IETF Structure and Internet Standards Process

Scott Bradner

89th IETF
London, England

I E T F®

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)

I E T F

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)

I E T F®

3

IETF Overview

Internet Standards R Us

> most Internet-related standards were developed or are maintained by the IETF
>
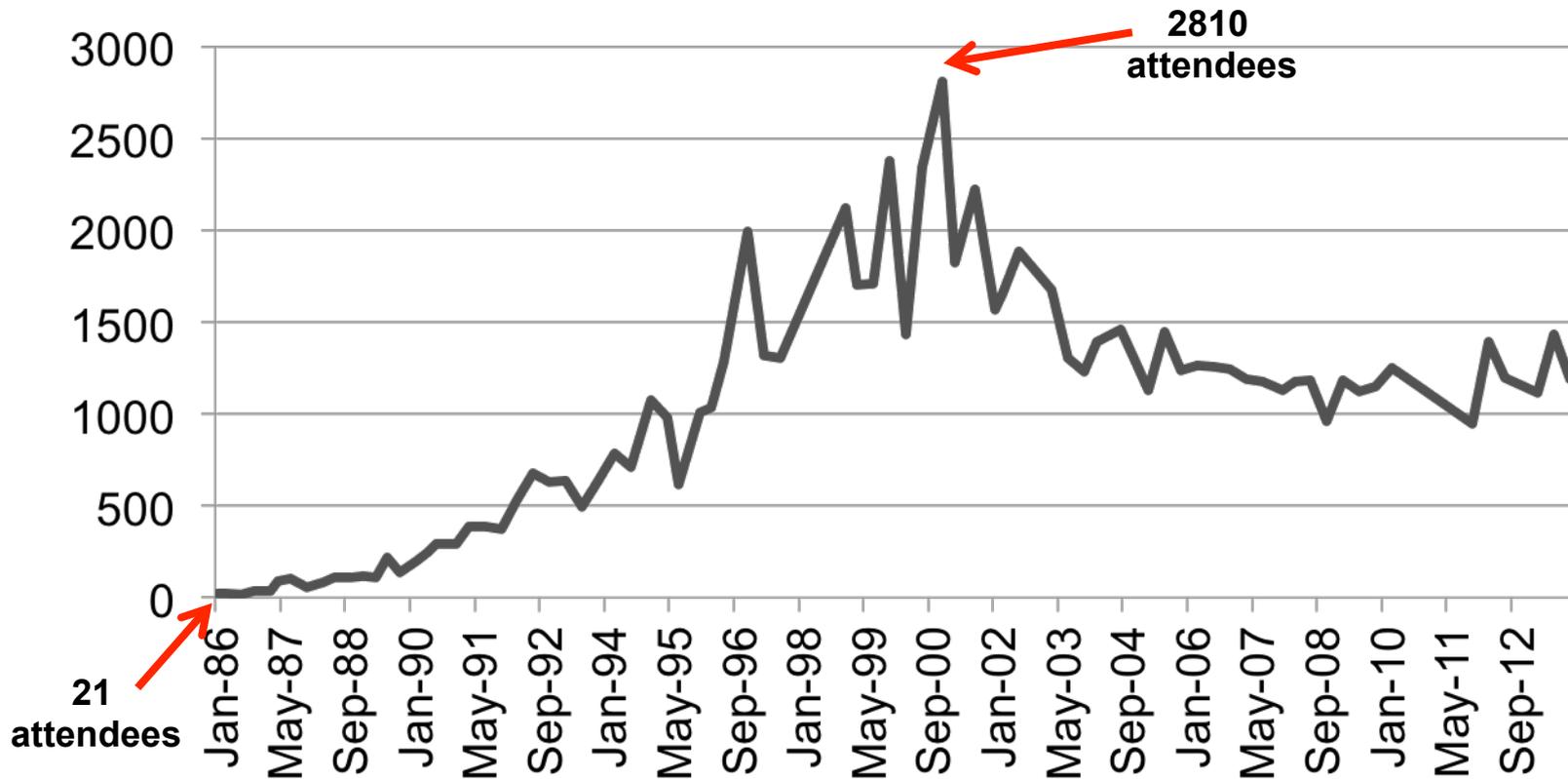> > not including physical network or page display standards

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

I E T F ®

IETF Meeting Attendance

2810 attendees

21 attendees

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 deployment and use scale

ensure that the technology is secure and can be operated securely

ensure that the technology is manageable

IETF produces standards and other documents

I E T F®

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

I E T F

IETF Work Team

125ish 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

I E T F®

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

I E T F

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 advice)

part of appeal chain

I E T F®

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

I E T F

How the IETF Work Gets Done, contd.

if AD approves, the IESG issues IETF-wide "Last Call" for comments

IESG performs interdisciplinary technical review of proposal & reviews Last-Call comments

returns document with comments if IESG finds issues

if IESG approves, document sent to RFC Editor for publication as RFC

I E T F

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

I E T F®

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

I E T F®

Working Groups, contd.

