IETF Structure and Internet Standards Process

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Agenda

IETF history & overview
IETF Purpose
how work gets done
IETF role & scope
IETF structure & associated groups
IETF management & selection
IETF process & procedure
a working group session
intellectual property rights (IPR)

The IETF
Internet Engineering Task Force
formed in 1986
expansion of US ARPANET-related government activities
Internet Configuration Control Board (ICCB) (1979) and Internet Activities Board (1983)
was not considered important for a long time - good!!
not "government approved" (US or other) - great!!
although funding support from U.S. Government until 1997
people not companies
“We reject kings, presidents and voting. We believe in rough consensus and running code”
Dave Clark (1992)

IETF Overview

Internet Standards R Us
most Internet-related standards were developed by, or are maintained by, the IETF
not including physical network or page display standards
does not exist (in a legal sense), no members, no voting
The IETF is “an organized activity of the Internet Society”
1K to 1.5K people at 3/year meetings
many, many more on mail lists

IETF Meeting Attendance

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
IETF produces standards and other documents
IETF “Standards”

IETF standards: not ‘because we say so’ standards
they are standards only if people use them
formal SDOs can create legally mandated standards
IETF standards are published in “RFCs”
no formal recognition for IETF standards
by governments or “approved” standards organization
but some government standards refer to IETF standards
lack of formal government input “a problem”
at least to some governments
no submitting to “traditional” standards bodies

IETF Work Team

129ish Working Groups
Working Group Chairs: manage working group
Document Editors: edit individual documents
8 Areas, each with Area Directors (ADs)
APS, GEN, INT, O&M, RAI, RTG, SEC, TSV
IETF Chair: AD for General Area, chief spokesperson
Internet Engineering Steering Group (IESG): technical review, process management (ADs + IETF Chair)
Internet Architecture Board (IAB): architectural guidance & liaisons

Area Directors

Areas have 2 ADs
except General Area, which has one
responsible for setting direction in Area
responsible for managing process in Area
approve BOFs & propose working groups
ensure working groups follow proper process
have authority to change working group management
generally with IESG consultation
review working group documents prior to IESG review

IESG

Internet Engineering Steering Group
ADs + IETF Chair (15 members)
multi-disciplinary technical review group
provides cross-area pre-publication technical review of IETF RFCs
approves publication of IETF documents
reviews and comments on non-IETF RFC submissions
manages IETF process
approves WG creation (with IAB & community advice)
part of appeal chain

How the IETF Work Gets Done

generally, IETF technology development is done in Working Groups
but can be an individual effort
proposal published as a working document
“Internet Draft”
working document revised & republished based on discussion
working document submitted to IESG via AD
AD performs technical and process review of document
returns document with comments if AD finds issues

How the IETF Work Gets Done, contd.

when AD satisfied, the IESG issues IETF-wide “Last Call” for comments
IESG performs interdisciplinary technical review of proposal & reviews Last-Call comments
returns document to WG with comments if IESG finds issues
when IESG satisfied, the document sent to RFC Editor for publication as RFC
**Birds of a Feather Sessions (BOF)**

Often precedes the formation of a Working Group

- A group of people interested in a topic convince an AD that they have a good idea - one worth exploring & that there are enough interested people to do the work
- Need description and agenda before a BOF can be scheduled
- Sometimes a draft charter for a working group
- BOFs generally only meet once
- Can lead to a WG or can be a one-time thing

**Working Groups**

This is where the IETF primarily get its work done

- Most discussions on a WG mailing list
- Face-to-face meetings focused on key issues (ideally)
- Note: face-to-face meetings generally quite short

"Bottoms up"

- i.e., generally proposed by IETF participants, not ADs, IESG or IETF Chair
- Makes it hard for the IETF leadership to commit the IETF to do something
- Often preceded by a BOF

**Working Groups, contd.**

Working Groups are focused by charters agreed between WG chair(s) and area director

- Restrictive charters with milestones
- Charter approved by IESG with IAB advice
- After public announcement for comments
- Announcement goes to other SDOs to check for overlaps
- IESG has final say on charter
- Working groups are closed when their work is done at least in theory

**Working Group Creation**

- May have BOF
- Chair, description, goals and milestones
- Area Director
- IESG
- IAB
- Working group created

**A Working Group Session**

- WGs only meet for a few hours at an IETF meeting
- Most working group work is done on the WG mailing list
- Often only specific unresolved issues are discussed at meetings
- So read the IDs and mailing list before the session
- Advice: listen (and read) before speaking
- Sessions are being streamed & recorded
- So speak directly into the mike (don’t look at the questioner)
- Say your name - every time you get to the mike
- For the people in audio-land & for the scribe(s)
- Sign the “blue sheets”
- Record of who is in the room - required for openness
- Scanned & posted - original not retained

