Standards development organizations
Introduction

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Introduction: learning goals

- Understand where cyberworld technology standards come from
- Understand the history and processes of the International Telecommunication Union

  Understand the history and processes of the Internet Engineering Task Force

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Introduction: this module

- This module deals procedures and policies, no technology

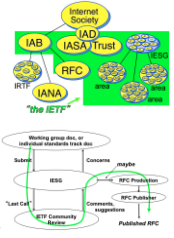3   Copyright © Scott Bradner & Ben Gaucherin 2016

Topics

- IT standards development organizations (SDOs) – R
  Review of the landscape of IT SDOs
- ITU history – O
  The history of the International Telecommunication Union (ITU)
- ITU-T process – O
  How the ITU-T makes IT standards
- IETF history – R
  The history of the Internet Engineering Task Force (IETF)

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Topics, contd.

- IETF purpose – R
  What the IETF thinks it purpose is
- IETF structure – O
  The structure of the IETF
- IETF operations - O
  How the IETF develops IT standards
- IETF management - O
  How IETF management is selected

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Topics, contd.

- IETF documents – R
  A roadmap to IETF documents
- IETF IPR – R
  The IETF's copyright & patent rules
- Publishing a RFC – O
  The different paths to get a RFC published in the IETF

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Technology standards
IT SDO landscape

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IP Standards Development Organizations

- Many SDOs involved in Internet or Internet Protocol standards development
- Many do not interact with others in any formal way
- E2e Internet enables isolated development of "standards"
- Following are some of the more important ones
  & what cyberworld area they work in

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ITU-T

- International Telecommunication Union ITU Telecommunications Standardization Sector

  Founded: 1993, history to 1865

  Area: telecommunications

  Member-based participation

  Members: countries (member states) & companies

  Member states approve standards

  Working documents: private
  Standards: public

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IEEE-SA

- The Institute of Electrical and Electronics Engineers Standards Association

  Founded: 1963, history to 1884

  Area: physical network (802)

  Member-based participation

  Members: companies & individuals

  Members approve standards

  Working documents: private

  Standards: 802 – free after 6 months

ISO

- International Organization for Standardization

  Founded: 1947, history to 1926

  Area: information technology & IT security, country codes

  Member-based participation

  Members: countries (member bodies)

  Members approve standards

  Working documents: private

  Standards: fee

IETF

- Internet Engineering Task Force

  Founded: 1986, history to 1969

  Area: Internet technology

  Participant-based participation

  Open participation by individuals

  Management committee (IESG) approves standards

  Working documents: public

  Standards: public

JTC1

- ISO/IEC JTC 1 (Joint technical committee)
  Founded: 1987 by ISO & IEC
  Area: where ISO & IEC IT standards are done
  Member-based participation
  Members: national standards bodies
  Members approve standards
  Working documents: private
  Standards: some public

ETSI

- European Telecommunications Standards Institute
  Founded: 1988
  Area: telecommunications
  Member-based participation
  Members: organizations
  Technical committee approves regular standards, EU national standards organizations approve EU standards
  Working documents: private
  Standards: public

W3C

- World Wide Web Consortium
  Founded: 1994
  Area: world wide web
  Member-based participation
  Members: organizations
  Management committee (Advisory Committee) approves standards
  Working documents: public
  Standards: public

3GPP

- 3rd Generation Partnership Program
  Founded: 1998
  Area: cellular telephony
  Member-based participation
  Members: members of supporting SDOs
  Supporting SDOs approve standards
  Working documents: public
  Standards: public

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International SDOs, Traditional

- Tend to be carrier centric
- Governments or national SDOs in approval process

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Open vs. Closed Standards & SDOs

- Multiple definitions of a "open" SDO
  Anyone can participate for free
  Anyone can participate but have to pay a fee
  Process to ensure that all impacted by a standard get to comment during development process

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Open standards
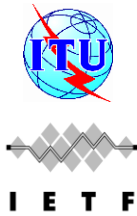
• multiple definitions of "open" standards

Standards that come from an "open process"

Standards available to anyone for free

Standards available to anyone but may have to pay a fee

Standards with no licensing required for implementation

Standards that anyone can change on their own

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OpenStand, Principles

• Due process
  Fair process & appeal mechanism
• Broad consensus
  All opinions considered
• Transparency
  Public comment period
• Balance
  No dominate participant
• Openness
  Open to all interested parties

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OpenStand, Principles, contd.

• Empowering standards
  Chosen based on technical merit
  Global interoperability
  Enable global competition
  Basis for further innovation
  Contribute to establishment of global communities
• Available
  Available to all
  Free or reasonable license
• Voluntary adoption
  Market based success

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Traditional Process

- Must reach consensus
- Final approval for standards by SDO with government involvement
  - Government represents interests of constituents (in theory)
- SDOs in a country are accredited by national body
  - e.g., ANSI for U.S.

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New Standardization

- Individual or industry
- No controlling government role

IETF

W3C WORLD WIDE WEB consortium

MEF METRO ETHERNET FORUM

DMTF

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Core Differentiator

IETF W3C

IEEE

multi-stakeholder

Vs

government-controlled

ITU

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Technology standards
ITU history

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ITU founding, 1865

Europe 1865

Delegates to ITC

- International Telegraph Union (ITU) founded in 1865
- To maintain International Telegraph Convention (ITC)
- ITC created by 1865 International Telegraph Conference

ITC negotiated by 20 European governments

Administrative (tariff and process) standards concerning telegraph interconnection

Very little technology

2

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Sample articles from 1872 convention

technology

encryption

Block traffic harmful to the security of the state

Tariffs

Disable service

Defining words

3

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Telephone, 1885

telephone equipment 1877

- Telephone patented in 1876
- ITU started developing telephone related regulations in 1885
- 5 paragraphs of telephone regulations in 76 pages of telegraph regulations
  Unit of charge: 5 minutes
  Max length of call unless no one waiting: 10 minutes
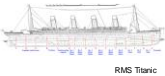- No important technology standards

