Summary of AIXLINK/x.25 V1.1.3 LPP Enhancements

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About This Document

The AIXLink/X.25 Version 1.1 licensed program product (LPP) for AIX Version 4 was made generally available in April, 1995. Since that time two major functional enhancements have been completed.

V1.1.2 Enhancement

The AIXLink/X.25 V1.1.2 enhancement, released in November, 1995, is available via APAR IX52536 and added

- x25status command
- dialup on demand functionality
- additional PAD customization options

The equivalent function is available with PTF U440663 for AIX V3.2.5 systems running the X.25 LPP.

Vi.1.3 Enhancement

The AIXLink V1.1.3 enhancement, released April 26, 1996, is available via APAR IX56707 (same as PTF U443681) and adds:

- support for higher speed IBM ARTIC i960 Micro Channel adapters
- support for the IBM ARTIC Multiport Model 2 (ISA bus) adapters
- further enhancements to PAD
- PAD printing support
- new x25mon command flags
- power management support

Details on the AIXLink/X.25 V1.1.3 release enhancements (available for AIX V4 systems only) follow.

Software and Documentation

New orders for RISCs running X.25 on AIX V4.1.4 systems will automatically be shipped with the latest release software. Existing AIX V4 X.25 users should first upgrade from the base X.25 LPP software to V1.1.2. Once at the 1.1.2 release, apply the APAR to upgrade to 1.1.3 level.

Users may identify the various software levels using the "List installed software" option in the fastpath "smit lslpp" menu or the lslpp command. Use one of the following or a variation:

```
lslpp -l | grep sx25.rte
lslpp -l | grep x25
```

Due to publication schedules, the AIX documentation reflects updated information on AIXLink/X.25 enhancements at the following levels.

AIXLink/ X.25 Rel.	AIX BOS minimum	InfoExplorer (Soft copy)	Publication (Hard copy)
1.1	AIX V4.1.2	AIX V4.1.2	"AIXLink/X.25 1.1 for AIX Guide and Reference" (SC23-2520-01)
1.1.2	AIX V4.1.4	AIX V4.1.4	
1.1.3	AIX V4.1.4	AIX V4.2	the SC23-2520-02 update

All release levels include the /usr/lpp/sx25/README file.

New ARTIC Adapter Support

Note: All of the adapters supported by AIX for X.25 are members of the ARTIC (A RealTime Interface Coprocessor) family of IBM adapters. For more information on this adapter family, visit URL:

```
http://wwprodsoln.bocaraton.ibm.com
```

With the V1.1.3 enhancement, X.25 users have a wider assortment of adapters to choose from to meet a range of system needs. A summary of current adapter support follows:

ADAPTER	SOFTWARE SUPPORT	PACKETS PER SECOND*	NUMBER LOGICAL CHANNELS
Micro Channel bus:			
X.25 Co-Processor/2	AIX V3 BOS**	35	64 per adapter
" " "	AIXLink LPP	100	512 per adapter
Portmaster/A	AIXLink LPP	200	512/port, 1024/adapter
ARTIC960	AIXLink V1.1.3	1,000	512/port, 1024/adapter
ISA bus:			
X.25 Co-Processor	AIXLink LPP	100	512 per adapter
Multiport Model 2	AIXLink V1.1.3	200	512/port,1024/adapter

*Assumes 128-byte packets, measured at the packet layer API

**Basic X.25 support was included in the AIX V3 Base Operating System

Support for two new IBM ARTIC adapter types, the ARTIC960 Micro Channel adapters and the Multiport Model 2 (ISA), is included in the AIX X.25 V1.1.3 enhancement. These single slot adapters are built by plugging a protocol-specific interface board (daughter card) into a base adapter. A matching protocol-specific interface cable (fanout box) plugs into the adapter and provides either 6 or 8 ports for network attachments. Each adapter has on-adapter memory -- if more memory than the minimum required is installed, it is not used by the X.25 software. The X.25 V1.1.3 enhancement supports up to eight X.25 adapters per system in any mix.

