views and does not cover all aspects, just some key highlights.
- *If you attended IETF 115 and have an interesting item we missed please speak up at the end...*



Key areas of interest for the APRICOT 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)

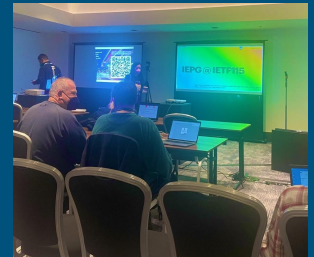
Measurements

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 115 good discussion on IPv6 extension headers testing on the Internet, measurements on DoH/DoT, measuring DSCP Traversal, YANG Push!
- In the past topics of interest includes IPv6, BGP, BGPsec, DNS, DNSSEC, Network operations, RPKI, Measurements, Network attacks...
- Join the mailing list - iepg@iepg.org



IPv6 Extension headers @ v6ops/IEPG

- Can IPv6 Extension header be used in the Internet?
- Various measurements have shown EH to fail at various degrees.
- 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, now moving to BPF.
- Dhruv is involved, if this interests you, please reach out!

MNA @ MPLS WG (joint work with others)

- 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) that refers to the technologies used to indicate network actions for MPLS packets and to transfer data needed for these actions in the MPLS Header.
 - Requirements has been adopted (draft-ietf-mpls-mna-requirements)
 - Framework has been adopted (draft-ietf-mpls-mna-fwk)
 - Extension is in WG Adoption (draft-song-mpls-extension-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 in WGLC and YANG model is in active development.
 - draft-ietf-teas-ietf-network-slices
 - draft-ietf-teas-ietf-network-slice-nbi-yang

New Work / BoFs @ 115

- **RADIUS Extensions Reanimated (radextra) BOF**
 - reopen Radius protocol to update cryptography!
- **Computing Aware Networking (can) BOF**
 - dynamic sharing of edge compute in-network resources to achieve better service response and optimizations
- **More Instant Messaging Interoperability (mimi) BOF**
 - make IM interoperate without undermining security
- **Time Variant Routing (tvr) BOF (now a WG)**
 - Handling of planned loss and resumption of network connectivity in routing
- **Supply Chain Integrity, Transparency, and Trust (scitt) WG**
 - security of supply chains with transparency and accountability
- **Secure Asset Transfer Protocol (satp) BOF**
 - transferring digital assets between networks or systems
- **Transfer dIGital cREdentials Securely (tigress) WG**
 - transfer a copy of a digital credential
- **Source Address Validation in Intra-domain and Inter-domain Networks (savnet) WG**
 - new techniques to accurately determine the valid incoming interfaces and perform source address validation.

Interesting side meetings @ 115

- ETSI IPE Side meeting to better understand ETSI IPE (IPv6 Enhanced Innovation) activities
- Discuss IPv6 enterprise issues
- IPv6 Extension Headers
- CONGRESS Bar BoF (a new proposed WG for congestion control)
- Discussion on Is Privacy preserving Web Filtering Possible?
- eBPF at IETF
- IETF Outreach activities
- Policy Programs from DCMS and ISOC
- Metaverse requirements
- Routing Research topics from SIGCOMM FIRA
- Discuss 6G topics related to IP

IAB Workshops

- IAB conducted workshops on
 - Environmental impact of Internet Applications and Systems
 - Both costs and benefits
 - Better understanding of the environmental impact of the Internet and its applications - direct and indirect!
 - Management techniques for Encrypted Networks
 - What new techniques are needed to manage networks when we don't have network visibility because of ubiquitous traffic encryption
 - Collaborative approaches that promote security, privacy while supporting operational requirements

Other Hot Topics @ 115

- Enhanced DetNet
- NTPv5 work is starting
- Support for versioning in YANG modules
- Inventory Management YANG for Enterprises
- Technology deep dive on QUIC with session on operations and manageability!



Upcoming IETF 116

March 2023, Yokohama, Japan

IETF in our Region

- IETF 116 in Yokohama
 - 25 March 2023 to 31 March 2023
- IETF “tries” to have one meeting in Asia each year.
 - But Asia is huge! At least east-asia should utilize this opportunity and participate in-person
 - Others, at least attend online
 - good timezone at least!
 - Fee-waivers for remote attendees are available!



Lookout for ...

