IETF Structure and Internet Standards Process

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(Slides from Scott Bradner)

76th IETF
Hiroshima, Japan

Agenda

history & overview

role & scope

structure & associated groups

management & selection

process & procedure

working group session

IPR

The IETF

Internet Engineering Task Force

formed in 1986

- evolved out of US government activities
  - ARPA's Internet Configuration Control Board (ICCB) (1979) and Internet Activities Board (1983)

was not considered important for a long time - good!!

not government approved - great!!

- but 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

does not exist (in a legal sense), no members, no voting

The IETF is an organized activity of the Internet Society

1K to 2K people at 3/year meetings

many many more on mail lists

100-120 working groups (where the stuff happens)

8 areas (for organizational convenience) with ADs

APS, GEN, INT, O&M, RAI, RTG, SEC, TSV

IESG: management (ADs + IETF Chair)

IAB: architectural guidance & liaisons

IETF produces standards and other documents

IETF "Standards"

IETF standards: not standards "because we say so"

standards only when 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" 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, ...

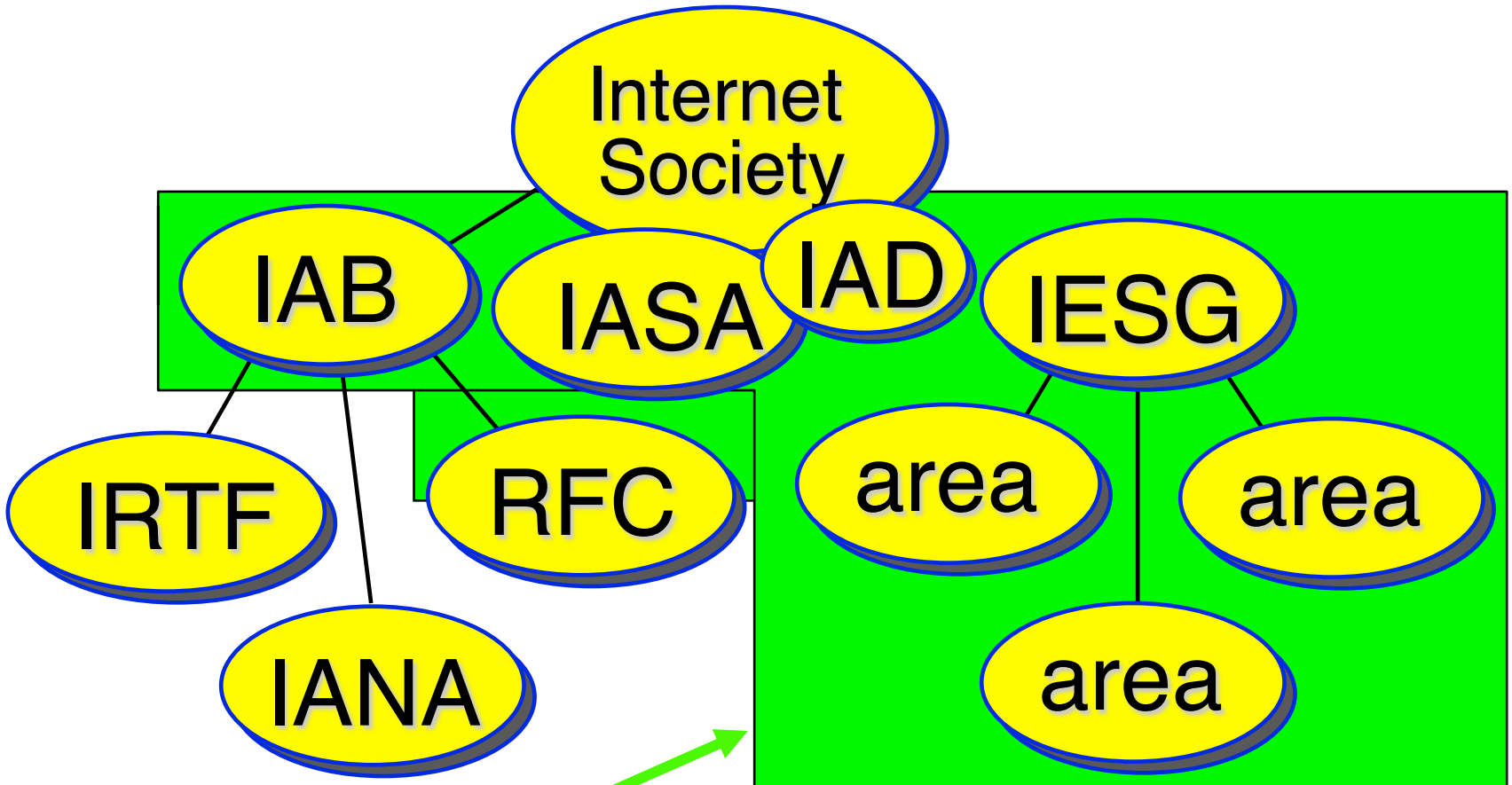
generally hard to clearly define IETF scope

