

SIGNALING FUTURES '99 **NORTEL NETWORKS**
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PRESENTATION NAME
Convergence and the IETF

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Company: Harvard University

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Outline

- **IETF overview**
- **the IETF & VoIP**
- **IETF telephony related work**
- **IETF IP QoS work**
- **other related IETF work**
- **timeframes**

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What is the IETF?

- **an engineering organization**
- **a group of people who solve Internet problems**

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An engineering organization

- **vendors**
- **users**
- **network operators**
- **academics**
- **researchers**
- **all as individuals**
- **no membership**

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Short history of the IETF

- **Initial DARPA research in 1970's using NCP**
 - Telnet
 - file transfer
 - electronic mail
- **Production network**
 - definition of Internet Activities Board (IAB)
 - IP4 and TCP deployed 1981-1983
 - MILNET/ARPANET division 1983

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IAB oversight period

- **1986**
 - Internet Assigned Number Authority (IANA)
 - Internet Research Task Force (IRTF)
 - Internet Engineering Task Force (IETF)
 - some other task forces
- **1987**
 - Working groups
- **1988**
 - Internet Engineering Steering Group (IESG)

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IAB oversight period, contd.

- **1989**
 - dissolution of other task forces
- **1992**
 - leadership redefined
 - IAB => "Internet Architecture Board"
 - IESG: manages the IETF & approve standards

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1992: Internet Society oversight

- **process evolution (poised/poisson)**
 - Standards track detailed - RFC 2026
 - Intellectual property rights (IPRs)
 - Handling of appeals
- **Internet Society: interface to outside world**
 - Corporate / legal umbrella
 - Evangelism - INET conference
 - Policy areas

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Role of IETF in the development of the Internet

- **protocol definition**
- **infrastructure issues**

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Protocol definition

- **all infrastructure protocols since 1986**
- **Examples:**
 - PPP**
 - OSPF**
 - SNMP**

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Infrastructure issues

- **Routing and addressing**
 - IP6 addressing
 - network address translation
 - BGP policy routing
- **Security**
 - IPSEC authentication
 - IPSEC encryption
 - ISAKMP key exchange

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Infrastructure issues, contd.

- **Next generation issues**
 - IP/ATM
 - Label switching
- **Quality of Service issues**
 - intserv
 - RSVP
 - diffserv

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Relationship between the IETF and other standards bodies

- ITU-T
- ATM forum
- IEEE
- W3C
- DAVIC

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Types of standards

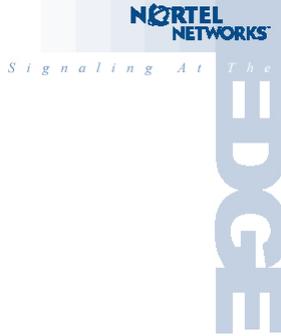
- de jure standards
- de facto standards
 - corporate consortia
 - individual efforts

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De jure bodies

- ITU-T
- ISO
- IEEE
- ANSI

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Closed industry consortia

- W3C
- DAVIC
- ATM Forum
- Frame Relay Forum

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McLuhan's global village

IETF

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Relationships:

- **liaisons**
ITU-T, ISO study groups
- **share people with other organizations**
more effective than formal liaisons
but confuse other standards organizations

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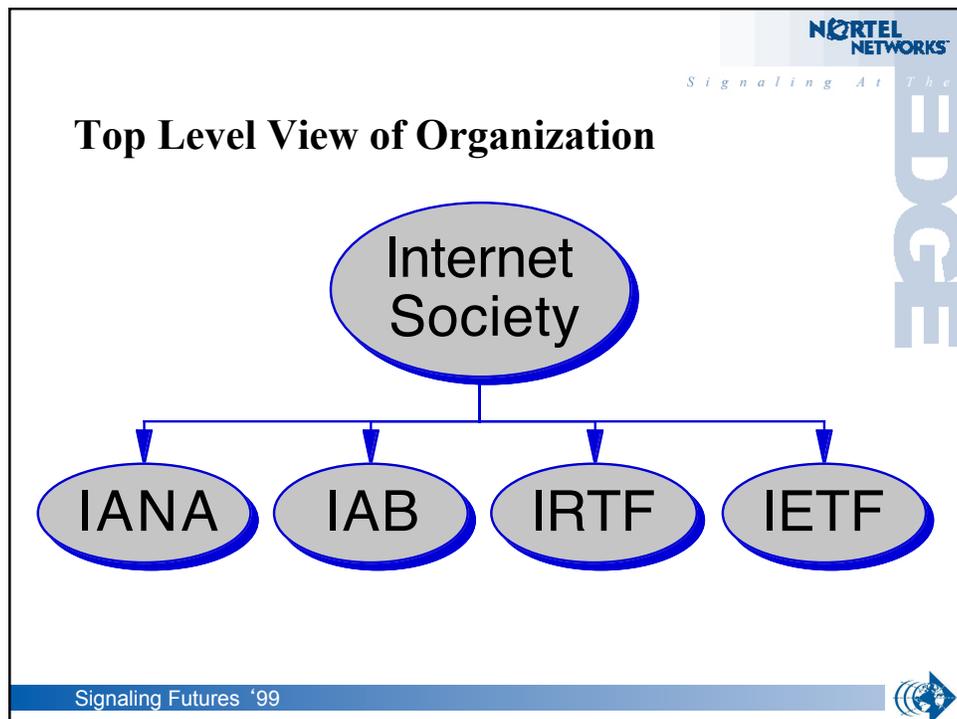
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The IETF Standards Process

