LANE TIP SHEET

(to be used in conjunction with af-lane-0021.000)

This document is for informational purposes. It contains interoperability and implementation suggestions from various LANE implementors.

The suggestions noted below, when properly accounted for, will improve interoperability. Many of these issues outlined in this document will be addressed in LUNI 2.0. However, it should be understood that this document applies only to LANE 1.0 (af-lane-0021.000) implementations. Any suggestions regarding the expected mechanisms that will be contained in LUNI 2.0 are subject to the approval of the LAN Emulation Working Group and hence, may or may not be realized.

This information is not intended and should not be used as the basis of any conformance metrics.

1. LE Services that wait for CONNECT ACK before initializing SAR resources may not establish connectivity with LE Clients, or do so after significant delay.

   This situation occurs when LE Clients immediately send LE_CONFIGURE or LE_JOIN messages after receiving the CONNECT signaling message. Due to signaling timing, the LE Service may not yet have received the CONNECT ACK message or completed initializing its local SAR. Hence, the LE_CONFIGURE or LE_JOIN message may not reach the LE Service protocol layer.

   LE Clients that do not retry LE_CONFIGURE and LE_JOIN requests before releasing Configuration Direct and Control Direct VCCs will never establish connectivity. Even those LE Clients that do retry will do so only after the control timeout C7 which, at a default value of 120 seconds, will significantly delay the establishment of connectivity between LE Client and LE Services.

   Procedures are specified for Data Direct VCCs to avoid such loss of data by requiring the called party to initialize its SAR resources before sending the CONNECT signaling message (Section 2.3.4.1). Because this is not required for control VCCs, there can be a combination of a LE Service that does not initialize its SAR resources before receiving the CONNECT ACK signaling message and a LE Client that does not retry LE_CONFIGURE or LE_JOIN. This is not interoperable.

   In future versions of LANE, i.e. LUNI 2.0, it is expected that called parties will be required to initialize local VCC and SAR and be ready to receive frames on the newly created VCC before sending CONNECT signaling messages. Note that this is subject to the approval of the LAN Emulation Working Group, as mentioned in the disclaimer at the beginning of this bulletin.

2. LE Clients that do not retry control messages before releasing control VCCs may not be able to establish connectivity with LE Services.

   As described above, if LE Clients do not retry LE_CONFIGURE or LE_JOIN after the C7 time-out, and if these clients are connected to a LE Service that does not initialize its SAR resources until after it receives the CONNECT ACK signaling message, then it is possible that no connectivity may be established between the LE Client and the LE Service.

3. LE Clients not using ILMI to locate LECS may not be able to locate and establish connectivity to a LECS.

   There are situations where LE Clients that do not completely implement the required LECS Connect phase procedure defined in 5.2.1 are unable to locate and establish connectivity with a LECS.

   This situation occurs when a LE Client depends on using the well known LECS address and the switch does not support the well known address but does support getting the LECS address using ILMI.

   Switches that implement LE Services are not required to support all 3 mechanisms outlined in 5.2.1

4. LE Clients that wait for CONNECT ACK before considering the connection establishment complete may not be able to join an ELAN.

   There are situations where LE Clients terminate ELAN membership when a JOIN RESPONSE message is received on a Control Direct VCC after sending a CONNECT message for a Control Distribute VCC, but prior to receiving the CONNECT ACK signaling message for the Control Distribute VCC.

   This is a normal sequence of events that can occur when the LE Service is fast and sends a JOIN RESPONSE on the Control Direct VCC immediately after receiving the ADD PARTY ACK or CONNECT signaling message from the Control Distribute VCC.

   LE Clients that consider connections to be established upon sending a CONNECT message do not experience the situation.

5. When legacy workstations are moved, they may experience temporary loss of connectivity across the ELAN due to stale LE_ARP cache entries.

   The current specification recognizes the fact that legacy station moves can invalidate LE_ARP cache entries in other LE clients and thus result in loss of connectivity between the stations until the cache entries are reverified after an aging time-out. To allow for faster recovery in these situations, bridges that detect such station moves can send an LE_NARP_REQUEST in certain situations to invalidate existing cache entries.

   In the current specification, a bridge can send an LE_NARP_REQUEST only if it knows that it is now representing a legacy station that was previously represented by another bridge. Hence, in situations where the “original” bridge detects that it no longer represents the legacy station (e.g. due to loss of physical connectivity) but no “new” bridge detects the new location of the station, no LE_NARP_REQUEST can be generated to invalidate cache entries that the “original” bridge knows are wrong.

