OSI: MacX25, MacX.400, MacODA, OSI Connection for Mac (4/95)

Article Created: 5 November 1992
Article Reviewed/Updated: 26 April 1995

TOPIC ---

This article describes Apple's OSI products. At the lower end of the OSI
protocol stack, Apple offers MacX25 and OSI Connection for Macintosh, which
provide OSI connections for the Macintosh. At the top end of the stack the
offering consists of MacODA and MacX.400.

DISCUSSION --

MacX25

Key Features and Benefits: Apple's first OSI product was MacX25 (see Figure 1),
first shipped in 1990. MacX25 provides WAN connectivity to other X.25 systems.
MacX25 has received permission of attachment with the Telenet, GEIS, and Tymnet
networks in the United States. This allows MacX25 to connect directly to these
networks. The MacX25 Tool is implemented as a connection tool for the Macintosh
Communications Toolbox. Any application that uses the Macintosh Communications
Toolbox to communicate on the network is compatible with the MacX25 Tool.
MacX.25 sessions can be distributed across any AppleTalk network which allows
several users to share one MacX25 server. MacPAD is a Packet Assembler
Disassembler (PAD) for Macintosh computers. The PAD accepts a stream of
characters from a source, such as a Macintosh, and assembles them into X.25
format data packets for dispatch to the host system over a packet switched data
network (PSDN). The PAD also receives packets over the PSDN, disassembles the
packets, and sends them out to devices (the same Macintosh in the example here)
as a stream of characters. This assembly, transmission, and disassembly process
is completely transparent to the users. The MacX25 server requires a NuBus
capable Macintosh with a hard drive, 2MB of RAM for System 6.0.7 or 4MB of RAM
for System 7 (or later), and a Serial NB card with appropriate connectors
(RS-232-C or V.35 cable).

```
.                     ODA
.                     ---------------
.     Application     X.400               X.500          FTAM
.     ---------------  ---------------     -----------    -----------
.     Presentation    ISO Presentation
```

```
.        --------------        --------------
.        Session               ISO Session
.        --------------        --------------
.        Transport             OSI Transport
.        --------------        --------------
.        Network             • MacX.25   CLNP
.        --------------        -------   -----
.        Link                • MacX.25   LLCI
.        --------------        -------   -----
.        Physical              Serial    802.3
.        --------------        -------   -----


.                      Figure 1 - MacX25
```

MacX25 1.1 Update:
This version of MacX25 offers the following improvements over its predecessors:

• Support for the Macintosh Quadra family of computers
• System 7 and 6.0.7 compatibility
• Line Monitoring application allows administrators to examine activity at both
HDLC frame and PLP (packet) levels
• More virtual circuits (in the same amount of memory)
• Coexistence with SNA•ps 1.1
• 4/16 MB Token Ring NB Card support

MacX.400

Key Features and Benefits:
X.400 is the OSI standard for mail and messaging services. It is based on the
OSI seven layer model and is a store and forward technology that is used by many
public service providers and private institutions (see Figure 2). X.400 can run
on either OSI or TCP/IP transports and is part of the U.S. GOSIP. Apple's goal
with MacX.400 is to integrate the Macintosh into the global X.400 Message
Handling System (MHS). The MHS can be viewed as a worldwide network of Message
Transfer Agents (MTA) and User Agents (UA). An MTA is a routing node in the
global network; it works in a "store & forward" fashion. User Agents are end
user applications. MacX.400 is an MTA running under the Mac OS. MacX.400 can
interconnect with multi vendor MTAs via X.25 or Ethernet. The goal was to open
up this offering to third party developers. As a result, MacX.400 was designed
as a development platform providing an API on top of which Gateways, as well as
UAs can be developed.

```
.        Application         • X.400              X.500          FTAM
.        --------------        --------------     -----------    -----------
.        Presentation        • ISO Presentation
.        --------------        --------------
.        Session             • ISO Session
.        --------------        --------------
.        Transport           • OSI Transport
.        --------------        --------------
.        Network               MacX.25   •CLNP
.        --------------        -------   -----
.        Link                  MacX.25   LLCI
```

```
.    --------------       -------   -----
.    Physical             Serial    802.3
.    --------------       -------   -----

.                    Figure 2 - MacX.400
```

