IETF Structure and Internet Standards Process

Presented by Brian Carpenter

Slides by Scott Bradner

79th IETF

Beijing, China

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 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” - 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

131ish working groups (WGs) (where the stuff happens)

anyone can join 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" 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, ...

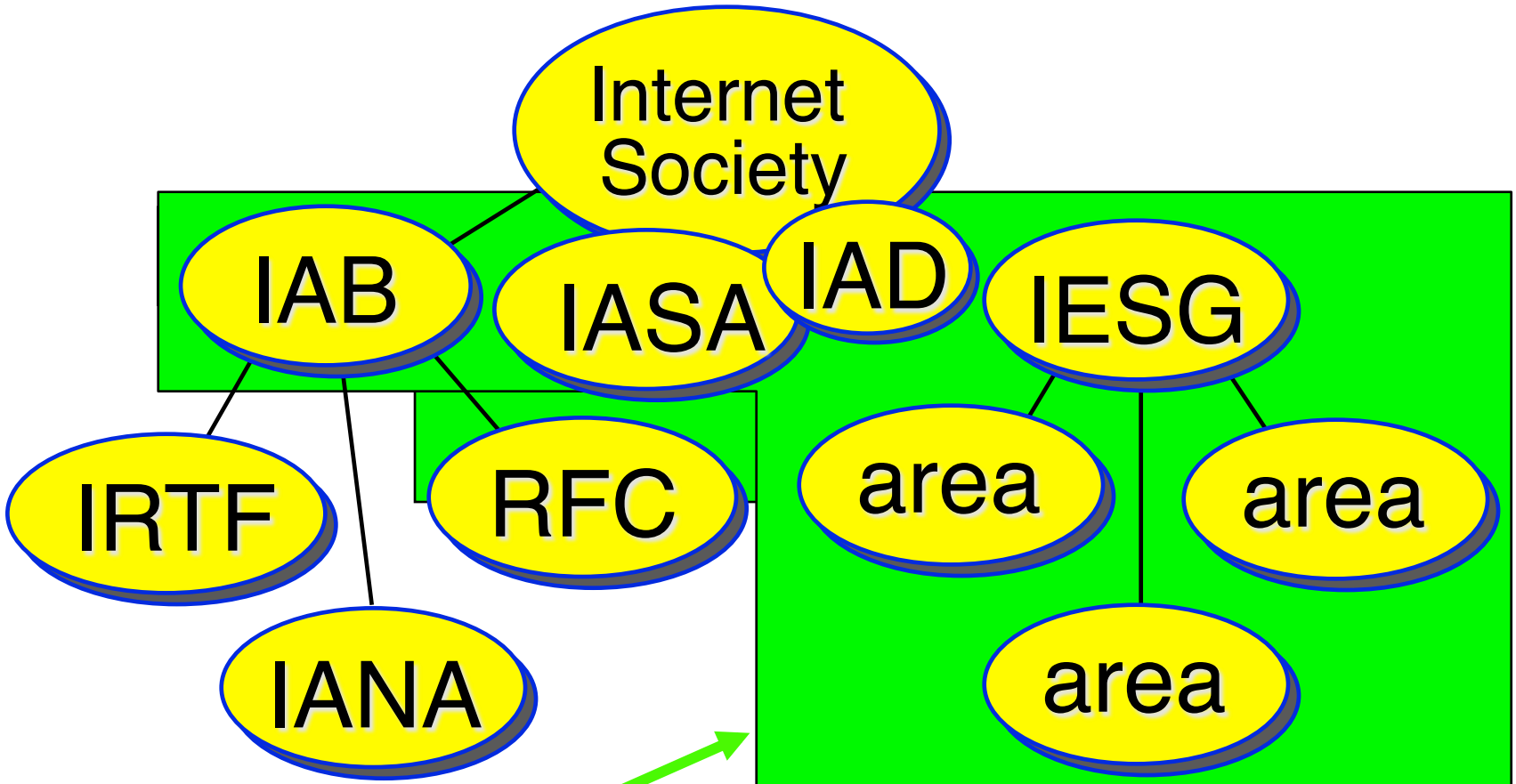
generally hard to clearly define IETF scope

IETF is constantly exploring the edges

Scope of Other SDOs

- 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 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 100 organizational members & more than 28,000 individual members & over 80 chapters around the world
- 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

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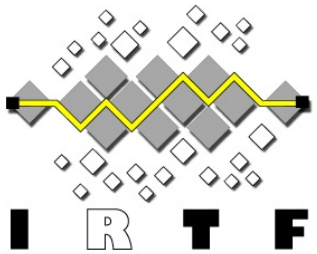
ISOC, contd.