- 1st meeting of newly formed TVR (Time-Variant Routing) WG
- 1st meeting of newly formed UFMRG (Usable Formal Methods Proposed Research Group) and RASPRG (Research and Analysis of Standard-Setting Processes Proposed Research Group)
- Quantum Internet talk as part of the Host Speaker Series
- Check out the agenda at <https://datatracker.ietf.org/meeting/116/agenda>

BoFs @ IETF 116

- **vCon**
 - Standardizing a container for conversation data (vCon) contained in transcripts and multi-media files
 - Specify mechanisms to ensure the integrity and privacy of the data in the container.
- **Structured Email (SML)**
 - Adding machine-readability for the automated transactional email
 - Provide a space to discuss requirements, existing solutions, and to identify areas for standardization
- **Key Transparency (KEYTRANS)**
 - Securely distributing the end-user public keys for E2E encryption in a safe, publicly-auditable way
- **BPF/eBPF**
 - Run sandboxed programs in a privileged context such as the operating system kernel
 - Standardize existing (e)BPF use and define processes for future extensions
- **CAN**
 - Dynamic sharing of edge compute in-network resources to achieve better service response and optimizations

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/116-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 116 in March <https://www.ietf.org/how/meetings/116/>
 - Hybrid meeting based in Yokohama (and online)!

Thank You!

Backup

How does IETF work?

- You are an 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

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 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>-...

