Overview of IETF Network Management Activities

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Disclaimer

- IETF OPS area has both the Operations and Network Management activities/responsibilities.

- I have been IETF co-AD for the OPS Area from March 1998 to March 2006.

- Current co-AD (Area Director) is Dan Romascanu (dromasca@avaya.com) and he is responsible for the Network-Management side of the house.

- Dan could not make it to this workshop, so that is why I am here to do this presentation.

Context

- The IETF has typically focused on NE-level management and management of IETF protocols.

- We have tried (in the past) to address the larger picture, but have not been good at it.

- IETF NM activities do not cover all layers and all management operations for managing the Internet and IP–based networks

- So I present what has been done and what activities are currently ongoing in the IETF.

- I am not claiming that this is exhaustive/complete.

(Internet) Operator Requirements

- See RFC3535 (report on IAB NM Workshop) for details of Operator Requirements
- We had Operators from Telco, IP and Enterprise
- Direct result was/is NetConf WG in IETF

NM Protocols (1/2)

- Main Protocols:
  - SNMPv3 – full Internet Standard (STD 62)
    - SNMPv1 and SNMPv2c are now HISTORIC
  - NetConf – Network Configuration Protocol
    - Base protocol complete and has been approved as Proposed Standard (PS).
    - It is in the RFC-Editor queue for publication as RFC.
  - IPFIX – IP Flow Information eXport
    - Standardized methods/protocol for flow information export
    - Documents entering IETF Last Call
    - Also used for building applications like PSAMP

NM Protocols (2/2)

- Others:
  - COPS – Proposed Standard (PS)
    - COPS == Common Open Policy Service
    - Outsourced Policy Decisions
  - COPS-PR – Proposed Standard (PS)
    - Policy Provisioning
  - GSMP – Proposed Standard (PS)
    - General Switch Management Protocol
  - Diameter (AAA and DIME WGs)
  - Radius (RADEXT WG)
  - Syslog.. etc

Information/Data Modeling (1/2)

- Also see RFC3444
  - On the Difference between Information Models and Data Models
- SMIv2 – full Internet Standard (STD)
  - SMI == Structure of Management Information
  - Many MIB modules defined (PS, DS, STD)
  - Many MIB modules defined outside IETF
  - Used with SNMP
- No standards work on NetConf XML data modeling (yet)

Information/Data Modeling (1/2)

- SPPI – Proposed Standard (PS)
  - SPPI == Structure of Policy Provisioning Information
  - A few PIB modules defined (Informational)
  - A few PIB modules defined outside IETF
  - Used with COPS-PR

- PCIM – Proposed Standard (PS)
  - PCIM == Policy Core Information Model
  - A few "modules" defined
  - (mainly) Used with LDAP

Focus on Element Management

- typically working on instrumentation of protocol stacks, applications, services

- typically working on instrumentation of Network Elements and Interfaces

- Most IETF protocols will come with one or more MIB module(s) for it

- Not working much (if any) on NM applications or interfaces (APIs) for such applications

Monitoring vs Configuration

- For many years, the main focus has been on monitoring with SNMP and MIB modules.

