

Update for the IPPM Framework: Adding Support for IPv6 and IP Options

**(IP Options and IPv6 Updates for IPPM's Active
Metric Framework: Packets of Type-P and Standard-
Formed Packets)**

draft-morton-ippm-2330-stdform-typep-02

A. Morton, J.Fabini, N.Elkins, M.Ackermann, V.Hegde

<mailto:draft-morton-ippm-2330-stdform-typep@ietf.org>

Background

- **The IPPM Framework (RFC2330) identifies two key prerequisites for valid measurements:**
 - 1. Valid measurement packets**
 - “**Standard-formed**” packets
 - “...all metric definitions ... include an implicit assumption that the packet is *standard formed*”...
 - Explicit criteria catalogue
 - 2. Result may depend on measurement packet type**
 - Distinct treatment of measurement packets along the path
 - Abstract term: **packet of Type-P**
 - Measurement is representative for any type (Type-P) vs. result is valid for ICMP-packets-64-byte-payload

Motivation and History

- Any {RFC|draft|metric} that references **IPv6 is out of scope of the RFC2330 IPPM framework!**
 - RFC2330, sec. 15 “...includes a valid IP header: **the version field is 4** (later, we will expand this to include 6)”...
- **Trigger:** GEN-ART review of RFC 2679-bis
Input by Brian Carpenter: **no IPv6 coverage**
 - RFC 2679-bis only vs. IPPM update
 - Decision for IPPM update
- **IPv6-support for IPPM “outsourced” to dedicated draft**
 - Precondition for –bis RFCs to pass GEN-ART and IESG review
 - More documents pending in the queue (active-passive, PDM, ...)
 - Avoid replication: one document can do the update for all.

Status

- Draft presented at IETF94 (Yokohama)
 - Only co-authors have read the draft
- Post-presentation „unanimous consensus“ that the IPv6 support for IPPM is urgently needed.
 - No follow-up discussion on mailing list
- **Recommended changes and Actions:**
 - **Draft title** and **file name** „offer room for improvement“
 - Document title changed in v2
 - File name will change, too (at latest when adopted)
 - Proposed: draft-ietf-ippm-2330-IPv6-options
- **Call for adoption as IPPM WG item.**

Recap RFC 2330 Definitions: Type-P

RFC 2330, Sec. 13:

- “A fundamental property of many Internet metrics is that the **value of the metric depends on the type of IP packet(s)** used to make the measurement...”
- ...“Whenever a metric's value depends on the type of the packets involved in the metric, the **metric's name will include either a specific type or a phrase such as "type-P"**.”
- ...**“Generic notion of a "packet of Type-P“**...
 - Fully defined (port-http-tcp-connectivity-50byte-payload)
 - Partially defined (UDP packet)
 - Generic (Type-P)
- **Type-P becomes part of any metric definition**
 - Example: Define *"IP-Type-P-connectivity"* metric instead of *"IP- connectivity"* metric

RFC 2330 **Update**: Type-P

- Mention **special treatment of packets**
 - Diffserv, ECN, Router alert, extension headers, ...
- Identify case when **Type-P changes along the path**
 - Type and length changes because of IPv4 <-> IPv6 translation, or IPv6 extension headers adding or removal
 - Modified values **SHOULD** be noted and reported with the results
- Discuss possible **impact of NAT** along path
 - Unpredictable impact on delay
 - Stateful NAT: state created on first packet: delay penalty
- RFC2330 Note: **class C equivalence** for path (MAP RG!)
 - ...”it would be very useful to know if a given Internet component treats equally a class C of different types of packets. If so, then any one of those types of packets can be used for subsequent measurement of the component. This suggests we devise a metric or suite of metrics that attempt to determine C.”

Recap RFC 2330 Definitions: Std-Formed

RFC 2330, Sec. 14:

- “...all **metric definitions** ... include an **implicit assumption that the packet is *standard formed***”...
- “...a packet is standard formed if it meets all of the following **criteria**:...”
 - Length (IP header) = sizeof (IP header) + sizeof(payload)
 - Valid IP header: “**version field is 4 (later, we will expand this to include 6)**” (quote RFC2330!)
 - Header length ≥ 5 , checksum is correct, no IP fragment.
 - Src and dest addr. correspond to the hosts in question.
 - TTL sufficiently large or 255
 - No IP options unless explicitly noted.
 - If transport header is present: valid checksum and fields.
 - Length B: $0 \leq B \leq 65535$...

RFC 2330 **Update**: Std-Formed Packet

- **IPv4 and IPv6** allowed
- Basic requirements (aggregated IPv4 and IPv6):
 - Valid IP header
 - Not an IP fragment.
 - Source and Destination addresses intended.
 - Transport header: valid checksum and valid fields
- Separate discussion of IPv4 and IPv6
 - IPv4 unchanged
- **IPv6**
 - Version field 6, total length including extension headers
 - Extension headers: none or correct types and correct order, extension header parameters conforming with IANA
 - Note controversies (RFCs 6564 and 7045) : intermediate nodes inspect/add/delete/change IPv6 extension headers

Next Steps

- **Urgent need to update IPPM for IPv6**
 - RFCs and documents in queue depend on it!
 - Draft scope and structure is stable
 - Feedback and Input requested
- **Call for adoption as IPPM WG item.**

Contact (all draft authors):

<mailto:draft-morton-ippm-2330-stdform-typep@ietf.org>