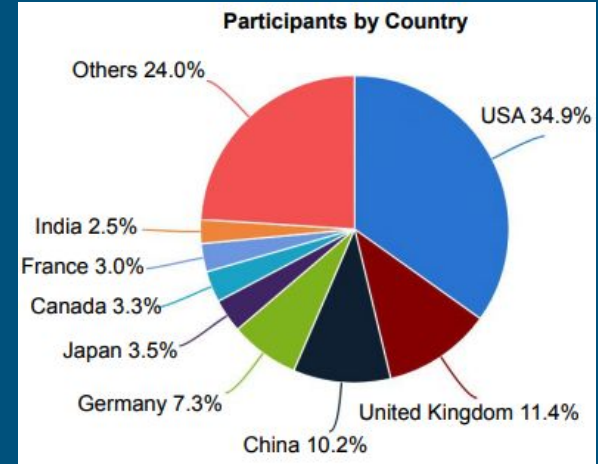
Towards Consensus

- 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

IETF Participation

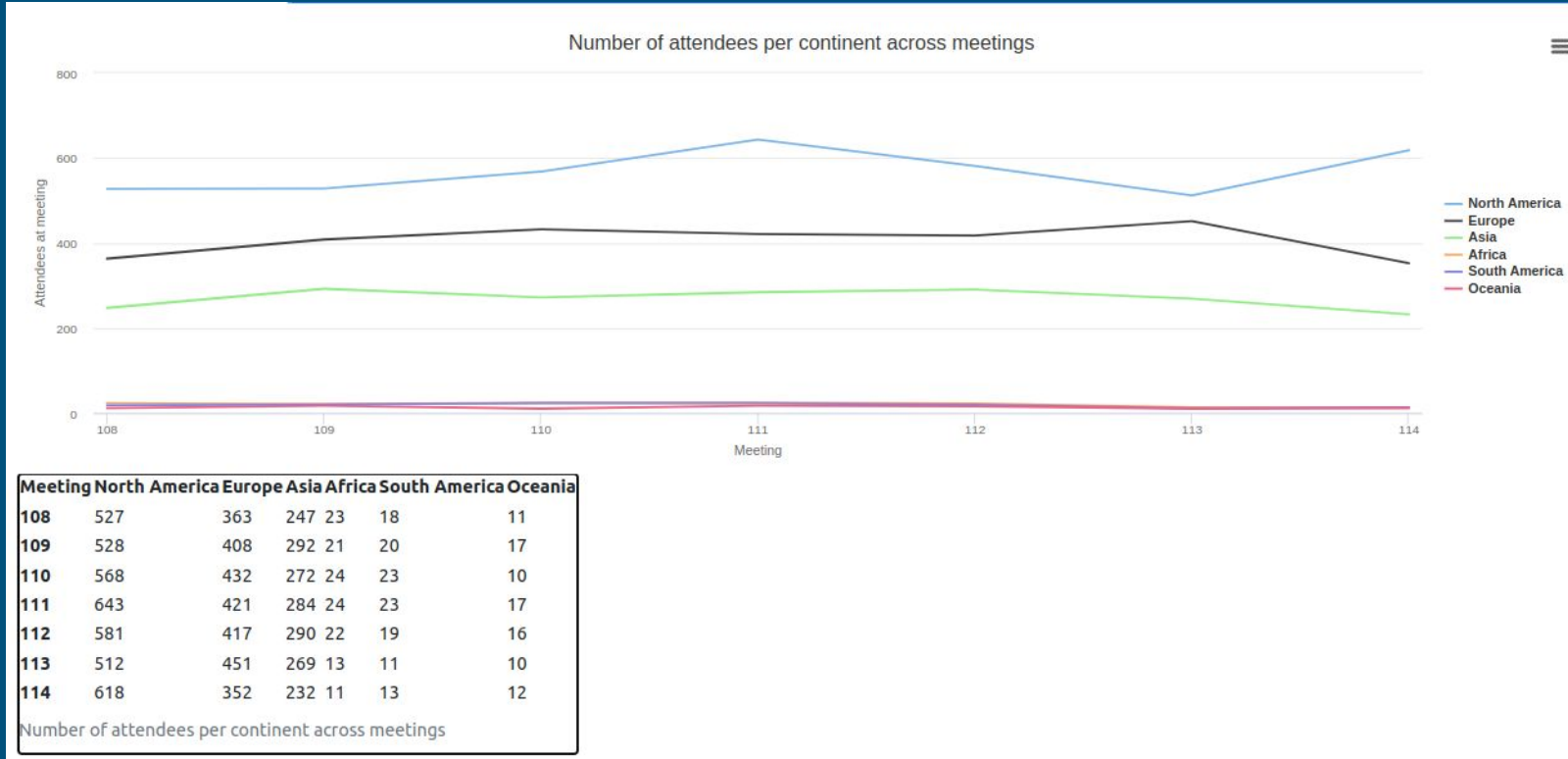
APNIC Region

- 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!

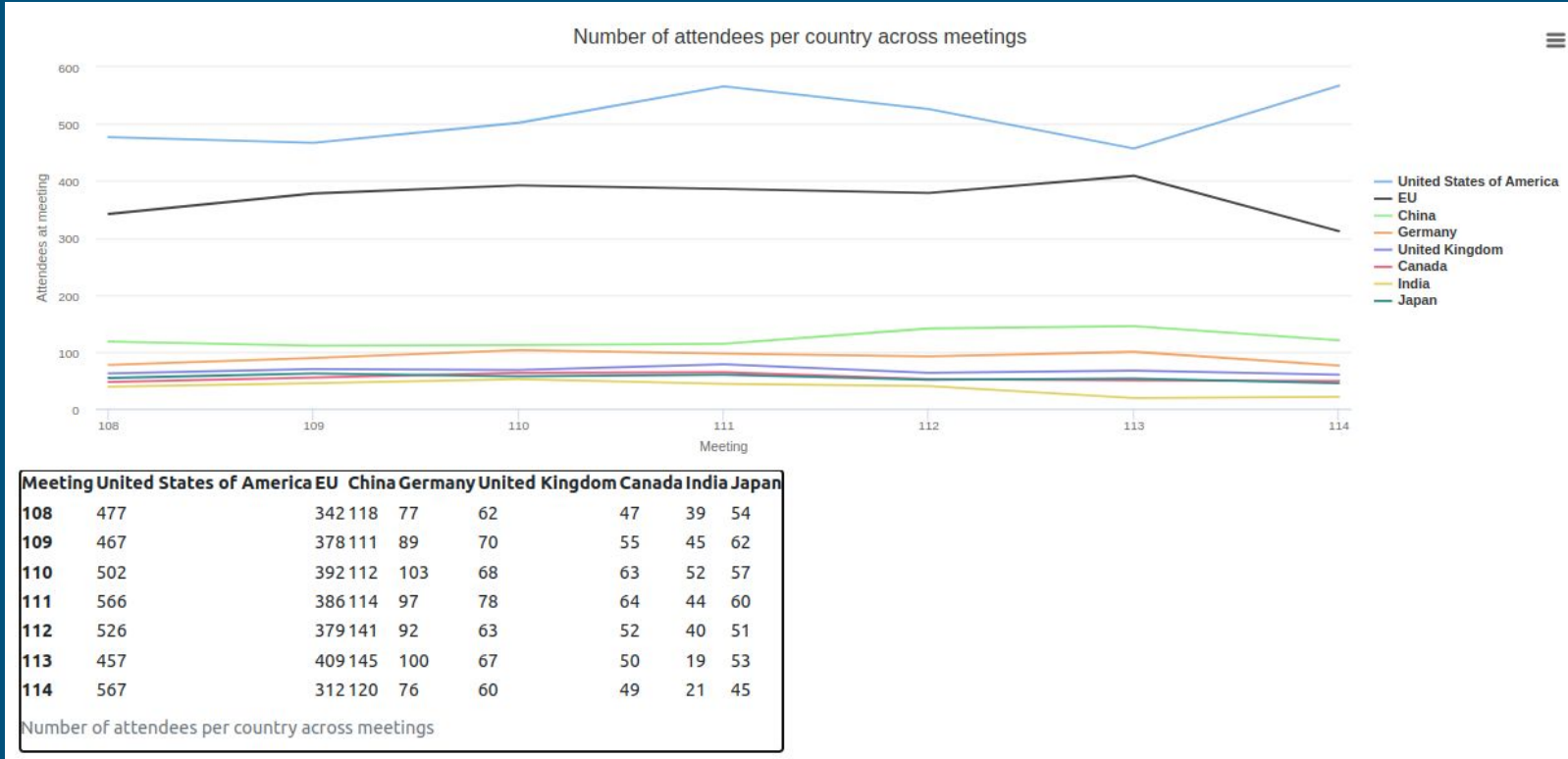


IETF 115

Continent Participation



Top Countries



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...

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!