FEP-4600

37x5 to FEP-4600 Migration and Planning Guide

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Introduction

The Visara FEP-4600 platform allows the migration from 37x5 Front End Processors of several features. If all features currently in use on any particular 37x5 are covered by the FEP-4600, then significant financial savings may be possible. This document can be used to help determine whether the current feature set of a particular 37x5 qualifies for replacement with the FEP-4600. The FEP-4600 makes use of gateway technology for SNA and Non-SNA protocols. Since some of the technologies used by the FEP-4600 may differ from the corresponding features on the 37x5, changes will be required as to how resources will be genered on the host systems. Although changes are required, in some instances the resulting gens may be simpler than before. Also with a difference in technologies, there may be some side effects, either positive or negative. This document will attempt to identify as many of these as possible so that there are no surprises.
Chapter 1. FEP-4600 Overview

The FEP-4600 provides a variety of attachments using SNA and Non-SNA gateway technology. Through use of this technology, a number of 37x5 FEP features may be replaced, allowing many 37x5 platforms to be decommissioned.

Through its ESCON and/or FICON interfaces, the FEP-4600 and its attached resources appears to an LPAR as one or more Control Units (CNTLUNIT macros). The number and makeup of these Control Units is dependent upon what your requirements are. Several types of Control Units can be defined. These are described in more detail later in this chapter.

- **PU 2 Nodes (XCA)** - Provides support for traditional 3270 controllers, PC gateways, midrange controllers (i.e. AS400), APPN nodes (NN, EN, and LEN), standalone PCs (IBM PCOM, or OS/2), Banking ATMs
- **PU 4 Nodes (SCTC)** – Provides support for connections to remote 3745s and remote channel connections including support for SNI (SNA Network Interface)
- **Non-SNA 3270 (3174, 2701)** – Provides support for remote 3270 controllers, Banking ATMs
- **EP-Bisync** – Provides support for remote 3270 controllers and RJE workstations

Multiple Control Units of each type and Control Units for multiple LPARs (EMIF and MIF supported) can be defined. If you attach the FEP-4600 through an ESCON or FICON director, the FEP-4600 can provide network connections for multiple CPUs. A properly configured FEP-4600 can use a single ESCON/FICON interface to replace multiple Bus and Tag interfaces required by a 3745.

Each FEP-4600 platform includes two Ethernet interfaces, each capable of operating at 1000 Mbps, 100 Mbps, or 10 Mbps speeds, as part of the motherboard, and 4 PCI-X card slots which can be populated by a combination of the following interfaces:

- **ESCON (maximum of 2/platform)**
- **Quad Serial Interface (QSI)**
- **Quad Bisync Adapter (QBA)**
- **Quad Ethernet Interface (QET) – Maximum of 2/platform**
- **Token Ring**

Additionally one PCI-Express slot is available for accommodating a single FICON Interface adapter (1, 2, or 4 interfaces).

Any combination of the above cards is permitted to customize the platform for whatever your requirements are.
Chapter 1. FEP-4600 Overview

Migrating from Serial and Token Ring to Ethernet
The FEP-4600 supports SNA communication (LLC) through any of the Ethernet interfaces. This may allow you to easily migrate from Token Ring or SDLC environments to Ethernet environments, especially if you are currently using a router to provide DLSw communications to remote sites.

True Migration Strategies
The FEP-4600 can be configured and operated in parallel with existing 37x5 FEPs to provide a safe means to migrate at your own pace, moving individual connections to the new platform without having to move every connection at once.

FEP-4600 Features
Features supported by the FEP-4600 include:

- ESCON Host attachment for multiple LPARs (16 LPARs per ESCON Interface, two interface maximum)
- FICON Host attachment for multiple LPARs (16 LPARs per FICON interface, four interface maximum)
- Channel to channel connections between LPARs through ESCON and FICON
- SNI over CTC connections
- Support for SDLC-attached PU 2.0 Platforms
- Support for SDLC-attached PU 2.1 Platforms
- SDLC-attached PU 4 Platforms (including SNI connections)
- Ethernet LLC-attached PU 2.0 Platforms
- Ethernet LLC-attached PU 2.1 Platforms
- Ethernet LLC-attached PU 4 Platforms
- Token Ring LLC-attached PU 2.0 Platforms
- Token Ring LLC-attached PU 2.1 Platforms
- Token Ring LLC-attached PU 4 Platforms
- EP BSC-attached 3270 Platforms
- VTAM BSC-attached 3270 Platforms
- EP BSC-attached RJE Platforms
- Direct support for DLSw (IP traffic directly through the Ethernet connections)
- Hardware Redundancy (Power Supplies, Fans, Hard Drives)

A more detailed explanation of each of these features will be described below.
**ESCON Host Attachments**

Each ESCON Adapter interface supports a total of 256 subchannel addresses. Up to 16 CU definitions are supported through the interface, each corresponding to a CNTLUNIT macro definition in the IOCDS gen. Each CU is dedicated to a single LPAR. Each CU is also dedicated to a single channel protocol. Protocols supported through the channel interface include PU 2 (FID 2) for support of remote PU2.0 controllers and PU 2.1 APPN platforms, PU 4 (FID 4) for SCTC connections (links between VTAM and a remote NCP) including SNI, Non-SNA 3270 for supporting remote BSC 3270 platforms (VTAM and), and Non-SNA EP for supporting remote BSC 3270 and RJE platforms.

Two ESCON interfaces are supported on the FEP-4600. Each interface uses a standard ESCON-Duplex connection. MTRJ to ESCON Duplex cables are required for compatibility to some hosts.

In some instances it may be possible (and desirable) to consolidate multiple remote connections into the same CNTLUNIT definition to conserve on the number of CU definitions required on the FEP-4600. For example, you could define 4 remote PU 2.0 controllers and a PU 2.1 platform, using one CU for each PU that is defined (a total of 5), or you could use a single CU to define all 4 remote PU 2.0 controllers and the PU 2.1 platform. The latter method leaves the other 15 CUs to define connections to other LPARs, other protocols, and other hosts.

**FICON Host Attachments**

The FICON Interface Adapter comes in three varieties, single, dual, and quad interfaces. Each FICON interface supports a total of 256 subchannel addresses. Up to 16 CU definitions are supported through each interface, each corresponding to a CNTLUNIT macro definition in the IOCDS gen. Each CU is dedicated to a single LPAR. Each CU is also dedicated to a single channel protocol. Protocols supported through the channel interface include PU 2 (FID 2) for support of remote PU2.0 controllers and PU 2.1 APPN platforms, PU 4 (FID 4) for SCTC connections (links between VTAM and a remote NCP) including SNI, Non-SNA 3270 for supporting remote BSC 3270 platforms (VTAM and), and Non-SNA EP for supporting remote BSC 3270 and RJE platforms.

Four FICON interfaces are supported on the FEP-4600. Each interface uses a standard LC connector, and both Long Wave FICON and Short Wave FICON are supported. The correct transceiver to match a Long Wave or Short Wave interface must be ordered.
Chapter 1. FEP-4600 Overview

SDLC-Attached PU 2.0 Controllers

The FEP-4600 provides SDLC support for PU 2.0 controllers. SDLC connections are through the QSI card. Each QSI card supports 4 independently configurable serial interfaces. Line speeds up to E1 and T1 are possible on every line. SDLC-attached platforms are supported by the FEP-4600 using an XCA PU 2.0 gateway feature. Host connections are through ESCON or FICON connections. SDLC lines for supporting PU 2.0 platforms can be supported as point-to-point or as multidrop connections. Leased Line and Dial-in connections are supported. Frame sizes from 265 bytes up to 4105 are supported. The FEP-4600 can support DTE and DCE connections, using RS232 and V.35 physical interfaces. X.21 connections require a V.35/X.21 or RS232/X.21 converter. Note that each QSI card supports a single type of physical interface (RS232 or V.35). DCE connections require a DTE to DCE adapter provided by Visara for each line to be run as a DCE.

With ESCON or FICON as the upstream connection, PU 2.0 platforms on SDLC lines are defined as Switched Major Nodes connecting through an XCA gateway.

Dial-in controllers are switched to the proper channel connection based on PUID settings configured in the downstream controller, and mapped to the proper upstream connection via the configuration in the FEP-4600.

Dial-out connections are not currently supported.

SDLC-Attached PU 2.1 Nodes

PU 2.1 nodes are supported through the FEP-4600 using the XCA gateway mechanism. The downstream PU 2.1 node is defined on the ESCON or FICON interface as a Switched Major Node PU TYPE=2 (and XID=YES) in VTAM. PU 2.1 platforms are supported over point-to-point connections. The FEP-4600 can support DTE and DCE connections, using RS232 or V.35 physical interfaces. X.21 connections are supported using an RS232/X.21 adapter or V.35/X.21 adapter. DCE connections require a DTE to DCE adapter provided by Visara for each line to be run as a DCE.

Dial-in controllers are switched to the proper channel connection based on PUID settings configured in the downstream controller, and mapped to the proper upstream connection via the configuration in the FEP-4600.

Dial-out connections are not currently supported.
SDLC-Attached PU 4 Nodes

PU 4 (remote 37x5) platforms are supported through the FEP-4600 over SDLC lines. The FEP-4600 connects to a UNIT=SCTC definition in IOCDS and a Channel Attached Major Node PU TYPE=4 definition in VTAM (CA definition). PU 4 connections can be same-network or SNI. Normally it is recommended that the FEP-4600 is configured to be the secondary on the SDLC line when communicating with a 3745, and a configuration parameter is offered to accomplish this. The FEP-4600 can support DTE and DCE connections, using RS232 or V.35 physical interfaces. X.21 connections are supported using an RS232/X.21 adapter or V.35/X.21 adapter. DCE connections require a DTE to DCE adapter provided by Visara for each line that is to be run as a DCE.

Ethernet LLC-attached PU 2.0 Platforms

PU 2.0 platforms are supported downstream from the FEP-4600 on Ethernet networks using LLC2 protocol. Upstream, PU2 traffic is routed through an XCA connection to VTAM. Using this method up to 255 downstream PU 2.0 platforms can be supported through a single XCA communication pipe. Up to 8 XCA communication pipes may be defined for use with a single Ethernet interface (total of 2048 downstream PUs). Each XCA Major Node definition uses one of the available 256 subchannels provided by the ESCON interface.

For older units supporting the Luminex ESCON interface card, you could also define a Channel Attached Major Node PU TYPE=2 in the VTAM definitions and UNIT=3174 in the CNTLUNIT and IODEVICE macros. Using this method the number of downstream PUs will depend on the number of Channel Attached Major Nodes defined. Each Channel Attached Major Node requires one of the available 256 subchannels provided by the ESCON interface.

DLSw can be supported by passing the LLC traffic to a router supporting LLC2/DLSw conversion. The FEP-4600 also supports internal DLSw conversion (see Ethernet DLSw-attached PU2.0 Platforms).
Ethernet LLC-attached PU 2.1 Platforms

PU 2.1 platforms are supported downstream from the FEP-4600 on Ethernet networks using LLC2 protocol. Upstream, PU2 traffic is routed through an XCA connection to VTAM. Using this method up to 255 downstream PU 2.1 platforms can be supported through a single XCA communication pipe. Up to 8 XCA communication pipes may be defined for use with a single Ethernet interface (total of 2048 downstream PUs). Each XCA Major Node definition uses one of the available 256 subchannels provided by the ESCON interface.

For older units supporting the Luminex ESCON interface card, you could also define a Channel Attached Major Node PU TYPE=2 in the VTAM definitions and UNIT=3174 in the CNTLUNIT and IODEVICE macros. You must code XID=YES in the VTAM PU definitions. A separate VTAM definition is required for each PU 2.1 node supported directly through this gateway. Each Channel Attached Major Node requires one of the available 256 subchannels provided by the ESCON interface.

DLSw can be supported by passing the LLC traffic to a router supporting LLC2/DLSw conversion. The FEP-4600 also supports internal DLSw conversion (see Ethernet DLSw-connected PU2.1 Platforms).

Ethernet LLC-attached PU 4 Platforms

PU 4 platforms are supported downstream from the FEP-4600 on Ethernet networks using LLC2 protocol. Upstream, the definition is for a Channel Attached Major Node PU TYPE=4 in the VTAM definitions and UNIT=SCTC in the CNTLUNIT and IODEVICE macros. PU 4 connections can be either same-network or SNI. Multiple PU 4 connections are supported through the same Ethernet interface. If support for DLSw is required, a switch/router must be used to provide the LLC2/DLSw protocol conversion.

Ethernet DLSw-attached PU 2.0 Platforms

PU 2.0 platforms can be supported downstream from the FEP-4600 across IP networks through the use of DLSw (Data Link Switching). The upstream connection is through the XCA gateway interface. Typically you need a device on each end of the IP network to convert LLC or SDLC traffic to DLSw traffic (SNA over IP). The FEP-4600 offers internal DLSw support eliminating the need to pass LLC traffic over the local network.

When using internal DLSw, only IP traffic emerges over the Ethernet interface. External routing of the IP traffic is still required by the FEP-4600 to move traffic beyond the local network. The FEP-4600 requires another DLSw capable platform to reside at the remote location to convert the DLSw traffic back to either LLC or SDLC. When using the Visara 1174 (3174 compatible) controller on the remote end, it is possible to let the 1174 perform the DLSw function directly, eliminating the need to have LLC or SDLC traffic on the remote network. The Visara 1174 supports direct attachment of coax displays and printers as well as TN3270 clients.
Ethernet DLSw-attached PU 2.1 Platforms

PU 2.1 platforms can be supported downstream from the FEP-4600 across IP networks through the use of DLSw (Data Link Switching). The upstream connection is through the XCA gateway interface. Typically you need a device on each end of the IP network to convert LLC or SDLC traffic to DLSw traffic (SNA over IP). The FEP-4600 offers internal DLSw support eliminating the need to pass LLC traffic over the local network.

When using internal DLSw, only IP traffic emerges over the Ethernet interface. External routing of the IP traffic is still required by the FEP-4600 to move traffic beyond the local network. The FEP-4600 requires another DLSw capable platform to reside at the remote location to convert the DLSw traffic back to either LLC or SDLC.

Token Ring LLC-attached PU 2.0 Platforms

PU 2.0 platforms are supported downstream from the FEP-4600 on Token Ring networks using LLC2 protocol. Upstream, PU2 traffic is routed through an XCA connection to VTAM. Using this method up to 255 downstream PU 2.0 platforms can be supported through a single XCA communication pipe. Up to 8 XCA communication pipes may be defined for use with a single Token Ring interface (total of 2048 downstream PUs). Each XCA Major Node definition uses one of the available 256 subchannels provided by the ESCON interface.

You could also define a Channel Attached Major Node PU TYPE=2 in the VTAM definitions and UNIT=3174 in the CNTLUNIT and IODEVICE macros. Using this method the number of downstream PUs will depend on the number of Channel Attached Major Nodes defined. Each Channel Attached Major Node requires one of the available 256 subchannels provided by the ESCON interface. If support for DLSw is required, a switch/router must be used to provide the LLC2/DLSw protocol conversion.
Token Ring LLC-attached PU 2.1 Platforms
PU 2.1 platforms are supported downstream from the FEP-4600 on Token Ring networks using LLC2 protocol. Upstream, there are two different ways to define the VTAM PUs. The preferred method is to define an XCA Major node in VTAM for the FEP-4600 and Switched Major Node definitions for the PU 2.1 platforms. Using this method up to 255 downstream PU 2.0 platforms can be supported through a single XCA communication pipe. Up to 8 XCA communication pipes may be defined for use with a single Token Ring interface (total of 2048 downstream PUs). Each XCA Major Node definition uses one of the available 256 subchannels provided by the ESCON interface.

For older units supporting the Luminex ESCON interface card, you could also define a Channel Attached Major Node PU TYPE=2 in the VTAM definitions and UNIT=3174 in the CNTLUNIT and IODEVICE macros. You must code XID=YES in the VTAM PU definitions. A separate VTAM definition is required for each PU 2.1 node supported directly through this gateway. Each Channel Attached Major Node requires one of the available 256 subchannels provided by the ESCON interface. A separate VTAM definition is required for each PU 2.1 node supported through this gateway. If support for DLSw is required, a switch/router must be used to provide the LLC2/DLSw protocol conversion.

