

# IPv6 Flow Label Specification

draft-ietf-ipv6-flow-label-01.txt

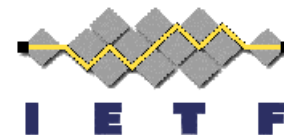
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# Introduction

- The WG draft based on the WG consensus in Salt Lake City
- The technical content without the analysis of the past specifications

## Outline:

- Flow Support in IPv6
- Flow Label Specification
- Flow Labeling
- Flow State Establishment Requirements

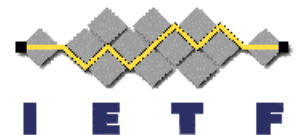
<http://playground.sun.com/pub/hinden/ipv6/draft-ietf-ipv6-flow-label-01.txt>

# Flow Support in IPv6

- **A flow** is a sequence of related packets sent from a source to a unicast, anycast, or multicast destination
  - Eg. transport connections, media streams, but not necessarily 1:1
- **Flow labeling** with the **Flow Label field** enables classification of packets belonging to a specific flow
  - Without the flow label the classifier must use transport next header value and port numbers
    - Less efficient (need to parse the option headers)
    - May be impossible (due to fragmentation or IPsec ESP)
    - Layer violation may hinder introduction of new transport protocols
- **Flow state** is established in a subset or all of the IP nodes on the path
  - Includes the **flow classifier**
  - Defines the **flow-specific treatment** the packets should receive
  - Can be signaled, or configured (administratively or manually)
  - Can also be determined algorithmically in some cases (e.g. load spreading)

# Flow Label Specification

- A packet is classified to a certain flow by the <Flow Label, Source Address, Destination Address> triplet
  - Allows the same Flow Label value to be used with different destinations
    - Enables definition of Flow Label based Session object in RSVP
  - Flow state establishment methods may wildcard either of the addresses
    - Enables the RSVP Wildcard-Filter reservation style to e.g. multicast destinations with multiple (wildcarded) senders
  - The Flow Label value is meaningless out of the context of the addresses
  - Non-zero Flow Label value for labeled flows, no other requirements
- The IPv6 node assigning a Flow Label value **MUST** keep track of all the <Flow Label, Source Address, Destination Address> triplets in use
  - To prevent mixing separate flows together
  - Programming interface needed, but out of scope
    - Three abstract functions defined in the draft
- The Flow Label value **MUST** be delivered unchanged to the destination



# Flow Label Specification (cont.)

- IPv6 nodes not providing flow-specific treatment **MUST** ignore the field when receiving or forwarding a packet

# Flow Labeling

- The Flow Label field is useless, unless it is actually used
- Source nodes **SHOULD** label all known flows, even if the source itself does not require any flow-specific treatment
  - Enables the receiver to initiate flow-specific treatment
- The Flow Label values **MUST** be included with the addresses in all flow related signaling
  - Eg. Transport set-up, RSVP, SDP (within SIP or SAP)
- Eg. in case of multicast sessions the destination may need to specify the Flow Label value to be used by the sources
  - Sources **SHOULD** honor requests by destinations to use specific values

# Flow State Establishment Requirements

- The methods are out of scope
  - But some rules needed to enable co-existence of different methods in IPv6 nodes
- **MUST** use the node facility when assigning Flow Label values to new flows
- **MUST** provide the means for flow state clean-up
  - Eg. Soft state/hard state
- **MUST** provide an indication to the source if the requested flow state cannot be supported
- **SHOULD** include also the Mobile IP home addresses of the source and the destination in the state establishment process
  - Avoid state duplication on portions of the path not changing when mobility takes place
  - SCTP will likely have similar requirements

# Next Steps?

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