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S. Dikshit
Aruba Networks, HPE
M. Srivastava
Juniper Networks

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EVPN-Specific BMP RIB Statistics Extensions
draft-saum-grow-bmp-afi-safi-evpn-02

Abstract

This document defines EVPN-specific BGP Monitoring Protocol (BMP) statistics types that extend the generic BMP RIB statistics defined in draft-ietf-grow-bmp-bgp-rib-stats. These extensions include scalar counters for EVPN route types (1-8), locally originated routes, multihoming Ethernet Segments, multihomed EVIs, aliased paths, dynamic inter-VRF route leaking (IVRL), and segment failure impacts, with a 16-bit bitmap for route-map/policy modifications in the high-order 16 bits of a 64-bit field. All counters are applicable to Adj-RIB-In, Adj-RIB-Out, and Local-RIB for the EVPN address family (AFI=25, SAFI=70), using 64-bit gauges unless explicitly specified otherwise.

Table of Contents

1. Introduction

RFC 7854 defines different BMP statistics message types to observe events on the router. The statistics are defined as counters or gauges to provide insights into BGP processing. This document extends the BMP RIB statistics defined in [I-D.ietf-grow-bmp-bgp-rib-stats] by adding EVPN-specific statistics types to monitor EVPN-related events in Adj-RIB-In, Adj-RIB-Out, and Local-RIB for the EVPN address family (AFI=25, SAFI=70). EVPN, as defined in [RFC7432] and extended by [RFC9135] for integrated routing and bridging, forms the basis for these statistics.

These statistics provide visibility into EVPN route types (1-8), locally originated routes, multihoming (Layer-2 and Layer-3), multihomed EVIs, aliased paths, dynamic inter-VRF route leaking (IVRL), route-map/policy modifications, and segment failure impacts, enhancing monitoring and troubleshooting in data center and enterprise networks.

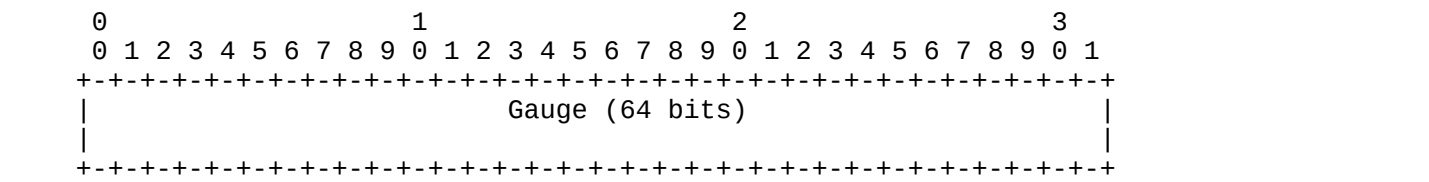
Unless otherwise specified, all statistics are 64-bit gauges, following [RFC7854], and are flattened to scalar values except for route-map attributes, which use a 16-bit bitmap in the high-order 16 bits of a 64-bit field to indicate modified attributes, ensuring simplicity for BMP clients while allowing flexibility for route-map modifications.

1.1. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2. EVPN-Specific BMP Statistics Extensions

This section defines EVPN-specific statistics types for BMP, applicable to the EVPN address family (AFI=25, SAFI=70). All statistics are encoded as 64-bit gauges, as defined in [RFC7854], unless explicitly specified otherwise. The common format for all 64-bit gauge counters is shown below:

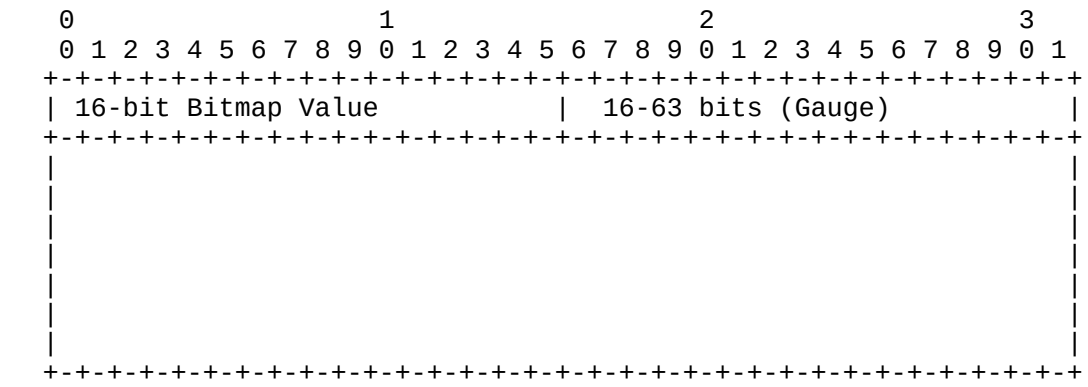


The route-map attributes statistic uses a 16-bit bitmap in the high-order 16 bits of a 64-bit field, as specified in the respective section.

