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Advertising IGP Measurement Group using TLV  
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## Abstract

This document defines an IS-IS capability sub-TLV for advertising measurement group membership for Active Measurement Protocols (AMPs) such as TWAMP and STAMP. The mechanism allows IGP routers to discover other routers participating in different measurement groups, enabling automatic discovery of measurement endpoints across IGP areas. The solution uses interface addresses (IPv4 or IPv6) to identify measurement group membership, where the same interface address may be used for multiple measurement groups.

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## 1. Introduction

In network deployments, different IGP routers may participate in different measurement groups for various purposes. For example, one measurement group may be used for TWAMP (Two-Way Active Measurement Protocol), another for STAMP (Simple Two-Way Active Measurement Protocol), and yet another for other measurement or operational purposes.

To enable automatic discovery and configuration of these measurement groups, there is a need for IGP routers to discover which other routers are participating in which measurement groups. This discovery mechanism must work whether the participating routers are in the same IGP area or not, which implies that the information must be leakable across area boundaries.

This document defines an IS-IS capability sub-TLV, similar to the seamless BFD discriminators mechanism defined in [RFC7883], that allows routers to advertise their measurement group membership. The mechanism uses interface addresses (IPv4 or IPv6) to identify

measurement group membership, where the interface address may be associated with either a physical interface or a loopback interface. The same interface address may be used to indicate membership in multiple measurement groups.

### 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. Use Case

At a high level, different IGP routers participate in different measurement groups. For example, measurement group A may be used for TWAMP, measurement group B for STAMP, and measurement group C for another purpose.

The requirements for measurement group discovery are:

- \* IGP routers MUST be able to discover which routers are participating in which measurement groups.
- \* Discovery MUST work whether participating routers are in the same IGP area or not, which implies that the information MUST be leakable across area boundaries.
- \* An interface address (IPv4 or IPv6) is used to identify the membership of a particular measurement group.
- \* The interface address MAY be associated with either a physical interface or a loopback interface.
- \* The same interface address MAY be used for multiple measurement groups.

Since loopback support is required, and there is no adjacency created over loopback interfaces to carry Adjacency Segment Identifier (ASLA) information, the solution uses an IS-IS capability sub-TLV similar to seamless BFD discriminators [RFC7883]. This approach allows the advertisement of measurement group membership information in the Router Capability TLV, which is propagated across area boundaries.

### 3. IS-IS Active Measurement Protocol Measurement Group Sub-TLV

This document defines a new IS-IS capability sub-TLV for advertising Active Measurement Protocol (AMP) measurement group membership. The sub-TLV is carried in the IS-IS Router Capability TLV (TLV 242) as defined in [RFC7981].

The Active Measurement Protocol Measurement Group sub-TLV has the following format:

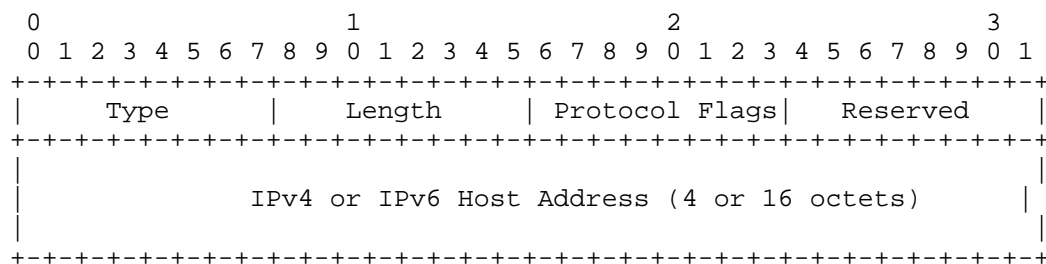


Figure 1: AMP Measurement Group Sub-TLV Format

Fields:

Type:

TBD (to be assigned by IANA)

Length:

1 octet. The length of the value field in octets. For IPv4 addresses, the length MUST be 6. For IPv6 addresses, the length MUST be 18.

Protocol Flags:

1 octet. A bit field indicating which Active Measurement Protocols are supported on this endpoint. Bit definitions are specified in Section 3.1.

Reserved:

1 octet. MUST be set to zero on transmission and MUST be ignored on receipt.