Adapter connection components include:

- Base adapter
- Interface board (daughter card)
- Interface cable (fanout box plus individual modem cables or octopus cable)
- Multiport Model 2 (ISA): This base adapter provides an ISA bus equivalent to the Portmaster/A Micro Channel adapter solution supported in the original AIX X.25 LPP. In both cases, the adapter is constructed using a base adapter with at least 1 MB of memory and one of three daughter cards (Electrical Interface Boards or EIBS). The daughter cards and corresponding interface cables (fanouts), which are interchangeable between the Micro Channel and ISA base adapters, provide an 8-port V.24 (EIA-232) or 6-port X.21 or V.35 connection. The AIXLink X.25 V1.1.3 software supports individual V.24 ports at speeds up to 19.2 Kbps and X.21 and V.35 connections running at up to 64 Kbps.

  The Multiport Model 2 (ISA) base adapter is not available using an RS/6000 order number, so it cannot be ordered through normal RS/6000 channels and cannot be specified via the RS/6000 Configurator. This base adapter must be ordered through normal PC channels using the PS/2 order number, feature #6590. Daughter cards and fanouts may be ordered under either the RISC/6000 or PS/2 feature codes. Modem cables, which attach

between the fanout and the modem or DSU/CSU, are also available through either channel.

- ARTIC960 Micro Channel: This new generation ARTIC adapter provides a higher performance Micro Channel alternative to the original Portmaster/A Micro Channel adapter. The adapter has an on-board Intel i960 RISC processor and is constructed using a base adapter with at least 4 MB of memory and one of three protocol-specific daughter cards (Application Interface Boards or AIBs). The daughter cards offer a 6-port V.36 or 8-port EIA-232/V.24 or X.21 connection. The AIXLink/X.25 V1.1.3 software supports individual EIA-232/V.24 ports running at speeds up to 19.2 Kbps and V.36 and X.21 connections operating at speeds up to 2 Mbps (E1/T1).

  With the new generation adapter comes a new design in interface cables -- whereas the Portmaster fanout box requires separate modem cables for modem attachment, the new "octopus" or fanout cable design combines the single adapter connector with the six or eight modem cables.

  V.36 offers, essentially, a new generation V.35 connection. One visible difference is that V.36 uses a 37-pin D-shell connector while V.35 defines a rectangular 34-pin connector. V.35 modem (or DSU/CSU) users may utilize the new ARTIC960 V.36 adapter and the Portmaster's V.35 fanout box and modem cables. This V.35 configuration is supported for port speeds up to 64 Kbps. The ARTIC960 EIA-232E/V.24 adapter users can also utilize the fanout box and cables that were used in the 8-port Portmaster/ A configuration.

  The ARTIC960 adapter/daughter card combination is approximately 4.5 inches in height and can be installed in any available slot on RS/6000 models 3xx, 5xx, and 9xx. Due to its height, the adapter will not fit RS/6000 models 7006 (such as 41T or 41W) and 7011 (such as 250).

- ARTIC960 Installation Notes: ARTIC960 users must install the IBM ARTIC960 AIX support Program for RS/6000 software shipped on a diskette packaged with the adapter. This software must be at V1.1.3 or later.

  Be sure to save the diskette shipped with the adapter!

  The following lslpp -l output indicates that the software has been installed and it is at the correct level.

```
devices.mca.artic960.rte       1.1.3.0
```

If the software is installed in the wrong order follow the recovery scheme included in the Hardware Installation section of the AIXLink/X.25 1.1 for AIX Guide and Reference (SC23-2520-02):

If you install the ARTIC960 AIX Support Program for RISC System/6000 Version 1.1.3 after installing AIXLink/X.25, the following error may occur when attempting to add a "twd" AIXLink/X.25 device driver to the ARTIC960 adapter.

```
Method error (/usr/lib/methods/define):
     0514-022 The specified connection is not valid.
```

If you encounter this error, run the following script to fix the problem:

```
/usr/lpp/sx25/inst_root/sx25.rte.config
```

PAD Enhancements

The following PAD functions are added to those in the AIXLink/X.25 V1.1.2 enhancement.

- Command line arguments for the xspad command allows the user to specify characteristics on the command line instead of within the profile or via a PAD command.
- Automatic termination of the PAD application (xspad) upon termination of the X.25 Host connection via a command line argument.
- User-defined default initial application to be spawned and auto-identification.
- More robust method of selecting non-default profiles for both outgoing and incoming connections.
- Configurable profiles makes setting PAD parameters/ values easy for user.
- Security on a per outgoing X.28/X.25 PAD session user via the restriction of specific addresses to which a user can connect.

