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LDP Bindings Refresh

(draft-pelletier-mpls-ldp-bindings-refresh-02)

André Pelletier

Kamran Raza

(Cisco Systems, Inc.)

Problem

- * There are situations when there is a need for performing consistency checks and state refresh for LDP binding state (address/label bindings) exchanged between LDP speakers.
- * For instance, a state refresh may be required to detect and purge stale bindings received by an LDP speaker, which have resulted from an in-service software upgrade.
 - * With introduction of high availability features such as NSR, it is possible to preserve the TCP session across in-service-software-upgrades, hardware failovers, or process crashes.
 - * When such an HA event occurs (i.e. without flapping the TCP session), an LSR can re-advertise all local state to the peers (optimizations possible)

Problem (cont'd)

- * Full re-advertisement of all state after an HA event does not remove any stale bindings being held by the peer LSR
- * If an LSR loses track of a piece of advertised/withdrawn state when an HA event occurs, it is possible that a withdraw will never be sent
 - * The receiver will be stuck holding this state indefinitely
 - * This stale state can cause future harm, like an address mapping
- * Tracking every piece of state to standby instance is complex:
 - * Must be synchronized with respect to TCP stream
 - * Compounded by various LDP applications (mLDP, AToM)

Solution: LDP Binding Refresh

- * RFC5919 introduced "END-of-LIB" marker which can be used to signal completion of a replay
- * When an HA event occurs and TCP session is preserved, it is possible to re-advertise all bindings, and signal END-of-LIB, but this won't trigger a receiver to clear stale state
- * This draft proposes a simple mark-and-sweep solution:
 - 1. START-MARKER
 - 2. Replay all state...
 - 3. END-MARKER
 - * Stale state flushed by the receiver

Solution: LDP Binding Refresh (cont'd)

- * The markers allow an LSR to PUSH a state refresh to a peer, thus triggering any stale state clearance.
- * Any state which is not re-advertised between the markers must be assumed to be stale, and should be purged by the receiver.
- * State = Label and Address Bindings

	Labels	Addresses
START Marker	Start-of-LIB	Start-of-Addresses
END Marker	End-of-LIB (Existing RFC5919)	End-of-Addresses

* For receiver-driven refresh and consistency check, solicited requests of label and/or address binding is also allowed.

State Refresh Triggers

- * With the control messages defined in this draft, an LDP LSR can push and pull a full state refresh to correct inconsistencies due to:
 - * In-service software upgrades (ISSU)
 - * Protocol process failures and restarts
 - * Stateful switchovers
 - * Software defects
- * In addition, an end-user could also trigger a full state reconcile between LDP LSRs without flapping the TCP sessions.

Protocol Extensions

* Capability:

* The draft introduces a "Bindings Refresh" capability to signal that an LSR supports the extensions described in the draft

* Wildcard Address:

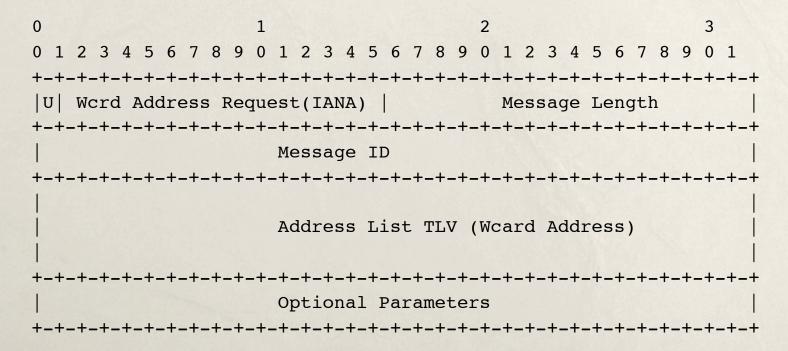
- * Specified as an empty "Address List" TLV i.e. the TLV containing only the Address-family identifier, with no addresses in it.
- * When received in an address message, it must be treated as "All addresses" for the given Address-family type.

Protocol Extensions (cont'd)

- * Markers:
 - * Label START:
 - * LDP Notification message with (a) Status TLV ("Start-of-LIB"), (b) FEC TLV (Typed Wildcard FEC element)
 - * Label END:
 - * No change, defined in RFC 5919 [End-of-LIB]
 - * Address START:
 - * LDP Notification message with (a) Status TLV ("Start-of-Addresses"), (b) AddressList TLV ("Wildcard Address")
 - * Address END:
 - * Same as above

Protocol Extensions (cont'd)

- * "Wildcard Address Request" message:
 - * To make the state-refresh solution symmetric, this draft also introduces ability to request (PULL) a state refresh for addresses:
 - * RFC5036 defines an wildcard label request but no address request
 - * This draft defines a new "Wildcard Address Request" message to solicit/request all addresses from a peer. This message uses "Wildcard Address" (as defined earlier) in AddressList TLV



I-D Status

- * Open Items:
 - * AToM/mLDP/ICCP application state reconcile?
- * Next Steps:
 - * Seeking WG feedback
 - * Looking for WG adoption