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Definition For New BGP Monitoring Protocol (BMP) Statistics Types

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Abstract

RFC 7854 defines different BGP Monitoring Protocol (BMP) statistics

message types to observe events that occur on a monitored router.

This document defines new statistics type to monitor BMP Adj-RIB-In

and Adj-RIB-Out Routing Information Bases (RIBs).

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1. Introduction

Section 4.8 of [RFC7854] defines several different BGP Monitoring

Protocol (BMP) statistics types to observe major events that occur on

a monitored router. Stats Reports are measured in either counters or gauges.

Section 6.2 of [RFC8671] also defines several BMP statistics types

for Adj-RIB-Out of a monitored router.

This document defines new gauges for BMP statistics message. The

format of the BMP statistics message remains unchanged from

[RFC7854].

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.

The terminology in this document aligns with [RFC7854] and [RFC8671].

2. Statistics Definition

This section defines different statistics type for Adj-RIB-In and

Adj-RIB-Out monitoring type.

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2.1. Adj-RIB-In Statistics Definition

\* Type = 18: (64-bit Gauge) Current number of routes in Adj-RIBs-In

Pre-Policy [RFC7854]. Note that this gauge updates stats type 7

defined in [RFC7854] and makes it an explicit for Adj-RIBs-In Pre-

Policy.

\* Type = 19: (64-bit Gauge) Current number of routes in per-Address

Family Identifier (AFI)/Subsequent Address Family Identifier

(SAFI) Adj-RIBs-In Pre-Policy. Note that this gauge is similar

from stats type 9 defined in [RFC7854] and makes it a explicit for

Adj-RIBs-In Pre-Policy. The value is structured as: 2-byte AFI,

1-byte SAFI, followed by a 64-bit Gauge.

\* Type = 20: (64-bit Gauge) Current number of routes in Adj-RIBs-In

Post-Policy [RFC7854].

\* Type = 21: (64-bit Gauge) Current number of routes in per-AFI/SAFI

Adj-RIBs-In Post-Policy. The value is structured as: 2-byte AFI,

1-byte SAFI, followed by a 64-bit Gauge.

\* Type = 22: (64-bit Gauge) Current number of routes in per-AFI/SAFI

rejected by inbound policy. Note that this gauge is different

from stats type 0 defined in [RFC7854]. The stats type 0 in

[RFC7854] is a 32-counter which is monotonically increasing number

and doesn't represent the current number of routes rejected by an

inbound policy due to ongoing configuration changes. The value is

structured as: 2-byte AFI, 1-byte SAFI, followed by a 64-bit

Gauge.

\* Type = 23: (64-bit Gauge) Number of routes in per-AFI/SAFI

accepted by inbound policy. The value is structured as: 2-byte

AFI, 1-byte SAFI, followed by a 64-bit Gauge. Some

implementations, or configurations in implementations, MAY discard

routes that do not match policy and thus the accepted count and

the Adj-RIB-In counts will be identical in such cases.

\* Type = 24: (64-bit Gauge) Number of routes in per-AFI/SAFI

selected as primary route. The value is structured as: 2-byte

AFI, 1-byte SAFI, followed by a 64-bit Gauge. A primary route is

a recursive or non-recursive path whose next-hop resolution ends

with an adjacency [I-D.ietf-rtgwg-bgp-pic]. A prefix can have

more than one primary path if multipath as described in draft-lapukhov-bgp-ecmp-considerations is configured. A best

path is also considered as a primary path.

\* Type = 25: (64-bit Gauge) Number of routes in per-AFI/SAFI

selected as a backup route. The value is structured as: 2-byte

AFI, 1-byte SAFI, followed by a 64-bit Gauge. A backup path is

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also installed in the Loc-RIB, but it is not used until some or

all primary paths become unreachable. Backup paths are used for

fast convergence in the event of failures.

\* Type = 26: (64-bit Gauge) Number of routes in per-AFI/SAFI

suppressed by configured route damping policy. The value is

structured as: 2-byte AFI, 1-byte SAFI, followed by a 64-bit

Gauge. Suppressed refers to a path which has been declared

suppressed by the BGP Route Flap Damping mechanism as described in

Section 2.2 of [RFC2439].

\* Type = 27: (64-bit Gauge) Number of routes in per-AFI/SAFI marked

as stale by any configuration. The value is structured as: 2-byte

AFI, 1-byte SAFI, followed by a 64-bit Gauge. Stale refers to a

path which has been declared stale by the BGP Graceful Restart

mechanism as described in Section 4.1 of [RFC4724], such as the

routes filtered by a remote peer through application of policies

during a graceful restart.

\* Type = 28: (64-bit Gauge) Number of routes in per-AFI/SAFI marked

as stale by Long-Lived Graceful Restart (LLGR). The value is

structured as: 2-byte AFI, 1-byte SAFI, followed by a 64-bit

Gauge. Stale refers to a path which has been declared stale by

the BGP LLGR mechanism as described in Section 4.3 of [RFC9494].

\* Type = 29: (64-bit Gauge) Number of routes left until reaching the

received route threshold as defined in Section 6.7 of [RFC4271].