Token Ring LLC-attached PU 4 Platforms
PU 4 platforms are supported downstream from the FEP-4600 on Token Ring networks using LLC2 protocol. Upstream, the definition is for a Channel Attached Major Node PU TYPE=4 in the VTAM definitions and UNIT=SCTC in the CNTLUNIT and IODEVICE macros. PU 4 connections can be either same-network or SNI. Multiple PU 4 connections are supported through the same Token Ring interface. If support for DLSw is required, a switch/router must be used to provide the LLC2/DLSw protocol conversion.

EP BSC-attached 3270 Platforms
Non-SNA 3270 products are supported on BSC lines. Upstream the host definition is for a UNIT=NOCHECK in the CNTLUNIT macro and a UNIT=2701 definition in the IODEVICE macro. EP devices do not have VTAM definitions, but need the appropriate definition in the application (BTAM definition).

VTAM BSC-attached 3270 Platforms
Non-SNA 3270 products are supported over BSC lines by the FEP-4600. Upstream host definitions are for UNIT=3174 in the CNTLUNIT macro and a 3270 display or printer definition for UNIT in the IODEVICE macro. VTAM definitions require a LOCAL Non-SNA Major Node definition, with appropriate display or printer types defined (i.e. TERM=3277 or TERM=3284).
**EP BSC-attached RJE Platforms**
RJE products are supported on BSC lines. Upstream the host definition is for a UNIT=NOCHECK in the CNTLUNIT macro and a UNIT=2701 definition in the IODEVICE macro. EP devices do not have VTAM definitions, but need the appropriate definition in the application (JES). (Note SNA defined RJE connections are treated as PU2 type connections.)

**Direct Support for DLSw**
The FEP-4600 is capable of converting host channel traffic directly to DLSw (Data Link Switching) traffic internally. DLSw is a method of transporting SNA traffic within IP packets that can traverse any typical IP network. You must have a platform on each end of the IP network capable of sending and receiving the IP traffic and converting the SNA traffic back into a more native data stream for processing by platforms that are incapable of handling the DLSw traffic. Using the capabilities of the FEP-4600 it is possible to keep LLC2 traffic off the local backbone network.

Two DLSw versions are supported by the FEP-4600. Version 1 represents remote nodes that adhere to RFC 1434. This is typically a Visara 1174 controller, but could also be an IBM 6611 router or possibly some other platform that supports RFC 1434. Version 2 represents remote nodes that support RFC 1795. This is the more commonly supported RFC supported by most router vendors. Note that platforms that support RFC 2106 should use the Version 2 setting, as those platforms should negotiate backwards to RFC 1795 compatibility.

**Hardware Redundancy**
The FEP-4600 makes use of redundant power supplies. Older platforms have 3 power supplies installed on them. Each supply is capable of supporting at least half of the power consumption requirements of the platform. Newer platforms have 2 power supplies installed, each capable of supporting all requirements of the platform. Each power supply has its own external power source cable associated with it allowing you to connect to multiple mains if you have them. Each power supply can be hot swapped if a failure were to occur.

The FEP-4600 has multiple cooling fans each independently monitored for speed. Heat monitoring is also maintained. Failing fans may be hot swapped for convenience.

The FEP-4600 has two hard drives using RAID mirroring to provide redundancy in case one of the hard drives were to fail. Hard drives may be hot swapped in some circumstances. The FEP-4600 Users Manual has more detail on procedures for replacing hard drives.

**BOSS © Attachments**
Connections between multiple FEP-4600 platforms are handled by the Visara BOSS © architecture over Ethernet connections, also referred to as clustering. This traffic is carried over TCP/IP using port 1026, and can be routed through any typical IP network. For best performance, the interfaces can be interconnected at 1 Gbps speed. This feature is no longer supported for new installations.
Feature Compatibility
The FEP-4600 is capable of supporting all combinations of features through a single
ESCON or FICON interface, however the host itself may have difficulty mixing different
types of traffic. It is not recommended to mix PU2 and PU4 traffic over the same host
CHPID. When ESCON CHPIDs are attached directly to the FEP-4600 (no ESCON
director in use) then you must separate PU4 traffic from other traffic (PU2 or Non-SNA)
by using more than one ESCON interface. When you are using ESCON directors then
you can direct the traffic into the director through different CHPIDs, but have a single
ESCON out to the FEP-4600.
Chapter 2. Support of PU 2.0 Platforms

The FEP-4600 supports PU 2.0 platforms by means of a PU 2.0 Gateway function. With ESCON as the upstream connection, PU 2.0 platforms are supported on a variety of downstream connections. These include:

- SDLC
- Ethernet (LLC2)
- Token Ring (LLC2)
- Ethernet (IP using DLSw)

Two different approaches are offered on the host side for defining the downstream PUs to VTAM. The following illustration shows what the network may look like.

The two options are partly dependent upon the network architecture of the downstream PU, partly on the ESCON interface used, and partly on redundancy requirements.

Option 1: Define Local (Channel) Major Nodes for each remote PU2. (This option is only supported over ESCON using the older Luminex ESCON card – no longer available, and is not supported over FICON.)

Option 2: Define an XCA Major Node and use Switch Major Node definitions for each PU2 (supported over ESCON and FICON).
Chapter 2. Support of PU 2.0 Platforms

Option 1 Considerations

This option is only available on older platforms that used the Luminex ESCON interface card, and is not available on current platforms using the BARR ESCON interface card or over FICON. When defining a Local Major Node definition for the FEP-4600, the downstream PUs appear to VTAM as if they were physically attached to the ESCON interface. This option is available if the PU is to be attached to the FEP-4600 via an SDLC, Token Ring, or Ethernet (LLC) link. Defining Local Major Node PU 2.0 definitions requires one subchannel per PU.

Option 2 Considerations

This option is the preferred method of connecting PU 2.0’s to VTAM, and does not have any ESCON or FICON restriction. For this option, PUs are defined to VTAM using Switched Major Node definitions. One or more XCA definitions are used to provide a path between a LAN interface and the ESCON/FICON channel. SDLC defined PUs pass through a gateway between a virtual LAN interface and the SDLC interface.

PUs currently attached to the 3745 via Token Ring use Switched Major Node definitions. In this case the PUs should already be defined to VTAM, and no change in these definitions should be required. The FEP-4600 will require a minimum of one XCA definition in VTAM for each network adapter to support up to 255 concurrent DSPUs (which makes use of only one subchannel as compared to the one subchannel per PU described in option 1). Using the Switched Major Node definitions additionally allows for redundant paths to be used to gain access to the host definition through multiple FEP-4600 platforms (and through multiple channel interfaces). This is because the Switched Major Node definition is not tied to a specific channel address.
Comparing the Options

For most environments the advantages of Option 2 outweigh the advantages of Option 1.

- Option 1 is not support over FICON or the current ESCON (BARR) interface.
- Option 2 uses fewer subchannels (one per physical network interface) versus one subchannel per PU 2.0 that Option 1 requires. This may not mean much if only a few PU 2.0 nodes are involved, but can be very important if hundreds are involved. Option 1 limits support for PU 2.0 sessions through a single ESCON interface to 256 (the ESCON interface supports a maximum of 256 subchannels). Option 2 supports 255 PU 2.0 sessions through a single subchannel.
- No change to PU 2.0 definitions in VTAM with option 2 if they are already defined for use with the Token Ring interface of the 3745.
- Multiple channel interfaces provide redundant ways to access the same PU 2.0 definition in VTAM with Option 2. Option 1 ties the definition to a single channel address. This means that if you want to provide redundant paths for the PU 2.0 to take to access the host resources, then redundant Local Major Node PU 2.0 definitions have to be created.
- Resetting a subchannel affects only one PU 2.0 with Option 1 but can affect several with Option 2.
- New Switched PU definitions can be added without having to take the XCA interface down. This means that you do not have to reconfigure the FEP-4600 to add more PU definitions, nor do you have to recycle the interface. For Option 1 environments, you would have to add a new configuration to the FEP-4600 and perform a Restart any time that you add a new interface. (Note that you will still have to make a configuration change on the FEP-4600 when the network interface is SDLC.)
- Option 2 also supports integrated DLSw connections. Integrated DLSw connections do not support Option 1.
Local Major Node Gateway Operation

Beginning with IBM’s 3174 Token Ring gateway in the late 1980’s, PU 2.0 Gateways have been around for several years so the technology is well proven.

The FEP-4600 sits on the ESCON channel appearing as one or more locally attached PU 2.0 platforms (such as a 3174). Each locally attached PU 2.0 image requires a single subchannel address. Multiple images are supported by using multiple subchannel addresses. Usually these addresses are grouped consecutively to make the host definitions simpler, and to conserve CU resources. Each PU 2.0 within the group can be independently routed through the FEP-4600 onto whichever interface is needed to reach the destination. By grouping the addresses consecutively, you can use a single CNTLUNIT macro and a single IODEVICE macro to define multiple remote PU 2.0 platforms. Each CNTLUNIT macro corresponds to a single CU definition in the FEP-4600.

The FEP-4600 is capable of supporting up to 16 CU definitions per ESCON interface. As many as 256 PU 2.0 platforms can be supported through a single ESCON interface. Through EMIF running on the CPU, the FEP-4600 can support connections to multiple LPARS over the same ESCON connection. Each LPAR that is to own PU 2.0 resources connected through the FEP-4600 requires a separate CU definition.

Similarly, through use of ESCON directors, the FEP-4600 can communicate with multiple CPUs through the same ESCON interface.

Running as a gateway, the FEP-4600 spoofs the ESCON PU 2.0 operations and provides the correct ESCON responses as if the PU 2.0 nodes were actually locally attached directly to the ESCON connection.

The SECNET=YES parameter (part of the PU definition) is used to inform supervisory packages such as NetView that the PU is not directly attached to the channel, but is located on a secondary network.
Meanwhile, the FEP-4600 maintains the downstream connections to the real PU 2.0 platforms over the network connections supported by those platforms (Token Ring, Ethernet, SDLC) as if they were still talking to the front end processor.

All SNA traffic is passed from end to end, so that VTAM and NetView have full visibility to the actual PU 2.0 platforms and all of their LU attachments.

Since PUs are defined to be associated with a local channel, they must attach through that specific channel interface. This limits redundant connections to be only at the network level (attachment through multiple Token Ring or Ethernet connections). Redundant network connections are achieved by setting these connections up on the FEP-4600 as dynamic connections. If you want redundant channel connections, you must make redundant definitions in VTAM as well.
XCA Gateway Operation

Setting up an XCA (External Communication Adapter) gateway takes a different approach that is much more advantageous for LAN attached PUs. Introduced with the IBM 3172, a single subchannel is associated with a network adapter on the FEP-4600. If multiple network adapters are to be used for the XCA function, then at least one subchannel for each network adapter is required. Up to 255 downstream PUs and all of their associated sessions can connect through each network adapter. Note that for performance reasons, you may choose to limit the number of downstream PUs through a single adapter to a smaller number than you can actually configure.

IBM z990

Appears to the host as if the channel where directly attached to a LAN (Token Ring or Ethernet)
Downstream PUs are typically set up to dynamically connect through the XCA to request connection to the Switched Major Node definition. Individual PUs are not locked to a specific XCA interface in the host gen unless the host is expected to initiate the connection (typically SDLC environments only). Connecting to a specific XCA is usually left up to the configuration of the downstream device. The downstream device is typically configured for its upstream gateway’s MAC address and SAP number. This MAC address and SAP are tied to a specific XCA gateway when the XCA gets activated in VTAM.

If multiple XCA’s are defined to the same VTAM, the downstream PU can connect through any of them to establish a session with VTAM. Access to a particular XCA pipe is controlled by the SAP assigned to it. Parallel connections to the same VTAM typically make use of the same SAP assignment. VTAM maintains a connection through only one of the XCAs to a specific PU at a time. If connection is lost, the downstream PU can establish a new connection through the same or through a different XCA. Token Ring, Ethernet, and SDLC attached PUs are supported through the XCA interface on the FEP-4600.
SDLC Support Through the XCA

XCA was primarily designed to support LAN based nodes. The FEP-4600 also supports SDLC-attached PU 2.0 nodes by making them appear to be LAN attached. A virtual MAC address is assigned to the SDLC device in the FEP-4600 configuration (through a gateway circuit) and assigned to one of the network adapters. All traffic destined to the virtual address is diverted to the associated gateway circuit that in turn sends the traffic down the proper SDLC line.
Data Link Switching (DLSw)

DLSw is a protocol described by RFC 1795 (and enhanced through RFC 2166) to provide a means to encapsulate SNA traffic into an IP packet. Devices compatible to RFC 2166 are typically also backwards compatible to RFC 1795. There are also platforms still in existence that are compatible to RFC 1434, a predecessor to RFC 1795. The FEP-4600 is equipped with support for RFC 1795 DLSw which will negotiate compatibility with RFC 2166 platforms and is also directly compatible with RFC 1434 platforms.

DLSw gateway functionality is typically found in some routers. SNA traffic is received by the router typically in the form of LLC2 packets and is encapsulated into IP packets that can be transported over the wider IP network. A similar router platform is typically located on the far side of the IP network to provide the de-encapsulation of the SNA traffic from the IP packets which is then provided to the SNA platforms located at the far end of the network. The SNA traffic may be in the form of LLC2 packets or perhaps SDLC packets.

A typical DLSw network is shown below.
Chapter 2. Support of PU 2.0 Platforms

The FEP-4600, by inclusion of the DLSw feature eliminates the need on the host side of the network to move LLC2 protocol over the LAN and in some cases may result in a simplified network. The host connectivity for the DLSw feature is the XCA feature described previously. The downstream connectivity can be a router with DLSw capability or some other device capable of communicating with RFC 2166, 1795, or 1434.

Note the improvements:

- DLSw feature moved from Router to the FEP-4600.
- Token Ring connection converted to Ethernet and possibly just a connection from the FEP directly into the router.
- LLC2 protocol eliminated from the host side LAN
- If Visara 1174 remote controller used, elimination of LLC2 traffic from the remote LAN as well.
- DLSw eliminated from the remote routers.
VTAM
Switched Definitions

ESCON
XCA Pipe
XCA Pipe

FEP-4600
ETH0
SAP08
DLSw Gateway
IP Traffic
Ethernet

ETH1
SAP04
DLSw Gateway
IP Traffic
Ethernet
**IOCDS Gen Requirements when VTAM Local Major Nodes are Used**

Note that this section only applies to older platforms using the Luminex ESCON interface configured for device type ‘3174’.

Each DSPU that is to be supported by the FEP-4600 requires that a single subchannel address be assigned, to the host LPAR that owns the resource. If multiple DSPU resources are owned by the same LPAR, then a single CNTLUNIT macro may be used to define the multiple PU 2.0 resources by using a consecutive range of addresses. This conserves CU resources in the FEP-4600. An example set of definitions for a single DSPU (type 2.0) would look similar to the following:

```plaintext
RESOURCE PARTITION=((PROD1,1),(TEST,3))
CHPID PATH=(1F),TYPE=CNC,SWITCH=01,SHARED
CNTLUNIT CUNUMBR=1F00,PATH=1F,UNITADD=((00,1)),UNIT=3174,LINK=C5
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1)UNIT=3174,UNITADD=00,PARTITION=(PROD1)
```

On a processor that supports Logical Subsystems (such as the z990), the definitions will look slightly different. Here is the same set of definitions as would be seen for the z990.

```plaintext
RESOURCE PARTITION=((CSS(0),(PROD1,1),(TEST,3))
CHPID PATH=(CSS(0),1F),TYPE=CNC,SWITCH=01,SHARED,PCHID=160
CNTLUNIT CUNUMBR=1F00,PATH=(CSS(0),1F),UNITADD=((00,1)),UNIT=3174,LINK=(CSS(0),C5)
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1)UNIT=3174,UNITADD=00,PARTITION=(CSS(0),PROD1)
```

A similar definition that supports 3 DSPU (type 2.0) controllers over separate links controlled by the same LPAR might appear like this:

```plaintext
RESOURCE PARTITION=((PROD1,1),(TEST,3))
CHPID PATH=(1F),TYPE=CNC,SWITCH=01,SHARED
CNTLUNIT CUNUMBR=1F20,PATH=1F,UNITADD=((00,3)),UNIT=3174,LINK=C5
IODEVICE CUNUMBR=1F20,ADDRESS=(680,3)UNIT=3174,UNITADD=00,PARTITION=(PROD1)
```

Note the consecutive range of addresses used when sharing a single CNTLUNIT macro for multiple PU2.0 platforms.
IOCDS Gen Requirements when VTAM XCA Major Nodes are Used

A single subchannel is required for each network adapter in the FEP-4600 that will be used for XCA communications. Each XCA definition will support up to 255 concurrent PU connections. Multiple XCA definitions to either the same adapter or to different adapters from the same LPAR can use a consecutive address range of subchannels. A unit type of 3172 or SCTC is typically used to define the FEP-4600 for an XCA definition. The following definition could be used to support up to 1020 DSPUs to the hosting LPAR over ESCON.

