

U.S. Department of  
Homeland Security



IT "C" School

United States  
Coast Guard

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## Unit 4 - Basic Alternate Route Selection (BARS)

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*BARS and NARS Overview – Standard Telephone Numbers – Trunk Types and  
Dialing Requirements – Customer Numbering Plan – BARS Call Flow – BARS  
Overlays – Intercept Treatment – Authorization Codes – Coordinated Dialing Plan*

STUDENT GUIDE



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**Creation Date:** April 01, 2009

**Revision Date:** March 01, 2011

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**Notice to Students**

Purpose: This course will provide training on Nortel CS1000E installation, programming, troubleshooting and maintenance. The graduate of this course will possess the skills necessary to install and maintain a CallPilot Voice Processing System.

**IMPORTANT NOTE:** This text has been compiled for TRAINING ONLY. It should NOT be used in place of official directives or publications. The text information is current according to the references listed.

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# LESSON 1

## STANDARD TELEPHONE NUMBERS

### Overview

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#### Overview

In this lesson you will be introduced to the purpose of BARS/NARS. Next, the lesson continues with an introduction to standard telephone numbers. Telephone numbers are coded to direct calls around the world. This lesson discusses the basic components that make up telephone numbers.

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#### Performance Objectives

Upon successful completion of this lesson, you will be able to:

- 4.1 **IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.
    - 4.1.1 **REVIEW** manufacturer's documentation
    - 4.1.2 **REVIEW** applicable security policies
    - 4.1.3 **DETERMINE** customer configuration
    - 4.1.4 **PROGRAM** an Electronic Switched Network (ESN) Data Block
    - 4.1.5 **PROGRAM** a Network Control (NCTL) Data Block
    - 4.1.6 **PROGRAM** a Digit Manipulation (DGT) Data Block
    - 4.1.7 **PROGRAM** a Free Calling Area Screening (FCAS) Data Block
    - 4.1.8 **PROGRAM** a Route List Block (RLB)
    - 4.1.9 **PROGRAM** a Numbering Plan Area (NPA) Data Block
    - 4.1.10 **PROGRAM** a Central Office Translation Code (NXX) Data Block
    - 4.1.11 **PROGRAM** a Special Number Translation Code (SPN) Data Block
    - 4.1.12 **PERFORM** function check
    - 4.1.13 **COMPLETE** unit documentation
- 

#### Performance Evaluations

The performance evaluations for these tasks are scheduled immediately following this lesson. These performance evaluations will be in delivered via a work order. These work orders will test the performance objective you have just completed in this lesson. These work orders will build in complexity based on previous tasks from previous lessons. These performance evaluations will be in a separate workbook from your student guide. Your instructor will hand out these workbooks out in class. Please do not complete these work orders prior to the instructor assigning them to you. You will work in your booth with your partner as a class. Your instructor will sign off these performance evaluations as you complete each tasks.

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## Overview, continued

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### References

Northern Telecom Publications (NTPs) is the documentation for the CS1000E system. These publications provide reference tools and information that is related to the various features and options of the system.

Document	Document #
<i>Communication Server 1000E Maintenance</i>	NN43041-700
<i>Communication Server 1000 Software Input Output Administration</i>	NN43001-611
<i>Communication Server 1000 Software Input Output Reference - System Messages</i>	NN43001-712
<i>Communication Server 1000 Software Input Output Reference - Maintenance</i>	NN43001-711

### Tools and Equipment

The tools and equipment used for this lesson are:

- Operational Nortel CS1000E

### Job Aids

There are no job aids for this lesson.

### Handouts

There are no handouts for this lesson.

### Key Terms

Review the following key terms before you begin the reading assignment:

Terms	Definition
Access Code	A number dialed by a station within the telephone system to gain access to features and trunk facilities.
Attendant Console	The attendant console is a larger, specialized multi-line telephone set that can access all incoming and outgoing trunks, and route calls for a customer. The operator or attendant uses the attendant console to answer incoming calls and send those calls to the proper extension.
<b>Authorization Code</b>	The authorization code feature lets a user temporarily override the access restrictions assigned to a station or trunk because of the assigned Network Class of Service (NCOS), Class of Service (CLS), and Trunk Group Access Restriction (TGAR) codes.
Basic Alternate Route Selection (BARS)	BARS routes outgoing calls over the most cost-effective trunk facility available at the time.
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## Overview, continued

### Key Terms, contd.

Term	Definition
Class of Service (CLS)	The Class of Service (CLS) restrictions assigned to telephones and TIE trunks control the degree of access to and from external networks and system features. Class of service restrictions are listed from most restricted to least restricted: Fully Restricted class 2 (FR2), Fully Restricted class 1 (FR1), Fully Restricted (FRE), Semi-Restricted (SRE), Toll Denied (TLD), Conditionally Toll Denied (CTD), Conditionally Unrestricted (CUN), and Unrestricted (UNR).
<b>Digit Manipulation Index (DMI)</b>	A data structure identifying digit deletion and/or insertion that must be performed before a call can be outpulsed.
<b>Digit Translation</b>	Digit translation is the process within BARS software that identifies the NPA, NXX, SPN, or HNPA dialed by the station user and determines which route list to route the call over. Overlay 90 lets network translation tables be generated and administered.
Directory Number (DN)	DN is a station number within the system consisting of one to seven digits. This term is also used to refer to any assigned number in the customer's database, such as trunk route access codes, SPRE codes, etc.
<b>Expensive Route Warning Tone (ERWT)</b>	Three bursts of tone given to the caller to indicate the call is about to be routed on a trunk classified as expensive.
Continued next page	

## Overview, continued

**Key Terms,  
contd.**

Terms	Definition
Extended Set (ESET)	All entries in a route list index not included in the initial set. Normally, those routes are considered expensive.
<b>Facility Restriction Level (FRL)</b>	FRL is a number from 0 to 7 associated with the Network Class of Service (NCOS) of a station. When compared to the entries in a route list index, the FRL determines the caller's eligibility to use a particular route.
<b>Free Calling Area Screening (FCAS)</b>	Free Calling Area Screening (FCAS) is a BARS feature that provides customers with the capability of full six digit (NPA+NXX) screening to determine the entry choice for completion of calls in the format AC1 + (1)+NPA+NXX+XXXX. FCAS provides a way to deny an NPA +NXX on one entry in a route list, while allowing the same NPA + XXX on another entry in a route list.
Initial Set (ISET)	ISET is those entries in a route list index over which the system attempts to complete a call before testing for Off-Hook Queuing (OHQ) and Call Back Queuing (CBQ) eligibility.
Network Alternative Route Selection (NARS)	The Network Alternate Route Selection (NARS) feature lets a customer with a number of systems in different locations create a private telecommunications network. NARS directs a call from a system in one geographical location to a system in any other geographical location in a cost-effective and easy-to-use manner. When used in large, widely-dispersed applications, NARS forms an integral part of the ESN network.
Continued next page	

## Overview, continued

### Key Terms, contd.

Terms	Definition
Network Class of service (NCOS)	Network Class of Service (NCOS) is a means of dividing BARS users into groups with different access restrictions and characteristics. A NCOS is assigned to each station and TIE trunk in the system.
Paging Trunk	Paging trunks provide a link between the PBX and speaker or radio paging equipment.
Recorded Announcement (RAN) Trunks	RAN trunks provide a link between a PBX and a recorded announcement device which provides recorded information to callers.
Route	A route is a group of similar trunks that form a path through a telecommunications system's switching network, such a trunk group.
<b>Routing Control (RTCL)</b>	The Routing Control (RTCL) feature provides a mechanism to reduce or increase a user's network access capabilities by changing the assigned Network Class of Service (NCOS) level. NCOS levels can be increased or reduced (or remain the same) for specific periods each day and/or the entire 24 hours of a day.
<b>Route List (RLB)</b>	A group of outgoing routes listed in the order they are to be searched by the switch when completing a call. This listing is normally from least expensive to most expensive.
Continued next page	

## Overview, continued

### Key Terms, contd.

Term	Definition
<b>Special Number (SPN) Translation</b>	Special Numbers (SPNs) are any numbers that do not fit the NPA/NXX format and are provisioned in a network translation table in Overlay 90 where TYPE = SPN. There is no limit to the number of SPNs that can be provisioned. Unlike NPAs and NXXs, SPNs can be any combination of digits. SPNs can be up to 19 digits in length.
<b>Supplemental Digit Recognition (SDRR)</b>	The purpose of Supplemental Digit Recognition (SDRR) is to recognize Local DID numbers or DDD numbers that terminate at the local switch (the switch performing the call routing). When these numbers are recognized, the system terminates the call at a station if a DID number was dialed or at the attendant if the DDD number was dialed. A route list is not searched; therefore, trunks are not unnecessarily used to complete the call.
<b>Supplemental Digit Restrictions (SDRR)</b>	The purpose of Supplemental Digit Restrictions (SDRR) is to block a specific telephone number or a range of telephone numbers within an NPA, NXX, or SPN. When supplemental digit restrictions are in effect for a specific telephone number or range of telephone numbers, access to those numbers through BARS software is denied to all station users.

### Pre-Lesson Work

There is no pre-lesson work for this lesson.

## Lesson Content: BARS and NARS Overview

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### What is BARS/ NARS?

Basic Alternate Route Selection (BARS) AND Network Alternate Route Selection (NARS) packages offer Electronic Switched Network (ESN) capabilities that let you make cost-effective call routing choices on both private and public networks.

BARS is a Nortel software feature designed to perform automatic cost routing by selecting the most cost-effective trunk route that is both eligible and available to complete any call dialed. It can also deny calls upon various criteria you configure. BARS can be provisioned to:

- Route a call from the switch via appropriate trunking facility to the Central Office, and then to the destination
- Route a call from one switch to another switch via TIE trunks to the destination

NARS is a Nortel software feature designed to automatically select the most cost-effective route that is both eligible and available to complete the call or deny the call based on pre-programmed criteria. It differs from BARS in that it is designed for customers with multiple switches in a private network environment.

NARS lets the customer link all unit locations together via TIE trunks. NARS can be provisioned to process a call from a remote connected switch to a long distance location by routing the call through less costly TIE trunks to the destination location's central office and then to the destination.

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## Lesson Content: Standard Telephone Numbers

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### Overview

A standard telephone number consists of various components, including 1 + dialing, NPA, NXX, and XXXX.

NPA-NXX-XXXX  
1-972-235-8210

### Telephone Number Components

The following table describes Telephone Number Components:

Components	Description
1+ dialing	The first digit in the number: 1+ dialing can be optional. It precedes the other ten digits of the phone number. 1+ dialing resolves conflicts associated with the North American Numbering Plan (NANP). When a caller dials the digit one first, the system knows the call is for a North American destination.
NPA	The first group of numbers is the area code, known as the Numbering Plan Area or NPA. The NPA directs the call to the appropriate region or group of Central Offices (COs).
NXX	The second group of numbers is called the local exchange. The local exchange has the format NXX. It directs the call to a specific central office within the desired numbering plan area.
XXXX	The third group of numbers is called the station code or Directory Number (DN). The last four digits designate the specific phone.

## Lesson Content: Standard Telephone Numbers, continued

---

### 1+ Dialing

1+ dialing is an option available to most customers, and required in certain dialing circumstances. Important factors that determine whether the digit 1 must be dialed first and the locations of the caller and the carrier used to make the 1+ dialing is:

- Used to identify the call as a toll call
  - The country code for North America
  - Required to complete long distance calls in North America
- 

### Numbering Plan Area (NPA)

Central offices and customers within a particular region are identified by the NPA or area code. The three key components in the NPA are:

- The first position (N) can have any digit from 2 to 9.
- The second position (P) can have any digit from 0 to 9.
- The third position (A) can have any digit from 0 to 9.

**Numbering Plan Area = NPA**

**N = 2-9**

**P = 0-9**

**A = 0-9**

---

### Local Exchange Number (NXX)

The NXX defines the local exchange of the central office a call goes to within a given area code. The NXX consist of three components:

- The first position (N) can have any digit from 2 to 9.
- The second position (X) can have any digit from 0 to 9.
- The third position (X) can have any digit from 0 to 9.

**Local Exchange Number = NXX**

**N = 2-9**

**X = 0-9**

**X = 0-9**

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## Lesson Content: Standard Telephone Numbers, continued

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### Station Code

The station code or directory number (XXXX) is the number that represents the final destination for the call. The XXXX is the last four digits in the phone number, and points to the actual telephone. The XXXX:

- Can use any digit from 0 to 9 throughout
- Is the most flexible of all the standard phone number components
- Can serve as a standalone number when the user is calling someone within the unit

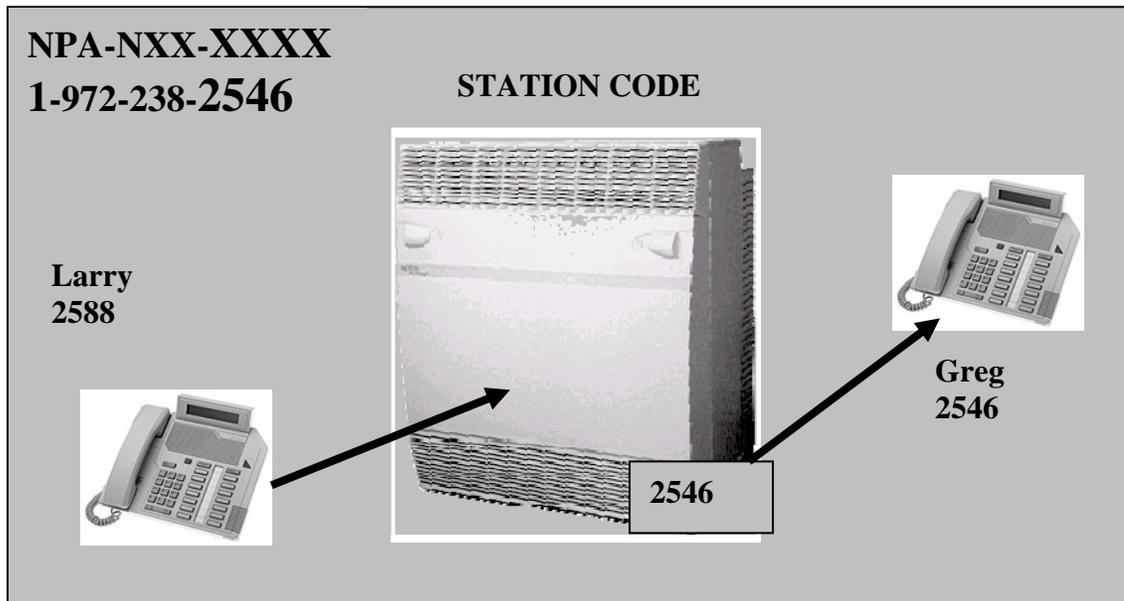


Figure 4.1.1: Station Code

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## Lesson Content: Standard Telephone Numbers, continued

### North American Numbering Plan (NANP)

The NANP was created in 1995 to open up numbers that were previously unavailable for urban areas because of dialing restrictions on the area codes. Because area codes were becoming crowded and the number available was dwindling, it was necessary to let area codes use a wider range of numbers.

Before NANP, the second placeholder in the NPA could only be a 0 or 1. This allowed easy identification of toll calls in the NPA format. With NANP, the NPA and NXX could be any number; therefore an NXX with a 0 or 1 as the middle digit was interpreted as a toll call and would not be allowed through because there was no 0 or 1 in the second placeholder to stop them. The resolution was the use of code restrictions or flexible code restriction tables to make allowances for TLD stations. This is only necessary if the class of service is TLD. Most stations today are programmed as Conditionally Toll Denied (or CTD) and are not affected.

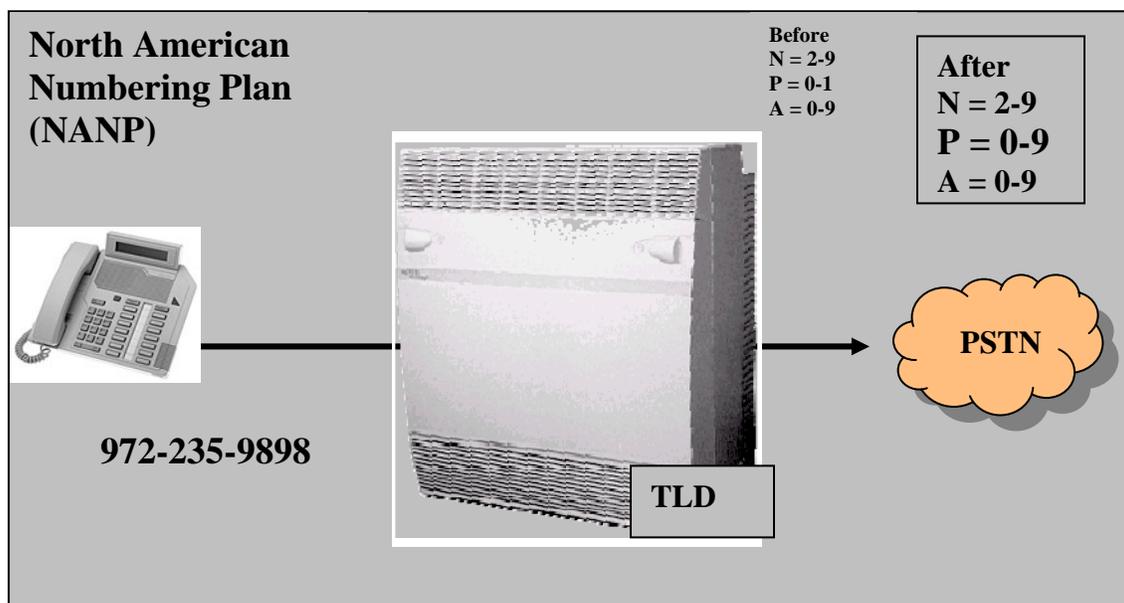


Figure 4.1.2: NANP

## Review Activity: Standard Telephone Numbers

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### Directions

Using the information you have learned in this module of instruction, answer the following questions.

---

### Questions

1. In the following standard telephone number, identify the key elements that we have just studied by matching the number sections to the components.

**1-972-235-8210**

Match the things in column A with their descriptions in column B. Use each description only once.

<u>Column A</u>	<u>Column B</u>
_____ 1. NPA	a. 8210
_____ 2. 1+Dialing	b. 972
_____ 3. XXXX	c. 1
_____ 4. NXX	d. 235

2. Use the phone number below for the next three questions.

**1-972-235-8210**

- a. What is the station code?

\_\_\_\_\_

- b. What is the local exchange number?

\_\_\_\_\_

- c. What is the numbering plan area?

\_\_\_\_\_

## Review Activity: Standard Telephone Numbers, continued

---

### Questions, contd.

3. The use of 1+ dialing is often dependent on:
  - A. The location of callers and/or carriers used to make the call
  - B. The central office of the caller and/or the carrier used to make the call
  - C. The model of phone the caller is using
  - D. The North American Numbering Plan
4. Which of the following is not an attribute of 1+ dialing?
  - A. It resolves the issues created by the North American Numbering Plan
  - B. It is used for toll calls
  - C. It tells the fax machine to prepared for an incoming fax
  - D. It is the country code for North America
5. What is another name for NPA?
  - A. Local exchange
  - B. Area code
  - C. Station code
  - D. Directory number
6. Fill in the ranges to complete the diagram below.

### Numbering Plan Area = NPA

**N** = \_\_\_ - \_\_\_

**P** = \_\_\_ - \_\_\_

**A** = \_\_\_ - \_\_\_

7. What does the NXX define in a standard telephone number?
  - A. The caller's location
  - B. The area code
  - C. The directory number
  - D. The central office of the person being called

## Review Activity: Standard Telephone Numbers, continued

---

### Questions, contd.

8. Fill in the ranges to complete the diagram below.

**Local Exchange Number = NXX**

**N =** \_\_\_ - \_\_\_

**X =** \_\_\_ - \_\_\_

**X =** \_\_\_ - \_\_\_

9. What is the technical term for the last four digits in a phone number?

- A. Local exchange
- B. Area code
- C. Station code
- D. Central office

10. Fill in the ranges to complete the diagram below.

**Station Code = XXXX**

**X =** \_\_\_ - \_\_\_

11. The North American Numbering Plan caused problems between which two elements of the standard telephone number (1-NPA-NXX-XXXX)?