IETF is constantly exploring the edges

Scope of Other SDOs

- Internet, and Internet protocols, are very interesting to other standards development organizations (SDO)
- 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 note to ITU-T
  - https://datatracker.ietf.org/public/liaison_detail.cgi?detail_id=127

Top Level View of IETF Organization



The Internet Society (ISOC)

- non-profit, non-governmental, independent & international, organization
  - more than 80 organizational members & more than 28,000 individual members in over 80 chapters around the world
- 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 Society™

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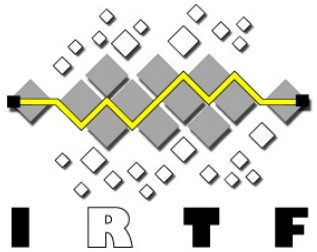
join at www.isoc.org

Internet Research Task Force (IRTF)



focused on long term problems in Internet

- Anti-Spam Research Group (ASRG)
- Crypto Forum Research Group (CRFG)
- Delay-Tolerant Networking Research Group (DTNRG)
- End-to-End Research Group
- Host Identity Protocol Research Group
- Internet Congestion Control Research Group
- IP Mobility Optimizations Research Group (MobOpts)
- Network Management Research Group

IRTF, contd.

- Peer-to-Peer Research Group (P2PRG)
- Public Key Next-Generation Research Group
- Routing Research Group
- Scalable Adaptive Multicast Research Group
- Transport Modeling Research Group

IRTF chair appointed by IAB

most groups are open, some are by invitation only

for more information see http://www.irtf.org

Internet Architecture Board (IAB)

provides overall architectural advice & oversight
to IESG, IETF, IRTF & 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 on architectural issues
  - community & IESG review
- participate in WG discussions

Internet Assigned Number Authority (IANA)

- assigns numbers and keeps them from colliding
  - protocol numbers (ports, MIME types, etc., in fact any sort of predefined parameter value)
  - IP addresses
    - mostly delegated to 5 regional IP Address registries
  - domain names
    - deals with top level domains (TLDs - e.g., .com, .ca, .us, ...)
    - mostly delegated to DNS name registries
- IANA predates IETF

IANA Contd.

- functioned sort of under IETF after IETF formed (1986)
  - but paid for by US government
- functions split from IETF with the creation of Internet Corporation for Assigned Names and Numbers (ICANN) in 1998
  - took over IANA functions under contract with US government
  - now IETF-IANA and non-IETF-IANA
  - US now releasing ICANN from direct oversight: soon to be independent corporation
  - separate US government contract with ICANN for IANA functions not going away for a while

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IETF-IANA

operates under MoU between ICANN and IETF

- RFC 2860

assigns protocol parameters for IETF protocols

- but not paid for by IETF

IP protocol numbers

- well known TCP/UDP ports
- PPP protocol ids
- MIME types
- etc.

IETF Management

- IETF Chair
  - AD for General Area, chief spokesperson
- Area Directors (ADs)
  - manage individual areas (two per area)
- Internet Engineering Steering Group (IESG)
  - ADs sitting as a body (includes IETF Chair)
- Internet Architecture Board
  - IETF chair also
- IETF Chair, ADs & IAB members selected by nomcom
  - two year terms

IETF Management, contd.

- 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
  - company or self-supported
  - secretariat personnel & 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 & working groups
    - charters then go to IESG & IAB for final approval
- 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 technical review & approves publication of IETF documents

reviews and comments on non-IETF submissions

multi-disciplinary technical review group

(* **that is, RFCs from the IETF**)

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: you were at 3 of last 5 IETF meetings
  - *very* random process to select from volunteers: RFC 3797
- gets list of jobs to fill from IETF chair
  - IETF Chair, IESG, IAB & IAOC members
- nominate one person for each job
    - IAOC approved by IESG, IESG & IETF Chair approved by IAB, IAB approved by ISOC BoT