2.1. EVPN Route-Map and Policy Applicability Count

This statistic indicates which route attributes were modified by route-maps using a 16-bit bitmap value in the high-order 16 bits of a 64-bit BMP statistics type, with the low-order 48 bits set to 0. Each defined attribute is assigned a unique 16-bit bitmap value, represented in hexadecimal notation (e.g., 0x0001, 0x0002, ..., 0x000B), set to that value if at least one route had that attribute modified, or 0 otherwise. The bitmap supports up to 2^16 values conceptually, with currently defined attributes using values 0x0001 to 0x000B and the remaining values reserved for future use.

* evpn_route_map_attributes: Bitmap value indicating which route attribute was modified by route-maps.



Bitmap value assignments (low bits first, bit 0 is the least significant bit in the 16-bit bitmap):

* Value 0x0001: Local Preference (set to 0x0001 if modified, 0 otherwise).

* Value 0x0002: AS Path.

* Value 0x0003: MED.

* Value 0x0004: Community.

* Value 0x0005: Extended Community.

* Value 0x0006: Prefix List.

* Value 0x0007: MAC Address List.

* Value 0x0008: Next Hop.

* Value 0x0009: EVI.

* Values 0x000A-0xFFFF: Vendor-specific attribute range.

The 16-bit bitmap value, located in the high-order 16 bits (bits 0-15) of the 64-bit field, supports up to 2^16 values conceptually. Values 0x0001 to 0x000B are assigned to currently defined attributes, with values 0x000C to 0xFFFF reserved. The low-order 48 bits (bits 16-63) are set to 0.

3. YANG Model Alignment

The counters defined in this document align with the EVPN YANG model described in [I-D.ietf-bess-evpn-yang-07]. Route type counters map to YANG leaves for EVPN route statistics, multihoming and IVRL counters align with Ethernet Segment and VRF-related leaves, the route-map bitmap aligns with policy-related leaves, and segment failure impact aligns with failure event counters. The referenced EVPN YANG model is expired but used due to its relevance to EVPN statistics alignment. Implementations SHOULD check for newer versions. Implementations SHOULD ensure compatibility with the YANG model for integrated monitoring.

4. IANA Considerations

This document requests that IANA assign new BMP statistics types from the "BMP Statistics Type" registry for the following:

* Type TBD1: evpn_rt1_adj_rib_in_pre_policy
* Type TBD2: evpn_rt1_adj_rib_in_post_policy
* Type TBD3: evpn_rt1_adj_rib_out_pre_policy
* Type TBD4: evpn_rt1_adj_rib_out_post_policy
* Type TBD5: evpn_rt1_local_rib
* Type TBD6: evpn_rt2_adj_rib_in_pre_policy
* Type TBD7: evpn_rt2_adj_rib_in_post_policy
* Type TBD8: evpn_rt2_adj_rib_out_pre_policy
* Type TBD9: evpn_rt2_adj_rib_out_post_policy
* Type TBD10: evpn_rt2_local_rib
* Type TBD11: evpn_rt3_adj_rib_in_pre_policy
* Type TBD12: evpn_rt3_adj_rib_in_post_policy
* Type TBD13: evpn_rt3_adj_rib_out_pre_policy
* Type TBD14: evpn_rt3_adj_rib_out_post_policy
* Type TBD15: evpn_rt3_local_rib