RESOURCE PARTITION=((PROD1,1),(TEST,3))
CHPID PATH=(1F),TYPE=CNC,SWITCH=01,SHARED
CNTLUNIT CUNUMBR=1400,PATH=1F,UNITADD=((00,4)),UNIT=SCTC,LINK=C5
IODEVICE CUNUMBR=1400,ADDRESS=(640,4)UNIT=SCTC,UNITADD=00,PARTITION=(PROD1)

When FICON is used the CHPID TYPE is different as well as the CNTLUNIT UNIT type.

RESOURCE PARTITION=((PROD1,1),(TEST,3))
CHPID PATH=(1F),TYPE=FC,SWITCH=01,SHARED,PCHID=170
CNTLUNIT CUNUMBR=1400,PATH=1F,UNITADD=((00,4)),UNIT=FCTC,LINK=C5
IODEVICE CUNUMBR=1400,ADDRESS=(640,4)UNIT=FCTC,UNITADD=00,PARTITION=(PROD1)
VTAM Gen Requirements when VTAM Local Major Nodes are Used

The VTAM gen requirements for PU 2.0 controllers are also rather simple. When making the PU 2.0 platforms appear as local 3174s, you must define one or more Local SNA Major Node definitions. Defining each PU 2.0 platform to have its own Local SNA Major Node definition has the benefit that if you need to take the definition down to make a change, you will only affect the PU that you need to make the change to.

An example definition for a PU 2.0 platform communicating through the FEP-4600 using a local channel definition might look like this:

```
LOCSNA01       VBUILD     TYPE=LOCAL
PUX25001       PU         CUADDR=300,
                  MODETAB=TABPU20,    MODETAB=TABPU20,
                  SSCPFM=FSS,        SSCPFM=FSS,
                  DLOGMOD=D4A32782,  DLOGMOD=D4A32782,
                  MAXBFRU=16,        MAXBFRU=16,
                  SECNET=YES        SECNET=YES
LUX25002       LU         LOCADDR=2
LUX25003       LU         LOCADDR=3
LUX25004       LU         LOCADDR=4
LUX25005       LU         LOCADDR=5,
                  DLOGMOD=SCS
```

A few notes:
1) The two low order digits in the CUADDR should match the PU address (subchannel address) in the FEP-4600 configuration.
2) SECNET=YES is for the benefit of NetView so that NetView problem determination will be more accurate.
3) The value of MAXBFRU indicates the number of buffers (size determined by IOBUF in the VTAM Start Options) that must be set aside to receive inbound SNA frames. The minimum value (MAXBFRU x IOBUF) must be at least 265. Larger values permit larger data transfers on the channel. For tuning purposes, setting the MAXBFRU value large enough so that an entire inbound frame can be passed at once is usually the most efficient.

VTAM Gen Requirements when XCA and Switched Major Nodes are Used

If you already have Switched Major Node definitions in use for your PU 2.0 platforms coming through the 3745’s Token Ring adapters, then you should not have to make any changes to those definitions at all. You will need to define at least one XCA Major Node definition for each network adapter that will be used to provide access for the downstream PUs through the FEP-4600. Each network adapter on the FEP-4600 can support up to eight XCA definitions, allowing support for up to 2040 DSPUs through each adapter. These XCA definitions can be directed through the same ESCON interface to a single or multiple LPARs or even through different ESCON interfaces.

If you need to create new Switched Major Node definitions to define new platforms, you will need to define IDBLK and IDNUM values in the VTAM PU definition to match the
XID value that will be configured on those platforms. Together these two parameters define an 8 character hex sequence. The IDBLK typically identifies the type of device (for example a 3174 type controller always uses ‘017’ for the first 3 characters of the XID). The IDNUM defines a unique 5 digit hex number for the remaining 5 characters.

Operations of the FEP-4600 XCA interface during the connection process involves the PU 2.0 platform sending its XID through the FEP-4600’s XCA interface to VTAM for processing (matching the XID to a SWNET PU definition). If a match is found the connection is established, if not the remote platform will be disconnected. A list of nodes that have failed to establish a connection is kept on the FEP-4600 and can be conveniently viewed to aid in troubleshooting.

Example Token Ring XCA Definition:

```
TRCXCA VBUILD TYPE=XCA
PORTC66 PORT MEDIUM=RING, (Token Ring)
    CUADDR=C66,
    SAPADDR=4,
    ADAPNO= 2 (FEP-4600 3rd Token Ring Adapter)
GRPC66 GROUP ANSWER=ON,
    CALL=IN,
    AUTOGEN=(6,L,P), (Number of Concurrent PUs)
    ISTATUS=ACTIVE
```

Example Ethernet XCA Definition:

```
ETHXCA VBUILD TYPE=XCA
PORTC67 PORT MEDIUM=CSMACD, (Ethernet)
    CUADDR=C67,
    SAPADDR=4,
    ADAPNO= 0 (FEP-4600 1st Ethernet Adapter)
GRPC67 GROUP ANSWER=ON,
    CALL=IN,
    AUTOGEN=(6,L,P), (Number of Concurrent PUs)
    ISTATUS=ACTIVE
```
Chapter 2. Support of PU 2.0 Platforms

Example Switched Major Node Definition:

SMN01 VBUILD TYPE=SWNET,
SWPU01 PU DLOGMODE=STUNSPEC,
MODETAB=SYSTSTMT,
USSTAB=USSTABA,
PUTYPE=2,
IDBLK=017, (3174 Compatible Controller)
IDNUM=86392, (Hex Value, Must Be Unique)
MAXOUT=7
WER002 LU LOCADDR=2
WER003 LU LOCADDR=3
WER004 LU LOCADDR=4
WER005 LU LOCADDR=5,
DLOGMOD=SCS

SAP Usage with XCA Upstream Connections

Multiple XCA definitions are created to support the following scenarios:

- SNA PU2 traffic flow to multiple VTAMs
- To increase the capacity of traffic to the same VTAM
- To provide multiple paths to the same VTAM (through multiple ESCON interfaces).

Connections are directed to the multiple XCA connections through use of the SAP (Service Access Point) in the FEP-4600’s configuration. Multiple paths to the same VTAM typically make use of the same SAP value. Paths to different VTAMs typically make use of different SAP numbers.

Local Major Nodes and XIDs

Local SNA Major Node definitions do not allow you to define the IDBLK and IDNUM parameters. When replacing a Switched Major Node definition or creating a new one with a Local SNA Major Node definition, it will be necessary to configure the XID information into the FEP-4600 configuration. This information is associated with the subchannel address that is to be used to support this specific PU. A dynamic interface will be configured on the FEP-4600, to receive the incoming connection. When the XID is received from the incoming connection, the FEP-4600 will map the connection to the appropriate upstream host connection.

Note that multiple dynamic interfaces may be configured on the FEP-4600 platform to receive connections to the same host connection, allowing for load balancing and disaster recovery.
Example

In the example diagram:
1. A PU 2.0 platform connects to the FEP-4600 through an interface configured to accept dynamic connections.
2. An XID exchange results in the submission of an XID of ‘01700123’ by the PU 2.0 platform.
3. The XID is linked internally by the FEP-4600 to a host connection that matches the XID ‘01700123’. This match is assigned to Subchannel Address 00 by the FEP-4600 configuration. Other vital information is part of this configured CU definition such as:
   - ESCON interface number
   - LPAR number
   - CUADD
   - Link through an ESCON switch (optionally)
4. The FEP-4600 establishes communication to VTAM over Subchannel 00.
5. SNA PU 2.0 communication flows end to end.
Chapter 3. Support of PU 2.1 Nodes

The FEP-4600 supports PU 2.1 platforms by means of a PU 2.1 Gateway passthrough function. With ESCON or FICON as the upstream connection, PU 2.1 platforms are supported over SDLC and LLC connections.

The following illustration shows what the network may look like.
Chapter 3. Support of PU 2.1 Nodes

**PU2.1 Gateway Operation**

Two different approaches are offered on the host side for defining the downstream PUs to VTAM.

The two options are partly dependent upon the network architecture of the downstream PU, partly on the ESCON interface used, and partly on redundancy requirements.

Option 1: Define Local (Channel) Major Nodes for each remote PU2. (This option is only supported over ESCON using the older Luminex ESCON card – no longer available, and is not supported over FICON.)
Option 2: Define an XCA Major Node and use Switch Major Node definitions for each PU2 (supported over ESCON and FICON).

**Option 1 Considerations**

This option is only available on older platforms that used the Luminex ESCON interface card, and is not available on current platforms using the BARR ESCON interface card or over FICON. When defining a Local Major Node definition for the FEP-4600, the downstream PUs appear to VTAM as if they were physically attached to the ESCON interface. This option is available if the PU is to be attached to the FEP-4600 via an SDLC, Token Ring, or Ethernet (LLC) link. Defining Local Major Node PU 2.0 definitions requires one subchannel per PU.

Each PU 2.1 platform must be genned according to the function of the APPN node. Network Nodes (NN), End Nodes (EN), and Low Entry End Nodes (LEN) are all supported. All APPN nodes that must have an exclusive connection through the FEP-4600 to VTAM, will require a definition. In the diagram below, three APPN (PU 2.1) nodes will use the FEP-4600 to provide the connection to VTAM and all must have a definition to VTAM and in the IO gen.

Configuration for the downstream media is performed in the FEP-4600 configuration. For detailed configuration information, see the FEP-4600 Installation and Configuration Guide.
Chapter 3. Support of PU 2.1 Nodes

**Option 2 Considerations**

This option is the preferred method of connecting PU2.1’s to VTAM. For this option, PUs are defined to VTAM using Switched Major Node definitions. One or more XCA definitions are used to provide a path between a LAN interface and the ESCON channel. SDLC defined PUs pass through a gateway between a virtual LAN interface and the SDLC interface.

PUs currently attached to the 3745 via Token Ring use Switched Major Node definitions. In this case the PUs should already be defined to VTAM, and no change in these definitions should be required. The FEP-4600 will require a minimum of one XCA definition in VTAM for each network adapter, which can support up to 255 concurrent DSPUs (this makes use of only one subchannel as compared to the one subchannel per PU described in option 1). Using the Switched Major Node definitions additionally allows for redundant paths to be used to gain access to the host definition through multiple FEP-4600 platforms (and through multiple channel interfaces). This is because the Switched Major Node definition is not tied to a specific channel address.

This will appear to VTAM as though each of the APPN nodes is attached to the CPU through the ESCON channel, as shown in the diagram below.
Chapter 3. Support of PU 2.1 Nodes

If VTAM is configured as a NN and if any of the PU 2.1 nodes attached directly to the FEP-4600 is a NN, and other PU 2.1 nodes have direct network connections to it, then it may not be necessary to define those other PU 2.1 nodes directly to VTAM in the gen. The PU 2.1 NN may be capable of providing the pathway information to VTAM for them. Refer to the illustration below. In this case only the Visara 1174 in the diagram would require a definition in the IO gen and VTAM gens.
In this scenario, only the network node would appear as though it were directly attached to the channel, as illustrated below.

This can reduce the number of host definitions and the number of subchannels required to support the remote network.
Chapter 3. Support of PU 2.1 Nodes

Creating Host Definitions

Local Major Node IOCDS Gen Requirements

Remember, this method can only be applied to the older Luminex ESCON card and does not apply to FICON or the newer BARR ESCON card.

Each PU 2.1 DSPU that is to be supported by the FEP-4600 requires that a single subchannel address be assigned, to the host LPAR that is responsible for communicating with the resource. If the same LPAR must communicate with multiple PU2.1 resources, then a single CNTLUNIT macro may be used to define the multiple PU 2.1 resources, by configuring a consecutive range of subchannel addresses. This conserves CU resources in the FEP-4600. An example set of definitions for a single DSPU (type 2.1) would look similar to the following:

```
RESOURCE PARTITION=((PROD1,1),(TEST,3))
CHPID PATH=(1F),TYPE=CNC,SWITCH=01,SHARED
CNTLUNIT CUNUMBR=1F00,PATH=1F,UNITADD=((00,1)),UNIT=3174,LINK=C5
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1)UNIT=3174,UNITADD=00,PARTITION=(PROD1)
```

On a processor that supports Logical Subsystems (such as the z990), the definitions will look slightly different. Here is the same set of definitions as would be seen for the z990.

```
RESOURCE PARTITION=((CSS(0),(PROD1,1),(TEST,3))
CHPID PATH=(CSS(0),1F),TYPE=CNC,SWITCH=01,SHARED,PCHID=150
CNTLUNIT CUNUMBR=1F00,PATH=(CSS(0),1F),UNITADD=((00,1)),UNIT=3174,LINK=(CSS(0),C5)
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1)UNIT=3174,UNITADD=00,PARTITION=(CSS(0),PROD1)
```

A similar definition that supports 2 DSPU (type 2.1) controllers over separate links controlled by the same LPAR might appear like this:

```
RESOURCE PARTITION=((PROD1,1),(TEST,3))
CHPID PATH=(1F),TYPE=CNC,SWITCH=01,SHARED
CNTLUNIT CUNUMBR=1F20,PATH=1F,UNITADD=((00,2)),UNIT=3174,LINK=C5
IODEVICE CUNUMBR=1F20,ADDRESS=(680,2)UNIT=3174,UNITADD=00,PARTITION=(PROD1)
```

Note that when sharing a single CNTLUNIT macro for multiple PU2.1 platforms, you are defining a consecutive range of addresses.
IOCDS Gen Requirements when VTAM XCA Major Nodes are Used

A single subchannel is required for each network adapter in the FEP-4600 that will be used for XCA communications. Each XCA definition will support up to 255 concurrent PU connections. Multiple XCA definitions to either the same adapter or to different adapters from the same LPAR can use a consecutive address range of subchannels. A unit type of 3172 is typically used to define the FEP-4600 for an XCA definition. The following definition could be used to support up to 765 DSPUs (3 x 255) to the hosting LPAR over an ESCON link.

```
RESOURCE PARTITION=((PROD1,1),(TEST,3))
CHPID PATH=(1F),TYPE=CNC,SWITCH=01,SHARED
CNTLUNIT CUNUMBR=1400,PATH=1F,UNITADD=((00,3)),UNIT=3172,LINK=C5
IODEVICE CUNUMBR=1400,ADDRESS=(640,3)UNIT=3172,UNITADD=00,PARTITION=(PROD1)
```

Similarly, over FICON the interface would appear like this:

```
RESOURCE PARTITION=((CSS(0),(PROD1,1),(TEST,3))
CHPID PATH=(CSS(0),1F),TYPE=FC,SWITCH=01,SHARED,PCHID=170
CNTLUNIT CUNUMBR=1400,PATH=((CSS(0),1F)),UNITADD=((00,3)),UNIT=FCTC,LINK=C5
IODEVICE CUNUMBR=1400,ADDRESS=(640,3)UNIT=FCTC,UNITADD=00,PARTITION=(PROD1)
```
Local Major Node VTAM Gen Requirements

This section applies to PU2.1 nodes attached using Method 1 described previously, ESCON host interface using a Luminex ESCON card.

The VTAM gen requirements for PU 2.1 controllers are simple, but some of the details vary dependent upon what type of APPN node you are attaching. You must define one or more Local SNA Major Node definitions. Defining each PU 2.1 platform to have its own Local SNA Major Node definition has the benefit that if you need to take the definition down to make a change, you will only affect the PU that you need to make the change to.

