

Introduction to the Operations and Management Area in the IETF

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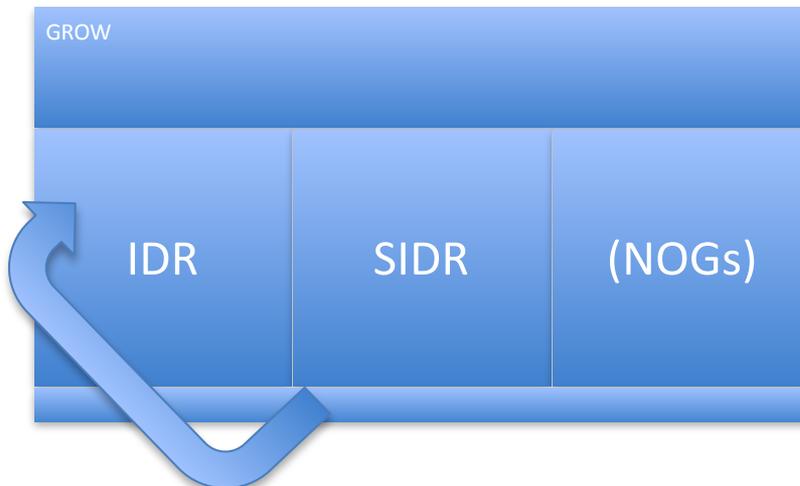
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Operations and Management Area

- Operating a network
 - Operational feedback, best practices
 - Network protocol deployment guidelines
- Managing a network (protocols and data models)
 - YANG models, NETCONF and RESTCONF
 - MIBs (with SNMP)
 - Flows (with IPFIX)
 - AAA (Diameter and Radius)
 - Fault Configuration Accounting Performance



How Do You Work This Thing?



Operations: Current WGs

Operating stuff (and providing operator feedback on specifications)

- [bmwg](#) Benchmarking Methodology
- [dnsop](#) Domain Name System Operations
- [grow](#) Global Routing Operations
- [mboned](#) MBONE Deployment
- [opsawg](#) Operations and Management Area Working Group
- [opsec](#) Operational Security Capabilities for IP Network Infrastructure
- [Sidr](#) SIDR Operations
- [v6ops](#) IPv6 Operations