- A. 1
  - B. NPA
  - C. NXX
  - D. XXXX
-

## Review Activity: Standard Telephone Numbers, continued

---

### Questions, contd.

12. What class of service restriction has had the most problems with the North American Numbering Plan?
    - A. CTD
    - B. FRE
    - C. TLD
    - D. UNR
  
  13. 1+ dialing:
    - A. Is mandatory for local calls
    - B. Is only valid outside this country
    - C. Identifies a call as a toll call
    - D. Is only used with computer equipment
  
  14. What network translator routes a call to a specific area code:
    - A. NANP
    - B. PSTN
    - C. CO
    - D. NPA
  
  15. The local exchange number identifies:
    - A. The Central Office within a given area code
    - B. The caller's home location
    - C. The type of service the caller has on his phone
    - D. Nothing
  
  16. What is the format for the directory number?
    - A. NXX
    - B. X
    - C. XXXX
    - D. NPA
  
  17. The NANP causes problems with class of service access restrictions and these elements of the standard telephone number:
    - A. TLD—Local Exchange and Directory Number
    - B. CTD—Area Code and Local Exchange
    - C. UNR—Local Exchange and Directory Number
    - D. TLD—Area Code and Local Exchange
-

## Summary

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### Lesson Summary

Upon completion of this lesson presentation and practice exercise, you will be able to:

**4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.

**4.1.1 REVIEW** manufacturer's documentation

**4.1.2 REVIEW** applicable security policies

**4.1.3 DETERMINE** customer configuration

**4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block

**4.1.5 PROGRAM** a Network Control (NCTL) Data Block

**4.1.6 PROGRAM** a Digit Manipulation (DGT) Data Block

**4.1.7 PROGRAM** a Free Calling Area Screening (FCAS) Data Block

**4.1.8 PROGRAM** a Route List Block (RLB)

**4.1.9 PROGRAM** a Numbering Plan Area (NPA) Data Block

**4.1.10 PROGRAM** a Central Office Translation Code (NXX) Data Block

**4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block

**4.1.12 PERFORM** function check

**4.1.13 COMPLETE** unit documentation

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## LESSON 2

### TRUNK TYPES AND DIALING REQUIREMENTS

#### Overview

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##### Overview

In this lesson you will be introduced to how to trunk types and dialing requirements. This lesson is designed to provide you with the key performance elements to assist you in implementing BARS. This lesson reviews the different trunk types, describes the trunk types that can be used with BARS software, defines different switching facilities, and defines dialing requirements for BARS. There will be a performance activity at the end of this lesson to test comprehension of the key performance elements that you'll need to perform for upcoming tasks.

##### Performance Objectives

Upon successful completion of this lesson, you will be able to:

- 4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.
- 4.1.1 REVIEW** manufacturer's documentation
  - 4.1.2 REVIEW** applicable security policies
  - 4.1.3 DETERMINE** customer configuration
  - 4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block
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  - 4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block
  - 4.1.12 PERFORM** function check
  - 4.1.13 COMPLETE** unit documentation

##### Performance Evaluation

The performance evaluations for these tasks are scheduled immediately following this lesson. These performance evaluations will be in delivered via a work order. These work orders will test the performance objective you have just completed in this lesson. These work orders will build in complexity based on previous tasks from previous lessons. These performance evaluations will be in a separate workbook from your student guide. Your instructor will hand out these workbooks out in class. Please do not complete these work orders prior to the instructor assigning them to you. You will work in your booth with your partner as a class. Your instructor will sign off these performance evaluations as you complete each tasks.

## Overview, continued

---

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Northern Telecom Publications (NTPs) is the documentation for the CS1000E system. These publications provide reference tools and information that is related to the various features and options of the system.

<b>Document</b>	<b>Document #</b>
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<i>Communication Server 1000 Software Input Output Administration</i>	NN43001-611
<i>Communication Server 1000 Software Input Output Reference - System Messages</i>	NN43001-712
<i>Communication Server 1000 Software Input Output Reference - Maintenance</i>	NN43001-711
<i>Element Manager System Reference – Administration</i>	NN43001-632

### Tools and Equipment

The tools and equipment used for this lesson are:

- Operational Nortel CS1000E

### Job Aids

The job aids for this lesson are:

- Local and Long Distance Dialing Requirements
  - International Dialing Requirements
  - Operator and Information Dialing Requirements
  - Special Number Dialing Requirements
  - Miscellaneous Number Dialing Requirements
  - TIE Trunks Dialing Requirements
  - FEX Trunk Dialing Requirements
  - WATS Dialing Requirements
  - OCC Dialing Requirements
  - CAC Dialing Requirements
-

## Overview, continued

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**Handouts**

There are no handouts for this lesson.

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**Key Terms**

Review the following key terms before you begin the reading assignment:

Terms	Definitions
Intra-lata	Telecommunication services that originate and terminate at the same local access and transport area.

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**Pre-Lesson Work**

There is no pre-lesson work for this lesson.

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## Lesson Content: Trunk Types and Dialing Requirements

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### Overview

Trunks are single or multi-channel telephone transmission channels with wide bandwidth providing communication between two switching systems or distribution points. The communication can be either voice or data transmission. It can be incoming, outgoing, or both (also known as two-way).

### Trunk Types

Trunk types include the following:

- Central Office Trunks (COTs)
- Direct Inward Dial (DID) trunks
- Foreign Exchange (FEX) trunks
- Wide Area Telephone Service (WATS) trunks

### Central Office Trunks (COT)

A COT is a circuit between a telephone unit's central office and PBX on a customer's premises. It is a physical carrier of voice and data to and from a local central office to the PBX. COTs:

- Can be incoming, outgoing, or both
- Lets users within a PBX call anywhere in the world, adhering to station restrictions
- Can be copper wire or optical fiber

### COT: Local and Long Distance Number Dialing Requirements

Local and Long Distance Number Dialing Requirements	
Type of Call	Digits Required
Local	NXX+XXXX NPA+NXX+XXXX
Long Distance within Home NPA (toll)	(1)+HNPA+NXX+XXXX
Long Distance (Direct Distance District Dial (DDD))	(1)+NPA+NXX+XXXX (1)+NXX+XXXX
Operator Assisted	(0)+NPA+NXX+XXXX

**Lesson Content: Trunk Types and Dialing Requirements, continued**

**COT:  
International  
Dialing  
Requirements**

<b>International Dialing Requirements</b>	
<b>Type of Call</b>	<b>Digits Required</b>
International DDD	011+CC+NN
Operator Assisted International	01+CC+NN

**COT: Operator  
and Information  
Dialing  
Requirements**

<b>Operator and Information Dialing Requirements</b>	
<b>Type of Call</b>	<b>Digits Required</b>
Outside Operator for Local Telco	0
Operator for Long Distance Carrier	00
Information	(1)+411 or (1)+555-1212 (1)+NPA+555+1212

## Lesson Content: Trunk Types and Dialing Requirements, continued

### COT: Special Number Dialing Requirements

Special Number Dialing Requirements	
Type of Call	Digits Required
Emergency	911
Non-Emergency	311
Repair	611
Telecommunications Relay Service (TRS)	711 (hearing impaired)
Business Office	811

### COT: Miscellaneous Number Dialing Requirements

Miscellaneous Number Dialing Requirements	
Type of Call	Digits Required
Interchange Carrier Service	(1)+700+NXX+XXXX
Toll Free Numbers	(1)+800+NXX+XXXX (1)+888+NXX+XXXX
Pay Per Call Number	(1)+900+NXX+XXXX (1)+NPA+976+XXXX

## Lesson Content: Trunk Types and Dialing Requirements, continued

---

### TIE Trunks

TIE trunks are used to bypass public telephone network when providing a connection between two switches. This lets calls proceed over the private network, whether those switches are in the same building or in two different states. They can be used to connect to any terminating PBXs' outgoing facilities unless restricted in that PBX's database. TIE trunks:

- Accept any class of service except FR2
- Can be incoming only, outgoing only, or two-way

### TIE Trunks: Dialing Requirements

TIE Trunks Dialing Requirements	
Type of Call	Digits Required
Station to Station	X...X
Local to distant PBX's HNPA	(AC1)+NXX+XXXX (AC1)+NPA+NXX+XXXX

### Direct Inward Dial (DID)

Direct Inward Dial (DID) trunks let outside callers dial stations directly. They do not have to go through an attendant. DID trunks:

- Will be incoming
- Are usually set up as one-way incoming direct DID trunks
- Are set up as two-way when using ISDN PRI with DID attributes
- Works with the Central Office (CO), in that the CO strips the prefix of the dialed number and outpulses the remaining digits to the appropriate PBX for distribution. The process of stripping digits from a dialed number is referred to as fencing.
- Have outpulsed digits of more or less than four digits determined by PBX

## Lesson Content: Trunk Types and Dialing Requirements, continued

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### Foreign Exchange Trunks (FEX)

Foreign Exchange Trunks (FEX) connect with a telephone company's Central Office that is different from the local central office serving the PBX. FEX trunks:

- Can be incoming only, outgoing only, or two-way
- Are designed to maintain service for stations a distance from the local area
- Receive a dial tone from the Foreign Central Office to allow local access to that area
- Lets businesses appear to be local companies increasing the geographical market
- Can have additional costs but is cost efficient in high call volume instances

### FEX Trunks: Dialing Requirements

FEX Trunk Dialing Requirements	
Type of Call	Digits Required
Local call on FEX trunk	NXX+XXXX NPA+NXX+XXXX

### WATS

Wide Area Telephone Service Trunks (WATS) trunks are available from the local or long distance company and are designed to let a customer make long distance phone calls at a lower cost than on a COT trunk. WATS trunks:

- Can be incoming or outgoing only
- Are purchased from the phone company in bands (geographical serving area of the trunk) and are numbered. Band numbers represent the area that the band covers. The higher the number, the greater the area. See the following table for band ranges.

## Lesson Content: Trunk Types and Dialing Requirements, continued

### WATS, contd.

Bands	
Band Number	Area Covered
Band 0	Intrastate Long Distance
Band 8	Intrastate Intra-Lata Service
Band 1-4	Interstate Long Distance (Inside United States)
Band 5	Alaska, Hawaii, Puerto Rico, Virgin Islands, Continental United States

- Are billed monthly either by the minute or in six-second increments
- Allow some international and intrastate calls
- Can have many different names depending on vendor

### WATS Trunks: Dialing Requirements

WATS Trunk Dialing Requirements	
Type of Call	Digits Required
Long Distance (DDD)	(1)+NPA+NXX+XXXX
Operator Assisted (DDD)	0+NPA+NXX+XXXX
Long Distance within HNP (Toll)	(1)+HPA+NXX+XXXX (1)+NXX+XXXX

## Lesson Content: Trunk Types and Dialing Requirements, continued

### Other Common Carrier (OCC) Service Types

OCC is the generic phrase for non-specific long distance service that allows customers to make long distance calls at a less expensive rate than their local service provider. OCC provides three types of service: Dial-Up, Full Equal Access, and Dedicated Access Lines.

Dial-Up:

- Uses local COTs to access the OCC network
- Usually requires a calling card with an authorized number
- Requires the user to dial the OCC telephone number, wait for proper tone, and dial the authorization number

Full Equal Access:

- Lets the customer access a selected carrier's network via COTs arranged by local provider
- Lets customers set the OCC as the default long distance provider

Dedicated Access lines:

- Use direct connections (TIE trunks) between PBXs and the OCC Network

### OCC: Dialing Requirements

OCC Dialing Requirements	
Type of Call	Digits Required
Long Distance	(0)+NPA+NXX+XXXX
Long Distance (DDD)	(1)+NPA+NXX+XXXX
Long Distance within HNPA (Toll)	(1)+HNPA+NXX+XXXX (1)+NXX+XXXX

## Lesson Content: Trunk Types and Dialing Requirements, continued

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### Carrier Access Codes (CAC) Service Types

CACs give customers equal access to Interchange Carriers. CACs are composed of an Equal Access Identifier and a Carrier Identification Code.

Format	Equal Access Identifier	Carrier Identification Code
Original CAC Format	10	XXX
Expanded CAC Format	101	XXXX

### CAC: Dialing Requirements

CAC Dialing Requirements	
Type of Call	Digits Required
Operator Assisted Dialing to NA and International Locations	101XXXX+0 101XXXX+0+NPA+NXX+XXXX 101XXXX+0+ NXX+XXXX 101XXXX+01+CC+NN

---

## Review Activity: Trunk Types

---

**Directions**

Using the information you have learned in this module of instruction, answer the following questions.

---

**Questions**

1. What is a format for making long distance calls across the COT trunk?  
\_\_\_\_\_  
\_\_\_\_\_
2. What is the format for making pay-per-call across the COT trunk?  
\_\_\_\_\_  
\_\_\_\_\_
3. What is a format for making a station-to-station call across the TIE trunk?  
\_\_\_\_\_  
\_\_\_\_\_
4. What is the format for making a local call to a distant PBX's HNPA across the TIE trunk?  
\_\_\_\_\_  
\_\_\_\_\_
5. Which of the following is NOT true for DID trunks?
  - A. The call bypasses the attendant console
  - B. Stations on the PBX usually share the calls
  - C. They can be incoming and/or outgoing
  - D. The central office strips the number of its prefix
6. What is the format for making a local call on a FEX trunk?  
\_\_\_\_\_  
\_\_\_\_\_

## Review Activity: Trunk Types, continued

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### Questions, contd.

7. What is the format for making a long distance call on a WATS trunk?

---

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8. What is the format for making an operator-assisted call on a WATS trunk?

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9. What is the typical format for making a long distance call on an OCC?

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10. What is a typical format for making a long distance call with HNPA on an OCC?

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11. What is a format for making an operator-assisted call to North America and International locations on a CAC?

---

---

12. Which of the following is a valid COT toll-free call format?

- A. 1+800+NXX+XXXX
- B. 011+CC+NN
- C. 811
- D. 1+411

## Review Activity: Trunk Types, continued

---

### Questions, contd.

13. What of the following is a valid TIE trunk format?
    - A. HPNA+NPA+NXX+XXXX
    - B. (0)+NPA+NXX+XXXX
    - C. (AC1)+NXX+XXXX
    - D. XXX
  
  14. Which of the following is true for DID trunks?
    - A. Incoming only functionality can only be provided with ISDN PRI trunks.
    - B. Typically, the central office strips the prefix and sends four digits.
    - C. They must be incoming only.
    - D. The call stops at the attendant console.
  
  15. When using an OCC, which of the following is a valid format?
    - A. NXX+XXXX
    - B. (1)+NPA+NXX+XXXX
    - C. (1)+HNXX+XXXX
    - D. (9)+NPA+NXX+XXXX
  
  16. Which of the following is a valid CAC format?
    - A. 0+SAC+NXX+XXXX
    - B. 1+NPA+NXX+XXXX
    - C. 101XXXX+0+XXXX
    - D. 101XXXX+0+NPA+NXX+XXXX
-

## Summary

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### Lesson Summary

Upon completion of this lesson presentation and practice exercise, you will be able to:

**4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.

- 4.1.1 REVIEW** manufacturer's documentation
  - 4.1.2 REVIEW** applicable security policies
  - 4.1.3 DETERMINE** customer configuration
  - 4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block
  - 4.1.5 PROGRAM** a Network Control (NCTL) Data Block
  - 4.1.6 PROGRAM** a Digit Manipulation (DGT) Data Block
  - 4.1.7 PROGRAM** a Free Calling Area Screening (FCAS) Data Block
  - 4.1.8 PROGRAM** a Route List Block (RLB)
  - 4.1.9 PROGRAM** a Numbering Plan Area (NPA) Data Block
  - 4.1.10 PROGRAM** a Central Office Translation Code (NXX) Data Block
  - 4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block
  - 4.1.12 PERFORM** function check
  - 4.1.13 COMPLETE** unit documentation
-

## LESSON 3

### CUSTOMER NUMBERING PLANS

#### Overview

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##### Overview

In this lesson you will be introduced to the concept of customer numbering plans. The lesson begins with an overview of the concept of typical customer numbering plans for BARS. Next, the lesson discusses how to define BARS access codes. The lesson concludes with the steps needed to review customer's directory number blocks (DNB) and terminal number blocks (TNB) using LD 20. There will be a performance activity at the end of this lesson to test comprehension of the key performance elements that you'll need to perform for upcoming tasks.

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##### Performance Objectives

Upon successful completion of this lesson, you will be able to:

- 4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.
    - 4.1.1 REVIEW** manufacturer's documentation
    - 4.1.2 REVIEW** applicable security policies
    - 4.1.3 DETERMINE** customer configuration
    - 4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block
    - 4.1.5 PROGRAM** a Network Control (NCTL) Data Block
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    - 4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block
    - 4.1.12 PERFORM** function check
    - 4.1.13 COMPLETE** unit documentation
- 

##### Performance Evaluations

The performance evaluations for these tasks are scheduled immediately following this lesson. These performance evaluations will be in delivered via a work order. These work orders will test the performance objective you have just completed in this lesson. These work orders will build in complexity based on previous tasks from previous lessons. These performance evaluations will be in a separate workbook from your student guide. Your instructor will hand out these workbooks out in class. Please do not complete these work orders prior to the instructor assigning them to you. You will work in your booth with your partner as a class. Your instructor will sign off these performance evaluations as you complete each tasks.

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## Overview, continued

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### References

Northern Telecom Publications (NTPs) is the documentation for the CS1000E system. These publications provide reference tools and information that is related to the various features and options of the system.

Document	Document #
<i>Communication Server 1000E Maintenance</i>	NN43041-700
<i>Communication Server 1000 Software Input Output Administration</i>	NN43001-611
<i>Communication Server 1000 Software Input Output Reference - System Messages</i>	NN43001-712
<i>Communication Server 1000 Software Input Output Reference - Maintenance</i>	NN43001-711
<i>Element Manager System Reference – Administration</i>	NN43001-632

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### Tools and Equipment

The tools and equipment used for this lesson are:

- Operational Nortel CS1000E
- 

### Job Aids

The job aids for this lesson are:

- How to List the Directory Number Block (DNB)
  - How to List the Terminal Number Block (TNB)
  - How to List Unused Directory Number (LUDN)
- 

### Handouts

There are no handouts for this lesson.

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### Key Terms

Review the following key terms before you begin the reading assignment:

Terms	Definitions
DNB	Directory Number Block
LUDN	List Unused Directory Number
TNB	Terminal Number Block

---

### Pre-Lesson Work

There is no pre-lesson work for this assignment.

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## Lesson Content: Customer Numbering Plan

---

### Overview

A customer's numbering plan determines which numbers represent specific services. For example, the digit 9 is used as the access code for many units. The digit 9 is part of the customer's numbering plan.

### Typical Numbering Plan Elements

Numbering plans vary for each customer. BARS software allows for one access code. NARS software allows for two access codes. The table below is an example of a typical customer numbering plan with BARS access code.

Typical Numbering Plan Elements	
Digit	Assignment
0	Attendant
1	SPRE
2	2XXX = DID DNs
3	3XXX = DID DNs
4	4XXX = Non-DID DNs
5	5XXX = Non-DID DNs
6	6106 = COT; 6102 = TIE 6105 = DID; 6109 = FEX
7	Paging
8	Unassigned
9	BARS Access Code

---

## Lesson Content: Customer Numbering Plan, continued

---

### Typical Numbering Plan Definitions

The following table defines the elements that compose the customer numbering plan:

Type of Number	Description
Attendant and SPRE	Numbering plans commonly reserve 0 for the attendant and 1 for the Special Prefix (SPRE) code
DID DNs	Blocks of numbers are usually set aside DID purposes. DID numbers let station users receive calls from the public network on DID trunks. The blocks are purchased from the local service provider.
Non DID DNs	Blocks of numbers are usually dedicated to non-DID numbers and used for secondary DN assignments and short hunting. These numbers are not purchased by the local service provider.
Trunk Route Access Codes	Trunk route access codes let the user dial directly on a specific trunk and thereby bypass any automatic routing. These numbers are typically 4-digit numbers, leaving the rest of the numbers in the 1000 range available for other features or services.
BARS Access Code	The BARS access code can be one or two digits that are available in the customer numbering plan.

### Number Blocks

In order to assign the access codes, the current customer numbering plan must be accessed to determine what numbers are available.

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## Lesson Content: Customer Numbering Plan, continued

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### Directory Number Block (DNB)

You can review the customer numbering plan by loading Overlay 20 and printing the DNB. All assigned numbers are included in the printout. Follow the steps listed below to print the DNB from Overlay 20:

How to List the Directory Number Block (DNB)	
Step	Action
1	At the REQ prompt, enter <b>PRT</b> .
2	At the TYPE prompt, enter <b>DNB</b> .
3	Enter through the rest of the prompts unless you want to narrow the list to a specific number or range of numbers.
End of procedure	

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### Terminal Number Block (TNB)

The Terminal Number Block (TNB) prints out sets and trunks. All of the programming for these sets is included in TNB. Follow these steps listed below to print the TNB from Overlay 20:

How to List Terminal Number Block (TNB)	
Step	Action
1	At the REQ prompt, enter <b>PRT</b> .
2	At the TYPE prompt, enter <b>TNB</b> .
3	Enter through the rest of the prompts unless you want to narrow the list to a specific number or range of numbers.
End of procedure	

---

## Lesson Content: Customer Numbering Plan, continued

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### List Unused Directory Number (LUDN)

Another way to find available DNs for the BARS/NARS is to print an LUDN. This gives you a printout of the unused numbers in the customer's numbering plan. Follow the steps listed below to print the LUDN from Overlay 20.