MacX.400 is easy to install and configure like most Macintosh products, but
unlike most existing MTAs. In addition, it does not require a dedicated machine
which is quite important for small businesses. The ease of use of the API has
been emphasized so developers do not have to be X.400 experts. MacX.400 can
convey one or more enclosures (body parts) within each message. All body parts
defined in the 1984 recommendation are supported as well as ODA documents and
Macintosh files.

The MacX.400 server permits any Macintosh user on a connected network to access
public X.400 message services via the MacX.400 server. Public X.400 message
services are currently available from MCI, Sprint, and AT&T in the U.S. Public
X.400 message services are accessed using an X.25 line. In local area network
(LAN) environments a MacX.400 server configured with the X.400 Gateway software
can be used to access a private X.400 backbone inside a corporation using the
Ethernet protocol stack. In this configuration, a user on a LAN can send mail to
users on other LANs via the server. The MacX.400 server requires a NuBus capable
Macintosh with a hard disk, at least 8 megabytes of RAM, and System 7 or later.
In addition, either a Serial NB or Ethernet NB is required for X.25 or IEEE
802.3 connection respectively.

MacX.400 Programmer's Kit

The non dedicated server capabilities designed into MacX.400 allow a single
Macintosh computer to run the MacX.400 server, X.400 gateway, and E-mail server
concurrently. The MacX.400 server is available from Apple. Developers have a
variety of tools and options available. The MacX.400 Programmer's Kit works in
conjunction with the MacX.400 server and presents the hooks necessary for
developers to build X.400 applications. The MacX.400 Programmer's Kit includes
the MacX.400 API software and the programmer's guide. The MacX.400 API software
lets the developer easily gain access to the X.400 network. The programmer's
guide helps developers to create efficient and reliable software. The MacX.400
Gateway API works with the MacX.400 server and is used to create custom gateways
to existing E-mail server systems. In this environment, the mail users can have
client E-mail software running on their computers that links to an E-mail
server. The E-mail server then reaches the MacX.400 server using an X.400 to
E-mail Gateway. E-mail gateways will be available from third parties.

The MacX.400 Simple Mail API (SMAPI) provides developers with easy access to
commonly used X.400 data structures. The SMAPI can be thought of as a
combination of three different APIs.

• Message API: to build and parse X.400 messages.
• Transfer API: submit messages to the MTA and retrieve messages from the MTA.
• Mailbox API: submit messages to the mailbox and retrieve messages from the
mailbox. The Mailbox Server API also presents a set of mailbox administration
primitives.

X.400 Gateway Market

Many vendors provide X.400 products today. The X.400 market can be divided in
two main segments: X.400 Protocol LAN Interconnect Market and X.400 Protocol
Host Systems Interconnect Market. Apple's competitors in the X.400 Protocol LAN
Interconnect Market can be divided in two categories, those that support the
Macintosh and those that do not:

Supporting Macintosh computers:

• OpenServer400 is a PC based X.400 MTA; Macintosh supported as Microsoft Mail
clients only.
• Microsoft MTA is PC based. Supports X.25 only (not Ethernet); Macintosh
supported as Microsoft Mail clients only.
• ISOCOR is a new player in this field. Its product, ISOPLEX400, is an OEM'd
version of Retix OpenServer400; does not currently support the Macintosh. ISOCOR
plans to add MacX.400 to its product line.