\* Type = 30: (64-bit Gauge) Number of routes in per-AFI/SAFI left

until reaching the received route threshold as defined in

Section 6.7 of [RFC4271]. The value is structured as: 2-byte AFI,

1-byte SAFI, followed by a 64-bit Gauge.

\* Type = 31: (64-bit Gauge) Number of routes left until reaching a

license-customized route threshold. This value is affected by

whether a customized license exists for the relevant address

family, and when the customized license is installed.

\* Type = 32: (64-bit Gauge) Number of routes in per-AFI/SAFI left

until reaching a license-customized route threshold. This value

is affected by whether a customized license exists for the

relevant address family, and when the customized license is

installed. The value is structured as: 2-byte AFI, 1-byte SAFI,

followed by a 64-bit Gauge.

\* Type = 33: (64-bit Gauge) Current Number of routes rejected by

exceeding the length threshold of the AS-PATH attribute.

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\* Type = 34: (64-bit Gauge) Current Number of routes in per-AFI/SAFI

rejected by exceeding the length threshold of the AS-PATH attribute. The value

is structured as: 2-byte AFI, 1-byte SAFI, followed by a 64-bit

Gauge.

\* Type = 35: (64-bit Gauge) Current Number of routes in per-AFI/SAFI

Adj-RIBs-In Post-Policy invalidated through the Route Origin

Authorization (ROA) of Resource Public Key Infrastructure (RPKI)

[RFC6811]. This is total number of routes invalidated due to

origin Autonomous System (AS) number mismatch and prefix length

mismatch. The value is structured as: 2-byte AFI, 1-byte SAFI,

followed by a 64-bit Gauge.

\* Type = 36: (64-bit Gauge) Current Number of routes in per-AFI/SAFI

Adj-RIBs-In Post-Policy validated by verifying route origin AS

number through the ROA of RPKI [RFC6811]. The value is structured

as: 2-byte AFI, 1-byte SAFI, followed by a 64-bit Gauge.

\* Type = 37: (64-bit Gauge) Current Number of routes in per-AFI/SAFI

Adj-RIBs-In Post-Policy not found by verifying route origin AS

number through the ROA of RPKI [RFC6811]. The value is structured

as: 2-byte AFI, 1-byte SAFI, followed by a 64-bit Gauge.

2.2. Adj-RIB-Out Statistics Definition

\* Type = 38: (64-bit Gauge) Current number of routes in per-AFI/SAFI

rejected by outbound policy. These routes are active routes which

should otherwise would have been advertised in absence of outbound

policy which rejected them. The value is structured as: 2-byte

AFI, 1-byte SAFI, followed by a 64-bit Gauge. This counter only

considers routes distributed from Loc-RIB into the Adj-RIBs-Out

and does not include cases like BGP add-paths [RFC7911].

\* Type = 39: (64-bit Gauge) Current Number of routes refused to be

sent by exceeding the length threshold of the AS-PATH attribute.

\* Type = 40: (64-bit Gauge) Current Number of routes in per-AFI/SAFI

refused to be sent by exceeding the length threshold of the AS-PATH attribute.

The value is structured as: 2-byte AFI, 1-byte SAFI, followed by a

64-bit Gauge.

\* Type = 41: (64-bit Gauge) Current Number of routes in per-AFI/SAFI

Adj-RIBs-Out Post-Policy invalidated through the ROA of RPKI

[RFC6811]. This is total number of routes invalidated due to

origin AS number mismatch and prefix length mismatch. The value

is structured as: 2-byte AFI, 1-byte SAFI, followed by a 64-bit

Gauge.

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\* Type = 42: (64-bit Gauge) Current Number of routes in per-AFI/SAFI

Adj-RIBs-Out Post-Policy validated by verifying route origin AS

number through the ROA of RPKI [RFC6811]. The value is structured

as: 2-byte AFI, 1-byte SAFI, followed by a 64-bit Gauge.

\* Type = 43: (64-bit Gauge) Current Number of routes in per-AFI/SAFI

Adj-RIBs-Out Post-Policy not found by verifying route origin AS

number through the ROA of RPKI [RFC6811]. The value is structured

as: 2-byte AFI, 1-byte SAFI, followed by a 64-bit Gauge.

3. IANA Considerations

IANA has assigned the following new parameters in the BMP Statistics

Types registry, part of the BMP parameters registry group

(https://www.iana.org/assignments/bmp-parameters/bmp-

parameters.xhtml).

This document requests IANA to update the reference cited for the

entries with the RFC number to be assigned to this document.

\* Type = 18: Number of routes currently in Adj-RIBs-In Pre-Policy.

\* Type = 19: Number of routes currently in per-AFI/SAFI Adj-RIBs-In

Pre-Policy.

\* Type = 20: Number of routes currently in Adj-RIBs-In Post-Policy.

\* Type = 21: Number of routes currently in per-AFI/SAFI Adj-RIBs-In

Post-Policy.

\* Type = 22: Number of routes currently in per-AFI/SAFI rejected by

inbound policy.