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Internet Research Task Force (IRTF)

- **focused on long term problems in Internet**
 - reliable multicast**
 - multicast routing**
 - congestion management**
 - end to end protocols**
 - etc.**

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Internet Assigned Number Authority (IANA)

- **assigns numbers and keeps them from colliding**
 - Protocol numbers**
 - IP addresses**
 - mostly delegated to IP Address registries**
 - Names**
 - mostly delegated to DNS name registries**
- **working out relationship with ICANN**

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Protocol numbers

- IP protocol numbers
- well known TCP/UDP ports
- PPP protocol ids
- etc.

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IP addresses

- mostly delegated to
 - registries such as RIPE/APNIC/ARIN
 - local providers via registries
 - few end organizations get addresses from IANA or registries
- now under ICANN direction

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Names delegated to DNS name registries

- **ISO 2 character names assigned by IANA**
national name registries generally nationally managed
- **international name space - iPOC**
new Top Level Domains - added to .com etc.
- **by agreement**
Things break when agreements break...
- **now under ICANN direction**

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RFC Editor

- **was Jon Postel et al**
now et al
- **rfc-ed@isi.edu**
- **supported by the Internet Society**

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IETF Chair

- chair of IESG
- selected by nomcom
- director of General Area
- ex officio member of IAB
- Chief Talking (and traveling) Officer

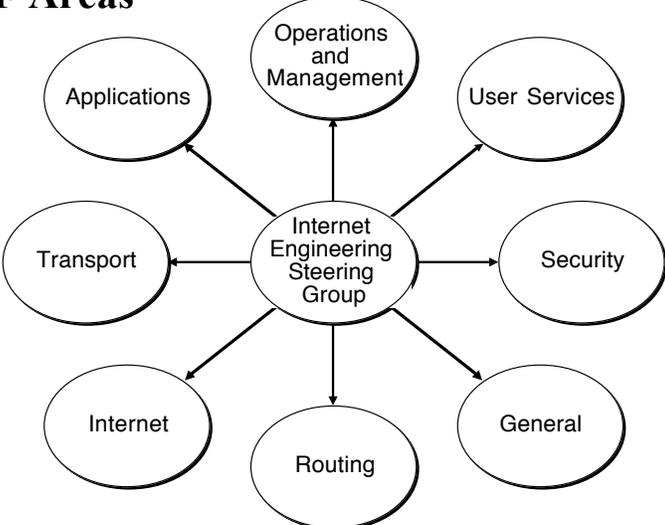


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IETF Areas



```

graph TD
    IESG((Internet Engineering Steering Group)) --> Applications((Applications))
    IESG --> OpsMgmt((Operations and Management))
    IESG --> UserServices((User Services))
    IESG --> Security((Security))
    IESG --> General((General))
    IESG --> Routing((Routing))
    IESG --> Internet((Internet))
    IESG --> Transport((Transport))
  
```



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Working groups

- **this is where we primarily get our work done**
- **focused by charter agreed between chair and area director**
- **specific deliverables**

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General Area

- **Area director(s)**
Fred Baker <fred@cisco.com>
- **Working groups:**
 - Authentication, Authorization and Accounting (aaa)**
 - Policy Framework (policy)**
 - Process for Organization of Internet Standards ONgoing (poisson)**

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Applications Area

- **Area director(s)**
 - Keith Moore <moore@cs.utk.edu>
 - Patrik Falstrom <paf@swip.net>
- **Working groups:**

