IETF Structure and Internet Standards Process

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Vancouver, BC, Canada
Agenda

IETF history & overview
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

evolved out 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 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 Work Team

126ish working groups (WGs) (where the stuff happens)
   anyone can participate in WGs
8 areas (for organizational convenience) with Area Directors (ADs)
   APS, GEN, INT, O&M, RAI, RTG, SEC, TSV
Internet Engineering Steering Group (IESG): management (ADs + IETF Chair)
Internet Architecture Board (IAB): architectural guidance & liaisons
IETF produces standards and other documents
IETF “Standards”

IETF standards: not standards “because we say so” they are standards only if people use them

formal SDOs can create legally mandated standards

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
The Role & Scope of the IETF

‘above the wire and below the application’

IP, TCP, email, routing, IPsec, 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 past dispute with ITU-T over MPLS for transport
Top Level View of IETF Organization

- Internet Society
- IAB
- IASA
- IAD
- IESG
- IANA
- RFC
- area
- area
- area

"the IETF"
The Internet Society (ISOC)

non-profit, non-governmental, independent, international organization
more than 130 organizational members & more than 55,000 individual members & about 90 chapters in 72 countries
formed 1992 to:
provide legal umbrella over IETF
continue Landwebber developing country workshops
now:
“dedicated to ensuring the open development, evolution and use of the Internet for the benefit of people throughout the world”

join at www.isoc.org
ISOC, contd.

IETF agreed to come under ISOC umbrella in 1996 after an open working-group-based discussion.
ISOC is now the organizational and administrative home for IETF:
- 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 3 ISOC trustees
Internet Research Task Force (IRTF)

focused on long term problems in Internet
Anti-Spam Research Group (ASRG)
Crypto Forum Research Group (CFRG)
Delay-Tolerant Networking Research Group (DTNRG)
Host Identity Protocol (HIP) Research Group (HIPRG)
Internet Congestion Control Research Group (ICCRG)
Information Centric Networking Research Group (ICNRG)
Network Complexity Research Group (NCRG)
Network Management Research Group (NMRG)
IRTF, contd.

Peer-to-Peer Research Group (P2PRG)
Routing Research Group (RRG)
Scalable Adaptive Multicast Research Group (SAMRG)

IRTF chair appointed by IAB
for more information see http://www.irtf.org

IRTF Chair: Lars Eggert
Internet Architecture Board (IAB)

provides overall architectural advice & oversight to IESG, IETF & ISOC
approves IESG slate from nomcom
step in appeals chain
provides “oversight” of IETF standards process
deals with IETF external liaisons
appoints IRTF chair
selects IETF-IANA
appoints & oversees RFC Editor
chartered by the ISOC
IAB Oversight Mechanisms

- review BOFs
- provide input to IESG on WG formation & charters
- sponsor & organize IRTF
- convene topic-specific workshops
  - mostly invitation only
- organize ad-hoc expert groups to adjudicate technical disputes
- write IDs/RFCs stating IAB opinion
  - with community & IESG review
- participate in WG discussions
Internet Assigned Number Authority (IANA)

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
IANA Contd.

functions generally came under IETF after IETF was formed
funded by US government until 1998
functions split from IETF with the creation of Internet Corporation for Assigned Names and Numbers (ICANN) in 1998
independent corporation, took over IANA functions
now IETF-IANA and non-IETF-IANA
separate US government contract with ICANN for IANA functions
0$ RFP for IANA functions (re)issued by US government in April 2012
award expected expected later this year
IETF-IANA

operates under MoU between ICANN and IETF
RFC 2860
assigns protocol parameters for IETF protocols
but not funded by IETF
IP protocol numbers
   well known TCP/UDP ports
   PPP protocol ids
   MIME types
   special use IP addresses
   etc.
IETF Management

IETF Chair

AD for General Area, chief spokesperson

Area Directors (ADs)

manage individual areas (two per regular area)

Internet Engineering Steering Group (IESG)

ADs + IETF Chair sitting as a body

Internet Architecture Board

IETF chair is part of IAB

IETF management selected by nomcom

two year terms
IETF Management, contd.

