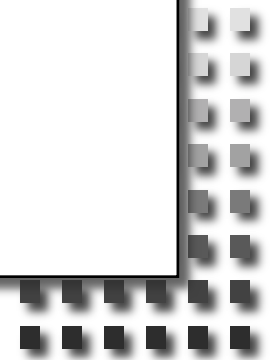# IETF Structure and Internet Standards Process

Scott Bradner
67th IETF
San Diego, CA, USA

I E T F

The IETF

Internet Engineering Task Force

formed in 1986

> evolved out of 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!!

people **not** companies

"We reject kings, presidents and voting. We believe in rough consensus and running code"

Dave Clark (1992)

I E T F

IETF Overview

Internet standards R us

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

1K to 2K people at 3/year meetings

  many more on mail lists

121ish **working groups** (where the stuff happens)

8 **areas** (for organizational convenience) with **AD**s

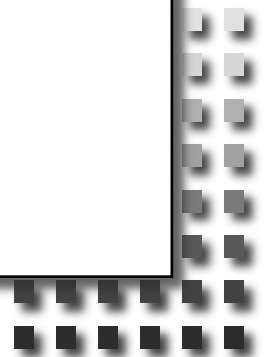 APS, GEN, INT, O&M, RAI, RTG, SEC, TSV

IESG: management (ADs + IETF Chair)

IAB: architectural guidance & liaisons

produces **standards** and other documents

I E T F

IETF "Standards"

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

    lack of formal government input "a problem"

        at least to some governments

no submitting to "traditional" bodies

    some keep trying to "help"

I E T F

The Role & Scope of the IETF
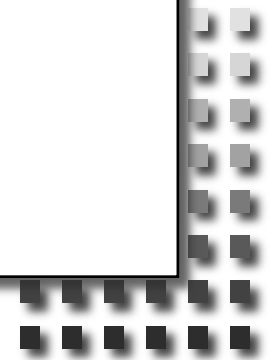
"above the wire and below the application"

> 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

> constant exploration of edges
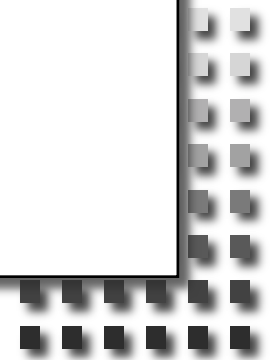
I E T F

Scope of Other SDOs

Internet (and Internet protocols) very interesting to other standards development organizations (SDO)

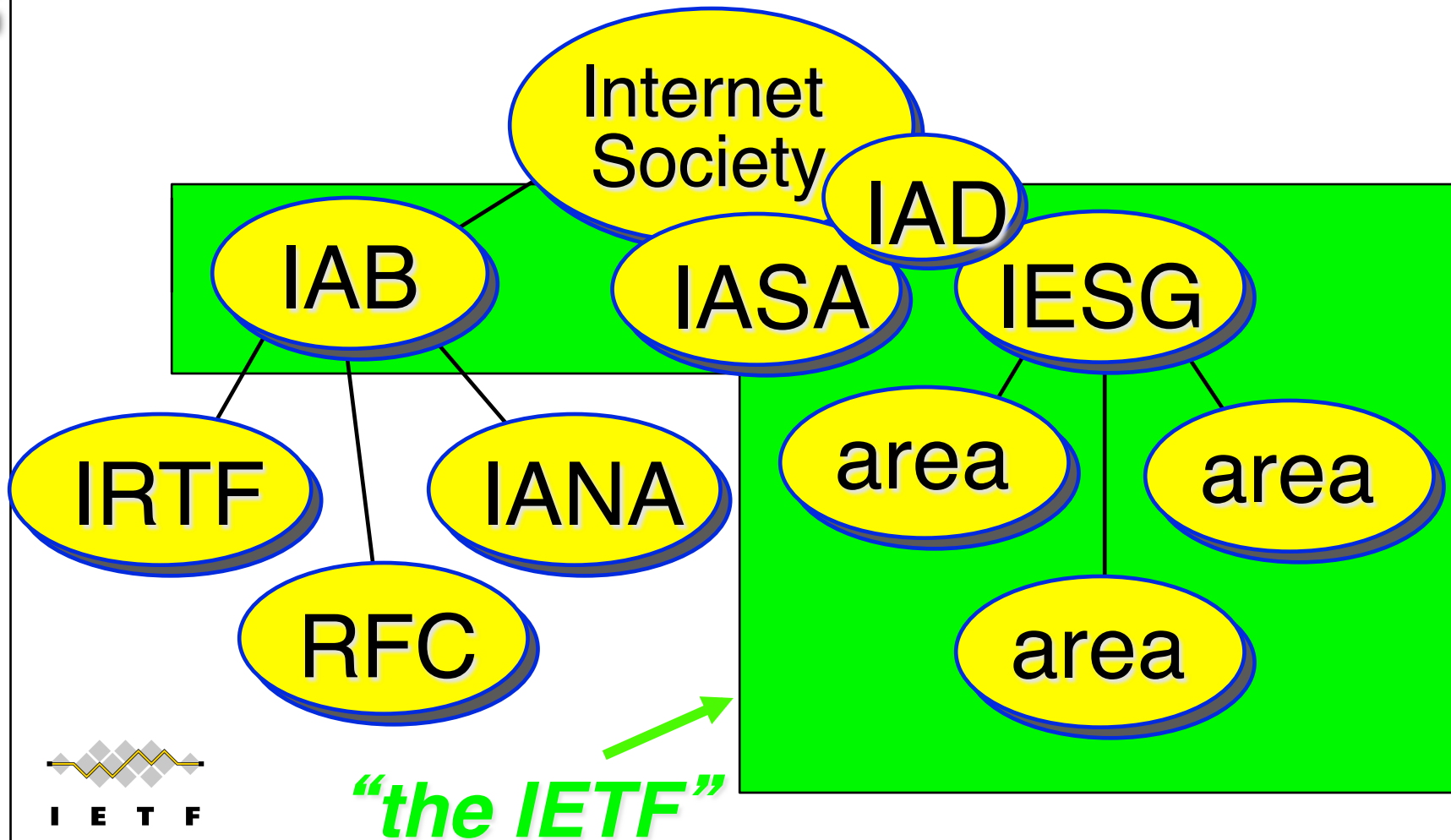other SDOs trying "fix" or "extend" IETF protocols