An example definition for a PU 2.1 LEN platform communicating through the FEP-4600 might look like this:

```
LOCSNA01 VBUILD TYPE=LOCAL
PU21AIX1 PU CUADDR=300,
MODETAB=TABPU21,
SSCPFMB=FSS,
DLOGMOD=LU62,
XID=YES,
MAXBFRU=9

LU062101 LU LOCADDR=0
LU062102 LU LOCADDR=0
LU062103 LU LOCADDR=0
LU062104 LU LOCADDR=0
```

Note that for LEN APPN nodes connected directly through the FEP-4600, all LUs must be defined to VTAM. LEN nodes do not report their LUs through the network automatically.

A definition for a pair of NN or EN will look similar, but without the need for the LU definitions if VTAM is also gened to be a Network Node or End Node.

```
LOCAPPN1 VBUILD TYPE=LOCAL
PU21AIX1 PU CUADDR=300,
MODETAB=TABPU21,
DLOGMOD=LU62,
XID=YES,
CPCP=YES
MAXBFRU=9

LOCAPPN2 VBUILD TYPE=LOCAL
PU21AIX2 PU CUADDR=301,
MODETAB=TABPU21,
DLOGMOD=LU62,
XID=YES,
CPCP=YES
MAXBFRU=9
```
XCA Major Node VTAM Gen Requirements

When setting the FEP-4600 up as XCA (External Communications Adapter) interface for PU 2.1 traffic, the gen requirements are also simple. The XCA interface provides a pipe through which PU 2.1 traffic flows between the external network and the channel. If you already have Switched Major Node definitions in use for your PU 2.0 platforms coming through the 3745’s Token Ring adapters, then you should not have to make any changes to those definitions at all. You will need to define at least one XCA Major Node definition for each network adapter that will be used to provide access for the downstream PUs. Each network adapter on the FEP-4600 can support up to eight XCA definitions, allowing support for up to 2040 DSPUs through each adapter.

Example Ethernet XCA Definition:

```
TRCXCA VBUILD TYPE=XCA
PORTC66 PORT MEDIUM=CSMACD, (Ethernet)
CUADDR=C42,
SAPADDR=4,
ADAPNO= 2   (Refers to 3rd Ethernet on FEP-4600)
GRPC66 GROUP ANSWER=ON,
CALL=IN,
AUTOGEN=(6,L,P),   (Number of Concurrent PUs)
ISTATUS=ACTIVE
```

Example Token Ring XCA Definition:

```
TRCXCA VBUILD TYPE=XCA
PORTC66 PORT MEDIUM=RING, (Token Ring)
CUADDR=C40,
SAPADDR=4,
ADAPNO= 1   (Refers to 2nd Token Ring interface)
GRPC66 GROUP ANSWER=ON,
CALL=IN,
AUTOGEN=(16,L,P),   (Number of Concurrent PUs)
ISTATUS=ACTIVE
```

Example Switched Major Node Definition for a Network Node or End Node:

```
RETEN01 VBUILD TYPE=SWNET,
RTENPU01 PU MODETAB=SYSTSTMT,
USSTAB=USSTABA,
PUTYPE=2,
XID=YES,
MAXOUT=7,
CPNAME=CPTITECN
```
Example Switched Major Node Definition for a LEN:

RETTR01 VBUILD TYPE=SWNET,
RTTRPU01 PU MODETAB=SYSTSTMT,
USSTAB=USSTABA,
PUTYPE=2,
XID=YES,
MAXOUT=7,
CPNAME=CAROLTN1
PU01LU00 LU LOCADDR=0
Chapter 4. VTAM BSC-Attached 3270

The FEP-4600 supports 3270 BSC platforms defined in VTAM by means of a Local Non-SNA to BSC Gateway function. This implementation consists of ESCON or FICON as the upstream connection, and one or more serial BSC lines downstream. For BSC 3270 installations that are currently supported by EP on the 37x5, please refer to the chapter entitled: EP BSC-Attached 3270 Platforms.

The following illustration shows what the network may look like.

Remote BSC 3270 devices appear to the host as if they were one or more locally attached Non-SNA 3270 controllers. For Non-SNA definitions, the host gen can look very different from one installation to another, because every attached device requires its own subchannel address (and appropriate UNIT definition) included in the gen. Configuration for the downstream media is performed in the FEP-4600 configuration.
It should be noted that the FEP-4600 supports up to 32 devices for each CU (CNTLUNIT) definition. These may be reallocated as needed in the FEP-4600 configuration to the downstream devices. For example, you could define a single Non-SNA CU to have 32 devices, and assign each device to a separate downstream ATM location, spread across multiple lines and multiple drops. For detailed configuration information, see the FEP-4600 Installation and Configuration Guide. Currently the FEP-4600 supports a total of 32 downstream devices per QBA card.

**IOCDS Gen Requirements**

Each BSC 3270 device (display and printer) that is to be supported by the FEP-4600 requires that a single subchannel address be assigned, to the host LPAR that owns the resource. A single CNTLUNIT macro is used to define the collection of devices attached to a single BSC cluster controller. An example ESCON gen might appear as follows:

```
RESOURCE PARTITION=((PROD1,1),(TEST,3))
CHPID PATH=(1E),TYPE=CNC,SWITCH=01,SHARED
CNTLUNIT CUNUMBR=1E00,PATH=1E,UNITADD=((00,32)),UNIT=3174,LINK=C5
IODEVICE CUNUMBR=1E00,ADDRESS=(1700,30)UNIT=3270-X,UNITADD=00,PARTITION=(PROD1)
IODEVICE CUNUMBR=1E00,ADDRESS=(171E,2)UNIT=3284,UNITADD=1E,PARTITION=(PROD1)
```

Note that you may require multiple IODEVICE macros to describe the attached devices, since there are a number of device specific UNIT types.

An example IO gen for FICON would look very similar with two major differences. The CHPID type for FICON is FC (TYPE=FC). UNIT=NOCHECK is required in place of the UNIT=3174 for the CNTLUNIT definition since a 3174 is not a valid device type for the FICON environment. The IODEVICE definitions could be the same as when done for ESCON.

```
RESOURCE PARTITION=((PROD1,1),(TEST,3))
CHPID PATH=(1E),TYPE=FC,SWITCH=01,SHARED,PCHID=165
CNTLUNIT CUNUMBR=1E00,PATH=1E,UNITADD=((00,32)),UNIT=NOCHECK,LINK=C5
IODEVICE CUNUMBR=1E00,ADDRESS=(1700,30)UNIT=3270-X,UNITADD=00,PARTITION=(PROD1)
IODEVICE CUNUMBR=1E00,ADDRESS=(171E,2)UNIT=3284,UNITADD=1E,PARTITION=(PROD1)
```
On a processor that supports Logical Subsystems (such as the z990), the definitions will look slightly different. Here is the same set of definitions as would be seen for the z990.

RESOURCE PARTITION=(CSS(0),(PROD1,1),(TEST,3))
CHIPID PATH=(CSS(0),1E),TYPE=CNC,SWITCH=01,SHARED,PCHID=160
CNTLUNIT CUNUMBR=1E00,PATH=(CSS(0),1E),UNITADD=((00,1),UNIT=3174,LINK=(CSS(0),C5)
IODEVICE CUNUMBR=1E00,ADDRESS=(1700,1)UNIT=3270-X,UNITADD=00,PARTITION=(CSS(0),PROD1)
IODEVICE CUNUMBR=1E00,ADDRESS=(171E,1)UNIT=3284,UNITADD=1E,PARTITION=(CSS(0),PROD1)

VTAM Gen Requirements

The VTAM gen requirements for Non-SNA controllers use an LBUILD Major Node definition. This would be the same whether the host channel is ESCON or FICON.

An example definition for a BSC platform communicating through the FEP-4600 might look like this:

<table>
<thead>
<tr>
<th>LOCNSNA1</th>
<th>LBUILD</th>
<th>CUADDR=800, TERM=3277, MODETAB=TABNS, DLOGMOD=NS32702, FEATURE=EDATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TNSD000</td>
<td>LOCAL</td>
<td>CUADDR=801, TERM=3277, MODETAB=TABNS, DLOGMOD=NS32702, FEATURE=EDATS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TNSD001 LOCAL  CUADDR=802, TERM=3277, MODETAB=TABNS, DLOGMOD=NS32702, FEATURE=EDATS</td>
</tr>
<tr>
<td>TNSD002</td>
<td>LOCAL</td>
<td>TNSD003 LOCAL  CUADDR=803, TERM=3277, MODETAB=TABNS, DLOGMOD=NS32702, FEATURE=EDATS</td>
</tr>
<tr>
<td>TNSD031</td>
<td>LOCAL</td>
<td>TNSD031 LOCAL  CUADDR=81F, TERM=3284, MODETAB=TABNS, DLOGMOD=NS3284, FEATURE=MODEL2</td>
</tr>
</tbody>
</table>
Chapter 5. EP BSC-Attached 3270

The FEP-4600 supports 3270 BSC platforms defined in BTAM applications by means of a Local Non-SNA to BSC Gateway function. This implementation consists of ESCON or FICON as the upstream connection, and a serial BSC line on the downstream connection. For BSC 3270 installations that are currently supported by VTAM on the 37x5, please refer to the chapter entitled: VTAM BSC-Attached 3270 Platforms

The following illustration shows what the network may look like.

For Non-SNA definitions, the host gen can look very different from one installation to another, because every attached device requires its own subchannel address and must be included in the gen. Configuration for the downstream media is performed in the FEP-4600 configuration. For detailed configuration information, see the FEP-4600 Installation and Configuration Guide.
**IOCDS Gen Requirements**

Each BSC 3270 device (display and printer) that is to be supported by the FEP-4600 over a BSC line requires that a single subchannel address be assigned, to the host LPAR that owns the resource. A single CNTLUNIT macro is used to define the collection of devices attached to a single BSC cluster controller. An example gen using an ESCON CHPID might appear as follows:

```plaintext
RESOURCE PARTITION=((PROD1,1),(TEST,3))
CHPID PATH=(1E),TYPE=CNC,SWITCH=01,SHARED
CNTLUNIT CUNUMBR=1E00,PATH=1E,UNITADD=((00,32)),UNIT=NOCHECK,LINK=C5
IODEVICE CUNUMBR=1E00,ADDRESS=(1700,30)UNIT=2701,UNITADD=00,PARTITION=(PROD1)
IODEVICE CUNUMBR=1E00,ADDRESS=(171E,2)UNIT=2701,UNITADD=1E,PARTITION=(PROD1)
```

Note that you may require multiple IODEVICE macros to describe the attached devices, since there are a number of device specific UNIT types.

The same type of definition using a FICON CHPID would look similar:

```plaintext
RESOURCE PARTITION=((PROD1,1),(TEST,3))
CHPID PATH=(27),TYPE=FC,SWITCH=02,SHARED
CNTLUNIT CUNUMBR=1E00,PATH=27,UNITADD=((00,32)),UNIT=NOCHECK,LINK=C7
IODEVICE CUNUMBR=1E00,ADDRESS=(1700,30)UNIT=2701,UNITADD=00,PARTITION=(PROD1)
IODEVICE CUNUMBR=1E00,ADDRESS=(171E,2)UNIT=2701,UNITADD=1E,PARTITION=(PROD1)
```

On a processor that supports Logical Subsystems (such as the z990), the definitions will look slightly different. Here is the same set of definitions as would be seen for the z990 (over ESCON).

```plaintext
RESOURCE PARTITION=(CSS(0),(PROD1,1),(TEST,3))
CHPID PATH=(CSS(0),1E),TYPE=CNC,SWITCH=01,SHARED,PCHID=150
CNTLUNIT CUNUMBR=1E00,PATH=(CSS(0),1E),UNITADD=((00,1)),UNIT=NOCHECK,LINK=(CSS(0),C5)
IODEVICE CUNUMBR=1E00,ADDRESS=(1700,1)UNIT=2701,UNITADD=00,PARTITION=(CSS(0),PROD1)
IODEVICE CUNUMBR=1E00,ADDRESS=(171E,1)UNIT=2701,UNITADD=1E,PARTITION=(CSS(0),PROD1)
```
BTAM Gen Requirements
BTAM definition requirements will be to define the remote BSC platform and attached devices as if they are locally attached.

It is beyond the scope of this document to display BTAM definitions.
Chapter 6. Support of PU 4 Connections

The FEP-4600 supports PU 4 platforms by means of a PU 4 Gateway function. These PU 4 platforms include a 3745 or another platform that is emulating a 3745 such as IBM’s CCL product, another FEP-4600, an Integrated Communications Adapter (on some mainframes), or a router passing PU 4 traffic. It can also support another Visara FEP-4600 operating in a PU 4 gateway mode. Both same SNA network and different SNA network (SNI) connections are supported over any of the specified interfaces. Following is a summary of connection types that are supported on the FEP-4600:

- SDLC connection to a remote 3745
- Token Ring (LLC) connection to a remote 3745 direct or using a DLSw router
- Ethernet (LLC) connection to a remote 3745 direct or using a DLSw router
- ESCON Channel-to-Channel connection either direct or through a clustered (FEP-4600 to FEP-4600) connection
- Ethernet (IP) connection to a remote FEP-4600

A variety of implementation scenarios are described below.
Scenario 1:
The first scenario described places a FEP-4600 in place of a 3745 that had three remote connections to 3 remote 3745s. These connections include:

- SDLC connection to a remote 3745
- Token Ring/LLC connection to a local 3745
- Remotely Bridged (LLC) or Routed (DLSw/IP) 3745
Scenario 2:
The next scenario shows Channel-to-Channel connections between adjacent SSCP. These SSCP can reside in the same SNA network, on same or different CPUs, and on same or different physical locations.

More specifically, the FEP-4600 can be configured to support these connections:

SSCP to SSCP traffic between two LPARs:
If a director is used, each LPAR should have an ESCON interface into the director, and a single ESCON into the FEP-4600. If no director is used, then each LPAR needs an ESCON cable into the FEP-4600. The two SSCP can reside in the same SNA network or can be located in two separate networks.
VTAM to TPF Interface: The interface between VTAM and TPF can be accomplished through a channel-to-channel connection using the FEP-4600. If an ESCON director is used, each LPAR should have an ESCON interface into the director, and a single ESCON interface can be used to the FEP-4600. If there is no ESCON director, then each LPAR should have an ESCON cable into the FEP-4600.

SSCP to SSCP Connections between CPUs: The FEP-4600 can provide SSCP to SSCP connections between CPUs. Again, the SSCPs can reside in the same SNA network or in different SNA networks. When an ESCON director is used, a single interface to the FEP-4600 can be used. No ESCON director is needed however when running an ESCON interface to each of the two CPUs.
Use of Clustering Feature to Provide SSCP to SSCP Connection: When CPUs are located in physically different locations, two FEP-4600 platforms can be used to provide a channel-to-channel connection between them for SNA PU4 traffic using the Clustering feature. Connectivity between the two sites uses encrypted IP. The two sites can be on the same or different SNA networks and can be VTAM and/or TPF.

This feature is no longer offered for new installations.
Scenario 3:
The third scenario makes use of a pair of FEP-4600s to provide an SNI connection between two distinct SNA networks. In this case the connection makes use of encrypted IP for the SNA transport. This time the two platforms are not Clustered, but function independently to provide added security. Neither Enterprise Extender nor DLSw is required or used, but the connection must be between two Visara platforms.

The type of definition used on the local host side will look the same, regardless of what type of remote connection is being used. Each PU4 connection over ESCON appears as a CTC connection to an adjacent SSCP.

Configuration for the actual remote connection is performed in the FEP-4600 configuration. For detailed configuration information, see the FEP-4600 Installation and Configuration Guide.
PU 4 Gateway to 3745 Operation

Being a gateway implementation, the FEP-4600 spoofs both the upstream ESCON connection and the remote 3745. The FEP-4600 does not use NCP in any form or fashion and does not have a real PU 4 running inside of it, but it does handle the PU4 data streams. Because NCP is no longer in the picture, there is no need to create a load module or perform a load of NCP from VTAM.

The FEP-4600 performs its gateway function by appearing as one or more adjacent subareas to the existing local VTAM(s). This allows you to define a pathway through the FEP-4600 as a Channel-to-Channel connection. The FEP-4600 becomes the ‘next hop’ in the pathway to remote VTAM (and NCP) subareas. Although it is possible to define the FEP-4600 to use the same subarea as the 37x5 that it is replacing, it is not always the desired method (it makes testing and partial implementation more difficult).