- Configuration (write access) has been claimed to be difficult/problematic

- Although there are success stories of using SNMP for configuration

- NetConf is intended to fill in the configuration protocol functionality

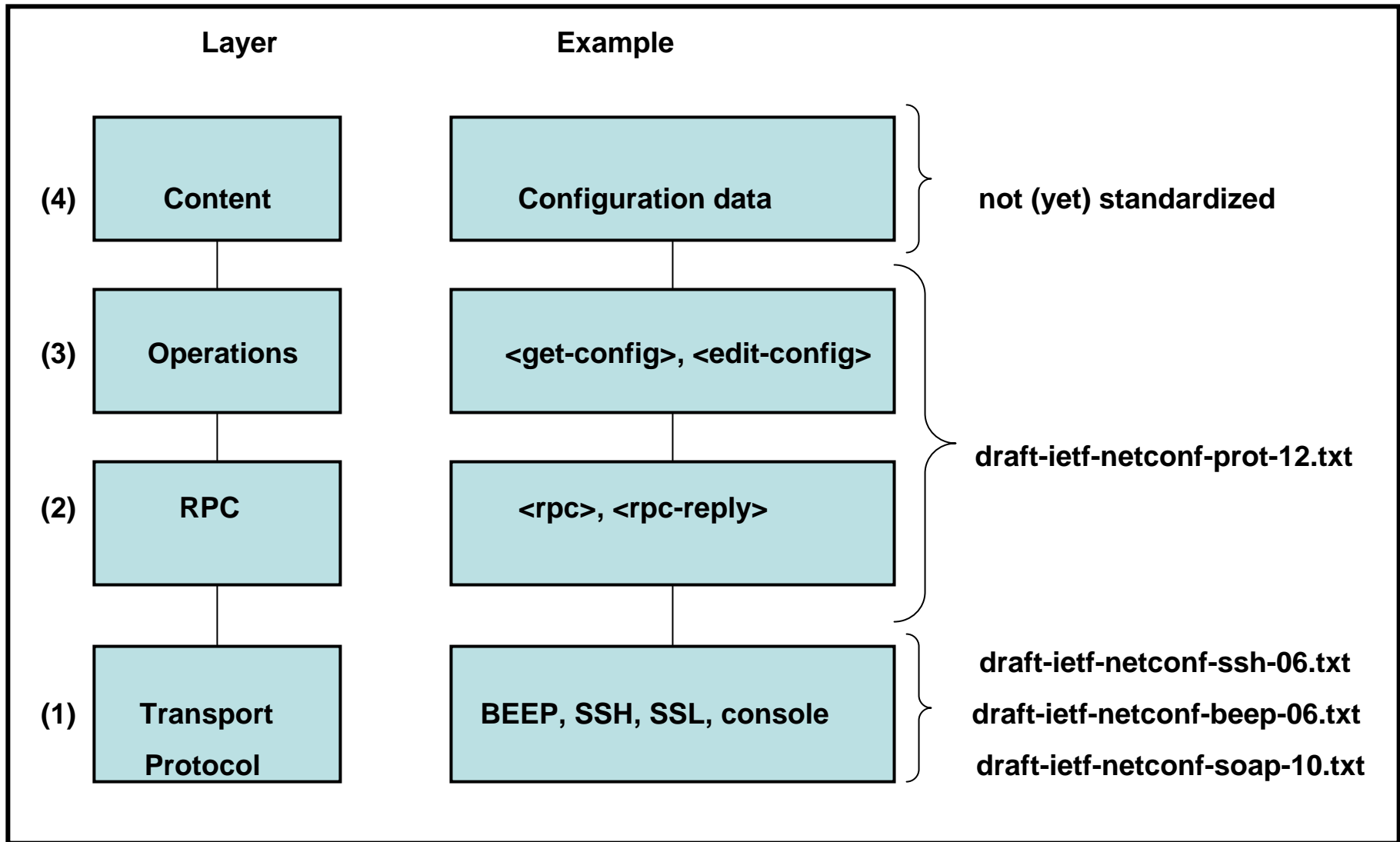 - (also seen as an alternative to CLI)

SNMPv3 and Security

- SNMPv3 has "embedded" security
- SNMPv3 has detailed Access Control Model
- SNMPv3 needs separate configuration of the security and access "parameters"
- That is claimed to be too much of a burden
- Need/requirement to integrate with existing mechanisms/protocols
- Hence ISMS WG
  - ISMS == Integrated Security Model for SNMP

ISMS work

- Integrated Security Model for SNMP
- Status:
  - Discussed and evaluated various approaches
  - Recently renewed focus on direction
  - Lots of work still to do
- Current direction:
  - Use SSH as security transport (authentication and encryption)
  - Use Radius/Diameter for authorization
  - Try to fit into existing SNMP architecture

Conceptual NetConf Layers

Layer		Example	
(4)	**Content**	**Configuration data**	**not (yet) standardized**
(3)	**Operations**	**<get-config>, <edit-config>**	
(2)	**RPC**	**<rpc>, <rpc-reply>**	**draft-ietf-netconf-prot-12.txt**
(1)	**Transport Protocol**	**BEEP, SSH, SSL, console**	**draft-ietf-netconf-ssh-06.txt** **draft-ietf-netconf-beep-06.txt** **draft-ietf-netconf-soap-10.txt**

NetConf concepts

- Configuration viewed as an XML document
- Config changes via "patches" to XML document
- Information retrieval with filtering capability
- Support for multiple configuration "datastores"
- Locking on the datastore level
- Commit/rollback support (capability)
- Authentication/encryption left to the transport
  - ssh default + mandatory to implement
  - beep and soap are optional
- Extensible for new operations via capabilities
- network wide configuration change transactions