How to List Unused Directory Number (LUDN)	
Step	Action
1	At the REQ prompt, enter <b>PRT</b> .
2	At the TYPE prompt, enter <b>LUDN</b> .
3	Enter through the rest of the prompts unless you want to narrow the list to a specific number or range of numbers.
End of procedure	

---

## Review Activity: Custom Numbering Plan

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### Directions

Using the information you have learned in this module of instruction, answer the following questions.

---

### Questions

1. What is the term for the access code provided by the BARS package?
    - A. ACOD
    - B. AC2
    - C. AC1
    - D. TOD
  
  2. What is the term for the access code provided by the NARS package?
    - A. ACOD
    - B. AC2
    - C. AC1
    - D. TOD
  
  3. Which of the following shows every number assigned in the system?
    - A. DNB
    - B. TNB
    - C. LUDN
    - D. COT
  
  4. Which of the following shows every number available?
    - A. DNB
    - B. TNB
    - C. LUDN
    - D. COT
  
  5. The directory number block:
    - A. Will show you every number in America
    - B. Will show you every number in the city
    - C. Identifies a call as a toll
    - D. Will show you every number assigned in the system
  
  6. LUDN stands for?
    - A. Least Used Dialing Number
    - B. Least Unused Directory
    - C. Local Union Directory Number
    - D. List Unused Directory Number
  
  7. The terminal number block:
    - A. Lists sets and trunks defined in a system
    - B. Details every local exchange in a given NPA
    - C. Will not function properly very soon
    - D. Lists all open access codes in the system
-

## Summary

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### Lesson Summary

Upon completion of this lesson presentation and practice exercise, you will be able to:

**4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.

- 4.1.1 REVIEW** manufacturer's documentation
  - 4.1.2 REVIEW** applicable security policies
  - 4.1.3 DETERMINE** customer configuration
  - 4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block
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  - 4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block
  - 4.1.12 PERFORM** function check
  - 4.1.13 COMPLETE** unit documentation
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## LESSON 4

### BARS FLOWCHART

#### Overview

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##### Overview

In this lesson you will be introduced to BARS call processing, including BARS overlays and intercept treatments. This lesson is designed to provide you with the key performance elements to assist you understanding the BARS call flow. This lesson focuses on the six stages a call goes through when processed by BARS. These stages are as follows:

- Stage 1: BARS Access Code
- Stage 2: Network Translation
- Stage 3: Supplemental Digit Restriction and Recognition
- Stage 4: Automatic Least Call Routing
- Stage 5: Digit Manipulation
- Stage 6: Call Outpulsing

There will be a performance activity at the end of this lesson to test comprehension of the key performance elements that you'll need to perform for upcoming tasks.

---

##### Performance Objectives

Upon successful completion of this lesson, you will be able to:

**4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.

- 4.1.1 REVIEW** manufacturer's documentation
  - 4.1.2 REVIEW** applicable security policies
  - 4.1.3 DETERMINE** customer configuration
  - 4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block
  - 4.1.5 PROGRAM** a Network Control (NCTL) Data Block
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  - 4.1.10 PROGRAM** a Central Office Translation Code (NXX) Data Block
  - 4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block
  - 4.1.12 PERFORM** function check
  - 4.1.13 COMPLETE** unit documentation
-

## Overview, continued

---

### Performance Evaluations

The performance evaluations for these tasks are scheduled immediately following this lesson. These performance evaluations will be in delivered via a work order. These work orders will test the performance objective you have just completed in this lesson. These work orders will build in complexity based on previous tasks from previous lessons. These performance evaluations will be in a separate workbook from your student guide. Your instructor will hand out these workbooks out in class. Please do not complete these work orders prior to the instructor assigning them to you. You will work in your booth with your partner as a class. Your instructor will sign off these performance evaluations as you complete each tasks.

---

### References

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<i>Communication Server 1000 Software Input Output Reference - Maintenance</i>	NN43001-711
<i>Element Manager System Reference – Administration</i>	NN43001-632

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### Tools and Equipment

The tools and equipment used for this lesson are:

- Operational Nortel CS1000E

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### Job Aids

The job aids for this lesson are:

- BARS Call Processing Stages

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### Handouts

There are no handouts for this lesson.

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### Key Terms

There are no key terms for this lesson.

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### Pre-Lesson Work

There is no pre-lesson assignment for this lesson.

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## Lesson Content: BARS Call Flow

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### Overview

BARS software is standard on every Meridian 1 or Communications Server 1000 (CS1000) switch. It is simple for callers to use and cost-effective for their units. When a caller places a call, BARS automatically checks the number dialed and makes choices to direct the call to a specific route for least-cost routing. Although several decisions and actions take place to complete this call, BARS occurs instantly, making it seamless for the caller.

---

### BARS Call Processing

Calls go through six stages when processed by BARS.

Calls enter BARS software when the caller dials the BARS access code and exit after digit manipulation. BARS passes the call to the switch for Call Outpulsing. A number of checks are performed between calls to make sure they conform to pre-programmed instructions.

BARS Call Processing Stages	
Stage	Description
1	BARS Access Code
2	Network Translation
3	Supplemental Digit Restriction and Recognition
4	Automatic Least Cost Routing
5	Digit Manipulation
6	Call Outpulsing
End of process	

---

## Lesson Content: BARS Call Flow, continued

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### 1. BARS Access Code

Before making a local, network, or long distance call outside the unit, the caller must first dial a one- or two-digit customer defined BARS access code. This triggers the BARS software to begin call processing and routing checks. The use of the BARS access code controls access to trunk routes based on cost-effectiveness.

Stage 1	Description
BARS Access Code	A one- to two-digit customer-defined BARS access code, dialed before the desired number
	Triggers BARS to begin call processing and routing checks
	Controls the cost-effective use of the trunk routes

### 2. Network Translation

The network translation step checks that the dialed digits includes an NPA, SPN, or NXX defined in the translation tables.

Stage 2	Description
Network Translation Check	Transaction that dialed number to locate NPA, SPN, or NXX
	Determines if Supplemental Digit Restriction or Supplemental Digit Recognition (SDRR) check applies
	Determines which route list index will be used for call completion

---

## Lesson Content: BARS Call Flow, continued

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### 3. Supplemental Digit Restriction and Recognition (SDRR)

The SDRR checks to see if the dialed number should be treated before selecting a route. The SDRR:

- Performs digit restriction checks to see if the dialed number was programmed to be restricted from call completion
- Performs digit recognition checks to see if the number dialed is an internal number that should be redirected to the attendant DN or another internal station
- Saves tying up two trunks by redirecting a call to an internal number

Stage 3	IF	THEN
SDRR Check	Number dialed is defined under SDRR Deny	Deny the numbers access to all station users.
	Number dialed defined under SDRR LDDD	Redirect internal number(s) to the attendant DN—this applies to all station users.
	Number dialed defined under SDRR LDID	Redirect local DID numbers to an internal station.

---

## Lesson Content: BARS Call Flow, continued

---

### 4. Automatic Least Cost Routing

Automatic least cost routing is the most critical series of checks performed by BARS. Automatic least cost routing performs the following steps:

Stage 4 – Automatic Least Cost Routing	
Step	Action
1	Locates the route list index associated with the digits dialed. (A pre-programmed list of outgoing alternate trunk routes from the least expensive route to the most expensive route. Each NPA, NXX, or SPN is programmed to reference only one route list index.)
2	Scans of entries in the route list index, starting with Entry 0 to select the most cost effective trunk route that meets pre-programmed eligibility criteria assigned to this caller and entry. Eligibility checks include: <ul style="list-style-type: none"> <li>• Time of the day schedule restriction</li> <li>• Network class of service restrictions</li> <li>• Restrictions on NPA + NXX</li> </ul>
3	Determines if the trunk route has available trunks to complete call.
End of procedure	

### 5. Digit Manipulation

Some trunks might require the deletion and/or addition of leading digits to the dialed number before routing. BARS can be programmed to manipulate digits of the dialed number to meet the outgoing trunk's requirements.

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## Lesson Content: BARS Call Flow, continued

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### 6. Call Outpulsing

The last step in completing the call is to output the originally dialed or modified number.

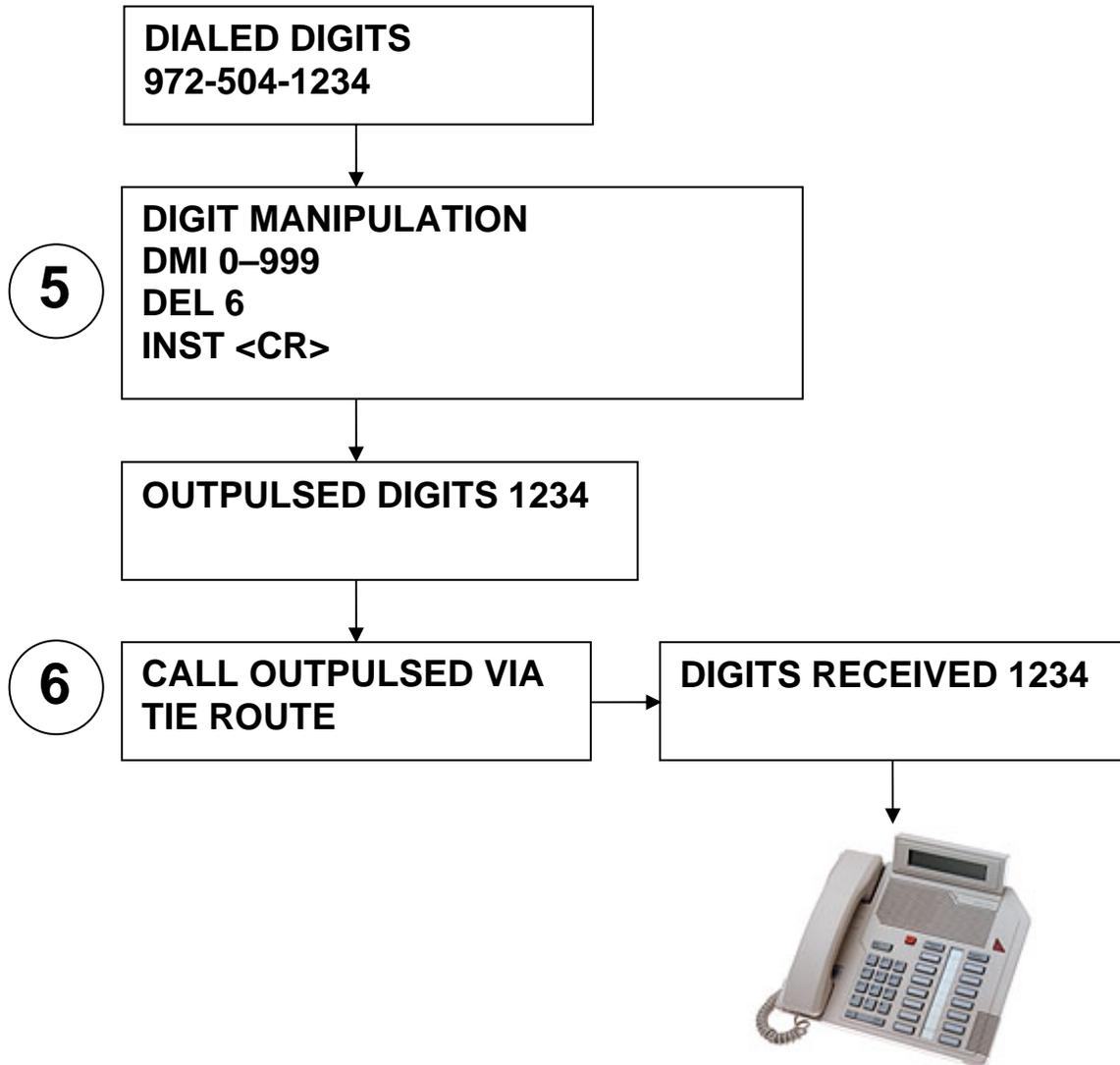


Figure 4.4.1: Call Pulsing

---

## Review Activity: BARS Call Flow

---

### Directions

Using the information you have learned in this module of instruction, answer the following questions.

---

### Questions

1. Match the call process stages in Column A with their descriptions in Column B. Use each description only once.

<u>Column A</u>	<u>Column B</u>
_____ 1.	a. Supplemental Digit Restriction and Recognition
_____ 2.	b. Call Outpulsing
_____ 3.	c. BARS Access Code
_____ 4.	d. Automatic Least Cost Routing
_____ 5.	e. Network Translation
_____ 6.	f. Digit Manipulation

2. The BARS Access Code:
- A. Can be a one- to four-digit code defined by the customer
  - B. Is optional if dialing a local call
  - C. Lets the caller choose the trunk route used to complete the call
  - D. Tells BARS to begin call processing and routing checks
3. In the dialed number below, which digit or digits does the network translation check recognize to determine whether to pass the call on for processing?

**8+214-604-4321**

---



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4. Charles dialed 8 + 476 1234 to reach his boss Benny, whose office is on the first floor. How should SDRR respond?
- A. Determine that it's an internal number, and block it because it was dialed incorrectly
  - B. Recognize that it's an internal number, and redirect it to Benny's DN
  - C. Route it through a COT trunk to the central office, and back to Benny's DN
  - D. SDRR would never see it. The number would be blocked in the network translation stage because it is an internal number,

## Review Activity: BARS Call Flow, continued

---

### Questions, contd.

5. When BARS performs the Automatic Least Cost Routing check on a call, what is the first thing it does is?
- A. Automatically select the trunk route identified in Entry 0
  - B. Check Entry 0 route for availability
  - C. Check Entry 0 route for eligibility
  - D. SDRR would never see it. This number would be blocked in the network translation stage because it is an internal number
6. The outgoing trunk requires 11-digit (1+) dialing. In the dialed number below, where would digit manipulation add or delete digits if applicable?

**212 616 1245**

- A. Before the 212 (NPA)
  - B. Before the 616 (NXX)
  - C. Either before the 212 or after the 1245 (station number)—it doesn't matter
  - D. After the 1245
7. Digit Manipulation tells BARS to delete or insert digits in which location in the following dialed number?

**1+847-476-2002**

- A. Before 847
  - B. Before 476
  - C. Before 1
  - D. Before 2002
8. During the network translation check, BARS determined that 1+ dialing is missing from the dialed number below. How would BARS respond?

**847-476-2002**

- A. Blocks the call because the dialed NPA does not match the NPA programmed in BARS
  - B. Automatically add '1' before the NPA dialed and passes the digits along to the next processing stage
  - C. Searches the other translation table, and a second access code is assigned
  - D. Checks for the NXX match
9. BARS determined that the dialed digits indicate an internal number that must be redirected to a station user. Which BARS step does this represent?
- A. SDRR/LDDD
  - B. Network Translation/NXX
  - C. SDRR/DENY
  - D. SDRR/LDID
10. The last check BARS performs on digits dialed is the...
- A. SDRR check
  - B. Digit Manipulation check
  - C. Network Translation check
  - D. Automatic Least Routing check

## Summary

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### Lesson Summary

Upon completion of this lesson presentation and practice exercise, you will be able to:

**4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.

**4.1.1 REVIEW** manufacturer's documentation

**4.1.2 REVIEW** applicable security policies

**4.1.3 DETERMINE** customer configuration

**4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block

**4.1.5 PROGRAM** a Network Control (NCTL) Data Block

**4.1.6 PROGRAM** a Digit Manipulation (DGT) Data Block

**4.1.7 PROGRAM** a Free Calling Area Screening (FCAS) Data Block

**4.1.8 PROGRAM** a Route List Block (RLB)

**4.1.9 PROGRAM** a Numbering Plan Area (NPA) Data Block

**4.1.10 PROGRAM** a Central Office Translation Code (NXX) Data Block

**4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block

**4.1.12 PERFORM** function check

**4.1.13 COMPLETE** unit documentation

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## LESSON 5

### BARS OVERLAYS

#### Overview

---

##### Overview

In this lesson you will be introduced to BARS Overlays 86, 87, and 90. This lesson begins with a discussion of the Electronic Switching Network (ESN) Data Block – Overlay 86. The ESN data block is used to define the features and parameters needed for defining a BARS database. Next, the Network Translation (NET) Data Block – Overlay 90 is discussed. This is where you provision the network translation tables used by BARS. The call has a network class of service (NCOS) assigned to it based on the translation table it went through. The Network Control Data Block (NCTL) – LD 87 assigns a NCOS to the BARS call. There will be a performance activity at the end of this lesson to test comprehension of the key performance elements that you'll need to perform for upcoming tasks.

##### Performance Objectives

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Upon successful completion of this lesson, you will be able to:

- 4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.
- 4.1.1 REVIEW** manufacturer's documentation
  - 4.1.2 REVIEW** applicable security policies
  - 4.1.3 DETERMINE** customer configuration
  - 4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block
  - 4.1.5 PROGRAM** a Network Control (NCTL) Data Block
  - 4.1.6 PROGRAM** a Digit Manipulation (DGT) Data Block
  - 4.1.7 PROGRAM** a Free Calling Area Screening (FCAS) Data Block
  - 4.1.8 PROGRAM** a Route List Block (RLB)
  - 4.1.9 PROGRAM** a Numbering Plan Area (NPA) Data Block
  - 4.1.10 PROGRAM** a Central Office Translation Code (NXX) Data Block
  - 4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block
  - 4.1.12 PERFORM** function check
  - 4.1.13 COMPLETE** unit documentation

##### Performance Evaluations

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The performance evaluations for these tasks are scheduled immediately following this lesson. These performance evaluations will be in delivered via a work order. These work orders will test the performance objective you have just completed in this lesson. These work orders will build in complexity based on previous tasks from previous lessons. These performance evaluations will be in a separate workbook from your student guide. Your instructor will hand out these workbooks out in class. Please do not complete these work orders prior to the instructor assigning them to you. You will work in your booth with your partner as a class. Your instructor will sign off these performance evaluations as you complete each tasks.

---

## Overview, continued

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### References

Northern Telecom Publications (NTPs) is the documentation for the CS1000E system. These publications provide reference tools and information that is related to the various features and options of the system.

Document	Document #
<i>Communication Server 1000E Maintenance</i>	NN43041-700
<i>Communication Server 1000 Software Input Output Administration</i>	NN43001-611
<i>Communication Server 1000 Software Input Output Reference - System Messages</i>	NN43001-712
<i>Communication Server 1000 Software Input Output Reference - Maintenance</i>	NN43001-711
<i>Element Manager System Reference – Administration</i>	NN43001-632

---

### Tools and Equipment

The tools and equipment used for this lesson are:

- Operation Nortel CS1000E
- 

### Job Aids

The job aids for this lesson are:

- How to Build a Route List
- 

### Handouts

Your instructor will provide you with the following handouts:

- BARS Work Order 09 - 17
- 

### Key Terms

Review the following key terms before you begin the reading assignment:

Terms	Definition
ESN	Electronic Switched Network

---

### Pre-Lesson Work

There is no pre-lesson work for this lesson.

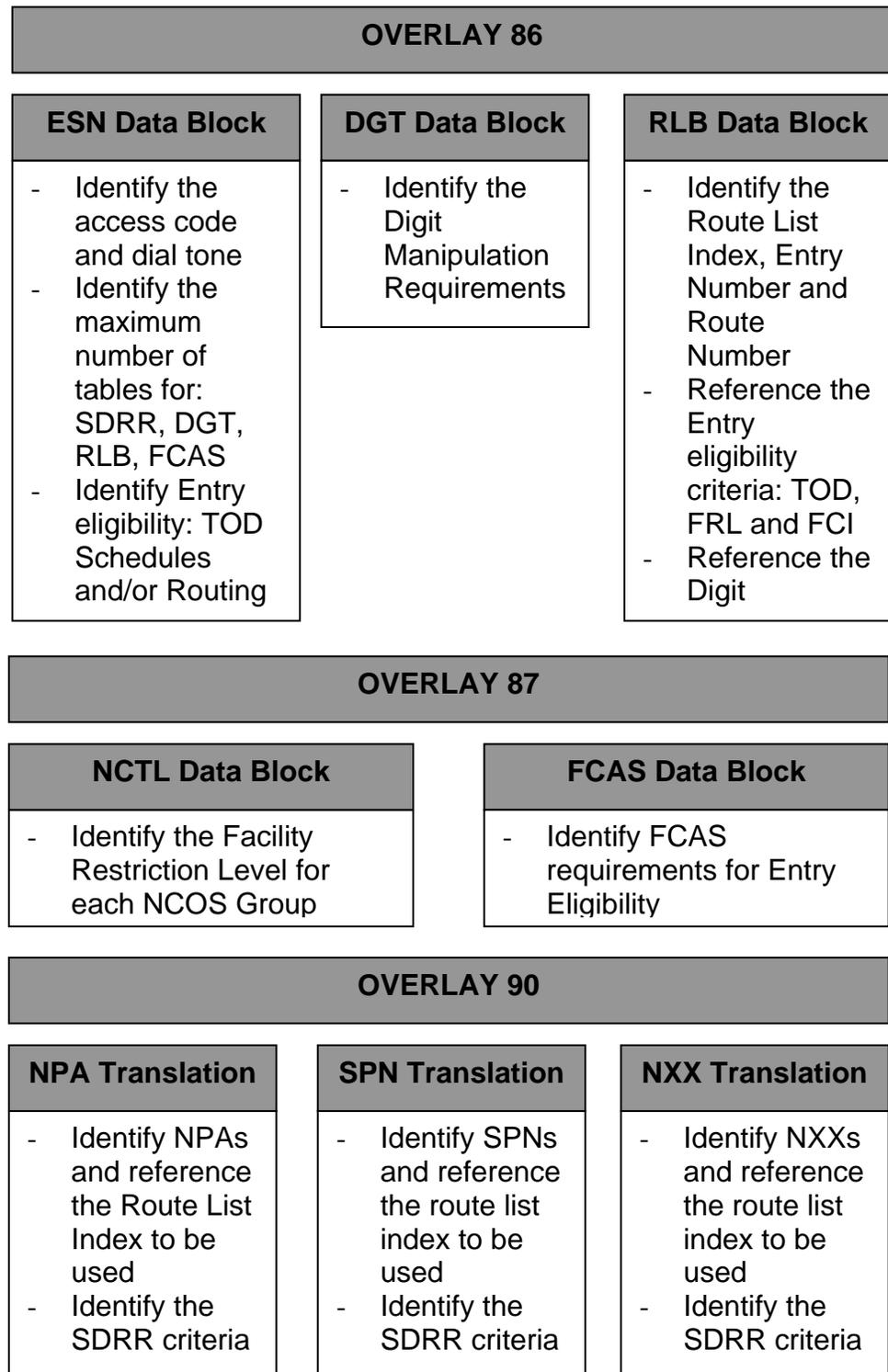
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## Lesson Content: BARS Overlays

### Overview

The three overlays used for programming BARS call processing are Overlays 86, 87, and 90. Provisioning of these overlays impacts the performance of every stage of BARS call processing.