**Rough Consensus**

- No defined IETF membership - just “participants”
- “Rough consensus and running code…”
- Does not require unanimity
- But should ensure that everyone has their say
- No formal voting (can not define the constituency)
- Can do show of hands or hum - but no count
- Disputes resolved by discussion on mailing list and in face-to-face meetings
- Final decisions must be verified on mailing list to ensure those not present at face-to-face are included but taking into account face-to-face discussion
IETF Documents

all IETF documents are open
i.e., anyone can download and make copies (in full)

Internet Draft
IETF working documents
some I-Ds are working group documents

RFC
archival publications (never changed once published)
update or correction gets new RFC number

IETF Document Format

English is the official language of the IETF
but blanket permission is given to translate any IETF document
(in total) into any language for any reason

ASCII is the mailing list and general document format
Moving to a XML-based authoritative format for documents
will still produce pure-text versions
note that the current format is still readable after 44 years
(see RFC 20 for an example)
how many other SDOs can claim that?

Internet-Draft

IETF working documents
random or non-random thoughts
input to the process
no admissions control other than boilerplate (see IPR)
removed from the main IETF Internet Drafts directory
after 6 months or upon replacement
all RFCs must pre-exist as IDs
( other than some IANA or RFC Editor created ones)

Internet Draft (ID) Naming

ID filename used to classify Internet Drafts
all ID filenames start with “draft-”
individual IDs continue with the last name of the lead
author/editor and, often, the name of the working
group the ID is targeted at
Working Group IDs continue with “ietf-WGNAME”
filename continues with subject
filename continues with version number
initial version “00”
filename ends with “.txt” extension

Internet Draft (ID) Naming, contd.

examples:
draft-ietf-idr-bgp4-26.txt
26th revision of the BGPv4 specification
a product of the Interdomain Routing Working Group
draft-bradner-rfc3979bis-06.txt
6th revision of my proposed update to RFC 3979
not a working group document
draft-lab/rfcformatreq-03.txt
3rd revision of an IAB document on requirements for the
formats of RFCs

What is a RFC?

IETF document publication series
RFC used to stand for “Request for Comments”
now just a ( brand ) name
now tend to be more formal documents than early RFCs
RFC 1 Host Software - Apr 7 1969
now over 7000 RFCs
not all RFCs are standards!
see RFC 1796
though some vendors sometimes imply otherwise
many types of RFCs
**RFC Repository Contains:**

- standards track
- OSPF, IPv6, IPsec...
- obsolete Standards
- RIPv1
- requirements
- Host Requirements
- policies
- Classless InterDomain Routing
- April Fool’s Day jokes
- IP on Avian Carriers
- ... updated for QoS

诗歌
- Twas the night before startup

- white papers
  - On packet switches with infinite storage

- corporate documentation
  - Ascend multilink protocol

- experimental history
- Nebbit

**Standards Track RFCs:**

**Best Current Practices (BCP)**
- policies or procedures (best way we know how)
- 2-stage standards track (changed 2011 - RFC 6410)
  - Proposed Standard (PS)
    - good idea, no known problems
  - Internet Standard (STD)
    - PS + stable + "benefit to Internet community"
    - multiple interoperable implementations to prove document clarity

**Experimental**
- good idea, no known problems

**Historical**
- multiple interoperable implementations to prove document clarity
  - note: Interoperability, not conformance

**Other RFC Types**

- Informational
- Experimental
- Historical

**always check the current status of an RFC before relying on it. A new RFC may have obsoleted or updated the one you are looking at, or it may have been reclassified as Historical**

- you can find out by looking at the RFC index
- remember that RFCs are not changed after publication - so no status change notice put in RFC

**RFC Editor**

- IETF publication arm
- was one person, then one small team
- now multiple parts
  - oversight (RFC Series Editor - RSE)
  - editing (RFC Production) - done by AMS
  - publishing (RFC Publisher) - done by AMS
  - independent submissions (Independent Submissions Editor - ISE)
  - RSE & ISE selected & appointed by IAB

**RFC Production & Publishing**

- receives requests to publish IDs from multiple streams
  - IETF (via IESG)
  - IRTF (via IRSG)
  - IAB
  - Independent Submissions (via ISE)
- edits IDs for publication
- verify edits with authors
- publishes RFCs
Independent Submissions Editor

ISE gets requests to publish IDs
- can only publish informational or experimental RFCs
- asks IESG for advice
- but can exercise own discretion to publish or not
- presumption is to publish technically competent and useful IDs
- which sometimes is a conflict with IESG