The number of Channel-to-Channel connections that you need to define is determined by the number of remote NCP connections that are needed, and the number of local adjacent VTAM links that are required. Each connection to a remote NCP requires a Channel-to-Channel definition for the FEP-4600 for each VTAM that appears directly adjacent to the FEP-4600, and utilizes one of the 256 subchannels supported by the FEP-4600 ESCON interface.

Because of the nature of the CTC protocol, CHPIDs should not be shared between LPARs for PU4 connections. When an ESCON director is used, each LPAR should have a separate CHPID into the director. When no ESCON director is used, then each LPAR should interface into the FEP-4600 through a separate CHPID. Note that each FEP-4600 platform supports a maximum of two ESCON and four FICON interfaces. Each Channel-to-Channel connection represents the host side of a Transmission Group (TG).
In the diagram to the left, each LPAR has an unshared CHPID connection into the ESCON Director. Each LPAR would require a single CNTLUNIT definition with a range of 3 subchannels to allow each LPAR to communicate with every other LPAR.
On the remote connection, the FEP-4600 appears to a remote front end processor as if it were an NCP.

This chapter describes the operations of the FEP-4600 when the connection is for PU4 communications and no SNI (or for single sided SNI situations where the FEP-4600 is not required to perform the SNI function. For SNI (SNA Network Interconnect) requirements, the FEP-4600 appears to the foreign network to be a GWNCP through the Null network connection. Refer to Chapter 7 for a complete discussion of SNI applications of the FEP-4600.
Chapter 6. Support of PU 4 Connections

Transmission Group Support on the FEP-4600

The FEP-4600 currently supports only single link Transmission Groups. When migrating from a 37x5 FEP where multilink Transmission Groups are currently used, it should be considered, why are multilink Transmission Groups currently being used? There are probably only two answers.

1. To provide increased bandwidth for data traffic.
2. To provide a redundant path, in case one link becomes inoperative.

Increased Bandwidth: Traditional 3745 Front Ends were stingy on link speeds due to the technologies commonly in use at the time they were developed. The FEP-4600 makes use of newer technologies, and easily provides ample bandwidth over a variety of interfaces:

- FICON
- ESCON
- 100 Mbps and 1000 Mbps Ethernet
- 100 Mbps Token Ring
- T1/E1 capable Serial Links

Redundant Paths: Although the FEP-4600 does not support multilink Transmission Groups, it will support parallel single link Transmission Groups, allowing you to set up multiple Explicit Routes between subareas.

If multilink transmission groups are currently in use between the 37x5 that the FEP-4600 is replacing and a remote NCP, it will be necessary to make changes to the gen of the remote NCP.

If the connection to the remote 37x5 is via DLSw, the routed IP network usually provides the needed redundancy within the IP network architecture.

TG Numbering: Each interface on the FEP-4600 can be configured to match the TG number defined in VTAM or can be matched to the definition in the remote NCP. TG numbers must match for the physical interfaces that the FEP-4600 shares with the adjacent subareas. The TG number assigned to the ESCON interface for a PU4 circuit must match the TG number assigned in the adjacent VTAM for the corresponding Link Station definition. On the remote link (such as SDLC or Token Ring) the TG number must match the TG number assigned on the remote NCP. The TG on the ESCON side does not have to match the TG number on the remote interface side of our circuit. The FEP-4600 will take care of linking the upstream TG to the downstream TG.

When multiple PU4 paths are defined through the FEP-4600, it is possible to assign a single subarea to the FEP-4600 and use a different TG number for each of the remote destinations. It is also possible to assign a different subarea number to each destination and use the same or different TG numbers for each destination.
Explicit Route Number and Virtual Route Numbers

Explicit Route (ER) number assignments are associated with a physical link and are a connection between adjacent subareas. Virtual Route (VR) number assignments are from the source subarea to the destination subarea and must be made to match in the local VTAM gen to the remote NCP (or remote VTAM) gen. The implementation that the FEP-4600 uses passes VR information through from one side to the other, and it is therefore important that the VR information lines up properly. When NCP was in place the VRs were typically from the local NCP to the remote NCP. With the FEP-4600 in place the VRs are between the local VTAM and the remote NCP.

Since new definitions have to be created typically for the local (ESCON or FICON) interface to the FEP-4600, it makes sense to create definitions in the local PATH table to match what is already defined in the remote NCP’s PATH table. This information is typically already defined in the local NCP’s PATH table that the FEP-4600 is replacing. So if the local NCP has been using VR0 and VR1 to communicate to the remote NCP, then when you create the local VTAM PATH definition to be used with the FEP-4600 you should also specify VR0 and VR1 so that there is not a VR mismatch.
Loading of Remote NCPs

For environments where an NCP is currently being loaded remotely into a remote 3745 through a local 3745, it may be desired to be able to remotely load that NCP through the facilities of the FEP-4600. This is not currently supported. Let’s look at this situation more closely, however for other solutions.

![Note: The clustering feature described below is no longer offered for new installations.]

It can be assumed that the remote 3745 is part of the local SNA network, thus owned by the same organization that owns or is replacing the local 3745. Remote loading of an NCP is typically part of a disaster recovery plan, or the remote 3745 is positioned to better provide resources closer to where they are needed.

The FEP-4600 technology is better suited to replace the remote 3745 and associated NCP license, with a remote FEP-4600 in its place. Requirements to have a serial interface to the remote 3745 for loading purposes go away, and higher speed, more dynamic IP connections can be implemented instead. The clustering feature of the FEP-4600 can be leveraged to make the remote network connections appear to be local, making administration of the remote connections simpler and more dynamic.
Here is a list of some of the advantages to use the FEP-4600.

- Eliminate NCP licensing for the remote NCP
- Replace obsolete 37x5 hardware eliminating maintenance charges on aging equipment
- Eliminate the requirement for a serial connection between sites (previously necessary to remotely load NCP), in lieu of higher speed WAN links
- Eliminate NCP gens and the special skill set needed to perform the gen
- Introduce IP as the connection protocol between sites
  - More network redundancy
  - Perhaps make use of existing corporate WAN resources
  - Eliminate one or more lease lines
- Eliminate Token Ring for the remote LAN connections (migrate to Ethernet)
- Remote definitions appear as local definitions

Known disadvantages:

- No multi-link transmission group support
- No direct NetView support/management of the FEP-4600 platform itself. There is support for downstream devices through the FEP-4600 using NetView.
Subarea Assignments on the FEP-4600

As a PU4 gateway platform, the FEP-4600 is capable of appearing as one or more subareas depending on perspective. Each PU4 link is configured for the subarea that it is to represent to the link partner. In some cases you will want to configure the same subarea for each link, but this usually is not the case. For the simplest of networks (one PU4 link), the FEP-4600 may be configured to take over the subarea assignment that was previously assigned to the 37x5 it is replacing. It is usually better however to assign a new subarea to the FEP-4600 so that testing can be conducted easier. When more than one PU4 link exists you may want to assign additional subareas to the platform, but you can also assign different TGs to each of the links and use just a single subarea to represent the FEP-4600. Below, you will find a number of scenarios.

Scenario 1: Simple Replacement
In this first scenario, the FEP-4600 is providing a simple replacement for a 3745 that was providing a single PU4 connection to a remote 3745. To keep things simple, the same subarea previously used for the 3745 is now used by the FEP-4600. Note that there are still gen changes required on the local VTAM since the FEP-4600 appears as a SCTC link and an adjacent VTAM, not a 3745.

### Before

<table>
<thead>
<tr>
<th>CPU</th>
<th>3745</th>
<th>3745</th>
<th>CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTAM SA03</td>
<td>NCP SA04</td>
<td>NCP SA14</td>
<td>VTAM SA10</td>
</tr>
</tbody>
</table>

### After

<table>
<thead>
<tr>
<th>CPU</th>
<th>FEP-4600</th>
<th>3745</th>
<th>CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTAM SA03</td>
<td>Appears as SA04 to both links</td>
<td>NCP SA14</td>
<td>VTAM SA10</td>
</tr>
</tbody>
</table>
Scenario 2: Gradual Replacement
In this scenario, the migration from the 3745 to the FEP-4600 does not occur immediately, and it is desired to continue to run the 3745 for a period of time along side the FEP-4600 that is replacing it. In this scenario the FEP-4600 may be configured with 2 subareas. For the remote link that it appears as an NCP to, it is configured to appear as subarea 04 the same as the 3745. To the ESCON attached VTAM it appears to be a new subarea (SA05).
In this second scenario, the 3745 continues to provide the connection to subareas 14 and 10. The FEP-4600 is providing the connection to subareas 24 and 22. By configuring the FEP-4600 to identify itself to the NCP in SA24 to be SA04, it will not be necessary to reconfigure the gens for SA24 and SA22. The FEP-4600 is configured to identify itself as SA05 to the VTAM in SA03. A PATH statement must be added to identify the new SA05. The PATH statements that identify the paths to SA24 and SA22 will need to be modified to route the traffic through SA05.

**Scenario 3: Replacing 37x5 with Links to Multiple Locations**

This situation calls for the FEP-4600 to provide connections to two different remote NCPs. (The network is the same as scenario 2, perhaps after the complete migration.) In this case, a second subarea is assigned to the FEP-4600 on the ESCON side to be used in addition to the subarea previously owned by the 3745. Both remote NCPs view the FEP-4600 as SA04, requiring no changes to the gens in the remote VTAMs and NCPs. The local VTAM sees the FEP-4600 as SA07 when it wants to communicate with SA10 or SA14. When VTAM wants to communicate with SA24 or SA22, it views the FEP-4600 as SA05. This is required so that VTAM will use the correct link (CTC connection) to direct the traffic to the appropriate destination.
As an alternate solution (shown below), both PATHs to the remote destinations are defined to go through the same subarea 05, but one PATH uses TG1 to get to SA14 and SA10, and uses TG2 to get to SA24 and SA22.
IOCDS Gen Requirements for the Local Host

Each channel-to-channel connection supported by the FEP-4600 requires that a single subchannel address be assigned, using a SCTC definition. Furthermore, if multiple physical links are to be supported between the FEP-4600 and a remote 3745, then multiple subchannel definitions will be required, one for each link. Also, if more than one SSCP is to have a direct connection to the FEP-4600, then a separate subchannel (and separate SCTC) definition must be made in the gen to accommodate each of the LPARs supporting the SSCPs. Reference the following definition examples.
Example 1:
In this example the LPARs 1 (PRODA) and 3 (PRODC) are interconnected with a CTC connection. And although EMIF is present and used to share channels for other applications, CHPID 1F must be unshared and only LPAR3 has a direct connection to the FEP-4600. A second CHPID would be required into the ESCON switch to allow direct connection of LPAR1 to the FEP-4600.

```
RESOURCE PARTITION=((PRODA,1),(PRODC,3))
CHPID PATH=(1F),TYPE=CNC,SWITCH=03
CNTLUNIT CUNUMBR=1F00,PATH=1F,UNITADD=((00,1)),UNIT=SCTC,CUADD=0,LINK=C5
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1),UNIT=SCTC,UNITADD=00,PARTITION=(PRODC)
```

On a processor that supports Logical Subsystems (such as the z990 or z9), the definitions will look slightly different. Here is the same set of definitions as would be seen for the z990 if these LPARs are in CSS0. If connections from LPARs in two different CSS’s are needed then you must have two separate ESCON channels coming from the CPU, one for each CSS.

```
RESOURCE PARTITION=(CSS(0),(PRODA,1),(PRODC,3))
CHPID PATH=(CSS(0),1F),TYPE=CNC,SWITCH=03
CNTLUNIT CUNUMBR=1F00,PATH=(CSS(0),1F),UNITADD=((00,1)),UNIT=SCTC,CUADD=0,LINK=(CSS(0),C5)
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1),UNIT=SCTC,UNITADD=00,PARTITION=(CSS(0),PRODC)
```

The same type of definition for a FICON CHPID may look like this:

```
RESOURCE PARTITION=(CSS(0),(PRODA,1),(PRODC,3))
CHPID PATH=(CSS(0),3D),TYPE=FC,SWITCH=03
CNTLUNIT CUNUMBR=1F00,PATH=(CSS(0),3D),UNITADD=((00,1)),UNIT=FCTC,LINK=(CSS(0),C5)
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1),UNIT=FCTC,UNITADD=00,PARTITION=(CSS(0),PRODC)
```
Example 2:

This example is very nearly the same, except that this time both LPARs have access directly to the FEP-4600 to get to two different destinations. Note that on the FEP-4600 it will be necessary to use a separate CU definition to connect to each of the two LPARs. Note that there would need to be two CHPIDs into the switch.

RESOURCE PARTITION=((PRODA,1),(PRODC,3))
CHPID PATH=(1F),TYPE=CNC,SWITCH=03,PART=(PRODC)
CHPID PATH=(27),TYPE=CNC,SWITCH=03,PART=(PRODA)
CNTLUNIT CUNUMBR=1F00,PATH=1F,UNITADD=((00,1)),UNIT=SCTC,CUADD=0,LINK=C5
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1),UNIT=SCTC,UNITADD=00,PARTITION=(PRODC)
CNTLUNIT CUNUMBR=1A00,PATH=27,UNITADD=((00,1)),UNIT=SCTC,CUADD=0,LINK=C5
IODEVICE CUNUMBR=1A00,ADDRESS=(720,1),UNIT=SCTC,UNITADD=00,PARTITION=(PRODA)

Note that since the two CNTLUNIT definitions are referencing two different LPARs the CUADD values can be defined to be the same value (in this case CUADD=0).

Once again, the definitions are shown where the two LPARs exist in Channel Subsystem 0.
RESOURCE PARTITION=((CSS(0),PRODA,1),(PRODC,3))
CHPID PATH=(CSS(0),1F),TYPE=CNC,SWITCH=03,PART=((CSS(0),PRODC))
CHPID PATH=(CSS(0),27),TYPE=CNC,SWITCH=03,PART=((CSS(0),PRODA))
CNTLUNIT CUNUMBR=1F00,PATH=(CSS(0),1F),UNITADD=((00,1)),UNIT=SCTC,LINK=(CSS(0),C5)
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1),UNIT=SCTC,UNITADD=00,PARTITION=((CSS(0),PRODC))
CNTLUNIT CUNUMBR=1A00,PATH=(CSS(0),1F),UNITADD=((00,1)),UNIT=SCTC,LINK=(CSS(0),C5)
IODEVICE CUNUMBR=1A00,ADDRESS=(720,1),UNIT=SCTC,UNITADD=00,PARTITION=((CSS(0),PRODA))
Example 3:
For this example, the FEP-4600 is being used to communicate with three different remote 3745s. Three CTC connections must be defined, one for each of the remote connections. (Note that if you need to configure 3 Explicit Routes to the same remote 3745, the IOCDS definition could look exactly the same.)

RESOURCE PARTITION=((PRODC,3))
CHPID PATH=(1E),TYPE=CNC,SWITCH=03
CNTLUNIT CUNUMBR=1E00,PATH=1E,UNITADD=((00,1)),UNIT=SCTC,CUADD=0,LINK=C5
IODEVICE CUNUMBR=1E00,ADDRESS=(720,1),UNIT=SCTC,UNITADD=00
CNTLUNIT CUNUMBR=1E01,PATH=1E,UNITADD=((00,1)),UNIT=SCTC,CUADD=1,LINK=C5
IODEVICE CUNUMBR=1E01,ADDRESS=(721,1),UNIT=SCTC,UNITADD=00
CNTLUNIT CUNUMBR=1E02,PATH=1E,UNITADD=((00,1)),UNIT=SCTC,CUADD=2,LINK=C5
IODEVICE CUNUMBR=1E02,ADDRESS=(722,1),UNIT=SCTC,UNITADD=00

In this case the local LPAR is communicating to the FEP-4600 with 3 different CNTLUNIT definitions, so you must use a different CUADD value for each definition.
Chapter 6. Support of PU 4 Connections

VTAM Gen Requirements
The VTAM gen requirements for a PU 4 connection through the FEP-4600 are much simpler than for a real 37x5. This is because VTAM sees the connection as a Channel-to-Channel connection (to the remote VTAM domain) and the majority of the configuration will take place on the FEP-4600 itself. You should define one Local SNA Major Node definition for each path to a 3745 that you need to define. (You can use a single Local SNA Major Node definition to define multiple connections, but you will then need to take all of those connections down any time that you make a change to one of them.)

