UNUM: NETMOD Unified Model

Martin Swany
U. Delaware
Direction

• Chairs asked for: presentations on "first takes" and "outlines" on how such documents could/should look
• Charter calls for “...a set of core YANG data models”
  – Presumably models of network elements and characteristics that can be reused and extended
• draft-ietf-netmod-arch-10 says about YANG
  – Adding "features" and replacing "third normal form" with a natural data hierarchy should reduce complexity.
Brief Background

• perfSONAR is a web services based network measurement and monitoring system
  – Efforts in the Grid Forum
  – Widely used in R&E networks
• We developed a network topology schema
  – Initially to codify and reuse measurement “subjects”
  – Capture the relationship among those elements
  – Eventually extended to support dynamic virtual “circuit” allocation in Internet2, ESnet, GEANT, etc.
  – Now investigating it for resource description and allocation in GENI
Network Description Schema

• YANG seems to be a solution to many of the problems that we have had with Relax NG
• I started working with YANG recently to produce a revised version of the perfSONAR topology schema (called UNIS)
Schema Approach

• Define basic network elements: node, port, link, etc.
• Reuse element names, vary the namespace for layer-specific properties
  – Also serves as the basis for other extensions (vendor or domain-specific)
• Example: ethernet:interface and ip:interface have distinct attributes (and potentially distinct counters)
  – Multiple ip:interface atop single ethernet:interface
• Two ways to look at it:
  – Separate but related elements
  – “Outer join” to create single entity with attributes from both namespaces
Existing Core Model

• **Network Object** (abstract base class)
  ─ Has **Identifier**, **Lifetime**, is the target of a **Relation**
• **Node**
• **Port** (Interface)
• **Link**
• **Service**
• **Groups**: **Network**, **Path**, **Domain**
Additions to the Model

• **Rule**
  – Models routes, but other policy as well
  – N-tuple of all matchable header fields: (src/dst IP, src/dst MAC addr, etc.) followed by an action (send to output port, IP next hop, increment counter, drop, etc.)

• Very illustrative of how we need to reduce things to their most basic components, but preserve the ability to refer to them in shorter, more familiar forms
Groups

- Group
  - Path
  - Topology
  - Domain
  - Network
Issues

• This model is broader than the current NETMOD mandate
  – If we can apply the broader model without impacting the current NETMOD needs, then good
  – We have to balance between over-specification, which slows and complicates this effort, and overly-narrow design decisions, which can make expansion more difficult later

• Can this work serve as a starting point for the NETMOD general models?
Issues - Modeling

• How to join basic elements, create views
• How best to manage inheritance (if at all?)