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 Chair

Russ Housley <chair@ietf.org>
also chair of the IESG
also AD of the General Area
also ex officio member of the IAB

nominated by IETF community - this now includes you
selected by nomcom

IETF’s “CTO” - “Chief Talking (& Traveling) Officer”
Area Directors (ADs)

Areas have 2 ADs
  except General Area

responsible for setting direction in Area
responsible for managing process in Area
approve BOFs & propose working groups
review working group documents
prior to IESG review
IESG

Internet Engineering Steering Group
ADs + IETF Chair

process management and RFC approval body
approves WG creation (with IAB advice)

provides cross-area technical review & approves
publication of IETF documents

reviews and comments on non-IETF RFC submissions

multi-disciplinary technical review group
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
IETF Areas

General Area (gen) - 0 WGs (as of 2/13/2012)
Applications (app) - 17 WGs
Internet (int) - 25 WGs
Operations & Management (ops) - 16 WGs
Real-time Applications and Infrastructure (rai) - 29 WGs
Routing (rtg) - 18 WGs
Security (sec) – 13 WGs
Transport Services (tsv) - 17 WGs
IETF Secretariat

Association Management Solutions, LLC - Fremont, CA, USA

managed by IETF Administrative Support Activity (IASA)

runs

  plenary meetings, mailing lists,
  Internet-Draft & directory, IESG teleconferences

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
money from meeting fees & from ISOC

responsible for IETF finances
contracts for IETF support functions
Secretariat functions, RFC evaluation and publication & IETF-IANA

deals with IETF IPR
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 (ex officio)

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
 etc

IPR created during secretariat contract goes to Trust
(not a patent pool)
Dots

- IAB member (red)
- IESG member (yellow)
- Working Group chair (blue)
- nomcom (orange)
- Local host (green)
- IAOC member (purple)

😊 IETFer specifically happy to help
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
sometimes preceded by a BOF
**Birds of a Feather Sessions (BOF)**

often precedes the formation of a Working Group

- group of people interested in a topic

- convince an AD that they have a good idea - one worth exploring & there are enough interested people to do the work

- need description and agenda before a BOF can be scheduled

  - and 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

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
- Working group created
- New-work & IETF Announce
- Community

- IAB
Working Groups. contd.

no defined membership
just participants

"Rough consensus and running code..."

no formal voting (can not define the constituency)
can do show of hands or hum - but no count
does not require unanimity
chair determines if there is consensus
disputes resolved by discussion
mailing list and 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 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 document format.

Constant discussion of alternate formats.

IETF seen as “behind the times” - e.g., (almost) no drawings - but no consensus on alternative format.

Note that the current format is still readable after 42 years (see RFC 20 for an example).

How many other SDOs can claim that?
Standards Process

technical proposals published as Internet Drafts (ID)
worked on in a Working Group
WG sends IESG request to publish an ID ‘when ready’
proposal reviewed by AD responsible for WG
can be sent back to working group for more work
2-week IETF-wide Last-Call
  4-week Last Call if individual standards track submission
IESG review
  last call comments + own technical review
can be sent back to Working Group for more work
publication as RFC
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
- many different types of RFCs
IETF Working Documents

Internet-Draft

random or non-random thoughts
input to the process

no admissions control other than boilerplate (see IPR)
in theory, removed from IETF ID directory after 6 months
   unless updated or under IESG consideration
   but many mirrors exist, including in IETF Tools

all RFCs must pre-exist as IDs
to deal with IPR handoff, etc
(other than some IANA or RFC Editor created ones)
What is a RFC?

RFC used to stand for “Request for Comments”
now just a (brand) name
now tend to be more formal documents than early RFCs

IETF document publication series
RFC 1 *Host Software* - Apr 7 1969
now over 6000 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...
- poetry
  - ‘Twas the night before startup
- white papers
  - On packet switches with infinite storage
- corporate documentation
  - Ascend multilink protocol (mp+)
- experimental history
  - Netblt
- process documents
  - IETF Standards Process
- ... updated for QoS
RFC Editor

IETF publication arm
was one person, then one function
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 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 Submission

Working group doc, or individual standards track doc

IESG

Concerns

RFC Production

RFC Publisher

Published RFC

Submit

“Last Call”

IETF Community Review

Comments, suggestions

maybe
Non-IETF Submissions

Submit

Content concerns and editorial details

Independent Submissions Editor

Comments

IESG

maybe

RFC Production

RFC Publisher

Published RFC

(The IAB & IRTF have their own procedures)
Standards Track RFCs:

Best Current Practices (BCP)
  policies & procedures (best way we know how)
3-stage standards track (not all that well followed)
  Proposed Standard (PS)
    good idea, no known problems
  Draft Standard (DS)
    PS + stable
    multiple interoperable implementations to prove document clarity
    note: interoperability not conformance
  Internet Standard (STD)
    DS + wide use
Standards Track RFCs:

Best Current Practices (BCP)
  policies or procedures (best way we know how)
2-stage standards track (changed Oct 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
    note: interoperability not conformance
Other RFC Types

Informational
Experimental
Historical

“The Internet runs on proposed standards” – perhaps first said by Fred Baker, IETF Chair 1996-2001

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

you can find out by looking at the RFC index
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
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
retained but not published
Intellectual Property Rights