   Currently, there are proposals to address this issue, including one in which the “original” bridge can send an LE_NARP_REQUEST. At this time, no preferred mechanism has been agreed upon.

6. Packets can be lost during Data Direct VCC setup.

   There are situations where packets can get lost during Data Direct VCC setup.

   This situation can occur during the switch over from using the BUS to using the Data Direct VCC, during the LE_FLUSH protocol. Since the time to set up a Data Direct VCC can be somewhat lengthy, a LE Client may not have enough buffers to hold traffic that occurs during the FLUSH process.

7. LE Clients that use a single C5 variable to store all ELAN-NAME information may experience connectivity problems with LE Services.

   There are situations where LE Clients experience interoperability problems with the use of the ELAN-NAME C5 client variable.

   This situation occurs when LE Services modify the contents of the ELAN-NAME field during various states of the ELAN configure and join process.

   A LECS may require a specific ELAN-NAME in LE_CONFIGURE but returns a different name than the LES expects in the LE_JOIN. Additionally, the ELAN-NAME returned to the LE Client in the JOIN response is different from the name sent in the LE_CONFIG and LE_JOIN.

LE Clients that have a single C5 variable will lose the initial configured C5 value on each response and will not be able to LE_CONFIGURE again.

8. When s4 equals c7 LE_CONFIG and LE_JOIN retries are not possible.

   There are situations where C7 (LE Client control time-out) and S4 (LE Service Control Time-out) are equal and a LE Service will release a Configuration Direct or Control Direct VCC just before the LE client is about to retry the request.

   This situation occurs when LE Clients and LE Service are using the default values recommended in the LANE 1.0 Addendum.

   In future versions of LANE, the default value of C7 will be less than S4.

9. LE Clients may fail to establish Data Direct VCCs or create very slow Data Direct VCCs.

   There are situations where Data Direct VCCs between 2 clients will fail to establish or be unintentionally extremely slow.

   This occurs when a LE Client not wishing to support PCR on a BEST-EFFORT connection places a very small or very large value in the PCR field of the outgoing SETUP signaling message and the called LE Client supports PCR rate control on BEST-EFFORT connections.

   LE Clients that strictly follow the recommendations in section 3.3.2.7.2, will release incoming calls if the PCR value is too low or too high.

   Section 3.3.2.7.2 states that an end system should clear incoming calls with appropriate cause codes if it is unable to process the cells at the requested Forward PCR.

10. LE Clients may continuously retry connections with LE services, causing resource bottlenecks.

    There are situations where LE clients continuously retry establishing connections with LE services, even when the LE services wishes to deliberately disconnect the client.

    This occurs when a LE Client does not have any sort of time-out delay mechanism to limit the configuration or initialization process.

    A LE Client that failed to configure might instantly attempt to reconnect to LE Services.

    One case worth noting is described in section 5.3.2.1. The LECS is allowed to release a connection without providing any status information for security reasons. In this particular case, the LE Client has no information as to why the connection was released.

11. LE Clients/LE Service that reject calls due to non-default values of signaling parameters in connection SETUP signaling messages may be unable to establish connectivity.

    There are situations where various implementations reject incoming connections due to various signaling parameters.

    This situation occurs when one implementation leaves off or modifies certain default parameters that are not really used but the receiving implementation sanity checks for them.

    One common problem is the MODE field of the AAL Parameters information element.

The specification currently requires a Mode field to be specified for UNI 3.0 based implementations, but not for UNI 3.1 based implementations. Further, RFC 1755 (signaling for RFC 1577) requires that the mode field not be specified even for UNI 3.0 implementations. This results in a mixed usage, some combinations of which are not interoperable.

Other notable parameters include: SSCS TYPE, and backward CPCS SDU size for multipoint connections.

Implementations that are strict on what they send and liberal on what they accept tend to enjoy the most interoperability.

12. LE clients that do not respond to LE_FLUSH_REQUESTs may be unable to receive data on Data Direct VCCs.

    Although the generation of LE_FLUSH_REQUEST is optional, it is mandatory to respond to any such received request. If this is not done, the LE client that generated the LE_FLUSH_REQUEST may not send data on the Data Direct VCC and may even disconnect that VCC. This will reduce the efficiency of data transfer between LE clients.

13. LE clients that do not support all frame sizes with all LAN types may not be able to join the ELAN.

    The specification requires LE clients to support all frame sizes with all LAN types. If a LE client does not, then if it tries to join an ELAN which has a combination of frame size-LAN type that it does not support, then it will not be able to join the ELAN.