<ul style="list-style-type: none"> Application Configuration Access Protocol (acap) Application MIB (applmib) Calendaring and Scheduling (calsch) Common Indexing Protocol (find) Content Negotiation (conneg) DAV Searching and Locating (dasl) Detailed Revision/Update of Message Standards (drums) Electronic Data Interchange-Internet Integration (ediint) Extensions to FTP (ftptext) HyperText Transfer Protocol (http) Instant Messaging and Presence Protocol (impp) Internet Fax (fax) 	<ul style="list-style-type: none"> Internet Open Trading Protocol (trade) Internet Printing Protocol (ipp) LDAP Duplication/Replication/Update Protocols (ldup) LDAP Extension (ldapext) Large Scale Multicast Applications (lsma) MIME Encapsulation of Aggregate HTML Documents (mhtml) Mail and Directory Management (madman) Message Tracking Protocol (msgtrk) NNTP Extensions (nntptext) Printer MIB (printmib) Schema Registration (schema) Telnet TN3270 Enhancements (tn3270e) Uniform Resource Locator Registration Procedures (urlreg) Uniform Resource Names (urn) Usenet Article Standard Update (usefor) WWW Distributed Authoring and Versioning (webdav) Web Replication and Caching (wrec)
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Internet Area

- **Area director(s)**
 - Jeffrey Burgan <burgan@corp.home.net>
 - Thomas Narten <narten@raleigh.ibm.com>
- **Working groups:**

<ul style="list-style-type: none"> AToM MIB (atommib) DNS IXFR, Notification, and Dynamic Update (dnsind) Dynamic Host Configuration (dhc) Frame Relay Service MIB (frnetmib) IP Over Fibre Channel (ipfc) IP Over IEEE 1394 (ip1394) IP over Cable Data Network (ipcdn) IP over VBI (ipvbi) 	<ul style="list-style-type: none"> IPNG (ipngwg) Interfaces MIB (ifmib) Internetworking Over NBMA (ion) PacketWay (pktway) Point-to-Point Protocol Extensions (ppptext) Service Location Protocol (svrloc)
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Operations and Management Area

- Area director(s)
 - Randy Bush <randy@psg.com>
 - Bert Wijnen <wijnen@vnet.ibm.com>
- Working groups:

ADSL MIB (adslmib)	Physical Topology MIB (ptopomib)
Benchmarking Methodology (bmwg)	Remote Authentication Dial-In User Service (radius)
Bridge MIB (bridge)	Remote Network Monitoring (rmonmib)
Distributed Management (disman)	Roaming Operations (roamops)
Entity MIB (entmib)	Routing Policy System (rps)
Ethernet Interfaces and Hub MIB (hubmib)	SNMP Agent Extensibility (agentx)
G and R for Security Incident Processing (grip)	SNMP Version 3 (snmpv3)
MBONE Deployment (mboned)	The Internet and the Millennium Problem (2000)
Network Access Server Requirements (nasreq)	Uninterruptible Power Supply (upsmib)
Next Generation Transition (ngtrans)	

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Routing Area

- Area director(s)
 - Rob Coltun <rcoltun@lightera.com>
- Working groups:

Data Link Switching MIB (dlswmib)	Multiprotocol Label Switching (mpls)
General Switch Management Protocol (gsmg)	Open Shortest Path First IGP (ospf)
IP Routing for Wireless/Mobile Hosts (mobileip)	Protocol Independent Multicast (pim)
IS-IS for IP Internets (isis)	QoS Routing (qosr)
Inter-Domain Multicast Routing (idmr)	Routing Information Protocol (rip)
Inter-Domain Routing (idr)	SNA DLC Services MIB (snadlc)
Mobile Ad-hoc Networks (manet)	SNA NAU Services MIB (sna nau)
Multicast Extensions to OSPF (mospf)	UniDirectional Link Routing (udlr)
Multicast Source Discovery Protocol (msdp)	

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Security Area

- **Area director(s)**
 - Jeffrey Schiller <jis@mit.edu>
 - Marcus Leech <mleech@nortel.ca>
- **Working groups:**

An Open Specification for Pretty Good Privacy/S/MIME Mail Security (smime) (openpgp)	Secure Shell (secsh)
Authenticated Firewall Traversal (aft)	Simple Public Key Infrastructure (spki)
Common Authentication Technology (cat)	Transport Layer Security (tls)
Domain Name System Security (dnssec)	Web Transaction Security (wts)
IP Security Protocol (ipsec)	
Intrusion Detection Exchange Format (idwg)	
One Time Password Authentication (otp)	
Public-Key Infrastructure (X.509) (pkix)	



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Transport Area

- **Area director(s)**
 - Scott Bradner <sob@harvard.edu>
 - Vern Paxson <vern@ee.lbl.gov>
- **Working groups:**