Not supporting Macintosh computers:

• Hewlett Packard's X.400/9000 is an X.400 MTA that runs on an HP 9000 under
HP-UX working with gateways to send mail to HP desk. This product has been
identified by customers as the best X.400 product on the market; it also
supports 1988 X.400.
• SunLink MHS is an X.400 MTA, plus a gateway to send mail to Sun workstations.

The key players in the X.400 Protocol Host Systems Interconnect Market are
as follows:

• IBM's PROFS to X.400 Connection is an X.400 MTA, as well as a gateway between
PROFS and the X.400 environment.
• IBM's DISOSS to X.400 Connection is an X.400 MTA, plus a gateway between
DISOSS and X.400.
• DEC's MRX is an X.400 Gateway between the DEC Message Router and X.400
environments.
• Note that HP also offers X.400 implementation on its HP800/900 computers.

In 1990, the total North American electronic mail gateway market was worth
$165.2 million. This is expected to reach a market value of $732.9 million in
1995. The X.400 segment is the fastest growing portion of this, $80 million
dollars in 1990, and expected to grow to $521 million by 1995. The X.400
gateways for LAN based systems represented 10% of the market in 1990 ($7.9
million), but is expected to grow to more than 50% of the X.400 gateway market
by 1995 ($281 million, roughly 40% of total gateway market). Source: IDC "North
American Proprietary and X.400 Electronic Mail Gateway Market Review and
Forecast, 1990-1995." July 1991.

From these numbers, one can draw three conclusions:

• X.400 has entered a real deployment phase (market share in 1990 was 50%,
roughly equivalent to the proprietary segment).
• X.400 market becoming predominant (70% of the total gateway market in 1995).
• X.400 Protocol LAN Systems Interconnect is the fastest growing segment (the

LAN messaging market is the most diffuse segment and therefore the most needy of
gateway technology).

MacODA

Apple is committed to international standards like Open Document Architecture
(ODA) that enrich the user experience in a multi vendor environment. ODA is the
international standard for interchange of compound documents. ODA allows the
exchange of compound documents (styled text, raster graphics, vector graphics)
between different applications and across different platforms. ODA preserves the
layout of documents as well as their logical structure. Document layout
attributes (fonts, sizes, styles) are preserved within the ODA exchange.
Document logical attributes (hierarchical structure of the document such as
chapters and paragraphs) are preserved within the ODA exchange. Headers,
footers, and footnote attributes are supported by the ODA standard. This
includes the ability to translate a variety of graphic formats and to preserve
advanced design features such as multiple column designs (see Figure 3). MacODA
is supported under System 6.0.4 (or later) and System 7 (or later).

```
.                           • MacODA
.                           ---------------
.    Application            X.400                 X.500           FTAM
.    --------------         ---------------        -----------      -----------
.    Presentation           ISO Presentation
.    --------------         ---------------
.    Session                ISO Session
.    --------------         ---------------
.    Transport              OSI Transport
.    --------------         ---------------
.    Network                MacX.25    CLNP
.    --------------         -------    -----
.    Link                   MacX.25    LLCI
.    --------------         -------    -----
.    Physical               Serial     802.3
.    --------------         -------    -----

.                     Figure 3 - MacODA
```

MacODA allows XTND compatible applications to read and create ODA documents.
General formatting attributes are retained: headers, footers, footnotes,
multiple columns, and graphics. Also tabulations, first, left, and right
indentation attributes are retained. The following fonts are supported:
Helvetica, Times, Courier. Other fonts default to Times. All type sizes are
supported. Text styles are supported: plain, bold, italic, strike through,
underline, double underline, superscript, and subscript. MacODA supports the ISO
8613 (ODA), ISO 6937 character set, T.4 and T.6 (CCITT raster graphics), and CGM
(ISO vector graphics). MacODA conforms to the European Workshop for Open Systems
(EWOS) Q112 profile. ODA profiles are sets of implementation options chosen from
the ISO 8613 base standard.