trying to figure out how to proceed when extensions break underlying protocol assumptions

see note to ITU-T

https://datatracker.ietf.org/public/liaison_detail.cgi?detail_id=127

I E T F

Top Level View of Organization

Internet Society

IAB

IAD

IASA

IESG

IRTF

IANA

RFC

area

area

area

"the IETF"

I E T F

The Internet Society (ISOC)

non-profit, non-governmental, international, professional membership organization

  more than 100 organizational and more than 20,000 individual members in over 180 countries

organizational and administrative home for IETF

  legal umbrella, insurance, IASA home, etc

ISOC BoT 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

join at www.isoc.org

I E T F

Internet Research Task Force (IRTF)

focused on **long term** problems in Internet

Anti-Spam Research Group (ASRG)

Crypto Forum Research Group

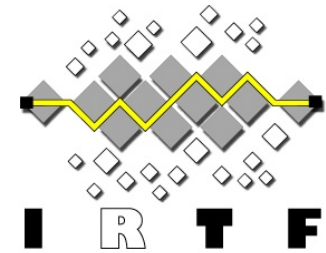Delay-Tolerant Networking Research Group (DTNRG)

End-to-End Research Group

Host Identity Protocol (HIP)

Internet Measurement Research Group

IP Mobility Optimizations (Mob Opts) Research Group

Network Management Research Group Charter (NMRG)

I R T F

I E T F

IRTF, contd.

Peer-to-Peer Research Group

Routing Research Group

Transport Modeling Research Group

Internet Congestion Control Research Group

Scalable Adaptive Multicast Research Group

most groups are open, some invitation only

IRTF Chair: Aaron Falk

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

I E T F

IAB Oversight Mechanisms

review BOFs

provide input to IESG on WG formation & charters

sponsor & organize IRTF

convene topic-specific workshops

> mostly invitation only

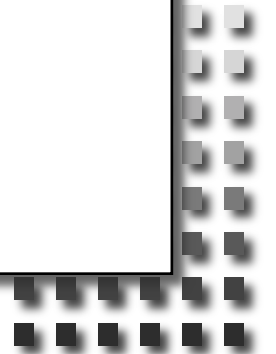organize ad-hoc expert groups to adjudicate technical disputes

write IDs/RFCs stating IAB opinion

> community & IESG review

participate in WG discussions

I E T F

IAB Members

Bernard Aboba

Loa Andersson

Brian Carpenter
 (as IETF Chair)

Leslie Daigle
 (IAB chair)

Elwyn Davies

Kevin Fall

Olaf Kolkman
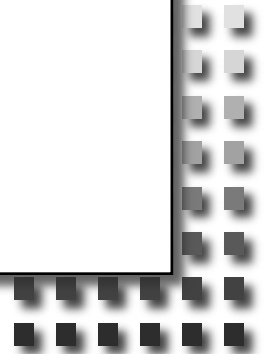
Kurtis Lindqvist

David Meyer

David Oran

Eric Rescorla

Dave Thaler

Lixia Zhang

I E T F

Internet Assigned Number Authority (IANA)

assigns numbers and keeps them from colliding

protocol numbers

IP addresses

mostly delegated to 5 regional IP Address registries

domain names

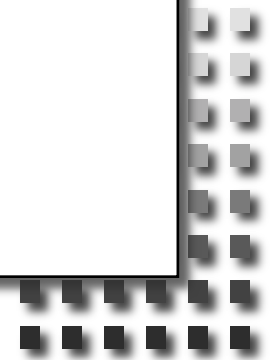deals with top level domains (TLDs - e.g., .com, .ca, .us, ...)

mostly delegated to DNS name registries

functions split from IETF with the creation of ICANN

Internet Corporation for Assigned Names and Numbers

(semi) independent corp. to take over IANA functions

(continuing) contract with US government

I E T F

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.

