

Vanguard Managed Solutions

Vanguard Legacy Documentation
X.32 and Central Network
User Identification (CNUI)

Notice

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This document contains legacy protocol feature documentation that appeared in early releases of Vanguard Applications Ware, formerly known as Network Access Products Operating Network Software (ONS). This information does not appear in the current Vanguard Documentation Set; it is included as a reference source only.

Caution!

These features were originally developed for connection to a NORTEL backbone. The possibility exists that changes have been made to the X.32 Component of the Vanguard Applications Ware, in its current release.

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Vanguard Legacy Protocol Documentation

Overview

Introduction

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Related Documentation

If you need additional information, please refer to these Vanguard manuals:

- *Vanguard Configuration Basics Manual* (Part Number T0113)
 - *X.25 Configuration Basics Guide* (Part Number T0107)
 - *Configuration for APAD/ATPAD* (Part Number T0110)
-

X.32 Service

Introduction

The X.32 service supports multiple logical channels on a dial connection. You can configure a maximum number of simultaneous port SVCs; the service provides a timer to break the dial connection after all SVCs are cleared.

Addition of X.32 service permits a switched access path through a PSTN that provides an X.25 user's DTE with access to a 6500^{PLUS} network. A new X.32 access port type has been added to the 65xx, in accordance with the X.32 communications protocol.

Note

This feature was introduced into Release 4.35 of Network Access Products Operating Network Software (ONS).

Before You Begin: Configure Key X.25 Port Parameters

Before the NORTEL feature enhancements can operate, you must configure three critical parameters in the X.25 Port Record:

- Packet Sequence Counting
- Facilities to Bar in Outbound Calls
- X.25 Options

Figure 1 describes the X.25 Port Record parameters that must be configured to allow NORTEL feature enhancements to operate.

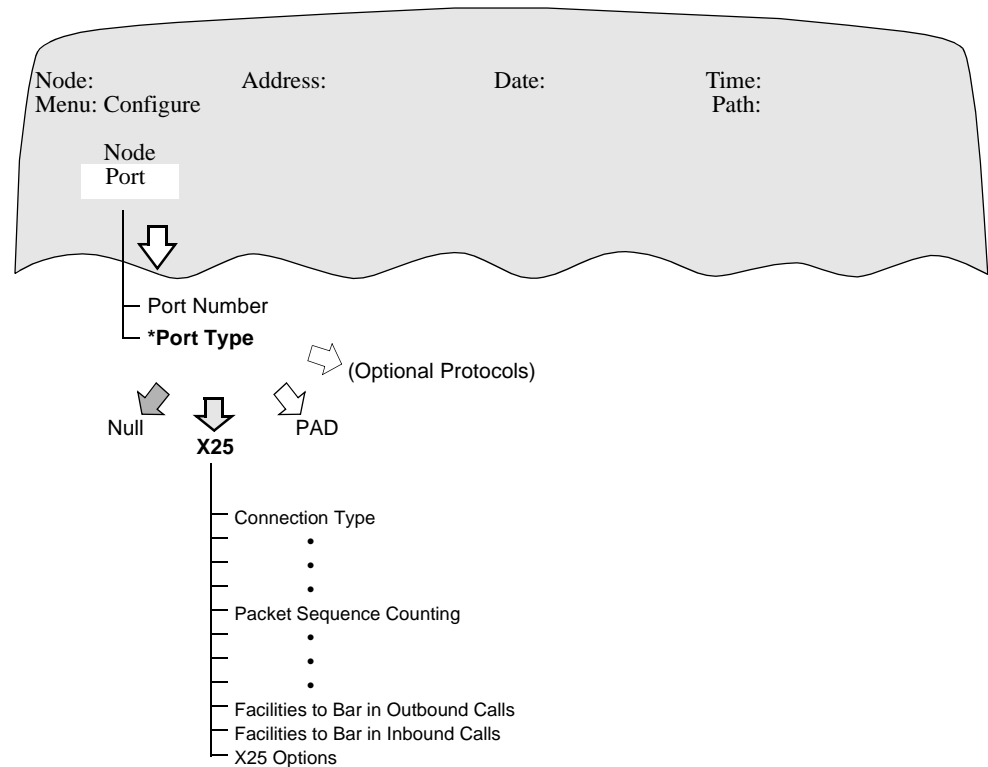


Figure 1. Critical X.25 Port Parameters for NORTEL Compatibility

**Port Record
Configuration**

Use the following procedure to configure an X.25 Port Record

Step	Action	Result
1	From the Configure menu, select Port.	The Port Type prompt appears.
2	Enter X.25.	The first parameter of the X.25 Port Record appears.
3	Configure these parameters: <ul style="list-style-type: none">• Packet Sequence Counting = EXT• Facilities to Bar in Outbound Calls = Any option except FAST• X.25 Options = CAUSE+NP	

X.32 Feature

What is X.32?