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Radio, 1906

Radio Regulations 1906

RMS Titanic

- Radio regulations adopted in 1906 by Radio Telegraph Convention
  By national representatives from 29 countries
  Mostly administrative
  Established international spectrum registry
  Established "SOS" as international distress signal
- Radio regulations strengthened after Titanic sinking in 1912

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CCIT & CCIF, 1924 & 1925

- ITU formed:
  International Long-Distance Telephone Consultative Committee (CCIF) (1924)
  International Telegraph Consultative Committee (CCIT) (1925)
- Purpose:
  "*Responsible for coordinating the technical studies, tests and measurements being carried out in the various fields of telecommunications and for drawing up international standards.*"

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ITU, 1932

- Radio Telegraph Convention and International Telegraph Union (ITU) merged to become the International Telecommunication Union (ITU)

  Radio Telegraph Convention & International Telegraph Union

  Telecommunication: *any telegraphic or telephonic communication of signs, signals, writing, facsimiles and sounds of any kind, by wire, wireless or other systems or processes of electric signaling or visual signaling (semaphores)*

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ITU & UN, 1949

- ITU became a United Nations special agency for telecommunications January 1, 1949
- Mostly arm's length relationship

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CCITT, 1956 & 1993

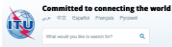- The Consultative Committee for International Telephony (CCIF) & the Consultative Committee for International Telegraphy (CCIT) merged to become the Consultative Committee for International Telephony and Telegraphy (CCITT) in 1956

  Hundreds of technical standards

  CCITT became the ITU Telecommunication Standardization Sector (ITU-T) in 1993

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ITU today

* Three sectors:
  Radiocommunication (ITU-R)
  Standardization (ITU-T)
  Development (ITU-D)
* Membership:
  Member states – countries
  Almost all UN countries
  Size-based fee
  From $20K to $10.8 M (U.S. & Japan) (2023)
  Sector members (ITU-T)
  $36,404 /year (2023)

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Technology standards
ITU-T process

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ITU decision makers

- All actual decisions are made by member states
  Structure, program and technology

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ITU WCIT

- World Conference on International Telecommunications
  Multi-week conference
  Held from time to time
      More than 25 year gap 1988-2012
  Only member states can participate
- Reviews & revises ITU treaty
  Unilaterally determines ITU roles

WCIT 2012
Dubai, UAE 3-14 DECEMBER
World Conference on International
Telecommunications

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ITU Plenipot

- ITU Plenipotentiary Conference
  Multi-week conference
  Held every 4 years
  Only member states can participate
- Sets ITU overall strategic direction and elects ITU senior leadership
  Can include quite specific goals for regulatory policies

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ITU-T structure, higher level
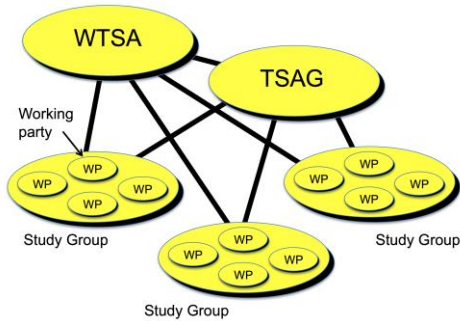
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WTSA

- World Telecommunication Standardization Assembly
  Multi-week conference
  Held every 4 years
  Only member states can participate
- Defines ITU-T structure, management, work plan and work procedures

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TSAG

- Telecommunication Standardization Advisory Group
- Responsibilities
  - Manage ITU-T activities
  - Review progress on WTSA goals
  - Guide SG work plans
  - Relationships with other SDOs
- Membership
  - SG chairmen
  - Member representatives
  - TSAG management (Chair etc.)

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Study Group

- SGs manage working parties
- Number and role of SGs change from time to time
- SG management includes
  - Chair & multiple Vice Chairs
- SG includes multiple topic specific Working Parties (WP)
- WP deals with multiple Questions
- Questions managed by Rappoteur(s)

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ITU-T standards development workflow

- Contribution driven
  - Could be suggestion for new work areas, a draft recommendation or an update to an existing recommendation
- Submit to SG
- May be assigned to a WP
- WP develops draft recommendation
- Submit draft recommendation to SG/WP meeting for "consent"

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ITU-T approval workflow

- **If consented**
  - 4-week last call for comments by member states
- **If no comments (or only editorial comments)**
  - Draft is considered approved
- **If substantive comments**
  - Post comments for 3-week review
- **If more substantive comments received**
  - Sent to SG plenary for discussion & possible approval

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Technology standards
IETF history

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In the beginning

Steve Crocker

- 1968: Network Working Group formed
  Ad-hoc group "concerned with the HOST software, the strategies for using the network, and initial experiments with the network" – RFC 3
    The Network Working Group name lived on in RFCs until late 2009
- April 1969: RFC 1
  Host Software – Steve Crocker
  Jon Postel became RFC Editor

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In the beginning

Vint Cerf

Dave Clark

- October 1969: the ARPANET started to be deployed
- 1974: Cerf & Kahn publish first version of TCP/IP (ITCP)
- 1979: Internet Configuration Control Board (ICCB) formed
  "To guide the technical evolution of the Internet Protocol suite"
    Formed by Vint Cert (ARPANET Program Manager at DARPA)
    Chair: Dave Clark (MIT)

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Internet Advisory Board (IAB)

Barry Leiner

- 1983: ARPANET moved to TCP/IP
- 1983: ICCB reorganized into the Internet Advisory Board (IAB)
  Reorganized by Barry Leiner – then APANET Project Manager
- 10 research task forces

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IAB task forces

IAB
TF TF TF TF
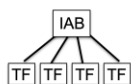
- Gateway Algorithms
- New End-to-End Service
- Applications Arch. and Requirements
- Privacy
- Security
- Interoperability
- Robustness and Survivability
- Autonomous Systems
- Tactical Internetting
- Testing and Evaluation

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Internet Activities Board (IAB)

Dennis Perry

- 1986: IAB reorganized into the Internet Activities Board (IAB)
  Reorganized by Dennis Perry – then APANET Project Manager
- 7 task forces
  Internet Engineering
  Internet Architecture
  Autonomous Networks
  New End-to-End Services
  User Interface
  Privacy and Security
  Scientific Requirements

