Overview of IETF Network Management Activities

Bert Wijnen
bwijnen@lucent.com
May, 2006
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

<table>
<thead>
<tr>
<th>Layer</th>
<th>Example</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4) Content</td>
<td>Configuration data</td>
<td>not (yet) standardized</td>
</tr>
<tr>
<td>(3) Operations</td>
<td>&lt;get-config&gt;, &lt;edit-config&gt;</td>
<td>draft-ietf-netconf-prot-12.txt</td>
</tr>
<tr>
<td>(2) RPC</td>
<td>&lt;rpc&gt;, &lt;rpc-reply&gt;</td>
<td>draft-ietf-netconf-ssh-06.txt, draft-ietf-netconf-beep-06.txt, draft-ietf-netconf-soap-10.txt</td>
</tr>
<tr>
<td>(1) Transport Protocol</td>
<td>BEEP, SSH, SSL, console</td>
<td></td>
</tr>
</tbody>
</table>

May 2006
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-I2vpn, 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.

may 2006
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

• For IETF OPS Area specifics goto:
  – http://www.ops.ietf.org/

• Contact OPS co-AD for Network Management:
  – Dan Romascanu: dromasca@avaya.com

• Presentation was given by:
  – Bert Wijnen: bwijnen@lucent.com