

IRS Obvious Questions

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How big is the community working on IRS?

What about my Use Case?

What about my favorite Encoding?

What about NetConf/Yang?

How big is the IRS community?

- **408 members on list**

Operators: comcast, ATT, Verizon, Level3, orange/FT, FT, btconnect, telecom italia,

Vendors: NEC, Cisco, Juniper, Ericsson, Hitachi, Cariden, Avaya, Cienna, Huawei, Intel, VCE, tekelec, ALU, ZTE, CA, Tellabs, Broadcom, Fujitsu, NSN, Infinera, tail-f, Extreme networks, Microsoft, vmware, rad

Non-Vendor/Academic/R&D:

[ACM.org](#), [ripe.org](#), [nlnetlabs](#), [cablelabs](#), [Zigsu China](#), [neclabs](#), [buh.org](#), [indiana.edu](#), [jacobs-university](#), [MIT](#), [mesh japan](#), [univie.ac.at](#), [kddilabs](#), [bell-labs](#), [ieee](#), [Yale University](#)

Use Cases

- The number of use cases being written up is greater than one, the counting will not stop at one and there is no limit
- The evaluation of Use Cases is to be considered examples not canonical designs
- They are to make sure we have reasonable targets not the only targets for the technology
- If you think your use is critical then please write a draft

My encoding is the prettiest

- No it isn't
- None are perfect today
- First we start with the data model and then the encoding
- In the charter == required analysis

IRS and NetConf/Yang

Recap: IRS and Programmability

- IRS is a mechanism to learn state from the network and program state into the network
- Network programmability translates to programming individual devices
- A protocol framework is required to access, learn state from and program state into individual devices

IRS Concerns

- Transport Protocol
- Client Identity
- State Ownership & Management
- Message Encoding
- Message Exchange Patterns a.k.a. Session Protocol
- API Mechanics
- Service Definition and Data Models
- Network Representation and Characterization
- Performance and Scale
- High Availability
- Application Consumption Model
- Operational Requirements
- Security

Role of Netconf/Yang

Netconf and Yang are candidates for the session protocol and data modeling language respectively, but.... we should address gaps between IRS's requirements and current state of Netconf/Yang

Advantages of Netconf/Yang for IRS

- Single model and protocol for both configuration and operational state manipulation
- Yang—satisfies IRS's modeling needs for the most part
- Netconf – satisfies IRS's session protocol needs for the most part
- Yang is modular and extensible
- Active IETF community involved in evolving Yang, Netconf and creating models (netmod)
- Vendor implementations on the rise

IRS – Netconf/Yang Gaps

- Operational State semantics – non-global with the ability to get, set, get-bulk and set-bulk
- State Persistence modes
- State ownership tied to client Identity
- Stronger HA semantics
- Pluggable on-the-wire encoding
- Topology modeling tools
- Multi-client state arbitration

Netconf/Yang applicability to IRS

- Current team investigating Netconf/Yang applicability to IRS:
 - Rex Fernando (rex@cisco.com)
 - Martin Bjorklund (mbj@tailf.com)
 - Bruno Rijsman (brijsman@juniper.net)
- Deliverable is an analysis draft on suggested changes to Netconf/Yang to address gaps by next IETF
- Contributions welcome!

Thank You!