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Internet Engineering Task Force (IETF)

Braun, Hans-Werner	U. of Mich.
Brescia, Mike	BBNCC
Callon, Ross	BBN Labs
Chiappa, Noel	MIT/Proteon
Eldridge, Charles	Sparta
Gross, Phill	MITRE
Hinden, Robert	BBNCC
Mathis, James	SRI
Mills, David (Chairman)	Linkabit
Nagle, John	Ford Aerospace
Natalie, Ronald	BRL
Rokitansky, Carl	DFVLR
Shacham, Nachum	SRI
Su, Zaw-Sing	SRI
Topolcic, Claudio	BBN Labs
Zhang, Lixia	MIT-LCS

2.2 Additional Attendees (5)

Clark, David	MIT-LCS
Corrigan, Mike	DCA
Deering, Steve	Standford
Meuzz, Robert	M/A Com
St. Johns, Mike	DCA (B612)

IETF Areas of Concern –

o Protocol Development and Stabilization,
o Protocol Conformance,
o An Implementors Support Organization,
o Internet Performance Measurements,
o ISO Conversion.

- 1st meeting January 1986
- 21 attendees
- Linkabit in San Diego, CA

The mission of this task force is to identify and resolve engineering issues in the near-term planning and operation of the DoD Internet. The goal of the effort is to improve and expand the service for operational users, including the gateway system and various networks operated (on behalf of all users such as Arpanet and Milnet)...

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Internet Activities Board (IAB) – v2

Vint Cerf – IAB Chair

Phil Gross – IETF Chair

Dave Clark – IRTF Chair

- 1989: IAB reorganized:

Reduced to 2 task forces:
  Internet Engineering Task Force: IETF
  Internet Research Task Force: IRTF
Established:
  Internet Engineering Steering Group
  Internet Research Steering Group
IAB Membership selected by chair
SG membership picked by IAB
IAB roles:
  Approves Internet standards
  Manages RFC publication
  Review IETF & IRTF operations
  Performs Internet strategic planning
  Internet technical policy liaison

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Internet Architecture Board (IAB)

INET '92 Kobe

- 1992: Internet Society (ISOC) formed
- IAB met in Kobe Japan after INET92
- IAB reorganized to form Internet Architecture Board (IAB)
- Chartered by ISOC
- Increased role of IESG in standards development

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IAB, Kobe & IPv7

Proceedings of the Twenty-Fourth
Internet Engineering Task Force

Massachusetts Institute of Technology
NEARnet
Cambridge
July 13-17, 1992

- 1992: The IAB, after the meeting in Kobe, published *IP Version 7*
- Which recommended:
  An immediate IETF effort to prepare a detailed technical and organizational plan for using CLNP as the basis for IPv7.
- Caused heated discussion in IETF community
  Issues:
  Who makes IETF decisions
  How best to evolve Internet Protocol

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POISED Working Group

Steve Crocker

- Vint Cerf called for new working group to examine processes and IESG/IAB selection processes
- POISED working group formed
  Chaired by Steve Crocker
- Restructured IETF/IAB
- Moved to nominations committee-based selections process

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Structure since 1992

I E T F

- Working groups organized into Areas
- Areas managed by Area Directors (ADs)
- ADs + IETF Chair = the IESG
- The IESG runs the IETF and is the standards review & approval body
- The IAB provides architectural advice, etc.
- ADs & IAB members picked by a nomcom

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The Internet Society emerging

- October 26, 1989: discussion of IETF liability
- Late 1989-early 1991: Vint Cerf & Bob Kahn started talking about forming the Internet Society
  Vint & Bob were at the Corporation for National Research Initiatives (CNRI)
  CNRI was serving as the IETF's secretariat
- August 30, 1991: ISOC announced

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The Internet Society emerging, contd.

- June 15, 1992: First Board meeting in Kobe, Japan
- Dec 11, 1992: ISOC incorporated
  as a 501(c)3 tax-exempt charitable organization in Washington, DC, USA

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Internet Society activities

- Support for Internet Technical Evolution
  IAB & IETF
  Offered to be IETF legal home & provide liability shield
- Meetings and Conferences
  INET conferences
- Information and Infrastructure Services
  Publish technical newsletter

INET'93 San Francisco

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Internet Society restructure

The Internet Engineering Task Force (IETF) is an organized activity of the Internet Society (ISOC).

- 1996: ISOC Board reorganized, charter memberships ended
- 1996: IETF accepted ISOC's legal housing offer with RFCs 2026 and RFC 2031
  - ISOC purchased insurance for IETF decision makers
- IETF is described as an "organized activity of the Internet Society"
  - IETF has no independent legal standing

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IASA & IAOC

- IETF agreed that ISOC was the IETF financial home with RFC 4071 (a.k.a. BCP 101) in 2005
  - All IETF funding handled by IETF Administrative Support Activity (IASA) ISOC under direction of the IETF Administrative Oversight Committee (IAOC)
    - Members include IETF & IAB chairs, ISOC President and people appointed by IETF nomcom, IAB, and ISOC Board

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ISOC re-restructure

- ISOC was originally a direct membership organization
- 2002: Public Interest Registry formed (.org)
  - Major ISOC funding source
- 2003: Board selection revised:
  - Trustees selected by IETF, and elected by chapters and organizational members

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IETF Funding

- Meetings and publications supported by U.S. government agencies until 1997
- Meeting fees started in March 1991 (IETF 20)
  - Initially *to defray some IETF meeting costs*
  - Later increased to also support Secretariat
- ISOC funding started in 1995
- U.S. funding ended in 1997
- Current funding from meeting fees, sponsors + ISOC

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isoc old - https://web.archive.org/web/19970605033539/http://www.isoc.org/
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Technology standards
IETF purpose & scope
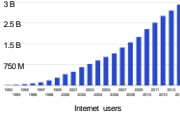
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IETF purpose