IETF Areas

IETF Chair & AD for General Area (**gen**) - 0 WGs

Applications (**app**) - 13 WGs

Internet (**int**) - 30 WGs

Operations & Management (**ops**) - 15 WGs

Real-time Applications and Infrastructure (**rai**) - 17 WGs

Routing (**rtg**) - 15 WGs

Security (**sec**) - 17 WGs

Transport Services (**tsv**) - 13 WGs

IETF Secretariat

Association Management Solutions, LLC
Fremont, CA, USA

managed by IETF Administrative Support Activity (IASA)

runs

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

coordinates

- day to day work of IESG and working groups

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 Editor & 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 (ex offico)
    - plus
    - members selected by nomcom (2), IAB, IESG & ISOC

IETF Trust

created in Dec 2005 to hold IETF Intellectual Property Rights (IPR)

- copyrights (on RFCs etc)
- domain names (e.g., ietf.org)
- trademarks
- software paid for by IETF
- databases
- IPR created under secretariat contract
- etc

not a patent pool

Dots

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

Standards Procedure

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

- can be sent back to working group for more work

IETF Last-Call (4-week if no Working Group)

IESG review

- last call comments + own technical review
- can be sent back to Working Group for more work

publication as RFC

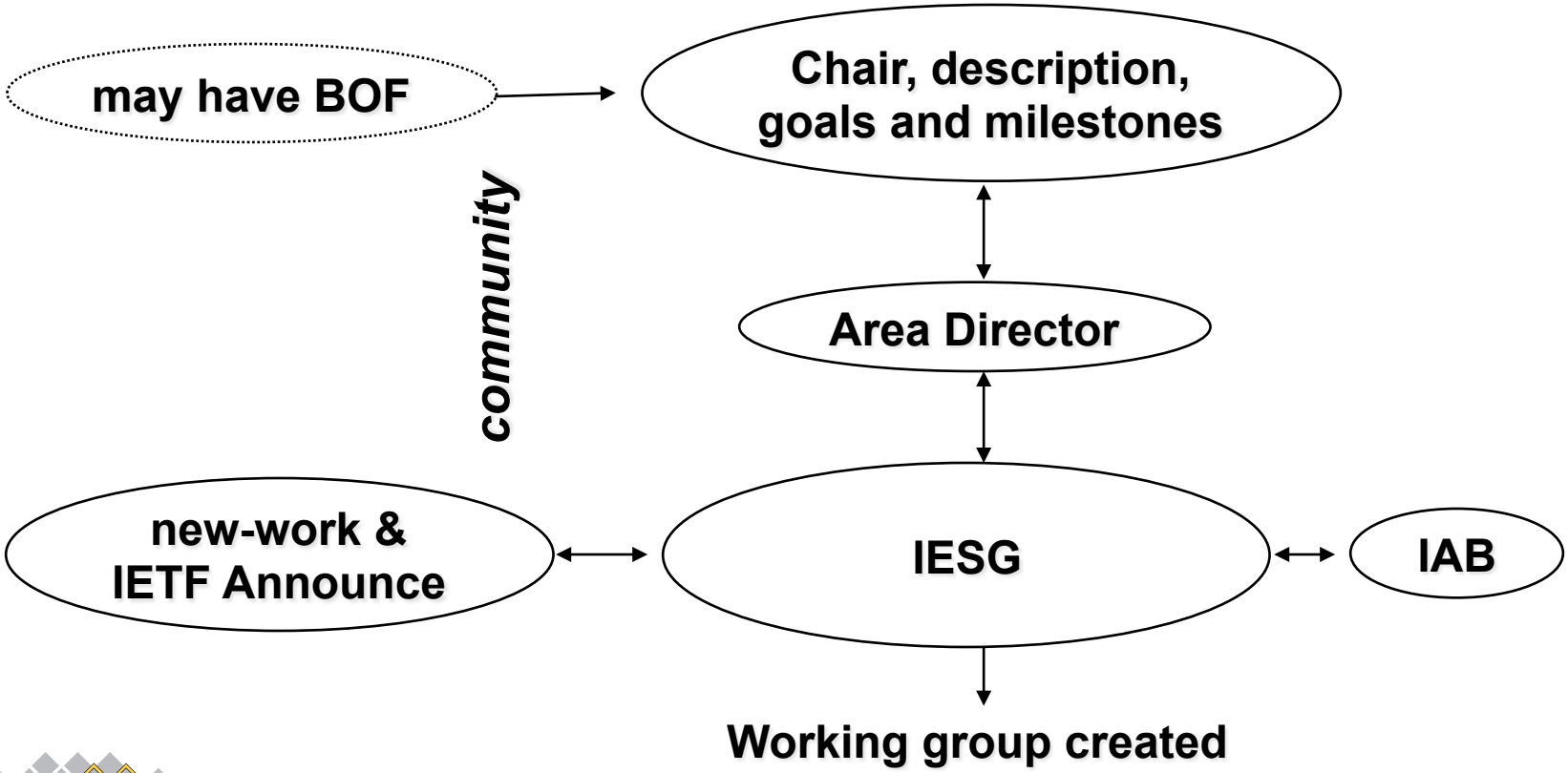
Birds of a Feather Sessions (BOF)

