APPENDIX A

OSI Traffic Characterization

A.1 General

A single implementation of OSI lower layers and two implementations of OSI upper layers were monitored on an 802.3 local area network. The PDUs were analyzed and are characterized in the discussions below.

A.2 Sun Lower Layers

The tests were run between two Sun 3/60 workstations using the SunNet OSI 6.0 lower layers over an 802.3 net work. The lower layers comprise CLNP and TP4. These are implemented in the SunOS kernel and were used for all tests in this seies.

A.2.1 Network

The CLNP used in the Network layer supports GOSIP style NSAP addressing. The NSAP is included in each PDU.

A.2.2 Transport

The Transport layer establishes an end-to-end connection before proceeding with the upper layer traffic. Thus, there is a pair of PDU exchanges before user data can flow.

To establish the connection, the Transport layer issues a Connection Request PDU and receives a Connection Confirm PDU. Connection identifiers for the source and destination systems are exchanged during this establishment phase. Both identifiers are present only on the second (Confirm) PDU. No user data accompanies this pair of request PDUs.

Next, Transport starts sending Data PDUs. The Session, Presentation (with ACSE data), and Application layers provide initial conversation data in the first of these PDUs. The PDU carries the transport connection identifier for the destination (but not the source). Each layer expects a reply in the next PDU.

Subsequent Data PDUs carry upper layer information. After the user indicates to close a Transport connection, this layer issues a Disconnect Request PDU and receives a Disconnect Confirm PDU.

A.3 Sun Upper Layers

The Sun upper layers are implemented in user code and are bound into each application program. All the Sun upper layers supply initial connection information stacked in the first Transport Data PDU and receive confirmation information in the next Data PDU, as detailed below. In subsequent PDUs, the Session and Presentation information is minimized.

A.3.1 Session

Session issues a Connect PDU, that supplies session identifiers and options and expects confirmation of these back in the next (Accept) PDU. The connection identifier comprises a source system name (calling reference) and a date-time group (common reference). This information is repeated in the reply PDU, but not in any subsequent PDUs.

User data is sent in Data PDUs for the remainder of the conversation. When the Finish PDU is sent, Session requests that the Transport connection be released.

A.3.2 Presentation

Presentation issues a Connect Presentation PDU, that contains a list of possible transfer syntax choices and expects one to be chosen in the next (Connect Presentation Response) PDU. The user data portion of these PDUs contain association and application information.

Data PDUs contain a presentation context identifier and user data.

A.3.3 Association Control

Association data is included in the Connect Presentation PDU as user information (as part of FTAM startup, actually) . This data contains the application contexts and titles of the application being started. The reply confirms the association contexts. No Association data appears in subsequent PDUs.

A.3.4 FTAM

The upper layers for our FTAM tests were Sun-supplied and linked into the executable FTAM application that came with SunNet OSI 6.0. Sun FTAM supplies a list of FTAM functional units to be used andsome authentication information about the user running the application.

A.3.5 X.400 (MHS)

A.4 ISODE Upper Layers

A.4.1 X.500

A.4.1.1 Directory Server Agent (quipu)

A.4.1.2 Directory User Agent (xpod)

A.4.2 FTAM

A.4.3 X.400 (PP)