IPv4 or IPv6 Host Address:

4 octets for IPv4 or 16 octets for IPv6. The interface address (IPv4 or IPv6) that identifies this endpoint's membership in the measurement groups indicated by the Protocol Flags field. This address MAY be associated with a physical interface or a loopback interface.

Multiple instances of this sub-TLV MAY be included in the Router Capability TLV to advertise multiple endpoints, each potentially supporting different combinations of Active Measurement Protocols.

### 3.1. Protocol Flags

The Protocol Flags field is an 8-bit field where each bit indicates support for a specific Active Measurement Protocol. The bit assignments are as follows:

Bit	Protocol	Reference
0	TWAMP	[RFC5357]
1	STAMP	[RFC8762]
2-7	Reserved	For future assignment by IANA

Table 1

Bits are numbered from 0 (most significant bit) to 7 (least significant bit). A bit value of 1 indicates that the endpoint supports the corresponding protocol for the measurement group identified by the Host Address. A bit value of 0 indicates that the endpoint does not support that protocol.

Multiple bits MAY be set to indicate that the endpoint supports multiple protocols, meaning the same interface address is used for multiple measurement groups.

## 4. Operations

A router that participates in one or more Active Measurement Protocol measurement groups MUST advertise the AMP Measurement Group sub-TLV in its Router Capability TLV. For each endpoint (interface address) that participates in measurement groups, the router MUST include one instance of the sub-TLV with the appropriate Protocol Flags bits set.

If an endpoint supports multiple protocols (e.g., both TWAMP and STAMP), the router MAY either:

- \* Include a single sub-TLV instance with multiple Protocol Flags bits set, or
- \* Include multiple sub-TLV instances, each with a single Protocol Flags bit set.

Routers receiving the AMP Measurement Group sub-TLV MUST process the information to build their measurement group membership database. This information is used to discover other routers participating in the same measurement groups, enabling automatic configuration of measurement sessions.

The Router Capability TLV, and thus the AMP Measurement Group sub-TLV, is propagated across IS-IS area boundaries when area leaking is configured, satisfying the requirement for cross-area discovery.

If a router's measurement group membership changes, it MUST update its Router Capability TLV advertisement accordingly. Routers receiving updated information MUST process the changes and update their measurement group membership database.

## 5. IANA Considerations

### 5.1. IS-IS Router Capability TLV Sub-TLVs

IANA is requested to assign a new sub-TLV type from the "IS-IS Router Capability TLV sub-TLVs" registry for the Active Measurement Protocol Measurement Group sub-TLV defined in this document.

### 5.2. AMP Measurement Group Protocol Flags Registry

IANA is requested to create a new registry called "AMP Measurement Group Protocol Flags" under the "Interior Gateway Protocol (IGP) Parameters" registry group. The registry should track bit assignments for Active Measurement Protocols in the Protocol Flags field of the AMP Measurement Group sub-TLV.

The initial assignments are:

Bit	Protocol	Reference
0	TWAMP	[RFC5357], this document
1	STAMP	[RFC8762], this document
2-7	Unassigned	

Table 2

Future assignments are to be made through IETF Review [RFC8126].

## 6. Security Considerations

This document defines a mechanism for advertising measurement group membership in IS-IS. The security considerations for IS-IS as specified in [RFC1195] and [RFC5304] apply.

An attacker that can inject false AMP Measurement Group sub-TLVs could cause routers to attempt to establish measurement sessions with incorrect endpoints, potentially leading to:

- \* Failed measurement sessions
- \* Misconfiguration of measurement infrastructure
- \* Resource exhaustion if many false endpoints are advertised

To mitigate these risks, implementations SHOULD authenticate IS-IS protocol exchanges using the mechanisms defined in [RFC5304] for IS-IS authentication. Additionally, operators SHOULD configure appropriate access controls and monitoring to detect and prevent unauthorized advertisements.

The information advertised in the AMP Measurement Group sub-TLV reveals which routers are participating in measurement groups and which interface addresses are used for measurement purposes. This information may be considered sensitive in some deployments. Operators should consider the implications of this information disclosure when deploying this mechanism.

## 7. References

### 7.1. Normative References

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