X.32 service is a switched access path through a PSTN that provides an X.25 user's DTE with access to a 6500^{PLUS} network:

- An X.25 DTE can *dial in* to an X.32 port
- A DTE can *dial out* to an X.25 DTE through an X.32 port

X.32 service supports multiple logical channels on a dial connection. You can configure a maximum number of simultaneous port SVCs; the service provides a timer to break the dial connection after all SVCs are cleared.

New Port Type

The X.32 access port type:

- Uses the V.25bis CCITT automatic dialing/answering protocol. It supports V.22bis (2400/1200 bps) and V.32 (9600/4800 bps) modems that support V.25bis commands
- Provides full-duplex operation at standard clock rates from 1200 to 80,000 bps.

How Dialing in Works

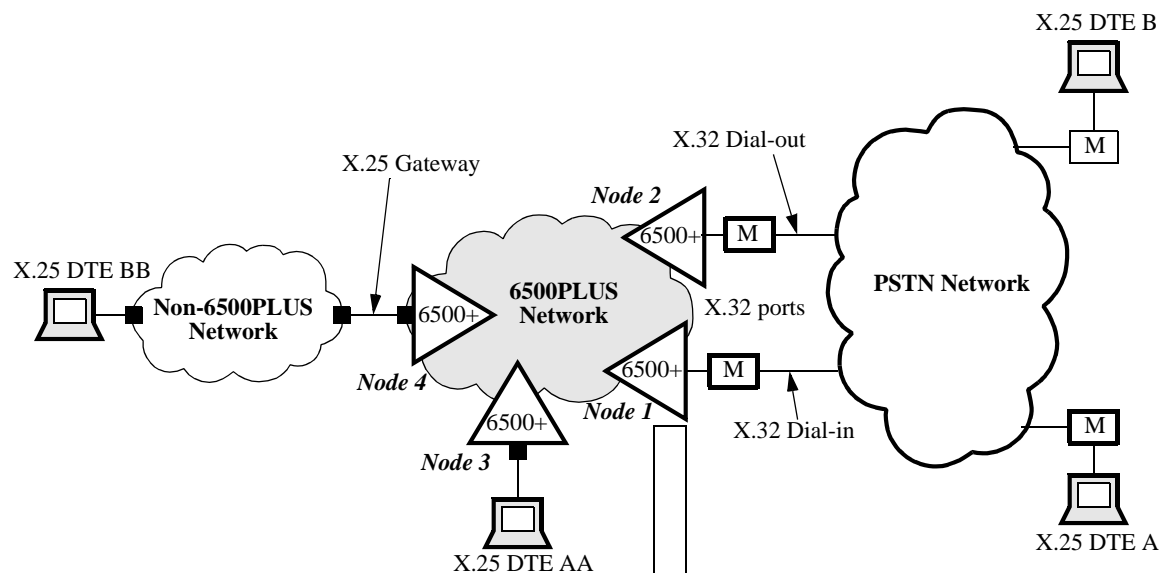
This is how dialing in works:

Step	Stage
1	The X.32 service functions as shown in Figure 2, where DTE A establishes an X.25 SVC with DTE AA .
2	DTE A uses dial modem M to connect over the PSTN to a dial-in X.32 port. It uses an X.25 Call Request for an SVC to DTE AA .
3	DTE A uses an X.25 Call Request for an SVC to DTE AA .

How Dialing Out Works

This is how dialing out works.

Step	Stage
1	Figure 2 shows DTE BB using X.32 dial-out to establish an X.25 SVC with DTE B .
2	DTE BB puts B 's phone-number in an X.25 Call Request.
3	The request enters the 6500 ^{PLUS} network by an X.25 Gateway link.
4	The request is routed to a dial-out X.32 port, which connects by a modem over the PSTN to DTE B .
5	BB uses the X.25 Call Request to establish an SVC.