There are three profile levels:

• Level 1: text only

- Level 2: text and graphics, word processing level
- Level 3: text and graphics, desktop publishing level

MacODA implements Q112, therefore it is a level 2 ODA product. Most other ODA products on the market implement that same Q112 profile. The ODAC Toolkit implements the FOD 26 profile, a level 2 profile. The primary difference between Q112 and FOD 26 is that FOD 26 adds support for double byte characters (such as Kanji). Q112 supports only European characters.

The following applications compatible with XTND and MacODA:

- BeagleWorks
- ClarisWorks
- GreatWorks
- MacWrite II
- Nisus Compact
- Ragtime 3
- WordPerfect

Developers can license MacODA from Apple and bundle it with their applications MacX.400 supports the ODA body part type. This way, E-mail enclosures that contain ODA documents can be transferred intact, which allows users running MacX.400 to transfer ODA documents in the X.400 mail environment.

The ODA Consortium consist of:

- IBM
- DEC
- Unisys
- Bull
- Siemens/Nixdorf
- ICL/Fujitsu

OSI Connection for Macintosh

OSI Connection for Macintosh (formerly named MacOSI Transport when it was announced in March 1992) is Apple's OSI transport platform for users and developers who want to extend the reach of their Macintosh applications to OSI environments. OSI Connection for Macintosh supports both the industry standard XTI interface and a Macintosh CTB interface. OSI applications required by U.S. GOSIP 2.0 include X.400, FTAM, and VT (Virtual Terminal). OSI Connection for Macintosh supports built-in Ethernet on Macintosh Quadra CPUs. OSI Connection for Macintosh includes layers 1 through 4 of the OSI model. Two OSI transport protocol suites are supported:

- LAN: ISO TP4 (CLNP/802.2/Ethernet)
- WAN: ISO TP0 (X.25)

For X.25 connectivity, OSI Connection for Macintosh has to be used with the MacX25 product. On an IEEE 802.3 Ethernet backbone one of the following must be used:

- Built in Ethernet port on a Macintosh Quadra

- Apple Ethernet NB Card
- Apple Ethernet LC Card

Software layers 2 and 3 are downloaded to the interface cards. Token Ring (IEEE 802.5) support is being considered for those customers who want OSI on a Token Ring network (see Figure 4).

```
.                          MacODA
.                          ---------------
.     Application          X.400                  X.500           FTAM
.     ---------------      ---------------      -----------     -----------
.     Presentation         ISO Presentation
.     ---------------      ---------------
.     Session              ISO Session
.     ---------------      ---------------
.     Transport          • OSI Transport
.     ---------------      ---------------
.     Network              MacX.25   •CLNP
.     ---------------      -------   -----
.     Link                 MacX.25   •LLCI
.     ---------------      -------   -----
.     Physical             Serial    802.3
.     ---------------      -------   -----
```

.   Figure 4 - OSI Connection for Macintosh

OSI Connection for Macintosh supports the End System to Intermediate System (ES-IS) protocol. ES-IS is a routing protocol defined by ISO to support the transfer of OSI packets between OSI End Systems (ES) via an Intermediate System (IS). MacX.400 functions as an OSI ES as do MTAs from other vendors. An IS is an OSI router that supports the ES-IS protocol, such as a Cisco router (see Figure 5).

```
.                 ISO TPO              ISO TP4
.           ----- ---------------      ---------------
.           |     X.25 PLP             CLNP      ------
.           |                                    ES-IS
.           |                                    ------
.     MacX25 --|    ---------------      ---------------
.           |     Link                 LLC Type 1
.           ----- ---------------      ---------------
.                 X.21 bis  V.35       802.3     Future
.                 --------  -----      -----     ------
```

.   Figure 5 - OSI Connection for Macintosh Detail

Article Change History:
26 Apr 1995 - Made correction of typographical errors.

Support Information Services

Keywords: <None>

==

This information is from the Apple Technical Information Library.

19960215 11:05:19.00

Tech Info Library Article Number: 11001