Introduction to IETF and standardisation process

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What is the IETF ?

- A membershipless organisation
- Not a conference
- Not a traditional standards organization
- Meets physically 3 times a year
- Open mailing lists, easy to participate remotely
- Publishes technical and process documents known as RFCs
- Divided into 7 different areas

What is the IETF ?

- The IETF is a loosely self-organized group of people who contribute to the engineering and evolution of Internet technologies. It is the principal body engaged in the development of new Internet standard specifications. The IETF is unusual in that it exists as a collection of happenings, but is not a corporation and has no board of directors, no members, and no dues; [Ref BCP 95]

Mission of the IETF

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.

Founding Beliefs

- We reject kings, presidents and voting. We believe in rough consensus and running code
  - David Clark
- Be conservative in what you send and liberal in what you accept
  - Jon Postel

History of the IETF

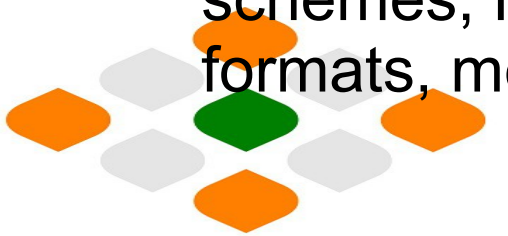
- 1st IETF meeting was held in January 1986 at Linkabit in San Diego, with 21 attendees
- 4th IETF, held at SRI in Menlo Park in October 1986 was the first one attended by vendors
- 5th IETF – concept of WG introduced
- 7th IETF – first one with > 100 attendees
- Internet Society formed in Jan 1992
- First IETF outside US in 2000 in Amsterdam,NL

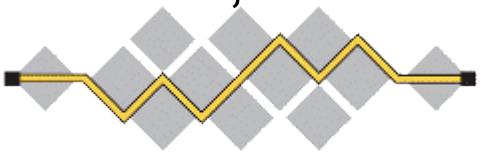
The 7 Areas

- Applications and Real-time (ART)
- General Area (GEN)
- Internet Area (INT)
- Operations and Management Area (OPS)
- Routing Area (RTG)
- Security Area (SEC)
- Transport Area (TSV)

Applications & Real-Time Area (art)

- Three (slightly overlapping) categories,
  - Protocols which handle delay-sensitive interpersonal communications via voice, video, instant messaging, presence, and other means ("real-time" applications and services) [Examples XMPP, WEBRTC]
  - Protocols more tolerant of delay, [Examples HTTP, email, and FTP]
  - Building blocks that are designed for use across a wide variety of applications and may be employed by both real-time and non-real-time applications, [Examples URI schemes, MIME types, authentication mechanisms, data formats, metrics, and codecs.]





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Internet Area (int)

- Includes IP layer (both IPv4 and Ipv6)
- Implications of IPv4 address depletion
- Co-existence between the IP versions, DNS, DHCP, host and router configuration, mobility, multihoming, identifier-locator separation,
- VPNs and pseudowires along with related MPLS issues, and various link layer technologies.
- Specifies how IP will run over new link layer protocols.

Transport (tsv)

- Focus on end-to-end transport
  - Protocols such as TCP, SCTP, DCCP, QUIC
  - Congestion managemnet schemes such as PCN, CONEX
  - Also includes stuff for congestion signaling and reporting, forward error correction, multicast, QoS and reservation signaling

Operations & Management (ops)

- The primary technical areas covered by the Operations & Management (OPS) Area include: Network Management, AAA, and various operational issues facing the Internet such as DNS operations, IPv6 operations, operational security and Routing operations.
- Two distinct areas
  - Network management and AAA (includes things such as NETCONF, SNMP, RADIUS, Diameter, and CAPWAP, and of data modeling and data modeling languages used in management such as SMI and YANG.)
  - Operations : Solicit feedback from ISPs/Network providers, incoporate them into existing protocols and also recommend BCPs. There is some overlap with other areas.

Security Area (sec)

- Focus is on security protocols and also security aspects of protocols in other areas
- Provides security mechanism and services for
  - Integrity
  - Non-repudiation
  - Confidentiality
  - Access control
  - Authentication
  - Key Management
  - Encryption
- Overlaps quite frequently with other areas for security considerations as well.