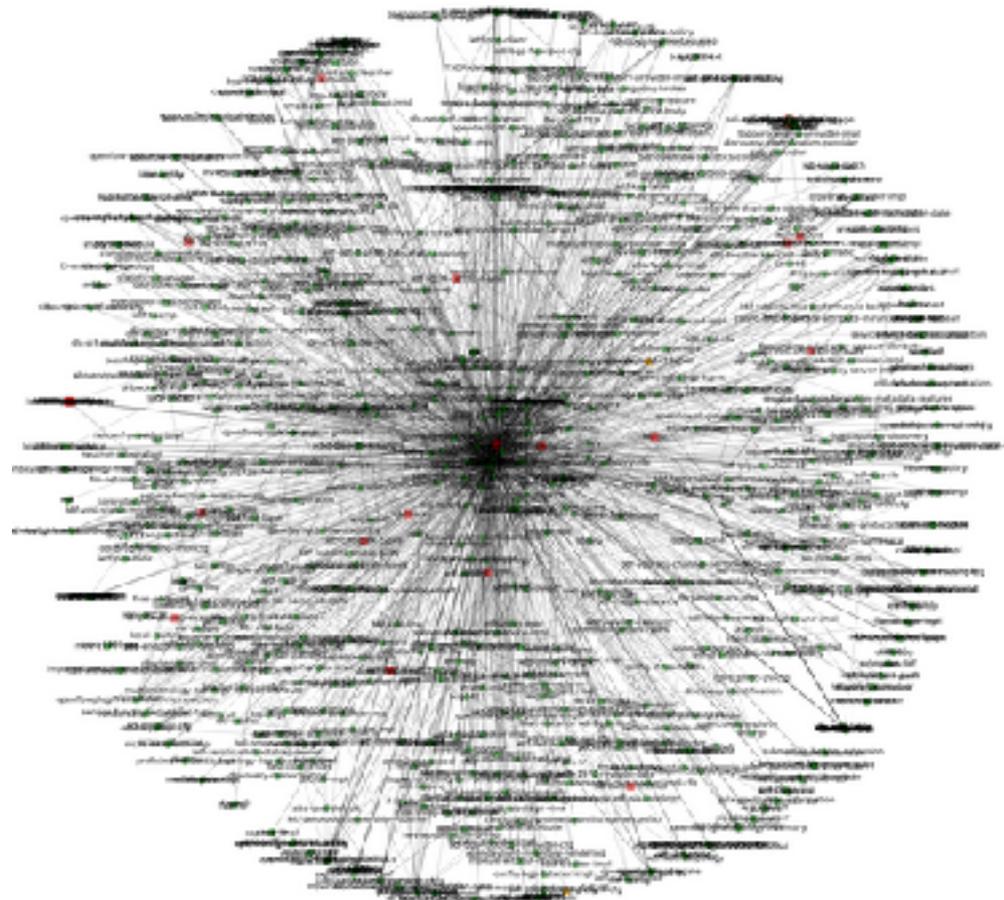
Management: Current WGs

- [netconf](#) Network Configuration
- [netmod](#) NETCONF Data Modeling Language
- [l3sm](#) L3VPN Service Model => Just closed [l2sm](#)
- [Lime](#) Layer Independent OAM Management in the Multi-Layer Environment
- [Supa](#) Simplified Use of Policy Abstractions
- [Anima](#) Autonomic Networking Integrated Model and Approach (Terry as AD)
- [Dime](#) Diameter Maintenance and Extensions (Stephen as AD)
- [Lmap](#) Large-Scale Measurement of Broadband Performance (Alissa as AD)
- [Radext](#) RADIUS EXTensions (Kathleen as AD)

OPS WG managed by non OPS ADs?

- [IESG YANG Model Work Redistribution](#) (Dec 2014)
 - Why? [YANG Really Takes Off in the Industry](#)
 - Benoit focusing on YANG and related activities
 - Other ADs helped with OPS-related WGs
 - Note: <https://www.ietf.org/iesg/statement/writable-mib-module.html>

Industry



<http://www.claise.be/modules-all-all.png>

Exploring Further

- Want to know more about a WG?
 - <https://datatracker.ietf.org/wg/netconf/charter/>
 - <http://tools.ietf.org/wg/netconf>
- Active WG documents, interesting documents
- Links to:
 - Charter
 - WG chairs
 - Mailing list subscription, archives

Network Configuration (netconf)

[Documents](#)[Charter](#)[Meetings](#)[History](#)[Photos](#)[Email expansions](#)[List archive](#)[Tools »](#)

WG**Name** [Network Configuration](#)**Acronym** [netconf](#)**Area** [Operations and Management Area \(ops\)](#)**State** [Active](#)**Charter** [charter](#) [ietf netconf 18](#) Approved**Dependencies** [Document dependency graph \(SVG\)](#)**More info** [Additional NETCONF Web Page](#)
[Wiki](#)
[Issue tracker](#)

Personnel**Chairs** [✉ Mahesh Jethanandani](#)
[✉ Mehmet Ersue](#)**Area Director** [✉ Benoit Claise](#)

Mailing list**Address** netconf@ietf.org**To subscribe** <https://www.ietf.org/mailman/listinfo/netconf>**Archive** <https://mailarchive.ietf.org/arch/browse/netconf/>

Jabber chat**Room address** <xmpp:netconf@jabber.ietf.org?join>**Logs** <https://jabber.ietf.org/logs/netconf/>

Charter for Working Group

Configuration of networks of devices has become a critical requirement for operators in today's highly interconnected networks. Large and small operators alike have developed their own mechanisms or have used vendor specific mechanisms to transfer configuration data to and from a device

Network Configuration (netconf)

- Documents
- Charter
- Meetings
- History
- Photos
- Email expansions
- List archive
- Tools »

Document	Date	Status	IPR	AD / Shepherd
Active Internet-Drafts				
draft-ietf-netconf-call-home-17 NETCONF Call Home and RESTCONF Call Home	2015-12-22 14 pages	RFC Ed Queue : REF for 319 days Submitted to IESG for Publication: Proposed Standard <i>Apr 2015</i>	3	Benoit Claise <i>Mahesh.jethanandani</i>
draft-ietf-netconf-key-store-00 Keystore Model	2016-10-31 33 pages New	✔ I-D Exists WG Document		
draft-ietf-netconf-netconf-client-server-01 NETCONF Client and Server Models	2016-11-03 38 pages New	✘ I-D Exists WG Document		
draft-ietf-netconf-netconf-event-notifications-01 NETCONF Support for Event Notifications	2016-10-31 48 pages New	✔ I-D Exists WG Document		
draft-ietf-netconf-restconf-18 RESTCONF Protocol	2016-10-27 100 pages	RFC Ed Queue : EDIT for 10 days Submitted to IESG for Publication: Proposed Standard		Benoit Claise <i>Michaël Ursuc</i>
draft-ietf-netconf-restconf-client-server-01 RESTCONF Client and Server Models	2016-11-03 33 pages New	✘ I-D Exists WG Document		
draft-ietf-netconf-restconf-notif-01 Restconf and HTTP Transport for Event Notifications	2016-09-29 21 pages	✔ I-D Exists WG Document		
draft-ietf-netconf-rtc5277bis-01 Subscribing to Event Notifications	2016-10-27 46 pages New	✔ I-D Exists WG Document		
draft-ietf-netconf-ssh-client-server-01 SSH Client and Server Models	2016-11-03 20 pages New	✔ I-D Exists WG Document		
draft-ietf-netconf-tls-client-server-01 TLS Client and Server Models	2016-11-03 14 pages New	✔ I-D Exists WG Document		
draft-ietf-netconf-yang-patch-13 YANG Patch Media Type	2016-11-10 43 pages New	✘ IESG Evaluation:AD Followup for 8 days Submitted to IESG for Publication: Proposed Standard	1	Benoit Claise <i>Mahesh.jethanandani</i>