I E T F®

3 B
2.5 B
1.5 B
750 M

Internet users

- 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
  Will support the proper deployment and will scale
  Is secure and can be operated securely
  Is manageable
- IETF produces standards and other documents

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IETF "standards"

What is a mandatory standard?
A mandatory standard is a standard that requires compliance because of a government statute or regulation, an organization internal policy, or contractual requirement. Failure to comply with a mandatory standard usually carries a sanction, such as civil or criminal penalties, or loss of employment. (Source: ANSI's *Standards Management: A Handbook for Profit*)

ANSI

- IETF standards: not 'because we say so' standards
- 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
  Lack of formal government input to the IETF is seen as "a problem" by some

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The 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

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4   voip http://northriverit.com/unified-communications/

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Technology standards
IETF structure

CSCI E 45a: The Cyber World – part A

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Top level view of the IETF

covered by the LLC

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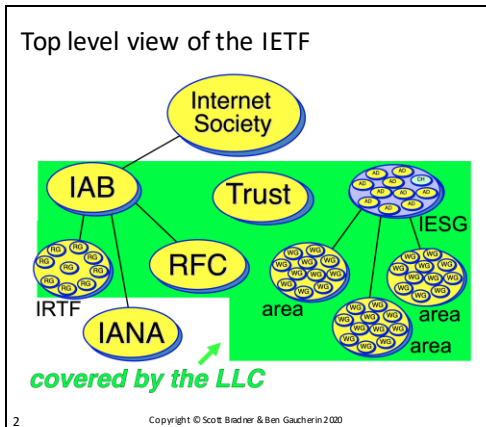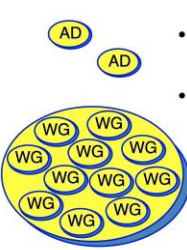
Working groups & areas

area

- Many Working Groups
  - Working Group Chairs: manage working group
  - Document Editors: edit individual documents
- Working groups organized into Areas, each with Area Directors (ADs)
  - Number of areas changes from time to time

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Area directors (ADs)

- Technical areas have 2 or 3 ADs
- Responsible for setting direction in Area
- Review working group documents prior to IESG review

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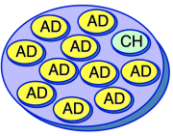
Area directors (ADs), contd.

- Responsible for managing process in Area

  Sponsor BOFs & propose working groups

  Ensure working groups follow proper process

  Have authority to change working group management

      Generally with IESG consultation

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Internet Engineering Steering Group (IESG)

IESG

- ADs + IETF Chair
- 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

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IESG, contd.
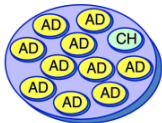
IESG

- Manages IETF process
- Approves BOFs
- Approves WG creation (with IAB advice)
- Part of appeal chain
- The IAB chair & an IAB liaison are ex-officio members of the IESG

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Internet Society (ISOC)

- Non-profit, non-governmental, independent, international organization
  Large numbers of organizational members, individual members & chapters in many countries
- Formed in 1992 to:
  Provide legal umbrella over IETF & to continue Landweber developing country workshops

Larry Landweber

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ISOC, contd.

The Internet is for everyone.

- ISOC mission:
  "To promote the open development, evolution, and use of the Internet for the benefit of all people throughout the world."
- IETF agreed to come under ISOC legal umbrella in 1996
  After a (long) open working-group-based discussion

RFC 2026
RFC 2031

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ISOC, contd.

- ISOC was the organizational and administrative home for IETF (2005-2019)
  - Legal umbrella, insurance, budget, bank account, etc.
  - Replaced by IETF Administrative LLC
- ISOC & IETF
  - 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

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Internet Architecture Board (IAB)
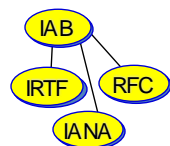
- Provides overall architectural advice & oversight
  - to IESG, IETF, IRTF & ISOC
- Deals with IETF external liaisons
- Appoints IRTF chair
- Selects & oversees IETF-IANA
- Appoints & oversees RFC Editor
  - IAB role under discussion

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IAB, contd.

- Chartered by & advises the ISOC Board
- Approves IESG slate from nomcom
- Step in appeals chain
- Provide input to IESG on WG formation & charters
- Convene topic-specific workshops
  - Mostly invitation only

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IAB, contd.

Programs
- RFC Editor Program: The RFC Series Oversight Committee (RSOC)
  - RSOC Procedures
  - RFC Series Oversight Committee (RSOC) Minutes
  - Past RSOC Members
- RFC Editor Future Development Program
  - Virtual Meeting: 2020-05-14
- Plenary Planning Program
- Liaison Oversight Program
- Internet Thread Model (model-t) Program
- IANA Program
- Evolvability, Deployability, & Maintainability (EDM) Program
- Concluded Programs
  - Security Program
  - Privacy Program
    - Privacy Reviews
    - IPv6 Privacy Survey
  - Privacy and Security Program
  - Names and Identifiers Program
  - ITU-T Coordination Program
  - IP Stack Evolution Program
  - IP Evolution
  - Internationalization Program
  - IETF Protocol Registries Oversight Committee (PROC)
  - IAB Tools and Processes Program
  - Emergency Services

- Write IDs/RFCs stating IAB opinion
  - With community & IESG review
- Participate in WG discussions
- IAB activities organized in multiple "programs"
  - IAB members plus others to ensure continuity
  - http://www.iab.org/activities/programs/
- Sponsor & organize IRTF

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Internet Research Task Force (IRTF)

I R T F

- Focused on long term problems in Internet
  - Topics not yet ready for standardization
- Multiple Research Groups
- Managed by IRTF Chair and IRSG

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Internet Assigned Number Authority

iana
Internet Assigned Numbers Authority

- IANA
- Need to assign & record parameters in IETF protocols
  - Ports, MIME types, etc.
  - At the request of the IETF and directly (for some values)
- Need to manage high-level IP address assignment
  - Assigns address blocks to 5 regional Internet registries
  - Which assign addresses to ISPs and end sites

Regional Internet registries

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IANA, contd.

