TLC-FM :Transport Layer Common Framework for Multihoming

<draft-arifumi-multi6-tlc-fm-00.txt>

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Background & Motivation

▶ **Fate-sharing Level Issue**(RFC1958)

SCTP/TCP-MH/DCCP(L4)

narrow

wide

SHIM/MAST/HIP(L3.5)

\<Session Level\>
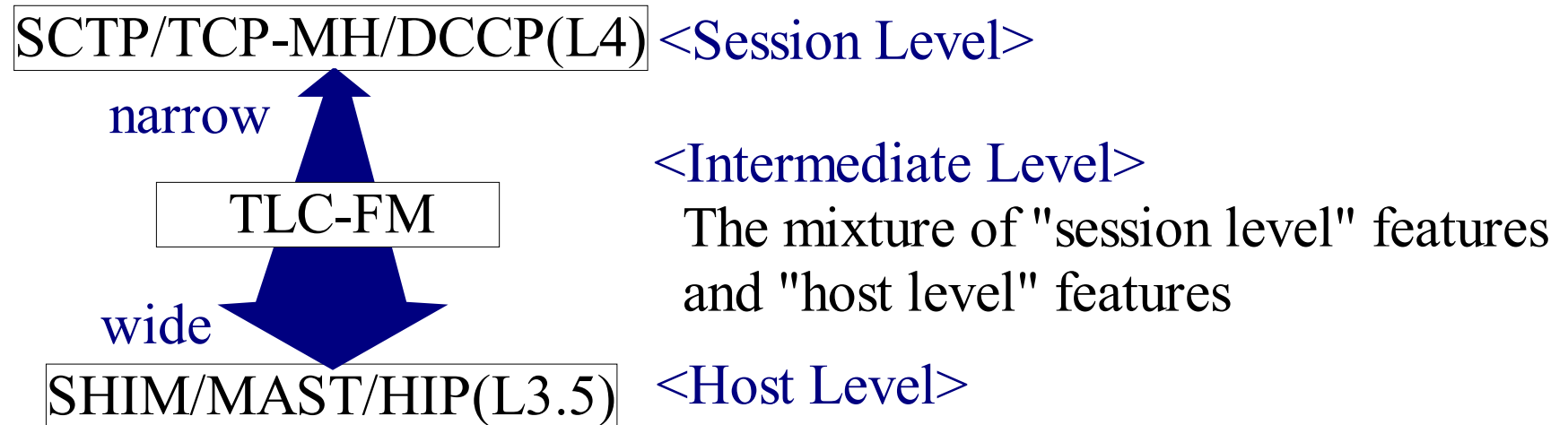Each transport session has its own mh-related info.(dst. addresses, paths) and it's not shared

\<Host Level\>
Each host has mh-information, and it affects all the sessions on a host

◆ Session level fate-sharing isn't efficient

　● Useful Info, such as dst. address and availability info., aren't shared

◆ IMHO, Host level fate-sharing also has difficulties

　● Each protocol/application should choose its own path

　　One session's best/usable path might be different from others' best/usable path

　● One session's fate should not be determined by any other session's fate (from the aspect of security)

The Concept of TLC-FM

▶ TLC-FM : the intermediate level of fate-sharing

SCTP/TCP-MH/DCCP(L4) <Session Level>

narrow

TLC-FM

<Intermediate Level>
The mixture of "session level" features
and "host level" features

wide

SHIM/MAST/HIP(L3.5) <Host Level>

- Each transport session shares mh-information with others
  - A feature from host level solutions
- Each transport session has its own path to be used,
  Each transport entity detects network outages
  For each transport session, path-switching is invoked
  - Features from session level solutions

Information to be shared

- **Path information**
  - Path = [dst addr + next-hop + src addr]
  - Next-hop is an important element when using multipath routing table(RFC2991,2992) especially for a multi-link host
- **IMHO, quality information of path, dst addr, next-hop and src addr should be shared**
  - Failed path and its elements' quality should be degraded and vice versa
  - The path of best quality is chosen in session-initiating or path-switching state
    - This is important to avoid (still more) network failures
    - So, this reduces session initiation/recovery time