IETF Submissions

Working group doc, or individual standards track doc
- Submit
- IESG
- "Last Call"
- IETF Community
- RFC Publisher
- maybe
- Concerns, suggestions
- RFC Production
- Published RFC

Non-IETF Submissions

Individual
- Submit
- Independent Submissions Editor
- maybe
- RFC Production
- RFC Publisher
- Published RFC

(The IAB & IRTF have their own procedures)

The Role & Scope of the IETF

‘above the wire and below the application’
- IP, TCP, email, routing, IPv6, HTTP, FTP, ssh, LDAP,
  SIP, mobile IP, PPP, RADIUS, Kerberos, secure email,
  streaming video & audio, ...
- but wires are getting fuzzy
  MPLS, GMPLS, PWE3, VPN, ...
- generally hard to clearly define IETF scope
- IETF is constantly exploring the edges
  e.g. (IP) telephony

Scope of Other SDOs

the Internet (& the Internet protocols) are very interesting
to other standards development organizations (SDO)

Internet is becoming the underpinnings of the entire world
telecommunications business

other SDOs trying “fix” or “extend” IETF protocols
- they may be trying to solve a different problem
- or are making different assumptions
- problem: what happens when these extensions break
  underlying protocol assumptions or make non-interoperable versions?

SDO (including IETF) assumption: each SDO modifies its own protocols
- but, see dispute with ITU-T over MPLS for transport

Top Level View of IETF Organization

IAB
IANA
IRTF
RFC
area
area
area
area

"the IETF"
The Internet Society (ISOC)
non-profit, non-governmental, independent, international
organization
more than 153 organizational members, more than 66,000
individual members & over 107 chapters in 72 countries
formed 1992 to
provide legal umbrella over IETF
continue Landweber developing country workshops
mission:
"To promote the open development, evolution, and
use of the Internet for the benefit of all people
throughout the world."
join at www.isoc.org

ISOC, contd.
IETF agreed to come under ISOC legal umbrella in 1996
after a (long) open working-group-based discussion
ISOC is now the organizational and administrative home
for IETF (as of 2005)
legal umbrella, insurance, IASA home, IAD employer, etc.
ISOC Board of Trustees part of appeal chain
ISOC President appoints chair of nomcom
IAB chartered by ISOC
ISOC President is on the IAB list & calls
IETF (through IAB) appoints 4 ISOC trustees

Internet Research Task Force (IRTF)
focused on long term problems in Internet
Crypto Forum Research Group (CFRG)
Delay-Tolerant Networking Research Group (DTNRG)
Global Access to the Internet for All Research Group (GAIA)
Internet Congestion Control Research Group (ICCRG)
Information Centric Networking Research Group (ICNRG)
Network Coding Research Group (NWCRG)
Network Management Research Group (NMRG)
Software-Defined Network Research Group (SDNRG)
Plus two proposed research groups
* Meeting this week

Internet Architecture Board (IAB)
provides overall architectural advice & oversight
to IESG, IETF, IRTF & ISOC
deals with IETF external liaisons
appoints IRTF chair
selects & oversees IETF-IANA
appoints & oversees RFC Editor
chartered by & advises the ISOC Board
approves IESG slate from nomcom
step in appeals chain

IAB, contd.
provide input to IESG on WG formation & charters
sponsor & organize IRTF
convene topic-specific workshops
mostly invitation only
write IDs/RFCs stating IAB opinion
with community & IESG review
participate in WG discussions
IAB activities organized in “programs”
IAB members plus others to ensure continuity
http://www.iab.org/activities/programs/

IANA
Internet Assigned Number Authority
need to record parameters in IETF protocols
assigns numbers and keeps them from colliding
assigns protocol numbers (ports, MIME types, etc)
IP addresses
assigns address blocks to 5 regional IP Address registries
which assign addresses to ISPs and end sites
domain names
defines top level domains (TLDs) - e.g., .com, .ca, .us, ...
maintains root server database of TLD server addresses
the IANA predates the IETF

IETF
IANA, contd.
Internet Drafts need to include a "IANA Considerations" section. This section tells the IANA what assignment actions are needed if an ID is to be published as a RFC. The IANA can say "no IANA actions required" see RFC 5226 for details. The IANA reviews IDs during the IESG consideration phase to see if any IANA actions required prior to publication.

IETF Management
IETF management are all volunteers:
- AD job: half to 3/4 time
- IAB job: 1/3 time
- IETF Chair job: full time
IETF does not pay ADs, IAB members, IAOC members, WG chairs or IETF Chair a salary or expenses. People are company- or self-supported, secretariat, RFC publication support & IAD are paid.