ICANN

- Need to define top level domains (TLDs) - e.g., .com, .ca, .us, ...
- Maintains root server database of TLD server addresses
- The IANA predates the IETF
- IANA function currently preformed by ICANN under a MoU with the IETF

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IANA, contd.

Internet Assigned Numbers Authority

- 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

- IDs reviewed by IANA during IESG consideration

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IETF Secretariat

- Association Management Solutions, LLC - Fremont, CA, USA

    managed by IETF Administrative LLC

AMS

- Runs

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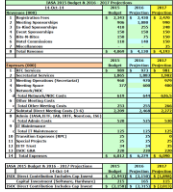
- Coordinates

    day to day work of IESG

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IETF Administrative LLC

Administration

The IETF Administration LLC (IETF LLC) provides the corporate legal home for the IETF, the Internet Architecture Board (IAB), and the Internet Research Task Force (IRTF).

The responsibilities of the IETF LLC include supporting the ongoing operations of the IETF, including meetings and non-meeting activities, managing the IETF's finances and budget, raising money on behalf of the IETF, and establishing and enforcing policies.

The IETF LLC is managed by the IETF Executive Director who is overseen by the IETF LLC Board of Directors.

- Non-profit (501(c) 3) corp.
- Provides the administrative structure required to support the IETF standards process: see RFCs 8711, 8713 & 8717
- LLC board members selected by IETF nomcom
- ISOC provided initial funding
- **Has no authority over the standards process**

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IETF LLC, contd.

- Develops 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

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IETF Trust

IETF Trust

Welcome to the IETF Trust homepage. The Trust was created by the Internet Society and the Corporation for National Research Initiatives as settlors, the Internet Engineering Task Force and the Initial Trustees on December 15, 2005

The purposes of the trust include the advancement of educational and public interest by acquiring, holding, maintaining and licensing certain existing and future intellectual property and other property used in connection with the Internet standards process and its administration, for the advancement of the science and technology associated with the Internet and related technology.

The Beneficiary of the Trust shall be the IETF as a whole and not any individuals who may participate in IETF activities or either of the Settlors.

We welcome your feedback. Suggestions should be addressed to the IAD at iad@ietf.org. You may contact the Trustees at trustees@ietf.org.

Recent Announcements

- Trustee License Use of Templates in RFCs
- Community Input on change to the Trust Legal Provisions to accommodate the inclusion of RFC Templates
- "Trustee Guide to Alternate "IETF Assistance" Trademark

Related Web Pages

ISOC and CNRI | IAB | RFC Editor | IANA | IETF | IETF Trust | ISOC

IEDC (Welcome to the IETF Trustee)

- Created in Dec 2005 to hold IETF-related IPR
  Copyrights (on RFCs etc)
  Domain names (e.g., ietf.org, rfc-editor.org)
  Trademarks
  Software paid for by IETF
  Databases
  Etc.
- IPR created under IETF contracts goes to Trust

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IETF Trust, contd.

IETF TRUST
Legal Provisions Relating to IETF Documents

- The IETF Trust is not a patent pool
- Publishes a document outlining Trust legal provisions:

Legal Provisions Relating to IETF Documents

https://trustee.ietf.org/documents/trust-legal-provisions/

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Technology standards
IETF Procedures

CSCI E 45a: The Cyber World – part A

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People, not companies

- People, not companies
  No government or corporate "representatives"

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

Dave Clark

Dave Clark (1992)

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Birds of a feather sessions (BOFs)

- Often precedes the formation of a Working Group
- Proposed by a group of people interested in a topic
- Need description, an agenda and an AD's approval before a BOF can be scheduled
  Some ADs require at least an Internet draft and a mailing list discussion

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BOFs, contd.

- BOFs generally only meet once
- Can lead to a WG or can be a one time thing
- BOFs help convince an AD that the group have a good idea – one worth exploring & there are enough interested people to do the work

4

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Working groups

Active IETF working groups

Concluded WGs   Historic charters

Applications and Real-Time Area (art)

art Area Directors (ADs)

Ben Campbell (ben@nostrum.com)
Alissa Cooper (alissa@cooperw.in)
Barry Leiba (barryleiba@computer.org)

art active WGs

Group	Responsible AD	Name
appsawg	Barry	ART Area General Applications Working Group
avtcore	Ben	Audio/Video Transport Core Maintenance
avtext	Ben	Audio/Video Transport Extensions
bfcpbis	Alissa	Binary Floor Control Protocol Bis
calext	Barry	Calendaring Extensions
cdni	Barry	Content Delivery Networks Interconnection
clue	Alissa	Controlling mUltiple streams for tElepresence
codec	Ben	Internet Wideband Audio Codec
core	Barry	Constrained RESTful Environments
dbound	Barry	Domain Boundaries
dispatch	Ben	Dispatch

- 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

- Sometimes preceded by a BOF

5

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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

6

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How IETF work gets done

- Generally, IETF technology development is done in Working Groups but can be individual effort
- Proposal published as a working document
  "Internet Draft" (ID)
- The ID is revised & republished based on working group discussion
  2-digit version number appended

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How IETF work gets done, contd.

- When working group thinks it is ready, the Internet draft is submitted to IESG via AD
- AD performs a technical and process review of the ID
  Returns ID to working group with comments if AD finds issues
- If AD approves, the IESG issues IETF-wide "Last Call" for comments
  2-week if working group ID
  4-week if individual ID

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How IETF work gets done, contd.

- IESG performs interdisciplinary technical review of proposal & reviews Last-Call comments
  Returns ID with comments if IESG finds issues
- If IESG approves, ID is sent to RFC Editor for publication as RFC

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Rough Consensus

- No defined IETF membership - just "participants"
- "***Rough consensus** and running code...*"
- Does **not** require unanimity
  - But issues need to be discussed

- No formal voting (can not define a constituency)
  - Can do show of hands or hum - but no count
    - Want to gage general level of consensus

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Rough Consensus, contd.

