

Creating the Internet Standards

Harald Alvestrand
IETF chair, Cisco Fellow

“

**There is nothing like a
dream to create
the future.**

”

Victor Hugo

The Internet around us

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- Internet—anytime, anywhere
- Used for all purposes, all the time
- Wireless is obvious
- High speed is commonplace



It's not about computers any more

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Dedicated computer appliances
are everywhere

Set top boxes
Downloadable Audio (MP3)
Electronic Books
Intelligent phones
Browser appliance
“5 IP devices per body”

Connected to the Internet and to each other!



So – who makes the rules?

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- **Governments?**
- **Industry?**
- **All of us?**
- **All of us!**

The IETF - History

Internet Engineering Task Force (IETF)

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- **Historical developer of Internet-related protocols**

[Http://www.ietf.org](http://www.ietf.org)

A gathering of individuals from

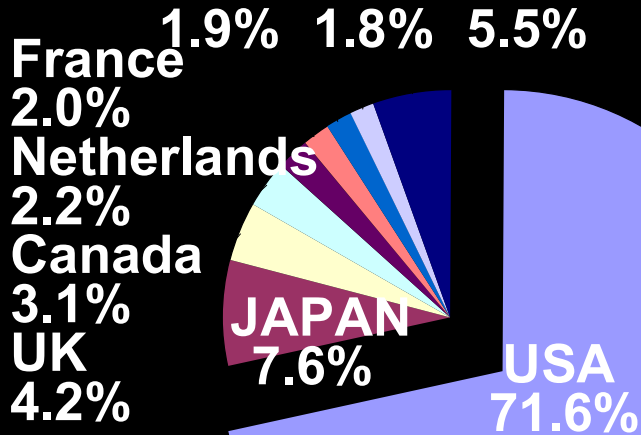
Research, Education, Network operators, and Internet vendors

- **Started in 1986 (DARPA sponsored)**
- **No government sponsorship since mid-90s**
- **Had its 60th meeting in August this year**

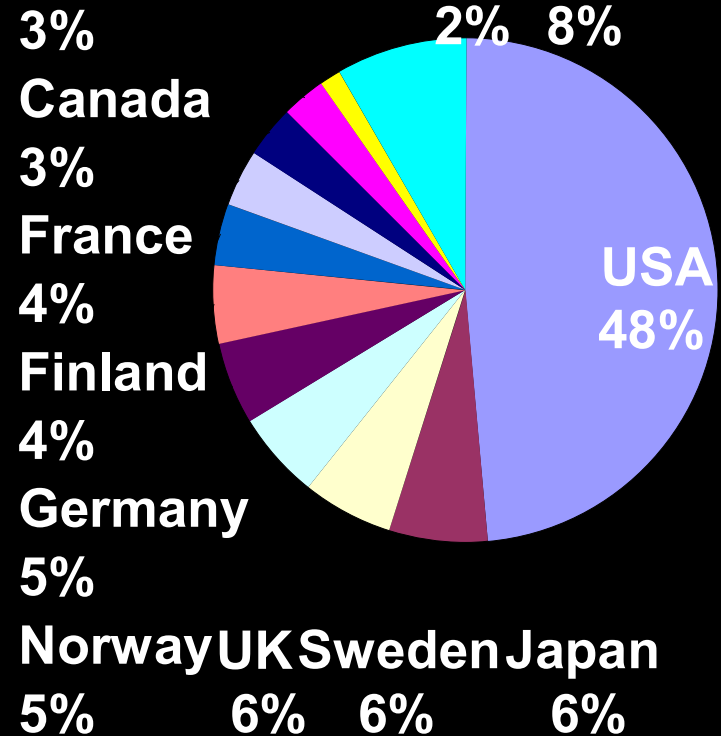
IETF – started US, became international

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Germany Sweden Other



Netherlands Italy Other



- December 1996 (San Jose)
- 11 Countries

- July 1999 (Oslo)
- 33 Countries

IETF structure

IETF structures and key forums

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- **Internet Architecture Board**
- **Internet Engineering Steering Group**
- **Working groups in eight areas**