I E T F

IETF Management

IETF Chair

   AD for General Area, chief spokesman

Area Directors (ADs)

   manage individual areas

Internet Engineering Steering Group (IESG)

   ADs sitting as a body (includes IETF Chair)
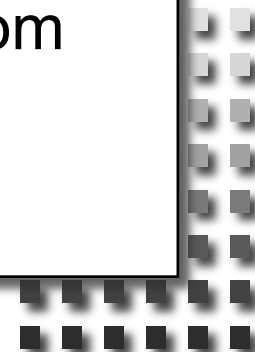
Internet Architecture Board

   IETF chair also

IETF Chair, ADs & IAB members selected by nomcom

   two year terms

I E T F

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, or IETF Chair a salary or expenses

  company or self-supported

  secretariat personnel are paid

I E T F

IETF Chair

Brian Carpenter <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 <u>you</u>

selected by nomcom

IETF's "CTO" - "Chief Talking (& Traveling) Officer"

I E T F

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

I E T F

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

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: you were at 3 of last 5 IETF meetings

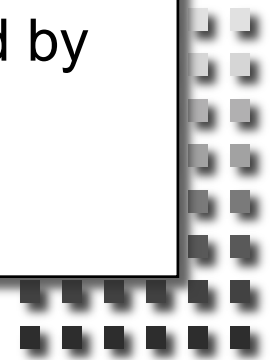 *very* random process to select from volunteers: RFC 3797

get list of jobs to fill from IETF chair

  IETF Chair, IESG, IAB & IAOC members

nominate one person for each job

  IESG & IETF Chair approved by IAB, IAB approved by
  ISOC BoT, IAOC approved by IESG

I E T F

IETF Areas

IETF Chair & AD for General Area (**gen**) (2 WGs)

Brian Carpenter <chair@ietf.org>

Applications (**app**) (12 WGs)

Lisa Dusseault

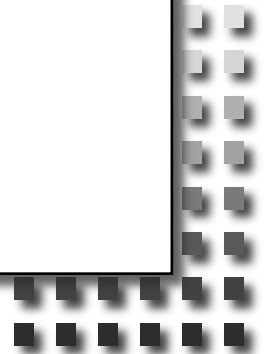Ted Hardie

Internet (int) (28 WGs)

Jari Arrko

Mark Townsley

Operations & Management (ops) (20 WGs)

David Kessens

Dan Romascanu

I E T F

IETF Areas (cont.)

Real-time Applications and Infrastructure (14 WGs)

  Cullen Jennings

  Jon Peterson

Routing (rtg) (16 WGs)

  Ross Callon

  Bill Fenner

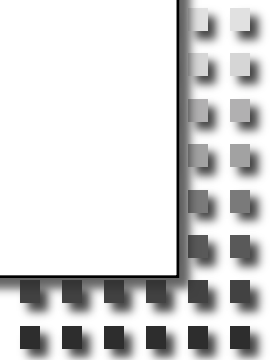Security (sec) (17 WGs)

  Sam Hartman

  Russ Housley

Transport Services (tsv) (15 WGs)

  Magnus Westerlund

  Lars Eggert

I E T F

IETF Secretariat

NeuStar Secretariat Services - Sterling Virginia, USA

managed by IETF Administrative Support Activity IASA)
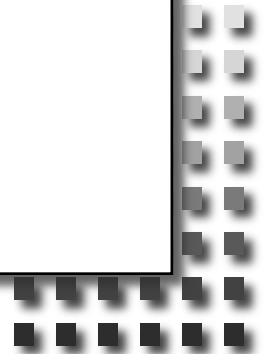
runs

plenary meetings, mailing lists,

Internet-Draft directory, IESG teleconferences

coordinates

day to day work of IESG and working groups

I E T F

IETF Administrative Support Activity (IASA)

provides the administrative structure required to

support the IETF standards process

has no authority over the standards process

housed within the Internet Society
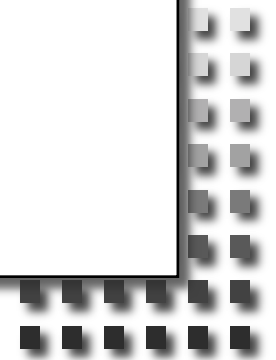
creates budget for IETF

money from ISOC (support from IETF meeting fees)

responsible for IETF finances

contracts for IETF support functions

Secretariat functions, RFC Editor & 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 (ex offico)

            plus

            members selected by nomcom (2), IAB, IESG & ISOC

I E T F

IASA Membership

Lucy Lynch, appointed by the IAB [Initial Chair]

