

SNMP-based QoS Programming Interface MIB for Routers

(draft-kanada-diffserv-qospifmib-00.txt)

In 46th IETF CFGMGMT BOF Meeting

Yasusi Kanada
Hitachi Ltd., Central Research Laboratory

Our experience

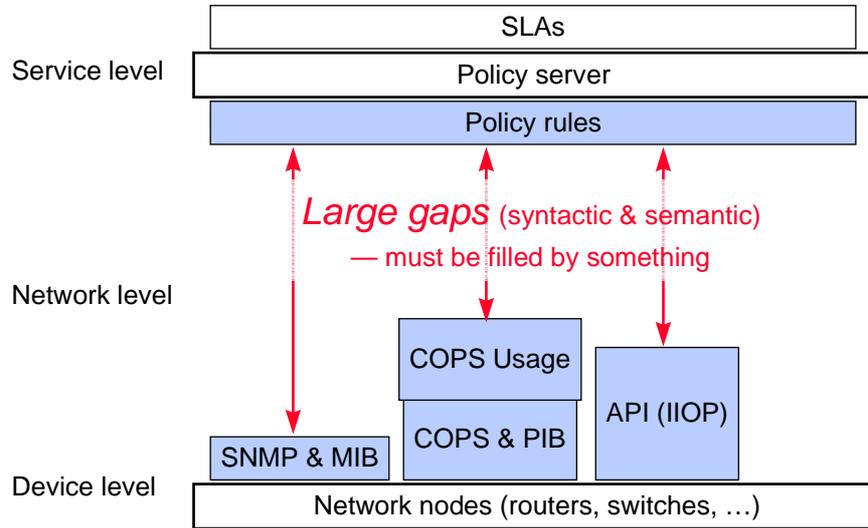
■ We have designed and implemented a QoS MIB/PIB for policy-based QoS control of routers.

- Written in draft-kanada-diffserv-qospifmib-00.txt
- Implemented as a MIB using SNMP
- Implemented as a PIB using COPS

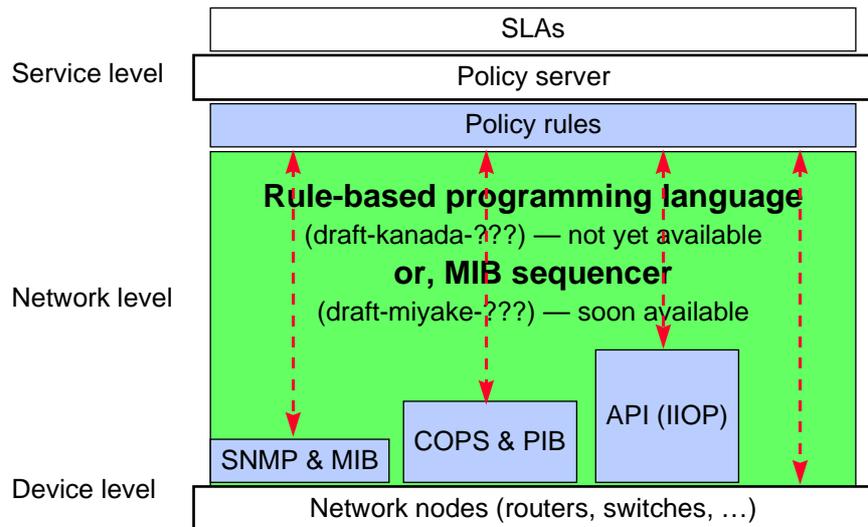
■ We have experienced much difficulty.

- Difficulty in understanding the structure of MIB/PIB
 - **Syntactic gap:** The syntax does not reflect the logical structure of policy rules, queues, ...
- Difficulty in implementing and using the MIB/PIB
 - **Semantic gap:** The unit of operation on a MIB is too small.
 - A policy rule should be handled as whole.
 - In SMI, each variable in a MIB is separately get/put.
 - The order and other *implicit* constraints must be satisfied.
 - This causes difficulty in mapping MIB operations to rule operations.

Problem



Possible solution



Why do we need a programming language?

- A language has its *syntax* and *semantics* that are suited to a specific purpose.
- Policy-based configuration is programming.
 - Network nodes have been configured only using parameters (data).
 - We need programs for configuration, because the function to be configured is so complex.
 - If-then rules (policy rules) are programs.
 - Network nodes are going to be intelligent.
 - Program semantics must be specified formally for the network to be interoperable.
 - Standard protocols do not guarantee interoperability any longer.
 - Protocols specify only very limited part of the semantics.

What kind of language?

- A rule-based language
 - Because a policy is a rule-based program.
- This language may be similar to languages for expert systems, such as OPS5 or Nexpert Object.
 - We may have to learn from AI and Knowledge Engineering.

Relation between the language and the protocols

■ This language may be used with any protocol.

- Either SNMP & MIB, COPS & PIB, API (IIOP), or other protocols.
- If COPS is used, the language semantics must be mapped to the COPS usage formally.
 - COPS-PR already contains language syntax definitions.
 - e.g. <Request> ::= <Common Header>
<Client Handle>
<Context = config request>
[<Named ClientSI: Provisioning >]
[<Integrity>]
 - Why not language semantics definitions?
 - Why not generalize them?

■ Or, the definition of a protocol must embed a language definition.

- A new method of specifying protocols is required.