BGP Diagnostic Message

draft-raszuk-bgp-diagnostic-message-00

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Agenda

- Goals
- Encoding
- Diagnostic message TLVs
Goals

- To enhance current practices for troubleshooting network connectivity problems, especially on eBGP boundaries.
- To detect routing inconsistencies before they are noticed by customers and result in escalation.
- To enable new way of error signaling for the proposal of more granular BGP error handling. (Dropped malformed attributes/updates rather than close the session).
- To enable visibility into installed filters by IBGP peers (RT constrain SAFI).
- To enable push model for routing changes monitoring (example: effectiveness of hot potato routing).
Encoding

- New BGP Message type: **BGP Diagnostic Message**
- Size 128 octets more than any other BGP Messages as defined in RFC 4271 (to enable encoding entire update)
- New BGP capability
- Format of TLV type:

```
+---+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| T | Lt h |
+---+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Variable size TLV value |
+---+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- **Type** - 2 octet value indicating the TLV type
- **Length** - 2 octet value indicating the TLV length in octets
- **Value** - Variable length value field
Diagnostic message TLVs

- Operational TLVs
- BGP database counters exchange
- Diagnostics for encoding errors in BGP messages
- AFI/SAFI signaling when malformed update
- Prefix specific BGP debugging
- Intra-domain BGP decision monitoring
- Monitoring of installed Route Target filters
Operational TLVs

- Diagnostic Message Periodic Request
- Max frequency permitted
- Diagnostic Message Query
- Counter’s reset request
- Not supported TLV reply
- Enabled and supported TLV types
BGP database counters exchange

- Number of reachable prefixes transmitted/received
- Number of prefixes in BGP_RIB_Out
- Number of paths in BGP_RIB_Out
- Number of prefixes present in BGP_RIB
- Number of paths present in BGP_RIB
Diagnostics for encoding errors in BGP messages

- Reachable prefixes present in dropped attribute case
- Un-reachable prefixes present in dropped attribute case
- Reachable prefixes present in malformed update message
- Entire malformed update message enclosure
AFI/SAFI signaling when malformed update

- List of ignored AFI/SAFI s over MP-BGP session due to errors encountered
Prefix specific BGP debugging

- Prefix specific BGP query
- Prefix specific BGP response
Intra-domain BGP decision monitoring

- Number of IGP metric best path tie breaks executed
- Number of BGP best path tie breaks in each selection step
Monitoring of installed Route Target filters

- Request for a list of RTs installed towards given peer by RFC4684
- Reply containing all installed RTs towards given peer
Conclusions

- Tool to simplify troubleshooting of BGP based networks
- Allows for proactive and automated detection of possible protocol or implementation issues
- Very lightweight (most is based only on counters exchange)
- Indicates to peers where malformed attribute or update message is detected and when it does not result in session reset
- Easily extensible to allow for any new type of diagnostic message to be incorporated.