Representing Unknown YANG bits in Operational State

draft-haas-netmod-unknown-bits

IETF 116 - Yokohama

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Bit vectors in a protocol

• Routing protocols have bit vector fields as part of their PDUs.

• Usually, only some bits are initially assigned in the specification.
Modeling Known Bit Vector State in YANG

YANG gives us several options for modeling known bits in a bit vector:

• We can use identities on a base identity for that bit vector type.
  • And example of this is the router-lsa-bit base identity for the RFC 9129 OSPF YANG module.

• The YANG bits type (RFC 7950, §9.7) permits bits to be explicitly named and numbered.
Modeling Unknown Bits in YANG

• Modeling known bits is quite easy. Unknown bits are problematic in that their position are known, but they require a positive presence in the model to be rendered:
  • If using identities, you’d have to declare an identity for the unknown bit.
  • If using ”bits”, you’d have to name the bit and position.

• YANG versioning doesn’t want you changing names:
  • If you gave bit position 1 the name “unknown-1”, the assignment is expected to be stable.
  • Bit position 1 may be assigned to a real feature in a future protocol update.
Example Update to an Existing Protocol
Bit Vector

0 1 2 3
+-+-+-+-+
|R|N|   |
+-+-+-+-+

RFC 4274 BGP Graceful Restart Flags, Revised by RFC 8538 to add the N bit
Why Do We Care?

• Incremental deployment of new features may mean previously unassigned bits are used in the protocol.
• Visibility for those bits may be needed for troubleshooting.
  • Perhaps those bits are the source of a bug.
Proposal

2. Modules that need to operationally render unknown bits use this type in an “unknown-flags” leaf.
Example Usage

include ietf-yang-unknown-bit-types {
    prefix yang-ubt;
}
leaf unknown-flags {
    type ubt:unknown-bits;
    description
        "When a bit is exchanged in the Graceful Restart Flags field that is unknown to this module, their bit position is rendered using the associated unknown bit.";
    reference
        "RFC 4724: Graceful Restart Mechanism for BGP, Section 3.";
}
Questions?