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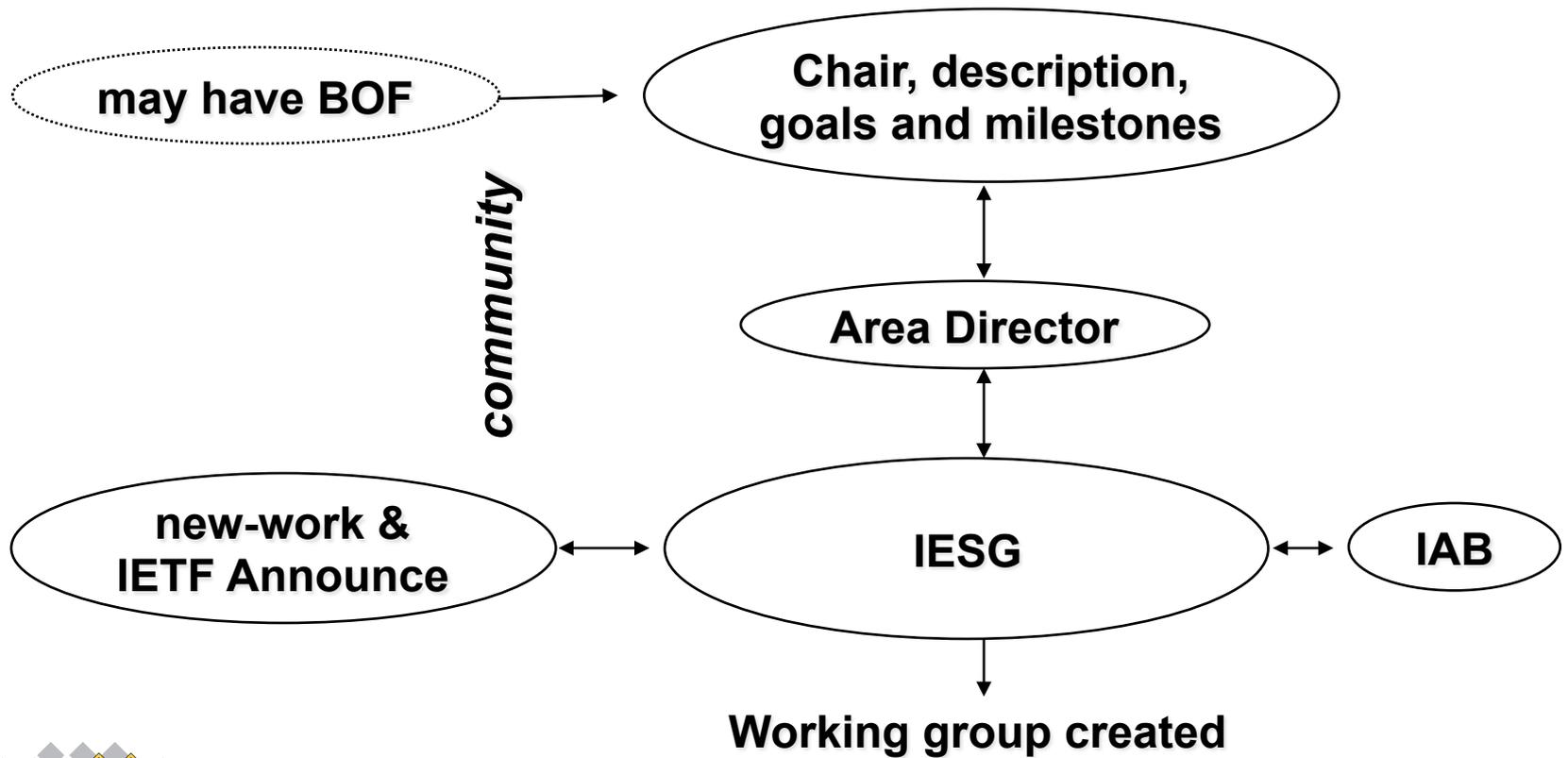
   restrictive charters with milestones

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

I E T F

Working Group Creation

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 & published - original not retained

I E T F

Rough Consensus

no defined IETF membership - just "participants"

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

does **not** require unanimity

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

I E T F

Rough Consensus, contd.

proposal to update understanding of what "rough consensus" means

discussion on IETF mailing list

proposal is process focused

ensure that all issues are fully discussed before a decision is made

I E T F

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

I E T F ®

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 - gaining consensus on alternative format

note that the current format is still readable after 44 years (see RFC 20 for an example)

> how many other SDOs can claim that?