Kurtis Lindqvist, appointed by the IESG

Steve Crocker, appointed by the ISOC Board of Trustees

Jonne Soininen, appointed by the NomCom (2 year term, appointed 2005)

Ed Juskevicius, appointed by the NomCom (2 year term, appointed 2006)

ex officio

    Brian Carpenter, the IETF Chair
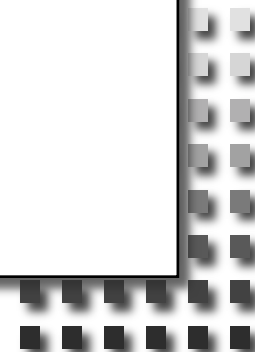
    Leslie Daigle, the IAB Chair

    Lynn St.Amour, the ISOC President/CEO

non voting

    Ray Pelletier, IETF Administrative Director

I E T F

IETF Trust

created Dec 2005 to hold IETF IPR

    copyrights (on RFCs etc)

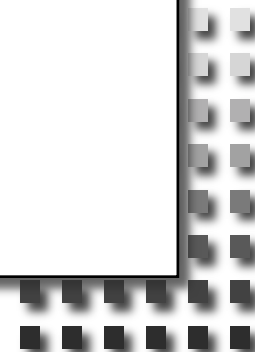   domain names (e.g., ietf.org)

    software paid for by IETF

    databases

    etc

IPR licensed to NeuStar Secretariat Services

    IPR created during contract goes to Trust

not a patent pool

    see http://koi.uoregon.edu/~iaoc/docs/TrustFAQv1.2.txt

I E T F

Dots

🔴 IAB member (red)

🟡 IESG member (yellow)

🔵 Working Group chair (blue)

🟠 nomcom (orange)

🟢 Local host (green)

I E T F

Standards Procedure

generally Birds of a Feather (BOF) first

most work done in a Working Group

    proposals published as Internet Drafts

proposal reviewed by AD

    can be sent back to working group
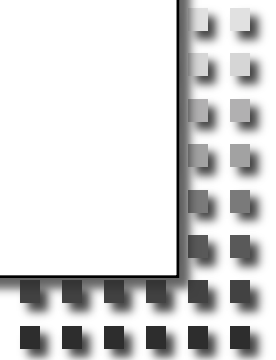
IETF Last-Call (4-week if no Working Group)

IESG review

    last call comments + own technical review

    can be sent back to working group

publication as RFC

I E T F

IETF Submission

Working group doc, or individual standards track doc

Submit

Concerns

IESG

"Last Call"