Figure 4.5.1



## Lesson Content: BARS Overlays, continued

---

### ESN Data Block – LD 86

When users dial the BARS access code, they trigger BARS call processing and immediately receive dial tone.

Both the access code and the dial tone are programmed in Overlay 86 in the ESN Data Block. BARS software provides one access code, and NARS software provides 2 access codes. Both BARS and NARS software are included in BASE software packages.

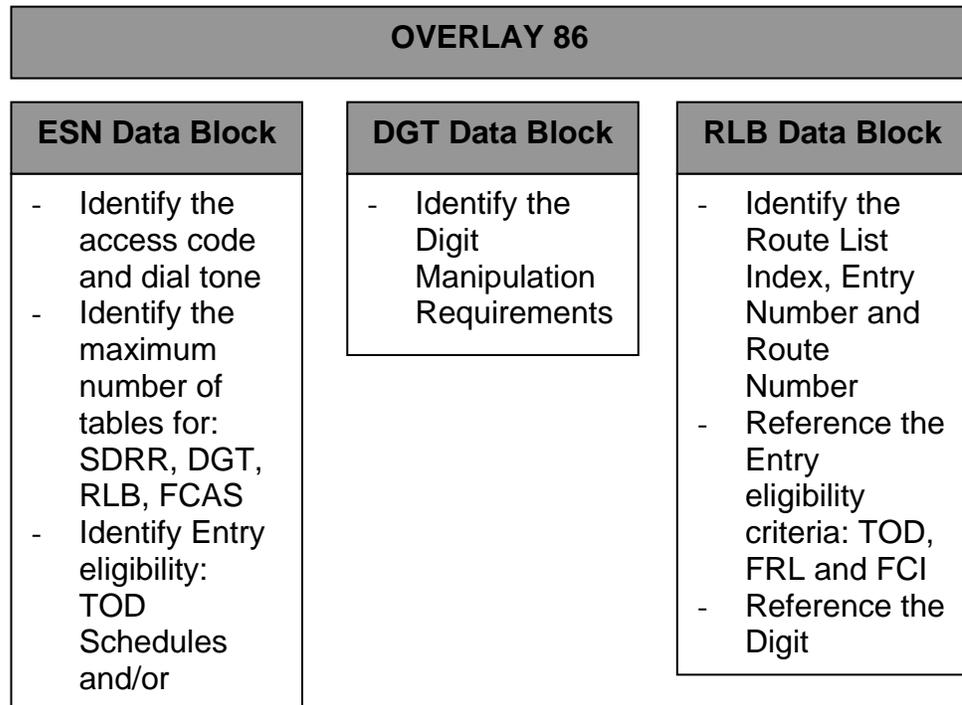


Figure 4.5.2: ESN Data Block – LD86

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## Lesson Content: BARS Overlays, continued

---

### ESN Data Block Features

The Electronic Switched Network (ESN) data block defines a variety of features and parameters necessary for defining a BARS or BARS database.

The following BARS/NARS features are defined in the ESN Data Block:

ESN Data Block Features	
Feature	Description
AC1	Access Code 1 (NARS/BARS)
AC2	Access Code 2 (NARS only)
DLTN	Dial tone after dialing AC1 and AC2
ERWT	Expensive Route Warning Tone
ERDT	Expensive Route Delay Time
TODS	Time of Day Schedules
RTCL	Routing Control
NMAP	NCOS Map
ETOD	Extended Time of Day Schedule
TGAR	Check for Trunk Group Access Restrictions

---

## Lesson Content: BARS Overlays, continued

---

### ESN Data Block Parameters

The ESN data block is provisioned (defined) in LD 86. The prompts used to set maximum parameters must be provisioned before any subsequent tables or blocks can be defined (MXSD, MXRL, MXDM, and so forth). These maximum settings are used to configure head tables in memory, which determines the numbering range of the associated types of tables.

<b>ESN Parameters</b>	
<b>Parameter</b>	<b>Description</b>
MXLC	Maximum number of Location Codes (NARS only)
MXSD	Maximum number of Supplemental Digit restrictions and recognition blocks
MXIX	Maximum number of Incoming trunk group exclusion table
MXDM	Maximum number of Digit Manipulation tables
MXRL	Maximum number of Route Lists
MXFC	Maximum number of Free Calling Area Screening tables
MXFS	Maximum number of special number Screening tables

---

## **Practice Activity: Programming the ESN Data Block**

---

### **Directions**

Complete Work Order 09C:

---

## Lesson Content: BARS Overlays, continued

---

### Network Control Data Block (NCTL)

The Network Control Data Block (NCTL) assigns a Network Class of Service (NCOS) to a Facility Restriction Level (FRL). In addition, the NCTL determines if the NCOS is eligible for Expensive Route Warning Tone (ERWT).

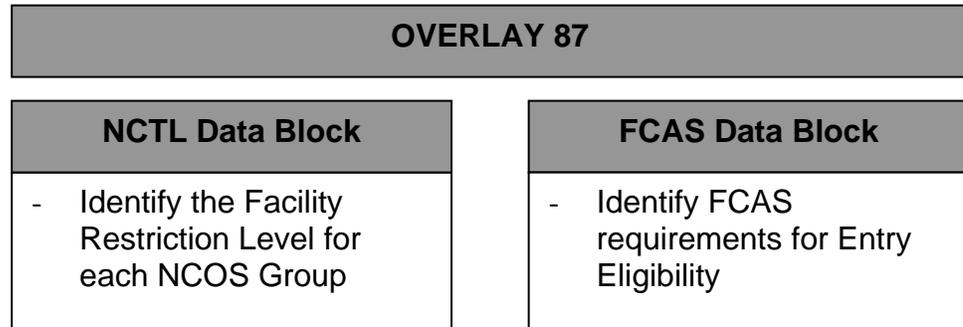


Figure 4.5.3

### Network Class of Service (NCOS)

Network Class of Service (NCOS) is a means of dividing BARS users into groups with different access restrictions and characteristics. An NCOS is assigned to each station and TIE trunk in the system.

### Network Control Data Block Parameters

NCTL Parameters	
Parameter	Description
NCOS	Network Class of Service group number
FRL	Facility Restriction Level
RWTA	Expensive Route Warning Tone

### NCOS Limitations

The maximum number of Network Class of Service (NCOS) tables is 100 (0–99)

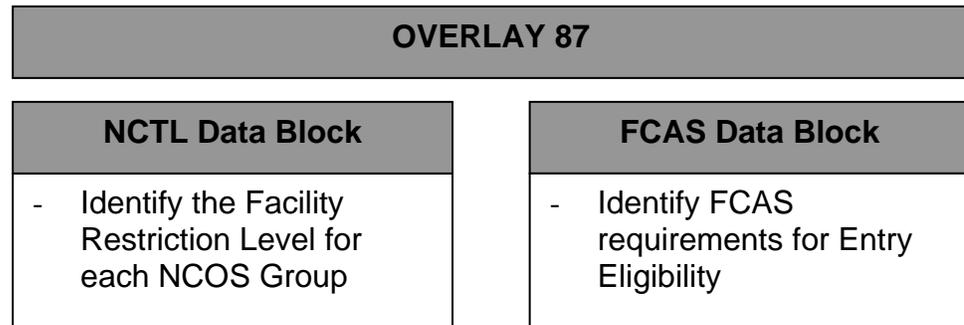
- Eligibility for a route list entry, via Facility Restriction Level (FRL)
- Eligibility to receive Expensive Route Warning Tone (RWTA)
- Eligibility to access Off-Hook Queuing (OHQ) feature
- Eligibility to access the Call Back Queuing (CBQ) feature

## Lesson Content: BARS Overlays, continued

---

### Free Calling Area Screening (FCAS)

Free Calling Area Screening (FCAS) is a BARS feature that provides the customer with the capability of full six-digit (NPA + NXX) screening to determine the Entry Choice for completion of calls in the format of AC1+ (1) + NPA + NXX + XXXX. FCAS provides a way to deny an NPA+NXX on one entry in a route list, while allowing the same NPA + NXX on another entry in a route list.



**Figure 4.5.4**

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### Purpose of FCAS

The purpose of the FCAS is as follows:

- To allow NXX codes within the free calling area surrounding a particular FEX or TIE trunk and restrict (deny) calls to those NXX codes that would incur long distance charges to a particular FEX or TIE trunk
  - To deny NXX codes to be routed over an OCC trunk when it is more cost-effective to route those calls over other facilities (COT, FEX, or TIE)
  - To differentiate between inter-lata versus intra-lata NXX different facilities or digit manipulations
  - To allow calls in format AC1+(1)+NPA-555-1212 to be routed over COTs only
-

## Lesson Content: BARS Overlays, continued

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### FCAS Parameters

Following is a list of FCAS parameters:

- FCAS only applies to calls in the format (1)+NPA+NXX+XXXX.
- FCAS tables are referenced by each route list entry.
- Only one FCAS table can be referenced per entry.
- If an FCAS table allows NXX for a given NPA, only those NXXs are allowed to route over the entry.
- If an FCAS denies NXXs for a given NPA, only those NXXs are denied over the entry. Any NXXs not listed are allowed.

FCAS Parameters	
Parameter	Description
FCI	Free Calling Area Screening Index Number
NPA	Three-digit NPA code to be screened
NXX	NXX codes for NPA
DENY	NXX code or range of codes to be Denied
ALLOW	NXX code or range of codes to be Allowed

### FCAS Limitations

Following is a list of FCAS limitations:

- The maximum number of Free Calling Area Screening (FCAS) tables per customer is 256 (0–255) (LD 86 ESN MXFC).
  - The maximum number of NPAs per FCAS table is 15.
  - The maximum number of NXXs per NPA is 800 (200–999).
  - BARS reserves FCAS table 0 to indicate the no free calling area screening is required for an entry.
  - FCAS is defined in LD 87.
  - Refer to QRC for provisioning steps, prompts, and responses.
-

## **Practice Activity: Programming the NCTL and FCAS Data Blocks**

---

### **Directions**

Complete Work Order 10C:

---

## Lesson Content: BARS Overlays, continued

---

### Digit Manipulation (DGT)

After BARS selects the entry number and route for an outgoing call, it seizes the idle trunk and prepares the dialed number for the outgoing trunk. Digit manipulation deletes or inserts leading digits before outpulsing the call. Three data blocks support the digit manipulation process.

Data Block	Description
ESN	Identifies the maximum number of digit manipulation tables allowed for the unit.
RLB	Identifies the digit manipulation index that applies to this route list index entry
DGT	Defines parameters for the digit manipulation index. Defines whether to delete and/or insert leading digits before outpulsing the call.

### Digit Manipulation Parameters

DGT Parameters	
Parameter	Description
DMI	Digit Manipulation Index Number
DEL	Number of leading digits to be Deleted
INST	Digits to be Inserted

---

## **Practice Activity: Programming Digit Manipulation Tables**

---

### **Directions**

Complete Work Order 11C:

---

## Lesson Content: BARS Overlays, continued

---

### Automatic Least Call Routing

Automatic Least Cost Routing is the method by which BARS automatically routes a call over the most cost-effective route available.

For each call that passes network translation, BARS selects a route from a list of up to 64 alternative outgoing routes to complete the call. A list of routes over which calls to a particular destination can be completed is called a route list, and each route specified in a list is called an entry. BARS searches the route list, beginning at Entry 0 and then searches for an idle eligible trunk.

Any combination of outgoing trunks (for example COT, WATS, FEX, or TIE) can be specified in a route list. The first entries in a route list are the least-cost routes to a destination, and are the Initial Set (ISET) of routes in the list. The last entries in the list are less cost-effective and comprise the Extended Set (ESET) of routes in the list.

---

### Route Selections

The ESN data block sets the maximum number of Route List Indexes (RLIs) allowed for this customer numbered from 0 to 255 (1000 if Flexible Plan is being used.)

RLB data blocks stores route lists indexes containing entries and associated route numbers defined by the administrator for cost effectiveness. BARS will locate the route list specified in the network translation and scans it in the defined order. The search starts at ENTR 0 and continued until an eligible entry and idle trunk are located for call completion.

---

## Lesson Content: BARS Overlays, continued

### Process for Building Route Lists

A six-step process is used to determine the appropriate number of route list entries required:

How to Build a Route List	
Step	Action
1	List the customer's trunk routes by: <ul style="list-style-type: none"> <li>• Route number</li> <li>• Type of trunk route</li> <li>• Calling areas served by that route</li> </ul>
2	List the types of calls the customer will make: <ul style="list-style-type: none"> <li>• Local</li> <li>• Inter-lata</li> <li>• Intrastate</li> <li>• Interstate</li> <li>• International</li> </ul>
3	A route list is typically created for each type identified. The following criteria could result in needing additional route lists: <ul style="list-style-type: none"> <li>• User's levels of access</li> <li>• DSN/AUTOVON</li> <li>• FCAS limitations (15 NPAs per FCI)</li> <li>• DMI requirements</li> </ul>
4	For every route list created, identify each trunk route that can process calls to the destination. In order of search (least expensive first), assign route list entry number to each trunk route.
5	Declare the ISET.
6	Assign a route list number to each type of call.
End of procedure	

## Lesson Content: BARS Overlays, continued

### Route List Data Block (RLB)— Facility Restriction

The RLB data block provides a place to set the minimum Facility Restriction Level (FRL) that is required for use on each route list entry (ranging from 0 to 7). The higher the FRL number, the more restrictive the route becomes. The caller's NCOS is compared to the route list entry's FRL and if the NCOS is equal to or greater than the FRL, the caller is eligible to access the route for outgoing calls.

### Initial Set (ISET)

The Initial Set (ISET) contains the entries in a route list over which the system attempts to complete a call before checking for additional expensive route warning tone criteria.

Following is a list of ISET parameters:

- Entries in a route list should be listed in order of search from least expensive to most expensive.
- All entries that are not included in the ISET are called the Extended Set (ESET).
- After declaring ISET, the remaining entries automatically become the ESET.
- The entry must be in the ISET to allow Expensive Route Warning Tone (ERWT).

### Route List Block (RLB) Parameters

The Route List Data Block (RLB) is provisioned in Overlay 86.

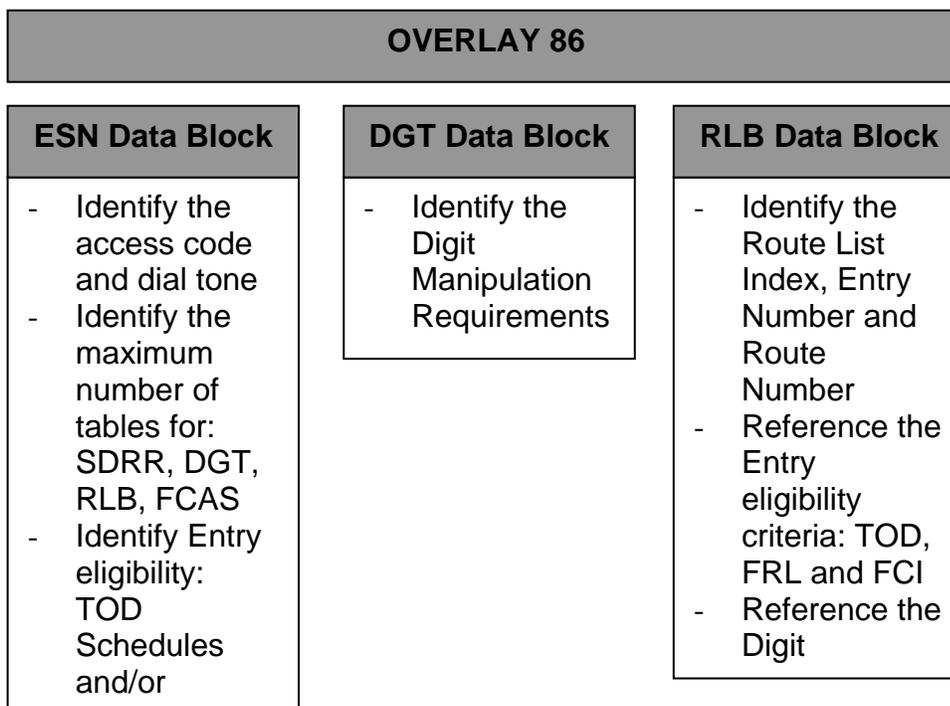


Figure 4.5.5

## Lesson Content: BARS Overlays, continued

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### Route List Block (RLB) Parameters

The following parameters must be configured when provisioning the Route List Data Block (RLB) for automatic least cost routing.

RLB Data Block Parameters	
Feature	Description
RLI	Route List Index to be accessed
ENTR	Entry number for BARS Route list
ROUT	Route Number
EXP	Expensive Route
FRL	Facility Restriction Level
DMI	Digit Manipulation Index Number
FCI	Free Calling Area Screening Index number
ISET	Initial Set

### Automatic Least Call Routing—Limitations

The maximum number of route list indexes is 1000 for BARS/NARS customers. The maximum number of routes in a route list index is 64 (0–63).

---

## **Practice Activity: Programming the Route List Data Block**

---

### **Directions**

Complete Work Order 12C:

---

## Lesson Content: BARS Overlays, continued

---

### Network Translation— LD 90

BARS provides network translation tables. The system translates the access code, determines that the call is to be processed by BARS and selects the appropriate network translation table. Based upon digits dialed, the network translation determines the route list index to be used to process the call.

The network translation tables are provisioned in Overlay 90. The three translation types in the tables are NPA, SPN, and NXX. You can input as many NPA, SPN, or NXX entries as needed as there is no limitation.

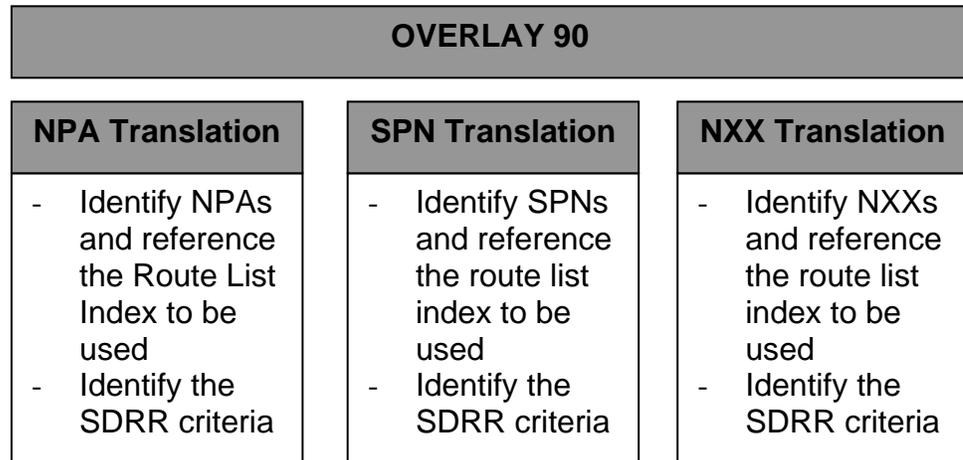


Figure 4.5.6

### NET Parameters

The four types of network translations are listed below:

- NPA + 7 Digits
- NXX + 4 Digits
- SPN + Flexible Length
- HNP + 7 Digits

### NET Limitations

Identical NPAs, NXXs, SPNs, and HNPAs cannot be assigned. Numbers must be unique from the left to right.