Audio/Video Transport (avt)	Network Address Translators (nat)
Differentiated Services (diffserv)	Network File System Version 4 (nfsv4)
IP Performance Metrics (ippm)	ONC Remote Procedure Call (oncrpc)
IP Telephony (iptel)	PSTN and Internet Internetworking (pint)
Integrated Services (intserv)	RSVP Admission Policy (rap)
Integrated Services over Specific Link Layer (issll)	Realtime Traffic Flow Measurement (rtfm)
Media Gateway Control (megaco)	Resource Reservation Setup Protocol (rsvp)
Multicast-Address Allocation (mallocc)	Signaling Transport (sigtran)
Multiparty Multimedia Session Control (mmusic)	TCP Implementation (tcpimpl)
	TCP Over Satellite (tcpsat)



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User services Area

- **Area director(s)**
April Marine <amarine@globe.arc.nasa.gov>
- **Working groups:**
 - Responsible Use of the Network (run)**
 - User Services (uswg)**

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IETF Secretariat

- **located physically**
 - Corporation for National Research Initiatives (CNRI)**
 - Reston Virginia (Washington DC)**
- **runs**
 - plenary meetings**
 - mailing lists**
 - Internet draft directory**
- **coordinates**
 - day to day work of IESG and working groups**

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Working papers

- **Internet-Draft**
 - random or non-random thoughts
 - input to the process
 - zapped after 6 months
 - all RFCs must pre-exist as IDs

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Standards Track Levels:

- **Best Current Practices (BCP)**
 - generally policies or procedures
- **Proposed Standard (PS)**
 - good idea, no known problems
- **Draft Standard (DS)**
 - multiple interoperable implementations
- **Standard (STD)**
 - wide use

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Archives

- **Informational (FYI)**
- **Experimental**
- **Historical**

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IETF & Convergence

- **many impacts of convergence on IETF**
- **focus on VoIP related ones**
- **VoIP work being done in Transport Area**
because unerlying protocols (e.g. RTP) there
some complementary with other standards groups
some not

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Transport Area Telephony Working Groups

- IP Telephony (iptel)**
 - call processing language
 - gateway location / attribute distribution protocol
- Media Gateway Control (megaco)**
 - MGC <-> MG control protocol
- PSTN and Internet Internetworking (pint)**
 - Internet-based PSTN signaling



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TSV Area Telephony Working Groups, cntd.

- Signaling Transport (sigtran)**
 - transporting IN signaling across an IP network
- Multiparty Multimedia Session Control (mmusic)**
 - SIP, SAP and SDP control, announcement and description protocols
- Audio/Video Transport (avt)**
 - RTP and RTP payload formats



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Transport Area QoS Working Groups

- **Integrated Services (intserv)**
guaranteed and controlled load services
- **Integrated Services over Specific Link Layers (issll)**
Intserv for various link types, including ATM
- **Resource Reservation Setup Protocol (rsvp)**
signaling protocol for Integrated Services networks
may become general IETF signaling protocol

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Transport Area QoS Working Groups, cntd.

- **RSVP Admission Policy (rap)**
router <-> policy server protocol for RSVP
- **Differentiated Services (diffserv)**
non-flow based QoS protocols
- **IP Performance Metrics (ippm)**
measure performance of networks

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Related Transport Area BOFs

- PSTN/Internet Notification (pin)**
 - PSTN signaling into Internet**
- Performance Implications of Link Characteristics (pilc)**
 - wireless and othe special environments**
- Support for Lots of Unicast Multiplexed Sessions (slums)**
 - many parallel sessions , useful for signaling**



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Other related IETF Efforts

- APS Area - e.164 / Internet addressing**
 - resolving e.164 phone numbers into IP addresses**
- APS Area - Internet FAX (fax)**
 - support FAX over the Internet**
- RTG Area - QoS Routing (qosr)**
 - define QoS-based Internet routing**



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Other related IETF Efforts, contd.

- **GEN Area - Authentication, Authorization and Accounting (aaa)**
 - determine AAA requirements in Internet
 - develop protocol or protocols to provide aaa support
- **GEN Area - Policy Framework (policy)**
 - policy definition language

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Cooperation with Other Standards Groups

- **ideal - multiple groups work on one protocol**
 - published by one group to prevent out of sync versions
 - e.g. Internet FAX, RTP
- **real - does not always happen**
 - too many groups working in telephony area
 - other groups finding IETF's area important
 - differences in architectural view
 - IETF has a "stupid network" bias

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Timing

- **ongoing**
 - revised SIP just published
 - revised RTP done
 - new QoS technologies being published soon
 - transport area telephony WGs
 - proposed standards over the next year or so

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Questions?

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