- Disputes attempted to be resolved by discussion
  - On mailing list and in face-to-face meetings
- Conclusion can be by rough consensus
- Conclusions reached during a face-to-face meeting must be verified on mailing list
  - Not always an easy thing to do

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10   balls http://www.fotosearch.com/CSP992/k13684694/
           hum http://www.conexaosabor.com.br/conexao-sabor-visita/63/
11   http://professorjosh.com/2012/08/08/online-discussions-versus-classroom-discussions/
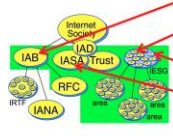
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Technology standards
IETF management & selection process

CSCI E 45a: The Cyber World – part A

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IETF management

- IAB job: 1/3 time
- AD job: half to 3/4 time
- IETF Chair job: full time
- IAOC member: 1/5 time
- Two year terms
- All volunteers
  No salary or expenses provided
      People are company- or self-
      supported
  Secretariat, RFC publication
  support & IAD are paid

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Selecting IETF management

The following are the seed selection that will be used on July 6, 2015 (2015-07-06).

Canadian Lottery Lotto 649
US public Debt
US intergovernmental holdings
Euromillions Lottery

Message from the 2015 IETF
nomcom chair

- Picked by a nominations committee (nomcom)
  Nomcom chair appointed by ISOC president
  Process described in RFC 3777
- Members selected randomly from a list of volunteers
  Requirement: be present at 3 of last 5 IETF meetings
  Very random process to select from volunteers: RFC 3797

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Selecting IETF management, contd.

ISOC BoT
IAB

IAB
AD   CH

IESG
IAOC
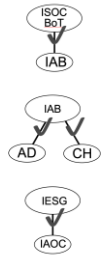
- Gets list of jobs to fill
  - List can include IETF Chair, ADs, IAB members & IAOC members
- Nomcom nominates one person for each job
  - IAB selections reviewed & approved by ISOC Board of Trustees
  - AD & IETF Chair selections reviewed & approved by IAB
  - IAOC selections reviewed & approved by IESG

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IETF management authority

the power of the ruler is delegated by the people and continues only with their consent.

Theodore Beza – 1579 – summarized by George Sabine

- IETF management can not speak for the IETF
  Unless the consensus of the IETF is known
  - E.g., from a consensus call on the mailing list
  IETF management can not commit the IETF to an action or to the development of specific standards
  Unless the consensus of the IETF is known and there are people interested in the work

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Technology standards
IETF documents

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ii. to translate IETF Contributions and IETF Documents into languages other than English, and to copy, publish, display and distribute such translated IETF Contributions and IETF Documents in full and without modification,

iii. to copy, publish, display and distribute unmodified portions of IETF Contributions and IETF Documents and translations thereof, provided that: …

Legal Provisions Relating to
IETF Documents – Dec 2005

- 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 (stands for "RFC")
  Archival publications (never changed once published)
  Updates or corrections gets new RFC numbers

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IETF document format

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iii. to copy, publish, display and distribute unmodified portions of IETF Contributions and IETF Documents and translations thereof, provided that: …

Legal Provisions Relating to
IETF Documents – Dec 2005

- ASCII text is the mailing list and old 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
- Publishing extracts of IETF documents is also OK
  As long as the IETF is properly acknowledged

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IETF document format, contd.

Data Link Switching: Switch to Switch Protocol - RFC 1434

- Constant discussion of alternate formats
  - IETF seen as "behind the times" - e.g., (almost) no drawings
  - XML-based format adopted after many years of trying
  - Text based documents are still produced
  - Note that the old format is still readable after 44 years
    - How many other SDOs can say that?

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Internet Draft (ID) naming

`draft-`

`draft-fan-opsawg-packet-loss`

- Can classify Internet Drafts using the ID's filename
- 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 offered to

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Internet Draft (ID) naming, contd.

`draft-ietf-opsawg-firewalls`

- Working Group IDs continue with "ietf-WGNAME"
- Filename continues with subject
- Filename continues with version number
  - Initial version "00"
- Filename ends with ".txt" extension

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Example ID names

Working Group document	**draft-ietf-idr-bgp4-26.txt** 26th revision of BGPv4 specification Interdomain Routing Working Group working document
Individual submission	**draft-bradner-rfc3979bis-05.txt** 5th revision of my proposed update to RFC 3979 Not a working group document
IAB publication	**draft-iab-rfcformatreq-03.txt** 3rd revision of an IAB document on requirements for the formats of RFCs

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Types of RFCs
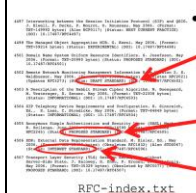
- Standards track
  Technical and process standards
      BCP, Proposed Standard, Internet Standard
- Informational
  Technical specification requirements or background
  Corporate documentation
  Work of other SDOs
  April Fools Day jokes
- Experimental
  Ready for people to try out
- Historical
  No longer recommended
- Index provides current status

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Standards track RFCs

- Best Current Practices (**BCP**)

Policies or procedures (best way we know how)

IETF standards process published as BCPs

    RFC 2026 is the RFC that defines the IETF standards process

RFC-index.txt

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Standards track RFCs

- 2-stage standards track

(used to be 3-stage)

Proposed Standard (**PS**)

Full IESG review, 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

RFC-index.txt

"Running Code"

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Technology standards
The IETF IPR rules

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Who do the rules apply to?

Note Well
A reminder of IETF policies.

This is a reminder of IETF policies in effect on various topics such as patents or code of conduct. It is only meant to point you in the right direction. Exceptions may apply. The IETF's patent policy and the definition of an IETF "contribution" and "participation" are set forth in BCP 79; please read it carefully.

As a reminder:

- By participating in the IETF, you agree to follow IETF processes and policies.
- If you are aware that any IETF contribution is covered by patents or patent applications that are owned or controlled by you or your sponsor, you must disclose that fact, or not participate in the discussion.
- As a participant in or attendee to any IETF activity you acknowledge that written, audio, video, and photographic records of meetings may be made public.
- Personal information that you provide to IETF will be handled in accordance with the IETF Privacy Statement.
- As a participant or attendee, you agree to work respectfully with other participants please contact the ombudsteam (https://www.ietf.org/contact/ombudsteam/) if you have questions or concerns about this.