- IETF agreed to come under IETF 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
- Delay-Tolerant Networking Research Group (DTNRG)
- Host Identity Protocol (HIP) Research Group
- Internet Congestion Control Research Group
- IP Mobility Optimizations (Mob Opts) Research Group
- Network Management Research Group (NMRG)
- Peer-to-Peer Research Group

IRTF, contd.

- Public Key Next-Generation Research Group
- Routing Research Group
- Scalable Adaptive Multicast Research Group
- Transport Modeling Research Group
- Virtual Networks Research GROUP (VNRG)

IRTF chair appointed by IAB

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

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
  - domain names
    - defines top level domains (TLDs) - e.g., .com, .ca, .us, ...
    - maintains root server database of TLD server addresses
- IANA predates 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
      - contract to be reviewed soon by US government

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
- 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
  - includes IETF chair
- 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
  - 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

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IETF Areas

General Area (**gen**) - 0 WGs

Applications (**app**) - 17 WGs (as of 6/26/2010)

Internet (**int**) - 26 WGs

Operations & Management (**ops**) - 14 WGs

Real-time Applications and Infrastructure (**rai**) - 25 WGs

Routing (**rtg**) - 18 WGs

Security (**sec**) - 15 WGs

Transport Services (**tsv**) - 15 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, RFC editing, production, 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 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 (ex offico)
    - 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)

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

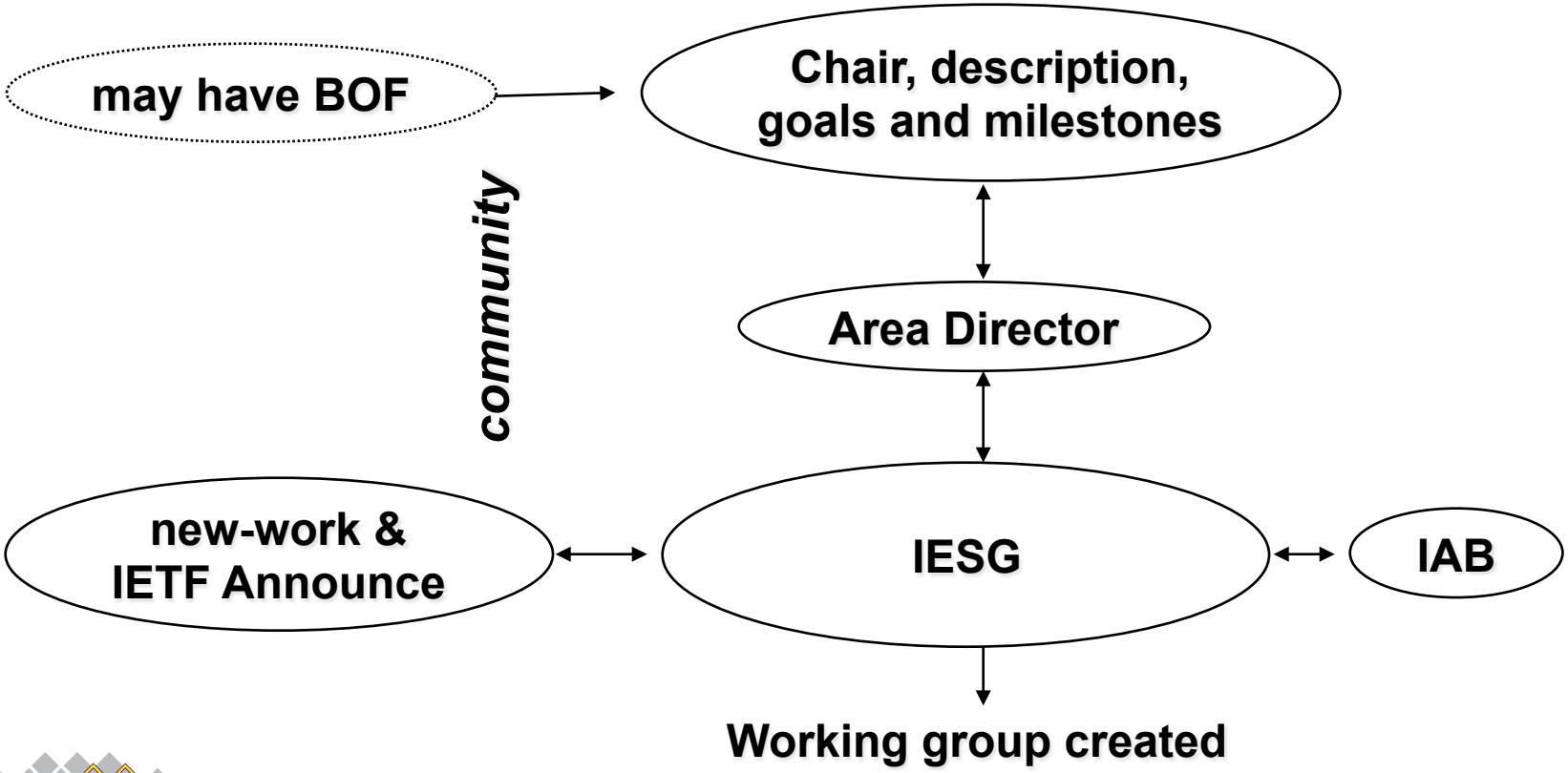
Birds of a Feather Sessions (BOF)

