

# SDN RG IAB Review

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**IETF 94 Yokohama**

## *“Nanos gigantum humeris insidentes”*

- “Standing on the shoulders of giants”
  - Previous (founding) SDN RG Chairs: Nick Feamster & Dave Mayer
- Current Chair – Daniel King ([d.king@lancaster.ac.uk](mailto:d.king@lancaster.ac.uk))
  - Researcher at University of Lancaster
  - Embedded in the British Telecom & Intel Co-Lab
- Open Chair position has had more than 16 applications, from strong candidates
  - More on this topic later

# What is SDN?

- **S**oftware - It's all software!
  - We are looking for automation
  - Tools and applications
- **D**riven or **D**efined
  - Does it matter?
- **N**etworks
  - Management of forwarding decisions
  - Control of end-to-end paths
  - Whole-sale operation of network resources



# Origins

- SDN Bar BoF
  - IETF 81 (July 2011)
  - SDNP List created
- Software Driven Networks BoF (400 participants)
  - IETF 82 (Nov, 2011)
  - *“Enables network applications to request and manipulate services provided by the network, and allow the network to provide feedback to the network applications.”*
- Proposed SDN RG Meeting
  - IETF 84 (July, 2012)

# SDN RG Charter

- The Software Defined Networking Research Group (**SDN RG**) investigates SDN from various perspectives
- Areas of interest include: architecture, solution scalability, abstractions, and programming languages and paradigms
- The explicit goal of the SDN RG is to provide a forum for researchers to investigate key and interesting problems in the SDN field

# SDN RG Areas of Interest

- Classification of SDN models, including
  - Definitions
  - Taxonomies
  - Relationship to work ongoing in the IETF and other SDOs
- SDN model scalability and applicability
- Multi-layer programmability and feedback control systems
- System Complexity
- Network description languages, abstractions, interfaces and compilers
  - Including methods and mechanisms for (on-line) verification of correct operation of network/node function.
- Security

# SDN RG Work Items

- Survey of SDN approaches and Taxonomies
- SDN Layers Architecture Terminology
- Open Issues in Software-Defined Networking Research
- SDN RG Publications
  - RFC7426 - Software-Defined Networking (SDN): Layers and Architecture Terminology

# A Short History of (almost) Everything SDN RG (1)

- **IETF 84** – Outlined the SDN (RG) Continuum
- **IETF 85** – Seeded some “SDN-hard” Problems
- **IETF 86** – SDN Trends, Experiments and NFV first mentioned
- **IETF 87** – Novel SDN Applications, Operator Perspectives, State Reduction and Dependable SDNs
- **IETF 88** – Defining SDN in the context of the IETF, Architectures and Terminology



## A Short History of (almost) Everything SDN RG (2)

- **IETF 89** – SDN Hybrid Architectures and SDN Research in Action
- **IETF 90** – Hardware Abstraction, Modeling Languages and Traffic Engineering
- **IETF 91** – Scaling SDN, Blending SDN &NFV, NFV H-W Acceleration, and IoT
- **IETF 92** – (Focused CFP) Inter-domain SDN, SDN in Mobile Networks
- **IETF 93** – (Focused CFP) SDN Security
- **IETF 94** – (Focused CFP) Operator Research (Challenges, Findings and Opportunities), invited Japanese & Chinese researchers

# SDN Research Group Documents

- Software-Defined Networking (SDN): Layers and Architecture Terminology RFC 7426  
<https://datatracker.ietf.org/doc/rfc7426/>
- Current document  
<https://datatracker.ietf.org/rg/sdnrg/documents/>

<a href="#">draft-abad-sdnrg-sdn-ipsec-flow-protection-01</a> <b>Software-Defined Networking (SDN)-based IPsec Flow Protection</b>	2015-10-19 19 pages	I-D Exists <b>New</b>
<a href="#">draft-chattopadhyay-sdnrg-multi-party-sdn-trust-01</a> <b>Multi-party Multi-Domain Trust Architecture</b> Recommendations for SDN Deployment in Carrier Network	2015-09-26 18 pages	I-D Exists
<a href="#">draft-contreras-sdnrg-layered-sdn-04</a> <b>Cooperating Layered Architecture for SDN</b>	2015-10-19 15 pages	I-D Exists <b>New</b>
<a href="#">draft-eddy-sdnrg-customer-filters-01</a> <b>Customer-Controlled Filtering Using SDN</b>	2015-08-11 21 pages	I-D Exists
<a href="#">draft-gu-sdnrg-problem-statement-of-sdn-nfv-in-dc-00</a> <b>Problem statement of SDN and NFV co-deployment in cloud datacenters</b>	2015-06-30 7 pages	I-D Exists
<a href="#">draft-wang-sdnrg-deployment-sdn-vnf-00</a> <b>Practice of deploying SDN and VNFs in the data center</b>	2015-10-17 12 pages	I-D Exists
<a href="#">draft-xia-sdnrg-nemo-language-03</a> <b>NEMO (NETwork MODELing) Language</b>	2015-10-14 23 pages	I-D Exists
<a href="#">draft-xia-sdnrg-service-description-language-02</a> <b>Requirements for a Service Description Language and Design Considerations</b>	2015-05-04 7 pages	I-D Exists <b>Expires soon</b>
<a href="#">draft-zhuge-sdnrg-sdn-sdp-00</a> <b>An SDN Framework with Software-Defined Pricing (SDP)</b>	2015-09-23 10 pages	I-D Exists

# SDN RG Moving Forward

- Restate the SDN Challenges?
  - Has the definition of SDN changed since 2012?
  - Charter may need a refresh
- We could develop a Work Plan?
  - But. We are not a WG.
- SDN RG Tools
  - Refresh the Wiki
  - How to (better) utilize the mailing list?
- Continue to promote remote participation
  - Meetecho facility has been awesome!
- Ultimately, its all about the **RESEARCH** and how to support the research **COMMUNITY!**

# SDN RG Initiatives MAY include (1)

- Continue contribution and interest driven model
- Split time at SDN RG sessions
  - Use of CFPs
  - Focused topics
  - Grand research challenges
- Co-locate with Academic events
  - SigComm, Globecom, EWSDN, NetSoft, et al.
- Incubation program for specific SDN research topics/proposals
  - Technical support/referrals/reviews
  - Seeding of (suitable) ideas within the IETF

## SDN RG Initiatives MAY include (2)

- Do we need more publications?
  - Informational Documents: requirements, experiments, findings, conclusions.
- Open Source Interaction
  - The IETF has started various initiatives already
- Inter-SDO Cooperation
  - Lots of other SDN discussion is taking place
  - Do we need more coordination?

# SDN Model in context of the IETF & IRTF

- IETF

- Abstraction
  - L3SM
  - LIME
  - SUPA
  - I2NSF
- Configuration & Orchestration
  - ForCES
  - NETCONF/YANG
  - I2RS
  - SNMP
  - PCE
  - SR
  - SFC

- IRTF

- NFV RG
- NM RG
- Proposed NML RG

(List is not exhaustive)

# Thank You

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