Internet Architecture Board (IAB)

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- **Mission**
 - Oversight of IETF, IRTF, IANA, liaisons**
 - Think tank for “Internet Architecture”**
- **Recent activities**
 - Liaisons with OMG**
 - Research – what does the IETF need?**
 - IETF admin support reorganization**

Internet Engineering Steering Group (IESG)

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- **Mission**

- Working group chartering and management
 - Assure openness and adherence to process
 - “Quality assurance” on specifications

- **Activities and trends**

- Making the system more effective
 - Continue to promote simplicity and clean architecture
 - IETF admin support reorganization

Working groups in eight areas

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Internet

Routing

Transport

Applications

(Sub-IP)

Security

**Operations and
management**

General

Working groups are the heart of IETF

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- **All WGs are open to all people**
- **Where consensus and understanding is developed**
- **Charged by IESG to do specific tasks**
- **Led by, but not ruled by, a WG chair**

Working group summary

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- **We have more than 120 working groups**
Not all currently active
- **Maintain the v4 Internet**
- **Enable the v6 Internet**
- **Create the mobile Internet**
- **Make all the Internet useful and secure**

IETF process

Fundamental working principle

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“

**We reject kings, presidents, and
voting.**

**We believe in rough consensus
and running code.**

”

**Dr. David C. Clark,
Massachusetts Institute of Technology**

Membership

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- **IETF members are people**
As opposed to nations or companies
- **Communications tend to be among people**
As opposed to working groups, boards, etc.
Have trouble understanding “liaison”

Fundamental perspective of enlightened self-interest

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- **There is no one organization or company which has a corner on intelligence or expertise**
 - Good ideas come from everywhere and anywhere**
- **Growing the Internet is good for all of us**
 - A larger Internet creates larger markets.**
 - Larger markets create cheaper products.**
 - Cheaper products create more end-user value.**
 - More end-user value makes the Internet grow.**

A document goes through two stages

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- You write an Internet draft
- The IETF publishes an RFC

- **Most analogous to ITU “contributions” and “working papers”**

Not necessarily work items

Half of all Internet drafts are simply documents people have chosen to post

Nine out of ten I-Ds do NOT result in RFCs

- **Types of drafts**

Working group documents (draft-ietf-wgname)

Submissions to working groups

Individual submissions

- **Historical archive**
- **Many kinds of documents**

Informational

Historical

Experimental

Standards

- **Standards**

Proposed, draft, full

Best current practice

Check index for status!

Development process

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- **Bottom-up**

 - Working Group charters are developed to support work people want to do

 - IESG review to make sure charter addresses important issues and fits with other work