I E T F®

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

  to deal with IPR handoff, etc.

    (other than some IANA or RFC Editor created ones)

I E T F

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

I E T F

Internet Draft (ID) Naming, contd.

examples:

draft-ietf-idr-bgp4-26.txt

- 26th revision of 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-iab-rfcformatreq-03.txt

- 3rd revision of an IAB document on requirements for the formats of RFCs

I E T F®

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 6000 RFCs

not all RFCs are standards!

    see RFC 1796

    though some vendors sometimes imply otherwise

many types of RFCs

I E T F®

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

experimental history
> Netblt

process documents
> IETF Standards Process

I E T F

Standards Track RFCs:

Best Current Practices (**BCP**)

  policies & procedures (best way we know how)

3-stage standards track (not all that's followed)

  Proposed Standard (**PS**)

  good idea, no known problems

  Draft Standard (**DS**)

  PS + stable

  multiple interoperable implementations improve 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 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

I E T F®

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

I E T F®

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 selected & appointed by IAB

I E T F®

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

I E T F

Independent Submissions Editor

ISE gets requests to publish IDs

   can only publish informational or experimental RFCs

asks IESG for advice
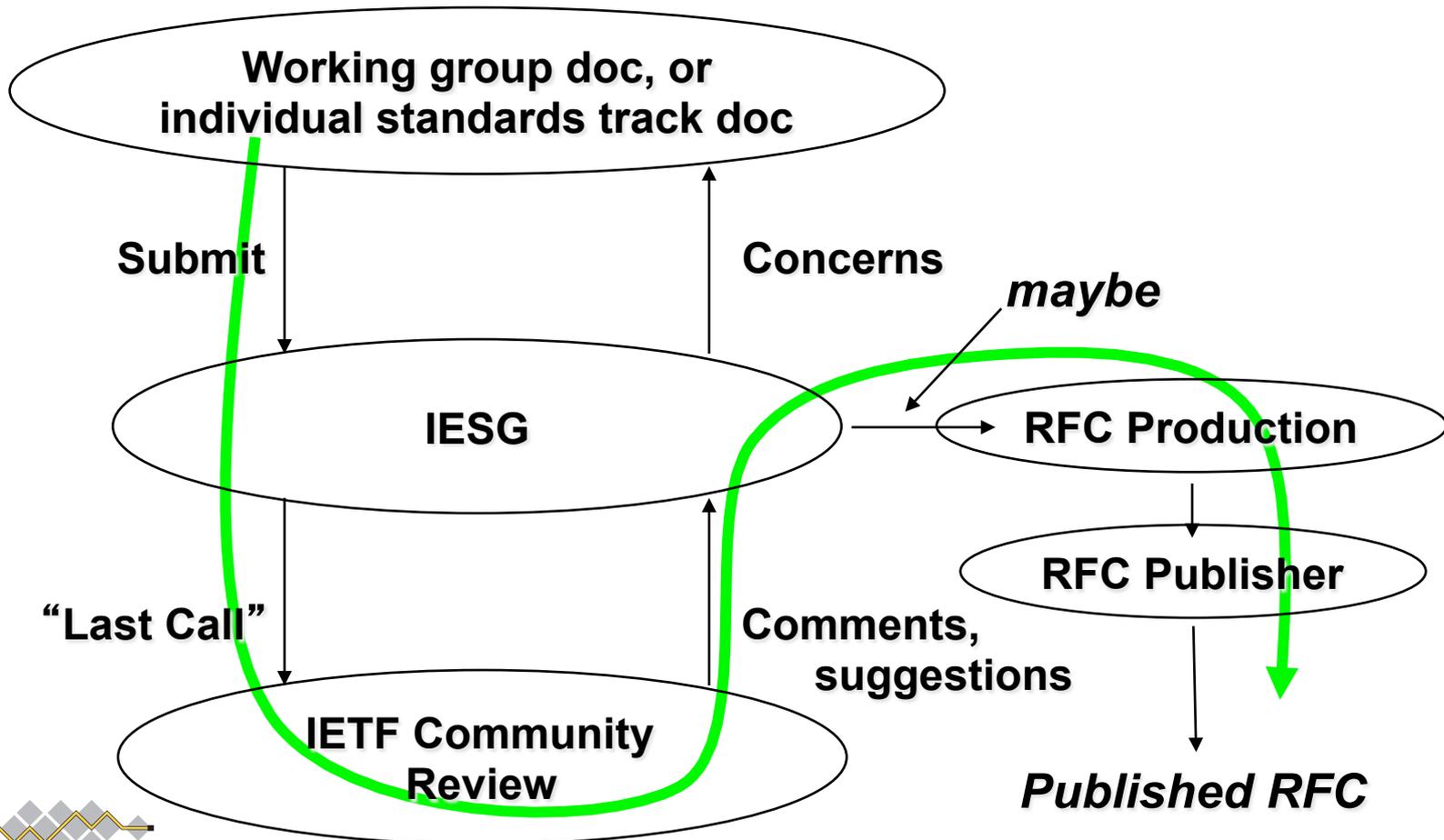
   but can exercise own discretion to publish or not

