IPv6 @IETF

What is the IETF?

Agenda

- Short overview of the IETF organisation

- Overview of IPv6 related activities per Area

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IETF organisation

* Work is done in over 120 working-grops (of ~60 meet at each IETF meeting)
* Workinggroups are split in 8 Areas
    * Each area is lead by 1-2 Area Directors
    * The Area Directors are members of the Internet Engineering Steering Group (IESG)
    * In addition there is the Internet Architecture Board (IAB) and the IETF Administrative Support Activity (IASA)

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IETF organisation

* In addition to areas and WGs the IETF also have

  * *DIRECTORATES*: Used to give advice and support to the area directors on specific topics or the area in general

  * *DESIGN TEAMS*: Group of people that have been given a specific task by the WG chairs, like producing a technical proposal

IETF standards process

- ✤ The process is defined in RFC2026
- ✤ IETF standards (Request For Comments, RFCs) can be of several types:
    - ✤ *Best Common Practice*: BCP documents have their own numbering and describes some form of "practice", but not a protocol spec
    - ✤ *Informational*: Does not descibe a protocol standard or a practice, but rather processes or other SDOs specs

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IETF Standards Process

* ***Proposed Standard***: Entry point for standards documents. Specification is stable. No operational or implementation experience needed
* ***Draft Standard***: Two independent and interoperable implementations that are not derived from each other needed.
* ***Standard***: Operational and implementation exerience is gained and specification is relied upon. Also given an STDXXXX number
* ***Experimental***:Research or development effort.