Node Record	
Node Name	.
.	.
.	.
Traffic Priority Step	.
.	.
Primary NUIC Data Network Address	12345
Secondary NUIC Data Network Address	(blank)
Billing Printer2 Mnemonic	.
E.164 Format Identifier	.
DORM Subaddress	180
Other DORM Address	180
Number of X.32 Ports	4

DORA Record	
DORA Subaddress	88
Primary DORM DNA	20090
Secondary DORM DNA	30091
Dial-Out Process Timer	100
PSTN Call Identifier	09
Number of digits to drop	2
PSTN Prefix	011
Area Code	011
Access Code	.

X.32 Port Record	
Clock Source	EXT
Clock Speed	9600
Number of SVC Channels	16
Starting SVC Channel Number	1
Initial Frame	SABM
T1 Transmission Retry Timer	30
N2 Transmission Tries	10
k Frame Window	7
Packet Sequence Counting	NORM
W Packet Window	2
P Packet Size	128
Maximum Negotiated Packet Size	1024
Data Queue Upper Threshold	5
Data Queue Lower Threshold	0
Restart Timer	180
Reset Timer	180
Clear Timer	180
Facilities to Delete from Outbound Calls	NONE
Facilities to Add to Outbound Calls	NONE
Facilities to Bar in Outbound Calls	NONE
Facilities to Bar in Inbound Calls	NONE
X.32 Options	CNUI
Port Address	[blank]
Facility Subscription Control	NONE
Billing Records	ON
Switched Access Mode	DIAL-IN
Ignore Local Address	NO
Call Threshold	0
Unsuccessful Call Threshold	0
T14 Disconnect Timer (T14)	100
Charging Information Subscription Control	NO
NUI Verification Timer	60 sec
Max. NUI Violations	10
Action Type for NUI Violations	NONE

Note: Each Access and Gateway node must be configured with a Dial-Out Routing Agent (DORA). One or two central, intermediate nodes must be configured with Dial-Out Routing Managers (DORMs).

Figure 2. X.32 Dial-In and Dial-Out Service Configuration Example

Advantages of X.32 Service

X.32 service offers the following features:

- Access for X.25 users through a PSTN; X.32 dial-out allows a user connected to an X.25 or APAD port to establish a connection just by specifying a destination X.25 telephone number
- Multiple logical channels (switched virtual circuits, or SVCs) on dial connections
- Configurable DTE thresholds to limit dial-ins; when a threshold is reached, the switched access path is disconnected
- A disconnect timer to limit the length of a dial connection that does not have an active X.25 SVC; when the timer expires, the switched access path is disconnected
- Network User Identifier (NUI) validation information in billing records

Sample Applications

These are some typical X.32 applications:

- Dial-in: An X.25 user's location is somewhat distant from the nearest NORTEL backbone access point. Traffic requirements are such that a leased line to a NORTEL backbone would be expensive. This uses X.32 dial-in to access the backbone's X.25 services.
- Dial-out: An X.25 user (A, in Figure 2) does not have leased-line access to a NORTEL backbone. To communicate with the X.25 user, an X.25 DTE or APAD user, B, puts A's phone number in an X.25 dial-out Call Request. The network dials and makes the connection.

Limitations

X.32 service does not support the following packet-level subscription-time facilities:

- Reverse Charging
- Bilateral Closed User Group
- Fast Select
- PVC

X.32 service:

- Can support up to two Dial-Out Routing Managers
 - Identifies DCEs only through the NUI facility, on a per-call basis
 - Provides a subset of the services specified in CCITT Recommendation X.32
-

X.32 Feature Configuration

Introduction

These sections describe how to configure the X.32 feature on a node.

X.32 Service Configuration Sequence

This section provides an overview of the steps for configuring an X.32 port. The procedures are described in detail in the following sections.

- Ensure that you have X.32 Dial-In Dial-in port telephone number(s) and characteristics.
- Ensure that you have the X.32 Call Request NUI/password combination.
- Configure the X.32 Dial-Out Routing Manager (DORM) parameters in the Node Record.
- Configure the X.32 Dial-Out Routing Agent (DORA) Record.
- Configure the X.32 Port Record.

Dial-Out Routing Manager Parameters in the Node Record

This section describes the Node Record parameters for configuring a network Dial-Out Routing Manager (DORM). There may be up to two managers on the network.