- 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
- 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 WG mailing list
  - face-to-face meetings focused on key issues (ideally)
    - note: face-to-face meetings generally quite short
- Working Groups are focused by charters agreed between WG chair(s) and area director
  - restrictive charters with milestones
  - working groups are closed when their work is done
- charter approved by IESG with IAB advice
- AD with IESG has final say on charter

Working Group Creation



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Working Groups. contd.

no defined membership

just participants

"***Rough consensus*** *and running code...*"

no formal voting - can not define 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 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 into any language

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 40 years (see RFC20 for example)

- how many other formats can claim that?

IETF Documents

all IETF documents are **open**

- i.e., anyone can download and make copies

Internet Draft (I-Ds)

- working documents
- **some** I-Ds are intended for IETF discussion
- **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 under IESG consideration
  - but many mirrors exist, including in IETF Tools
- all RFCs must pre-exist as IDs
  - to deal with IPR handoff
  - (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 5000 RFCs

not all RFCs are standards!

- see RFC 1796
- though some vendors 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
- 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

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RFC Editor

IETF publication arm

rfc-editor@rfc-editor.org http://www.rfc-editor.org

semi-independent

- gets requests to publish IETF IDs from IESG
- also gets requests to publish IRTF and independent IDs for informational or experimental RFCs
  - asks IESG for advice on publishing such RFCs
  - but can exercise own discretion
  - presumption is to publish technically competent IDs
    - which sometimes is a conflict with IESG

RFC Editor, contd.