Also Relevant for NGN

- IPPM WG
  - IP Performance metrics
  - IANA maintained registry
- RMONMIB WG
  - widely used monitoring MIB modules
  - Application performance monitoring MIB
  - Real-time Application Quality of Service Monitoring (RAQMON) MIB
- SYSLOG WG.. others

IETF and other SDOs

- Try to have technical individuals participate in multiple SDOs
  - de-facto coordination & conflict avoidance
  - without too many formal mechanisms
- Good examples are:
  - Liaisons (people and LS), but don't over-use
  - new work list (new-work@ietf.org),
  - MIB reviews (IETF MIB doctors do review IEEE 802 MIB modules),
  - distribution of OAM work between IETF-l2vpn, IEEE 802.1 and ITU-T (mainly by same people participating in each organization)
- Individuals do participate in NGNMFG & SCRM

Conclusions/Discussion

- In principle the NGN NM work seems to be able to use existing and upcoming IETF NM protocols and Data Models

- We need to (continue to) exchange needs and requirements and keep each other up to date on developments (NGNMFG)

- NGN NM should study NetConf Work and probably also ISMS work/discussions

- Active participation from technical individuals in cross-SDO work is important to stimulate re-use and avoid duplication or overlap.

Questions?   Start Shooting !
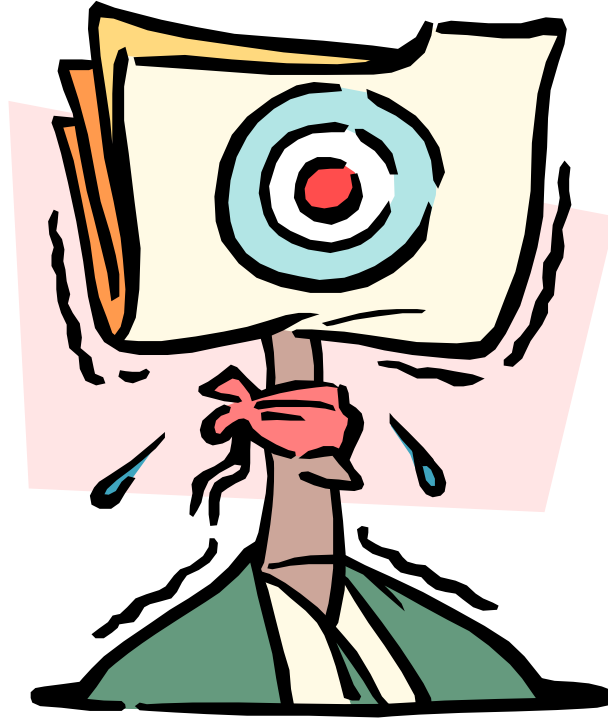
Answers ?? I will try !

Reading material

Contact information

SNMPv3 – Internet Standard 62

- RFC3411 – Architecture
- RFC3412 – Message Processing/Dispatching
- RFC3413 – SNMP Applications
- RFC3414 – VACM, View-based Access Control
- RFC3415 – USM, Used-based Security Model
- RFC3416 – Protocol Operations
- RFC3417 – Transport Mappings
- RFC3418 – SNMP MIB module

SNMPv3 – Additional documents

- RFC3410 – Overview and Applicability (Informational)
- RFC3419 – Textual Conventions for Transport Addresses (Proposed Standard)
- RFC3430 – SNMP over TCP (experimental)
- RFC3584 – Coexistence SNMPv1, SNMPv2c and SNMPv3 (BCP – Best Current Practice)

SMIv2 – Internet Standard 58

- RFC2578 – Structure of Management Information Version 2

- RFC2579 – Textual Conventions for SMIv2

- RFC2580 – Conformance Statements for SMIv2

Other documents

- COPS – RFC2748, RFC2749, RFC4261 (all at Proposed Standard level)

- COPS-PR – RFC3084 (Proposed Standard)

- SPPI – RFC 3159 (Proposed Standard)

- PCIM – RFC3060 and RFC3460 (Proposed Standard)

More pointers

- For RFCs, goto
  - http://www.rfc-editor.org
- For IETF Working Groups goto
  - http://www.ietf.org/html.charters/wg-dir.html
- For IETF OPS Area specifics goto:
  - http://www.ops.ietf.org/
- Contact OPS co-AD for Network Management:
  - Dan Romascanu: dromasca@avaya.com
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