---

## Lesson Content: BARS Overlays, continued

### Supplemental Digit Restriction (SDRR)

The purpose of Supplemental Digit Restriction (SDRR) is to block a specific telephone number or range of telephone numbers within an NPA, NXX, or SPN. When supplemental digit restriction is in effect for a specific telephone number or range of telephone numbers, access to those numbers through BARS software is denied to all station users.

### SDRR Parameters

A supplemental digit restriction entry requires an SDRR block. SDRR can be applied to an NPA, NXX, or SPN (LD 90).

To override an SDRR entry, a station user must directly access a trunk and bypass BARS.

Calls blocked through SDRR Deny are intercepted and the user received intercept treatment (NRES).

SDRR Parameters	
Parameter	Definition
NPA SDRR	An SDRR for an NPA can be from 1 to 11 digits, depending on the length of the NPA translation and whether 1+ dialing will be utilized.  Example: NPA: 1205 SDRR: DENY DENY: X..X (entry can be up to 11 digits)
NXX SDRR	An SDRR for an NXX can be from 1 to 8 digits, depending on the length of the NXX translation and whether 1+ dialing will be utilized.  Example: NXX: 781 SDRR: DENY DENY: X..X (Entry can be up to 8 digits)
SPN SDRR	An SDRR for an SPN can be from 1 to 19 digits, depending on the length of the SPN translation.  Example: SPN: 011 SDRR: DENY DENY: X..X (Entry can be up to 19 digits)
Continued next page	

## Lesson Content: BARS Overlays, continued

---

### SDRR Parameters, contd.

Parameters	Definitions
SDRR DENY Entry	Denies the call if the digits in the entry match the digits dialed.
SDRR ALLOW Entry	Lets a call process if the digits in the entry match the digits dialed, even if a shorter version of the number is denied.  This is a restricted example: NPA: 1312 SDRR: DENY DENY: 976 SDRR: ALLOW ALLOW: 9761234
	The Allow entry only works in conjunction with the other SDRR entries:  This does not have a Deny entry example: NPA: 1312 SDRR: ALLOW ALLOW: 9761234
<p>Not only is 976-1234 allowed, but every number in NPA 1312 is blocked. This blocks all other numbers dialed in NPA 1312.</p> <p><b>NOTE:</b> The SDRR digits do not have to be left wise unique. For non-left wise unique numbers, the longer number takes precedence over the shorter number. Always look for a longer allow code.</p>	

### SDRR Limitations

The following is a list of SDRR limitations:

- 1,500 SDRR blocks per customer
  - 1 SDRR block per NPA, NXX, or SPN
  - 64 SDRR entries per block
-

## Lesson Content: BARS Overlays, continued

---

### Supplemental Digit Recognition (SDRR)

The purpose of Supplemental Digit Recognition (SDRR) is to recognize local DDD numbers or DID numbers that terminate at the local switch (the switch providing the call routing). After these numbers are recognized, the system terminates the call at a station if a DID number was dialed or at the attendant if a DDD number was dialed. A route list is not searched. Trunks are not unnecessarily used to complete the call.

---

### SDRR Parameters

A Supplemental Digit Recognition entry (LDDD or LDID) requires an SDRR block. The two types of supplemental digit recognition entries are listed below:

- SDRR LDDD: Local DDD numbers that normally terminate at the local attendant. After the number is recognized, the system does not search a route list for an outgoing trunk, but deletes the entire number dialed and dials the attendant DN (as defined in the CDB ATDN). The call remains internal.
- SDRR LDID: Local DID number that normally terminate at the local station. After the number is recognized, the system does not search a route list for an outgoing trunk, but rings the internal station user. The call remains internal.
- Supplemental digit recognition can be applied to an NPA, NXX, or SPN (LD 90).

Parameters	Definitions
NPA SDRR	A SDRR entry for an NPA can be from 1 to 7 digits.
NXX SDRR	A SDRR for an NXX can be from 1 to 4 digits.
SPN SDRR	A SDRR entry for an SPN can be from 1 to 10 digits.
<p><b>NOTE:</b> The SDRR digits do not have to be left wise unique. For non-left wise unique numbers, the longer number takes precedence over the shorter number.</p> <p>To override an SDRR entry, a station user must directly access a trunk and bypass BARS. Supplemental digit recognition may be applied to an NPA, NXX, or SPN (LD 90).</p>	

---

### SDRR LDDD and LDID Limitations

The following limitations apply to LDDDs and LDIDs:

- 1500 SDRR blocks per customer
  - 1 SDRR block per NPA, NXX, or SPN
  - 64 SDRR entries per block
-

## Lesson Content: BARS Overlays, continued

---

### NPA Digit Translation

The purpose of NPA network translation is to locate the NPA dialed by the station user in the translation table and determine over which route list the call is to be routed.

The parameters are as follows:

- No limit in the number of NPAs
- Must be in proper NPA format
- 3 to 10 digits in length
- 4 to 11 digits in length if 1+ dialing

#### NPA

- N = 2 to 9
- P = 0 to 9
- A = 0 to 9

### NPA Parameters

Numbering Plan area code data block parameters	
Feature	Description
FEAT	FEAT = NET
TRAN	Translator (AC1, AC2, or SUM)
TYPE	TYPE = NPA
NPA	Numbering Plan Area code translation. Precede the xxx entry the character "1" when using 1+ dialing.
RLI	Route List Index
SDRR	Supplemental Digit Restriction or Recognition
ALLOW	Allowed codes
DENY	Number to be denied within the NPA
LDID	Local DID number to be recognized
LDDD	Local DDD number to be recognized

---

## Lesson Content: BARS Overlays, continued

---

### NXX Digit Translation

The purpose of the NXX network translation is to locate the NXX dialed by the station user and determine over which route list the call is to be routed.

The parameters are as follows:

- No limit in the number of NXXs
- Must be in proper NXX format
- 3 to 7 digits in length
- 4 to 8 digits in length if 1+ dialing

#### NXX

- N = 2 to 9
- X = 0 to 9
- X = 0 to 9

### NXX Parameters

Central Office Code data block parameters	
Feature	Description
FEAT	FEAT = NET
TRAN	Translator (AC1, AC2, or SUM)
TYPE	TYPE = NXX
NXX	Numbering Plan Exchange (Central Office)
RLI	Route List Index
SDRR	Supplemental Digit Restriction or Recognition
ALLOW	Allowed codes
DENY	Number to be denied within the NXX
LDID	Local DID number to be recognized
LDDD	Local DDD number to be recognized

---

## Lesson Content: BARS Overlays, continued

---

### SPN Digit Translation

The purpose of the SPN network translation is to locate the SPN dialed by the station user in the translation table and determine over which route list the call is to be routed. Remember that a special number is a digit sequence that does not conform to the standard NPA or NXX format.

The parameters are as follows:

- No limit in the number of SPNs
  - Can be any combination of digits
  - 1 to 19 digits in length
- 

### Flexible 0 Routing

When an SPN is encountered, a special check is made to determine if a zero was dialed. If zero has been dialed, the system waits for the next one or two digits (or end of dialing indication). The system directs the call to the route list index and proceeds with call processing.

This feature lets a few non-left wise unique, dialing sequences to be entered in a network translation table. Left wise unique means that each entry cannot match the leftmost portion of any entry in the table.

The ESN translation table lets any or all of the following non-left wise unique numbers (along with their associated route list) is entered:

- 0
  - 00
  - 01
  - 011
-

## Lesson Content: BARS Overlays, continued

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### SPN Parameters

Special Number Translation data block parameters	
Feature	Description
FEAT	FEAT = NET
TRAN	Translator (AC1, AC2, or SUM)
TYPE	TYPE = SPN
SPN	Special Number Translation
FLEN	Flexible Length
RLI	Route List Index
SDRR	Supplemental Digit Restriction or Recognition
ALLOW	Allowed codes
DENY	Number to be denied
LDID	Local DID number to be recognized
LDDD	Local DDD number to be recognized

---

## **Practice Activity: Programming NET Translators**

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### **Directions**

Complete Work Orders 13C,14C & 15C:

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## Lesson Content: BARS Overlays, continued

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### Home NPA Digit Translation (HNPA)

The purpose of the HNPA network translation is to locate the HNPA dialed by the station user, delete the HNPA, and locate the NXX dialed to determine the route list over which the call is to be routed.

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### HNPA Parameters

The parameters are as follows:

- Only one HNPA can be defined
  - Most commonly used in areas that do not require the home NPA to be dialed for toll calls
  - (1) + HNPA + NXX + XXXX (HNPA is automatically deleted from dialed digit sequence). (HNPA or 1 + HNPA)
  - Can be 3 or 4 digits in length
- 

Home Number Plan area code data block parameters	
Feature	Description
FEAT	FEAT = NET
TRAN	Translator (AC1, AC2, or SUM)
TYPE	TYPE = HNPA
HNPA	Home Numbering Plan Area code

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## Lesson Content: BARS Overlays, continued

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### Expensive Route Warning Tone (ERWT)

The Expensive Route Warning Tone (ERWT) alerts the caller that an expensive route has been selected to complete the call and provides the caller with the option of either:

- Accepting the expensive route and completing the call
- Aborting the call

ERWT is three bursts of tone.

---

### ERWT Criteria

For the user to hear Expensive Route Warning Tone (ERWT), all of the following criteria must be met for the call:

- Expensive Route Warning Tone (ERWT) must be turned on for the customer (LD 86 ESN ERWT)
- Expensive Route Warning Tone (ERWT) must be turned on for the station's NCOS (LD 87 NCTL RWTA)
- The entry the system has chosen for this call must be in the extended set (defined by ISET)
- The entry that the system has chosen for this call must be classified as expensive (LD 86 RLB EXP)

**NOTE:** Expensive Route Delay Time (prompt ERDT) is programmed in two-second intervals: 2-(6)-10 (LD 86 ESN). Because there is a default of six seconds, the system sets ERDT automatically.

---

## Lesson Content: BARS Overlays, continued

### Routing Control (RTCL)

The Routing Control (RTCL) lets you change a group of users' NCOS during a specified time period. When RTCL is invoked, members of the NCOS receive an alternative NCOS assignment that is typically lower so that unauthorized after hour calls cannot be made. RTCL is:

- Programmed in Overlay 86—ESN Datablock
- Invoked by a special time of day schedule (TODS 7) on a specified day or days (Extended TOD or ETOD)
- Created by changing RTCL to Yes and programming the ETOD and NMAP
- Manually invoked by a key on the attendant console (RTC key)

### Eligibility Criteria

The Eligibility Criteria are programmed using the following information:

Term	Definition
Network Class of Service (NCOS)	The caller's NCOS define a Facility Restriction Level (FRL). NCOS provisioning divides the unit's users into groups of up to 100, each with its own eligibility criteria for making outgoing calls. NCOS-based call eligibility is defined by provisioning in Overlay 86 and 87. BARS uses the FRL assigned to an NCOS to determine the eligibility.
Routing Control (RTCL)	RTCL can be used to alter a user group's NCOS. This is used by call forward by call type feature.
Time of Day Schedules (TODS)	<p>The administrator uses the ESN data block in Overlay 86 to define Time of Day schedules for up to eight time periods within a 24-hour day. The eight schedules are numbered 0–7 (TODS 0 to TODS 7). By default, TOD schedule 0 contains the entire 24 hours of the day. The administrator can reassign time from a 24-hour day into schedules 1 to 7 and use the schedule number to "turn off" route list entries where applicable.</p> <p>Using the RLB data block in Overlay 86, the administrator assigns a route list entry to a TOD schedule. Each references all schedule numbers from 0 to 7. During provisioning, the administrator "turns off" access to an entry for a specific Time of Day schedule identified as 0 through 7. Entries previously "turned off" can be turned back on through a service change to the route list.</p>

## Review Activity: BARS Overlays

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### Directions

Using the information you have learned in this module of instruction, answer the following questions.

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### Questions

- In which BARS overlay and data block would you enable the dial tone that users hear after dialing?
  - Overlay 86, DGT data block
  - Overlay 86, ESN data block
  - Overlay 86, ACI data block
  - None. The dial tone can't be changed in a BARS overlay. It can only be changed in NARS.
- In which overlay and translation table will BARS search for the following dialed digits to perform a network translation check?  

97666999

  - Overlay 90, NXX data block
  - Overlay 86, ESN data block
  - Overlay 90, NPA data block
  - Overlay 90, SPN data block
- Ray's unit wants to deny all station users' access to 976 numbers in all area codes. In which overlay would the SDRR block be defined that he needs to provision to handle this request?
  - Overlay 86, ESN data block
  - Overlay 90, SPN translation
  - Overlay 90, NPA translation
  - Overlay 90, NXX translation
- To make a change to an existing route list, which overlay and data block(s) would you use?
  - Overlay 86, ESN data block
  - Overlay 86, RLB data block
  - Overlay 86, NPA data block and RLB data block
  - Overlay 87, FCAS data block

## Review Activity: BARS Overlays, continued

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### Questions, contd.

5. The unit determines it does not want any calls going out after 6:00 p.m. every day. Where would you provision this change?
- A. Overlay 86, ESN data block
  - B. Overlay 87, FCAS data block
  - C. Overlay 86, RLB data block
  - D. Overlay 87, NCTL data block
6. Your unit wants to restrict all users who are not managers from having access to COT trunks for long-distance calls. All managers have an NCOS that has an FRL of 5 assigned. What is the minimum FRL that you must assign to route list entries that access COT trunks for long distance calls in order to restrict all others?
- \_\_\_\_\_
- \_\_\_\_\_
7. Your unit asks you to change everyone's Network Class of Service just for the upcoming holiday which falls on a Monday. You can provision this request in Overlay 86 ESN data block by defining:
- \_\_\_\_\_
- \_\_\_\_\_
8. The unit determines that the COT trunk should only serve NXXs 616 and 626 in NPA 212. In which overlay and data block would you define the index that contains these restrictions?
- A. Overlay 86, ESN data block
  - B. Overlay 87, FCAS data block
  - C. Overlay 86, RLB data block
  - D. Overlay 87, FSNS data block
9. The unit wants you to delete three leading digits for TIE trunk calls to its new office in San Francisco. A DMI that deletes three leading digits and inserts no leading digits currently exists. In which overlay would you assign this DMI to the entry associated with the TIE route?
- A. Overlay 87, NCTL data block
  - B. Overlay 86, ESN data block
  - C. Overlay 86, DGT data block
  - D. Overlay 86, RLB data block

## Review Activity: BARS Overlays, continued

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### Questions, contd.

10. In which BARS overlay and data block would you change a time of day schedule?
    - A. Overlay 86, RLB data block
    - B. Overlay 87, NCTL data block
    - C. Overlay 90, NPA data block
    - D. Overlay 86, ESN data block
  
  11. In which overlay and data block would you program BARS to prevent users from dialing 900 numbers by deleting them from the table?
    - A. Overlay 90, NXX translations
    - B. Overlay 90, NPA translations
    - C. Overlay 86, ESN data block
    - D. Overlay 86, RLB data block
  
  12. In which overlay and data block would you program BARS to define which NXXs will be allowed or denied following a dialed NPA (true 6-digit screening)?
    - A. Overlay 86, ESN data block
    - B. Overlay 87, FCAS data block
    - C. Overlay 90, RLB data block
    - D. Overlay 86, NCTL data block
  
  13. In which data block would you define the parameters of the following tables: minimum number of SDRR blocks, maximum number of digit manipulation tables, and maximum number of route lists?
    - A. Overlay 86, DGT data block
    - B. Overlay 87, NCTL data block
    - C. Overlay 86, ESN data block
    - D. Overlay 86, RLB data block
  
  14. In which data block would you identify the digit manipulation index that a specific route entry points to?
    - A. Overlay 86, DGT data block
    - B. Overlay 87, NCTL data block
    - C. Overlay 86, ESN data block
    - D. Overlay 86, RLB data block
  
  15. In which overlay data block would you provision BARS to change the network class of service group's facility restriction level in order to allow this NCOS outgoing long distance telephone calls during a TODS 7 schedule?
    - A. Overlay 86, ESN data block
    - B. Overlay 87, RLB data block
    - C. Overlay 87, NCTL data block
    - D. Overlay 87, FCAS data block
-

## Summary

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### Lesson Summary

Upon completion of this lesson presentation and practice exercise, you will be able to:

**4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.

**4.1.1 REVIEW** manufacturer's documentation

**4.1.2 REVIEW** applicable security policies

**4.1.3 DETERMINE** customer configuration

**4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block

**4.1.5 PROGRAM** a Network Control (NCTL) Data Block

**4.1.6 PROGRAM** a Digit Manipulation (DGT) Data Block

**4.1.7 PROGRAM** a Free Calling Area Screening (FCAS) Data Block

**4.1.8 PROGRAM** a Route List Block (RLB)

**4.1.9 PROGRAM** a Numbering Plan Area (NPA) Data Block

**4.1.10 PROGRAM** a Central Office Translation Code (NXX) Data Block

**4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block

**4.1.12 PERFORM** function check

**4.1.13 COMPLETE** unit documentation

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## LESSON 6

### INTERCEPT TREATMENT

#### Overview

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##### Overview

In this lesson you will be introduced to BARS intercept treatments. This is where the calls that are not completed are handled. These intercept treatments are provisioned in Overlay 15. There will be a performance activity at the end of this lesson to test comprehension of the key performance elements that you'll need to perform for upcoming tasks.

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##### Performance Objectives

Upon successful completion of this lesson, you will be able to:

- 4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.
    - 4.1.1 REVIEW** manufacturer's documentation
    - 4.1.2 REVIEW** applicable security policies
    - 4.1.3 DETERMINE** customer configuration
    - 4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block
    - 4.1.5 PROGRAM** a Network Control (NCTL) Data Block
    - 4.1.6 PROGRAM** a Digit Manipulation (DGT) Data Block
    - 4.1.7 PROGRAM** a Free Calling Area Screening (FCAS) Data Block
    - 4.1.8 PROGRAM** a Route List Block (RLB)
    - 4.1.9 PROGRAM** a Numbering Plan Area (NPA) Data Block
    - 4.1.10 PROGRAM** a Central Office Translation Code (NXX) Data Block
    - 4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block
    - 4.1.12 PERFORM** function check
    - 4.1.13 COMPLETE** unit documentation
- 

##### Performance Evaluations

The performance evaluations for these tasks are scheduled immediately following this lesson. These performance evaluations will be in delivered via a work order. These work orders will test the performance objective you have just completed in this lesson. These work orders will build in complexity based on previous tasks from previous lessons. These performance evaluations will be in a separate workbook from your student guide. Your instructor will hand out these workbooks out in class. Please do not complete these work orders prior to the instructor assigning them to you. You will work in your booth with your partner as a class. Your instructor will sign off these performance evaluations as you complete each tasks.

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## Overview, continued

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### References

Northern Telecom Publications (NTPs) is the documentation for the CS1000E system. These publications provide reference tools and information that is related to the various features and options of the system.

Document	Document #
<i>Communication Server 1000E Maintenance</i>	NN43041-700
<i>Communication Server 1000 Software Input Output Administration</i>	NN43001-611
<i>Communication Server 1000 Software Input Output Reference - System Messages</i>	NN43001-712
<i>Communication Server 1000 Software Input Output Reference - Maintenance</i>	NN43001-711
<i>Element Manager System Reference – Administration</i>	NN43001-632

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### Tools and Equipment

The tools and equipment used for this lesson are:

- Operational Nortel CS1000E
- 

### Job Aids

The job aids for this lesson are:

- Standard Intercept Treatments
  - Intercept Treatment Programming
- 

### Handouts

There are no handouts for this lesson.

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### Key Terms

Review the following key terms before you begin the reading assignment:

Terms	Definition
RAN	Recorded announcement.

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### Pre-Lesson Work

There is no pre-lesson work for this lesson.

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## Lesson Content: Intercept Treatments

### Overview

When a call does not meet call processing requirements, the caller receives a pre-programmed tone or message alerting them to the fact. This section examines the intercept treatments for calls that cannot be completed. This does not include BARS treatments. We will discuss how BARS Intercept treatments differ from standard system intercept treatments. For standard system wide intercept situations see below.