DORM Subaddress

Range:	0 to 3 decimal digits
Default:	91
Description:	<p>Specifies this node's dial-out routing manager subaddress. If there are two DORMs:</p> <ul style="list-style-type: none"> • Enter the higher-number address in this parameter • DORM subaddresses must have the same number of digits • The subaddress (equal to the current subaddress + 1) is reserved for internal use

Other DORM Subaddress

Range:	0 to 15 decimal digits
Default:	(Blank)
Description:	<p>Specifies the destination network address of a second Dial-Out Routing Manager subaddress if a second DORM exists in the network.</p>

Number of X.32 Ports

Range:	1 to 1024
Default:	50
Description:	Specifies the maximum number of X.32 ports in the network that may be configured for dial-out. Requires that Switched Access Mode is set to one of the Dial-Out options.

Configuring the Dial-Out Routing Manager

Configure the following DORM parameters in the Node Record as follows. The values here are shown for the example in Figure 2. Values for your specific network may vary.

Step	Action	Result
1	From the Configure menu, select the Node record.	The Node Record appears.
2	Configure these parameters: <ul style="list-style-type: none"> • DORM Subaddress = 90 • Other DORM Subaddress = 30091 • Number of X.32 Ports = 4 	

Dial-Out Routing Agent Record Parameters

This section describes the parameters in the Dial-Out Routing Agent Record shown in Figure 2, which are needed for configuring a network Dial-Out Routing Agent (DORA). Configure one DORA Record on each node that has an X.32 port.

DORA Subaddress

Range:	0 to 3 decimal digits
Default:	90
Description:	This node's Dial-Out Routing Agent subaddress.

Primary DORM DNA

Range:	0 to 15 decimal digits
Default:	(Blank)
Description:	Primary Dial-Out Routing Manager Destination Network Address (DNA).

Secondary DORM DNA

Range:	0 to 15
Default:	(Blank)
Description:	Secondary Dial-Out Routing Manager Destination Network Address.

Dial-Out Process Timer

Range:	50 to 255 sec
Default:	100
Description:	Time that DORA allows to process a dial-out request. If this timer expires, the call is cleared.

PSTN Call Identifier

Range:	0 to 10 decimal digits
Default:	(Blank)
Description:	Used to determine whether the called address is for a dial-out request in the local network region.

Number of Digits to Drop

Range:	0 to 5
Default:	(Blank)
Description:	Number of digits to drop from the number to be dialed.

PSTN Prefix

Range:	0 to 10
Default:	(Blank)
Description:	The node's location.

Area Code

Range:	0 to 7
Default:	(Blank)
Description:	The node's PSTN region code.

Access Code

Range:	0 to 3
Default:	(Blank)
Description:	

Configuring a DORA Record

Configure a DORA Record as follows. The values here are shown in the example in Figure 2.

Step	Action	Result
1	From the Configure menu, select DORA Record.	The Dial-Out Routing Agent Record appears.
2	Configure these parameters: <ul style="list-style-type: none"> • DORA Subaddress = 88 • Primary DORM DNA = 20090 • Secondary DORM DNA = 30091 • Dial-Out Process Timer100 • PSTN Call Identifier = 09 • Number of digits to drop = 2 • PSTN Prefix = 11 • Area Code = 11 • Access Code = <blank> 	

X.32 Port Record Parameters

This section describes the critical parameters in the new X.32 Port Record.

X.32 Options

Range:	IBAR, OBAR, CNUI, CINFO
Default:	CNUI
Description:	<ul style="list-style-type: none"> • IBAR: unavailable on dial-in only ports. • OBAR: unavailable on dial-out only ports. • CNUI: enables NUI verification against an external database. Supersedes the NUI option. • CINFO: enables X.25 charging information by facility request for the port.

Port Address

Range:	0 to 15 decimal digits
Default:	(Blank)
Description:	Specifies the port's data network address. Required.

***Switched Access Mode**

Range:	DIAL_IN, DIAL_OUT
Default:	DIAL_IN
Description:	<ul style="list-style-type: none"> • DIAL_IN: Limits port to dial-in. • DIAL_OUT: Limits port to dial-out. • DIAL_IN + DIAL_OUT: Port can be used for both dial-in and dial-out. <p>■ Note A maximum of 32 X.32 ports can be configured for dial-out.</p> <p>■ Note You must perform a Node boot for changes to this parameter to take effect.</p>

Ignore Local Address

Range:	YES, NO
Default:	NO
Description:	<ul style="list-style-type: none"> • NO: Entering X.25 Call Request packets' calling address is verified against the configured Port Address • YES: Calling address is not verified.