Comments, suggestions

IETF Community Review

RFC Editor

Published RFC

I E T F

Non-IETF Submissions

individual

Submit

Content concerns and editorial details

RFC Editor

Comments

IESG

Publish
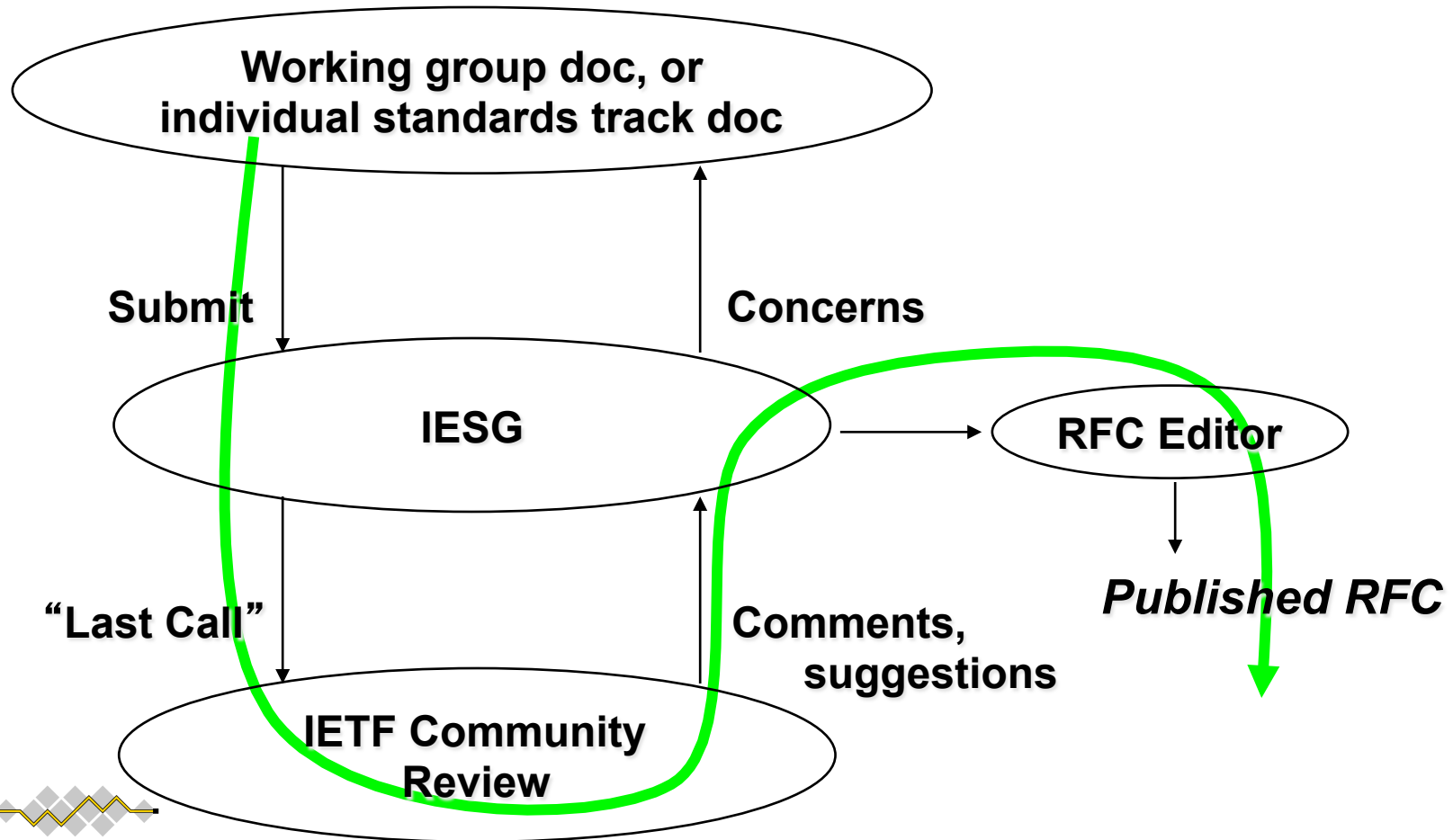
I E T F
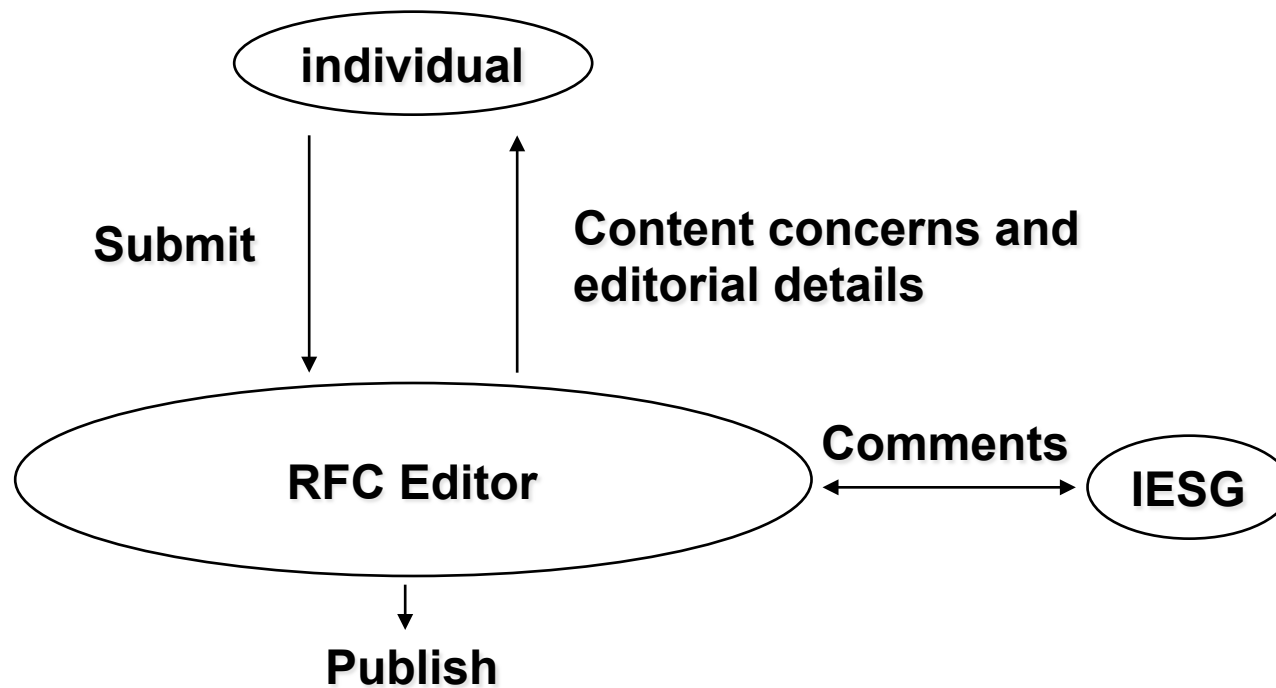
Birds of a Feather Sessions (BOF)