\* Type = 23: Number of routes currently in per-AFI/SAFI accepted by

inbound policy.

\* Type = 24: Number of routes currently in per-AFI/SAFI selected as

primary route.

\* Type = 25: Number of routes currently in per-AFI/SAFI selected as

a backup route.

\* Type = 26: Number of routes in per-AFI/SAFI suppressed by

configured route damping policy.

\* Type = 27: Number of routes in per-AFI/SAFI marked as stale by Graceful Restart.

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\* Type = 28: Number of routes in per-AFI/SAFI marked as stale by

Long Lived Graceful Restart.

\* Type = 29: Number of routes left until reaching the received route

threshold.

\* Type = 30: Number of routes in per-AFI/SAFI left until reaching

the received route threshold.

\* Type = 31: Number of routes left until reaching a license-

customized route threshold.

\* Type = 32: Number of routes in per-AFI/SAFI left until reaching a

license-customized route threshold.

\* Type = 33: Number of routes currently rejected due to exceeding

the length threshold of the AS-PATH attribute.

\* Type = 34: Number of routes currently in per-AFI/SAFI rejected due

to exceeding the length threshold of the AS-PATH attribute.

\* Type = 35: Number of routes currently in per-AFI/SAFI Adj-RIBs-In

Post-Policy invalidated after verifying route origin AS number

through the ROA of RPKI.

\* Type = 36: Number of routes currently in per-AFI/SAFI Adj-RIBs-In

Post-Policy validated after verifying route origin AS number

through the ROA of RPKI.

\* Type = 37: Number of routes currently in per-AFI/SAFI Adj-RIBs-In

Post-Policy not found after verifying route origin AS number

through the ROA of RPKI.

\* Type = 38: Number of routes currently in per-AFI/SAFI rejected by

outbound policy.

\* Type = 39: Number of routes currently refused by exceeding the

length threshold of the AS-PATH attribute.

\* Type = 40: Number of routes currently in per-AFI/SAFI refused by

exceeding the length threshold of the AS-PATH attribute.

\* Type = 41: Number of routes currently in per-AFI/SAFI Adj-RIBs-Out

Post-Policy invalidated after verifying route origin AS number

through the ROA of RPKI.

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\* Type = 42: Number of routes currently in per-AFI/SAFI Adj-RIBs-Out

Post-Policy validated after verifying route origin AS number

through the ROA of RPKI.

\* Type = 43: Number of routes currently in per-AFI/SAFI Adj-RIBs-Out

Post-Policy not found after verifying route origin AS number

through the ROA of RPKI.

4. Security Considerations

The considerations in Section 11 of [RFC7854] apply to this document.

It is also believed that this document does not add any additional

security considerations.

5. Implementation Status

Note to the RFC Editor - remove this section before publication, as

well as remove the reference to [RFC7942].

This section records the status of known implementations of the

protocol defined by this specification at the time of posting of this

Internet-Draft, and is based on a proposal described in [RFC7942].

The description of implementations in this section is intended to

assist the IETF in its decision processes in progressing drafts to

RFCs. Please note that the listing of any individual implementation

here does not imply endorsement by the IETF. Furthermore, no effort

has been spent to verify the information presented here that was

supplied by IETF contributors. This is not intended as, and must not

be construed to be, a catalog of available implementations or their

features. Readers are advised to note that other implementations may

exist.

According to [RFC7942], "this will allow reviewers and working groups

to assign due consideration to documents that have the benefit of

running code, which may serve as evidence of valuable experimentation

and feedback that have made the implemented protocols more mature.

It is up to the individual working groups to use this information as

they see fit".

5.1. Juniper Networks

\* Organization: Juniper Networks.

\* Implementation:

\* Description: Below RIB-IN statistics are implemented.

- Type = 18.

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- Type = 19.

- Type = 20.

- Type = 21.

- Type = 22.

- Type = 23.

- Type = 26.

- Type = 27.

- Type = 28.

- Type = 35.

- Type = 36.

- Type = 37.

\* Maturity Level: Demo

\* Coverage:

\* Version: Draft-05

\* Licensing: N/A

\* Implementation experience: Nothing specific.

\* Contact: msri@juniper.net

\* Last updated: January 20, 2025

5.2. New H3C Technologies

\* Organization: New H3C Technologies.

\* Implementation: H3C CR16000, CR19000 series routers implementation

of New BMP Statistics Type.

\* Description: Below New types have been implemented in above-

mentioned New H3C Products (running Version 7.1.086 and above).

- Type = 18.

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- Type = 19.

- Type = 20.

- Type = 21.

- Type = 22.

- Type = 23.

- Type = 24.

- Type = 25.

- Type = 29.

- Type = 30.

- Type = 31.

- Type = 32.

- Type = 33.

- Type = 34.

- Type = 35.

- Type = 36.

- Type = 37.

- Type = 38.

- Type = 39.

- Type = 40.

\* Maturity Level: Demo

\* Coverage:

\* Version: Draft-05

\* Licensing: N/A

\* Implementation experience: Nothing specific.

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\* Last updated: January 20, 2025

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