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C. Petrie
RIPE NCC
T. King
DE-CIX
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**Multi-Threaded Routing Toolkit (MRT) Routing Information Export Format
with BGP Additional Paths Extensions
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Abstract

This document updates the Multi-threaded Routing Toolkit (MRT) export format for Border Gateway Protocol (BGP) routing information by extending it to support the Advertisement of Multiple Paths in BGP extensions.

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[1.](#) Introduction

The MRT record format [[RFC6396](#)] was developed to provide researchers and engineers a means to encapsulate, export, and archive routing protocol transactions and routing information base snapshots.

The Advertisement of Multiple Paths in BGP [[RFC7911](#)] defines a BGP extension to allow the advertisement of multiple paths for the same address prefix without the new paths implicitly replacing any previous ones.

This document contains an optional extension to the MRT format [[RFC6396](#)] and introduces additional definitions of MRT subtype fields to permit representation of multiple path advertisements [[RFC7911](#)].

[2.](#) Rationale

MRT parsers are usually stateless. In order to parse BGP messages which contain data structures that depend on the capabilities negotiated during the BGP session setup, the so-called MRT subtypes are utilized. The Advertisement of Multiple Path [[RFC7911](#)] extension for BGP alters the encoding of the BGP NLRI format for withdraws and announcements. Therefore new BGP4MP/BGP4MP_ET subtypes as defined in [[RFC6396](#)] are required to signal to a MRT parser how to parse the NLRI.

In [section 4.3](#) [[RFC6396](#)] of the MRT specification RIB subtypes are specified. Prefix length and prefix fields are encoded in the same

manner as the BGP NLRI encoding. In order to support path identifier information as defined in [[RFC7911](#)] new subtypes need to be added.

The following two sections define the required subtypes.

3. MRT Subtypes for Types BGP4MP/BGP4MP_ET

This document defines the following new Subtypes:

- o BGP4MP_MESSAGE_ADDPATH
- o BGP4MP_MESSAGE_AS4_ADDPATH
- o BGP4MP_MESSAGE_LOCAL_ADDPATH
- o BGP4MP_MESSAGE_AS4_LOCAL_ADDPATH

The fields of these message types are identical to the equivalent non-additional-path versions specified in [section 4.4 \[RFC6396\]](#). These enhancements continues to encapsulate the entire BGP message in the BGP message field.

4. MRT Subtypes for Type TABLE_DUMP_V2

This document defines the following new Subtypes:

- o RIB_IPV4_UNICAST_ADDPATH
- o RIB_IPV4_MULTICAST_ADDPATH
- o RIB_IPV6_UNICAST_ADDPATH
- o RIB_IPV6_MULTICAST_ADDPATH
- o RIB_GENERIC_ADDPATH

The fields of these message types are identical to the equivalent non-additional-path versions specified in [section 4.3 \[RFC6396\]](#). However, for the specific case of the 4 AFI/SAFI specific RIB subtypes, the existing RIB Entries field is re-defined as detailed in the sections below.

4.1. AFI/SAFI specific RIB Subtypes

In order to preserve the record compaction achieved by using the most common subtypes, and allowing multiple RIB Entries to be stored in a single TABLE_DUMP_V2 record, the existing RIB Entries field is

BGP4MP_MESSAGE_AS4_LOCAL_ADDPATH = 11 ([Section 3](#))

The values provided above are suggested as they are used in implementations.

5.2. TABLE_DUMP_V2 Subtype codes:

RIB_IPV4_UNICAST_ADDPATH = 8 ([Section 4.1](#))

RIB_IPV4_MULTICAST_ADDPATH = 9 ([Section 4.1](#))

RIB_IPV6_UNICAST_ADDPATH = 10 ([Section 4.1](#))

RIB_IPV6_MULTICAST_ADDPATH = 11 ([Section 4.1](#))

RIB_GENERIC_ADDPATH = 12 ([Section 4.2](#))

The values provided above are suggested as they are used in implementations.

6. Security Considerations

It is not believed that this document adds any additional security considerations.

However, the security considerations of [[RFC6396](#)] are equally applicable to this document, and this document permits the export of more detailed routing data.

An organization that uses the MRT format to store their BGP routing information should be aware that supporting these extensions permits more detailed network path information to be stored, and should consider the implications of this within their environment.

An organization that peers with public BGP collectors, and enables the additional-paths capability on a peering session, should be aware that it is exporting not only its best paths, but potentially other paths within its networks. The BGP peer should consider any and all implications of exposing this additional data.

7. References

7.1. Normative References

- [RFC6396] Blunk, L., Karir, M., and C. Labovitz, "Multi-Threaded Routing Toolkit (MRT) Routing Information Export Format", [RFC 6396](#), DOI 10.17487/RFC6396, October 2011, <<http://www.rfc-editor.org/info/rfc6396>>.

[RFC7911] Walton, D., Retana, A., Chen, E., and J. Scudder,
"Advertisement of Multiple Paths in BGP", [RFC 7911](#),
DOI 10.17487/RFC7911, July 2016,
<<http://www.rfc-editor.org/info/rfc7911>>.

7.2. URIs

[1] <https://www.iana.org/assignments/mrt/mrt.xhtml>

Authors' Addresses

Colin Petrie
RIPE NCC
Stationsplein 11
Amsterdam 1012 AB
NL

Email: cpetrie@ripe.net

Thomas King
DE-CIX Management GmbH
Lichtstrasse 43i
Cologne 50825
Germany

Email: thomas.king@de-cix.net