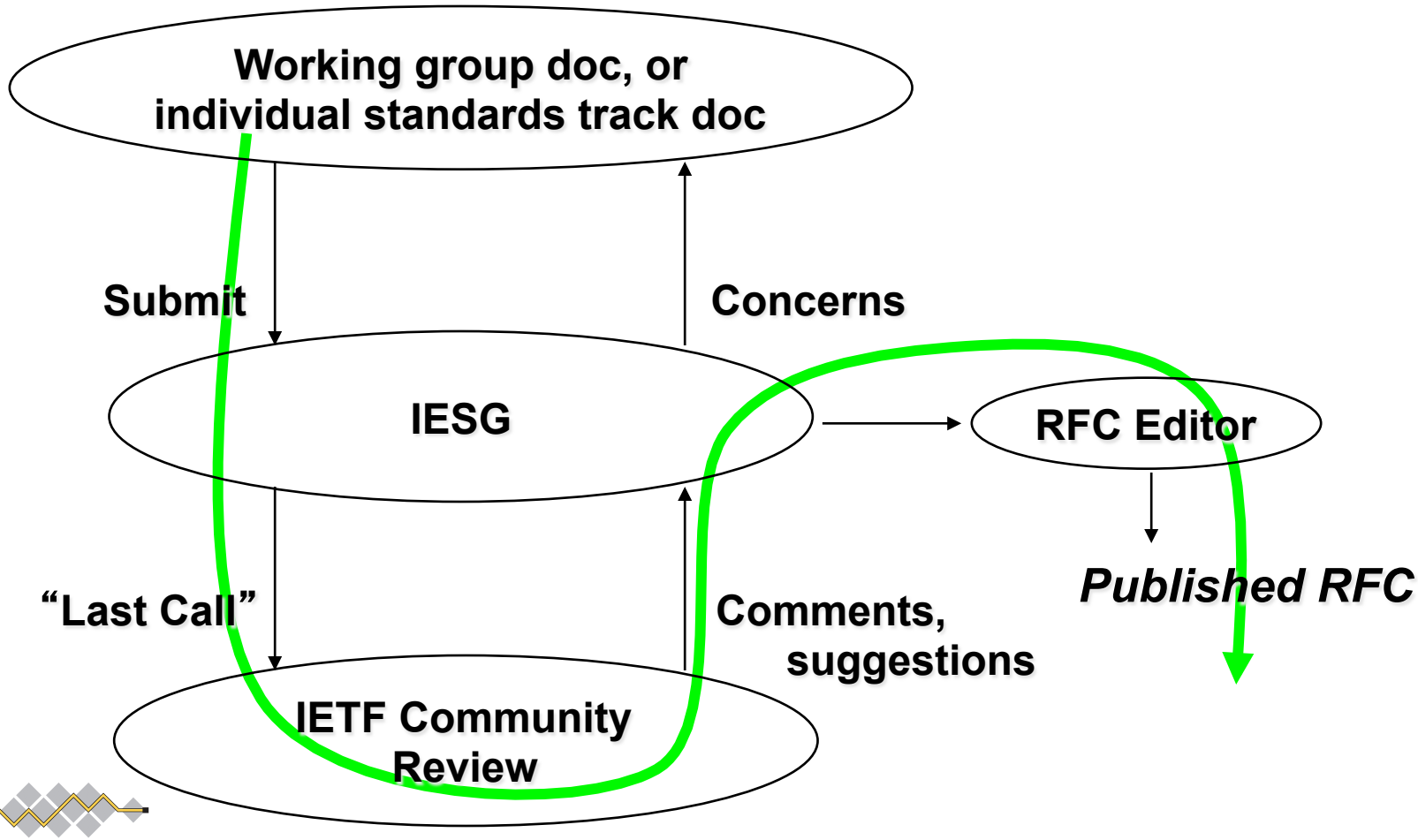
RFC Editor being reorganized

split into multiple functions

- oversight (RFC Series Editor)
- editing (RFC Production)
- publishing (RFC Publisher)
- independent submissions (Independent Stream Editor)

contract(s) to be awarded soon

IETF Submission



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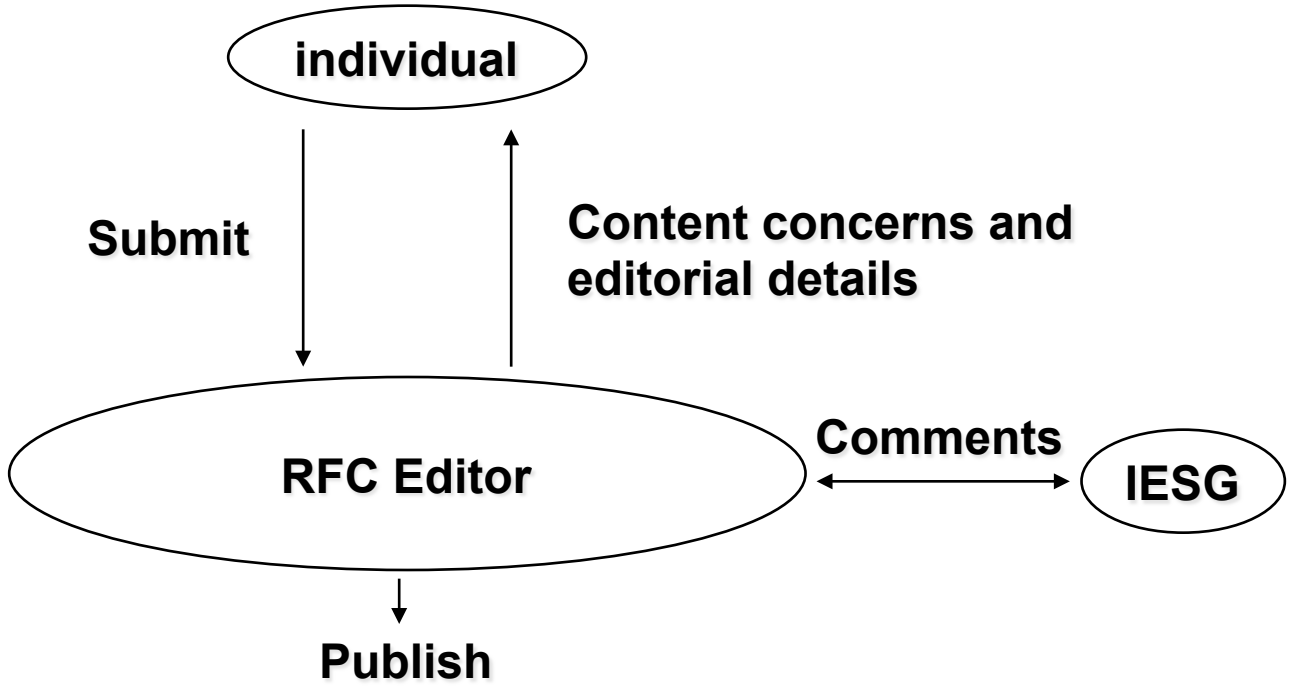
Non-IETF Submissions



(The IRTF has its own RFC procedure)

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Standards Track RFCs:

- Best Current Practices (**BCP**)
  - policies or 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
    - note: **interoperability** not conformance
  - Internet Standard (**STD**)
    - DS + wide use

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 obsolete an old one.