Charging Information Subscription Control

Range:	YES, NO
Default:	NO
Description:	<p>Specifies whether charging information is sent without being requested.</p> <ul style="list-style-type: none"> • NO: Charging Information is not sent. • YES: Charging Information is sent.

NUI Verification Timer

Range:	5 to 180 sec
Default:	60 sec
Description:	Specifies the maximum time within which an NUI verification request must complete; if the timer expires, the request is cancelled and the call cleared.

Max. NUI Violations

Range:	0 to 100
Default:	10
Description:	The number of NUI verification failures allowed for the port as a whole.

Action Type for NUI Violations

Range:	NONE, DISC, DEGR
Default:	NONE
Description:	<ul style="list-style-type: none"> • NONE: No action is taken • DISC: SVCs on the port are cleared; the PSTN line is disconnected; the port is then available for connection. • DEGR: The port is busied-out for one minute; then SVCs can be initiated.

**Configuring X.32
Port Record
Parameters**

This section describes critical X.32 Port Record parameters needed for configuring a node with X.32 service.

Step	Action	Result
1	From the Configure menu, select Port.	The Port Type prompt appears.
2	Enter X.32.	The first parameter of the X.32 Port Record appears.
3	Configure these parameters: <ul style="list-style-type: none">• X.32 Options = CNUI• Port Address = <blank>• Switched Access Mode = DIAL_IN• Ignore Local Address = NO• Charging Information Subscription Control = NO• NUI verification timer = 60 sec• Max. NUI violations = 10 sec• Action type for NUI violations = NONE	

Centralized Network User Identifier (NUI) Validation

Introduction

Network User Identifier (NUI) validation allows a 6500^{PLUS} network to verify NUIs with an Off-Network NUI Database Server. With NUI validation, you can protect your network with enhanced user ID security.

■ Note

This feature was introduced into Release 4.35 of Network Access Products Operating Network Software (ONS).

What Is It?

Centralized Network User Identifier (NUI) validation enables a network to verify NUIs with an Off-Network NUI Database Server. This function uses an X.25 link to an access port in the NORTEL network to communicate with the database.

You must use PAD commands to manage the validation function.

How It Works

When the network receives calls originating from X.25, X.28, or X.32 DTEs, it transmits NUI/password combinations to an NUI concentrator in one of its nodes. The concentrator has an access port to the data public network. The concentrator uses the access port's validation capability to analyze and validate NUI/password combinations. It returns results to the node.

The NUI validation feature operates when the calling and called DTEs are located in the network, the data public network, or both. See Figure 3.

NUI validation functions generate reports and status data; these topics are covered later in this document.

Advantages of NUI Validation

With this feature, a network connecting to any data public network can use one NUI validation mechanism. This avoids maintaining a separate NUI database for the network.

Requirements

Each node that uses NUI validation must have an NUI concentrator interface (NCI), which handles communication with the NUI concentrator (NUIC).

Two NUICs per network, in discrete nodes, are recommended: one primary, and one secondary. Plan NUIC locations carefully to avoid congestion resulting from NCI-NUIC communication.

Because a NUIC uses an X.25 link, you configure, in each direction, a number of X.25 logical channels equal to the number of concurrent NUI validations expected.

In network topologies with a *single* X.25 Gateway link between the 6500^{PLUS} network and the data public network, the link carries both user and verification traffic. The data public network switch must be configured for no NUI verification or for optional NUI verification (in which Call Requests that have a NUI/password combination are accepted or cleared according to their validity, but Call Requests without this data are always accepted).

In network topologies with optional, *multiple* X.25 Gateway links, one link must be dedicated to verification and the other(s) carry user traffic. (Refer to Figure 3.) Such dedicated gateways must verify *all* inbound calls' NUI/password combinations. (Inbound calls that lack this data are not accepted.)

Plan your configuration carefully according to this usage.

NUI Validation Configuration Example

Introduction

Figure 3 shows the centralized NUI validation feature and default parameter settings.