An example definition for a PU 4 platform communicating through the FEP-4600 might look like this:

```
VISBLD VBUILD  TYPE=CA
VISGRP GROUP  LNCTL=CTCA,ISTATUS=ACTIVE,REPLYTO=25,MIH=YES
VISLN LINE  ADDRESS=C30,MAXBFRU=16
VISPU1 PU  PUTYPE=4,TGN=1
```

If you wish to define parallel transmission groups to the same remote SA or definitions for multiple destinations, you would need to create a multiple definitions as shown above, but with different TGN number definitions.

VTAM CDRM Table
For PU4 definitions (no SNI) there is no need to make a CDRM definition for the FEP-4600 itself. The gateway function of the FEP-4600 passes all traffic through and is more or less transparent. There is a place in the FEP-4600 configuration for a CDRM name, and that should be configured, but it really does not get used in the actual PU4 (no SNI) operations. Note that if a CDRM is defined for the FEP-4600 locally, any attempt to establish a CDRM-CDRM session between the local VTAM and the FEP-4600 actually gets passed through the interface to the remote CDRM which will cause confusion for the two CDRMs.

VTAM Adjacent SSCP Table
If all of the PU4 connections that the FEP-4600 is providing are within the local SNA network, then there is no reason to modify the VTAM Adjacent SSCP table.

VTAM Cross Domain Resource Considerations
The FEP-4600 does not affect the assignment of Cross Domain Resources when handling same network PU4 traffic and there is no need to address resources within the FEP-4600, so there should be no need to modify or add any CDSRC statements.

VTAM PATH Table Considerations
VTAM PATH definitions will need to be modified only if a new subarea number has been assigned to the FEP-4600. If the FEP-4600 is simply taking over the subarea previously used by the 37x5 that it is replacing, then no changes should be required.
If parallel transmission groups are being set up for use by the FEP-4600, then do not forget to code an explicit route for each transmission group.

If more than one VTAM is defined to be adjacent to the FEP-4600 (a CTC definition was created), you will need to consider the PATH tables for each VTAM that is directly adjacent.

There should be no need to modify the PATH tables for non-adjacent subareas, since they do not have to directly communicate with the FEP-4600.

As for the PATH table of the adjacent 37x5 that the FEP-4600 is communicating with; if the FEP-4600 is configured with the subarea of the 37x5 it is replacing, then there should be no need to make any changes.

**Example 1:**

Following is an example of the changes that would need to be made to the PATH table of the VTAM that is directly adjacent to the FEP-4600 in the discussion found earlier in this chapter for the subarea usage requirements of the FEP-4600 (Scenario 3). Reference the Before and After diagrams found with those scenarios.

**VTAM PATH TABLE for VTAM 03 (Before)**

<table>
<thead>
<tr>
<th>PATH</th>
<th>DESTSA</th>
<th>ER1</th>
<th>VR1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PATH0304</td>
<td>04</td>
<td>(04,1)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0314</td>
<td>14</td>
<td>(04,1)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0310</td>
<td>10</td>
<td>(04,1)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0324</td>
<td>24</td>
<td>(04,1)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0322</td>
<td>22</td>
<td>(04,1)</td>
<td>1</td>
</tr>
</tbody>
</table>

**VTAM PATH TABLE for VTAM 03 (After)**

<table>
<thead>
<tr>
<th>PATH</th>
<th>DESTSA</th>
<th>ER1</th>
<th>VR1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PATH0307</td>
<td>07</td>
<td>(07,1)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0305</td>
<td>05</td>
<td>(05,1)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0314</td>
<td>14</td>
<td>(07,1)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0310</td>
<td>10</td>
<td>(07,1)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0324</td>
<td>24</td>
<td>(05,1)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0322</td>
<td>22</td>
<td>(05,1)</td>
<td>1</td>
</tr>
</tbody>
</table>

**VTAM PATH TABLE for VTAM 03 (Alternate Solution)**

<table>
<thead>
<tr>
<th>PATH</th>
<th>DESTSA</th>
<th>ER1</th>
<th>VR1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PATH0305</td>
<td>05</td>
<td>(05,1)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0314</td>
<td>14</td>
<td>(05,1)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0310</td>
<td>10</td>
<td>(05,1)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0324</td>
<td>24</td>
<td>(05,2)</td>
<td>1</td>
</tr>
<tr>
<td>PATH0322</td>
<td>22</td>
<td>(05,2)</td>
<td>1</td>
</tr>
</tbody>
</table>
Example 2:

This example shows the FEP-4600 requirements for setting up parallel Transmission Groups. For this example, use the diagram below. Because of the way the FEP-4600 supports PU 4 type connections, if you want to provide multiple connections between the FEP-4600 and a remote NCP, you will need to set up parallel Transmission Groups on both the ESCON side and the remote side. Remember that the FEP-4600 does not support Multilink Transmission Groups. Note that depending upon the desired results, you can define multiple TGs through the same physical ESCON interface, and you can similarly define multiple TGs through the same LAN interface interface. This however will continue to give you single points of failure, so you will probably want to establish the multiple links through physically different interfaces.

VTAM PATH TABLE for VTAM 03
PATH0304 PATH DESTSA=04,ER0=(04,7),ER1=(04,8),VR0=0,VR1=1
PATH0314 PATH DESTSA=14,ER0=(04,7),ER1=(04,8),VR0=0,VR1=1
PATH0310 PATH DESTSA=10,ER0=(04,7),VR0=0,VR1=1

The path tables used by the SA14 NCP and SA10 VTAM should look similar to these:

PATH TABLE for NCP 14
PATH1403 PATH DESTSA=03,ER0=(4,1),ER1=(4,2),VR0=0,VR1=1
PATH1404 PATH DESTSA=04,ER0=(4,1),VR0=0,VR1=1
PATH1410 PATH DESTSA=10,ER0=(10,1),VR0=0

PATH TABLE for VTAM 10
PATH1003 PATH DESTSA=03,ER0=(14,1),VR0=0
PATH1014 PATH DESTSA=14,ER0=(14,1),VR0=0
Chapter 7. NULL SNI Network

To replace a 37x5 that is currently implemented as a Gateway NCP and providing a Null Network connection to another network, the FEP-4600 must handle the null network role of the Gateway NCP. The diagrams below illustrate how the FEP-4600 replaces the 3745.

Before

In the ‘Before’ diagram, there are two networks (NET1 and NET2), each with a Gateway VTAM and a Gateway NCP. The two NCPs provide a Null SNI network (NULL); in this case through a Token Ring connection. Note that the Null SNI network connection could also be over SDLC, routed LLC over Frame Relay, or a routed DLSw connection.

After

The ‘After’ diagram shows the FEP-4600 ESCON attached through a Channel to Channel connection to the local host, and Token Ring attached to the remote 3745. Remember, the type of connection to the remote network (Token Ring, Ethernet, SDLC, Frame Relay, or routed DLSw) appears the same to the adjacent VTAMs. Although the subarea previously used by the 3745 (SA04) could have been used by the FEP-4600, it is usually better to assign a new subarea so that testing can more easily be done prior to the final replacement of the 3745.
At the data connection level, a more accurate representation of what appears at the ESCON channel interface is shown below.

**Viewed from the ESCON Side**

As viewed from the ESCON side, the FEP-4600 appears to the gateway VTAM in SA03 to be an adjacent subarea (SA05) on NET1 with the name of FEP4600 (this name is defined in the FEP-4600 configuration and coded in the VTAM CDRM table). PATH statements related to the new subarea will need to be created, in all VTAMs residing on the local network that would need to be able to establish a CDRM-CDRM session for locating resources. References to NET2 disappear and all resources previously available on NET2 appear to be in the new subarea SA05 (CDRSC definitions can be left alone or changed to the new subarea). The FEP-4600 will automatically forward requests for those resources across the SNI boundary with the proper NETID included.

From the foreign network NCP side, the FEP-4600 appears as a front end processor using subarea 98 on the network NULL. The remote network continues to view the connection as an SNI null network connection, with no apparent changes over what previously existed.
There should be no need to change the gens on the remote side of the network, unless multilink transmission groups are being used. The FEP-4600 does not currently support multilink transmission groups.
**Null SNI IOCDS Gen Requirements for the Local Host**

At the IOCDS level, there is no knowledge of SNI or VTAM, so the gen requirements are going to be the same as for any PU4 Channel-to-Channel connection. Each Explicit Route that the FEP-4600 is to support into the null network requires a subchannel assignment within an SCTC definition. This would include connections to multiple remote 3745s, or multiple links to the same 3745. Furthermore, if more than one SSCP (VTAM) is to have a direct connection to the FEP-4600, then a separate SCTC definition through a separate CHPID must be made in the gen to accommodate each of the LPARs supporting the SSCPs. Reference the following definition examples.

**Example 1:**

In this example the LPARs 1 (PRODA) and 3 (PRODC) are interconnected with a CTC connection. And although EMIF is used to share CHPID 1F between LPARs 1 and 3, for this example only LPAR3 has a connection to the FEP-4600. (The configuration of the FEP-4600 is used to deny LPAR 1 access to the FEP-4600. In this example the IOCDS also implies denied access using the Explicit Device Candidate List, by specifying with the PARTITION parameter which LPARs have access.)

```
RESOURCE PARTITION=((PRODA,1),(PRODC,3))
CHPID PATH=1F,TYPE=CNC,SWITCH=03,SHARED
CNTLUNIT CUNUMBR=1F00,PATH=1F,UNITADD=((00,1)),UNIT=SCTC,CUADD=0,LINK=C5
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1)UNIT=SCTC,UNITADD=00,PARTITION=(PRODA)
```

On a processor that supports Logical Subsystems (such as the z990 or z9), the definitions will look slightly different. Here is the same set of definitions as would be seen for the z990 if these LPARs are in CSS0.

```
RESOURCE PARTITION=((CSS(0),PRODA,1),(PRODC,3))
CHPID PATH=(CSS(0),1F),TYPE=CNC,SWITCH=03,PCHID=374,PART=(PRODA,PRODC),SHARED
CNTLUNIT CUNUMBR=1F00,PATH=(CSS(0),1F),UNITADD=((00,1)),UNIT=SCTC,LINK=(CSS(0),C5)
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1)UNIT=SCTC,UNITADD=00,PARTITION=(CSS(0),PRODA)
```
Example 2:

This example is very nearly the same, except that this time both LPARs have access directly to the FEP-4600 (both have a CTC definition for the FEP-4600). Note that on the FEP-4600 it will be necessary to use a separate CU definition to connect to each of the two LPARs.

```
RESOURCES
PARTITION=((PRODA,1),(PRODC,3))

CHPID PATH=(1F),TYPE=CNC,SWITCH=03
CHPID PATH=(27),TYPE=CNC,SWITCH=03
CNTLUNIT CUNUMBR=1F00,PATH=1F,UNITADD=((00,1)),UNIT=SCTC,CUADD=0,LINK=C5
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1)UNIT=SCTC,UNITADD=00,PARTITION=(PRODA)
CNTLUNIT CUNUMBR=1800,PATH=27,UNITADD=((00,1)),UNIT=SCTC,CUADD=0,LINK=C5
IODEVICE CUNUMBR=1800,ADDRESS=(260,1)UNIT=SCTC,UNITADD=00,PARTITION=(PRODC)
```

This time each LPAR requires its own CHPID. Because an ESCON switch is being used, a single ESCON interface into the FEP-4600 can be used. The FEP-4600 can communicate with up to 16 LPARs over a single ESCON interface. However for PU4/SNI communications, a separate CU should be used for each PU4/SNI connection. If no ESCON switch were in use, then each LPAR would need a separate ESCON channel. A similar configuration on a system that supports logical subsystems would appear similar to the configuration below.

```
RESOURCES
PARTITION=((CSS(0),(PRODA,1),(PRODC,3))

CHPID PATH=(CSS(0),1F),TYPE=CNC,SWITCH=03,PART=(PRODA),PCHID=370
CHPID PATH=(CSS(0),27),TYPE=CNC,SWITCH=03,SHARED,PART=(PRODC),PCHID=372
CNTLUNIT CUNUMBR=1F00,PATH=(CSS(0),1F),UNITADD=((00,1)),UNIT=SCTC,LINK=(CSS(0),C5)
IODEVICE CUNUMBR=1F00,ADDRESS=(680,1)UNIT=SCTC,PARTITION=(CSS(0),PRODA)
CNTLUNIT CUNUMBR=1800,PATH=(CSS(0),27),UNITADD=((00,1)),UNIT=SCTC,LINK=(CSS(0),C5)
IODEVICE CUNUMBR=1800,ADDRESS=(260,1)UNIT=SCTC,PARTITION=(CSS(0),PRODC)
```
Example 3:
For this example, the FEP-4600 is being used to communicate with three different remote SNI networks. Three CTC connections must be defined, one for each of the remote connections. This should be done using three CNTLUNIT statements.

```
RESOURCE PARTITION=((PRODC,3))
CHPID PATH=(1E),TYPE=CNC
CNTLUNIT CUNUMBR=1E00,PATH=1E,UNITADD=((00,1)),UNIT=SCTC,CUADD=0
IODEVICE CUNUMBR=1E00,ADDRESS=(720,1)UNIT=SCTC,UNITADD=00
CNTLUNIT CUNUMBR=1E01,PATH=1E,UNITADD=((00,1)),UNIT=SCTC,CUADD=1
IODEVICE CUNUMBR=1E01,ADDRESS=(721,1)UNIT=SCTC,UNITADD=00
CNTLUNIT CUNUMBR=1E02,PATH=1E,UNITADD=((00,1)),UNIT=SCTC,CUADD=2
IODEVICE CUNUMBR=1E02,ADDRESS=(722,1)UNIT=SCTC,UNITADD=00
```

Note that whenever you have more than one CU defined between the same local LPAR and the FEP-4600 over the same CHPID, you must use a different CUADD value to distinguish between them. (This is a requirement of the architecture, not just a requirement of the FEP-4600.) In the above example you can see that CUADD numbers of 0, 1, and 2 are used.
VTAM Gen Requirements

Because the FEP-4600 spoofs the remote network resources to appear as though they reside in the local network, the basic VTAM CTC definitions are no different than they would be for the FEP-4600 used for a local PU 4 connection, or any normal CTC link to another VTAM.

The VTAM gen requirements for a PU 4/SNI connection through the FEP-4600 are much simpler than for a real 37x5. This is because VTAM sees the connection as a Channel-to-Channel connection to an adjacent VTAM and the majority of the configuration will take place on the FEP-4600 itself. You should define one Local SNA Major Node definition (Link Station) for each path to a remote 3745 that you need to define. This includes multiple paths to the same remote 3745. (You can use a single Local SNA Major Node definition to define multiple connections (Link Stations), but you will then need to take all of those connections down any time that you make a change to one of them.)

An example definition for a PU 4/SNI platform communicating through the FEP-4600 might look like this:

```plaintext
VISBLD VBUILD TYPE=CA
VISGRP GROUP LNCTL=CTCA,ISTATUS=ACTIVE,REPLYTO=25,MIH=YES
VISLN LINE ADDRESS=C30,MAXBFRU=16
VISPU1 PU PUTYPE=4,TGN=2
```

VTAM PATH Table Considerations

Because the FEP-4600 makes the remote FEP to FEP connections transparent to the ESCON or FICON connections, the local PATH statements may need to be modified to reflect the new apparent adjacent subarea if any have been defined. All resources that were previously described as being on a foreign network must now appear to be on the local network, residing in one of the subareas assigned to the FEP-4600. The FEP-4600 requires a separate subarea assignment for each remote SNI network connection that is to be supported (only adjacent SNI networks). This will cause the GWPATH statements to go away in the CDRM and be replaced by PATH statements in the PATH table. Note that if the FEP-4600 is using the same subarea number as the 37x5 that it is replacing (only one SNI connection), the PATH statement may already be defined. You may need to add an explicit route to address a new TGN assignment defined for use by the FEP-4600.

PATH for Example 1:

Following is an example of the changes that would need to be made to the PATH table of the VTAM that is directly adjacent to the FEP-4600. Reference the Before and After diagrams found earlier in this chapter.

