IPv6 Fragment Header Deprecated
draft-bonica-6man-frag-deprecate-02

IETF 87

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Recommendation – Part I

- Deprecate IPv6 fragmentation and the IPv6 fragment header

- Application and transport layer protocols SHOULD support effective PLMTUD [RFC4821]
  - since ICMP-based PMTUD [RFC1981] is unreliable

- Any application or transport layer protocol that cannot support effective PMTUD MUST NOT in any circumstances send IPv6 packets that exceed the IPv6 minimum MTU of 1280 bytes.

Recommendation – Part II

- IPv6 stacks and forwarding nodes MUST continue to support inbound fragmented IPv6 packets as specified in [RFC2460].
  - Backwards compatibility
- However, this requirement exceeds the capability of some types of forwarding nodes such as firewalls and load balancers. Therefore implementers and operators need to be aware that on many paths through the Internet, IPv6 fragmentation will fail. Legacy applications and transport layer protocols that do not conform to the previous paragraph can expect connectivity failures as a result.

Text Not Found In Recommendation

- Legacy protocols that rely on fragmentation will be forced to change
    - DNSSEC and SIIT are examples
    - Some legacy protocols (e.g., SIIT) simply cannot break their dependence on IPv6 fragmentation
- OS Vendors should remove the capability to fragment outbound packets from their products
- ISPs may discard all fragments

Motivation

- Prevent the IETF from standardizing any more protocols that rely on IP fragmentation

- Encourage legacy applications that can break their dependence upon IPv6 fragmentation to do so
  - But levy no requirement to do so

- Raise awareness that applications are currently impaired by their dependence on fragmentation

Rationale

- Reassembly is computationally expensive
- Fragmentation/reassembly mechanisms are favorite attack targets
- A significant number of enterprises mitigate fragment-related threats by discarding all fragments
  - Default behavior for some firewalls
  - Viewed as cost-effective solution, because relatively few applications rely on IPv6 fragmentation

Next Steps

- Much discussion expected
  - Line up at the microphone now
  - This is the last slide
- Update the draft
- Adopt as working group item?