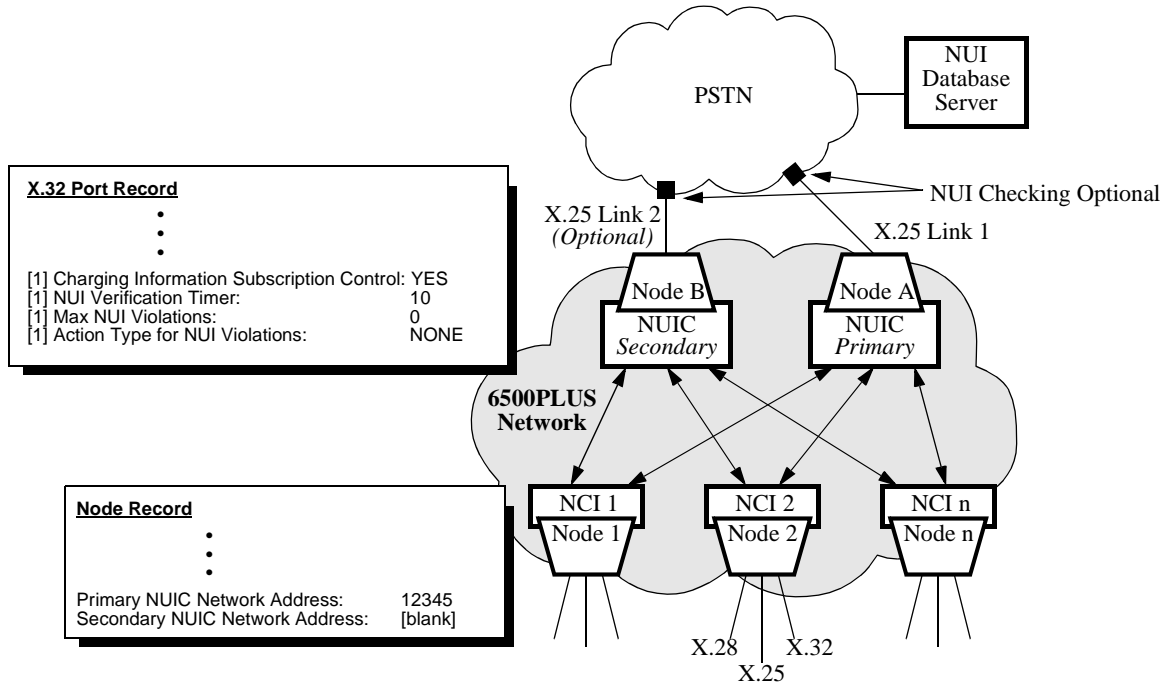


Figure 3. Centralized NUI Validation

Centralized NUI Validation Process

The NUI validation process works as follows.

Step	Stage
1	NUI/password combinations in incoming call requests from an X.25, X.28, or X.32 user in a 6500 ^{PLUS} node network go from the NCI module, by a fast-select call, to a NUIC.
2	The NUIC puts the NUI/password combination in a call on the X.25 link to the data public network, addressed to the Host NUI database.
3	The Outbound Call Translation Table converts the Called Address to the NUIC Address, so that, after validation, the call is routed back to the NUIC.
4	The data public network port validates the NUI/Password combination with the NUI Database server. If the combination is: <ul style="list-style-type: none"> • <i>Valid</i>, the server forwards the call to the NUIC, which clears the call with a DTE Cause/Diagnostic Pass code • <i>Invalid</i>, the server forwards the call to the NUIC, which clears the call with a DCE Cause/Diagnostic Fail code

Centralized Network User Identifier (NUI) Validation

Step	Stage (continued)
5	The NUIC forwards the code to the originating NCI, which: <ul style="list-style-type: none">• For X.25/X.32 users, accepts if the combination is valid; otherwise clears the call with proper Cause/Diagnostic Code.• For X.28 users, sends the appropriate Pass or Fail message
6	Once validation is passed, calls going from the 6500 ^{PLUS} network to the data public network are routed by an X.25 link with NUI validation disabled, to prevent duplicate NUI validation.

Centralized NUI Validation Configuration

Introduction

The following sections describe how to configure NUI validation.

Pre-configuration Requirements

Ensure that the following requirements are met before configuring the Centralized Network User Identifier Validation feature.

- For the Network User (NUI) Validation feature to work correctly, at least one X.25 port in the 6500^{PLUS} X.25 network must connect to a NORTEL backbone network.
- The backbone network's X.25 port connecting to the 6500^{PLUS} X.25 port must be capable of NUI validation in call packets.