Routing (rtg)

- The Routing Area is responsible for ensuring continuous operation of the Internet routing system by maintaining the scalability and stability characteristics of the existing routing protocols, as well as developing new protocols, extensions, and bug fixes in a timely manner.
- Includes topics such as
  - Forwarding methods (such as destination-based unicast and multicast forwarding, MPLS, and pseudowire)
  - Routing and signalling protocols (such as OSPF, IS-IS, BGP, RSVP-TE, LDP, PIM, L1-, L2-, and L3-VPNs)
  - Path Computation
  - Traffic Engineering

General (gen)

- The General Area consists of a few IETF WGs and other activities focused on supporting, updating and maintaining the IETF standards development process.
- As General AD, the IETF Chair manages the General Area Review Team (Gen-ART) and other IETF-wide directorates.

Acronyms Acronyms Acronyms

- AD : Area Director
- BCP : Best Current Practice
- BOF : Birds of a Feather
- IAB : Internet Architecture Board
- IAD : IETF Administrative Director
- IANA : Internet Assigned Numbers Authority
- IAOC : IETF Administrative Oversight Committee
- IASA : IETF Administrative Support Activity

Acronyms Acronyms Acronyms

- ICANN : Internet Corporation for Assigned Names & Numbers
- I-D : Internet-Draft
- IESG : Internet Engineering Steering Group
- IETF : Internet Engineering Task Force
- IRTF : Internet Research Task Force
- ISOC : Internet Society
- RFC : Request for Comments
- STD : Standard (RFC)
- WG : Working Group

Working Groups

- Working group is a group of people interesting in standardisation in a certain narrow area
- A WG is really just a mailing list with a bit of adult supervision.
- It is also the “unit” around which the IETF meeting and mailing list discussion is arranged.
- Anyone can join a WG (just join the Mailing list)
- Produced drafts for consideration of WG participants

Typical working group meetings

- Role of WG chairs – Volunteers herding cats
- WG charters
- “Note Well”
- No formal voting (but “Humming”) - Rough consensus
- Working group drafts
- “Blue Sheets”
- “Document Shepherd”
- WG meetings
- Interim Meetings / Virtual Interim meetings

Typical Working group meeting

- Submit drafts to WG chair before meeting for inclusion on agenda
- Presentations
- WG discussions (some personal experiences)
- Lining up at the Mic
- Remote participation via Jabber/Meetecho
- Typical duration from 1 to 2.5 hours

Typical IETF meetings

- WG Meetings (the core)
- Plenaries (Technical and Administrative)
- Adjacent events
  - Hackathon / Code Sprints
  - Bits-N-Bytes
  - Welcome receptions
  - Tutorials
  - ISOC events
  - IETF Socials
  - Side Meeting

Typical Journey of a working group

- Discussion amongst participants internal or external – Side meetings
- A Bar BoF or non-WG-forming BoF
- “Official” BoF
- Chartering of the WG
- Scheduling of meetings
- Adopting, Reviewing and Publishing Drafts
- Dissolution of Working group

Journey from a idea to an RFC

- Discussing and Writing an I-D
- Receive comments on the draft
- Review process in WG / mailing lists
- WG Adoption (not always necessary)
- Independent Submission
- WG Review (and possibly Directorate reviews)
- WGLC
- IETF / IESG Review LC
- RFC Editor
- Publication

A note on ISOC and IESG

- Role of ISOC
  - Financial and legal support for IETF
  - Home base of IETF Administrative staff
  - Supports IETF tools such as datatracker
  - RFC-Editor / IETF Secretariat
- Role of IESG
  - Consists of ADs from different IETF areas (Selected by Nomcom)
  - Have an good understanding of their areas
  - Provides technical oversight for Wgs/Drafts & cross-area reviews
  - Note on Area directorates