presumption is to publish technically competent and useful IDs

   which sometimes is a conflict with IESG

I E T F

IETF Submissions

Working group doc, or
individual standards track doc

Submit

Concerns

maybe

IESG

RFC Production

RFC Publisher

"Last Call"

Comments,
suggestions

IETF Community
Review

Published RFC

I E T F

Non-IETF Submissions

(The IAB & IRTF have their own procedures)

individual

Submit

Content concerns and editorial details

Independent Submissions Editor **Comments** **IESG**

maybe

RFC Production

RFC Publisher → *Published RFC*

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

I E T F

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?
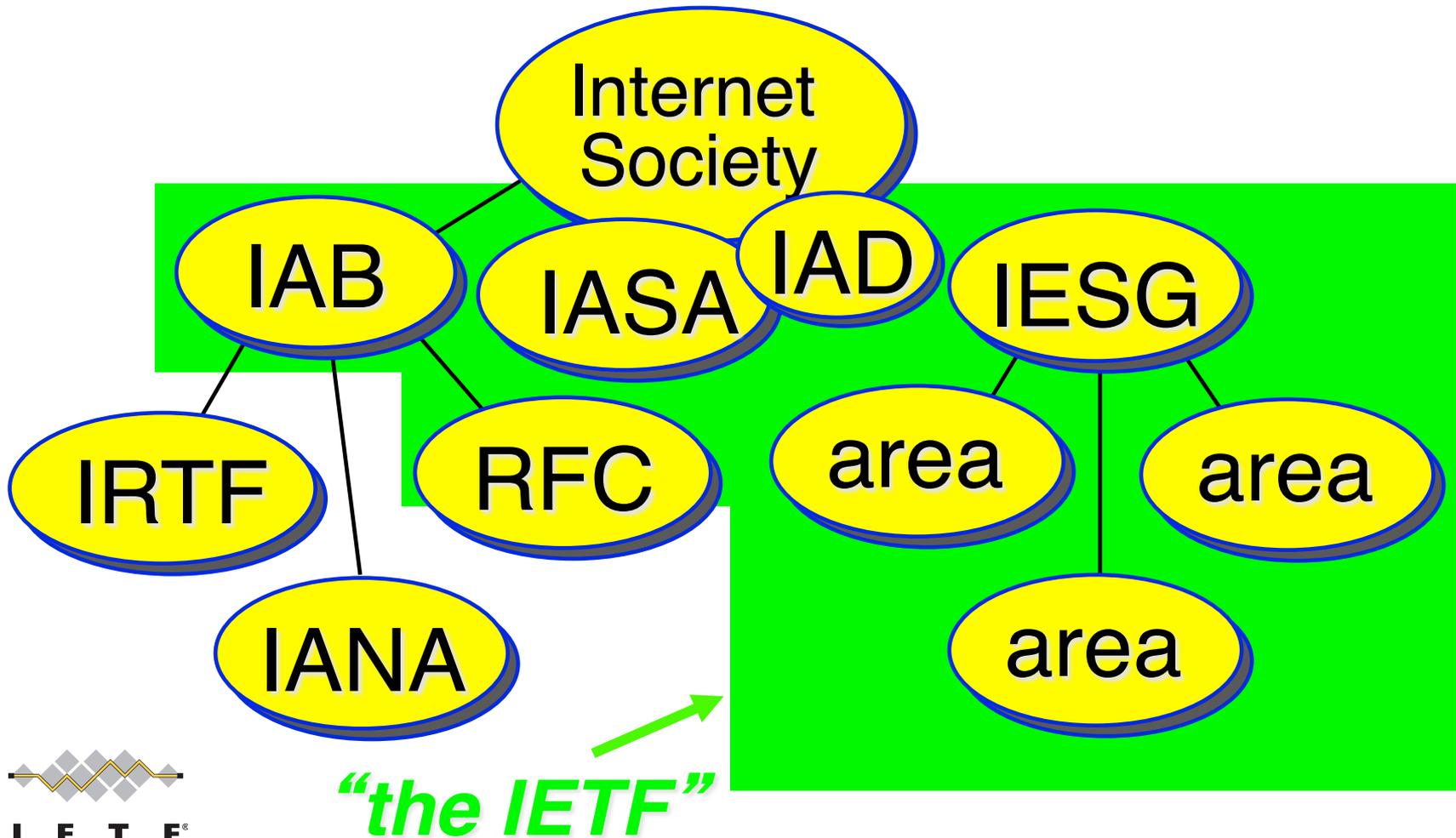
SDO (including IETF) assumption: each SDO modifies its own protocols