Appeals Process

IETF decisions can be formally 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” and informally is the right thing to do

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Working Group Session

- WGs only meet for a few hours at an IETF meeting
  - most working group work must be done on mailing lists
  - often only specific unresolved issues discussed at meeting
  - so read the IDs before the session
  - advice: listen (and read) before speaking, take your turn
- 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
- sign the blue sheets
  - record of who is in the room - required for openness
  - retained but not published

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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 patent applications?

what if you do not know until it's already a standard?

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?

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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)

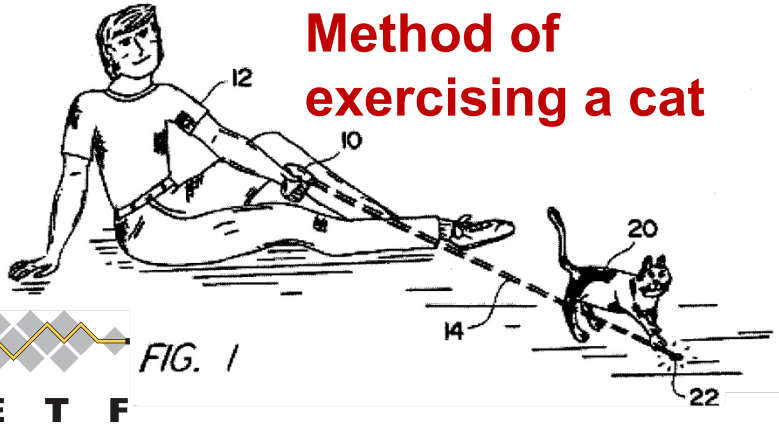

FIG. 1

Method of exercising a cat

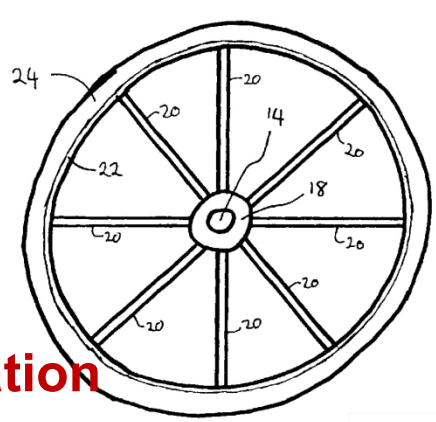

FIGURE 2

Circular transportation facilitation device

I E T F

IPR (Patents)

RFC 2026 revised IETF IPR rules

- used to require “fair & non-discriminatory” licensing
- some standards blocked using old process

now use standards sequence to check IPR issues

- by requiring multiple implementations based on multiple licenses to progress to Draft Standard or Internet Standard

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
- "**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 assumed IPR-free

Patents, Cases

"your IPR" = a 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, 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

Most companies insist that company lawyers do this.

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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

Remember – by participating in the IETF, you automatically accept 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
  - required for standards track documents
- author(s) **retain** all other rights
- updated by RFC 5378
  - expanded rights granted to IETF Trust
  - extra legal text needed when words copied from older IDs and RFCs
- IETF Trust released a FAQ on IETF copyright

Note Well (1)

The “Note Well” statement shows up a lot at the IETF.

Mailing lists, registration, meeting openings, etc.

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

continued ...

Note Well (3)

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 (you are here)

1300 - 1450 DNS for programmers (you are not here)

1300 - 1450 RFC tutorial (you are not here either)

1500 - 1650 Newcomer's Training (Japanese)

1500 - 1650 MIB

1700 - 1900 Welcome Reception

(talking to IETF people is often quite an education!)

What next?

- *join mailing lists*
  - *this is where the work happens*
  - *read (and understand) before writing*
- *read the drafts*
- *don't be shy*
- *talk to people*
- *look for common ground*
- *help people*
- *don't settle for second-rate*

Questions?