draft-ietf-opsawg-discardmodel-08

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Problem statement

- The primary function of a network is to transport and deliver packets
- Understanding both where and why packet loss occurs is key to automate network operations
- Router reported packet loss should be the primary signal of network packet loss: not sampled in time or space and can indicate discard reason
- Existing packet loss metrics – ifInDiscards, ifOutDiscards, ifInErrors, and ifOutErrors [RFC2863, RFC8343] – lack the required precision and are ambiguous
- Vendor implementations inconsistent

draft-ietf-opsawg-discardmodel

- draft-ietf-opsawg-discardmodel defines both an information model and corresponding YANG data model for packet loss reporting which address these issues
  - Information Model provides an implementation-independent framework for classifying packet loss with sufficient classification precision sufficient to be enable automated network mitigation of unintended packet loss
  - Data Model specifies a YANG implementation of this framework for network elements, while maintaining consistency through clear semantics

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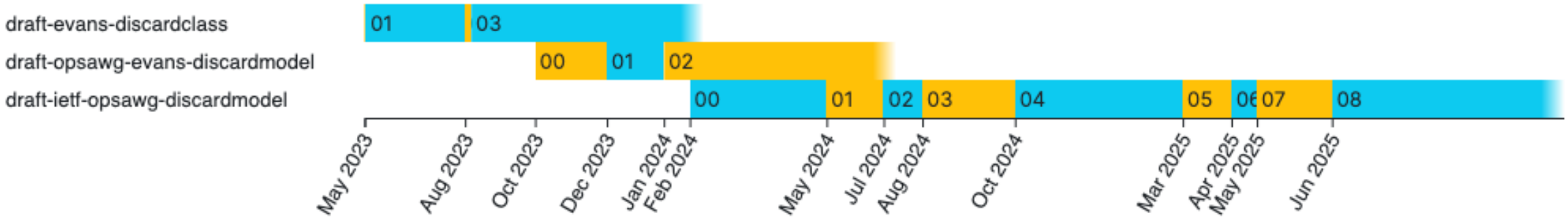
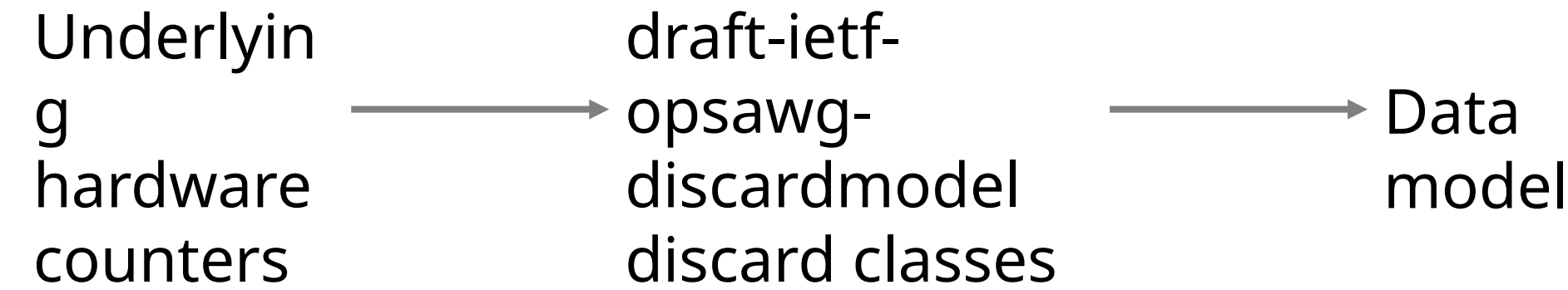


- Draft history
  - 00-01 – IM(tree) - Informational
  - 02 – IM(YANG) - Informational
  - 03-04 – IM(YANG) - Standards Track
  - 05 – IM(YANG) + DM(YANG) - Standards Track

draft-ietf-opsawg-discardmodel Information model (YANG)

- Defined using YANG with [RFC8791] Data Structure Extensions
- Allows the model to remain abstract and decoupled from specific implementations in accordance with [RFC3444]
- Abstraction supports different data model implementations – e.g. YANG, IPFIX [RFC7011], gMNI [gMNI] or SNMPv3 [RFC3411] – while ensuring consistency across implementations
- Incorporated feedback from subsequent YANGDOCTORS review
  - Changed YANG Module to “address-family” type for v4 and v6
  - Added Design Rationale (4.1) and Structure sections (4.2)
- IM approach now endorsed in the Guidelines for Considering Operations and Management in IETF Specifications
  - https://ietf-opsawg-wg.github.io/draft-opsarea-rfc5706bis/draft-opsarea-rfc5706bis.html#name-information-model-design

What’s involved in implementation



From 64 to 256 underlaying hardware drop counters, depending on platform

Known Information Model implementations

- 8 hardware platforms across 4 vendors
  - Broadcom: Trident, Tomahawk 1, Tomahawk 3, Tomahawk 5
  - Cisco: Q200L
  - Juniper: MX, PTX, QFX
  - Marvell: TL7

Data model (YANG)

- YANG data model implements the information model for the **interface, device** and **control plane** components
- Using YANG for the information model enables lossless translation to the corresponding YANG data model
- There is a direct mapping between the information model components and their data model implementations – each component in the hierarchy is represented by corresponding YANG containers and leaves.

Known Data model (YANG) implementations

- YANG compliant open source slax script implements a subset of the draft-ietf-opsawg-discardmodel for Juniper MX routers
  - https://github.com/o-pylypenko-aws/draft-ietf-opsawg-discardmodel-sample/

Data model (IPFIX)

- Automated triage often requires understanding which flows are impacted
  - e.g. to identify and trace the sources of elephant flows when mitigating congestion
- This requires the ability to correlate device and interface-level discard classes with the specific flows being dropped
- The drop reason codes defined by the forwardingStatus Information Element [RFC7270] lack the required granularity and clarity
- **draft-evans-opsawg-ipfix-discard-class-ie-00** proposes a new Information Element, flowDiscardClass, to provide a consistent classification scheme for packet discards across IPFIX implementations
- Implements the information model from draft-ietf-opsawg-discardmodel for the **flow** component

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- Addressed all received comments
- Ready for WGLC?