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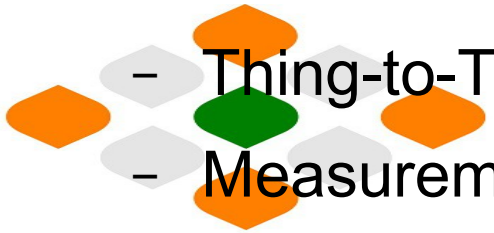
A note on IRTF

- Works on long-term research ideas and early implementations
- Significant participation from industry researchers & academia
- 2 differences between IRTF RGs & IETF WGs
  - IRTF groups are not trying to produce standards of any kind
  - Output of IRTF groups does not require consensus within the RG, or broad consensus from the IETF.
- Some currently active Rgs
  - Crypto Forum Research Group (CFRG)
  - Network Management Research Group (NMRG)
  - Thing-to-Thing Research Group (T2TRG)
  - Measurement & Analysis for Protocols RG (MAPRG)



Types of RFCs

- Proposed standards
- Internet standards (sometimes called "full standards")
- Best current practices (BCP) documents
- Informational documents
- Experimental documents
- Historic documents

- IMPORTANT : Not all RFCs are standards

How to effectively participate in IETF

- Follow and comment on the mailing lists
- Read the drafts and references
- Review the drafts of WG particpants
- Attend an IETF meeting physically
  - Registration
  - Side events (Plenary, Bit-N-Bites,Hackathon)
  - Mentoring Program
  - ISOC Fellowship to the IETF
  - IIREF Fellowship (for Indians)
- Participate remotely (Remote Hubs)

Normative Language RFC 2119

- Words like MUST, SHOULD, MIGHT have specific meanings in the context of RFCS
- Some examples (RFC 7231 – HTTP/1.1
  - An HTTP sender **MAY** generate, and a recipient **MUST** be able to parse, line breaks in text media that consist of CRLF, bare CR, or bare LF.
  - A sender that generates a message containing a payload body **SHOULD** generate a Content-Type header field in that message unless the intended media type of the enclosed representation is unknown to the sender.
  - All general-purpose servers **MUST** support the methods GET and HEAD. All other methods are **OPTIONAL**.

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Structure of a typical I-D

- Introduction
- Table of contents
- IANA considerations
- Security considerations
- Note on IPR

Tools

- IETF tools
- IETF datatracker
- Remote participation via MEETECHO
- Participating on mailing lists
- Ref : https://www.ietf.org/ietf-ftp/1id-guidelines.txt

How to write and submit an I-D

- Overview of formats
- NROFF, XML, MSWORD
- Checking references

Writing an I-D DEMO

- Demo using .NROFF format (using NROFF EDIT)
- Demo using XML (using xml2rfc python tool)
- Submission and checking online on IETF site for Nits

Updates and Hot Topics (IETF99)

- BANdwidth Aggregation for interNet Access (BANANA) – WG forming BoF. BANANA is concerned with providing coordinated Internet Access to a device over multiple links of different types to allow for increased bandwidth utilization, load-balancing and/or higher reliability.

Updates and Hot Topics (IETF99)

- IDentity Enabled Networks (IDEAS) - WG forming BoF. The goal of this work is to standardize a framework that provides identity-based services that can be used by any identifier-location separation protocol. The new requirements driving this framework go beyond the traditional discovery service and mapping of identifier-to-location for packet delivery.

Updates and Hot Topics (IETF99)

- Network Slicing (NETSLICING) will be having a non-working-group-forming BOF. a “network slice” is conceptualized as a logical network comprised of the union of resources (connectivity, storage, computing), network functions, and service functions. Network slicing is a concept garnering much attention as part of 5G standardization and development efforts.

Updates and Hot Topics (IETF99)

- QUIC – Work 'quic'-ly progressing in drafts https://github.com/quicwg/base-drafts/wiki/Second-Implementation-Draft

- 5G standardisaton efforts

References

- Tao of the IETF - https://www.ietf.org/tao.html
- IETF Newcomers - https://www.ietf.org/newcomers.html
- IETF standards process - https://www.ietf.org/about/process-docs.html
- IETF Community India - https://www.ietf.org/mailman/listinfo/ietf-community-india
- Tussle in cyberspace - http://david.choffnes.com/classes/cs4700fa14/pape

Q&A