### Standard Intercept Treatments

Treatments for standard system wide intercept situations include:

Standard Intercept Treatments	
Treatment	Description
Access Denied (ACCD)	Applied to intercepted calls on trunks that the caller is not allowed to access
Calls to Vacant Numbers (CTVN)	Applied to intercepted calls made to an unassigned number
Maintenance Busy Number (MBNR)	Applied to intercepted calls when an attendant extends the call to: <ul style="list-style-type: none"> <li>A disabled station</li> <li>The switch room set in maintenance mode</li> </ul>

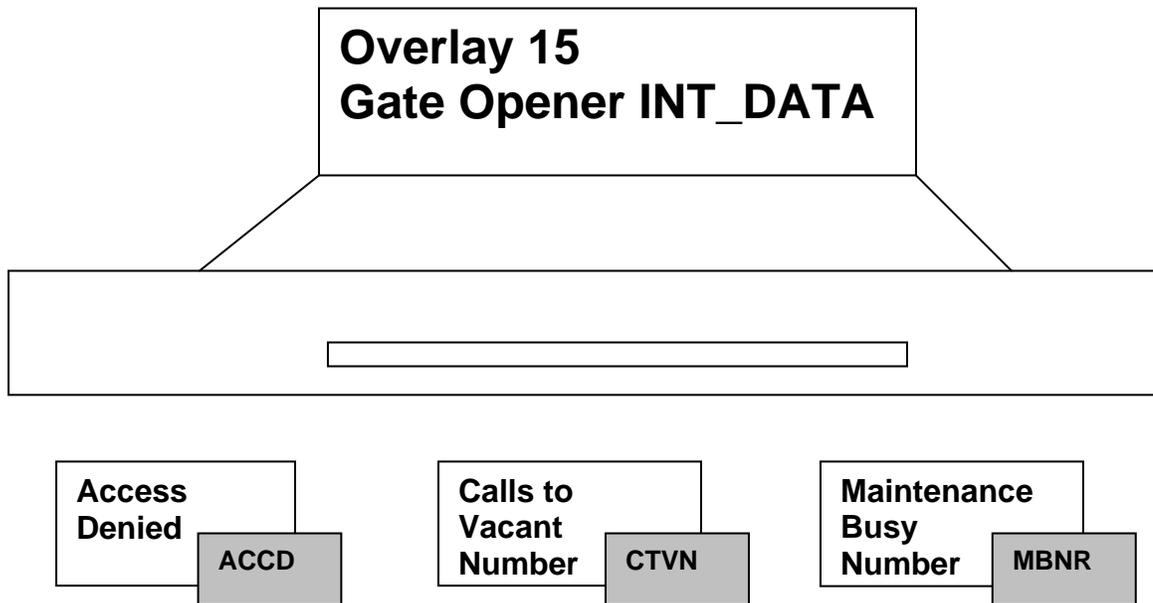


Figure 4.6.1: Standard Intercept Treatment

## Lesson Content: Intercept Treatments, continued

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### Four Point of Call Origination

The four points of call origination are:

- Station
- Attendant—Extended or Originated
- TIE Trunk
- DID

“SCORE A TOUCH DOWN”

---

### Intercept Treatment Programming

Using the table below, choose one of the treatments for each of the four call originator types, or leave the default. Default entries are in parentheses.

- OVF—Overflow fast busy tone
- ATN—Attendant
- RAN—Ran treatment (requires a defined ran route number)

**Intercept Treatment Programming**

	Station	Attendant Expected or Originated	TIE Trunk	DID
<b>ACCD</b> —Access Denied	(OVF) ATN RAN	(OVF) ATN RAN	(OVF) ATN RAN	OVF (ATN) RAN
<b>CTVN</b> —Calls to Vacant Number	(OVF) ATN RAN	(OVF) ATN RAN	(OVF) ATN RAN	OVF (ATN) RAN
<b>MBNR</b> —Maintenance Busy Number	(OVF) ATN RAN	(OVF) ATN RAN	(OVF) ATN RAN	OVF (ATN) RAN

**Figure 4.6.2: Intercept Treatment Programming**

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## Lesson Content: Intercept Treatments, continued

### Recorded Announcement (RAN) Treatment

To use RAN as a treatment, you must first define a RAN route number in Overlay 16 and assign at least one trunk member to that route in Overlay 14. Overlay 15 presents the RAN Route program (RANR) as soon as the RAN response is entered. RANR is the reference to the route number of the recorded announcements.

<b>➤ LD 21</b>	
<b>REQ</b>	<b>PRT</b>
<b>TYPE</b>	<b>INT_DATA</b>
<b>CUST</b>	<b>0</b>
<b>ACCD</b>	<b>OVF OVF OVF ATN</b>
<b>CTVN</b>	<b>OVF OVF OVF ATN</b>
<b>MBNR</b>	<b>OVF OVF OVF RAN</b>

Figure 4.6.3: RAN Treatment

### BARS/NARS Intercept Treatments

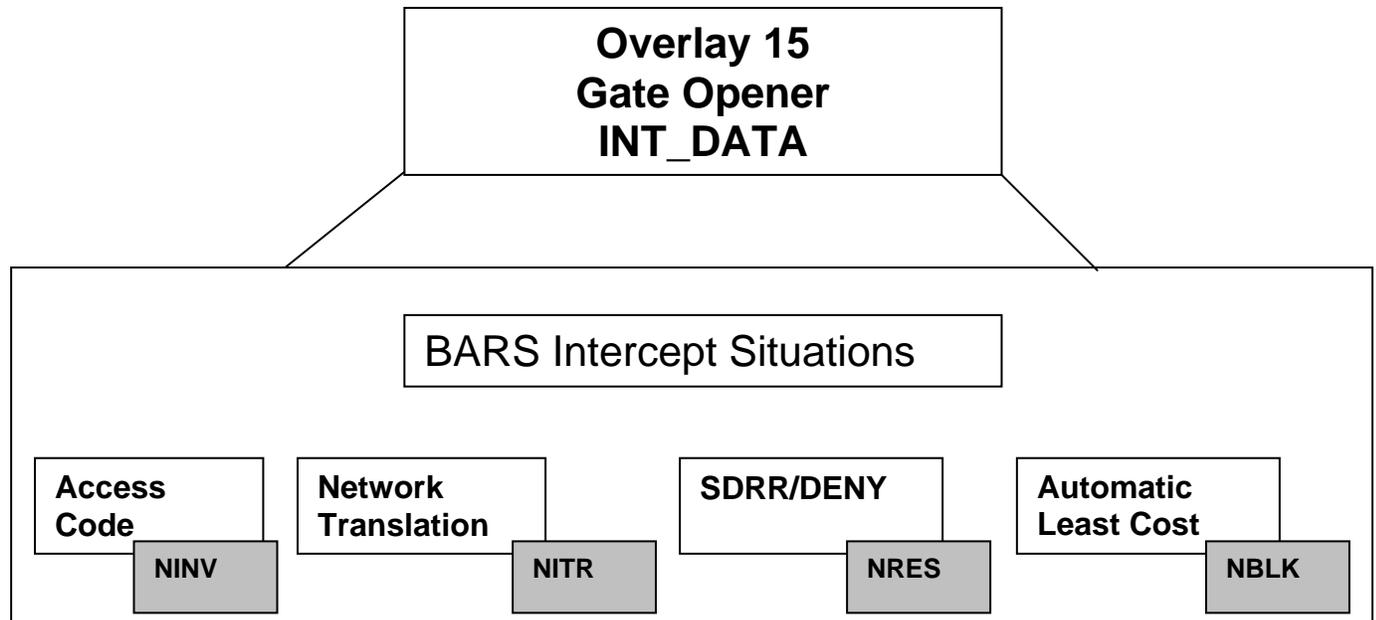
At any stage during the BARS process, a call can be intercepted due to call restrictions or dialing irregularities. Each time the call is intercepted, the caller receives a defined intercept treatment. This section discusses intercept situations and typical treatments.

<b>Treatment</b>	<b>Description</b>
NINV	Applied to a call if the BARS Access Code was defined but either the network translation or network control data blocks were not yet defined. This situation should only occur during initial BARS provisioning.
NITR	Applied to a call when there is no match of the dialed digits found in the NPA, SPN, or NXX network translation tables.
NRES	Applied to a call when the dialed digits match supplemental digits that are restricted.
NBLK	Applied to a call that doesn't meet route list entry checks of eligibility based on time of day, free Calling Area Screening, or Facility Restriction Level criteria. A call can also be blocked when a trunk is not available.

## Lesson Content: Intercept Treatments, continued

### Overlay 15 Provisioning for BARS

Provisioning in Overlay 15 supports all BARS intercept situations and treatments in the same way that it supports standard intercept treatments.



**Figure 4.6.4: Overlay 15 Provisioning**

You must define which treatment response to apply for various types of call originators to each BARS intercept treatment prompts. As with standard intercept treatments, three options are available:

- Overflow (OVF)
- Route to the Attendant (ATN)
- Recorded Announcement (RAN)

## Lesson Content: Intercept Treatments, continued

### Overlay 15 Provisioning, contd.

#### BARS Intercept Treatment Programming



	Station	Attendant Expected or Originated	TIE Trunk	DID
<b>NINV</b> —Access Code Intercept (No NET or NCTL)	(OVF)	(OVF)	(OVF)	OVF
	ATN	ATN	ATN	(ATN)
	RAN	RAN	RAN	RAN
<b>NITR</b> —Translation Table Intercept	(OVF)	(OVF)	(OVF)	OVF
	ATN	ATN	ATN	(ATN)
	RAN	RAN	RAN	RAN
<b>NRES</b> —SDRR Intercept	(OVF)	(OVF)	(OVF)	OVF
	ATN	ATN	ATN	(ATN)
	RAN	RAN	RAN	RAN
<b>NBLK</b> —Automatic Least Cost Routing	(OVF)	(OVF)	(OVF)	OVF
	ATN	ATN	ATN	(ATN)
	RAN	RAN	RAN	RAN

**Figure 4.6.5: Intercept Treatment Programming**

Choose one treatment for each of the four call originator types or leave the default. Default entries are in parentheses.

## Review Activity: Intercept Treatments

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### Directions

Using the information you have learned in this module of instruction, answer the following questions.

---

### Questions

1. The intercept treatment for DID calls made to an unassigned number has been incorrectly programmed to provide a fast busy tone. These calls must be routed to an attendant. Which of the following choices represents the correct Overlay 15 provisioning?
  - A. ACCD: OVF ATN OVF OVF
  - B. CTVN: OVF OVF OVF RAN
  - C. CTVN: OVF OVF OVF ATN
  - D. MBNR: OVF OVF RAN ATN
  
2. Match the BARS stage in Column A with the intercept treatments in Column B. Use each description only once.

	<u>Column A</u>		<u>Column B</u>
_____	1. Automatic Least Call Routing	a.	NINV
_____	2. Network Translations	b.	NRES
_____	3. Access Code (No NET or NCTL)	c.	NBLK
_____	4. SDRR/DENY	d.	NITR

3. The unit wants to change intercept programming so that the restricted 976 calls made by station users will receive a recorded announcement. All other treatments will remain defaults. Which of the following choices represents the correct Overlay 15 provisioning?
  - A. NRES: RAN OVF OVF ATN
  - B. NINV: OVF OVF ATN OVF
  - C. NITR: OVF RAN OVF ATN
  - D. NBLK: OVF OVF OVF ATN

## Review Activity: Intercept Treatments, continued

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### Questions, contd.

4. The unit wants to change intercept programming so that all outgoing calls that can't be completed because trunks are busy or TOD, FCI, or FRL eligibility criteria for an entry are not met will receive default treatments. Which of the following choices represents the correct Overlay 15 provisioning?
    - A. NBLK: OVF OVF RAN ATN
    - B. NINV: OVF OVF ATN OVF
    - C. NITR: OVF RAN OVF ATN
    - D. NBLK: OVF OVF OVF ATN
  5. The unit wants to change intercept programming so that all outgoing calls by station users that don't pass BARS network translation checks will receive a recorded announcement. All other callers will get the default treatment. Which of the following choices represents the correct Overlay 15 provisioning?
    - A. NBLK: RAN OVF OVF OVF
    - B. NINV: OVF RAN ATN OVF
    - C. NITR: RAN OVF OVF ATN
    - D. NBLK: OVF OVF RAN ATN
  6. What intercept prompt is used to define the treatments of dialed digits blocked via SDRR/DENY?
    - A. NBLK
    - B. NRES
    - C. NITR
    - D. NINV
  7. What intercept treatment is used to block calls because a network translation data block has been defined for the dialed digits?
    - A. NITR
    - B. NRES
    - C. NBLK
    - D. NINV
  8. What intercept prompt is used to define the treatments for calls blocked when all trunks are busy or TOD, FCI, or FRL eligibility criteria aren't met on an entry?
    - A. NRES
    - B. NITR
    - C. NBLK
    - D. NINV
  9. Which set of responses below represents the default treatments applied to BARS Intercept situations?
    - A. OVF ATN OVF OVF
    - B. RAN OVF OVF ATN
    - C. OVF OVF OVF OVF
    - D. OVF OVF OVF ATN
-

## Summary

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### Lesson Summary

Upon completion of this lesson presentation and practice exercise, you will be able to:

**4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.

**4.1.1 REVIEW** manufacturer's documentation

**4.1.2 REVIEW** applicable security policies

**4.1.3 DETERMINE** customer configuration

**4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block

**4.1.5 PROGRAM** a Network Control (NCTL) Data Block

**4.1.6 PROGRAM** a Digit Manipulation (DGT) Data Block

**4.1.7 PROGRAM** a Free Calling Area Screening (FCAS) Data Block

**4.1.8 PROGRAM** a Route List Block (RLB)

**4.1.9 PROGRAM** a Numbering Plan Area (NPA) Data Block

**4.1.10 PROGRAM** a Central Office Translation Code (NXX) Data Block

**4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block

**4.1.12 PERFORM** function check

**4.1.13 COMPLETE** unit documentation

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## LESSON 7

### PROGRAMMING BARS IN ELEMENT MANAGER

#### Overview

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##### Overview

In this lesson you will be introduced to BARS programming in Element Manager. There will be a performance activity at the end of this lesson to test comprehension of the key performance elements that you'll need to perform for upcoming tasks.

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##### Performance Objectives

Upon successful completion of this lesson, you will be able to:

**4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.

- 4.1.1 REVIEW** manufacturer's documentation
  - 4.1.2 REVIEW** applicable security policies
  - 4.1.3 DETERMINE** customer configuration
  - 4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block
  - 4.1.5 PROGRAM** a Network Control (NCTL) Data Block
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  - 4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block
  - 4.1.12 PERFORM** function check
  - 4.1.13 COMPLETE** unit documentation
- 

##### Performance Evaluations

The performance evaluations for these tasks are scheduled immediately following this lesson. These performance evaluations will be in delivered via a work order. These work orders will test the performance objective you have just completed in this lesson. These work orders will build in complexity based on previous tasks from previous lessons. These performance evaluations will be in a separate workbook from your student guide. Your instructor will hand out these workbooks out in class. Please do not complete these work orders prior to the instructor assigning them to you. You will work in your booth with your partner as a class. Your instructor will sign off these performance evaluations as you complete each tasks.

---

## Overview, continued

---

### References

Northern Telecom Publications (NTPs) is the documentation for the CS1000E system. These publications provide reference tools and information that is related to the various features and options of the system.

Document	Document #
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<i>Communication Server 1000 Software Input Output Administration</i>	NN43001-611
<i>Communication Server 1000 Software Input Output Reference - System Messages</i>	NN43001-712
<i>Communication Server 1000 Software Input Output Reference - Maintenance</i>	NN43001-711
<i>Element Manager System Reference – Administration</i>	NN43001-632

### Tools and Equipment

The tools and equipment used for this lesson are:

- Operational Nortel CS1000E

### Job Aids

There are no job aids for this lesson.

### Handouts

There are no handouts for this lesson.

### Key Terms

There are no key terms for this lesson.

### Pre-Lesson Work

There is no pre-lesson work for this lesson.

## Lesson Content: Programming BARS in EM

### Introduction

Element Manager enables users to configure the Dialing and Numbering Plans for the Call Server and the Network Routing Service (NRS) Manager. The information configured in the Dialing and Numbering Plans corresponds to the Command Line Interface (CLI) prompts and responses for Electronic Switched Network (ESN) data traditionally configured in LD 86, LD 87, and LD 90.

For more information about the overlays referred to in this lesson, see *Software Input Output Administration (NN43001-611)* and *Software Input Output Reference - Maintenance (NN43001-711)*.

### Electronic Switched Network

To configure or edit the Dialing and Numbering Plan for the Electronic Switched Network, click the **Electronic Switched Network** link in the **Dialing and Numbering Plans** branch of the Element Manager navigator. The **Electronic Switched Network (ESN)** Web page appears as shown below. From this Web page users can configure the Dialing and Numbering Plan for each customer on the Electronic Switched Network.

Element Manager provides access to the following Dialing and Numbering Plan parameters:

- Network Control & Services
- Coordinated Dialing Plan (CDP)
- Numbering Plan (NET)

Managing: **192.167.100.3**  
 Dialing and Numbering Plans » Electronic Switched Network (ESN)

---

### Electronic Switched Network (ESN)

- Customer 00
  - Network Control & Services
    - Network Control Parameters (NCTL)
    - ESN Access Codes and Parameters (ESN)
    - Digit Manipulation Block (DGT)
    - Route List Block (RLB)
    - Incoming Trunk Group Exclusion (ITGE)
    - Network Attendant Services (NAS)
  - Coordinated Dialing Plan (CDP)
    - Local Steering Code (LSC)
    - Distant Steering Code (DSC)
    - Trunk Steering Code (TSC)
  - Numbering Plan (NET)
    - Access Code 1
      - Home Area Code (HNPA)
      - Home Location Code (HLOC)
      - Location Code (LOC)
      - Numbering Plan Area Code (NPA)
      - Exchange (Central Office) Code (NXX)
      - Special Number (SPN)
      - Network Speed Call Access Code (NSCL)
      - Free Calling Area Screening (FCAS)
      - Free Special Number Screening (FSNS)
    - Access Code 2
      - Home Area Code (HNPA)
      - Home Location Code (HLOC)
      - Location Code (LOC)
      - Numbering Plan Area Code (NPA)
      - Exchange (Central Office) Code (NXX)

Figure 4.7.1

Continued on next page

## Lesson Content: Programming BARS in EM, Continued

### Network Control and Services

Under Electronic Switched Network (ESN), users can click the links to configure or modify the parameters associated with the following items:

- **Network Controls and Services**
  - Network Control Parameters (NCTL)
  - ESN Access Codes and Parameters (ESN)
  - Digit Manipulation Block (DGT)
  - Route List Block (RLB)
- **Numbering Plan (NET)**
  - Access Code 1
    - Numbering Plan Area Code (NPA)
    - Exchange (Central Office) Code (NXX)
    - Special Number (SPN)
    - Free Calling Area Screening (FCAS)

### Electronic Switched Network (ESN)

The Electronic Switched Network (ESN) parameters that are configurable using Element Manager correspond to data traditionally configured in LD 86.

To configure Electronic Switched Network parameters, click **Customer 0 > Network Control & Services > ESN Access Codes and Basic Parameters**. The **ESN Access Codes and Basic Parameters** Web page appears as shown below. Enter configuration data as needed. Click **Submit** to save changes.

The screenshot shows the 'ESN Access Codes and Basic Parameters' configuration page in the Nortel CS 1000 Element Manager. The interface includes a navigation tree on the left and a main configuration area with the following parameters:

Input Description	Input Value
Maximum number of Digit Manipulation tables (MXDM):	10 (0 - 1000)
Maximum number of Route Lists (MXRL):	10 (0 - 1000)
Time of Day Schedules (TODS): (Items separated by a space)	0 08 00 15 59 7 00 00 07 59 7 16 00 23 59
Routing Controls (RTL):	<input checked="" type="checkbox"/>
Check for Trunk Group Access Restrictions (TGAR):	<input type="checkbox"/>
NCOS Map (NMAP): (Items separated by a space)	00-0 01-0 02-0 03-3 04-4 05-5 06-6 07-7 08-8 09-9 10-10 11-11 12-12 13-13 14-14 15-15 16-16 17-17 18- 18 19-19 20-20 21-21 22-22 23-23 24-24 25-25 26-26 27-27 28-28 29- 29 30-30 31-31 32-32 33-33 34-34
Maximum number of Supplemental Digit restriction blocks (MXSD):	100 (0 - 1500)
Maximum number of Incoming Trunk Group exclusion tables (MXIX):	10 (0 - 255)
Maximum number of Free Calling area screening tables (MXFC):	10 (0 - 255)
Maximum number of Free Special number screening tables (MXFS):	10 (0 - 255)
NARS/BARS Access Code 1 (AC1):	8
NARS/BARS Dial Tone after dialing AC1 or AC2 access codes (DLTN):	<input checked="" type="checkbox"/>
Expensive Route Warning Tone (ERWT):	<input checked="" type="checkbox"/>
- Expensive Route Delay Time (ERDT):	0 (0 - 10)
Extended Time of Day schedule (ETOD):	1 7
Maximum number of LOC codes (NARS only) (MXLC):	10 (0 - 10000)
Maximum number of Special Common Carrier entries (MSSC):	(0 - 7)
NARS Access Code 2 (AC2):	
Coordinated Dialing Plan feature for this customer (CDP):	<input checked="" type="checkbox"/>
- Maximum number of Steering Codes (MXSC):	100 (1 - 32000)

Figure 4.7.2

Continued on next page

## Lesson Content: Programming BARS in EM, Continued

### Network Control Parameters (NCTL)

The Network Control Parameters (NCTL) that are configurable using Element Manager correspond to data traditionally configured in LD 87.