* Type TBD16: evpn_rt4_adj_rib_in_pre_policy
* Type TBD17: evpn_rt4_adj_rib_in_post_policy
* Type TBD18: evpn_rt4_adj_rib_out_pre_policy
* Type TBD19: evpn_rt4_adj_rib_out_post_policy
* Type TBD20: evpn_rt4_local_rib
* Type TBD21: evpn_rt5_adj_rib_in_pre_policy
* Type TBD22: evpn_rt5_adj_rib_in_post_policy
* Type TBD23: evpn_rt5_adj_rib_out_pre_policy
* Type TBD24: evpn_rt5_adj_rib_out_post_policy
* Type TBD25: evpn_rt5_local_rib
* Type TBD26: evpn_rt6_adj_rib_in_pre_policy
* Type TBD27: evpn_rt6_adj_rib_in_post_policy
* Type TBD28: evpn_rt6_adj_rib_out_pre_policy
* Type TBD29: evpn_rt6_adj_rib_out_post_policy
* Type TBD30: evpn_rt6_local_rib
* Type TBD31: evpn_rt7_adj_rib_in_pre_policy
* Type TBD32: evpn_rt7_adj_rib_in_post_policy
* Type TBD33: evpn_rt7_adj_rib_out_pre_policy
* Type TBD34: evpn_rt7_adj_rib_out_post_policy
* Type TBD35: evpn_rt7_local_rib
* Type TBD36: evpn_rt8_adj_rib_in_pre_policy
* Type TBD37: evpn_rt8_adj_rib_in_post_policy
* Type TBD38: evpn_rt8_adj_rib_out_pre_policy
* Type TBD39: evpn_rt8_adj_rib_out_post_policy

* Type TBD40: evpn_rt8_local_rib
* Type TBD41: evpn_local_rt1_count
* Type TBD42: evpn_local_rt4_count
* Type TBD43: evpn_l2_multihoming_es_count
* Type TBD44: evpn_l3_multihoming_es_count
* Type TBD45: evpn_iesi_count
* Type TBD46: evpn_l2_esi_evi_count
* Type TBD47: evpn_l3_iesi_evi_count
* Type TBD48: evpn_aliased_paths_count
* Type TBD49: evpn_l2_ivrl_leaked_routes
* Type TBD50: evpn_l3_ivrl_leaked_routes
* Type TBD51: evpn_route_map_attributes
* Type TBD52: evpn_segment_failure_impact_count

The 52 types are necessary to provide comprehensive monitoring of EVPN route types (1-8) across Adj-RIB-In, Adj-RIB-Out, and Local-RIB, as well as multihoming, IVRL, route-map attributes, and segment failure impacts, ensuring detailed visibility into EVPN deployments.

All types, except for evpn_route_map_attributes, use a 64-bit gauge as their value. The evpn_route_map_attributes type uses a 16-bit bitmap value in the high-order 16 bits of a 64-bit field, with the low-order 48 bits set to 0.

5. Security Considerations

The security considerations of [RFC7854] apply to this document. No additional security risks are introduced by these EVPN-specific statistics, including the route-map attributes bitmap.

6. References

6.1. Normative References

[RFC7854] Scudder, J., Fernando, R., and S. Stuart, "BGP Monitoring Protocol (BMP)", RFC 7854, DOI 10.17487/RFC7854, June 2016, <https://www.rfc-editor.org/info/rfc7854>.

[RFC7432] Sajassi, A., Aggarwal, R., Bitar, N., Isaac, A., Uttaro, J., Drake, J., and W. Henderickx, "BGP MPLS-Based Ethernet VPN", RFC 7432, DOI 10.17487/RFC7432, February 2015, <https://www.rfc-editor.org/info/rfc7432>.

[RFC9135] Sajassi, A., Drake, J., Boutros, S., and J. Rabadan, "Integrated Routing and Bridging in Ethernet VPN (EVPN)", RFC 9135, DOI 10.17487/RFC9135, October 2021, <https://www.rfc-editor.org/info/rfc9135>.

[I-D.ietf-grow-bmp-bgp-rib-stats] Srivastava, M., Liu, Y., Lin, C., and J. Li, "Definition For New BGP Monitoring Protocol (BMP) Statistics Types", Work in Progress draft-ietf-grow-bmp-bgp-rib-stats-08, April 2025, <https://datatracker.ietf.org/doc/html/draft-ietf-grow-bmp-bgp-rib-stats-08>.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

6.2. Informative References

[I-D.ietf-bess-evpn-yang-07] Brissette, P., Shah, H., Chen, I., and K. Patel, "Yang Data Model for EVPN", Work in Progress draft-ietf-bess-evpn-yang-07, March 2019, <https://datatracker.ietf.org/doc/html/draft-ietf-bess-evpn-yang-07>.

Authors' Addresses

Saumya Dikshit
Aruba Networks, HPE
Mahadevpura
Bangalore 560 048
Karnataka
India
Email: saumya.dikshit@hpe.com

Mukul Srivastava
Juniper Networks
10 Technology Park Dr
Westford, MA 01886
United States of America
Email: msri@juniper.net