L3Shim state management using Vertical layered Communication

draft-you-shim6-l3shim-state-management-00.txt

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Tae-wan You, ETRI

twyou@etri.re.kr

IETF-63 Shim6 WG

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Introduction

- Background
  - The signaling interface between the L3Shim and the ULP requires further consideration ULP progress information helps failure detection
    - The multihoming layer needs to inform ULPs that a slow start is needed after we have switched to a new address.

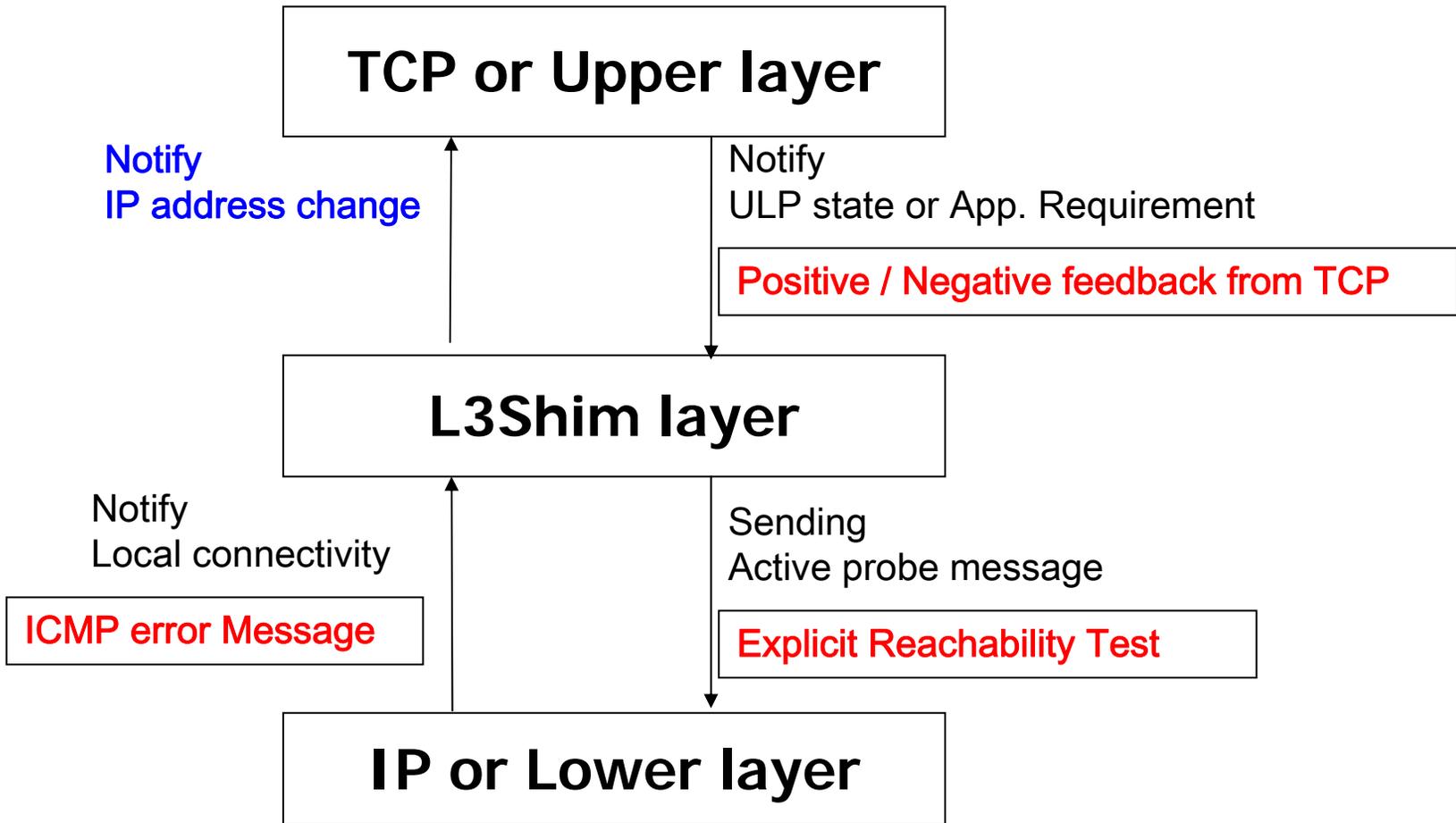 [draft-ietf-shim6-arch-00.txt], [draft-ietf-shim6-failure-detection-00.txt]
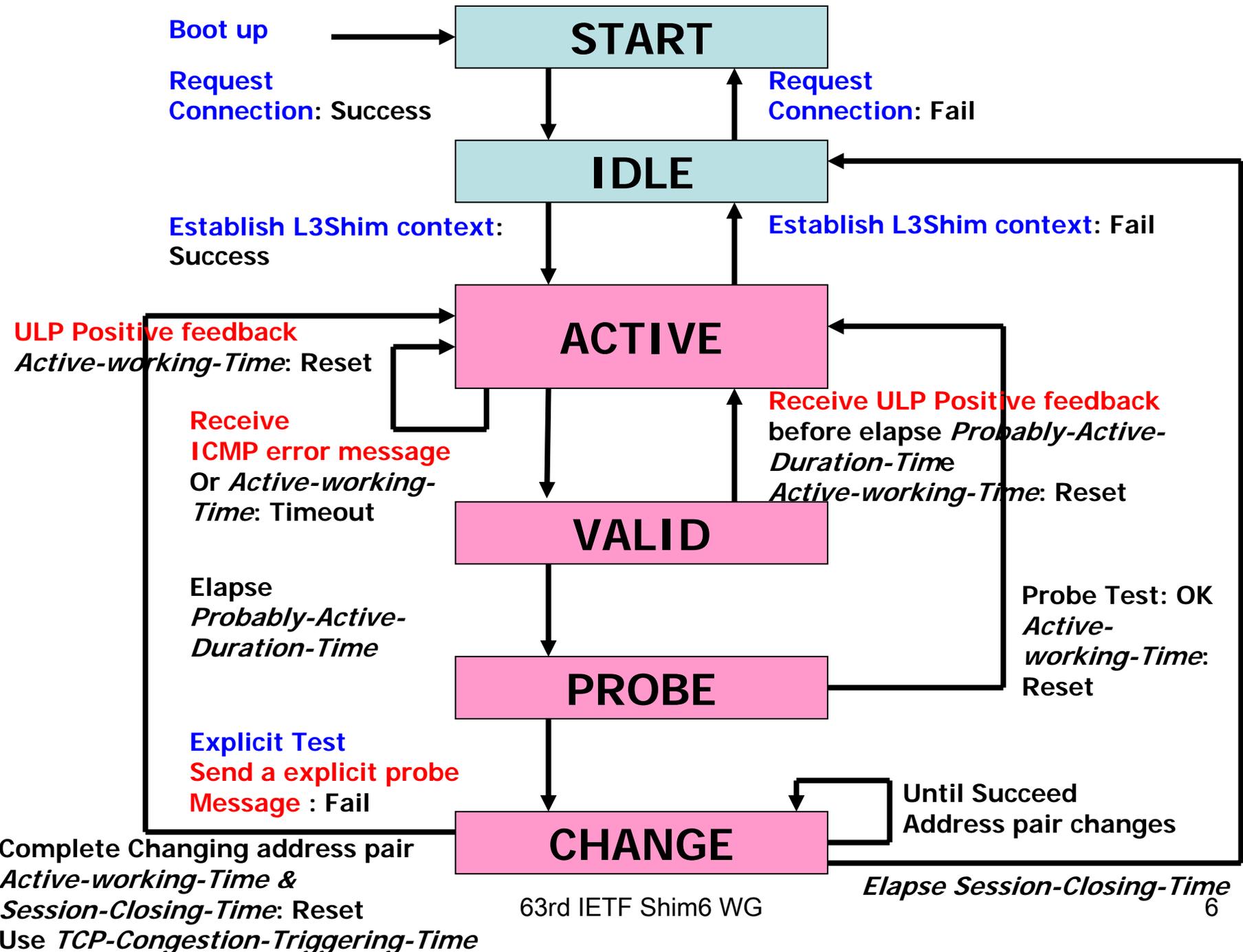
- Motivation
  - The L3Shim state diagram changed by both Vertical layered communication and various events to help to understand L3shim-enabled node's behaviors
  - We proposed a notification method to inform TCP of changing of locator using timer