To configure Network Control Parameters, click **Customer 0 > Network Control & Services > Network Control Parameters (NCTL)**. The **Network Control Parameters (NCTL)** Web page appears as shown below. Enter configuration data as needed.

**NOTE:** For first time configuration, click **Submit** from the **Network Control Basic Parameters** Web page. The **Electronic Switched Network** Web page will reappear. Access the **Network Control Parameters** link again to configure NCOS values.

The screenshot shows the CS 1000 Element Manager interface. The top header includes the NORTTEL logo and the title 'CS 1000 ELEMENT MANAGER'. Below the header, there is a navigation breadcrumb: 'Dialing and Numbering Plans > Electronic Switched Network (ESN) > Customer 00 > Network Control & Services > Network Control Parameters'. The main content area is titled 'Network Control Parameters' and contains a list of 22 items, each labeled 'Network Class of Service Group Index -- [number]' followed by an 'Edit' button. The left sidebar contains a navigation menu with various categories like 'UCM Network Services', 'Links', 'System', 'Customers', 'Routes and Trunks', 'Dialing and Numbering Plans', 'Phones', 'Tools', and 'Security'. The 'Electronic Switched Network' link is highlighted under 'Dialing and Numbering Plans'. At the bottom of the page, there is a small copyright notice: 'Copyright © 2002-2011 Nortel Networks. All rights reserved.'

Figure 4.7.3

Continued on next page

## Lesson Content: Programming BARS in EM, Continued

### Network Class of Service (NCOS)

The Network Class Of Service (NCOS) parameters that are configurable using Element Manager correspond to data traditionally configured in LD 87.

To configure Network Class Of Service, click **Customer 0 > Network Control & Services > Network Control Parameters (NCTL)**. The **Network Control Parameters (NCTL)** Web page appears. Click the **Edit** button next to the corresponding **Network Class of Service Group Index**. The **Network Class of Service Group** Webpage will appear as shown below. Enter configuration data as needed. Click **Submit** to save changes.

The screenshot shows the 'Network Class of Service Group' configuration page in the CS 1000 Element Manager. The interface includes a left-hand navigation menu with categories like 'UCM Network Services', 'Links', 'System', 'Customers', 'Routes and Trunks', 'Dialing and Numbering Plans', 'Phones', 'Tools', and 'Security'. The main content area displays a table with the following parameters and values:

Input Description	Input Value
Network Class of Service group number (NCOS):	0
Maximum Precedence Level (MPL):	
Equal Access associated with this NCOS group (EQA):	<input type="checkbox"/>
Facility Restriction Level (FRL):	0
Expensive Route Warning Tone (RWTA):	<input type="checkbox"/>
Network Speed Call access allowed (NSC):	<input type="checkbox"/>
Off-Hook Queuing eligibility (OHQ):	<input type="checkbox"/>
Call Back Queuing eligibility (CBQ):	<input type="checkbox"/>
Starting Priority in CBQ (SPR):	0
Maximum Priority attainable in CBQ (MPR):	0
Priority Promotion timer (PROM):	0 (0 - 30)
MLPP service domain class of service (MLSD):	000000

At the bottom of the configuration area, there are three buttons: 'Submit', 'Refresh', and 'Cancel'.

Figure 4.7.4

Continued on next page

## Lesson Content: Programming BARS in EM, Continued

### Free Calling Area Screening (FCAS)

The Free Calling Area Screening (FCAS) parameters that are configurable using Element Manager correspond to data traditionally configured in LD 87.

To configure Free Calling Area Screening, click **Customer 0 > Numbering Plan (NET) > Access Code 1 > Free Calling Area Screening (FCAS)**. The **Free Calling Area Screening Block List** Web page appears. Enter a value for the **Free Calling Area Screening Block Index** and click the **Add** button. The **Free Calling Area Screening** Webpage will appear as shown below. Enter configuration data as needed. Click **Submit** to save changes.

The screenshot shows the Nortel CS 1000 Element Manager interface. The top navigation bar includes the Nortel logo, the title "CS 1000 ELEMENT MANAGER", and "Help | Logout". The breadcrumb trail reads: "Managing: 137.135.128.50 Username: admin" followed by "Dialing and Numbering Plans > Electronic Switched Network (ESN) > Customer 00 > Numbering Plan (NET) > Access Code 1 > Free Calling Area Screening Block List > Free Calling Area Screening".

The main content area is titled "Free Calling Area Screening" and contains a table with two columns: "Input Description" and "Input Value".

Input Description	Input Value
Free Calling Area Screening Index number (FCI):	2
NXX codes for NPA (NXX):	NXX codes to be denied for NPA (DENY) ▼
- NXX code or range of codes to be Denied (DENY): (Items separated by a space)	
Three-digit NPA code to be screened (NPA):	

At the bottom of the configuration area are "Submit" and "Cancel" buttons. The left navigation menu includes categories like "UCM Network Services", "Links", "System", "Customers", "Routes and Trunks", "Dialing and Numbering Plans", "Phones", "Tools", and "Security". The "Dialing and Numbering Plans" section is expanded to show "Electronic Switched Network".

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Figure 4.7.5

Continued on next page

## Lesson Content: Programming BARS in EM, Continued

### Network Translations

The Network Translations that are configurable using Element Manager correspond to data traditionally configured in LD 90.

To configure Network Translators, click **Customer 0 > Numbering Plan (NET) > Access Code 1 > NPA/NXX/SPN**. The appropriate Network Translator Web page appears. Enter the translation value and click the **Add** button. The translation webpage will appear as shown below. Enter configuration data as needed. Click **Submit** to save changes.

The screenshot shows the 'Numbering Plan Area Code' configuration page in the CS 1000 Element Manager. The interface includes a navigation menu on the left, a breadcrumb trail at the top, and a main configuration area with various input fields and dropdown menus.

Input Description	Input Value
Numbering Plan Area code translation (NPA):	1800
Route List Index (RLI):	1
Number to be denied within the NPA (DENY): (Items separated by a space)	
Digit Manipulation Index for LDID Numbers (DMI):	1
Local DID number to be recognized (LDID): (Items separated by a space)	
Local DDD number to be recognized (LDDD): (Items separated by a space)	
Remote DID number to be recognized (RID): (Items separated by a space)	
Remote DDD number to be recognized (RDDD): (Items separated by a space)	
Incoming Trunk group Exclusion Digits (ITED): (Items separated by a space)	

Figure 4.7.6

--End--

## Summary

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### Lesson Summary

Upon completion of this lesson presentation and practice exercise, you will be able to:

**4.1 IMPLEMENT** Basic Alternate Route Selection (BARS) using both Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.

**4.1.1 REVIEW** manufacturer's documentation

**4.1.2 REVIEW** applicable security policies

**4.1.3 DETERMINE** customer configuration

**4.1.4 PROGRAM** an Electronic Switched Network (ESN) Data Block

**4.1.5 PROGRAM** a Network Control (NCTL) Data Block

**4.1.6 PROGRAM** a Digit Manipulation (DGT) Data Block

**4.1.7 PROGRAM** a Free Calling Area Screening (FCAS) Data Block

**4.1.8 PROGRAM** a Route List Block (RLB)

**4.1.9 PROGRAM** a Numbering Plan Area (NPA) Data Block

**4.1.10 PROGRAM** a Central Office Translation Code (NXX) Data Block

**4.1.11 PROGRAM** a Special Number Translation Code (SPN) Data Block

**4.1.12 PERFORM** function check

**4.1.13 COMPLETE** unit documentation

---

## LESSON 8

### BASIC AND NETWORK AUTHORIZATION CODES

#### Overview

---

##### Overview

In this lesson you will be introduced to basic and network authorization codes. There will be a performance activity at the end of this lesson to test comprehension of the key performance elements that you'll need to perform for upcoming tasks.

---

##### Performance Objectives

Upon successful completion of this lesson, you will be able to:

**4.2 PROGRAM** Authorization Codes using Command Line Interface (CLI) with 100 % accuracy as evidenced by a positive function check..

**4.2.1 REVIEW** manufacturer's documentation

**4.2.2 REVIEW** applicable security policies

**4.2.3 DETERMINE** customer configuration

**4.1.1 PERFORM** function check

---

##### Performance Evaluations

The performance evaluations for these tasks are scheduled immediately following this lesson. These performance evaluations will be in delivered via a work order. These work orders will test the performance objective you have just completed in this lesson. These work orders will build in complexity based on previous tasks from previous lessons. These performance evaluations will be in a separate workbook from your student guide. Your instructor will hand out these workbooks out in class. Please do not complete these work orders prior to the instructor assigning them to you. You will work in your booth with your partner as a class. Your instructor will sign off these performance evaluations as you complete each tasks.

---

##### References

Northern Telecom Publications (NTPs) is the documentation for the CS1000E system. These publications provide reference tools and information that is related to the various features and options of the system.

Document	Document #
<i>Communication Server 1000E Maintenance</i>	NN43041-700
<i>Communication Server 1000 Software Input Output Administration</i>	NN43001-611
<i>Communication Server 1000 Software Input Output Reference - System Messages</i>	NN43001-712
<i>Communication Server 1000 Software Input Output Reference - Maintenance</i>	NN43001-711

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## Overview, continued

---

**Tools and Equipment**

The tools and equipment used for this lesson are:

- Operational Nortel CS1000E
- 

**Job Aids**

The job aid(s) for this lesson are:

- How to Perform Authcode Operation
- 

**Handouts**

There are no handouts for this lesson.

---

**Key Terms**

There are no key terms for this lesson.

---

**Pre-Lesson Work**

There is no pre-lesson work for this lesson.

---

## Lesson Content: Basic and Network Authorization Codes

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### Overview

The Authorization Code feature lets selected users temporarily override the access restrictions assigned to the station or trunk. This lesson describes the function and parameters of Basic and Network Authorization Codes.

A user can enter the Authorization Code (Authcode) to access different system facilities than would normally not be allowed because of the assigned Network Class of Service (NCOS), Class of Service (CLS), and Trunk Group Access Restriction (TGAR).

### Purpose

The Authorization Code feature is useful when a user initiates a call from a restricted telephone and requires access to more system functionality than allowed on a telephone. Entering a valid Authcode lets the user access these additional facilities. After a valid Authcode is entered, the NCOS, CLS, and TGAR associated with the Authcode replace the NCOS, CLS, and TGAR associated with the telephone for the duration of the call.

Authcodes can be used to override the restrictions imposed through Routing Control (RCTL). When a user enters a valid Authcode, the NCOS associated with the Authcode is applied for the duration of the call. Routing Control for other callers is not affected.

### Basic Authcode Operation

To enter an Authcode, follow the procedure below:

Basic Authcode Operation	
Step	Action
1	The station user goes off-hook and receives dial tone. The station user dials the SPRE digit + 6 (SPRE code) + the Authcode, or FFC + Authcode. If the Authcode entered is valid, a second dial tone is heard. If the Authcode is invalid, no response is given for 30 seconds or defined interdigit time (LD 15 TIM DIND DIDT). Then, the station user receives overflow tone.
2	When the second dial tone is heard, the station user dials the telephone number as usual.
End of procedure	

---

## Lesson Content: Basic and Network Authorization Codes, continued

---

### Authcode Conditionally Last Definition

With the Network Authcode feature, users can be prompted conditionally for an Authcode after dialing a call. The prompt consists of ten bursts of dial tone, followed by a steady dial tone; or recorded announcement followed by ten bursts of tone, then steady dial tone. The user is prompted for an Authcode if:

An Authcode was not entered prior to dialing the telephone number, and

The Facility Restriction Level (FRL) associated with the user's Network Class of Service is lower than the assigned Minimum FRL (MFRL) of the Route List being used the call.

If the call is incoming on a tie route from another network PBX, the prompting for an Authcode must also be allowed for the TIE TRUNK ROUTE. (LD 16, Route Data Block: AUTH = YES)

---

### Authcode Last Operation

The Authcode last operation as follows:

- User dials call
  - User receives an Authcode request
    - Ten bursts of dial tone or, recorded announcement followed by ten bursts of dial tone
  - User dials Authcode (SPRE + 6 not required)
  - If the Authcode is valid, the call is processed with Authcodes NCOS used for the call
  - If the Authcode is invalid and the Authcode Last Retry has been programmed, the user hears the standard retry offer (ten burst dial tone) or the operational RAN retry offer
  - If the Authcode is invalid, and the Authcode Last Retry has not been programmed, overflow is given after the interdigit time-out period
-

---

## Lesson Content: Basic and Network Authorization Codes, continued

---

### Static Specific Authorization Codes

Static Specific Authorization Code (SSAU) lets a customer control the level of Authcode access on a per telephone basis. SSAU applies to 500/2500 and proprietary telephones and is defined in the station Class of Service (CLS).

SSAU provides three levels of Authcode access:

- Authcode Unrestricted (CLS = AUTU). An AUTU telephone has no Authcode access limitations. Any Authcode is accepted and processed normally.
- Authcode Restricted (CLS = ATR). An ATR telephone can enter up to six assigned Authcodes. The Authcode entered must match one of the pre-assigned codes. Any other Authcode is rejected and the call is not accepted.
- Authcode Denied (CLS = AUTD). An AUTD telephone has no access to Authcodes. Any Authcode is rejected and the call is not completed.

The same Authcode can be assigned to more than one ATR telephone. The Authcode must be defined in Overlay 88 before it can be assigned to individual station(s).

A cross-checking occurs between Overlays 10 and 11 (which define a SSAU), and LD 88, which ensures that the user entered a valid Authcode.

---

### Authorization Code Security Enhancement

The Authcode Alarm feature alerts the technician when an invalid Authcode has been entered by generating an Authcode Alarm. The Alarm indicated to the technician that some unauthorized person might be trying to use an Authcode illegally to access the switch. The Authcode Alarm is generated upon detection of invalid Authcode entry after the interdigit timer expires. The exception is calls originated by attendant.

Class of alarm, Security Administration (SECA) distinguishes security violations from other types of system messages. The SECA0001 message is printed on the TTY.

---

## Summary

---

### Lesson Summary

In this lesson, you discussed basic and network authorization codes. Upon completion of this lesson presentation and practice exercises, you will be able to:

**4.2 PROGRAM** Authorization Codes using Command Line Interface (CLI) with 100 % accuracy as evidenced by a positive function check..

**4.2.1 REVIEW** manufacturer's documentation

**4.2.2 REVIEW** applicable security policies

**4.2.3 DETERMINE** customer configuration

**4.2.4 PERFORM** function check

---

## LESSON 9

### COORDINATED DIALING PLAN

#### Overview

---

##### Overview

In this lesson you will be introduced to the concept of Coordinated Dialing Plans (CDP). A CDP lets users dial other users on a unit's private network without having to dial access codes or wait for a dial tone. There will be a review activity at the end of this lesson to test comprehension of the key performance elements that you'll need to perform for upcoming tasks.

---

##### Performance Objectives

Upon successful completion of this lesson, you will be able to:

**4.3 PROGRAM** a Coordinated Dialing Plan using Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.

**4.3.1 REVIEW** manufacturer's documentation

**4.3.2 REVIEW** applicable security policies

**4.3.3 DETERMINE** customer configuration

**4.3.4 PERFORM** function check

**4.3.5 COMPLETE** Unit Documentation

---

##### Performance Evaluations

The performance evaluations for these tasks are scheduled immediately following this lesson. These performance evaluations will be in delivered via a work order. These work orders will test the performance objective you have just completed in this lesson. These work orders will build in complexity based on previous tasks from previous lessons. These performance evaluations will be in a separate workbook from your student guide. Your instructor will hand out these workbooks out in class. Please do not complete these work orders prior to the instructor assigning them to you. You will work in your booth with your partner as a class. Your instructor will sign off these performance evaluations as you complete each tasks.

---

## Overview, continued

---

### References

Northern Telecom Publications (NTPs) is the documentation for the CS1000E system. These publications provide reference tools and information that is related to the various features and options of the system.

Document	Document #
<i>Communication Server 1000E Maintenance</i>	NN43041-700
<i>Communication Server 1000 Software Input Output Administration</i>	NN43001-611
<i>Communication Server 1000 Software Input Output Reference - System Messages</i>	NN43001-712
<i>Communication Server 1000 Software Input Output Reference - Maintenance</i>	NN43001-711
<i>Element Manager System Reference – Administration</i>	NN43001-632

---

### Tools and Equipment

The tools and equipment used for this lesson are:

- Operational Nortel CS1000E
- 

### Job Aids

The job aids for this lesson are:

- Customer Numbering Plan
- 

### Handouts

There are no handouts for this lesson.

---

### Key Terms

Review the following key terms before you begin the reading assignment:

Terms	Definition
CDP	Coordinated Dialing Plan

---

### Pre-Lesson Work

There is no pre-lesson work for this lesson.

---

## Lesson Content: Coordinated Dialing Plan

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### Overview

A Coordinated Dialing Plan (CDP) lets users dial other users on a unit's private network without having to dial access codes or wait for a dial tone. CDP offers internal users a simplified dialing plan and uses many of the cost-effective routing features. When provisioned, it offers a customer a complete package that serves a wide variety of useful purposes.

The three types of CDP steering codes are listed below:

- Local Steering Code (LSC)
  - Distant Steering Code (DSC)
  - Trunk Steering Code (TSC)
- 

### CDP Features

A CDP lets a customer with several PBXs typically close together geographically use the dialing plan among these locations. The CDP feature lets a user at any PBX directly call any other station in the group of switches within the CDP.

In a typical CDP configuration, the CDP is programmed at the ESN node and at remote locations. Calls controlled by a CDP can be terminated locally at the originating switch or they can be routed to remote switches.

---

### CDP Process

To complete a Coordinated Dialing Plan (CDP) call, the user dials a station's CDP-DN, which is a combination of a steering code and a station's directory number.

The steering code is a unique number (3 to 10 digits) used for route list selection in the CDP software. The three variations for dialing plans are listed below:

- The CDP directory number consists of an internal DN prefixed with a CDP steering code.
  - The CDP has a steering code as a first digit of the internal DN.
  - The steering code equals the entire DN.
-

## Lesson Content: Coordinated Dialing Plan, continued

---

### Customer Numbering Plan

Steering codes are part of the customer numbering plan. When assigning a steering code, you must use digits currently in the numbering plan at each site in the CDP network. If the sites do not have the available numbers, then typically a 5-digit CDP dialing plan would be created.

In this example, the customer at this CDP switch could assign steering codes from 4000 to 4499, as well as 7XXXX or 8XXXX. All other digits in the customer numbering plan are already assigned. You can see how AC1 at the ESN node is referenced by the CDP later in this lesson.

Customer Numbering Plan	
Digit	Assignment
0	Attendant
1	SPRE
2000–2999	DID DNs
3000–3999	Non DID DNs
4000–4499	These numbers can be assigned
45	TIE Trunk
46	COT
47	Paging
48-49	RAN routes
5000-5999	DID DNs
6000-6999	Non DID DNs
7	These numbers can be assigned
8	These numbers can be assigned
9	AC1 at the ESN node

---

## Lesson Content: Coordinated Dialing Plan, continued

---

### Local Steering Codes

Rules for local steering codes:

- No conflicting DID ranges
  - Only requires four digit dialing, no access codes
  - Gives the appearance that all calls are being placed within the PBX
  - Identifies the PBX performing call routing
  - Provides internal station translation only
  - Provides uniformity where variable dialing plans are supported
- 

### Example Local Steering Code Dialing Plan

An example of a local steering code dialing plan is shown below:

- TRACEN has a four-digit dialing plan.
  - CAMSPAC has a five-digit dialing plan for internal numbers
  - The local steering code for TRACEN is 6.
  - A local steering code is not required for CAMSPAC.
  - Every user in the CDP group dials a CDP DN with the same number of digits to complete a call without having to change their dialing plans.
- 

### Local Steering Code Parameters

The local steering code parameters are listed below:

- An LSC can be deleted by CDP software.
  - A CDP switch can have more than one LSC assigned.
  - If internal DNs are unique and the same length at each location, LSCs are not necessary.
-

## Lesson Content: Coordinated Dialing Plan, continued

### Programming

Each coordinated dialing plan steering code is provisioned in Overlay 87, CDP data block. For example, the system administrator for TRACEN defines 6 in the translation as a local steering code. The database indicates that one leading digit is to be deleted. When a five-digit CDP DN call is dialed within the TRACEN PBX, the LSC of 6 is deleted, and the internal DN 5181 is dialed.