- 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



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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 41 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

- 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 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 5000 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
- 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

was one person, then one function

now multiple parts

- oversight (RFC Series Editor - RSE)
- editing (RFC Production) - done by Secretariat
- publishing (RFC Publisher) - done by Secretariat
- independent submissions (Independent Stream Editor - ISE)
  - ISE appointed by IAB

RFC Production & Publishing

receives requests to publish IDs from multiple streams

- IETF (via IESG)
- IRTF
- IAB
- Independent Stream (via ISE)

edits IDs for publication

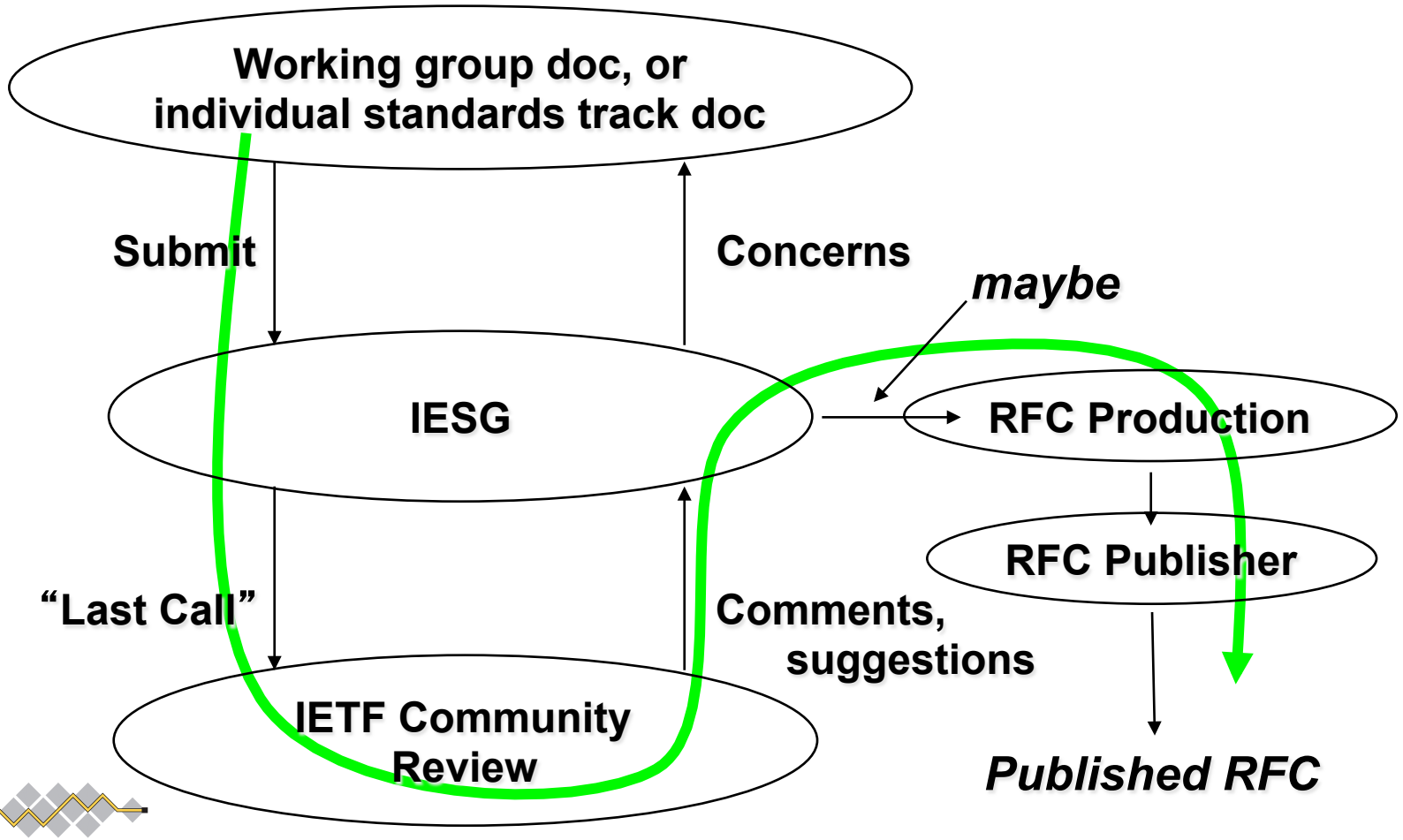
- verify edits with authors

publishes RFCs

Independent Stream 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

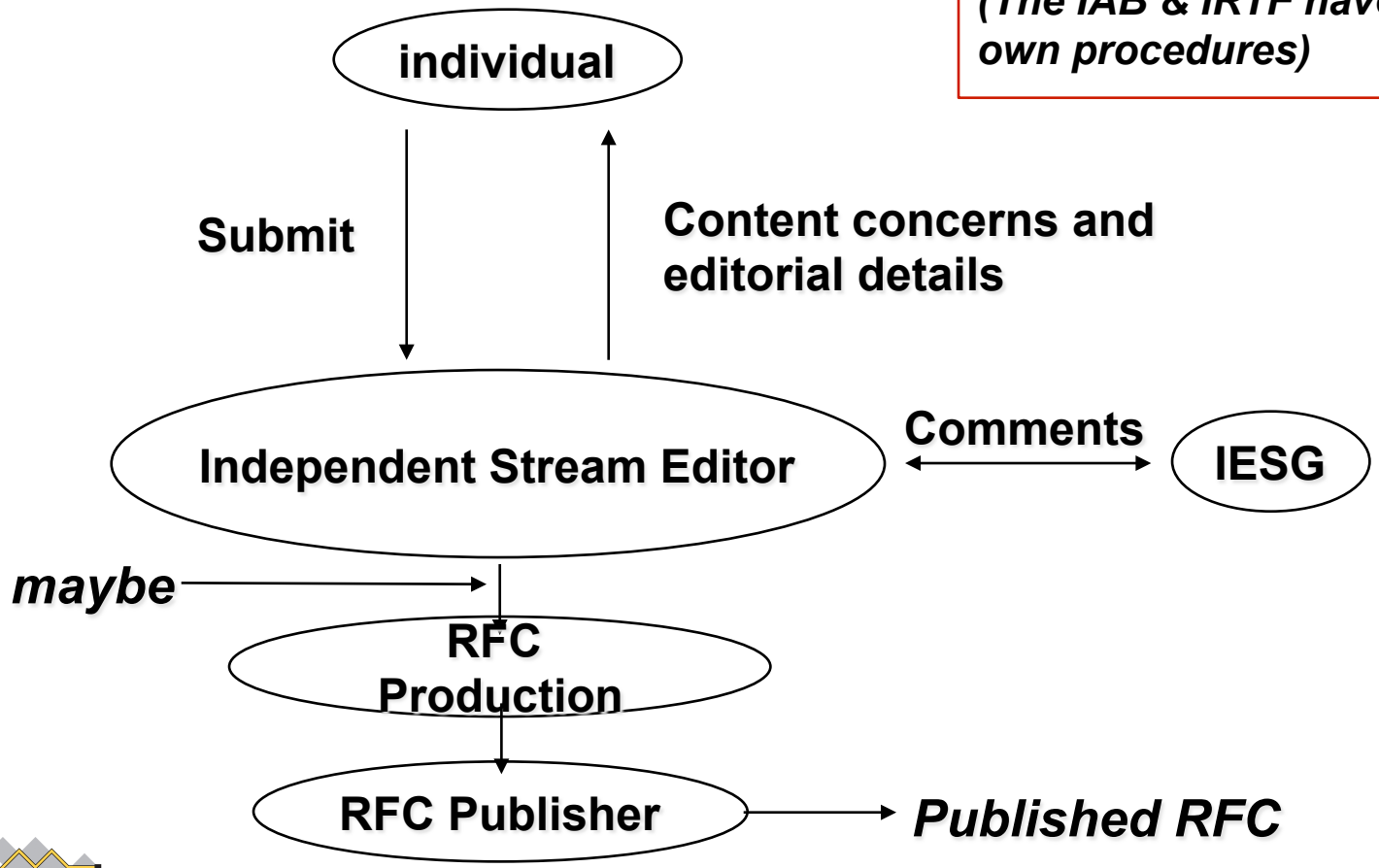
IETF Submission



IETF

Non-IETF Submissions

(The IAB & IRTF have their own procedures)



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 to prove document clarity
    - note: **interoperability** not conformance
  - Internet Standard (**STD**)
    - DS + wide use

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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

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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 are discussed at meetings
  - so read the IDs 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

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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 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?