- All participants in the IETF are subject to the IETF's IPR rules
- Acknowledgement of rules required to register to a meeting, to sign up to a mailing list or to post an Internet draft
- A statement of the requirement is shown at the start of most IETF face-to-face sessions

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ITEF IPR: two types of IPR

Anno Octavo
Annæ Reginæ.

An Act for the Encouragement of Learning, by Vesting the Copies of Printed Books in the Authors or Purchasers of such Copies, during the Times therein mentioned.

Statute of Anne - 1709

To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.
U.S. Constitution. Article One, section 8, clause 8

- Copyright
  The right to the text in the document
- Patent
  The right to the technology discussed in the text

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IETF Copyright rules

Copyright and IETF Copyright Policies

▸ Why are copyrights relevant to the IETF?

Copyright law protects all forms of creative expression, including written documents, images, diagrams, audio recordings, software code and even designs printed on t-shirts. Almost all countries have some form of copyright law, and most developed countries adhere to the so-called Berne Convention on Artistic and Literary Works, which normalizes copyright protection among member countries.

Copyright is relevant to IETF because almost all written documents are protected by copyright. This includes Internet-Drafts, RFCs and all code that is included in these documents.

This FAQ addresses copyright and licensing issues relating to IETF Documents (Internet-Drafts and RFCs) and other contributions to the IETF standards process, as well as documents published as Internet-Drafts and RFCs in the Independent Stream, IAB Stream and IRTF Stream.

▸ Where can I find the IETF's policy regarding copyrights?

The IETF copyright policy is currently set out in two documents: RFC 5378 and the IETF Trust's Legal Provisions Relating to IETF Documents which we sometimes refer to as the "TLP". For reference, superseded versions of the TLP are also cataloged here.

▸ When did the current policy go into effect, and what about documents that were published or submitted before that?

IETF's current copyright policy in RFC 5378 became effective on November 10, 2008 and applies to all IETF Contributions submitted on or after that date and to all IETF Documents published on or after that date.

- The author(s) need to give non-exclusive publication rights to IETF Trust to get anything published
  - Mailing list submission, Internet Draft, RFC
- Also (normally) the right to make derivative works
  - This right required for standards track documents
- The author(s) retain all other rights

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IETF patent rules

Worry about undisclosed (submarine) IPR

- Based on the requirement that IETF participants disclose IPR when it might relate to IETF work
- Working groups take disclosed IPR into account when developing IETF specifications
- IETF does not require that specifications not have any IPR disclosures
  - Working group makes up its own mind on what technology to adopt

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IETF patent rules, licensing

RAND: reasonable and non-discriminatory

FRAND: Fair, Reasonable and Non-Discriminatory

- The IETF does not require that an IPR disclosures include licensing information
  - But it is requested

  The IETF does not require that working groups adopt IPR just because it has free, RAND or FRAND licensing

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IETF patent rules, when must you disclose?

reasonably and personally means a patent search is not required, but that you, yourself, know, or should have known because of your job, of the IPR

your IPR means a patent or patent application that you or your sponsor owns or would benefit from

A/ When you **reasonably and personally** know of **your IPR** that would necessarily be infringed by someone implementing an IETF specification

Not limited to standards track documents

Note that this includes patent applications!

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When must you disclose, contd.

And

B/ the IPR is in a contribution you make to the IETF

Or

C/ the IPR is in a contribution someone else makes to the IETF and you are participating in any discussions on that contribution

Participating means doing anything to impact the discussion

8

When it would be nice if you disclosed

- The IPR is in a contribution someone else makes to the IETF and you are not participating in any discussions on that contribution

9

When to disclose

- Disclosures must be made as soon as practical after the realization that the IPR requires a disclosure
  - i.e. do not wait until last call or any other event
- Many companies insist that company lawyers make IPR disclosures

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What is a disclosure & how do I make one?

File an IPR Disclosure

- A disclosure is a claim of IPR
- Link on IETF home page
- What must be in a disclosure
  - IPR holder's name & contact
  - Patent (or application) information
  - Disclosure submitter's name & email
- What is also requested
  - IETF participant's name and email
  - Which IETF document or contribution triggered disclosure
  - Licensing declaration
    - Licensing type & details

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What is a contribution?

- A/ any submission intended to be all or part of an Internet Draft or an RFC
- B/ submissions in the form of oral statements or email intended to be input to an IETF activity, group or function
  - Some plenary or technical talks by 3rd parties at IETF meetings are not IETF contributions

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Working group preferences

- IETF working groups tend to prefer technology with no known IPR claims

  But the IETF has published many RFCs that had IPR disclosed prior to adoption

  It is up to the working group

  Seconded guessed by the IETF community and by the IESG

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Technology Standards
Publishing a RFC in the IETF

CSCI E 45a: The Cyber World – part A

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Getting your work done

- Three different ways to get a RFC published – will explore each way
  IETF track: working group
       All RFC types
  IETF track: individual submission
       All RFC types
  Independent submissions track
       Informational & experimental RFCs
- First thing: discuss your ideas with a few people
  A "sanity check"
  Listen to what they have to say

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Getting your work done, contd.

- Next: publish your ideas in an Internet draft (ID)

draft-YLN-xxxx-00.txt

  Publish using your own last name
       Last name of 1st author if multiple authors
  Include the working group name if targeted at a specific working group

draft-YLN-wgname-xxxx-00.txt

  Note: lots of authors does not help
  Limit to number of authors that may be listed on 1st page of RFCs
  ID quality gaged by its contents

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IETF track, working group

- If the right working group exists & topic is in its charter
- Send a message to working group mailing list
  Announcing publication of the ID
  Asking working group to consider the ID for adoption as working group document

draft-YLN-wgname-xxxx-01.txt
draft-YLN-wgname-xxxx-02.txt
draft-YLN-wgname-xxxx-03.txt

draft-ietf-wgName-xxxx-00.txt

- Working group is not required to adopt your ID
  May require multiple revisions based on comments
- If adopted, republish ID with working group name

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IETF track, working group, contd.