NETCONF WG

NETwork CONFiguration

- Provide standard mechanisms to manage network devices, with YANG data models:
 - NETCONF, RESTCONF protocol (just finished)
 - Encoding: JSON or XML
- Basic protocol complete, additional work continues:
 - Event Notifications (4 drafts)
 - YANG models for managing NETCONF/RESTCONF
 - Call home

NETMOD WG

NETconf data MODeling language

- Data modeling language for NETCONF and RESTCONF: YANG language 1.0 and 1.1
- YANG models for routing (just published), access-list, syslog
- Hot topics:
 - YANG schema mount: mechanism to combine YANG modules into the schema defined in other YANG modules
 - A Revised Conceptual Model for YANG Datastores: intended and applied

LIME WG

- Layer Independent OAM Management in the Multi-Layer Environment
- YANG models for consistent configuration, reporting, and presentation for the OAM mechanisms
- Getting there...

SUPA WG

Simplified Use of Policy Abstractions

- Layer Independent OAM Management in the Multi-Layer Environment
- YANG models for policy elements
 - If ... then ...
 - No intend!
- Metric for success: “SUPA policy constructs are re-used in future IETF specifications (and ideally specifications from other SDOs)”

L3SM WG

L3vpn Service Module

- A service YANG module for L3VPN
 - What is a service YANG module?
 - Driven by operators, for operators
 - For a controller/orchestrator
- Concluded WG

L3SM => L2SM WG

L2vpn Service Module

- A service YANG module for L2VPN
- Based on the L3SM success
- Just created, first meeting

DIME WG

Diameter Maintenance and Extensions

- Update Diameter based on experience and new use cases.
- AAA (Authentication, Authorization, and Accounting) tutorial at IETF89
 - <http://www.ietf.org/proceedings/89/train-6.html>
- Work well under way
- Managed by the Security AD Stephen Farrell

RADEXT WG

RADiUS EXTensions

- Extend RADIUS with greater attributes, improve security.
- AAA (Authentication, Authorization, and Accounting) tutorial at IETF89
 - <http://www.ietf.org/proceedings/89/train-6.html>
- Work well under way
- Managed by the Security AD Kathleen Moriarty

Imap

Large-Scale Measurement of Broadband Performance

- Chairs: [Dan Romascanu](#), [Jason Weil](#)
- Define an architecture to measure broadband networks, work with IPPM to define a performance metric registry
- Managed by the Security AD Alissa Coper

ANIMA WG

- Autonomic Networking Integrated Model and Approach
- Managed by the Security AD Terry Manderson

OPS Area Directorate

Team of experienced operators who help the ADs improve their efficiency, particularly when preparing for IESG telechats, allowing them to focus on (potentially) troublesome documents and spend less time on the trouble-free ones.

Improving the documents is an important, but clearly not the primary, purpose.

An additional goal is to expose the OPS Directorate reviewers to work going on in other parts of the IETF.

Reviews from OPS Directorate members do not, in and of themselves, cause the IESG to block a document. The reviews may, however, provide advice to the OPS ADs or convince other IESG members to challenge or block a document. The reviews, particularly those conducted in IETF last call and earlier, may also help the document editors improve their documents.

<https://trac.ietf.org/trac/ops/wiki/Directorates>

Other Ops Area Directorates

- YANG Doctors <http://www.ietf.org/iesg/directorate/yang-doctors.html>
- MIB Doctors <http://www.ietf.org/iesg/directorate/mib-doctors.html>
- AAA-doctors (mailing list)
<http://www.ietf.org/mail-archive/web/aaa-doctors/current/maillist.html>
- Performance Metrics Directorate <http://www.ietf.org/iesg/directorate/performance-metrics.html>

OPS open hours:

Where: Park Ballroom 3

When: this Monday at 3:50 PM

The Ops in Operations and Management

Joel Jaeggli

What is it?