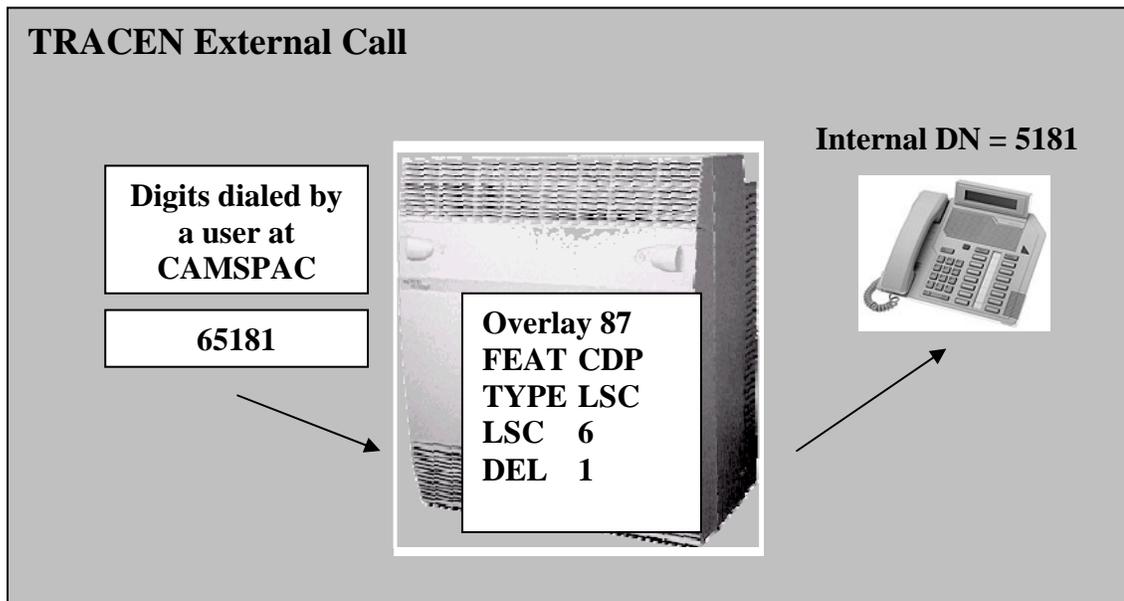


Figure 4.9.1: Programming Internal DN

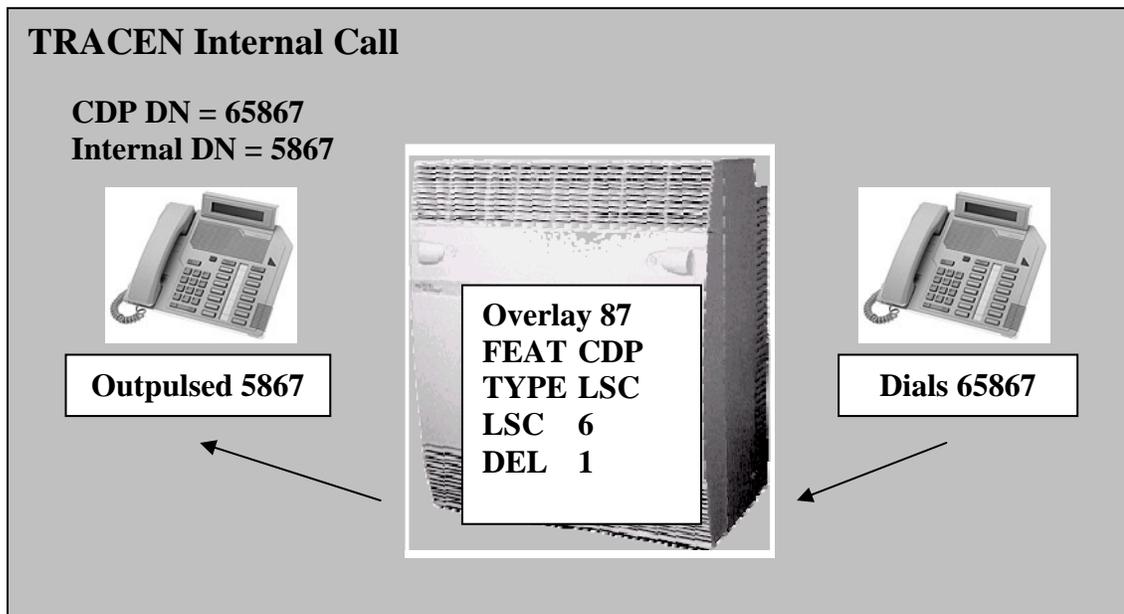


Figure 4.9.2: Programming CPD DN

## Lesson Content: Coordinated Dialing Plan, continued

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### Distant Steering Codes (DSC)

A Distant Steering Code:

- Identifies another PBX in the CDP group
  - Provides call routing to a station at a distant location
  - Is associated with a route list index
  - When a user dials a call that contains a DSC, Overlay 87 provisioning for the CDP feature identifies a route list for call completion to the specified location. For example, when DSC 4 is dialed, CDP was defined so that the 4 references the CAMSPAC site and directs the calls to RLI 10 for completion.
  - Overlays 86 provisioning for RLI 10 routes that call over the entry and route identified.
- 

### Distant Steering Code Parameters

The distant steering code parameters are listed below:

- The code is outpulsed with other dialed digits on the outgoing trunk.
- Automatic least cost routing eligibility criteria for TODS and NCOS/FRLs can be applied.
- Digit Manipulation can change digits to conform to requirements.
- The DSC + other dialed digits must conform to the CDP DN length defined in the Overlay 86 ESN data block.

## Lesson Content: Coordinated Dialing Plan, continued

### Distant Steering Codes

Distant Steering Codes (DSC) are designed for on-net calls to other switches. Figure 4.9.4 provides a more detailed look at the configuration of the TRACEN call server referenced below.

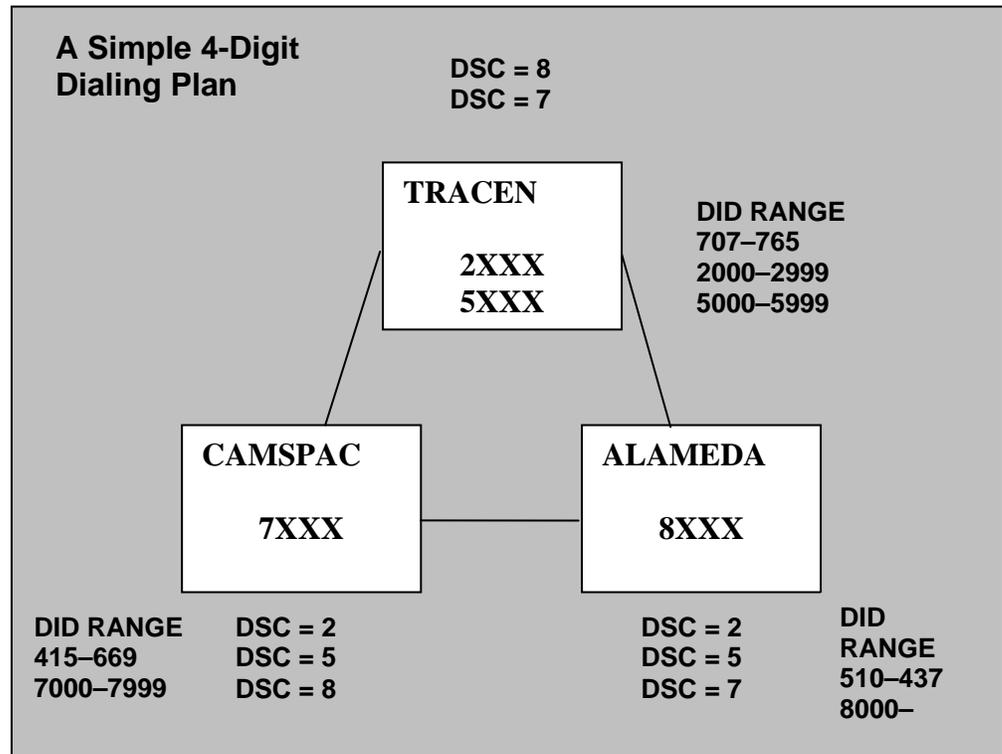
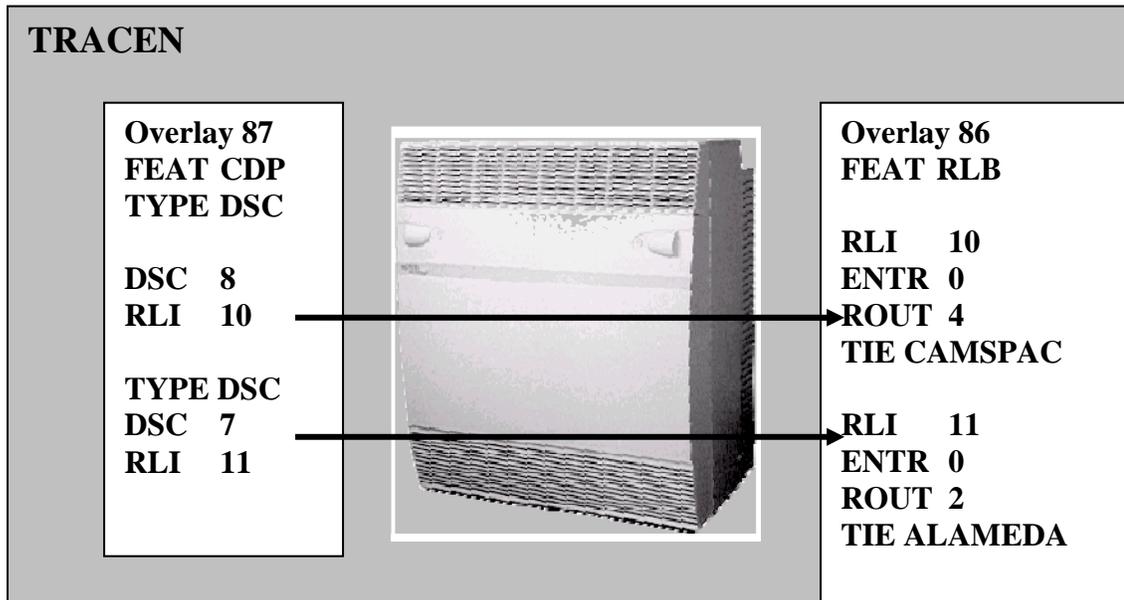


Figure 4.9.3: Distant Steering Codes

**Lesson Content: Coordinated Dialing Plan, continued**

---



**Figure 4.9.4: Distant Steering Codes**

**Example**

In this example, the distant steering code guides the call between two switches. Richard at TRACEN dials the CDP DN of Glenda at CAMSPAC. The 7 is defined as a distant steering code associated with RLI 11. An available trunk in route 2 is seized and the CDP DN is outpulsed to CAMSPAC. CAMSPAC receives the digits and dials the DN, Glenda's internal DN.

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## Lesson Content: Coordinated Dialing Plan, continued

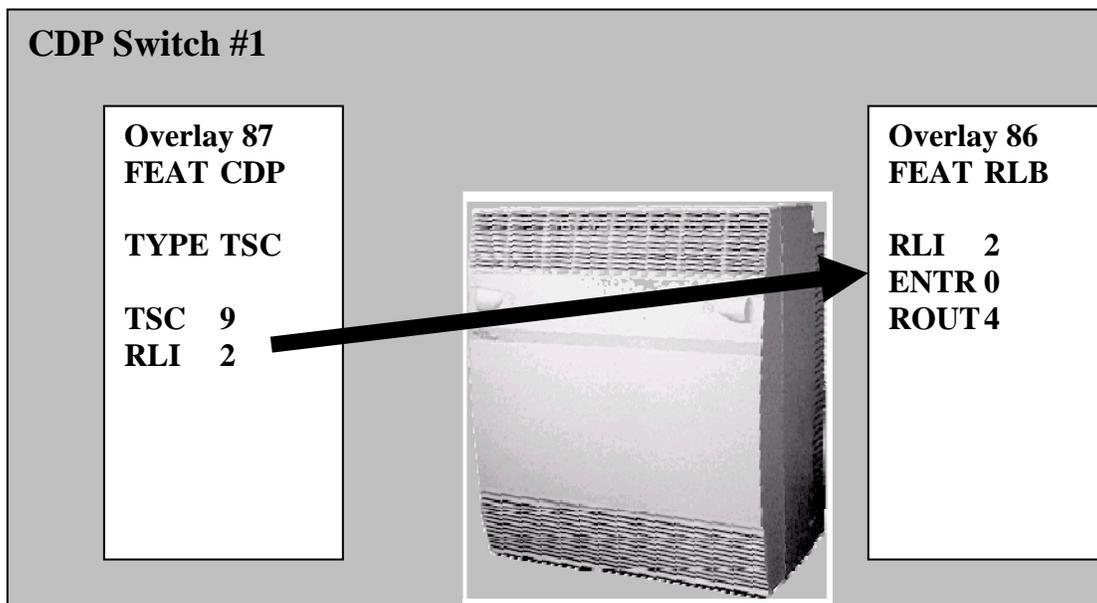
### Trunk Steering Code

Trunk Steering Codes (TSCs) are designed to:

- Provide centralized access to the Public Switched Telephone Network (PSTN)
- Identify route access codes at another PBX
- Be used when a call is routed to the PSTN via a facility at a distant PBX in the CDP group
- Identify ESN access codes (AC1/AC2) in a conventional main at another ESN location
- Associate with a route list

When a user dials a call that begins with TSC Overlay 87, provisioning translates the TSC and determines which RLI is referenced. Using this information, CDP directs the call to the proper RLI.

At the ESN node, BARS provisioning recognizes digit 9 as the BARS access code. Next, BARS translate the NPA 1214 and sends the call along for call completion.



**Figure 4.9.5: Trunk Steering Codes**

This is commonly used for PBX installations that do not have PSTN resources. Calls are forwarded to an ESN node with PSTN provisions reduces additional dialing by PBX users.

## Lesson Content: Coordinated Dialing Plan, continued

### Trunk Steering Code Parameters

The trunk steering code parameters are listed below:

- The code is outpulsed with other dialed digits on the outgoing trunk.
- The code can be BARS/NARS AC1/AC2 at a distant PBX or an ACOD.
- Automatic least cost routing eligibility criteria for TODS and NCOS/FRLs can be applied.
- Digit manipulation can be applied to the dialed digits.

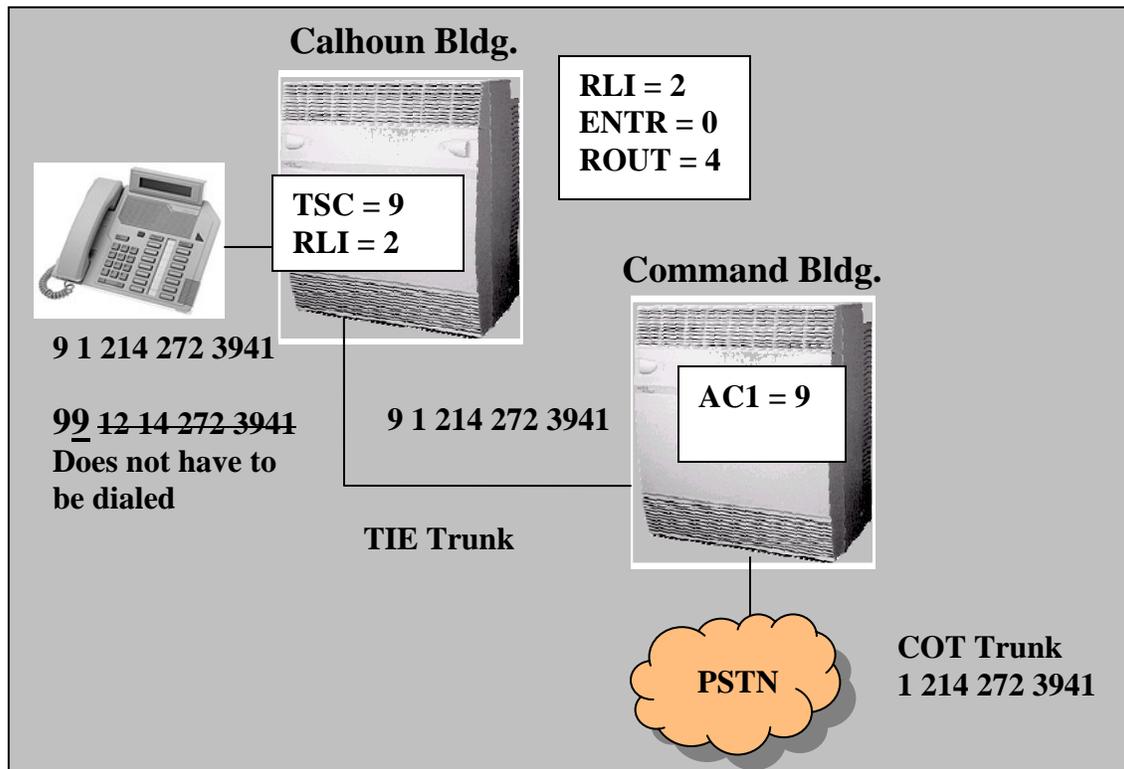


Figure 4.9.6: Trunk Steering Code Parameters

## Lesson Content: Coordinated Dialing Plan in EM

### CDP in Element Manager

Element Manager can be utilized for the commissioning of a Coordinated Dialing Plan. Under Coordinated Dialing Plan (CDP), users can click links to configure or modify parameters associated with the following codes:

- Local Steering Code (LSC)
- Distant Steering Code (DSC)
- Trunk Steering Code (TSC)

The Coordinated Dialing Plan parameters that are configurable using Element Manager correspond to data traditionally configured in LD 87.

To configure a Coordinated Dialing Plan, click **Customer 0 > Coordinated Dialing Plan (CDP) > LSC/DSC/TSC**. The appropriate steering code list web page appears. From the drop down list select **Add**, enter the steering code value and click the **Add** button. The steering code webpage will appear as shown below. Enter configuration data as needed. Click **Submit** to save changes.

The screenshot shows the 'Distant Steering Code' configuration page in the Nortel CS 1000 Element Manager. The interface includes a navigation menu on the left, a breadcrumb trail at the top, and a main configuration area with various input fields and checkboxes.

Input Description	Input Value
Distant Steering Code (DSC):	5
Flexible Length number of digits (FLEN):	0 (0 - 10)
Display (DSP):	Local Steering Code (LSC)
Remote Radio Paging Access (RRPA):	<input type="checkbox"/>
Route List to be accessed for trunk steering code (RLI):	1
Collect Call Blocking (CCBA):	<input type="checkbox"/>
maximum 7 digit NPA code allowed (NPA):	
maximum 7 digit NXX code allowed (NXX):	

Buttons:

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Figure 4.9.7

--End--

## Review Activity: Coordinated Dialing Plan

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### Directions

Using the information you have learned in this module of instruction, answer the following questions.

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### Questions

1. From Tulsa, Jackie dials a steering code, 72, plus 876, her boss's station number in his Chicago office. These five digits are collectively referred to as:
  - A. CDP
  - B. CDP DN
  - C. Non DID DNs
  - D. DID DNs
2. The LSC code provides:
  - A. Digit translation of CDP DNs in a switch and call routing to the correct DN
  - B. Call routing for calls between two switches within the same PBX
  - C. Call routing for calls between two callers, one inside a PBX and one outside
  - D. A substitute for BARS/NARS call-processing
3. The DSC code provides call routing to:
  - A. A station user in the same switch
  - B. A station user in a different unit switch at the same location
  - C. A station user in a different unit switch at another location
  - D. A station user outside the unit
4. TSC provides call routing to:
  - A. A station user at a remote unit location via a TIE trunk
  - B. A station user outside the unit, by sending the call through BARS/NARS at another switch and through the PSTN
  - C. A station user at a remote unit location via the PSTN
  - D. A station user in the same switch via the PSTN
5. On a CDP call, which steering code(s) outpulse the calls over a trunk to another PBX location?
  - A. TSC and DSC
  - B. LSC and TSC
  - C. TSC only
  - D. LSC, DSC, and TSC

## Review Activity: Coordinated Dialing Plan, continued

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### Questions, contd.

6. All three coordinated dialing plan steering codes are created in which overlay data block?
    - A. LD 86, ESN
    - B. LD 87, CDP
    - C. LD 86, RLB
    - D. LD 87, NCTL6
  
  7. Which of the following does a coordinated dialing plan with all three steering codes provisioned offer?
    - A. Access Code 1 or Access Code 2
    - B. Translation of NPAs, NXXs, or SPNs
    - C. Supplemental digit restriction and recognition
    - D. Automatic least cost routing
-

## Summary

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### Lesson Summary

In this lesson, you discussed how to program customer number dialing plans. Upon completion of this lesson presentation and practice exercises, you will be able to:

**4.3 PROGRAM** a Coordinated Dialing Plan using Command Line Interface (CLI) and Element Manager (EM) with 100 % accuracy as evidenced by a positive function check.

**4.3.1 REVIEW** manufacturer's documentation

**4.3.2 REVIEW** applicable security policies

**4.3.3 DETERMINE** customer configuration

**4.3.4 PERFORM** function check

**4.3.5 COMPLETE** Unit Documentation

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