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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)

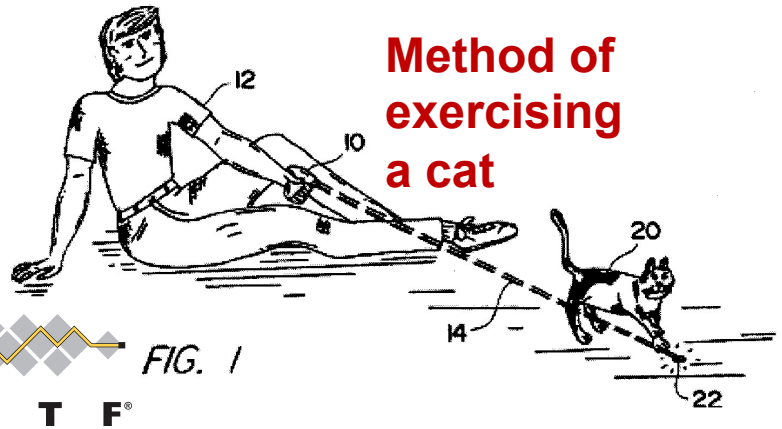

FIG. 1

Method of exercising a cat

Circular transportation facilitation device

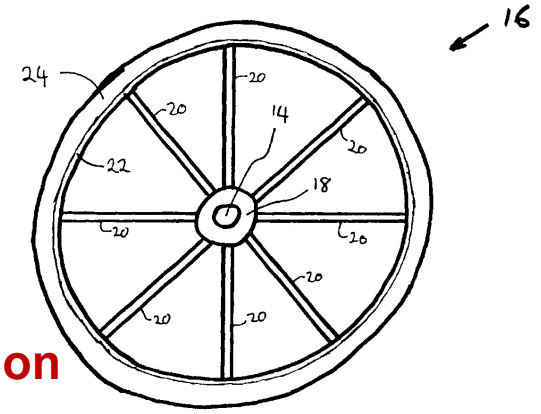

FIGURE 2

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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, 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
  - 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 ...

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 Security Tutorial (you are not here)

1500 - 1650 Document Lifecycle Tutorial

1500 - 1650 NAT and NAT Traversal Tutorial

1700 - 1900 Welcome Reception

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

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?