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.

0 1 2 3

+-+-+-+-+

|R|Resv.|

+-+-+-+-+

BGP Graceful Restart Flags

RFC 4274

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

1. Define an IETF typedef providing consistent naming for unknown bits in a bit vector, "ietf-yang-unknown-bit-types:unknown-bits".

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?