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Areas

* Applications Area

* General Area

* Internet Area

* Operations and Management

* Real-time Applications and Infrastructure

* Routing Area

* Security Area

* Transport Area
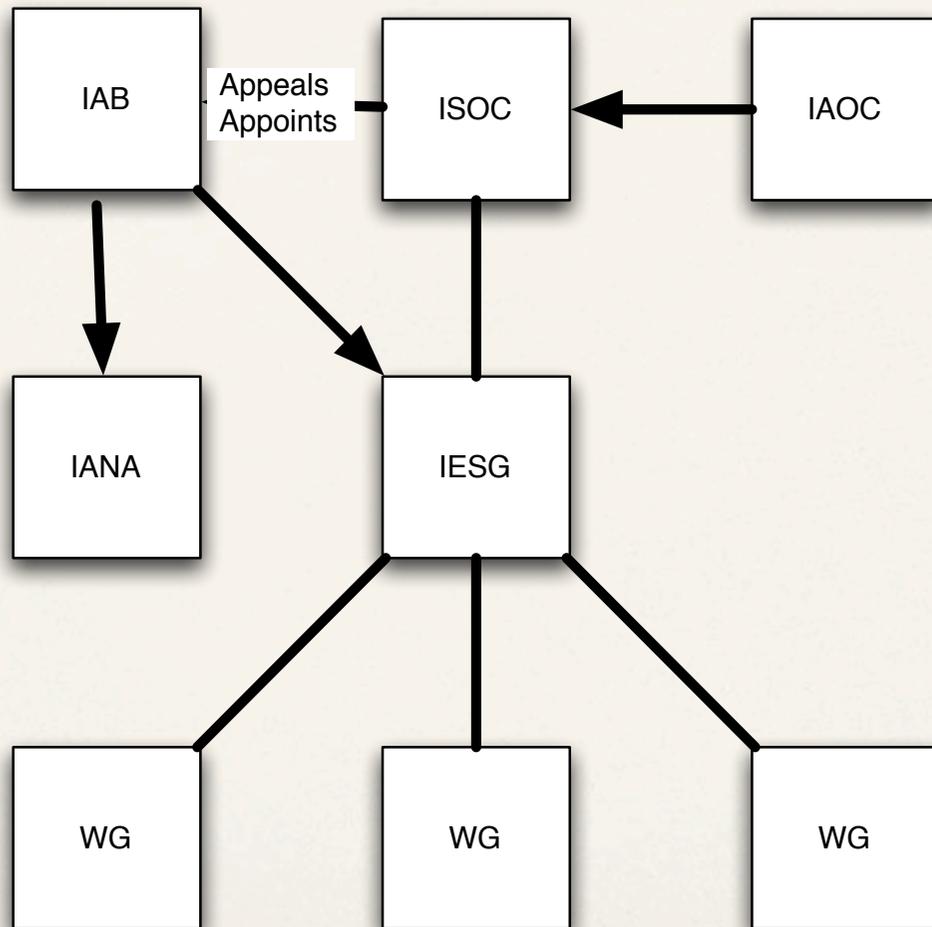
Applications Area

* Two ADs (Lisa Dusseault and Alexey Melnikov)

* Handles the application layer, such as LDAP, CRISP, WEBDAV, SIEVE etc)

* Current work involves

  * Calendar/Scheduling

  * Oauth

  * Internationalized email

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General Area

* AD is the IETF chair (Russ Housley)

* Handles mostly administrative issues

* Currently no active WGs

Internet Area

* Two ADs (Ralph Droms and Jari Arkko)

* Handles internet area issues such as encapsulations (IP over...), VPN, tunneling and DNS...

* Some details on some working groups...

Internet Area

* ntp WG

    * Tasked with actually documenting the NTP protocol as used today

    * Also to update the protocol with new features such as improved traceability and security

    * Also deals with some clocking issues that comes from other WGs such as PWE3

Internet Area

* tictoc WG

  * Was intended to come up with a new packet based time transport

    * Security (Authentication)

    * Higher precision

  * Instead ended up doing most work on a IEEE1588 profile

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Internet Area

* shim6

    * Follow up to multi6

    * Handles the "scalability problem of site multihoming in IPv6"

    * We all know that the current more specific prefix announcements won't scale

    * We have given up on waiting on the big "graph theory break-through"...

    * Shim6 is host based (as opposed to network based)

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Internet Area

* LISP

    * Also works on a site-mulithoming solution for IPv6

    * Network based (as opposed to host-based)

    * Is not aiming for IETF standard

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Internet Area

* 6man

  * Handles bug-fixes / Updates of "core" IPv6 standards

  * RFCs

    * Update to IPv6CP (equivalent to IPCP), RFC5172

    * Reserved IPv6 Interface Identifiers, RFC5453

  * Current Work

    * Work on address selection problems

    * Update of IPv6 node-requirements

    * IPv6 Subnetmodel, the relationship between links and subnets

    * IPv6 text representation

Internet Area

* trill
  * Was originally called RBridges

  * A node that needs to move in a campus will most likely switch subnets and therefore have to be re-numbered

    * Causes significant problems in campus

    * Partly an artifact of scaling concerns with spanning-three and bridged networks

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Operations and Management

✤ Two ADs (Don Romascanu and Ronald Bonica)

✤ Handles general operational practices

✤ "Normally" do not specify protocols

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Operations and Management

* grow
  * Handles issues around global operations
  * Anycast BCP
  * Collection communities
* opsec
  * Specifies some best operational security practices
  * Non-normative

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Operations and Management

* Netconf

    * Configuration and config retrival protocol

    * SNMP didn't really cut it...

Operations and Management

* v6ops

  * Standardization

  * IPv4 Address surveys

  * Survey of which RFCs that contains dependencies on IPv4 addresses and 32-bit address formats, or IPv4 header format