  The AIXLink/X.25 V1.1.3 provides a new set of PAD configuration profiles in the /etc/sx25pad directory: x28parm, x28user, x29access, x29parm, x29tty, and x29user. Clear cut defaults and examples are also provided. Four files (address, profile, tty and user) were included in X.25 V1.1.2.

PAD Printing

AIXLink/X.25 V1.1.3 provides for remotely or locally initiated PAD printing. In the remotely initiated case, the printing is initiated when a remote PAD transmits an X.25/X.29 call to AIX. AIX, then, identifies the printer queue, prints the job, and terminates the connection after the last job queued. In the locally (or host) initiated case, a pre-configured mapping between the remote printer queue and the RISC's NUA is used.

New x25mon Flags

With X.25 V1.1.3, two new x25mon flags (-i and -d) are offered and the length of data is indicated via an "l:" in the trace for both packet and frame layers.

Running an X.25 line trace (via x25mon) on a system with heavy X.25 traffic can negatively impact X.25 throughput due to additional processing overhead and adapter memory resource constraints. Thus, tracing is recommended for problem isolation activity rather than as a matter of routine.

Prior to the X.25 V1.1.3 enhancement, all packet and frame data was saved in the x25mon trace information and trace packets were discarded, when neces-

sary, to keep up with the incoming traffic. When this happened, the trace output was flagged with:

```
PK_LMS_IND  1:0 missed: xx  (where xx is the number of packets missed)
```

With X.25 V 1.1.3, users can lessen the trace burden by saving only a portion of the contents of the data packets. Two new flags, the "i" and "d", allow users to specify the maximum number of frame and packet level data bytes to save in the trace. In addition, all trace data will be captured, regardless of network load -- the X.25 device driver will no longer sacrifice trace data in order to service in-coming traffic.

The i flag indicates the Info frame trace size. Valid value ranges are from 0 to 5003. If -i flag is not specified, 512 bytes is assumed. The d flag sets the data packet trace size. Valid value ranges are from 0 to 4096). If -d flag is not specified, all data is captured in the trace.

The following command will, for example, trace the packet and frame layers of the sx25a0 port, showing the first 5 bytes of data in the packet layer and the first 10 bytes of data within the frame layer. The user will know that the trace shows only a portion of the actual content because those bytes are annotated with ".."

```
x25mon -p -d 5 -f -i 10 -n sx25a0
```

Limiting the number of bytes saved in the trace is extremely important as it affects both performance and memory resource utilization. It is highly recommended that frame traces be limited to less than 512 bytes. Running with larger traces may result in severe adapter memory constraints.

Power Management Support

AIX's power management is a technique for minimizing power consumption -- an outgrowth of portable systems running on battery. Power Management (PM) is available for non-Micro Channel RISC models with PM controllers, including the 43P, E20, and F30. It defines the following power-saving transitions:

```
enable --> standby --> suspend --> hibernation --> shutdown
```

The AIXLink/X.25 V1.1.3 device driver is now "power management aware". (Drivers with no power management awareness can prevent PM-capable systems from going into power-savings transition.) This X.25 enhancement is appropriate for customers connected via X.25 to packet switching data networks who want to utilize the suspend or hibernate power management modes. Today, this PM support is available to X.25 users running either the Multiport 2 or X.25 Interface Co-Processor adapters in PM-enabled ISA bus systems.

When PM is configured and enabled, the entire system goes into hibernate mode after user-configured period of inactivity from the keyboard. >From an X.25 perspective, things behave as if the X.25 adapter cable had been

unplugged from the NTU (modem or DSU/CSU) -- all ports remain "Available" and applications (such as the x29 daemon) continue to run, but the physical connection is broken.

Keyboard activity keeps systems in full-on state -- X.25 link activity will neither keep a system in full-on mode, nor reactivate it during hibernation. Thus, remote users will not be able to access AIX systems that have gone into suspend/hibernate mode. For this reason,

```
PM is not recommended for X.25-attached hosts running as
    unattended data servers!
```

By default, PM software is Configured (device pmc0 is Available) and Enabled. When PM is disabled, no system state transition occurs and devices operate in the full-on mode. PM software can be force installed on Micro Channel RISC models, but there is no PM controller, so the software can't run.

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