often precede formation of a Working Group

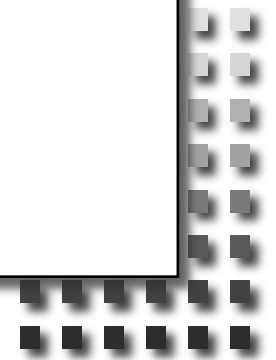group of people interested in a topic

convince an AD that they have a good idea - one
worth exploring

need description and agenda before a BOF can be
scheduled

and sometimes a draft charter

BOFs generally only meet once

can lead to a W G or can be a one time thing

I E T F

Working Groups

this is where the IETF primarily get its work done

- on mailing list
- face-to-face meetings focused on key issues (ideally)
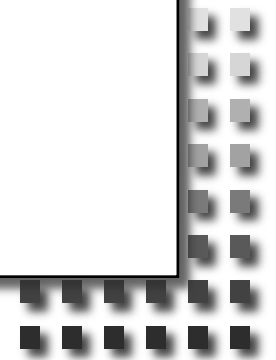 - note: face-to-face meetings generally very short

working group focused by charter agreed between chair and area director
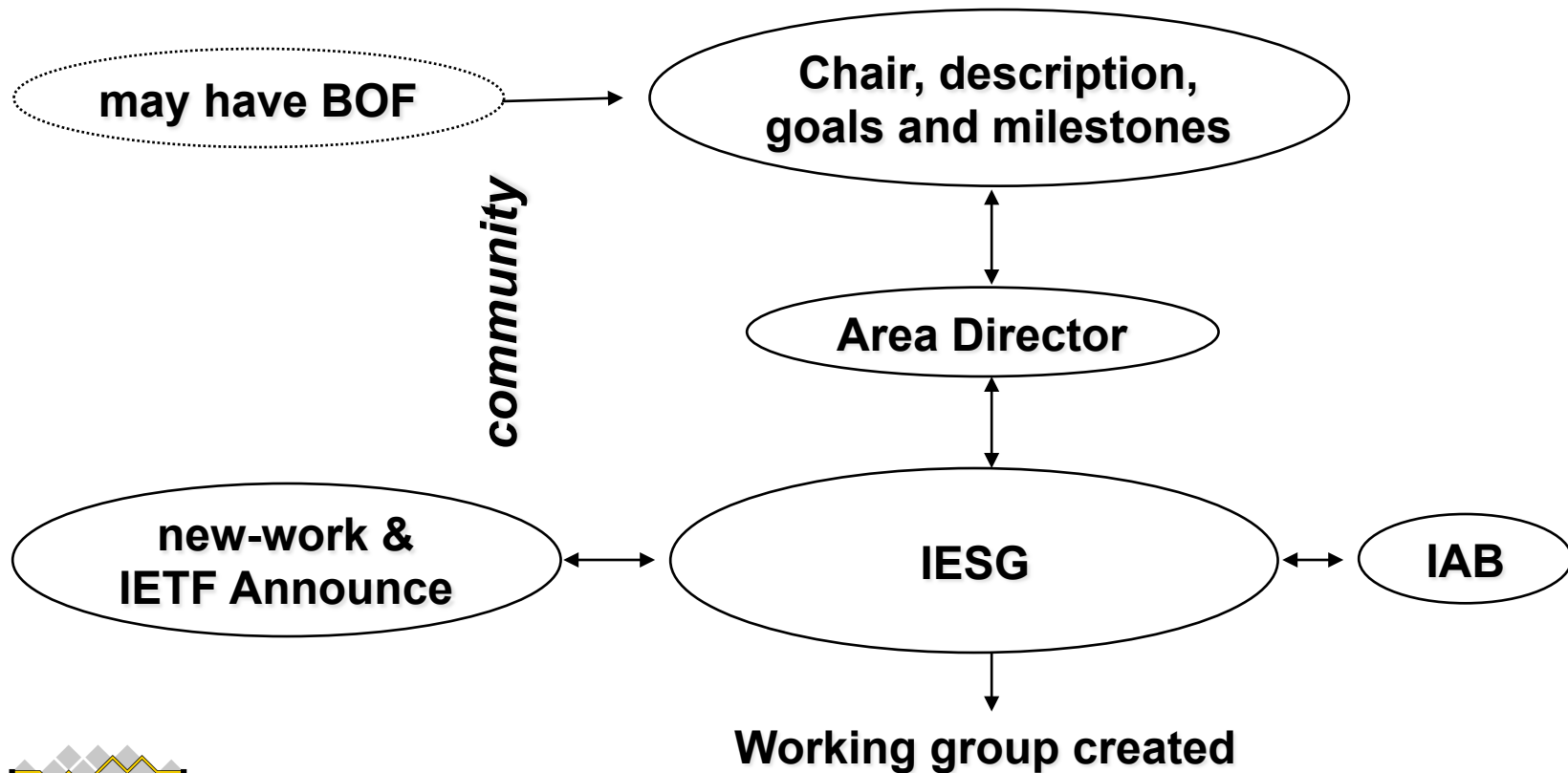
- restrictive charters with milestones
- working groups closed when their work is done