- Working group will discuss the ID
- The ID is revised based on the working group discussions

draft-ietf-wgName-xxxx-01.txt
draft-ietf-wgName-xxxx-02.txt
draft-ietf-wgName-xxxx-03.txt

- Important issues may have to discussed at a working group session during an IETF meeting
  Or at a working group interim meeting

5

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IETF track, working group, contd.

- Revisions continue until working group feels ID is "done"

draft-ietf-wgName-xxxx-04.txt
draft-ietf-wgName-xxxx-05.txt
draft-ietf-wgName-xxxx-06.txt
draft-ietf-wgName-xxxx-07.txt

  The working group chair(s) may issue a "working group last call" to determine if there is consensus that the ID is "done"
    No defined time period for a working group last call

- Need to designate a "document shepherd"
  Does writeup for the IESG

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IETF track, working group, contd.

- The working group chair(s) then send a message to the working group's "responsible AD" asking for publication
  - AD = area director
- The responsible AD reviews the ID to determine if the AD feels it is ready
  - AD will return it to the working group, with comments, if not

draft-ietf-wgName-xxxx-09.txt

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## IETF track, working group, contd.

IESG
Internet Engineering
Steering Group

- When the AD feels the ID is ready, the AD forwards the request & writeup to the IESG
- IESG will issue a IETF-wide "last call" for comments
  - Also goes to other SDOs
  - Two-week last call period
- May receive reviews from assigned reviewers
  - Area directorates, Gen ART

8
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IETF track, working group, contd.
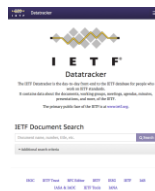
- The IESG will then review the ID and any last call comments to determine if they think the ID is ready
  - IESG will return it to the working group, with comments, if not
- Individual ADs record their opinions on the ID
  - Can record a "discuss"
  - Often, an ID must be revised to satisfy AD discuss(es) before IESG will approve
    - Track progress with datatracker
    - https://datatracker.ietf.org/

draft-ietf-wgName-xxxx-10.txt
draft-ietf-wgName-xxxx-11.txt

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IETF track, working group, contd.

RFC *Editor*

RFC NNNN

- The IESG will send a publication request to the RFC Editor when they feel the ID is ready
- The RFC Editor will copy edit the ID and, after verifying any edits with you, publish a RFC

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IETF publication process

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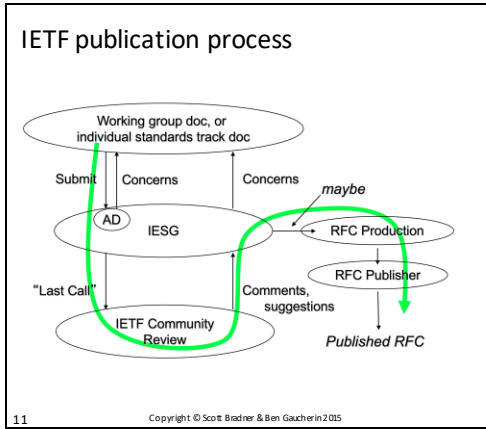
IETF track, working group, not in charter

- Working group exists but topic is not in the charter
- Work with the working group chair(s) to see if they would support revising the charter
  The chair(s) do not have to agree to add the topic to the charter
  If the chair(s) agree, they will work with the AD to see if the IESG agrees (they do not have to)
    If not, then this path is closed
- You proceed as above if the IESG updates the charter

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IETF track, no existing working group

- If the right working group does not exist

  Talk to an appropriate area director about holding a BOF

  AD might tell you "no" or to first set up a mailing list, or use an existing mailing list, and hold a discussion

  If a BOF is held & it demonstrates interest, work with the AD to try to form a working group

- Note that, generally, an ID author is not selected as a working group chair

  To avoid conflicts of interest in managing discussions

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IETF track, individual submission

- Set up a mailing list to discuss your ID
- Iterate your ID based on the discussion
- When you think it is ready talk to a AD working in the area about submitting your ID for publication
- The AD may agree to review the ID – but is not required to

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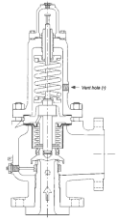## IETF track, individual submission, contd.

- If the AD agrees to review the AD & agrees to support it after reviewing it, the process proceeds like the normal working group process

  Except that the last call period is four-weeks (instead of two)

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Independent submissions track

- Can publish non-IETF technical documents
  - e.g. proprietary vendor technology
- Safety valve for IETF
  - Can publish rejected proposals
- Can only publish informational or experimental RFCs

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Independent submissions track, process

- Submit ID to Independent stream editor (ISE)
- ISE may ask RFC editorial board to review
- ISE will take reviews under consideration
- ISE then evaluates comments along with his or her own review

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Independent submissions, contd

- ISE may tell authors that a revised ID is needed
- If ISE decides that the ID is proper to publish as an RFC
- ISE then asks IESG if they have an issue, IESG can:
  - Recommend not publishing
  - Ask authors to submit ID to a current working group (WG)
  - Ask authors to help form a WG
  - Say they do not care
- If all is OK , ISE asks RFC-Editor to publish as a RFC

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Additional resources

- An informal guide to the IETF process
  https://www.ietforg/about/process-docs.html
- IESG Statement on Document Shepherds
  https://www.ietforg/iesg/statement/document-shepherds.html
- To monitor the status of your ID in the process
  http://datatracker.ietforg/

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Technology standards
Conclusion

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SDO summary

- Lots of SDOs
- ITU-T is the primary telecommunications SDO
  Founded in mid 1800s to deal with telegraph regulations
- IETF is the primary Internet technology SDO
  Founded in 1986 to deal with Internet protocol standards

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SDO types

- Traditional SDOs
  Membership-based
      Governments & companies
  Governments have deciding vote
  Approval requires consensus
- Most "new" SDOs
  Membership-based
      Companies
  Approval requires consensus
- IETF
  No members
  Approval requires rough consensus

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IPR

- IPR an issue for all SDOs
- Copyright & patent

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