Requirements

Ensure that the following requirements are met; then set parameters as shown in Figure 3.

The following requirements refer to the DPN-100 port on the X.25 Gateway link, which connects the data public network and the 6500^{PLUS} network.

For Single-Gateway Configuration:	
DTE Originated Cause parameter, DPN-100 Port Record	This parameter must be disabled for the NUI validation feature to operate correctly.
NUI Verification Timer parameter, X.32 Port Record	The validation request from NCI to NUIC must be handled within the timeout period of an X.25 Call Request (maximum 180 seconds). If the NUIC does not respond to a request within this parameter's time limit, NCI clears the call.
X.25 channel	At least one X.25 channel on the port must be reserved from NUI validation.
For Multiple-Gateway Configuration:	
DTE Originated Cause parameter, DPN-100 Port Record	This parameter must be disabled for the NUI validation feature to operate correctly.

Configuration

This section provides an overview of the steps in configuring centralized NUI validation. The procedures are described in detail in the following sections.

Step	Action
1	Configure the NUI Concentrator (NUIC) at the nodes that connect to the data public network.
2	Configure an X.25 Gateway port for NUIC. Optionally, configure the CNGL option on it.
3	Configure the Route Selection Table for NUIC.
4	Configure the Outbound Call Translation Table for NUIC.
5	Configure the NUI Concentrator Interface (NCI) at all the access nodes.
6	Configure X.25, X.32, and PAD ports for NUI validation.

Centralized NUI Validation Configuration Example

Introduction

Figure 3 shows centralized NUI validation parameters and default values (which display on Page 3 of the X.25 Port Record).

NUIC Configuration

This section describes parameters needed for configuring centralized NUI validation, as shown in the example in Figure 3. Values will vary for your network.

Step	Action	Result
1	From the Configure menu, select the Network NUIC Record.	The Network NUIC Record appears.
2	Configure these parameters: <ul style="list-style-type: none"> • NUIC Address = 55555 • Host NUI Database Address = 67890 • NUI Database verification timer = 100 • Max. Number of Queued NCI Requests = 250 • Max. Number of concurrent NUI Database Requests = 20 	

Configuring an X.25 Gateway Port for a NUIC

Use the following procedure to configure the X.25 gateway port for an NUI Concentrator.

Step	Action	Result
1	From the Configure menu, select Port.	The Port Type prompt appears.
2	Enter X.25.	The first parameter of the X.25 Port Record appears.
3	Configure this parameter: <ul style="list-style-type: none"> • X.25 Option = [at least] CAUSE 	

Configuring the Route Selection Table NUIC

Use the following procedure to configure the Route Selection Table for an NUI Concentrator.

Step	Action	Result
1	From the Configure menu, select Configure Network Services.	The Network Services prompt appears
2	Select Route Selection Table.	The Route Selection Table appears.
3	Configure these parameters: <ul style="list-style-type: none"> • Entry Number = 10 • Address = 67890 • Destination = X25-3 • Entry Number = 11 • Address = 12345 • Destination = NUIC-NCI • Entry Number = 12 • Address = 55555 • Destination = NUIC-VER 	

Configuring the Outbound Call Translation Table

Use the following procedure to configure the Outbound Call Translation Table for an NUI Concentrator.

Step	Action	Result
1	From the Configure menu, select Outbound Call Translation Table.	The Outbound Call Translation Table appears.
2	Configure these parameters: <ul style="list-style-type: none"> • Entry Number = 5 • Private Network Address = 67890 • Outbound Network Address = 55555 • Options = NONE 	

Centralized Network User Identifier (NUI) Validation

Configuring the NUI Concentrator Interface

Use the following procedure to configure the NUI Concentrator Interface.

Step	Action	Result
1	From the Configure menu, select the Node record.	The Node record appears.
2	Configure these parameters: <ul style="list-style-type: none">• Primary NUIC Network Address = 12345• Secondary NUIC Network Address = <blank>	

Configuring X.25, X.32, and PAD Ports

Use the following procedure to configure the X.25, X.32, and PAD Ports.

Step	Action	Result
1	From the Configure menu, select X.25/X.32/PAD Port record.	The X.25/X.32/PAD Port record appears.
2	Configure these parameters: <ul style="list-style-type: none">• NUI Verification Timer = 100• Max. NUI Violations: = 5• Action Type for NUI Violations: = NONE	