  * RFC3793, RFC3796, RFCRFC3795, RFC3794, RFC3792, RFC3791, RFC3790, RFC3789

  * Transitions scenarios for

  * 3GPP networks RFC3574, RFC4215

  * Unmanaged network RFC3570, RFC3904

  * Security considerations for 6to4, RFC3964

  * Application aspects of IPv6 transition, RFC4038

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Operations and Management

✤ Scenarios and analysis for introducing IPv6 in ISP networks, RFC4029

✤ IPv6 Enterprise network scenarios, RFC4057

✤ Renumbering without a flag day, RFC4192

✤ Basic transition mechanisms for IPv6 hosts and routers, RFC4213

✤ Using VLANs for IPv4/IPv6 co-existence in entrprise networks, RFC4554

✤ ISP IPv6 deployment scenarios in broadband access networks RFC4779

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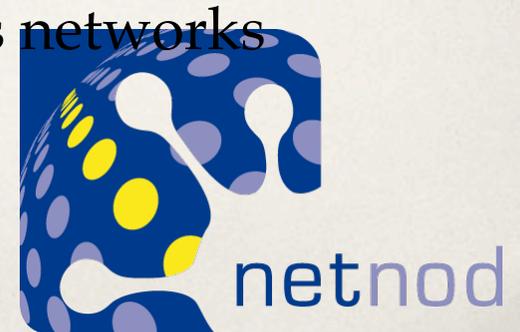
Operations and Management

- IPv6 Neighbor Discovery On-Link assumption Considered Harmful
- Reasons to move NAT-PT to Experimental
- Enterprise network analysis
- Local network protection for IPv6
- IPv6 Transition/Co-existence security considerations
- Using IPs-Sec to secure IPv6-in-IPv4 tunnels
- Recommendations for filtering ICMPv6 in firewalls
- Work in progress
  - CPE security capabilties / CPE recommendations
  - IPv6 RA-Guard / Rouge IPv6 RAs
  - IPv6 deployment in IXPs

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Real-time Applications and Infrastructure

* Two ADs (Robert Sparks and Cullen Jennings)

* Does work on protocol that supports real time applications and the infrastructure protocols needed to support this

* Typical example : SIP

* ECRIT, Emergency Context resolution

* Enum, Geopriv, xmpp

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Routing Area

- Two ADs (Ross Callon and Adrian Farrel)

- Work on routing protocols and other "path finding" protocols

  - For example mobile ad-hoc networking

Routing Area

* idr
    * BGP specification and additions
* ospf
    * Develop OSPF, such as fast convergence and hitless fall-over. IPv6 spec.
* isis
    * IS-IS is not an IETF protocol, it's an ITU protocol
    * Specifies TLVs and publishes the ISIS spec as Informational

Routing Area

* rpsec

  * Routing protocol security

  * Work based on attack-three analysis of routing protocols

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Security Area

✤ Two ADs (Tim Polk and Pasi Eronen)

✤ Security protocol and algorithms

✤ For example

  ✤ syslog, sasl, btns

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Transport Area

- Two ADs (Magnus Westerlund and Lars Eggert)

- General transport protocols such TCP, UDP, SCTP

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Bonus-slides, historical view

* IPv6 was standardized by the IETF
* Work was done mainly in two groups
* V6ops
    * Operational issues
    * Migration from v4 to v6 - to some extent
* IPv6
    * Protocol development
    * Architecture
* softwires
    * Develop tunneling protocols for the transition scenarios
* Also some work done by the IAB
    * Address architecture and address allocations policy

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IPv6

* Standardized

  * An Architecture for IPv6 address allocation RFC1887

  * DNS Extensions to support IPV6 RFC1886

  * Path MTU discovery for IPV6 RFC1981

  * OSI NSAPs and IPV6 RFC1888

  * IPV6 Multicast address assignments RFC2375

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IPv6

* Neighbour Discovery for IPv6 RFC2461

* IPv6 stateless address autoconfiguration RC2462

* ICMPv6 RFC4443

* IPv6 over…

* Default address selection for IPv6 RFC3484

* Basic socket interface extensions for IPv6 RFC3493

* IPV6 addressing architecture RC3513

* IPv6 Global unicast address format RFC3587

* Deprecating Site Local addresses RFC3879

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IPv6

✤ Default router preference and more specific routes RFC4191

✤ Modifying of router advertisement o support multiple exits

✤ IPv6 host to router loadsharing RFC4311

✤ Linked scoped IPv6 multicast addresses RFC4489

✤ IPv6 MIB RFC4293

✤ IPv6 node requirements RFC4294

✤ List requirements that a IPv6 host/router needs to meet

✤ IPv6 scoped address architecture RFC4007

✤ Optimistic DAD RFC4429

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