IETF Secretariat
Association Management Solutions, LLC - Fremont, CA, USA
Managed by the IETF Administrative Support Activity (IASA)
Runs plenary meetings, mailing lists, Internet-Draft & directory, IESG teleconferences, REF editing & publication.
Coordinates day to day work of IESG.

IETF Administrative Support Activity (IASA)
Provides the administrative structure required to support the IETF standards process: see RFCs 4071 & 4371
Has no authority over the standards process housed within the Internet Society.
Creates budget for IETF
Sells meeting fees, meeting-related sponsors & from ISOC
Responsible for IETF finances
Contracts for IETF support functions
Secretariat functions, RFC evaluation and publication & IETF-IANA deals with IETF IPR.

IASA, contd.
Includes:
- IETF Administrative Director (IAD) - Ray Pelletier
- ISOC employee
- Day to day operations oversight
- IETF Administrative Oversight Committee (IAOC)
- 8-member body
- IAB & IETF chairs & ISOC president
- Plus members selected by nomcom (2), IAB, IESG & ISOC

IETF Trust
Created in Dec 2005 to hold IETF IPR
Copyrights (on RFCs etc)
Domain names (e.g., ietf.org)
Trademarks
Software paid for by IETF
Databases
IPR created under the secretariat contract goes to Trust
The IETF Trust is not a patent pool
Legal Provisions Relating to IETF Documents
http://trustee.ietf.org/license-info/IETF-TLP-4.htm
Selecting IETF Management

picked by a nominations committee (nomcom)
nomcom chair appointed by ISOC president
process described in RFC 3777
members selected randomly from list of volunteers
requirement: present at 3 of last 5 IETF meetings
very random process to select from volunteers: RFC 3797
gets list of jobs to fill
can include IETF Chair, IESG, IAB & IAOC members
nominate one person for each job
IAOC selections approved by IESG, IESG & IETF Chair
selections approved by IAB, IAB selections approved by ISOC BoT

Appeals Process

IETF decisions can be appealed
start level above decision being appealed
1st to the WG chair(s)
only then to the Area Director
only then to the IESG
only then to the IAB
if claim is that the process itself is broken, (not that the process was not followed)
then an appeal can be made to the ISOC Board (after the above is complete)
it is OK to appeal decisions – people do (& succeed)
but appeals are not quick
starting "low" is the right thing to do

Intellectual Property Rights

IPR is a very big issue in standards bodies
two areas:
copyright in documents
patents covering standards technology

IPR (Copyright)

ID author(s) need to give non-exclusive publication rights to IETF Trust if to be published at all
also (normally) the right to make derivative works
this right required for standards track documents
author(s) retain all other rights

Rules described in RFC 5378
IETF Trust released a FAQ on IETF copyright
see http://trustee.ietf.org/faqs.html

IPR (Patents)

IETF IPR (patent) rules (in RFC 3979)
require timely disclosure of your own IPR in your own submissions & submissions of others
disclosures published on IETF web site
"reasonably and personally" known to the WG participant - i.e., no patent search required
WG may take IPR into account when choosing solution
RFC 3669 gives background and guidance
push from open source people for RF-only process
consensus to not change to mandatory RF-only
but many WGs tend to want RF or IPR-free
(or at least assumed to be IPR-free)
update in the works
Note Well
The “Note Well” statement shows up a lot at the IETF. Mailing lists, registration, meeting openings, etc.
defines "contribution" and requires obeying IETF rules. In effect, a "contribution" is anything you say or write with the intent to effect the IETF standards process. If you make a contribution that includes or relates to your IPR you must disclose that fact. Note Well note is undergoing revision – big discussion on IETF discussion mailing list.

IETF Mentoring Program
match experienced IETF participants with newcomers to aid newcomer integration into the IETF community through advice, help, and collected wisdom for more information or to request a mentor see: http://www.ietf.org/resources/mentoring-program.html

Other IETF Training/Tutorials
1300 – 1450 Newcomer’s Orientation <- you are here
1300 – 1450 Introduction to the Security Area
1500 – 1650 YANG Advice and Editing Session
1500 – 1650 Presentation Skills
1600 – 1700 Newcomer’s Meet and Greet newcomers, WG chairs & ADs
1700 – 1900 Welcome Reception (talking to IETF people is often quite an education!)

Newcomer’s Dinner
informal dinner for new comer’s to chat about their experience meet at the IETF registration desk at 8 PM Monday walk to nearby reasonably priced restaurant please email Maddy Conner (mconner@amsi.com) if you would like to attend or for more information

What next?
join mailing lists this is where the work happens but read (and understand) before writing read the drafts & contribute don’t be shy (but do not come on too strong) talk with (not just to) people treat everyone with respect, even if you disagree look for common ground don’t settle for second-rate discussion or technology

Questions?