VTAM PATH Statements for VTAM 03 (Before)

```plaintext
PATH0302 PATH DESTSA=02,ER0=(01,1),VR1=1
PATH0301 PATH DESTSA=01,ER0=(01,1),VR1=1
PATH0304 PATH DESTSA=04,ER0=(04,1),VR1=1
```
VTAM PATH Statements for VTAM 03 (After)
PATH0302 PATH DESTSA=02, ER0=(02,1), VR0=0
PATH0301 PATH DESTSA=01, ER0=(01,1), VR0=0
PATH0305 PATH DESTSA=05, ER0=(05,2), VR0=0

The primary change that occurred was that the reference to subarea 04 previously used by NCP has been removed and replaced by a reference to SA05 used by the FEP-4600. The TGN used by the FEP-4600 in Example 1 is ‘2’. Note that during testing periods, by setting up a different subarea for the FEP-4600, it is possible to leave the PATH0304 definition in the table. It is generally not recommended to use the same subarea number in the 3745 and FEP-4600 as this complicates the whole testing procedure.

PATH Example 2:

This example shows the FEP-4600 requirements for setting up parallel Transmission Groups. For this example, use the diagram below. Because of the way the FEP-4600 supports PU 4 type connections, if you want to provide multiple connections between the FEP-4600 and a remote NCP, you will need to set up parallel Transmission Groups on both the ESCON or FICON side and the remote side. Remember that the FEP-4600 does not currently support Multilink Transmission Groups. Note that depending upon the desired results, you can define multiple TGs through the same physical ESCON/FICON interface, and you can similarly define multiple TGs through the same LAN interface. This however will continue to give you single points of failure, so you will probably want to establish the multiple links through physically different interfaces. In this case you would probably want to use the same subarea number (SA05) for both paths.
VTAM PATH TABLE for VTAM 03
PATH0301 PATH DESTSA=01, ER0=(01, 1), VR0=0
PATH0302 PATH DESTSA=02, ER0=(02, 5), VR0=0
PATH0304 PATH DESTSA=05, ER0=(05, 2), ER1=(05, 3), VR0=0, VR1=1

PATH Example 3:

This example is for the replacement of a 3745 with 3 SNI connections with a FEP-4600. The 3745 appears as a single subarea to the local network, and as three different subareas on three null networks.

VTAM PATH Statements for VTAM 03 (Before)
PATH0302 PATH DESTSA=02, ER0=(01, 1), VR0=0
PATH0301 PATH DESTSA=01, ER0=(01, 1), VR0=0
PATH0304 PATH DESTSA=04, ER0=(04, 1), VR0=0
Chapter 7. NULL SNI Networks

The FEP-4600 requires that a separate subarea be assigned for each SNI connection. This makes the FEP-4600 appear as if it were multiple gateways to the Gateway VTAM. Choice of the subarea numbers that get used depend on whether you want to reuse the subarea that the 3745 was using and of course any new subarea numbers that get assigned must be unique within the local SNA network. It is probably best not to reuse the subarea number.

VTAM PATH Statements for VTAM 03 (After)
PATH0302  PATH DESTSA=02,ER0=(01,1),VR0=0
PATH0301  PATH DESTSA=01,ER0=(01,1),VR0=0
PATH0305  PATH DESTSA=05,ER0=(05,5),VR0=0
PATH0306  PATH DESTSA=06,ER0=(06,6),VR0=0
PATH0307  PATH DESTSA=07,ER0=(07,7),VR0=0
VTAM Cross Domain Resource Manager Changes

Since resources in the foreign network no longer appear to be on a foreign network, you need to remove references to the foreign network(s) from the CDRM Major Node table. This includes all foreign NETWORK references and GWPATH references for networks now fronted by the FEP-4600, along with CDRMs that are located in those networks. These will be replaced by a CDRM entry for each subarea that is defined to the FEP-4600. (References to the foreign CDRMs and foreign networks will continue to be referenced in the ADJSSCP table.)

CDRM Example 1:

CDRM for VTAM 03 (Before)

CDRMSA03 VBUILD TYPE=CDRM
NETWORK NETID=NET2
ACME1 CDRM CDRDYN=YES,CDRSC=OPT
GWPATH GWN=GWNCP4,ADJNET=NULL,ADJNETSA=99,ADJNETEL=1

CDRM for VTAM 03 (After)

CDRMSA03 VBUILD TYPE=CDRM
FEP4600 CDRM CDRDYN=YES,CDRSC=OPT,SUBAREA=5

Without the NETWORK reference, the NETWORK is assumed to be NET1 (the local network). FEP4600 is the name being given to the subarea for the FEP-4600 but can be any valid name as long as it is also configured in the FEP-4600.

CDRM Example 3:

CDRM for VTAM 03 (Before)

CDRMSA03 VBUILD TYPE=CDRM
NETWORK NETID=NET2
ACME1 CDRM CDRDYN=YES,CDRSC=OPT
GWPATH GWN=GWNCP4,ADJNET=NULL,ADJNETSA=99,ADJNETEL=1
NETWORK NETID=NETB
BRF1 CDRM CDRDYN=YES,CDRSC=OPT
GWPATH GWN=GWNCP4,ADJNET=NETX,ADJNETSA=38,ADJNETEL=1
NETWORK NETID=NETQ
PDK1 CDRM CDRDYN=YES,CDRSC=OPT
GWPATH GWN=GWNCP4,ADJNET=NETX,ADJNETSA=12,ADJNETEL=1
Chapter 7. NULL SNI Networks

CDRM for VTAM 03 (After)

<table>
<thead>
<tr>
<th>CDRMSA03</th>
<th>VBUILD</th>
<th>TYPE=CDRM</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEP07</td>
<td>CDRM</td>
<td>CDRDYN=YES,CDRSC=OPT,SUBAREA=7 (path to ACME1)</td>
</tr>
<tr>
<td>FEP05</td>
<td>CDRM</td>
<td>CDRDYN=YES,CDRSC=OPT,SUBAREA=5  (path to BRF1)</td>
</tr>
<tr>
<td>FEP06</td>
<td>CDRM</td>
<td>CDRDYN=YES,CDRSC=OPT,SUBAREA=6  (path to PDK1)</td>
</tr>
</tbody>
</table>

VTAM Cross Domain Resource Considerations

The FEP-4600 provides access to resources located through the connections that it supports into other networks. Resources that were previously listed to exist in foreign networks and belonging to foreign CDRMs are still valid information and do not need to be changed. The ADJSSCP table should provide adequate information for routing the traffic to its proper destination. The FEP-4600 will redirect requests for connection to those resources across the corresponding connection to the Gateway on the other side and beyond.
VTAM Adjacent SSCP Table

Since the FEP-4600 must function to forward resource search requests you should add one or more entries to the Adjacent SSCP table for the FEP-4600 for each subarea assigned to it. The placement of these entries is determined by the location and function of the FEP-4600 in the network. Information listed in this table provides the local VTAM with routing information for finding remote networks and the resources in those networks. The following example illustrates the placement and function of entries for the FEP4600.

Adjacent SSCP Table (for GWSSCP10):

TABLE1 VBUILD TYPE=ADJSSCP
SSCP11 ADJCDRM
FEP18 ADJCDRM
FEP19 ADJCDRM
NETWORK2 NETWORK NETID=NETWORK2
GWSSCP20 CDRM
GWSSCP21 CDRM
FEP18 ADJCDRM
NETWORK3 NETWORK NETID=NETWORK3
GWSSCP30 CDRM
FEP19 ADJCDRM
NETWORK4 NETWORK NETID=NETWORK4
GWSSCP40 CDRM
FEP18 ADJCDRM
This table would also be valid:

<table>
<thead>
<tr>
<th>TABLE1</th>
<th>VBUILD</th>
<th>TYPE=ADJSSCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSCP11</td>
<td>ADJCDRM</td>
<td></td>
</tr>
<tr>
<td>FEP18</td>
<td>ADJCDRM</td>
<td></td>
</tr>
<tr>
<td>FEP19</td>
<td>ADJCDRM</td>
<td></td>
</tr>
<tr>
<td>NETWORK2</td>
<td>NETWORK</td>
<td>NETID=NETWORK2</td>
</tr>
<tr>
<td>NETWORK4</td>
<td>NETWORK</td>
<td>NETID=NETWORK4</td>
</tr>
<tr>
<td>FEP18</td>
<td>ADJCDRM</td>
<td></td>
</tr>
<tr>
<td>NETWORK3</td>
<td>NETWORK</td>
<td>NETID=NETWORK3</td>
</tr>
<tr>
<td>GWSSCP30</td>
<td>CDRM</td>
<td></td>
</tr>
<tr>
<td>FEP19</td>
<td>ADJCDRM</td>
<td></td>
</tr>
</tbody>
</table>

In this case the foreign CDRMs are not listed on NETWORK2 and NETWORK4. Typically listing of foreign CDRMs is dependent upon whether you are listing foreign resources. Normally the search algorithms will find the foreign resources, but it may take longer the first time if they are not explicitly defined. VTAM will normally cache destinations as they are learned for faster access later.
Chapter 8. Providing Channel-to-Channel Links

The FEP-4600 can be used to provide Channel-to-Channel connections between LPARs for SNA traffic. These LPARs can reside on the same CPU, different CPUs, and even on two CPUs that are remote from each other. CTC links can be provided between any combination of ESCON and FICON channels. See the diagram and example below.

The FEP-4600 can provide CTC connections between all LPARs in the diagram if needed, even if the LPARs are supporting different SNA networks. Each connection between two LPARs is accomplished by configuring a PU4 circuit through the FEP-4600. You can achieve this by creating a CNTLUNIT statement for each PU4 connection in each LPAR to each other LPAR. The total number of circuits on the FEP-4600 required to support a single Explicit Route between each LPAR in a multi-LPAR system can be represented by the mathematical expression:

\[(n-1) + (n-2) + \ldots + (n-(n-1))\]

where \(n\)=total number of LPARs

The following table illustrates this example.
## Chapter 8. Providing Channel-to-Channel Links

<table>
<thead>
<tr>
<th>Source Subarea</th>
<th>Destination Subarea</th>
<th>Source ESC Link</th>
<th>Destination ESC Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA01</td>
<td>SA02</td>
<td>ESC1</td>
<td>ESC1</td>
</tr>
<tr>
<td>SA01</td>
<td>SA03</td>
<td>ESC1</td>
<td>ESC1</td>
</tr>
<tr>
<td>SA01</td>
<td>SA04</td>
<td>ESC1</td>
<td>ESC1</td>
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<tr>
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<td>SA05</td>
<td>ESC1</td>
<td>ESC3</td>
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</tr>
<tr>
<td>SA04</td>
<td>SA05</td>
<td>ESC1</td>
<td>ESC3</td>
</tr>
</tbody>
</table>

### IOCDS Definitions

An example of what the IOCDS might look like for the CPU with 3 LPARs is shown below (ESCON channels):

```
RESOURCE PARTITION=((TEST1,1),(PROD2,2),(PROD3,3))

CHPID PATH=(1F),TYPE=CNC,SHARED

CNTLUNIT CUNUMBR=1F00,PATH=1F,UNITADD=00,UNIT=SCTC,CUADD=0
IODEVICE CUNUMBR=1F00,ADDRESS=180,UNIT=SCTC,UNITADD=00,PARTITION=(TEST1)

CNTLUNIT CUNUMBR=1F01,PATH=1F,UNITADD=00,UNIT=SCTC,CUADD=1
IODEVICE CUNUMBR=1F01,ADDRESS=181,UNIT=SCTC,UNITADD=00,PARTITION=(TEST1)

CNTLUNIT CUNUMBR=1F02,PATH=1F,UNITADD=00,UNIT=SCTC,CUADD=2
IODEVICE CUNUMBR=1F02,ADDRESS=182,UNIT=SCTC,UNITADD=00,PARTITION=(TEST1)

CNTLUNIT CUNUMBR=1F03,PATH=1F,UNITADD=00,UNIT=SCTC,CUADD=3
IODEVICE CUNUMBR=1F03,ADDRESS=183,UNIT=SCTC,UNITADD=00,PARTITION=(TEST1)

CNTLUNIT CUNUMBR=1F10,PATH=1F,UNITADD=00,UNIT=SCTC,CUADD=0
IODEVICE CUNUMBR=1F10,ADDRESS=190,UNIT=SCTC,UNITADD=00,PARTITION=(PROD2)

CNTLUNIT CUNUMBR=1F11,PATH=1F,UNITADD=00,UNIT=SCTC,CUADD=1
IODEVICE CUNUMBR=1F11,ADDRESS=191,UNIT=SCTC,UNITADD=00,PARTITION=(PROD2)

CNTLUNIT CUNUMBR=1F12,PATH=1F,UNITADD=00,UNIT=SCTC,CUADD=2
IODEVICE CUNUMBR=1F12,ADDRESS=192,UNIT=SCTC,UNITADD=00,PARTITION=(PROD2)

CNTLUNIT CUNUMBR=1F13,PATH=1F,UNITADD=00,UNIT=SCTC,CUADD=3
IODEVICE CUNUMBR=1F13,ADDRESS=193,UNIT=SCTC,UNITADD=00,PARTITION=(PROD2)

CNTLUNIT CUNUMBR=1F20,PATH=1F,UNITADD=00,UNIT=SCTC,CUADD=0
IODEVICE CUNUMBR=1F20,ADDRESS=200,UNIT=SCTC,UNITADD=00,PARTITION=(PROD3)

CNTLUNIT CUNUMBR=1F21,PATH=1F,UNITADD=00,UNIT=SCTC,CUADD=1
```
In each case you are defining a CNTLUNIT and IODEVICE statement for each PU4 connection. Because you have more than one controller defined between each LPAR and the FEP-4600, you must use a unique CUADD value for each of the four CNTLUNIT definitions. The assignment of which CNTLUNIT gets used for each destination will be made in the VTAM definition and the FEP-4600 configuration.
VTAM Definitions

As for the VTAM definitions, you would define a standard Channel Adapter PU4 definition for each of the four subchannels. One might look like this:

```
VISBLD VBUILD     TYPE=CA
VISGRP GROUP      LNCTL=CTCA,ISTATUS=ACTIVE,REPLYTO=25,MIH=YES
VISLN LINE        ADDRESS=C30,MAXBFRU=16
VISPU1 PU         PUTFYPE=4,TGN=1
```

Remember to match up your Transmission Groups numbering between each VTAM definition (TGN option) and the value assigned in the FEP-4600 for that interface. The value for MAXBFRU should normally be set to a value of 16. This ensures that the maximum amount of data can be moved in each transfer.

Remote Connections

Remote connections between two FEP-4600s can be achieved by implementing the SNI over IP feature of the FEP-4600. This option allows you to select to encrypt the connection adding security.
VTAM to TPF (SNI) Connections
The FEP-4600 can provide a VTAM to TPF network connection (or VTAM to VTAM where the two VTAM domains are in different SNA networks), supporting the SNI nature of the connection through a simple CTC connection. The following diagram shows perhaps the simplest manifestation of this scenario.

If an ESCON/FICON director is available to connect the FEP-4600 through, the entire job can be accomplished through a single ESCON/FICON interface on the FEP-4600. Without a director, two interfaces would be required on the FEP-4600.
Chapter 9. Replacing Both Ends of SNI Link

When replacing both ends of an SNI link, the FEP-4600 greatly simplifies the network structure, by appearing as a simple CTC connection on each end. Communication between sites can make use of a variety of options including secure IP for the SNA transport. The role of the Gateway VTAMs (GWSSCP) on either side of the FEP-4600s changes so that there is no reference to the foreign network on the opposite side.

Before

![Diagram of network layout before replacement]

After

![Diagram of network layout after replacement]

Any type of interconnection between the two FEP-4600s can be made (Token Ring, Ethernet, SDLC, routed DLSw, or SNI over IP). Of these the simplest is the SNI over IP option. This connection allows the SNI traffic to be routed over any IP network and makes use of the Ethernet interface. SNI traffic over IP can be SSL encrypted for security and directed through a single TCP port (configuration selectable). Note that if both networks are owned by the same organization (for example VTAM to TPF connection), you also have the FEP-4600 clustering feature as an option to interconnect the platforms.
Looking at the connection more closely from the NET1 side of the FEP-4600, you will see the following. The FEP-4600 appears as if it were a new VTAM domain in Net1. All resources existing on NET2 appear as if they are now located in this new subarea (SA05) and they appear as if they are now on the same network. Although SA04 could be recycled for use by the FEP-4600, it is not typically recommended since that would complicate testing prior to final implementation.
Likewise, looking at the connections from the NET2 network, the ACME1 VTAM now sees an adjacent subarea (SA12) on NET2 that appears to have all of the resources previously found on NET1.

