

Issues regarding cut-through

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Purpose of this presentation

- To identify issues that proposals on cut-through should address.
- Generally these are issues related to meeting the CSD questions

BROAD MARKET POTENTIAL

Limited applicability?

- Cut through is only useful when going between two ports running at a similar data rate.
 - Going from a slower port to a faster port, can't run out of bits to transmit in the middle of a packet. Switch doesn't know packet size of arriving packet so must buffer enough for a max packet.
 - Going from a fast port to a slower port, cut through doesn't save much time.

Examples of speed difference impact

- 100 Mb/s port to 1 Gb/s port, 2 Kbyte max frame takes
 - 160 us to arrive
 - 16 us to send
 - Must buffer for the first 144 us of packet arrival
 - Packets less than 1800 bytes don't cut through at all.
 - Cut through for max packet saves 16 out of 160 us of latency
- 1 Gb/s port to 100 Mb/s port
 - Cut through saves less than 16 us of 160 us transmit time

Speed differences and switch architecture

- Depending on switch architecture, there may be internal connections in the switch that carry packets at a specific data rate.
 - There can be a significant speed difference even when the exposed ports operate at the same speed.
 - Therefore, even when switching packets between ports running at the same speed, cut-through might provide only marginal or negligible performance improvement.

Broad Market Potential Impact

- Given the limitations on cut-through in speed diverse networks, is there broad market potential for cut-through?

**COMPATIBILITY / TECHNICAL
FEASIBILITY**

Bit errors in headers

- Bit errors in headers can change fields including address, VLAN, and priority fields
- Cut-through occurs before CRC is checked.
- Therefore data may be forwarded to the wrong link and/or in the wrong class of service

Impact of incorrect forwarding

- Security / Privacy
 - Packet payload may become visible on links where it shouldn't be seen.
- Deterministic latency disruption
 - Incorrectly forwarded packet may use bandwidth that has been reserved for other traffic disrupting deterministic latency.

Service interface

- 802 MAC service interface is a packet interface.
 - MAC client receives and sends whole frames, not bytes or words.
- Therefore, we have no way of formally specifying cut-through behavior.

Bad BER Link identification

- If CRC errors on incoming packets become CRC errors on outgoing cut-through packets, it may be hard to identify and correct the links that have high BER.