charter approved by IESG with IAB advice

AD with IESG has final say on charter

I E T F

Working Group Creation

may have BOF → **Chair, description, goals and milestones**

community

Area Director

new-work & IETF Announce ↔ **IESG** ↔ **IAB**

Working group created

I E T F

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

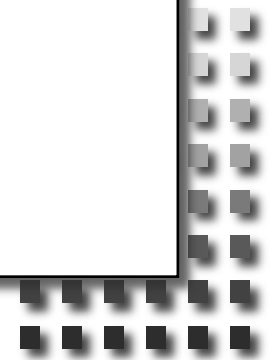   does **not** require unanimity

    disputes resolved by discussion

    mailing list and face-to-face meetings

    final decisions must be verified on mailing list

      taking into account face-to-face discussion

I E T F

IETF Document Format

English if the official language of the IETF

    but blanket permission is given to translate any IETF document into any language
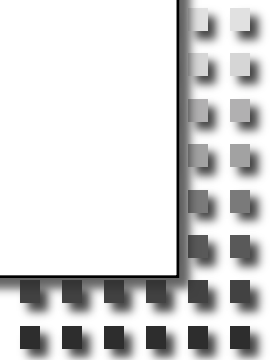
ASCII is the mailing list and document format

constant discussion of alternate formats

    IETF seen as behind the times

    but no consensus on alternative format

note that the current format is still readable after 38 years

I E T F

IETF Documents

all IETF documents are **open**

    i.e., anyone can download and copy

Internet Draft

    IETF working documents

    some I-Ds are working group documents

RFC

    archival publications (never changed once published)

    different types: (**not all RFCs are standards!**)

I E T F

IETF Working Documents

Internet-Draft

    random or non-random thoughts

    input to the process

    no admissions control other than boilerplate (see IPR)
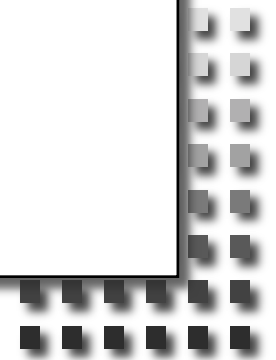
    removed from *IETF* directory after 6 months

      but many mirrors exist

    all RFCs must pre-exist as IDs

      to deal with IPR handoff

      (other than IANA or RFC Editor created ones)

I E T F

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 4400 RFCs
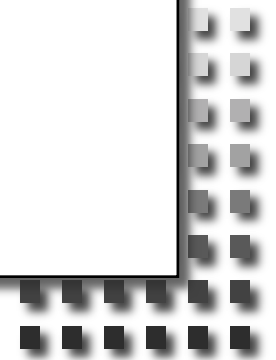
not all RFCs are standards!

    see RFC 1796

    though some vendors 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 (mp
    +)

experimental history

    Netblt

process documents

    IETF Standards Process

I E T F

RFC Editor

IETF publication arm

rfc-editor@rfc-editor.org

funded by the Internet Society

semi-independent

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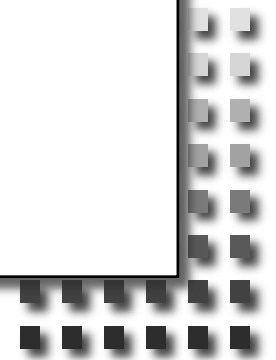- also gets requests to publish independent IDs for informational or experimental RFCs
  - asks IESG for advice on publishing independent RFCs
  - but can exercise own discretion
  - presumption is to publish technically competent IDs
    - which sometimes is a conflict with IESG

IETF reviewing RFC Editor role

I E T F

Standards Track RFCs:

Best Current Practices (**BCP**)

    policies or procedures (best way we know how)

3-stage standards track (currently under review)

    Proposed Standard (**PS**)

        good idea, no known problems

    Draft Standard (**DS**)

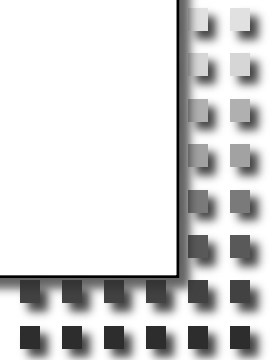   stable

        multiple interoperable implementations

        note: **interoperability** not conformance

    Internet Standard (**STD**)

        wide use

I E T F

Other RFC Types

Informational

Experimental

Historical

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** has not been followed,
    only then an appeal can be made to the ISOC Board
it is OK to appeal decisions – people do
    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

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?

