ANSI E1.30-11 – 2019,

EPI 33. ACN Root Layer Protocol Operation on TCP

(E1.17 Profile for Interoperability)

Approved by the ANSI Board of Standards Review on 21 May 2019

CP/2014-1002a
Revision 28 January 2014

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ACN EPIs

E1.17 is the “ESTA Architecture for Control Networks” standard [ACN]. It specifies an architecture – including a suite of protocols and languages that may be configured and combined with other standard protocols in a number of ways to form flexible networked control systems.

E1.17 Profiles for Interoperability (EPIs) are standards documents that specify how conforming implementations are to operate in a particular environment or situation in order to guarantee interoperability. They may specify a single technique, set of parameters or requirement for the various ACN components. They may also specify how other standards (including other EPIs) either defined within ACN or externally are to be used to ensure interoperability.

1. Applicability

This interoperability profile specifies the operation and formats for the ACN Root Layer Protocol [Arch] operating on [TCP].

2. Introduction

The nature of TCP as a stream and connection oriented protocol and the fact that it provides reliability lacking in [UDP] means that the root layer requirements are different from UDP or other datagram oriented transports.

2.1 Streams

TCP data is essentially a stream of octets and the fact that the underlying transport (IP) is packet based is not relevant. The reliability mechanisms of TCP operate at the single octet level and TCP stacks may divide the stream into packets at any boundaries they choose. In the case of retransmission of missing or corrupted segments of the stream, the division into packets may also differ from the original. At the receiving end, TCP guarantees reconstruction of the original stream but makes no guarantee about which sized chunks the stream arrives in.

A primary purpose of the ACN root layer on TCP is therefore to divide the stream up into identifiable blocks. In this document these blocks are called *frames*.

2.2 Synchronization

One relevant guarantee that TCP does make is that the start of a newly connected stream is clearly defined. This combined with the reliable delivery means that there is no need for a rigorous synchronization method to identify the start of a frame as there might be for an unreliable protocol or one where the stream was joined in mid flow. Assuming each message is correctly constructed before transmission and correctly parsed on reception, the two will remain in lock-step indefinitely.