Failure Detection

▶ **Failures are detected by each transport entity**

- ◆ TCP (and other reliable protocols)
  - ● The same method as TCP-MH suffices
    - ● That is, several times of RTO(data retransmission)
- ◆ UDP (and other unreliable protocols)
  - ● Failure avoidance is important
  - ● It is likely that a host receives these messages when facing an outage
    - ● ICMP Destination Unreachable
    - ● ICMP Time Exceeded
  - ● A help from applications
    - ● New API to notify network outages to TLC-FM

Each transport entity detects network failures and notify them to TLC-FM

Information are stored in TLC-FM and shared by each transport sessions

L7 | Application

L4 | TCP | UDP | RAW

Transport Layer Common Framework

L3 | IPv4 | IPv6 | MIP4 | MIP6 | LIN6
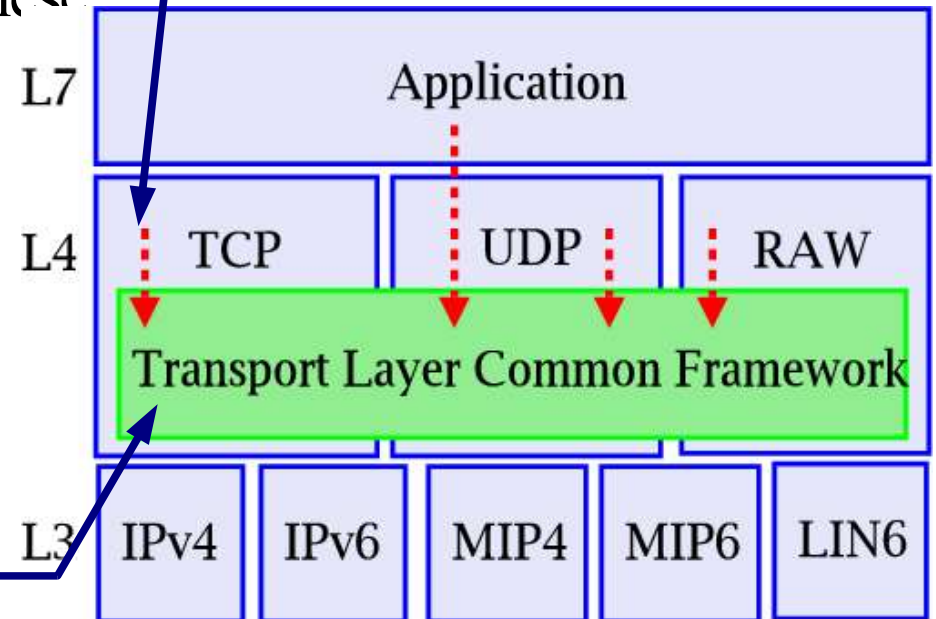
Control Channel

▶ **TLC-FM needs a control channel**

- To exchange additional address information
- **NOT** to detect network failures

▶ **The specification of a control channel isn't included**

- We can follow MAST/SHIM or other proposals' manner
- Perhaps, tt should be piggy-backed in data packets
  - IPv6 Extension Header ?
- Many approaches are looked into in multi6

Questions and comments ?

RFC3582

Redundancy	Connection level redundancy
Load sharing	Session based load-sharing
Performance	No problem
Policy	Site control may be hard
Simplicity	Site management isn't complex
L4 suvivability	Can survive
Impact on DNS	No impact
Packet filtering	No impact
Scalability	Really scalable
Impact on routers	No impact
Impact on hosts	Should support TLC-FM
Host & Routing Interaction	Not necessary
Operation & management	No impact
Cooperation between ISP	Not necessary
Multiple solutions	Co-exist with other layer solutions