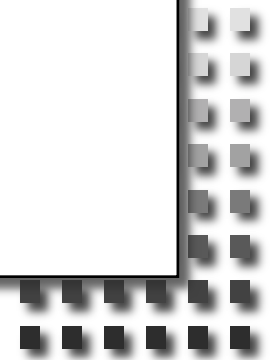 require "fair & non-discriminatory" licensing?

  what if IPR claim is false?

    e.g. an attempt to block the standard

    should the standards body evaluate validity of patents?
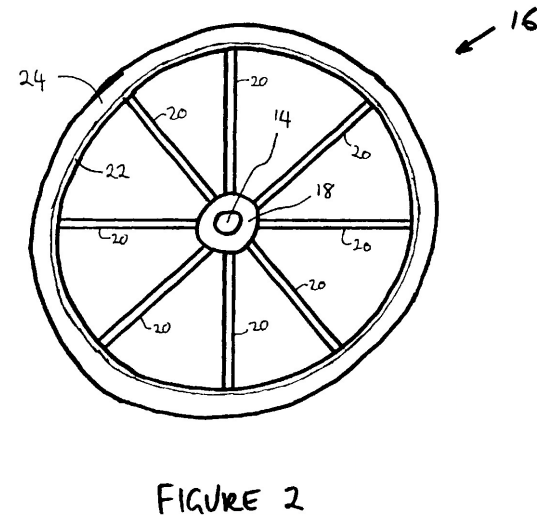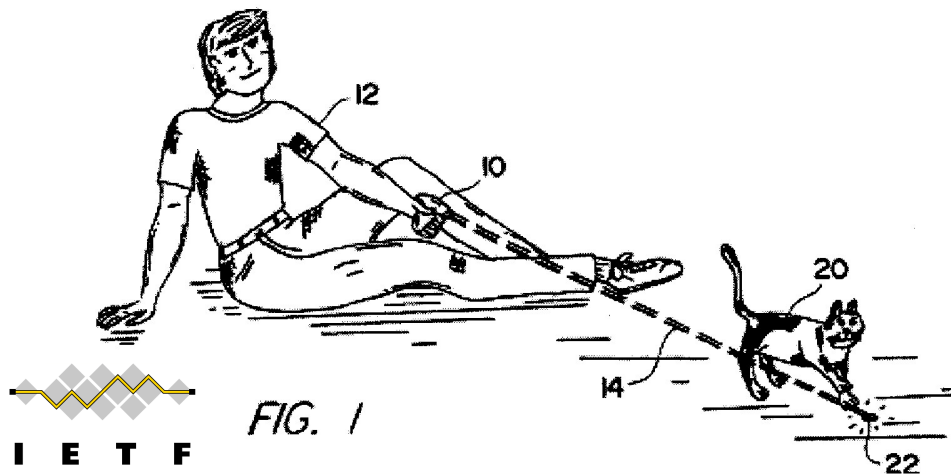
I E T F

Patents - Issues

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

FIGURE 2

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

  require multiple implementations based on multiple licenses to progress to Draft Standard or Internet Standard

but a worry about "submarine patents"

IPR working group

  clear up fuzzy language in RFC 2026

  produced RFC 3978 and RFC 3979

  tweaked by RFC 4748 to recognize the IETF Trust

I E T F

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 IPR

i.e., no patent search required

WG takes 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

I E T F

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

author(s) **retain** all other rights
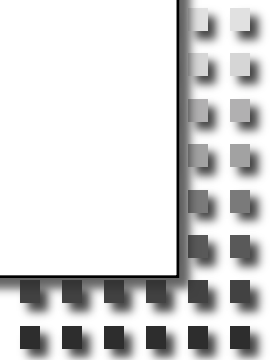
mandatory ID boilerplate statement

> 1/ agreement that IPR disclosures have been (or will be) made

> 2/ (optional) no right to produce derivative works

> not permitted for standards track documents

> 3/ (optional) just publish as ID

> 4/ Copyright statement

I E T F

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 ...

I E T F

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:

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- 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 ...

I E T F

Note Well (3)

"All IETF Contributions are subject to the rules of RFC 3978 and RFC 3979.

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 3978 for details."
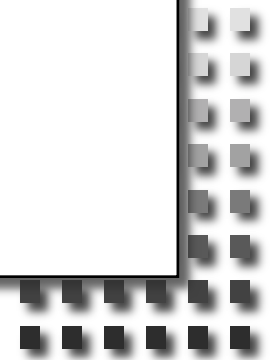
I E T F

Other IETF Training/Tutorials

1300 - 1445 New Comers (you are here)

1300 - 1445 Writing an RFC: The Definitive Guide

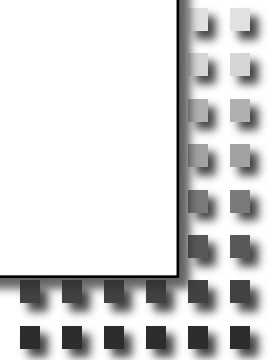*1300 - 1445 What MIB Document Editors Need to Know*

1500 - 1645 Bringing New Work to the IETF

1500 - 1645 Security Tutorial

1500 - 1645 Working Group Leadership Tutorial

1700 - 1900 Welcome Reception

(talking to IETF people is often an education!)

I E T F

What next?

join mailing lists

   this is where the work happens

read the drafts

don׳t be shy

talk to people

look for common ground

help people

don׳t settle for second-rate

I E T F

Questions?

I E T F