**Viewed from the NET2 Side**

![Diagram showing network connections between CPU, FEP12, VTAM SA12, ACME1, VTAM SA10, and CTC.]

In each case, references to another network and CDRMs in that network are removed. Cross Domain Resources (CDRSCs) definitions are left as is.

The pair of FEP-4600s handle the network conversions and resource search forwarding required to handle the SNI traffic.
Chapter 9. Replacing Both Ends of SNI LINK

IOCDS Definitions

The IO definitions for the FEP-4600 would fall into the same category as described in the Example 1 in chapter 8. Assuming a single channel connection into each of the two FEP-4600s, each from a single LPAR, the definitions would appear similar to those below.

**FEP-4600 Connection to PROD3:**

RESOURCE PARTITION=((PROD1,1),(PROD2,2),(PRODC,3))
CHPID PATH=(1F),TYPE=CNC,SHARED
CNTLUNIT CUNUMBR=1820,PATH=1F,UNITADD=((00,1)),UNIT=SCTC,CUADD=0
IODEVICE CUNUMBR=1820,ADDRESS=(320,1)UNIT=SCTC,UNITADD=00,PARTITION=(PROD3)

**FEP-4600 Connection to ACME1 (ESCON):**

RESOURCE PARTITION=((ACME1,1))
CHPID PATH=(CSS(0),24),TYPE=CNC,PCHID=3E0
CNTLUNIT CUNUMBR=1260,PATH=(CSS(0),24),UNITADD=((00,1)),UNIT=SCTC,CUADD=0
IODEVICE CUNUMBR=1260,ADDRESS=(1160,1)UNIT=SCTC,UNITADD=00,PARTITION=(ACME1)

If FEP-4600 Connection to ACME1 is FICON:

RESOURCE PARTITION=((ACME1,1))
CHPID PATH=(CSS(0),24),TYPE=FCTC,PCHID=3E0
CNTLUNIT CUNUMBR=1260,PATH=(CSS(0),24),UNITADD=((00,1)),UNIT=FCTC,CUADD=0
IODEVICE CUNUMBR=1260,ADDRESS=(1160,1)UNIT=FCTC,UNITADD=00,PARTITION=(ACME1)

VTAM PU Definitions

Each FEP-4600 would have a standard CTC definition for the Link Stations. Again, reference these samples:

**FEP-4600 Connection to PROD3:**

VISBLD VBUILD TYPE=CA
VISGRP GROUP LNCTL=CTCA,ISTATUS=ACTIVE,REPLYTO=25,MIH=YES
VISLN LINE ADDRESS=C30,MAXBFRU=16
VISPU1 PU PUTYPE=4,TGN=7

**FEP-4600 Connection to ACME1:**

VISBLD VBUILD TYPE=CA
VISGRP GROUP LNCTL=CTCA,ISTATUS=ACTIVE,REPLYTO=25,MIH=YES
VISLN LINE ADDRESS=A20,MAXBFRU=16
VISPU1 PU PUTYPE=4,TGN=12
VTAM PATH Table Definitions

PATH tables need to be modified to include a path to the new subarea represented by the FEP-4600

VTAM PATH Table Definitions for PROD3:
PATH0302  PATH DESTSA=02,ER0=(02,1),VR0=0
PATH0301  PATH DESTSA=01,ER0=(01,1),VR0=0
PATH0305  PATH DESTSA=05,ER0=(05,7),VR0=0

VTAM PATH Table Definitions for ACME1:
PATH1012  PATH DESTSA=12,ER0=(12,12),VR0=0

VTAM CDRM Major Node Definitions

The CDRM definitions need to be modified to remove any references to the foreign network and a CDRM definition representing the FEP-4600 should be added. Examples of the CDRM Major Node definitions are shown below.

CDRM Definitions for PROD3:
CDRMSA03  VBUILD TYPE=CDRM
PROD1    CDRM  SUBAREA=1,CDRDYN=YES,CDRSC=OPT
PROD2    CDRM  SUBAREA=2,CDRDYN=YES,CDRSC=OPT
PROD3    CDRM  SUBAREA=3,CDRDYN=YES,CDRSC=OPT
FEP5     CDRM  SUBAREA=5,CDRDYN=YES,CDRSC=OPT

CDRM Definitions for ACME1:
CDRMSA10  VBUILD TYPE=CDRM
ACME1    CDRM  SUBAREA=10,CDRDYN=YES,CDRSC=OPT
FEP12    CDRM  SUBAREA=12,CDRDYN=YES,CDRSC=OPT

VTAM CDRSC Major Node Definitions

CDRSC definitions may not be used. If they are however, no changes are required to make those definitions continue to be used with the FEP-4600.
Chapter 10. Replacing a Remote Front End

This function is only available on older FEP-4600 platforms and is not supported for new installations.

Remote front end replacements (one that normally requires remote loading and does not have a directly attached host) by the FEP-4600 are handled by replacing both the local front end and the remote front end with a pair of FEP-4600s clustered together. Through the clustered platforms, connections that were previously handled by the remote front end will appear much the same as a local connection from a FEP-4600. Refer to the diagrams below.
Through the clustering feature, all connections to the remote FEP-4600 are generated exactly the same as if they were connected directly to the ESCON attached FEP-4600. The FEP-4600 configuration takes care of the necessary routing of the traffic from the ESCON interface on the upstream side to the remote connections on the downstream side.

Reference the appropriate chapters within this document for how to gen PU2, PU4, and BSC definitions for the FEP-4600.

**Limitations of the Clustered Connection**

Clustered connections do not support dynamic connections from the LAN interfaces. This excludes the use of the XCA/Switched Major node definitions method on the host side. All LAN attached PU2 devices will require a local channel PU2 definition in the gen.

This also requires that each LAN attached device has a specific drop defined on the FEP-4600.
Chapter 11. Network Management

Differences

NetView Management Differences

Since the FEP-4600 does not contain a real SNA PU, there is currently nothing for NetView to communicate with directly in the FEP-4600 platform. SNA nodes that are remotely reachable through the FEP-4600 however can be contacted by NetView and managed in a fashion similar to what you are used to.

To view line status information for lines managed by the FEP-4600, you can use the browser interface of the FEP-4600 to display line status, and most any other type of status. Refer to the FEP-4600 Users Guide and Maintenance Manual for details on viewing status on the FEP-4600.

Line Trace Facility Differences

The FEP-4600 has its own Line Trace facilities for tracing, and retrieving data streams for diagnostic purposes, and does not interact directly with VTAM or NetView.

All network interfaces and protocols can be traced on the FEP-4600 and viewed or downloaded as needed as long as you are logged on as the administrator.

For detailed usage of the FEP-4600 Tracing facilities, refer to the FEP-4600 Users Guide and Maintenance Manual.
Chapter 12. Frequently Asked Questions

Q: Does the FEP-4600 run NCP?
A: No.

Q: How do you load a gen from VTAM into the FEP-4600?
A: You don’t. The FEP-4600 is independently configured using a web browser. The configuration is stored on the hard drive in the form of an INI file, and is automatically booted at IML time.

Q: How do I activate the FEP-4600?
A: Once the FEP-4600 is properly configured, it is self activating. Because the FEP-4600 uses gateway technology and spoofs VTAM(s) and remote front ends, it will automatically attempt to communicate once it has booted. You will still have to activate VTAM resources, such as the VTAM Major nodes for devices, and PU4 link stations that communicate through the FEP-4600. Most remote connections will simply self activate.

Q: Do I have to change my VTAM or NCP gens to support the FEP-4600?
A: Yes. Since the FEP-4600 does not run NCP, there is no NCP gen. PU4 connections are defined as channel-to-channel connections, not as an NCP. PU2 connections are defined as Switched Major Node definitions (requires an XCA definition). In some cases information that must be implicitly defined for NCP, may in fact be learned by the FEP-4600 ‘on the fly’. In many cases the VTAM gen is much simpler. Some resources such as PU 2 Switched definitions may be used ‘as is’.

Q: Is there a NetView interface in the FEP-4600?
A: No, not at this time. However, the platforms supported by the FEP-4600 over remote links will still work the same from a NetView perspective as before. The FEP-4600 passes the NMVT datastreams used by NetView to the attached products.

Q: Is the FEP-4600 a PU type 4?
A: No. The FEP-4600 is actually a gateway product. It supports PU 4 traffic through it, and does terminate certain PU4 connections within it, but does not function as a PU 4 itself. As a gateway product, the FEP-4600 brings itself up automatically at boot time, and does not require activation by VTAM. It appears to VTAM as if it were an adjacent VTAM. Links to and through the FEP-4600 will typically require an operator to initiate similar to other CTC connections. The FEP-4600 handles PU 4 datastreams and responds to CDRM requests, appearing to the external world to have a CDRM within it.
Chapter 12. Frequently Asked Questions

Q: Can I bring up or take down lines from VTAM or NetView?
A: No. The browser interface allows you to bring lines up and take them down as needed. If you desire to affect a line from VTAM, then define a separate VTAM Major Node that includes all of the devices on that line. By taking the VTAM Major Node up and down you are effectively taking the line up and down.

Q: How do I know the status of the FEP-4600 or the connections through it?
A: The browser interface allows you to maintain a console interface which provides real time line status information using easy to see red, green, yellow status indicators to inform you what the current status of the network is through the FEP-4600. You will still get VTAM and NetView console messages for the platforms attached to the FEP-4600 to alert you to when communication is broken. You can configure the screen refresh rate for the status panels (default is 5 seconds).

Q: How many serial lines does the FEP-4600 support?
A: Older FEP-4600 platforms support 5 PCI-X card slots which may be populated with ESCON, Token Ring, Quad Ethernet, Quad Serial BSC, and the Quad Serial SDLC card. Newer FEP-4600 platforms support 4 PCI-X card slots and a PCI-Express card slot (for FICON). Serial lines can be supported 4 lines to a slot. Two Ethernet interfaces are supported in the base platform and do not take up a slot. Depending on your selection of interfaces determines the maximum number of serial lines supported. For example, a platform that requires ESCON and 2 Ethernet interfaces, could support up to 12 serial lines. A similar platform that uses FICON in place of ESCON could support up to 16 lines.

Q: When FEP-4600 platforms are clustered together, does each unit work as a separate unit?
A: The answer is both Yes and No. You can configure the multiple platforms as a single entity, with an upstream ESCON connection on one platform and the serial lines that it is driving on a different platform. Individual platforms can fail, obviously disrupting the traffic that would normally pass through it, but the remaining platforms can still function, less the resources that were lost in the failed platform.

Q: Must the clustered FEP-4600 platforms be located at the same site?
A: No. The clustered FEP-4600 platforms can be placed at multiple locations, provided that there is ample bandwidth for them to communicate through.

Q: Are you restricted to a single management console?
A: No. The FEP-4600 supports multiple web based consoles. Since the FEP-4600 supports multiple consoles, you can split up management of the FEP-4600 complex any way that you see fit.
Q: How secure is the FEP-4600 interface if I can use a browser to access it?
A: The security is determined by what you feel comfortable with. The web interface itself is a secure encrypted connection (HTTPS). This means that the communication is encrypted between the browser on your desktop and the FEP-4600 platform. Administrative functions require a password to access. You can isolate the entire management LAN if needed to provide the ultimate in security, or you can provide access to the corporate LAN or even the Internet. You can also attach a monitor, keyboard and mouse directly to the FEP-4600 to provide the ultimately secure console function.

Q: Does the FEP-4600 allow you to remote load a remote NCP?
A: No.

Q: What is involved with upgrading the software of a FEP-4600?
A: There are four methods offered for updating the software on a FEP-4600. These include using FTP to retrieve code from the 1) Visara site or 2) a local FTP site, 3) downloading code from a CD, or 4) from a travel drive through a USB port. Software upgrades automatically create a 'system restore point' to fall back to in case the upgrade does not provide the desired results. After the software has been installed the platform performs a restart operation automatically. The entire procedure can be accomplished in just a few minutes.

Q: What is a 'system restore point'?
A: The 'system restore point' is a means to gather the existing code and configuration together and create a snapshot of the system that you can restore to at a later time, in the case that you make changes to the code or the configuration that you are not satisfied with. Creation of a system restore point, or restoring the system typically takes less than a minute. Restore points are automatically created when software levels are changed, and can also be manually initiated at any time.

Q: Does the FEP-4600 support X.25?
A: No. Not at this time.

Q: How will implementing the FEP-4600 on my SNA network affect other SNA networks that I am connected to through SNI connections?
A: In most cases, the change is completely transparent to the remote network. There is normally no need to make any gen changes in the remote network. The one thing that requires a change is if Multi-link Transmission Groups are in use. The FEP-4600 does not support Multi-link Transmission Groups currently.

Q: Does the FEP-4600 support SNMP?
A: Yes it does, in a limited fashion. At this time the FEP-4600 functions as a MIB2 agent only for SNMP. Activities are limited to GETs and GET NEXT functions. No TRAPs are supported at this time.
Chapter 12. Frequently Asked Questions

Q: Does the FEP-4600 support multilink transmission groups?
A: No not at this time. The FEP-4600 does support parallel transmission groups however, allowing for redundancy of connections. The abundance of higher links supported by the FEP-4600, along with parallel transmission groups can often provide a credible alternative to multilink transmission groups. Of course defining a single link to interact with the multilink group on the other side does not really require a gen change on the other side, it will just appear that all but one link is inactive.

Q: If my 3745 currently supports a multilink transmission group for an SNI link, doesn’t that mean that I will need to require my SNI partner to change their gen to support the FEP-4600?
A: Yes, you would require a change to migrate away from the multilink transmission group.

Q: Does the FEP-4600 support NTuneMON?
A: No.

Q: Does the FEP-4600 support IBM’s Enterprise Extender?
A: No. However, using the FEP-4600 allows you to connect over IP without having to implement Enterprise Extender. The FEP-4600 offers a SNA over IP feature that allows a FEP-4600 to communicate to another FEP-4600 on another network using a secure IP connection between them. The traffic that flows is still SNA/SNI traffic but without the need for APPN, Enterprise Extender, or DLSw routers.

Q: Does the FEP-4600 communicate to IBM’s Communication Controller for Linux?
A: Yes. CCL appears the same as a 3745 to the FEP-4600 and is treated as such.

Q: Does the FEP-4600 communicate PU4 to a Cisco router?
A: Yes. Straight PU4 connections and single-sided SNI communications (where the FEP-4600 is performing the SNI function) can be supported.

Q: Can I use my existing PU2 Switched Major Node definitions that I am using for my 3745 to support Token Ring clients with?
A: Yes. The FEP-4600 supports an XCA definition for the channel that will provide access to those same Switched Major Node definitions.

Q: Can I use the FEP-4600 to provide TPF to VTAM communications?
A: Yes.

Q: Does the FEP-4600 support DLSw connections for PU4/SNI traffic to remote customer sites?
A: Yes. Like a 3745, it requires that an external DLSw router provide the DLSw encapsulation function.
Q: Does the FEP-4600 support DLSw connections for PU2 traffic to remote sites?
A: Yes. The FEP-4600 offers two different options. Like a 3745, you can have an external DLSw router providing the encapsulation function. The FEP-4600 can also provide the DLSw function internally providing IP-only traffic through an Ethernet port to tie directly into your IP network.

Q: What all types of remote connections are supported through the FEP-4600’s XCA interface (allowing Switched PU definitions to be used)?
A: The FEP-4600 supports XCA connectivity to PU2.0 and PU2.1 devices attached through Token Ring, Ethernet, and SDLC interfaces.

Q: Does the FEP-4600 support EMIF to allow multiple LPARs to share a single CHPID?
A: Yes and no. EMIF is supported completely for PU2 traffic, but not for PU4 traffic. Although you can configure PU4 connections through shared CHPIDs, you will likely run into intermittent problems. Using ESCON directors you can direct traffic from multiple CHPIDs through a single ESCON connection to a FEP-4600 with success.

Q: Does the FEP-4600 support FICON connections?
A: Yes

Q: What does the FEP-4600 look like to my host through a FICON link to support PU4 connections?
A: The FEP-4600 looks like a channel-to-channel connection (TYPE=FCTC).

Q: Can the FEP-4600 provide channel-to-channel connections between an ESCON channel and a FICON channel?
A: Yes. Both same VTAM network and SNI connections can be supported this way.