- IETF Areas are typically organized around particular lines of work (routing, internet, transport, applications, realtime applications etc).
- Operations and Management gets two, Management protocols, and Operations
- Both are in many requests meta-lines of work.
- Management stretches across most other lines of work in the IETF.
- Operations Concerns itself with the operation of IETF protocols.

What has it done?

- We didn't start with an operations area.
- Over time the IETF protocols accumulate gaps between documented expectations and reality
 - Sometimes experience sharing and coordination between operators is a necessary part of protocol usage.
- Operations tries to fill that hole.
 - routing coordination
 - security coordination
 - measurement

Challenges

- Operations, working groups typically do not do protocol development or maintenance except in narrowly defined cases.
- Coordination with protocol developers, for active working groups is easier than with dormant / closed working groups.
- Maintaining critical-mass / process on open-ended activities
 - sometimes activities levels are cyclical
 - don't be afraid to charter new work just because it might not work out.

Operators (how not to make this us vs them)

- Perhaps obviously the audience for the work is operators rather than protocol developers / standards folks
- In many cases authors are participants come from both sides of the fence developers / vendors / operators / consumers.
 - we do this together.

Operations as a Moral Compass

- RFC 5706 - Guidelines for Considering Operations and Management of New Protocols and Protocol Extensions
 - A way to think about how operations and management considerations are considered in IETF work.
 - In action (quic charter)

“The fifth focus area will provide an Applicability and Manageability Statement, describing how, and under what circumstances, QUIC may be safely used, and describing deployment and manageability implications of the protocol.

Current practices for network management of transport protocols include the ability to apply access control lists (ACLs), hashing of flows for equal-cost multipath routing (ECMP), directional signaling of flows, signaling of flow setup and teardown, and the ability to export information about flows for accounting purposes. The QUIC protocol need not be defined to enable each of these abilities, or enable them in the same way as they are enabled by TCP when used with TLS 1.3, but the working group must consider the impact of the protocol on network management practices, reflecting the tensions described in RFC 7258.”

An overview of current operations work.

- Currently Chartered working groups
 - bmgwg
 - dnsop
 - grow
 - mboned
 - opsawg
 - opsec
 - sidrops
 - v6ops

bmwg – Benchmarking Methodology

- Chairs: [Sarah Banks](#), [Al Morton](#)
- Operational since 1989!
- Recommendations and methodology for benchmarking of internet technologies.
- Long-lived group with ongoing work in benchmarking BGP convergence, SIP, traffic management, neighbor discovery, virtual network functions. . .

dnsop - Domain Name System Operations

- Chairs: [Tim Wicinski](#), [Suzanne Woolf](#)
- The place in the IETF that's all DNS all the time.
- behavior of resolvers, authoritative servers, new record types, zone handling, dnssec etc.
- Interface to other constituencies is through participants that come here.
- In it's current chartered form picks up from where dnsext left off.

grow – Global Routing Operations

- Chairs: [Chris Morrow](#), [Peter Schoenmaker](#)
- Document issues and operational practices with BGP, routing table size, IGP/EGP interaction, security, and VPN.
- Best practices for configuration, problem statements.

mboned – MBONE Deployment

- Chairs: [Leonard Giuliano](#), [Greg Shepherd](#)
- Deployment and operation of multicast routing protocols.
- Coordination of operator demands for new work, run jointly with the pim working group

opsawg – Operations and Management Area

- Chairs: Tianran Zhou, [Warren Kumari](#)
- Catch-all for work that doesn't fit into an existing WG, but isn't big enough to justify creating a new WG.
- Current topics include management of constrained devices, CAPWAP updates, VM MIB.
- Undertakes MIB or datamodel work that doesn't justify spinning up a dedicated WG.
- Maintenance actions for legacy documents.

opsec – Operational Security Capabilities for IP Network Infrastructure

- Chairs: Erick Vynke, [Gunter Van de Velde](#)
- Best practices for network security.
- Several active topics.
 - Highlights operational security issues for deployed protocols and networks.
 - Develops recommendations and best practices.

sidrops – SIDR Operations

- Chairs: Keyur Patel, Chris Morrow
- Newly Chartered; to commence on Closure of SIDR working group.
- Focused on the deployment and operations guidance for SIDR and the RPKI.

v6ops – IPv6 Operations

- Chairs: Ron Bonica, [Lee Howard](#)
- Deploying and running a dual-stack network.
- Guidelines for operators, DHCPv6 v. SLAAC, ULA considerations, etc.
- Recommendations for deployment/migration strategies.
- Problem Development.

Questions?

<https://www.surveymonkey.com/r/97ops>

Bibliography

- RFC 5706
 - <https://tools.ietf.org/html/rfc5706>
- IESG Areas
 - <https://www.ietf.org/iesg/area.html>