L3Shim state transition Process

- It will be help to implement L3Shim functionalities through understanding L3Shim process
  - Illustrate the **L3Shim state diagram** simply
  - Will make **pseudo code** [TBD]
- L3Shim state management changed by triggering info.
  - Vertical layered Communications
  - Several Events happened by timeline
    - Bootstrap
    - Connect Communication session
    - Shim context Establishment
    - Doubt primary address pair Failure (stale)
    - Explicit Test
    - Address change trigger
    - Close Connection

The Classification of Vertical layered Communication

TCP or Upper layer

Notify
IP address change

Notify
ULP state or App. Requirement

Positive / Negative feedback from TCP

L3Shim layer

Notify
Local connectivity

Sending
Active probe message

ICMP error Message

Explicit Reachability Test

IP or Lower layer

Boot up → **START**

Request Connection: Success   **Request Connection**: Fail

IDLE

Establish L3Shim context: Success   **Establish L3Shim context**: Fail

ACTIVE

ULP Positive feedback *Active-working-Time*: Reset

Receive ICMP error message Or *Active-working-Time*: Timeout

Receive ULP Positive feedback before elapse *Probably-Active-Duration-Time* *Active-working-Time*: Reset

VALID

Elapse *Probably-Active-Duration-Time*

Probe Test: OK *Active-working-Time*: Reset

PROBE

Explicit Test **Send a explicit probe Message : Fail**

Until Succeed Address pair changes

CHANGE

Complete Changing address pair *Active-working-Time &* *Session-Closing-Time*: Reset **Use** *TCP-Congestion-Triggering-Time*

Elapse Session-Closing-Time

L3Shim state management (1)

- Context establishment
  - The "ACTIVE" state
    - It use *Active-Working-Time* for keeping up this state
- Reachability detection
  - Use Monitor & Probe
    - If positive indication is not received, send a explicit probe message to confirm reachability as similar to NUD
    - Change state by both info. VLC and Events
- Locator Pair Selection
  - The "VALID" state
    - there is no action until the *Probably-Active-Duration-Time* passed. However, other available address pairs are managed in this time
- Locator change trigger
  - The "CHANGE" state
    - If the result of explicit probe test is failed, this state is entered upon
    - If Session-Closing-Time is elapsed since changing address pair, go up to the "IDLE" state, which means L3Shim sate cache is cleared.

L3Shim state management (2)

- Notify locator changing to ULP
  - It SHOULD be accomplished by two timers
    - *Probably-Active-Duration-Time* in the "VALID" state
      - Give a time in those cases where *Active-Working-Time* have passed since the last positive indication due to lack of recent traffic
      - When operational address pair is failed, An address pair changing is delayed intentionally. Consequently TCP timeout is occurred to slow start naturally.
    - *TCP-Congestion-Triggering-Time* in the "CHANGE" state
      - Assumptions
        » The L3Shim SHOULD be able to detect address pair switching from a high-bandwidth interface to a low bandwidth interface through L2 information
      - Whenever address pair is changing under the only specific situation
        » The L3Shim SHOULD discard the entire packets from correspondent node during TCP-Congestion-Triggering-Time to occur timeout.

Next step

- L3Shim state management
  - We will propose this mechanism more detail, and make pseudo code to help to implement and understand shim enabled node's behaviors

- Vertical layered signaling
  - If Shim6 group have a consensus that other layer protocol MAY be modified, We will propose specific method such as APIs for Vertical Layered Communications include notification, triggering information and so on.