    but see dispute with ITU-T over MPLS for transport

I E T F

Top Level View of IETF Organization

The Internet Society (ISOC)

non-profit, non-governmental, independent, international organization

    more than 145 organizational members, more than 65,000 individual members & about 100 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

Internet Society ™

I E T F

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
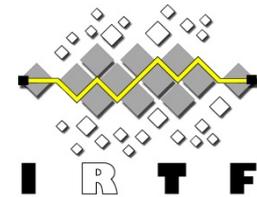
ISOC President appoints chair of nomcom

IAB chartered by ISOC

ISOC president is on the IAB list & calls

IETF (through IAB) appoints 4 ISOC trustees

I E T F

Internet Research Task Force (IRTF)

focused on long term problems in Internet

Crypto Forum Research Group (CFRG)

Delay-Tolerant Networking Research Group (DTNRG)

Internet Congestion Control Research Group (ICCRG)

Information Centric Networking Research Group (ICNRG)

Network Coding Research Group (NWCRG)

Network Complexity Research Group (NCRG)

Network Management Research Group (NMRG)

Routing Research Group (RRG)

Software-Defined Network Research Group (SDNRG)

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

I A B

I E T F

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/

I E T F®

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

I E T F

IANA, contd.

Internet Drafts need to include a "IANA Considerations" section

- section tells the IANA what assignment actions are needed if ID is to be published as a RFC

- can say "no IANA actions required"

- see RFC 5226 for details

IANA reviews IDs during IESG consideration phase to see if any IANA actions required prior to publication

I E T F®

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

I E T F®

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, 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

money from 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

I E T F

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

I E T F

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 under the secretariat contract goes to Trust (not a patent pool)

I E T F®

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

I E T F

Dots

🔴 IAB member (red)   🩷 IRSG member

🟡 IESG member (yellow)

🔵 Working Group chair (blue)

🟠 nomcom (orange)

🟢 Local host (green)

🟣 IAOC member (purple)

☺ **IETFer specifically happy to help**

I E T F

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

I E T F

Intellectual Property Rights

IPR is a very big issue in standards bodies

two areas:

    copyright in documents

    patents covering standards technology

I E T F

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

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

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

I E T F®

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

a "contribution" is anything you say or write with the intent to effect the IETF standards process

if you make a contribution that includes your IPR you must disclose that fact

Note Well note is undergoing revision – big discussion on IETF discussion mailing list

I E T F ®

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

I E T F®

Other IETF Training/Tutorials

1300 – 1450 Newcomer's Training **← you are here**

1300 – 1450 Introduction to the Applications Area

1500 – 1650 Engineering Privacy into Internet Protocols

1500 – 1650 Introduction to Authentication, Authorization and Accounting (AAA) management for distributed IP networks

1600 – 1700 Newcomer's Meet and Greet

1700 – 1900 Welcome Reception

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

I E T F

Newcomer's Dinner

informal dinner for newcomer's to chat about their experience

meet at the IETF registration desk at 8:00 PM Monday

walk to nearby reasonably priced restaurant

please email Maddy Conner (mconner@amsl.com) if you would like to attend or for more information

I E T F®

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

I E T F®

Questions?

I E T F