IPR is a very big issue in standards bodies
what to do if there is a patent on the technology
what about just a patent application?
what if you do not know until it’s already a standard
when you find out about a patent?

patent questions:
should you demand free rights to implement?
require “fair & non-discriminatory” licensing?
what if IPR claim is false?
  e.g., an attempt to block the standard
should the standards body evaluate validity of patents?
Patents - Issues

lots of patents in the world
some very good, some not so good

getting pressure from the open source folk for standards with no (known?) IPR

maybe in some parallel universe

see AU “Innovation Patent” AU 2001100012 A4 (8/01)
also U.S. Patent 5,443,036 (8/95)
IPR (Patents)

RFC 2026 revised IETF IPR rules
used to require “fair & non-discriminatory” licensing
standards could be blocked using old process
now use standards sequence to check for IPR issues
by requiring multiple implementations based on multiple
licenses to progress on standards track
but a worry about “submarine patents”
patent rules part of RFC 2026 replaced by RFC 3979 &
RFC 4879
mostly clarifications
IPR, contd.

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)
Patents, Cases

“your IPR” = an issued patent or a patent application that is owned directly or indirectly, by you or your employer or sponsor (if any) or that you otherwise have the right to license or assert

example cases:

A/ you want to submit an ID, some part of which covered by your IPR
B/ you see that someone from your company submitted an ID, or says something at a mic, some part of which covered by your IPR
C/ you discover your IPR that covers some part of a published ID or RFC from you or someone at your company

in these cases you or your company MUST make an IPR disclosure as soon as reasonably possible

Many companies insist that company lawyers do this.
Patents, Cases, contd.

example case:

D/ you find an ID or RFC submitted by someone else, some part of which covered by your IPR

two situations:

1/ you or someone from your employer or sponsor participates in any WG where the ID or RFC is discussed or otherwise participates in any discussion of the ID or RFC

in this situation you or your company MUST make an IPR disclosure as soon as reasonably possible

2/ situation #1 is not the case

in this situation, you SHOULD make an IPR disclosure as soon as reasonably possible
Patents, Cases, contd.

example case:

E/ you know of IPR, other than your own IPR, which covers some part of an ID or RFC

in this case you MAY make an IPR disclosure

the IETF Secretariat will attempt to contact the IPR holder and ask for an IPR disclosure statement

remember – by participating in the IETF, you are agreeing to abide by its IPR rules

if you are in any doubt, consult the WG chair and your employer’s legal experts – the IETF will not give legal advice
IPR (Copyright)

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
updated by RFC 5378
expanded rights granted to IETF Trust
issue with text copied from older IDs and RFCs
IETF Trust released a FAQ on IETF copyright
see http://trustee.ietf.org/faqs.html
Note Well (1)

The “Note Well” statement shows up a lot at the IETF. Mailing lists, registration, meeting openings, etc. defines “contribution” and requires obeying IETF rules.

“Any submission to the IETF intended by the Contributor for publication as all or part of an IETF Internet-Draft or RFC and any statement made within the context of an IETF activity is considered an "IETF Contribution".

continued ...
Note Well (2)

Such statements include oral statements in IETF sessions, as well as written and electronic communications made at any time or place, which are addressed to:

* The IETF plenary session
* The IESG, or any member thereof on behalf of the IESG
* Any IETF mailing list, including the IETF list itself, any working group or design team list, or any other list functioning under IETF auspices
* Any IETF working group or portion thereof
* The IAB or any member thereof on behalf of the IAB
* The RFC Editor or the Internet-Drafts function

continued ...
All IETF Contributions are subject to the rules of RFC 5378 and RFC 3979 (updated by RFC 4879).

Statements made outside of an IETF session, mailing list or other function, that are clearly not intended to be input to an IETF activity, group or function, are not IETF Contributions in the context of this notice.

Please consult RFC 5378 and RFC 3979 for details.

continued ...
Note Well (4)

A participant in any IETF activity is deemed to accept all IETF rules of process, as documented in Best Current Practices RFCs and IESG Statements.

A participant in any IETF activity acknowledges that written, audio and video records of meetings may be made and may be available to the public.”
Other IETF Training/Tutorials

1300 – 1450 Newcomer’s Training

1300 – 1450 Meetecho Tutorial

1300 – 1450 Network Configuration Management with NETCONF and YANG

1500 – 1650 Introduction to IETF Tools

1500 – 1650 Security

1600 – 1700 Newcomer's Meet and Greet

1700 – 1900 Welcome Reception

(talking to IETF people is often quite an education!)
Newcomer’s Dinner

informal dinner for newcomer’s to chat about their experience

meet at the IETF registration desk at 7:45 PM Monday

restaurant is within walking distance

email smccammon@amsl.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
look for common ground
don’t settle for second-rate discussion or technology
Questions?