- **Development process**

 - Working groups develop

 - Talk until "rough consensus" reached

 - IESG reviews

 - RFC editor publishes

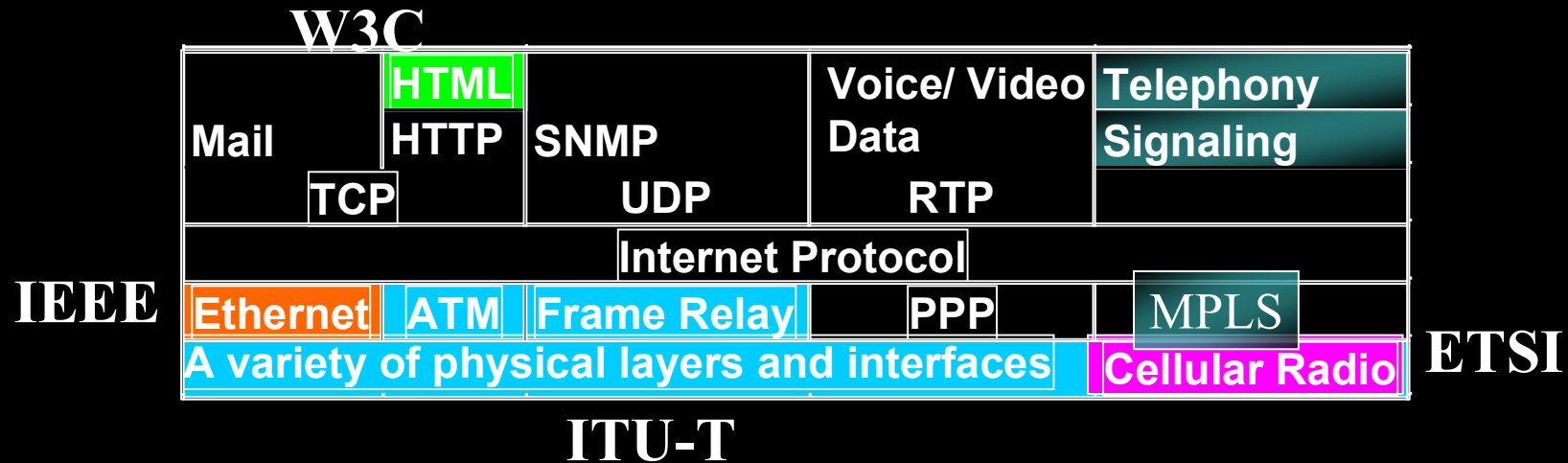
Relations among standards bodies

**“Anyone who likes legislation or sausage should watch neither one
being made”**

Baron von Bismarck

Dividing the world by technology

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- Applications come from all over
- IETF

Provides network infrastructure

Tends to use interfaces defined by other bodies

Wants to make sure the whole thing works

IETF: infrastructure protocols

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- **Some link layer**
 - PPP
- **Network layer**
 - IPv4, IPv6
 - Routing protocols
- **Transport layer**
 - TCP, UDP, RTP
- **Security services**
 - Transport layer security, IPSEC, ISAKMP
- **Telephony signaling**
 - Signaling transport
- **Quality support**
 - Differentiated services
 - Integrated services

IETF: infrastructure applications

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- **SNMP management**
- **SMTP mail**
- **DNS name services**
- **LDAP directory services**
- **SSH virtual terminal protocol**
- **FTP file transfer**
- **HTTP web transfer**
- **And more...**

How standards groups work

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- **Who decides what to work on?**
- **Who participates in the work?**
- **Who decides on the result?**
- **(Does theory match reality?)**

Types of participation in standards

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- **3GPP: Companies vote.**
- **IEEE: Members vote.**
- **ITU: Companies talk. Governments vote.**
- **W3C: Companies talk. Director decides.**
- **IETF: People talk. Nobody votes.**
 ”rough consensus”, judged by IESG

The IETF way to attack a question

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- **Get a group of people together**
- **Have a discussion – in public**
- **Repeat a lot of "old wisdom"**
- **Try to figure out what is new ideas**
- **Figure out what might work**
- **Try it out**
- **Make a protocol embodying the concept**

Why is IETF effective?

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- **Openness – you expose your ideas by coming to the IETF**
- **Respect for reality – people know how networks work**
- **Wide participation – people with widely different backgrounds participate**

Challenges to IETF effectiveness

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- **People who talk and talk**
Even when not having facts in support
- **People who do not talk**
Even when their knowledge/viewpoint is important
- **People who do not desire consensus**
- **People who do not do what they promise**
- **People who do not show up**

The Future is Not Organizational

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- **Next Generation Networks: One Net to fit them all – QoS meets the Internet**
- **Privacy, security, wiretap and All That**
- **Bridging the Digital Divide**
- **The IETF is just part of this picture**

The IETF in the 21st Century

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- **Keeping focus on core Internet technology**
- **Keeping focus on the individual's voice**
- **Continuing to be open to all**
- **Continuing to be useful to the Internet**